THE OFFICIAL MONOGRAM PAINTING GUIDE TO GERMAN AIRCRAFT 1935 — 1945







Kenneth A. Merrick & Thomas H. Hitchcock

THE OFFICIAL PAINTING G TO GERMA

1935 — 1

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*Not yet published

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PUBLISHER'S PREFACE

At the risk of "gilding the lilly," it is our contention that this publication brings to the modeler and historian alike, the most authoritative and complete record of paint samples and related material yet published. It was our intention from the beginning to allow the authors considerable latitude in the presentation of material. By so doing, we might present you with a reference source *par excellence*. To this end the process of collecting, collating and evaluating data has not been instantaneous nor easy. The road was paved with obstacles, and more than once the authors felt hopelessly bogged down in very conflicting material. Reconstructing what was done, often in haste, more than forty years ago or even thirty-five years ago was a formidable task.

As will be noted, in several instances we have published the conflicting material exactly as we have it without dogmatism in our approach to color identification. The reader is, therefore, free to make his own associations, and draw his own conclusions. In the last analysis this allows for as complete an understanding as is possible. Although this approach may be dismissed by some as incomplete research or lacking in objectivity, we feel that it is exceedingly important to guide the reader through the maze without undue prejudice.

On the other hand, both authors recognized the need to be controversial where data warranted. They also felt a sense of obligation to bring as much new insight into focus as possible. There can be no doubt that much remains to be deciphered, or at the very least clarified.

The cornerstone to this book is the color fidelity of our paint samples. It must be appreciated that every effort was made to ensure that our samples were thoroughly matched with originals. Our paint chips were professionally matched using both the latest technology and human perception. This has guaranteed perfect matches to the originals in both color and finish.

Given the fact that there are more than 6,000 shades of color distinguishable by the human eye, nearly half of them in blues and browns, it becomes even more apparent that direct observations can often vary. The British Color Council has cataloged an astonishing 1,400 shades of blue, 1,375 browns, 1,000 reds, 820 greens, 550 oranges, 500 grays, 360 violets and 12 whites. With these statistics in mind there can be little doubt that deviations due to human error do occur. When we compound the process of color identification by adding the effects of weathering, paint application and field expedience, we begin to see why so many variations exist for so-called standard colors. Nevertheless, using multiple observations under ideal light conditions, the authors have been remarkably successful. All of the paint chips contained in this book were matched to actual aircraft, aircraft parts or components, original German color card samples and independent comparisons.

For the modeler who is building a replica of a particular aircraft in a scale below the original machine, we have included an essay on the scale effect of color. This section speaks for itself. Our only observation rests with the order in which aircraft camouflage paints were applied. Unlike the rules of classical painting, where one is taught to begin light and work gradually toward darker colors, the application of camouflage paint was the reverse. Hence, we see that the light blue of the underside would have been applied last and, in the German national insignia, black would preceed white. Translated into the scale model, this procedure can have a profound effect on the final result, particularly in the application of mottling. Of course, there are limits to this principal. In the case of the spotted camouflage of the Heinkel 219, (see page 10) it would be illogical to assume that hundreds of gray-violet spots preceeded the light blue background.

For the sake of better understanding the complex nature of German wartime camouflage and markings, the authors have directed your attention to relevant passages in two previously published works: **LUFTWAFFE COLORS** Volumes 1, 2, and 3, and **GERMAN AIRCRAFT MARKINGS,** hereafter respectively identified as LC/1, 2 or 3 and GAM. Kenneth A. Merrick has written Volume 1, of LUFTWAFFE COLORS (Arco, 1973) and GERMAN AIRCRAFT MARKINGS (Ian Allen and Sky Books Press 1977). The former series was published in Australia under the title **LUFTWAFFE CAMOUFLAGE AND MARKINGS** by Kookaburra Technical Publications. Subsequently, Volumes 2 and 3 of LUFTWAFFE COLORS were published in the U.S.A. by Monogram Aviation Publications.

We wish to acknowledge the invaluable service performed by Messers J. Richard Smith and John D. Gallaspy, coauthors of LC/2 and LC/3 for their immense contributions. The thoroughness of their research has stood the test of time, and in addition, has proven invaluable in the preparation of this work.

Finally, in order to better understand and appreciate the problems of aircraft restoration, color photographs of ten outstanding restorations have been included in this work. Some restorations have been more successful than others, but we applaud and offer encouragement to the many dedicated restoration teams around the world.

FORWARD

Publication of this work is, for the authors, the realization of a dream that first crept into the conscious about nine years ago. In the intervening years a great deal of material has been published specifically on the subject of German aircraft camouflage and markings employed during the war years. A good deal of this material has been exceedingly helpful to the serious model builder. Publishers, model manufacturers and world-wide enthusiasts' organizations have been instrumental in generating considerable public interest in this fascinating subject.

In 1973 Monogram Aviation Publications brought to its readers **MESSERSCHMITT 'O-NINE' GALLERY** which included an authentic set of camouflage color chips augmented by a concise text. The success of this title underscored the need to create a broader spectrum. In 1973 a new series of three volumes was launched by Kookaburra Technical Publications which, for the English speaking world, was the first serious venture into this complex area. Following publication of the second volume of LUFTWAFFE COLORS, ideas were formulated and work was begun, now culminating in this work.

The authors have chosen quite deliberately, to present their material in distinctive categories and time periods which serve as a concise yardstick of historical development. As model builders themselves, the authors planned this approach both as an overall perspective and to satisfy the need for easy access to an exceedingly complex subject.

Since the publication of LUFTWAFFE COLORS and GERMAN AIRCRAFT MARKINGS, new information has made revision necessary to certain sections dealing with the early and mid years of the war. However, it is in that enigmatic period between mid 1944 and May 1945 that the most significant finds of new information occur. The color chip samples we present represent the latest finds, the most comprehensive and inclusive listings yet undertaken. For comparison purposes, we have even provided paint samples of Italian and American colors where appropriate. The German colors chosen have been carefully selected from a wide variety of sources. Official air ministry color cards were, of course, used wherever possible. Variation colors have been fully authenticated and identified as such. The reader is cautioned, however, that even within the German paint industry, and from one official color card to another, first-hand observations reveal variations.

To be sure, the variations are often subtle and slight, but the fact remains that they are testimony to the inconsistancies one encounters. As applied to aircraft, the reasons for this are not as complex as might be imagined. Contained within the official painting directives and procedural guides are repeated exhortations to prepare paints carefully so that all pigmentation is activated. Clearly, variation due to human error was anticipated; and clearly it inevitably occurred. In addition, it is well known that weathering took its toll on colors.

Since the RLM apparently failed to publish a color atlas for colors beyond number 80 before the war's end, we are left with samples taken from aircraft. In retrospect perhaps this will prove the more valuable of the two alternatives. The many samples we have included for late war colors are authentic German-applied. Postwar restoration color samples are not included. We have listed a number of colors for which no known identifying RLM designator or manufacturer's number can be found. Additionally, we have included samples of the so-called sky green color often cited in official reports and observed in color photographs from the late war era. The comment has been made that these sky colors are in fact only deviations of Light Blue 76. Indeed, some critics have dismissed these colors as the result of oxidation or of thinly applied paint.

While it is not possible to refute or substantiate each and every report, we can categorically state these colors are not in any way directly associated with Light Blue 76. The samples we present on pages 41 and 69 are typical. Our samples were obtained from actual aircraft parts preserved since the war.

The authors are eternally grateful to the following persons for their respective contributions: Robert Aiello, Robert Andonian, Nils Arne-Neilson, Bernd Dieter Barbas, R. M. Bascom, Dana Bell, Greg Bell, Roland R. Belling, F. Birch, Peter M. Bowers, Robert Bracken, David Carpenter, Christian Cichorius, Des Cormack, Eddie Creek, James V. Crow, Nigel Daw, Martin Deskau, Patrick Donahue, Jeffery L. Ethell, John D. Gallaspy, Frank Hartman, Rainer Haufschild, William Hesz, Anthony R. Hnilica, Stuart Howe, Ferenc Kovács, Marian Krzyżan, Ralph Leonardo, Robert D. Migliardi, Robert C. Mikesh, Leo C. Moon, Heinz J. Nowarra, Hans Obert, Geoffery G. Pentland, Peter Petrick, Varge C. Pfuehler, Ian Primer, Günter Sengfelder, Steve Sheflin, Frank Smith, J. Richard Smith, Erich K. Sommer, Jay P. Spenser, William Swisher, Harold Thiele, John Vasco, David J. Vincent, Hank Volker, Harold E. Watson, Bo Widfeldt, Elmar Wilczek and Franz Zimmermann. Finally a very special word of thanks must surely go to William Berge, Austin Brown and Ralph W. "Jack" Woolner for their confidence and significant contributions. Our wives, Rae and Sally, deserve special recognition for their patience, enthusiasm and everlasting support.

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SCALE EFFECT

The superb model of the Messerschmitt Me 263, shown above, built by master modeler Günter Sengfelder, is ample evidence of what can be achieved. An area often overlooked concerns the application of paint to scale. Color expert Patrick Donahue, has made available his experience which surely will aid modelers of all levels. *The question is asked: "Should compensation be made for the scale effect in model paints?" To answer this question we must recognize that models are replicas of real things. It is a matter of perspective. For example, a 1/32nd scale model, if viewed from 1 foot away, would be the same size in your vision as the actual aircraft 32 feet away. Correspondingly, a 1/48th scale model and a 1/72nd scale model when viewed one foot distant, would appear as the actual aircraft if viewed from 48 and 72 feet respectively.*

On any given day the light images we receive are reflected back to our eyes giving us a visual impression of size, distance and color. Viewing familiar objects over large distance gives the impression such objects have somehow changed their colors. This effect is known as aeromatic or atmospheric perspective. American and English landscape painters like John Constable and Winslow Homer became famous for their incredible use of color to achieve distance.

What Turner, Homer and Constable knew so well was the fact that the atmosphere is not wholly transparent. We see things looking through a filter, as it were. Objects viewed from far away are not sharp and clear. As applied to aircraft, the smaller the scale, the further away the aircraft appears. The smaller the scale, such as 1/44th, the more atmospheric perspective would contribute to the deintensification of color. In larger scales such as 1/24th, the reverse would be true. What must be understood has to do with paint intensity or chroma. Basically, intensity or chroma is the amount of gray in a color. The chroma of a color such as red, can extend from pure red on the intense end to a redish gray on the least intense end. To the purist, in working to reduce the intensity of a given color, gray would be added. However, if one is working to reduce the intensity of a subtle color like Light Blue 76, the addition of gray would tend to destroy the delicate balance and possibly alter the hue. It must be appreciated that there exist several kinds of gray and that any one of these would also render a differing effect. The problem is best resolved by using white as a deintensification medium. At first glance it seems likely that by adding white you would alter the value (lightness or darkness) and not the chroma, thus not really deintensifying the color. This is a possibility. However, with camouflage colors, which have a very low chroma, they are on the least intense (grayed out) side of the scale. For example, most of the camouflage colors employed by the Luftwaffe have a chroma of 1 or 2 which is on the low end of the scale. The highest found was 4. Chroma notations extend to different intensities depending upon the color, some may reach as high 14.

Basically, what this means is that most camouflage colors are already on the gray end of the scale, some on the very bottom. Therefore, adding gray is not the answer to deintensification. The full scale color is already heavily grayed.

By adding white instead of gray, we add to the gray already present to produce a lighter shade of gray, which in turn reduces the chroma of a color. The addition of white does not change the actual color (hue). The white does reduce the value of the color but this is to advantage. We know that large areas of color in daylight tend to look lighter than small color chips of the same color because of the larger areas reflecting light. All of these factors tend to work to advantage in scale color. The amount of white necessary to achieve the desired result may vary from person to person. Experiments show that it is not unreasonable to add 25% white to a given color to achieve the necessary scale effect for aircraft to 1/48th scale. Since 25% is about 1/2 the numerical value of the scale, 15% reduction would yield satisfactory results for 1/32nd scale while 36% reduction would provide for 1/72nd scale. Recognizing that the above examples pertain mainly to camouflage colors, we must address marking colors like Yellow 04, Red 23 or White 21.

White may be used directly without change. Due to juxtaposition, light colors will appear somewhat darker when placed next to dark colors. If one were to paint an entire model airplane white, as an example, it would be desirable to break up the



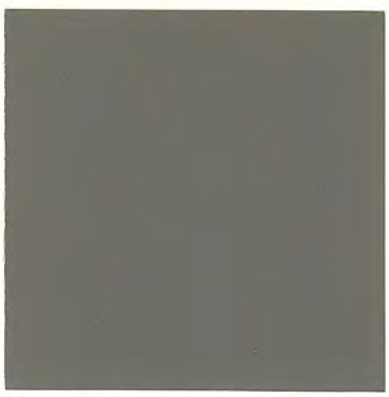
82 Dark Green
82 Dunkel Grün



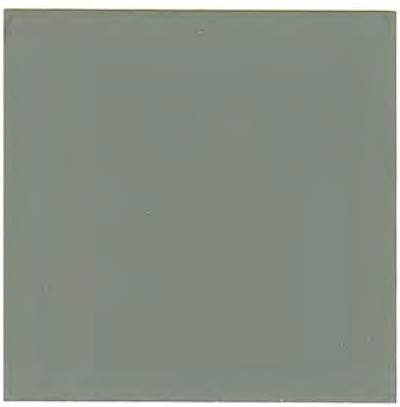
1/32 Scale Dark Green 82



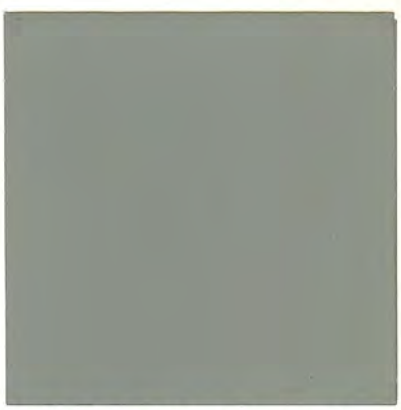
1/72 Scale Dark Green 82



75 Gray-Violet
75 Grau-violett



1/32 Scale Gray-Violet 75



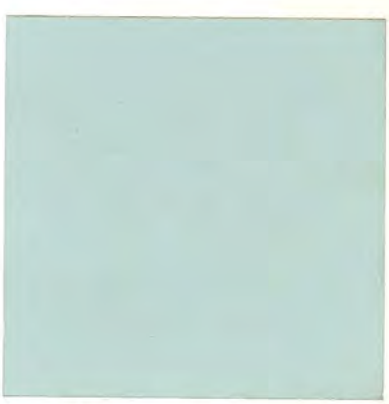
1/72 Scale Gray-Violet 75



76 Light Blue
76 Licht Blau



1/32 Scale Light Blue 76



1/72 Scale Light Blue 76

whites with gray added here and there. Otherwise a monotone finish will result that may be technically correct but optically unrewarding. The same situation applies to aluminum surfaces. And like the example given above for an all-white aircraft, adding gray to the aluminum will give better results than white. Other than these two examples, all other colors may be safely deintensified by the addition of white.

The paint chips found on this page are designed to serve as a practical guide. The modeler is advised to conduct tests prior to actual application of paint.



MARKING COLORS

Unlike the flat finish colors used for camouflage and tactical markings, paints used for *Balkenkreuz*[1] and *Hakenkreuz*[2] markings had a distinctive sheen which produced a slight highlight. Application of these markings at the point of manufacture was usually done with stencils, a solid cross of black being spray painted first, with the smaller, white outline marking oversprayed. A straight edge and brush were then used to trim the edges and apply the thin black outer edge. A late war painting guide makes reference to a specific rivet head being colored red at the primer coat stage, and later used for a center datum. The *Hakenkreuz* marking was applied using the same methods.

Prewar permanent black was used to mark manufacturers' four-letter registrations and unit codes on all classes of aircraft. The registration markings applied at the point of manufacture had to be overpainted at unit level, with permanent coloring to match the particular background paintwork, codes were then applied in permanent black. This was augmented with permanent white after the introduction of 70/71 camouflage, and with permanent red, yellow, blue and green on the eve of war. (GAM 45, 46.)

In 1942 a new type of paint, temporary black, was introduced at the point of manufacture for all aircraft intended for front line duties. This paint, which had a slight sheen, could be removed by scraping, thus saving both time and materials when unit codes were applied. (GAM 105.)

The constructor's airframe serial number (*Werk Nummer*) was applied in varying forms and styles throughout the 1935-45 period. It was normally applied in small numerals on the fin, and in a contrasting color to the background. Prewar it was normally applied in small numerals on the fin, and in a contrasting color to the background. Prewar it was often repeated in large white numerals on the fuselage to aid identification during the delivery stage. (LC/1, 20, 21, 79, 80.) The practice diminished after the outbreak of war, although many aircraft used for second line duties continued the practice and retained the marking, often reduced to the last two or three numerals. (LC/1, 136, 140, LC/3 105.)

During the late 1930's and into the early part of the war, serial numbers using only three digits were by no means uncommon but the majority of aircraft produced during the early war years utilized a four or five digit number. In 1944 a new unifying system was introduced whereby a six digit serial number was assigned to all new aircraft. The first two or three numbers usually identified the assembly point for particular aircraft, something which was not previously taken into consideration by the industry. There also existed serial numbers for front-line aircraft using an eight digit number although these examples were rare. Some older four digit numbers were expanded by the prefix addition of two new digits to conform with the 1944 regulations. An example of the eight digit number was W.Nr. 63801022 found on a Fw 190 F-8/R1 while W.Nr. 0189, allocated to the 4th Ju 290 A-7, was expanded in 1944 to become W.Nr. 110 189.

Other than the gradual disappearance of the prefix letters after 1942, the application of the number remained fairly consistent until late 1944 when marked variations began to occur between aircraft of the same type, e.g., duplication of the number on the fin or repetition of the number on the front of the engine cowling ring or elsewhere on the airframe. In some instances the number was applied to the rudder instead of the fin, rather odd in view of the replacement factor. Production Ar 234 aircraft exhibited a variation within the number itself, the first three numbers being half the size of the remaining three, a reversal of approved practice. A further variation common to late war Bf 109s was the repetition of the last three digits, applied roughly by brush or spray on the rear of the

1. German National Insignia
2. Swastika

Continued on p. 11

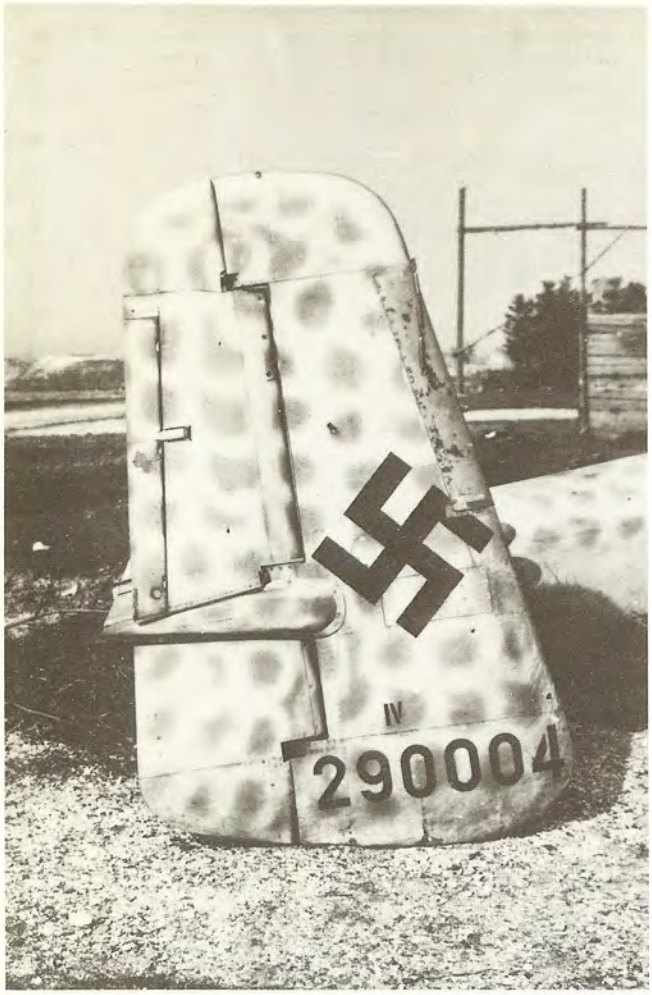
Top: Splendid restoration of a Bf 109 G-6 in colors 74/75/76 with regulation markings. Fuselage mottle is, perhaps, incomplete since colors 02/70/74 were officially specified, not color 75 shown here.





Top left: Insignia of 2./JG 400, a unit which employed the remarkable rocket-propelled Me 163 B-1. Inscription reads, "Like a flea but oh!" See page 49 for another view of this *Komet*. Top right: Close-up of JG 7's insignia. This emblem inexplicably differs slightly from the one painted on the starboard side of the Me 262 A-1a/R, W.Nr. 500 491, shown below. Below: Perfect restorations are not impossible. This superb example, completed on March 20, 1979, by the National Air and Space Museum, is a faithful restoration throughout. Blue and Red tail bands, associated with JG 7, are modified by a vertical bar indicating the 3rd Gruppe while the yellow number 7 identifies this aircraft as the 7th machine of the 11th Staffel within Jagdgeschwader 7. Individual aircraft numbers employed by the Me 262s in addition to yellow (for the 3rd, 7th and 11th Staffeln), could have been white (for the 1st, 5th and 9th Staffeln), red (for the 2nd, 6th and 10th Staffeln), and blue (for the 4th, 8th and 12th Staffeln). Aircraft operated by Staff Flights usually were green.







Top: Close-up of a Me 262 A-1a brought down by machine gun fire on April 21, 1945, near Klotze. Regulations stipulated that *Halkenkreuze* markings for the Me 262 were to be 400 mm wide surrounded by a 15 mm narrow white trim. Left: One of the twin vertical tailplanes of a He 219 A-7 shows the entire surface to be covered with a mottle of Color 75, Gray-Violet over a base of Light Blue 76. The *Halkenkreuz* conforms to the simplified style common after August 15, 1944. Small "IV" above the serial number identifies this night fighter as having SN-2 type D radar with altered frequency. Below: German airfields were littered with countless wrecks following demolition by retreating personnel, like these remains from a Ju 88G. Beneath the serial number atop the fin, is the inscription in white: VD/R, referring to radar equipment. Barely visible ahead of the simplified *Balkenkreuz* is the code 3C, identifying this aircraft as having served with NJG 4, while the two blue letters aft of the cross tell us that this aircraft was the 4th machine in the Staff flight of the 1st Gruppe. Overall color was 76 with a mottle of 75. Note the radar probe beneath the swastika has been striped with white and red bands as cautionary warning to ground personnel.



fuselage, aft of the *Balkenkreuz* marking and approximately half the height of the latter. Given time, this practice may have developed into routine production. Some Bf 109s carried this abbreviated duplication in carefully stenciled numbers.

Internal piping was color coded for maintenance purposes, using the colors yellow (04), white (21), black (22), red (23), blue (24), green (25) and brown (26). (GAM 169.) Where services terminated at an external point, the relevant coloring was used to identify the specific service. Additionally, instructions and symbols relating to maintenance were painted externally on the airframe. (LC/3 158.)

Aircraft allocated to specific theaters of operation usually wore tactical markings applied in either of the permanent colors 04 or 21. However, tactical situations within a specific theater of operation often required temporary tactical markings which were applied using glyptal-resin based paint. (GAM 74-76.)

Reichsverteidigung[3] markings were, technically, a tactical marking and first appeared in 1943 as a single, red fuselage band marking applied in permanent 23. This augmented the existing tactical marking of a 21 colored fin and rudder. (GAM 120.)

3. Reichs Defense Units



04 Yellow
04 Gelb

21 White
21 Weiss



22 Black
22 Schwarz



23 Red
23 Rot



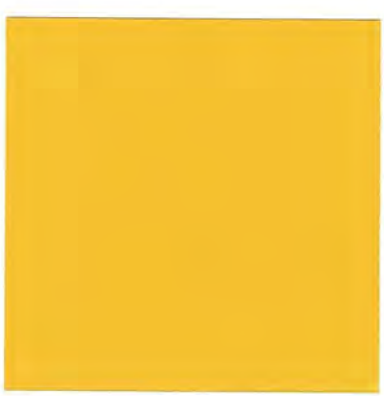
24 Dark Blue
24 Dunkelblau



25 Light Green
25 Hellgrün



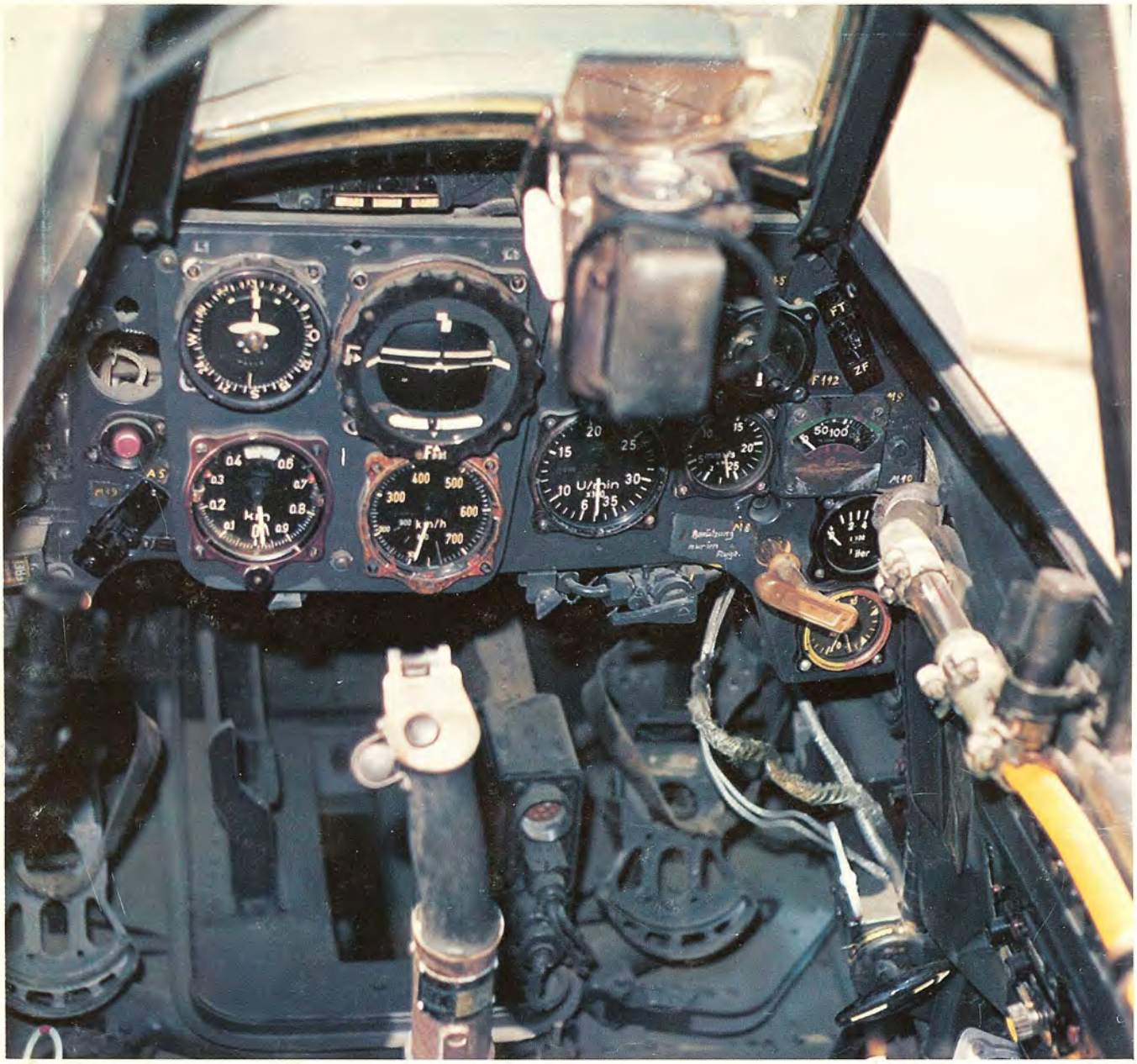
26 Brown
26 Braun



27 Yellow
27 Gelb



28 Wine Red
28 Weinrot



INTERIORS

Prior to the introduction of strict standardization in 1936, aircraft interiors were varied in coloring, dependent upon the nature of the material used. (LC/3 154.) The reissue of L.Dv.521 in November 1941 stipulated that all cockpit areas or crew areas visible through a glazed covering were to be painted Black-Gray 66, principally as an antiglare measure. The remainder of the interior, including weapons bays and undercarriage housings, were to be finished in Green-Gray 02. Instrument panels were to be Gray 41 with individual instrument locations identified by a letter/number combination, usually hand painted, in either 04 or 21. Certain equipment packs were painted in other shades of gray, e.g., battery housing in Gray 42. (GAM 168.)

Interior areas such as wings and tailplanes were given an electroplated finish which produced a very high quality anticorrosive surface, a golden metalic sheen very similar to that seen inside some processed food cans. Interior wooden components were painted with a special finish which had an identifying color of pale Yellow-Green 99 when used with one paint formula, and a very pale yellow tinge when used with another paint formula. (GAM 169.) (LC/3 156.) Prewar the interior of the engine cowlings was finished in silver as were internal framework and all connecting rods between the cockpit and engine. The firewall was left unpainted on the engine side, but was painted 02 on the cockpit side as were the fuel, oil and coolant tanks. Pipelines for fuel, oil, coolant, air and fire extinguisher system were painted, respectively, yellow, brown, green, blue and red. Around 1937 color 02 was used inside the engine bay, but the firewall remained unpainted. Engine serial numbers usually appeared in large white or yellow numbers along the upper vertical surfaces of inline engines and on the front face of radial engines.

Above: Beneath the Revi C/12D reflector gun sight of this Bf 109 G-6, may be clearly seen the flight (to the left) and engine instruments. Note the yellow fuel line which passes from the rear fuselage through the cockpit and into the engine compartment. A portion of the line was glass which afforded positive assurance the engine was getting fuel. Right: Like the Bf 109 above, the interior of the Me 262 A-1a cockpit was universally Black-Gray 66. Flight and engine instruments essentially were similar in both aircraft, but it will be noted that those of the jet Me 262 were additionally color coded.



02 RLM Gray
02 RLM Grau



41 Gray
41 Grau



66 Black-Gray
66 Schwarzgrau





DAY FIGHTERS 1935-1937

Between 1933 and 1935 the embryonic *Luftwaffe* had at its disposal a number of paramilitary aircraft types bearing a variety of external finishes. Depending upon their construction, many had lacquered wood and fabric, while others were operated in the natural aluminum finish in which they were delivered. Camouflage in those early days was not a serious consideration. However, by 1935 the aviation industry in Germany had made great strides on many levels, with an ever increasing number of new aircraft being made available to the still untouted *Luftwaffe*. Almost all of the new warplanes then appearing in the skies over Germany were finished in colors not unlike those being applied strictly to civil and general aviation types. Thus, for a period of time between 1935 and 1938, new fighter types often were seen in the civil Light Gray (*Hellgrau*) complete with black civil registration letters on the wings and fuselage. Across the vertical tailplane were the colors of the state (black, white and red) on the right side, while the swastika motif of the NSDAP[4] appeared on the left side. (LC/1 13, 18.)

The use of the swastika motif on both sides of the vertical tailplane was made mandatory in June 1936. Although the Light Gray previously mentioned was to be found on both civil and military types, a new color was introduced at about the same time in 1935, and from the outset it was considered camouflage. Officially known as *Grüngrau* (Green-Gray) 63, this shade of gray differed from the civil gray in hue and intensity. Green Gray 63 was used on a wide range of military aircraft and was to be seen as primary camouflage up to Autumn 1938 on various fighter types.

Research into newly discovered prewar documentation is revealing with respect to the true character of Green-Gray 63. It has now been established conclusively that Green-Gray 63 and RLM Gray 02 are identical colors. The reason for this seeming anomaly rests with the prewar RLM system of paint color identification numbers which was introduced in 1936. Paint suppliers to the German aircraft industry previously had used their individual company catalog numbers to identify specific colors. The RLM revised this system and, accordingly, issued a single set of identification numbers common to all suppliers and the industry in general.

In 1937 a comprehensive listing of all paints then in use was issued. This was cross-referenced to the new RLM system and to existing company catalog numbers. (GAM 161-164.) The transition was not instantaneous due to obvious problems of remarking existing stock held in store as well as that in use. In addition, the very comprehensive painting schedules in use needed to be either replaced or amended. The latter method was used initially, a process that is seen in surviving wartime painting documents.

The painting schedule for the He 51C and D (LC/1 54-59) is an example of an interim document that has been partly amended. The final external finish specified is a combination of the existing company paint catalog numbers plus a suffix identifying the paint by the new RLM number and paint description, i.e., *Cellesta-N-Flugzeug.Ubz.L.Nr.2000 Grüngrau 63*. The RLM cross-referenced listing of 1937 shows the same restrictions for its use, i.e., external application over wood and fabric. (GAM 162.)

The existing *Grüngrau* overall coloring adopted as standard external finish on military aircraft was quite adequate as a sky camouflage because of its relatively neutral coloring. The *Luftwaffe* had no need, at that time, of a passive ground static camouflage. When the initial lessons of the Spanish conflict began to be

4. National Socialist German Workers Party

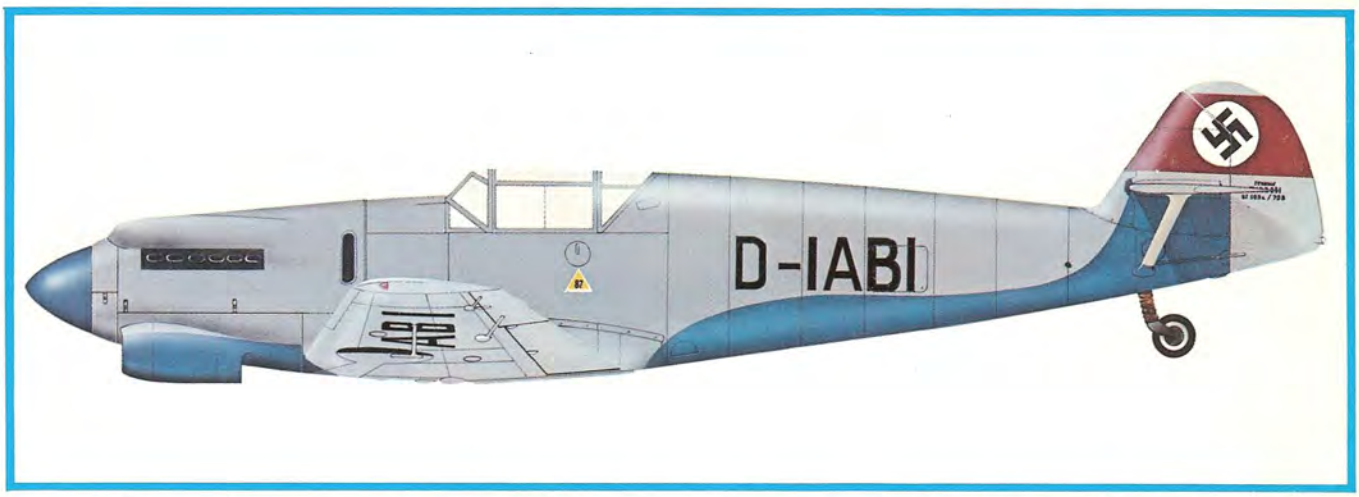
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Top: A He 51 C-2 is shown here in the markings of a typical fighter training school. Overall finish is Color 63 Green-Gray.

63 Light Gray
63 Lichtgrau

63 Green-Gray
63 Grungrau

65 Light Blue
65 Hellblau



The very first Me 109, Bf 109 V1 (initially known as the Bf 109a), is shown here undergoing tests at Rechlin. It was painted in the civil Light Gray over all surfaces except the lower portion of the fuselage which was decorated in blue. Beneath the red band of the fin/rudder device, can be seen the typical data block which lists vital information including the field to which the aircraft belonged and its telephone number. The B1 registration appeared above and below the wings in addition to both sides of the fuselage. Other early prototypes of the Bf 109 were painted in Green-Gray 63 overall without distinctive trim colors.





A line up of Arado 68 F-O fighters in the official color scheme of 63 overall with the *Balkenkreuz* markings introduced in mid-1936. Coloring on the engine cowling and fuselage consisted of traditional colors bestowed to six *Jagdgeschwadern*. Lack of unit codes indicate the aircraft are newly delivered.

analyzed, the passive camouflage aspect for larger aircraft was quickly appreciated and the splinter pattern in colors 61, 62 and 63 was introduced in late 1936. This availability of paint stocks, in turn, lead to unit applications of camouflage for both fighter and reconnaissance aircraft operating on the Iberian front. Initially, combinations of 61, 62 and 63 were used on some of the He 51 aircraft while 61 and 62 were used on some Bf 109s. The final supplies of Bf 109s were camouflaged in a more standard manner with 62 on upper and side surfaces and 65 on lower surfaces.

It should be noted that the color identifier, *Grüngrau* 63, was added only to paint identification numbers where such paint was destined for final external finish, i.e., camouflage. Where the same *Grüngrau* coloring was used as pigment for internally applied paints, the official color designation became RLM Grau 02.

It should be remembered that during this time RLM color identification numbers below 60 were intended for either internal or minor external markings. The use of 61, 62 and 63 as camouflage was relatively brief, being abolished for use on any type of aircraft, other than bombers, in the Spring of 1938.

The painting schedule for a typical mixed construction fighter of the period was three coats of red primer, two coats of 63 plus a special additive, one coat of plain 63, and finally a coat composed of five

Completed early in 1936, the third prototype of the Heinkel 112, He 112 V3, W.Nr. 1292, is shown here in its initial form with open cockpit and overall 63 color scheme. Small emblem atop the fin is the Heinkel logo: a winged H.





The Arado 80 V3, which was retained by Arado as a flying test-bed, is seen here in typical 1937 markings and coloring. Overall finish was 63 with black B1 registration letters.

parts 63, two parts colorless waterproofing lacquer and one part special additive. (LC/1 54-59.) The waterproofing lacquer, necessary because of the fabric surfaces of the period, produced a glossy finish which disappeared when metal-skin clad aircraft were introduced.

A military emblem, the *Balkenkreuz,* was introduced in the Spring 1936, and in June the *Hakenkreuz* marking superseded the black, white and red fin and rudder horizontal striping. Five part military codes, and for some fighter units traditional coloring, were added in the same month. Fighter codes, however, were rescinded in July 1936 and replaced by numerals and a system of symbols, (GAM 13-15, 18-21.)

Finally, mention must be made of one other permanent marking that frequently appeared on fighters of this period. On the rear section of the fuselage, usually only on the port side, a data block was stencilled which listed basic information about the aircraft such as: name and address of the owner, the empty weight, the payload, the maximum weight, maximum number of persons to be carried, including the crew and the date of the last major inspection. This information was applied in characters 25 mm tall in a color contrasting with the background.

Hardly resembling the early prototypes of the series, this particular machine is the much refined He 112 V12 which appeared in mid 1939. Finished similarly to other prototypes of the series, it was overall 63 Green-Gray.





DAY FIGHTERS 1937-1940

During the summer of 1937 with tensions on the rise in Europe, the new German *Luftwaffe* was still undergoing growth and not yet prepared for war. In full recognition of this, a new passive camouflage system was being introduced into the ranks of the fighter force. Two colors, used in unison over all uppersurfaces, began to appear on several aircraft types. The two new colors, Black Green 70 and Dark Green 71 (respectively: *Schwarzgrün* and *Dunkelgrün*) were accompanied by Light Blue 65 (Hellblau) as the official undersurface camouflage color.

Civil registrations for military aircraft on delivery flights were rescinded in March 1938 and replaced by a four letter registration applied at the point of manufacture. In August the red band and white disc background to the *Hakenkreuz* were deleted, and soon after, the four letter registration markings (GAM 39-40.) Fighter codes and symbols were finally rationalized just prior to the outbreak of war, and fighter identification numeral size was officially set at 6/10ths of the height of the fuselage *Balkenkreuz*. (GAM 45.)

The use of 63/02 as primary camouflage was finally discontinued in the autumn of 1938, but its potential as a camouflage color began to reemerge a year later when field experiments were carried out by fighter units in France. It was then, however, referred to as 02 since the identification numbers and descriptions 61, 62 and 63 had been discontinued.

The initial fighting in Poland produced a field modification to the *Balkenkreuz* markings on Bf 109s, the size being radically increased.

During the 1939-40 winter, Bf 109s of JG 53 were recorded wearing upper surface camouflage of contrasting colors. Field tests were being carried out with varying combinations of 70/02 and 71/02 and even 70/71/02. The resulting camouflage effects produced a disruptive pattern better suited for air to air combat. The motivation behind this camouflage change clearly underlined the successes of the Polish campaign and the lack of initiative by the British and French in particular. This was reflected in an order to restrict camouflage for single-engined fighter aircraft to the extreme plan view, 65 coloring being extended up the fuselage sides.

Implementation of this order had begun when fighting once more broke out. By the conclusion of the French campaign, in May 1940, an official order had been issued to the aircraft industry simplifying the original upper surface splinter pattern and repositioned the *Hakenkreuz* marking on the fin area. In addition, those *Jagdgeschwadern*[5] serving in France were to receive replacement aircraft camouflaged in the newly approved RLM scheme of 70/02/65.

Retrospectively supplies of 02 were used to modify existing examples in 71/02/65. This variation is usually detectable by comparing the tone value of the propeller blades with the darker camouflage color, 70 being stipulated for metal propellers blades throughout the war years.

A further line of camouflage experimentation and field tests was being carried out with a new set of colors during this period, the purpose being to produce a pure air-to-air camouflage. The recent recovery of a Bf109 C-1 of 11 (N) ./JG 2 from Norwegian waters, and a detailed examination by *Herr* William Berge has determined that the aircraft was painted in the simplified pattern but using the colors 74/75/76. The aircraft was repainted over its existing 70/71/65 scheme during the unit's relatively brief stay at Vaernes in May 1940. It subsequently ditched near Lindesnes on June 2. *Herr* Berge's research has also located an eyewitness report from the person who captured the pilot of a Bf 109E, when Red 14, of 5./JG 77 made a forced landing at Mandal (about 20 miles from Kristiansand) on April 11, 1940. Camouflage colors were recorded as grays, and photographs of the machine show clearly the very pale coloring typical of 76 camouflaged side surfaces.

5. Fighter Groups

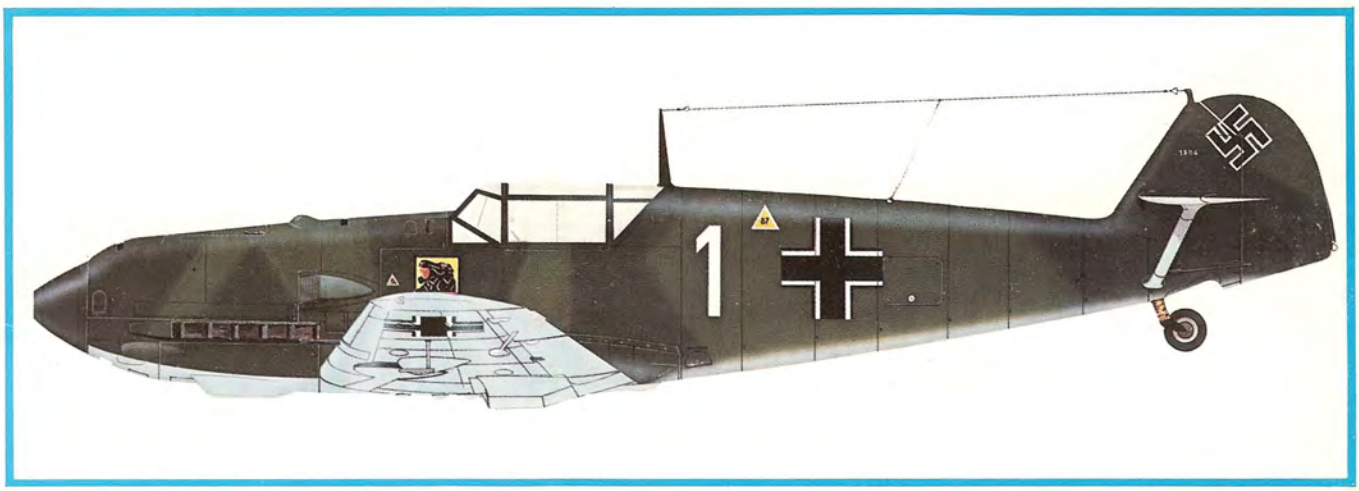
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Top: A Bf 109 B-1 in regulation standard 70/71/65 camouflage and markings, photographed in the early summer of 1937. Note cockpit interior was, at this time, RLM Gray 02. Wing walk area is outlined in Wine Red 28.

70 Black-Green
70 Schwarzgrün

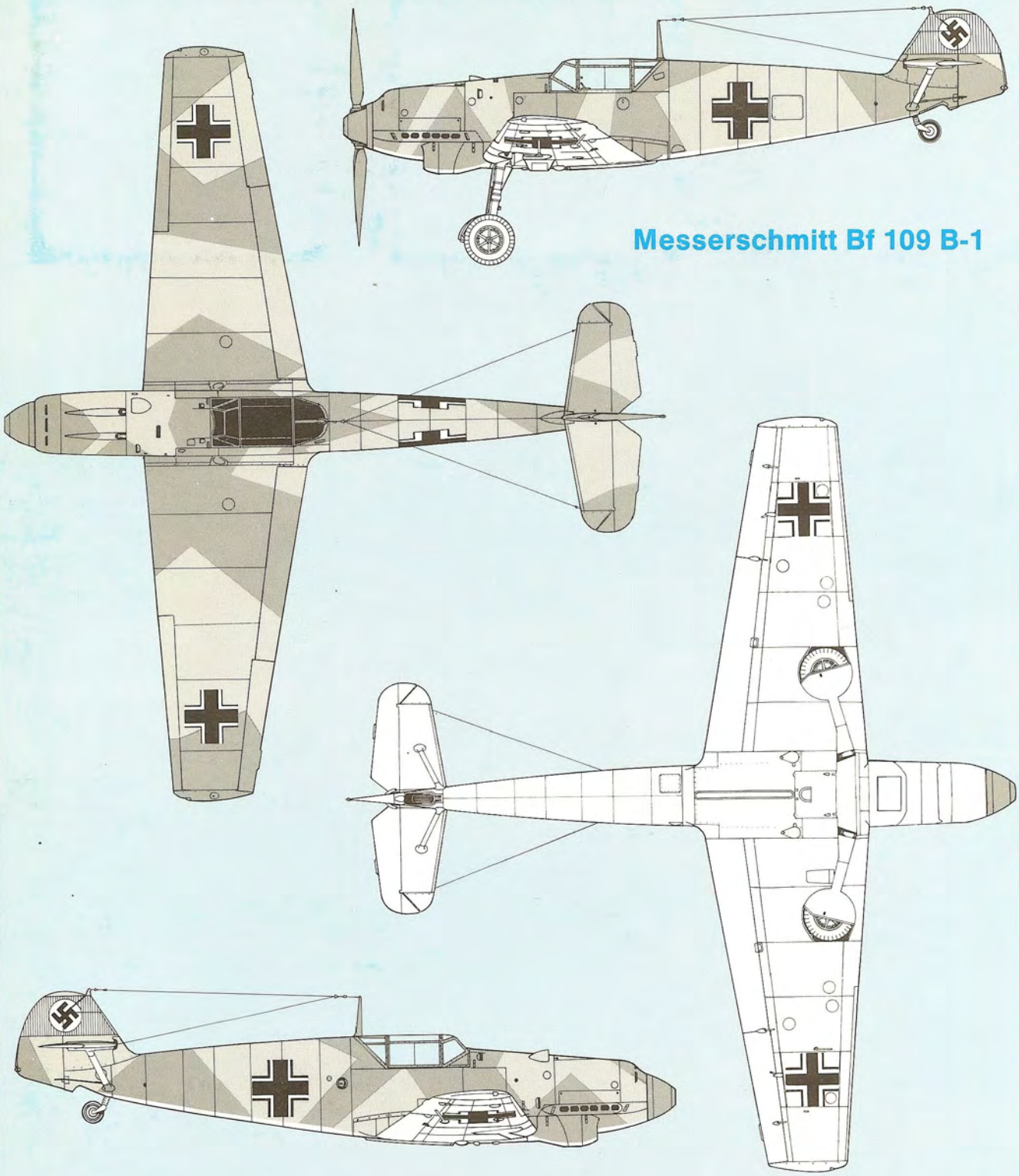
71 Dark Green
71 Dunkelgrün

65 Light Blue
65 Hellblau



Messerschmitt Bf 109 E-3, W.Nr. 1304, of I./JG 76 (later II./JG 54), is shown above in its original camouflage of 70/71/65. This Emil had the distinction of being the first example captured by the Allies when it landed behind French lines on November 22, 1939. The RAF acquired it on May 2, 1940, and by June 1940 its French insignia (shown below) was replaced by British markings and RAF number AE 479. On April 7, 1942, it was shipped to the U.S.A., arriving at Wright Field on May 14, 1942. During the last half of 1944, it was located at AAF Depot Kearns, Utah, where it remained (as Class 26 Inactive Foreign Aircraft) up to September 1945, thereafter failing to appear on Army Air Force equipment rosters. Its ultimate fate is unknown.





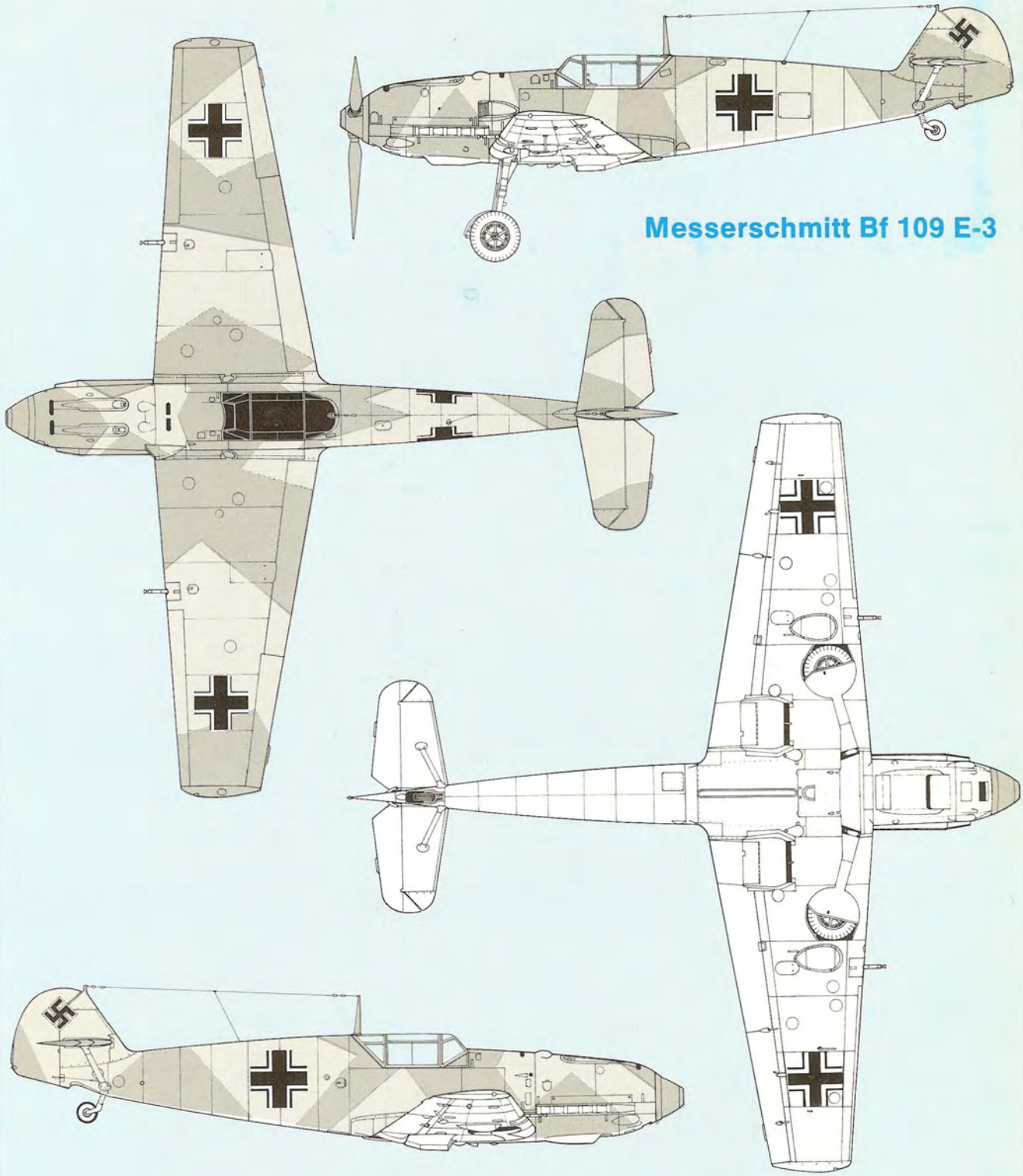
Messerschmitt Bf 109 B-1

This February 1937 factory camouflage pattern was also applicable to the Bf 109 C-1 and D-1 series. Spinners were sometimes RLM 02, while metal propeller blades were usually Color 70. Wooden Schwarz props fitted to early production Bf 109 B-1s, along with their spinners, were RLM 02. Some Bf 109 D-1s were produced with polished metal propeller blades having matt black rear surfaces. Main wheel hubs were black, while tail wheel hubs were unpainted.

Color 70
Black-Green

Color 71
Dark Green

Color 65
Light Blue



Messerschmitt Bf 109 E-3

Color 70
Black-Green

Color 71
Dark Green

Color 65
Light Blue

The February 1937 factory camouflage scheme continued for the Bf 109 Emil series up to the early part of 1940. It was typical for early production Bf 109 E-1, E-2*, E-3 fighters as well as Bf 109 E-0 preproduction and test aircraft. Spinners and metal propeller blades were almost always Color 70, apart from early test aircraft which had polished metal prop blades. National insignia size, style and placement varied with respect to changing directives.

*Bf 109 E-2 entered limited production and was only employed by II./JG 27.



In view of the official RLM order directing the introduction of a revised camouflage scheme of 70/02/65, specifically for fighter units engaged on the only active battle front, it seems probable that the 74/75/76 scheme was still in its early test stages. Significantly, the two units identified with these tests were both operating in an area well removed from the main battle front. The 70/02/65 scheme was introduced at the point of manufacture with the phasing in of the Bf 109 E-4 model in May 1940. A further addition to the production paint scheme was the introduction of spray gun, soft-edge mottling in color 02 on the fuselage sides. This occurred circa August 1940, reflecting the battle-dictated field modifications of the front line units.

Despite an exhaustive search of both official intelligence reports, private notes and many contemporary photographs, not one single conclusive example has been found of a Bf 109E operating over Britain wearing an RLM camouflage scheme of 74/75/76 for this period. Grays certainly existed and were used during the period of the daylight air war over Britain in 1940. Most, if not all, appear to have been unit-mixed paints. Recorded descriptions are ambiguous enough to be interpreted as identifying one of the two new grays, 74 or 75. The first reports of grays appear during August 1940, but usually in conjunction with other known or hybrid colors and obviously unit-applied. An JG 2 veteran recalled mixing stocks of the standard greens with 65. Black-Gray 66 mixed with 65, produced a variety of grays. However, the undiluted 66 is probably the true identification of the black mottling sometimes recorded. The 66/65 mixture may also account for various references to a dirty blue color quoted with various gray applications.

More positive descriptions of two tone gray schemes appear in September 1940. Again the reader is cautioned that such references as "... cloudy gray on fuselage", "... wings battleship gray", or "... two shades of gray on upper surfaces" or "... gray dappled black" do not substantiate the use of an RLM scheme of 74/75/76. It is possible that small stocks of the new gray colors were made available, either together or singly, to some front line units. However, the high attrition rate suffered by the fighter units and the maintenance pressures on ground staff during the period under discussion make it unlikely that time was available to repaint entire aircraft. A point often overlooked is that the *Luftwaffe* was operating from former French military airfields which, like any other military airfield, had stocks of aircraft camouflage paints. In view of the foregoing it would be totally misleading to infer the use of an approved RLM camouflage scheme of 74/75/76 by fighter aircraft of the front line units operating over Britain during this period.

