ADVANCED TERRAIN MODELLING

Richard Windrow

An advanced guide to building and finishing model landscapes for any type of layout, diorama or vignette ■ Hundreds of colour photos ■ Step-by-step instructions ■ Ideas for more creative modelling

OSPREY MASTERCLASS

Advanced Terrain Modelling

Richard Windrow

Series editors Marcus Cowper and Nikolai Bogdanovic

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FOREWORD

About five years ago I wrote a book called *Terrain Modelling* for the Osprey Masterclass series; to my surprise and pleasure, it was well received by many modellers, and Osprey Publishing have now asked me to produce a second volume. My first thought was that once you've written a book on how to make 1/35th-scale mud, you've pretty much said all there is to say on the subject; but on further thought I realized that in the intervening time new products had come on to the market – and, indeed, I had learnt one or two new wrinkles about how to achieve different effects in my groundwork. However, I still felt that there needed to be a definite difference between this book and the first – there are few things more irritating than buying a book but finding that it's only the cover that has changed. In view of this I decided to add some more man-made objects to the scenes, rather than just serving up more 'scale model dirt'.

In *Advanced Terrain Modelling* I have tried to cover the creation of some different basic terrains, and this time I've added a few field fortifications and buildings, as well as photographing the results complete with figures 'for scale' (though I hope readers will not look too closely at the latter – I am well aware that I need quite a bit more practice before I reach the standards of a dedicated figure painter). Once again, I hope to make life easier for those of you who find it a bit of a struggle to create realistic-looking groundwork to fittingly complement all the skill and patience that you have put into the main subjects of your models. I usually try to add enough details to the scene to ensure that everything is not always obvious at first glance. My approach is rather like those wonderful Giles cartoons that older readers may remember from the *Daily Express* back in the 1940s and 1950s – you never saw everything all at once.

I naturally cannot assume that everyone who buys this book has read the first volume, so I hope that those of you who have will excuse a bit of repetition where I think it necessary for new readers. The most obvious instance of my repeating some of the original work is in the chapter of advice on materials and tools. In the intervening years I have come across some excellent new products that I now use in place of some I mentioned originally. The other repetition is over the question of how to make model trees. The first book covered this in rather greater detail than I do here, but to omit basic advice on this subject would leave a fairly important gap, so I've returned to it in the logical place, in Chapter 4 on 'Fall in the Forest'.

While most of the models in this book are built to 1/35th scale, the materials and techniques I discuss can be used in almost any scale, and for models depicting any sort of scene from any period of history. All you need do to make them appropriate to your own subject is to study reference pictures carefully, and plan your groundwork accordingly. I also repeat the most basic piece of advice from *Terrain Modelling*: get out into the open air and use your eyes – the real thing is the best reference of all.

As any honest author will admit, very few books can be written without help from a number of other people. Space does not allow me to list everyone who has contributed to my modelling over the years, but I do want to mention just a few who have helped me in different ways: Charles Davis, for providing and painting the figures in the 'Walled Garden' model; the Perry twins, for generously donating the figures for the 'Motte-and-Bailey' (again, my apologies for the paint job); Lynn Sangster and his crew at Historex;

Bob Wyatt of Scale Link; Tim at the 4D Model Shop; my son Stephen for his beautiful photos of nature in all its glory; and lastly to that small, select group 'The Saturday Breakfast Club', for their continuous support and constructive heckling. My sincere thanks to you all, whether your name is here or not.

One final word on the illustrations in this book. When it comes to photography, I'm completely lost when the conversation turns to such arcana as 'f-stops' and 'depth of field', so no one was happier than I when I finally got a digital camera. All the photographs were taken with a Fuji S602Z, with the selector firmly set on automatic. Unless otherwise stated, all the pictures are the author's.

So, here we go again; I do hope that some of you out there will find something in here that will help you create that special diorama.

Richard Windrow
Kent
September 2006

MATERIALS, TOOLS AND TIPS

All the contact details for the outlets named below can be found in the chapter on 'Sources' at the end of this book.

As I am sure most of you have done, over the years I have collected a number of tools and materials without which I don't think I could function as a modeller. Although I covered many of these in *Terrain Modelling*, for the benefit of those brave souls just starting out on the modelling trail

(1) Claycrete *papier maché* is the basic groundwork material that I usually use on any diorama baseboard.
(2) A rubber mixing bowl is ideal for both this material and for plaster; if you flex the bowl most of the dried residue will just fall out without scraping.
(3) A variety of brushes that I use both for smoothing the wet groundwork and for covering large areas that need to be painted. These are very cheap and can be discarded when they've become too ragged. When this happens, I cut some of them very short and use them thereafter for stencilling, or applying pastels and weathering powders.
(4) Vallejo acrylic paints are my favourites – they cover really well, and the 'eye-dropper' bottles prevent them drying out too soon if you leave the top off by mistake.
(5) A couple of very flexible palette knives, as used by oil painters, can be backed up with cheap plastic spatulas for more general work.
(6) The Superfast Wood-Stick two-part epoxy adhesive from Sylmasta has many uses; as the two parts come in a single roll, you can't get the mix wrong.

I think it helpful to repeat brief details of the ones that I use most often when building a diorama or vignette. The list does not include items necessary to complete the actual model that you are placing in the diorama: firstly, there are any number of good books out there by master modellers that will give you all the help you need on that subject, and secondly, I don't count myself in that class. What follows is an idea of the basics needed for making your groundwork.

MATERIALS

BASEBOARDS

The first thing you need for a diorama is obviously a good baseboard, and I've tried a few different materials for this purpose. The most important thing from my point of view is that a baseboard must not warp when I add plaster or 'Claycrete' – at this point the board is obviously going to get wet. For the diorama in Chapter 4, 'A Walled Garden', I used a product new to me that I got from the Micro-Mark company

in the USA. This 'Gatorfoam' board is very light but very tough, comprising a layer of foam sandwiched between two layers of veneer, measuring about 12in × 18in (300mm × 457mm) and ¼in (5mm) thick. I have applied plaster, *papier maché*, liquid glue, paints and stains to this board, and when it dries it does not warp – even when coated on one side only.

Although an excellent product, Gatorfoam is not always the answer, since there are many cases

(1) The 'Arty's' pump-up spray bottle, which is much better for misting water or cement on to your model than the more boisterous spray bottles one normally finds in shops.

(2) Mission Models 'Multi Tool'. I use this for forming rings from brass wire or rod. It is stepped down along its length, so you have a variety of diameters available; and if you need more than one of a size, you'll be able to repeat it exactly each time.

(3) The 'Olfa' P-Cutter scoring tool for use on wood or plasticard.

(4) A roller cutter, this one sold under the trade name 'DAFA'; these are also marketed by Olfa.

(5) A 12in metal safety rule. Hold it flat with your fingers behind the central ridge and, if your knife slips, your friends won't be referring to you as 'Old Four-Fingers' …

(6) Some Swan modelling knives; my armoury includes one with a hooked blade for carving thicker bits of wood.

(7) This fine-mesh flour shaker is ideal for the even application of the particles of finely ground scatter and static grasses. You can get coarser-mesh ones for more heavy-duty materials. These may seem an unnecessary luxury, but the extra control they give is much better than scattering by hand.

The guillotine that I use for cutting lengths of plasticard or wood that need to be of the same length or angle.

CAUTION Sharp blade
THE CHOPPER
by NorthWest Short Line

when it will be found too thin to be used for particular subjects. The other material that I use – in the rest of the dioramas in this book – is polystyrene. I get this in block form, about 19½in × 13in × 2in (500mm × 300mm × 50mm), which gives me a surface into which I can cut ditches, wells, trenches, etc; and if one block isn't deep enough – as for the Western Front trench model in Chapter 2 – then I just stick another on top. I get it from a company specializing in industrial packing materials, and this is probably the best place to look for it. Once the model is finished, you can make up a veneer frame to cover the exposed polystyrene edges.

CLAYCRETE/CELUCLAY

The material that probably gets the next most frequent use across the greatest number of my dioramas is Claycrete (or 'Celuclay' – I'm not quite sure which name is used in the UK and which in the United States, as I have bought it in the UK under both names). This is an instant *papier mâché* to which you just add water, and then lay it on your model in much the same way as if you were using plaster. I

normally add whatever colouring may be needed to the water with which I mix the Claycrete, so that when it is applied to the model I don't get those irritating little spots of white that always seem to get missed out if I paint it afterwards. I know some modellers find

Claycrete dries out and loses its flexibility, sometimes cracking after a period of time, or lifting from the baseboard. I must admit that I've never had these problems, but this could be because I also add a little white glue to the mix, which helps it to retain a bit of flexibility.

A good quality filter mask is very necessary when working with any material that will create fine particles, such as resin.
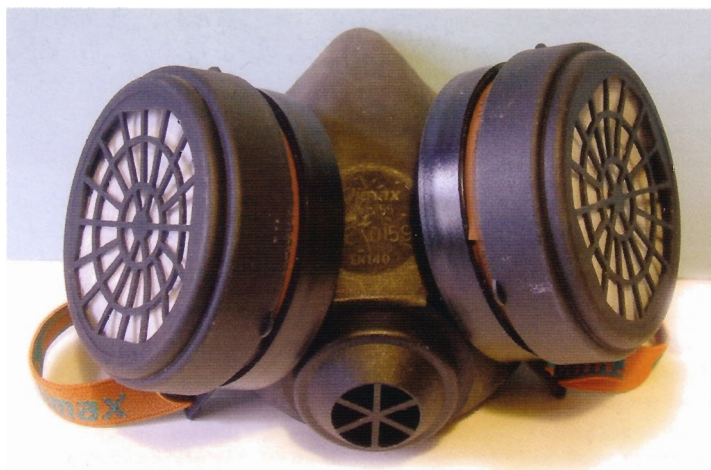
A hot-glue gun is ideal for joining large blocks of polystyrene.

It also lengthens the drying time, but not enough to bother me. Another plus, as far as I'm concerned, is that if you keep your mix in a bowl or container with a lid, it will remain useable for at least a week.

PLASTER

When it comes to making items with plaster, I prefer to use 'Eberhard Faber Ceramic Casting Powder'. This comes in two colours, white or terracotta. It dries considerably more quickly and to a harder finish than plaster of Paris or Polyfilla-type compounds; it also retains its white colour better and longer, if that is the effect you want. I use it for casting parts for buildings (see the 'Motte-and-Bailey' diorama, Chapter 3), for casting

rocks, and also as an underlay for snow effects.

For plasterwork actually on the model, as opposed to making separate items in moulds, I use Woodland Scenics 'Lightweight Hydrocal' plaster. This is useful for sealing layers of plaster bandage (see below) and for filling in gaps or crevices in rockwork.

PLASTER BANDAGE

Plaster bandage, often sold in the UK under the name 'Mod-Roc', is a coarse woven bandage impregnated with plaster. When making up a section of groundwork that needs to be very irregular or lumpy, I normally use odd scraps of polystyrene as a foundation. (If you ever buy some of the larger electrical items such as TVs or computers, you'll find they are usually packed in enough thick polystyrene to provide you with a generous stash.) Carve your lumps roughly to shape, stick them in place, and then apply the bandage. Simply take a length from the roll, dip it in water, and then smooth it over your 'lumps' to blend them into the baseboard. You can then seal it with a layer of Hydrocal to give yourself a good

The hot-knife kit for carving up lumps of polystyrene and shaping them.

surface for colouring, attaching 'scatter' and so forth.

If lumps of polystyrene aren't available, then you can simply take newspaper, dampen it, and make it into balls or rolled lengths. Attach these to your baseboard with white glue, and then lay your plaster bandage and plaster over the top.

ADHESIVES

The adhesive I mostly use on a diorama is Woodland Scenics 'Scenic Glue'. This holds most types of groundcover in place, and has the advantage of drying to a clear, matt finish. If I want a spray adhesive then I use the same maker's 'Scenic Cement'. This water-based adhesive also dries matt; the makers can provide a spray head to attach to the bottle for covering large areas.

Another useful one, which I get from the 4D Model Shop, is called 'Green Flock Adhesive'. This is a fairly thick glue in a tin and — surprisingly enough — it's green. It is obviously meant for sticking down flock, but if you have a large area of

(1) Woodland Scenics Realistic Water, a no-mixing resin that I use for water.
(2) Snow Scatter from The Small Shop EU; this is an excellent product, and a little goes a long way.
(3) An aerosol of Faux Fabrix that I use for adding texture to smooth surfaces to replicate cloth; several layers give a coarse finish for sacking.

(4) Weather-Rite, for producing an aged effect on wood. I use it before adding pastels to get different areas of colouring on old, damp or rotten timbers.
(5) I use this Blacken-It chemical for darkening most metals, but it does not work on aluminium or stainless steel.
(6) Woodland Scenics Water Effects. I use this for creating ripples, and for

white water such as rapids and waterfalls.
(7) Ice-Coat produces an excellent smooth, slippery-looking surface on frozen water, and is also useful when making icicles.

(1) Woodland Scenics static grass flock comes in a large container with a double-sided flip-top lid, so you can use one side for scattering and one to just pour it out.

(2) One of the jars of leaves available from the Noch company; they make several different colours, and Gaugemaster are the UK importers.

(3) Green Scene's Flexi-Bark, which makes a textured finish for your trees. It has several other uses as well, making it a good addition to your groundwork armoury; it is supplied by 4D Models.

