

Luftwaffe Camouflage 1935-40

An Introduction to LUFTWAFFE CAMOUFLAGE & MARKINGS Vols 2 & 3



Alain Fleuret

LUFTWAFFE CAMOUFLAGE 1935-40

Alain Fleuret

Color paintings by Geoffrey Pentland

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INTRODUCTION

This publication is intended as a replacement for the Kookaburra title *Luftwaffe Camouflage & Markings* 1935-45 Vol 1, which was completed in 1972 and published the following year, but which has now been out of print for some time. When first released, this same book provided a very useful survey of the subject for the period from 1935 until early in 1940. By 1981, however, much of this information had already appeared many times in a variety of books and magazines to the point where it had almost become universal knowledge for those interested in the subject and thus rather pointless for it to be reproduced yet again at the expense of completely new material.

It seemed, therefore, that a fresh new approach was justified in the form of a totally different book, not merely a reprint of a previous one which, as a result of recent discoveries, some would now consider to be slightly dated. This new presentation, it was felt, would permit the publication of a vast amount of fascinating original material offered by enthusiasts over recent years. At the same time it would make possible the correction of a number of small errors in the earlier work, amongst them the correct identification of the widely used colors brown 61, green 62 and grey 63.

Since Volume 3 of *Luftwaffe Camouflage & Markings* appeared, persistent requests have been received from readers all over the world for further information, especially for more good modelling subjects. This resulted in the publication of *The Modeller's Luftwaffe Painting Guide* together with its facsimile color chart of 30 hand-mixed colors. That also was a great success and demonstrated the fascination which the serious study of color holds for many people.

It was evident, however, that even this was not enough and that many readers were still curious about the colors of *Luftwaffe* aircraft during the relatively little-known period of 1935-40. It was only natural that there should have been some misgivings at this point. Had the subject become exhausted from an interest point of view? In an overall sense this appeared not to be the case, for whilst many of the more experienced *Luftwaffe* enthus-

iaists were understandably turning toward new areas, there was no doubt that an entirely new generation of modellers still remained to be satisfied. Indeed, the overall consensus of opinion seemed to be that as long as fresh information continued to appear, it should be published. There were evidently many paths and byways of this large and complex subject still untrodden by the feet of the serious investigator.

As a result of examining so much of this new material, which included well over two thousand unpublished photographs, it has now been possible for the author, an expert on *Luftwaffe* aircraft color schemes for many years, to offer a number of illuminating insights and some gently provocative surprises in keeping with the traditions of Kookaburra's research methods. These included the exciting discovery of an NSFK chart which revealed for the first time the colors of German gliders of the mid-thirties, a complete chapter on the gliders on which so many *Luftwaffe* aircrews were trained, evidence of the introduction of a new standard fighter scheme as early as the winter of 1939-40, an explanation of the long-standing mysteries of transport aircraft markings, and the resolution of a number of difficulties relating to the intriguing Battle of Britain period. Concerning the latter, the chapter is presented as a complementary account to the one which has already appeared in *Luftwaffe Camouflage & Markings* Vol 2, and is all the more fascinating through having been written a little more recently from a totally different perspective on the opposite side of the Channel, from where the air offensive against Great Britain originated.

Although the quality of a few of the rarer early photographs may leave a little to be desired due to the limited range of material available, it is nevertheless hoped that this book will contribute to the reader's further enjoyment and provide a worthy up-to-date introduction to the now universally popular *Luftwaffe Camouflage & Markings* series.

The Publishers.

ACKNOWLEDGEMENTS

The author is extremely grateful to the following individuals who kindly contributed valuable photographs from their private collections or assisted in other helpful ways.

Special thanks are due, however, to gliding enthusiasts Christopher Wills, Peter Selinger and Martin Simons who, between them, helped make possible the inclusion of much new information in the very neglected area of pre-war German sailplanes and gliders.

I trust that my other helpers, listed in alphabetical order, will also accept my sincere thanks: Giorgio Apostolo, Bernd Barbas, Olivier Bonnefoy, M. Bonino, Siegfried Borzutski, Rick Chapman, James V. Crow,

Hermann Dorner, H-J Fieguth, Jean Bernard Frappé, Peter Heck, Mitter Imre, Jean Yves Lorant, Patrick Loreau, Richard P. Lutz Jr, Ted Malsem, the Musée de l'Air, Rainer Niedrée, Michael Payne, Geoff Pentland, Peter Petrick, Alfred Price, Karl Ries, Günther Sengfelder Archiv Schliephake, Frank Smith, J. Richard Smith and Paul Stipdonk.

It is often difficult to identify photographic sources going back over forty years and if any credits have been overlooked, I trust I may be forgiven for the omission.

Alain Fleuret
Iteuil, France
1981

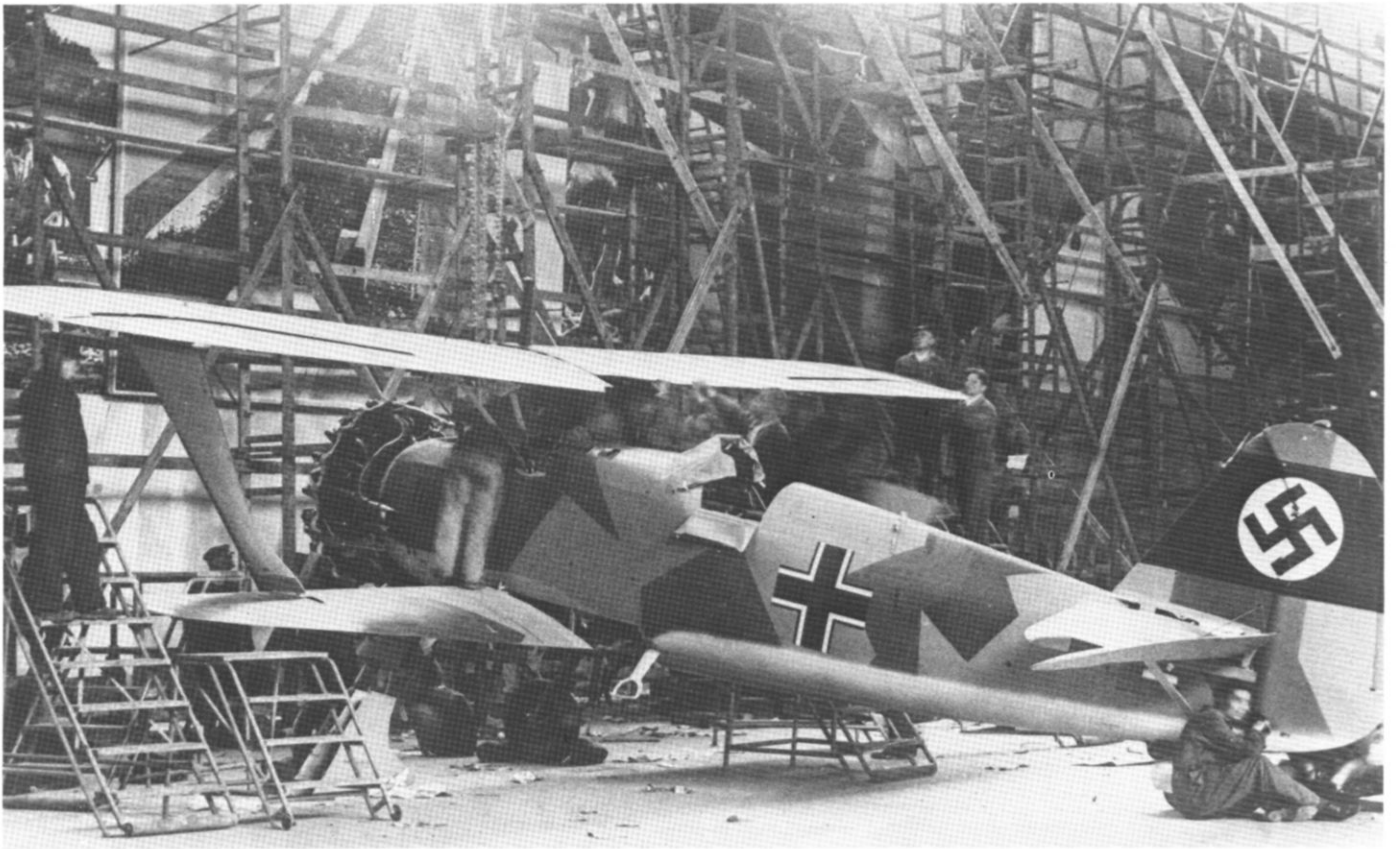


Upper. Good photographs of *Luftwaffe* aircraft serving in weather units are rare. Unfortunately the code of this Dornier Do 17P is not known but its emblem followed by the words *Wetter Flug Rhein-Main* (Rhein-Main Weather Unit) is of interest. The aircraft had standard 70/71/65 camouflage with black-green propeller blades and spinners. *Uffz* Jakob Mitschke was seated in the centre. The photograph was taken in 1939. Lower. Waiting for action. This Heinkel He 111 of the ninth *Staffel* of III./LG I had quite battered camouflage after only a few weeks of operations, suggesting that the dark green 71 especially may not have been of a very high quality in 1939. Its yellow spinners indicated the third *Gruppe*. The fuselage and lower surfaces of the wings wore old-style crosses and the large exhaust marks are very obvious.



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Upper. Assembling a very new Henschel Hs 123 for a display in Berlin in 1937 at an exhibition which illustrated well the emergence of the new *Luftwaffe*. The standard four-color scheme was used here but no individual markings had been added at this stage. The exceptionally pale tone of the light-colored areas — much lighter than any known official RLM color — is noticeable here. As indicated in the main text, the true shade of this color has yet to be established beyond reasonable doubt. Lower. This Heinkel He 60 coded S6+C30 flown by the German aviator Steining established a new world altitude record for seaplanes, climbing to 6,000 metres (23,600 ft). The aircraft, of FFS (See) Stettin, wore the usual RLM grey 02 finish with 01 clear lacquer on both floats. The photograph was taken on 23rd May 1937.





This photograph, taken at Neuhausen in 1935, shows Gefr. S. Schonau posing alongside a nicely maintained Focke-Wulf Fw 44 *Stieglitz*. The aircraft was the usual overall silver with blue fuselage upper decking. A tiny red cross was painted on a small white disc just above the second letter of the registration and it will be noted that the red tail band did not quite reach the leading edge of the fin. The blue-tipped pale grey propeller blades carried the black stylised eagle emblem of the manufacturers. The fabric covered wheel spokes were black.

CHAPTER 1

A NEW LUFTWAFFE

Not long after his seizure of power on 30th January 1933, Adolf Hitler began pursuing his declared aim of rebuilding the *Wehrmacht* as an instrument of foreign policy. He constantly worked toward the abolition of the Treaty of Versailles and creating in the Allied signatories a sense of guilt at its harsh provisions, which included a 60-year period of reparations.

As early as 1919 a number of officers of the old Imperial German Air Service, frustrated by the restraints of Versailles, had begun to organise an aviation revival. Civil aviation had not been entirely prohibited and the DLV or *Deutscher Luftfahrt-Verband eV* (the German organisation of flying clubs), founded in 1922, started using former military pilots as instructors. From that early period, model building and gliding became the nucleus of the new movement, both these activities receiving considerable state aid for many years.

When the prohibition on aircraft construction was lifted in 1922, three large German airlines dominated the scene and developmental flights to many places were being undertaken. In April 1925 the *Deutsche Verkehrsfliegerschule* or DVS (the school for German commercial pilots) was set up at Berlin-Staaken airfield and in 1927 and 1929 further schools for pilots were established at Braunschweig, Schleissheim and Warnemünde. There could be little doubt about the eventual military implications of this training, especially as it concerned navigation, long-distance flights, and blind flying.

High on Hitler's list of priorities was the rapid but concealed expansion of a new *Luftwaffe*, and at a cabinet meeting on 9th February 1933, the colossal sum of forty million reichmarks was made available for the development of aviation. It was realised that only a predominantly bomber force would be capable of deterring Germany's neighbors from interfering with this ambitious operation and as the whole illicit re-armament program was to be in defiance of the Versailles agreement, the period of greatest risk would be during the actual build-up.

No industry in Germany had ever seen an explosion of energy like the one which was to follow over the next few years. Before 1933 the entire German aircraft industry had employed less than four thousand people, but by the end of that same year a workforce of two million was being employed on factory construction and airfields alone. A whole new system of landing grounds, ground control stations, barracks and flying schools was initiated in a great flurry of activity. The time factor was of paramount importance owing to the enormous risk of provoking other nations in the process. The evidence of construction was to be seen all over Germany; it was impossible to hide the fact that a secret air force was being established as a third service to rival the army and navy.

At this time a great variety of new aircraft types was being improved, built, or tested. These included the Junkers Ju 52 airliner which doubled as a bomber or

transport, the Heinkel He 51 biplane fighter, the Dornier Do 11 bomber and the tactical reconnaissance Heinkel He 45 and He 46. New training types such as the Focke-Wulf Fw 44 and Arado Ar 66 were built whilst more lethal and modern bombers were being developed in the Dornier Do 17, Junkers Ju 87 and Heinkel He 111.

The architect for this huge expansion program was the energetic Erhard Milch, state secretary for the newly formed Air Ministry, under Hermann Goering as Minister. The target was a force of 600 front-line aircraft which was to include nine bomber wings, including a substantial contribution from Lufthansa. The program had to be carried out under camouflage as Milch stated on 25th July 1933, "to make it impossible for foreign powers to prove actual violations of our existing foreign commitments ... or of the actual size and organisation of the *Luftwaffe* we are founding."

By January 1934 the planned output had been increased to 525 bombers, 120 fighters and 127 other types *per month*, the real intent being to obtain air parity with France. By the following year Hermann Goering was ordered to 'uncamouflage' the new air force and to avoid in the process any measure likely to draw public comment.

On 10th March 1935 *Reichminister der Luftfahrt* Goering gave an interview to the "Daily Mail" announcing the creation of a new third arm of the *Wehrmacht*. Born in secret, the *Luftwaffe* was now a grim reality and boded ill for hopes of peace in Europe. This violation of the Versailles Treaty and the introduction of conscription a few days later marked the most critical period when intervention by the Allies would have had shattering consequences for a Germany ill-equipped for war. Despite all the propaganda, there was a lack of properly trained aircrew and of the 800 front-line aircraft types available, many were still in training schools and unfit for combat. The period of crisis passed quietly with almost no reaction from other governments, although the RAF commenced a period of significant expansion in order to meet any threat. The big gamble had succeeded.

The earliest markings system for German aircraft, introduced after WW I, had consisted of a letter D for *Deutschland* followed by a simple number. There were no particular rules for finishing aircraft, which were usually to be seen with doped and varnished fabric, painted plywood parts and natural metal panels.

From 6th July 1933, however, new tail markings were introduced, those on the starboard side consisting of three horizontal bands in the colors of the German flag, black white and red with the black uppermost. Another innovation was the use of the swastika emblem of the Nazi Party, a symbol which was later to carry such sinister and chilling overtones throughout Europe and the world. The black swastika on a white disc was provided with a red horizontal band as background. Initially the port and starboard insignia were restricted to the rudder but after a few months both were enlarged and extended across the rudder and fin also.

The actual swastika itself, of ancient origin, is believed to symbolise the explosive energy present at the creation of the universe, the arms of the crooked cross representing the tails of four whirling planets. Hitler, in *Mein Kampf*, characteristically claims that the swastika flag was his own idea, but in actual fact the dentist Friedrich Krohn had designed it for the inaugural meeting of a local National Socialist Party group in May, 1920. Hitler's skill lay in his early exploitation of its symbolic

magic and ordering that it should be raised to the status of a party emblem. The use of the flag's blood red background was in itself a provocative affront to his bitter enemies the Communist Party, whose use of the same color had been traditional.

April 1934 saw another and more extensive change in aircraft registrations. The old civilian numerical marking system was gradually replaced by a new one which retained the letter D but now used four letters in place of numbers. It was now possible to deduce from its registration group certain information about the aircraft itself, as follows:

LANDPLANES:

Class	Registration Group	Personnel and Weight
A1	D-Y...	1 person, all-up weight 500 kg
A2	D-E...	1 to 3 persons, all-up weight 1,000 kg
B1	D-J ...	1 to 4 persons, all-up weight between 1,000 and 2,500 kg
B2	D-O...	1 to 8 persons, all-up weight between 2,500 and 5,000 kg
C	D-U...	Single-engined
	D-A...	Multi-engined
		All-up weight in excess of 5,000 kg

SEAPLANES:

A1	D-Y...	1 person, all-up weight 600 kg
A2	D-E...	1 to 3 persons, all-up weight 2,200 kg
B	D-I ...	1 to 4 persons, all-up weight 5,000 kg
C	D-A...	Multi-engined, all-up weight in excess of 5,500 kg

There are, incidentally, few known examples of aircraft with the registration D-J..., as most aircraft in this group wore registrations in the D-I... range.

The other three letters of each group were allocated in simple alphabetical sequence from AAA to ZZZ, the various registration blocks consisting of the following:

D-YAAA to D-YZZZ
D-EAAA to D-EZZZ
D-IAAA to D-IZZZ
D-OAAA to D-OZZZ
D-UAAA to D-UZZZ
D-AAAA to D-AZZZ.

Registrations in the D-I... group were reserved for experimental aircraft, those which would form the clandestine organisation of the future *Luftwaffe*. An example of this practice was the first Arado Ar 65 which was delivered to the *Reklamefliegerabteilung* (Flying Publicity Department), based at Berlin-Staaken in the autumn of 1933. It had the registration D-IAAA applied to both sides of the fuselage, the upper surfaces of the top wings and the lower surfaces of the bottom wings. All lettering was black so as to provide an effective contrast with the all-silver finish.

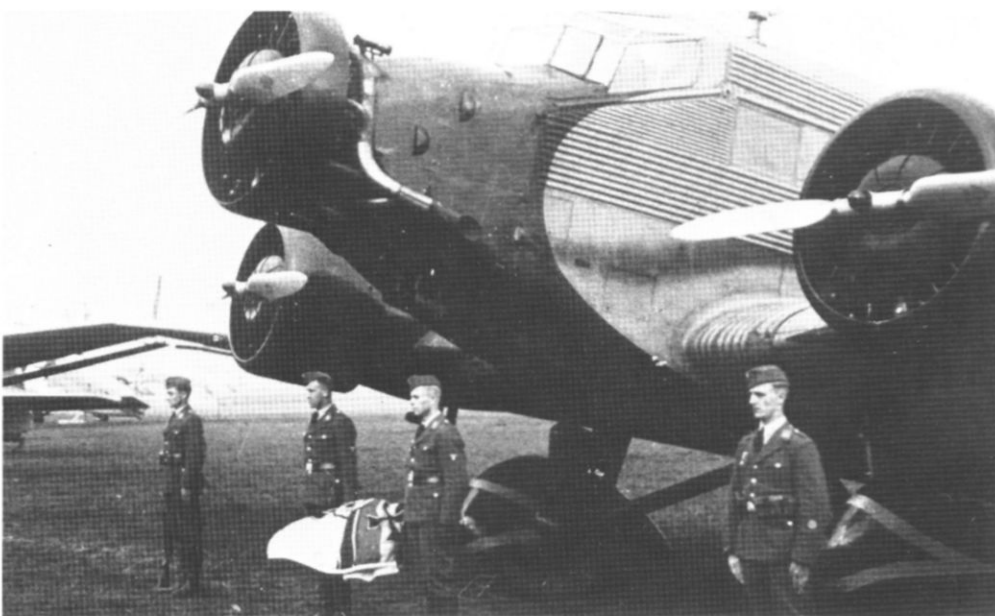
An example of this practice on a Heinkel He 72 between September 1935 and June 1936 was as follows:

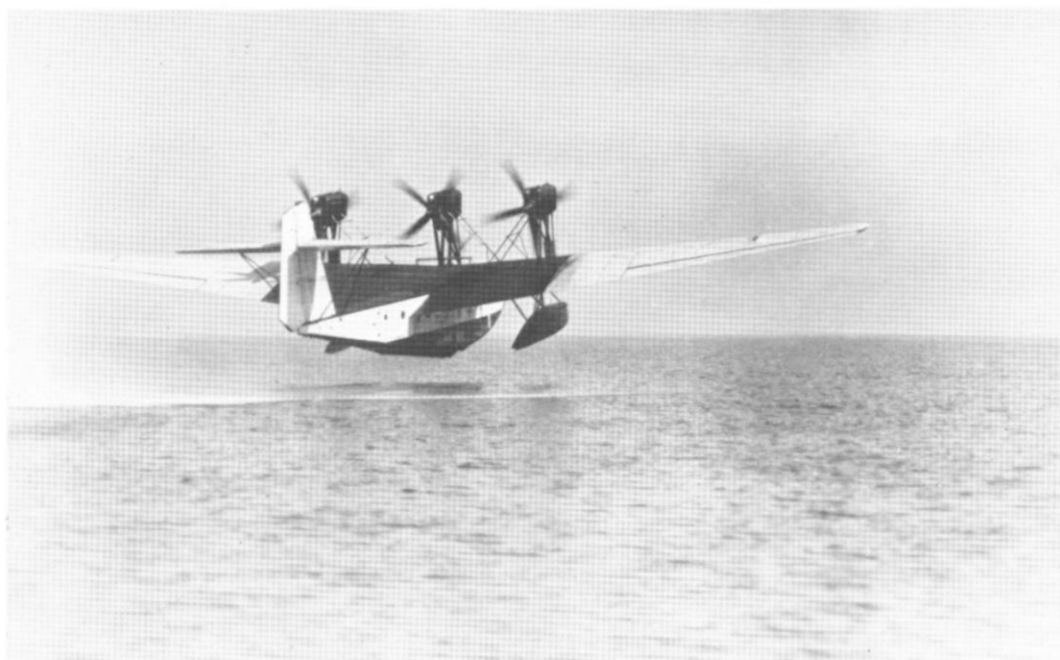
(Please turn to Page 14).

On this Heinkel He 60, illustrated in color on Page 17, an individual number was added within a simple black outline. The aircraft bore the usual overall RLM grey 02, except for the floats. Owing to the curious lighting effect, the sides of the floats appear to be dark whereas they were actually clear varnished over natural metal.



Adolf Hitler was fond of creating dramatic effects and in true Wagnerian style often stage-managed solemn ceremonies down to the last detail. On 3rd March 1935 the *Fliegerschule Fassberg* (actually I./KG 154) became *Geschwader Boelke* based at Fassberg with Dornier Do 11s and Junkers Ju 52s. These two photographs depict part of the official ceremony, the black-nosed Junkers aircraft having greenish-grey 63 finish and stylish wheel spats. Hitler is on the extreme left in the lower shot.





In January 1926 Deutsche Luft Hansa (then two words) was formed, using mainly Junkers F 13s plus other landplanes and flying boats like the Rohrbach Romar. The last design of Adolph Rohrbach, the airliner had no registration letters at all, simply its own type name and that of its owner in black on the nose. It had white fuselage sides and wings. Some eye witnesses of the time stated that the dark color on the upper fuselage and hull was blue, a color often used on the Junkers F 13.



Delivered to Lufthansa in early 1934, these three Heinkel He 70Ds inaugurated the so-called lightning routes between Berlin, Hamburg, Cologne and Frankfurt in June 1934. Given the bird names *Schwalbe*, *Habicht* and *Falke* respectively, D-UGOR, D-UDAS and D-UBAN were painted pale grey overall with the well-known black Heinkel nose trim and lightning flash. Small variations are noticeable on the red band on the tail, the small lettering on the rear fuselage, and the DLH emblem above the swastika.

This rare photograph shows an obsolete Albatros L 101 at Danzig airfield. It is an especially interesting shot for the registration code was repeated under both wings as prescribed for the old style of numerical registration. All wing and tail struts were black and the anti-glare upper decking was blue. The propeller boss was probably the usual light brown wood color, the wheel spokes being covered with black fabric.



This shot, taken at Döberitz during 1935, shows an Arado Ar 65 of I./JG 132 *Richthofen* in either pale grey or greenish-grey 63 finish and wearing civil registration in conjunction with National Socialist markings on the tail. The identity of the nearest aircraft was D-IXIN.



Taken at a parade at Staaken airfield to celebrate Hitler's 46th birthday on 20th April 1935, this shot shows pale grey Heinkel He 51s, silver-painted Arado Ar 65Fs and several Junkers Ju 52s in the background. The registration of at least two of the Arados showed black figures, not letters. The Junkers on the left, D-2600, was Hitler's personal aircraft.



LUFTWAFFEN RESERVE 5 (MÜNCHEN)	Owner
RÜSTGEWICHT: 535KG.	Empty weight
ZULADUNG: 365 KG.	Payload
FLUGGEWICHT: 900 KG.	Flyable weight
HÖCHSTZUL. PERS. ZAHL: 2	Max. number of persons
LETZTE NACHPRFG:	Last overhaul
NACHSTE NACHPRFG:	Next overhaul

On 1st June 1936 an important change was introduced and from that time a new military registration system took the place of the old five-letter block concept. It was based on the organisation of the new *Luftwaffe* which was divided into six *Luftkreiskommandos*, or local air commands, with headquarters at the following locations:

Luftkries I	Königsberg
Luftkries II	Berlin
Luftkries III	Dresden
Luftkries IV	Münster
Luftkries V	München
Luftkries VI	Kiel (sea-based aircraft).

Each *Luftkreiskommando* consisted of a *Geschwader* divided into three *Gruppen*, each of these in turn being divided into three *Staffeln*. It was possible to identify an aircraft's origin from the combination of figures and letters painted on each side of the fuselage, above the wings, and below the wings. Examples of this manner of presentation will be seen in various photographs and color paintings. This new registration system indicated the following information:

- 1st figure The number of the *Luftkreis*.
 - 2nd figure The numerical sequence of the *Geschwader* within the *Luftkreis*.
 - Letter The aircraft's individual code.
 - 3rd figure The number of the *Gruppe* within the *Geschwader*.
 - 4th figure The number of the *Staffel* within the *Gruppe*.
- To quote one example, the He 51 coded 21+D11, illustrated in color on Page 35, can be identified as follows:
- 2 *Luftkreiskommando II* at Berlin, where nearly all fighters were based.
 - 1 The first *Geschwader* within the *Luftkreis*.
 - D Aircraft D within the *Staffel*.
 - 1 The first *Gruppe*.
 - 1 The first *Staffel*.

For security reasons the identity of the *Jadgeschwader*, in this case I./JG 132, was not revealed.

In a slight variation of the same system, seaplane units, without enough aircraft to complete an entire *Geschwader*, had their unnecessary second figure replaced by 0.

Thus the code of a typical Dornier Do 18, 60+E52 of 2./Kü Fl Gr 506, illustrated on Page 19, indicated the following information:

- 6 *Luftkreiskommando VI* at Kiel.
- 0 No significance.
- E Aircraft E within the *Staffel*.
- 5 The fifth *Gruppe*.
- 2 The second *Staffel*.

A handy short-cut method of identifying all *Küstenfliegergruppen* aircraft is to ignore the aircraft's individual letter and simply read the rest of the code backwards. This figure and letter coding system only applied to operational aircraft. Details for the separate method of identifying training aircraft are provided in Chapter 5.

Perhaps the most important innovation in June 1936

was the introduction or rather re-introduction of the *Balkenkreuz* similar to the black and white cross employed during the closing weeks of WW 1. The use of these crosses was to continue until the end of the war in Europe in May 1945, albeit with minor variations, but always in the same basic locations on the aircraft.

The black paint of the new registration code was designed to contrast strongly with the background color in which most operational aircraft were required to be delivered from factories. Until 1937 this color was overall greenish-grey 63. Dornier Do 23 and Do 23G bombers, however, were delivered in silver. Amongst other exceptions were the Arado Ar 68, Heinkel He 70F, these being painted in a somewhat lighter shade of grey or greenish grey which is still the subject of further investigation.

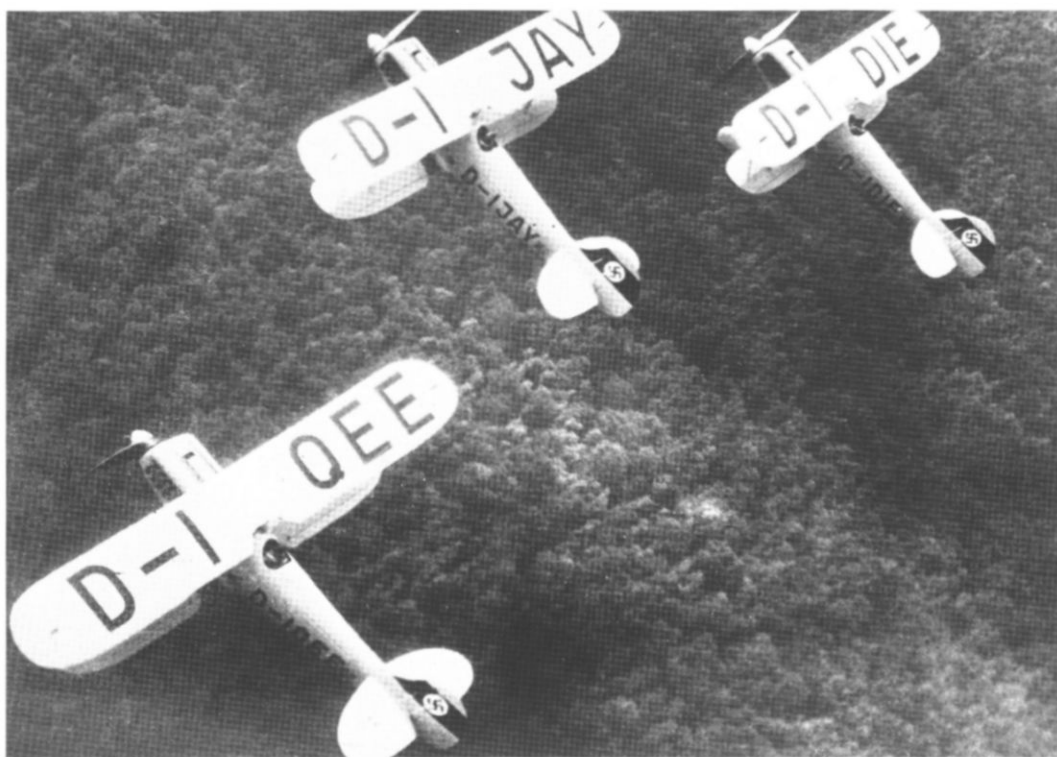
The theory has been put forward by one published source that many German military aircraft of this period were painted in a reputedly civilian color "63 lichtgrau", but how this name and number designation for a non-military color was arrived at is still rather vague. No documentation has been offered to support the use of this particular number and name association and in the RLM's own LDv 521/1 color chart, color 63 is in any case referred to as *hellgrau*. This was a term somewhat at variance with the names listed in the contemporary documents of some paint manufacturers, an irregularity which rather tends to confuse the issue for it is not at all clear if they refer to the same thing. That there was a pale grey color in use during the early 'thirties on both civil and military aircraft has never been in dispute and is verified time and again by photographs. The questions yet to be settled, however, are whether or not it was a whitish grey or a greenish-grey, or as a further possibility, that there may have been two shades which were interchangeable. (For clarity of description, the schemes provisionally identified in the captions are referred to as pale grey and greenish-grey 63 respectively).

From early surviving documentation, it is now also fairly clear that the greenish-grey camouflage color 63 was in effect the same color as RLM grey 02, having been redesignated under a new system of standardising the identification numbers of various paint manufacturers to a universal RLM stores system. A small correction and explanation is therefore necessary to the 30-color chip chart included in The Modeller's *Luftwaffe Painting Guide*, a supplement to this series. It is simply that the color 63 *hellgrau* should be identical in hue to 02 *RLM-grau*; however the actual shade of the former is still a good representation of the pale grey color used on many aircraft of this period such as the Heinkel He 51, Arado Ar 68 and, later, the Henschel Hs 123, Heinkel He 111 and Dornier Do 17. Photographs of these types certainly show a much lighter tone than would have been the case for greenish-grey 63, and probably the full story has yet to be told.

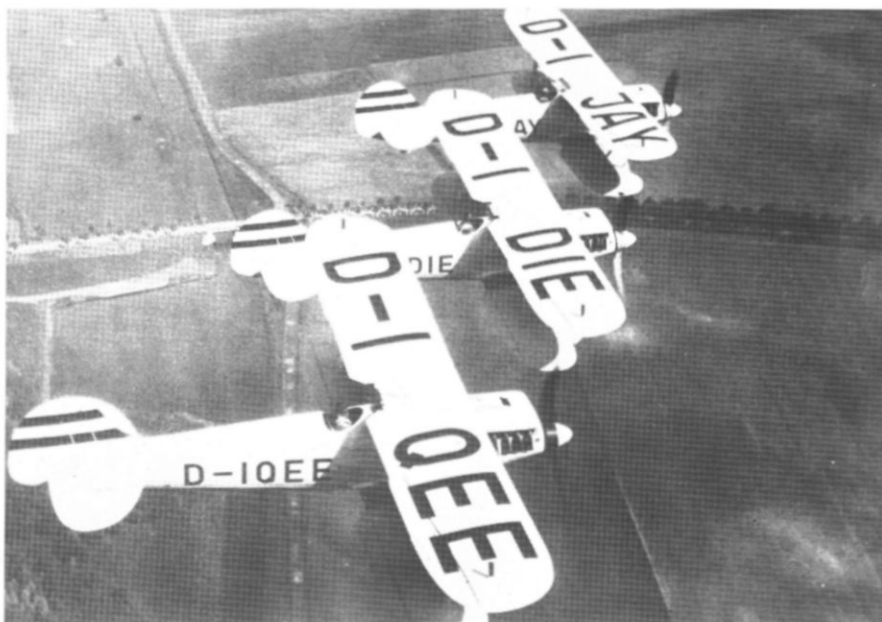
As early as March 1935, some operational units were given the name of famous heroes. The first was the old *Reklamestaffel Mitteldeutschland* (or central German propaganda squadron) renamed JG 132 and awarded the name *Richthofen* in the presence of the *Führer* on 28th March 1935. After the famous German ace of WW 1, who often flew a red aircraft, the group now became associated with the color red. The dive-bombing unit I./162 received the name *Immelmann*. I./KG 154 was named after Oswald Boelke whilst another fighter unit,

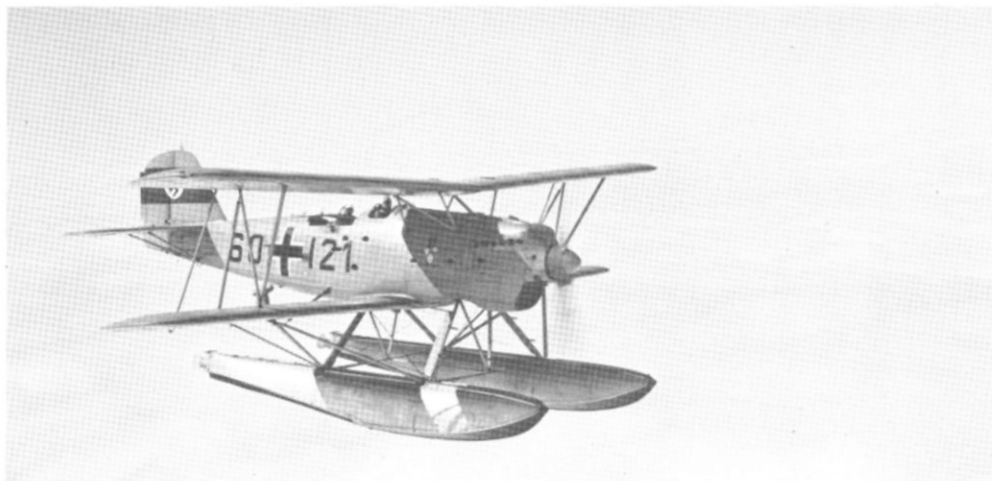
(Please turn to Page 16).

This Arado Ar 65 of JG 134 *Horst Wessel* appears to have been painted greenish-grey 63. It carried the usual information on the rear fuselage just behind the registration. The dark area in front of the cockpit was a black anti-glare panel and for the same reason, the rear surfaces of the propeller were similarly treated. The dark line from the cockpit door to the tail indicated a badly fitting upper fuselage decking.



Upper and right. Oversized registration letters were used on the wings of these Heinkel He 51s which in these two photographs are seen wearing the second registration system with five-letter combination. This type of fighter was usually delivered in glossy pale grey finish. The propellers were black and it will be noted that the markings on each side of the fins and rudders were different. On the starboard side from top to bottom the bands were black, white and red.





A fine shot of a very attractively turned out Heinkel He 60C of 1.(Aufkl)/Kü Fl Gr 206 from Nordeney, photographed in August 1935. The code, 60+121, was shown in the usual color, black, and the red, white and black National Socialist markings were carried over the fin and rudder. Camouflage was the usual RLM grey 02 with the floats treated with silver 01 and clear lacquer for added protection against salt water corrosion. The *Staffel* emblem, consisting of a tumbler and three dice, was carried on both sides of the fuselage.

JG 134, was given the name *Horst Wessel* and adopted the brown color of the *Sturm Abteilung* (the SA). The remaining color allocations were follows:

JG 131	Black
JG 232	Green
JG 233	Blue
JG 234	Orange

In some cases, particularly with the Heinkel He 51s of JG 132 and JG 134, when the application of the *Balkenkreuze* used up the maximum available depth on the fuselage and the full chord of the wings, an oversized effect resulted, even though the correct proportions were used. In addition, due to the limited space on each side of the fuselage cross, it was necessary to relocate the cross further aft on the starboard side than on the port side. On the upper surfaces of the wings the codes were grouped in a somewhat unusual manner, being equally spaced across the wing between the two *Balkenkreuze*. For quite some time these two fighter groups were apparently untroubled by their rather incongruous markings. In any case, due to the difficulties encountered with rapid air-to-air identification during practice combats, not long

afterward it was found necessary to abandon the whole rather cumbersome system.

Soon after the introduction of these new markings, a small revision was made to the style of the *Balkenkreuz* and the narrow white borders received a very thin black outline to sharpen the contrast between the white of the cross and the pale grey finish on these aircraft.

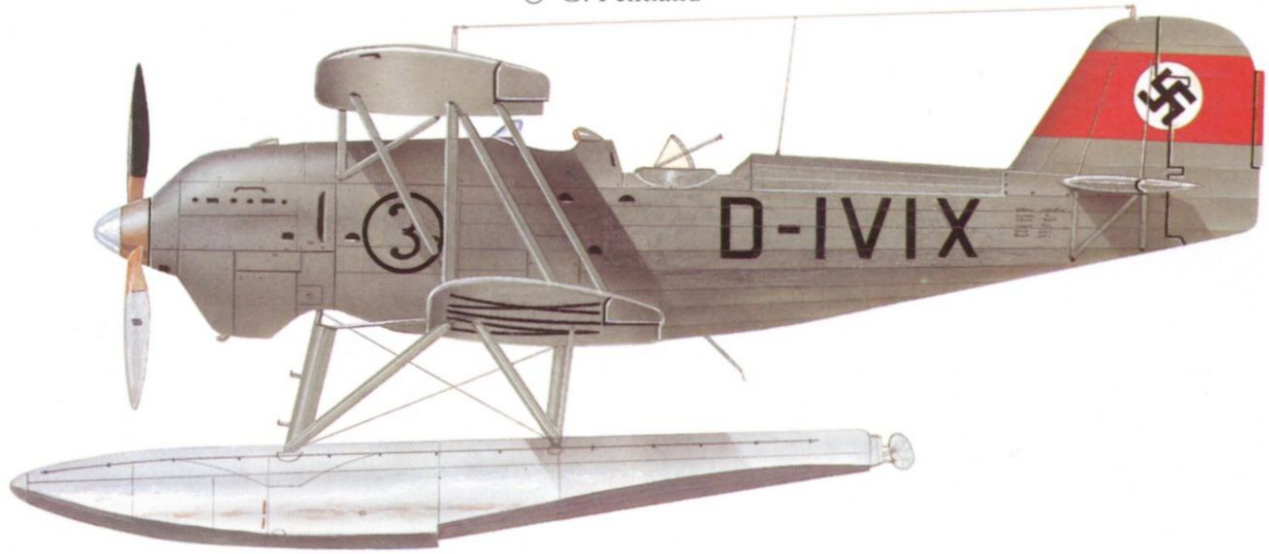
On 2nd July 1936 the *Luftwaffe Amt*, seeking further improvement, issued a directive which changed radically the coding of fighters. From 1st September 1936 the identification of fighters was to be based on new combination of colors, symbols, and numbers, as follows:

One color	To identify the <i>Geschwader</i> .
Two symbols	To identify the <i>Gruppe</i> and the <i>Staffel</i> .
One number or symbol	To identify the aircraft within the above units.

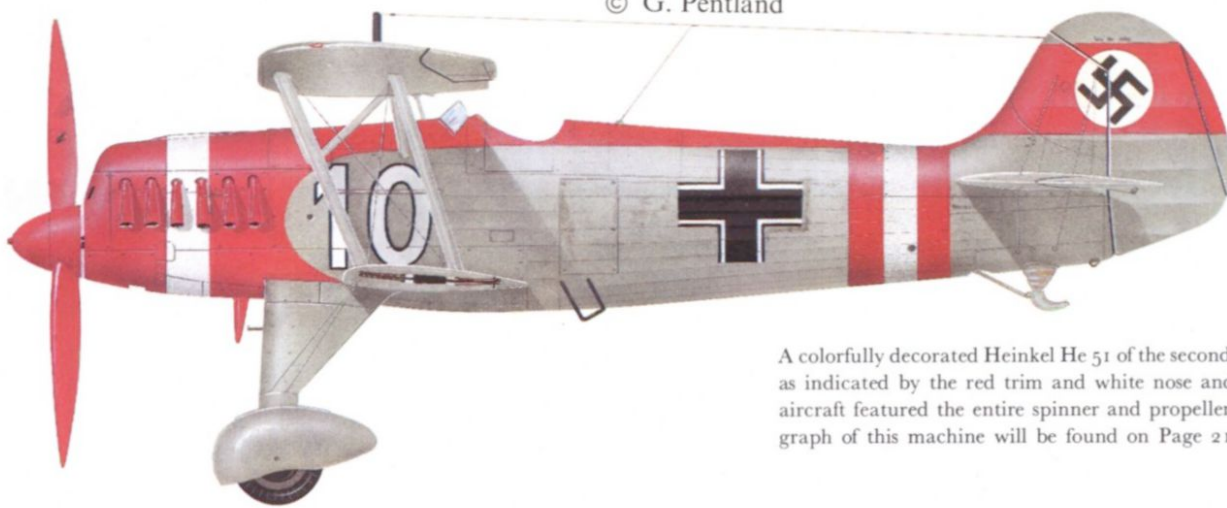
With only small modifications this system was used successfully by the *Luftwaffe* throughout the whole of WW 2. The table in the Appendix on Page 139 sets out the structure of a *Geschwader* and how it employed the above system on its aircraft.

Overall pale grey paint was used on this Arado Ar 68E of JG 134 *Horst Wessel*, based at Wiesbaden in 1937. The lack of any markings other than the individual black-outlined white 6 indicated the aircraft belonged to the first *Staffel* and first *Gruppe* of the *Geschwader*. The black areas on the wheel spats served as footsteps, the dark panel on the port one being simply an inspection door.

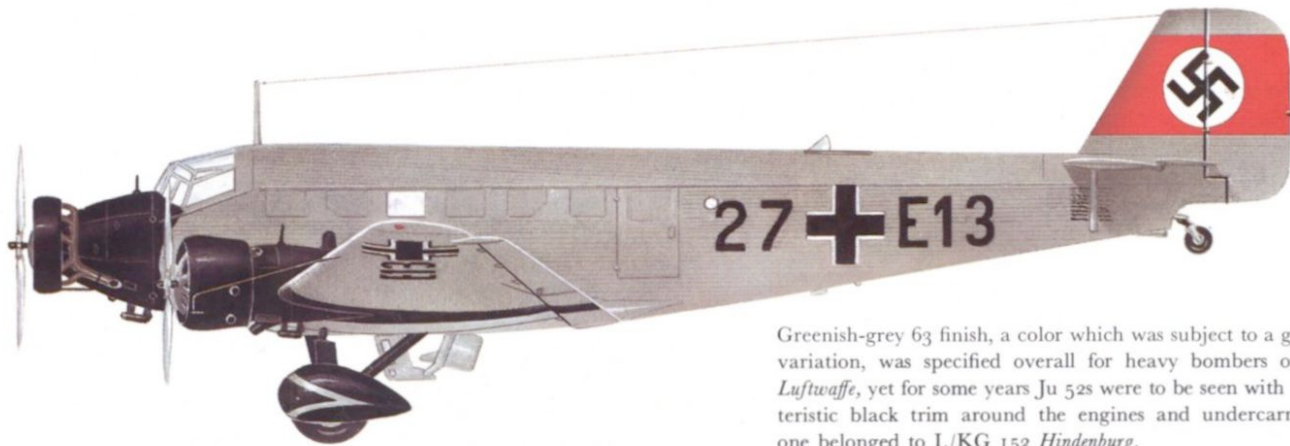




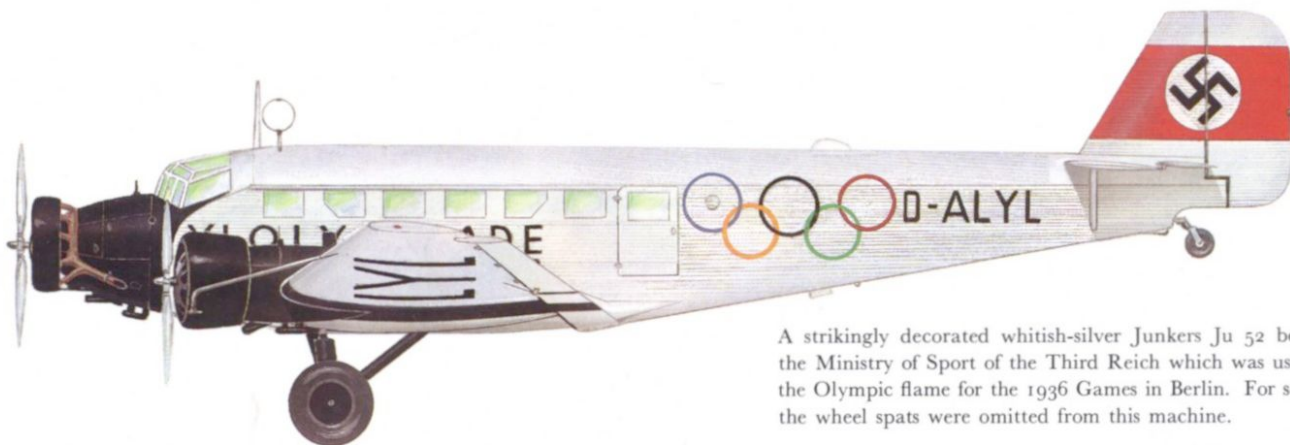
This Heinkel He 60 shows the earliest style of identification markings in use during 1935, consisting of a simple five-letter civil registration code. In this case the machine's individual identification number, 3, was shown within a thin black circle. Photographs do not shown whether or not it was used on the undersurfaces of the bottom wing. The color scheme was overall RLM grey 02 except for the silver painted floats which were then treated with clear lacquer.



A colorfully decorated Heinkel He 51 of the second *Staffel* of I./JG 132 as indicated by the red trim and white nose and tail bands. This aircraft featured the entire spinner and propeller in red. A photograph of this machine will be found on Page 21.

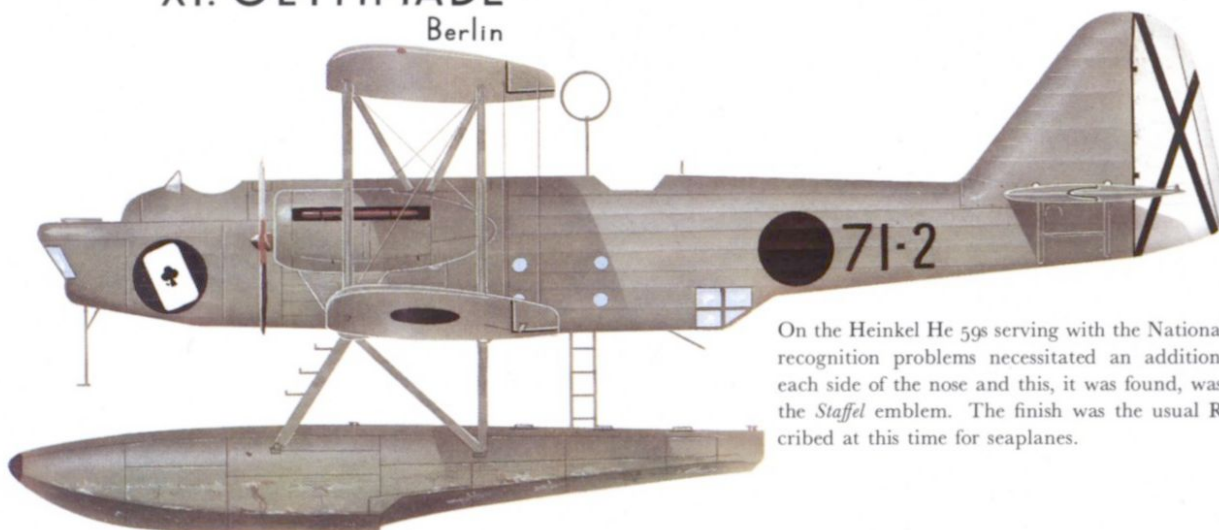


Greenish-grey 63 finish, a color which was subject to a good deal of variation, was specified overall for heavy bombers of the early *Luftwaffe*, yet for some years Ju 52s were to be seen with the characteristic black trim around the engines and undercarriage. This one belonged to I./KG 152 *Hindenburg*.

