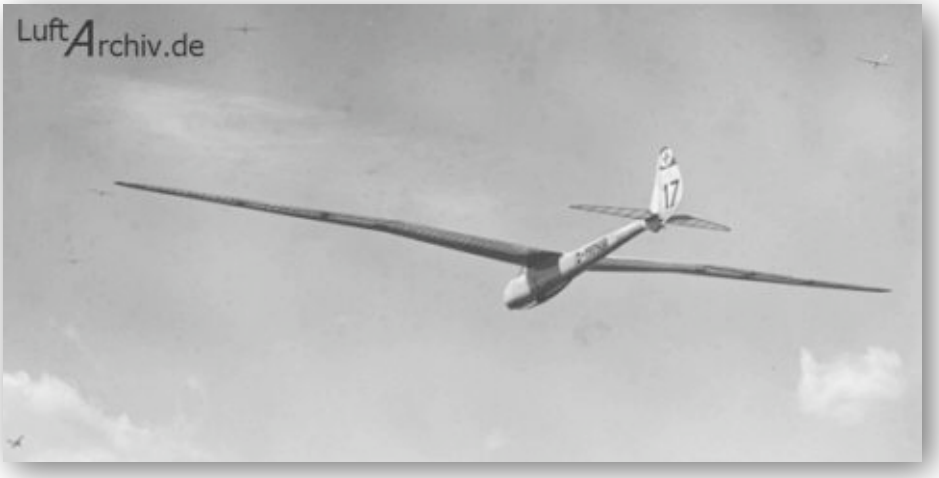
Fafnir

(A mythical Dragon)

The short history of a 1930 German Sailplane
and of it's pilot, Günther Groenhoff



Collected and translated by Vince Cockett in support of his scale radio control plans made freely available to all modelers - 2004

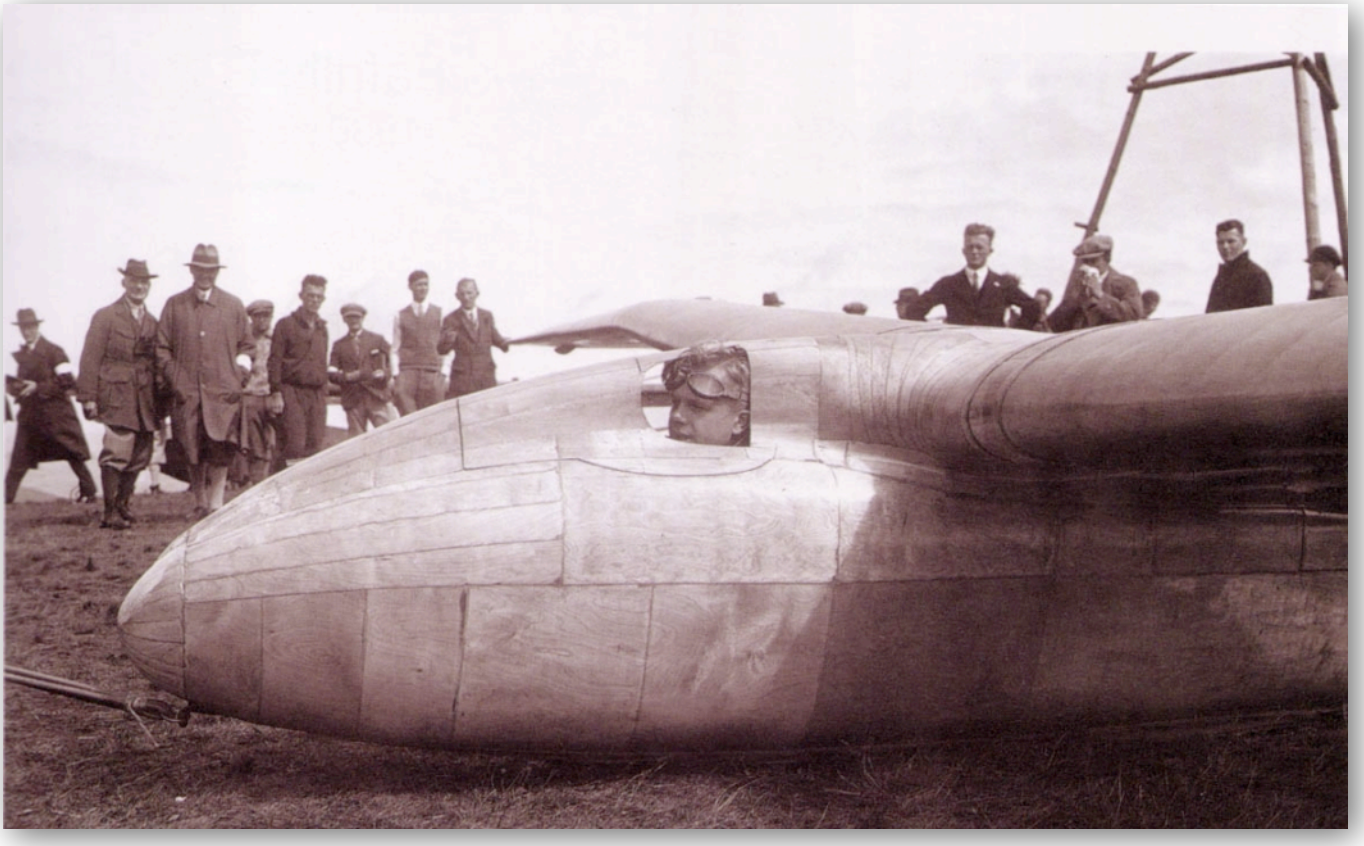
Alexander Lippisch - Designer of the Fafnir

(November 2, 1894 - February 11, 1976)

Dr. **Alexander Martin Lippisch** was a German pioneer of aerodynamics who made important contributions to the understanding of flying wings and ground effect craft. His most famous design was the Messerschmitt Me 163 rocket-powered interceptor.

Lippisch was born in Munich, Germany. He later recalled that his interest in aviation was first kindled in September 1909 by watching a demonstration in Berlin by Orville Wright. He was, however, planning to follow in his father's footsteps and enter art school when World War I intervened. During his service with the German Army from 1915 – 1918, Lippisch had the chance to fly as an aerial photographer and mapper.

Following the war, Lippisch worked for a while with the Zeppelin Company, and it was at this time that he first became interested in tail-less aircraft. In 1921 the first such design of his would reach fruition in the form of the Lippisch-Espenlaub E-2 glider, built by Gottlob Espenlaub. This was the beginning of a research programme that would result in some fifty designs throughout the 1920s and 30s. Lippisch's growing reputation saw him appointed the director of Rhon-Rossitten Gesellschaft (RRG), a glider research group.