(4) One of the many other shades of static grass available.

diorama to cover with a static grass or other scatter material, using this glue will ensure that green is the only colour that will show through. Unlike the two Woodland Scenics adhesives, however, this one does not dry matt, so you need to be sure it is well covered.

De Luxe are a company who specialize in adhesives, and their range of products can be obtained in the UK from Gaugemaster Controls. (They also make a very good rust-effect product called 'Real Rust'.)

There are occasions when you may need to use a cyanoacrylate glue ('superglue'), but hopefully this will be the exception rather than the rule. If the case should arise, it will help the adhesion if you dampen one of the surfaces to be joined before applying glue to the other.

For sticking foliage in place on trees I use an aerosol can of photo-mount adhesive. Some of my friends use a can of unperfumed hairspray for this job (avoid a

perfumed one, or you'll get some funny looks when you enter your model in a competition).

GROUNDCOVER

There are far too many types and suppliers of groundcover for me to list them all here. The best thing to do is to get hold of the catalogues that are available from virtually all the companies that I list in the final 'Sources' chapter, and make your own choice. I will mention, however, a couple of those suppliers whose products I have found to be most useful for groundcover.

Gaugemaster Controls plc

This company markets a large range of model railway equipment and accessories, but they also sell a range of their own grass mattings

and some groundcovers. They are also main agents for *Noch*, who market a wide range of scenic materials including excellent individual leaf scatter; and for *Faller* and *Preiser*, these last two probably being of most interest to modellers in the smaller scales, since their lines are produced for the model railway enthusiast.

Woodland Scenics (USA)

Two forms of 'instant water' are available from this company. The first is 'Realistic Water', for creating still ponds, puddles and small streams. It is a one-part resin, requiring no mixing, and can be added straight to the model. The second is 'Water Effects', for making more turbulent effects such as rapids, waterfalls, or ripples on

(1) Also available from 4D Models, this pre-coloured Green Flock Adhesive helps when applying green scatter to a light-coloured baseboard.
(2) Woodland Scenics Scenic Glue is a white, PVA-type adhesive that dries completely matt.
(3) Their Scenic Cement is a liquid adhesive which you can apply using either a spray-bottle or brush.
(4) Zip-Kicker accelerant for use with superglue.
(5) I don't use superglue nearly as much as the other products here, but there are times when it is useful to have some at hand.

the surface of deeper water; toothpicks or a toothbrush can be used to shape these.

Woodland Scenics also make polyfibre wadding, which is very useful for making the basic shapes of bushes or foliage for trees, to which you can then add your own choice of scatter to represent the leaves. Teased out, it can also be used for ground-covering vines or slender roots.

A wide range of static grasses, in a variety of seasonal colours, are available from this company. They also sell a variety of differently textured foliage, made from ground-up foam rubber. The textures range from very fine to very coarse, and can be used for a multitude of different types of foliage and groundcover.

4D Model Shop
This firm supply a range of scenic materials under the name of 'Green Scene'. These include 'Flexi-Bark', an excellent compound for adding texture to your tree trunks; pre-coloured leaves by the 'Little Leaf Company'; tree kits, and several other products. They also carry a very large range of plastic sheet, rod and tubing, plus a whole host of other modelling products. They are a most helpful company to deal with, and I recommend that you get hold of their catalogue.

Apart from these specific suppliers, don't forget that grass matting is available from almost any model railway shop, as well as some of the more general modelling outlets. This is good for use as any well-mown grass area, e.g. lawns or airfields.

While on the subject of groundcover and leaves, I also use a number of natural herbs: jars of dried parsley, thyme, etc. make wonderful scatter for forest scenes – see the photograph on page 15. Take a look next time you're in your local deli or supermarket.

TOOLS

The armoury of tools needed to create groundwork can be as simple or as comprehensive as you wish to make it. Obviously, over the years I have collected a number of items that make life easier but are not absolutely essential; you may find one or two of my suggestions cost rather more than you're prepared to pay, or you might just think them unnecessary, but not investing in them will not stop you from creating realistic groundwork.

Probably the most basic items will be a jug for water and a bowl to mix materials such as Claycrete and plaster. It makes life easier if you can get a flexible bowl; the one

I use is rubber, but if you can get a fairly soft plastic one this will do just as well. Having such a bowl makes the chore of cleaning dried-up residue much quicker – you just flex the sides a few times, and most of it drops out.

I have a couple of cheap plastic spatulas for mixing, but I also have two very flexible steel artist's palette knives. These come in handy when I have to apply a really smooth layer, such as the underlay for snow – the blades can be flexed to lie almost perfectly flat to the surface of the plaster. They are also handy when laying plaster or Claycrete over uneven areas, since they conform more closely than a stiff spatula to the contours of the model.

Any brushes you use for applying adhesive or plaster should obviously be the cheapest you can get, since they'll be no good for anything else once you've used them.

I mentioned above that you can spray Scenic Cement on to a model.

(1) Timberline Scenery in the USA supply several useful groundcover materials and scatters. This one is intended for use when making a forest floor, and comes complete with pieces of dead wood mixed in.
(2) Silflor is a German company who have a wide range of scenic materials. At the moment I can get these from Scenic Express in the USA – I have not yet found a UK importer. This particular material is a mat of beech tree leaves that you can stretch out over the framework of your tree. They make several other types of tree cover, all using the same principal of a stretch mat.

However, there will be times when you want to secure, say, a layer of leaf scatter, and an ordinary spray bottle would probably blow them off rather than securing them. In these cases I use a useful little item called 'Arty's Spray Bottle', which comes from Fibrecraft Ltd. This is a refillable plastic bottle that works like an aerosol; once you've filled it, you use a pump – which is supplied – to pressurize the bottle, and then just press the nozzle like an aerosol. The resultant spray is much finer than an ordinary spray bottle; don't hold the bottle too near the model, and you can just mist the surface with Scenic Cement without ending up with puddles of adhesive lying around. As well as a pump, the

bottle comes with a spare nozzle. One thing I should add: when you have finished spraying the adhesive you should release the pressure by unscrewing the cap slightly, then take out the nozzle and tube and pour the remaining adhesive back into its container. Fill the spray with warm water, replace the spray tube, pressurize it, and blow the clean water through the nozzle to clear out any residue. If you don't, you'll find that the whole thing has seized up next time you want to use it.

I do have one or two tools which, while not strictly necessary additions to your arsenal, do come in very handy when working with the polystyrene blocks. The first is

(1) Eberhard Faber Ceramic Casting Powder dries within 30 minutes and is very strong; when set, it is much easier to work with than the softer plasters.

(2) Woodland Scenics Lightweight Hydrocal plaster is useful for making up large areas of groundwork, since it doesn't weigh as much as a standard plaster when dry. Forgetting to allow for the weight your baseboard will eventually have to bear can lead to miniature tragedies when you move the finished model.

(3) I don't use this much these days, but Polyfilla is perfectly OK if neither of the above plasters is available.

(4) A roll of plaster bandage can be found in almost any good model shop; this one is from Peco, and another well-known brand is Mod-Roc.

a 'hot knife' – an electrically heated blade. This cuts through the polystyrene much more easily than an ordinary blade, and also tends to seal off the cut edge rather like cauterizing a cut – this means that you don't get thousands of little beads of poly flying around (and getting into your lungs). Obviously, this is a tool that should only be used by an adult; the blade gets hot enough to cause serious burns.

(1) This groundcover from the Noch company is a fairly rough grass, e.g. for meadows, which has small pieces of material mixed in for leaves and weeds.

(2) This is deer hair, which can be bought from shops that supply anglers – they use it to tie fishing flies, but I find it ideal for reeds and long grasses. It comes as a small rectangle of cured deerskin with the hair attached, and you just cut off the length that you need.

It is available in about three different colours: the one shown here; a very dark, almost black-green; and one that is bleached almost white.

(3) This is a piece of the fan coral that I used in the 'Fall in the Forest' diorama. I bought it years ago at a boot fair, and I use bits of it each time I need to make small roots – sparingly, since I don't know when I will find any more.

A selection of the ground-up food products that I use most often for forest litter or the detritus you see under hedges. They are all slightly different colours, so they can be used in many combinations to add variety to the finished groundwork. The thyme is very good for using under fir or pine trees since, if you look closely, it is made up mostly of little oblong pieces. The ground olive pits are from the 4D Model Shop, and make excellent dusty paths, very fine soil, or sand if you can't get the real thing in a suitable size. Since these materials are organic you can colour them with acrylics.

MINT   BASIL   GROUND OLIVE PITS

THYME   PARSLEY

SILVER BIRCH SEEDS

The next is a 'hot-glue gun'. These have been available from craft shops for some time, but I now see that a very superior one, with adjustable temperature settings, is available from Dremel. You just load a stick of glue in the back, let it warm up, and press the trigger – the stick automatically advances through the gun as you use it. It is simple to apply blobs or strips of glue in this way; it dries very quickly and provides an extremely strong joint. Once again, this is a tool that should be handled carefully, as the glue is red hot when it first emerges.

The easiest way to cut up sisal string for foliage, long grass, straw or any other use you may have for it is to use a rotary cutter; I use one sold under the name of 'DAFA', which is made for fabric cutting by patchwork-makers. You just roll the blade back and forth across several strands of string, and there is your straw. I also used it for trimming close up to the edges when making the chickenwire frame revetting in

the First World War trench diorama; using a knife for this job would have pulled the mesh out of shape as I trimmed it, and might also have pulled the joints of the frame apart. You can find these cutters in most craft and fabric shops.

For engraving heavy lines in timber (rather than lighter scoring), and also for setting lines in plasticard – such as the piece used to make the greenhouse door in my 'Walled Garden' diorama – I use an 'Olfa' cutter, which carves a nice clean groove in the material. One word of caution, however: if you are using one of those nice green self-sealing cutter mats, don't use the Olfa; if your cut line extends on to the mat you'll gouge a score in it that won't seal up.

The last specialist item that I would mention is the 'Multi Tool' from Mission Models. This enables you to make rings from brass wire or rod, for scale door furniture and many other uses.

The rest of the tools on my work bench are pretty much what you would expect. They include the usual collection of odds and sods such as old dental tools; one or two modelling knives; a metal safety rule for cutting straight edges (this has a raised rib along the centre. Hold the rule in place on the flat portion of the rule behind the rib, thus keeping your fingers safe if the knife should slip); a pair of dividers; a couple of glass stirring rods (I don't remember where they came from, but they are easier to clean off than plastic ones); and a fine-mesh flour sifter, which I use for spreading flock and other scatter on my models. It is better to apply these in this way rather than scattering straight from your hand or a spatula, as a sifter tends to prevent the scatter from clumping up. I also have a small pestle and mortar which I use to grind up dried leaves that I've collected from the garden, to use as litter under hedges or trees.

A FIRST WORLD WAR TRENCH

The first diorama I created for this book is a depiction of a small section of a British fire trench on the Western Front in 1917. It includes some of the details that were to be found in virtually all trenches during this and some other 20th-century wars, and the basic approach can be modified to create many variations on the theme.

Waiting for the evening 'stand-to' in Rum Trench, somewhere on the Western Front in 1917. This diorama is now in the First World War section of the Kent Battle of Britain Museum, Hawkinge, Kent.

The base of the model is constructed from two large pieces of polystyrene, joined with PVA adhesive, and measuring about 20in long × 14in wide × 5in deep (roughly 78mm × 55m × 19mm).

Since I wanted to be able to take clear photographs of both the front and rear faces of the trench, I cut one layer apart into six sections, and built the front and back of the trench separately before finally

LEFT The real thing: Lancashire Fusiliers in a trench near Ploegsteert ('Plugstreet') Wood in the southern part of the Ypres Salient, January 1917. Careful study of reference photos always pays dividends in planning and detailing any diorama, and several points from this picture were used in the model. Note the virtually submerged duckboards, the wire mesh and timber revetting, and the sandbag parapet. At top right is a roll of barbed wire on its wooden carrier, and at centre – in place of the shellcase 'gas gong' alarm in the model – a Strombos compressed air klaxon. As a point of interest, a magazine for the Lewis gun (in the hands of the seated man) can be seen balanced on top of a post, just above the klaxon. The T-shaped device that appears to be sprouting from the helmet of the Tommy on the right is a revolving vane mounted on the parapet behind him, to indicate the wind direction in case of a gas attack. Note in this instance how narrow the trench is, and the amount of spoil that has fallen in. (Imperial War Museum Q 4649)

The layout of the trench drawn out on lining paper and then transferred to the polystyrene block.

joining them near the end of the project. Obviously, for anyone building a similar layout who does not have to worry about taking 'progress' photos this method would not really be necessary – but, even so, it does make the detailing of the two faces much easier.

