MISTEL

THE PIGGY-BACK AIRCRAFT OF THE LUFTWAFFE

HANS-PETER DABROWSKI

Schiffer Military/Aviation History

A camouflaged Ju 88 G-1/Fw 190 A-6 Mistel parked at the edge of a forest, discovered by US soldiers in Gardelegen, 1945.

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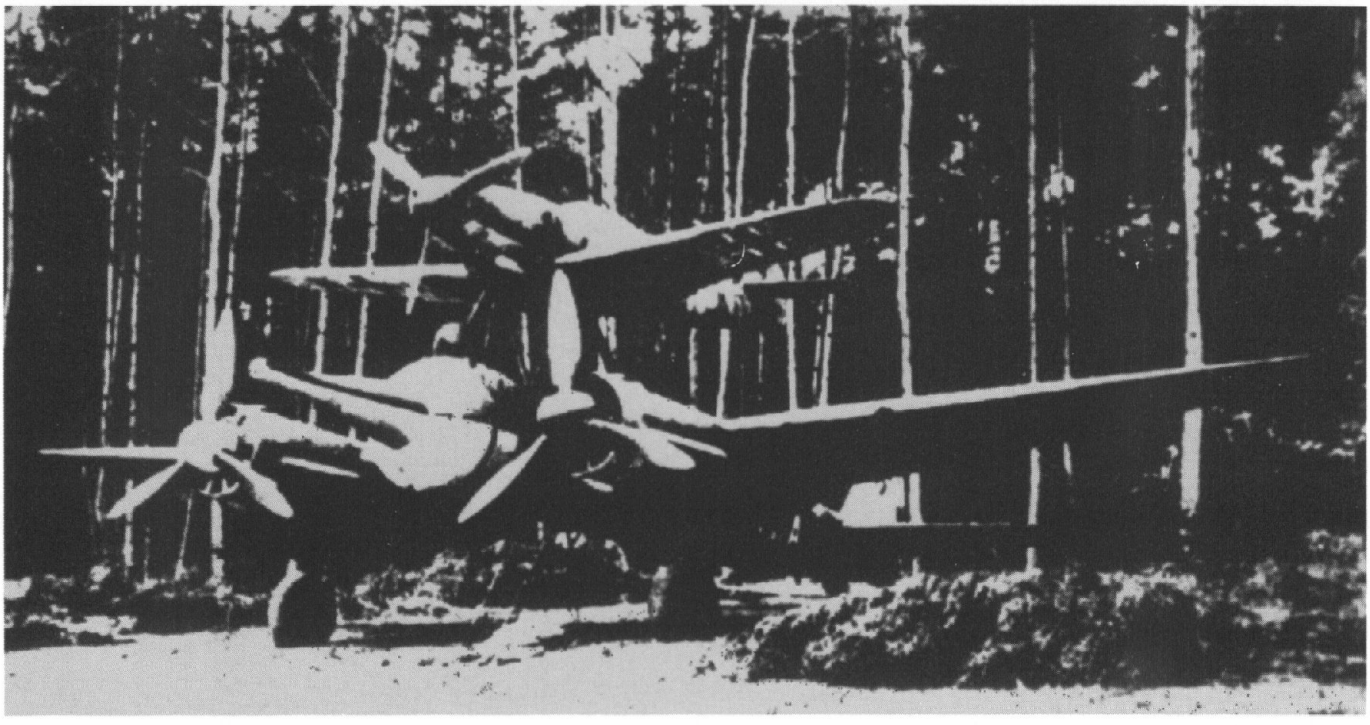

A live Mistel with warhead.

Hans-Peter Dabrowski

Schiffer Military/Aviation History
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L. Schmitt: "Die Entwicklung der Mistel-Gespanne", Modell Magazin 7/82

H. Lächler: "Mistel im Einsatz" Flugzeug 6/88

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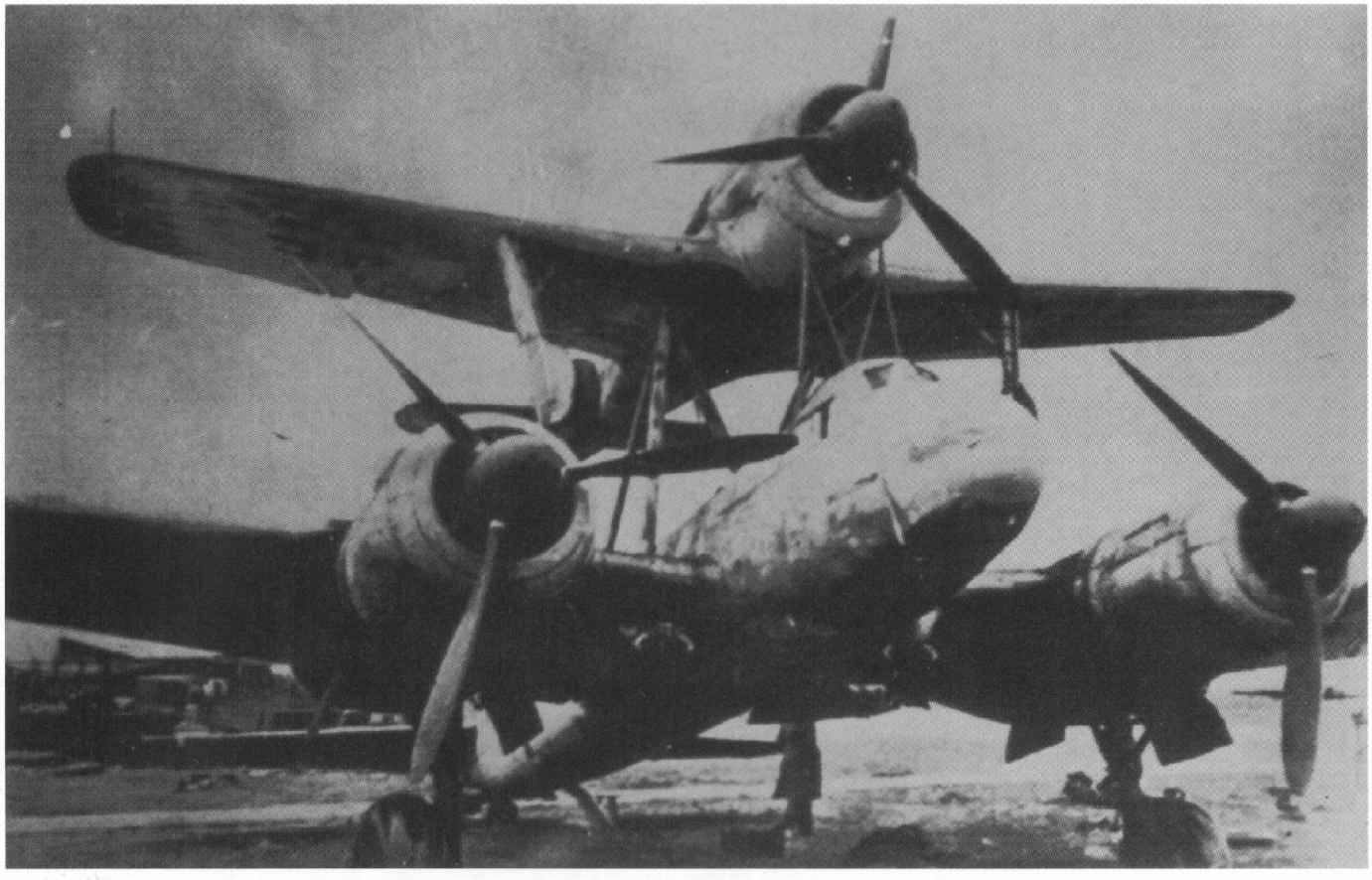

An S 2 Schulmistel, a Ju 88 G-1 with an Fw 190 A-8 attached.

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Preface

Development and operations of the German Mistel aircraft were kept under the tightest security, in an era fraught with the chaotic turmoil of a losing war. Aside from the limited

space available – which precludes a detailed account of this unusual variant of the air war – it should also be mentioned that the quality of the photographic material often leaves something to be desired. This concession, which should be considered the exception rather than the rule, is necessary in the interest of providing a good general overview. Arno Rose, to whom I offer my gratitude for his generous help and support, has presented a comprehensive historical account in his book "Mistel – Die Geschichte der Huckepackflugzeuge" (Motorbuch Verlag, Stuttgart 1981).

Mistel – Reinvented in Germany

In search of a better means of towing transport gliders than the previous rope towing method, research was conducted by the Deutsche Forschungsanstalt für Segelflug (DFS) at Ainring near Freilassing (Bavaria). In addition to fixed towing, this research included the piggyback or "Mistel" (mistletoe) method. With this type of towing, it was planned to affix a smaller motorized aircraft to the larger DFS 230 transport glider using a detachable connector. The intended goal: takeoff on its own power, i.e. dispensing with a tow plane, and then having the Mistel combination separate at a preplanned altitude and preplanned time.

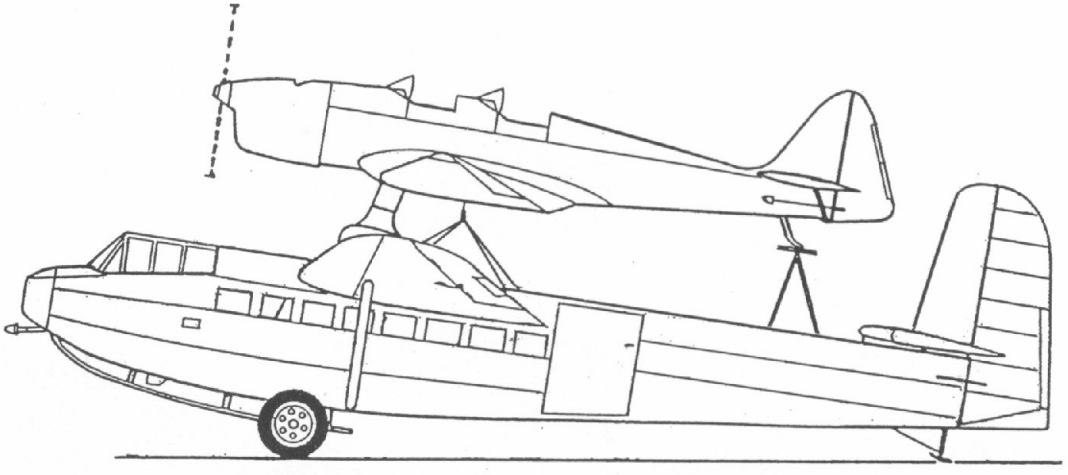
The testing program began on 1 September 1942 under the supervision of the Institute director, Fritz Stamer. Kurt Oppitz, Paul Stämmler, Paul Kiefel, Hermann Zitter, Karl Schieferstein, Karl von Jan and Erich Klöckner carried out the testing. Fritz Stamer viewed the Mistel composition with a rather large amount of skepticism, for this was the first time that something like this had been tried in Germany. The British piggyback Short/Mayo version, which had previously been flown with success, was known to the group. But at that time much experimentation was being done in the field of aeronautics, constantly searching for new methods and approaches to problems, and so it was that these British flights didn't spark any particular interest.

The first successful "Mistel" team from England: the Short/Mayo composite from 1937/1938. It was hoped that this piggyback version would offer increased long-range performance.

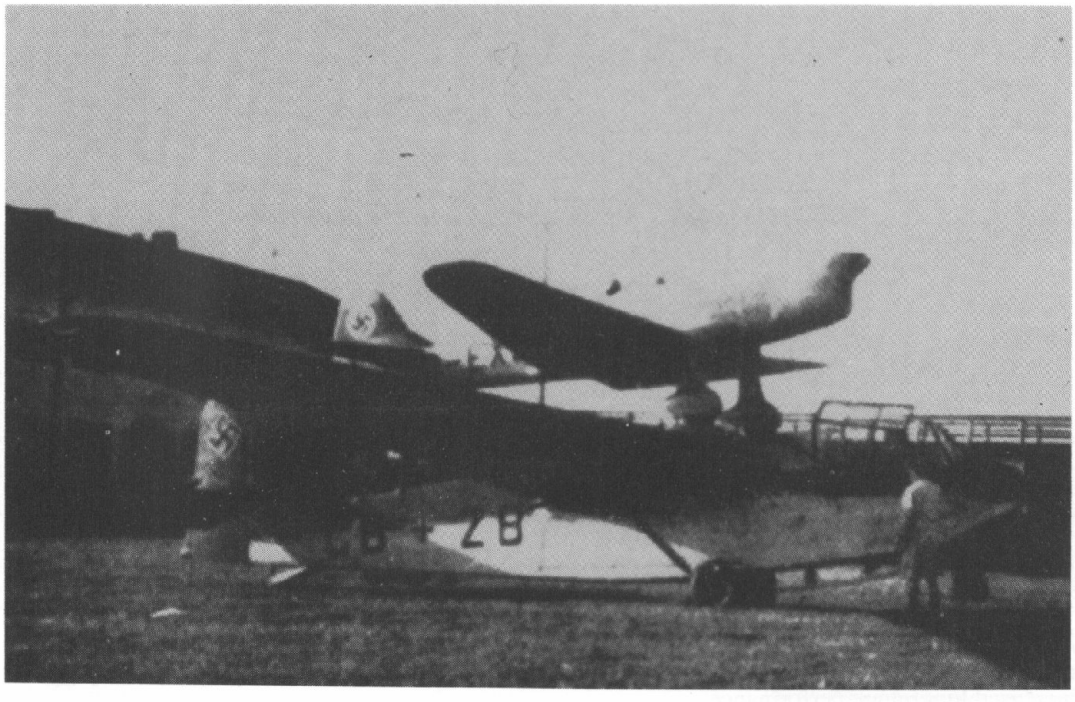
In any case, DFS "reinvented" the Mistel towing method, meaning that it was developed independent of the research and testing results of another group. The first Mistel combination was a Klemm 35 supported on a DFS 230 transport glider. The connection between the two planes consisted of a rope pyramid, the uppermost point of which was attached to the fuselage underside of the Kl 35. The Klemm's tail strut rested on a vertical hollow steel tubing brace, so that the upper aircraft had the same flight attitude as the glider. The landing gear sat in wheel supports which were attached to the wings. The rope pyramid was stressed in such a manner so that the landing gear suspension on the Kl 35 was fully compressed. When the connection was released, the aircraft was then given an additional "boost" upward, quickly separating itself from the transport glider.

Karl Schieferstein sat in the Klemm, while Kurt Oppitz piloted the DFS 230; both pilots were linked to each other by intercom. A Ju 52 served as a tow plane, piloted by Flugkapitän Hermann Zitter. The Klemm's motor was running at full throttle, which shortened the takeoff run. The planned altitude of 2000 meters was attained without incident, and the Mistel was released from its Ju 52. After descending 500 meters the team separated, having determined that the engine of the Kl 35 was too weak to maintain altitude with the DFS 230. Separation occurred without mishap. Karl Schieferstein gave the Klemm full throttle and at the same time Kurt Oppitz slowed his bird down; the Klemm immediately pulled up and away.

Then separation was conducted at varying altitudes, including just above ground level – so as to obtain reliable data for emergency situations. Landings with the complete Mistel were also conducted smoothly. Since the upper airplane had the engine power and the lower one the landing gear, both pilots constantly kept each



The first German Mistel: DFS 230 glider with a Klemm 35 attached.



Takeoff preparations for the Kl 35/DFS 230 Mistel team at the Ainring Airfield in Bavaria, near Salzburg. The glider has the normal, detachable landing gear.

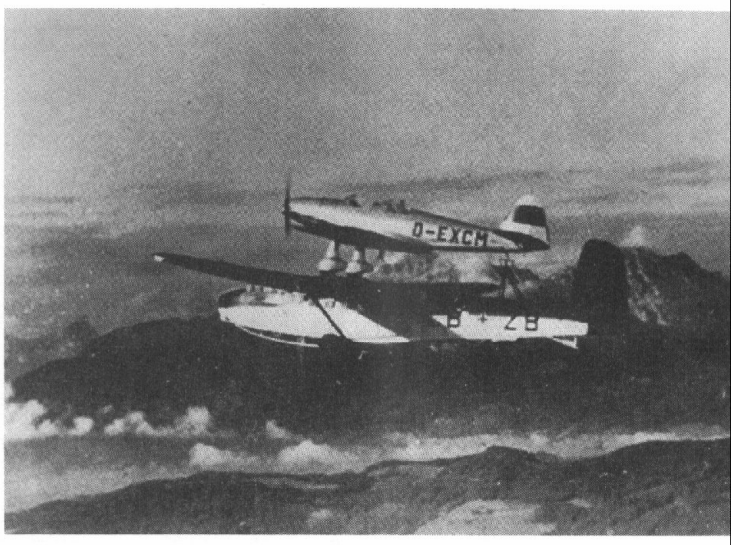
other informed by radio to ensure a synchronous landing maneuver.

The next aircraft to be set atop the DFS 230 was the Fw 56 "Stösser", which could maintain altitude as part of a Mistel team thanks to its more powerful engine. An independent takeoff without a tow aircraft was still not possible, however. Nevertheless, it was already apparent that the Mistel method was generally more advantageous than other methods of towing.

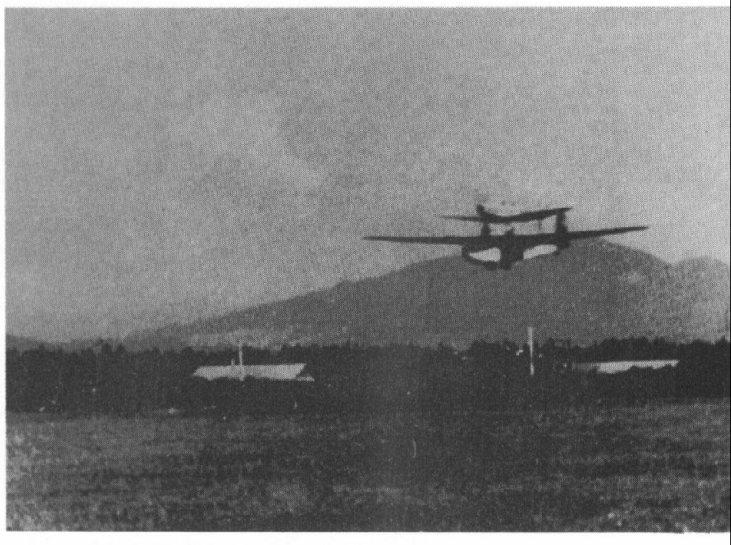
In order to achieve an independent takeoff, a Messerschmitt Bf 109 E with 1100 hp engine was set on the DFS 230, but not without modifying the glider beforehand. It was given a leaf-spring landing gear with the wheels of a Junkers W 34 and the tailwheel of a Henschel Hs 126, the fuselage was strengthened and for the first time the upper aircraft rested on a support mount with its landing gear retracted. Together with additional safety measures for the pilot of the DFS 230, the transport glider's weight had increased by 600 kg. This time the takeoffs would not be performed from the relatively small grass strip at Ainring; instead, the longer and solid runway at the Hörschling airfield near Linz would be used. This airfield was also utilized by the DFS. The Bf 109 E/DFS 230, with Zitter/Schieferstein as pilots, took off without a hitch on 21 June 1943, climbed to an altitude of 2000 meters and reached a maximum speed of 240 kmh. No separation occurred and the team landed 40 minutes later in good order.

Immediately afterward the combination took off again, this time with the intention of separating in flight. During this procedure, at an altitude of 1500 meters, Schieferstein broke cleanly away in his Bf 109. Zitter's glider, however, suddenly pitched nose upward – probably due to the adverse flight path profile – and brushed solidly against the Bf 109's coupling with its canopy. As a result, the support mount was improved, and the installation of a dive brake provided the necessary flight attitude.

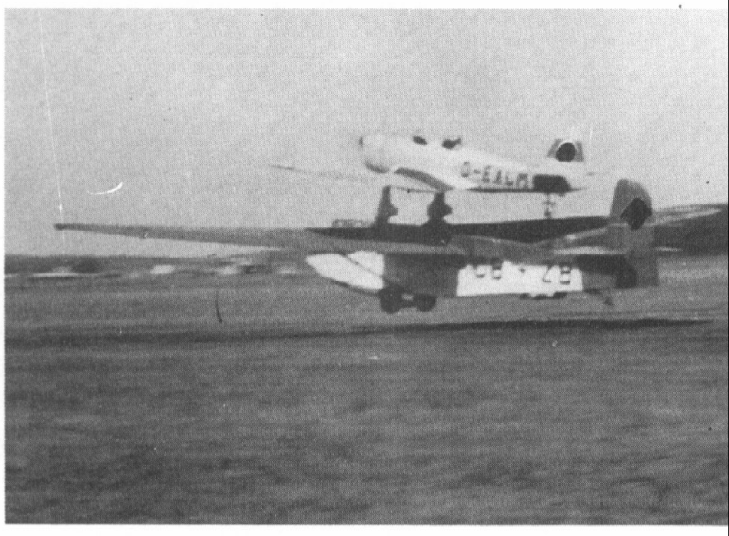
Once again, takeoffs were made back at Ainring, since the Bf 109 E/DFS 230 combination only needed a takeoff run of 400 meters. In all subsequent tests the Mistel combination proved itself to be an entirely "flyable" concept – with the exception of an attempt to replace the DFS 230 with a larger and heavier design, an idea which failed from inception.



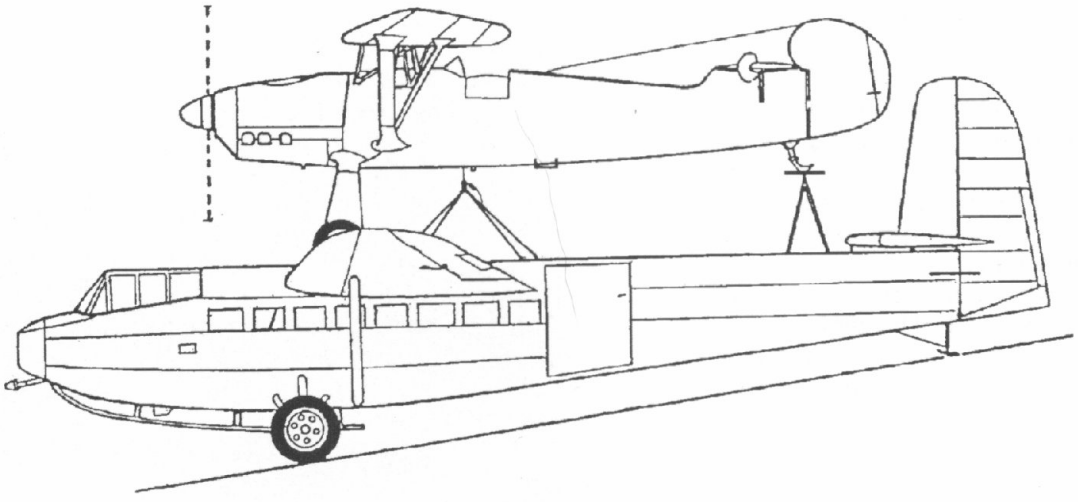
The Kl 35/DFS 230 Mistel during testing, in flight . . .



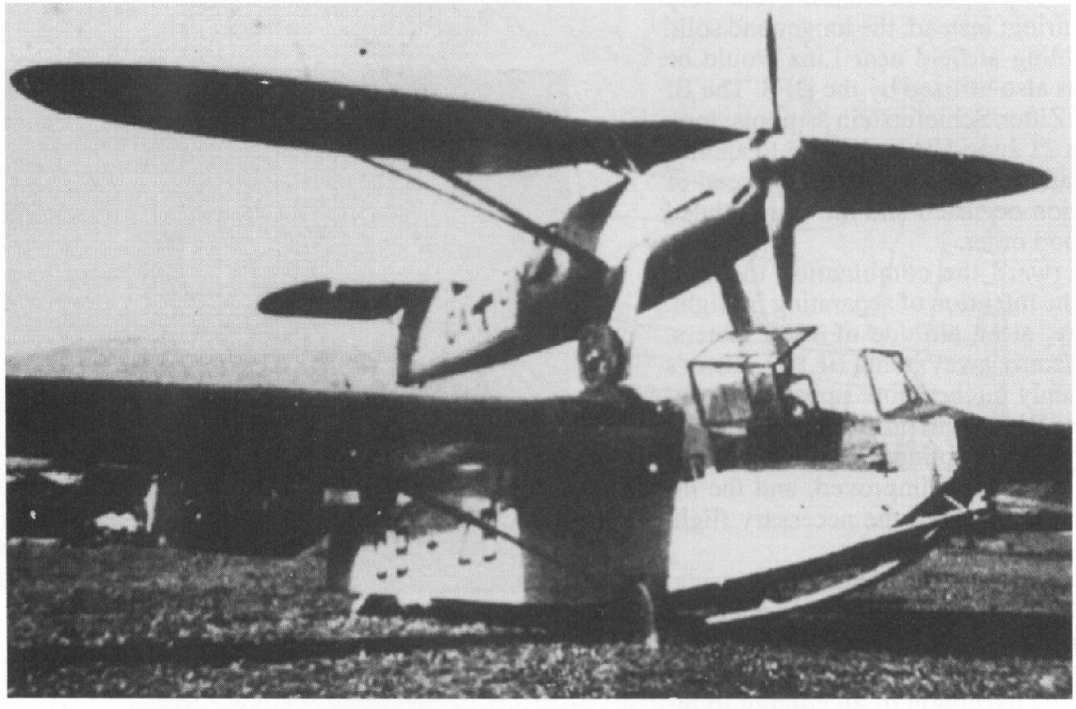
. . . then in landing approach at the Ainring Airfield . . .



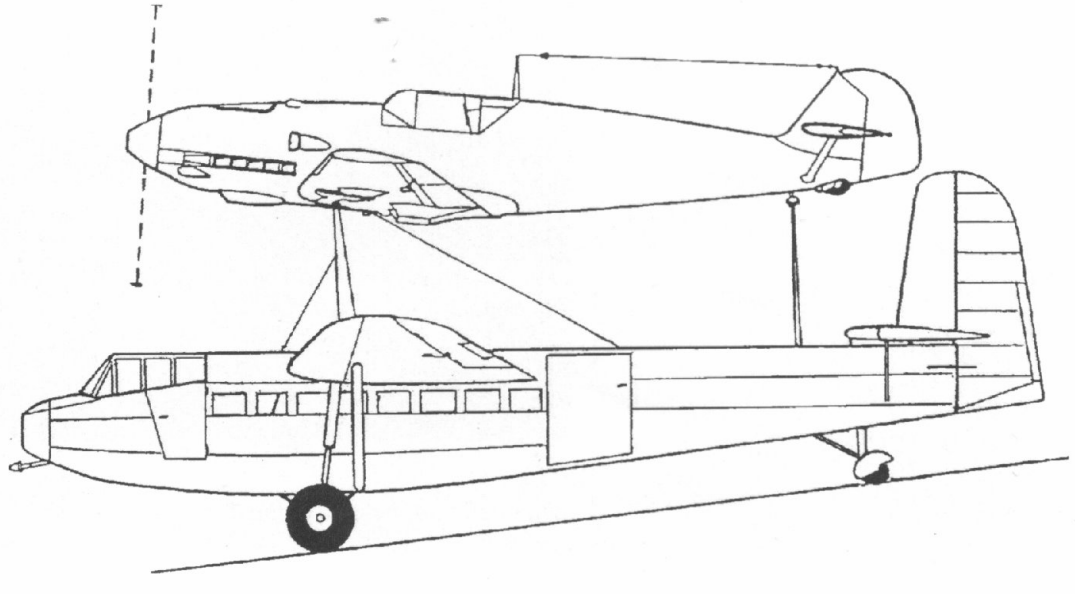
and finally just before setting down for a smooth landing.