The heavy fighters, Bf 110s, retained their 70/71 upper surface camouflaged with 65 restricted to the lower surfaces. However, their role was to change during the weeks of the battle. The first example of a revised camouflage scheme occurred in late July 1940, when a Bf 110 was captured wearing a 71/02/65 scheme. It had a raised demarcation line between upper and lower colors and heavy mottling on the side surfaces. Its photo-reconnaissance role may account for its being camouflaged in a manner that was still comparatively rare for the type and would remain so for some weeks to come.

The opening phase of the air battle over Britain was fought without further variation to fighter camouflage and markings. Not until the heavy reversals of August 1940 did the German fighter force begin a range of unit modifications to camouflage and markings.

The rapid succession unit-modified camouflage for the Bf 109s was introduced using a soft mottling in standard upper surface colors, then temporary yellow (04) tactical markings for wing tips and tailplane tips and rudder, and lastly the engine cowlings. On August 30, 1940, the yellow was replaced by white, which on the Bf 110 was confined to the nose section. Mottling became more varied and extensive during the same period. Most significantly though was the adoption of unit-mixed camouflage colors in a wide variety of blues, blue-grays, grays, gray-greens, yellow-green and blue-greens. These were applied over all upper and side surfaces, down to the original 1939 style lower fuselage demarcation line. Additionally, the fuselage *Balkenkreuz* marking was often modified to reduce the white area.

Top: A Bf 109 E-1 in the new offensive scheme introduced during the early months of 1940, utilizes 70/71 on the uppermost decking of the fuselage, with 65 over the rest of the airframe. Top surfaces of the wings were still 70/71, but the light blue undersurface color had extended over the leading edges. Individual number was in red outlined by a thin black line.

70 Black-Green
70 Schwarzgrün

02 RLM Gray
02 RLM Grau

65 Light Blue
65 Hellblau



Top: Bf 109 E-4s at their point of manufacture. Nearest is W.Nr. 2782 in the revised color scheme of 70/02/65, introduced with this model in May 1940. This particular aircraft was shot down over Biggin Hill on August 30, 1940, while flying with III./JG 2. It is the earliest known photographic evidence of mottling applied at the point of manufacture. Right: A propaganda photo showing the limited production He 100 D-1s "in active service", finished in 70/71/65 during the spring of 1940. Below: Another propaganda photo from the same period shows the Bf 109 V11 and V12 ostensibly being made ready for operational duties.







DAY FIGHTERS 1940-1944

The question of the introduction of an RLM approved camouflage scheme incorporating the new colors 74, 75, and 76, remains enigmatic for this period. Contemporary photographs of Bf 109Es show a wide range of camouflage schemes, many clearly being the hybrid schemes of the previous autumn. JG 54's use of grays extended even to the upper surfaces of the wings. They used a combination of the two low contrast grays 74 and 75, coupled with a high contrast color that may have been 65. From this evidence alone, and in the absence of confirmatory RLM documentation, it appears that stocks of the new paints were available at unit level.

The first Bf 109 F-2s achieved operational status with JG 2 in March 1941. The few photographs extant show a low contrast camouflage consistent with 74 and 75, plus a heavy overspray of one or both colors taken down the fuselage sides to the lowest point. This appears to be unit-applied as there is little evidence of consistency of application between various aircraft. The first of the new Fw 190 A-1s, which entered service with JG 26 in June 1941, also showed a consistency of camouflage in low contrast colors but with far less mottling on their fuselage side surfaces. An RLM order, dated June 24, 1941, is believed to have ratified the changeover to an official RLM camouflage scheme incorporating the new colors 74, 75 and 76 in conjunction with 65. By August 15, 1941, Messerschmitt had set forth its new painting chart for the Bf 109 F calling for camouflage colors 74/75/76 with a fuselage mottle of 02/70/74. (See page 27) Although exceptions occurred even after release of this chart, it remained the officially prescribed painting document for the Bf 109 F. As the new Bf109 G series appeared in March 1942, it too was painted according to this chart.

The reissue of L.Dv.521/1 and 2 in November 1941, incorporated all amendments that had occurred since the 1938 issue. Upper surface camouflage of 74, 75 and 76 was stipulated for all single-engined and twin-engined fighter aircraft, but lower surface coloring was to remain 65. The 74/75 combination was confined to the upper plan view with 76 for fuselage side surfaces grading into the 65 colored lower surfaces. (GAM 83.) Additionally, all single-engined fighter aircraft leaving the point of manufacture were to have their spinners painted in 70 with one-third in White 21. Some skepticism exists regarding the validity of the four color scheme of 74/75/76/65 for fighters and *Zerstörer*[6] types. Page 5 of directive L.Dv. 521/1 clearly states the camouflage colors approved for all classes of aircraft, but in each instance the relevant lower surface color is omitted. However, the camouflage listing is again repeated on page 29 of this important document for all aircraft classes, this time with the addition of lower surface coloring data. The argument that 65 was listed merely as an alternative for 76 receives no substantiation anywhere in this highly detailed and comprehensive 52 page document.

As the most skeptical of the critics has pointed out, other than L.Dv.521/1, no known factory camouflage drawing or official directive has been located showing the use of a 74/75/76/65 scheme. The same remark applies to the hypothesis of a 74/75/65 scheme, but without the support of a single document. However, the RLM document *HM-Anweisung Nr. 7/42,* dated May 18, 1942, refers in part to a simplified painting schedule for Fw 190 aircraft, the colors being listed as 74/75/76. It was known that the four color scheme for the Fw 190 was eventually discarded and document *HM-Anweisung Nr. 7/42* confirms this.

It is noteworthy that despite the official scheme of grays, some of the aircraft of the channel-based units continued to display modifications to their camouflage.

6. Heavy Fighters

Top: This well restored Bf 109 E-3/B, W.Nr. 4101, is representative of the late 1940 period. This particular machine was acquired on November 27, 1940, when its pilot, Lt. Wolfgang Teumer, made a forced landing at Manston following combat with three Spitfires.

HU 23 ± (ANA 606)



74 Gray-Green
74 Graugrün

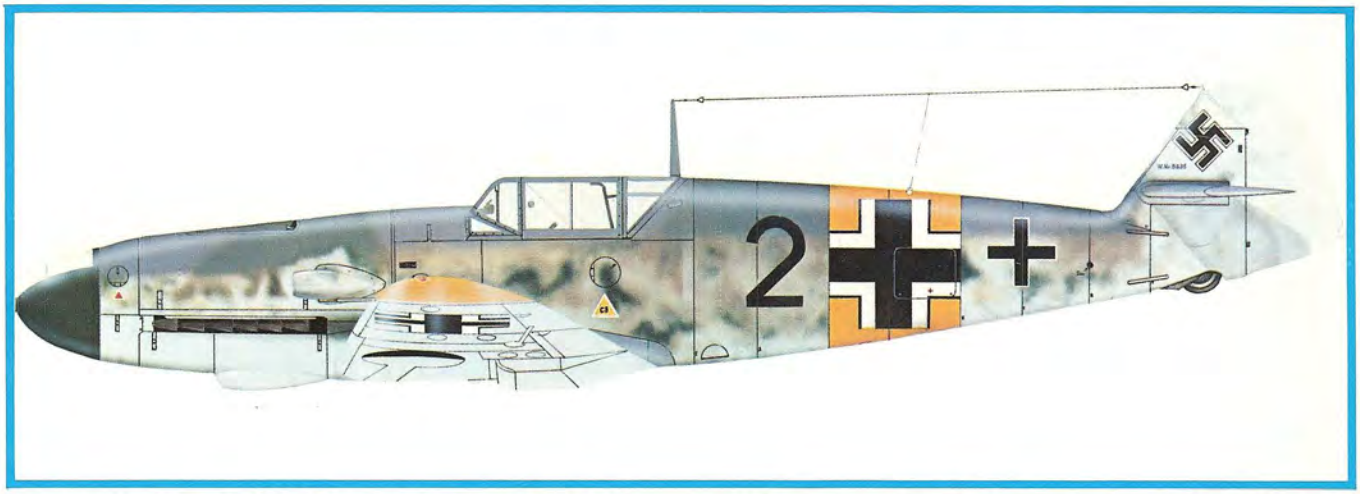
HB 7 / HG-11 + 10% white



75 Gray-Violet
75 Grauviolett



76 Light Blue
76 Lichtblau



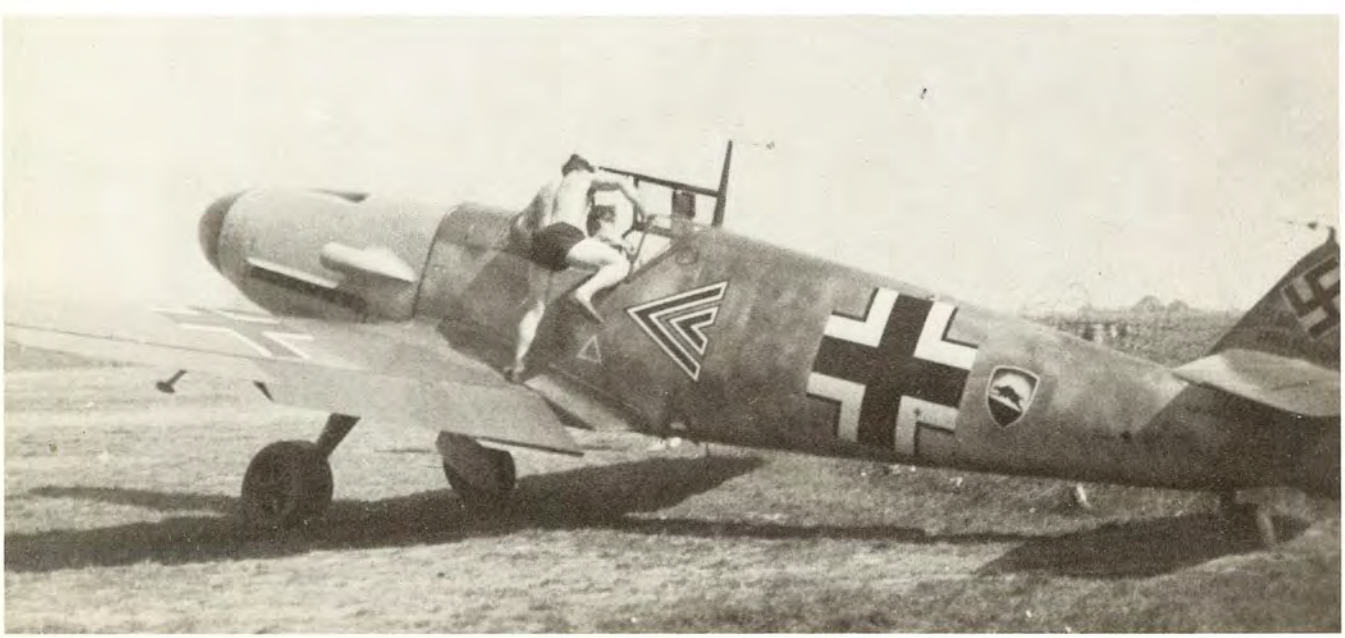
Camouflaged in the standard 74/75/76 colors this Messerschmitt Bf 109 F-2 carries a relatively dense mottle of 02/70/74. This particular machine, possibly of IV./JG 51, is shown grounded in Russia. It carries the rarely seen marking of the 4th Squadron, a narrow black cross outlined in white. The fuselage is also adorned with the yellow (Color 27) tactical theater band common to aircraft operating on the Eastern Front. The Bf 109 F-2 was powered by DB 601N and armed with a 20 mm MG 151/20 engine cannon augmented by two synchronized cowl 7.92 mm MG 17s. Faintly visible around the black 2 are traces of the factory call letters which were applied with temporary washable paint. Upon delivery to an operational fighter unit, these call letters were usually removed.

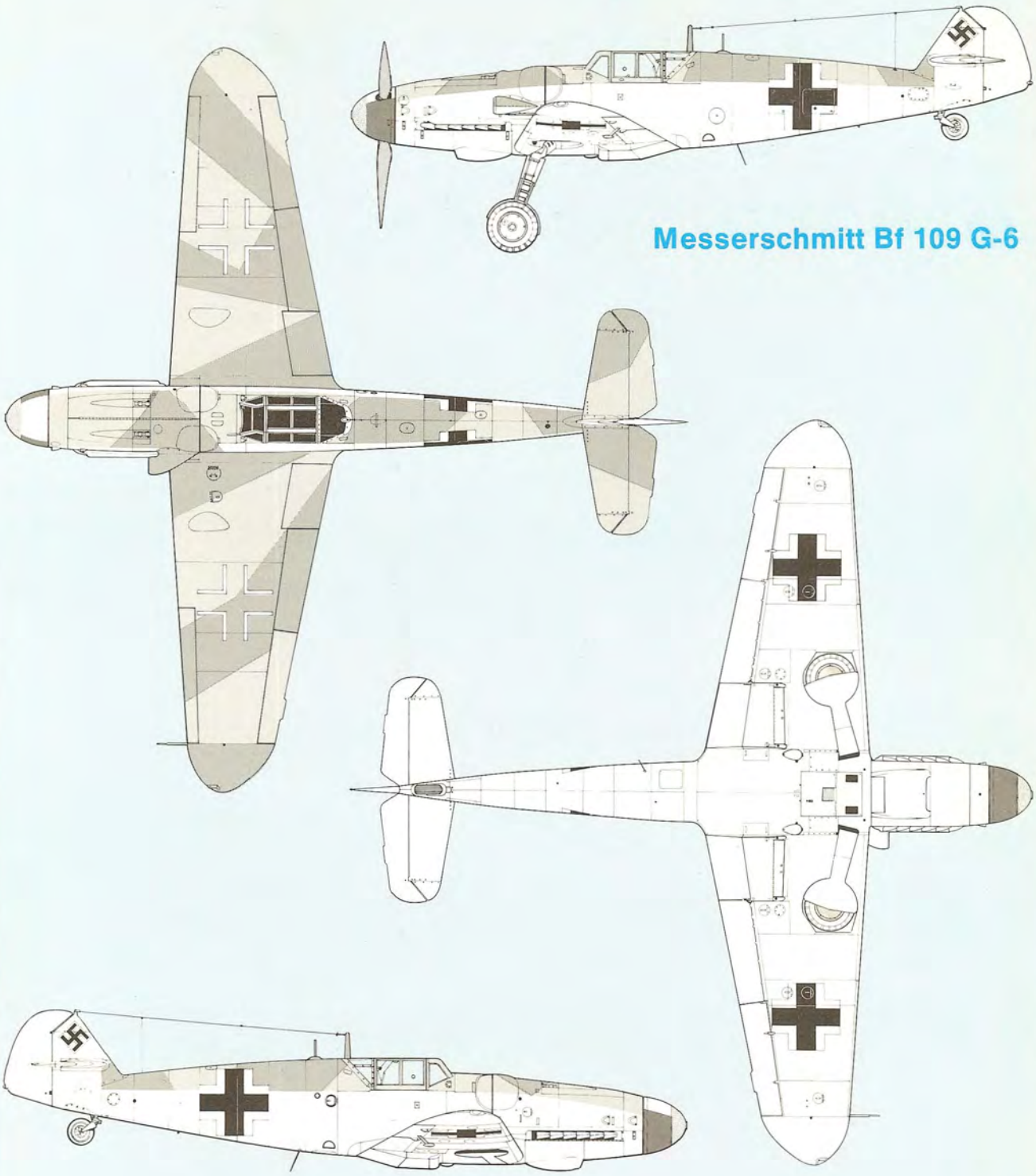






Above: *Hauptmann* Diethelm v. Eichel-Streiber, Commander of I./JG 27, is shown flying escort in his Bf 109 G-6/R6 during September 1944. Camouflaged in 74/75/76 with black chevrons, this Gustav carries a 900 mm green RVT rear fuselage band. Both the spinner and prop were 70 overall, while the simplified fuselage cross is applied over Gray-Green 74. Left: Bf 109 G-1s are shown here during the summer of 1942 in 74/75/76, with a fuselage mottle of 02/70/74. Spinners have been painted in three colors; 21/70/76. Also noteworthy are the two styles of wing crosses indicating this was the transition period encompassing simplified national insignia. Below: *Oberleutnant* Karl-Heinz Leesmann, *Gruppenkommandeur* of I./JG 52, runs up his Bf 109 F-2, W.Nr. 8155, on the Eastern Front during the summer of 1941. Camouflage was 74/75/76 with the regulation triple fuselage mottle. The rudder, cowl and undersurface of the wing tips were Yellow 27, while 22 victory bars were applied to the fin. Oblt. Leesmann was awarded the Knights Cross on July 23, 1941.





Messerschmitt Bf 109 G-6

Color 74
Gray-Green

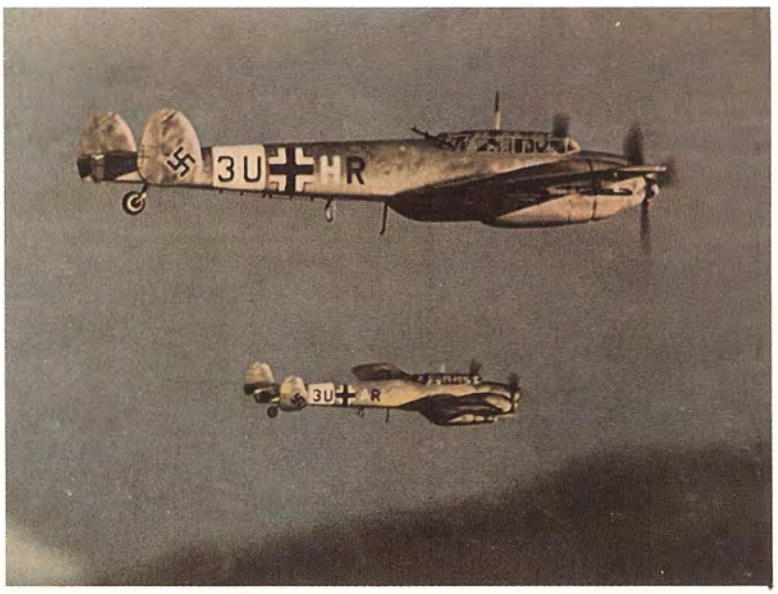
Color 75
Gray-Violet

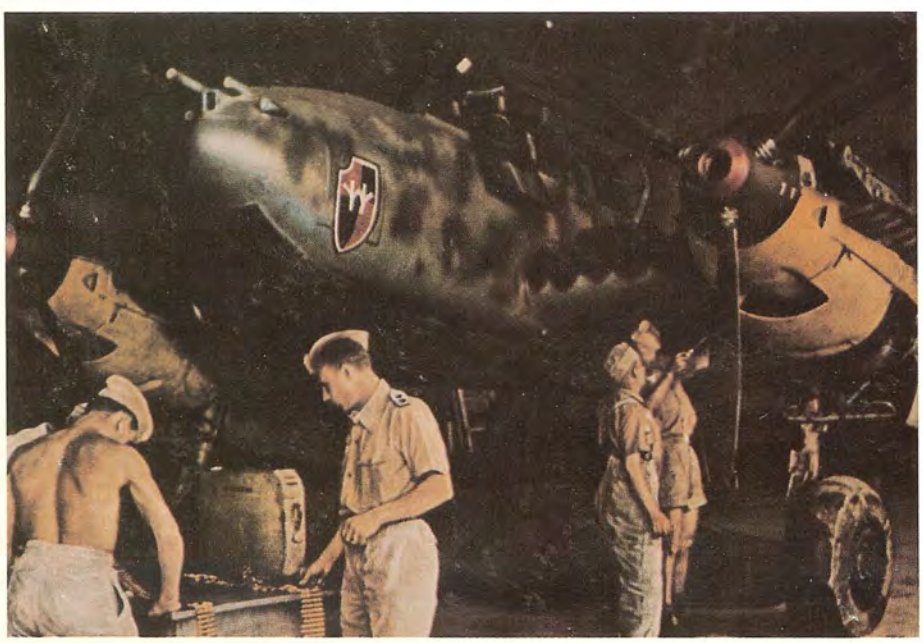
Color 76
Light Blue

This August 15, 1941, factory camouflage pattern was established for the Bf 109 F-series. Later it was approved for the Bf 109 G-series as the Oberflächenschutzliste 8 Os 109 FuG. Although color separation on the wing uppersurfaces is usually shown by straight demarcation lines, the actual directive states the separation edge between colors was to be ragged, with a depth of 199 mm (¾ in). Fuselage mottle was composed of three colors: 02/70/74. Spinners were frequently Color 70 and metal prop blades were always 70. However, as set forth in the directive, he spinners were painted in three colors: 76/21/70. National markings varied according to directives. However, size and placement usually were consistent within a specific series. Dimensions were: Wing Top: 1000 mm; Wing Bottom: 900 mm; Fuselage: 900 mm; Swastika: 300 mm.









Top: A Messerschmitt Bf 110 C-1, VC+DP, carrying the standard *Zerstörer* camouflage of 74/75/76 with a fuselage mottle of 02/70/74. Middle Left: Serving with 5./SKG 210, this Bf 110 C-4 conforms to the two gray uppersurface scheme, with Light Blue 65 lower surfaces. An interesting deviation in the fuselage cross design features a cross with disproportionately wide centers relative to the narrow white outline. Above: Two Bf 110 D-1s of III./ZG 26 in 74/75/76 on patrol. Left: Another Bf 110 D-3 of ZG 26 shows well the fuselage mottle of 02/70/74. The unit's emblem carries the initials of Horst Wessel, a Storm Trooper martyred in the 1930s.



Above: The promising Me 209 V5, SP+LJ, photographed late in 1943, is camouflaged 74/75/76 with a dense mottle of 02/70/74 along the fuselage sides and vertical tailplane. Note the yellow and white GM 1 powerboost marking next to the fuselage cross. Both spinner and prop were 70. Right: A standard Me 210 A-1, VN+AT, W.Nr. 182, is seen here during the summer of 1942 wearing a *Zerstörer* camouflage scheme of 74/75/76 with a mottle of 02/70/74 along the fuselage and vertical tailplane. Like the Bf 109 F and G, the spinners were often segmented in White and Black-Green. Below: Although the contrast appears slight in this photograph taken during the summer of 1942, camouflage colors on the Me 309 V1 were 74/75/76 with 02/70/74 softly mottled along the fuselage and vertical tailplane. Propeller and spinner were Black-Green 70.







Focke-Wulf Fw 190 A-8

This factory camouflage scheme was common to the Fw 190 A-1 through A-8 series as well as various subtypes of the F and G-series produced up to mid 1944. Variations existed both in pattern and application. Fuselage mottle was usually Color 74 but occasionally employed a combination of Colors 02/74. Spinners and metal props were usually Color 70 but were occasionally segmented by a 1/3rd panel of Color 21. Although insignia style varied, size and placement did not vary significantly. Pitot tube tips were left in natural brass and wheel hubs were always black.

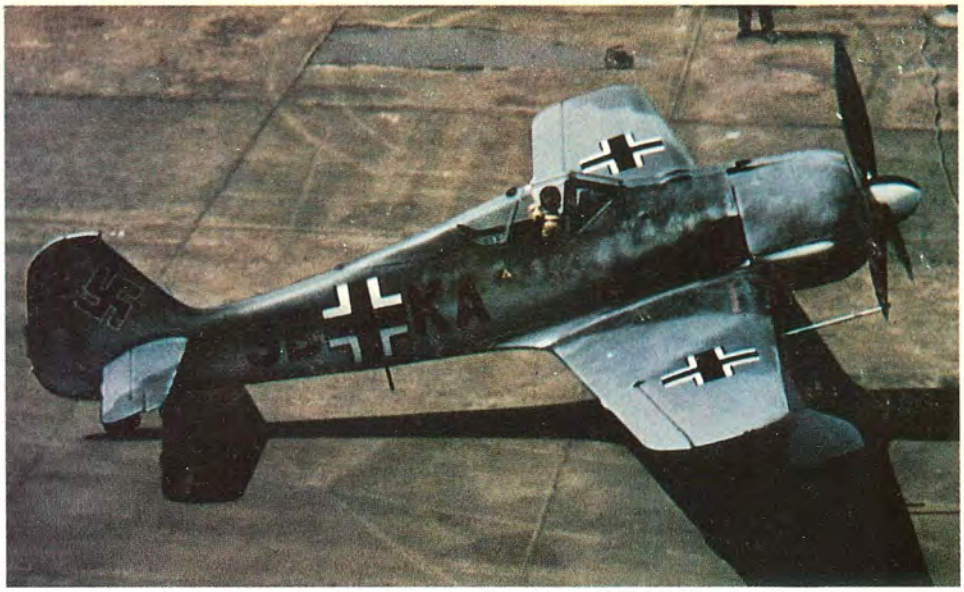
Color 74
Gray-Green

Color 75
Gray-Violet

Color 76
Light Blue

Right: This Focke-Wulf Fw 190 A-1/U1 carries 74/75/76 camouflage with a mottle of Gray-Green 74 along the fuselage and vertical tailplane. The spinner was one-third White 21 and two-thirds Black-Green 70. VDM propeller blades were also Black-Green 70. The fuselage mottle, applied to most Fw 190s, was usually composed of two colors, while the use of three colors, as found on the contemporary Bf 109s, appears to have been somewhat rare.

Middle: Captured by U.S. Forces near St. Trond, this Fw 190 A-8, W. Nr. 681 437, "White 11", of 5./JG 4, carries the distinctive RVD tail bands of JG 4. Camouflage was standard grays on upper surfaces, with Light Blue 76 on lower portions. The pilot of this particular machine was *Gefreiter* Wagner who was taken prisoner.





Right: A derelict Fw 190 G-3 in standard camouflage. Unlike Messerschmitt, Focke-Wulf persisted in using obsolete fuselage crosses which were generally phased-out of service by the fighter force in 1942. Such inconsistency makes it difficult to date this particular aircraft. Continued use of the factory call letters was more common among aircraft attached to fighter-bomber units.





DAY FIGHTERS 1944-1945

The long awaited introduction of the new colors 81 and 82 occurred officially on July 1, 1944, the changeover to take place at the point of manufacture. (LC/3 95,96.) While this order did not immediately affect fighter aircraft, it was to do so by the end of the year when declining fortunes pushed the Luftwaffe more and more onto the defensive. Of more direct influence upon fighter camouflage was the order of August 15, 1944, which withdrew from general use the colors 65, 70, 71 and 74. The use of four letter registrations at the point of manufacture was also forbidden. In addition to the withdrawal of the four colors listed above, this document also mentioned a new color, 83, the wording clearly indicating that this color was already known to production centers. Unfortunately, the RLM failed to identify the nature of colors 81/82/83 either in descriptive terms or by color card standards. The earliest known attempt to label these colors occurred late in November 1944, when the Dornier company defined both 81 and 82 as Dark Green. Three months later the Messerschmitt firm identified these two colors as Brown-Violet and Light Green (respectively 81/82). In the absence of additional documents, one can only speculate as to the official RLM descriptions for 81/82/83. As evident from our many genuine samples, there existed considerable variation for Color 81; these ranging from Dark Green to an Olive Brown-Violet. Color 82 is similarily difficult to precisely define. Depending upon the source, it could have been either Dark Green or Light Green. Regrettably, Color 83 remains an enigma. Not a single document recovered specifies its true color. Therefore, pending official documentation to the contrary, we have provisionally identified 81 as Brown-Violet, 82 as Dark Green and 83 as Light Green. These descriptions would be consistent with previous practices.

Additionally, many fighters used the older camouflage colors with the new. Thus we see the appearance of 75 used in conjunction with 82 on many of the Luftwaffe's late war fighters. Moreover, many aircraft received the new sky-greens in varying combinations.

During this period the national insignia were also the subject of revised orders and the black edging and interior of both the *Balkenkreuz* and *Halkenkreuz* markings were eliminated. The darkest of the upper surface camouflage colors was to be used for the center coloring of the *Balkenkreuz* marking. Some late production Fw 190s exhibited bare metal centers to the fuselage *Balkenkreuz* marking. (LC/3 125.) This practice may be, in part, related to the officially authorized experiment on a production test group of 50 Fw 190s which were to be produced without any undersurface camouflage. The intent was to save both strategic materials and man hours. Late in 1944 a further order was issued clearly aimed at conserving materials and labor. Only steel and wooden parts were to be painted on undersurfaces, all aluminum panels were to be left bare. Compliance with these regulations seems irregular. Because of decentralization, many aircraft produced during the last months of the war were often reported with widely differing camouflage schemes on the same airframe. On July 20, 1944, a comprehensive order was issued relating to all classes of aircraft operating in Germany, France and Italy. Specific reference was made to spinner coloring on fighter aircraft. It was to be black with a white spiral. (LC/3 129.) No precise date has been verified for the introduction of officially approved *Reichsverteidigung* markings. They are known to have been in use from December 1944. Initially, red was used as the Defense of the Reich color as early as 1943. However, an order dated February 20, 1945, attempted to establish some degree of order by assigning certain colors to specific units. (LC/3 113.) These colorful tail bands were 900 mm wide which could be split into two 450 mm or three 300 mm bands depending on the individual color combinations allocated.

Top: This restored Heinkel He 162 A-2, W.Nr. 120 227, originally was acquired at Leck. Although some examples may have had their jets adorned with the Staffel color, most did not. Since the forward cowling was part of the engine and not the airframe, it was often left natural aluminum.

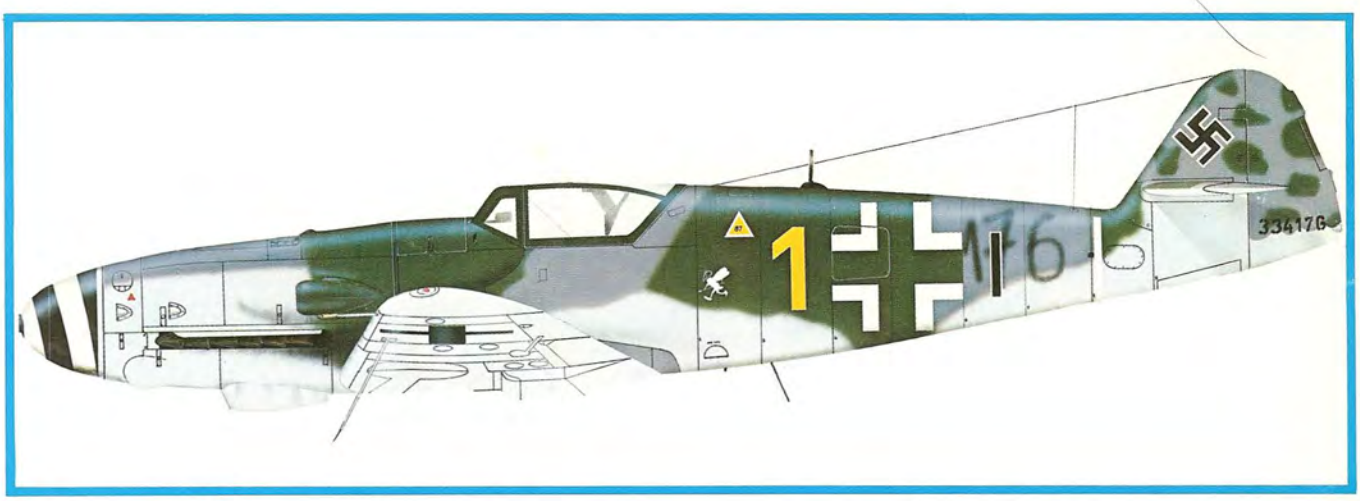
HB 7 ?

HB-8

75 Gray-Violet
75 Grauviolett

82 Dark Green
82 Dunkelgrün

76 Light Blue
76 Lichtblau



The Messerschmitt Bf 109 K-4, W.Nr. 334 176, "Yellow 1", of Unteroffizier Martin Deskau while attached to 11./JG3 based at Pasewalk in April 1945. Camouflage colors, verified by Herr Deskau, were composed of the semidefensive camouflage scheme of 82/75 while undersurfaces were 76. Although not well defined, the underwing cross was unusual without its white trim elements. It was becoming common practice to paint the last three digits of the serial number on both sides of the rear fuselage. In this instance, Uffz. Deskau's machine carries the number 176 which is partly covered by a vertical bar denoting the 3rd Gruppe of Jagdgeschwader 3 (II./JG3). The light colored vertical stripe next to the rear fuselage tie-down aperture is not a unit marking but merely a trestle locating point.







Above: A photo-reconn Messerschmitt Bf 109 G-10/R2, W.Nr. 770 269, "Black 12" of 2./NAG 14. Camouflage was essentially 74/75/76 with a dense mottle of 02 and 74. Prop blades and two-thirds of the spinner were 70 with one-third 21. A red cap, fitted over the aperture, indicated the engine-mounted weapon was not fitted. The MW 50 powerboost fuel triangle was red and white with yellow trim. The rear yellow and white triangle identified the location of the engine fuel primer tank. Left: Photographed at Messerschmitt's Augsburg plant in May 1945, this Bf 109 G-14, W.Nr. 165 545, carries an interesting camouflage of Gray-Green 74 and Gray-Violet 75 over Light Blue 76. The significance of yellow tail bands at this juncture in the war is unclear, but it is believed to have indicated that the aircraft operated on instruments. Below: The remains of a Bf 109 G-6, found by U.S. troops following demolition by retreating Luftwaffe personnel. Compare this fighter trainer with the one at the bottom of page 43.





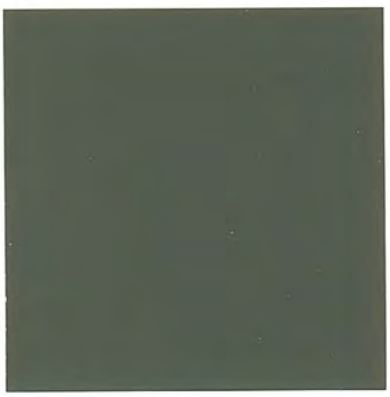
Brown-Violet
Field applied color



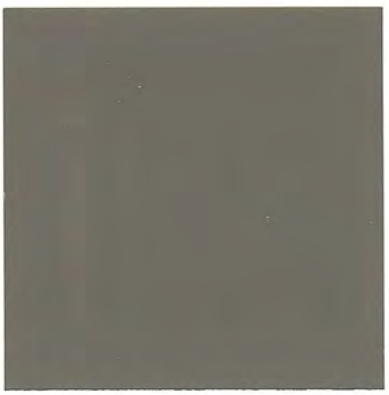
75 Gray-Violet
75 Grauviolett



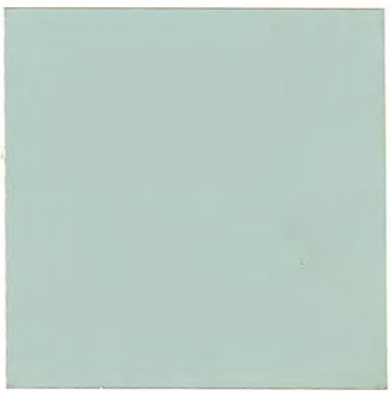
76 Light Blue
76 Lichtblau



74 Gray-Green
74 Graugrün



75 Gray-Violet
75 Grauviolett



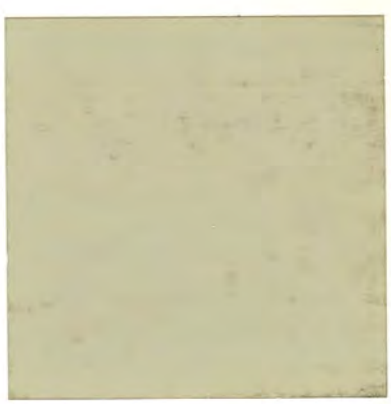
76 Light Blue
76 Lichtblau



81 Brown-Violet
81 Brunviolett



82 Dark Green
82 Dunkelgrün



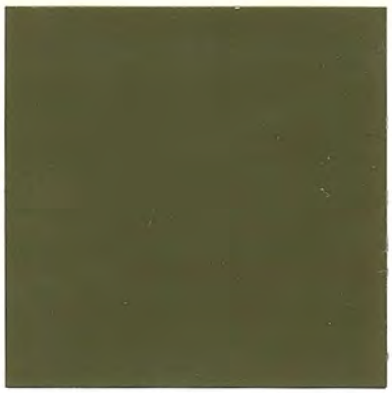
Gray
See p. 43





Above: Meticulous examination and recording techniques employed by the experts at Silver Hill, Maryland, guaranteed precise recreation of all camouflage and markings of this Me 262 A-1a/R, W.Nr. 500 491, of 11./JG 7. Left: Do 335 A-02, W.Nr. 240 102, VG+PH, in its original uppersurface camouflage of dark and light green. The lower surfaces were finished in Color 76, while both propellers and spinners were Black Green 70. These colors were established conclusively at Silver Hill prior to the aircraft being returned to Dornier for restoration. Below: Camouflaged in Dark Olive 81 and Dark Green 71 (in lieu of 81/82) uppersurfaces, with lower surfaces in 76 except for the gear doors and underwing areas (these being in 65). This He 162 A-2, W.Nr. 120 230 (British swapped original tailplane for that from 120 222), is an excellent example of camouflage being applied to various parts of the aircraft. This machine, formerly of 1./JG 1, awaits restoration at Silver Hill. At least two confirmed victories were scored by the He 162 during the closing weeks of the war.





81 Brown-Violet
81 Brunviolett



82 Light Green
82 Hellgrün



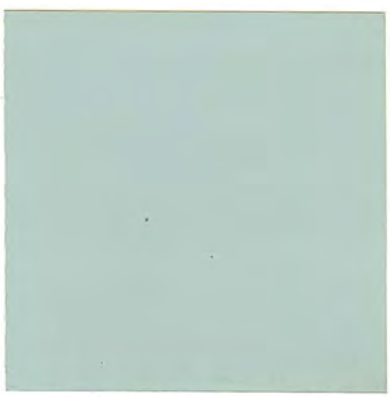
76 Light Blue
76 Lichtblau



81 Dark Green
81 Dunkelgrün



82 Dark Green
82 Dunkelgrün



76 Light Blue
76 Lichtblau



81 Brown-Violet
81 Brunviolett



82 Dark Green
82 Dunkelgrün

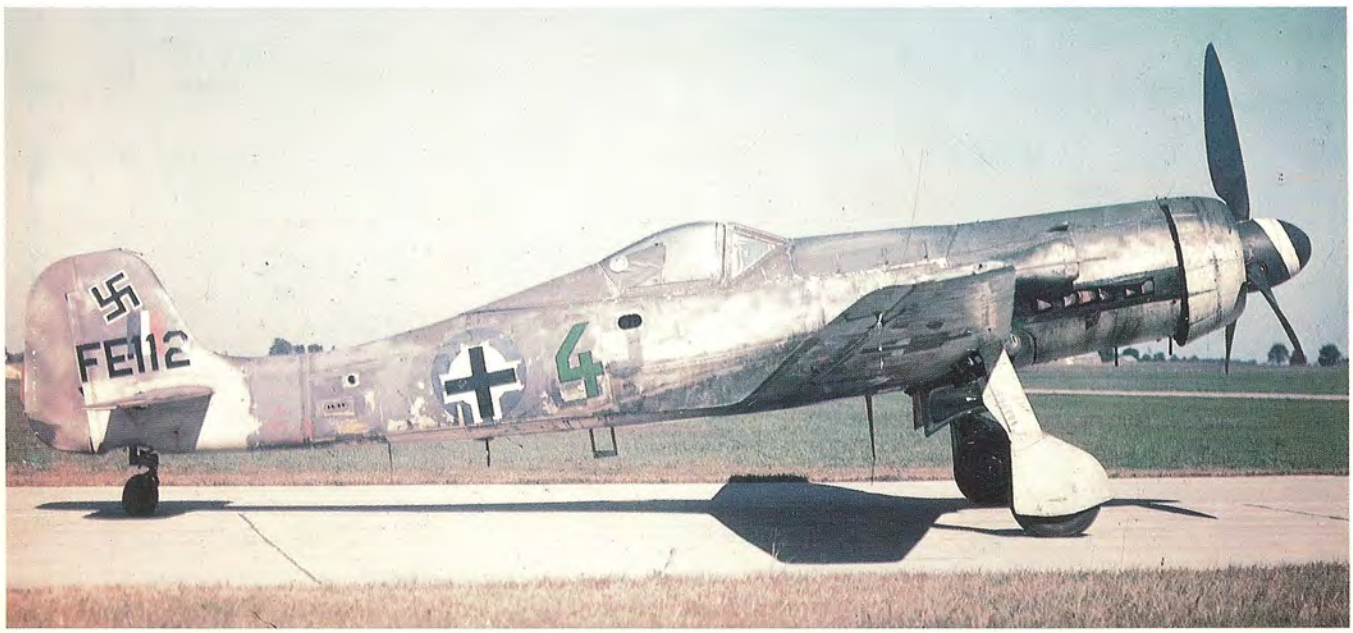


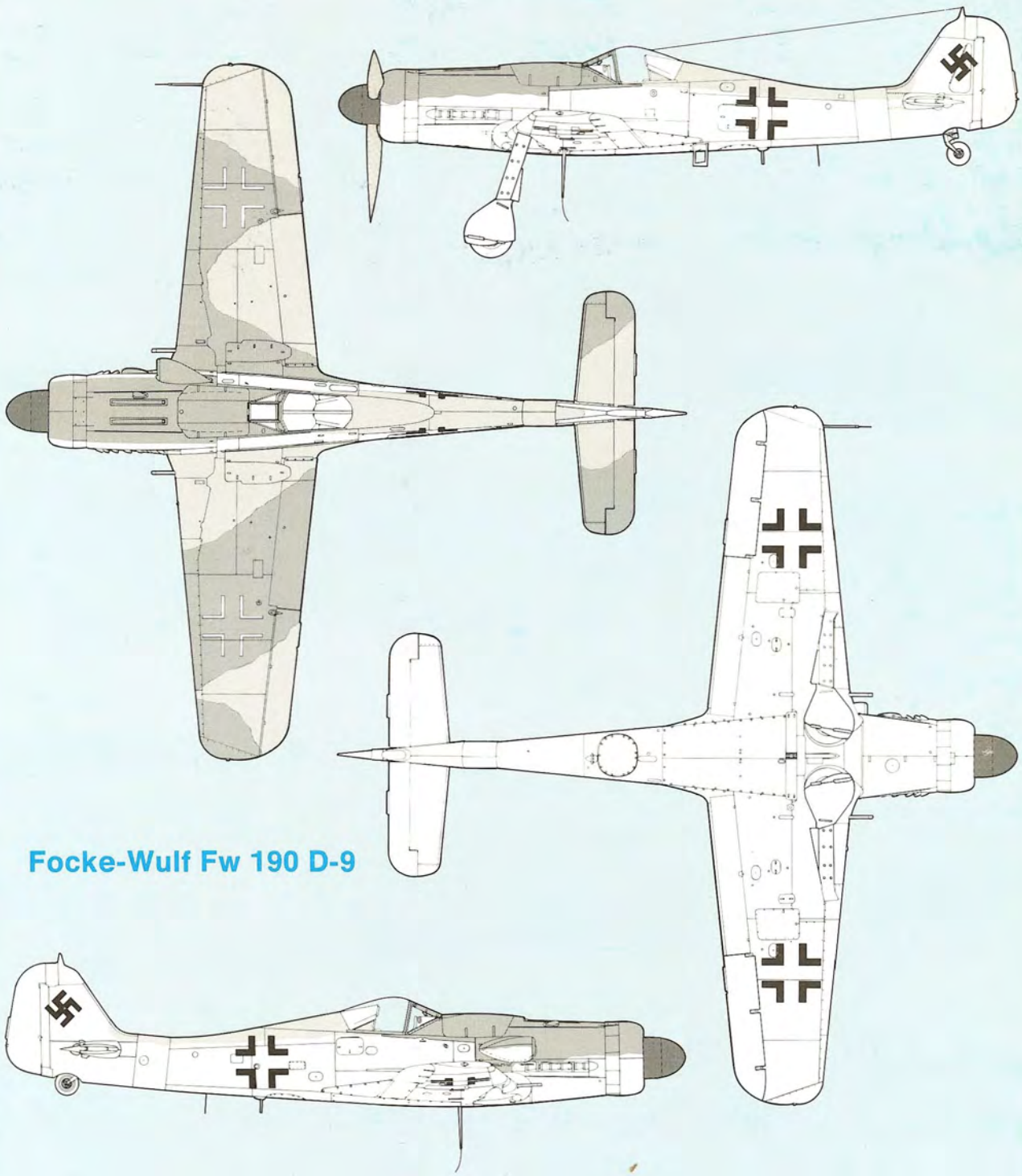
65 Light Blue
65 Hellblau





Above: Photographed at Fürth, this Focke-Wulf Fw 190 D-9, W.Nr. 500 571, "Black 12" belonged to the 2nd Gruppe of an unknown fighter group. Upper surface of the cowl was 82. The remainder of the fuselage was predominantly 75. Lower portions of the cowling, fuselage and wing, including the landing gear covers, are painted in a color similar to the "Sky Green" found on page 41. Uppersurfaces of the wings were undoubtedly 82/75. Note the Light Blue 65 rudder with a mottle of 75. Left: This view of the Focke-Wulf Ta 152 C-O/R11, W.Nr. 110 007, CI+XM, shows the machine to be camouflaged in accordance with directives dictating simplified markings. Uppersurfaces were a combination of 82/75 with 76 on all lower surfaces. Below: Formerly attached to Stab/JG 301, this Ta 152 H-1, "Green 4", displays camouflage consistent with the Fw 190 D-9 above, except for the undersurfaces which were uniformly 76. Visible beneath the thin layer of British paint is the yellow-red RVD tail band adopted by JG 301.





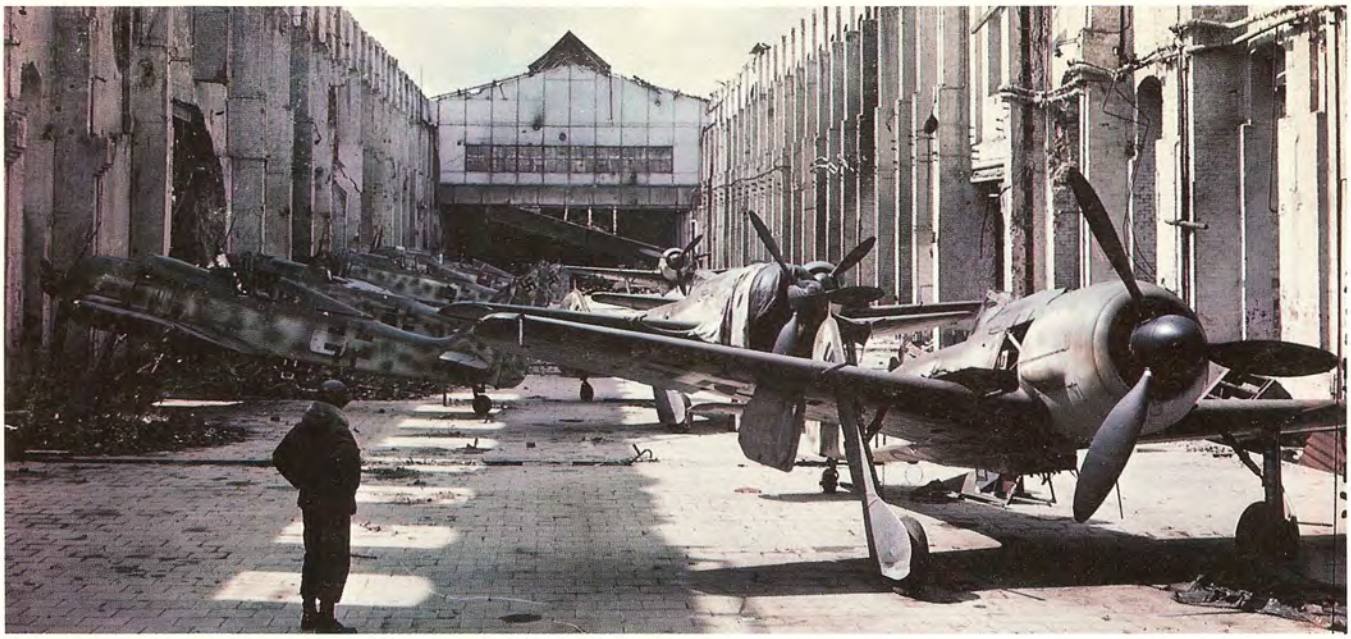
Focke-Wulf Fw 190 D-9

Color 82
Dark Green

Color 75
Gray-Violet

Color 76
Light Blue

This factory camouflage scheme was common to most production versions of the Dora series. Some early production examples were delivered with fuselage uppersurfaces solid Color 75. Wing uppersurfaces also could have been solid 75 or a combination of 75 and 02. Fuselage mottle was Color 82 and/or 75. Frequently spinners were Color 70, although many were delivered with the Color 21/22 spiral motif. Wooden propeller blades were usually Color 71, but some were Dark Blue-Gray. Although the black or white fuselage cross size was reduced in 1945, wing and rudder national insignia remain fairly consistent. With the introduction of the new late-war colors in 1944, specific parts of the airframe were camouflaged prior to final assembly. This resulted in some camouflage schemes being quite different from those aircraft camouflage after assembly.





Above: Newly completed Focke-Wulf Fw 190 A-9s at Ago's Oschersleben facility. The entire uppersurfaces were painted Gray-Violet 75 with fuselage undersurfaces and side portions in Light Blue 76. A soft mottle of Brown-Violet 81 and Dark Green 82 was carried along the length of the fuselage. Like the Fw 190 D-9 shown at the top of page 38, the rudders were Light Blue 65 mottled with 75. Note that the color of the undercarriage covers (and presumably the wing undersurface) is nearly identical to the "Sky Gray" shown on page 41. Left: Although camouflage of this Fw 190 A-9, "Red 5", is similar to the ones above, the fuselage sides appear to be RLM Gray 02. Bottom: A high magnification photographic blow-up reveals a near perfect Fw 190 D-9 (right) once operated by the 2nd Squadron's Technical Officer. Uppersurface are 82/75/76 with a mottle of 82. Although not distinct in this blow-up, the remains of a Bf 109 K-4 may be seen to the lower left undeniably camouflaged in colors 75/82/76 with a narrow yellow tail band.

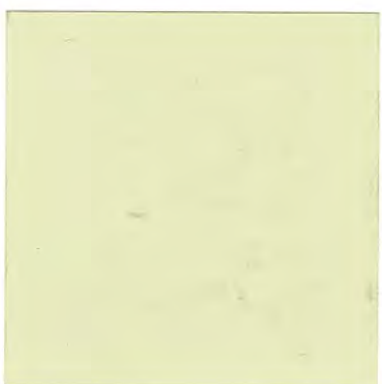




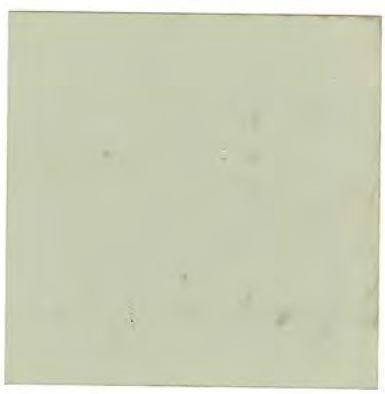
Brig. General George C. McDonald poses next to a Fw 190 D-9 once operated by JG 26's 2nd Gruppe staff flight (Stab II./JG 26). Barely visible to the extreme right is the horizontal bar used in conjunction with a chevron to denote the *Geschwader* 1A staff element. Both the bar and chevron were applied ahead of the fuselage cross, while the bar aft of the cross indicated the 2nd Gruppe. The black and white RVD tail band has been unusually detailed with additional trim. Camouflage was, in all probability, 82/75/76 with a fuselage mottle of 82.

During the last months of the war, the *Luftwaffe* began to employ a new series of sky colors. The samples shown below (plus the one on page 69) are representative. The aircraft from which these samples were obtained varied, but all were operational during the last months of the war. Some sources dismiss these colors as oxidized or chemically altered Light Blue 65 or 76. Thorough analysis of our genuine samples conclusively rules this explanation invalid. Could these colors have been local mixes applied by dispersed factory personnel? The possibility exists, but the frequency with which the colors have been recorded would rule against this explanation. Therefore, pending official confirmation, we are left with the conclusion that these so-called sky colors were quite intentionally employed by the industry and were quite distinct from previous undersurface colors.

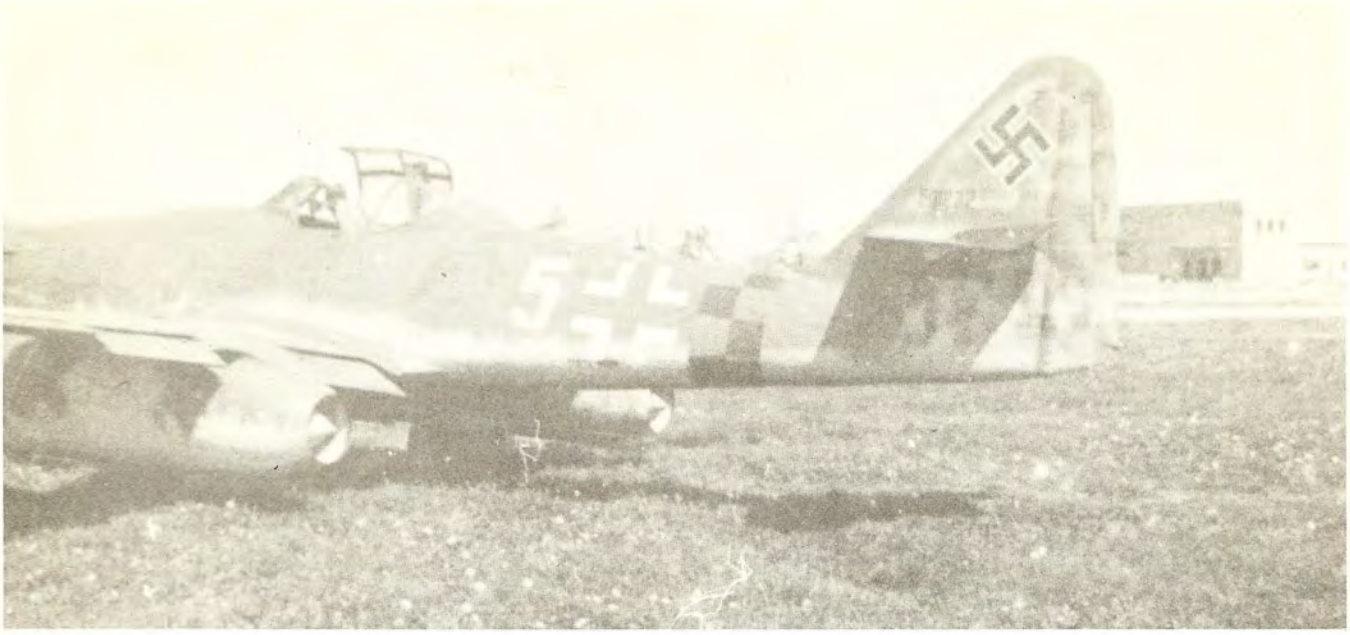
Gray-Blue
Graublau



Green-Blue
Grunblau



Gray-Blue
Graublau





Above: This Me 262 A-1a, W.Nr. 501 232, "Yellow 5" is believed to have been operated by 3./ISS 1 *(Industrie Schutz Schwarm 1),* a factory protection unit based at Lechfeld. Camouflage was consistent with other Me 262s but the checkered tail bands (almost certainly in Blue 24 and Green 25) are unusual. Left: Almost all of the Heinkel He 162 A-2s produced by Heinkel-Nord Marienehe, had distinctive red arrows painted toward their noses like W.Nr. 120 028, "White 3", shown here. Below: The seventh preproduction Dornier Do 335 A-O, W.Nr. 240 107, is shown here following completion. This machine, and others like it, were camouflaged Dark Green and Light Green on all uppersurfaces with Light Blue lowersurfaces. Spinners and propellers were Black-Green. All markings were of the simplified outline variety except for the underwing crosses.





