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## Chapter 12

# The Excluded: Hermann Oberth and Rudolf Nebel in the Third Reich\*

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With the Nazi seizure of power in spring 1933, conditions for Germany's rocketry and spaceflight movement quickly began to deteriorate. The Verein für Raumschiffahrt (Society for Space Travel or VfR), the Rakettenflugplatz Berlin, and a handful of other groups—already suffering from the effects of the Great Depression—soon found themselves under subtle or blatant pressure from the new police state to restrict their activities or disband altogether. The source of this pressure was Army Ordnance Testing Division, headed by the ballistics expert, Brig. Gen. Dr.-Ing. Karl Becker. He and his assistants—most notably Capt. Walter Dornberger, later head of Army rocket development—felt that rocketry provided the key to devastating new surprise weapons of at least two types: battlefield solid-fuel projectiles carrying poison gas, and long-range liquid-fuel ballistic missiles for attacking enemy cities and installations. In order to achieve surprise and avoid alerting foreign powers to the potential of the rocket, they felt it was imperative to impose total secrecy by concentrating all development in Army hands.

For a number of rocketeers, that meant an opportunity would arise—often years later—to apply their experience to military missile development, usually under the direction of Werner von Braun, who had begun working for the Ar-

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<sup>†</sup> National Air and Space Museum, Smithsonian Institution, Washington, D.C., USA.

my in late 1932. But others judged by Ordnance not to be useful to its program were barred from any rocket activity for many years, or throughout the short history of the "Thousand-Year Reich." Often frustrated and bitter, the responses of these, the excluded, varied. Two or three, like the writer Willy Ley, emigrated. At least one, the enthusiast Werner Brügel, gave up rocketry rather than let it be used for weaponry, but ironically worked as an engineer in other military development anyway. A few, like Raketenflugplatz veteran Rolf Engel, fought the Army by working from the inside as members the National Socialist Party and SS.<sup>1</sup> Others worked against their banning from outside the Party and its organizations, but from a position sympathetic to the Nazis.



**Figure 1** Hermann Oberth during the filming of *Frau im Mond* at the UFA movie studios near Berlin in 1929 (Smithsonian neg. no. A-3894).

The latter strategy was the one chosen by the two most prominent surviving leaders of the Weimar space movement, Hermann Oberth and Rudolf Nebel. Oberth (Figure 1) was the movement's doyen, the man who sparked the enthusiasm for liquid-fuel rocketry and space travel in Germany with his groundbreaking 1923 book, *Die Rakete zu den Planetenräumen* (The Rocket into Interplanetary Space).<sup>2</sup> The Nazi seizure of power found him in his native German-speaking region of Romania, where he had returned in 1930 disgusted at the obstacles

to a rapid realization of his ideas. Nebel, on the other hand, made his name as the energetic, if slippery, head of the largest amateur rocket development group, the Raketenflugplatz Berlin. During the early months after Adolf Hitler became Chancellor on 30 January 1933, his group continued to operate unhindered by any problems except financial ones. Over the summer, his group launched rockets at Magdeburg and in various parts of Berlin (Figure 2). But he would soon begin to feel the effects of the Army's drive for a monopoly.<sup>3</sup>



**Figure 2** Rudolf Nebel (second from left, in suit) during the preparations for the launch of the Magdeburg rocket in June 1933 (Smithsonian neg. no. 77-4199).

While Becker and his subordinates in Ordnance could safely ignore Oberth, who was remote and inactive until mid-1934, they were determined to force Rudolf Nebel out of the rocket business. Not only was his group the most publicly active, relations with him had been troubled. In spring 1930, Ordnance had secretly given him 5,000 marks (about \$1,200) as Oberth's representative, with the promise that he would organize the launching of Oberth's rocket, which had been built to promote the movie *Frau im Mond* (Woman in the Moon). Yet that ill-fated vehicle never got off the ground, and Nebel violated confidentiality by openly discussing the Army's role. In 1932, Nebel revived contact by touting Raketenschiffplatz's progress and liquid-fuel rocketry's military applications. Notwithstanding the spaceflight focus of most pre-1933 enthusiasts, Oberth had discussed intercontinental ballistic missiles with chemical warheads in his 1929 book, *Wege zur Raumschiffahrt* (Ways to Spaceflight), and Nebel had used jingoism to raise money for that concept and others, such as anti-aircraft missiles. Nebel's renewed efforts led to a demonstration launch at the Kummersdorf artillery range outside Berlin on 22 June 1932. The test was a failure, and Ordnance refused to pay the agreed-upon expenses; the officers felt that Nebel had once again been a liar. Afterward Becker lured away one of Nebel's assistants, von Braun, by offering him a chance to pursue a doctorate through secret work at Kummersdorf.<sup>4</sup>

