SCIENCE HISTORY INSTITUTE

JENNY PICKWORTH GLUSKER

Transcript of an Interview
Conducted by

Jacqueline Boytim and Sarah Schneider

at

Interviewee's home
Huntingdon Valley, Pennsylvania

on

1, 3, and 4 November 2022

(With Subsequent Corrections and Additions)

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Jenny Pickworth Glusker

SCIENCE HISTORY INSTITUTE
Center for Oral History
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JENNY PICKWORTH GLUSKER

1931	Born in Birmingham, England, on 28 June

Education

1953	BA, Oxford University, Chemistry (first class honors)
1957	MA, Oxford University, Chemistry
1957	DPhil, Oxford University, Chemistry

Professional Experience

California Institute of Technology

1955-1956	Postdoctoral Research Fellow

The Institute for Cancer Research

1956	Research Fellow
1957-1967	Research Associate
1967	Assistant Member
1967-1979	Associate Member
1979-2003	Senior Member
2003-Present	Senior Member Emerita (now Professor Emerita)

University of Pennsylvania

1980-2012	Adjunct Professor of Biochemistry and Biophysics Earlier affiliated appointments beginning in 1969

Honors

1968	Rosa Briegel Barton Lectureship, University of Oklahoma
1978	Philadelphia Section Award, American Chemical Society
1979	Garvan Medal, American Chemical Society
1983	Philips Lectureship, Haverford College
1984	Who's Who in Technology
1985	Honorary DSc, College of Wooster
1991	Public Service Award, American Crystallographic Association
1994-1995	Visiting Fellowship, Oriel College, Oxford

1995	Hassel Memorial Lecture, Oslo, Norway
1995	Fankuchen Award, American Crystallographic Association
1997	Visiting Professorship, International Union of Crystallography Suez Canal University
1998-Present	Who's Who in America, of American Women, in the East, in Science and Engineering
1999	Fellow of the American Association for the Advancement of Science
2001-Present	Elected Honorary Fellow of Somerville College (lifetime)
2002-Present	Who's Who in the World
2006	Visiting Professorship, International Union of Crystallography Kayseri University, Turkey Invited lecture, Second Turkish Crystallographic Meeting, Erciyes University, Kayseri, Turkey
2011	Inaugural Fellow, American Crystallographic Association
2011	John Scott Award
2014	Fellow of the Royal Society of Chemistry (FRSC)
2014	International Year of Crystallography (IYCr2014) Opening Ceremony 20 January 2014, UNESCO, Paris, France Lecture: "Crystallography: past, present and future"
2014	Sigma Xi William Procter Prize for Scientific Achievement

ABSTRACT

Jenny Pickworth Glusker grew up in Birmingham, England. Her parents were physicians who had met through their work at a psychiatric hospital, and Glusker had a sister and a brother. She grew up attending a local Presbyterian church. When she was young, her father took her to see King George VI and Queen Elizabeth at an opening celebration of the Queen Elizabeth Hospital.

Many of Glusker's childhood memories are connected to World War II. She would often spend the night in the air raid shelter that her father had set up to protect the family from bombs. When the war ended, Glusker remembers an illuminated bus and street parties that were in Birmingham to celebrate the end of the war in Europe. Though her ability to travel was limited during the war, after the war, she traveled with a school group to Sweden. She also, after her undergraduate studies, took a trip to Morocco.

In Glusker's early school days, there was an emphasis on math and spelling, and she learned practical skills such as cooking. She would have liked to do woodworking, but that was something that girls did not do in her school. When Glusker took her eleven-plus exam to place into high school, she did well and earned a scholarship to attend the King Edward VI High School for Girls. She loved chemistry and would read her mother's textbook on incompatibles and experiment with chemicals that her father gave her. She was encouraged by her chemistry teacher, Yvonne Way, and had hands-on experience carrying out chemistry experiments in class. Glusker also studied Latin, German, and French in school.

Glusker decided to apply to university a year early. She took the necessary exams and interviewed for Somerville College of the University of Oxford with Dorothy Hodgkin. The unknown during the practical exam was sodium thiosulfate, which Glusker was familiar with from working in her father's dark room. She demonstrated her familiarity with using scientific equipment during the exam and was admitted to Somerville College.

At the University of Oxford, Glusker says she was one of just five women in a group of over one hundred people studying chemistry. She had tutorials with Dorothy Hodgkin, who provided feedback on Glusker's essays. Glusker describes recreational activities that students participated in, including sailing and going to dances, and she attended political lectures on campus. Glusker conducted undergraduate research in Harold Warris Thompson's lab. She researched infrared spectroscopy and deuterium chloride, which resulted in published papers. She was the first woman in Thompson's lab and made friends with peers in the lab, including her future husband, Donald L. Glusker.

For her graduate studies, Glusker chose not to continue working with Thompson and instead went to work in Dorothy Hodgkin's lab to study crystallography. When Hodgkin received small crystals of a derivative of vitamin B_{12}, Glusker started working on the structure. Kenneth Trueblood at the University of California, Los Angeles assisted by using newly developed computer technology. Glusker would also use computer card-reading machines in the Mathematical Institute late at night and employed diffraction maps and calculations in her analysis. Eventually, the structure of vitamin B_{12} was identified. Glusker gave the first talk about the findings from Hodgkin's lab, and Hodgkin was excited to have the discovery presented. When Alexander R. Todd would lecture about vitamin B_{12}, Hodgkin would follow him to his lectures and explain to the audience how her lab had identified the structure.

Glusker went to Caltech to do a postdoctoral fellowship, and by that time was engaged to her future husband, Don, who was already working at Caltech. They had a small wedding in California. At Caltech, Glusker worked in the lab of Robert B. Corey and conducted research on peptides.

After one year at Caltech, Glusker moved with her husband to Philadelphia. She began working for Lindo Patterson at the Institute for Cancer Research, which later became Fox Chase Cancer Center. Initially, Patterson did not have enough money for her position, so she agreed to start her work as a technician. After a year, her role and title changed to be more reflective of her expertise. Glusker used crystallographic methods to research the Krebs cycle. She also conducted research on hydrocarbons that go into DNA, enzymes, and neutron diffraction. She had some researchers from abroad work in her lab. Also at the institution were award-winning scientists, including one of the scientists, David Hungerford, who discovered the Philadelphia chromosome. After Lindo Patterson's death, Glusker took over running the lab.

In addition to her work at the Institute for Cancer Research, Glusker was an adjunct professor at the University of Pennsylvania. She wrote a book with Kenneth Trueblood on crystal structure analysis that was translated into Russian and other languages. Glusker also stayed busy serving as a journal editor, volunteering in a local group enhancing science education, and traveling to set up schools around the world on crystallographic teaching.

Glusker explains how she approached work-life balance as she raised her three children and describes what the process was like for her to become a United States citizen. She talks about mentoring other women in the field and describes the influence of William Henry Bragg on inclusion of women in the field of crystallography. She also discusses donating historical materials, including research equipment, to the Science History Institute. Throughout the interview, Glusker mentions her friendships and professional relationships with other scientists, including Dorothy Hodgkin, Dorothy Semenow, Linus Pauling, Lindo Patterson, Gabrielle "Gai" Donnay, Max Perutz, and others.

Glusker reflects on her achievements and the honors that she has received, sharing that she loved the work that she did throughout her career.

INTERVIEWERS

Jacqueline Boytim is a museum professional based in Philadelphia. She worked at the Science History Institute from 2011-2023, in roles with the Center for Oral History, the museum, the Institute for Research, and Public Engagement. She studied Science, Technology, and Society at the University of Pennsylvania.

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.

ABOUT THIS TRANSCRIPT

Ann Glusker and Mark Glusker, children of Jenny Pickworth Glusker, reviewed the transcript document. Ann Glusker assisted with confirming details and providing relevant contextual information. Dr. Miriam Rossi also assisted with confirming some information.

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INTERVIEWEE: **Jenny Pickworth Glusker**

INTERVIEWERS: **Jacqueline Boytim**
Sarah Schneider

LOCATION: **Interviewee's home**
Huntingdon Valley, Pennsylvania

DATE: **1 November 2022**

[00:00:00]
SCHNEIDER: So today is Tuesday, November 1, 2022. My name is Sarah Schneider, and I am joined by Jacqueline Boytim. We are conducting the first session of an oral history interview with Dr. Jenny Pickworth Glusker at her home in Huntingdon Valley, Pennsylvania. So thank you for being with us today and participating in the oral history. And so to start off—

[00:00:21]
GLUSKER: Should I start out again? A little bit, yes.

[00:00:23]
SCHNEIDER: Yes, if you could start talking about some of your memories from growing up and tell us where you were born and where you grew up.

[00:00:30]
GLUSKER: Well, I was brought up in England, in Birmingham, which is a big industrial city. No real rivers, but a very good canal system, which is, you know, if you're a child, is of great interest to watch. And my father [Frederick Alfred Pickworth] and my mother [Jane Wylie Stocks] were both physicians at a mental hospital on the edge . . . almost in the country, just suburban Birmingham. Birmingham was built so they had circles of grass areas, and then more housing and then more circles of grass area. So it was rather well designed. And the buildings that he worked in were really nice, and they'd have beautiful gardens so the patients could walk there but couldn't get out. Then they met.

[00:01:31]
And my father's father [Alfred Joseph Pickworth] was a Wesley Methodist minister and a general practitioner, and he had . . . what did he have? He had six children [Florence "Flossie," William, Frederick Alfred, Thomas Claude, Eric, and Ralph], one of whom [Ralph] died at birth. The first three were by his first wife [Sarah Hannah Hart], who was really quite an artist. Somehow, several of us have just a little bit of ability to do artwork, which is nice when you

know that it's come from a particular relative. I'm not quite sure what else I can say. Anyway, here's a picture of my father. I don't know if you can turn that around.

[00:02:20]
BOYTIM: And you were telling us, his mother [Sarah Hannah Hart] died while he was quite young?

[00:02:24]
GLUSKER: Yeah, he was one year old, exactly, yes. His father didn't know what to do. So he called his sisters [Charlotte, Caroline, Jessie, and Emily] to come and help him look after the three children. They squabbled like mad. He sent a message—I have this from my cousin—he sent a message down to the village saying he was interviewing for a new wife and he had three children. Could they send people up? So they sent people up.

[00:02:54]
And what he did was, he gave them a cup of tea, very hot tea, in a saucer, and then he waited to see how they managed to arrange to drink it. It was too hot to drink, but did they put a little in the saucer or what did they do? And I'm not sure what this one wife [Mary Household] did, but she did okay, and so he married her and he had three boys [Thomas Claude, Eric, and Ralph] by her. And they lived in Lakenheath, [England], which no one had ever heard of until World War II, when it was a US Air Force base, Lakenheath. When his father had . . . his father had died, a lot of people would come to his house and knock on the door and there would be an American living in the house. And they'd say, "Is this Pickworth's old place?" Now if you go into town, into the village, you will see the big sign: "Pickworth's old place." So he was remembered as someone . . . .

[00:04:05]
So I had three uncles and one aunt from my father's side. But my father was very good at designing things, and the thing that was most important with him was how he dealt with World War II, because we were young children, I mean, the three of us, in 1939. So he ordered an air raid shelter and it couldn't fit into the house. So he just went into the garden and dug under a flowerbed and put an air raid shelter there. So then he built a little playhouse for us in the garden, and he built a telephone, his own version of a telephone, and he had a telephone to the air raid shelter and a telephone to the house. So we would go and be put to sleep in the air raid shelter under the flowerbeds and we would call him when we could hear the German planes because they sounded different.

[00:05:09]
They handled the gasoline in a different way. So while an English plane would go *zzzzzz*, a German plane would go *zzir-zzir-zzir-zzir*, so you could tell whenever you were about to be bombed. We spent a lot of time during the war in that air raid shelter. But then they would leave about three in the morning because they had to get back over the English Channel before

daylight. So we were bombed for several years. Somehow, my father arranged that we didn't have to be too disturbed by all of that. Because it, sort of, I mean, various people have written that World War II was a war where everybody knew what they were fighting for, which was anti-Hitler, really. It, sort of, put a sort of calmness on the people because they knew what they were doing and they knew they had to try and keep their daily lives and earn their incomes and so on. And deal with having their house destroyed. So that was my father.

[00:06:27]
BOYTIM: I was going to ask if you could back up. Before we started recording, you were telling us about when he was fourteen he started to work for a chemist.

[00:06:34]
GLUSKER: Oh, yes, yes. He was brought up in Lakenheath. As a matter of fact, my grandfather's second wife discriminated between her own children and her stepchildren. So the three stepchildren from the first wife would get potatoes and gravy and the real children would get the roast beef and so on. And for that, there was a lot of controversy in the family that he should be allowed to have that happen in his house when he was a doctor.

[00:07:14]
And so both my father and his older brother [William] were stutterers. They would stutter. But they would only stutter when they went to visit him. And so, of course, their wives made sure they didn't go very often. They'd come back and they'd be stuttering for about a month and then they'd be back and no problem at all. I don't know if you've seen *The King's Speech*, but it told a story that is just right. You're not born with this problem, but it comes to you because life is difficult.

[00:07:48]
Yes, when he was fourteen and he went to work with this chemist in a different town [Lincoln, England] and didn't really know anybody. Had some distant relatives somewhat nearby. Was apparently a very good chemist. I mean, I asked him to describe how he mixed the chemicals and so on, and he said, "Well, you have this big tray and you have your bottles, and then you have to check that you've got the right bottles. So you go through, but you never check once; you always check twice. And then you have to make sure that you put the right thing in the mixture." You know, it's all mestle, nestle . . . what's it?

[00:08:31]
BOYTIM: Mortar and pestle.

[00:08:33]
GLUSKER: Yes. Yes. You can't say it but you know. Yes. So that's how he did it. And then

he would have to go back and he would then check again that he had put the right chemicals in, which I wish they could do nowadays. I've had some accidents from the local store where they give you the wrong prescription because they read the wrong number and they just say, "We can't always get it right," but . . . .

[00:09:00]
BOYTIM: Oh my goodness. [laughter]

[00:09:00]
GLUSKER: You need to. And he met my mother, who . . . my mother came from a Scottish family. Ancestry [Ancestry.com] says I have more Scottish blood than English blood. 57 percent Scottish. A bit less. But, of course, all of us, English and Scottish, have some Viking . . . Norway, Sweden, Iceland. You always come [up with] a little bit of that. And here is my parents' wedding. They had a formal wedding. And the newspapers, of course, all thought it was very exciting to have two doctors get married. I don't know if . . . I couldn't find the form, but . . . .

[00:09:58]
SCHNEIDER: So did they meet while he was working as a chemist? Or was that later?

[00:10:00]
GLUSKER: No, they met when he was working as a doctor at the hospital.

[00:10:05]
SCHNEIDER: The doctor. Oh, okay.

[00:10:05]
GLUSKER: They met back there. Yes.

[00:10:05]
SCHNEIDER: Yes.

[00:10:11]
GLUSKER: So they always talked about cases. But the problem at that time was that when she married him, she then couldn't go and form her own practice in competition because there was the health service and doctors had their areas. She could do locums when a doctor was away on

holiday or away sick, but she didn't do much else. And then she developed arthritis. My mother had wanted to study. She loved studying French. Anything French, she just loved. And then during the middle of World War I, they went into the high schools in Scotland and said, "We need more doctors." And they were all at the front. "So we'll go through the schools and pull out the bright girls and send them to medical school." So that's where she went.

[00:11:12]
In 1920, she was still in medical school, but she was in Ireland, in Dublin, when all the Troubles started.[1] So she was delivering babies, having to wear an ID all the time. All the rebels apparently honored it if you were wearing a white coat and you had a special thing that says you're a doctor; they'd let you go. Nobody bothered her. But she did go back to Scotland. And we don't know why . . . nobody in the family knows why she came to England.

[00:11:52]
She had worked for many years for quite a famous doctor, who was known in Scotland as a "shilling doctor." If you came into his office, you'd just put down a shilling on the . . . twelve p [twelve pence], whatever. Asking you to put down a quarter, you know, you come to see the doctor, you put down your quarter. And he survived, but led a quiet, poor life, but was a very good doctor. So she learned a lot from him and then she decided she wanted to be on her own. That's when she ended up in the hospital.

[00:12:32]
And when she got married, all the patients got together to meet to do embroidery for her and paintings for her and letters for her. So I got a huge pile, divided between me and my brother and sister. She was apparently well thought of. I think she was really the only woman doctor at that time. I don't know if I have a picture of her . . . it's probably in my father's part. [pause while looking through photograph albums] I think this is my father's. This is my mother. My mother came from a part of Scotland where they did a lot of curling. I never knew that until somebody sent me a photograph. There's a picture of my mother in her . . . when she got her degree from University of Glasgow. First year they had a lot of women in their class.

[00:13:42]
SCHNEIDER: And I can't remember if you mentioned, but what was her . . . if you could talk a little bit more about her family background and did you ever meet grandparents on that side of the family?

[00:13:54]
GLUSKER: I knew her mother [Janet Wylie Steven], who I was named after, although her

[1] See "the Troubles," *Encyclopedia Britannica*. Accessed at https://www.britannica.com/event/The-Troubles-Northern-Ireland-history on 28 August 2025.

name was Janet. People say, “How can you be Jenny named after Janet?” But that’s the way they did it.

[00:14:07]
Her [my mother’s] father [John Scott Stocks] died [on 2 October 1923] when she was in medical school. He had a perforated peptic ulcer and died, to her great distress. Operated on it on the kitchen table but it didn’t work. Year 1920, something like that [1923], long before I was born, so I never saw him. But he was a grocer and well respected in his neighborhood. And she, of course, always said, “If you want to see a handsome man, he has to be wearing a kilt.” [laughter] You know, the rest of us are not brought up that way.

[00:14:46]
But here she is from the University of Dublin to certify . . . 1920, that she’s doing, twenty-sixth of November 1920, that she had been doing maternity work, Coombe Hospital [Coombe Lying-in Hospital], Dublin. And then she got her degree from the University of Glasgow. And won a lot of prizes. I’m sure you don’t want a list of those, but here are all the certificates of merit. And I have all her letters of recommendation, which all said she probably was the best in the class. So she did very well. You know, women are just as good at that as men. Probably better in some aspects.

[00:15:41]
And oh, here is the staff, Hollymoor Hospital, 1928. And there in the front row, the only person who’s not in a nurse’s uniform, is my mother, next to the director. Then my father is here, and he is in a different photograph because they didn’t know in 192—they didn’t get married till 1930—so nobody knew they were going to get married.

[00:16:12]
But my mother’s family were shipbuilders. And shipbuilders like to build ships. But if they’re going to leave money to their children, they’ll leave a lot to the oldest, and then the younger ones will have to go to sea and be sailors. So they went around the world. So you’ll find that there are Indian relatives.

[00:16:38]
BOYTIM: Oh my goodness.

[00:16:39]
GLUSKER: Stop in India, have children. I mean, perfectly respectably, not have more than one wife or anything. So you could follow some of those . . . life in that part of the world, which you don’t expect to find. And pictures of the ships they built, of course, were marvelous. I don’t think I have one here.

[00:17:03]
SCHNEIDER: Did you ever talk with any relatives, write letters to relatives that lived elsewhere?

[00:17:09]
GLUSKER: Oh, yes. I had quite a lot of correspondence with relatives in Burma [now Myanmar]. Actually, people living in India, but in the old days, Burma was, kind of, a super place to go on vacation. You've got a little bit of money and you can afford good accommodation, you go to Burma, which was a wonderful place. Of course, now it's in terrible shape. I mean, it's, sort of, like the Middle Ages, I think. I'm very sorry about that.

[00:17:48]
SCHNEIDER: And when you were a child, did you ever travel outside of where you grew up, or were you mostly just in the Birmingham area?

[00:17:55]
GLUSKER: Well, I was seven when the war started and I was fourteen when it ended. And then I went with a school group to Sweden, which had not been in the—had been neutral during the war. Was able to go in a train through Germany just after the war to see destroyed railway lines, destroyed buildings, destroyed everything. And then see the Swedes, who, kind of, said we weren't very well dressed. But what happens when you're kids? If everybody can't buy material to make clothing and it's dangerous to go shopping anyway; if you go into the middle of the town, you might get killed. So that was okay. But then you go to a place like Sweden where they were super well dressed. [laughter]

[00:18:51]
BOYTIM: It's a priority there.

[00:18:53]
GLUSKER: It was a change. I mean, we all of us just laughed about it, but they provided me with some better clothing, they said, which I never wore, but that was the way it was. Of course, the food was different. Yes. So I went to Sweden. And then we had—we used to have pen pals, too. After the war, we would have pen pals. So my sister [Marjorie Wilson] had a pen pal in Paris and she [the pen pal, Annette Metge] had a cousin who lived in Morocco, North Africa, which was then a French colony. So after I'd done my undergraduate work in Oxford, [England], I spent time in Morocco visiting the family, living with them, learning about Arab culture. But it still was a French colony at the time.

[00:19:52]
I think that was one of the most exciting things I ever did. It really was great to see. And to go to these cities, where there at the entrance to the city, it's a beautiful wall, there's a beautiful gate, and there is a man sitting there who is a scribe, who, if you've got a letter, he will write it for you. And there is a snake charmer. Various visitors have said that's probably not a real . . . the snake is probably de . . . it can't . . . if it bites you, it's okay. You know, a lot of people were killed that way because they were wrong. They were real, biting snakes. They didn't know.

[00:20:34]
And also the Arabs on horseback, the groups of them, if they would come riding through, it was really very nice to see. Just trying to learn. Nobody spoke English, so I had to be good with my French and learn a little bit of Arabic at that time. But we traveled around quite a bit. What I hadn't realized was how much the Romans had been in Morocco. And they built cities and they're still there in the desert. Nobody's there, but you could go and visit the cities and see how the Romans—with their wonderful roads and beautiful buildings.

[00:21:28]
I think I can say that during the war, my growing up wasn't terribly much affected, except we had to spend the night in the air raid shelter. That would end at three in the morning. My father would make us hot chocolate and french fries and then we'd go to bed until seven or eight. And then go to school, having gone through the garden to see if there's anything fallen on the garden that we can use for show and tell. So that's how the . . . .

[00:21:58]
And they had very big shelters in the schools, so they were pretty careful. And we were taught what to do if a plane came down to shoot us. I had that happen to a friend. She was in the country and she was in my class. She told me this story. She was in the country because her mother thought she'd be safer there; the Germans wouldn't be so likely to bomb. Sent her into the village to get some supplies, and in order to get food and so on, you had to have your ration cards. So she went and she got the rations and she was walking home and a German plane saw her and came down and started machine gunning.

[00:22:41]
And what we were told to do was to jump into a fence and lie on the ground along the fence, along the hedge. Get to a good hedge and lie there. The man in the plane has got to spend part of his time watching that he doesn't crash because he's come down and he's . . . . The plane got away. So her mother heard about this and came looking for her, couldn't find her. She [my friend] found that in jumping into the hedge, which was what we were taught to do, she had broken all the eggs, whole week's ration of eggs for a whole family. I mean, it's probably only three or four, but she broke them all. So she couldn't go home and she didn't know what to do, where should she go?

[00:23:30]
BOYTIM: Poor kid.

[00:23:30]
GLUSKER: It was her mother frantically looking to see if there was a dead body.

[00:23:35]
BOYTIM: I know.

[00:23:38]
SCHNEIDER: Oh, my.

[00:23:38]
GLUSKER: So her mother found her, and said, "It doesn't matter about the eggs. I don't care tuppence about them. We just won't have eggs for the next two weeks."

[00:23:48]
BOYTIM: Oh my goodness.

[00:23:48]
SCHNEIDER: Wow.

[00:23:48]
GLUSKER: But it did happen. But not too often. I went to the . . . you had to go to the nearest school for a while. No matter what school it was, you had to go to the nearest so that you could walk or cycle and didn't have to use public transportation. Then they had a high school system, which started—they had what was called the eleven-plus exam. They examined you at eleven years old. So I went through the levels and I got a scholarship to go to the high school. So I went to the high school, which is where I was educated. I was educated initially in just local teaching schools, but then I went to this—it was probably one of the best high schools. The high school was founded by the brother [Edward VI] of Queen Mary [I] and Queen Elizabeth [I] of England in the Middle Ages [the school was founded in 1552]. They had a brother who was king for a short while. He founded a big school system, so it was called King Edward's School. They were quite famous. So I went there [to the King Edward VI High School for Girls].

[00:25:06]
And a hobby that I can tell you about is I loved doing chemistry. I found one of my mother's

textbooks, which is on what is called incompatibles. So you shouldn't give patients A and B, and then it would tell you why not. So I thought this was absolutely fascinating. I got my father to give me some chemicals, persuaded my friends to all get chemicals, and in those days, nobody worried about what children were doing with chemicals in their bedrooms and so on. So then I had a chemistry teacher [Yvonne Way] who was the daughter of a very famous chemistry teacher in the north of England. She had got a PhD, but she decided that teaching was what she wanted to do. I got to know her very well and we corresponded for the rest of [her] life, actually. She would tell me—write me every Christmas and tell me what was going on. I loved chemistry. So I decided I wanted to go to the university and study chemistry.

[00:26:19]
BOYTIM: I think before we get into your university years, did you have more questions about childhood?

[00:26:26]
SCHNEIDER: Yes. Going back to your parents' background and their work. Did you ever go with them to their work when you were a child or what did they talk—did they ever talk about it at home?

[00:26:39]
GLUSKER: They would talk about it at home. I would go with my father once in a while. He was a person who was great fun to go for a walk with because he would identify every flower that we'd pass by, identify everything that he saw. And he was very good at this. And he felt it was important that one learned these things and remembered them and was precise. So it was always great fun to go for a walk with him. And then in among identifying the flowers, he would talk about the Old Testament in the Bible, the creation of the world and how the people who wrote the Bible got it in the right order, that sort of thing. Nothing more religious, but just going on.

[00:27:35]
And then in Sunday afternoon, he always had us children and he would read from the New Testament. Then when he finished the New Testament, he read from . . . what was it? Oh, I was going to say it. It was all about the Arabian princess or something, you know, the biography of an Arabian princess and so on, so we would listen to this. I'll remember the name later, probably. And so he tried to make sure we knew all these things. And my mother was having a very hard time with her arthritis, so she would be in bed for a while.

