

FROM EXCEPTIONAL PROMINENCE TO PROMINENT EXCEPTION

LISE MEITNER AT THE KAISER WILHELM INSTITUTE FOR CHEMISTRY

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IMPRESSUM

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CONTENT

Abstract / Kurzfassung	4
From Exceptional Prominence to Prominent Exception:	5
University education for women in Germany	5
From Vienna to Berlin	7
Making exceptions: Meitner in Berlin 1907-1912	9
The Kaiser-Wilhelm-Gesellschaft	10
Personal patronage, scientific independence	11
Women in Meitner's laboratory	14
Women in other Kaiser Wilhelm Institutes	14
Under Hitler	15
Gender discrimination under the National Socialists	18
Meitner at the KWI for Chemistry 1933-1938	20
Dismissal and emigration	23
Afterword	23
Sources	27
Literature	28
Index	34
Author	35

ABSTRACT / KURZFASSUNG

Lise Meitner (1878-1968) was associated with the Kaiser Wilhelm Institute for Chemistry from its beginning in 1912 until she was driven out of Germany in 1938. For the first twenty years, hers is an expansive story of a woman who achieves exceptional prominence in physics; after 1933 her story gradually narrows until nothing is left for her as a person of Jewish origin in Germany. This article traces Meitner's career in the context of the inclusion of women into German science, particularly the Kaiser Wilhelm institutes, and the issues of education, patronage, and marriage that affected the first generation of women scientists. After 1933 the focus shifts to the changed conditions for non-Jewish women and Meitner's experiences as a prominent exception within the Kaiser-Wilhelm-Gesellschaft, raising questions of emigration, conformity, and moral responsibility under National Socialism.

Die Geschichte von Lise Meitner (1878-1968) ist mit dem Kaiser-Wilhelm-Institut für Chemie vom Zeitpunkt der Institutsgründung 1912 bis zum Vorabend ihrer Flucht 1938 fest verbunden. Während der ersten 20 Jahre zeugt diese Verbindung von der Erfolgsgeschichte einer Frau, die auf dem Gebiet der Physik außerordentliche Bedeutung erlangte. Ab 1933 wird ihre Geschichte jedoch zunehmend beschnitten, bis man sie schließlich auf die einer in Deutschland lebenden Person jüdischen Ursprungs reduziert hat. Der vorliegende Beitrag beschäftigt sich mit Meitners Karriere im Hinblick auf die Einbeziehung von Frauen in die damalige Wissenschaftswelt mit besonderer Berücksichtigung der Kaiser-Wilhelm-Institute. Im Vordergrund stehen dabei die Auswirkungen, die Ausbildung, Patronage und Heirat auf diese erste Wissenschaftlerinnengeneration hatten sowie die veränderten Arbeitsbedingungen nicht-jüdischer Frauen nach 1933. Lise Meitners Erfahrungen stellen eine prominente Ausnahme innerhalb der Kaiser-Wilhelm-Gesellschaft dar. Diese und damit verbundene Fragen nach Emigration, Konformität und moralischer Verantwortung im Nationalsozialismus werden beleuchtet.

From Exceptional Prominence to Prominent Exception:

Lise Meitner at the Kaiser Wilhelm Institute for Chemistry

Ruth Lewin Sime

Lise Meitner worked in Germany for over thirty years – longer, no doubt, than any other woman scientist of Jewish origin. When she came to Berlin from her native Vienna in 1907 she was among the first women seeking a place in science; when she left in the summer of 1938 she was one of the very last Jewish academics to be driven out. Like many of her generation, Meitner experienced the pattern of exclusion, marginalization, and exceptional status that characterized the foundational decades for women in science, but hers is also a story of great success. She became a truly prominent physicist of international stature, with a remarkable career that was a series of firsts for the inclusion of women into German academia. Her scientific home was the Kaiser Wilhelm Institute for Chemistry from the day it opened until the night before she escaped from Germany. In the end, almost none of her success transferred into exile. Even her scientific legacy was clouded by her forced emigration, raising questions of the uses of history and memory that are still being debated to this day.

UNIVERSITY EDUCATION FOR WOMEN IN GERMANY

In the latter part of the nineteenth century women in German-speaking countries were among the most undereducated in Europe, excluded from universities and, by the same logic, from the academic secondary schools that prepared students for university entrance. It was not until the turn of the century that women were admitted to universities on the same legal basis as men: in Austria in 1897, followed by a series of German states, Prussia being among the last in 1908.

Before that, however, the system had become slightly permeable, allowing a tiny number of women to study at German universities.¹ Most were unmatriculated auditors who managed to attend classes on a provisional basis, with permission required from each professor. In the 1890s a few women actually completed their studies in this way and received their doctorate. These included several foreign women who were accepted on a trial basis in the Mathematics Institute (*Mathematisches Institut*) in Göttingen, where their

1 The Russian mathematician Sofia Kovalevskaja was one of the first women to obtain a German doctorate, from Göttingen in 1874. Ann Hibner Koblitz, *A Convergence of Lives. Sofia Kovalevskaja: Scientist, Writer, Revolutionary*, New Brunswick 1993, p. 123.

professors judged them as capable as the men. For purposes of gender testing, foreign women were considered relatively harmless, since they were expected to return to their native countries without posing a threat to the German status quo.² In Berlin, which allowed women auditors only in 1895, twenty-two women earned a doctorate in the period prior to the legal admission of women in 1908. Of these the majority were foreigners, mostly Americans, but nine Germans also got through, including Elsa Neumann, who in 1899 became the first woman in Berlin to be awarded a doctorate in physics.³ Among the professors who helped her petition the government for her degree were the experimental physicist Emil Warburg, who subsequently sponsored two other women students,⁴ and the theoretical physicist Max Planck.

A woman desiring an education, therefore, might consider the situation to be somewhat hopeful, while the professors could be satisfied that the system remained entirely under their control. Planck, for example, was willing to admit women with “a special gift”⁵ to his lectures “on a trial basis and always revocably,”⁶ but he emphasized that “such a case must always be considered an exception” since “nature itself has designated for woman her vocation of mother and housewife.”⁷ When Planck wrote this in 1897 he was thirty-nine years old, married, and the father of four. Within a few years his quantum theory would initiate a profound revolution in atomic physics, but he did not then (or perhaps ever) imagine a social structure different from his own. To be sure, he was open to exceptions. He helped Elsa Neumann and a few years later he took an interest in Lise Meitner, eventually becoming her mentor and close friend.

2 American women saw admission to German universities as an important “entering wedge” for opening U.S. graduate schools to women. See Margaret W. Rossiter, *Women Scientists in America: Struggles and Strategies to 1940*, Baltimore 1982, pp. 38-43.

3 Annette Vogt, „Auch Damen möchten den Doktorhut“ – Promotionen von Frauen an der Philosophischen Fakultät der Berliner Universität zwischen 1898 und 1945, in: Christoph Meinel/Monika Renneberg (eds.), *Geschlechterverhältnisse in Medizin, Naturwissenschaft und Technik*, Verlag für Geschichte der Naturwissenschaften und der Technik, Bassum, Stuttgart 1996, pp. 288-296; Vogt, *Die Spielregeln der Objektivität. Die ersten Promotionen und Promotionsversuche von Frauen an der Philosophischen Fakultät der Berliner Friedrich-Wilhelms-Universität 1898 bis 1908*, in: Johanna Bleker (ed.), *Der Eintritt der Frauen in die Gelehrtenrepublik. Zur Geschlechterfrage im akademischen Selbstverständnis und in der wissenschaftlichen Praxis am Angang des 20. Jahrhunderts*, Husum 1998, pp. 31-48; Vogt, *Elsa Neumann: Berlins erstes Fräulein Doktor*, Berlin 1999.

4 Horst Kant, *Emil Warburg und die Physik in Berlin*, in: *Dahlemer Archivgespräche* 2, 1997, pp. 64-100, here p. 78.

5 “besondere Begabung” in: Arthur Kirchhoff (ed.), *Die Akademische Frau*, Berlin 1897, pp. 256-257.

6 “[...]ich werde ihr gerne [...] den probeweisen und stets widerruflichen Zutritt zu meinen Vorlesungen und Übungen gestatten”, *ibid.*

7 “dass ein solcher Fall immer nur als Ausnahme betrachtet werden kann [...] die Natur selbst der Frau ihren Beruf als Mutter und Hausfrau vorgeschrieben hat”, *ibid.*

FROM VIENNA TO BERLIN

Meitner arrived in Berlin in 1907 with a doctorate that she had earned the year before, some experimental experience in radioactivity, and several independent publications.⁸ As one of the first group of women to attend university in Vienna (and only the second woman to earn a physics doctorate there),⁹ Lise was in many respects similar to others in her situation. It appears that a supportive father was crucial;¹⁰ Lise's father was a liberal, politically active lawyer who encouraged all his children, including his five daughters, to seek a profession. In Vienna, moreover, Jews were significantly over-represented among the first generation of women students, a phenomenon for which several explanations have been suggested.¹¹ In Lise's case, her family background was entirely Jewish, but her upbringing was secular. It seems clear that her parents, who had experienced the emancipation of Jewish men in their own generation, wanted their daughters to share in those freedoms too.

