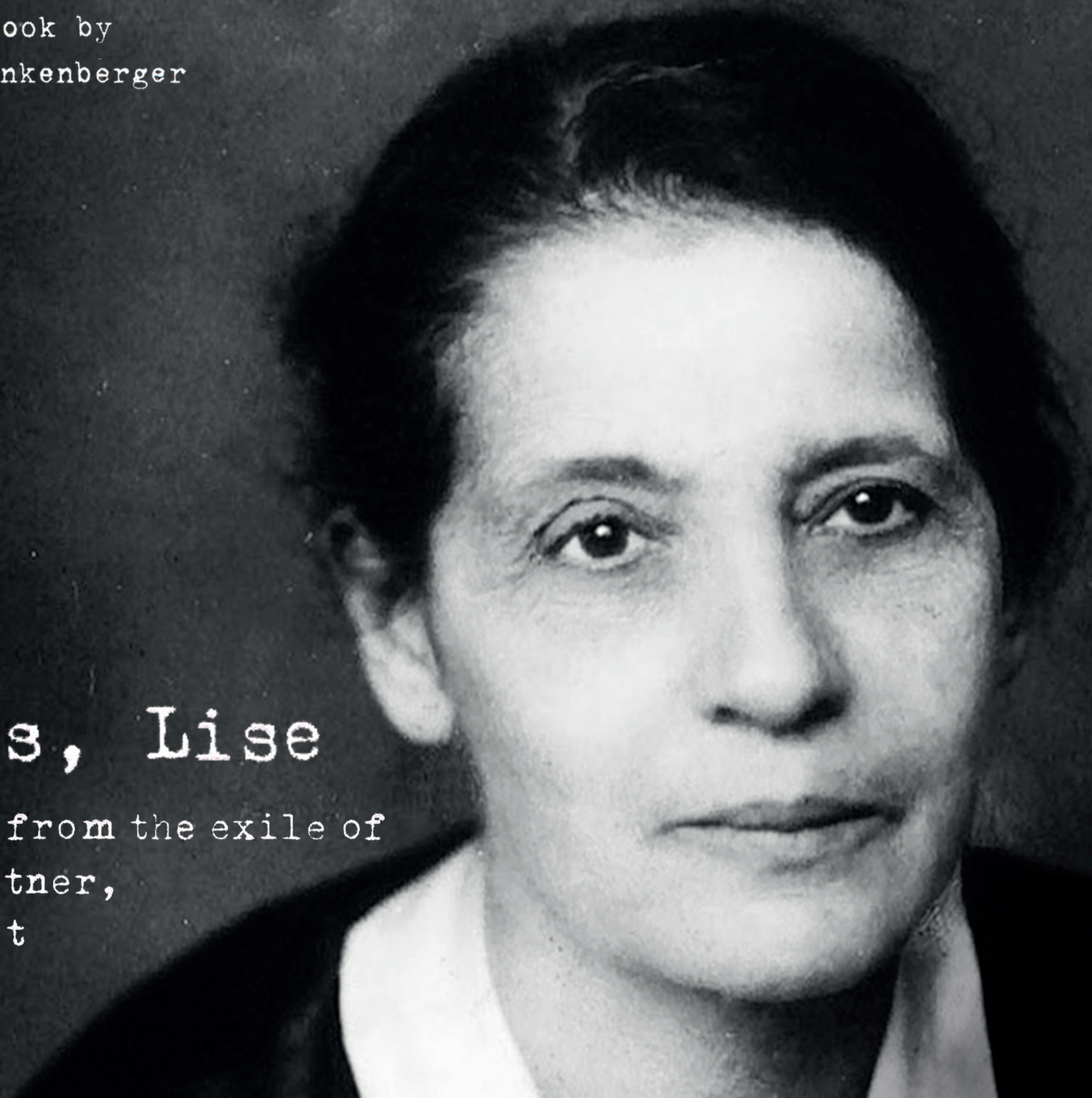


an audio book by
Stefan Frankenger

Yours, Lise

letters from the exile of
Lise Meitner,
physicist



PREFACE

I came across Lise Meitner for the first time in the early 1990's on the German TV-show „The End of Innocence.“ Since then, Meitner had been on my mind until three years ago when I received an offer to make an audio book out of her story. Then when I found out in the course of my research that her birthplace in Vienna's Heinestraße is only five minutes from my studio, I saw it as serendipity.

In this audiobook, I wanted to approach her in a context that adds essential details to the existing biographical knowledge of Lise Meitner. Above all, I wanted to expand the subjective-emotional approach and let the protagonists speak for themselves – not in the conversational tone of everyday life, but in the exceptional situation of her life's turning point: her escape into exile.

