Science, Politics, and Morality
The Relationship of Lise Meitner and Elisabeth Schiemann

*By Elvira Scheich**

LISE MEITNER AND ELISABETH SCHIEMANN were both among the first women in their academic fields. Meitner was involved in the creation of modern physics; she is especially well known for her work with Otto Hahn and Fritz Straßmann, which led to the discovery of nuclear fission. Max Planck supported her career in spite of his reservations about women in science. He was impressed by her scientific abilities and her extraordinary determination. Meitner came from a Jewish family in Vienna and was forced to leave Germany in 1938. She went to Stockholm and spent the last years of her life in Cambridge, England. Her friend Schiemann lived in Berlin almost all her life. Her father had been a professor of European history, specializing in Russian history, culture, and politics, and a counselor to Kaiser Wilhelm II. Schiemann worked for nearly two decades with Erwin Baur, who held the first chair for genetics in Germany. She dedicated the largest part of her work to the history of cultivated plants, efforts later funded with the help of Fritz von Wettstein. She was one of the few German biologists who made no secret of her criticism of Nazi politics, especially its anti-Semitism.[1]

TWO FRIENDS

Meitner and Schiemann met for the first time in 1909, when both were on their way to work on the S-Bahn in Berlin-Dahlem. They soon initiated a friendship that would last sixty years. The two women had many interests in common: they went to conferences together, but also to concerts and on hiking tours; they were part of the scientific community in Berlin and of the newly founded institutes in Berlin-Dahlem; and Meitner was a regular guest in Schiemann's family home, while Schiemann

* Zionkirchstr. 54, D-10119 Berlin, Germany.

I am grateful to the Hamburger Institut für Sozialforschung for supporting my research on Lise Meitner and Elisabeth Schiemann.

[1] On Meitner see Renate Feyl, "Lise Meitner (1878–1968)," in *Der lautlose Aufbruch—Frauen in der Wissenschaft* (Darmstadt: Luchterhand, 1981), pp. 162–186; Charlotte Kerner, *Lise, Atomphysikerin: Die Lebensgeschichte der Lise Meitner* (Weinheim/Basel: Beltz, 1986); and Ruth Sime, *Lise Meitner: A Life in Physics* (Berkeley: Univ. California Press, 1996). Two short biographies of Schiemann, written by former students and colleagues, have appeared: Hermann Kuckuck, "Elisabeth Schiemann, 1881–1972," *Berichte der Deutschen Botanischen Gesellschaft,* 1980, *93:*517–537; and Anton Lang, "Elisabeth Schiemann: Life and Career of a Woman Scientist in Berlin," *Englera,* 1987, *7:*17–28.

 0369-7827/97/1201-0009$02.00

Figure 1. *Elisabeth Schiemann (left) and Lise Meitner on a summer excursion in the outskirts of Berlin. (Courtesy of Churchill Archives, Cambridge.)*

accompanied Meitner on visits to the Plancks. (See Figure 1.) Both felt obligated to the women's movement (although they were not activists), and they shared the conviction that access to education was a major goal that would further the liberation of women. Faced with the misogyny of academic life, they recognized the fragility of their own careers and the necessity for networks among women in science. In 1909 both were around thirty years old and had struggled for some years to reach the positions they held. These were still very low in the university hierarchy and, accordingly, paid poorly (many male colleagues of the same age had already secured chairs or were applying for professorships), but Meitner and Schiemann were happy about the success they had achieved.[2]

During World War I both women were staunch German patriots, convinced that Germany had to defend itself against foreign aggressors. Their male colleagues went to the front. Meitner decided to do the same and worked as an X-ray assistant at a military hospital in the Ukraine. Schiemann had become responsible for maintaining research and teaching at her institute and was not free to leave. In their correspondence Meitner expressed her thoughts and feelings in the face of the realities of war, her wish to help the injured soldiers of all nations, and her concern about her friends and colleagues at the western front. After her return to Berlin and to her experiments at the Kaiser Wilhelm Institute for Chemistry in 1916, however, she was not critical of Fritz Haber's research on poison gas. Her only problem with his group was the

[2] See Elisabeth Schiemann, "Freundschaft mit Lise Meitner," *Neue Evangelische Frauenzeitschrift*, 1959, *1* (offprint). My main source for this article was the correspondence between Meitner and Schiemann, which began in 1911 and ended with Meitner's death in 1968; it is to be found with the Lise Meitner Papers at the Churchill Archives, Cambridge (hereafter cited as **Meitner Papers**).

threat it posed to her own work as it took over more and more of the institute. She endorsed all means to bring the war to an end, an outcome still tantamount, in her mind, to a German victory.[3]

Things changed after the war. In November 1918 Meitner wrote one of her longest letters to Schiemann, detailing the news from Berlin. Berlin was the center of the revolutionary uprising that swept over postwar Germany; the monarchy had broken down, and information was becoming available on the political and military strategies that had led to the prolongation of the war and on the unwillingness to compromise that resulted in a disastrous defeat. Meitner took the side of the Social Democrats, advocating the establishment of a parliamentary democracy with the full participation of intellectuals and women. She wrote, "But the middle classes too have to fulfill their duties and we women also. . . . Well, dear Elisabeth, don't mind, if you consider my opinions wrong. I have indeed the honest aspiration to know the objective truth, whether it is in accordance with my wishes or not, and I expect the same of you."[4] Schiemann did not agree—either with Meitner's new political insights and convictions or with the course of political developments in Germany. To her the Hohenzollern monarchy still represented Germany's culture and the best of its values. Like most German academics, she remained deeply skeptical toward the Weimar Republic.

This disagreement between the two friends was not an incidental personal difference. Schiemann's family came from the Baltic provinces and her father was a Prussian professor, while Meitner grew up as the daughter of an Austrian lawyer and her family was of Jewish descent. Meitner's hopes for a democratic Germany as part of a cosmopolitan, humanistic, and ethical global society were typical for assimilated Jews in Germany during that period (Meitner, like many others, strongly wished that Austria would become part of Germany). They imagined the "true" Germany: Germany as it should be, not as it was. Jewish intellectuals saw German culture as an expression of universal human values: rationality, science, knowledge, truth. The two friends did not disagree upon this point; the difference was that one held that this ideal was yet to be achieved, while the other sought it in the past.

The difference in Meitner's and Schiemann's stances after World War I suggests that race, as well as gender, played a role in their world views and their self-positioning as academic women. However, gender and race are not universal categories; they have to be specified in a given context—here, Germany during the interwar period. So situated, these categories can be used as probes into a network of meanings connecting science, politics, and morality. What is provided by the cultural and social surroundings of these two women? What shifts occur as they interact with the field of meaning that surrounds science?

REPRESENTING AMBIVALENCE

In mapping the field of meaning that links science, politics, and morality, I draw on Zygmunt Bauman's book *Modernity and Ambivalence.*[5] Bauman's work has

[3] See Sabine Ernst, *Lise Meitner an Otto Hahn: Briefe aus den Jahren 1912 bis 1924* (Stuttgart: Wissenschaftliche Verlagsgesellschaft, 1992).

[4] Lise Meitner to Elisabeth Schiemann, 29 Nov. 1918, Meitner Papers. Here and elsewhere, translations into English are mine unless otherwise noted.

[5] Zygmunt Bauman, *Modernity and Ambivalence* (Cambridge: Polity, 1991).

contributed to the recognition that the horrors of Nazism were not a fall from the state of modernity. What had seemed to be the particularity of racism against the Jews turns out to be general traits rooted in the modern political order. In his penetrating reflections on the social order and the elimination of difference, Bauman links the structure of modern thought with the experience of those beyond the pale of this order and investigates the motives and causal connections that sustained their advocacy of modernity, reason, and universal cultural values. His writings provide a rich framework that can be employed to study the relation of race and gender, two categories of otherness.

The modern national state is an artificial social order, created by humans and, hence, potentially alterable. The collective identity of a nation needs constantly to be reinforced; the grounds of its self-constitution are inherently unstable and thus can easily be jeopardized. Assimilation, the way strangers and outsiders are accommodated within liberal political culture, ultimately enhances the dominance and the superiority of the established culture and the otherness of the stranger. While political discrimination is directed against the collective of outsiders, cultural assimilation is seen as a matter of individual efforts, acts of self-improvement and self-transformation that are doomed to fail. The majority of German Jews, however, did not view themselves as different or as strangers.

Bauman's analysis draws attention to the social and political contradictions inherent in stigmatizing. The stigma points to a difference, stereotyped and conceived as essential and unchangeable. "An otherwise innocuous trait becomes a blemish, a sign of affliction, a cause of shame." The different ones are marked with bodily signs that draw attention to their putative inferiority, even dangerousness. As the manifestation of an inner truth set forth by nature, inherited and unchangeable, the stigma of otherness annuls acquired cultural characteristics. Thus it undermines modern beliefs in the ameliorating role of education and in individual responsibility, self-improvement, and self-determination. The burden of proof is placed on the stigmatized, who have to demonstrate the absence of a distinctive feature. "The bond between signs and inner truth may be denied, but cannot be broken." In the case of assimilated German Jews, no visible signs of difference were given by nature or class; their differences were the creation of racial theories and politics.[6]

In modern political thought, the constitution of society is grounded on its separation from nature. The definition of universal human values is a cornerstone in the Enlightenment program to rationalize every aspect of human life. The laws of nature—rightly understood—were to be employed to improve the natural and social conditions underwriting the progress of humanity. Scientific principles, important features of modern thought and modern forms of knowledge, are held to be unrelated to moral responsibility and personal relations. Classification, division, and boundaries, the designation and separation of strangers and outsiders, are integral to the establishment of order. Founded on the basis of universal cultural values, the modern political effort to establish order sought to eliminate whatever differed or was unfit, uncontrollable, or reluctant, uncertain or paradoxical. Otherness and ambivalence were cast in negative terms, as chaos or waste. Exclusion and elimination of the recalcitrant, then, became a mere question of technology. "Having emancipated pur-

[6] *Ibid.*, pp. 67, 68. On assimilated German Jews see Gertrud Koch, *Die Einstellung ist die Einstellung* (Frankfurt am Main: Suhrkamp, 1992).

poseful action from moral constraints, modernity rendered genocide possible."[7] Moreover, the tendency to dehumanize and naturalize otherness, denying its bearers political and civil rights, was strengthened by the fact that the German nation was understood (as is still the case in the 1990s) as a community defined by descent rather than by territory. In racial theories the German *Volk* was seen as a superorganism, whose health could be secured only by the extirpation of otherness.