BASIC STRUCTURES

I first of all drew the plan view of the trench on a piece of lining paper and used this as a template, laying it over the poly block and scribing it with a very soft pencil to mark the outline on the polystyrene. I then cut out the shape of the parapet (front wall
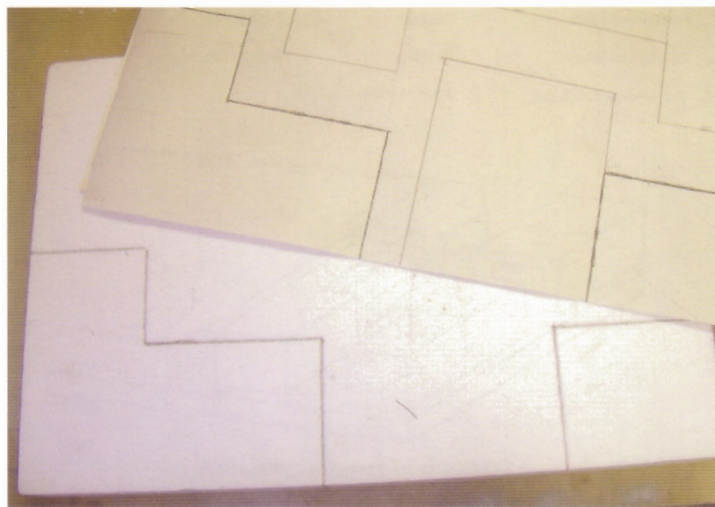
of the trench) in one piece, and the shape of the parados (rear wall) in four pieces – see the schematic drawing on the next page. When making deep cuts in poly blocks, I've found that a 'hot knife' makes

BELOW The front portion of the trench, the fire bay and firestep, carved out and placed on the baseboard, with the outlines of the rear sections drawn out. The headless man was to check on the height of the firestep – but I got it wrong anyway.

1. Polystyrene block   2. Dugout   3. Funk hole

4. Polystyrene block   5. Firestep   6. Polystyrene block

7. Polystyrene baseboard   8. Barbed wire

A schematic of the construction of the trench, showing how I made up the individual blocks before piecing the whole thing together.
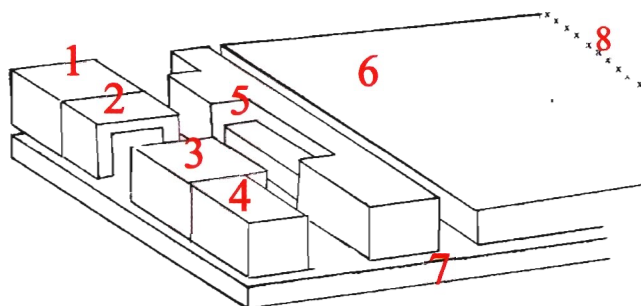
Schematic of Trench construction.

(not to scale.)

light – and much cleaner – work of the task. Once you've cut the shapes out roughly you can tidy up the melted surface that the hot knife leaves behind.

Starting with the parapet, I carved out the fire bay with its firing step and elbow ledge; just to make sure of my scale, I propped a Scale Link 'Tommy' figure roughly in place to check. I then cut the block to leave the two traverses on either side of the bay. When seen from above, these traverses and fire bays along the length of a trench gave it a sort of castellated appearance; the traverses were intended to prevent blast or small arms fire travelling the full length of the trench in the event of a shell or enemy raiders landing in it.

There were many minor variations of the exact layout, and you should study as many photos as you can; the Imperial War Museum photo library in Lambeth,

south London, has thousands of them. If you are attracted by the idea of a very specific subject, you might also bear in mind that during 1915–16 the British Expeditionary Force progressively took over more and more French trenches as their sector of the front was extended southwards, and that these were not immediately rebuilt to British standards. Again, during episodes such as the terribly costly advances on the Somme in July–October 1916, and Third Ypres (Passchendaele) a year later, British troops often occupied captured German trenches, repairing the shell damage and consolidating them with British trench materials. These foreign trenches offer several possible variations of, particularly, revetting and wiring. For instance, German trenches tended to be more permanently established than Allied ones; they seem often to

have used a good deal of sturdy log and/or brushwood revetting, and sometimes 'roofed in' trenches with a zig-zag canopy of barbed wire to deter raiders. French trenches could be a bit haphazard by British standards, sometimes being simply large ditches dug to link up shellholes, with fairly perfunctory hurdle revetting.

To return to our diorama: moving on to the back wall, I made the recesses that are sited opposite the traverses; I then cut the length of poly into four sections and separated it. One section (block 3 on the schematic) would have to accommodate the 'funk hole' sited opposite the fire bay. Another (block 2) would include the dugout entrance, sited in the right side of the communication trench, which comes up from the rear, just behind the corner where it meets the fire trench. (Note that in all descriptions I call the no man's land side the 'front' of the model, so the communication trench is at the 'right' side.) Once I was happy with the layout, I stuck one section to the base at each end of the trench (blocks 1 & 4 on the schematic), leaving space for blocks 2 & 3 and the width of the communication trench. For glueing large blocks of polystyrene quickly, I use a 'hot-glue' gun; the adhesion

is very good and it dries rapidly. Next I began to detail the funk hole and the dugout.

FUNK HOLE AND DUGOUT

A funk hole was simply a recess hollowed out of the back wall of the trench, its roof reinforced and its floor lined with sandbags and often covered with a tarpaulin or a couple of groundsheets. It was used by a soldier for resting, when he got the chance (which was rare, during a battalion's several days at a time in the front and support trenches). I hollowed out the poly block, set in a timber beam lintel across the front of the opening,

A close-up of the completed 'funk hole' in block 3, with the detailing added. The floor of sandbags is just visible under the tarpaulin; note the hurricane lamp, mug and water bottle, and the bundle of field telephone cables with their wooden label.

and built in the timber supports and corrugated iron that lined the roof. Once the roof was done I made up the floor, using sandbags from Scale Link. These are made from resin and come in pre-formed blocks; you can use them as they are, cut sections off, or even cut off singles (see below). Whichever way you are working resin, however, whether cutting or sanding, I strongly recommend that you use a filter mask; resin dust is extremely fine and very easily breathed in. With the sandbag floor of the funk hole laid, I added some detail. I made a tarpaulin from thin lead sheet, and furnished the hole with a mug, water bottle and paraffin hurricane lamp. These were stuck in place, and the finished block 3 was then set to one side.

This done, I took another block of poly and made the dugout entrance. I needed to give the

impression of steps going down into the earth, so having hollowed the block out in the same way as for the funk hole, I lined the sides of the entrance with strips of basswood set in at a downward angle. I then added more strips to the back face, also set at a downwards tilt, to give the impression of a slanted shaft leading down to the dugout below. I then took a strip of Scale Link sandbags and sanded a number of shallow grooves in the underside. Into these grooves I glued small sections of round dowel, so when turned the right way up again it looked like a layer of sandbags lying on logs. I made an entrance frame for the dugout, once again from roughened-up basswood, and with that stuck in place I glued the sandbag/log layer above the door lintel. I then set block 2 aside until the parapet was finished.

PARAPET

It was now time to start building up the parapet. The first step was to glue the area in front of the trench – no man's land – in place (section 6 on the schematic). This done, I checked my Tommy against the firestep/elbow ledge again – and realized that I had not brought the ledge up high enough, so this was rectified with a thick strip of cardboard. Once again the Scale Link sandbags were used, this time cut so as to give me three courses the length of the parapet. These
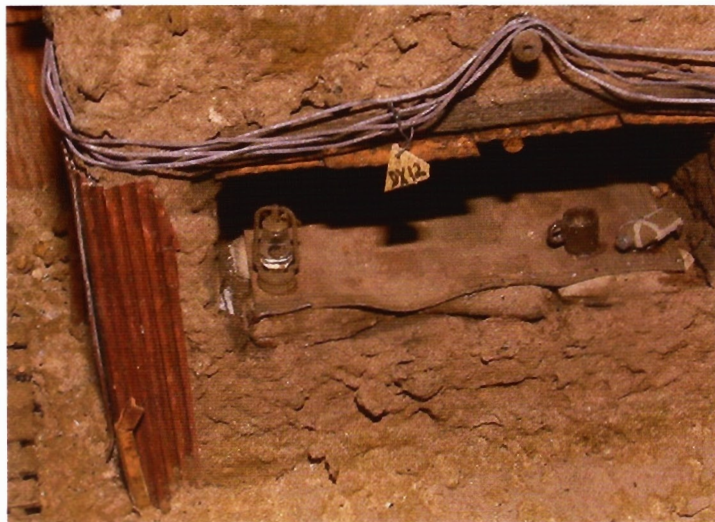
Resin sandbags from Scale Link. The block at the top is how they arrive; note the frequent but not consistent use of a characteristic 'English bond' arrangement, with sides and ends alternating along the rows and down the stacks. Below are sections that I cut off to make up different parts of the revetting. (Remember to wear a filter mask when working with resin.)
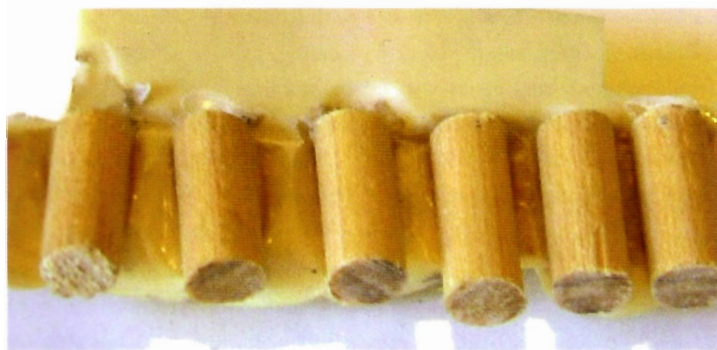

The section of sandbags for setting above the doorway of the dugout, with grooves hollowed out underneath to take the short pieces of dowel representing beams; and the same piece turned the right way up.

The doorway of the dugout in block 2, with the sandbag/log section let in over the top. When this is almost covered with Claycrete it looks like the front of a continuous roof. This photo shows the entrance 'offered up' on the base, but the 'floor' has not yet been dug away to give the illusion of the steps leading down inside.

Looking inside the dugout entrance; the slanting planks at the side help to give the impression of the interior staircase leading downwards. The canvas gas curtain is rolled up over the doorway and the bucket of water for dampening it stands just outside.
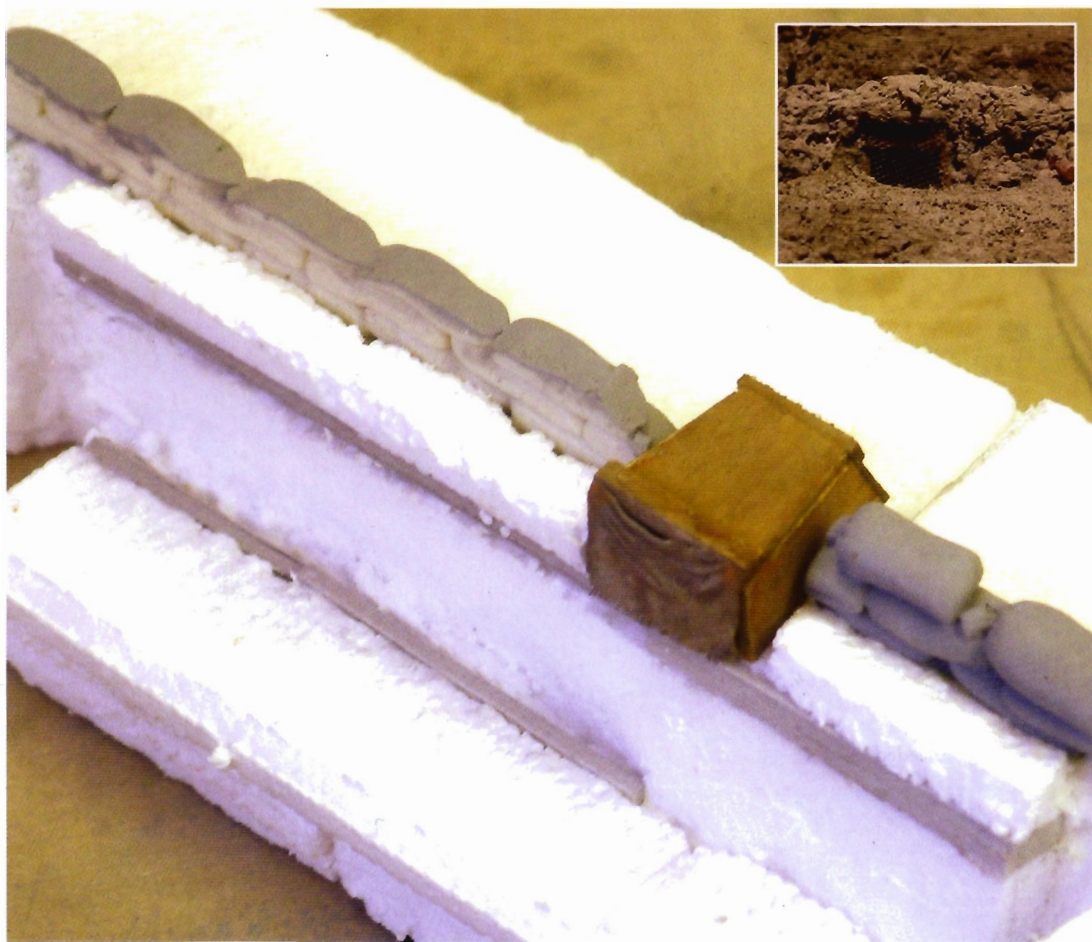
ABOVE Building up the parapet. The strip of thick cardboard shows where I had to raise the height of the elbow ledge. The sandbags are being undercoated in Automotive Grey paint, and the sniper's box is set in position.

INSET The sniper's box as seen from no man's land.

LEFT The thin lead sheet 'blanket' used for the light screen behind the sniper's box. Creases are pressed in with a blunt point, the edges frayed with a knife, and coats of Faux Fabrix texturing spray add a 'cloth nap'.

