OSPREY MASTERCLASS

WORLD WAR 2 LUFTWAFFE FIGHTER MODELLING

GEOFF COUGHLIN

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From the fearsome Messerschmitt Bf 109 to the Heinkel 219 Nightfighter, the World War 2 era Luftwaffe offers the modeller a wealth of opportunity, inspiration and challenge. This superb addition to the Masterclass series forms a key practical reference for the modeller from basic construction through to super-detailing, providing plenty of hints and tips to help bring out the very best in your models. The author, Geoff Coughlin, has been building scale models for over 20 years and is a regular contributor to popular magazines such as *Tamiya Model Magazine International* and *Scale Models International.*

OSPREY MASTERCLASS

In this acclaimed series, leading modellers from both sides of the Atlantic – designers, sculptors, and prize-winning miniaturists – share their experience of the materials and techniques which produce Gold Medal standard models and dioramas. From planning projects and gathering references, through selection of materials and use of tools, to final mounting and display, their step-by-step advice is illustrated by nearly 250 colour photographs and drawings.

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ISBN 1-84176-060-9

9 781841 760605

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INTRODUCTION

I have always been very interested in WWII Luftwaffe fighters, and the opportunity to draw on that interest and write a book for the Masterclass series proved irresistible. The purpose of this book, however, is to provide advice on building scale models of Luftwaffe fighters, not to act as a definitive reference source about the Luftwaffe in WWII. I will leave that to the likes of Kenneth Merrick, Uwe Feist, J. R. Smith, J. D. Gallaspay and others. All have written excellent books covering the various fighter types and variants that flew with the Luftwaffe in WWII.

I am no expert on the history of the airmen who flew for the Luftwaffe, nor on the technical data of the aircraft that it operated. I have come across many whose knowledge of the subject is encyclopaedic, and the majority of them continue to bring a wealth of information to the modelling table. So if you believe that you may be among this group, please be tolerant and understand that it is not my intention to try to offer you information that is generally available elsewhere. There are hundreds of books currently available that provide modellers with the photographic reference and information they need to make a decent go of any modelling project. My hope is that the text will appeal to all modellers who have an interest in aircraft flown by the Luftwaffe in WWII and who enjoy building models – not just talking about it!

The range of different aircraft types included in this book is limited, but the techniques that are explained cover just about everything you need when tackling any WWII Luftwaffe fighter project. Hopefully, they will add to the broad range of skills that no doubt you already possess, improving the options at your disposal.

THE AIMS OF THIS BOOK

In writing this book, I had a number of aims:

- To help you create scale models that look realistic and eye-catching, and are, perhaps, that little bit different;
- To provide ideas that will stimulate a creative approach to your modelling;
- To explain the techniques that I use – there are many others, but these work for me.

From the discussions I have had at model shows around the country, it has always struck me that we modellers are a very interesting group. I never cease to be amazed at the knowledge some modellers have about their subject, and I have learned a great deal from these conversations. The quality of the modelling that I see is also astounding, and often the best models do not appear in the competitions, but on the club table displays. For me, this is the most enjoyable aspect of attending shows – stopping just to chat to the builder of, say, a Bf 109 about its mottled finish or weathering. My own modelling has improved greatly over the years as a result of these discussions, and quite often I go home to try out new techniques for myself. A great example of this was the use one modeller had for Blu-Tac, which he formed into long rolls to mask camouflage patterns. This, he said, produced a really fine, lightly feathered demarcation between the colours. The real benefit, he continued, was that it gave just a hint of a feathered edge, unlike the greater overspray that is quite common when using an airbrush freehand. I just had to give the technique a go, and I have never found anything easier for achieving this effect.

The moral I learned quite quickly in this hobby of ours is to remain open-minded about what can be done – it is truly astonishing what you can achieve through talking to people and trying 'new' techniques.

WHAT'S IN IT FOR YOU?

Although this book is about building scale models of Luftwaffe fighters, I am convinced that there is much in it to assist any modeller who wants to develop his or her modelling skills. I haven't actually counted the total number of techniques explained, but it runs into dozens.

PHOTOGRAPHY

They say that a picture is worth a thousand words, and I adhere to that philosophy wholeheartedly. To this end, I have selected over 240 quality colour photographs to illustrate the various techniques, while the text has

been written carefully to support them. My intention is that the information should come across in a clear and concise way.

SO WHAT'S INCLUDED?

Any study of the aircraft employed by the Luftwaffe during WWII could demonstrate the variety and originality of the designs used. The colour schemes were distinctive and varied, setting these machines apart from RAF aircraft, which tended to have more sombre and predictable schemes (with a few notable exceptions). This variation in the camouflage patterns has always fascinated me and provides a seemingly endless source of subject matter for the workbench.

From evenings spent at my local model club and after looking around the model shows, two aircraft stand out among the fighter types operated by the Luftwaffe in terms of popularity: the Messerschmitt Bf 109 and Focke-Wulf Fw 190. Both aircraft were built in huge numbers during the war and appeared in many different configurations. Equally important from a modelling perspective, both have been kitted widely by all the major manufacturers. At the time of writing, Hasegawa, Tamiya, Airfix and Revell/Monogram, to mention a few, all have models available. If, like me, you are a Luftwaffe fan, you will probably have more unmade models of these aircraft insulating your loft than you have assembled! With any luck, this book will motivate you into digging out one or two of those boxes and starting modelling!

DETAIL SETS

There are some simply stunning resin and etched brass accessory sets available for models of Luftwaffe fighter types. Notably, Aires, Verlinden and Eduard, again to mention just a few, all produce excellent products if that's what you want. However, therein lies a real dilemma for many modellers – to detail or not to detail? Only you can answer that question, but I have included techniques that will help you whichever way you go. The fact is, I blow hot and cold when it comes to adding extra detail; to be honest, much depends on my mood at the time. There are days when I have just finished a model that has been quite involved in terms of detailing and the last thing I want to do is get out another resin super-detail set. Probably one of the greatest

ABOVE My model of a Messerschmitt Bf 109F-4, built from a Hasegawa kit, and detailed with aftermarket accessories and the paint techniques described later in the book.

forms of relaxation is to take (another) Hasegawa Bf 109 variant and build it straight from the box. The kit is a real gem and builds into an excellent replica using the kit parts alone, because the fit of parts is so good and construction so straightforward. I have finished one in a weekend.

ABOVE This Fw 190D-9 displays a host of detailing that makes it stand out.

WHAT TO LEAVE OUT?

Without question, one of the most difficult tasks has been to decide what specific models and aircraft types to cover in the book. The Luftwaffe flew so many different types and sub-types of aircraft that it would have been impossible to include them all. So some difficult decisions have had to be taken, and my particular approach has been to choose aircraft that stretch the range of modelling techniques to the full. For example, I have included a model of the Focke-Wulf 190A-4 in the white distemper winter scheme used by I/JG 54 on the Russian Front. By way of contrast, I have also featured an Fw 190F-8 of 2./SG 4 with upper surfaces oversprayed in *Sandgelb* and mottling in *Olivgrün*. Very different techniques were required to build these models, which has meant that some other types are not featured. I accept that this may be disappointing at first, but I would suggest that you can apply the techniques outlined in this book to any specific aircraft that may have been omitted.

WHAT SCALE?

The vast majority of my models are in 1/48 scale, or quarter scale as it is often described. So it made sense to focus on these kits for this book. I particularly love quarter scale because you get the best of both worlds – a reasonably sized model and a decent level of detail, particularly in the cockpit.

Another important decision in terms of what scale to feature was the availability of the kits themselves. Furthermore, a substantial number of aftermarket accessories and detail sets favour quarter scale.

However, no matter which scale you choose to work in, all of the techniques described in this book can be used to good effect.

THE GALLERY

Good colour references are thin on the ground, although photographic information about Luftwaffe types often appears in good reference works. Some of these are listed at the back of this book. Every now and again, a book is released by Verlinden Productions showing in graphic colour detail their products assembled and finished. It is no coincidence that these books sell very well, because modellers can't resist using them for colour reference and inspiration. To help you in this book, I have included a gallery of photographs by two of the best photographers I have ever met, Robin Edwards and Ian Taylor. Their shots really bring to life the models I refer to throughout the book.

REFERENCES

It is often said in reviews and articles in the modelling press that reference material is invaluable. I really want to stress this point and have devoted a chapter to the various reference sources I have used, giving pointers to other key texts identified in the Bibliography.

On the positive side, this book contains just about every modelling technique that I know – come to think of it, just about *everything* I know about building models the 'Geoff Coughlin' way. Again, I must stress that this is how I build and finish my models, but it is definitely not the only way. Many modellers I know have their own methods of doing things that work very well for them, and long may that continue. My purpose is to contribute to the great pot of modelling knowledge just about everything that I have picked up during the 30 odd years I've been building scale models so that you may benefit from it.

I do not claim ownership of all the techniques explained, though – someone once said to me, 'You know, Geoff, nothing's really that original is it? After all, what we know has usually been picked up from someone else along the way, hasn't it?'

I very much hope that you enjoy this book. Good luck in your hobby – we share a great common interest.

Geoff Coughlin
December 1999

CHAPTER 1

GETTING STARTED

To be honest, like so many other aspects of our hobby, the depth you go into before commencing the project depends entirely on you. In Chapter 2, I have explored the various sources for reference material, so I will begin here on the basis that you have assembled a variety of references around you and are now ready to get started.

CHOOSING A KIT

Kits for some Luftwaffe fighters, notably the Bf 109 and Fw 190, can be found in most of the major scales: 1/72, 1/48 and 1/32. There is even the old Airfix Bf 109 kit in 1/24 scale, if you have the room to store it when finished. Older products, usually from Airfix and Revell/Monogram, often have raised panel lines. Personally, I prefer recessed panel lines, mainly because they will take washes and look more realistic when the model is finished, but I am aware of the differences of opinion that many modellers have, so it is up to you. I'll go into greater detail on this subject in Chapter 3.

Another factor in deciding which model to build from those available of the desired subject is simply how much you want to spend. If you are on a budget and want to build your model straight from the box, using the kit decals and none of the aftermarket sets, Tamiya's 1/48 range is difficult to beat – especially in terms of value for money. Indeed, while on the subject of cost, if 1/72 scale is preferable, Revell's fighter kits offer unbeatable value, featuring recessed panel lines, generally very accurate detailing and good build quality. Two I have added to my collection are the Me 262A 1a and Me 262B 2a, the latter being the definitive night fighter.

I have long wanted to build a model of the Fw 190D-9, and until recently there wasn't a great choice. In the 1980s, Trimaster produced an excellent range of quarter scale Luftwaffe subjects, mainly fighters. The detailing was exquisite and all included an etched steel fret containing items like instrument panels, rear cockpit decking, seat harnesses and undercarriage bay fittings. They sported finely recessed panel lines and usually were moulded in a hard, brittle plastic. On the whole, the engineering of the parts was good, although some definitely fitted better than others. A good example of positive fit is the D-9 itself, while one that didn't go together so well was the Messerschmitt 262 1a.

The Trimaster series went out of production some time ago, but I know of many modellers who bought the kits despite their hefty price tag. Dragon subsequently released several of the original mouldings, alas without the etched steel frets, those parts usually being moulded in plastic. All this has led to a lot of unmade Dragon and Trimaster kits knocking around, many still in their cellophane wrappers just waiting to be built. In more recent years, Tamiya has come to the rescue for those who didn't buy a Trimaster or Dragon D-9. The current offering from Tamiya is a real gem, providing an accurate shape, superbly detailed panel lines and a moderate level of detail. Many Luftwaffe modellers have probably bought this kit as well, so the choice remains as to which one to build first. For my part, this was an opportunity to dig out the old Trimaster kit and get started.

WHAT DETAIL TO ADD?

Clearly this decision will be affected by what is included in the kit. The Trimaster Fw 190D-9 has all the detail most modellers will ever need. Having said that, Aires produces a stunning resin engine and gun-bay detail set for the 1/48 Tamiya D-9 that simply blows you away when you look at it. One day, I will summon up the courage to attempt to incorporate one of these truly super-detail sets. The company even offers a stunning resin engine for Hasegawa's 1/72 kit – all very well if your eyes are up to it! Some of the resin detail sets available have been incorporated in the projects contained in this book.

A key question I always ask myself is, 'Will this resin/etched set really enhance the detail offered in the kit?' Answering this 'needs' versus 'wants' issue honestly can really save you a fortune in the long run. For example, I remember seeing a resin detail set for the Grumman F5 Hellcat that really seemed to be a waste of money. The way the cockpit rails close up on this aircraft prevents virtually all

RIGHT My workbench; notice that everything is to hand.

BELOW A 'daylight' bulb is essential, as it provides a true light under which you can work. Ordinary bulbs have a yellow hue, which can affect your judgement of colours.

of the detail inside being seen when the fuselage halves are closed. What Hasegawa offers in its kit is more than adequate and reinforces my belief that you should think long and hard before shelling out for the latest sculptured resin masterpiece.

At this stage in the process, you should have all the reference material you need, plus the detail sets (if any) and the necessary decal sheet from one of the specialist manufacturers if not using the markings supplied in the kit.

WORKING AREA

The accompanying photographs will give you a good impression of my own working area, and you can use them as a guide for setting up your own. Arranging a working area for building models raises a number of issues. Firstly, where can you do your modelling? I know from bitter experience that it is not always possible to have a dedicated work area, but this is preferable for a number of reasons. For a start, if you intend spraying your models, whether with an airbrush or cans, good ventilation is essential. This is also necessary when using virtually all of the glues and solvents required by the hobby. I have installed a powerful extractor fan in the window that draws away most of the fumes generated when spraying. In fact, I never spray with aerosol cans indoors, mainly because they operate at high pressure and are extremely smelly and often toxic. In this situation, the garden shed comes in handy. Speaking of sheds, more and more modellers are turning to purpose-built garden sheds for modelling, but don't ask me where all the gardening stuff goes! There is a lot to be said for this approach, particularly if space is at a premium inside the house.

I have located my workbench under the window, not only because of the ventilation

issue, but also because this provides a lot of natural light to work in. The bigger the window, the better.

KITTING-OUT THE WORK AREA

While on the subject of good light, I cannot stress highly enough the importance of this aspect of modelling. There are key health and safety issues to consider like avoiding eye strain and the seemingly inevitable need to progress to larger scales because we just can't see small things any more. In fact, unless you have very good natural light in which to work, you should always use an angle-poise desk lamp – preferably two. They can be set at each end of the workbench and will flood your work area with light. Don't forget to fit blue 'daylight' bulbs, as these will give you a natural white light; normal light bulbs produce a yellow light that may prevent you from seeing colours in their true form. Daylight bulbs are readily obtainable from lighting shops – even my local supermarket stocks them.

For a workbench, visit your local DIY or discount furniture store, which should produce any number of desks that will be suitable. Make sure the surface area is large enough for you to spread out all the necessary tools and kit parts, as it is all too easy to buy something that looks okay in the store, or maybe is on special offer, but is too small to do the job.

Another issue for me was that the worktop had to be high enough to get my legs under when sitting on a proper swivel chair. Again, the latter is vital to avoid causing back injury, which can often result from long periods spent at the workbench. A tip when buying a chair is to get one with back, lumbar and height adjustment controls so that you can tailor the settings for your individual needs. Take it from me, I learned the hard way by making do with what was clearly unsuitable furniture: it resulted in a disc being removed from my spine and the need for regular MoTs at the osteopath and health clinic. Enough said.

A decent cutting mat is essential, and although they can seem a bit pricey at first, the large, green, self-sealing mats you often find at model shows are ideal. I use an A3 size (450 x 300mm), which works well. I tape it to the workbench to prevent it from slipping when cutting and sanding. When one area becomes soiled, you can simply turn the mat around and use another section.

Storage is definitely a major consideration, and I'm sure you will have seen – indeed probably already have – some of the many freestanding and wall-mounted storage trays that are on the market. I have fixed mine to the wall – primarily for ease of access, but they also take up what otherwise would be 'dead' space in the corner of the room. I use different styles to accommodate a variety of manufacturers' bottles and tinlets; it is a good idea to take a few bottles and tinlets with you when looking for storage trays to check out the fit before buying.

ABOVE These storage boxes, available from good hardware stores, are excellent for storing the 1001 items we accumulate as modellers.

THE TOOLS OF THE TRADE

KNIVES AND CUTTERS

I have a number of these, which can be seen in the accompanying photograph. Mainly used for cleaning up components that have been removed from the sprue, they are essential for retaining control while cleaning up the plastic parts. My main cutting tools are a pair of

RIGHT A selection of cutters. The Olfa P-cutter is on the left with the yellow handle, while to the right of it is an assortment of scalpels and craft knives. I straighten fuse wire by rolling it between the two steel rules on the far right.

Swann-Morton scalpels fitted with No.10A and No.11 blades. Xacto produces a comprehensive set, in fact more than one, with varying sizes of handle and blade. Major model shows are great for stocking up on all your tools. They allow you the opportunity to try them out and find those that suit you best.

The large yellow-handled instrument to the left of the photograph is an Olfa P-cutter. This exceptional tool is used to create recessed panel lines and cut plastic card. Its blade must be held vertically against a hard edge, like a steel rule or a strip of Plasticard. Old credit and store cards work well, and I have a selection of templates cut from them. They are excellent for following fuselage contours where it is difficult to be accurate. The plastic strip can be secured with small amounts of Blu-Tac or masking tape while cutting. As with all cutting tools, go easy on the pressure, letting the blade do the work. With practice, you will be able to cut a line with one pass of the blade, which is always preferable to returning for a second cut, when you might create a 'tram-line' or slip.

MINI SPARES BOX

This is something I have built up over the years and it has become invaluable. It contains

RIGHT The Olfa P-cutter and steel rule are used for cutting plastic and engraving panel lines. When carrying out the latter, the steel rule is held in place with a small amount of Blu-Tac on the reverse side.

a variety of tiny scraps like Plasticard, brass, metal foil and fuse wire. It comes into its own when detailing cockpits and adding all those tiny extra details that can really bring a model to life. The aluminium and lead foil comes from decent wine bottle tops and is superb for creating seat harness straps, seat cushions and the like; no doubt, you'll find a hundred other uses for this versatile material.

FISHING LINE

Another good product that the designers never thought would be used by modellers is ultra-fine fishing line. For me, it is the mainstay for creating aircraft aerial wires. I prefer it to stretched sprue because it is closer to scale thickness. Fishing line is particularly useful for 1/48 and larger scales, and even has uses in 1/72 scale. In addition, it is slightly elastic and, when secured with cyano (super) glue to a fin, can be stretched under a small amount of tension to the aerial mast. A roll will last a lifetime.

WOODCARVING CHISELS

It is surprising how often I resort to my set of woodcarving chisels. I bought a really cheap set from an ironmongers many years ago and they have proved ideal for many modelling jobs. In the main, I use the curved chisels for removing the interior detail from plastic fuselage halves when replacing it with resin

ABOVE LEFT My mini spares box contains a useful collection of little bits and pieces that are invaluable for detailing models.

ABOVE Aluminium and lead foil from the tops of wine bottles has many uses. It is excellent for creating securing straps for hydraulic lines on undercarriage legs and seat harness straps.

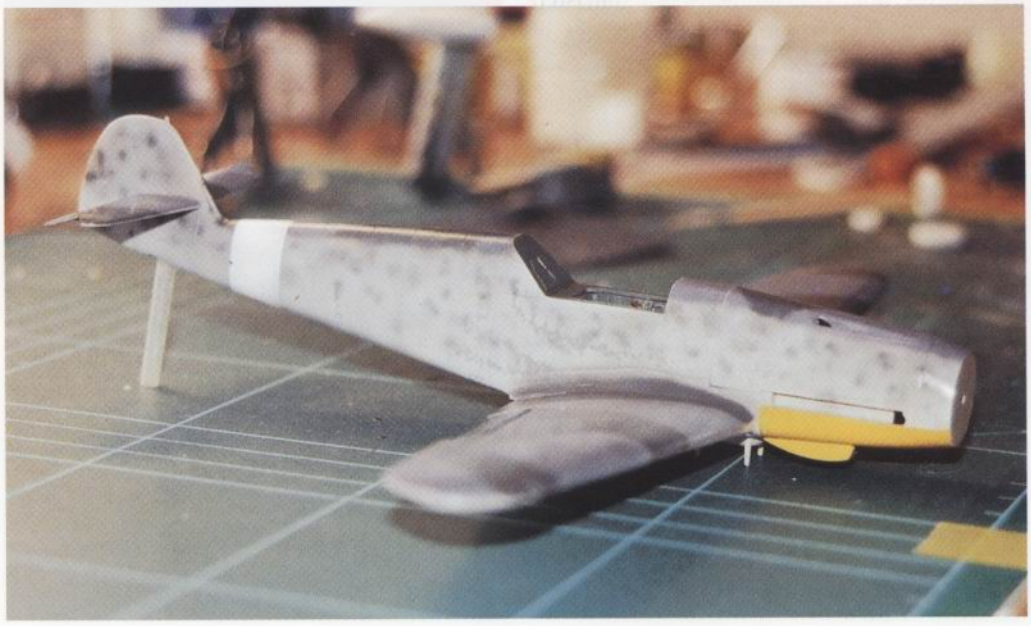
CENTRE LEFT Ultra-fine fishing line is good for re-creating the thin aerial wires fitted to many Luftwaffe types. It is really important not to make these wires appear unrealistic by using material that is too bulky.

LEFT This set of cheap wood carving chisels was picked up at a hardware store, and while I don't think they would last very long when working with wood, for plastic they are ideal.

RIGHT A selection of tools for holding small parts – the tweezers are essential, and those 15-year-old clothes pegs continue to provide sterling service. Notice the sculptured ends of the pegs.

RIGHT Here, a brass replacement instrument panel has been attached to one of the pegs with a little Blu-Tac to hold it secure while all the painting is carried out

RIGHT Where there's a will, there's a way. A paintbrush protective tube has been inserted in the tail wheel bay to help support the model while the paint dries.



aftermarket sets. More often than not, they work best by drawing the blade across the surface with a scraping motion, which is more controllable than cutting into the plastic with the chisel's cutting edge. The steel blades of such cheap chisels are not really suitable for any heavier work, but by respecting their limitations, you can get years of use from them, which is true of all tools.

CLAMPS AND TEMPORARY MOUNTS

I have to smile whenever I look at my modified wooden clothes pegs, but they are probably the single most useful tools I have. They are always in use, either having parts attached to them with Tamiya tape or holding parts in their jaws for spraying. As you can see from the accompanying photograph, the jaws have been modified to different shapes so that they can hold a variety of parts. They must be 15 or more years old, and I reckon they'll still be around when I go!

Good old bulldog clips of various sizes also come in handy, especially for holding small brass parts like seat harness straps for painting.

As far as tweezers go, most of the time I only use the fine pointed type. They seem large enough for most jobs that I need help with, while they come into their own when handling small parts. I also have a pair of flat-nosed tweezers, which are very good for removing decals from their backing paper when adding them to a model. They don't tend to cut into the decal, which is useful.

One of the really irritating tasks is finding a way of supporting a model while the paint is drying. This isn't so much of a problem when using flat acrylic paint, such as Aeromaster, mainly because it becomes dry almost as the spray touches the plastic. When using gloss enamels like Hannants Xtracolor, however, it is a different story. So don't forget to hang on to small items like the plastic tubes that often come with new paintbrushes to protect their bristles. I have acquired several over the years and often find them useful for this purpose. For example, you can jack up the rear of the airframe of a small-scale fighter by locating a tube in the wheel well. In the accompanying photograph, my Bf 109F-4 can be seen propped up in this manner and sitting on the two small mounts for the centre-line fuel tank.

PLIERS, SIDE CUTTERS AND SCISSORS

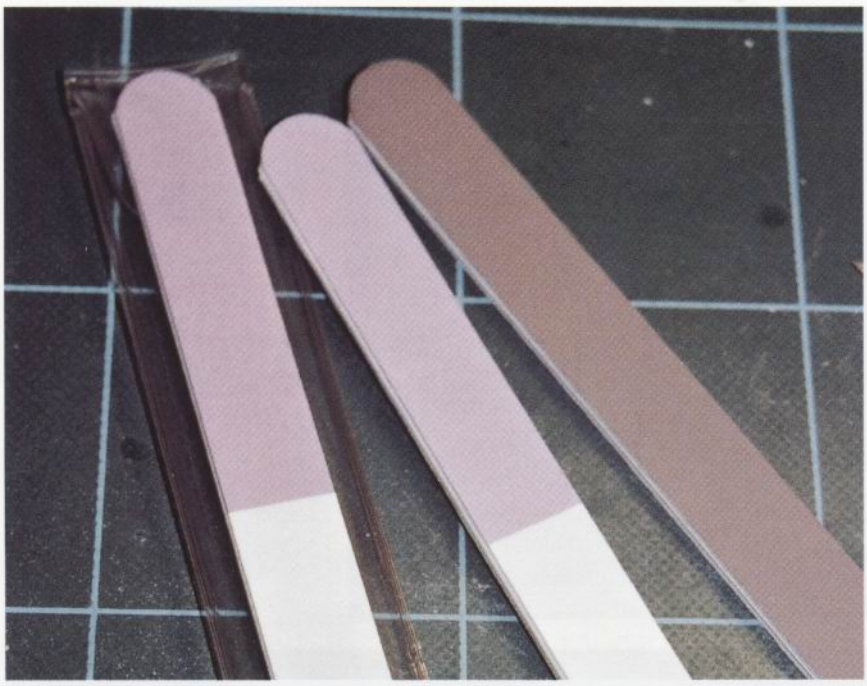
The pair of yellow-handled side cutters that can be seen in the upper right corner of the photograph below are ideal for removing most plastic components from their sprue frames. Always try to cut away from the part itself to prevent unnecessary damage, which is easily caused unless you are careful. The scissors in the centre of the photograph have pointed ends that are useful for cutting individual markings from a water-slide decal sheet prior to soaking them in water. They are also handy for trimming the tiny pieces of metal that remain attached to items that have been removed from etched brass, copper and steel frets.

The flat-nosed pliers with the orange handles are perfect for holding small etched items that require bending. In fact, I have two pairs of these, one a little smaller than the pair shown, and the two combine well for the folding process.

ABOVE Three key tools – from left: a pair of flat-nosed pliers used for bending etched parts; scissors for cutting decals and small brass parts; side cutters for removing parts from their sprue frames.

FOAM SANDING STICKS

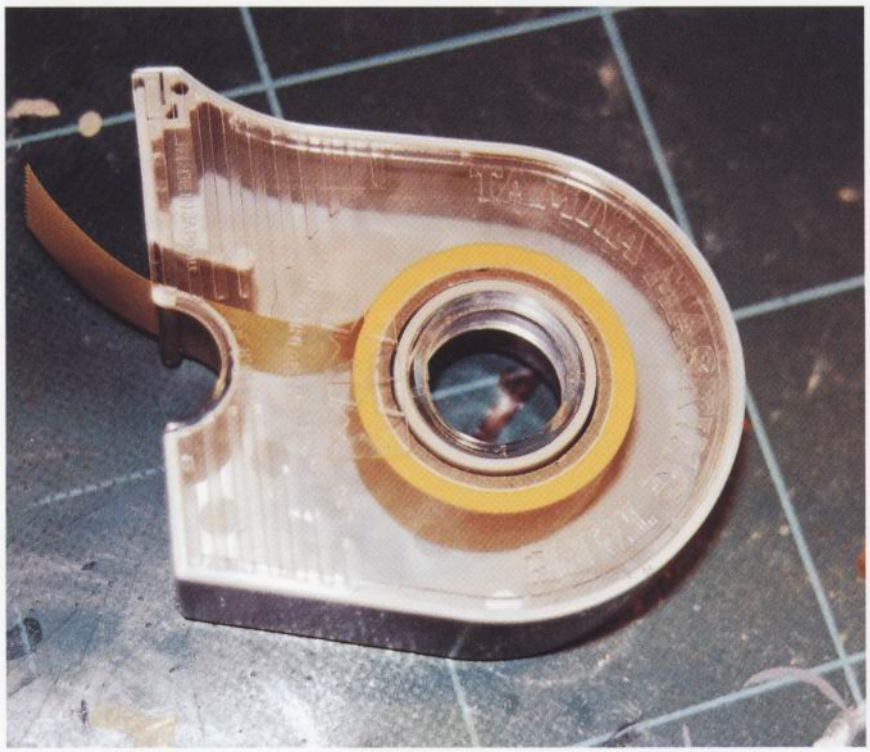
I discovered these several years ago, and many of you who have read my reviews in model magazines may remember my constant references to these invaluable tools. In fact, they are nail buffers, which can be obtained from the nail-care section of any chemist's shop or pharmacy. I have seen the same items offered for sale in modelling shops, but they always seem to be slightly more expensive. Basically, each stick has three surfaces: the pink or purple portion of one side is usually the coarsest and is roughly equivalent to 800-grade wet-and-dry paper; the white portion of the same side is quite fine; the remaining side has a soft, flat grey surface that is used to polish parts once they have been treated with the first two in the order described. Given that these boards are



ABOVE The best discovery I have made in years – these nail buffers are available from chemists and pharmacies.

designed for shaping and polishing fingernails, which have a similar texture to polystyrene, they are ideally suited to our sanding task. They are also durable, too: on average, one will last for about two or three models before being binned.

People I meet in this hobby often say that they have a favourite part of the modelling process. Some like painting and finishing; others hardly seem to finish anything, enjoying the construction stage. For me, there is nothing better than to watch the surface of the model transform into a brilliant shining finish before my eyes, and in such a short period of time. Any blemish in the preparation is usually visible after using the polishing side of the board. By adding small amounts of cyano, these hairline joint lines – particularly at the junctions of fuselage and wings – can be eliminated with the board. Clearly, there is a need to reduce any obvious step in the joint with a sanding block prior to using a board, otherwise you will spend a long night sanding to obtain the desired finish.



BELOW A good-quality masking tape will pay you back ten times over, and Tamiya produces the best.

MASKING TAPE

In my opinion, there is no better tape than Tamiya masking tape. Available in several sizes, it is dispensed from its own holder. What I particularly like is the fact that it was designed specifically for modellers and has just the right degree of tackiness. When cut into strips with a scalpel and steel rule, it can be used for so many tasks that it would be difficult to list them all. Its main use is for masking off and protecting areas that have been painted before adding another colour. The result is a sharp demarcation line, as required for Luftwaffe splinter schemes. You will see the tape in several photographs throughout this book, which will give you an idea of the major uses to which I put this superb product. Another excellent feature is the tape's durability – you can frequently reuse strips to hold parts together while the glue dries.

In the accompanying photograph, you can see that the tape has been used to mask a Bf 109 canopy before it is sprayed Tamiya German Grey. The topcoat camouflage colour is applied after this, the reason being that the correct grey of the interior framing will show through, especially if the canopy is displayed in the open position.

Another very useful masking medium are Post-it Notes. These have an ultra-low-tack adhesive strip and are available in a variety of colours from stationary shops. Again, they are often reusable and are great for masking painted areas during the weathering process. I use them a lot when brushing on pastel chalk dust, their straight edges being easily aligned with panel lines.

FILES

A set of six or seven small files is a real must for your toolbox. They will come in handy for many different sanding jobs, particularly in

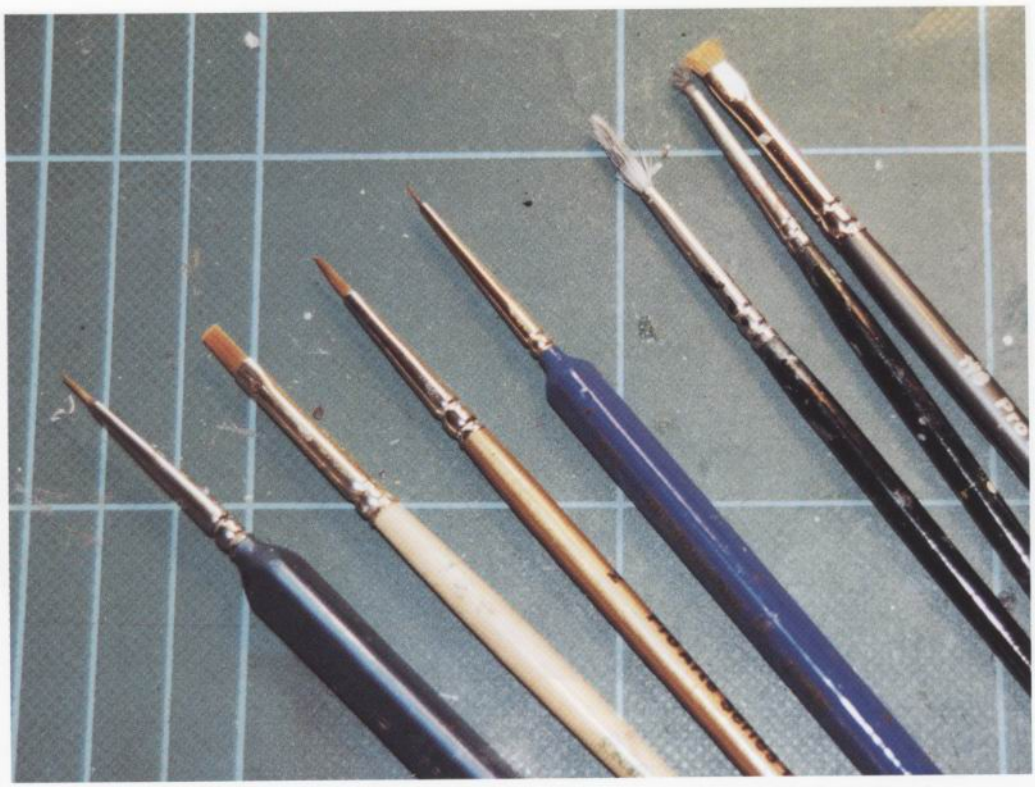
LEFT Those clothes pegs again, this time supporting the canopy of a Bf 109, which has been masked off for painting.

areas that are difficult to reach with your sanding block. You should be able to find companies selling these files at major model shows, and good model shops will also stock them. They are quite inexpensive and will last you a lifetime.

PAINTBRUSHES

The relevance of this section will depend very much on whether or not you use an airbrush. I have to say that I do for the majority of painting jobs. However, for smaller tasks, I revert to one of the half dozen or so brushes that live on my workbench. Although sable brushes are more expensive than nylon brushes, normally I use the former, mainly because I find that, if looked after, they have a longer life and, therefore, offer better value. I do have a 00 size nylon brush, made in Germany, which gets a lot of use. Because many of the parts I brush paint are small – cockpit details for example – my brushes are on the small side. If you prefer to brush paint larger areas, flat-headed brushes

LEFT A selection of thin files, or rat-tail files as they are popularly called.



RIGHT A selection of paintbrushes: the blue-handled brush in the centre has only a few hairs and is used for inking, while the broad brush to the right of it is for dry-brushing. The broad, good-quality sample brush at the far right is for freehand painting of relatively small areas of the aircraft.

will be best because they distribute the paint more evenly along each stroke, making it is easier to achieve an even finish.

One brush in my collection has lasted for several years and only has about four bristles in it; I find it ideal for running ink into panel lines when applying washes. It can be seen at the bottom of the photograph with a dark blue shaft and gold tip. The technique for accentuating panel lines is explained fully in Chapter 6.

CLEANING FLUIDS

For cleaning brushes used with acrylic paint, from companies such as Tamiya and Aeromaster, water is fine, and I keep a supply in the red tub that can be seen at the top of my workbench in the earlier photograph. For enamels, though, something stronger is required, and I find you can't beat Polyclens. This blue paintbrush cleaner is widely available from most DIY stores. I have two glass jars, each containing about 1cm of the

RIGHT Polyclens is ideal for cleaning your brushes after using enamel paint. Each brush is cleaned in jar 1 first, then in jar 2 to remove any remaining vestiges of paint.

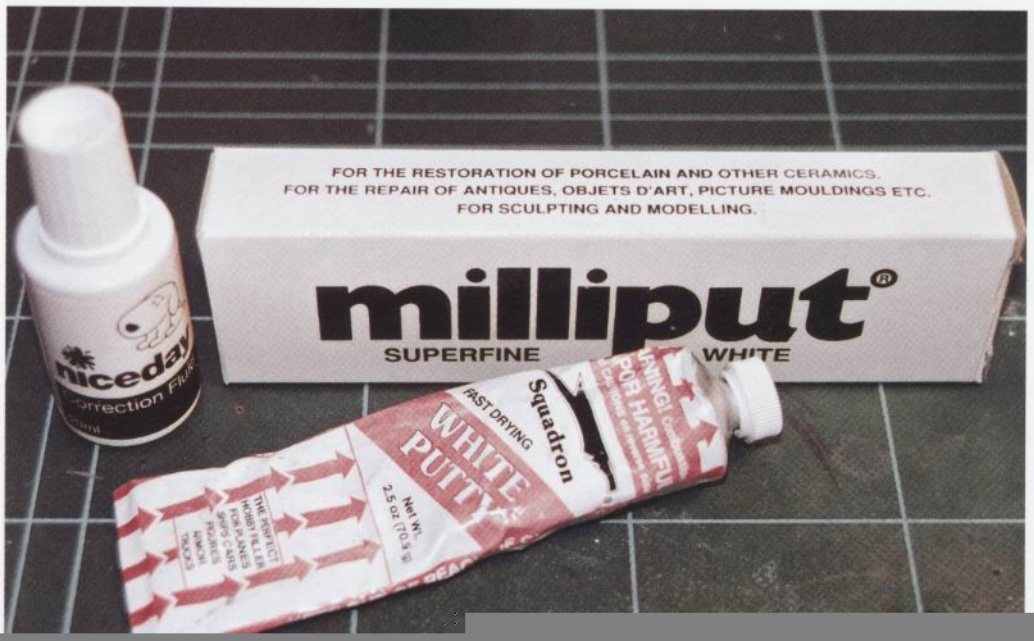
fluid. They are clearly marked '1' and '2' and are used in that order every time I clean my brushes. This is an old trick that Ted Taylor told me about many years ago. The second jar makes sure the fluid gets right into the stock of the brush, and it is amazing how much paint still comes out once the bulk has been removed in jar No.1. I give the brush a quick rinse in the water tub to clean off the excess once it has been wiped over a tissue.

For cleaning my airbrush, I use Badger Spray Away airbrush cleaner. It is quite expensive, but boy does it get rid of any paint. If you use it, I strongly suggest always turning on your extractor fan and ensuring a good supply of fresh air, as this stuff is really smelly – my rule of thumb is that if it's smelly, it's probably highly toxic, too! So be warned. Spray Away is available from many art and craft shops or your local model shop.

LEFT Badger's Spray-Away is perfect for cleaning airbrushes. I clean mine every time I use it, which eliminates blockages and fouling of the nozzle.

FILLER

Much is said about filler, but unless carrying out some heavy conversion work or working with a very poor limited-run kit, I have found that the occasions I need to resort to the use of filler are becoming fewer and fewer. None the less, there will be times when you have to make good a joint or similar defect. I have found that wing-root joints that are greater than hairline size are best filled with Milliput Superfine White two-part filler. Equal amounts of each part are easily mixed between finger and thumb, then pressed into the joint with your fingertip or an old craft knife. It is a good idea to remove any excess that sits proud of the joint at this stage, using a wet sponge or cloth over your fingertip. Then it can be left overnight to cure. The next day, the filler will be rock hard and can be sanded with wet-and-dry paper plus plenty of water. The nail buffer boards are good for finishing the job. What I like most of all about Milliput is that you can scribe panel lines that may have been lost in the process and the filler doesn't crumble like so many others.



Other fillers you can try are Squadron Green and White putty, which smell awful, but are quite good. You don't have to mix them and they dry a lot quicker than two-part fillers usually do. However, if the area can be seen easily, as at the wing root, I find that these one-part fillers often need more attention to achieve a super-fine finish.

Another interesting approach to filling is to use liquid correction fluids like Tippex and Niceday. They can be brushed into a joint and dry in a matter of minutes; if the joint is very small, they work well after any excess has been sanded away. One drawback I have found with these fluids is that generally they don't like scribing tools and the surface is prone to cracking. I really would suggest playing with different types to determine which ones work for you.

For small hairline cracks and joints, try using white PVA wood glue or Micro Kristal Klear (very similar and also used to attach clear parts).

PIN-VICE AND ELECTRIC DRILL

A small hand-held drill, known as a pin-vice, is a brilliant tool for making all kinds of holes. There can be many reasons why you need to drill very small holes when building a model. I find that I commonly use the pin-vice to accentuate rivet detail if I have had to carry out extensive sanding and the original detail has been lost. Frequently there are bracing supports inside undercarriage bays that have lightening holes. For example, on Revell/Monogram's Bf 110G-4, the moulding in the kit needs to be improved, and you can either add custom-made supports from Verlinden Productions' super-detail set (No. 1252) or scratch-build your own. In fact, I have incorporated this detail set into one of the projects in the chapter on advanced modelling techniques. Another main use I have for my pin-vice is opening up the gun barrels of fighter aircraft if the kit parts are okay, save for the fact that the barrel is solid, which is usually the case.

A small electric drill, like those offered by Minicraft, has many uses. One of the most common tasks I put mine to is cutting lengths of brass tubing to simulate gun barrels. I know many armoured vehicle modellers also use them with dental burrs to create a textured finish on tanks and the like. You can get hold of some pretty small drill bits and chucks, but make sure you buy a variable-speed transformer to power the drill. The main reason for this is that the drill will rotate at too high a speed otherwise, melting the plastic you

BELOW An electric modeller's drill, such as that made by Minicraft, is ideal for cutting new gun barrels from brass tubing and many other jobs that require a little more power than thumb and forefinger.

are attempting to drill. Operate your drill at the lowest speed setting for this kind of work, but at a higher speed when drilling brass.

ADHESIVES

There was a time, long ago, when most of us simply used polystyrene tube cement to stick kit parts together. Over the years, however, modellers have experimented with many other forms of adhesive depending on the task in hand. This has developed to the point where several types are commonly employed – I use four or five. The primary adhesive that I use for gluing most of the main components is liquid polystyrene cement. Usually it comes in a bottle and is applied with an old paintbrush. Although the bristles of the brush set hard after each application, they simply soften up each time they are put into the bottle.

Where the fit of parts is not quite so good, I use cyanoacrylate (super glue), especially where parts need to be taped together to hold firm while they set. One real advantage cyano has over all other glues is that it also acts as a hard filler when dry, and after sanding the joints, you virtually always eliminate that irritating fine line that can persist in appearing when liquid poly is used. For this reason, sometimes I simply use cyano for all the main jobs, but you have to be careful with it. I'm sure you know the obvious dangers, like sticking yourself to the parts instead of the parts together! We've all done it at some time or another. A couple of tips here: always have a bottle of 'un-sticker' to hand, just in case, and read the instructions; where possible, use thick cyano, because it is much easier to control when applying. Just occasionally I have felt the need to resort to the thin variety for reaching into recesses, but it is lethal and very difficult to control, getting everywhere before you can blink – so take great care with this variety.

When using cyano, there may be times when you need the glue to go off quickly, and this is where cyano activator, or accelerator, comes in. I use Super Grip activator from Ripmax. Just a dab with the brush on the area where you have applied the cyano will cause it to harden and go off immediately. There can be a tendency for this liquid to weaken the joint slightly, but to be honest, I haven't noticed any significant problems.

Attaching canopies to fuselages without them fogging up has been, and often continues to be, a real challenge for modellers. The fogging is caused because the adhesive's strong vapours are unable to escape from the confined

LEFT EMA Plastic Weld is a very good, powerful liquid adhesive suitable for sticking many parts together. I relegate Revell's Contacta tube cement to sticking the occasional wheel to its axle; it allows me to adjust the flats of the tyres on the worktop while it dries.

ABOVE A selection of cyano glues – thick cyano is used 90 per cent of the time because it gives more control.

LEFT When you need the cyano to set quickly, a dab of Ripmax activator/accelerator will prove invaluable.

ABOVE The three key products from Microscale that many modellers use – the two decal softening/wetting solutions (left and centre) and canopy adhesive.

FACING PAGE, TOP My Badger 200 airbrush has lasted for ages, and I still use it for the majority of spraying work.

FACING PAGE, BOTTOM For finer work, I use an Aztec double-action airbrush, which is great for creating German mottled camouflage schemes.

area beneath the canopy and begin to attack the clear plastic. This problem is far worse when you build a model with the canopy in the closed position. If you construct a model with an open canopy, the harmful vapours can escape and there is far less likelihood of fogging occurring. I find that the best product for the job is Micro Kristal-Klear. This is a specialised modeller's adhesive that has been formulated for use specifically with clear parts. It is available from good model shops and comes in the same type of small bottle as Micro's vital decal softening solutions, Micro Set and Micro Sol.

Another product is Humbrol's Clear-Fix. Again, it is intended for attaching clear parts and has been formulated to prevent fogging. It can work quite well.

COCKTAIL STICKS

It is always a good idea to have a container with some wooden cocktail sticks in it. These improvised 'tools' can be used for so many odd jobs that they are never far from my workbench. The two main uses to which I put them are adding fine detail to the cockpits of my aircraft and applying small amounts of cyano. Keep some handy; they're excellent aids and are very cheap.

