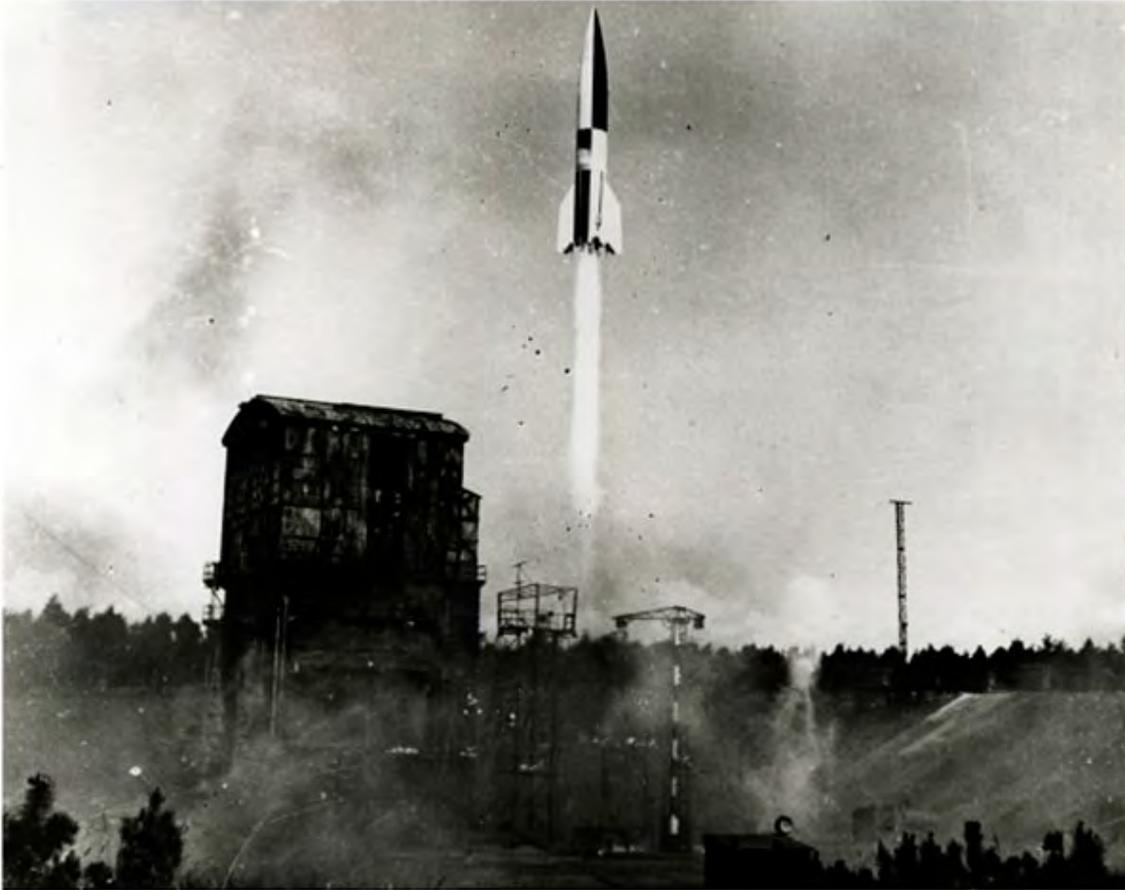


The Rest of the Rocket Scientists

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Launch of a German V-2 rocket, dated October 3, 1942. (NASM)

IN THE CLOSING WEEKS OF WORLD WAR II, AS ALLIED TROOPS RUMBLED INTO GERMAN TOWNS and the victors jockeyed to divide the spoils, one prize stood out: the people and machinery that had produced the V-2 rocket, one of the war's most exotic weapons. To the delight of U.S. intelligence, Wernher von Braun and most of his top associates on the V-2 development team chose to surrender to the Americans, shrewdly calculating where they might be allowed to continue their pioneering research after the war. One German rocket engineer, quoted by historians Frederick Ordway and Mitchell R. Sharpe in their book *The Rocket Team*, sized up his options in April 1945: "We despise the French, we are mortally afraid of the Soviets, we do not believe the British can afford us. So that leaves the Americans."

On June 20, 1945, von Braun and about 1,000 other German engineers and family members made the exodus from east Germany into the U.S.-held western zone, just ahead of the advancing Red Army. When the Soviets arrived, they found the V-2 underground

production center at Mittelwerk mostly abandoned, its top personnel gone and key documents missing.