At a time when the number of university women was still exceedingly small, supportive teachers were also essential. Here, too, Lise was fortunate. Her most influential professor was the great theoretical physicist Ludwig Boltzmann, a charismatic teacher and socially progressive person, who welcomed women students as long overdue. After receiving her doctorate, Meitner also worked for a year with Stefan Meyer, a lecturer in physics who introduced her to research in radioactivity.¹²

Thus as a student Meitner benefited from a number of significant changes for women, from formal access to education to a growing climate of acceptance that included families, teachers, and young male scientists. The presence of a highly visible woman in radioactivity was another factor. Marie Curie was a pioneer in radioactivity from its discovery in 1896, and when the 1903 Nobel Prize in Physics was awarded to her, together with her husband Pierre Curie and Henri Becquerel, the award was a sensation, stimulating worldwide debate

8 Ruth Lewin Sime, *Lise Meitner: A Life in Physics*, Berkeley 1996, chapter 1.

9 The first was Olga Steindler (1879-1933) in 1904. See Brigitte Bischof, *Physikerinnen: 100 Jahre Frauenstudium an den Physikalischen Instituten der Universität Wien*; Broschüre zur Ausstellung, Wien 1998.

10 Pnina Abir-Am and Dorinda Outram, Introduction, in: Pnina Abir-Am/ Dorinda Outram (eds.), *Uneasy Careers and Intimate Lives. Women in Science 1789-1979*, New Brunswick 1987, pp. 1-16, here pp. 15-16.

11 In Vienna prior to World War I the percentage of Jews among women students in the philosophical faculties varied between 25 and 37%. See Waltraud Heindl, *Die konfessionellen Verhältnisse: jüdische und katholische Studentinnen*, in: Waltraud Heindl and Marina Tuchy (eds.), *„Durch Erkenntnis zu Freiheit und Glück...“ Frauen an der Universität Wien (ab 1897)*, Wien 1990, pp. 139-149. For Jews in German academia and the professions, Ute Deichmann, *Flüchten, Mitmachen, Vergessen. Chemiker und Biochemiker in der NS-Zeit*, Weinheim 2001, chapter. 1. For Jewish women's "emancipation through higher education," Harriet Pass Freidenreich, *Female, Jewish, and Educated. The Lives of Central European University Women*, Bloomington 2002, chapter 1.

12 Lise Meitner, *Looking Back*, *Bulletin of the Atomic Scientists* 20/11, 1958, pp. 2-7.

about the changing roles for women in the new century.¹³ As a student Meitner certainly knew of Curie's Nobel Prize, and in 1906 she apparently inquired about working in the Curie laboratory in Paris, without response.¹⁴ Later Meitner dismissed the suggestion that Curie been an influence, saying only that it had been greatly to her advantage that she had not gone to Paris. That may have been true for Meitner, but Curie was a model for many young women in science, particularly those in radioactivity research.

It also helped that many of the men in this new field were young and forward looking. The physicist Ernest Rutherford, for example, cheerfully accepted women in his Montreal laboratory beginning in 1898, and remained supportive of women in science.¹⁵ In Vienna, where physicists with ties to the Curie couple made the university an early center for radioactivity research, Meyer was Meitner's teacher and friend, as he eventually would be for many other women in the field.¹⁶ And in Berlin there was Otto Hahn, a young chemist who had worked in Montreal for a year and regarded Rutherford as his most influential teacher. Hahn did not hesitate to ask Meitner to work with him when she first came to Berlin.¹⁷

Historians of science have been intrigued by the fact that for a period of nearly forty years, from the early twentieth century until World War II, the number of women scientists in radioactivity was disproportionately high.¹⁸ Perhaps it is not surprising that a substantial number of new women graduates would enter a field that was itself new and professionally unformed; indeed, the absence of established academic positions may have made radioactivity relatively more attractive to women who at first had no realistic expectations of a university career. Moreover, radioactivity could be approached from several disciplines, including physics and chemistry, with industrial and medical applications. It may well be that women crossing their own gender borders into science could more readily adapt and be accepted in a field in which the men were also crossing disciplinary borders and which was, moreover, a site for revolutionary discoveries and a remarkable number of early Nobel prizes: the aforementioned 1903 prize in physics, the 1908 chemistry prize to Rutherford, and in 1911 a second prize to Marie Curie, this one in chemistry. Adding to its appeal, radioactivity was scientifically wide open, so that even a newcomer could survey the field, learn to use the simple equipment, and quickly discover

13 Susan Quinn, *Marie Curie. A Life*, New York 1995, chapter 9.

14 Charlotte Kerner, *Lise, Atomphysikerin. Die Lebensgeschichte der Lise Meitner*, Weinheim 1986, p. 23.

15 Marelene F. Rayner-Canham and Geoffrey W. Rayner-Canham, *Harriet Brooks: Pioneer Nuclear Scientist*, Montréal 1992, pp. 19, 22-25.

16 Wolfgang L. Reiter, *Österreichischer Wissenschaftsemigration am Beispiel des Instituts für Radiumforschung der Österreichischen Akademie der Wissenschaften*, in: Friedrich Stadler (ed.), *Vertriebene Vernunft II, Emigration und Exil Österreichischer Wissenschaft*, Wien 1988, pp. 709-729, here pp. 711-713; Wolfgang L. Reiter, Stefan Meyer, *Pioneer of Radioactivity*, in: *Physics in Perspective*, 3, 2001, pp. 106-127; Sime, Meitner, pp. 19-21, 71-73.

17 Otto Hahn, *Vom Radiothor zur Uranspaltung: Eine wissenschaftliche Selbstbiographie*, Braunschweig 1962, pp. 28-36, 46ff.

18 Marelene F. Rayner-Canham and Geoffrey W. Rayner-Canham, authors and eds., *A Devotion to their Science. Pioneer Women of Radioactivity*, Philadelphia, Montreal & Kingston 1997, p. 18.

something new. Meitner had done just that in Vienna, and when she arrived in Berlin Hahn was genuinely delighted to find a physicist with whom he could collaborate.

MAKING EXCEPTIONS: MEITNER IN BERLIN 1907-1912

In Berlin, Meitner found that the university was closed to women and that it was necessary to petition Planck to attend his class as an auditor. But Planck quickly saw her as one of the gifted exceptions, and Heinrich Rubens, the professor of experimental physics, offered her a place in his laboratory. He also introduced her to Hahn, then an *Assistent* in Emil Fischer's Chemistry Institute, who asked her to work with him instead. Although Fischer barred women from his institute – he was concerned about fire hazards to their hair – he allowed Meitner to work with Hahn in a basement laboratory with a separate entrance.¹⁹

Meitner thus encountered almost the entire range of reactions to women: institutional prohibitions; exclusionary rules disguised as protection; physical segregation; one professor who readily accepted her and two others who made exceptions; and a young man who was eager to collaborate with a physicist regardless of gender. She regarded herself as fortunate. In just a few weeks she had come to the attention of several powerful professors, and she had found a man with whom to work, historically a necessity for a woman engaged in laboratory research.

In Berlin as elsewhere, radioactivity research benefited from the interdisciplinary collaboration of physicist and chemist, and over the next five years Hahn and Meitner made a number of new discoveries, published often, and became well-known. With Hahn, Meitner also avoided the common disadvantage for a woman working with a man, for despite gender stereotypes she was not seen as his subordinate. In radioactivity the relationship between physicist and chemist was, if anything, the other way around.

Academically, however, Meitner had no prospects. In Germany at the time a man could begin with the research position of *Assistent*, followed by *Habilitation*, which gave him the right to teach and the title of *Privatdozent*, the first rung on the academic ladder. If a place was open, he might be appointed an associate professor or ultimately an *Ordinarius*, or full professor, a level most academics never reached. In Berlin none of these positions had ever gone to a woman,²⁰ and for five years Meitner worked as a “guest” without position or pay. It should be noted that her outsider status was not based on her religious background: in 1908 she withdrew from the Jewish community and accepted baptism as a Protestant (*evangelisch*), a move that for a man would have cleared the way for academic advancement. Although Meitner never stated her reasons for conversion, career opportunism was almost certainly not one of them, as it

¹⁹ Sime, Meitner, chapter 2.

²⁰ Annette Vogt, Women Members of the Academies of Science—A comparative study with special consideration of the Kaiser Wilhelm Society (1912-1945), Preprint 155, Max-Planck-Institut für Wissenschaftsgeschichte, Berlin 2000.

was evident that gender and not religion was her greatest handicap. At the same time, Hahn's career was not progressing either. In Germany no professorships existed in radioactivity and in 1912 he was still a *Privatdozent*.