Günther Groenhoff takes control of his "beloved Fafnir"

The Following is an extract from Martin Simons book "Vintage Sailplanes 1908-1945"

The Fafnir was designed by Alexander Lippisch and built by the RRG workshops on the Wasserkuppe, for the 1930 Rhoen competitions. It was made to fit the body contours of Guenther Groenhoff, a small, but as it proved, very skilful pilot. All the main principles affecting the performance of a sailplane were known to Lippisch by now. Struts like those on the Wien, were eliminated. The aspect ratio remained almost as high. To avoid excessive weight the root of the cantilever structure had to be made very deep. The Fafnir wing was strongly tapered. At the root, the thick, very greatly cambered aerofoil, Goettingen 652, was used, this changed progressively to Goettingen 535 at the mid-span station and thence to Clark Y, at the tip. This change of profile plus several degrees of negative twist or 'washout', prevented tip stalling at low airspeeds, and improved aileron control.

The wing was slightly cranked to give the attractive 'gull' form. Lippisch's liking for this shape went back to the tailless Weltensegler of 1921. The reasons usually given for it were that it raised the wing tips clear of the ground during landings and take offs, and it was also thought to improve stability in turns. Both could have been achieved by giving the wing a slight, straight dihedral angle. Still, the Fafnir was acclaimed as the most beautiful sailplane ever built and set a fashion, which persisted until the 1950s.

Considered to be the most beautiful sailplane of its time, the Fafnir, flown by Groenhoff, at the Wasserkuppe.

The wing had three spars, a main, box beam at the one- third chord position, with two auxiliary 'I' beams fore and aft. The leading edge was plywood covered, as was usual by now. The ribs were more closely spaced than on other gliders, to preserve an accurate profile. Lippisch gave a great deal of attention to the junction of the wing and fuselage. The centre section was built integrally with the fuselage and a very elaborate, three-dimensionally curved fairing was built up out of numerous small strips of plywood. In service, several modifications were tried to improve the airflow near the leading edge. To reduce drag from the open cockpit, a wooden canopy was constructed and was faired into the nose and wing roots, with portholes on either side. There was no landing wheel, the skid being cleverly sprung by means of a row of tennis

balls trapped between the keel and the ash skid by wooden laths and a canvas or leather covering. Ground clearance all the way along the fuselage belly, and especially at the tail, was very small and this gave much trouble in service.

The Fafnir was just ready for the 1930 Rhöen contest, but the performance of Lippisch new sailplane proved disappointing, primarily due to the high drag experienced from the fairing of the cockpit to the wing. The fairing was hastily modified by the addition of blocks of Balsa glued to the rear of the cabin and carved to a new shape. This was sufficient to improve the Fafnirs performance.

After the 1930 (Rhöen) contest, Groenhoff in 1931, as a member of a team experimenting with aero-tow launching, became the first glider pilot ever to exceed 200 km distance in soaring flight. His 278 km from Munich on 4th May 1931 was not officially allowed as a record because aero-towing had not been recognised by the FAT for such purposes. During this flight, in stormy conditions, the wing was badly holed by hail and accumulated quantities of ice and water which sloshed around inside. When on 24th July Groenhoff achieved 220 km from a bungee launch at the Wasserkuppe, this was accepted. On this occasion he flew on until after darkness and in the end landed using his electric torch, poked out of the barely adequate portholes to make his landing.

Later the Fafnir went to the High Alps. Launches were made by bungee from deep snow on the slopes of the Jungfrau-joch. Ten men on each side of the launching rope were used, but even so, in the rarified air and hampered by the snow, the Fafnir on its first attempt did not reach flying speed. Groenhoff then found himself sliding down the slope toward a precipice. To the horror of the launching crew the sailplane toppled over the edge and as it did so the tail hit a snow wall, tearing off half the elevator. The damaged Fafnir dropped into space. After falling vertically for about 100 meters without hitting anything, sufficient airspeed was attained for the controls to respond and Groenhoff was able to pull out of the dive away from the rocks, out over the open valley. The pilot realised that he had lost half his elevator and decided to maintain a high airspeed until he could reach the centre of the valley where there would be enough height for him to use his parachute. The sailplane behaved normally, provided the airspeed was maintained. Hating to lose his beloved Fafnir he decided after all to try to save it. Choosing a large fiat meadow near the edge of the town he made a very fast touchdown. A wingtip caught in the long grass and a severe ground loop resulted. The Fafnir slid for twenty meters sideways, and came to rest without further damage.

Two days later, with a new tailplane sent from the Wasserkuppe. Groenhoff again flew the Fafnir from the Jungfraujoch, this time gliding down to a landing, which by comparison with his previous escapade was something of an anticlimax. Several days of poor soaring weather followed. On his first flight after this, Groenhoff found he had no rudder control, but was able to get safely down into the valley, where it was found that during the launch the wooden block at the rear end of the fuselage (where the hold-back hook for bungee launching was mounted) had broken off. This had taken with it the main rudder mounting and brought the rudder itself out of its bearings. Only four flights were made by the Fafnir from this lofty launching point. Two of them had been nearly disastrous. The fourth, when Groenhoff soared away to land at Bern aerodrome was successful.

Groenhoff became the third pilot in the world to gain the coveted Silver 'C' badge, after Kronfeld and Hirth.

At the 1932 Rhoen came disaster. Groenhoff, hurrying back to the launching point for what would now be termed a 'relight', found that the wind had changed. Instead of moving to another launching point he allowed himself to be bungeed off downwind. The Fafnir skidded down the slope and finally got into the air, its tail dragging on the ground. At this moment the elevator struck a rock, the aluminium tube on which it pivoted was bent and the elevator

control jammed. Groenhoff, this time, decided to bail out and did so, but his parachute did not open until he hit the trees and he was killed. The Fafnir fell into the forest. One wing broke off close to the root and the fuselage was badly damaged.

Georgii and Lippisch, director and head respectively of the technical division of the RRG, decided to repair the remains of the Fafnir. This time the cockpit was built large enough to accommodate pilots of average size and the old wooden canopy was replaced by a transparent one. In this form Peter Riedel flew it 228 km from Darmstadt into France in June 1933. Riedel, later in the same year, won the Rhoen contest and was awarded the Hindenhurg Cup.