Among the disappointed Russians was 33-year-old Boris Chertok, an aerospace engineer who had arrived in Germany two months earlier with a broad assignment to search for and evaluate Nazi technology, particularly the V-2. Today a consultant at RKK Energia, the company that built the Mir station and other Russian spacecraft, Chertok's career in the space industry goes back 65 years, including work on the Soviet attempt to send a man to the moon. In the mid-1990s he wrote *Rakety i Lyudi* (Rockets and People), a monumental four-volume memoir that became a bible for space historians around the world.

When I met Chertok in Moscow last year, his health was declining, which slowed his movements and forced him to talk loudly to overcome deteriorating hearing. Yet his memory of events that took place half a century earlier was still vivid. He recalled the scramble in 1945 as he and his colleagues tried, with little success, to lure top German talent to the Soviet side. His emissaries made risky dashes into the American zone, approaching the rocket specialists with offers of hefty salaries, food rations, and—most importantly—the opportunity to stay in Germany. That was one of the few battles von Braun and his colleagues had lost in negotiating with the Americans, and the Soviet recruiting campaign appealed to the Germans' longing to remain in their homeland.

Few took the bait. One who did was Helmut Gröttrup, a physicist by training and a top expert on the V-2's flight control system. Historians have debated why Gröttrup turned down the offer to work in the United States, suggesting that it was a combination of his leftist views and his refusal to become a bit player on von Braun's team. Chertok thinks the primary reason was Gröttrup's wish—and the even stronger desire of his wife Irmgard—to stay in Germany. He doesn't discount, however, the scientist's left-wing politics. "He was what we would call a social democrat—definitely anti-fascist," Chertok recalls.

For whatever combination of reasons, Gröttrup signed up with the Soviets, who established a rocket research institute in the town of Bleicherode, not far from the Mittelwerk plant, and set him up with a \$1,250 per month salary and a spacious house (the owner, an affluent merchant, was rudely turned out, according to Ordway and Sharpe). Gröttrup's first task was to compile a detailed report about the rocket research he and his colleagues had been engaged in at the Peenemünde center on the Baltic coast. He also was placed in charge of hundreds of Germans, whose main job was to produce a full set of drawings for the V-2 and re-start production. Irmgard volunteered to search for food and other provisions for institute personnel in the midst of devastated Germany.

It wasn't long before the other shoe dropped, however. As flightworthy V-2 missiles started rolling off the restored production line in 1946, the Soviet government made a secret decision, signed by Josef Stalin on May 13, to transfer all ballistic missile work, along with the German rocket experts, to Russia by year's end. Ivan Serov, the head of the Soviet secret police in Germany, devised a plan, code-named "Osoaviakhim" after a Soviet aeronautical organization,

to accomplish the deportation in just five days, with no advance notice. As Serov bluntly put it, moving quickly and relying on the element of surprise would “prevent Germans from running away when they learn that Soviet organizations deport their German employees.” Some 2,500 security officers were assigned to the operation, along with regular army units.

Chertok, who had tried hard to build good relations with his new recruits, favored the decision. “I believed it was a useful step,” he says. “We worked with Germans almost a year and a half, achieved a lot, and I considered it necessary to continue in Russia for some period of time.”

Not everyone agreed. Chertok’s friend and colleague, Sergei Korolev, who would go on to lead the stunning Soviet space achievements of the 1950s and 1960s, despised the move. In 1946, the man who would later become the Soviets’ chief designer for space nurtured ambitions of building his own rocket team. “Korolev had a negative attitude toward German participation in our work from the very beginning,” says Chertok, “and he did see them as potential competitors.”

The German engineers had little warning of what was coming. Early in the morning of October 22, 1946, Soviet soldiers showed up at the homes of top technical workers and informed them that they would be deported to work at various Soviet industrial ministries. It was the same story at each house: A Soviet security officer, accompanied by an interpreter, shocked half-asleep families by ordering them to pack up personal belongings and prepare to board trains for Russia. A promise of a five-year contract in the Soviet Union and an offer of assistance with packing and moving were little consolation. According to recently published Soviet accounts, as many as 7,000 workers and family members were rounded up. Only 500 or so were rocket engineers and their families—the rest worked primarily for the aircraft and nuclear industries.

When an angry Helmut Gröttrup asked when he and his colleagues might return to Germany, Dmitry Ustinov, the head of the ministry responsible for missile development, joked, “As soon as you can fly around the world in a rocket!” Gröttrup boarded one of the 92 trains transporting the deportees and immediately dictated a letter of protest to his secretary, but it was to no avail. He arrived in Russia a few days later.