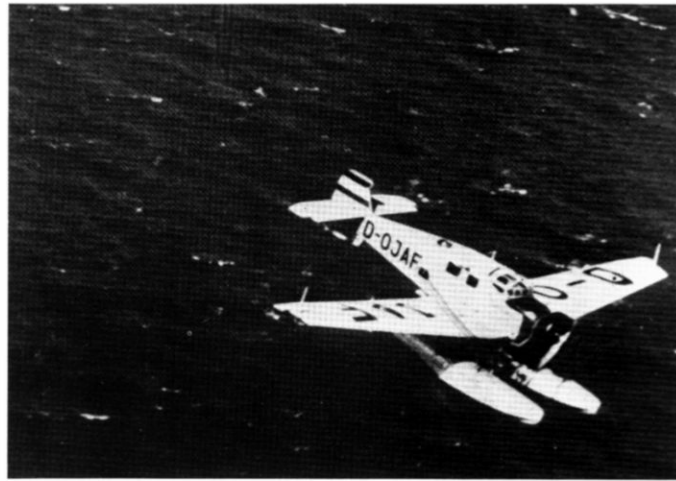


A strikingly decorated whitish-silver Junkers Ju 52 belonging to the Ministry of Sport of the Third Reich which was used to carry the Olympic flame for the 1936 Games in Berlin. For some reason the wheel spats were omitted from this machine.

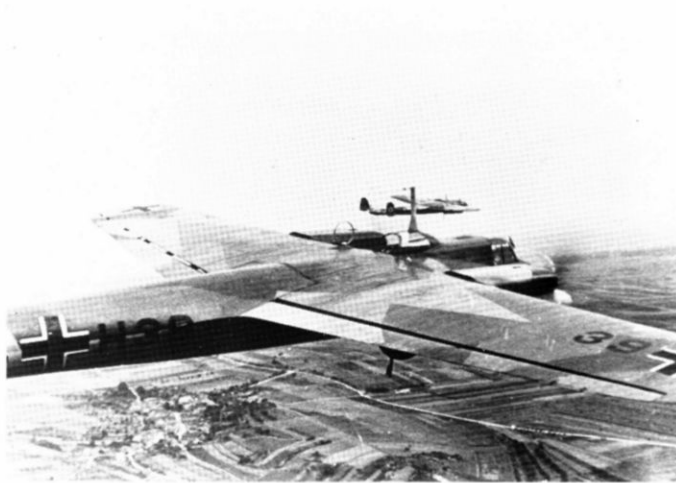
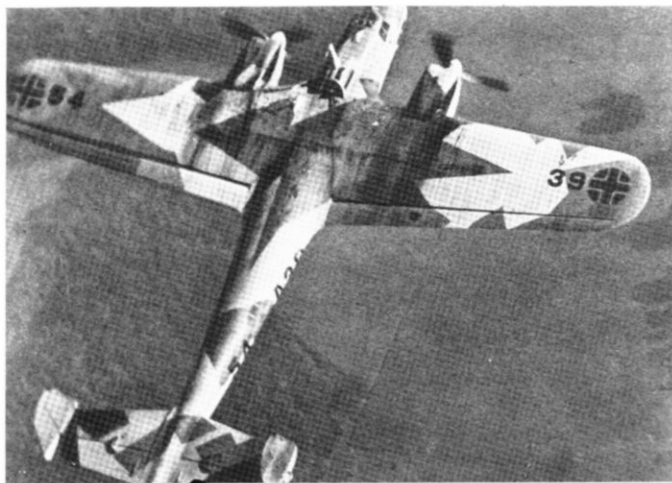
XI. OLYMPIADE Berlin



On the Heinkel He 59s serving with the Nationalist forces in Spain, recognition problems necessitated an additional black band on each side of the nose and this, it was found, was an ideal place for the *Staffel* emblem. The finish was the usual RLM grey 02 prescribed at this time for seaplanes.



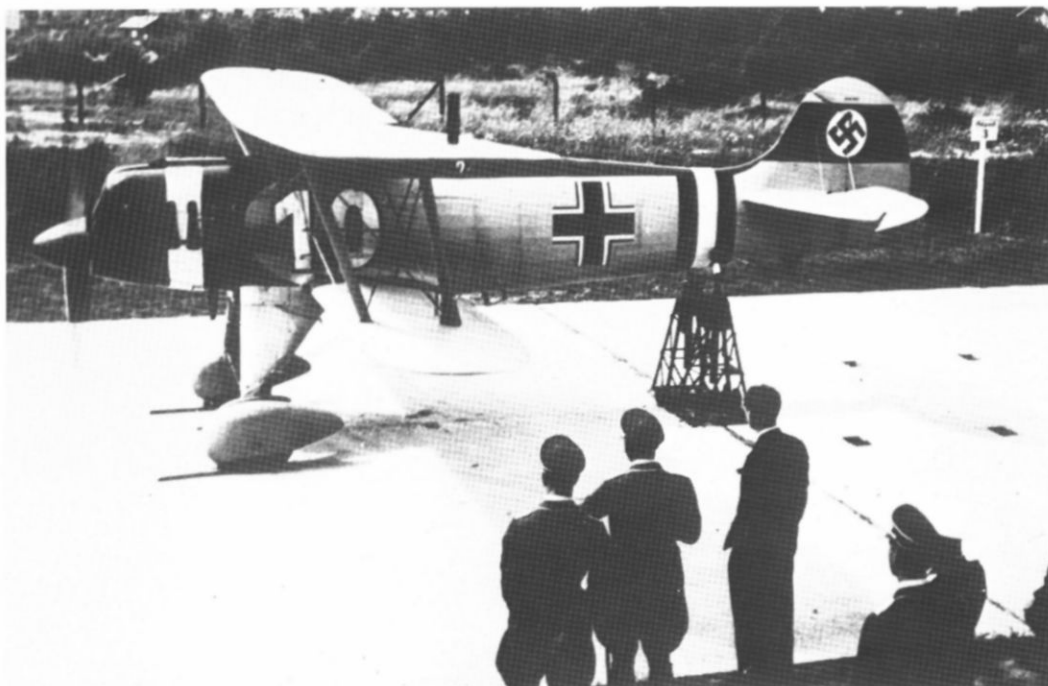
Left. A colorfully decorated Dornier Do 23 of I./KG 155 reproduced from an old and obviously used postcard! The grey 63 finish appears to be a little darker than usual and the very dark, glossy nose (probably black or red) wore a rare insignie consisting of an eagle's claw on a yellow background. The entire tailplane, elevators and also the fuselage band were painted in the same color, possibly for air-to-air identification purposes during manoeuvres. Right. A rare and interesting shot of a Junkers W 34 floatplane used for drogue towing for gunners of the naval air force authorised by the Treaty of Versailles. The machine was painted overall silver except for the shiny black engine cowling.



Left. This Dornier Do 17 belonged to the "blue party" for the period of the 1937 manoeuvres. It was aircraft A of the ninth *Staffel* of the third *Gruppe* of KG 255 and showed clearly its camouflage pattern in the standard colors of 61/62/63/65. Right. Another aircraft, 54+H39, from the same *Staffel* having the same pattern, yet with the colors transposed. In this unit, an emblem consisting of an *Edelweiss* flower was normally worn on each side of the nose.



Left. Formed in late 1937, 2./Kü Fl Gr was based at Dievenov. Equipped in 1939 with the Dornier Do 18, the *Staffel* retained the old registration for a considerable time. This shot shows the standard finish for flying boats; all surfaces visible when the aircraft was in the water were painted RLM grey 02, the undersurfaces of the hull and sponsons being covered with a coat of silver 01 plus two coats of clear lacquer. The *Staffel* unit emblem appeared on both sides of the engine cowling, and by this time the red horizontal fin and rudder band had vanished. Right. More careful use of the brakes might have prevented this landing accident to 3Z+AT, a Do 17 of the *Alpen Geschwader*, KG 153. It bore the *Gentian* emblem which became the insignie of the first two *Gruppen* of KG 255. It was camouflaged in the usual four colors and had bare metal propeller blades and yellow spinners.



Upper. In 1936 the American aviator Charles Lindberg toured Germany and visited JG 132 at Döberitz. In this shot, Lindberg, the third from the left, is seen watching this Heinkel He 51 of the second *Staffel* (indicated by white bands) of the first *Gruppe* (no symbol behind its number). The machine is illustrated in color on Page 18. Right. *Reichsminister der Luftfahrt* Hermann Goering used his own personal aircraft, a glossy all-red Junkers Ju 52, for visiting air bases in 1936. The photograph was taken at Lechfeld. Lower. Seen at Le Bourget on 28th November 1935, this whitish-silver Ju 52 Junkers Ju 52 was used by the Ministry of Sport of the Third Reich. It was decorated with the appropriate colored rings for the 1936 Olympics as seen here and also on Page 18.



Luftwaffe day on 22nd March 1936 on the Staaken airfield, and this Heinkel He 51 prepares to take off. From the aerobatic *Staffel* of JG 132 *Richthofen* and marked 21+K12, it had overall pale grey finish with red engine cowling and black walkway panels on the wing roots. Due to a curious lighting effect and the film used it is quite difficult to distinguish the red cowling on the lower shot.



Reputedly photographed in Summer 1940 at Brandenburg-Briest, this Dornier Do 23 still had pale grey finish, the semi-civilian code D-ATOZ, and a red and white background to its swastika. The date, however, may well have been incorrect for the markings certainly suggest a much earlier period.





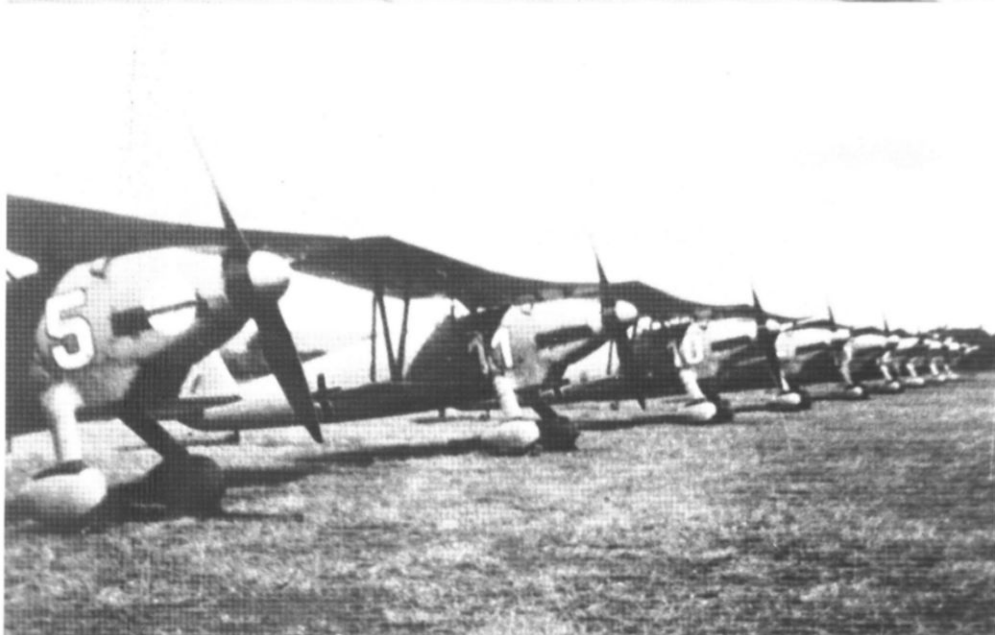
Upper. All these Heinkel He 46s appear to have the pale grey color scheme and the usual markings but there was an exception, the sixth aircraft from the left, D-IKAO, which had the old letter markings system. Right. During Air Day on 21st April 1935 a Santos-Dumont *Demoiselle*, probably a replica, flies over a pair of He 46s. The Heinkels were painted pale grey and wore the small rear fuselage legend giving the owner's name and miscellaneous technical information. On the near aircraft the propeller and wing struts were black. Lower. Although the color scheme of this Dornier *Wal* D-ABAU should have been RLM grey 02, the color used certainly looks much lighter in tone here. Just as obvious is the light color of the upper wing surface markings when compared to the very black registration on the fuselage. On this aircraft both machine-gun positions seem to have been deleted. A further interesting detail is the black text stencilled on the tail, this practice being very rare on aircraft of this size.



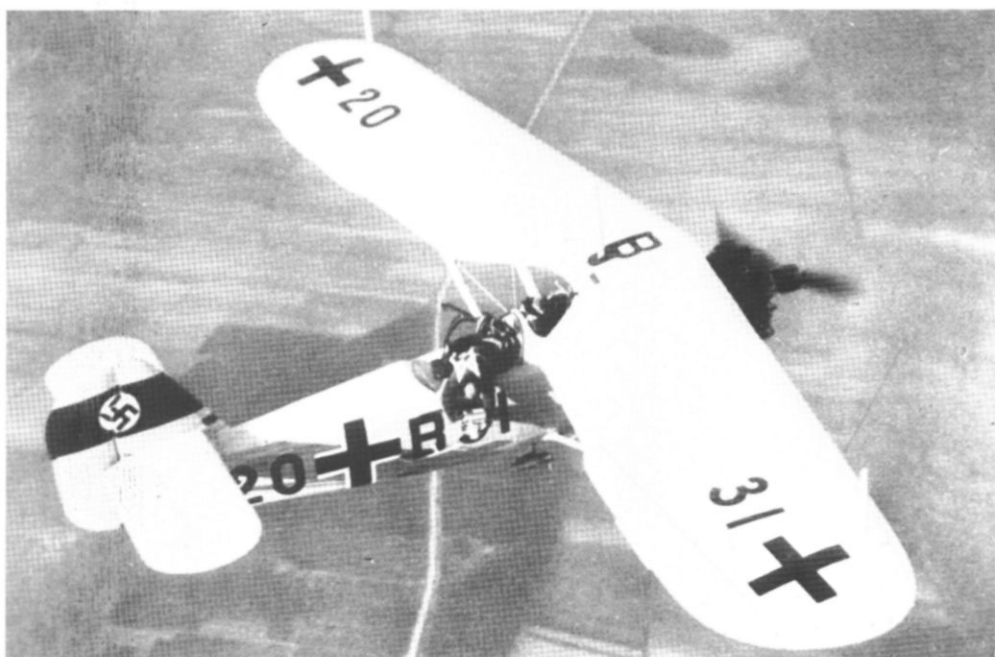
Wearing a bright red cowling and spinner tip, this Heinkel He 51 of JG 132 *Richthofen* was flown by the *Gruppe Kommodore* of II *Gruppe*. It carried overall pale grey finish even on the propeller blades which also bore the black stylised eagle emblem of the Schwarz company.

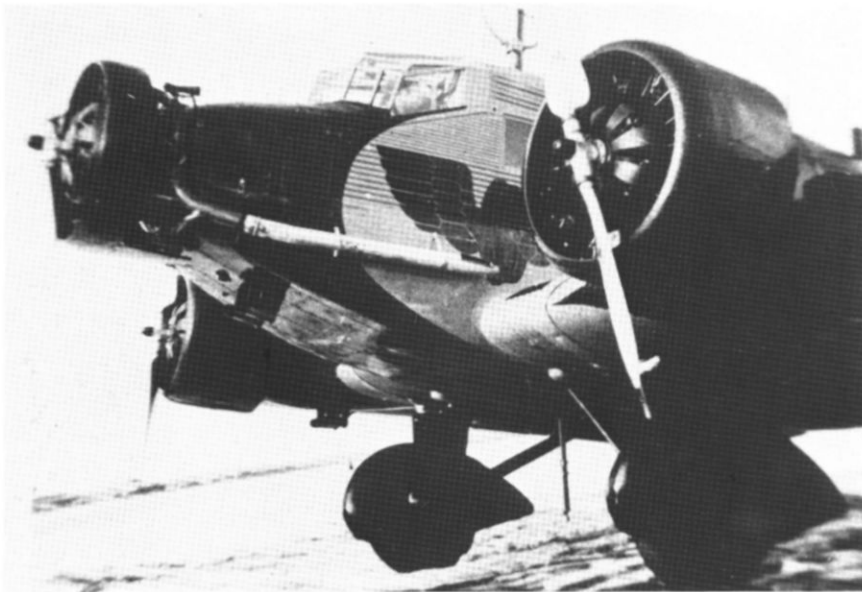


This line-up of pale grey Arado Ar 68s display the markings of the third *Staffel* (a white disc) and the first *Staffel* (a white number only) of an unidentified *Geschwader*. On these aircraft both front and rear surfaces of the propellers were evidently painted anti-glare black.



Heinkel He 46, 20+B31, of the first *Staffel* of *Aufklärungsgruppe (H) 52* seen in action. With only two *Staffeln*, this reconnaissance unit was unable to use all the allocated markings figures and the figure 3 was redundant. If regulations had been observed, this aircraft would have been painted in RLM grey 02, but the color looks more like the pale grey color seen on many He 51s. It will be noted that the *Balkenkreuze* had no black edging.

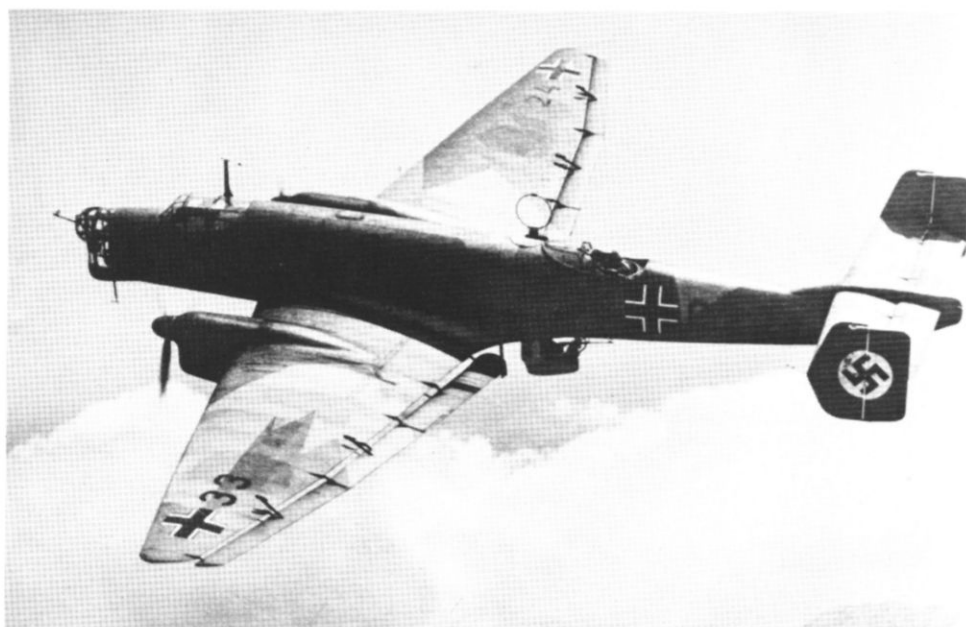




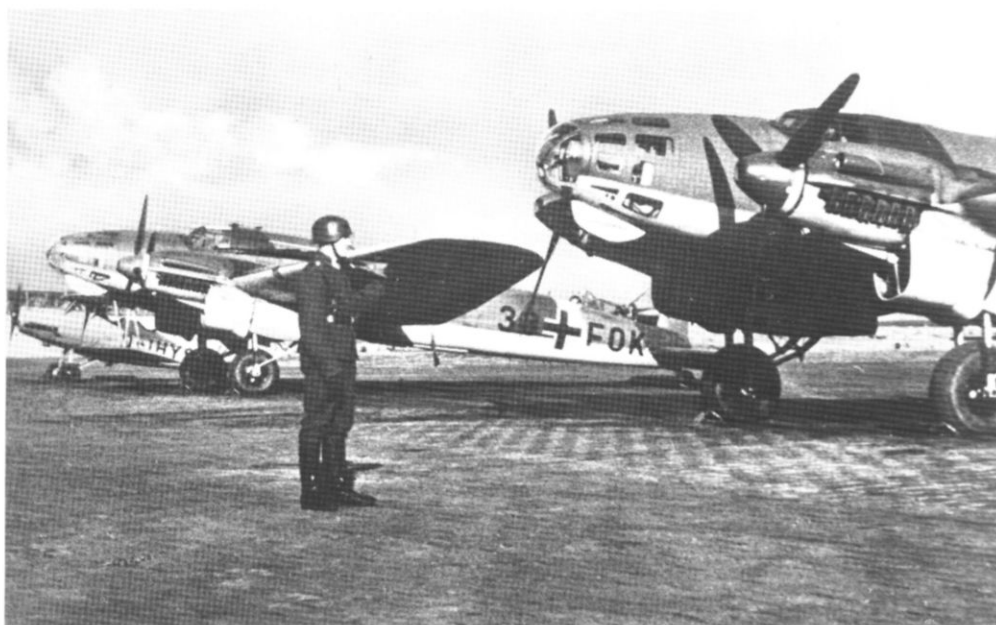
Upper. A very light-colored Heinkel He 59B of 3.(Mz)/Kü Fl Gr 106 at List-Sylt in October 1936. In this case the individual letter A was not painted on the upper surfaces as it should have been. A short-cut recognition method valid for all *Küstenfliegergruppen* is to ignore the individual letter and simply read the registration backwards. Left. Seen on Berlin-Tempelhof airfield in 1936, this silver and black Ju 52 carried the emblem of its operator, German Railways, presumably for advertising purposes. Lower. This Heinkel 51B, white 5, belonged to I./JG 132 *Richthofen* and was photographed after the introduction of a new registration system for fighters in June 1936. The absence of all markings apart from the single number indicates that the aircraft belonged to the first *Staffel* of the first *Gruppe*.



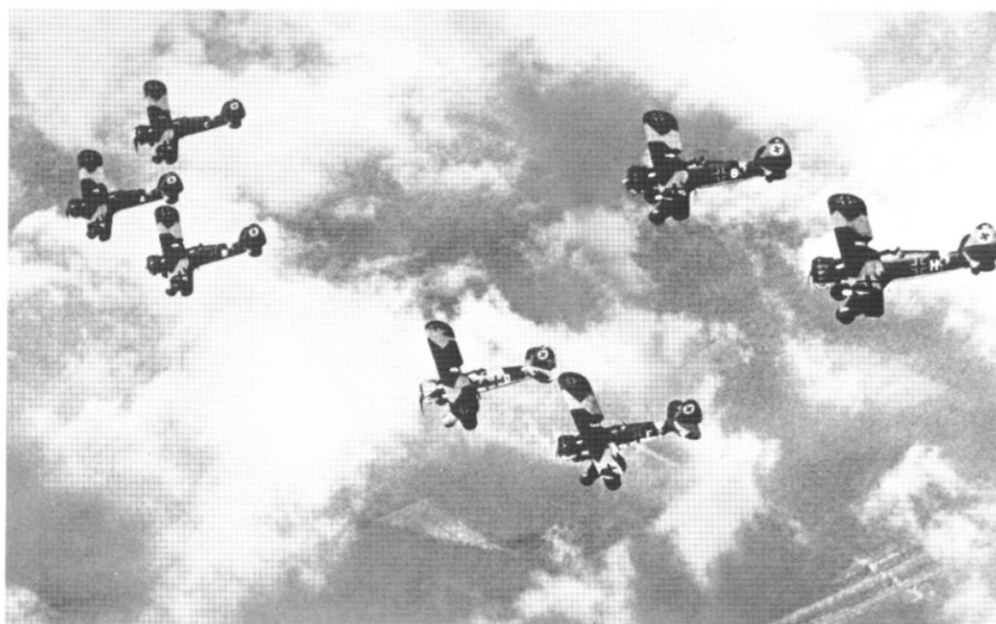
The Junkers Ju 86 was disliked by its crews because of incessant engine trouble. This aircraft of the fourth *Staffel* of KG 253 was painted in the usual four-color camouflage and shows the gunners at action stations.

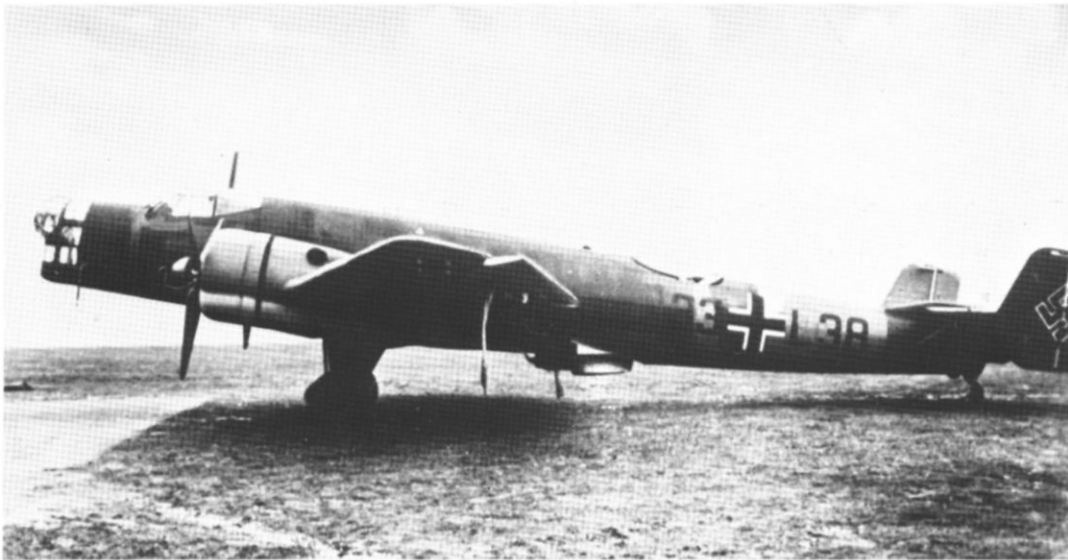


The second Heinkel He 111 shown here had a curious marking, 33+FOK, and was probably retouched by a censor for the last two letters of the registration should have been two figures to indicate the *Gruppe* and *Staffel* within the *Geschwader*, in this case KG 253 *General Wever*. The 61/62/63/65 camouflage colors were brand new. In the background was an Arado Ar 66 wearing the old civilian letter-style marking D-IHYS on its RLM grey 02 finish.

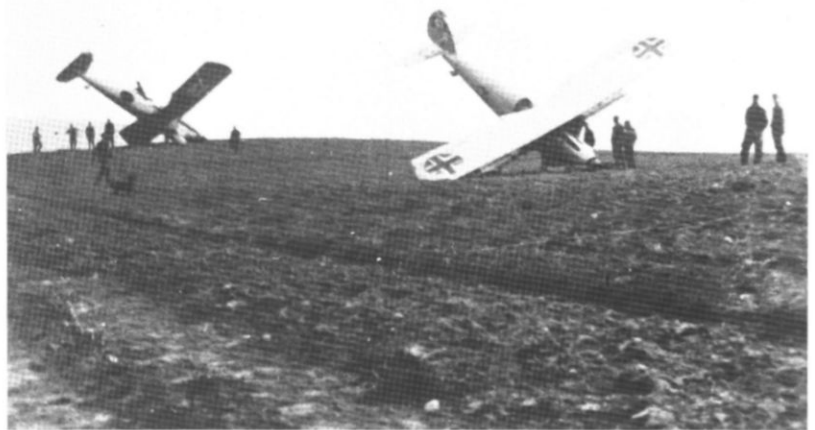


When studying old photographs it is important to try and ascertain the type of film used and the prevalent lighting conditions at the time. In this shot it is almost impossible to distinguish the brown 61 areas from those painted green 62. These seven Henschel Hs 123s of 3./St G 165 were variously marked from 52+A13 to 52+H13 and carried the same camouflage pattern except for 52+D13 in the middle, on which the green and grey were reversed. On two aircraft the red bands under the swastikas had faded considerably.

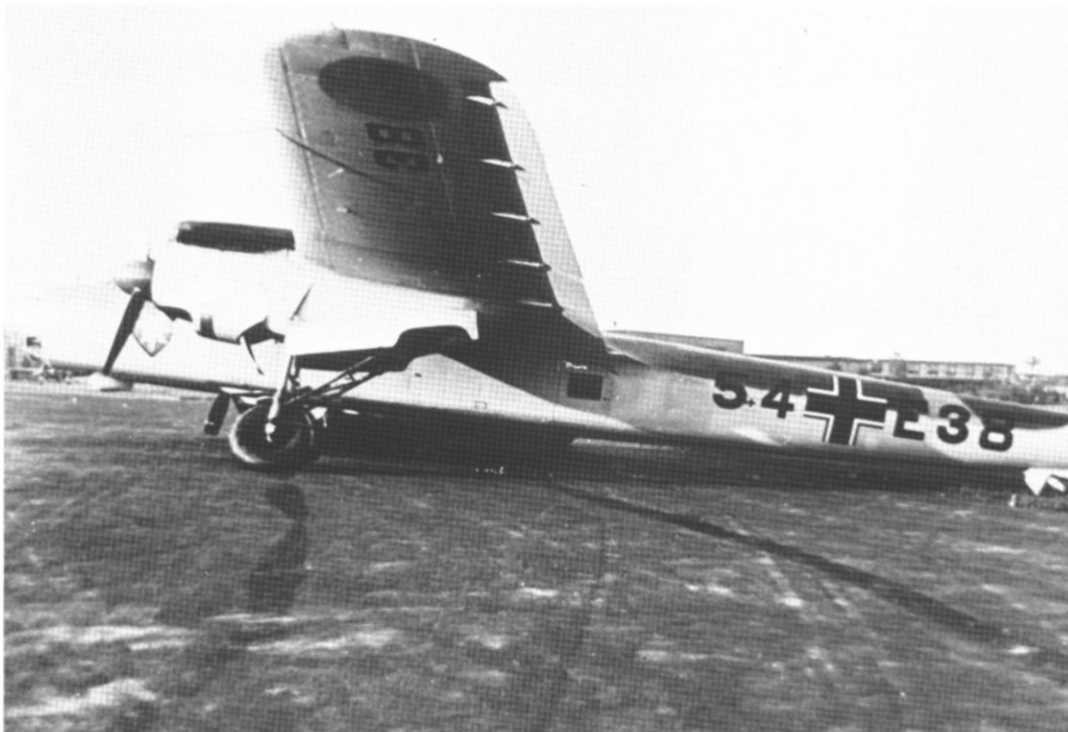




Upper. This Junkers Ju 86 of 8./KG 253 based at Erfurt displayed the codes 33+L38. The white disc and red band under the swastika had evidently been overpainted in dark brown 61 and the paintwork showed signs of weathering. Right. The result of two Arado Ar 68 pilots of JG 334 misjudging the softness of the ground at Mecklenburg during the 1937 *Wehrmacht* manoeuvres.



Lower. The landing gear of this Dornier Do 17E-1 of KG 255 collapsed during a landing run. The red disc, added to the port wing for the 1938 air manoeuvres, was evidently retained for some time afterward.





This crashed Heinkel He 111 shows an early version of what was later to become the insignia of IV./KG 53. The upper surface three-color camouflage had faded somewhat in intensity. The white letter K on the fin is of interest for this was an unusual practice at the time. Bare metal propeller blades are visible here and the three-color spinner may have been red, yellow and red, the colors of Nationalist Spain.

CHAPTER 2

EXCURSION TO SPAIN

In early August 1936 an innocent-looking group of German tourists disembarked at Cadiz. Apart from their cameras and personal belongings they were accompanied by several much more surprising items of luggage, six Heinkel He 51 fighters, then the most elegant and modern operational type in the one-year-old *Luftwaffe*. The presence of this contingent and the manner of its arrival summed up the whole German involvement between 1936 and 1939; to help General Franco's forces with the best machines available, but also with the greatest prudence.

For more than two years Hitler's government sent men and war equipment to Spain, ostensibly to help General Francisco Franco in his fight against the Communists, but more importantly, to test the newly-formed *Luftwaffe* in the convenient proving ground provided by the Civil War. Documents now show quite clearly that during this turbulent period, the real benefit to Hitler was the international unrest it introduced whilst his other aims could be pursued.

As early as July 1936 the first Junkers Ju 52 transports reached Spain and were incorporated into *Gruppo 22*. In the closing months of the same year the main force arrived. It was soon to become known as the Condor Legion. The arrival of the Ju 52s was perhaps the decisive factor in the war, for with the help of these aircraft Franco was able to transport his troops across the Mediterranean and establish a bridgehead in Spain itself. In all some 670 aircraft were sent by Germany during the conflict. As the *Legion Condor*, however, was nothing more than a group of German "volunteers", it was necessary to integrate all its aircraft into the existing organisation of the Spanish forces and adopt Nationalist markings.

Before discussing the whole aspect of markings, it is necessary to come to grips with one of the most difficult problems encountered by the air historian interested in this fascinating period; how to recognise the *real* nationality of crews operating German aircraft in the Nationalist Air Force, often without any information other than an unidentified photograph of obscure origin. During the entire Civil War, Germany was insistent that its aircraft must be integrated into the Nationalist forces; indeed in a number of cases mixed Spanish and German crews resulted. This interchange occurred mainly in 1938 when the *Luftwaffe*, under the tension of the Munich Crisis, ordered many of the Legion's most experienced officers to prepare to return home in case war should be declared.

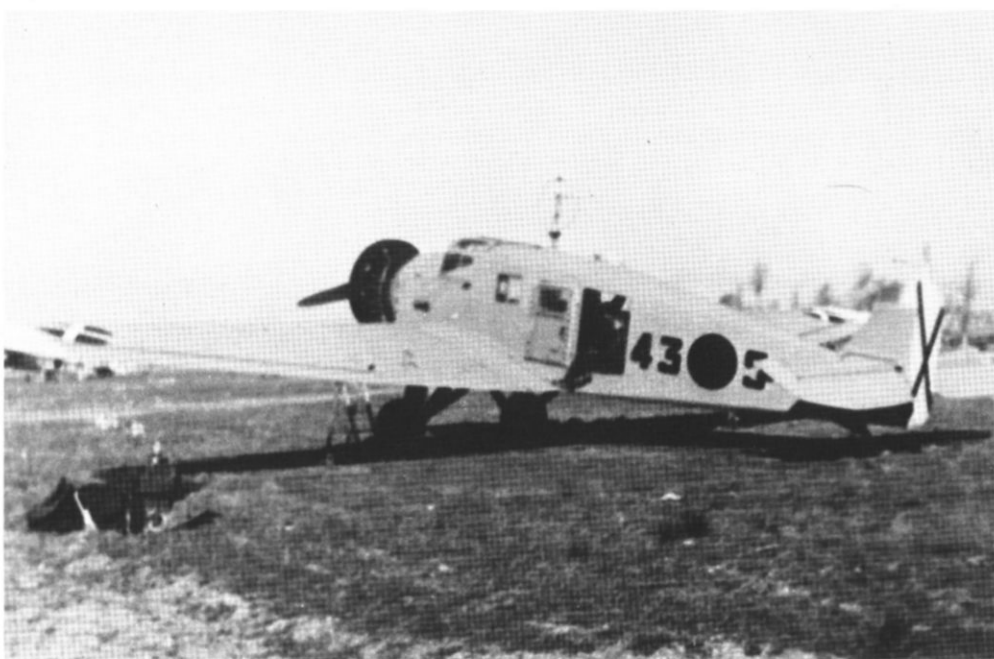
The other difficulty is that when a new type of aircraft entered service within a Legion's *Staffel*, the superseded type was generally passed on so that a new Spanish *Gruppo* might be formed. For example in August 1938 some surviving examples of the Dornier Do 17E, Do 17F and a few Do 17Ps formed *Gruppo 8-G-27* which retained the Devil's head emblem of 1.A/88 and even German personnel! For the Heinkel He 59s of AS/88 it was the same story; German aircrews were gradually replaced by Spaniards as they reached a standard of sufficient competence to operate the new aircraft, and by the end of the war the transition was virtually complete.

As soon as air operations commenced, it was necessary to avoid confusion with the opposing Republican aircraft which wore red, yellow and purple roundels, and because these colors were so similar to the old Nationalist colors of red, yellow and red, it was decided to use a black St Andrew's cross on a white painted rudder in conjunction with a solid black disc in six places.

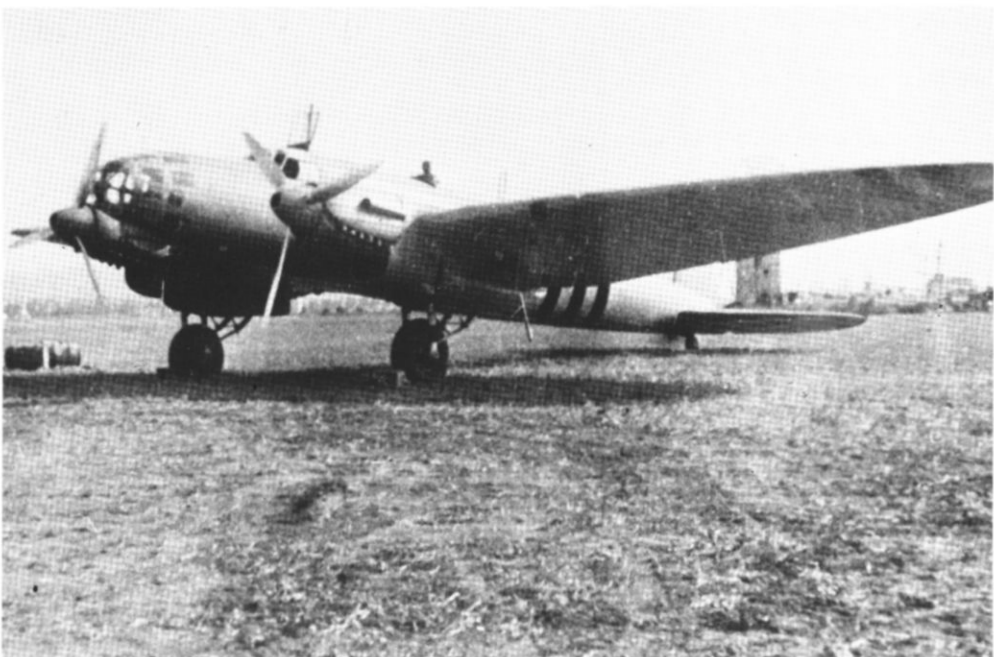
(Please turn to Page 30).



For a long time after the arrival of the first Heinkel He 51s in Spain, they wore their original pale grey color with full Nationalist codes and markings, but persistent recognition problems made changes a matter of some urgency. This example, 2024, carried two black discs on the upper surfaces of the top wing as well as four extra black stripes.

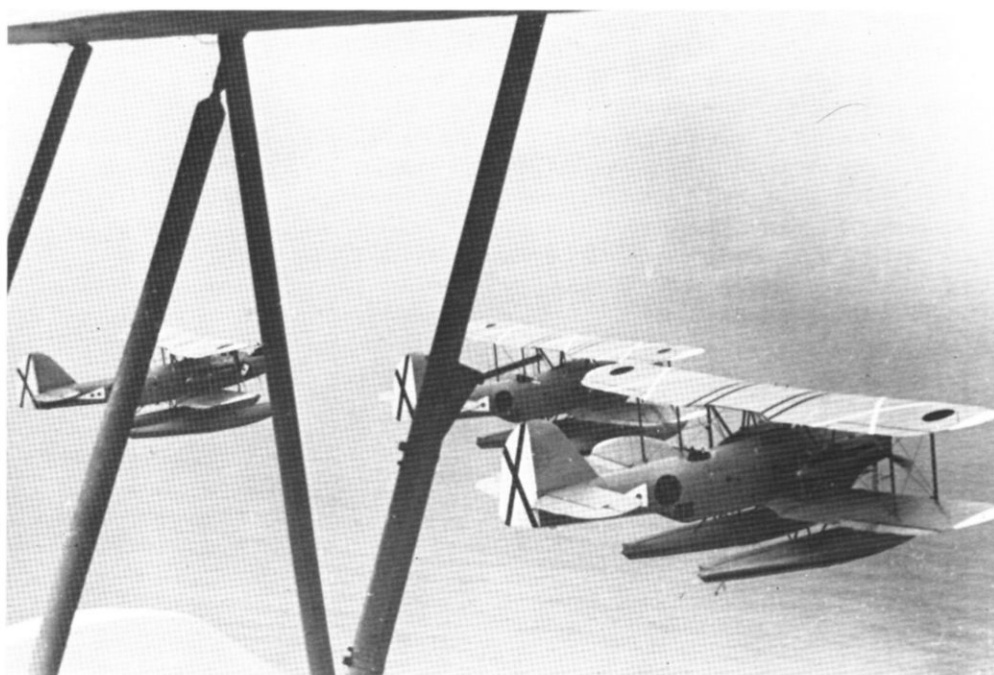


One of the few Junkers W 34 second-line aircraft sent to Spain. At least eight aircraft of the type were operated, each wearing greenish-grey 63 paint with the normal black engine cowling typical of Junkers machines.



A most interesting shot showing an early Heinkel He 111 without Nationalist markings but with the usual diagonal black cross on its white rudder. Painted overall pale grey, it had large black stripes on the fuselage and wingtips as a recognition aid.

Good photographs of the *Zapadne* (big shoes) or Heinkel He 59 are very rare. This flight carried the normal RLM grey 02 finish on all surfaces except those in contact with water, these parts being treated with a special dark varnish. This type of seaplane had two black discs on each side of the fuselage, the front one serving as a convenient background for the unit emblem, an ace of clubs. No individual codes or markings are visible here except for a white triangle with two black or red spots aft of the rear black disc. All wingtips were painted white and the upper surfaces of each top wing had a combination of white crosses and black stripes. Curiously, the nearest machine had no white cross on the centre section of its top wing.



Five examples of the Messerschmitt Bf 108B were sent to Spain during the winter of 1938-39. They wore the common RLM grey 02 and pale blue 65 colors with markings from 44 ● 1 to 44 ● 5. Note the unpainted cockpit frame and black rear surface of the propeller.



Few photographs survive of some of the rarer types which served in Spain, the Bücker Bü 131 *Jungmann* being a good example. This one, 33 ● 21, had the normal Nationalist codes and markings in conjunction with its original color, pale grey. Strangely, the metallic parts of the aircraft around the nose region look decidedly darker than the rest of the aircraft and were probably RLM grey 02 or greenish-grey 63. The slightly glossy undersurfaces of the top wing are of interest, for clear lacquer was frequently a constituent part of one of the top coats on pale grey-colored aircraft.



Compared with the very methodical *Luftwaffe* system of classifying its aircraft within a *Staffel* within a *Gruppe*, and finally the *Gruppe* within a *Geschwader*, there was no such order in Spain, even within the *Legion Condor*.

The Nationalist forces formed several *Gruppo* which had a number identical to that attributed to the type of aircraft in service with the same *Gruppo*. For example, the Junkers Ju 52 entered service with *Gruppo 22* and was thus allocated the number 22. Similarly the first Heinkel He 51s served with *Escuadrilla 1-E-2* and *Escuadrilla 2-E-2* (of *Gruppo 2*) with the number 2 as the individual identification prefix whilst Messerschmitt Bf 109s, bearing the number 6, were incorporated within *Gruppo 6*. The individual identity of each aircraft was indicated by a second number which simply progressed arithmetically from 1.

It has often been stated that for security reasons the second number of this identification system did not commence at 1, but this is simply not borne out by available photographs. Messerschmitt Bf 109s, for instance, carried a continuous sequence from 1 to 130. The only exception would appear to be the Junkers Ju 52, as low individual numbers for this type are unknown.

These identification numbers, separated by hyphen, were painted in black on the fuselage in front of or behind the black disc. This early system continued for a considerable time as some photographs show Bf 109s with the hyphen-number-hyphen combination even in December 1937.

Soon two important changes occurred. The first was the separation of the two groups of numbers by the black fuselage disc instead of the hyphen. There seems to be no obvious reason for this except perhaps a shortage of space in which to paint the long three-number identification codes, for instance on a Junkers Ju 52 with an individual number higher than 100. From about 1937 onward the new number-black disc-number system of markings became standardised on all aircraft and continued until well after the end of hostilities. The numbers themselves were applied in a graceful and distinct style.

The other major change came about as a result of operational experience during the first combat missions. During air combat under Spanish winter conditions, it was very hard for pilots to differentiate between the black discs of their friends and the three-color roundels of their opponents. The black and white rudder marking was really the only readily recognisable common feature amongst the incredible variety of types flown by each side. Unfortunately the rudder was only visible from the side-on position, which made it completely useless during a frontal or rear attack. On Nationalist aircraft an attempt was made to solve this pressing problem by painting an extra set of black discs beside the existing ones on the upper wing surfaces of some aircraft.

It has often been claimed that red bands painted on the fuselage and wings were also used as air-to-air identification during the closing weeks of 1936, but there are no known photographs to demonstrate clear proof. In fact red (or more accurately purple) was a color exclusive to the Republicans. All Nationalist aircraft seen with any kind of red bands were only captured aircraft seen or photographed before repainting. In addition, it was also very dangerous to fly over Nationalist positions in an aircraft bearing red markings as the anti-aircraft gunners were very touchy! The only known photograph of any kind of bands shows a Heinkel He

70 of A/88 and the twin bands around the lower surfaces of its wings appear to be black.

All things considered, the extra black discs did not help very much with more rapid identification, so it was decided to apply white paint to the wingtips of Nationalist aircraft, whilst biplanes also received a large white cross above the top wings and below the bottom wings, this marking including the ailerons. An anomaly in some cases was that the white paint of the wingtip sometimes covered part of one of the black discs. Due to space limitations on some aircraft such as the Henschel Hs 123, the new white cross was sometimes superimposed over the black discs. Later the white crosses on the wings were limited to the diameter of the black discs but the black fuselage discs generally remained unchanged.

During any war there are always exceptions to the normal markings specifications required and this was certainly true of the situation in Spain. One such case was the example of the Heinkel He 59s of AS/88. With their exceptionally large wings and engines, it was found necessary to paint a second black disc on each side of the nose under the cockpit to assist in identification from the frontal quarter. These same aircraft, incidentally, were to experience similar difficulties during WW 2 when operating on air-sea rescue missions bearing a large red cross in the same position as that of the extra black Nationalist disc.

Another unusual feature is evident from a study of Junkers Ju 52 photographs taken in Spain; a large fuselage-depth cross just aft of the wing roots. The cross was later overpainted but on a number of photographs can still be seen through the camouflage. It appears in dark paint on a lighter background color and lighter upon dark camouflage. Could it have been a further recognition aid or perhaps a Red Cross marking?

The third exception is much better known; a small white cross painted inside the black fuselage disc on some Messerschmitt Bf 109s. The exact reason for this is unknown but all Bf 109s reported to have carried the marking served in I.J/88 and it may, therefore, have been one of the first unit emblems. Similarly the diving raven character was only used by Heinkel He 51s of I.J/88 and the *Holzauge*, or wooden eye, which is supposed to have made its earliest appearance in Spring, 1939, was to be seen on a Bf 109D coded 5 ● 86 as early as September 1938.

After their arrival from Germany, the first aircraft, consisting of Junkers Ju 52s, He 59s and He 51s, wore the prevalent factory camouflage of overall RLM *Grau 02* or the elusive pale grey referred to in the previous chapter. Soon, however, the introduction of a new aircraft type would provide some interesting surprises.

In December 1936 the latest product of the German aeronautical industry was discharged at Seville, five examples of the Henschel Hs 123A, which had been sent to permit the *Legion Condor* to evaluate the characteristics and operational merits of this new dive-bomber. All aircraft wore a curious new camouflage scheme consisting of a sharp-edged pattern in three colors; *Dunkelbraun 61*, *Grün 62* and *Hellgrau 63*, all undersurfaces being painted in *Hellblau 65*.

