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## Chapter 3

# Klaus Riedel at Peenemünde\*

Harald Tresp

For almost two and a half years now, there has been an historical-technical information center on the site of the former center of German research in Peenemünde, which was also the site of the so-called revenge or 'V-weapon' testing. This small center sees itself as a collection of documents and artifacts from one decisive phase in the history of space flight, whereby the presentations are not restricted only to the period between 1936 and 1945. The exhibition increasingly presents an historical description of how this historically and politically contradictory development came about. Visitors, who are counted in tens of thousands per year, are also introduced to events between 1945 and the present, so the exhibition is not restricted to space flight alone, but it also looks at the general development of the region.

Wernher von Braun, who, since the end of the 1920's, had actively shown his interest in space travel and devoted his professional career to rocket research, was the dominant personality of Peenemünde. It is not the purpose of this talk to pay tribute to this man or even to describe his life, which has already been done elsewhere many times. However, the enormous achievements necessary for the development of a functional large rocket could never have been created and realized by him alone. Klaus Riedel was one of many men who

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assisted von Braun, and he was a friend as well, during the beginning years of the liquid-fuel rocket. However, Klaus Riedel appears only infrequently in publications of scientific or technical character, or he is mentioned mostly in association with Rudolf Nebel. The reason for this may be that the achievements of other men have been emphasized more, and that the inconspicuousness in which Klaus Riedel did his work did not facilitate widespread publication or appreciation.

Klaus Riedel was born on August 2, 1907 in Wilhelmshaven, and he had a relatively normal childhood and youth. Even the blows or fortune (with the deaths of his mother and father within two short years of each other) did not scar his development. He was then raised and educated in Berlin by his uncle, where he came into contact with the early rocket research enthusiasts and pioneers. Rudolf Nebel wrote in his book, *Die Narren von Tegel* [The Fools from Tegel], that he met Riedel for the first time at a lecture in Berlin, about the current technical work the "Die Frau im Mond" [The Woman in the Moon], that premiered on October 15, 1929.

Another slightly different description is provided by the single surviving rocket pioneer, Rolf Engel. According to this recollection, Klaus Riedel, while earning his pocket money as a temporary ice cream salesman, also allegedly made it to the UFA area, where attempts with the UFA rocket were taking place. This contact developed quickly, and in this way Klaus Riedel soon became a regular visitor to the rocket pioneers of the time.

However, in the end it is not important how the first contact with Nebel's group in Berlin came about. What is important is that from this contact a fruitful working partnership was established, which lasted until Riedel's death in a tragic auto accident on August 4, 1944. The young field of rocket technology was to dominate his life.

## Childhood and Youth

His parents, Kapitänleutnant Alfred Riedel and his wife Marie Erhardt, entered the birth on August 2, 1907, under registry number 300. The Christian name was added later, as this was not yet clear at the time of the birth. The beginning of Klaus Riedel's interest in space flight must have begun early in life, for his sister, Freda, remembers that her brother was already dreaming of a trip to the Moon by the age of 10 or 12.<sup>1</sup> Klaus may well have obtained his first stimulation in this direction from the book, *Auf zwei Planeten* (On two Planets), by Kurt Lasswitz.

After entering school in Wilhelmshaven, he transferred, due to the outbreak of the First World War, to the Askanische Gymnasium in Berlin, and later to the Realgymnasium in that same city.

Within the relatively short span of two years Klaus lost both of his parents, with his mother dying in 1919 and his father in 1921. Responsibility for the young Klaus fell to his uncle, Carl Riedel, while his sister Freda was taken in by their grandmother, Meta Riedel, of Bernstadt in Saxony. In later years, this small place was to play a not unimportant role in the development of liquid-fuel rockets.

Klaus Riedel graduated from school in 1923, and he began an apprenticeship as a machine builder with the firm of Ludwig Loewe & Co. A.G. in Berlin, with the ultimate aim of becoming an engineer. Starting in 1927, he studied in evening courses. He later qualified as a precision mechanic. At the technical college in Berlin he studied general mechanical engineering in 1928-29. His first contact with the rocket pioneers began during this time, which was to have a substantial influence on the path of Riedel's life.