From then on, the written language became an umbilical cord of interpersonal communication. At the same time, these letters almost fully document the discovery of nuclear fission as one of the central events of the 20th century. In the back and forth dispatches of the winter of 1938-39, the true scope of Lise Meitner's authorship is revealed. At this point, Meitner's life turns from the purely private to the public interest.

The first chapter of nuclear physics concludes with uranium nuclear fission. It catapulted mankind within a short time into the possibility of destructive omnipotence, which until then had been reserved for natural disasters or supernatural powers. Seen in this way, the glittering path that led to its discovery, paved with the stunning successes of Einstein, Bohr, Heisenberg and many others, becomes a fateful twist. The honorable goals of science were dimmed by human hubris.

Perhaps ironically, the isolation of her exile spared Lise Meitner from direct involvement. The theoretical interpretation of nuclear fission was, in a sense, her dowry, which she was able to pass on to those who came after her, before her interpretation was overwritten by further knowledge. But soon she was rediscovered: first, by the Americans who falsely celebrated her as the „mother of the bomb,“ and later by the physicists of the younger generation, who recognized in her decade-long work as a nuclear physicist tremendous continuity, quality, and resistance. In the end, she became the model for many – and in this audio book the center of these events.

THE LIFE AND WORK ...

... of Lise Meitner have already been amply described in several biographies (incidentally, all of them written by women). They draw a vivid picture of her personality as well as of her work.

Well aware of the focus of these books, I limited the scope of this audiobook to the most important biographical information and to the milestones of her career within the scientific world, honing in on the emotions brought about by this distinct period of time from 1938-1945.

VIENNA

Lise Meitner was born on November 7th, 1878, the third child of a liberal Jewish home in the second district of Vienna, an area which at the time was the center of Jewish life within the Imperial Austrian capital and residence. Lise's father, Philipp Meitner, a respected lawyer with excellent contacts within the distinguished circles of the Viennese bourgeoisie and nobility, was a man with an unshakable belief in the future and much love for his family. His wife Hedwig and he came from old Slovak-Moravian families and they had settled in Vienna, where Philipp Meitner ran a successful law firm. As progressives, Lise's parents enabled all of their children, including their

daughters, to benefit from the possibilities for educational and professional advancement in the thriving metropolis of Vienna. They all received excellent educational opportunities and were allowed to choose for themselves their main interests of study.

Lise's passion came to light early on: she was fascinated by mathematical and scientific phenomena and by questions described in the books of her father's library. She immersed herself in her own observations until late at night, trying to find her own solutions. To her it was clear that she wanted to become a scientist. To follow this path, however, she first had to complete the compulsory school for girls and teacher training. Only at that point would she be able to register for the general university entrance exam. At the end of the nineteenth century, this was only possible for girls through self-study because the academic high schools of the monarchy were still reserved for boys only. Thus, Lise studied intensively with a private tutor to prepare for the exam. Finally, in 1898, before what was, naturally, a purely male committee, she presented herself as one of over twenty external applicants to take the Matura school-leaving exam. She passed with flying colors and the door to higher studies was open. Her father advised her as to which major to choose. She initially leaned toward mathematics, but her father convinced her to devote herself

to physics. He may have thought of the many uses of applied physics in industry and business and of the prospects for his daughter to find a position that would enable her to lead an independent and fulfilling life.

Yet Lise's passion lay more in the direction of pure research.

At the time, physics was facing a major upheaval. It had only been a short while since Wilhelm Conrad Röntgen had discovered x-ray imaging, and people were amazed by this sudden ability to see through the human body. Soon afterwards, Henri Becquerel in Paris identified the element uranium as the cause of further types of radiation. Marie and Pierre Curie, the wife and husband research couple, succeeded in endless test series to provide an exact description of these rays as well as their effects. The age of radioactivity had dawned, and Lise Meitner was confronted with it for the first time while studying in Vienna. She had already completed a number of radio-physical experiments and papers when she decided, after finishing her studies and doctorate in 1906, to devote herself entirely to this new subject. In Vienna, however, this path seemed less promising; after an unsuccessful application to Curie's institute in Paris, Meitner took courage and set out on her own to Berlin to apply to study under Max Planck, the founder of quantum

theory, whom she had recently met in Vienna.

BERLIN

Planck was skeptical at first. He was opposed to free university access for women and he exclaimed to Meitner: „You already have a doctorate!“ – nevertheless, she persisted. This ambition coupled with her obvious giftedness impressed Planck so much that he eventually hired her as his assistant and even gave her permission to attend lectures and work in the labs. Still, she was only allowed to enter through the back door ...