A more distant view of the dugout entrance set in the side wall of the completed communication trench. Inevitably, it was only after I had finished the model that I came across reference for the officially recommended design for a gas-proof entrance: this had a frame which sloped outwards towards the bottom, with a shelf at the top for the rolled curtain, and laths spaced down the curtain at intervals to hold it rigid. I comfort myself with the thought that if a lot of people had not been doing it wrong, there would have been no need for an official pattern to be circulated.

bags are cast with only one side detailed, but since the undetailed face would be buried in 'soil' this was no problem. Once this strip was stuck on, I built up the ground surface in front of the trench with scraps of poly roughly covered with plaster – I needed to make a slight downwards slope running forwards from the parapet.

My next move was the construction of a sniper's box; this was a tapered, wood-lined 'tunnel' set in the parapet and large enough at the inner end for a soldier to lean in with his head, shoulders and rifle, to snipe across no man's land. The outer end of the box was covered with something like chickenwire and camouflaged amongst the spoil on the face of the parapet. I made the box from basswood and used some Verlinden mesh netting to cover the outer end. It was a matter of life or death for the sniper to remain invisible from his counterparts in the German front trench, so an

old blanket or sandbag curtain was hung over the inner end; he ducked under this when getting into position, to prevent his head from being silhouetted against the light in the trench behind him. To make the blanket I used some more of my very thin lead sheet. I placed this on a piece of thick rubber to support it and prevent it from tearing, and scribed the creases and sags in the reverse side with a blunt-ended wooden skewer; I then frayed the bottom edge, and sprayed it all over with a product called Faux Fabrix.

This is very useful stuff which comes in an aerosol can, made by Scale Motorsport LLC in the USA (see the 'Sources' list at the end of the book). While it is actually intended for use in model cars to give a fabric finish to seats and convertible tops, it can be

used for many other applications in the military modelling world, and I'm most grateful to my friend Rob Hebden for introducing me to it. In this case I wanted to give texture to the blanket, and a light coating of the Velvet Gray spray (No. 5510 – one of a couple of colours available) was enough to put a nice nap on my lead-sheet 'wool'. Once it had dried I gave it a base coat of Vallejo Flat Earth, and then dirtied it up with MMP Medium Earth weathering powder (No. 006 – this is also an American product, but is available from Small Shop EU in the UK, in a wide range of colours.) Construction finished, I fitted the box into the gap I had left in the parapet. Now was the time to set about detailing the inner face with different types of revetting.

REVETTING

The earth walls of even a peacetime trench will gradually collapse and slip inwards under repeated rain, frost and thaw; trenches also subject to shell and mortar fire needed sturdy lining, and First World War photos show a number of different types of revetting materials. When a trench had been occupied for a long time, with periodic damage and repairs, it is plausible – and attractive – to show a number of different typical materials in use.

RIGHT A section of the trench wall revetted with corrugated iron, here supported simply with angle-iron stakes at the bottom.
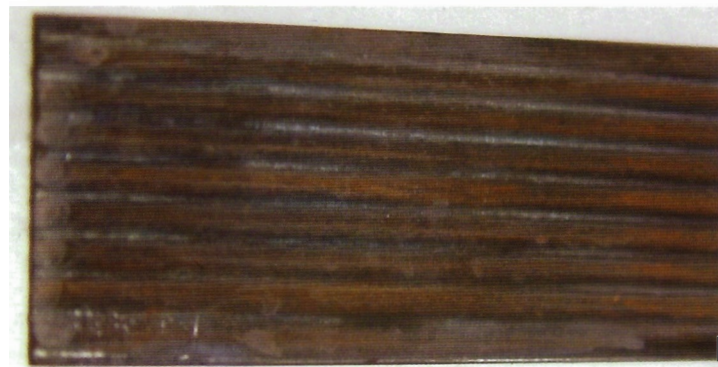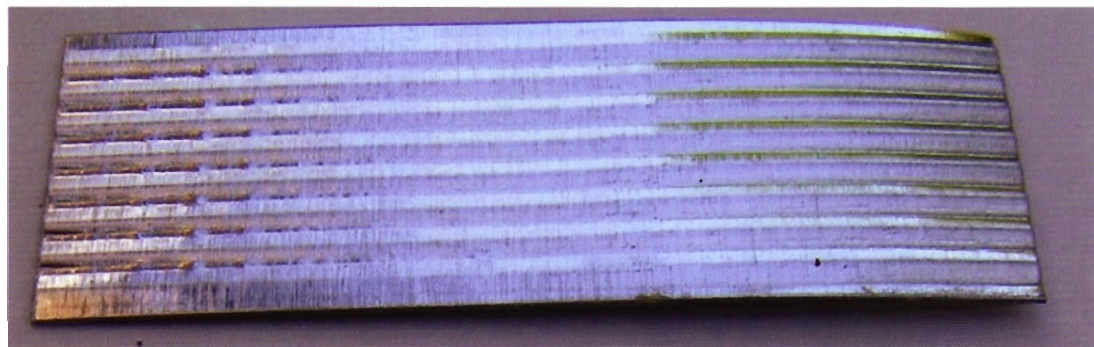
A length of Scale Link corrugated iron, before and after the rust treatment.

Making up the basswood frames for the chickenwire revetments. The steel right-angle blocks help me get accurate corners, which I seem unable to do just by eye.

The first type I made was simple corrugated iron sheeting, braced with timber and angle-iron uprights. Tin corrugated sheeting comes ready cut from Scale Link, but naturally this needed to be aged to achieve the varying colours I wanted. First, I coated them with 'Blacken-It', from the US firm Micro-Mark, which chemically blackens most ferrous metals. Once they were dry I brushed on 'Rustall', also available from Micro-Mark; I applied one or two layers on some sheets and several more on others, to give different shades of rust. After the Rustall I used MMP Rust powder (No. 009), some black powder, and a number of shades of brown until I was satisfied with the result. These sheets were stuck to the wall of the trench along part of the firestep, and secured with stakes or timbers.

The next type of revetting was made from sawn timber frames covered with chickenwire. As usual, I used basswood for the frames and Verlinden netting for the mesh; to make sure that I got the framing square, I glued the sides together with the aid of some engineer's right-angle metal blocks. I then cut the netting larger than the frames, glueing it on with PVA adhesive; when this dried I used a roller
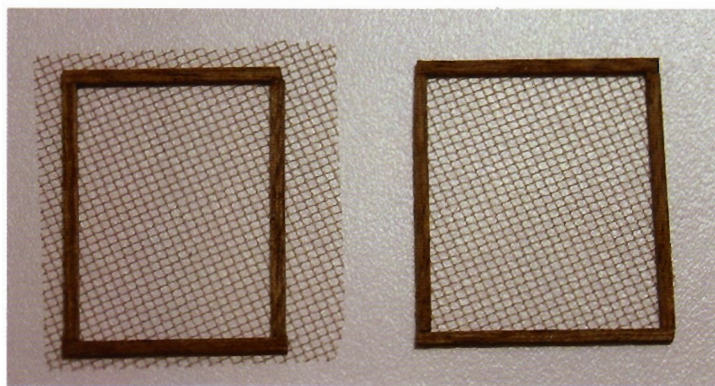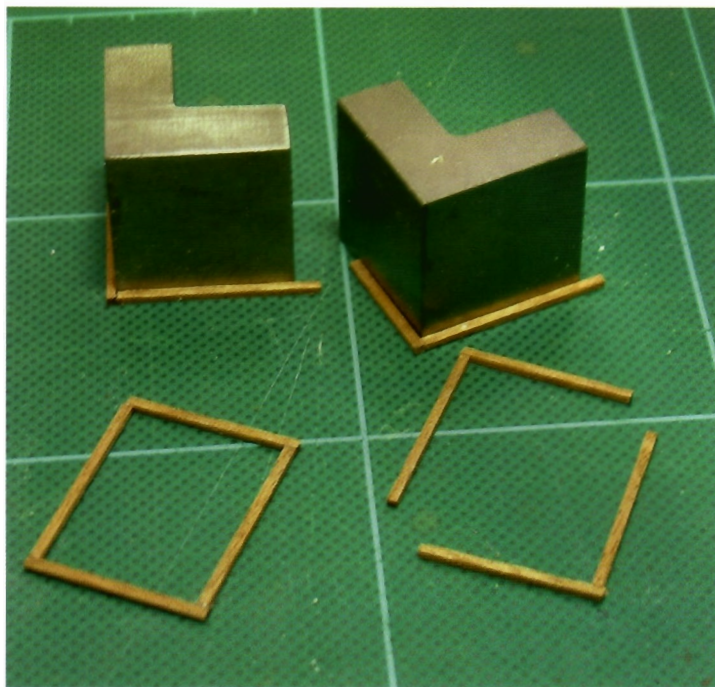
cutter to trim it – so much easier than trying to cut the components to size beforehand. The frames were then fastened to the trench wall, using timber posts made from wooden skewers, which I first bound with thread so as to look as if the frames were tied to the posts. Once in place, I

The frame on the left has had white glue applied to the back and is laid on a piece of Verlinden netting. Once set, it was trimmed round with a rotary cutter.

dirtied them up with MMP Medium Earth powder mixed with a drop of water to give a 'dried mud' look.

ABOVE Various revetting materials in place, including the chickenwire frames tied to sturdy posts driven into the firestep.

BELOW Sandbag traverse, with a liberal coating of a mixture of MMP Medium Earth (No. 006) and Sand (No. 005) – these sandbags had a hard life.

SANDBAG TRAVERSES, AND TRENCH FLOOR

The next move was to stick the parapet block to the base layer, for which I again used the hot-glue gun. Once it was in place I could proceed to build up the whole length of the front of the trench.

The first step was to add the sandbag traverses either side of the fire bay. This time I used complete blocks of sandbags, but shortened to match the depth of the traverse; the height of the block was fine as it was. I had cut all the faces of the trench and traverses at an angle so that, as in real life, the walls splayed outwards slightly at the top and were more stable than if cut vertically.

This view of the completed and 'furnished' trench shows the front edge of the firestep, revetted with short lengths of corrugated iron secured by wooden stakes driven into the trench floor.

Looking out of the forward end of the communication trench at the fire bay, showing corrugated iron revetting held in place with stakes and (above) horizontal timber supports.

With the sandbags glued in place, I spread the first layer of groundwork over the diorama using Claycrete/Celluclay instant *papier maché*. Before mixing this I added Flat Earth paint to the water to pre-colour the Claycrete evenly; and I also added some PVA glue to the mix, which delays the drying time a bit but improves the adhesion to the polystyrene foundation. I laid the mixture over the whole area, up to and including the sandbagged parapet.

While this was drying I painted the detailed face of the sandbags a yellowish-brown colour; sprinkled them liberally with MMP Medium Earth powder; and then gently trickled water over them – just enough to dampen the powder but not enough to wash it off. When this was dry, I flicked off any remaining large lumps with a very soft make-up brush. The result was a nice earthy texture on the bags and clumps of earth in the gaps between them, as though some of them had leaked.

Using the Claycrete mix I then covered the firestep with a layer of mud, tamped down hard to give it a well-trodden look, and added some corrugated iron revetting along the front edge of the step – once again, held in place by short wooden stakes. It was then time to detail the floor of the trench.

The first step was to cut a shallow trough along the bed, to represent the drainage sump that was always dug under the duckboards. A layer of Claycrete was added, followed by a 'dirty
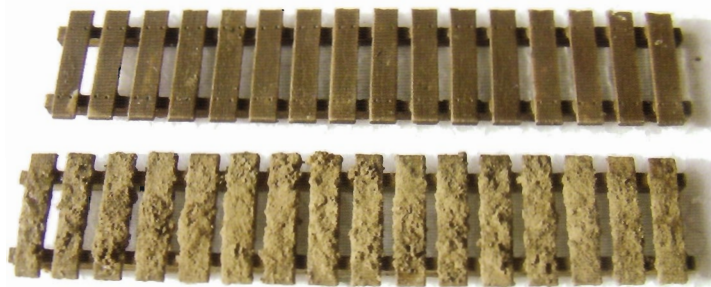
Scale Link duckboards, before (top) and after treatment. They are undercoated with Automotive Grey; painted with Weathered Wood acrylic; and treated with MMP Medium Earth powder mixed with acrylic medium.

Visible at right is the sump dug along the trench floor, complete with muddy water; it follows the corners of the trench. The weather must have been quite kind to the occupants of this section of the line; there are period photos showing trenches thigh-deep in muddy water.

BELOW A view under the trench bridge, showing brushwood revetting ahead (the very thin twigs came from the remains of an old Christmas tree), sandbag traverse on the left, and hurdles on the right, with dumped grenade boxes and petrol tin at the foot.

Bird's-eye view of trench floor with duckboards in place. Note that I have deliberately not laid them beautifully level – with laden men constantly trudging back and forth along the trenches, they slanted and tipped to all angles.

The rear face of the fire bay seen from the front, with funk hole, revetting of corrugated iron, and (right) brushwood secured behind timber stakes.

water' mix poured into the sump using Woodland Scenics ready-to-pour Realistic Water, which I pre-tinted with acrylic paint to a yellowy-green colour. The Scale Link duckboards came next; as they are in white metal, I primed them with Automotive Grey paint and then painted them with a Weathered Wood acrylic. Once dry they were heavily muddied, using the MMP Medium Earth mixed with matt acrylic medium to add bulk, and then stippled here and there with satin varnish for a damp mud appearance. These were then laid over the sump and secured in place by bringing the Claycrete slightly over the edges.

PARADOS, AND COMMUNICATION TRENCH

With the groundwork for the front and bottom of the trench in place, I started work on the rear wall and the communication trench. The first move was to stick the funk hole section (block 3) to the base with my trusty hot-glue gun, and then start on the revetting. The face of the funk hole block was revetted with corrugated iron, and this was carried around the corner and along the left-hand end of the rear wall.