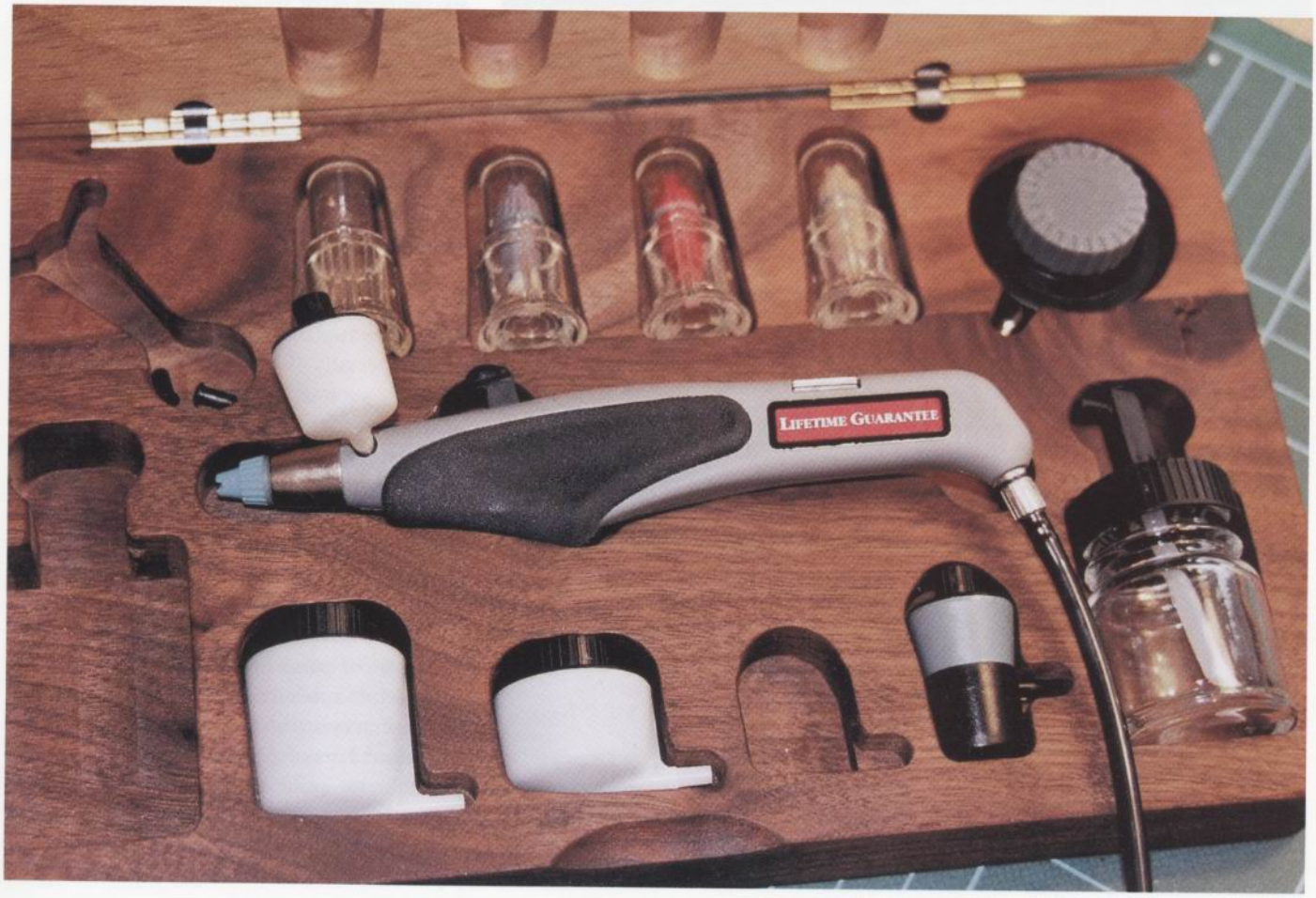
AIRBRUSHES

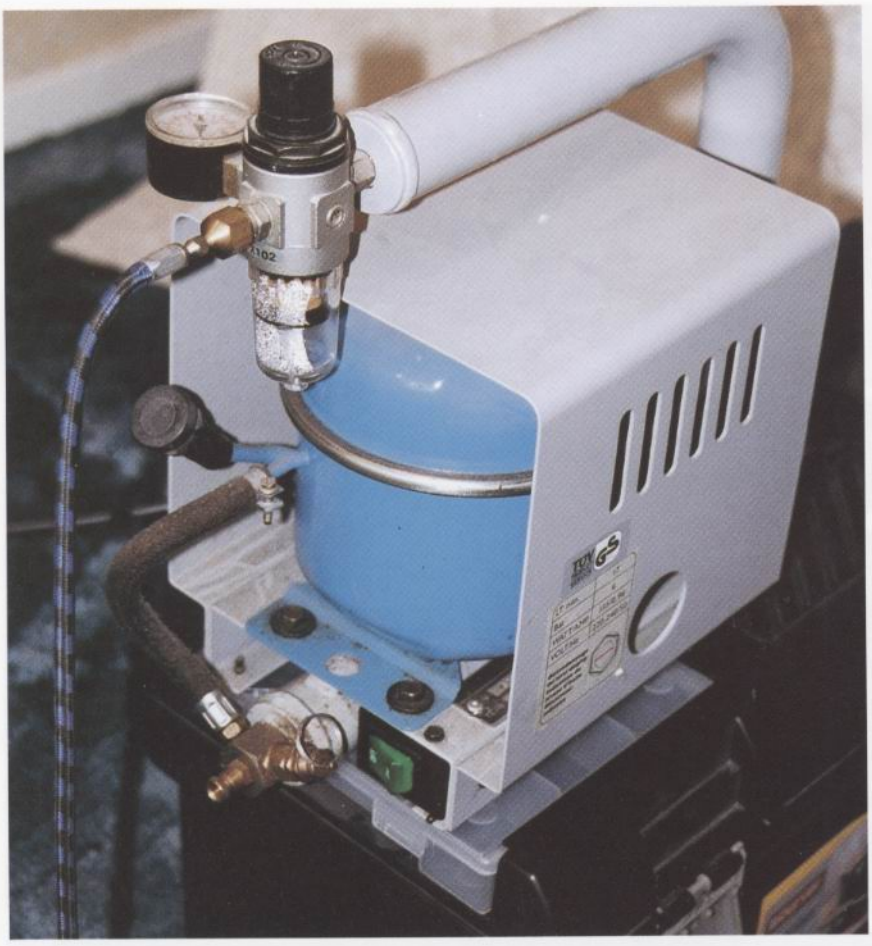
To be honest, you could write a book about airbrushes, and while that might be useful for some, I am not in a position to go into so much detail here. Having said that, by explaining what I use and why, I may be able to assist you if you are considering forking out for one, or maybe two. If you don't have an airbrush and Luftwaffe modelling is your interest, you will be at a disadvantage, because so many of the WWII schemes require subtle mottling of the various RLM shades. I have never seen a Luftwaffe fighter model of the period that has had this mottling convincingly finished without the use of an airbrush. So at the risk of offending anyone, which is not my intention, let's move on.

For years, I have found that the very reasonably priced Badger 200 is an excellent all-round airbrush for achieving quick coverage of large areas. Fitted with a medium needle, it is ideal for use with both enamels and acrylics. In the photograph, you can see me holding the airbrush with the side cup fitted. Some modellers prefer to use a screw-in paint reservoir that connects beneath the brush. The button beneath the tip of my forefinger controls the air, while the paint flow is regulated by a screw mechanism attached to the needle and adjusted by the control at the end of the brush (right of the picture). You pre-set the screw, test the amount of paint flowing until you are happy, then spray to your heart's content. The Badger 200 is known as a single-action airbrush because you can only control a single function with your fingertip. A double-action airbrush, like the Aztec shown in its wooden case, is a real gem in that you can control both paint and air flow from the one trigger. With practice, you will find that a double-action airbrush is much more flexible than a single-action model, but usually costs at least twice the price. I find it much easier to control the paint flow with the Aztec, which is superb for spraying the mottled effects and tiny squiggles that crop up so often on Luftwaffe fighter aircraft.

AIR SUPPLY

Whichever type of airbrush you choose, you will need an air supply to operate it. There are two distinct choices: you can invest in a decent compressor or rely on canned air supplies from manufacturers like Badger. The latter are readily available from good model shops and art and craft stores. Their immediate attraction is the apparently low outlay at any one time. For several years, I relied exclusively on cans before finally seeing the light. A drawback with using them is that the air is delivered at quite a high pressure and is very difficult to control. Therefore, it limits the tasks you can


LIFETIME GUARANTEE



ABOVE The Revell compressor may seem expensive at first, but it is an excellent investment.

BELOW A good face mask to prevent particle inhalation is essential for spraying work.

attempt. Moreover, you always need a spare can for the time when the pressure dies, which occurs with little warning.

I daren't hazard a guess at how much money I spent during the years I relied on air cans, but it is certainly as much as, if not more than, the cost of my Revell compressor. I just wish I had come across it sooner. At the time of writing, I believe they cost around the £200 mark, but I have had mine for ten years and it is a superb piece of kit that has never let me down. The plus factors are considerable, not least that the compressor is virtually silent save for a gentle hissing in the background. Some cheaper types are so noisy as to make them offensive in a domestic setting. The valve at the top controls pressure on the model shown – for the record, I do most of my spraying at about 25psi. The water trap is immediately below the air hose, where it connects to the compressor, and the power switch lives at the bottom near the air-release safety valve. The pressure dial is at the top and can be seen next to the hose. The carrying handle is the large grey tube running away from the pressure control valve. Another thing I really love about this machine is that it requires virtually no maintenance – perhaps a small amount of oil every couple of years.

If you're still in any doubt about buying a compressor, ask your local stockist to take you through all the features of some. Better still, buy the Revell unit – I have never seen another to touch it for specification. Finally, add up the cost of all those air cans – honestly, now – and ask yourself what you got for your money.

On a health and safety note, when spraying, always wear a good mask that is designed to prevent paint particles from getting through. The simple dust masks available in most DIY stores are unsuitable, so ask your stockist for one that is appropriate for the job.

PAINT TYPES

There are two main types of paint that have been specially formulated for modellers: enamels, such as those offered by Humbrol, Revell and Xtracolor, and which have been with us for decades; and acrylics. The main manufacturers and suppliers of acrylics in the UK are Aeromaster and Tamiya, although some model shops will also stock paints from Gunze-Sangyo. It is difficult to say that one type of paint is any better than another; it really is a matter of personal choice and how each type of paint fits in with your particular approach to modelling.

I use acrylics and enamels, depending on the colour I am after and on how much time is available to build a project. When time is short, I often use Aeromaster acrylic paint. The range of colours is comprehensive and the pigment in the paint is very good. The colours

spray extremely smoothly, and because the paints are flat, they dry within an hour or so, often less. This means that you can get on to spraying the second and subsequent colours without delay. The slight disadvantage with these acrylics – and any of the matt or flat enamel paints – is that they need a coat of gloss varnish before the decals can be applied. During hot summers, when the weather has been very dry for a number of weeks, I have noticed that because the air is so dry, acrylic paint dries almost as it hits the model, while the paint begins to clog the nozzle of the airbrush. When using Aeromaster acrylic paint, the manufacturer recommends using a few drops of distilled water for thinning, and I fully endorse this. For thinning other acrylic paints, such as those from Tamiya, I use Halfords Value Screen Wash intended for cars. It is cheap and ideal for thinning the paint, the blue colour having no adverse effect and disappearing when mixed with the paint in such small amounts.

As far as spraying gloss paints is concerned, I have found Hannants Xtracolor to be very good. Its main advantages are that it has been formulated for both hand and spray painting, and being a gloss, you don't have to worry about applying a gloss varnish for the decals. This paint sprays beautifully, giving excellent coverage and density, which means that you don't have to put huge amounts on to your model. A small tip for you to try when using gloss paints is to thin them with cellulose thinners or Aeromaster's own thinners. I find that cellulose reduces the drying time and helps achieve a smoother finish when dry. Again, have the extractor going and ensure plenty of fresh air when using cellulose, as it is toxic.

DECAL SETTING SOLUTIONS

Decal setting solutions are designed to soften decals, which helps them to bed down over the parts to which they have been applied. I use Micro Set and Micro Sol, which are sold in good model shops. Micro Set should be used first and is often enough to do the job without the need to resort to Micro Sol.

Sometimes I have noticed an adverse reaction between Micro Sol and some decals, a notable example being the decals supplied with Tamiya's A1 Skyraider. I have never had any problems with Micro Set, but it is always advisable to be cautious.

INKS AND WASHES

The use of inks and washes will be explained fully in a subsequent chapter, but some basic

ABOVE LEFT Aeromaster acrylic paints are superb for spraying.

ABOVE CENTRE De-ionised water is ideal for thinning Aeromaster acrylic paints (and very cheap!).

ABOVE Halford's Value screen car wash is good for thinning other acrylic paints, such as those from Tamiya.

BELOW Cellulose thinners is very effective for thinning gloss enamels, such as the Hannants Xtracolor range – Aeromaster's thinner is recommended for its own enamel paint.

RIGHT Just some of the acrylic inks I use from the Citadel Color range.

information about them is appropriate here. The key point to remember is that any ink or wash must be applied to a gloss surface, otherwise the ink will stain and pool around the area you want to accentuate. I frequently use washes to achieve a three-dimensional effect. When you look at a completed model that has an overall finish of just one colour and little, if any, weathering, it can appear flat and two-dimensional. There is no variety to the surface, all of which seems to reflect the light in one way, leaving you to wonder what the real aircraft actually looked like. To overcome this and make the model duplicate the appearance of the real machine, it is important to consult as many photographs as possible; you will soon notice that real aircraft have many varying tones to their finish. This comes about for a variety of reasons, among them hydraulic fluid and oil seepage, the cleaning of some areas by ground crew and the toll taken by the elements. Panel lines, in particular, are prone to grime and dirt gathering in the fine gaps between the panels, and around panels that are frequently removed for servicing, the effect can be even more marked. All this means that it can be really effective to enhance the panel lines slightly with coloured inks.

Citadel Colour produces a range of brown and black inks. In the UK, they are available from E. D. Models, near Birmingham, but they can also be found in the Games Workshop stores, which sell fantasy gaming figures and paints. I find that the most useful colours are Rust Brown, Brown Wash and Armour Wash. The Rust Brown is excellent for accentuating panel lines, while Rust Brown and Brown Wash are good for cockpits and wheel wells. Armour wash is brilliant for applying over silver to obtain a really good gun-metal colour.

PENS FOR CHIPPED PAINT

Both Pentel and Tamiya produce silver ink pens that are very effective for simulating paint chips and wear in the cockpit and on the fuselage and wing areas of aircraft. The silver is usually bright and almost chrome-like, but if added before the flat varnish and ink washes are applied, it will take on a more realistic tone.

VARNISHES

All the major paint manufacturers produce ranges of varnishes. The three main types are gloss, matt/flat and semi-gloss or satin. Each has its own particular qualities, and the best advice I can give you is to try as many as you can find to see for yourself the qualities each has. In my opinion, they are all very different, and depending on the type of finish your particular Luftwaffe fighter had at any particular stage in its life, a different varnish will be needed.

Most Luftwaffe aircraft had a definite matt or flat finish. This doesn't mean that they were flat overall because, especially around access panels and the engine cowling, oil and other hydraulic fluid gave a satin or even

semi-gloss finish. It really comes down to researching your subjects thoroughly to achieve the desired level of authenticity. The other key factor is putting in that little extra time at the end of the modelling process to add the necessary weathering and other details that will ensure you are really happy with the result.

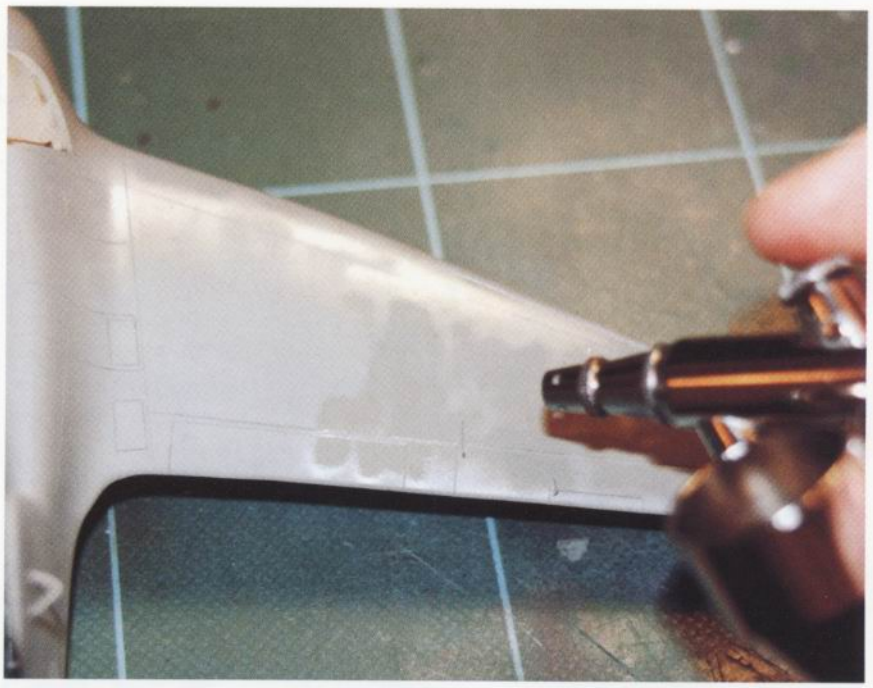
If you use matt paints, you'll need to gloss varnish the surface prior to applying decals. There are many makes of gloss varnish to choose from, but my favourite is Humbrol Glosscote. It sprays on very evenly and dries in a few hours.

PASTEL CHALKS FOR WEATHERING

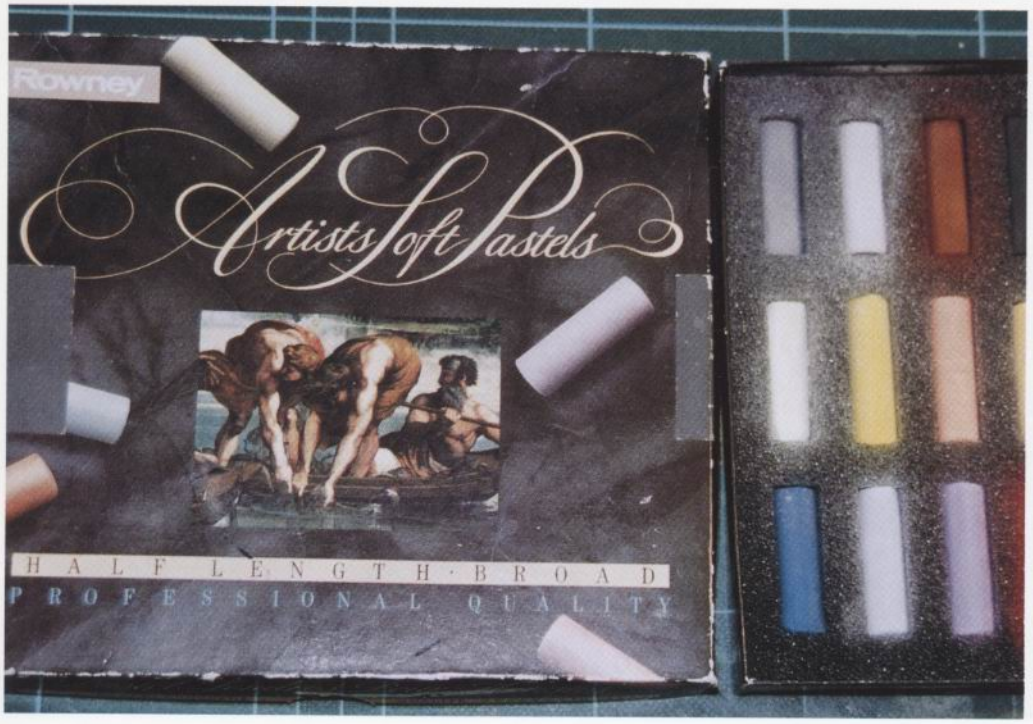
A vast range of coloured pastel chalks is available from any good art shop. The set I bought a few years ago, by Rowney, is still going strong and contains a variety of colours. The most useful and most often used are the greys and browns, but from time to time others can be very helpful in creating a particular weathered effect.

A good example of the usefulness of pastels is the finish needed for aircraft tyres. As most of you will know, rubber tyres are not black, despite what most kit manufacturers tell us in their instruction sheets. In fact, they are grey, and varying tones of grey at that. Tamiya German Grey (XF-63) is good for the base colour, but the rubber effect comes to life when you dust small amounts of light grey pastel chalk over this. Try it and you'll see what I mean. Pastels are also good for shading around panel lines, adding dirt around undercarriage units and engines, and for exhaust staining.

Pastels remain fixed once applied, but when you try to seal them, under a flat varnish for example, they have a tendency to disappear. For this reason, I apply them last of all to my models, which is the case with the models featured in this book. Provided you keep the model away from rain, when transporting it to a show for instance, the effect should remain intact for a long time.



ABOVE Humbrol Glosscote is sprayed over Aeromaster RLM 02 acrylic paint with my trusty Badger 200 airbrush.



LEFT A good selection of pastel chalks, in this case from Rowney, makes an excellent aid for the weathering of a model.

CHAPTER 2

REFERENCE SOURCES

The key question for me is how far to go in terms of research before applying glue to plastic? It may sound an obvious question, but in my experience modellers have very different reasons for pursuing their hobby. There are those who will not start building until they have collected as many plans, diagrams and detailed photographs as possible (they are few though!). At the opposite end of the spectrum are those who simply accept that most manufacturers will have done their homework at the design stage, and are happy to build and finish their model in one of the schemes offered in the box. A lot of modellers fall into this category and good luck to them if that's what makes them happy.

For me, modelling is very much a creative hobby, much like painting and sculpting. Ultimately, you make your own choice about what to build and how to build it; provided you are happy with the result, that, frankly, is all that matters.

At times, I think that some modellers become too serious in their quest for accuracy. For myself, I take basic steps to check out the look of a model: do the details and mouldings match up with any photographs I can find in reference books or have access to from other sources? When test-fitting parts together before applying any glue, do the surfaces mate together well and, significantly, will the final stance and appearance of the model depict accurately those of the original? Also, do the markings reflect the photographic evidence? These are the key steps I take. They are essential if you don't want to end up with egg on your face or disappointed later that you didn't delve that little bit deeper before ploughing into the contents of the box. At times the latter can be very tempting, particularly with some of the better models and makes – the quarter scale Hasegawa Bf 109 for example.

THE SOURCES OPEN TO YOU

There are many sources of information available to the modeller, some of which are

BELOW A wide selection of books will prove invaluable when researching a specific subject. Here are some of mine.

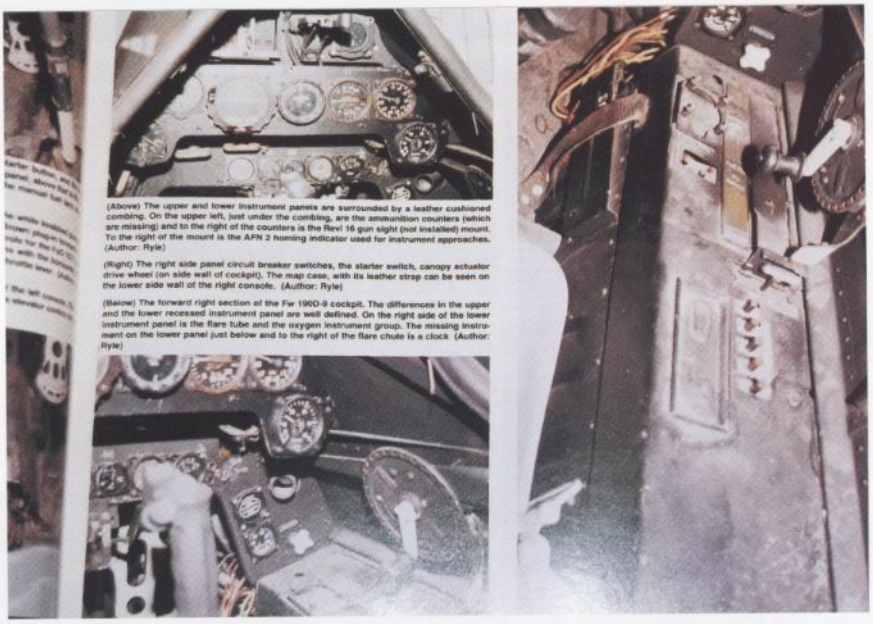
listed here. But before I get on to these, a general note about using reference material is appropriate. In deciding which material to use, there are some overriding questions to ask yourself. How good is the information? What sources has the author used? Who, or what, is relating the information? Is there photo-graphic evidence to back up the claim or other supporting documentation? Once you start down this road, there can seem no end to the possibilities, and often you may find yourself questioning the validity of some of the statements you read.

I am usually very wary of authors and modellers who suggest absolutes. What I mean by this are comments like, 'The Focke-Wulf 190A-4s that served with JG 54 on the Russian Front in 1942 only had white distemper applied with brooms and brushes in the field.' In fact, the temporary white distemper finish was frequently sprayed; some photographs clearly show the overspray on the propeller boss and blades where the latter entered the spinner. Furthermore, the white distemper was often sprayed in an irregular white zigzag pattern over the normal camouflage. It is a brave man or woman who uses such terms as 'always' and 'never'.

For me, one of the joys of modelling is trawling through books and photographs to find the one that will kick-start the next modelling project. Equally, a new set of decals from Aeromaster, Meteor Productions or Xtradecal will send me off in search of any reference material I can find to complete a model. Frequently I spend more money on purchasing reference material than I do on the kit itself – considerably more – especially as there are so many good books to be found these days.

Listed below are sources of reference that will help you research your model projects:

- Books
- Book fairs
- Book shops and clubs
- Libraries
- Model clubs and special-interest groups
- Model magazines and journals
- Model shows
- Museums
- Air shows and displays
- Kit instructions
- Decal sheets
- Instructions with resin and etched metal accessory sets
- The Internet


(Above) The upper and lower instrument panels are surrounded by a leather cushioned combing. On the upper left, just under the combing, are the ammunition counters (which are missing) and to the right of the counters is the Revi 16 gun sight (not installed) mount. To the right of the mount is the AFN 2 homing indicator used for instrument approaches. (Author: Ryle)

(Right) The right side panel circuit breaker switches, the starter switch, canopy actuator drive wheel (on side wall of cockpit). The map case, with its leather strap can be seen on the lower side wall of the right console. (Author: Ryle)

(Below) The forward right section of the Fw 190D-9 cockpit. The differences in the upper and the lower recessed instrument panel are well defined. On the right side of the lower instrument panel is the flare tube and the oxygen instrument group. The missing instrument on the lower panel just below and to the right of the flare chute is a clock (Author: Ryle)

BOOKS

Clearly, books are a great source for photographs and facts. Among the widely available ranges are the *Walk Around* and *In Action* series from Squadron/Signal. The *In Action* series has been around for many years, yet continues to expand, every book containing a wealth of black and white, mostly wartime, photographs. These photos provide the excellent weathered views and variety of paint schemes that often form the basis of my choice of subject matter.

The *Walk Around* series is really very good indeed, offering a more in-depth look at an aircraft type. Usually there are colour photographs of preserved examples of the machine, which can prove helpful. You do need to be very wary, though, of aircraft that

TOP The *Walk Around* series of books from Squadron/Signal is well worth examining.

ABOVE The kind of detail that you can expect in the *Walk Around* series.

RIGHT The *In Action* series from Squadron/Signal has been around for many years and is an excellent reference source. Each book contains many wartime photographs and line drawings – when I buy the model, the relevant book usually follows.

have been preserved in museums. Some acquire paint schemes that have not been researched fully or, worse still, have been completely fabricated. To be fair, a lot of authors will point out the genuine from the rest, and these days the staff at many museums go to great lengths to restore their aircraft to an authentic specification.

Here is a good example of just how useful these books can be. The *Fw 190 In Action* publication (1975) includes a photograph of an F-8 belonging to 2./SG 4. This machine is over-painted in RLM 79 *Sandgelb* and RLM 80 *Olivgrün* mottling. The aircraft featured in the picture is said to be 'Red 10', and of key interest is the over-painting of the swastikas, upper portions of the tail band and wing crosses. The Tamiya kit decals offer 'Black 10', and to be honest the '10' in the picture looks quite dark to be red, so you have to make your choice as to the colour of the '10'. Also, the fin swastika is not shown over-sprayed in the kit, yet this can be seen in the photograph. Both options seem to be possible, because it is virtually impossible to distinguish red from black in the

FACING PAGE, TOP The *Aero Detail* books from Japan are simply stunning. They cover each subject in full colour and incorporate plans, too.

FACING PAGE, BOTTOM One of the most useful reference sources I have come across: Ken Merrick's *German Aircraft Interiors 1935–1945, Vol. 1*.

RIGHT Other Luftwaffe fighter titles from Squadron/Signal.

monochrome photograph, and who's to say that the swastika on the fin was over-sprayed at the same time as the fuselage band?

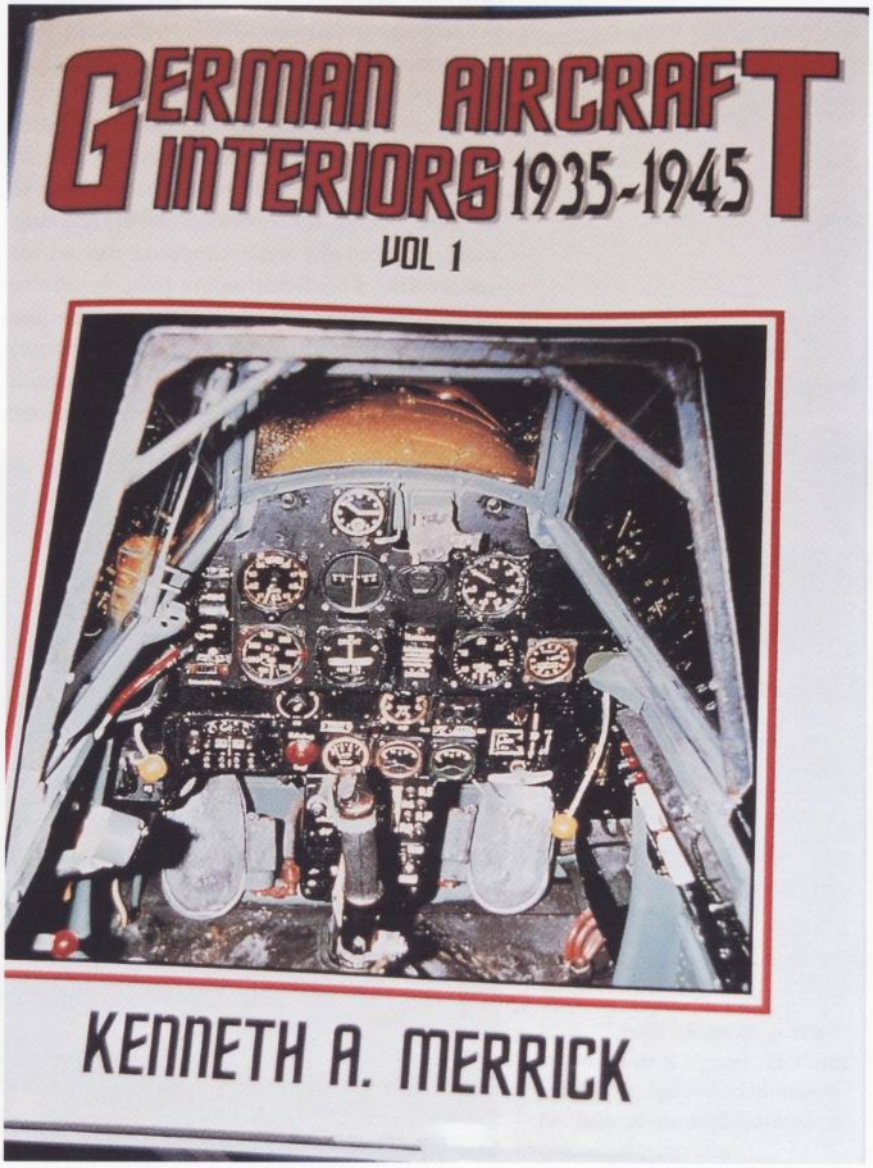
Having only discovered this photograph quite recently, I have decided to keep my model of the F-8 as 'Black 10', but to overspray the fin lightly with RLM 79 *Sandgelb*. Despite the fact that the model is finished, the fin is relatively easy to spray by restricting the amount of paint coming from the nozzle. It is important to let the swastika just show through.

So the moral of this story is check and check again, then make a decision based on the best information you can find. This is essential, even though you have two perfectly reasonable reference sources offering contradictory information.

Another recent offering comes from Cutting Edge Modelworks (known for their excellent decals and resin accessories) under the *Colortech* name. These publications are small, full-colour, quick-reference guides to the colours and markings of particular aircraft. The first covers the Focke-Wulf Fw 190A/F/G. Some excellent colour artwork shows the spinner and fuselage/wing banding permutations, as well as the main camouflage patterns with RLM chip colours. The entire guide is easy to understand and is aimed squarely at the scale modeller. They are not expensive, and the Fw 190 example seems to be well written and accurate, providing an invaluable resource for the modeller of this fighter type.

The publications mentioned are readily available from good model and bookshops (like Hannants, Midland Counties and The Aviation Bookshop in the UK) and at a reasonable price. Slightly more expensive, but among the best references you can get for specific aircraft, is the *Aero Detail* series. Published in Japan, these full-colour reference works include scale plans, the differences between variants, colour profiles and detailed 'walk around' views of surviving preserved aircraft. I have several of these; despite the price, they are simply stunning references.

One of the best books I have come across in recent years is by Kenneth A. Merrick and titled *German Aircraft Interiors 1935–1945, Vol. 1*. It is illustrated with (mostly) full-colour photographs of many of the Luftwaffe fighters of WWII. Although this is an expensive publication, books of this type come along so rarely that, in my view, any modeller who enjoys adding detail to cockpits simply cannot afford to ignore it.



It is impossible to name all of the outstanding publications that are available, but I have found one or two others to be excellent for their coverage of Luftwaffe fighters of WWII. The *Camouflage & Markings* series, from A. J. Press of Poland (available from Midland Counties Bookshop), offers some superb profiles, illustrations and wartime photographs.

BOOK FAIRS, MODEL SHOWS AND AIR SHOWS

There is a very healthy trade in second-hand books; book fairs, model shows and air shows are all excellent sources of these. Whenever I get the chance to pop into a bookshop or, better still, a book fair, I seize the opportunity, because it is amazing what you can find. Although I have more reference books than I care to mention, covering a wide range of subject matter, the fairs and shops provide the possibility of filling the gaps that still remain.

A good example of how lucky you can be occurred when I was in Telford in October 1999 for the UK IPMS Nationals. I was with Andy Hoare from our club, IPMS Barnet, and we were looking for somewhere to eat. Having wandered into the main shopping centre, we noticed that a book fair was in progress in the main aisles, so as you can imagine, we were like dogs with two tails! An hour and a half later, we realised that food really was becoming a necessity and broke off the engagement, our wallets having been suitably relieved of their contents. I had managed to obtain a copy of *Luftwaffe Camouflage & Markings, Vol. 3* by J. R. Smith and J. D. Gallaspay, a book I had been after for ages...how lucky it was that we felt hungry that day.

There are the specialist bookshops like The Aviation Bookshop and Motor Books in London, and many others. All are well worth visiting in an attempt to build a library of reference material that will suit your budget and cover your areas of interest. One of my problems is that I am not a die-hard Luftwaffe fanatic, which is no criticism of those who may feel they fall into this category. The reason is that I also have a great interest in the USAF and RAF of the WWII and post-WWII periods. Therefore, my reference collection reflects this.

One of the problems I face quite regularly is that I rarely spend very long choosing my next project. Okay, I am lucky enough to be able to build some review samples for *Tamiya Model Magazine International* and occasionally *Scale Models International*, but most of my modelling is focused on building for my personal collection of kits. Invariably, I suddenly get the urge to build a particular model and I like to have at least some reference material to get started. If I only begin to search for the reference material I am going to need at that stage, I usually find that I am disappointed and lose interest pretty quickly. Then it is back to square one and the need to make a new choice – very frustrating indeed.

LIBRARIES AND BOOK CLUBS

One of the great causes of sadness to me is the apparently diminishing number of good local public libraries. These are often very useful sources of reference books and have the added advantage that books can usually be ordered if you have a particular request. In addition, since the books are on loan, you can save a packet compared to buying them. If you are on a tight budget, and even if you are not, I strongly recommend that you visit your local library and try some of the larger libraries further afield. It is always worth ordering a book well before you are thinking of starting a project to give the service time to locate the item.

On and off over the years, I have been a member of the Military and Aviation Book Club, and every now and again it offers some very good buys indeed. One I noticed recently was *Warplanes of the Luftwaffe* by Aerospace Publishing, together with different volumes of *Wings of Fame*, also from Aerospace. The former provides a good overview and some interesting colour schemes for Luftwaffe aircraft of the period, while the latter series is strong on specific types.

One tip that some of you may not know is that the book clubs often have shops in London and other major cities, and it is worth checking whether there is one local to you. The discounts offered through their mail-order services, which can be significant, are also available in the shops.

MODEL CLUBS AND SPECIAL-INTEREST GROUPS

If you are a member of a model club or a special-interest group, like those of the International Plastic Modellers Society (IPMS), you will be well aware of the advantages membership brings.

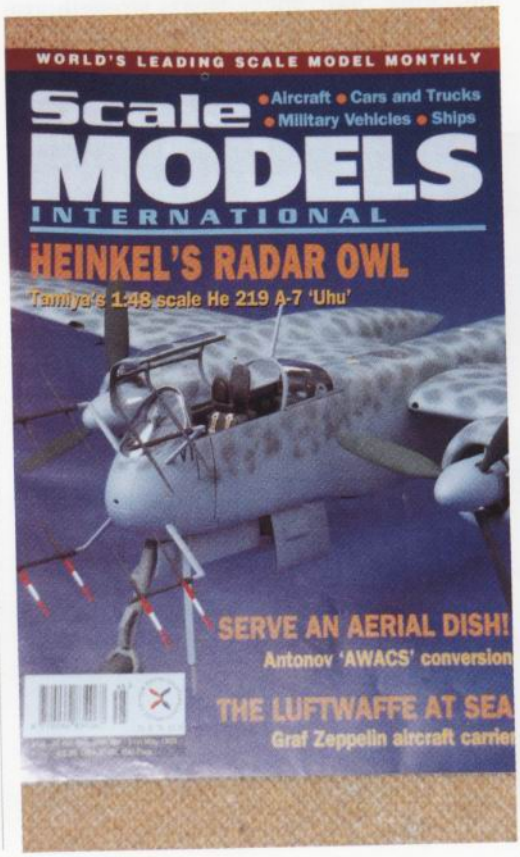
LEFT Model shows provide a wealth of information. Here you can see Rick Dawson and Mamas Pitsillis, from IPMS Barnet, at the UK's International Model Show, Alexandra Palace, in December 1999.

I remember that when I got together with Pete Stern, the secretary of IPMS Barnet, over ten years ago, the standard of my modelling was okay, but many questions remained unanswered. For ten years before that, I had not lifted a brush, having concentrated on other things not related to modelling. When I came back to modelling, I couldn't believe how complicated everything seemed to be. Etched brass sets, resin accessories and different decals were all available, but there was little guidance on how to incorporate them into models. The club seemed the ideal solution, and I have gained some of my closest and best friends through this common interest. Moreover, I have never experienced any of the elitist arrogance that used to be associated with some elements of the hobby. No, the benefits were, and are, tangible: people who had used the techniques I wanted to know about took the time to explain them. Very little we do in modelling is really unique as far as techniques are concerned – someone, somewhere has probably tried and mastered it before, and the club can provide an excellent opportunity to access that knowledge. By trying and practising what I have been told by others, my modelling has gone from strength to strength. I could have continued to sit at home and wonder how to crack a particular problem, but I'm glad I didn't.

LEFT *Tamiya Model Magazine International* is a good reference source for modellers, primarily because of the high-quality colour photography.

ABOVE An in-depth review of the Dragon Ju 88 in *Tamiya Model Magazine International*.

RIGHT *Scale Models International* is worth keeping an eye on for some interesting build articles.



FACING PAGE, TOP The lower engine cowl has been removed from this Bf 110G-4 – note the massive flame dampers outboard of the engines and pipework of the engine.

FACING PAGE, BOTTOM Another view from below the Bf 110's left engine.

MODEL MAGAZINES AND JOURNALS

Model magazines and aviation journals may seem obvious sources of information, and there are many to choose from. Unless you have a very deep pocket, however, you will want to purchase just a selection of these. This book is about Luftwaffe WWII fighters, so it is appropriate to refer you to the model magazines that specialise in aircraft. These include *Scale Aviation Modeller* and *Scale Aircraft Modelling*. However, several general modelling publications also address Luftwaffe subjects. *Tamiya Model Magazine International*, *Scale Models International*, *Quarter Scale Modeller* and *Fine Scale Modeller* all publish interesting and informative articles from time to time. I have had several conversations with people at model shows who have said that they buy *Tamiya Model Magazine International*, for example, because of the quality of the colour photography. Some say that this gives them an excellent reference point when it comes to trying to achieve a particular model effect.

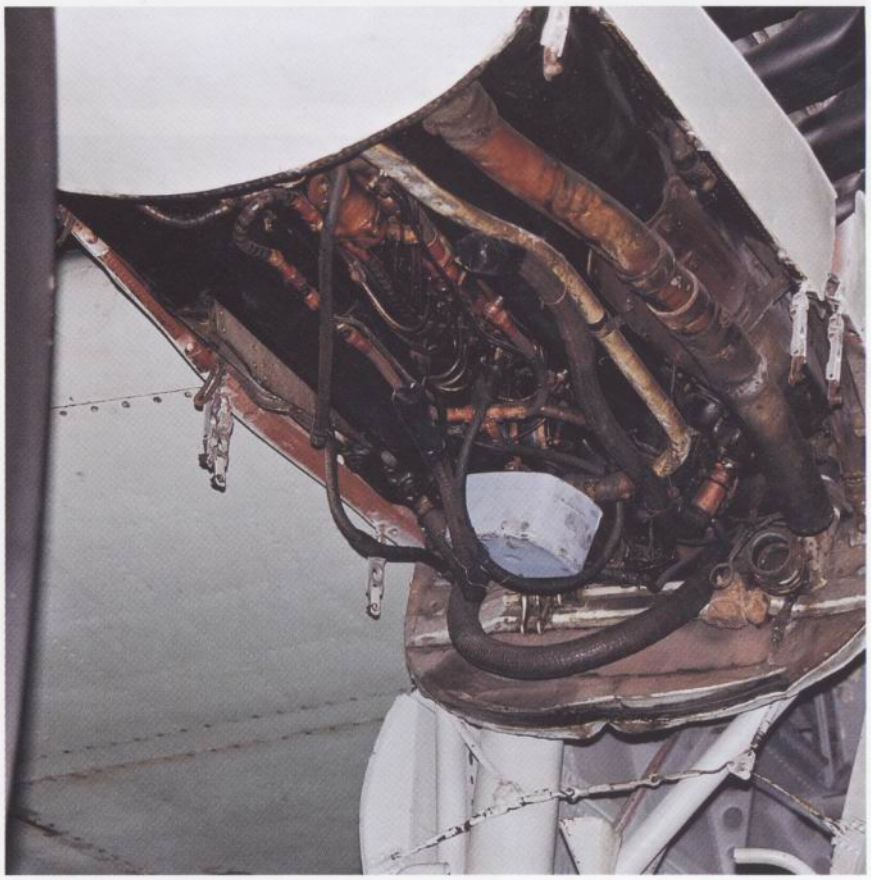
I would recommend having a serious look at all the publications that are available so that you can identify the magazines that seem to offer you the best coverage of your chosen areas of interest.

One of the reasons I like to read general modelling magazines is specifically because they cover a variety of subjects together with their relevant techniques and approaches. Take armoured-vehicle modelling for example. I have learned so much about the use of washes and general weathering techniques from reading articles by modellers who specialise in this subject. The use of pastel chalks to highlight angular edges and various parts of a tank can just as easily be applied to the upper fuselage of a Messerschmitt 262. By scouring wartime photographs of the real aircraft, it is possible to identify the areas that became lightened and weathered, then the appropriate amount of weathering can be added to the model. Again, for me, the key thing is that I try not to restrict my research purely to aviation. Take a broad look at what others in our hobby do, and you'll be surprised at how much can be adapted for your own use.

Now a word of caution about some of the general aviation magazines, like *Flypast*. There is no question that this and others provide an excellent read, and a means of keeping up to date on restorations and the historical aspects of many aircraft. However, from a modelling perspective, some of the aircraft featured have often been restored using different colours, codes and serials than were actually applied originally. There can be many reasons for this, so it is worth double-checking that any restored aircraft you want to model does represent the original accurately. Quite often, cockpits will be modified with additional or non-standard equipment to allow an aircraft's operation in the modern environment. It is easy to take such matters for granted, but a visit to the machine's home base will frequently clarify any queries you may have.

MUSEUMS

Some of the comments I have made in relation to restored aircraft can also apply when visiting museums. Having said that, museums are unique sources of information when modelling Luftwaffe aircraft. In particular, the Royal Air Force Museum at Hendon, London, is a veritable treasure trove – if you haven't visited it, if at all possible, you should rectify the situation immediately.

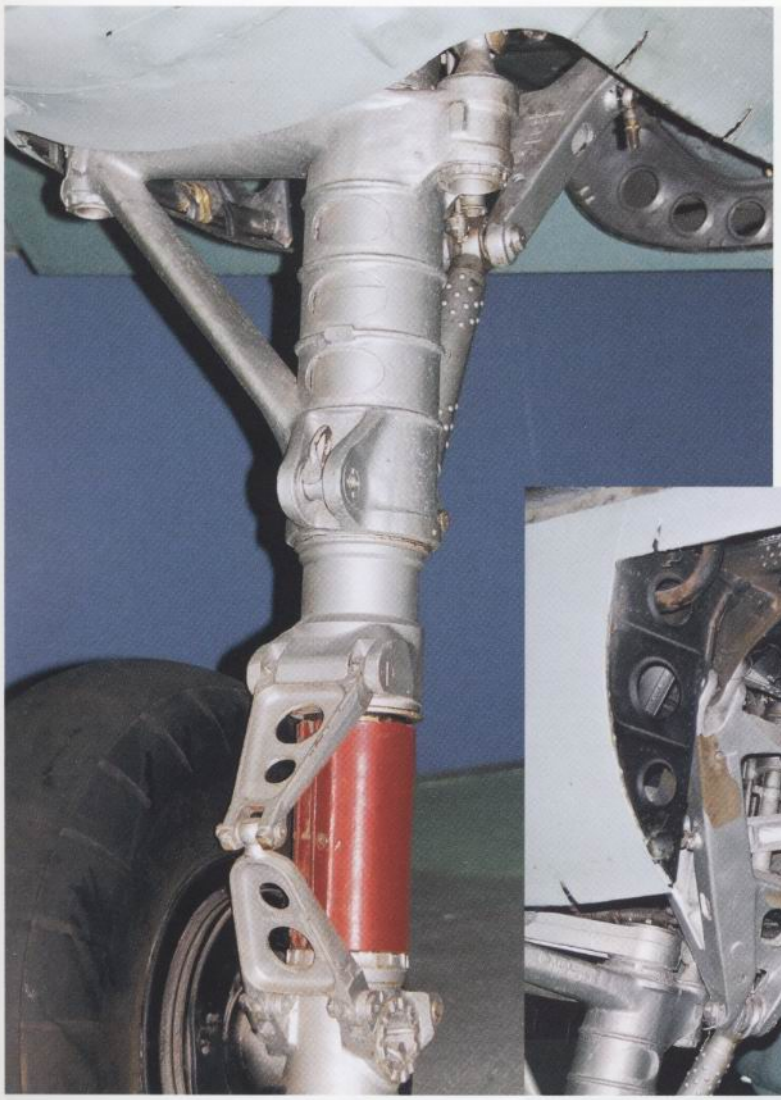


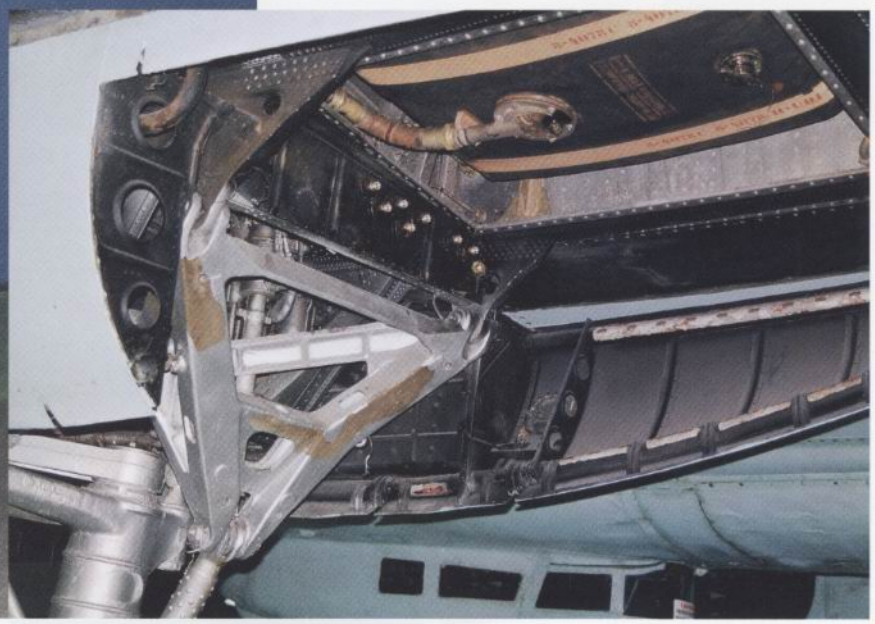
Of particular interest to the Luftwaffe fighter fan is the only surviving example of a Messer-schmitt Bf 110G-4 in the world. The restorers at the museum have done a superb job to ensure that this effective night fighter retains its imposing looks. This particular G-4 is fitted with the FuG 220SN-2c search radar and equipped with a number of G-variant kits, making it particularly interesting from a modelling perspective. It has a 300-litre drop tank under each wing (B-2 kit), GM-1 power boost (R-2 kit) and Mk 108 30mm nose cannon (R-3 kit), which when mounted together were known as the R-6 kit. Finally, there is an ETC 500 IXb bomb rack under the fuselage (M2 kit). This aircraft was originally assigned to I./NJG 3 and was captured by British forces at Grove airfield, Denmark.