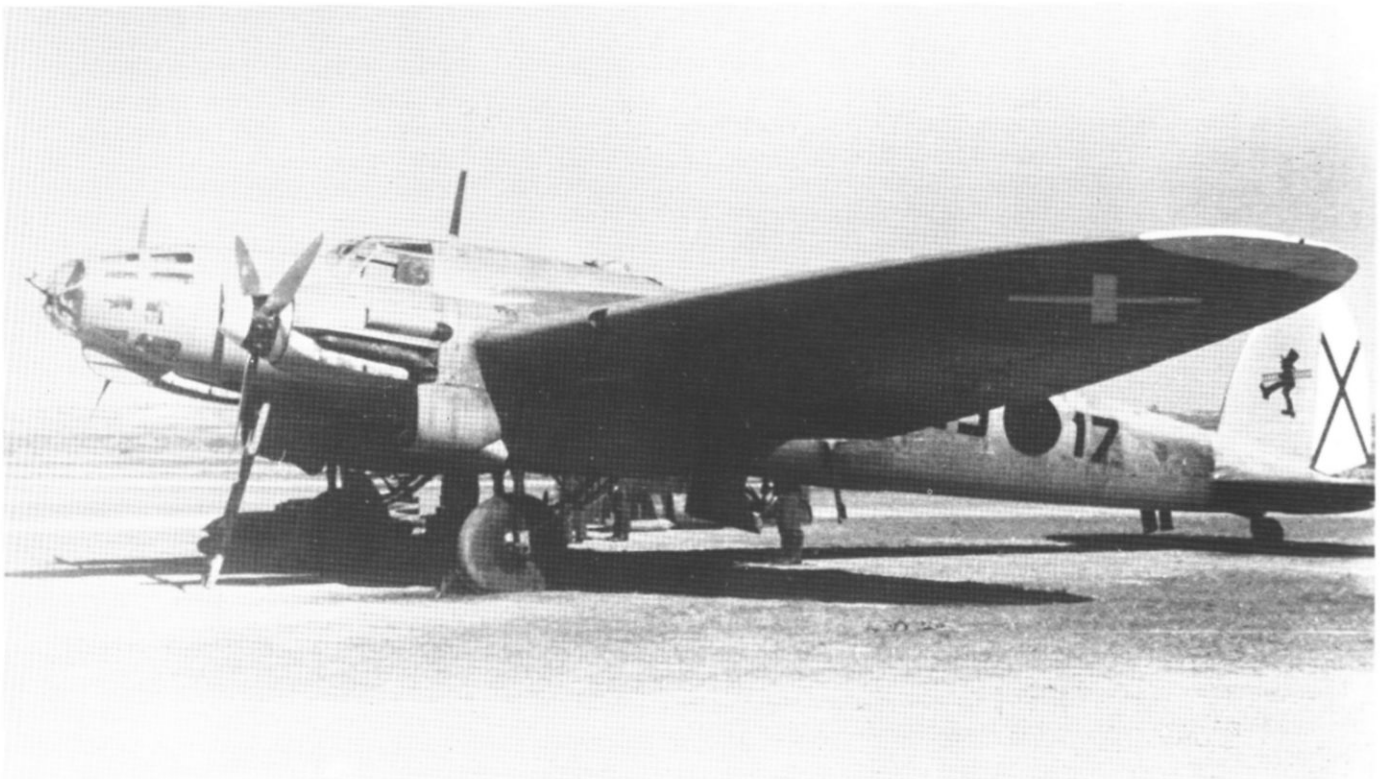
In the following months, more than thirty different types, sub-types or prototypes of German aircraft reached Spain to be flown by German or Spanish Nationalist crews. Many types such as the Dornier Do 17, Junkers

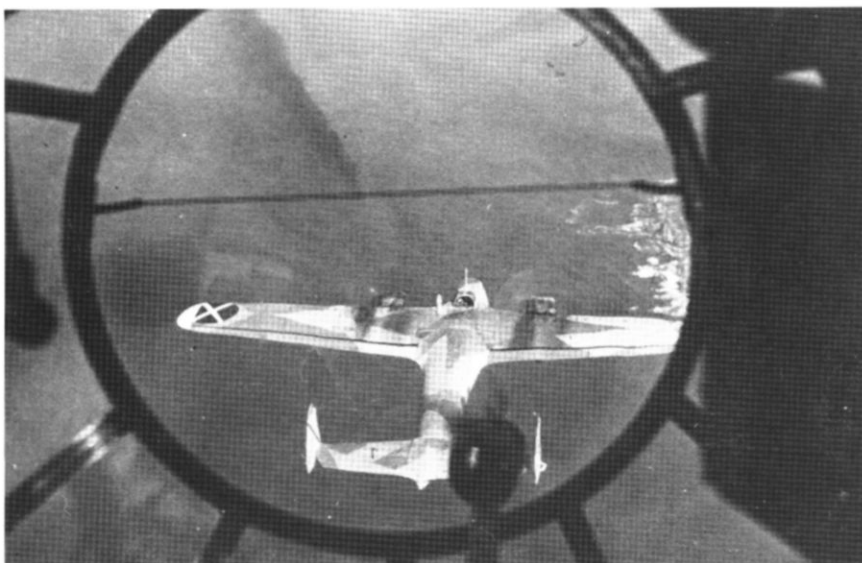
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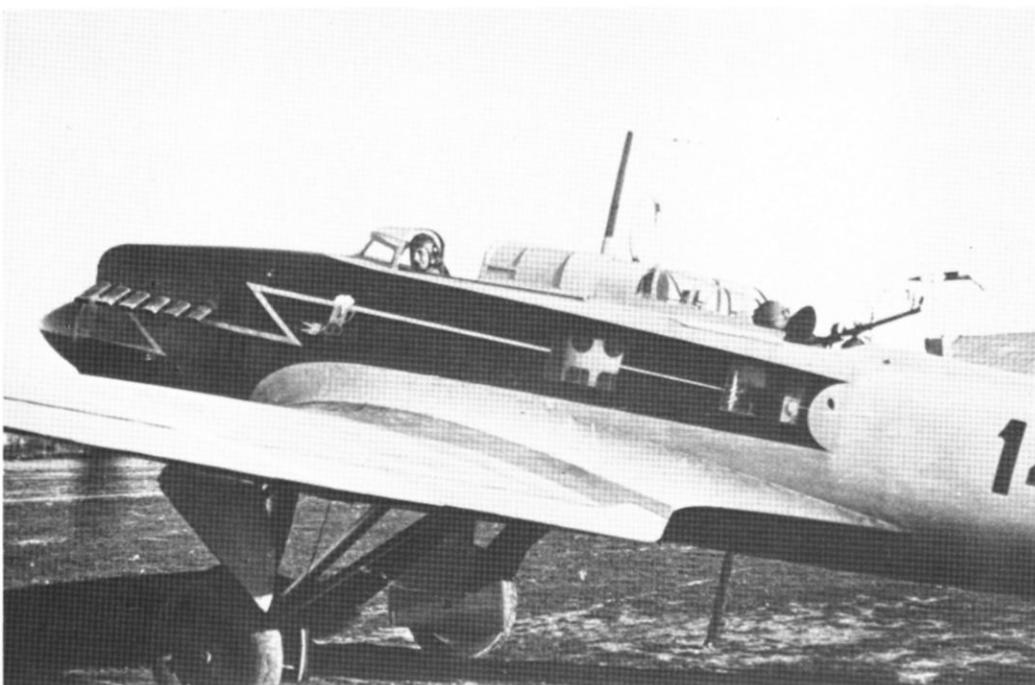
Left. *Hasenbrümmen II* was the name of this Heinkel He 111 of KG/88, one of the first Heinkels with the new exhaust pipe which later became standard. The propeller blades were bare metal. Members of the *Legion Condor* did not wear *Luftwaffe* uniform, but one bare of German emblems. Right. Holding a propeller blade, this member of the *Legion Condor* proudly poses for the camera. The Heinkel carries the emblem which later became the insigne of III./KG 53. The triangular VDM trademark on the propeller blade is obvious, but during the Spanish conflict blades were usually bare metal.

A fine shot of the Heinkel He 111 25 ● 17 in very patchy three-tone camouflage, basically *Hellgrau* 63. K/88, and VB/88 before it, found the fin a most suitable place to paint personal markings, in this case the silhouette of a black chimneysweep. Note the white spinner and extended "dustbin" ventral gun turret.





Upper. A good example of improvised field camouflage was seen on this Heinkel He 51 2●85, which tipped on its nose during touchdown at El Burgo de Osma on 5th December 1937. The pilot was H. Neumann. On the fuselage the dark color, probably dark brown 61, had a hard edge and appears to have been applied by brush rather than by the more usual spraygun. Left. This rather unusual photograph was taken of one Dornier Do 17 of A/88 through the nose of another as both aircraft were flying along the Bilboa coast in April 1938. Except that the greenish-grey 63 areas appear to have faded considerably, this aircraft is very similar in appearance to the one illustrated in color on Page 71. Lower. Two interesting details may be seen on this Heinkel He 70 of the *Legion Condor*. The first is the beer mug emblem under the front cockpit, probably to indicate the pilot's drinking prowess. The other is the large and obviously repainted part of the fuselage aft of the black trim covering the area once occupied by its previous German code.



Ju 52 or Heinkel He 111 arrived already painted in the four-color scheme, but a great number still retained the early all-grey camouflage. To permit the updating of the latter aircraft, as well as for the retouching of all types after repairs or overhaul, quantities of the new colors were sent out from Germany. In many cases, however, it is obvious from photographic evidence that the correct painting instructions were disregarded.

Some of the best examples of improvised field camouflage were to be seen on veteran aircraft such as the Heinkel He 51 or He 45 and later on Henschel Hs 126s which arrived in Spain during October 1938. Often in complete disregard of regulations, ground crews simply experimented with the colors at their disposal in order to try and find the most effective camouflage to blend in with the Spanish landscape. At first they chose a system of random blotches of green and brown paint on the original pale grey. An alternative scheme consisted of large rounded or curved shapes in various colors. The choice of camouflage depended largely on what colors were available and the whims of the spray painter concerned. These early camouflage schemes were applied either before or after the painting of Nationalist markings. In the latter case, the camouflage was carefully added so as not to interfere with the black code and discs or white St Andrew's crosses.

Even more curious were the patterns seen on many Heinkel He 45s and Henschel Hs 126s, a strange style of paintwork which was reminiscent of the famous lozenge system of the German Air Force during WW 1. As this kind of camouflage was undoubtedly applied before Nationalist markings were added, it is reasonable to suggest that it may have been an experimental scheme painted in Germany or, if not, one added as soon as the aircraft were uncrated and assembled. This unusual pattern was almost certainly applied with the existing range of 61, 62, and 63 colors.

Special mention must be made of the Messerschmitt Bf 109, which, along with the Heinkel He 51 and Junkers Ju 52, was delivered in considerable numbers during the war. At first sight one might suppose that the Messerschmitts retained the same fairly simple camouflage scheme, but a number of changes occurred between the B-1 models delivered in April 1936 and the last *Emil* which reached Spain in late 1938. Although it is uncertain whether or not the first four prototypes were treated with operational camouflage, no such doubt exists about the remainder and the painting practices which were followed are fairly clear.

The first B-1 and B-2 models bore an overall scheme of pale grey which on the Bf 109's metallic components, looked slightly different to the same color when applied to fabric surfaces on aircraft such as the Heinkel He 51. The appearance of the paint also depended on how well it was stirred, its age, the type of panel to which it was applied, its thickness, and the type of undercoat used.

Before long the Messerschmitts started to appear in two new color schemes. The first combination consisted of a color darker than the previous pale grey on the upper surfaces with light blue 65 underneath, with quite a distinct color separation line on the lower part of the fuselage and engine cowling. With so much experimentation with camouflage then taking place, it is virtually impossible to identify this upper surface color or colors. RLM grey 02, greenish-grey 63 and green 62 were all in use and their tonal appearance in most black-and-white photographs is almost identical, newly applied green 62 being very slightly darker than the others. If the paints

were slightly weathered, however, it is usually impossible to tell the difference by this method. When 70/71/65 camouflage was introduced in Germany, Bf 109s were being delivered in the RLM grey 02 primer coat, apparently on the upper surfaces only, the idea being that local camouflage could be added, if desired, upon arrival. Thus it is believed that with few exceptions, either RLM grey 02 or, much less likely, green 62 on the upper surfaces with pale blue 65 underneath, was the standard camouflage for most Bf 109s in Spain.

As early as 1937 several Bf 109B-2s serving with 1.J/88 had appeared in a new two-tone camouflage on the upper surfaces, but it is not clear if these aircraft arrived in Spain already painted or if it was merely another example of operational camouflage. The actual colors present something of a riddle. If we consider contemporary photographs and camouflage paints, there are only two possibilities; brown 61 and green 62 as on many Heinkel He 51s or possibly the first field tests of the two dark greens *Schwarzgrün* 70 and *Dunkelgrün* 71. Certainly the Junkers Ju 87Bs which arrived in Spain in October 1938 were camouflaged in a new 70/71/65 scheme, but this was a full year later. At least three examples of this elusive camouflage were to be seen on 6 ● 34, 6 ● 36 and 6 ● 38 and it is believed that 70/71 or 61/62 was the most likely combination.

Another unusual feature distinguished the Messerschmitt Bf 109; the black area around and behind the exhaust stacks, which was painted so as to simplify cleaning and maintenance. On the *Emil* this black area extended even onto the wing roots, ending as far back as the first number of the code. The earliest air-to-air victory markings evolved in Spain, and on the Messerschmitt, took the form of small white vertical bars painted near the tip of fin. By the end of the war many pilots had quite impressive tallies.

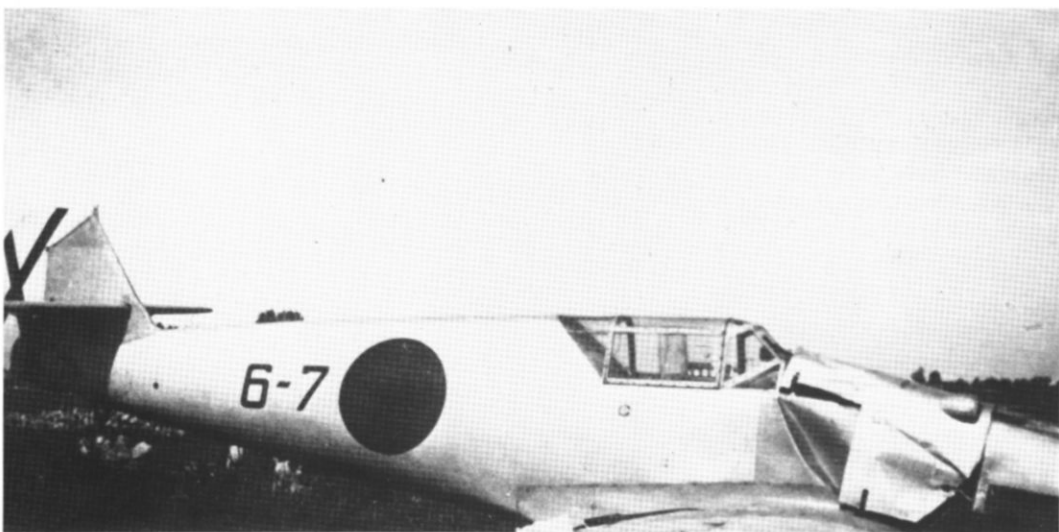
Another significant area of interest for the modeller or *Luftwaffe* historian is the origins of a new tradition of personal and unit markings which would continue with the fledgeling German air force throughout WW 2. Beginning with personal markings, emblems were soon developed for various units involved in the struggle for air supremacy.

Naturally enough, the prominent black disc on the fuselage was a tempting place for further embellishment, and many young pilots chose it as the background for their own markings. These showed considerable variety and originality and ranged from a simple initial such as the H on the Messerschmitt Bf 109 of Handrick or G for the aircraft of Grabmann to a more elaborate drawing such as the Maltese Cross on the Heinkel He 51 of Galland, or the swastika used by Harder on his He 51 or the famous ace of spades used by the fourth *Staffel* of J/88. Naturally enough, the remainder of the aircraft was utilised by imaginative painters, the propeller spinner and tail being sometimes decorated with such emblems. One of the most incredibly decorated aircraft of the period, however, was the Heinkel He 70, 14 ● 34, in full Nationalist markings, which was painted in a spectacular dark and very light sunburst pattern on all the entire upper surfaces at least, a scheme reminiscent of the *Habicht* illustrated in color on Page 53 and, judging from a black and white photograph, quite likely in the same colors!

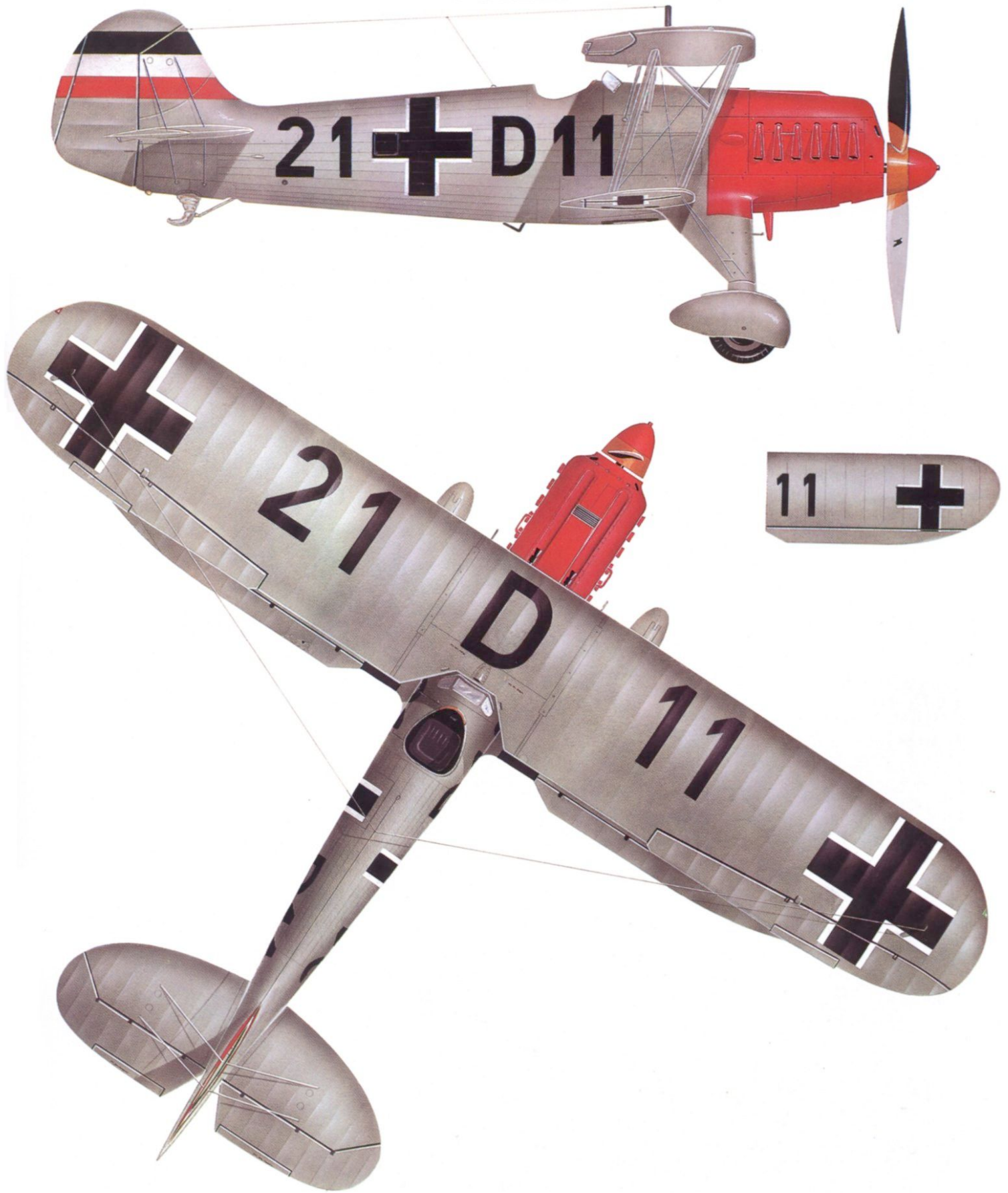
As the Spanish Civil War drew to a close in 1939, ominous black clouds were forming in the skies of Europe. All the new-born emblems would fight again, and very soon.



The seventh Messerschmitt to reach Spain, this basically pale grey Bf 109B-1 flown by *Fw* Norbert Flegel wore the well-known top hat marking of 2.J/88, the first group to be equipped with the new fighter. These two interesting shots show a second color, possibly greenish-grey 63 or RLM grey 02, on the panels of the nose. On the original photograph it was possible to see traces of a red horizontal band on the fin. The areas around the exhausts and wing walks were painted black.



Carrying the Devil's head emblem on each engine cowling, this Dornier Do 17F, 27 ● 20, served in 1.A/88, the reconnaissance unit of the *Legion Condor*. It had the usual four-tone camouflage, white wingtips, white on both sides of each fin and rudder, with black St Andrew's crosses. The other two aircraft were 27 ● 27 and 27 ● 4.



One of the most elegant of all biplane fighters, the Heinkel He 51 formed the backbone of the early *Luftwaffe* fighter force until replaced by the Arado Ar 68. This machine, carrying the three-color starboard side tail markings dating from 6th July 1933, belonged to I./JG 132. The oversized national markings are of interest. The port side of the fin and rudder carried the familiar swastika and National Socialist blood red banner.



This Junker Ju 52, oddly enough, had the same numbers, 22●101, as the four-color camouflaged aircraft on Page 39. Painted overall greenish-grey 63, it showed dirty dark exhaust stains as seen in this photograph taken when it was dismantled for towing.



As described in the main text, some Messerschmitt Bf 109B-2s which reached Spain in Autumn, 1937, bore a slightly darker camouflage than the one used normally on this type of fighter. This one, 6●38 of the first *Staffel* of J/88, may have been painted in RLM grey 02 with perhaps dark brown 61 applied strongly on segments of the wings but only lightly in patches on the fuselage. The undersurface color was almost certainly pale blue 65, tiny segments being barely visible around the exhaust area. The small white cross on the fuselage indicated the first *Staffel*. Note the rear vision mirror. This aircraft was flown by *Uffz* Ernst Terry.



An interesting shot of a Junkers Ju 52/3m in four-color camouflage and showing the *Staffel* emblem of 3.K/88. The pilot was *Oblt* Krafft von Dellmensingen and the photograph was taken in December 1936 at Sevilla-Tablada.





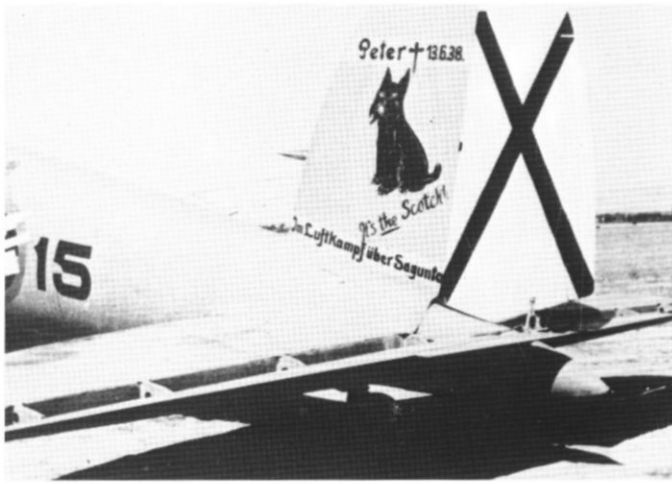
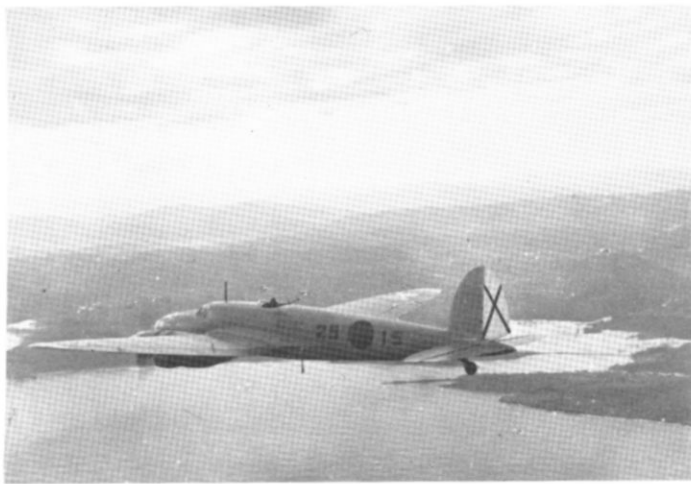
Upper. Fourteen Henschel Hs 123s survived the Spanish Civil War, including 24●7 and 24●13, seen here at Leon in May 1939. Flown by the Spanish *Grupo 24*, which nicknamed the type *Angelito* (little angel), these close-support aircraft wore the sharp-edged three-color upper surface camouflage with pale blue underneath. Lower. The first combat aircraft in Spain equipped with radio, the Messerschmitt Bf 109 *Emil* arrived in the winter of 1938/9 when the war was virtually over for the Republicans. This example, 6●11, had the usual RLM grey 02 upper surfaces, a color noticeably darker than on the first Bf 109Bs and Cs, with pale blue 65 undersurfaces. The long black area from the exhausts to the rear of the wing roots was common for these aircraft. A rare practice, however, was the inscription of a name under the cockpit. Named *Bärchen*, it was the mount of *Lt Ursinus*. Note the white wingtips.



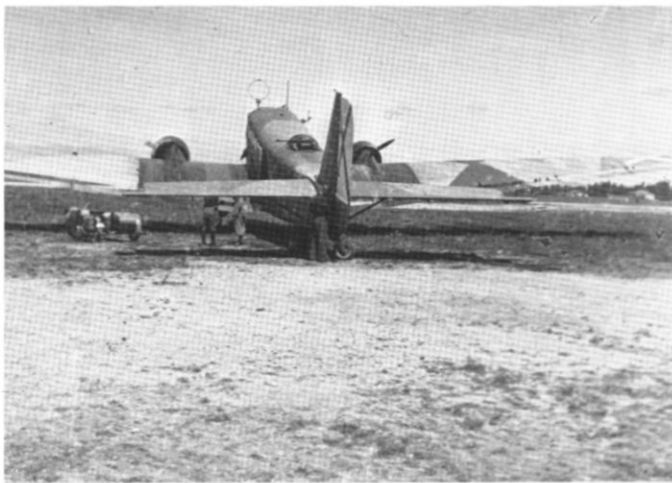


Upper. Photographed at Leon in May 1939, this fifth and last Fieseler Fi 156 had its upper surfaces painted dark green 71 with an obvious mixture of colors underneath. Curiously, the wing did not have the usual black disc underneath. See Page 72 for color painting. Lower. Extensively used during the Civil War, almost all Junkers Ju 52s left KG/88 in the spring of 1937 to be transferred to the Spanish Nationalist Air Arm. As there is no way of distinguishing between German or Spanish-operated aircraft, it is impossible to determine the nationality of the crew. This example, coded 22 ● 101 like the aircraft on Page 37, wore all the usual markings seen on the type; a large white underwing cross quite separate from the black disc, and no disc on the upper surfaces of the wings. The camouflage was 61/62/63/65 and the photograph was taken at Salamanca.

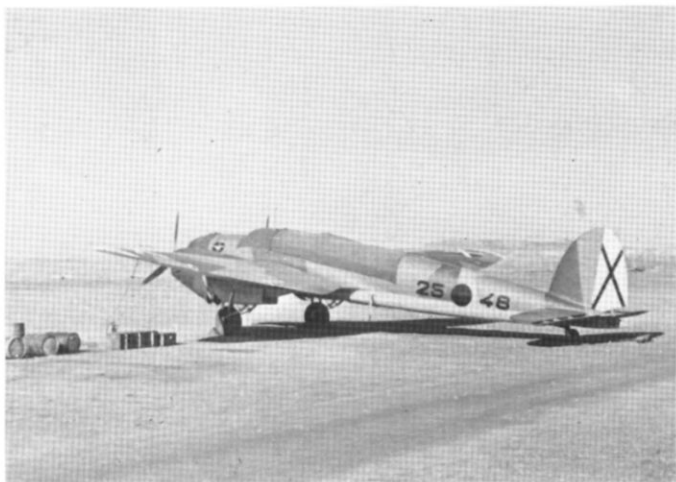




Two shots, taken at different times, showing an interesting Heinkel He 111B, 25 ● 15, of VB/88. It was painted in the usual overall pale grey, had the name *Pedro* on the nose in white, and later had the elaborate markings added as in the shot on the right. The fuselage disc, with its diving eagle insigne, had obviously been retouched as it appears to have been outlined in some color a little darker than the camouflage.



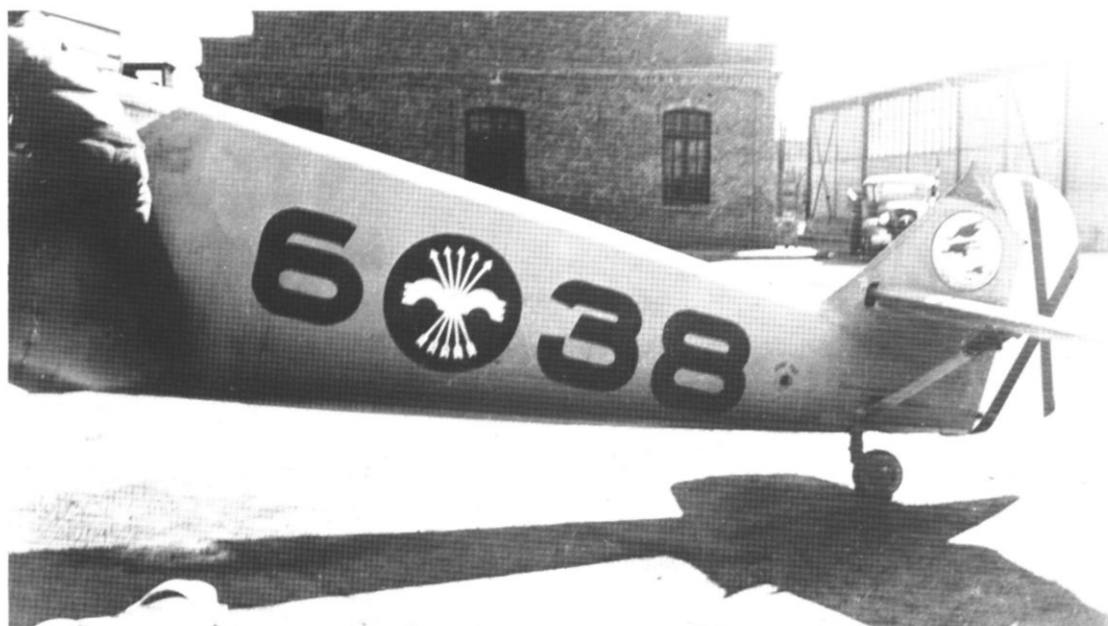
Left. This crashed He 51 was operated by Spanish crews of the first *Grupo de Cadena* 1-G-2 which formed on this type of aircraft in November 1937. Here 2 ● 54 was overpainted in a dark color, believed to be green 62, and within the black fuselage disc wears the insigne of the unit, a stylised eagle holding a chain. See color illustration on Page 72. Right. A rare view of the upper surfaces of a Junkers Ju 52, this shot shows well the lack of any black disc on the upper surfaces of the wing. Only the white cross indicated the bomber's nationality. Just visible on the original photograph was a large light-colored diagonal cross painted on the fuselage just under the turret, perhaps the remnants of an old marking later overpainted.

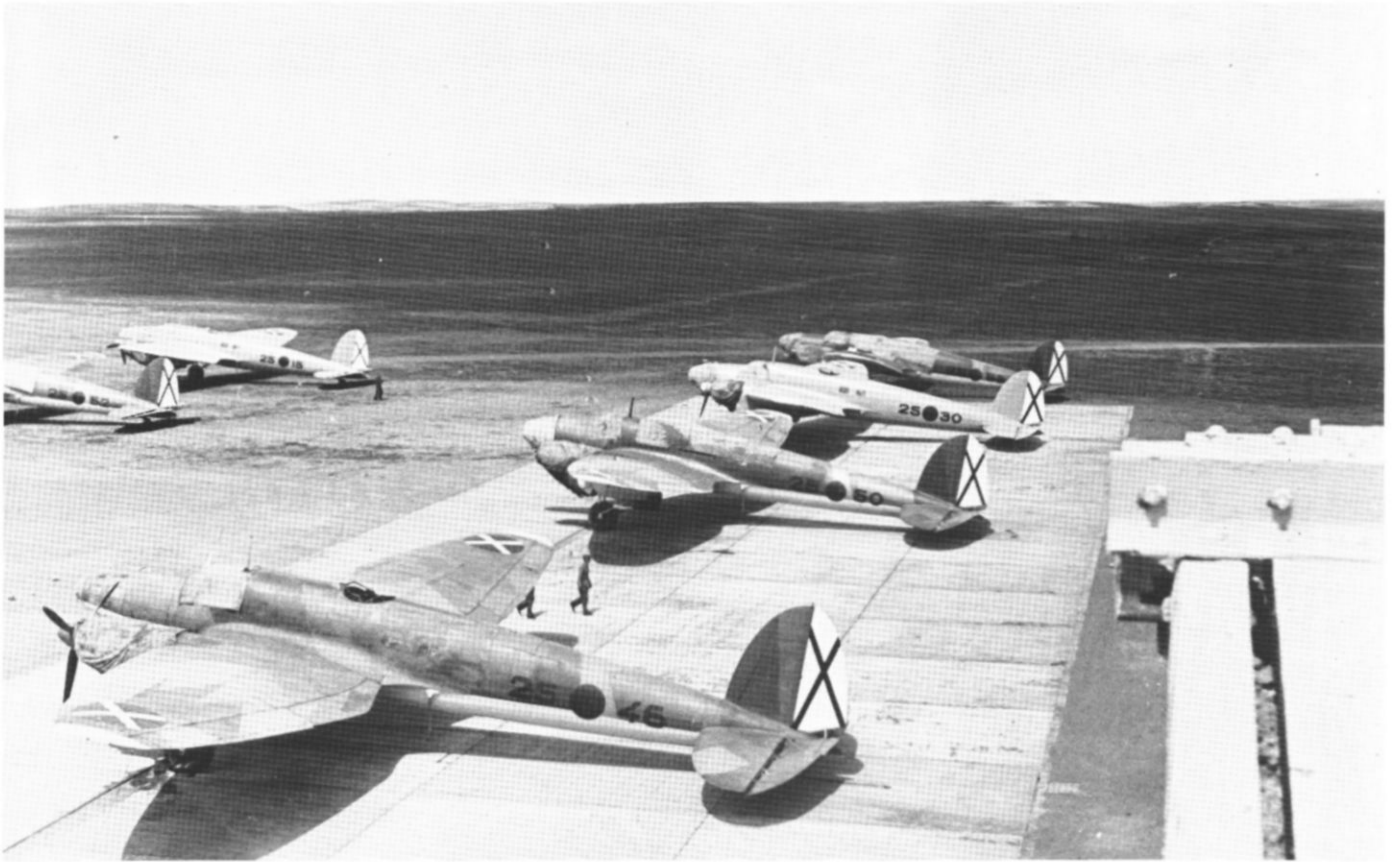


Left. Shown at Burgos in May 1937, this Heinkel He 111, looking very clean with its new 61/62/63/65 camouflage and freshly painted unit emblem, belonged to 2.K/88. Right. A line-up of Messerschmitts at Zaidin airfield in late December 1938. The second machine, 6 ● 40, was flown by *Uffz* Szuggar and shows three victory bars on the fin. In the foreground is 6 ● 87, the first Bf 109E delivered to J/88 in Spain.



Upper. Taken at the end of the war, this photograph shows more than 20 Bf 109s, mainly *Emils*, of 2.J/88 and with most bearing the famous top hat emblem. The last Messerschmitt sent to Spain, 6 ● 130, is third from the right. Left. Sometimes the spinners of aircraft were the recipients of personal markings, such a case being this Bf 109B-2 of Lt Walter Oesau. The photograph was taken in October 1938 at La Cenia. Lower. 6 ● 38 after being handed over to the Spanish fighter group 5-G-5, a unit recognisable by the Falange symbol on the black fuselage disc and the group emblem on the fin. The machine was a Bf 109B-2 in RLM grey 02 finish on the upper surfaces and pale blue 65 beneath.





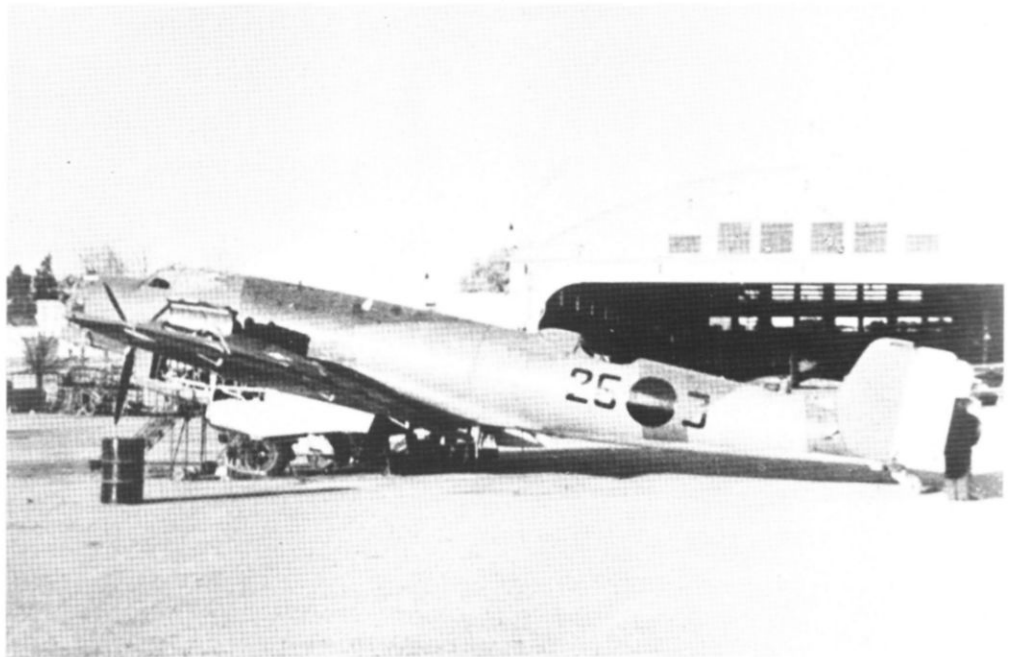
Upper. This shot is especially interesting for modellers as it shows well the diversity of camouflage seen on just one aircraft type at one place during wartime. It was taken in May 1939 at Leon airfield, just before the departure of the *Legion Condor*. Two of the Heinkels wore the early all-grey camouflage whilst the other four had the four-color type. Note the very sharp color division between upper and lower surface colors. Lower. Contrary to what is generally believed, the Heinkel He 112B-O never actually served with the *Legion Condor*. A batch of 17 of these fighters was simply sold to the Nationalist Government and issued to *Grupo 5-G-5* in November 1938. Both the Heinkels here survived the war and in May 1939 still retained their original German colors, pale grey and pale blue 65 with the insignie of the Spanish Air Force within the black fuselage disc.





Upper. In early 1939 a few examples of the Junkers Ju 87B-1 reached Spain and flew operationally. This one was one of the first to wear the new greens 70 and 71 instead of the 61/62/63 scheme used hitherto on upper surfaces. An unfused bomb was sometimes quite handy for keeping the tail down in blustery weather! Lower. Known as *Bacalaos* to Spanish crews, the Dornier Do 17F-1s were handed over by I.A/88 to *Grupo* 8-G-27 in August 1937. The red Devil marking of the *Legion Condor*'s reconnaissance unit was retained. This aircraft, a Do 17P, apparently had dark green 71 or 70/71 upper surfaces and pale blue 65 underneath with crudely applied white paint and black St Andrew's crosses on both sides of each fin and rudder.





Upper. As far as is known, only four Junkers Ju 86s reached Spain during the Civil War, 25 ● 3 shown here being one of them. It is interesting to note how difficult it could be to distinguish the black tail cross in conditions of bright sunlight. Left. A close-up of the port engine cowling of the Dornier Do 17 seen on the previous page. The red Devil emblem was carried on the outer side of the engine cowlings only. Lower. Although partly obscured by the group in the foreground, this Junkers Ju 52, 22 ● 2, appears to have had its tail crudely repainted over the previous German national markings. On the fuselage a diagonal cross can be made out under the grey camouflage. The very dark undersurfaces, strongly contrasted with the white wingtip and cross, suggests that this machine may have served with one of the night bombing groups.





With chocs removed, this immaculate *Taifun* warms up prior to take-off. A liaison aircraft with KG 55, it still retained the overall paramilitary finish of highly polished blue-black. Due to the lack of space, the code G1+CL was not painted in the correct position.

CHAPTER 3

RESEARCH DEPARTMENTS AT WORK

After describing the scene in Spain, it is now necessary to return to Germany where some highly significant developments in the aeronautical field were taking place. Compared with the nine years between 1925 and 1934 when some 20 to 25 prototypes were built, during the following 1935-39 period, no less than 50 new aircraft made their maiden flights. These prototypes included almost all the aircraft which subsequently became famous during World War 2; all the Dorniers, all Fieseler's, the Fw 190 and Fw 200, the Heinkel He 111, the jet-propelled He 178, all the Henschels, the Junkers Ju 87, Ju 88 and Ju He 90 plus the Messerschmitt Bf 109, Bf 110 and Me 210. It was also a vital transition time in which thousands of aircrew were trained to become the strongest single air force in the world and the cutting edge of Germany's expansionist ambitions.

These pre-war years also saw the introduction of several new methods of air organisation which in turn produced significant changes in the markings of aircraft. As the geographic areas of probable future operations became more and more clearly defined, camouflage itself also began a gradual period transition.

PRE-PRODUCTION AIRCRAFT

German prototypes generally flew for the first time in bare metal finish with no civil or military markings whatever. Provided they survived the test program — and many did not — only then would they be treated with protective paint and identification markings. These pre-production aircraft generally fell into two main categories; those built under a commercial or sporting pretext and those whose future military purpose could in no way be concealed.

Aircraft of the first group, most of them destined for

use by Lufthansa, were painted in the national company's colors soon after their respective test flights. The usual scheme was one of clear varnish or silver paint over metal with the traditional black trim on the nose. Aircraft such as the Junkers Ju 52, Ju 90, Heinkel He 70 and He 111 were typical examples.

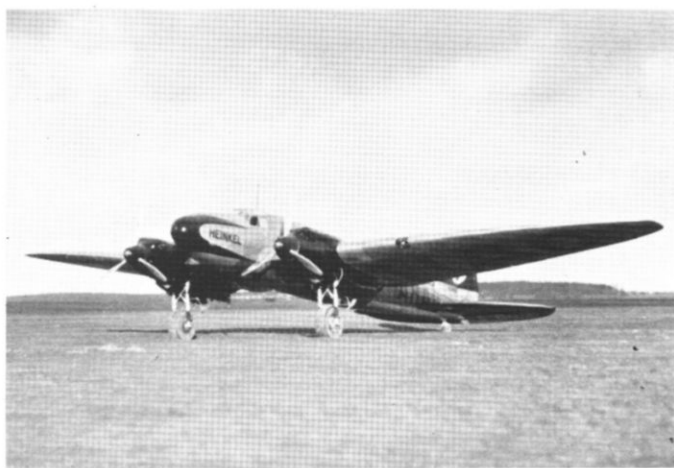
Light sport or communications aircraft were painted in a similar style except that they often received more colorful paintwork. Such an example was the Messerschmitt Bf 108 *Taifun* D-IBUM which first flew in June 1934. From 1935 until the beginning of the war it carried three separate so-called civil schemes, cream, pale grey and blue-black. This machine was used for communication duties and races, always being highly polished for extra speed. Its final color was blue-black with cream registration, a scheme adopted for paramilitary reasons. At various times the Heinkel He 100, Messerschmitt Me 209 and other aircraft were also painted in one or more of the above color schemes.

A matter yet to be resolved conclusively is the exact shade of the very dark glossy blue-black of many paramilitary aircraft, notably Messerschmitt Bf 108s, but also Focke-Wulf Fw 44s and Arado Ar 68s. Photographs show that the color was darker than RLM blue 24, possibly being a special factory finish applied during manufacture in the case of the Bf 108. The color has been interpreted by one source as the equivalent of FS 595a 15024, but there is unfortunately no known documentation and apparently an RLM color number was never issued.

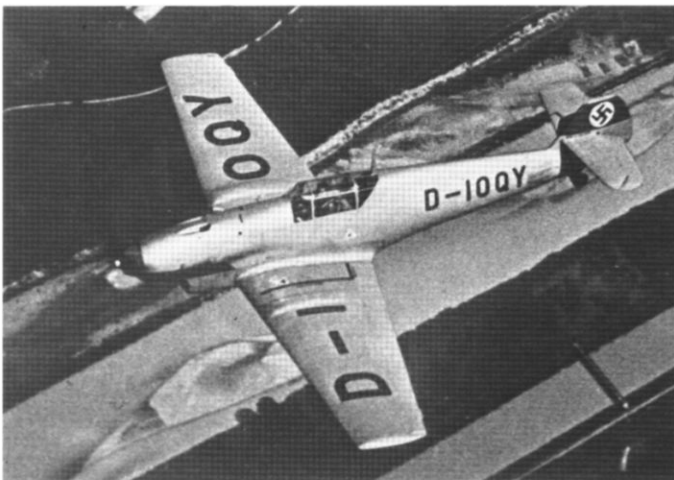
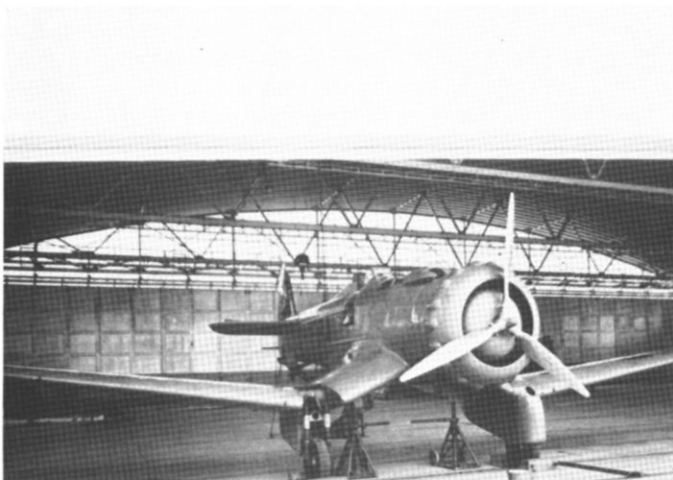
Aircraft of the overtly military group were usually test flown unpainted, sometimes without national markings, before being treated with the smooth, often glossy, pale



Left. Only a few days after its maiden flight, this Junkers Ju 87 V3, the third prototype, was coded D-UKYQ on the fuselage only and carried no swastika. All surfaces of the new aircraft were in bare metal without the usual clear varnish. Under the wings a light protective putty had been applied between the panels of the riveted joints. Right. Like the early Lufthansa aircraft, this Junkers Ju 160 was left in bare metal finish apart from a coat of clear varnish. The A-model shown here had a tailwheel in place of the former landing skid, and a modified rudder. This aircraft was named *Rotfuchs*, or chestnut horse. The anodized alloy engine cowling is of interest.



Left. This extremely rare photograph shows the first prototype of the Heinkel He 111 after application of the code D-ADAP. The aircraft had received a finish of pale grey on all surfaces, except for the spinners which were painted white. Right. The fourth prototype of the He 111 was registered D-AHAO and was delivered to Lufthansa in January 1936. Named *Dresden*, it was equipped for ten passengers in two cabins. Its finish was mainly bare metal with a protective coat of clear varnish and decorated with black trim on the nose and engine cowlings.



Left. The Blohm and Voss HA 137 entered a competition including the Junkers Ju 87, Arado Ar 81 and Heinkel He 118, for the selection of a standard dive-bomber for the new *Luftwaffe*. Seen here during the harmonisation of its four MG 17s, D-IFBA, thought to have been the first prototype, had an overall silver-painted finish with only the black code on each side of the fuselage and above and below the wings. The swastika with red band and white disc was also utilised on each side of the fin and rudder. Right. A familiar photograph but one which shows to perfection all standard markings and stencilling on the fourth prototype Messerschmitt Bf 109. The dark line on the wing is the limit of the walk-on surfaces as described in the supplementary book to this series, *The Modeller's Luftwaffe Painting Guide*.

The first prototype of the famous Junkers Ju 88 made only a few test flights before it crashed in early 1937. Coded D-AQEN on its pale grey finish, the Ju 88 V1 had two narrow white bands around the fuselage, an unusual practice on German prototypes. Just visible is the leading edge of the fin which was pale grey, not red.



grey camouflage of the period. In the immediate pre-war months, prototype and pre-production aircraft were quickly covered in a scheme of 70 and 71 greens over pale blue-grey 65 undersurfaces. For markings the most appropriate color, naturally enough, was black, at least on bare metal or pale grey aircraft, as it provided a suitably strong contrast with the background color.

Aircraft in the glider category were an important exception to these color schemes and will be dealt with in the next chapter.

NEW CAMOUFLAGE

As related previously, a new camouflage system made its appearance on the five Henschel Hs 122 aircraft which arrived in Spain in late 1936. Comprising three upper surface colors, dark brown 61, medium green 62 and greenish grey 63 with pale blue-grey 65 underneath, the new scheme was not officially approved until the issue of a confirmatory directive in 1937. On 22nd March 1938 a new document *Luftwaffen-Dienstvorschriften 521/1* set out the definitive instructions for the camouflage of all Luftwaffe aircraft. (A later second part, *L Dv 521/2*, gave instructions for the painting of gliders.)

All paints were divided into special groups named *Flieglackketten* and were allocated a two-figure code. Numbers 01, 02, 03, 20, 21, 30, 31 and 32 were mentioned in the first edition with numbers 01 to 19 reserved for paints used on metal surfaces, whilst numbers 20 to 39 were intended for use on fabric-covered components.