Growing up in Moscow in the 1970s, I spent my summer vacations at a dacha in Valentinovka, in the city’s northeastern suburbs. It was a place of magnificent pine and birch trees, gravel roads, and unpaved trails, twisting between ageless wooden cottages with brick chimneys and glass-covered porches. Back then, the hemorrhaging Soviet economy left local food stores largely empty, prompting my mother, in her never-ending quest for groceries, to make frequent trips to nearby Podlipki, where the shelves always seemed well stocked.

Official Soviet encyclopedias listed timber production as Podlipki’s main industry, but even then we knew it was home to the rocket industry, whose privileged workers could find cheese and milk even during the worst shortages. It wasn’t until the 1990s that the town’s true mission was made public, and it was renamed Korolev to honor the luminary of the Soviet

space program, who spent the most productive years of his life there. It was here that Helmut Gröttrup was sent, to work at the newly established NII-88 scientific research institute, the first Soviet industrial facility dedicated to rocket development.

Boris Yezhov, a Korolev town historian, says that about half the Germans were accommodated in vacation houses in the northeastern suburbs. Most of the residences no longer exist, but at least one, in Bolshevo, is still standing. On the way to see it, Yezhov showed me an old black-and-white photo of a majestic stone mansion, sitting oddly in the middle of a forest. Today it's a vacation house for Russian movie executives. But when Germans lived there it was nicknamed the "Fascist Palace," and it housed "I don't know how many tenants," according to Irmgard Gröttrup. She and Helmut moved into a six-room villa more befitting his status, and were given a chauffeur-driven BMW. Later, though, when Helmut was transferred out of Moscow, Irmgard would spend a few months in the Fascist Palace. During her first night in the crowded building, her Russian hosts asked when she and her fellow Germans were going to bed. She recalled, "We looked at the 10 bottles of vodka on the table and laughed out loud: We hadn't the slightest intention of going to sleep."

Other Germans were housed according to their jobs. Specialists in guidance and radio systems, perhaps the most challenging task in the Soviet missile development program, settled in the town of Monino, farther east on the Yaroslavskaya Railroad. Another group, led by V-2 propulsion specialist Erich Putze, was attached to the collective of Valentin Glushko, the other principal figure in Russian rocketry at that time. Glushko worked on rocket propulsion systems at the OKB-456 design bureau, now known as NPO Energomash, the company that builds engines for almost every Russian rocket as well as the U.S. Atlas booster. Like Korolev, Glushko was not enthusiastic about German participation in his work. "He distanced himself from the Germans," says Vladimir Sudakov, a historian at NPO Energomash.

Without support from above, Gröttrup struggled with badly equipped laboratories and a lack of tools. The Germans working for Glushko were taken off work on a more advanced engine for the V-2, designated RD-102, and given secondary and often humiliating jobs, such as designing the foundation for industrial buildings.

For the Russian rocket pioneers, it was partly a matter of pride. Korolev and Glushko had been at this business for years, and believed they could improve on the already outdated V-2 with no outside help. But Stalin himself was keen to have his scientists launch German missiles before moving on to their own. He believed that by copying Western designs, like that of the American B-29 bomber (see "Made in the USSR," Feb./Mar. 2001), Soviet engineers could quickly absorb foreign innovations. Decades later, veterans of the Soviet aerospace industry publicly admitted they had done just that.

So in August 1947, Gröttrup and several other Germans boarded a train to a new launch range at Kapustin Yar, near the border with Kazakhstan, to assist with the first launches of V-2s. Out here, Irmgard wrote in her diary, the camels outnumbered the cars. Still, the

engineers were excited to be launching rockets again. The atmosphere, she noted, was “just like Peenemünde when we made our first experiments.”

Upon returning to Moscow in December, the Germans continued to be shut out of important work. Gröttrup and his associates presented to their Russian hosts a concept for a new guided missile, the G-1, partially based on work done in Germany during the war. Also designated the R-10, it featured a number of improvements over the V-2, including a longer range. But despite positive Russian reviews of the concept, it went nowhere. Soon German engineers began losing their positions at NII-88 and were reassigned to a research facility on Gorodomlya Island, 200 miles northwest of Moscow, where half their fellow Germans had already been living since arriving in Russia.

Helmut Gröttrup had few regrets about leaving the frustration of NII-88, but his wife felt a pang of nostalgia: “Farewell Moscow!” she wrote. “In spite of everything, you meant a great deal to me—a host of good friends—a city, in which I quarreled, laughed, wept, and pondered much.”

In the Upper Volga region of Russia, surrounded by swamps and evergreen forest, lies magnificent Lake Seliger, and at its center, Gorodomlya Island. In 1629 a rich landowner donated the island to a Russian Orthodox monastery, and for most of the three centuries that followed, Gorodomlya remained virtually uninhabited. Mid-19th-century maps of the island show the lone house of a forester. In 1928 the Soviet government evicted the monks and established a biological research laboratory. According to local legend, one of the defiant monks drowned himself in the lake, and his ghost has wandered the island ever since.