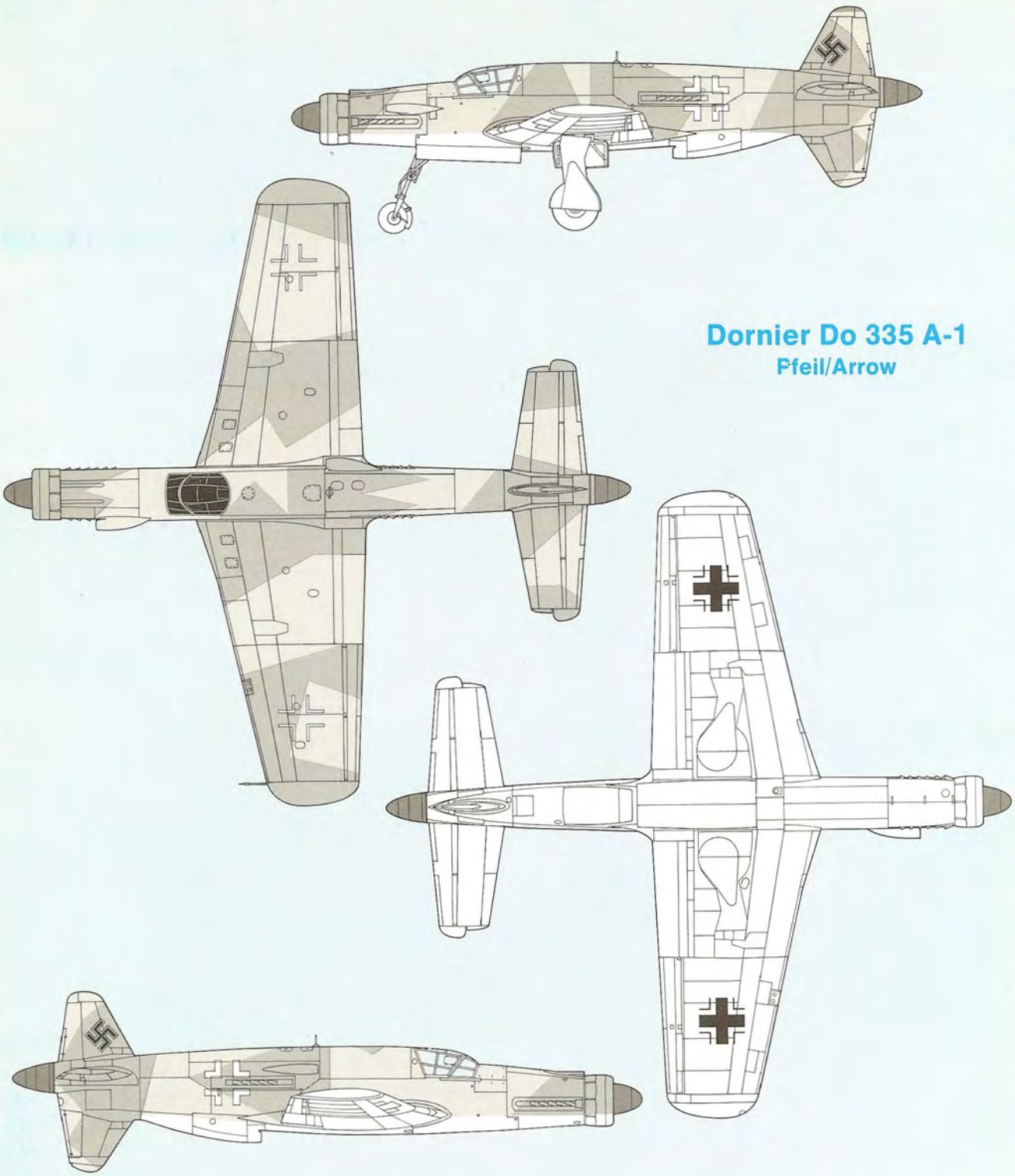




The two color photos to the right show the rudder of *Maj.* Friedrich-Karl Müller's Bf 109 G-10. *Major* Müller was commander of I./NJG 11 from November 1944 until the end of the war. He accumulated a total of 30 night victories flying single engine fighters. The fully defensive colors of Brown-Violet 81 and Dark Green 82 were employed with a lower color similar to RLM 02 (See p. 35). The Bf 109 K-4, shown above, displays a pattern almost identical to *Maj.* Müller's aircraft. Yet because of the relatively high contrast of the two colors, it is almost certain that the colors were 75/82/76. Another example of the semidefensive colors is the Bf 109 G-10 flown by *Uffz.* Karl Müller of 6./JG 77 shown to the left. The fully defensive scheme is again evident in the photograph below. Destroyed by retreating German personnel, this Bf 109 G-6 clearly shows an upper surface camouflage of Brown-Violet and Dark Green with Light Blue lower surfaces. The three digit number, 479, indicates that this aircraft was employed by a school for final operational flight training. Compare the color of these numbers with the Red on page 69.







Dornier Do 335 A-1
Pfeil/Arrow

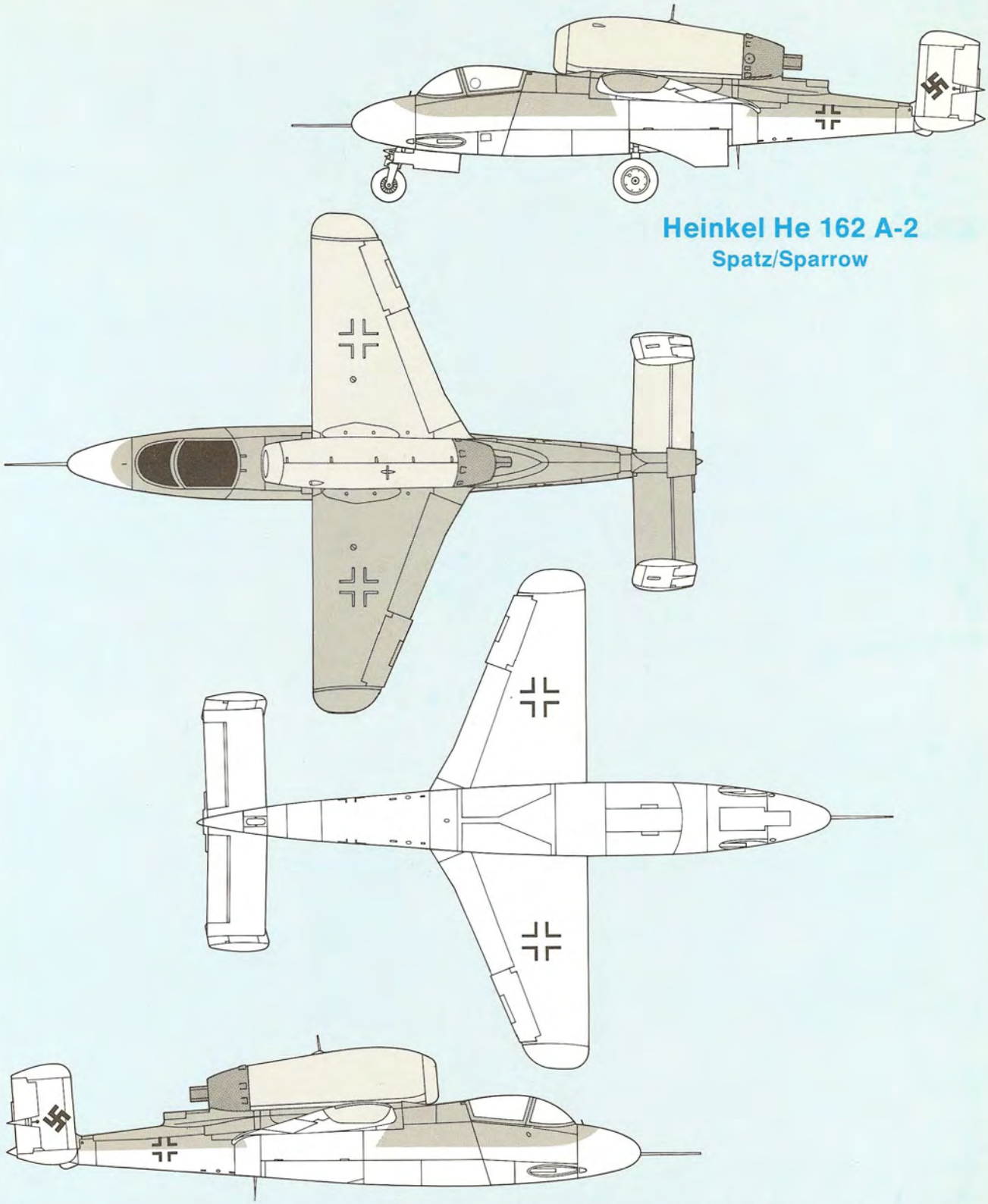
This November 1944 factory camouflage scheme is depicted as applied to the A-series. This scheme is inconsistent with RLM directives with respect to the undersurface color: Color 65. Light Blue 65 was authorized only until existing stocks were exhausted. Thereafter Color 76 was to be used. Both uppersurface colors were identified by Dornier as Dark Green, yet the sole surviving Do 335, thoroughly examined prior to restoration, carried Dark Green and Light Green with Light Blue 76 lower surfaces. This ambiguity cannot be fully explained. However, it must be assumed that either the Dornier company revised its designation of Color 82 from Dark Green to Light Green, or the RLM amended its description of Color 82. In its current form, following complete restoration, colors similar to Brown-Violet and Light Green have been applied.

Color 81
Dark Green

Color 82
Dark Green

Color 65
Light Blue

Color 70
Black-Green



Heinkel He 162 A-2

Spatz/Sparrow

Color 81

Color 82

This January 18, 1945, factory camouflage scheme called for the He 162 to be painted in parts. Color descriptions were not given and the undersurface color was unspecified. Captured examples suggest occasional compliance, but the majority produced during 1945 were either overall Dark or Light Green or combinations of these applied to parts of the airframe. Undersurfaces were usually Color 76, although 65 was frequently used underwing and on landing gear doors. Additionally, many were completed without any protective camouflage to their fuselage lower surfaces, while others employed combinations of 71 with 81 or 70 with 82. Forward cowl rings of the BMW engine were quite frequently left natural aluminum, since these components were part of the engine and not the airframe.



Messerschmitt Me 262 A-1a

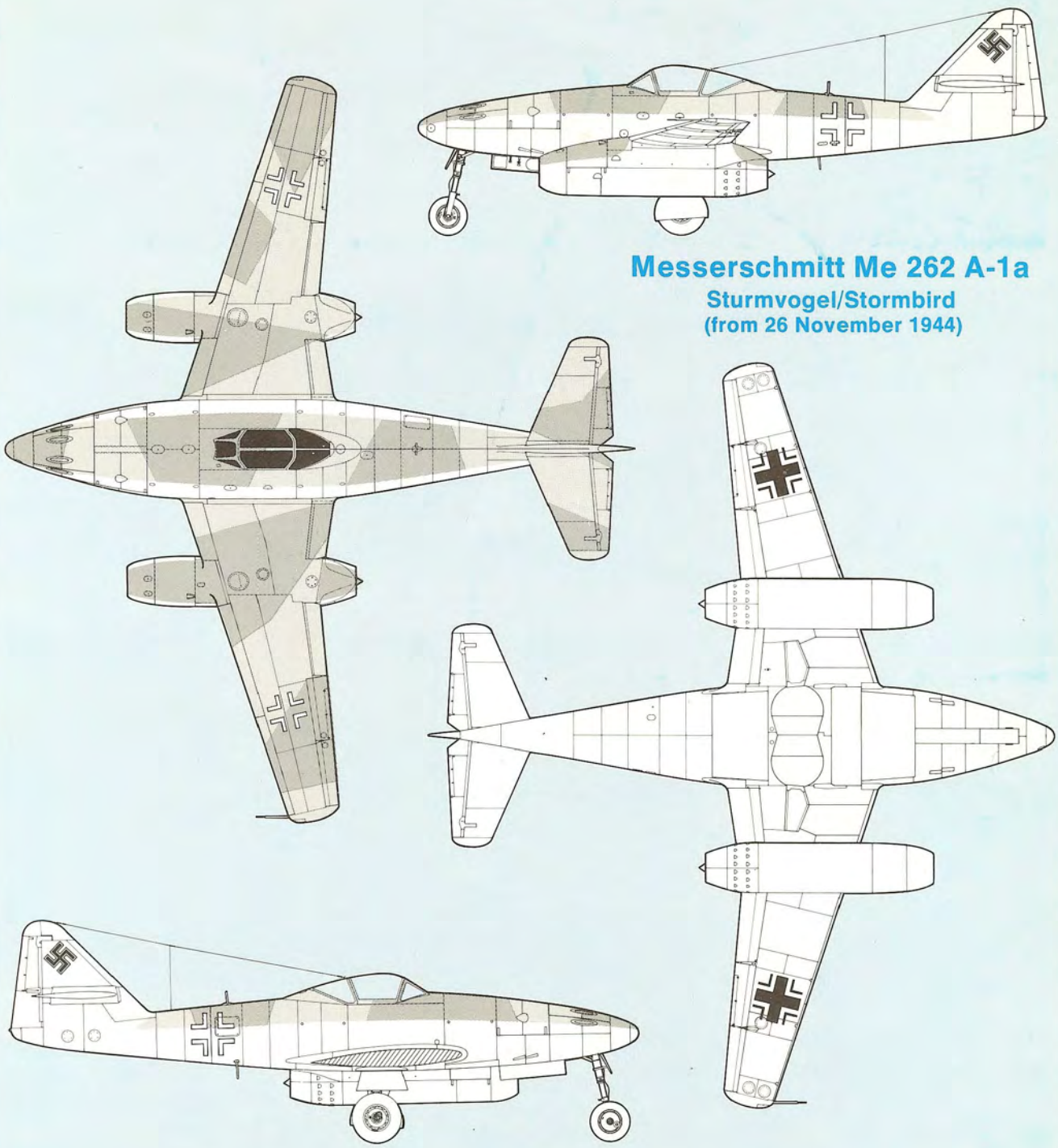
Blitzbomber/Lightning Bomber
(from 17 June 1944 to 26 November 1944)

This factory devised camouflage scheme using grays was relatively short lived. It was confined to early production models of the Me 262 A-1a including most of the early prototypes. Aircraft with serial numbers close to 110 604 were, in all probability, painted in grays. Size and placement of the national insignia did not vary considerably, but the styles employed changed according to directives. Dimensions were: Wing Top: 630 mm; Wing Bottom: 800 mm; Fuselage: 800 mm; Swastika: 430 mm.

Color 74
Gray-Green

Color 75
Gray-Violet

Color 76
Light Blue



Messerschmitt Me 262 A-1a

Sturmvogel/Stormbird
(from 26 November 1944)

Color 81
Brown-Violet

Color 82
Light Green

Color 76
Light Blue

This February 23, 1945, factory camouflage pattern is depicted as applied to the Me 262 A-1a series. Numerous variations occurred including irregular wing uppersurface demarcation lines, a solid single color over all uppersurfaces, and mottling variations to the vertical tail assembly. Apart from the wooden gear doors, metal RATO panel and jet engines which were painted Color 76, undersurfaces were to be left unpainted. In spite of this directive, most aircraft routinely were camouflaged Color 76 on all undersurfaces. Some examples carried light gray (see p. 143) fuselage sides and vertical tail assemblies. Undersurface areas of the fuselage and wing were sometimes initially painted light gray over which various stencil data was applied. All undersurfaces were then sprayed Light Blue 76 excepting the stencil data which was carefully avoided. Wing crosses are shown in their common positions. However, official specifications called for their alignment to be parallel to the line of flight. Dimensions were Wing Top: 630 mm, Wing Bottom: 800 mm (810 mm NASM 262), Fuselage: 800 mm, Swastika: 430 mm.



ROCKET INTERCEPTORS

The only rocket interceptor to reach production status and to become operational was the famous Me 163 *Komet*. Although relatively few machines were produced, they exhibited a variety of finishes. These are given below. Unless otherwise stated, upper and lower surface demarcation terminated at the horizontal center line of the fuselage.

a) 74/75 segmented pattern on wings and fuselage including fin and rudder. Lower surfaces 76.

b) 02 overall with large, soft-edged patches of 83 over all the fuselage including fin and rudder. Wing upper surfaces in 81/82.

c) 74/75 on wings and fuselage with 76 lower surfaces. Mottling on the forward fuselage in 74 and 02 with soft-edged ripple pattern of 74 on the 76 colored vertical tail surfaces.

d) 81/82 on wings and upper fuselage with 74 and 75 sprayed in large mottles over the vertical tail surfaces and lower fuselage forward and aft of the wings.

e) 81/82 on wings and fuselage with 76 colored fin, rudder and lower surfaces. 82 faintly sprayed in large soft-edged patches on the fin and rudder.

Like most prototypes and preproduction aircraft, the Me 163A series was painted in 02 overall, a color that was initially carried over to very early deliveries of the B series.

The Bachem Ba 349 also achieved service status, albeit in extremely limited numbers. It was never used operationally so far as is known. Early test program machines were finished in 05 overall or given a further coat of plain 02. The last phase of testing was done using a rudimentary form of camouflage. 75 coloring was brush applied in a scribble pattern over a base color of 76. Bottom fuselage surfaces, from wing trailing edge to nose cone tip, were divided in half along the aircraft center line and painted 22 to port and 21 to starboard.

The operational *Natter* (Adder), as the Ba 349 was known, is thought to have been camouflaged in Gray-Violet 75 on all surfaces with an optional random mottle of Light Blue 76 overall. Apart from prototype designation numbers painted on the wings of test machines, no other markings were applied. In keeping with the aircraft's role as a piloted missile, no nationality markings were applied. The example brought to the U.S.A. after the war and exhibited at various functions before being returned to the National Air and Space Museum's Silver Hill facility, was given spurious markings and camouflage by U.S. authorities.



Top: Me 163 B-1a, W.Nr. 191 916, "Yellow 26", beautifully restored in Canada and bearing the crest of Baron Münchhausen astride a cannon ball. This insignia was frequently used by *Komets* of 1./JG 400. Above: The next step in rocket interceptors would have been the Me 263. The Me 263 V1, W.Nr. 381 001, DV+PA, shown above was undoubtedly camouflaged in colors 81/82/76. In keeping with directives, upper surface colors were separated by parts of the aircraft rather than by areas.

81 Brown-Violet
81 Braunviolett

82 Dark Green
82 Dunkelgrün

76 Light Blau
76 Lichtblau

74 Gray-Green
74 Graugrün

75 Gray-Violet
75 Grauviolett

76 Light Blue
76 Lichtblau

This English restoration of a Me 163 B-1a, W.Nr. 191 904, carries the crest of 2./JG 400 on its nose. Both the Canadian and English restorations were based on actual *Komet* camouflage colors. Both schemes, although highly attractive, are incorrect in several respects.

The fuselage *Balkenkreuz* of the machine below, for example, is in the wrong proportions, while the vertical tailplane mottle of the Canadian *Komet* is a little too heavy.

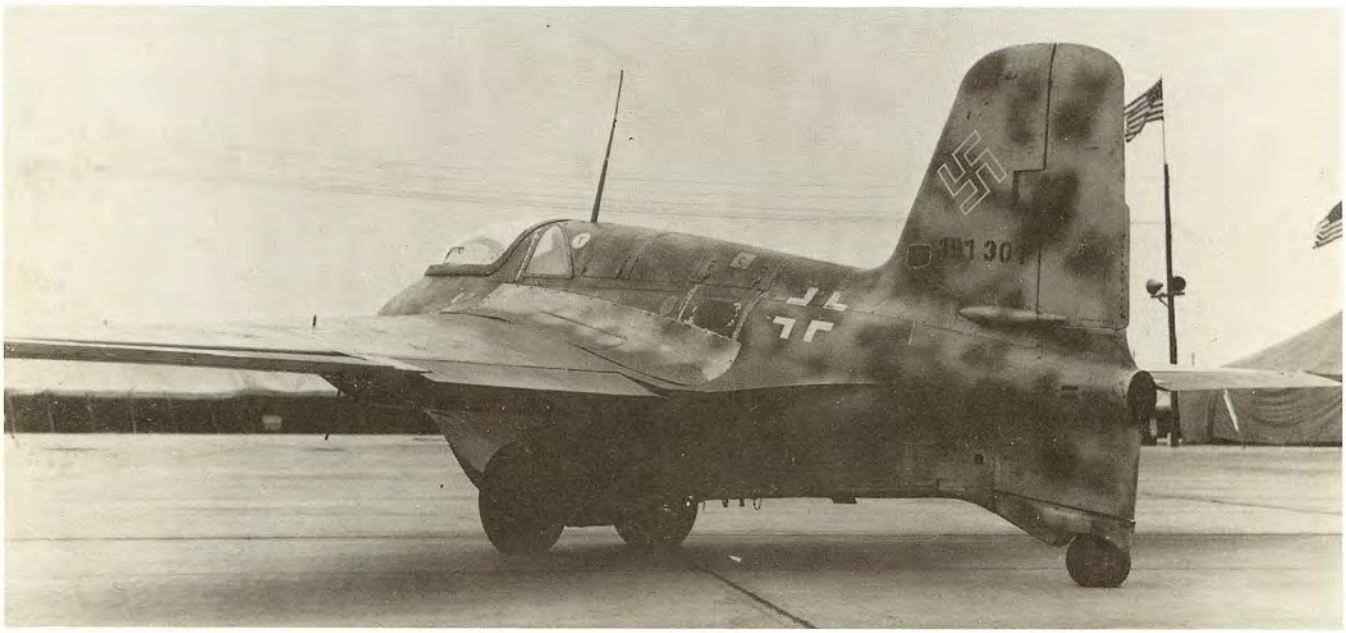






Above: Photographed in Britain after the war, this *Komet* carries a mix of German and RAF colors. Uppersurfaces of the wings, and undersurfaces have been repainted, leaving only the rudder and fuselage top in original camouflage, probably 81/82/76. Left: Two *Komets* with either 13. or 14. *Staffeln*. The two training units carried distinctive unit crests. The machine to the right is noteworthy on two points. First, it is unusual in not having a nose generator propeller; and second, the shape of the side window is quite different from most production *Komets*. Both of these aircraft subsequently were brought to the U.S.

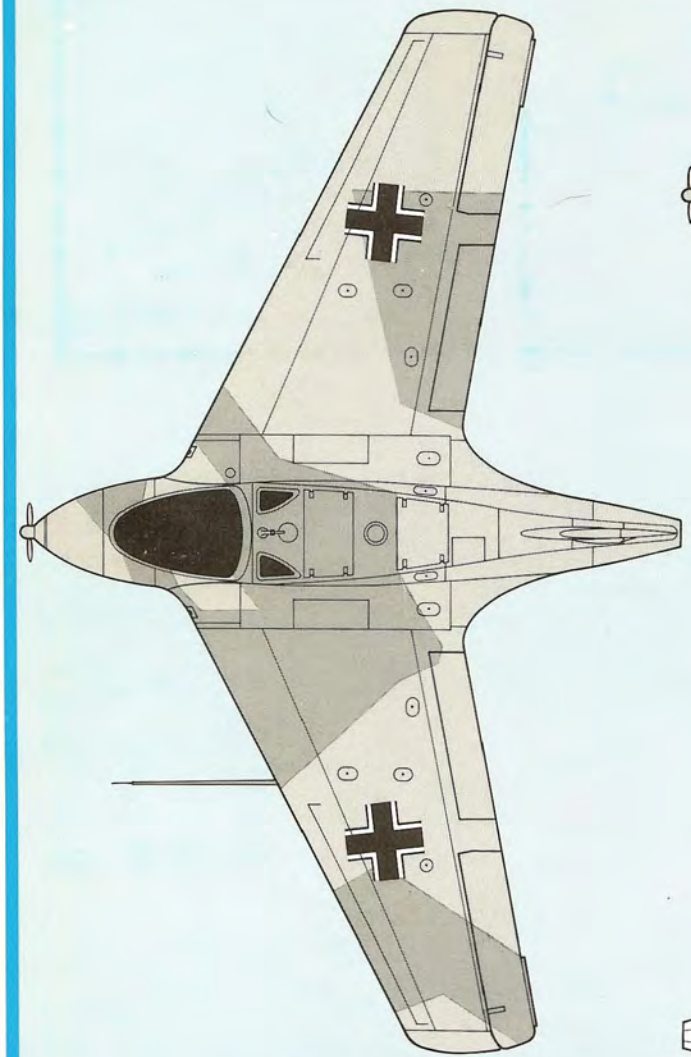
Bottom: This Me 163 B-1a, W.Nr. 191 301, is currently on limited display at the Silver Hill facility operated by the NASM. Shown here following reassembly at Freeman Field, Indiana, it is still in its original camouflage believed to be nearly identical to the Australian *Komet* shown in color to the right.

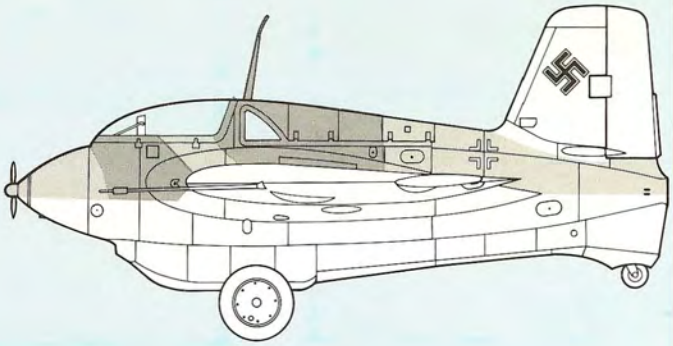


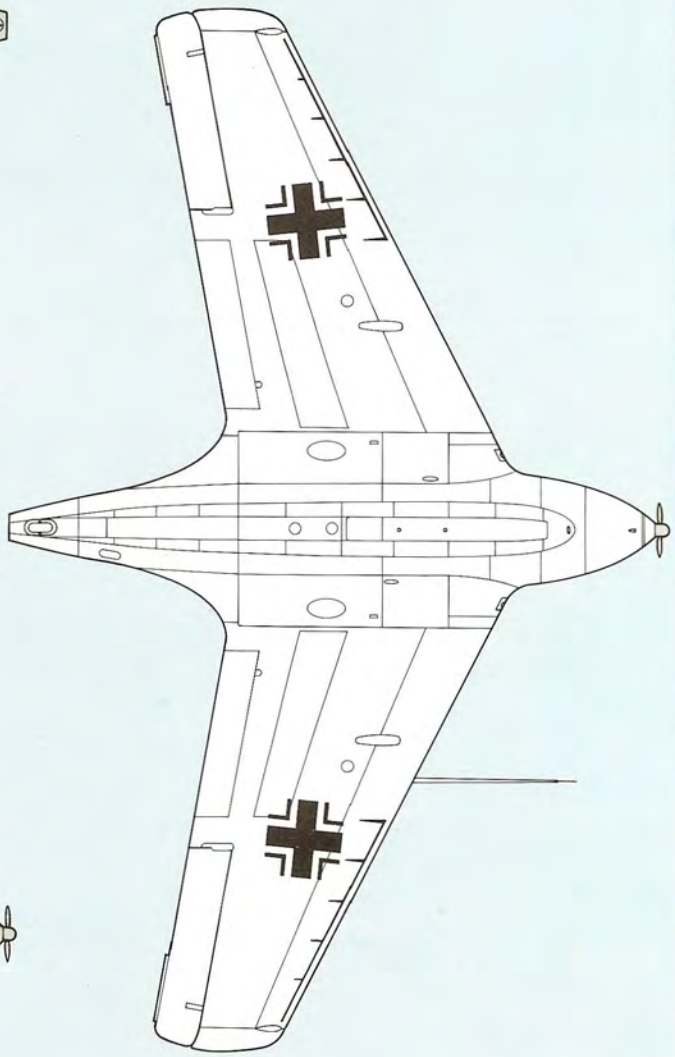


Until recently, this *Komet*, stored at Point Cook, Victoria, Australia, was the last example still in its original wartime camouflage shown here. Bearing W.Nr. 191 907, this Me 163 B-1a was camouflaged in colors Brown-Violet 81, Dark Green 82 and Light Blue 76. The effect of soft-spraying various densities of the 81 and 82 coloring is well depicted in these two photographs. The reddish-brown patches are standard primer (see p. 143). The semigloss finish, visible where the light catches curvatures of the airframe, is produced by a sealing coat of colorless lacquer, a not uncommon feature of Luftwaffe high speed aircraft of the late war period. Note the unusual use of the older style upper wing cross on this *Komet* as well as on W.Nr. 191 301 shown on page 50 Bottom.

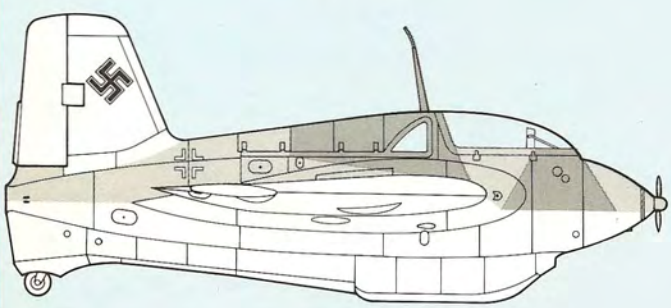








Messerschmitt Me 163 B-1a
Komet/Comet



This factory camouflage scheme was evolved for the Me 163 B-1 using the late-war colors 81/82/76. The fuselage and vertical tailplane were usually mottled with 81 and/or 82. However, some examples were delivered with solid color fin/rudder assemblies. Still others had only their vertical tailplanes mottled, the fuselage being painted in solid camouflage colors. National markings for the wings were often of the older style, while fuselage and fin insignia were usually the simplified outline variety.

Color 81
Brown-Violet

Color 82
Dark Green

Color 76
Light Blue

05 Cream
05 Lasur

75 Gray-Violet
75 Grauviolett

76 Light Blue
76 Lichtblau



Right: The Bachem Ba 349 M23 is being readied for the first piloted flight on February 28, 1945. Camouflage coloring consisted of Light Blue 76 over all uppersurfaces with a dense mottle of Gray-Violet 75. Undersurfaces were Black and White 21 which were divided longitudinally. Prototype numbers applied to the wings were also in black. Above and Below: Found near St. Leonhard, Austria, these newly completed *"Natters"* lack wood sealants or camouflage. The application of national insignia was forbidden on all expendable aircraft, including the Ba 349.







NIGHT FIGHTERS

Initially camouflage was a standard day fighter scheme of 70/71/65 plus a special code. The letter N was applied to the left of the fuselage *Balkenkreuz* marking with an identifying number to the right.

Not until the winter of 1940/41 did any known variation to camouflage take place. All black upper and side surfaces were introduced on Bf 110s. Lower surfaces remained in 65 and were overpainted with black when required. Possibly temporary, Black 7120.22 was used initially but this would have been superseded by the permanent Black 7124.22 and permanent Light Blue 7125.65 allowing rapid change from night to day duties. (GAM 78, 84, 85.) This scheme had a very limited life and by March 1941 an overall black scheme had been adopted. The N code also had been replaced by standard coding in Light Gray 77.

Interestingly, the November 1941 reissue of L.Dv. 521/1 made no specific reference to night fighter camouflage schemes, although the all black scheme continued until early 1943 in some instances. Precise dating is not possible at present but a major changeover to a revised scheme of 76 overall with 75 mottling over the plan view area took place in late 1942/early 1943. (LC/3 108.)

The last of the new breed of night fighters to enter service, the He 219, used the same general two-color scheme. The mottling, however, was done in hundreds of small spots closely spaced, a scheme also seen on some late production Ju 88 night fighters. Very late production Bf 110s also displayed a further variation, the 75 coloring being applied as a solid application over the strict plan view of the aircraft.

Black, a color not used for night interception duties since early the previous year, reappeared in 1944 on early He 219s, some Bf 110s and, occasionally, Ju 88s. Its use was restricted to the starboard wing lower surface and usually did not include engine lower surfaces projecting beyond the wing edges. The *Balkenkreuz* marking was left unpainted, the white areas contrasting markedly with the black background. Introduced around April 1944, it was reputedly an identification aid for flak and searchlight crews defending metropolitan areas. Interestingly appearance of this scheme coincided with the diversion of the RAF heavy bombing force to softening up raids against French targets prior to the invasion of Europe. Bombing of German targets fell almost exclusively to the twin-engined Mosquitos of the Light Night Striking Force escorted by Mosquito night fighters. The final stages of night fighter interceptions were done visually and the use of an illusionary effect of a single-winged aircraft would have been a very positive form of identification. The night sky was rarely pitch black.

Late war greens also made their appearance on some night fighters. More specifically two of the few Me 262 B-1a/U1 aircraft used by 10./NJG 11 during the closing weeks of the war survived (W.Nr. 110305 "Red 8" and W.Nr. 111980 "Red 12"). The fuselage and undersurfaces originally were finished in the unidentified grayish-green over which all top and side surfaces were given a dense mottle of 81 and 83, while the upper surfaces of the wings and tailplane were finished in a solid application of 83. The tops of the engine nacelles, forward of the wings, were painted a very dark green, undoubtedly 82. Undersurfaces and the sides of the engine nacelles were overpainted with a black lacquer and not the old matt temporary distemper. (It is possible that this was 7124.22). The neat stencilling over the black undersurface areas and the similarity in mottling between the two aircraft indicate that the camouflage scheme was applied at the point of manufacture rather than in the field.

Top: A Messerschmitt Bf 110 G-4 once with NJG 5. Painting the underside of the right wing black distinguished the aircraft to flak crews. Uppersurfaces and unit code were 75, while underside of the port wing and fuselage sides were 76.



22 Black
22 Schwarz



65 Light Blue
65 Hellblau



77 Light Gray
77 Hellgrau



Another splendid RAF restoration is this Junkers Ju 88 R-1, W.Nr. 360 043, which once flew with 10./NJG 3 as D5+EV. Camouflage was 70/71 with 65 lower surfaces. Note the *"England Blitz"* emblem common to many night fighters.



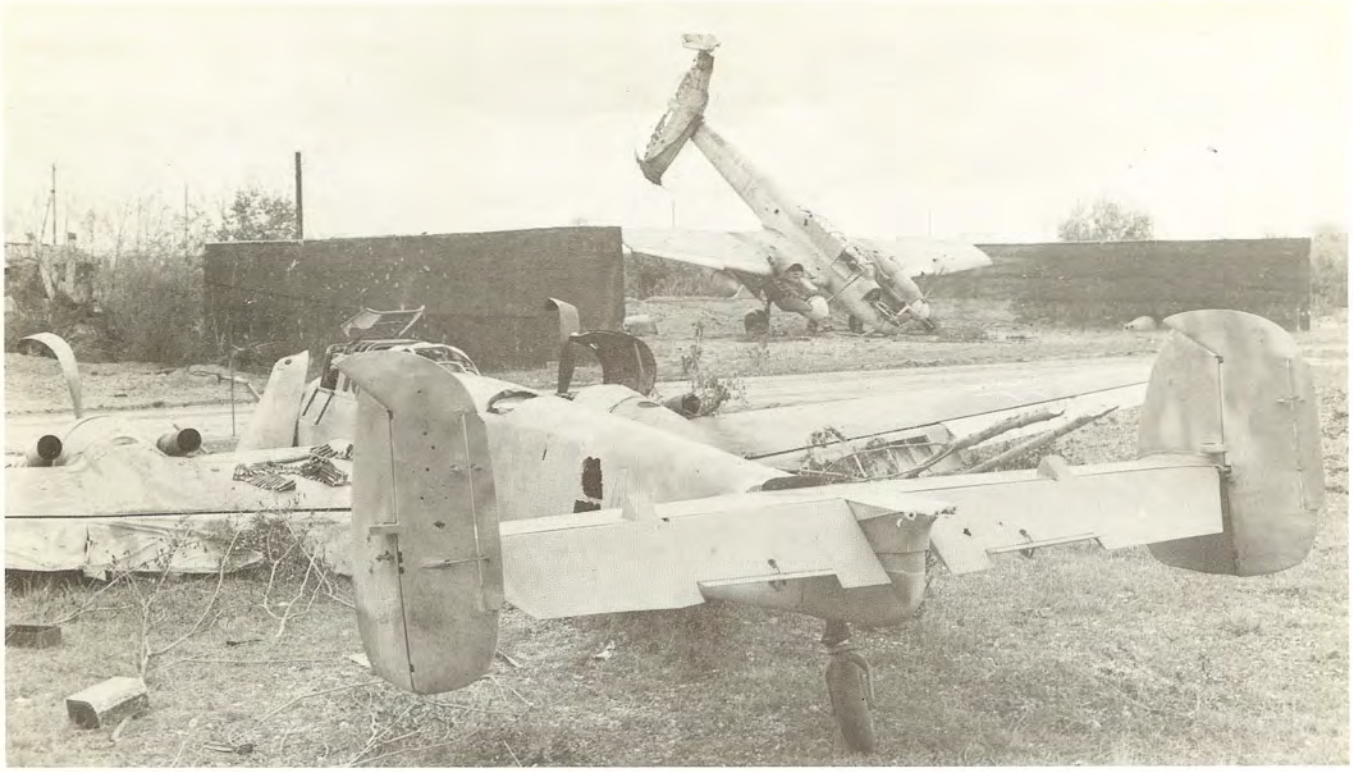
70 Black-Green
70 Schwarzgrün



71 Dark Green
71 Dunkelgrün



65 Light Blue
65 Hellblau



Above: Two Bf 110 G-4s found abandoned at St. Dizier during August 1944. The machine in the foreground, C9+AK, of 2./NJG 5, has been repainted prior to its forced landing. The code letter A is red outlined in black. Camouflage of both machines appears to be 75/76.

Below: Camouflaged overall Light Blue 76 with Gray-Violet 75 uppersurfaces, this Bf 110 G-4, A.Nr. 160 128, G9+HT was operational with 9./NJG 1. Captured at Fritzlar in early April 1945, this machine was equipped with 300 Liter drop tanks.

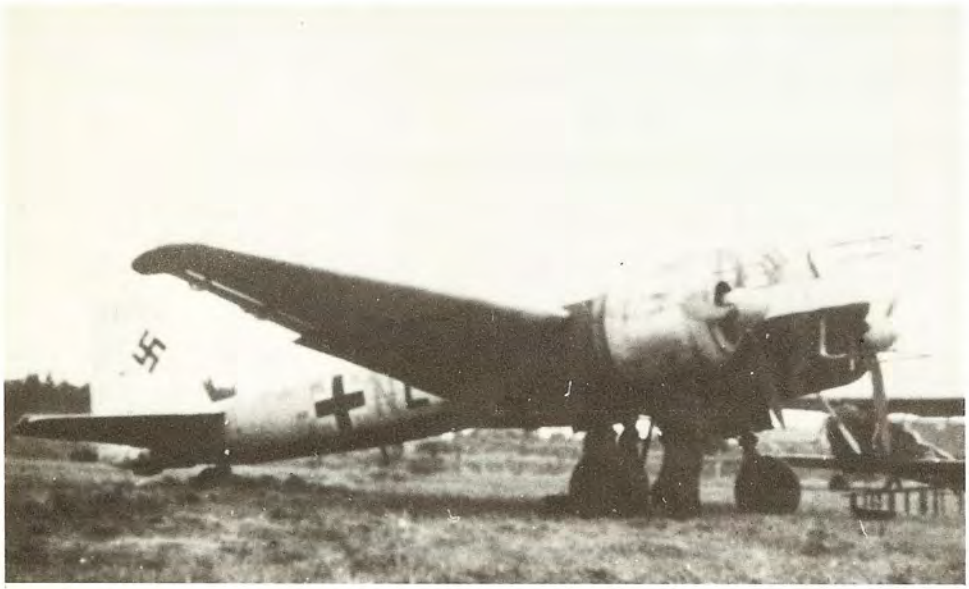




Above: The Focke-Wulf Ta 154 V1, W.Nr. 0001, TE+FE, Kurt Tank's plywood night fighter, is shown here in mid-1943. The camouflage is reputed to have been 02/74/76. Generally, colors 74 and 75 would have been of much lower contrast than we see in this view. Lower: Camouflage for the seventh prototype, the Ta 154 V7, W.Nr. 0007, TE+FK, had been refined to the scheme adopted for full production machines. They employed a base of Light Blue 76, with upper surfaces covered by a random application of Gray-Violet 75 spots. Spinners were Black-Green 70, while the wooden Junkers VS 11 prop blades were Dark Green 71.







Above: This Junkers Ju 88 G-1, W.Nr. 714 811, PW+BC, photographed in May 1945 at Bad Abling, carries Light Blue 76 as a base color with Gray-Violet 75 mottle over uppersurfaces. It is somewhat unusual that the factory call-letters have not been removed or modified by a unit code. Left: Another Ju 88 G-1, D9+NL, of 3./NJG 7 based at Vaerlöse, Denmark. Camouflage is Light Blue 76 overall with a soft mottle of Light Green 83. Underside of the fuselage is Black 22 and the individual letter "N" was in yellow. Below: This Ju 88 G-6, W7+IH, formerly operated by 1./NJG 100, is shown here with improvised American markings on the fin and fuselage. The pilot had just arrived at Lechfeld on May 7, 1945, following a flight from Czechoslovakia. Camouflage consisted of Light Green 83 and Olive Green 81 uppersurfaces, with Light Blue 76 lower surfaces. Note the FuG 218 Neptun V/R with combined AI tail radar antennae.





22 Black
22 Schwarz



75 Gray-Violet
75 Grauviolett



76 Light Blue
76 Lichtblau



83 Light Green
83 Lichtgrün



76 Light Blue
76 Lichtblau



22 Black
22 Schwarz



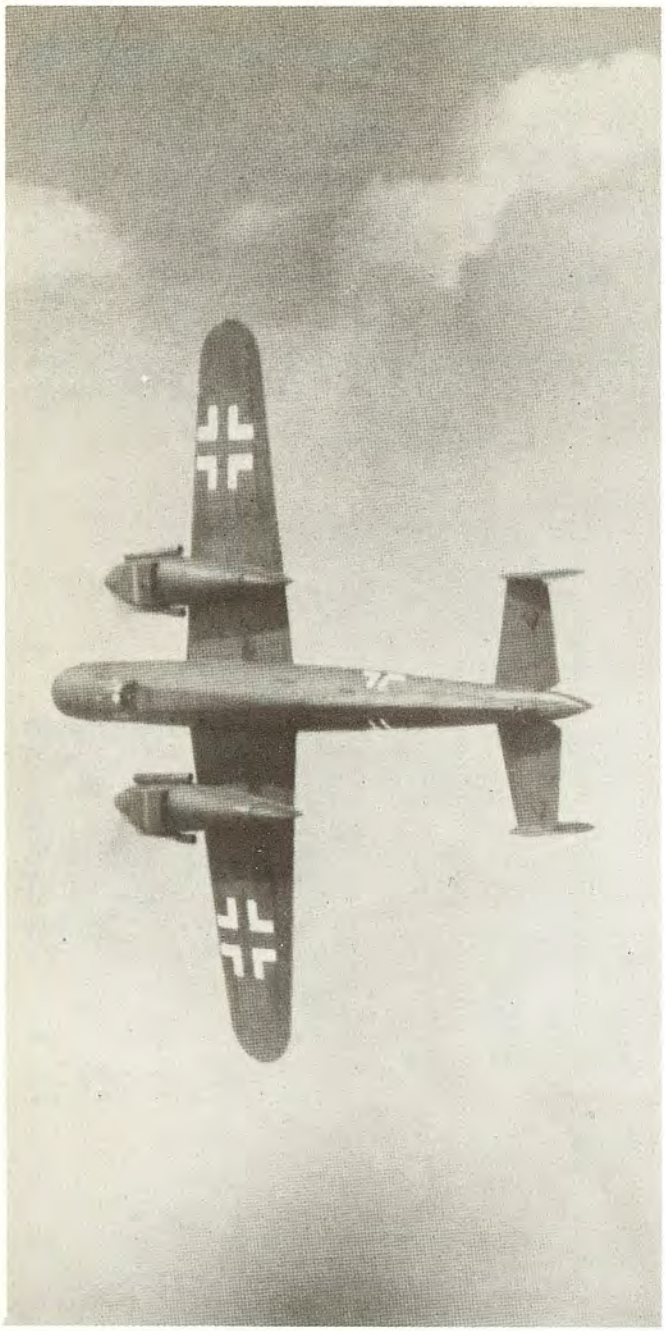
81 Brown-Violet
81 Brunviolett



83 Light Green
83 Lichtgrün



76 Light Blue
76 Lichtblau

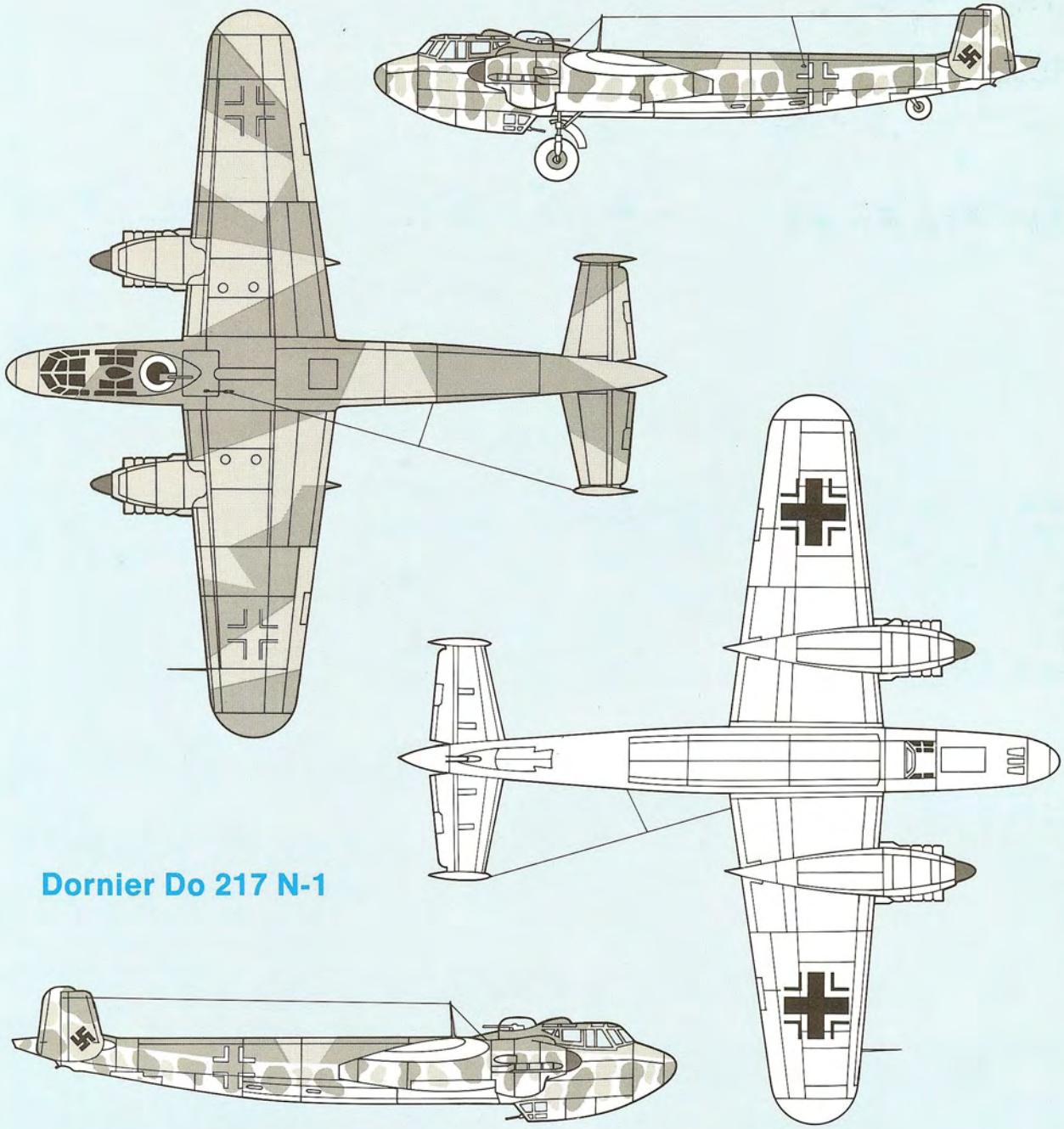


Three camouflage schemes were employed by the Dornier Do 217N series. Left: Banking steeply, this Do 217 N-1 is entirely black with simplified white outline crosses, a pattern closely followed by the earlier Do 217 J-2 night fighters. Following the decision to abandon the all black camouflage, night fighters switched to a variety of schemes usually evolved by the manufacturer and approved by the RLM. Lower right middle: The second scheme employed is illustrated by the Do 217 N-1, GG+YG. Uppersurfaces were segmented into distinct patterns of Gray-Green 74 and Gray-Violet 75, with undersurfaces of Light Blue 76. The fuselage and engine sides were mottled in patches of 74/75. Spinners and props were the usual Black-Green 70. All national markings were of the outline type except for the underwing cross which was of the older style. Immediately below: Although of poor quality, this view of a Do 217 N-1 is interesting insofar as the fuselage cross is concerned, it being of the style formerly reserved for upper wing positions. Camouflage appears to be generally consistent with the 74/75/76 scheme. Bottom: A newly completed Do 217 N-2, PE+AW, carries a camouflage of Light Blue 76 overall with an interlocking pattern of Gray-Violet 75 over all top surfaces including the inboard sides of the vertical tailplanes. This, the third pattern, was principally employed by the improved Do 217 N-2 series.









Dornier Do 217 N-1

Color 74
Gray-Green

Color 75
Gray-Violet

Color 76/02
Light Blue or
RLM Gray

Color 70
Black-Green

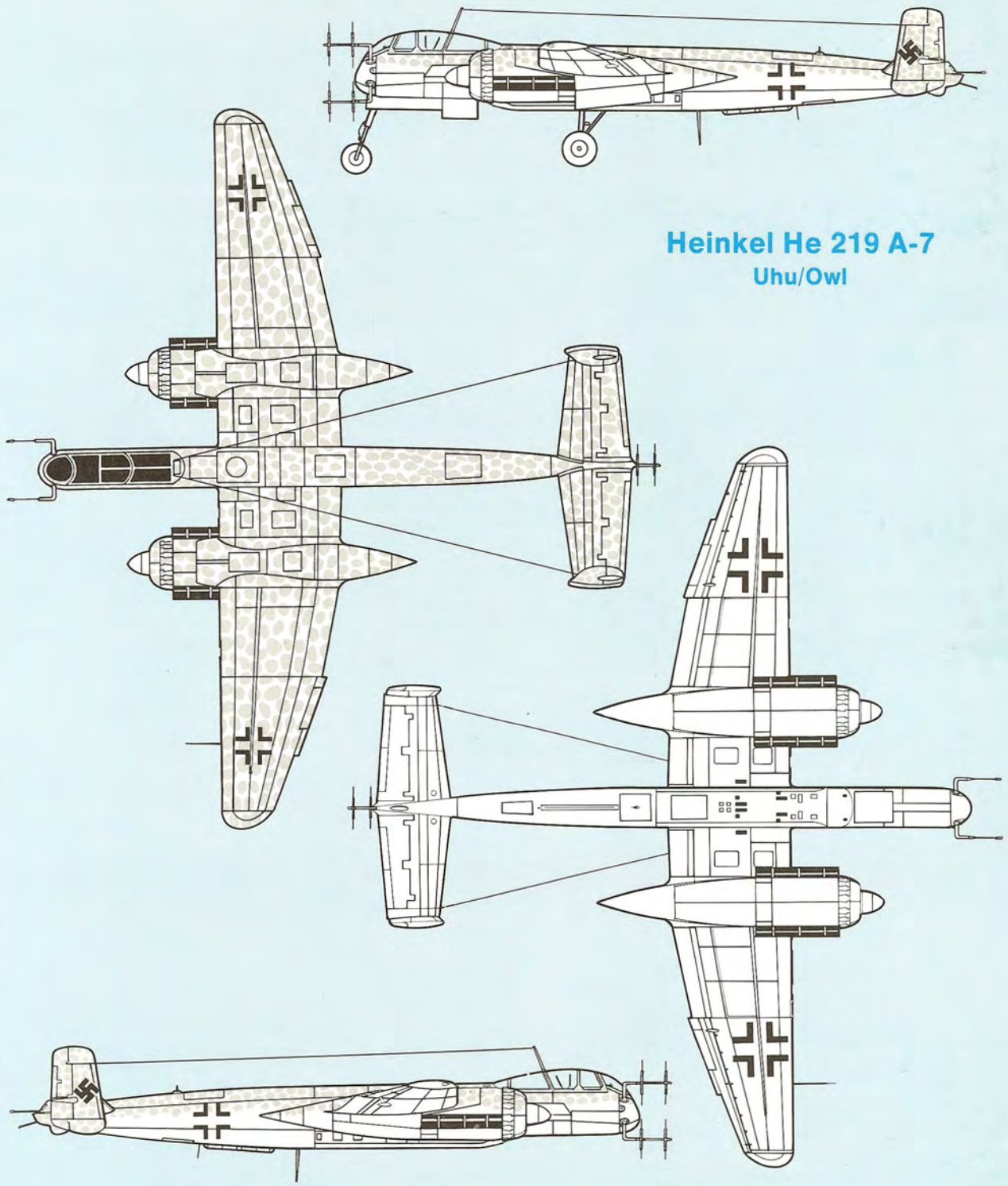
This February 1943 factory camouflage scheme assigned to the Do 217 N-1 specified a splinter pattern of Colors 74/75 over all uppersurfaces. Metal propellers and their spinners were Color 70, while the entire undersurface was Color 76 or, alternatively, 02. The fuselage sides, engine nacells, and vertical tailplanes received an alternating pattern in 74 and 75 spots. Later, this scheme was simplified to restrict the entire uppersurfaces including the vertical tailplane to only Color 75, while the lower surfaces and fuselage sides were solid 76. The fuselage *Balkenkreuz* was similar in style to those on the wing uppersurfaces.





Left: The Heinkel He 219 V3, VG+LW, which flew in late December 1942, is shown here during evaluation early in 1943. Overall finish was Black 22 with registration code letters in Gray 77. Middle Left: Photographed in August 1945, this He 219 A-7, W.Nr. 310 189, formerly D5+CL of 3rd Staffel, I./NJG 3, was camouflaged Light Blue 76 overall including the spinners, with a soft-edge mottle of Gray-Violet 75 over all top surfaces. The small "VI" near the foot step beneath the canopy indicates that the aircraft was fitted with FuG 220d radar with *Streuwelle VI* (dispersal waveband). Aircraft code letters, D5+CL were most likely Gray-Violet with the exception of "C" which was yellow. Lower: Another He 219 A-7, W.Nr. 190 176, is shown here following capture by Col. Watson's special group at Lechfeld, June 1945. Note this "Uhu" has been victimized and is lacking the lower radar antenna elements and forward windscreen. Minor camouflage variations appear even within the He 219's approved scheme. Note that this example's props and spinners were solid Black-Green 70. The placement of the serial number is also noteworthy.





Heinkel He 219 A-7
Uhu/Owl

Color 75
Gray-Violet

Color 76
Light Blue

This official factory camouflage pattern for the He 219A called for the entire airframe to be painted Color 76, with a spotted mottle of 75 over all upper surfaces including the vertical tailplane. Spinners and metal propellers received the usual Color 70, but some examples were delivered with spinners in Color 76. Still other He 219s were camouflaged overall Color 22 with a mottle of 02 and 75. National markings were almost always the specified late-war outline variety.





Design and development of the Ju 388 J-1 was tied to the mistaken belief that the Allies soon were to introduce over the Reich high altitude night bombers such as the anticipated B-29. Fitted with a pressurized cockpit and turbosupercharged engines, the Ju 388 J-1/V2, W.Nr. 500 002, PE+IB, shown above, was completed in early 1944, camouflaged in colors 70/71/65. Spinners and props were Black-Green 70. Fitted with FuG 220 radar and only mockups of the projected weapons, it was extensively tested at Rechlin. When it became obvious that the B-29s were not to be deployed in Europe, the role of the Ju 388 J shifted to low level operations.

Left: The second J-series prototype to be completed, the Ju 388 J-1/V4, PE+ID, is shown in this photo camouflaged RLM Gray 02 overall.

Below: The final J-series prototype, the Ju 388 J-1/V5, PE+IE, is shown here following a landing gear collapse on July 31, 1944. Camouflaged 70/71/65, and carrying typical insignia for the type, the aircraft proved disappointing. The troublesome BMW 801 TJ engines were never developed to a reliable state and even though production was planned during January 1945 the program was canceled in February.

