

Breaking Atoms, Breaking Barriers: The Trude Goldhaber Story

Episode 24 of Exile with Mandy Patinkin

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MANDY PATINKIN: London, 1935. A young woman, with neatly kept curls, shoves open the door of a cramped, west end apartment. She feels out of place, still wearing the expensive, fashionable clothes her mother bought her. 25-year-old Gertrude Scharff recently arrived from Munich, but she's not here by choice. Hitler and his Nazi party have taken control of Germany. As a young, Jewish scientist, she had to get out, even though it meant being alone in a foreign city. Trude, as her family calls her, places her bags on the creaky floor. She carefully removes the few treasured possessions she was able to bring on the journey—a camera, a painting—reminders of the comforts she was forced to leave behind. She has spent the last five years studying physics at Munich, one of the leading universities in Europe. And just a few months ago, graduated at the top of her class. Out the window, Trude notices a crowd of people in the street. The United Kingdom is in the midst of its Great Slump. Millions are out of work. And despite her impressive resume, she's one of them. But Trude has no intention of giving up her dream. She has already come too far.

THEME

MANDY PATINKIN: Welcome to Exile, a podcast from LBI - the Leo Baeck Institute, New York. I'm Mandy Patinkin. When everything is taken away, then what? From LBI's archives, untold stories of Jewish lives in the shadow of fascism. Today, the story of a young physicist who blazed a trail for the next generation of women scientists, and contributed to significant scientific breakthroughs that changed the course of history.

THEME RESOLVES

MANDY PATINKIN: Trude grew up in a stately apartment building in Munich, overlooking the English Garden, one of the largest urban parks in the world. She was always surrounded by aromas of the exotic foods her father sold, including coffee,

rice and sugar. Trude was the eldest daughter of Otto and Nellie Scharff. She was born in Manheim in 1911, then moved to Munich as a young girl. Life was comfortable, even with the aftershocks of the Great War. Michael Goldhaber is Trude's youngest son. He followed in her footsteps and became a physicist, and has been researching his mother's early life.

MICHAEL GOLDHABER: While she was quite young, right after the war, there was a communist uprising in Munich. So she would have been about eight and she witnessed it from the window. I assume shooting people dead. That was something she always remembered and quite traumatic.

MANDY PATINKIN: In spite of this horror, the Munich Trude grew up in was starting to find its feet again.

MICHAEL GOLDHABER: Munich seemed to prosper and it had a full scene of music and opera and art, and her father encouraged both her and her sister to use those opportunities.

MANDY PATINKIN: During World War I, Otto was a cavalry officer. He was a skilled rider, as were his wife, Nellie, and older daughter, Liselotte. But Trude's talents lay elsewhere.

MICHAEL GOLDHABER: She was always the first in her class. She was considered the 'smart Scharff'.

MANDY PATINKIN: Trude had been captivated by numbers from a young age, but in high school, she fell in love with science, especially physics and chemistry. At first, her father was supportive. He had studied chemistry before taking over the family business. But when Trude told him that she had her heart set on studying science at university, he changed his tune.

MICHAEL GOLDHABER: He certainly encouraged her to pursue her interests in high school, but when it came to university, he just wanted her to study law.

MANDY PATINKIN: Despite the pressure, Trude knew what she wanted her future to be. And it did not include taking over the family business.

MICHAEL GOLDHABER: She absolutely refused. And I know she admired him in some ways. But she always was extremely stubborn.

MANDY PATINKIN: Trude got her way. Soon, she was off to Munich University to study science and math. Trude reflected on her academic journey in an interview in 1982.

TRUDE GOLDHABER: I was always interested in numbers and math, and I tried to understand the world, and I felt that physics gives you the best entrance to understanding the inanimate part of the world. And so, rationally, I was attracted to that.

MANDY PATINKIN: Trude had timed her entry into the world of physics perfectly. As the nucleus is the center of the atom, Germany had become the world's center of scientific exploration.

RUTH LEWIN SIME: The 1920s was really a golden age for physics.

MANDY PATINKIN: Ruth Lewin Sime is a retired Professor of Chemistry at Sacramento City College. She has written books about pioneering physicists from this period.

RUTH LEWIN SIME: At the turn of the century, there were still people who thought that atoms did not exist. Ten years later, people understood that the atom consisted of electrons and a positive nucleus. The 1920s was when all sorts of developments in understanding the structure of the atom and the beginnings of understanding what was going on in the nucleus. And it was just tremendously exciting because every year, almost every month, there was so much new to be discovered.

