Los Alamos in a Way was a City of Foreigners: German-Speaking Émigré Scientists and the Making of the Atom Bomb at Los Alamos, New Mexico, 1943-1946

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Many people believe that the creation of atomic bombs at the Los Alamos Laboratory came solely from American-born scientists such as Robert Serber, Norris Bradbury, and, in particular, J. Robert Oppenheimer, the scientific director of Los Alamos. But, as nuclear scientist Victor F. Weisskopf astutely noted, “Los Alamos in a way was a city of foreigners.” Perhaps the most important single group of foreigners were German-speaking émigré nuclear scientists Hans A. Bethe, Felix Bloch, Egon Bretscher, Martin Deutsch, Otto R. Frisch, Klaus E. J. Fuchs, Maria Göppert-Mayer, Rolf Landshoff, John R. von Neumann, Rudolf E. Peierls, George Placzek, Hans H. Staub, Edward Teller, and Weisskopf. Despite their relatively small numbers in the overall effort, German-speaking émigré scientists played a pivotal role in one of the most significant events in human history: the making of the atomic bomb during the Second World War. The chief sites of the Manhattan Project, the joint wartime American-British-Canadian nuclear weapons program, were Oak Ridge, Tennessee; Hanford, Washington; and Los Alamos, New Mexico. These scientists were especially important to the theoretical science and weapons engineering conducted at Los Alamos Laboratory.

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While the history of Los Alamos is well documented, the exceptional contributions and experiences of the German-speaking émigré scientists as a cohort have so far remained untold. Their Germanness, particularly their language and exposure to German culture, distinguished them from their American-, British-, and Canadian-born colleagues and also had far-reaching consequences for their motivations, their scientific input, and their lives outside the laboratory in Los Alamos. The New Mexico portion of the émigrés’ wartime saga offers a unique perspective on the history of the Los Alamos Laboratory.

The fourteen émigrés came to the Hill, as the residents of Los Alamos called their town, from diverse areas of the German-speaking world. Bethe, Fuchs, Göppert-Mayer, Landshoff, and Peierls originated from Germany proper, while Bloch, Bretscher, and Staub arrived from Switzerland. In addition still other scientists hailed from the old Austro-Hungarian Empire. Frisch, Deutsch, and Weisskopf were Austrian; Teller and von Neumann were Hungarian; and Placzek was Czech. The majority of these scientists, especially those who were Jewish, formed part of the Nazi-induced migration of intellectuals that caused an unprecedented brain drain of Continental Europe. For the most part, these nuclear scientists arrived at the secret laboratory by two routes. Some scientists such as Bretscher, Frisch, Fuchs, Peierls, and Placzek traveled to Los Alamos as part of wartime British-American-Canadian cooperation. They were members of the British Mission to the Manhattan Project. Scientists such Bethe, Bloch, Deutsch, Göppert-Mayer, Landshoff, von Neumann, Staub, Weisskopf, and Teller found employment in American universities after their departure from Europe and thus arrived at Los Alamos as naturalized American citizens.

Most of these scientists pursued considerable parts of their higher education in German universities during the country’s golden age in international science during the 1920s and 1930s. German universities played a key role in the development of nuclear science. In particular the university preparation in quantum physics, with a strong theoretical orientation, laid the foundation for the émigrés’ success at Los Alamos. Beyond the German-speaking émigré scientists, other famous staff of the Los Alamos lab received degrees from German universities. The Ukrainian-born explosives expert George Kistiakowsky earned a PhD in chemistry from Berlin University in 1925, while Oppenheimer received a PhD in physics from Göttingen University in 1927. Several Los Alamos theoreticians studied at one time or another with German scientist Max Born, a pioneer in the field of quantum mechanics. In addition to Oppenheimer, the list of students who studied with Born included Fuchs, Göppert-Mayer, Teller, Weisskopf, and even the Italian Nobel Laureate
Enrico Fermi. Oppenheimer had further ties to Germany because of both his and his wife Kitty’s German ancestry.  

The shared experiences of the émigré scientists in both German universities and the country’s centers of nuclear science like Göttingen, Berlin, and Munich facilitated strong social bonds within the German-speaking émigré community at Los Alamos. As they joined the project, many of them came across old friends and former colleagues on the Hill. Peierls felt “a strange sensation to meet so many old friends from various phases of our lives in such an outlandish place.” In Teller’s words, the Hill represented “an enormous international reunion of the atomic physics community.”