These *Flieglackketten* had no relationship at all to types of paints identified by a *Fliegerwerkstoff-Nummer* (a four-figure code reserved exclusively for paint manufacturers) or the nowadays well-known *Farbton* two-figure code. To facilitate the use of these camouflage colors they were often identified by their *Farbton Nummer* accompanied by their official name, sometimes prefixed by the designation RLM.

The new 61, 62, 63 and 65 colors were applied to upper surfaces following a pattern or grid, superimposed on the plan view of each aircraft prior to painting. Depending on the requirements of particular aircraft, the squares of the grid could be either enlarged or reduced. The original pattern could also be reversed, giving a "mirror image" scheme. Each color could also be interchanged with others. Thus with one basic camouflage pattern and three upper surface colors, it was possible to create up to twelve different combinations. Only six, however, were ever mentioned in official documents. As events transpired, by the time this new camouflage scheme was in general use, a new one was starting to appear on factory-fresh aircraft.

It will be recalled from Chapter 2 that a few Messerschmitt Bf 109B-2 fighters photographed in Spain in Autumn 1937 bore a dark two-tone camouflage in unknown colors. Possibly developed in the field with available paints green 62 and dark brown 61, it is nevertheless thought more likely that this scheme was painted *before* departure from Germany in two new shades of green, 70 and 71. Further research may yet provide an answer to this fascinating puzzle.

Before long it was decided to adopt the new 70/71 colors on all fighters, especially the new and potent Bf 109, but also the Arado Ar 68 biplane which still remained the standard *Luftwaffe* fighter of the period, having replaced the Heinkel He 51. Political considerations also had an important bearing on the introduction of the new color scheme, for this was the time of the Austrian *Anschluss*, just before the Munich crisis. Playing for high stakes in a gigantic game of bluff, the political leaders required the *Luftwaffe* to at least have the appearance of being ready for anything. It is now generally accepted by most historians, however, that had war commenced in Autumn 1938, Germany could not have survived more than a few days.

The new very dark low-contrast colors certainly looked more aggressive than the overall pale grey formerly used in conjunction with colorful unit symbols. From above and at a distance the new combination certainly looked much lighter in tone than it did from close up and the colors showed a much more marked contrast. Very quickly this two-tone green camouflage, well suited to the European landscape, was adopted for the whole *Luftwaffe*. New aircraft were delivered from factories painted in this fashion whilst those camouflaged in the 61/62/63/65 scheme continued unchanged until the respite of an overhaul provided the opportunity for applying new paintwork. Indeed some bombers were still to be seen wearing the old livery well into 1940.

MARKINGS

If the markings of bomber and reconnaissance aircraft were only changed in minor ways between 1935 and 1939, it was the fighters which reflected more pressing identification needs, culminating in the introduction of *Reichversteidigung* colored fuselage bands on 20th February 1945.

The main changes in aircraft markings are set out in Appendix IV on Page 141. If this is compared with the camouflage table published on Page 69 of *The Modeller's Luftwaffe Painting Guide* it is easy to understand the problems of air-to-air recognition resulting from the use of black codes painted on dark green background. For this reason, modifications were sometimes made by the



Upper and right. Good photographs of lesser known German aircraft are very rare, these two shots showing the Arado Ar 79 D-EKCX with the civilian colors used on several light aircraft. The light parts of the machine were cream and the darker ones bright blue, all surfaces being highly polished. The tail markings indicate that the photographs were taken after September 1935. Lower. Tested for the carrier *Graf Zeppelin*, the Arado Ar 195 was equipped with an arrestor hook. The first prototype shown here had standard markings on its pale grey finish. Note the yellow white-outlined fuel triangle marked 87, the dark brown one beside the oil filler cap, and the very unusual small black anchor symbol.





Left. A fine shot of two Heinkel He 111F-4s with the early four-color scheme. The white disc and red tail band, discontinued as from 1st January 1939, had evidently been overpainted in green 62 on both aircraft. The black codes indicated that the bombers were the first and seventh aircraft (A and G respectively) of the fifth *Staffel* (second *Gruppe*) of KG 253 operating within *Luftkries III*. Right. This Heinkel He 111B, 56+E12, gently dropped its starboard wing into the snow after an undercarriage failure. Taken in 1939, the photograph shows the interesting tonal contrast between the standard colors of the time. An odd feature was the absence of any upper surface wing cross on the starboard side.



“black men”, the nickname given to *Luftwaffe* mechanics because of the color of their overalls. Quite often each letter or figure of the code would be outlined with a light color, generally white, but even more frequently the whole of the individual aircraft letter would be painted in this contrasting tone.

The main reason for most variations in markings at this time was a very practical one — sheer lack of space. The new order of June 1936 requiring a fuselage cross and, later, the WL-code in place of the former D-code in January 1939 caused many problems for ground crews, particularly on small aircraft. For this reason some *Balkenkreuze* were sometimes painted very high on the fuselage, particularly on the tiny Bücker Bü 133. In some cases the cross was painted very small, the hyphen being replaced by the horizontal bar of the cross.

Another important change soon took place, again because of lack of space and also because of the recently introduced dark colors on fighter aircraft. By early 1937 all *Jagdgruppen* were equipped with the final model of the Arado biplane fighter, the Ar 68E. In accordance with the directive of 2nd July 1936, the color scheme of this fighter followed the same style as that of its predecessor the Heinkel He 51; a colorful engine cowling to identify the *Geschwader* with two different symbols to indicate the *Gruppe* and *Staffel* also. At the same time a sleek new monoplane fighter was starting to enter service, the now famous Messerschmitt Bf 109. When the first B-models were put into service in the second *Gruppe* of JG 132 in February 1937, they already bore 70/71/65 camouflage and simplified markings in place of the previous biplanes' nose trim colors with large symbols. This very short transition period, however, presents a number of minor mysteries. In only a few months the old method of painting the cowlings in the *Geschwader* color was deleted, as also were the two white bands for the second *Staffel* and the white discs of the third *Staffel* of each *Gruppe*. With the first dark green Arados and Messerschmitts, a modified air-to-air identification system was introduced, which combined two types of symbols and three *Staffel* colors as seen in the table on Page 139.

As the organisation of the *Luftwaffe* expanded, a larger command structure was instituted within the

Jagdgeschwader in place of the old *Stabkette*, each sub-division having an identification symbol of its own. (See table on Page 139). Initially, on the Arado, the figures or symbols were painted in front of the cockpit in the old style, but on the new Bf 109 this practice was abandoned and the symbols were moved back slightly to a position immediately in front of the fuselage cross.

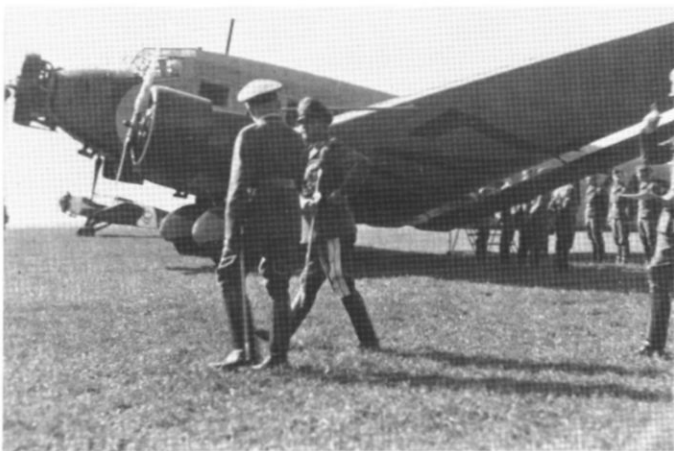
For quite some time some *Jagdgeschwadern*, finding old habits hard to break, continued to wear their individual figures or symbols on the engine cowling or in front of the cockpit. Naturally all clues as to the *Geschwader* identity also vanished, for in a time of mounting international tensions this was felt desirable for security reasons. Fortunately for today's air historians and modellers, unit emblems soon began to appear, creating a new fighting tradition and permitting much easier identification of individual aircraft.

For bombers, reconnaissance units, and also for new “destroyer” units (which had previously been designated heavy fighter units), the markings system also underwent a number of changes. As Germany was rapidly increasing its bombing forces by creating new *Luftflotten*, the simple identification system then in use was found to be inadequate, and just on the eve of war, a new four-character system was adopted. Although this directive was only issued on 24th October 1939, several new types of aircraft, some of them factory-fresh, employed these markings during the war against Poland. The Messerschmitt Bf 110 was a good example.

The new method of identification, set out in the table on Page 139, was used for all *Luftwaffe* units except those allocated day-fighting or close-support duties. Curiously, the *Stukageschwadern* used a bomber system whilst the *Schlachtgeschwadern* used a fighter system as they had been formed with fighter aircraft and pilots. The latter units utilised the same method of identification for the entire war. The main difference between the four-character bomber identification and that of fighters lay with the indication of the *Geschwader*; on fighters this was shown by an emblem whilst on bombers it could be deduced from the letter/figure/letter group painted just in front of the fuselage *Balkenkreuz*.



Left. This Curtiss Hawk with the registration D-IRIS was flown by the well-known aerobatic pilot Ernst Udet. Its color scheme is believed to have been silver with red trim. The DLV emblem may be seen on the side of the fuselage just forward of the cockpit. Right. The eleventh pre-production Heinkel He 112. Painted overall grey, this machine had all its crosses overpainted and covered by the new registration D-IYWE. The red tail band, and possibly the swastika also, had apparently been added by a not-so-skilful photographic retoucher, for propaganda purposes. In his enthusiasm he had completely obliterated the rudder hinge!

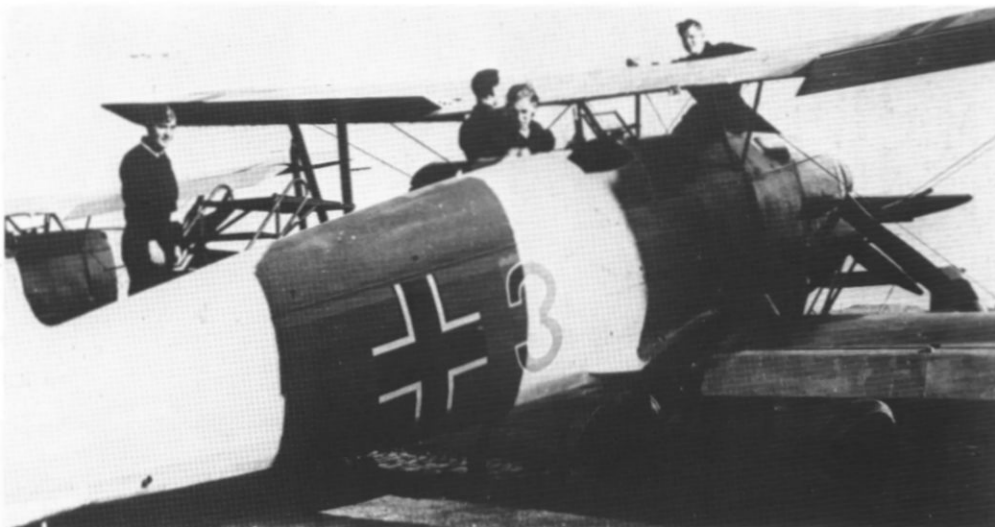


Left. Generals and their mounts. This Junkers Ju 52 D-AZAZ was the personal aircraft of *General* Milch and the Klemm K1 32 in the background belonged to *General* Christiansen. The Junkers' camouflage was the usual greenish-grey 63 with black codes and trim, but the Klemm had a spectacular white decoration on its very dark-looking fuselage. A diagonal band aft of the cockpit bore the letter C for Christiansen. Right. The first aircraft equipped with radio carried a forest of masts and antennae. Another feature of this Heinkel He 46 was the huge swastika on the tail. The green 70 and 71 camouflage had been applied rather roughly on the lower fuselage separation line and along the wing leading edge. Note the wing cross which had been moved inboard.



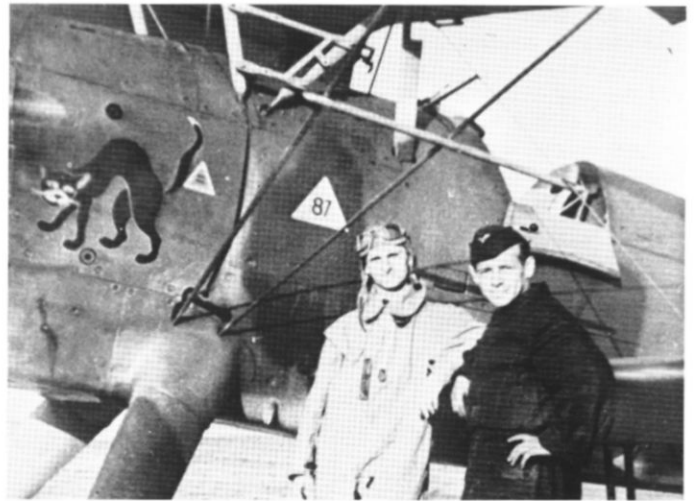
Left. On this Henschel Hs 123, CH+?W, white 5, the old background to the swastika had been overpainted and it is therefore safe to say that the photograph was probably taken during 1939. This aircraft carried the usual four-color camouflage and its underwing crosses in a most unusual inboard position. Note the small white letter L within a white circle just behind the cowling gills. Right. The use of a solid black disc beside the fuselage markings of these Junkers Ju 52s is something of a mystery, this photograph showing 21+D12, 21+E12 and 21+H12, all with the symbol. The difference between the four-color aircraft in the background and the more recent one in 70 and 71 dark green is obvious here.

Historians and modellers should always study photographs with extreme care before jumping to conclusions and the color scheme here provides a stern test of sheer experience in distinguishing between dark painted areas and large shadows. The middle fuselage section of the near aircraft is especially interesting for the faded number 3 appears to have been partially repainted in black-green 70 before having the overpainted left hand edge of the number retouched with a thin white border. The upper surface of the bottom starboard wing seems to have received black-green paint also. The light-colored areas were most likely pale grey. This shot of a JG 134 Arado Ar 68 was taken at Dortmund in September 1938.

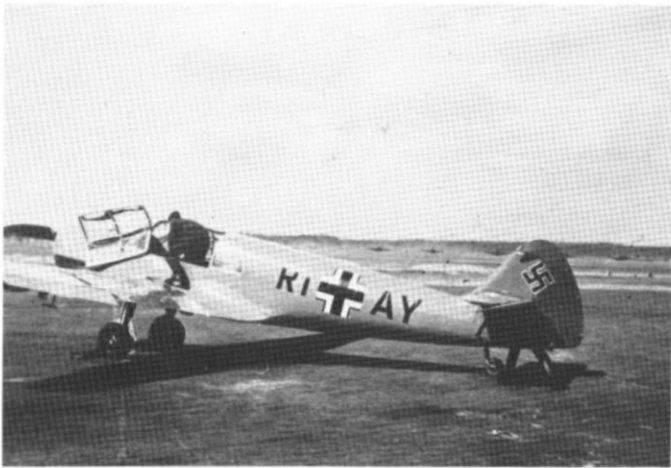


Upper. An unusual photograph in which four different styles of camouflage are visible on Arado Ar 68Es of the first and second *Staffeln* of JG 131. White 10 had the early pale grey finish with black trim and the white vertical band of the second *Staffel*. White 2 in the foreground had 61/62/63/65 camouflage whilst the fourth fighter in the background had the newly introduced 70/71/65 scheme. Lower. The first prototype Blohm & Voss HA 140, a type intended for maritime reconnaissance and torpedo bombing, had an inauspicious test program when it suffered severe damage during a rough water landing. It was probably finished in overall glossy RLM grey 02.





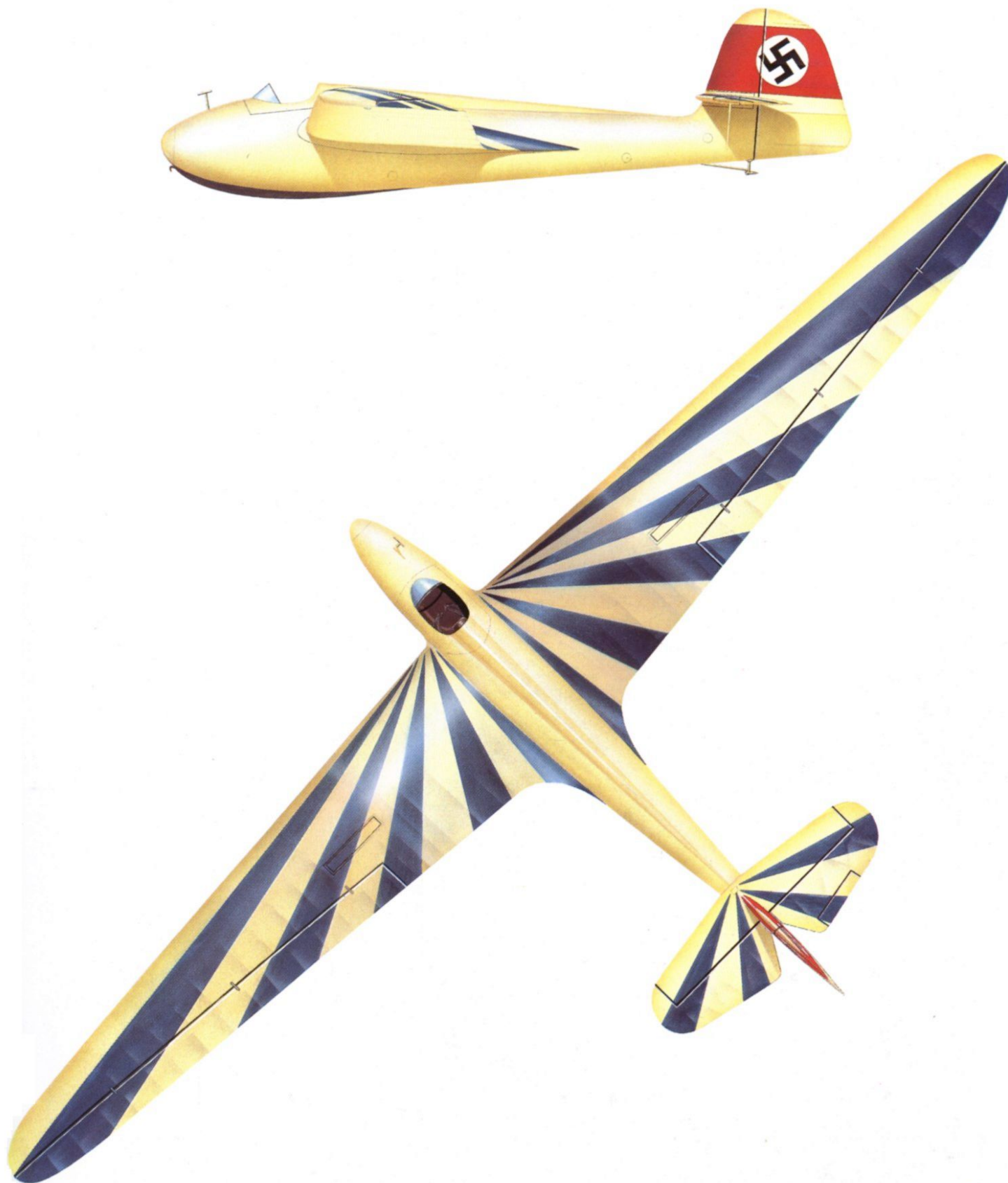
Left. Taken in September 1938, this photograph shows one of the first applications of the dark greens 70 and 71 with pale blue-grey 65 camouflage. The second Arado Ar 68 wore the chevron and bar symbol of the *Geschwader Adjutant*. Right. This photograph shows that even the replacement of a simple panel can change a pattern as it has under the fuel triangle of this Arado Ar 68. The angry cat emblem dates from the pre-war period and was even to be seen on the engine cowlings of some Fw 190D-9s in 1945.



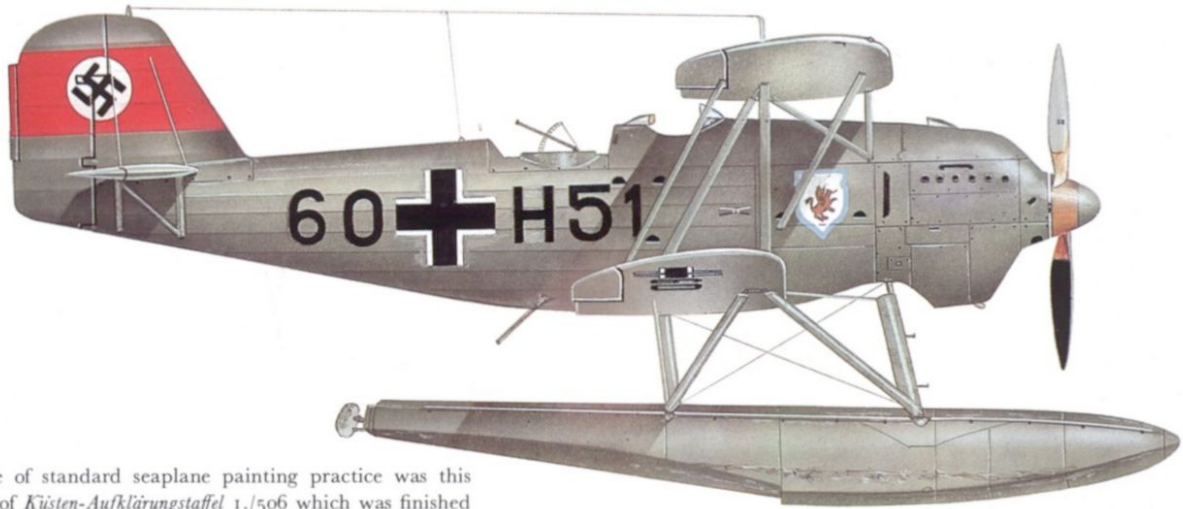
Left. Another of Willy Messerschmitt's successes was the Bf 108 *Taifun* which was one of the best liaison aircraft ever built. This one, KI + AY, bore the standard 1939 markings on an RLM grey 02 finish. Note the high gloss, on the wing especially. The canopy frame was left in natural metal and the white aircraft type name was carried on the usual white lightning flash under the cockpit. Right. All these Dornier Do 17Ps used by 3.(F)/123, a reconnaissance unit named *Die Eiserne Dritte* (the Iron Third), wore an individual name beside their unit emblem. In early 1940, as the snow began to melt, these aircraft were to be seen with two distinctly different types of camouflage, the middle one having a 70/71/65 scheme. The end Dornier bore the name *Flitzer*.



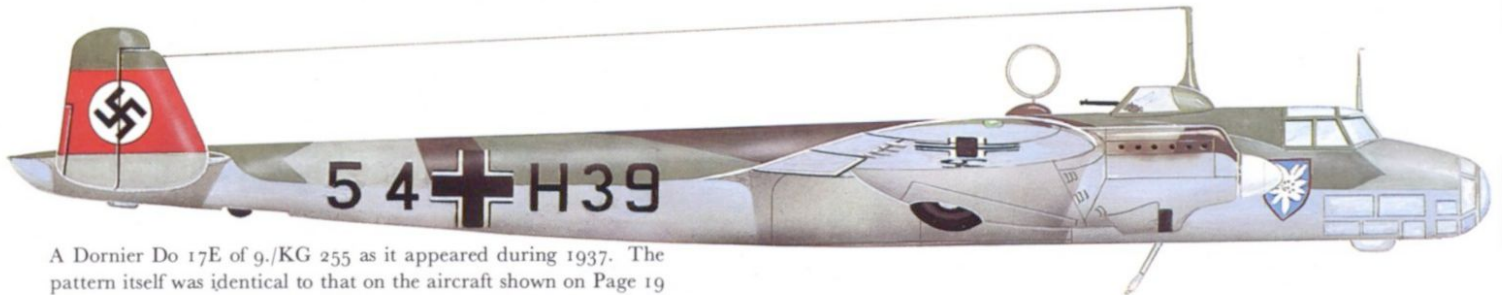
Left. Some Messerschmitt Bf 108s received an overall coat of blue-black paint which was highly polished. This one had the civilian registration D-IHDD marked in cream 05, a competition number on the nose, and the usual text stencilled in black on the rear fuselage. The cockpit framing was left in bare metal, a common practice. Right. An unusual code was used on this liaison Fieseler Fi 156 used by an unknown officer. The letters FIME were painted aft of the fuselage cross and also on the upper surfaces of the wing. A standard 70/71/65 color scheme was used.



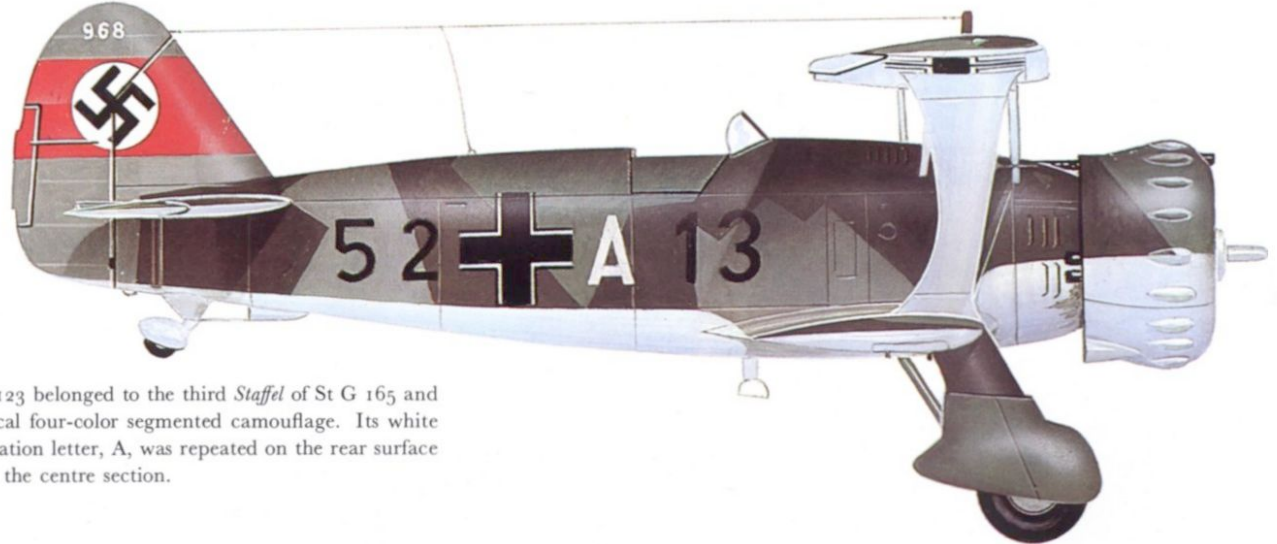
One of four *Habicht* (Hawk) sailplanes which put on a breathtaking aerobatic display at the 1936 Berlin Olympics, one of the pilots being Hanna Reitsch. The striking sunburst pattern was carried on the upper surfaces only in the NSFK colors pale cream (FAS1) and blue (FAS 2). Radio control sailplane enthusiasts will find a detailed set of multi-view scale drawings of this and over 100 other types in the new Kookaburra book "Vintage Sailplanes 1908-45". The attractive gull-winged *Habicht* was stressed for dives of up to 420 kph and could perform half bunts with ease.



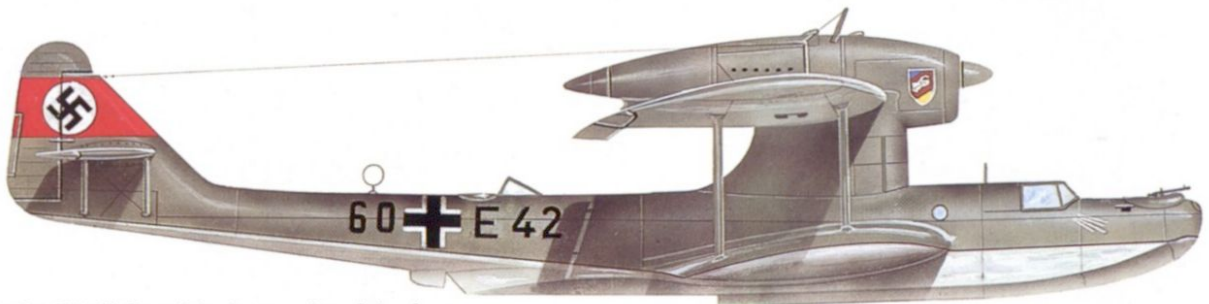
A fine example of standard seaplane painting practice was this Heinkel He 60 of *Küsten-Aufklärungstaffel 1*/506 which was finished in overall RLM grey 02. Its *Staffel* marking appeared on each side of the fuselage.



A Dornier Do 17E of 9./KG 255 as it appeared during 1937. The pattern itself was identical to that on the aircraft shown on Page 19 except that the color areas had been transposed. The first two and last two numbers of the code were shown in black on the upper surfaces just inboard of the wing crosses. See emblem below.



This Henschel Hs 123 belonged to the third *Staffel* of St G 165 and is shown with typical four-color segmented camouflage. Its white individual identification letter, A, was repeated on the rear surface of the top wing on the centre section.



A Dornier Do 18 of 2./Kü Fl Gr 406 in the prevalent flying boat scheme of 1938; RLM grey 02 except for the lower part of the hull and sponsons which were finished in silver and two coats of clear lacquer. The unit badge appeared on both sides of the cowling and a fine ruby red 28 line marked the division between upper and lower surfaces. No underwing markings were carried.

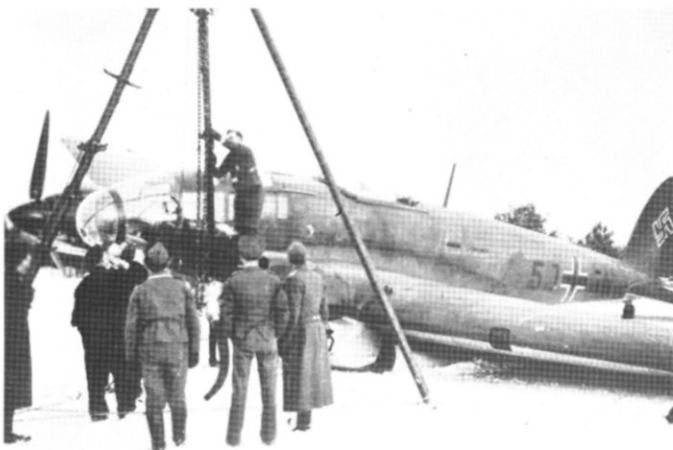


Upper. These Dornier Do 17Z-2 bombers of 4./KG 77 were stationed in East Prussia in 1940. Both 3Z+BM and 3Z+CM had the usual 70/71/65 camouflage with their individual letters and spinner tips painted white, this color indicating the *Staffel* to which they belonged. Right. For propaganda purposes the German Government had a series of Heinkel He 100D photographs widely distributed around many countries. The aircraft received 70/71/65 camouflage, spurious unit emblems, and individual numerals but, curiously, with their national markings painted in a non-standard manner. The ruse was so effective that in May-June 1940 a number of French and British pilots were convinced they had shot some of them down. Lower. A Messerschmitt Bf 109E of 3./JG 53, yellow 7, being refuelled in late Autumn, 1939.





With their individual numbers painted in white, these Messerschmitt Bf 109Ds served within the first, fourth, or seventh *Staffel* of a *Geschwader* in late 1939. Previously published photographs of the same unit showed the absence of any other *Gruppe* symbol behind the fuselage cross, suggesting the first *Staffel* of a first *Gruppe* — but which *Geschwader*? The owner of the photographs states that they were taken at Böblingen of aircraft of 4./JG 52, which used a red angry cat emblem. This, however, is inconsistent with the lack of any horizontal bar even though this could not have been seen here. The emblem, in fact (not to be confused with the black cat of 2./JG 20, later 8./JG 51), was at this time worn by the first squadron, called 1. *Jago* on its unit flag. The camouflage here was 70/71/65.



Left. A weak undercarriage was one of the drawbacks of the Heinkel He 111. Here 5J+JN of 5./KG 4 is seen after a landing accident at Hessesch-Lichtenau during the winter of 1939. Normal 70/71/65 camouflage was carried with early-style crosses and rearward-mounted swastika. In order to participate in searchlight exercises, the former red letter J and the propeller spinners had been painted over in black. Right. This Heinkel He 111E-3, V4+JH of 1./KG 1 bore the usual four-color camouflage and the white spinners of the first *Gruppe*. On the original photograph the unit emblem was just visible on the nose of the aircraft. Its letter, white J, was repeated in black on the lower wingtip, just inside the cross.

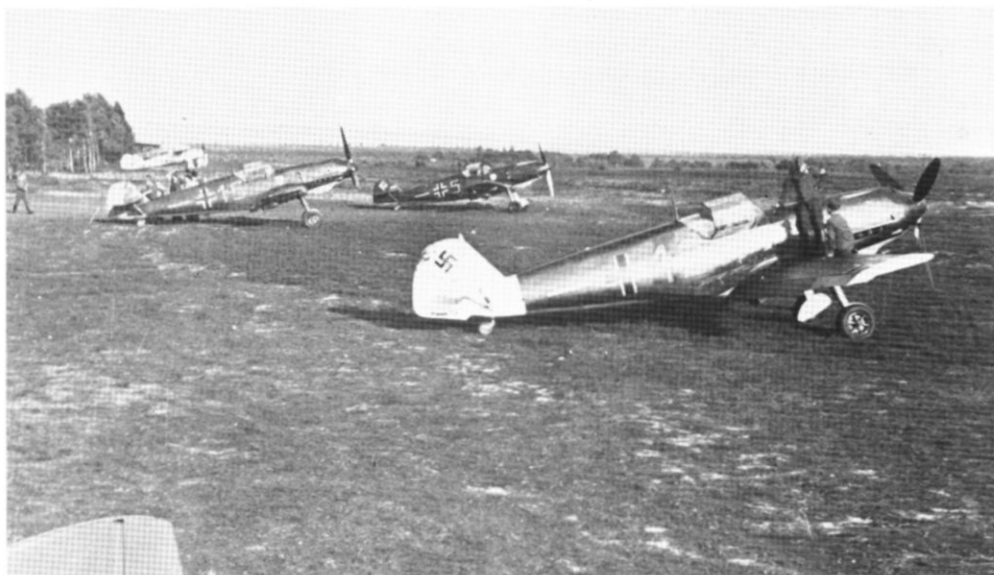


Left. Photographed just after entering the water, this Arado Ar 196, 6W+DN, was about to be towed out for take-off. Like all seaplanes it wore the low-contrast dark green 72/73 camouflage. On these aircraft the third letter of the code was rarely painted in the *Staffel* color, thus making identification rather difficult. The sailing ship emblem of Bordfl Gr 196 was worn just behind the engine cowling. On these aircraft the swastika was usually mounted on the rudder. Right. For many years it was believed that during 1939 all *Luftwaffe* aircraft were camouflaged with only one shade of dark green, but subsequent evidence has now disproven this assumption. This Junkers W 34, however, was almost certainly dark green 71 only on the upper surfaces, although the exact date of the photograph is unknown.

Photographed during maintenance, this Messerschmitt Bf 109D of JG 2 *Richthofen* was the second aircraft of the *Stabkette* as it bore the special markings of a bar on each side of the fuselage cross. The color scheme was 70/71/65 and in this case the dark green 71 camouflage had faded rather badly. Lower. Retaining the same registration as the old Junkers Ju 52, this Focke-Wulf Fw 200 V3 was one of Hitler's personal fleet. Except for the non-standard code, 26+00, indicating the city of Berlin, the aircraft had the usual markings and 70/71/65 camouflage. Note the bent elevator tip!



Three aircraft of 6./JG 26 awaiting action at a sunny airfield in Germany. Yellow 12 in the foreground had its entire tail unit and wingtips overpainted in temporary white, yellow 15 having only its rudder in this color. All fighters wore 70/71/65 camouflage and corresponding markings. As far as is known, tactical markings were not used until mid-1940 during the first attacks on Great Britain. The photograph was probably taken in late 1939, a few weeks after the unit, JG 132, had been renamed JG 26 *Schlageter*.





Bungee cords taut, a trainee pilot prepares to be catapulted into space in an SG 38 primary glider. The machine was named *Ernst Huchel* in memory of a respected instructor killed in a flying accident. Holding the stopwatch preparing to record the flight time is Konrad Dehn, another flying instructor.

CHAPTER 4

AN AIR-MINDED GENERATION

In the last chapter we saw the tremendous effort made by Germany to become the dominant European air power of the mid-thirties. Whilst many aeronautical firms were busy creating the equipment for the *Luftwaffe*, it was also necessary to build up an effective human fighting force to fly the new aircraft. The German government, therefore, taking advantage of the great public interest in aviation in this time of new records, set up several paramilitary or military organisations in order to swell the numbers of future aircrews.

The gliding movement, which began in Germany, had by this time become well established as an extremely popular sport, and from 1933 onward Hitler began to use it increasingly for propaganda purposes and for the training of future pilots. It really became a sport with a point. Even now, its enormous contribution to the *Luftwaffe* is not generally appreciated and as a consequence the pre-war gliding movement in Germany and the wonderful variety of types it used seems to have largely escaped the attention of serious air historians.* In March of 1933 all civilian flying clubs in Germany were incorporated into the *Deutscher Luftsport Verband*, or DLV, whose aim was to promote public interest in aeromodelling, gliding, balloons and powered aircraft.

During this period the plywood components of sailplanes and gliders varied in shade from a light honey to a dark mahogany, according to the type of wood used and the type of waterproof varnish applied to it. Some early examples were stained but this practice was not widespread. The cotton or linen fabric on the flying

surfaces was treated with clear dope and varnish, whereupon the color charged to ivory cream which flashed like gold if the sun should shine through it. This transparent finish allowed plywood, wooden components, and fabric to be inspected periodically for structural failure or bad workmanship. If this was present, the fault would then show immediately. Clear varnish, added after doping, was lighter than opaque paint, and after the fashion of the day was thought to be more elegant. Examples of this type of finish were to be seen on German gliders right up to and even after 1945.

In 1935 the DLV divided the administrative control of all civil flying into *Luftsport-Landesgruppen*, one for each separate area of Germany. To provide an identification aid, the gliders of each region would have their fuselages painted in the color or colors allocated. Where a two-color combination was designated, it was intended to paint the front half of the fuselage (and sometimes the wing leading edge) in one color with the rear fuselage and tail in the other. Where the two regions had the same colors, the order would be reversed. This, at least, was the intention although for various reasons was not always the final result. The allocated numbers and colors were as follows:

Area	Number	Colors
East Prussia	1	White
Pomerania	2	Light blue
North Germany	3	Black
Berlin/Prussia	4	Black and white

(Please turn to Page 63).

*The history of gliding and sailplanes is more fully dealt with in the new book, *The World's Vintage Sailplanes 1908-45*, which includes some 80 very accurate scale drawings of different types and is also published by Kookaburra. Details may be obtained by forwarding a stamped addressed envelope to the Publishers. (Overseas readers, an International Reply Coupon).



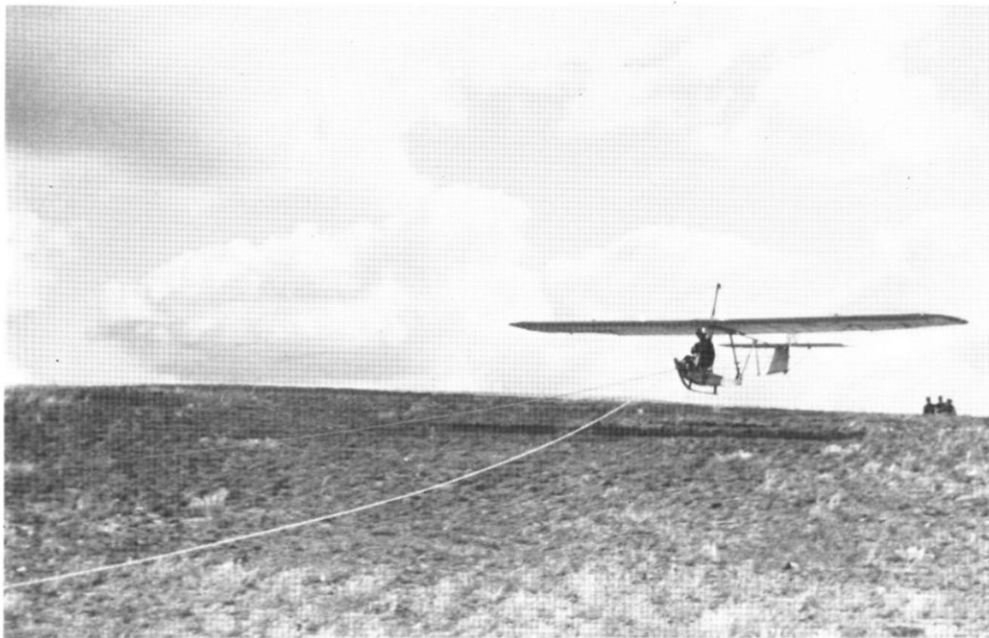
These fascinating photographs, taken at a free flight duration contest in the late 'thirties, illustrate the extent to which aeromodelling was actively encouraged in pre-war Germany. The famous Brown Junior spark ignition engine appears to have been standard equipment in these three models which reflect an interesting variety of design concepts. The symmetrical tailplanes on the upper and lower models would surely have presented some trimming problems!





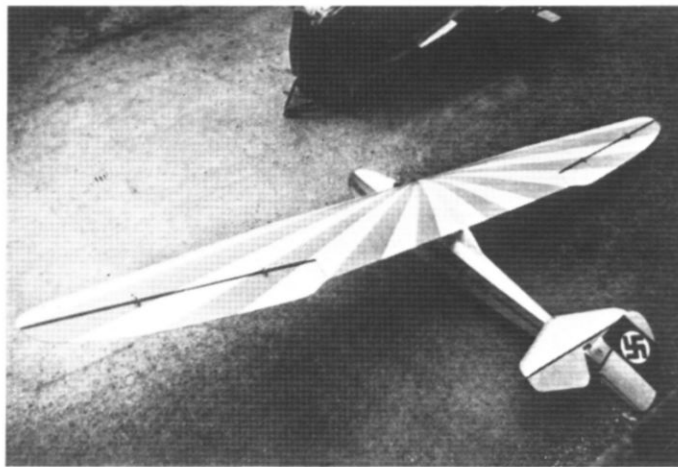
Upper. A fine flying shot of an SG 38 marked 4-1222 on the lower part of the rudder. Left. A busy scene at an NSFK flying site in the late 'thirties, showing three SG 38s, a type built in great numbers. Lower. A fine shot of a *Rhönbussard*, D-15-485, probably taken in 1937, at the famous Wasserkuppe site. The contest number 49 suggests that the aircraft was participating in a large competition. The finish was most likely clear fabric with a varnished fuselage. The allocated colors for gliders of the Stuttgart region were red and black and if the forward fuselage of this machine was in fact red, it certainly seems much lighter than the red on the fin and rudder.



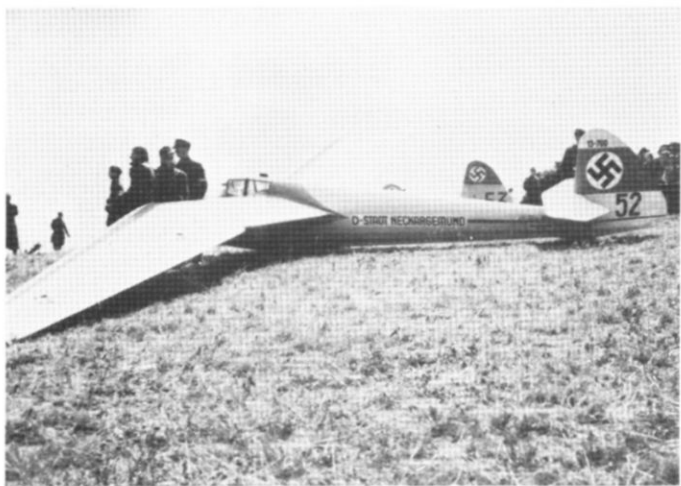


Three more fine action sequences showing the precarious nature of the art of flying primary gliders. In the upper shot the relatively slack bungee cord suggests a short practice hop prior to a more powerful launch. In the lower photograph the aircraft, 4-817, is also an SG 38 but in this case had been fitted with a nacelle, a modification which probably offered some small psychological benefit to the pilot.





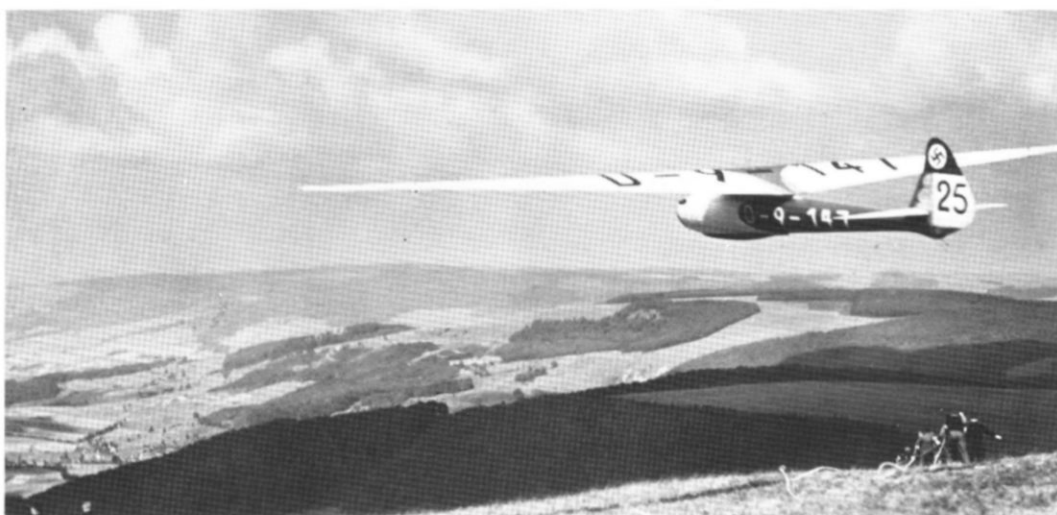
Left. This 1935 photograph shows the second *Wolf* produced. The entire aircraft had a clear doped and varnished finish except for the lettering and national markings. It is highly likely that the starboard fin and rudder would have carried the red, white and black national colors. The legend under the tailplane seems to read: TYP — WOLF Sport — Flugzeugbau Göppingen. Right. Photographed in 1936, this is another sailplane of the same type, appropriately enough bearing the registration D-WOLF on the fuselage and showing its aerobatic markings to perfection. The color scheme was pale cream and medium blue. The trim and entire elevator appears to have been medium blue.



Left. A *Minimoa* bearing the name D-STADT-NECKARGEMUND on a white background on its fuselage along with the registration 15-790 on the top of the rudder and with the contest number 52 on the lower portion. The color scheme was pale cream with red trim. Right. This shot of the rare high performance Huetter H 28 III shows to perfection its overall pale cream finish and markings. Black registration was carried on the fuselage but that on the wings appears to have been a slightly lighter color, possibly grey or red. The type is regarded as the forerunner of the present day *Libelle*.



Left. What's this? Nothing more than another *Wolf* with a Grunau Baby's rudder, a component very similar in area but of different shape and only partly painted pale cream like the rest of the aircraft. Right. Capturing all the thrill of silent flight, this overall pale cream *Minimoa* heads out across a valley after being catapulted off by its rubber bungee cord and helpers. The registration was painted above and below the wings.



A strikingly painted *Rhönadler* heads off for some thermal hunting from the famous Was-serkuppe. It provides an excellent example of an aircraft with a red and white DLV color scheme but with NSFK markings. The registration D-9-147 was painted in black on the wings, probably on the lower surfaces as well, but in white on the fuselage.

Halberstadt	5	Light green
Breslau/Silesia	6	Yellow
Dresden	7	White and green
Weimar	8	Green and white
Hannover	9	White and red
Dortmund	10	White and black
Darmstadt	11	Red and white
Essen	12	Black and white stripes
Nuremberg	13	White and blue
Bavaria	14	Blue and white
Stuttgart	15	Red and black
Rheinland	16	Brick red
Austria	17	—

From July 1933 onward the old Prussian colors black, white and red had started to appear on the starboard side of the fins and rudders of German aircraft, with the black horizontal band uppermost. Photographs of this practice on gliders, however, are quite rare. Simultaneously, the port side of fins and rudders were painted with a black swastika on a white circular background enclosed within a horizontal blood red band. On some examples the red was taken right up to the tip of the fin and rudder, as the photographs will show.

In many cases a club would bestow on each of its aircraft an appropriate name, often in Gothic script, preceded by a large letter D for *Deutschland*. Not all gliders followed the identification system described, however. SG 38 primary gliders, for instance, although usually displaying the party flag on the rudder and a number underneath, simply had nowhere to write any large registration numbers, for the rear fuselage consisted of nothing more than a crude arrangement of uncovered metal tubing. Three other notable exceptions to the practice laid down were Hanna Reitch's diminutive and colorful Sperber Junior, Kurth Schmid's Mu 13 D-Atalante, and Ludwig Hoffman's Rhönsperber, these machines being photographed in 1936.

In October 1937 the DLV was replaced by the *Nationalsozialistisches Fliegerkorps* (NSFK), a branch of the party formed in April of that year in order to encourage boys from the age of 12 to take up flying. (As a comparison, the Air Training Corps in British and Commonwealth countries trained a roughly similar age group.) It was the 18 to 20-year age group which concentrated on gliding instruction, commencing on primary gliders and, if the pupil was promising, perhaps graduating to a Grunau Baby or another type in which soaring flights

were possible. Only very advanced glider pilots were permitted to fly the more specialised types of sailplane in which many new distance, duration, or altitude records were established.