The year 1928 saw several attempts to turn the rocket fever, then prevailing in Germany, into capital, through the plans of the UFA film company and their director Fritz Lang. One result of this effort was the film, "Die Frau im Mond," for which the young man from Siebenbürgen, Hermann Oberth, was one of the technical advisors. His book, *Die Rakete zu den Planetenräumen*, which was published in 1923, led to his association with UFA. As a result of this association with the film company, several of Oberth's and his colleagues got off the ground.

The end result was that, for advertising purposes related to the premiere of the film, "Die Frau im Mond," a rocket was supposed to be launched on October 15, 1928. All efforts of the rocket builders of Hermann Oberth and Rudolf Nebel were associated with this event, and it was in this connection that important achievements came about for the development of propulsion by liquid fuel. Moreover, the rocket launch area in Berlin, whose origin Rudolf Nebel had written extensively about in his book, *Die Narren von Tegel*, became a center for the contemporary enthusiasts of German rocket development.

## The Beginning

Klaus Riedel joined this group on October 1, 1929.<sup>2</sup> He began to attract attention due to his practical understanding for this very young branch of modern technology, which was still frequently ridiculed by the general public. Klaus Riedel was frequently successful in offering solutions for the various problems, most commonly with Rudolf Nebel, so that soon he made himself into one of

the distinguished people in the rocket launch area in Berlin, Reinickendorf. This was largely due to his filing an Imperial patent, number 633867, for a "Liquid-fuel reaction engine," on June 13, 1931 (in conjunction with Rudolf Nebel).

"From the very beginning of his work with the pioneers around Nebel, Riedel was in contact with Hermann Oberth at the seaside resort of Horst in Hinter Pomerania in connection with the planned launching of a 'space rocket' which however, due to several circumstances, was never realized."<sup>3</sup> The announcement of this launch was a publicity attempt by UFA to recoup the advance money from the unfulfilled contract, which had failed due to time pressure.

It seems that the rocket was finally ready to launch during the last weeks in December. Rudolf Nebel, Klaus Riedel and two others from the UFA team were present (from the Berlin group). Oberth was not at the launch, since Nebel had convinced him that there were more important things to be done. Oberth himself probably did not attach great meaning to this test firing, which took place without public presence. During Oberth's absence, Nebel had changed the rocket in such a matter that Oberth could no longer guarantee its functioning.

From the end of September 1930, Klaus Riedel was manager of the technical works on the field in Berlin, Reinickendorf, which had been christened "Raketenflugplatz Berlin" [Rocket-launch-area Berlin] by Nebel. Riedel was instrumental in developing the practical foundations of liquid-fuel rocket technology, and in his specific work area he achieved success in the practical testing of rocket motors on the test stand, as well as in improving the light metal-welding engineering in rocket construction.

The completion of the first development work and testing of liquid-fuel rockets, in association with Rudolf Nebel and Hermann Oberth, also falls into this time period. The names of the rockets, Mirak and Repulsor in particular, are associated with Klaus Riedel. However, it was impossible to carry out fire experiments in the Berlin chemical-technical testing ground without problems. Due to the great noise pollution and the great interest of the press and many spectators (to such a degree that safety could no longer be guaranteed), a new home for future experiments had to be found. This site was found in Bernstadt in Saxony, which had approximately 2,500 inhabitants. The fact that Klaus Riedel had relatives there was probably the main reason for choosing this site. Most important of these relatives must be the grandmother, Meta Riedel, who despite her great age very strongly supported the 'new fangled' ideas of her grandchild and his associates. While all of the scientists in their previous sphere of activity had constantly suffered from a shortage of money or material goods (only the young student Wernher von Braun was better equipped owing to his birth), in Bern-

stadt they could now at least be sure of regular food and lodgings, which was a very good value at that time.

