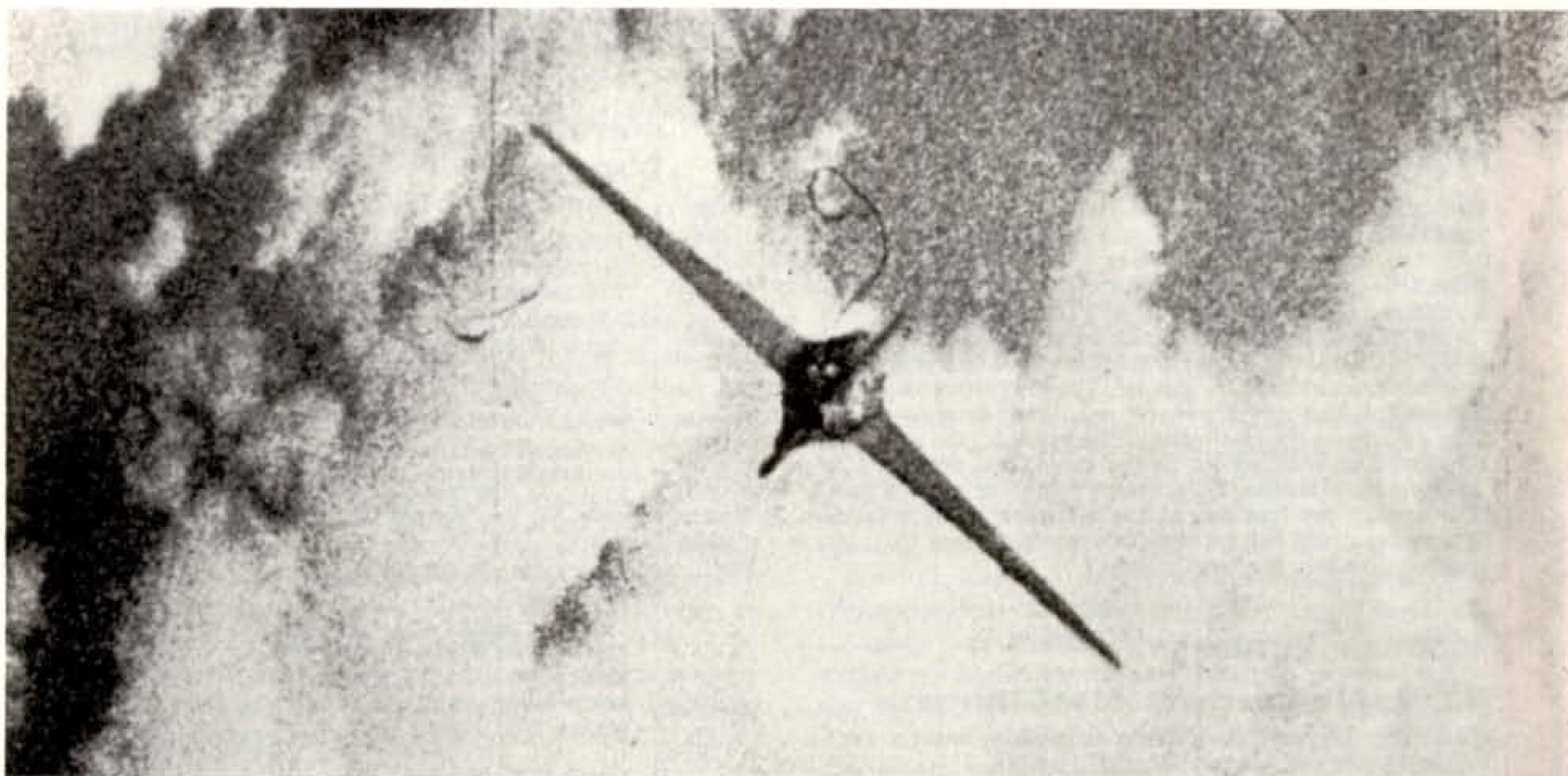


## Messerschmitt Me 163 Komet

by Oberstleutnant a.D. Wolfgang Späte and Richard P. Bateson





A refined version of the DFS 194, the Me 163 AV 1 (first prototype), KE+SW, resting on its take-off trolley with a wheeled tail-mounted cradle attached for ground-handling. Taken at Augsburg, this view shows the large-area landing flaps in the lowered position.

(Photo: Messerschmitt-Bölkow-Blohm GmbH ref. Archiv Mtt)

# Messerschmitt Me 163 Komet

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and Richard P. Bateson

**PROFESSOR** Alexander Martin Lippisch, born in the Bavarian city of Munich on November 2, 1894, is one of the most distinguished names in German aviation. The originality of his design genius is most obviously expressed in the revolutionary Messerschmitt Me 163 Komet rocket-powered, tailless interceptor fighter.

The aeronautical design career of the legendary Lippisch now spans well over 50 years. What can now be read is only part of his story, for today, Professor Lippisch is still advancing the cause of aircraft design. Currently, he is applying the principles of air-cushion effect to new-type flying-boats. And, also assisting in these advanced projects is another name which features in this *Profile*, Wolfgang Späte, an outstanding pilot by any standards. EDITOR

BY the mid-1930s, Alexander Martin Lippisch had a whole string of challenging aircraft and sailplane designs to his credit. Many were of the most difficult configuration of all—tailless or all-wing.

Although Alexander Lippisch had helped to create Claudius Dornier's first aerodynamics department before the end of World War One, it was not until 1921 that he began to design in his own right. In that year, Lippisch, together with co-worker Espenlaub, helped to establish a small enterprise optimistically named *Weltensegler G.m.b.H.*—World Gliders Ltd. In post-war Germany, the Treaty of Versailles so severely restricted powered-aircraft production that designers were largely faced with the alternative of departing for other countries or attempting to build-up markets for unpowered or motorless aircraft. Thus, by the 1930s, Germany not only possessed the world's best training gliders but also the most advanced, high-performance sailplanes. Among the leading designers of gliders and sailplanes in the 1920-30s can be numbered the following—alphabetically listed—Walter Blüme, Heini Dittmar, Wolf Hirth, Ulrich Hütter, Hans Jacobs, Alexander Lippisch, Kurt

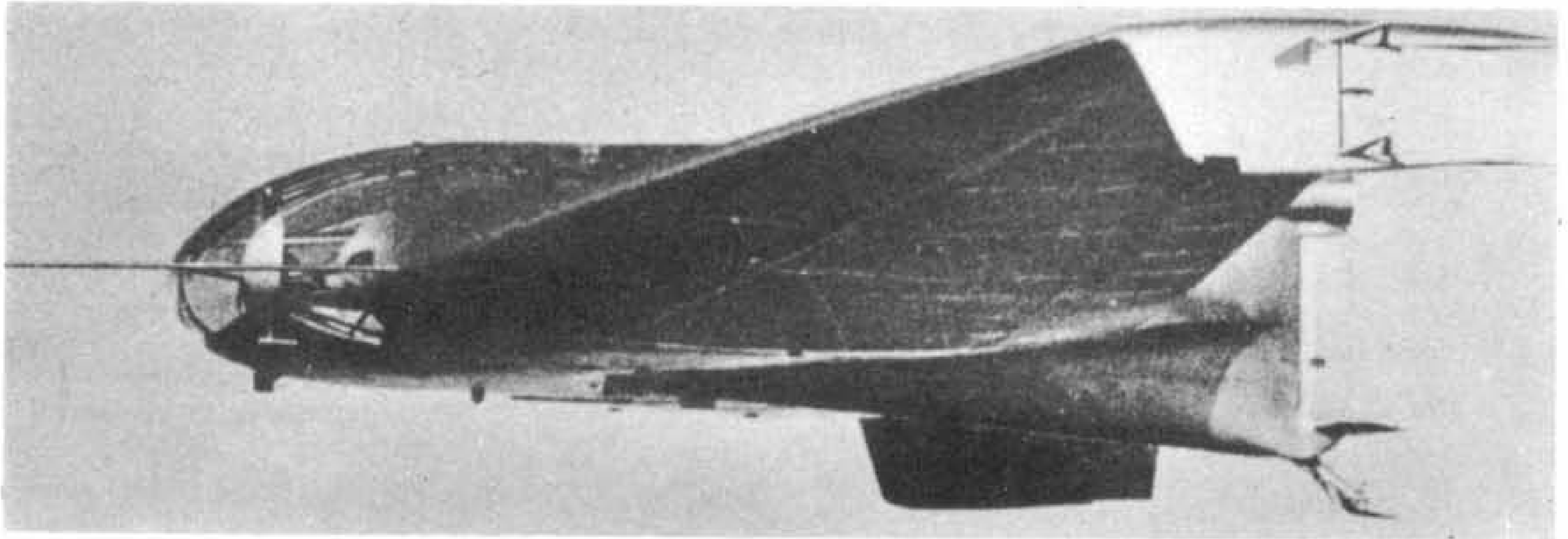
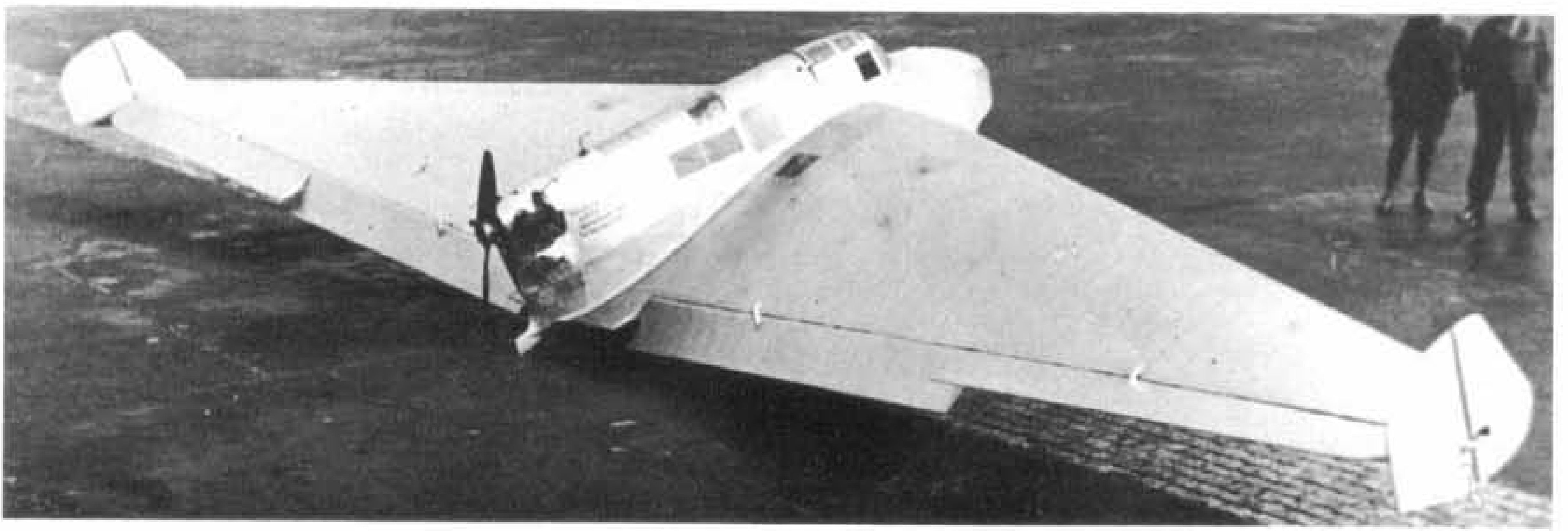
Tank and, also, Espenlaub, the brothers Günther, Hackmack, Harth, Hentzen, Laübenthal, Mertens and Spiess.

Then, in 1925, Lippisch joined the *Rhön Rossitten Gesellschaft* or *R.R.G.* at the Wasserkuppe in the Rhön mountains. His first all-wing glider, the *Storch I* (Stork I), flew two years later and was followed by modified versions, the *Storch II, III* and *IV*.

In 1928, Lippisch began his first association with rocket-powered aircraft although at this time his thoughts were directed towards the use of solid-fuel rockets to enable motorless aircraft to attain suitable soaring height conditions. What resulted was a 7-foot span canard or tail-first glider designed by Lippisch in conjunction with a pioneer rocket-power advocate, the Opel automobile manufacturer, Fritz von Opel. Two trial launches with the canard catapulted into the air—briefly—by means of the bungee or rubber rope launch were followed on June 11, 1928, with the world's first rocket-assisted flight. Friedrich Stamer was the pilot and the two Sander powder rocket units provided an uncertain 44 pounds of thrust (1 lb) apiece. The venue was Wasserkuppe and the historic flight lasted only 35 seconds.

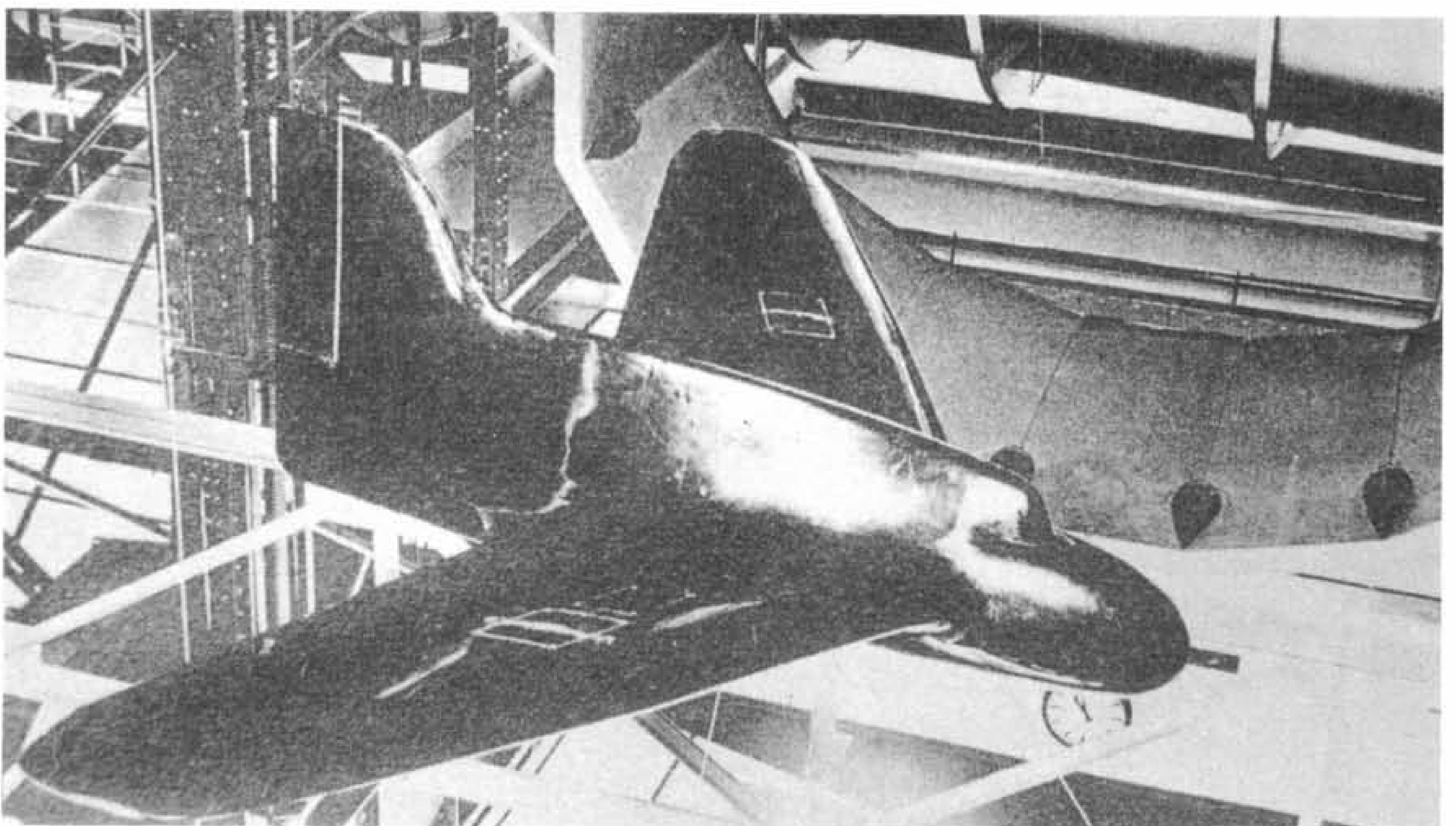
On September 30, 1929, Fritz von Opel (who had joined with Max Valier in a new venture) crashed spectacularly soon after the redesigned canard had been rocket-boost launched from an inclined ramp. Flames from the Sander rocket had ignited the flimsy structure. Thereafter, civilian interest waned rapidly.