THE KAISER-WILHELM-GESELLSCHAFT

By 1909 over 200 women were studying mathematics and physical science in Germany overall, more than forty in Berlin alone, where they were 5% of all science students.²¹ More women took their doctorates in chemistry than other sciences, but a significant number studied physics.²² Many became teachers in the new academic secondary schools for girls and others went into industry, but by 1920 women were allowed to undergo *Habilitation* and academic positions were at least a possibility. It is of interest that in Berlin a sizable fraction – about a quarter – of the first generation of university-educated women were Jewish or of Jewish origin, numbers similar to those Meitner had encountered in Vienna.²³

The foundation of the *Kaiser-Wilhelm-Gesellschaft* (KWG) opened new alternatives for women. An autonomous, privately funded organization, the KWG was designed to be more flexible than universities in establishing scientific institutes in new areas of research. The first such institute was the Kaiser Wilhelm Institute for Chemistry (KWI-C), which was inaugurated in 1912 in Dahlem, outside Berlin. Along with departments for inorganic and organic chemistry, the KWI-C included a modest radioactivity department, the first in Germany, under Hahn. Although the KWG, unlike the universities, had no policies excluding women²⁴ and proved to be far more open to Jews, Hahn was hired with a decent salary and the title of “Professor” while Meitner was invited to join him as an unpaid “guest.”

At the end of 1912, however, Planck gave Meitner her first paid position, as his *Assistent*, the first woman to have this position in Berlin. She graded his students' papers. In 1913 she was made an associate of the KWI-C, the same position as Hahn's, giving her shared responsibility for their laboratory but without the professor title and at much lower pay.²⁵ The position came from Emil Fischer, the same professor who in 1907 had relegated Meitner to the basement of his institute. Now as the de facto “president of German science” who headed the *Verein Chemische Reichsanstalt*, the parent organization for the

21 Margot Fuchs, Isolde Hausser (7. 12. 1889 – 5. 10. 1951), Technische Physikerin und Wissenschaftlerin am Kaiser-Wilhelm-/Max-Planck-Institut für Medizinische Forschung, Heidelberg, *Berichte zur Wissenschafts-geschichte* 17, 1994, pp. 201-215, here p. 204.

22 Renate Tobies, Physikerinnen und spektroskopische Forschungen. Hertha Spöner (1895-1968), in Meinel/Renneberg, *Geschlechterverhältnisse*, pp. 91-97, here p. 91; Britta Engel, Clara Immerwahr's Kolleginnen. Die ersten Chemikerinnen in Berlin, in Meinel/Renneberg, *Geschlechterverhältnisse*, pp. 297-304.

23 Pass, Female, Jewish, and Educated, pp. 207, 210; Engel, Clara Immerwahr, p. 298.

24 Vogt, Women Members (unpaginated).

25 Sime, Meitner, pp. 47, 52. In 1913 Hahn and Meitner were „*derzeitige Mitglieder*“ (provisional members), not to be confused with the high-ranking position of „*wissenschaftliche Mitglieder*“ (scientific members), which they acquired later.

KWI-C,²⁶ he consistently supported her. In 1914 Fischer doubled Meitner's initial salary, and in 1916, after she returned from a year's voluntary service as an X-ray nurse in the Austrian army, he raised her salary again, to the equivalent of Hahn's. Most important, in early 1917 Fischer appointed Meitner to head her own section for physics in the institute, the equivalent of a professorship. All her life, she regarded this as the decisive point of arrival in her career, assuring her scientific independence and giving her control over budget and personnel decisions. The professor-title followed soon after, in 1919.²⁷

PERSONAL PATRONAGE, SCIENTIFIC INDEPENDENCE

Every one of these steps came not because Meitner made demands – it does not appear that she ever did – but because Fischer, with judicious prodding from Planck, decided that her advancement was justified. Meitner was, therefore, the beneficiary of what Rossiter has called a “personal patronage system” shaped by powerful men, in which “a woman was dependent on the good will and tolerance of those around her for the opportunity to work.”²⁸ Although a protégé system was and is not unusual in academia, Meitner's behavior suggests that women may have been more dependent and in some respects more passive than men of similar talent and accomplishments. All her life Meitner was intensely grateful to Planck, Hahn, and other colleagues, convinced that she could not have succeeded anywhere else but in Berlin.²⁹ Her assessment does not seem unrealistic. She could see how unlikely it would have been for her to find an independent position had she stayed in Vienna, for example, where women flocked to Meyer's Radium Institute in the interwar period but no woman even reached the level of *Privatdozentin* before 1933 – and then none were Jews or of Jewish origin.³⁰ She could see, moreover, how difficult it was for other women scientists to make their way in Germany, including her friend Elisabeth Schiemann, a distinguished plant geneticist who never held a position

26 Jeffrey Allan Johnson, *The Kaiser's Chemists: Science and Modernization in Imperial Germany*, Chapel Hill 1990, pp. 125-128.

27 Sime, *Meitner*, chapters 2, 3. Although Meitner gained the status of department head in 1917, the KWG continued to treat the Hahn/Meitner *Abteilung* administratively as one unit. See Horst Kant, *Vom KWI für Chemie zum KWI für Radioaktivität – Die Abteilung(en) Hahn/Meitner am Kaiser-Wilhelm-Institut für Chemie*, in: *Dahlemer Archivgespräche* 8, 2002, pp. 57-92, here pp. 68-69.

28 Rossiter, *Women Scientists*, p. 190.

29 Sime, *Meitner*, pp. 45, 95-96.

30 Bischof, *Physikerinnen*; Brigitte Strohmeier and Robert Rosner, *Biographischer Abriss*, in: Robert Rosner and Brigitte Strohmeier (eds.), *Marietta Blau – Sterne der Zertrümmerung. Biographie einer Wegbereiterin der modernen Teilchenphysik*, Wien 2003, pp. 21-89, here pp. 26-32; Reiter, *Wissenschaftsemigration*, pp. 718-722, 733 n. 33; Ruth Lewin Sime, *Twice Removed. The Emigration of Lise Meitner and Marietta Blau*, in: Friedrich Stadler (ed.), *Österreichs Umgang mit dem Nationalsozialismus. Die Folgen für die naturwissenschaftliche und humanistische Lehre*, Wien 2004, pp. 153-170, here pp. 157-159; Maria Rentetzi, *Gender, Politics, and Radioactivity Research in Interwar Vienna*, in: *Isis* 95, 2004, pp. 359-393, here pp. 382-385.

commensurate with her accomplishments until late in life.³¹ And when Meitner left Berlin for exile in Sweden she once again found herself struggling for acceptance as a scientist, this time in an unwelcoming environment that thwarted her ability to work.

On a personal level Meitner felt dependent, even insecure, but this did not extend to her scientific work where from the beginning she was independent and confident, even bold. In collaboration with Hahn, she acquired a strong reputation in radioactivity, culminating in their discovery of element 91 (protactinium) in 1918. In her own department, independently of Hahn, Meitner pioneered the field of nuclear physics in the 1920s. An experimentalist close to theory, she was best known for her studies of magnetic beta-gamma spectra and gamma radiation; for her work with artificial nuclear reactions; for the discovery of positron-electron pairs; and for neutron mass determinations, all at the forefront of new developments in nuclear physics.

Beginning in the 1920s, Einstein liked to refer to Meitner as “our Madame Curie,” good-naturedly recognizing Meitner’s importance in the field of radioactivity and including her, as a matter of course, in the physics community they both inhabited in Berlin.³² Intentionally or not, Einstein’s statement also suggests that the two women were still considered as exceptions, to be compared to one another, but not to men.³³ In fact both women were among the most important physicists of their day, irrespective of gender. Although Meitner never acquired Curie’s iconic status, she was exceedingly well recognized within the physics community, with prestigious awards and multiple nominations for Nobel Prizes. In the interwar years, moreover, Meitner’s department grew into an international center for nuclear physics, with a permanent *Assistent*, doctoral students, and visiting scientists from Germany and abroad.³⁴ As Hahn later noted, her department was at least as important as his for bringing international recognition to the KWI-C,³⁵ which by then was entirely devoted to radioactivity and nuclear physics.³⁶

Meitner also climbed the conventional academic ladder. In 1922 she underwent *Habilitation* – apparently the first woman physicist to do so in all Germany³⁷ – and in 1926 she was appointed an adjunct professor in Berlin, making her the first woman physics professor in a German university. Soon afterwards she was

31 Elvira Scheich, *Science, Politics, and Morality: The Relationship of Lise Meitner and Elisabeth Schiemann*, in: Sally Gregory Kohlstedt/Helen E. Longino (eds.), *Women, Gender, and Science. New Directions, Osiris 2nd Series 12*, 1997, pp. 143-168, here pp. 152-157.

32 Philipp Frank, *Einstein. His Life and Times*, London 1948, p. 139.

33 Ruth Lewin Sime, *From Radioactivity to Nuclear Physics: Marie Curie and Lise Meitner*, in: *Journal of Radioanalytical and Nuclear Chemistry* 203, 1996, pp. 247-257.