[00:28:24]
Oh, yes, there's one time I should tell you about. The Queen Elizabeth [II] who just died, her mother was also Elizabeth and George [VI]. And the hospital, one of the hospitals that my father worked in, that he had some labs in, was the Queen Elizabeth Hospital [Birmingham]. And they

rebuilt it. So they decided to open it and have Queen Elizabeth come. It was just before the war. I don't know where my mother was. We thought she was upstairs in bed. We were told she was upstairs in bed and we were not allowed to go and disturb her. But I'm convinced—I talked to my brother [Frederick John Pickworth] about this—and we are convinced she'd gone up to Scotland to see her physician in Scotland about her arthritis. So she wasn't there. So he [my father] woke me up and said, "Do you know how to curtsy? We're going to go and see the king and queen."

[00:29:23]
Off we went and they opened the building and there was the king and the queen. And, of course, I was the only person of that age. And I had been taught to curtsy, but forgot to curtsy, but the queen really gave me a big smile and was . . . that was the mother of Elizabeth [II]. I thought the king was very handsome. It just was a wonderful experience. Then we went home. We didn't go and talk to them or anything, but just . . . I was up on a balcony and there they were, down below, and the lady, the queen, looked up and there was one child, so she obviously was going to give her a little wave. So I did get to see them when I was pretty young. And that was a great day. Yes, yes.

[00:30:11]
SCHNEIDER: Yes. And you mentioned show and tell earlier. Did you go back to school and tell your friends about it?

[00:30:15]
GLUSKER: Yes, yes, yes, yes, yes. "Guess who I saw today?" He had to take me out of school to do it, actually. Yes. Yes. But he said it was more important than being at school, which it was. So I can't remember where we are now.

[00:30:34]
SCHNEIDER: Well, you mentioned a little bit about, you know, your father reading the New Testament and Sunday afternoons. Was there anything else about your religious background or life that you want to share? Did you go to church regularly? Did you hear about religion from your relatives?

[00:30:48]
GLUSKER: There was a church just up the road, a Presbyterian church [Weoley Hill Church, then a Presbyterian church and now a United Reformed Church], which is the equivalent of the Church of Scotland that I had been baptized in. So I went there regularly, yes, so my brother and sister, we went. My parents didn't go. I guess we would spend Sunday morning there. Yes. Yes. Those were the days that when you went to school, you would be asked how many times you went to church. Some kids would say three times. The schools were all Church of England or

Episcopalian because that's the English—they consider that still their main religion. I belong to a church here [Memorial Presbyterian Church of Fox Chase], which is a Presbyterian church, and know all the hymns because we had to sing them in school every morning at the opening.

[00:31:55]
The school is such it was just for girls and they tried . . . a given year, they would have three classes, so they would make sure that it was done by age. So everybody in your class was a girl who was within two or three months of the same age that you were. Some of them I got along with and some of them I didn't. So I did eventually go to try to get into [University of] Oxford, and that worked for some reason. That was a different—that was part of my life. Yes. So you don't want to do that part today, right? Yes.

[00:32:49]
BOYTIM: I think we'll get there at some point. But did you want to talk about maybe the King Edward's School or were there other questions about, I don't know, just talking about your religious experiences made me think of the community your family was a part of, just the social fabric of your childhood, things like that.

[00:33:09]
GLUSKER: Well, actually, you know, my parents were the doctor[s] on the street, and a lot of the people worked for Cadbury's, which was the chocolate factory. So if it was a really hot day, you could smell chocolate all day. And if they had—if they wanted to give you a present, they'd give you chocolate, leftover chocolate you could—because they were—at Cadbury's, the workers were allowed to eat as much chocolate as they wanted and they would do so for a week. Then they would be desperately ill. They really wouldn't want it much more, anymore. So that worked out well. Rather than saying, "You may not eat the chocolates," they'd just say, "Yes, if you like the look of one, just eat it."

[00:33:58]
The Cadbury factory did a lot of trying to organize picnics and May flowers and celebrations and plays for us to go to. So our daytimes weren't too bad except for the occasional plane, like I told you about my friend. There weren't very many of those and there weren't very many cars. They had to restrict cars at night because they were trying very hard to hide whether the Germans had hit Birmingham or not. It was all a matter of trying to make sure the Germans didn't know too much. I find it fascinating, so I've read quite a bit about it.

[00:34:46]
And they said there were quite a few German spies in England—or maybe in Great Britain, I don't know—not counting Southern Ireland, but the rest. The English knew who they were and said, "You have to collaborate with us." And then I found out recently something that you're not supposed even to find out. Our next-door neighbor where I lived [E.C. Naylor-Strong] was an ear, nose, and throat surgeon, a very famous one, who actually looked after my sister when she

had a mastoid and an ear infection. He didn't have any children. He was a bit aloof. But he had a chauffeur and a car, which was rather unusual for that area. It turned out, at night, he would go to one of the local theaters, climb onto the roof, and listen to the German broadcasts, translate them, and then send the information to Bletchley Park.

[00:35:51]
BOYTIM: Wow.

[00:35:52]
GLUSKER: But, anybody who did that was told, if they ever tell a single person, they will be tried for treason and shot automatically. No indication from his wife or anybody. And I'm sure my parents didn't know that either. I told my brother and sister and they were just amazed, didn't know that he did his ear, nose, and throat stuff in the daytime and spent the night listening to German . . . helping find out what's going on and what's planned.

[00:36:26]
SCHNEIDER: Wow. And when—

[00:36:26]
GLUSKER: A lot of people did that during the war, had different things to do.

[00:36:34]
SCHNEIDER: Would you listen to the radio at home when you were growing up?

[00:36:37]
GLUSKER: Yes, yes, yes, yes. Well, mostly just one person I remember, Bruce Belfrage. They were very careful about that, made sure there was only one person who listed the news on the BBC [British Broadcasting Corporation]. He identified himself. And you got to know his voice, of course there was no visual thing at that time, but you got to know his voice. And he said, "You'll know if it's not me and they're pretending to be me."

[00:37:12]
I didn't meet Germans, really. You know, they'd say if you're a schoolchild and somebody asks you the way to a certain city, don't tell them. Find the nearest policeman, and tell them. And the police were very cooperative with children. And, of course, if you didn't carry your gas mask, they would say, "Where's your gas mask?" "Oh, I left it at home." "Where's your home? Come with me." "I have to walk there." "Well, I'll walk with you, but we go and get your gas mask." So they made sure we all had a gas mask. I think they told the Germans that if they use gas on

the English, they would use gas on Germany, otherwise, they wouldn't. I think they kept their promise, but I don't know for sure, of course.

[00:38:06]
SCHNEIDER: And I know that Birmingham as a city was very heavily bombed. So—

[00:38:11]
GLUSKER: But they didn't want the Germans to know whether they had got to it. So I was—we were four miles from the factory that made Spitfires and they painted it.[2] And I went, I cycled. You'd go and you'd cycle. So I cycled around. We would cycle for long distances. And I went down and looked at it and I thought, "Well, it's, sort of, crude painting." But if you go up on the hills behind the city and you look over the city, you can't tell where the factory is. They managed to camouflage it so it never had a bomb on it. The nearest one was, they hit a bridge and they hit—actually, the bridge had a canal on it and lots of water came all over everywhere for a while. But that was—nobody minded that.

[00:39:06]
So, yes, there was a lot of bombing and then they had the blast furnaces for the certain factories to work. So they made fake ones and they built a fake York Minster, one of the cathedrals so that—I mean, that's what we were told. I may be wrong because you didn't travel to see whether any of these things are true. You just heard them. You stayed at home and played with the local children. The way the houses were built, there was plenty of grass around, so you could play. Could play various ball games, football, kick the can, all sorts of things that we—people built up and imagined, made up new games and you could go and play. So there was always plenty to do. Then all the parks, they were planting vegetables, which was very good for . . . the lawns were replaced by vegetables, which was great for the lawns, because when they put the lawns back again, of course, it had been much more fertilized. That was good.

[00:40:26]
SCHNEIDER: And do you remember when the war ended, what that—do you have any memories of hearing that news and what that was like?

[00:40:33]
GLUSKER: Oh, that was very exciting, yes. We were all very excited that it ended, but it was not, we were not being bombed then. The bombing with Germany was—Germany was not coming over to England. It was trying to deal with its own problems with the English and Americans and so on, and Russians all converging on Moscow, [Union of Soviet Socialist

[2] Spitfires were British single-seat fighter aircraft used during World War II. See "Spitfire," *Encyclopedia Britannica*. Accessed at https://www.britannica.com/technology/Spitfire on 28 August 2025.

Republics]. Yeah, there was great celebration. And they had an illuminated bus that came immediately to celebrate. And you went and, sort of, just went to see it. Small celebrations and street parties. A lot of street parties. Yes.

[00:41:22]
It meant you just didn't have to worry about your relatives who were—well, you did have to worry about some of them. My Scottish relatives were all fighting in China and that part of the—India and that part of the world. The Scottish. My uncle [Jack] came back and he was just a mental wreck. You know, one of these delightful men who's great fun, he's tremendous fun if you're a young child, you know, and he'd tell you all sorts of funny stories. He came back. He just had seen too much and he'd been enclosed in these boxes that they put people in where they couldn't stand up and they couldn't sit down and so on. So it was pretty terrible. I think quite a lot of it's been portrayed. So that uncle was just . . . he was found dead in the streets of Glasgow, [Scotland] and nobody knew what he died of, even. It didn't look like he'd been attacked. He looked like he'd just died, you know?

[00:42:33]
BOYTIM: Yeah, wow. That's tragic.

[00:42:35]
GLUSKER: He may have had something wrong with him, as well as his misery about the problems of war. But other people, some of them came back and were okay. But there still was the war going on in Japan. We did follow that. Then followed the atomic bomb testing, which nobody at first knew what to do. I remember that clearly. They were . . . nurses were rushing in, giving blood. It's not what people wanted—it's not what they needed because they didn't know what to do for them. So they also, after the war, they had an atomic train, which taught you about radioactivity. I remember I was asked at school to give a talk on how to build an atomic bomb.

[00:43:36]
SCHNEIDER: Really?

[00:43:37]
GLUSKER: It's quite easy to do. Yeah, I mean, it's just you've got to get the right materials. That was the problem. Getting the [uranium-235] was the problem. Just mixing, and so on . . . I remember it. We all knew exactly how you did it, but had no access to any of the material to make one. Yeah. And hoped it would never—you know, a lot of predictions in the paper that it could blow the world into—blow the whole planet into two and then it would spin off in a funny direction and . . . . Tremendous . . . your future is terrible. It didn't happen.

[00:44:22]
BOYTIM: Thank goodness.

[00:44:23]
SCHNEIDER: Yeah.

[00:44:23]
GLUSKER: Still a lot of flat earth people, too.

[00:44:29]
SCHNEIDER: And you had mentioned your siblings. You had a sister and a brother, right? So could you tell us a little bit about them, what their interests were, what the age difference was, things like that?

[00:44:40]
GLUSKER: My father wanted a son and he had me. That's the way it goes. But he was very supportive of me all during my life because he, kind of, liked . . . I liked to talk to him. And if you like to talk to your father, he likes you, too, because he . . . most people are wandering off and doing other things. My sister is a year younger than me. She's still alive. She's in England. She went to the same schools and she went to Oxford to study history. She was interested in history. And she was younger . . . is she two years younger? She may be two years younger. [She is two years younger.] Anyway. She was interested in the diet of England in the times of the first Queen Elizabeth, because it was pretty good. I mean, they drank a lot of beer, but beer was much safer than water. Water was dangerous. So having beer was a good way. The whole population was quite well treated.

[00:45:57]
So she did a lot of cooking and she also liked to read about history. And she sends me history books from time to time. I have a problem with history books because most history writers will start a paragraph with the words "he" or "she." "He did so-and-so." So you then have to look at the previous paragraph, and there is the Duke of something and there is Prince So-and-so and there is so-and-so, and you don't know who they're talking about. I mean, I have one book that they sent, which I just . . . after the first chapter, I said, "I can't read this because I can't tell who the next paragraph is about." And, of course, if I were a historian, I would know it in detail. Well, I know a lot of details of the history of England. Sometimes you don't know who all the counts and dukes and so on, are, even now.

[00:47:02]
BOYTIM: So much to keep track of.

[00:47:04]
GLUSKER: Yes. If you'd say, Duke of York, you'd say, "Which one is the Duke of York?"

[00:47:08]
BOYTIM: Right, right. So are you . . . is your sister the family historian? You have these scrapbooks here. Do you have a hobby of genealogy?

[00:47:16]
GLUSKER: I don't know why. When I wrote to my father, I wrote to—well, I wrote to my parents and told them what I was doing. They disapproved of my wedding because—not because I married a man who was Jewish, but I married an American. And marrying an American was, to them, going into a world where you'll come and you'll find that he already was married and had six kids. Now you'll have six kids to look after, et cetera, and will not take good care of you. And they'd been to movies. There were a lot of movies at the time about joint parenthood of divorced parents, who will have which child and so on. Whenever you went to the movies it seemed there was always one. So they were very—didn't think it was a great thing for me to get married but we did, in the end, get married. He was working in the same lab with me and we were very good friends. He died about twenty years ago, very sadly.

[00:48:21]
Yes, I came here and then my sister, of course, had—I would write and tell my father all about what I was doing. I have my mother's diaries. My mother always kept diaries, and I have a listing from her of all the times of all the air raids in Birmingham, for example, which I think is not available because they didn't want to have them report it. But she wrote it down, being a doctor, you know, who came at such and such a time and left at such and such a time.

[00:48:54]
So I don't know why, but somehow I managed to keep all this, whereas my sister didn't seem to have quite the collecting ability that I do. I mean, these look big, I know, but I've just everything that I got, I put into this kind of a . . . it's a nice way to take care of it. And, you know, if it turns out we don't need it in the end, you can just throw that page away. So, yes, I have a lot of history and I've contacted a lot of people about history of the family name and so on.

[00:49:32]
So she [my sister] got married. She was a historian and she married a historian [Patrick Wilson] who was teaching in one of the major schools, private schools, in England. And they had twin boys right away, who were just lovely. They were fraternal twins; they were not identical twins.

One of them was just a very engaging young man. And the other one was one who loved to climb and he loved to . . . he was a collector. Collected. Came to visit me once and, sort of, said, "I don't know what I'd collect in your garden." So he collected insects and surprised me. I mean, the insects he found, you know, little green ones with red dots on them. All kinds of insects. He just went through all the flowerbeds. "I found a new insect." "Be careful," I'd say. He said, "Well, here it is." Took a photograph of it and so on.

[00:50:42]
The other boy, his brother, got a melanoma when he was in school and it got injured in a football game and he had a lump in his tummy and wouldn't tell his mother or anybody. When they finally looked at it, they said it might be a juvenile melanoma, but it looks like it's the lowest kind of age at which you get this kind of trouble. And he did die of it. And that was the sad thing that happened in our family. I still almost want to cry when I think about it. A sixteen-year-old dying is so sad. So there we are.

[00:51:26]
But his brother went on to college and he now teaches and he wins a lot of awards for his . . . he's a great climber. He loves to climb. But if you like to climb, you're always falling and breaking something. And then he has to wait till it bends again and then he is climbing again. But he just—my sister said earlier this week he just got a prize for his climbing some mountain in Scotland, with some very good climbing. It's a good climbing area.

[00:51:59]
BOYTIM: I bet.

[00:52:00]
GLUSKER: It's one of the places where some of the Everest climbers trained. Also in the north of Wales there are good climbing places. So that's my sister and her husband who are still alive and living in Oakham, [England]. Then I had a brother. He died about three years ago, but he was a general practitioner. When he was in, went to the high school—the boys version of the high school that I went to—he went into . . . he wanted to join the [Royal] Navy. So he was in uniform and he was told to ride a motorbike down to the main street. A friend of his said, "Can I have a ride from you?" And the two of them rode out. And the school had forgotten to tell him that the brakes didn't work. So he ran out into a very busy road. And the result is, his passenger was killed and he lost his leg. So he lost one leg.

[00:53:13]
BOYTIM: Oh my goodness.

[00:53:13]
SCHNEIDER: Wow.

[00:53:14]
GLUSKER: So that was difficult. But he went through medical school and became a general practitioner. And was very much liked because he obviously knew what pain and having to divert how your career will go is—can be—just from a medical problem like losing a leg. Because he couldn't stay in the Navy. It meant [they were] not interested in him. So he was very good and he married a doctor, a woman [Sheila Brodie]. They had four boys. She wanted a girl desperately. "I had four boys." And two of those boys have been visiting me this month.

[00:54:08]
Because we—I had a meeting in Moscow that I wanted to go to in 1966, I think it was. And my husband, whose family had—the Glusker family—had come from Lithuania and Russia, and he said he didn't want to take his children to Russia because you can't depend on what the government will do. You know, they might arrest him and then take his children and send them off to somewhere else. I mean, even in the sixties one worried about that. So my brother said, "Well, we'll take your children for a week." So we said, "Wonderful." So my children, my three children, and their—they only had three at that time—their three children, six children. They both looked after six children for a week. They have been lifelong friends ever since. Cousins. Yes. And they correspond all the time with the—there's a system you can do where you can correspond and it doesn't cost very much.

[00:55:15]
BOYTIM: That's so nice.

[00:55:16]
GLUSKER: They just keep in contact with each other all the time. So he was mainly involved with medicine, but he loved to sail. And he said when he really—when his job became too much or so on, he would sail off on his own to the north of Spain. He said it was lovely, for about three days, nobody could reach you. Nobody knew where you were. Well, it was a bit hard on relatives, but he loved doing it. So he was . . . his wife died a bit early. We were quite close for a long, I mean, on the phone, quite close for several years. But I was very sorry when he died. But he had to smoke, and tiny little dot on his lung. Two sons who were medical doctors said, "You don't have to worry about that. It's so tiny, we know about it." They removed the little dot, but it killed him in the end. You just don't know. So it was just the three of us. That was nice.

[00:56:42]
SCHNEIDER: And did you play together when you were young? What was your relationship like with them?

[00:56:47]
GLUSKER: Well, you tended to go into pairs. Two would pair and then the—and my kids are like that, too. Once in a while, one of them would say, "The other two are really giving me a hard time." And it can be a variable of which two it is. I don't know if any of you have two—

[00:57:09]
BOYTIM: I'm one of three. Yeah, so.

[00:57:10]
GLUSKER: You're one of three, so you know how it goes.

[00:57:12]
BOYTIM: Exactly. [laughter]

[00:57:16]
SCHNEIDER: All right. So I think now might be a good time to talk about your early education a little bit more.

[00:57:22]
BOYTIM: Do you want to take a break at all? It's been about an hour.

[00:57:24]
GLUSKER: Yeah, let me just walk around. [Short break]

[00:57:25]
SCHNEIDER: [. . .] All right. So we're back after a short break. So I was wondering if you could just talk about some of your early years of education and what were some of the classes you took and what interested you? I know you already mentioned this interest in chemistry, but—

[00:57:45]
GLUSKER: Yes. Right, right, right. And science, and so on. And we often had to make decisions, German, Greek, or geography, and that sort of thing. I'd think, "Well, if I'm going to be a chemist, I need to know German." In those days, you had to worry—I mean, German

chemistry was quite dominant at that time. And you had to pass German exams in Oxford to make sure that you could read the German articles, although they're nearly all in English now.

[00:58:28]
Well, the first school I went to was run by the Cadburys, was a Cadbury school [likely Bournville Infant School followed by Bournville Junior School]. I don't remember too much about it. One thing that happened was every single—from the first, almost the beginning of school, maybe it was in second grade or third grade, we always had a math exam and a spelling exam first thing in the morning. So you had to do your math. And in those days, English math was quite complicated because there were so many different units, you know, the mile, the furlong, the yard. And a man works twenty-four hours a day for so much and he goes to this yard, which is, and they'd tell you how big it is. "How much has he earned for that day?" Those kinds of questions we had to deal with very early on. And also we were taught, if you go shopping, how to read the thing and be able to tell whether the total is—quick—tell whether the [total's] right. So if you see a hundred, it's fine. And then you see fifty and then a forty and then look for a little bit more, and so on. Then you can . . . . Because a lot of people nowadays can't do that.

[00:59:55]
BOYTIM: It's a very practical kind of education.

[00:59:58]
GLUSKER: Yes, yes, yes. We also did cooking. But girls did not do woodwork. And I was so jealous of my daughter when she came here and she was able to do woodwork. I would have loved to have done woodwork, making a table or so on, that would have been nice. I used to make a lot of models of . . . well, we'd make models of the battleships, and so on, and also train sets. I mean, the breakfast cereal that we would eat had to be some that gave you—if you saved enough covers, you could get some plans for a village—build a village and that sort of thing. That's what we liked to do.

[01:00:53]
Because you weren't able to go very far anywhere because you might get stuck in a place that you don't know and get bombed, and so on. But we didn't live in fear or anything. We, kind of, knew what was going on. I can't remember which . . . oh, it's the movie *The Darkest Hour*. I don't know if you've watched that, but I recommend you do. It's about Winston Churchill and what the British were told. I mean, they were not deceived. You were told, they've gone into Belgium and they're now ill-treating the population, and so on, and doing terrible things to them no matter what. We, kind of, knew what the war was for, which makes a big difference. And since then we've had all these battles but you've often . . . I don't want to be political, but . . . .

[01:02:12]
BOYTIM: We can take it out of the tape.

[01:02:13]
GLUSKER: Sometimes you're not quite sure why we're doing what we're doing. It hasn't been explained very well, and then you know you've been fooled in some ways. And they didn't fool us into thinking, "Well, we'll just win the war."

[01:02:32]
BOYTIM: Transparency.

[01:02:32]
GLUSKER: But they did a—I mean, almost everybody, every adult, was involved in some . . . helping with design or math or so. My father was always writing to the people in charge of the Air Force saying they didn't know how to shoot down German planes and here's the equations. And they would write back and say, "No, we got the equations already."

[01:03:00]
BOYTIM: Well, I was curious about—so that's a little bit about your early school years and you mentioned this placement exam that you took when you were eleven years old that sent you to the King Edward's School.

[01:03:12]
GLUSKER: That's the eleven-plus. They decided they wanted to get you before you go through puberty. And in those days, they thought eleven, you're not there yet. Of course, now they say, of course you're—they're there much earlier now. In those days, you really hadn't—you were not involved with boyfriend-girlfriend so much and you could just concentrate on yourself and get into school. So it was a written exam and almost all the kids took it, and then the city just decided which school you would go to. So that's how that worked. But I got into the school my parents wanted me to get into. So did my brother and sister. And, of course, we'd had a background in learning from the early days, which a lot of kids hadn't had.

[01:04:16]
BOYTIM: From your parents?

[01:04:17]
GLUSKER: Yeah.

[01:04:17]
BOYTIM: Right, right.

[01:04:20]
GLUSKER: But there were some very bright kids in my class. One was a great writer and would lead us all into chanting this poem to the teacher, "Miss so-and-so, we love you so. Where are you from? This place to go. We would be cries of, 'O, E, and O,' you know," that sort of poor poet's poetry. But teachers would laugh, too.

[01:04:50]
BOYTIM: That's fun.

[01:04:50]
GLUSKER: Some were very good at math. I did quite well. I got in—decided I would apply to [University of] Oxford and, sort of, looked up to see which the best college was, which was Somerville [College], and applied. Went for the exam there; you have to do an exam there. For some reason, I got in. Yeah, I was lucky. Everyone was surprised. I missed my last year of high school, but that was . . . that was great. And I was already now off doing what I wanted to do, going to the lectures I wanted to go to. And, of course, my tutor was Dorothy Hodgkin, who was the Nobel Prize winner. She, kind of, took a motherly interest and remained friends for the rest of my life—of her life. She's dead now. Things suddenly change. That was a big change and it was great. My parents weren't quite sure about it, but I was.

[01:06:08]
SCHNEIDER: Yeah. Before we get to those years, when you were in school—before that—did you have—what [was] the equipment like in your science classes? Did you have hands-on experiences in the classroom?

[01:06:21]
GLUSKER: Excellent. It was just a newly built school. The only problem of it was they had started building both ends to meet in the middle. And then when they met in the middle, they were slightly different heights. So there was a step. And so if you were trying to bring an air—you know, one of these cans with air in it, pushing it, you had to get it up the step, and everyone would laugh about the step. It was considered that the architect should have known what they were doing, but they were in a hurry because they knew the war was coming. It was just finished just before the war.

[01:07:02]
We had a huge air raid shelter, too, a very substantial one, and had to practice once a week by going to it at a meeting, unexpected meeting in a class. You then had to—well everybody had to go down to the air raid shelter and just wait. But we didn't have too many. I think the Germans didn't like to bomb us in the daytime because they were too visible. And at night, they could often get by without the searchlights catching them.

[01:07:38]
BOYTIM: And you mentioned already your chemistry teacher, Yvonne Way. Do you have particular memories of her that come to mind?

[01:07:48]
GLUSKER: Oh, well, she was very kind, but she also knew that I thought—I had read so extensively about the various people who had developed chemistry. The various elements, finding the various elements, of course, was great fun to do, and then actually getting some of the material and being able to mix it. I mean, the nice thing about chemistry is that's the way things happen. So it was quite intriguing to me and she was, would encourage me, but then she'd say, I look bored in her last class and would I please try and look interested even if I knew it all. [laughter] So there we go. I think she had a great affection for me, so that was good.

[01:08:51]
BOYTIM: And as you were starting to gather ideas about, I don't know, maybe being a chemist in the future, what did you imagine that would be like? Did you picture yourself teaching like Dr. Way, or did you . . . ?

[01:09:03]
GLUSKER: No, no, no, I imagined myself doing experiments. Yes, yes. And what I did, you know—but it was all luck, nothing else, was [that I] went into a subject that was just beginning to develop in how to do atomic structure in three dimensionals. Because you had all the textbooks with the diagrams of molecules, and you could draw a carbon atom and put four lines around it and it looks fine, but they'll actually be tetrahedral, so they'll fill space in a way that you haven't thought about and will not fit in. And, of course, now the exciting thing is to find out what molecules look like and how they would fit in the proteins or DNA, or so on, getting things to fit.