Two weeks previously, on September 17, 1929, a powered version of the earlier Lippisch gliders, the *Storch V*, had made its first flight with an 8 h.p. *D.K.W.* motor. Later it was demonstrated by Günther Groenhoff at Berlin's Tempelhof aerodrome. The performance of the *Storch V* was impressive enough for Lippisch to find a private backer to fund a new tailless tandem two-seater



*Lippisch tailless evolution: (Top) The Lippisch Delta I, first completed as a glider, eventually flew in the spring of 1931 powered by a 36 h.p. Bristol Cherub. It was partially aerobatic. (Middle) The D.F.S. 40 Delta V, flying in 1938, was another two-seat glider which also had design provision for a rear-mounted engine but this was never implemented. Main wheels retracted cleanly into the underside of the wing. Heini Dittmar made the first flight on Sept. 15, 1938. (Bottom) A model of the gull-wing D.F.S. 194 undergoing wind-tunnel tests, circa 1939, at the Deutsche Versuchsanstalt für Luftfahrt (German Research Institute for Aeronautics), Berlin-Adlershof.*

(Photos: via the German Aviation Research Group of Air-Britain)



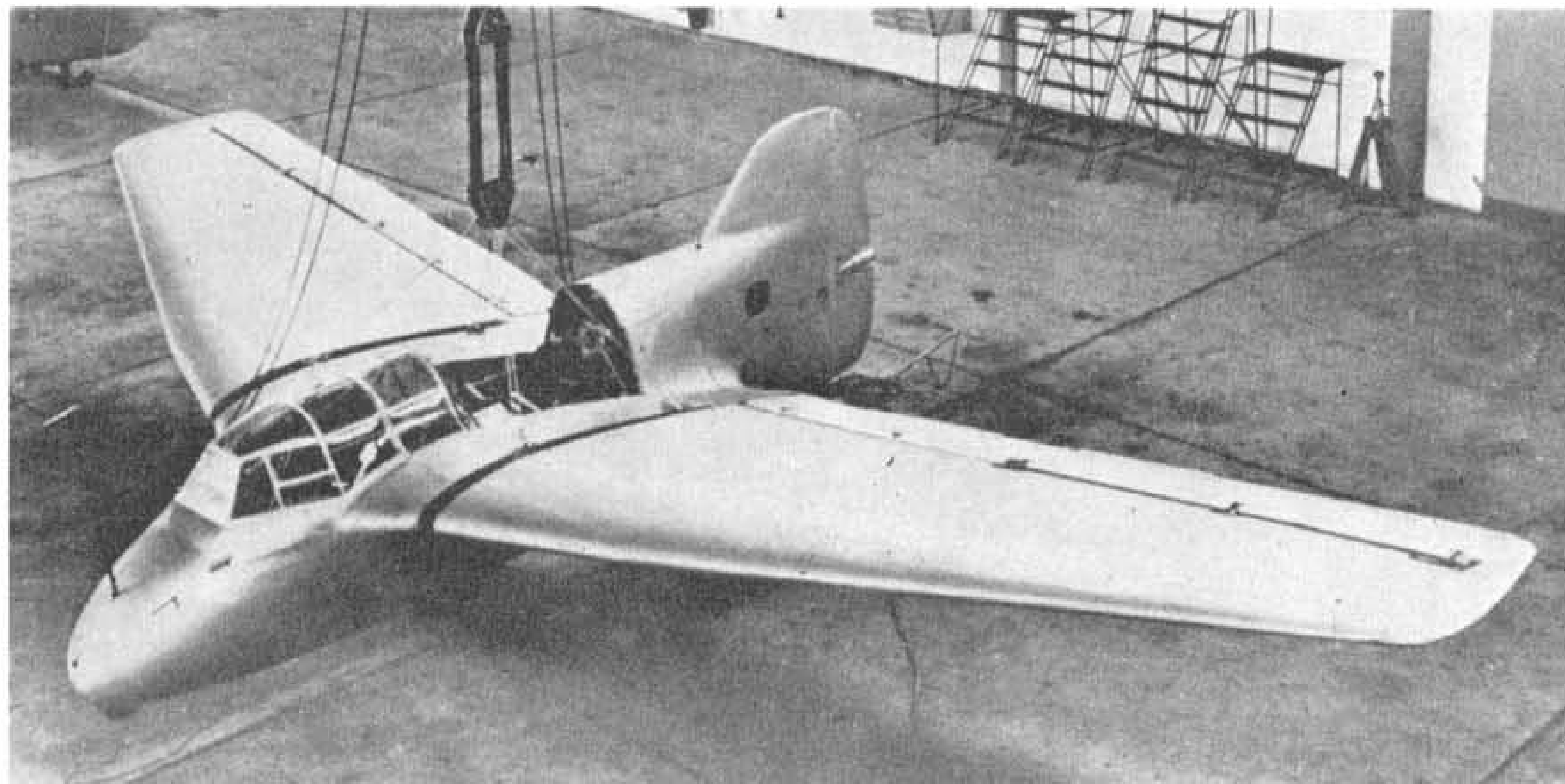
powered by a pusher engine (a 36 h.p. Bristol Cherub flat-twin) to be known as the *Delta I*. During demonstrations of this design, Groenhoff—a superb pilot—showed dramatically that Lippisch had truly mastered the control problems of this type of wing form when he spun the *Delta I* prototype. The smaller *Delta II* followed. In 1931–2, Lippisch received an order for the tandem two-seat *Delta III*. Having insufficient resources, he arranged for this design to be built at the Bremen plant of *Focke-Wulf Flugzeugbau A.G.* A two-motor (tractor and pusher) development, the *Delta IV*, was also to be assembled by the new *Fieseler-Flugzeugbau G.m.b.H.* at Kassel-Bettenhausen. At these works it was known as the *F-3 Wespe* (Wasp).

At this period of his career, a series of disasters befell Lippisch's work. First, and tragically, Groenhoff was killed in 1932 during the German National Gliding Championships. Next, after moving to Darmstadt-Griesheim in 1933, where a State-backed gliding research centre was being founded, Lippisch had to rebuild the *Delta III* following a taxiing accident. Then the *Erprobungsstelle* (Testing and Experimental Station) at Rechlin evaluated the tailless aircraft, giving it an adverse report. To cap everything, the *Delta IV* (built in collaboration with Gerhard Fieseler) was found to have poor handling qualities. The rear pusher propeller was removed, and the prototype was written-off soon afterwards while flying in a single-motor configuration. Two weeks later the *Delta III* crashed at Halle on take-off and it too was destroyed.

The assets of the *Rhön Rossitten Gesellschaft* were taken over by the Government-run *Deutsche Forschungsinstitut* (later *Forschungsanstalt*) für Segelflug e.V. (German Glider Research Institute) at Darmstadt. *Ingenieur* (Ing.—Engineer) Alexander Lippisch became an employee of this establishment. The *D.F.S.* was headed by *Professor Dr. Phil. Walter Georgii* (a famous meteorologist); a section of the institute led by a well-

*The D.F.S. 194 V 1 during weighing tests. The rocket motor's limited access is clearly shown as is the slight gull-wing configuration of the mainplane. Compare resultant empennage shape with that of wind-tunnel model opposite, photo of which is inverted for easier study.*

(Photo: via Air-Britain archives)



*The all-wing, tractor-powered D.F.S. 39 Delta IVd with marked anhedral on the wing-tips.*  
(Photo: via Air-Britain archives)

known designer, *Ing. Hans Jacobs*, dealing with glider construction. Lippisch set up a special sub-section for all-wing development.

\* \* \* \* \*

Progressively, by the mid-1930s, there had developed unprecedented enthusiasm, by air-minded Germans, for the sport of gliding. Encouraged by the new National Socialist (*Nazi*) Government, which poured enormous sums of money into the movement, large numbers of young men had their first taste of flying by this relatively cheap and simple means. In 1936, 31 high-performance sailplanes, 50 pilots and 130 helpers assembled at the Laucha gliding school for a competition over height and distance. The winner was a certain Wolfgang Späte of the *Nationalsozialistisches Fliegerkorps* (*N.S.F.K.*—National Socialist Flying Corps) *Luftsport-Landesgruppe 7* (*Lsp.-Lgr. 7*) at Chemnitz, who flew 115 miles cross-country climbing to a peak height of 7,800 feet en-route. During 1935, Späte had been awarded the *Günther-Groenhoff-Gedächtnispreis*, a gliding trophy given annually in memory of Lippisch's test pilot killed three years

previously while flying a *Fafnir* sailplane.

A highpoint of the German gliding year was the *Rhön-Segelflug-Wettweberb* (Rhön Gliding Competition) held on the Wasserkuppe. It was the seventeenth such event and was especially important that year of 1936 as Nazi Germany was host to the world's athletes at the Berlin Olympic Games; the press coverage being consequently quite enormous. As a preliminary to the Wasserkuppe meeting, a special display of the latest German and foreign gliders was put on at Berlin-Staaken aerodrome on August 4, and attended by many of those assembled for the Games. One participant holding the attention of the crowd was the petite woman flier, Hanna Reitsch, who, with fellow *D.F.S.* pilots, performed aerobatics over the throng.

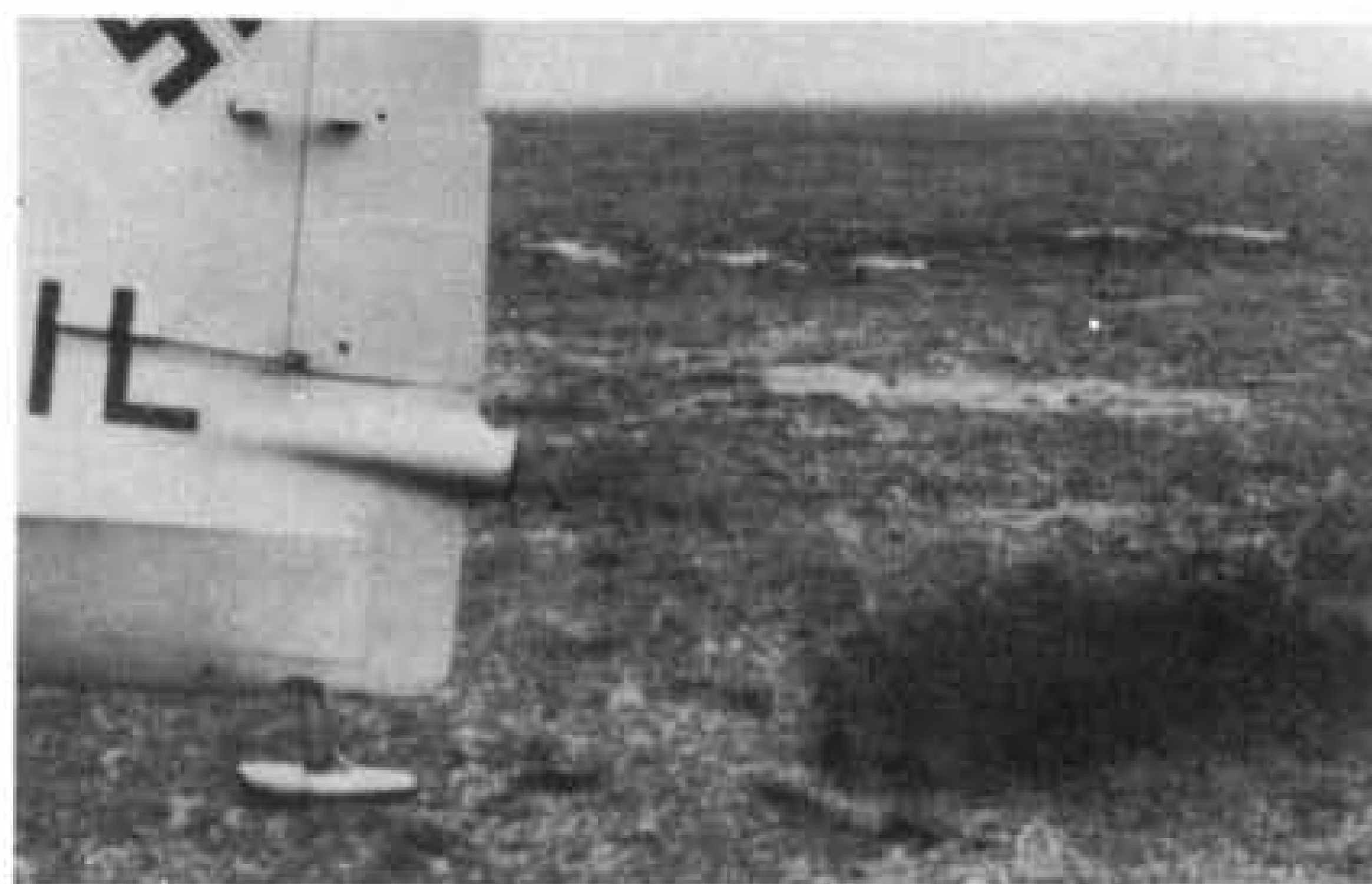
Sixty-one machines participated at the Wasserkuppe site in the Rhön mountains. Points were awarded for distance flown, endurance and height gained. Fifth place in the overall competition went to Hanna Reitsch flying an official *D.F.S.*-entered, Espenlaub-designed *Sperber-Spezial* (Sparrowhawk-Special). Twenty-three points behind her and in sixth place was Wolfgang Späte. His entry was the graceful long-span, Hirth-designed *Minimoa*. Well down the field in 33rd place was another young *N.S.F.K.* flier in a Lippisch-designed *Präsident* (President) glider. This was 26 year-old Rudolf Opitz of *Luftsport-Landesgruppe 11*. One well-known name absent from the 1936 list of Rhön competitors was the *Condor* sailplane designer, Heini Dittmar. He was to make up for this the following year when he was declared outright winner of the championships.

Dittmar, Opitz, Reitsch, Späte . . . their names will recur again and again.

\* \* \* \* \*

Yet again in the mid-1930s, a young engineer, Helmuth Walter, left the employ of the German Army Ordnance Department to set up business on his own account in the Baltic port of Kiel. Although his military work had been mainly in the field of anti-aircraft sights and other aiming devices, his prime interest was rocket propulsion. By judicious lobbying in Berlin, Walter soon received funds from all three of the armed services for the development of ordnance rockets. By 1937, again on his own initiative, he was engaged in the problem of applying

*Close-up of the rocket exhaust nozzle of the Me 163 A V 2, CD+IL, with motor running. The miniature ski-like tail skid fitted to A-series Kometen (Comets) was superseded by a steerable tail wheel on operational Me 163 Bs. (Photo: Peenemünde-West Bildstelle via R.Ae.S., London)*



rocket motors to aircraft, and this fact soon came to the attention of the *Reichsluftfahrtministerium* (*R.L.M.*—the German Air Ministry). The *R.L.M.*'s *Entwicklungsamt* (Development Office) set up a 'Special Propulsion Systems' (*Sondertriebwerke*) department within the existing Power Plant Group to oversee this work. From these early beginnings, the firm of *Walter Werke K.G.* went on to pioneer the production and use of high-strength hydrogen peroxide, both as a source of energy in its own right, and, when burnt with normal fuel, as an oxidant. These hydrogen peroxide units were of two types—known as 'cold' and 'hot' engines; this referred to the chamber temperatures of specific designs of motor.

Although the Air Ministry was primarily interested in rockets as a means of aiding short or overload take-offs by conventional aircraft, Walter diverted some of the *R.L.M.* funding to various private venture constant-thrust 'cold' rocket motor developments. The simplest of these was a device using compressed air to force a weak concentration of hydrogen peroxide from a tank into a reaction chamber lined with a paste catalyst. The thrust thus produced was virtually constant, control being limited to the air supply line via a system of valves. This was tested experimentally in a Heinkel He 72 *Kadett* (Cadet) biplane and Focke-Wulf FW 56 *Stösser* (Hawk) parasol monoplane. A liquid-spray catalyst was used with encouraging results in the latter test bed's motor.

A controllable-thrust unit was then flown in a converted Heinkel He 112 fighter. Unaided take-off with the rocket motor was achieved during the spring of 1938. The engine for this aircraft was the Walter TP-1\*, using two fuels coded *T-* and *Z-Stoff*. The former was 80% strength hydrogen peroxide, the latter an aqueous solution of sodium or calcium permanganate. The *T-Stoff* was forced into a reaction chamber by a turbine-driven pump. The motive power for this turbine was steam, generated in a 'pot' into which *T-* and *Z-Stoff* were sprayed by compressed air. *Z-Stoff* for the main combustion chamber (replacing the earlier catalyst paste) was also delivered by compressed air; only the main unit's *T-Stoff* was pumped.

A development of this first bi-fuel motor, with pilot-operated controls regulating the *T-Stoff* flow to the turbine, was installed and flown in the experimental Heinkel He 176 V 1 initially piloted by *Flugkapitän* Erich Warsitz on June 20, 1939. This engine was designated TP-2\*. The He 176 was a single-seat pressurised research aircraft with small elliptical wings. It was the world's first aircraft designed from the outset to be powered solely by a rocket powerplant. However, the performance achieved did not come up to expectation.

\* \* \* \* \*

Alexander Lippisch's first design for *D.F.S.* was a tailless glider designated the *Storch IX*. It was similar to the early *Storch* series, development of which had been shelved when he began his delta planform research. The *Storch IXb* and *IXc* were conventional tractor-powered versions of the glider. The final aircraft in this series was the *D.F.S.* 193 (8-193). From this work stemmed the *D.F.S.* SMS or 8-38. This was a pusher-engine design with high-mounted and braced swept-back wings with

\* Refers specifically to design of turbopump.

anhedral wing-tips. It was later followed by the low-wing, tractor-engine D.F.S. 39. Finally, in 1938, the D.F.S. 40—an advanced form of the earlier *Delta* series, also dubbed the *Delta V*—was flown as a glider towed behind a Heinkel He 46 parasol monoplane.

At about this time, Lippisch was officially approached and asked to study the application of Walter's rocket motor to a medium-speed research aircraft based on the D.F.S. 39. The proposal was known simply as *Entwurf X*—Design X. It was later given the official designation 8-194; known as the D.F.S. 194 by Lippisch's small team of designers and technicians working in a specially sealed area at Darmstadt on this top-secret venture.

Some idea of the security surrounding the work can be gauged by the fact that not even Lippisch had any firm data on the exact characteristics of the power plant. He was provided with general information on the size, weight and engine thrust specifications, but could obtain no actual blueprints.