At about the same time, a young chemist by the name of Otto Hahn, a few months younger than Meitner, approached Planck and asked him whether he knew of an experienced physicist to work with him on his radio-chemical experiments. Planck recommended Lise Meitner, a recommendation that set the foundation for what would become a fruitful and long working relationship and friendship between Meitner and Hahn.

The two quickly meshed into a team of equals, each coming from different disciplines, who came together within the new common field of radiation research. They published substantial results in rapid succession, which increasingly attracted the



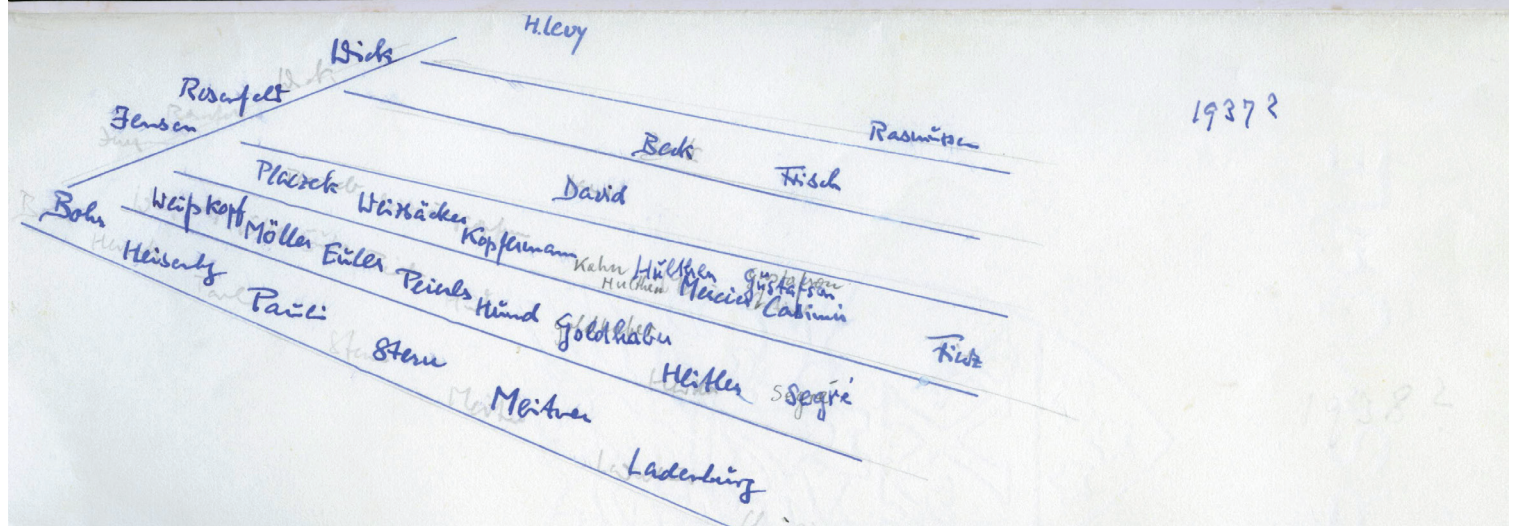
Lise Meitner with Otto Hahn in their laboratory, 1909

interest of experts. The First World War sent Hahn as an officer in the „poison gas battalion” to the Western Front and Meitner as a nurse and radiologist to the Austrian Eastern Front – but even this did not jeopardize their cooperation. Quite the opposite: in 1917, Meitner and Hahn had their breakthrough as a research team with the discovery of the element Protactinium. For the first time, they were cited internationally, and by the end of the First World War, they were both established as scientists. Shortly thereafter they parted as a team, but as colleagues and friends they remained in very close connection until the end.

Lise Meitner’s growing reputation was reflected above all in the fact that she was entrusted with the management of her own „Radio-physical Department” at the Kaiser Wilhelm Institute from 1917 onward, and in 1922 as the first woman professor at the Friedrich Wilhelm University in Berlin. She had professional exchanges with the leading physicists of the time and was regarded internationally as an excellent experimental scientist and a luminary of theoretical interpretation. Many future scientists were students at her institute and she co-authored numerous publications.

The 1920’s and early 1930’s were Lise Meitner’s most fertile and rewarding time.

Lise Meitner (front row) among colleagues
 at a conference in Copenhagen, 1937.
 (See names indicated below)



UNDER THE NS-REGIME

Meanwhile, „radio-physics“ had advanced to „nuclear physics“ and had become a separate branch. In the 1930's, new discoveries continued, the most important of which was, without a doubt, that of the neutron in 1932 by James Chadwick. Yet, the more quickly physics approached a new era, the more it found itself affected by political developments.