Culturally, German-speaking émigrés also differed from their American-born hosts and often showed a deeper appreciation of “high culture,” especially classical music. Frisch and Teller were gifted pianists, and Frisch even performed weekly concerts for the local radio station KRS. Many of their American-born colleagues, by contrast, joined the square-dance club, an expression of their native vernacular culture. The same distinction held true in outdoor activities. German-speaking émigrés enjoyed extensive hikes and mountain climbing in the Sangre de Cristo and Jemez Mountains—

ILL. 1. HANS A. BETHE, ENRICO FERMI, NICK KING, AND PAUL TELLER, 1946
(Photograph courtesy Los Alamos National Laboratory)
activities enjoyed in the Alps of Germany, Austria, Switzerland, and Italy. Their American-born counterparts, meanwhile, preferred horseback riding and exploring Native American ruins in the area.\(^{11}\)

**Motivations to Work on the Atom Bomb**

The personal encounters of the German-speaking émigrés with the oppression, violence, and terror of National Socialism in Germany especially motivated their work on the atomic bomb. Fuchs, for example, had barely escaped the lethal clutches of Adolf Hitler’s regime. A known Communist in the northern German city of Kiel, where he studied in the early 1930s, Fuchs was forced underground in the immediate aftermath of the Nazi takeover in January 1933. He boarded the train to Berlin early in the morning after the burning of the Reichstag. The Gestapo came to his apartment but missed Fuchs by a few hours.\(^{12}\) “I remember clearly when I opened the newspaper in the train,” Fuchs later remarked on his journey to Berlin, “I immediately realized the significance and I knew that the underground struggle had started. I took the badge of the hammer and sickle from my lapel which I had carried until that time.”\(^{13}\) Fuchs had managed to escape, but the Gestapo arrested some family members, and the fear drove his sister Elisabeth to commit suicide.\(^{14}\)

German-speaking émigré atomic scientists also lived through intense periods of uncertainty about the fate of family members or loved ones who had stayed behind in Germany or Nazi-occupied parts of Europe. Frisch’s parents remained in his native Vienna, and after the Anschluss, when Nazi Germany annexed Austria, his father was deported to a concentration camp. Decades after the war, Frisch still remembered the months that followed his father’s arrest as “a confused nightmare in my memory.” Luckily, he was released
from captivity, and his parents emigrated to Sweden. Hitler’s rise to power also affected Peierls’s family. While his brother, father, and stepmother managed to leave Germany, he lost relatives who could not immigrate. To make matters worse, Rudolf and Genia Peierls were separated from their children, when they were evacuated from England to Canada as a safety precaution in the summer of 1940. The impact of the European war on German-speaking émigré scientists was visible to their American-born hosts. Jane Wilson, the wife of scientist Robert Wilson, stated, “The war would come very close to an American even if he were on top of a mesa in New Mexico, when his [émigré] host, listening to a radio broadcast on fighting in Hungary, said simply, ‘My family is there.”’

Apart from these personal experiences with the National Socialist regime, many of the German-speaking émigrés at Los Alamos personally knew atomic scientists who were still practicing science inside the Third Reich and who, they believed, were working on an atomic bomb. Bloch, Fuchs, Peierls, Placzek, Teller, and Weisskopf all had been either students or colleagues of Werner Heisenberg at Leipzig University in the late 1920s and early 1930s. Heisenberg was now playing a key role in the German nuclear weapons project. Peierls even listed Heisenberg as a reference shortly after his arrival in the United Kingdom in 1934.

The German-speaking émigré scientists, with their knowledge of the brilliant scientists available to Hitler and their direct experiences with his regime, worked with a greater sense of urgency to complete the atomic bomb than did their British-, American-, and Canadian-born colleagues. Their exposure in 1940 to the Luftwaffe’s heavy bombardment of Britain prior to Germany’s planned but aborted invasion of the British Isles made the German military threat more real and imminent for those German-speaking scientists who would later join the Manhattan Project. After the war, Frisch explained that he had suffered from a “depression” at the time: “I had a pretty strong presentiment that I had only got a few more months to live—so strong that for once I really believed it.”

It was this urgency that led Frisch and Peierls to compose their seminal “Frisch-Peierls Memorandum” in February 1940. In the document, the two physicists suggested that building a nuclear weapon was technically feasible, initiating a serious British nuclear weapons program with far-reaching consequences for the Manhattan Project. Peierls also collaborated with Fuchs to draft reports on atomic-related German-language publications, the activities of nuclear physicists inside the Third Reich, appointments of scientists at German universities, and science-related issues in Germany. Peierls carried on with this scientific-intelligence work during the war and
ILL. 3. LOS ALAMOS, NEW MEXICO, TRADING POST, OCTOBER 1945
(Photography courtesy Churchill Archives Centre, Bretscher Papers, BRER A.62.a/0418)

ILL. 4. BIG HOUSE, OCTOBER 1945
(Photography courtesy Churchill Archives Centre, Bretscher Papers, BRER A.62.a/0417)
provided James Chadwick, a chief scientist and administrator in both the British atomic weapons program and later the Manhattan Project, with a list of physicists working inside Germany who might conduct nuclear weapons research. This list included the names of Werner Heisenberg, Karl Wirtz, Manfred von Ardenne, and Paul Harteck.24

Born, an émigré who had found refuge in Edinburgh, Scotland, summed up the shared predicament of the dislocated scientists. He stated that scientists such as Fuchs were “not only prepared, but extremely keen” to be involved in the war effort, “as their fate entirely depends on the victory of this country.” That characterization also applied to German-speaking émigré atomic scientists across the Atlantic.25 In the United States, Americans were also alarmed that German nuclear scientists might construct a nuclear weapon giving Hitler unimaginable destructive power. As a consequence, in August 1939, three Hungarian-born scientists, Leo Szilard, Teller, and Eugene Wigner, convinced physicist Albert Einstein, the father of the General Theory of Relativity and a German émigré to the United States in 1933, to sign a letter addressed to Pres. Franklin D. Roosevelt. The so-called Einstein letter warned the president about the possibility of a German atomic bomb in the near future.26