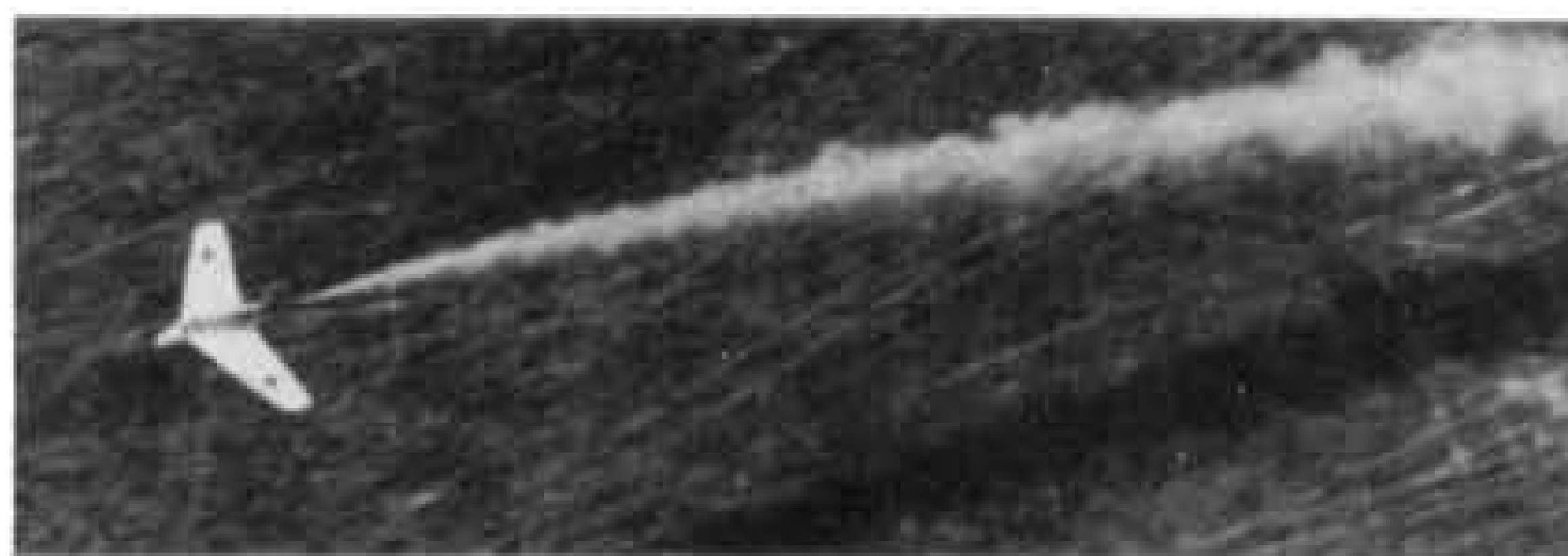
By late 1938 it was apparent that even the well laid out workshops of the *D.F.S.* were ill-equipped to assemble the metal fuselage of such an advanced prototype. And, since an earlier move to get *Ernst Heinkel A.G.* to help with the project having fallen through, the *R.L.M.* directed that *Messerschmitt A.G.* take over the contract.

Lippisch and his co-workers transferred to Augsburg *en bloc* during January 1939, being incorporated in a special department known as *Abteilung L*. Aided by the availability of the latest wind-tunnel facilities, the wing shape was finalized, and prototype construction went ahead. The D.F.S. 194 was tailless with a mid-set gull-wing layout of 236.8 square feet in area and grossed 3,527 pounds all-up. It had been calculated that the prototype when fitted with its special powerplant would be capable of 342 m.p.h. and have a best rate of climb of 5,300 feet per minute.

The D.F.S. 194 was transferred to Peenemünde-West airfield during the summer of 1939. The flying field was on the north-west tip of the Baltic island of Usedom and skirted the sea. The whole area had been purchased by the German military authorities during April 1936 and a large ballistic-rocket testing and development establishment constructed by the Army to the south of the *Luftwaffe*-controlled airfield. It was from here that the notorious 'V-2' (or in official parlance, A-4) long range missile prototypes designed by Dr. Werner von Braun and his team were later assembled and test-fired.

In the event, much trouble was experienced with the rocket motor installation of the D.F.S. 194. The engine was similar to the one used in the Heinkel He 176, but the powerplant assemblies were integral with the aircraft's fuselage; only the fuel and compressed air lines being easily removable. This resulted in all static trials having to be carried out in the airframe. Ground runs of the D.F.S. 194's motor commenced *in situ* on October 16, 1939. This type of installation was soon found to be fundamentally unsound and the aircraft never flew under rocket power, only gliding tests being carried out. Despite this, the go-ahead was given for the construction of three development prototypes initially known as Lippisch P 01 V 1, V 2 and V 3 (*V-Muster*—Experimental types), but later officially designated Messerschmitt Me 163 A V 1 to V 3.

Dissatisfaction with the clumsy engine access to the D.F.S. 194 and its low serviceability, led the *R.L.M.* to detail that the new R II-203 engine specified to power the



*KE+SW* making a low-level pass over the airfield at Peenemünde-West on the island of Usedom off the German north Baltic coast.  
(Photo: Peenemünde-West Bildstelle via R.Ae.S., London)

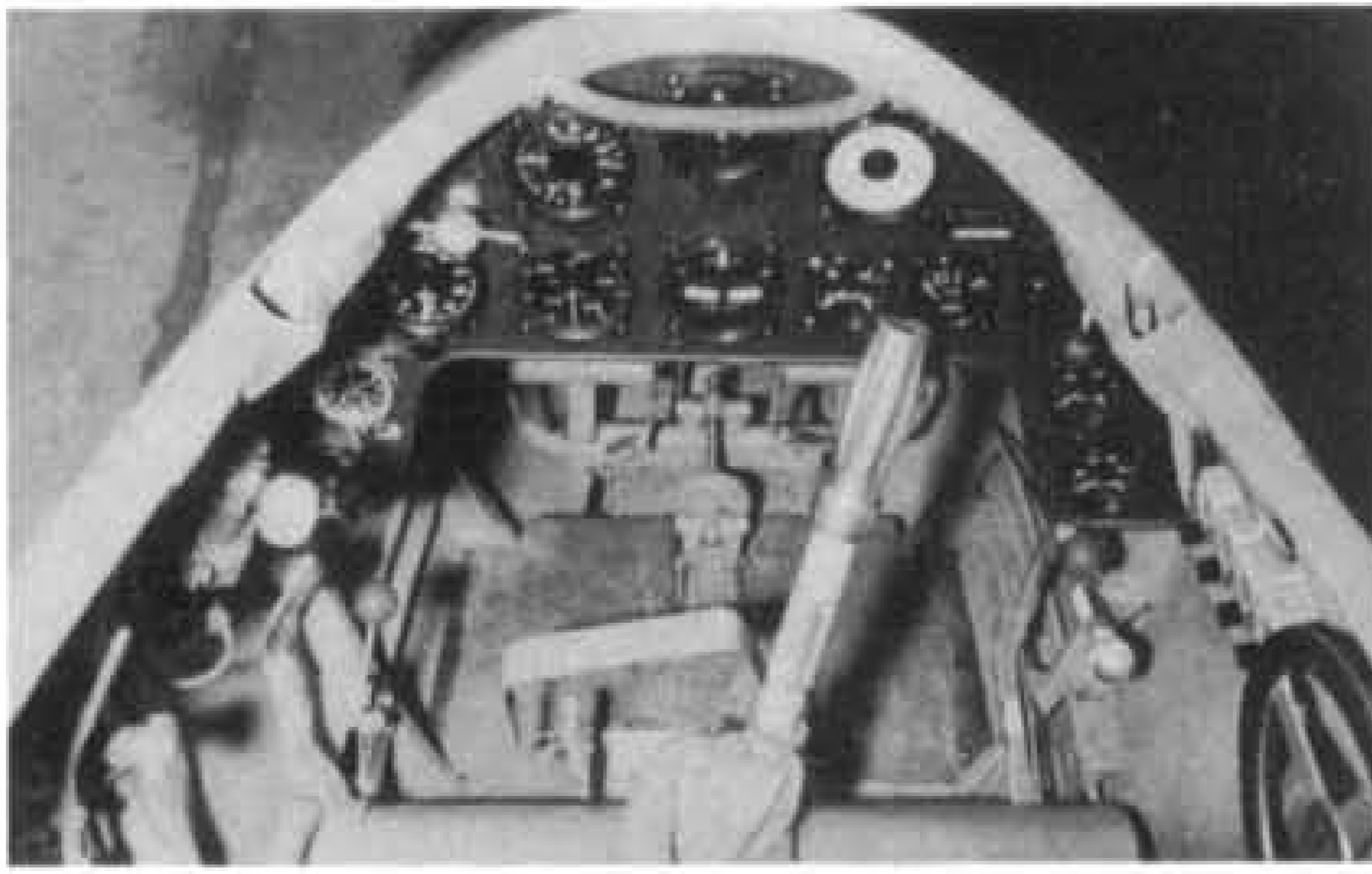
A-series Me 163 was to be removable from the airframe. Thus engine runs and general maintenance work was to be drastically simplified. Other requirements of the R II-203 specification was that its thrust was to be manually regulated over the range 331 lbt to 1,653 lbt and that it could be cut and re-lit by the pilot in flight. Initially, six prototype R II-203 motors were ordered by the Air Ministry.

With the war clouds gathering, September 1939 saw the final dispersal of the highly qualified team of test pilots earlier brought together at *D.F.S.* through the efforts of Alexander Lippisch. Hanna Reitsch was retained at Darmstadt. Heini Dittmar, now a Messerschmitt test pilot, stayed with the firm. Rudolf Opitz was drafted by the *Luftwaffe* to *Sonderkommando Koch* (a specialized D.F.S. 230 troop glider assault unit), while Wolfgang Späte hopefully applying for a posting to a fighter unit was assigned instead to *Heeresaufklärungs-*

*Heini Dittmar, photographed post-war (shortly before his death in a lightplane accident) with a model of the Me 163 in a room decorated with trophies and other awards gained during the 1930s as Germany's most successful competition glider pilot. Throughout this period, Dittmar was responsible for the flight-testing of a series of sailplanes and powered experimental aircraft evolved by D.F.S. at Darmstadt-Griesheim, including the various delta-wing designs of Dr. Alexander Lippisch.*

(Photo: Messerschmitt-Bölkow-Blohm GmbH ref. PA 41)





The simple uncluttered cockpit of an Anton shows the strong influence of the Me 163's pre-war D.F.S. sailplane lineage.  
(Photo: Peenemünde-West Bildstelle via R.Ac.S., London)

gruppe 2.(H)/23 or the second *Staffel* of Army Reconnaissance Gruppe 23, flying slow Henschel Hs 126 Army co-operation parasol monoplanes.

The overall German military successes during the 1939-40 period had a detrimental effect on the development of both the Me 163 and complementary rocket engine work at *Walter Werke K.G.* *Generalleutnant* (Lieutenant-General) Ernst Udet, the *Generalluftzeugmeister* (Director-General of *Luftwaffe* Equipment) was always most enthusiastic when presented with unconventional designs, being highly impressed with the performance of the engineless first prototype Me 163 V 1. This flew early in 1941. It was towed by a Messerschmitt Bf 110 *Zerstörer* (Destroyer). With this sleek tailless little glider, Heini Dittmar achieved 528 m.p.h. in a dive after releasing at height from the tug aircraft. Even so, the runaway victories of his armed forces persuaded Hitler that financing military research programmes of this

nature was no longer necessary, and in accordance with this *Führerbefehl*, the *R.L.M.* would only sanction the completion of two more *Anton* (A-series) prototypes, the Me 163 A V 4 and A V 5.

During May 1941, a wooden mock-up of the Me 163 A was delivered to *Walter Werke's* Kiel factory. It was used for R II-203 engine installation trials. This unit like those flown in the He 112, He 176 and ground run in the D.F.S. 194 was a bi-fuel motor using a combination of *T-* and *Z-Stoff*. It incorporated experience gleaned from the R I-211 unit, a small motor featuring most of the components of the He 176 unit, but used as a 'climb-booster' for the Messerschmitt Bf 109 E fighter; several of which were flown experimentally at Peenemünde-West in 1941 with this non-jettisonable motor faired into the belly. The R II-203 V 1 (first prototype) rocket engine began its acceptance trials at Kiel on July 18, 1941.

On August 13, 1941, the first flight of an *Anton* powered by this motor was made in the hands of Heini Dittmar at Peenemünde-West. An unassisted run across the grass airfield, a climb-away until the fuel supply was exhausted and a normal glide landing was the pattern. Throughout August and September, flights were made with this aircraft, observers from the Air Ministry and other aeronautical research establishments being most impressed by the results achieved. Short runs at speeds above 500 m.p.h. were made. This was a phenomenal performance for that time and in excess of the World Speed Record of 469.22 m.p.h. set up some two years before by Fritz Wendel in the piston-engined Messerschmitt Me 209 V 1. As a result of these reports, Ernst Udet sanctioned the construction of eight more A-series prototypes at Augsburg, bringing the total to 13. These were to be used as trainers.

Dittmar soon found that it was not possible to get the very best out of the *Anton* because the R II-203 cut out

A trio of Antons. An everyday scene at Peenemünde-West during the summer of 1942 as Me 163 A V-Muster (prototypes) are inspected and refuelled. The right hand hangar was originally leased from the Erprobungsstelle (testing station) to *Walter Werk KG* but was later taken over by Messerschmitt AG. The centre Anton (coded CD+IM) is the third prototype in which Heini Dittmar unofficially broke the world's speed record on October 2, 1941.  
(Photo: Wolfgang Späte)



due to insufficient fuel while the aircraft was still accelerating. In order to ascertain the absolute limit at which the Me 163 A could be flown, it was necessary to conserve rocket fuel normally consumed during take-off and subsequent climb-away.

So on October 2, 1941, a fully-fuelled *Anton* prototype (the A V 3 coded CD+IM) was towed aloft from Peenemünde-West attached by cable to a Bf 110 tug-plane. The combination climbed to an altitude of 13,000 feet. Casting off, Dittmar switched on the motor and accelerated. Observers on the ground followed his progress through binoculars and the lenses of the tracking kinetheolides. Suddenly, the long black smoke trail wavered and then stopped. Indicating over 600 m.p.h., Dittmar had lost control of CD+IM when it ran into compressibility effects. The Me 163 A V 3 plunged into a dive. Shutting off the engine, Dittmar slowly regained control over the pitching *Anton* as the speed dropped off, and, after recovering from the fright induced by this totally incomprehensible stability loss, he spiralled down to a normal landing on the island of Usedom. A trace of his flight showed that the aircraft had reached a maximum of 623.85 m.p.h. (approximately Mach 0.84). Security regulations prevented the news from being publicized. To mark this feat, Dittmar, Lippisch and Walter were each given a Lilienthal Diploma award, one of Germany's highest aeronautical honours.

As a direct result of this record-breaking flight, the *Luftwaffe* Commander-in-Chief, *Reichsmarschall* (Reich Marshal) Hermann Göring asked to be kept personally informed of progress with the design. On October 22, 1941, just under one month before he unexpectedly committed suicide, Ernst Udet was presented by *Messerschmitt A.G.* with a detailed plan that envisaged the construction of 70 rocket-powered Me 163 B prototype and pre-production aircraft. This he approved. It meant that the *Luftwaffe* could have had an experimental Me 163 fighter unit operational by the first quarter of 1943. When, on November 17, 1941, Udet shot himself, some of the advanced projects that he had nurtured died with him. Others were given lower priority by his successor, *Generalfeldmarschall*—Field Marshal—Erhard Milch. The rocket-fighter programme was one such.

Early in 1942, Erhard Milch recalled *Hauptmann*

(Captain) Späte from the Russian Front where he was serving with *II./J.G.54* (having re-trained on Bf 109s during 1940). He was re-assigned as *Typenbegleiter* or 'type leader' of the Me 163, charged with looking after all Service interests connected with the contract. This post gave him *carte blanche* to coordinate the work at the airframe and engine factories, obtain personnel and equipment for a test unit and, generally, to ensure the smooth introduction into service of this radically new type of aircraft within the shortest possible time-scale.

*Walter Werke K.G.* was slow in delivering the R II-203 motors to Peenemünde-West and by February 1942 only four engines were available. The Me 163 A V 4 had made its first flight in a glider configuration at Lechfeld on February 13, 1941, being towed north to Usedom on April 17. The next *Anton* prototype, the A V 5, was test flown initially on November 8, 1941. However, it was not until April 29, 1942 that both of these aircraft were flown under power.