The region around Lake Seliger saw heavy fighting during World War II, and the laboratory was evacuated in the face of the German advance. By the war’s end, Gorodomlya had become home to numerous Soviet military hospitals, and was connected with the outside world by an underwater telephone cable. But its real claim to fame was the rocket research conducted there in the years immediately following the war.

It took Gröttrup and his fellow Germans days to reach the island from Moscow, but I made the trip in five hours by car. From the shores of Lake Seliger, I boarded a ferry that takes a half-hour to reach Gorodomlya. Not far from the pier is a gated entrance and a guardhouse. By the time I reached the gate, it was already under siege by a group of teens from our ferry, who were quarreling loudly with a female guard. Apparently they were here for a dance party at a nearby club, and some of them did not have permits to be on the restricted island.

As I climbed the road past the security fence, I could appreciate Irmgard Gröttrup’s feelings when she arrived here a half-century earlier: “So great was our curiosity about the island that we hardly noticed the dreaded barbed wire once we had landed. I think we were all too anxious to know what went on behind it.” At the top of the hill, the asphalt road took me around a white stone building marked “LIBRARY.” It used to be a café, which doubled as a social club for the Germans. The newcomers, it seems, tried to make it feel like home.

"The camp looks like an outsize toy village transplanted from Germany," Irmgard wrote. "There are flowers in the touchingly well-tended gardens, and on the balconies, the windows are curtained and the washing on the lines is spotless." More than 50 years later, a visitor can still find many houses at Gorodomlya surrounded by rose bushes, their bright flowers striking a dissonant note in that harsh landscape.

The German engineers and their family members could obtain permits to leave the island, but only for limited periods, and only with a Soviet escort. According to Valery Bukreev, a Russian engineer who has lived on Gorodomlya since the 1960s, the weekly trips German housewives made across the lake drove up prices at the local produce market. During winter the lake iced over, and the wives pulled sleds loaded with provisions. During spring thaws the trip became more dangerous, and Irmgard Gröttrup remembered watching Russians hop from one piece of floating ice to another.

Compared to Moscow, life on the island was primitive. The first German families to arrive had been given apartments with no bathtubs but plenty of bugs. (I learned on my first morning there that the descendants of these bloodsucking insects remain.) Eventually, after much bickering with the Soviet authorities and their own efforts on the weekends, things improved. In the summer of 1948, the Germans built a tennis court. "Even today," Bukreev says, "the surface of this court gets dry in minutes after the rain, so well was it laid out." The Soviets provided schools, which had 150 German students at one point, some of whom went on to college in St. Petersburg.

The real problem, though, was not the living conditions or even the lack of freedom, but disillusionment with the work. Gröttrup was pleased with the caliber of his German colleagues, who were well equipped and had more cohesiveness as a unit than he had seen back in Moscow. Although only a few had worked at Peenemünde, he quickly discovered a number of brilliant specialists on his new team: Joachim Umpfenbach, responsible for propulsion systems; Waldemar Wollf, a ballistics expert; aerodynamicist Werner Albring; Johannes Hoch, who led the team developing flight control systems; Alois Yasper, in charge of production; and Heinz Jaffke, who headed construction of launch facilities.

But politics worked against them. "There was a suspicion toward any foreigner in the U.S.S.R.," says Alexander Eremenko, a historian of NII-88, and the Germans at Gorodomlya were physically and intellectually isolated. Back in Moscow, Korolev was building a vast industrial network for rocket development, but the Germans were unable to test their concepts or even collaborate with anyone off the island.

Korolev was trying to push his own rocket design through the bureaucracy at NII-88. In many ways his R-2 paralleled the Germans' G-1 concept. Both rockets minimized weight and added range. And both featured a separable warhead, so the rest of the missile wouldn't have to survive the scorching heat of atmospheric reentry.

Three days after Christmas 1948, a delegation from NII-88 arrived at Gorodomlya to review progress on the G-1 project. Gröttrup bluntly told his bosses that further development of the

rocket made no sense unless he and his co-workers were allowed to do experimental work. The review ended on a positive note, but there was no further discussion of building the G-1 rocket. Soviet officials continued visiting the island over the following year, seeking proposals for various rocket concepts, but nothing came of any of them.