Because I have discussed elsewhere the Army's campaign to suppress the amateur rocket groups in 1933-34,<sup>5</sup> I will focus here only on Nebel's response, which reveals the pattern both he and Oberth would follow. While Nebel never joined the Nazi Party, he was an ultra-nationalist and member of the massive veterans' group Stahlhelm (Steel Helmet). The Stahlhelm had been included in the first Hitler cabinet through the appointment of its leader, Dr. Franz Seldte, as Labor Minister. As police harassment of the Raketenschiffplatz began to build in fall 1933, Nebel turned to Seldte for advice. His ally in this effort was Rolf Engel, who, for reasons still unclear, had already been singled out for arrest by the secret police in April 1933, while heading his own rocket group in Dessau. Seldte advised Nebel and Engel to contact Ernst Röhm, the leader of the SA (Sturmabteilung)—the Stormtroopers—since Röhm was a bitter critic of the generals and hoped to turn the SA into a truly Nazified mass army. Engel, and probably Nebel too, were brought under the wing of a short-lived SA auxiliary organization, the Deutsche Luftwacht (German Air Guard). Röhm and the SA leadership pressed the Army to tolerate rocket activities outside its jurisdiction, particularly those of Nebel. Nebel meanwhile assumed the colors of the regime, even if he did not join the party; Ley asserts that he wore "a swastika armband" and the British space enthusiast Philip Cleator, who visited Berlin in early 1934, later described Nebel as acting "as befitted a knight of the New Order." Nebel also tried to approach Hitler, the Foreign Ministry, and other offices to gain support for his work. When the Army stymied the SA initiative, he used his

Seldte connection to have the Post Office Minister ask the Army to allow him to develop mail rockets. That too was thwarted by Ordnance.<sup>6</sup>

Nebel's room for maneuver was decisively narrowed on June 30, 1934, when he was briefly arrested during the bloody purge of the SA leadership. Röhm and other SA chieftains were shot on Hitler's orders. Nebel was jailed because only weeks before he had printed a leaflet *Raketen-Torpedos* (Rocket Torpedoes), which listed a number of potential military uses for the rocket. The SA leadership had intervened on his behalf, but the Army had already denounced him to the Gestapo (Secret State Police) for violating secrecy. He was lucky to get out of jail within a day due to the intervention of a friendly policeman, but found himself expelled once-and-for-all from the *Raketenflugplatz*—or so he says.<sup>7</sup> With the SA purge, Becker and the Ordnance rocket group finally had the tools to cement their monopoly over the technology. The Army's main rival had been eliminated as a factor and the secret police now collaborated fully in the imposition of total secrecy on rocketry. Soon even second-rank figures like Rolf Engel and Werner Brügel were harassed into stopping all activity.<sup>8</sup> Although the Third Reich remained a collection of warring bureaucratic empires held together by Hitler's charismatic leadership, Rudolf Nebel would now find it much more difficult to continue any activity in the rocket field.

During the battles of 1933-34, in which Nebel had been the chief nemesis of the officers in Army Ordnance, Hermann Oberth had remained far removed and indifferent in Romania. In February 1933 he had emphatically written to Otto Wiemer, a German space enthusiast: "I will not work in Germany any more."<sup>9</sup> He concentrated instead on small-scale experimentation in what time he could spare from his job as a high-school physics teacher. Yet he ultimately was unsatisfied with that marginal existence. On 8 June 1934, just weeks before the bloodbath of "The Night of the Long Knives," he wrote to or approached the German embassy in Bucharest with a proposal for a ballistic missile. His motivations appear to have been more than merely technical; although he (like Nebel) never joined the Nazi Party, he was, he said, a member of a "National Socialist self-help organization" in Transylvania. Like many ethnic Germans in Eastern Europe, he apparently was enthusiastic for Hitler's new Germany. Army Ordnance, however, brushed off his proposal in September 1934 through intermediaries by dismissing altogether the possibility of a missile—even the existence of the Army program was classified. In December, Oberth tried again by acquiring a representative in Berlin, a Dr. H. Stark, who turned out to be an Italian citizen. This proved to be far from wise, because military secrecy prevented all foreign citizens from having knowledge of the program. In March 1935, Ordnance initiated a second rejection through the Foreign Ministry.<sup>10</sup>

The reasoning behind Army rocket group's refusal to work with Oberth is clearly revealed in a 28 February 1935 position paper written by Capt. Erich Schneider and Leo Zanssen. First, they explained, Oberth had a "very well-versed, imaginative mind," but was an impractical theoretician. Secondly, his

character was immodest and querulous, which would lead to “a string of conflicts” with his superiors—an entirely justified assessment. Finally, he was a Romanian citizen and his character made it too difficult to bring him to Germany and have him naturalized, especially in view of his famous name, which in itself might draw attention to the supersecret program. The danger existed, however, that other powers might become interested in hiring him. So a document from 4 March, apparently drafted by Wernher von Braun, recommended that any contact with Oberth “be handled dilatorily,” in order to string him along and thereby prevent a loss of the “lead in armaments” the Army had built up through its liquid-fuel rocket program at Kummersdorf. Thus Oberth received no rejection until May. When Dr. Stark visited Ordnance in June to find out why, he was told nothing except that the Army had no interest in rocketry at the moment, but perhaps he could check in at the end of the year.<sup>11</sup>