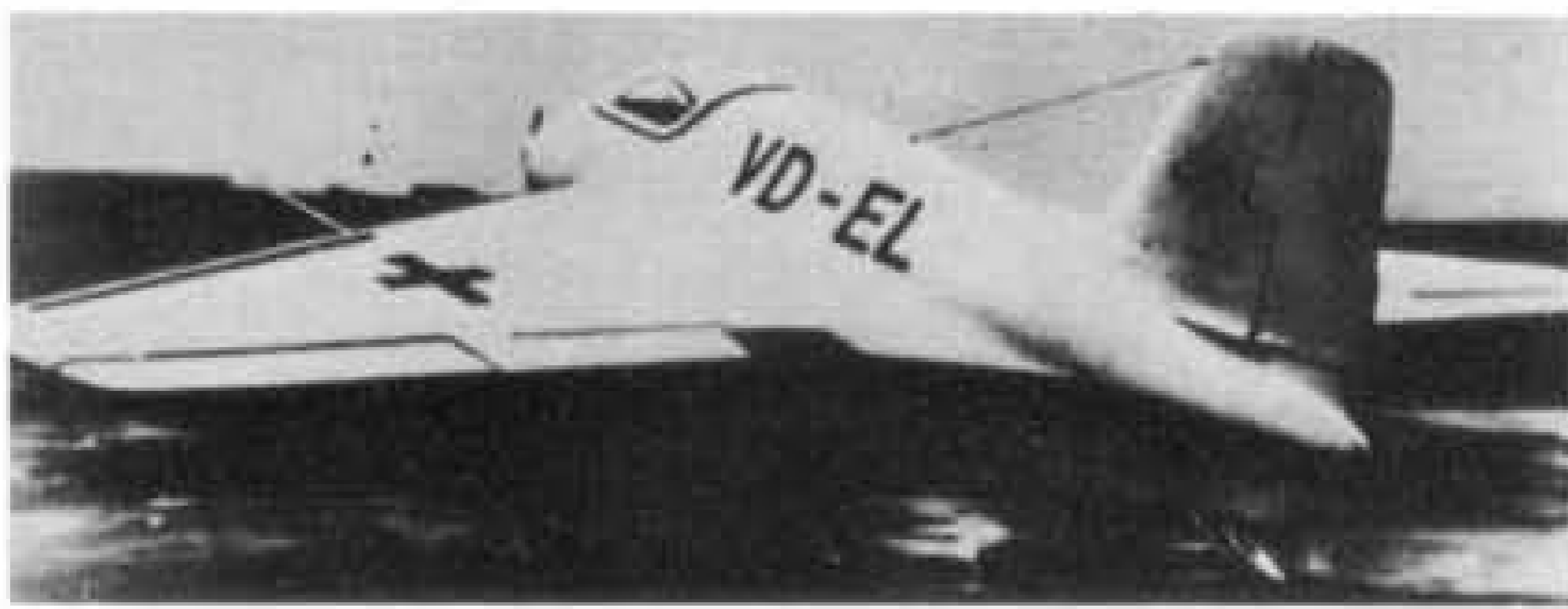
In May 1942, Späte paid a visit to Peenemünde-West. Shortly afterwards, Hanna Reitsch also arrived. She was still flying as a test pilot with D.F.S. which, by then, had moved to new quarters at Ainring in Upper Bavaria. She was now anxious to join her former friends (including *Feldwebel*—Sergeant—Rudolf Opitz who had managed to get a transfer from a D.F.S. 230 gliding schools' training post on the personal intercession of Udet the previous autumn) then flying the handful of Me 163 As available to them. *Flugkapitän* Reitsch, for all her lack of height and deceptively demure appearance, was a woman not to be trifled with. Apart from her flying skill, which had made her a household name throughout Germany, she had the ear of many of the most powerful politicians in the land, being *persona grata* with the *Führer* himself. She left Peenemünde-West filled with enthusiasm for the Me 163, determined that she, too, would soon fly the rocket aircraft.

Throughout the spring and summer of 1942, Späte flew his *Messerschmitt Bf 108 Taifun* (Typhoon) light cabin monoplane from Staaken aerodrome to the *Messerschmitt A.G.* factories at Augsburg (where the prototype *Berta* or Me 163 B V 1 was under construction), Regensburg (where the remaining 69 Me 163 Bs were to be assembled) and Peenemünde-West where test flying was in progress. In the morning he might be sitting in an office at the *Reichsluftfahrtministerium* on Leipziger

Peenemünde-West: June 13, 1942. *Generalfeldmarschall Erhard Milch* (Reichsmarschall Hermann Göring's *Luftwaffe* deputy and newly promoted to head Germany's Central Planning Board where he was responsible for raw material allocation), *Albert Speer* (War Production Minister) and Generalmajor *Adolf Galland* (leader of the *Luftwaffe* Fighter Arm) were among those who watched this impressive formation take-off of Me 163 As. The *Kettenführer* (flight leader) was *Hauptmann Späte* with *Oberleutnants Opitz and Pöss* as wingmen. (Photo: Wolfgang Späte)







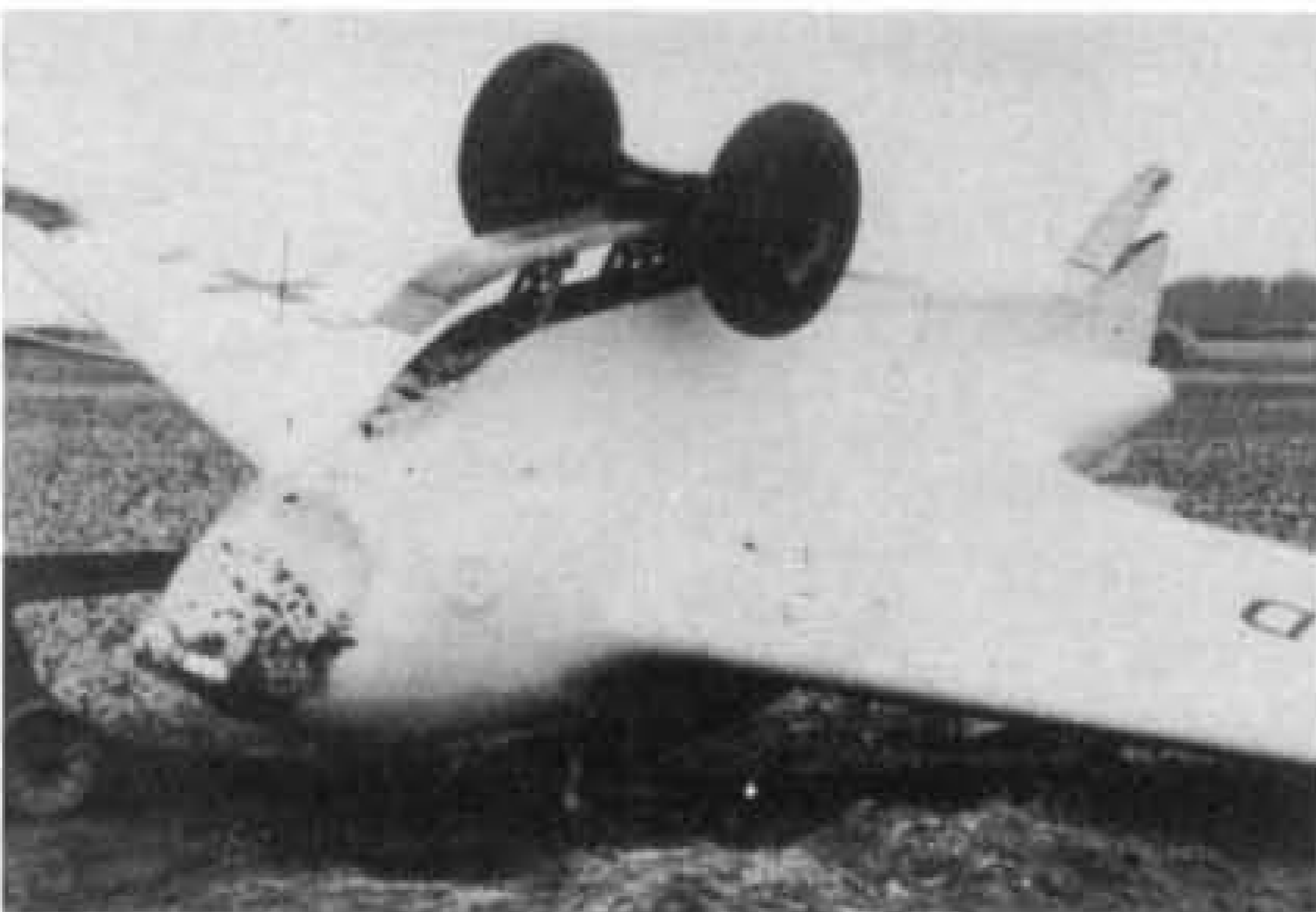
One of the first Berta prototypes, VD+EL, probably the Me 163 B V 2. Flown as a glider (the rocket efflux is faired over), this aircraft features 'C-Schlitz'—special leading-edge slots designed by Ing. J. Hubert to prevent spinning—an airflow-driven propeller generator for powering the Komet's electrics and a hinged sideways-opening cockpit canopy. (Photo: Messerschmitt-Bölkow-Blohm GmbH ref. 163/5)

Strasse in Berlin W.8; then late afternoon could find him landing at the isolated airfield surrounded by pine forest and lagoons where *Erprobungskommando 16* (the Me 163 test formation) was being established. He was also a regular visitor to Kiel inspecting the progress of the R II-209 and R II-211 rocket motors (one a 'cold' unit, the other a 'hot' engine) tailored to the *Berta*. Soon his *Taifun* would be seen at Stuttgart-Böblingen, where *Leichtflugzeugbau Klemm G.m.b.H.* had obtained a sub-contract to equip and install motors in the batch of Me 163s, B V 23 to 70 inclusive. It was hard but rewarding work for a young officer as yet unschooled in the inner workings of the R.L.M. 'establishment'.

On June 26, 1942, the Me 163 B V 1 (coded VD+EK) was towed-off behind a Bf 110 on its initial test flight at Lechfeld. Two days later the first rocket motor for the *Berta*, the R II-209 V 1 (a design closely modelled on the R II-203 and far less radical than the R II-211 which it was planned would power production Me 163 Bs) was readied at *Walter Werke* Kiel for static trials. However, all was not well. From this point in time, serious hold-ups with the rocket motor schedule (development by then had shifted to a new factory at Beerberg in Silesia) caused both the *Messerschmitt A.G.* and *E.K.16* flight-testing programmes to slip. Air Force planning revolved around a condition that Walter's production 109-509 (R.L.M. designation for the R II-211) would give a full-thrust running time of thirteen minutes. Bench tests now only gave a quarter of this endurance.

Failure to jettison the undercarriage trolley on take-off was highly dangerous. Inexperienced pilots were advised to bale out rather than risk landing with the trolley attached. In this instance, the usual fatal accident with subsequent catastrophic explosion caused by rupturing of the C- and T-Stoff fuel tanks, did not take place. Photographed at Peenemünde-West, VD+EN is believed to be the Me 163 B V 5. This aircraft is unarmed.

(Photo: Peenemünde-West Bildstelle via R.Ae.S., London)



## Key to colour illustrations

- 1 D.F.S. 194 V 1 flown at Peenemünde-West during winter 1939-40.
- 2 Me 163 A V 3. On October 2, 1941, Heini Dittmar flew this prototype at 623.85 m.p.h. over a measured course at Peenemünde-West.
- 3 Me 163 B-1. Flown operationally by 2. *Staffel Jagdgeschwader 400* at Brandis, winter 1944-5.
- 4 Me 163 B-O V 28. On August 23, 1944, this *Komet* was destroyed by fire following a landing accident at Bad Zwischenahn. The pilot, *Feldwebel* Lukas of *Erprobungskommando 16*, was killed.

By the summer of 1942, *Hauptmann* Späte's position had enabled him to secure the release of three former fighter pilots to form the nucleus of *Erprobungskommando 16* (Test Detachment 16). These were *Hauptmann* Johannes Kiel, together with two *Oberleutnants* (First Lieutenants), Herbert Langer and 'Joschi' Pöss. Kiel and Pöss were holders of the *Ritterkreuz* (Knight's Cross); the former a victor in 53 aerial combats and the latter credited with 43 victories. *Hauptmann* Toni Thaler was seconded to *E.K.16* as *Kommando Adjutant*.

Towards the end of 1942, Hanna Reitsch achieved her ambition when she was allowed to fly one of the first engineless *Bertas* at Regensburg. However, the take-off trolley failed to jettison immediately after the Me 163 was airborne with the result that Reitsch was forced to land with the trolley still in position. Having a steeper than normal angle of descent, the Me 163 undershot the airfield and crashed. Hanna Reitsch was thrown forward and her head smashed against an experimentally installed gunsight mounting. Although severely injured (her nose had to be restored by plastic surgery), she sat for some fifteen minutes in the wreck refusing all medical aid, noting down an account of the flight in order that her experience might be of value to others. A major operation followed by six months hospitalization resulted from Hanna Reitsch's understandable desire to emulate her male compatriots in sampling the *Komet* (Comet), as the type was to be officially named.

Heini Dittmar also injured his spine in a heavy landing

Assembled at the Regensburg plant of Messerschmitt AG, VD+ER was the eighth Berta prototype (Me 163 B V 8) and the second in the pre-production B-O series.

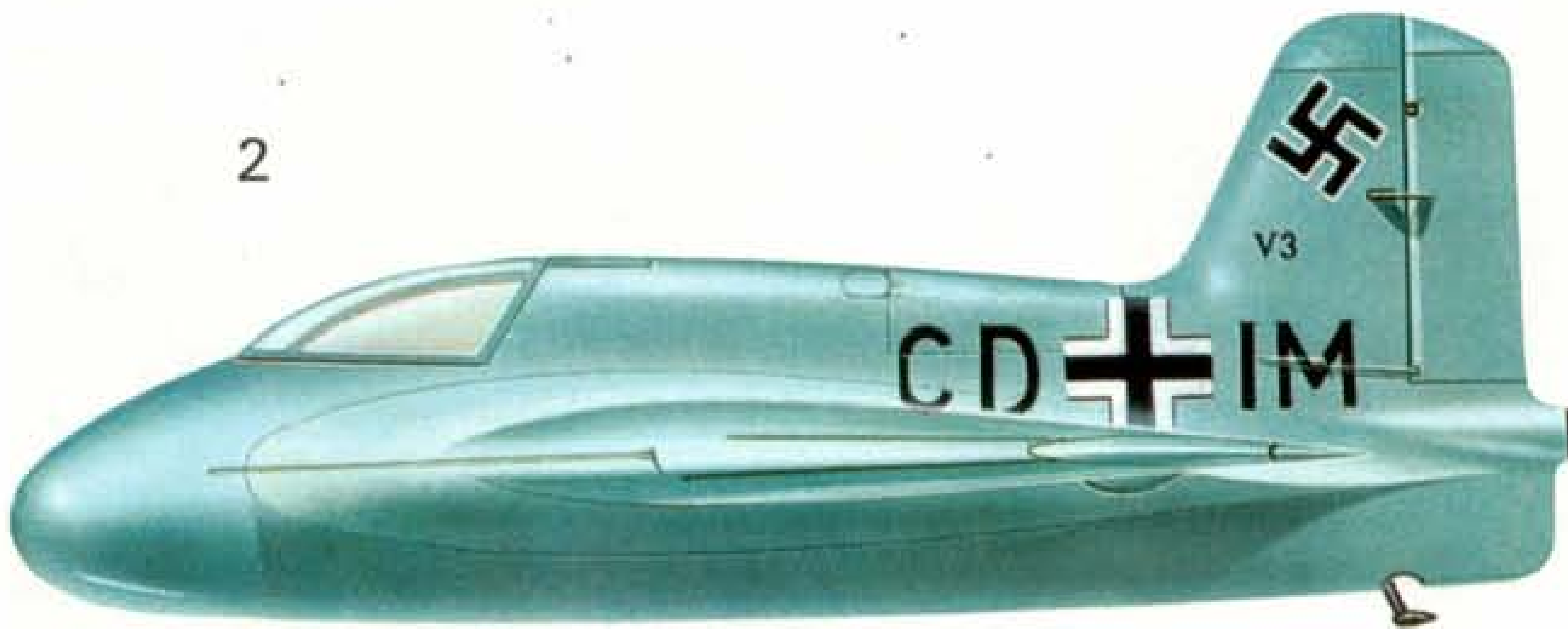
(Photo: Messerschmitt-Bölkow-Blohm GmbH ref. 163/34)



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Hauptmann Wolfgang Späte, Generalmajor Adolf Galland and Professor Willy Messerschmitt in conversation at Lechfeld airfield on May 22, 1943. At that time, Erprobungskommando 16 was also responsible for service evaluation of the Heinkel He 280 and Messerschmitt Me 262 twin-jet fighters. Here, Späte is giving Galland some advice on the handling qualities of the Me 262 before the General der Jagdflieger flies the fourth prototype. (Photo: Karl Lüttgau)

with a Me 163 and he too was admitted to hospital. This was a serious blow to the programme, his place as *Abteilung L*'s test pilot being taken by Rudolf Opitz. Spinal injuries during landing, especially with the Me 163 A, were commonplace. Another hazard which now began to manifest itself was in connection with the highly volatile *C-* and *T-Staff* fuels which arrived at Peenemünde-West for use in the new 3,307-lbt R II-209 motors. Even a minute quantity of these unstable chemicals, if brought together in uncontrolled circumstances, could result in a fatal explosion. On

Still wearing his goggles after the first 'sharp' or 'hot' take-off of the B-series Me 163 at Peenemünde-West in August 1943, Leutnant Rudolf Opitz examines a decoration not on the list of official German Air Force awards. This is a 'Baron Munchhausen' (emblem of Erprobungskommando 16) specially carved for the occasion and presented to him by forage-capped Hauptmann Späte, the Kommandoführer. Others watching include one of Dr. Lippisch's engineers, Ing. Brecht and Oberleutnant Toni Thaler. (Photo: Wolfgang Späte)



This modified 'Baron Munchhausen' astride a champagne bottle instead of riding the customary cannonball became the unofficial crest of 7. Staffel Jagdgeschwader 400. The Staffel (forming part of the Geschwader's third Gruppe) was set up on November 12, 1944, its first Staffelkapitän being Hauptmann Rudolf Opitz.

(Photo: via Wolfgang Späte)

January 14, 1943, an R II-209 motor blew-up after it had not been properly flushed with water following a test run. This was a salutary reminder of the highly dangerous properties of the fuels concerned, a fact that was constantly drilled into maintenance personnel and pilots alike.