MANDY PATINKIN: These leaps in physics would eventually lead to the most destructive bomb the world had ever seen. But this was an age of innocence, of discovery.

RUTH LEWIN SIME: Munich would have been an amazing place to study. Albert Einstein was in Germany during this period. By that time he had already formulated the theory of special relativity, $E=MC^2$. James Franck, who already had a Nobel Prize in the 1920s for his work on the quantization of the atom. Max Planck by that time was very famous for having first formulated the idea of quantized forms of energy.

MANDY PATINKIN: These amazing scientists all had something in common that Trude did not. They were all men. Had she started her career 20 years earlier, it might have felt impossible. But thankfully, a trail had already been blazed by another Jewish woman physicist.

RUTH LEWIN SIME: Lisa Meitener was really a pioneer in nuclear physics. She was the first woman to become a professor in physics at the University of Berlin in the 1920s. And in the early 1930s, began an investigation which eventually led to the discovery of nuclear fission. When Lisa Meitener came to Berlin in 1907, women were still not admitted to the Prussian universities. It took a long while until women were fully accepted as students. By the end of the 1920s, when Gertrude was attending university, there were opportunities for women to prove themselves and to learn.

MANDY PATINKIN: Trude knew how difficult it was for women to become tenured academics, let alone professors. She immersed herself in her studies, taking advantage of academic exchanges in cities like Freiburg and Berlin. But she felt most at home in the lab. And people were starting to notice.

RUTH LEWIN SIME: Gertrude, as a very bright physics student, was seen by professors as sort of an up and comer, and someone that they would look after.

MANDY PATINKIN: As well as fitting in academically, Trude was also turning heads. Her son, Michael, has heard stories.

MICHAEL GOLDHABER: Curly hair, I would say brunette, and she had a very, noticeable smile. She would have been an attractive figure, being very smart, and she was wealthy, so she had lots of admirers.

MANDY PATINKIN: One of those admirers was a reserved, but brilliant, physics student. Trude met him during one of her exchanges.

MICHAEL GOLDHABER: So, it was in Berlin that she met my father, Maurice Goldhaber. I think they may have met in a classroom or a laboratory or something like that, that her intelligence and skill would have shown.

MANDY PATINKIN: As the story goes, it wasn't Trude's looks that Maurice was drawn to.

MICHAEL GOLDHABER: He was very interested in her because she was interested in physics. I don't think it made much difference to him that she was wealthy or not. His interest was totally in talking about physics, and that's what he loved to do.

MANDY PATINKIN: It's what Trude loved to do, too. But she didn't have time for romance. In 1932 she began her PhD in experimental physics, focusing on ferromagnetism. Her task? To test out the degree of magnetism in nickel when you subject it to extreme temperatures. It meant spending months on end in the lab, testing her theories. But then the world turned upside down. Germany's parliament passed the Enabling Act in the spring of 1933. It effectively made Adolf Hitler dictator, and cemented the Nazis' rise to power. One of the first things the party did was to try to remove Jews from the civil service. That included any type of university employees and students, because German universities were state-run. Professor Ruth Lewin Sime.

RUTH LEWIN SIME: It would have been a really scary time, I think, for any Jewish student. One of the reasons for that was that they saw their Jewish

professors being dismissed and having to resign. Perhaps even a more important reason was that the universities had, for a long time, been full of student groups that were very supportive of the Nazis before they came to power, and once they came to power they were more or less in charge.

MANDY PATINKIN: In a matter of weeks, Trude felt the university atmosphere transform. Gone was the spirit of intellectual optimism and idea-sharing. Many of her peers turned on her.

RUTH LEWIN SIME: They were hostile to Jewish professors who still happened to be there for one reason or another. They booed them, they didn't allow them to give lectures. And don't forget, they burned books in May of 1933.

MANDY PATINKIN: In the interview decades later, Trude recounted that time.

TRUDE GOLDHABER: Yes, I was completely isolated. Many of my fellow students were members of the so-called SS, and SA, and they didn't bear to talk to me. It wasn't very pleasant.

MANDY PATINKIN: Jewish students were still technically allowed to continue their studies at most schools, but their movements were increasingly restricted. Trude understood that she might never graduate. But she was determined to see her PhD research through.

MICHAEL GOLDHABER: She was extremely stubborn. She was not going to let that stop her, although it was a very severe and difficult thing.

MANDY PATINKIN: So Trude kept a low profile. But in 1935, when she was ready to take her final exam, that was no longer an option.