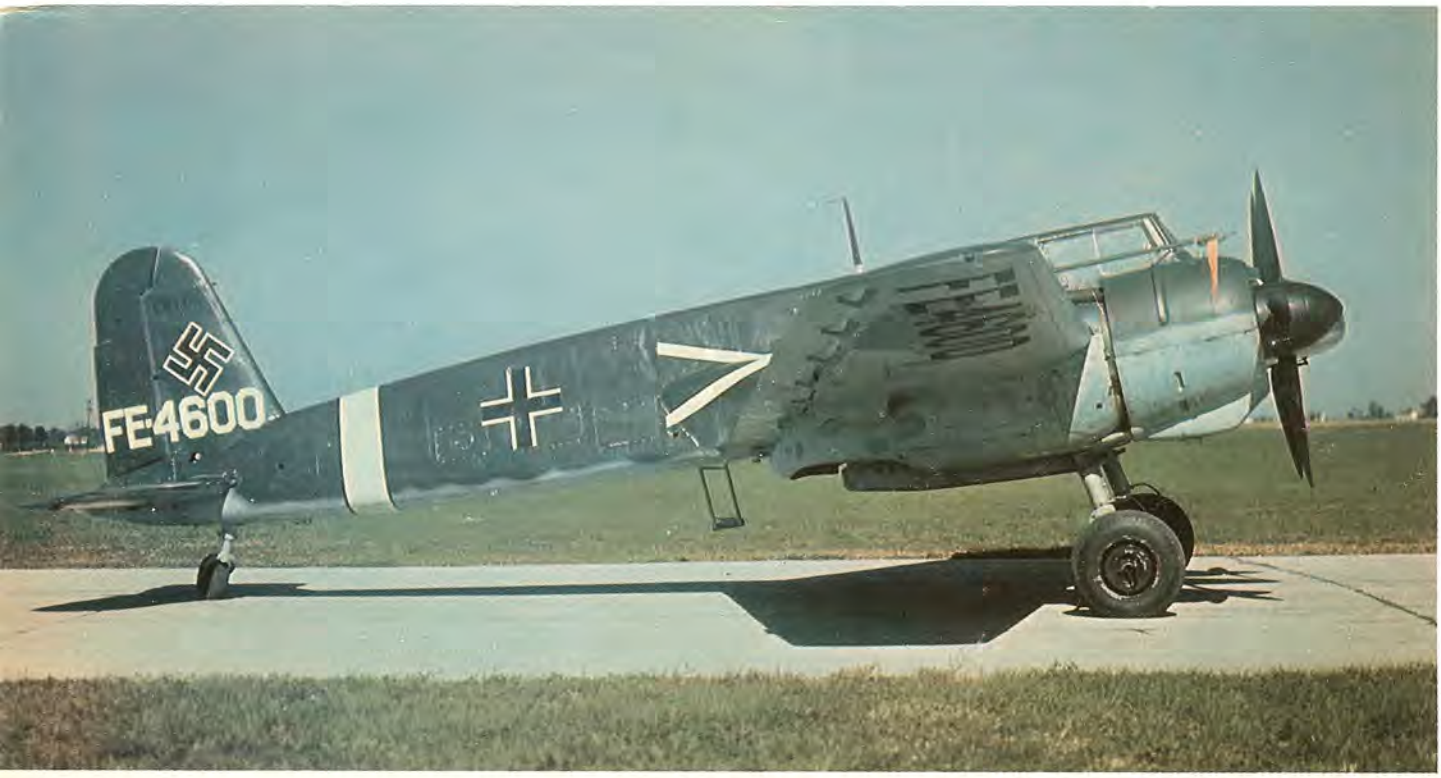




Above: Lacking its rudder, this Messerschmitt Me 262 B-1a/U1, W.Nr. 110 635, "Red 10" shown here at Dizier was one of the two-seat night fighters acquired by Col. Watson's crew at the close of the war. Although carrying RAF roundels and fin flash, the rear fuselage bears the inscription "USA 1". Most of the two-seat conversions were carried out by Blohm & Voss and their camouflage was fairly consistent from one aircraft to another, being Light Blue 76 over top surfaces with a mottle of Gray-Violet 75. Red 10's wing uppersurface was similar to the fuselage mottle, this being applied in a random pattern of serpentine Gray-Violet lines. The simplified black outline cross was applied to the fuselage and upper wing surfaces. The fin carried a simple solid black swastika which clearly had been stencil-applied, the four central arms and the outer arms being fractured. Undersides were finished in Black 22 with white outline simplified crosses.

Below: This Me 262 B-1a/U1, W.Nr. 110 306, like the aircraft above, was formerly employed by 10./NJG 11. Photographed at Scheleswig, and bearing the inscription "USA 2", this particular aircraft became FE-610 upon arrival in the United States. Camouflage and markings were similar to "Red 10" apart from the upper surfaces of the wings and horizontal tailplane which were solid Gray-Violet 75.





CLOSE-SUPPORT

Prewar the only specific type designed for close support duties which was in operational use was the Hs 123. It used standard bomber camouflage of the period, 61/62/63/65. Later, most Hs 123s were eventually camouflaged in 70/71/65.

The Hs 129 proved it could perform well in Russia. In this theater it excelled while camouflaged in 70/71/65. Operations undertaken in North Africa were less satisfactory where the majority of Henschels were camouflaged in the desert colors of 78/79/80.

Some lesser known types were to eventually find themselves drawn into this role. Amongst the lesser known adaptations was the Bf 110. After its apparent failure as a heavy fighter in the air battles of 1940, production was initially allowed to decline and many of the existing Bf 110s were diverted to other roles ranging from fast bomber to glider tug. A few also served with the *Stukageschwadern,* but their use appears to have been limited in both numbers and duration.

In late December 1942 a special night ground attack force (whose individual units were initially titled *Störkampfstaffeln*[7] but were later expanded into *Nachtschlachtgruppen*[8]) was formed for use on the Eastern front. Limited to night operations, the force was composed of obsolete aircraft types, i.e., Ar 66s, Go 145s, He 45s and He 50s.

The first of the *Störkampfstaffeln* were initially equipped rather hurriedly with aircraft from second line units, often retaining their equally obsolete camouflage schemes. Some of the He 46Fs were still in their prewar 61/62/63/65 camouflage. Little was done to them other than to repaint the lower and fuselage side surfaces in permanent black 7124.22. The vertical tail surfaces were either treated similarily or oversprayed with elongated mottling in either of the two Greens 70 or 71. Later batches of aircraft appear to have been processed through a refurbishing center where standard camouflage in 70/71/22 was applied in uniform manner.

A fuselage identification symbol, a black equilateral triangle, had been introduced in August 1940 for those units with the specific *Schlacht Geschwader* designation. On October 5, 1943, an order was issued amalgamating all ground attack, dive bomber and fast bomber units into a single ground attack force. From this date onwards the triangle emblem officially ceased to exist. (GAM 135.)

For winter operations all upper surfaces were recamouflaged with temporary White 7126.21. This paint was a vast improvement on the original temporary White 7120.21 with which the *Luftwaffe* commenced the war. Normal application of 7120.21 was done with hand brushes. Because of its limited life, eight days, it was necessary to remove and restore this color frequently. This was done by means of wooden scrapers, metal type being forbidden as these would have damaged the paintwork underneath.

While the Do 335 was intended as a fighter bomber, none achieved operational status, initial preproduction aircraft being finished in 70/71/65.

In the close support role the ubiquitous Ju 87 flew on until the last day of the war. Camouflage remained standard 70/71/65 for many of the older machines, production of this type ceasing just as the new colors 81 and 82 were being officially introduced onto the production lines.

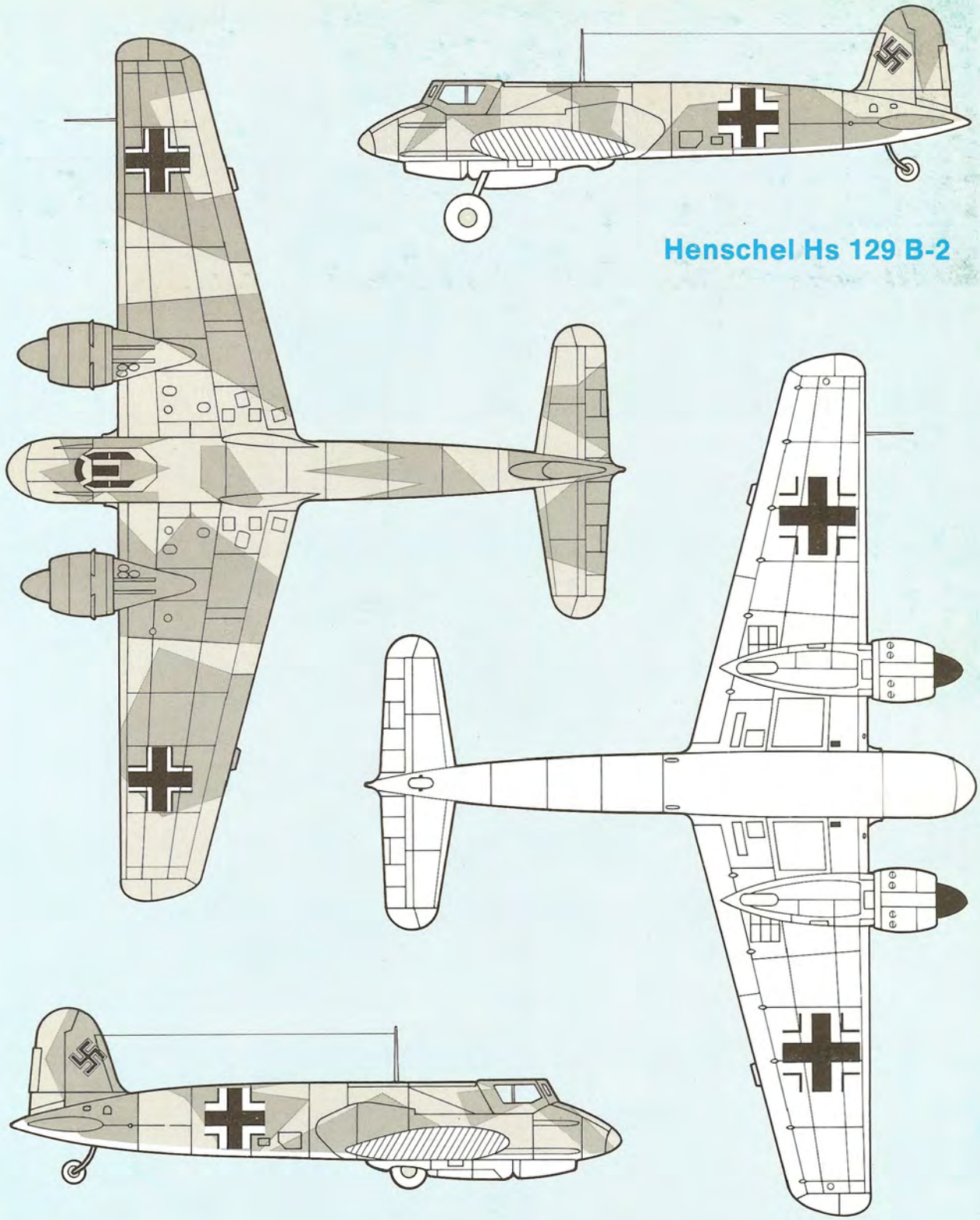
Late production Fw 190s used in the ground assault role were in time to make use of the late war camouflage colors. Some highly modified schemes have been recorded showing these colors being used in large patches or even long segments similar to RAF style camouflage schemes.

As with the Ju 87s, quite often the national markings were oversprayed in part or completely obliterated, the camouflage effect taking precedence over all other considerations.

7. Night Harassment Flights

8. Night Attack Squadrons

Top: This Henschel Hs 129 B-2 was repainted after capture. Consequently, only the undersides, props and spinners are shown in original camouflage. Prior to application of Foreign Equipment numbers, the aircraft bore U.S. Army Evaluation Branch number 105.



Henschel Hs 129 B-2

Color 70
Black-Green

Color 71
Dark Green

Color 65
Light Blue

This official factory camouflage scheme called for Colors 70/71/65. Aircraft which operated in the Mediterranean were finished in the so-called tropical colors of 78/79/80. National insignia was comprised of a wing and fuselage crosses of 1000 mm diameter and a fin-mounted swastika measuring 420 mm. Uppersurface crosses were positioned 2000 mm from the wing tips, while the fuselage cross was centered equally distant from the wing's trailing edge to the horizontal stabilizer's leading edge. The swastika was centered 360 mm from the rudder leading edge. Spinners and props were Color 70.



Left: Photographed following the war, this Focke-Wulf Fw 190 F-9, W.Nr. 347 763, was the mount of the Technical Officer of 2 Staffel as indicated by the horizontal rear fuselage bar and circle with chevron. These markings undoubtedly were painted Green 25 and thinly outlined in black. Camouflage was quite likely similar to the color illustration shown opposite on page 69 but with a yellow rudder and a black-and-white spiral motif on the spinner. Middle: This Fw 190 F-8 carries the correct style of simplified markings on all positions. The white bar and number 5 indicate that this machine was attached to the 5th Flight of an unknown unit. Camouflage is in all probability 82/75/76 with a rather heavy mottle of 82.





Left: This Fw 190 F-8/R1 serving with SG 2, taxies into takeoff position in Hungary early in 1945. Note the tactical "V" marking under the port wing which is identical to the aircraft on page 69. The "V" motif overlaps the top surface, extending for 56 cm on the outboard side and 38 cm on the inboard side. This marking also was employed by Oberstltn Rudel of Stab II./SG2. Undoubtedly camouflage was similar to the color illustration on page 69.

70 Black-Green
Fuselage deck and mottle.

Gray (variation)
Top of cowl.

Brown (variation)
Canopy and frame.



Above: Awaiting full restoration by the NASM, this Focke-Wulf Fw 190 F-8/R1, W.Nr. 931 884, began its career as a standard Fw 190 A-7 fighter. As W.Nr. 640 069, it was manufactured by Fieseler about May 1944. In keeping with others of its type, this aircraft was later returned for recycling. In its new form as a fighter-bomber it appeared with four underwing ETC 50 bomb racks and other related equipment. Following the war, this aircraft was brought to the United States and issued Foreign Equipment number FE-117. On August 1, 1945, it was received at Wright Field where it remained for a considerable time. The wartime history of this machine is obscure but the authors have reason to believe that it saw action on the Eastern Front, probably on strength with SG 2 operating from bases in Hungary. Rubbing down the spinner has disclosed three previous paintings. Initially, a solid coat of brown was applied followed by Black-Gray 66, then by blue and finally as shown above. The "V" emblem carried under and slightly over the port wing is identical to the one illustrated on the Fw 190 F-8/R1 at the foot of page 68. The significance of this tactical marking is unknown. The paint chips attached to this page are accurate examples of the colors found on this aircraft. The propeller blades were dural and painted Black-Green 70.

Red (variation)
Rear half of spinner.

Yellow (variation)
Markings.

Light Blue (variation)
Underwing color. Fuselage undersurfaces was 65.



Above: Surrendered by its crew at Fürth, this Junkers Ju 87 D-5, W.Nr. 141 286, is camouflaged 70/71/65 with yellow tactical colors applied to the nose, rudder and underside wing tips. Note the absence of wheel trousers exposing the landing gear legs painted RLM Gray 02. Below: This Ju 87 G-2 was captured in Pilsen, Czechoslovakia. Although the color has badly sepiad over the years, the basic camouflaged coloring of 70/71/65 is still obvious. Like the Stuka above, this example carries the tactical color yellow around the cowling; but unlike the machine above, the flame-damping exhaust tubes are angled to eject downward. The spinner was finished in Black-Green 70 while the Junkers VS 11 wooden prop blades were in Dark Green 71.





Above: This Ju 87 D-3 trop, W.Nr. 2883, (originally RI+JK), is shown here for film purposes in fictitious unit markings. It has subsequently been repainted to represent an aircraft attached to 10. (Pz)/SG 1. There is evidence that this aircraft was at one time modified to Ju 87 G-1 standards. Right: This Ju 87 D-7, found near Innsbruck, Austria in May 1945, was camouflaged in 70/71/76 with a dense pattern of 76 overall uppersurfaces. Note lack of underwing insignia. The spinner has a one-third panel in white, while the aircraft's individual letter, G, has been repeated on the wheel cover. Below: Several Bf 110 F-1s attached to Stab I./SG 1, operational in the East during 1941. Both aircraft, A5+HB and A5+EB, carry the standard 70/02/65 camouflage with their individual letters (i.e. E and H) in green, denoting their staff positions. Note the stylized blue and white bird emblem on the nose of the closest machine.







PREWAR BOMBERS

Revelation of the existence of the *Luftwaffe* in March 1935 coincided with the first production batch of Do 23 bombers which were delivered to the new military force in an overall finish of silver. The service life of these aircraft was brief due to their disappointing performance. None was produced after 1935. The *Luftwaffe's* other bomber type, the Ju 52/3m g3e, wore an overall finish of the new Green-Gray 63 with black trim where exhaust fouling occurred.

In late 1936 a straight-edged segmented four-color camouflage scheme was introduced using flat colors of 61/62/63 for upper and side surfaces, with 65 for all lower surfaces. The pattern was a complex one and allowed six variations. All three upper surface colors were interchangeable in given sequences, producing three schemes which were also available as a mirror image of each. A grid system was used to plot the scheme for a particular aircraft type. The basic pattern was laid out in the specific painting guide only as a plan view projected on a grid system. Areas of camouflage, outside the strict plan view of the aircraft, were projected onto the fuselage side areas down to a predetermined demarcation line. In effect, the excess camouflage pattern was "wrapped" around the fuselage sides. In doing so the varying cross-sectional area of the fuselage produced a natural realignment of the relationship between the various color areas. The actual projection of the areas of camouflage appears to have been left to the individual production centers, for variations have been noted.

In most instances the pattern did not vary from type to type. One notable exception was the He 111 which utilized a consistent minor variation to the camouflage pattern for the rear portion of the fuselage. It was displaced aft by one grid square. This occurred just forward of the tailplane and was done, presumably, to more effectively break up the relatively large area of the tailplane itself. This may also be the reason for the very minor variations to color sequences, but still within the prescribed pattern areas, seen on some aircraft, e.g., He 111B and Do 17F, was the result of their relative proportions and not due to any change in standard pattern.

Some minor variations, between aircraft of the same type, occurred between production centers. This involved the actual positioning of the pattern, some being set forward only a matter of inches, but sufficient to cause a noticeable difference to the careful observer. More pronounced was the common variation, of the type mentioned previously, on the port side of some Ju 86s. This resulted from a simplification of the concertina-shaped pattern on the rear portion of the fuselage as shown in the accompanying diagram.

Following the Munich crisis of September 1938, the 61/62/63 upper and side surface camouflage scheme was finally superseded. All heavy bombers leaving production lines in the future were being painted in the simplified two color upper surface scheme of 70/71/65 was retained for all lower surfaces. Bomber aircraft already in service were to retain their existing schemes until replaced. The red tail band and white disc marking to the *Hakenkreuz* was also deleted by overpainting in 61, the *Hakenkreuz* marking remaining at the center line of the fin and rudder assembly. (GAM 42.)

The 70/71/65 scheme had already been introduced for dive bombers, e.g., the Ju 87, during the Spring of 1938. A grid pattern was again employed to lay out the two upper surface colors in a straight-edged pattern, but this time only four variations were available by interchanging the two colors and using a mirror image. This practice of variation was discarded once war broke out.

Top: This Dornier Do 17 E-1, operated by 5./KG 155 is typical of bombers of the prewar era, and is camouflaged in colors 61/62/63/65 with the black, white and red colors of the NSDAP across both vertical tailplanes.

61 Dark Brown
61 Dunkelbraun

62 Green
62 Grün

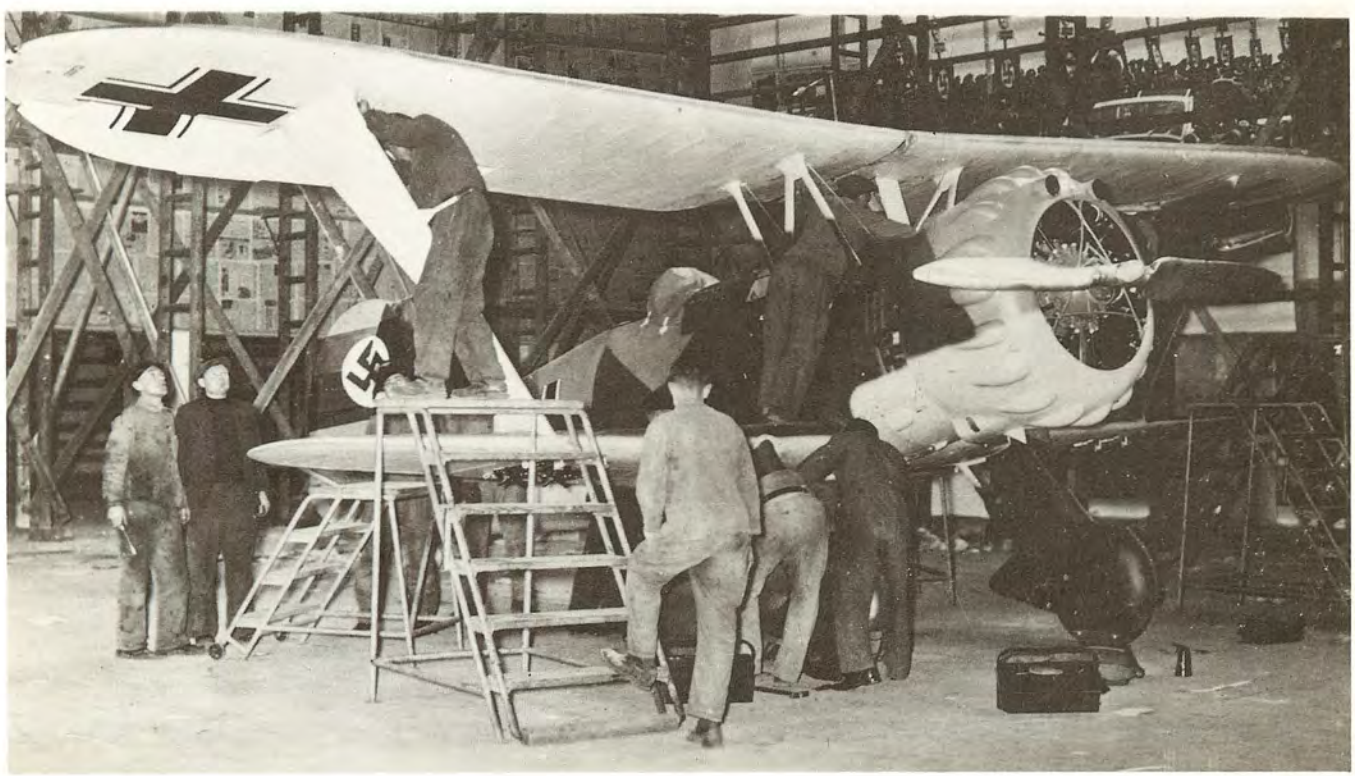
63 Green-Gray
63 Grüngrau

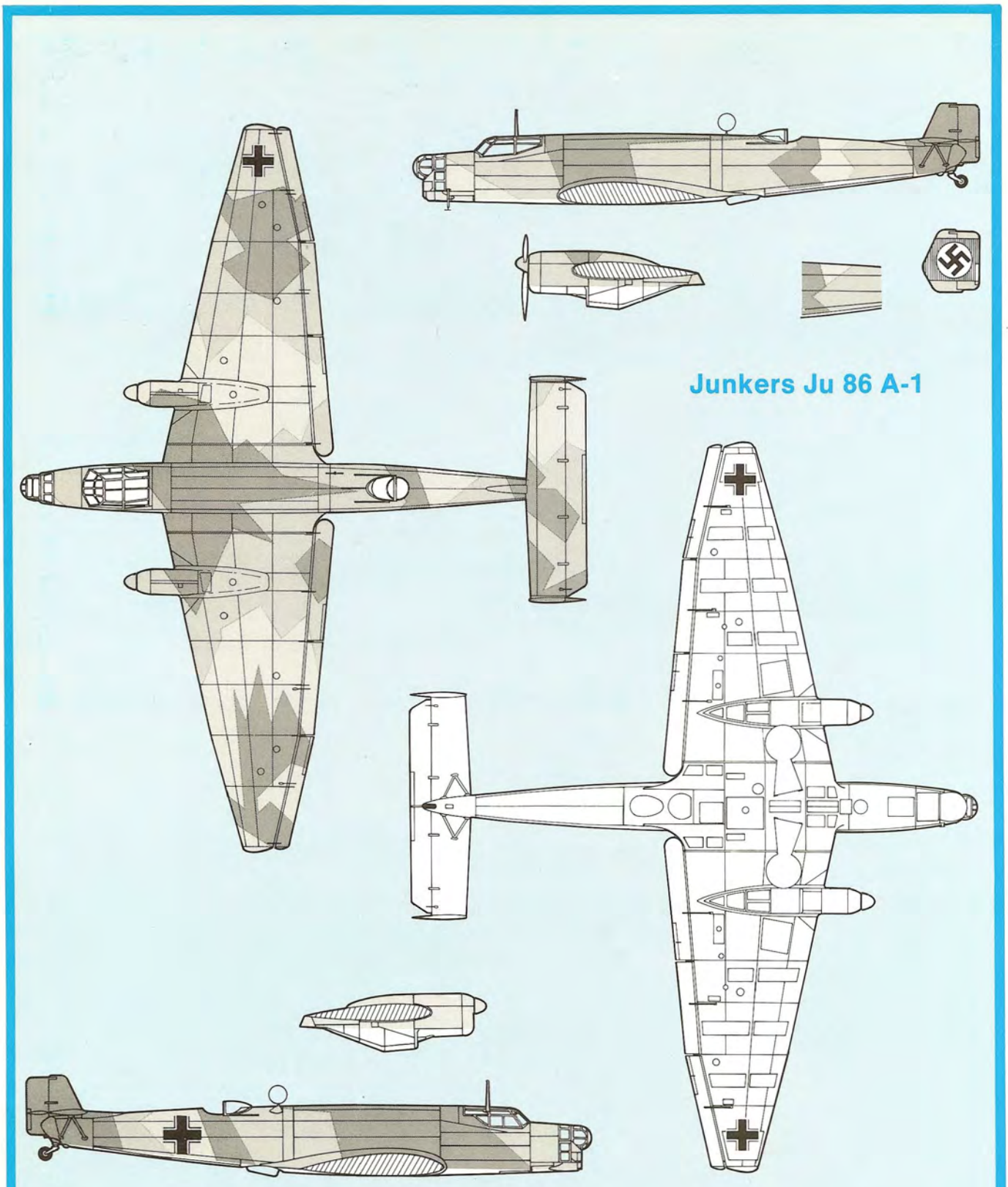
63 Light Gray
63 Lichtgrau

63 Green-Gray
(variation)

65 Light Blue
65 Hellblau

Workman complete final assembly of the Henschel Hs 123 A-1. Here it is camouflaged in the three uppersurface colors of Dark Brown 61, Green 62 and Green-Gray 63, with Light Blue 65 undersurfaces. The Hs 123 served on the Eastern Front well into the 1940s, usually camouflaged in 70/71/65.





Junkers Ju 86 A-1

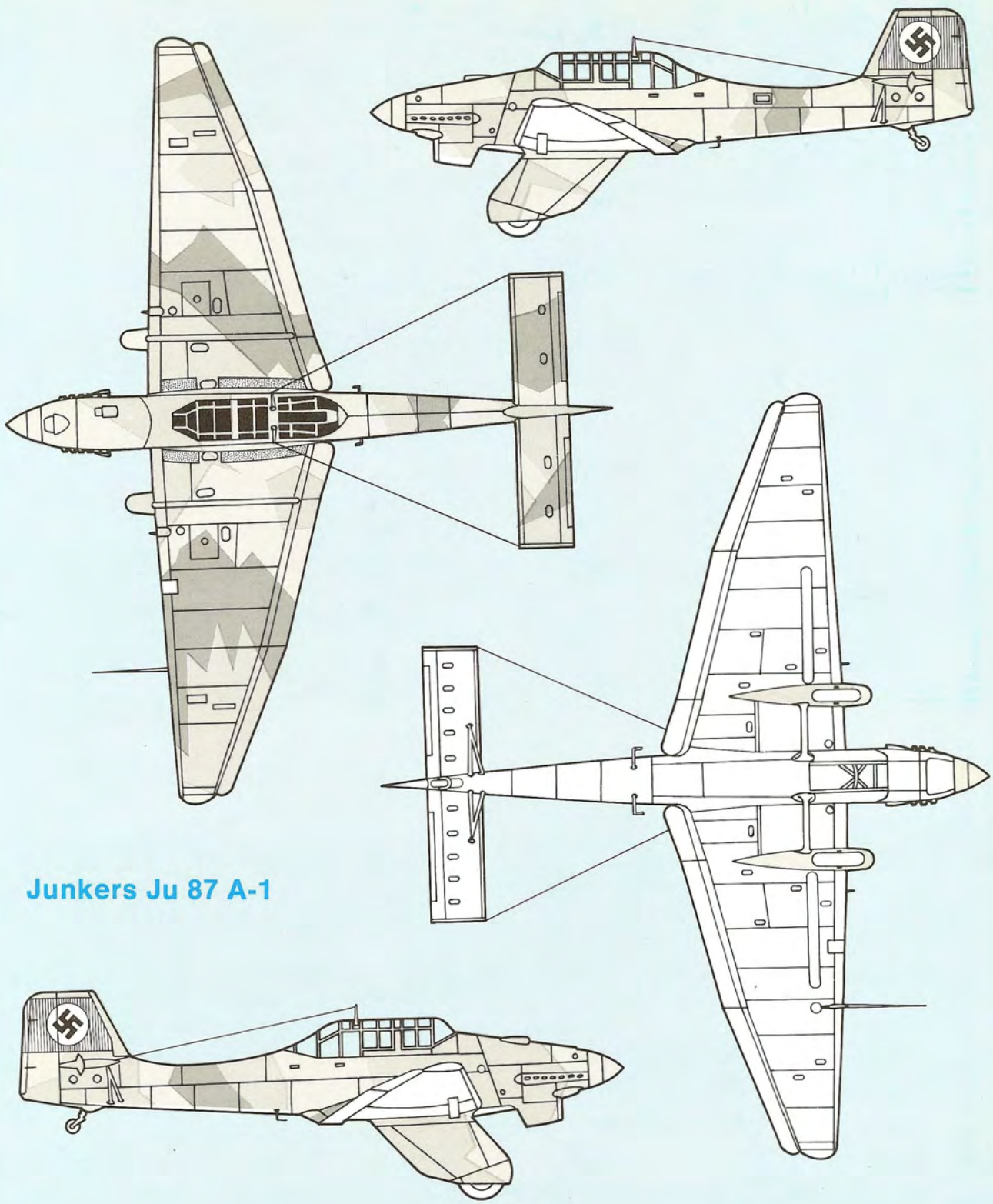
This was a standard A2a scheme for the Ju 86 A-1 and D-1 series. The three uppersurface colors were not only interchangeable with one another, but the entire pattern could have been a mirror image also with three interchangeable colors. The *Balkenkreuz* marking for the port wing upper surface has been omitted for clarity of the camouflage pattern. The inside face of both the port and starboard fin and rudder is painted 61 overall. The outside face of each is 62. Some production aircraft had their camouflage patterns simplified on the port side as shown in the scrap view.

Color 61
Dark Brown

Color 62
Green

Color 63
Green-Gray

Color 65
Light Blue



Junkers Ju 87 A-1

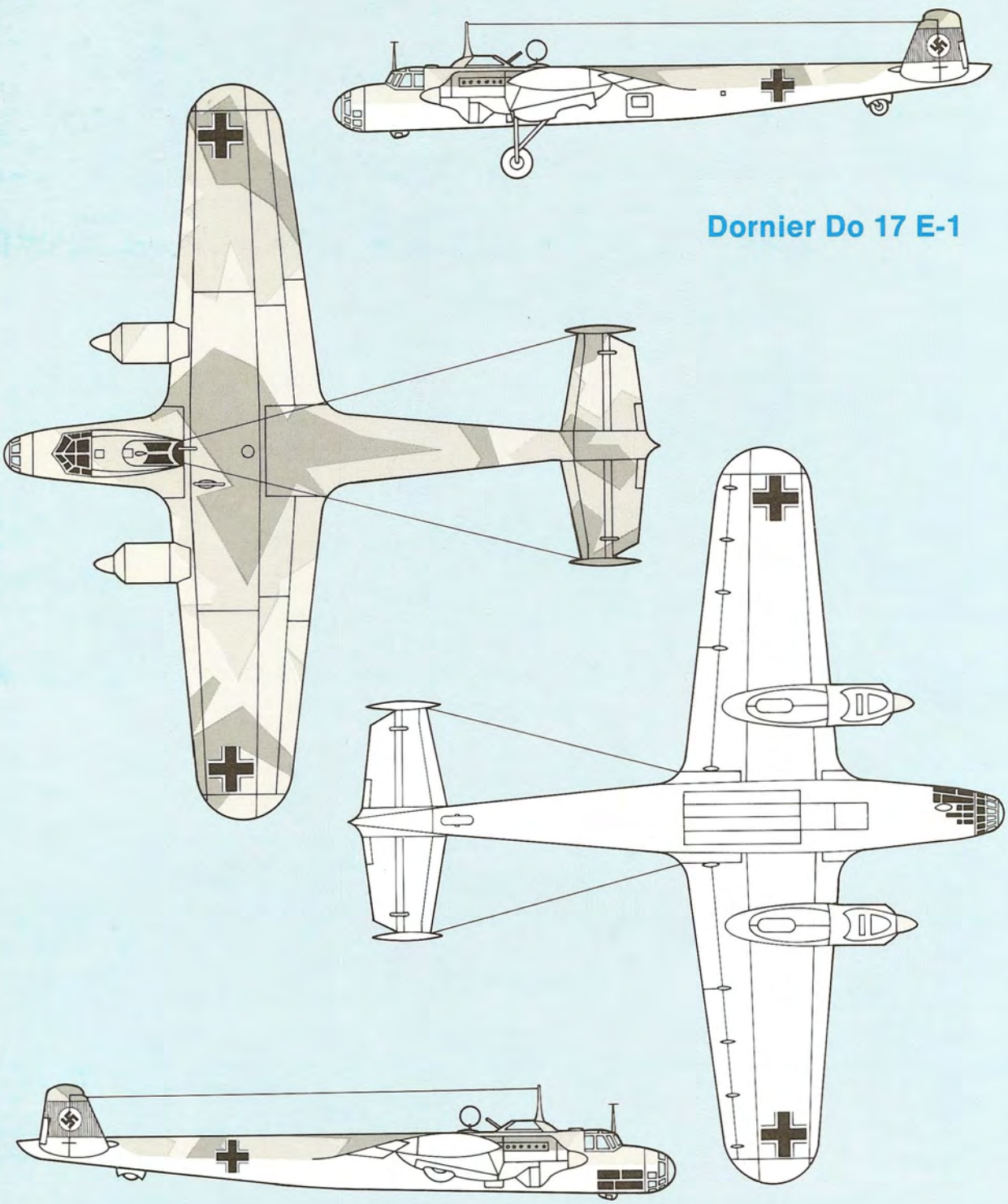
Color 61
Dark Brown

Color 62
Green

Color 63
Green-Gray

Color 65
Light Blue

This was a standard A scheme for the Ju 87 A-1 and A-2 series. Six camouflage variations were possible by interchanging the three upper surface colors with one another, plus a mirror image of each. Following delivery to the Luftwaffe, national markings were added to the wings and fuselage in a style and placement similar to the Ju 86 shown on page 74.



Dornier Do 17 E-1

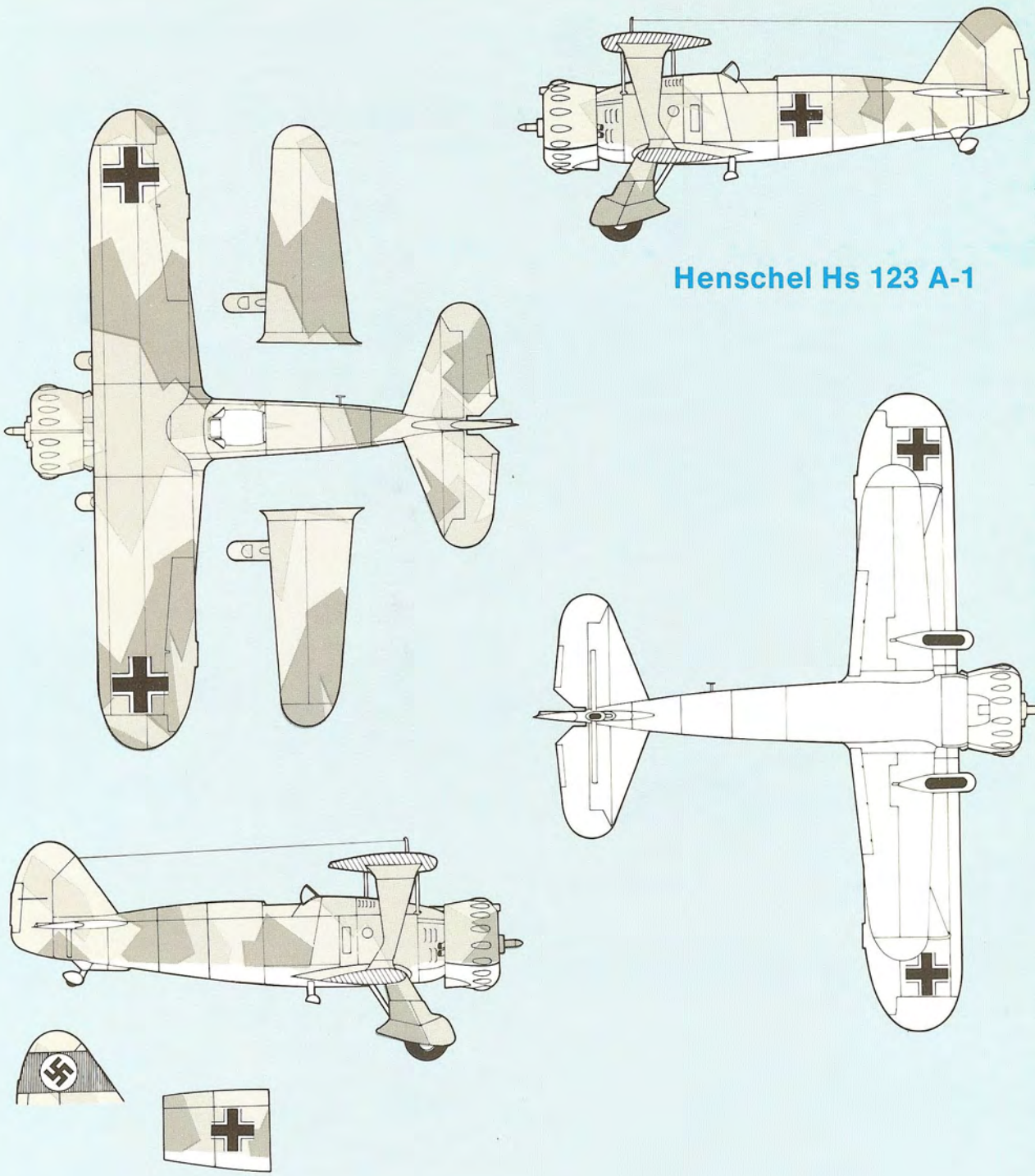
This standard A scheme was the camouflage pattern for the Do 17 E-1, E-2 and E-3 series as well as the Do 17 F-1 and P-1. The inside face of both the port and starboard fin and rudder were 61 overall, while the outside face of each was 62. Propeller blades were 63. Aircraft which were shipped to Spain were left in their Luftwaffe colors but carried Spanish Nationalist insignia.

Color 61
Dark Brown

Color 62
Green

Color 63
Green-Gray

Color 65
Light Blue



Henschel Hs 123 A-1

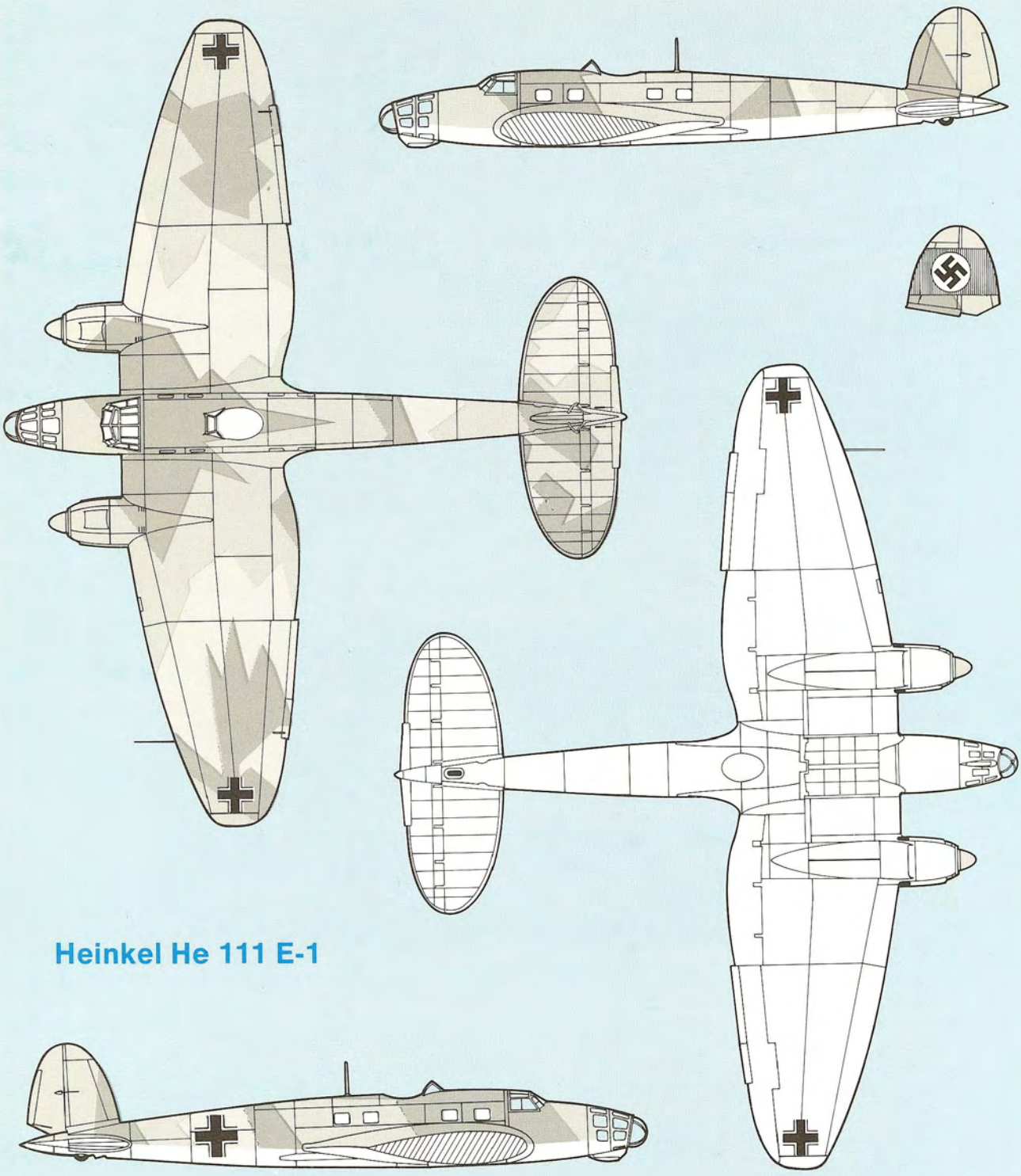
Color 61
Dark Brown

Color 62
Green

Color 63
Green-Gray

Color 65
Light Blue

This standard A scheme incorporated the modifications to the top surface of the upper wing as detailed in the text. Interplane struts normally were left in Color 65, but the undercarriage spats were generally camouflaged as shown. The fuselage *Balkenkreuz* markings were offset to allow sufficient spacing for the five part code application. The metal propeller was frequently polished metal with matt black rear surfaces but later models had their blades painted on both sides.



Heinkel He 111 E-1

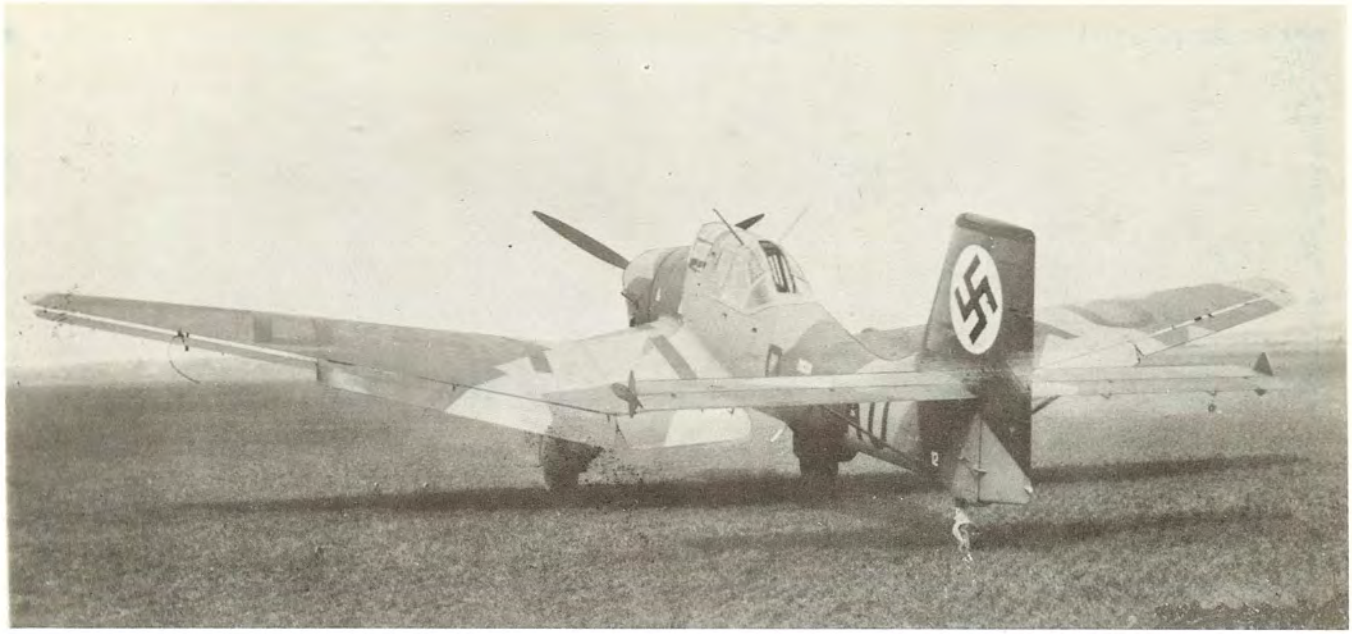
This was standard camouflage scheme A2a for the He 111 E-1. It was also applicable to the He 111 B and D-series. The port side elevation *Balkenkreuz* was omitted for clarity of camouflage pattern. The *Halkenkreuz* emblem has also been omitted for the same reason. This camouflage pattern incorporates the standard modification as set forth in the text.

Color 61
Dark Brown

Color 62
Green

Color 63
Green-Gray

Color 65
Light Blue



Above: This view of the 12th production Junkers Ju 87 A-1, D-IEAU, illustrates the splinter pattern of 61/62/63 over uppersurfaces. At least one Ju 87 A-1 continued flying until 1945 in its prewar camouflage and bearing the registration SI+AU. Right: Another prewar scheme of 61/62/63/65 appears on this Heinkel He 111 E-3. Absence of the early style fin-rudder marking, dates this photograph as post September 1938. The unit code, 56+E12, reveals that it was aircraft E of the *2nd Staffel, I Gruppe,* of the *6th Geschwader* of *Luftkreiskommando H.Q.* at *München* (Munich). Below: A Junkers Ju 86 A-1 in 61/62/63/65 camouflage, coded 33+D24 of II./KG 253, is shown here circa early 1937. It is not generally recognized, but these triple camouflage color schemes could result in six differing variations. The positions of the three colors were interchangeable. Each of these patterns could be applied in a mirror image adding an additional three arrangements.







EXPORT COLORS

The German aircraft industry was extremely active prewar and a wide range of military aircraft were sold to selected governments, principally those who were sympathetic to Germany.

Where aircraft were handed over to foreign governments after use by German forces, e.g., in Spain, the standard Luftwaffe camouflage of that time and place was generally retained. However, where orders were placed and aircraft delivered directly from German aircraft manufacturers, a special set of camouflage colors was specified for their finish.

It has not been possible to verify these four colors against an irrefutable RLM source, such as a color atlas, but careful matching has been done against surviving photographic evidence. The colors appear to have been Dark Olive Green (67), Light Olive Green (68), and a Light Tan color (69), all three of which were used for upper and side surfaces while a Light Blue (64) was applied to the lower surfaces. The three upper surface colors were applied in a soft-edged random pattern quite distinct from the Luftwaffe camouflage style of the period.

As with its Luftwaffe counterpart, there appears to have been a series of camouflage schemes available. Several of these are discernable from a study of Ju 86 aircraft supplied to Sweden and Hungary. These show an interchange of colors consistent with the prewar Luftwaffe scheme, but with the addition of variable styles not possible with the RLM grid system. One was a soft-edged pattern in long blocks of color while the other used a 'jigsaw'-edge style to separate the color blocks. In contrast, the Ju 86 E-2s purchased by Austria appear to have used either an overall natural metal finish, no doubt sealed with a clear lacquer finish, or an overall 63 finish.

More consistent with the Luftwaffe's prewar style of application was the scheme displayed on the Ju 87 B-1 displayed at the Paris Air Salon in 1939. Finished in the export colors 67/68/69/64, it used a relatively straight-edged segmented pattern on both the wings and the fuselage. It is not known for certain whether these colors were actually used on any of the Ju 87Bs exported to Germany's allies. Those supplied to Italy were repainted in standard dark green bomber camouflage while little photographic evidence has survived of those supplied to Bulgaria, Rumania and Hungary. However, the few photographs extant of these aircraft in service with the Hungarian forces show a color scheme very similar to the original Luftwaffe export colors.

In addition to Dornier and Junkers another prominent manufacturer, Heinkel, also delivered aircraft to foreign air arms. Colors and patterns were quite distinct from those supplied to the Luftwaffe. Examples include the He 45, He 46, He 51, He 70 and He 112. Working from surviving black & white photography, it is almost impossible to determine beyond doubt exactly what colors were employed by these aircraft. It is possible that certain specific aircraft received a mix of standard Luftwaffe colors in conjunction with one or more of the so-called export paints. Such factors as local terrain and operational needs of the foreign air arm would, of course, have figured in the final colors selected once the aircraft were received and allocated to front line units. Additionally, the German colors would have been subject to modification or perhaps replacement with one or more indiginous colors available to the foreign air force.

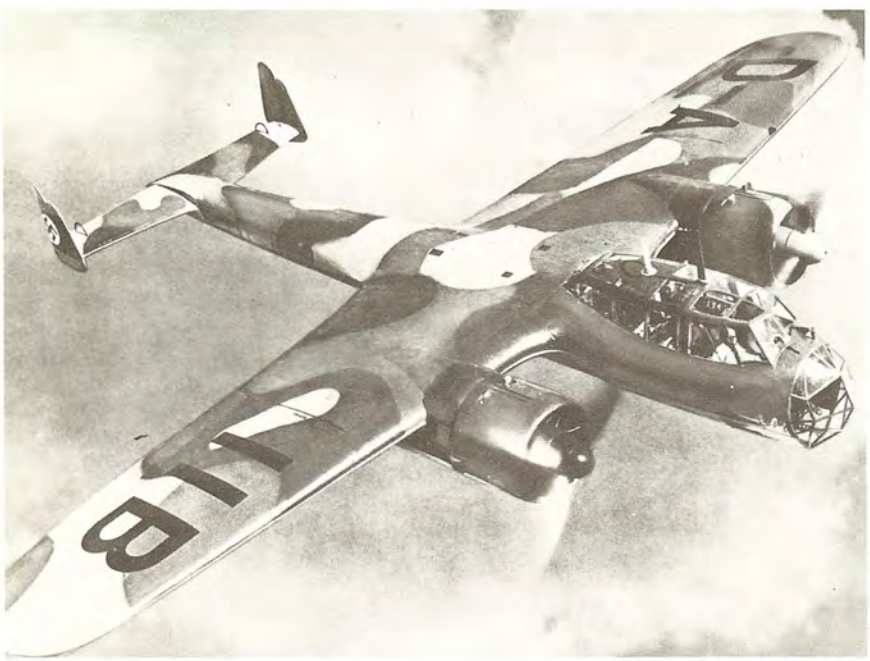
After the outbreak of war, export orders virtually ceased to noncombatant countries except for fighter aircraft supplied to Spain and Switzerland. These were delivered in the standard Luftwaffe finish of the period.

The Junkers Ju 86 K-5, export bomber shown above, was the last German-built version of 38 ordered and delivered to Sweden in 1937. The camouflage of these and the ones destined for Hungary were similar.

67 Dark Olive Green
67 Dunkelolivgrün

68 Light Olive Green
68 Hellolivgrün

69 Light Tan
69 Lichtlohfarbe



64 Light Blue
64 Lichtblau

Above: The first prototype of the Dornier 215, the Do 215, V1, D-AIIB, was actually a Do 17 Z-O used for demonstration purposes to interested foreign governments. It is shown here in the camouflage evolved for export models. Below: Another demonstration aircraft was the Junkers Ju 86 E-O, D-ALOH, shown here in mid-1937. Unlike the standard Luftwaffe splinter camouflage pattern, the export schemes were less angular and more flowing in design. The Ju 86 E-series was manufactured in limited numbers with many also operated by the Luftwaffe primarily as advanced trainers.





BOMBERS 1938-1945

The majority of bomber aircraft used in the opening phase of the war against Poland were finished in 70/71/65, although a few older aircraft still retained both the 61/62/63/65 scheme as well as the prewar five part alpha-numeric code application. The latter had been superseded by a four part code which remained in force for the rest of the war. (GAM 46.)

This new camouflage scheme could, technically, be applied in four variations based on a simple interchange of the two colors 70 and 71 plus a mirror image of both schemes. In practice, however, all available evidence points to only a mirror image of the primary pattern being used as an alternative. Minor variations occurred between various manufacturing centers, principally in relation to the demarcation line between upper and lower surface coloring. A more specific instance is the horizontal v-shaped pattern on one side of the rudder. On some He 111s this was simplified at the point of manufacture by painting that entire side of the rudder in one color. Overall, however, German bombers of the early to mid-war period displayed a remarkable consistency of camouflage application.

In September 1940 concentrated massed daylight attacks were undertaken by the *Luftwaffe*. At this time tactical markings were introduced in the form of broad stripes of color, i.e., white, yellow and red (actually salmon pink). (GAM 74-76.) The use of glyptal resin-based temporary paints became more widespread with the opening of the night bomber offensive against Britain. Removable temporary black distemper was another in the 7120 paint group. (GAM 166.) It was applied to the lower and side surfaces of aircraft up to the line of the top edge of the *Balkenkreuz* marking. Wing and tail undersurfaces were coated, the black paint overlapping the leading edge top surfaces by 50 cm. The white areas of the national markings were overpainted with another color from this paint group 7120.77, Light Gray.

A revised scheme was introduced in 1941 when the war situation dictated more intensive night bombing operations. Permanent black was introduced for those areas subjected to constant maintenance due to weathering. The undersurfaces of the wings for approximately the center third of the total span, plus the fuselage area between the wing roots, the undersurfaces of the engine nacelles and the leading edge of both wings, and the tailplane were painted in permanent black 7124.22. Temporary black 7120.22 was applied to all these areas as well as the remainder of the undersurfaces.

The wide scale introduction of 7124.22 was accompanied by the similar permanent paint, 7125.65 allowing the permanent 7124.22 areas to be overpainted with a permanent finish. In late 1943 a revised scheme was introduced for Ju 88, Ju 188s, Do 217Ks and He 177s engaged in night raids over Britain. Permanent black lower and side surfaces was used with 76 uppersurfaces, oversprayed with a scribble or mottle pattern of 74 or 75. With the introduction of the Ju 88S in early 1944, an overall scheme of 74 was used with soft-sprayed, continuous lines of 76 on all surfaces.