The NSFK decreed that gliders of every area should receive an overall scheme of pale cream oil-based paint. This practice, however, was never fully implemented and it was more common to see clear doped fabric in conjunction with painted plywood surfaces. Even well after 1935 many gliders were still to be seen in the old multi-color scheme. Perhaps in acknowledgement of the practical difficulties of completely repainting these machines, or possibly to try and achieve a higher degree of standardisation of the outdated scheme still being used, the NSFK issued a color chart of six shades which can be described as follows:

FAS 1	Pale cream	FS 595a 27855, No BS 381C equivalent
FAS 2	Medium blue	FS 595a 25102, two shades lighter than BS 381C middle blue
FAS 3	Medium brown	FS 595a 20117, BS 381C 489 leaf brown
FAS 4	Light green	No FS 595a equivalent, lighter and more yellow than BS 381C 218 grass green
FAS 5	Chrome yellow	FS 595a 23538, BS 381C 356 golden yellow
FAS 6	Medium grey	FS 595a 26134, no BS 381C equivalent

A photograph of this chart appears on Page 66. It is thought highly probable that the unlisted colors red and black were used only for the national markings.

On each glider the NSFK numbering system was shown on the sides of the fuselage, on the lower surfaces of the wings, and sometimes on the upper surfaces of the wings also. It is not possible to be dogmatic about dimensions, but photographs indicate that on the wings at least, the height of the registration varied from between half and two-thirds the wing chord at the position of the first letter. The prefix D was followed by a number representing the *Gruppe* to which the sailplane belonged, followed by a further number denoting either its number in the *Gruppe* or its number amongst all the sailplanes in Germany, a mystery yet to be unravelled! A typical ex-

(Please turn to Page 66).

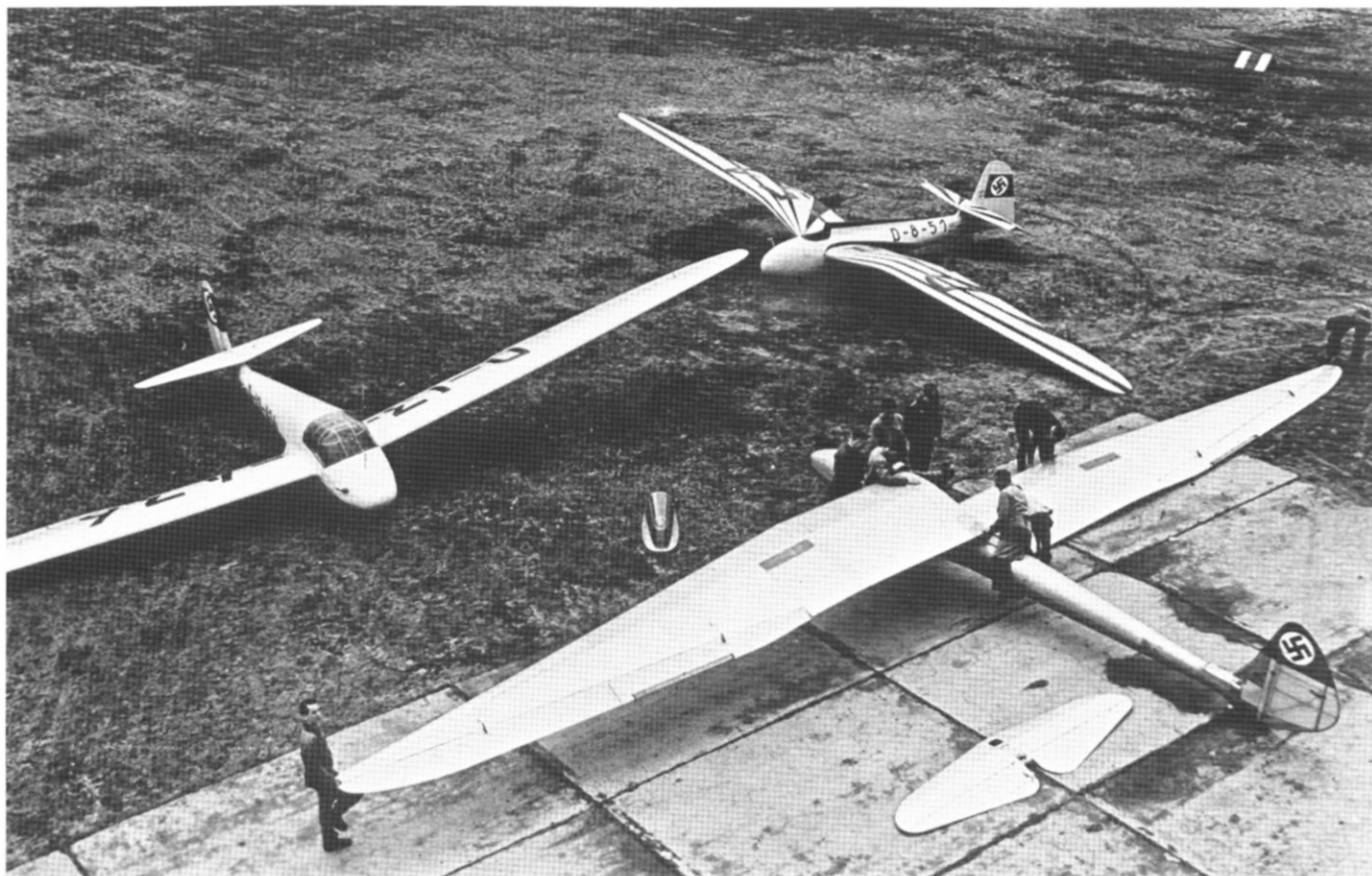


Upper. This beautiful photograph, taken at Dettingen airfield on 30th June 1939, makes an interesting comparison with the color shot on Page 73. In each case the inscription indicates the 100th *Minimoia* built, yet two sailplanes with different registrations could scarcely qualify for the same distinction and even the plaques are different! Here the highly transparent fabric covered components are especially evident. Lower. Another photograph taken at Dettingen, this busy scene shows a *Rhönbussard* in the foreground, apparently with clear varnished flying surfaces and pale cream fuselage and with the NSFK emblem under the cockpit. The stencilled information under the tailplane is of interest.





Upper. The quest for high performance gave rise to some elegant sailplanes, of which the FVA 10b *Rheinland* was one. It won the award for advanced technical design at the 1937 Rhoen competitions, its fuselage shape being designed to conform as closely as possible to the airflow over the wings. Its landing wheel was made semi-retractable and the nosecap was painted red. Finish was the usual glossy pale cream. On this example the registration was rather smaller than was normal. Lower. Illustrating three distinctly different color schemes, this photograph shows a partly assembled *Condor II* in varnished wood and clear doped finish but no registration, a two-seat *Göppingen 4 II*, D-13-436 in overall pale cream, and a *Habicht*, D-8-51, in the colorful pale cream and medium blue sunburst aerobatic scheme also shown on another machine on Page 53.



ample was D-11-3400 from NSFK Gruppe 11 of Hessen-Moselland, whose headquarters were at Frankfurt-am-Main. There were frequent exceptions to official requirements; for example one Grunau Baby IIB had no markings other than D-3-340 written in black under the red band on its rudder and the small NSFK emblem on each side of its nose. The colors of this emblem are detailed on Page 70.

Frequent exceptions to the officially required overall pale cream scheme were to be seen, many gliders still bearing their fabric parts clear doped and varnished with only their plywood components, usually not including the wings, being painted. The new type of registration was usually applied over the existing two-color basic finish. Aerobatic aircraft were often marked in a sunburst pattern of the NSFK colors FAS 1 pale cream and FAS 2 medium blue, an example being the *Wolf* on Page 62.

The following NSFK identification table for gliders dates from 1938 after the annexation of Austria.

Area	Number	Headquarters
Ostland	1	Königsberg, East Prussia
Nord	2	Stettin, Pomerania
Nordwest	3	Hamburg
Berlin-Kurmark	4	Prussia
Not yet allocated	5	
Schlesien	6	Breslau, Silesia
Elbe-Saale	7	Dresden
Mitte	8	Eschwege, Central Germany
Weser-Elbe	9	Hannover
Westfalen	10	Dortmund, Westfalia
Hessen-Westmark	11	Darmstadt
Niederrhein	12	Essen, Lower Rhein
Main-Donau	13	Nuremburg, Danube
Bayern-Sud	14	Munich, Bavaria
Schwaben	15	Stuttgart, Swabia
Sudwest	16	Karlsruhe, Southwest
Ostmark	17	Vienna, Austria

From the previous chapters it will be recalled that the two letters WL were introduced instead of the former single letter D as the code prefix for all second-line *Luftwaffe* aircraft from 1st January 1939. To comply

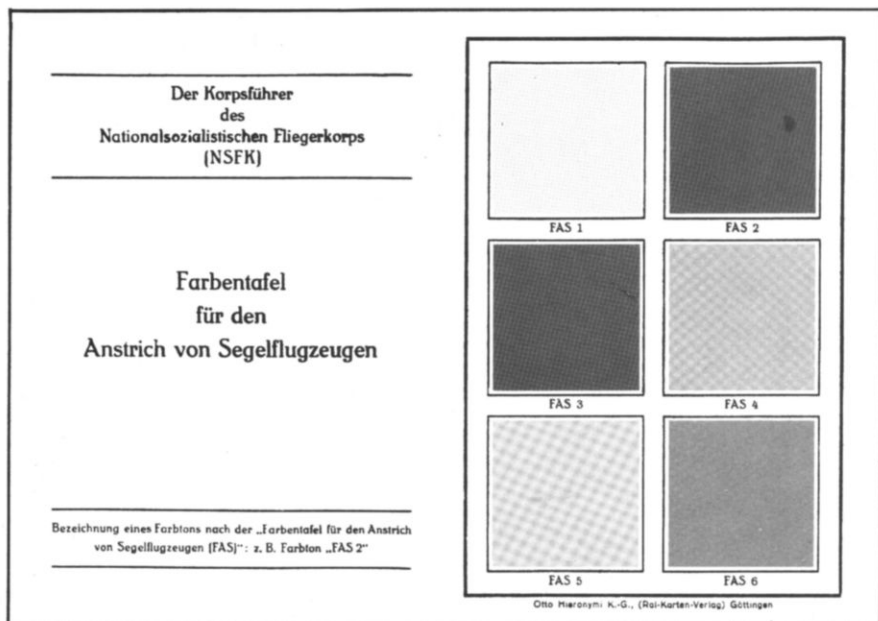


The pilot of this all-cream Grunau Baby awaits the flagman's signal to the winch operator.

with this order, all German military gliders should have worn this type of code, especially those serving in the training of crews which later participated in the world's first glider-borne attack, the operation by *Luftlande-geschwader 1* against the Eben Emael fortifications in Belgium on 10th May 1940.

Photographs of German gliders coded in the WL manner, however, are extremely rare and do not permit one to lay down hard and fast rules about the marking system. Another peculiarity of this registration method was the use of Roman numerals for the second group of figures. The regulation WL marking remained in force until 25th June 1943, when the registration system of gliders was changed in favor of two groups of two letters separated either by a hyphen or a small *Balkenkreuz*.

Another relatively little-known identification system relates to the codes painted on the troop-carrying DFS 230. Reminiscent of the civilian D prefix followed by two numbers, the first of these assault gliders received the code LB and two numbers separated by a hyphen, an example being LB-1-91. The complete absence of the swastika on the tail unit and very small crosses might seem strange, but it should be remembered that a vital element in any successful glider-borne assault was to cause initial hesitation and confusion, and too rapid identification would have compromised these essential operational requirements.



Reproduced here is a recent but very significant discovery, the official NSFK chart with its six color samples as described in text. It shows that pre-war gliders had their own quite distinctive color scheme, the most common basic color being FAS 1 pale cream, a shade which was lighter than the later RLM color cream 05.

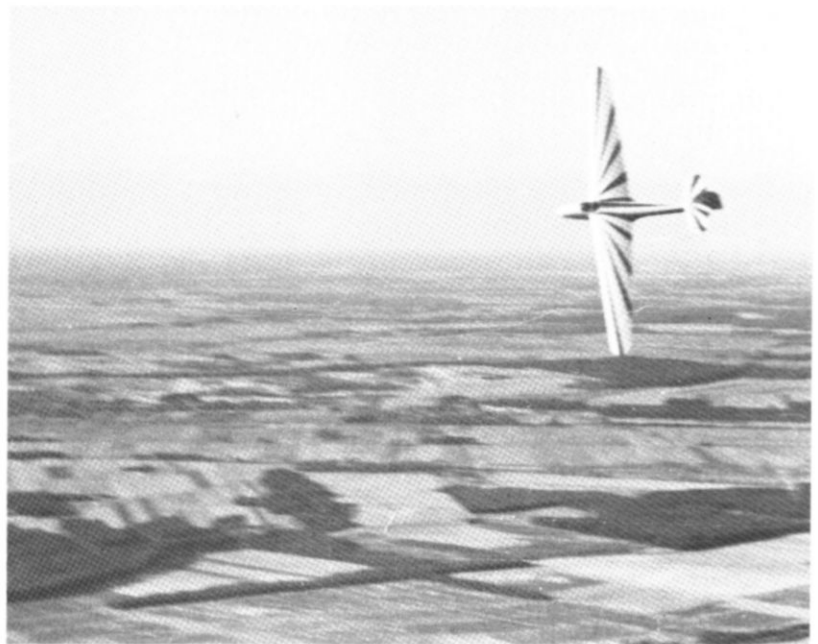


Upper. A beautifully clean and very new NSFK Grunau Baby II being manhandled onto a lifting trolley prior to being returned to its launching point. The color scheme was glossy pale cream FAS 1, a special NSFK color. The registration indicates that it belonged to the fourth *Gruppe* in the Berlin-Kurmark region, the final figures indicating the machine's individual identity. Again no registration was carried on the wings. Right and lower. The prototype DFS *Meise* (Titmouse), which later became the famous Olympia, seen at Sezze in Italy during the international competition in February 1939 at which it was chosen as the standard contest sailplane for the proposed 1940 Olympic Games. It was painted in the usual pale glossy cream scheme with red trim and black registration under the wing. The type was selected by the NSFK for mass production and over 600 were built in Germany alone.





Upper and right. Two fine in-flight shots of the same *Habicht*, D-4-1209, showing well both upper and lower surface markings. Unlike the aircraft illustrated in color on Page 53, this one bore a complete registration code in addition to its FAS 1 pale cream and FAS 2 medium blue sunburst scheme. Lower. Two pale cream *Kranich* sailplanes in front of some Grunau Babies. They belonged to the fourth NSFK *Gruppe*, their registrations being D-4-1816 and D-4-1781 respectively.





These three interesting views show examples of the two-seat *Kranich*, a widely used two-seat sailplane, each one having the usual pale glossy cream color scheme with clear doped fabric, black registration, and national markings in the usual colors. The tail of the aircraft on the right of the lower shot is interesting for the smaller than usual swastika was not centred on the rudder hinge and the red band did not cover the fin. On D-4-1350 the NSFK emblem is clearly visible under the cockpit.

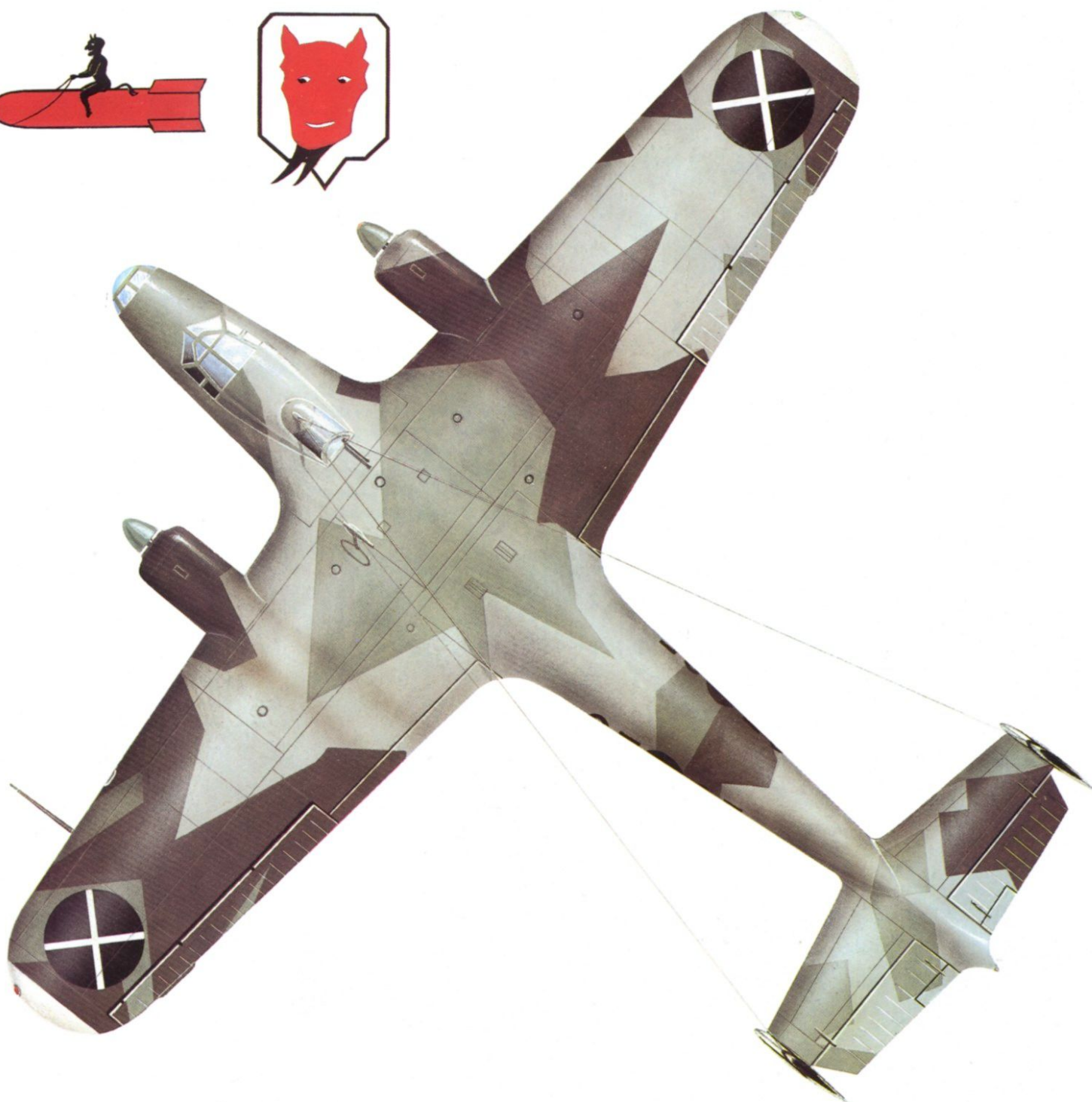




A fine shot of a *Condor II* at Rhoen, nicely painted in overall glossy pale cream and with its registration visible under the wings. The competition number 15 appeared in black under the red band on the rudder.

Right. A close-up shot of the cockpit of a DFS *Reiher* with its NSFK emblem. The standard color for the arch and wings was reputedly silver with a gold man and black swastika and lettering. On this example the basic color appears to be yellow with an even darker man, possibly red. Lower. A fine shot of the Berlin B8 in pale cream finish with black registration, D-4-660. The fuselage of the sailplane behind it, bearing the name *Zeus* on the nose, was simply varnished plywood with no color coat applied.





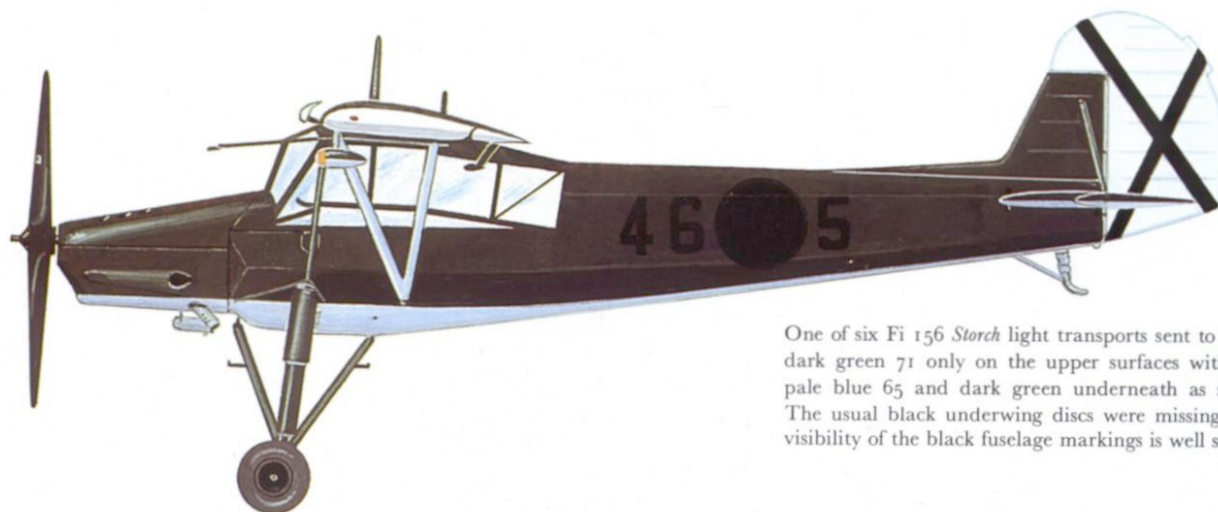
This Dornier Do 17E of K/88 was a good example of the camouflage and markings to be seen during the Spanish Civil War. The actual colors were dark brown 61, green 62, pale grey and pale blue 65. The white crosses, indicating Nationalist identity, were used over the black discs on the wing, never over the black fuselage discs. This machine carried the unit emblem on the outside of each engine nacelle in addition to the crew's own personal emblem.



This Heinkel He 51 was transferred from the *Legion Condor* to the Spanish crews of *Gruppo de Cadena 1-G-2* around November 1937. Originally in overall pale grey, photographs indicate this machine had received a coat of a darker color, almost certainly green 62, on the upper surfaces. See also Page 40.



This Heinkel He 111D-1 belonged to KG 1 *Hindenburg* at Greifswald in 1938 and had the usual four-color 61/62/63/65 camouflage. The tiny underwing crosses, dramatically presented swastika and interesting noseband markings are noteworthy features.



One of six Fi 156 *Storch* light transports sent to Spain, this one was dark green 71 only on the upper surfaces with a combination of pale blue 65 and dark green underneath as shown on Page 39. The usual black underwing discs were missing and the very poor visibility of the black fuselage markings is well shown here.



This Bf 109 of II./JG 53 is shown in the colors and markings it carried during the air exercises at Babenhausen/Hessen during 1938. At this time the standard practice was to feature the swastika on a red and white background.



Upper. A line-up of four Bf 109Cs at a fighter training school in Germany in late 1940. Three distinctive styles of camouflage are evident, the aircraft on the left having the pre-war greens 70 and 71 right down the fuselage sides with the usual pale blue 65 undersurfaces. The middle aircraft had the same colors but with the raised color separation line as used in the French campaign. The last two show a random overspray over their pale blue fuselage sides to provide a better camouflage effect when dispersed on the ground. The glossy pink paint – not faded red – used for the spinners and identification numbers was probably a mixture of roughly equal parts of red 23 and white. Lower. An interesting photograph taken on 30th June 1939 showing a newly completed Minimoa sailplane in the NSFK color pale cream with clear doped fabric surfaces. The blown canopy is of interest.



Right. Modellers would do well to note the condition of the paintwork of this Bf 109E from a fighter training school in 1940. The original pale blue 65 undersurfaces color showed signs of marked discoloration, the poor condition of the rear fuselage being especially noticeable. In about ten separate places new paint, possibly pale blue-grey 76, had been used for reconditioning, including patches in the area of the former outer wing crosses.



Left. An interesting in-flight shot of a Messerschmitt Bf 108 *Taifun* in pre-war civil registration and cream 05 finish. Another color photograph of the same aircraft gives the impression that the nose trim was black, but in this better quality shot it can be identified clearly as dark blue-grey. Lower. This photograph, probably taken during 1940, shows the well-known *Oblt* Hans Philipp of 4./JG 54 chatting to two other pilots. Eighteen black victory bars are evident on the near aircraft. An interesting but quite common feature of these Bf 109s was the very whitish base coat to their predominantly grey camouflage.





A landing amongst cows was probably the last thing this *Stieglitz* pilot anticipated. Information as to the aircraft owners, the air base, and the phone number, were painted on the rudder under the red horizontal band. The significance of the two-color triangle and circle remains a mystery. It would be very odd indeed if this marking had served as the emblem of the unit concerned, the NSFK at Hannover. The finish was overall silver 01.

CHAPTER 5

THE TRAINING SYSTEM

During the secret build-up period of air power in Germany from 1933 to 1935, the paramilitary DLV had been the nucleus of training for air-minded youth. Its facilities were of two kinds; the *Fliegerausbildungsstellen* (for basic flight training) and the *Fliegerübungsstellen* (for proficiency training), the latter providing a reserve of fully trained pilots ready for an emergency.

On 17th April 1937 the *Nationsozialistischen Fliegerkorps* or NSFK was created as an integral part of the National Socialist Party. It took charge of all so-called sport flying within the *Reich* territory and in a subtle shift of emphasis, lost its overt military image. It operated some light aircraft, but mainly gliders as described in the previous chapter. The NSFK was divided into three groups according to the age of its members. These groups were:

Flieger-HJ (Hitler Youth) – model building for 12-13 year old boys.

Jugend I – special instruction courses for up to 18 year olds.

Jugend II – training in gliding camps, workshops and paramilitary exercises.

Very quickly the old *Fliegerübungsstellen* were converted into new *Flugzeugführerschulen E* or reserve pilot's schools and attached to the *Kommando der Fliegerschulen* and thus to the *Luftwaffe*. At the same time, the

newly-born *Luftwaffe* had restructured the organisation of schools and had abandoned the alibi of the DVS (German commercial pilots' schools) for the new FFS. These *Flugzeugführerschulen* were divided into three distinct groups; FFS (A) which led on from basic military training and permitted the young pilot to get his A2 licence, FFS (B) (to qualify for the B1 and B2 licences) and FFS (C) (which led to the extended military pilot's licence – the ELF – with some training in blind flying).

After these courses came the blind flying schools where pilots qualified for a special licence which was necessary before they could proceed to reconnaissance or bomber schools. At the same proficiency level as FFS (A) and (B) were the LKS or *Luftkriegsschulen* (air colleges) for future officers. In November 1938 the FFS (A) and (B) combined to form new FFS (A/B). Following these courses, young pilots were introduced to specialised weapons training in fighter schools, bomber schools, reconnaissance schools, dive-bomber schools and naval aircraft schools. Only then were they considered well enough prepared to join operational units.

With large numbers of aircraft and great variety of training types, the *Fliegerführerschulen* and *Fliegerwaffenschulen* had no special standard camouflage, probably in recognition of the very practical difficulties involving time, manpower, and materials. The color schemes were



Left. In the paramilitary NSFK or National Socialist Flying Corps the aircraft were simply varnished to protect the plywood parts. Such was the case with this Klemm K1 25 which also had its engine cowling in bare metal except for the black upper panel from another aircraft. Above the manufacturer's construction plate was the Klemm factory emblem which, in turn, was surmounted by a variant of the NSFK insigne. Right. On the Klemm K1 25 the plywood parts not requiring covering were usually varnished instead of being painted, such as is seen here on these aircraft of the FFS at Herzogenaurach during 1937. Other parts of the aircraft were painted silver, the engine cowlings being left in bare metal.

similar to those carried by machines of the early *Luftwaffe*, overall silver and later, overall pale grey or greenish-grey 63 finishes which were sometimes glossy in appearance. As soon as operational units were re-equipped with new makes of aircraft after 1935, the obsolete types were transferred to flying schools, the result being a complete mixture within the same FFS. These aircraft were then supposed to have been painted according to current practices.

Interesting examples were to be seen at the time of the Munich crisis when even advanced trainers were painted in the new 70 and 71 colors. Similarly, dark green-camouflaged Bf 109Cs and Ds serving in fighter schools when the new E models entered service, received a coat of pale blue on their fuselage sides in late 1939 when the general standard scheme for fighters was changed. There was one notable exception, however, the Bücker Bü 133 *Jungmeister* which was allowed to retain its grey scheme with a spectacular V-shaped red trim area on the nose. All elementary trainers in fact, such as the Klemm K1 25, Heinkel He 72, Focke-Wulf Fw 44, Bücker Bü 131 and Bü 133, retained their original silver or grey paintwork until their safety became a problem, even in Germany in the later war years, but by then even gliders had started to receive protective camouflage.

From Chapter 1 it will be recalled that the early figure system of registration had been replaced by a four-letter registration as from the end of March 1934, and all powered aircraft of the so-called *Fliegerübungsstellen* were naturally required to carry this same type of code.

On 1st June 1936 the introduction of new military codes for all *Luftwaffe* aircraft resulted in a number of modifications for trainers. The main difference was the letter S (for *Schule* or school) appearing as the first figure of the new code. To cite an example, on S7+B96, an Arado Ar 68 seen as late as 1940 at Jüteborg, the code gave the following information:

- S – the *Schule*
- 7 – the seventh *Luftkreiskommando*
- B – the number of the flight within the school, in this case the second
- 96 – the individual number of the aircraft within the school.

The high numbers sometimes used for individual aircraft are noteworthy, as they demonstrate the very large numbers of aircraft in many of these elementary schools. Also of interest is the use of both the old number system of registration and the new number/letter combination within the same schools. It was to be quite some time before examples of the early system vanished altogether.

In the case of "all-letter" codes, it was virtually impossible to distinguish between the individual aircraft during formation flying and it became necessary to paint colored markings to facilitate air-to-air recognition. Very soon, white or red bands, either alone or in pairs, as well as large identification numbers, appeared on the fuselages of these aircraft. Along with the new military code, the *Balkenkreuze* were introduced in June 1936, albeit with some problems due to lack of space. In 1938, as the tensions in Europe mounted steadily, it was decided to paint all advanced training aircraft in the standard and certainly more aggressive-looking front-line 70/71/65 camouflage. Paradoxically, to distinguish each aircraft as a trainer, a wide white band was painted around the rear fuselage and also on the centre section of the top wing. These white areas provided a suitably contrasting background for the aircraft's black identification number. Many Avia B 534s seized after the annexation of Czechoslovakia and which found their way to fighter schools, were to be seen still with their original dark green camouflage and also these black and white markings.

A further need arose to paint bands on the aircraft when it became necessary to distinguish the aircraft used by blind flying schools. To achieve this, yellow bands, usually of fairly narrow width, were painted on the fuselages of these aircraft; for example on the Junkers Ju 52 two thin yellow bands sometimes encircled the fuselage between the trailing edge of the wings and the code. It was not long before these yellow markings became standard for all special aircraft such as trainers and captured types.

There was another interesting modification to the registration of training aircraft which was used briefly between 1st January 1939 and 24th October of the same year. The letter D for *Deutschland*, painted hitherto on all German civilian and second-line military aircraft, was

(Please turn to Page 79).



Upper and right. As described in the main text, some flying schools introduced a system of colored bands and individual aircraft numbers. These Heinkel He 45s were painted overall pale grey and carried two narrow red bands around the rear fuselage. Both aircraft had the early three-color fin and rudder on the starboard side, the one above, possibly D-IJOE, having a white figure 3 on the fuselage and the Heinkel on the right, D-IJUS, a red 2 just under the cockpit. Lower. Schlessheim training school often used an identification system of white or red bands. Here all Arado Ar 65s carried a white band around the fuselage just behind the rear cockpit. The D of the registration code was superimposed on the band on the port side. Curiously, all propellers came from separate manufacturers, most being light grey with a wooden boss. The finish of all aircraft was standard greenish-grey 63.





Left. This upended Arado Ar 66, photographed in the summer of 1936 at the *Fliegerübungsstelle Freiburg*, was a good example of the way civil registration was painted on training aircraft during this period. The color scheme was overall greenish-grey 63 and the registration letters were black. Right. Another Arado Ar 65 from the Schlessheim training school, showing clearly the white band around its fuselage, five-letter registration and in this case an entirely black propeller with a metal-sheathed leading edge.



Left. In this shot of Junkers W 34s it is possible to see under the cockpit canopy of the near aircraft the bathing trunks emblem used by FFS A/B 113 at Detmold, both machines being finished in greenish-grey with black codes and engine cowlings. Right. On this Arado Ar 66 the lower red tail band seems to be missing, but it is only due to a trick of lighting and the low contrast between the red and overall greenish-grey 63 finish of the aircraft. The correct color, however, should have been silver. The blue anti-glare upper fuselage decking appears to have been finely outlined in red.



Left. As the National Socialist emblem is just visible on the starboard side of the fin of this Focke-Wulf Fw 56 in place of the previous black white and red stripes, this peacetime *Stösser* was probably photographed between September 1935 and June 1936. It was painted overall silver 01 as prescribed for training aircraft of the period. The wing and tailplane struts were in the same silver color but the black D of the registration was continued on the starboard wing strut. The tiny red cross on a white disc on the cowl indicated the location of the medicine chest. Just behind it was the stylised eagle of the Fieseler company. Right. This Arado Ar 96 fighter trainer appears to have carried greenish-grey 63 paintwork, a swastika with no white disc or red band, and large WL registration. As this machine did not have the six crosses, one can safely assume it was unarmed.



Left. On this Fieseler Storch, WL+IQJC, the fuselage cross was literally jammed in between the letters L and I of the registration and the upper wing crosses were quite small. The contrast between the two shades of green, 70 and 71, was only just discernable. The small white spot and tiny red cross between the Q and the J indicated the position of the medicine chest. Right. The twenty-first aircraft of the flying school at Grossenhain-Dresden in 1936, this Heinkel He 45 was about to take off. Painted overall greenish-grey 63, it carried the registration system introduced in June 1936.

now replaced by the prefix WL (for *Wehrmacht Luft*) on all military aircraft operating in a training role, the prefix D being reserved for civilian use. Lack of space on small aircraft produced some understandable exceptions, mainly when the *Balkenkreuz* had to be shown on aircraft such as armed trainers. It should also be noted that some of these trainers marked with the WL prefix participated in the Polish campaign as second-line aircraft of the *Lehrgeschwadern* (or school units). These units held crews for a time of further experience after graduating from previous schools, and for this reason the first school unit, or LG 1, had four specialised *Gruppen* as follows:

- I./LG 1 was a *Zerstörer Gruppe* with heavy fighters,
- II./LG 1 was a *Kampf Gruppe* with bombers,
- III./LG 1 was another *Kampf Gruppe* with bombers and
- IV./LG 1 was a *Sturzkampf Gruppe* equipped with dive-bombers.

It has been stated elsewhere that several Bücker Bü 133s which wore a special code such as LG+01 or LG+02 were part of some unknown training units. The fact is, however, that these aircraft comprised the *Kunstflugstaffel der Luftwaffe*, a special aerobatic squadron under *Hpt* Trutenbach and which in 1938-39 was officially part of I./LG 2. This was the reason why the unit allocated the somewhat unusual registration to these special aircraft.

An element of confusion still surrounds the four-letter identification system introduced from 24th October 1939 for all *Luftwaffe* aircraft, including those in training units. From that time, in order to provide all machines with a new code (with the exception of those in front-line service), groups of letters were allotted to flying schools, but also to aircraft factories. Although it is sometimes possible to read the same two-letter prefix on different aircraft of the same training unit, this is by no means an infallible method of identification. To cite an instance, at the FFS (C) 2 at Neuruppin, the following aircraft were to be seen; Dornier Do 23 SA+FL, Dornier Do 17 SA+BG, SA+BH, SA+BJ and SA+UO.

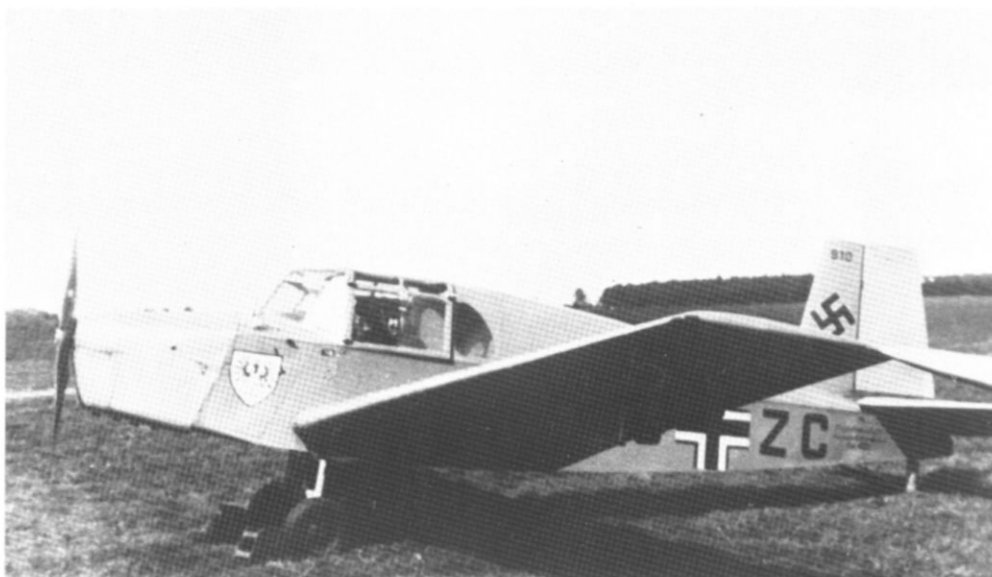
The first emblems began to appear on trainer aircraft at about the same time as those on front-line types. As the training units were scattered all over Germany, their emblems were often based on the coat of arms of the

nearest city, or on some other subject. Amusing ones were fairly rare, but two examples were the well-known Detmold swimming trunks of A/B 113 and the blind cow motif used by many blind flying schools.

All the Arado Ar 66s and Focke-Wulf Fw 44s in this hangar appear to have been painted silver with the usual black codes and markings of the early period with the swastika on the port side only. The Arados in the foreground had their rear upper fuselage decking painted in dark blue for anti-glare effect.

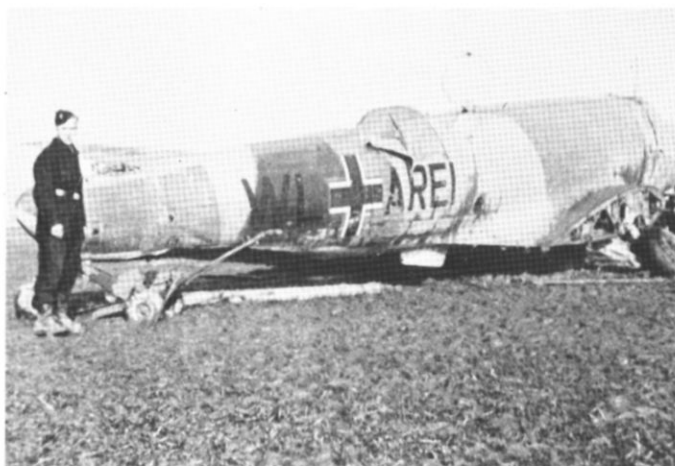


The Brandenburg *Fluglehrerschule* used a variety of aircraft of which the Siebel Si 202 and Heinkel He 70 were typical. The *Hummel* had RLM grey 02 camouflage which had a slightly lighter appearance on the engine cowling compared with the fabric-covered fuselage. As only about 66 of this type were built, the number 910 was probably not the *Werk Nummer* in this case but more likely the individual number of the aircraft within the school. The Heinkel below had lost most of its characteristic black parts and only the engine cowling retained this color. The rest of the aircraft was pale grey and the dark part of the cockpit would almost certainly have come from another He 70. Both aircraft showed the school's emblem on the nose.



As soon as a system of codes for training schools was introduced, it was even used by seaplane schools. These two Heinkel He 59s wore the codes S6+A15 and S6+D70 respectively on their overall RLM grey 02 finish. It is interesting to note the high numbers used on training aircraft to indicate their identities within each school.





Left. The fuselage of this crashed Junkers Ju 86A-1 shows clearly the recently introduced black edge around the fuselage cross and the WL code which indicated the aircraft's training role. The normal 61/62/63/65 color scheme was used, and to prevent rain damage, the cockpit and upper gunner's position had been covered with canvas. Right. No doubt seen here at a bomber or blind flying school, this Dornier Do 23 had received a coat of temporary black paint normally reserved for front-line night bombers. It appears to have had dark green and RLM grey 02 upper surfaces. Judging by its condition the starboard propeller was almost due for an overhaul.



Left. Despite the fact that this shot was taken in August 1940 at Bromberg, these two Focke-Wulf Fw 44 *Stieglitz* trainers still retained their early style fuselage crosses. Each had a coat of overall silver 01. Note the small black stencils on the tail of CK+IX, W Nr 2902. Right. Four captured Avia B 534 fighters used by the FFS at Herzogenaurach in early 1940. The aircraft had lost their large white fuselage bands, the individual numbers being painted instead in white just in front of the fuselage crosses.



Left. This Heinkel He 60 was being pulled onto the slipway after completing a flight. The required RLM grey 02 finish appears lighter than usual and was probably closer in shade to pale grey. On this aircraft a camera gun was mounted on the bottom starboard wing. Both floats were probably silver. Right. Temporary black paint covered all the undersurfaces of this Junkers Ju 86 used by *Blindflugschule 2* in Neuberg during 1939. The interesting emblem under the cockpit was the head of a white cow!



After the *Stieglitz*, Focke-Wulf provided another good aircraft in the Fw 56 *Stösser*. Photographed in February 1940 at Jüteborg at the same time as the Arado Ar 68 S7+B96 on Page 81, this trainer had similar features; the silver color, a modified fuselage cross and an oversized plain black swastika. Despite the date of the photograph, the machine still carried its outdated WL code. Note the large underwing cross, the barely visible stylised Focke-Wulf emblem and the *Werk Nummer* high on the rudder.



Upper. A training Messerschmitt Bf 108 in very battered overall blue-black and the cream-painted code WL+IAJB. The swastika was carried on the fin but due to the lighting effects in this photograph it is practically invisible here. The fuselage cross itself was most unusual. Left. A Bücker Bü 131 with the same style of markings as the one on Page 82 but this one had a white rear fuselage band and fin-mounted swastika.

Yellow warning stripes were painted on aircraft used for blind flying training, this Ju 86G-1 of a flying school, possibly for bombers, had a marking of this kind on its fin. The code read as S13+C76. Lower. Photographs of the Arado Ar 76, the unfortunate competitor of the Fw 56 *Stösser*, are very rare. The few which were built were used by fighter schools in early 1936, but some, like WL-INZA, continued to serve until 1939. Finished in pale grey, this aircraft had its fuselage upper decking painted in a dark anti-glare color, probably blue.



Generally, twin-engine aircraft equipped the FFS C for the training of pilots for the ELF (*Luftwaffe* pilot's extended licence). This Dornier Do 17 was certainly part of such a school for it carried the unusual number 400 in black under the port wing. Unfortunately, the rest of the code is not discernable and the red and white background to the swastika had been overpainted in a dark camouflage color.





Left. A parade at Lechfeld air base showing three different types of trainers standing unprotected in the open during winter. All were painted silver and bore the old civilian registration. The Heinkel He 46 on the left, D-?137, even had the earliest system with four figures. The two middle Arado Ar 66s had no armament in the gunner's position and the photograph was presumably taken after 1st January 1939 as the swastikas had no white disc or white band. Right. Probably originating during the war in Spain, the *Pikas* emblem decorated the engine cowling of this Gotha Go 145A photographed during the early part of the war, the clue being the swastika still centrally mounted on the rudder hinge. The finish was overall RLM grey 02.



Left. Contrasting with the pure white of the snow, the color of this Gotha Go 145 looks darker than the usual pale grey and may have been RLM grey 02. The blue and yellow emblem of FFS A/B 112 was visible just aft of the engine cowling. The individual number of this aircraft was not readily discernable but was painted in white on the top of the rudder. Right. Spending most of their time in the open, large aircraft like this Junkers Ju 86E-2, PR +OU, were often in rather poor condition after a couple of years in service. The photograph was taken in 1940.



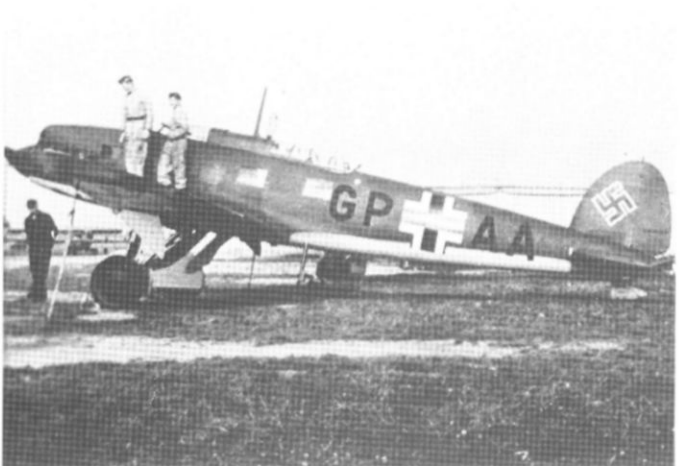
Left. The Brandenburg eagle served as the emblem of the *Luftwaffe's* flying instructors' school when based at Brandenburg-Briest airfield. This Focke-Wulf Fw 58, white 1, wore the usual 70/71/65 camouflage and, curiously, very dark lower parts of the engine cowlings. Right. After the defeat of France in the summer of 1940, the *Luftwaffe* took over many French aircraft for training or other duties. This Morane Saulnier MS 230 had all its original markings removed and German ones applied over its existing camouflage colors. Some parts, however, appear to have been patched with pale grey.



Left. Some Focke-Wulf Fw 44 *Stieglitz* trainers were fitted with skis, this one being finished in overall RLM grey 02. Just behind the engine was an unidentified unit badge. Can any reader identify the unit? Right. Another *Stieglitz*, this beautifully clean example was photographed just before take-off from Pilsen in 1940. The non-regulation fuselage cross had still not been modified and in this case the finish was overall silver.



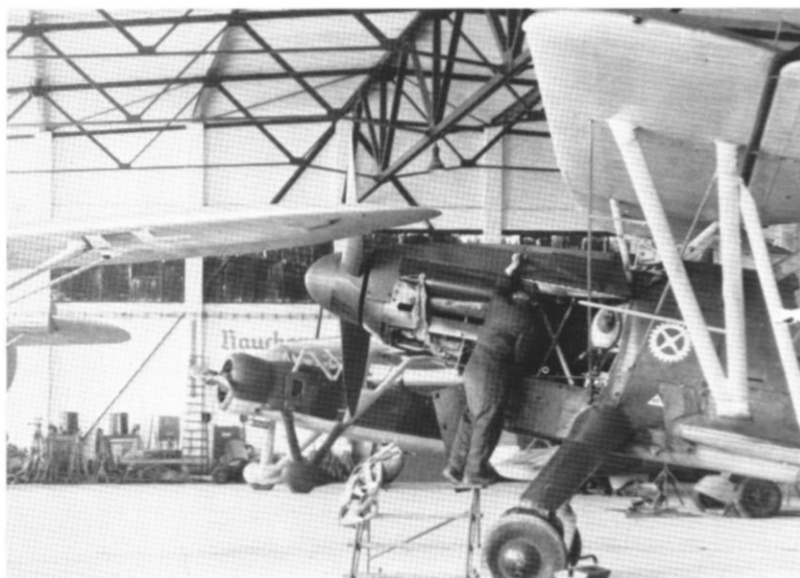
Left. Ready to go! This pupil awaits his instructor's signal to commence a solo flight. The Focke-Wulf 56 had the standard overall silver paintwork and a four-letter code. Of special interest is the narrow band, probably red, around the engine cowling, an unusual practice on this type of aircraft. The Focke-Wulf emblem under the wing showed a stylised eagle within a black-outlined disc which was probably light blue. Right. An Arado Ar 68 at Jüteborg in Spring, 1940, with an S7 code as described in the main text and grossly oversized swastika applied over traces of the former white disc and red band. The trainer had a dark blue top decking and thin piping. The paintwork had obviously been patched under the code.



Left. During the war years the Heinkel He 70s generally lost their former black-colored noses. Probably quite new, GP+AA showed its contrasting 70 and 71 colors quite clearly on the original photograph. In this case the fuselage cross, but not the swastika, was outlined thinly in black. Right. This forced landing of a Heinkel He 45 flown by *Uffz* Pierig finished safely enough, but in a potato field. The photograph was most likely taken in 1939 as the swastika had no white disc nor red band background, yet it was still centred on the rudder hinge. The aircraft, W Nr 815, was painted in overall RLM grey 02.