In Bernstadt, many experiments with different constructions and motors took place. Indeed, most of the inheritance which Riedel received was used up on the attempts in Bernstadt. These Bernstadt tests included, among other things, experiments with the "Mirak 1" (minimum rocket 1) that had begun in Berlin. Approximately 140 burn experiments and measurements with this first version of the Mirak took place within 4 weeks.<sup>4</sup> In the course of these tests, the thrust climbed from 400 grams at the beginning, to 3,500 grams.<sup>5</sup> With this thrust, it became possible to launch the Mirak 1. Therefore, the first launch was scheduled for September 7, 1930. This test, however, also signaled the simultaneous end of the Mirak.

At this point, our attention turns back towards Reinickendorf, where Rudolf Nebel, owing to his talents, had convinced the authorities to arrange sufficient area so that he and his friends could clear up the remaining problems.

The successful, though by today's standards modest, rocket launches of 1931 and following, were admittedly not the first in Germany. Two months earlier, on March 14, 1931, Johannes Winkler had launched his first liquid-fueled rocket in Dessau.

During the autumn months, the question of fuel composition arose. This was, as always, influenced by the ever prevalent tightness of money among the rocket enthusiasts, and the fact that water-cooling of the burning tests had become insufficient for the motor which had been developed in the meanwhile. Hermann Oberth wrote repeatedly in his publications about the use of alcohol as one component of the fuel, however in practice he preferred using gasoline, as did all the other rocket pioneers after him.

It was Klaus Riedel who focused on alcohol as a fuel, which could be obtained either free or at a very low price. He knew that one must have a minimum of 40% alcohol to burn in air, and he also discovered through experiment that a concentration of 90% caused the rocket motor to burn through. Finally, Klaus Riedel determined that the optimum concentration was approximately 70% alcohol and 30% water. The Reinickendorfers could obtain alcohol as a by-product of the Linde firm in Berlin.<sup>6</sup> This knowledge was then also applied by various other scientists in the continuing work on the rockets in Peenemünde.

One essential new technical development was introduced in 1932, namely fuel-cooling of the rocket drive. Here, also, ideas proven by Klaus Riedel were used. The continuing development of the liquid-fuel rocket got further away from the principle of Oberth's conical nozzle with each of these epoch-making innovations.

The name RAKETE was, at the time, mainly used for the powder rocket. Although Riedel's "Zweistaber," first tested by him in 1931, after Nebel's Mirak II proved to be a failure, the idea of "Repulsor" came into discussion, taken from the novel, *Auf zwei Planeten*, by Lasswitz. Reinickendorf was, in this connection, not only the center of ideas for the continued development of the modern rocket technology, but it was also where ideas were translated into action. In this, Klaus Riedel played a major role.

From 1932 on, the military weapons office of the Reichswehr showed increased interest in the achievements of the men involved around Rudolf Nebel, Kurt Heinisch, Rolf Engel, Klaus Riedel, and others. On June 22, 1932, a memorable demonstration of the significantly improved Mirak III took place, however the previously established height of 3,000 meters could not be achieved by the test rocket, so that the Reichswehr did not want to pay the urgently needed and previously arranged sum for further testing.

The foundation of the PANTERRA company, to whose founders belonged Klaus Riedel, falls in the year 1932. The aim of the peaceful conquest of space with aid of modern technology, as proclaimed in the statutes of the company, ended abruptly a year later, with the National Socialist's seizure of power on January 30, 1933. The PANTERRA as well as the "Verein für Raumschiffahrt" [Union for Space Travel] was dissolved.

### **Klaus Riedel's impact at Peenemünde**

When the rocket launch area of Berlin was finally closed, because of the developing political situation in Germany, Klaus Riedel took a job as an engineer with the firm of "Siemens Apparate und Maschinen GmbH," and he worked, among other things, on autopilots for aircraft. In a contemporary report, Mister Helmut Zoike remembers that, at this time, the Siemens firm felt that it was a necessity to acquire a special knowledge of aeronautics in connection with the task of furthering the development and mastery of the ever more complicated steering mechanism. This task fell to Klaus Riedel. Very little is known about the following three years at Siemens.