In Germany, Hitler was made Chancellor following the elections of January 1933. From the start, the Nazi regime made no secret of its intentions to remove unwanted, and above all Jewish scientists from universities and other scientific organizations. Some scientists, such as Albert Einstein, immediately left of their own accord. They knew what the future had in store. However, most of them, because their attachment to their homeland, friends, and families was too great, left only once they were forced to resign their posts and emigrate for „racial reasons.“

Lise Meitner was also directly affected, as she immediately lost her professorship at the University. However, as an Austrian citizen, she was not completely subject to German legislation and could at least continue her research at the Kaiser Wilhelm Institute.

Within these protective walls, she approached her old colleague and friend Otto Hahn in 1934 with a promising series of experiments. The Italian physicist Enrico Fermi had recently succeeded in using neutrons as projectiles for the bombardment of heavy elements, and Meitner wanted to apply this method to the production of „transuranic elements“ – elements that have heavier cores than uranium, which at that time was the heaviest known element. Otto Hahn agreed, and the two resumed their previous teamwork.

They were not the only ones. Marie Curie's daughter Irène Joliot-Curie and her husband Frédéric, as well as teams in England and the USA, were feverishly searching for the transuranic elements. Yet Hahn and Meitner also had, besides their scientific drive, another reason for entering into this time-consuming international competition: in full worldwide public view, this research represented a kind of life insurance for them and their work, since both were already regarded with suspicion by the National Socialist leaders and their omnipresent bureaucracy.

In March 1938, a predictable but no less catastrophic event occurred: the independent state of Austria was suddenly annexed by Germany. Thus, Meitner's Austrian citizenship became irrelevant and overnight she had, as a Jew in the German

Reich, lost all rights; she was no longer allowed to work, could no longer leave the country, and could be imprisoned at any time. Despite the many signs of what was happening, the events hit her completely unprepared, and she was forced to act. Not even the Kaiser Wilhelm Institute could protect her. A secret initiative to save Lise Meitner was started.

She seriously blamed herself for not having emigrated much earlier when it was still possible without danger. She was forced to leave everything behind: her work, her friendships, and her furniture, including books and records; she was heading into an uncertain future. Otto Hahn was very committed to helping her and tried all available contacts to colleagues abroad. However, in addition to the organization of Meitner's escape itself, the bureaucratic hurdles and the employment opportunities for Meitner proved problematic. Ultimately, a position was arranged for her in the Nobel Institute of Stockholm, where she would flee to via the Netherlands. Time was pressing.

On the night of July 13, 1938, a friend brought her to the railroad station, from where she was to take a train to Neuschanz on the German-Dutch border. The Dutch officials had been informed, and the German border guards did not think of asking Lise Meitner for her passport. She

had succeeded and was safe. But she had lost everything.

NEW START FROM SCRATCH

At first, she stayed with Dirk Coster, a colleague and good friend, who also provided her with the essentials and a little cash. In late July she flew to Sweden, where she was received by her longtime friend Eva von Bahr-Bergius, and soon after Lise Meitner came to Stockholm to take up her appointment at the Nobel Institute under the direction of Manne Siegbahn.

She had to be relieved to have found something in the short term, but she was in fact devastated by the working conditions: the equipment was poor, and whatever money was available was invested mainly in large-scale technical equipment, not in basic research. For Meitner, it was a regression to her time as an assistant 30 years earlier. She always had to ask Siegbahn for materials or space to work, and independent research, such as she had done at the Kaiser Wilhelm Institute, was not only unwanted but not possible. (Does this work for you? “impossible” sounds wrong here) The language was foreign to her and the cool temperament of the Swedes also affected her; she felt lonely,

isolated and deprived of everything that was important to her for a meaningful life. In this situation, intensive correspondence by mail was her only consolation. Above all, she confided her sadness to Otto Hahn. He tried to support her as much as possible, but he himself felt responsible, powerless, and discouraged. The international situation also made it difficult for him. The next war seemed imminent – and its postponement through Chamberlain's appeasement policy was palpably just a delay, not a permanent solution. Thus, the ongoing experimental test series on the transuranic elements, which he undertook together with his assistant Fritz Strassmann, offered both a welcome distraction from outside pressure as well as a sense of professional fulfillment. Still, these tests had not produced satisfactory results.

In the fall of 1938, the couple Joliot-Curie repeatedly published large parts of their research results, but something about them did not seem right. Meitner was also kept informed of the progress and discussions by letter. But for her, too, the actual reasons for the problematic results remained unknown for the time being. On the basis of the research from Paris, Hahn and Strassmann continued to design new series of tests, and although they proceeded with the utmost care, inconsistencies persisted – until Hahn once again turned to Meitner by letter on December 19th 1938.