In 1934 with the Fafnir, Riedel accompanied Georgii's expedition to Brazil and Argentina. The Fafnir achieved good cross-country soaring flights, the first accomplished in Latin America and on one occasion Riedel soared for seven hours over Buenos Aires. On return, the Fafnir remained in use far some years at Darmstadt, where the DFS, successor to the RRG, established its headquarters. By 1938 the Fafnir was retired. It was destroyed in a Berlin museum during the Second World War.

The Fafnir Instrumentation

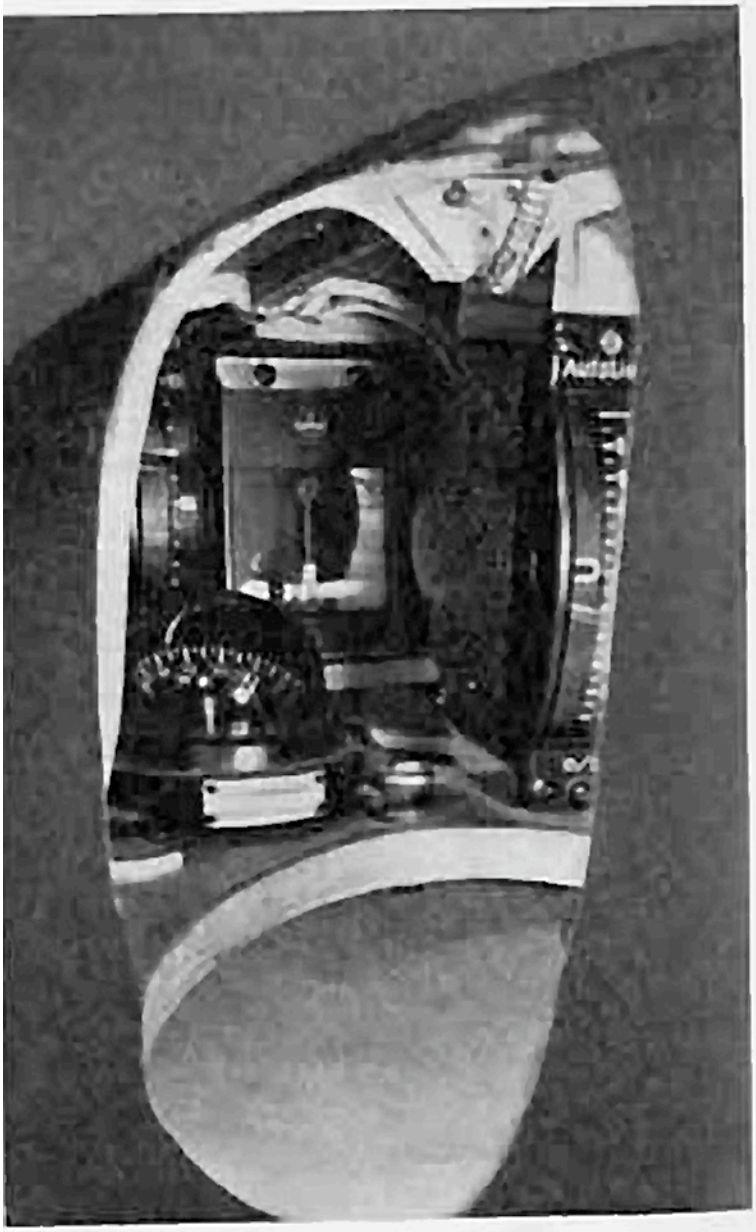


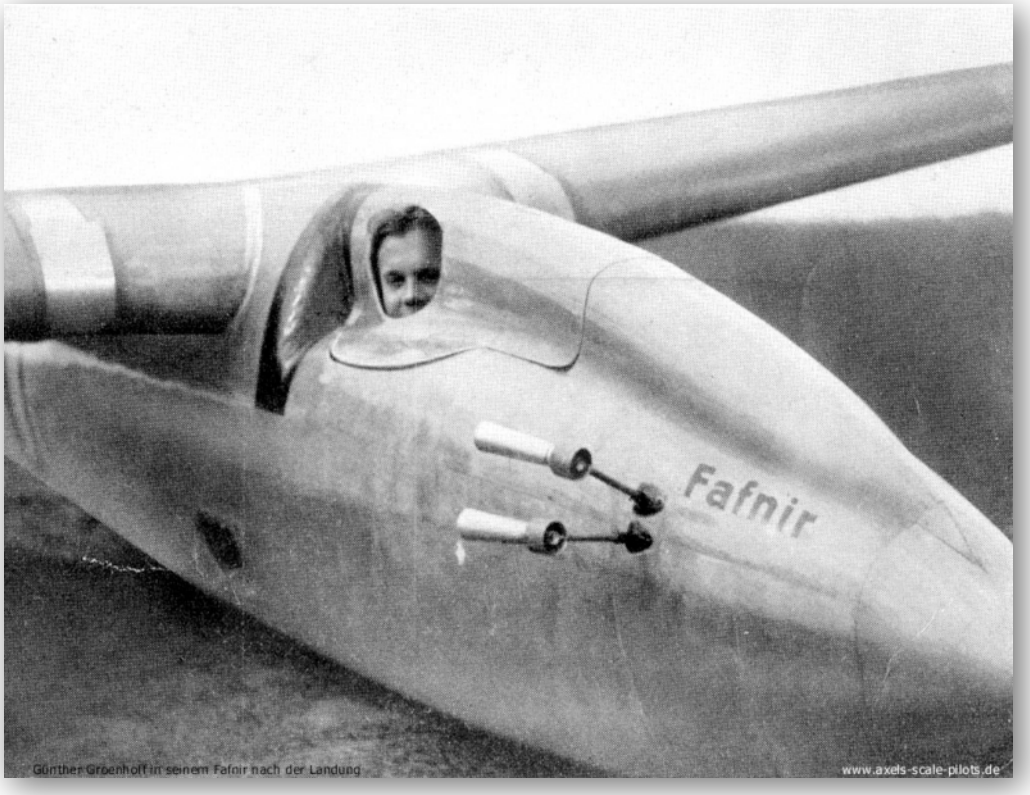
Abb. 135. Instrumenteneinbau beim Fafnir (durch die Führerluke gesehen).