[01:09:59]
We learned a lot of basic chemistry and she was very good at it and we were able to do chemistry experiments ourselves and have test tubes and mixing and so on. How to make things pass through filter paper quickly, how to fold it, and all that sort of thing. So I knew that when I applied to Oxford. I had to do a practical exam and they said I seemed to know what to do with

a lot of the chemistry experiments. That helped me get in I think. And, of course, I did mess up some questions that the whole school got to do, the questions that I missed. [laughter] I got the wrong answer in the physics part, but there we are.

[01:10:59]
SCHNEIDER: Were there any other teachers who played a particular role in influencing your interests or that you just remember from that time?

[01:11:10]
GLUSKER: Well, we had to do Latin and we had a Latin teacher and she was very good. It's actually quite useful to do Latin because you learn a lot of the words and then you find they're applied to—like agriculture. If you know "ager," then you know it's a field, so you know immediately what agriculture might be, that sort of thing. I mean, I know that's a simple example. That did come to me as a, "Oh, I see. Yes. Latin is very useful." And I really liked analyzing the sentences. I thought that was great. But I had a math teacher who taught us that there can be not just one, but two, answers to a lot of problems. And that has been a very useful learning. Often the answer is—the second one is—if there's nothing, then so and so will happen, but it's still a piece of information that you can get from an equation.

[01:12:21]
SCHNEIDER: And you had mentioned German earlier. Did you take—were you saying—did you take German in your later education?

[01:12:29]
GLUSKER: Yes.

[01:12:29]
SCHNEIDER: Or when—or was it throughout?

[01:12:31]
GLUSKER: I took German in school. Yes, yes, yes.

[01:12:34]
SCHNEIDER: Okay. And so German and Latin. Were there any other languages?

[01:12:37]
GLUSKER: French, we learned French.

[01:12:37]
SCHNEIDER: French.

[01:12:38]
GLUSKER: French is the main one you learn, which is ridiculous because if you live in England, in Birmingham, you're right near Wales and everyone speaks Welsh. Nobody teaches Welsh in high school. [laughter] Well, that must be true in this country, too.

[01:12:56]
BOYTIM: That is true. [laughter]

[01:12:59]
GLUSKER: No, we had to learn French and German. And various mothers objected to German from time to time, but they said, "No, it's a good thing to learn." The French is, sort of, related to Italian; if you know French, you could make a try at Italian and Spanish. And then the German is a different thing.

[01:13:29]
SCHNEIDER: And was the objection to German because of the war?

[01:13:32]
GLUSKER: Yes. Yes, yes, yes. Maybe singing a hymn in the morning, which they said was Deutschland über alles; there's some words for that hymn that you can sing.[3] And they were saying your children should not—your class should not be singing a song with that music. They were told they weren't singing it with that music. They were singing the hymn that had that same . . . . We had a pretty good principal [Dr. Mary Sybil Smith]. She knew how to deal with parents. She would tell us what was going on.

[01:14:08]
BOYTIM: It's a real skill set.

[3] This may be referring to *Deutschlandlied*, the official national anthem of Germany. See "Deutschlandlied," *Encyclopedia Britannica*. Accessed at https://www.britannica.com/topic/Deutschlandlied on 28 August 2025.

[01:14:09]
GLUSKER: So every morning she would meet us and then we'd have a prayer and a small reading from the Bible and a hymn, and then we would go to our classes. That was the standard for the time, yes.

[01:14:24]
BOYTIM: And was this an all-girls school?

[01:14:26]
GLUSKER: All girls. With an all-boys school right next to it.

[01:14:33]
BOYTIM: Okay. And your teachers were all women, or . . . ?

[01:14:36]
GLUSKER: Well, during the war, we had a male biochemistry teacher. Boy, did we tease him. Yeah, yeah. I mean, we liked him and he had a good time, but we'd say, "Oh, you're so wonderful. It's so nice to have a man teaching us." He would grin from ear to ear. We were pretty naughty, actually, but we got through to him.

[01:15:06]
SCHNEIDER: And what was your relationship like with your peers at that time? Did you have friends who you'd play with or were you more with your family more of the time?

[01:15:14]
GLUSKER: Yeah, well, I did have friends that I was close to. Yes. And it changed sometimes from year to year. And once in a while, a friend would not get moved up in class, be asked to repeat a year. If you didn't get good marks, they would ask you to repeat a year. And then if you still didn't get good marks, they would say, "Well, you're probably in the wrong school. You need to go to a school which is more for people who want a profession, want carpentry or a profession or electricity." Those schools were good, too. So they tend to, sort of, say, "What are you good at and what would you like to do?" Not all kids want to know Latin and Greek, and so on. I didn't learn Greek, but . . . .

[01:16:08]
SCHNEIDER: I think that that covers a lot of your early days in education, unless there's anything else you wanted to ask about that time period.

[01:16:16]
BOYTIM: Could I ask a quick question? You mentioned your principal and she was talented at handling parents, but I read . . . I think you wrote a memoir for the American Crystallographic Association, where you mentioned your principal earning her PhD from [University of] Cambridge and announcing it at school?[4]

[01:16:35]
GLUSKER: My principal?

[01:16:36]
BOYTIM: Earning her PhD from Cambridge. She hadn't been awarded a doctorate when she was there and then I think she eventually was?

[01:16:45]
GLUSKER: Who are you talking about?

[01:16:47]
BOYTIM: Either your principal or maybe your chemistry teacher.

[01:16:51]
GLUSKER: Oh, I don't remember where she got her degree to tell you the truth, now. She got a PhD, yes, but said that was not where she wanted to be, not the course that she wanted to do. She didn't want to do research; she wanted to teach and she'd really enjoyed teaching. It was a good school, which had very good labs and, you know, with areas that took care of the air in the room and so on. She was there the rest of her life, yes. Well, the rest of her professional life. She retired. She still wrote to me.

[01:17:45]
BOYTIM: We could transition to you moving on to Oxford, if that's where you're headed.

[4] "Memoir - Jenny Pickworth Glusker," ACA History, American Crystallographic Association, https://history.amercrystalassn.org/jp_glusker, accessed 28 August 2025.

[01:17:50]
SCHNEIDER: Yeah, I think that sounds good. So you've already mentioned a little bit about applying to university, but I'd like to go back to that and tell us about that process of applying to university and the interview process as well.

[01:18:07]
GLUSKER: Yeah, well, you're going to apply to the university. So the first thing is where is the best place to learn chemistry? Everything that I could read—I mean, in those days you had to go to the library, you couldn't use your cell phone. So it was a lot more work to look at which universities were there and where would it be good to go? And I, kind of, thought, "Well, why don't I go for [University of] Oxford? And what would they have? The women's college. And what's the best college in Oxford? I'll apply to it." That's what I did, with my teachers all saying, "It's a year early, you don't really need to do that yet." And I [said], "Well, I want to." I went for my . . . you have to do a written exam and an exam in physics and math. I don't remember anything else. Just they want to make sure you can do math and physics.

[01:19:11]
So then I got an interview, so I had to go to Oxford, which was not very far away by train. I went there and got interviewed by Dorothy Hodgkin, who's not a terribly good interviewer. I mean, she would just sit and look at you and try to think of a question. We had a lot of silence, but there we are.

[01:19:35]
And then she came and watched me while I did the practical exam when I was there, where you had to . . . I can't remember what the exam was. Oh, I know what it was. I had helped my father in the darkroom because he liked taking photographs, and so I was used to dealing with the sodium thiosulfate, and the unknown was sodium thiosulfate. So all I had to do was look at the crystal, and I wrote down, "It's sodium thiosulfate crystals." And then I proceeded. And everything you did with this darn thing was—you added a little bit of acid to try and guess what it was and you precipitated sulfur. So you got this gunk come out. So you tried something else and you precipitated sulfur, you did something else, and you precipitated sulfur. So I wrote at the end, "It precipitates sulfur all over the—no matter what I do, and it's sodium thiosulfate."

[01:20:36]
That was a great success. So later on in the years, I asked Dorothy Hodgkin if I got in because I knew what the unknown was, and she said, "No, no, you got in because you knew how to handle the equipment when you were doing the practical exam." So I was the only chemist in my year. So my best friends were an English major and a geography major. So that was, kind of, nice. Each person in Somerville had their own room. They don't have the sharing—no roommates. Yes. Unless the person has said there's a reason they want a roommate, but I only ever knew, of all the people, just one person who wanted to be the roommate with a friend of theirs. And they let them both share a room, but they were set up for [a] single. And you had

what's called a scout who would clean your room for you, and you had to, sort of, give them a little money, but you didn't have much money because your parents were probably spending every penny they had to get you to go through the university.

[01:21:54]
SCHNEIDER: But were those dormitories on campus or where were . . . ?

[01:21:57]
GLUSKER: No, that's where you lived. You lived on campus in the college and you had your own single room and then the next year you would have a different room. But they would assign you a room. You could meet with your friends and there was a room where you could cook a little, enough to boil an egg and wash dishes and wash out your underwear and hang it up. No washing machine, but just enough to get by.

[01:22:39]
So it was just great. Lots of interesting people had been staying in the same room that you'd been staying in. It was just a lot of fun. You went in the morning, early morning, you went to lectures and then you went into the lab to work. Then you had lunch and then you would find your friends and you'd all go on the river sailing in the afternoon. Then in the evening, you'd have a big dinner, and then you'd have to write your essays or do your studying. So it is really—the afternoon, you didn't work very much. Most people didn't work very much. They found something else to do, which I think was a very good system. It just didn't overwhelm you as much as it might have.

[01:23:38]
BOYTIM: It's nice to have the downtime to digest your classes.

[01:23:43]
GLUSKER: Yeah. So I thought that was good. And, of course, there's plenty of history around Oxford. You could just walk in the parks. Lots of nice things you can do. Yeah, the gardens are beautiful. The college has its own chapel, which I didn't really go to, actually. Well, you get to know the other tutors and other people. Get to know people from other colleges who were in—also studying chemistry, so they all get together. We were five women and 120 men, I think, was the ratio. So the women knew each other very well and the men would assume that they had better sit in the front row, but they probably are not very bright.

[01:24:50]
SCHNEIDER: And how was that transition when you first started at Oxford? Just what was it like starting there and did it feel like a big transition from growing up? Did your age, since you

maybe were a little bit younger than some of the other students, did that have any impact on your experience or not? I'm just, kind of, curious what it felt like to start there.

[01:25:18]
GLUSKER: Well, my memory of the time was, I was doing what I wanted to do and I didn't see any problems with any of it. I don't know why. I mean, that sounds a bit—maybe I shouldn't be talking that way, but that was how it was. That was what I wanted to do, and when I did it, it was wonderful. Okay? And here I was meeting really famous chemists and so on. In other areas, too. You can go to any lectures you want so you can hear famous people who talk to the English or in politics or anything like that. So there was plenty of good things to do.

[01:26:13]
Of course, there were dances you could go to. If you were a woman, you just went and you might meet someone or you might not, but it didn't matter whether you did or not. Nobody really noticed much. You were not allowed out late at night. You had to be home by—back in your college—by 10:30 [p.m.]. But the police saw this as interesting because the girls would want to go dancing and they'd be dancing till two in the morning. Then the police would come by and help them. They would take off their ball dresses and the police would help them over the garden wall. And the principal, of course, said the police were really interfering. And they said, "No, no, we're helping them into their place, their residence. What's wrong with that?" [laughter] So it wasn't stopped. It was, sort of, fun to know.

[01:27:08]
So you had to be careful if you saw your friend hadn't signed out that they were going to be a bit late. You mustn't write for them because they were going to be helped by the police later in the night. And you were not allowed to leave Oxford without permission. If you wanted to go down to London, [England] you had to—or home—you had to go and explain and see the dean and give a reason why you were not in class. And you had tutorials once a week. I had Dorothy Hodgkin and I had a math tutor, actually, as well.

[01:27:49]
SCHNEIDER: And can you explain a little bit about what a tutorial was like, just since the educational system [in England] I think is a little bit different [than in the United States]? I'm curious, what did that mean or what was that like?

[01:28:04]
GLUSKER: Well, you see, Dorothy Hodgkin was my tutor, so it was probably not like the normal tutorial. She would just sit there, but you'd written an essay and she had read it and she would remark on it and say, "This part is fine." And then she wouldn't have anything to say for a while. You'd, sort of, think, "Well, I'll ask her about some chemical or other." Then she'd say nothing, and then suddenly she'd say, "Oh, my God, I was supposed to pick up someone at the

train station and I forgot all about them!" And off she would run. So that's what my tutorials were like, with her, anyway.

[01:28:40]
But then I did have a tutor at St Hilda's College, which was where my sister was, and she would make us sit down and just go through the textbooks and learn about it. But it didn't have the same feeling that having Dorothy Hodgkin just, sort of, sitting there trying to think of . . . . Dorothy Hodgkin would also say things like, "You've got an exam to take. I think you'd better learn all you can about boron because I think there's going to be a question on boron." Of course, there wasn't.

[01:29:13]
That's what my tutorials were like. So they were not as organized as they could be, but that meant I had to write an essay for her each week and she would mark that in detail. You didn't say this, and you should have considered such and such a paper when you're writing about the chemistry of some unknown, some element I didn't know very much about. So it was constructive and she got to know us. I did get some students that I actually had to teach, too, just new students. You just had to say, "We want to make sure you know how to pass your chemistry exam." You had to pass a chemistry exam when you first went. But that worked out okay.

[01:30:14]
Yes, she [Dorothy Hodgkin] always seemed a bit vague, but she knew what she wanted us to do and was a very nice lady. We used to come here quite a lot, so I took her to school with—when one of my kids was in school, we went to school. I went with her, with a friend of mine who was actually the dean of the college, as well, and we went to this school [Cedar Road Elementary School], which is right near here for Abington [School District]. It's now a Ukrainian school, but . . . kids up to age ten, I think. My friend, the dean, says, "You know, this lady [Dorothy Hodgkin] won the Nobel Prize." Well, they weren't interested in that, but they were interested in other things. So she talked to them. But she was willing to do that, so she was flexible in what she would do.

[01:31:10]
Of course, she had taught Margaret Thatcher, who used to come to Somerville quite a bit. Margaret Thatcher was very different from Elizabeth . . . I've forgotten what her name is. You know, the one—Truss. Yes. [Mary Elizabeth "Liz"] Truss. Yes. Who just didn't make it. I thought she wouldn't. And she didn't. Because Margaret Thatcher really knew what she was doing. I mean, you may not . . . I didn't agree with what she was doing, but she had studied it. And I had a good friend [Sir David Chilton Phillips] who was a science adviser to the queen, and he said she would go to a meeting and there would be the agricultural secretary with a big pile of papers in case he was asked about something. And he's shaking most of the time. There's Margaret Thatcher saying, "Well, you know, none of you have chemistry degrees. I have a chemistry degree." [laughter] So there we go. So she was . . . . But she knew if there was anything ever to be done, she knew, she had read on it very carefully. It was interesting. But we

didn't all agree with her making people poor and so on. And Dorothy Hodgkin's husband would go around saying, "You shouldn't be talking to her, Margaret Thatcher, she's a nasty lady."

[01:32:43]
BOYTIM: Can I ask about the political environment at Oxford? And did you have these kinds of conversations and explore politics with friends or in lectures?

[01:32:57]
GLUSKER: Well, I went there and the thing about going to Oxford or Cambridge is, if somebody comes to talk, they're the Prime Minister or the main ministers who have a lot of input. So I used to go to, whenever the leaders came, whichever party. But, of course, then you have to join the Conservative Party—the Tory Party—and the Labour Party and the Liberal Party. You know, you have to pay, but it's only a very small amount of money, but you have to join.

[01:33:33]
So when I was coming here to the United States, the first thing they asked me was, "Did you ever go to political meetings?" So I said, "Yes, I made a point of doing that." So they said, "Oh. Did you go to any Communist meetings?" Well, I didn't go to Communist meetings. I didn't hear of any of those. But there was a Communist in my class in Oxford who would come when I was having breakfast, and I'd been working late the night before and I'd written an essay, I was having breakfast. I've got to get to the lecture and I'll be late for the lecture. And she would put this red stuff with text for Communists in front of me. But I never read it because I was just too tired—

[01:34:19]
BOYTIM: In a rush.

[01:34:19]
GLUSKER: —with all I was doing. I better get some, a little bit of food in me, and then I'll go off. We didn't really communicate very much. But they asked me about this and they wanted to know which societies I'd been in, you see. So I said, "Well, I was in the Tory and the Liberal and the Labour and so on." And they said, "Oh." So he was quite worried about Labour, what had I done? I said, "Well, I went to the lecture and it was interesting to hear what the head of the Party was thinking." I mean, you're not going to miss something like that if you're a student. I went to hear him. He said, "Oh, were you ever in the—what did you do in the Party?" I said, "I just went to that one lecture, but I had to join in order to get to the lecture." I mean, it was just a group, but they needed to raise a little bit of money so that they could pay for the people to come. That was really what you were paying for. Paying for the train trip and whatever it was, and a little bit of extra, not too much.

[01:35:29]
So, yes, there were a lot of . . . . Of course, there were great writers who would come and talk and it was great to go to their talks, too. And you could go to any of the lectures. If you were accepted as a student there, you could go to any of the lectures. But you're required, of course, to wear a college gown, short college gown, show that you're a member of the university, then they'll let you in. So it was great for that reason. I mean, you could go to all the chemistry lectures, but you could also go and hear people who had something interested in history they had been working out. Somebody would say, "You've got to come into this lecture." You would go with them and learn something new. Flat Earth and non-flat Earth was one of the big things. But then we did hear, the head of the Flat Earth Society gave a lecture.

[01:36:38]
BOYTIM: Oh, my goodness.

[01:36:39]
GLUSKER: At that time, they were saying there's a chance that somebody might land on the moon, but it was still to be in the future. He said, "No, no, you don't know how flat the earth is."

[01:36:52]
SCHNEIDER: And you also mentioned meeting famous chemists. Who were some of those notable people who you interacted with or saw speak?

[01:37:02]
GLUSKER: Well, I met them more when I was doing research. [For] the chemistry degree at Oxford, you do three years of lectures and having to write essays, and then you have one year to do research. And if you're going to be working in a chemistry industry, just in business, you'll only do the first three years and you'll just get what's listed as an unidentified degree in chemistry, but you've got this degree. I mean, you've got a bachelor's in chemistry, but it doesn't have a first, second, or third class. And then if you do the year's research, then you have to present a thesis and then you will get a first, second, or third. Like summa cum laude—was it Harvard they do cum laude and all that? It makes a difference when people read your degree.

[01:38:03]
So I really met people mostly in my first year of research because I was working on vitamin B_{12} and nobody knew what the chemical formula was. Then they were very excited at what we were finding out so they would . . . . Friends would come to visit Dorothy Hodgkin, but they would also come and talk to me. And so I got to meet some of the early founders of X-ray diffraction, and that was very nice.

[01:38:41]
BOYTIM: Well, could you elaborate more on your undergraduate research, your thesis?

[01:38:46]
GLUSKER: Sorry?

[01:38:46]
BOYTIM: Could you elaborate more on your undergraduate research for your thesis? I think you worked with Harold—

[01:38:52]
GLUSKER: Well, I was working out the structure of vitamin B_{12}.

[01:38:56]
BOYTIM: But first with Harold [Warris] Thompson, you were doing infrared spectroscopy.

[01:39:00]
GLUSKER: Oh, that. Yes, yes. I'm sorry. Oh, yes.

[01:39:04]
BOYTIM: Getting ahead of ourselves.

[01:39:06]
GLUSKER: I had heard him lecture. You do have to—yes, you have to do that. I heard him lecture. He was very clear about what he talked about, and I thought, "This is really good." He was quite a famous footballer who nobody liked. So I said I would like to work with him. So he came and he, sort of, looked me over and said, "Fine." Said, "I've never had a woman." So there were twelve men and me. That was my introduction to more than chemistry. But it worked out very well because the men were delighted to find there was someone who would sew on their buttons and then they would . . . . We became great friends, and one or two of them were married, but only one or two, and the rest would ask me to go do things with them. So I got to know them, and that's where I met my husband, because he was one of the people in that lab.

[01:40:20]
He [Harold Thompson] was not used to dealing with women. Of course, he was always trying to persuade me that I could go and do something with him, my boss, which was totally

inappropriate, of course. So keeping him at bay was quite a lesson, and not very pleasant. They thought I might do a mixture of spectroscopy and crystallography for my doctorate. But I said finally, "I just don't want any more to do with him." I just stayed with Dorothy Hodgkin. But I did get to publish, yes, I got to publish some papers on what . . . methyl . . . oh, yes, deuterium chloride and so on, and get the bond length. So you can measure the bond length to great accuracy. So you know a lot about deuterium and chlorine and then you could compare [END OF AUDIO, FILE 1.1] it with hydrogen, which is—deuterium and hydrogen are the same kind of element and, sort of, write a little bit about that. But then I went on to more complicated molecules, and you don't find out as much as you hope you will. So I thought, "Well, crystallography, you do find out a lot more." So I said I wanted to work with Dorothy and she was very pleased and she said she got a place for me because she wanted to be working on B_{12}.

[00:00:30]
So it was, kind of, you know, my luck came. And I'm telling you, my life has been luck. Luck came in again and I got this great problem, which was the largest structure done at that time. So everyone was very excited about it. So all these people would come and see me and I got to give the first talk on it. People at Cambridge wanted to say that they had made the crystals that I worked on, and therefore, they were the ones who should get the honor for the structure. They didn't know anything about it chemically. That was pretty hard work, but it was good. In order to find it, you have to use your brain and develop methods of doing things.

[00:01:25]
And then I got connected with the man [Kenneth N. Trueblood] at UCLA [University of California, Los Angeles] in California, a professor there, and he was working with the main, huge computer they had. So they could do the calculations, some huge calculations. So we corresponded for years and we eventually wrote a textbook together.

[00:01:48]
BOYTIM: Yeah, that's Kenneth Trueblood?

[00:01:51]
GLUSKER: Yeah, Trueblood, yes. So yes, I mean, working on vitamin B_{12} was great. As they say, it was the largest at the time, and that's what—one of the things Dorothy got a Nobel Prize for, for penicillin.

[00:02:17]
SCHNEIDER: So you talked a little bit about your lab and some of the men in the lab who you became friends with. What kinds of things would you all do? Would you socialize in the lab? Would you, after you did the lab work, go elsewhere and spend time together? What was that social life like?

[00:02:41]
GLUSKER: Well, I would go in in the morning when Don [Donald L. Glusker], who was eventually my husband, would be—he was working on some other project to do with charge-transfer molecules, I think. But he had to set up the apparatus. And it took—in those days, the apparatus took an hour to get itself together in the morning. After you turn it on, you don't . . . . So he would sit and chat with me and tell me what life was like in America and what kind of a girl he was going to marry and what he would get for her. Never asked me out. But we would chat every morning for an hour, so we got to know each other very well.

[00:03:28]
And then the others, well, we would go to have lunch together sometimes, but not always. They would invite me out to dinner once in a while, you know, in a restaurant. Nothing very fancy, just a student restaurant, but they would pick up the bill, usually give me flowers or something. There was a couple who were married who didn't do that, of course, but we were friends. I was friends of them and their wives. Sometimes we could go on the river in the afternoon together. But it all worked out. I mean, I was friends with all of them.

[00:04:18]
And a lot of them have come here. If they were ever in America, they would make a point to come and see me and tell me what their lives were like. They'd got married and had kids, here are pictures of their children, and what were my children like, and so on. It was a good relationship. I wasn't really dating. I was just interested in getting on with chemistry. So I wasn't really very—I did have some dates, yes, but not too many. They were not in the lab. I had one date for a while, it was fairly serious for a while, but then it was obvious it wasn't going to work out.

[00:05:02]
And you were not allowed to be married when you were in college. There was a girl in my year who was a great mathematician and she got married—no, she wanted to get married and she got pregnant anyway and then, in those days, you got married. So she had to get married. She had to choose between marriage or getting her degree. She finally chose marriage and I always felt that was really very unfair. She was in her last year, so what, but . . . . So yes. A lot of friends, a lot of very good men friends and their wives. As I say, they would come here. One [Ronald T. Reuther] was the head of the zoo here in Philadelphia [Philadelphia Zoo] for a while.

[00:05:52]
BOYTIM: Oh, really? Huh.

[00:05:52]
GLUSKER: Ron Reuther, yes. Married an English girl. I think he arranged for the two of us to

go for dinner with him in some part of the zoo. That was good. But then he had a fight with the board of the zoo and had to go off and do something else.

[00:06:17]
BOYTIM: Were you thinking about your future and whether you would have to make a choice between marriage and a family or pursuing your doctorate?

[00:06:26]
GLUSKER: I wasn't really thinking about getting married at that point. I was in my early twenties and hadn't really thought much about it. Most people—I mean, for example, my uncle, my father's older brother, would, sort of, say, "You know, you're not bad looking. It's a shame you won't get married." And so I said to my mother, "Why won't I get married?" And she says, "Oh, because you're a scientist. They don't get married." So there we are. But no, as I say, I had—various men would ask me out and we would have good times together. I mean, go into the country or go—walks in the woods, that sort of thing.

[00:07:16]
I wasn't really thinking about it until just at the very end, when I was going around with Don after—I was doing graduate work in a different lab from him. He was a Rhodes Scholar, and so he had two years and he got an extra year. He loved Oxford and he loved going to Europe. And then we decided we would go and we thought we'd better get married, and my parents said, "Marrying an American is a big deal." Well, it was in those days. They adjusted in the end. No, I hadn't thought about getting married. I thought I wanted to make sure I got a good job after I finished. That was the main thought. Yes.

[00:08:14]
BOYTIM: And at what—

[00:08:14]
GLUSKER: A good job where I could do research. And I got job offers from both DuPont [E.I. du Pont de Nemours & Company] and Rohm and Haas [Company]. But then I was told [A. Lindo] Patterson was here in the Fox Chase [Cancer Center]. So I went to see him. He didn't have any money, he said, but I could be a technician for a year. So I was a technician for a year. Then he said, "We'll give you a proper title after that. I'll make sure of it," which he did. So new directors have all said, "Here's someone who rose from being a technician to being head of a lab." And I said, "No, I wasn't really a technician. It was only because he didn't have any money and I wanted desperately to work for him." He gave me a little salary, not a great one, and it was perfectly adequate. I mean, in those days, two good salaries really made things work. Yes.