In the meantime, Nebel—astonishingly—had not given up trying to find his way back into rocket work; his ego was anchored in his moment of glory as head of the Rakettenflugplatz. In October 1934 he managed to interest the large engineering firm of Borsig in rocket development, but that initiative was immediately stopped by Army Ordnance. The Air Ministry, which had agreed to leave the technology to the Army, also collaborated by quashing an appeal to help Nebel from the city of Magdeburg, which had helped finance his launch attempts there in June 1933. In early 1935, Nebel tried appealing to the Nazi Party. Again he was stymied when Theo Croneiss, a senior manager at Messerschmitt Aircraft who was also an SA (later SS) general responsible for technology in the staff of Deputy Führer Rudolf Hess, found Army Ordnance unwilling to budge. The Army was not even willing to let Nebel become an officer in the new Luftwaffe, for which he had volunteered as a World War I 1st Lieutenant and fighter pilot. As Nebel asserts in his memoirs, he had been effectively blacklisted as a security risk. By mid-1935 he had little choice but to take a routine designer/draftsman job at the giant electrical firm of Siemens.<sup>12</sup>

The next two years brought him somewhat better luck. In the spring of 1936 Ordnance once again stopped his hiring first as an officer, then as a civilian in the Air Ministry. (Since 1935, the Luftwaffe had begun to collaborate with the Army in the development of rocket planes; by 1936, it also began to build an independent capability in this technology). But in July, Nebel’s attempts to manipulate Nazi organizations from the outside finally bore some fruit. He received a letter of endorsement from Dr. Fritz Todt, head of the Party’s technology organizations, but much more famous as chief of autobahn construction. According to Todt’s testimonial, he had met Nebel twice in the preceding months and had talked to some of Nebel’s acquaintances. It is not clear if this high-level support had any impact on the Reich Patent Office, but only three weeks later that body finally issued a patent on a rocket motor for which Nebel had applied in 1931, together with the main designer at the Rakettenflugplatz, Klaus Riedel.<sup>13</sup>

This patent and Todt's letter gave Nebel a new credibility. He attempted to exploit it by again approaching the Propaganda Ministry, to which he had written in 1934 and 1935. At the end of 1936 he told the Ministry that he could design a rocket that could fly 1,000 km to an enemy capital, shower it with leaflets and return to Germany! Army Ordnance killed this proposal by pointing out its technical absurdity, as well as Ordnance's long history of conflicts with Nebel. Nebel also made an unsuccessful attempt, he says, to meet Hitler at Berchtesgaden just before New Year's. Early 1937 brought yet another job offer in the Air Ministry, which was once again thwarted by the Army, as was an offer of employment with the armaments firm Rheinmetall, which was developing solid rockets but would not hire him without Ordnance's permission. But Werner von Braun and Walter Dornberger, head of the Ordnance rocket program since early 1936, decided that they now had to try to purchase Nebel's silence with a patent settlement. When von Braun asked his old friend, Klaus Riedel, to suggest a sum in early April, the latter asked for 65,000 marks. To account for fees and taxes it was later raised to 75,000 and the contract was signed on 2 July 1937 by Becker, Nebel and Riedel. It not only transferred the patent rights to the Reich, it also specified that Riedel, who had been working at Siemens, would become an employee of the Army in order to ensure a transfer of related knowledge. Von Braun needed experienced rocketeers with the opening of Peenemünde in May and wanted to bring Riedel on board, along with other Raketenflugplatz veterans at Siemens—except, of course, Nebel.<sup>14</sup>

In a private agreement with Riedel, Nebel got two-thirds of the payment, i.e., 50,000 marks—not an insignificant sum when 10,000 marks a year was an upper-middle-class income. Nebel used part of the money to start a business with a partner to build “automatic workers”—assembly-line robots! But what he did with another part of his money was revealed by one of the most bizarre and comic events in a life already full of them. On 3 January 1938 the border police turned him over to the Gestapo after he crossed back into Germany from Czechoslovakia. He had driven past the German border post without stopping and had been carrying a copy of the patent settlement and a letter from the Air Ministry, both of them secret. Before leaving on a skiing vacation with a girlfriend over New Year's in his fancy new car, he claims, he had picked up his mail. In it was a letter from the German Labor Front returning both documents. Nebel was held in jail for weeks and suspected of crossing the border to meet Czech agents, but was eventually released for lack of proof. Once again, he was very lucky in escaping the consequences of a charge of high treason, which could include the death penalty. But he received a new, sterner warning from the Gestapo that he was forbidden for life to work in rocketry. Although he obviously was not easily intimidated, he seems to have taken this warning seriously—at least for a couple of years.<sup>15</sup>