The official directive of August 15, 1944, announced the replacement of 7125.65 with 7126.76 (another in the single coat paint range) for use with 7124.22. (LC/3 95.)

On July 1, 1944, the colors 81 and 82 were officially introduced to replace 70 and 71. However, existing stocks of 70 and 71 were to be used up; and where supply of one color ran out, combinations of 82/70 and 81/71 were permitted. By an official order dated August 15, 1944, colors 74 and 65 were also withdrawn from use. Obviously, though, existing stocks were also used up, particularly of 65 before 76 was substituted for it. (LC/3 95, 96.) These revisions had little effect upon the bomber force as it was largely disbanded in late 1944.

Top: This Heinkel He 111 H-6, A1+BE, of the Staff Squadron of the 4th Flight of Bomber Group 53 (Stab IV./KG 53), was fitted with flame dampening exhaust stacks for night operations.

70 Black-Green
70 Schwarzgrün

71 Dark Green
71 Dunkelgrün

65 Light Blue
65 Hellblau

Brown
Braun

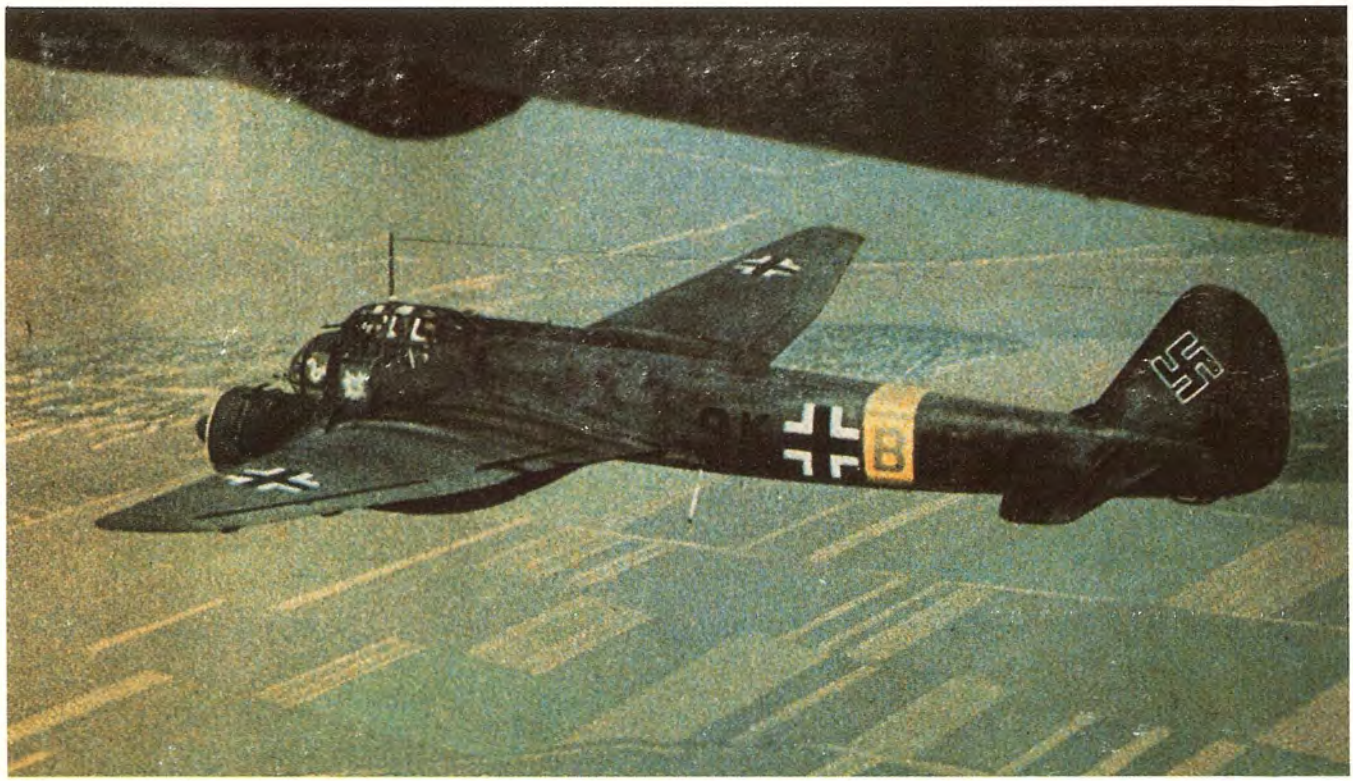
76 Light Blue
76 Lichtblau

26 Brown
26 Braun

Captured by Col. Watsons' group near Munich, this He 111 H-16, W.Nr. 8433, is shown here in its original camouflage represented by the three color chips above. The brown code letters "DC" and number "4" are unusual. One would have expected the letter "D" to be in green, to represent an aircraft belonging to the staff flight of the 2nd squadron.

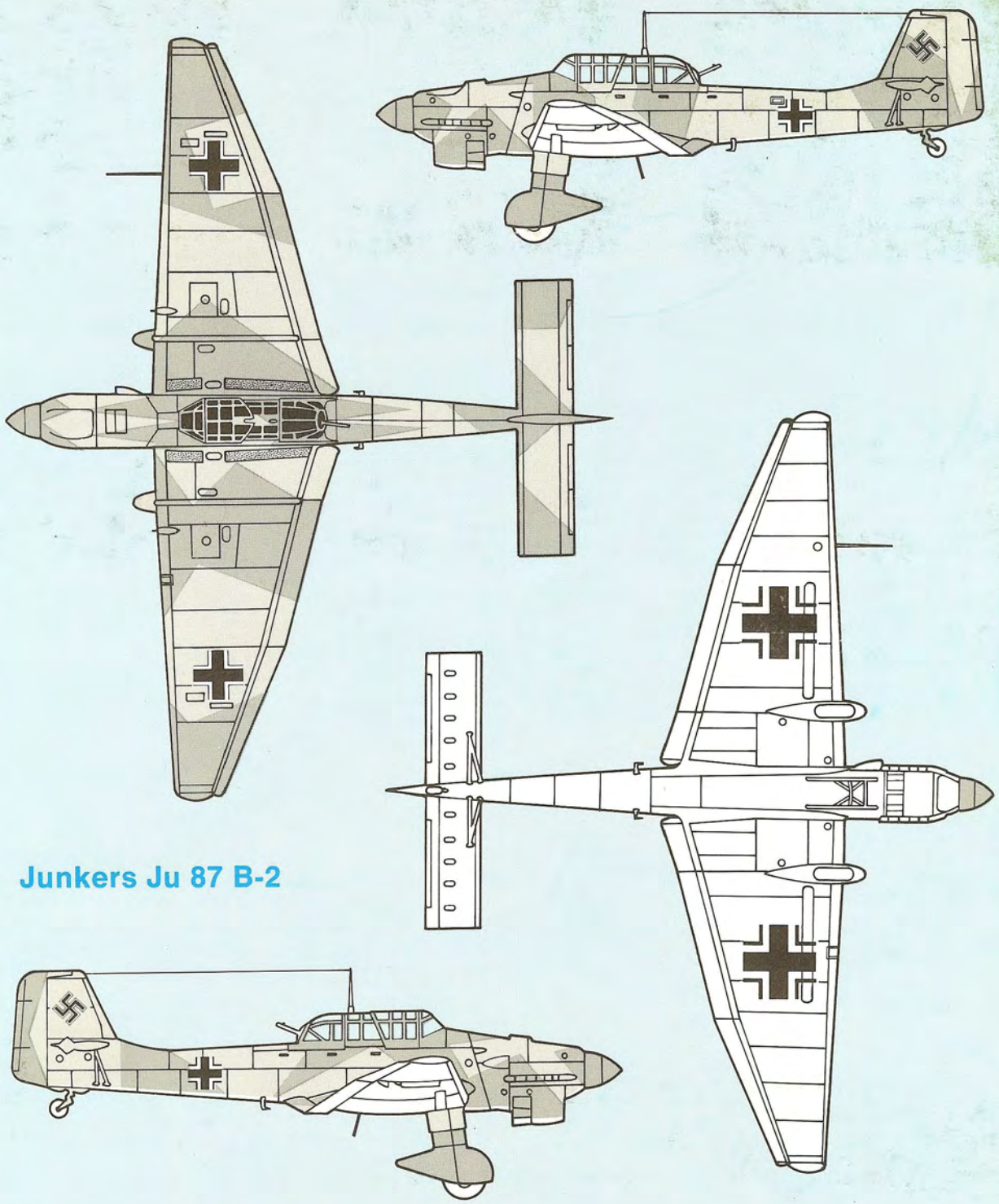
The absence of a unit code ahead of the *Balkenkreuz*, is also unusual. Later, this aircraft was assigned Foreign Equipment number FE-1600. Unfortunately, only fragments of the aircraft survive today.





Above: Camouflaged in the standard 70/71/65 colors, this Junkers Ju 88 A-5, was attached to the Staff of the 1st Gruppe of KG 51 (Stab I./KG 51). Below the cockpit may be seen the blue shield with a white edelweiss.
Below: As in the photograph above, this Junkers Ju 87 B-2, was operational on the Eastern Front as indicated by the yellow tactical fuselage bands. This particular machine was flown by the 7th Staffel of Stuka Group 77 (7./St.G.77), and was coded F1+AR with the letter "A" and prop spinner in white. The standard 70/71/65 camouflage and markings were carried by this Stuka.





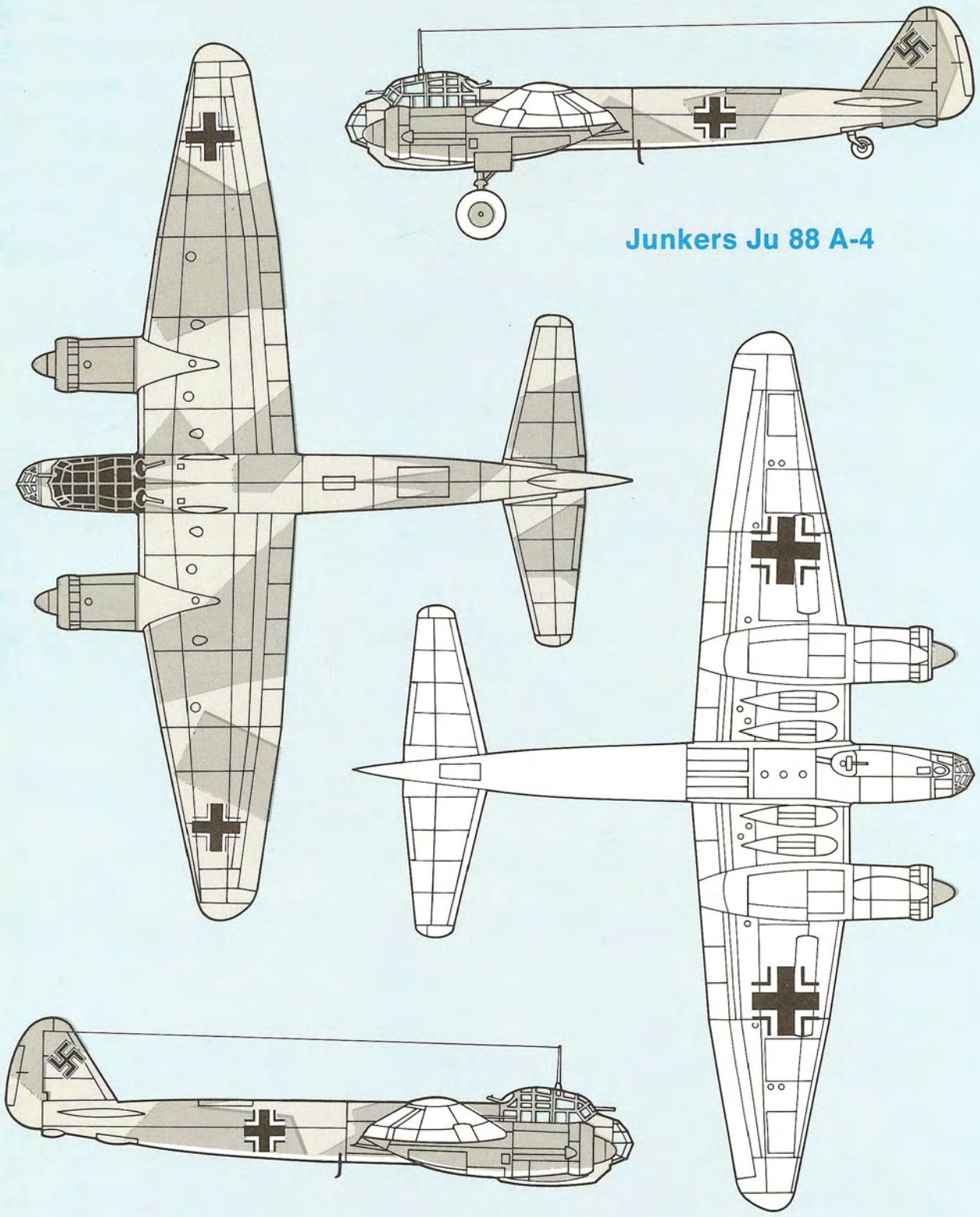
Junkers Ju 87 B-2

Color 70
Black-Green

Color 71
Dark Green

Color 65
Light Blue

This standard camouflage pattern used Colors 70/71/65 for the Ju 87 B-1, B-2, R-1, R-2, R-3 and R-4 series. Spinner and metal prop blades were the usual Color 70. German national markings were remarkably consistent in size, style and placement. Aircraft operated in North Africa were camouflaged in Colors 78/79/80, in accordance with Luftwaffe directives governing the so-called *tropen flugzeug*.



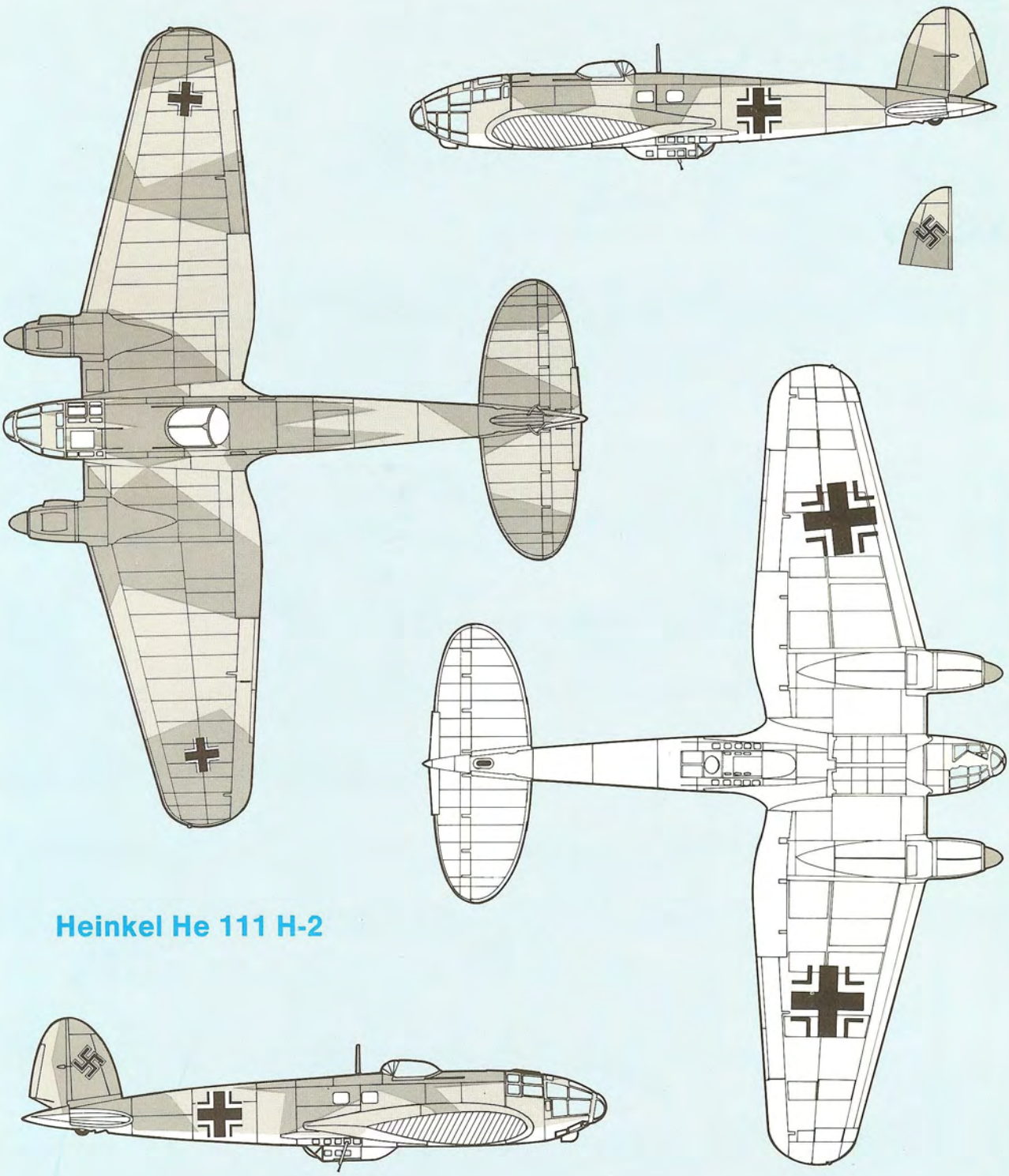
Junkers Ju 88 A-4

This standard camouflage pattern for the Ju 88 A-series (A-1 through A-17) used Colors 70/71/65 with spinners in 70. Early production versions such as the A-1 and A-5 series received metal props which were painted Color 70. However the Ju 88 A-4, and subsequent models, received wooden props painted Color 71. National markings were quite constant in style, position and application.

Color 70
Black-Green

Color 71
Dark Green

Color 65
Light Blue



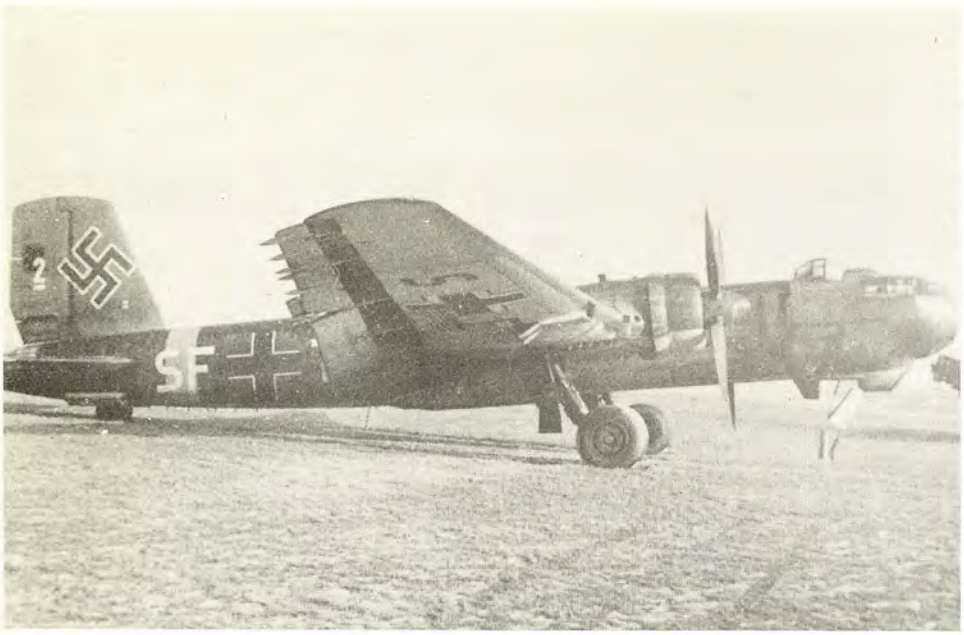
Heinkel He 111 H-2

Color 70
Black-Green

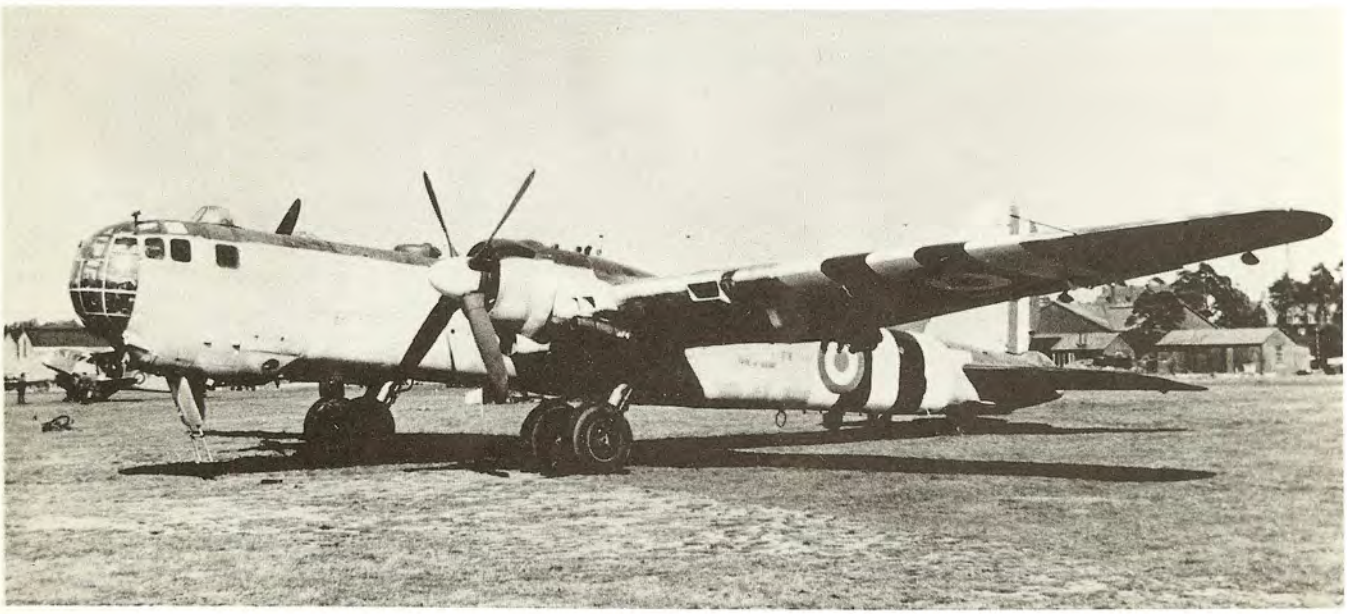
Color 71
Dark Green

Color 65
Light Blue

This standard early to mid-war camouflage for the He 111 H-2 was also applicable to other models of the P and H-series. The port side elevation view shows the *Balkenkreuz* in the regulation position. However, the starboard side elevation shows the most common application midway between the tailplane leading edge and the wing fillet. Series production models after the H-2 mark standardized the half way position. Similarily, the bottom view shows the regulation position (port) and the common position (starboard) which later became standard. Dimensions were: Wing Top: 1000 mm, Wing Bottom: 2000 mm, Fuselage: 1800 mm (later 1400 mm), Swastika: 710 mm (later 650 mm). Spinners and metal props were 70 while wooden prop models were 71.

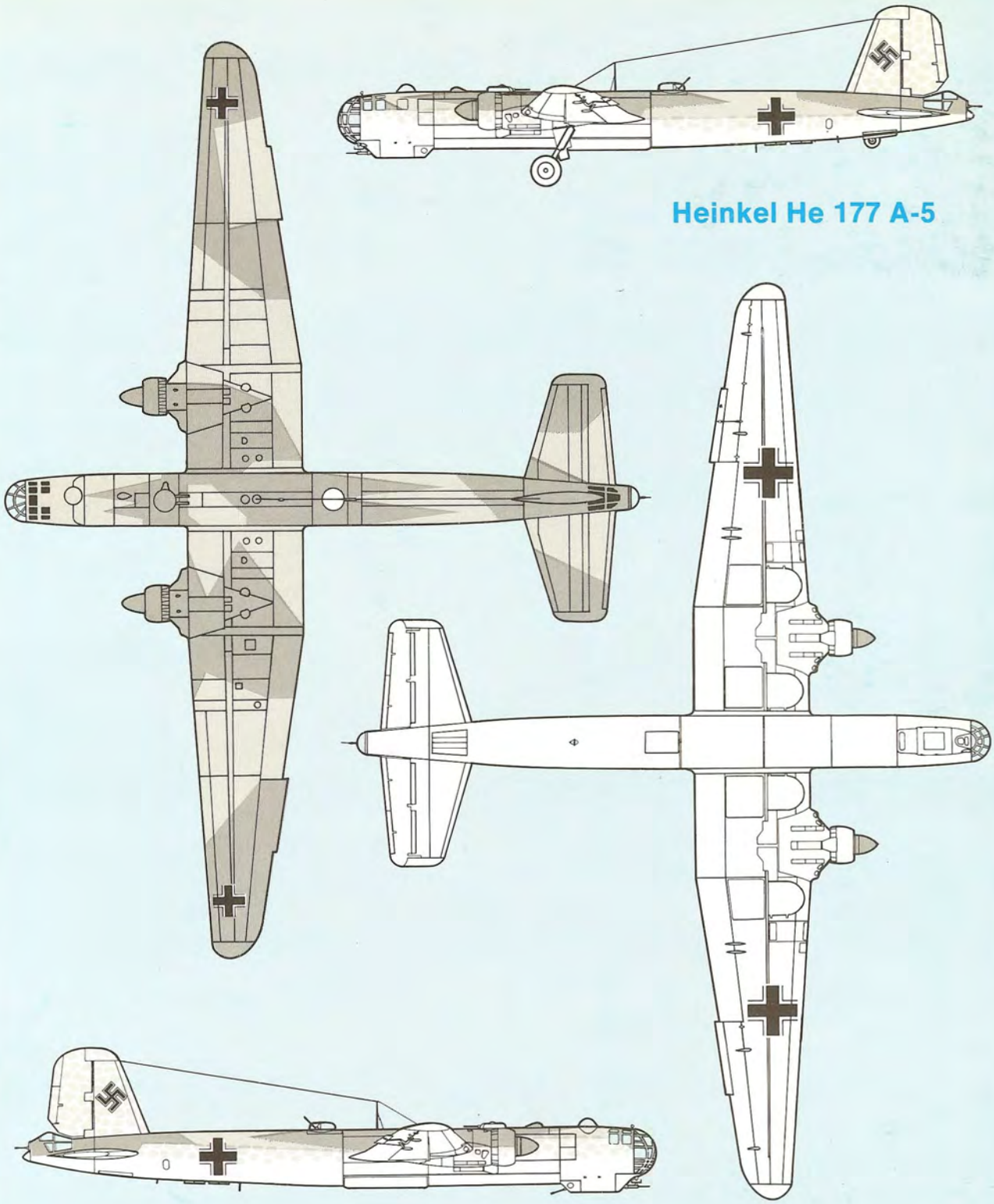


Left: The Heinkel He 177 V8, W.Nr. 00 008, SF+TC, is shown here at Rechlin late in 1941, camouflaged 70/71 uppersurfaces with fuselage sides and vertical tailplane in 02. Undersurfaces were the usual 65. The very large *Halkenkreuz* and narrow width fuselage *Balkenkreuz* were not uncommon to early production models. This was the last machine completed from the outset as a prototype. It was intended primarily for engine tests. Middle: This captured He 177 A-5/R6 was once operated by KG 40 and is shown here in French insignia which, in turn, was overpainted with British roundels and fin flash. Camouflage was standard 70/71 over uppersurfaces with 70 propeller blades and white spinners. The entire vertical tailplane, fuselage below the top decking, and undersides of the wings and horizontal tailplane were RLM Gray 02 with irregular spots of Light Blue 65. The unit code, F8, may be seen just ahead of the fuselage roundel. The remaining two unit code letters are unknown.





Left: Another He 177 A-5/R6, but in quite different camouflage. This example, 6N+JM, of 4./KG 100 was camouflaged in a novel pattern of RLM Gray 02 over all surfaces of the aircraft, combined with Dark Green 71 applied in a random flowing pattern over all uppersurfaces. Other aircraft within this unit were similarly camouflaged; however, some had Light Blue 76 lower surfaces extending only up to the beginning of the fuselage side curvature. In this photograph, the crew members obscure the aircraft serial number which began with a small "0" followed by two larger numbers, the first digit of which was "3". Despite the type's questionable reputation, it was still quite popular with its crews who were enthusiastic about its flight qualities.



Heinkel He 177 A-5

Color 70
Black-Green

Color 71
Dark Green

Color 65
Light Blue

Color 02
RLM Gray

This depicts standard day camouflage pattern for the He 177 A-5. Fuselage sides were mottled with Colors 02 and 70 over a base of 65. Numerous variations existed. Spinners and metal propellers were Color 70. Serial numbers were frequently represented by the last three digits applied beneath the nose. The first digit was half the size of the remaining two. Dimensions of national insignia were: Wing Top: 1000 mm (later 900 mm); Wing Bottom: 1900 mm; Fuselage: 1600 mm (later 1500 mm); Swastika: 1000 mm (later 810 mm). Unlike the more common narrow type shown above, under wing and fuselage crosses could have had wide white elements with black trim arms.



Left: Captured at Kassel, this Junkers Ju 188 A-2 had its 70/71 uppersurfaces densely mottled with a close spray of 76 Light Blue. Undersurfaces were the usual Light Blue 65 while spinners were black with a white spiral. The Junkers VS 11 wooden prop blades were Dark Green 71. Although the unit code is obscured, the individual aircraft letter, R, was red with a white outline followed by a black letter M. This is an instance where the *Gruppe* color (red) was combined with the *Staffel* color (white).

Below: The camouflage of this Ju 188 E-1, W.Nr. 10 001, was standard 70/71/65 throughout. All insignia, apart from the underwing crosses, were of the white outline variety. The spinners and metal VDM prop blades were Black-Green 70. The factory registration code is difficult to distinguish, but appears to be GB+GE.





Left: This war-weary Ju 188 A-2, W.Nr. 160 078, has received several replacement parts during its service career, but the basic 70/71/65 scheme seems to dominate. The rudder may well have been covered with a marking color, such as yellow; but most likely it is merely a replacement item painted RLM Gray 02. Note the duplication of the serial number on the fuselage in addition to the model number immediately above the center of the fuselage simplified black outline cross.



Junkers Ju 188 E-1
Rächer/Avenger

Color 70
Black-Green

Color 71
Dark Green

Color 65
Light Blue

This depicts the August 5, 1942, standard camouflage pattern B for the Ju 188 A, D, E and F-series. Spinners and propellers were Color 70. Some variations existed particularly in the area of the lower cockpit demarcation line between upper and lower colors. Style, placement and size of national insignia did not vary greatly. In October 1944 it was specified that the Ju 188 D-2 series was to continue using 70/71 camouflage colors until stocks were exhausted, or until the type ceased production in January 1945.





Above: The advanced Junkers Ju 288 V103, DE+ZZ, prototype for the Ju 288 C-1, was completed in the Spring of 1943 in colors 70/71/65.

Left: The remarkable Arado Ar 234 B-2, T9+HH, of 1./ObdL being readied for another mission in colors 81 and 82, with 76 on all lower surfaces. Note the red and white striped retractable foot step.

Below: This Me 262 A-2a, 9K+YH, of 1./KG 51, carries the Squadron color (white) on top of the tail, the nose cone and the individual letter "Y", with all three being outlined by a narrow black line. Camouflage consisted of Light Blue 76 undersurfaces, merging with the two uppersurface colors Brown-Violet 81 and Light Green 82. The mottle applied to the fuselage sides and vertical tail were an equal blend of 81 and 82. In 1945 this version was discontinued in favor of the Me 262 A-1a fitted with bomb pylons as *Rüstsätz* equipment.





The high performance Junkers Ju 388 K-1/V6, W.Nr. 500 006, PE+IF, prototype for the Ju 388 K-1 series, was completed during the summer of 1944. Captured intact by British Forces, it was shipped to England for evaluation. Camouflage in all probability was 70/71/65. Ultimately, however, the new colors, 81/82/76, would have been employed. German national markings, except for the underwing crosses, were the usual simplified white outline variety. The white number six applied to the rudder denotes prototype number 6.





MARITIME AIRCRAFT

Initially an overall silver finish was used for seaborn aircraft, but this was changed in 1935 to 63 overall coloring on multiseat floatplanes such as the He 59 and He 60. Floats were finished in Silver 01 with 00 clear protective finish. Alternatively, floats were sometimes painted in 02 coloring with a 00 clear finish. This scheme appears to have been in the minority.

The He 51 single-seat floatplane used the 63 overall coloring applicable to its landplane counterpart, the floats being finished in 01 with a 00 clear finish.

Do 18 seaplanes used an overall finish of 63 for all surfaces above the water line, the lower hull and sponson surfaces being finished in 01 with 00 clear protective finish. A 3 mm water dividing line was applied in Wine-Red 28. This marking color was also used for the propeller safety line found on the upper surface of each float of types, such as the He 59 and He 60 floatplanes. (LC/1 48, 50.)

In late 1939 all front line seaborne aircraft converted to camouflage of Green 72 and Green 73 on all upper and side surfaces with Light Blue 65 coloring for the lower surfaces. This scheme remained in force, virtually unchanged, throughout the remainder of the war. (LC/1 70.)

The haste to comply with the October 1939 order calling for the revision of wing *Balkenkreuz* markings, produced the same spate of incorrect applications. Just as occurred on some bomber aircraft, some Do 18s initially reappeared wearing literally enormous — approximately 14 feet across — *Balkenkreuz* markings on the wing upper, and some times lower, surface at about the mid-wing position. Often the original markings near each wing tip were retained. Such aberrations were, however, relatively short lived.

In the arctic regions ice flows were present for many months of each year and seaplanes operating in those regions, principally He 115s and Bv 138s, had their camouflage modified. Large white areas, 7126.21, were created, using soft brooms or brushes.

During 1943 the process was reversed, a continuous snaking line of 65 being sprayed over all upper surfaces, thus blending the two markedly contrasting areas of camouflage. The same year, revised color schemes using 74, 75 and 76 of widely differing patterns were introduced for the Do 217 and He 177 units operating over the Bay of Biscay.

With the introduction of the Do 217K series onto antishipping duties, the gray camouflage scheme was abandoned. For night operations most units had originally used temporary black distemper. But, as the war progressed and the Allies gained aerial supremacy, antishipping operations became more dependent upon the cover of night for success and survival. Permanent night camouflage of single coat 7124.22 replaced the old glyptal resin based material, this having the advantage of being easily converted back to a daylight scheme if orders should so demand. Principally, it saved an almost permanent cycle of stripping and refurbishing, plus the advantage of less drag. (GAM 166.)

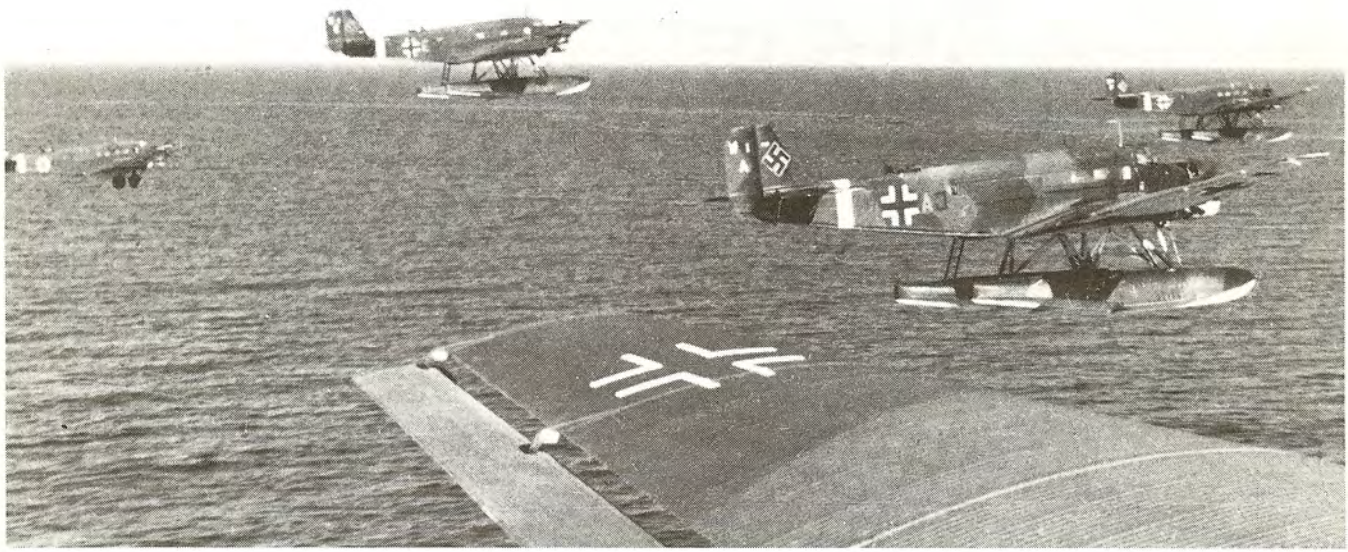
Late production Do 217K-2s were delivered from their point of manufacture in a 72/73/22 camouflage scheme. The last of these were received by the *Luftwaffe* in May 1944 after which time the type was rapidly phased out of service in the antishipping role. Several hybrid schemes were used by specific units but one special color requires mention. An unidentified blue-green was seen in use by a Bv222 as an overall finish. (GAM 123.) This same color has been positively identified in use by Fw 190s of JG 5 based in Norway for coastal patrol work. No official documentation has been found to give this color an RLM paint identification number but its use has been established beyond doubt.

Top: One of the more unusual floatplanes was the large Blohm & Voss Ha 139 B/MS, W.Nr. 217, P5+GH, employed by *Sonderstaffel Transozean* as a mine sweeper in colors 72/73/65.

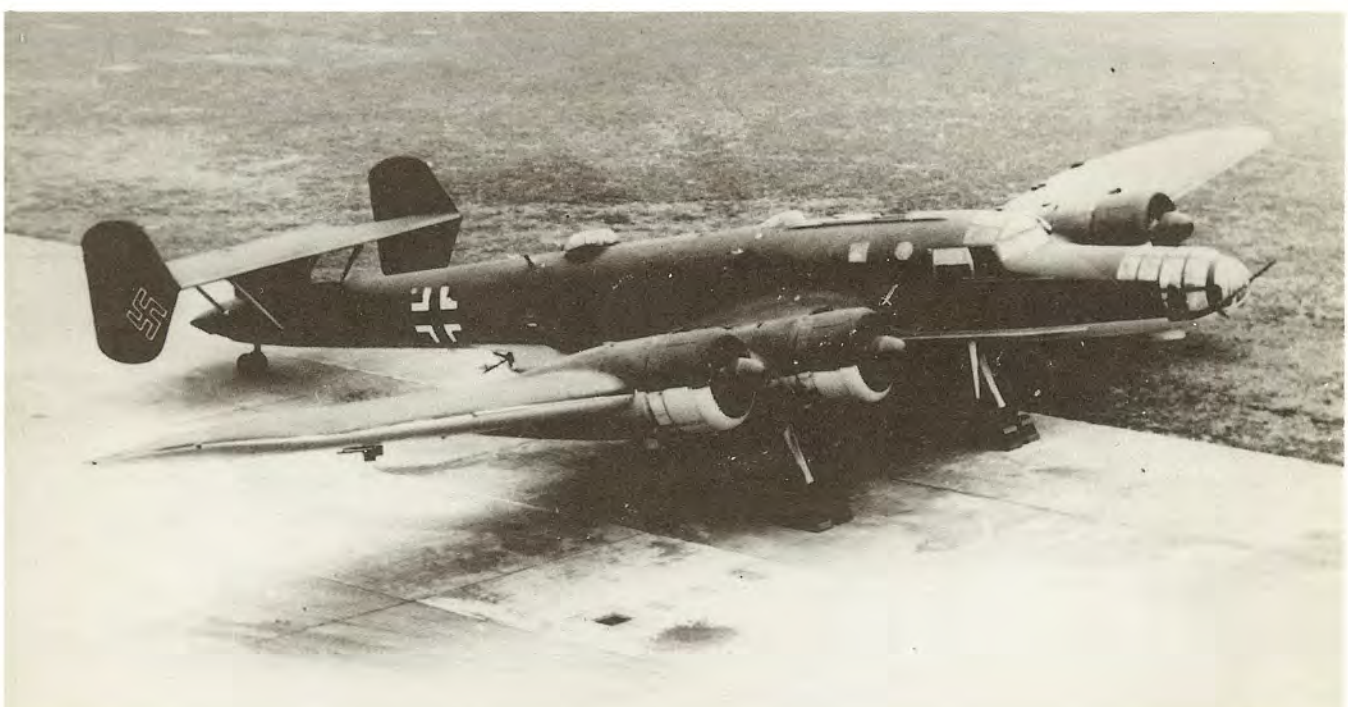
72 Green
72 Grün

73 Green
73 Grün

65 Light Blue
65 Hellblau



Above: It is not possible to say with certainty that the Ju 52/3m (See) was camouflaged in the maritime colors, since the floatplane was a modification of the standard land transport. Undoubtedly, the large twin floats were painted in colors 72/73/65. These aircraft of L.Tr.St. (See) 1, are shown early in 1944 with tactical rudder markings. Fuselage code was 8A+AJ with the letter A in yellow. Below: The Blohm & Voss BV 142 V2/U1, T5+CB (originally PC+BC), was one of two conversions completed for the maritime reconnaissance role in colors 72/73/65, and operated by Stab I./Aufkl. Gr. ObdL.

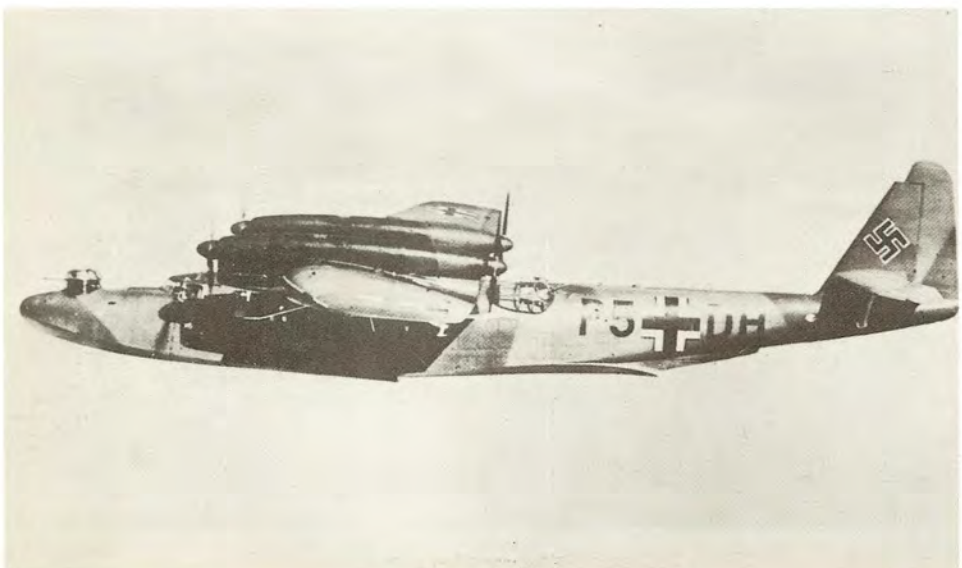




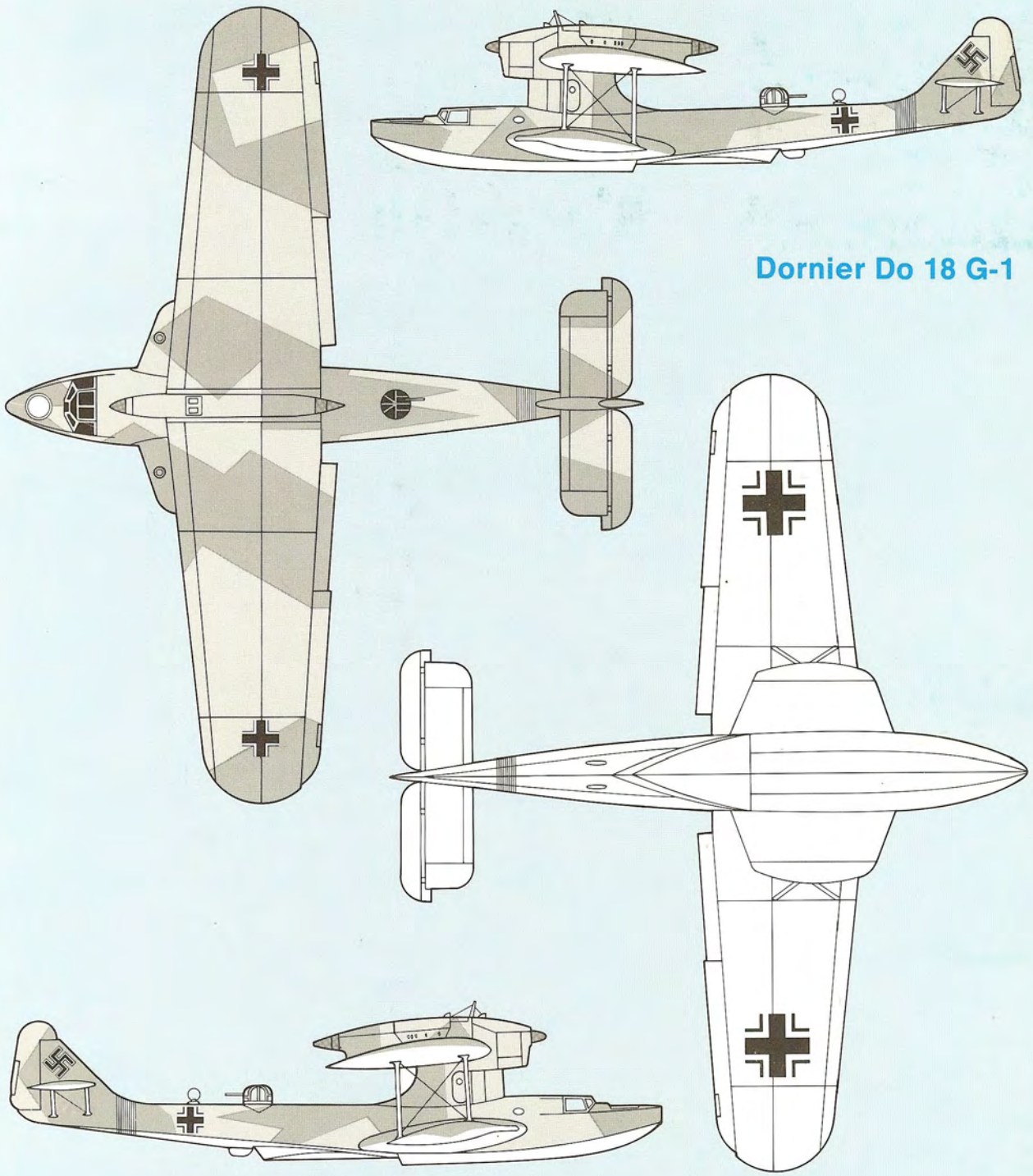
Left: This air-sea rescue Dornier Do 18 G-1, RZ+AT, was camouflaged 72/73/65. Note the red, yellow and blue prop tips and bow emblem. Spinners and most of the prop blades were the usual Black-Green 70.

Below: A standard Dornier Do 24 T-2, VH+SM, in the prescribed colors of 72/73/65 with a yellow tail band and wing tips. Note the simplified white fuselage cross and fin swastika.





Left: Like the BV 142 V2/U1 shown on page 95, the Dornier Do 26 V6, P5+DH, was operated by the First Squadron of the Reconnaissance Group of the Air Force High Command (I./Aufkl.Gr. ObdL) in colors 72/73/65. The sixth prototype, shown here, was at the same time one of the D-series preproduction machines, i.e., a Do 26 D-O.



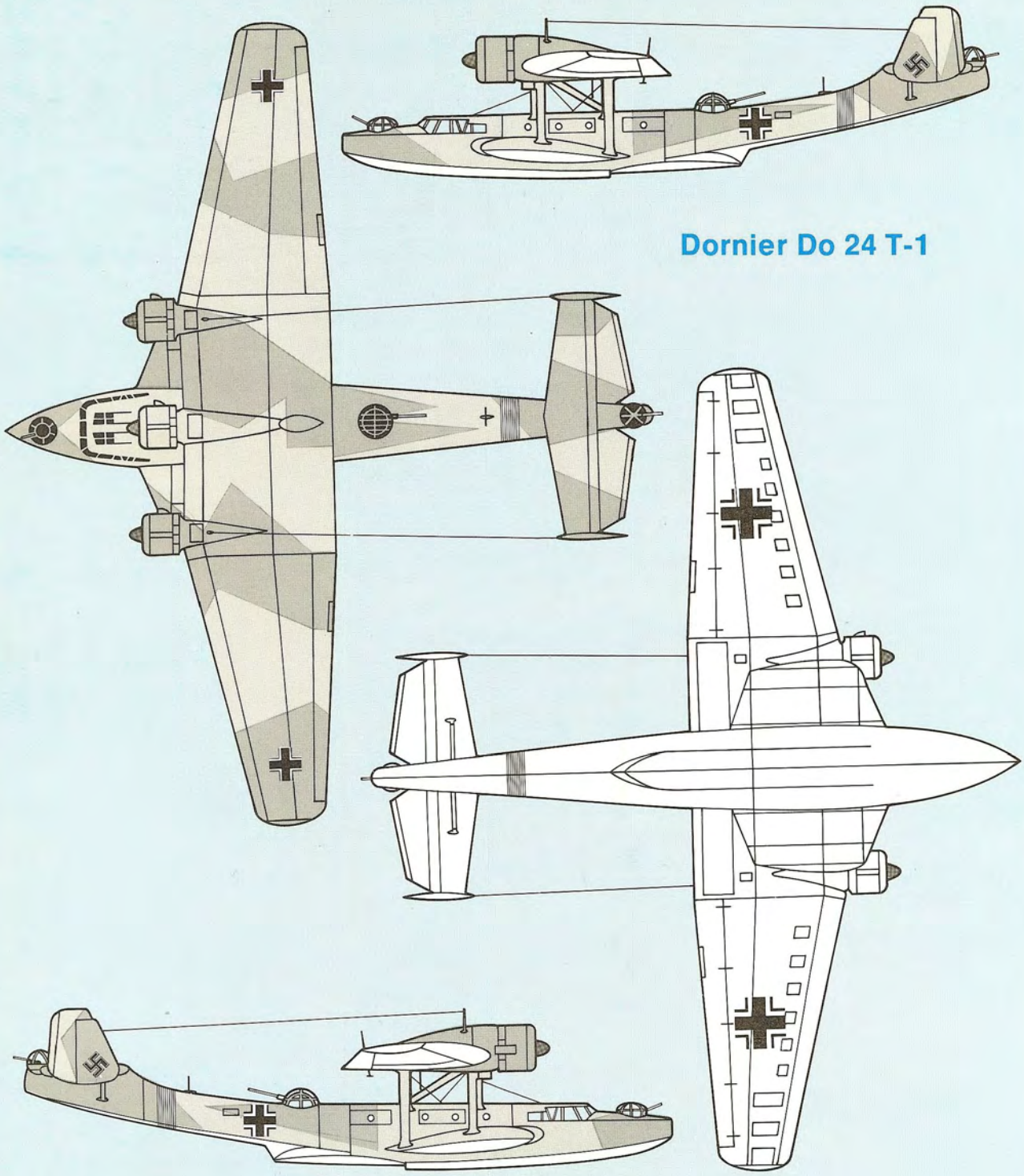
Dornier Do 18 G-1

Color 72
Green

Color 73
Green

Color 65
Light Blue

This depicts the standard camouflage pattern for the Do 18 D, G and H-series. Little deviation existed and most machines carried standard national markings. The yellow tail band frequently was omitted, but many examples did carry colorful unit emblems on their bows or forward engine cowlings. Spinners and propellers were the usual Color 70.



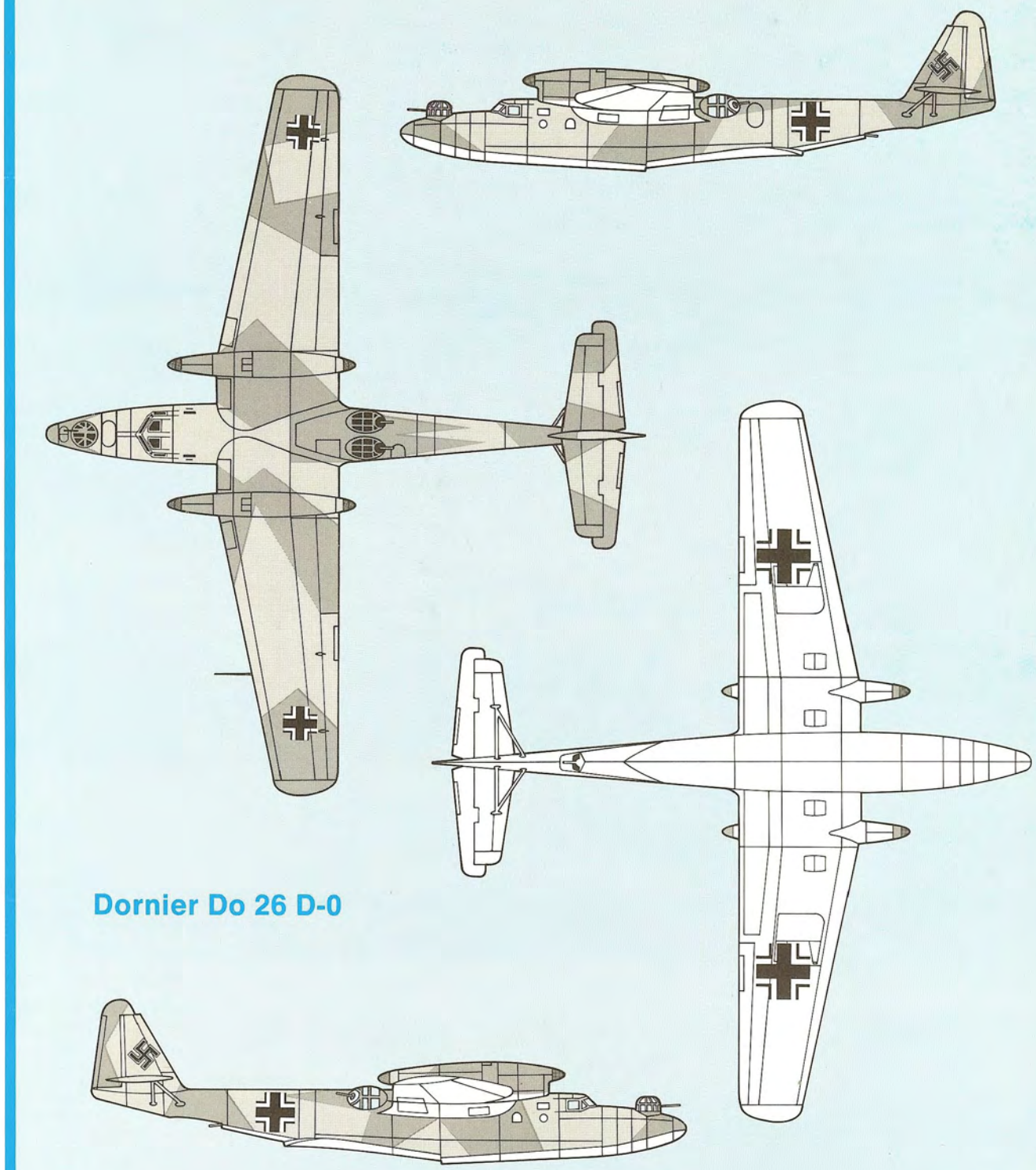
Dornier Do 24 T-1

This drawing depicts the standard camouflage pattern for the Do 24 T-1, T-2 and T-3 series employing the basic maritime colors. Spinners and propellers were Color 70, while unit emblems frequently were applied to both sides of the bow.