TRUDE GOLDHABER: When I announced that I wanted to take a PhD exam, I had to give the registrar a form, and had to fill in about my eight great grandparents, whether they were Aryan or non-Aryan. And I filled out for all of them non-Aryan, and the registrar said he had never seen that. I was the only

student at the large University of Munich at that time who was non-Aryan according to that definition.

MANDY PATINKIN: Incredibly, Trude was allowed to take the exam, and she sailed through it. In 1935, she received her PhD *summa cum laude*, the highest distinction. But her triumph was bittersweet. Here's Michael Goldhaber again, from an interview he did with the Physics World Weekly podcast.

MICHAEL GOLDHABER: She was boycotted by the other students and the professors in terms of any kind of informal interchange, except for one professor, Arnold Sommerfeld, and he was one of the most famous physicists there, but he continued to be friendly to her.

MANDY PATINKIN: Arnold Sommerfeld was one of Germany's most brilliant theoretical physicists. He was nominated for 84 Nobel prizes over the course of his career. He wasn't Jewish, but he recognized Trude's prodigious talent and continued to support her.

TRUDE GOLDHABER: Sommerfeld was practically the only professor in Munich who did not compromise with the Nazi system. He, for instance, didn't give the Hitler greeting when he entered the classroom, and he freely talked about Einstein's work and relativity theory, which was at the time already almost traitorous and all the students jeered, because Einstein was supposed to be non-German—to pursue lines which did not agree with German physics.

MANDY PATINKIN: Jewish scientists, especially Albert Einstein, were the targets of a movement called *Deutsche Physik*, or "German Physics." The Nazis claimed that Einstein's famous theories were baseless works of so-called "Jewish physics." In their view, only ideas developed by Aryan scientists could be taken seriously. Even with an influential physics heavyweight like Sommerfeld behind her, any remaining hope Trude had of staying in Munich to pursue her career was about to be dashed. In September 1935, the same year Trude graduated, the notorious Nuremberg Laws were passed.

RUTH LEWIN SIME: The Nuremberg Laws affected all Jews because it took away their civil rights. It took away their citizenship. They were now subjects of the state. And it was very questionable if they had legal rights or any rights at all. It would have made all the difference for anyone who was even thinking of leaving Germany, that this was the time to do it.

MANDY PATINKIN: Trude knew it was time to leave. She began writing letters to other refugee scientists across Europe about what her job prospects might be.

TRUDE GOLDHABER: When I wanted to leave, I wrote to several other physicists whom I knew, who had left the country, and asked them where I should go to. And they all said, "Don't come here, there are already too many refugees."

MANDY PATINKIN: But amidst all the grim news was one ray of light. She heard back from a friend she had met back in Berlin: Maurice Goldhaber. He had left Germany a few years earlier, and was now doing research at Cambridge. He urged Trude: pack up, move to England. So in early 1936, Trude found herself in London and managed to find shared lodging in the city's west end. It was a world away from her family's glorious apartment in Munich. There, she had everything she needed. Here, almost nothing.

MICHAEL GOLDHABER: It was a complete transformation. When she arrived in London, she had no money.

MANDY PATINKIN: When she left Germany, Trude was forbidden from withdrawing cash from the bank. All she had were a few prized possessions.

MICHAEL GOLDHABER: She arrived with a trunk that I assume had been packed by her mother. And in addition, she had a Leica camera, an impressionist painting, which later on certainly was worth a great deal. But at the time, I'm not sure.

MANDY PATINKIN: London was in the grip of a devastating economic depression. Unemployment was rampant, and Trude quickly discovered that jobs were hard to come by, especially if you were a foreigner.

TRUDE GOLDHABER: In England, the trouble was that an alien couldn't get a position, unless he or she could show that no Englishman could replace her.

MANDY PATINKIN: Trude was penniless. She had to do something to survive.

MICHAEL GOLDHABER: She didn't sell the painting, but she did sell the camera and she lived on the proceeds for six months, eating mainly potatoes.

MANDY PATINKIN: She took odd jobs translating and tutoring students in German. Eventually, she managed to get a job in a lab researching for a British physicist called G.P. Thompson. Not long after, Thompson would win the Nobel prize for his groundbreaking work on electron diffraction. But Trude's job was menial, mainly translating papers.

MICHAEL GOLDHABER: I don't think the work was fulfilling and she had no publications while she was in England, which is a significant drawback for a young physicist, and so, that, I think, added to the difficulties of her situation.