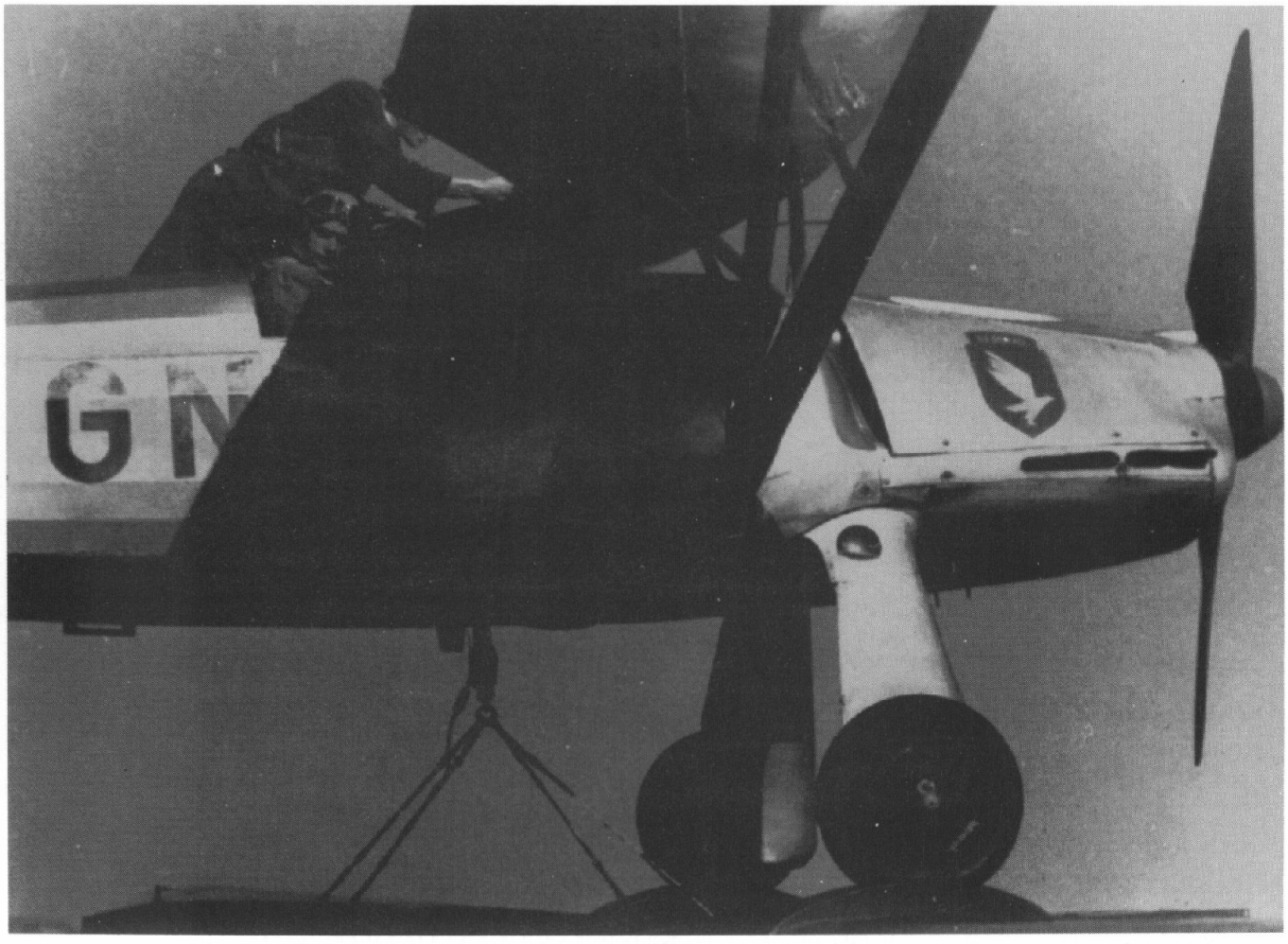
The second Mistel version, Focke-Wulf Fw 56 "Stösser" and DFS 230.



Fw 56/DFS 230 at the airfield in Ainring.

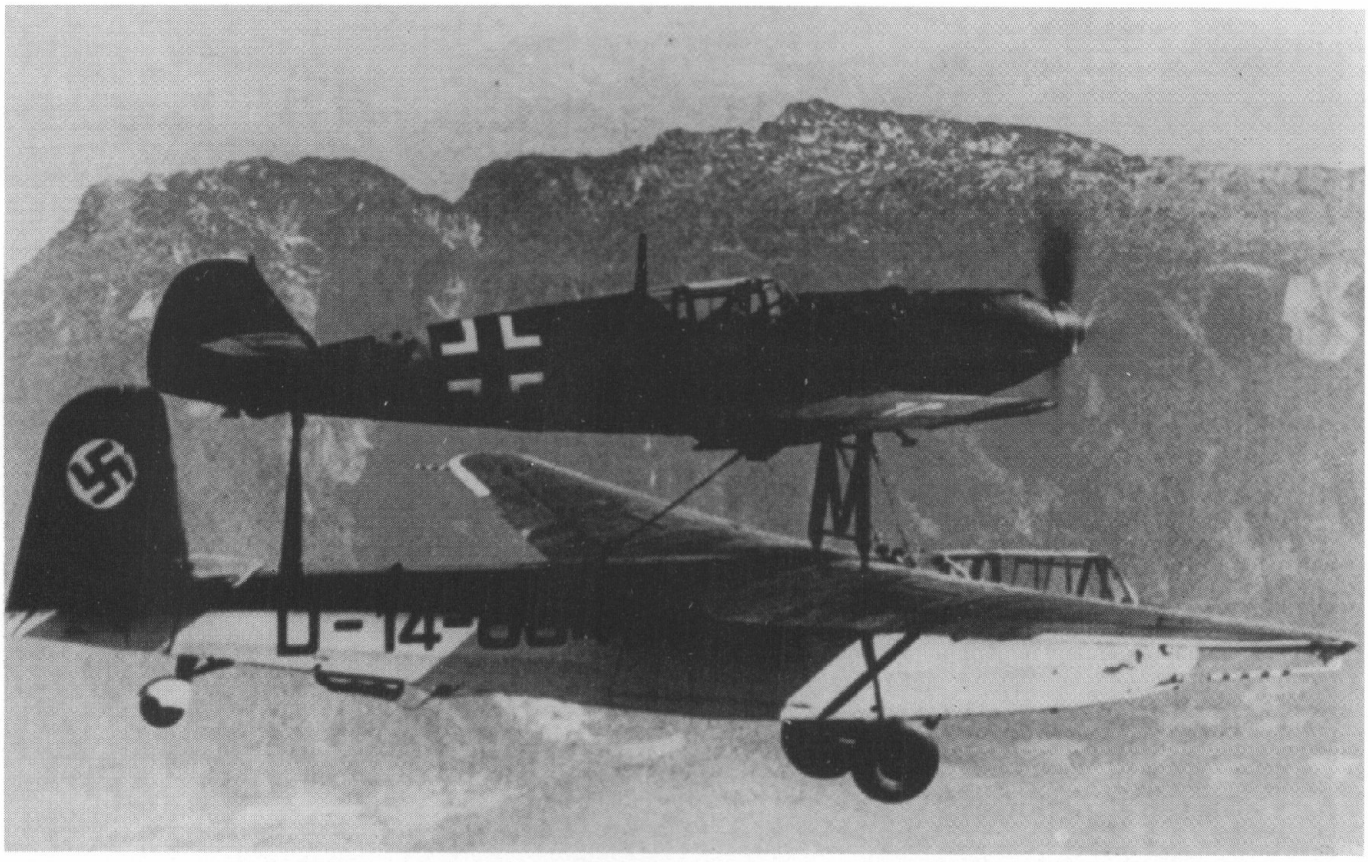


The third Mistel, Messerschmitt Bf 109/DFS 230.



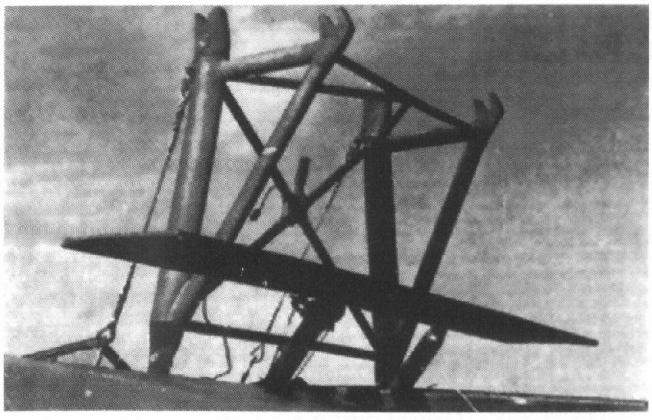
Above: Fw 56 "Stösser" as the control aircraft. Note the clearly discernible rope pyramid and the wheel supports on the DFS 230.

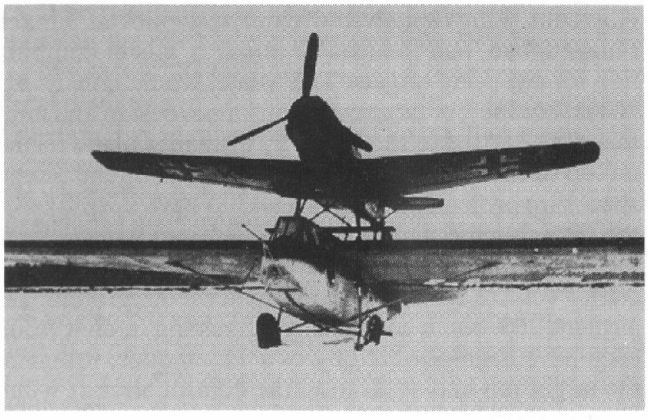
Below: the combination, ready for takeoff.

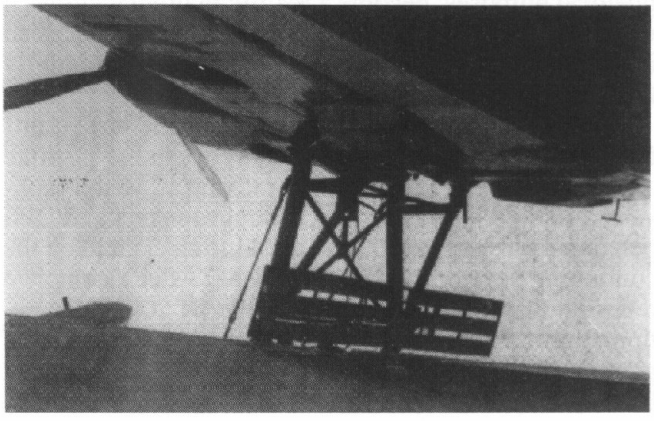


The third Mistel version, and the first to take off under its own power, seen during a test flight over the Alps.

Bf 109/DFS 230 with a simple brace. For comparison, the lower photos show the version with dive braking mechanism.









Three men whose names are closely associated with Mistel operations: (l. to r.) Joachim Helbig, Dietrich Peltz, Werner Baumbach.

In the fall of 1943 the DFS trials were concluded and the Mistel towing method was deemed to be fully suitable. The director of the institute, Fritz Stamer, even considered it within the realm of possibility to have a Bf 109 and a Ju 88, for example, take off singly and couple together once in the air.

Combat Misteln

At the beginning of the Second World War Siegfried Holzbaur, Flugkapitän and chief test pilot at Junkers Flugzeugbau, had the idea to utilize a Mistel combination for attacking targets. The Mistel would consist of a "Grossbombe", or large bomb of simple design and minimal cost, carried to the target by a smaller plane resting on top of it. As with the current thoughts on the Sänger spaceship project, this aircraft was to have been fixed to the Grossbombe partially embedded into its upper surface. The combination would take off by means of a starter vehicle which would remain on the ground. The airplane-like bomb and the aircraft resting in/on it would each have been powered by two TL engines; following the target run and separation the control aircraft would return to base.

Holzbaur proposed this concept to the Junkers firm and in 1940 patent protection was even applied for, but otherwise

the design wasn't pursued further. At that time, victory after victory was being reported, the Luftwaffe shooting down and bombing all opponents wherever they could be found, and the ship tonnage being sunk was climbing to dizzying heights – at least that's what could be heard and seen on a daily basis.

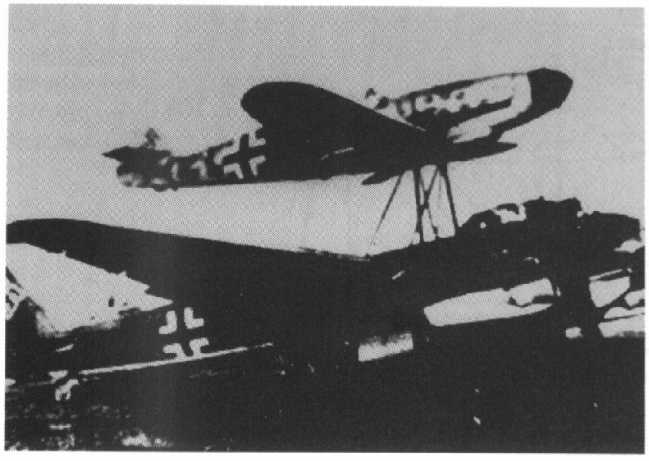
Two facts gave renewed life to Holzbaur's idea: 1) the blatant disparity between the ships sunk and the loss in friendly aircraft (statistically speaking, one ship equaled 27 aircraft), and 2) the precise execution of target approaches by means of a new course guidance system which had hitherto not been possible. In 1941 Holzbaur himself had tested this new system and determined that objects of approximately 200 square meters' (e.g. ships) size could be accurately targeted and struck from a distance of more than 10 km. Nevertheless, the RLM was still not interested and a development contract was not forthcoming.

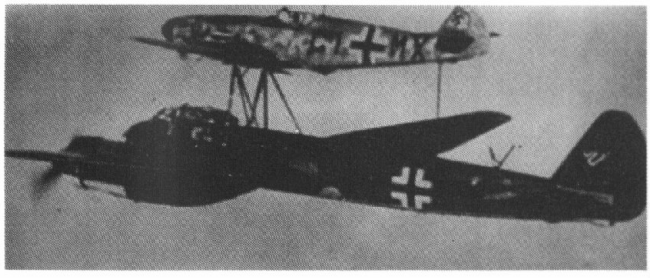
Holzbaur was able to demonstrate this automatic target run during a visit by Major Peltz to Junkers, and considerable interest ensued. Such a Grossbombe used against a point target would mean one ship = one aircraft! The operation was similar to the Japanese kamikaze attacks, but without having to sacrifice the pilot. Both Major Peltz and Hauptmann Baumbach supported the Grossbombe thinking, though initially their efforts were unsuccessful – no one in the RLM understood the significance of this project.

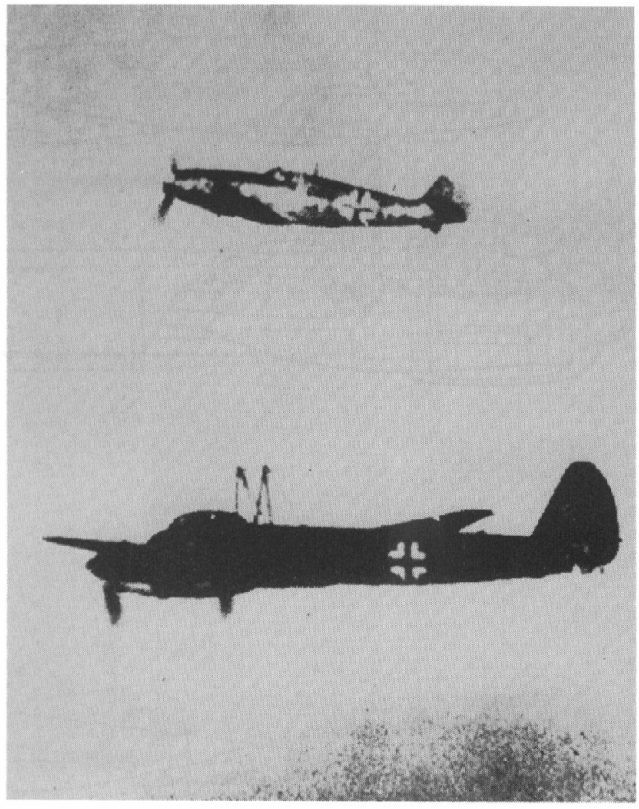
Peltz and Baumbach interested Göring in the possibility of converting aircraft which were no longer in serviceable condition over to Grossbomben, whereby the upper aircraft – after separation – would be a fully operational fighter and thus have the greatest chance of survival. Göring arranged it so that Junkers – in strict secrecy – could provide the appropriate modifications to a few aircraft.

Holzbaur's Grossbombe concept had now, for all practical purposes, become a reality; in official circles it was called the "Beethoven-Gerät", but the troops called it "Mistel", the name by which it became popularly known.

In mid-1943, as Junkers learned of the test results from the DFS, closer cooperation between the institute and Junkers grew, with the latter making a "Mistel" converted Ju 88 A-4 available for testing. Junkers and DFS personnel worked together at the Ainring airfield on the continuing development of the Mistel. After a complete redesign of the support brace for the Bf 109 F, separation from the Ju 88 occurred without problem. It was planned to utilize a simplified landing gear for the Mistel lower component (i.e. the Ju 88), which would be droppable and not require hydraulic operation.







One of the first S 1 Schulmisteln during testing – separation finally occurs smoothly.

The penetration depth of the Mistel combination into enemy territory was naturally dependent upon the weight of the explosives carried, the capacity of the auxiliary fuel tanks, removal of all unnecessary parts, etc. 1,500 km with 3.5 tons of explosive charge was considered to be possible.

Based upon the data from the DFS, a flight altitude of 3000 to 5000 meters would be considered the most effective for the maximum penetration of enemy airspace. The fuel for the control aircraft's return flight would be drawn from the Ju 88's tanks, since the aircraft would have to begin its trip home with full tanks. The determination of the DFS to use the Bf 109/Ju 88 combination as a Grossbombe turned out to be quite good: minimal personnel requirements (1 pilot), large distance to target following separation and finally, a fully operation fighter in the form of the control aircraft.

The most effective type of explosive was achieved by the hollow charge, a type of giant Panzerfaust. Duds were avoided by using four completely separate fuses and an extended fuse (called an "elephant's trunk") ensured that upon impact the base of the hollow charge would be ignited first; the sequence of detonation would then progress from rear to front. A shaft of flame and molten copper (or other soft metal) would be propelled forward, melting its way through the armor plating of the target. Only then would the actual 3.5 t charge detonate.

The first live tests began in May of 1944. Takeoff was from Peenemünde and the target was the chalk cliffs of Móen, Denmark. As a result of an unintentional break in the electrical feed to the autopilot of Holzbaur's Bf 109, an emergency separation took place and the Mistel crashed on the island of Rügen, barely three kilometers from a village. The powerful explosion from the hollow charge left nothing remaining of the Ju 88, but other than a few damaged buildings there were no further casualties. The incident was kept under tight wrap and the "crew" of the crashed plane even received a "burial."

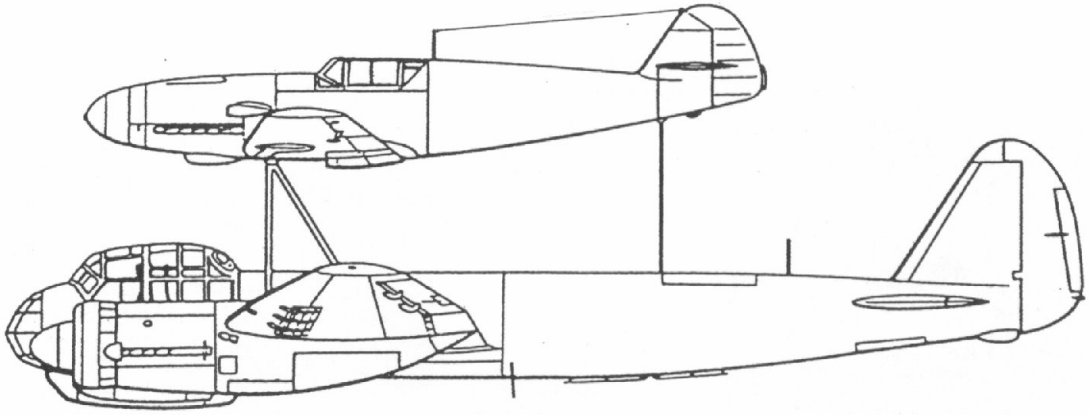
The second live test, on 31 May 1944, resulted in a lateral deviation of 100 meters and a 40 meter overshoot of the target at a launch range of 4 km. Allied reconnaissance wasn't sleeping, either, and on 16 June 1944 warnings were already being issued to be on the lookout for German "Mistel" aircraft.

After the first failed attempt Holzbaur again flew to the chalk cliffs of Móen in August of 1944, this time with an Fw 190 as a control plane. He released the lower plane at a distance of 1,500 meters from the target and an altitude of 800 meters and, despite the poor weather conditions, scored a relatively successful hit.

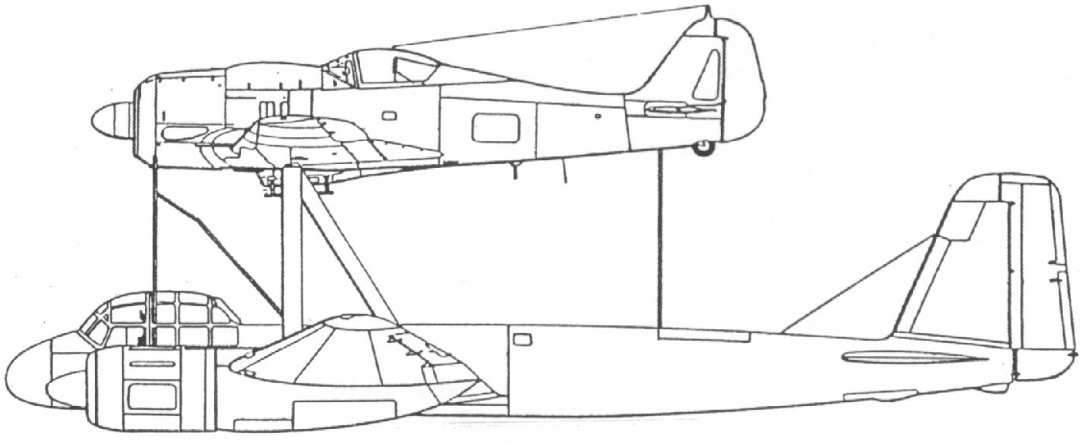
All Kampfmistel lower components were Ju 88s of the most varied construction and of Zustand 3 (Class 3), meaning repaired and in flyable condition (Zustand 4 meant scrap). It was a tight squeeze in the cockpit of the control aircraft, since nearly all functions for the Ju 88 were assumed by the control pilot.

Most of the Misteln were probably test flown in Nordhausen am Harz. A note on the Mistel landing gear: the Ju 88 compression strut was an oleo design, which could be filled to compensate for higher weights. The last models made use of larger tires. The tires were the critical point for all aircraft when weight was being considered.

The normal Ju 88 tire, 1140x410, was rated at a maximum overloaded weight of 20.6 tons at takeoff, with

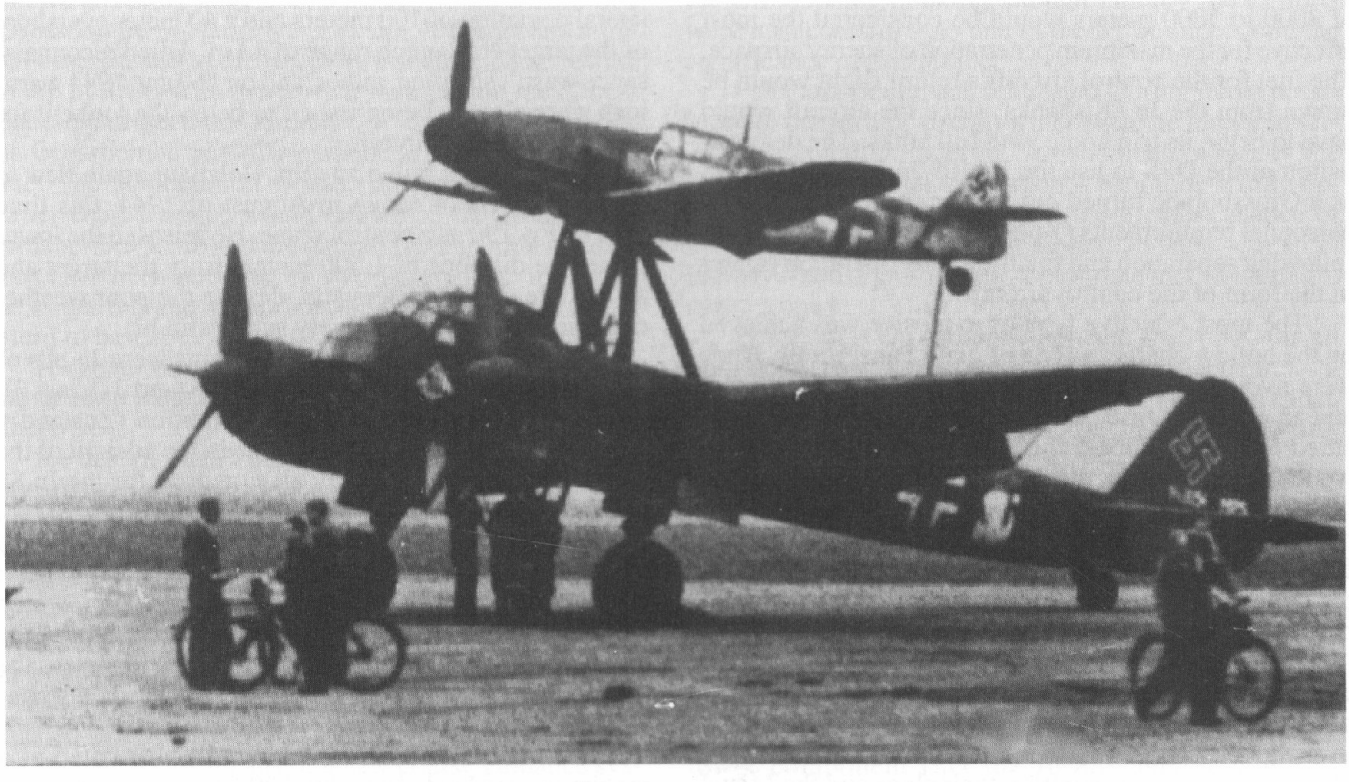


Schulmistel S 1:
Ju 88 A-4 with Bf 109 F.

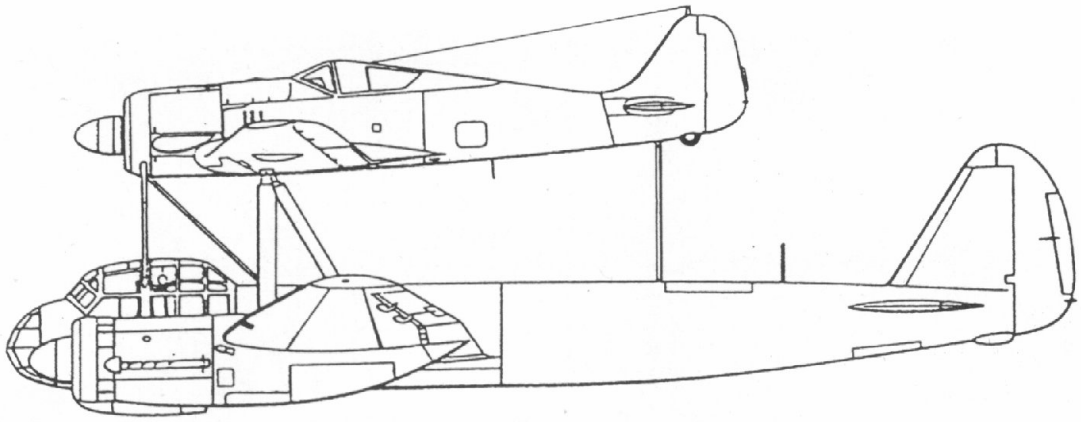


Left:
Schulmistel S 2:
Ju 88 G-1 with Fw 190 A-8.

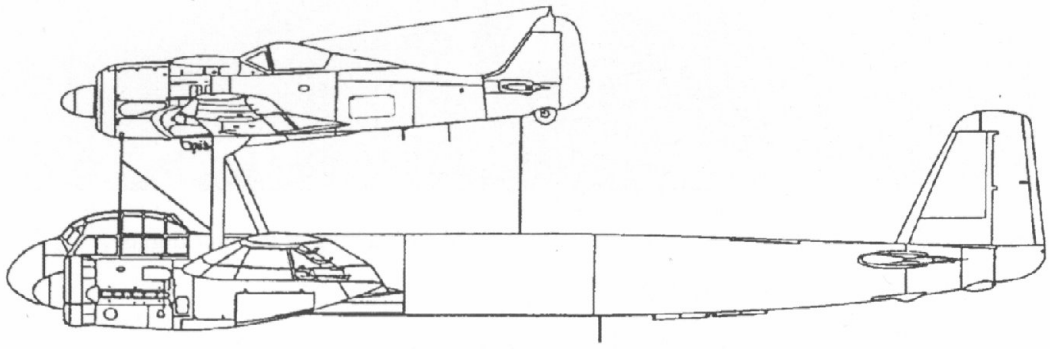
Below:
In order to reach the upper aircraft of an S 1 Mistel a ladder is rested on the Ju 88.