Color 72
Green

Color 73
Green

Color 65
Light Blue



Dornier Do 26 D-0

Color 72
Green

Color 73
Green

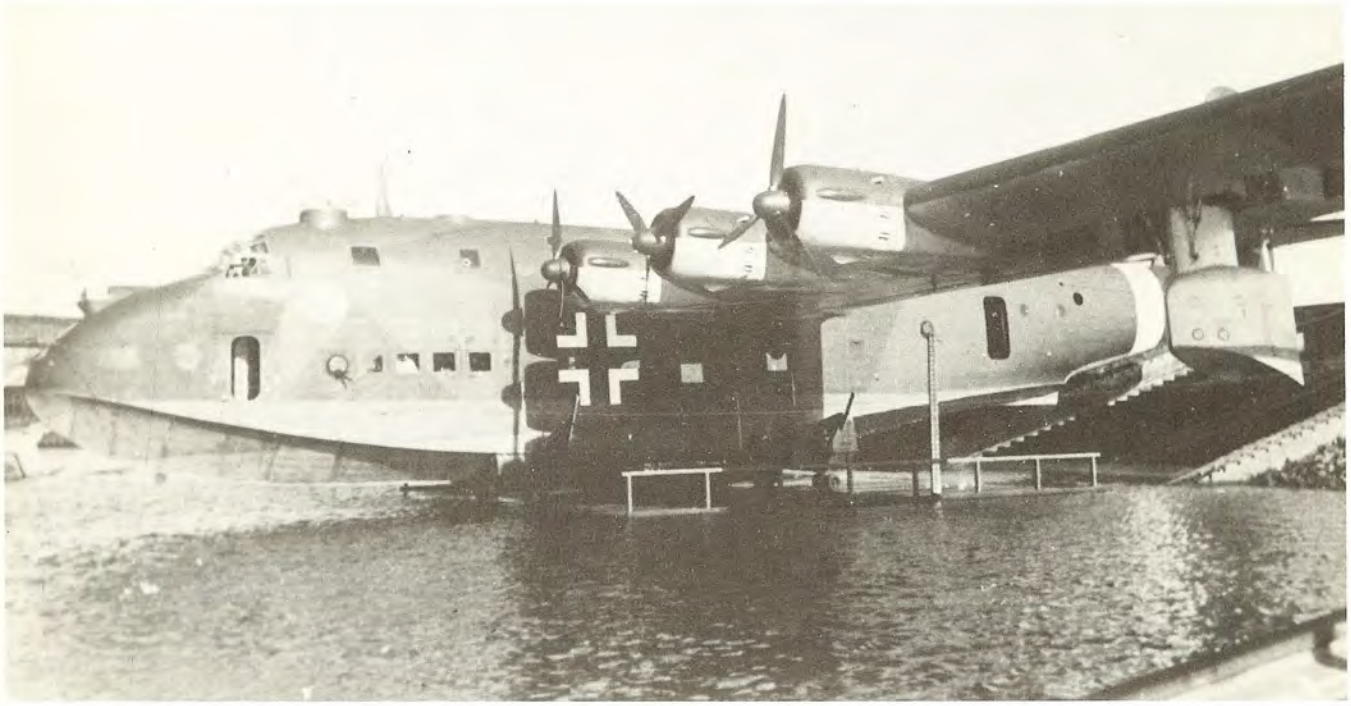
Color 65
Light Blue

This was the factory camouflage pattern assigned to the six Do 26 D-0 machines employed by the Luftwaffe. Originally designed as civil transatlantic mail planes, they were modified for military duties with standard maritime colors. All four spinners and props were Color 70.



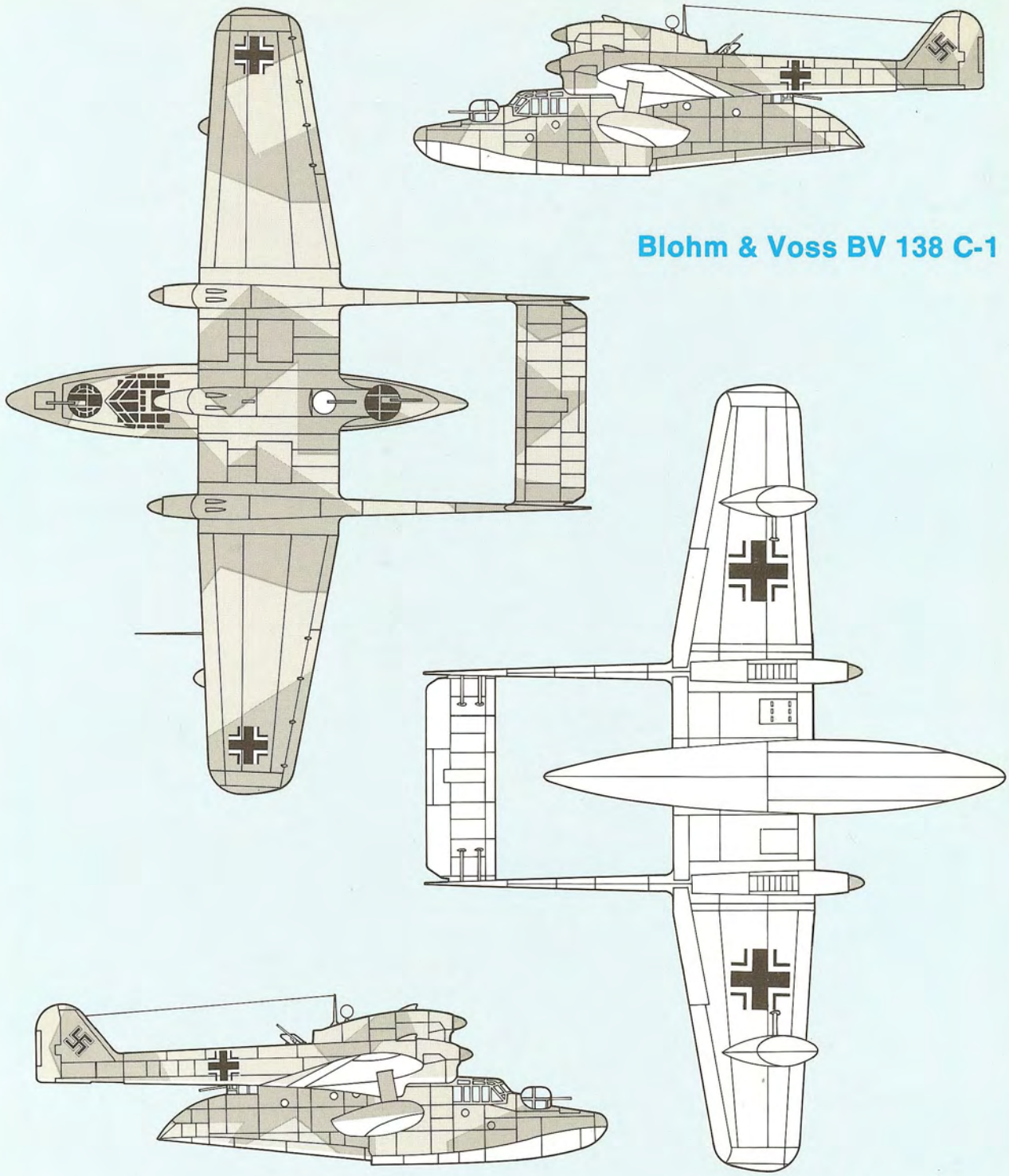
Left: This Blohm & Voss BV 138 C-1, K6+BK, of 2./Ku. Fl.Gr. 406, rests at its mooring with others operating from Norwegian waters. Camouflage was 72/73/65 with all spinners and prop blades of the center engine being 70. Props of the other two engines were 71. The individual aircraft letter, B, was red.

Below: Delivered to the Luftwaffe's *LTS See 222* on October 26, 1942, the BV 222 V8, W.Nr. 0008, X4+HH, was the last A-series machine completed. It is camouflaged in colors 72/73/65, with a white tail band and diagonal rudder stripe. Atop the rudder, one above the other, was the code S8 in white. On December 10, 1942, while on an unescorted flight with the first and fourth prototypes, this machine was shot down by RAF Beaufighters.





Left: With a wing span of 197 ft. 4¼ in., the BV 238 V1, RO+EZ, was a very large flying boat completed in early 1944 for maritime transport and patrol duties. Camouflage colors were standard 72/73/65, with the simplified white outline insignia at all positions except for the outboard underwing crosses. Prior to the completion of flight trials, it was sunk at its mooring on Lake Schaal by American P-51s.



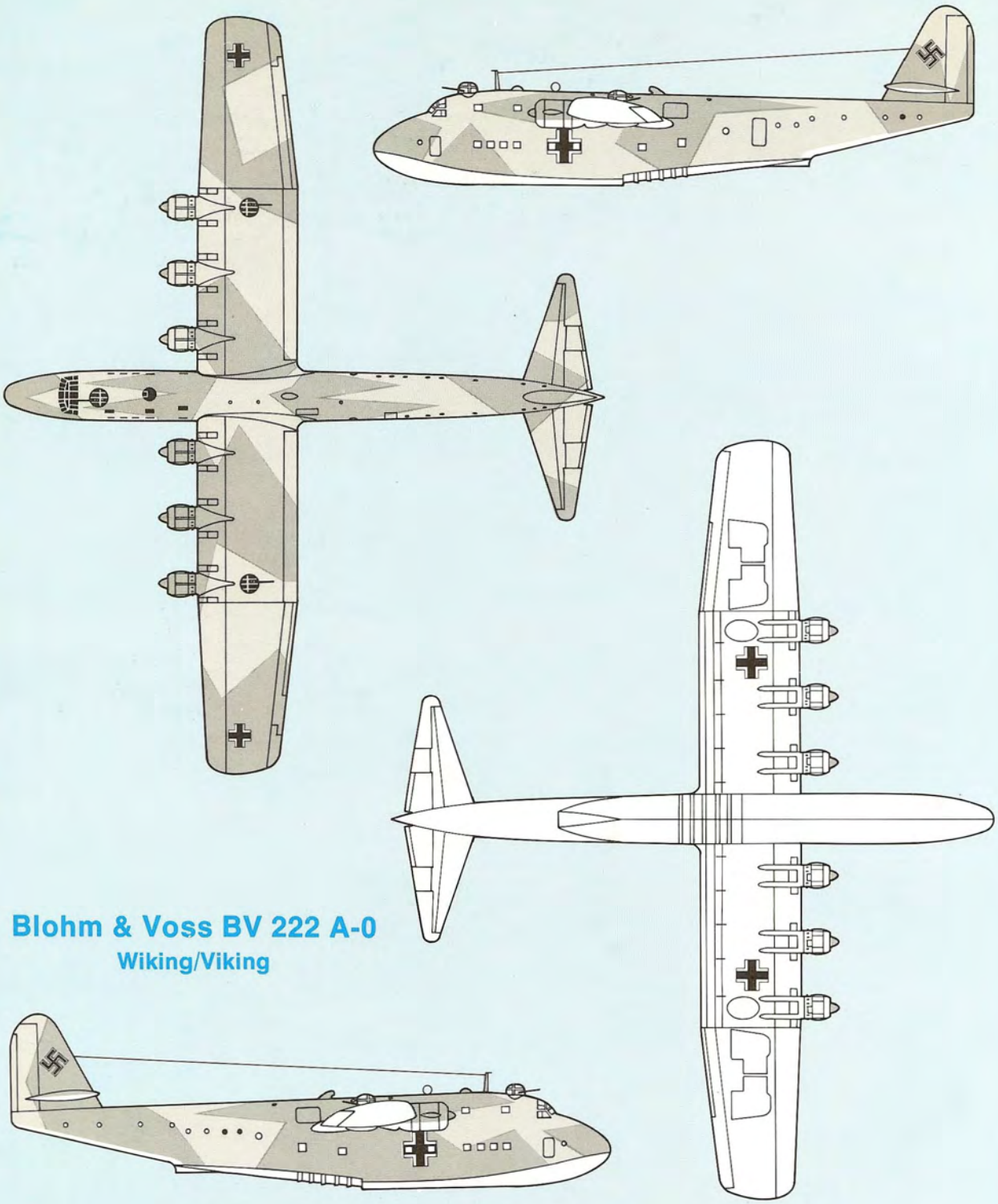
Blohm & Voss BV 138 C-1

Color 72
Green

Color 73
Green

Color 65
Light Blue

This was the standard maritime camouflage pattern established for the BV 138 B and C-series. With the B-series all three spinners and props were Color 70. However, with the introduction of the C-series, the center engines propellers were wooden and therefore painted in Color 71. Some aircraft carried the hull undersurface color up to the waterline, while others used the pattern shown above. Yellow tail bands also were frequently applied to both tail booms.



Blohm & Voss BV 222 A-0
Wiking/Viking

This was the maritime camouflage pattern evolved for the BV 222C which was also applicable to the A-series. All six spinners and propellers were Color 70. The large BV 238 V1, illustrated on page 100, was camouflaged in a similar pattern but adequately compensated for its increased size.

Color 72
Green

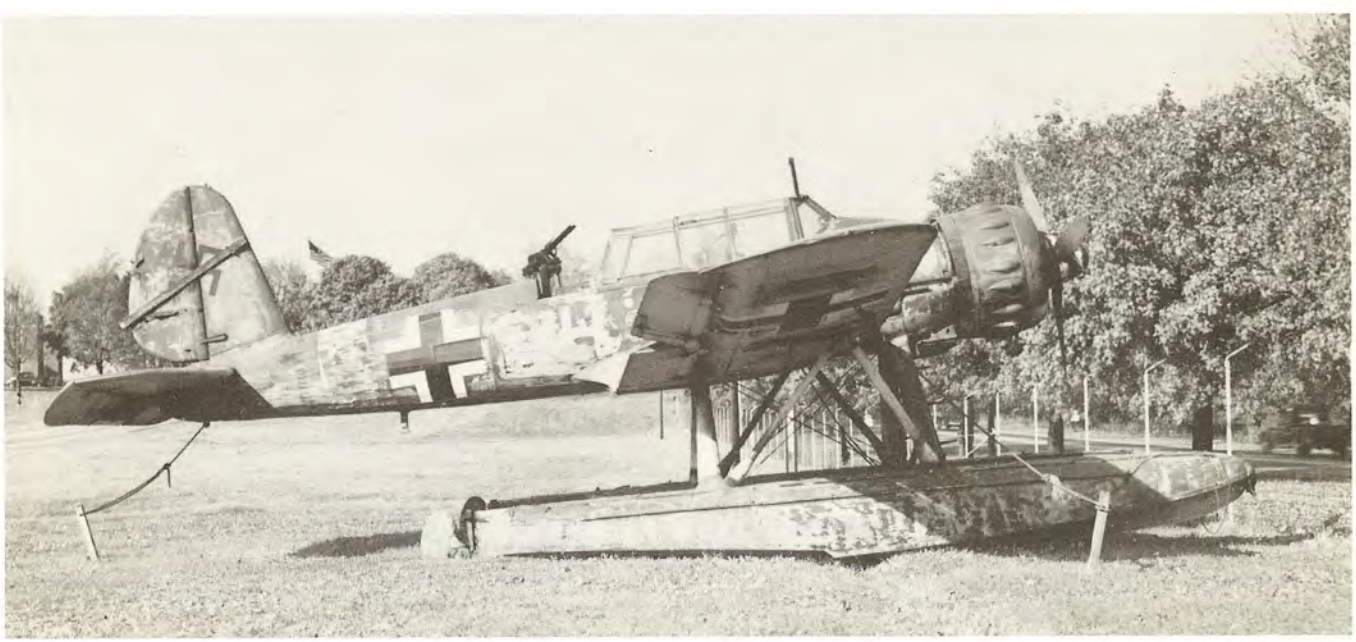
Color 73
Green

Color 65
Light Blue

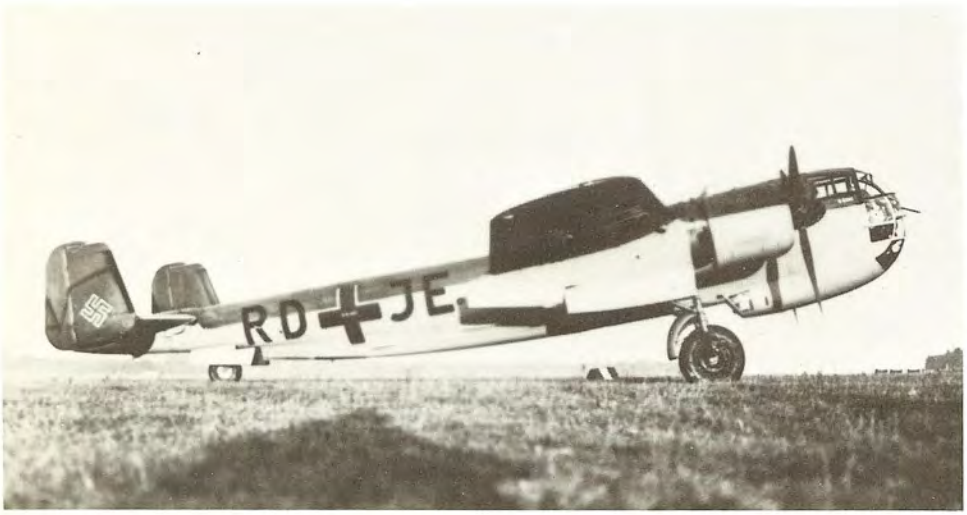


Above: Three newly completed Heinkel He 114 A-2s in standard 72/73/65 camouflage. Their service life with the Luftwaffe was quite short since performance and handling qualities left much to be desired. Right: Close-up of a He 115 B-2, PP+AX, involved in crew training exercises shows this machine to be painted in the camouflage colors of maritime aircraft except for the spinners and props which were Black-Green 70. Below: The highly successful Arado Ar 196 A-5, which appeared early in 1943, is shown here near the main gate of the Willow Grove NAS, Pennsylvania with traces of its original camouflage of 72/73/65 and black fuselage code, TW+SH, still visible. In addition to the white tail band, the sea horse emblem of Bordfl. Staffel 1./196, may be seen immediately aft of the cowl flaps.







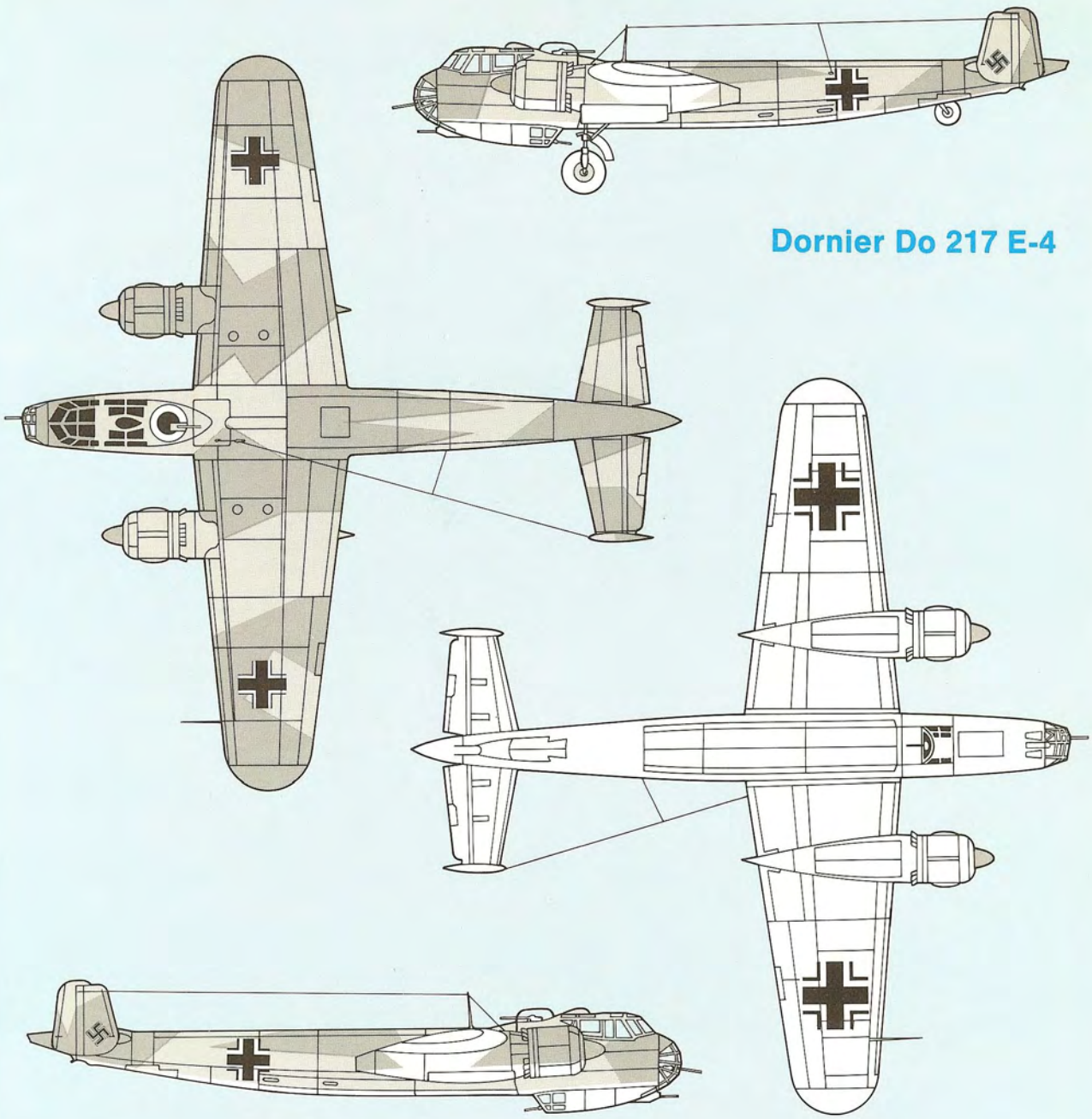




Above: Produced in 1941, this Dornier Do 217 E-3/R2, W.Nr. 44, TC+−R, has just returned from a trial flight camouflaged in the maritime colors of 72/73/65. This model was fitted with underwing racks for two SC 250 bombs.

Middle left: This Do 217 K-1, W.Nr. 4406, RD+JE, is somewhat unusual since most production models of the K-series were delivered with black undersurfaces which completely eliminated the Light Blue 65. The top surfaces were still camouflaged in a 72/73 splinter pattern associated with the E-series. In addition to Heinkel, the Dornier firm also employed the narrow width fuselage cross on a number of its Do 217 Es and Ks.

Lower left: Camouflage of this Dornier Do 217 M-1, W.Nr. 6158, was composed of Green 72 and Green 73 uppersurfaces with Black 22 lower and side surfaces. Light Blue 76 was applied in a serpentine line network over all top and side surfaces excluding the engine nacelles. Spinners and propellers were the usual Black Green 70. All markings were of the simplified white outline variety.



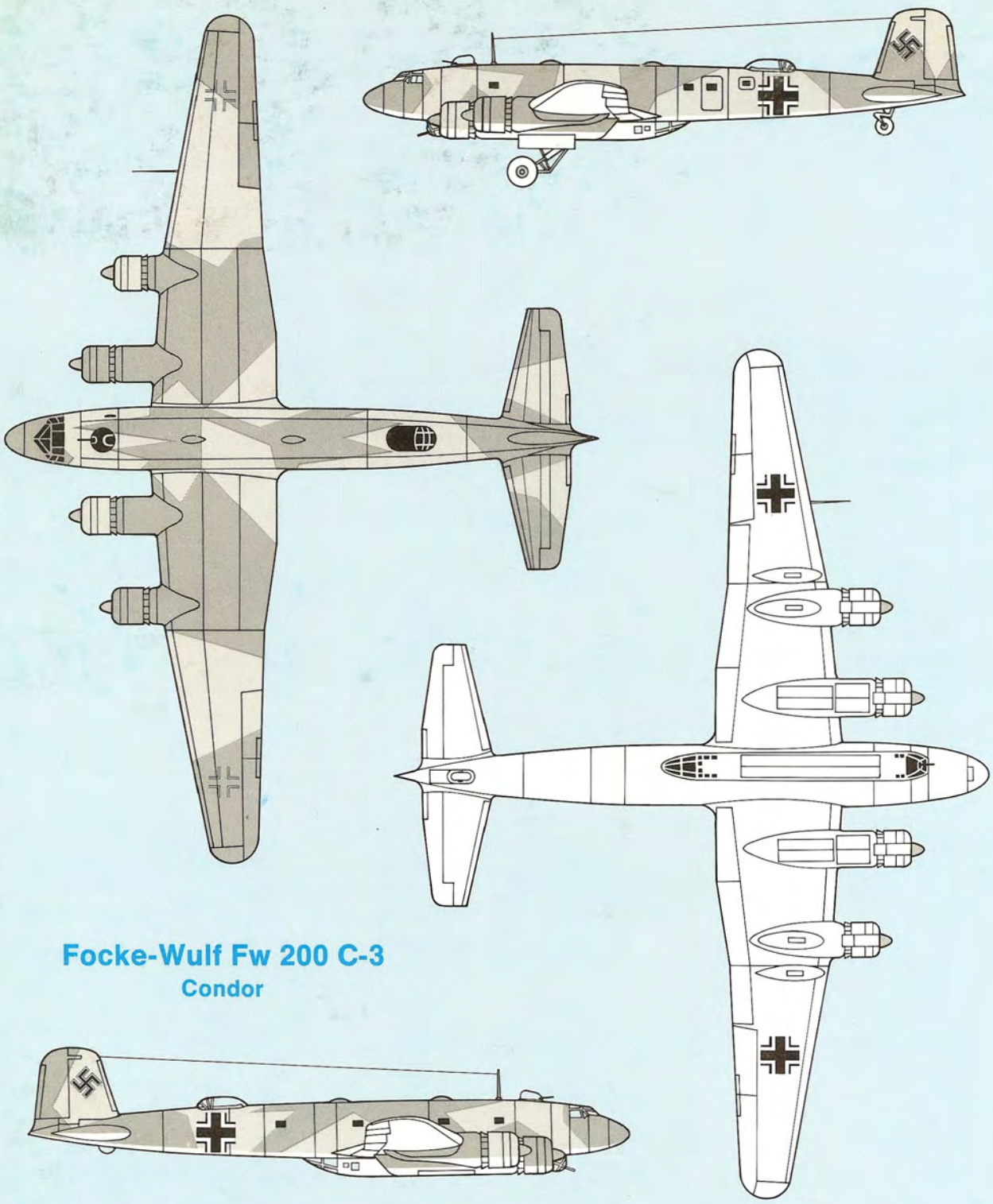
Dornier Do 217 E-4

Color 72
Green

Color 73
Green

Color 65
Light Blue

This standard factory camouflage was evolved for the Do 217 E-1 to E-3. It was also applicable to the E-4 and E-5 series. This pattern's colors were interchangeable. Additionally, a mirror image of each was possible making up to 4 variations. Spinners and props were the standard Color 70. The Do 217 K and M-series also used this camouflage pattern, incorporating a much higher undersurface color demarcation line. Fuselage *Balkenkreuz* markings varied in style with the E-4 model to include both wide and narrow width styles. National insignia dimensions were: Wing Top: 1000 mm; Wing Bottom: 1750 mm; Fuselage: 1250 mm; Swastika: 420 mm.



Focke-Wulf Fw 200 C-3
Condor

This was standard factory camouflage pattern for the Fw 200 C-series except those select few which were modified for VIP transport duties, those being painted in colors 70/71/65 using the same camouflage pattern. Spinners and props of all models were the usual Color 70. Size and placement of national insignia remained constant, however, fuselage crosses were subject to field modification to reduce the white areas to minimums.

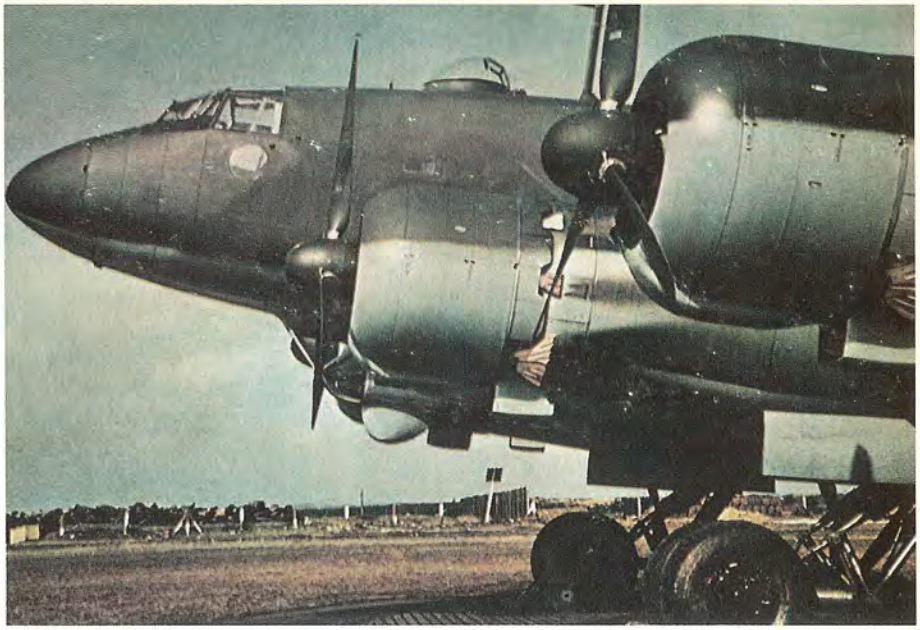
Color 72
Green

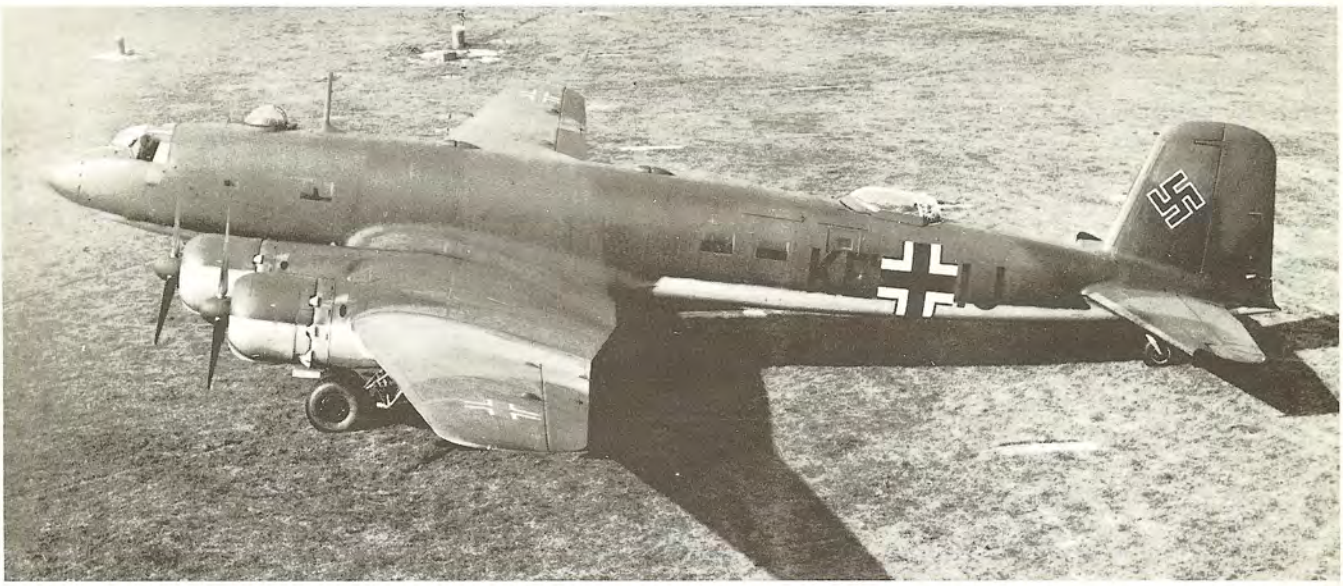
Color 73
Green

Color 65
Light Blue

Right: Close-up of the nose of a Focke-Wulf Fw 200 C-3/U2, clearly shows the two maritime colors Green 72 and Green 73 used in conjunction with Light Blue 65. Props and spinners were the usual Black-Green 70. The Condor's camouflage did not vary appreciably during its long service career. However, after the type was withdrawn from maritime operations, land-based camouflage colors were usually substituted.

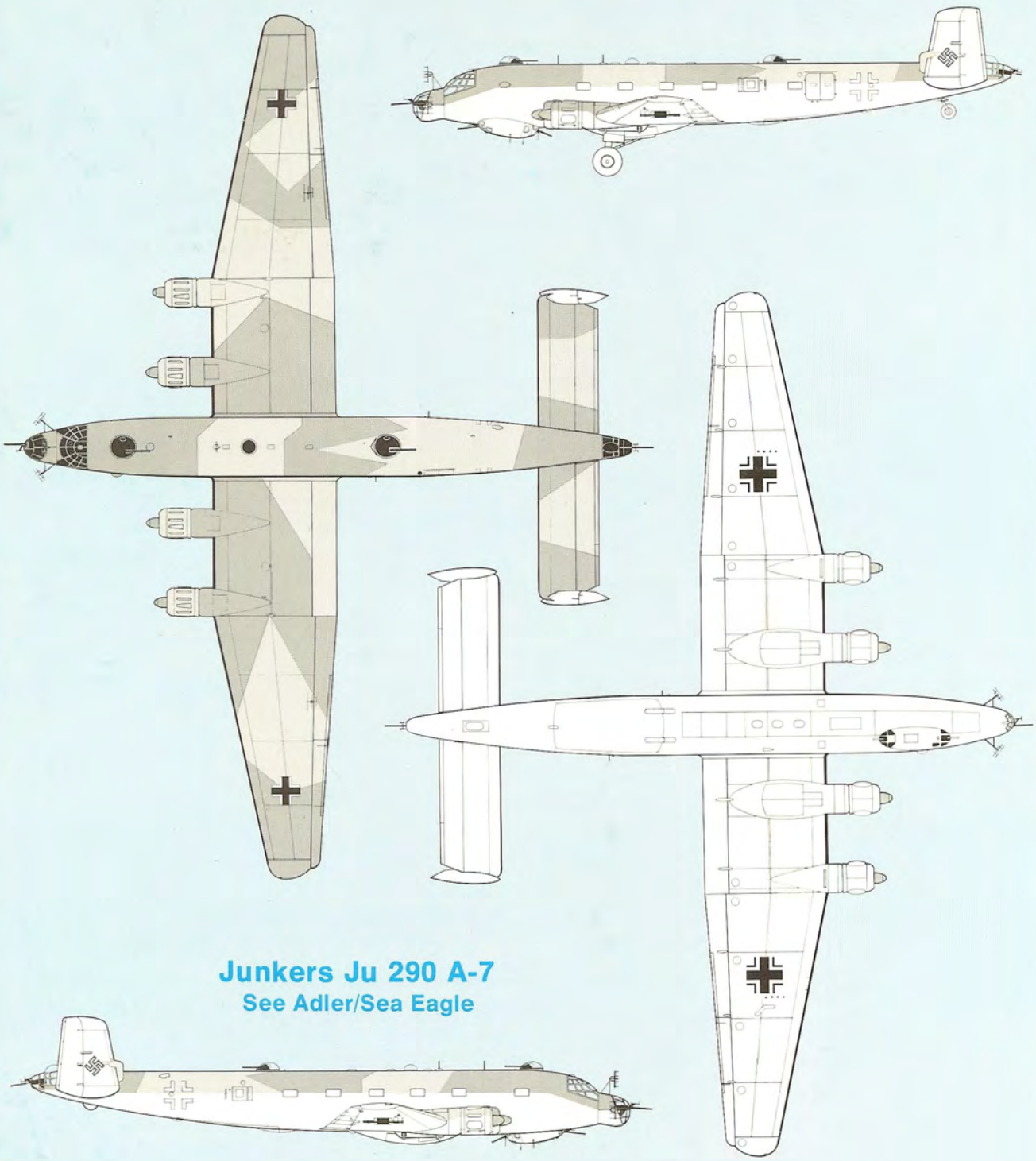
Below: This factory fresh Condor, a Fw 200 C-3, KE+IJ, awaits delivery to an operational unit.





Right: Crew members prepare to board this Fw 200 C-3/U2, F8+AH, of 1./KG 40 for another mission. Camouflage colors were 72/73/65 in the standard positions. It is interesting to note that the fuselage *Balkenkreuz* has been modified, at unit level, by increasing the area of the central black cross, thus reducing the effective range at which the white cross marking could be recognized.





Junkers Ju 290 A-7

See Adler/Sea Eagle

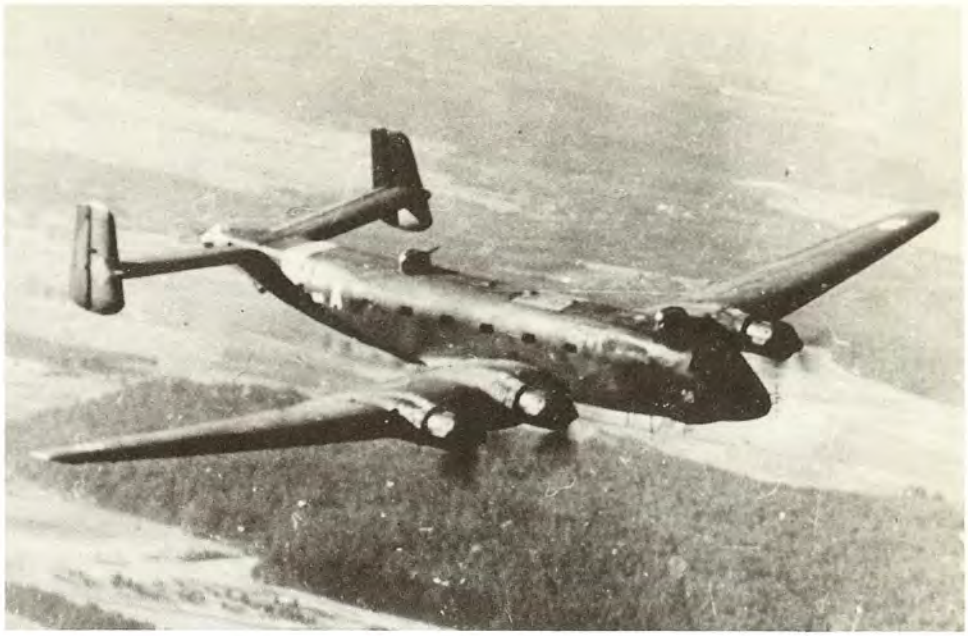
This standard factory camouflage pattern was employed by the Ju 290 A-3, A-4, A-5 and A-7 series of maritime aircraft. Spinners and metal propellers were Color 70, while those Ju 290 A-7s with wooden props were painted Color 71 or a dark blue-gray (see p. 143). While the aircraft were employed in the maritime role the size, placement and style of national markings did not vary from the established format.

Color 72
Green

Color 73
Green

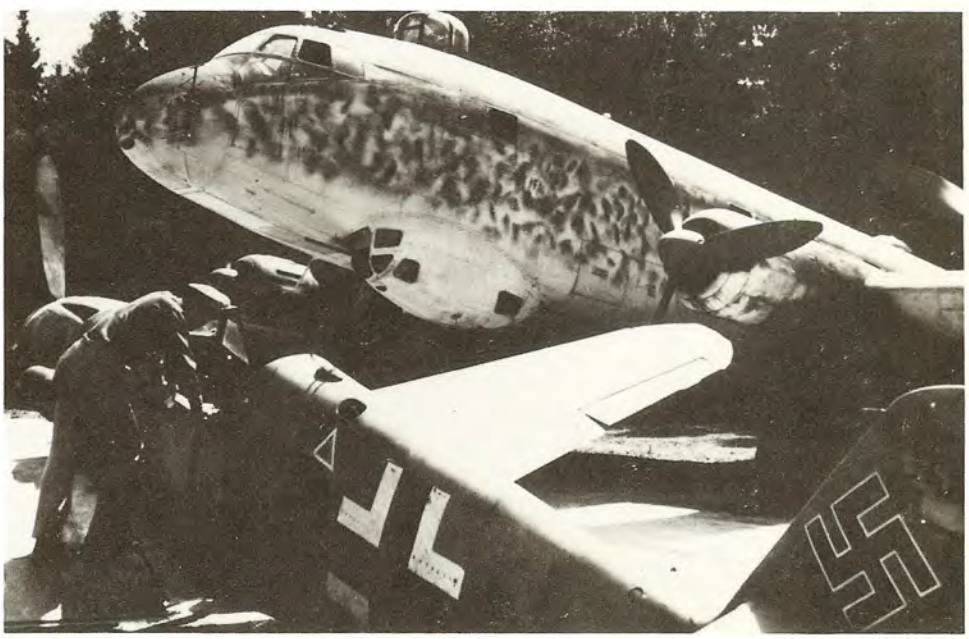
Color 65
Light Blue

Right: Based at Mont de Marsan, south of Bordeaux, the large Junkers Ju 290 A-2, W.Nr. 0158, 9V+AH (formerly SB+QH), was operated by I./FAG 5. Camouflage was the standard 72/73/65 with props and spinners in Black-Green 70. A white tail band was applied around the rear fuselage. Only three examples of the A-2 series were built and these aircraft were the first 290s assigned to the maritime reconnaissance role. Below: This newly completed Ju 290 A-7, W.Nr. 0187, KR+LR, illustrates the camouflage scheme first adopted by the A-3 series. Colors 72/73/65 were standard for the "Sea Eagle" but those machines with wooden props had their blades painted Dark Green 71. The last two digits of the serial number were repeated near the top of each fin. Late in 1944, when maritime reconnaissance roles were taken over by other aircraft, most 290s were reassigned to night transport duties.





Right: An interesting find at Salsburg is this Ju 290 A-3, still fitted with its FuG 200 maritime search radar. The standard maritime camouflage of 72/73/65 has been modified by a fuselage mottle of Black Green 70, which was also the color of the props and spinners. Although positive identification is not possible, it is believed this machine carried the unit code A3+FK, since the red letter "F" may be seen midway up the fuselage in line with the propeller. It is known that 2./KG 200 (which is identified by the remainder of the code), a secretive special mission unit, operated the Ju 290 on a number of highly classified flights during the final weeks of the war. Abandoned aircraft in the foreground is a Bf 109 G-6, W.Nr. 13156, "Black 63".





NORTH AFRICAN THEATER

Axis operations in the Middle East in 1941 produced an additional range of camouflage colors. Initial arrivals of fighter aircraft were recamouflaged in colors appropriate to their desert habitat. (GAM 94-107.) (LC/3 26-50.)

There is a clear discrepancy between the yellow used on these early arrivals as compared with later deliveries in factory finish tropical camouflage. It is now thought that Italian paints were used initially, the darker shade, RLM Sand Yellow 79, appearing on the first stocks of fighter aircraft delivered directly from the manufacturers. The color difference between the green 80 and the Italian green is less easily discerned and is nearly impossible to determine from contemporary black and white or color photographs.

Thus, three new RLM colors were introduced for tropical use, 78 Light Blue, 79 Sand Yellow and 80 Olive-Green. These were promulgated in the November 1941 edition of L.Dv.521/1 and evidence points to the introduction of these colors into North Africa before the close of the year. Equally in evidence is the fact that both color schemes remained in use for much of the North African campaign. However, many aircraft retained their original European camouflage, particularly later arrivals.

Initial application of the colors varied with Ju 88s and He 111s plus Bf 110s favoring an overall coat of 79 with 65 colored lower surfaces. A few Ju 87s also used this scheme but most adopted a combination of the Sand Yellow and Olive-Green on upper and side surfaces, a wide range of individualistic styles being used.

Bf 109Es were the first single-engined fighter aircraft to arrive. They received a mottled application of green over yellow on their upper and side surfaces, a style similar to that used by the Italian fighters. However, with the arrival of the Bf 109F model, an overall finish of 79 was used on upper and side surfaces with 78 colored lower surfaces. This was again revised when further supplies of Bf 109Fs arrived wearing a raised demarcation line between upper and lower surface coloring, this now occurring at approximately the horizontal center line of the fuselage. A similar scheme also appeared on some Bf 110s and, since both were products of the same parent firm, this style may have been an individualistic manufacturer's format.

The inevitable support aircraft, e.g., Fi 156, Bf 108, initially paralleled the applications of the main force with overall yellow or soft-sprayed green over yellow on all upper and side surfaces. This was to change in respect to late arrivals which used the official RLM colors. Later in the campaign a more intensive form of camouflage was seen both on Fw 58s and Fi 156s — a solid base color of 80 with a closely patterned snaking line of 79 over all upper and side surfaces, undersurfaces being finished in 78. Occasionally some aircraft had their upper surface colors reversed with 80 as the base color.

Permanent tactical markings in white were used by all categories of aircraft operating in the Mediterranean area, a white fuselage band and white wing tips being common to most types. (GAM 94-107.)

Top: Abandoned in the Libyan desert, this Henschel Hs 126 A-1, 5F+JK, was operated by 2./Aufkl.Gr. (F) 14. Basic camouflage was Sand Yellow 79 over all uppersurfaces with a random overspray pattern of Olive Green 80. The engine cowl is curiously painted in reverse. 80 is the base color, oversprayed with 79. Spinner was 70 and props were 71. All undersurfaces were Light Blue 78. The individual aircraft letter, J, was repeated under both wing tips. In its fuselage position the "J" could have been painted in the Staffel color (red).

78 Light Blue
78 Hellblau

79 Sand Yellow
79 Sandgelb

80 Olive Green
80 Olivgrün

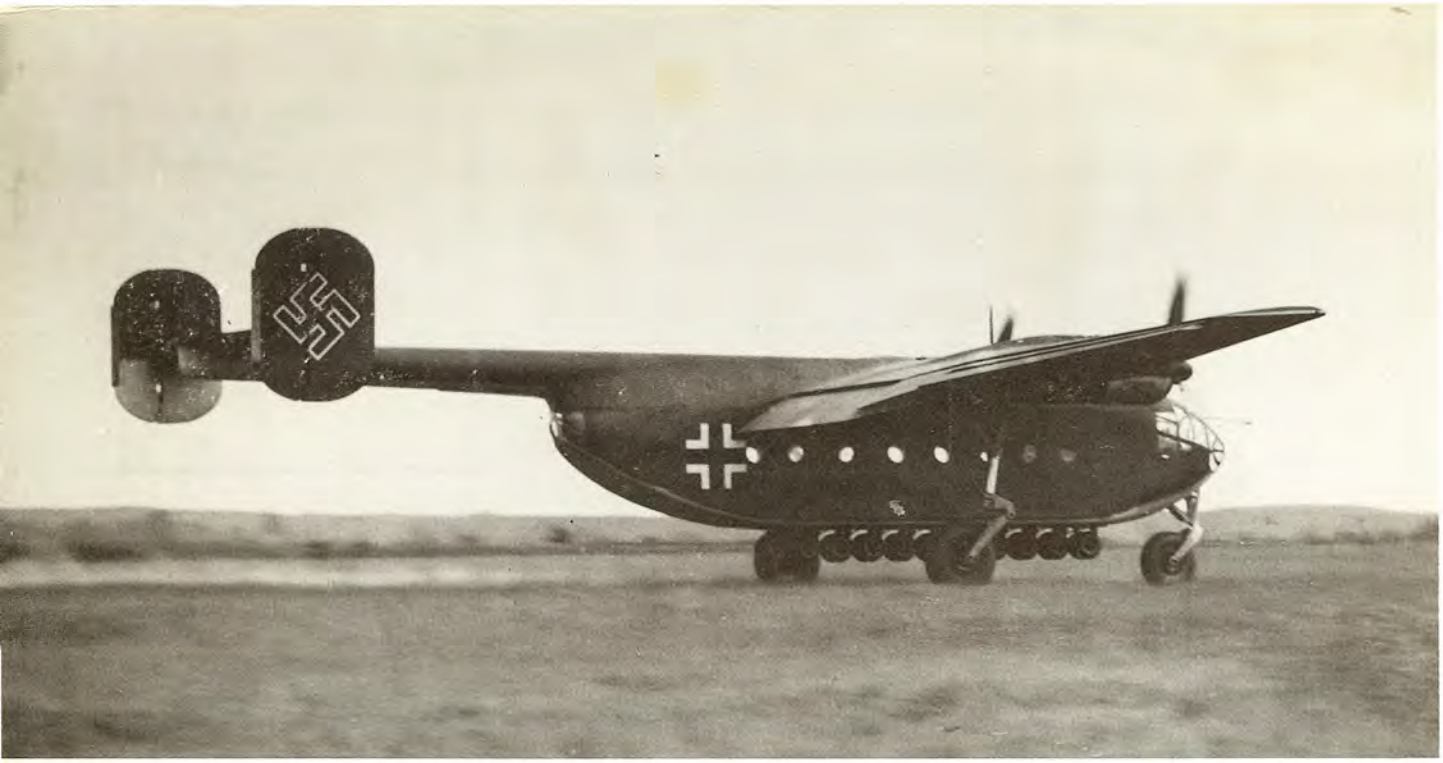
Italian Sky Gray

Italian Sand Yellow

Italian Mottle Green

Following damage from antiaircraft fire, the pilot of this Bf 109 F-4/trop force-landed near El Alamein on August 14, 1942. It is camouflaged in 78/79. It has a white spinner, forward cowl, wing tips and tail band. Prop blades were Black-Green 70, while the individual number 5 and horizontal bar of the 2nd Squadron are yellow outlined in black. cap. 1





TRANSPORTS

The *Luftwaffe* entered the war with the ubiquitous Ju 52/3m which proved to be the mainstay of general transport duties for the entire war. Camouflage was initially RLM Gray 63, but by late 1936, this had given way to 61/62/63 on upper surfaces with 65 on lower portions. This scheme then gave way to colors 70 and 71 on all top surfaces with 65 lower.

The initial impact of the war caused the RLM to issue a specification for a new transport. Subsequently, the Arado firm gained a production contract for its Ar 232, but only a few of these promising transports were ever completed. All of these aircraft received the standard 70/71/65 camouflage. Meanwhile, the successor to the Ju 52, the Ju 252, was undergoing numerous required revisions considerably hindering its operational debut. The few that were completed and delivered were finished 70/71/65. A redesign of the Ju 252, using largely nonstrategic materials in its construction, resulted in the Ju 352, appearing in late 1943. These transports, like the previous machines, were finished in 70/71/65. Meanwhile the shortage of transports was offset by impressing into service the Fw 200Bs of *Deutsche Lufthansa*. These were handed over to K.Gr. z.b.V. 105 which operated resupply missions to German forces in Norway. Other Fw 200Bs went directly from the production line to this unit as well as the first four Fw 200Cs. Camouflage for all of these aircraft was 70/71/65. The Luftwaffe also impressed DLH's Ju 90s for transport duties inside Germany. As promising as many of the new types were, the RLM sought additional troop transport requirement solutions in very large gliders and powered gliders. Aircraft like the huge Me 321 and Me 323 were introduced carrying standard 70/71/65 camouflage. Smaller types like the Go 242 and Go 244 also were finished in 70/71/65. Many were also given a soft mottle along the fuselage. One of the smaller troop gliders to see operational duties was the DFS 230. Most of these gliders were finished in the standard 70/71/65 scheme, however, many had Color 65 Light Blue carried up the side of fuselage ending in a soft edge midway. Occasionally, this side coloring was accomplished with RLM Gray 02, and in both cases, the mottle was 70 sometimes augmented with 71 or 74.

The Arado 232 V1, GH+--, above, and the Ar 232 B-O, A3+RB, (7./KG 200) below, were camouflaged 70/71/65. The latter aircraft has received a dense mottle of 02 over the top of the fuselage. Note the winged elephant emblem near the nose, and the red and white prop warning arc on the forward entry door.



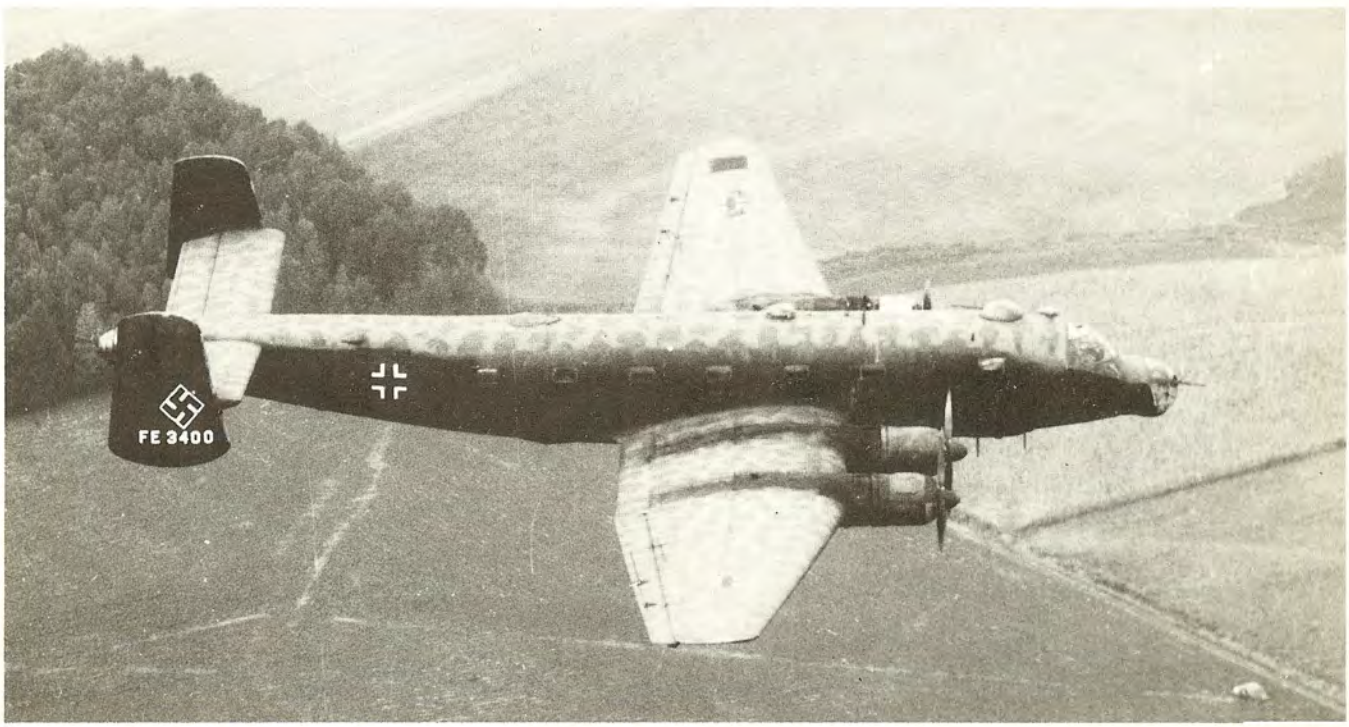
01 Silver
01 Silber

70 Black-Green
70 Schwarzgrün

71 Dark Green
71 Dunkelgrün



Above: A few Heinkel He 111 H-2s were converted as VIP high speed transports like this example, D-ACLQ, captured intact by American troops in Algeria late in 1943. Uppersurface color was RLM Gray 02 with undersurfaces in color 65. The vertical tail carries the prewar red, white and black insignia. Below: The large Ju 290 A-7, W.Nr. 110 196, PJ+PS, glides over the Indiana countryside following its record breaking transatlantic flight by Col. Watson. Camouflage was Gray-Violet 75 uppersurfaces, with Dark Green 82 mottle. Undersurfaces were Black 22, while the original registration (removed by the Americans) PJ+PS, appeared in Gray 77 on the fuselage. In its new role as night transport, the maritime radar and other related equipment were removed.