Riedel ended his work in Berlin in 1937, and he followed the call of his friend, Wernher von Braun, whom he had gotten to know in 1930 on the rocket launch area, to Peenemünde. There the first experiments began with the Aggregat 3 (A 3), which was launched from the island of Greifswalder Oie. In this way, fundamental experience was gathered even before the final completion of the military research establishment in the small fishing villages of Peenemünde and Karlsruhen. On August 5, 1937, Klaus Riedel became a technical employee at the military weapons office WA-II in Peenemünde. In this way, he was again



active in his profession and able to devote his experience and knowledge to the continued development and refinement of the Aggregat 4 (A 4).

With the beginning of his activity in Peenemünde, references to Klaus Riedel, who in previous years had always been known to be connected with the name of Rudolf Nebel, became more infrequent. This was because he was busy translating the ideas of other celebrated men into action. Indeed, several solutions had their origin with Klaus Riedel. Peenemünde, however, was not the place to find publicity in the headlines. The strictest silence was kept about the work in this rocket center, until the breakup of the military research establishment. After 1945, one could for the first time, little by little, learn important details of the results of the research, partly through the corresponding personal descriptions of leading figures, or through opening relevant archives and access to documents.

As far as Klaus Riedel is concerned, it is known that he belonged to the league for human rights even before National Socialists seized power, and he was also associated with the "Rote Hilfe" after 1933. (Rolf Engel) His active lifestyle, which he possessed from the very beginning, made him one of the conspicuous figures in Peenemünde. In contrast to many other residents of the Karlshagen settlement, in which he lived in a house with his family until August 10, 1943, he was relatively unconcerned about the prohibitions set by the National Socialists. For example, it is known from several sources that, even after the prohibition of the so-called "Nigger-Jazz" in October 1935, these records, including those of Ella Fitzgerald, were heard being played in Riedel's house. His daring style of driving also tells us something about his character. Nevertheless, Klaus Riedel was not foolhardy.

Klaus Riedel was, first of all, concerned with attending to the practical work of a test engineer, his abilities had already been very successfully demonstrated, even in Reinickendorf. However, because a different style of work was drafted for Peenemünde than in the first years of the new technology, where results of the work were immediately available and comparatively easy to grasp, his job also required a great deal of paperwork. These new demands, however, did not correspond to his personal interests, so that on several occasions missing test documents led to his being criticized by his superiors, including Wernher von Braun.<sup>7</sup> Finally, Riedel was placed in a position where his abilities as practical man could be accommodated, while still serving the logistics of the large rocket.

From approximately 1941 on, Klaus Riedel took over the preparation of the organization of the deployment of the A 4. It was he who prepared the theoretical and practical requirements for the mobile setup of the later V 2. This included the selection and construction of the required people and the assess-

ment of possible places for stationary launch constructions for the long-distance rocket on the Channel coast of France. It is known from contemporary sources that Klaus Riedel, among others, worked on the construction of St. Omer for the firing of the V 2 (*Vergeltungswaffe*) [Revenge Weapon 2]. This explains his numerous stays in France.

A mobile transport vehicle for the Aggregat 4, later designated as the "Meiller-Wagen," is attributed to Klaus Riedel as creator, and the individual responsible for the testing. (Reisig) In addition to this, he was also ordered to search in the occupied area of the Soviet Union for signs of possible information on the situation of Soviet rocket research. This order took him to the region of Smolensk/Borissov soon after the outbreak of war with the Soviet Union. There he became familiar with a Soviet rocket launcher, designated by Riedel as the "Nebelwerfer" [Nebel launcher], in an analogy to one of Rudolf Nebel's German developments. In his notes, Klaus Riedel described this as eight-piped launching ramps stationed on a large truck.<sup>8</sup> The experiments, under Riedel's direction, to carry out launching of the A 4 from converted railway cars in Peenemünde, should not remain unmentioned in this connection. This experiment, however, was quickly put aside after the first unlucky experiment.