34 Sime, *Meitner*, chapters 5, 7, 9, 10; Elisabeth Crawford, J. L. Heilbron, Rebecca Ullrich, *The Nobel Population 1901-1937. A census of the nominators and nominees for the prizes in physics and chemistry*, Berkeley, Uppsala 1987; Elisabeth Crawford, *The Nobel Population 1901-1950. A Census of the Nominators and Nominees for the Prizes in Physics and Chemistry*, The Royal Swedish Academy of Sciences, CD 2002.

35 Otto Hahn, *Erinnerungen 1901-1945*, in: Dietrich Hahn (ed.), *Otto Hahn. Erlebnisse und Erkenntnisse*, Düsseldorf 1975, pp. 15-73, here p. 43.

36 Kant, *KWI für Chemie*, pp. 57-92.

37 Hedwig Kohn is often listed as the first, but in fact Kohn was *habilitiert* in Breslau in 1930. See Brenda Winnewisser, *Hedwig Kohn – eine Physikerin des zwanzigsten Jahrhunderts*, in: *Physik Journal* 2(11) 2003, pp. 51-55.

named a *wissenschaftliches Mitglied* (scientific member) of the KWG,³⁸ which placed her on par with institute directors, a rank essentially equivalent to full university professors.³⁹

One cannot help noticing, however, that for all Meitner's scientific creativity and drive, her life outside physics was muted. Although by all accounts she was warmhearted and had many close friends, Meitner never married or had children, nor, as far as one can tell, was she ever involved in a serious romantic relationship. This was a common pattern among academic women in Germany and elsewhere, and can certainly be understood as a pragmatic choice for a woman whose intense commitment to work left neither the time nor perhaps the desire for a family of her own. In a social order that emphasized difference, however, emancipation from gender roles did not automatically render a woman acceptable in traditionally male domains. As a result, a woman scientist risked being perceived as doubly "other" – not truly a woman, yet incapable of being fully integrated as a scientist. Moreover, as Scheich has pointed out, the model of sexlessness for professional women fostered rather than challenged the existing forms of paternal authority.⁴⁰ The few women scientists who were highly successful, Meitner included, could be and were labeled as exceptions, leaving traditional categories intact.⁴¹ Thus the early generation of women in science remained vulnerable, not among the close friends and colleagues who knew them and valued their work, but everywhere outside. Undoubtedly it was this that made Meitner so aware of her dependence on her fortunate conditions in Berlin, despite her extraordinary level of accomplishment and success.

Politically Meitner also was not active, although she came from a liberal, politically involved family in Vienna and her outlook was basically democratic (unlike most of her German friends, such as Hahn or Schiemann, who were aghast at the end of the monarchy and disdained Weimar politics). Yet like nearly all her colleagues – Einstein being the best-known exception – she seems to have believed that scientific work and political engagement were mutually exclusive.⁴² There is also no evidence that Meitner was involved with contemporary women's issues or movements. In part one can attribute this to the fact that she was not native to Germany, but such distancing may well be another consequence of the patronage system, which required some degree of conformity. As Rossiter has noted, the system tended to isolate women from one another, since it was not to their advantage to seek help from other women, or to offer it.⁴³ As an outsider several times over – a scientist who was female, a

38 Eckart Henning and Marion Kazemi, *Chronik der Kaiser-Wilhelm-Gesellschaft zur Förderung der Wissenschaften, Veröffentlichungen aus dem Archiv zur Geschichte der Max-Planck-Gesellschaft* 1 (1988), p. 20. The appointment was made April/May 1929, retroactive to 1 April 1928.

39 Annette Vogt, *Vom Hintertgang zum Hauptportal – Wissenschaftlerinnen in der Kaiser-Wilhelm-Gesellschaft*, in: *Dahlemer Archivgespräche* 2, 1997, pp. 115-139, here p. 120.

40 Scheich, *Meitner and Schiemann*, pp. 146, 150 n. 15.

41 Rossiter, *Women Scientists*, p. 168.

42 Lise Meitner to Elisabeth Schiemann, 12 and 19 November 1918, Churchill Archives Centre, Cambridge, *Lise Meitner Papers*; Sabine Ernst (ed.), *Lise Meitner an Otto Hahn, Briefe aus den Jahren 1912 bis 1924*, Stuttgart 1992, pp. 152-156; Sime, *Meitner*, pp. 73-75; Scheich, *Meitner and Schiemann*, pp. 143-168, 160, 166.

43 Rossiter, *Women Scientists*, p. 190.

woman in physics, an Austrian in Germany – Meitner may well have thought that she had ventured far enough from the mainstream.

WOMEN IN MEITNER'S LABORATORY

Other than Meitner, no women were employed in a permanent scientific capacity in the KWI-C during her tenure from 1912 to 1938, and none obtained their doctorate from her. In the 1920s and early 1930s a small number of women, including students and visiting scientists, worked in Meitner's department;⁴⁴ in the annual reports of the KWI-C the names of three women appear in the list of publications.⁴⁵ One of them, Tikvah Alper, was at the institute from 1929 to 1932 on a fellowship from her native South Africa.⁴⁶ She remembered Meitner as a strong figure who was strict about radioactivity procedures yet kind to younger people and forgiving of their laboratory mishaps, a "marvelous" person who took her to the Philharmonic and taught her to be responsible for herself and others. Nevertheless it appears that Meitner was unwilling to accept women who were not as single-mindedly committed to physics as she was – she took "a dim view," for example, of Alper's plans to marry – and she never published with any of the women: all her collaborators were men. Overall there is no evidence that she made particular efforts to mentor women or recruit them to her institute. It was not until late in life that Meitner publicly reflected on the difficulties and opportunities that she and other women of her generation had faced.⁴⁷

WOMEN IN OTHER KAISER WILHELM INSTITUTES

Meitner's presence as a prominent woman in an institute with very few others raises the question of how typical her situation may have been for women in Kaiser Wilhelm institutes overall. The KWI for Brain Research (*KWI für Hirnforschung*, KWI-H) provides an obvious counter-example. There Cécile Vogt, a French-born physician, headed a department, her husband Oskar Vogt was director, and several women worked as scientists, including the geneticist Elena Timoféeff-Ressovsky and the Vogts' two daughters, of whom the elder,

44 Kant, KWI für Chemie, pp. 69-70. The Hahn/Meitner *Abteilung* prior to 1938 included a total of about 85 scientists of which 12 were women, but the records are often unclear as to their status or for whom they worked.

45 The *Tätigkeitsberichte* of the KWI-C, annual reports of activities (primarily publications) from the previous April to March, appeared each year in May or June in *Naturwissenschaften*: 1924, 12:1176-1177; 1925, 13:1063-1064; 1926, 14:1247; 1928, 16: 439-440, 1929, 17: 333-334; 1930, 18: 497-498; 1931, 19: 546-547; 1932, 20: 445-446; 1933, 21: 432-433; 1934, 22: 352-353; 1935, 23: 426-427; 1936, 24: 32-33; 1937, 25: 386-387; 1938, 26: 337-338. The women listed for Meitner's department were J. Petrová, (1929 and 1930), Susanne Bramson (1931) and Tikvah Alper (1932). Nora Feichtinger (1930 to 1934) and Vera Senftner (1935) were listed for Hahn's department.

46 Tikvah Alper, audio-taped interview with Steven Weininger, Sarisbury Green, England, 21 October 1989; Alper to author, pers. comm., 17 May 1992.

47 Lise Meitner, *The Status of Women in the Professions*, *Physics Today* 13/8, 1960, pp. 16-21.

Marthe, became a department head in 1931.⁴⁸ But the presence of women in high positions remained an exception, and of these nearly all were unmarried, as for example Maria Kobel, who began as a research scientist at the KWI for Biochemistry in 1925 and headed a department for tobacco research from 1928 to 1936.⁴⁹ Altogether only about seven women served as department heads during the interwar period when the number of Kaiser Wilhelm institutes increased to thirty and the number of departments was well over a hundred, and Meitner and Cécile Vogt were the only women to be appointed *wissenschaftliche Mitglieder* before 1938.⁵⁰

As at the KWI-C, most women came to Kaiser Wilhelm institutes as students or young graduates seeking research experience, with or without external stipends, usually for a short time.⁵¹ Gerta von Ubisch, for example, did research in the KWI for Biology from 1914 to 1915, went on to work in private laboratories in plant genetics, and in 1923 was the first woman to undergo *Habilitation* in Heidelberg, where she never held a position beyond that of *Privatdozentin*, the result of outright gender discrimination and the paucity of university positions in her field.⁵² The physicist Hertha Sponer worked at the KWI for Physical Chemistry from 1920 to 1921 in James Franck's department, moved to Göttingen as his *Assistent* when he took a professorship there, underwent *Habilitation* in 1925, and established herself as a molecular spectroscopist of great potential, widely expected to be the first woman *Ordinarius* in physics.⁵³ Many women came to the Kaiser Wilhelm institutes briefly as unpaid guest researchers, but some acquired their own funding and became quite permanent, including Agnes Bluhm, a physician who worked on the effects of alcohol on embryonic development in the KWI for Biology from 1919 to 1941.⁵⁴

UNDER HITLER

High on the list of National Socialist priorities was the removal of “non-Aryans” and political “undesirables” from public service, and on 7 April 1933 the *Gesetz zur Wiederherstellung des Berufsbeamtentums* (Law for the Reformation of the Professional Civil Service) was passed. The universities, all public institutions, were immediately affected. Gerta von Ubisch, for example, was dismissed for “racial” reasons. Although she fell under one of the exemptions of the civil service law (her father had fought at the front during the War), students boycotted her classes. She left Heidelberg in 1933 and went from the Netherlands to Switzerland to Brazil without finding a permanent position,

48 Helga Satzinger, *Die Geschichte der genetisch orientierten Hirnforschung von Cécile und Oskar Vogt in der Zeit von 1895 bis ca. 1927*, Stuttgart 1998.