Also in the RAF Museum is the night fighter variant of the Ju 88, the R-1, which is displayed in such a manner (as are many others) that it is easily photographed. Such photographs are the lifeblood for any modeller who wants to add extra detail to a standard kit. The R-1 had a search radar and the same engines – BMW 801s – as the Focke-Wulf 190. This particular aircraft has an interesting background, having been forced by three Spitfires to land at what is now Aberdeen Airport on 9 May 1943. Interestingly, later studies of its FuG 202 radar led the British to develop 'Window', the small metal fragments dropped by

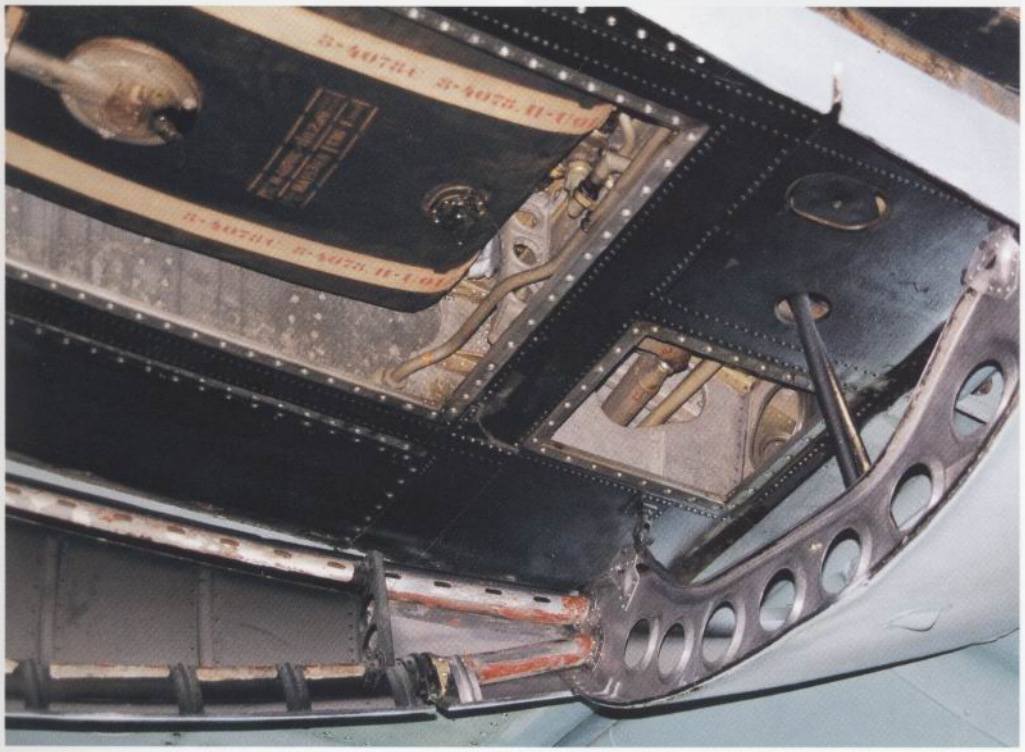
ABOVE The main landing gear of the Bf 110G-4 – notice the loop protruding from the main wheel hub.

RIGHT The rear canopy removed from the Bf 110.





LEFT The main undercarriage leg of a Ju 88R-1 – the red bracing support at the bottom of the leg has been added to hold the leg in its correct extended position.



ABOVE The forward end of the Ju 88R-1's left wheel well.

LEFT The rear of the same wheel well – notice the lightening holes in the bracing and the tank above.

Allied bombers to jam the enemy's radar. Unfortunately, the FuG 202 fitted to this R-1 is a replica, the original having been removed following testing during the war.

Nearly all the Ju 88s that fell into Allied hands after the war were scrapped, so the museum's R-1 is a rare survivor. It resides in the Battle of Britain Hall at Hendon and is well worth visiting.

TOP A Bf 109F-4 seen at the Imperial War Museum, Duxford.

ABOVE The propeller blade of the same F-4 retains a tiny bullet hole from its more aggressive days!

RIGHT The gun barrel of a Focke-Wulf 190 – notice the space that exists around the barrel root and the gun-metal colour of the barrel itself.

FAR RIGHT The main landing gear of the same Fw 190. Note the hydraulic line running down the leg – the technique for replicating this detail is explained later in the book.

KIT INSTRUCTIONS AND DECAL SHEETS

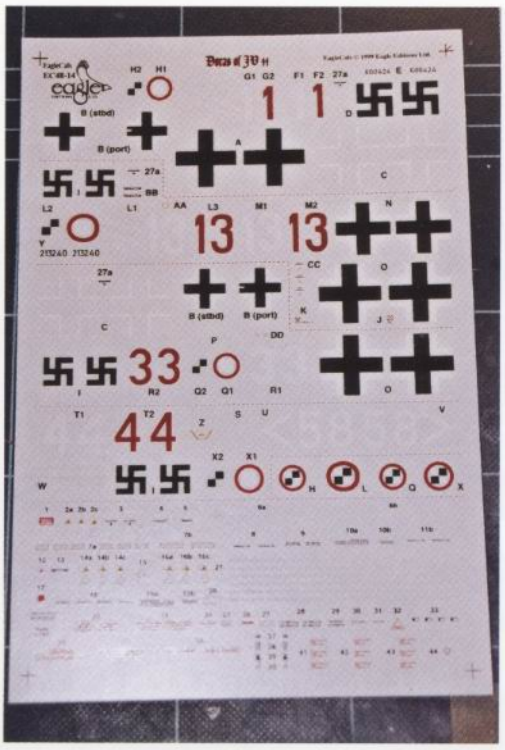
Although they may seem unlikely sources of useful information, kit instructions and decal sheets should not be overlooked as sources of reference. Certainly some of the Far Eastern manufacturers, like Hasegawa and Tamiya, produce very useful instruction sheets. At the very least, they offer an insight into the colours of all the parts in the cockpit, in addition to the main RLM camouflage numbers. Usually there is some introductory information about the particular subject of the model that can help to steer you to the right period and theatre of war, which will be documented in other reference sources, like books and magazines.

If you are using one of the aftermarket decal sheets from manufacturers such as Aeromaster, Xtradecal, Eagle Cals and Cutting Edge, some helpful facts about the particular aircraft are usually printed near the profiles showing the positions of the decals themselves. Many of the subjects available in these sets have been selected because they represent notable aircraft flown by the famous aces, such as Galland, Priller and Marseille. Often these aircraft had special identifying features, markings and logos that singled them out.

The beauty is that the extra decal sheets we can buy contain the necessary information required to build something a little different from the standard options available from the kit manufacturers. Again, we come back to the question of why you have selected a particular aircraft and type to model. With a little imagination, it is possible to put together a really unique subject because many of these specialist decal manufacturers produce sets that contain a series of numbers and codes applicable to a particular fighter aircraft type. By altering the code supplied on the sheet, it is often possible to create an authentic 'one-off' aircraft that stands out on the shelf, in a club display or on a competition table.

THE INTERNET

As more people come to terms with the computer age, an increasing number of my fellow modellers and business colleagues are obtaining access to the Internet. This is proving to be an extraordinary source of reference, providing access to a world-wide network of modellers, aviation historians and special sites devoted to just about every subject imaginable. By using the various search engines, you can look for information on specific aircraft types and subjects. Invariably, a number (sometimes a huge number!) of sites is offered from around the world or selected region.



LEFT Eagle Cals is renowned for the quality of the information provided with its decal sheets. This is the complete decal sheet for various aircraft from JV 44.

A tip here is to attempt to refine your search by using key words that are specific to the subject you want to know more about. This will help to reduce the number of matches and, with any luck, will lead you to the sites that are relevant.

Many sites have so-called 'chat rooms' and 'bulletin boards' where you can leave messages and requests for information. If you are lucky, someone will get back to you with the answers you want. This method of research is very much a case of having a 'play' to see what you can turn up. I have included details of some interesting sites at the back of this book.

Some web sites are devoted to selling modelling products direct, and one of these I came across recently is Hobby Link Japan (www.hlj.com). This company offers models and accessories at very reasonable rates, doesn't charge the earth for handling and shipping, packs items well for shipping and, in my experience, is reliable. Companies like Hobby Link also seem to be able to provide products that normally I can't get hold of in the UK so, for that reason alone, they are well worth contacting.

CHAPTER 3

AVAILABLE PRODUCTS

RIGHT A few of the mouth-watering kits available of Luftwaffe fighter types.

BELOW A selection from the excellent range of aftermarket decals, which will help you produce models that are just that little bit different.

Going back perhaps 20 or 30 years, and before my time, the market leaders – like Airfix, Monogram and Frog – were producing new models by the bucketful. In my youth, that was certainly my impression, because each Saturday I would visit my local model shop and look for the latest releases. It was difficult to keep up with them. As soon as they were released, a birthday or holiday seemed to crop up to provide yet another excuse to build the new kit as soon as possible. There was precious little time for painting; in fact, many of my models never saw a drop in those days. In my early teens, like so many of my friends at the time, I began to improve (slightly) and my models were painted in colours that approximated those that they should have worn. I remember being really proud of these models, and sure enough they ended up suspended across the ceiling of my bedroom, from one corner to the other. They also began to stack up in tightly parked rows on top of the bedroom units and desk area that I'm sure were intended for homework. My mother simply gave up trying to keep the room dust-free, and it was down to me to get out the vacuum cleaner and remove all the dust – where did it all come from?

Today, things have changed. I don't suspend my completed models from the

bedroom ceiling, and the hobby is remarkably different from those early, pioneering days of the 1960s.

Recent years have seen the growth of a massive aftermarket industry of relatively small companies that specialise in producing resin, white metal, etched brass, steel and copper replacement parts. All are designed to improve and add to the detail and parts offered by a standard kit. Even the kit manufacturers are beginning to offer these options. For example, Hasegawa has started to produce its already very good models with replacement cockpits moulded in resin, often with an etched brass fret for the finer details like throttle levers, handles, rudder pedals and the like. The level of choice available to modellers now could only have been dreamed of by the modellers of yesteryear.

An illustration of the importance of the variety of detail sets and range of construction kits now available can be seen at events like the UK's IPMS National Modelling Competition. In 1999, over 800 models were entered into the competition. The standard overall had to be seen to be believed, and not only on the competition tables, but also on the club stands, where equally high standards were apparent. The number of models in competition that incorporated one or more additional detail sets from the aftermarket manufacturers was considerable. Demand for high-quality products is clearly strong among modellers at the turn of the millennium.

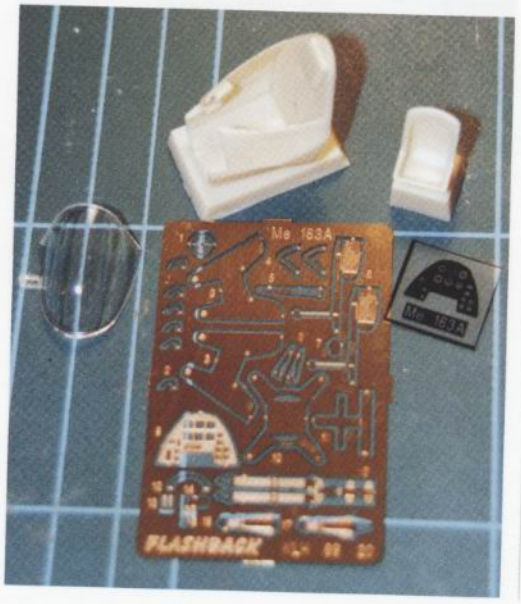
I am all in favour of the additional choice this ever growing range of products provides, particularly as several kit manufacturers, like Revell/Monogram and Airfix, currently offer kits that were originally tooled 20 or 30 years ago. Examples of Fw 190s in each range are cases in point.

The most detailed, accurate and varied construction kits covering Luftwaffe fighters during WWII come from the Far East. Hasegawa, Tamiya and Dragon all offer wide ranges of fighters, mainly in 1/48 scale. This is rapidly becoming the most popular scale for models of the period. I suspect that the primary reason for this is because it strikes an acceptable balance between the amount of detail you can add, the overall size and the 'Where am I going to put it?' question.

If lack of space is a particular issue, the smaller 1/72 scale will probably be your preferred choice, in which case recent releases by Revell in this scale, covering a variety of fighter types, will be particularly pleasing. The Me 262s, for example, are very well tooled, and Airwaves has released some brass detail sets for these kits. They make it possible to add a good deal of detail and raise the standard of the finished models to something close to that possible in quarter scale.

TOP A range of currently available aftermarket resin and etched metal accessory sets.

ABOVE Hasegawa's Bf 109G-6 model – one of a range of 109s produced by that manufacturer – is simple to build and well detailed. Other 109s are available from companies like Tamiya, Airfix, Revell/Monogram and Hobbycraft.



LEFT The Flashback release of the Me 163A contains all you need to detail what is otherwise a very simple and basic model.

ABOVE Just look at this box-art by Koike Shigeo, the artist who produces most of the original artwork for Hasegawa – who says that box tops don't sell kits? I know several modellers who keep these tops, and some even frame them.

AFTERMARKET DETAIL SETS

Aftermarket manufacturers offer a range of replacement cockpits, engines, wheel wells, armament, undercarriage legs, propellers, etc for many of the kits that are currently available. The techniques for incorporating sets like these are explained elsewhere, so here I want to give you a flavour of what is out there so that you can have a go at using the parts if you want to.

Some of the best detail sets that I have seen recently have come from Aires. This Czech company produces stunning resin parts that, in general, I have found to fit well – some have been included in this book. Its replacement Bf 109 cockpit, for example, designed for the Hasegawa kit, fits like a glove and substantially improves the look of the finished model. What also makes this range particularly attractive are the reasonable prices charged for the sets. What I find really irritating is a detail set that looks fine in the packet, but requires a lot of time spent correcting and carving away the kit to accept it. I don't mind paying more for detail, but I do expect the sculptors and mould makers to have done their homework correctly at the design stage.

RIGHT An example of the very reasonably priced, quality resin and etched brass aftermarket sets from Aires – in this case, for the Hasegawa Bf 109F.

Another well-established manufacturer of parts for Luftwaffe fighters is Verlinden, now based in the USA. No doubt, this company is well-known to many of you. Over the years, its detail sets have set the standard for others to follow. The company's set for the Bf 110G-4 is shown later in the book.

The third manufacturer worthy of mention here is True Details. This company made its name in the UK by producing flattened tyres for models and subsequently has gone on to produce quite a selection of detail sets, primarily for cockpits. Perhaps not quite as refined as the Aires sets, none the less they offer replacement parts that should not be ignored.

Of course, there are other manufacturers producing resin and etched brass sets for Luftwaffe fighters – I have already mentioned Airwaves for example – and the best advice I can give anyone who is new to this aspect of modelling is to take a good look at what is being offered.

DECALS

The range of aftermarket decal sheets is truly awesome. Any visit to a model show trade stand or good model shop will reveal a tremendous choice for the Luftwaffe enthusiast. Some manufacturers are notable, such as Aeromaster, Eagle Cals, Third Group, Meteor Productions and Micro/Super Scale to name only a few. Their waterslide decals will cover all the main types of fighter operated by the Germans during WWII. The great advantage of these decals is the opportunity they create to produce a model that is just that little bit different. The quality offered by all those I have listed is excellent, which makes a difference when you are paying more for a specialised item.

WHERE TO BUY

MODEL SHOPS

It has been very sad to witness the steady decline of the local model shop in recent years,

LEFT Looking down into the cockpit of a Bf 109E-4 – despite the rather odd canopy, the remainder of the airframe and cockpit interior reveal invaluable detail.

and the subject has attracted some concern in the modelling press. I do like to support my local model shop whenever I can and would urge you to do the same. Although there may be fewer model shops in the UK now, some of the larger ones offer a good range of products and several are listed in the pages of some modelling magazines. Certainly, all the model mags carry advertisements from the major mail-order companies, and it is well worth obtaining their catalogues to see for yourself the range of products that they carry. I am fortunate in that I am within driving distance of Hannants' retail model shop at Colindale, near the RAF Museum, Hendon. It has a vast range of decals, kits and detail sets, not to mention books, paints and 101 other items of special interest to the modeller. Visits like this can be truly inspirational when it comes to choosing a new subject to build, so if you haven't yet been to one of the larger model shops, take the time out and go.

MODEL SHOWS

Recently I had a conversation with a modeller whom I personally rate as highly competent in many areas of the hobby. He produces models that are truly outstanding, but I have noticed that he frequently resorts to scratch-building replacement parts. Good luck, I hear you say, and I echo that sentiment, but he is not a happy man. During the course of our chats, he has said time and time again things like, 'I never knew you could get a replacement cockpit for that...' I have lost count of the number of times I have shown him resin bits that have made his eyes pop out. He goes on, 'If I had known you could get it, I wouldn't have done all this!' But he really is his own worst enemy. I say this because when I suggest that he goes along to one of the better UK model shows, like the IPMS Nationals, Barnet (yes I know I'm biased) or Southern Expo for example, where there are lots of traders selling such items, he simply refuses to go. All he says is 'I don't go to shows...' I can't get a sensible reason out of him, but what can you do? Maybe get him into therapy?

Shows are a good source of aftermarket parts and, as with the larger shops, it is worth making the effort to go. I have also included the addresses of suppliers at the back of this book.

LEFT An example of one of the good-quality decal sheets from Aeromaster.

CHAPTER 4

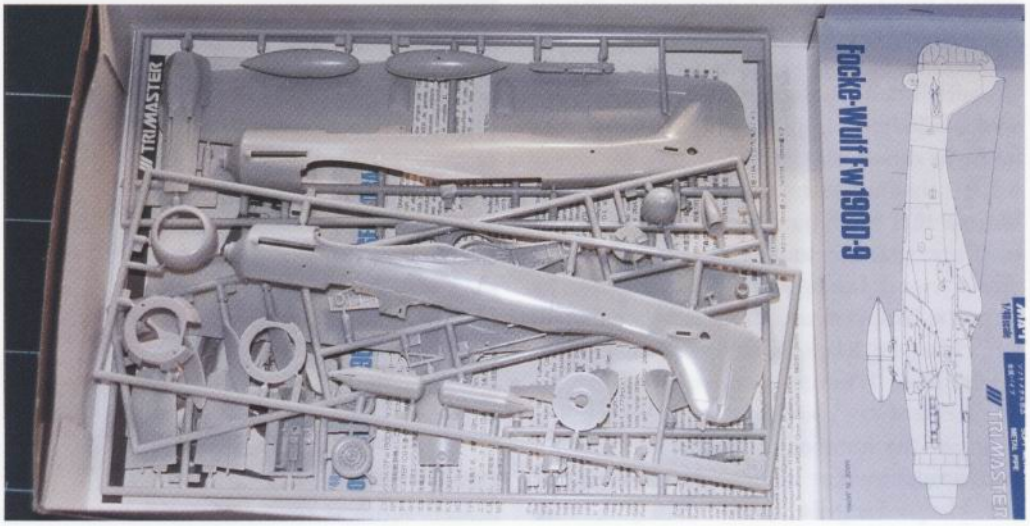
BASIC CONSTRUCTION

In this chapter, we're going to look at the techniques and steps that are crucial to the final look of your model. Once again, I must stress that the approach and techniques that I employ may not be the same as those of other modellers or those you have used yourself. This really doesn't matter. What is important is that I know these techniques work, and they should work for you, too. If you are not really happy with the way some aspect of your modelling is turning out, it may be down to your preparation work or painting for example. You may find an approach here that is new to you, and I would urge you to have a go to see if it's something that you can add to your own store of knowledge and skill.

WHAT'S IN THE BOX?

I'll assume that you have picked your project and are at the first stage of construction. Generally, my approach is pretty much the same whatever aircraft I am tackling. So what do you have in your box? You can see here that I have decided on the old Trimaster/Dragon Focke-Wulf 190D-9 in 1/48 scale. This model is an example of a mixed-media kit, not all the components being of plastic. In the accompanying photograph showing the parts

RIGHT The old Trimaster kit of the Focke-Wulf 190D-9, which was due for re-release in 2000.



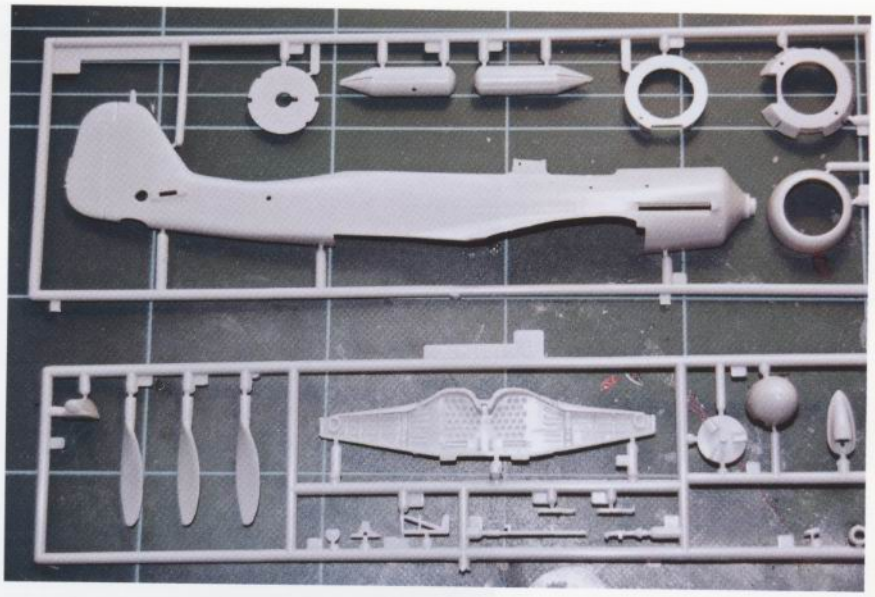
RIGHT The contents of the box are crisply moulded with fine recessed panel lines.

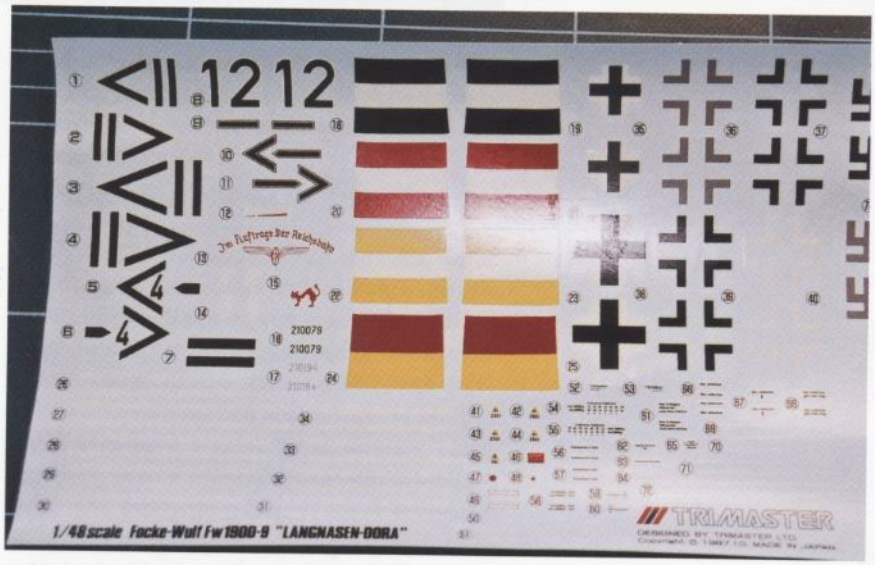
in the box, the blue raised section to the right inside the box contains parts that have been moulded in white metal and steel. The detail and precision of the parts that can be achieved with these media, as well as resin, is far superior to that possible with polystyrene plastic. It is worth saying at this point, though, that you always pay a premium price for these extra parts. In addition, they are only as good as the toolmakers who produce them, so have a good look inside the box to determine that the parts offered are actually a significant improvement over the standard items, which invariably are included anyway. Eduard, for example, usually produces two kits of the same subject, one called the Profi-Pack, which contains resin replacement parts, and a standard release without them. This is an excellent approach, allowing the modeller to decide on the product to go for. If the detail parts do offer a significant improvement, I may go ahead and buy the more expensive item.

The sprue layout that contains the main components is pretty standard for most injection-moulded plastic kits. The Fw 190D-9, being a fighter, is quite compact, and the parts of the Trimaster kit are crisply moulded, featuring finely recessed panel lines. Older kits often have raised panel lines, and the jury is probably still out for some modellers in respect of which type of tooling is preferable. I really don't want to open up that debate here; after all, we've got some serious modelling to do, haven't we? My own preference, though, is for recessed panel lines where they are delicately tooled, simply because they allow me to add ink washes. This technique is explained in Chapter 6.

The Trimaster decal sheet is definitely one of the better examples to be provided in a kit of this size. Four versions are included, which are keyed on the instruction sheet together with an explanation of who flew which aircraft.

The accompanying photographs show the etched steel parts, white metal parts and thin brass tubing for the gun barrels and pitot tube. In my experience, although etched steel parts are usually well tooled, the fact that the manufacturer has chosen steel as a medium is often a downer. This is because steel is so hard, whereas brass and copper are much softer and easier to work with. Fortunately, most of the aftermarket manufacturers use the softer metals. A particularly nice feature of the Trimaster kit is the protection the parts receive by being packaged separately in their own poly bags. Again, I always check to make





TOP The sprue layout of the Trimaster kit is fairly basic and straightforward, not over-engineered like some kits.

ABOVE The beautiful decal sheet will have to be used for another model, as I chose to employ a sheet from Eagle Cals relating to JV 44.

LEFT This model really was state of the art when it first appeared – notice the metal tubing and wire, not to mention the quality white and etched metal parts.

sure that the extra parts are undamaged before buying the kit.

STARTING CONSTRUCTION

It is probably fair to say that, in general, the construction sequence specified by the kit manufacturer is usually okay, but I should qualify this. A key question is, 'If I add this part now, is it likely to become damaged during the remainder of construction?' If the answer is yes, can it be added later without any assembly problems? If the answer to that question is yes, I usually put the part to one side, painting and finishing it separately before adding it in the final stages of construction. In this way, it is possible to reduce the likelihood of damage. I am sure many of you will recognise that situation. If you are not sure, even after thinking ahead a few stages and having studied the instructions carefully, you would be advised to put the part in and take care thereafter.

USING FILLER

Some of the more common fillers were identified in Chapter 1. Here, I want to give you an insight into how to use those fillers and their different applications.

MILLIPUT SUPERFINE WHITE

Probably the most common use for this material is to fill a gap at a wing root or around an ill-fitting engine cowling/engine nacelle. It is also useful when converting one particular mark or sub-type into another, which can produce all sorts of gaps that need filling to give the appearance that the various airframe panels are a seamless fit. In this case, it is worth remembering that you will have to disguise the fact that there is any filler there at all, which means rescribing the panel lines that inevitably will be lost as a result of the sanding process. It is surprising how many modellers simply forget this, or hope to get away with just sanding the joints down without replacing the detail. When you have painted your model, any defect at all will show through to the final finish.

If you want to fill a wing root using Milliput, the first stage is to take the two rolls of putty contained in the box and break small, equal amounts from each. One is a hardener that ensures the putty sets. They should be blended together until a uniform colour emerges and no streaks remain. I simply blend the putty between thumb and forefinger. Then, using an old modelling knife, cut off small amounts and press them into the gap to be filled. I do recommend building up the filler in layers until eventually it is just proud of the surface along the length of the gap.

Milliput stays soft for some hours, and once you have enough in place, it is time to reduce the excess. The purpose of this is to avoid a very long session of sanding with wet-and-dry paper later on – nothing is more certain, as the putty dries absolutely rock-hard. This quality is the material's greatest value as far as I'm concerned, because it allows me to scribe the surface perfectly later on.

The way to reduce the amount of excess filler is to use plenty of water and a damp cloth or, better still, your fingertip. Just run either along the joint, taking care not to dig into the filler below the level of the adjoining parts, otherwise you'll have to start all over again. Simply keep wiping your fingertip or the cloth across the surface until you are left with the filler in the joint, where it is supposed to be. Also at this time, you can use an old tooth brush to clean any filler out of the panel lines that surround the joint, otherwise it will have to be picked out once it has dried, and it is easy to damage the surface of the model during such 'repair' jobs.

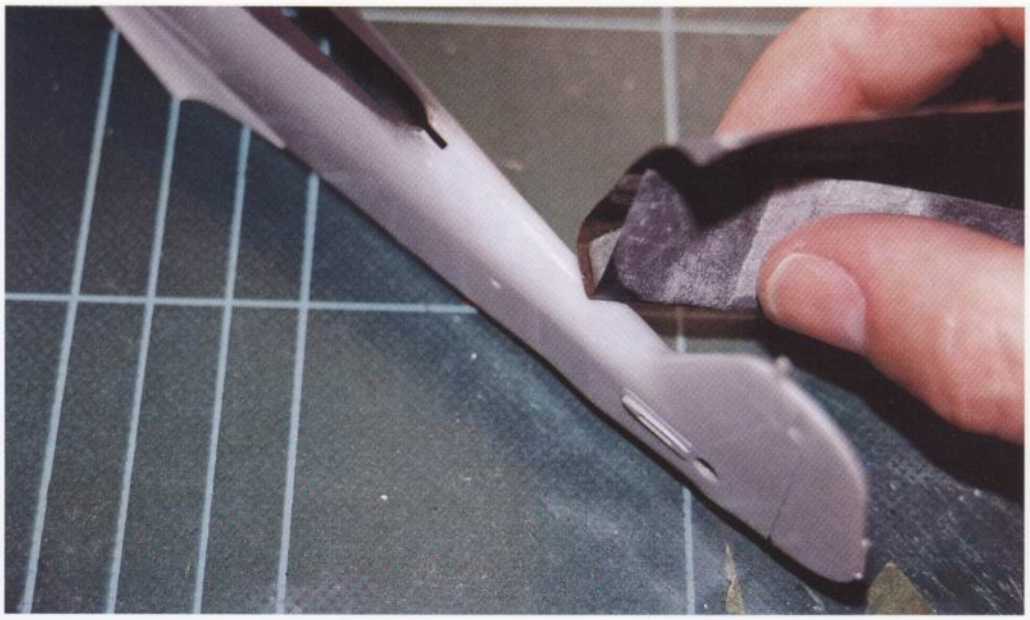
Although the manufacturer states that Milliput filler will be ready to sand in about three hours, my experience is that it is worth allowing a little longer – even overnight if you can be patient enough (there are always other jobs to do).

When the putty is completely dry, wrap a piece of 800-grade wet-and-dry paper around a small sanding block and shape the filler, using plenty of water. Any excess filler will quickly wear away. Finish the joint with 1200-grade paper and plenty of water, then use a nail buffer to polish the surface of the joint and surrounding plastic to a good shine.

SQUADRON GREEN AND WHITE

Sometimes, the facility for rescribing a filled area may not be required, or you may need a quick-drying putty. Fillers suitable for this kind of work include Squadron Green and White putty, and Humbrol and Revell fillers. These fillers are quite toxic, well the vapour that they give off certainly is, so you must ensure that your work area is well ventilated and preferably has an air-extraction system.

I'll concentrate on the Squadron products, mainly because I tend to use them, but I am



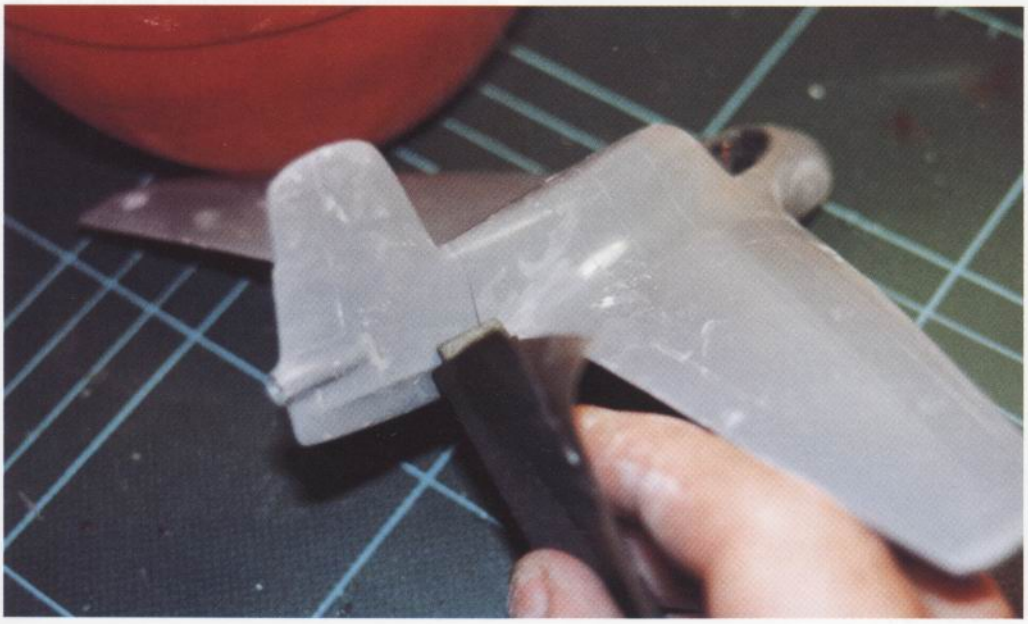
LEFT The upper fuselage joint line is sanded smooth.

sure that the principles are the same for the other varieties, too. The point to remember with these products is that they are very powerful and will attack the plastic before bonding to the styrene and setting hard. The key, then, is to be careful and apply small amounts of filler at a time. Certainly, the Squadron putty dries quite quickly – in an hour or so – therefore it won't take very long to build up the amount of filler required. What can happen if you try to build up the filler too quickly is that it doesn't set properly below the surface and when you come to sand the surface, the putty crumbles.

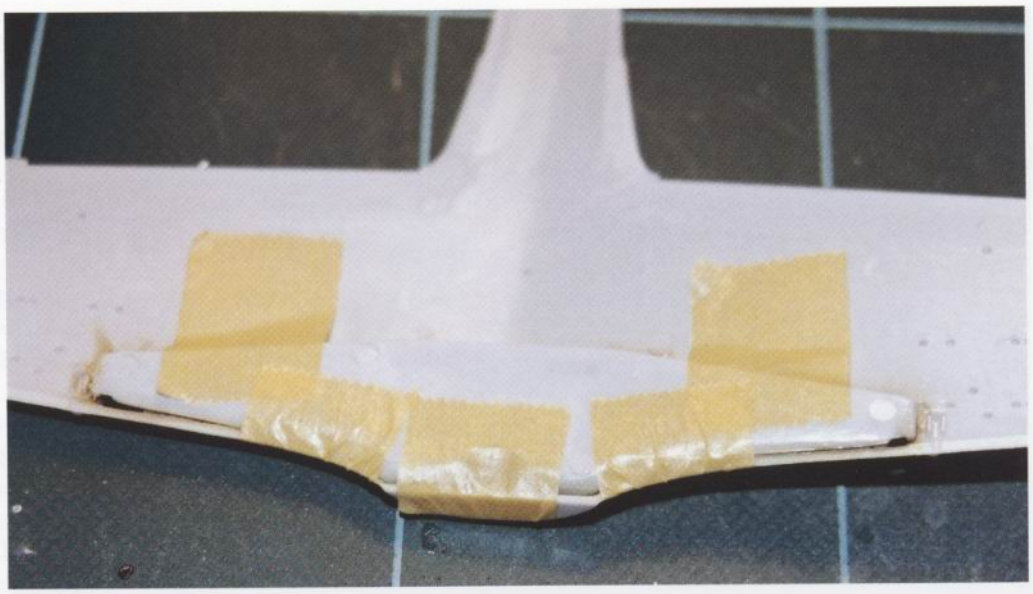
These fillers can be sanded using wet-and-dry paper, but always use plenty of water and progressively finer grades of paper, ending with 1200-grade. You can always use a nail buffer to complete the job, which is a very good way of showing up the smallest blemishes that may need further attention.

SANDING AND ELIMINATING JOINT LINES

I mentioned these tasks in Chapter 1 when I discussed different glue types. The Fw 190D-9 in the accompanying photograph is having the main fuselage centre seam sanded with wet-and-dry paper wrapped around an old clothes peg. I also have a small balsa sanding block for this purpose that has been in my sandpaper box for many years. Here, I am using 800-grade paper and, although you can't really see it in the picture, plenty of water. The water helps the paper to abrade the surface, this



LEFT Wet-and-dry paper, used wet, is ideal for cleaning up joint lines and areas of filler.



RIGHT Tamiya masking tape has been used to hold the wheel wells in position while the liquid cement dries.

method being much more effective than using the paper dry. Another important point to note from this photograph is that the completed cockpit has not been added, as it can be inserted later from below before the main wing sections are joined to the fuselage. This is always preferable, as it allows access to the interior of the joint, where I always add plenty of liquid poly cement. The glue effectively welds the parts together, and it is vital to let it dry thoroughly before attempting to sand any excess glue or plastic from the joint line. I usually allow several hours for this, even overnight. If you try to sand too soon, that irritating hairline keeps appearing between the parts because they haven't had a chance to weld together fully.

While the fuselage is drying, it is well worth looking around the box for other sub-assemblies to begin gluing at this stage. Then they can all be drying together and you will save yourself quite a bit of time. The wheel wells are a case in point on the '*Dora*' (D-9) and can be seen in the photograph after having been glued to the inside of the lower wing. Note also the use of masking tape to hold everything together securely. Sometimes, it is not necessary to use tape, especially when the fit of parts seems okay. What can often happen, however, if the fit isn't absolutely perfect, is that when the cement is drying the parts can begin to pull apart slightly under tension. So I always tape parts together if I'm in any doubt.

USING CYANO TO FILL HAIRLINE GAPS

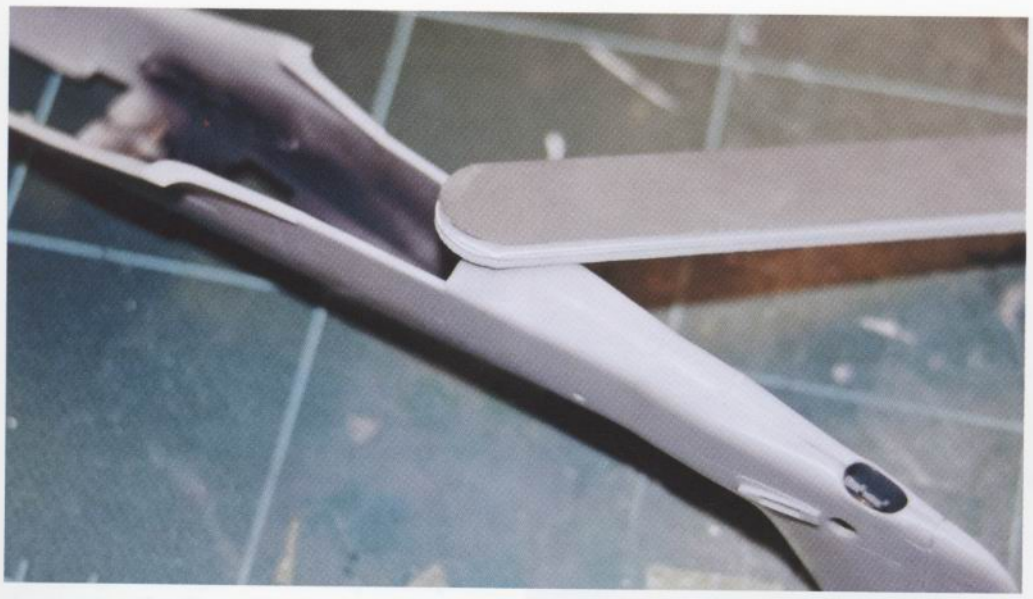
Despite your best endeavours with wet-and-dry paper plus the foam nail buffer, when the fuselage joint is closely examined, you may find that a few slight imperfections remain. If you have used the buffer, the plastic on each side of the joint will appear glass-like, which is really helpful in highlighting any points along the line where the joint is less than perfect. It is at times like this that cyano is the perfect material for eliminating these hairline problems.

First, gently run the point of a pin along the affected area, which will cut into the joint to provide a key into which a tiny amount of cyano can be added. Take great care here; remember that it is necessary only to scratch the surface to create a key for the cyano to take hold.

Next, squeeze a small amount of thick cyano on to the tip of a cocktail stick and spread this evenly along the prepared section of the joint. If you aren't in a hurry, set the part aside to dry for a few hours. If you want to press on, brush a small amount of cyano activator/accelerator over the glue. Immediately blow across the area to evaporate the excess, otherwise it will attack the surrounding polystyrene. After about ten minutes or so, the cyano will be ready to sand back using more wet-and-dry paper. At this stage, I generally use 800-grade paper followed by the three surfaces of the nail buffer. If you follow these simple steps, you will never see another joint imperfection in your models – honest!

FINISHING JOINTS WITH A NAIL BUFFER

These small foam-cored sticks are excellent for giving a really polished finish to joints after



LEFT The nail buffer is an outstanding sanding tool.

any excess glue and plastic have been removed with wet-and-dry paper wrapped around a sanding block. The surface will come up like glass, making it easy to see if you haven't sanded down the area well enough. Use the purple or pink coarse area of the stick first. When the surface is uniformly matt, progress to the white portion, which will begin to polish the surface. After a few circular movements of the white area, the final stage is to turn the stick over and polish the surface with the grey side. This is when you will notice the spectacular transformation of the joint.

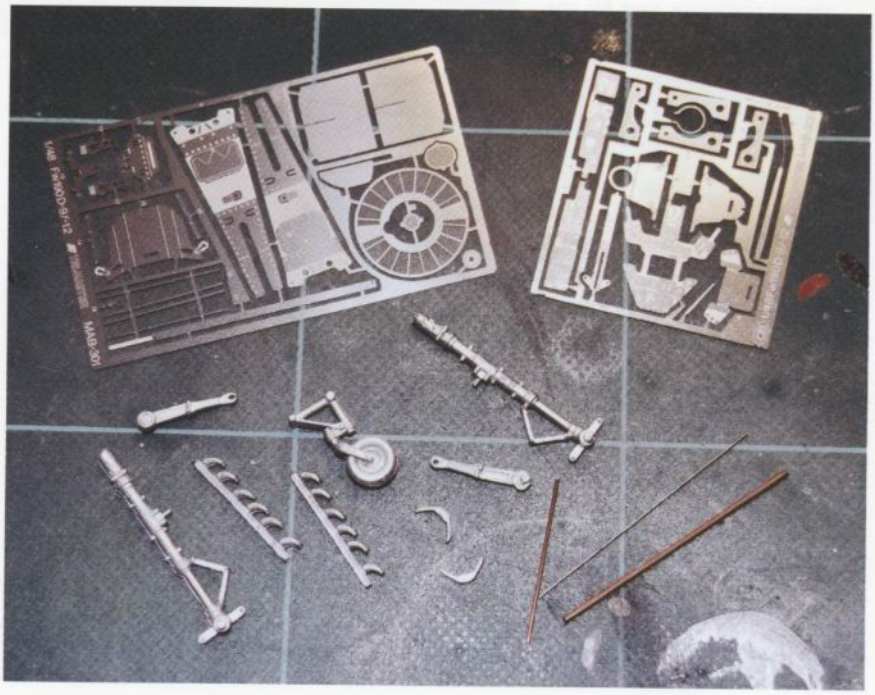
COCKPIT ASSEMBLY

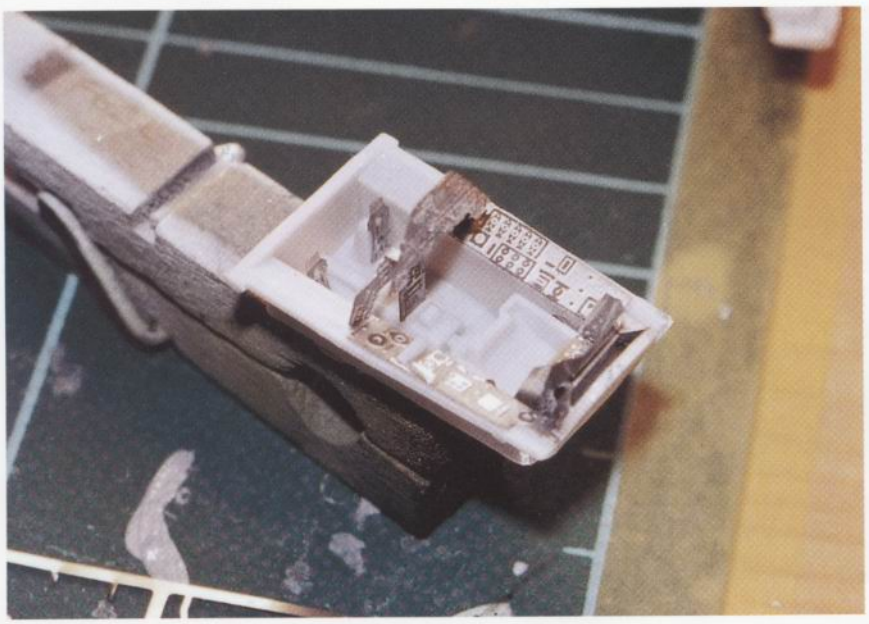
While the main components are drying, you can normally turn your attention to the cockpit, and here you can either use the plastic kit parts or incorporate more detailed replacement items. Steel cockpit parts must be secured with cyano glue. When removing these parts from the fret, it is important to use a sharp – preferably new – scalpel blade. Alternatively, some specialist model tool suppliers offer very sharp pointed clippers that work well. When using a scalpel, make sure you cut on a firm cutting mat or a hard surface like a steel rule or pane of glass. The parts will be very brittle and will easily distort. As I said, brass and copper parts are much softer and are easier to remove from their frets, but they are even more prone to distortion, so do take care.

Whatever the parts used, normally I spray all those requiring the same colour at the same time. Interior colours for German aircraft are well documented in Kenneth Merrick's book, *German Aircraft Interiors 1935–1945, Vol. 1*, and I thoroughly recommend this text to you. In it, Merrick has established that cockpit interiors were officially required to be painted RLM 66 *Schwarzgrau*. There was a general suggestion that all areas viewed by the pilot through the glazing from all directions should be finished in RLM 66. Interestingly, there were some variations to the prescribed standard for pre-war aircraft, in which RLM 02 *Grau* could be found on the interior side walls of cockpits and canopy framing. The instrument panels, too, displayed variations, RLM 02 being used occasionally; even RLM 41 *Grau* has been seen.

Areas of the aircraft not visible from the outside were not normally painted; if they did receive any coating, RLM 00 *Wasserhell*

BELOW The kit's white metal parts – the engraved detail is superb, adding greatly to the appearance of the model.





ABOVE The cockpit tub takes shape prior to spraying.

was used to help prevent oxidation of the metallic surfaces.

Instrument boxes and casings were black (RLM 22) or sometimes RLM 02, but the face surrounds of the dials were always black.

The metal replacement parts for the D-9 were added to the plastic cockpit tub, and I experienced no problems of fit at all. Because the steel fret is silver in appearance, I sprayed the parts with Tamiya German Grey (XF-63). The side walls, which can just be seen from outside the cockpit, were also painted this colour.

DRY-BRUSHING

When dry (after a few minutes), the whole interior was dry-brushed with light grey enamel paint. The point of this process was to highlight the angles and edges of parts that would reflect the light more than hidden or flat areas. Using a lighter shade of the base colour prevents too strong a contrast and an unrealistic look.

All that you need is an old or long-standing pot of enamel of the correct colour in which the pigment has settled to the bottom. Remove the lid, tip the tinlet slightly and, using the handle of an old paintbrush or a length of sprue, pick up a small quantity of solid paint from the bottom. Wipe this on to a tissue, which will soak up any excess oil. Taking an old paintbrush – I use a short, stubby brush that's been in my toolbox for about ten years – pick up a small amount of the paint on the bristles, then wipe it off immediately on the tissue, leaving the brush literally dry and virtually paint-free. Then 'dust' the part to be dry-brushed with the bristles, taking great care to ensure that only the smallest amount of paint is deposited on the edges you are seeking to highlight. Take your time and be patient; it is painstaking and time-consuming work, but the result is well worth the effort. With practice, you can become very adept at the technique. For me, this is a very rewarding part of modelling, mainly because you see the final effect appearing before your eyes.

As with all painting techniques, it is much easier to add a little more to achieve the desired result than remove it without damaging the paint finish.