Schulmistel S 3A, above is an Fw 190 A-6 on a Ju 88 A-6.



Schulmistel S 3C, an Fw 190 F-8 resting on a lengthened version of the Ju 88, the H-2.



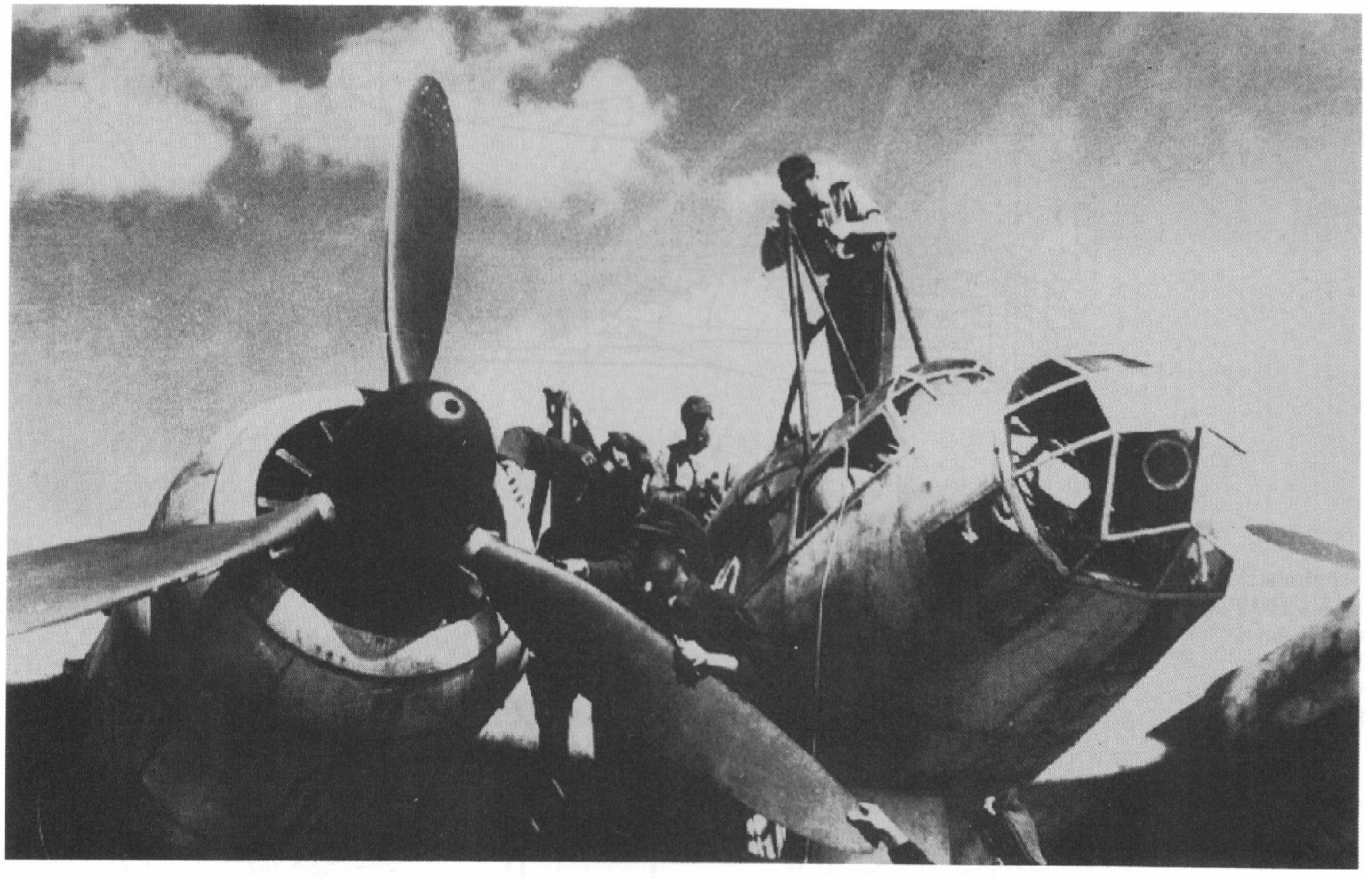
the later, larger 1220x445 tire rated as high as 23.4 tons – but only for takeoff; the maximum permissible load at landing was significantly lower so as to avoid the so-called tire blowouts when the aircraft touched down. But then again, a Mistel with a live warhead wasn't expected to "land" in the normal sense.

A Mistel taking off on an operational combat mission had a weight of 20 – 21 tons, nearly approaching the load limits. This meant that takeoffs could only be made from concrete surfaced runways which were in perfect working order. The smallest hole in the runway's surface could easily lead to a mishap.

2/KG 101 received the first five Kampfmistel aircraft and formal training began in the spring of 1944 in Nordhausen; later the unit moved to Kolberg on the Baltic Sea. Since this was to be purely training, both upper and lower aircraft were manned, but the Ju 88s were readied to the point to where they could be modified to flying bombs with little effort. With the beginning of the Allied invasion on the Normandy coast IV/KG 101 transferred from Nordhausen to St. Dizier with twelve Misteln. There the Ju 88 nose glazing was replaced by the 3.6 t hollow charge explosive. On 24 June the 12 Misteln took off on a strike against the ships in the mouth of the Seine and Orne rivers.

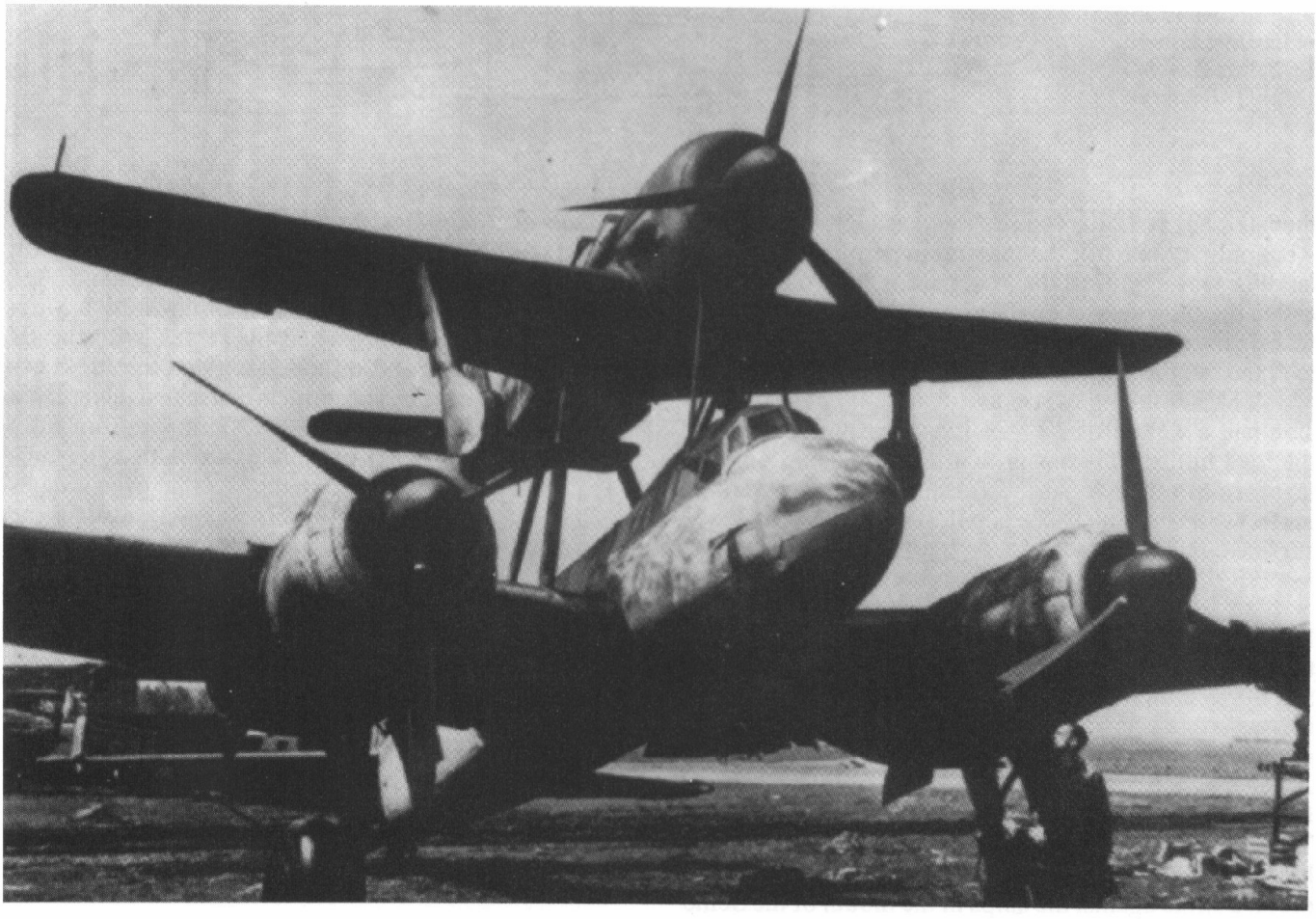
Due to a technical malfunction, one Mistel was aborted during approach to the area; it continued flying in a straight path as far as the Scottish mainland. Another Mistel was intercepted and shot down by a Mosquito as the group approached the target, with the Bf 109 breaking away and disappearing and the Ju 88 exploding in the sea. The ship targets concealed themselves in smoke, thereby preventing the Germans from fully determining the efficacy of their attack. Allied and German data also differentiated in the fact that even if damage did occur as a result, it was probably against the "blockade ships", expressly designed to absorb such attacks

The first Mistel Gruppe was formed from 2/KG 101 as the III/KG 66, from which II/KG 200 was born and whose 6 Staffel (insignia "father and son") was exclusively responsible for Mistel operations. 5/KG 200 functioned as pathfinders and 7/KG 200 was an operational training and auxiliary unit. There then followed the occasional combat mission, most of which failed in their attempts; "misfires" terrified the English population when they detonated in the countryside, even if they didn't cause any casualties.

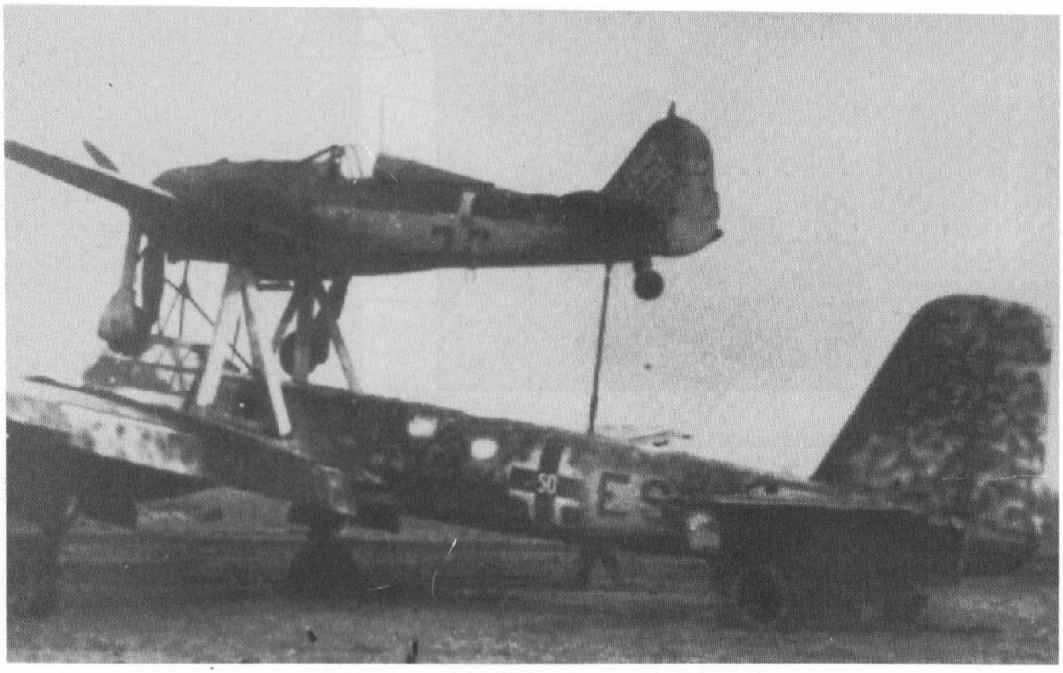


Above: Ju 88 (H-1?) as a Mistel lower component, used for training or transfer flights.

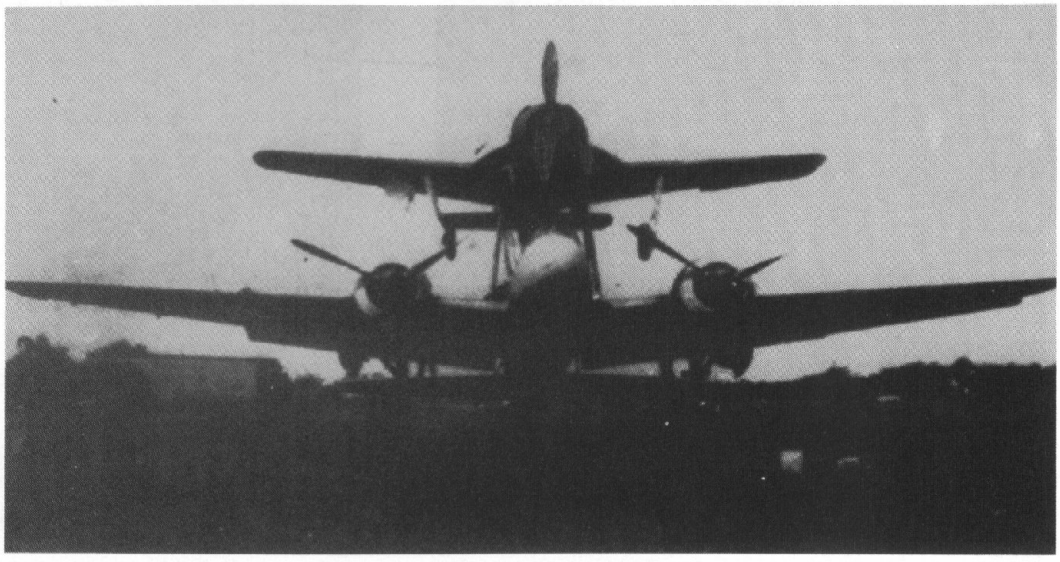
Below: An S 2 serving the same purpose.



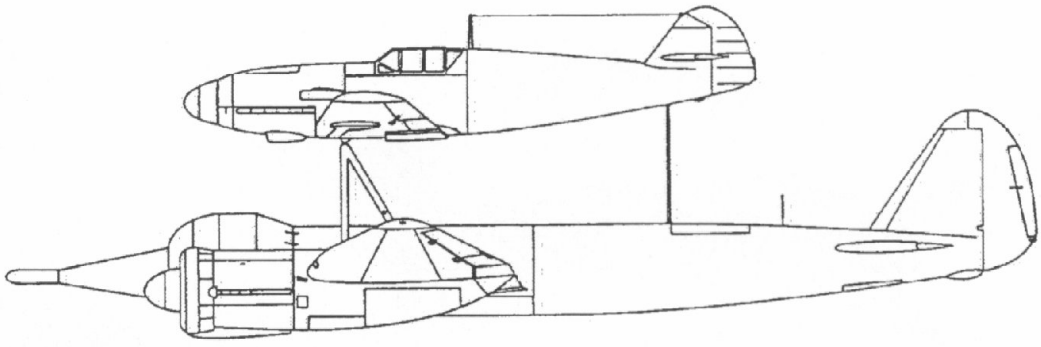
Fw 190 A-8/Ju 88
G. Löbnitz, 1945.



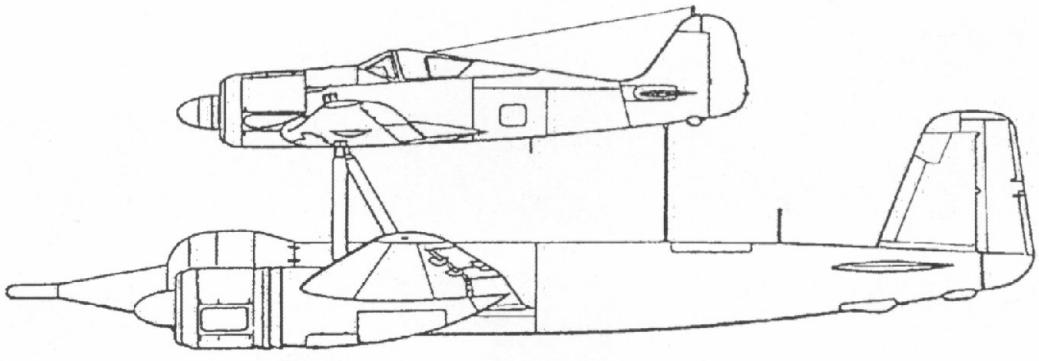
The same type of combination, seen here at dusk. Takeoffs on operational flights occurred mostly at night in order to reach the target during the early dawn hours – a tactic which required practice.



Ju 88 G-1 as a Mistel lower component. These were discovered in large quantities near the wars end at places such as Nordhausen.

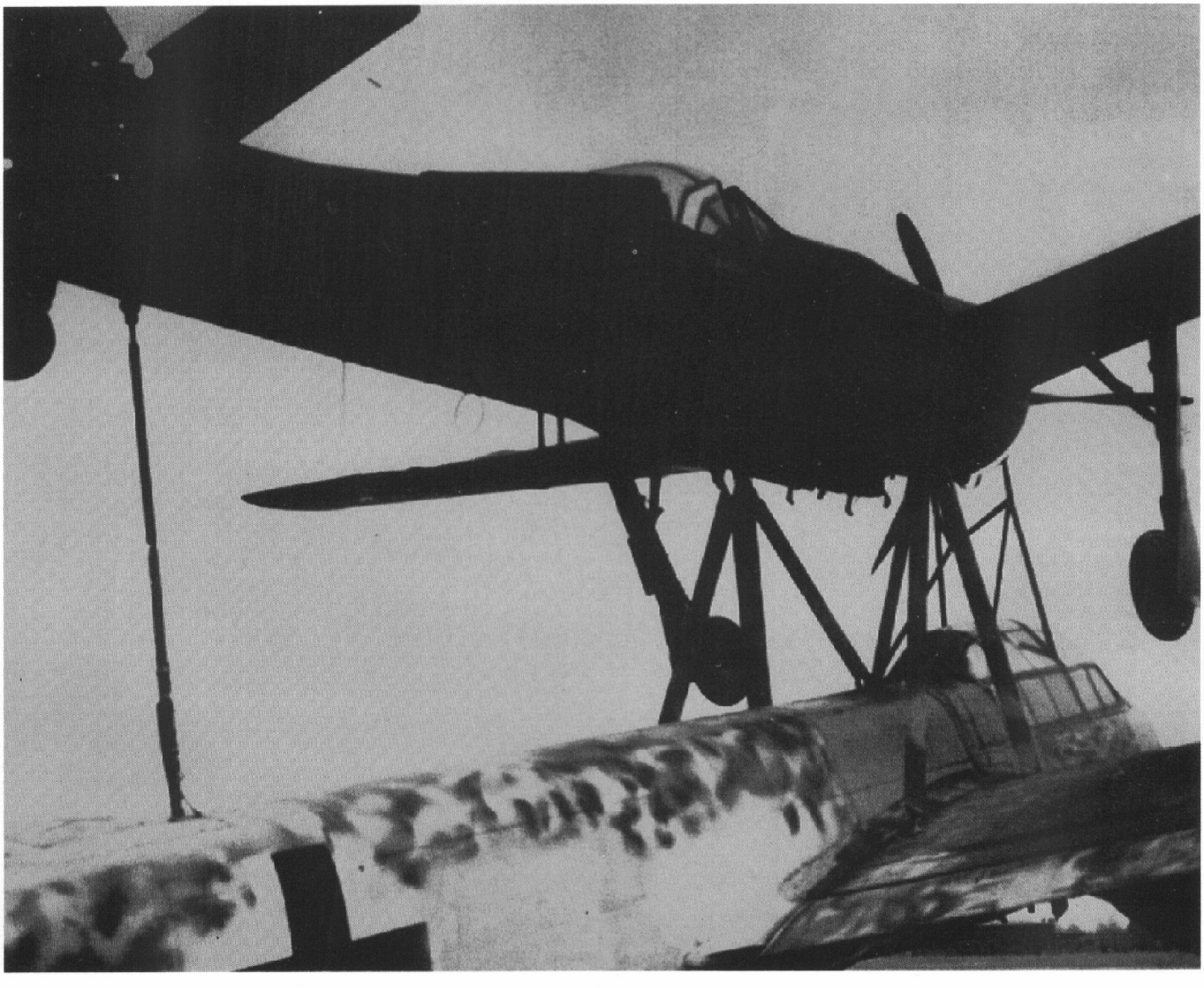


Mistel 1, above a Bf 109 F-4, below a Ju 88 A-4.

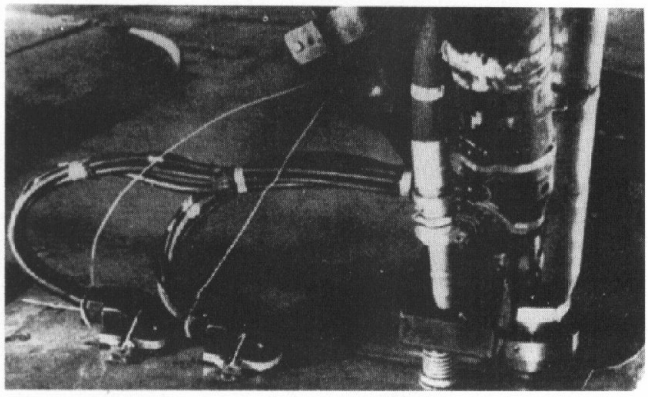


Left:
Mistel 2, above an Fw 190 A-6, below a Ju 88 G-1.

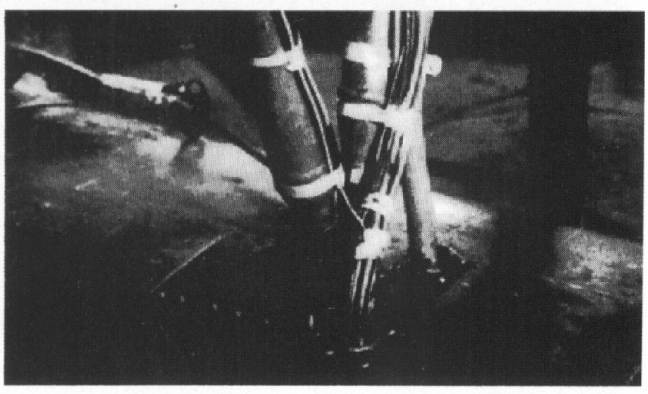
Below:
Fw 190 F-8 on a lengthened Ju 88 (H-2) in Merseburg.



It was a tight fit in the cockpit of an Fw 190, since all the important functions of the Ju 88 needed to be included as well.



Cabling: fuel lines and rapid-release connections for a Mistel 1.



Fuel hose and cables on a Ju 88 A-5 – for such a purpose common tape proved adequate.

There were also German losses during low-level flights in bad weather, etc., with the Misteln usually exploding somewhere in the countryside.

In the fall of 1944 60 Misteln were collected together at the Danish airfields of Grove, Tilstrup and Aalborg-West for an attack on the British Home Fleet in the Scapa Flow.

Bad weather repeatedly caused delays for the long flight over water. The main reason preventing the Home Fleet from leaving, the German battleship Tirpitz, was finally sunk after several attacks by British bombers on 12 November 1944 in Tromsö. The fleet was then able to leave its base, the Mistel target ceased to exist and plans for the attack were scrapped.

Scapa Flow had been written off, but priority was then given to a target from earlier times: the destruction of powerplants and armament factories in the Soviet hinterland – Operation Eisenhammer. In 1943 there was a lack of aircraft with sufficient bomb capacity and range. Armaments Minister Albert Speer's idea of a suicide operation, e.g. an He 111 with a large external bomb, was shelved – and then the Misteln became available.

Through Baumbach's (KG 200) efforts the Mistel operations found favor; Even Hitler wasn't opposed to the idea, and there was even talk of the possibility of using an Fw 190/He 177 Mistel combination (longer range and greater load). But this enthusiasm was countered by the well-known incidents of malfunctions which would have to be taken into account over such a long-distance flight.

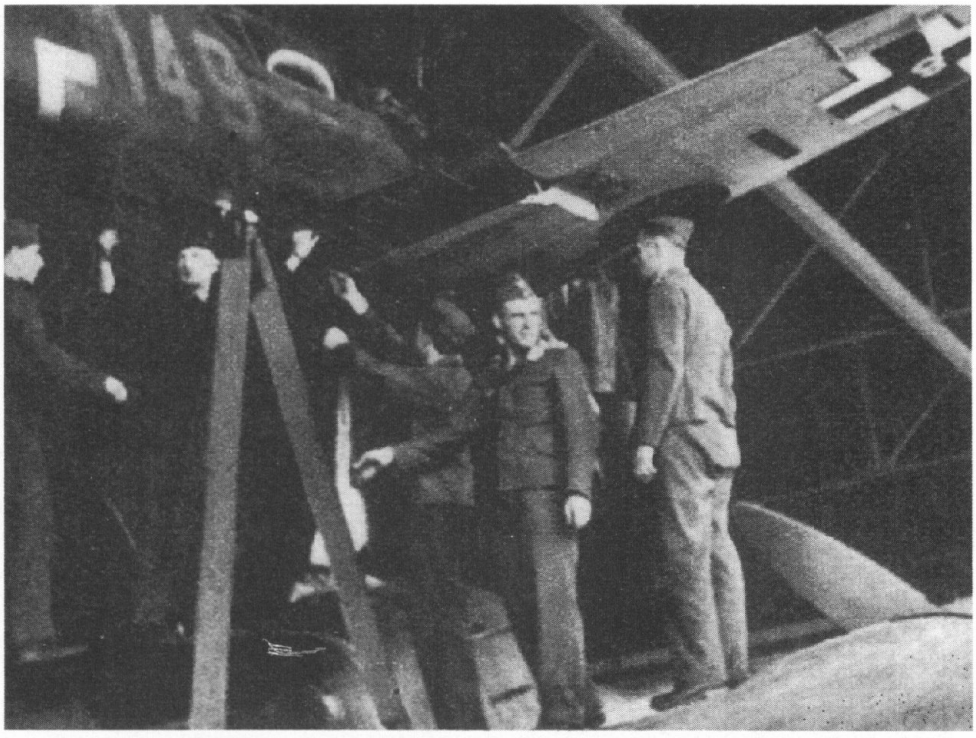
The Junkers production facilities were now producing large numbers of Mistel aircraft, but the front lines grew closer and the distances to the targets became greater. The resulting load and weight problems (larger fuel capacity) was expected to be solved by an additional third detachable landing gear strut.

A control Mistel, consisting of a Ju 88 H-4 with its nose dipped sharply downward (with space for bomb targeting and location equipment), a new 3.37 meter long center section for the fuselage (for 2,440 liters fuel) and an Fw 190 with "Doppelreiter" wing tanks resting above was proposed by a few of the Junkers engineers, but did not play a role in Eisenhammer or other ventures.

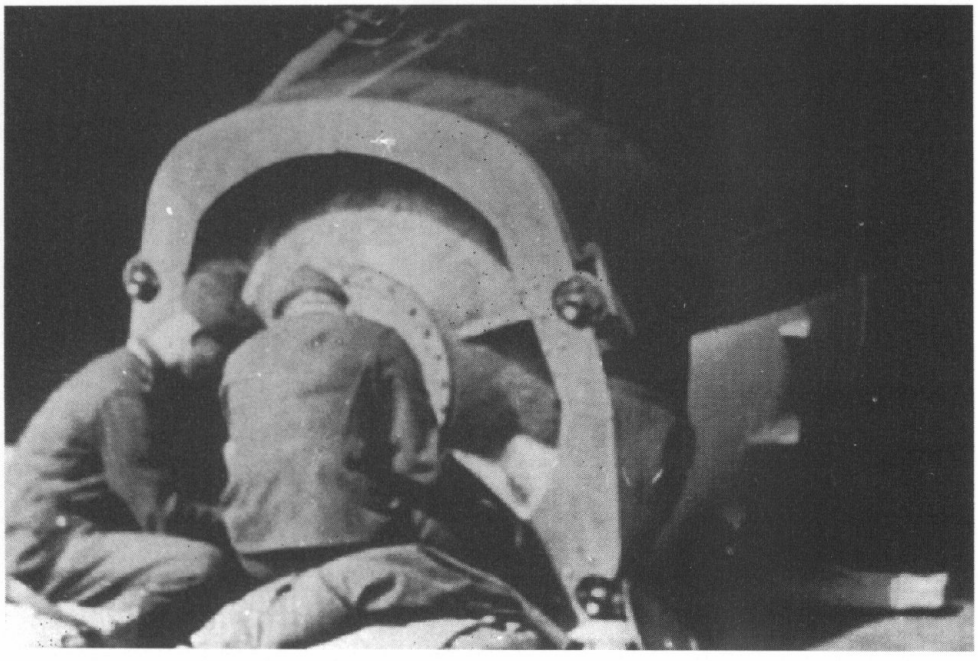
In early March 1945 the Mistel combinations which were to play a part in Operation Eisenhammer stood ready in Rostock-Marienehe, Oranienburg, Rechlin-Lärz, Parchim, Brandenburg-Briest and Karlshagen. By mid-March the distances to the targets in the Soviet Union had become so great that the overload on the Mistel unit had grown to an impossible level. A practice mission, which mirrored the distance and time of a live mission, confirmed that the Eisenhammer plan was indeed dead.