[00:09:18]
BOYTIM: If you were imagining going on to a career in research, I assume you always figured you would go on to get a PhD after.

[00:09:28]
GLUSKER: Yes, yes, yes. Well, that's what I was doing. The B_{12} was in the PhD. That worked out well. So that's when I got to . . . well, you're going to talk about it another day, right?

[00:09:45]
BOYTIM: Yeah. I guess . . . we've been talking for a couple of hours. I don't know if there are any other questions from undergraduate years or anything else you want to cover, Sarah?

[00:09:55]
SCHNEIDER: I think this could be a good place to stop and then pick back up.

[00:09:59]
GLUSKER: If you think of another undergraduate question, you could sneak them in.

[00:10:02]
BOYTIM: Of course. We'll do that. I'll stop the recording.

[END OF AUDIO, FILE 1.2]

[END OF INTERVIEW]

INTERVIEWEE: **Jenny Pickworth Glusker**

INTERVIEWERS: **Jacqueline Boytim**
Sarah Schneider

LOCATION: **Interviewee's home**
Huntingdon Valley, Pennsylvania

DATE: **3 November 2022**

[00:00:05]
SCHNEIDER: So today is Thursday, November 3, 2022. My name is Sarah Schneider and I am joined by Jacqueline Boytim, and we're here with Dr. Jenny Glusker [at her home in Huntingdon Valley, Pennsylvania] to conduct the second session of the oral history interview.

[00:00:18]
BOYTIM: Thanks, Sarah. So, Jenny, yesterday we were talking about your undergraduate research at Oxford, which you did under Harold Thompson getting into IR spectroscopy. You talked a little bit about the environment in that lab. It was an all-male lab, and they weren't familiar with—

[00:00:37]
GLUSKER: It was an all-male lab. And everyone was watching to see how the men would react to having a woman. But they—I could get along fairly well with all of them and managed to flood the lab once, but that's about all I did that was bad.

[00:00:56]
BOYTIM: Oh, no. How did that happen?

[00:00:59]
GLUSKER: Oh, it's very easy when you're doing chemistry. You put your pipe into the glasswork and it springs out on the water pressure. So they all helped. Most of them still, during the time since, have been in communication, you know, tell me who they married and how many children they had and what their children were doing. So we exchanged notes. So I've kept contact with, I'd say, most of them. Some of them have done very well, and some of them teach other parts of science. Most of them are in England or Scotland. But it's nice to hear [from] them. I got asked to give a talk in Edinburgh once and I went up, and my husband went

with me, too, and there, as one of the professors, was somebody who had been in the lab. So we could catch up, all of a sudden, unexpectedly.

[00:02:03]
BOYTIM: That's nice.

[00:02:04]
GLUSKER: So that was nice. And that was the place that had a letter from [Dmitri Ivanovich] Mendeleev who designed the periodic table. So I said, "Please, please, let me touch the letter." [laughter] Ridiculous, but I've touched a letter that Mendeleev touched.

[00:02:26]
BOYTIM: Part of history.

[00:02:28]
GLUSKER: So, yes, I always liked chemistry. Yes.

[00:02:32]
BOYTIM: I guess we talked a little bit about this yesterday, I wasn't sure how much to go back into, but your research was on IR spectroscopy. You were looking at deuterium chloride with that.

[00:02:42]
GLUSKER: Yes.

[00:02:43]
BOYTIM: Do you want to talk through maybe the state of the field at the time? My understanding is that IR spectroscopy, kind of, took off in the 1940s with advanced instrumentation.

[00:02:55]
GLUSKER: Yes. Well, if you have something like deuterium chloride, you can tell what its bond length is and variations with respect to temperature or something and compare it with where the deuterium is replaced by hydrogen or the other way around. And then when you get to a more complicated molecule, you don't really have measurements on everything. You

measure the moments of inertia, and from that you can derive something about the distances. But I thought it was rather unsatisfactory.

[00:03:32]
The problem with the professors is, most of them just thought women were a nuisance and you didn't need them and they didn't do very well anyway. You didn't get too much support except for one or two who thought it was interesting and would help along, and I felt I could go to. The person I was working for was very good in his science, but he was not a person you would tell if you were having problems, you know, or anything. You would go to one of these other professors and they'd say, "How's it going? Can I help you at all?"

[00:04:20]
I did a year's research in spectroscopy and went to a meeting in Paris and met some of the early workers in that field. That was interesting. You get to know who people are and they get to know who I am, what I've done. I could, sort of, see a different way of doing an analysis, so that was a help. Went on to the methyl halides and found that they were more difficult to analyze. So I finally left. But I got a thesis that went in. So I got a good degree. Yes.

[00:05:14]
BOYTIM: So at what point did you start talking with Dorothy Hodgkin about working with her for your graduate . . . ?

[00:05:19]
GLUSKER: Well, she was my tutor, you see, in college. And so I saw her regularly, and she was very interested in what I was doing in spectroscopy. I mean, just that I was doing it and that I was doing it properly and being careful about—you're dealing with lots and lots of numbers. I was trained from the beginning, you always have to go back and check your numbers. It might take a day to do so, but you have to do it anyway. And you'll be asked, "Have you checked your numbers or did you just write it down?"

[00:05:58]
BOYTIM: Was she one of the . . . ?

[00:06:00]
GLUSKER: So she knew I was a fairly careful worker and she said what I . . . . The idea was it might be interesting to look at some crystal structures where you have big planar molecules and then look at the spectroscopy and see if the analysis methods at the time gave the same answer for how the flat molecule lay. And she thought that might be a nice subject for a doctorate. So I thought, yes, but then I was having trouble with my boss who was a little bit too affectionate and so on. I had to keep him at a distance. So I decided I just couldn't deal with that. So I said,

"I think I'll just come and do the crystallography because I'd like to learn how to do that." So I started out, and very shortly after that, along she got some small crystals of a derivative of B_{12}, which had been grown by an Australian [Jack Cannon] who was in Cambridge. Oh, you know this story.

[00:07:18]
BOYTIM: I've heard it, yes, but please.

[00:07:21]
GLUSKER: He had not been able to crystallize the material he was sent. So he tried with all kinds of solvents, and finally, he gave up and he said he just put a little bit of every liquid he had in the lab in the test tube, and put his material in and put it in a cupboard and went on vacation in Europe. Came back to find there were crystals. And nobody has since been able to crystallize this, but I was given these crystals to see if I could do the structure. So it wasn't the whole of vitamin B_{12}, but it was all the part that they didn't know any chemistry of.

[00:08:03]
And the problem with the people in Cambridge was, they felt in giving us crystals, we were just technicians who had then told them what the formula was. Whereas in fact, we had to start from much earlier principles and try and figure out how to analyze the diffraction pattern. But the useful thing about vitamin B_{12} is it has cobalt in it, which is quite a good X-ray scatterer. Atoms scatter X-rays according to where they are in the periodic table, and the heavier they are, the more they scatter. So you've got a good, sharp scatterer.

[00:08:44]
So if you do a map called a Patterson map—we'll talk about Patterson later—you can find out where the cobalt is in the unit cell. You can look at the unit cell and tell where the cobalt is. And then, you can try doing an analysis saying, you know the answer; you know that there's a cobalt in that one position, but you know there's about one hundred other atoms. So you pretend that you know all the phases and where the waves were. What we're dealing is with summing waves and we want to know where the peak of the wave is with respect to the peaks of all the others. So there's a little phase difference for each reflection, each X-ray reflection.

[00:09:40]
Ken Trueblood at UCLA came up to Dorothy at a meeting and said he had access to the new Southwest Automatic Computer [Standards Western Automatic Computer (SWAC)] that the US had just tried. I think they had two or three around the country and he had access at night and could he help? So that made help.

[00:10:04]
So I would say, "Well, let's pretend it's just got cobalt in. What are all the phases?" And then we'll do a diffraction map and see what comes up. And sometimes you could see some little

peaks, which probably were the atoms around the cobalt. And so the next round, you would add the few atoms around the cobalt. That's essentially what I did for my graduate work, try and figure out . . . . And how much to believe if they moved a little bit from one calculation to the next. Have they really moved that far or have they moved about half as far because you've made assumptions? I had to, sort of, derive some of the assumptions. And then it was the largest molecule people were looking at even, but it didn't have a heavy atom.

[00:10:56]
So people were quite excited when it came out. Gave the structure, and the professor at Cambridge [Alexander R. Todd] said, "I'm a great man and we've done the structure of vitamin B_{12}. We had the crystallographers tell us what the formula was." And Dorothy did very well. He came to visit one time and I thought he was trying to get the formula, because they didn't know what it was until we told him, and she wouldn't give it to him. And then she heard he was giving a talk in the south of England on some interesting nitrogen-containing compounds. So she got in the train and turned up and said, at the end of the talk, she said, "I just want to say that Professor Todd did not do this structure. We did." And then talked about it. So she just followed him around. And so she said, "Whenever anybody from Todd's lab gave a lecture, somebody in the lab had to be at that lecture and stand up at the end and say, 'This is how it was done.'" So that's essentially . . . I got to go to some quite interesting places to . . . . [phone ringing]

[00:12:08]
BOYTIM: [. . .] I do want to back up a little bit. That was a great overview of your graduate research. You were talking about . . . some mentors or advisors were very hands-off and you couldn't go to them with your problems.

[00:12:28]
GLUSKER: I'm sorry?

[00:12:29]
BOYTIM: You mentioned early on in your research, there were advisors or mentors who were very hands-off and you couldn't go to them with your problems, only to show that you were making progress. I was curious about Dorothy Hodgkin as a mentor and if you could go to her with challenges.

[00:12:45]
GLUSKER: Well, I thought she was a very good mentor, as I say, when I had a tutorial with her, we almost never spoke, it was almost nothing. She didn't know what to say. But she'd had me write an essay and then she'd write on the essay, "You should have written a bit about this, and you didn't get it quite right about that." So I worked very hard on the essays, and so I learned a lot by what she did. And she believed that you should read the original paper, which

can be very difficult. I mean, some of the famous papers, it's almost impossible to tell what's going on. I mean, I could read German, but sometimes you couldn't tell what was going on. Apparently, somebody with a better background in diffraction or light could understand it.

[00:13:40]
BOYTIM: A lot of physics and math.

[00:13:41]
GLUSKER: I'd say, "Well, I didn't quite understand what he did." But if you go to the textbooks, then you find out. She'd say, "Well, that's not where you should go. You should go back to the original." And in those days there was no web. You had to go to the science library, see the man in the science department, who got to know me quite well, and say, "I need this book and this book and this book." Then I can read about it. They'd say, "Well, you can't have it for more than the afternoon. You have to bring it back before closing time."

[00:14:14]
And when Todd gets started saying all this about his doing the structure, she did follow him around, but she didn't make a huge fuss. She just would turn up at the end and say, "This is how we did it." And show pictures of the various stages along the way.

[00:14:33]
And she let me give the first talk that was given about it, so that was exciting. I was absolutely terrified. But the man in the previous talk had said he'd done a very small structure, but it's very interesting and it was an unusual space group. It was a very difficult problem to solve. And those who worked in a certain space group didn't have such a hard time as he did. So then when I got up, I had to say, "Well, this structure was in the space group that he said you wouldn't have too much trouble with." And everyone laughed. So it got me going, you know. So I gave the talk and Dorothy sat in the back and was just jumping with joy that the thing was announced as something that she and her lab had done. So she continued to follow my career for the rest of my life. I mean, she was good, would give advice. She wanted me to stay in Oxford.

[00:15:47]
BOYTIM: And when she first suggested possibly doing some spectroscopy of crystals and you started to work in her lab. What was your experience with X-ray crystallography up to that point? Had you studied it in your coursework or learned it from her?

[00:16:06]
GLUSKER: I'd heard a bit about it, but we didn't know much. And her lab was in the university museum, in the basement. We had to go there. We would go there every morning and in England it was cold, so you'd put on the—turn on the apparatus and then you'd have to wait.

But there were heating pipes in the darkroom, so we'd all sit in the darkroom and have coffee and donuts, you know, and so on, and then get to work, and it would warm up. But it was right in—next to the room that Charles Darwin and the Bishop of Oxford [Samuel Wilberforce] had fought about the [*On the*] *Origin of Species*.[5] So that was a—there was a big sign about it, "In this room was a meeting of the British Association. This was discussed in this room."

[00:17:06]
BOYTIM: Did that feel inspiring or, kind of . . . ?

[00:17:08]
GLUSKER: That was very inspiring, yes, yes, yes. Because one of her students [Cecily Darwin Littleton] was the granddaughter of Charles Darwin. She wasn't there when I was there, but I got to know her after, when I was back in Philadelphia, because she lived in Philadelphia. I don't know if you—I've ever written about her, but she died quite recently.

[00:17:38]
The men in the lab had to show me how to mount the crystal and measure it. Then I would go away and I could do it myself. I kept detailed notebooks, so I knew what was going on. And lots of measurements of intensities of diffracted spots, which you just did by looking at it. What you did was you'd take a crystal and you would expose it to X-rays for maybe a minute, and then you would move the film and then you'd do it for two minutes and then you'd do it for five minutes, and so on. And you'd see the different intensities and then you'd use that and you'd put it along the diffraction photograph and say, "Yes. Well this reflection has a number of, let's say, fifty, and this one's about thirty-five." So that was data to put into the computer as to how strong these diffraction spots were. I spent a lot of time doing that. But I could wander around the museum, too, which was, sort of, nice. I still have the key to the museum. [laughter]

[00:18:48]
BOYTIM: Oh my goodness.

[00:18:51]
GLUSKER: I had to pay a pound for it, but I still have it.

[00:18:54]
BOYTIM: Could sneak back in. So did you ever have to prepare the crystals yourself? I'm wondering, coming from your chemistry background, if that was . . . ?

[5] See "The Great Debate" webpage to learn more about the 1860 Oxford evolution debate. "The Great Debate," Oxford University Museum of Natural History, https://oumnh.ox.ac.uk/great-debate, accessed on 28 August 2025.

[00:19:04]
GLUSKER: Well, I did most of my work on the one set of crystals that were grown in Cambridge and communicating with the people there. Because we did tell them exactly what we were doing and what we were finding. And I got to know the Australian guy [Jack Cannon] quite well, and he tried to recrystallize the stuff again, but he couldn't. It's just rather amazing.

[00:19:32]
But I had to work quite late at night and I managed to persuade the people in the Maths [Mathematical] Institute, which was nearby, that I could use some of their computer card-reading machines at night. So I would work usually till about three in the morning. And then there was a policeman who had seen me walking home, you know, young girl walking home. They were supposed—assume that you're running away or that something is wrong. So he said he wanted to know where I lived and so I told him. And he said, "Well, I'm going to walk you home." I guess he didn't have much to do because for a long time I had a policeman who liked to chat and walked me home at night at three in the morning, which was pretty good because we were near an American Air Force base and you didn't want to be picked up by accident.

[00:20:31]
But the Americans were good. They had a camp up on the hill near Oxford. They were always late. They had to be back at camp by a certain time any day. And they were always late, so they would always just steal a bicycle. And so it could be your bicycle that they would steal and they would go up the hill. And then there was a field nearby where the police had said, "Always put your bicycle in that field." It's only a two-minute walk back to the camp, which they did. Then the police would go up in the morning, pick up all the bicycles, take the numbers, and then you would go to the police station, say, "I've lost my bicycle. And it's number so and so," and they would give you back your bicycle. So, you know, the odds and ends of undergraduate life in Oxford at that time. You could lose your bicycle very easily, but the police would make sure you got it back.

[00:21:34]
BOYTIM: Wow. I was also curious about just the state of X-ray crystallography at that time and if you had a sense that it was a field that was taking off.

[00:21:52]
GLUSKER: It was just beginning. Yes, yes, yes. And I think the reason that it did so well was because the German physicists knew enough about diffraction and the treatment of light, and so on, and were able to interpret the original diffraction patterns and see that it had information. And then they were beginning to solve the problems of chemistry. As an example, the simplest of the problems was: What is sodium chloride and is it an NaCl? And if so, what is the NaCl distance and what then happens around again? And so that was one of the first structures done.

And, of course, it's Na^+ and Cl^- just regularly in a cubic lattice. Potassium, which is bigger, then has a slightly different structure, and so on.

[00:23:02]
And then the next thing was the—one of the professors at Cambridge, [William Lawrence] Bragg, was looking for people to work for him and it was hard. And there was a woman, Kathleen Lonsdale, who worked on benzene, and that was another very important structure determination because she was able to show that it was flat and that all the carbon–carbon bonds were the same length. I guess those were the two things that people had wondered because the various people had ideas. So the chemists were very good at where they were in chemistry, but it was all in textbooks, which give us a two-dimensional picture. And what was beginning to happen now was that the third dimension was coming out.

[00:24:05]
BOYTIM: And then my under—oh, go ahead.

[00:24:07]
GLUSKER: Well, I had to point out once, you know, if you've got a helix and you draw it and you put it on a piece of paper as a flat picture, you don't have a feeling for where there are places that other molecules could go and attack it. But if you have a three-dimensional structure, then you can.

[00:24:26]
BOYTIM: And it was my understanding that it was around the 1930s that X-ray crystallography started dealing with larger biomolecules, like proteins and . . . .

[00:24:35]
GLUSKER: Yes, yes, yes. Well, they went—I think Dorothy was one of the first. She was looking at the biological molecules.

[00:24:49]
BOYTIM: In [John D.] Bernal's lab?

[00:24:50]
GLUSKER: Yes. Yes. Bernal was her tutor for a while and encouraged her to go because she'd done penicillin during the war. That was good. And it had a formula, not the one they had thought it had. Of course, then they learned how it worked, and so on. And then all sorts of

doctors wrote to *Nature* magazine and said, "Oh, for the last century I've been growing mold in the basement and giving it to patients and they're all miraculously cured." [laughter] So, yes.

[00:25:29]
BOYTIM: Finally got it figured out scientifically.

[00:25:31]
GLUSKER: Yes.

[00:25:34]
BOYTIM: Okay. Were you introduced to much of the crystallography community as you were getting started in your graduate work through Dorothy Hodgkin?

[00:25:46]
GLUSKER: No, I was introduced to someone who'd worked on vitamin B_{12}. Yeah.

[00:25:52]
BOYTIM: Were you meeting anyone through conferences, you mentioned your first presentation, or communicating with anyone?

[00:25:59]
GLUSKER: Actually, I spent most of my time just doing the work, trying to do these calculations, which are very long. And then Ken Trueblood would maybe do an electron density map for me, which I had to draw by hand, and it took three weeks to come from UCLA to Oxford in those days. Then I would send him back some more information to do it again. We worked closely together on that, yes.

[00:26:38]
BOYTIM: I guess I'm also thinking of, you donated a [neck]tie to our museum this summer from the Festival of Britain that was based on crystallography patterns.[6]

[6] The Festival of Britain in the summer of 1951 "was a nationwide celebration of British design, science, technology and identity that aimed to create a sense of recovery from the war." "The Festival of Britain 1951," London Museum, accessed 28 August 2025, https://www.londonmuseum.org.uk/collections/london-stories/festival-britain-1951/.

[00:26:47]
GLUSKER: Oh, yes.

[00:26:48]
BOYTIM: Yes. And I saw a plate in your kitchen. Is that also from the same exhibition?

[00:26:54]
GLUSKER: No, but I have the book. I found the book. [short break for her to get the book] Yeah, it was very good. A science exhibition in London, which we went to.

[00:27:05]
BOYTIM: Yeah. What are your memories of that exhibition?

[00:27:10]
GLUSKER: Yeah, I think the [inaudible] on the tie's in there. Maybe I can find it.

[00:27:23]
BOYTIM: Here.

[00:27:24]
GLUSKER: Yes, yes. There you are.

[00:27:25]
BOYTIM: That's so interesting. Do you have any memories from being at the . . . ?

[00:27:32]
GLUSKER: Oh, yes, yes. We thought it was great. A great idea to do these fabrics. Mostly from Patterson maps. Yes.

[00:27:47]
BOYTIM: They're great. It's such [a] fun, midcentury kind of design to see.

[00:27:57]
GLUSKER: You can borrow it for, until tomorrow.

[00:27:59]
BOYTIM: Oh, okay. Thank you. I'll take a closer look at it.

[00:28:01]
GLUSKER: But I do want it back.

[00:28:03]
BOYTIM: Of course. I'll put it here for now.

[00:28:06]
GLUSKER: It was someone who worked for me who found that book and sent it to me immediately because she knew I was interested in the patterns and the design. Yes.

[00:28:17]
BOYTIM: Did many of your colleagues go to that exhibition, or was it more for the public?

[00:28:23]
GLUSKER: Yes, yes, they were going and they had bought a taxi. In those days, London taxis were—there were a lot available and they didn't cost very much, but they were very easy to drive and they could do a U-turn without any trouble, and so on. So they were going down to London and they said, "Do you want to come with us?" So I said, "Yes, of course." Well, mainly because the Vienna State Opera was just opening after the end of the war. They were performing in London and they were performing in all their beautiful clothes, but no props, no background. But I remember, it was *The Marriage of Figaro* and *Don Giovanni*. Beautiful singing. And it didn't matter that there was no backdrop. You just listened, and it was heavenly. Then we went to the science fair.

[00:29:20]
BOYTIM: Okay.

[00:29:22]
SCHNEIDER: Was that your first time in London, or had you been there before?

[00:29:27]
GLUSKER: I think it was my first time in . . . yes, yes, yes.

[00:29:31]
BOYTIM: We were talking before we started recording this morning about limitations to your travel as a child during the war, and you didn't get to go to London to visit the museums.

[00:29:40]
GLUSKER: The only place I used to go to quite a lot was Stratford-upon-Avon, [England], which was very near to where I lived, and my parents would try and go there to do a little shopping, and so on. You could go in the morning and try and get a ticket for the theater [then called the Shakespeare Memorial Theatre] of Stratford-upon-Avon to see a Shakespeare play. But we also just liked to go there. And there was a place on the way that was allowed to make ice cream during the war. I think it was the only place we knew of. We'd like to go there, too.

[00:30:21]
BOYTIM: It sounds nice.

[00:30:25]
GLUSKER: But Dorothy Hodgkin was just a very nice person. I mean, she was very anxious to be accurate and do the right thing, but to make sure people got credit for it. [She] tended to list all the people who'd worked on a project, you know, some people just write they did the work. But she certainly trailed after Todd and made sure everybody knew that it wasn't something that the organic chemists had—because they had found almost nothing out about the structure of that molecule.

[00:31:03]
BOYTIM: What did you think about that whole experience with Alexander Todd claiming credit for . . . ?

[00:31:11]
GLUSKER: Well, I wasn't surprised. I mean, I've since had the same—I mean, it's a problem. It's a common problem. I had an idea and I wrote about it and then I wrote a grant application wanting to expand it. And then some other person was saying he'd had that idea because I told him about it in a lecture. I was not pleased. Just thoughts that that man, he knew what he was doing. I guess you can accidentally not know. And you can have two people who think of something at the same time. You know, they say with some ideas, they reach a point where somebody is going to think of that particular scientific idea.

[00:32:11]
BOYTIM: Yeah. I imagine the experience must have taught you to be vigilant and to stay on top of what others were doing.

[00:32:16]
GLUSKER: Well, I mean, the problem was he would come beautifully dressed with a flower in his lapel, into a science lab where we were all dressed in old clothes and then say, "Make sure you tell me what the formula is."

[00:32:33]
BOYTIM: Oh my goodness. Yeah, and you mentioned . . . .

[00:32:37]
GLUSKER: But he did write a retraction to *The New York Times*, actually, saying he was not the one who found the structure, but somebody in his lab did provide the chemical that led to the determination.

[00:32:55]
BOYTIM: Right. Yeah. Interesting. You were saying that he had the attitude that giving your lab the crystals, it seemed like he thought he was giving it to some technicians or someone to just work out the . . . .

[00:33:07]
GLUSKER: Right, right, right. I mean, it's like nowadays, I think you might get some DNA and you might give it to somebody. And then you'd say, "I found that this person is so-and-so."

[00:33:24]
BOYTIM: I guess that also makes me think of, it's this famous textbook case nowadays, but Rosalind [E.] Franklin doing work in crystallography, and then who gets credit for the discovery of DNA? Of the structure of DNA.

[00:33:41]
GLUSKER: Yeah, yeah. Well I knew Rosalind Franklin.

[00:33:44]
BOYTIM: Yeah. What are your memories of her?

[00:33:48]
GLUSKER: Well, when I gave my talk on vitamin B_{12} and I gave it in Bristol to the—I think it was the American Physical Society. And she came up and she said, "I'm going to a fashion show this afternoon." We were in Paris. "I'm going to a fashion show this afternoon." Oh, yes, I gave the talk in Paris. She says, "I'm going to a fashion show. Do you want to come?" So I said yes. So I always tell people, "I went to a fashion show with Rosalind Franklin."

[00:34:20]
And I have a book that was written by her sister [Jenifer Glynn], *My Sister Rosalind Franklin*, by somebody who has no scientific information.[7] She came from quite an educated family. One of her ancestors, I think, was a prime minister—or some very important person in British government. I can't remember the details, but if you look her up, you'll find she—a great-great-grandfather [great-uncle, Herbert Samuel], something like that, was quite famous. And they were Jewish, and that wasn't very usual at that time. Except, of course, it was the time of [Benjamin] Disraeli, which, again, you know, was probably Jewish, well, he was, yes.

[00:35:04]
But she was delightful, and we had a very nice afternoon. I mean, the only bad thing in Paris in the fifties is if you were exhibiting clothing, you had to be very skinny. And these girls looked like—you wanted to take them and say, "Look, come with me, I'll give you a meal. You look like you haven't had a meal for months."

[00:35:29]
BOYTIM: I bet.

[00:35:30]
GLUSKER: Yes.

[00:35:31]
BOYTIM: Goodness.

[00:35:32]
GLUSKER: Yeah.