In addition to the three scientists directly behind the famous Einstein Letter, Bethe, Placzek, and Weisskopf also showed great concern about the prospect of an atomic bomb in Hitler’s hands. Decades after the war, Weisskopf said, “I have often wondered what our attitudes would have been had we known that there was no seriously competitive Nazi effort toward a bomb.”27 The émigré scientists’ personal experiences with National Socialism translated into a determination to finish a bomb before the Germans; this drive sometimes reached a state of obsession. Jay Wechsler, who worked as Frisch’s assistant in early 1944, recalled an episode during a Saturday night that clearly revealed his boss’s dedication and work ethic. Frisch’s group had come up with the idea to use film rolled around a motor in a dark room as a high-speed camera to photograph an implosion. The ideal time to perform the test was, of course, at night. Although it was Saturday night and Wechsler was playing in a band and had a few beers, Frisch, well known for his fondness of Los Alamos night life, came to the dance and urged Wechsler to join him in the laboratory. After Wechsler’s initial protest, he finally gave in and met Frisch at the lab, where the two stayed until the experiment’s completion the next morning.28

The strong determination of the German-speaking émigré nuclear scientists was not limitless. While V-E day did not significantly impact the scientists’ motivation to complete their mission, the moral and ethical implications of
their work confronted them for the first time after the Trinity test of 16 July 1945 in the New Mexican desert. Bethe summarized the ambiguous feelings many of his colleagues expressed after they witnessed the atomic explosion: “It was awesome. We had calculated it all, and we knew pretty well what would happen, and still it was a tremendous impression when it really did happen.” Peierls recollected “the feeling of awe at the terrible power of this weapon mixed with elation at the success of the work.” By December 1945, after the successful Trinity test and the subsequent atomic bombings of Hiroshima and Nagasaki, Peierls noticed an “amazing deterioration of morale” at Los Alamos.

Scientific Contributions

The émigré scientists’ personal experiences with National Socialism motivated them to take leading roles in the creation of nuclear weaponry. They leveraged their education in Germany, with its strong theoretical orientation, to gain a disproportionately high number of senior administrative posts in
the top level of scientific management at Los Alamos. Their elite positions within the laboratory indicate that the émigré scientists were an invaluable asset to the atomic bomb project.

Bethe, perhaps the most important German-speaking scientist at Los Alamos, headed one of the laboratory’s initial five departments, the Theoretical Division, or simply T-Division. On 1 March 1945, Oppenheimer even appointed Bethe as a member of the “Cowpuncher Committee,” which oversaw the final stages of the implosion project. Besides his senior administrative roles, Bethe made further pivotal contributions to the project. Shortly before the Trinity test, his calculations refuted his colleagues’ fears that an atomic explosion might set the entire earth’s atmosphere on fire.\(^{32}\)

In the laboratory’s administrative hierarchy, group leaders stood one step below division leaders. All German-speaking members in the British Mission, except Fuchs, held positions as group leaders after the laboratory’s reorganization in August 1944 (Bretscher, F-3: “Super Experimentation”; Frisch, G-1: “Critical Assemblies”; Peierls, T-1: “Implosion Dynamics”; Placzek, T-8: “Composite Weapon”). Their positions underlined the high caliber of the British Mission in general and its German-speaking émigré atomic scientists in particular. Among the British team members, Placzek’s case was special. Although he was a member of the British Mission, he had worked at Cornell University before he joined the Manhattan Project in Montreal, Canada, where he led the Theoretical Physics Division. In May 1945, he transferred to Los Alamos. Placzek, who was a distinguished expert on neutron diffusion theory, directed a newly formed group within the Theoretical Division that worked on the science required to create a combined plutonium-uranium weapon. Shortly after the war, Placzek replaced Bethe as the head of a reformed T-Division.\(^{33}\)

ILL. 6. EGON BRETSCHER (LEFT) AND MR. PEÑA (RIGHT), JANUARY 1946
(Photography courtesy Churchill Archives Centre, Bretscher Papers, BRER A.6z.a/0710)
Some German-speaking group leaders, including Staub, Weisskopf, and Teller, did not come to Los Alamos as members of the British team. Staub initially worked in the Experimental Physics Division, where he led a team that focused on the improvement of counters. In September 1943, Staub’s group was combined with Bruno Rossi’s group. This new laboratory group, headed by Rossi, was known as the Detector Group. This team later developed instrumentation that recorded and monitored the implosion diagnostics for Robert Serber’s RaLa (radiolanthanum) method. Both Weisskopf and Teller worked in the Theoretical Division. Weisskopf, who was also known as the “Los Alamos Oracle” because of his successful reliance on his intuition, headed the T-3 group (“Experiments, Efficiency Calculations, and Radiation Hydrodynamics”). Bethe acknowledged Weisskopf’s talent and appointed him deputy chief of the Theoretical Division. In March 1945, Weisskopf also began work as a consultant for the Trinity test.