According to a "Führerbefehl" from 1 March 1945, Werner Baumbach (Kommodore of KG 200) was named as "Brückenbevollmächtigter" (lit. "one who has complete charge over bridges") and was answerable only to Göring. He was given the task of severing all crossings over the Oder and Neisse and thereby stopping the Soviet advance. Any support needed was promised to him.

Left page:
A Ju 88 A-4 is modified as a Kampfmistel and is fitted with a warhead; the nose glazing has already been removed. The following photos aren't necessarily of the same aircraft, but nevertheless illustrate the various phases.



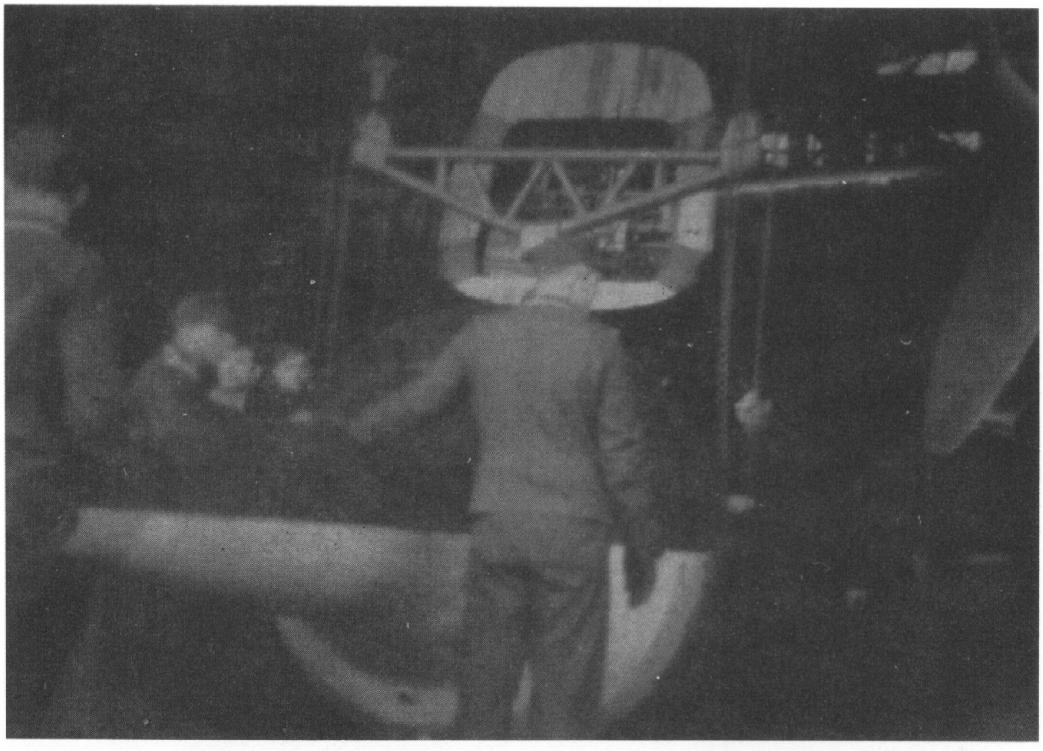
Right:
The control airplane is affixed.



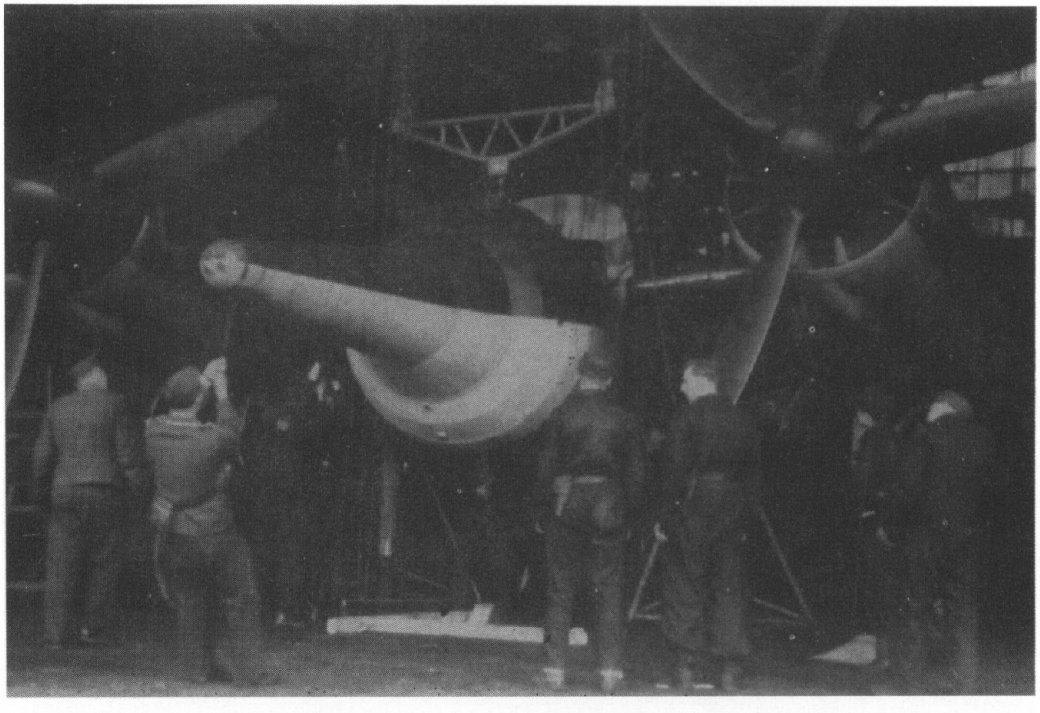
The hollow-charge warhead is made ready.

Baumbach became a very busy man; Oberst Joachim Helbig was named as his second in command. The British were quite familiar with Helbig from his days as a bomber commander of I/LG 1 and called his Gruppe the "Helbig Flyers." The Ju 88 had seen constant use under his command in many theaters – but now as a Mistel it would serve another purpose, a climactic one.

Oberstleutnant Baumbach's first Mistel assignment was given the same day he assumed his new command, on 1 March 1945. II/KG 200 was to target three bridges over the Weichsel with 14 Misteln under the command of Oberleutnant Pilz. Technical problems and unfavorable weather conditions made implementation impossible, and the attack never took place.



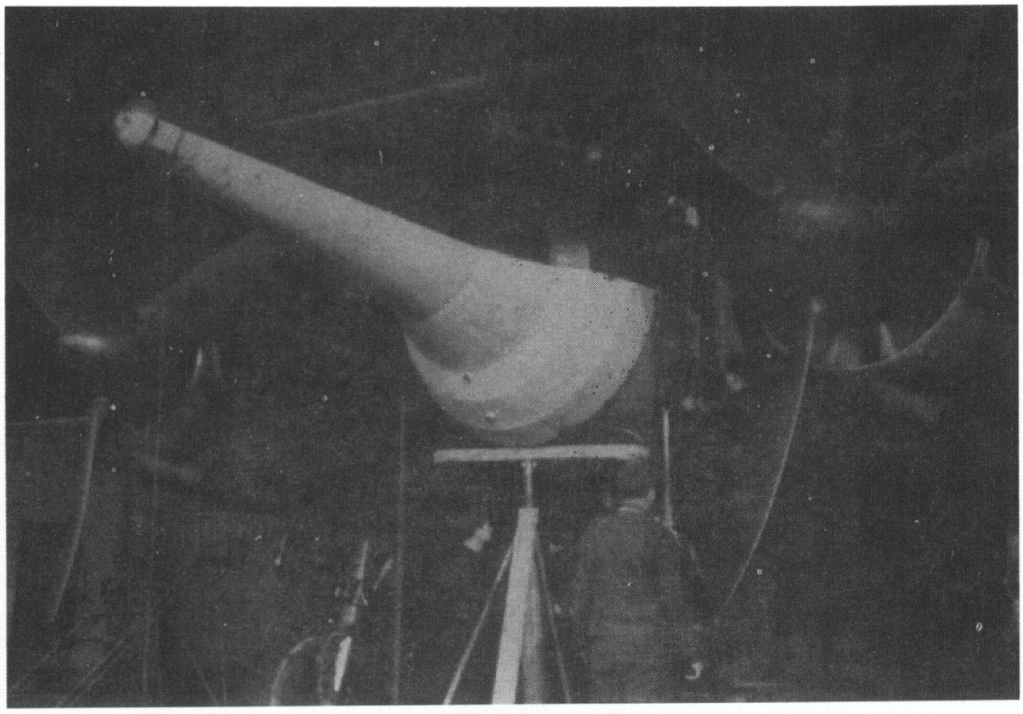
Attaching the warhead to the block and tackle assembly.



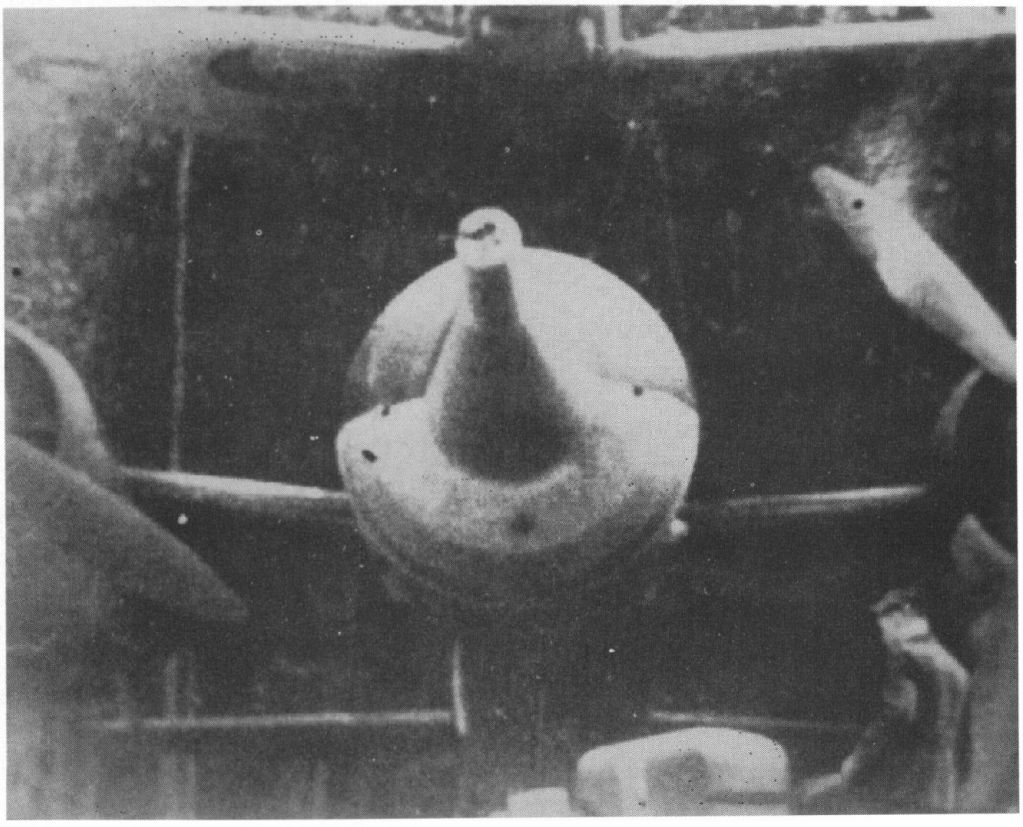
Lifting the high explosive load to the same height as the Ju 88 fuselage.

Naturally, targeting the Soviet advance over the existing bridges and auxiliary bridges built by the Red Army was still primarily a job for strike aircraft, despite the plans to use the Misteln as such. Misteln were first and foremost considered for destroying fortified positions. Each mission had to be calculated down to the minutest detail, since aviation fuel for a long time now had only been available for the most critical missions. At that period of the war Operation Eisenhammer was certainly considered critical, a fact which dictated the use of a corresponding number of the Mistel combinations.

Then the warhead is bolted onto the fuselage.

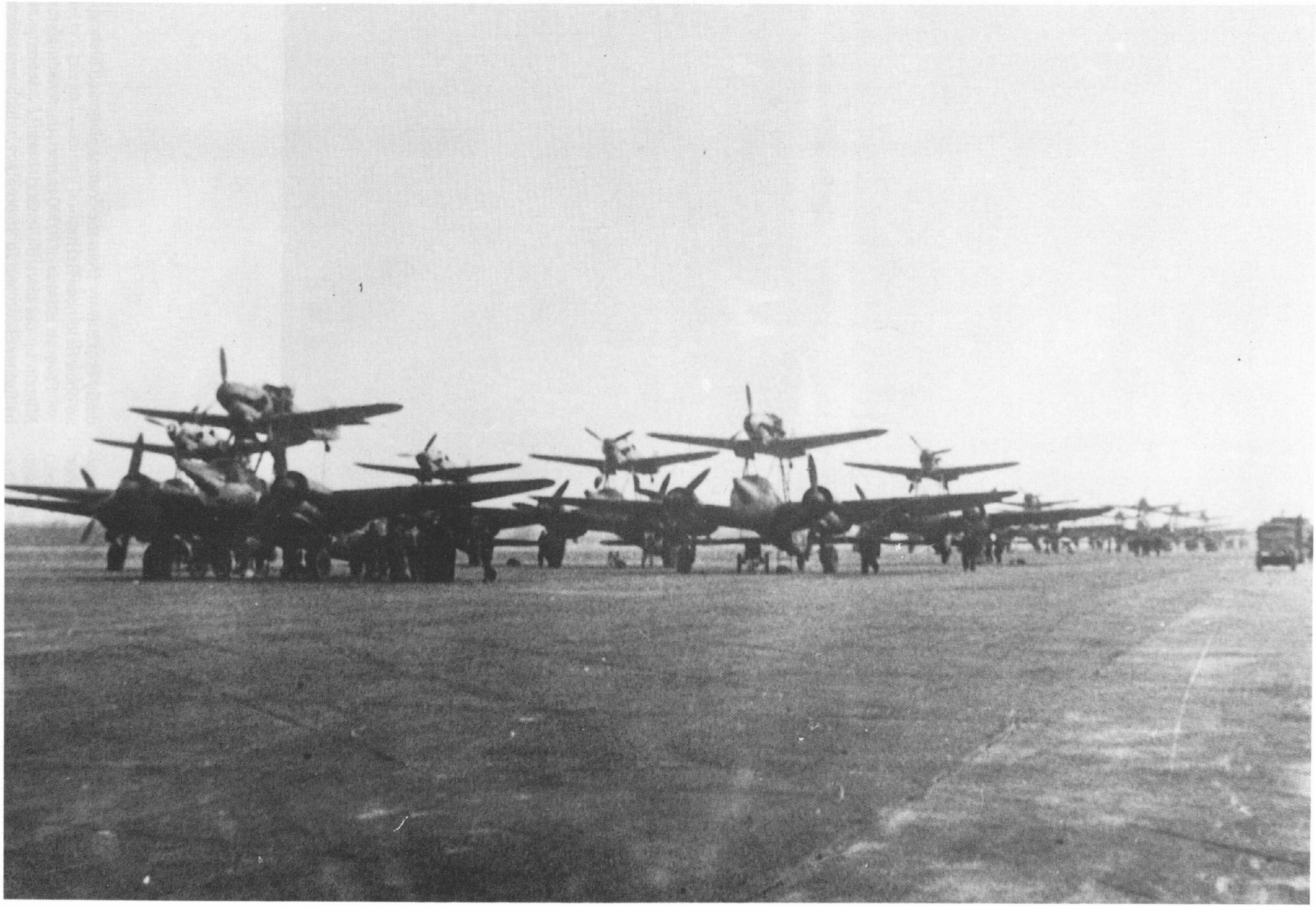


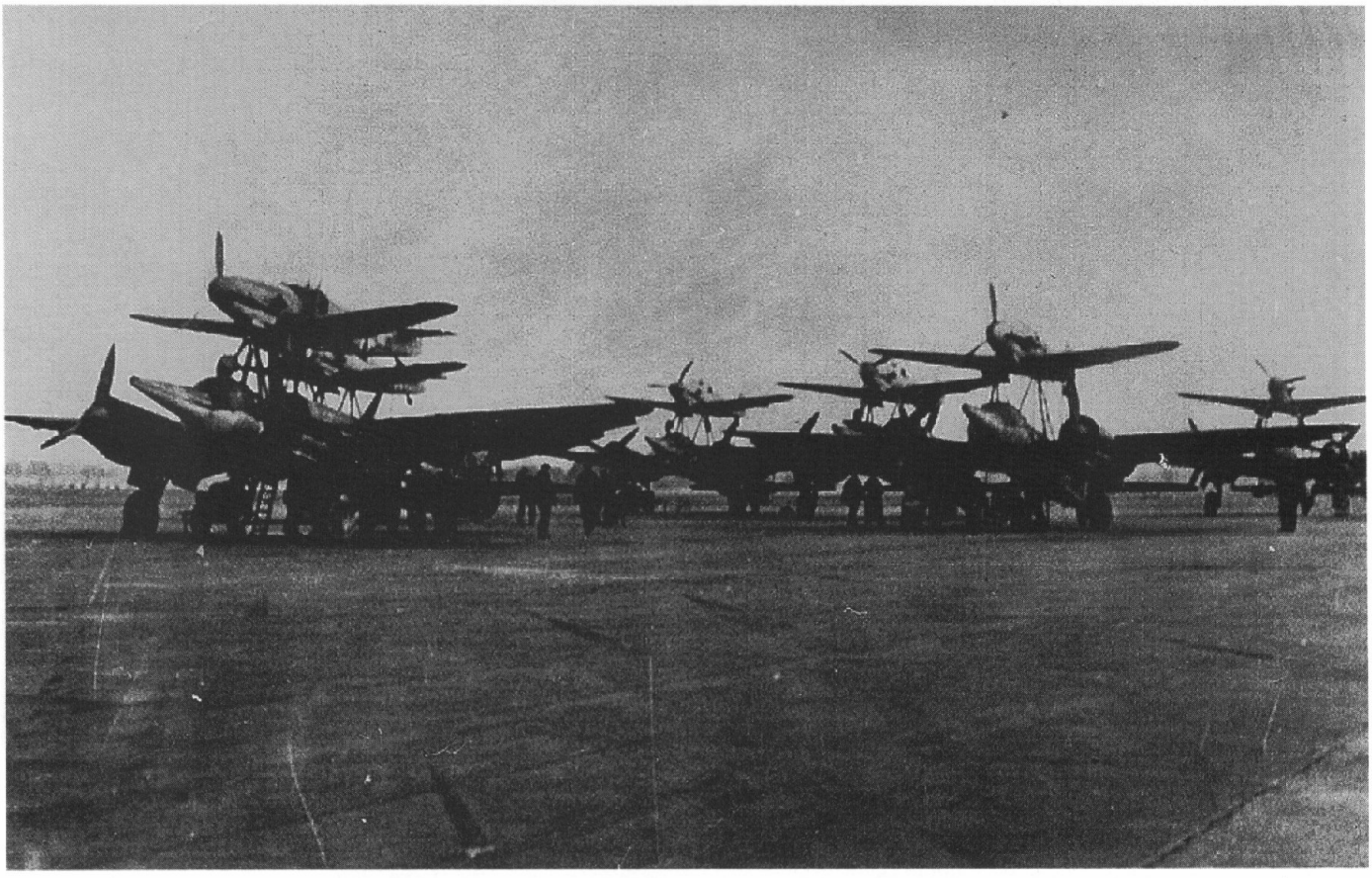
The Kampfmistel is operationally ready; notice the starter cart being wheeled up.



On 8 March 1945 Helbig was able to attack the Oder bridge targets for the first time, using four Misteln. After every other means had resulted in only limited success, all hope was placed in the Mistel mission. Target was the two bridges near Göritz. One Mistel was lost during its climb to altitude when, due to an error, the Ju 88 suddenly broke away from the control plane and blew up in an open field near Berlin.

From an altitude of 3,000 meters, the remaining three Misteln set out toward the Göritz bridges, accompanied by fighter escort and Ju 88 bombers, which immediately struck the anti-aircraft positions of the enemy. One



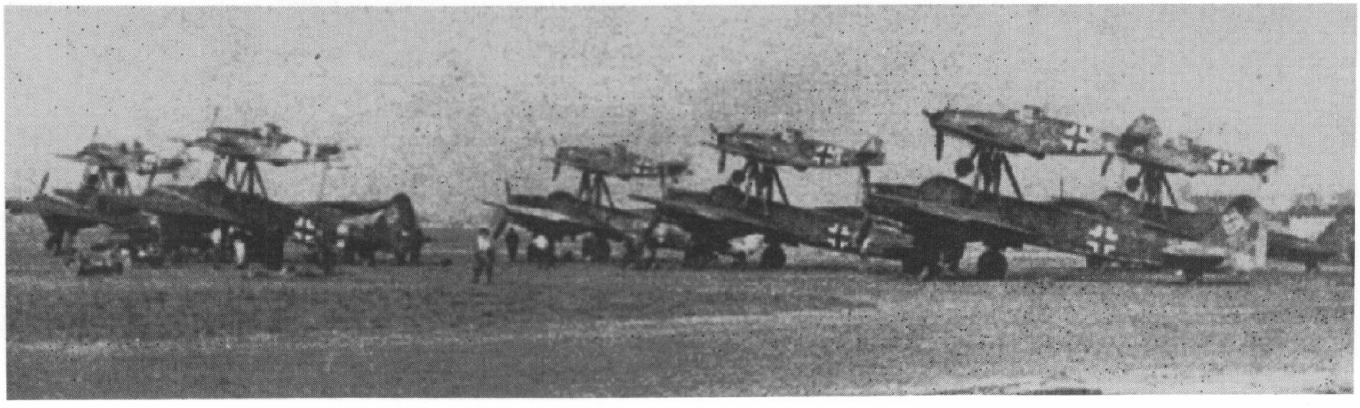


Left page and above:
Live Misteln 1 of 6/KG 200 await their mission in Burg bei Magdeburg. As these photos prove, the Mistel combinations were clearly not just rarely utilized as single-example weapons.

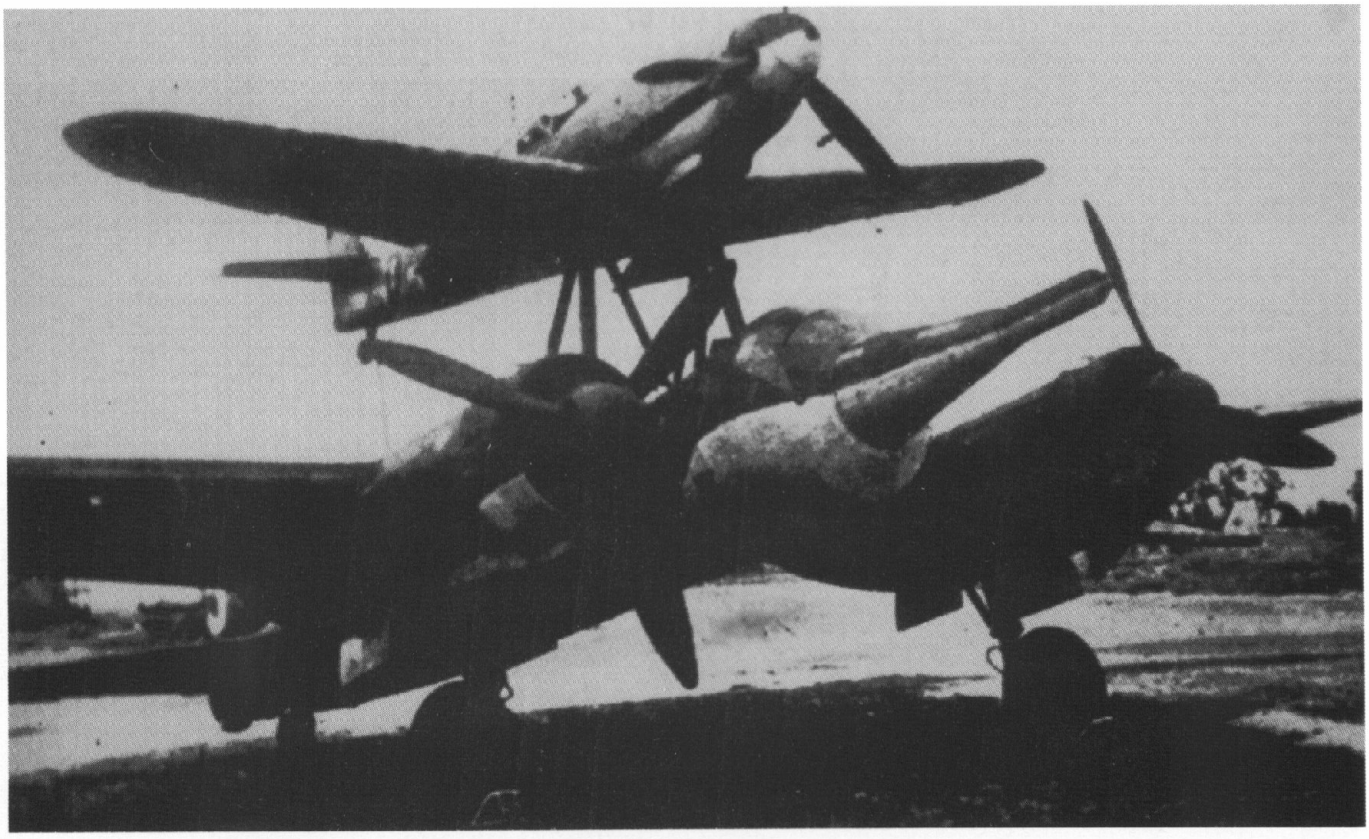
Mistel, having made a successful target approach, suddenly took a flak hit and impacted on the western bank far from the bridges. Neither of the two remaining Misteln scored direct hits and although tremendous explosions were seen, no further damage was noted.

There were still talks of continuing with Operation Eisenhammer, but the acute shortage of fuel coupled with the chaotic logistical situation meant that all further plans were scrapped.