[7] Jenifer Glynn, *My Sister Rosalind Franklin* (Oxford: Oxford University Press, 2012).

[00:35:33]
BOYTIM: Did you talk about either of your work, either of your research, when you met her?

[00:35:39]
GLUSKER: Well, we didn't really. I mean, we talked about some of the other speakers in the talk, but we didn't talk much about that. We talked about clothing, and so on. I mean, [James D.] Watson wrote that she was not very good looking, but she was fine looking. I mean, she wasn't—you wouldn't say she was an absolute beauty, but she was a good-looking lady. Yes. Very good-looking. Yes.

[00:36:06]
BOYTIM: And I know Dorothy Hodgkin was one of the first invited to Cambridge to see the—

[00:36:12]
GLUSKER: She what?

[00:36:13]
BOYTIM: Dorothy Hodgkin was one of the first people invited to Cambridge to see the double helix model. Is that right? Do you remember that? There was a group—

[00:36:20]
GLUSKER: Yes, I think so. Yes, yes, yes. Yes.

[00:36:24]
BOYTIM: I didn't know if that felt like a big moment or anything.

[00:36:28]
GLUSKER: Oh, I think she was very excited about it. Yes, yes. There are pictures of her. She did get very excited when you'd find out something, she'd say, "Oh, that's great," was very pleased. So she was very positive compared with the spectroscopy man who was not positive about you getting results. It was just, "You'd better get some more for me."

[00:37:03]
BOYTIM: That makes a difference to have someone encouraging.

[00:37:05]
GLUSKER: Yes. Right, right, right. So she would come here. I mean, if she came to the United States, she always called me or she would come and see me. Want to know what the kids were doing and talk to them. That was good.

[00:37:23]
BOYTIM: Can I ask how many women were in your graduate program or in your lab specifically?

[00:37:30]
GLUSKER: Well [in] my undergraduate program, there were five women and 120 men in chemistry. My graduate work, I honestly don't know. Not . . . . But crystallography has done, with early people, thanks to Bragg. I have a picture of Bragg at the entrance.

[00:37:52]
BOYTIM: Oh. I see it.

[00:37:55]
GLUSKER: I say he's my scientific grandfather. He employed women. He said, "They can do it just as well as men can do it." Kathleen Lonsdale said there were quite a lot of women who saw that as a very interesting way to get into science. You needed to be good at math and being fairly good at art is a help too, to be able to see the arrangement.

[00:38:25]
BOYTIM: Did you have any sort of artistic background or experience drawing, or with visual . . . ?

[00:38:29]
GLUSKER: Well, my grandmother did beautiful art, but she died when my father was just one year old, so I never knew her. Most members of my family did painting a bit. Yes. Yeah.

[00:38:44]
BOYTIM: Okay. Grew up with it.

[00:38:46]
GLUSKER: I mean, I don't paint, I don't have time, but I have a lot of friends and I sometimes go to art class for a while and I find that it's—it's my major relaxation. Yes, yes.

[00:38:57]
BOYTIM: I bet. Yeah.

[00:38:59]
GLUSKER: I can have a terrible headache, go to a class in art, and the headache's gone immediately. So that's good. And it helps if you can draw some diagrams that explain things to the readers. A lot of people just put the picture that the computer has drawn, but that's often not what the reader needs.

[00:39:32]
BOYTIM: Or I wonder for your own process, too, does it help to draw things out, to think that way?

[00:39:37]
GLUSKER: Yes, yes, yeah.

[00:39:41]
BOYTIM: Okay, let's see. Just checking on time. Do you mind if we take a break for just a moment?

[00:39:56]
GLUSKER: Sure.

[00:39:57]
BOYTIM: Okay. [short break]

[END OF AUDIO, FILE 2.1]

[00:00:02]
BOYTIM: So one follow-up question I had was: With these crystals coming in from Alexander Todd's lab, was that a common occurrence, were people exchanging materials like that?

[00:00:17]
GLUSKER: Oh, yes, yes, yes. In fact, there was an industrialist [E. Lester Smith], I'm just trying—can't remember his name now. One of the problems of old age. He was also working on them and he would come and bring crystals, too.

[00:00:33]
BOYTIM: On B_{12}?

[00:00:33]
GLUSKER: Of the vitamin. Yes, yes, yes. It was a common problem, the lack of vitamin B_{12}. Now it doesn't exist. I mean, it appeared a couple of years ago, somewhere in the *New York Times* magazine section, as a doctor who had a patient who had pernicious anemia and just happened to know an Indian doctor who was in the same hospital, who said, "I know what that is." But it was an unknown. Yes.

[00:01:15]
BOYTIM: Yeah. Not even recognizable anymore.

[00:01:16]
GLUSKER: Everyone takes their vitamin B_{12} regularly. But you have to take a lot more if you've got pernicious anemia because the enzyme that pulls it from the food canal into the body is not doing its work properly.

[00:01:37]
BOYTIM: Yeah. And I wonder with an open exchange of material like that, sharing crystals or working with someone in industry or something, did that ever feel challenging to navigate how open to be versus how cautious to be about someone scooping your work or taking credit for it? I'm just thinking about—it sounds like there was an openness to exchanging materials, but then that could also get you in trouble if someone took credit for your work, if there was free exchange.

[00:02:08]
GLUSKER: Well, if you gave your crystals to someone to do the work, you would probably put their name on at least the original paper. Yes.

[00:02:21]
BOYTIM: Right. That makes sense.

[00:02:23]
GLUSKER: I did actually work hard to make sure people got their name on . . . . I used to have Drexel [University] students. I'd say, "I'll give one of you the first authorship, the first on the list." They come back to see me sometimes now, and say, "I don't even remember what I was doing."

[00:02:49]
BOYTIM: They got the credit.

[00:02:49]
GLUSKER: But they learned a little bit of chemistry as well, you see.

[00:02:52]
BOYTIM: I'm sure. And then, I think I was wondering if you could just talk through generally what the experimental setup is for X-ray crystallography. So starting with wanting to solve the structure of vitamin B_{12} for our museum visitors, perhaps.

[00:03:13]
GLUSKER: Well, I haven't been doing it for—I've been retired for twenty years, so I'm a little bit behind. But I can tell you about how we did it, which is you need an X-ray source, a good X-ray source. Different X-ray tubes involve different metals, so that you have different wavelengths, so you'll need to know what the wavelength of the X-rays that are coming out. The usual is copper radiation, has been reflected off copper. That's 1.54 angstroms, 10^{-8} centimeters.

[00:03:55]
So you have your X-ray source and then you have a little hole and you put what's called a collimator. It's just really a metal tube. So the X-rays only go through the tube; they don't just come all over the room. And it points at a crystal. The crystal's mounted on a goniometer head, which is just a series of arcs so that you can take the crystal mounted here and then you can rotate it until you get the axes or can get it the way you want. And so that as you rotate it, it's still in the X-ray beam. The goniometer head is moving. And then you put film around it and you take a photograph.

[00:04:45]
Then, of course, later on came the idea, well, you can design an instrument that has a detector,

which can move, and then you just measure where is the detector when it finds diffraction spots. So then you measure the diffraction spots, thousands of them, and you measure the brightness and where they are on the film. And from that you've got enough information to try and run an electron density map and worry about phasing still. So you maybe, might add a heavy atom to the protein and see what change that makes. And get more information on the phasing problem, which is the problem which various people have worked hard to try and figure out how to do. And there have been Nobel Prizes quite recently. I think went to Jerry [Jerome] Karle and [Herbert A.] Hauptman for figuring out how to work out what the phases might be more accurately.

[00:06:03]
And then you have your information. You'll have a three-dimensional map. You draw it in two dimensions, of course, and you can layer it. Or you get used to looking at it and you can put it on the computer, which is even easier, put your model of where you think things are and play with it that way. Yes. So you need a computer these days, but in the old days, you still could learn something. [phone ringing]

[00:06:34]
BOYTIM: Yeah. I'll give your phone one moment. But then I was going to ask about, so before computers, you had to look at the, measure the intensities by eye.

[00:06:48]
GLUSKER: Yes. When I was doing it, yes.

[00:06:50]
BOYTIM: Right. Had to get a feel for—learn to see that.

[00:06:56]
GLUSKER: Yeah. Well sometimes, you see, you'll get—I had once a crystal, it was a flat molecule and it crystallized like that. So we gave it a very sharp diffraction point in one direction, which was of course due to the distance between the flat areas. It would almost burn a hole through the X-ray film.

[00:07:20]
BOYTIM: So that was an intense spot.

[00:07:22]
GLUSKER: Yes, yes, a really intense spot. But you'd know immediately, you'd get to do

them, you'd say, "Oh, I know the flat—it's a flat molecule and it's lying parallel instead of lying like this and then this and then this and then this." But you do get these big variations.

[00:07:43]
BOYTIM: Yeah. And I think this summer when you were visiting our museum, you and Amy [Katz] were saying you would look at these images and look at spots all day. And then you would leave the lab and just be seeing spots everywhere.

[00:07:56]
GLUSKER: Yes, yes, yes, yes. And that's what I want you to change in the—

[00:08:10]
BOYTIM: In the exhibit.

[00:08:11]
GLUSKER: —display in your [Science History] Institute. Just make it a little clearer. I did have a request a few weeks ago from someone who wrote to [me, not to the Institute], saying, "What is this instrument?"

[00:08:24]
BOYTIM: Yeah, that surprises me, they would not reach out to us.

[00:08:28]
GLUSKER: I had to say a goniometer head. Yeah.

[00:08:33]
BOYTIM: Yeah. I remember Ann [Glusker] also said she had memories of seeing the electron density maps just all over your dining room table, working on those day and night.

[00:08:40]
GLUSKER: Yes, right, right, right, right, right.

[00:08:45]
BOYTIM: And did you build your own models once you figured out the structure?

[00:08:49]
GLUSKER: We did. Yes, yes, yes. I built them in England, and we used to use wax, but then I built a model here with wax, but a nice summer day, and all the wax was on the base.

[00:09:02]
BOYTIM: Oh, no.

[00:09:04]
GLUSKER: So I decided that was not a good way to go. But you can move—we used to have mounts for sticks, and then you could measure how far up and then put a ball here and then another stick in here and put a ball here. And then you got a picture of your molecule. But now, we mostly do it on the computer. We're, kind of, used to thinking in those terms.

[00:09:30]
BOYTIM: Yeah, that was like John [C.] Kendrew's approach to map the—

[00:09:32]
GLUSKER: Yes, right. Yes, yes, yes, yes.

[00:09:33]
BOYTIM: —"forest of rods" kind of . . . .

[00:09:34]
GLUSKER: Yes, yes.

[00:09:39]
BOYTIM: Okay. Well, I think those are all the questions I had from your graduate years. I don't know if you had any other follow-ups, Sarah?

[00:09:46]
SCHNEIDER: Yeah. The only other thing I was curious about was, you mentioned that first conference presentation, and I'm just, kind of, curious, how did you feel going into it? Did you feel like you were prepared? Were you—just what was that experience like presenting for the first time about that project?

[00:10:01]
GLUSKER: I was terrified. Absolutely terrified. And sure I would say the wrong thing, you see. But just, somehow, a joke came with the beginning, so that, sort of, settled me down and I could then proceed with what I was talking about and, kind of, forget the audience. Yeah. No, I was just terrified. I mean, here were all these important people. It was I had to go and talk about—and Dorothy's saying, "Go on up and you tell them."

[00:10:35]
SCHNEIDER: And do you remember what the reaction was of the people in the audience?

[00:10:39]
GLUSKER: Oh, yes, they were, thought it was great. Yes, yes, yes.

[00:10:45]
BOYTIM: It takes a lot of confidence to be able to say that you're contributing new ideas to a field that already has so many big names in it.

[00:10:52]
SCHNEIDER: Yeah, absolutely.

[00:10:56]
BOYTIM: Okay. Well, then, I guess as you were finishing up your graduate work, your husband—or at that point you were engaged maybe—had gone to Caltech [California Institute of Technology].

[00:11:08]
GLUSKER: I was engaged when I left England to go to Caltech, which is like a monastery. I mean, there they had no women. They didn't believe in women. We got married just shortly after that, yes. So when I came to Philadelphia, we had been married about a year. Yes.

[00:11:32]
BOYTIM: Were you always planning to move to the US together or was that . . . ?

[00:11:37]
GLUSKER: Well, we were trying to work out what to do because my husband's family is all

in California. We wondered if we should settle in England. I was offered a position in Oxford, in my college. So we could have stayed there, but we wouldn't earn very much, so it would be hard to go and visit his parents, whereas if we came to the United States . . . . And we'd said we were going to only look for jobs if they were both in the same city. And we were only going to leave that job if we were both unhappy with our jobs. We came to Philadelphia. I've been here ever since. So we were able to go back to England most years just to see parents and let the children know what Europe was like, which they loved.

[00:12:48]
BOYTIM: And you both had postdocs at Caltech? Postdoctoral fellowships?

[00:12:52]
GLUSKER: I was a postdoc. Yes, yes.

[00:12:54]
BOYTIM: Were postdocs very common back then? I feel like it's so much more normal now for someone after they get a PhD to go on to one.

[00:13:00]
GLUSKER: Well, it wasn't used—it wasn't general for a woman postdoc. I mean, my friend was the first woman graduate student and she had gone to work with Jack [John D.] Roberts at MIT.

[00:13:13]
BOYTIM: This is Dorothy [A.] Semenow?

[00:13:15]
GLUSKER: Dorothy Semenow. Yes. He said he would come to Caltech, but he wanted to bring all his graduate students and they said, "No problem. What were their names?" So he gave their initials and their names, and then they found out that one of them was a woman. And I have this from Dorothy. I mean, I have this straight from Dorothy. They said they would pay for her to go from Boston to California twice a year, all expenses paid, airfare, accommodation, everything to visit Jack Roberts. But she had to promise to get an MIT degree.

[00:14:01]
BOYTIM: Yeah. They didn't want her at Caltech.

[00:14:05]
GLUSKER: Have you talked to her?

[00:14:06]
BOYTIM: No, no, no. You were telling us this summer though.

[00:14:08]
GLUSKER: Okay. Yes.

[00:14:09]
BOYTIM: Oh my goodness.

[00:14:15]
GLUSKER: Jack Roberts actually talked to Linus Pauling, who was much more for—I mean, he wasn't for women. He just thought if women apply, treat them the same as the men. But then I had a case where I went to visit my husband, who was working for Jack Roberts on the fourth floor, and the X-ray rooms were in the basement. Maybe I've told you this story. Oh, sorry.

[00:14:41]
BOYTIM: No, no, no, please, for the tape. Yeah.

[00:14:45]
GLUSKER: We had to go down in the elevator. So he leant in and pressed the button on the elevator so I'd go down and he ran down the stairs. And I said, "What's going on?" And everyone laughed and said, "Well, he couldn't be alone in the elevator with a woman, just the two of you." I was thinking, "Oh, my gosh." Never would have crossed my mind. But there we are.

[00:15:13]
BOYTIM: Of course. Right, right.

[00:15:15]
GLUSKER: He was just supposed to be teaching me how to use the equipment, which is normal. Any place has their own rules of using the equipment and how to do it and how to be careful and so on. And then [Robert B.] Corey, who I was working with, was very helpful.

[00:15:38]
BOYTIM: So what was your project working in Robert Corey's lab?

[00:15:42]
GLUSKER: We were looking at some peptides, little bits of proteins, trying to do the structure. And I was working with a Frenchman [Robert Degeilh] who died a few years ago, but just before he died he wrote to me just to say he remembered working with me and wanted to, sort of, tell me about himself. The two of us were trying to do the structure of a small molecule. But there was another man [Richard Edward "Dick" Marsh] there at Caltech who also helped, and he finally solved the structure and we reported it. It was an early bit of a protein because everyone was interested in how a protein folded because Linus Pauling would have these ideas about protein structure. And he was a delightful guy. He was a lot of fun. Yes.

[00:16:44]
BOYTIM: What stands out from your time—

[00:16:45]
GLUSKER: He wasn't going to bother whether you were male or female. You just were a person who he could tell a funny story to. Yeah. Yeah.

[00:16:54]
BOYTIM: Were there any stories you remember him telling you?

[00:17:02]
GLUSKER: Not really, I can't think of one, but maybe I'll think of one. He would come to parties if we gave parties. He would always come with his wife. I went to a party once and he said, "Oh, so nice to see you. Come in. My wife is wearing the same dress you're wearing."

[00:17:25]
BOYTIM: Shopping in the same store. [laughter]

[00:17:28]
GLUSKER: We weren't, actually, but it was the same color.

[00:17:32]
BOYTIM: That's funny. Did you ever talk about your research with him, or . . . ?

[00:17:38]
GLUSKER: Oh, yes, yes.

[00:17:39]
BOYTIM: Or what was the lab environment? I imagine you had meetings.

[00:17:41]
GLUSKER: I was in his lab, so we had to report to him every once in a while. He would just say, "Continue thinking about these things, thinking about protein structure, and how a big protein would fold." We really learned by, when structures started to be published, rather than, I mean, there are so many varieties of ways for proteins to fold. But Corey followed me the rest of his life. He would write and ask what I was doing or tell me about something he thought I ought to know. That was nice.

[00:18:38]
BOYTIM: I guess I'm wondering how much . . . . Well, actually, I'll ask that later. Sarah, I know you had questions about Jenny coming to the US. Sarah is working on a project with oral histories of scientists who had immigrated to America and their experiences. Do you want to talk through some of your lines of questioning?

[00:19:01]
SCHNEIDER: Sure. Yeah. So I'm curious about if you remember that journey coming to the United States and how did you get here? What were some of your first memories from arriving in the US?

[00:19:17]
GLUSKER: Well, I came with Don, who I had met in the lab when I was an undergraduate. I mean . . . . He paid for my passage. He had saved. He had gone back a year earlier from Oxford because he was a Rhodes Scholar and he stayed for three years [in Oxford] and then he went back. And he was working at Caltech. So he came for me and we came straight to Philadelphia because he had a very close friend who was here at the university, Arthur [S.] Brill, who died recently. And we went around and looked around Philadelphia, which was, kind of, nice, and I just thought, "Oh, this is really nice," but it's, sort of, somewhat British and, you know, not so different as I had half expected.

[00:20:28]
And then we got on a plane to go to California. But in those days you had to stop in Chicago, [Illinois]. So in Chicago, there was a big line of Don's relatives at the airport, all wanting to see what I looked like and meet me and so on. So that was, kind of, nice. And they, kind of, took me and we all went out for lunch. And then we went on to California, where everyone had just got up, just had breakfast, and we'd had a full day.

[00:21:03]
And I got introduced to California. And I wasn't so sure about California. I didn't like it at first, but by the end of the year, I really liked it, living in Pasadena. A lot of nice people and easy to get around. Could go down into Los Angeles when you wanted to. We had an apartment that belonged to a judge, and it was in an area where you're not allowed to have residents living in your house, non-family residents. So I was the maid and Don was the butler.

[00:21:45]
So this judge, he said his main hobby was self-adulation, and indeed it was. And he told me he'd been to London and he got on a bus and there was a—a judge was on the bus but was in the British uniform for the judge with the headdress and so on. Actually, the headdress is very useful. I've had to testify in court. If you see people with a headdress on, you know they're—you know where you are and what's going on. So anyway, he saw this judge on the bus. So he went up to him and he said, "Hi, Judge, I'm a judge, too." And so the judge, sort of, looked at him and, sort of, moved away. And then he said, finally they came to a bus stop and the judge got off. And so the judge who was our landlord's wife said to me, "You know, the judge stayed at the bus stop. He was obviously waiting for the next bus." He didn't want to deal with this American poking him and saying, "I'm a judge, too."

[00:23:04]
And he had a fireplace, which had all sorts of rocks from Europe. "This is a bit of the, some important building in Rome. And this is part of a building in Florence. And this I lopped off such and such." And I said, "Oh, dear." We stayed there for a year and then came to Philadelphia, drove to Philadelphia.

[00:23:38]
SCHNEIDER: And when you came to the US, was that your first time in the US?

[00:23:43]
GLUSKER: Oh, yes, yes. Oh, yes, yes, yeah.

[00:23:45]
SCHNEIDER: And was there anything culturally that was an adjustment or transition, or

how—or did you . . . . I'm curious if you felt like it was somewhat of a smooth transition or if, you know, you encountered things along the way that were new?

[00:24:05]
GLUSKER: Well, I did all right. I had problems with certain things. I think I told you the story about sherbet and looking for . . . . I went to a party and they said they were short of sherbet. So I told you that story.

[00:24:21]
BOYTIM: Did you bring it up yesterday? I forget. I don't think it's on the recording.

[00:24:23]
GLUSKER: Yes. I mean it was such a—it was so funny. And to me, sherbet—

[00:24:27]
BOYTIM: Oh, you didn't know what sherbet—

[00:24:28]
GLUSKER: —sherbet is a powder that you suck up licorice sticks in England. You have a bag and you suck up the sherbet. So I went to the store to look for sherbet, and they didn't have any. They sent me to the ice cream department. I said, "I can't imagine why they'd send me to the ice cream department." So I went back and I said, "They didn't, no, the department stores don't have sherbet." So they had to send someone else to get it. So there are a few phrases that are just a bit different and you have to get used to and try and remember which way round you have to do it. Sometimes you forget, you know it's a problem, but you can't remember which is the English and which is the American way of saying it.

[00:25:19]
And I had trouble with the income tax because we filed a joint tax return because we were married before the end of the year. And they said, well, I was a nonresident alien for part of the year, which we had not noticed, having read the whole thing and somehow didn't realize the importance of that. But they finally decided I didn't owe them anything, so that was okay. Otherwise, I was used to traveling by then, so money wasn't too much of a problem. And I had my own bank account; I didn't share with my husband. The bank used to be worried about that, but I thought it worked. Might make our marriage better. Well, my husband, each month, always made sure everything was right. Each year, I just made sure it was exactly where I thought it should be. With that difference, it's not going to be good. I kept my account and I paid half on everything and he paid half.

[00:26:31]
SCHNEIDER: And I have to ask, when you came to California, what did you think of the weather?

[00:26:38]
GLUSKER: Well, I thought it was good, but I found nobody knew anything about the clouds. You know, my father-in-law said, "Well, you'll love California because it never rains." And I said, "There's a huge anvil in the sky, which is the sign of a major storm. Just look there, look." And he said, "Don't be ridiculous." And it wiped out a Boy Scout camp that weekend. I thought, "Well, I don't know how to predict . . . . " Because it does rain in the summer, just once in a while. I used to love to go out and get wet, "Oh, it's raining. How lovely." Everyone would say I was crazy. I didn't like Philadelphia in the middle of the summer. I would tell people not to come from Europe to visit in August. And then when we got air conditioning, it was easier. But before that.

[00:27:41]
BOYTIM: Yeah, it can be brutal.

[00:27:42]
GLUSKER: You might spend the night in the bathtub with cold water. Yes, yes.

[00:27:48]
SCHNEIDER: And so you mentioned being a nonresident alien. And then what was the process like of becoming a citizen? And when—do you remember when that happened?

[00:27:57]
GLUSKER: Well, I didn't do it for a long time because you had to give up your British [citizenship] and I wasn't going to give up my British. So I waited. It was '76 when I finally decided, "Why not?" So I applied. I didn't quite make '76. I[t] was '77 when I finally made it, but I had started it in '76. And my kids were in school learning all this stuff that I needed to know for the citizenship exam. So that was good.

[00:28:29]
BOYTIM: Good timing.

[00:28:32]
GLUSKER: We all worked on it together. So my kids were all anxious to teach me to make sure I knew what was being said. Then I had the exam. I don't know if I told you, but the final question he had was: "Who was the leader of Task Force Two in World War II?" And, of course, I didn't know. So I did what you always do. Well, I don't think it's Mark [W.] Clark. I don't think it's so-and-so. But I didn't get the right person. He said, "No, no, it was Omar [Nelson] Bradley." But I've asked a lot of people who tell me about the war and the various things, and I say, "Do you know who the leader of Task Force Two in World War II is?" And they say, "Task Force Two? I don't remember a Task Force Two." [laughter] So it was possibly just a trick question.

[00:29:31]
BOYTIM: That's a tough one. A stumper.

[00:29:34]
GLUSKER: But at the time . . . . So then when I got my certificate, it said I was born the day I got my certificate. So I took it to the desk, you know, and I said, "You've put my date of birth as 1977, and I'm here. I don't look like I'm newly born." And so on. The person says, "No, you don't, but you have to go to court to get your form changed." So I said, "But that's ridiculous." I said, "It's just obvious that it can't be right." So they've written across the back, "We made a mistake and the date of birth should have been so-and-so." But when I got married, I got married December the eighteenth, which was the week before Christmas. So the minister wrote Christmas Day as the day I got married. So my marriage certificate has on the back, "I made a mistake and they got married on . . . . " [laughter] So if you look at any of my notifications, you have to look on the back, too, to see if there's a retraction.

[00:30:53]
BOYTIM: You were telling us about someone at Fox Chase correcting your signature, too.

[00:30:56]
GLUSKER: What?

[00:30:57]
BOYTIM: You were telling us about someone at Fox Chase changing your signature, too.

[00:31:00]
GLUSKER: Yes, yes.

[00:31:01]
BOYTIM: This documentation, your whole life, there are these mistakes.

[00:31:07]
SCHNEIDER: Yeah. And so I'd love to hear about, what was your wedding like and who attended and yeah, what was that experience like?

[00:31:16]
GLUSKER: Oh, well, my husband was Jewish and my father-in-law said there was no way he was setting foot at a church. And my parents didn't want me to get married because they didn't want me to marry an American. They didn't care if he was Jewish, but they did care if he was American because Americans are not, don't make good husbands, they said. "You'll just be unhappy. You'll be divorced." They had been to the movies. You know, the movies then, in that time, were concentrating particularly on divorce and then what happened to the children. There were all sorts of things about crossing state lines and all that sort of thing.