Ironically, as Rudolf Nebel was being forbidden to ever work on rocketry in Germany, the Air Ministry was about to bring Hermann Oberth from Roma-

nia to do exactly that. The origins of this surprising move go back to late 1936, when Oberth once again decided that rocketry's military implications were too important for Hitler's Germany to ignore. In early December, Dr. Hans Hedrich, a Nazi member of the Romanian parliament, came to Berlin on his behalf. Through connections Hedrich met Hermann Göring, who designated Luftwaffe Gen. Kesselring to take care of the matter. In January 1937, Kesselring saw Dornberger. The head of the Army rocket program explained that Ordnance still felt that Oberth was to be excluded as querulous and technically naive, whatever his important theoretical accomplishments. But he was willing to give the same explanation to Hedrich—and did so on 1 February. To that meeting, Hedrich brought a badly typed memorandum by Oberth which confirms many of the Army's assertions; the space pioneer argued that he could build an incredibly accurate missile of up to 1,000 ton (one million kg) takeoff weight, beginning only with a handful of assistants and thousands of marks. Yet with the probable intent of keeping Oberth on the hook, Dornberger told Hedrich that he was interested in truly constructive suggestions and was willing to meet Oberth in person.<sup>16</sup>

That meeting apparently took place on 6 April 1937 in Berlin; an Air Ministry official was present. In the meantime, the headmaster of Oberth's high school had contacted Berlin, indicating that Oberth was a patriotic German who had already turned down offers of employment by the Soviet Union and Japan. (Soviet agents had indeed tried to recruit him five years earlier, both indirectly by making an offer through Willy Ley, who naively urged him to take it, and directly through a visit by an agent to his house in Romania.) The outcome of the April meeting was an Air Ministry promise to consider employing the German-Romanian pioneer in a research capacity at the Technical University of Dresden. On 7 May, Wernher von Braun, now the technical director of the new Peenemünde Army facility, wrote an assessment of Oberth that was friendlier than Zanssen and Schneider's of 1935, although it noted his lack of practical engineering ability. It ended with a comment as revealing of the author as the subject: "Regarding his character I have only good things to say. He [Oberth] is known as a thoroughly nationally minded German."<sup>17</sup>

Why was Army Ordnance now willing to allow Oberth to work in Germany, although under Luftwaffe sponsorship and at arm's length from any involvement in, or even knowledge of, the two services' programs? It appears that the Luftwaffe was pushing this idea and that the Army may have taken seriously other powers' attempts to recruit Oberth, justifying a policy of putting him "on ice" in Germany. The air service's intentions are more difficult to fathom, especially because of the destruction of the Luftwaffe archive at the end of the war. Yet the conditions under which Oberth eventually worked indicate that that service too wished to sideline him. The contract finally signed on 1 December 1937 foresaw two years of work at an unnamed location under the direction of the Deutsche Versuchsanstalt für Luftfahrt (German Research Establishment for

Aviation) in Berlin. After taking a leave of absence at the end of the school year, Oberth moved in the summer 1938 to the Technical University of Vienna, which, with the *Anschluss*, had become a German institution. Within months he became completely fed up by the lack of clear direction from Berlin for his rocket research; even his own institute director told him that he had been “put on ice (*kaltgestellt*).”<sup>18</sup>

Out of frustration, on 18 March 1939 Oberth composed an impassioned appeal to “*Mein Führer!*”—Adolf Hitler. In it, he promised to build ballistic missiles of up to 3,000 km range that would be much cheaper than conventional air forces and would have demoralizing effects on an enemy. He could begin working on a missile immediately by doubling his current two-year budget of 36,000 to 50,000 marks. “With God’s help the first projectile could even be launched early in this year.” The letter was diverted from the Reich Chancellery to Army Ordnance, which was scornful of these assertions, but asked for clarification through a series of detailed questions. Oberth’s answer grandiosely pictured a Saturn V-sized vehicle, yet he expected to solve all its problems with a handful of people. On 8 August, the Peenemünde Commandant, Zanssen, described this proposal as “childish,” although it must be said that the Army and Luftwaffe had done Oberth no favors by keeping him completely innocent of day-to-day engineering. Given the character of his proposals, however, it is not surprising that nothing changed during the rest of 1939. Nonetheless, he passed up an opportunity from the Air Ministry to quit his contract and go home.<sup>19</sup>