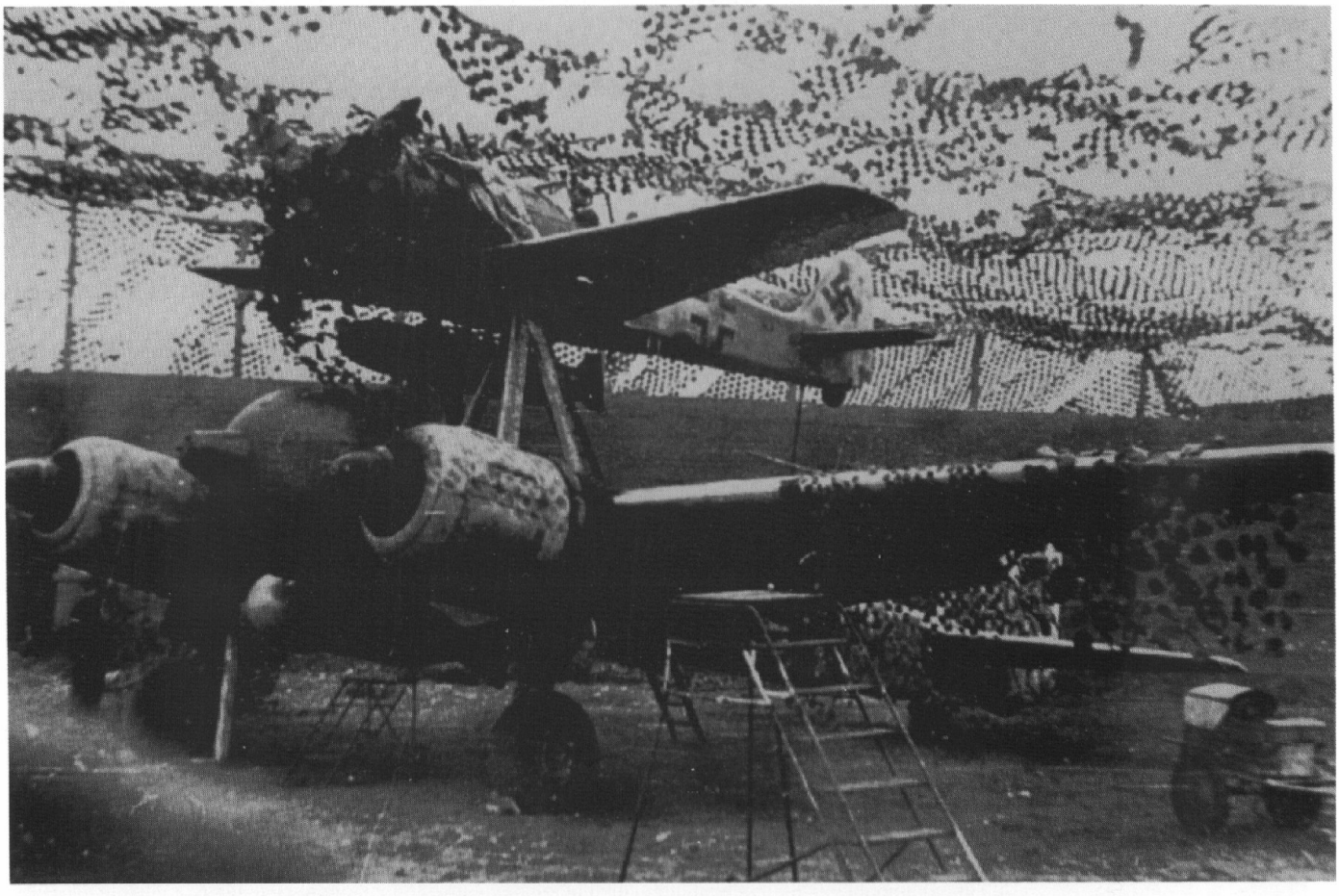
One of the last trump cards of the Third Reich had been played –and lost. Naturally, there has been much conjecture as to whether concentrated Mistel operations would have even been possible as the war drew to a close.



2 June 1944: Mistel 1 teams ready to operate as flying superbombs.

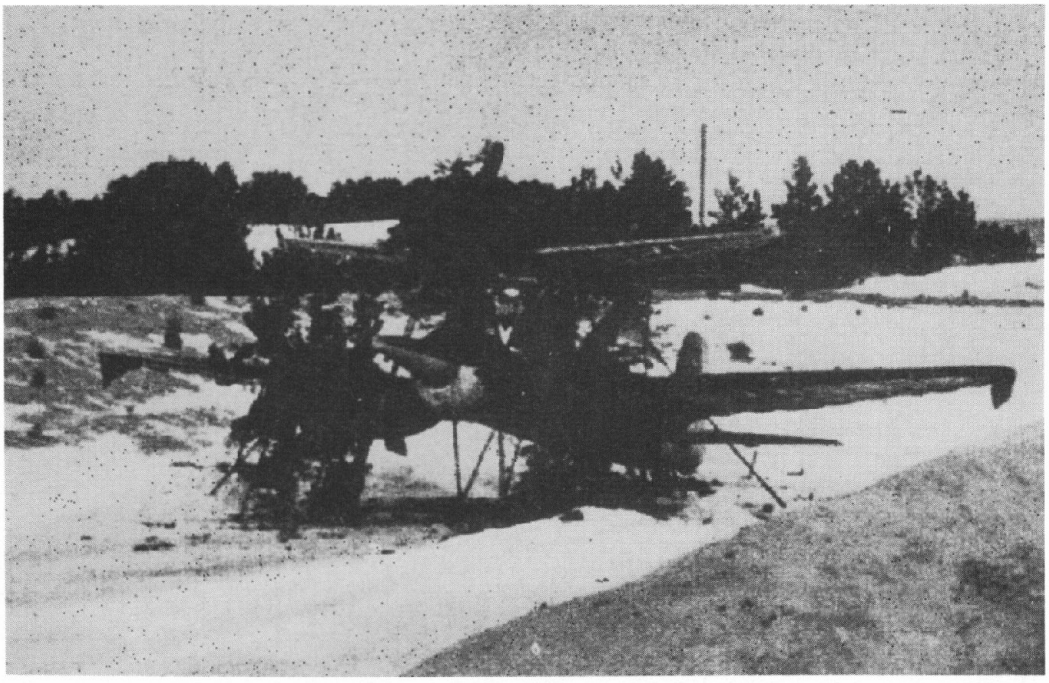


An operationally-ready Mistel 1, seen close-up.

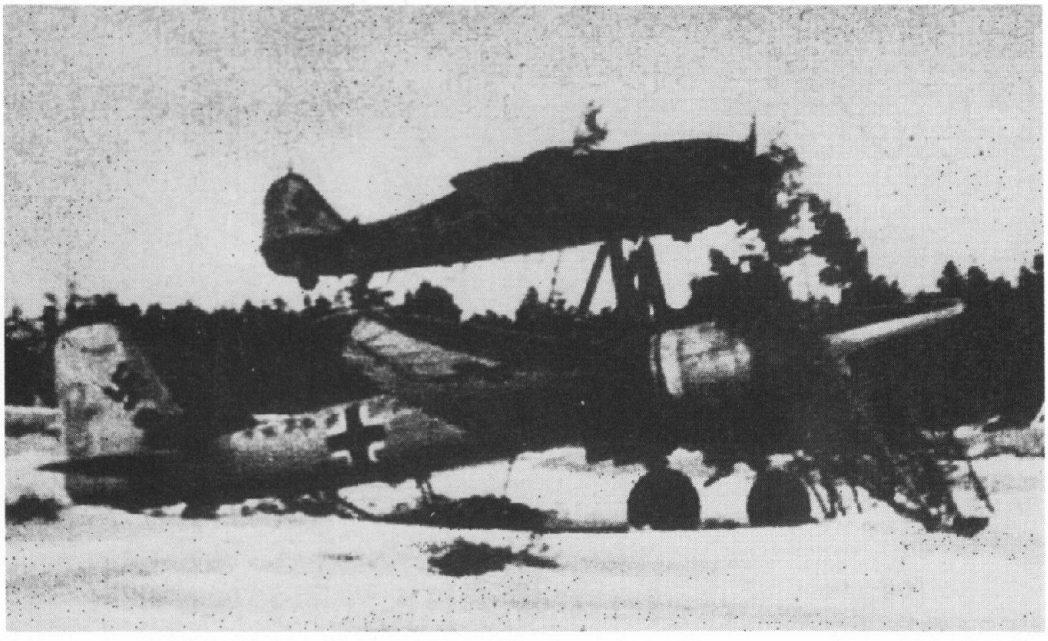


An Fw 190 F-8/Ju 88 G-1 long-range combination in Oranienburg 1945, as it was planned for use in Operation Eisenhammer.

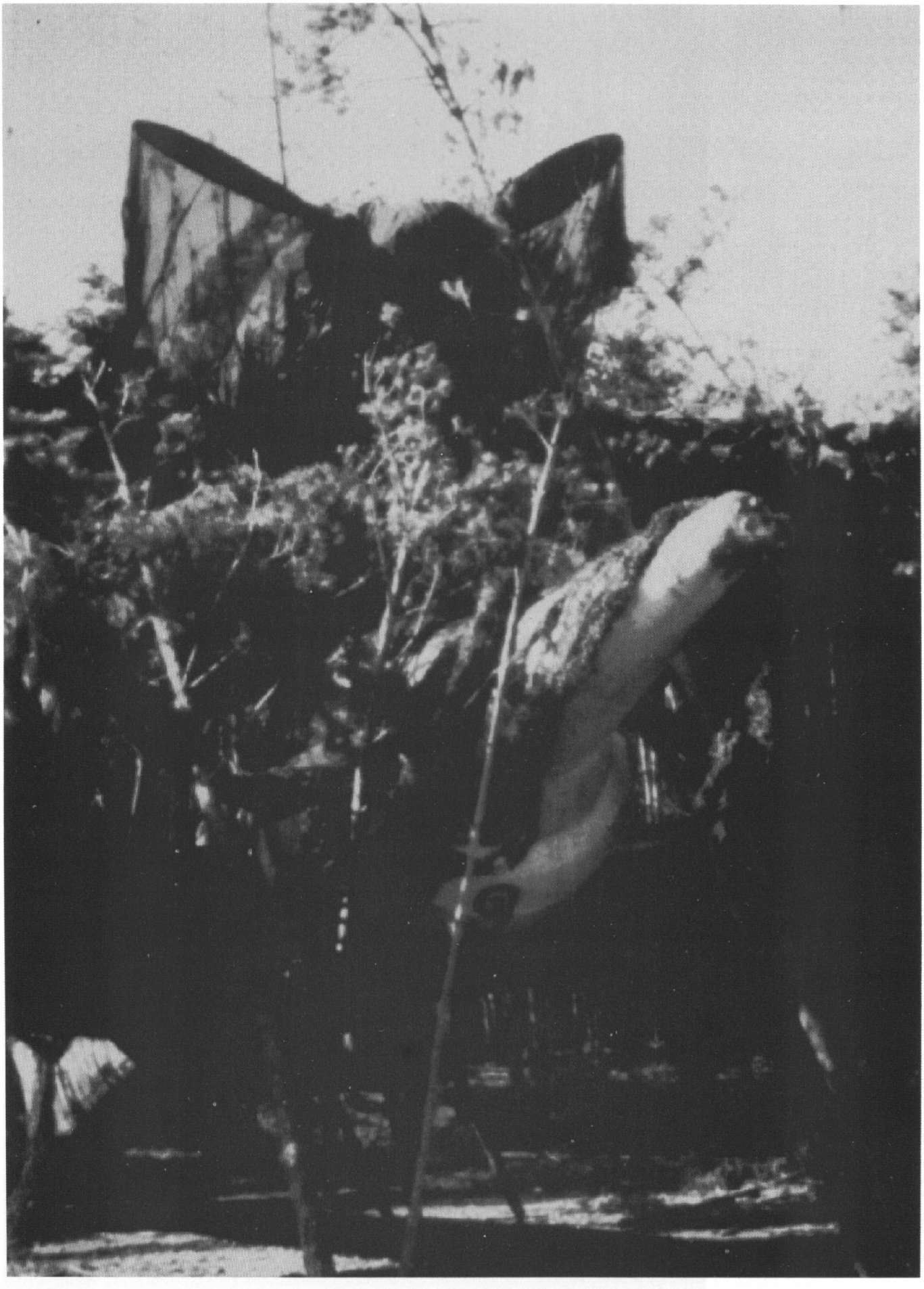
A makeshift camouflage job for a Mistel 2 in Tilstrup, Denmark, early 1945.



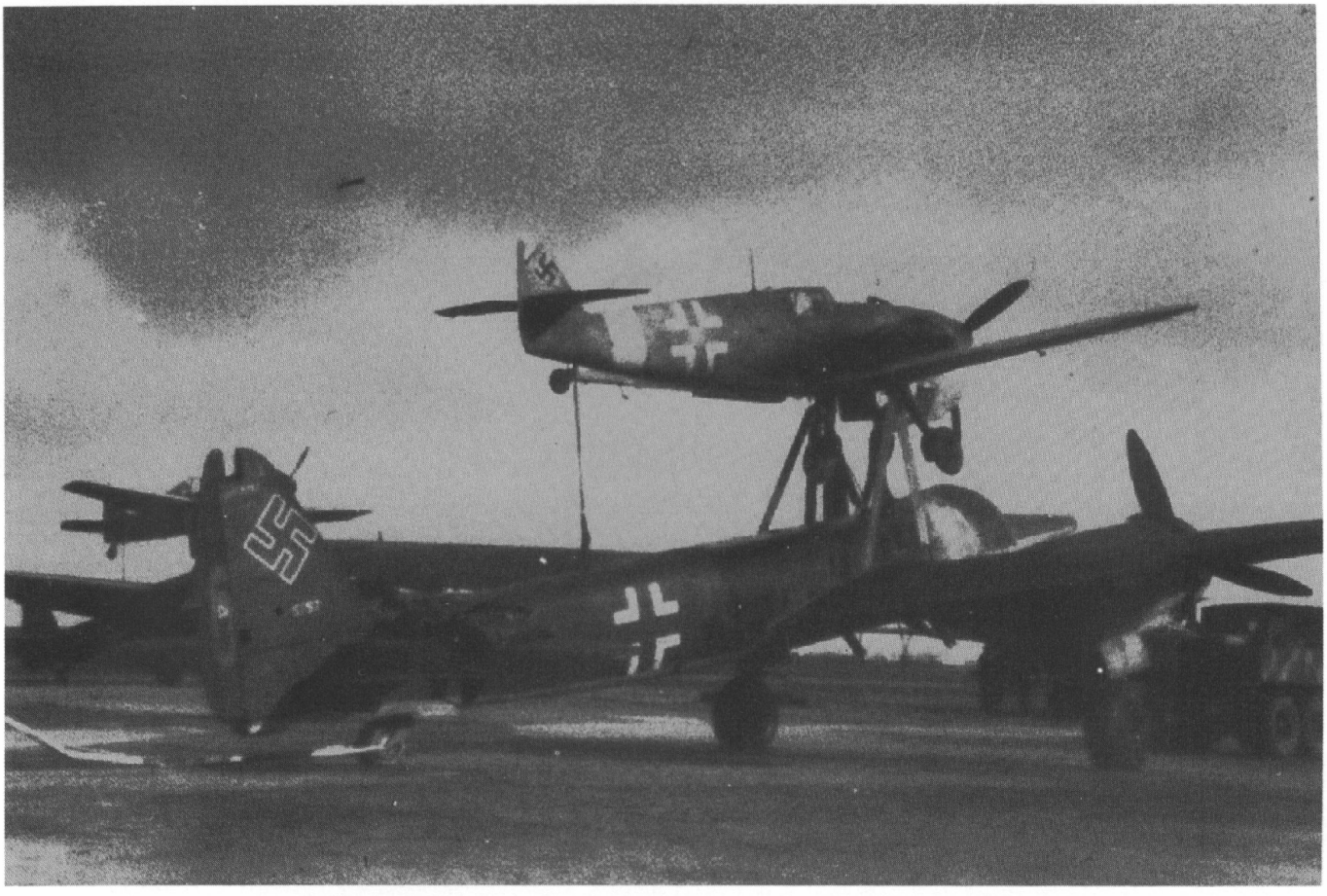
The same Mistel seen from the side.



This Mistel is camouflaged somewhat better against ground attack planes and aerial reconnaissance. (Burg bei Magdeburg, April 1945)



Invisible to enemy air recon flights, this Mistel waits for takeoff. Notice the number 9 on the warhead.



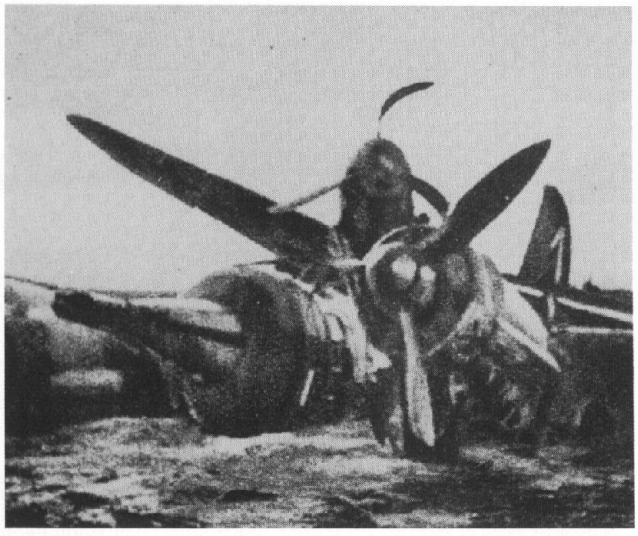
Mistel 1 teams ready for operations in Burg bei Magdeburg, April 1945.

Above:
An extremely rare photo of a Mistel in flight, here seen during landing. Another Mistel can be seen on the left.

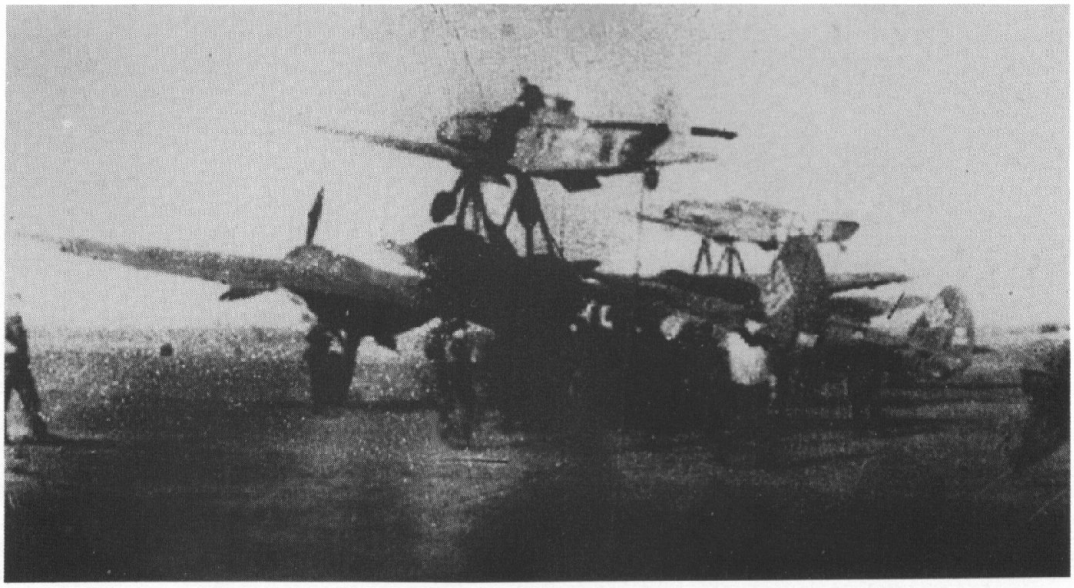
Left:
The Mistel combination resulted in an unfavorable center of gravity, so that even Schulmisteln had an "allergic reaction" to rough spots on the runway. Flip-overs such as these were the results.

This is what a flip-over looked like close-up.

An impressive photo of another unfortunate Mistel.

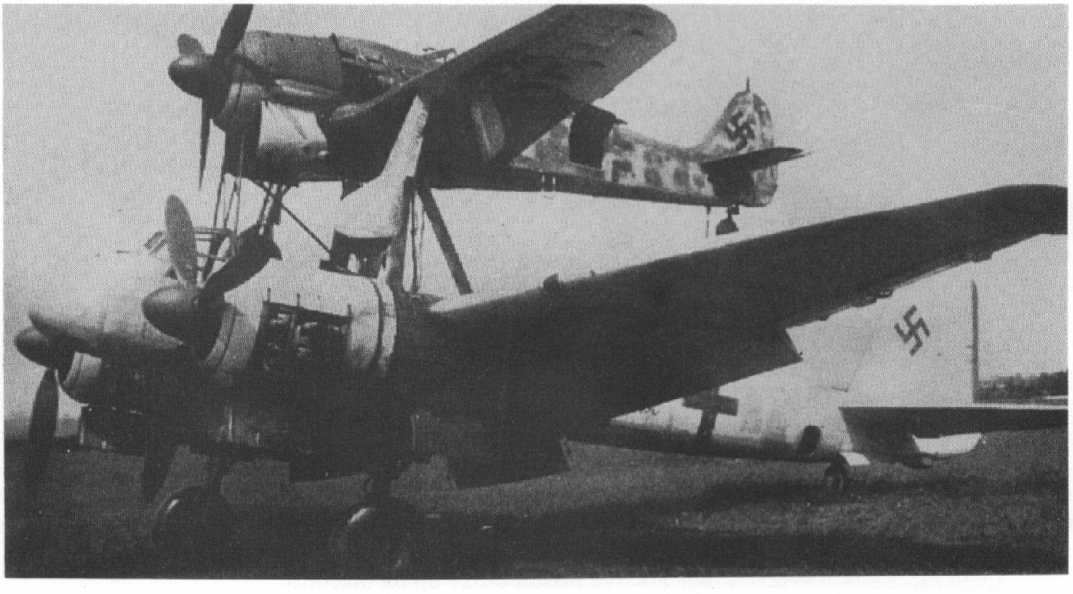


Even more dangerous was when a live Mistel broke up on takeoff.



Although not a good-quality photograph, this is an authentic picture showing the preparations for an operational mission (6/KG 100, Burg bei Magdeburg, 1945). The landing gear on the rear Bf 109 has already retracted.

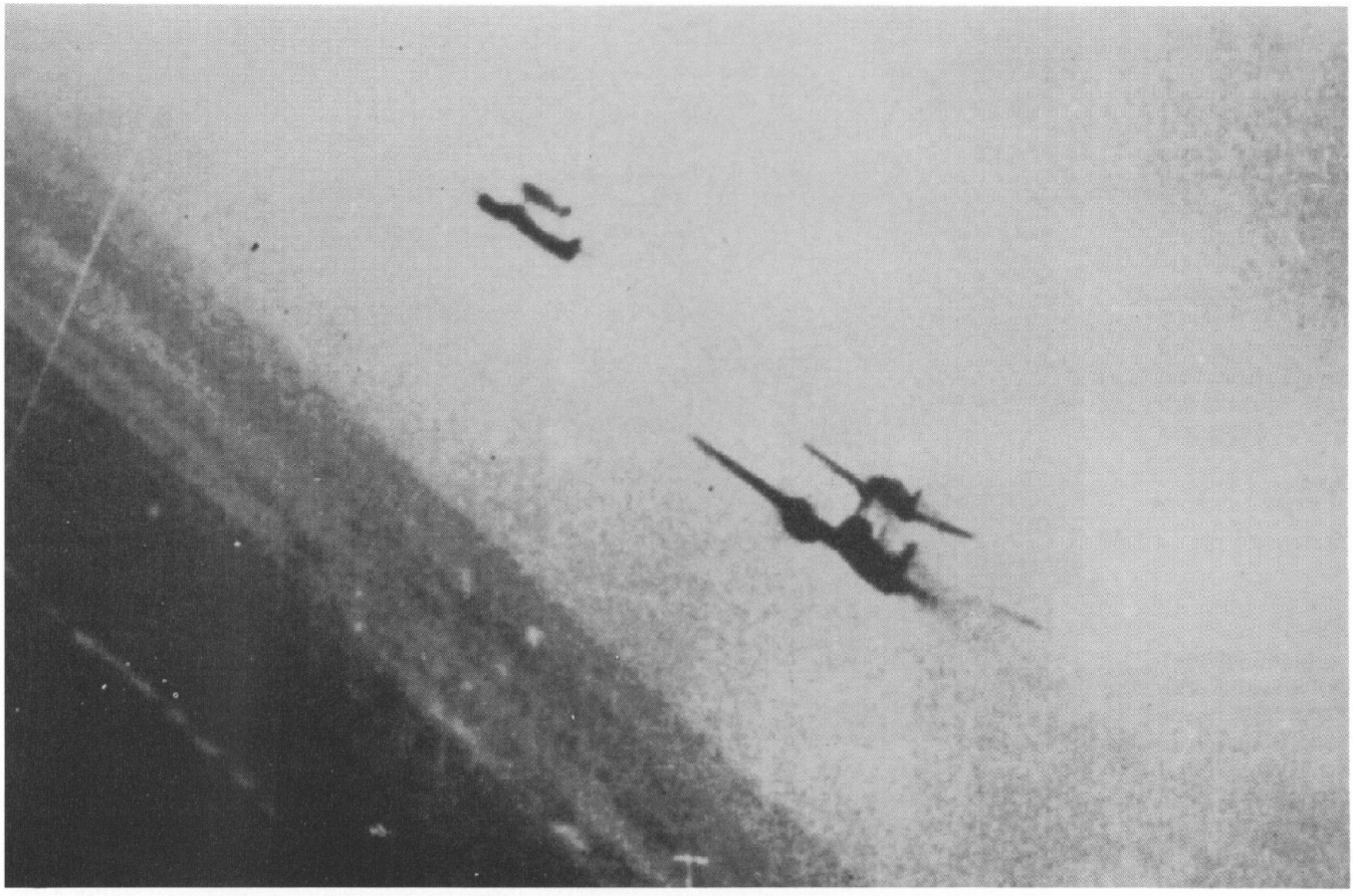
This Schulmistel most probably never went into operation. Based on the paint scheme, the lower component was actually planned for night missions.



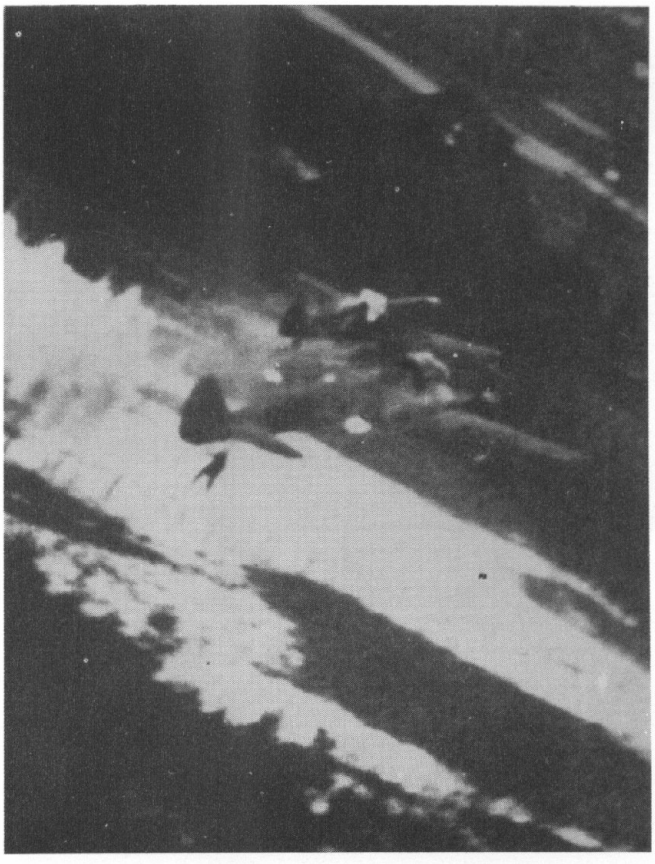
This photo shows, as does a large portion of the other photos, how different the color patterns were on Mistel teams. Wherever they came from and whatever the previous function of the aircraft were – for their last mission they were left in their old paint scheme.

A member of the ground crew carries out last minute adjustments, the pilot in the control aircraft takes off his cap . . .

. . . to put on his flying helmet and prepare for takeoff. That this is a Mistel combination is evidenced by the shadow, which casts the Fw 190 at an imposing height.



These Mistel teams were sighted by pilots of the US 8th Air Force, probably over Belgium.



On 3 February 1945, six Mistel weapons were caught by four Mustangs of the 55th Fighter Group, which shot down four of the teams. These photos were taken by the gun cameras.

This Ju 88 A-4 of a Mistel 1 was given a provisional nose prior to its planned conversion over to an operational version.