[00:31:57]
So I talked to the minister and he said, "Well, I'll marry you in my living room, and then your father-in-law . . . . " Because I wanted my father-in-law to come, too. My parents didn't come. They said they couldn't come. They were not too opposed, but they just said, "Marrying an American . . . you should marry an Englishman." The wedding was small. It was just . . . let me see. My husband's cousin had married a non-Jewish person, so she knew how to do the whole thing. Lent me a wedding dress. So my husband's brother and sister and their families came. I think there was something like fifteen of us. Not very many. It was quite late at night. We went through the whole service. Married by a congregational minister. We had attended his church regularly, both of us. That was that.

[00:33:13]
SCHNEIDER: And can you say more about, so I'm curious, both you and your husband, it sounded like, attended this church. What kind of church was it?

[00:33:22]
GLUSKER: Well, I'm a Presbyterian. I was baptized in the Church of Scotland, which is Presbyterian. But this was a Congregational church because my husband's cousin went there and knew the minister. And he was very interested in world affairs, particularly where the atomic bombs had fallen at that time; we were, sort of, thinking about . . . . And I kept up with him for many, many years. Just wrote to him in California. He gave us advice from time to time. And then we came here and joined a church here, which was a Presbyterian church here. Yeah.

[00:34:11]
SCHNEIDER: And do you think—I could imagine that having an American husband may have made your transition a little bit easier. Did he ever help you out with learning some of the lingo in American English?

[00:34:25]
GLUSKER: Oh, yes, yes, yes.

[00:34:26]
SCHNEIDER: Or did he ever teach you things about American culture?

[00:34:27]
GLUSKER: Yeah, well, he was—I mean, he said to me one time, which I didn't know, the way I used the word "quite" is totally different in [British] English and American [English]. I can't remember which way around it is now. He would say, "Do you like this?" And I'd say, "Well, it's quite nice." And he'd say, "Does that mean you like it or you hate it?" [laughter] He wasn't sure. No, he was very helpful. And he was a good guy. Really good guy. My kids used to say they'd go to school and the kids were all talking about their parents screaming at each other all night. But we concentrated on sleeping, so they said they were glad of that. But he just dropped dead. And we were in England. Just dropped dead. Heart attack.

[00:35:24]
BOYTIM: Oh my goodness.

[00:35:26]
SCHNEIDER: Oh, wow. And how was it keeping in touch with family in England while you were in the United States?

[00:35:38]
GLUSKER: Oh, I wrote every month. Or maybe twice a month. Something like that, yes. Depending on . . . . When I had kids, young kids, it was hard to find time to go and write on these air letter forms that you'd get. My father kept all my letters, so I have a nice record of what I was doing because I didn't keep a diary at that time. Yeah. Yeah, we kept—and I saw them every year, pretty much every year. We took the children to be near their grandparents.

[00:36:20]
SCHNEIDER: And I was wondering about one other thing in thinking about your experience here in the US versus in Great Britain. Did you feel like the—your experience as a woman or the gender roles were different or different expectations here in the US when you arrived? Or maybe it depended more on the institution, like what Caltech was like versus Oxford, but I'm wondering if you feel like the—being in the US there were any differences in gender roles, or not.

[00:36:54]
GLUSKER: Well, there are differences in general, I mean . . . . I really worked hard to employ women and try and encourage them, and quite a few went on to do very well. So I thought that was something I could contribute. Women would have, still through the years, been having a lot of troubles. You know, they sue sometimes when they don't get the position that they're obviously entitled to, composed of the man who didn't even know what he was doing, and people liked him better. I had a friend that happened to. It can be dreadful. No, I . . . . The universities are fairly similar. I always thought Oxford was a particularly good one, and certainly it had women very early in the 1870s. The women's colleges. And the women went. Some of them quite famous quite early on, especially writers, some very good writers.

[00:38:30]
BOYTIM: May I ask, since we were talking about your husband, since he's a scientist, too, I'm wondering how much you shared intellectual interests and talked about your research together. Was that . . . ?

[00:38:42]
GLUSKER: Yeah, he was working for Rohm and Haas. He would sometimes take the—we would go to each other's lectures, to lectures that we were interested in. We would go together. He was very interested also in different cultures around the world, you know. When he retired, he retired early, and went to work down at the University Museum [Penn Museum] on some of their researches in, particularly, I think he was working on the age of wine and that kind of thing.

[00:39:23]
BOYTIM: This is Penn's museum of anthropology.

[00:39:24]
GLUSKER: Just before he died, he, they had an article about the age of wine. It made the front page of *Nature* at Christmas.[8] So he was very excited about that. Yes.

[00:39:36]
BOYTIM: That's so fun to have a passion project you can pursue like that after you finish work.

[00:39:39]
GLUSKER: Yes, yes. No, we kept up with each other's work. He knew it. And he gave a series of lectures at the Institute, even about flexibility in materials, which he knew about from working in silk and elastic materials. But he knew the chemistry of it, so people were interested.

[00:40:06]
SCHNEIDER: Interesting.

[00:40:09]
GLUSKER: And I went and gave talks at Rohm and Haas, every once in a while. [About] what we were doing.

[00:40:19]
BOYTIM: Yeah. Ann [Glusker] made a comment this summer that your husband was very supportive of your career.

[00:40:25]
GLUSKER: Very supportive of?

[00:40:26]
BOYTIM: Supportive of your career and you being able to take time . . . .

[00:40:29]
GLUSKER: Yes. Oh, yes. Yes. Yes. Yes. He would come to the meetings and have a good time. I guess one of the most interesting was we, in 1966, we had a meeting in Moscow, [Union

[8] Patrick E. McGovern, Donald L. Glusker, Robert A. Moreau, Alberto Nuñez, et al., "A funerary feast fit for King Midas," *Nature* 402, no. 6764 (December 1999), https://doi.org/10.1038/47217.

of Soviet Socialist Republics] and it wasn't very usual to go to Moscow in those days. So I said to Don, "You have to come with me to Moscow." He said, "Well, I'm not going to bring the children to Moscow." Because his background was Russian—Lithuanian, actually, but connected with Russia. So he said, "You never know with Russia whether—your children—you might get imprisoned or something happened that would make it awkward for the children." So my brother in England said, "Well, no problem, I'll look after your three children." He only had three children. He and his wife looked after six children for the week.

[00:41:30]
So he [Don] came to the meeting and there were a whole lot of women who had worked for Dorothy Hodgkin had gone to the meeting. So there was a series of men who were the husbands. So there were about six of them, I think. And they all got into a group and spent the week having a good time learning all about Moscow because they weren't attending the meeting. They just were having a good time, going to sports things and all sorts of things. He really loved that. Yes.

[00:42:01]
BOYTIM: I bet. Well, I guess this may be a good place to stop for today. I think I'll pause this recording.

[END OF AUDIO, FILE 2.2]

[END OF INTERVIEW]

INTERVIEWEE: **Jenny Pickworth Glusker**

INTERVIEWERS: **Jacqueline Boytim**
Sarah Schneider

LOCATION: **Interviewee's home**
Huntingdon Valley, Pennsylvania

DATE: **4 November 2022**

[00:00:00]
GLUSKER: [The recorder was turned on in preparation for the interview session and Dr. Glusker began discussing issues related to gender and science before the session was introduced. See below for session introduction.] And there was one interesting . . . I don't know if I told you. Did I tell you about Dorothy Hodgkin being carried out of a meeting?

[00:00:06]
BOYTIM: No.

[00:00:07]
SCHNEIDER: No.

[00:00:08]
GLUSKER: Well, at the time I was at Oxford the tradition was, I think both [in] America and in England, if you had a dinner party, you had the men and women all sit together. And then towards the end, the men move into a smoking room and have drinks and smoke. And the women all go to another room and talk about fashion and whatever, gossip, so on. So it was an American Chemical Society meeting and someone that Dorothy Hodgkin, who was one of the professors there, wanted to go to hear his talk. So she said, "I've come to hear his talk." They said, "Well, you can't come to hear his talk because you're a woman." And she said, "But I'm a member of the American—of the British—sorry, the British Chemical Society. I'm a member of the Chemical Society and it's not [exclusive]. It doesn't exclude women." The women all moved to their one room, and the men moved to another room, and then they went to the lecture room. So Dorothy went in, too, and found a seat and sat down. So they had a little conference, and a couple of men came, picked her up, carried her out of the room.

[00:01:32]
BOYTIM: That's incre—I can't even imagine that happening!

[00:01:34]
GLUSKER: I mean this is a woman who won a Nobel Prize.

[00:01:35]
BOYTIM: I know. I know. Oh my goodness.

[00:01:38]
SCHNEIDER: Wow.

[00:01:39]
GLUSKER: They just carried her out of the room. She told the story many times.

[00:01:42]
BOYTIM: Yeah.

[00:01:43]
GLUSKER: She was just surprised.

[00:01:44]
BOYTIM: That's wild.

[00:01:45]
GLUSKER: I think she didn't get to hear the lecture. She wanted people to know that that was going on.

[00:01:52]
BOYTIM: Yeah, that's too bad.

[00:01:55]
GLUSKER: But then other times, they didn't pay any attention. And that was fine. So now I've come to Philadelphia.

[00:02:06]
BOYTIM: Do you mind if we take one second? I think Sarah wants to just give an introduction so that we know which recording this is.

[00:02:12]
GLUSKER: Yes, right.

[00:02:14]
BOYTIM: It is started.

[00:02:16]
SCHNEIDER: It is started. Okay. All right. So today is Friday, November 4, 2022. I am Sarah Schneider, and I'm here with Jacqueline Boytim. And we're conducting the third session of an oral history interview with Dr. Jenny Pickworth Glusker at her home in Huntingdon Valley, Pennsylvania.

[00:02:33]
GLUSKER: Yes, right. Right, right, right.

[00:02:36]
BOYTIM: Okay. Well, I suppose, unless you had something else to add to that—

[00:02:40]
GLUSKER: No, I've said . . . .

[00:02:42]
BOYTIM: Yeah. Yesterday we were wrapping up your time at Caltech, and I think you and your husband were both looking for jobs to take afterwards.

[00:02:51]
GLUSKER: We were looking, yes. And he applied for a job at the University of Minnesota. But I said, "It sounds like it's too cold." And he went from California. He didn't own a coat, so he had to borrow a rain coat, of all things, go to Minnesota in the middle of winter. He walked down the street and people were stopping him and saying, "I see a little blue patch on your face. You might have a bit of frostbite. Be careful. Go and get it taken care of." So he said everyone looked out for him, but he decided it was too cold, as well.

[00:03:29]
We both applied to Rohm and Haas Company. And he had a very long series of interviews and they liked him very much, but they couldn't interview me at the same time. So I went out separately, and when I went, they met me at the hotel. I think there was only one hotel in Philadelphia at that time. Took me to see all the countryside and the flowers and everything, you know, "This is a beautiful place, surely you want to come. Even if you don't want your job, we want your husband to come." So we both got good offers and they were about the same. He got offered a little bit more, but he had another year's experience. So in that area, we actually had a way to check that things were going okay.

[00:04:24]
I wasn't sure what I wanted to do, so I wrote a letter to Dorothy Hodgkin and said, would she give me a letter of recommendation? I told her what I was planning to do, go to work for Rohm and Haas or DuPont because I thought that's what you did after you finished your PhD, got a proper job. So she wrote back this letter that starts, "You silly girl. Go to Fox Chase [Cancer Center] and there is [Arthur] Lindo Patterson, and he would be delighted to have you." So I looked up Fox Chase and I talked to various people and they said, "Oh, you can't go and work for him because he's leaving." So I thought, "Oh, dear."

[00:05:08]
It turned out the board of directors at Fox Chase had decided that there was a simple way to solve the cancer problem. And actually, in later years, my brother-in-law, who was Don's brother, who was a lawyer, said the same thing, "You just go to every single chemical you have and you test it for cancer and one of them will give you the answer." Well, of course, we know that that's not true. Even if we went through every one in the world, we still might not have the . . . . So they said, "That's the way to go."

[00:05:43]
And what they wanted to have was all the personnel at Fox Chase doing injections of mice of the various chemicals that were available to them. So those of us who were more mathematically minded said, "We're not going to. Can't. Injecting mice is not something we thought we would do when we grew up. It's not our thing. We like mice." Couldn't possibly do that.

[00:06:13]
But finally, enough people managed to persuade the board that this would not work. And so he did decide to stay. So he wrote me a letter and he said he didn't have a place, didn't have money, but he could employ me as a technician and for one year, then he guaranteed that I would then be employed as a PhD. So I said, "Well, that sounds fine." So I moved there for about half the salary that the industrial companies would have offered, but doing research of his kind was what I wanted to do.

[00:06:56]
BOYTIM: Can I ask? Before we get too far into your time there, had you considered applying for academic positions at all?

[00:07:04]
GLUSKER: Well, no, I was thinking more in terms of applying for positions in the same place that my husband was applying, where the two of us could. And I already had an offer from Oxford that I could stay there as a paid teacher, professor. Sort of assistant kind of a professor. But I decided I had to decide what I wanted to do and then all these things would work out. The position at Fox Chase interested the University of Pennsylvania. So I did then get an assistant professorship at the University of Pennsylvania. So I have that also. It should be on here somewhere.

[00:07:53]
BOYTIM: Yes. Yeah, I think . . . .

[00:07:54]
GLUSKER: I'm not sure where, but . . . .

[00:07:55]
BOYTIM: Somewhere.

[00:07:57]
GLUSKER: Yes. Adjunct professor. Which meant I was supposed to go down every once in a while and give talks and look after students. Suggest questions for PhD exams. I used to go to their meetings as well, downtown. So I did quite a bit there. That seemed to me to be enough. They didn't pay me, but they consider Fox Chase paid me.

[00:08:28]
BOYTIM: Right, right.

[00:08:32]
GLUSKER: So we were working on just one part of the body that involves work. When you get the right chemicals together, you then can move your muscles and do things. The Krebs cycle. And we were interested in the Krebs cycle because people believed that maybe some error in that might be where cancer was happening, but nobody really knew, of course. If you really wanted to, if you had cancer and you had a problem, think in those days it was quite

common to go down to Mexico and they had all kinds of, you know, foreign fruits and drugs that you could use.

[00:09:20]
BOYTIM: Oh, wow.

[00:09:21]
GLUSKER: Almonds and all these things, slightly . . . make you very ill, but at least might get rid of your cancer though at the same time.

[00:09:30]
BOYTIM: Interesting.

[00:09:31]
GLUSKER: So we weren't looking at cures. We were just looking at how these molecules worked. So that's when I had to apply the crystallography that I learned in working with Dorothy Hodgkin. Had to apply it. The lab had—it had some quite nice diffraction apparatus. Computing was not very good. All our computing was done with great big boards where you had to write your little program and put a metal thing into the right places, you know. It meant you had very sore fingers. You had to work on this big board and then you put it in the computer and maybe it would just add some numbers for you.

[00:10:29]
So you could do the same business of mounting your little crystal and having the photographic film around it. You got all the spots on it and then you'd have to measure all the spots. And mentioned where they are. You actually do it by a numbering, you know, you have a number, you do one, two, three, four, and now this one's one, two. So this will be one, one, you know, one, two, and so on.

[00:10:53]
BOYTIM: Okay. Coordinates, kind of.

[00:10:55]
GLUSKER: So you have that and then the number. Those are the data that we worked with. And then you had to take those and as I say, make a guess as to what the phase would be. Just want to draw something for you.

[00:11:14]
BOYTIM: Of course.

[00:11:15]
GLUSKER: [opens and closes a drawer and rummaging noises] She was summing waves. [drawing noises] The height of the wave depends on the number that will—it's actually the square root of the number that we got when we were measuring the intensity. So that's this—this is part. And how many there are in the unit cell depends on what the number. This is the, one, two, three, four, say the fifth. One, two, three, four, five. And this is the end of the unit cell. So you're adding. And then you want to add another one. It's a pretty bad pen. [rummages in drawer for a new writing utensil] So you're going to . . . . [drawing noises] You're going to take another one that you've measured and it will look a little bit like this, you see. So you're adding these numbers and these numbers and these numbers and these numbers until you get what you've done for maybe a thousand reflections. Which is what we're talking about. So you need the best of computers. And the best of computers had not been invented.

[00:12:58]
BOYTIM: Oh, okay. [laughter]

[00:13:00]
GLUSKER: They were being invented in downtown Philadelphia, actually, the ENIAC [Electronic Numerical Integrator and Computer] computer.

[00:13:05]
BOYTIM: Oh, that's right. At Penn.

[00:13:07]
GLUSKER: But that's when we needed to have help. Otherwise, you would spend just, maybe six months on one calculation just to get the answers all together. I think the B_{12} that I was working for, there was something like 3,500 reflections. So that's a lot.

[00:13:25]
SCHNEIDER: Wow.

[00:13:26]
BOYTIM: Right.

[00:13:27]
GLUSKER: And then to have to work all this out. So that's what we were doing. And then—so then we would add these all together and apply a mathematical equation, and you will get what's called a calculated electron density map. So you will have your unit cell, your unit, repeat unit. I mean, you know the definition of a crystal. It's the same thing repeated millions of times in all directions.

[00:14:03]
BOYTIM: Right.

[00:14:04]
GLUSKER: And so you will do your calculation and you'll have the origin and then you will have a big peak here. So you will know that in the real crystal structure, there's something that distance apart. And Patterson gave the equation to get this. But the real structure is probably something like this, you see. But somewhere there's a heavy cobalt and a heavy cobalt and then around it are smaller peaks. So then we'd say, "Well, what would these smaller peaks be? Are they the right distance apart to be a cobalt looking at an oxygen or a nitrogen?" And so we would go on and that's how we did the analysis.

[00:14:56]
But at the same time, the diffraction apparatus was being made better because people were trying to do structures. So you could buy automatic diffractometers if you could persuade the government to give you enough money to buy one. I mean, they were hugely expensive. The computing was much better, too, and the government grants were paying for computing. So your main problem then became how do you get enough money to be able to afford to use the better methods? Because then instead of taking six months to do something, or a year, it's going to take you a month or six weeks or so. I was right in the middle of that.

[00:15:50]
And, of course, developing—what I was involved with a lot was trying to develop how I analyzed the peaks that appeared around here. And I would say, "Oh, that's probably an oxygen or a nitrogen that likes to join onto the cobalt." And then you do another map with that information in it, which gives you the information on the phase. On the phase of this peak here is where its peak is. See it might be here, instead. A bit further over. So this is the phase, when I'm talking about how you're adding these, you really have—these beams each have a phase, so you've got to bring that in. So I'm not sure how well I explained that, but that's how you do your electron density map and then you've got your chemical formula.

[00:16:50]
BOYTIM: Yeah, yeah.

[00:16:51]
GLUSKER: If it looks good and you say, "This is the chemical formula in this unit cell, and if that is so, I can now calculate what the intensities of all the diffracted beams will be because that's the simple equation." And if they're the same or almost the same, you say, "I've got it." And sometimes it's no relationship, "Oh, I didn't get it." You know.

[00:17:16]
BOYTIM: Try again.

[00:17:17]
GLUSKER: So we go through all of that.

[00:17:20]
BOYTIM: Yeah. Do you mind if I take a picture of this just to have in our transcript?

[00:17:25]
GLUSKER: I should have some better pictures than that, but . . . . So, then a lot of people would come through the lab and they really didn't know how to do all of this. So that's when I thought, "Well, I'd better write an article for some journal or other, which tells how you do all this." Which is not my idea; it's what I was taught.

[00:17:46]
BOYTIM: Right, right.

[00:17:47]
GLUSKER: But this is how it works. I was writing the article, and then I think there was a journal that wanted to publish the current stage of crystal chemistry. So they said they would like me to write this article. And then Ken Trueblood, who I'd been doing calculations with in Oxford earlier on, wrote and said he had been asked to write a book and would I like to join with him? So I said yes. So that's when we wrote a text.[9] And apparently, it did very well.

[9] Jenny Pickworth Glusker and Kenneth N. Trueblood, *Crystal Structure Analysis: A Primer* (New York: Oxford University Press, 1972).

[00:18:32]
BOYTIM: That's right. Yeah. It feels . . . it seems like it's, like, canonical.

[00:18:38]
GLUSKER: Well it got translated immediately into Russian, you know, that sort of thing.

[00:18:41]
BOYTIM: Oh, wow.

[00:18:42]
GLUSKER: Yes.

[00:18:42]
SCHNEIDER: Wow.

[00:18:43]
GLUSKER: My son was very keen on listening to international radio. And then he would report that he had heard, to these various countries all over the world, and then they would write to him and send him information about their country. You know, "These are the parks and this is what our country is famous for." So he had this big file. Here he was, he must have been six or seven or eight, something like that, doing all of this. So he wrote a lot for the Russians and they said was there anything he would like? So he says, "Yes, I would like to get a copy of my mother's textbook." So. [laughter]

[00:19:27]
SCHNEIDER: Oh my gosh.

[00:19:28]
GLUSKER: So they had to seek it. But they did find it and sent it to him.

[00:19:33]
BOYTIM: Oh, wow.

[00:19:36]
GLUSKER: So, so much for that.

[00:19:37]
BOYTIM: That's so neat.

[00:19:38]
GLUSKER: It got translated into . . . oh, a few other languages. And more recently, more recent editions have been translated in Japanese, Thai, and that sort of thing. Yeah. So that was—that's a lot of work, though. Yes, yes.

[00:19:59]
BOYTIM: Yeah, yeah. And that's a great overview of your trajectory at Fox Chase. And I have so many questions to come back to. Is it all right if I come back to the beginning—

[00:20:11]
GLUSKER: Yes, right, right.

[00:20:12]
BOYTIM: —and you first learning about the Institute for Cancer Research? Just could you talk through that environment more and the kind of institution that it was?

[00:20:19]
GLUSKER: Well, it was founded by a pathologist [Stanley P. Reimann] who said, "We're talking about cancer and we're talking about something that goes wrong with growth." And, of course, that's what we all know, if you get cancer of the liver, your cancer will grow and grow and grow. If you're normal, you can't . . . your liver will grow and then stop growing because it reached the size it's supposed to reach and you've lost that ability to stop the growing. So he said, "We need to learn what we can about normal growth and abnormal growth and how they compare." So he founded the Institute. Didn't have very much money. Had a brilliant idea.

[00:21:06]
He talked to all the wives of wealthy people on the [Philadelphia] Main Line and how they could fund, if they would like, they could fund an animal colony where they were going to do experiments to find out about normal growth and abnormal growth. And somehow, he caught their fancy. I mean, he was very good. He would take—if he wanted to show people around the Institute that he'd built and I walked by in the corridor, I was a new employee, not very important, he'd say, "Stop. This is Jenny. I want you to meet Jenny Glusker." And he would say what I was doing. He'd get it all wrong, but it didn't matter. No, it didn't matter because a lot of places you'd go and you see all these important people walking by and they just walk by. But he

always stopped and said, “This man is so-and-so and he’s doing so-and-so.” So he was very interactive with everybody. And that was good. And it did help him to raise money and he would arrange parties. He was of German origin, so he would have the parties where you had to sing German songs. Some of them were great fun. What’s the autumn festival where you have to drink a lot?

[00:22:32]
BOYTIM: Oktoberfest, or . . . .

[00:22:33]
GLUSKER: Oktoberfest. Yes, yes, yes, yes.

[00:22:36]
BOYTIM: Oh, wow.

[00:22:36]
GLUSKER: And so he would celebrate that. So he really interacted with everyone. And he’d come by and he’s saying, “Are you working hard enough? You know, this is a very important problem. You’ve got to work with it.”

[00:22:50]
BOYTIM: Did he set research agendas for everyone or how did that . . . ?

[00:22:55]
GLUSKER: No, he would listen to what you wanted to do. But he might make a suggestion, “You might look at so-and-so if you . . . . I understand rats do better than mice in that particular thing that you’re looking at.” Or it might happen, “I know someone who can get you crystals.” And so on. Later on, there were people who communicated with the people going to the moon and so on, as to whether you could grow crystals better on the moon.

[00:23:24]
BOYTIM: Oh, interesting.

[00:23:26]
GLUSKER: Well, one of the things that’s good for growing crystals is not to pick them up and wiggle the test tube. If you just leave the test tube for a month, it’s more likely to have crystals

in it. If you get it up and shake it, then the crystals that you've grown will redissolve and, sort of, mess each other up. Then you get crystals with a little bit of this crystal, and a little bit of that crystal, whereas you want something that's all one crystal. No, he was very good, but he left. He had to retire eventually. And they got a younger man who was a hematologist, [Timothy R.] Talbot [Jr.].

[00:24:09]
BOYTIM: Talbert?

[00:24:10]
GLUSKER: Talbot. He ran the Institute. And he was pretty good, too, because when he was going to retire, he, sort of, said to me—he was talking to the next candidate—and he said, "The important thing, if you're the head of an institution, scientific institution, is that you help people as much as you can. And you take deep pride in the fact that people that you have employed have done well because you've helped them. And your helping them is the satisfaction that you get when you're a director, because you don't yourself find out things." [phone ringing] Sorry.

[00:24:55]
BOYTIM: That's okay.

[00:25:01]
GLUSKER: So I was there, and I worked for about ten years with Lindo Patterson, who was a very interesting person. He was working in the early days of crystallography and they were trying to work out the equations of how do you work out the equations that relate the things that you've measured, which is, you remember, is the number of the positions of the spots, so the number of the waves you're adding, and then their intensities. And he couldn't find out.

[00:25:40]
He was born in New Zealand and he went to Canada when his father moved there, when he was very young. Then he went to Germany and worked with Fritz Haber, because in those days you did work with—to go to Germany was the main thing. I mean, that's where science was before World War I—well, before World War II—that was the real center, knowing all these people. So he thought, well, he would—he had some life insurance that his father had given him, so he cashed that and cashed in everything else he could think of. And decided to take a year off and spend it going through the city libraries, reading the math section, and trying to find out how to get an equation that the crystallographers would use to work out this whole thing. And by the end of the year, he found it.

[00:26:43]
BOYTIM: Wow.

[00:26:44]
GLUSKER: Yes, he found it. It was great. But he also was dating the daughter [Elizabeth "Betty" Knight] of the chief executive at Bethlehem Steel [Corporation], who also worked at the Institute, who was an absolutely beautiful girl. Of course, her parents didn't see that as what she was going to do with her life. She went to Bryn Mawr [College] and studied science and decided that's what she wanted to do. So they eventually got married, but he had very little money. Of course, his father-in-law didn't think this was a good idea. I had to go through that, you know, your father-in-law . . . . I saw a movie the other night, which was to do with a daughter getting married, and the mother saying to the father, "You know, there's no man in the world who's good enough for your daughter."