The gentle dry-brushing motion helps to remove some of the paint from raised details, which gives an authentic metallic appearance to the cockpit. Small details can be picked out with coloured acrylic paints. I find the Citadel and Tamiya ranges of paint very good for this purpose and usually apply them with a slightly blunted cocktail stick. The paint gathers around the point, allowing you to add small blobs where you want. Another useful technique here is to add small amounts of white PVA wood glue to the etched handles to provide a more realistic three-dimensional appearance to these parts. Then they can be painted in an appropriate colour. Again, Ken Merrick's book is an outstanding source of accurate reference in this respect.

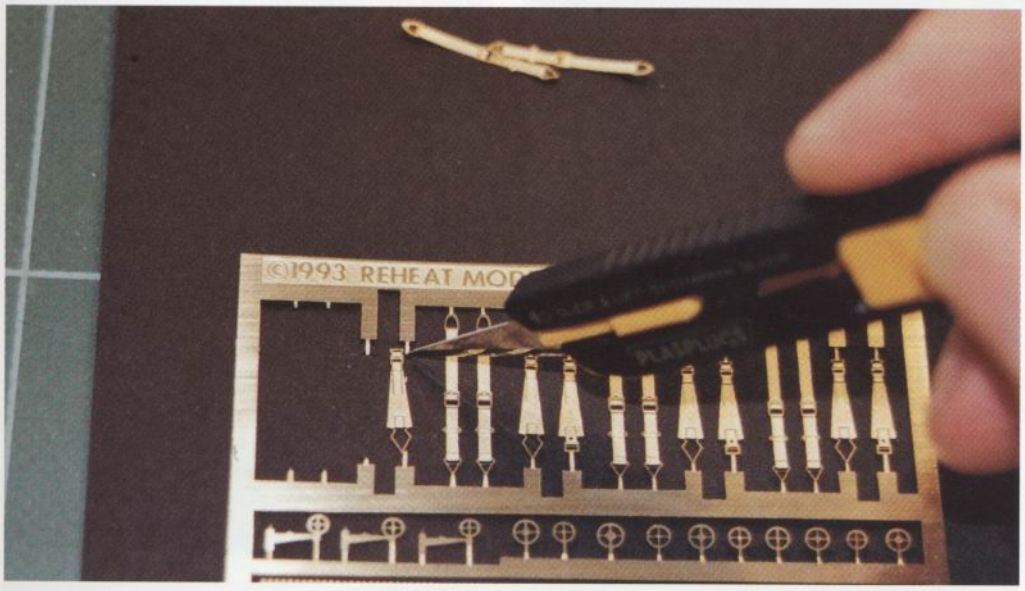
At this stage, the cockpit of my Fw 190D-9, minus the seat harness straps, is nearing completion, and you can see that I have mounted the tub on an old clothes peg, using Blu-Tac. This makes handling for painting so much easier.

BELOW The cockpit tub is almost complete, save for the addition of the seat harness.

ADDING BASIC DETAIL

At the very least, many modellers like to add seat harnesses to their models, and there is no shortage of aftermarket manufacturers to supply them. Among the main suppliers in the UK are Reheat Models, Airwaves, Eduard and True Details, all of which produce excellent brass sets that incorporate these parts. Like so many other products, they are available from good mail-order companies like Airwaves, Avia Imports and Hannants. One of the best manufacturers of these etched brass parts is Reheat Models, the tooling and level of detail on its frets being superb. A good fret covering Luftwaffe aircraft is No. RH071 'Luftwaffe WWII'. On one small brass sheet, it offers four sets of belts, gun sights, ammunition belts, different styles of rudder pedal and two complete seats. Not only is this good value, but the parts are of a universal nature that can be added to just about any Luftwaffe fighter.

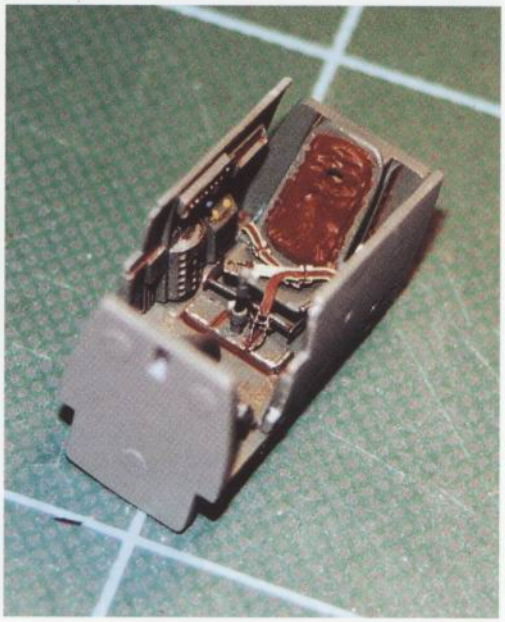
LEFT Reheat Models produces some of the best etched brass items on the market.



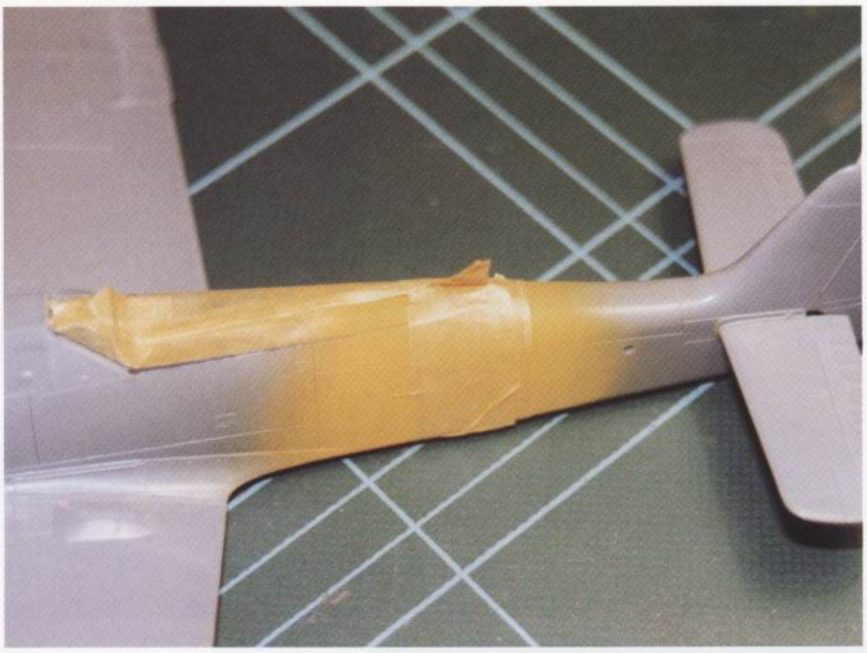
LEFT Using a sharp scalpel and hard cutting surface will make removal of the brass parts an easy task.

The brass belts have very small gates that connect the parts to the main fret, and separating them is easy with a sharp scalpel blade. I use bulldog clips to hold these parts for brush painting. The main straps were either a light or dark brown on most Luftwaffe fighters, with a canvas flap underneath the lap belts. This was usually a khaki or light olive-drab colour. Many pilots also used to fit some kind of cushion behind them, and I have seen several in brown, but these were frequently non-standard items, so black or another shade would probably suffice.

You can see in the accompanying photograph the completed cockpit tub for a Bf 109E-3 of the Spanish Civil War's Legion Condor. This model features in The Gallery



LEFT The completed cockpit tub for the Bf 109E-3, ready for installation in the fuselage.

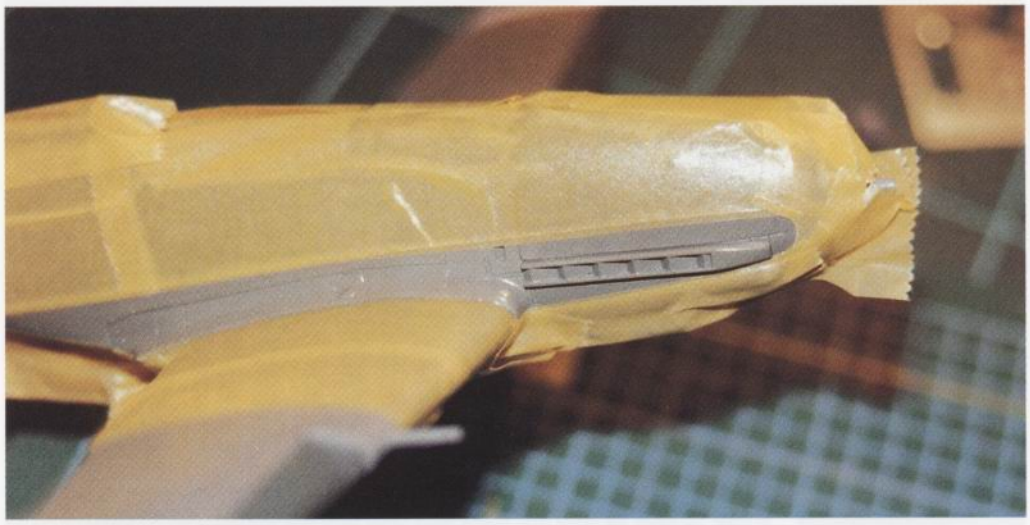


and in Chapter 6, illustrating techniques such as inking and the use of washes .

PAINTING

In Chapter 1, I explained the different types of paint that you can use. Now, I'll run through my approach to applying paint, using a variety of fighter projects to illustrate the techniques. The choice of markings will have a bearing on the order in which you tackle the various stages of painting. For example, you can see in the accompanying photograph of an Eastern-Front Focke-Wulf 190A-4 of JG 54 that the aircraft has a yellow (RLM 04 *Gelb*) band around the fuselage. From early in the war, fuselage bands were used to help identify friendly aircraft, but they should not be confused with *Reichsverteidigung* (Reich Defence) bands. In

ABOVE To save time and trouble, I painted the fuselage band first and masked it out at an early stage, rather than spraying it at the end and having to mask off a large portion of the airframe.



ABOVE RIGHT Tamiya masking tape put to good use again.

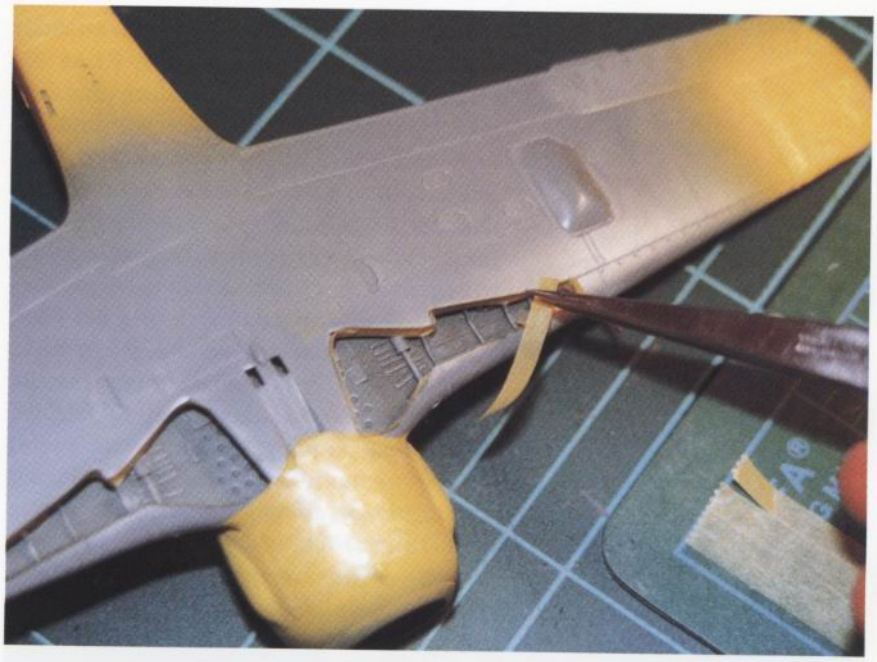
RIGHT Gloss black paint goes on to the Bf 109E-3.

this case, it was easier to spray the yellow for the fuselage band first, followed by the RLM 76 *Lichtblau* (also known as *Weissblau*) sides and undersurfaces, then the upper camouflage scheme. I used Aeromaster RLM 04 *Gelb*, the flat paint drying very quickly. The kit is the Tamiya 190A-3, which was readily converted to the A-4 by the addition of a small mast on top of the fin – I wish all conversions were that easy!

On the other hand, it is much easier to mask off an area once the main painting has been completed, as shown in the photograph of the Bf 109E-3 of the Legion Condor. These aircraft had large black areas painted on the fuselage sides to prevent the exhaust from staining the light coloured fuselage sides. If you look carefully, you can see that the tape curves around the front of the exhaust outlets, one of the useful properties of Tamiya masking tape.

Another useful tip when painting is to plan ahead so that you don't get paint on the main airframe where it isn't needed. The Tamiya and Trimaster/Dragon Fw 190s have separate wheel wells that glue to the inner face of the lower main wing. By pre-painting these and the wheel-well walls, you can avoid getting a lot of dark paint on the wing undersurfaces, which eventually will be finished in the very light RLM 76 *Lichtblau*. The photograph shows me masking the RLM 02 wheel wells ready for the RLM 76. It is also worth noting the masked off yellow wing tips on the underside of the Fw 190. Coloured underwing tips (with many variations in the size of the area covered) were common. Yellow has been documented on the Eastern and Western Fronts, while white was applied to aircraft in the Mediterranean area.

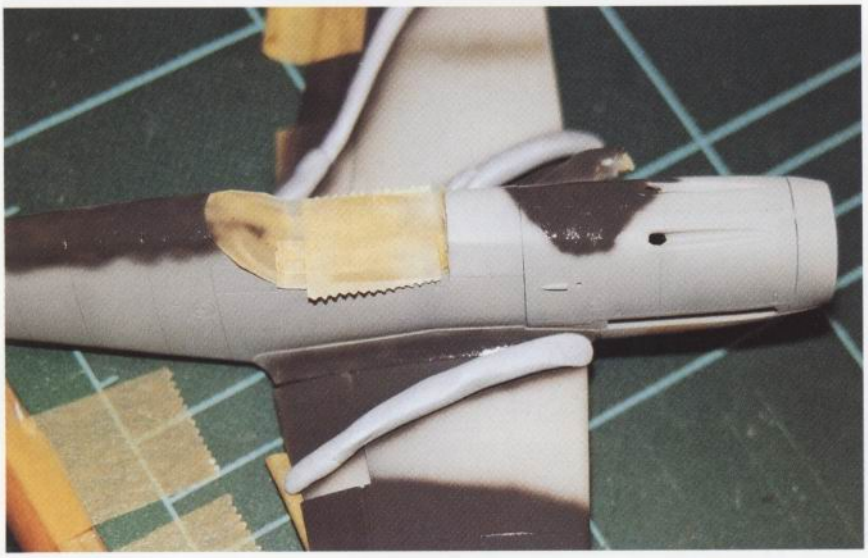
The photograph of the nearly completed Bf 109E-3 of the Legion Condor illustrates a number of useful techniques. You can see where I have dry-brushed in a lighter grey around the intakes and vent holes on top of the engine cowling to give a worn appearance. I felt that this was particularly relevant in the Spanish theatre of war, where these fighters operated between 1936 and 1939. The terrain was rough and sandy, with very hot weather conditions in the summer months. In the foreground of the picture, you can see the main upper wing, which has been lightened



ABOVE I like to paint the wheel wells, then mask them off before turning my attention to painting the undersurfaces.

LEFT The Legion Condor Bf 109E-3 nears completion and awaits its canopy – notice the seat belt hanging randomly over the cockpit sill.

and weathered by the use of light grey pastel chalks. The aircraft was sprayed RLM 02, although there is some evidence that the colour was lighter, so to cover myself, and add a sense of realism, I tried to create a lighter, weathered feel to the airframe. Note, too, the shoulder straps hanging over the cockpit sill, giving the impression that the pilot has just walked away. Just visible along the top of the fuselage is a long panel line that has been inked in (others are visible, too). Bf 109s had a noticeable panel line all the way from the rear of the canopy to the leading edge of the fin. So clean up the glued joint by all means, but you need to re-create this line by running a scalpel blade down the spine, guided by a steel rule or an old plastic store card. Modellers often miss this – but I bet you knew that already, didn't you?



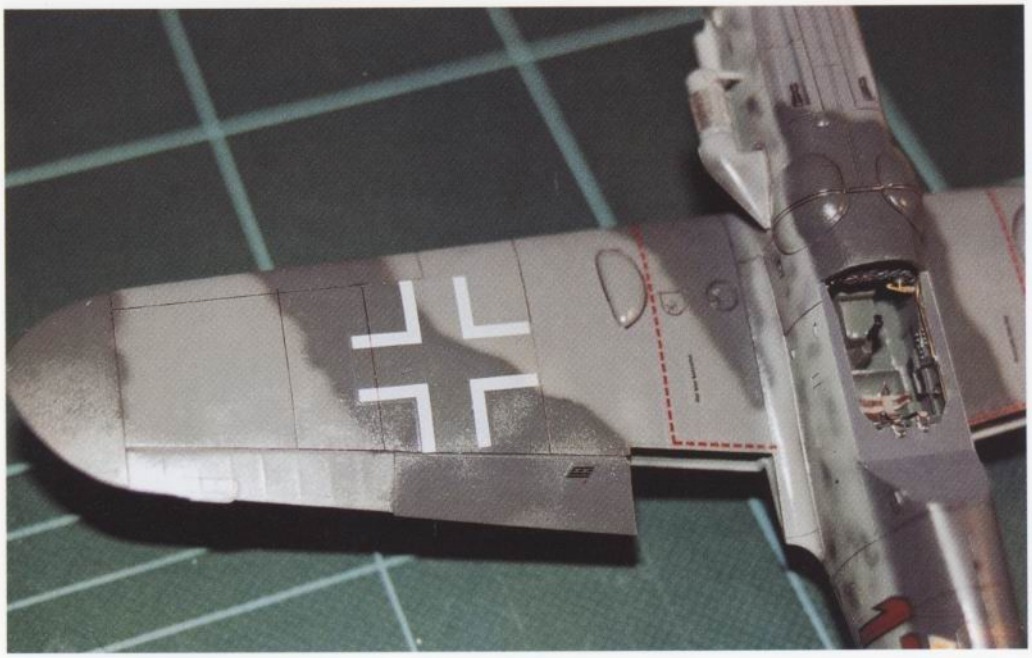
CREATING FINE FEATHERED EDGES TO THE CAMOUFLAGE PATTERN

I tend to paint the undersurfaces of my models first, then move on to the main upper fuselage camouflage. It may be helpful to explain how I achieved the fine feathered edges of the camouflage pattern on a Bf 109F-4 flown by *Obl.* Günther Freiherr von Maltzahn, *Geschwader Kommodore* of JG 53 in Sicily during May 1942. This aircraft was finished in RLM 74 *Graugrün* and RLM 75 *Grauviolett* over RLM 76 *Lichtblau*, with RLM 04 *Gelb* ventral nose, white fuselage band and black/RLM 24 *Blau* prop spinner. The mottling is RLM 74/75. This particular scheme is one of the subjects featured on Aeromaster's decal sheet No. 48-129 'Mediterranean Bf 109s of JG 53'.

Having applied acrylic Aeromaster RLM 76 to the fuselage sides and undersurfaces, I sprayed Hannants Xtracolor enamel RLM *Graugrün* on to the upper surfaces in line with the camouflage pattern suggested on the decal sheet. In fact, I ran out of Aeromaster acrylics for the upper-surface colours, so I continued with the enamels. There was no danger of a reaction between the paints, even though I had used cellulose thinners with the enamels. The main thing was to leave the acrylic paint to dry for about two hours first. I had left the areas bare that were to receive the second camouflage colour – RLM 75 *Grauviolett* – and once the *Graugrün* was dry, I set about masking these ready for the next colour. This was achieved using small pieces of Blu-Tac rolled out on a clean flat surface until about

ABOVE I mask with Blu-Tac rolls to create very fine feathered edges for camouflage schemes. The rolls are laid on the wings so that they overlap the first colour slightly.

RIGHT The final effect is very effective and pleasing.



half a centimetre in diameter and long enough to lay across the wing where needed. I leave the smallest amount of the first colour showing to ensure that I don't miss any of the surface. Then all that is required are a few pieces of masking tape to span the tops of the Blu-Tac rolls to protect the pre-painted areas.

For spraying gloss enamel paint, I usually adjust the compressor's air pressure setting to around 15–20psi, and because the paint is well thinned, it goes on beautifully and smoothly. The Blu-Tac rolls should be removed as soon as the paint has been applied and the airbrush cleaned, which I always do thoroughly between coats of paint.

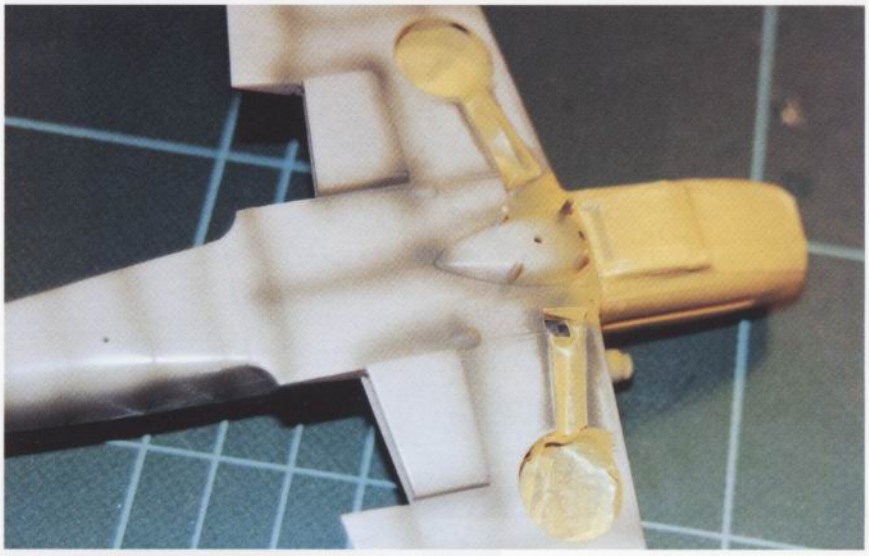
I have included a photograph of a Bf 109G-6 to illustrate what can be achieved by this technique. It really does produce very neat, scaled-down feathered edges, and the beauty of the method is that it is very easy to increase or decrease the amount of feathering. To do this, simply increase the diameter of the roll for broader feathering and decrease it for a finer, 'harder' edge.

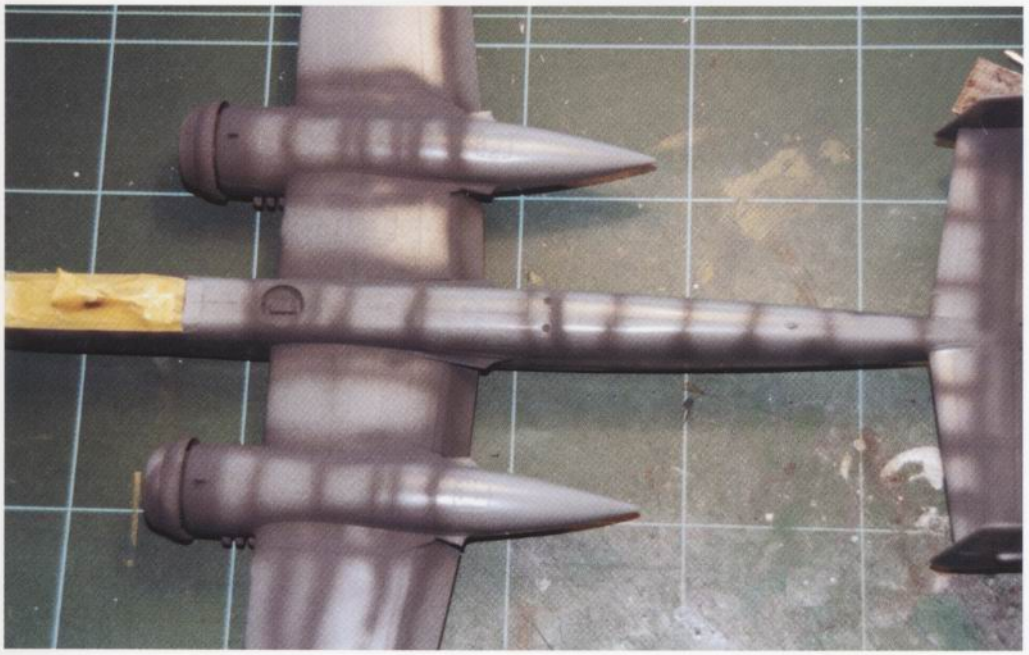
The techniques for mottling are explained in Chapter 6.

PRE-SHADING

This technique seems to be gaining quite a lot of supporters, judging by the number of times I have read about its use in the modelling press. Some of you, though, may not have heard about it, so I will explain this simple, but effective, technique.

The idea is to produce variety in the finished paintwork by creating the illusion of shadows around panel lines and control surfaces. This is achieved by spraying black or dark grey matt paint on to the model in the first stages of painting. Spray along the entire panel and control surface joints. You don't have to be too careful at this point, suffice to say that the paint should only go into these general areas and not on to any of the main flat areas of the panels themselves. Once the paint has had a chance to dry – a couple of hours or so – you can spray on the top colour. I have included a photograph that shows the Bf 109F-4 undersurfaces about half-way through spraying on the RLM 76 paint. On the left, you can see that the black is disappearing fast, and therein lies danger. It is very important just to 'ghost-on' the top colour, that is apply it very lightly so that you can build up the final effect slowly. This is





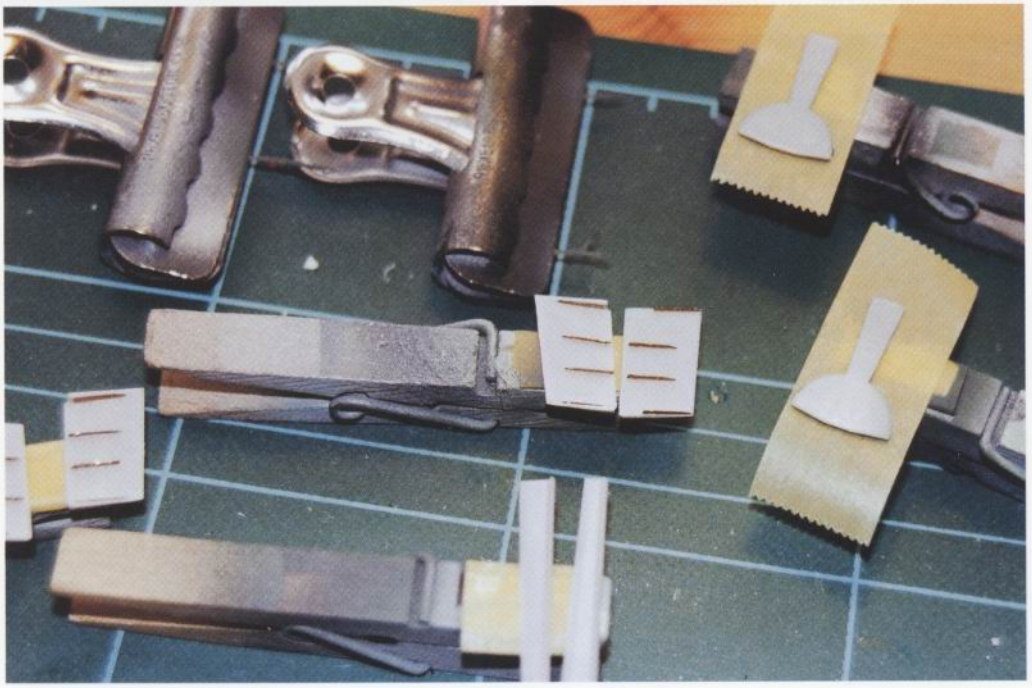
ABOVE Pre-shading being applied to a Bf 109.

LEFT The He 219A-7 '*Uhu*' pre-shaded with dark grey paint.

much easier than it may appear at first. The key is control of your airbrush and restricting the paint flow to a minimum. Also shown is pre-shading applied to the fuselage of an He 219A-7 '*Uhu*'. Notice that I have used dark grey on this occasion, primarily because the surface colour is very light, RLM 76 *Lichtblau*. What's really required here is a little patience; there have been times when I have not taken enough care and the shadow effect has been obliterated by too much top coat. If this happens to you, don't despair; simply carry on and touch-in the shadow during the final stages of construction by applying a little grey pastel chalk with a small dry brush.

ABOVE The elevators on the tailplane are scored and realigned so that they droop slightly, creating a little added interest to the model.

RIGHT A mass spray job looms, and more clothes pegs and bulldog clips are called up from the reserves!



ADDING SOME EXTRA LITTLE TOUCHES

Sometimes, it is nice not to go to the lengths of adding a lot of resin and brass. Hasegawa, for example, includes dropped leading-edge slats and double split flaps in its Bf 109 kits. By simply displaying your model with these in the drooped position, you can really improve the final effect and realism. How about dropping the tailplane elevators, too? This can be achieved by lightly scoring each tailplane along the upper surface of the joint line. After a couple of gentle passes with a well-used scalpel, it will be possible to bend the elevators down. Don't forget that both should be up or down, but not opposite one another, as would be the case with the ailerons on the wings.

In addition, there are four small ribs inside each flap, which can be created with thin strips of Plasticard or left-over brass.

APPLYING DECALS

In Chapter 1, I explained the use of decal softening solutions. If, for some reason, you haven't read that section yet, it would be a good idea to do so now.

By far and away the most common form of decal is the water-slide variety, which has to be dropped on to lukewarm water, then slid on to your model. However, there are some key points to consider. The first golden rule is that all water-slide decals must be applied to a gloss surface. There are several ways by

which you can achieve this gloss surface. Perhaps the easiest is to use gloss paints, like those from the Xtracolor range. However, the paint takes several hours to dry, so a quicker method may be more appropriate. I have noticed that many modellers have taken to using flat paints, like those offered by Humbrol, Revell and Aeromaster, followed by several coats of Johnson's clear floor polish. Now I've no idea how on earth this all started, or who had the gumption to try it out in the first place, but this method of gaining a smooth, gloss finish on to which decals can be applied works very well. It is important to build up the gloss finish with several thin

coats of polish, but the product dries very quickly, so you won't have to wait very long before you can apply those decals.

Of course, the traditional method with flat paints is to apply a coat of gloss varnish. I think all the model paint manufacturers produce a gloss varnish, but the product that I have had the most success with, and have kept coming back too time and again when one of the others has proved disappointing, is Humbrol Gloss Cote. This varnish thins well, using a few drops of cellulose thinners, and dries in two or three hours. When your model can be comfortably held without leaving great fingerprints on the paintwork, it is okay to add the decals. It is always a good idea to test a concealed part of the model first before handling it freely.

The order in which you apply the decals is purely a matter of choice. I tend to add the main markings, like the crosses and codes/emblems, before getting down to the smaller items such as stencils. In this way, I obtain various datum points against which I can line up the other decals to ensure that they are placed accurately.

Invariably, it is a good idea to use one of the decal setting solutions that soften the decals when applied to the aircraft. The major reason for using these is that they cause the decals to conform to the contours on which they are applied. Once they have dried and been covered with a coat of matt or satin varnish, they will look as though they have been sprayed on – exactly as on the real aircraft. As with all good modelling, however, the result will be only as good as the preparation and effort that has gone into the project beforehand.

USING MICRO SET AND MICRO SOL

Micro Set is the solvent that should be applied to the model first, using a brush to wet the area where the decal is to be applied. I do this just before sliding the decal off its backing paper, otherwise the liquid may evaporate. I try to place the decal as accurately as possible straight from the sheet. This is because some decals are very thin and are prone to tearing, as they adhere too well and too quickly. However, for minor adjustments, most decals respond to a light touch with a fingertip that has been dipped in water. This approach seems to create just enough adhesion between the finger and the decal. Once the decal is in the correct position, I gently dab it with a soft, clean tissue, pressing progressively harder to remove any air bubbles and leaving the carrier film virtually invisible. Any silvering or greying of the border of the decal means that air is still trapped between the marking and the paint finish. This must be eradicated at this stage, otherwise it will show up when the decal is dry. By pressing a little harder, any silvered areas can be reduced or eliminated, but it may help to lightly prick the affected area with a needle and apply a little more of the decal setting solution.

After 10–15 minutes, Micro Sol should be applied. On rare occasions, this liquid can have an adverse reaction with the decal, so try it out first on some innocuous stencil that can't easily be seen. Micro Sol solution softens the decal and often produces a slight crinkling of the surface – but this is quite normal. The decal should be left to dry thoroughly, after which it

LEFT The spiral decals applied to the propeller spinners of many Luftwaffe fighters can be a real handful – I find it best to start at the tip and work toward the rear of the spinner.

will have bedded down over often quite complex curves and contours. If the decal hasn't quite gone down, I find that pricking the affected area a few times with a needle and applying lots more Sol usually does the trick.

SPRAYING VARNISH

The best time to varnish your model is just after the decals have gone on and any ink washes have been added to enhance the panel lines. The very best finish will be obtained with a good-quality product like Aeromaster acrylic flat varnish. This variety dries very flat indeed, although the company's gloss varnish isn't very glossy, unlike Humbrol Gloss Cote for example.

I'll assume that you are using an airbrush or perhaps one of the flat varnishes available in aerosol form. I have to say that I'm not really a fan of cans because you can't control the speed/pressure at which the contents emerge, and they can be prone to spitting.

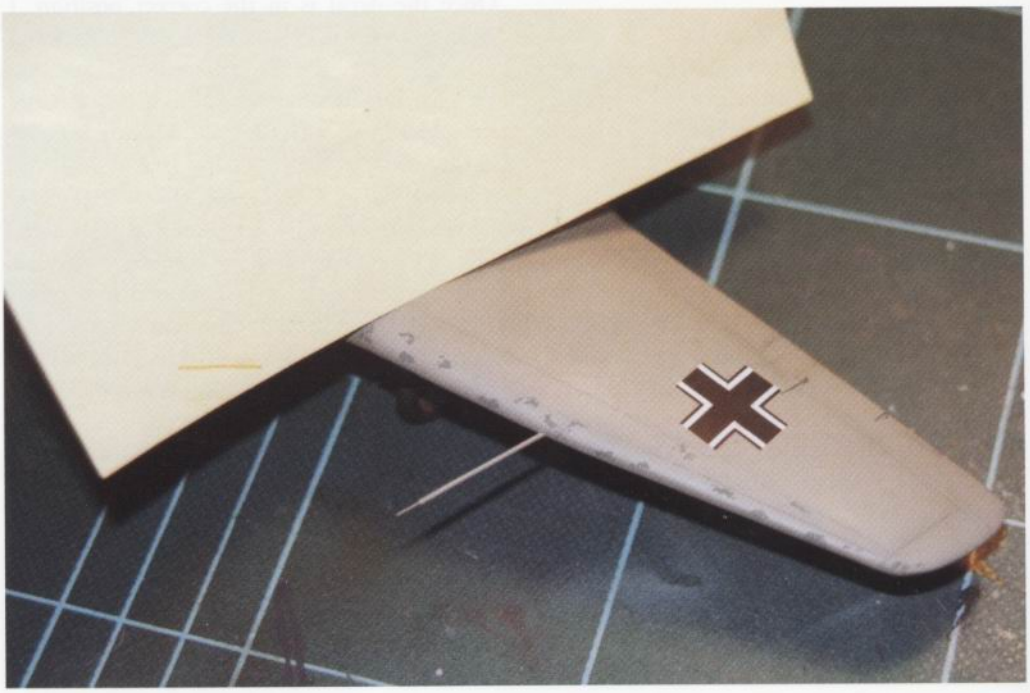
Before you load the airbrush with varnish, take the time to plan where you're going to hold the model while you spray. Many times I've been so keen to get on and add the varnish that this issue has completely passed me by, only to cause a delay while one section of the model dries enough to handle it. Wheel wells, engine cowls and wing leading/trailing edges are my usual favourites for hand-holds, but clearly every model is different, so you need to decide what is best at the time.

Spray with the head of the airbrush 6–10cm from your model, keeping it moving and working in even strokes across the surface. Any inadvertent pause will result in a serious pooling of the varnish, which can ruin the paint finish. Although Aeromaster flat varnish has a rather milky appearance, this is perfectly normal and it dries clear, so don't be put off by the look of the liquid in the bottle.

Once the varnish has been applied, you will be able to handle the model – with care – within a few minutes.

After you've finished painting the model and have added the final details like the canopy and aerial wires, you may find that you have missed an area when spraying on the varnish, the tell-tail sign on a flat finish being an area that has a semi-gloss appearance. This means spraying on more matt varnish. For this purpose, Post-it Notes work wonders as self-adhesive masks. They have very low-tack properties and will not damage the surface of the model. They can be placed strategically so that you can spray the varnish without risk of spoiling features such as the canopy.

The photograph illustrating the Post-it Note in use is also interesting because it shows weathered chips along the leading edges of the wings. The subject of the model, an Me 163A CD-10, exhibits this weathering in wartime photographs. At first, the researchers for the Flashback kit thought it was mottling, but this appears not to be the case, and they are helpful enough to point this out in the kit instructions. I used Aeromaster RLM 02 acrylic for the main overall colour and Tamiya



RIGHT Post-It notes are invaluable for masking painted or even finished surfaces.

RLM Grey (XF-22) to create the chipped areas. The 'chipping' technique is explained in Chapter 6.

ATTACHING THE CANOPY AND OTHER CLEAR PARTS

As I explained earlier, just about the most effective product for attaching canopies is a white adhesive called Micro Kristal-Klear. There are others on the market, and you can even use PVA wood glue, but I find that this particular substance works best for me.

One of the first dilemmas you'll have to face is deciding when to attach the canopy. The answer to this lies in its fit. If the fit is good, as on all recent Tamiya aircraft kits and most Hasegawa models for example, I tend to mount the canopy and, if possible, any other clear parts on clothes pegs. They are painted and varnished at the same times as the remainder of the model and are only added at the final stage of finishing. I do this to avoid damage to the clear parts, which remain quite fragile when attached to the model, and to ease handling of the model during the main painting stages.

When attaching the canopy and other clear parts, apply small dots of Kristal-Klear to the edges of the parts, not a continuous bead. You only need to secure the parts sufficiently to ensure that they do not come off when transporting the completed model and during general handling. The other main reason for limiting the amount of adhesive, especially if using PVA wood glue or cyano, is that you can substantially reduce the likelihood of the parts fogging up from the strong vapours given off.

Kristal-Klear is best applied with a cocktail stick, which will deliver the adhesive to the exact points you need it. Always test-fit transparencies before applying any adhesive, just to make sure that there are no problems .

Humbrol's Clear-Fix is another adhesive that is suitable for attaching clear parts. It should be used in exactly the same way as Kristal-Klear, but I have found that it tends to have a pretty short shelf life before becoming quite thick in consistency and very stringy, neither of which makes for ease of use.

This advice should be helpful when dealing with canopies and clear parts that fit well, but what if they don't?

You may have the option of replacing a poor-fitting canopy altogether with one of the vacuum-formed clear canopies supplied by manufacturers like Falcon and Squadron. They are available by mail-order from several good modelling shops and suppliers. These items are quite delicate, and you need to check that the canopy has been made to fit your specific make of kit; if it hasn't, ask the supplier if it will be suitable. The canopy will need careful cutting from the backing sheet and should be offered up to the model frequently to check its fit. When you are happy, the vac-formed item can be attached in the manner described previously.

Of course, it may not be necessary to replace the kit item at all if careful sanding of the kit part will produce a better fit. Simply dry-fit the canopy before the model is painted, noting the gaps and points of contact. By gently sanding the raised areas with a small sanding block, you can reduce the areas that cause the poor fit. This can be a very tedious process, but with some of the older products on the market, or if you are carrying out a conversion, this may be the only course of action open to you.

HANDLING THE FINISHED MODEL

The last thing I want to do here is 'teach you to suck eggs' so to speak, or appear patronising, but a comment on handling your finished models would seem appropriate.

Many is the time I have been at a show and seen a modeller pick up his or her pride and joy by the fuselage sides, thumb and forefinger above or below the wing, or in some similar fashion. I cringe inside when I see this, mainly because, when examined close up, the model displays the dreaded thumb prints all over the surface. Such prints are caused by the oil that all of us secrete from our hands (the police service has enjoyed the benefits of this problem for decades!). It is a real problem to remove this oil once it's there – certainly I haven't found a satisfactory method.

Applying a good coat of varnish to your model will help to reduce the effect that the oil can have: it becomes less visible and is easier to rub off if the worst occurs. Also, always try to handle the model positively by securing it by the wing edges, if this is possible, or with one finger under the spinner and the other under the tail. Whatever method you choose, which will be different for just about every model you have because of the aerial/aerial-wire fit, try to minimise contact with the main surface areas.

CHAPTER 5

ADVANCED CONSTRUCTION

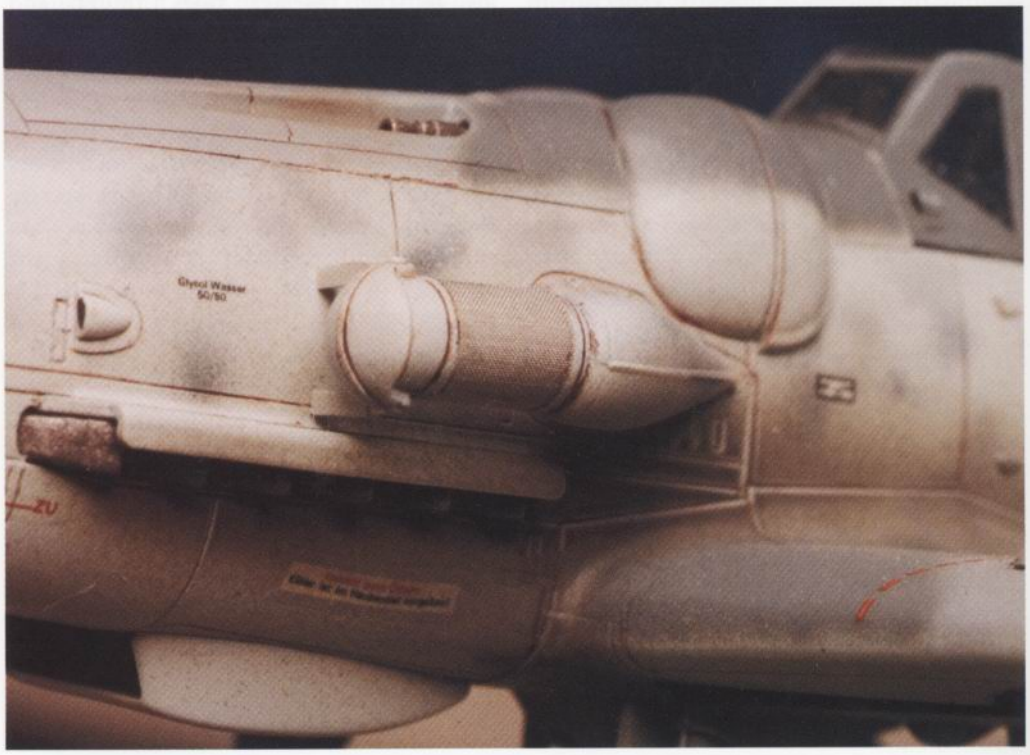
The overall standard of plastic construction kits seems to be getting progressively better these days, which is a very welcome situation for modellers. It is particularly noticeable that the investment in tooling technology in the Far East is reflected in the fine detail apparent on the parts. For many modellers, and I'm sure for all at some stage, what comes in the box is enough to satisfy our needs. Speaking personally, I don't always want to spend my time incorporating every last piece of resin that is on the market. Sometimes, it is enjoyable simply to take a good kit from the stockpile, like another Hasegawa Bf 109, add a seat harness and make the best of the perfectly acceptable parts in the box.

Every now and again, though, there is an urge to find a source of items and additional parts that will enhance those provided by the kit manufacturer. You see, when you begin to look closely at a real aircraft, more and more details begin to emerge. In this chapter, we'll look at including a typical aftermarket resin cockpit, some brass parts and other scratch-built items to add to a model's realism.

IMPROVING A TROPICAL FILTER USING REAL METAL MESH

Many fighters had 'Trop' filters fitted to their engine air intakes, and the Bf 109G-6s operating in Greece during 1943 are good examples. When you examine the tropical filter, you can see that there is a very fine wire-mesh grille wrapped around each side of the main cylinder, making this area ripe for improvement on a model, using a fine wire-mesh replacement. I wanted to build this variant of the famous Messerschmitt fighter, and the release of an aftermarket decal sheet by Aeromaster provided the incentive I needed. The markings I was keen to use are those of a Bf 109G-6/R6 of 11./JG 27, flown by one of the Luftwaffe's most notable fighter aces, Heinrich Bartels, who was based at Kalamaki, Greece, during September 1943. The aircraft, 'Red 13', is finished in RLM 74 *Graugrün* and RLM 75 *Grauviolett* over RLM 76 *Lichtblau* with a white fuselage band and rudder. The propeller spinner is white with a black spiral, and the fuselage mottling is RLM 74/75.

To be fair, Hasegawa has made a good effort at representing the wire-mesh effect in



RIGHT My model of Heinrich Bartels' Bf 109G-6 displaying its new tropical filter.

the filter offered with the G-6 kit, and using a brown wash, you can make a reasonable job of enhancing this detail. However, it can be improved still further by replacing the filter mesh with the real thing. Of course, you do need to find a suitable replacement medium, and I was fortunate to have done so a few years back at the International Model Show at Olympia in London. This show is a very good source of tools, materials and specialised modelling products, and while I was there I came across a company selling rolls of very fine mesh that is superb for this task. For the life of me, I can't remember the name of the supplier, but if you keep asking around, especially in model engineering circles, you are likely to get lucky.

The fine wire mesh is so thin that it is easily cut with a pair of scissors, but the first task is to measure the apertures of the kit filter that will hold the two metal replacements. The kit item also needs to be prepared by gently scraping away the slightly raised, moulded 'mesh'. For this, you can use an old scalpel blade. To obtain a nice snug fit of the mesh, I stuck a small piece of Tamiya masking tape over each aperture and pressed it into the corners with a sharp cocktail stick. Then, with a sharp pencil, I drew around the outline of the aperture, making sure to get into the corners. The tape was removed and the pencilled shape cut out with a sharp scalpel. This would act as a template for marking out the exact shape of the replacement wire-mesh grille. After pressing the tape down on to the wire mesh, I cut around the part with sharp scissors, peeled away the masking tape and I had my new mesh.

To obtain a really good fit, the mesh needs to be gently bent around the handle of a paintbrush to give it a curved shape, which allows it to drop into the recess in the kit part. Each piece of mesh is secured with tiny amounts of cyano.

There are a couple of points to bear in mind here. Firstly, if you don't want to build your Bf 109 with a tropical filter, a small mesh disc can be added to the standard air intake. This is a small detail, but one that is noticeable

ABOVE LEFT The ultra-fine metal mesh used to make the new filter.

ABOVE Masking tape is used to make templates for the sections of metal mesh.

BELOW LEFT A tape template is attached to the mesh.

BELOW The new section of mesh about to be attached to the body of the filter.

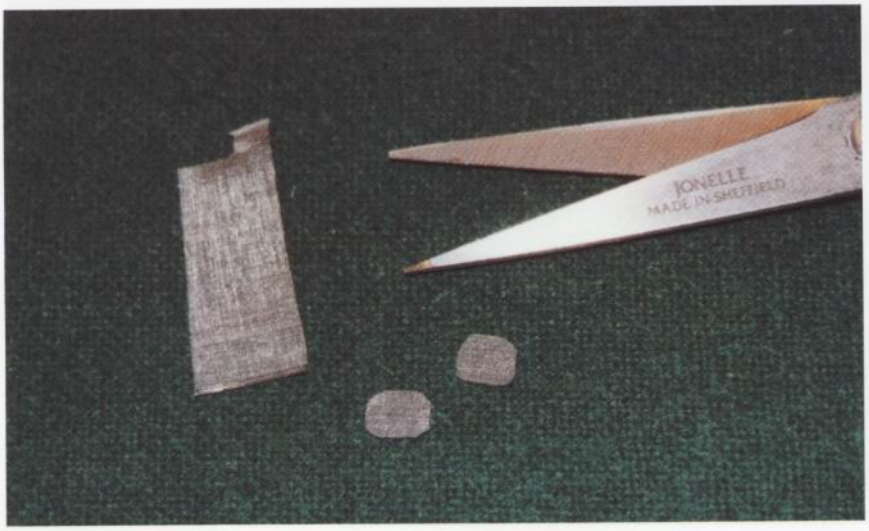
to enquiring eyes. Secondly, paint the filter at the same time as the remainder of the model, but don't attach it so that you can work on it – add it to your model during the final stages of construction. I decided not to paint the mesh of the new filter, but allow its metallic appearance to show. Photographs I have seen suggest that the tropical filters were generally left unpainted.