Among the group leaders, Teller represented an exceptional case. During his early days at Los Alamos, he served as leader of the T-1 group that investigated “Hydrodynamics of Implosion and Super [bomb].” Teller was perhaps the most controversial scientist at Los Alamos. He was disappointed when Oppenheimer chose Bethe over him to head the T-Division. The fact that the Hungarian-born scientist had also become increasingly obsessed with the idea of a hydrogen bomb, the so-called Super, and had ceased to follow orders from Bethe and Oppenheimer further alienated him from the laboratory’s scientific director. As a consequence of the strained relationship, Oppenheimer revoked Teller’s status as head of the T-1 group and assigned him to lead a team in the so-called Fermi Division in September 1944. Although Teller had to report directly to Oppenheimer, this appointment enabled Teller to pursue his ideas on the Super and thus to start thermonuclear weapons research at Los Alamos.

Peierls, who assumed the leadership of Teller’s former group in the Theoretical Division, gained authority among the group leaders when he was appointed director of the British Mission after Chadwick received orders to go to Washington, D. C. Besides Peierls and, in particular, Bethe, experimental physicist Frisch was perhaps the most significant German-speaking émigré on the Hill. With his so-called Dragon Tail experiment, Frisch proved that the uranium bomb, code-named “Little Boy,” would work and thus obviated the need for a test detonation. Given the limited amount of fissile material available at the time, Frisch’s experiment was priceless to the Manhattan Project.

In August 1945, the émigré scientists contributed significantly to the compilation of a technical history of the laboratory in the style of the German
Handbuch der Physik (Physics Handbook). This high level of involvement in the Los Alamos publication is yet another indicator of the émigrés’ scientific expertise and stature. In all they edited five of the twenty-four volumes of the Los Alamos Technical Series: Bethe (Blast Wave), Frisch (Critical Assemblies), Peierls (Theory of Implosion), Placzek (Neutron Diffusion Theory), and Weisskopf (Efficiency).38

While these five nuclear scientists had firmly established themselves in their fields by the time they joined the Manhattan Project, others like Fuchs and Deutsch had not yet achieved high professional standing. In 1984 Fuchs suggested in one of his very few interviews that many of his colleagues had praised him, along with Richard Feynman, as the most gifted junior scientist at Los Alamos.39 Fuchs’s report on the scaling for blast waves, for example, has been widely influential since he drafted it during his stay on the Hill.40

In 1945 Norris E. Bradbury replaced Oppenheimer as scientific director of the Los Alamos Laboratory. Bradbury held Fuchs’s skills in such high esteem that he requested the budding physicist stay at Los Alamos until after the first U.S.-postwar atomic tests in 1946. In the summer of 1946, the British, who had also realized his talent, demanded his immediate return to the United Kingdom to resume work on their nuclear-energy program.41

Apart from their individual contributions, German-speaking émigré nuclear scientists, as a cohort, helped shape a new approach to nuclear physics that combined the traditional “German” preference for theory with the British and American leaning toward experimentation. The German-speaking scientists were also exposed to the Italian Fermi School at Los Alamos. Both the school’s founder and Emilio G. Segré, who studied under Fermi at the University of Rome, worked at Los Alamos. This synthesis of British, American, German, and Italian approaches toward science, led to the formation of a new style of nuclear research built on the close cooperation of theoreticians and experimentalists. Bethe’s T-Division, which housed a
large number of German-speaking émigrés, was pivotal in forging this new methodology because, as Bethe said, it “had to do with practically everything in the laboratory.”

Historian Paul K. Hoch appropriately calls the German-speaking émigré atomic scientists “bridge-builders” because they fused a connection between German, British, and American research cultures.

This new interdisciplinary approach bore fruit perhaps most visibly in the plutonium-implosion bomb project. In this enterprise, success depended on three prerequisites. First, the scientists committed themselves to working under tremendous pressure and a tight schedule to achieve their goal of beating the Third Reich in the race for the atom bomb. Second, their project required and received abundant financial support from government sources. And third, theoreticians needed to collaborate closely with experimentalists, who possessed the ability to transform plans into material realities, since the design of atomic weapons called for the application of highly specialized engineering skills.

In the early days of the Manhattan Project, the plutonium-implosion program was regarded as only secondary to the development of the gun-assembly method that would be used to trigger a nuclear reaction within the uranium bomb, which was, by contrast, easier to detonate. Despite the Manhattan Project’s early inclination to engineer a uranium bomb, Bethe, Peierls, Teller, and, in particular, von Neumann still devoted considerable attention to the plutonium-implosion program. Not until the summer of 1944, however, did the laboratory pursue the implosion principle on a grand scale. After a group working under Segrè, which included Deutsch, discovered that pile- or reactor-produced plutonium emitted five times more neutrons than anticipated, Los Alamos’ primary mission changed fundamentally and even prompted the lab’s reorganization. This spontaneous fission meant that a gun-type plutonium weapon would predetonate, or “fizzle,” before it reached critical mass rather than igniting a nuclear explosion. Implosion seemed to offer a promising solution to the crisis. The realization that the gun-assembly method would not work for the plutonium bomb altered the overall mission of the implosion program at Los Alamos. The laboratory’s implosion research had previously explored the possibilities of detonating both a uranium and plutonium bomb with an implosion system. Now the implosion program focused exclusively on a plutonium-implosion bomb. In response the program working on a gun weapon now concentrated solely on uranium.