Lise Meitner 1938 in the night of her escape from Germany

This letter reached her in Kungälv, her holiday resort southwest of Stockholm, and Hahn described to her the strange test results, with a request to give them some thought. Meitner was very careful in formulating her answer two days later. On the one hand, she was aware of the dogma that the nucleus could not be split; on the other hand, she did not want to completely exclude the possibility of an error. When her nephew Otto Robert Frisch came to visit the following day, she brooded over Hahn's letter and shared her thoughts with her nephew. On a walk together through the southern Swedish winter landscape, she on foot, he on skis, they discussed all the possibilities and concluded that, in fact, a splitting of the nucleus **MUST** have taken place – during which an incredibly large amount of energy was released. Nuclear energy had been discovered!

Otto Hahn remained preoccupied, despite the Christmas holidays. Intuitive as he was, he subconsciously felt close to a great discovery but professionally was not yet willing or ready to perceive it rationally. Only in his letter of December 28th did he himself arrive at the idea of a split nucleus and become aware of this sensational discovery.

The turn of the year 1938 to 1939 is marked by a constant back and forth of letters between Berlin and Stockholm. Hahn and Strassmann soon published the results in

the German scientific journal *Naturwissenschaften* because Hahn knew that he would no longer be able to withhold them. In any case, he was not able to name Lise Meitner as co-author without exposing himself as a confidant and organizer of her escape.

Hahn also quickly realized a positive side effect of this discovery: it would shield him from attacks by the Nazi regime. He was very gratified to see how the news spread like wildfire during a US lecture tour by Niels Bohr, the godfather of nuclear science – news that was always linked to his name: Otto Hahn.

In the meantime, Meitner and Frisch were still working on their own publication...

In the wake of Hahn's article, all laboratories worldwide with available radium had long since performed the necessary verification experiments. Meitner's and Frisch's publication simply arrived too late, and what was worse was that for the uninitiated observer, the discovery of nuclear fission was apparently not based on physics but on the chemistry work of their colleague and friend, Otto Hahn.

Thus began Meitner's scientific exile.

In the meantime, Meitner slowly started to adapt with iron equanimity to her new situation in Stockholm. She learned Swedish, deepened existing contacts, and es-

tablished new ones. She wrote incessantly to the whole world, to her scattered family, to friends in exile, and even more to those who had remained in Germany.

The onset of the Second World War did not change her situation. Research on nuclear fission took its own course and played no major role in Meitner's life from then on.

Yet she was unaware what fatal momentum the discovery of fission had gathered in the meantime. In 1940, her nephew Otto Robert Frisch and his colleague Rudolf Peierls wrote their famous memorandum, which, in theory, proved that it was actually possible to utilize nuclear energy in explosive devices by dramatically reducing the amount of critical mass of uranium-235 needed. The international race for the construction of the atomic bomb had begun.

Otto Hahn and numerous other German scientists became involved in corresponding plans as well. Werner Heisenberg, the dean of the German community of physicists, had even been appointed head of the German „Uranium Project,“ commissioned by the Wehrmacht to explain the possibilities of constructing both a reactor and a bomb.

Lise Meitner only learned of these activities much later, through rumors. She still considered the use of nuclear energy for

bombs a technical impossibility, but it was even more impossible for her to imagine that physicists would follow the call to construct such a weapon!

On the other side of the Atlantic, moral doubts such as hers had long since fallen victim to politics. Since F.D. Roosevelt's decision to implement the Manhattan Project, the USA was pursuing the construction of the first bombs at tremendous expense and on an industrial scale. A host of emigrated European physicists stationed in the luxurious ghetto of Los Alamos, New Mexico played a significant role in this. On the one hand, they were driven by the possibility of a victory over the totalitarian aggressors, from whom they had escaped, and on the other, they were simply motivated by scientific ambition. Otto Robert Frisch also joined them in 1943.

Physically removed from the danger zone, but deeply shaken emotionally, Lise Meitner saw the end of the war approaching. Hahn's letters to Meitner were becoming more and more fatalistic. Her friend Max von Laue, through regular correspondence, kept her up to date in ever clearer terms. Lise Meitner's fear for her friends and attempts to apportion blame grew and competed with each other. From her safe distance, she recognized the responsibility of the Germans for the destruction

of their country and their culture, for the terror they had induced in their neighbors and, the closer the Russians approached, for the extermination of Jews throughout Europe. She was beside herself as she learned, bit by bit, what had happened in her beloved second home of Germany up until that moment. It was not only the immediate loss of people who she loved and cherished but also the loss of a whole culture, which filled her with deep sadness and anger. She wrote touching letters to Hahn, von Laue, and her longtime friend Elisabeth Schiemann, but the letters also contained hints of reproach for how they could have permitted the situation to deteriorate so far. Later on, the deep rifts created by this conflict could no longer be completely mended. For Lise Meitner it was clear: Germany could never be her home again.