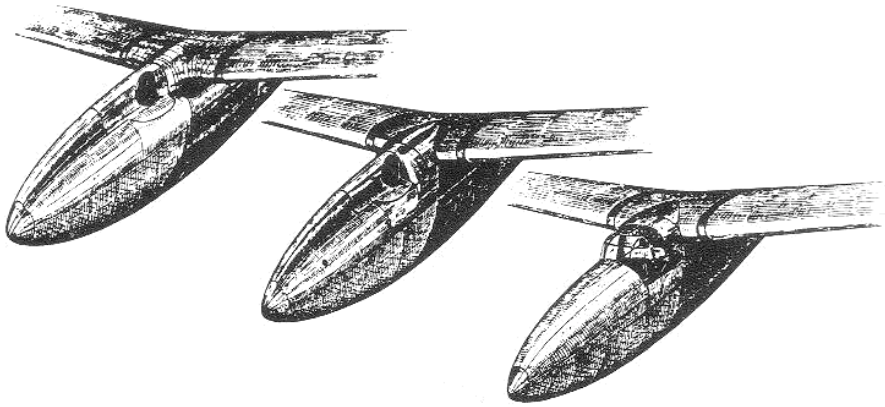
In this view, the instruments are seen from the port side through the cockpit side opening. There is not an actual 'panel', rather the instruments were mounted on a sort of shelf above the pilot's knees

From the left is a liquid filled ball **Compass.** Behind and to the right is the **Turn and Slip** indicator which has a spirit level to indicate bank angle at the bottom and a needle to indicate the rate of turn. This was used when flying in cloud. The instrument is linked to an air-driven gyro connected to one of the venturis on the starboard side of the nose.

Next to this is a **Variometer** with a large vertical scale. An **Altimeter** and an **ASI** were also installed, poitioned out of site to the right and were driven from the second venturi.

On one of the photos below you can see the instrument used for the recording of meteorological information secured to the outside of the fuselage below the starboard wing.





Nose development of the Fafnir

The following are extracts from Groenhoffs own book as found on the Wasserkuppe website and translated into English

I fly the "Fafnir" for 272 kilometers!

From Munich into Czechoslovakia

One of the most outstanding achievements of the year 1931 was the thunderstorm flight of Günther Groenhoff from Munich to Kaaden. The flight was considered by the press to have greatly contributed to the fact that, in Germany in the thirties, sailplane flying had become a sport for the people.

Since the FAI did not yet recognise aero-towing, the 272 km flight could not be recognised as world record.

Here is the exciting report of Guenther Groenhoff from his book " **I fly with and without an engine** ", for background information. Replicating this flight is not recommended.

The Munich Met Conference

With the flight to Buehl the usefulness of the aero-towing of gliders had been proved. On behalf of the Rhoen Rossitten society I would demonstrate this new method and the flight should also prove useful for the research into areas of meteorology for the Munich Meteorological Conference.

On 4 May 1931 the weather briefing in Munich began in the morning. With the dominant northwest wind the plan emerged to try an alpine sail flight. I had arrived at Munich the day before with the "Fafnir" and the tug.

On the Oberwiesenfeld airfield everything is clearly ready for the start and I want to begin to collect good information for the Meteoroligists, but typically the wind turns and throws out our plans, but there is so many beautiful cumulus clouds in the sky. Amongst them one had to be able to hold a glider steady. Peter Riedel in the sluggish engine machine gives full power and soon pulls me with the long towrope over the airfield at 120 meters. The "Fafnir" makes an efficient bounce on the molehills and then floats steadily behind the tug. Humans and houses down below become ever smaller. We have enough height to fly us over Munich. I observe carefully each movement of the "Fafnir", in order to get the correct moment for releasing the tow-rope. There is an slight jerk, the tow-rope falls downward. Riedel immediately flies back to the airfield and leaves me to my fate.

Groenhoff readv to start

The thunderstorm forms

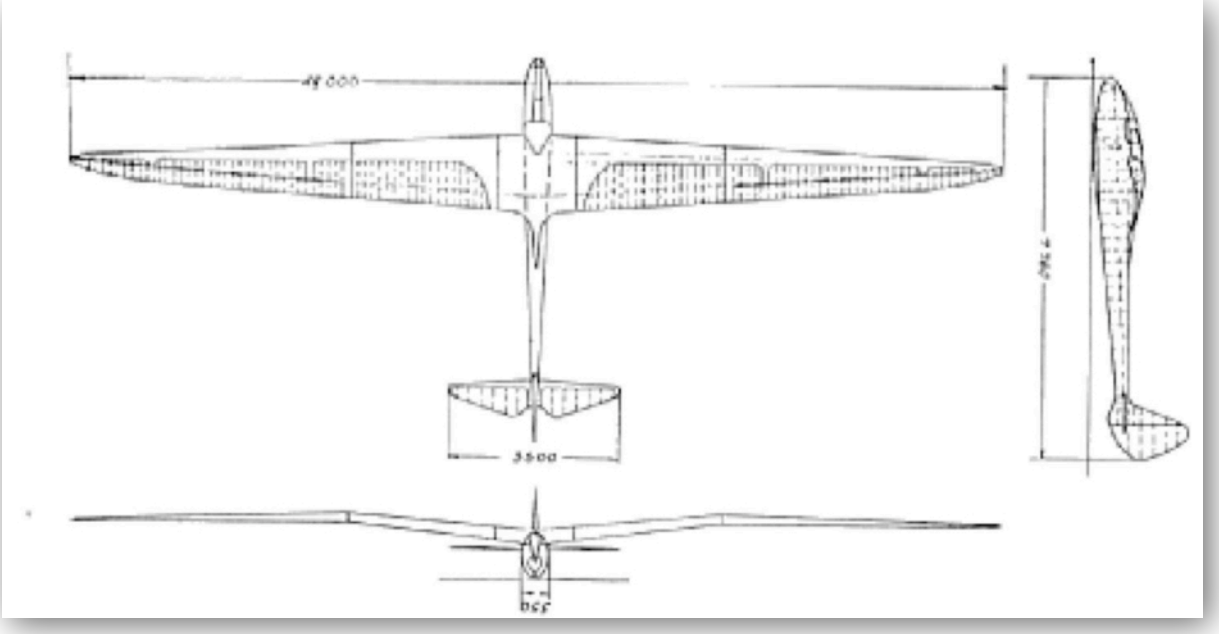
The first hail falls with uncanny uniformity on the structure Thick, down torn clouds hang down before me. The thunder follows, each time with lightning and terrible rumbles as if everything would have become an empty space. I strain to hear whether my instruments are still functioning, because of the way that the flight had started. What will now happen will be of extraordinary importance for the scientific evaluation of the flight.

Again I consider whether I dare to continue this flight into these enormous natural forces outside, but the options had already been forged as I had sufficient time to consider what I wanted to do in such a situation. Thoughts come and go.