Representing otherness, indefiniteness, and existential and intellectual ambivalence, the Jews were at the core of the set of contradictions that characterize modernity. Their experience of estrangement, marginalization, exclusion, and expulsion linked them to the situations and standpoints of the modern intelligentsia. Rootlessness and alienation, in intellectualized form, became cosmopolitanism and universalism—calling into question the concrete, specific, and unequivocal and discerning the particularism of any system of absolutes. "The standpoint of the exile is the only cognitive determinant of universally binding truth."[8] This new intellectual and political understanding of objectivity had ambiguous results. On the one hand, it yielded the insight that being different, a stranger, is an essential characteristic of the human condition and indeed its only universal feature. On the other hand, adherence to universal and absolute values led to a turn to the inner life and frequently resulted in an intellectual remoteness that distanced critique from social practice. The experience and epistemological standpoint of the outsider made recognition of the antinomies of modern thought and modern life possible: order, the absolute, and transparency gave way to pluralism, relativism, and ambiguity; the Enlightenment values of spontaneity and freedom were inverted.

Bauman's analysis is congruent in many respects with the feminist analysis of the role of women in modern society. Women have been denied full political rights by emphasizing and naturalizing their difference from men. Their bodies have been described and inscribed as well as stigmatized and used. In the discourse of gender, women represent the other and embody ambiguity; the images of women are contradictory and threatening to the identical male self. However, the otherness of women does not refer directly beyond culture. Women represent nature, but they cannot simply be expelled from culture and society. The bodily differences that set women apart from men are bound to the natural and hence the social reproduction of human life in a very fundamental way, individually and collectively. Women's straddling of the divide between the natural and the social sits uneasily with modern thinking; the modern way of perceiving the self in the world has never come to terms with sexuality and the fact that we are all born of woman. Within the culture of universalism women may signify chaos, but they cannot signify waste; they embody culture's foundations in nature—not rootlessness, but the roots. In modernity, women lead a double existence, in and outside the social; simultaneously acting out the absence and presence of the signs of femininity is a condition of their social life.

This essay goes on to examine the relations of universality and difference from the vantage point of women's struggles to participate in modernity and in science. I will focus on debates among German intellectuals after World War I and their

[7] Bauman, *Modernity and Ambivalence,* p. 48. The dismissal of morality was a salient feature of the role of the sciences during the Nazi period; see Peter Weingart, Jürgen Kroll, and Kurt Bayertz, *Rasse, Blut und Gene* (Frankfurt am Main: Suhrkamp, 1988).

[8] Bauman, *Modernity and Ambivalence,* p. 85.

differing attitudes toward modernization, on how that shaped their views about women, and, finally, on how women academics perceived themselves.

PARTICIPATION IN MODERNITY

The outcome of the Great War had been devastating for Germany—economically, politically, and individually. Some 2.7 million disabled veterans needed care; 6 million demobilized soldiers awaited reintegration. The defeat and its aftermath—especially the sense of humiliation shared by the vast majority of the nation that had begun the war in a rapture of enthusiasm—erected nearly insurmountable obstacles to the restoration of a civil society. The natural sciences were not untouched by the disastrous effects of Germany's wartime politics: the boycott of German science by Allied scientists and the economic crisis of the immediate postwar years severed ties to the international scientific community for years to come.

The first two decades of the twentieth century had been marked by fast-paced social changes that followed rapid industrialization and urbanization; the war effort accelerated the processes of modernization still further. For German society in general, and its intellectuals in particular, reactions to the ways of modern life varied widely. Conservatives interpreted modernization as an erosion of German "culture" and saw traditional values and forms of life being undermined by "machines and masses." They opposed parliamentary democracy and party politics on the grounds that the nation as a whole should be the focus of concern. Their concepts of *Bildung* and of the university aimed at developing comprehensive knowledge and "pure" science unsullied by practical and political interests. Others welcomed modernism and rationalization, which made it possible to dispense with notions of introspective authenticity. Like the conservatives, they employed the rhetoric and ideas of the philosophy of life (*Lebensphilosophie*), but they reached opposite conclusions.[9] The modernist avant garde perceived the artificiality of the social as its natural condition. They valued anonymity, alienation, and indifference in social relationships as liberating and welcomed the chance to redesign social life and its technocratic management. They consistently advocated materialism and positivism, analytical and pragmatic thinking; they called for the application of scientific research to social life and favored orienting institutions of higher learning toward the interests of the state and industry. Theirs was a culture of doers, builders, and inventors in which science was held to eliminate cumbersome beliefs and restrictions and to open up new ways of approaching the fundamental problems of its disciplines.[10]

[9] "Bildung is generally translated as 'cultivation.' It was an educational ideal which emphasized not simply the nurture of intellect, but the development of the whole person. . . . The aim of bildung was to acquire a 'complete view of the world,' to grasp the 'essence of the whole world's structure' ": Jonathan Harwood, *Styles of Scientific Thought: The German Genetics Community, 1900–1933* (Chicago/London: Univ. Chicago Press, 1993), pp. 276–277. The conservatives recognized divisions in the outer manifestations of both natural and social life, a fracturing that threatened their true inner unity, whereas the modernists accepted fragmentation and the loss of wholeness as genuine, inevitable, and final.

[10] The literature on the central features of modernization is extensive. Among the works most important for my understanding of this period see Peter Ulrich Hein, *Die Brücke ins Geisterreich: Künstlerische Avantgarde zwischen Kulturkritik und Faschismus* (Reinbek bei Hamburg: Rowohlt, 1992); Corona Hepp, *Avantgarde: Moderne Kunst, Kulturkritik und Reformbewegungen nach der Jahrhundertwende* (Munich: DTV, 1987, 1992); Helmut Lethen, *Verhaltenslehren der Kälte: Lebensversuche zwischen den Kriegen* (Frankfurt am Main: Suhrkamp, 1994); and Fritz K. Ringer,

At the beginning of the century numerous women discovered new orientations and lifestyles that offered escape from traditional gender roles. At first sight the case of women in science is puzzling: university education and careers became possible for women when the pragmatic attitudes of modernists and technocrats who accepted outsiders prevailed, yet the women scientists who took advantage of these opportunities came mainly from families of the educated middle classes (*Bildungsbürgertum*) and clung to conservative values and ideals of comprehensive understanding.[11] However, neither conservatives nor modernists were ready fully to accept women—in society or in science. Gender roles had been rendered obsolete during the war; in reaction, conservatives turned back to the old conceptions of women as mothers, the domestic heart and soul of the nation, while in modernist discourse on gender a shift becomes visible as a result of their understanding of human nature and human society.[12] Conservatives had sought to develop the individual's complexity through education (*Bildung*), and their conception of gender relations was embodied in a complementary extension of the individual, the couple. Modernist personalities were constructed as antipoles: a "cold persona" of functional adaptation and change, whose actions were unconstrained by moral restrictions, was set against a "creature" reduced to an organic substratum, a bare, needy, driven bundle of reflexes in constant fear, indistinguishable from an animal, at the mercy of others in a time that knew no compassion. Modernist literature designed male and female protagonists, both cold and creature-like, yet sexuality made a difference, tipping the balance: only one aspect could predominate. The brutish natural force of sexual attraction caused an irreducible disunity; equality between men and women was not possible. Thus women could be seen only as calculating and deploying their sexual

---

The Decline of the German Mandarins: The German Academic Community (Cambridge, Mass.: Harvard Univ. Press, 1969). On the sciences see Michael Eckert, *Die Atomphysiker: Eine Geschichte der theoretischen Physik am Beispiel der Sommerfeldschule* (Braunschweig/Wiesbaden: Vieweg, 1993); Harwood, *Styles of Scientific Thought;* Bettina Heintz, *Die Herrschaft der Regel: Zur Grundlagen Geschichte des Computers* (Frankfurt am Main: Campus, 1993); Herbert Mehrtens, *Moderne—Sprache—Mathematik: Eine Geschichte des Streits um die Grundlagen der Disziplin und des Subjekts formaler Systeme* (Frankfurt am Main: Suhrkamp, 1990).

[11] The inner conflicts for women caught between these two worlds could become unbearable; see, for a case study, Gerit von Leitner, *Der Fall Clara Immerwahr: Leben für eine humane Wissenschaft* (Munich: Beck, 1993). On the new opportunities for women see Sigrun Anselm and Barbara Beck, eds., *Triumph und Scheitern in der Metropole: Zur Rolle der Weiblichkeit in der Geschichte Berlins* (Berlin: Dietrich Reimer, 1987); Heide Schlüpmann, *Unheimlichkeit des Blicks: Das Drama des frühen deutschen Kinos* (Frankfurt am Main: Stroemfeld/Roter Stern, 1990); Inge Stephan, Sabine Schilling, and Sigrid Weigel, eds., *Jüdische Kultur und Weiblichkeit in der Moderne* (Cologne/Weimar/Vienna: Böhlau, 1994); and Gisela von Wysocki, *Die Fröste der Freiheit: Aufbruchsphantasien* (Frankfurt am Main: Syndikat, 1980).