USING METAL MESH TO DETAIL WING LEADING EDGES

Fine wire mesh has many other uses, one of which came to light during construction of my He 219A-7 '*Uhu*' project. When assembling the wings, I noticed that there was quite a prominent joint line within the small intakes inboard of the engines. This is nearly always the inevitable consequence of splitting the wings horizontally when the moulds are designed.

You can disguise the joint line by painting the inner face black to reduce reflection and make the intake appear to be a hole. Alternatively, you can attach a Plasticard blanking plate immediately in front of the joint to hide it, painting the plate an appropriate colour. However, neither of these options really seems satisfactory. On the real aircraft, fine grilles were fitted into the recesses, and this is where that excellent mesh comes in handy again. What you do is cut a small square of masking tape that is just larger than the aperture and press it into the hole against the back wall. A cocktail stick works well for this task, but go easy on the pressure, otherwise you'll puncture the tape. When you have worked the tape into the corners/edges, take a sharp pencil and draw around the outline of the back wall. Remove the tape and stick it on a small piece of the wire mesh. Cut around the pencil line to create the new mesh insert and keep test-fitting the mesh until you achieve a snug fit. The mesh can be tacked in place with cyano, but go easy on the glue, otherwise it will squeeze through the fine holes in the mesh and spoil the whole effect.

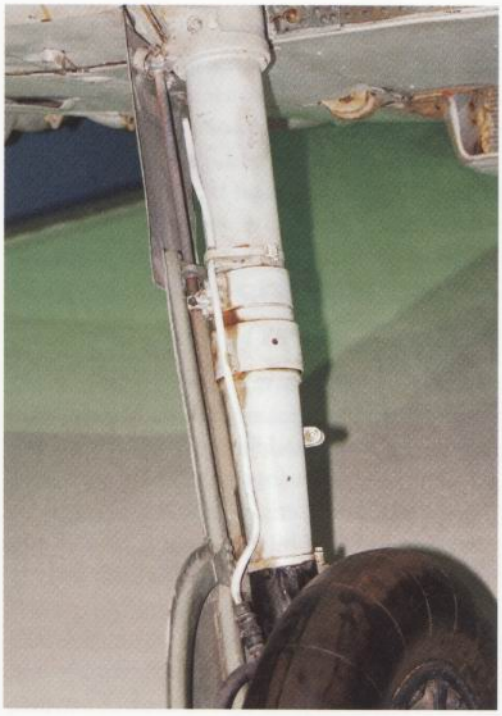
RIGHT You can just see the joint line inside the air intake.

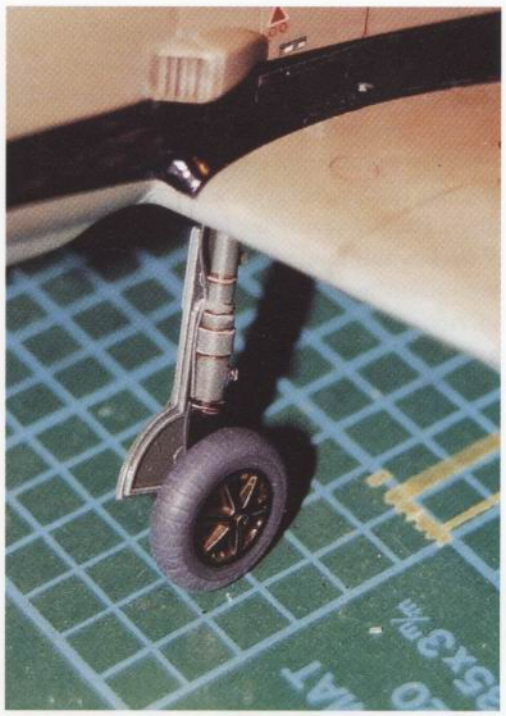


BELOW Replacement grilles are cut from the wire mesh.

ADDING HYDRAULIC LINES TO UNDERCARRIAGE LEGS

One of the nicest touches that you can add to your Luftwaffe fighter aircraft are the thin, yet very obvious, hydraulic lines that run down the front or side of the main undercarriage legs. If you look at the accompanying photograph of a real Messerschmitt Bf 109E-4, you'll notice the thin pipe running down the length of the undercarriage leg. This carries





FAR LEFT The undercarriage leg of a Bf 109E-4 – note the hydraulic line that runs down the inside of the leg.

LEFT The author's attempt at simulating an accurate undercarriage leg.

hydraulic fluid to the main wheel brakes. The lines are usually secured by metal straps to the undercarriage legs and disappear into the wheel wells at the top. Note also the change in diameter, colour and shape of the hydraulic line at the foot of the leg, together with the small rounded lug that protrudes from the rear of the leg, a few inches above the tyre. These are all details that you can add, especially in 1/48 scale and above, potentially making the difference between a good model and an outstanding one.

In the photograph of my model of a Legion Condor Bf 109E-3, the undercarriage leg can be clearly seen, while the hydraulic line is just visible running down the inner edge of the leg. Less easy to see is the tiny retaining strap about a third of the way down the leg. The straps that secure the hydraulic line to the undercarriage leg are much more noticeable, being of a different design, in the accompanying photograph of an Fw 190F-8.

Fortunately, hydraulic lines are really straightforward to make. All you need is a small amount of fuse wire of the correct diameter – 5-amp wire works well. Lead or aluminium foil is ideal for cutting into small strips to anchor the line to each leg, exactly like the real parts. The first job is to find accurate reference photographs of the original, remembering that not all fighters had the same arrangement on their undercarriage legs. Many of the reference sources identified earlier in this book will yield the necessary information.

Cut a small length of fuse wire for each leg, making sure that it is longer than actually required. The excess can be trimmed off later when you know exactly how each leg will sit in the wheel well. At that point, you can also decide where to put the top of the line as it enters the wheel well. The fuse wire will probably be bent from being stored in a roll and will need straightening. This is easily achieved by rolling the wire between two flat surfaces, like steel rules or pieces of stiff Plasticard or glass. You'll find that pointed tweezers will prove invaluable for the subsequent tasks. First, you need to drill a small locating hole in the bottom of each undercarriage leg where one end of the fuse wire should be secured with a small amount of cyano. If you want to press on, apply a little

LEFT The leg of one of the author's Fw 190F-8s. Note the different arrangement for the hydraulic pipe.

cyano activator/accelerator to set the cyano hard on contact.

The next stage involves running the wire up each leg, following its contours and taking care to reproduce the shape and route of the original line. When you are happy with the shape, you can secure the line with small strips of lead or aluminium foil. Again, make sure to replicate the correct arrangement for the specific aircraft type. I find the easiest way to handle these very small items is to place a small blob of cyano at, say, the front of the leg. Then I attach the foil about two-thirds of the way along its length, to prevent any join showing at the front, and wrap the foil around the leg, securing it with a little more cyano at the rear. Any overlap can be trimmed with a sharp scalpel blade. A slightly thicker piece of fuse wire can be used to create the second, thicker line at the foot of the leg, behind the wheel – as on the Bf 109.

Any final details of the leg are best added at this stage, after which the parts will be ready for spraying. Most undercarriage legs on Luftwaffe fighters are painted RLM 02. If using matt paint, the parts will need coating with a gloss varnish so that you can add a little wash to the recesses. Any of the washes described in Chapter 6 will be suitable, depending on the effect you are after. Generally, though, I find Citadel Rust or Brown ink to be ideal. This is simply run into the recesses using a very thin paintbrush, the excess being removed with Rotring airbrush remover or car screen wash.

The final stage of the job is to dry-brush each leg with a lighter shade of grey. Normally, I use enamel paint because it doesn't dry so quickly on the tissue paper. The final parts look really effective and greatly enhance a model. It is amazing what you can achieve with a little extra effort!

OTHER USES FOR METAL FOIL

DISGUISING JOINTS

Metal foil from wine bottle caps, made from either lead or aluminium, has virtually limitless uses in modelling, and it seems like I'm always discovering more applications for this versatile material. That's an excellent excuse to keep on buying good wine to build up a useful stock of foil (as if I don't already have one!).

One of the most useful applications I have come across for foil is to use it for concealing joint lines that are difficult to reach. Examples of this problem can be found in air intakes, radiators and the like. On the Bf 109, for example, the oil cooler intake below the engine has two very noticeable joints inside, one at the front and one at the rear where the two fuselage halves come together. This is a devil to remove. There is not enough room to get a sanding tool or file inside, so you are left with little option but to try to disguise the fact that the joints are there. This is where the metal foil comes in. It has some great qualities, not least of which are its thin section and pliability, which make it excellent for the job.

RIGHT A useful application for metal foil is as a lining for areas of a model that are difficult to reach for sanding.

The first step is to measure the aperture at each end of the oil cooler, and compass pointers are ideal for this. Transfer the measurements to a small piece of metal foil and, using a sharp scalpel blade and a steel rule, cut out the foil insert that will be placed inside each aperture. It is essential to test-fit the parts before securing them with cyano adhesive. To help the foil adhere properly, I sand off the coloured finish that is printed on one side of the foil. Use a sanding block and some fine wet-and-dry paper, say 800- or 1000-grade, and the colour will come away quite easily. If you don't remove the coloured finish, occasionally the cyano sticks to the colour, but this separates from the metal, especially if you're using it for a seat harness.

The final stage is to make sure that the foil sits snugly in the corners of the oil cooler. Wooden cocktail sticks are ideal for this job – you simply blend in the edges by rubbing gently. You need to take care, however, to avoid marking the surface of the foil unnecessarily.

These metal parts can look very realistic if left in their natural colour when the rest of the model has been painted, but check your reference material to make sure this is correct.

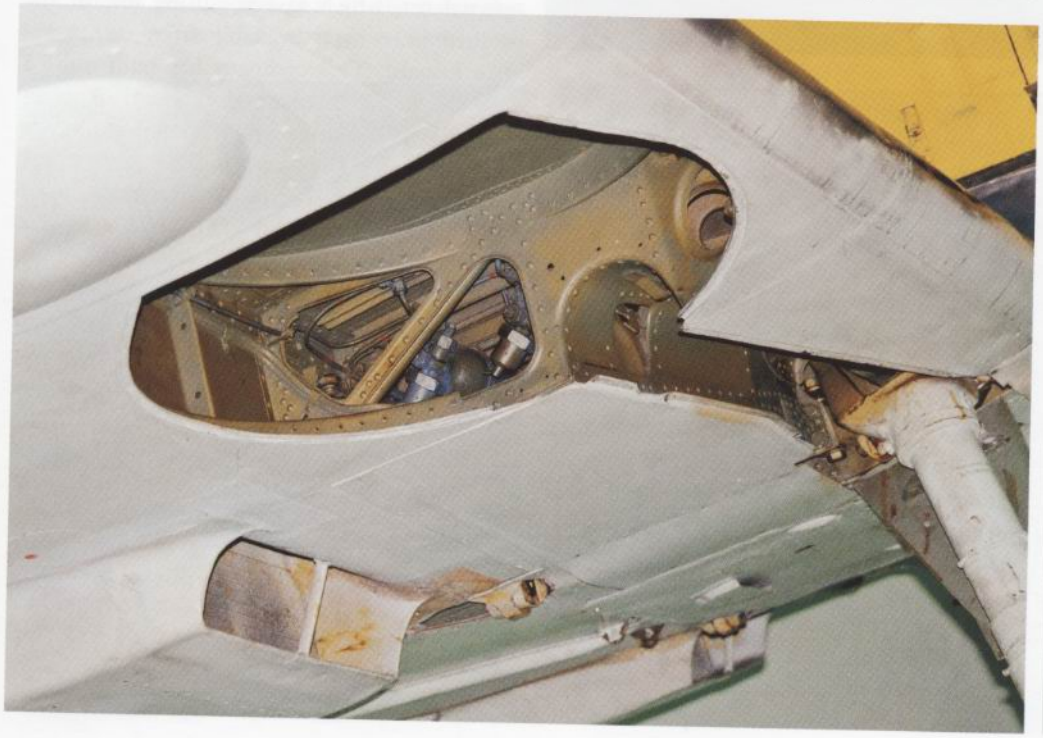
LINING WHEEL-WELL SIDE WALLS

Another great use for metal foil is to represent the canvas lining around the wheel-well side walls, which was often fitted to Luftwaffe fighter types such as the Bf 109. Tamiya masking tape also works well because it has a slight surface texture that suggests canvas. The foil is easily given a texture by rubbing it with 250-grade wet-and-dry paper. This task only takes seconds to do, but the result is very effective when painted. However, I particularly like using foil because it can be detailed by using compass pointers or a small draughtsman's pin. The most noticeable feature on each canvas guard was the zip that ran all the way around the middle. These covers were various shades of tan, buff and brown.

The accompanying photograph of the inside of the main wheel well of a Bf 109E-4 shows why canvas guards were installed. Notice the large opening into the wing interior and associated mechanisms. These would quickly clog with foreign objects, which had to be prevented. On the majority of kits I have seen, the side walls within the main wheel wells are moulded flat and are devoid of detail. In the smaller 1/72 and 1/48 scales, this is not surprising. To re-create the canvas guards, simply cut strips of foil that are long enough to wrap around the inside of the well. To ensure the correct size, make a template from masking tape if you wish and use this to mark out the canvas boot on the foil. The foil can be glued in place with cyano and any excess trimmed off with a sharp scalpel blade. Don't forget to blend in the edges with a cocktail stick.

USING A RAZOR SAW

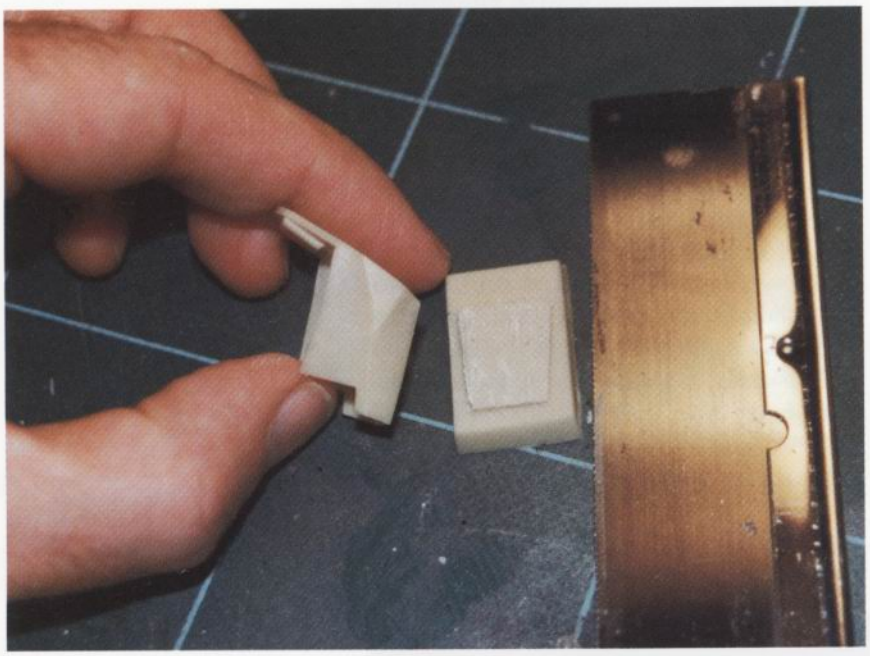
Sooner or later, you are likely to get into adding resin detail sets to your Luftwaffe



LEFT The wheel well of a Bf 109E-4. Notice the lightening holes in the wing's structure. Often the side wall would be covered by a canvas lining with a zip fastener.

fighters, and for this an essential tool is a razor saw. This is a specialised modelling tool designed, in the main, for cutting plastic, and if you already possess one, no doubt you have found it extremely useful. Razor saws are readily available from good modelling outlets. You'll notice that they have very small, sharp teeth that make them ideal for cutting plastic while retaining maximum control of the blade.

Three of the most common uses to which I put my razor saw are removing control surfaces from wings, cutting through fuselages and removing the mould blocks from resin replacement parts. For the first two tasks, it is always best to try to complete the task with a proper cutting instrument, like an Olfa P-cutter – you just keep scoring with this tool until the part comes away. If you don't have such a tool, you can use the saw. In the accompanying photograph, you can see that I have used the razor saw to remove the block from the bottom of an Me 163A resin cockpit tub. However, there are two vital safety precautions to take before you start to saw anything made of resin. The first is to wear an effective dust mask to prevent the highly toxic dust from getting into your lungs. The second is to make sure that the block is secured to the cutting mat by something like Blu-Tac.



ABOVE Removing the Me 163A cockpit tub from its resin moulding block was a simple task with the razor saw.

Once the block is secure, you must ensure that the blade is vertical and that you cut quite close to the part you're trying to remove. This will ensure that you are left with only a minimal amount of further sanding to do to remove excess resin. To accomplish this final task, I use plenty of water on a piece of coarse wet-and-dry paper taped to the cutting mat. In this instance, the cockpit tub was slowly moved around the paper in a circular motion, making frequent checks to ensure that my sanding action was even.

DETAILING COCKPITS

The purpose of this section is to take you through the steps of adding a resin and etched brass aftermarket detail set to a typical Luftwaffe fighter aircraft. As has been explained previously, you have quite a choice when it comes to the main Luftwaffe types. The Messerschmitt Bf 110G, He 219 '*Uhu*', Fw 190 and Bf 109 are all catered for, to mention just a few. The main resin/etched metal aftermarket manufacturers all produce a variety of sets covering these and other subjects – Aires, Eduard and Verlinden products are particularly good. I have to say that the quality of the Aires resin products is simply mind blowing. If you take a look at their Me 110G, He 219 and Fw 190 sets, you'll see what I mean. A nice touch to guide the modeller is that these manufacturers indicate on the packaging which particular kit the detail set is designed to fit. This is valuable information, and while some sets may fit kits other than those they were designed for, assuming that they will could prove an expensive mistake.

Often, a slightly cheaper option is not to go for a complete cockpit replacement, but for a partial set, which involves using one of the etched brass frets available from companies like Eduard. This company has built quite a reputation for supplying excellent replacement parts for different aircraft that include many of the Luftwaffe fighter aircraft of WWII. Set 48 080 is typical of the range, being designed to replace and add several new parts to the cockpit of the Bf 109F. It includes items like a trim wheel, rudder pedals, instrument panel, oil cooler grilles, strakes for the inside of the split flaps (how to scratch-build these items is described later in this chapter) and an exhaust fender.

By way of example, I have chosen the Aires detail set for the Hasegawa quarter scale Bf 109F-4. The kit parts are reasonable, but do not exhibit the fine tooling or quantity of detail offered in the replacement package. The Bf 109's canopy hinges away to the right and the interior is quite visible, making the effort of including the resin replacement parts worthwhile. You rarely receive colour

references with any of the replacement resin items, so you need to use a combination of kit instructions and any other colour reference material you can find. As mentioned previously, Kenneth Merrick's excellent book, *German Aircraft Interiors, 1935–1945, Vol. 1*, is a classic for modellers and will prove invaluable.

The first stage is to thoroughly familiarise yourself with the kit and replacement instructions. Those offered by Aires are particularly helpful, although I do wonder why these manufacturers don't give the builder a colour key to help with the detail painting. They have obviously researched the real aircraft in detail, and to include this information for the modeller doesn't seem an unreasonable request.

The next step is to clean up the parts you intend using from the aftermarket set, and one feature I particularly like with the Aires sets is that they only require a minimum of cleaning. Primarily, this is because they have very thin backing plates and moulding blocks. When all the parts are ready for assembly, the task is to create a complete cockpit tub that will simply replace the kit tub, being added to the fuselage from below once the halves have been joined. It is worth test-fitting the cockpit side walls to the tub floor to ensure that you're going to obtain a decent fit later when you get out the cyano.

Before any painting can be done, you have to assemble all the resin items and detail the cockpit using the etched brass parts. You can see in the photograph that all the parts that need to be painted dark grey have been assembled on clothes pegs, which will provide useful handles for holding the parts when they are airbrushed. Much of the detail is already moulded on to the resin parts, except the fine details like the small brass trim wheel, rudder pedals and instrument panel. These can also be seen in the picture. In this instance, the overall colour required was dark grey, and I used Tamiya German Grey (XF-63).

Once the overall colour has dried – in this instance, the matt acrylic paint was dry in an hour or so – you are ready to press on and gloss varnish the interior parts. Using the techniques already explained, add a thin brown wash to the recesses within the cockpit, and when this is dry, spray the whole interior with a matt varnish to restore a more authentic appearance. The parts are now ready for detail painting in the various colours that were prevalent on Luftwaffe fighters.

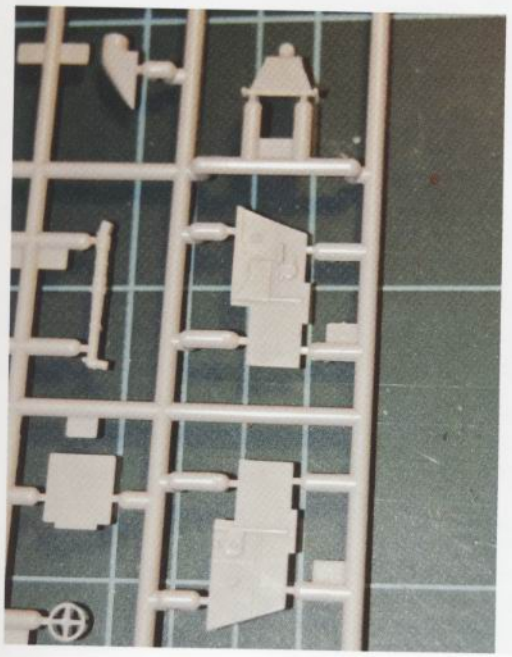
For painting the detail colours on what are very small items indeed, I use a small paintbrush or the point of a cocktail stick. The information provided in the panel only gives a brief insight into the colours that were used, so I recommend buying a copy of Kenneth Merrick's book – it will be the best investment you will ever make in reference material for Luftwaffe fighter cockpit interiors.

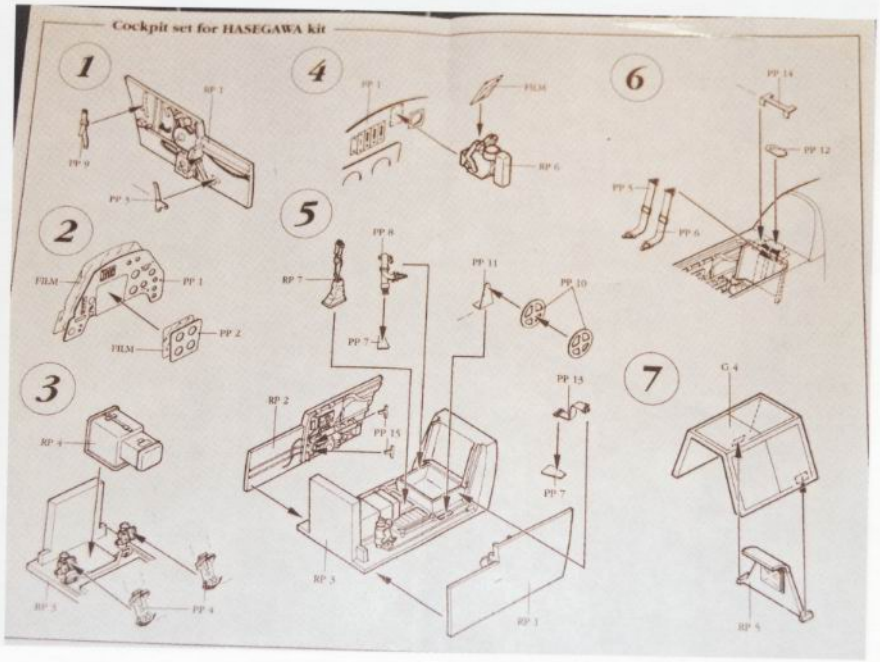
In the accompanying photograph, you can see that the main resin replacement parts are almost complete. Note that some of the detail painting has still to be completed, such as the long fuel line that is visible on the right-hand fuselage side wall (bottom right). This small detail will be painted RLM 04 *Gelb*. You may

ABOVE One of the many etched brass accessory sets available from Eduard.

BELOW LEFT The Aires cockpit parts for the Hasegawa Bf 109F-4 look quite simple by comparison to some of the resin alternatives available today.

BELOW The instructions included with the Aires aftermarket sets, and others, are very comprehensive, but could be improved by the inclusion of a detailed painting guide.





INSTRUMENT COLOURS

Instruments that indicated specific engine services and functions were usually colour-coded around all or part of their rims. Examples include:

- Fuel in RLM 04 Yellow; oil, RLM 26 Brown; coolant RLM 25 Light Green; and oxygen in RLM 24 Dark Blue.
- Battery boxes were almost always painted in RLM 42 Grey, which was lighter than RLM 02 Grey.
- Variations: some instruments would have only a portion of their rims painted in the indicative colour; the remainder would be painted in sections denoting maximum limits. However, as far as the modeller is concerned, these are very much the exception.
- Electrical equipment usually carried a stylised lightning-bolt emblem in RLM 23 Red.

Electrical wiring was colour-coded to match the instruments to which it was connected.

also be able to make out the excellent acetate instrument faces showing through the main instrument panel (bottom centre). The obvious omission from the cockpit is the seat harness. These small brass items were painted separately and added just before the tub was installed in the fuselage.

One of the most important stages follows – the dry-brushing of the interior. A light grey paint is used for this and an old, broad brush, if you have one. If not, just about any old paintbrush will suffice. This process will really bring the cockpit to life by giving the colours depth. It will also highlight the very small details moulded into the surface. You will notice that bright paint chips are evident on the seat pan and floor areas of the cockpit, and the method for achieving these is described later.

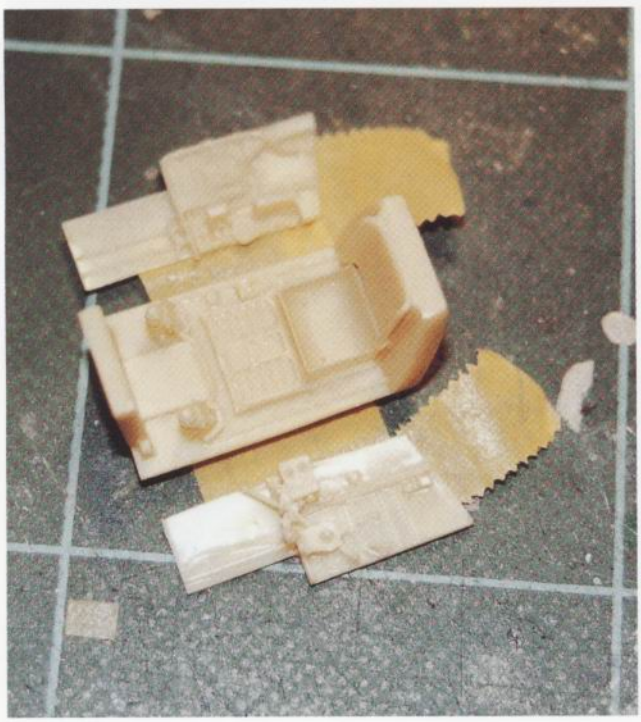
At this stage, the cockpit side walls and remaining details should be glued to the cockpit tub. It is worth checking again the fit of the side walls to the cockpit sills, ensuring there are no unsightly gaps. An alternative approach that I sometimes employ, particularly if there is a small gap between the top of each side wall and the cockpit sill is to attach the side wall components directly to the fuselage halves instead of the cockpit floor. This can prevent any unsightly gap that otherwise may have emerged under the sills. You do need to be careful, though, that in rectifying one problem you don't create another, that is gaps between the bottoms of the side walls and the cockpit floor when everything is assembled. To be honest, you should really have sorted out such potential disasters much earlier in the build process, when the parts were cleaned up. That is the time to test-fit, not after you have put in loads of work painting and finishing the cockpit.

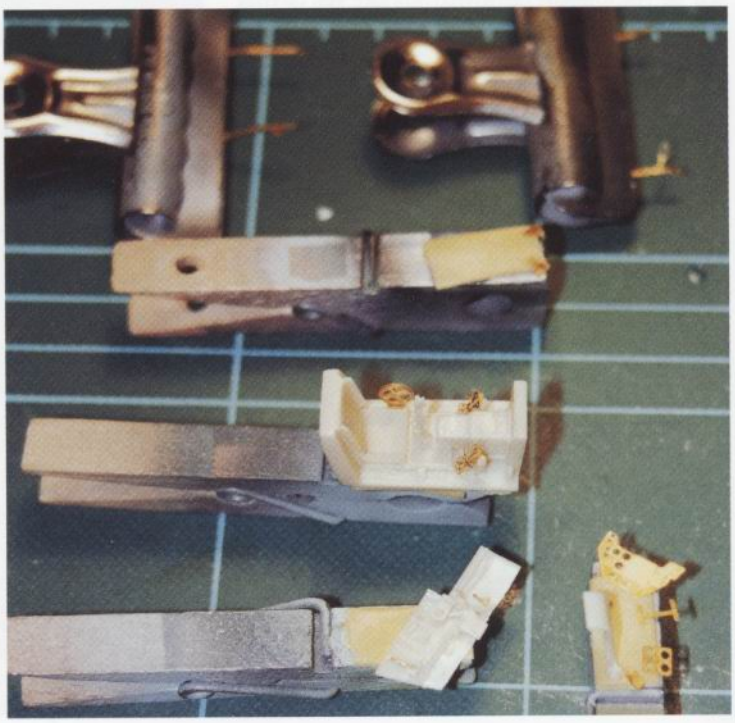
ADDING PAINT CHIPS

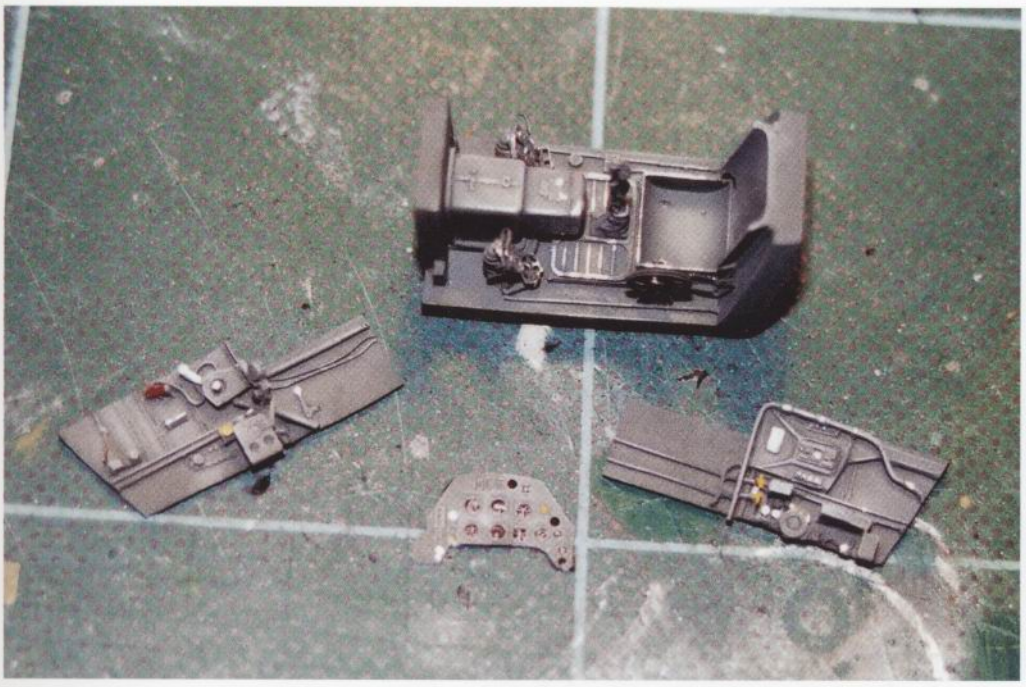
In Chapter 1, I mentioned the use of a silver roller pen for simulating chipped paintwork. When detailing the cockpit, you simply need to roll the nib of the pen across some of the edges around the seat pan and floor – areas

BELOW The resin cockpit is test-fitted with masking tape before assembling and gluing.

BELOW RIGHT The additional parts have been secured to the resin cockpit with cyano, and everything now awaits painting.







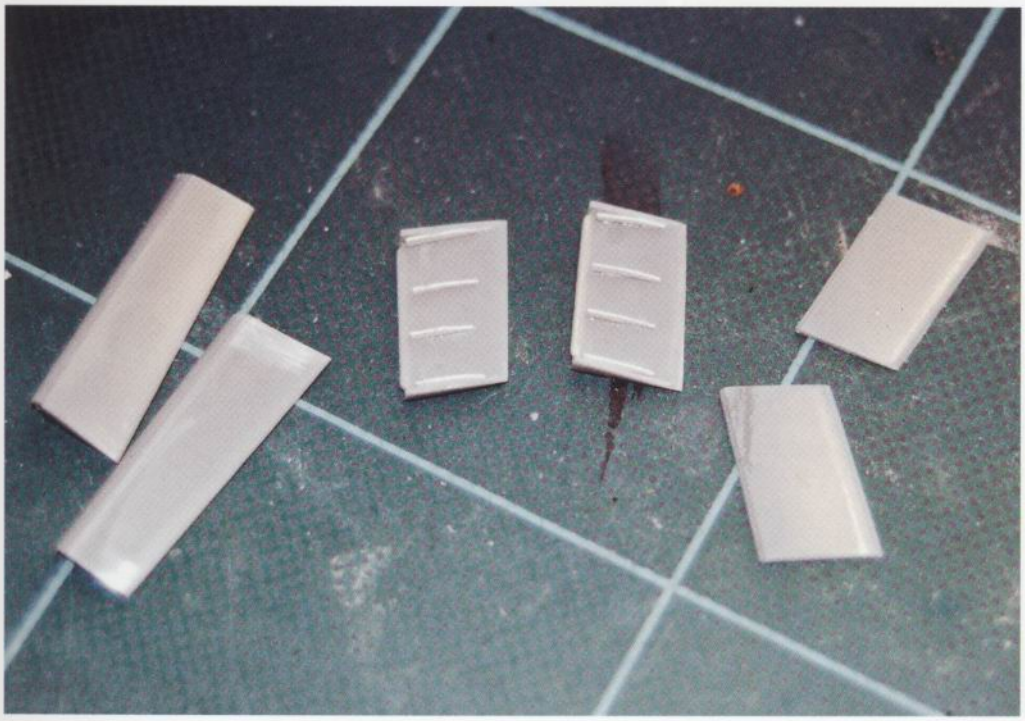
LEFT The Bf 109F-4 cockpit nearing completion.

that naturally would attract a fair amount of wear and tear during operational use. I usually apply the silver after the ink wash has been run into the recesses, but before the interior has been matted down again.

If you feel that the silver ink is too bright, try adding the paint chips before you run an ink wash into the recesses of the cockpit. You can run the ink over the silver chips at the same time, which will tone them down, but make sure the silver is dry before you carry out this task. Then gently remove some of the excess ink with a dry cotton bud.

CREATING REINFORCING STRIPS FOR BF 109 SPLIT FLAPS

The tools that you will need for this fairly straightforward task are a sharp scalpel, steel rule and pin-vice. Once again, try to locate some appropriate reference material (take a look at the *Aerodetail* guide). The accompanying photograph shows the general layout of the strakes, four of which are incorporated in each flap. Because the strakes require a number of lightening holes to be drilled along their length, it is probably best to



LEFT Small strips of Plasticard have been added to the Hasegawa kit's split flaps.

cut each from a piece of scrap plastic sheet. For a realistic scale effect, use thin sheet, say 10 or 20 thou. Simply cut a short length for each strake: it should run from just behind the forward edge of the flap to a point about 3mm from the trailing edge. The upper edge of each strake should be curved down toward the rear tip. Each strake should have five lightening holes drilled along its length, using a 0.4mm drill. Take care to ensure that the holes are equally spaced along the length of the strake. This can be a little tiresome, but the result will be well worth the effort. Attach the strakes with thick cyano, but only a little is needed, so go easy.

The interior of the flaps can be painted with RLM 02 *Grau*, then everything should be given a light dry-brushing with a paler grey enamel. When the paint has dried, the parts can be mounted on lengths of Tamiya masking tape and attached to clothes pegs with small pieces of Blu-Tac ready for spraying with the outer camouflage colours when you get to that stage.

DETAILING WHEEL WELLS

The wheel wells of any aircraft model can be greatly enhanced by the addition of aftermarket accessory sets or by scratch building your own detail parts. Which way you go will depend largely on the specialised items that are available and how much time you are prepared to spend on adding the missing detail. Tamiya's kit of the He 219A-7 is a prime example of a model that can be improved dramatically by detailing the wheel wells. If you have seen the model, no doubt you will agree that it is a fine kit that produces a superb replica of the original. My own example can be seen in the Gallery later in the book.

I had seen two in-depth magazine reviews of the kit, one by Angus Creighton in *Tamiya Model Magazine International* (No. 65), and a nice model by Graham Newitt in *Scale Models International* (Vol. 29, No. 345). Armed with both of these, together with a line drawing that showed the rear of each undercarriage well, indicating the position of a solid bulkhead and the hydraulic lines that ran around the well, I decided it was time to detail the wheel wells of my model, and the result was well worth the effort.

STEP 1

You can clearly see from this photograph that there is no rear wall to the He 219's undercarriage bay within the engine nacelle. Some internal ribbing is included, but this needs to be supplemented with additional strips of plastic. The assembled undercarriage units will slip into the two prominent locations situated at the forward end of the undercarriage bay. The first stage involves making a template of the rear opening to gauge the diameter and shape of the nacelle where it meets the rear lip of the wheel well. To do this, place a broad piece of masking tape across the opening. Pull it tight and gently run the point of a sharp pencil around the tape where it meets the nacelle walls.

STEP 2

Remove the masking tape, which will provide a pretty accurate template for the rear bulkhead. Stick it on to a piece of 20 or 30 thou. Plasticard.

STEP 3

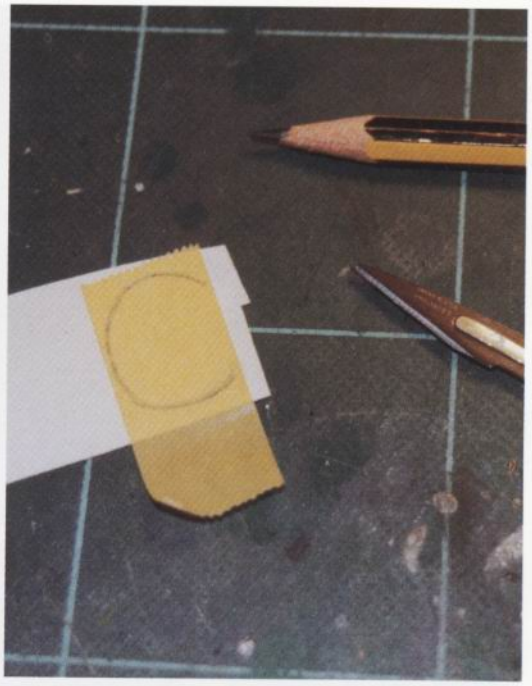
As the Plasticard is quite thin, the new plastic bulkhead can be cut out using scissors. Be generous with the plastic; you don't want to cut it too small and have to start all over again. Keep test-fitting the bulkhead, inserting it through the hole with tweezers and trimming it until you achieve a snug fit. At this stage, you can secure it with plastic weld/liquid poly cement. I left the lower edge of the bulkhead protruding slightly proud of the wheel well opening. The surplus was gently cut off, then sanded back until it was flush with the rounded nacelle.

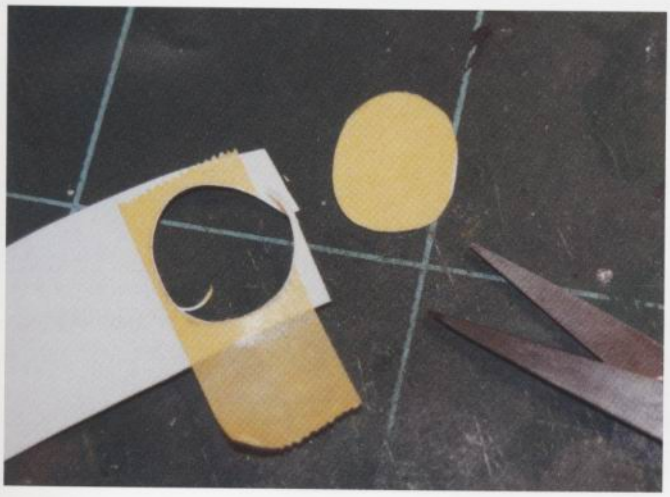
STEP 4

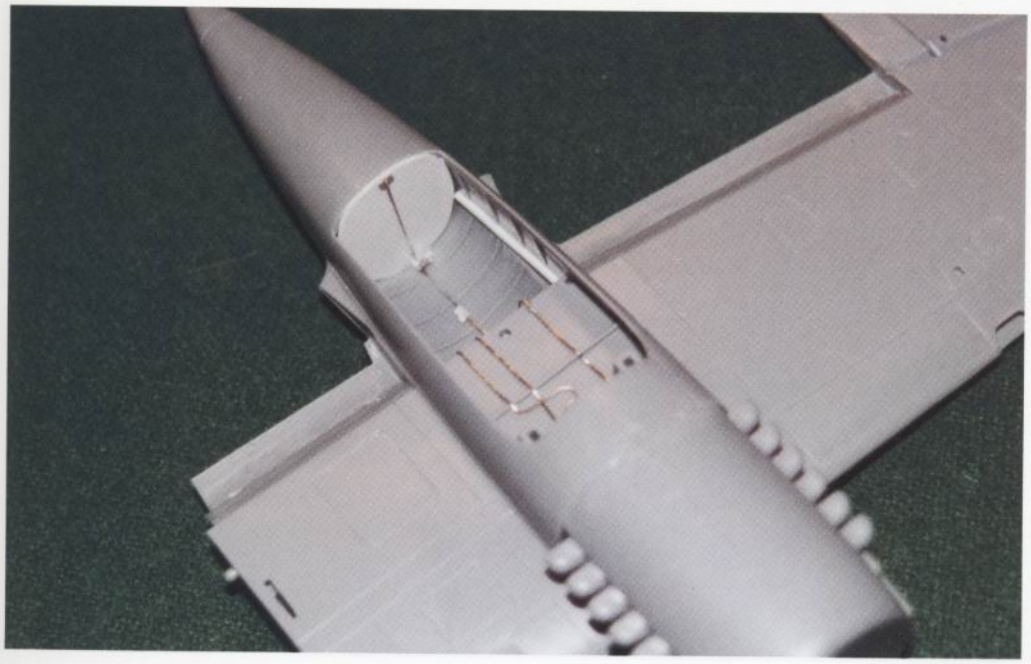
Now is the time to consider adding the necessary detail to the new bulkhead and roof of the wheel well. The reference material I had gathered proved invaluable for this task and most of the detailing work involved creating new hydraulic lines. Fuse wire of differing diameters is ideal for the purpose, and my tool box contains several spools.

STEP 5

The final photograph shows the detail added to the wheel well with fuse wire, Plasticard and aluminium foil. You can also see a length of plastic strip added to the side wall (there is another out of view on the opposite side). At this stage, the undercarriage bay is ready to be spray painted with RLM 02 *Grau*, then







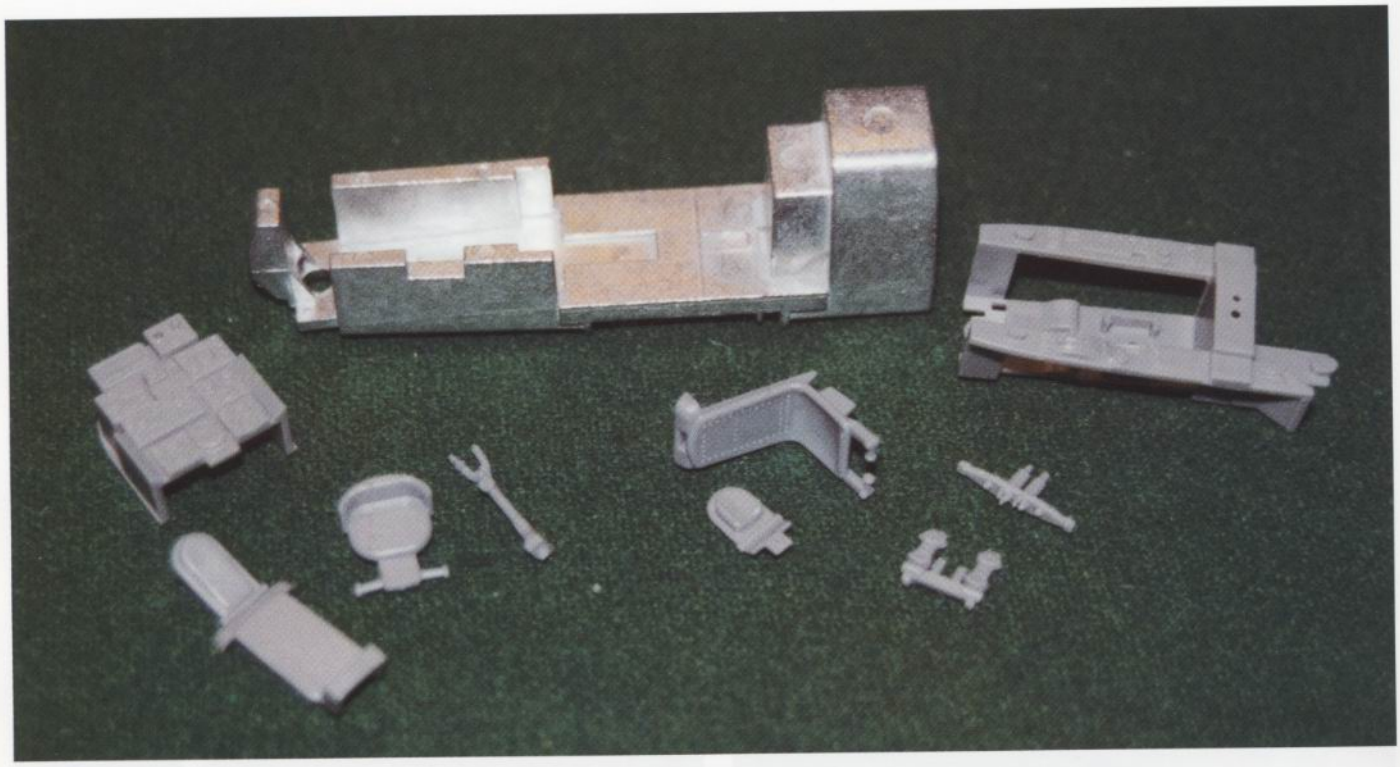
TOP LEFT The open rear end of the Tamiya He 219 wheel well.

TOP RIGHT A masking-tape template has been made and attached to some Plasticard.

ABOVE LEFT The new rear bulkhead wall is cut from the plastic sheet.

ABOVE Fuse wire is useful for detailing wheel wells. I keep several reels of different diameter wire.

LEFT The completed wheel well adds much to the original kit offering.