In the spring of 1940, matters took a turn which would eventually bring Oberth to Peenemünde, although he would always remain marginal to the Army rocket program. Perhaps out of sympathy with Oberth’s frustration at his pointless and primitive experimentation, Dornberger and von Braun agreed at the end of 1939 that he should be given a task useful to the A-4/V-2 program. In February 1940, he was sent a request through the Air Ministry to design a propellant turbopump. One can only speculate, but von Braun may have hoped that Oberth had original ideas to offer, although Peenemünde had already contracted turbopump development to a company in that field. At the end of April, he notified Oberth that representatives of Ordnance would be in Vienna and would like to meet him. That meeting took place on May 22 or 23. From it, Oberth not only gleaned some information about the Army rocket program, but also heard Werner von Braun—who had met in 1930—promise him a permanent job. Von Braun emphatically denied that he made such a promise, yet Oberth could not now be so easily discarded—particularly because he knew too much. Since the Luftwaffe did not want to continue the contract past its two-year limit, the Army moved Oberth to the Technical University of Dresden in the fall of 1940, where he continued his essentially pointless turbopump development.<sup>20</sup>

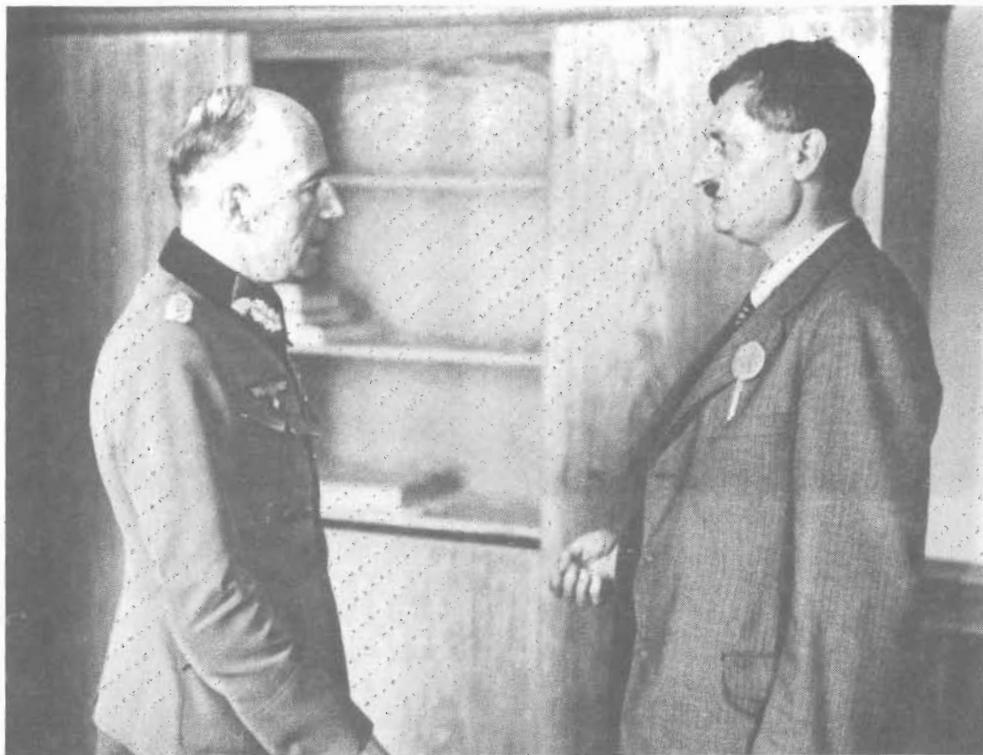
As he later told Willy Ley, at Dresden he received “a great salary (better hush money),” but by May 1941 was once again completely exasperated with the job’s futility. He told the institute director that he wished to go back to

Romania. The reply reportedly was: "You have only the choice of either becoming a German citizen, or going to a concentration camp"—Oberth was already too well informed about the supersecret Army rocket program. The choice was not difficult, and within a short time he became a citizen of the "Greater German Reich" eligible to work at Peenemünde. Dornberger and von Braun gave him a job, apparently out of a lack of viable alternatives. He reported for work at the center on 1 Sept. 1941, and was assigned the task of investigating patents from Germany and abroad for possible employment in the program (Figure 3). Within short order, Oberth made himself unpopular by criticizing the A-4 (V-2) missile for numerous "errors" in design that had some validity theoretically, but were naive from the standpoint of practical engineering and the project's history. Although Oberth soon wrote a ground-breaking paper on optimal staging in multi-stage vehicles, his two-year stay at the Baltic coast center turned out to be an uncomfortable one for all concerned; it was impossible to reconcile the great importance of his work in the twenties with his irrelevance to the tasks at hand. In 1943, he was shunted into a job at the wind tunnel establishment, then allowed to leave for the explosives company WASAG, where he was to develop a solid-propellant anti-aircraft missile. In part due to air raids, he achieved little there too. In sum, Hermann Oberth was the exception among the excluded, in that he joined the Army rocket program eventually, but he remained an outsider to the bitter end.<sup>21</sup>