[12] Women had filled traditionally male positions during the war. The trauma of defeat had particularly wounded males' sense of self, which in Germany more than elsewhere was shaped by military ideals and education. On modernist discourse on gender see Christina von Braun, *Nicht Ich—Ich Nicht: Logik, Lüge, Libido* (Frankfurt am Main: Neue Kritik, 1985), esp. pp. 324–356; Braun, *Die schamlose Schönheit des Vergangenen: Zum Verhältnis von Geschlecht und Geschichte* (Frankfurt am Main: Neue Kritik, 1989); Silvia Bovenschen, *Die imaginierte Weiblichkeit: Exemplarische Untersuchungen zur kulturgeschichtlichen und literarischen Präsentationsformen des Weiblichen* (Frankfurt am Main: Suhrkamp, 1979); Ute Frevert, *Ehrenmänner: Das Duell in der bürgerlichen Gesellschaft* (Munich: DTV, 1995); Klaus Theweleit, *Männerphantasien* (Frankfurt am Main: Stroemfeld/Roter Stern, 1977); and Nike Wagner, *Geist und Geschlecht: Karl Kraus und die Erotik der Wiener Moderne* (Frankfurt am Main: Suhrkamp, 1987). On science see Karin Hausen, "Warum Männer Frauen zur Wissenschaft nicht zulassen wollten," in *Wie männlich ist die Wissenschaft,* ed. Hausen and Helga Nowotny (Frankfurt am Main: Suhrkamp, 1986), pp. 31–40.

attractiveness or as ruled by instinct. "The problematic man is shown on the run through a gallery of female figures."[13]

Organizations of middle-class and academic women concentrated upon education for girls and women, professionalization of women's work, and rationalization of the living conditions of women. They held that the "coldness" of abstract thinking, of economic and technological rationality, had to be remedied by the emancipation of women and "female culture."[14] They aligned the strategies of modernization with the traditional values of the educated middle classes. The resulting mélange of discordant and partly contradictory elements was double edged, both liberating and repressive. The feminist voices that merged into the nationalist frenzy at the beginning of the Great War, into the German *Volksgemeinschaft,* located women squarely within a family: they were mothers and sisters of the soldiers and dispassionate, reasonable, and active daughters embracing and advocating the paternal order. The self-presentation of these women often hints at a thoroughly elite consciousness and a novel form of emancipated female authoritarianism. It is significant that the women so depicted were without sexuality.[15] Their acquiescence in this image left these women helpless in the face of new surges of sexism and misogyny. Encircled by various ideological images of femininity, the feminist project of constructing the "new woman" was inevitably burdened by the deep-rooted tensions that characterized Weimar democracy as a whole and its intellectual framework in particular.

The controversies about the form of politics and the roles of science and morality in Germany after World War I cannot be directly reduced to patterns of left or right party politics. The National Socialists built their political power base on a mixture of seemingly opposed ideological elements; their appeal transcended political affiliations and thus reached people from vastly different social backgrounds. The establishment of the National Socialist state occurred through a series of almost imperceptible steps rather than in a singular turn; it was accompanied by a swelling

[13] Lethen, *Verhaltenslehren der Kälte* (cit. n. 10), p. 43.

[14] On women's organizations see Bärbel Clemens, *"Menschenrechte haben kein Geschlecht!" Zum Politikverständnis der bürgerlichen Frauenbewegung* (Pfaffenweiler: Centaurus, 1988); Hildtraud Schmidt-Waldherr, *Emanzipation durch Professionalisierung?* (Frankfurt am Main: Materialis, 1987); and Irene Stoehr, "'Organisierte Müttelichkeit': Zur Politik der deutschen Frauenbewegung um 1900," in *Frauen suchen ihre Geschichte: Historische Studien zum 19. und 20. Jahrhundert,* ed. Karin Hausen (Munich: Beck, 1983), pp. 221–249. The feminists' slogan of "spiritual motherliness" transformed the idealized unity of the couple from a private to a political idea, and they understood the complementarity of men's and women's qualities, abilities, and tasks as a model for society on all levels. In setting "motherliness" against "machinery," as "life" against "death," these feminists used traditional gender concepts in order to overturn traditional stereotypes by applying female activity and self-determination to the realms of the state and high culture. See Barbara Brick and Christine Woesler, "Maschinerie und Mütterlichkeit," *Beiträge zur Feministischen Theorie und Praxis,* 1981, *5*:61–68. On the reception of Georg Simmel's "Philosophie der Geschlechter: Das Relative und das Absolute im Geschlechter-Problem" see Annemarie Wolfer-Melior, "Weiblichkeit als Kritik," *Feministische Studien,* 1985, *2*:62–78; and Inka Mülder-Bach, "'Weibliche Kultur' und 'stahlhartes Gehäuse': Zur Thematisierung des Geschlechterverhältnisses in den Soziologien von Georg Simmel und Max Weber," in *Triumph und Scheitern in der Metropole,* ed. Anselm and Beck (cit. n. 11), pp. 115–140.

[15] The elimination of sexuality from this image of women might have seemed a necessity; self-determination was apparently to be gained only through emotional independence. But when sexlessness became a model for professional women, it fostered the bond to rigid forms of paternal authority. See Ulrike Prokop, "Die Sehnsucht nach der Volkseinheit: Zum Konservatismus der bürgerlichen Frauenbewegunng vor 1933," in *Die Überwindung der Sprachlosigkeit: Texte aus der neuen Frauenbewegung,* ed. Gabriele Dietze (Darmstadt: Luchterhand, 1979), pp. 176–202.

undertow of demoralization and political apathy.[16] The well-known antifeminism of the Nazis was an old vintage. Their ideology added little to the conservative image of women; their leadership was solely male and their politics made it abundantly clear that this would not change.[17] The majority of women were either uninterested in or reacted with resignation to political developments. The associations of the women's movement disbanded when confronted with the process of forced alignment (*Gleichschaltung*) by which the Nazis secured their control over many organizations and institutions in German society.[18]

The gates to National Socialism were much narrower for academic women than for their male colleagues, but they were not nonexistent—unless the experience of expulsion or the promptings of individual conscience rendered them so. The values held by many educated women—egalitarianism, internationalism, and pacifism—were directly opposed to the politics of the Nazis. Moreover, women's emancipation was regarded by right-wing ideologists as the cause of racial degeneration; in particular, academic women without children were targets of calumny. In the first year of the National Socialist regime two laws directed against academic women were passed: one limited the number of women students at the universities to 10 percent, and the Law on Reinstatement of the Permanent Civil Service (Gesetz zur Wiedereinführung des Berufsbeamtentums) made it possible to discharge married women, so-called double earners, from state service. Without exception, this second law applied to women who were of Jewish descent or married to Jews. In the twelve years of the Nazi regime eight of the fourteen women lecturers at the University of Berlin were forced to resign or to emigrate for political or "racial" reasons. Elisabeth Schiemann and Lise Meitner were among them.[19]

[16] The Nazis echoed the conservative rhetoric of authenticity and mixed in a nationalist—*völkischer*—ideology, making it difficult for conservatives to pinpoint differences from their own positions. To the modernists the Nazis promised a renewed nation that would make effective use of social management techniques, technology, and science, specifically biology and eugenics (although the goals of the two groups might have been different). On the sciences see Ute Deichmann, *Biologen unter Hitler: Vertreibung, Karrieren, Forschung* (Frankfurt/New York: Campus, 1992); Benno Müller-Hill, *Tödliche Wissenschaft: Die Aussonderung von Juden, Zigeunern und Geisteskranken 1933–1945* (Reinbek bei Hamburg: Rowohlt, 1984); Monika Renneberg and Mark Walker, *Science, Technology, and National Socialism* (Cambridge: Cambridge Univ. Press, 1993); and Weingart *et al.*, *Rasse, Blut und Gene* (cit. n. 7).

[17] See Schmidt-Waldherr, *Emanzipation durch Professionalisierung?* (cit. n. 14), pp. 41–62; and Robert Proctor, *Racial Hygiene: Medicine under the Nazis* (Cambridge, Mass./London: Harvard Univ. Press, 1988), pp. 118–130. However, the Nazi combination of misogyny and racism could seem attractive to women (of the "correct" race) because of the policy of pronatalism, and even a few feminist interpretations of race elitism sprang up. See Gudrun-Axeli Knapp, "Frauen und Rechtsextremismus: 'Kampfgefährtin' oder 'Heimchen am Herd'?" in *Nationalsozialismus und Moderne,* ed. Harald Welzer (Tübingen: Diskord, 1993), pp. 208–239.

[18] The acceptance of "a party which is likewise a combat unit against the citizenship of women" (Gertrud Bäumer) was not possible, but women in these groups were unable to come to agreement on an appropriate form of resistance; see Schmidt-Waldherr, *Emanzipation durch Professionalisierung?* For an overview on women in the National Socialist state see Lerke Gravenhorst and Carmen Tatschmurat, eds., *TöchterFragen: NS-Frauengeschichte* (Freiburg: Kore, 1990); see also Gisela Bock, *Zwangssterilisation im Nationalsozialismus: Studien zur Rassenpolitik und Frauenpolitik* (Opladen: Westdeutscher, 1986).

[19] See Ulla Bock and Dagmar Jank, *Studierende, lehrende und forschende Frauen in Berlin: 1908–1945 Friedrich-Wilhelms-Universität zu Berlin; 1948–1990 Freie Universität Berlin* (Berlin: Universitätsbibliothek Freien Univ. Berlin, 1990); and Kristine von Soden, "Zur Geschichte des Frauenstudiums," in *70 Jahre Frauenstudium—Frauen in der Wissenschaft,* ed. Soden and Gabi Zipfel (Cologne, 1979), pp. 9–42.

RISKING A CAREER: MORALITY

In 1934 Schiemann wrote an exhaustive obituary note on Erwin Baur that highlighted his work in genetics. From their eighteen years of collaboration she knew well both his field of research and his style of administration. He had been her doctoral advisor, and afterward she became his first assistant at the Institute for Heredity and Breeding Research (Institut für Vererbungs- und Züchtungsforschung), established in 1914. After 1921 she held a tenured position as senior assistant, and her tasks brought her into contact with the whole range of research techniques.[20] Schiemann was responsible for the experimental equipment and, in particular, the plant collections. She conducted the practical investigations of the students, supervised the research of younger colleagues, lectured on plant breeding and the genetics of cultivated plants, and helped organize the Fifth International Congress on Genetics, held in Berlin in 1927. The theoretical basis of the breeding experiments was found in the genetic methods of hybridization and selection. The institute's research program was strongly oriented toward the atomistic approach and experimental pragmatism of the American geneticists who had created the basic structure of classical genetics through a synthesis of cytology and Mendelian factor analysis. T. H. Morgan's theory on chromosomes was taken up promptly as well.[21] (See Figure 2.)