During February 1943, *E.K.16* was given the additional task of evaluating all rocket aircraft and those jet-powered designs intended for fighter purposes. So the Messerschmitt Me 328 fighter-bomber with two athodyd units, Me 262 and Heinkel He 280 twin-jet fighters now came under the *Erprobungskommando's* aegis. This, too, tended to inhibit the progress of Me 163 development work as Späte's manpower resources were stretched to cover these additional types.

One notable event in that month was the first powered flight of a *Berta*. This was the Me 163 B V 8 (VD+ER)—which was also the pre-production B-O series prototype. On February 21, Opitz flew this aircraft at Peenemünde-West. It was fitted with the stop-gap R II-209 'cold' power unit.

In an attempt to speed up flight testing, two engineering test pilots, Hans Boye and Bernhard Hohmann attached to the *Erprobungsstelle* at Peenemünde-West and its outstation at Karlshagen, were converted to the Me 163 A by Rudolf Opitz. They then participated in *Komet* development trials; one task being Machmeter calibration in an *Anton*.

During the summer of 1943, some engineless *Bertas* were being flown at Lechfeld and Peenemünde-West or were being equipped at Regensburg for various trials. These included: the B V 1 for parachute-brake and landing-brake experiments; the B V 2 for static weapons and general equipment installation; the B V 3 which was earmarked for engine trials at *Walter Werke*; the B V 4



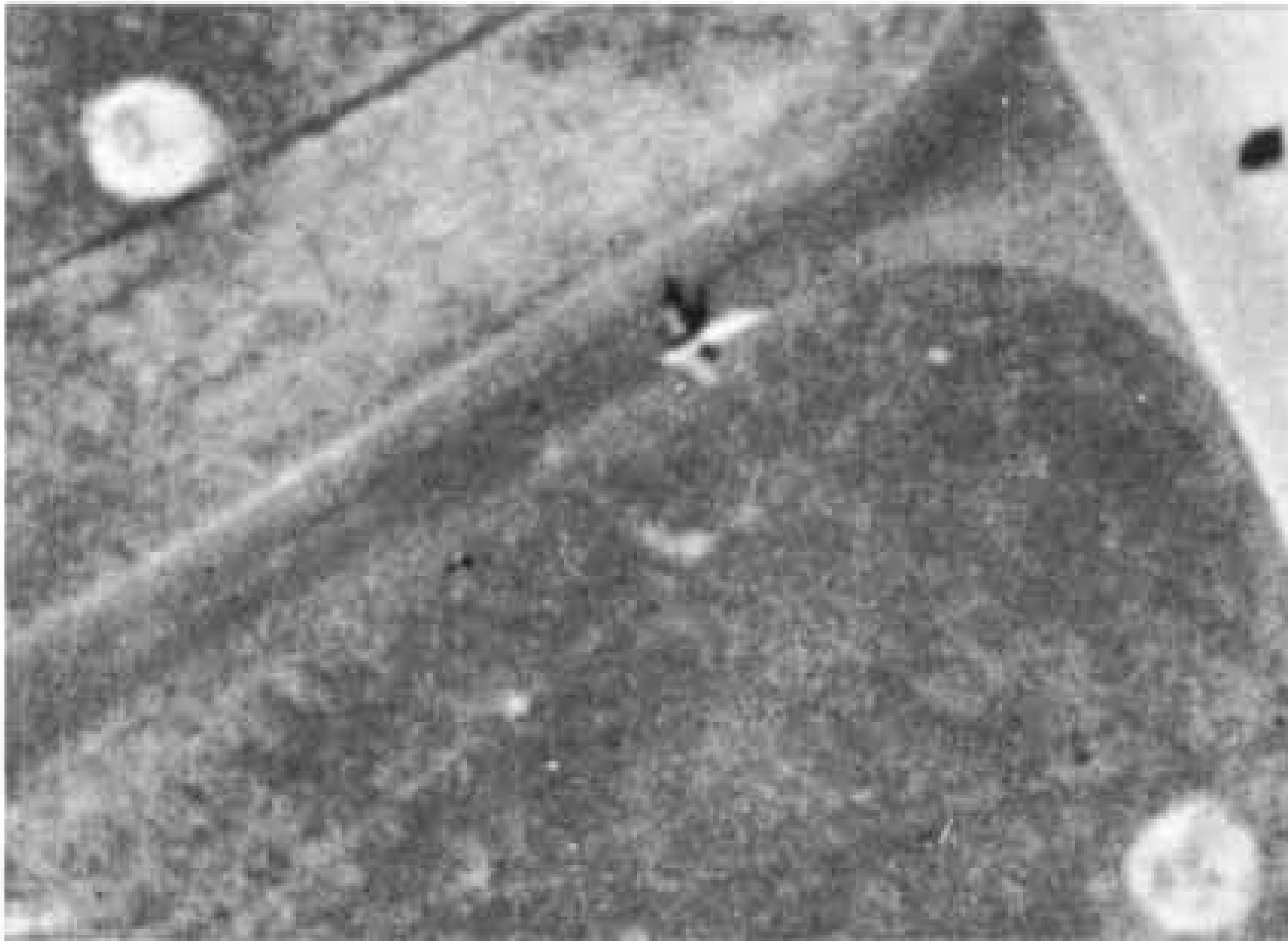
*A mechanic helps a pilot of Jagdgeschwader 400 to adjust his straps prior to start-up in Me 163 B-1, W.Nr. 191116. Aircraft of this Geschwader carried a wide variety of camouflage finishes and it would appear that this Komet has not fired its 30-mm. MK 108 cannon since the application of additional doping. The thick plate of bullet-proof plexiglas forward of the cockpit was not integral with the canopy and was sprung in order to lessen the-chance of splintering if hit by enemy fire.*

(Photo: via the German Aviation Research Group of Air-Britain)



*Clad in a partially acid-resistant and fire-proof Asbestos-Mipolamfibre flying suit and wearing an identifying armband inscribed 'Deutsche Luftwaffe' (to help prevent his possible lynching by enraged German civilians if mistaken for a shot-down Allied 'Terrorflieger'), this pilot of J.G.400 is aided into the cockpit of a Me 163 B-1, W.Nr. 190579, by a ground crew member.*

(Photo: via the German Aviation Research Group of Air-Britain)



*With a searing white flame equally as long as the aircraft itself, a Me 163 of Erprobungskommando 16 commences its take-off run at Bad Zwischenahn airfield north-west of Oldenburg. The round circles on this photographic-reconnaissance cover are filled-in bomb craters.*

(Photo: Imperial War Museum ref. CL 1374)



*Taken from a high-flying Royal Air Force photographic-reconnaissance de Havilland Mosquito, the ominous scene at Peenemünde-West recorded during the summer of 1943. A pair of Me 163s can be seen between the two large hangar blocks: another is almost lost in the shadow of the larger hangar. The elongated scorch marks on the grass were a tell-tale sign of rocket-fighter activity and Allied photographic interpreters were briefed to watch out for them.*

(Photo: Imperial War Museum ref. CL 1372)

*At least one Anton prototype was still being usefully employed by Erprobungskommando 16 at Udetfeld (Silesia) during February 1945. It was used as a test aircraft for 55-mm. R4M folding-fin air-to-air rocket trials, as part of a programme ordered by the General der Jagdflieger, Oberst Gordon Gollob. A Sonderkommando from the Askania equipment firm was working at the same time at Tarnowitz on modifying a Me 163 to take the associated EZ 42 gun-sight.*

(Photo: Messerschmitt-Bölkow-Blohm GmbH ref. 163/1)





Messerschmitt Me 163 B-0 V 41. On Saturday, May 13, 1944, this *Komet* (Comet) was flown on the world's first operational rocket-fighter sortie from Bad Zwischenahn by Major Wolfgang Späte, Kommandoführer of Erprobungskommando 16.

T. Hadler © Profile Publications Ltd.



Clouds of steam billow from beneath an Me 163 B of J.G.400 as its pilot goes through the start-up procedure. T-Stoff was 80% hydrogen peroxide and apart from its main function as a fuel propellant, was also used to initiate a cycle that produced steam to power the turbine driving the two main fuel pumps. (Photo: Herr Husemann)

(with 'cold' R II-209 motor) for radio trials; the B V 6, after completing R II-209 performance tests at Lechfeld, was to be modified to take a pressure cabin; the B V 7 would undergo MK 108 30 mm. cannon installation; and the B V 8 (yet another prototype with a 'cold' engine) was used for general radio and armament work at Peenemünde-West. The continuing delays to the Walter 109-509 bi-fuel rocket motor had resulted in other designs being progressed—one, the B.M.W. P 3330 A rocket engine was planned to be tested in the Me 163 B V 10. An even more unusual scheme to fit Argus 109-014 pulse duct motors (later used in the Fieseler Fi 103 or FZG 76 'V-1' flying bomb) had fallen through. Both the Me 163 B V 11 and V 12, earmarked as 109-014 test-beds, were now standing idle because of the cancellation of the programme.

On April 28, 1943, increasingly strained relations between Professor Willy Messerschmitt and Dr. Lippisch, resulted in *Abteilung L* being dissolved. One of the many points of conflict was Messerschmitt's refusal to back a piston-engined development of the Me 163 designated 8-334 by the R.L.M.'s *Technisches Amt* (Technical Office). Lippisch and some of his old D.F.S. team now moved to the *Luftfahrtforschung Wien* (Aeronautical Research Institute of Vienna) where he was able to pursue his own design interests outside the constricting framework of the monolithic Messerschmitt organisation.

Despite Allied bombing, and until the area was overrun by the Soviet Army, Lippisch was able to continue work in a variety of fields closest to his heart. These ranged from the development of *Lorin*-type ram jets to a

Wearing an acid-proof smock, a Luftwaffe mechanic hoses out the 'Trichter' or special funnel used in transferring the Komet's C- and T-Stoff from the bowser to the aircraft's tanks. Absolute cleanliness was essential to prevent accidental explosions.

(Photo: via Wolfgang Späte)



series of aircraft incorporating his own advanced aerodynamic theories. His creations ranged from the Li P 10 (originally designated Me 265; a swept-wing tailless twin-pusher, piston-engined fighter-bomber abandoned in favour of the Me 410) via the P 13a coal-dust-fuelled supersonic fighter, to the P 15 (an He S 011 jet-engined development of the Me 163 B) which was in the wind-tunnel stage when the war ended.

During June 1943, *Reichsminister* Albert Speer sent his Chief of Staff for Chemical Industry Questions to inspect Army and Air Force establishments at Peenemünde. This official slated the gigantic A-4 ballistic missile programme, but reported with great enthusiasm on the Me 163 (which Speer had already witnessed during a visit to Usedom island one year previously). Speer's representative revealed that the *Luftwaffe* now had plans to maintain an operating strength of 1,000 of these relatively cheap but potentially effective rocket-fighters.

By now, Allied information-gathering agencies were becoming aware of the top secret rocket work of all kinds going on at the Peenemünde complex. A photographic-reconnaissance de Havilland Mosquito flying from R.A.F. Benson in Oxfordshire on July 26 returned with detailed pictorial cover of the area. The photo-interpreting unit at R.A.F. Medmenham soon located a small tailless aircraft at Peenemünde-West. It was given the unidentified-type designation 'Peenemünde 20' (a combination of place at which first noted and its estimated wing span).

Assessing the potential threat from a *Luftwaffe* equipped with new and as yet relatively unknown jet and rocket aircraft was difficult, but despite controversy, the joint Anglo-American targeting staffs decided to try and eliminate the danger before it had time to materialise.

Accordingly, on August 17, 1943, the United States Army's Eighth Air Force based in England sent a force of 126 Boeing B-17 Flying Fortress bombers on a daring unescorted daylight raid against the *Messerschmitt A.G.* complex at Regensburg. At that time the area was considered by the Germans to be safe from bombing attacks. Aiming visually, 242 tons of high-explosive bombs plus another 56 tons of incendiaries were dropped on the aircraft works. One 'green' American unit, the 390th Bombardment Group, although only operational for five days, produced such accurate results and beat off such vicious *Luftwaffe* fighter reaction that it was awarded a 'Distinguished Unit Citation' for this mission. In all, 24 B-17s were lost from the Groups engaged.

Eleven Klemm-built Me 163 B-Os at Regensburg were destroyed in this raid. Far worse was the immediate effect on Messerschmitt Bf 109 production. At first sight, the overall picture looked catastrophic. Output of Bf 109s (then running at about 350 per month) was completely stopped. This precipitated a near-crisis in the *Reich* fighter defence organization. No less serious was the skilled manpower situation; no fewer than 396 aircraft workers were killed and another 750 injured (some 300 seriously). The main plant at Prüfening bore the brunt of the attacks. However, energetic dispersal measures by Albert Speer, coupled with clear directives from the Messerschmitt management to waste no time in salvaging lathes, machine tools and materials (so that production could be re-started in the unrepaired and shattered buildings), ensured that assembly was under way again within three weeks of the attack. One result of this raid

was that the assembly of Me 323 *Gigant* (Giant) troop transport gliders and Me 163 Bs at Obertraubling ceased in the autumn to make way for Bf 109 production moved from Prüfening. This placed full responsibility for manufacturing the vital rocket-fighter on Klemm, a small company and one inexperienced in modern well-planned, highly-mechanized aircraft production techniques.

A few hours later the Me 163 programme was dealt another heavy blow.

On the night of August 17–18, 1943, Royal Air Force Bomber Command sent a stream of 597 four-engined bombers against the Peenemünde complex. German night-fighters and anti-aircraft guns shot down 40 of the attacking force and another 32 heavy bombers were damaged. But, the Army V-weapons establishment at Peenemünde-Ost was heavily hit and 735 personnel killed. Much damage was done to the A-4 (V-2) rocket assembly works, drawing office and the main administrative block. The *Luftwaffe*-controlled area at Peenemünde-West remained relatively unscathed but, as a result of this unmasking of what the Germans believed was a completely secure testing area, *Erprobungskommando 16* was forced to seek a safer base for its work. The unit moved first to Anklam on the mainland opposite the southern tip of Usedom island, then to Bad Zwischenahn near Oldenburg.

The *E.K.16* training programme was again set back. However, by September 1943 the strength of the unit had reached 150 men, including five pilot instructors and 23 pilots under training. The course began with 100 flights in single-seat Grunau Baby and D.F.S. *Kranich* (Crane) tandem-two-seat gliders. Only after the embryo *Komet* pilot was pronounced fully-skilled in the handling of gliders was he allowed to progress to the Me 163 A. Initial flights were made without engine, towed-off by a tug Bf 110. Progressively higher take-off weights (water ballast replaced the rocket fuel) resulting in faster landing speeds, allowed the pupil to master the handling problems of the tailless aircraft in easy stages. Finally, take-offs under power with the Me 163 A were allowed. At a later date, three variants of D.F.S. *Habicht* (Hawk) high-performance aerobatic sailplane with differing



Leutnant *Fritz Kelb* takes to his parachute at low level during an air-test from Fliegerhorst Brandis in the winter of 1944–45. In this instance, the *Berta*'s cockpit filled with choking smoke following an engine fire, forcing the pilot to abandon the aircraft. (Photo: Herr Husemann)

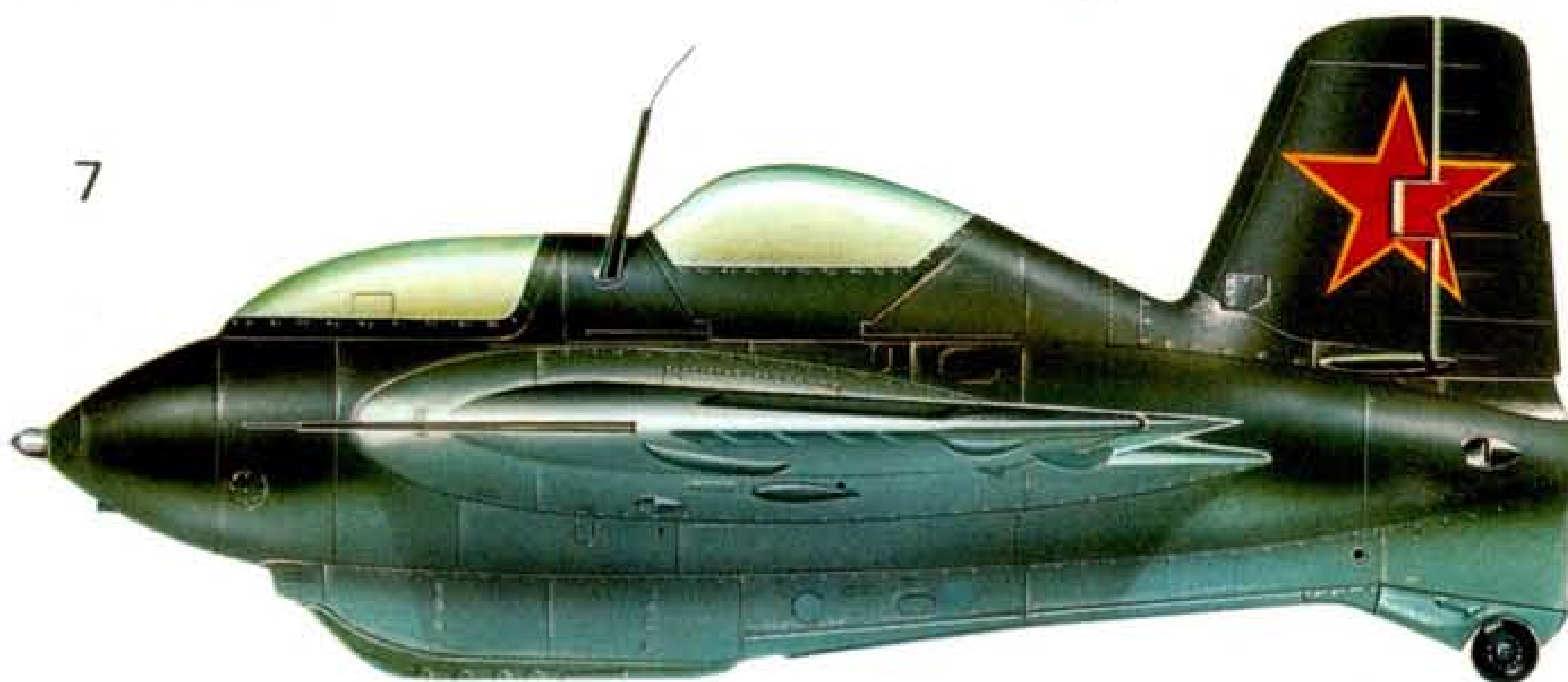
wing-span were introduced into this type sequence as an additional means of acquainting pupils with the technique of fast approach and touch-down.