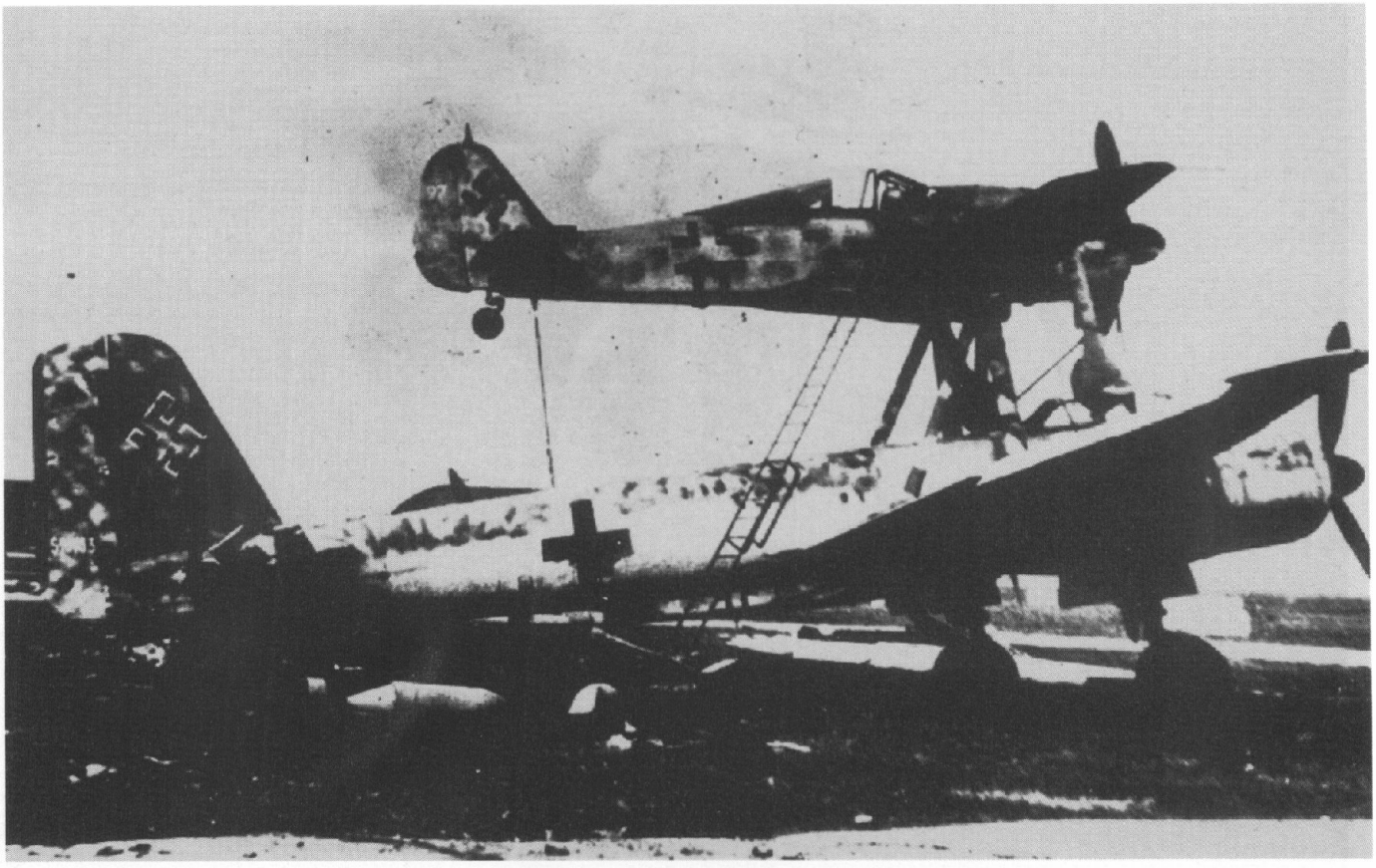
The super attack weapon then became an emergency stop-gap measure, to be used where the threat was greatest, i.e. in the East on the Oder, Weichsel and Neisse and in the West on the Rhine following the invasion. It was here that, on 15 March 1945, four Misteln attacked the Ludendorffbrücke at Remagen, which had fallen intact into the western Allies' hands and remained standing despite all attempts to destroy it. The attack, conducted in poor weather, failed. Ten days later the bridge collapsed of its own accord after tens of thousands of tons of Allied war material had rolled across.

The western Allies were well aware of the Mistel combinations, both from the attacks in Normandy as well as from aerial reconnaissance activity. The sites were called Peenemünde, Kolberg, St.Dizier, Biblis, Nordhausen, Burg, Halberstadt, Prague-Rusin, Tilstrup, Dessau, Bernburg, Neuruppin, Oranienburg, Rechlin-Lärz, Rostock-Marienehe, Parchim, Wesendorf, Merseburg. Their purpose was known, but why they were not being used remained a mystery.

At the end of March an American bombing raid destroyed 18 operationally ready Mistel combinations sitting in Rechlin-Lärz; these were lost to Gefechtsgruppe Helbig forever. In the meantime, Helbig had attacked the Oder bridges at Göritz and Neu Rathstock once again, using six of the attack weapons. The mission was relatively unsuccessful, for what damage was done was quickly repaired by Soviet engineers. Even a bombing raid a short time later resulted in no long-lasting effect. On 22 March 1945 a British bombing attack destroyed the Junkers facilities in Nordhausen; all personnel working on the Mistel project were transferred to Merseburg. The Junkers plant in Bernburg was directed to not only convert repaired Ju 88s to Misteln, but in view of the precarious situation to also make use of the brand new, longer Ju 88 H-2 and H-4 models.

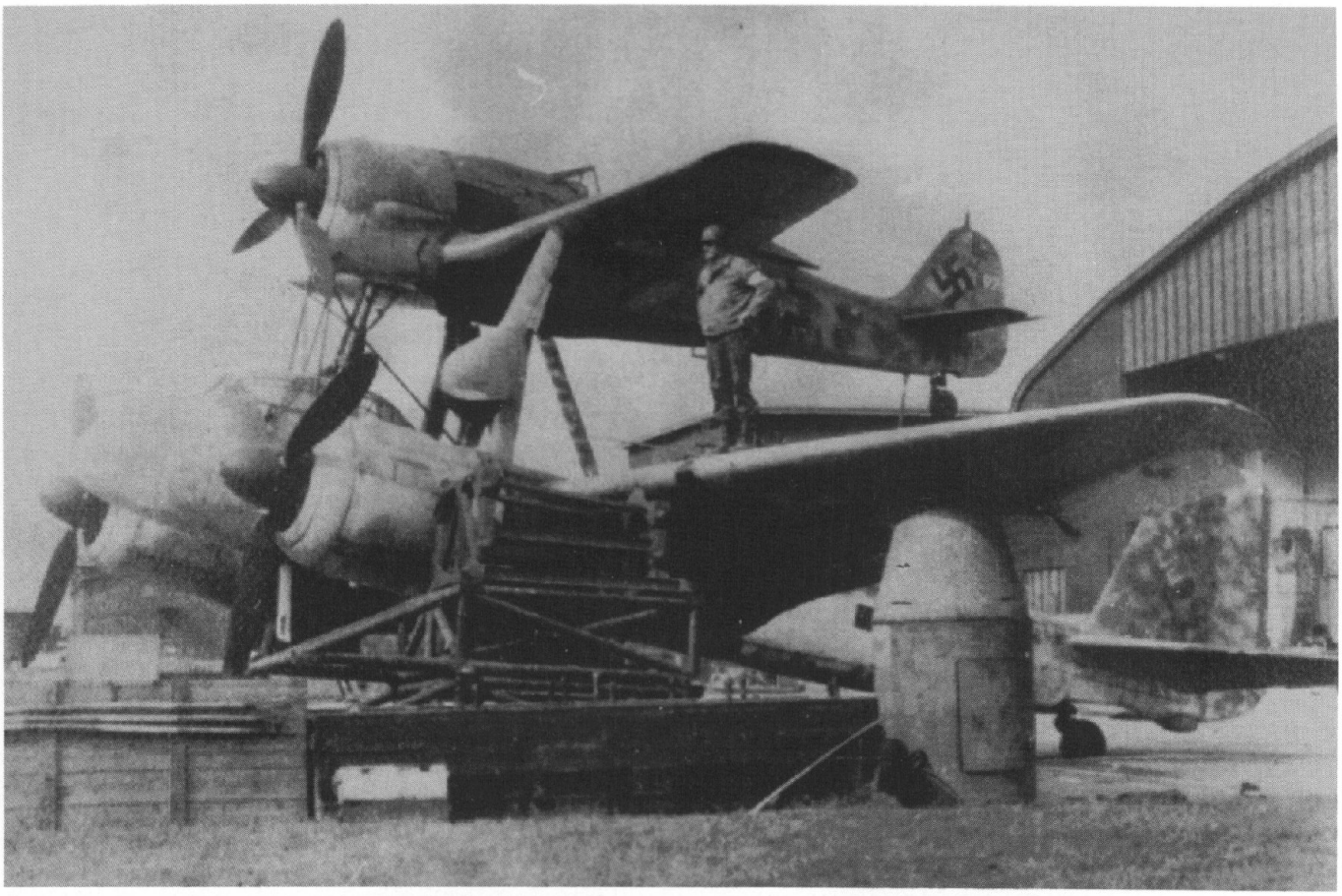
By the end of March Hitler was ready to lay all his cards on the table once again and authorized a renewed Operation Eisenhammer, using the remaining Mistel aircraft and on a smaller scale than previously. However, the ever increasing pressure being exerted by the overpowerful Red Army caused him to retract his decision shortly afterward.

On 31 March 1945 six Misteln from Gefechtsverband Helbig took off from Burg as part of a formation totalling 33 aircraft. Their target was the railroad bridge at Steinau.



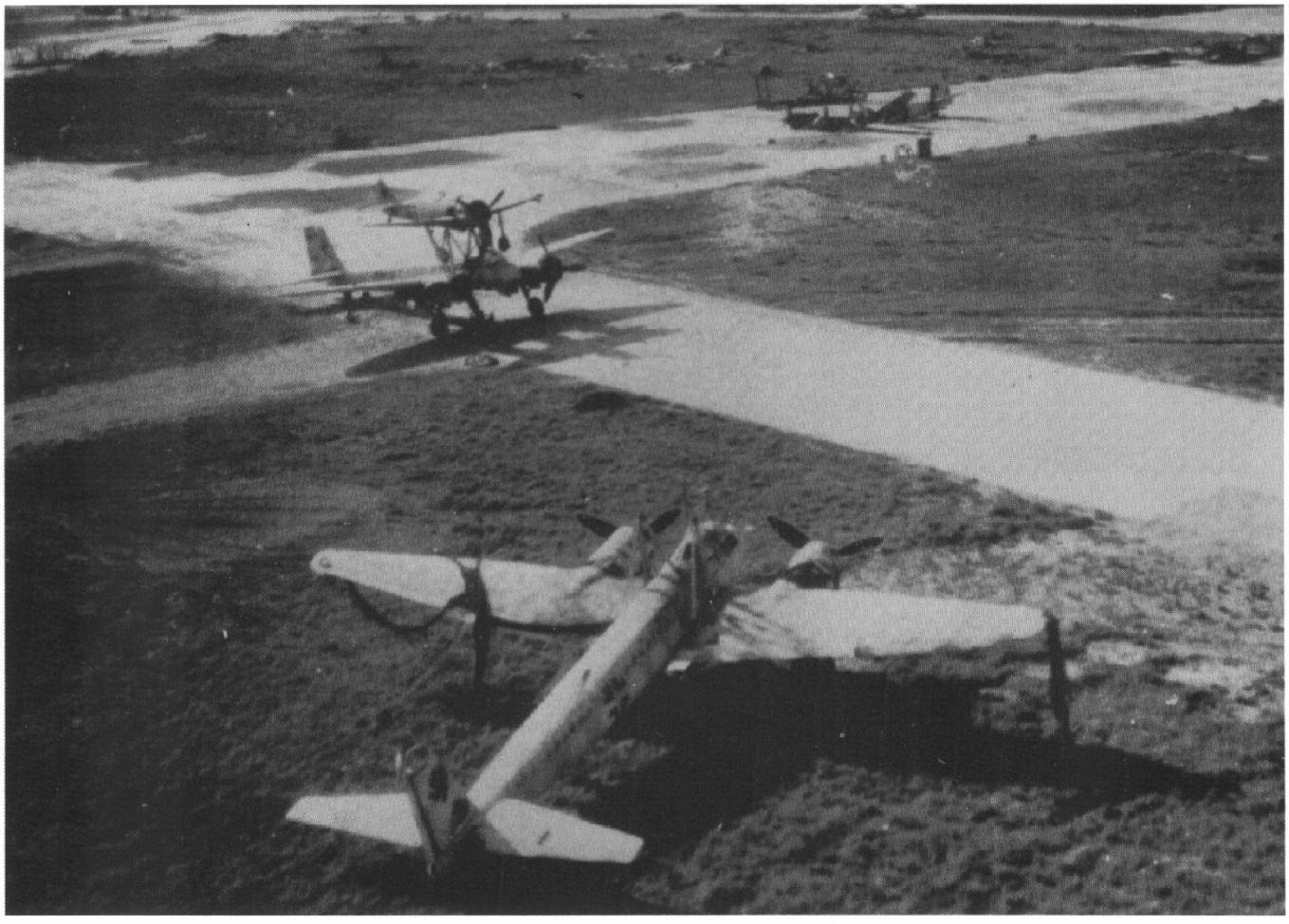
Discovered by American troops in Merseburg – notice the long ladder to the Fw 190 (via United States Air Force Museum).

The same Mistel minus the ladder, being observed by an interested GI.

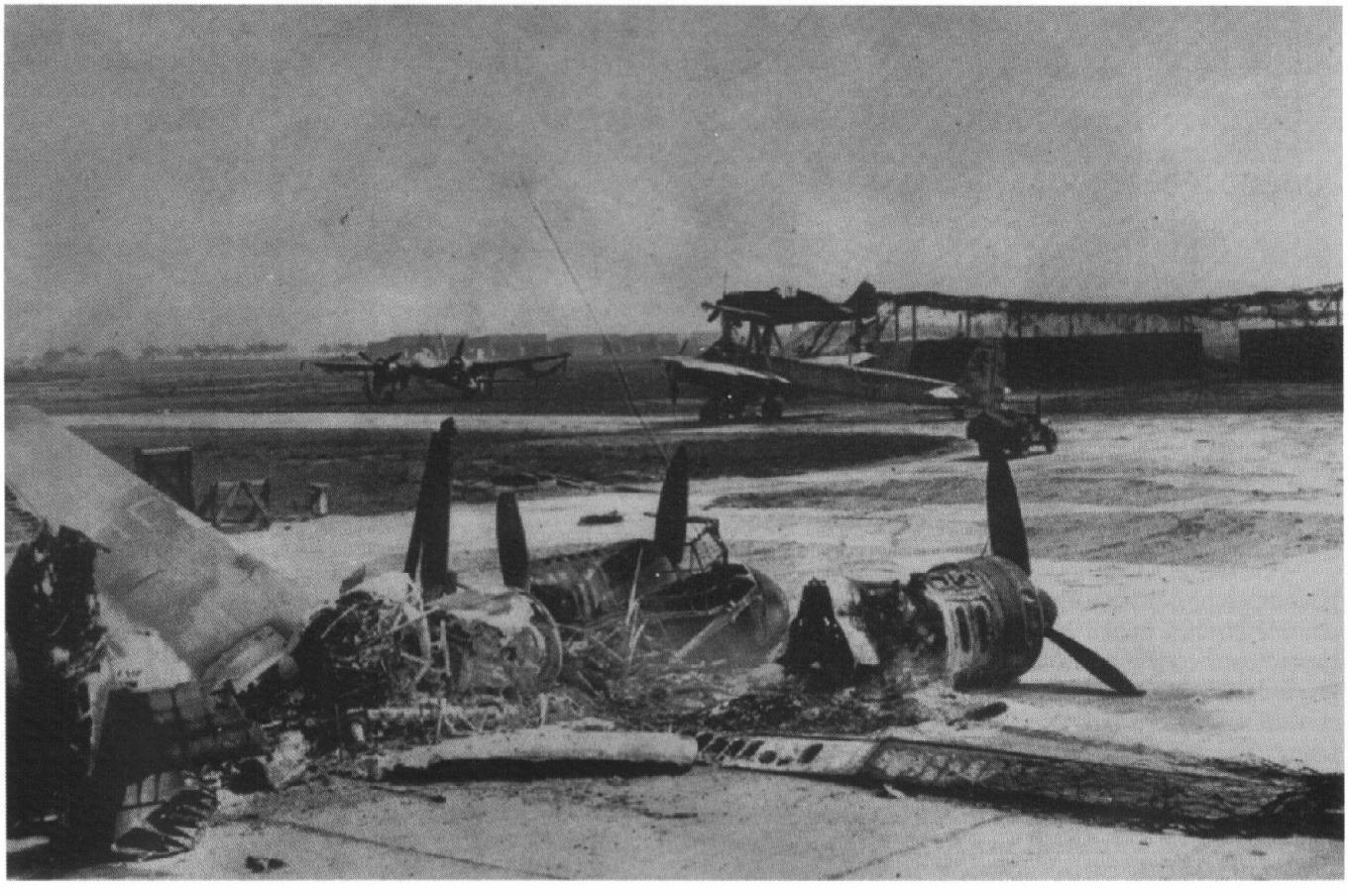


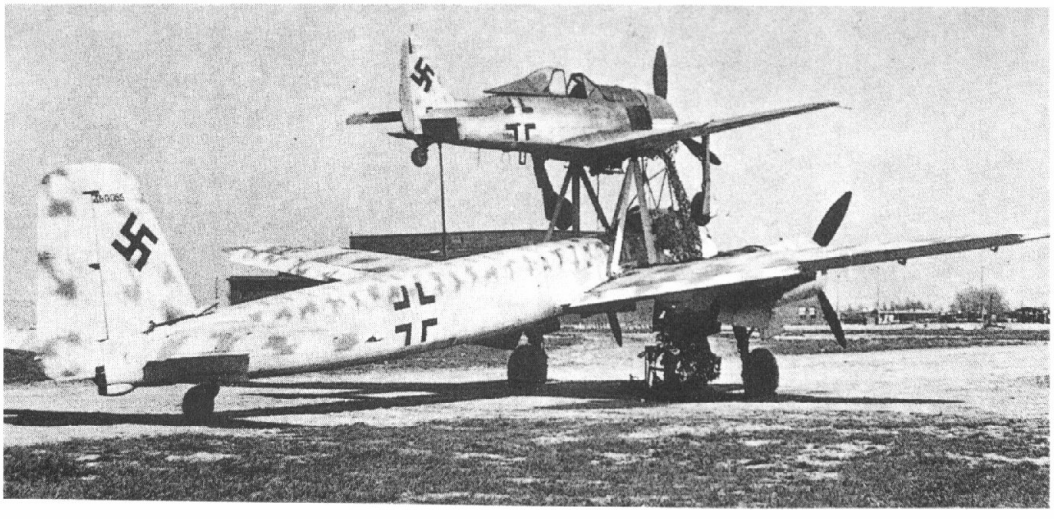
Posing for the family album. The GI most certainly could have not known that a similar concept would someday play such an important role in his own country.

The same Mistel seen once again, from a different viewing angle.

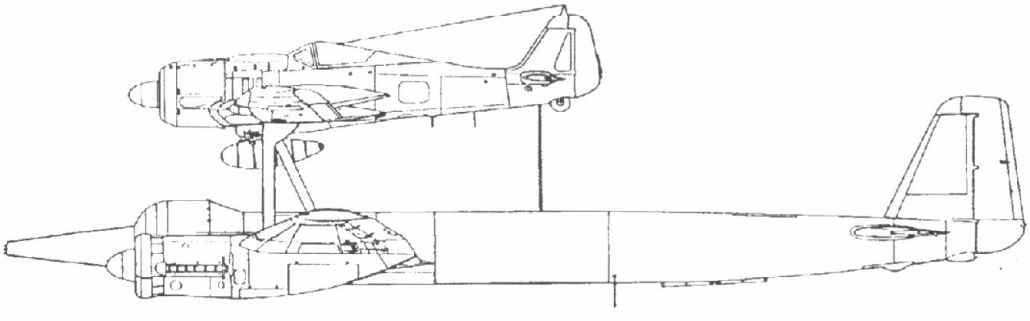


Mistel S 2 and S 3-C combinations, Merseburg (left page) and at Bernburg.

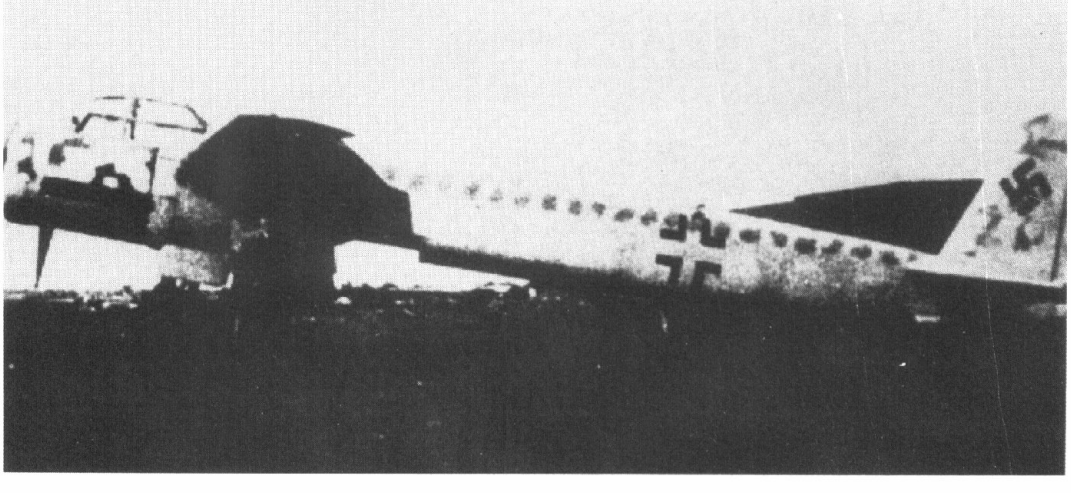




Planned to go directly from production to operation – with no return: the Ju 88 H-2.

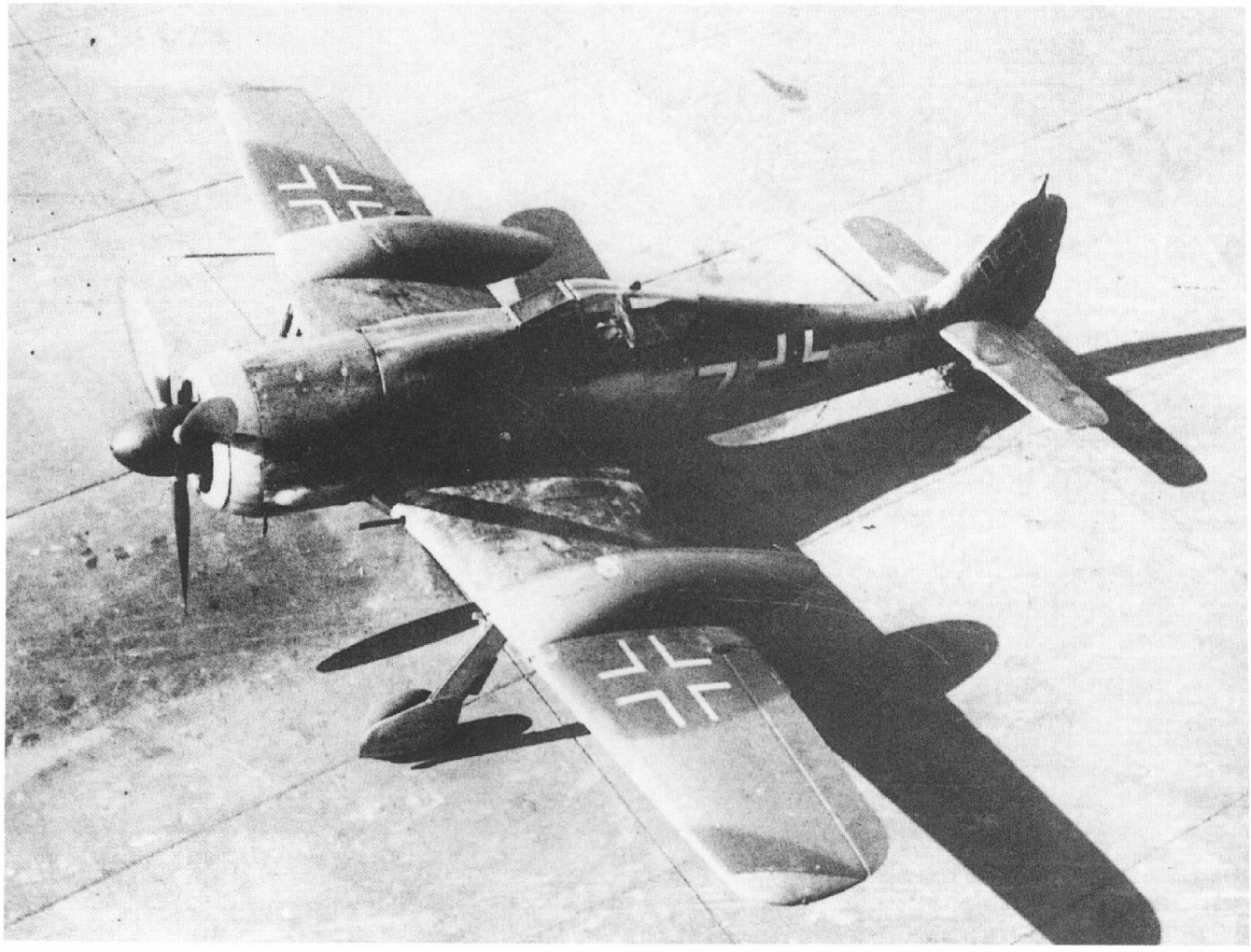


Mistel 3-C – the upper component was an Fw 190 A-8 with "Doppelreiter" auxiliary fuel tanks, set atop a Ju 88 H-2.

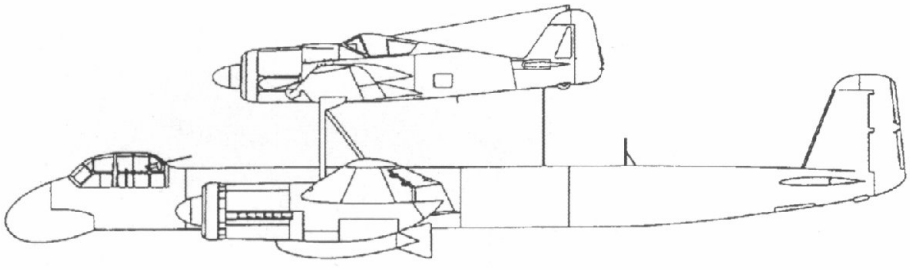


Ju 88 H-2 – approximately 10-12 examples were built, most of them planned for Mistel operations.

One of the Misteln wasn't able to retract its landing gear and therefore couldn't maintain cruising speed. The control aircraft broke away over an open field and returned back to Burg, while the Mistel impacted into the ground. With the second Mistel, first the engine of the control craft gave out, then one of the Ju 88's engines failed. The Mistel exploded in an open field after separation, with the Bf 109 making a forced landing. The pilot was injured, but survived. The third Mistel also had difficulties with the control aircraft, the engine of which suddenly died. Here, too, the Mistel exploded in an open field and the Bf 109 made a belly landing. The remaining three Misteln carried out their attack according to plan and, despite withering anti-aircraft fire, didn't suffer any further losses. Two Misteln impacted near the target, while the third scored a direct hit on the Steinauer Brücke. The high loss rate due to technical malfunctions was unacceptable. On 6 April 1945 the last Mistel to be completed at Merseburg left the factory.