While Rudolf Nebel never did see Peenemünde, he too found his way to the margins of the Army program—through contracts with the center and with the Mittelwerk (Central Works), the underground slave-labor V-2 production site in central Germany. Throughout the war, his partnership continued to get contracts from various Reich and Party authorities to develop production-line "automatic workers." It appears that they never finished a working prototype and that the whole enterprise bordered on fraud. Yet Nebel continued to nurse his bitterness about his exclusion from rocketry. In spite of the Gestapo warning, when Hitler appointed Fritz Todt the first Armaments Minister in March 1940, Nebel immediately appealed to him. Dornberger once again had to counter Nebel's litany of persecution and betrayal by Ordnance officers. Nebel also dismissed Werner von Braun as only his "chauffeur" at the Raketentagplatz. Once again, Nebel got nowhere. But he did have friends at Peenemünde—particularly Klaus Riedel—and visited them outside the closed area no later than 1939. In 1943, Riedel appears to have helped him get a contract for some production machinery related to welding. He later put Nebel in touch with Mittelwerk, which issued a contract on 12 August 1944, signed by managers Albin Sawatzki and Arthur Rudolph, to build "20 automatic workers for the automatic assembly of the *vare* servomotor [Rudermaschine] 8401."<sup>22</sup>

Ironically, while Nebel was becoming marginally involved with the V-2 program, he was declared unwanted for the same program by the SS. In November 1943 a cousin of Heinrich Himmler, at the behest of a Party official respon-

sible for inventors, wrote to the Reichsführer-SS about the poor, persecuted Nebel. A background check quickly turned up the Gestapo order of mid-1938, which led to a new round of surveillance by the secret police. Himmler's headquarters also consulted Rolf Engel, now an SS officer with his own solid-rocket company. But no one took much interest in the Nebel matter, least of all SS-General Hans Kammler, a fast-rising figure in the V-2 program. In spite of another appeal on Nebel's behalf, Kammler ultimately rejected Nebel in September 1944 as an "inventor" who had contributed much to rocketry at its outset, but was now of little use. Kammler did not know about the Mittelwerk contract. Meanwhile, because of air raids on Berlin, Nebel and his partner moved to a small town, then received production space in the underground plant. By his own admission, he also got a hundred concentration-camp prisoners for the work—thus implicating him, however marginally, in that enterprise of untold suffering and mass death. He claims to have had little contact with the prisoners. The end came in April 1945, with the collapse of the Reich, the murderous evacuations of the prisoners by the SS, and liberation by American troops. Nebel remained in what soon became the Soviet zone of occupation, before finally moving west in 1948.<sup>23</sup>



**Figure 3** Hermann Oberth talks to Brig. Gen. Walter Dornberger, commander of the Army Ordnance rocket program, at Peenemünde, mid-1943 (Smithsonian neg. no. 87-2252).

The parallel lives of Rudolf Nebel and Hermann Oberth continued after 1945. Both lived in poverty after a select group of rocketeers, led by Wernher von Braun, were taken to the United States. Once again, Oberth was the one who belatedly joined them, this time to spend three years in a comfortable semi-retirement in Huntsville, Alabama, before going home. Nebel was left to his own devices. But it is their Third Reich careers that are more illuminating: they shed light both on the motivations of Ordnance officers in building the Army rocket program, and on the attitudes of the Weimar pioneers before and after the Nazi seizure of power. In the traditional historiography of this topic, which was shaped by von Braun and his followers, the Weimar rocketeers were apolitical enthusiasts solely interested in spaceflight. Because of the money required to build large rocket vehicles, however, they were forced to make a military "detour" to reach the stars. In addition, this historiography simultaneously validated and undercut service to Hitler's Germany by treating it as merely the patriotic duty of engineers and scientists in wartime. Yet neither Oberth nor Nebel saw ballistic missiles and other military applications of rocketry as a mere "detour"—they were crucial technologies that Germany had to develop first. Neither were they apolitical, although they did not join the Party. As they both later admitted, they were ultra-nationalists quite willing to offer their services to the Nazis. In their attempt to manipulate the organs of the Third Reich from outside, they can best be described as Nazi "fellow travellers." Of course, Becker and Dornberger's justified opinion that they were ill-suited to the secret Army rocket program led them into endless frustration and, in the case of Nebel, even into Gestapo arrest. Yet, while neither their fate as members of the excluded, nor their strategy for dealing with it, were entirely typical of Weimar rocketeers, their central importance to the space movement before 1933, and their actions afterward, are a strong argument for rethinking the early history of German rocketry and spaceflight.

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### Reference Notes

<sup>1</sup>Brügel to Rolf Engel, 30 Dec. 1949, Daimler-Benz Aerospace AG Archiv, Ottobrunn (hereinafter DASA), Rolf Engel Papers; Michael J. Neufeld, "Rolf Engel vs. the German Army: A Nazi Career in Rocketry and Repression," *History and Technology* 13 (1996), 53-72.

<sup>2</sup>Munich: R. Oldenbourg, 1923 (reprint; Nuremberg: Uni-Verlag, 1960).