Upper. The Bücker Bü 131 *Jungmann* served as a primary trainer before and during the whole of WW 2. Unlike its successor, the *Bestmann*, only rarely did it carry dark green camouflage and was usually seen in glossy pale grey. This one, W Nr 132, carried its swastika over both fin and rudder plus its type name stencilled on the engine cowling and top of the rudder. Right. Taken at Fassberg-Celle in the last months of 1939, this photograph suggests that the aircraft were not operational. Photographs of the Henschel Hs 122B-0 are quite rare. The one shown in the background was very clean looking and probably wore 71/02/65 camouflage. The Arado Ar 68 on the right had no underwing markings at all and bore the strange unidentified white cogwheel marking. Lower. When German forces entered Czechoslovakia, many aircraft were seized for the use of training schools. This Avia B 534 was photographed at Elbing in 1940 and kept its original camouflage to which *Luftwaffe* markings were added along with the letters DA. The aircraft's identity, black 9, was painted on a yellow band, the same color as the tip of the spinner. Note the whitewall tyres!





Left. The Arado Ar 96 was one of the best fighter trainers of the war, this one, ??+AA, being painted in the usual RLM grey 02 with black code repeated under the wings. The propeller blades and the distinctive spinner were also black. Right. Even obsolete types were useful in the training role. This veteran Albatros L 101D, from the early days of the *Luftwaffe*, was still serving on in 1940. The basic colors had evidently not changed from its original silver 01 with dark blue upper decking.



Left. During the winter of 1939-40 an important change took place in the camouflage of single-seat fighters when it was decided to continue the light blue undersurface color right up the fuselage sides almost to the top. This Bf 109C of FFS Vienna-Schwechat received the new scheme, its black individual number 16 being painted on a large yellow band aft of the fuselage cross. The spinner was also in the same bright yellow color with the propeller blades being the usual black-green 70. Right. Interesting for modellers and historians, this photograph shows one of only six Junkers Ju 86C-1s ever built. Marked D-AVOE and named *Obersalzberg*, it served with DLH (*Deutsch Luft Hansa*) from 1937 to 1939, then after war broke out it was repainted and received its new marking DK+C?. The coat of paint was so thin that on the original photograph the old markings could still be seen.

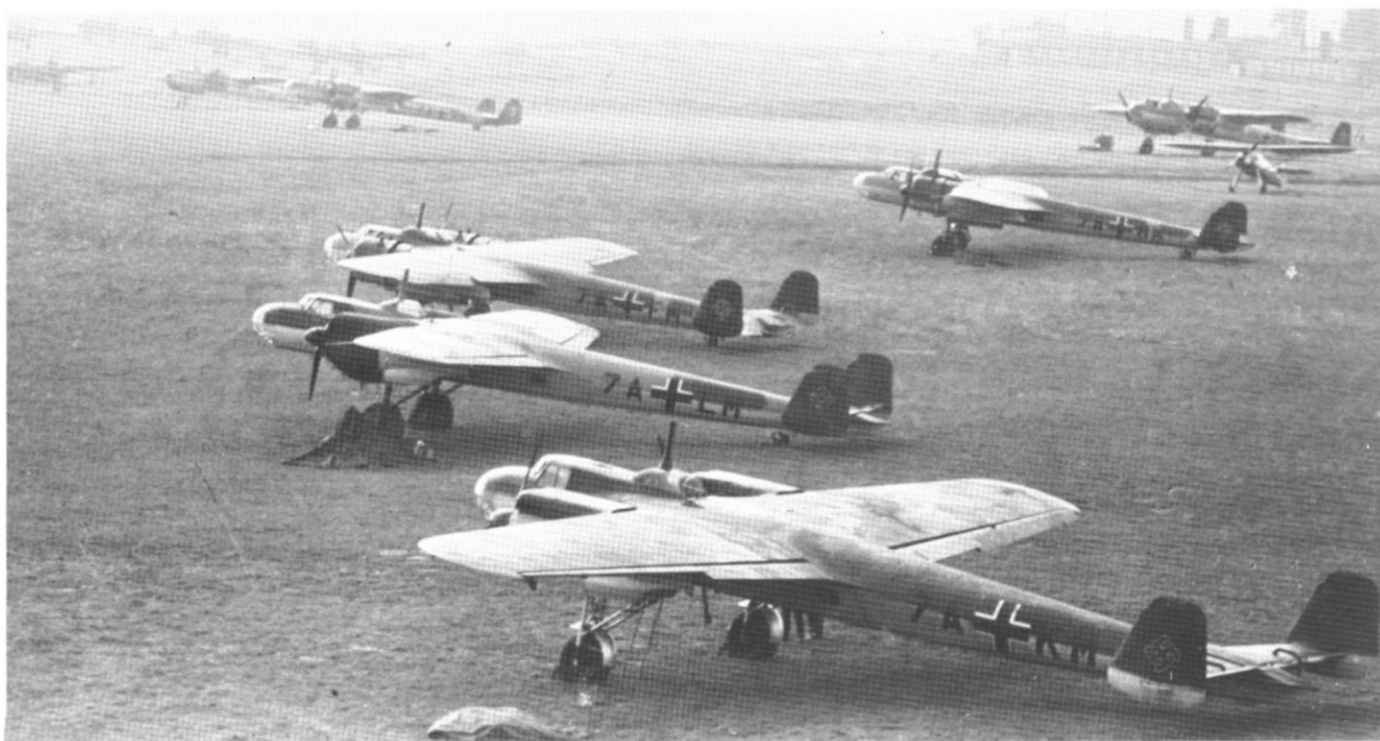


Left. This US-built Curtiss H 75 was used as a fighter by the French *Armée de l'Air* before being taken away to Germany for evaluation in November 1940. It retained its original camouflage and also its large underwing French code, which was just visible on the original photograph. In the background on the right were two Arado Ar 68s camouflaged in the usual 70/71/65 colors with black markings and yellow numbers 4 and 11 respectively. A large white band covered each top wing centre section, this feature serving as a background color for the individual number on many training aircraft which had been camouflaged. Right. The Focke-Wulf Fw 56 was the first design for which Kurt Tank was completely responsible. Over 1,000 *Stössers* (Falcons) were built, this one having the usual 70/71/65 livery with yellow fuselage band and spinner tip. The aircraft's individual number, 900, appeared in white just forward of the cockpit and the black code read as NN+AB.



Upper. Finished in overall silver like most primary trainers, this Focke-Wulf Fw 44 *Stieglitz* belonged to FFS A/B 23 at Kaufbeuren. It had a modified fuselage cross, a yellow band around the rear fuselage, a four-letter code and unit emblem aft of the cowling, showing that the photograph was most likely taken during 1940. Right. In this ECPA photograph a pupil is seen preparing for a flight in his Focke-Wulf Fw 44. This one was standard enough with, most likely, overall silver finish, modified fuselage cross and *Werk Nummer* stencilled in black on the fin ... but look at the wingtips and rudder, for all had been painted in yellow, the recognised safety color. Lower. This Bf 109D is interesting for several reasons. The forward position of the swastika indicates that the photograph was taken no earlier than 1940, and some parts of the fuselage had been repainted. One suspects that W Nr 1723 may have once been an operational fighter allotted to a mechanic's school, the clue being the white gearwheel symbol just forward of the cockpit.





The fourth *Staffel* of Auf Kl Gr (F)/121 at readiness in September 1939. Almost all Dornier Do 17s here wore the early 61/62/63/65 camouflage except for the very patchy 7A+KM in the foreground. In keeping with the latest painting orders, the white discs and red horizontal bands on the tails of these aircraft had been overpainted with black-green 70.

CHAPTER 6

BLITZKRIEG — THE LIGHTNING WAR

After the Munich conference in September 1938 over the fate of Czechoslovakia, England and France suffered a considerable loss of prestige and a small ally felt betrayed. The mood of the time, however, was quite the opposite, and when in the subsequent House of Commons debate Winston Churchill began his speech with the words: "We have suffered a total unmitigated defeat", there were cries of outrage. Documents and statistics now available permit no room for doubt that in Autumn, 1938, Germany could not have survived an armed conflict for more than a few days. With the wisdom of hindsight, many historians now agree that by shrinking from a small risk, the major Western powers made war inevitable.

With the effortlessness of a major diplomatic victory behind him, an emboldened Hitler, now suffering (according to many reputable reference sources) from a marked loss of contact with reality, became more and more bent on war and looked toward the acquisition of yet another territory — Poland. He needed a granary and source of timber but even more importantly, a common boundary with the Soviet Union in keeping with his grand design for Germany; the conquest of living space at Russia's expense.

On 1st September 1939, Germany's armed might rolled across the Polish borders. Great Britain declared war shortly afterward, followed by France, but when Poland realised that she was without practical military aid it was already too late. Swarms of motorised German formations supported by lightning strikes from the air were soon engaged in a methodical onslaught against a country utilising, in the main, the equipment and tactics

of World War 1. A few days later the first successful *Blitzkrieg* was over. For all its dramatic success, however, Hitler had miscalculated the response of the British, and in a state of gloom, appears to have realised the fatal error of attacking Poland. Consequently, he found himself diverted from what had been his major objective for almost twenty years, and now fighting a major war in the West — on the wrong front.

The utilisation and painting of aircraft described in the previous chapters had only one aim, the prosecution of war and the expansion of the *Reich* territory. It is not difficult to understand why the two basic shades of green chosen for camouflage were so dark, for they corresponded admirably with the colors of the forests of Central Europe, especially when an aircraft painted in these shades was viewed from above under average weather conditions and from a distance. The national and individual markings themselves had also been studied methodically so as not to spoil the overall camouflaged appearance.

Combat experience in Poland soon dictated several important alterations to national markings. Immediately prior to the opening round of hostilities, all *Luftwaffe* aircraft had only one basic camouflage scheme but two separate methods of displaying individual markings. The standard dark greens 70 and 71 had been applied to all land-based aircraft, with maritime aircraft being treated with the dark greens 72 and 73. In each case the pale blue 65 color was limited strictly to the undersurfaces. The national markings consisted of the *Balkenkreuz* shown in six position plus the *Hakenkreuz* on each side of the tail surfaces, overlapping the fin and rudder. To re-



Ground personnel of 6./JG 26 taking a break during the air manoeuvres in Summer, 1939. Yellow 5 was camouflaged in 70/71/65 with a virtually indistinguishable contrast between the two dark greens.

capitulate, the two systems for the recognition of individual aircraft were as follows: Single-engined day fighters bore a combination of a number and symbol, or symbols, in a special color to identify the *Staffel*, whilst all other *Luftwaffe* aircraft were required to carry a code consisting of numbers and letters painted on the fuselage in front of and behind the cross.

The first group of numbers and letters, set out in the list contained in *Luftwaffe Camouflage & Markings Vol 2* is now well known and indicated the *Geschwader* to which the aircraft belonged. The third letter served to identify the individual aircraft within the *Staffel* and was painted in the allotted color. The fourth letter of the code identified the *Staffel* itself. For example, as seen in the table on Page 139, a typical code, V4+JH, would be explained as follows:

V4 — *Kampfgeschwader 1*

H — the first *Staffel* of the *Geschwader*, *Staffel* color white

J — aircraft white J of the unit.

Sometimes the third letter, normally painted in the plain *Staffel* color, would be left in black or simply outlined thinly in the correct color. As red was a color which did not contrast particularly well against dark green camouflage, the individual code letter of aircraft of the second, fifth, eighth and eleventh *Staffeln* would often be outlined thinly in white for better visibility.

When this four figure/letter system was introduced, the full code was usually repeated on the upper and lower surfaces of the wings. Soon, however, this method was abandoned in favor of a colored or black individual letter only under each wingtip and sometimes on the upper surface of the wing as well.

There was an important exception to this identification scheme which has never been described in previous literature, the code system for transport units. These *Kampfgeschwader zur besonderen Verwendung* (KGzbV for short, or bomber units for special purposes) had the same basic organisation as other units, but with an important difference; from 1st August 1938 all *Transportgeschwadern* consisted of four *Gruppen* with four *Staffeln* each. On Page 141 will be found information on these special units, which included another color, blue, for the extra *Staffel*. Another real problem in the study of the transport units is the fact several of them operated for only a very short time. For example KGzbV 103, 105 and 107 existed solely for the *Weserübung* operation against Norway in April 1940. The necessary Junkers Ju 52s were collected from all available sources, generally from blind flying schools, and as a consequence, often

had the yellow bands of these schools overpainted with dark green camouflage. The examples of yellow bands which missed out on this treatment, however, were certainly not a special recognition aid as has sometimes been claimed in the past.

During the *Blitzkrieg* campaign in Poland, another important change took place with the modification of the *Balkenkreuz*. Photographs show quite clearly the very low contrast between the black of the codes and markings and the surrounding dark green areas of the camouflage. In addition, the white parts of the crosses were very narrow, so that it is not hard to imagine the difficulties which ground forces faced in distinguishing German aircraft from Polish machines, particularly as the camouflage schemes were similar. With the unprecedented speed of aircraft engaged in aerial warfare, the skill in telling friend from foe had now become a matter of instant life or death.

For these reasons, in early October 1939, it was decided to enlarge the four white angles of each cross, and even the complete *Balkenkreuz* itself on both upper and lower surfaces of the wings. This enlargement required the repositioning of the wing crosses a considerable distance inboard from the wingtips to a point where the wing chord was much greater. Sometimes crosses of almost grotesque proportions were to be seen taking up the entire wing chord, including the ailerons and flaps. A few weeks after the events in Poland, all these markings alterations were ratified by official orders, and many examples will be seen in the photographs and color paintings.

Apart from a new position for the tail *Hakenkreuz*, which was required to be repositioned on the fin (or on the rudder when the fin area was insufficient) there was no further modification to German aircraft markings until after the period under discussion in this volume, up to the end of December 1940. Single-engined day fighters continued to bear a number and a symbol as already described, and in some cases a Messerschmitt Bf 109 flown by a *Geschwader* or *Gruppe Kommodore* would be seen with the corresponding *Winkel* or chevron in front of its normal four-character code.

After September 1939 almost all units began to adopt an emblem to identify with their growing traditions. It is interesting to note that these newly introduced and sometimes provisional emblems generally lasted for only a short time, a typical case being the *Staffel* emblems of KG 76.

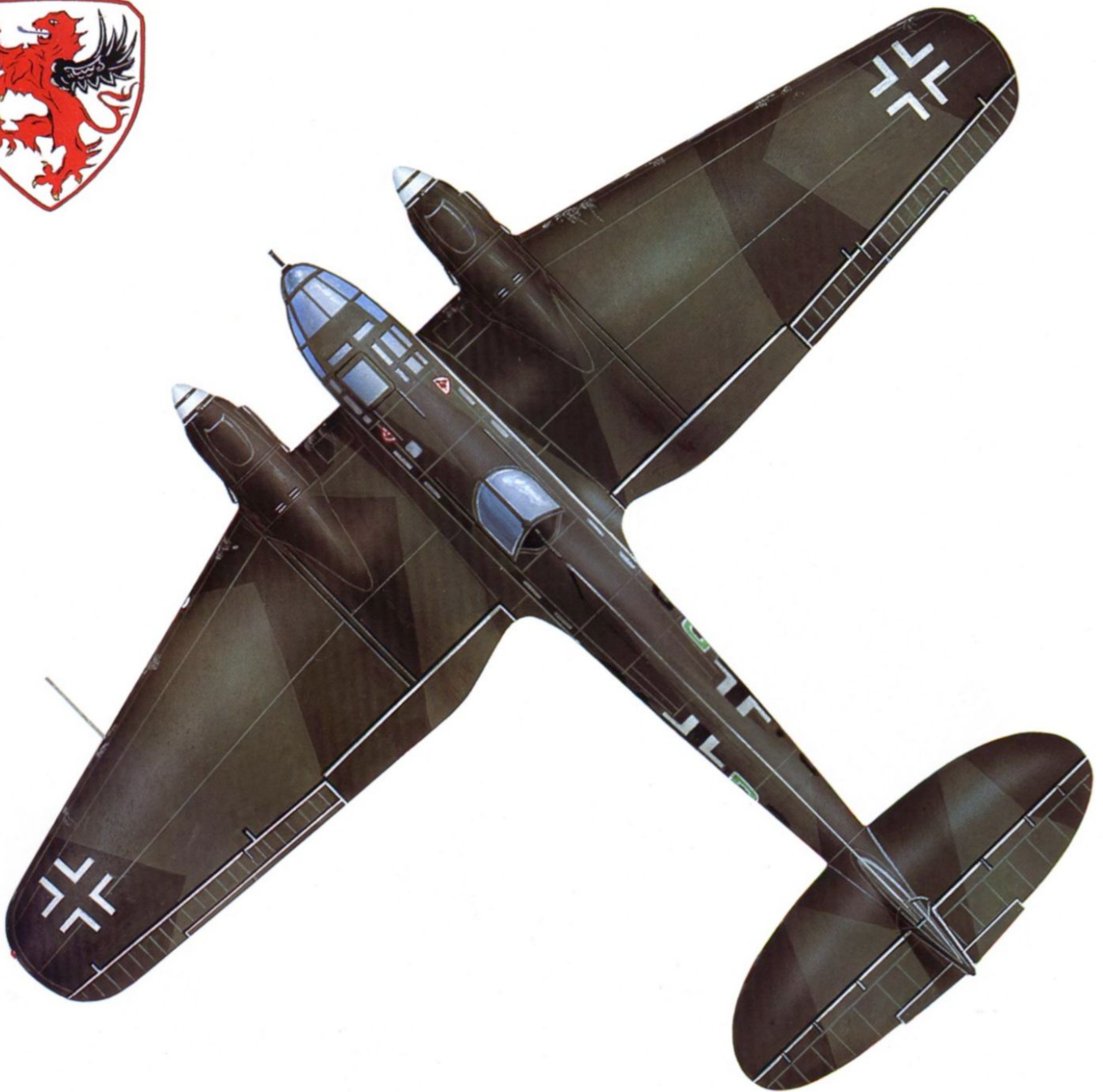
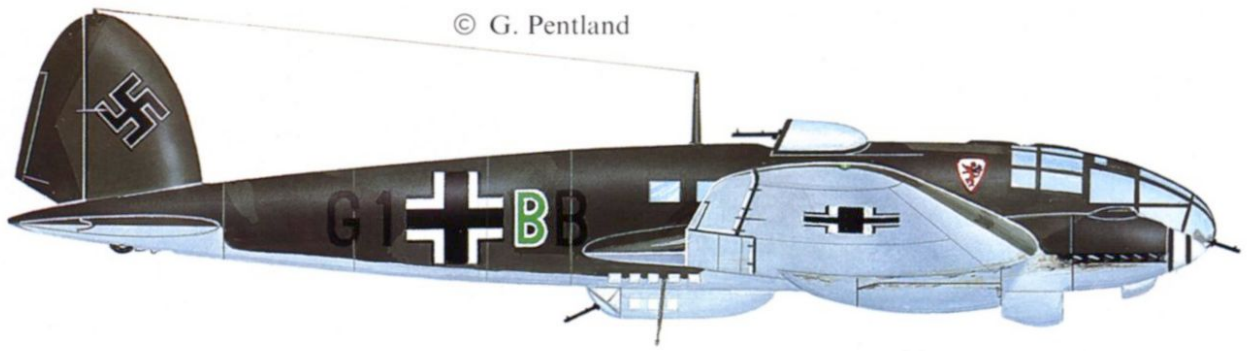
After his early fame as an orator and politician, Hitler's swift military success in Poland strengthened his conviction that he would win glory as a supreme commander. Against the advice of his generals, he now decided on a risky strike on Denmark and Norway during April 1940 — Operation *Weserübung*, which would provide essential iron ore and a base from which to attack Britain. The brief campaign which Allied staffs had considered impossible, again proved a brilliant success.

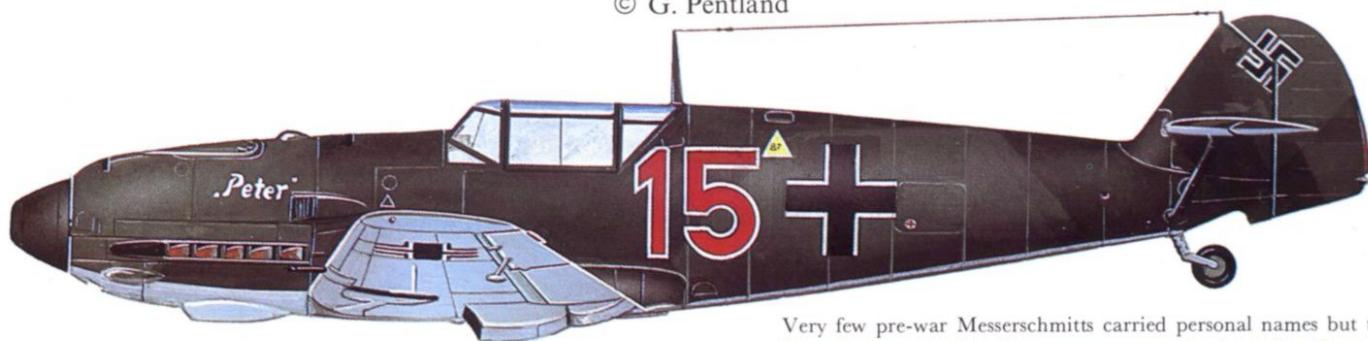
With the aim "to bring the French and British to the battlefield and rout them", he now turned his eyes in the direction of France. Although the opposing ground forces were nearly equal in strength when the German offensive began at dawn on 10th May 1940, surprise and clever tactics allowed the might of the highly mobilised *Wehrmacht* to roll quickly over France and the Low Countries. Some spirited resistance in the air was offered

(Please turn to Page 98).



Toward the end of the Battle of Britain, the prevalent camouflage scheme on the Bf 109 was definitely grey and this aircraft, black 9 of 2./JG 3, provided a typical example of the practice. Prominent yellow nose and tail markings were carried, the color of the worm *Gruppe* emblem varying according to the *Staffel*, red being the color allocated to the second *Staffel*.

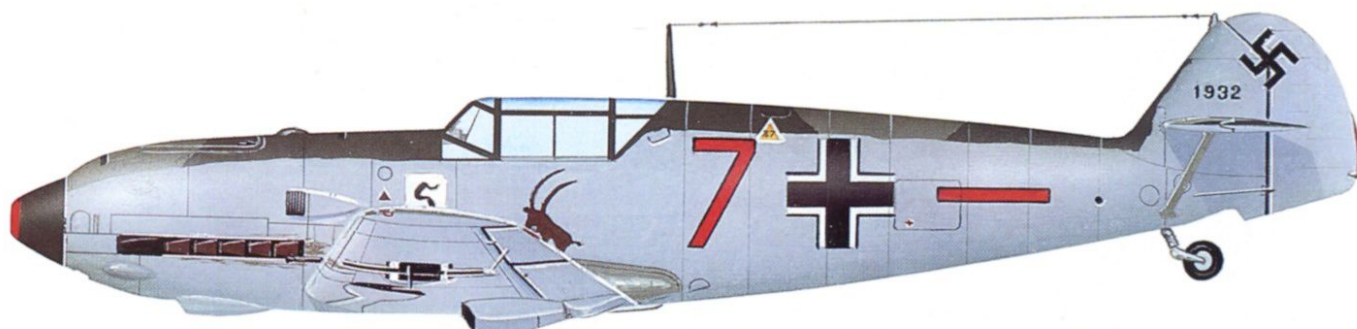




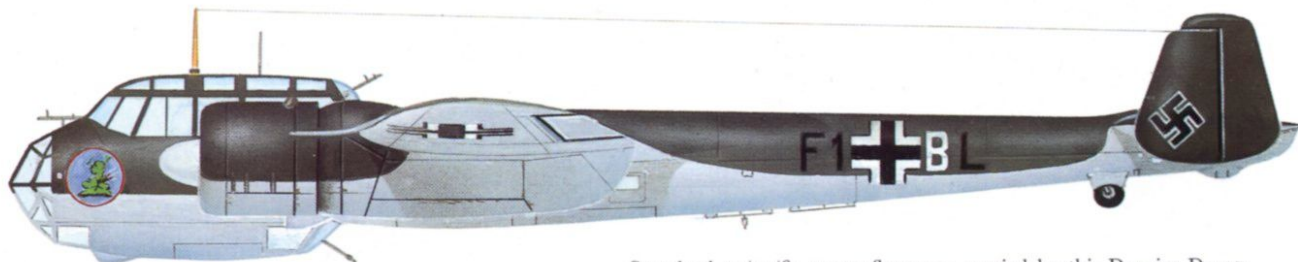
Very few pre-war Messerschmitts carried personal names but this Bf 109E, "Peter", of II./LG 2 was one example which did. The thin-edged crosses and rearward-mounted swastika minus any red and white background were typical of the late-1939 period.



This Henschel Hs 126 belonged to 4.(H)/121 in November 1940, a *Staffel* at one time known as 9. (H)/LG 2, hence the code L2 +DM. Standard 70/71/65 camouflage was used with the individual aircraft letter thinly outlined in white for visibility reasons.



Illustrating the 71/02/65 scheme common in early 1940, this colorful Bf 109E of 6./JG 26 in France had several interesting features. These included a swastika centred on the rudder hinge line, early style wing and fuselage crosses with the underwing cross much further inboard than usual, and an unusually large *Werk Nummer* on the fin.



Standard 70/71/65 camouflage was carried by this Dornier Do 17 "Flying Pencil" of 3./KG 76 during 1940. A photograph of this machine is shown on Page 121. The painting of its little-known unit badge showed some slight variations from normal.



Something of a puzzle is provided by these intriguing Bf 109E color photographs of 1./JG 20 as indicated by the white bow and arrow emblem of the first *Staffel* and the angry black cat of the second *Staffel*. Formed in July 1939, the *Geschwader* had only one *Gruppe* and thus would not normally have worn the wavy line symbol of a third *Gruppe*, yet in July 1940 1./JG 20 became the third *Gruppe* of JG 51. By this time, however, most operational fighters had long since abandoned the two-tone dark green fuselage sides and rearward-placed swastika. As it is easier to paint false markings on photographs than repaint whole aircraft, this may well have been done for propaganda or intelligence purposes in late 1939. Another possibility is that as JG 20 had only one *Gruppe*, it may have been attached to JG 2, perhaps forming the third *Gruppe* of this *Geschwader* which consisted of only *Stab*./JG 2 and 1./JG 2 whilst based at Berlin-Döberitz. The pilot of the aircraft with a chevron was *Oblt* Kath, the adjutant of 1./JG 20 in late 1939.





Upper. This photograph shows several Messerschmitt Bf 109Es of the first and second *Staffeln* of the well-known JG 53 *Pikas*. On the nearest one at least it is possible to distinguish between the 70 and 71 shades of dark green. Only red 9 and the other aircraft behind it had the unit emblem, white 15 and white 10 having no unit symbol at all. The shot was taken at Wiesbaden in September 1939. Lower. This rear view shows a Dornier Do 17 of 4.(F)/121 being refuelled after its first mission over Poland. The three-tone upper surface camouflage, the black code 7A+BM, and the early-style fuselage cross are all visible.





Upper. Rest time for the crews of LG 2 during the Polish campaign. Three different types of aircraft are visible in this photograph; a dark green-camouflaged Focke-Wulf Fw 44 with black WL-EGBA code, a green-camouflaged Heinkel He 70 with the code L2+E10, and a distant Focke-Wulf Fw 58 in civilian-style finish and WL markings. Lower. Inspecting a recent victory in Poland, the crew of this Fieseler *Storch*, WL-IWFT, landed close to a downed PZL *Karas*. The former was camouflaged in 70/71/65, its code being repeated under the wings. The wheel struts were dark green outside and light blue inside.





Upper. Things seldom change quickly! This photograph, taken in late 1939 at Lachen-Speyerdorf, shows two newly-camouflaged Messerschmitt Bf 109s, a 70/02/65-colored D-1 marked as white 3, and an *Emil*, black 11. The partially covered one was wearing the white symbol of the *Gruppen Kommandore* and seven white victory bars in front of the swastika. This was the aircraft of *Maj Hannes Gentzen*, the first ace of the *Luftwaffe*. The fighters carried the Bernburg Hunter emblem of JG 102 plus the black hand within a white disc on the engine cowling. The overall RLM grey 02 Junkers W 34 had no code at all, a rare practice on operational aircraft. Lower. The first Iron Crosses were awarded shortly after the initial victories of WW 2. These 1./JG 53 pilots pose proudly for the photographer. An unusual feature on wartime aircraft was the legend "JAGDGRUPPE WIESBADEN" with the phone number "TEL. 58881" on the rear fuselage in black.





Posing for the photographer, these crew members of 7./St G 151 were pretending to be studying their maps. The Ju 87, 6G+AR, wore the yellow *Staffel* emblem under the cockpit with the individual letter A also in pale yellow. The rest of the code was in black. It is interesting to note the condition of the paintwork after only a few weeks of war. From the radio mast flutters the Deutschorden crusader's pennant, well known in Germany.

by French and British units, but overwhelmed by superior organisation and weight of numbers, their fate was inevitable. A country half prepared for defeat had not been expecting utter collapse and on 14th June German troops pulled down the tricolor from the Eiffel Tower. The Battle of France was over.

Between late-1939 and mid-1940 a number of very significant developments took place concerning aircraft camouflage, especially that of the fighters. As the proud Polish people smarted under their new conquerors, in the west, things took on an almost unreal aspect during the "phoney war" period of 1939-40. Taking advantage of these precious months of comparative inactivity, all the belligerent nations engaged in one of the most crucial arms races of modern history.

In Germany, whilst bombers and dive-bombers were being received by their new units wearing the usual 70/71/65 camouflage, some aircraft plants were beginning to deliver the Messerschmitt Bf 109 with a new livery. From this period, the pale blue 65 color started to replace the previous dark greens 70 and 71 on the fuselage sides, the darker colors being kept only for the strict plan view upper surfaces of the wings and fuselage. Again, the dividing line between colors was very clear-cut. As the order of October 1939 had prescribed, markings were applied in fairly standard fashion, but some units used variations or special positions, creating some interesting exceptions as follows:

III./JG 27 (known as I./JG 1 between November 1939 and September 1940) and III./JG 54 (I./JG 21 prior to July 1940) wore their individual numbers or rank symbols either on the engine cowling or aft of the supercharger air intake. Meanwhile, III./JG 2 *Richthofen* (formed in early 1940) continued to display the pre-1937 wavy line as the third *Gruppe* symbol instead of the more modest-

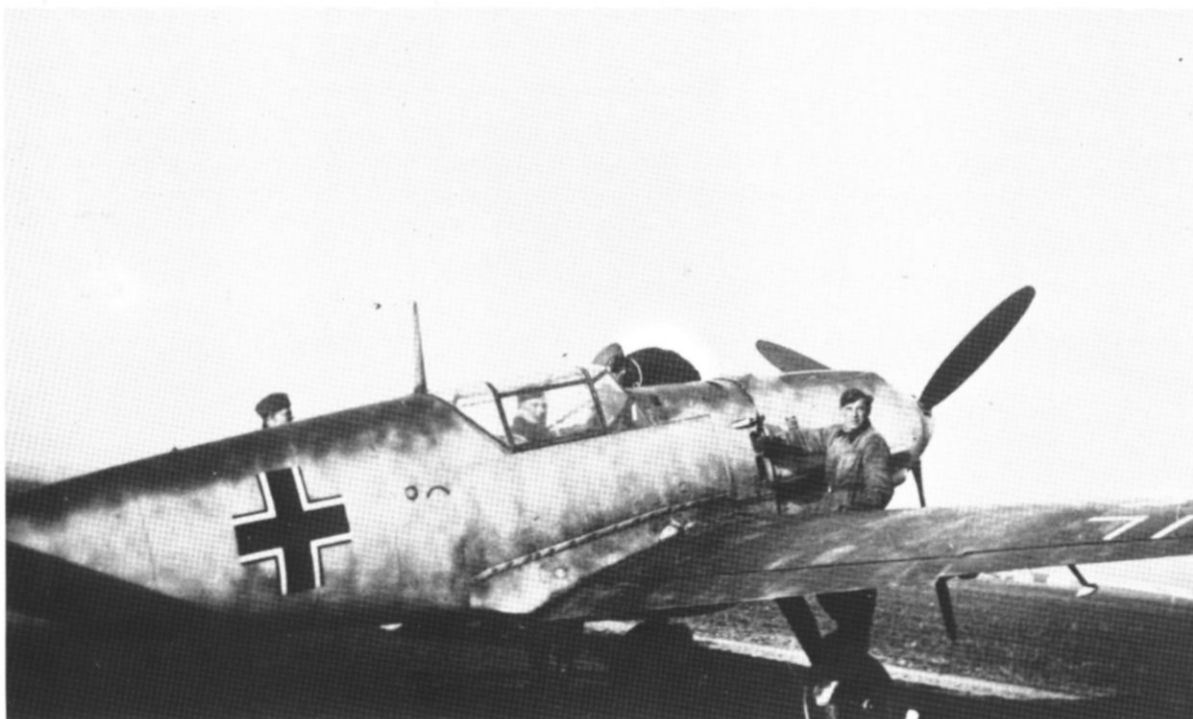
looking plain vertical bar which had become mandatory from 14th December 1937. The reasons for these exceptions are still unknown, but they remained for a surprisingly long time. Occasionally, no doubt due to mistakes made by certain painters, a number of new aircraft reached units bearing the old-style fuselage crosses. Another non-standard practice on the new light blue fuselage color was the omission of the *Staffel* color in of the aircraft's number or rank symbol, this appearing merely as a thin black outline in the normal places. The very narrow white band around the rear fuselages of some dark-camouflaged fighters likewise has no known official explanation, but for all that it was a quick and effective air-to-air recognition aid to identify the *Staffel* leader. In the heat of combat there was frequently no time to pick out, for instance, the figure 1 on a Bf 109 or to read an A as the third character of the code on a Bf 110. The reason why there were sometimes two of these thin white bands on some fighters is still a mystery.

There was, however, a further apparent disregard of official orders (or perhaps the introduction of new ones which have never been located), for photographs taken at the time show a most interesting development. Shots of the upper surface camouflage of day fighters, officially 70 and 71, show a very noticeable and much greater contrast than previously, providing conclusive evidence that the colors used could not possibly have been the standard combination. There is no doubt that a lighter color, RLM grey 02, was now used to replace one of the dark greens. The RLM grey 02 was in fact the standard primer color used on all metallic surfaces. It was, by far, the paint manufactured in the greatest quantities for the entire 1935-40 period (even until 1945) and was readily available in all theatres of operation.

(Please turn to Page 101).



Meanwhile, some interesting aircraft schemes and markings were to be seen in Germany. According to the owner of these photographs, they show operational Messerschmitt Bf 109Es and crew members of 6./JG 51 at Entigen in December 1939. If this is correct, in spite of the mild climate for the extremely severe winter of that year, the aircraft are very interesting for they had early-style national markings but no individual numerals or emblems, plus a most unusual camouflage on the upper and side surfaces. The pale blue fuselage sides and all green parts (probably 70 and 02 in this case) had evidently been overpainted with a light dapple of RLM grey 02. A further minor mystery.

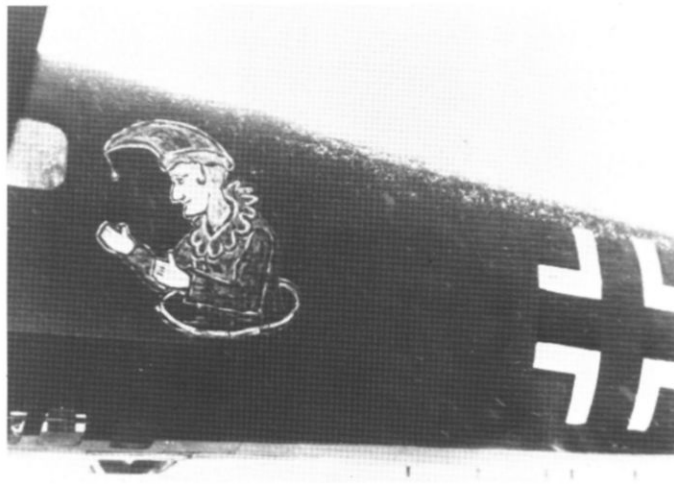
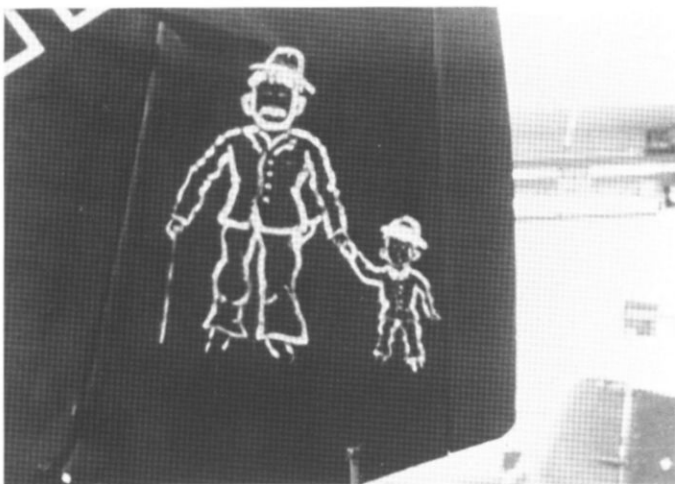




Left. Saint Nikolaus (Santa Claus) arriving aboard a Messerschmitt Bf 109 in December 1939 on the Wiesbaden-Erbenheim airfield, the home of III./JG 53 *Pikas*. The aircraft carried the usual national markings, its white number and bar indicating the seventh *Staffel*. The most interesting feature is the puzzling color of the upper surfaces. This unit is known to have had some special color schemes, but in this case it is not certain whether the light-colored overspray (which had partly obliterated the wing crosses) was applied for the occasion only or if it was a new scheme, possibly RLM grey 02, being tested. Right. The grim logo on this Junkers Ju 52 read: "1.9.39. Ob Figuren, Benzin, Bomben oder Brot, wir bringen Polen den Tod." (More than soldiers, petrol, bombs or bread, we bring death to Poland). This photograph will be especially interesting to modellers as it shows a machine-gun turret added to the cockpit and a specially modified third window for another gun.



Left. When new markings orders were introduced, there was often a brief period of confusion, this air ambulance Junkers Ju 52 seen in Poland in September 1939 providing a good example. The normal WL registration for second-line aircraft was retained along with the *Balkenkreuze*, indicating its military status. It was painted overall white with the usual black Junkers trim on the engine cowlings and wings. Right. Mechanics of 6./JG 26 warming themselves during the hard winter of 1939-40. Both Bf 109s had the new 71/02/65 camouflage introduced in late 1939, but the fuselage crosses and swastika were still shown in the old style. The *Staffel* emblems on each aircraft were partly hidden, only the horns of the goats being visible. The different sizes of the *Werk Nummern*, 1943 and 1937 respectively, are interesting.



After the Polish campaign, the Heinkel He 111s of 1./KG 27 received some personal emblems painted with temporary white on their dark green camouflage. On the original photograph of the one reproduced on the left, the JG code of KG 27 was just visible. The drawings disappeared progressively with time and the weather.

For the operation against Norway, the first to require a complete airlift, some transport units were created especially for the occasion. KGzbV 107 was one such example, but never operated again. This shot shows a Junkers Ju 52 flying to Oslo on 9th April 1940. Still carrying the old 61/62/63 upper surface camouflage, it had the early rear-mounted swastika and revised fuselage and wing crosses. All undersurfaces were painted black. The chained dog nose emblem is interesting, such aircraft having the extreme and unenviable position at left or right of the main formation.



It has been suggested that as from May 1940, a new 70/02/65 scheme was introduced with the Messerschmitt Bf 109-4, although this type of camouflage has been noted in photographs taken over six months earlier. No substantiation, however, has been offered for the use of color 70 (which may equally have been 71) and the assumption appears to depend entirely on the interpretation of black and white photographs, a risky area in which to be so dogmatic as it is such a highly subjective one. As any official orders approving this scheme have yet to be produced, the claim of the existence of such orders must for the moment remain a rather dubious one. In the case of one Bf 109 camouflage pattern, the darker areas were certainly shown as black-green 70, but photographs show that *at least four different patterns were in use on Bf 109Es* and there is in any case no guarantee that the officially required disposition of colors was always complied with. Even in the factory, dark green 71 could well have been substituted for black-green 70 as in practical terms the difference was not great. At least until more conclusive evidence comes to hand, therefore, it is the author's belief that photographs show, in the main, the 71/02/65 scheme although the 70/02/65 scheme is certainly known to have been used. In most black and white photographs of Bf 109s of this period, comparisons of the very dark section of the upper fuselage show a noticeably lighter shade than either the standard black-green 70 propeller blades or the similarly colored spinner. A further point is the slightly greater contrast between 70/02 and 71/02 and this too is obvious in better quality photographs of the period.

It is not known whether the substitute color RLM grey 02 was first used on Bf 109s or Bf 110s, but it is interesting to observe that bombers, with a few odd exceptions, continued to wear the normal 70 and 71 shades right down their fuselage sides. This practice was due to the types of missions they flew; as the bombers were always seen in great numbers by day, they could not pass unnoticed, so there was little point in trying to achieve a better ground-to-air camouflage. On the other hand it was absolutely vital for them to be as inconspicuous as possible from above so as to lessen the risk of interception by enemy fighters. In the event the dark green upper surfaces were proven to be quite effective.

As has been noted, the camouflage of the Messerschmitt Bf 110 heavy fighter was also changed at the time of the French campaign in May and June 1940. Like the single-engined *Emil*, the Bf 110s' fuselage sides were now painted pale blue 65, to which were added random sprayed patches of RLM grey 02, presenting a rather fuzzy appearance similar to the shadow areas of deciduous trees. No doubt the whole purpose of the exercise was to provide a more effective camouflage under foliage

when dispersed on the ground. No photographic evidence has yet been discovered of Bf 110s with their fuselage sides in plain pale blue 65 for, like the Bf 109, this color was always used in conjunction with others.

To summarise the results of studying several hundred contemporary photographs, most in black and white but some in color, it can now be stated fairly confidently that the camouflage colors used on the fighters which participated in the campaigns in Denmark and Norway in April 1940 and in France during May and June of the same year, were as follows:

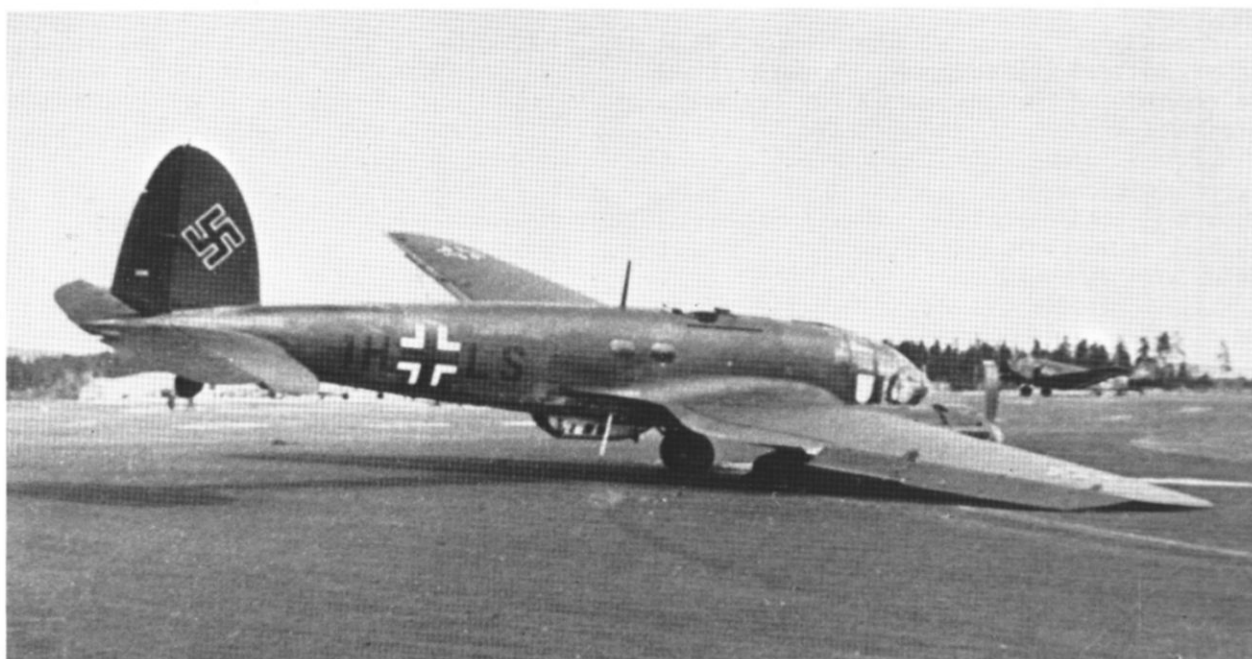
1. Black-green 70 and dark green 71 on all upper surfaces with pale blue 65 underneath.
2. A scheme of dark green 71 (or black-green 70) and RLM grey 02 with pale blue 65 on the fuselage sides and lower surfaces. In the case of the Bf 110, sprayed effects using RLM grey were added to the fuselage sides and often on the vertical tail surfaces also.

It is also important to mention another new type of marking which began to appear on aircraft between September 1939 and June 1940, the *Abschussbalken* or victory markings. During the war in Poland these score tallies were very simple and continued the tradition which originated in Spain. Initially, *Luftwaffe* ground-crews painted these plain white bars under the swastika with no further embellishments. The practice was continued for several months, but by the spring of 1940, it was possible to deduce the date of the combat, the place of the victory, the nationality of the victim, and sometimes if the enemy aircraft had been destroyed in flight. If the latter had been the case, the bar was arrowed upward, or if destroyed on the ground, the bar was shown pointing downward. After a succession of victories, the lack of space on the fin made it necessary to transfer these scores to the rudder, where they were to remain until the end of the war. In this publication, unfortunately, it is not possible to deal in detail with the sometimes odd schemes and personal markings of the more successful German fighter pilots. These are a quite separate study and will form the subject of another two-part major work by Kookaburra, *Planes of the German Fighter Aces 1939-45*, to be released in the near future.

After the fall of France in mid-June 1940, Hitler wished to negotiate a compromise with Great Britain to free him, as he stated privately, for his "great and proper task; the conflict with Bolshevism." In addition, German forces needed a respite in order to consolidate their positions in France, and in consequence a break of a few weeks resulted. The *Luftwaffe* again used this breathing space to improve its camouflage and markings, especially on aircraft which would be used operationally in the fighting yet to come.



Upper. To make the red individual letter of an aircraft more easily visible against dark camouflage, it was often outlined in white, as on this Junkers Ju 88 of 8./KG 4 *General Wever* during 1940. The apparently strange design of underwing cross was due to its application on the airbrake. Note also how a previous identification letter had been crudely overpainted under the port wing. Right. The Junkers Ju 87 operated as part of the *Blitzkrieg* against Norway in April 1940. This one served within I./St G 1 and carried the diving raven unit emblem on the upper part of the port engine cowling. The full code was A5+BC and the spinner tip was probably white. Lower. The individual identification letters of bombers were not always painted in the correct *Staffel* color, an example being this Heinkel He 111, 1H+LS, of 8./KG 26. In this case even the unit emblem was unfinished.





Upper. This is an example of early 1940 camouflage of either 71/02/65 or 70/02/65 for a Messerschmitt Bf 109E. The wing and fuselage crosses were of the modified design with wide white outlines, but the swastika was still mounted on the rudder hinge line. The *Werk Nummer*, 1272, was stencilled in black on the base of the fin. This photograph is further proof that individual numbers were by no means limited to the 1-12 range. Yellow 15 bore the emblem of I./JG 76, a unit which became II./JG 54 in April 1940; thus the photograph must have been taken before that time. Note the rear view mirror and early-type canopy.



Left. A veteran of the war in Spain, *Haupt* Wilhelm Balthasar wore a number of decorations of that country plus the Iron Cross (Second Class) which he received in Autumn, 1939. As the pilot of white 1, he was the *Staffelkapitän* of I./JG 1. Note the metal pennant attached to the radio mast.

Lower. As explained in the main text, fighters received a new style of camouflage during the winter of 1939-40 consisting of light blue undersurfaces which were continued right up to the top section of the fuselage. These newly-delivered Bf 109Es in the second *Staffel* of an unknown *Jagdgeschwader* participated in the "phony war". It is believed the second aircraft, red 4, also had its propeller spinner painted in the red *Staffel* color.