Given that the basic principles of gun assembly were understood at the time, the laboratory’s primary aim thus changed to exploring the hitherto uncertain and only theoretical implosion principle. Fortunately, the Los
Alamos Laboratory had followed a method of simultaneously pursuing a variety of approaches and experiments to speed progress toward an atomic weapon. This practice enabled scientists to achieve a fluid mission change at Los Alamos. While the making of the atom bomb was chiefly an engineering task, well-trained engineers would have been unable to produce a fission, let alone an implosion bomb, without the scientific input of theoreticians such as Bethe, Fuchs, von Neumann, Peierls, Teller, and Weisskopf. Although von Neumann did not permanently reside at Los Alamos, he helped advance work on the implosion principle in major ways, and Bethe consequently placed him in the triumvirate alongside Fermi and physicist Neils H. D. Bohr as “the greatest intellects at Los Alamos.” The product of this new methodology, in which scientists worked closely with engineers, was the so-called “Fat Man” device that was successfully tested near the town of Socorro, New Mexico, on 16 July 1945. Von Neumann first proposed the idea of testing the implosion bomb to Teller in late 1943. Notwithstanding the risk of squandering a good deal of the extremely valuable plutonium, von Neumann’s suggestion found many advocates when it was openly debated in January 1944. The German-speaking émigrés’ wartime mission, along with that of the other Los Alamos scientists, ended with the Trinity test.

ILL. 8. PALACE OF THE GOVERNORS, SANTA FE, NEW MEXICO
Hanni Bretscher (left) in front of the Palace of the Governors, Santa Fe, New Mexico, July 1945. (Photography courtesy Churchill Archives Centre, Bretscher Papers, BRER A.62.a/0105)
Secrecy, National Security, and Suspicion

The émigrés’ Germanness had a reciprocal effect on their lives and work. While their German-speaking backgrounds proved a crucial prerequisite for their scientific achievements, it also caused the laboratory’s security regime to monitor closely the émigré scientists and their families. Largely as the result of acute fears of German espionage, a culture of secrecy and security dominated their professional and private lives to the point that they literally lived a “goldfish existence,” as journalist Marie Kinzel described in 1946. In an ironic twist, many German-speaking émigré scientists who had escaped Fascism and Nazism in Europe found themselves confined to a military post where their American hosts regularly suspected them of spying for Germany.

The secrecy surrounding the Manhattan Project affected future residents of Los Alamos long before they arrived on the Hill. The Manhattan Project’s security restrictions forbade recruits from telling anybody where they were going. Most of them literally vanished from the corridors of their university departments. Los Alamos scientists only revealed where they worked after the bombing of Hiroshima. In a letter to the Secretary of the Society for the Protection of Science and Learning, a British aid organization for displaced scientists and scholars, Frisch explained the reasons behind his disappearance: “In November 1943, I became a British Subject and was immediately sent to the United States, where I have been working . . . at the big research establishment at Los Alamos, New Mexico . . . as described in Dr. Smyth’s Report on ‘Atomic power for military purposes.’”

The journey to the Hill proved especially difficult for members of the British Mission, who had to cross the Atlantic, infested by German submarines, on the first leg of their tour. Once within the continental United States, they usually traveled by train to Lamy, New Mexico, just like their American peers did. The émigré scientists then proceeded to the Manhattan Project’s undercover front office at 109 East Palace Avenue in Santa Fe. Oftentimes a member of the Women’s Auxiliary Corps (WAC) would then drive the scientists to Los Alamos in the Jemez Mountains. Manhattan Project administrators had chosen Los Alamos, formerly a boys school, because of its isolated location on mesas overlooking the Rio Grande Valley. Once they reached the secret laboratory, the scientists and their families confronted even tighter security measures. While the German-speaking émigré scientists commonly received a warm welcome by their American and German colleagues, they were placed under special scrutiny by the laboratory’s security organs.

As at the other Manhattan Project facilities, the ubiquitous culture of security that dominated the entire operation was naturally apparent at the
Los Alamos Laboratory. The Manhattan Project’s security culture especially utilized the military policy of compartmentalization. This principle, which aimed to prevent espionage by separating both the Manhattan Project as a whole and individual installations like the Los Alamos Laboratory into small compartments, generated a good deal of conflict between the scientists and the military leadership. Owing to tensions with Oppenheimer and his frustration with the organization of the laboratory, Bloch, like American scientist Edward U. Condon, decided to leave Los Alamos before the wartime mission was completed.55

The compartmentalization policy often prevented laboratory staff from knowing with whom they were working and sometimes drove them to perform “detective work” in order to obtain information about their colleagues. In one case, Jay Wechsler, who worked under Frisch, conducted research in the technical library at Los Alamos to find out about his boss and learn what kind of weapon they might be developing.56 Not all Los Alamos scientists, however, strictly adhered to compartmentalization protocol. Unlike American-born scientists, married German-speaking émigrés such as Bethe, Peierls, Teller, and Weisskopf commonly told their wives about the purpose of their stay on the Hill and even discussed crucial issues with their spouses.57