The last quarter of 1943 was not a pleasant one for *Erprobungskommando 16* at Bad Zwischenahn. Ground facilities were lacking and hangar accommodation was at a premium. Fixed ground radio installations—a prerequisite for safe powered Me 163 A training flights when a rapid 'fix' from two or more ground stations could mean the difference between a life-saving course to steer back to the airfield and a safe landing, or a lost pilot bailing out or killing himself—were non-existent. During August, just prior to the Peenemünde raid, Rudolf Opitz had made the first test flight with a *Berta* prototype powered by one of the first Walter 109–509 motors. Now that there was some prospect of the *Komet* entering service with this developed engine, more aircrew were posted to Bad Zwischenahn for rocket-fighter conversion training.

At this time, veteran pilots from piston-engined fighter

The ingenious 'Scheuchschlepper' combined towing and lifting vehicle developed as a means of retrieving and speedily manoeuvring the Me 163 on the ground, is driven away from a Me 163 B about to be aero-towed by the Messerschmitt Bf 110 in the background on a training flight. Note the camouflage nets slung over the wing Balkenkreuze (crosses) of the tug aircraft—a standard precaution in areas subject to surprise Allied low-level fighter strafing attacks. (Photo: via Wolfgang Späte)







## Key to colour illustrations

- 5 Junkers Ju 248 V 1. During 1945, this prototype was fitted with a fixed nosewheel undercarriage and flight-tested in glider condition with a Messerschmitt Bf 110 acting as glider-tug.
- 6 Me 163 B-O V 45. Used by *Erprobungskommando 16* for trials of the wing-installed, upwards-firing SG 500 *Jagdfaust* 50-mm mortars. When flown by *Leutnant* Gustav Hachtl on December 24, 1944, this *Komet* was severely damaged in an accident at Brandis.
- 7 Me 163 S. A two-seat training glider captured by Soviet forces at Brandis and test-flown in Soviet Air Force markings, 1945-6.
- 8 Me 163 B-1. This *Berta*-series *Komet* had served with *Jagdgeschwader 400* and was seized by British forces following the occupation of Schleswig-Holstein. Air-lifted to the Royal Aircraft Establishment, Farnborough, Hampshire, in the summer of 1945, it was transferred to France on March 10, 1946, and accepted at Dieppe by the *Armée de l'Air*—which accounts for the hastily daubed French roundels.

units as well as new recruits from the *Segelflugschule* (Gliding School) at Gelnhausen north-east of Frankfurt am Main were put through special tests to see if they were medically suitable for Me 163 operations. These involved simulated ascents both in a war-booty Soviet low-pressure chamber at Bad Zwischenahn and in another high-altitude pressure chamber at the Zugspitze outstation of the *Institut für Luftfahrtmedizin* (Aviation Medicine Institute), *München* (Munich), on Germany's highest mountain peak.

The weather over southern Germany throughout December 1943 was especially bad, with severe blizzards. No test flying of production Me 163 B-Os delivered to Lechfeld by special railway waggons from Klemm could as a consequence of these conditions be carried out. Again the *Kommando* had to fall back on its hard-worked *Antons*, although Späte, Opitz and Pöss had by now all flown the 109-509-powered *Berta* at Lechfeld before this spell of poor weather.

In January 1944, the *Oberkommando der Luftwaffe* (O.K.L.-*Luftwaffe* High Command) began initial moves to set up the first operational unit of Me 163 Bs. On the last day of that month, the first 'paper' *Staffel* of rocket-fighters was entered on the *Luftflotte Reich* (Airfleet *Reich*—geographical area covering Germany proper) order of battle. This was the 20th. *Staffel* of *Jagdgeschwader 1* (20./J.G.1) which was formed at Bad Zwischenahn with a nominal strength of 12 Me 163s. On that date neither aircraft nor crews existed.

From the beginning of 1943, detailed planning had been undertaken by *Hauptmann* Späte with a view to setting up rings of large airfields in the west, north-west and north of Germany as operational bases for the *Komet*. Lying across the main Allied bomber routes to the east, these would be lavishly equipped with underground tanks for rocket-fuel, bomb-proof servicing accommodation and independently sited radar installations. Carefully chosen, these Me 163 fields would be within gliding distance of one another (assuming a



Like so many fairground toys, Me 163 Bs of 1./J.G.400 wait in readiness on the hard-standing at Brandis during the winter of 1944-45. Faintly discernible in the background (right) is the prototype four-jet Junkers Ju 287 bomber then being evaluated on the same airfield.

(Photo: Herr Husemann)

*Komet* had broken-off action with Allied bombers in the height band 20-25,000 feet due to fuel lack) and were to have all the ground-handling aids and re-arming facilities to enable aircraft of whatever unit and wherever based to be sent into action again as speedily as possible.

During January 1944, the initial armed combat-ready *Berta* prototype (the Me 163 B V 14—coded VD+EW) was delivered to Bad Zwischenahn and tested by *Oberleutnant* Opitz. Soon after this, the first simulated operational sortie was flown. It was assumed that an enemy bomber formation flying at between 20,000 and 26,000 feet was in the vicinity of *E.K.16*'s base. Attack would be carried out from the rear. The take-off and climb to the enemy's height was normal; at a 45° angle with an airspeed of between 430 and 500 m.p.h. Reaching 20,000 feet, the Me 163 was eased out of the climb by forward pressure of the control column. The 109-509 cut. The rocket-fighter decelerated slowly due to the aircraft's clean aerodynamic shape, but even so would soon have been a 'sitting duck' both for any defending escort fighters or the gunners of the attacked bombers. It was a characteristic of the 109-509 that an engine re-light could not be attempted for two to three minutes following a flame-out.

Further mock-attack profiles were flown as more pre-production Me 163 B-Os began to arrive in a trickle from Klemm. This firm had taken over responsibility for Me 163 production following *Messerschmitt A.G.*'s post-Regensburg attack reorganization. *Bertas* flown by Klemm acceptance pilots at a new centre at Jesau near Königsberg in East Prussia were later re-tested by *E.K.16* pilots at Bad Zwischenahn. Again and again, as the climb attitude was changed to the horizontal position, the resulting deceleration appeared to shut down the engine. The Service use of such an aircraft was out of the question.

Eventually the cause was traced to the automatic cut-out that controlled the flow ratio of the *C-* and *T-Staff* fuel components. These had to be fed into the combustion chamber in an exact mixture. Any deviation involved the real risk of explosion. Consequently, it was a design feature that if the flow in one of the fuel lines was interrupted for any reason, the propulsion unit shut down automatically. It transpired that when the *Komet* was brought out of its climb, the position of the fuel in its tanks was altered so much by the deceleration that the



'Jupp' Mühlstroh, a Komet pilot of 2./J.G.400, climbs into his Me 163 B while his mechanic waits to assist him with his parachute straps. Fliegerhorst Brandis, winter 1944-45. (Photo: Herr Husemann)



A standard Me 163 B-1 of Jagdgeschwader 400. This aircraft appears to be newly delivered, with the underwing and lower fuselage sky-blue sprayed paintwork as yet unsullied by the Geschwader's own peculiar brand of camouflaging.

(Photo: German Aviation Research Group of Air-Britain)

fuel outlet became air-locked and the 109-509 was automatically shut-off. Locating the cause took time and this put back the introduction into operational service of the type.

An even more hazardous situation developed with the phasing-in of the *Berta* (or '*Kraftei*'—'power egg'—as it was dubbed by *E.K.16* personnel) to the training programme. Pre-production Me 163 B-0s fitted with equally untried Walter 109-509 A-0 motors were now being flown by pilots training for 1./J.G.400 (20./J.G.1 redesignated), the world's first operational rocket-fighter unit. Both at Lechfeld (where development flying of Messerschmitt-built and Klemm-assembled *Kometen* continued) and at Bad Zwischenahn, incidents began to occur of motor failures on take-off, especially where the Me 163 B's tanks were half or three-quarters full. At the most critical point in the take-off sequence, when the aircraft was pulling over the airfield boundary at around 240 m.p.h., the engine would suddenly cut out.

One pilot was forced to make an emergency landing with full tanks—by a miracle he lived. Two other *Bertas* crashed. Only by good luck and flying skill—or a combination of both—were other fatalities avoided. A desperate remedy was sought and partially hit upon. This is best illustrated by a verbatim quotation from a

contemporary paper: "On airfields from which Me 163s operate, markers (flags) are placed on the field so that if the pilot is not airborne when he crosses the first mark, he can close the throttle and come to a stop. If he is not airborne when he reaches the second mark, he jettisons the canopy, climbs out on the wing and pulls the ripcord, because when the aircraft crashes at the end of the field, an explosion is inevitable if the C- and T-Stoff come together. This procedure is the only means whereby the pilot can save his life." Obviously, this was of no value in a power-loss after take-off.

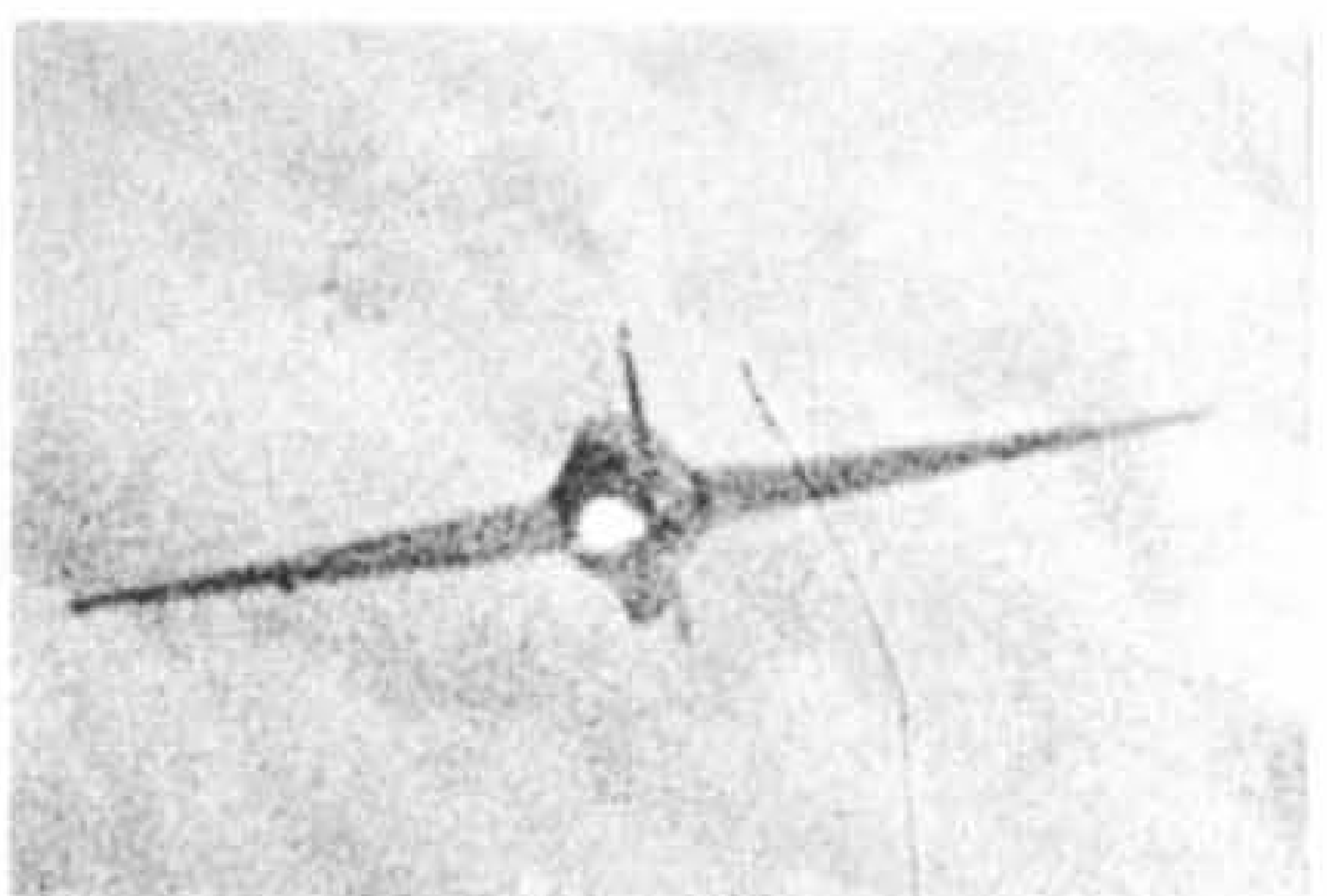
It is little wonder, therefore, that *Flugkapitän* Hanna Reitsch was not allowed to fly the Me 163 B at this time. Discharged from hospital, she arrived at Bad Zwischenahn to participate in *E.K.16*'s conversion course, but only flew the Me 163 A under power.

*Oberleutnant* Robert Olejnik, a *Ritterkreuzträger* (Knight's Cross holder), his decoration won as *Kommandeur* of III./J.G.1 (in August 1943), took command of 1./J.G.400 with the ultimate intention of expanding the unit to *Gruppe* strength. During February 1944, Olejnik made his first powered solo in a *Berta* at Bad Zwischenahn. On March 1 he moved to Wittmundhafen with five aircraft and 12 pilots. On April 21, taking off from 1./J.G. 400's new base, Olejnik's *Komet* suffered engine

*Death of a Komet.* A series of camera-gun sequences taken over Germany by an American fighter pilot. Taking advantage of height, the U.S. fighter closes on the Me 163 from the port quarter, opening fire outside effective range.



From much closer range the attacking aircraft again exposes its camera, but aware of the danger and with rocket motor flaming the *Komet* begins to pull away from the American fighter.



failure, crashed and caught fire. Olejnik broke his back, being fortunate to escape with his life.

Despite this unhappy situation, the Luftwaffe High Command ordered that there were to be no further delays in the planned introduction of the Me 163 B into service. All further airframe testing was stopped from April 1944 and manufacture of a small series of Me 163 B-1s began. While 1./J.G.400 remained non-operational at Wittmundhafen, another *Staffel*, 2./J.G.400 was set up, initially in a training role. The establishment of both *Staffeln* was increased from 12 to 14 *Kometen* (Comets) on May 10, 1944.

At Bad Zwischenahn, meanwhile, *E.K.16* working closely with the Walter company, was making determined efforts to discover the cause of the latest series of motor failures. Bench tests could not simulate the trouble, since it was not possible to reproduce the condition of acceleration and g-forces acting on a Me 163 during take-off. After several months, it was found that the reason was a build-up of turbulence in the *T-Stoff* tank fuel outlet. When developing full power, the 109-509 engine drew off more than 11 lb. of *T-Stoff* through its fuel pump and sprayed this into the combustion chamber every second. At the slightly inclined take-off attitude, and with a constantly increasing acceleration, turbulence was induced at the fuel outlet—similar to that seen at the drain outlet of a domestic bath. Under certain circumstances, this turbulence sucked bleed air in with it, causing the fuel control unit to shut down the engine. The installation of vertical baffles above the outlet overcame this problem.

By May 1944, *Erprobungskommando 16* was sufficiently experienced to commence experimental fighter trials. One morning\*, entering a hangar at Bad Zwischenahn, Späte, who had been promoted *Major* prior to being posted back to Russia with his old unit, *Jagdgeschwader 54*, where he was to lead its fourth *Gruppe* (IV./J.G.54), was both amazed and angered to find that the Me 163 B V 41 (the only serviceable *Komet* then equipped for combat use) had been re-sprayed an overall red colour. He had given no order for this to be done. The culprits were his own personal young mechanics. They blurted out that it was the general feeling within the unit that it would bring him good luck if Späte could fly the first interception with this revolutionary aircraft painted in the same red scheme as carried by Baron Manfred von Richthofen's legendary World War I Fokker Triplane. No harm was intended!