With the chances increasing that the A 4 would actually be used, it was decided that Klaus Riedel would provide instruction for the necessary manpower. Therein began a new period in Riedel's life, since it was not possible for a civilian to give commands to a militarily organized unit. This was against the corresponding regulations of the German Wehrmacht. It is still a matter of debate whether Riedel ever received an officer's commission, or whether he merely traveled and was treated as such for 'camouflage' reasons. There is hardly any information on this in the estate. However, he is registered from August 6, 1941, under number 241, as a regular member of the "Offiziersheimgesellschaft" [Officer home organization], under the description "War administration inspector." One of the few surviving private films shows Riedel, in officer's uniform, in connection with an upcoming official trip to the occupied area of the Soviet Union. This photograph shows a clumsy acting man who does not appear to feel at ease in his new role. He made jokes about it.

The friendship with Wernher von Braun also survived in Peenemünde. Despite the different duties and their different educational standing, Wernher von Braun was often a private guest of the Riedel family. Frequently, in this way problems of the A 4 were talked over and possible solutions discussed. The results of these friendly meetings emerged in the later work on the A 4. Contributions made by Klaus Riedel, however, were probably practical in character, because presently available records and documents do not remark on whether and which theoretical ideas of Riedel's actually came to a successful realization.

It was in Peenemünde that a new kind of scientist emerged, who worked according to a new working style—known today as teamwork. In this way, individual achievements entered into the complex of overall assessment of new knowledge. Notes recorded by Klaus Riedel about thoughts on the use of automatic workers, today called robots, in order to intensify the production of the A 4 apparatus and to reduce the likelihood of mistakes, date back to November 27, 1941. He was mostly concerned with the following aspects:

- o Maintenance and exchangeability of building components with the aim of multiple small machines and apparatus construction
- o Development of a production series with the simplest operation maintenance and production safety
- o The greatest working room
- o Ability to produce a force of 200 kg
- o Working speed, double that of the human hand
- o Easy exchangeability of the curve-line, tool-setter, curve-cutter
- o The construction required approximately 25 building patterns with continuous improvements.

Soon after the first successful launch of an Aggregat 4 into the stratosphere from Prüfstand VII [Testsite seven], on October 3, 1942, another less scientific event had an important impact on Peenemünde. August 17/18, 1943, was a turning point in the further development of the A 4 at Peenemünde. That night, 596 British bombers attacked the military research establishment at Peenemünde and destroyed most of the residential settlement of the scientists, and the foreign workers camp in Trassenmoor—733 people lost their lives. Riedel had recognized the imminent danger of attack on Peenemünde (This had been obvious since June of 1943, when increased air protection measures were ordered), and he moved to Loddin, about 25 kilometers from Peenemünde on the island Usedom, on August 10, 1943, together with his wife and his daughter Henrike, who was born in February of that year. In this way the Riedels escaped the inferno in Peenemünde.

On March 15, 1944, Wernher von Braun, Helmut Gröttrup, Hans Lührssen, and Klaus Riedel were arrested by the Gestapo office in Stettin, and they were accused of treason, because within their internal circle they were thinking about the future peaceful uses of the rocket, and thereby they did not spend all their efforts on the rocket, and this fact had become public. Only after long and difficult appeals to the highest offices of the German Reich was Major-General Walter Dornberger, the military commander of Peenemünde at the time, successful in having all four men released.

Shortly before or after this incident, Klaus Riedel underwent a change, which seems to indicate that he no longer believed in the meaning of his work in Peenemünde. Even colleagues who had previously known him as always smiling, a joking man who enjoyed life, noticed that change. He didn't talk much anymore. The optimistic family man became more and more withdrawn. People close to him, such as Walter Schuran, attributed Riedel's recognition of the uselessness of his work in Peenemünde to the circumstances of the war. There was also probably the realization that travel to the Moon, which was still the dominant private thought in 1944, had become impossible under these conditions.