49 Annette Vogt, *Wissenschaftlerinnen in Kaiser-Wilhelm-Instituten A-Z*, Veröffentlichungen aus dem Archiv zur Geschichte der Max-Planck-Gesellschaft 12, 1999, p. 72.

50 Vogt, *Hintergang*, pp. 119-120.

51 Vogt, *Hintergang*, pp. 116-119.

52 Ute Deichmann, *Biologists Under Hitler*, Thomas Dunlap, transl., Cambridge 1996; pp. 52-56; Deichmann, *Biologen unter Hitler. Vertreibung, Karrieren, Forschung*, Frankfurt 1992, pp. 303-309, 378-379.

53 Tobies, Hertha Sponer; Marie-Ann Maushart, „Um mich nicht zu vergessen:“ Hertha Sponer – Ein Frauenleben für die Physik im 20. Jahrhundert, Bassum 1997.

54 Vogt, *Hintergang*, pp. 122-130.

an example of the particular difficulties of emigration for women, many of whom held low-level positions prior to emigration and faced gender discrimination abroad. In 1952, at the age of nearly seventy, Ubisch returned penniless to Germany and had enormous difficulty obtaining her pension and compensation for her dismissal.⁵⁵ Similarly, émigré scientists seeking pensions from the KWG's successor organization, the Max-Planck-Gesellschaft (MPG), were met with hostility and delay.⁵⁶

In 1933 the implications of the April 7 law were less clear in the Kaiser Wilhelm institutes than in the universities. Although the KWG was a private organization and thus not explicitly subject to the law, its funding had suffered during the economic crises of the 1920s, and by 1933 twenty-one of its thirty institutes were over 50% government-funded, as was the KWG budget overall. Moreover, as Hachtmann has shown, the KWG was inherently conservative politically and its military associations were longstanding and strong.⁵⁷ That spring the KWG called for the dismissal of everyone subject to the civil service law but made exceptions for a handful of its most prominent "non-Aryan" scientists.⁵⁸ For example, Fritz Haber, the director of the KWI for Physical Chemistry, was exempt due to his war service but since his institute was largely funded by the government he was instructed to dismiss all his Jewish coworkers. Haber refused and resigned but other institute directors, including several "non-Aryans," did as they were told. The KWI-C's funding, on the other hand, came almost entirely from private industry. This and Meitner's prominence kept her from being dismissed in 1933.

It is difficult to assess the quantitative effect of the racial laws on women in the Kaiser Wilhelm institutes, as the statistics are notoriously incomplete for students and others in temporary positions. Nevertheless, Vogt has found that of the seventy women scientists in Kaiser Wilhelm institutes in 1933 only thirty-one remained in 1938. Most of the women who left were directly affected by the racial laws: of these, nearly all emigrated but at least two did not survive the Holocaust.⁵⁹

55 Deichmann, *Biologists*, pp. 54-58.

56 Michael Schüring, *Ein Dilemma der Kontinuität. Das Selbstverständnis der Max-Planck-Gesellschaft und der Umgang mit Emigranten in den 50er Jahre*, in: Rüdiger vom Bruch/Brigitte Kaderas (eds.), *Wissenschaften und Wissenschaftspolitik. Bestandaufnahmen zu Formationen, Brüchen, und Kontinuitäten im Deutschland des 20. Jahrhunderts*, Wiesbaden 2002, pp. 453-463; Michael Schüring, *Minervas verstoßene Kinder. Vertreibung, Entschädigung und die Vergangenheitspolitik der Max-Planck-Gesellschaft*, Phil. Diss. Humboldt-Universität zu Berlin, 2003.

57 Rüdiger Hachtmann, *Eine Erfolgsgeschichte? Schlaglichter auf die Geschichte der Generalverwaltung der KWG im „Dritten Reich“*, (= Ergebnisse. Vorabdrucke aus dem Forschungsprogramm „Geschichte der Kaiser-Wilhelm-Gesellschaft im Nationalsozialismus“; 19), Berlin 2004.

58 Helmuth Albrecht/Armin Hermann, *Die Kaiser-Wilhelm-Gesellschaft im Dritten Reich (1933-1945)*, in: Rudolf Vierhaus/Bernhard vom Brocke (eds.), *Forschung im Spannungsfeld von Politik und Gesellschaft. Geschichte und Struktur der Kaiser-Wilhelm-/Max-Planck-Gesellschaft*, Stuttgart 1990, pp. 356-406, here pp. 362-363 Deichmann, *Flüchten*, pp. 53-64.

59 Annette Vogt, *Vertreibung und Verdrängung: Erfahrungen von Wissenschaftlerinnen mit Exil und „Wiedergutmachung“ in der Kaiser-Wilhelm-/Max-Planck-Gesellschaft (1933-1955)*, in: *Dahlemer Archivgespräche* 8, 2002, pp. 93-136, here pp. 101-101, 122-123. According to Scheich, Meitner and Schiemann, p. 151, eight of fourteen women lecturers at the University of Berlin were dismissed (including Meitner and Schiemann) between 1933 and 1945; the numbers are likely to be smaller elsewhere in Germany.

Several women were dismissed or driven out of their institutes for political reasons, including Cécile Vogt (along with her husband Oskar), not because they were actually in the “undesirable” category but because their liberal outlook and Soviet contacts made them a target for harassment and threats. In 1937 they left the KWI-H under pressure to work privately; their daughters emigrated to Great Britain and the United States.⁶⁰ A more complex “political” case is that of the Elisabeth Schiemann, Meitner’s friend from her early days in Berlin. Schiemann was outspokenly opposed to Nazi anti-Semitism; as a geneticist who expressed her views against “race theory” she became an outsider to her own profession as well. In 1940 she lost her right to teach at the University of Berlin on political grounds, but in 1943 she accepted an appointment in the newly-formed Kaiser Wilhelm Institute for Research on Cultivated Plants (*Kaiser-Wilhelm-Institut für Kulturpflanzenforschung*). Schiemann objected to the Nazis for reasons of personal morality, but, as Scheich notes, she maintained a distinction between science and politics and thus did not grasp the essential relationship between her new institute and the expansionist plan for agriculture in German-occupied Eastern Europe once Jews and others were eliminated and displaced.⁶¹

Some non-Jewish women were indirectly affected by the racial laws when the men who had been their mentors or patrons were dismissed. Maria Kobel’s department in the KWI for Biochemistry was eliminated when the institute director, Carl Neuberg, was forced out in 1936. Neuberg had been supportive of women and Kobel never worked as a research scientist again.⁶² Hertha Sponer’s prospects were similarly threatened. She had worked in James Franck’s institute in Göttingen for more than ten years and was in line for a tenured university professorship, but when Franck left Göttingen in April 1933 – he had served at the front but refused the exemption and resigned in protest of the civil service law⁶³ – his post was provisionally taken by the “frauenfeindliche” (woman-hating) physicist, Robert Pohl. Sponer was threatened with dismissal, and her long association with Franck was held against her as well. Sponer decided she had no future in Germany and was one of the few women to emigrate for reasons of gender rather than “race.” Although gender discrimination in American universities was no less severe than in Germany – the physicist Robert Millikan, for example, insisted that the only top-ranking women physicists were Curie and Meitner and that no other woman was likely to come close⁶⁴ – Sponer was offered a professorship in 1936 at Duke University, where she pursued a distinguished career.⁶⁵

60 Satzinger, *Geschichte*, p. 65; Vogt, A-Z, pp. 149-155.

61 Scheich, Meitner and Schiemann, pp. 159, 163-165; Scheich, Elisabeth Schiemann (1881-1972). Patriotin in Zwiespalt, in: Susanne Heim (ed.), *Autarkie und Ostexpansion. Pflanzenzucht und Agrarforschung im Nationalsozialismus*, Göttingen 2002, pp. 250-279, here pp. 261-272.