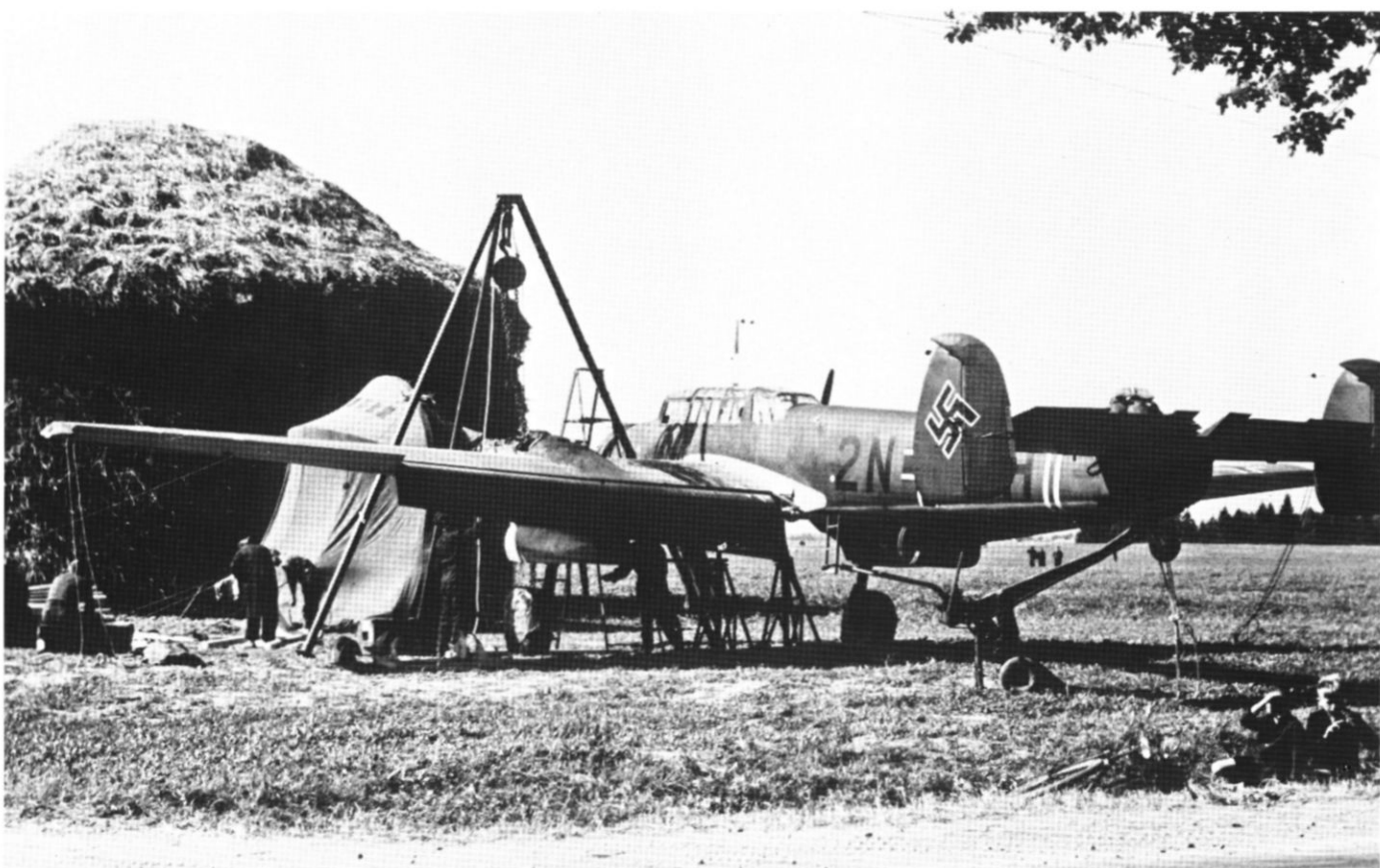
Upper left. A beautiful Christmas card photograph for the modeller! This Messerschmitt Bf 109E of JG 77 had no emblem at all but it did have unusually large underwing crosses. The shot was taken at Nordholz, Germany, in early 1940. Upper. This JG 77 Bf 109E photographed in Norway, wore the standard black chevron of the Gruppe *Adjutant* and the second Gruppe black horizontal bar. The aircraft in the foreground had a non-standard vertical bar aft of the *Winkel*, possibly added before the operation to promote the pilot to the temporary rank of *Geschwader Adjutant*. Left. *Oblt* Domaschk, Technical Officer of II./JG 2, in a 71/02/65-camouflaged Bf 109E at Nordholz in April 1940. The direct sunlight on the wing makes even the black of the cross seem much lighter than usual.

Guarded by a French soldier, this Heinkel He 111 belly landed in a field during the French campaign. It may in fact have been the aircraft forced down on 13th May 1940 by Australia's first WW 2 air ace, F Off Leslie Clisby, who landed his Hurricane nearby, arrested the startled crew at gunpoint, and handed them over to the French police. The incident was reported on the BBC news. Appropriately enough, the motto of Clisby's unit, 1 Sqn RAF, was "First In Everything"! Of interest are the huge wing crosses introduced during the Polish campaign.



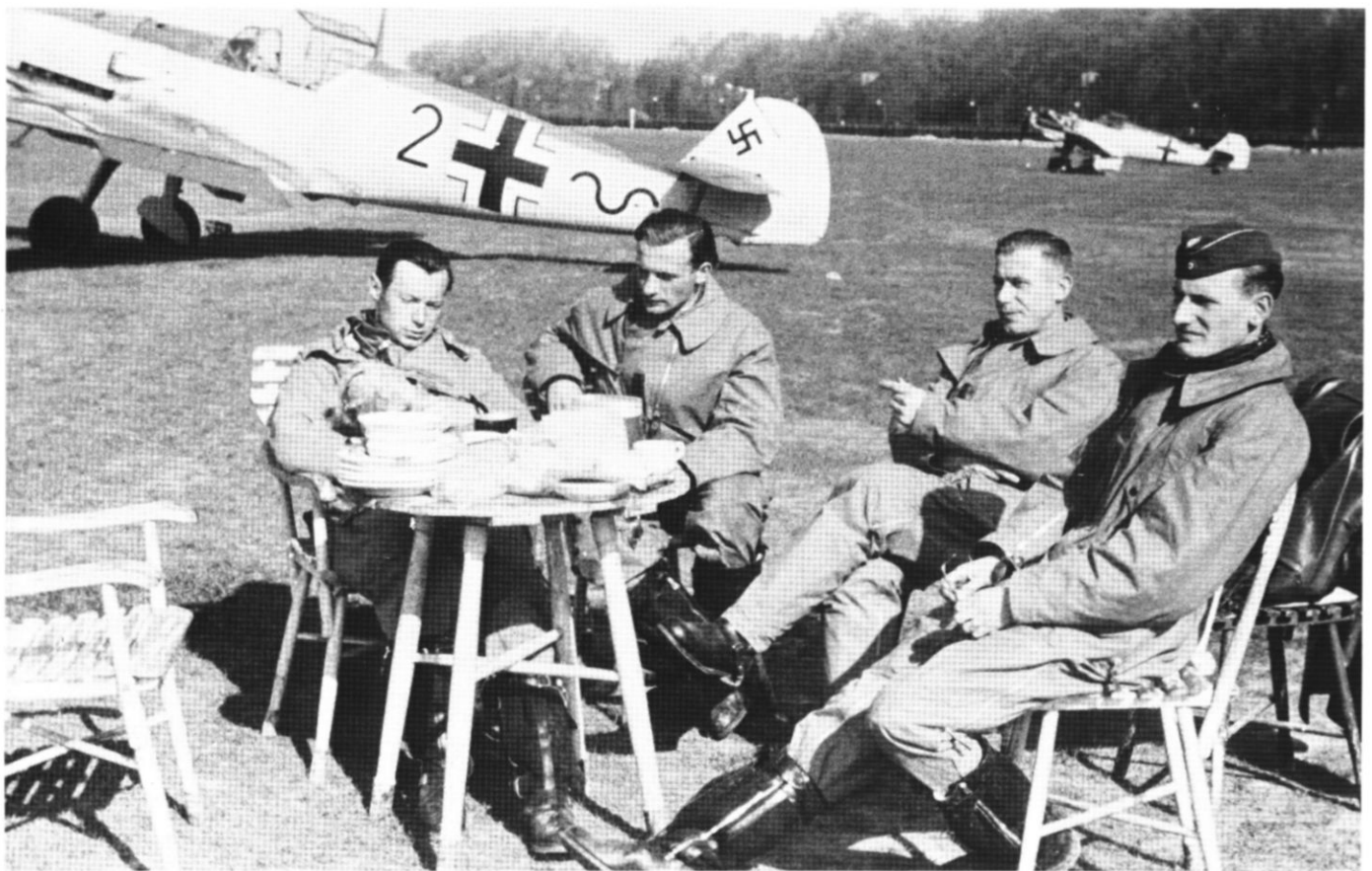


Upper. A superb subject for the modeller, this very "used" Junkers Ju 52 was photographed en route to Norway. Its old 61/62/63/65 camouflage was visible in many places under retouches of 70 and 71 greens. All undersurfaces were in temporary black for night operations. The crisply painted fuselage cross looks strangely new between the code 1Z +LM, the last letter after the blue L being almost invisible. The knight emblem indicated the first *Gruppe* of KGzbV 1. Lower. To the complete indifference of two small boys in the foreground, an engine overhaul is carried out on a Messerschmitt Bf 110 of 1./ZG 26. Just visible on the original photograph was the usual text on the rear fuselage behind the two white bands. Used for tactical reasons during the French and Polish campaigns, these bands, either one or two, were also seen on some Bf 109s. On this aircraft the upper surface wing crosses were still of their original size.





Upper. This air ambulance Fieseler Fi 156 came to evacuate an injured pilot of JG 2. Painted overall white, all its black crosses had been replaced by red ones, the code being repeated above and below the wings. The nose of the aircraft appears to have been slightly darker than the rest of the airframe, an effect which would have resulted from a spray painter having run out of white paint and being compelled to use an excessive amount of thinners in order to achieve sufficient coverage. The emblem on the cowling was probably that of an air ambulance unit. Lower. These four pilots of 8. JG 2 has just finished a meal during the French campaign. Their aircraft appear to have had the usual 71/02/65 camouflage and the non-standard wavy symbol of the third *Gruppe* as explained in the main text. On red 2 its *Gruppe* symbol was also painted in red, with a white outline, red being the *Staffel* color. The place is believed to be Signy le Petit.





Left. A natural and very effective camouflage was provided for this Heinkel He 111 of KG 53 *Legion Condor* during the "phoney war" of 1939-40. Used as a second-line aircraft, the old He 111B-2 had white spinners which indicated the first *Gruppe*, and extra surface coolant radiators under the wing leading edges. Note the extraordinary size of the underwing cross added after the Polish campaign. Right. Dating from the practice of the early *Luftwaffe*, some units continued to carry their distinctive identification numbers well forward on the fuselage. This Junkers Ju 87, yellow 7 of 9./St G 51, (later renamed 6./St G 1) with the torch-bearing Devil insignie, was the seventh aircraft of the unit. The code may have been obliterated by a wartime censor. The yellow spinner tip indicated the third *Gruppe*.



Left. These two shots show a cleanly painted Heinkel He 111 of KG 55 being prepared for its next mission. The strange style of markings are obvious, and although the fuselage cross is of the standard 1939 type, the letters very definitely are not. The walkway warning *Nicht betreten* (don't walk) was painted in light grey. On 13th May 1940 the aircraft was bounced by five Morane fighters and belly landed near Arlon, in Belgium.



Left. Camouflaged under trees, this Junkers Ju 87 of 1./St G 77 displayed its unit emblem between its petrol and oil filler triangles. The underwing cross overlapped the airbrakes as was normal on this type of aircraft and also on the Junkers Ju 88. The transparent panel leaning against the wheel spat is of interest, this being normally fitted in the fuselage floor to help the pilot when aiming at the target. Right. Photographed in January 1940, this Bf 109 *Emil* was flown by Gerd von Massow, the *Kommodore* of JG 2. As related in the main text, this unit continued to use pre-1937 markings for some time. On this example the aircraft had a chevron followed by two arrowed horizontal bars instead of the double chevron and vertical bar which, since 14th December 1937, had normally identified the *Geschwader Kommodore*. The number 1 indicated the aircraft was the first of the *Stabkette*. Note the small fuselage cross but a huge one on the wing upper surface.

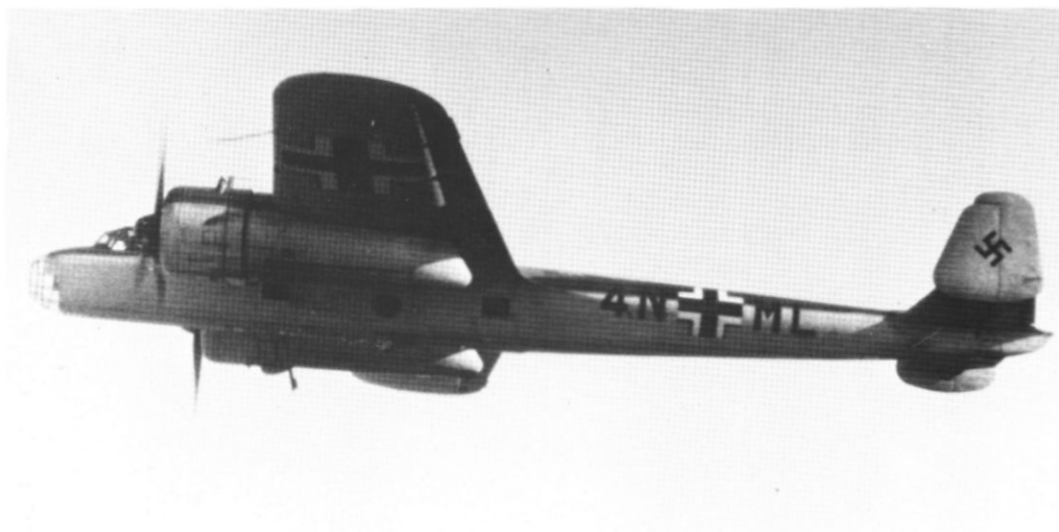


Forced down during the Battle of France, this Messerschmitt Bf 110, U8+DL, W Nr 3011, is depicted in the usual dark green 70 and 71 camouflage then prevalent. Because of the low contrast, many aircraft of this period appear to have been camouflaged in a one-color upper surface scheme only, this impression being particularly noticeable in strong sunlight. The code and drunken raven emblem show that it belonged to 3./ZG 26.



This very interesting photograph shows the emblem worn by the Dornier Do 17s of 9./KG 76 during the brief weeks of the French campaign. The camouflage was the standard 70/71/65 and the yellow spinner indicated the third Gruppe.

Flown by the third *Staffel* of Auf Kl Gr 22, this 61/62/63/65-camouflaged Dornier Do 17P shows its entrance hatches and camera windows to the camera. The fins and rudders were overall pale blue 65. In this case the individual letter, M, was not painted in the normal color, yellow, nor was it repeated under the wingtip.



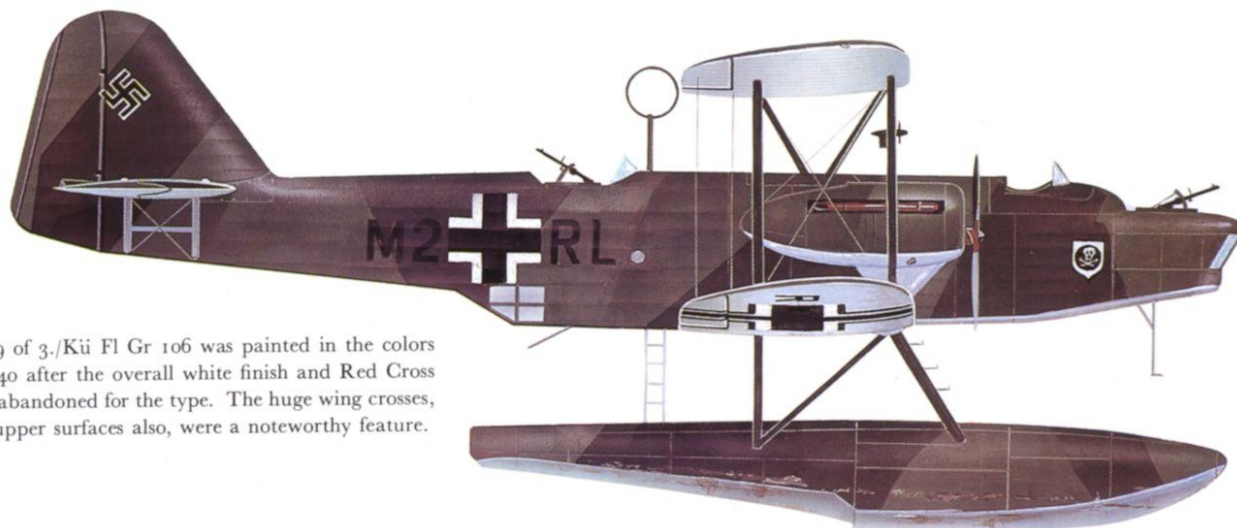
This Siebel Fh 104 *Halore* was used by *General Kesselring* as his personal aircraft. Seen here in France in 1940, it was overall pale grey 63 painted with black codes ??+AQ. As was the practice at this time, the swastika overlapped both fin and rudder. A special safety feature for the occupants of the aircraft was the extra *Balkenkreuz* right on the nose, being of special value in the head-on position. When the machine was at rest, the general's flag flew from the top of the cockpit.





Upper. All is finished in France! These German soldiers were waiting to go home on their first leave. Some seats of the Junkers Ju 52 of IV./KGzbV 2 had been removed to make the wait more comfortable. The nearest aircraft, G6+DQ with a blue identification letter, had the *Werk Nummer* 6585 stencilled on the rudder and bore the usual 70/71/65 camouflage. On the upper surface of the starboard wing the two letters, a blue D and a black Q respectively, were repeated in a non-standard manner. The RLM grey 02 on the inside of the open door is interesting. Lower. Another aircraft of the same unit being loaded with shell boxes. Quite new in appearance, G6+MQ (blue M) carried 70/71 camouflage, a fuselage cross of the white outline type only, and almost indistinguishable faded black code letters.





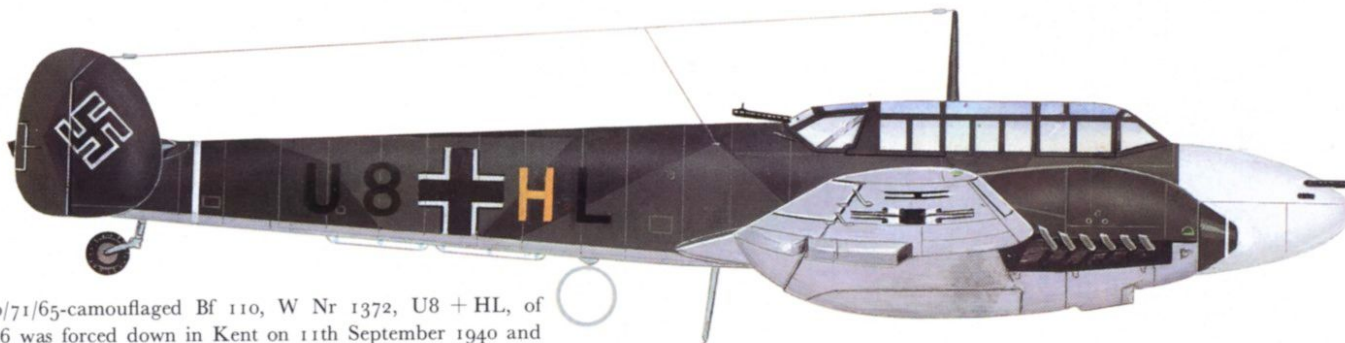
This Heinkel He 59 of 3./Kü Fl Gr 106 was painted in the colors 72/73/65 during 1940 after the overall white finish and Red Cross markings had been abandoned for the type. The huge wing crosses, most likely on the upper surfaces also, were a noteworthy feature.



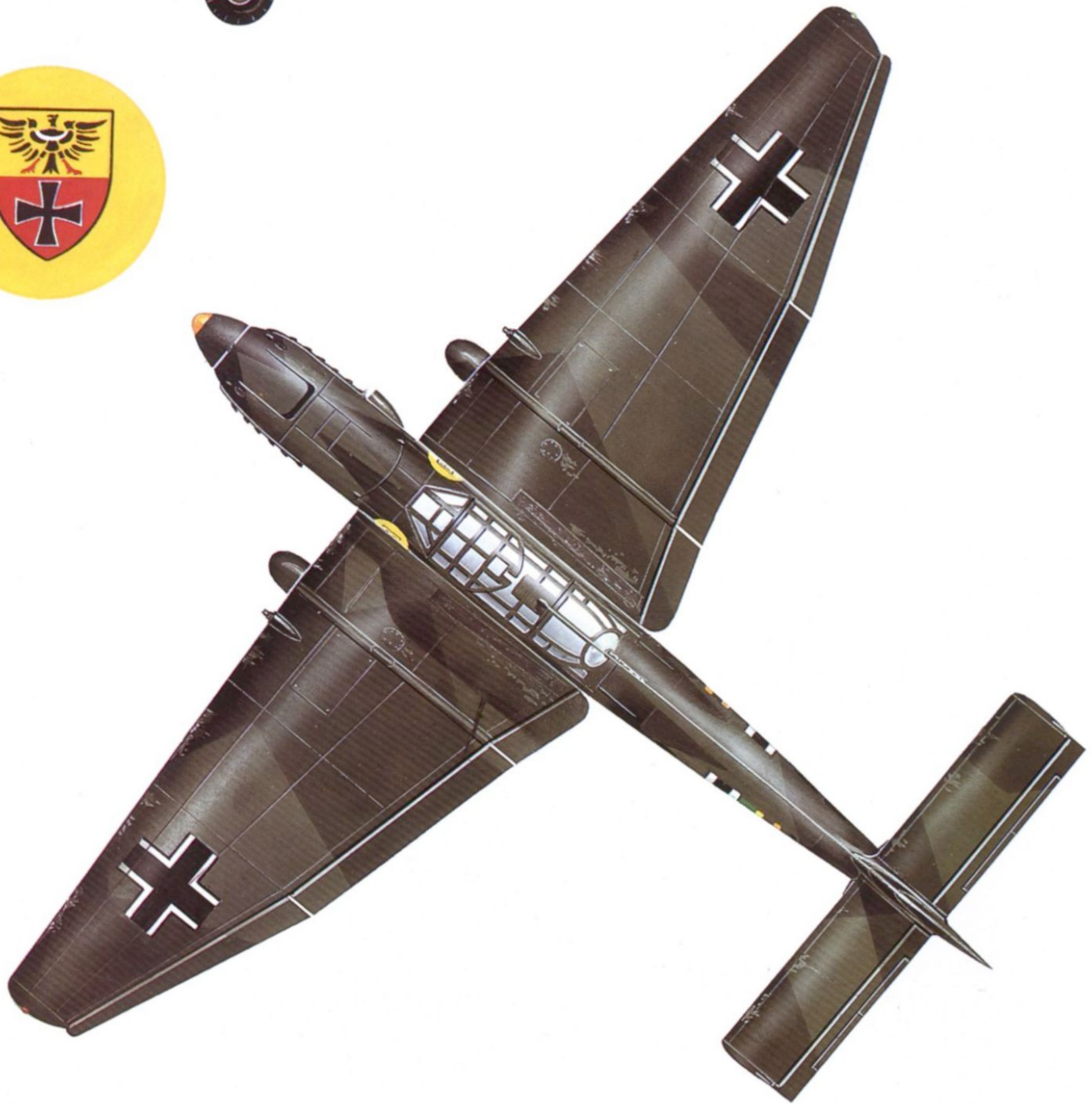
A Fw 56 *Stösser* in the overall silver finish common on this fighter trainer. Many examples of the type had their wing struts painted black but this was an exception. The interesting badge on the cowling indicated the unit, FFS A/B 112.



This Bf 109E bearing blotched dark green 70 and 71 upper surfaces, yellow tactical markings, and the angry cat emblem of 4./JG 52, was forced down at Hazeleigh, Essex, on 8th October 1940. The pilot was *Fw* Paul Boche.



This 70/71/65-camouflaged Bf 110, W Nr 1372, U8 + HL, of I./ZG 26 was forced down in Kent on 11th September 1940 and carried a striking white nose marking with a narrow white tail band. Its identification letter, H, was applied in the *Staffel* color of yellow. Just under the cockpit on the port side was the small railway engine marking of 3./ZG 26.



This Junkers Ju 87B, W Nr 3360, T6 +HL, was a 3./St G 2 aircraft shot down by a Hurricane beside the Selsey-Chichester Road in Sussex on 10th August 1940. Standard 70/71/65 camouflage was carried with the individual identification letter, H, being shown in yellow on the fuselage. The unit emblem itself was predominantly yellow, the same color as the spinner tip.



Upper. Another transport aircraft attached to a bomber unit, in this case KG 3 *Blitz Geschwader*. This long-serving "Auntie" had its old three-tone camouflage overpainted in standard 70 and 71 but it is still possible to discern grey parts on the elevator and the two yellow bands under the 5K of the code, showing that this particular aircraft had served previously in a blind flying school. Lower. Can anyone identify the unit indicated here by the prefix B1? This Junkers W 34 managed to stand on its nose after landing on a soft grass runway. Painted RLM grey 02 overall, it carried the oversized upper surface wing crosses introduced after the Polish campaign. Interesting details for the modeller are the electric generator, the large radio mast, the loop antenna and tailskid.





Left. For long over-sea missions, most of the Focke-Wulf Fw 200s of KG 40 were camouflaged with 72 and 73 dark greens and pale blue 65 under-surfaces. Note the unit emblem on each aircraft. Unfortunately, in this photograph all codes had been censored from the machine in the background. Right. The first Focke-Wulf Fw 200s arrived in France as early as mid-1940. This one, F8+CH (yellow C) was a veteran as it wore on the fin the tally of its missions on Narvik and over England. On the rudder, also painted in white, were the silhouettes of two sunken ships, whilst the unit emblem of KG 40 is plainly visible on the nose.



Two high-numbered Messerschmitt Bf 109Es serving with 7./JG 53, both aircraft having pale blue 65 up to the top of the fuselage as was normal in Spring, 1940. The photographs were taken in April 1940 at Wiesbaden-Erbenheim. White 13 had received a light overspray for better camouflage effect. Note the camouflaged wing root of the fighter on the right, the thin red 28 line indicating the walk-on area and the small "wheels down" indicator protruding from the wing surface. The pilot of white 13 was *Uffz* Schulte.



Left. Photographed in 1940 amongst Heinkel He 111s of KG 53, this Messerschmitt Bf 108 was used by the unit as a liaison aircraft. Painted overall RLM grey 02, it wore the "second generation" type of fuselage cross with the swastika in the early rearward position. Note the tiny red cross within the usual white disc under the letter N of the code and the VDM manufacturer's triangles on the propeller blades of the Heinkel in the foreground. Right. This old Junkers Ju 52 was used as a transport by KG 3 and carried the code 5K+VM. Even then, in 1940, it retained its old 61/62/63/65 camouflage and early style of national markings. The red band and white disc under the swastika had obviously been repainted in dark green.



Upper. Typical of the French campaign, this view shows the airfield of KG 54 *Totenkopf*. The unit emblem of B3+BT in the foreground can just be seen above the wingtip. A common practice in the unit was the use of a narrow diagonal band in the *Gruppe* color (yellow in this case) on the fuselage. Of interest is the small Polish flag under the fuselage window in front of the band, indicating a victory for the port gunner. The aircraft's spinner tips were yellow. Left. Can anyone identify this *Oberfeldwebel Staffelpilot* of I./JG 26? Photographs showing the green grasshopper emblem of this *Staffel* are very rare. Curiously, the number 1 and the fuselage cross appear to have had their white parts omitted, an oddity noted on some other JG 26 aircraft. The radio mast bears this officer's pennant. Lower. The soft ground was responsible for this Messerschmitt Bf 109 upending itself at Le Mans airfield in France. The unit, 8./JG 54, painted its individual aircraft numerals in a very forward position, just aft of the supercharger air intake. The sparrow emblem was worn on the engine cowling and the upper surface camouflage was either 70 or 71 and 02 with all lower and side surfaces pale blue 65. The rudder was not overpainted in yellow; this was simply a light effect caused by its being turned a few degrees.





As this photograph illustrates, the fighters of JG 53 *Pikas* received a red vertical band around their engine cowlings. These five Messerschmitt Bf 109s about to leave on a mission over England had their rudders and engine cowlings painted in temporary yellow. On yellow 1 the red band had been overpainted in yellow but traces are still faintly visible. On the two aircraft on the right the distinctive band hid the unit emblem, which may have been part of the reason for the marking being introduced. The shot was taken at Octeville airfield in 1940.

CHAPTER 7

REVERSED FORTUNES

Shortly after the brilliant success of the *Wehrmacht* over its feared enemy, France, Hitler issued the famous Directive Number 16 for the preparation of a landing operation in England and publicly abandoned all hopes of making peace with Great Britain. Complete mastery of the air and an effective siege of the British Isles were prerequisites to invasion, yet Hitler scorned the advice of his military leaders and refused to engage in either total air or total naval warfare. The now legendary Battle of Britain commenced, from the German point of view, on 13th August 1940, with attacks on crucial airfields and radar stations in the south of England. After four weeks of unexpectedly heavy losses, the *Luftwaffe* had still not achieved any of its goals and its daylight offensive was called off.

A new phase of the campaign began in October when Goering with his vaunted air force's self esteem now seriously undermined, directed his bomber force to concentrate on night attacks on the cities, operations which were much less prone to interception by defending fighters. This complete change of tactics was a clear admission that the *Luftwaffe* had for the first time met its match under daylight conditions, and was to prove the turning point in the whole campaign.

When France and Germany signed their armistice in June 1940, aircraft camouflage on most front-line *Luftwaffe* types had been relatively simple as described in the previous chapter. Aerial ambulances, a notable exception however, were required to carry an all-white finish with red crosses and all other aircraft, a dark camouflage scheme of 72/73/65 for maritime aircraft and 70/71/65 for others used in such roles as transport and communications.

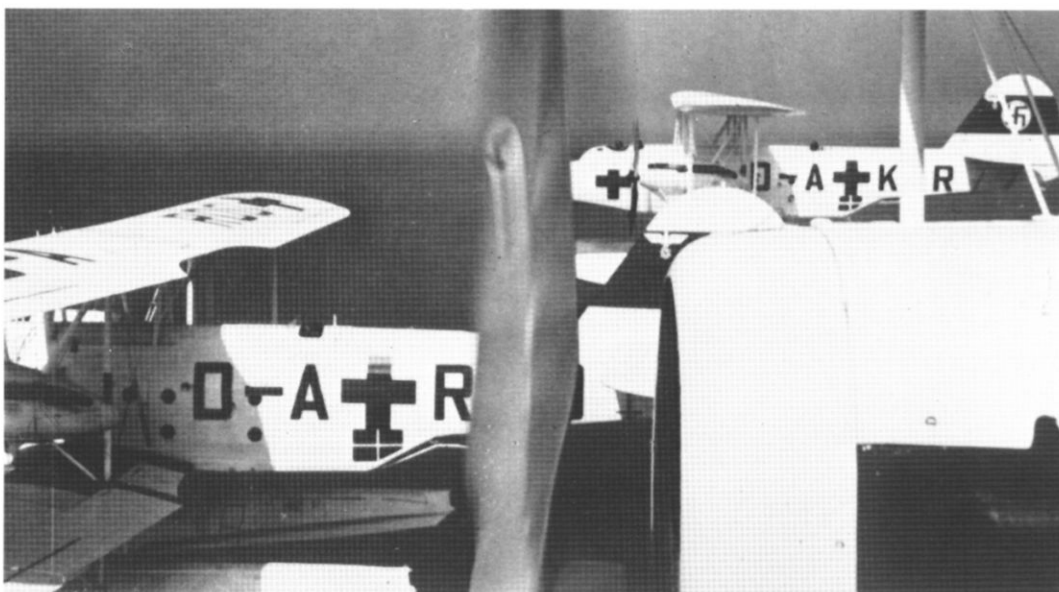
Meanwhile, Messerschmitt Bf 110 heavy fighters began to leave factories during 1940 with a new lighter-colored livery, especially on the fuselage sides. The then unorthodox camouflage of these Bf 110s was also duplicated by the aircraft of a notable single-engined fighter unit, JG 53 *Pikas*, albeit with many variations, as confirmed by contemporary photographs. All three *Gruppen* had in fact been experimenting for some time with patches, mottles, and even flat areas of RLM grey 02, providing some interesting effects in the process. It should be noted that a different appearance would result from a sprayed mottle when the density of the spray was varied or when the base or primer color was different. For instance a light or well thinned spray of RLM 02 over a base color

(Please turn to Page 119).

On the original photograph the griffon emblem of KG 55 was just visible on these Heinkel He 111s of the fifth *Staffel* of this unit. The usual 70/71/65 colors were used but one appears to have been covered with temporary black paint on the upper surfaces also. Note the position of the swastika on G1+BN whose red individual letter was outlined in white.



An interesting photograph of three Heinkel He 59s in flight in August 1940. These air ambulances were overall white with red crosses in all six positions and also on the nose. Marked as civilian aircraft, they bore non-military registration letters and the state service flag instead of the normal swastika.



Initially, air-sea rescue aircraft wore white overall with red and not black crosses. After a few months of war against Great Britain, they were camouflaged. This one operated over the North Sea in the original all-white color scheme.





A "black man" takes a snooze in the sunshine. In these two shots yellow 10 of JG 53 *Pikas* shows well the new camouflage scheme introduced during 1940. Here RLM grey 02 had been used extensively on the upper surfaces, giving a strong contrast between colors. This aircraft had also received a few wisps of dark green over its light blue fuselage sides. The nickname *Peter* had been preserved as were the other markings. Note the three white victory markings, the blurred outline of the swastika, the rear vision mirror, and the very large wing crosses.



This Messerschmitt Bf 109E, red 15, was photographed in France during 1940 and is illustrated in color on Page 93. The unit emblem, a small black top hat within a white disc on the rear fuselage, was absent here, but the same name *Peter* was painted on the engine cowling. Note that the stencils on the rear fuselage and lower part of the fin had been over-painted.



Photographed on the Böblingen airfield on 8th March 1940, this line-up of Messerschmitt Bf 109Es belonged to II./JG 51. The unit emblem appeared on each aircraft aft of the fuselage cross in place of the usual horizontal bar. The nearest aircraft, yellow 1, was the mount of Joseph "Pips" Priller and carried 71/02/65 camouflage.

of pale blue 65 gave a vastly more feathery effect than a more solid spray of dark green 71 near a fuselage spine or around a wing root area. The same considerations applied to sprays of the dark greens 70 and 71.

With no known special orders specifying any change, the camouflage style of the unit's Messerschmitt Bf 109s was modified in the field. There were no set patterns, all being left to the natural creativity of the ground crews, which in some cases was rather remarkable! The object of the exercise was to disguise the very conspicuous light-colored upper surface areas of the fighters, especially the fuselage sides, when these aircraft were flying close to the ground and also when they were dispersed around airfields and partly hidden under camouflage netting or foliage. The colors used for these alterations were the normal ones available at the time, usually dark green 71 and RLM grey 02. In some cases different shades are known to have been mixed and applied in the field.

Other fighter units quickly followed the practice of JG 53, the result being a great variety of original camouflage schemes. A few units, however, were easily recognisable because of special effects, examples being the sponge-type mottling of JG 2 or the plain pale blue 65 of III./JG 26. The mixing of improvised colors became widespread, particularly various shades of grey and this practice is confirmed by many Allied Intelligence Team reports made on aircraft which crashed or force-landed on British soil. (Please refer to Chapter 1 of *Luftwaffe Camouflage & Markings Vol 2.*)

JG 53 made itself even more notable by another non-standard marking which began to appear on its fighters during the early summer of 1940, a red vertical band completely encircling the engine cowling, covering the unit emblem. Available photographs show that some seven Messerschmitt Bf 109Es of different *Staffeln* within JG 53 crashed in Great Britain between 2nd September and 2nd November 1940 whilst wearing this distinctive red marking. The reason for the band is a question that has never really been settled, for certainly no known official documents make any reference to the matter. It can only be assumed that it was some sort of marking intended possibly, to obliterate the *Pikas* emblem and, certainly, to assist with air-to-air recognition. Indeed, this matter of recognition was to present a number of serious difficulties.

Ideally, a military aircraft should be invisible to its foes, but should be instantly recognisable by its friends,

which is obviously a complete practical impossibility. This question of conflicting requirements took on a new importance when, during the Battle of Britain, great numbers of different units, both fighters and bombers, had to operate in almost the same air space in the south of England and generally with a different target for each unit. Because of the need for strict radio silence, a quick and effective method of air-to-air recognition became an urgent need.

As early as the summer of 1940, the simplest solution seemed to be to paint parts of the aircraft in distinctive colors. Again, the Messerschmitt Bf 110 heavy fighters were amongst the first to utilise the new system by over-painting the entire nose area in white. No other color is known to have been used. As for the single-engined fighter units, apart from the red nose band used by JG 53, most of the other operational units at this time had either white, or more frequently, yellow identification markings. The retention of unit emblems was evidently regarded as an acceptable operational hazard. The earliest use of washable yellow and later, white tactical identification markings, as shown by dated photographs, was on the wingtips, tailplane tips, and most importantly, as a small triangle on top of the rudders of Messerschmitt Bf 109s. The apparent success of this led to the complete covering of entire cowlings and rudders. In some cases, for instance the third *Gruppe* of JG 26, the Bf 109s were left in their original camouflage with tail units receiving bands or triangles in the tactical color.

It must be stressed that these special markings, painted in temporary finishes, were subject to many exceptions and it was sometimes possible to see two or three quite different types of tactical markings on aircraft of the same unit, all taking off from the one airfield on the same mission!

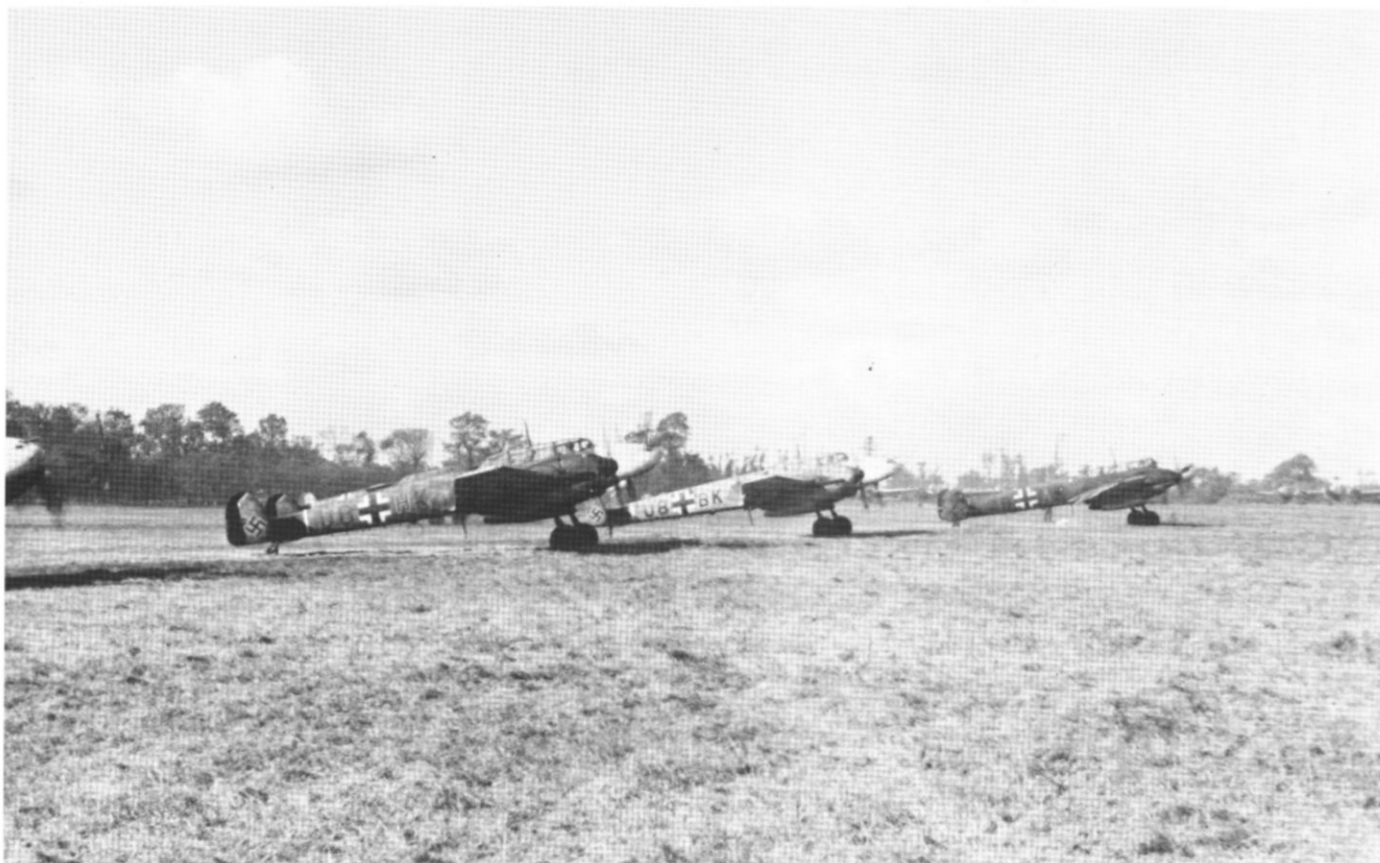
Meanwhile, bombers and dive-bombers exhibited much more regularity than the fighters in the matter of camouflage and markings. For the entire period of the intense aerial combats over England, the Junkers Ju 88, the Heinkel He 111 and the Junkers Ju 87 had only one type of basic camouflage, the standard 70/71/65 scheme. When the *Luftwaffe* began its terrific night bombardment, it was made mandatory for these aircraft to receive a coat of temporary black on all surfaces visible from underneath, to lessen the chances of being detected by searchlights. Frequently, the mechanics who added this sooty

(Please turn to Page 123). 119



Upper. Awaiting action, these crew members take it easy beside their aircraft. Four of the Junkers Ju 88s visible in this photograph had a large white rectangle painted on the rudder and probably also on the upper surfaces of the wing, for air-to-air recognition. In the foreground, 3Z+HM wore the normal 70/71 camouflage pattern and the emblem of KG 77 on the nose. Its individual letter H was outlined in white, the fourth *Staffel* color, on the fuselage and also on each upper wingtip. Lower. During the Battle of Britain, many Bf 109Es such as yellow 7 here, received a sponge-applied field camouflage over their pale blue fuselage sides. The *Bonzo* emblem of 1./JG 2 *Richthofen* was partly obscured by the panel removed from immediately forward of the cockpit. This aircraft might provide a good diorama subject.





Upper. Ready for take-off! Five Messerschmitt Bf 110s pictured just before opening up the throttles. All aircraft had the same white color on the nose, three wore a single white band just in front of the empennage, and one, the middle aircraft, had a special camouflage. Close scrutiny of the original photograph revealed that the fuselages of all Messerschmitts had been overpainted. (By this time the old 2N code of ZG 26 had been replaced by the identification U8.) U8+BK had received a very light-colored pattern, possibly the first use of light grey in the camouflage of day fighters, or, more likely, simply an overspray of RLM grey 02 in some places to lighten the general tone of the camouflage. The photograph was taken in France during the Battle of Britain. Lower. Almost unknown is the emblem of 3./KG 76 as seen on this Do 17Z, F1+BL. The spinner was pale yellow and the propeller blades were the usual black-green 70. See color illustration on Page 93.

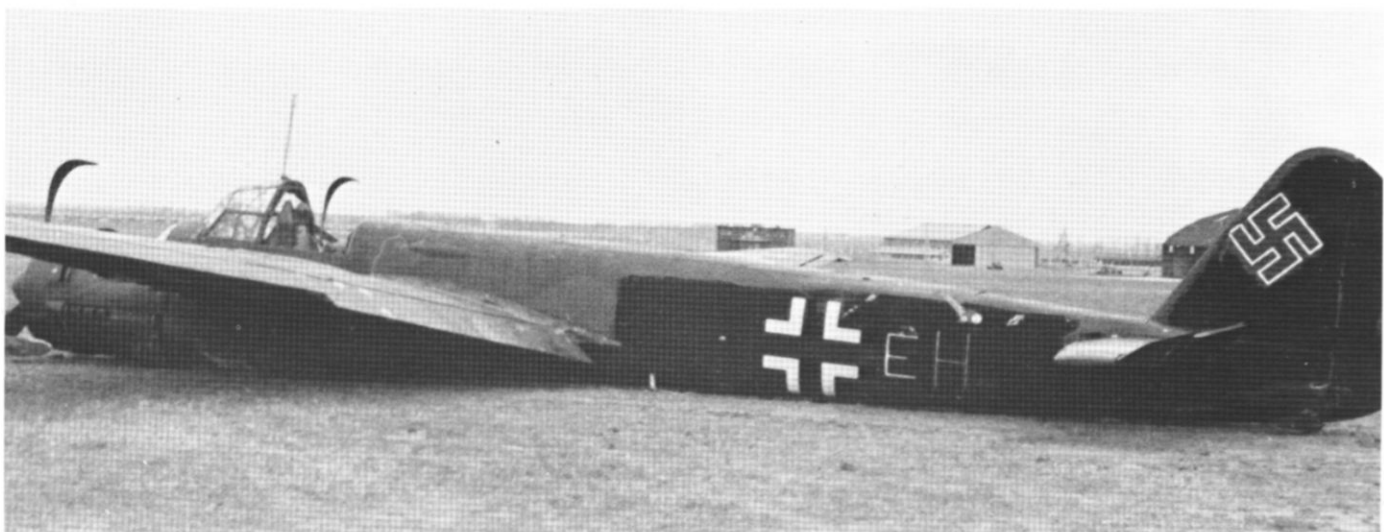




Showing the *Bonzo* mascot on their cowlings, these Messerschmitt Bf 109s of 1./JG 2 had the same type of camouflage and white tactical markings on their rudders and wingtips. In this shot it is obvious that the former white engine cowlings had been lightly camouflaged. The spinners, however, were overall white. The photograph shows the old style of fuselage cross still in use even in the second half of 1940.



Upper. In late 1940, operational fighters received many kinds of field camouflage yet on this example the dark green 71 additions to the fuselage were still decidedly unusual. The low dividing line of the topmost fuselage colors was rather uncommon. Lower. After being badly hit on a mission over England, this Junkers Ju 88 just managed to make it back to France. All the undersurfaces and fuselage sides were painted black except for the white parts of the crosses and swastika. On the original photograph it was possible to see a white letter E on the upper starboard wingtip. The bomber belonged to 1./KG 51 *Edelweiss*.





Left. Arming operations in progress on this 3./Kü Fl Gr 506 Heinkel He 115 at its mooring ramp. The special maritime colors of dark green 72 and 73 are easily seen and show the usual contrast, for the lighter color, 73, usually faded to approximately the same shade as new RLM grey 02. The propeller blades and spinners were black-green 70 and the rubber bumpers on the floats were red. On most German seaplanes, the tip of each propeller blade was painted a bright color, but this was not the case here. Right. In this shot the "black men" of JG 53 *Pikas* are seen spraying the ace of spades emblem onto the yellow engine cowling of a Messerschmitt Bf 109 at the time of the Battle of Britain. A simple stencil system was used with air supplied to the spraygun from a compressed air cylinder.

black undersurface scheme also overpainted other light-colored areas of the bombers, including the white segments of the crosses and swastikas, light-colored individual identification letters, and often the tips of propeller spinners if they had been white or yellow. When these same bomber aircraft were required for day missions, the black paint had to be removed, then re-applied for the next night operation. After several changes of this kind, it is not difficult to imagine the condition of the undersurfaces!

Like the fighters, the Junkers Ju 88s and Heinkel He 111s of the *Kampfgruppen* also had their own air-to-air recognition system. This consisted of large light-colored rectangles — usually white — painted on the upper surfaces of the wings or on the vertical tail surfaces. These markings, in contrast to those of the fighters, were normally reserved for the leading aircraft of each formation, and were thus an important aid for assembling all bombers participating in the same mission. The slow Junkers Ju 87 dive-bombers were completely decimated by the British fighter defences and had simply not had time to have their camouflage and markings changed, so quickly had they been withdrawn from operations. For similar reasons the Messerschmitt Bf 110 did not see out the Battle of Britain and was transferred elsewhere to become better known as a successful night fighter.

The year 1940, however, had a further surprise in store for the student of color schemes. To digress a little, in the second volume of this series, readers will note that with the November 1941 issue of L Dv 521/1, three new camouflage colors appeared, the greys 74, 75 and 76, which were intended for use on single and twin-engined fighters. It is now believed that this grey scheme saw action on some operational Bf 109Fs in Spring 1941, which is much earlier than is generally supposed. Close scrutiny of crash reports of the time indicate quite

clearly that at least one unit, II.(S)/LG 2, was equipped with all-grey aircraft.

This same unit participated in the Polish and French campaigns with the old Henschel Hs 123 and after the French defeat, was re-equipped with the new Messerschmitt Bf 109E-4B. The first of these fighter-bombers were built in the Wiener-Neustadt plant and wore *Werk Nummern* from around 5560 to 5600. It is believed they were the earliest German aircraft to be painted in a factory finish of the greys 74 and 75 with a fuselage mottling in 02, 70 and 74 on the light bluish-grey 76 base coat, a shade very similar to the previous pale blue 65. This all-grey scheme was also applied to three special Messerschmitt Bf 109Fs supplied to JG 51 in October 1940 to be tested under operational conditions, the well-known Werner Mölders being one of the pilots.

The Messerschmitt Bf 109s of II.(S)/LG 2 were also the object of another markings change when the *Gruppe* abandoned the old style of four-letter/figure system used earlier on their Henschel Hs 123s and added a white-outlined black equilateral triangle to each side of their aircraft. This distinctive triangle was to remain the symbol of close-support aircraft until October 1943. The new marking was worn in front of the fuselage crosses whilst the individual letter of each aircraft was located between the cross and the tail unit. The unit did not use numbers as the fighters did, and from the middle of 1940 all close-support units were identified by the black triangle/cross/individual letter sequence.