[00:27:42]
So they did get married and they were very good friends to me and played a lot in my life. He became quite a famous person. Should have won a Nobel Prize for what he did, because other people have won the Nobel Prize for that. But he didn't live long enough. He died in 1966, rather suddenly and unexpectedly. Not entirely unexpectedly, he was getting old, having trouble getting around.

[00:28:21]
BOYTIM: What kind of role did he play in your research at ICR [Institute for Cancer Research]? Did you suggest the problems you would work on and he advised, or did he . . . ?

[00:28:34]
GLUSKER: Well, I would tell him what I wanted to work on, but he had the program. He had to raise money from the National Institutes of Health, which gave him an annual salary and a certain number of wages for scientists so that he could do that. He would write and say, "We're trying to find out about cancer." So the National Cancer Institute said, "Good, good, good. There aren't very many people . . . . " There weren't very many people doing that at the time. That seemed like too big a problem to tackle.

[00:29:09]
Now, I don't know if it's the end of your story, but while I was there, there was a man who I'd really like to talk to, David [A.] Hungerford, who was working on chromosomes. There were a lot of people working on chromosomes. In fact, when I went—my first day at Fox Chase, I was greeted by a girl who was working there, and she said, "You know, I work with chromosomes. Have you ever seen a chromosome?" So I said no. So she said, "Come with me." And she showed me a chromosome.

[00:29:47]
Well this man, David Hungerford, was also working on chromosomes, but he found, if you look at the chromosome of people who have a certain kind of lymphocytic leukemia, it's a little bit short; one of the chromosomes is a little bit shorter. And he announced this and he said, "You can look—if you look at a person's blood and you look at their chromosomes in the blood, and if you see a shorter one, you should have them diagnosed with this particular kind of leukemia," which was very difficult to find. So through the years . . . . And he called it the Philadelphia chromosome. You probably know there's a book about it.[10]

[00:30:35]
BOYTIM: Yeah, I've heard about it.

[00:30:37]
GLUSKER: You should read [it].

[00:30:38]
BOYTIM: I should?

[00:30:39]
GLUSKER: You should read. You really should.

[00:30:40]
BOYTIM: Okay.

[00:30:41]
GLUSKER: Go ahead and read it.

[00:30:42]
BOYTIM: It's a good story.

[00:30:43]
GLUSKER: Leave the middle out. Then someone, a woman at another lab [Janet D. Rowley], I can't remember who it was, did some experiments and found out an enzyme that reacted with

[10] Jessica Wapner, *The Philadelphia Chromosome: A Genetic Mystery, a Lethal Cancer, and the Improbable Invention of a Life-Saving Treatment* (New York, NY 2014).

the chromosome and clipped off a little bit—or she found the little bit that had been lost, which was important. Then people said, "Aha! Now, what was the sequence?" And, of course, more recently, they've been able to do these sequences. So they found out the sequence and what was chopped. And they were also able to find out what enzyme was chipping and what it was doing. So the obvious thing was they had to find something that would kill the enzyme, had to find a chemical that would make it not work, but wouldn't kill the patient for other reasons.

[00:31:43]
So that took a lot of work and the pharmaceutical company stepped in, which is why I said you may not have to read the middle of the book because there's a huge amount about that. But in the end, they found the enzyme. They found the inhibitor. And now, they can give it to patients with this one kind of cancer, which is doing exactly what I said earlier, which is, your problem is, you're supposed to stop growth after a certain point and it doesn't stop. And that's what this enzyme was doing. It was cutting off a bit, so it was failing to stop growing. And I don't know, some other enzyme must have been—I mean, a much more complicated process might have been involved. When you've cut your livers the right size, there must be some way something gives the message. But it's an amazing story because it's actually, people are existing—I mean, the rest of their lives—but they're existing on this chemical that inhibits that particular enzyme.

[00:32:59]
BOYTIM: Yeah. Wow.

[00:33:00]
GLUSKER: So the first part was found at Fox Chase and they don't seem to make enough of it. I think they should be telling everyone, but there we are.

[00:33:08]
BOYTIM: Yeah.

[00:33:11]
GLUSKER: I mean, it's only one very unusual form of cancer. But it shows that what you were looking for is what you should be looking for, something that would stop an enzyme saying, "You can go on growing," when it should have said, "Stop."

[00:33:34]
BOYTIM: Yeah.

[00:33:35]
GLUSKER: So if you get a chance, look at *The Philadelphia Chromosome*.

[00:33:39]
BOYTIM: I will. It sounds like such a satisfying finding and a clear . . . .

[00:33:43]
GLUSKER: Read the beginning and the end. You know, the pharmaceutical companies had a lot to do and they [inaudible] over who owned what information, a hundred different things that . . . .

[00:34:01]
BOYTIM: Yeah. And this makes me wonder, too, about your introduction to cancer biology, and coming from a chemistry background, how much did you have to learn once you started at Fox Chase?

[00:34:13]
GLUSKER: Well, I just tried to read as much as I could and go to the seminars and listen. Sometimes it didn't seem so interesting. The immunologists, of course, have all their peculiar things that they talk about, and you're not quite sure what they're talking about. I think that's why scientists have to have friends. It's important to go to a meeting, see your friends. It's a very important part of the interrogation process. You go to your best friend and you say, "I'm very stupid, but I never got this part straight." Somebody wouldn't have—other professors . . . you know, you couldn't go to the professor and say, "I didn't understand this" because "It's so ridiculous that you didn't know what I was talking about." But you can tell your friends and they'll say, "Well, think of it in this way." Or, "I have a way of getting it in my brain." And then you ask another friend and you finally then understand exactly what's going on.

[00:35:31]
BOYTIM: Yeah. Those informal learning opportunities.

[00:35:34]
GLUSKER: But it's an important part of the research, I think. Is if you can talk to people. But there are some people who just want to go away in a corner and do their research and they sometimes do very well, too. But the man who found out about penicillin [Sir Alexander Fleming] hadn't really been talking to people very much. I can't remember what his name was, but he gave a talk, which was announcing that penicillin will stop all this infection. He just was

so dull that nobody really noticed that he'd told something really exciting. Because he wasn't excited, he just told them.

[00:36:21]
BOYTIM: Right, right. Wasn't trying to make connections with people.

[00:36:24]
GLUSKER: "I did this and then I did that and then I did this. And then the person . . . . Stuff died on the tray—on the petri dish." But I've often thought about, "Why do we go to meetings?" Well you go because you'll talk to people as well about things you didn't understand and say, "You know, I never got this straight in my brain." In fact, if you go to the university, they will say, "We have these measuring equipment in chemistry to measure the weight of anything." And it said, "Come to the professor and ask him to teach you how to use the instrument." Silence. He'd say, "I know you were taught in school, but most people were not taught properly." [laughter]

[00:37:16]
BOYTIM: Right. Right.

[00:37:17]
GLUSKER: "Come and learn, really, how you should be doing it. Or I'll see you destroying the instruments by moving parts that shouldn't be moved and undoing little bits, and so on." The average scientist is not interested in deceit of any kind. They're just interested in finding out how things work. They look with a very negative eye on anyone who deceives with . . . . And I've only heard of, you know, maybe two or three in my lifetime, but really was pretending to have done a scientific experiment and found some results and couldn't possibly be. Okay?

[00:38:12]
BOYTIM: Yeah. Yeah.

[00:38:13]
GLUSKER: So I think I've gone from the beginning to the end.

[00:38:16]
BOYTIM: It's okay. Well . . . .

[00:38:19]
GLUSKER: So you think I can go back to the middle years?

[00:38:21]
BOYTIM: Yeah. I guess I'm curious about . . . . Well, could you talk a little bit more—you mentioned some about the diffraction apparatuses at Fox Chase and how they were advancing and how you were seeking out computing resources elsewhere. Could you just tell us about your laboratory setup at Fox Chase?

[00:38:45]
GLUSKER: Yeah, well, actually, I had—I mean, if you're working with X-rays, you've got to watch out for people. I mean, you tell them, "Do you know where the X-ray beam is?" And so on. And, "Show me—well, don't touch it, but there is where the X-ray beam is, and you don't get in the line of it. You make sure you have something to collect it so that it's not going to give people trouble." When I was in Oxford, there was a big box in one of the rooms where we had a lot of meetings and it belonged to a very famous scientist named [Frederick] Soddy. And Soddy had a whole lot of radioactive materials. And so I asked, "Well, that's an interesting box, but what's the box in the room for?" And they said, "Oh, that's where he stored all his chemicals." And then one day somebody brought in one of these detection devices and said, "There's a big beam of radiation of various kinds coming out of the keyhole to the safe."

[00:39:52]
BOYTIM: To the box. Oh my goodness.

[00:39:55]
GLUSKER: No key in it. And out into all these people was a beam. So you've got to be careful. You've got to know how to protect the room. So I guess they had all together . . . . Well, I arranged for most of my people who worked for me to have a little cubbyhole that belonged. Yeah, about the size of this kitchen without the cabinets, but just a desk and where they could put their papers and think about what they had done.

[00:40:27]
Then we had a big room, which had the X-ray equipment in it, which was very extensive. The computer would probably be in the same room, although it might not be. We had a room, which was where we looked at crystals and layout solutions, and it had to be a room where nobody would go in just and move things around. A room where they should be left where they are. I had a lot of fume hoods so that you could work in the fume output and all the air was going up, away from you. So it was quite a big operation. As I said, I had seven rooms. One of them was my office and then most of the others were apparatus of some kind or other. I actually had a

very big table at one place, and people used to like to sit around and talk about what they were doing every once in a while.

[00:41:41]
And then I found all the Chinese students would come down in the early morning to have coffee. So I said, "Uh, what are you here for?" "Oh, we came down because you have coffee." So I said, "Well, you have to talk science if you're sitting at this table." So for a while they decided to go somewhere else. But I think I was almost the last place that they were allowed to sit and just chat. They like to get together and chat.

[00:42:10]
BOYTIM: I bet, yeah.

[00:42:11]
GLUSKER: So we had, a lot of people came from abroad, often with their own money. I had a girl from Germany [Beatrix "Trixie" Wagner] who had a Humboldt scholarship. I had a fellow from Japan [Setsuo Kashino] who was working in industry, but he got a year off to come and work with me. Did a lot of good work. Couldn't speak English very well. I tried to teach—tried to arrange for him to go down to the University of Pennsylvania and be taught English, but it just didn't get through to him. But I've corresponded with his children ever since. He died recently. But he would tell people he liked my textbook, so he would have his classes—he was at [Okayama University], which is right at the very end of Japan.

[00:43:10]
When I went into his office, there was a big picture of my cat. I had a cat who was taught—who liked to sit at the table when we had visitors. And so we taught it to sit at the table but he wasn't allowed to put his paw on the table or ask for food or anything. Had to just sit there the whole time, and a lot of people were very impressed by this cat. And it wasn't allowed to get on the table or leave the chair. These kids in Japan all saw the American cat who just sat at the table while everybody else ate. I mean, I'd already fed him, of course.

[00:43:54]
BOYTIM: So what would a typical day or week in your lab look like with all of these different components and different people working there?

[00:44:03]
GLUSKER: Well, the most likely thing is that I would be . . . I would go to my office and see what the new mail was and what I was expected to do. And I was expected to do a lot of editing. If somebody wrote to a journal, they would write and say, "Is this paper any good?" And so I

became an editor and then became the organizing editor and that took a tremendous amount of time. So I would do that.

[00:44:33]
And then I would go to one of the people who worked for me and say, "Do you want to chat with me or are you busy?" And they'd say, "Oh, yes, I've been meaning to ask you about this thing and if I should do this or that, which would be the best way to proceed?" And, "I think I've got the answer and take a look at what I've got." So I would go around.

[00:44:58]
I would then go and see that the apparatus was all in good shape and properly organized. And I had a rule that if they misset the readings on the diffractometer, they had to tell me and then they had to redo all the measurements that they did with the wrong settings. But if they didn't tell me, then they'd lose their jobs. So they all were pretty good about that. Well, you know, it's very tempting to say, "Well, she won't notice. Or it's just a lot of numbers." I'd say, "You're going to lose your job if you do that." So you have to keep them a little bit in order, find out what their problems are, who they're having arguments with, and the usual life experiences of people, of scientists. I had a nice group and they still come and see me, so that's pretty good.

[00:46:03]
BOYTIM: Did you ever have to seek funding for your lab yourself, were you . . . ?

[00:46:07]
GLUSKER: Yes, I did. All of the—yes.

[00:46:08]
BOYTIM: I didn't know if that was your responsibility.

[00:46:09]
GLUSKER: I worked for ten years and then Patterson died. I mean, he just went to lunch and then suddenly he keeled over. They took him to a hospital, but he never regained consciousness, and his wife just wanted him—didn't want people going in. So none of us know what really happened, but it didn't matter. He was gone. And then they were trying to figure what to do. So I said, "Well, I've got three children at the moment." And I'm not sure I wanted to run the lab. But then after a while, they kept bringing people in and finally they just decided they would keep me as running the lab. So that's what happened.

[00:46:54]
BOYTIM: No one else better.

[00:46:57]
GLUSKER: Well, I was working part-time. I was only working half-time.

[00:47:00]
BOYTIM: Oh, okay.

[00:47:02]
GLUSKER: I mean, my son, I guess, was three. Or two and a half and three. And I thought I wanted to spend time with him. Those years go very quickly.

[00:47:16]
BOYTIM: Yeah, I bet.

[00:47:21]
GLUSKER: I had to go full-time in the end.

[00:47:24]
BOYTIM: Yeah. Did you hit the ground running? Did you feel like you had been well prepared just learning from Lindo Patterson, or . . . ?

[00:47:30]
GLUSKER: Oh, no, I knew what to do. I knew what to do. I mean, in fact, in the last few years of, couple of years of his life, he was trying to work out a new theory. So he was leaving me to run the, keep the lab going. They said it was a nuisance that I didn't work full-time, but they got used to it. I'd say, "Well, you've got families, too, think about it."

[00:47:57]
BOYTIM: Yeah. What was that new theory or new area of research that you were taking over at that point?

[00:48:06]
GLUSKER: I think it was just to do with the summation, but sometimes when it didn't work, what to do about it. Yes. And he never did work out the answer. And in his will he left us, various people, to continue that research, but they didn't.

[00:48:26]
BOYTIM: No one could carry it forward.

[00:48:29]
GLUSKER: Yes. Right, right, right.

[00:48:34]
BOYTIM: Well, I was curious about you having kids and what years they were born and how you juggled your work-life balance.

[00:48:45]
GLUSKER: Well, it wasn't too hard. There were no daycare centers. I mean, it was only after my kids were in school that I helped found a daycare center. But I just put a notice in the paper and just said I wanted someone to come and look after my children. I wanted to do it for five days a week. Remember, I had a full salary as well as my husband. I mean, both of us were—we could afford something. I think the first time I did that, I put the ad in the main paper, the Philadelphia—I don't remember what it was at that time. That would be in about the fifties, the very late fifties, beginning of the sixties. I had a huge number of people. Something like fifty people applied for the job.

[00:49:46]
BOYTIM: Oh, wow.

[00:49:47]
GLUSKER: Yes.

[00:49:48]
SCHNEIDER: Wow.

[00:49:49]
GLUSKER: Yes. I mean, they were supposed to clean the house and watch the children and that I would be there part of the time, but not all of the time. So everyone said . . . . So I found a lady who said, "I can do it for you, but I only do it two days a week." And so I talked to her and I liked her. So I said fine. And then somebody else said, "I could do Wednesday and I could do Friday." I said fine. And then I had to find someone for Thursday and I was ahead. So for fifteen

years, I think it was, we had the same people and they all knew about each other. So if one got sick or had to go to the doctor, they would say, "I have to go to the doctor. Will you do my day and I'll do your day?" And so on. So they knew each other and . . . . But then the kids would say, "I thought today was Tuesday and Mrs. so-and-so came." [laughter]

[00:50:53]
So I had a variety of Black and White people helping. The one who came Monday and Tuesday did a lot of cleaning and had the kids help her clean. And her kids used to—she used to bring her kids sometimes. And when she died, one of her kids came to the house and asked me to go to her funeral. We kept the relationship many years after they were in college. And then the next lady would take them for walks. And she owned a horse. She lived near here and she owned a horse. She and her husband owned a horse. So they'd take the kids to ride the horse or clean up after the horse. So they loved that. So they would stay with the Wednesday and Friday lady, if we went on to a meeting, the two of us, Don and myself, she would look after them for the week. I'd pay her extra, of course. And then one was just the mother of a neighbor, of one of the neighbors, but who liked to play cards with them. So there we go.

[00:52:05]
BOYTIM: Yeah. And what are all of your kids' names? Can you, so it's . . . .

[00:52:10]
GLUSKER: Well, the oldest is Ann because she was named—her grandmother died just before she was born. So that's her name. And my son is Mark John. And my youngest daughter is Katharine. I remember talking to a lady who said everyone knows how to spell Katherine. And I said, "You do?" [laughter] And the girls only had one name because I thought they would use their childhood name as a middle name. Because I did. But they said, "You should have given us a middle name." If you have children, there's always something you did wrong.

[00:52:59]
SCHNEIDER: I'm curious about something. When you were working in, you know, say, the 1960s, 1970s in the US here, there was the Civil Rights Movement. There was the women's [rights] movement and a lot of change happening in society. And so I'm curious what your experience was of that period, if you were involved in anything or just if that impacted your thinking about your work and your life.

[00:53:27]
GLUSKER: Well, to some extent, I had no time to be involved because I was involved a lot with the school. And, for example, Kathy, I have—well, Ann did very well in school. Mark did very well in school. And Kathy didn't want to be like them. So by accident, one time, she made the list. What are they called? There's a special list that they give if you've done very well.

[00:53:54]
BOYTIM: An honor roll, or . . . .

[00:53:55]
GLUSKER: She had to come home with a note to say she'd done well and she'd say, "I didn't mean to. I tried not to. Here, I got it." But she said they had a special program for children who were very bright and they could do extra things. And so they asked her what she'd like to do as extra. And she always loved to build things. So she said she'd like to do house building and archeology and how things are built. So they said—so when she went to the class, they said, "Well, we figured out what you can do for house building. And we found someone who's an interior decorator who will come and tell you how to decorate your living room and dining room." Well, that went over like a ton of bricks. She said, "That's not what I said. That's not what I wanted to do. I'm not into what color your cushions should be. I'm into how do you make the arches?" So I had to go to the principal and say, "I want my daughter taken out of the gifted program and put back in the ordinary class because she said they were messing up her math class." Let me take her out for this special gifted program, and then it was going to be about cushion colors.

[00:55:20]
But then my husband and I also joined a group for Cheltenham Township, which was anybody who had a science degree. We used to meet and talk about what we should do for children and teach them extra science. So we would tell them things. And we were quite [inaudible]. Quite a lot of very interesting people, including those who were, people who were developing the computing system down at Penn. So we got to meet them and that was nice. We had two kids who we were in charge of. They then went on to college and we said, "Write and tell us whether the program was any good." [coughs] Excuse me, I'm losing my voice. This kid wrote and said, "You indicated that it was fun to do science and you got all these results." And he says, "Here I am now doing research, and I've been doing the same thing for six months and I haven't found a thing. You led us astray."

[00:56:28]
BOYTIM: Part of the process. [laughter]

[00:56:32]
GLUSKER: So it wasn't quite clear how much we were helping the kids. But Abington and Cheltenham were pretty good high schools. I mean, they worried a lot about it. Before we looked for this house, we looked to see what townships are where and what reputations they had.

[00:56:53]
BOYTIM: Do you want to pause for a moment and get a drink of water or something? [pause in the recording] Okay. So we're back on, and you were talking about Fox Chase.

[00:57:00]
GLUSKER: There were lots of quite important people. Jack Schultz was an important [geneticist] and development biology. Bea [Beatrice] Mintz, who recently died, was working on many parent mice. She did a lot of good work, too. I think she was, sort of, half considered for a Nobel Prize for her work. But she died recently, aged [almost] 101. Barry [Baruch S.] Blumberg won a Nobel Prize. [Irwin "Ernie"] Rose won a Nobel Prize. So that's pretty good for a small institution.

[00:57:53]
BOYTIM: Certainly.

[00:57:54]
GLUSKER: Nobel Prize winners in it. Yeah.

[00:57:56]
BOYTIM: Yeah. It seems like all your life you've been around these Nobel Prize winners.

[00:58:00]
GLUSKER: Yes. Right, right, right.

[00:58:02]
BOYTIM: Does that set a certain standard for the quality of research you're doing or a certain tone for . . . ?

[00:58:07]
GLUSKER: Well, one of the ones who kept coming was Max Perutz, who worked on the structure of hemoglobin.

[00:58:15]
BOYTIM: Right.

[00:58:16]
GLUSKER: And I think he thought because I'd done a lot of writing, as you may have noticed, that I was going to write his obituary. So he came several times to teach me how to write a good obituary.

[00:58:29]
BOYTIM: Yeah.

[00:58:30]
GLUSKER: Sad, yeah. I've been thinking about what I should say to you about obituaries. But, of course, when he died, I wasn't the person they asked. But I have written quite a few obituaries. But it's actually, kind of, fun to find out about people and all the things that they found during their life and how they felt about it all.

[00:58:58]
BOYTIM: Could you tell us a little bit more about—you mentioned your early research on the Krebs cycle and then . . . .

[00:59:05]
GLUSKER: Yes. Well, when I took over the lab, I decided there was one major enzyme that was working in the lab and I could work out how it worked, which I did. So that's—I concentrated on that for a while. I was working in the dining room area, which also, the table served as a . . . and I have these little models and I was working on them one evening at home. Mark was a tiny baby and he let out a shriek. So, you know, what you do is you drop whatever you have and you go running upstairs to see what happened. So when I came back, this substrate, the thing that the enzyme worked on, looked different because the model had, kind of, rotated a little bit. So that gave me an idea on how this worked. So I always say to Mark, "You helped me figure this out." So I worked on that for a while, and what the implications were.

[01:00:10]
But I was also working on materials that go into DNA, especially these hydrocarbons. And some of them are not very flat. I'm trying to work out if they were not very flat, did that make them more carcinogenic than the ones that were very flat that were fitting into DNA? We did some structures about that. Didn't come to a really good conclusion.

[01:00:40]
BOYTIM: I'm just not familiar with that science. So the hydrocarbons going into the DNA was—

[01:00:45]
GLUSKER: You know what DNA looks like? It's the [inaudible] thing. And I say, this is one of the reasons that you have to do things in three dimensions and not two, because if you draw a picture of a double helix, you do your . . . you have your two DNA. [drawing] DNA, wiggle, wiggle, wiggle, wiggle, wiggle, wiggle, wiggle. It looks like that sort of thing. But sometimes, you can . . . if you twist it a little bit, then the lines in the middle separate and something else can go in between. And it may not matter or it may matter a lot. You see.

[01:01:33]
BOYTIM: Just in the environment of the cell, things go in there.

[01:01:35]
GLUSKER: It's just something that could happen as causing cancer. So we looked into that. But we also started working on an enzyme, which had been sent to us, xylose isomerase. It's quite a simple enzyme. We were working out the structure and how it folded, what determined how it folded. It, kind of, makes a kind of barrel like this. And there in the middle is where all the work comes. But you've got your barrel with a folded protein. That was fun.

[01:02:19]
But they were beginning to do a lot on neutron diffraction at Oak Ridge [National Laboratory] and in Los Alamos [National Laboratory] and . . . well, various places, and I would go and see about that and try and work with the people there to measure what happens with neutrons. And neutrons are interesting because if an X-ray comes along and it hits an atom and it's diffracted, but it's diffracted by all the electrons that are around the nucleus. But if a neutron comes along, it's diffracted by the nucleus. So you've got the nucleus for neutrons, and then the electron density around it for X-rays. So with X-rays, you're finding the average, the center of gravity of this map of electrons. So if you want to know about bond distances and whether it's a strong bond or a weak one, it's nice if you really know where the nuclei are. So we did quite a lot of work with that. Yeah.

[01:04:02]
With writing, I got to be editor of the *Acta Crystallographica*. And then they put me in charge of a new journal to be the *Acta Crystallographica* for big molecules, proteins, and so on. So I did that for, I think, six years I was the editor. And that was a huge amount of work. I was an editor of a few other journals.

[01:04:41]
I also got asked at one of the teaching commission meetings, they used to hold it in Sicily, [Italy], and they asked me to go down and give a talk in Sicily about teaching crystallography. So I went down and told them what I did. And gave them a lecture and they liked that, so they

put me in charge of crystallographic teaching. So then I had to go around the world setting up schools in various places, and you probably have a list. I think I have a list of some of the places I went to. Crystallographic teaching. [pause while looking through papers]

[01:05:47]
BOYTIM: I'm seeing lots of place names.

[01:05:48]
GLUSKER: India. Florida. Bucknell University. Chinese University of Hong Kong, just when Hong Kong was going over to the Chinese. Athens, [Georgia]. And I know I gave it in the Suez Canal University. So those . . . and in Cairo, [Egypt], I did a school in Cairo as well. So it's, kind of, interesting because I didn't speak a lot of these languages. Everybody reacted well, would try and teach me what to do.

[01:06:34]
I don't know if I told you the story about going to Thailand. I love Thailand. Thailand is marvelous if you ever get a chance to go. So I was running this school and they came in one day with a big orange gown and they said, "We have a holy festival tonight and the priests in these golden gowns will walk around holding a lotus flower and a candle. Would you like to join us? Here is a golden gown for you." So what would you do? I thought, "Why not? Sounds like an interesting evening." So I went with them and I got in the golden gown and we walked around to the music, holding a lotus flower, actually, and a candle and the gold-colored gown. It was, sort of, orange, really. It was very moving. So, of course, I came home, said to my minister, "I'm thinking of changing to Buddhism as my religion." [laughter] But it was, it was very moving. It was very nice.

[01:07:49]
BOYTIM: Special, yeah.