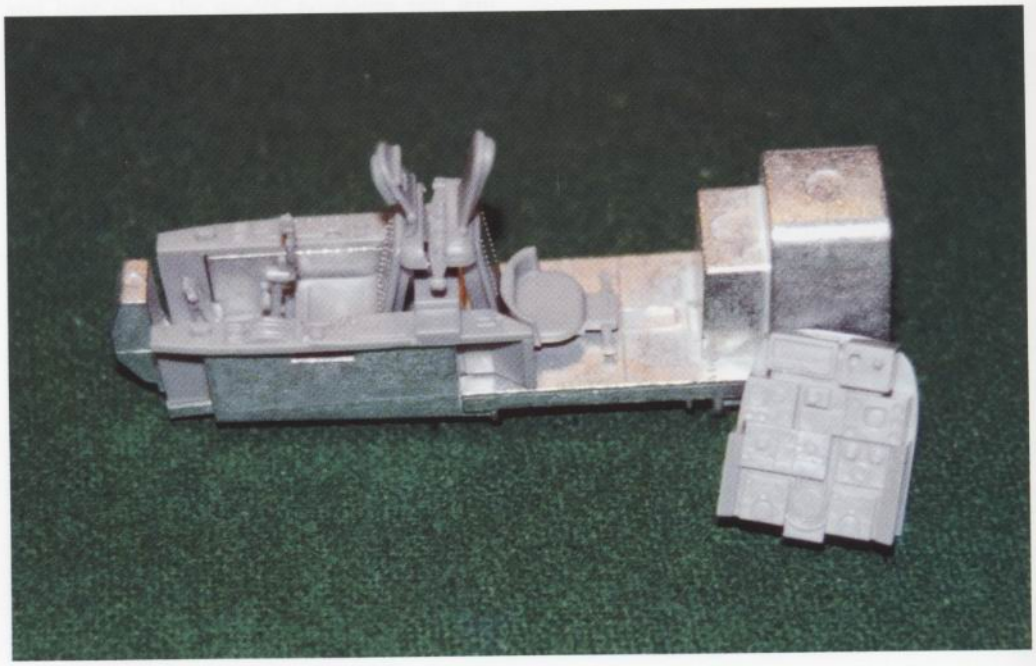
ABOVE The novel Tamiya cockpit parts for the He 219A-7 '*Uhu*' are dominated by the large white metal cockpit tub that doubles as a nose weight.

dry-brushed using a lighter grey. After this, the fine detailing can be picked out with a small brush.

ADDING COCKPIT DETAIL TO TAMIYA'S HE 219A-7 *'UHU'*

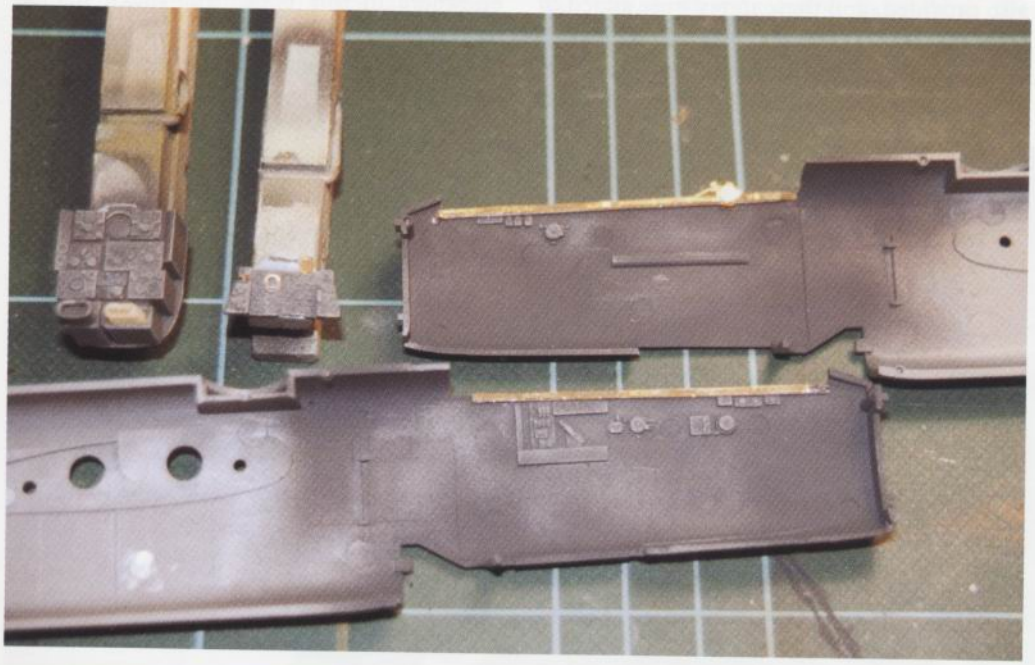
The accompanying series of photographs charts the assembly of the Tamiya He 219 cockpit. Although well detailed as standard, the cockpit can be enhanced still further, as the photographs show. The Czech company Aires produces an excellent resin replacement cockpit for the '*Uhu*', the mouldings being quite superb and providing a lot of extra detail, particularly around the side walls of the cockpit. In fact, I did not use all of the replacement parts, but was selective. The reason for this was to retain the benefit of the kit's one-piece, white metal moulding that acts as a nose weight to prevent the model, which has a tricycle undercarriage, from sitting back on its tail.

As you can see from the first photograph, Tamiya provides quite a bit of detail in the kit, the various radio/instrument boxes

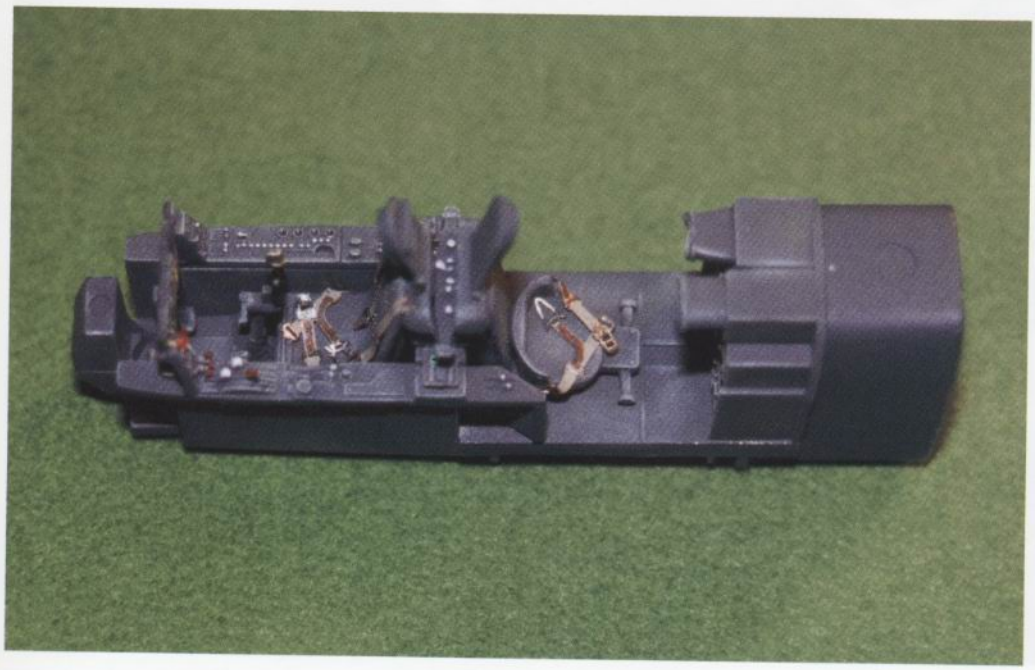


RIGHT Here, some of the kit parts have been added to the white metal tub.

LEFT The fabulous Aires set contains many useful details. Here, the seat harness straps have been removed and clamped ready for painting.



LEFT Replacement cockpit sill components were also taken from the Aires set.



LEFT The completed cockpit tub awaits installation and looks quite impressive, having been dry-brushed.

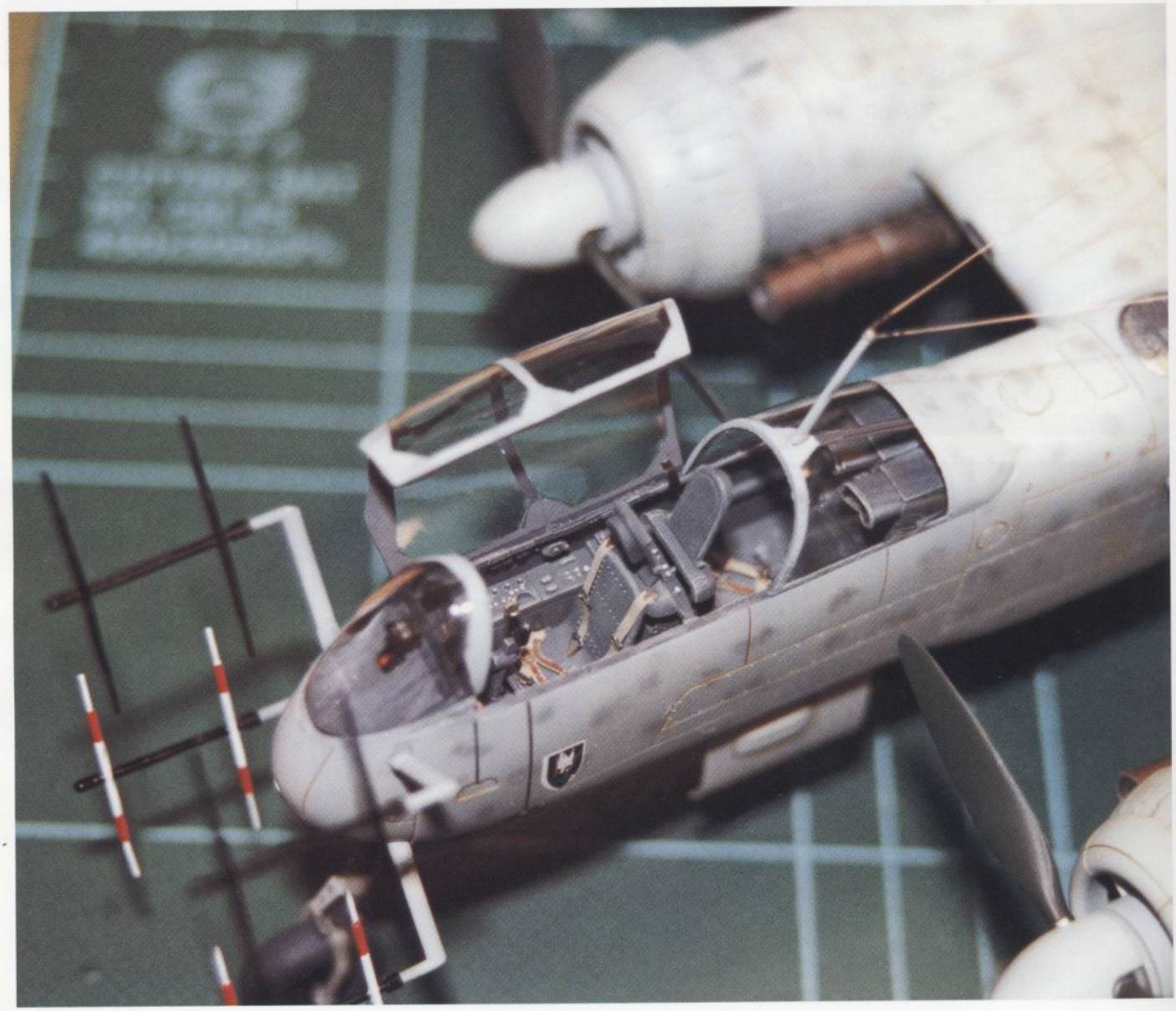
being designed to fit over the white metal tub. This they do very well and, apart from the radio boxes that fit on to the rear of the main moulding, they can be glued in place at this stage. I used cyano for the purpose, to make sure of a good bond between the plastic and metal.

There is a wealth of finely etched brass parts in the Aires set, some of which can be seen in the photographs. The seat straps were detached from the fret and secured in bulldog clips ready for painting. At the bottom of the etched fret were additional sills for detailing the inner faces of the moulded-in cockpit sills, which I used. All of the little T-shaped handles and levers were also provided, and these items were added to the cockpit.

In the fourth photograph, I have painted and dry-brushed the detail that is moulded into the various kit parts and glued the new sills in place. The latter add a lot of realism to the finished model and immediately give the cockpit a 'busier' appearance when you look inside.

In the final photograph, you can see the completed cockpit tub waiting to be installed in one fuselage half. The new straps attached to the seats make a world of difference and are so much better than the rather poor and unrealistic option of using decals to represent these items, as provided in the kit. Luftwaffe fighter cockpits are relatively colourful, many of the handles being red or white, while the instruments have variously coloured dials, as explained elsewhere in this book. The much lighter, dry-brushed grey stands out and really gives the three-dimensional look that I want to replicate.

BELOW Quite a busy looking He 219A-7 cockpit.



A VARIETY OF COLOUR COMBINATIONS

In this section, I want to consider the Luftwaffe camouflage schemes that were applied to fighters during WWII. It isn't possible to produce a definitive reference source for modellers wishing to build aircraft of the period. However, the majority of kits that are manufactured these days have pretty accurate paint schemes suggested in their assembly instructions. That said, it is always worth scouring your own sources: reference books, magazine articles and, above all, photographs from the period.

A word of caution here is appropriate: be wary of interpreting black and white photo-graphs and making definitive statements from that interpretation. Many comments have been made in a wide variety of texts about what the 'real' colours were, only for some new information to emerge that contradicts what previously has been regarded as correct. Colour photographs, too, can be very misleading, and there are quite a lot of these to be found in reference books like *The Modeller's Luftwaffe Painting Guide*, by J. R. Smith, G. G. Pentland and R. P. Lutz, published by Kookaburra (1979). Colour photography has moved on a long way since those early days of the war, and it should be remembered that colour photographs have a tendency to fade and change with time. As a result, they should never be relied upon completely.

The fact is, there are no absolutes or sweeping statements concerning colours that actually hold any water. From studying excellent reference sources like the book mentioned above, it is possible to achieve a partial understanding of the official and unofficial colour combinations applied to Luftwaffe fighters during WWII. At times, it was very frustrating trying to establish the correct colour schemes for the models shown in this book. On the other hand, the fact that many variations existed between aircraft of the same type, period and location can be considered a blessing in disguise. While I am sure that most modellers do their best to identify the correct colour scheme to apply to their models, because there was such variety we should be more open-minded than is often the case.

RLM COLOURS

The reference sources that I have used over the years are listed in the Bibliography at the back of this book, and I find that they provide enough insight into the complex world of Luftwaffe paint schemes. You can use the following list as a quick-reference guide to allow you to identify common RLM colour names with their appropriate RLM numbers.

00 *Wasserhell* (clear varnish)
01 *Silber* (silver)
02 *Grau* (grey)
04 *Gelb* (yellow)
05 *Creme* (cream)
21 *Weiss* (white)
22 *Schwarz* (black)
23 *Rot* (red)
24 *Dunkelblau* (dark blue)
25 *Hellgrün* (light green)
26 *Braun* (brown)
27 *Gelb* (yellow)
28 *Weinrot* (ruby)
61 *Dunkelbraun* (dark brown)
62 *Grün* (green)
63 *Hellgrau* (light grey)
65 *Hellblau* (light blue)
66 *Schwarzgrau* (black grey)
70 *Schwarzgrün* (black green)
71 *Dunkelgrün* (dark green)
72 *Grün* (green)
73 *Grün* (green)
74 *Dunkelgrau* (dark grey)
75 *Grauviolett* (grey violet)
76 *Lichtblau/Weissblau* (light blue)
77 *Hellgrau* (light grey)
78 *Himmelblau* (sky blue)
79 *Sandgelb* (Temp.) (sand yellow)
79 *Sandgelb* (sand yellow)
80 *Olivgrün* (Temp.) (olive green)
80 *Olivgrün* (olive green)
81 *Braunviolett* (brown violet)
82 *Dunkelgrün* (dark green)
83 *Hellgrün* (light green)

LUFTWAFFE CAMOUFLAGE SCHEMES

To round off this chapter on advanced construction techniques, I have included a selection of photographs showing some of my own models and a few from the collections of Jonathan Burns and Mick Pitts, to whom I am extremely grateful. Their models display some very interesting colour schemes and help to illustrate what can be achieved in scaled-down form. Moreover, these photographs illustrate the wide variety of Luftwaffe colour schemes used during WWII.

RIGHT Dornier Do 335A-6 by Jonathan Burns.

DORNIER DO 335A-6 (JONATHAN BURNS)

This is one of the most interesting models I have seen in a long time, and I expect you'll agree. Jonathan built it from the old Frog/Revell 1/72 release. The kit was fairly basic due to its age, but notice how it has been improved by the addition of aftermarket detail parts. It incorporates Aeroclub SN2 aerials, while the builder added a lot of scratch-built detail to the cockpit and undercarriage wheel wells. This is a small model, and the new scale aerials make all the difference. The canopies were neatly masked, and this alone makes the model stand out for me. The rudder was offset slightly to the left, which is a very good technique for breaking up the regular lines of a model. Note, too, the exhaust staining around the front and rear of the aircraft on the sides of the fuselage, created around the massive flame dampers that cover the exhaust outlets.

This night fighter had a very light coloured scheme, which in reality would have shown the signs of weathering incorporated by the builder. The camouflage scheme is RLM 76 *Lichtblau* overall with RLM 75 *Grau* over the top in squiggles applied freehand with a Badger 200 airbrush. The paints used were Xtracolor gloss enamels.

FOCKE-WULF TA 152H (JONATHAN BURNS)

This model is to 1/48 scale and comes from Dragon. The kit was built straight from the box with the exception of the seat harness, which came from an aftermarket manufacturer. The model is interesting for a number of reasons. You can see simulated paint chipping at the left wing root, which was common wear and tear on operational aircraft. The technique for this has been explained already, but it is important not to overdo it. Although silver has been used here, an alternative is to use RLM 02 *Grau* instead. This gives a toned down appearance to the chipping which, in the smaller modelling scales, can look slightly more authentic. It is worth

FACING PAGE, TOP Focke-Wulf Ta 152H by Jonathan Burns.

FACING PAGE, CENTRE Lippisch P-13A by Jonathan Burns.

FACING PAGE, BOTTOM Focke-Wulf Fw 190F-8 by the author.

experimenting with both to see which effect reflects the level of authenticity you're after.

The open engine cowl is a nice touch that adds a little more realism. It would look even more effective if the model was displayed on a realistic display base. With ground crew figures and some German ground accessories, like those supplied in 1/48 scale by Revell, it is possible to create a very effective looking diorama.

This Ta 152H is finished in Xtracolor enamel paints, with RLM 76 *Lichtblau* undersides and lower fuselage, RLM 75 *Grauviolett* and RLM 83 *Dunkelgrün* upper wing surfaces, and RLM 83 *Dunkelgrün* and RLM 81 *Braunviolett* upper fuselage.

LIPPISCH P-13A (JONATHAN BURNS)

The final model from Jonathan is of the Lippisch delta-winged aircraft that was typical of the advanced designs being developed for the Luftwaffe towards the end of WWII. In fact, this particular aircraft never flew, but it has been included to illustrate the interesting models that can be found for this period. The kit has been released twice under the Revell label in quarter scale. The builder has weathered it using pastel chalks, and added paint chips with a silver-grey paint mix. The trolley provides added interest and would look superb in a small, realistic airfield setting.

The colours used on this model are RLM 81 *Braunviolett*, RLM 82 *Dunkelgrün* and RLM 76 *Lichtblau* with RLM 84 *Blaugrau*.

FOCKE-WULF FW 190F-8 (AUTHOR)

This Luftwaffe scheme is one of the most interesting that I have come across and simply had to be included. The F-8 variant of the Fw 190 was used in the fighter-bomber role, the aircraft shown being based with 1./SG 2 '*Immelmann*' at Varpalotta, Hungary. The F-8 was far superior to the Junkers 87 that it largely replaced. It had a bulged canopy to improve the pilot's vision.

The spiral on the spinner is a decal, while the remainder of the markings were taken from various decal sheets. More detail on these markings is available in *Wings of Fame, Vol. 7*.

The aircraft is sprayed RLM 70 *Schwarzgrün* over the upper surfaces, broken up by meandering stripes in RLM 65 *Hellblau*. The yellow fuselage stripe and underwing markings in RLM 04 *Gelb* were standard for the Hungarian theatre of operations from

September 1944 to February 1945, when they were removed. The stripes were sprayed on to the model freehand.

FOCKE-WULF FW 190F-8 (AUTHOR)

Probably delivered in the standard European scheme of RLM 65 *Hellblau*, RLM 70 *Schwarzgrün* and RLM 71 *Dunkelgrün*, 'Black 10' (possibly 'Red 10'), an Fw 190F-8 belonging to 2./SG 4 while based in Sicily, has had the upper surfaces over-painted with RLM 79 *Sandgelb* and RLM 80 *Olivgrün* mottling. Of particular interest in the original photograph (*Fw 190 In Action*, Squadron/Signal) is the over-painting of the swastikas, upper portions of the tail band and wing crosses. As I only discovered this photograph after the model had been finished, the upper wing crosses have still to be painted out, which I shall do in due course. This really does show the value of looking around for alternate sources of reference and not relying totally on the kit instructions. Although to be fair to the manufacturer, Tamiya, it is not clear exactly when the original markings were over-sprayed.

Notice that the wing armament was restricted to the root-mounted 20mm MG 151 cannon. I have added some slight weathering in the form of paint chips to the spiral-marked spinner, and I am particularly pleased with the outcome. The RLM 80 *Olivgrün* mottling was sprayed freehand.

BELOW Fock-Wulf Fw 190F-8 by the author.

BOTTOM Messerschmitt Bf 109G-6/R2 by Mick Pitts.

MESSERSCHMITT BF 109G-6/R2 (MICK PITTS)

Hermann Graff flew this particularly colourful aircraft with JG 50 in 1943/4. The RLM 23 *Rot* spinner and forward cowl make a very striking scheme, and it's not surprising that Mick wanted to finish his model in this famous livery. The kit is a Hobbycraft release in 1/48 scale, and the decals come from Aeromaster. What is particularly interesting on this model are the extended wing leading-edge slats, the R2 underwing rocket tubes and the zigzag upper wing surface camouflage pattern. While the slats come as standard options on the

LEFT Focke-Wulf Fw 190A-8/R2 '*Rammjäger*' by Mick Pitts.

Hasegawa kit, Mick had to drop them himself here. This can be achieved by placing masking tape over the leading edge of each wing to make a template of the moulded-in slat. Then, the template should be transferred to a thin sheet of brass, which can be cut with a pair of household scissors. The brass is formed over the moulded-in slat. Once the shape has been formed, remove the kit slat by scoring along the panel lines, using a scalpel or Olfa P-cutter. You will need to fit a blanking plate to the resulting hollow in the wing and two small spacers inside the new slat to ensure that it sits away from, and parallel to, the wing leading edge.

The R2 rocket tubes were scratch-built from brass tubing and fitted with the kit end parts.

The saw-edge or zigzag camouflage pattern on the tailplane and upper wings can put off some modellers, but in fact it is quite easy to achieve. In this instance, stencils were cut from thin paper and held in place on the model with Blu-Tac. Then RLM 75 *Grauviolett* was over-sprayed and the templates removed to leave the distinctive pattern. The red 'tulip' nose was sprayed on, using the decals to make stencils. However, Mick did use the thin yellow and white stripes from the decal sheet to edge the red areas.

The model is finished with RLM 76 *Lichtblau* undersurfaces, RLM 74 *Dunkelgrau* and RLM 75 *Grauviolett* upper surfaces, and RLM 23 *Rot* nose.

FOCKE-WULF FW 190A-8/R2 *'RAMMJÄGER'* (MICK PITTS)

From the photograph that inspired Mick Pitts to build this interesting subject, it is apparent that the aircraft was quite scruffy and very weathered. Flown by Paul Lixeldt, this Fw 190A-8, 'Yellow 12' of 6./JG 301, was based at Lobnitz, Germany, in November 1944. The kit came from Dragon in 1/48 scale, while the decals are a combination of Aeromaster and Dragon items. The finish incorporates bare metal patches and signs of heavy over-spray, and Mick used a novel method to achieve this effect. First, he sprayed the fuselage sides silver, and when they were dry, he applied small amounts of Maskol (a rubberised masking solution available from model shops) to the surface in a planned, yet apparently random, manner. Then he continued to spray the model. When all the paint had dried, he removed the patches of Maskol to leave the 'bare metal' showing.

The model has a red *Reichsverteidigung* (Reich Defence) band sprayed on the rear fuselage. RD bands were applied to assist in quick air-to-air identification. Apparently, these markings first appeared in late 1943, when JG 1 adopted red bands for its aircraft. During the early months of 1944, the aircraft of other units, such as JG 27, 11 and 301, began to sport these coloured bands, but not

ABOVE Focke-Wulf Ta 152H-1/R11 by Mick Pitts.

all units applied them, and their use had declined by the middle of 1944. As Reich Defence units began to be reorganised in October 1944, the use of coloured bands increased again, and it was at about this time that JG 301 switched from the red solid band seen on Mick's model to a yellow and red band. Other units also adopted the same approach.

A really excellent reference source for modellers who need information on Fw 190 markings is *Focke-Wulf Fw 190A/F/G Part 1* in the *Colortech* series by Thomas Tullis, published by Meteor Productions/Cutting Edge Modelworks in the USA.

Another interesting feature of Mick's Fw 190A-8 is the additional armour plating on the sides of the fuselage, below the cockpit. This is formed from thin plastic card, the name on the side armour being hand painted. The numbers and badges were taken from an assortment of other decal sheets. Notice, too, the way in which the seat harness is displayed with one belt hanging loosely over the edge of the cockpit sill. This kind of detail really brings a model to life and makes people take a second look when they see it in the flesh at a show.

The undersurfaces are RLM 76 *Lichtblau*, while the upper fuselage is in RLM 81 *Braunviolett* over RLM 74 *Dunkelgrau* and RLM 75 *Grauviolett* with RLM 02 *Grau* armour and mottling. The wing and tailplane upper surfaces are in RLM 81 *Braunviolett*, but this has been faded to give a more authentic weathered appearance. The nose band is RLM 04 *Gelb*.

FOCKE-WULF TA 152H-1/R11 (MICK PITTS)

Josef 'Jupp' Keil piloted this aircraft, 'Yellow 1', with the *Stab* (staff) flight of JG 301 at Sachau, Germany, in March 1945. The model is from Italeri and is a re-release of the original Trimaster/Dragon kit. It incorporates an etched brass detail set from Eduard, which provided additional parts mainly for the cockpit and flap areas. The decals are from Italeri and Aeromaster. Although they can't be seen in the photograph, the moulded-in flaps of this model were removed using an Olfa P-cutter and refitted so that they droop in a more realistic manner.

The Ta 152 was a fast fighter that saw service toward the end of the war; its distinctive long wings are evident in the photograph. There were numerous sub-types of the Ta 152H, including versions for reconnaissance and as the upper (piloted) component of the *Mistel* composite aircraft, but most were built as pure fighters. At least 150 were delivered from Cottbus before the factory was evacuated, small numbers serving with JG 301, chiefly to fly over the Me 262 bases when the jets were landing and taking off and at their most vulnerable.

The colours of this Ta 152H are: undersurfaces in RLM 76 *Lichtblau*, fuselage top in RLM 83 *Hellgrün* and RLM 82 *Dunkelgrün* over RLM 81 *Braunviolett*, wing and tailplane upper surfaces in RLM 81/83.

FOCKE-WULF FW 190D-9 (MICK PITTS)

The last of Mick Pitts' models I want to feature is his version of the Italeri (ex-Trimaster/Dragon) 1/48 kit. It is finished in the colours of 'Black 12' of II/JG 6 while operating from Fürth, Germany, in May 1945. Although some of the Dragon/Trimaster offerings displayed a questionable fit in some areas, the *'Dora'* was one of their best. Now kitted by Italeri, its moulds are still in quite good shape, and this one has been built pretty much straight from the box. The keen-eyed among you will notice the 'blown' canopy, which was taken from a Tamiya D-9 kit. The obligatory seat harness straps come from Airwaves and, again, one of the straps is nicely posed hanging outside the aircraft's cockpit.

This D-9 is finished in RLM 76 *Lichtblau* and RLM 84 on the undersurfaces with some exposed bare metal panels. The fuselage is in RLM 81 *Braunviolett*, RLM 82 *Dunkelgrün*

LEFT Focke-Wulf Fw 190D-9 by Mick Pitts.

BELOW AND BOTTOM
Messerschmitt Bf 109G-6/R6 by the author.

and RLM 84, and the wing and tailplane upper surfaces are in RLM 75 *Grauviolett* and RLM 77 *Hellgrau* (primer). The propeller blades, as with most other Luftwaffe fighters, are RLM 70 *Schwarzgrün*.

MESSERSCHMITT BF 109G-6/R6 (AUTHOR)

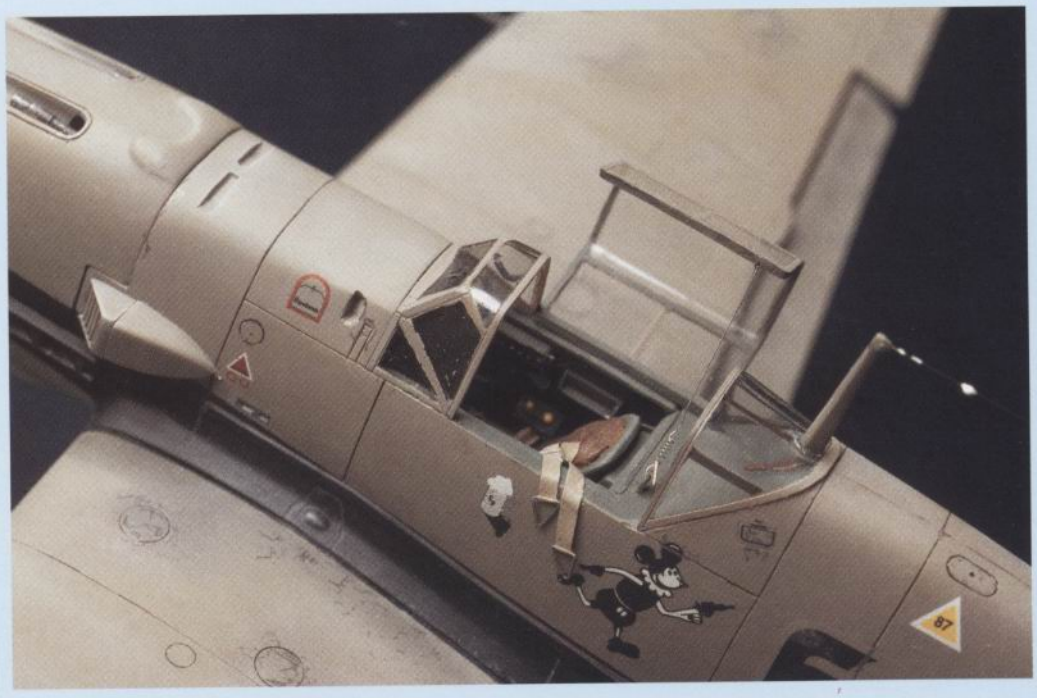
'Red 13' carries the well-known scheme of the aircraft piloted by Heinrich Bartels of 11./JG 27 while operating from Kalamaki, Greece, around September 1943. The photograph shows the colour scheme to good effect. Particularly noticeable are the split flaps common to the 109; note, too, the exhaust staining that extends rearward from the tropical filter on the left side of the engine.

This model is an example of Hasegawa's excellent Bf 109G-6 kit, which was built straight from the box. The fit of the parts was very clean, requiring no filler, and the kit was simple to construct. Hasegawa's tooling is first rate, and to date, the company has produced just about all the main variants of the Bf 109.

The G-6 remained in service until the end of the war. It can be distinguished from the pressurised G-5 by the tiny fresh air intake on each side of the windscreen. You can just make this out in the photograph. Over 10,000 Bf 109G-6s were produced, making it the most widely used variant of the 109.

The model was finished using Hannants Xtracolor gloss enamel paints. The upper fuselage is in RLM 74 *Dunkelgrau* and RLM 75 *Grauviolett* over RLM 76 *Lichtblau*. The

RIGHT AND BELOW
Messerschmitt Bf 109E-3 '*Emil*' by the author.



white fuselage band and rudder were sprayed first and masked off before the remainder of the aircraft was painted. The fuselage mottling is RLM 74/75.

MESSERSCHMITT BF 109E-3 *'EMIL'* (AUTHOR)

The aircraft featured operated with 3./JGr. 88 of the Legion Condor in 1939 during the Spanish Civil War. Three *staffeln* of JGr. 88, the fighter component of the 'voluntary' Legion Condor, gained much experience during this campaign. The inability of the early Bf 109 models to cope with the Republicans' Polikarpov 16s led directly to the development of further variants, including the 'E', and a revision of combat methods. It was largely through men such as Werner Mölders and Adolf Galland, who fought in Spain in the Bf 109, that basic fighter tactics were evolved that were to last well into the jet age.

The model shows some interesting features. Notice the canopy hinge spring just forward of the aerial mast and the way in which the seat harness is draped over the cockpit sill. The aerial wire was fabricated from fine fishing line, the small blisters on the line, just aft of the mast, being added using Citadel Colour Bolt Gun Metal silver applied with a cocktail stick. It is best to add these fine details at the end of the project to prevent them from becoming damaged during construction. You may be able to make out the dry-brushing around the pair of oblong vents aft of the top of the engine cowl. The panel line down the fuselage spine is accurate, appearing on all Bf 109 aircraft. The white rudder was spray-painted, but the prominent black cross is a decal, which was supplied with one version of the Hasegawa release.

The colours for this Bf 109E-3 are upper surfaces in RLM 02 *Grau* lightened with white and dry brushed with light grey pastel chalks. The RLM 65 *Hellblau* undersides are clearly visible, too.

MESSERSCHMITT BF 109F-4 (AUTHOR)

The model featured here depicts the very attractive scheme sported by a Bf 109F-4 flown by *Obl.* Günther Freiherr von Maltzahn,

LEFT AND BELOW
Messerschmitt Bf 109F-4 by the author.

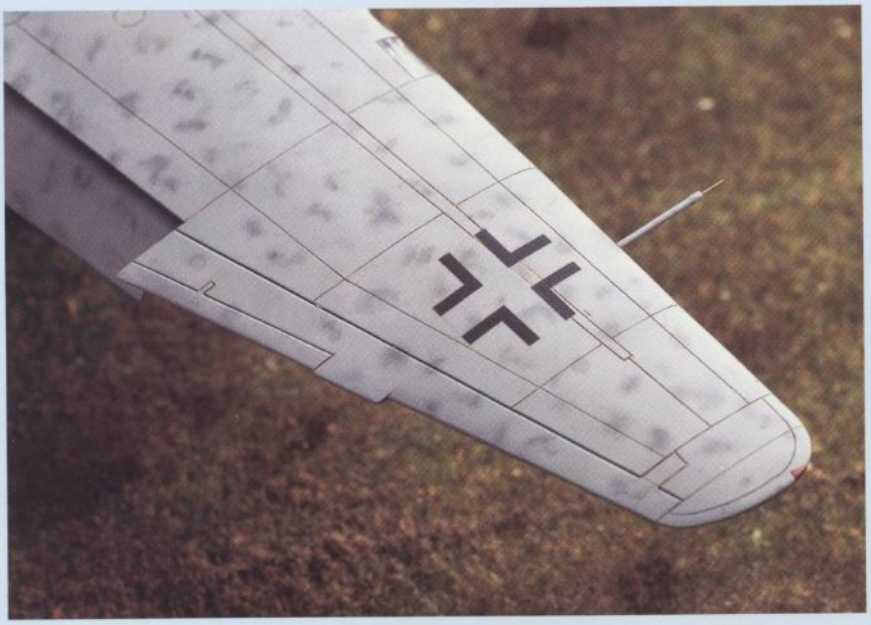
Geschwader Kommodore of JG 53, in Sicily around May 1942. This model has already been featured in the book, but it is worth further comment.

The kit is from Hasegawa, while the decals came from a sheet produced by Aeromaster. Notice the oil drips that have fallen on to the centre-line fuel tank. The hydraulic lines running down the undercarriage legs can also be seen; they were made from fuse wire. The tyres have been dry-brushed over the dark grey paint to simulate rubber. Most kit manufacturers persist in telling modellers to paint tyres black, which is simply misleading. Rubber is never truly black, and with a little wear after exposure to the elements, it becomes decidedly grey in colour. Tamiya German Grey is a good base colour, which can be lightened still further by adding liberal amounts of very light grey pastel chalk dust with a dry paintbrush. In the cockpit photograph, note the yellow stencilled triangle near the filler cap indicating the appropriate octane of fuel for the aircraft.

This model was fitted with a complete resin replacement cockpit from Aires (Set 4028) and an etched brass set from Eduard (48-080), both specifically designed for the Hasegawa Bf 109F kit. I used Aeromaster acrylic paints throughout for the main finish. The basic camouflage pattern is RLM 74 *Dunkelgrau* and RLM 75 *Grauviolett* over RLM 76 *Lichtblau* with RLM 76 undersides. The mottling on the fuselage is RLM 74/75. RLM 04 *Gelb* was used for the underside of the engine cowl, while the spinner is RLM 24 *Dunkelblau* and black.

HEINKEL HE 219A-7 *'UHU'* (AUTHOR)

This excellent kit from Tamiya appeared in December 1997, and the model featured in these two photographs represents an aircraft flown by 3./NJG 3 around May 1945 while based in Denmark. Potentially, the He 219 was one of the most effective night fighters available to the Luftwaffe during WWII. However, bizarre politics and poor judgement condemned it. The aircraft started out as a private venture and incorporated several advanced features that made it quite unconventional. The cockpit was pressurised and the undercarriage was of tricycle configuration. The 219 was also the world's first operational aircraft to be equipped



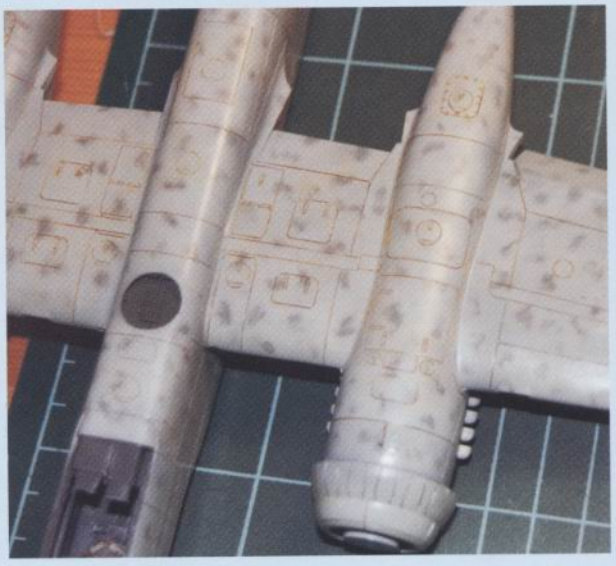
with ejector seats. The A-7 variant was the final and most complicated version of the *'Uhu'*, incorporating FuG 220 radar, two 30mm dorsal cannons, two 30mm wing-root cannons and a ventral pack that made for a very potent night-fighter package. The huge flame dampers are very noticeable on each side of the Daimler-Benz 603G engines, and it is worth looking back at Jonathan Burns' model of the Do 335, which also features these items.

The model was finished in RLM 76 *Lichtblau* overall with RLM 75 *Grauviolett* mottling. The former was applied first, followed by freehand spraying of the mottled effect, using an Aztec airbrush fitted with a medium nozzle. Because the airbrush has a double-action system, allowing one trigger to control both paint and air flow, the mottled effect was relatively easy to apply.

ABOVE AND RIGHT **Heinkel He 219A-7 '*Uhu*' by the author.**

BELOW **The nozzle of my Aztec airbrush is brought quite close to the surface to spray the mottling on the He 219A-7, paint release being controlled by the double-action trigger.**

BELOW RIGHT **Citadel Color Flesh Wash is applied over the gloss surface to pick out panels.**



CHAPTER 6

SPECIAL TECHNIQUES

In this chapter, I will go into a little more detail about the techniques I use to create my models. While the chapter heading may suggest that these techniques are advanced, I would stress that they should not be beyond any modeller who is willing to put in a little effort and go the extra mile to achieve the best model possible. Of course, you have to ask yourself the old question, 'How far do I want to go?' It may be that you would prefer to try out some of these techniques and leave others well alone – at least for the time being. However, I would urge you to have a go at all of these techniques in due course, because they really could make a difference to the quality of your models.

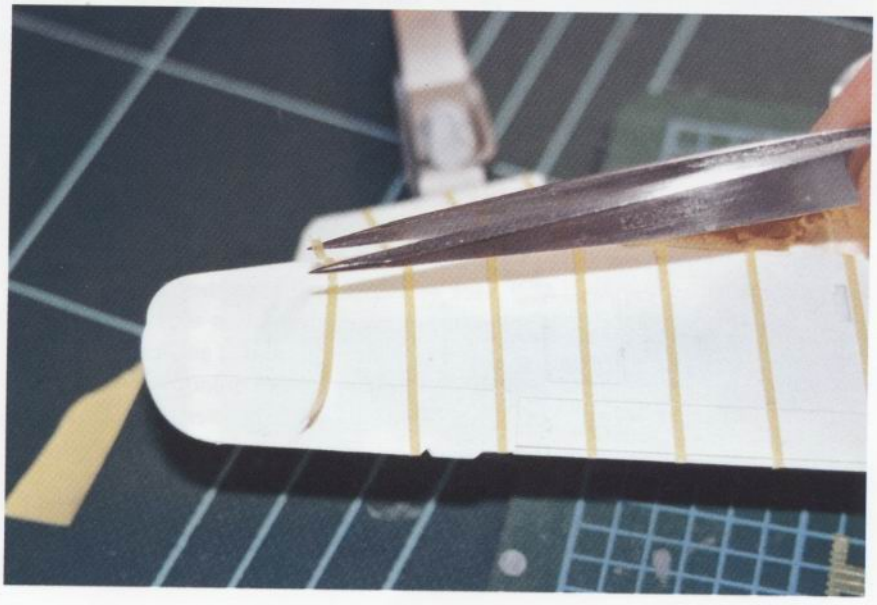
CHOOSING A PROJECT THAT IS REALLY DIFFERENT

The Fw 190 '*Dora*', with its purposeful looking, slender fuselage, has always been a favourite of mine. While reading about the Luftwaffe's 'Galland Circus', I discovered that examples of this aircraft served in a small special unit in *Generalleutnant* Adolf Galland's JV 44. Their sole function was to protect the Me 262 jet fighters during their critical take-off and landing runs. To help German flak gunners identify them in the air, they were given a flamboyant paint scheme with red undersurfaces and white stripes. Three D-9s and one D-11 can be identified as having belonged to this protection flight, which was not a *Staffel*, but rather a small element informally named the *Würgerstaffel* (the original name for the Fw 190 was '*Würger*', which means butcher bird). Later, however, it was referred to as the *Papageienstaffe*, in reference to the German word for parrot because of the aircraft's colourful finish.

The release by Eagle Cals of a decal sheet devoted to the '*Doras*' of JV 44 proved too tempting, and I simply had to dig out my old Trimaster kit and add these colourful decals. I was particularly attracted by 'Red 1', *Werk Nr.* 600424, piloted by Heinz 'Heino' Sachsenberg. The slogan stencilled on the left-hand side of the fuselage, below and behind the cockpit, reads, '*Verkaafi's mei Gwand 'I foahr in Himmel!*' ('Sell my clothes, I'm going to heaven!') – some sense of humour, but it did make me laugh when I first read it. So 'Red 1' it had to be.

CREATING THE RED AND WHITE STRIPED UNDERSURFACES

Once the model was at the painting stage, the wheel wells were masked and the undersurfaces sprayed Aeromaster flat white, RLM 21 *Weiss*. Although the Eagle Cals decal set included white striping that was intended to be applied over the red base coat, I was a little concerned that the white may have been slightly translucent. This may have been unfounded, but I wanted to be sure that a really solid striped effect was created.

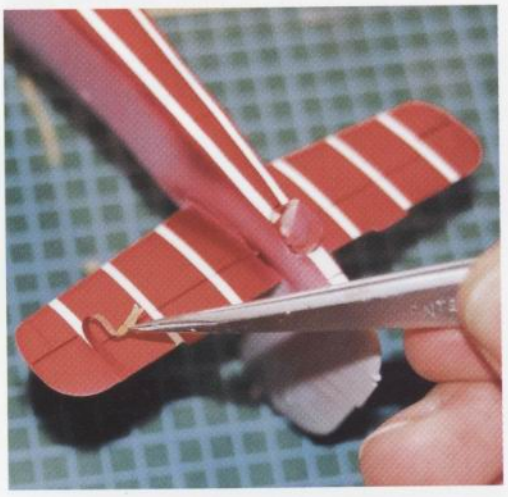


BELOW A steel rule and scalpel were used to cut the masking strips.

BOTTOM The strips were laid over the pre-painted white undersides of the '*Dora*'.

RIGHT **RLM 23 *Rot* was sprayed over the masked undersides of the model.**

BELOW RIGHT **The masking strips were removed to reveal the striped effect.**



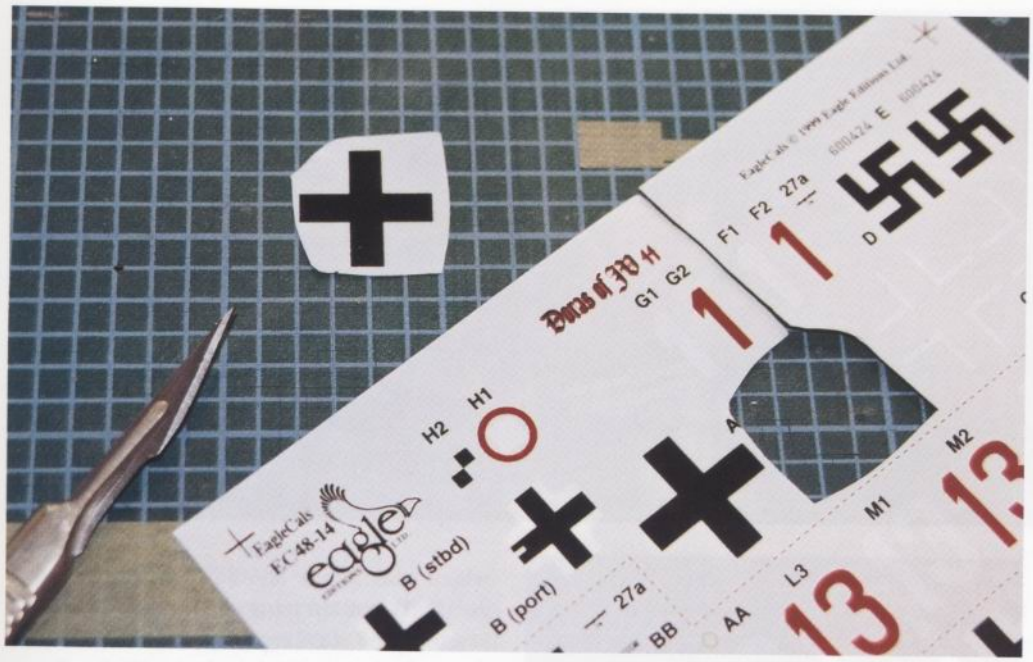
There was another reason for spraying the white first, specifically that it was a simple job to cut thin strips of masking tape and add them to the model in the pattern set out on the decal sheet. It was important to make sure that the stripes were equal in width and spacing, and using a steel rule this was not difficult. Once the flat white had dried, the strips of masking tape were added. In all, the task took an hour or so. A tip when adding strips of tape in this way is to rub them down gently with the back of a fingernail once they are in position, paying particular attention to the edges. This ensures that you don't get that irritating seepage of the second colour on to the base coat. When all the strips were in place, it was time to get out the RLM 23 *Rot* paint. This was sprayed in an even coat on the undersurfaces with an airbrush.

The paint was touch-dry in minutes, and as soon as the airbrush had been cleaned, I couldn't wait to remove the masking tape and see the effect. When hand painting, you need to allow longer between colours and coats to allow the each to dry thoroughly. As you can see from the accompanying photographs, the masks did their job and there was no seepage under the edges. The effect was very colourful and needed toning down later, using Tamiya Smoke (X-19) and/or grey pastel chalk dust.