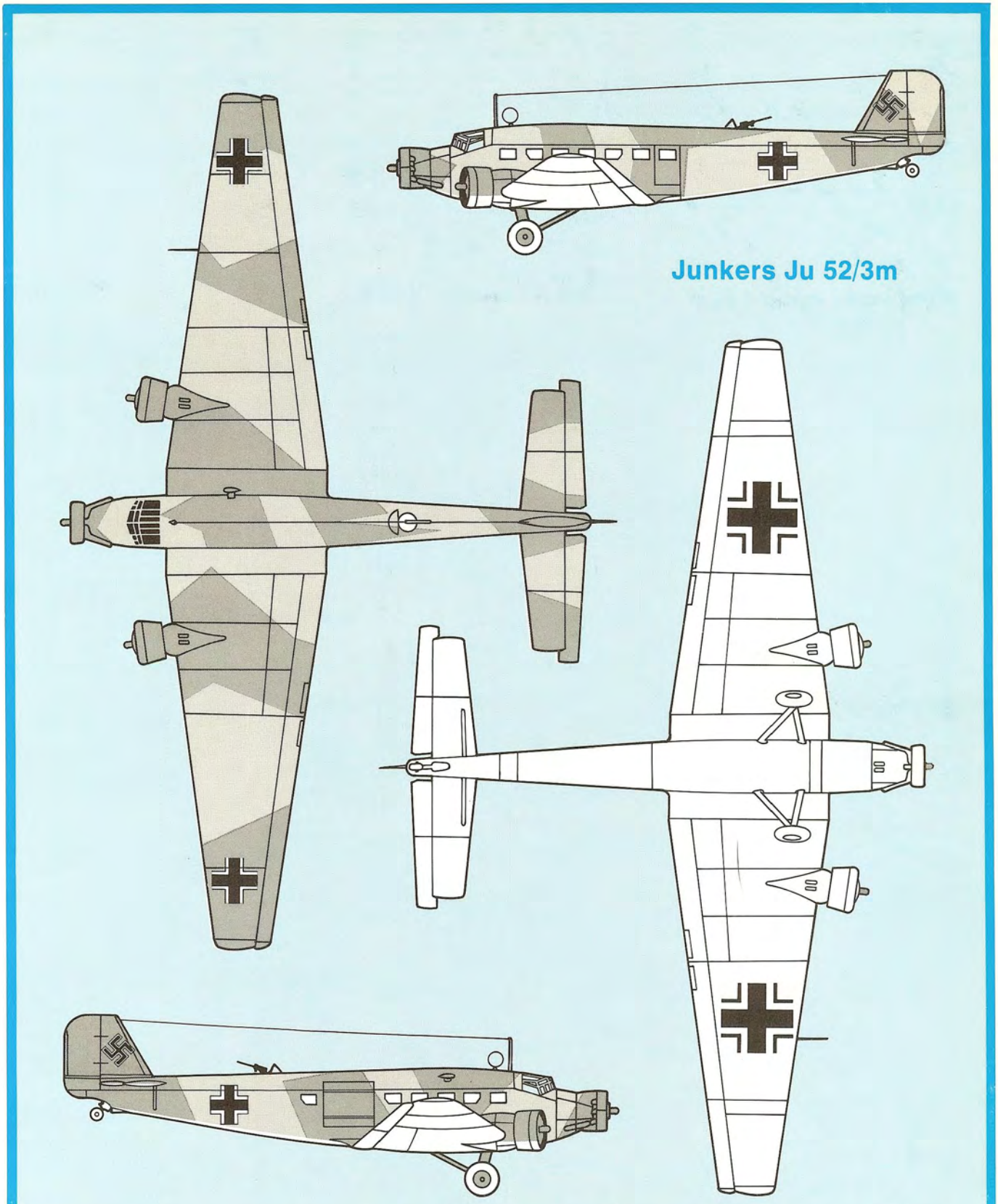






Above: This Ju 52/3m g5e, W.Nr. 7279, 4V+BP (originally TG+ES) was one of a pair which force-landed on January 22, 1945, southwest of Asselborn, Luxembourg. Fitted with flame dampers for night operations, the standard 70/71/65 has been altered by the liberal application of white over uppersurfaces, while the outer portion of the wing's undersurface was in yellow. Reportedly, this machine was on strength with III./TG 2. Left: Logical successor for the Ju 52 would have been the Ju 252, but only 25 were built. This example, Ju 252 V5, DF+BQ, was in 70/71/65, with a yellow tail band. It was operational with LTSt. 290 based at Berlin's Tempelhof airfield early in 1943. All 25 examples of the "Herkules" were considered prototypes being retained for special missions and VIP transports. Below: This Ju 352 A-1, N1+CX, originally attached to *Grossraumtransp. st.* based at Tutow, was captured after the war and used by the RAF for various ferry missions as AM 18. Camouflage was 70/71/65.





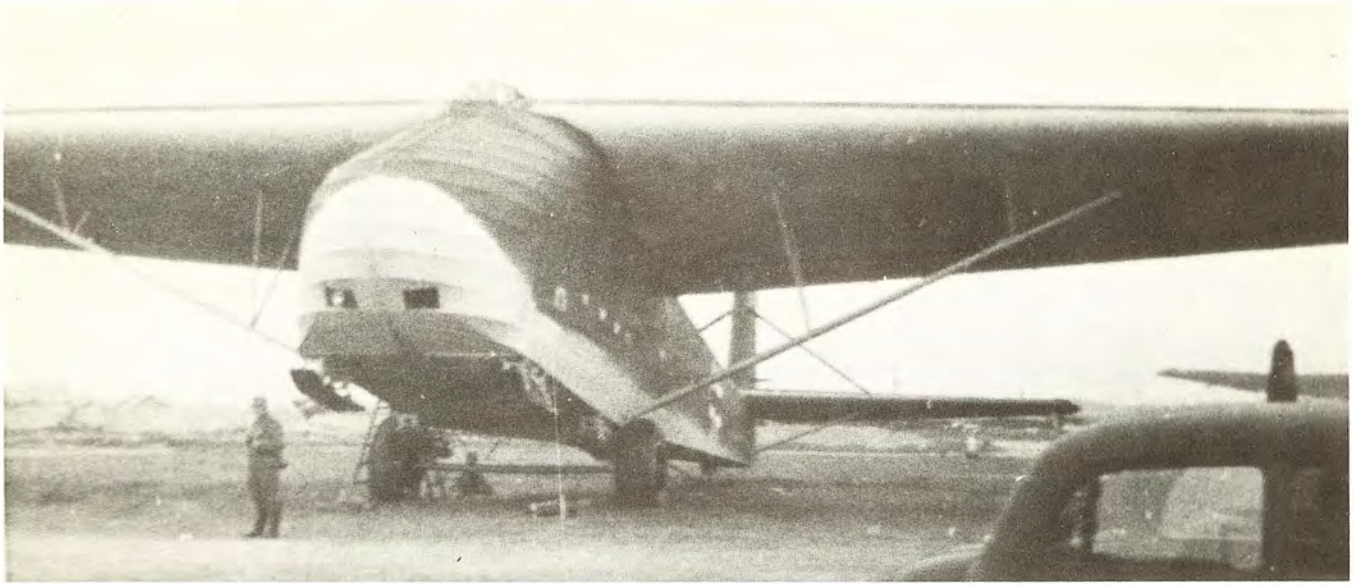
Junkers Ju 52/3m

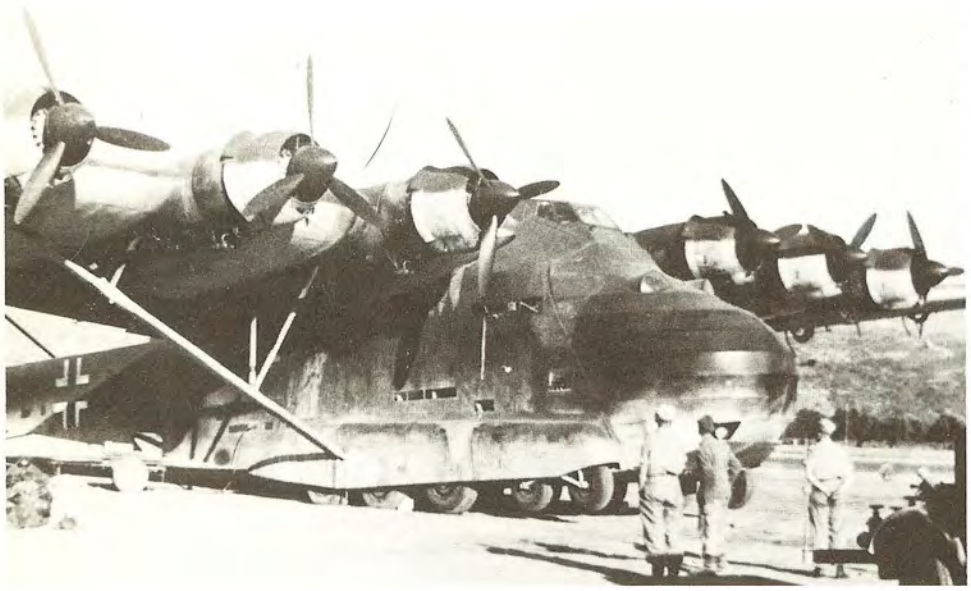
Color 70
Black-Green

Color 71
Dark Green

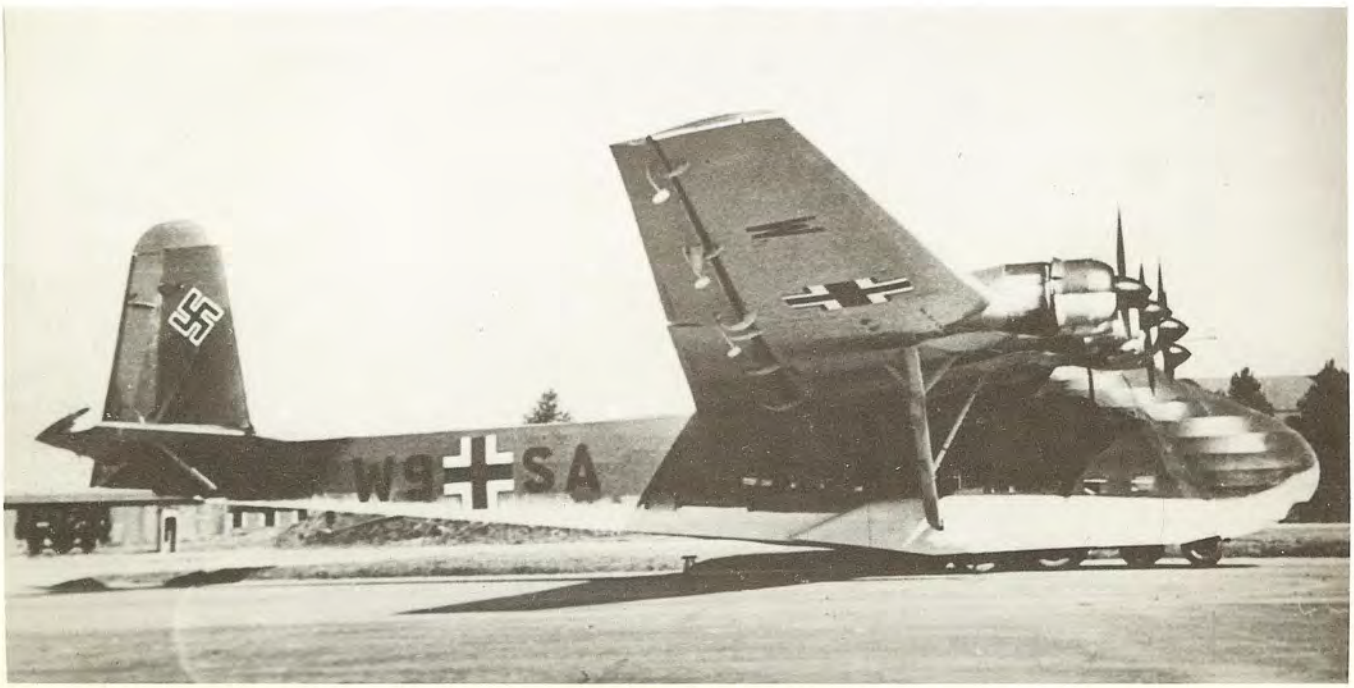
Color 65
Light Blue

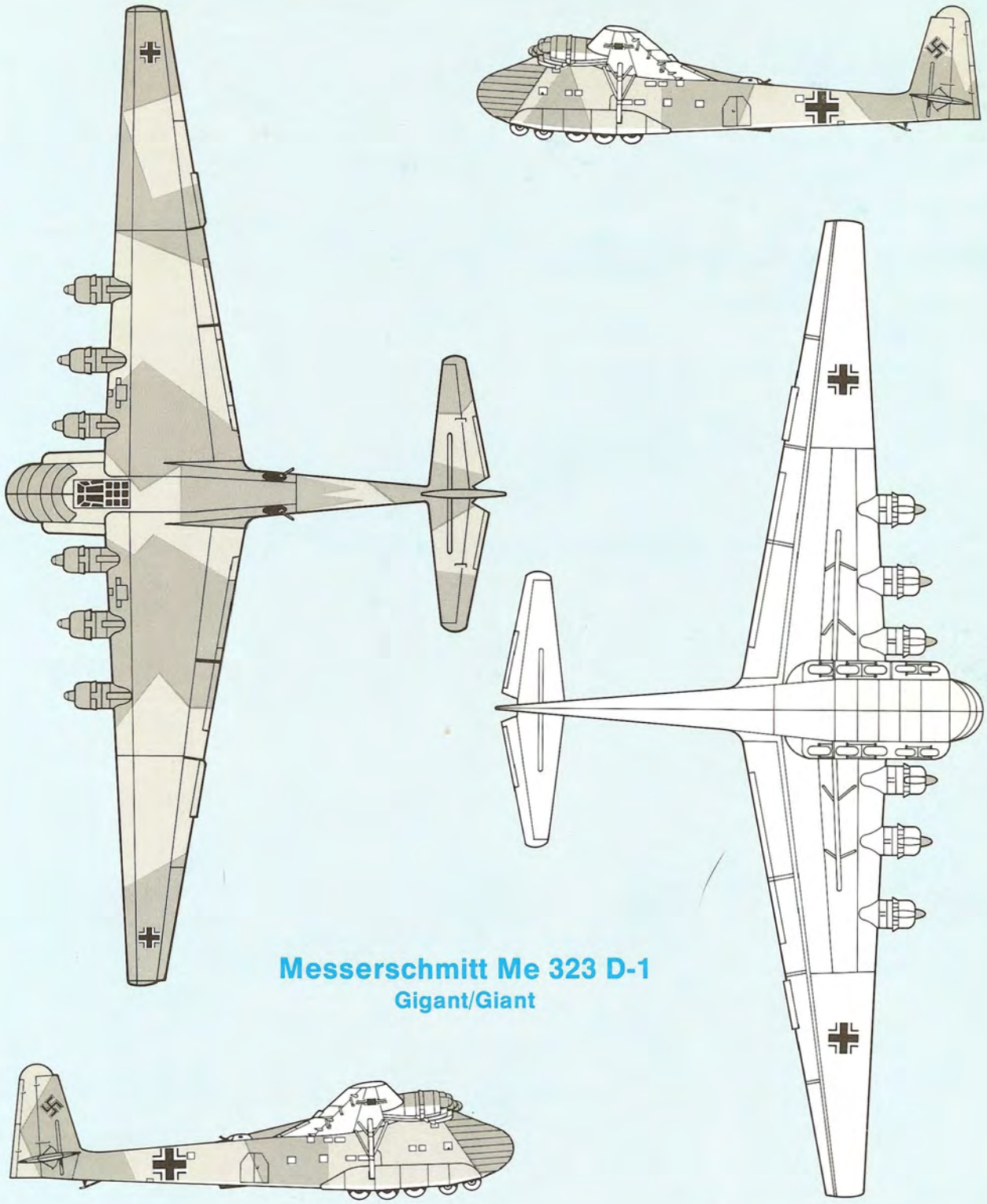
This standard factory camouflage pattern evolved for most versions of the Ju 52/3m produced after the Ju 52/3m g4e model and up to the Ju 52/3m g14e. It is unclear if the various models eligible to receive the twin float assembly (g4e up to the g8e, g10e and g14e) received the maritime colors or retained their land-based colors. Size, placement and style of the national markings did not significantly change during the war years. Those employed as ambulance aircraft had their markings modified to accommodate the red and white Red Cross emblem along the fuselage.





Above: Resting on its tail skid, this Me 321 A-1 is camouflaged in 70/71/65 in much the same pattern as employed by the powered version. With a wing span of over 180 ft., the *Gigant* was capable of carrying 120 troops. Left: Close-up of a Me 323 D-1 gives some impression of its size. Camouflaged in colors 70/71/65 this example still retains its factory code letters. Below: The Me 323 V2, W9+SA, during the summer of 1942. The undersurface demarcation line running along the fuselage varied from one production batch to another. Some had sharp separation lines, as below, while others employed a softer mottle between the Light Blue 65 and the upper surface greens. Just under 200 of these large 28 ton transports were completed and most were delivered to *Transportgeschwader 5*.





Messerschmitt Me 323 D-1
Gigant/Giant

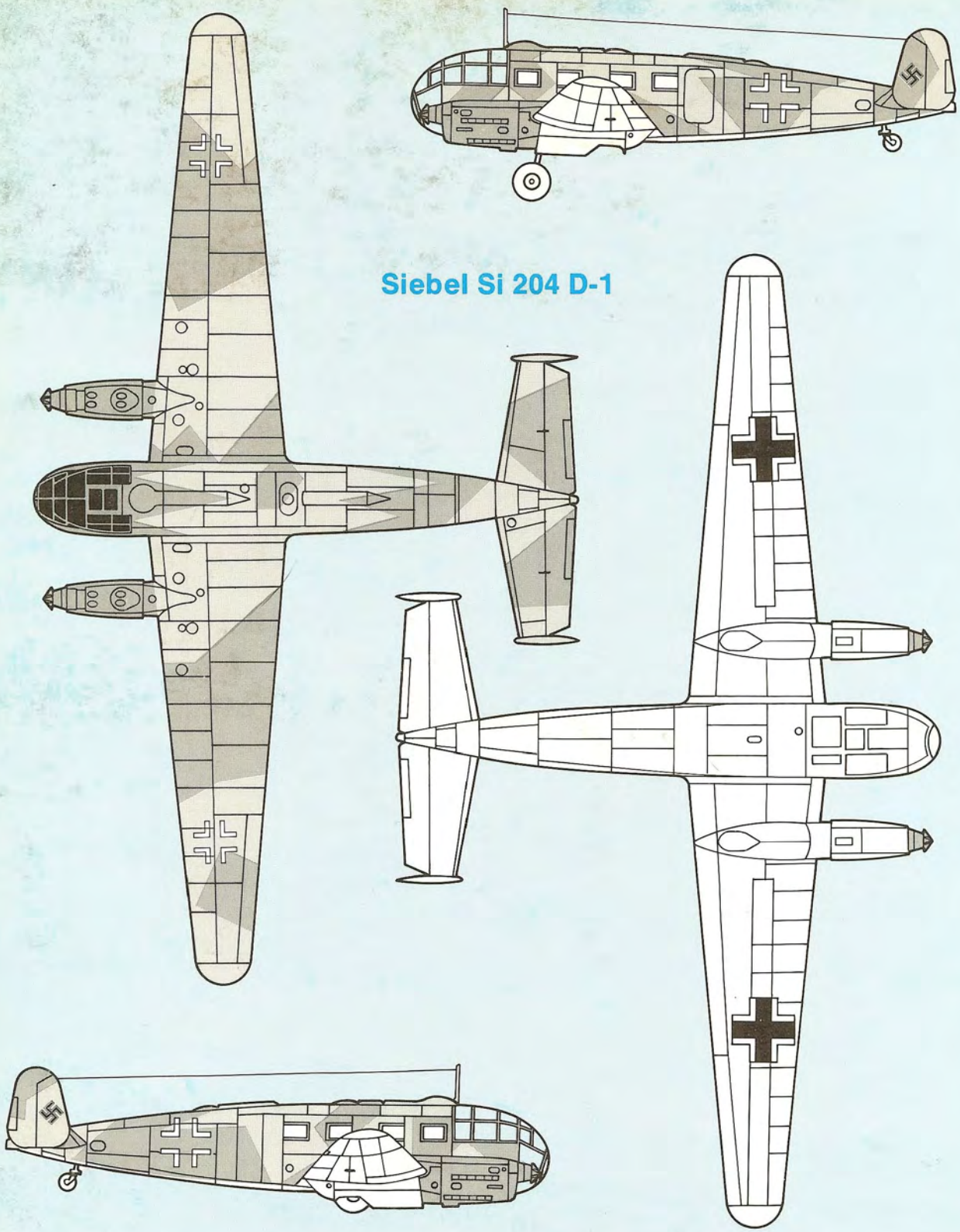
Color 70
Black-Green

Color 71
Dark Green

Color 65
Light Blue

This standard factory camouflage pattern evolved for the Me 323D and E-series. It was similar to the one employed by the Me 321A and B-series. Its principal variation occurred during placement of the demarcation line between undersurface color and the upper surface colors. In some cases the dividing line between the two was rather hard edged, but on others a more soft merger was sprayed applied. Size, placement and style of the German national insignia remained fairly constant with few deviations.

Siebel Si 204 D-1

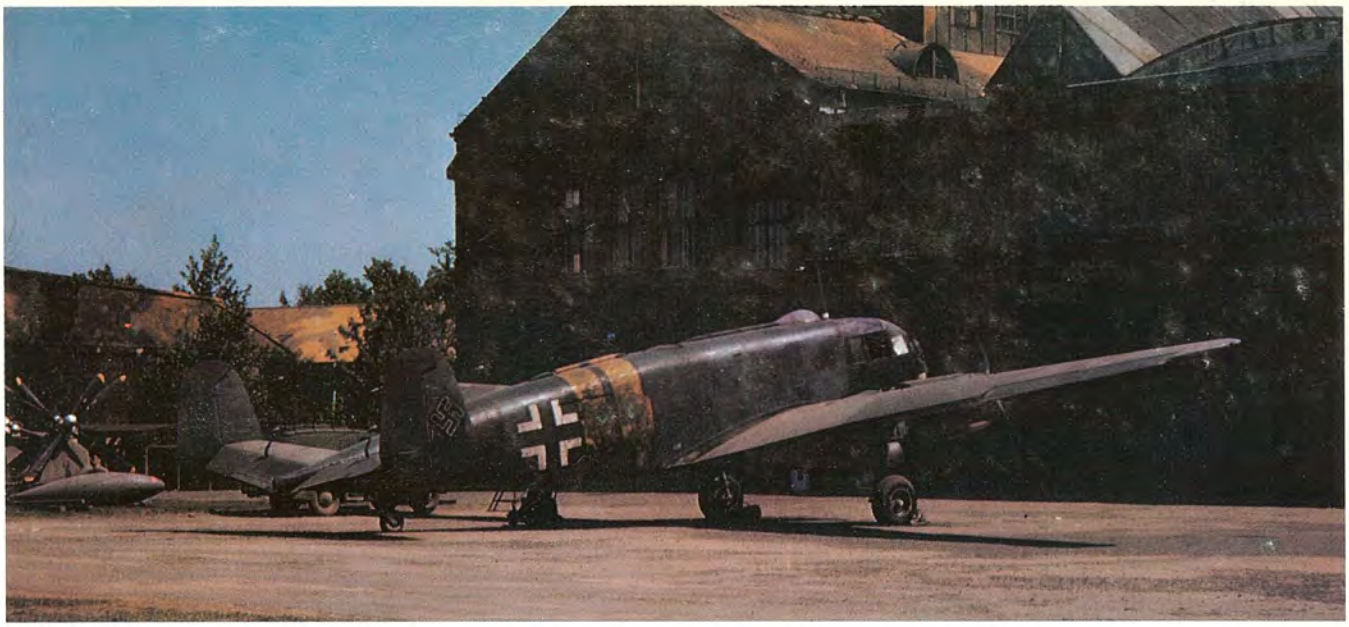


Standard factory camouflage for the Si 204 D-1 remained with the type throughout most of its service career although some examples were recorded with an overall coat of RLM 02. Additionally, the Si 204 A-1 series with a stepped cockpit, also carried the pattern shown above with certain concessions to its longer nose. Size, placement and style of national markings did not vary significantly.

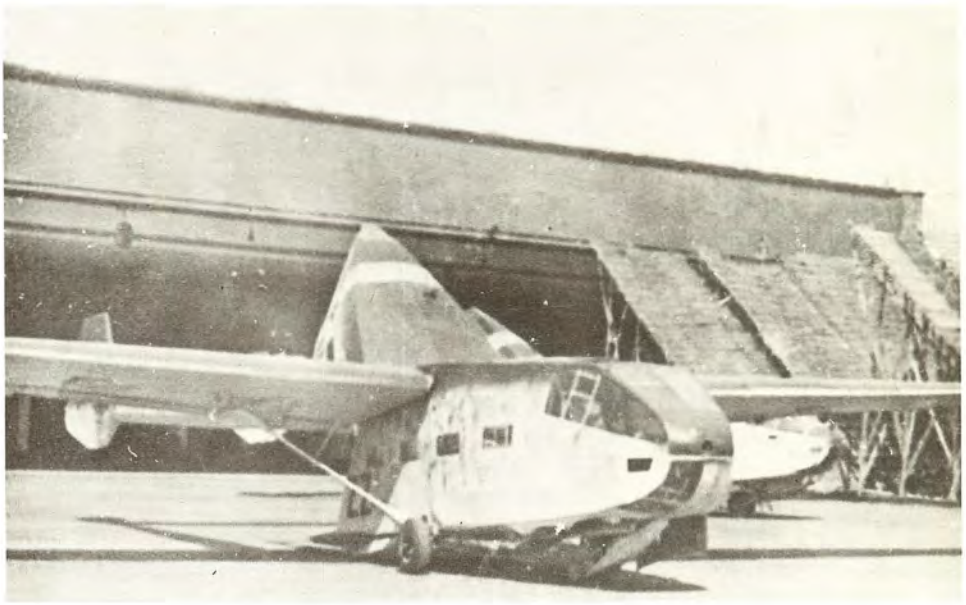
Color 70
Black-Green

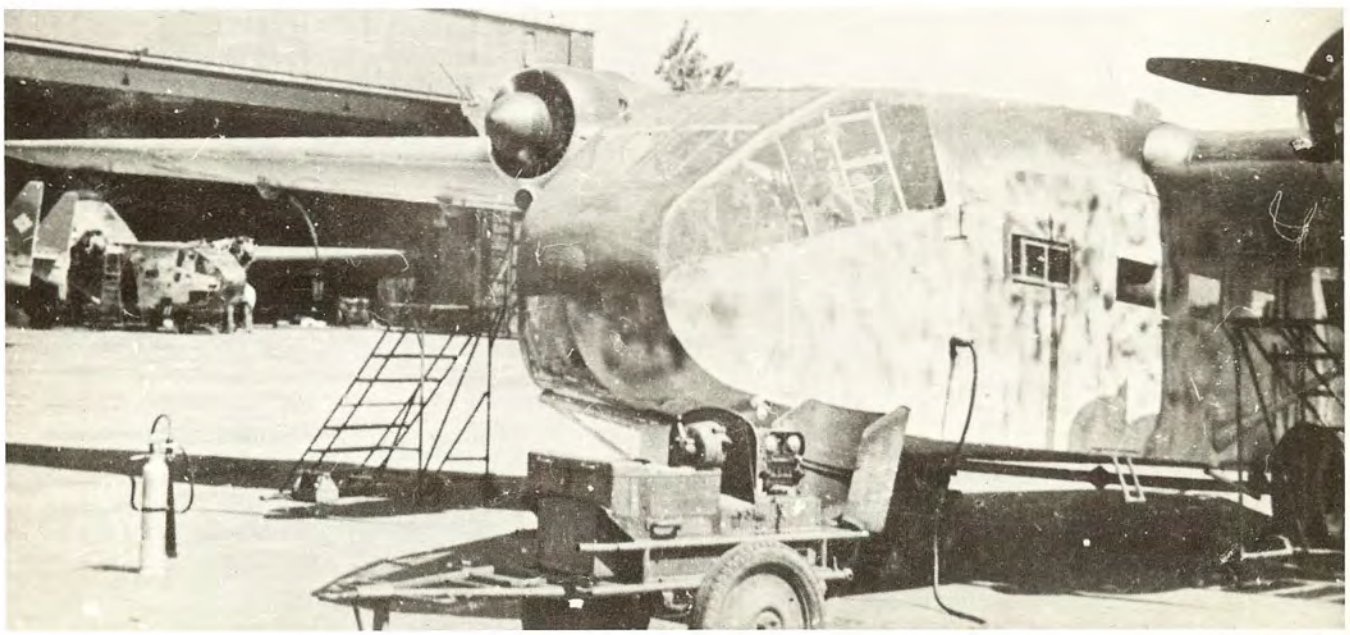
Color 71
Dark Green

Color 65
Light Blue



Above: Technically not a transport but a trainer, many Siebel Si 204 D-Is were pressed into VIP transport duties. This example, KJ+RN, was camouflaged in 70/71/65 with yellow fuselage bands denoting aircraft of blind flying schools. The undersurface of the wing tips and engine cowlings were also yellow, while the last two code letters, RN, were red. This machine reluctantly was surrendered at Fürth carrying a VIP and his family. Right: Camouflaged in 70/71/65 with a soft mottle of 02/70, this Go 242 A-1 carries a yellow rear fuselage band. Below: The pilot of this Go 244 B-1 prepares to run-up his engines at Stendal. Like the glider version, shown above, the powered troop carrier was camouflaged in 70/71/65 with a soft fuselage mottle of 02/70. Both the unpowered and powered versions often carried colorful and varied camouflage patterns. Most of their radius of action was confined to the Eastern Front where they saw considerable action.







RECONNAISSANCE AIRCRAFT

Prewar two classes of aircraft were developed for this duty: the short range He 46 which equipped the *Nahaufklärungstaffeln*,[9] and the He 45 for the long range operations of the *Fernaufklärungstaffeln*.[10] Both types wore an overall finish of 63, plus standard markings and codes.

The passive reconnaissance role was altered with the introduction of the reconnaissance-bomber type, which role was initially filled by the He 70F-1.

In the short-range role the He 46 was superceded by the Hs 126, initial deliveries of which wore 61/62/63/65 camouflage. However, most aircraft left the production lines wearing the newly introduced standard finish of 70/71/65. The He 70F-1 had, meanwhile, been supplanted by the Do 17F-1, a pure long-range reconnaissance model which entered service early in 1937 wearing standard 61/62/63/65 camouflage. The Do 17P eventually replaced the F-1 model. Initial deliveries retained the same type of camouflage as the earlier model, but later deliveries wore the then standard 70/71/65 camouflage. scheme.

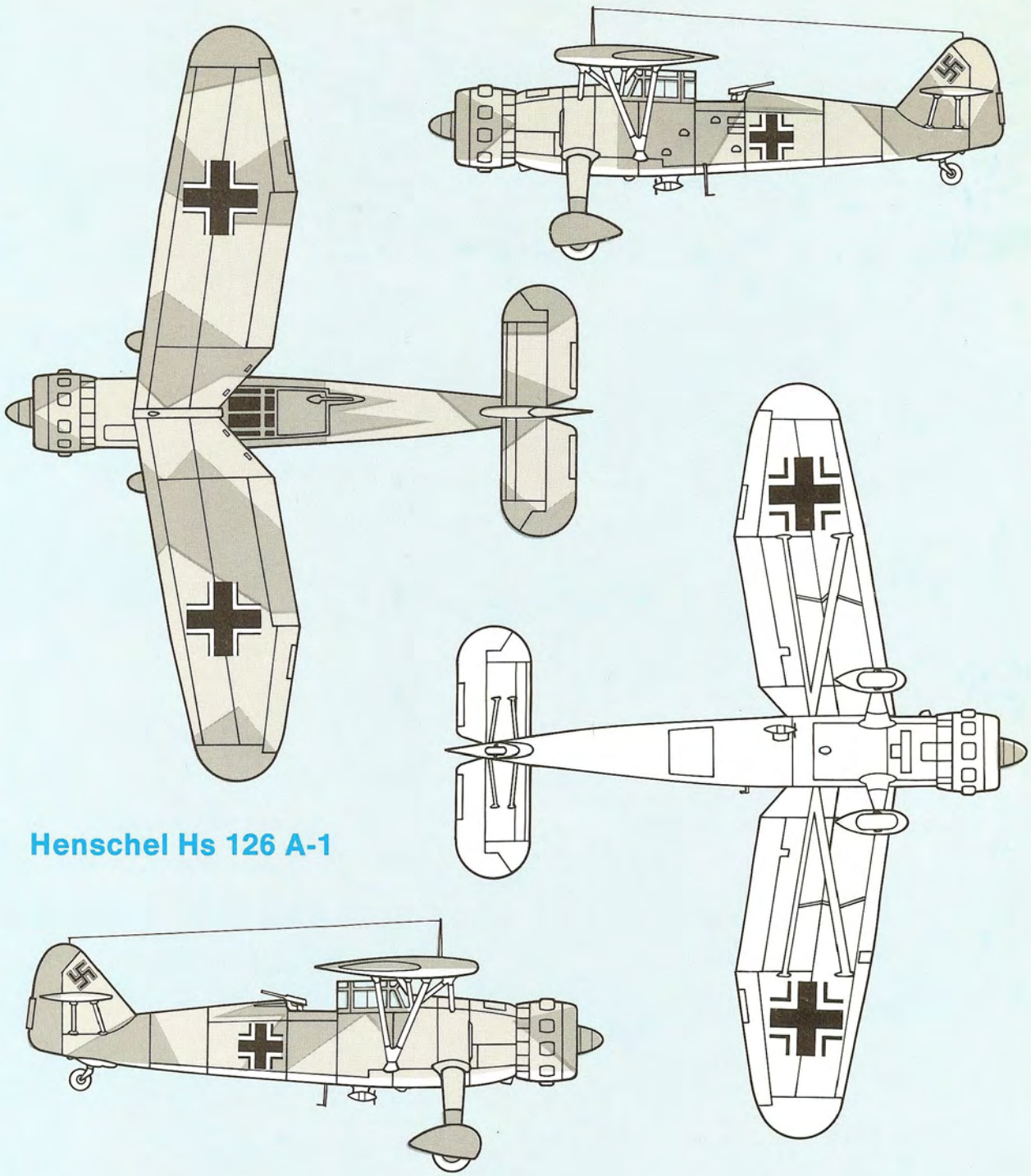
Intelligence requirements fell entirely to the *Fernaufklärungsstaffeln* whose Do 17Ps were supplemented by a small number of Do 215 B-0 and B-1 aircraft. Camouflage for all of them was 70/71/65, although the Do 17Ps were later to adopt a heavy, soft-edged mottling of 70 or 71 over the side and under surfaces of both the fuselage and the engine nacelles.

9. Short Range Reconn Flights

10. Long Range Reconn Flights

Top: A Heinkel He 46 C-1, BB+CK, is overall RLM Gray 02. Below: This Hs 126 A-1 is in 61/62/63/65. However, the majority of the A and B-series were delivered in 70/71/65.





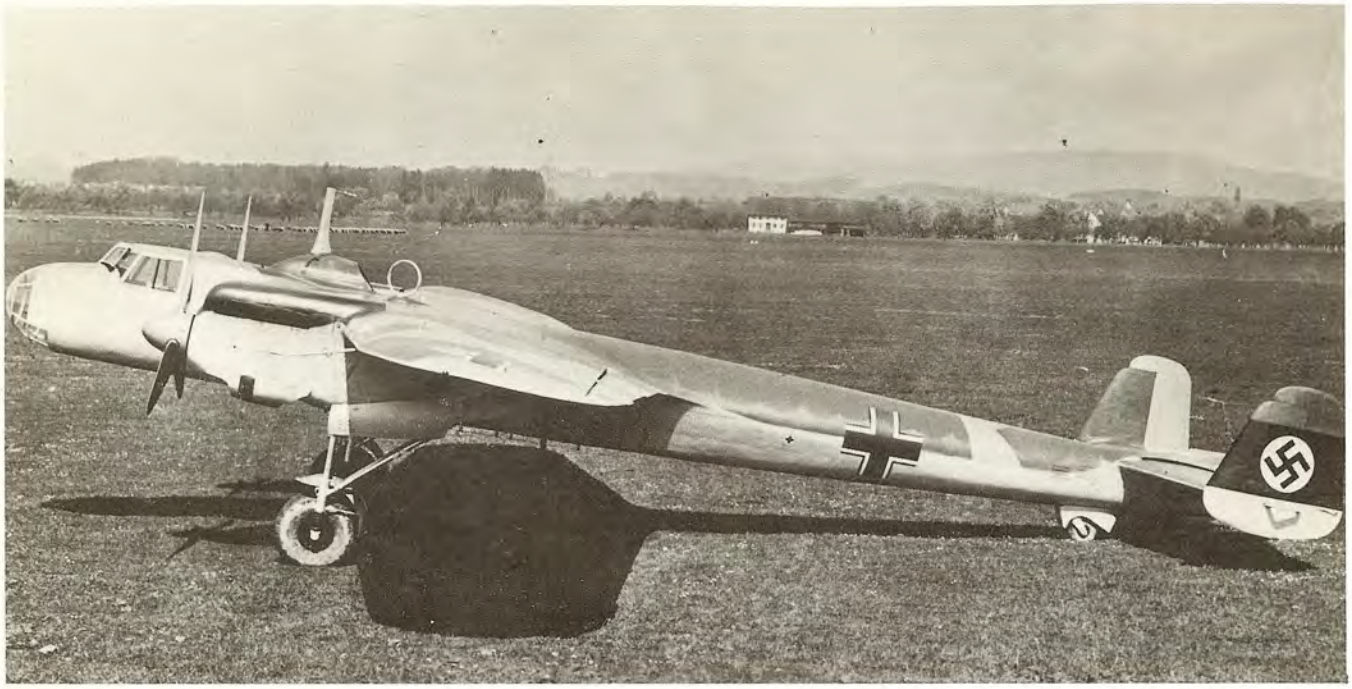
Henschel Hs 126 A-1

Color 70
Black-Green

Color 71
Dark Green

Color 65
Light Blue

The factory camouflage pattern shown above replaced the four color (61/62/63/65) scheme abandoned in 1938. It remained in force until the type was finally withdrawn from service. The style and placement of national insignia kept pace with changing Luftwaffe directives, but within these guidelines there existed little deviation from regulations.



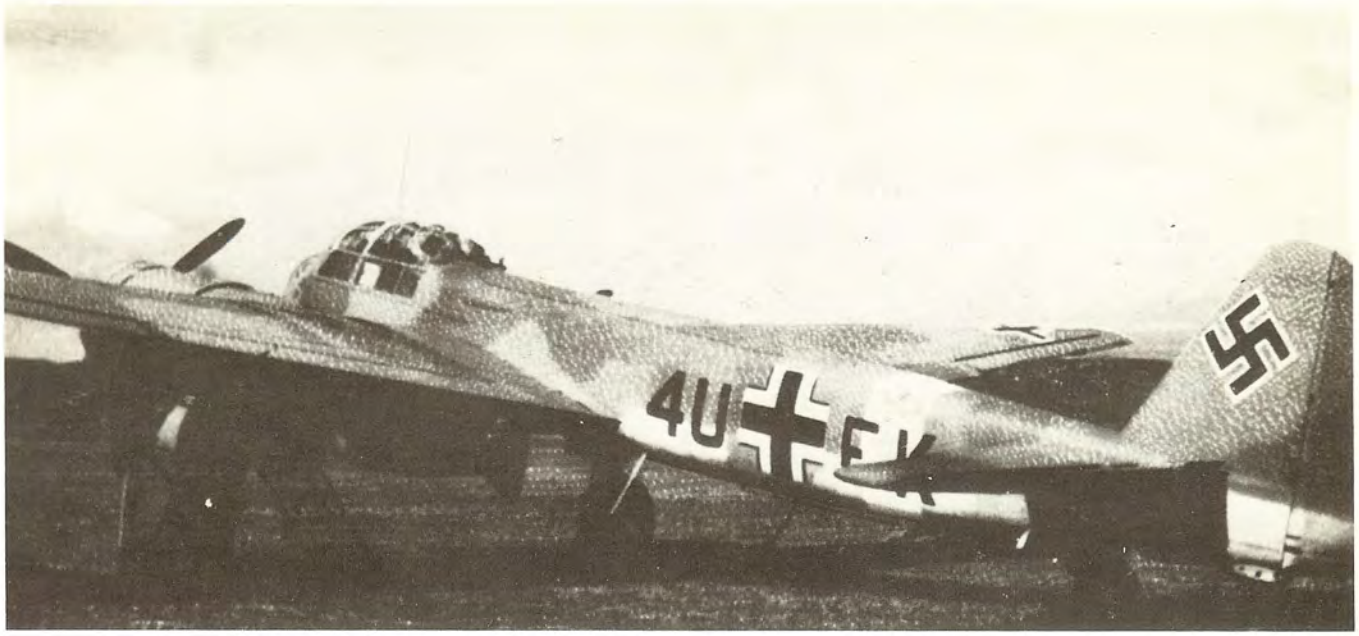
During the early summer the first of the new Bf 110C-5 reconnaissance aircraft entered service over England. Initially these were operated alongside the Do 17Ps and the comparatively rare Do 17Z-3 bomber-reconnaissance model. One of the Bf 110C-5s fell into British hands shortly after the type entered service. Its camouflage was found to be quite different, being 71/02/65 with a high demarcation line along the fuselage and heavy mottling in both upper surface colors down the fuselage sides.

Another class of reconnaissance aircraft had also appeared in May 1940, when the Bf 109 E-5 reconnaissance fighter entered service. In camouflage of 70/02/65, it was the first of several variants of the Bf 109 to fulfill this role.

It had been intended to replace the Hs 126 with a newer design, but the first of these, the Bv 141, failed to achieve service status. Preproduction aircraft were finished in 70/71/65 camouflage. The other design, the Fw 189, began to reach operational units in mid-1942 and generally wore standard 70/71/65 camouflage. The principal exceptions were the few Fw 189s serving alongside some Bf 110s with an *Aufklärungstaffel*[11] in North Africa. Camouflage for both types was 79 upper and side surfaces with 78 lower surfaces although some of the Fw 189s are thought to have been finished in a more elaborate scheme: a base coat of 80 on upper and side surfaces, oversprayed with a continuous snaking line of 79, and with 78 on the lower surfaces. A small number of Hs 126s serving with 2.(H)/14 were finished in the simplified 79/78 scheme although again a few were seen wearing a soft random mottle of 80 over a base coat of 79 with 78 lower surfaces.

11. Reconnaissance Flights

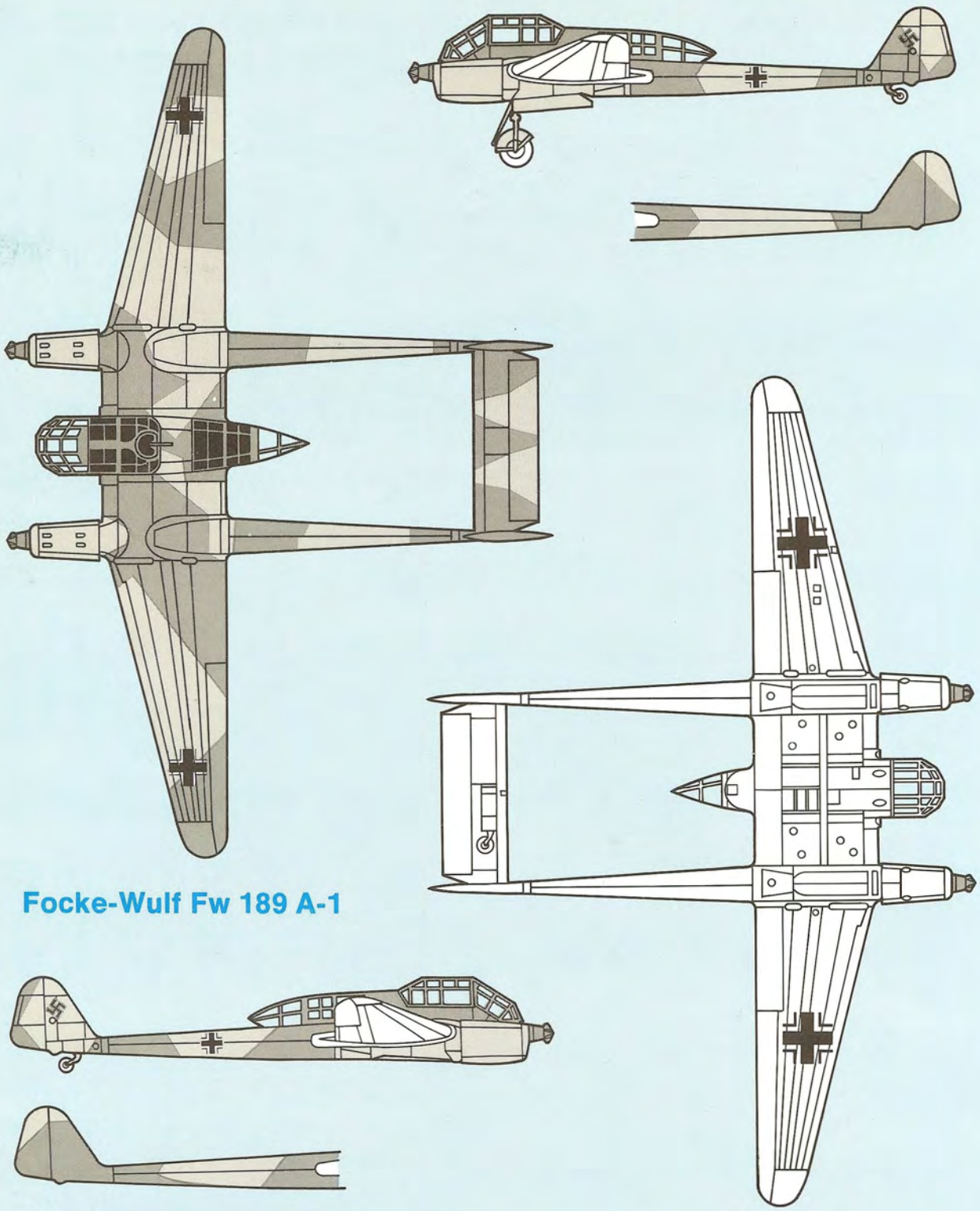




Opposite top: A factory fresh Dornier Do 17 F-1 wears standard prewar 61/62/63/65. Opposite below: A Do 17 P-1 attached to 3. (H)/15 in a differing combination of 61/62/63/65. The fin-rudder insignia has been altered by painting out the red band and white disc. Above: An unusual visual effect is seen in this Ju 88 D-2/trop of Aufkl. Gr. 123. The standard 70/71/65 has been modified by adding flowing areas of RLM Gray 02 with the whole dappled with a tight network of Light Blue 65 brush lines. The Letter "E" was red, outlined in white. Right: Initially painted Light Blue 65 overall, the six He 116 B-Os intended for strategic reconnaissance, were later painted 70/71/65 for less ambitious missions. Below: This Ju 188 D-2, W.Nr. 0608, G2+BR, attached to 7. (F)/124, and other machines were captured at Kirkenes, Norway, in standard 70/71/65, with serpentine lines of Light Blue 65 over uppersurfaces. The letter, "B", trimmed in yellow, indicates the 2nd Squadron.







Focke-Wulf Fw 189 A-1

This 1941 factory camouflage scheme was adopted for the Fw 189 A and F-series. Late in 1941 a North African camouflage scheme was approved consisting of Color 78 which replaced 65 on all undersurfaces, Color 80 over all upper surfaces followed with a serpentine line network of Color 79. The German national insignia remained relatively unchanged throughout its service career.

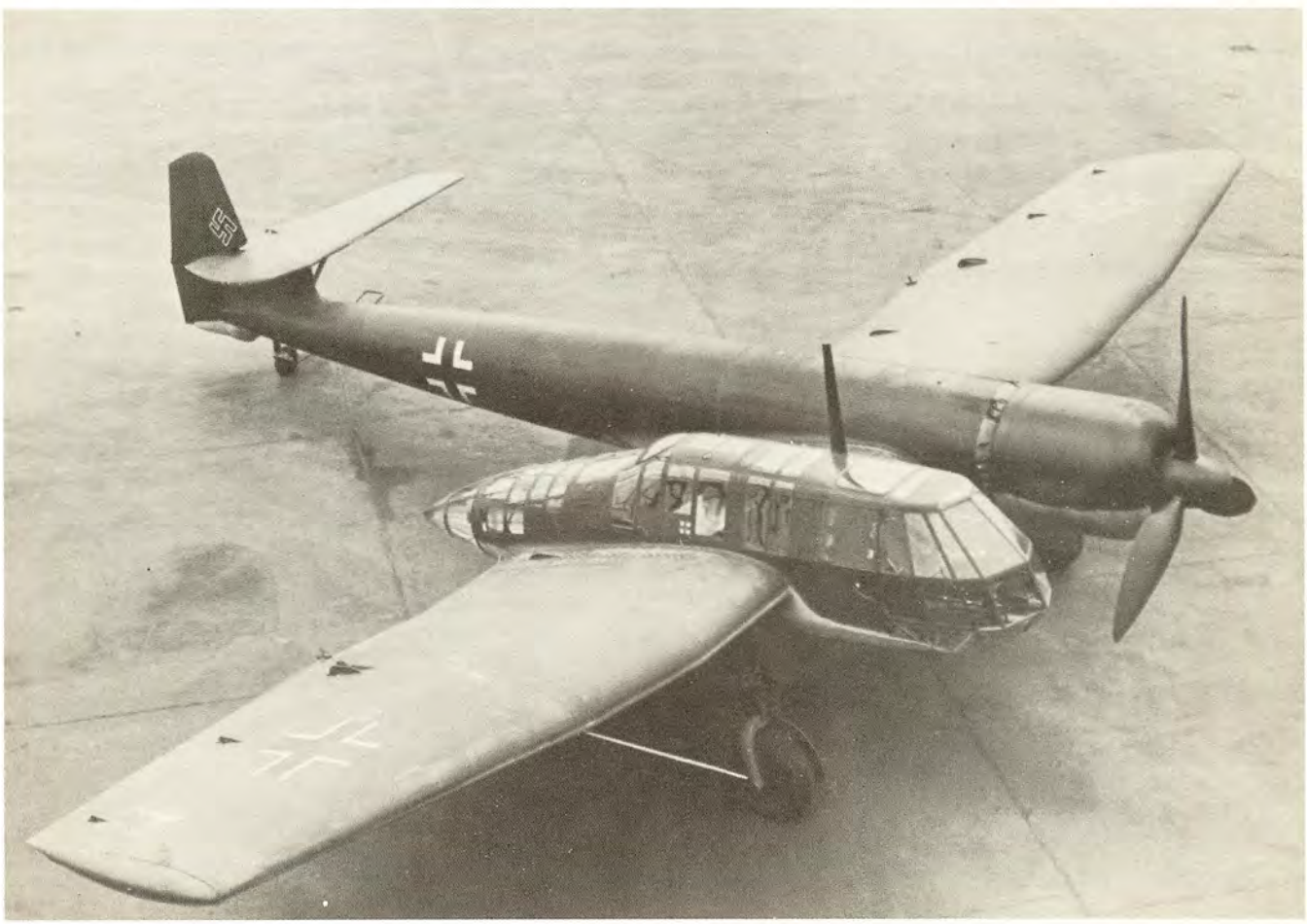
Color 70
Black-Green

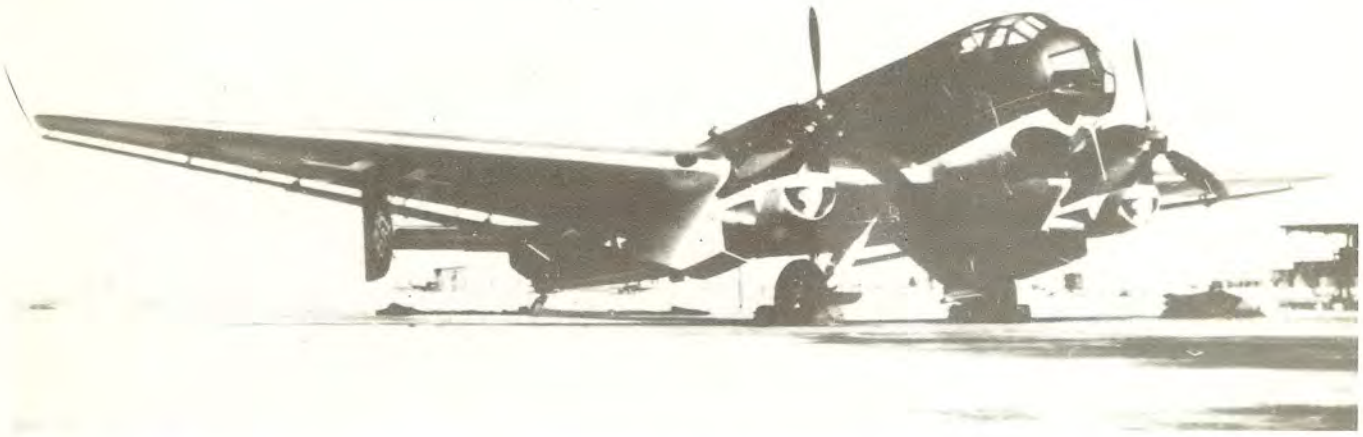
Color 71
Dark Green

Color 65
Light Blue



Above: A somewhat rare version of a ubiquitous reconnaissance aircraft is this Focke-Wulf Fw 189 F-1, 5H+RK, captured by American Forces at Salsburg. Flown by Aufkl.Gr. (H)/14, the camouflage was standard. This photograph, originally in color, has badly sepiad over the years. Nevertheless, the yellow tactical rudders, engine cowls and wing tips are still clearly recognizable. The individual aircraft letter, "R", is red (*Staffel* color), outlined in white (*Gruppe* color). Below: One of the more original reconnaissance aircraft designs to appear during the Second World War was the asymmetric creation of Dr. Richard Vogt, the BV 141. Camouflaged in standard 70/71/65 colors, the BV 141 V11 (B-03), W.Nr. 10003, NC+RB, was an aircraft with considerable developmental bugs, resulting in a general lack of serviceability. In the end, the BV 141 never saw operations.





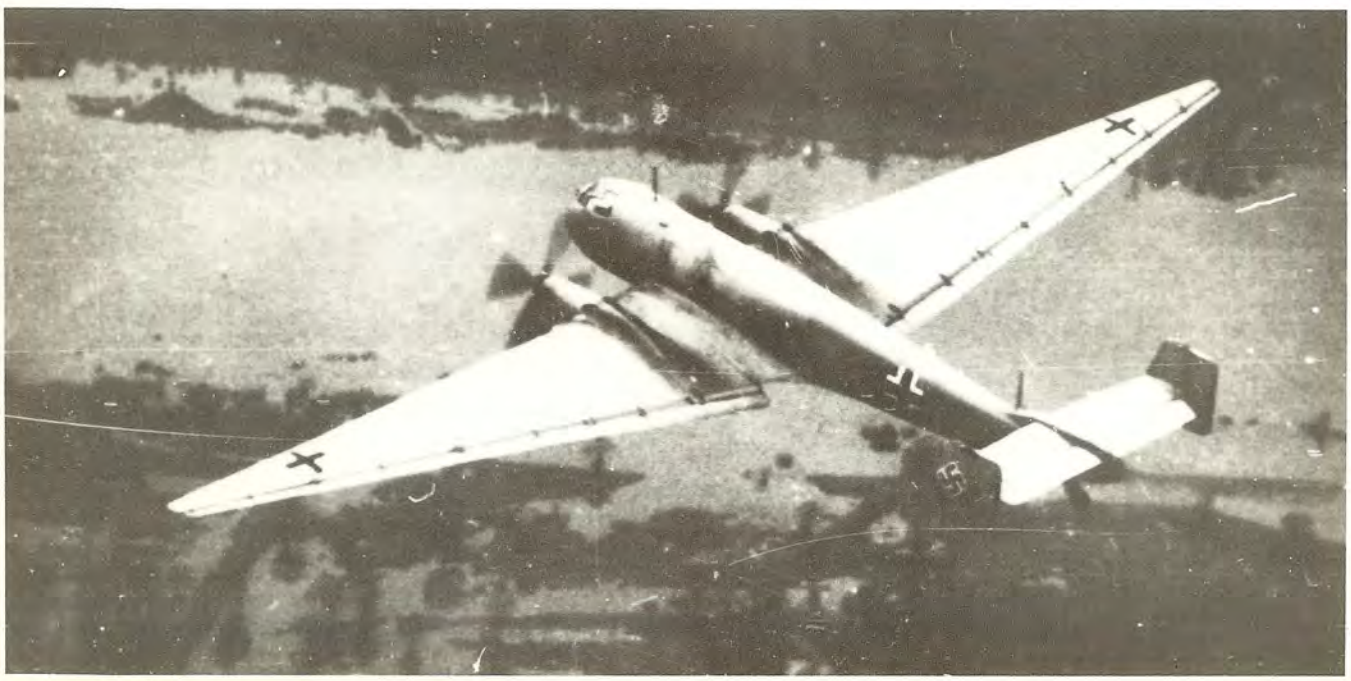
The Me 210 which was to have replaced the Bf 110 was unsuccessful in both its role as a fighter and a reconnaissance machine. Its successor, the Me 410, was an improvement and the Me 410A-1/U1 version went to the same reconnaissance unit 2./F)/Aufkl. Gr. 122 based on Sardinia. Despite Mediterranean deployment they retained their standard fighter finish of 74/75/76 although the harsh sun temperatures tended to fade these colors. They also wore the requisite white tactical marking band around the rear fuselage.