62 Vogt, *Hintergang*, pp. 130-134. Neuberg was dismissed in 1934, but continued as provisional director until 1936; see Deichmann, *Flüchten*, p. 468.

63 Anikó Szabó, *Vertreibung, Rückkehr, Wiedergutmachung. Göttinger Hochschullehrer im Schatten des Nationalsozialismus*, Göttingen: Wallstein Verlag 2000, pp. 46-50; Hans-Joachim Dahms, *Einleitung*, in: Heinrich Becker/Hans-Joachim Dahms/Cornelia Wegeler (eds.), *Die Universität Göttingen unter dem Nationalsozialismus*, second edition, München 1998, pp. 29-74, here pp. 41-46.

64 Rossiter, *Women Scientists*, pp. 190-194.

65 Tobies, Hertha Sponer; Maushart, Hertha Sponer, pp. 27-29.

GENDER DISCRIMINATION UNDER THE NATIONAL SOCIALISTS

In keeping with the National Socialist ideology of a masculine, militaristic society, academic women were targeted almost immediately: women university students were restricted to 10% (a cut of about half), and the 1933 civil service law included a provision making it possible to discharge married women from state service.⁶⁶ It appears that few women scientists were affected by the “double earners” campaign, the best known being Elena Timoféeff-Ressovsky in the KWI-H, who was allowed to continue working with her husband Nicolai, but without pay.⁶⁷ As Hachtmann points out, similar “double-earner” restrictions on working women had the effect of depressing the marriage rate and were not rigidly enforced, and in any case were largely reversed by 1937 to meet the labor needs for the impending war.⁶⁸

Enforced or not, the “*Hausfrau*” ideology had a chilling effect, at least in the first years of the National Socialist regime. Fewer women attended the universities, professional women could be more easily turned away, and employers and others might openly engage in gender discrimination as a show of allegiance to National Socialism. In 1933, for example, Otto Hahn did his best to arrange a stipend for Vera Senftner, a good student who was, as Hahn wrote, “a pure Aryan”⁶⁹. Senftner was turned down in favor of the man who was Hahn’s second choice, because “a man would surely have better prospects than a woman”.⁷⁰ Beyond the gender inequity, this incident shows how quickly the political climate had changed, eroding Hahn’s authority as an institute director responsible for personnel decisions and requiring considerations of “race” for an otherwise ordinary exchange.

For some women, however, the National Socialist period offered more opportunity than discrimination. Physicist Isolde Hausser’s husband Karl was director of the physics institute in the KWI for Medical Research; when he died in 1933 she expected to stay on as head of a department for biological physics within the institute. Her appointment was strongly opposed by Walther Bothe, the new director, but his authority was weakened, in part for political reasons, and Hausser kept her position, was made a *wissenschaftliches Mitglied* of the

66 Scheich, Meitner and Schiemann, p. 151. In Prussian universities in 1932/33 women made up 20% of all students: Pass, Female, Jewish, and Educated, p. 207.

67 Annette Vogt, The Timoféeff-Ressovsky’s – A couple in science, Preprint 157, Max-Planck-Institut für Wissenschaftsgeschichte, 2000.

68 Rüdiger Hachtmann, Arbeitsmarkt und Arbeitszeit in der deutschen Industrie 1929 bis 1939, in: Archiv für Sozialgeschichte 27, 1987, pp. 177-227, here pp. 199-200, 211.

69 “dass Fräulein Senftner reine Arierin ist”, Mark Walker, Otto Hahn. Verantwortung und Verdrängung (= Ergebnisse. Vorabdrucke aus dem Forschungsprogramm “Geschichte der Kaiser-Wilhelm-Gesellschaft im Nationalsozialismus”, 10), Berlin 2003, p. 11; Kant, KWI für Chemie, p. 75.

70 “So wie ich heute die Stipendiumsfrage beurteilen kann, würde ein Herr sicher größere Aussichten haben als eine Dame”, *ibid.*, p.76

KWG in 1938, and worked on radar research for the military during the war.⁷¹ Erika Cremer, a physical chemist, worked in the KWI for Physical Chemistry (*KWI für Physikalische Chemie*) until it was dismantled in 1933, then was unemployed and without research space for four years. Her situation improved in 1937 when job restrictions on working women were eased, and after brief stints at the KWI-C and the KWI for Physics she was offered a *Privatdozentin* position in Innsbruck in 1940 that had been vacated by a man in the military. Although she was admonished that she must surely return to “*Kinder, Küche, und Kirche*” after the war, she stayed, eventually becoming a never-married professor known for her work in gas chromatography.⁷²

As to the vacancies left by dismissed Jewish scientists, there is no reason to believe that women were less opportunistic than men; in any case as vacancies near the top were filled, a ripple effect was felt further down.⁷³ For younger scientists such spoils were regarded as unparalleled career opportunities that almost no one refused, and they engendered loyalty to the National Socialist enterprise early on.⁷⁴ Among non-Jewish women scientists there was little opposition to National Socialist antifeminism, in what Scheich has described as “a swelling undertow of demoralization and political apathy.”⁷⁵ And there is little evidence of solidarity with the women who were forced out, at the time or later. In the postwar years Cremer, for example, dismissed Meitner’s part in the discovery of nuclear fission and extolled Hahn’s, while asserting that the wartime German fission project never aimed for a weapon – distortions of history that reflected and outlasted the mindset of the National Socialist period.⁷⁶

71 Fuchs, Isolde Hausser; Dieter Hoffmann, Ein Physiker per se. Zum 100. Geburtstag von Walther Bothe, in: *Wissenschaft und Fortschritt* 41/5, 1991, pp. 162-165.

72 Jane A. Miller, Erika Cremer (1900-), in: Louise S. Grinstein, Rose K. Rose, Miriam H. Rafailovitch (eds.), *Women in Chemistry and Physics: A Biobibliographic Sourcebook*, Westport 1993, pp. 128-135; L. S. Etre to author, pers. comm., 14 September 1996.

73 The ripple effect was especially dramatic in Vienna after the *Anschluss*, when male *Assistenten* and *Privatdozenten* moved into vacant professorial slots within weeks of the dismissals, and at least one formerly unpaid women scientist (and NSDAP member), Herta Wambacher, was immediately given a paid position. Peter Galison, *Image and Logic. A Material Culture of Microphysics*, Chicago 1997, pp. 155-160; Sime, Lise Meitner and Marietta Blau, p. 159; Österreichische Unterrichtsministerium, 7 April 1938, Archiv der Universität Wien, Personalakte Hertha Wambacher.

74 Deichmann, *Flüchten*, pp. 76, 80.

75 Scheich, Meitner and Schiemann, pp. 150-151, notes that associations of the women’s movement were quickly disbanded after 1933.

76 Erika Cremer, *Zur Geschichte der Entfesselung der Kernenergie*, Österreichische Chemische Zeitschrift 1, 1989, 10-15. Cremer’s hostility to Meitner is also cited by L. S. Etre, pers. comm. to author, 14 September 1996.

MEITNER AT THE KWI FOR CHEMISTRY 1933-1938

Meitner was one of very few “non-Aryan” academic scientists to keep her position for an extended period under Hitler. Hahn later remembered that she was protected by her Austrian citizenship, and it is true that she was forced out only after the *Anschluss* made her a German subject in 1938. But from 1933 until 1937 it appears that her most solid protection was the KWG itself. The organization was formidable: its advisors and patrons were the heads of Germany’s giant industrial concerns and its president was Planck, Germany’s most eminent scientist (Einstein being gone), an upright man and Meitner’s close friend. In the first year of the Hitler regime, the KWG complied with Nazi policy by dismissing nearly all its Jewish employees, but it made a point of retaining Meitner and a few others of Jewish origin, including Fritz Haber, Carl Neuberg (director of the KWI for Biochemistry), Richard Goldschmidt (director of the KWI for Biology), and Otto Meyerhof (head of the physiological institute of the KWI for Medical Research), all of whom were Germans. (Haber resigned at once, Neuberg and Goldschmidt lasted a few years longer, and Meyerhof, like Meitner, left in 1938.)⁷⁷ Moreover, the KWI-C was a haven: Hahn, her closest friend, was the director, and the institute itself seemed less vulnerable to National Socialist racial policies as it was almost entirely funded by chemical industry. Meitner herself was a *wissenschaftliches Mitglied* and a member of the scientific council (*wissenschaftlicher Rat*) of the KWG.⁷⁸ Although Meitner’s Austrian citizenship did not protect her from being dismissed from her university position in 1933, her place in the KWI-C seemed secure.