MAKING AND USING TEMPLATES FOR SPRAYING

The JV 44 project also allows me to illustrate how you can create templates for spraying some codes and insignia. In this instance, I wanted to ensure that the black crosses on the undersurfaces of the wings looked solid. The last thing I needed was for any of the white line beneath a cross to show through the decal, so I decided to use the decals to make templates. If you want to do this, you need to get hold of some clear, self-adhesive plastic. I found some, called Frisk Film, in a stationery shop. The main requirement is that the film should have a relatively low tack quality so that it can be removed easily from the model's surface without damaging the paintwork. You will also need to fit a new blade to your scalpel.

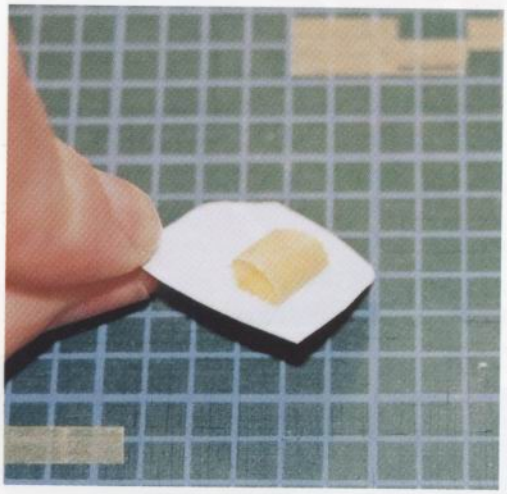
The relevant cross was removed from the decal sheet, leaving a border of backing paper around it. I attached a small amount of masking tape to the back of this and pressed it firmly down on to the cutting mat. A small piece of film was laid over the decal and



LEFT The first stage in making a template from a decal is to remove the appropriate marking from the sheet.

pressed down gently. I left about 5cm as a border around the decal, as the film would act as a mask for spraying. Using a steel rule as a guide, I carefully cut the cross from the film. You need to concentrate here, making sure that you cut exactly into the corners. When all the cuts had been made, I removed the central portion of the film, over the cross, with pointed tweezers. When removing the mask from the decal sheet, care is essential to avoid distorting it in any way. I find that the easiest way is to lift each corner at a time until eventually the mask comes away from the surface.

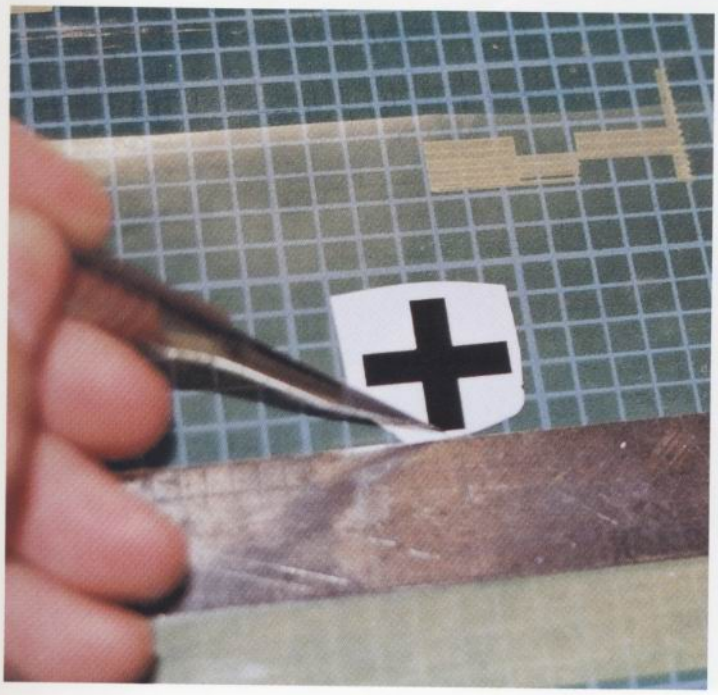
Because the film is transparent, it is easy to position it exactly where you want it, after

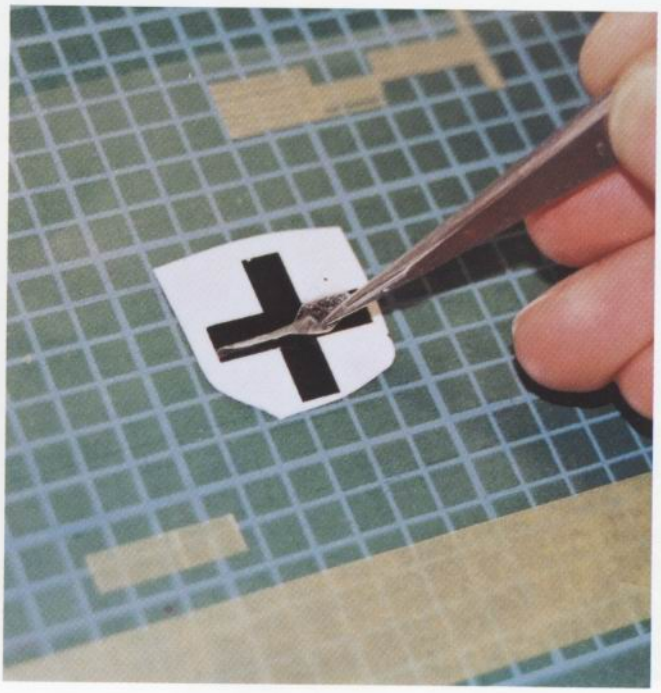


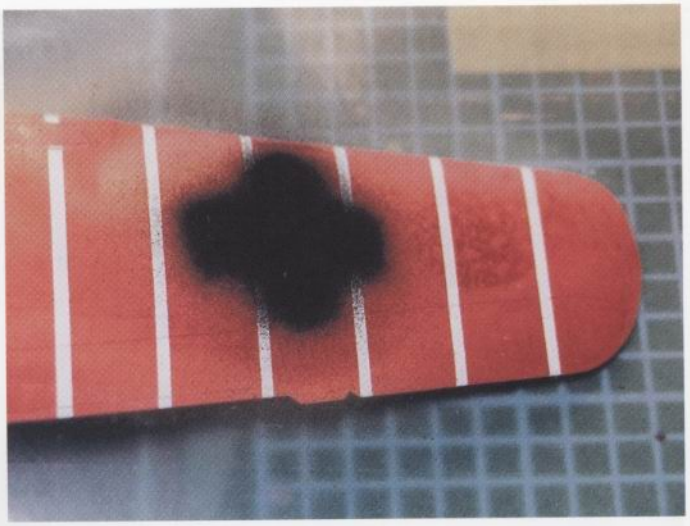
LEFT A small piece of masking tape secures the decal to the workbench.

BELOW LEFT Lay the clear film over the decal and, using a steel rule and scalpel, carefully cut out the cross.

BELOW Pick out the film in the centre of the cross to reveal your new template.





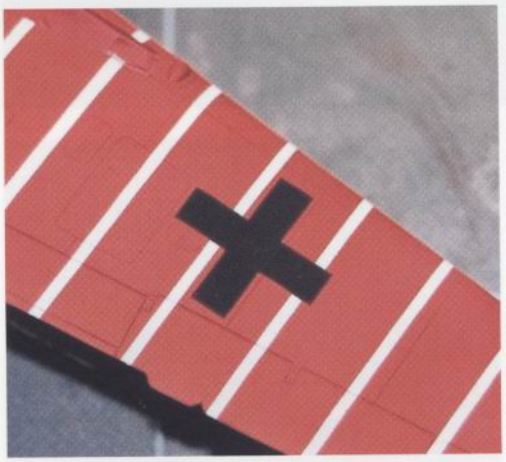


ABOVE The self-adhesive film acts as the mask.

ABOVE RIGHT Matt black is sprayed over the template to create the new underwing cross.

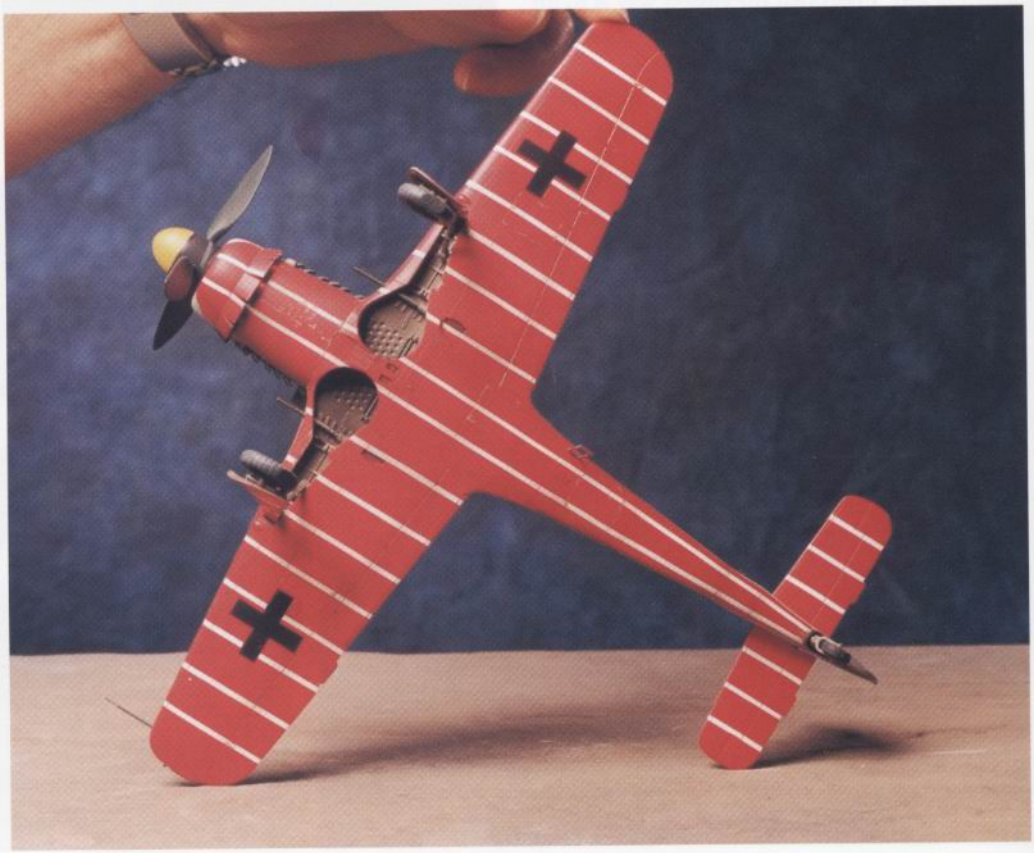
RIGHT There you have it, and none of the white stripes shows through the black.

BELOW RIGHT The overall effect of the JV 44 scheme is very striking and well worth that little extra bit of effort.



which the edges should be pressed down gently. When spraying through the template, I attempted to keep the airbrush directly overhead and at right angles to the surface to minimise the risk of paint creeping under the edges of the film. Once the airbrush had been cleaned thoroughly, the mask was gently peeled away from the surface to leave a perfectly formed cross.

It has to be said that creating a cross is one of the most straightforward masking jobs that you can attempt, but the principles are the same regardless of the type of marking you want to reproduce.



THE LITTLE EXTRA TOUCHES

I incorporated a variety of little extra details in the '*Dora*' project to provide extra interest to the finished model. If you look at the accompanying photograph showing the left side of 'Red 1', you will notice the seat shoulder harness draped over the cockpit sill and the fuel filler cap hanging from its hinge. In addition, there is significant wear and tear on the rear portion of the canopy, the canopy itself is open, encouraging the viewer to look inside to see what detail has been added there, and then there's the aerial wire that looks as if it has come adrift. Let's take each of these in turn.

SEAT SHOULDER HARNESS

The canopy is just about the last piece of the kit to be added, save for the aerial wire, and the harness should not be attached to the top of the seat until just before the canopy is glued on. The straps are made from brass and are readily available from aftermarket manu-facturers, such as Reheat and Airwaves. They should be secured in a small bulldog clip and painted a light buff colour. When dry, each belt can be dry-brushed with light beige or grey enamel, or gently dusted along the edges with pastel dust of the same colour. With the latter, the trick is to use just a small amount of dust and apply it with a very small, dry paintbrush across the edges only. Depending on the variant of Fw 190, the belts had slightly different attachment points at the top of the seat; some were connected to the decking just behind the seat. Attach them with cyano.

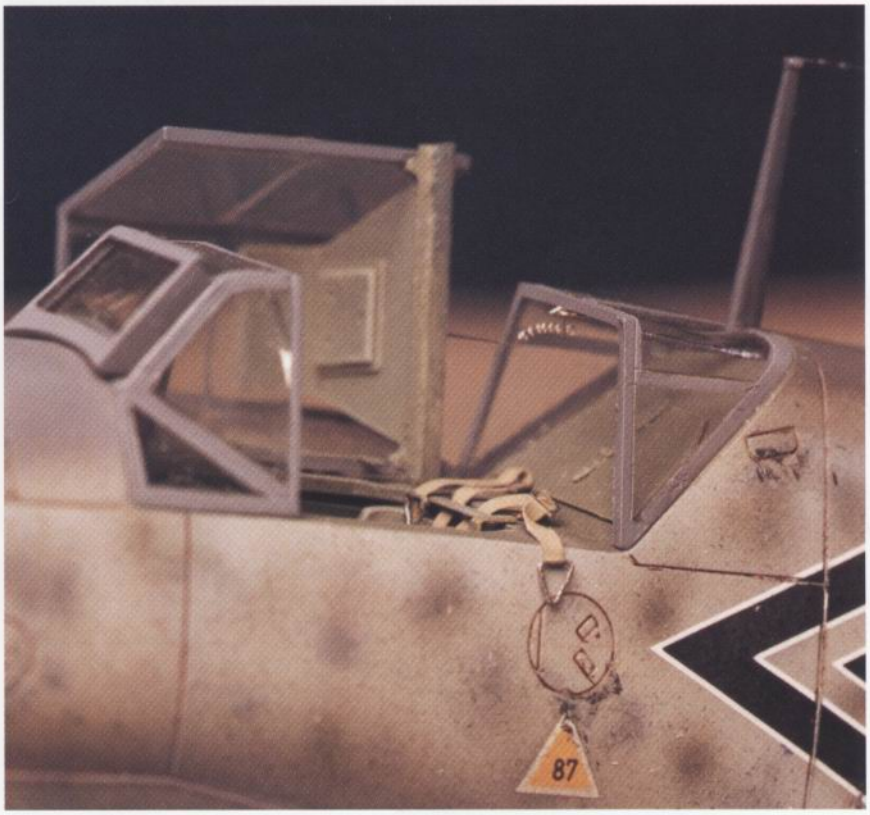
When you are happy that the harness is secure, you can bend it to the correct shape to lie across the cockpit sill. I referred to wartime photographs of fighter aircraft, and 190s in particular, to achieve a realistic pose. Sometimes, the shoulder straps were stowed behind the pilot's seat on the front edge of the decking, or they hung free into the seat pan itself, but just about any logical arrangement is possible.

OPEN FUEL FILLER CAP

I noticed this neat little addition in the Squadron/Signal book about the Fw 190. The photograph actually shows 'Red 1', and you can clearly make out the fuel filler cap, hanging down by a small hinge. This detail is relatively easily to create, but it is better to

ABOVE A good close-up view of the side of the '*Dora*'.

BELOW Note the seat harness and canopy retaining spring on this Bf 109F-4. The spring was formed simply by winding some fuse wire around a needle and pushing the coils together to form a tight spring, which was cut to size.



plan for it early in the construction sequence, thereby avoiding damage to the finished paintwork. Using a pin-vice fitted with a suitable bit, I drilled a hole at each end of the filler cap that's clearly marked on the fuselage side. These holes created the necessary rounded shape at each end of the aperture. Then the centre was picked out with the point of a scalpel blade. When tackling this sort of task, take care not to put too much pressure on the blade, otherwise there is a danger of it snapping and causing serious bodily injury or, at the very least, leaving a nasty gouge in the plastic that needs filling. If the latter does occur, fill it by adding small quantities of cyano with a cocktail stick. Usually, I set the cyano immediately, using a tiny amount of accelerator. The hardened excess can be sanded away with wet-and-dry paper.

Having created the opening in the fuselage, I needed to blank it off from the rear, and I used a small piece of aluminium foil, again attached with cyano. In the photograph of the real machine, I could just make out some kind of locating ring, presumably for the hand-held fuel nozzle, and a small piece of scrap sprue did the trick. Aluminium foil also proved useful for the new filler cap. Using the opening in the fuselage as a template, I roughly cut the foil to size, then shaped it by cutting around the edge with a scalpel. A tip here is to keep turning the foil as you cut it. On the inner face of the tiny door, there appeared to be two small strakes, and short lengths of fuse wire recreated these quite well. Finally, the hinge was also cut from a short length of fuse wire.

This sort of detail takes quite a time to create, and it could be lost easily in that great graveyard for small bits, the carpet! Take care to keep similar items safe until the end of construction, when they should be added, or better still, only make them up when you are ready to attach them to the model.

WEAR AND TEAR ON THE CANOPY PAINTWORK

Photographs of 'Red 1' show quite a lot of wear and tear on the paintwork around the rear of the canopy. I think that this sort of weathering is best achieved by adding light grey paint, and in this instance, RLM 02 *Grau* appeared most authentic, as it formed the base colour. My reasoning was that this would show through, rather than silver, when the top colour became chipped. That said, silver would be appropriate on some aircraft, and it is always worth consulting photographs to get an idea of what tone is best. I added the RLM 02 on top of the camouflage colours and before the flat varnish was sprayed on to the model. This had the effect of blending the chipped paintwork into the surrounding surface, rather than it looking like it had just been dabbed on as an afterthought. If you add the chips last, the paint sits slightly proud of the surface and stands out too much, often having a different tone from the surrounding area.

SAGGING AERIAL WIRE

A fact worth noting on the D-9 variant of the 190 is that the aerial wire was attached directly to the top of the canopy. When the canopy was opened, the wire sagged characteristically. Other variants of the Fw 190 allowed the wire to enter the top of the canopy and run down and back to a spring-loaded tensioning device. This removed any slack from the wire when the canopy was opened, ensuring that it remained relatively taut. Check out wartime photographs to determine how the aerial wires were attached to various aircraft.

REPLACING A DF LOOP

The accompanying photograph clearly shows the round DF loop antenna on top of my model of Heinrich Bartels' Bf 109G-6, 'Red 13' of JG 27. The loop is a prominent feature of the type and usually is included by the kit manufacturer as a plastic item. To be fair, DF loops are commendably thin in some kits, but for a better scale effect, it is worth replacing the antenna with a thin strip of aluminium or lead foil. This is easily achieved.

RIGHT The scratch-built DF loop on my model of Bartels' Messerschmitt Bf 109G-6.

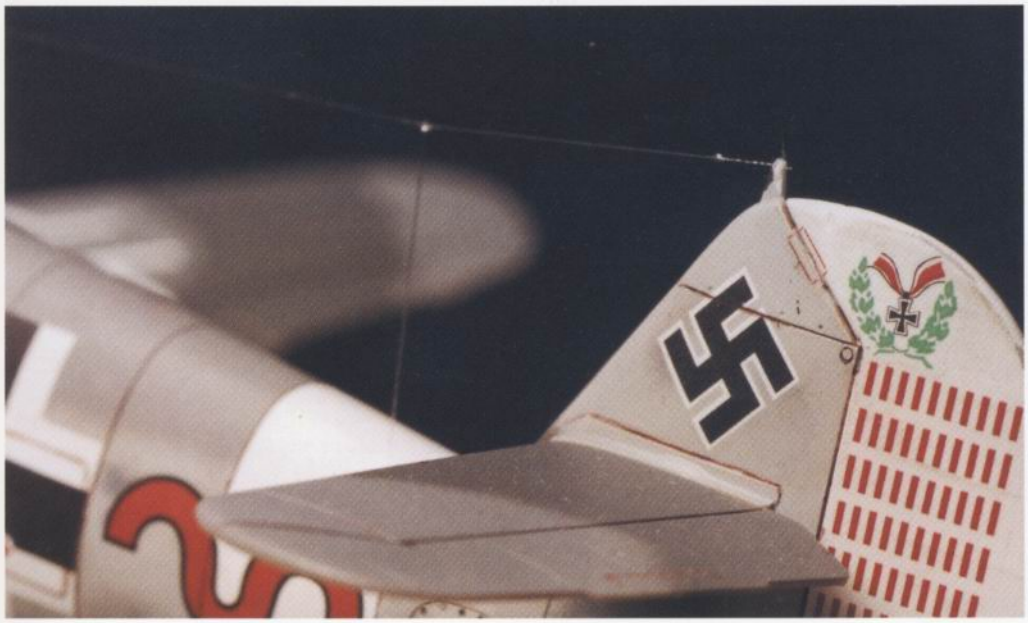
Using a steel rule, cutting mat and scalpel, carefully cut a thin strip of foil that is long enough to produce a loop of the correct diameter; use the kit part as a guide. I cut the foil with a new, or nearly new, scalpel blade, drawing it along the foil at a shallow angle. This helps to prevent the foil from rucking up and creasing. Then it is a simple matter of wrapping the foil strip gently around a paintbrush handle of the correct diameter. The surplus can be removed with your scalpel and the loop located on top of the fuselage. The method used to secure the loop will be indicated by the kit part, but it may be easier to drill a small hole, into which the two ends of the loop can be pushed and secured with a little cyano adhesive. The natural metal colour of the foil is quite realistic and it shouldn't need painting.

AERIAL WIRES

The photograph of 'Red 13' is also interesting because it shows the forward location of the aerial wire to the vertical mast immediately behind the canopy. I use Mitchell Pro fishing line for all my aerial wires, as mentioned in Chapter 1. Some modellers prefer fine 'invisible' thread, which is very elastic, making it ideal for the purpose. You should be able to obtain this thread from stores that sell sewing materials. A third option is to use heat-stretched plastic sprue. This is certainly a very cheap medium, and I will explain the technique of making it later in this chapter. However, I prefer the fine fishing line because of its slight elastic quality.

Usually, I start with the connection at the fin, because it offers a more solid anchor point than the aerial mast behind the canopy. I drill a hole with a 0.4mm bit into the top of the fin and insert one end of the fishing line, having dipped it in cyano first. Once the line has been inserted, a small amount of cyano accelerator fixes the joint. However, on the G-6, you can see that the wire attaches to a small mast on top of the fin. In this instance, no drilling is required. Instead, a small amount of cyano should be applied to the top of the mast, the line brought into contact with it, and the glue set with a touch of the accelerator brush. In a few seconds, the line will be ready to stretch to the mast behind the canopy. Exactly the same procedure is followed here, leaving a line that is taut, with some excess at each end. You must take care when removing this excess line, and the best way I have found to do it is to use a very sharp scalpel and simply 'lean' the blade on the line as close as possible to each mast. You may have a second or two of doubt, waiting for the scalpel to do its work, but eventually it will cut through with a 'ping'. When fitting the aerial wire, don't put it under too much pressure; remember that it only has to be just taut.

If, despite your best efforts, the installed aerial wire displays a slight sag, don't despair; you can put it right without the need to dislodge the strong joints at each mast. Most modellers have an old craft knife or scalpel in their toolbox, and you simply need to heat its blade in a candle flame for about 30 seconds. Bring the blade to within an inch or so of the centre of the line, either below it or to one side. Keep a sharp eye on the line as the blade



LEFT The aerial wire attached to the Bf 109G-6 fin-top mast.

approaches, and as soon as you notice it tighten up sufficiently, remove the blade immediately. Provided care is taken, I have found this to be a very reliable 'get out of jail free' approach!

FURTHER TECHNIQUES

I have included the accompanying photograph of a Bf 109F-4 because it shows to good effect a number of further detailing techniques. Notice the exhaust staining, oil drips on the belly tank and dry-brushing on the tyres.

EXHAUST STAINING

You can employ different methods to achieve this realistic interpretation of the exhaust staining that marked virtually all operational fighters almost as soon as they came out of the factory.

OPTION 1 – USING TAMIYA SMOKE PAINT

My preferred method is to employ probably the most useful paint colour available – Tamiya Smoke (X-19). This colour is like a dirty gloss varnish and is used either neat or thinned with Halford's Value car screen wash (I use this for thinning all my acrylics). The paint should be misted on to the area that needs staining; because the colour is quite translucent, it will take a few passes of the airbrush to build up the degree of staining required. It is this flexibility that makes the product stand out for me. Smoke should be applied on top of the completed camouflage scheme, but before flat varnish is used to finish your model. When the varnish goes on to the Smoke, it blends this in, leaving the necessary very flat finish that these exhaust-stained areas exhibited on the real aircraft.

I hold the head of the airbrush almost parallel to the surface of the fuselage, aimed backwards and below the deflector shield immediately above the exhaust outlets. A point to watch is that the paint does not pool on you, that is form a puddle with horrible dark edges that will stain the model's finish unless you flood the area immediately with water. This may sound a bit OTT, but it isn't. Acrylic paint will come away readily if you're quick enough off the mark. On 109s, the staining used to stream away above and below the wings, and this should be reflected on your model.

OPTION 2 – USING XTRACOLOR EXHAUST

Hannants Xtracolor Exhaust (X504) is a good alternative to Tamiya Smoke. This flat paint is designed to be sprayed on as a final addition to

RIGHT The oil drips look effective on the centre-line tank of this Bf 109F-4. Note, too, the replacement wire-mesh grille in the air intake.

the weathering effect. The method of application is almost identical to that described for Tamiya Smoke. The colour is very realistic, producing a deep brownish-black colour that accurately resembles the true exhaust stain. However, a point to bear in mind is that the colour is much denser than Tamiya Smoke. Therefore, it is less forgiving if you don't apply it exactly where you want first time.

OPTION 3 – PASTEL CHALK

In my opinion, this is perhaps the least effective of the possible options, although pastel chalk dust is good for touching in any areas that you can't quite reach with the nozzle of your airbrush. Typically, this can be the area immediately adjacent to the exhaust outlet opening.

OIL DRIPS

Just take another close look at those photographs of operational fighters and notice that they often show signs of oil dripping on to the floor or, in this case, the centre-line drop tank. This effect is easily simulated using an enamel paint from the Xtracolor range called Oily Steel (X-503). Simply shake the tinlet vigorously for a few seconds, less time than you might spend if you were going to use the paint proper. Taking a small paintbrush, open the tinlet and just dip the brush into the oil at the top of tin and gently paint a couple of drip marks on to the tank, as if oil has fallen on to it. Make sure that you don't stir the paint before you carry out this task, because you are really only using the oil at the top, not the paint sediment at the bottom. The oil is exactly that, and has the right gloss look to it.

DRY-BRUSHING TYRES

I mentioned previously that I use Tamiya German Grey for the 'rubber' base colour of tyres. This dark grey paint more accurately reflects the true hue of rubber. It is greatly enhanced, however, by subtle dry-brushing. The technique was explained in Chapter 4. Suffice to say that I used a light grey, flat enamel paint. By drawing the brush across the tyre tread pattern at right angles, each ridge was highlighted as if it really was catching the light. This technique creates a more three-dimensional look to the relevant parts by accentuating any raised detail. In fact, in the picture of the F-4, you can just make out other areas that have been dry-brushed, like the edges of the radiator intake and the under-carriage leg.

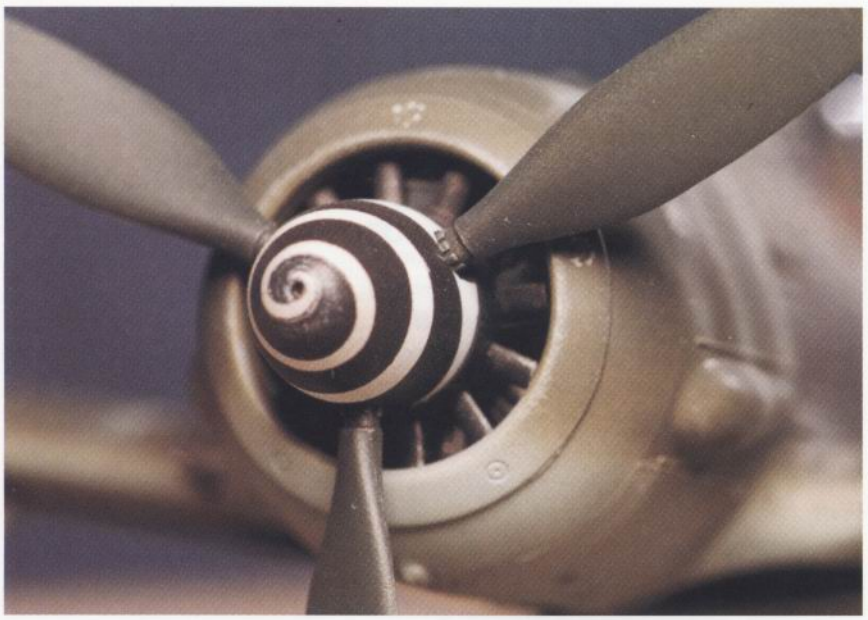
SILVER CHIPPED PAINTWORK

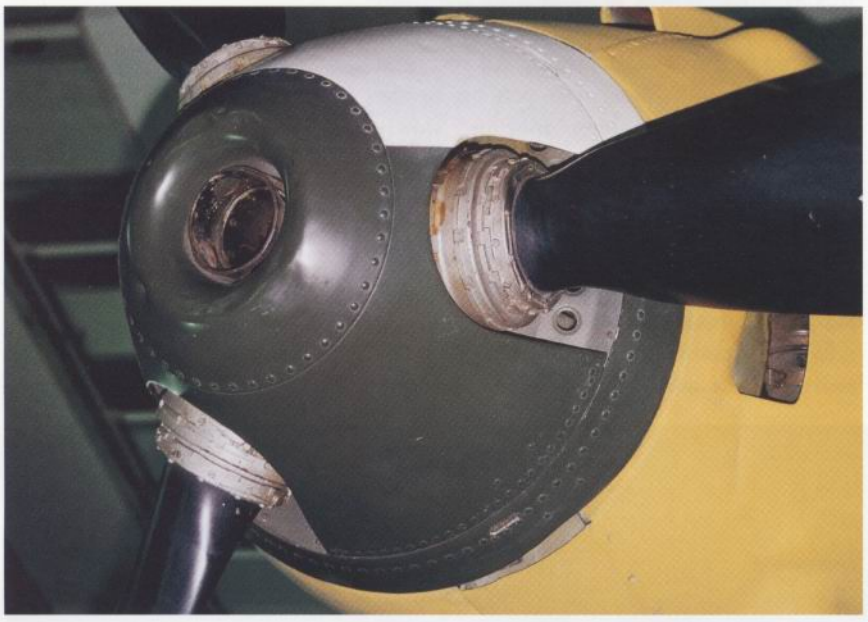
The front end of any operational fighter would have taken quite a bashing from the elements, and the Bf 109 was no exception. In many respects, propeller spinners were even more prone to wear and tear from the F-4 variant onwards, since these aircraft were fitted initially with a 15mm, then later 20mm, Mauser cannon firing through the airscrew shaft. Barrel exhaust staining and chipping of the paintwork is noticeable in some photographs of actual machines, and it can be worth simulating this on your model.

A very handy way of simulating the paint chips is to use a silver ink pen, like those produced by Pentel and Tamiya. All you need to do is carefully touch the pen on to the spinner with a dabbing motion, slowly building up the amount of chipped paintwork you want. This can be extended to the edges of the propeller blades and small areas on the faces of the blades. Don't overdo this effect, otherwise you'll end up with something that doesn't look realistic.

When the silver is dry, after a couple of hours or so, add a little smoke staining

BELOW It is important not to overdo the chipped paint effect, but I think it's about right here.





TOP The spiral decal on the spinner of this Fw 190 looks quite purposeful.

ABOVE There's quite a lot of detail around the spinner and cannon port of this Bf 109E-4.

around the gun barrel outlet in the spinner. This will give the impression that the gun has recently been fired, which is exactly the effect you are after.

CREATING WHITE DISTEMPER WINTER SCHEMES

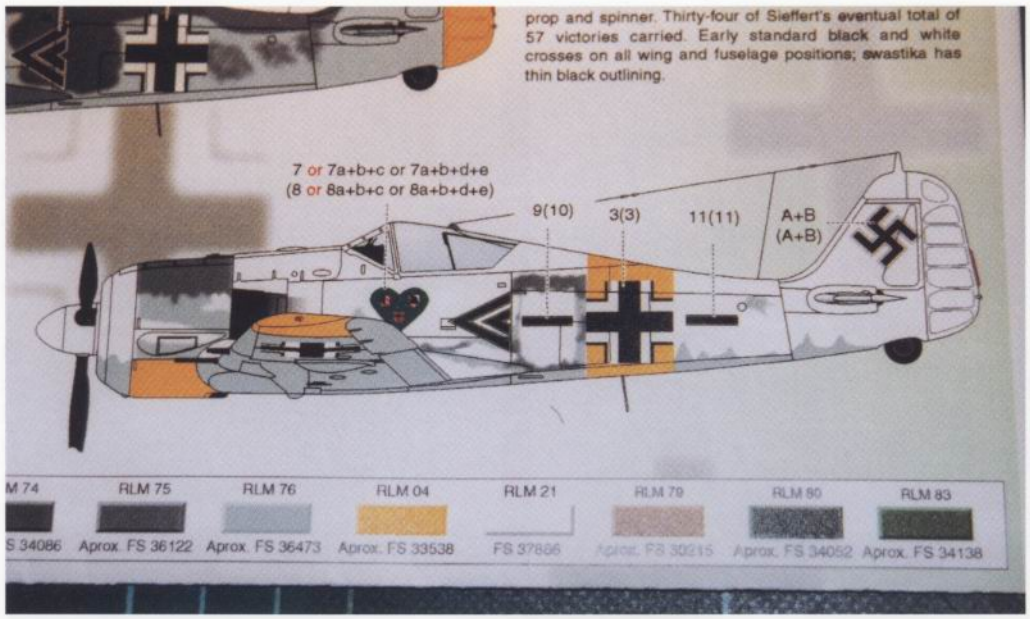
If you haven't realised by now, of all the Luftwaffe fighters of WWII, Fw 190s are a particular favourite of mine. You'll probably already be aware of the huge variety of schemes used by the Luftwaffe for the different fronts on which it served. The winters in Russia must have been truly desperate, and it is difficult to imagine what it must have been like, not only for the aircrews, but also for the ground crews who had to spend hours in the bitter cold keeping the aircraft flyable.

Aircraft of this period, late 1942, often had temporary winter schemes applied to their upper fuselages and wings in an attempt to provide additional camouflage protection. From a modeller's point of view, creating a realistic representation of these schemes provides a real challenge. None the less, I want to address that challenge here, particularly as not many models finished this way appear at shows. It is very easy to overdo the white effect and obliterate the camouflage detail below. However, with the use of masks and the application of a little patience, it is possible to achieve success. I suspect that opinions of my efforts will vary, but I'm happy that my approach works.

Once again, I must stress the need to find suitable reference photographs on which to base your model. Some of the specialised decal instruction sheets provide a wealth of information, being the culmination of research by the manufacturer. However, a note of caution is appropriate: occasionally, this research is flawed or interpretative, and the markings produced, especially in terms of the colours of codes, can be off beam. To be fair, trying to interpret the correct hues of colours from black and white photographs, and often poor-quality pictures at that, is a very difficult task. I'm sure the manufacturers do the best they can, but it is always worth doing a little research yourself, using some of the sources mentioned in Chapter 2.

The Aeromaster Decals sheet 48-431 provided a great incentive for me to have a go at producing a winter scheme. One of the aircraft featured is an Fw 190A-4 of *Oberstleutnant* Hannes Trautloft, *Kommodore* of JG 54 in December 1942 when the unit was based at Krasnogvardeisk, Russia. It had a patchy white temporary winter camouflage over RLM 74 *Dunkelgrau* and RLM 75 *Grauviolett* upper surfaces with RLM 76 *Lichtblau* undersurfaces, RLM 04 *Gelb* lower cowl, fuselage band and lower wing tips, RLM 70 *Schwarzgrün* prop and white spinner. Standard early black and white crosses were applied to all wing and fuselage positions, while the swastikas had thin black outlining. JG 54's green heart marking, containing the emblems of I. and III./JG 54, was carried on each side, below the cockpit.

It is always a good idea to build up the finish using the correct RLM colours and camouflage pattern, on to which the white 'temporary' scheme can be added. The reason



LEFT Hans Trautloft's Focke-Wulf 190A-4 detailed on the Aeromaster decal sheet.

BELOW A range of paints used in the project.

BOTTOM Hannants Xtracolor is an excellent gloss enamel paint that reproduces a range of RLM colours.

for this is that it gives you flexibility later on when deciding how much of the white to rub away or mask out to allow the original camouflage to show through. Thus the RLM 76 went on first, followed by the RLM 74/75 pattern. The good news is that you don't have to be too particular here, for example in achieving fine feathered edges between colours; a small amount of over-spray won't show later on. I used Aeromaster acrylic RLM 76 paint followed by Xtracolor gloss enamels. The reason for this was simply that these were available at the time, although the acrylic paint dried quickly, allowing me to get on with applying the gloss upper-surface camouflage pattern.

When it came to the white 'temporary' finish, I used Aeromaster matt RLM 21 *Weiss*. However, to be honest, just about any white would suffice for this purpose. As with all things connected with painting, it is much better to add the paint in thin coats, rather than blast it all on in one go.

Before the white was added, any areas where the original camouflage pattern was to show were masked out. You can see from the accompanying photograph that the top of the engine cowl was protected, as were the yellow fuselage band and cockpit interior. The edges of the tape on the engine cowl were lifted to produce a broad feathered edge to the white paint, and this area was further enhanced with pastel chalks later on.

The white paint should be 'ghosted' on, concentrating on the centre of each panel and slowly building up the effect. You will notice that a patchwork-quilt effect soon emerges, which can be toned down by a couple of passes

RIGHT The white temporary scheme has been ghosted on. Notice how the panel lines just show through the white to give a good three-dimensional effect.

over the panel lines. By ensuring that only a relatively small amount of paint is delivered by the airbrush, you can retain a high degree of control and, therefore, take your time in building up the finish.

PAINT MIXES

For spraying, you need to thin the paint, using distilled water, until you achieve a consistency that is similar to milk. A test that I use, which has always proved itself, is to mix the paint with a stirrer, then lift it clear and watch the droplets of paint that fall from it. They should drip steadily and reasonably freely. Much has been said about thinning paint, and I have to say that the thought of painstakingly measuring exact numbers of drops and proportions gives me a headache. By using the correct colours from the main manufacturers' ranges, you can choose the preferred medium, like acrylic or enamel, and simply worry about thinning sufficiently.

I am convinced that unsatisfactory paint finishes usually occur because the air supply to the airbrush is faulty or irregular, or the paint hasn't been thinned enough. Of course, there can be other reasons, but I'm sure that these two lie at the root of most problems. Having said that, I do remember a third that arose out of a discussion I had with a modeller friend. He said that he just couldn't get his pot of Extra Dark Sea Grey to spray evenly. He had used it on three models, and the finish of each had been spoiled. When he showed me the pot of paint, it turned out to be an old tinlet of Humbrol Authentic Colour (now I really am showing my age!) that must have been over 20 years old.

Now what on earth was he doing spraying paint that had been opened several times and was that old? It beats me. So do give yourself a chance. Paint may have gone up in price, but having bought a model, added extra resin parts and paid for a specialised decal scheme, why risk blowing your outlay by using aged paint?

To a greater or lesser extent, many of us are guilty of doing the same as my friend, but to counter this problem, I have made a rule. Like other modellers, I have dozens and dozens of paint tins and bottles, so each time I buy a new tin of paint, I throw away one of the oldest. By doing so, I can remove the temptation to use really old paint.

WEATHERING THE WHITE FINISH

The decal instructions will prove invaluable here, as will any pictures of the real aircraft. The Squadron/Signal Publications book on the Fw 190 includes an excellent photograph of 'Black 6' from JG 54, the aircraft's white temporary scheme being very weathered. This isn't difficult to understand when you consider the beating that the aircraft took from the weather and the wear that would have occurred during daily maintenance by the ground crews. White shows up everything anyway, so my model is relatively clean. I particularly wanted to show off the JG 54 markings and the overall pattern of colours,

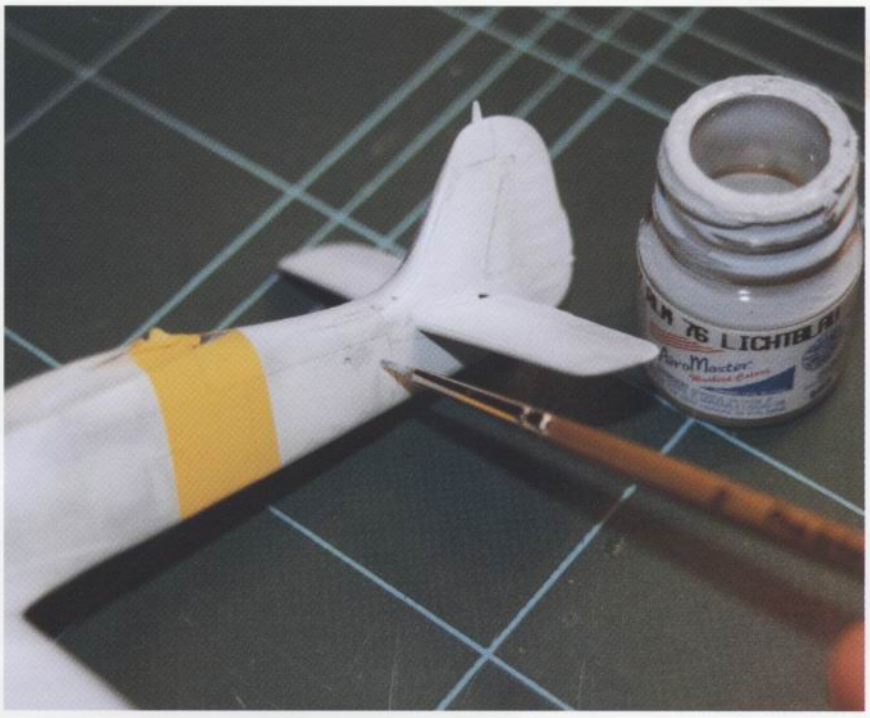
but you could really go to town and add plenty of dirt and grime.

In quite a number of areas, the white paint wore away, allowing the colour underneath to show through. To re-create this effect over the RLM 76 *Lichtblau*, simply apply small patches of the undiluted paint with a small paintbrush. The patches should have rough edges, as shown in the accompanying photograph.

Exhaust staining can be added to the fuselage sides once the decals have been applied to a gloss surface, achieved with Humbrol Glosscote or similar. Before spraying on a coat of matt varnish, however, it is worth considering the use of ink washes to weather the model further.

INKING IN THE PANEL LINES

I used Citadel Rust Brown ink for this project. Another option could be Flesh Wash or Brown Wash, but Rust seemed to have just the

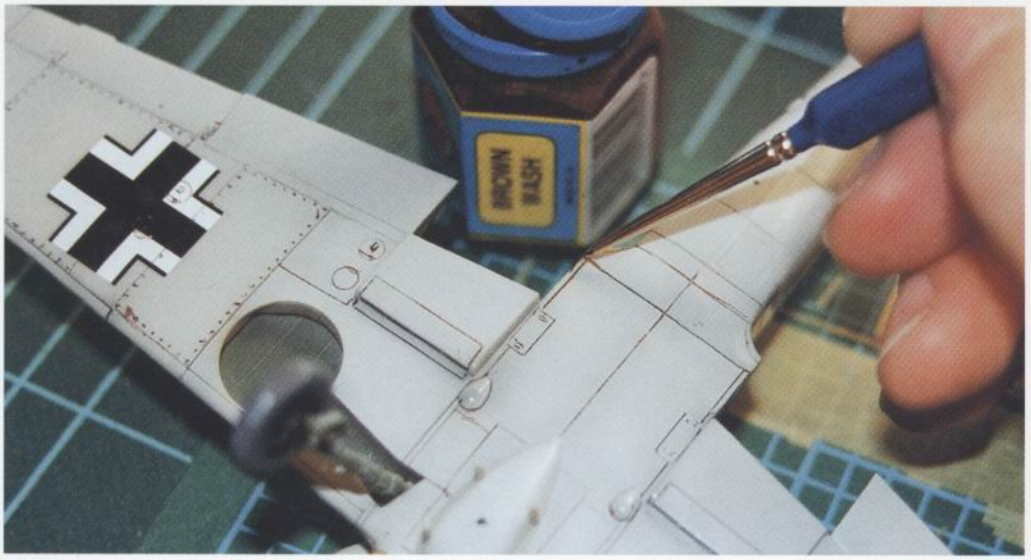


ABOVE Further weathering was applied by hand, using Aeromaster RLM 76 *Lichtblau*.

LEFT Citadel Color Rust Brown wash was added with a very small brush.

BELOW LEFT Here, the wash is applied to the underside of the Fw 190F-4.

BELOW Rotring Airbrush Cleaner was used to remove any excess ink/wash from the centre-line tank.



RIGHT It is important to include the decals in the weathering process.

right density. Using a very small paintbrush – I use one that has only four bristles – the neat ink is run into each panel line in turn. Working on a small section of the airframe at a time, try to keep the ink in the recessed panel lines. There is an obvious advantage here in building a modern model that has fine recessed panel lines, as opposed to a model from older tooling that has raised lines. Once an area has been covered, the excess ink must be removed, and for this I use Rotring Airbrush cleaner, which comes in a plastic bottle and should be available from good art shops. If you can't get hold of any, you must use gloss enamel paints or matt paints with a gloss varnish over the top before applying the ink. Then it will be safe to remove the excess with car screen wash or acrylic thinners (such as Tamiya's). A cheaper alternative, in the UK at least, is to purchase a bottle of isopropyl alcohol from your local chemist or pharmacy; this is much cheaper than proprietary acrylic thinners and lasts for ages.

I run the ink into all the recesses in the airframe, and as I do so, a three-dimensional effect begins to emerge as the fine-tooled detail becomes visible. The key to the process is not to overdo the effect. I have seen models finished with black and very dark grey ink and, to be honest, I think this creates too stark a contrast between the ink and the paintwork, which can really spoil a model.

At this point, the model should be well on its way to a pleasing finish, but there are one or two stages to go yet. The airframe needs a coat of matt/flat varnish, and the best that I have found, which can be applied to any finish at all – except perhaps metallic ones – is Aeromaster acrylic flat varnish. It produces an absolutely flat finish that, I find, generally works better than anything else on Luftwaffe fighters.

In the accompanying photographs of the completed Fw 190A-4 of JG 54, you can see that I have added some further weathering. Grey and brown pastel chalk dust was carefully brushed on to the areas that would have received extra wear and tear, like the access areas, wing roots and engine cowl. The spinner has a darkened tip where the white distemper would have quickly worn away. Note also the chipped paintwork around the windscreen. Dark brown pastel chalk dust was added to the area immediately behind the exhaust outlets. I am particularly pleased with the effect of the slightly open canopy and the way the yellow rear portion is offset over the fuselage band. Note, too, the taut aerial wire of this variant of Fw 190, unlike the drooping wire of the '*Dora*' described previously.

RIGHT The varnishes I use most of all.

ABOVE LEFT Pastel chalks are very useful for weathering a model, as can be seen on the finished Focke-Wulf 190A-4.

ABOVE Note the worn looking finish – in fact, this one is quite mild compared to some operational Fw 190s.

LEFT The underside of the Fw 190F-8. Notice the use of Tamiya Smoke (X-19) paint.

USING TAMIYA SMOKE TO ENHANCE PANEL LINES

It might be that inking panel lines does not appeal to you, or you may prefer something slightly more subtle. If this is the case, applying Tamiya Smoke (X-19) to the panel lines is worth trying. This technique, which requires the use of an airbrush, involves spraying the translucent colour freehand along each of the main panel lines. Of course, the technique can be used in conjunction with the inking process, but care must be taken not to overdo things. The Smoke should be sprayed before the final coat of matt varnish is applied, but after the decals because it is important to overspray these where appropriate.