POSTWAR TIME

Lise Meitner first discovered the news of the two atomic bombs that were dropped on Hiroshima and Nagasaki from the newspapers. While still in a state of utter dismay, she immediately began receiving phone calls and photographers were waiting at her door. Since she was one of the few professionals who were reachable at this time – some were bound by rules of military confidentiality, others were in

THE LIFE OF LISE MEITNER AND NUCLEAR PHYSICS

DAY OF BIRTH IN VIENNA 11/77/1878

finishes **COMPULSORY SCHOOL** for girls — 1892

finishes training as — 1895 —

PRIMARY SCHOOL TEACHER for French

1896 —

in **PARIS**

1897 —

1898 —

1900 —

WILHELM CONRAD RÖNTGEN BY CHANCE DISCOVERS X-RAYS

HENRI BECQUEREL DISCOVERS RADIATION OF URANIUM in **PARIS**

J.J. THOMSON DETECTS the ELECTRON as **FIRST ELEMENTARY PARTICLE**

MARIE and PIERRE CURIE DISCOVER RADIUM in **PARIS**

MAX PLANCK INTRODUCES his CONCEPT of the «**WIRKUNGSQUANTUM**» **h** (**QUANTUM of ACTION**) in **BERLIN**

SUCCESSFULLY COMPLETES GYMNASIUM FINAL EXAMS — 1901 —

as a **NON-ENROLLEE**; **BEGINS STUDIES of PHYSICS** at the **UNIVERSITY OF VIENNA**

1903 —

1905 —

GRADUATION in Vienna — 1906

FIRST NOBEL PRIZE of PHYSICS goes to **W.C. RÖNTGEN**

ERNEST RUTHERFORD CLASSIFIES RADIATION as **ALPHA-, BETA- and GAMMA-RAYS**

ALBERT EINSTEIN'S 3 essential **PAPERS** published, among them the «**SPEZIELLE RELATIVITÄTSTHEORIE**» (**SPECIAL THEORY OF RELATIVITY**);

moves to **BERLIN**, begins **ADVANCED STUDIES** at **MAX**

PLANCK'S INSTITUTE; **COLLABORATION** with **OTTO**

HAHN BEGINS

discovery of the **RADIOACTIVE RECOIL** («radioaktiver

Rückstoß») with Hahn — 1909

1911/13 —

begins work in the **KAISER-WILHELM-INSTITUT BERLIN**,

at first as **UNPAID ASSISTANT** — 1912 —

ERNEST RUTHERFORD and **NIELS BOHR DEVELOP** the «**PLANETARY MODEL of ATOMS**», having a **HEAVY NUCLEUS** in its **CENTRE**

First **SOLVAY-CONFERENCE** in Brussels

REGULAR EMPLOYMENT at the K.-W.-Institute — 1913

1915 —

1915/16

takes part in **WW I** as **NURSE** and **RADIOLOGIST** at the

AUSTRO-RUSSIAN EASTERN FRONT

HEAD of RADIO-DEPARTMENT at the

Kaiser-Wilhelm-Institute

discovery of the element **PROTACTINIUM** (with Hahn) — 1918

1919 —

HABILITATION at the **FRIEDRICH-WILHELM-UNIVERSITY,**

BERLIN; first lectures

EXTERNAL PROFESSORSHIP — 1923

1926 —

EINSTEIN PUBLISHES the **GENERAL THEORY OF RELATIVITY**

RUTHERFORD succeeds in the **FIRST TRANSFORMATION** of one element into another (nitrogen – oxygen)

WOLFGANG PAULI DETECTS the **ELECTRON SPIN**

WAVE- and QUANTUM-MECHANICS ESTABLISHED by **ERWIN SCHRÖDINGER, WERNER HEISENBERG, PAUL DIRAC**

JAMES CHADWICK DISCOVERS the **NEUTRON**

1932 —

1933

REMOVED from **UNIVERSITY** due to her **JEWISH ORIGIN**;

BEGINS EXPERIMENTS on the

TRANSURANIC ELEMENTS with Hahn

loses **AUSTRIAN CITIZENSHIP** due to the «**ANSCHLUSS**»;

ESCAPES to NETHERLANDS, EXILE in **SWEDEN**, begins

work at the **NOBEL INSTITUTE** in **STOCKHOLM**

THEORETICAL INTERPRETATION of FISSION

(with her nephew **OTTO ROBERT FRISCH**)