MANDY PATINKIN: Despite the challenges, Trude had one thing to be thankful for. Her friend Maurice Goldhaber, he continued to write to her from Cambridge, and even visited on occasion. Eventually, their relationship became romantic, although Maurice wasn't the most passionate of suitors.

MICHAEL GOLDHABER: He was extremely unromantic. He was most interested in talking with my mother about physics. But also, one other thing about him, which made him very unusual as a physicist, was he wanted his wife to do physics and not be a housewife.

MANDY PATINKIN: In 1939, shortly after Maurice was offered a position as an assistant professor in the United States, he asked Trude to join him, and then he proposed. And Trude said yes. At first, Illinois felt like a fresh start. But Maurice's

position was in the small town of Urbana, right in the middle of the prairie state, surrounded by an endlessly flat landscape. Before this, Trude had only ever lived in big cities. She knew she should be grateful. Maurice could support them. But she was almost 30, and she wanted a career of her own.

TRUDE GOLDHABER: The University of Illinois was a very good university. There were some good scientists. But I didn't like the scenery and I didn't like the climate.

MANDY PATINKIN: Unfortunately for Trude, her hopes of working as a physicist were soon dashed. Once again, the rules were standing in their way. Professor Ruth Lewin Sime.

RUTH LEWIN SIME: In the United States, certainly, in the 1940s, '50s, '60s, it was very hard for women to get an upper level position in the sciences in universities. In most academic institutions, there were anti-nepotism laws which prevented two spouses from being employed in the same department, sometimes even in the same university.

MANDY PATINKIN: Laws like this were intended to prevent favoritism between relatives and ensure that jobs went to the most qualified applicants. The problem was that one group of people, in particular, were often unfairly kept out.

RUTH LEWIN SIME: The most obvious effect, and most deleterious effect, was that the wives of university professors and other scientists were not hired, independent of how qualified they might be and it almost always affected the wife.

MANDY PATINKIN: Trude was one of many academic spouses whose careers were obstructed by these laws. So was Ruth.

RUTH LEWIN SIME: I absolutely did experience anti-nepotism laws. At Sacramento State University, I met my husband, who was a professor in the same department. He had tenure, I did not at that time. And when we decided

to get married, I was basically told that I was not a member of the department anymore.

MANDY PATINKIN: At the University of Illinois, Trude was only permitted to work as an unpaid assistant in her husband's lab. When she and Maurice welcomed their first child, Michael's older brother, Alfred, the birth certificate listed Maurice as 'professor'. Trude's title was 'housekeeper'. But she was never the kind of person who could switch off her curious mind. She kept working on experiments with Maurice, even though, on paper, she was just the assistant.

FRED GOLDHABER: During that time, she did an experiment which showed something that hadn't been known before.

MANDY PATINKIN: This is Trude's eldest son, Fred Goldhaber, speaking in an interview he did on the Physics World Weekly podcast. Fred, like his brother and his parents, was a physicist, so he had a unique understanding of his mother's pioneering work.

FRED GOLDHABER: It was known that when a nucleus was struck by a proton or neutron, that the nucleus would emit some particles as well as having a large fragment that would stay. And what she found in her experiments in Illinois, in Maurice's lab, is when the nucleus fragmented into two big pieces, that there were always some little ones, that those could in turn generate further reactions where they would strike other nuclei and break them up so that this could become a self-sustaining process.

MANDY PATINKIN: Just two years later, in a desert in New Mexico, one J. Robert Oppenheimer gathered a group of physicists to experiment in this same area of science—and create the world's first nuclear bomb. This was the now infamous 'Manhattan Project'. Trude and Maurice were never invited to work on it.

TRUDE GOLDHABER: Well, since several people who had been at Illinois had joined the project we heard about it very early, and so we were very aware of it. The reason Oppenheimer gave was that my parents were still in Germany, so he implied there was a possibility to exert pressure on us by the

Nazis, and therefore he didn't want us to join. It was a strange thing, but Oppenheimer was quite adamant. It was rather hard to explain because my husband knew more about neutrons than most people on the project.