Finally the time approaches. In the middle under the heavy dark clouds the "Fafnir" begins to rise evenly at 5 meters per second. The view becomes ever worse downwards. Behind, the earth slowly disappears. Laterally, lightning flashes in the grey, but of the thunder nothing is to be heard. The hail strikes noisily on the "Fafnir". My instruments still shows: ‘Climb’. The Air becomes jerkier. It becomes more difficult to hold the "Fafnir" in a normal position. The Air Speed indicator decreases then returns suddenly. I descend fast, in order to keep flying speed, but the pointer jumps back and forth, and the "Fafnir" whistles loudly with the excessive airspeed. The speedometer is clogged by hail and precipitation. Similarly the artificial horizon is affected. Only with the compass and my senses am I able to continue the flight.

The gusts become stronger. The hail falls in cherry sizes and hits with such force against the covering that slowly large tears develop. The elevator is of little use. A strong gust lifts me into the canopy cover above the top of my seat. The machine reaches such high speeds that I watch the wing in order to see how they will break. But they only bend into degrees I would never have considered possible. Occasionally lightning flashes, apparently in close proximity. The thunder cracks, as if the lightning would be struck into the machine, then rumbles slowly afterwards from above. I try again and again to fly N.E. using the compass in order to come ahead of the thunderstorm. Finally, I succeed. The hail patters more quietly and then, in time, I see the earth very hazily beneath me. I immediately push the Fafnir into a steep spiral dive.

It is, as if I could breathe deeply again for the first time in a long while. In the brightness I view my wings. They have long tears and many small holes. Water and hail lie as a thick layer on the wing, but the faithful bird still flies so beautifully that I do not need to feel concern. The heavy thunderstorm was perhaps a hundred meters behind me. The whole grey of the storm is continually in motion. Large eddies form. An area for airplanes that would be difficult to overcome. Before me a marvelously illuminated landscape lies to the N.E and in the South, ahead of the thunderstorm, can clearly be seen the long Alpine chain lit by from the sun.



Technical data
Span. 19.00 Metres. **Wing area.** 18.6 sq m.
Empty Weight 220 kg. **Flying weight.** 315 kg.
Wing loading. 16.9 kg / in.
Aerfoils: root. Goettingen 652. **mid.span**. Goettingen 535 **tip,** Clark Y.

First I go on patrol, in order to see, what size the "front" is and where the best rising air is to be found. That can be done fast. The thunderstorm is judged to be small, perhaps 15 kilometers in expanse. There are fronts of 1000 kilometers width. Ahead of the thunderstorm the rising air is even and strong so that I climb fast to approximately 2200 meters. From time to time clouds form around me. But in blind flight I fly again and again with course N.E. to head out of the front. I fly for hours following the thunderstorm.

At one time I discover a butterfly at these unbelievable heights. I wonder if, like me, this small chap freezes; but already I am past it. My seat becomes damp. The hail, which collected on the surfaces, is melting. The water gathers in the fuselage and begins to slowly rise. For a long time I bore into the floor until I have a hole through the plywood by which the water can leave.

Blind flight

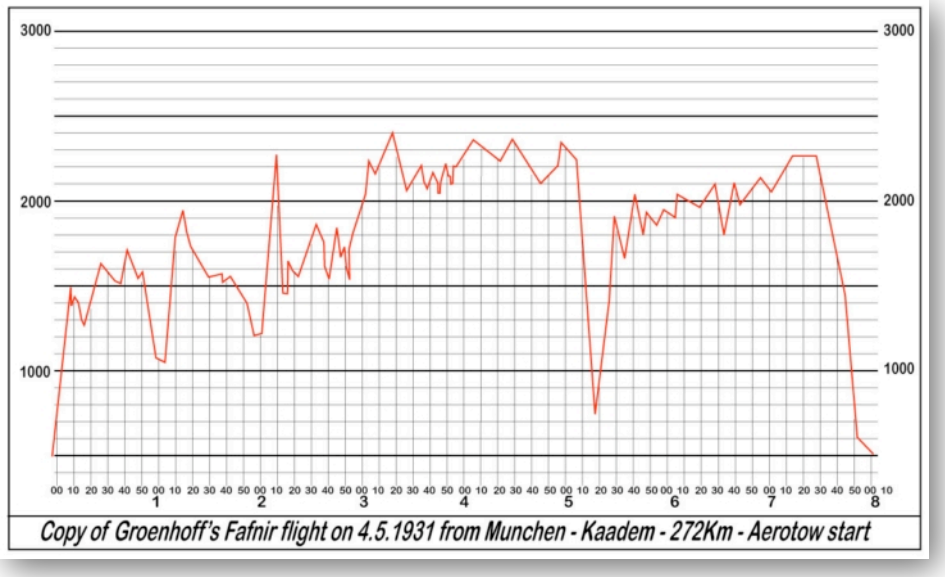
It is interesting to observe what takes place down on the ground if a thunderstorm arrives. If a large smoke trail emerges somewhere, I observe the exact direction that the smoke takes. I can see exactly how the wind slowly turns ahead of the thunderstorm and how the thunderstorm lifts the smoke upwards at it’s front. On the edge of the thunderstorm, long spirals are pulled upwards.

Down on the roads the vehicles dash. They want to get home before the cold rain shower. Sometimes I can observe, how the rain approaches them and then steadily pours. In the trees the storm before the thunderstorm begins. Lightning flashes continuously to earth and sometimes into my locality. Has it caused a fire somewhere? Nothing is to be seen.

After a long flight I recognise before me the course of the Danube and then beneath me the

Valhalla. From Regensburg I cannot see much any longer, because clouds form everywhere around me and completely surround me.

In blind flight I try to fly again a N.E. course to the front, but it seems to last for an eternity.



Copy of Groenhoff's Fafnir flight on 4.5.1931 from Munchen - Kaadem - 272Km - Aerotow start

Again the hail begins. It is unexplainable. I assumed that the compass had failed and I had again flown back into the thunderstorm.

The "Fafnir" suddenly falls steeply downwards. I come out from the clouds and approach the ground quickly. I recognise that I had come into a developing thunderstorm in blind flight and am now being pressed down in the descending air on the back of the storm. I circled back to where I had come from, but it seemed too late. At, perhaps, 150 meters above ground the descending air finally stopped. I still had sufficient height in order to look for a landing place. Before me I discover a small slope. I must try and hold there for a few minutes. With great caution I circle for approximately ten minutes back and forth and maintain my height.