1938/39

1942 —

THEORY of TRANSURANIC ELEMENTS established by **ENRICO FERMI** in **ROME**

OTTO HAHN and **FRIITZ STRASSMANN** discover **NUCLEAR FISSION** in **BERLIN**

FISSION in **BERLIN**

MANHATTAN PROJECT AUTHORIZED by **F.D.ROOSEVELT**

8/6/1945 —

FIRST ATOMIC BOMB RELEASED over **HIROSHIMA**, Japan

1946

1947

GUEST LECTURER at several **UNIVERSITIES IN THE USA**

WOMAN OF THE YEAR

PROFESSOR at the **ROYAL TECHNICAL UNIVERSITY,**

STOCKHOLM

SWEDISH CITIZENSHIP (but retains Austrian)

1957

1959

MEDAL POUR LE MÉRITE in **GERMANY**

OPENING of the **HAHN-MEITNER-INSTITUT** in **BERLIN**

1960

MOVES to Cambridge/UK

DIES in **CAMBRIDGE**, shortly after **OTTO HAHN** 10/27/1968

ELEMENT 109 NAMED MEITNERIUM, in her honor

1997 —

captivity – the press rushed to her and invented all sorts of stories about her involvement in the atomic bomb. She was presented to the US public as „Mother of the Bomb“ and was named „Woman of the Year.“ She received fan mail and numerous invitations. As a result, Meitner first set off for the US in 1946 to give lectures, receive honors and, finally, to see her family members again. She also met many of her old colleagues, prompting her to make a sober statement:

„What a gift Germany has given to America!“

After her stay in the United States, Meitner returned to Sweden despite ongoing reservations and her painful experience in exile there. In Stockholm, as of 1947, she headed the Department of Nuclear Physics at the Royal Institute of Technology, as she had been in charge of a similar department in Berlin for nearly 20 years. She received Swedish citizenship and countless honors worldwide, including from Germany and her native Austria, which by then had been restored as a sovereign country.

This late recognition of her work was only dampened by the Nobel Prize being awarded to Otto Hahn in 1946. Hahn learned that he would be belatedly



awarded the 1944 Nobel Prize in Chemistry for the discovery of nuclear fission. This was during his military captivity in Great Britain where he was

held, along with many other German physicists, at the estate in Farm Hall. Yet, Lise Meitner and Fritz Strassmann remained unmentioned.

Lise Meitner with science talent finalists at the Catholic University Washington, D.C., 1946

This was a big blow for her. She was happy for Hahn to receive the prize, but she felt it was a gross omission by the Nobel Prize Committee (to which Manne Siegbahn also belonged) that her and Strassmann's part received no mention. Nor could she understand Hahn's behavior; he could have at least mentioned her in his statements. It would have been easy for him to publicly rectify this error, but he never did.

This rejection by Meitner's peer and longtime friend, partner and colleague, Otto Hahn, also increasingly coloured her relationship to Germany, a country to which she ascribed historical neglect, repression, and guilt with no conscience.

In 1960, she left Sweden behind and moved to Cambridge, close to her beloved nephew Otto Robert. After more than fifty years of work, she withdrew from active research, but physics remained an important element in her life. She maintained extensive correspondence until the very end, and when she died at the age of nearly ninety on October 27th, 1968, she left a plethora of letters and copies of her own texts, having always used carbon copy paper in her typewriter. It seems as if it was important to her to preserve her thoughts for posterity – the right decision without which even this audiobook would not have come about.



Lise Meitner in 1960

LISE MEITNER AND MUSIC

It is striking that many scientists from the late 19th and early 20th centuries were excellent musicians. Max Planck played cello, Einstein violin, Werner Heisenberg organ, and Otto Hahn was a talented and passionate tenor. Lise Meitner herself played the piano throughout her life, as did her nephew Otto Robert Frisch (even his mother, Meitner's sister Gusti, had been a professional pianist and composer). The idea arises that scientific and musical work are two forms of one and the same expression of creative, limitlessly thinking people. Thus, if the scientific work is the productively bound side of its creation, the music represents, so to speak, the free and liberal interpretation. Music is balance and reflection, escapism, a means of focusing – and undoubtedly also a social cement.

But within these circles of scientists, this passion applied above all to the canon of „classical“ music. Neither Lise Meitner nor the others mentioned a penchant for the emerging jazz, pop, or more exotic genres known at the time.