MANDY PATINKIN: Instead of publishing their work, Trude and Maurice had to swear to keep it secret. It was declared classified until after the war. Meanwhile, Trude was becoming increasingly concerned about her parents, who were still living in Munich. Initially, Otto kept running his food import business, but after Kristallnacht, in November 1938, Otto and Nellie lost everything, including their home, their livelihood, and their beloved horses. They were forced to move into one of many overcrowded buildings designated for Jews. Trude and her sister, Liselotte, had been sending letters to embassies trying to get their parents out of Germany. They knew that Brazil and Cuba were accepting refugees. Liselotte had already settled in Rio. The Leo Baeck Institute archive has one of their mother's replies, in which she also comments on the birth of Trude's eldest son, Fred:

NELLY SCHARFF: Munich, June 18, 1941. Today, my dear Trude, I am writing to you mainly to wish your dear little Freddy and also you, much, much happiness on your approaching birthdays. I often look at Freddy's cute little head in the photo and just wish I can hold it in my hands one day. From Hamburg we received the message that new requirements were introduced and that the visa could therefore not be issued, but that the consul would telegraph to Rio in our case if we wished, which of course we did. Thereupon, we received another letter with various requests, which we answered immediately, and now we are again waiting anxiously to see if we get it. The new development has probably put everything in question again. One really has to arm herself with patience again and again.

MANDY PATINKIN: By the fall of 1941, Trude and her sister had a plan in place to get Otto and Nellie to Havana. But in November, they got news they were dreading. Here's Michael again.

MICHAEL GOLDHABER: She had gotten a postcard from Germany saying that her parents had been taken away in November. And they were taken away to supposedly resettle in Riga.

MANDY PATINKIN: Riga, in German-occupied Latvia, was the site of a ghetto that housed more than 30,000 people. That's where Otto and Nellie were being sent by train, along with thousands of other Jews. After the postcard, Trude never heard from her parents again. For the next few years, Trude continued her work in the lab at Urbana assisting Maurice, still underpaid and rarely credited. Then, in 1948, the Goldhabers spent Maurice's sabbatical at a new research laboratory near New York City, called Brookhaven. As soon as they arrived, Trude felt like she could breathe again.

MICHAEL GOLDHABER: It was on Long Island and there were very nice beaches nearby. And my mother loved the ocean.

MANDY PATINKIN: This already felt like a step up. But then came even better news. Brookhaven offered them a permanent placement. Not just for Maurice. They also offered Trude a position as an associate physicist.

MICHAEL GOLDHABER: It was a big deal because she would have a real position, she could have money for doing experiments on her own, and so she could do her own work. There were a large number of possible collaborators there and a very good facility. It was a tremendous improvement for her.

MANDY PATINKIN: Brookhaven was a relatively new institution. It didn't have a nepotism policy. The Goldhabers moved to Long Island. And at the age of 40, and 15 years after she got her PhD, Trude had her first professional paid job as a physicist. She was the first woman with a PhD to join Brookhaven's permanent staff.

MICHAEL GOLDHABER: She found herself totally absorbed in the kind of physics she had learned to do in Illinois. And she kept doing it in a very systematic way, determining the energy levels of numerous nuclei, and she therefore contributed a great deal to the understanding of how the nucleus was constructed.

MANDY PATINKIN: By the time Trude retired in 1977, she had published over 60 papers and attended numerous conferences. But as a woman physicist, Trude was still very much in the minority.

MICHAEL GOLDHABER: It was still very unusual to be a woman scientist. I think I knew two others, perhaps, at Brookhaven. She was very authoritative in the way she put things and what she had to say and that's the only way she could have been and survived as a physicist.

MANDY PATINKIN: Despite her success, Trude still felt the need to prove herself among her male colleagues. Even with her husband, Maurice.

MICHAEL GOLDHABER: She was a little bit in his shadow. I mean, he went on to be chair of the physics department and then director of Brookhaven. And he was doing some very famous experiments before that. So I think perhaps she felt it a little bit. But she was very happy doing the work she was doing and was given recognition for it.

MANDY PATINKIN: Trude's impact at Brookhaven went far beyond her scientific research.

PETER BOND: Gertrude felt very strongly about two things. One about the role of women in science because of the difficulty she and many other women had gone through, by the way. And also about bringing more cohesion to the laboratory, as to letting them know what kinds of activities were going on in the science areas at the lab.

MANDY PATINKIN: Peter Bond joined Brookhaven National Laboratory in the early '70s as a young nuclear physicist. He first met Trude during his job interview.

PETER BOND: She looked very energetic and spry. She was certainly very forthright and she instituted several things at the laboratory that were really sort of outreach to the whole community to try to bring the lab together.

MANDY PATINKIN: Trude also co-founded a group at the lab dedicated to promoting equal opportunity for women who wanted to build a career.