- <sup>3</sup>Frank H. Winter, *Prelude to the Space Age* (Washington, DC: Smithsonian Institution Press, 1983), 40-48; Willy Ley, *Rockets, Missiles and Space Travel* (New York: Viking, 1951), 131-62. I have not included Nebel's Magdeburg project in this article because it is adequately covered in the above sources and it occurred in an environment which had not yet changed much from the late Weimar period, at least for Nebel.
- <sup>4</sup>Michael J. Neufeld, *The Rocket and the Reich* (New York: The Free Press, 1995/Cambridge, Mass.: Harvard University Press, 1996), 5-23; H. Oberth, *Wege zur Raumschiffahrt* (1929; reprint, Bucharest: Kriterion, 1974), 199-200; Nebel, "Raketen-Artillerie," c. mid-1931, National Air and Space Museum Archives, Washington, DC (hereinafter NASM), R. Nebel bio. file; Schneider report, 23 June 1932, and Nebel to Bodenschatz, 23 August 1933, in Imperial War Museum, London (hereinafter IWM), MI 14/801(V); Winter, *Prelude*, 51-54, 174.
- <sup>5</sup>Neufeld, *Rocket*, 23-32.
- <sup>6</sup>Ordnance documents on Nebel, 1933-34, in IWM, MI 14/801(V); R. Nebel, *Die Narren von Tegel* (Düsseldorf: Droste, 1972), 16; Hans Horeis, ed., *Rolf Engel—Raketenbauer der ersten Stunde* (Munich: Lehrstuhl für Raumfahrttechnik/TU München, c. 1992), 24, 50-51; Neufeld, "Rolf Engel," 56-58; Ley, *Rockets*, 158; P. E. Cleator, "Matters of No Moment," *Journal of the British Interplanetary Society* 9 (1950), 50.
- <sup>7</sup>Copies of leaflet in DASA, Engel Papers, and in Hermann-Oberth-Raumfahrt-Museum (hereinafter HORM); Nebel, *Narren*, 139-40; Ordnance documents on Nebel, June-July 1934, in IWM, MI 14/801(V). Herbert Schaefer, a VfR member who emigrated to the United States in 1936, states (based on original notebooks) that his last visit to the Raketenflugplatz was on 26 Sept. 1934, which may indicate that Nebel was not evicted immediately after his arrest, although he certainly was by the end of the year. See Schaefer, "Extract from Notebooks" and answers to questions from Frank Winter, in NASM, Herbert Schaefer bio. file. Because Nebel's memoirs are often dishonest, and written evidence is so sketchy, many mysteries about the end of the VfR and the Raketenflugplatz will never be resolved.
- <sup>8</sup>Ordnance documents on Brügel, June 1934-June 1935, in NASM, FE microfilm reel 61, FE 3663; Neufeld, *Rocket*, 31; Neufeld, "Rolf Engel," 58-59.
- <sup>9</sup>Oberth to O. Wiemer, 21 Feb. 1933, in H. Oberth, *Briefwechsel*, ed. Hans Barth (Bucharest: Kriterion, 1979), 1:117.
- <sup>10</sup>Ordnance documents on Oberth, Sept. 1934 – Mar. 1935, Oberth to Diekhuth-Harrach, 11 Jan. 1934 ("nationalsozialistische 'Selbsthilfe,'" p. 8) and Oberth to Stark?, 3 Dec. 1934, in Bundesarchiv/Militärarchiv Freiburg (hereinafter BA/MA), RH8/v.1226; Tanja Jelina, *Hermann Oberth und das Heereswaffenamt 1934-1945* (Feucht: Hermann-Oberth-Raumfahrt-Museum, 1995), 1-2; oral history interview of H. Oberth by Martin Harwit and Frank Winter, 1987 (German version), 45, deposited in the NASM Department of Space History. Oberth and Nebel's Nazi records were checked at the Berlin Document Center (hereinafter BDC), now the Berlin-Zehlendorf section of the Bundesarchiv. Microfilm of the NSDAP, SS, SA and other Nazi records of the BDC are being made available at the National Archives (hereinafter NA), College Park, Maryland.
- <sup>11</sup>Schneider and Zanssen, "Grundsätzlicher Stellungnahme...", 28 Feb. 1935, von Horstig (draft by von Braun) to Wa Fw 3, 4 Mar. 1935, and Schneider Aktenvermerk, 18 June 1935, in BA/MA, RH8/v.1226; Jelina, *Hermann Oberth*, 2-3.
- <sup>12</sup>Ordnance documents on Nebel and Nebel-Croneiss correspondence, 10 Oct. 1934 – 5 June 1935, in IWM, MI 14/801(V); Nebel, *Narren*, 141; Croneiss SS officer file in NA, BDC microfilm, reel SS0-132. An interesting sidelight on Nebel's World War I record is that, according to Willy Ley's memory, Nebel claimed "eleven enemy planes" to his credit when he introduced himself in 1929: Ley, *Rockets*, 126. Yet research by Rick Duiven has shown only two Allied planes shot down by Nebel—on 31 July 1917 and 7 Sep. 1918. See Duiven to Michael Neufeld, 27 June 1996, in NASM, Nebel bio. file.