This fact prompted us in this audiobook to work with the experimental and innovative spirit of these scientists' exploratory work instead of „their“ highly-canonized music, which was not even contemporary in their time, and to bring that spirit into our interpretation. The result was a completely open-ended music. Apart from a few miniatures, nothing was composed. We relied on improvisation and coincidence, given that they also play a central role in physics, as an experimental arrangement for the testing of theory in practice. This was coupled with the absolute urge to explore new dimensions, singular in terms of time and therefore unique. The serious difference between physics and music is factuality. While science is always searching for reality, music is simply true, dream and illusion at the same time.

LISE MEITNER AND HER ROLE AS WOMAN

Today, Lise Meitner is often held up as a prime example of women's emancipation. But this picture is skewed, as Meitner did not perceive herself that way. Not only was she not a feminist – she was generally suspicious of militant advocacy for any ideology.

Rather, she was a radical individualist who, beginning with her father's support, was afforded the possibility of self-realization. Yet, what she made of it is another story that has nothing to do with luck. She made the best possible use of her opportunities, and thereby had an extraordinary career as a woman among men, with whom she mostly held her own. She was respected for her achievements and stability, and she was able to prevail. Certainly, she was exposed to discrimination, but derived from it neither an emancipatory dogma nor a special claim. And yet, together with Marie Curie, she represents a new archetype. The female scientist in her day was a harbinger of modernity, and it is significant that her “home” was within the very young fields of radio and nuclear physics. Lise Meitner was a novelty as a person and was distinguished in both fields primarily by two characteristics: exclusion through gender and extraordinary diligence. While the former limited her scope for possibilities in which her life would play out, the latter provided the means to make the best out of it and to tacitly question those limits. Her achievements were not only the result of aspiration, but the awareness of her own predilection and an enormous assertiveness. From the time she was first confronted with these limits, namely when having taken the external Matura exam, she had had to arrange things herself throughout her life, even in her happiest period of 1921-33. The patriarchal society was plainly overwhelmed with „public“ women and generally reacted with chauvinism, contempt, and derision.

In science, as in all other hierarchical systems, women will likely continue to have a harder time than their male counterparts – the fact is, things are made more difficult for them. Yet it is precisely the sciences (no, not physics, but the social sciences and gender studies) that have established that the inclusion of women in the processes of opinion formation and the claim to power in all areas brings better results for all in the long term. The systematic exclusion of female thinking – and participation, action and leadership – which in many regards still continues to this day, is not only unjust, but also deprives society of broader and more diverse perspectives and options. This must change.

In her own story, Lise Meitner almost appears as a genderless individual from a time overloaded with traditional values, as a vestal of science who rejected a private life as a wife, lover, or mother. She devoted herself completely to her life as a researcher, self-confidently and unselfishly. With all her inconspicuousness, she is for that very reason considered to be an icon.

EPILOGUE

This audiobook is the second part of a loose series of biographies of important but underappreciated women and their works. The first episode in 2014 was the audiobook „The Unknown Soldier“ about the Austrian pacifist Bertha von Suttner – the pioneer of the United Nations, tireless fighter for a world without war and initiator of the Nobel Peace Prize, which she herself received in 1905 as the first woman.

Suttner and Meitner united a profoundly humanistic worldview shaped by an unshakable belief in the goodness of man, and they were both extremely strong-minded and visionary. As a result, they are considered the protagonists of a new female perspective, at a time when women were only afforded the roles of wife, mother, or mistress. But their achievements and their perspectives demonstrate just what a valuable and sustainable impact this „other view“ has on the world. These two books are for those who, through the deeds and ideas of others, seek to be inspired to contribute in making the world a little better. The present time needs you!

CREDITS

Lise Meitner – Kate Reading
Otto Hahn – Brian Hemmingsen
Max von Laue – Stephen McLaughlin
Otto Robert Frisch – Henry Kramer
Werner Heisenberg – Henry Kramer
Max Planck – Stephen McLaughlin

Narrator – Michael Kramer

Isabelle Duthoit – clarinet, voices
Franz Hautzinger – trumpet
Lukas Lauermann – cello
Stefan Frankenberger – the rest

Arranged and mixed at studio77, Vienna
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Bibliography (extract):
Ruth Lewin Sime, a life in physics (1995)
Patricia Rife, Lise Meitner and the dawn of the Nuclear Age (1990)
Otto Robert Frisch, what little I remember (1981)
Richard von Schirach, the night of the physicists (2014)

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Born in 1977 in Rosenheim/Bavaria, lives and works in Vienna/Austria as a freelance musician, artist, producer and lecturer.

Some publications/releases:

Morgen es wird schoen – “capriole” (LP) 2017, „false stars“ (EP) 2012
“Der unbekannte Soldat” (“the unknown soldier”), audio book 2014

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www.studio77.at
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Lise Meitner with students at Bryn Mawr College, 1959