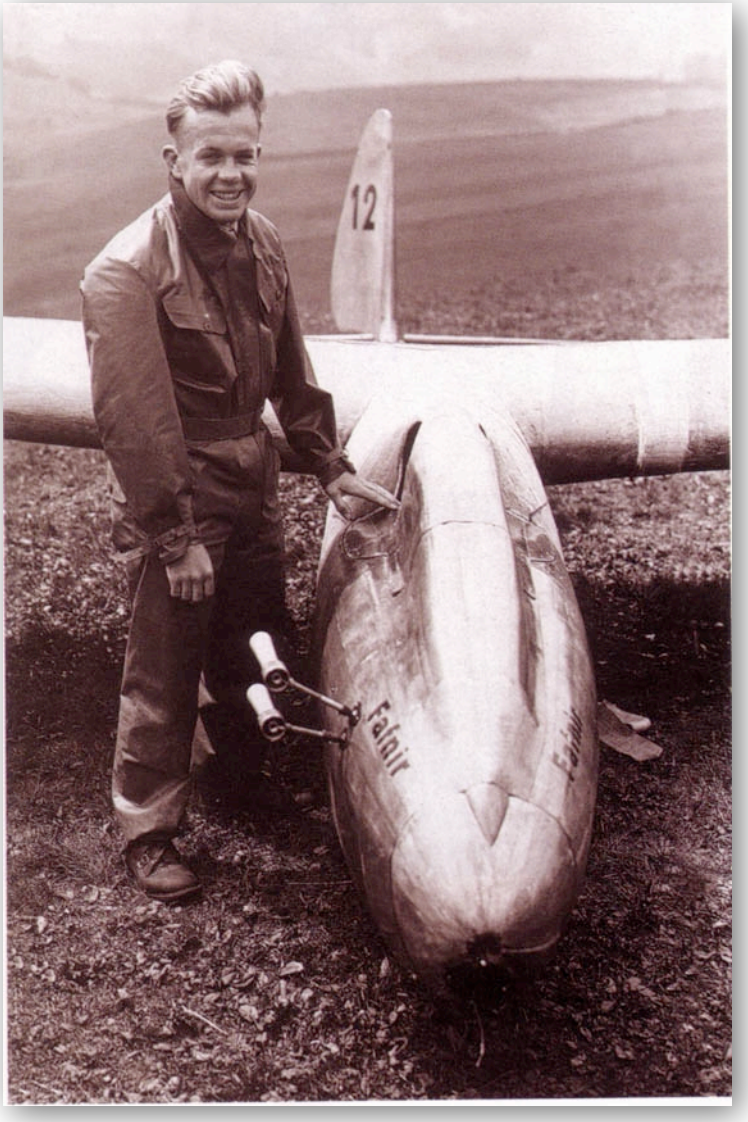
The thunderstorm catches up me with me again, the updraft strengthens and then the thunderstorm pulls me back to my previous height of 2000 meters. The thunderstorm passes now over the Boehmerwald, strengthens again and unloads itself with force over the mountains. Slowly the evening approaches. The sun appears on the clear horizon and floods everything with a red glow, a powerful picture after those many exciting events. In order to land before darkness, I fly away from the front and the good lift. Slowly I lose my height in gliding flight, but the darkness comes much faster than I had expected.

When I am still scarcely 1000 meters high, the first lights below are already turned on. The view becomes ever worse. I see after some time, how in a larger city before me the road lighting in a quarter is switched on one by one. I fly on in the direction of the city where I will get assistance. I can no longer recognise the area below me. Suddenly, I see the lights of a house close beneath me. It is clear I must land immediately. I shout as loud as I can to catch attention, however, suddenly I am again over a deep and steep river channel. Between these steep slopes, without any embankment, flows the Eger. I wanted to circle back, but I cannot reach the edge of the slope as I had no height left.

Landing in Kaaden

The far side of the river lay lower and I tried to fly over there. Now I notice how bad the "Fafnir" has become with the hail damage. It descends fast and becomes very exciting, but with a few meters height I arrive at the other side and land smoothly in a young oat field, just before a high voltage line. Since I hear no one, I call out loudly: Hurrah! I lift my rigid members from out of the fuselage, but my limbs no longer want to move. Soon I find myself standing beside my dear "Fafnir", the faithful bird. She seems badly mangled. The instruments still tick to their even work.

After I had called aloud for one quarter of an hour my throat was hoarse and there was still no curious appearance from the public, I decide, to follow the high voltage line along to the next settlement over fields, meadows and fields. From time to time there is still more lightning in the distance. On the opposite side of the Eger, along which I am walking, there are so many houses, but nowhere is there a boat to be found with which I could cross over there.



After three-quarters of an hour I see an old man with a large box on his back. I call him. He gets such a fright that he immediately drops his box and tries to disappear behind a few shrubs, but I am much faster. I calm him down with some words and find that he is going to the next locality after Kaaden. I tell him that I had landed with a glider, an airplane without engine, in the proximity, so he might be a little interested.

Along the way, he described the interesting life he had as an organ player. Thus we drew into Kaaden as good acquaintances and said our cordial good-byes.

The authorities in Kaaden had more interests in me. They seized the "Fafnir" and took it and me into military custody. I had to disassemble the "Fafnir" in the night onto three horse carts, and with the airplane bedded on straw, we drew into the barracks at five o'clock in the morning. At seven o'clock the telegraph office finally opened. I could now telephone the message of my safe arrival. This was probably the most beautiful moment of my flight, because I knew that everyone had waited for my message and with everything else, they were pleased.

In eight and a half hours flight I had flown 272 kilometers and had brought rich information for the meteorological research at home.

Typical bungee launch of the Fafnir

The Fafnir as it appeared on its debut in South America sporting the new enclosed nose and piloted by Peter Reidel

The following are extracts from information found on the Wasserkuppe website and translated into English

The Short Life of Günther Groenhoff

Arguably, the greatest and most popular of the German glider pilots was Günther Groenhoff who set many world soaring records in distance, duration and altitude. Many of his record setting flights originated at Wasserkuppe. His first official long distance record was achieved in the summer of 1931 when he flew from Wasserkuppe to Magdeburg, a distance of 140 miles. Flying from Berlin's Templehof airport in a tailless plane he helped design, he attained a record setting speed of 90 mph. His altitude mark of 7,000 feet was set during a flight from Munich to Czechoslovakia. Not all flights were successful. During a 1931 flight from Jungfrau-Jock Mountain, high in the Swiss Alps, he lost half of his plane's rudder, but skillfully flew it to a safe landing on the valley floor 6,000 feet below.