The communication trench, which ran down the right side of the funk hole block, was revetted with brushwood. I used small, fine twigs for the brushwood, held in place with wooden uprights, which
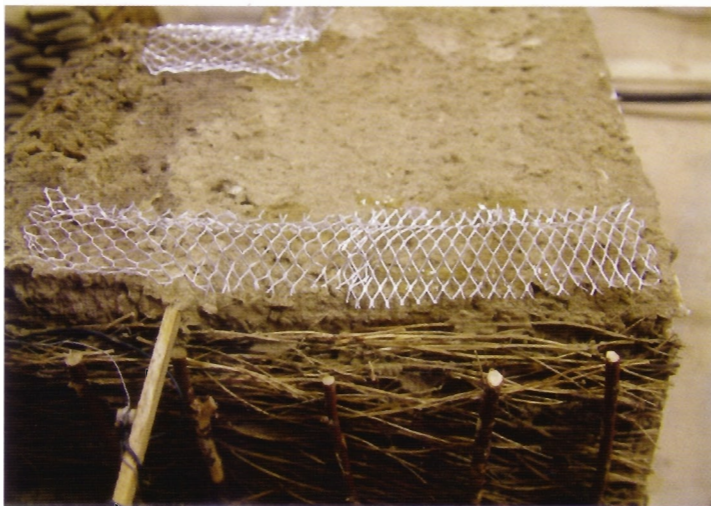
ABOVE The flexible metal mesh I used to create a support for building up the parados; this foundation saves a lot of time and Claycrete.

BELOW The expanded mesh covered with Flexi-Bark. Used in a thicker layer than if you were coating a tree, this dries to give a good appearance of torn-up soil.

resulted in a fairly untidy look exactly as in real life; with this finished, I laid the rest of the duckboards down the communication trench. The right-hand side of this trench was taken up with the dugout section (block 2), which I then glued to the base.

I added a bit of detail to the dugout entrance, starting with the gas curtain. This was a sheet of canvas or an old blanket that could be rolled down to prevent heavier-than-air gas from drifting down into the dugout; the curtain was soaked in water in the event of a gas attack, to improve its impermiability. My curtain was made from lead sheet, as were the tapes used to tie it up when not in use. I also added a nearby bucket of water for dampening the curtain, using one from Plus Models.

With the dugout in place, I then built the parados along the back of the trench. To greatly reduce the drying time that such a thick layer of material would require, I first of all formed a supporting frame from soft, expanded metal mesh. I then covered this with Flexi-Bark (see Chapter 1); intended for covering model trees to provide a deeply textured surface, it served just as well for broken-up spoil, thrown up when the trench was dug. When it was dry I added some lumps of Claycrete mud for variety of texture. I then covered the rest of the back portion of the diorama with Claycrete.

HURDLE REVETTING, TRENCH BRIDGE AND SHELLHOLES

While all this was drying, I started detailing the section of fire trench that runs off the right side of the diorama. I decided to use woven hurdle revetting panels here, and the only way I've found to create realistic woven hurdles is ... to weave hurdles. It is possible to find cast resin ones, but I prefer to do it the hard way, as the end result differs from hurdle to hurdle, which isn't the case with items from a mould. I took a bit of scrap wood and drilled four or five holes in it, into which I pushed toothpicks. For the weaving material I used thatching bought from a doll's-house shop. I dampened the strands to make them a bit more flexible, and then wove them in and out between the toothpicks, starting each row from alternate ends. As you can see from the photos, the result is fairly convincing, and it is very cheap to produce. When the hurdles were finished I stuck them to the trench walls with white glue.

The next piece to build was the bridge crossing the right-hand end of the fire trench. These varied a lot: some were sturdy enough to take a horse team with gun and limber, while others would not support anything much heavier than men on foot. I went for a light bridge, made from heavily weathered timbers overlaid with corrugated sheeting and then a layer of sandbags. As this

Hurdles in place, revetting the trench wall under the bridge. Note the grenade boxes and petrol tin on the trench floor; water and tea were brought up to the line in such tins, and always tasted – at best – of the chlorine used to decontaminate them.
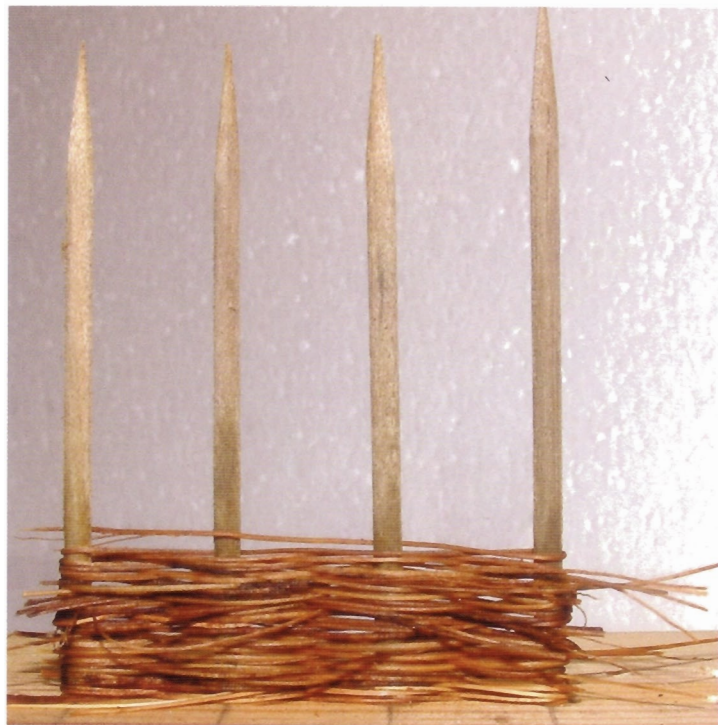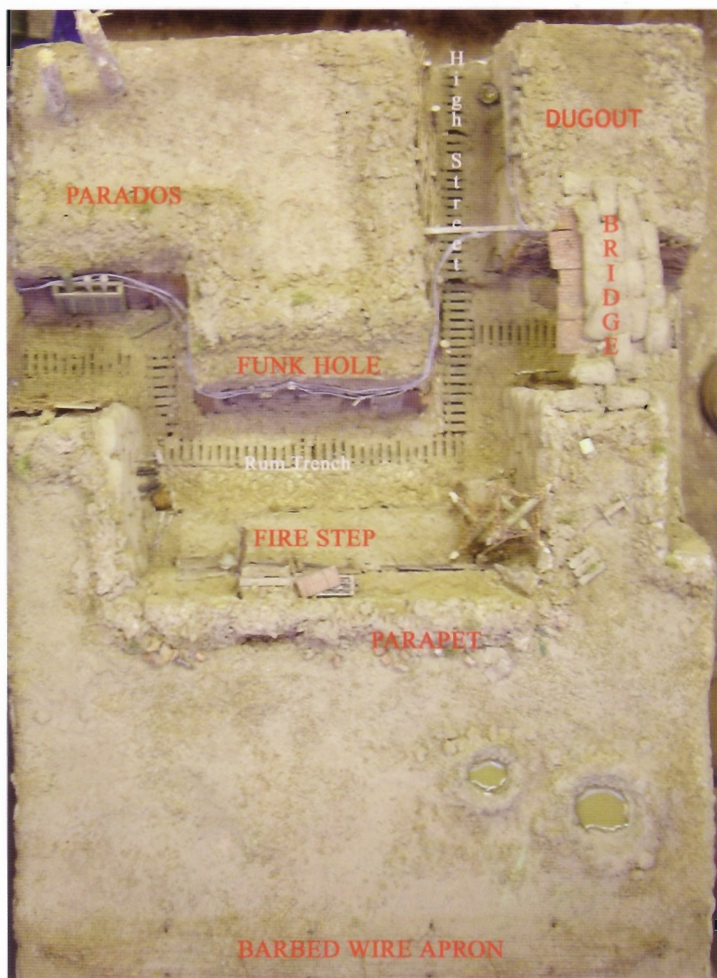
Weaving a hurdle. Thread the material in and out round toothpicks set in a wooden base, starting each layer from alternate ends.
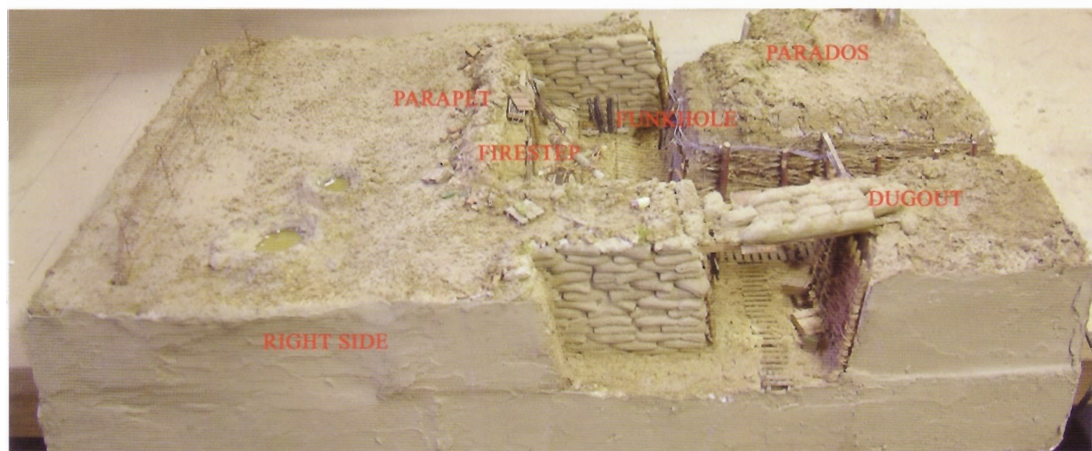
The foot bridge over the trench, made up from heavy timbers, corrugated iron sheeting and a layer of sandbags; note the discarded ration tin.
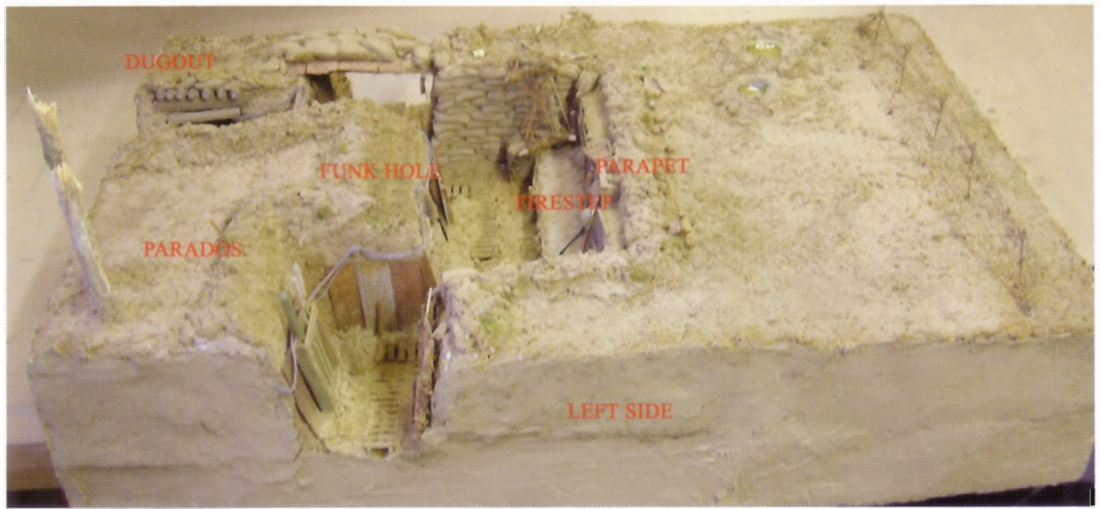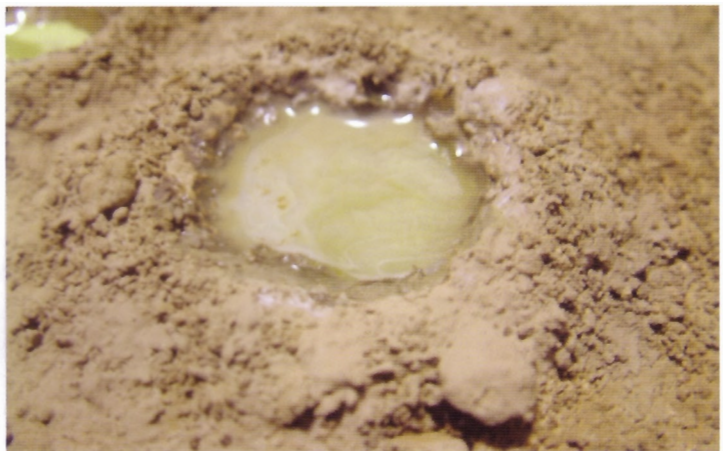
PARADOS

DUGOUT

High Street

BRIDGE

FUNK HOLE

Rum Trench

FIRE STEP

PARAPET

BARBED WIRE APRON

PARADOS

PARAPET

FUNKHOLE

FIRESTEP

DUGOUT

RIGHT SIDE

DUGOUT

FUNK HOLE PARAPET

FIRESTEP

PARADOS

LEFT SIDE

ABOVE The diorama from the left side, with two shell-torn tree trunks added in the rear corner.