With the phasing out of the bomber version of the Ju 188 in May 1944, a changeover was made to a reconnaissance model. The Ju 188D was made in two forms: the D-1 and D-2, the latter being for maritime reconnaissance. Camouflage was 70/71/65, but the 70/71 areas were broken up with a continuous line of 65 applied in random fashion.

Extreme high altitude reconnaissance had been carried out from 1940 to 1943 by specially modified Ju 86 P-2 aircraft. These aircraft retained their standard 70/71/65 camouflage. During August 1942, *Höhenflugkommando Beauvais* flew at great height over the British Isles in three Ju 86 R-1s (T5+QM, T5+RM and T5+SM). All three were camouflaged 76 uppersurfaces with 65 on all lower sides. Yellow 04 were operational markings applied to the underside of cowlings, wing tips and rear fuselage band.

A better equipped successor was the Ar 234B which began high altitude reconnaissance missions over Britain in September 1944 and continued in this role for the remainder of the war. Camouflage remained the same as for the bomber version. 81/82/76.

Top: A newly completed Ju 86 P-2 camouflaged in colors 70/71/65. Below: This Ju 86 R-1, BO+BJ, is shown during its acceptance flight painted 65 overall.

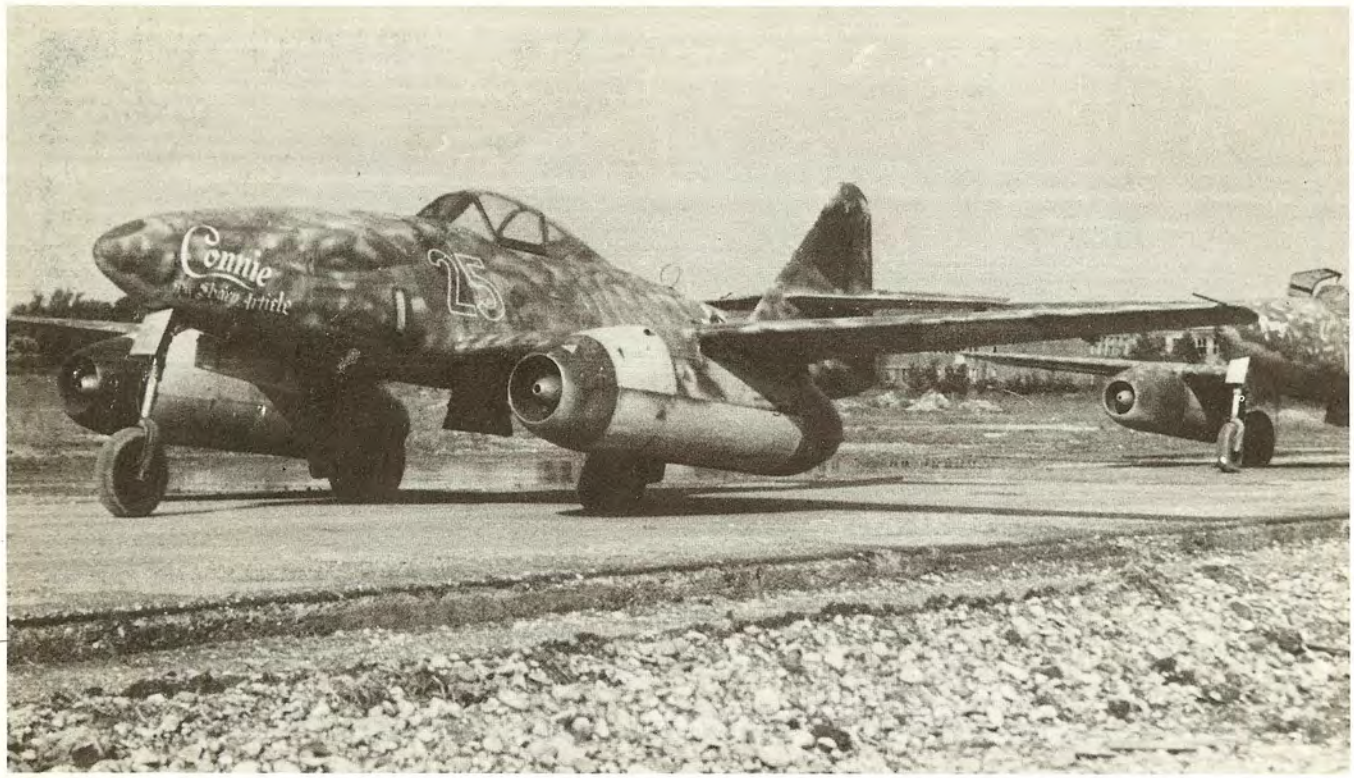




Above: This high altitude reconnaissance machine, Ju 388 L-1, W.Nr. 560 049, was captured at ATG's Merseburg plant by Col. Watson's group and later shipped to the United States for evaluation. It is shown here at Merseburg on May 20, 1945 in its original camouflage. All uppersurfaces were Gray-Violet 75 with Light Blue 76 on lower and side surfaces. A light mottle of Color 75 was applied to the vertical tailplane. Spinners and propellers were the usual Black-Green 70. The *Halkenkruz* applied to the fin as well as the upper wing and fuselage *Balkenkreuz* markings were of the simplified outline variety. The fin and fuselage insignia were Black 22 while the upper wing crosses were White 21. The underwing *Balkenkreuz* marking was of the older black and white variety but without trim elements. Subsequently this aircraft received the American evaluation code, FE-4010, while at Wright Field. It is currently in storage for the National Air and Space Museum.

Below: The remains of numerous Ju 388 L-1s found at Leipzig-Mockau illustrate similarities with the aircraft above. These aircraft carry serial numbers in the 340 000 block. The last three digits are repeated below the cockpit. Unlike the swastika originally applied to the machine above, these examples carry the solid black variety in addition to black outline fuselage crosses.





Above: Several reconnaissance models of the Me 262 were recovered by Col. Watson's group immediately following the war. This Me 262 A-1a/U3, "White 25", like most of the others captured, exhibits a camouflage pattern composed of a densely applied mottle of 81/82 over a base of 76. Like the 262 found on page 36, it is possible that the fuselage sides were not 76 but a light gray as shown by our documented sample on page 143. This aircraft, "Connie The Sharp Article", was flown by Lt. Roy W. Brown to Melun and Cherbourg. It is shown here at Lechfeld during June 1945. Aircraft number 30 is immediately behind the lead machine.

Below: Another Me 262 A-1a/U3, "White 33', has suffered a nose gear failure at Lechfeld. Camouflage is similar to the machine above but the fuselage mottle is more dense. Other reconn Me 262 A-1a/U3s carried individual numbers in the range 27, 29 and 34.





Above: Photographed in the United States after the war, this was one of three examples of the *Blitz* (Lightning) acquired by General Watson in Norway. This Arado Ar 234 B-2, W.Nr. 140 312, carries the transition colors 71/81/76 with the rear portion of each turbojet in black. Thanks to large stocks of the older paints, color 71 was authorized for use with 81, while 70 was approved for use with 82 on uppersurfaces. This aircraft later became FE-1010 and still survives as part of the collection at Silver Hill, Maryland.

Below: Once operational with 2. (F)/FAG 122 in the Mediterranean area, this Me 410 A-3, W.Nr. 10 018, F6+WK, is a classic example of how camouflage should work. Painted in colors 74/75/76, with 65 spinners and 70 prop blades, this *Hornisse* (Hornet) was brought to the United States for evaluation as FE-499. It is now in storage at Silver Hill, Maryland.





FOREIGN AIRCRAFT

A wide range of foreign aircraft saw service with the *Luftwaffe*, the bulk of them being operated by the training establishments and the second line transport units. In addition, captured Allied aircraft were evaluated and sometimes, for special duties, operated by the Luftwaffe in a clandestine manner. Normally, captured aircraft were left in their original camouflage, only their nationality markings being replaced. However, where aircraft were put into use as training aids for tactics they were often repainted in one of the standard Luftwaffe colors. This was particularly so with Allied fighter aircraft which were repainted in either 74 or 75 on all upper and side surfaces, lower surfaces being repainted Yellow 04 which was extended to the entire tail unit as a further safety aid against friendly fighters.

Foreign aircraft used operationally on first or second line duties, (there were a considerable number of Italian aircraft used for transport duties following Italy's capitulation), were subject to a special directive issued on July 20, 1944. Black and white spiral markings on spinners were required for aircraft on first line duties but for second line work the underside of the wings were to be painted yellow equal to one third of the span. Civil aircraft pressed into service were required to have the fuselage undersurface, the entire engine nacelles and rudder painted yellow. This order applied to Germany, France and Italy, virtually all that remained of the Axis domination of Europe. (GAM 139.) (LC/3 129.) As the war progressed into its fourth year, more and more flyable Allied aircraft fell into German hands in addition to those that were assembled from several wrecks.

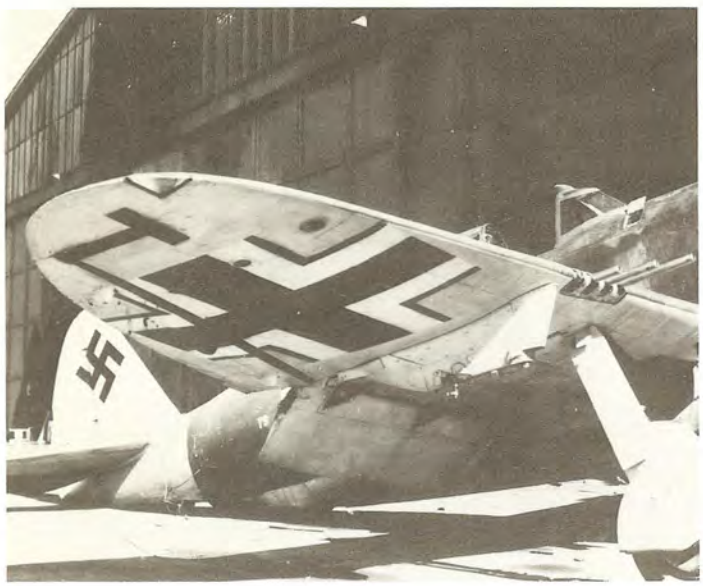
Top: Former USAAF P-51D with yellow undersurfaces and tail assembly. Below: French Dewoitine D-520 near Brussels. Camouflage was dark brown and light blue.



75 Gray-Violet
75 Grauviolett

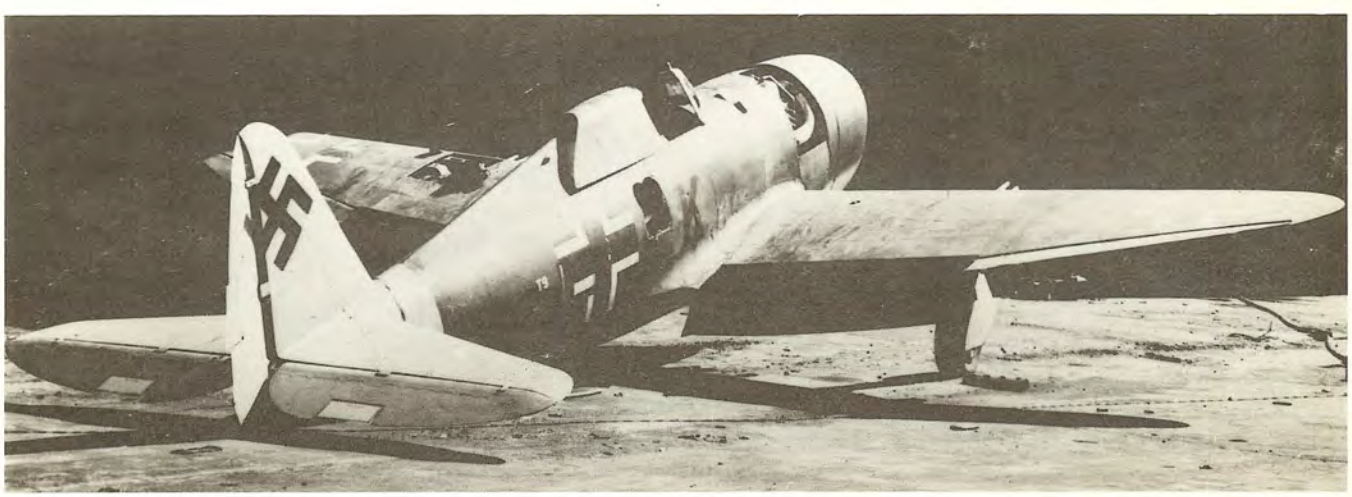
04 Yellow
04 Gelb

American ANA Standard
613 Olive Drab





Above and Below: This Republic P-47 D-20 Thunderbolt was recovered at Gottingen bearing the Luftwaffe code T9+EK, indicating the aircraft was flown by *2./Versuchsverband OKL*, a unit operated by the Luftwaffe High Command. Uppersurface camouflage colors applied by the Germans consisted of a Brown-Violet similar to the sample found on page 83. The entire lower surfaces and tail assembly were in Yellow 04. Right: This Consolidated B-24 D-1, Serial Number 41-23641, was camouflaged in colors similar to the Thunderbolt. While some captured Allied aircraft were operated with minimal repainting, most were routinely recamouflaged using German paints. A sample of U.S. Army Olive Drab 613 is included on this page for comparison purposes only.





SPECIAL PURPOSE

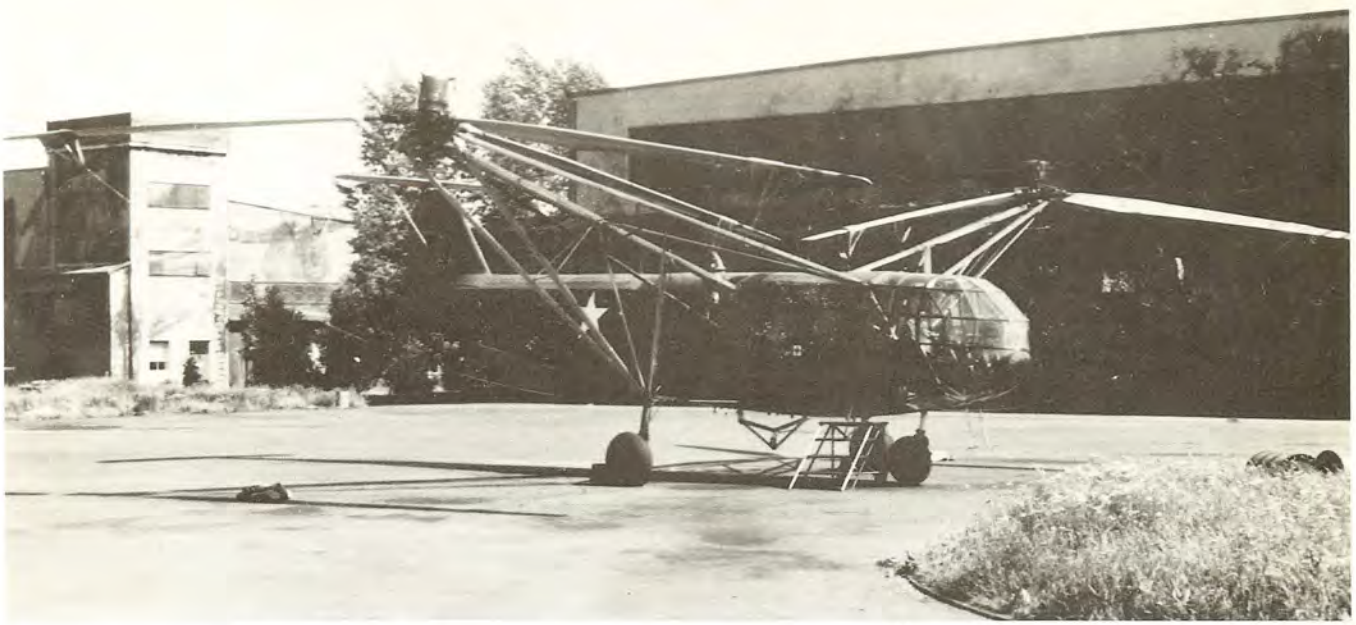
The RLM projected a variety of aircraft for special purposes but only a few designs actually were built. Fewer still reached operational status. The well-known *Mistel* projects involved the use of two aircraft each having the same powerplant. The *Mistel* S3C, shown above, is typical of the camouflage found on both the control fighter and the lower explosive carrier.

This particular setup illustrates the trainer model. The operational version would have been similar apart from the nose configuration of the lower component. Atop is a standard Fw 190 A-9 wearing a style of camouflage typical of the last months of the war, namely Dark Green 82 and Gray-Violet 75 over uppersurfaces, with a sky gray color on all lower surfaces. The lower component, a Ju 88 G-10, is camouflaged 76 overall with Light Green 83 mottle spots over the upper surfaces. On other Ju 88G lower component aircraft, a combination of Gray-Violet 75 and Light Blue 76 were to be seen.

Another special purpose type produced, but not operationally used, was the Fi 103 A-1/Re 4 piloted version of the V1 "Buzz Bomb". The one hundred and fifty of these piloted missiles completed bore camouflage similar to their unmanned cousins: top surfaces in Yellow-Green 99 with Light Gray lower surfaces. Examples with Dark Green 82 upper surfaces and Light Blue 76 undersurfaces have also been identified. The warhead was constructed of semimoulded plywood, and as such was sealed with a protective clear sealant prior to the application of camouflage.

Top: The Mistel S3C (Fw 190 A-9, W.Nr. 961 243 and Ju 88 G-10, W.Nr. 460 066) composite. The last three digits of the Ju 88's serial number are repeated near the Fw 190's fuselage cross. Below: This Fi 103 A-1/Re4 was displayed with the nose from a nonpiloted bomb.





HELICOPTERS

Two advanced German helicopter designs actually reached production during WW II, the Flettner Fl 282 *Kolibri* (Hummingbird) and the Focke-Achgelis Fa 223 *Drache* (Kite). The former, an airborne maritime reconnaissance and observation craft and was the only helicopter to be used operationally during the war. The production run for the Fl 282 was only about two dozen, although, plans were made for upwards of 1,000 machines. The early prototypes of the Fl 282 were either left unpainted or were camouflaged in the maritime colors of Green 72 or Green 73 on top surfaces with Light Blue 65 under the fuselage and tailplane. The sixth prototype, the Fl 282 V6, was flown operationally for convoy protection duties in the Aegean Sea. This helicopter was painted Light Blue 65 overall with black factory code letters (GF+YF). The seventh and all remaining "Hummingbirds" were camouflaged in either Black Green 70 or Dark Green 71, with Light Blue on lower sections of the fuselage and tailplane. Factory registration letters were applied to the fuselage and under the short stubby horizontal tailplane in black, beginning with CI+TG (for the V7 alias A-03) and ending with CI+TX (for the V24 alias A-020). The rotor blades were considered surfaces, albeit flying surfaces, and as such were painted in the same camouflage colors as the airframe. The second helicopter design to enter production was the Focke-Achgelis Fa 223. Total production of the Fa 223 amounted to no more than 15 machines, in spite of the fact that tooling-up for 400 per month had been put in motion. All completed Fa 223s were camouflaged Black Green 70 or Dark Green 71 on all uppersurfaces including the rotors. The underside of the fuselage and horizontal tailplane were painted Light Blue 65.

Top: This Focke-Achgelis Fa 223 E-015 was in 70/71/65. Below: The Flettner F1 282 A-019 (V23), CI+TW, with counter-rotating, intermeshing rotors.





TRAINERS

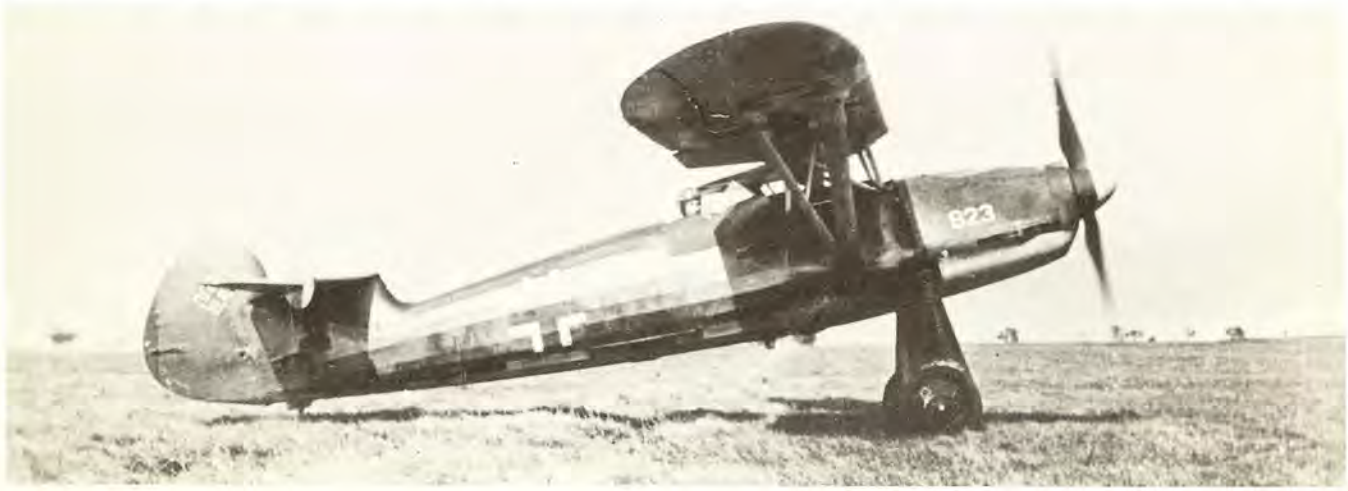
Basic airmanship instruction was done using gliders which retained the prewar finish of Cream 05. However, the directive issued on July 1, 1944, specified the immediate painting of all sailplanes and gliders with a mottled application of 81 and 82. Solid coloring was not to be used. (LC/3 9.)

Ab initio training prewar were usually painted Silver 01 overall with black trim on struts and wheel hubs. The 01 coloring was superseded by RLM Gray 02 in 1941.

Advanced training aircraft, such as the Fw 58 and Bü 133, had also had their Light Gray coloring replaced by 63 overall since the open declaration of the Luftwaffe in 1935. However, as with the primary training force, wartime pressures saw a transition to camouflage. The Munich crisis had brought the Luftwaffe onto a full alert. All obsolete aircraft available in an emergency for use on front line duties, were hastily camouflaged in 70/71/65. Some received the correct camouflage pattern, others were subjected to more haste and less conformity. They remained in daily use at their relative training establishment. In order to identify them, a broad white band approximately one meter wide was painted around the rear of the fuselage. In addition, the wing top surface center section on biplanes was also painted white and a large black identifying number painted on both white areas. Standard *Balkenkreuze* markings were applied in all six positions. These and the white fuselage band obliterated most of the existing D-registration marking which had, in most cases, been carefully retained when the camouflage was applied. Obsolete aircraft seconded for the final stage of training. This included all categories: bomber, fighter, reconnaissance and transport. They were generally left in their existing camouflage until a major overhaul was necessitated. This was stipulated in the November 1941 issue of L.Dv.521/1. The order remained in force for the duration of the war. Fighter trainers produced during the war were usually fully camouflaged at the point of manufacture.

All aircraft used for advanced training duties wore a combination of distinctive yellow markings on wings and fuselage, e.g., for blind flying training two yellow bands around the rear portion of the fuselage immediately aft of the wings; for bomber or fighter finishing courses a single yellow fuselage band and yellow beneath the wing tips.

Top: Originally these two Grunau Baby II gliders, captured at Moebach in early April 1945, were Cream 05 overall, but only the glider to the left has been repainted in a specified mottle of 81/82. Below: A Focke-Wulf Fw 56 A-1, W.Nr. 823, in standard 70/71/65.



Right: This two-seat Fw 190 S-8, W.Nr. 388 047, was a trainer conversion from the standard A-8 fighter. This particular example was most likely camouflaged in the standard Fw 190A colors of 75/76 with a vertical tail mottle of 75, while all national markings were of the simplified outline variety.



Below: German mechanics assist American personnel in making this Me 262 B-1a, W.Nr. 110 639, "White 35", ready for flight. Camouflage was undoubtedly 81/82 over all uppersurfaces with 76 undersurfaces. However, it is quite likely that the fuselage sides were sprayed initially Light Gray prior to the application of the two-color mottle. The jet cowls have been left in their natural aluminum, a not uncommon practice. It is interesting to note that the starboard wing tip has been painted white on what appears to be both surfaces. This particular aircraft is now on outside display at NAS Willow Grove, Pennsylvania.



Right: Shown here upon its arrival at Neubieburg, this Do 335 A-12, W.Nr. 240 112, was camouflaged in the late war colors of 81/82/76 as described on pages 36, 42 and 44. Flown in by a civilian crew, it was flown out a few days later by an RAF team. Subsequently, this machine crashed during a routine test flight on January 18, 1946, when a rear engine fire burned through the elevator control cables.





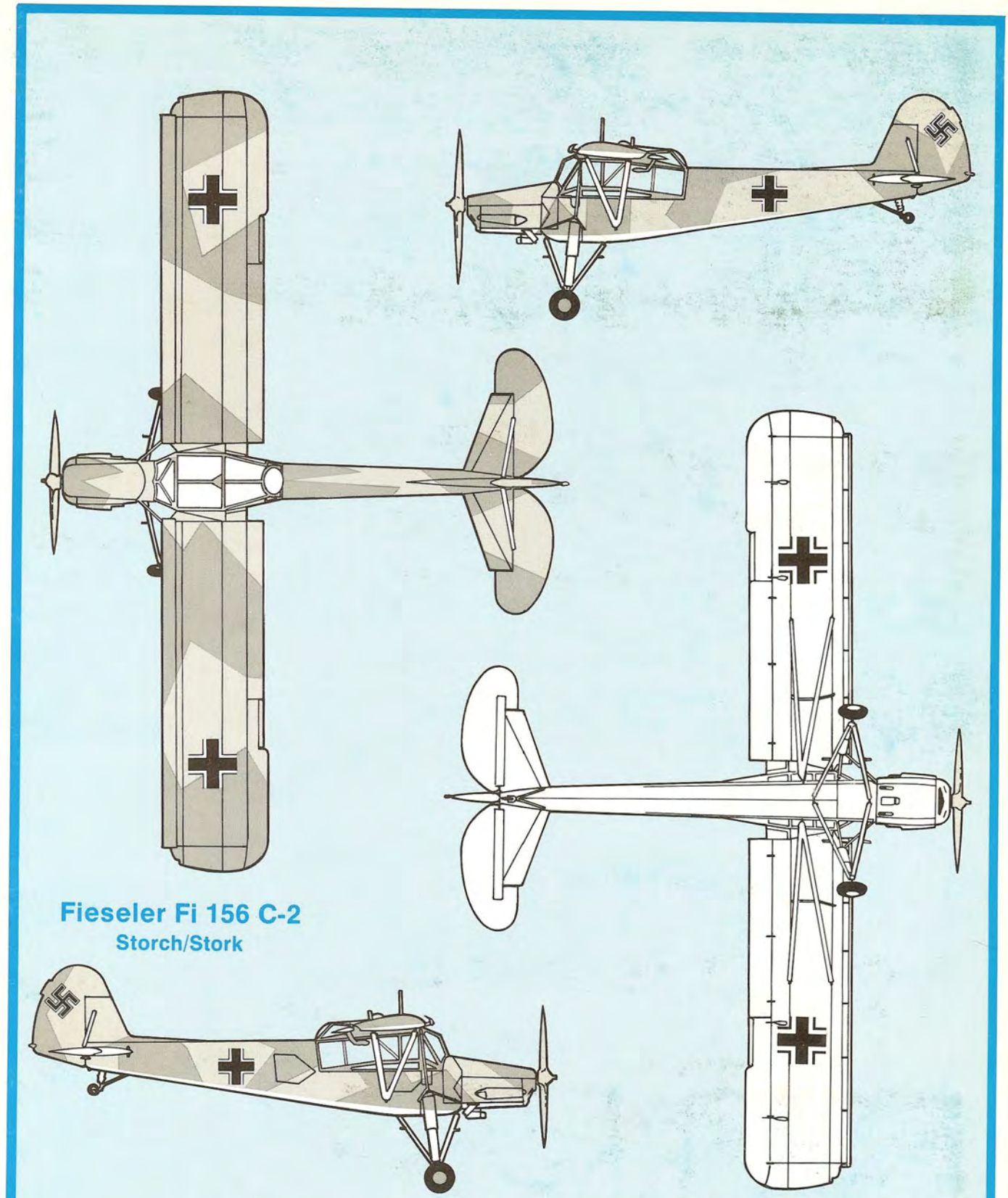
LIAISON

Liaison duties were fulfilled principally by the Fi 156 and Bf 108, the bulk of the work being done by the former, although a wide range of other types were pressed into use in this role, such as Junkers W 34, Fw 58, Si 204, Kl 35 and Go 145. Camouflage, or often the lack of it, depended upon the theater of operations where the aircraft were used during the early to midwar period. However, as the war progressed and Allied air supremacy became more established, camouflage became necessary. For larger aircraft such as the Ju 52 postal couriers, or one of the special bomber conversions used for VIP flights, standard 70/71/65 camouflage was used. Smaller types such as the Kl 35 and Go 145 were often repainted in the field, using stocks of paint available to the parent unit. Late production machines, however, including the Bü 181 left the point of manufacture prepainted, even to the extent of tactical markings for their intended theater of use.

Both the Kl 35 and the Go 145 were popular as unit hacks and in such circumstances more elaborate camouflage was often applied, complete with unit and Staffel emblems. Photographs of several examples of JG 54 hacks show that the camouflage was applied at unit level and even extended to personal markings where ownership was by a senior officer.

Above: Bf 108 D-1, W.Nr. 3059, restored in Charlottesville, Virginia during 1968. Below: Fi 156 D-1 (MS 500 c/n 340) restored in Newburyport, Massachusetts during 1973.





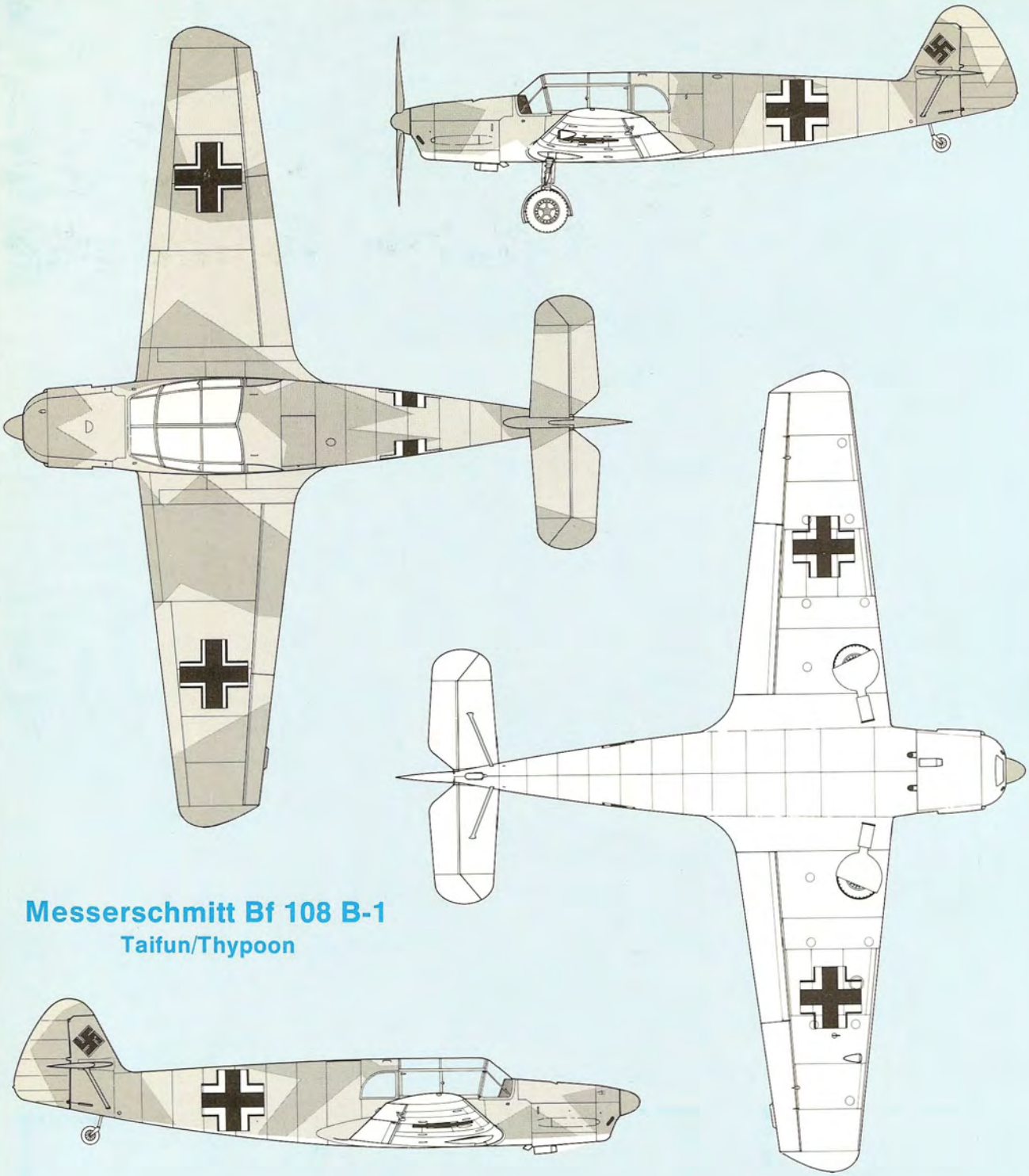
Fieseler Fi 156 C-2
Storch/Stork

Color 70
Black-Green

Color 71
Dark Green

Color 65
Light Blue

This standard factory camouflage pattern was employed by the Fi 156 C and D-series, remaining unchanged during the war years. The desert model, employed in North Africa, was similar to the photograph on page 136. However, the serpentine line network would have been Color 80 and not the dark gray shown. Additionally, the typical factory delivery code letters would have had smooth edges in place of the angular American-style shown in this restoration. German national insignia also remained consistent in size, placement and style throughout the war years.



Messerschmitt Bf 108 B-1

Taifun/Thypoon

This was the July 19, 1940, official factory camouflage pattern for the Bf 108 B-1 series but was also applicable to the B-2 and D-1 series. In the last year of the war, some repainted examples were camouflaged in the new late-war colors with upper surfaces of medium Brown-Violet and a soft mottle of Dark Green 82. North African machines were usually 78/79/80, although some examples dispensed with the Olive Green 80. German national markings were fairly consistent in their application. Dimensions were: Wing Top: 900 mm; Wing Bottom: 800 mm; Fuselage: 800 mm (Later 750 mm); Swastika: 300 mm.

Color 70
Black-Green

Color 71
Dark Green

Color 65
Light Blue

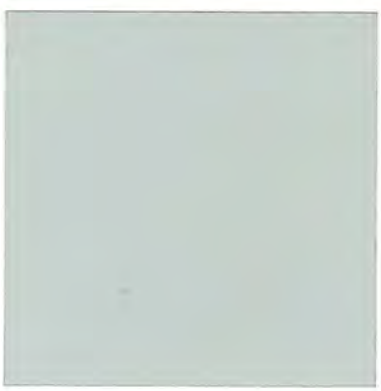


LIGHT PLANES

Unquestionably, the Fieseler 156 *"Störch"* (Stork) and Messerschmitt 108 *"Taifun"* (Typhoon) were outstanding examples of light planes and, not surprisingly, many examples of these two aircraft are still to be seen in Europe and North America. Like many other light planes produced prior to the war in Europe, the *Störch* and *Taifun* were impressed by the Luftwaffe for military liaison duties. However, between the years 1935 and 1940 most of the light planes produced were still within the general aviation sector and bore paint schemes and markings associated with this category. In the main, there were three basic color schemes employed by light planes during the last half of the 1930s. The color chips below represent the three principal colors which were applied over all external surfaces of the aircraft. Initially, almost all light planes were finished in a cream color generally associated with wooden and fabric surfaces. Later, the cream color became formalized as RLM Color 05. By 1937, cream had given way to a Light Gray which was to be seen on a variety of airplanes including paramilitary types still thinly disguised as civil aircraft. Often, a second decorative color was applied to the nose and carried gracefully to the rear of the fuselage in a gradually diminishing trim line. This second color was usually blue, but black also was used on occasion. About mid-1938 a paramilitary color was introduced. It was applied to various single engine aircraft. The *Taifun* illustrated at the top of this page is typical of this scheme. Various other aircraft including Ar 68s and some Fw 44s also were to be seen in this Dark Blue-Gray which, at this time, is otherwise unidentified by number code. With the outbreak of war in September 1939, general aviation in Germany was curtailed and few manufacturers ventured to introduce new light planes into the market. It was hoped that the war would quickly be over and that the political climate would once again permit light planes a place in the sky. As events progressed and the war continued, several light plane types began to appear in outright military colors. Notable were the Arado Ar 96 trainers which were often seen in RLM Gray 02 overall. (LC/3 11.) (GAM 40.) Black Green 70 and Dark Green 71 were also widely used with undersurfaces in Light Blue 65.

Top: Painted Dark Blue-Gray, this Bf 108 B-1, D-IIPY, carries the Messerschmitt logo and registration letters in Cream 05. The black-white-red swastika tail insignia appeared on both sides after June 1936. Canopy framing was left natural plated metal.

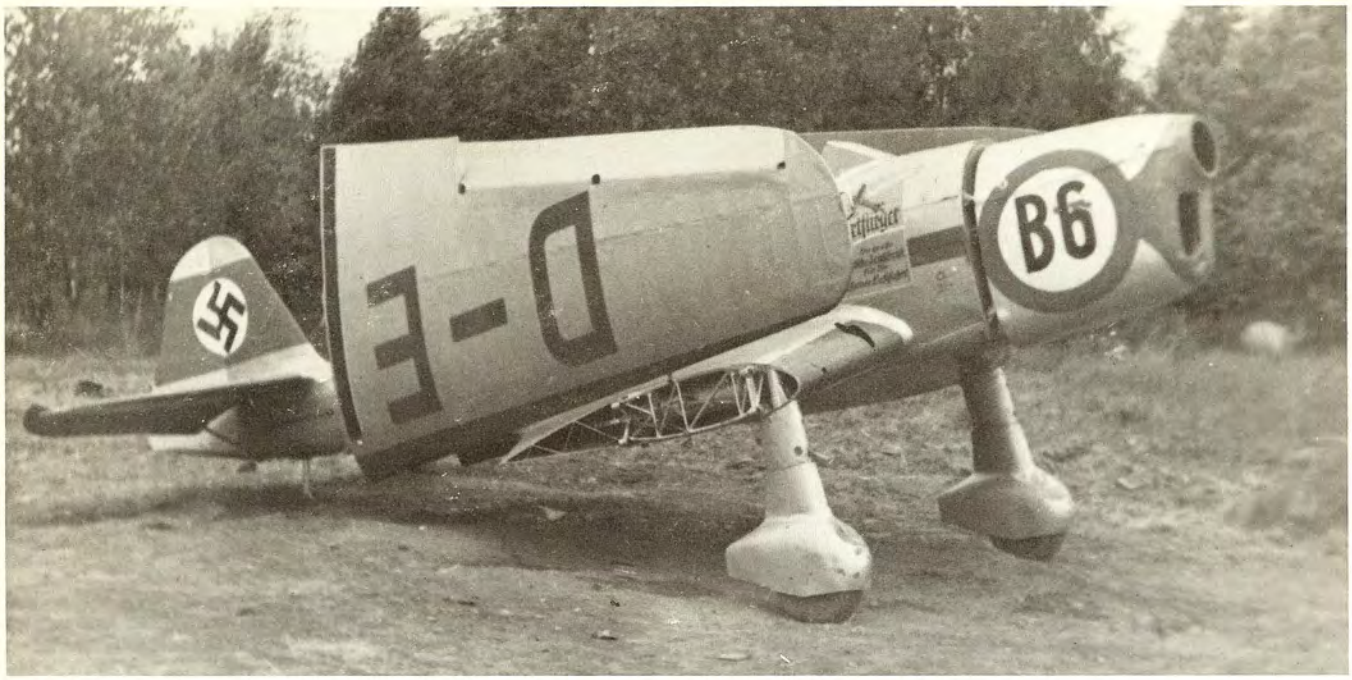
05 Cream
05 Lasur



Light Gray
Lichtgrau



Dark Blue-Gray
Dunkelblaugrau





Top: Photographed at Schweinfurt in June 1945, this Klemm K1 35 B-1 was the official light plane of *Der Deutsche Sportflieger*, a prominent German publication. Left: Painted 05 overall with blue trim and adorned with the Arado logo on its cowl, this Ar 79 A-1 was produced in limited numbers in 1938. Below: The personal aircraft of *Graf* Hagenburg, this Bücker Bü 133 C-1 was finished in 05 overall with blue and white trim, and an aluminum engine cowl. This *Jungmeister* was photographed in Cleveland during September 1938 where it participated in the National Air Races.



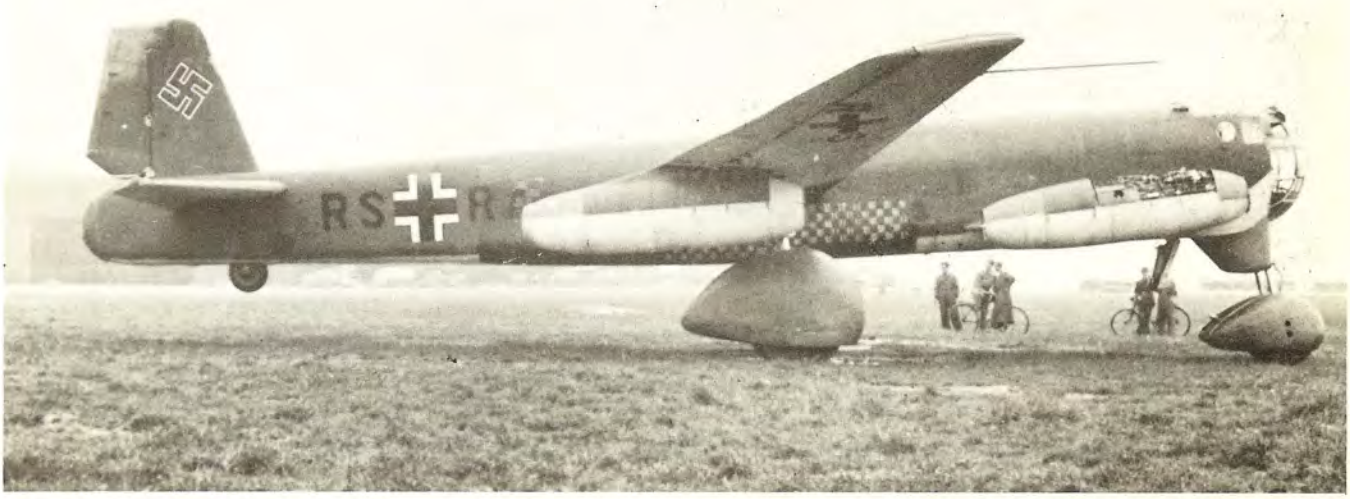


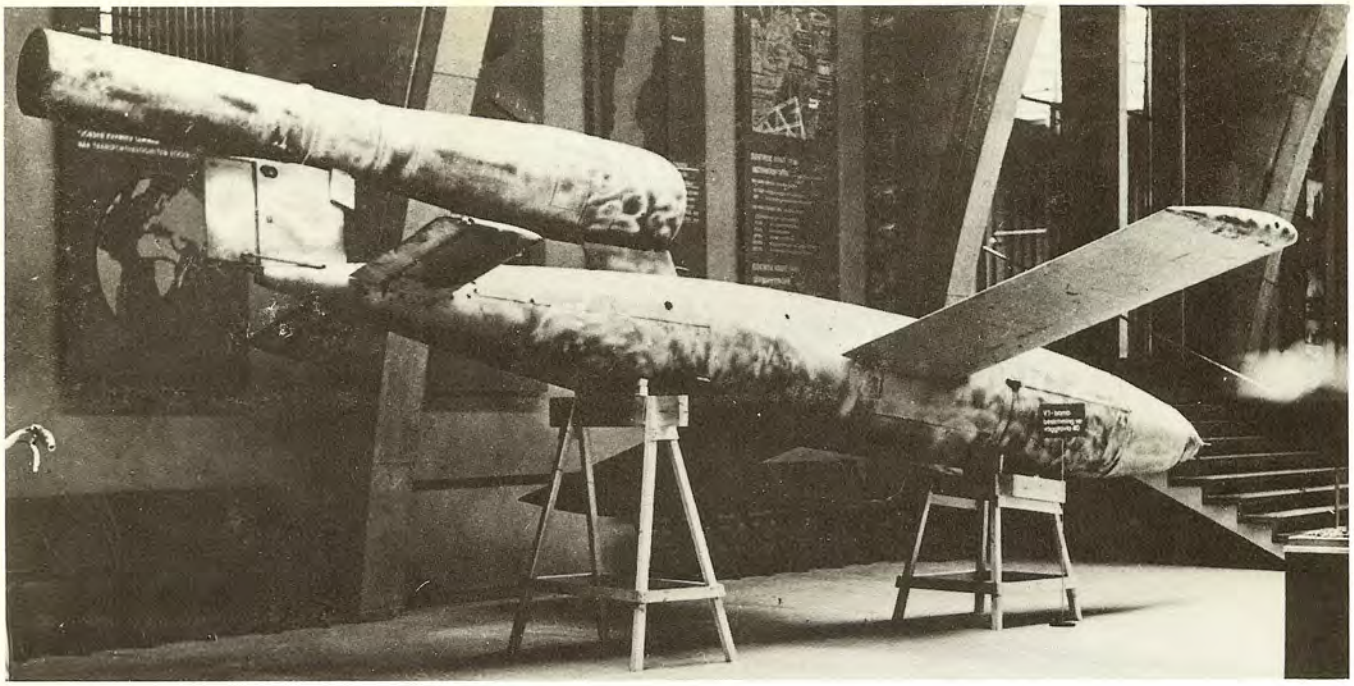
RESEARCH & DEVELOPMENT

With only a few exceptions, all Luftwaffe aircraft which were solely intended as research and development, were painted according to their ultimate roles. Apart from the uniqueness of a particular design, there was often little to distinguish the R&D machine from production types. The Göppingen Gö 9, an R&D aircraft, built by Schemp-Hirth of Wüsterberg for testing the rear engine and propellor concept later adopted by the Do 335, was mainly built of wood and fabric. This R&D aircraft was painted in color 05 generally associated with wood and fabric, and carried the black civil registration D-EBYW. Another R&D machine, the FGP 227, was created to test the capabilities of the huge BV 238 six-engined flying boat (See p. 100) and was camouflaged in the maritime colors of 72 and 73 over all uppersurfaces with 65 on all lower surfaces.

Another R&D design was the jet Heinkel He 280 V7, shown above, which was transferred to the DFS facility in April 1943 for various aerodynamic research programs. The jet engines normally underslung beneath each wing were removed, since the prototype was flown as a glider, it being towed aloft by a He 111 H-6. As shown here, the camouflage consisted of RLM Gray 02 overall with fuselage crosses in the size and proportion of those once seen on prewar He 51s. All other insignia and registration letters appear to conform to regulation size and position specifications.

Above: The He 280 V7, minus its jets, is finished in RLM Gray 02 overall. Below: During 1944 the unusual forward swept winged Ju 287 V1, RS+RA, was built from components of three different aircraft to expedite flight tests of the new wing form. Overall color was Dark Green 71 top surfaces, with Light Blue 65 undersurfaces. Traces of 02 may be seen on the engines and rudder.



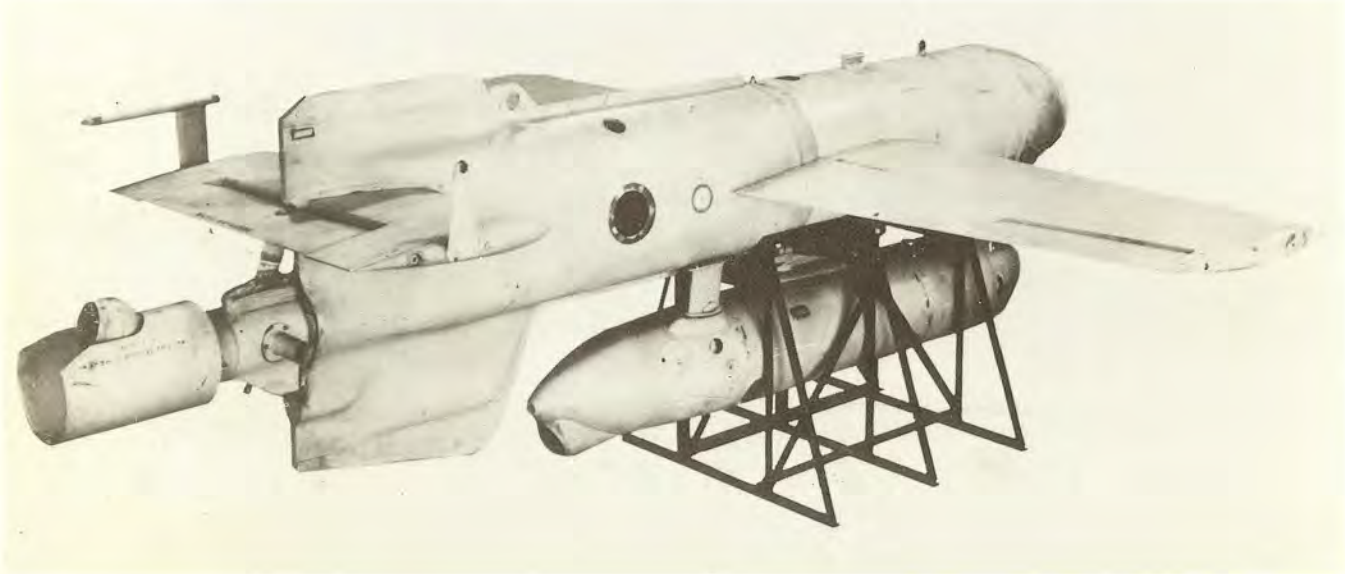


MISSILES

During the war the German aviation industry succeeded in producing a wide range of missiles, many of which were operationally deployed. Besides the better known "Buzz Bomb", the Germans produced a host of air-to-ground, air-to-air, and ground-to-air missiles. In the former category were the Ruhrstahl PC 1400X controlled trajectory bomb, the Henschel Hs 293A radio control bomb and the Blohm & Voss BV 246 *Hagelkorn* (Hailstone) glider bomb. In the air-to-air category were the Ruhrstahl X4, while the latter category were represented by the Henschel Hs 117 *Schmetterling* (Butterfly), the Messerschmitt *Enzian* (Gentian) and the Rheinmetall-Borsig *Rheintochter* (Rhine Maiden).

With the exception of the Bv 246, most of the above mentioned missiles were not camouflaged in the usual manner. The upper surfaces of the BV 246 were in Dark Green with Light Blue lower surfaces. Henschel 293A bombs were usually Light Blue 65 overall, as were the PC 1400X missiles. The best known of the ground-to-ground missiles was, of course, the V1 *Höllenhund* (Hellhound). Initially, most of these bombs were camouflaged with a single uppersurface color of either Black Green 70, Dark Green 71 or either of the two maritime greens, 72 and/or 73. There are also recorded instances of bombs in Gray Green 74, Gray-Violet 75 over uppersurfaces. The lower portions were usually in 65 Light Blue (for greens) and 76 Light Blue (for grays). The solid application of paint later gave way to a mottle effect while still others incorporated a mix of styles due to decentralization in manufacturing of parts. The bombs uncovered by the U.S. Army at the large Dannenberg complex in April 1945 were painted in a thin coat of Yellow-Green 99 over uppersurfaces, with Light Gray underneath. Warheads were in Dark Green 82. This is a case where the protective primer paint (99) also served as adequate camouflage covering. Traces of Light Blue were observed on certain small underside components on many of these bombs such as fillets and control covers.

Top: This Fieseler Fi 103 A-1 was Dark Green over uppersurfaces which extended beneath the bomb's fuselage. Below: This Henschel Hs 293 A-1 was overall Light Blue 65.





02 RLM Gray
02 RLM Grau



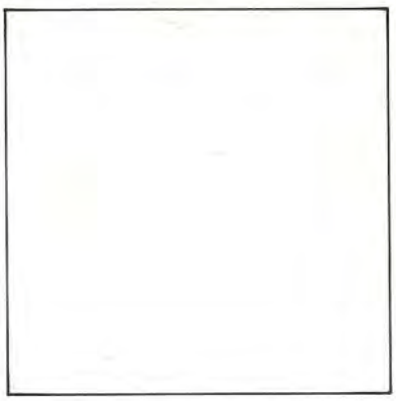
Light Gray
Hellgrau



99 Yellow-Green
99 Gelb/Grün



Blue-Gray
(wooden propellers)



00 Clear
00 Wasserhell



Wood/Fabric Sealer

PROTECTIVE PAINTS

Essentially, protective paints were applied to surfaces subject to exposure from the elements, chemicals or as primer paints for additional treatment. During the prewar years, a light gray primer, probably not unlike our specimen above, was used for metal panels and tubing. Correspondingly, a reddish-brown primer, shown above, was applied to all fabric and wooden surfaces. This, or a similar reddish-brown primer, was also applied to certain internal metal equipment boxes. The light gray primer was, for the most part, superseded by RLM Gray 02, shown above, for metal parts by the time war broke out.

A variety of colorless finishes, to different chemical specifications, were used both internally and externally on wooden, metal and fabric surfaces. Flying boats and float planes had their hulls and floats finished with a colorless anticorrosive paint through which the normal camouflage paint could be seen. A special protective dip, used for waterproofing light metal parts on ocean going aircraft, had a distinguishing blue tinge to identify parts so treated. (GAM 165, 167.)

These clear protective finishes usually did not produce a glossy outer finish. Contrasted with this is a clear paint identified as Light Water (*Wasserhell*) 00, shown above as an empty block.[1]

The blue-gray sample shown above is listed here as a protective paint but we cannot be completely sure of its composition. This color was found on wooden VS 9 and VS 111 propellors during the closing months of the war.

Another protective color serving a dual role was Yellow-Green (*Gelb/Grün*) 99 shown above. This protective paint appeared as a primer on a variety of metal surfaces such as props and spinners and also as camouflage during the last weeks of the war.

An example of the later practice was, until recently, still to be seen on the Fieseler Fi 103 A-1 (alias the V1) on display at the Imperial War Museum in London. This particular "Buzz Bomb", W.Nr. 477 663, fitted with a yellow nose (excluding the 82/76 colored nose cone) denoting its training role, was finished in Color 99 over all upper surfaces including the Argus pulse jet. The bomb's lower surfaces were entirely a light gray, very similar to the Light Gray shown above. The fin-rudder assembly was light gray with 99 as a one-pass spray, horizontally positioned across both the fin and rudder.

Another example of possible dual purpose paint can be seen in our sample of Light Gray above. This particular color was uncovered along the entire fuselage side of the Me 262 A-1a/R1 (see pages 9 and 36) restored by the NASM. The underside color, 76 Light Blue, met the light gray at the turn-up point, but extended no farther up the fuselage side.

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During the last two months of the war, many aircraft received only a fraction of the attention to detail during their construction and final finishing that earlier production models once enjoyed. A good example is this He 162 A-2, W.Nr. 300 027, being examined by S/Sgt. Robert S. Boyle at the Junkers factory field between Stassfurt and Bernburg on April 16, 1945. Parts such as the gear covers, wings, engine covers, horizontal stabilizer, rear fuselage upper decking and parts of the fin have been painted in camouflage colors while the remainder of the airframe, excluding the nose cone, was left natural aluminum. The formed wooden nose cone has been primed but not painted. As mentioned elsewhere, the application of camouflage during the final months of the war was, in many cases, greatly simplified. The painting of parts (as opposed to areas) afforded a degree of production time savings which resulted in some interesting and unusual camouflage patterns. Wing and fuselage crosses have been applied but not swastikas. Damage to the canopy and engine were inflicted by German personnel prior to their withdrawal.