While the strict compartmentalization applied to all laboratory staff regardless of their rank and ethnic background, some security measures particularly angered German-speaking scientists. The many mechanisms of laboratory security, including barbed wire, fences, patrol dogs, and watch towers, elicited mixed emotions among émigrés, particularly in those scientists like Fuchs who had experienced Fascist or National Socialist persecution or internment in Britain. Wartime residents of the Hill thus sometimes sarcastically referred to Los Alamos as the “Concentration Camp Project.”58 Staub posed the legitimate question to fellow Los Alamosans: “Are those big tough MPs, with their guns, here to keep us in or to keep the rest of the world out?”59 Teller, who had encountered anti-Semitism in both Hungary and Germany, remarked on the Hill’s security measures: “The first thing that I noticed on arriving was that we were all going to be locked up together for better or for worse. . . . Los Alamos, I soon realized, gave one a new appreciation of grass and strangers.”60 After the war, a French paper echoed those sentiments when it cynically compared wartime Los Alamos to a concentration camp of Nobel laureates.61

In their prison-like environment, German-speaking scientists suffered what scholar Thomas Elsaesser appropriately refers to as a “two-fold estrangement.” First, they underwent traumatic separation from their homelands. Second, some military and civilian authorities suspected them of spying for
the Third Reich. In most cases, their heavy German accents were the chief marker of their otherness. Staub’s accent proved problematic, for example, during a return journey from California to Los Alamos. After receiving the standard security briefing, the Swiss-born physicist boarded an Albuquerque-bound plane but then vanished off the radar of the security services. Upon reaching Albuquerque, he simply asked for the way to the restroom, but his thick accent caused passengers to suspect that Staub was a Nazi agent. The passengers called the local police who arrested Staub for further interrogation. Staub followed the directives of his security handlers and refused to answer any questions or give the police his identity. Meanwhile, his now unsanctioned absence at Los Alamos sparked a manhunt. The investigation led security agents to an unidentified inmate, who fit Staub’s description, at an Albuquerque jail, and he was set free and brought back to Los Alamos.

Göppert-Mayer also encountered problems with the Manhattan Project’s security organs. Despite being a naturalized American, the army denied Göppert-Mayer full security clearance. Teller had to accompany her to Washington, D.C., to retrieve data on temperature ranges for the calculations that she was assigned to perform for the Los Alamos Laboratory. When she received the requested figures, Göppert-Mayer was shocked by the extremely high temperatures that were expected in the top-secret experiment. The experiment studied the opacity of uranium in order to avoid an accidental formation of a critical

ILL. 9. KLAUS E. J. FUCHS’S SECURITY BADGE PHOTO
(Photograph courtesy Los Alamos National Laboratory)

ILL. 10. EDWARD TELLER’S SECURITY BADGE PHOTO
(Photograph courtesy Los Alamos National Laboratory)
mass that would have resulted in an unintended nuclear explosion. No one had informed her about the wider implications of her work.  

Paradoxically, in a scientific community set up to help safeguard the survival of the free world, the U.S. Army censored almost every aspect of the scientists’ private and public communications. During the Second World War at Los Alamos, all telephone calls and all mail were subject, respectively, to monitoring and censorship. The army assigned false names to the elite atomic scientists in order to obscure their identities: Oppenheimer became James Oberhelm, Teller became Ed Tilden, and Bethe became Howard Battle. The only languages permitted for postal correspondence apart from English were French, German, and Italian. The military leadership mandated that foreign scientists conduct their phone calls in English. This policy impeded the ability of several German-speaking scientists to communicate with their colleagues, friends, and families. The army also required that émigrés use only English in public places like Santa Fe. The security measures sometimes had a ludicrous effect on everyday life in Los Alamos. In 1947 journalist Alden Stevens
pointed out, “[I]n one of the most convivial towns in the country there was no conviviality.”

Gen. Leslie R. Groves, the Manhattan Project’s commanding officer, and his security agency did not show the slightest trace of humor when faced with security breaches. When a guard at a POW camp in Santa Fe tried to impress prisoners with a story about a super-weapon of unprecedented destructive force being built on the mysterious fenced-in mesa nearby, he was interrogated by the Federal Bureau of Investigation and immediately dispatched to the Pacific theater of operations. Only after Hiroshima did the members of his guard unit learn about the reason behind his quick transfer: his speculation had come too close to reality.

Despite the tight security measures at Los Alamos, Fuchs managed to pass on sensitive nuclear data to the Soviet Union and thus ended the United States’ atomic monopoly. Groves later called the Fuchs case, which evolved into one of the biggest spy scandals of all times, the “most disastrous break in security” within the entire Manhattan Project. The German-born scientist managed to evade army intelligence because of a policy that dictated foreign scientists would be monitored within the perimeter fence of the Los Alamos Laboratory but left unwatched off-site. U.S. security services relied on their British colleagues to vet Fuchs, who maintained a low profile during the war to cloak his dealings with the Russians in a veil of secrecy. In 1949 a report by the British security service MI5 explained Fuchs’s successful strategy: “His existence [had] in effect [been] that of a mathematical machine.”