Shortly after his 37th birthday on August 4, 1944, at 5:00 in the morning, Klaus Riedel died in an automobile accident. He lost his life on a straight stretch of road between Bannemin and Zinnowitz, when his car hit a tree on his way home. This accident has been interpreted in different ways. Some people believe that sabotage was the reason behind the accident, in that an axle journal was partially sawed through (Mader: *The Secret of Huntsville*). Others believe that overtiredness and a large quantity of alcohol were the reason, since on the night before, General Zanssen, commander of Peenemünde, had had a farewell party, and the third of August was also celebrated as the day of the artillery in the German Wehrmacht. In the meantime, it is impossible to establish, or would at least require further intensive research, to find out what was responsible for the death of Klaus Riedel. The records of the former Gestapo office in Stettin, which was in charge of investigating the accident, are not open or were lost during or after the war. Later inquiries by Klaus Riedel's widow, after the end of the Second World War, were unsuccessful.

The legal attempt to establish that Klaus Riedel was a victim of National Socialism was dismissed. Klaus Riedel is buried in his last place of residence, Loddin. With the opening of the Moon by man, Klaus Riedel received his deserved recognition; on the back side of the Earth's satellite a crater has borne his name since 1970. The exact position is 49°S and 140°W. However, Klaus Riedel has to share this honor with Walter Riedel, who was also working in Peenemünde. Wernher von Braun personally announced this recognition on December 16, 1970, in a note to Irmgard Riedel.<sup>12</sup>

The historical-technical information center at Peenemünde is in possession of the original death mask of Klaus Riedel, which was donated on the occasion of the opening of the center on May 9, 1991, by the only daughter of Klaus Riedel. It can be seen in the exhibition. Close contacts with the daughter of Klaus Riedel, Henrike Riedel-Lückmann, will help with efforts to continue research on his life.

## Summary

- o Klaus Riedel was one of the driving forces behind the German rocket research and development during the 1920s and 1930s.
- o Due to his early involvement with theoretical findings, Riedel developed the desire to fulfill for himself the dream of Moon flight.
- o It was fortuitous that Klaus Riedel became an early member of the circle of rocket pioneers around Rudolf Nebel. He became one of the leading contributors to this group, and he was able to share in many solutions due to his practical understanding.
- o The most important development was the joint invention of a rocket engine with Rudolf Nebel in 1931.
- o During the Peenemünde era, Klaus Riedel slid into a secondary role. Other scientists and technicians, which had meanwhile gained higher training, occupied important positions in the military research establishment of Peenemünde. However, this did not detract from his ability to perform.
- o Only in 1944, after his arrest by the Gestapo and the looming defeat of Germany in the Second World War, did his outlook on life become more depressed. His death on August 4, 1944, ended his short life, which had been characterized by contradictions.

## References

<sup>1</sup>Karl Werner Günzel: "Die fliegenden Flüssigkeitsraketen/Raketenpionier Klaus Riedel," Eigenverlag, Hoxter 1988.

<sup>2</sup>*Ibid.*

<sup>3</sup>Unpublished material from Karlheinz Rohrwild (Hermann-Oberth-Museum, Feucht).

<sup>4</sup>Karl Werner Günzel: "Die fliegenden Flüssigkeitsraketen/Raketenpionier Klaus Riedel."

<sup>5</sup>*Ibid.*

<sup>6</sup>H. Gartmann: *Träumer, Forscher, Konstrukteure*, Econ-Verlag GmbH, Düsseldorf, 1955; memories from Rolf Engel.

<sup>7</sup>Correspondence Dr. Gerhard Reisig and Helmut Zoike with author.

<sup>8</sup>Estate from Klaus Riedel - personal recordings.

<sup>9</sup>*Ibid.*

<sup>10</sup>Memories from Irmgard Riedel (1988).

<sup>11</sup>Estate from Klaus Riedel - personal recordings.

<sup>12</sup>Letter from Wernher von Braun to Irmgard Riedel from December 16, 1970.