PETER BOND: She also started the Brookhaven Women in Science program, had regular meetings to talk about problems they faced or things they wanted

to do to improve the life of women scientists at the laboratory, get women to feel they're not second rate citizens, that they should be playing a role in the science community. And in fact, the number of women scientists the lab has now, of course, is extremely different than what it was way back when. That's a quite remarkable achievement.

MANDY PATINKIN: And in 1972, Trude was given her own, very prestigious honor. Professor Gertrude Goldhaber was formally elected to the National Academy of Science.

PETER BOND: She was the third woman to get that honor, a wonderful recognition of her contributions to science. There's obviously the physics legacy, but the legacy that she worked so hard to get, the recognition of women being equally creative or maybe even more creative than men in doing science was an enormous issue to overcome. Her will to change the way things were done. I think, to me, that's probably the biggest legacy.

MANDY PATINKIN: Trude died in 1998 at the age of 86. In the end, Trude lived a happy, accomplished life. But she died never knowing what happened to her parents when they were put on that train to Riga. Nobody else in the Goldhaber family knew either, until five decades later. That's when Michael, Fred, and Fred's wife Suzan started to look into Otto and Nellie's lives in Munich.

SUZAN GOLDHABER: We knew the address, and based on that, we were planning a European trip.

MANDY PATINKIN: This is Suzan Goldhaber. One summer, soon after Trude's death in 1998, they decided to go to Munich and pay a visit to an archive.

SUZAN GOLDHABER: We were greeted by a young man, who took us into his lovely appointed office, which was sort of like a library. We said we knew the residence of Trude's family, the Scharff family, but we wanted to find out more about the business, where that was located. And he was very, very welcoming and he said, could you wait here for a short while? And I'll try to bring you some more information.

MANDY PATINKIN: The archivist returned with information they weren't expecting.

SUZAN GOLDHABER: He had in hand Fred's grandparents passports, their identity cards, and we had never seen this before, and he also brought the information, the exact information, of what had transpired, what had happened to them.

MANDY PATINKIN: They soon discovered the terrible truth. Otto and Nellie had boarded that train bound for Riga on November 25, 1941, but it was stopped en route. Along with 1000 other Jews, they were taken off the train, apparently by volunteers working for the Nazis. They were shot and buried in mass graves.

SUZAN GOLDHABER: We were both shocked and stunned. Fred is not a visibly very emotional person, but we were at a loss for words. We hadn't known the details of their demise until that moment. We all felt, understandably, a sense of closure, an understanding of what had happened, rather than a mystery.

MANDY PATINKIN: During the four decades that she lived in the United States, Trude only returned to Germany twice. On one occasion, she attended her 50th high school reunion. Michael remembers his mother telling him about the trip.

MICHAEL GOLDHABER: She was by far the most notable person to emerge from that high school class. And one of the members of the class had been an overt Nazi and, at the time she came back, that overt Nazi apologized. So that was very meaningful to her.

MANDY PATINKIN: Meaningful, and perhaps also a powerful reminder that Trude never allowed prejudice to stand in her way. That's the example she set, and how her family remembers her.

MICHAEL GOLDHABER: I think that she was a path breaker for a lot of people. I'm very proud of that aspect of her life.

MANDY PATINKIN: And that's something Trude was proud of, too.

THEME MUSIC

ANNOUNCER: During the production of this episode, Alfred Goldhaber passed away. He followed in his mother's footsteps to become a physicist researching topics across elementary, particle, and nuclear physics. Thanks to a grant from the American Institute of Physics and funds from the German Foreign Office, LBI processed and digitized the approximately 19 linear feet of Trude's papers, which consist of notes, graphs and diagrams, original data, and correspondence related to her research between 1930 and 2000. Maurice Goldhaber's papers are awaiting processing. Learn more at lbi.org/goldhaber. Exile is a production of the Leo Baeck Institute, New York and Antica Productions. It's narrated by Mandy Patinkin. This episode was written by Clem Hitchcock and Rami Tzabar. Our executive producers are Laura Regehr, Rami Tzabar, Stuart Coxe, and Bernie Blum. Our producer is Emily Morantz. Research and translation by Isabella Kempf. Voice acting by Hannah Gelman. Sound design and audio mix by Philip Wilson. Theme music by Oliver Wickham. Special thanks to the Physics World Weekly podcast, and to David Olson from the Oral History Archives at Columbia University. This episode of Exile is made possible in part by a grant from the Conference on Jewish Material Claims Against Germany, which is supported by the German Federal Finance Ministry and the Foundation Remembrance, Responsibility and Future.