By the end of 1940 the most intense period of the air combat was over, and the once invincible *Luftwaffe* was forced to admit that it had lost the struggle for air superiority over Great Britain. In an unexpected reversal of fortunes, the German units on the Channel Coast now found themselves on the defensive for the first time in the war, heralding the end of a significant phase in the story of their airborne camouflage and markings.

Publisher's Note

There is a quite intentional overlap between this volume and *Luftwaffe Camouflage & Markings Vol 2* as regards the study of the very popular Battle of Britain period, and the two accounts are intended to complement each other. Whereas the final chapter here is written from the perspective of the operational bases in France and the photographs illustrate mostly intact aircraft, the earlier and more detailed account in *Luftwaffe Camouflage & Markings Vol 2* is presented from the British viewpoint and shows, for the most part, photographs of damaged aircraft which never returned home. Having been completed a little later with the benefit of much new information, the photographic coverage and research here is naturally slightly more up-to-date. It is our earnest desire that readers will enjoy the contributions made by both authors.



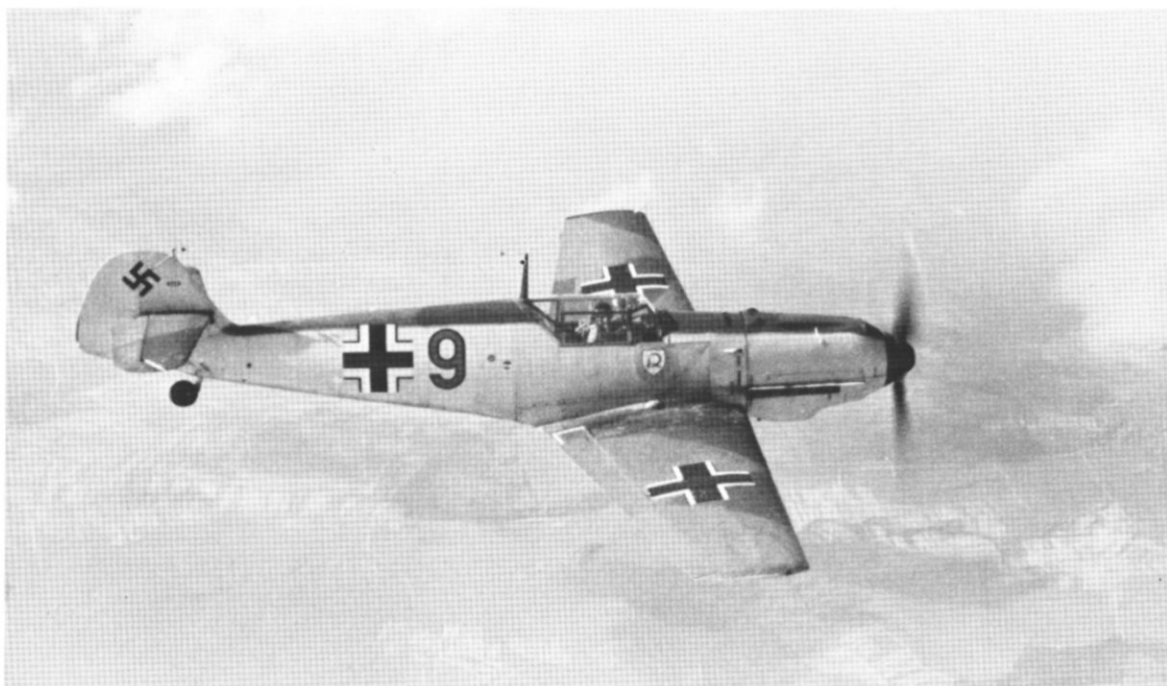
Left. This Messerschmitt Bf 110, shown here being rearmed, shows some interesting details including the cock emblem of the ninth *Staffel* and the ladybird of III./ZG 26. The code, therefore, should have been U8+.T with a yellow individual letter. Note the red caps to each of the machine-gun muzzles. All stencils were present and the spinner tips were painted in the *Gruppe* color. Right. Erwin Leykauf, the pilot of red 3, seen during a rest day in September 1940. The 8./JG 54 aircraft was painted in the 71/02/65 scheme and carried five black victory bars on the rudder. The *Werk Nummer* was 1572 and the fighter carried the red sparrow *Staffel* emblem on the front of the engine cowl.



Left. The second *Staffel* of KG 100 used the Heinkel He 111 in a pathfinder role early in the war. Taken at Hannover-Vahrenwald, this photograph shows a "three-master", 6N+EK, on a compass swinging platform. The bomber's red letter E was thinly outlined in white, the letter being repeated in black just above the swastika. Note the trailing antenna between the main wheels. Right. A line-up of Messerschmitt Bf 110s awaiting their next mission in 1940. The 70/71 colors look a little lighter than usual and the black letters of the code can be read quite easily. The 3U+LR code indicates this aircraft belonged to the seventh *Staffel* of ZG 1. The individual letter, white L, was repeated under the wingtip and probably above it also.



Left. This Junkers Ju 88 of KG 51 *Edelweiss* suffered a collapsed undercarriage after engine trouble. The rear canopy and all armament had been removed. The front ring of each engine cowl was painted white, like the spinners, indicating an aircraft of the first *Gruppe*. Right. This Henschel He 126, L2+DM, photographed at Freiwaldau in November 1940, served with 9.(H)/LG 2. Later this *Staffel* became 4.(H)/21 and retained the griffon emblem. Oddly enough, a white band was painted around the upper part of the rear fuselage. See Page 93 for color illustration.



Upper. This almost brand new Messerschmitt Bf 109E-1 of 1./JG 2 *Schlageter* had evidently been transferred from a previous unit as the well-known JG 2 emblem appears to have been added to an overpainted panel. The camouflage pattern is of the French campaign style of 71/02/65, the aircraft's identity number, red 9, being thinly outlined in black. Right. For safety reasons, German bombers were dispersed around their airfields, this Heinkel He 111H of 5./KG 55, G1+NP, being photographed with its control locks in place. The SC bombs in the foreground were dark green with yellow tail cones, each being left on its crude wooden towing skid. Lower. Good photographs of LG 2 aircraft are very rare, this one being photographed in 1941 but with late-1940 type camouflage. The low contrast between colors was due to one of the earliest uses of 74/75 greys for camouflage.





Upper. During the French campaign and the Battle of Britain these Junkers Ju 87s changed their unit identity. Formed on 1st May 1939, on 9th July 1940 III./St G 51 became II./St G 1. Forming part of the *Gruppe Stab* (indicated by the last letter of their codes) these aircraft were photographed before July 1940 in France. They had the usual 70/71/65 camouflage with the swastika centred on the rudder hinge. Both 6G+AD and 6G+CD had their white serial numbers painted on top of the rudder, and each bore a light-colored background for an unfinished unit emblem. Another oddity was the color used for identification, for all four characters were painted in either light blue, light grey or light green. Lower. Franz von Werra as a *Leutnant* with only three victories at the time, seen here with his lion cub "Simba". The emblem of II./JG 3 had not been added to his then very new Messerschmitt Bf 109E.



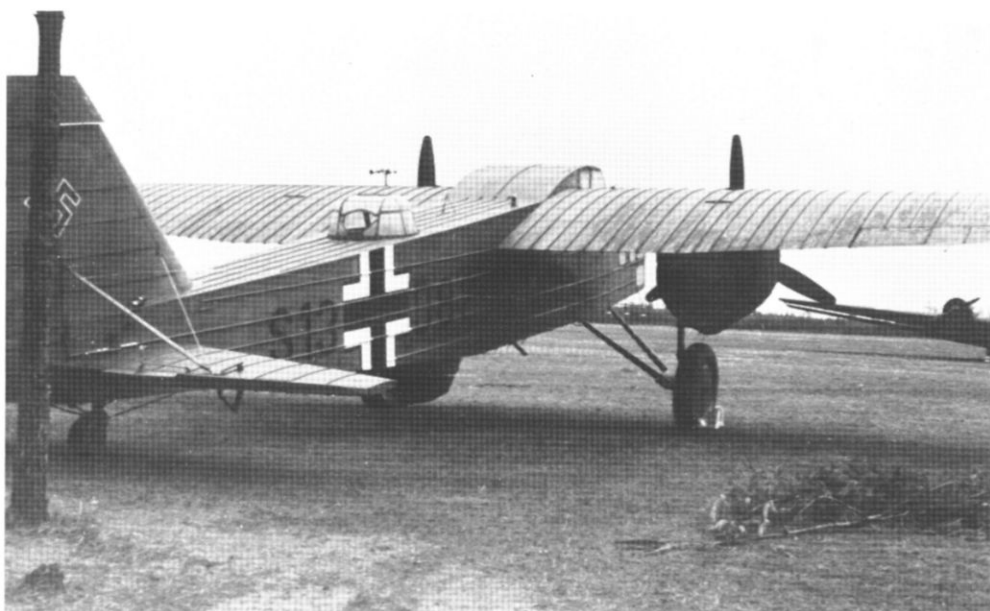


Upper and lower. Two fine shots of Messerschmitt Bf 109Es of the second *Gruppe* of JG 53 being prepared for action. Climbing into white 6 was Rudolf Lochner, assisted by ground personnel. Early in the war this unit tested several types of field-applied camouflage. In these shots the aircraft of the fourth *Staffel* (indicated by white individual markings) and the sixth *Staffel* (shown by yellow markings) had standard 71/02 upper surface camouflage with an overspray of dark green 71 on the pale blue 65 fuselage sides. Most of these fighters had been fitted with rear vision mirrors. Lochner's aircraft was W Nr 1958 and in the lower shot the second aircraft was yellow 4.





A good photograph for diorama enthusiasts, showing mechanics working on a 70/71/65-camouflaged Junkers Ju 88, 9K + GM of 4./KG 51 *Edelweiss*. The position of the dinghy in the top fuselage section is of interest. The rearward-firing machine gun had been removed and the ladder is clearly visible near the wing root. The effect of hobnailed boots on the paintwork can well be imagined!



After the capitulation of France, the *Luftwaffe* seized many aircraft such as this Marcel Bloch MB 200. It retained its original drab green camouflage to which was added the usual German markings and the code S13 + D82. All armament had been removed. The shot was taken on the operational airfield of KG 53.

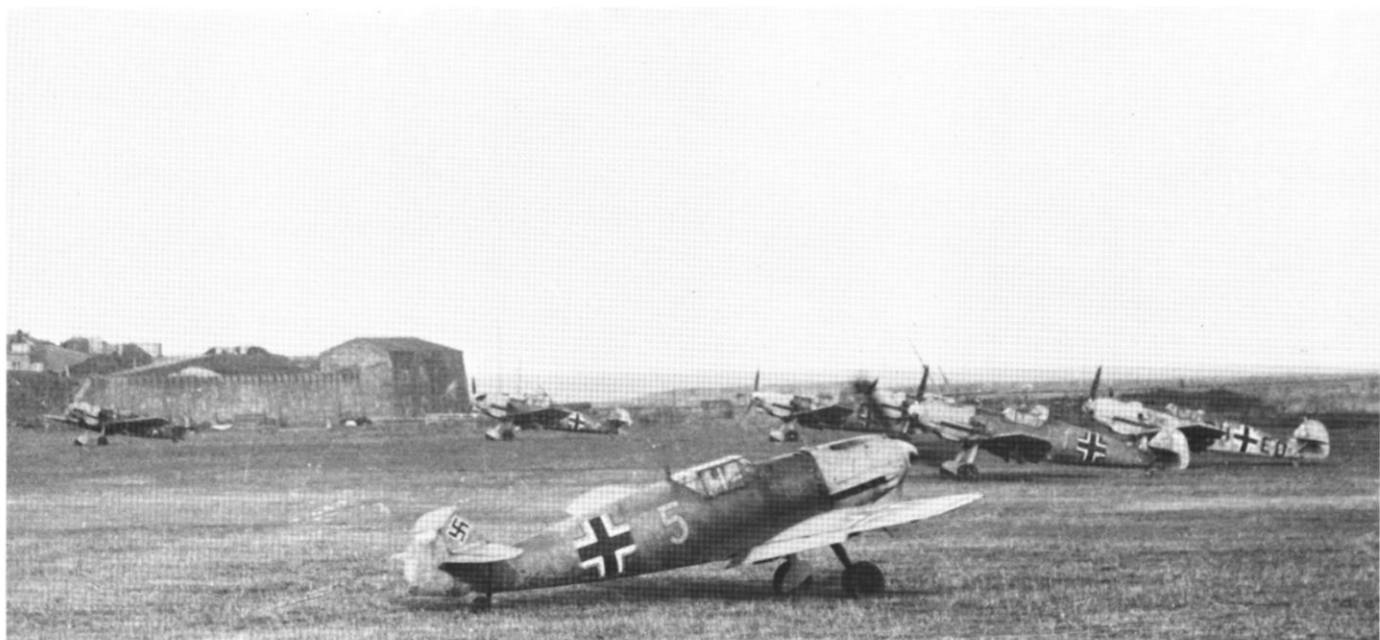


Another interesting subject with diorama possibilities, this shot shows a crew member and two *Schwarzmannen* basking in the sun in front of a shark-mouthed Messerschmitt Bf 110. Hastily camouflaged with nets and greenery, it had the light-toned painting scheme with extensive use of RLM grey 02. The individual letter, yellow I, was repeated under the wings. The use of the yellow spinner tip, indicating the sixth *Staffel*, suggests that the fourth letter of the code would probably have been P. The teeth on the nose were used by the second *Gruppe* of ZG 76.

Photographed over England, this Dornier Do 17Z shows the condition of its camouflage after several months of hard operational use. As the first *Gruppe* of KG 76 flew mainly by day, this aircraft did not require its undersurfaces to be painted in temporary black. Its individual letter K was painted clearly on each wingtip and the former two-tone green camouflage had either faded very badly or had worn right through to the RLM grey 02 primer coat underneath.



Right. Taken during the Battle of Britain, this shot shows Messerschmitt Bf 109Es of the first *Staffel* of an unknown *Jagdgeschwader*, as indicated by the white numbers and lack of any visible *Gruppe* symbols. As was normal at the time, the camouflage colors were 71/02/65 with further touches of 71 and 02. The rudders of all aircraft were overpainted in yellow and probably the engine cowlings also, otherwise they would hardly have needed covering. Lower. The first *Gruppe* of JG 2 and the second *Gruppe* of JG 53 were located on Octeville airfield in 1940. Yellow 5 in the foreground shows the poor condition of the temporary yellow paint on its cowlings and rudder where this tactical color had almost worn off. A row of small white victory bars was displayed on the rudder.





The pale blue fuselage sides of the Messerschmitt Bf 109E-3s of 7./JG 53 were completely overpainted using large applications of the colors 71 and 02. Even when this photograph was taken in France in Summer, 1940, the early type of fuselage cross was still in use.

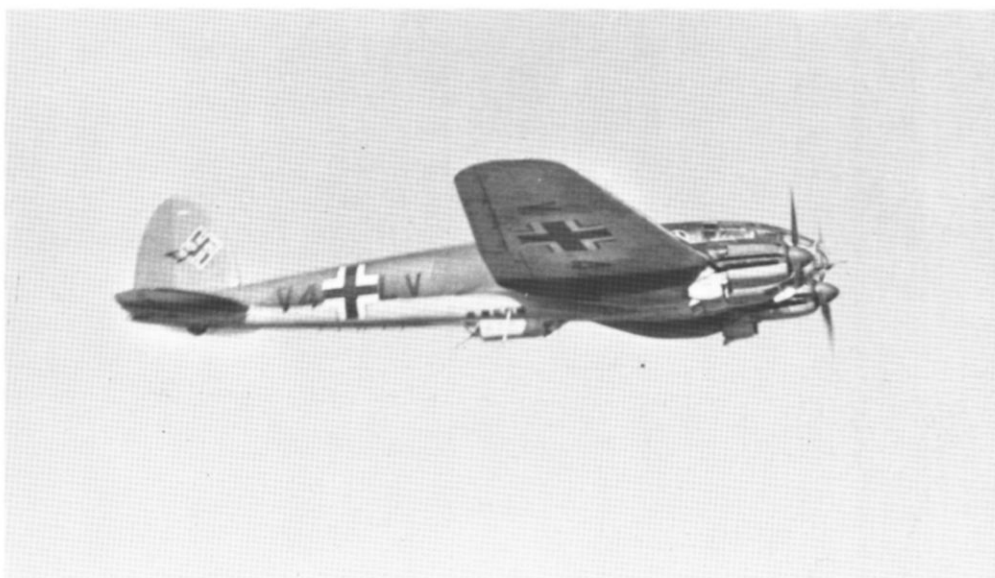


Messerschmitt Bf 109E fighters of 6./JG 26 seen in France during 1940. On yellow 3 the radio call-sign had been overpainted and replaced by identification markings whilst yellow 4 still had the early fuselage cross and carried a black name on its cowling, a rare practice at this time. Note the soft-sprayed separation line between the 71 and 02 upper surface colors and the pale blue 65 of the sides and undersurfaces.



Taken in France in 1940, this photograph demonstrates clearly that the quality of the camouflage paint, even at the beginning of hostilities, left much to be desired. After several flights over Britain, this Heinkel He 111 of 1./KG 100 had lost much of its temporary black undersurfaces and required retouching. The colors of the framing around the nose are interesting.

In July 1940, IV.(E)/KG 1 was established to provide a reserve of aircraft and crews. This Heinkel He 111 with standard daytime bomber camouflage of 70/71/65, had both the fuselage and underwing crosses repainted in a modified style, somewhat larger for the fuselage, and of reduced size on the wing undersurfaces. The entire code was shown under the wings, an uncommon practice at this time. The L of the code was black, not red as it should have been. The *Gruppe* emblem is partly visible aft of the cockpit area.



In company with JG 2 and JG 54, JG 52 also continued to use the wavy symbol instead of the correct vertical bar for the markings of its third *Gruppe*. Yellow 1, flown by the *Staffel Kapitän* of the ninth *Staffel* of JG 52, carried the *Gruppe* emblem on its cowling and its fuselage sides had received small blobs of the colors 71 and 02.



The personal emblem of *Hpt* Hans von Hahn, the *Kommandeur* of I./JG 3, is well known, but the symbols of his rank are not. On this aircraft the triangle usually painted inside the *Winkel* was enlarged considerably and positioned between the chevron and the fuselage cross. The aircraft's whole cowling was painted in white, right up to the windscreen, and displayed the yellow worm emblem of the first *Gruppe* above the exhausts.





Upper. Seen heading for England, this Messerschmitt Bf 109E-4B belonged to II.(S)/LG 2. As noted in the main text it wore a 74/75/76 camouflage scheme, one of the earliest uses of these colors. For tactical reasons the rudder and wingtips were painted in a light color, either white or pale yellow. This aircraft, red H, was armed with four SC 50 bombs. Right. A Dornier Do 17Z being shifted to tree cover in the summer of 1940. Note the huge underwing cross, the black stencilling on the access hatch and the painting on the frames of the nose. Lower. Dutch and French beaches were havens for many German crews in distress. This Heinkel He 111 of 2./KG 26 coded 1H+KK failed to return home after one engine overheated. The first letter K of the code was not painted in red but this *Staffel* color was evident on both spinners.



German mechanics of KG 51 are seen here painting the undersurfaces of this Junkers Ju 88 during the hot summer of 1940. In this view the strong sunlight had given a deceptive appearance to the colors 70 and 71, a trap for those inexperienced in interpreting black-and-white photographs.



Lower. Taken well after the French campaign had finished, this photograph shows a strangely marked *Emil*. The fuselage had received mottle-type camouflage on the pale blue 65 background, and its yellow nose was striped with a thin red band. The white-outlined black bars and small square behind the cockpit identified it as the third aircraft of the *Geschwader Stab*.





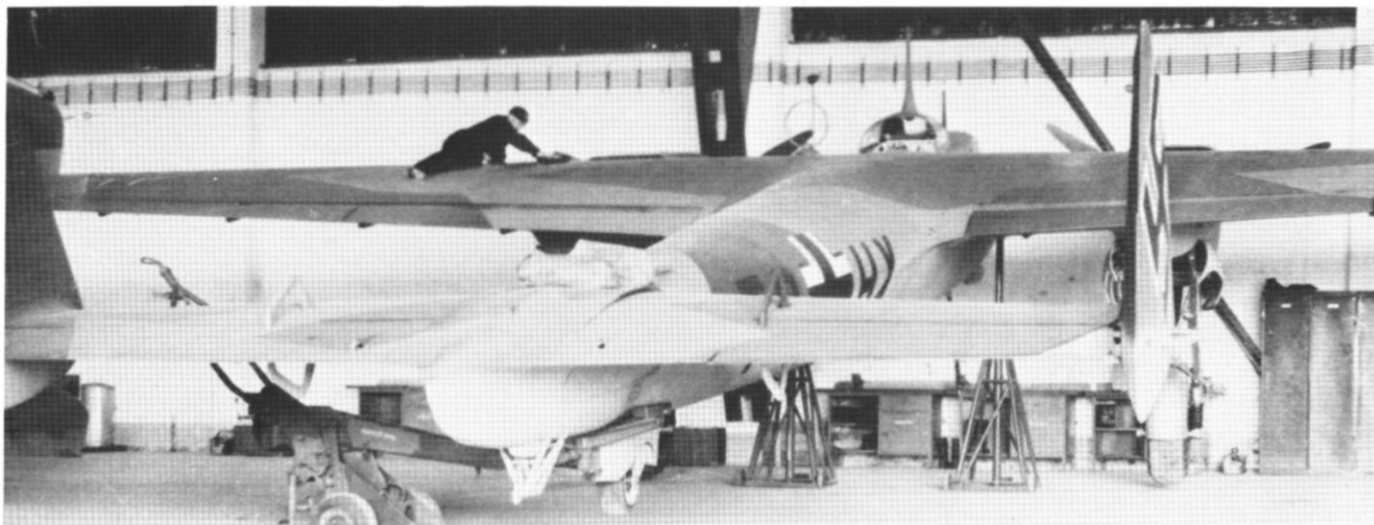
Contrary to the impression given here, this KG 53 Heinkel He 111 did not have a diagonal white stripe on the nose, simply a protective canvas covering. The high color separation line on the fuselage is of interest. The spinners of all three aircraft were white.



The *Luftwaffe* established many new airfields in occupied countries such as this one where aircraft of 7./JG 54 are seen dispersed under apple trees in Normandy. As explained in Chapter 5, JG 54 often painted individual aircraft numbers forward of the windscreen such as is seen on white 4. The unit emblem, a white flying clog, was worn on each side of the engine cowling. Painting the spinner in the *Gruppe* color — yellow in this case — was also common practice.

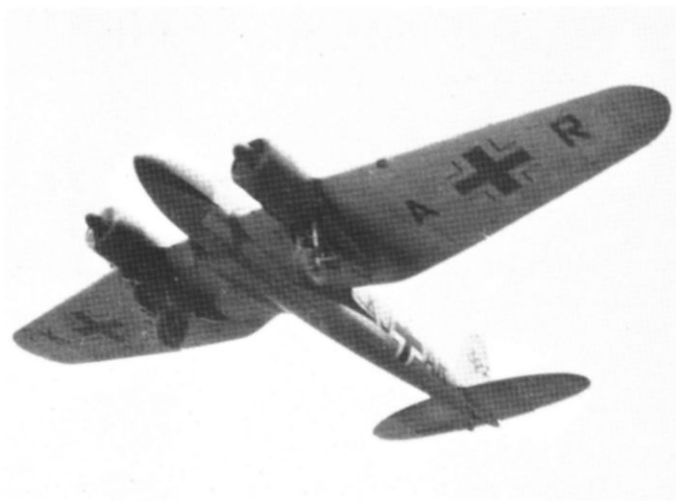


Ofw Werner Machold adds his ninth victory bar to the rudder of his *Emil*. The unusual effect given to the camouflage by the sponge-applied 71 and 02 over the pale blue 65 is very obvious here. On Machold's left lapel was the small white *Bonzo* emblem of 1./JG 2.



Upper. Often the correct painting of aircraft lagged far behind operational requirements. This Dornier Do 17, FB+HX, photographed during routine maintenance in 1940, still wore the pre-war four-color camouflage and a grossly oversized swastika which almost covered the entire area of the fin and rudder. Right. The seventh *Staffel* of KG 75 carried this fearsome emblem for a short time during the winter of 1940. The inscription GLYKOL under the starboard engine was a necessary precaution for even though the engine was of circular form, it was not air cooled. Although the bomber belonged to the third *Gruppe*, whose color was yellow, the spinners were painted in the white *Staffel* color. Lower. Two shots of the crew of a battered Heinkel He 111 of 3./KG 1 in the last few minutes before a mission over England. The aircraft had the usual temporary black undersurfaces and wore the relatively rare unit emblem consisting of an eagle attacking a lion.





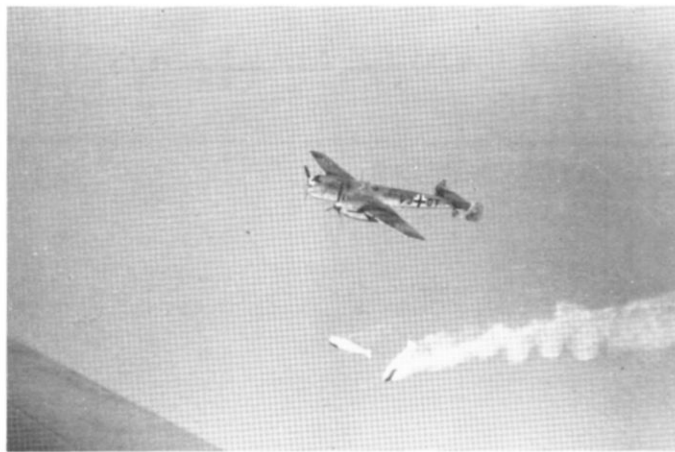
Left. The Heinkel He 111 was tested with BMW air-cooled radial engines on the 14th and 15th prototypes, marked D-ACBS and D-ADCF respectively. With the markings alterations of October 1939, the codes were changed to a four-letter sequence. The aircraft here, XJ+AR, had an all-grey finish with black trim on its nose and cowlings as used during its service with Lufthansa. Right. Seen at Aspern airfield in late 1938, this Junkers Ju 52 wore an unusually dirty greenish-grey finish. The usual black Junkers trim was painted on the engine cowlings and wings, two narrow bands — possibly yellow — indicating its blind-flying role.



Two further fascinating shots in the same series as the one published on Page 26 of *The Modeller's Luftwaffe Painting Guide*. Udet (not Milch), Hitler, and Goering were photographed at the Rechlin test centre in July of 1939. Here they are being shown the new 30-mm MK 101 cannon as fitted to the Messerschmitt Bf 110 in the background. Marked with the civilian registration D-AAPY, it nevertheless wore the military camouflage of 70/71/65.



Left. On 24th June 1940 this Henschel He 126 was shot down near Romans by *Sous-lieutenant* Marchelidon. Its code 4E shows that it served within 5.(H)/13, a unit whose emblem has hitherto been unknown. Standard 70/71/65 camouflage was carried and the swastika was shown in the early position. The fuselage cross had been modified and repainted in the new larger shape with its edges almost touching the black code letters. Right. Something of an oddity, this special camera-equipped Junkers Ju 87 belonged to III./St G 51. This unit was the first one known to have used a very light color for its entire code, a practice which later became standard within night-fighting units.



Left. On 26th November 1939 *Uffz* Ernst Schulz was photographed participating in the *Sitzen Krieg* at Vorden-by-Osnabruck. His Messerschmitt Bf 109E-3 had the dark-toned 70/71/65 camouflage with the identification, yellow 6, indicating the third *Staffel* of JG 1. The spinner was decorated with three yellow bands, the blades of the propeller being black-green 70 with the prominent VDM trade mark. Right. This dramatic shot shows a Messerschmitt Bf 110 dropping both its long-range tanks. Still carrying its factory radio call-sign, VJ+OY, it bore the second-generation type camouflage of 71/02 with mottled fuselage sides. The drop tanks were pale blue 65 with a dark green front section.



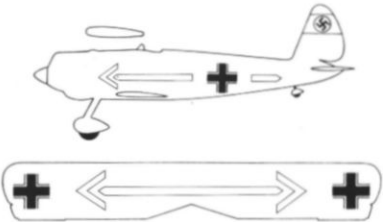
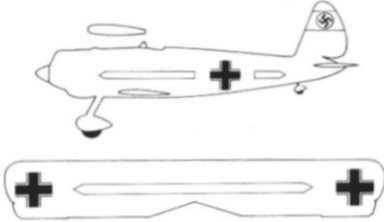
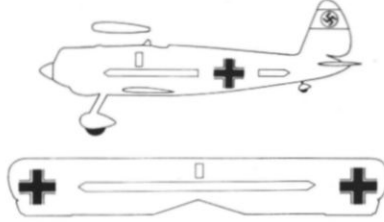
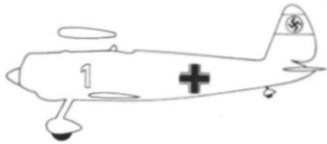
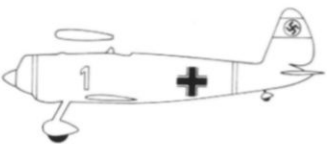
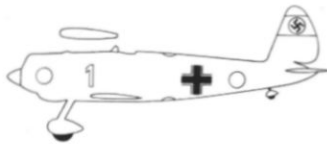
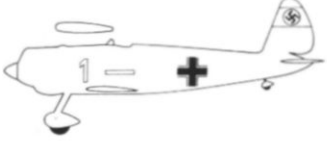
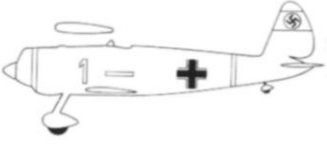
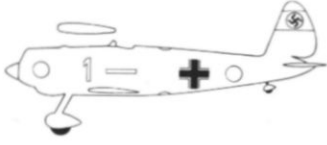
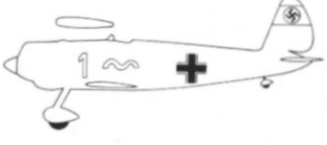


Left. A close-up of the rear fuselage of a 4./KG 55 Heinkel He 111 showing all the light parts overpainted in temporary black for night missions. The thin white outline of the letter D had even been included in this process. Right. Especially interesting to the modeller, this shot shows the cockpit area of a Messerschmitt Bf 110 with all hatches open. The contrast between the 70/71 camouflage is barely discernable and the double chevron of the *Gruppe Kommodore* of I./ZG 76 was simply outlined in white on the fuselage. The lower part of the radio mast was painted yellow.



Left. Although 3.(F)/11 used mainly Messerschmitt Bf 110s during the Battle of Britain, it had some Dornier Do 17Ps such as 6M+GL shown here. Wearing standard 70/71/65 camouflage, it still showed faint traces of its previous three-color camouflage around the cockpit area. A feature rarely seen in photographs is the rack under the fuselage for four small flare bombs. Right. A Messerschmitt Bf 110, U8+BL, preparing to take off from Yvrench airfield in northern France in 1940. It wore the newly-introduced 71/02 camouflage but retained a thin white band around its rear fuselage. The nose had also been overpainted in white as a recognition aid.

APPENDIX I

THE LUFTWAFFE MARKINGS SYSTEM FIGHTERS

GESCHWADERSTAB   		
I GRUPPE 1 STAFFEL Aircraft 1 to 12 2 STAFFEL Aircraft 1 to 12 3 STAFFEL Aircraft 1 to 12		
		
II GRUPPE 4 STAFFEL Aircraft 1 to 12 5 STAFFEL Aircraft 1 to 12 6 STAFFEL Aircraft 1 to 12		
		
III GRUPPE 7 STAFFEL Aircraft 1 to 12 8 STAFFEL Aircraft 1 to 12 9 STAFFEL Aircraft 1 to 12		
		

Note:

The symbol carried by each aircraft was also to be shown centred on the upper centre section, and if the machine carried an individual number in place of the symbol, this was to be displayed on the upper centre section and also on the lower fuselage under the wing. Where white bars or discs were carried, these were to be shown on both the top and bottom of the rear fuselage. Such at least was the intention, variations being noted on contemporary photographs.

SUMMARY OF FIGHTER UNIT SYMBOLS

GRUPPE	NUMBER OF STAFFEL	GRUPPE SYMBOL
I	1	3
II	2	Nil
III	4	A horizontal bar 1100mm long
Staffel symbol	5	A wavy line 1098mm long
	7	
	8	
	Nil	A white disc, 500 mm diameter on cowl, 400mm diameter on fuselage
		A white band, 300mm wide on cowl, 200mm wide on fuselage

INDIVIDUAL FIGHTER MARKINGS

STAB	GESCHWADER SYMBOL	GRUPPE SYMBOL
Kommodore	◀ or ▶	◀ or ▶
Adjutant	◀ or ▶	◀ or ▶
Operations Officer	◀ or ▶	◀ or ▶
Technical Officer	◀ or ▶	◀ or ▶
Major	◀ or ▶	◀ or ▶

GRUPPE	STAFFEL	COLOR	STAFFEL	COLOR	GRUPPE
I	1	White	2	Red	Nil
II	4	White	5	Red	Horizontal bar
III	7	White	8	Red	Wavy line
IV	10	White	11	Red	Cross or disc

NOTE:

The wavy line symbol was replaced after 14th December 1937 by a plain vertical bar, the third *Gruppe* of JG 2, JG 52 and JG 54 being the only units to continue using the old symbol. The fourth *Gruppe* symbol (either cross or disc) was seldom used in 1940 as only JG 51 had a fourth *Gruppe* late in that year.

BOMBERS

STAB	LAST LETTER	INDIVIDUAL LETTER COLOR
Geschwader	A	Blue
I Gruppe	B	Green
II Gruppe	C	Green
III Gruppe	D	Green
IV Gruppe	E	Green
V Gruppe	F	Green

GRUPPE	COLOR	STAFFEL	COLOR	LAST LETTER	STAFFEL	COLOR	LAST LETTER
I	White	1	White	H	2	Red	K
II	Red	4	White	M	5	Red	N
III	Yellow	7	White	R	8	Red	S
IV	Blue	10	White	U	11	Red	V
V	—	13	White	X	14	Red	Y
					15	Yellow	Z

APPENDIX II

GERMAN AIRCRAFT IN SPAIN

Where the information is available, the following list gives the total number of German aircraft sent to Spain. Not all the types were used by the *Legion Condor*, but in some cases by the Spanish Nationalist Air Force.

TYPE	NUMBERS
Fighters	
2 ● Heinkel He 51	131 or 135
5 ● Heinkel He 112B-O	17 plus the He 112 V4, 5 ● 1
6 ● Messerschmitt Bf 109	See special note
8 ● Heinkel He 112 V9 (and later I-15 <i>Chato</i>)	8 ● 2, flown by Harro Harder
9 ● Arado Ar 68E	3
Fighter-bombers and ground attack	
11 ● Heinkel He 46 <i>Pava</i>	20
14 ● Heinkel He 70 <i>Rayo</i>	18
15 ● Heinkel He 45 <i>Pavo</i>	40
19 ● Henschel Hs 126 <i>Super Pava</i>	6
Bombers	
22 ● Junkers Ju 52	120
24 ● Henschel He 123 <i>Angelito</i>	16
25 ● Heinkel He 111	He 111B, 30; He 111E, 45
26 ● Junkers Ju 86	4
27 ● Dornier Do 17 <i>Bacalao</i>	Do 17E, 20; Do 17F, 15; Do 17P, 10
29 ● Junkers Ju 87 <i>Stupido</i> and <i>Stuka</i>	Ju 87A, 3; Ju 87B, 5
Sport aircraft	
30 ● Single-engined aircraft such as Klemm Kl 32	3
33 ● Bücker Bü 131 <i>Jungmann</i>	
35 ● Bücker Bü 133 <i>Jungmeister</i>	
36 ● Arado Ar 66C	
38 ● Gotha Go 145	
Transport aircraft	
43 ● Single-engined aircraft such as Junkers W 34	

44 ● Messerschmitt Bf 108B <i>Taifun</i>	5
46 ● Fieseler Fi 156 <i>Ciguena</i>	6
Maritime aircraft	
60 ● Heinkel He 60	6 or 8
64 ● Arado Ar 95	
70 ● Dornier <i>Wal</i>	
71 ● Heinkel He 59 <i>Zapatone</i>	10 or 15
72 ● Junkers Ju 52/3m and W	

MESSERSCHMITT BF 109S IN SPANISH SERVICE

Prototypes for evaluation

Bf 109 V3, 6 ● 3
Bf 109 V4, possibly 6 ● 4
Bf 109 V5, possibly 6 ● 5
Bf 109 V6, possibly 6 ● 6

All these aircraft reached Spain between the end of 1936 and the spring of 1937, joining VJ/88, a fighter evaluation unit, before serving with J/88.

Messerschmitt Bf 109B, 39 aircraft

Some Bf 109B-1s with wooden propellers were delivered to the second *Staffel* of J/88 in March 1937 whilst the balance of Bf 109B-2s with VDM all-metal propellers reached Spain in April of the same year. The codes, which included both types, ranged from 6 ● 7 to 6 ● 45.

Messerschmitt Bf 109C, 5 aircraft

These machines were fitted with another MG 17 machine gun and the Junkers Jumo 210G engine, providing 20 hp more than the engine of the Bf 109B-2. Their codes ranged from 6 ● 46 to 6 ● 50.

Messerschmitt Bf 109D, 36 aircraft

The codes of these deliveries ran from 6 ● 51 to 6 ● 86.

Messerschmitt Bf 109E, 44 aircraft

The first *Emils*, a mixture of E-1s and E-3s, arrived in the winter of 1938-39. All these aircraft were used operationally, their codes running from 6 ● 87 to 6 ● 130.

APPENDIX III

FIRST PROTOTYPES OF MAIN GERMAN AIRCRAFT 1925-39

Arado	Ar 68	1934	Ar 68A	D-IKIN	Do 215	1937	D-AIIB (Do 17Z-O)
	Ar 95	1936		D-OLUO	Do 217	1938	
	Ar 96	1938		D-IRUU	Fieseler	Fi 156	1936
	Ar 196	1938		D-IEHK		Fi 167	1938
Blohm & Voss	BV 138	1937		D-ARAK	Focke-Wulf	Fw 44	1932
	BV 139	1937		D-AJEY		Fw 56	1933
	BV 141	1938		D-ORJE			
	BV 142	1938		D-AHFB		Fw 58	1935
Bücker	Bü 131	1934		D-3150		Fw 187	1937
	Bü 133	1935		D-EVEO		Fw 189	1938
	Bü 134	1936		D-EQPA		Fw 190	1939
	Bü 180	1937		D-ELIO		Fw 200	1937
	Bü 181	1939		D-ERBV	Gotha	Go 145	1934
DFS	DFS 230	1936-37		D-5-289 (?)	Heinkel	He 45	1932
Dornier	Do 17	1934				He 45	1931
	Do 18	1935		D-AHIS		He 50	1931
	Do 24	1937		D-ADLR (Do 24 V3)		He 59	1931
	Do 26	1938		D-AGNT		He 60	1933
							D-2477
							D-1028
							He 46A (seaplane)
							He 50aW
							He 59B
							D-2215
							D-2325

	He 70	1932			Ju 52	1930	(Single engine)
	He 72	1933			Ju 52	1932	(Trimotor)
	He 100	1938			Ju 86	1934	(Ju 86A or V1)
	He 111	1935			Ju 87	1935	
	He 112	1935	D-IADO		Ju 88	1936	D-AQEN
	He 114	1936			Ju 90	1937	D-AALU
	He 115	1936	D-AEHF		Ju 160	1932	
	He 116	1937			Klemm	Kl 25	1927
	He 170	1937	D-OASA			Kl 31	1933
	He 176	1939				Kl 32	
	He 177	1939				Kl 35	1935
	He 178	1939	World's first jet-propelled flight on 27/8/39		Messerschmitt	Bf 108	1934
						Bf 109	1935
Henschel	Hs 123	1935				Bf 110	1936
	Hs 126	1935	D-UBYN (Hs 122 V1)			Me 162	1937
	Hs 126	1936	(Hs 126 V1)			Me 209	1938
	Hs 128	1939					
	Hs 129	1939	(Hs 129 V1)				
Junkers	W 33	1926	D-921 (Ju W 33)			Me 210	1939
	W 34				Siebel	Si 104	1937

APPENDIX IV

MAIN LUFTWAFFE CODES AND MARKINGS 1919-39

Stabsschwarm (five aircraft)	Last letter A,B,C,D, E		Color Green for each letter		
Gruppe	I	II	III	IV	Staffel color
	White	Red	Yellow	Blue	
Staffel	1	5	9	13	White
Last letter	H	N	T	X	
Staffel	2	6	10	14	Red
Last letter	K	P	U	Y	
Staffel	3	7	11	15	Yellow
Last letter	L	R	V	Z	
Staffel	4	8	12	16	Blue
Last letter	M	S	W	Q	

Each *Staffel* was allocated 12 aircraft, coded from A to M. The letter I was not used, being replaced by the letter J.

APPENDIX V

TRANSPORT AIRCRAFT MARKINGS 1/8/38 TO 24/2/44

Date	Markings	Registration or code
After 1919	None	D-1, D-2 etc in numerical sequence
From 6/7/33	Swastika on port side of fin and rudder with three bands on starboard side	No change
From 30/3/34	No change	D-ABCD etc. Figures now replaced by four letters
From 15/9/35	Swastika now on both sides of fin and rudder	No change*
From 1/6/36	Adoption of <i>Balkenkreuze</i>	Operational aircraft: 12+A34 etc.** Second-line aircraft D—A+BCD or D+ABCD etc
From 1/1/39	White disc and red band background to swastika discontinued	Operational aircraft; no change except for fighters. Second-line aircraft; WL instead of D. Armed training aircraft, WL+ABCD etc. Unarmed training aircraft, WL—ABCD etc
From 24/10/39	No change	Removal of the WL code. All powered aircraft except fighters to wear codes in the style AB+CD etc

* The registration system for civilian aircraft remained unchanged from 1/4/34 until the end of the war.

** The directive LA Nr 1290/36 geh. LA II/Fl. In. 3 of 2nd July 1936 ordered special markings for fighters (see Appendix I), this new symbol system commencing from 1st September 1936.

APPENDIX VI

EARLY LUFTWAFFE IDENTIFICATION CODES

The following unit codes are known to have been used in the early *Luftwaffe*, but it must be remembered that all these units did not exist simultaneously. In the examples which follow, the individual aircraft letter, for instance, A, B, C, D, etc, is indicated by the letter X.

LUFTKRIES I (Königsberg)

10+X11, -2, -3 and -4 *Aufklärungsgruppe (F)* 121
10+X21, -2 and -3 *Aufklärungsgruppe (H)* 11

LUFKRIES II (Berlin)

20+X1, -2 and -3 *Aufklärungslehrgruppe*
20+X11, -2 and -3 *Aufklärungsgruppe (F)* 122
20+X21, -2 and -3 *Aufklärungsgruppe (H)* 12
20+X31, -2 and -3 *Aufklärungsgruppe (H)* 52
21+X11, -2 and -3 I./Jagdgeschwader 132
21+X21, -2 and -3 II./Jagdgeschwader 132
21+X31, -2 and -3 III./Jagdgeschwader 132
21+X41, -2 and -3 IV./Jagdgeschwader 132
23+X11, -2 and -3 I./Stukageschwader 162
23+X24, -5 and -6 II./Stukageschwader 162
23+X37, -8 and -9 III./Stukageschwader 162
25+X11, -2 and -3 I./Kampfgeschwader 152
25+X24, -5 and -6 II./Kampfgeschwader 152
25+X37, -8 and -9 III./Kampfgeschwader 152
27+X11, -2 and -3 I./Kampflehrgeschwader
27+X21, -2 and -3 II./Kampflehrgeschwader
27+X31, -2 and -3 III./Kampflehrgeschwader

LUFTKRIES III (Dresden)

30+X11, -2 and -3 *Aufklärungsgruppe (F)* 123
30+X21, -2 and -3 *Aufklärungsgruppe (H)* 13
32+X11, -2 and -3 I./Kampfgeschwader 153
32+X24, -5 and -6 II./Kampfgeschwader 153
32+X37, -6 and -9 III./Kampfgeschwader 153
33+X11, -2 and -3 I./Kampfgeschwader 253
33+X24, -5 and -6 II./Kampfgeschwader 253
33+X37, -8 and -9 III./Kampfgeschwader 253
35+X11, -2 and -3 I./Stukageschwader 163
35+X24, -5 and -6 II./Stukageschwader 163
35+X37, -8 and -9 III./Stukageschwader 163

LUFTKRIES IV (Münster)

40+X11, -2 and -3 *Aufklärungsgruppe (F)* 124
40+X21, -2 and -3 *Aufklärungsgruppe (H)* 14
40+X31, -2 and -3 *Aufklärungsgruppe (H)* 224 (?)
41+X11, -2 and -3 I./Kampfgeschwader 154
41+X24, -5 and -6 II./Kampfgeschwader 154
41+X37, -8 and -9 III./Kampfgeschwader 154
42+X11, -2 and -3 I./Kampfgeschwader 254
42+X24, -5 and -6 II./Kampfgeschwader 254
42+X37, -8 and -9 III./Kampfgeschwader 254
42+X10, -11 and -12 IV./Kampfgeschwader 254

LUFTKRIES V (Munich)

50+X11, -2 and -3 *Aufklärungsgruppe (F)* 125
50+X21, -2, -3, -4 *Aufklärungsgruppe (H)* 15
and -7

51+X11, -2 and -3 I./Jagdgeschwader 135
52+X11, -2 and -3 I./Stukageschwader 165
52+X24, -5 and -6 II./Stukageschwader 165
52+X37, -8 and -9 III./Stukageschwader 165
53+X11, -2 and -3 I./Kampfgeschwader 155
53+X24, -5 and -6 II./Kampfgeschwader 155
53+X37, -8 and -9 III./Kampfgeschwader 155
54+X11, -2 and -3 I./Kampfgeschwader 255
54+X24, -5 and -6 II./Kampfgeschwader 255
54+X37, -8 and -9 III./Kampfgeschwader 255
55+X11, -2 and -3 I./Kampfgeschwader 355
55+X24, -5 and -6 II./Kampfgeschwader 355
55+X37, -8 and -9 III./Kampfgeschwader 355

LUFTKRIES VI (Kiel)

(Naval command)
60+X11, -2 and -3 *Küstenaufklärungsgruppe* 106
60+X21, -2 and -3 *Küstenaufklärungsgruppe* 206
60+X31, -2 and -3 *Küstenaufklärungsgruppe* 306
60+X41, -2 and -3 *Küstenjagdgruppe* 136

LUFTKRIES VII (Brunswick)

70+X11, -2 and -3 *Aufklärungsgruppe (F)* 127
71+X11, -2 and -3 I./Kam
71+X11, -2 and -3 I./Kampfgeschwader 157
71+X24, -5 and -6 II./Kampfgeschwader 157
71+X37, -8 and -9 III./Kampfgeschwader 157
72+X11, -2 and -3 I./Kampfgeschwader 257
72+X24, -5 and -6 II./Kampfgeschwader 257
72+X37, -8 and -9 III./Kampfgeschwader 257

LUFTKRIES VIII (Vienna)

80+X11, -2 and -3 *Aufklärungsgruppe (R)* 18

As will be realised, very few *Luftwaffe* fighter units of the period carried this type of code system but instead used the identification scheme described in Chapter 1 and shown diagrammatically in Appendix I. To further complicate matters, in July 1938 the *Luftkries* were reorganised into four *Luftflotten* (air fleets) which were located at Berlin, Brunswick, Munich and Vienna respectively. This reorganisation had no effect on the *Luftwaffe's* bomber and reconnaissance units until May 1939, but it did lead to a reshuffle of the fighter *Gruppen*, mainly as a result of the need to create heavy fighter units to fly the Messerschmitt Bf 110.

July 1938	November 1938	May 1939
I./JG 131	I./JG 130	I./JG 1
I./JG 132	I./JG 131	I./JG 2
II./JG 132	I./JG 141	I./ZG 1
III./JG 132	II./JG 141	II./ZG 1
IV./JG 132	I./JG 331	I./JG 77
I./JG 134	I./JG 142	I./ZG 26
II./JG 134	II./JG 142	II./ZG 26
IV./JG 134	III./JG 142	III./ZG 26
I./JG 135	I./JG 233	I./JG 51
I./JG 136	II./JG 333	II./JG 77

I./JG 137	I./JG 231	I./ZG 2
II./JG 137	II./JG 231	I./JG 3
I./JG 138	I./JG 134	I./JG 76
I./JG 234	I./JG 132	I./JG 26
II./JG 234	II./JG 132	II./JG 26
III./JG 234	I./JG 143	I./ZG 52
I./JG 334	I./JG 133	I./JG 53
II./JG 334	II./JG 133	II./JG 53
III./JG 334	I./JG 144	I./ZG 76

As is obvious, the last numeral of the unit designation indicated the *Luftkries* or *Luftlotte* to which it was attached. In May 1939 this was changed when units within *Luftlotte* 1 were numbered from 1 to 25, those within *Luftlotte* 2 being numbered from 26 to 50 and so on.

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