- <sup>13</sup>Ordinance documents on Nebel, 16 Mar. – 9 May 1936, in IWM, MI 14/801(V); patent, 3 August 1936, and Todt letter, 11 July 1936, in NA, microfilm publication T-175 (Reichsführer SS and Chief of German Police)/r.155/fr.268578-80 and 617-18; Nebel, *Narren*, 103-05, 142; Neufeld, *Rocket*, 43-48, 57-62.
- <sup>14</sup>Ordinance-Nebel-Propaganda Ministry documents, 8 Dec. 1936 – 27 April 1937, in IWM, MI 14/801(V); Magdeburg Oberbürgermeister to Propaganda Min., 20 Aug. 1935, and contract, 2 July 1937, in NA, T-175/r.155/fr.2685610, 619-22; Nebel and Riedel to Dornberger, 11 Apr. 1937, in NASM, FE749; Nebel, *Narren*, 142-47; Nebel to Jungk and Udet/Air Min., 9 Feb. 1937, Ingehaag collection, copy from Karlheinz Rohrwild, HORM; von Braun to Willy Ley, 30 Dec. 1951, in NASM, Willy Ley Collection, box 9, folder 304.
- <sup>15</sup>Nebel, *Narren*, 147-50; Becker (Woike) to Gestapo, 7 Jan. and Wa Prv 13 to Abwehr, 12 Jan. 1937, IWM, MI 14/801(V); BA/MA, RH8/v.1226; copy of Haftbefehl, 13 Jan. 1938, from Ingehaag collection, HORM.
- <sup>16</sup>Oberth to Wiemer, 1 Nov. 1936, in BA/MA, RH8/v.1224, Oberth proposal, late 1936, and Ordinance documents on Oberth, 25 Jan. – 8 Mar. 1937, in BA/MA, RH8/v.1226; Jelnina, *Hermann Oberth*, 3-5.
- <sup>17</sup>Ordinance documents on Oberth, 5 Apr. – 7 May 1937, and Oberth to Dickhuth-Harrach, 11 Jan. 1934, in BA/MA, RH8/v.1226; Ley to Oberth, 25 May 1932, in Oberth Papers, HORM; Boris V. Rauschenbach, *Hermann Oberth: Father of Space Flight* (Clarence, NY: West-Art, 1995), 80-83; Jelnina, *Hermann Oberth*, 5-6.
- <sup>18</sup>Dornberger to Lorenz, 8 May 1937, in BA/MA, RH8/v.1226; Jelnina, *Hermann Oberth*, 6-8; Barth, *Hermann Oberth* (Feucht: Uni-Verlag, 1985), 185-86; Ley, *Rockets*, 204-205.
- <sup>19</sup>Oberth to Hitler, 18 Mar. 1939 (transcript), and Ordinance documents on Oberth, 25 Apr. – 24 Aug. 1939, in BA/MA, RH8/v.1226; Jelnina, *Hermann Oberth*, 8-15.
- <sup>20</sup>Ordinance documents on Oberth, 30 Jan. – 24 May 1940, in BA/MA, RH8/v.1226; Jelnina, *Hermann Oberth*, 16-19; von Braun to Oberth, 29 Apr. 1940, in NASM, FE microfilm, FE746.
- <sup>21</sup>Rauschenbach, *Hermann Oberth*, 111-121; Barth, *Hermann Oberth*, 185-201; Jelnina, *Hermann Oberth*, 19-25. For Oberth at Peenemünde in 1943, see also Peter P. Wegener, *The Peenemünde Wind Tunnels: A Memoir* (New Haven: Yale University Press, 1996), 32-33, 41-42, 59.
- <sup>22</sup>Ordinance documents on Nebel, 22 June 1938 – 14 May 1940, in IWM, MI 14/801(V); Nebel "Denkschrift," 1940, in T-175/r.155/fr. 2685581-88; Nebel Papers, file NL 002 ("Automatische Arbeiter"), Deutsches Museum Archives, Munich; Nebel? to Sawatzki, 14 July 1944, in NASM, FE microfilm, FE694a; Karl Werner Günzel, *Die fliegenden Flüssigkeitsraketen: Raketenpionier Klaus Riedel* (Höxter/Westfalen: privately published, 1988), 95.
- <sup>23</sup>Nebel, *Narren*, 253; SS documents on Nebel, 16 Nov.(?) 1943 – 19 Sep. 1944, in NA, T-175/155/2685561-75; Nebel Papers, file NL 002 ("Automatische Arbeiter"), Deutsches Museum Archives, Munich.