The rubber mould that I made up to produce 'instant' shellholes; and a finished shellhole, complete with some Woodland Scenics Realistic Water, suitably discoloured.
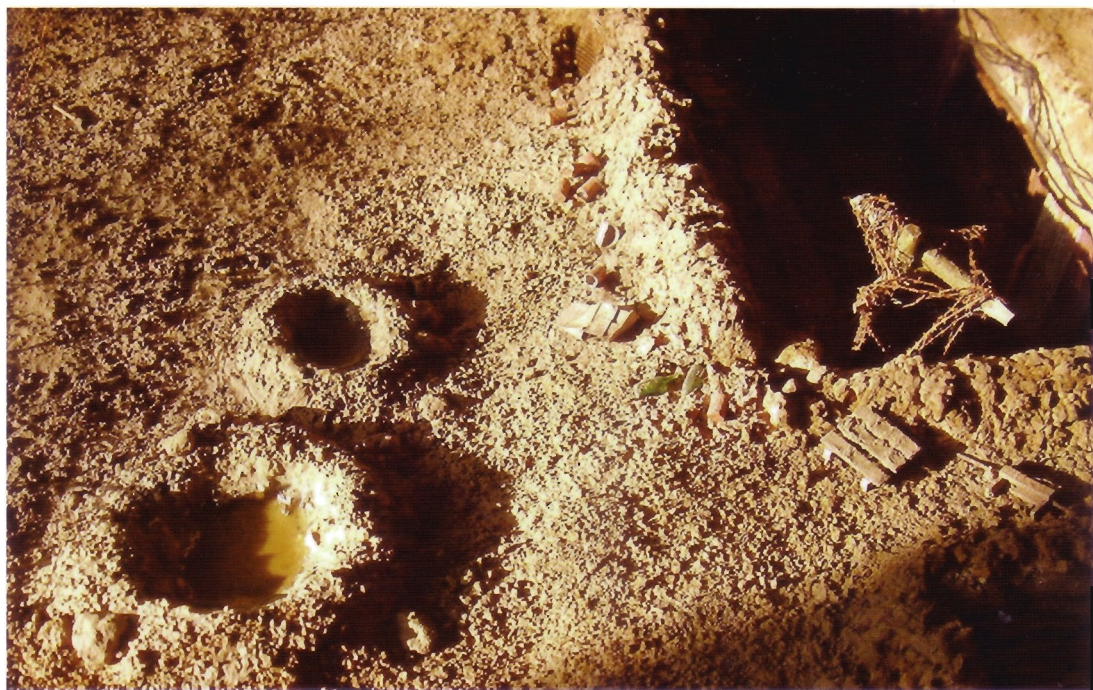
Sunrise steals across no man's land ... If you wanted, you could even recreate the specific appearance of holes made by the new mustard gas shells from mid-1917. Allied troops decontaminated these by scattering white lime on them, and then a shovelful of clean earth over the top to prevent the smell from the lime disguising the tell-tale odour of other mustard gas sites nearby. In spring 1918 the Germans started adding red or purple dye to mustard gas shells, so the stained shellholes would warn off their own advancing troops. There is no end to the detail a real obsessive can add to his models ...

bridge had presumably carried a fair amount of foot traffic and several of the sandbags would probably have split open, I added a heavy dressing of MMP Medium Earth.

By now the Claycrete covering over the whole diorama had dried, and so I next spread a layer of the Flexi-Bark over the groundwork. When dry this gave a much better effect of heavily torn-up and turned earth than I could have achieved with Claycrete alone, which tends to dry to a much 'softer' texture.

I also added two shellholes at this point, first making a rubber mould and then casting the shellholes with plaster. Once set, I stuck a piece of plasticard over the base of each of them to make a shallow well, into which I poured some more of the Woodland Scenics Realistic Water, suitably

coloured. When they dried I feathered them into the roundwork. Upon reflection, I think they turned out rather too neat, but this is easily rectified by adding more torn-up soil around the rims.

APRON WIRE

I had decided to place an apron of barbed wire along the edge of the diorama; this would provide a natural 'limit' to the scene, and was also worth modelling accurately in its own right. Wire wasn't just piled up in a tangle, but was strung to standard patterns. The diagram opposite shows one of the official layouts, as found in War Office field fortification manuals of the time.

STANDARD DOUBLE ARON FENCE.

PLAN.

SECTION.

PERSPECTIVE VIEW
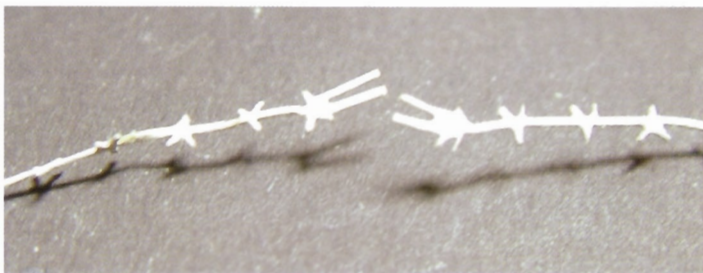- - - - Horizontal Apron wires
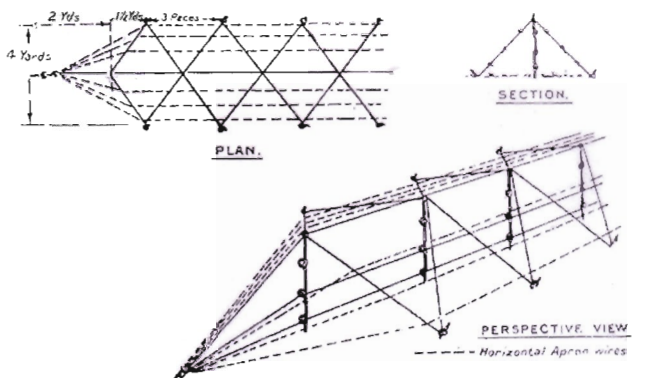
The official layout for stringing a double apron barbed wire fence. (The spelling mistake is down to the War Office, not the author.)

Brass wire annealed and twisted to form a screw picket.
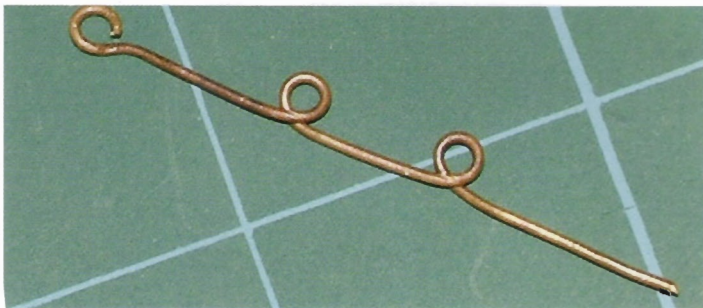
The notches in the ends of Scale Link's barbed wire strands slot together; they are held in place by giving them a bit of a twist and adding a drop of superglue.

Before you make up your length of wire, take each length from the fret, hold one end in a pin vice, and twist it for its whole length to make the barbs stand out at different angles. You'll probably break some while doing this, but that doesn't matter – use the bits for odd pieces emerging from the water in a shellhole or out of the mud.
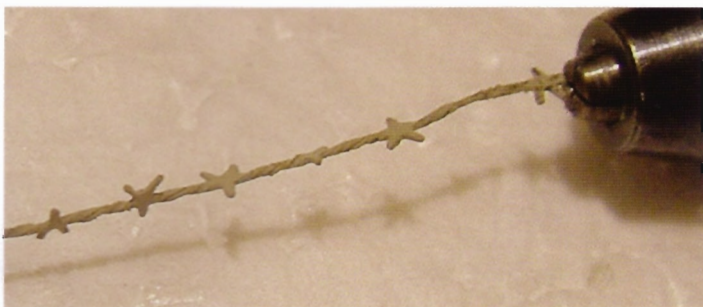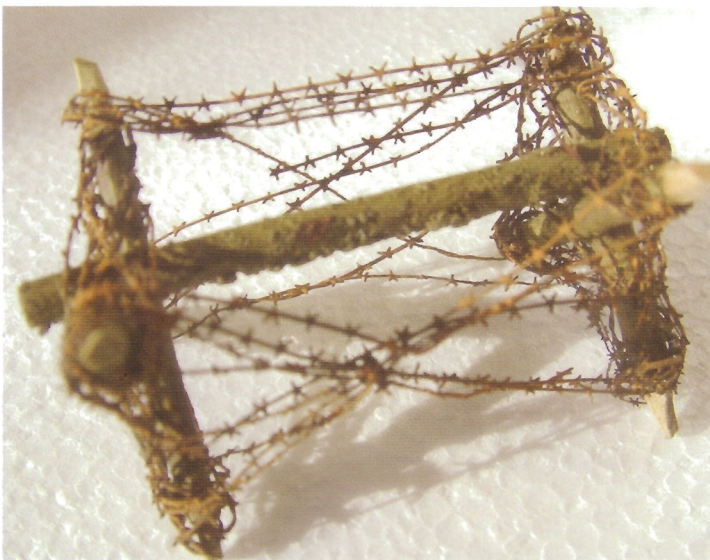
Close-up of a section of the completed apron wire – compare this with the War Office diagram on page 37.

The 'knife-rest' barrier, made from wooden barbecue skewers coated with Flexi-Bark and coloured with Grey-Green acrylic, then strung with 'rusted' Scale Link barbed wire.

The first move was to make a number of 'silent' or screw pickets on which to fasten the wire. These were so called because, unlike angle-iron stakes, they could be screwed into the ground rather than hammered in with a mallet — the noise this made, when the nightly wiring parties were working in no man's land, would bring flares or pre-registered machine-gun fire down on them. Since mine were to be set in the groundwork, I didn't bother trying to make the threaded section at the bottom end of the picket. I used brass rod, which I annealed with a small gas pen torch, and then formed around pegs set in a wooden block. (Incidentally, when annealing brass wire or rod to soften it, don't cool it by putting it in cold water — let it cool naturally. Only ferrous metals need cooling in water.) I blackened the pickets and added rust colours, with both paint and weathering powders; they were never painted in real life, and were left to rust. Once I had put them in position in the groundwork, I made up the smaller pegs that held the 'apron' of barbed wire out to the sides.

I ran the main run of wire through the top holes of the pickets and fastened it down to the ground at either end. I then ran the 'zig-zag' of supporting wires through the same holes and pinned them to the groundwork on either side. That done, I ran three strands of wire, spaced as indicated in the diagram, along the support wires and fixed them to the same pegs that secured the main run at either end. I know this sounds rather complicated, but in fact it's quite easy once you get started. As you can see from the photos, my apron is much slacker than the nice taut lines of the diagram, and almost certainly yours will be, too; don't worry — every photo I've seen of the real thing is far untidier than mine. If you want to be really fancy, you can add another apron on the no man's land side of the first; this was quite often the case. In reality, the apron was set up at a distance from the trench that would keep an enemy too far away to lob a grenade into it.

The Scale Link barbed wire comes flat, on a brass photo-etch frame, and each strand has a notch at either end so that you can join as many as you need to get the length you want. Once I had joined the lengths, I clamped one end in a pin vice and held the other in a pair of pliers; by twisting the pin vice round, you get the barbs to stand out at different angles and remove the 'flat' appearance of the wire. Once strung, it was given a coating of rust; I added an odd piece of rag, and an unexploded German stick grenade just inside the wire.

FINE DETAILING

Now all the basics were in place,

A brass shellcase from the scrap box, hung beneath the trench bridge by a length of wire, makes a realistic 'gas gong', together with a striker made from annealed brass rod.

the fun part began — adding the details. The first thing I made was a gas alarm to hang under the bridge; these were often just empty shellcases, with a striker made from a bit of metal rod, perhaps from a screw picket. The shellcase came from my scrap box and the striker was made from brass wire, bent to shape and darkened with Blacken-It.

Next I made a wooden frame for three signal rockets; these were an essential item, since troops under attack called for pre-registered artillery support by

A piece of basswood dowel being turned into a signal rocket head, by means of a Dremel drill used as a mini-lathe, and a couple of files.

The rockets set up in their launching frame, two ready to be fired and one with its canvas cover still in place. When the fuses are lit, somebody may regret draping the telephone cables so carelessly close to them.

Another view of the signal rockets, fitted to the rear wall of the trench at the left-hand end. Note the discarded canvas cover on the ground.

The tools used to make the 'cotton reel' spools for the telephone cables: turned down from dowel with the Dremel drill, sanding boards and files, they were separated off with a fine jeweller's saw.

The solder telephone cables in place above the funk hole. Note the wooden triangular labels identifying the cables; a battalion headquarters dugout needed several separate links to its companies, the brigade HQ, the supporting artillery and so forth. Cables were always getting cut – by shellfire, or traffic – so it was important for linemen to be able to sort out which needed repairing.

sending up agreed sequences of coloured rockets. I chucked a piece of dowel in my Dremel drill and, while it was spinning, I held a sanding board and a fine file against it to get the shape. This done, I added the sticks from brass rod, and then used thin lead sheet to make a couple of the canvas covers that protected the rockets; I

put one of these over a rocket and the other I left discarded on the ground. The rockets were then positioned at the back of the left-hand end of the trench, tilting to the rear so that, when fired, their trajectory would take them back towards the artillery gunlines.

Prominent features in many period photos are the bundles of field telephone wires that were strung along the trenches. These were supported by wooden spools, shaped rather like cotton reels, fixed to the rear trench wall. Using the Dremel again, I turned the cotton reels from the end of a narrow wooden rod, leaving a tiny 'neck' at the base, where I cut them

off using a fine jeweller's saw. I then used a fine drill bit to bore a hole through the centre to accept a fixing pin to hold them to the walls. The actual phone wires are simply lengths of solder, which allowed me to put nice, heavy sags in the lines. The last touch was to attach a couple of the wooden triangles used to label which line was which; I then strung the lines along the trench, across a timber beam and into the dugout entrance.