Take a look at the accompanying photograph of the underside on an Fw 190F-8 fighter-bomber. You should be able to pick out the subtle darker lines along the joints between the main panels. This effect can be achieved by one or two passes with the airbrush. You can control the line much more easily if you keep the head at right angles to the surface and about 3cm from it. I find that it definitely helps if you've had a few gins or glasses of wine first! Simply be positive and believe that you can do this; being quite transparent, the paint is forgiving, allowing you to make the odd slip without it becoming too obvious. However, it is a good idea to practise the technique on a piece of scrap paper before moving on to your model.

USING PASTEL CHALKS TO ENHANCE PANEL LINES

So far, I have explained a variety of methods for enhancing the panel lines that are often noticeable on real fighter aircraft. Ink washes, pre-shading and Tamiya Smoke can all add depth and realism to the finished model. However, there is another method that you can use to enhance the panel lines of your models, and that is to use pastel chalk dust. In many respects, it is one of my favourite techniques because it is very subtle and looks very realistic. Working with pastel chalk is not difficult, but to learn the necessary skill, you need the courage to experiment and practise, mainly with various tones of grey.

All you need are a selection of pastel chalks and a small paintbrush – I prefer a round brush for this purpose, as opposed to a broad head. The thin section of the round brush helps deliver the dust exactly where it is needed, in the panel lines and along the lips on each side. The accompanying photographs show an Me 163A rocket-propelled fighter, which is finished in RLM 02 *Grau*, quite a light shade of grey. The idea is to create a slight shadow around each of the panels to break up the rather bland appearance that aircraft finished in one colour so often display. In this instance, it was necessary to use a slightly darker grey than the base colour.

The pastel dust must be applied to a matt or semi-matt surface, so it is best carried out

RIGHT **Pastel chalk dust works well as an alternative to inks when outlining panels.**

LEFT Notice the subtle way in which the panels are highlighted. This could be the most effective enhancing technique.

as one of the last tasks of the project after the matt varnish has been applied. All you need to do is draw the dry brush (it should remain dry throughout) a few times across the pastel stick. You will see that the dust is very fine and readily adheres to the brush. When you see the bristles darken, gently tap the brush on the side of the pastel box to remove the excess dust, then gently run the bristles down the panel line in one direction. I used a medium grey pastel chalk for the Me 163A so that the effect would be very subtle and not look like a patchwork quilt. If you find that your initial choice of pastel is too pale, you can simply repeat the process with a darker version. However, once the chalk dust has been applied, it cannot be removed, so great care is needed.

The whole job doesn't take very long, and with a little practice you will soon develop the confidence to select the right pastel shade to start with. The general rule is that the darker the base colour, the darker the pastel shade.

Having said that, there may come a time, especially when you have sprayed matt black on the undersides of a night fighter, such as the He 219A-7 '*Uhu*', Bf 110G or Me 262B, that you need to use a lighter pastel shade. Obviously, a really dark grey pastel chalk will be lost on a black surface, but you can still achieve a realistic effect by using a dark grey pastel. In this instance, the principle of choosing the correct shade works in reverse. Try not to use too light a pastel stick first, but build up the finish progressively from a very dark grey until you achieve the most effective blend.

SEALING IN THE FINISH

One of the advantages of pastel chalks is that once they have been applied to a model's matt finish, they remain pretty much fixed, and unless you carry the model through a rain shower (definitely not recommended!), it can be handled carefully without any adverse effect.

I have tried several varnishes over pastel chalks used in this way, and all seem to produce the same result – they kill the effect completely, the lines apparently disappearing under the varnish. So my advice is to put the pastels on to matt or semi-matt varnish and handle the model with care. If anyone discovers a technique for curing this problem, I'd be pleased to hear from them.

SIMPLE WOOD EFFECTS FOR PLASTIC

When building my model of the Me 163A prototype of the operational Me 163B rocket fighter, I had the opportunity to build the Flashback 1/48 kit. This nice limited-run, injection-moulded plastic kit came from the Czech Republic, and a number of photographs of the model can be found in this book. One problem I faced was achieving a realistic

ABOVE Tamiya Buff paint was used as the base coat for the creating wood effect.

ABOVE RIGHT Next the Rust Wash was liberally brushed over the surface.

effect for the wooden blast plates of the R4M '*Orkan*' underwing rocket projectiles. Only one of the prototype Me 163As appeared to have carried these underwing stores, namely AV6 CD-10, the aircraft test flown by Adolf Niemeyer.

The wooden blast plates are moulded with ribs that provide attachment points for the rockets. For a base colour, I chose Tamiya acrylic Buff (XF-57). Using a small, broad paintbrush, I applied an even coat of this colour and left it to dry thoroughly. Usually a couple of hours is fine. Then an ink wash of Citadel Colour Rust Brown was painted liberally over the whole surface (you could also use Citadel Flesh Wash). This was the easy part, taking only a few seconds per item to complete. A point to remember when carrying out this process is that the wash should be applied quite roughly so that various tones of brown are laid over the lighter undersurface, which will show through to a greater or lesser degree, simulating wood grain. Once the wash has been allowed to dry for an hour or so, the ridges and edges can be dry-brushed with a light shade of beige or grey paint. A similar process can be used to re-create the wood effect on propeller blades, most often seen on WWI aircraft. A varnish can be added to complete the effect, and I recommend a satin or semi-gloss version. This will have the effect of deepening the colour, bringing a richness and definition to the different browns.

USING PENCIL GRAPHITE DUST

One of the most readily available and useful materials for detailing aircraft models is pencil graphite dust. You can use it to weather the surface of parts and give a more realistic look to components such as iron weapons and stores (bombs, rockets and the like). It can also serve as yet another means of enhancing panels on the airframe of your model, making them look more like painted metal. The techniques for employing graphite dust are among the most straightforward to master, and I have lost count of the number of times that I have used them to finish off a model's appearance.

WEATHERING IRON STORES

For this technique, you will need a graphite pencil, a small piece of wet-and-dry paper (800-grade or similar) and a cotton bud. There is no need to be particularly fussy when selecting a pencil, as just about any will do, irrespective of hardness. Having said that, you need to rub the pencil point on the wet-and-dry paper to create a small pile of graphite dust, and a softer 'B' pencil will be easier to rub down and create more dust. Keep a pencil sharpener handy, because it won't take long to wear down the point.

As mentioned, the Me163A CD-10 carried underwing anti-aircraft rocket projectiles on wooden racks. The rockets were painted either black or black-green by the Luftwaffe, and the latter colour is well represented by Tamiya's

XF-27 Black-Green. This matt paint dries in minutes, after which it can be submitted to the graphite treatment.

Take the cotton bud and gently roll it in the dust until the end is covered. Tap off any excess dust, then gently rub the bud across the item to be weathered, in this case the rocket projectiles. You will notice an immediate change in the surface colour to a metallic grey, but it is important not to add too much dust, otherwise the paint underneath will be completely obscured. As with so many modelling techniques, it is best to add a little at first and gradually build up to the desired effect; note that you can't remove the dust once it has gone on because it stains the surface. The effect can be achieved quite quickly, and the harder and longer you rub the bud on the surface, the more solid and metallic the final effect.

Another point to remember, especially when it comes to deciding when to attach the completed stores, is that the graphite surface will be darkened by any varnish that you apply. Most Luftwaffe fighters ended up with quite a matt finish after a period in service, and if you apply this varnish to the airframe with the stores attached, they will become dull and far less realistic. It is much better to add the underwing stores at the end of construction, thus avoiding this problem completely.

HIGHLIGHTING AIRFRAME PANELS

If you look at wartime photographs of aircraft, you will often see that as the war progressed and spare parts became harder to come by, written-off aircraft provided a useful source of replacement parts. Invariably, the donor and recipient machines were from different production batches and had suffered different amounts of weathering. Consequently, they had different tones and colouring, albeit having been painted in a similar manner originally. In fact, even this was not always the case as the war progressed, and there is a wealth of photographic evidence showing panels painted in completely different schemes or merely in primer, or even remaining unpainted, all fitted to the same aircraft. I think that this is a great bonus for us modellers, because it gives us a wonderful opportunity to be creative, authentic and achieve a collection of truly 'different' models.

To employ graphite dust to highlight panels in this way, you need to mask out the panel you want to weather, which can be done either before or after the final coat of varnish has been applied. I always use Post-it Notes at this stage, because their low-tack adhesive strips will not damage the painted surface. I cut a few pieces of the paper into appropriate sizes to fit the shapes of the panels to be weathered and stick them in place. It is very easy to overdo this effect; great care is needed to ensure that you have the smallest amount of graphite dust on the cotton bud. Gently dust some of the graphite on to the panel, then turn

LEFT Pencil graphite has many applications for weathering kit parts. First, rub the tip of the pencil on a piece of wet-and-dry paper to create graphite dust.

LEFT The graphite dust is best added with a cotton bud.

LEFT The dust should be gently worked into the paint finish.

the cotton bud around and use the clean end to work the dust into the surface. This provides a good degree of control over the technique.

ENHANCING PANEL LINES

I have already explained the methods of enhancing panel lines with ink washes, oil paints, Tamiya Smoke and pastel chalks; in certain circumstances, graphite pencil dust can also be very effective for this task. Again, I can't stress enough the benefits to be gained from practising these techniques on different paint finishes to determine which work best for you and create the effect you want.

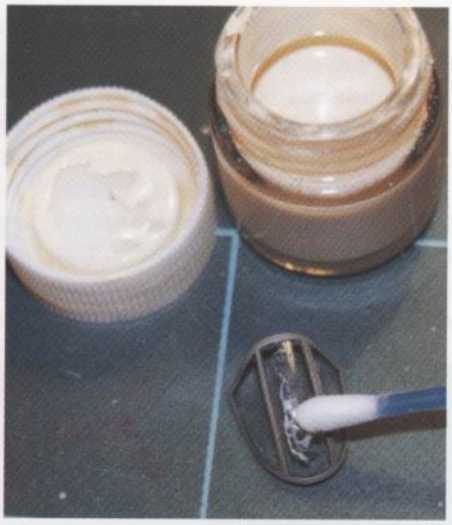
When using graphite, simply add a little to the bud as normal and lightly dust this along each panel line you want to enhance. Try to be as accurate as possible and use long strokes, as this avoids a scruffy looking line, which will be unrealistic and impossible to remove. Also, remember that you need to enhance the line only slightly to bring out that three-dimensional shadow effect, so go easy on the dust.

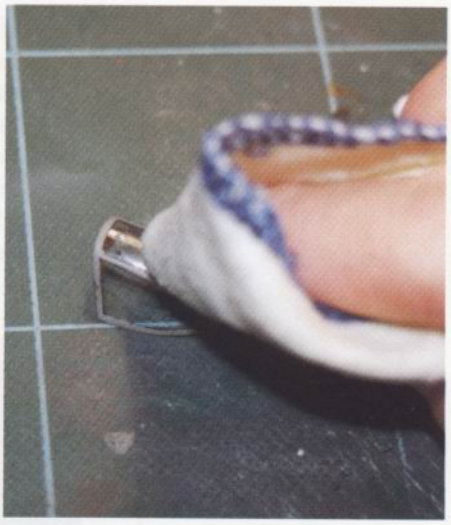
APPLYING TAMIYA SMOKE OVER SILVER PAINT

By now, you will have gathered that I am a fan of Tamiya Smoke paint. Although I have described its qualities elsewhere, I'd like to point out how useful it is when used over silver paint. This glossy, semi-clear wash can be used to tone down silver paint, especially on areas of an aircraft that would have weathered, like the wheels and undersides. In fact, it is invaluable for painting wheels. Where WWII Luftwaffe fighters are concerned, it does have its limitations, mainly because their wheel hubs were invariably painted semi-gloss black. None the less, some aircraft did have natural metal areas showing, and it is on these that Smoke can come into its element.

By way of example, I used silver to paint the inner faces of the main wheel bogies for the Me 163A. It really does not matter what silver you use, only that you allow the paint to dry first. Then Smoke was applied liberally to the face of each wheel hub with a brush. It is essential to ensure that plenty of the paint gets into the recesses and crevices of the part. This has a really stunning effect, bringing out the detail moulded into the parts. Leave the parts to dry flat; wheels can be attached to cocktail sticks before painting to avoid any need to touch the painted surfaces. Alternatively, you may be able to use small clamps or clothes pegs to hold them for painting. The Smoke paint remains fluid for a little while, and keeping the parts flat ensures that it doesn't collect in puddles that will look very odd when dry.

RIGHT AND BELOW RIGHT
Tamiya Smoke works incredibly well over silver – try it.





POLISHING CANOPIES

This is another technique that has moved on a long way in recent years. I remember the days when the primary method of polishing the clear parts of models involved the use of toothpaste and a brush. I never did get the hang of that, although I'm assured by even older friends that it really did work. Another technique was to allow Brasso metal polish to dry on a cloth overnight; the abrasive quality of the dry, polish-impregnated cloth worked wonders in restoring a clear finish to a canopy.

So what can we do now? Well, by far the best product for polishing canopies that I have come across in recent years is MER car polish. In the UK, it is widely available from car accessory shops and comes in a light blue plastic bottle. Various sizes of bottle are available, but the smallest is more than adequate and will last for years. Because such a small amount of the liquid is needed for modelling purposes, the club I belong to bought a bottle and we decanted the polish into small pots for the members. Another great quality of this polish is its incredibly long shelf life when stored in an airtight container; I use an old screw-top paint bottle, suitably cleaned out.

For the purposes of demonstrating the technique, I used the Flashback Me 163A canopy. To be fair to the manufacturer, however, the canopy was actually very clear and really didn't need polishing, but it was to hand and served the purpose. There are two very important pieces of kit you need for this polishing process: a cotton bud and a very soft, good-quality polishing cloth, like those sold for polishing antiques. Such dusters aren't very expensive, but the finish they produce is superb and they won't scratch the clear plastic.

Pick up a small amount of the polish with the cotton bud and gently work it into the canopy's surface. You may need to polish both the inner and outer surfaces, but usually the outer surface will suffice. Don't be tempted to press too hard or get carried away with the working-in stage, because it is possible to fog the clear parts.

Once the polish has been applied and worked into the surface, leave it to dry for a couple of minutes. Then buff the canopy with the soft cloth. Sometimes the results can be little short of miraculous. If you have missed an area, simply repeat the application and buffing process until the canopy becomes crystal clear.

RESTORING CLARITY TO FADED AND OLD CANOPIES

I'm sure many of you know the scenario – your lovely model has been standing on the shelf for weeks or months, or even years. Every now and again, you take it down and gently dust it off with a soft brush, perhaps before displaying it at a show. Eventually, however, it may begin to look scruffy, at which point it is a good idea to wash the surfaces gently with luke warm water and dab off the excess with a clean tissue (assuming that the model does not have any unstable finishes, such as pastel chalk). This will leave you with a nice clean model, but what stands out more than anything at times like these is the dull, faded look of the canopy and other clear parts. This is another good opportunity to use MER car polish to restore a bright, new look to the transparencies. If at all possible, remove the canopy carefully, which is often a lot easier than it sounds, especially if you've used one of the special adhesives, such as Kristal-Klear. When constructing my models, I try to get away with simply tacking the canopy on, with the

ABOVE LEFT **MER car polish works a treat on kit canopies, enhancing the clarity and shine.**

ABOVE CENTRE **A cotton bud should be used to apply the polish to the canopy.**

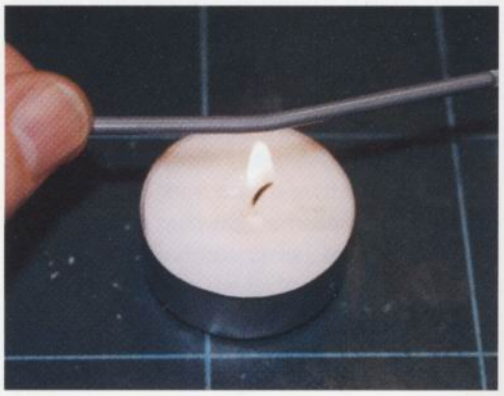
ABOVE **Buff with a very soft duster to restore the clarity.**

smallest amount of adhesive, so that it can be removed later for just this purpose.

Apply the polish and buff the canopy, as described previously, to make it look like new. Don't worry too much if you get the polish on the canopy framing, because invariably it will simply be buffed off by the duster. However, do be careful if the canopy has been detailed with latches, mirrors or other fittings, as they may be knocked off inadvertently during the buffing process. In this case, a better approach might be to buff the surface with the clean end of the cotton bud. It may take a couple of cotton buds to obtain full clarity, but good results can be achieved in this way.

STRETCHING SPRUE

The applications for stretched sprue are endless. Well, they are if you know what I'm



RIGHT The tools of the trade for stretching sprue.

BELOW LEFT Heat a length of sprue over the candle flame, rolling it continuously.

BELOW RIGHT When the sprue begins to bend, continue rolling it until you see a glossy surface at the bend. Then pull the two ends apart smartly.

BOTTOM This is the result: a substantial length of thin plastic 'wire' that can be used for a variety of purposes.

talking about. In case you don't, I'll explain what this material is and go on to describe how you can make your own endless supply of ultra-fine 'wire'. A few of the many possible uses of stretched sprue are for aerial wires, bracing wires, whip aerials, cockpit details, hydraulic lines and the detail in undercarriage wells. You may prefer to use fine fuse wire for some of these applications and, to be honest, I frequently do, but sometimes you may not have the correct diameter, which is where stretched sprue can really help.

So what is stretched sprue? Well, it can be created from a straight length of the plastic framing (sprue) that holds the various moulded parts of a kit.

The first stage is to select a suitable length of sprue and cut it from the frame with side cutters. A piece about 5cm long will be fine. Then you need a wax candle, which should be secured to a base so that the wax won't drip on to your workbench. Light the candle, hold one end of the sprue and roll it evenly above the flame. The key is not to hold the sprue too close to the flame, otherwise it will ignite; apart from being potentially dangerous, this will create acrid smoke that you should avoid like the plague. Try to keep the sprue rotating around a single point so that only the centre is heated. I keep the sprue about 4cm above the flame, heating it gently and evenly.

After a minute or so, you'll notice that the free end of the sprue begins to droop. Continue to roll the sprue and keep a close eye on the area of plastic above the flame. When it becomes glossy, the plastic will have reached the molten stage. Quickly remove the sprue from the heat, take hold of both ends and pull them apart quickly. If you have removed the sprue at the right time – when the plastic is molten enough – you will be able to pull it apart easily. It should stretch readily to the full extension of your arms.

The stretched sprue can be cut into a combination of long lengths (about 300cm or so) and small pieces to provide a supply for your spares box.

Several people have said to me that they just can't get the hang of this technique at all and, to be honest, it doesn't work every time for me either. I think that there are two main reasons for this. One is that I may not be in the right mood – well, sometimes when you really could do with some, you're out of stock, and despite your best efforts, it just won't stretch, the sprue keeps breaking, you get too close to the flame, and so on. The second reason for failure, I am convinced, is that not all manufacturers use the same formula for the polystyrene of their kits. In practice, good old Airfix and Tamiya always seem to come up trumps.

STRETCHING OTHER PLASTIC SHAPES

By using a similar approach to that outlined for sprue, you can stretch other plastic shapes,

LEFT This replacement gun barrel, made from stretched plastic tubing, looks much better than the kit part.

like tubing and rectangular or square strips. The real advantage is that the stretched material will retain its original section, albeit in smaller form.

Finding fine tubing to replace kit gun barrels in 1/48 scale can be very difficult, but stretching larger-diameter tubing, such as that made by EMA, can be a very effective solution to the problem. All you need do is cease pulling the tubing apart when you can see that it is broadly of the correct diameter. You may need to attempt this a few times to obtain the correct diameter, but don't throw away the rejects, as they may be of use for other projects in the future. If you can crack this and you seem to be enjoying a measure of success, keep going and produce more than you need. This will provide a plentiful supply for the future.

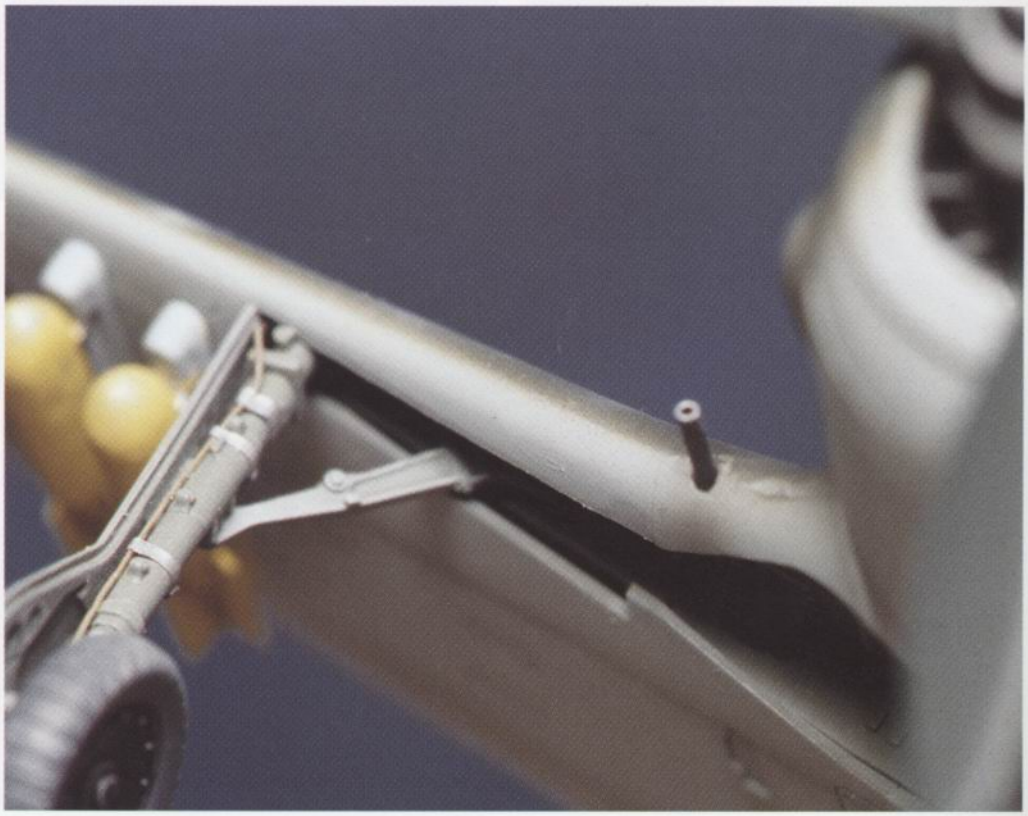
GUN BARRELS

With the best will in the world, and despite considerable investment by kit manu-facturers, there are limits to the tooling and engineering processes that can be put into any scale model. Aircraft gun barrels are a good example of the limitations that modellers come up against. It is rare indeed for guns to be supplied with hollow barrels, although they may be well formed in outline shape. To overcome the hurdle of building your model with unrealistic machine-gun or cannon barrels, the best option is to replace them with new items. With care, they are very simple to create and, when painted and dry-brushed, they look very realistic indeed. In my opinion, this is one of the most effective ways of making Luftwaffe fighter models really come to life.

While you could try making new barrels using the technique for stretching plastic tubing, I think the best option of all is to use brass tubing of the correct diameter. The accompanying photograph shows a replace-ment brass barrel that I fitted to a model of a Focke-Wulf 190F-8.

I know it is difficult to get hold of suitable fine brass tubing, but possible sources are model railway specialists; alternatively, you could look on the Internet for a suitable supplier. Keep an eye on the advertisements in modelling magazines, too, and don't forget to ask around the model clubs at shows to see if anyone has found a supplier. I am fortunate to have a stock that a friend brought back from Italy.

Assuming that you have managed to get hold of some suitable brass tubing, the next stage is to create the holes from which the guns emerge, in the wing roots of Fw 190s for example. On the Tamiya Fw 190 kit, the smaller machine guns fitted on top of the engine cowl are best left as they are, although



RIGHT The replacement gun barrel of this Fw 190 was made from fine brass tubing.

the end of each barrel can be drilled out with a pin-vice.

Obviously, the size of tubing used should correspond to the diameter of the kit part, assuming that you are happy with its dimensions. Since you won't want to waste any of the brass tubing, cut the new barrels so that they are only slightly longer than necessary. This will allow for the small amount that will be lost inside, for example, the wing leading edges to secure the gun barrels.

There are two practical methods of cutting brass tube: one is to employ a modeller's electric drill, as made by Minicraft and Dremel, fitted with a cutting disc; the other is to use a new scalpel blade and a flat, hard surface. To be honest, I prefer the latter technique, as it is simple and easy to control, let alone quick. It is essential to use a new scalpel blade to cut the tube, because a blunt blade will cause the relatively soft brass to buckle under any pressure and ruin your efforts. You need to create a clean cut that will leave a perfectly round aperture, which will represent the opening in the end of the barrel. Also necessary is to cut on a very hard surface, like a steel rule, a pane of glass or a ceramic tile.

Use a pencil to mark the brass tube where it is to be cut. Then hold the scalpel blade on the mark, making sure that it is exactly at right angles to the surface. Gently roll the tube with the blade, exerting just enough pressure to cause the tube to roll slowly beneath the cutting edge. Because brass is quite soft, only a couple of rotations will be needed before the blade cuts through the tube, leaving a near perfect cut. The cut end can be refined and cleaned up, if necessary, by gently wiping around the end with some fine wet-and-dry paper. By inserting a drawing pin or drafting pin in the end of the tubing and gently twisting it, you can remove any internal burr. This will leave you with an excellent replacement gun barrel.

Repeat the process for any remaining barrels, then secure them in their holes with cyano glue. Another feature of this approach is that it creates a space around the barrel where it enters the wing. This adds extra realism to the finished model.

PAINTING GUN BARRELS

When it comes to painting the new gun barrels, a variety of special paints can be used, the most obvious being gun metal colours. One of the best combinations that I have come across is Citadel Colour Bolt Gun Metal, which is quite a dark silver, with Citadel Colour Armour Wash over the top, and a final light dry-brushing with Bolt Gun Metal again.

Another option that works well is to use Gunze Sangyo Burnt Iron, which dries to a matt finish. This should be finished with a light dry-brushing of Bolt Gun Metal around the muzzle opening. Subtlety is the name of the game here; try not to overdo the silver dry-brushing phase.

A third option, instead of using Burnt Iron, is to apply one of the proprietary gun metal colours produced by most paint manu-facturers. This should be dry-brushed, using the method described previously.

IMPROVING STANDARD KIT GUN BARRELS

This option should be considered if you are unable to obtain suitable tubing to replace the existing barrels. It can look quite effective and relatively foolproof, although you do need a steady hand to control a pin-vice. Again, I'll stay with the example of the wing-root cannons on Tamiya's Fw 190. Each barrel actually comes moulded to one half of the relevant wing, which is not very satisfactory because it leaves a gap between the barrel and the other half of the wing. There is a small raised mould seam across the end of the barrel. This needs removing, and careful scraping with a scalpel will produce a flat end.

The next step is to mark the centre of the barrel end with a drafting pin, making a tiny indent exactly in the centre. The purpose of this is to provide a key for the drill bit to bite into, preventing it from slipping, which could be terminal for the gun barrel. You will appreciate that the drill bit needed to open up a quarter scale gun barrel will be very small; 0.4mm works well to start with.

Take great care to push the drill bit well down into the chuck of the pin-vice, allowing only about 2–3mm to protrude. Any longer and you run the risk of the bit snapping off and injuring your thumb or forefinger. It is also crucial to ensure that you drill at right angles to the barrel end. There is precious little room to play with and it is all too easy to drill through the side of the barrel, ruining it in the process. Another factor to bear in mind is that there is no need to go too deep, only about 1mm or so – just enough to simulate a hollow gun barrel when the model has been finished.

CREATING A REALISTIC DISPLAY BASE

It was only relatively recently that I became a fan of displaying my models on realistic bases that set the scene for the theatre of operations relevant to the aircraft. This certainly does make a difference, and it is surprising just how quickly you can produce a simple base that will set your model off to good effect. By way of example, I thought it would be appropriate to create a base that reflected the Eastern Front in Russia during the time that the Fw 190s were there. The accompanying series of photographs shows the various stages of construction.

THE MATERIALS

The first requirement is for some kind of base board, and that shown here is made from MDF (medium-density fibreboard). Such boards are widely available at model shows and from specialist retailers that advertise in the modelling press. Of course, you could also cut your own, edging it with a suitable wooden moulding.

In addition, I used various types of model (railway) grass and 'earth', real dried earth from the garden, PVA wood glue (which dries clear), gloss varnish and icing sugar (to represent snow – I could have used flour instead). A large sheet of newspaper is also needed to work on.

STEP 1

As a first step, I poured PVA wood glue all over the board, then spread it around with an improvised spatula made from a piece of old plastic card. It was necessary to work quite swiftly before the glue set.

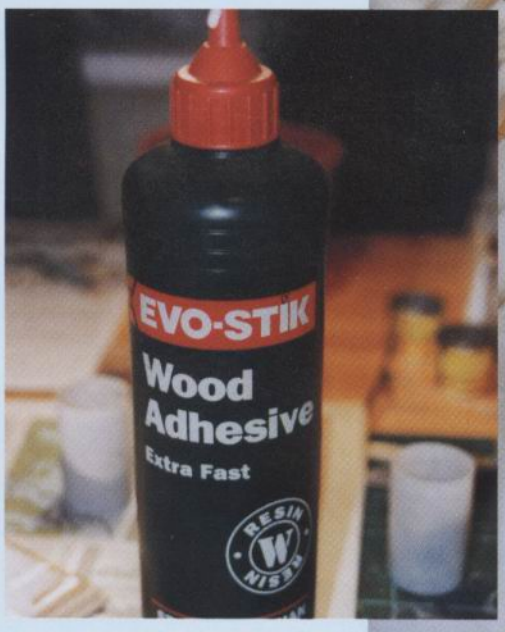
STEP 2

The different grasses and real and mock earth were sprinkled over the glue. I wasn't worried about there being any gaps in this layer, as they would be filled later. It is a good idea to have a picture in your mind of what the terrain will look like and work toward this. I find that this helps me to remain focused on what I'm trying to achieve.

STEP 3

Next, Tamiya Red Brown (XF-64) and Desert Yellow (XF-59) were sprayed over the

BELOW AND BELOW RIGHT
PVA wood glue was spread over the base board.



base in a random manner, paying particular attention to any areas of the baseboard that remained exposed.

STEP 4

Snow was simulated with icing sugar dispensed from an improvised sieve. This was fashioned from a small plastic tub and a piece of material cut from an old pair of tights (not mine, I hasten to add!). The material was secured around the neck of the tub with masking tape.

Then the icing sugar was sprinkled at random over the wet paint.

ABOVE 'Grasses' and 'earth' were sprinkled over the glue.

LEFT Tamiya Red Brown and Desert Yellow were sprayed on in random fashion.

BELOW AND BELOW LEFT Snow was simulated with icing sugar, dispensed from an improvised sprinkler.

ABOVE AND RIGHT **Gloss varnish was used to simulate pools of water from melted ice.**

BELOW **The completed base board ready for the model.**

STEP 5

Gloss varnish was dabbed on to some areas of the base to simulate small pools of water caused by melted snow. Where the varnish was applied over areas of icing sugar, the sugar dissolved partially and took on the appearance of ice.

There was no need to be too careful here. I simply kept building up the effect until I was happy with the finished result.

STEP 6

When I had finished working on the 'landscape', I painted the edge moulding matt black to complete the display board.

THE GALLERY

FOCKE-WULF 190D-9

'Red 1' was an Fw 190D-9 (600424) based at München-Reim in May 1945. The aircraft belonged to JV 44's protection flight and is believed to have been flown by *Hptm.* Walder Wubke. These '*Doras*' of JV 44 had the job of protecting the Luftwaffe's Me 262 jets when they were at their most vulnerable – during landing and take-off.

The spinner front is yellow and the spinner rear is RLM 70 *Schwarzgrün*. The fuselage is painted in RLM 82 *Dunkelgrün*, RLM 83 *Hellgrün* and RLM 76 *Lichtblau*, while the undersides are painted RLM 23 *Rot* with narrow white stripes. The upper wing and stabiliser are painted RLM 82/83. The circle and checkerboard emblem is the unit crest, while the inscription translates as 'Sell my clothes I'm going to heaven'.

Of particular note is the open fuel filler cap, hanging from the left side of the fuselage, behind the canopy. Note, too, the weathering around the rear of the canopy itself. Reference to photographic sources was vital here. The white spiral on the spinner is just visible through an over-spray of black, which was quite apparent in period photographs of this machine.

The kit is the Trimaster release, which came with etched steel details for the cockpit interior, rear decking and undercarriage bays. The striking decals are from Eagle Cals.

MESSERSCHMITT BF 109F-4

Piloted by *Obl.* Günther Freiherr von Maltzahn, *Geschwader Kommodore* of JG 53 in Sicily, during May 1942, this Bf 109F-4 is painted in RLM 74 *Graugrün* and RLM 75 *Grauviolett* over RLM 76 *Lichtblau* – with RLM 04 *Gelb* ventral nose, white fuselage band and black/RLM 24 *Blau* prop spinner. Mottling is RLM 74/75. Aeromaster acrylic paints were used for the main RLM colours. The kit is by Hasegawa and incorporates the Aires (4028) and Eduard (48-080) resin and etched brass detailing sets.

The model has had its tailplane surfaces dropped, while scratch-built items were added to the cockpit, such as a retaining spring for the canopy.

HEINKEL HE 219A-7 *'UHU'*

This night fighter was attached to 3./NJG 3 in May 1945, being based in Denmark. The markings are RLM 76 *Lichtblau* overall with mottling in RLM 75 *Grauviolett*.

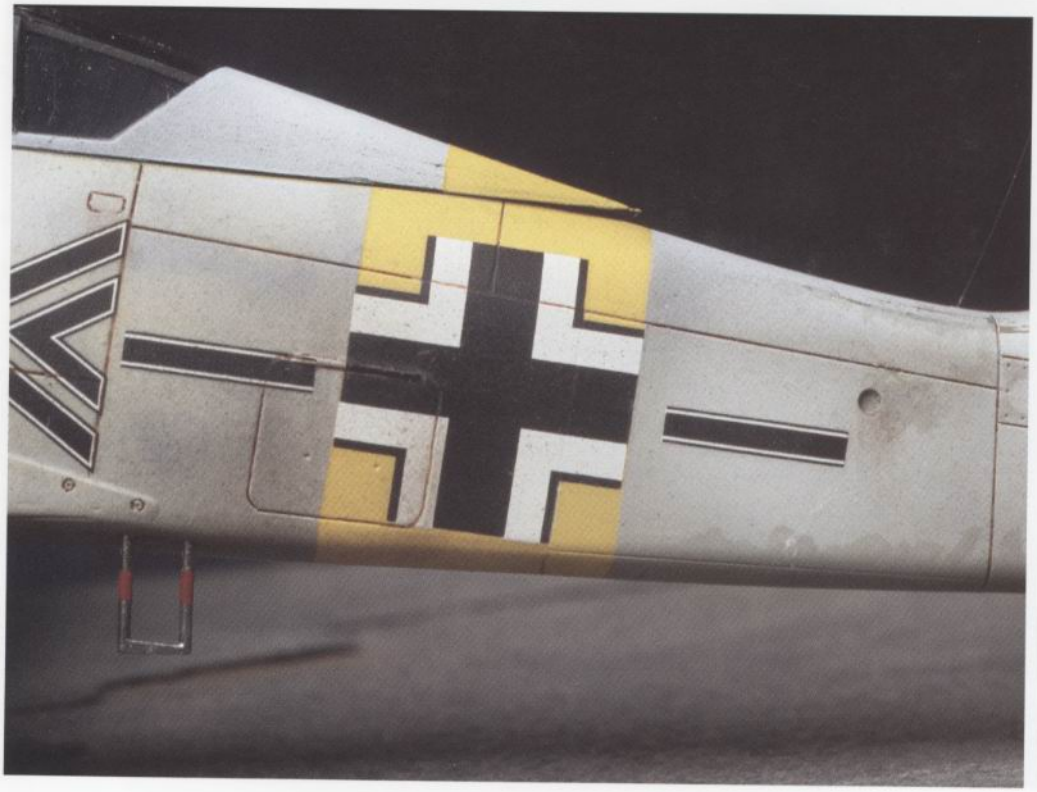
The model features some of the cockpit detail from the excellent Aires resin and brass set, such as the cockpit sills and seat harness. However, the majority of the kit cockpit was used, including the novel white metal cockpit tub supplied in the kit. The aerial wires were made from very fine elastic thread, which can be found in the needlework sections of many department stores.

FOCKE-WULF 190A-4

This Fw 190A-4 was flown by *Obertsleutnant* Hannes Trautloft, *Kommodore* of JG 54 in December 1942, when that unit was based in Krasnogvardeisk, Russia. It displays a patchy white temporary winter scheme over RLM 74 *Dunkelgrau* and RLM 75 *Grauviolett* upper surfaces with RLM 76 *Lichtblau* undersides, RLM 04 *Gelb* lower cowl, fuselage band and lower wing tips, and RLM 70 *Schwarzgrün* prop with white spinner. Standard early black and white crosses are applied to all wing and fuselage positions; the swastikas have thin black outlining. The JG 54 'Green Hearts' emblem containing the badges of I. and III./JG 54 is carried on each side.

You can really go to town on this temporary scheme, as the white paint weathered very badly on operational aircraft.

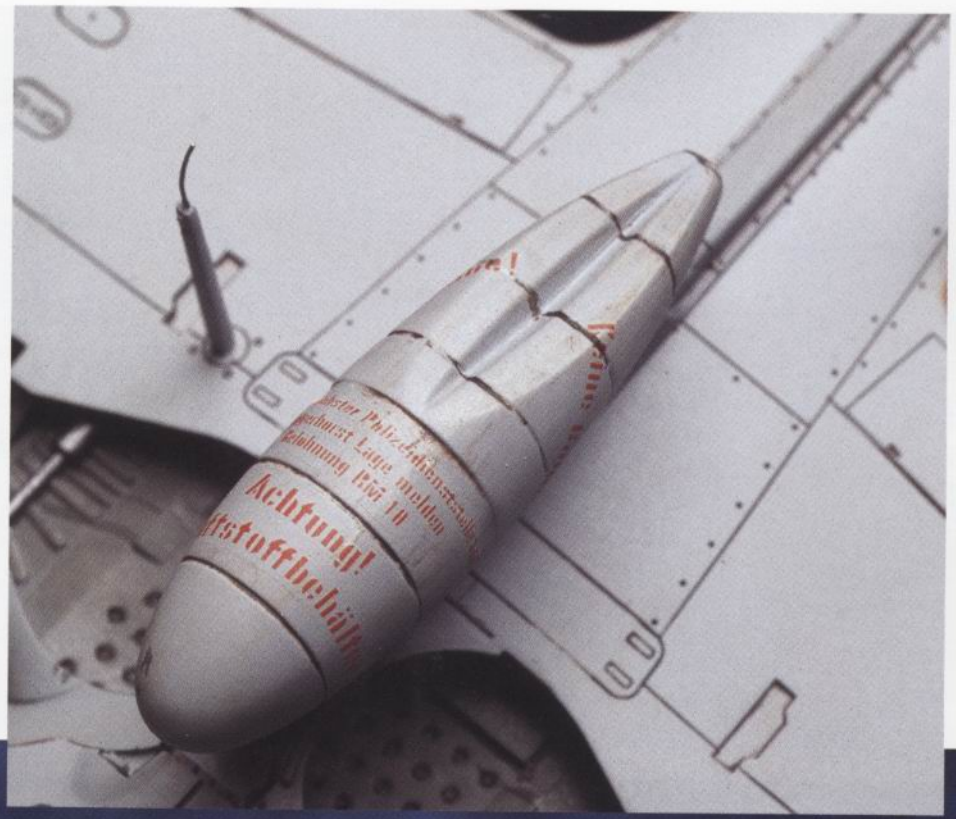
The model is a simple conversion of the Tamiya Fw 190A-3 offering, the fin-tip aerial housing having been changed to a small spike. Note the fine aerial wire made from ultra-fine fishing line.



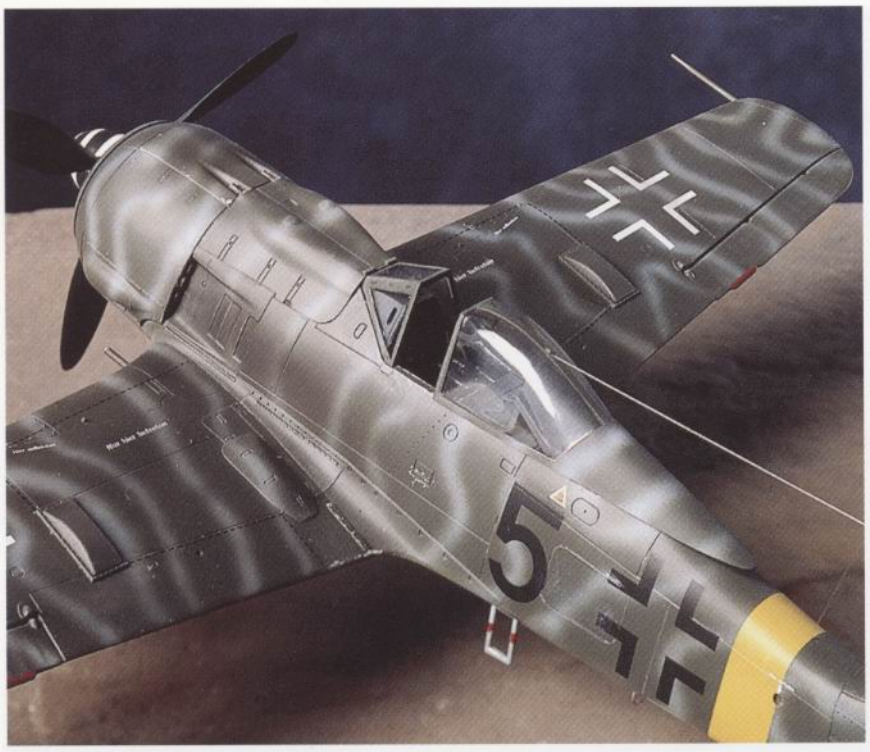
FOCKE-WULF 190F-8

This model was built to represent an Fw 190F-8 of 2./SG 4, based in Northern Italy during 1944. It carries a tropical scheme of RLM 79 *Sandgelb* and RLM 80 *Olivgrün*. In fact, 'Black 10' is thought by some to be 'Red 10', although pictures in the Squadron/Signal publication on the Fw 190 suggest black rather than red to me. This exemplifies one of the difficulties of trying to interpret old black and white photographs. Subsequent photographs also reveal that this machine had its fuselage crosses over-sprayed completely. This will need to be addressed on my model.

The model is from Tamiya and was built pretty much straight from the box. However, there are one or two additions, such as the hydraulic lines running down the under-carriage legs and a seat harness.


Achtung!


10



FOCKE-WULF 190F-8

This Fw 190F-8 of 1./SG 2 '*Immelmann*', based at Varpalotta, Hungary, carries an interesting scheme. It comprises the standard RLM 70 *Schwarzgrün* camouflage with an over-sprayed RLM 65 *Hellblau* meandering pattern. The yellow underwing and rear fuselage bands were standard for the theatre of operations.

The model is from Tamiya and was built straight from the box, the only additions being brake lines running down the outsides of the undercarriage legs.

Note that the aircraft is fitted with a bulged canopy for better pilot vision.

MESSERSCHMITT BF 109E-3

This Bf 109E-3 represents a machine of the Legion Condor during the Spanish Civil War, and it served with 3./JGr. 88.

The model is a Hasegawa kit actually released with these markings, but it has been enhanced by the addition of the Eduard etched brass cockpit detail set. The shoulder strap can be seen hanging over the cockpit sill, which helps to create a little more interest in the finished model. Hydraulic lines have also been added to the undercarriage legs.

Overall, the model is painted RLM 02 *Grau*, although some sources suggest a slightly lighter shade. The surface was lightened using light grey pastel chalks to give a weathered look typical of aircraft subjected to harsh treatment by the sun.

MESSERCHMITT BF 109G-6

This Bf 109G-6/R6, of 11./JG 27, was piloted by *Fwbl.* Heinrich Bartels at Kalamaki, Greece in 1943. RLM 74 *Graugrün* and RLM 75 *Grauviolett* were applied over RLM 76 *Lichtblau*, the white fuselage band and rudder being common to the Mediterranean theatre of operations. The prop spinner is white with black spirals.

Once again, the kit is an excellent offering from Hasegawa, with decals mainly from the kit and the aftermarket set by Aeromaster (48-128).

The kit was built as a project straight from the box, save for improving the sand filter on the left-hand side of the engine. This model was finished in Xtracolor gloss enamels, providing the perfect surface on to which the decals could be applied.

MESSERSCHMITT ME 163A

The subject of this model, an Me 163A V6, was tested by Adolf Niemeyer with R4M '*Orkan*' anti-aircraft rockets and a new, strengthened undercarriage. Although it has been suggested that the aircraft wore camouflage spots on the RLM 02 *Grau* surface, it is believed that, in fact, these 'patterns' were simply weathered paint.

The Me 163A was the forerunner of the operational Me 163B Komet rocket-powered interceptor, the model having been released by Flashback in 1999. It came with some fine etched brass parts for the cockpit and undercarriage. The cockpit tub was supplied as a resin item.

Note the subtle weathering and shading around the panels. This was achieved with grey pastel chalk, dry-brushed into the recessed panel lines.

APPENDICES

APPENDIX A

SOME USEFUL ADDRESSES

Aeromaster
www.aeromaster.com
Excellent decals (available through Hannants in UK).

Airwaves
E-mail: airwaves@ultramail.co.uk
Etched brass and resin items
In UK, available from E.D. Models, 64 Stratford Road, Shirley, Solihull, West Midlands B90 3LP
Tel: 0121 744 7488 Fax: 0121 733 2591

Avia Imports USA
PO Box 99, Cary, NC 27512, USA
Tel: (919) 233-0212 Fax: (919) 469-0212
E-mail: aviausa@aol.com
Model accessories, resin/etched items, etc.

The Aviation Hobby Shop
4 Horton Parade, Horton Road, West Drayton, Middlesex UB7 8EA, UK
Tel: 01895 442123 Fax: 01895 421412
Suppliers of general modelling products and books. Also mail order.

Cutting Edge Modelworks/Meteor Productions
www.meteorprod.com
Resin and etched metal items; decals (available from Hannants in UK).

Dartmoor Military Models
Calverleigh Cottage, Tiverton, Devon EX16 8BB, UK
Tel: 01884 254167 Fax: 01884 253226
Good for 1/48 scale Luftwaffe figures for dioramas (send SAE for details).

Eagle Editions
www.eagle-editions.com
Specialist Luftwaffe reference/decal supplier (available from Hannants in UK).

Glomart Displays
Business and Technology Centre, Bessemer Drive, Stevenage, Hertfordshire SG1 2DX, UK
Tel: 01767 317537
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Hannants
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Scale Aircraft Modelling magazine
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Tel: 01582 505999 Fax: 01582 560731
www.samnet.co.uk
Good for kit reviews and reference material.

Tamiya Model Magazine International
ADH Publishing, 31 High Street, Hemel Hempstead, Hertsfordshire HP1 3AA, UK
Tel: 01442 236977 Fax: 01442 236988
E-mail ModMagint@aol.com

APPENDIX B

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ACKNOWLEDGMENTS

Any book of this sort simply cannot be produced without the help of a whole posse of people who support the author. This one is no different.

I would like to acknowledge the kind help and assistance of the following friends, colleagues and modellers.

First and foremost to Sara my wife for her unbelievable support, enthusiasm and tolerance. Sara's contribution may have been low key, but it was immense as the delivery time for the book approached.

To Robin Edwards of Imago photographic studio in Potters Bar for his outstanding contribution to the photography contained in this book. The excellent results you see between these covers, especially in The Gallery, is a testimony to his care, attention to detail and sheer professionalism.

To Ian Taylor for the excellent atmospheric photographs that appear in The Gallery and elsewhere in the book. His willingness to become involved in the project and support me has brought home the true value of belonging to a model club.

To Pete Stern, secretary of IPMS Barnet and a long-time friend, for allowing me to plunder his Luftwaffe library.

To Jerry Scutts for offering me the benefit of his experience as an author.

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