Groenhoff further demonstrated his skill and courage while conducting research for a Munich meteorology conference in May 1931. On a mission to gather weather data, he installed various instruments on his Alexander Lippisch built "Fafnir" model 272 glider and was towed to altitude by a powered aircraft piloted by another famous pilot, Peter Reidel. As they approached towering cumulus clouds over Munich, Groenhoff's Fafnir was released to his fate. For the next eight hours, he was bounced and buffeted around the thunderstorm amid lightning flashes, hail and torrential rain, all the while collecting valuable information on weather conditions. Many times he flew blind. His journal indicates that he experienced one rapid descent in zero visibility to emerge from the cloud to see the ground only a few hundred feet below. He managed to bank and return to the front side of the thundercloud. He wrote, "as soon as the storm reached me, some powerful force pulled the plane straight up into the center of the clouds. It seemed to me as if I were riding an express elevator of a high skyscraper."

After soaring with the storm for eight hours, he had traveled 240 miles and finally landed on a riverbed, coming to rest a few meters short of an electric line near Kaaden, Czechoslovakia. Groenhoff wrote that he was gratified that he was able to bring home "the rich information for meteorological research."

Back at Wasserkuppe on July 23, 1932, Groenhoff once again soared into the strong, turbulent winds of a thunderstorm. However, his good fortune had run out. The rudder of his beloved Fafnir snapped and he crashed on the west slope, dying instantly. He was 23 years old.

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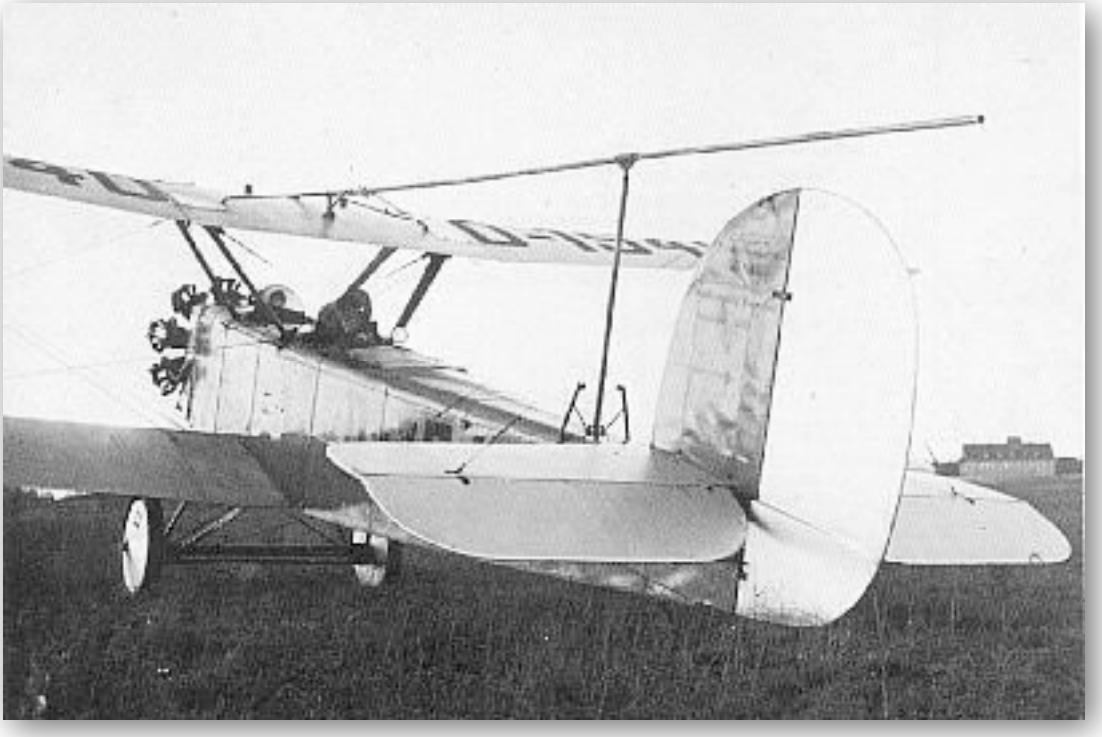
1927 - The Beginning of aerotowing



The Flamingo tug

The first Aerotow was implemented in 1927 by Gottlob Espenlaub and Gerhard Fieseler, and briefly by Espenlaub and Edgar Dittmar. In the following years aerotows were shown, particularly as attraction, on flight days with special "aerotow drones". For primary gliders the loads were considered too large.

In the spring of 1931 Otto Fuchs of the Akaflieg Darmstadt made the suggestion to tow the "Starkenburg“ and the "Darmstadt II" with the Flamingo. Kurt Starck on "Darmstadt II" made the first attempt. Tug pilot, Peter Riedel reports:

Thus on the morning of March 1931 "Darmstadt II" stood with Kurt Starck at the east end of the Griesheimer Platze. They were by connected by a 120m to 150m long tow cable - the exact length escapes me - connected to the tow point of the NLG U 1a "Flamingo" D-1540. A red rag made the thin steel cable more visible. Slowly I gave full power. In the rear view mirror I saw, how the cable became taut and started the "Darmstadt" in motion. At the beginning, forward acceleration was retarded by the landing skid on the sandy soil. When we took off finally, I must probably have had too much speed. Anyhow there was jerk forward. Starck had released.