Fuchs’s espionage confession in 1950 confirmed, in retrospect, the suspicions many Americans held during the war about the likelihood of
German-speaking émigré atomic scientists passing allied secrets to the Nazis. This postwar sentiment, however, contradicted the historical record because Fuchs had never spied for the Third Reich and the Soviet Union had been an ally during the war. The anti-Communist passions sweeping the country after the war elevated Fuchs into a household name and cast a long shadow over the legacy of many German-speaking émigré atomic scientists who spent time at Los Alamos both during and after the war. The Fuchs tale resonated throughout American popular culture and inspired Hollywood films like Jerry Hopper’s *The Atomic City* (1952) and Russell Rouse’s *The Thief* (1952), as well as spy novels like Martin Cruz Smith’s *Stallion Gate* (1986), Joseph Kanon’s *Los Alamos* (1997), and Quinn Fawcett’s *Death to Spies* (2002). In the early 1990s, a Santa Fe-based company even planned guided tours through northern New Mexico locales related to the Fuchs case.

Conclusion

While interest in the Fuchs espionage affair has remained highly popular in late twentieth-century popular culture, the public’s awareness of the German-speaking émigré atomic scientists’ saga faded with their departure from the Hill shortly after the war. Many émigré scientists, however, would always remember Los Alamos. Their stay in New Mexico marked an important stepping-stone in their careers. After the war, Bethe, Bloch, and Göppert-Mayer won Nobel Prizes. Von Neumann gained fame as one of the leading figures in the emerging postwar field of computer science. Although often critical, Teller received publicity from his leading role in the creation of thermonuclear weapons, for his testimony in the Oppenheimer security hearings, and for his contributions to Pres. Ronald Reagan’s Strategic Defense Initiative (SDI), sometimes referred to as “Star Wars.” Other German-speaking émigré nuclear scientists returned to university positions. Weisskopf joined the faculty at the Massachusetts Institute of Technology (MIT) and also served on the board of the European Organization for Nuclear Research (CERN) in Geneva, Switzerland. Placzek became a member of the Institute for Advanced Study located in Princeton, New Jersey, before he died prematurely in 1955. Deutsch joined the Physics Department at MIT and discovered the “exotic atom” system positronium, which is an atom that exists for only a fraction of a nanosecond. In a rare case of re-emigration, Staub returned to his native Switzerland, where he became director of the Institute of Physics at the University of Zurich. Peierls and Frisch returned to Britain and pursued academic careers that eventually led to professorships at the prestigious universities of Oxford and Cambridge, respectively. After Fuchs returned...
to the United Kingdom, he headed the Theoretical Physics division at the British Atomic Energy Research Establishment (AERE) located in Harwell near Oxford. Bretscher also worked for the AERE, where he first directed the Chemistry Division and later the Nuclear Physics Division. In early 1950, Fuchs confessed to spying for the Soviet Union and served nine years in a British prison. After his release in 1959, he immigrated to the German Democratic Republic to become deputy director of the Institute of Nuclear Research in Rossendorf near Dresden.

Many of the émigré scientists launched impressive postwar careers, and their pathbreaking wartime work at Los Alamos, which only became visible after the war, shifted the very field of nuclear science toward Big Science. This type of research includes ample funding by one or more national governments and the private sector, the interdisciplinary collaboration of hundreds of international scientists, large-scale machinery, and enormous laboratories. The émigré scientists accelerated the formation of Big Science and therefore contributed to the creation of what Pres. Dwight D. Eisenhower labeled “the military-industrial complex” in 1961.

The émigrés’ wartime work also led to the advent of thermonuclear arms after the war. The development of these super weapons plunged the nuclear age into even more potentially destructive depths and eclipsed all

ILL. 15. DANCES AT THE SAN ILDEFONSO CHURCH, JANUARY 1946
Peter Bretscher (left) and Mark Bretscher (right) are in the foreground. (Photography courtesy Churchill Archives Centre, Bretscher Papers, BRER A.62.a/0706)
other projects on the U.S. atomic agenda, such as harnessing nuclear power for civilian or commercial uses. Bethe, Bretscher, Fuchs, Göppert-Mayer, Landshoff, von Neumann, Staub, and especially Teller, who became known as the father of the hydrogen bomb (H-bomb), all made pivotal contributions to the research and design of thermonuclear weapons. During their time at Los Alamos, Fuchs and Bretscher gained insight into fundamental aspects of H-bomb design and accumulated valuable knowledge for their subsequent work on the British thermonuclear project at the AERE. On the regional level, the work of the émigré scientists helped transform New Mexico into a major hub of worldwide science. The number of scientists living in New Mexico dramatically increased after the war. With the enlargement of the Los Alamos Laboratory and the establishment of new research institutions, in particular the Sandia National Laboratories in Albuquerque, scientists now found an unprecedented number of job opportunities outside the university.