Baur was clearly a representative of the new generation of scientists in Germany. He was one of the innovative young men who built their careers as they built a new science.[22] Schiemann frankly acknowledged the importance of Baur in her academic career. She presented him as a versatile personality, a gripping and resourceful teacher whose strength lay less in routine work than in an "intuitive understanding of the essential." Like his research, his management style was innovative: he constantly reinforced his connections to agricultural associations, to the breeding industry, and to government authorities. In his attempt to utilize scientific genetics, Baur did not limit himself to breeding research on plants and animals. Like many other physicians and biologists of his generation, he saw eugenics as the application of Mendel's laws to society and applied hereditary laws to the human population. At the beginning of

[20] For the obituary see Elisabeth Schiemann, "Erwin Baur," *Ber. Deut. Bot. Gesell.*, 1934, *3*(2):51–114. My information on Baur is drawn from this essay unless otherwise noted. The general information on Schiemann's career presented in this paragraph comes from Kuckuck, "Elisabeth Schiemann" (cit. n. 1); Lang, "Elisabeth Schiemann" (cit. n. 1); Elisabeth Schiemann, "Erinnerungen an meine Berliner Universitätsjahre," in *Studium Berolinense: Gedenkschrift der Westdeutschen Rektorenkonferenz und der Freien Universität Berlin zur 150. Wiederkehr des Gründungsjahres der Friedrich-Wilhelms-Universität zu Berlin* (Berlin: De Gruyter, 1960), pp. 845–856; and Schiemann, "Autobiographie," *Nova Acta Leopoldina*, 1959, *143*:291–292.

[21] Harwood underscores the political significance of this congress, the first international scientific congress to be held in Germany after the war; see Harwood, *Styles of Scientific Thought* (cit. n. 9), p. 239. Baur's institute resembled American genetics centers in organizational aspects as well; see *ibid.*, pp. 41, 160.

[22] In 1908 he took the initiative, with others, in founding the *Journal of Inductive Evolutionary and Hereditary Theory (Zeitschrift für Induktive Abstammmungs- und Vererbungslehre)*, and he was a founding member of the German Society for Genetics (Deutsche Gesellschaft für Vererbungswissenschaft). In 1911 his book *Introduction to Experimental Genetics (Einführung in die experimentelle Vererbungslehre)* was published and he succeeded in gaining his own institute. Baur's main research objects were snapdragons; his goal, to produce a gene chart of antirrhinum paralleling Morgan's gene chart of the fruit fly, was achieved in the late 1920s. He then started work with Max Delbrück, N. W. Timofeeff-Ressovsky, and K. G. Zimmer that led to a systematic interpretation of gene mutations and to molecular genetics.

Figure 2. *Lise Meitner (standing) and Elisabeth Schiemann in the garden of the Institute for Heredity and Breeding Research in Berlin-Dahlem. (Courtesy of Churchill Archives, Cambridge.)*

the twentieth century such ideas were commonplace in political thought, in Germany as elsewhere, on both left and right. But with the institutionalization and professionalization of eugenics after the war came a shift toward more conservative and authoritarian politics; social criticism directed toward improving the lot of the lower classes was replaced by a biological rhetoric aimed at halting national degeneration.[23] Baur's writings and political activities reflect this development. "He compared the German Empire to an antirrhinum-Volk—a nation of snapdragons. Its composition was equivalent to the population resulting from crossing three or four varieties of snapdragons." Baur's diagnosis was that negative selection was threatening the existence of the nation's elite and that measures had to be taken to weed out degenerated population stocks. In a text entitled "The Decline of the Cultivated Nations

[23] Schiemann, "Erwin Baur" (cit. n. 20), p. 63. Gisela Bock has described the widespread interest in applying Mendelian laws to human populations as "thinking in hereditary norms [*Denken in Erbwerten*]"; see Bock, *Zwangssterilisation im Nationalsozialismus* (cit. n. 18), p. 40. See also Paul Weindling, *Health, Race, and German Politics between National Unification and Nazism, 1870–1945* (Cambridge: Cambridge Univ. Press, 1989), pp. 399–487; and Weindling, "Weimar Eugenics: The Kaiser Wilhelm Institute for Anthropology, Human Heredity, and Eugenics in Social Context," *Annals of Science*, 1985, *4*:303–318.

from a Biological Viewpoint," first published in 1922 and issued again in 1932, he drew on Oswald Spengler's ideas, which were popular in conservative and right-wing circles.[24] He presented a mixture of eugenics views that denigrated urban life and advocated agricultural self-sufficiency as the basis of a planned national economy. Baur combined nationalism, social progress, and biology in a fashion typical for postwar conservatives: biology should dictate national values and be a guide to future legislation, circumventing the chaos of party politics.

Schiemann did not question or object to Baur's views on eugenics.[25] But although she, too, belonged to the cultural elite and held a conservative political stance in general, two important features of her thinking and her behavior distinguish her from Baur: the role of biology in her understanding of cultural and social developments and her pronounced rejection of National Socialism. Both features emerged as the result of the course her career took in the late 1920s.

While Schiemann was collecting information for the obituary of Baur she received several letters that expressed surprise that she had agreed to write the article.[26] Why? She had worked with him for most of his professional life and might have seemed the obvious choice. What had happened?

During 1928, preparations were under way at the Dahlem institute for the establishment of the new Kaiser Wilhelm Institute for Breeding Research in Müncheberg, which was to be headed by Baur. Schiemann had helped plan this new institute and was responsible for moving the extensive collections from Berlin-Dahlem. On 29 September the institute in Müncheberg opened. However, the original plan to place Schiemann in a tenured Kaiser Wilhelm Institute membership post, as director of an independent department for the history of cultivated plants, was abandoned. Her appointment kept being postponed without explanation. After two years a heated argument over this issue terminated Baur and Schiemann's long-standing cooperation. In 1931 a relatively unknown and much younger male scientist was appointed Baur's successor in Berlin-Dahlem, in reaction to which Schiemann left the institute there. Moreover, she resigned her professorship at the Agricultural College of Berlin, which housed the institute, and had her rights to lecture transferred to the Friedrich Wilhelm University of Berlin. She found a place at the Botanical Museum in Berlin-Dahlem, but this unpaid post offered very limited possibilities for breeding and genetics experiments. During the next twelve years she intermittently obtained re-

[24] Weindling, *Health, Race, and German Politics*, p. 237; and Erwin Baur, "Der Untergang der Kulturvölker im Lichte der Biologie," *Deutschlands Erneuerung*, 1922, *6*:257–268, rpt. in *Volk und Rasse*, 1932, *7*:65–79. Spengler was the author of *The Decline of the West;* for the German original see Oswald Spengler, *Der Untergang des Abendlandes: Umrisse einer Morphologie der Weltgeschichte*, 2 vols. (Munich, 1919–1922). Baur expressed his views in Erwin Baur, Eugen Fischer, and Fritz Lenz, *Grundriß der menschlichen Erblichkeitslehre und Rassenhygiene* (Munich, 1920), which was later used by Nazi ideologues to back their "race theory." Baur had been a member of the Society for Eugenics since 1907; he later became chairperson of the Berlin branch and cooperated with the ministry of health and numerous other state agencies. He served as a consultant to the standing committee on eugenics and population affairs in the Prussian parliament and was influential in the establishment and staffing of the Kaiser Wilhelm Institute for Anthropology, Human Genetics, and Eugenics. See Weindling, "Weimar Eugenics."

[25] In 1934 she wrote: "Thus during the years of his collaboration in the eugenics movement great things had been achieved, and steady progress on carefully prepared ground had been set in motion, when the National Socialist revolution took charge of further developments." Schiemann, "Erwin Baur" (cit. n. 20), p. 107.

[26] These letters can be found in the Staatsbibliothek Preußischer Kulturbesitz Berlin, Handschriftensammlung, Nachlaß Elisabeth Schiemann (hereafter cited as **Nachlaß Elisabeth Schiemann**).

search scholarships from the Kaiser Wilhelm Institute for Biology, supported by its director, Fritz von Wettstein.[27]

Schiemann never expressed herself openly on her treatment by Baur. Neither did she completely hide the negative side of working with him: "Baur was . . . 'chemically clean of vanity'; he clung so little to his own ways of thinking that when he saw better ways he was quite prepared to change them, without inner inhibition. Yet he could forget that other people's fate had been determined by his work, and that they were then thrown off track."[28] Her case can be seen, in the first place, as discrimination because of her sex. In the early days Baur employed only women assistants: Schiemann, Gerda von Uebisch, Emmy Stein, and Luise von Graevenitz (some years later Paula Hertwig joined the staff). The first male colleague appointed was Hans Nachtsheim, in 1921. The Institute for Heredity and Breeding Research was not a university institute; rather, it was affiliated with the Agricultural College of Berlin. A decade later, when Baur headed the prestigious and well-equipped Kaiser Wilhelm Institute for Breeding Research in Müncheberg, things were very different, and he had left most of his female assistants behind. Despite the promising beginnings, it was virtually impossible during the Weimar era for a woman to pursue a successful academic career in genetics, whatever her qualifications. Only two women were appointed as full professors in any field—one in pedagogy, one in agriculture; both of these appointments came in 1923, when the economic crisis of the postwar period had abated somewhat. Because the establishment of a new discipline was hindered by the structure of German universities, geneticists had to apply for chairs in one of the traditional biological fields. Competition was particularly intense; specializing in the new field most often meant a position as an assistant at an institution of secondary importance.[29]

But there is more to Baur and Schiemann's disagreement than sex discrimination. She had embarked on a path contrary to the reductionist method of radiation genetics he favored, with its exclusive concentration on the decoding of the molecular structures of genes. Schiemann was aware of the philosophical questions prompted by developments in the sciences. As a student she had heard Oskar Hertwig lecture on the ethical, social, and political problems of Darwinism (he was very skeptical about the promises made by eugenics), Max Planck on positivism and the mechanistic approach toward nature, and Max Hartmann on causality. By combining new

[27] Most of the time her sister Gertrud Schiemann, a violinist, supported both of them; when she had no musical engagement Gertrud worked as a masseuse.

[28] Schiemann, "Erwin Baur" (cit. n. 20), p. 78. Others are peculiarly silent on this topic too. See Hans Stubbe, "Elisabeth Schiemann zum 70. Geburtstag," *Züchter,* 1951, *7/8:*193–195; Lang, "Elisabeth Schiemann" (cit. n. 1); and Kuckuck, "Elisabeth Schiemann" (cit. n. 1). Personality differences are put forward as an explanation for their breakup, if it is mentioned at all. Further inquiries have been made by Petra Hillmann and Helga Wackwitz, "Elisabeth Schiemann 1881–1972" (unpublished thesis, Carl von Ossietzky-Universität, Oldenburg); among the former assistants of Schiemann they interviewed, only the women would concede sex-based discrimination.