A 'knife rest' was the next bit of trench furniture. This was a length of log supported on pairs of cruciform legs, the whole thing then being strung with barbed wire; they were used for instant

barricades when raiders or attackers got into a trench and were fighting their way along it. (The name comes from a piece of tableware probably unknown to younger readers – they used to appear on dining tables as rests to keep carving knives and forks off the tablecloth.) It was a simple matter to make this from dowel and cover it with Flexi-Bark to give the appearance of unpeeled logs. I then wrapped it with Scale Link photo-etched barbed wire, copying the pattern from period photos; I undercoated the wire with grey primer and aged it with varying shades of rust. The finished unit was placed, on end, at one end of the firestep. These knife rests would be held up out of the way by a rope, which could be cut in emergencies to drop them across the trench at a moment's notice.

I next added some typical 'trench stores' to the scene. I started with a reel of barbed wire on a carrier, wirecutters, a mallet for driving in stakes and a number of angle-iron pickets. The carrier once again came from Scale Link; this was a wooden frame with a hole through the centre for a carrying pole. I built up a fairly thick layer of wire using solder, and then laid a 'skin' of Scale Link barbed wire over the top. I applied
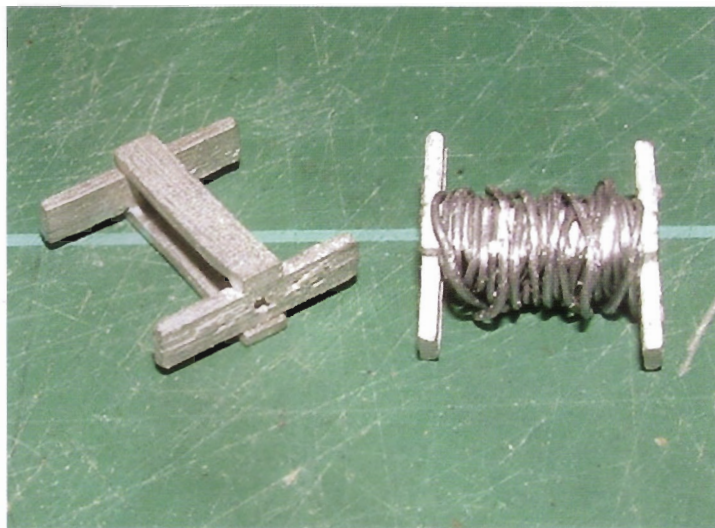
The wire carrier, before and after having a layer of soldering wire wound around it. I used this to bulk up the appearance of a full carrier, rather than using a lot of the more expensive photo-etched brass wire.

The finished trench stores. The wooden mallet, the reel of barbed wire and the pair of wirecutters all come from Scale Link's First World War catalogue. For the angle-iron pickets I used 35mm lengths of 2mm Plastruct angled strip, cut three pairs of notches in the sides, and shaped the end to a point.
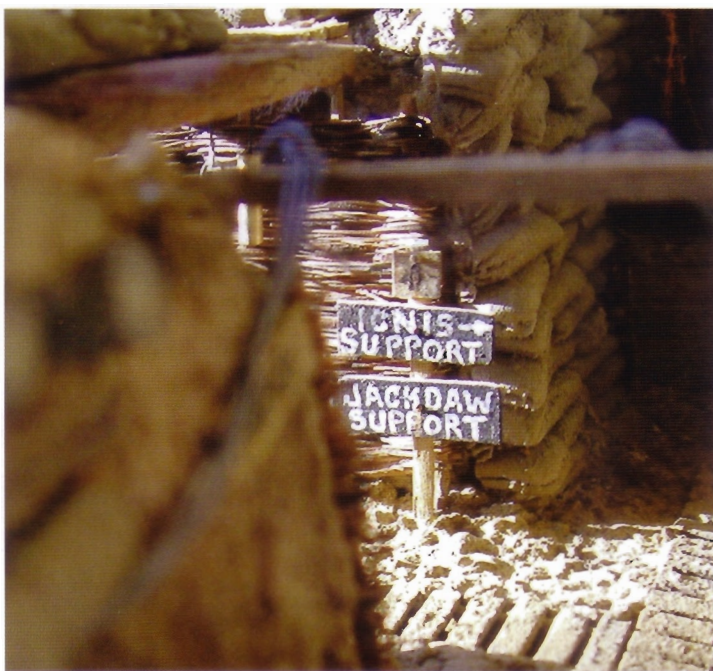
a liberal amount of Rustall and weathering powder, and weathered the carrier with a worn wood colour and mud on top of that; the carrying pole was a length of brass wire, blackened and rusted.

The angle-iron stakes were very simple to make: just take some 2mm plasticard angle strip, cut to the required length, and shape one end to a 'V'. Then cut two 'V' notches in the two flat sides near

the top, another two rather more than halfway down, and two more spaced below these – obviously, these notches were to secure the wire when wrapped around the stake. Like the screw pickets, these stakes were left unpainted, so I gave them a coat of Vallejo Hull Red mixed with German SS Camo Black, a coating of rust, and then ran a very soft lead pencil (8B) over the edges to show worn areas of metal; finally I added a few dabs of mud. (While on the ever-fascinating subject of mud, I can thoroughly recommend the Tamiya 'Mud Sticks' that are now available; they are excellent for touching in odd spots here and there, both on groundwork and vehicles.)

The wirecutters lying on the firestep are also from Scale Link; I used a light buff for the worn wooden handles, and matt grey for the metalwork, heavily rubbed over with pencil lead and then a coating of rust, which I rubbed off on the high spots.

The opened box of 'Mills bombs' (No. 19 grenades) on the elbow ledge comes from the same supplier and, to my surprise, the tiny grenades all come separately – which makes for great fun when you drop one on the floor. I painted these black and the box with varying shades of dark yellow and Burnt Sienna, with SS Camo Black for shading. You also get a couple of closed boxes with this

their place in the line. Nearly all trench sections were consequently given names (which would mean nothing to the enemy), painted on signs in various colours and styles. These might be chosen to recall familiar streets in the home towns of the units that first named the trench, but they never gave any indication as to the unit itself – both for obvious security reasons, and because units rotated on a virtually weekly basis. The main fire trench normally had a name ending with 'trench' – e.g. my 'Rum Trench'; and many communication trenches were, I believe, given names ending in 'street' – e.g. my 'High Street'. There were also signs indicating support trenches; for my model I picked 'Ignis Support' and 'Jackdaw Support' from photos. I hand-lettered these on scraps of basswood and attached them in the appropriate places.

The two figures on the firestep and the rifle and helmet all come from Scale Link. I was not trying to reproduce an actual historical place or moment, but purely for effect I chose to give them the famous red triangle 'Bass beer' battle patch of the 29th (London) Division.

The last touch was to add the litter in front of the parapet. Empty ration cans, bottles and other rubbish had to go somewhere, and what easier than simply to toss them 'over the top'? The green wine bottles and the

The sign for the main trench, and others pointing the way to support trenches in the rear. Photos of such signs show every type of lettering, from professional-looking signpainters' work with fancy serifs to the crudest daubs done in a rush by any handy soldier.

set, and I put these on the trench floor later.

Finding ones way around the labyrinth of trenches was always difficult, and especially so for troops moving up at night to take

OPPOSITE TOP Another angle on the support signs under the trench bridge, the hurdle revetting and the gas alarm. Beyond, a Tommy is just visible sitting on the fire step.

OPPOSITE BOTTOM The finished fire bay, now occupied by two Scale Link figures. The lance-corporal, enjoying a cuppa in the afternoon sun, has propped his SMLE rifle and Brodie helmet against the parapet. Above him note the open box of grenades on the elbow ledge.

THIS PAGE
TOP Trash thrown over the parapet into no man's land: the scratch-built dixie, with holes punched in the sides and extensive soot marks showing that it has been used as a brazier. Note the weeds growing in the earth spoil.

MIDDLE More trash: wine bottles, a piece of broken duckboard and an old wire-carrier. Broken earthenware rum jars would also be a convincing detail here.

BOTTOM And yet more trash: rusty tin cans, an old messtin, and a cardboard box from a Verlinden accessories set. This is one of those with no text printed on it – I didn't have reference for an actual printed carton of the 1914–18 period.

ABOVE Making the discarded ration cans. The bodies are short lengths of Plastruct tubing and the lids and bases were punched out from plasticard, using the Historex round punch-and-die set. To make the lids look sufficiently ragged, I ran a small pounce wheel around the edges of the discs.

crushed cardboard carton both came from my spares box. The beer bottle, rum jar, broken barbed wire carrier and piece of duckboard all came from our old friends at Scale Link. The empty cans and the rusted-out dixie were scratch-built

with plasticard. The dixie was made from sheet with a wire handle, and then had holes punched in it and soot staining added, to show that it had it had been used as a brazier.

The tin cans were a little bit more involved. I first cut lengths of

hollow plastic tube for the bodies and stuck plasticard discs on the bottoms, and squashed some of them to a rough oval shape. I then punched out some more discs of plasticard for the lids, and used a pounce wheel to make the edges ragged where they had been opened, before attaching them to the bodies with white glue. I painted them allover silver and, when dry, went over them with a rust coating, leaving small traces of the silver showing through.

I placed all the trash on the groundwork; and then added a few clumps of weeds – remember that these will always appear, after a surprisingly short time, on earth that has been disturbed. This effect can be seen in many photos of some of the quieter sectors of the Western Front.

LEFT An early morning lighting effect, with the sunlight slanting in across no man's land from the south-east.

RIGHT Two tree trunks were added, standing to the left rear of the diorama; these are made from dowel coated with a thin layer of plaster. There are many photos showing the effects of shellbursts on trees: the bark is stripped from the side facing the burst, where the trunk is peppered with fragments, while the far side is left comparatively unscathed.

FOLLOWING PAGE Looking down into the completed diorama, at the junction of High Street with Rum Trench. Note the beam supporting the field telephone cables where they cross to enter the dugout.

With the whole diorama finished, I wanted to add a final overall coating to pull it all together. For this I used a generous scattering of the Medium Earth weathering powder from Small Shop EU, working it in gently with a fine make-up brush. Then it was time to 'stand down', and gratefully join my miniature lance-jack in a cuppa.

A MOTTE-AND-BAILEY CASTLE

The image of a Norman castle with which we are most familiar is a great pile of sinister stone, glowering over the countryside — which would be an ambitious project for any modeller. But for the first years after their arrival on any defended site the Normans raised a much more feasible type of fortification in earth and timber — the motte-and-bailey castle. The motte was the mound on which they built a timber keep, and the bailey the palisaded yard at its foot, with living quarters, stables and sheds.

This overhead view shows the basic layout better than an oblique-angled shot. Although made in wargaming scale to match figures about 28mm high, restrictions on my working space still obliged me to make the mound too steeply sided for most actual sites. To replicate this kind of site for a displayed model you should make the base of the mound wider and slope the sides at about 45 degrees.

To make this diorama at my usual 1/35th scale would obviously have required a base the size of the kitchen table; for a large subject like this a wargaming scale of roughly 1/65th is more suitable and practical. In retrospect, I should have made the angle of slope for the mound shallower; but this did not affect any of the materials or techniques I used,

which can be employed for any model of an earth-and-timber ancient or medieval site.