[01:07:50]
GLUSKER: Yes, yes, yes. In Cairo, they were having a lot of trouble when I was there. A lot of Egyptians had found a group of German tourists and captured them and taken all their money and everything. So the government issued a note that if you see visitors walking around, you have to have two armed guards follow them everywhere. There was a friend of mine who was actually involved in Islamic religion. So she took me over to the church and we went inside, and then when we came out, there were two girls wanting to go shopping. So we had these police who followed us everywhere we went. With the machine guns and everything.

[01:08:50]
BOYTIM: Oh my goodness.

[01:08:52]
GLUSKER: We kept, sort of, looking, and didn't speak enough to really ask them what they were doing, but we worked it out because they obviously were not . . . they were not taking notes or anything. They were not. They were just there to make sure nobody bothered us. But then I had to go from Cairo to Suez Canal [University]. I had to do it by bus. I don't know if you saw the movie *Romancing the Stone*, but they were traveling around trying to get to some place in—

[01:09:25]
BOYTIM: Colombia.

[01:09:26]
GLUSKER: Colombia, yes. And that was just like it. Going across the Sahara Desert.

[01:09:31]
BOYTIM: Oh my goodness. [laughter]

[01:09:34]
GLUSKER: Everybody with their chickens and the . . . you know, everything else. It was exactly the same. It was just very funny.

[01:09:42]
BOYTIM: You seem very travel hardy. [laughter] Lots of experiences.

[01:09:46]
GLUSKER: But I enjoyed it. It was, kind of, fun and nobody bothered me. They were done to know if I wanted something. They'd give me stuff to eat, and so on. I'd have my pile of papers to hand out for the students. I had a lot of fun doing it.

[01:10:06]
BOYTIM: I bet.

[01:10:07]
GLUSKER: I think some of them quite liked it.

[01:10:11]
BOYTIM: Can I ask more about how much teaching has been part of your career? Is that something you always enjoyed doing? Is it more that this fell in your lap?

[01:10:19]
GLUSKER: Well, in the schools, I really give the main talks about, you know, the overview of crystallography. And I'm going to be doing that in a few weeks. I think it's the University of British Columbia is setting up a professorial system, and they wanted someone to introduce it with a talk about crystallography. I've got to give that talk, but I won't go. I'll just Zoom it [give a remote lecture via a Zoom video call]. So I still get asked. I'm not sure I know how to do all the presentations of slides and so on, but I'll find out in the next few weeks. Yes. They said they would do everything to make sure . . . I just turned up with some spoken words.

[01:11:13]
BOYTIM: That sounds great, yeah.

[01:11:16]
GLUSKER: Mostly—I get asked quite a lot. People in Japan want a lecture, and I think, "I can't go to Japan now." I can scarcely walk upstairs without having to hold onto the railing. My family all worry. Don't want me to drive or anything. The problems of old age, I guess. Both of you don't have to deal with them.

[01:11:50]
BOYTIM: I guess I was, kind of, glancing through some of your works on teaching crystallography last night, and something that I came across a few times that was interesting to me was an analogy you make between crystallography and microscopy.

[01:12:05]
GLUSKER: Yes.

[01:12:06]
BOYTIM: Could you talk about that a little bit? It might be interesting for museum visitors.

[01:12:10]
GLUSKER: You mean just going down in scale? Yes.

[01:12:13]
BOYTIM: Right, yeah.

[01:12:14]
GLUSKER: Yes. Right, right, right.

[01:12:17]
BOYTIM: So if you were to explain X-ray crystallography to someone who is totally unfamiliar but might understand a little bit about how a microscope works, how would you . . . ?

[01:12:28]
GLUSKER: Well, let me think about this. I'd probably talk a little bit about the surfaces of crystals, which are, kind of, interesting, and how they tell you what's sitting on the surface sticking out. You can make guesses about it. But you're going down many orders of magnitude, but you still can look at that and you could have left-handed crystals and right-handed crystals. You could have left-handed molecules and right-handed molecules and how they crystallize. And that's a very interesting problem. I think that's how I'd go. I mean, it's all rather the same, but . . . .

[01:13:20]
BOYTIM: Right. Just a different scale.

[01:13:21]
GLUSKER: But you have to have a shorter wavelength light to be able to see these things. It's been a revolution. I was reading an article about . . . . When I first came to Philadelphia, there was a magazine that, once a month, published a list of all the articles in the scientific journals for that week, and it was very useful. I mean, now you go on the computer. But then you would find that somebody had written an article about something you were really interested in.

[01:14:07]
And his secretary wrote an article and said she'd worked for a long time, but her father had told her, "If you want a really good job, go to people who are working in a new field. If the new field works out, you will gain a lot." And I was thinking, "Oh, that's what I did." I started off in a new field, you know, and other people were going off in spectroscopy, which was much further developed.

[01:14:37]
BOYTIM: That's right.

[01:14:40]
GLUSKER: Other people were growing certain chemicals, and so on. But doing the crystallography was just wonderful because they were still trying to work out how it worked. And I was able to be involved in that kind of working out how it worked, sort of thing. Yes. So as I said, I've been very lucky in my life. It's all luck. It really is. I mean, whether you get into the college you want to get into is luck, and if you don't, you're sad. Whether you get the degree that you wanted or not or the level of degree, and so on.

[01:15:21]
BOYTIM: You've also talked about a lot of mentors you've had over the years, and, I don't know, I'm curious about your approach to mentoring. It sounds like you've supervised a lot of staff and done a lot of teaching and . . . .

[01:15:37]
GLUSKER: Yeah, I've had a lot of women who said I've mentored them and they appreciated that. Which usually involved getting them out of some situation with someone they didn't like and couldn't get along with and were in despair. And then it didn't have to be in despair. They just had to change their jobs. A lot of people don't want to change jobs, but sometimes you can see that if they change jobs, the problems that they list every day might just disappear. So they go and work for someone else.

[01:16:21]
Well, I enjoyed having all these people and tried to see the best, show them the best they could do and help them develop. Grumble at them if they didn't do it quite the way I thought it ought to be done. But teaching . . . . I think working with Ken Trueblood was good, but I think I, kind of, knew what I didn't understand, and I was scared to leave. And also, I did another textbook and I wrote to various people. Some of the very famous scientists wrote me several-page letters in their own handwriting about, you know, you should deal with this subject and this subject and tell them how so and so—to have Linus Pauling do that was really exciting. So you have those letters somewhere in your . . . somewhere.[11]

[11] This is likely referring to correspondence donated to the American Philosophical Society. See: Jenny Pickworth Glusker Papers, Mss.Ms.Coll.180, American Philosophical Society, https://as.amphilsoc.org/repositories/2/resources/3348.

[01:17:21]
BOYTIM: We do, or . . . ?

[01:17:22]
GLUSKER: Yes, yes, I gave them to the Science [History] Institute.

[01:17:25]
BOYTIM: Oh, I didn't even know they'd been . . . I didn't hear about that donation.

[01:17:28]
GLUSKER: I've given a lot of stuff to the Science [History] Institute.

[01:17:30]
BOYTIM: I know you've given, yeah, various things to us.

[01:17:32]
GLUSKER: Yes. We gave them a movie on how to measure a Weissenberg photograph. X-ray photograph.

[01:17:39]
BOYTIM: Yeah. I just don't work in our collections department, so I don't hear about all of these things.

[01:17:43]
GLUSKER: No, but you might go and look at the Weissenberg thing [Weissenberg materials].

[01:17:45]
BOYTIM: I would love to.

[01:17:48]
GLUSKER: It's only a specific camera and we gave it to them. What happened was, I had a letter from one of my friends at Caltech, when I was working there, who said there was a place in Philadelphia that was looking for information and equipment. So I wrote to them and said, "Well, I'm just about to close my lab." So it would be about 2003 and I'm closing my lab. So I

wrote to them and I said, "I've got a lot of apparatus. Can you send a truck up?" People came up with a truck. And I think it was your Institute. It was then called the Chemistry . . . .

[01:18:29]
BOYTIM: Right, right. The Chemical Heritage Foundation.

[01:18:30]
GLUSKER: Yes, yes, Chemical Heritage, which I think was a better name. Chemical Heritage sent up a truck. And they came and they looked through my lab. But I told you that Lindo Patterson married this girl who was the daughter of the head of Bethlehem Steel, and she had some of the very original pH meters. So she came to me and she said, "I've had to empty my lab. They want my lab space for someone else. So I've had to get rid of everything. But I can't—if I put these for them to put in a special place, they'll throw them away." So I said, "Well, I have a little corner cupboard." You know how you have these cupboards that are right in the corner and the back of them [are] hard to reach. I said, "There's a little space there. Why don't you just put them there?" So that's what she did. And then she died. And she left everything from her lab that she had moved at that time, she said, belonged to me.

[01:19:33]
So the people from the Chemical Heritage found these pH meters, and they said, "We just found some pH meters, and they're what we'd been trying to find. We'd been advertising and looking on all the places to see if we could buy them. And here you've got two of them." And I said, "Well, we didn't use pH meters. It's not what you use in crystallography. But I was just saving them. But you can have them." So I thought Betty Patterson would have been very happy that her pH meters, that she'd worked hard to save, were in a good place. So they have them somewhere. It was, kind of, funny. They were so excited. And I said, "Would you like some X-ray apparatus?" They said, "Oh yeah, you can send some X-ray . . . . " But they weren't as excited about it. It was, kind of, funny.

[01:20:26]
BOYTIM: Yeah. Well, it's nice we now have your equipment in the museum and we do have some pH meters on display, too. They're all given a place of pride.

[01:20:36]
GLUSKER: Yes. Well, so these were some of the very original ones that she believed in taking care of very carefully.

[01:20:44]
BOYTIM: Like the Beckman Instruments . . . .

[01:20:46]
GLUSKER: Yes. Yes. Yes.

[01:20:50]
BOYTIM: Okay.

[01:20:51]
GLUSKER: So what . . . you were asking me about teaching?

[01:20:54]
BOYTIM: Yes.

[01:20:55]
GLUSKER: Well, I learned a lot about teaching, both from having to explain to people . . . . I mean, I gave, I got asked to give a series of lectures at the University of Pennsylvania on crystallography. So it was to be four lectures. And I went down and I gave my first lecture, my second lecture. My second lecture was how to analyze a Patterson map and how to do this stuff here. Various people said they . . . it was . . . I'd ask them questions, you know, "What have you learned? Did you find out and did you understand this?" And so on. It was, kind of, obvious they hadn't.

[01:21:36]
So the third time, I repeated number two, just went through and I said, "I'm going to do number two all over again." Would you believe it? The kids wrote letters to the university saying I had gone and they hadn't understood this, and I gave the same lecture again and then they understood it better. So I think that's something that sometimes helps. You've given them the beginning of the idea, but they can't, they haven't retained the whole part of it. And then if you do it again, they get the last part, which is how it all works. So I think that's important. And quite a bit, of course, working with Ken Trueblood.

[01:22:30]
BOYTIM: When you wrote the textbook with Ken Trueblood, were there other key works on X-ray crystallography before that people used?

[01:22:39]
GLUSKER: Oh, yes, there were plenty, there were some. But they weren't as detailed as we

tried to explain what was happening. Ken wrote to me once. I mean, we became very close friends. He was in California. I guess I was for the rest of that year, but then after that, he kept writing to me. He said he went to the library at one stage, the UCLA library, and he said he wanted to see our textbook. So they said, "Fine. We were trying to save money. So we've been Xeroxing a lot of the textbooks and we just Xeroxed it from somewhere and got permission to do so." I guess from Oxford University Press. "So we have this Xerox copy of the book." So he said, "Well, that's not very good." So then he said he looked, and they said, "Well, you don't have to worry because on the outside we wrote the name of the book and the authors." So he looked on the back and it said, "J.P. Glusker." And he said, "You didn't put my name on and I'm the dean at UCLA now." So they said, "Well, we didn't have enough room on the back to write everything. So we left you out." I mean, he wrote—it was a very funny letter.

[01:24:07]
BOYTIM: Yeah. I hope they eventually got a full copy, a bound copy.

[01:24:11]
GLUSKER: I don't know whether they did. I think we combined and just sent one to . . . .

[01:24:15]
BOYTIM: I'm sure.

[01:24:17]
GLUSKER: But these things, sort of, make life funny. Yes, yes.

[01:24:20]
BOYTIM: Of course. That's nice.

[01:24:23]
GLUSKER: We tossed a coin vote. Win first. So there we are.

[01:24:31]
BOYTIM: I think I had some broader, just reflection questions. Do you have anything else before we get into that, Sarah?

[01:24:36]
SCHNEIDER: Yeah, I don't think so.

[01:24:39]
BOYTIM: I think we've talked a few times about the number of women in the field of X-ray crystallography, and I was wondering if you had any thoughts on what might account for that.

[01:24:48]
GLUSKER: Oh, yes, yes, yes. [pause as she moves to get an item from the other room] That's the reason.

[01:25:10]
BOYTIM: Okay. So this is a portrait of William Henry Bragg.

[01:25:13]
GLUSKER: Yeah. And on the back, I have a . . . .

[01:25:17]
BOYTIM: Oh, and a family tree.

[01:25:18]
GLUSKER: Yes.

[01:25:20]
BOYTIM: Okay, I'm going to take a picture of this. That's cool.

[01:25:24]
GLUSKER: Because he believed in women. He was from England, but he taught in Australia for a while. Then he came back to England. And he and his son [William Lawrence Bragg] won the Nobel Prize for doing the chemical structure of sodium chloride, which is one of the earliest ever done. So he's the older, and his younger son, who I knew, I didn't know him [William Henry Bragg] because he died before I was doing the work. But his younger son was always, always felt . . . people just felt he was the son who went along, not that he'd had the thoughts about it. Had a few hang-ups about his father. A lot of important people worked for him. So, as you can see, there are a lot of names.

[01:26:21]
BOYTIM: Right. Right. Are there certain things that you heard about him doing that were more conducive to women being able to work in his lab, or . . . ?

[01:26:31]
GLUSKER: Well, he let, he arranged that Helen—Kathleen Lonsdale—yes, I knew it wasn't Helen. Kathleen Lonsdale was working for him on benzene and he just supported her one hundred percent. You know, if she needed money, she should just contact him and he would find it. Go to the colleges or government or raise the money and say, "This is important." One of the most important molecules in chemistry is benzene. I mean, the huge number of benzene derivatives. So they really wanted to know what benzene looked like. But she found out. I don't know. There's [Dorothy] Hodgkin.

[01:27:18]
BOYTIM: Okay. And did he . . . .

[01:27:20]
GLUSKER: Oh, there am I. Yes. There am I.

[01:27:23]
BOYTIM: Did he employ other women that you know of besides Kathleen Lonsdale, or . . . ?

[01:27:30]
GLUSKER: Yes, he did. One was a zoologist—sorry—a geologist [likely Judith Milledge]—who did very well. And I can't remember her name at the moment. But I'll think of it. Let me have a look at this. She got a lot of awards for her work. Eleanor [J.] Dodson worked on the structure of insulin with Dorothy. [pause] Rosalind Franklin worked with [J.D.] Bernal, I think, who is the person that Dorothy worked with. I didn't make this. This was just in a journal. I didn't make it up. It's, kind of, fun. So it's listing two people, William Henry Bragg and Linus Pauling. Linus Pauling was very good about my coming to Caltech.

[01:29:03]
BOYTIM: Yeah, you talked about him yesterday.

[01:29:05]
GLUSKER: Yes, yeah, yes.

[01:29:06]
BOYTIM: He was very supportive of women in science.

[01:29:07]
GLUSKER: And he was very supportive of women, yes.

[01:29:09]
BOYTIM: Yeah. That's great.

[01:29:13]
GLUSKER: When my friend Dorothy Semenow was—they were going to try and make her not come to Caltech. He was the head of the department and stepped in and said, "This is not right what you're doing."

[01:29:25]
BOYTIM: Right, right.

[01:29:26]
GLUSKER: Yes. Oh, Gabrielle ["Gai"] Donnay was also someone who worked for Linus Pauling, and she wanted to stay at Caltech, and they wouldn't like it. They didn't want her to. Her husband [Joseph "José" Désiré Hubert Donnay], whose name I can't remember at the moment, was at Johns Hopkins. And so she went to work for him.

And she wanted to stay at Caltech, but he [Linus Pauling] wouldn't—he said she was the best in the class. She was better in the class than the person that my husband worked for at Caltech, who—as an undergraduate. But she just couldn't get into . . . being received there. She had a little bit of mental problems. So when that happens, it, kind of, gets multiplied.

[01:30:37]
BOYTIM: I bet, yeah.

[01:30:38]
GLUSKER: Yeah. Because she will go and tell. She won't just let it happen and say, "Okay, I'll accept it that this is the way the world is." But, "I have to tell you all the details." I've had interesting stories following her around the world, going when she calls me, "You've got to come. You've got to come. I'm going to leave at—" She was teaching at McGill University,

she says, “I’ve got to retire tonight. And they’re having a retirement party for me and nobody that I know is coming. So will you come?” So I thought, “Well, she obviously needs somebody to help her.” So I said, “I’ll come.”

[01:31:19]
So I went to McGill and I went to Canada and I got to McGill University and I said, “I’m here to see Gabrielle Donnay,” and they said they didn’t know where she was. Nobody knew where she was. So I was thinking, “Oh, I’m going to have to have paid to come to Canada and now I’ve got to go back without even seeing Gai, you see.” But then she finally did find me. So she said, “You’ve got to come and stay with me for a couple of days.” So I did.

[01:31:54]
And then she said she would drive me to the airport, which she did. And she said, “We’ll be stopped by the police because I’m [affiliated with] McGill University and McGill is not very popular with the French, Frenchmen in Canada.” So indeed, we got stopped by the police, who made her turn back, go back two intersections and just join the line of traffic again. So, I mean, that’s really trouble.

[01:32:25]
Got to the airport and then went to take her through because she was in a wheelchair. She had a plaque that had been written for Lindo Patterson, which she’d taken off the wall. It was on her lap. She had a fern, which is, of course, a plant, which you’re not supposed to bring into the US. So she was going through, but she had a big cover, so she covered it all over her.

[01:33:05]
The immigration person asked to see my passport. So I showed it and he said fine. And he asked to see her passport. And he said, “Why are you going to America? And why do you only have a one-way ticket?” So she says, “I only have a one-way ticket because I might die when I’m there.” She was going to come to Fox Chase because she had cancer of the esophagus. I didn’t know she had a one-way ticket. I was busy getting my ticket when she was arranging for a one-way ticket. So he said, “Well, you can’t go through for a one-way ticket.” So she says, “Well, I got a letter from my doctor and it should be okay.” So the man looked at me and he said, “How do you two know each other?” So I said, “Well, we’re crystallographers.” So he said, “Well, what’s that?” So I thought, “Well, I’ve won the battle.” So I just said, “Oh, you take a crystal and you mount it on a goniometer head.” He said, “You can go through.” [laughter]

[01:34:11]
So we came to the Institute and then she gave them a lot of trouble. A lot of fun stories. She eventually died, but she lived for a long time. And she kept saying, “Everyone ought to interview me because I’ve lived—was told I had a year to live and here it’s five or six years.” Nobody was very interested, but I think they weren’t sure what to believe of what she said. That causes the trouble. So you get women who have had problems, but work their way around it. But then there are others who get, sort of, caught up in complicated systems. Then they get, in a way, laughed at and not treated as seriously as they should be.

[01:35:09]
BOYTIM: Yeah. It's too bad.

[01:35:11]
GLUSKER: I mean, Dorothy [Semenow] was one of them. Yes, yeah. She had a very hard time.

[01:35:17]
BOYTIM: Did she ever talk with you about . . . ?

[01:35:20]
GLUSKER: Oh, yeah, all the time.

[01:35:21]
BOYTIM: Confide in you?

[01:35:22]
GLUSKER: Yes. Oh, yes, yes, yes. I haven't talked to her for a while. We have a game, DNA game [DNA Ahead] that she worked on, I helped her a bit with.

[01:35:40]
BOYTIM: That's funny. I think we have something in our collections, in our archives.

[01:35:43]
GLUSKER: Do you? I thought you might have it. Yes, yes, yes.

[01:35:48]
SCHNEIDER: Yeah. Well, you know, you were the recipient of the 1979 American Chemical Society Garvan Medal. You've been recognized via Who's Who. You've had visiting professorships. You were a fellow of the Royal Society of Chemistry in the UK. Among—these are just some of many honors you've received. So I'm wondering, how have you felt when you've received that kind of recognition? What has it meant to you or just how have you reacted when you win those kinds of awards and honors?

[01:36:20]
GLUSKER: Well. I think, looking back in my life, the best honor I had was to get a first-class degree in chemistry. I think I was the fourth woman who managed to do that. And I think that meant that—that is why I'm writing to all these places. It's a little hard if you've got a first-class degree. I mean, was it summa cum laude, or something like that in chemistry. That makes a difference. And that means that you can—you have a bit of a say over how your life will go. I think that's what—that and the working on vitamin B_{12} was what the Garvan Medal was. That was the first year I—I'd just become a US citizen. I had to be a US citizen [to win the award]. But a gold medal is a nice thing to have.

[01:37:23]
BOYTIM: You've earned it.

[01:37:24]
GLUSKER: But it has its . . . I mean, there are all sorts of things can go . . . . They had the ceremony and they had invited someone who was very anti-Japanese come and give a talk about his science. And he was saying really nasty things about what the Japanese had done in the World War [II]. And I was stand—I was listening to this and there were a whole lot of Japanese near me and a whole lot of Japanese in another part of the hall. In Hawaii, this was happening. And, of course, the people who heard what he was saying got up and left in protest. So here was this big line of Japanese who left the ceremony. The ones near me couldn't hear it; the system was not good. So they didn't know what was going on and they were, sort of, looking and trying to figure out what was going on. The newspapers made a huge thing of this, that the Japanese had been invited and everyone was very excited. And I was involved with helping get some information on crystallography in Japan and in the United [END OF AUDIO, FILE 3.1] States. Then they weren't polite to them. Then the speaker wasn't polite. I think the thing I'm most pleased with now is that I'm a fellow of the college at Oxford [Honorary Fellow of Somerville College]. That was nice for them to do that. Yeah. I don't know . . . . I mean, there were a lot of other people who were fellows.

[00:00:28]
BOYTIM: In good company.

[00:00:30]
GLUSKER: Margaret Thatcher, yes. Yeah.

[00:00:35]
SCHNEIDER: And it sounds like you've really maintained those connections with England and with, you know, visited countries all over the world, which is pretty remarkable.

[00:00:42]
GLUSKER: I couldn't become a US citizen unless they let me keep my English [citizenship]. Yes. Yes. But I don't . . . I can't vote in England.

[00:00:53]
BOYTIM: Right. Right.

[00:00:54]
GLUSKER: No, I mean, there are rules about it. That's okay. I accept that. But my daughter Ann is now . . . used to be if the father was English, then you became English, but not the mother. So my children were not English as well as American. But she went through everything to be English.

[00:01:18]
BOYTIM: She has dual citizenship now?

[00:01:19]
GLUSKER: Yes. Yeah. Yes, yes. Two passports. And she goes back quite a bit because she's a librarian at UC Berkeley. Yeah, she's one of their chief librarians. [Ann is a social sciences librarian at Berkeley.] So I think she contacted you, didn't she?

[00:01:42]
BOYTIM: Yes, yeah. And we met her this summer when you visited [the Science History Institute].

[00:01:44]
GLUSKER: Yeah, yes, yeah. So there we are.

[00:01:51]
BOYTIM: Okay. All right. Well, I think we're, kind of, reaching the end. Are there any other broader reflections that you wanted to share or anything we didn't talk about?

[00:02:03]
GLUSKER: No, I'd say I'd had a lot of people who worked for me, almost all of my practical, structural life, who did good work to, kind of, keep the lab going, make sure we had good X-ray diffraction data, and so on. And all these people who came, I mean, it was really nice how people would come and see me just once in a while, you know. Max Perutz liked to come, but . . . he's, kind of, an amusing guy to have. I guess he's dead now, but . . . .

[00:02:48]
BOYTIM: Can I ask quickly do you have—

[00:02:49]
GLUSKER: My son, though, had to give up his bed when Max Perutz came, you see.

[00:02:54]
BOYTIM: He stayed in your house?

[00:02:56]
GLUSKER: Yes, to fit in here. So he [my son, Mark] wrote Max a little letter and then rolled it up and tied it up into a little thing that he put on the bed. And so Max started to read it. He was saying, "Oh, that's so nice." So he actually wrote a letter to Mark to say how nice, because usually when he goes and stays with a friend and they have a child who has to give up their bed for the visitor, the child is rather resentful and doesn't see why it had to be done. And here is someone who welcomed him. So he liked that.

[00:03:33]
BOYTIM: That's sweet.

[00:03:34]
GLUSKER: So he came back, yes, so he would come back and always ask how Mark was doing. Yeah. Yes, well. So you know my kids, I mean, I guess you don't know them all. That's Kathy with her two daughters. So they look like triplets almost. [laughter] They were in a museum and the lighting was that way, and I just loved that picture so much. Yeah.

[00:04:02]
BOYTIM: Well, I think that was a good overview of the rest of your career and your family, and we really enjoyed the conversation. Just want to thank you again for taking the time.

[00:04:12]
GLUSKER: Oh, you're welcome.

[00:04:14]
SCHNEIDER: Yeah, thank you.

[00:04:15]
GLUSKER: I don't know what else I should be saying to you.

[00:04:18]
BOYTIM: Yeah, I think we're finished.

[00:04:19]
GLUSKER: I mean, I love doing that. I love doing this. I loved doing . . . I loved running a lab. I loved all the editing work I had to do, interacting with people and trying to persuade them not to put a paper in, or write it slightly differently. Some people like to write a letter explaining how they were badly treated by almost everybody else. And I'd say, "Why don't you spend your time talking about how exciting what you found is and then do another paper on the bad world, you know?" And they often are very reluctant to do that, but it helps science if they don't mix the two.

[00:05:04]
BOYTIM: Right. Right. Yeah. It sounds like a healthy approach.

[00:05:08]
GLUSKER: Yeah. Yes. Yes.

[00:05:12]
BOYTIM: Well, I'll end the recording.

[END OF AUDIO, FILE 3.2]

[END OF INTERVIEW]

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