When Meitner half-heartedly considered emigration in 1933 Hahn and Planck advised against it, and that was what she wanted to hear. “I built up [my department] from its very first little stone,” she wrote to Gerta von Ubisch after the war. “It was, so to speak, my life’s work, and it seemed so hard to separate myself from it.”⁷⁹ Meitner’s ability to work was largely unaffected, although outside the institute she was increasingly marginalized. She no longer attended university colloquia or scientific conferences, and although she continued to publish, others would attribute work she had done with Hahn only to him.⁸⁰

Meitner adjusted to the newly politicized climate by no longer publishing with her students and assistants, nearly all of whom were National Socialist Party members, but she continued to direct their research, which included building a

77 For Planck under National Socialism, see J. L. Heilbron, *Dilemmas of an Upright Man: Max Planck as Spokesman for German Science*, Berkeley 1986.

78 Generalverwaltung, Archiv zur Geschichte der Max-Planck-Gesellschaft, Abt. I, Rep.1A, Nr. 178-182.

79 “Ich hatte ja die physikalische Abteilung von ersten Steinchen an selbst aufgebaut, es war so zu sagen, meine Lebensarbeit und es schien mir so schwer, mich davon zu trennen.” Meitner to Gerta von Ubisch, 1 July 1947; Churchill Archives Centre, Lise Meitner Papers; Sime, Meitner, chapter 6.

80 Kant, KWI für Chemie, p. 89; Fritz Krafft, *Im Schatten der Sensation. Leben und Wirken vom Fritz Strassmann*, Weinheim: Verlag Chemie 1981, pp. 171-172; Sime, Meitner, p. 150.

particle accelerator that was completed just before she left in 1938.⁸¹ Nevertheless the power relationships had shifted. In 1934 a young physicist in her department tried to bring charges against her at the instigation of the leader of his local National Socialist teachers league. When the incident was brought up during his denazification hearings after the war, he begged Meitner to exonerate him, saying that he had been an immature young man who was not anti-Semitic but resented working for a woman.⁸² True or not, Meitner's "race," far more than her gender, made her a target at the time.

Meitner's reaction, as always, was to focus on physics. 1932 had been a "miracle year" for physics with the discovery of the neutron and the positron, and Meitner was in the thick of it. In 1934, following Irène and Frédéric Joliot-Curie's discovery of artificial radioactivity and Enrico Fermi's experiments with the neutron irradiation of uranium, Meitner recruited Hahn and Fritz Strassmann, a young chemist in the institute, for the "uranium project," a four-year investigation that would lead to the discovery of nuclear fission in 1938. The team's interdisciplinary expertise was essential to the research, but politically they were also well-matched. Both men detested the Hitler regime, and Strassmann was so outspokenly anti-Nazi that he was forbidden to undergo *Habilitation* and virtually unemployable outside the KWI-C.

Meitner's chief concern was her work, but one should consider to what extent her gender also influenced her decision to stay. Clearly she feared emigration: she did not want to be an unwanted outsider again, as when she first came to Berlin in 1907, and she was aware that gender discrimination and anti-Semitism were not inconsiderable abroad. For an unmarried woman with no family the decision was especially difficult, in that she would face her new start quite alone, while at the same time she had fewer reasons to leave. James Franck resigned his professorship in 1933 because he believed there was no future for Jews and their children in a country where they were treated as "strangers and enemies of the Fatherland."⁸³ Meitner, in contrast, had only her own situation to consider, and physics was her greatest priority. She had struggled to reach a position that she believed was uniquely favorable, and in 1933 she seemed in no danger of losing it. She chose to stay in Berlin over an uncertain future abroad.

Meitner may have been especially reluctant to leave, but it should be noted that men also held on as long as they could. In Deichmann's comprehensive studies of émigré biologists and chemists of the period, one finds that almost no one emigrated unless or until they had no other choice.⁸⁴ Meyerhof remained head of the institute for physiology in the KWI for Medical Research (*KWI für medizinische Forschung*) until 1938 when he, like Meitner, was forced out. Richard Willstätter, a chemist who resigned his Munich professorship in 1925 to protest anti-Semitic hiring practices, continued working in his private

81 Burghard Weiss, Lise Meitners Maschine, in: Kultur & Technik, March 1992, pp. 22-27.

82 Sime, Meitner, p. 350.

83 "Fremde und Feinde des Vaterlandes," Freiwilliger Amtsverzicht Prof. James Francks, Göttinger Zeitung, 18 April 1933, reprinted in: Jost Lemmerich (ed.), Max Born, James Franck. Physiker in ihrer Zeit, Ausstellungskatalog 17, Staatsbibliothek Preussischer Kulturbesitz, Berlin 1982, p. 114; Becker/Dahms/Wegeler, Die Universität Göttingen unter dem Nationalsozialismus, p. 43.

84 Deichmann, Biologists; Deichmann, Flüchtlinge.

laboratory until the *Reichskristallnacht* in November 1938, and then barely escaped from Germany with the clothes on his back.⁸⁵ And although Otto Warburg was undeniably “non-Aryan” he never left because he was never dismissed from his position as director of the Kaiser Wilhelm Institute for Cell Physiology (*Kaiser-Wilhelm-Institut für Zellphysiologie*).

Later, after the war, Meitner was troubled by her decision to stay on in National Socialist Germany. “It was very wrong,” she reflected, “not only from a practical point of view, but also morally.”⁸⁶ Meitner did not elaborate, but the morality question deserves further consideration. Perhaps Meitner later believed that she had been wrong to place her scientific work above all else at a time of persecution and injustice. In this her outlook reflected her view that the scientific domain was distinct from that of politics or morality, an outlook no different from that of nearly all her colleagues and consistent with her own behavior prior to 1933, when she avoided engagement with political or social issues. During the Nazi years she might well have thought that she could continue to function as a prominent exception, her excellence as a physicist insulating her from racial persecution just as it had freed her from gender constraints years before. In those years she never denied her Jewish origins but neither did she feel a particular affiliation with other Jews, and this may have prevented her from protesting or even perhaps fully comprehending the radical injustice of the racial policies.

Meitner later judged that she herself had “supported Hitlerism” by choosing to stay after 1933.⁸⁷ Perhaps she believed that her work had contributed to Germany’s prestige, or that her students and assistants could take her presence as tacit acceptance of their politics while colleagues outside could conclude that Nazism was tolerable, at least for some Jews. In addition it is important to note that Hahn and Meitner, in their capacity as administrators of their institute, themselves implemented the policies of the Hitler regime. Under the KWG policy of “self-coordination” (*Selbstgleichschaltung*) with National Socialist policies, Meitner could keep her position and Hahn could employ Fritz Strassmann, but that was as far as it went. At one time, for example, they refused to take on a young physicist who was blacklisted for his anti-Nazi views, even though he offered to work without pay. Employing a Jew, even unpaid or for a short time, was completely out of the question.⁸⁸ Hahn and Meitner made their work, their institute, and themselves by far their highest priority, and it can be argued that in doing so they became, in effect, complicit with the policies of National Socialist regime.

85 Richard Willstätter, *From My Life*, Lilli S. Hornig, transl., New York 1965, pp. 424-425.

86 “Und doch war es sehr unrecht von mir. Nicht nur vom praktischen Standpunkt, sondern auch moralisch gesehen.” Meitner to Ubisch, 1 July 1947, Churchill Archives Center, Lise Meitner Papers.

87 “...denn letzten Ende habe ich durch mein Bleiben doch den Hitlerismus unterstützt [sic].” Meitner to Hahn, 6 June 1948, Churchill Archives Centre, Lise Meitner Papers; Sime, Meitner, p. 356.

88 Sime, Meitner, chapter 6.

DISMISSAL AND EMIGRATION

In 1937 the KWG was reorganized in accordance with the “leadership principle” (*Führerprinzip*), which brought it under the direct control of the government. This signaled the end for the few remaining Jews with positions in the Kaiser Wilhelm institutes, including Otto Meyerhof. As an Austrian Meitner might have been exempt for a while but in March 1938 the *Anschluss* made her a German subject no more privileged than any other “non-Aryan” in the Third Reich. In fact her very prominence made her situation more precarious. In June she learned that she would be dismissed but forbidden to emigrate: her case had come to the attention of the leader of the SS, *Reichsführer* Heinrich Himmler, who considered it “undesirable that well-known Jews leave Germany” for foreign countries where they might “demonstrate their attitude against Germany.”⁸⁹ With the help of Dutch friends, Lise Meitner secretly escaped to Holland on 13 July 1938, and a few weeks later made her way to Stockholm. Completely unprepared for emigration, she found her Swedish welcome to be distinctly cool.

For the KWG, however, 1938 was a very good year. At the staff festivities that Christmas, the General Secretary of the KWG, Ernst Telschow, was presented with a handsome red leather album of amusing rhymes composed by his secretary. It began: “Dieses Buch ist fragmentarisch / aber garantiert rein arisch.”⁹⁰ By then, the same could be said for the KWG: its “Jewish problem” was over.