By the end of 1950, with no prospect of returning home and no hope of creative engineering work, Gröttrup asked visiting Soviet officials to relieve him of his duties as head of the German collective. He hoped that as a show of solidarity, none of his German colleagues would agree to fill his position. He was wrong. Johannes Hoch, the flight control system expert, was appointed to take his place. But only four days later, possibly due to negative reactions from other members of the team, Hoch and five of his supporters were transferred to Moscow to join a team developing anti-aircraft missiles; it was led by Sergei Beriya, the son of Lavrenty Beriya, Stalin's infamous secret police chief. Boris Chertok agrees with Irmgard Gröttrup's perhaps biased characterization of Hoch as a "crypto-Communist." According to Chertok, Hoch applied for Soviet citizenship and even tried to join the Communist party. "He also was an extraordinary talented engineer," says Chertok, "and if not for his premature death could have been one of our chief designers."

By the time Helmut Gröttrup walked away from his job, the Soviets had gotten about all they wanted from their foreign experts. As more newly trained Russian engineers took over key jobs on the island, the Ministry of Armaments decided to discontinue the German collective's missile development project, and the secret work at Gorodomlya ceased. Around the same time, back at the OKB-456 design bureau, Glushko authored a document essentially asking the government to send the Germans back home. Meanwhile, the German scientists were assigned such tasks as designing aerodynamic weighting mechanisms or boat engines. Depression, heavy drinking, and even suicide attempts plagued the team and their families.

In 1951, the first group of Germans was allowed to return to East Germany. The Gröttrups remained until November 1953, when all but a few of the remaining Germans were sent home. The rest, mostly guidance experts, eventually were transferred to Moscow. Helmut and Irmgard returned to Germany and even succeeded in moving back to the western sector. Again Helmut was offered a job in the United States, and again he opted to stay in his home country. He went on to a successful career in the electronics industry, and turned his back on the past.

On August 21, 1957, the Soviet newspaper Pravda boasted that the U.S.S.R. was in possession of intercontinental ballistic missiles. As Western intelligence confirmed the Soviet claim, one high-ranking official at NATO's European headquarters reportedly exclaimed, "We captured the wrong Germans."

His comment was based on a rather common belief in the West: that Soviet breakthroughs in rocketry, including the triumphant launch of Sputnik 1 a few weeks later, were due to the contributions of German rocket scientists. When Wernher von Braun and his team answered

Sputnik the next winter with the first U.S. satellite, Explorer 1, a popular joke was that the two orbiters exchanged greetings in their common language—German.

Historians, however, disagree about the impact of German rocket scientists on the Soviet program. “In reality, the Germans did not build anything for the Russians, did not ‘supervise’ the firings, and did not introduce innovations,” wrote German-born rocket historian (and von Braun colleague) Willy Ley in 1968. Nearly three decades later, Boris Chertok echoed the opinion in his memoirs. The R-7, the Soviets’ first ICBM and the vehicle that launched Sputnik, bore no German “birth marks,” he wrote.

However, Olaf Przybyski, an historian at the Technical University of Dresden, disagrees. His analysis, published in Germany in 1997, points out a striking resemblance between a cone-like aerodynamic shape the Gröttrup team had proposed for several rockets and the conical shape of Korolev’s largest designs—the R-7 and the ill-fated N1 moon rocket.

The truth lies somewhere in between. Germans did not design the Sputnik or its rocket, but the ideas developed by Gröttrup’s team on Gorodomlya did influence Soviet designers and accelerate their efforts. On her last day on Gorodomlya Island, Irmgard Gröttrup wrote in her diary: “Once more we had a meal with our friends, draining glass after glass and taking stock of the past years. We came to the conclusion that they had not been wasted, as we had so often believed. The men agreed that...the long-range rocket has made the conquest of space a definite possibility in the foreseeable future.”

Whether or not their work ultimately mattered, there is no question that the Germans who went east after the war had a markedly different experience from those who headed west. Wernher von Braun would eventually supervise construction of NASA’s Saturn V moon rocket, rise to the top levels of agency management, and win the National Medal of Science. Kurt Debus, another Peenemünde alumnus, headed launch operations at Cape Canaveral during the Apollo program. Helmut Gröttrup was happy just to make it back home to Germany.

After the 1991 collapse of the Soviet Union, some of the surviving “Russian Germans,” as the rocket scientists had come to be known in their homeland, returned to Russia for a reunion with former friends and colleagues. Among them was Ursula Gröttrup, the daughter of Helmut and Irmgard and now a woman in her late 50s living in Hamburg. Back on the island, she found her childhood home still standing, and learned that shortly after her family left, a new organization began producing gyroscope technology for Soviet rockets and spacecraft. Some of that hardware eventually flew on the Buran space shuttle and the Mir space station in the 1980s. Finally, something made on Gorodomlya made it to the launch pad.