Seeing that at least *E.K.16*'s morale was high, and knowing that there was no time to have the aircraft repainted, *Major* Späte ordered the Berta armed and fuelled. Although not normally superstitious, he secretly hoped that the sight of a red *Komet* would not bring a

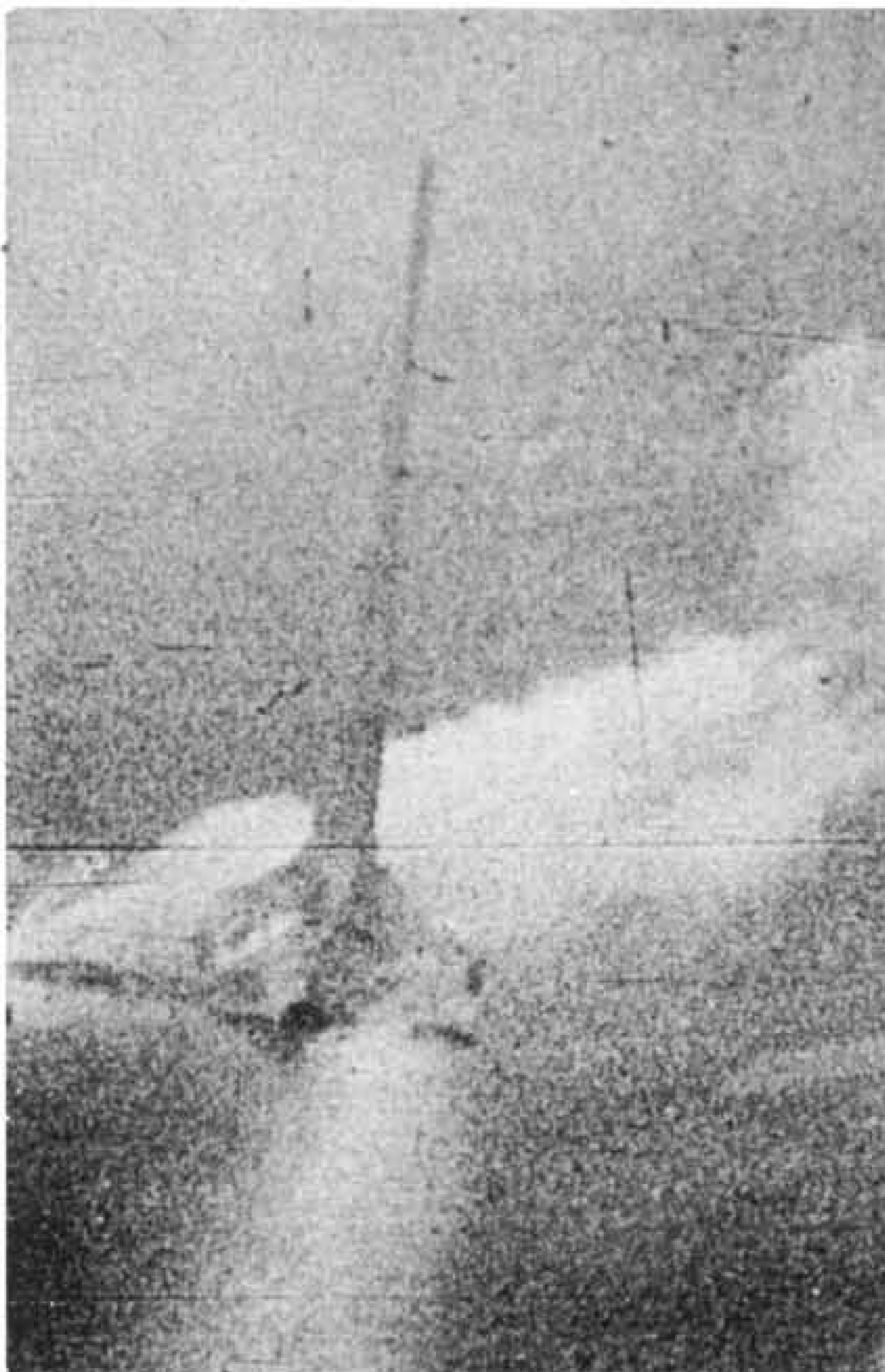


Out of fuel or with its engine damaged by enemy fire, the German pilot pulls his Me 163 into a tight left spiral.

flock of enemy fighters down upon him. That same day, May 13—another unlucky omen—enemy aircraft were reported approaching Bremen. The whole *Kommando* assembled to watch *E.K.16*'s commander take-off.

Bad Zwischenahn's *Würzburg-Riese* (Giant Würzburg) ground radar was now tracking the enemy force. Späte advanced the throttle; the rocket engine's thunderous roar became an ear-splitting shriek. A diamond-shaped flame snaked from the rocket orifice. Jumping the chocks the *Komet* rolled smoothly down the runway gathering speed. At last the tubby little fighter lifted off.

Struck by a fusillade of 0.5-in bullets, the doomed rocket-fighter streaming smoke and steam goes over the vertical in an uncontrolled roll. (Photos: via Richard Bateson)



\* In the evocative book, 'Elusive Horizons' (published by A. S. Barnes and Co. Inc., Cranbury, New Jersey, U.S.A.), Keith C. Schuyler a former Consolidated B-24 Liberator pilot of the 67th. Bombardment Squadron, 44th. Bombardment Group, U.S. 8th. A.A.F., describes how on Saturday, April 21, 1944, after bombing Hamm his left waist gunner reported a red-painted aircraft (with an incredible rate of climb) take-off from an airfield on the line of their return route. The book's author was surprised that the S-2 (Intelligence) officer at the de-briefing expressed little astonishment at this information. He told Schuyler that it was one of the "new jet airplanes that the Germans are building". Possibly the Me 163 B V 41 had been given its unofficial colour before the date in May recalled by Obstlt. a.D. Wolfgang Späte. EDITOR



The cockpit layout of a Me 163 B captured by British forces in north Germany and speedily transferred to the Royal Aircraft Establishment at Farnborough in Hampshire for examination. Photograph taken one week before the final German surrender on May 1, 1945.

(Photo: RAE negative No. 61869, Crown Copyright Reserved)

Its take-off trolley fell away, danced fitfully on the ground and then lay still. The red machine rotated. A great spear of smoke marked the progress of the *Berta* as it climbed at a sharp angle into the cloud-flecked sky. Within a few seconds the B V 41 was lost to sight of those on the ground.

As the *Komet*'s instruments started to settle, *Leutnant* (2nd Lieutenant) Korff in the control centre linked to the ground radar gave the pilot corrections of course. At approximately the height estimated by radar, Späte suddenly spotted two minute dots. These pinpoints resolved into a pair of single-engined aircraft. A split-second later—such was his closing speed—radial engines indicated they were Republic P-47 Thunderbolts. Switching on his gun sight and cocking his *MG 151/20* cannon with practised hands, the intercepting pilot scanned the blue sky. Where there were two enemy fighters there must be more. Sure enough, he spotted two more P-47s almost in silhouette vertically above him. They were unaware of his presence. He was in luck.

To allow the Thunderbolts above to ease ahead of him, Späte commenced a tight weave. Inadvertently he

Sunning himself on a mild spring day in 1945, a *Komet* pilot of 2. Staffel Jagdgeschwader 400 relaxes on the wing of his *Berta* at Brandis airfield immediately east of Leipzig. Fuelled, armed, with oxygen mask to hand (draped across the heavy Plexiglas frontal bullet-proof shield) and with parachute in place on his cockpit seat, this deceptively peaceful scene will change to one of bustling activity the moment that Allied day bombers are reported approaching the area.

(Photo: via the German Aviation Research Group of Air-Britain)



released the control column, inducing a negative g-force. At once the rocket motor flamed out. All of a sudden the tables were turned. The *Komet* was without power and in a vulnerable position below an enemy a little over 1,000 yards distant. After such an engine cut, two minutes or more must elapse before a re-light could be attempted. Resisting an impulse to dive away to safety, Späte punched the stopwatch on his instrument panel, at the same time holding the gliding Me 163 on the same course as the enemy fighters. Depressing the nose he lost height, maintaining as much speed as possible. Twice the hand circled the dial. The unsuspecting Americans receded into the distance. At last the long two minutes were over.

Pressing the starter button, Späte got an immediate response from tachometer gauge. When the turbine indication reached 40% of maximum he released the button and advanced the throttle. The stalled 109-509 had picked up without trouble. By now the two P-47s were just smudges on the horizon. Perhaps three miles separated them from the trailing *Komet*. The German pilot's eyes swiftly took in the scene. There were no other aircraft in sight. He could safely take up the pursuit.

There was sufficient fuel remaining, so Späte slid the throttle forward to 100% power. The *Berta* bounded forward faster and faster. He checked his weapons again. All in order. Once more the distant shapes resolved into recognisable fighters. For the first time the wings of the rearmost Thunderbolt began to fill the graticule of the *Revi 16* gun-sight. All Späte's concentration centred on the silver P-47 in front of him. Larger and larger grew the target. The Me 163's airspeed indicator needle swung past 550 m.p.h. Späte's gloved thumb lay poised on the gun button.

Without warning, the *Komet*'s left wing snapped down. The aircraft went into a dive as its lift disappeared. Instinctively the control column was snatched back in an effort to raise the nose. The Me 163 B began to vibrate as the effects of compressibility manifested themselves. The instability about the aircraft's lateral axis became even more violent. The shaking got worse and now heavy negative g was again experienced. The long-suffering rocket engine flamed out once more. Späte eased back the throttle. Slowly the shaking died away.

It was Späte's first experience of what was later to be popularly called the 'sound barrier'. The Me 163 had exceeded its limiting Mach number. Suitably chastened he circled back to a safe landing at Bad Zwischenahn. That afternoon he was again airborne in the red *Berta*, but was unable to locate any enemy aircraft.

On May 20, 1944, another pilot, *Oberfeldwebel* (Flight Sergeant) Nelte (a graduate of the first *E.K.16* course of autumn 1943) took off in the Me 163 B V 40 (*Werk Nummer—W.Nr.—*work number 310049) responding to an *Alarmstart* ('scramble' in R.A.F. parlance). He too made no contact with the enemy. Two days later, *Oberleutnant* Opitz flew his first operational mission in the Me 163 B V 33 (GH+IL); it too was unsuccessful.

Heavy patterns of bombs fell on the southern part of Bad Zwischenahn together with the airfield's western and north-eastern dispersal areas on the morning of May 30th. As a result of this American attack, in which the *Erprobungskommando* lost two Me 163s destroyed (one a combat-ready aircraft) with two others 25% damaged, together with a number of piston-engined types and sundry gliders, the airfield was abandoned to the

*Luftwaffe's* repair columns. On June 7, 1944, *Hauptmann* Thaler, now *Kommandoführer*, supervised the transfer of Me 163 training to Brieg on the river Oder. It now fell to the new commander to reorganise and refurbish *E.K.16* at this low point in the unit's fortunes.

Early in June 1944, *I./J.G.400* with *Hauptmann* Otto Böhner as *Staffelkapitän* moved from Wittmundhafen to Venlo in Holland. It was not a propitious moment. The Anglo-American landings had just taken place in Normandy. Allied air power was overwhelming and airfields as far afield as the Netherlands were under constant attack. Only a few sorties were flown—none successful.

It is hardly surprising, therefore, that it was not until late July that the Me 163 B was used against Allied bombers attacking Germany. In the meanwhile, *E.K.16* had returned to a patched-up Bad Zwischenahn, where it now concentrated on improving the climb performance and powered endurance of the Me 163 B. Concurrent with these trials, the *Erprobungskommando* was charged with running a general engine development programme to back the projected introduction into *Luftwaffe* service of the tricycle-undercarriage Messerschmitt Me 263 then intended to replace the Me 163 B. Four prototypes (Me 263 V 1—V 4) were on order from *Focke Achgelis G.m.b.H.* at Delmenhorst, a company till then specialising in helicopter design. Later the programme was taken over by *Junkers Flugzeug-und Motorenwerke G.m.b.H.*, the Me 263 designation being dropped and Ju 248 substituted.

On July 28, 1944, North American P-51 Mustangs escorting 8th. A.A.F. heavy bombers to Merseburg encountered Me 163 Bs. Over Wesermünde on the same day, another *Komet* (probably from Bad Zwischenahn) was reported to have made a beam attack out of the sun on a damaged 3rd Air Division B-17 being escorted back to England by P-38 Lightnings of the 479th. Fighter Group. It soon out-distanced a flight of P-38s that gave chase.

Bad Zwischenahn was again visited by the U.S. 8th. Army Air Force on August 15. Although the Allied assessment of the damage was, "... the dispersal area used by these (Me 163) aircraft was little affected..." the hangar occupied by *E.K.16's* Me 163s was badly damaged and the total strength of aircraft (of all types) reduced to six. It was not until early September that test flying could recommence.

With *Major* Späte's departure for the Eastern Front, a new *Typenbegleiter* had been appointed by the *General der Jagdflieger* (General of the Fighter Arm), *General-leutnant*—Lieutenant-General—Adolf Galland. This was *Oberst* Gordon Gollob, one of the *Luftwaffe's* most highly decorated fighter pilots then serving on Galland's staff. Gollob modified the plan to establish rings of Me 163 bases across the Allied bomber lanes. Instead, he ordered the concentration of rocket-fighter activity around a few selected high-priority factories. The most important of these was the Leuna distillation plant to the west of Leipzig. To the east of this city lay Brandis airfield—31 miles from Leuna. Brandis now became the focal point of Me 163 combat operations.

By August 16, 1944, *I./J.G.400* was fully re-established at Brandis following its dismal debut at Venlo. *Leutnant* Ryll was killed by Mustang fighters after he had made three attacks on a B-17 in the Leipzig area. Another Me 163 could not retract its skid; this aircraft's wing



Probably relegated to a ground instructional rôle, the Me 163 B V 13, seen here in a hangar at Polzen on April 19, 1945, guarded by a private of the U.S. First Army's 9th. Armoured Division, was still flying at Lechfeld during August 1944. On the 18th. of that month, it underwent a rocket motor change: a Walter 109-509 A-0 being removed and a new A-1 engine (W.Nr. 3487) being installed in its place.

(Photo: U.S. Army ref. SC 231454)

man had his guns jam, the pilot landing wounded from a Fortress's return fire. Two victories were claimed by returning *Komet* pilots on that day.

From these first encounters with American bombers it was found that although the Me 163 was a good gun platform, it was extremely difficult for any but the most experienced pilot to make a successful attack. To avoid the attentions of escorting fighters it was necessary to make the approach run on the compressibility fringe in the speed range 550–580 m.p.h., this giving an excess of speed over the attacked Fortress or Liberator of the order of 340 m.p.h. The closing speed was approximately 500 feet per second. Experience with the first *E.K.16* weapons trials (and especially later with the low velocity *MK 108* 30-mm cannon) had shown that accurate fire could be only opened at ranges under 650 yards. To avoid a possible collision with the attacked aircraft, a *Komet* pilot had to disengage at a minimum distance of 200 yards from his target. This gave him just 450 yards or

'Gelb 15'—'Yellow 15'—a Me 163 B-1 formerly of *II./J.G.400* captured in Schleswig-Holstein during May 1945 by elements of the Royal Air Force Regiment. Work's number 191659, this *Komet* was presented to the College of Aeronautics at Cranfield, Bedfordshire, England on May 14, 1947. It appears to have been standard practice for the Werk-Number to be applied on the port side of the Me 163's fin only.

(Photo: via Richard Bateson)





Canadian Air Cadets inspect the rocket efflux of a tame Berta. Currently (1971), two ex-J.G.400 Me 163 Bs still survive in Canada. The best kept example is W.Nr. 191914, 'Yellow 26', probably ex-6. Staffel. This is now on permanent exhibition at the Canadian War Museum in Ottawa. In store at the same establishment is W.Nr. 191095 which, standing exposed to the elements in a compound at C.A.F. St. John, Quebec for many years, deteriorated rapidly. Vandals stripped many items from this aircraft before it was handed over to the museum authorities.  
(Photo: Public Archives of Canada ref. PL 38458)

2½ seconds at a safe anti-fighter closing speed to assess the correct range and deflection, open fire and then commence an anti-collision manoeuvre. With a head-on attack—then a well-tryed and often successful piston-engined fighter tactic—there was only a single second's opportunity for an effective hit. Obviously only a handful of even the most keen-eyed pilots had any hope of hitting a 'jinking', well-defended four-engine bomber in such circumstances.

Probably *Jagdgeschwader 400*'s most successful sortie against the American day bombers was on August 24, 1944. *Feldwebel* (Sergeant) Schubert leading the second pair of *Bertas* to take off from Brandis climbed with his wing man at full power to 36,100 feet. Switching off their motors, they sank silently back towards the earth. No enemy was in sight. Descending through 19,700 feet they spotted a formation of bombers 1,600 feet above. Re-lighting their powerplants they climbed to the attack. On the first pass they made for the leading aircraft scoring hits in the port wing. Another firing run and the

Photographed in the mid-sixties in an 'Aladdin's Cave' of World War. Two German rocket equipment and weaponry then stored in a hangar at the Rocket Propulsion Establishment, Westcott, Buckinghamshire, England, this hitherto little-publicized Me 163 B-1, W.Nr. 191614 has never been previously illustrated. At that time, although minus a tailwheel and certain items of panelling, its general condition was good. The paintwork is not original.  
(Photo: RPE negative No. 12091, Crown Copyright Reserved)



'Dicke Auto' (*Luftwaffe* slang for a four-motor bomber) began to burn and went into a right hand spin. Other pairs of *Komet*s now attacked. In all, three enemy bombers were claimed destroyed.

This was to be almost *J.G.400*'s swansong. Also during August, a factory producing *C-Stoff* at Kiel had been razed to the ground by a bombing raid. This was a crippling blow to the rocket-fighter programme. At the same time, large-scale attacks on the entire German railway system resulted in the loss of several tanker trains of fuel. Other consignments of *C-* and *T-Stoff* were left for lengthy periods in sidings because of the rail dislocation. On arrival at Brandis they had to be destroyed due to deterioration on route. So as production of *Bertas* built up (with *Junkers Flugzeug-und Motorenwerke G.m.b.H.* being brought into the programme during the autumn), the amount of fuel to fly them dwindled. Now only occasional interceptions of high-flying reconnaissance aircraft by the most experienced pilots was sanctioned.