[29] On Baur's early assistants see Harwood, *Styles of Scientific Thought* (cit. n. 9), p. 202. On Mathilde Vaerting, the professor of pedagogy, see Theresa Wobbe, "Ein Streit um die Gelehrsamkeit: Die Berufung Mathilde Vaertings im politischen Konfliktfeld der Weimarer Republik," *Reihe: Berliner Wissenschaftlerinnen Stellen Sich Vor,* 1991, *8:*3–30. On Margarethe von Wrangell, the professor of agriculture, see Margarethe von Wrangell, *Das Leben einer Frau 1876–1932: Aus Tagebüchern, Briefen und Erinnerungen dargestellt von Fürst Wladimir Andromikow* (Munich, 1936). For details on the difficulties of the new field in establishing itself in the universities see Jonathan Harwood, "National Styles in Science: Genetics in Germany and the United States between the World Wars," *Isis,* 1987, *78:*390–414.

research methods in genetics, Mendelian factor analysis, cross-breeding experiments, hybridization, and selection with cytology, she saw a way to investigate the wealth of biological variations as the basis of both evolutionary development and agricultural practice.[30] She chose barley, other grains, and strawberries as her favorite research objects. In the late 1920s she became more and more interested in the development of cultivated plants from wild forms to present-day selective breeds. She was particularly interested in the history of grain, in tracing back its earliest forms and establishing the biological connection between wild and cultivated plants. This development could only be understood through work that integrated various biological methods and disciplines, including genetics, cytology, systematics, and plant geography. Schiemann was inspired by Nikolai Vavilov's gene center theory, which linked all these aspects "and states that the area where the greatest variety of a cultivated plant is found is also the area of origin and the place where its original wild form should be traced." This theory provided the basis for initiating various collection expeditions and extensive research on cultivated plant populations, which Schiemann followed with interest. At the Botanical Museum in Berlin-Dahlem she could at least continue her work in this field. Questions about the age, origin, and subsequent migration of plants led her to studies in prehistory, anthropology, and archaeology in a fascinating interdisciplinary research field that Meitner once described as "reading human cultural history in the diversity of existing cultivated plants." Schiemann's *The Development of Cultivated Plants* was published in 1932 and has since been recognized as one of the main books in this research field.[31]

Jonathan Harwood's distinction of two styles in genetics helps in situating Schiemann's approach. The pragmatists, among them leading American geneticists but also the group at Baur's institute, were characterized by their use of materialist terms, atomistic theory, and mechanistic explanations and by their strong focus on applied research. Most German biologists, particularly the older generation like Carl Correns, Fritz von Wettstein, and Richard Goldschmidt, were skeptical about this reductionism. Their understanding of genetics was much broader, and they advocated a comprehensive approach that stressed basic research on the role of the gene in evolutionary and embryonic development. Their efforts to study the contexts of hereditary processes and their choices of problems were based on a holistic understanding of nature that saw organisms not as random associations of individual parts

[30] Information on Schiemann's student years comes from Schiemann, "Erinnerungen" (cit. n. 20), pp. 846–847. On the combination of insights and techniques from various fields see Elisabeth Schiemann, "Die Rolle der natürlichen Auslese in der Pflanzenzüchtung," *Illustrierte Landwirtschaftliche Zeitung,* 1927, *36* (offprint).

[31] Elisabeth Schiemann, "Biologie, Archäologie und Kulturpflanzen," *Jahrbuch der Max-Planck-Gesellschaft* (Göttingen: Hubert, 1955), pp. 177–198, on p. 189; and Meitner to Elisabeth Schiemann, 23 Oct. 1956, Meitner Papers. See also Paula Hertwig, "Elisabeth Schiemann zum 75. Geburtstag," *Zeitschrift für Pflanzenzüchtung,* 1956, *2:*129–132. For the book see Schiemann, *Entstehung der Kulturpflanzen: Handbuch der Vererbungswissenschaften,* Vol. 3, ed. Erwin Baur and Max Hartmann (Berlin: Borntraeger, 1932). Schiemann also published some essays for the wider public. See, e.g., Schiemann, "Auf den Spuren der ältesten Kulturpflanzen," *Forschungen und Fortschritte,* 1933, *28:* 1–3; Schiemann, "Die Geschichte der Kulturpflanzen im Wandel der biologischen Methoden," *Saertryk af Botanisk Tidsskrift,* 1954, *51:*308–329; and Schiemann, "Biologie, Archäologie und Kulturpflanzen." A list of her publications can be found at the Archiv zur Geschichte der Max Planck-Gesellschaft, Berlin; a selection of her works is presented in Kuckuck, "Elisabeth Schiemann" (cit. n. 1), pp. 534–537.

but as *Wirkungsganzes.* As late as 1934, Paula Hertwig explained why many biologists still had reservations about the atomistic model of the chromosome: "This rejection [of the atomistic model] is mainly without experimental proof. It is, rather, based on the desire to find a holistic principle in organic development. It is the reluctance to understand organisms as aggregates of predispositions . . . whose total independence could not guarantee the unity" of the whole.[32]

Schiemann started her career in botany and genetics within an institute run along pragmatist lines, but she shared the attitudes toward science, culture, and politics of those who favored a comprehensive understanding of biology. Like other outsiders in the German academy, women were more likely to obtain posts in new disciplines and at less (or not yet) prestigious institutions like colleges of agriculture and engineering or in applied research institutes rather than at the established universities. But their social background and education often affiliated them with the dominant group of German scholars whose self-confidence and research programs were determined by ideas and values compatible with the classical humanistic conception of *Bildung.* These tensions that marked the situation of academic women in the postwar period increased with the political events that soon took place.

The rise of the Nazi regime to power in 1933 marked a turning point in the development of eugenics. In combination with anti-Semitism, it became the ideological foundation of the totalitarian state. The Nazis described their political policies as applied biology, and they could in fact use the latest findings in population genetics for their purposes.[33] The coordination of research strategies and social policy developed during the Weimar period was retained and refined; the administrative apparatus of health departments and welfare institutions became the efficient technocratic tools of the extermination policy.[34] No opposition to the sterilization laws or to Nazi racial policy formed among scientists. While only a few were as ready as Fritz Lenz to subordinate their research to the plans and conditions specified by the new rulers, most approved a political move to the right, as did Baur, or soon adapted to the new circumstances despite initial disapproval, as did Eugen Fischer. The conflicts that occurred between the Nazi regime and its scientists were arguments between competing authorities: frictions between different centers of power within academic

[32] Paula Hertwig, quoted in Weingart *et al., Rasse, Blut und Gene* (cit. n. 7), p. 334. On the two styles in genetics see Harwood, *Styles of Scientific Thought* (cit. n. 9). *Wirkungsganzes* means, roughly, "effect of the whole," but also refers to the structure of an entity. On this topic see Evelyn Fox Keller, *Refiguring Life: Metaphors of Twentieth-Century Biology* (New York: Columbia Univ. Press, 1995).

[33] See Proctor, *Racial Hygiene* (cit. n. 17), p. 64. The Nazis were unconcerned as to whether they appealed to work of scientists who actively supported them or of those who ran into difficulties because of their criticism of the regime—like Paula Hertwig, for whom Schiemann wrote a letter of recommendation to Hermann Boehm, Reichsführerschule der deutschen Ärzteschaft, 17 Feb. 1940, Nachlaß Elisabeth Schiemann. To the Nazis, the invisibility of genetic defects over many generations meant that practically everyone could be suspected of carrying hereditary diseases or "racial inferiority." This concern led to the plan of registering and controlling the genotype of the entire population. This point has been stressed by Karl Heinz Roth, "Schöner neuer Mensch: Der Paradigmenwechsel der klassischen Genetik und seine Auswirkungen auf die Bevölkerungsbiologie des 'Dritten Reiches,'" in *Der Griff nach der Bevölkerung: Aktualität und Kontinuität nazistischer Bevölkerungspolitik,* ed. Heidrun Kaupen-Haas (Nördlingen: Greno, 1986), pp. 11–63.

[34] This process has been described by Ludger Weß, *Die Träume der Genetik: Gentechnische Utopien von sozialem Fortschritt* (Nördlingen: Greno, 1989); and Weindling, *Health, Race, and German Politics* (cit. n. 23), pp. 441–533.

politics, or wranglings over status between the conservative first generation of geneticists and their successors, to whom the Nazis offered a career boost. The Nazis remained suspicious toward scientists who insisted on the precedence and independence of their expertise and their departments. However, the very fact that the earlier critiques of eugenics had been limited to genetic and biological controversies, never superseding the scientific context, facilitated the reconciliation of biological theory and Nazi race ideology.

The belief that "pure" and "free" science was by definition ethical was shared by Harwood's "comprehensives" and "pragmatists," though their understanding of ethics differed. Whereas the comprehensive ideal saw the ethics of scientific work in its presumed betterment of the German nation and humanity as a whole, modernist reductionism completely stripped science of any concern with social norms or political interests. Ironically, this very disconnectedness from political conflicts, particular social relations, and concrete moral responsibilities meant that "doing science" led to an involvement with the politics of destruction and extermination. The majority of German scientists continued their research under the Nazis as if nothing had changed. Biological and genetics research in Germany during the 1930s met international standards and was funded by the Rockefeller Foundation until 1942. Conservatives contributed to the rhetoric of a national German science. However, in the end modernists proved even more effective for the purposes of the state apparatus and in preparations for war. The role of science in the discourse on eugenics and the professionalization of the eugenics movement initiated a dismissal of morality that allowed the incorporation of many scientists into the Nazi power apparatus—which thereby made the modernization of social management and the use of modern science an integral part of its practice.[35]

During the difficult years at the end of the 1920s Schiemann had become a committed member in the Dahlem congregation of the Protestant Church. After the Nazis came to power, they demanded enforcement of "Aryan laws" within the church itself. Those who refused to abide by this demand formed the Confessional Church (Bekennende Kirche). Schiemann spoke against anti-Semitic attitudes that arose even in the Confessional Church itself. She criticized the church for condemning state intervention into its internal affairs while otherwise acknowledging the legitimacy of the Nuremberg Laws.