AFTERWORD

Lise Meitner’s ties to the KWI-C did not end with her emigration. Scientifically they lasted another five months, until nuclear fission was discovered in Berlin. The scientific events of the fall of 1938 have been described elsewhere; here it is important to note that in all essential respects Meitner continued to function as a member of her Berlin team through her correspondence with Hahn, and that as a physicist she played a crucial role for the experiments that led to the fission discovery in December 1938.⁹¹

It was then that Meitner’s scientific ties to Hahn and the KWI-C came to an end and politics took over. She was not included as a coauthor in Hahn and Strassmann’s publication – politically that would have been impossible – and, as a result, her part in the discovery was not recognized. Meitner and her nephew Otto Frisch, also a refugee physicist, did publish the first theoretical

89 „Es wird für unerwünscht gehalten, daß namhafte Juden aus Deutschland ins Ausland reisen, um dort als Vertreter der deutschen Wissenschaft oder gar mit ihrem Namen und ihrer Erfahrung entsprechend ihrer Einstellung gegen Deutschland zu wirken.“ Reichsministerium (Wilhelm Frick) to Carl Bosch, 16 June 1938, in: Sime, Meitner, chapter 8, pp. 195-196; Ruth Lewin Sime, 13. Juli 1938: Lise Meitner verlässt Deutschland, in: Barbara Orland/Elvira Scheich (eds.), *Das Geschlecht der Natur*, Frankfurt 1995, pp. 119-135.

90 Erika Bollmann, *Weihnachten 1938*; Telschow Nachlass, Archiv zur Geschichte der Max-Planck-Gesellschaft, Abt. III, Rep. 83, Nr. 22.

91 Sime, Meitner, chapters 9, 10

interpretation of the fission process, an important discovery in its own right, but her exclusion from the fission discovery itself damaged her reputation, casting doubt on the work she had done before. Adding to the damage, Hahn was afraid to admit to his ongoing collaboration with a “non-Aryan” in exile and soon began to claim that Meitner and physics had contributed nothing to the discovery. Those who did not understand the science or the political situation concluded that the chemists had discovered fission while the physicists had merely explained it, and in 1945 the Nobel Prize in chemistry for 1944 was awarded to Hahn alone. With that, Meitner largely lost her place in the history of science.

However damaged, Meitner’s connection to the KWI-C persisted, often as an indicator of the political and social continuities between the National Socialist period and postwar Germany. As president of the newly formed Max-Planck-Gesellschaft, Hahn was the spokesman for the postwar rehabilitation of German science. Himself a “pure” scientist, a Nobel laureate, and a non-Nazi, Hahn projected an image of science as inherently excellent and untouched by the Nazi regime, claims that were the founding tenets of the MPG. Hahn never set the record straight with respect to Meitner, and for decades a chorus of his associates and other scientists, none of them close to the discovery, echoed his contention that Meitner had done nothing for the fission discovery except, perhaps, to impede it. Their stridency suggests a political motivation. A fair examination of the circumstances of the discovery would have called attention to the racial persecution, political oppression, and moral compromises that permeated the scientific establishment, including the KWG and Hahn’s own institute, and that was just what Hahn and much of his generation were trying to suppress and forget.⁹²

Meitner was aware of this mentality and it kept her from returning to Germany. In 1948 she was offered her old position and the directorship of the KWI-C (soon renamed *Max-Planck-Institut für Chemie*), which had been relocated to Mainz, but she refused it, fearing that she “would not be able to breathe” in the postwar atmosphere.⁹³ This may well mark the point at which Meitner herself was able to sever some of her ties to the past.

Looking back to the postwar decades, it is striking to see how the injustice to Meitner as a scientist was reinforced and made plausible by prevailing assumptions of women’s role in science. In postwar Germany Meitner was nearly always referred to as Hahn’s *Mitarbeiterin*, which angered her greatly because it was so obviously untrue. When the term was used by a physicist such as Werner Heisenberg,⁹⁴ who had been her colleague before 1938 and knew

92 Ruth Lewin Sime, *Otto Hahn und die Max-Planck-Gesellschaft. Zwischen Vergangenheit und Erinnerung*, (= Ergebnisse. Vorabdrucke aus dem Forschungsprogramm „Geschichte der Kaiser-Wilhelm-Gesellschaft im Nationalsozialismus“; 14), Berlin 2004.

93 “Ich glaube, ich würde in dieser Atmosphäre nicht atmen können.” Meitner to Eva von Bahr-Bergius, 10 January 1948, Lise Meitner Papers, Churchill Archives Centre; Sime, Meitner, pp. 353-354.

94 Sime, Meitner, pp. 370-374; Fritz Krafft, Lise Meitner (7. XI.1878-27.X.1968), in: Willi Schmidt/Christoph J. Scriba (eds.), *Frauen in den exakten Naturwissenschaften. Festkolloquien zum 100. Geburtstag von Frau Dr. Margarethe Schimank (1890-1983)*, Stuttgart 1990, pp. 33-70, here pp. 55-56.

better, it seems clear that he was discounting Meitner's importance for political reasons. But to others, including historians with little understanding of the science, the gender stereotype evidently struck a chord and it stubbornly persists to this day.⁹⁵ In casual histories of fission, such as museum displays, public media, derivative histories, and textbooks, Meitner was essentially invisible, also a persistent stereotype for women in science.

Lise Meitner never disappeared completely under the cloud of history because she had been exceptionally visible and widely recognized during her lifetime, and because a great quantity of documentation made it possible for a new, critical generation of scholars and scientists to bring her history to light. Recently an element (number 109) was named for her, a distinction that has gone to only one other woman (Marie Curie) and one other KWG scientist (Einstein) before her.⁹⁶ Here again Meitner is exceptional, but nevertheless it is clear that in many respects her experiences were similar to those of other women scientists of her time. Above all, her story shows that the history of science is inseparable from its social and political context, and that special efforts are needed to counter the effects of traditional histories, which have disproportionately neglected women and their contributions to science.

95 Meitner is a „Mitarbeiterin“ in Otto Gerhard Oexle, Hahn, Heisenberg, und die anderen. Anmerkungen zu ‚Kopenhagen‘, ‚Farm Hall‘ und Göttingen‘, (= Ergebnisse. Vorabdrucke aus dem Forschungsprogramm „Geschichte der Kaiser-Wilhelm-Gesellschaft im Nationalsozialismus“; 9), Berlin 2003, p. 39. Equally remarkably, in Albrecht/Hermann, Die Kaiser-Wilhelm-Gesellschaft im Dritten Reich, p. 364, Meitner is listed as an “Assistentin” at the time of her emigration.

96 The discoverers of element 109, Peter Armbruster and his group at the Gesellschaft für Schwerionenforschung in Darmstadt, named it Meitnerium “to render justice to a victim of German racism and to credit in fairness a *scientific* life and work” (emphasis in original). Peter Armbruster, Lise Meitner (1978-1968). “Mother of Nuclear Shell Physics”, in: Gesellschaft für Schwerionenforschung mbH, Darmstadt, Preprint 2001-05 (March 2001), p. 13.

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INDEX

- Alper, Tikvah 14
- Becquerel, Henri 7
- Bluhm, Agnes 15
- Bollmann, Erika 23
- Boltzmann, Ludwig 7
- Bothe, Walther 18
- Cremer, Erika 18, 19
- Curie, Marie 7, 8, 12, 17
- Curie, Pierre 7
- Einstein, Albert 12, 13, 20
- Fermi, Enrico 21
- Fischer, Emil 10, 11
- Franck, James 15, 17, 21
- Frisch, Otto 23
- Goldschmidt, Richard 20
- Haber, Fritz 16, 20
- Hahn, Otto 8, 10, 11, 12, 13, 14, 18, 19, 20, 21, 22, 23, 24, 25
- Hausser, Isolde 18
- Hausser, Karl 18
- Heisenberg, Werner 24
- Himmler, Heinrich 23
- Joliot-Curie, Irène and Frédéric 21
- Kobel, Maria 15, 17
- Kohn, Hedwig 12
- Kovalevskaia, Sofia 5
- Meitner, Lise 5, 6, 7, 8, 10, 11, 12, 13, 14, 16, 17, 19, 20, 21, 22, 23, 24, 25
- Meyer, Stefan 7, 8, 11
- Meyerhof, Otto 20, 21, 23
- Neuberg, Carl 17, 20
- Neumann, Elsa 6
- Planck, Max 6, 10, 11, 12, 14, 15, 16, 17, 20, 23, 24
- Pohl, Robert 17
- Rutherford, Ernest 8
- Schiemann, Elisabeth 11, 13, 16, 17, 19
- Senftner, Vera 14, 18
- Sponer, Hertha 10, 15, 17
- Strassmann, Fritz 20, 21, 22, 23
- Steindler, Olga 7
- Telschow, Ernst 23
- Timoféeff-Ressovsky, Elena 14, 17
- Timoféeff-Ressovsky, Nicolai 17
- Ubisch, Gerta von 15, 20, 22
- Vogt, Cécile 14, 15, 17
- Vogt, Marthe 15
- Vogt, Oskar 14, 17
- Warburg, Emil 6
- Warburg, Otto 22
- Willstätter, Richard 21

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