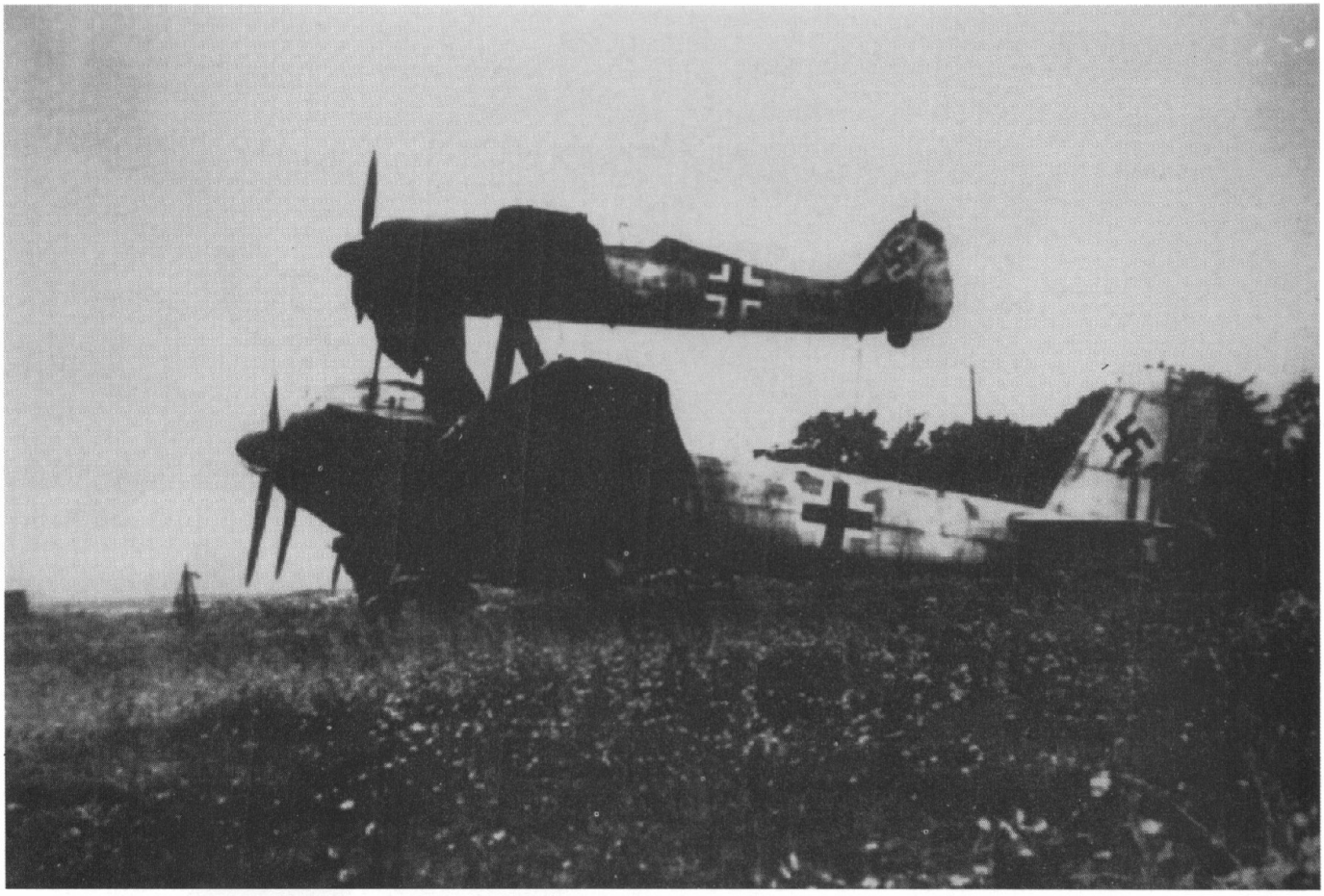


Above: An Fw 190 A-8 with "Doppelreiter" wing tanks, each holding 300 liters of fuel, and (right) how it was to be used in the role of the projected "Führungsmistel."



On 7 April 1945, KG(J) provided 24 Misteln for the destruction of the Weichsel bridges at Thorn, Warsaw and Deblin, as well as the command post at Tarnow. An American bombing raid on Parchim shut that airfield down for several days, also destroying several of the Misteln configured for the mission. In Oranienburg there were six Misteln ready. After a bit of indecisiveness on the part of the weather, the go-ahead for takeoff was given. But the first Mistel's engines wouldn't start, loss of time became greater and greater to the point where it couldn't be made up and Oranienburg, too, bowed out.

In Peenemünde, six Misteln were ready for takeoff and everything looked good. But as the first combination began its takeoff run, its left tire burst – the Mistel broke apart and caught fire. Although the pilot got safely out and the fire was extinguished, the wreckage blocked the runway. Following Parchim and Oranienburg, Peenemünde also reported in that it could not carry out the mission. Rechlin, too, had problems with the first Mistel in line, which would not start. The second Mistel, which rolled off the runway during takeoff after the first Mistel had been towed away, was repositioned again –



Above and below:
Mistel combinations abandoned in Denmark (probably Karup) near the end of the war.

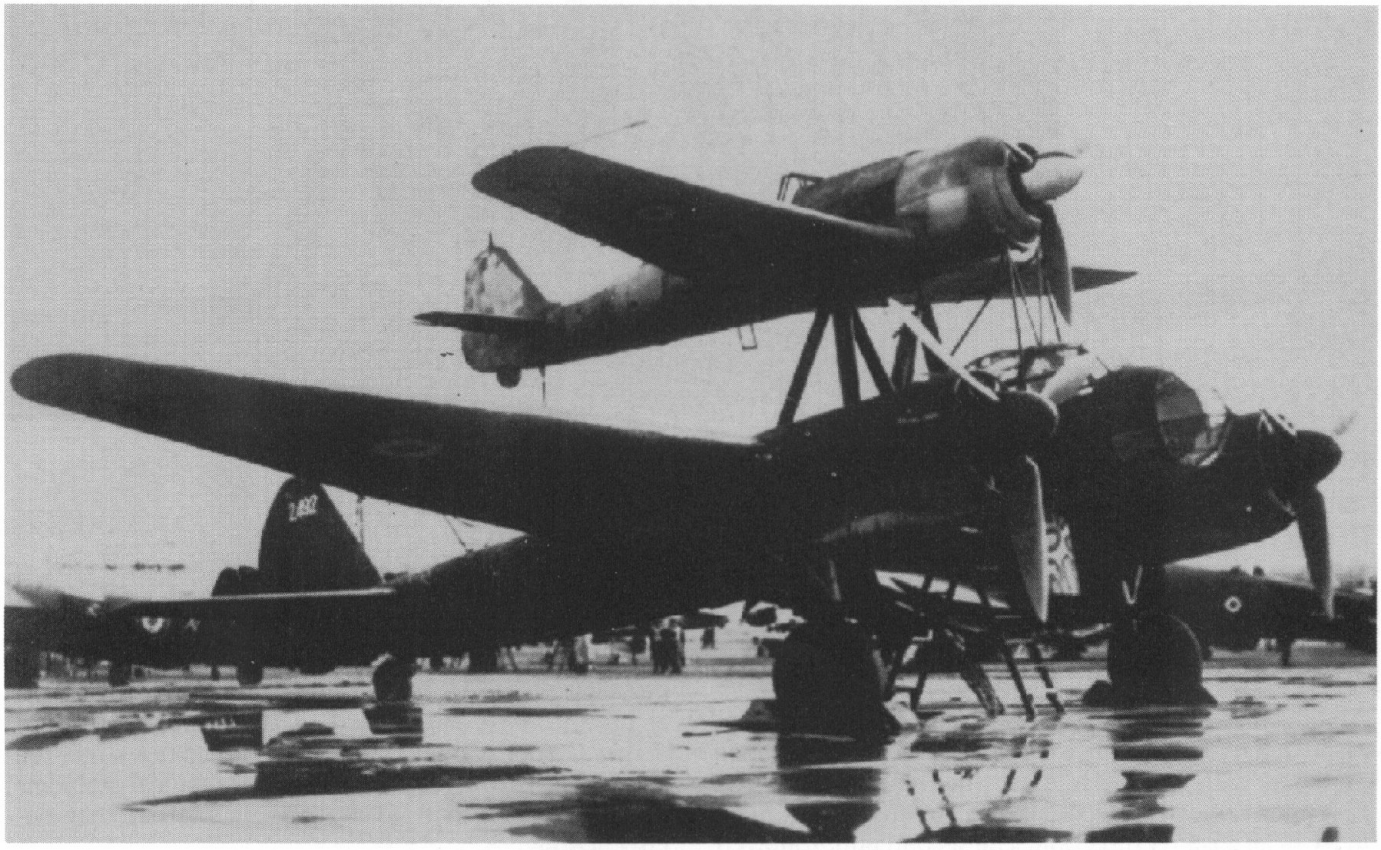
Another parked Mistel in Denmark (Tilstrup), camouflaged at the forest edge.

Detail photo of the support brace from a Mistel abandoned in Karup (May 1945).

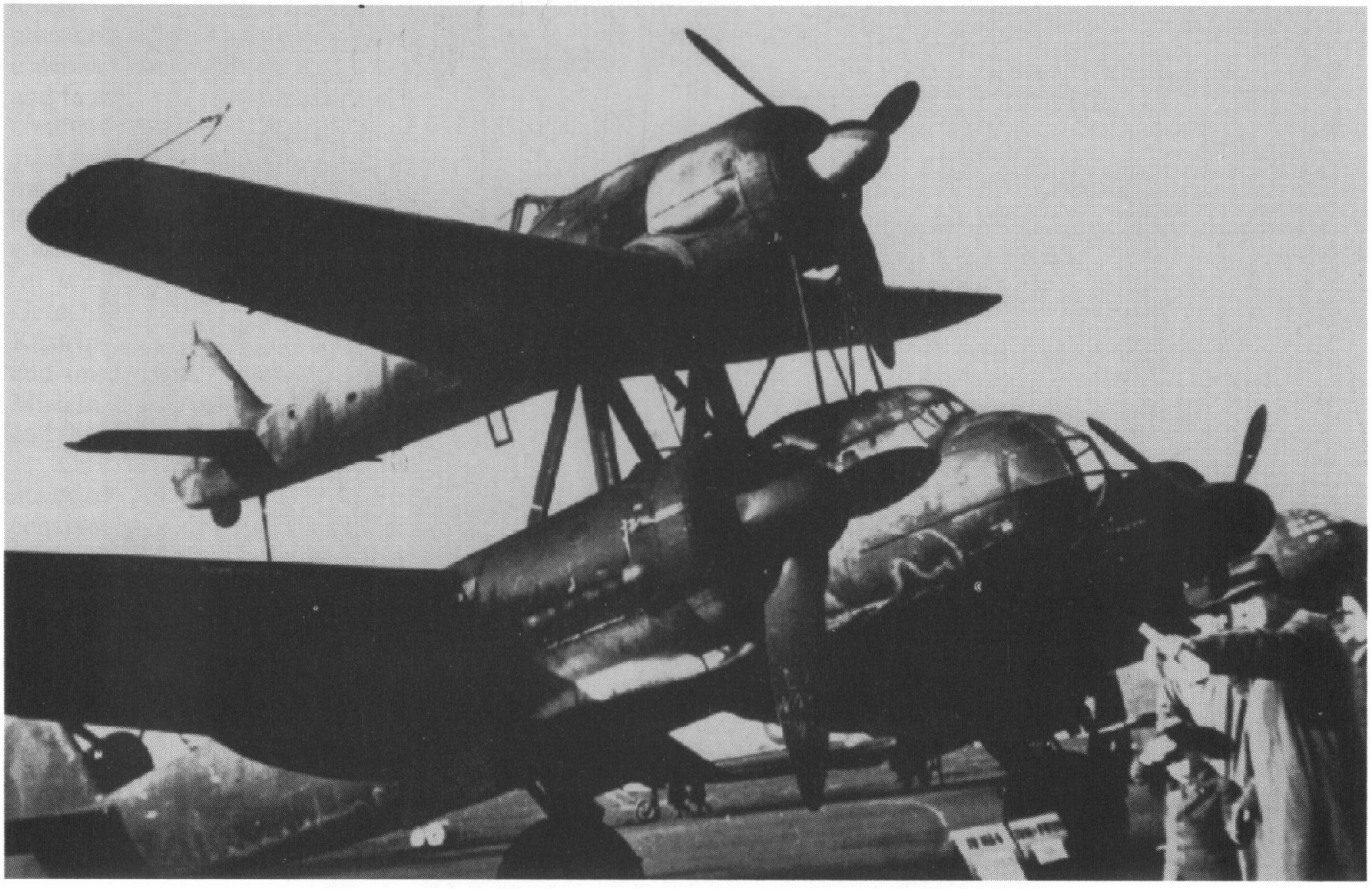
but once more valuable time had been lost. At the proverbial last minute the remaining Misteln plus a reserve were finally able to take off.

The controls of one Mistel were shot out by an American fighter plane making a pass and the control plane separated itself. Two other Misteln had serious problems with the fuel transfer pump mechanism. The first pilot decided to separate, but his Mistel continued to fly in an easterly direction. The second pilot followed his example shortly afterward. Due to instability the next pilot broke off and the last Mistel arrived over the target much later than planned. The pathfinders had long since departed and anti-aircraft fire was spewing from every gun. Trusting to luck, the pilot raced toward the bridge at full throttle – but in the end missed the target altogether. The only one of 24 Misteln to make a target run was unsuccessful – organization and technical problems had contributed more to the mission's failure than enemy action.

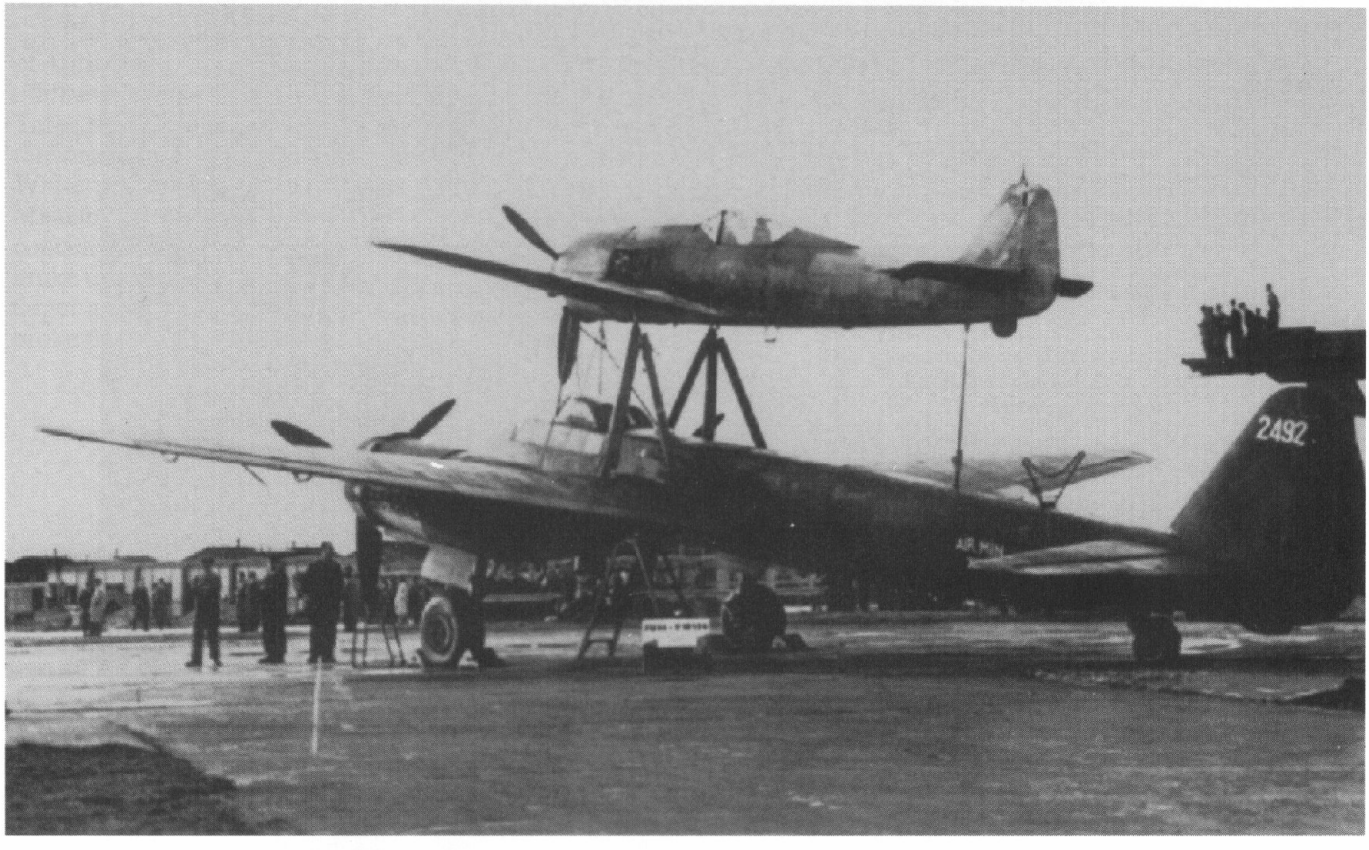
A Mistel S 3-A at the war prize exhibition in Farnborough, 1945.



The same combination from another angle.



Instructions on the propeller read: Do Not Touch.



Here the catch fork for the rear support can clearly be seen.

After the exhibition the combination was separated (Farnborough 1946).

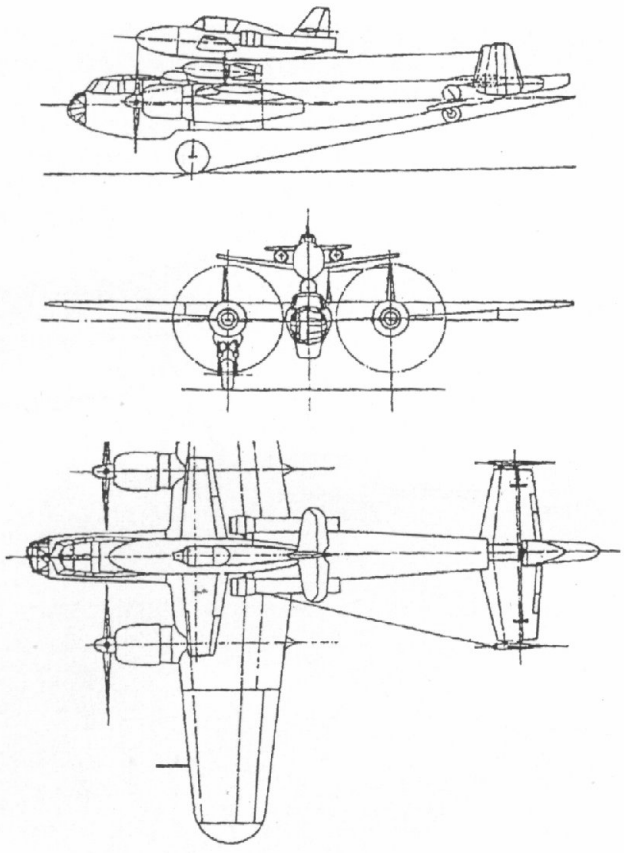
The number of Misteln gradually grew smaller due to diverse missions or bombing of their airfields. Supplies could no longer be expected, mission orders and Eisenhammer readiness states contradicted themselves, and in addition to the acute fuel shortage problems the communication lines became more worse by the day. On 10 April 1945 a bombing attack on Rechlin-Lärz ruled out any further possibility of operating Misteln from that airfield again. A Mistel mission order for 9 April 1945 could only be carried out on the 12th of that month due to weather conditions. Four Misteln of the Gefechtsverband Helbig took off to strike the bridge in Küstrin. The Fw 190 control aircraft separated cleanly and immediately attacked Soviet flak positions. The Misteln didn't impact directly on the target, however, and the bridge remained standing.

On the 16th of April 1945 the Red Army began its major offensive on the Oder Front. Oberst Helbig didn't consider himself able to carry out the orders of 17 April 1945, which called for using his Misteln against the partially reconstructed bridge at Steinau. The skies buzzed with Russian aircraft, meaning that the Misteln in all probability would not have even been able to make it off the ground.

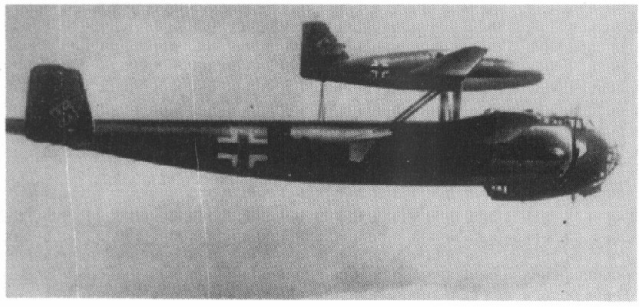
These mission orders were pushed back for so long that it became impossible in any case to carry them out.

Once more, three Mistel attack Gruppen were called upon to destroy the Oder bridges at Küstrin on 26 April 1945. Only seven Misteln from Peenemünde were able to take off. The target was reached in miserable weather conditions, and under heavy anti-aircraft fire the formation broke up. Each pilot was on his own, attempting to bring his Mistel to bear on the target. This time two Fw 190s made it back home, one with such severe damage that it was forced to make a belly landing.

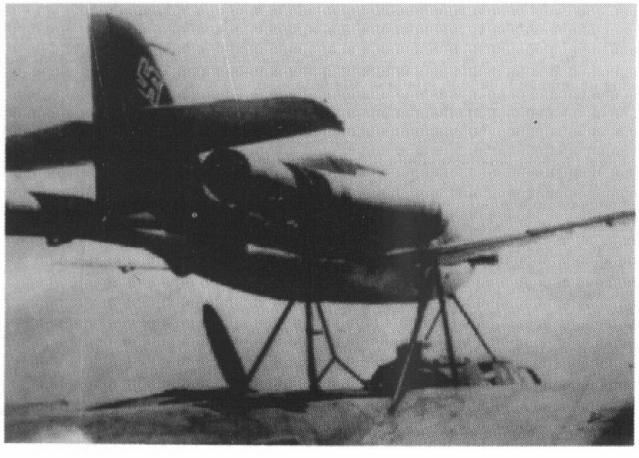
Probably the last Mistel attack took place on the 30th of April, 1945. Four combinations from II/KG(J) 30 took off from Peenemünde to strike the Oder bridge at Tantow. Three reached their target; the fourth was forced to separate prematurely and the Mistel sank into the Baltic Sea. While still roughly 10 km from the target, the three Misteln and their fighter cover were welcomed by a heavy concentration of flak and enemy fighters. The formation broke up immediately, the bombs were lined up with the target as accurately as possible and the control aircraft broke free – one with its Mistel already burning.



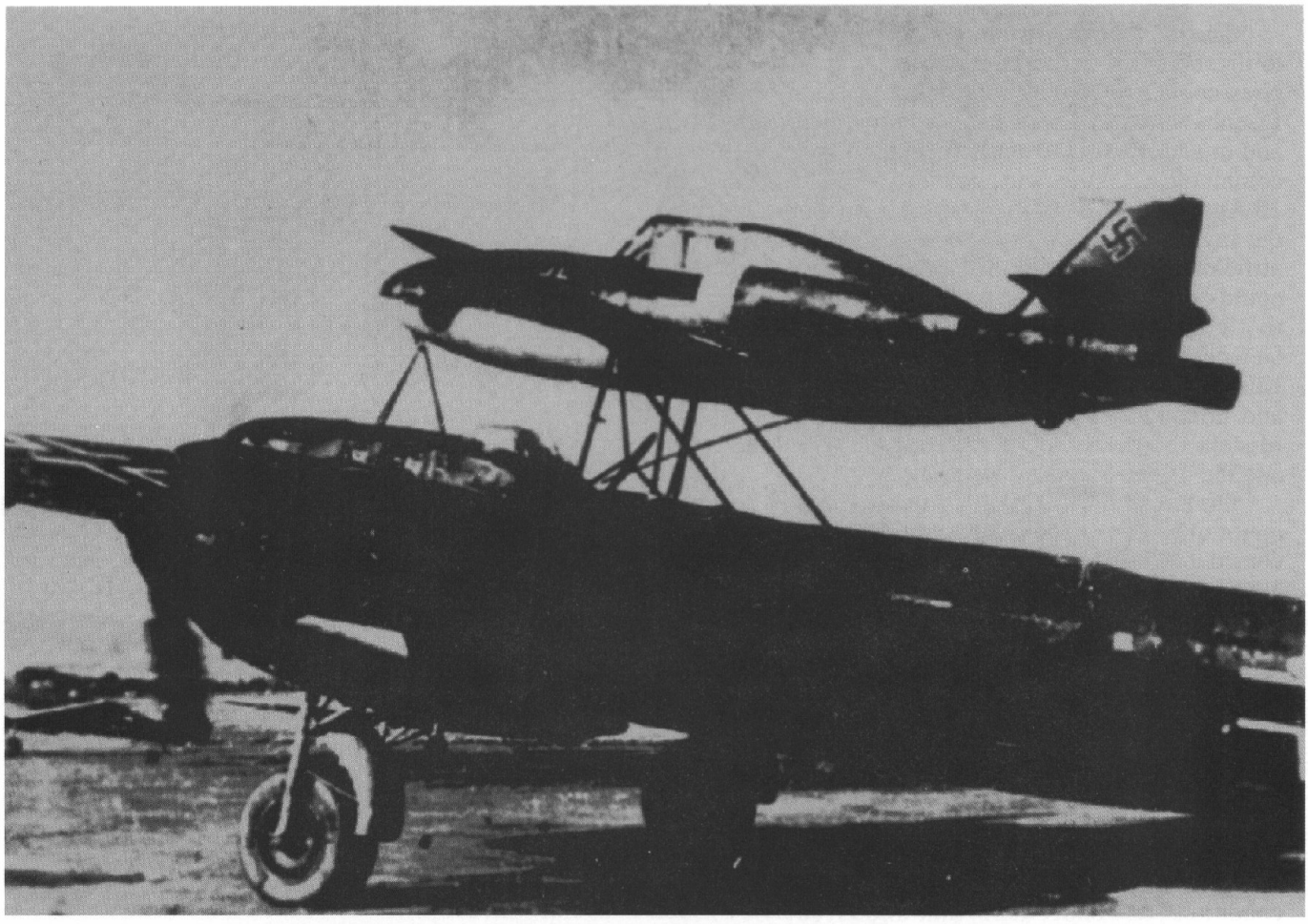
Three-view drawing of the Me 328/Do 217 E.



Artist's impression of the Me 328 V1/Do 217 E team.



Close-up photo of the Me 328 B/Do 217.



Me 328 B on a Do 217 E-2 test carrier, Hörsching Airfield near Linz, 1945.

One of the pilots failed to return and no successful hits on the bridge were observed.

A number of Misteln became victims of the bombs and shells of the Allies; some were blown up by their own crew. Soviets and western Allied forces captured numerous complete Mistel combinations and Ju 88 lower components, which had been grounded due to fuel shortages or the rapidly advancing front lines. Altogether, a total of more than 200 Misteln were built.

Foreign "Grossbomben" in the Second World War

The Italians were the first, using Savioa Marchetti SM 79s as Grossbomben after they had been written off for conventional operations. Their sole purpose was to be attacking ship targets, with a pilot taking off in and operating the airplane. Just before the target the pilot would bail out and the actual target approach would be controlled remotely. A known test flight off the Algerian coast failed on 12 August 1942 – the remote control equipment malfunctioned due to a damaged condensator.

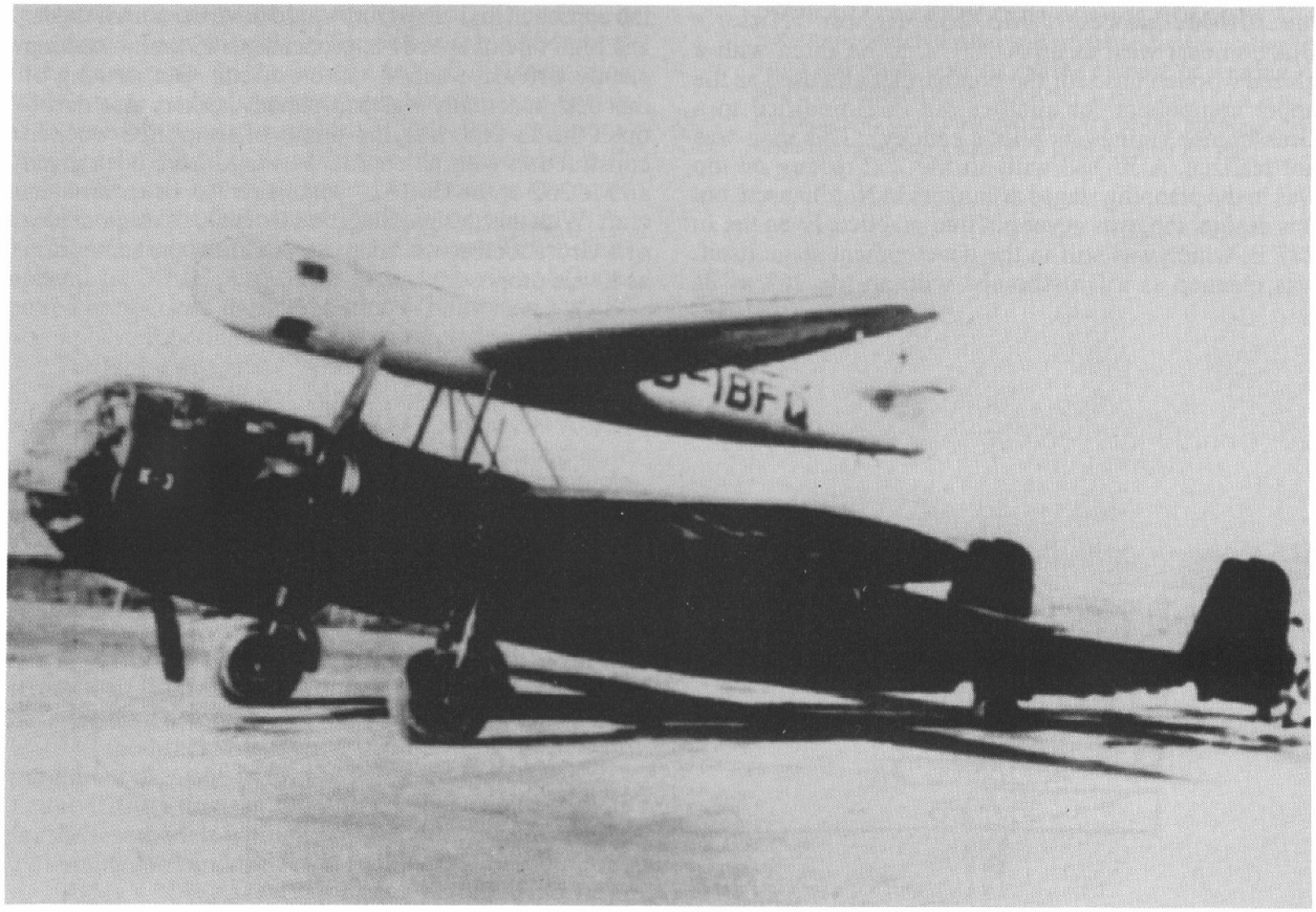
The USAAF planned to strike point targets in the anticipated invasion zone by using war-weary bombers converted into flying bombs. There were many advantages to this: the costly return flight to the States for scrapping was dispensed with, the old birds were gotten rid of and the Germans could be attacked with super bombs by remote control. For the most part, war-weary B-17s were filled with circa 10 tons of Torpex explosive and painted bright yellow or white. Volunteer pilots would get the "Aphrodite" (as they were called) into the air and on course, then bail out after turning on the remote control and arming the fuse mechanism. From that point on, the "robot" would be controlled from a "mother ship" to the target by remote control. Tests in England didn't prove satisfactory, yet attacks were ordered on German V-1 sites nonetheless. German and even British anti-aircraft, radio interference and technical problems led to unsuccessful operations.