> The state takes for itself the right to decide what divine order is, namely: blood, race (specie), soil, and nation. The church accepts this decision, declares that it is not binding for the realm of the church, but allows it in the realm of the state. . . . Thus the church sanctions all the injustice which is committed in the name of this decision. . . . The definition of people is wrong! For me, for the church in Germany, these baptized people [she meant Christians of so-called non-Aryan descent] are German people. This is where the question arises, May I and may the church draw a limit at these baptized persons? . . . Who then is my neighbor? . . . To the question: who does not understand the intentions of the state? I have to answer as a member of the Christian (B.K.) church: me.[36]

[35] The studies I have cited on science under the Nazi regime have shown various aspects of this transformative process.

[36] Elisabeth Schiemann to Martin Niemöller, 4 Mar. 1936, Nachlaß Martin Niemöller, Zentralarchiv der Evangelischen Kirche in Hessen und Nassau. For an extensive account of the formation of the Confessional Church see Kurt Meyer, *Der evangelische Kirchenkampf*, 3 vols. (Göttingen:

Her tone is clearly impatient when she discusses the biological arguments of "race theory": "this flood of confusing dilettantism that has been poured over our nation." In an open letter to priests of the Confessional Church she states that not the "purity of race," as Linnaeus could perhaps still have claimed, but, rather, general change and transformation is the main natural law of biology. Variability is the precondition of development, and it originates only from "mixing." "And thus it is an old and outdated notion, just like the one of heaven and earth, if one takes the story of the Bible literally: each according to his own destiny."[37] In her academic writings Schiemann never draws an analogy between human society and biological heredity. Rather, her approach to "The Relationship between the Phylogeny of Human Races and That of Cultivated Plants" (as the title of one of her articles puts it) is determined by interdisciplinary considerations that take genuine historical perspectives into account. She did not adjust her method of working or her convictions to suit the new doctrines. At the university she expressed her views against the "race theory," even if she stood alone. One of her former students recalls that during a meeting organized by students, "only Schiemann got up and stated, with a clear although slightly breaking voice—as was her wont in times of great stress or passion—that we should acknowledge the contributions of different peoples to German culture and science—French, Italian, and 'Yes, let us say it clearly, the Jews.'"[38]

By the time the Nazis took power Schiemann had become an outsider in the scientific community. Not only was she excluded from the important institutional and informal networks of her profession; she also stood apart from the lack of moral concern—even abandonment of hopes and ideals—that spread among her colleagues. Her public statements against the Nazi regime constrained her professional situation even further, and in 1940 her right to teach at the Friedrich Wilhelm Universität in Berlin was revoked on political grounds.

Schiemann had found her own independent and very particular response to the Nazis' policies by relating science and ethics. In our attempt to understand how she brought her fascination with modern biology and her beliefs about acting responsibly in professional and social relations into thoughtful consistency, Harwood's distinction of two styles of thought again is helpful. The two groups of geneticists differed in other than scientific aspects. Those who advocated a comprehensive approach held to the traditional cultural and ethical values of the German educated middle classes. They can be characterized by the breadth of their interests and their knowledge not only of their own discipline but also of philosophy, history, and fine

---

Vandenhoeck & Ruprecht, 1976–1984). Schiemann suffered from gastric disease at the end of the 1920s, and in their private correspondence during this time Meitner often asks about her health.

[37] Elisabeth Schiemann to Niemöller, 4 Mar. 1936. The letter contains a typescript, from which this quotation is taken. Martin Niemöller went to prison in 1937 and spent the following years in concentration camps; see Wolfgang Gerlach, "Vom Seeteufel zum Friedensengel: U-Bootskommandant, Freikorpsoffizier, Pastor, Widersacher Hitlers, KZ-Häftling, Gewissen der Nation," *Zeit,* 3 Jan. 1992, pp. 33–34. Another well-known cleric who resisted the Nazis is Dietrich Bonhoeffer, who was hanged in Flossenbrück, a concentration camp, on 9 Apr. 1945. The death sentence for high treason was abolished only in 1996; see Heinrich Wefing, "Gerechtigkeit für einen Gewissenstäter," *Zeit,* 12 Apr. 1996, p. 4. After World War II members of the Confessional Church were still notable for their democratic stance and engagement.

[38] Elisabeth Schiemann, "Beziehungen zwischen der Stammes geschichte der Menschenrassen und der Kulturpflanzen," *Jahrbuch des Naturwissenschaftlichen Vereins für die Neumark,* 1931/1932, *3*:5–14; and Lang, "Elisabeth Schiemann" (cit. n. 1), p. 25.

arts; they espoused a general humanism that positioned itself "above politics" and had a distaste for modernization and democratization.[39]

Schiemann's outspoken opposition to anti-Semitism reveals her humanistic attitude toward personal relations. In her correspondence with Meitner, the wish "to help others" is a constant theme and an element of their mutual understanding. Schiemann's activities in the church were not restricted to theoretical debates; she taught biology to priests and laypeople, and her name is mentioned among those who helped Jews escape from Germany during the war.[40] She saw the anti-Semitism of the Nazis as a direct and manifest threat to the lives of many of her friends and colleagues, and to complete strangers as well. In 1937, a period when the two were especially close, Gertrud Schiemann's answer to a letter in which Elisabeth had given her an account of the conflicts in the Confessional Church reflects her sister's point of view: "By the way, you cannot count on Irmgard in these matters. She avoids everything that could cause her any internal or external problems. One reason why we had a breakup all of a sudden was that she could not stand being together with someone, whose different views she knew. Personally she is after all quite a disappointment to me."[41]

Variability was the key word that linked Elisabeth Schiemann's understanding of science and morality, just as it created a bridge between the two styles of biological thought with which she was affiliated. In her use of the notion, variability served as both a technical concept in her study of the history of cultivated plants and agricultural breeding practices and as a theoretical concept that enabled her to integrate her evolutionary theory and Mendelian genetics. Moreover, it served to broaden her view of the relation between knowledge and ethics in order "to realize the far-reaching nexus between what has been envisioned individually and what takes place in general, between the living and life."[42] This semantic linking of science, politics, and morality, as Schiemann transformed it into her own, stressed personal responsibility; however, because Schiemann—like the majority of the educated middle class—interpreted the comprehensive ideals as in opposition to politics, she had no perception of the power structures that lay behind the developments in the German nation and in German science.

A retreat into reminiscences about better times, an orientation toward the past, was the effect of such an apolitical stance. Elisabeth and Gertrud Schiemann sent congratulations on the sixtieth birthday of Kaiser Wilhelm II, who had long since

[39] "While the Institute for Biology under von Wettstein's directorship became a haven for dissidents, the events at Müncheberg during 1933 are a textbook example of the process of Gleichschaltung (forced alignment)"—notwithstanding, as Jonathan Harwood also notes, the political diversity within Erwin Baur's staff; see Harwood, *Styles of Scientific Thought* (cit. n. 9), p. 219.

[40] Schiemann mentioned her teaching of biology in her church in Elisabeth Schiemann to Niemöller, 4 Mar. 1936. A note indicating that she held a seminar for women in the church on 6 June 1938 and a manuscript for a talk on this topic can be found in the Nachlaß Elisabeth Schiemann. There is no evidence as to whether Schiemann helped Jews leave Germany. Some of those I interviewed in preparing this essay mentioned it. I find the suggestion credible because of her ongoing friendship with some members of the Bekennende Kirche, about which a letter from Dr. Ekkehard Loerbroks, dated 23 Apr. 1993, has informed me.

[41] Gertrud Schiemann to Elisabeth Schiemann, 30 Apr. 1937, Nachlaß Elisabeth Schiemann. The phrase I have translated as "personally" is "in menschlicher Beziehung," which also has the sense of "with regard to humaneness."

[42] Schiemann, "Erwin Baur" (cit. n. 20), p. 58.

lost power. When she met former friends on a trip to the southwest of Germany, Gertrud Schiemann wrote to her sister:

> Oettingen is strongly disposed "pro," although he loathes everything except the Jew-baiting, in which he participates with full strength. But since he is no party member, and will not now be admitted, he won't get an important position. . . . The eldest son Eberhardt too is a physician and above all a raving Nazi. The 2nd, originally a lawyer, thereupon became a military man, much more critical. . . . This was in broad outline what I got to know. It is a strange feeling. . . . Somehow I saw all this . . . the Oettingens, like a hundred other people in those days [before World War I at her parents' house], served only as background decoration for the intellectual circle and the general sprightliness of life at that time. An unburdened and yet eventful life it was nevertheless, and wideness of mind formed its ground.[43]

In contrast, during the Nazi period the lives of these women were shaped by the experience of isolation, the spell of social coldness.

GETTING INVOLVED WITH POLITICS

"I had exactly one and a half hours to pack, to leave Germany after thirty-one years." In July 1938 Lise Meitner finally was forced to flee. Many of her friends and colleagues had left after April 1933, when the new regime passed the Law on Reinstatement of the Permanent Civil Service, which resulted in the dismissal of all "non-Aryans" and other unwelcome persons from academic positions, or after passage of the Nuremberg Laws in September 1935. By 1938 Germany had lost a substantial portion of its leading scientists—10 percent of the professors and other scholars in biology, about 60 percent of the nuclear physicists.[44] Meitner had hesitated for a long time, hoping that the "nightmare" of National Socialism would soon come to an end. When she escaped from Germany she could take along nothing more than a small suitcase. She was sixty years old.

Meitner had come to Berlin as a young physicist in 1907 to attend Planck's lectures in theoretical physics. After some negotiating, the director of the Institute of Chemistry, Emil Fischer, agreed to allow her to cooperate with Otto Hahn in conducting experiments on beta rays and to investigate actinium C and thorium D, two radioactive products of atomic disintegration. Later, in 1912, she worked as an unpaid guest in Hahn's department in the brand new Kaiser Wilhelm Institute for Chemistry. At the same time she became Planck's assistant at the University of Berlin. A year later she was awarded a tenured research position at the Kaiser Wilhelm Institute, and by 1918 she headed her own department, where she further studied the characteristics of beta and gamma rays using the cloud chamber.