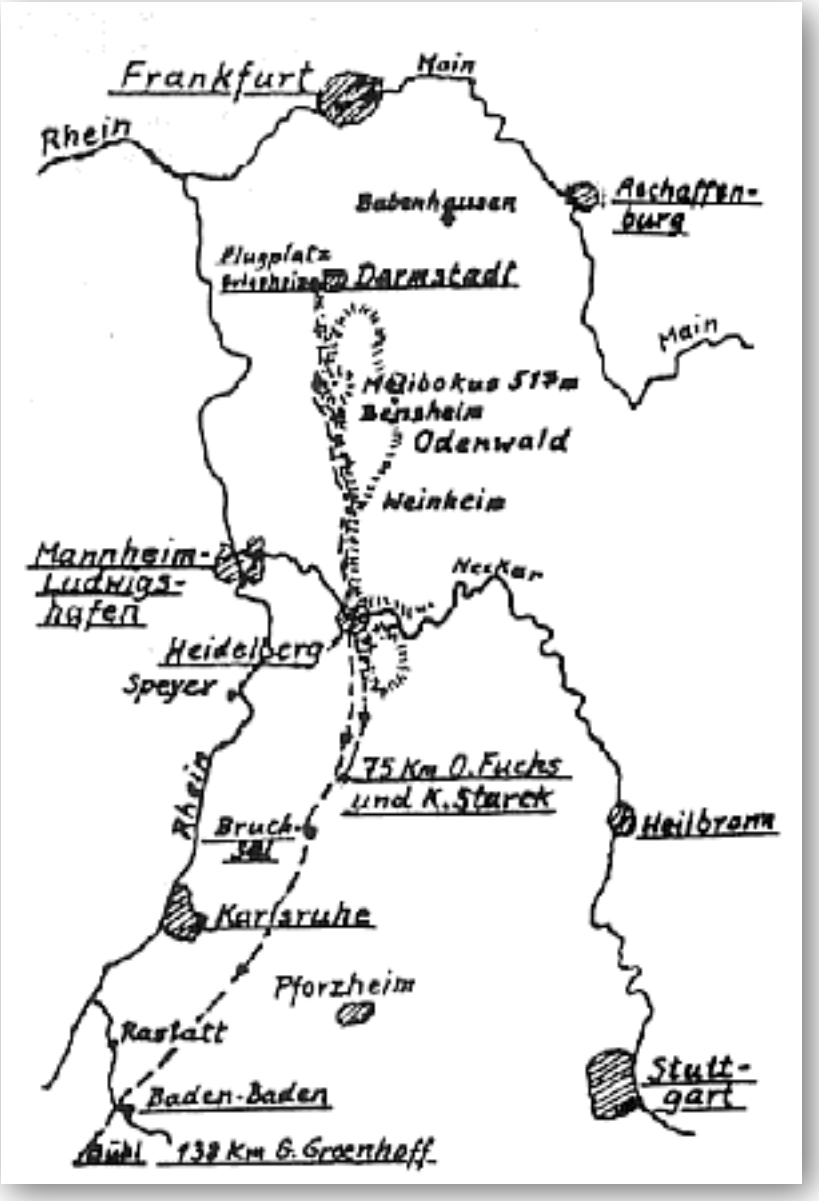
"Abort, Abort!" - professor Georgii had excitedly called, when the "Darmstadt" started longitudinal

oscillations – pulled the release -, separated and landed from the tow rope. Otto Fuchs however came over to me, as I had remained seated in the Flamingo. "Mr. Riedel, can you go a little more slowly?", he asked calmly and friendly. He understood that we both, Starck and I, had something like stage fright.

Now it came to the second start. There were no problems at all. We made a long tow flight up to a height of 1500m. Calmly the "Darmstadt" could be seen hanging in the rear view mirror, behind the Flamingo. Only after Starck had finally separated did the joy come over our achievment. The spell was broken. Aerotowing of gliders was no longer a problem and soon found it emulated.

Professor Georgii had Groenhoff and the "Fafnir" come immediately from the Wasserkuppe to Griesheim. Thus I towed a few days later Groenhoff, Starck and Fuchs of the Griesheimer, in that order. All three glider flights lasted several hours.

How deeply the rooted prejudice was against Aerotowing of gliders was shown by the following: Kurt Starck reported that, a few weeks later Wolf Hirth who had strong influence in Griesheim appeared and visited the Akaflieg Darmstadt, right after his return from the USA. There he spoke about the dangers of Aerotowing gliders and only after long discussions on the safety of Aerotow would he later be convinced.



En-route flights at the mountain route

On 15 April, Riedel towed the three ' Griesheimer' pilots Otto Fuchs, Kurt Starck and Guenther Groenhoff with the Flamingo to a 1000m releasing height. Fuchs and Starck landed south of Heidelberg, Groenhoff carried on to Buehl, Baden-Baden. That was 138 km and a new German distance record. Here is the report of Guenther Groenhoff.

My sailplane flight from Darmstadt to Buehl

April weather! Sunshine, followed with a light showers and a fresh wind from northwest: the suitable weather, for which I had waited. Already, for weeks, on Griesheim Airfield attempts to tow gliders by a powered aircraft into the had been made with the 'Darmstadt' under the supervision of Professor Georgii. Now the first opportunity had come to put the lessons learned so far into practice.

Successively, three machines were towed up. I am flying the "Fafnir" in third place. At a height of 1000m I released from the tow-rope of the powered plane and have the luck to find a cloud front. Slowly I am lifted ever higher and even disappear for some time in the cloud. When I can see downward again, I was already over Odenwald. But now the descending air forces me very strongly downward so that I must fly fast into the lift of the slope at Melibokus. After soaring there for some time, I suddenly find favourable lift, which pushes me in few seconds from 900 to 1600m. I come out alongside a cloud and can fly away now in somewhat calmer air, directly towards Heidelberg. Like a holiday traveller I set off accompanied by the quiet whistling of the machine, I fly in the marvelous sunshine over the pretty cities of the mountain passes. Laterally, in the west, the bright glisten of the Rhine accompanies me. From down below came noises of car horns, bustling humans and hammering in a quarry. It is so beautiful, so quiet to glide! From time to time I lost height, but recovered again under a cloud. Time passes. It is now four o'clock. I want to cover a good distance before the evening calm. Thus: no time to lose!

At the turning point of Heidelberg comes the difficult part of my flight. Between Heidelberg and Bruchsal there is no slope in whose lift I could regain lost height. It is a distance of thirty kilometers.

At the turning point strong turbulence began. The lift at the slope did not give any height gain. With 1000 m I flew on and lost height slowly more and more. I saw another sailplane, which had started before me, in a meadow below. The comrade had thus failed today, exactly the same as in previous flights and had been forced into this difficult landing area. I begin to fight for each meter of height. In completely weak lift I win 200m, but this is sufficient in order to reach directly the first slope with Bruchsal.

I am pleased, however, to have overcome all the difficulties and enjoy in this happiness the view of the pretty Bruchsal with its wonderful castle. At low altitude I now have to fly along the slopes. I see many pretty small cities to the west of Karlsruhe whose names are unknown to me and fly over at approximately 50m height. The inhabitants shout and make signs to me. I answer only: “Hello, hello!” I have enough to do with my flying.

I am now at the Black Forest. The mountains become ever higher, and soaring should become easier now, but the evening comes and the wind turns and diminishes so that it becomes ever more difficult to get over the forests and villages. I still see close on my left Murgtal with its castle ruin, then straining hard I can see Baden-Baden, however, I have to decide to the land in a meadow at Buehl. The joy of the arriving at Buehl is great. Someone addresses me with my name. An acquaintance from Wasserkuppe.

How far had I flown I noticed by the dialect, which sounded strange and nevertheless so friendly to me. In three hours I had covered a distance of approximately 138km on a direct track and had brought with it the German distance record for me.