With the coming of winter the situation worsened. The incidence of days when the weather was suitable for *Komet* operations diminished. The Me 163 could only be safely flown in conditions of good visibility. The difficulty of 'homing' this ultra short-range aircraft back to its airfield once the pilot had lost visual contact with known landmarks was almost insurmountable. Early in October 1944, *Hauptmann* (Captain) Fulda, *Kommandeur* (Commander) of the first *Gruppe* (I./*J.G.400*) writing to *Oberst* Gollob on the problems associated with the need to assist Me 163 pilots in this way, said that the successful operation of the rocket-fighter depended upon a system of radar guidance and control of a precision equally as high as that available to night-fighter units—but for normal day-to-day flying. For this reason, the Me 163 must have been one of the few combat aircraft in any Air Force never to have flown at night.

During October, *E.K.16* under *Hauptmann* Thaler also moved to Brandis. Its main work consisted of proving air-to-air mortar and rocket weapons and their application to the Me 163 B. Engine and radio trials relating to the Ju 248 programme went on. *Jagdgeschwader 400*'s 1. and 2. *Staffeln* continued to languish on that increasingly crowded airfield east of Leipzig. The third and fourth *Staffeln* (3. and 4./*J.G.400*) had arrived at Stargard in Pomerania around November 1944, where an underground storage tank for rocket fuel was under construction. Small-scale training activity continued while the *O.K.L.*'s planners debated the fate of the whole rocket-fighter concept. In a paper transaction on December 12, 1944, 3. and 4. *Staffeln* were re-designated 5. and 6. *Staffeln*, thus forming the nucleus of *J.G.400*'s second *Gruppe* (II./*J.G.400*).

So as the Russians flowed across the eastern borders of the *Reich*, and the Anglo-American bomber fleets ranged virtually unchallenged over the smoking cities and towns of Germany, production of *Bertas* that could not be flown, transfer of fighter pilots that could not be adequately retrained and conversion and extension of airfields by labour and material in desperately short supply went ponderously on.

At this nadir in the Me 163's fortunes, *Major* Späte was recalled from the Russian Front and promoted *Kommandeur* of *Jagdgeschwader 400*, setting up his *Geschwaderstab* (*Geschwader Staff*) headquarters at Brandis. As soon as he had assessed the chronic situation surrounding the

Me 163 programme, Späte called for the cessation of all activities in this field. He now threw his weight behind officers lobbying for the full-scale emergency production of the Me 262 and its employment as a day fighter. The winter of 1944–5 was to be one where certain factions of the German Air Force fought almost as strongly among themselves in the conference rooms of a dispersed Air Ministry as in the air against the common enemy.

March 1945 brought about a renewal of rocket-fighter activity. The situation was so critical that hoarding C- and T-Stoff now seemed pointless. With the longer days and improving weather, like hibernating mammals awakened by the spring, the *Kometen* fought back in brief pin-prick engagements.

On the morning of March 7, a photographic-reconnaissance Spitfire Mk XI, (serial PL 886) of No. 542 Squadron, R.A.F. was attacked by a pair of Me 163 Bs over Rositz. The British pilot, Flight Lieutenant Raby, dived from 35,000 to 18,000 feet, clocking 500 m.p.h. in the process, and escaped.

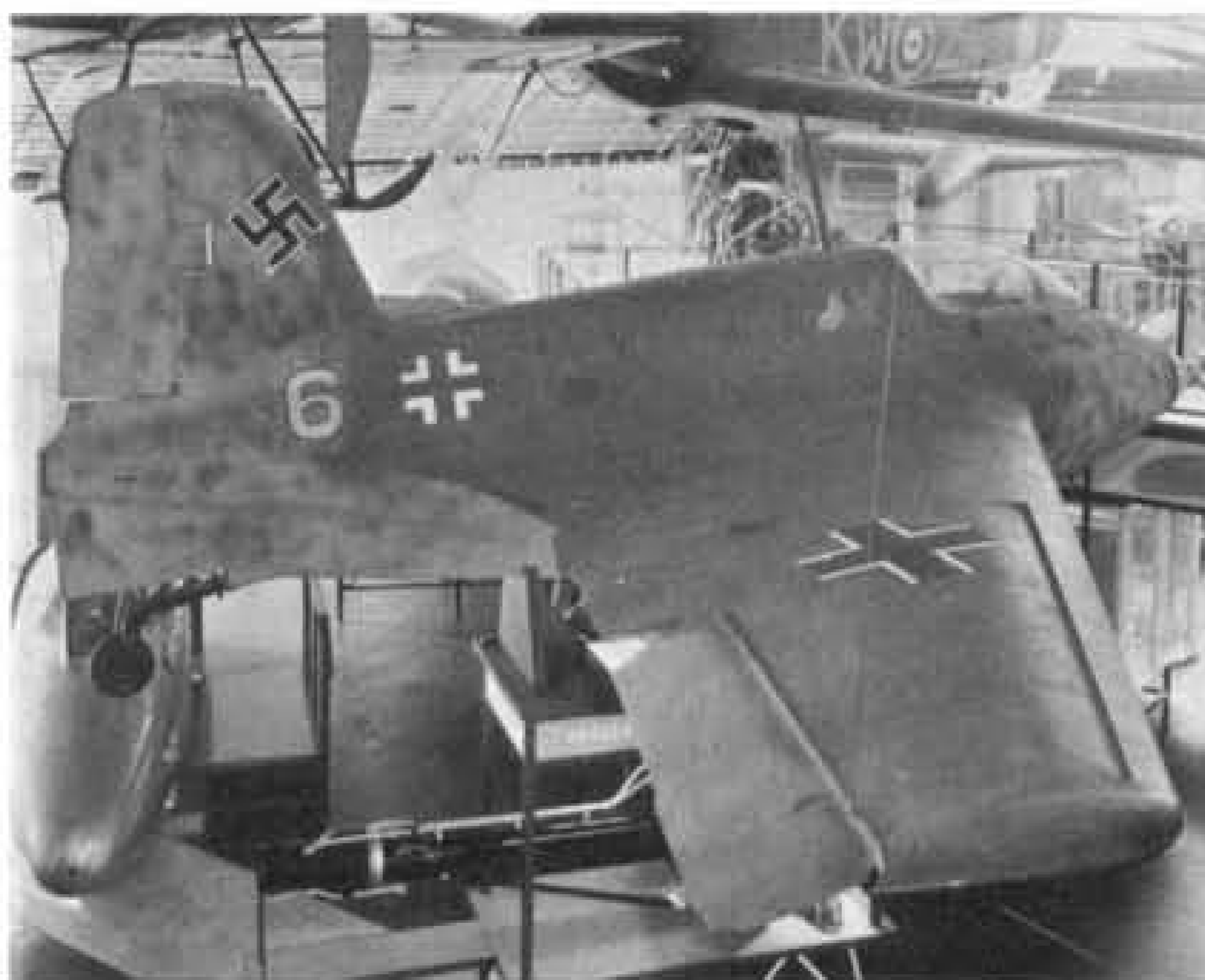
A Mosquito P.R. Mk. XVI (NS 795) of No. 544 Squadron, R.A.F. was intercepted by *Oberleutnant* Rolf Glogner and his wing-man over Leipzig on March 16. The reconnaissance aircraft's starboard motor was hit by *MK 108* shells. After an epic single-engined return flight, the pilot, Flying Officer R. M. Hays, crash-landed his crippled Mosquito at Lille in France. He was awarded an immediate Distinguished Flying Cross.\*

On March 19, 20 and 23, 1945, some 2,000 British and American bombers were dispatched each day over Germany. The third *Reich* was in its death throes. Yet Me 163s were still to be seen mixed in with the pitifully small number of *Luftwaffe* fighters that rose to oppose these attacks. It was all in vain. On May 8, 1945, *Hauptmann* Rudolf Opitz's *II./J.G.400* surrendered to elements of the Royal Air Force Regiment at Husum in Schleswig-Holstein. With this unit were most of the 48 intact Me 163s seized by the British in their Occupation Zone. Twenty-five were air-lifted back to the Royal Aircraft Establishment, Farnborough (in Hampshire, England), four more were handed over to the French *Armée de l'Air*, while others found in the American Zone of Germany were shipped independently to the United States for evaluation. No fewer than 10 still survive in various of the world's museums.

While the advanced state of German rocket research was being revealed to Anglo-American and Soviet technical investigators, on the other side of the world the Japanese fought on. During 1944, Hitler had permitted the Japanese access to various weapons hitherto classified *Geheime Kommandosache*—Top Secret. One of these was the Messerschmitt Me 163. In the spring of 1944, a specimen *Berta*, together with crates of detailed blue prints, was sent to Kiel and stowed aboard an ocean-going *U-Boat*. On route to Japan the submarine was sunk.

Working from a set of simple technical manuals that had evaded the Allied blockade, the firm of *Mitsubishi* constructed a copy of the Me 163 B known as the J8M1

\* During 1968, the former navigator of NS 795, ex-Flight Sergeant Morgan Phillips, now headmaster of a school at Aberdare, South Wales, met Rolf Glogner and presented him with a section cut from one of the propellers of the crippled Mosquito. With the badge of No. 544 Squadron suitably mounted this relic of a wartime encounter occupies a place of honour in Glogner's home at Bad Nauheim.



'Yellow 6', W.Nr. 191316, the Me 163 B-1 restored by members of the Royal Air Force Apprentice Training School at Halton during 1960–61 seen in situ at the Science Museum's Aeronautical Gallery in South Kensington, London.

(Photo: Science Museum negative No. 45/64, Crown Copyright Reserved)

*Shusui* or 'Rigorous Sword'. Simultaneously, an all-Japanese SR NO. 2 bi-fuel rocket motor of equivalent power to the Walter 109–509 A was jointly developed by the Navy Aeronautical Engineering Arsenal and the airframe manufacturer. Before the first powered prototype was flown, glider versions were constructed in quantity and allocated to both Army and Navy flying schools.

When the first engine was ready for flight trials, J8M1s were sent to testing establishments of both services. The initial test made by the Navy on July 7, 1945 ended in disaster. Taking off on a wheeled trolley, the aircraft climbed under power to some 1,300 feet at an angle of 45°. Then the motor failed. The *Shusui* stalled and crashed. It was the same problem of engine cutting that had plagued *E.K.16* and *J.G.400* a year and more before. The Far East war ended before any other powered trials could be attempted.



(Above) The prototype Mitsubishi J8M1 Shusui (*Rigorous Sword*); and, (below) 'AM 210' an Me 163 B-0, further illustrated on page 72 but while still at R.A.F. Biggin Hill on November 24, 1964. This was a gift from the R.A.F. to their German partners in NATO and was later flown to Germany in a *Luftwaffe* *Noratlas*. (Photo: Reinhard Opitz)



## SPECIFICATION

Messerschmitt Me 163 B-O *Komet* Rocket-Fighter

### Dimensions

Span 30 ft. 6 in. (9.30 m.); length 18 ft. 8 in. (5.70 m.); height 8 ft. 2 in. (2.50 m.); wing area 210.97 ft<sup>2</sup> (19.60 m<sup>2</sup>); wheeled take-off trolley tyres 27.5 in. x 6.8 in. (700 x 175 mm.); retractable tail-wheel tyre 10.2 in. x 3.3 in. (260 mm. x 85 mm.).

### Crew

One in a non-pressurised cockpit. Access to the cockpit via a ladder placed against the port side of the nose. Aircraft fitted with a one-piece jettisonable sideways hinging canopy with a clear-vision panel over which air from a generator was bled in order to prevent condensation. Canopy opening to the right. The pilot's seat was fitted with a *Latscher* torsion spring and was of the bucket type to accommodate a seat parachute equipped with portable oxygen apparatus.

### Powerplant

One Helmut Walter Kiel Kommandogesellschaft HWK 109-509 A. A bi-fuel liquid rocket motor controllable in the static thrust range 220 lb. (100 kg.) idling to a maximum of 3,307 lb. (1,500 kg.). **Dimensions:** length 8 ft. 3½ in. (2.532 m.); height 2 ft. 5 in. (732 mm.); width 2 ft. 11 in. (900 mm.). **Weights** Motor 366 lb. (166 kg.); fuel system 441 lb. (200 kg.); control system 7 lb. (3 kg.); Total power plant weight 813 lb. (369 kg.). Full throttle specific fuel consumption 20 lb./lb. thrust/hr. (5.5 gram per kg./sec). Starting by external electric motor.

### Fuel

The Me 163 B-O carried two main propellant fuels code-named C- and T-*Stoff*. C-*Stoff* was a combination of 57% methyl alcohol, 30% hydrazine hydrate and 13% water. T-*Stoff* was hydrogen peroxide of 80% concentration. T-*Stoff*'s main property was as an oxygen carrier for combustion with methyl alcohol and hydrogen hydrate. A secondary function was to act as a generator of steam for a turbine pump unit. There were two fuel tank systems. The T-*Stoff* system consisted of a main fuselage tank with two reserve tanks in the cockpit either side of the pilot's seat. All C-*Stoff* was carried in four wing tanks. Two centrifugal pumps drove these separate systems. Potassium cuprocyanide was added to the C-*Stoff* to catalyse the T-*Stoff* and ensure spontaneous combustion of these fuels in the combustion chamber. Part of the hydrogen peroxide pump delivery (T-*Stoff* system) was passed over a catalyst of porous stones impregnated with calcium permanganate and potassium chromate in order to produce steam for use with a turbine driving the two main fuel pumps. From these pumps, high pressure C-*Stoff* circulated the double-walled combustion chamber as a coolant. It was then throttled by a control valve before being passed to atomising nozzles in the combustion chamber. Meanwhile, the main T-*Stoff* pump delivery to the same atomising nozzles was metered with a regulator operated by the C-*Stoff* pressure. After combustion of the fuels the gaseous products were expended through a convergent-divergent nozzle. Total fuel: C-*Stoff* 1,032 lb. (468 kg.); T-*Stoff* 3,417 lb. (1,550 kg.)

### Armament

Early examples of the Me 163 B-O (when armed) were equipped with two fixed forward-firing 20-mm. *Mauser* MG 151/20 cannon, one in each wing root. Loading fully automatic with breech mechanism. From the 47th. pre-production aircraft these were superseded by two fixed forward-firing 30-mm. *Rheinmetall-Borsig* MK 108 cannon, one in each wing root. Electro-pneumatic loading and triggering. 60 rounds per gun.

### Radio equipment

FuG 16 ZE. (with no homing device) transmitter, receiver, operating unit and remote control all located in a suspension frame in the nose cap. The antenna adapter and exciter loop were installed in the fin. Mast and high-frequency filter were in the fuselage. FuG 25 I.F.F. (Identification—Friend-or-Foe) transmitter and receiver equipment were placed in a suspension frame under the pilot's seat. The antenna wire and antenna adaptor were in the port wing.

### Electrical system

24 volts.

**Weights** (applies to Me 163 B-O with 2 x MG 151/20 armament). Empty 3,918 lb. (1,777 kg.); crew, fuel, oil and ammunition 4,790 lb. (2,173 kg.); maximum take-off weight 8,707 lb. (3,950 kg.); maximum landing weight 4,189 lb. (1,900 kg.); wing loading (at take-off) 42.84 lb./ft.<sup>2</sup> (209 kg./m.<sup>2</sup>); wing loading (at landing) 21.93 lb./ft.<sup>2</sup> (107 kg./m.<sup>2</sup>). Strength group—H 5.

### Performance

Maximum permissible speed at all heights from sea level (0 m.) to 39,372 ft. (12,000 m.), 559 m.p.h. (900 km./hr.); Landing flap limiting speed, 186 m.p.h. (300 km./hr.); Rotate speed at take-off, 174 m.p.h. (280 km./hr.); Best climbing speed, 435–447 m.p.h. (700–720 km./hr.); Approach speed, 137 m.p.h. (220 km./hr.); Landing speed (at 4,189 lb. - 1,900 kg.), 99 m.p.h. (160 km./hr.); Time of climb (including take-off run): 1.48 min. to 6,562 ft. (2,000 m.), 2.02 min. to 13,124 ft. (4,000 m.), 2.27 min. to 19,686 ft. (6,000 m.), 2.84 min. to 26,248 ft. (8,000 m.), 3.19 min. to 32,810 ft. (10,000m.), 3.45 min. to 39,372 ft. (12,000m.); Bale-out speed had to be kept below 248 m.p.h. (400 km./hr.) as otherwise the airflow prevented the canopy from jettisoning. \*Note: Service ceiling of the Me 163 B-O was limited by lack of pressure cabin. The Me 163 B V 14 was climbed to 49,543 ft. (15,100 m.) on December 12, 1944 with the pilot wearing captured American oxygen equipment.

Main source: *Baubeschreibung Me 163 B-O*, Messerschmitt A.G., Augsburg, August 1943.

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On July 2, 1965, the Deutsches Museum (German Museum) on the Museuminsel in Munich was presented with 'AM 210' suitably refurbished to represent a Me 163 B-0 of 7./J.G.400. Current German law prevents a swastika from being applied on the fin. Following the hand-over ceremony, Professor Willy Messerschmitt entertained a galaxy of former Me 163 designers, technicians, pilots and others connected with this wartime rocket-fighter at a reception organised by the aircraft company which bears his name to this day. (Photo: Messerschmitt-Bölkow-Blohm GmbH ref. I 13)