Despite visual aids such as brightly colored paint, smoke markers, lighting and even television guidance the mother airplane often lost sight of the robot if the weather turned uncooperative. Attacks on Heligoland failed due to flak and bad weather; during another attack an "Aphrodite" even went down in German territory undamaged. Allied fighter-bombers, which were to have destroyed it afterwards, couldn't locate it again. By the war's end the 8th Air Force had flown 15 "Aphrodite" missions with 34 robots – with altogether limited success. In the Far Eastern theater the atomic bomb made such Grossbomben superfluous.

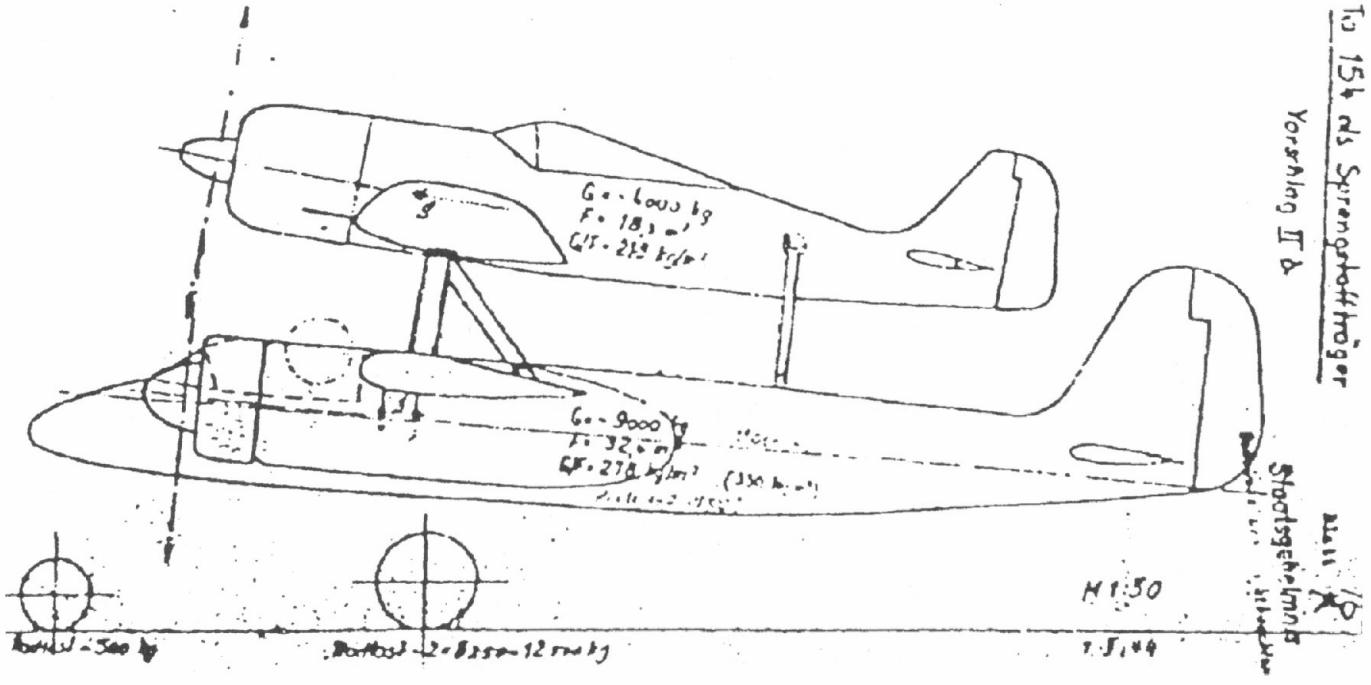
Test Carrier Mistel and Other Plans

Mistel combinations were not only used as weapons or for researching new methods for towing, there were also several designs where the lower aircraft served as a carrier for a test airplane resting on it.

The simplistically designed Me 328 compact fighter/fighter-bomber, equipped with two Argus-Schmidt ramjet engines, was set on a Do 217 E and flown in 1943. The rocket powered DFS 228 high-altitude test aircraft (possible reconnaissance role) was given a Do 217 K-3 as its carrier aircraft, and this combination also was tested in practice. The Bachem 349 "Natter" interceptor aircraft, also rocket powered, was also tested as a Mistel in conjunction with an He 111.

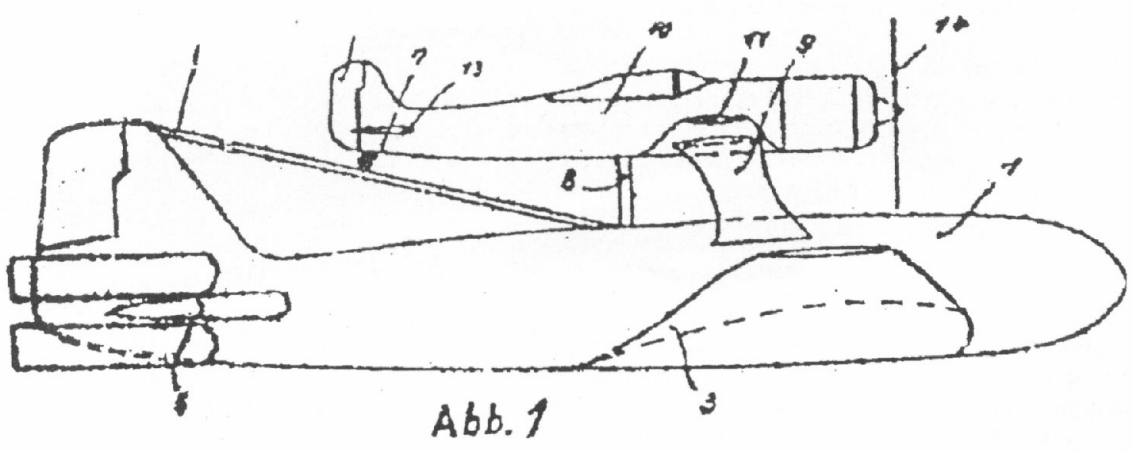


The DFS 228 high-altitude research aircraft on a Do 217 K, also at Hörsching Airfield near Linz.

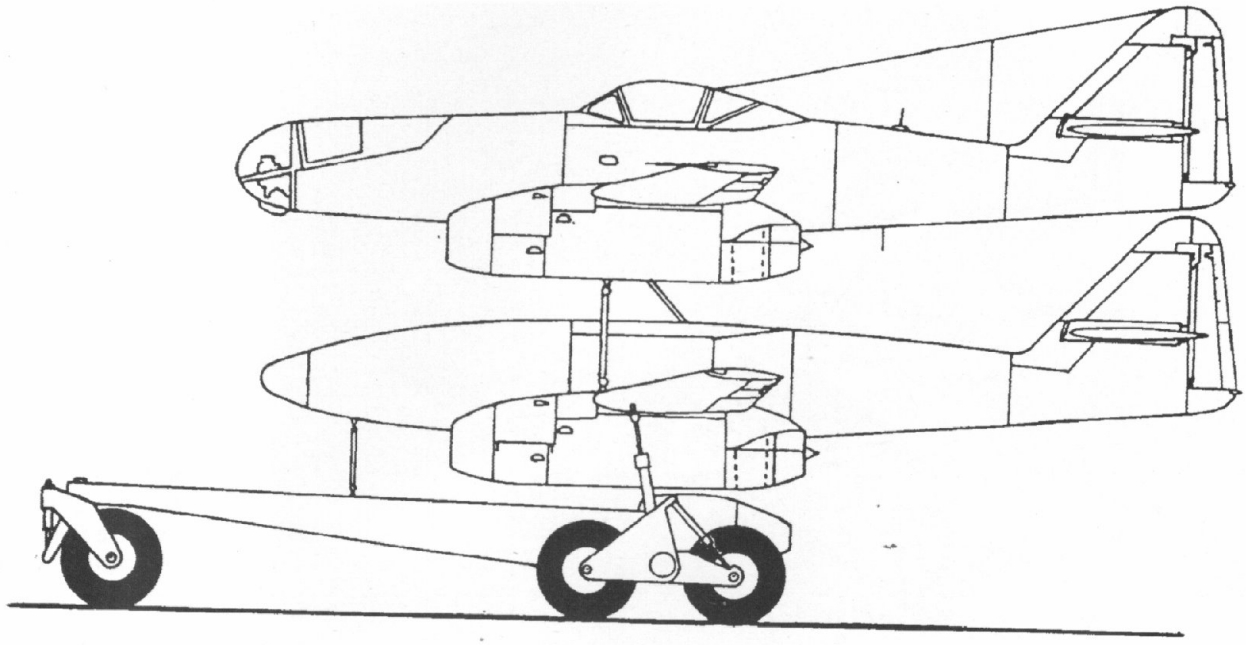


"Formation Buster": Ta 154 as a warhead carrier (sketch from 1944).

There were also a few designs in the planning stages: the turbine powered Me 262 fighter (Hitler's Blitzbomber) was, as an A-2a/U2, to be fitted with a glazed wooden nose for the bombardier and used as the upper component for another Me 262 modified to a Grossbombe (minus its pilot's canopy). This plan was not realized. A Ju 188 with an Me 262 resting on top was in the planning stages at Junkers in Nordhausen, but this design, too, was never put into practice. Even the Ju 287 B, which was still in the development stage itself, was planned as a Grossbombe with an Me 262 as its control aircraft. Since both aircraft were turbine driven, the approach and target run would have been undertaken at a high rate of speed –approaching 800 kmh – making enemy defensive action quite difficult. But nothing of this design actually was completed. Junkers also developed the Ju 268, a flying bomb of simplified wooden construction with jet engine. It was to have been given an Me 262 or the He 162 "Volksjäger" as its control aircraft. With this design, Siegfried Holzbaur's original idea of a Grossbombe was taken up in almost the same form as it was proposed.



One of the various Mistel combinations proposed by Siebel.



Focke-Wulf had Mistel plans with a Ta 154 and Fw 190 as a "Pulkzerstörer" (formation buster), in which the Ta 154 lower component would be packed full of explosives and manouvered into an Allied bomber formation, where it would be detonated. With an effective destructive diameter of approximately 180 meters, it would have been possible to knock out several bombers at the same time. In the second half of 1944 six such Misteln were said to have been built, but nothing is known as to their operational use. In April 1945 Misteln comprised of Ta 152 H/Ju 88 airframes may have been built in Quedlinburg, but no additional information has come to light regarding these combinations.

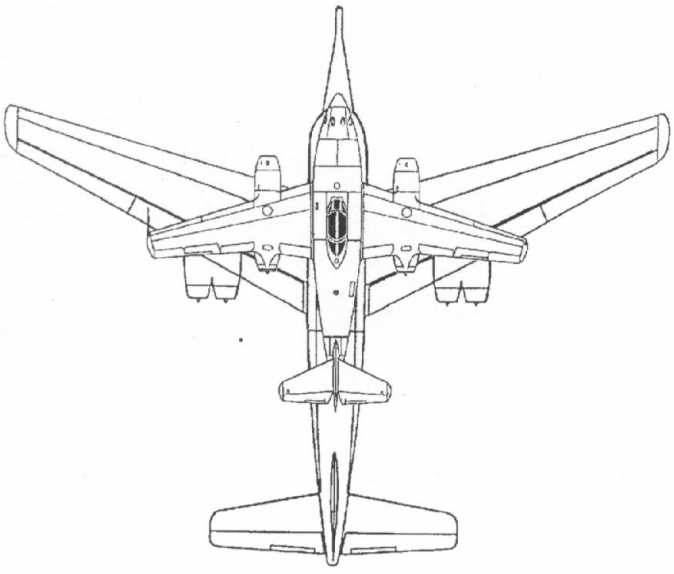
Siebel planned to manufacture its own lower components for Mistel purposes, which could either be catapulted or operated as an amphibious bomb. An Fw 190 was to have functioned as the control plane.

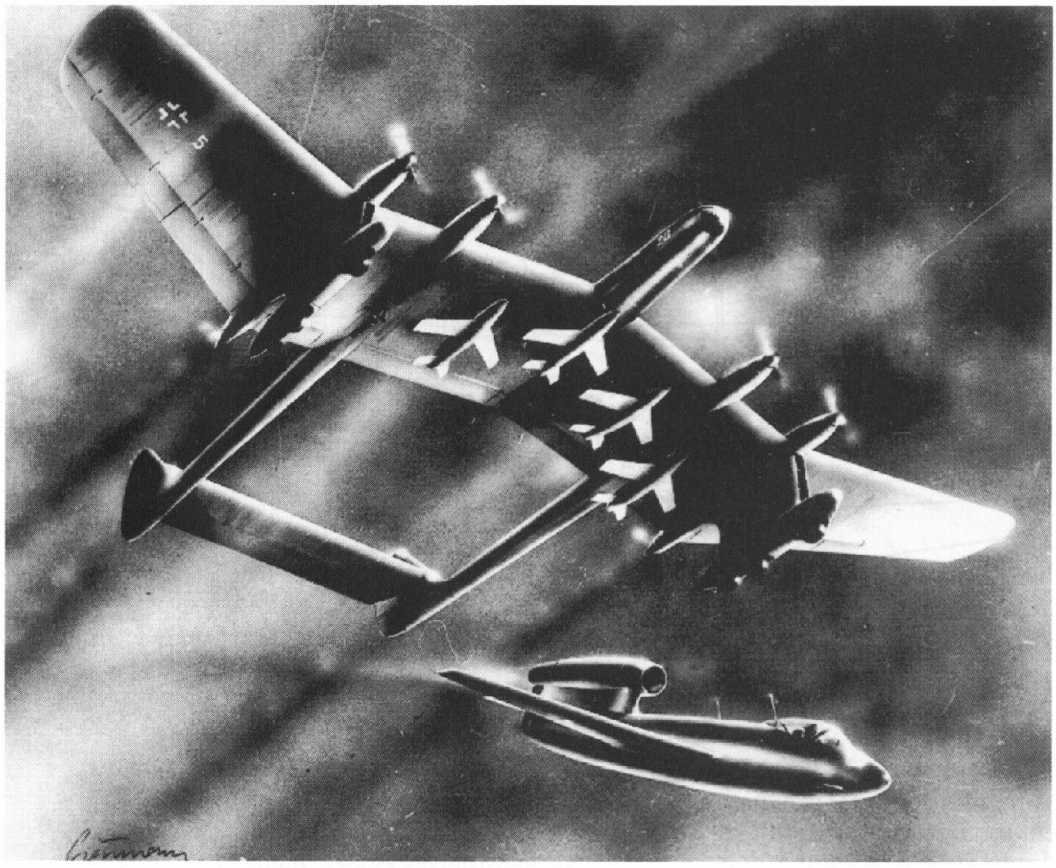
The DM-1 test glider, which was under construction in Prien/Chiemsee at the end of the war, was to have been taken to altitude on the back of a Siebel 204 A. The war's end interrupted these plans. The American plan to carry the DM-1 on top of a C-47 was also never put into practice.

There were many other proposals for combinations of the most varying types, which will not, however, be explored further in this book. Nor is there adequate room for discussing the concepts of using "Parasit" aircraft and flying bodies, which could be considered as an external load – since they would now be carried on the back or slung below (e.g. Ar 234/Fi 103, He 111/Fi 103). In 1946 the Mistel idea was given new life when a test program took place in France using the ramjet powered Leduc 010-01 and the SO-M1 jet. The carrier aircraft for the test models were the four-engine SO Bloch 161/1 "Languedoc" and the AAS-1 (He 274).

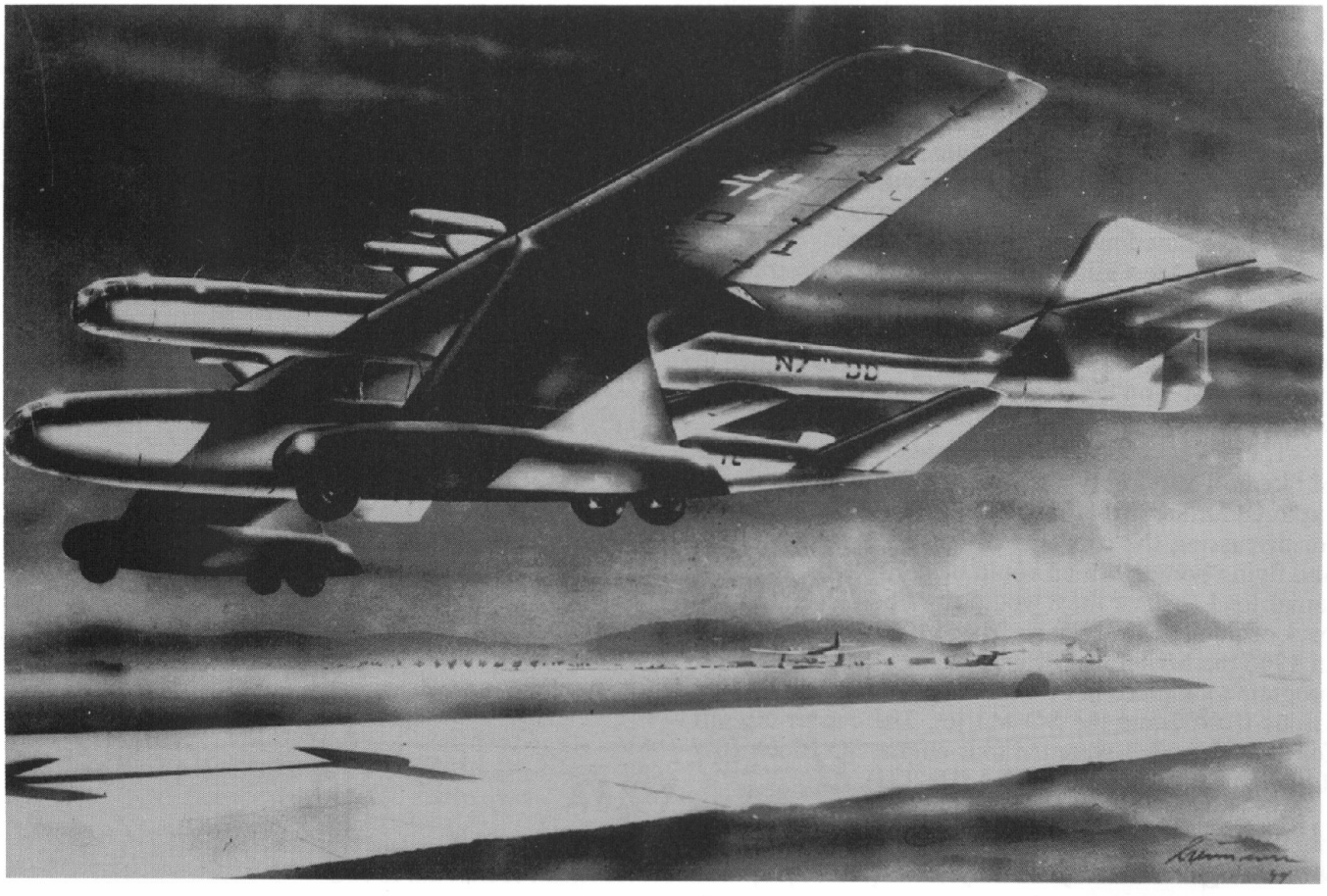
Today's NASA space program continues to make regular use of the piggyback aircraft concept, an idea whose origins not everyone may be aware of.

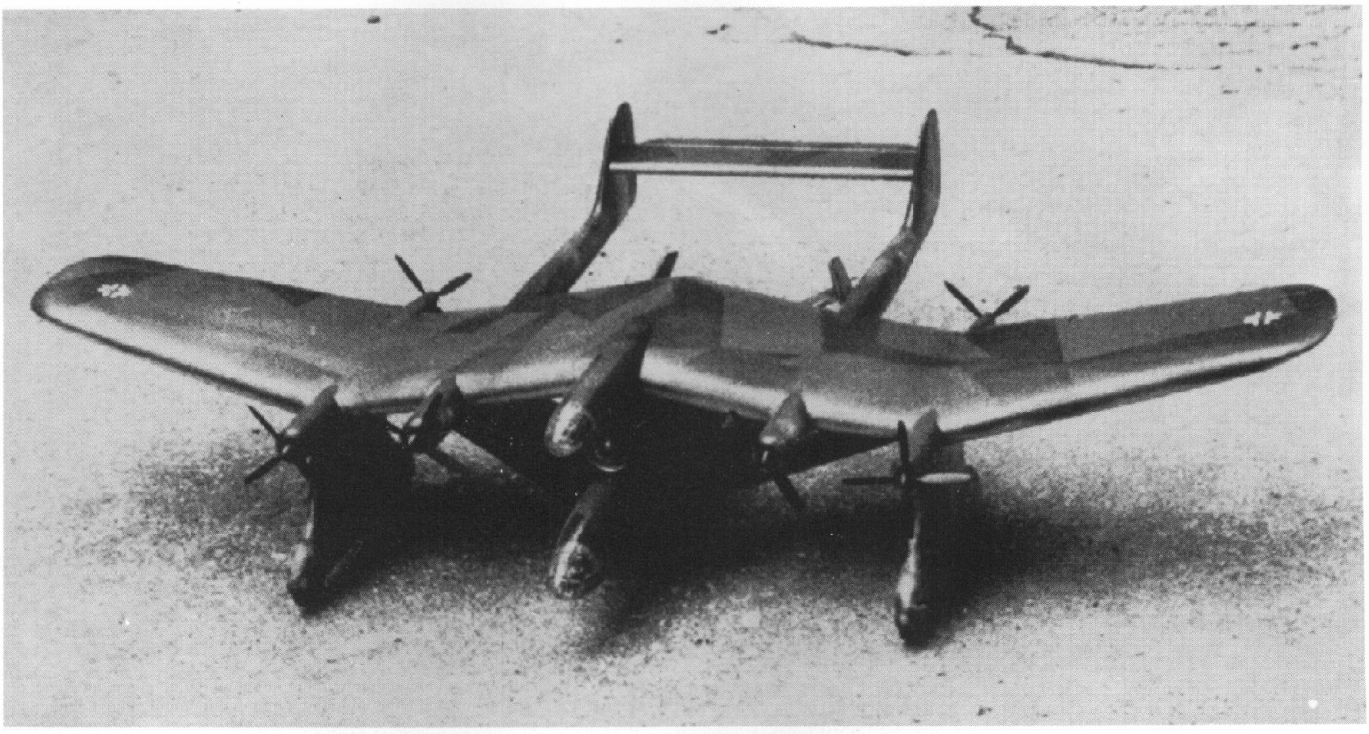
The above drawing is a proposal for using the Me 262 in Mistel operations. Below is a Ju 287/Me 262 combination. The series of projected Mistel variants continued on, making it impossible to accurately determine which design was under serious consideration and which only served the purpose of creating work considered "important for armament." In a few cases, it was only possible to learn of the proposal once the engineers had been interrogated by the Allies.



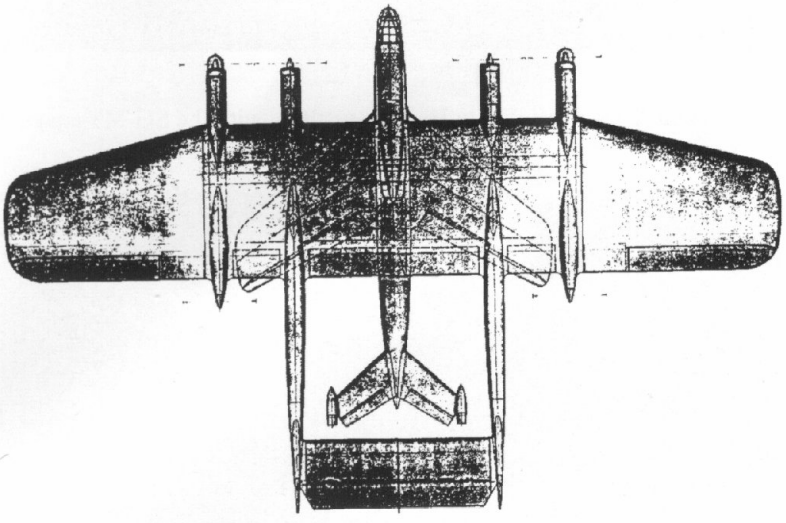


Left and above right:
The artist's impression on this page as well as the model on the opposite page show the various applications of the Daimler-Benz Projekt E: as a mother ship carrying five fighters or unmanned guided bombs, or as a high-speed bomber. This massive flying contraption was to have been powered by six DB 603 engines.

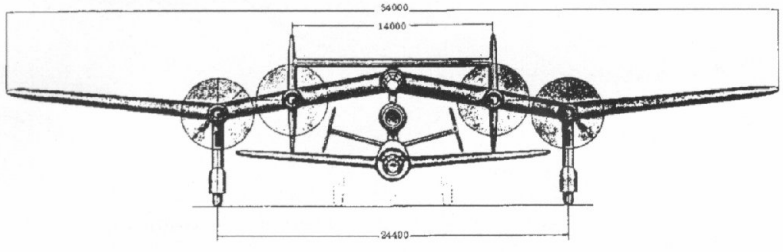


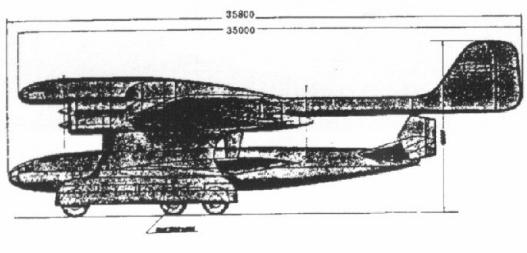


Left page, below:
Even larger was the Daimler-Benz Projekt A: 94 meter wingspan, powered by four or six Heinkel 109-021 engines. The weight of the carrier airplane alone would have been around 50 tons.



Right:
Although this book has confined itself exclusively to "real" Mistel combinations (a smaller aircraft resting on a larger one), this particularly interesting variant should not go unmentioned. Offering increased range or the ability to carry heavy bombs, it was a project of Daimler-Benz dating from early 1945. This truly gigantic combination was planned as a high-speed bomb platform and proposed by Daimler-Benz as such. Professor Kurt Tank, chief design engineer at Focke-Wulf, had this sketch drawn up at his design bureau in Bad Eilsen. It can therefore be said that this was no imaginary concept. Practical application, however, was questionable, given the Allied air supremacy and chronic shortage of fuel at the time. Gert Heumann did a masterful job in 1949 of portraying how it would have appeared, had the giant bird actually flown.





The French AAS-1 (originally He 274) testbed, with the SO-M1 attached (1946).

Beginning in 1977, "piggyback" once again was "in." With the Space Shuttle "Enterprise"/Boeing B 747 combination a new piggyback age had dawned.

US soldiers inspect an abandoned S 2 Mistel. Notice the flattened tires on the main landing gear.

German Mistel combinations as British war prize, which were never tested in flight.

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