Though her career advanced steadily, Meitner was acquainted with the prejudices against academic women. When she arrived in Berlin she did not know that Prussian universities would not admit women. In Fischer's institute she was allowed only in the basement, where she and Hahn had their laboratory in the former woodwork

[43] Gertrud Schiemann to Elisabeth Schiemann, 13 June 1937, Nachlaß Elisabeth Schiemann.

[44] Kerner, *Lise, Atomphysikerin* (cit. n. 1), p. 82. On scientists leaving Germany see *ibid.;* and Deichmann, *Biologen unter Hitler* (cit. n. 16), p. 310. These numbers do not begin to indicate the damage to German intellectual life.

shop. From time to time she sneaked into the auditorium, where she listened to lectures from under the ascending seats. She had to live on the small amount of money that her family could spare. However, she recalled those early years without regret: "When our own work turned out well, we sang in two voices, mostly songs of Brahms. I could only hum, but Hahn had a very good singing voice. With the young colleagues of the nearby physics institute we had personally and scientifically a very good relationship. Often they came to visit us, sometimes entering through the window of the woodwork shop instead of taking the ordinary path. In short, we were young, cheerful and light-hearted, maybe politically too light-hearted."[45]

Meitner was the first female assistant at a Prussian university. Women in Prussia were given the right to teach at universities and to hold the title of professor in 1920; in 1922 Meitner became the fourth woman to qualify. During these years she succeeded in achieving most of her goals. Her friendship with Schiemann, however, taught her that her case was exceptional. When she became a member of the board of the German Association of Academic Women in 1930, Meitner was leading her own research department at a prestigious institute, teaching at the University of Berlin, and had become a well-respected member of the international nuclear physics community.[46] She had already been nominated, together with Hahn, for the Nobel Prize in chemistry.

Meitner's situation changed dramatically in 1933. In July she was suspended from the university, and in September she was put out of her lectureship altogether. After 1936 public appearances became impossible, even at a colloquium held by a colleague she knew personally. For the moment she was protected from real danger by her Austrian citizenship. She could continue her research at the Kaiser Wilhelm Institute for Chemistry, where her colleagues remained helpful and supportive. She had considered resigning her professorship and had thought about leaving Germany, but colleagues and friends, especially Planck, had convinced her to stay on. Moreover, she had started another project with Hahn in 1934. After reading about Enrico Fermi's new experiments and his plan to discover new artificial elements, the transuraniums, she convinced Hahn that they too should begin bombarding uranium with neutrons. Fritz Straßmann joined them in this work a year later.

After the annexation of Austria in March 1938 Meitner's situation became imminently dangerous. She now counted as a German Jew, and so the racial laws affected her directly. In addition, a Nazi at the institute had started making trouble. At the end of June, her fear that she would not be allowed to leave Germany was confirmed. The Nazis did not want well-known Jews to travel abroad and would make no exception in her case. Hasty preparations, kept absolutely secret, for flight began. Her Dutch colleague Dirk Coster came to Berlin to pick her up, having already arranged with the Dutch border officials that she could enter the country without a visa. Meitner spent her last night in Berlin with the Hahns. The next day she was lucky in that no SS control was on her train; from Groningen she telegraphed to Berlin the code word that signaled her safe arrival. During a visit in Copenhagen Niels Bohr asked her to stay at his institute, but she decided to go to Stockholm.

[45] Kerner, *Lise, Atomphysikerin*, p. 37.

[46] Schiemann qualified as a professor in 1924. On Meitner's joining the board of the association see *Rundschreiben des Deutschen Akademikerinnenbundes*, 2 July 1930, Landesarchiv Berlin, Helene Lange-Archiv.

During the following months Hahn and Meitner exchanged letters about the continuation of their experiments in Berlin-Dahlem. Before the Christmas holidays she received word that Hahn and Straßmann had found the chemical element barium by bombarding uranium. Working with her nephew, Otto Robert Frisch, she correctly interpreted the results of the experiments as nuclear fission and theoretically calculated the enormous amount of energy that was set free. In February 1939 their article was published; but Meitner did not feel altogether confident about the outcome of these matters. She had helped to pave the way to a success she could not share, and she feared that others would see her part in the collaboration as unimportant.[47]

In fact, the director of the Nobel institute in Stockholm, Manne Siegbahn, accepted her only with great reservations. To Meitner's disappointment, he agreed to give her a job but provided her with no assistants and very little research equipment. She lived the life of a refugee. With very little money, staying in a hotel, she had to wait almost a year until her belongings were sent from Berlin. When they arrived, she found that many of her books had been confiscated and that the furniture was badly damaged. Her family had left Vienna and was scattered over the United States and Europe, though a sister, Gustl Frisch, had come to Sweden with her husband. Meitner's past life in Germany began to slip away. By writing letters and sending parcels she kept in contact with her friends and colleagues and tried to counter the increasing estrangement. At least once a month she wrote to Schiemann. The letters were short, for there was not much to tell. Meitner felt lonely and depressed and was constantly tired and prone to colds. "What shall I write? What the day brings me superficially has become so irrelevant, and unimportant, I can't sit down and tell it. It means almost nothing to me anymore." Or: "My very own life has the substance = zero. Unfortunately I hear very little from friends . . . and at the same time one always sits and waits longingly for news."[48]

Elisabeth Schiemann had been deeply shocked when she had come to visit Meitner only a few days after her flight and found the house empty. She then learned from Hahn what had happened: "What I do know now! what I did foresee long since! and what indeed has become inconceivable reality." She walked through the garden and the house, packed away some of the books, and talked to the housemaid. Together with Hahn she oversaw the transportation of Meitner's belongings to Sweden. At least once a month she wrote a long letter to her friend, trying to make her feel connected with goings-on in Berlin. Five years later, in summer 1943, she could happily inform Meitner of her appointment at the Kaiser Wilhelm Institute for Research on Cultivated Plants (Kaiser Wilhelm Institut für Kulturpflanzenforschung), where she would have her own department for the history of cultivated plants. "It is strictly speaking precisely what B[aur] laid into my hands in 1928, in order to take it away from me one year later. Since then I have grown fifteen years older, and the times have not exactly made such work easier to begin."[49] Schiemann was sixty-two, and it had been a bad year so far. Berlin was often the target of bomb attacks, and the offices at the Botanical Garden had been severely damaged and partly burned

[47] For details see Ruth Sime, "13. Juli 1938: Lise Meitner verläßt Deutschland," in *Das Geschlecht der Natur: Feministische Beiträge zur Geschichte und Theorie der Naturwissenschaften,* ed. Barbara Orland and Elvira Scheich (Frankfurt, 1995), pp. 119–135.

[48] Meitner to Elisabeth Schiemann, 29 Nov. 1938, 30 Oct. 1939, Meitner Papers.

[49] Elisabeth Schiemann to Meitner, 24 July 1938, 25 July 1943, Meitner Papers.

down. During the spring she had been in the hospital, later spent time at a spa, and still had not fully regained her health.

Schiemann welcomed the new opportunity. The institute was located in Tuttenhof, not far from Vienna; she would have to move to Austria. "And yet it lies heavy on me, that I cannot come to you with all my *personal* questions for this new future—it probably will be the rest of my life. Do you know, do you feel, what this will mean to me and how this is now circling simultaneously in all my thoughts?" Meitner's response was double edged:

> That you miss talking with me about your personal questions connected with the new post, I gratefully value as an expression of your amicability; however, whether I could have been useful to you? If I refrain from sharing the joy that you are allowed to realize long-planned work and to count on a glad future, it is because affairs have a completely different aspect for me. I see only the grave, . . . a grave that contains everything that has given formation and joy to my former life.

Schiemann felt misunderstood:

> What I wrote about Vienna, *that* should have said something *completely* different than what you heard—and that nearly hurts me! That you believe that matters would have a completely different aspect for you than for me! Exactly *this* I have meant to say: that for me all this has an edge because it has to be without you.—No, really *no,* I did *not* mean to express regret that you cannot give me useful advice. I thought it would be enough for you to understand me when I say that I miss you:—too, I *cannot* say more and if you don't always have this in mind, you will misunderstand anything. I could tell you about my future work and the preparations now and later. Should I wait until we could speak our minds in person? Shouldn't it also be possible, *without* saying everything—which after all just now, as long as the border lies between us, is not possible—to *understand,* because we ought to know each other, that such a thoughtless passing through life, as you believe me capable of, couldn't by any means be possible between us. It is my request—and may it dare be my Christmas wish—that you credit me with a somewhat more loving and sympathetic heart.[50]

Censorship prevented any further communication on this point. Schiemann's letters to Meitner in 1944 tell about the friends that have been bombed out, about moving her research materials from Berlin to the new institute, about the autumn crops in Austria, and about her plan to start living there at the beginning of the next season.

The following spring the war came to an end. Meitner could now articulate her views more clearly, and she touched upon responsibility for the terrors of the National Socialist regime. She expected her German friends, finally, to take a stand. "I have listened to many discussions in Sweden, America, and England. . . . Many of us scientists, including myself, had hoped that German scientists, who had really remained free of Nazi ideology, would express publicly their regret about the horrific events and their wish to repair what was left to repair." She had learned to see Germany from the outside and had come to the opinion "that it was not only stupid, but also a great injustice, that I did not leave immediately . . . because in the last resort I had supported Hitlerism by staying on." Schiemann did not understand her. She recognized only issues of personal morality and could not follow Meitner's political

[50] Elisabeth Schiemann to Meitner, 17 Oct. 1943; Meitner to Elisabeth Schiemann, 25 Oct. 1943; and Elisabeth Schiemann to Meitner, 12 Dec. 1943, Meitner Papers.

views about complicity in a totalitarian system of injustice. She maintained the distinction between political participation and doing science; indeed, she did not see the strategy behind the foundation of an institute for research on cultivated plants by the Nazi administration. The Tuttenhof institute had been part of a general plan to expand the Third Reich far into the east; its purpose was to acquire the knowledge that they assumed would be necessary to improve agriculture there when the "master race" (*Herrenrasse*) would take over, after the extermination of the Jews.[51]

In the spring of 1945 the Allied forces occupied Germany. Travel became almost impossible, and the institutional structure of German science disintegrated. The Tuttenhof institute fell into the Soviet zone of occupation and was dissolved.[52] In July Meitner sent an advertisement to the German Red Cross in Berlin asking for news of Elisabeth Schiemann and her sister Gertrud.