As much as their presence on the Hill influenced the progress and outcome of the Manhattan Project, the scientists’ temporary hometown and its surroundings also left a strong impression on them about American cultural life and the majestic New Mexican landscape. Scientist Robert Brode’s wife Bernice, a resident of Los Alamos, underlined the Hill’s uniqueness. She suggested that the peculiar locale perhaps shaped numerous émigrés’ first impressions of the United States in a way that led them to false conclusions about American life. Despite all the hardships and the emotional estrangement of living far from their homelands and loved ones, the Land of Enchantment also fascinated some of the scientists. Bretscher gushed, “The natural beauty of N.M. appeals to me so much that I am quite in love with the place.” Although most of the German-speaking émigré nuclear scientists had left the Hill by the summer of 1946, they nonetheless left behind an impressive legacy.

Notes


Françoise Ulam, interview by Theresa Strottman, 1992, transcript, p. 5, LAHM.


22. The “Frisch-Peierls Memorandum” consists of two sections entitled “Memorandum on the Properties of a Radioactive Super-bomb” and “On the Construction of a ‘Super-bomb’; Based on a Nuclear Chain Reaction in Uranium.” The first part of the memorandum details the effects of a nuclear weapon and raises the moral implications of such a weapon of mass destruction, while the second part is primarily concerned with technical details. “Frisch-Peierls Memorandum,” AB 3/210, M.A.U.D. Committee Professor J. D. Cockcroft Correspondence, Department of Scientific and Industrial Research and Related Bodies; Directorate of Tube Alloys and Related Bodies: War of 1939–1945, Correspondence and Papers, Records of the Directorate of Tube Alloys and Related Bodies, Records of the United Kingdom Atomic Energy Authority and Its Predecessors, TNA.


24. Rudolf Peierls to James Chadwick, 10 May 1944, AB 1/631, Professor R. E. Peierls Personal Papers: Correspondence with Feather, Fowler, Frisch, Fuchs, etc., Department of Scientific and Industrial Research and Related Bodies: Directorate of Tube Alloys and Related Bodies; War of 1939–1945, Correspondence and Papers, Records of the Directorate of Tube Alloys and Related Bodies, Records of the United Kingdom Atomic Energy Authority and Its Predecessors, The National Archives, Kew, Richmond, Surrey, United Kingdom [hereafter Peierls Papers, TNA].

25. Max Born to Esther Simpson, 22 May 1940, fol. 164 recto, file 1, MSS S.P.S.L. 328/1, Learning Papers, BL.


31. Rudolf Peierls to James Chadwick, 14 December 1945, Personal Correspondence with Staff at Los Alamos, Work in North America, Papers Relating to Chadwick’s Atomic Energy Work, CHAD IV/3/6, CAC, UC.
39. Fuchs, interview.
41. James Chadwick to Norris E. Bradbury, 23 January 1946, Norris E. Bradbury to James Chadwick, 5 February 1946, and James Chadwick to Klaus Fuchs, 24 January 1946, CHAD IV/3/6, CAC, UC; and Rudolf Peierls to Klaus Fuchs, 25 May 1946, AB 18631, Peierls Papers, TNA.


46. Hoddeson, “Mission Change in the Large Laboratory,” 265–89.

47. Bethe, interview, 9 November 1979, pp. 7–8, 16; and Hoddeson and Byam, *Critical Assembly*, 130–34.


51. Otto R. Frisch to the Secretary of the Society for the Protection of Science and Learning, 27 November 1945, fol. 519 recto, MSS S.P.S.L. 327/10, Learning Papers, BL. Fuchs, for example, wrote a similar letter to the organization. Klaus Fuchs to Joseph B. Skemp, 12 December 1945, fol. 190 recto, MSS S.P.S.L. 328/1, Learning Papers, BL.


54. Hedy [sic] Bretscher, interview by John Bennett and Anne Shepherd, 21 July 1984, transcript, p. 35, OHC, AIP. Note that Bretscher’s first name was Hanni and not Hedy, as erroneously stated in the interview. Mark S. Bretscher, e-mail message to author, 30 March 2007.


56. Wechsler, interview.


58. Laura Fermi, *Atoms in the Family: My Life with Enrico Fermi* (Chicago: University of Chicago Press, 1954), 201; Wilson, “Not Quite Eden,” 46. Fuchs was interned from 12 May 1940 until 17 December 1940, at first, in Edinburgh, Scotland, before he was transferred to the Isle of Man and finally to Quebec, Canada. See “Alien Registration Form: Fuchs, Emil Julius Klaus,” n.d., KV 2/1253, Emil Julius Klaus FUCHS:


63. Jay Jorgensen, "Autobiography," 1993, manuscript, p. 82, LAHM. Jorgensen wrongly calls Hans Staub an Austrian in his manuscript. The heavy accents of many émigré scientists caused Americans confusion and even wonderment over the national identity of the foreign researchers. Since roughly one-third of the British Mission was made up of German-speaking émigrés, many Los Alamosians expressed surprise to find numerous “Britons” unable to speak proper English. Szasz, *British Scientists and the Manhattan Project*, 39.


71. Tom Sharpe to Rudolf Peierls, 26 August 1993, and Peierls to Sharpe, 3 September 1993, supplementary catalogue, Section D, folder 58, Peierls Papers, BL.


78. Egon Bretscher to James Chadwick, 2 July 1945, CHAD IV/3/6, CAC, UC. Otto Frisch, for example, occasionally visited Los Alamos after the war. Wechsler, interview.