Meitner continued her efforts to maintain the friendships from her past. In December 1946 the Hahns were her guests in Stockholm. Hahn was being honored with the Nobel Prize in chemistry for the discovery of nuclear fission—a clear injustice to Meitner and Straßmann, whose parts in the experiments and in formulating the theoretical interpretation were ignored. Not surprisingly, the reunion was not altogether a happy one. But the subject of conflicts between Meitner and Hahn was not the Nobel Prize but, rather, politics. She could not accept that he deflected any discussion of Germany's crimes, pointing instead to the Allies, especially the Americans, for the production and detonation of the atomic bomb. She reported in a letter to James Franck: "Forgetting the past and instead stressing the injustice that is being done to Germany. Since I am a part of the past to be repressed, Hahn has not mentioned our long cooperation or even my name in those interviews in which he talked about his life's work."[53]

COMING TO TERMS THROUGH SCIENCE

For most of 1947 Elisabeth Schiemann was in England at the invitation of the Commonwealth Bureau of Plant Breeding and Genetics, which collected studies on agriculture from all parts of the world. She was glad for the chance to close the gap in her knowledge of scientific developments outside of Germany. In May Lise Meitner visited London and they had the chance to see each other again, nine years after Meitner's flight from Berlin. Despite their intense exchange of letters over the years, the meeting between the two women was disappointing for both of them. Meitner was the first to comment on this: "I have thought a lot about our meeting in London. Maybe it would have been better if we had been less cautious with each other and had talked more frankly to each other. Persons who are connected through a long

[51] Meitner to Elisabeth Schiemann, 3 Nov. 1946, Meitner Papers; and Meitner to Otto Hahn, in Kerner, *Lise, Atomphysikerin* (cit. n. 1), p. 76. On the founding of the Tuttenhof institute see Hans Stubbe, *Bericht über die im Auftrage des OKW und des Reichsforschungsrates durchgeführte zweite biologische Forschungsreise nach dem Peleponnes und nach Kreta 1942,* Archiv zur Geschichte der Max Planck-Gesellschaft; for the "Generalplan Ost" in general see Mechthild Rössler, *"Wissenschaft und Lebensraum": Geographische Ostforschung im Nationalsozialismus* (Hamburg: Reimer, 1990).

[52] Its director, Hans Stubbe, moved with the remaining staff and materials to Gatersleben, in the former German Democratic Republic.

[53] Meitner to James Franck, 16 Jan. 1946, in Kerner, *Lise, Atomphysikerin* (cit. n. 1), p. 111. Franck was a former colleague in Berlin-Dahlem who had emigrated to the United States in 1933. As Renate Feyl has remarked, Meitner's "work was crowned with the Nobel Prize for Otto Hahn": Feyl, "Lise Meitner" (cit. n. 1), p. 162.

common experience, a tie that was a very valuable part of my life, can probably reach an understanding on problems which occupy them both very intensely, even if their points of view are partly very different." Schiemann was hurt; she had felt that Meitner was avoiding her company and her confidence. They had not met until Meitner's tenth day in London, and even then not privately. They talked about physics, traveling, and other neutral subjects. Schiemann could only interpret this as a personal rejection. "*This* was it, I suppose, what you express in saying we were too cautious with each other. And therefore I wish with my whole heart, that the new year will bring us together again once more, that we can really talk at leisure and perhaps even resume a conversation when we have slept on it overnight—to have a few days together! If that could be possible?"[54]

She would not try to vindicate herself. Instead, her sister Gertrud tried to clarify her standpoint for Meitner:

> I fear, the distrust that you show for the political attitude of your friends does not let you feel how much positive resistance Hahn and Elisabeth have offered during these dark twelve years, when every breath one took was protest. What it means, in a war that daily costs the life of dear friends, to hope for the victory of the enemy, that the evil may not gain domination—this is such a hard sorrow and I believe the most reliable proof, that two such warm patriots as those two are and ever were, were on the right side with their outlook and acted, both of them, during the years—which you have thank God not gone through here—without regard for themselves, whenever there was even a small expectation to be useful to others, or to work against the system. . . . Especially Elisabeth has matured inwardly and risen above herself. Her *entire* thinking was devoted to work on behalf of the persecutees and to emergency campaigns, and that has given her much worldly wisdom and stability, which she had previously often lacked.

Meitner wanted to understand the causal connections that led from Germany's past to the National Socialist regime. She was concerned not only with questions of personal guilt but with structural faults as well. She tried to explain this in a letter to Gertrud Schiemann, concluding: "My friends, Otto, Edith, surely also Elisabeth, think differently about it; for them the past is all over and done with. I was prepared for that and have known it for at least eight years. I have learned much in these years and obtained insight one cannot regret, even if it makes life somewhat more complicated."[55]

One legacy of the National Socialist period was an insurmountable and yet elusive division between victims and perpetrators. The extermination policy of the Nazis had left both sides speechless. One side had had experiences that were unspeakable; the other was silent in its guilt. Meitner's friends, even Schiemann, were unwilling to recognize the difference that resulted from the experience of being threatened by genocide. The absence of such acknowledgment cut short their appreciation for one another. Although the tensions between the two women later diminished, their one-time closeness was never restored; the estrangement could not be overcome simply by time. They kept in touch, informing each other of their whereabouts and goings-on. At Christmas 1946 Schiemann knew that she was appointed as a tenured profes-

[54] Meitner to Elisabeth Schiemann, 11 Aug. 1947; and Elisabeth Schiemann to Meitner, 1 Nov. 1947, Meitner Papers.

[55] Gertrud Schiemann to Meitner, 21 Mar. 1947; and Meitner to Gertrud Schiemann, 21 Jan. 1947, Meitner Papers.

sor, extraordinarius, at the University of Berlin, but reflected: "Doubtless in the future full professorships for women will not come into question." In December 1949 she celebrated the opening of "*my* little institute," the Research Unit for the History of Cultivated Plants (Forschungsstelle für Geschichte der Kulturpflanzen), in Berlin-Dahlem.[56] Retirement, only seven years later, was not easy for her since her institute was dissolved at the same time by the Max Planck Society (as the Kaiser Wilhelm Society was now called). Meitner, on the other hand, had been glad to stop working in Stockholm in 1954. It had never been the same as in Berlin. She became increasingly engaged in political questions concerning science, including the situation of women in science and the military use of nuclear energy. She had turned down offers of posts in Germany. Meitner had learned to accept the divide between herself and Germany—and the losses that came with it.[57] The intensity of her intimate friendship with Schiemann was one more casualty of the politics of National Socialism.

In order to analyze the context of Meitner's and Schiemann's lives and careers, it is helpful to take some recent and more general reflections on the history of science into consideration. The specific culture of modern science is produced through the combined use of instrumental, social, and writing technologies to establish "pure science" and to secure the separation of nature from society and the separation of science from moral responsibility and politics. It is the irony (and the antinomy) of both modernity and science that the very effort to enforce such separations creates multiple and powerful linkages, mixtures, and mediations between elements that are meant to stay isolated. The history of the sciences during the Nazi regime in Germany reveals many aspects of this hybrid quality of science. The attempt to distinguish science from ideology, rationality from its destructive results, basic research from applications, technological from social management, and so forth, is doomed to fail amid the entanglements of cognitive and institutional connections. But this was no isolated case; instead, the development of German science during this period should be seen as part of the process of modernization in science, especially in biology and in physics.

In post–World War II Germany the ideal of "pure science" holds a special ideological meaning: as a part of a semantic structure to negate the differences created by the Nazi extermination policy, a part of the silence that followed the war, and a part of the political foundations of the Federal Republic of Germany. However, this ideal could express other meanings as well—even meanings directly opposed to the mainstream understanding, as the cases of Schiemann and Meitner show. Schiemann had linked her scientific knowledge with an ethics of care and with her activities in the Confessional Church against the Nazis. Meitner had come to a universal humanism, hoping that science could be an agent in connecting people; from this standpoint she asked her friends to condemn the Nazis. Both women's positions were linked to their experience of otherness, of being different. But these were not the same differences, and they brought about correspondingly different shifts in the network of meanings: discrimination because of her sex had led Schiemann to an individual morality that prompted her to risk personal endangerment by speaking her mind and caring for others. The realities of exile required Meitner to think about her own

[56] Elisabeth Schiemann to Meitner, 26 Dec. 1946, 1 Jan. 1950, Meitner Papers.

[57] She remarked, "I feel like a mother who sees clearly—and helplessly—that her favorite child has turned out badly." See Kerner, *Lise, Atomphysikerin* (cit. n. 1), p. 100.

involvement with the social structures that had made her a victim. Both women represent, then, the double aspect of what Max Horkheimer has called the "feeling for morality": compassion and politics.[58] Thus the concept of "pure science" divided and united them at the same time, both linking them to and separating them from their surroundings. Schiemann and Meitner were limited in their reflections on their identity as scientists, their lifelong efforts to succeed as women in science, and their remaining fragile bond.

Lise Meitner and Elisabeth Schiemann shared the central ideals of their academic colleagues and yet gave them a new direction by posing their identification as scientists against their experiences facing discrimination as women and the threats of the Nazi regime. However, further connections between science, politics, and morality remained hidden to them. A subsequent generation of women, in a world deeply changed by World War II, came closer to recognizing these correlations, particularly in understanding their patriarchal dimensions. It is important to think in new ways about how science acquires its social meaning: the ambiguity of its rhetoric and appeals to facts can be employed for the purposes of domination and destruction as much as for emancipation and freedom. Science thus requires of its practitioners and students the "feeling for morality," that is, political ethics—both theoretical insight and individual responsibility—in a world that science itself has rendered too complex to be comprehended in a single framework.

[58] On Max Horkheimer's concept of moral and political responsibility see Mechthild Rumpf, *Spuren des Mütterlichen: Die widersprüchliche Bedeutung der Mutterrolle für die männliche Identitätsbildung in kritischer Theorie und feministischer Wissenschaft* (Frankfurt am Main: Materialis, 1989).