BASIC STRUCTURE

The base of the diorama was made up from three blocks of polystyrene stuck together, side by side, using the hot-glue gun. The mound was made by sticking several layers of poly together

and then carving them to shape. I stuck the three blocks together and marked out the area of the mound on them, then carved out the ditch that would surround the mound, which extended on to the second and third blocks. I finished up with the three blocks side by side and the whole ditch carved out, looking rather like a figure of eight.
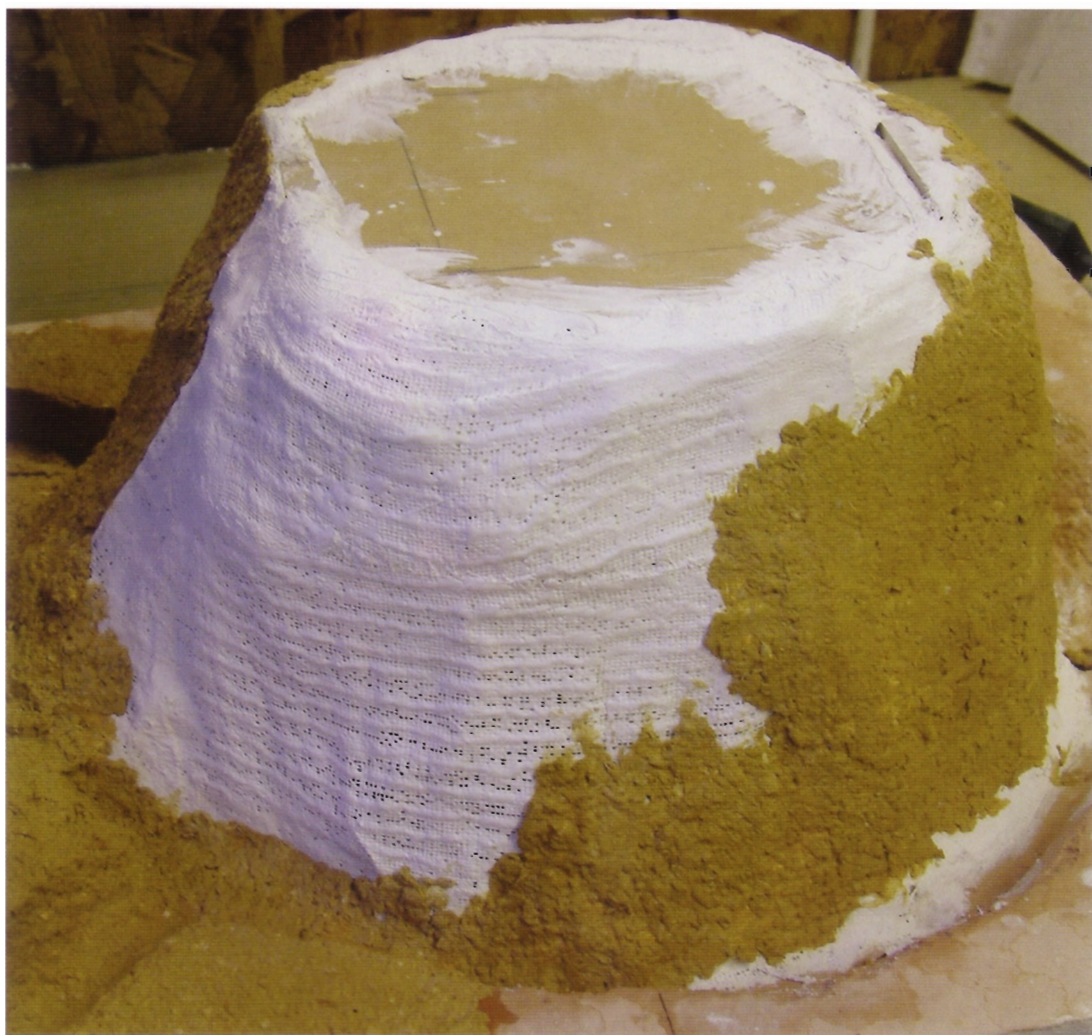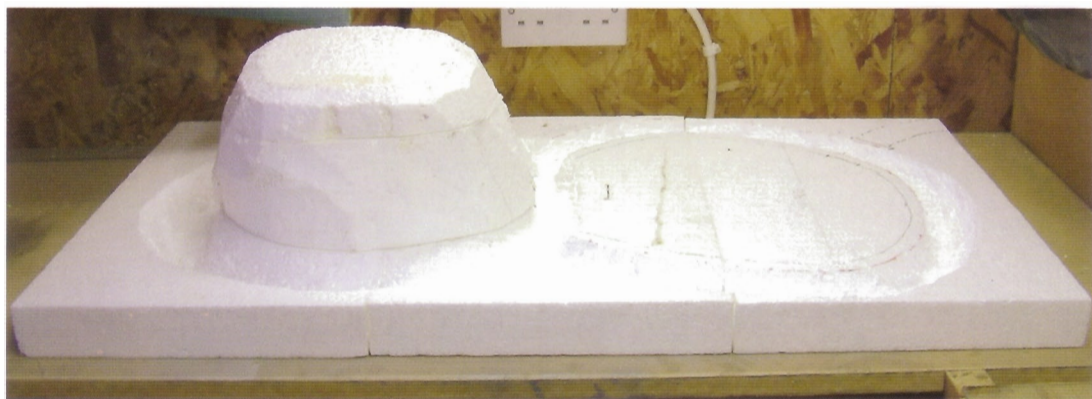
OPPOSITE TOP The three blocks of polystyrene forming the base have been joined side to side, with some of the defensive ditch cut into the surface. The faint pencil line inside the bailey ditch is a guide to the width of the area where the palisade will eventually be placed.

OPPOSITE BOTTOM The mound, covered with plaster bandage and topped with Gatorfoam board, being covered with Claycrete.

Once I'd made the mound, I stuck it in place with hot glue; then I glued a piece of Gatorfoam board on top, to act as a firm base for the timber keep. I covered the whole thing with plaster bandage, and coated that in turn with a layer of Claycrete pre-coloured by adding Burnt Umber acrylic to the water. I then left it all to dry; with this amount of Claycrete that can take a couple of days, but there was plenty of work to do in the meantime.
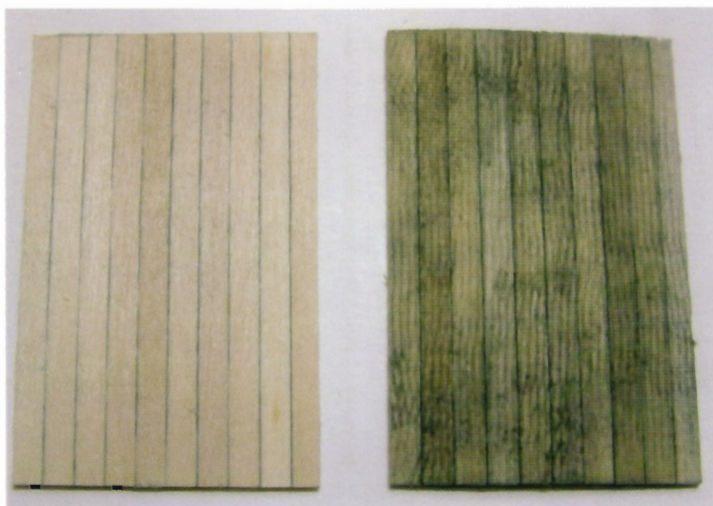
KEEP

The keep started as a cardboard 'box' with the appropriate holes cut in for doors and windows. This was then clad in strips of basswood, scored with a grain pattern using an edged tool, and stuck on with white glue. I then

Before-and-after views of a couple of pieces of the Micro-Mark Board-by-Board Siding: as it looks when you buy it, and after being scored with a grain pattern and stained with Weather-Rite from Timberline Scenery.

stained the wood with a product called 'Weather-Rite', which comes from the Timberline Scenery company in the States. This produces a nice 'old wood' effect, and you can control the 'age' by the number of washes you apply. This is not a paint but a chemical stain, which works its way into the surface of the wood and does not hide any of the detail.

The scoring tool that I use for adding grain to my timberwork. I was given this by master modeller Tony Greenland; it is actually used by cobblers to spread glue when fixing new soles on shoes, but Tony discovered that it was ideal for marking *Zimmerit* patterns on his Panzers, and I have found it perfect for scoring grain into wooden surfaces.
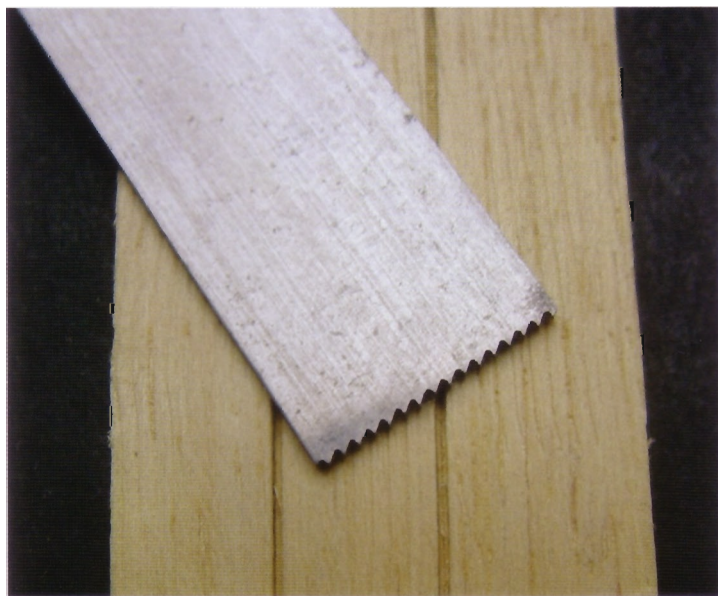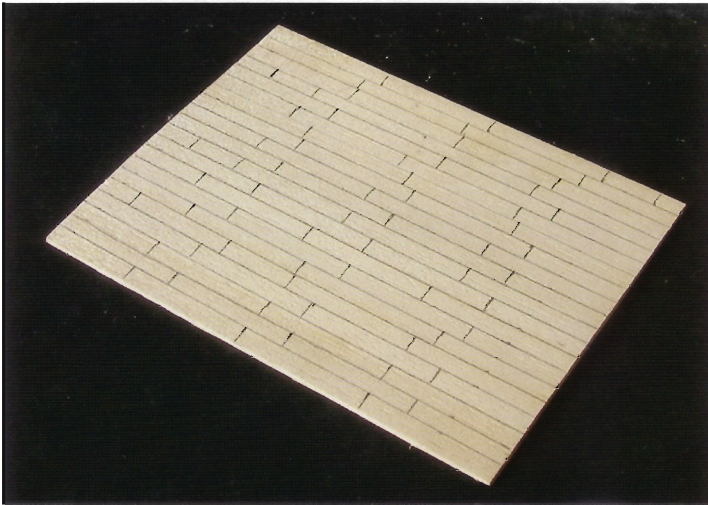
The piece of Board-by-Board Siding used to make the keep roof, before staining. Extra crosswise marks have been scribed where the planks butt end-to-end.

The main keep door, made in the same way as the trapdoor in the roof. The iron strapping is plasticard strip, the rivets are punched out with a Historex round punch-and-die set, and the iron ring is brass wire annealed and formed around a Multi Tool, attached with superglue.

A close-up of one of the covers for the crossbow ports in the keep walls, hinged at the top like the gun ports on a ship.

Sections of the castellation, grained and then stained.

Making up lengths of the castellation, using an AFV track template as a straight edge; its weight stopped the bits from moving about. At the top are individual long and short lengths, above a run of sections temporarily held in place with a strip of masking tape.
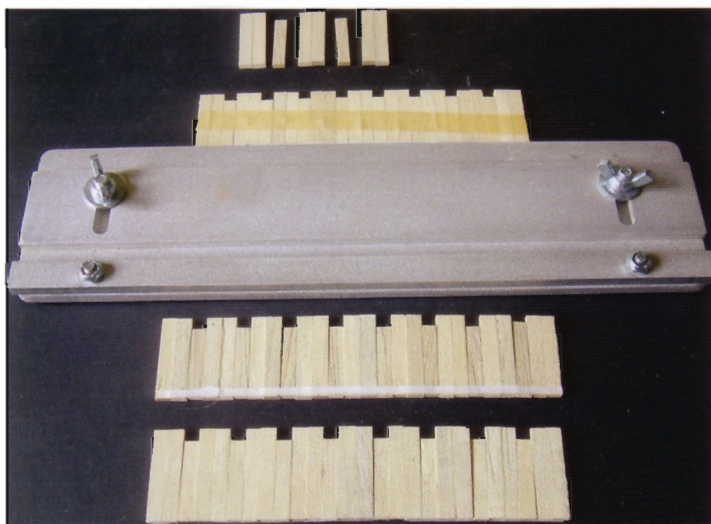
Construction of the sentry's walkway around the inside of the rooftop wall. The plank ends are marked in pencil, prior to touching them in with Indian ink; supports are glued on underneath.

The gateway in the keep wall.

The keep, finished apart from adding the castellated parapet around the roof.

The completed keep set on the top of the mound, with the outer timber wall and gateway in place.

The next task was the roof of the keep, which was made from a pre-marked sheet of thin basswood which has the individual planks stuck together with black glue, replicating the joints between the planks. You can get this from Micro-Mark; it is sold as 'Board-by-Board Siding', and comes in four different plank widths. The markings only run the length of the sheet, so you have to add the marks where one plank butts end-on to another.

Having marked my roof, I stuck it in place and then built the trapdoor that gave access to it, since the roof doubled as a fighting platform. I made this separately from basswood, using Plastruct plasticard strip for the hinges and strengthening bands; the lifting ring was brass wire, annealed to soften it for ease of working and then formed around a Mission Models 'Multi Tool'. The hinges and bands were painted with acrylic Matt Black and then rusted with watered-down MIG Rust weathering powder. The rivets holding the ironwork in place were punched out of plasticard sheet, using the Historex octagonal punch-and-die tool, and fixed using a small brush and liquid plastic cement.

I used pretty much the same technique to build the door to the keep and the covers over the 'windows' – actually, small ports for bowmen. The placing of the keep door on the second floor

made life difficult for attackers; a removable ladder was kept inside on the second floor, and could be pulled up in the event of an enemy breaking through the last defensive wall around the top of the motte. The ground floor was used for the storage of food, weapons and all the other essentials of life for the small garrison.

With the door in place, I then made up lengths of castellated timbers for the defensive wall around the top of the mound. I cut the wood into two lengths and then stuck one short piece between each pair of the longer pieces. When I judged I had enough for a length of wall I held them all together with masking tape while sticking a length of thin wood strip along the inside face. I kept them lined up in the meantime by butting them along a straight-edged tool.

The castellation around the top of the keep itself was made in the same way. Once this had been stuck in place, I made the sentry walk that ran around the inside of it, once again using basswood scored to show the joints between boards and stained with Weather-Rite. I stuck wooden supports under these strips and then fixed them to the roof.

Finally, I made the gateway for the wall running around the top of the mound. The grille over the 'peep' in the door is made from a small piece of metal mesh. With the walls and gateway complete, I fixed the lengths around the mound by setting them in Claycrete, which I then covered with clumps of grass.

PALISADES

The next job was making the palisading to go around the bailey – and a fairly lengthy and boring one it was, too. I had bought several bundles of wooden skewers; I cut them all to length, leaving the pointed ends as the sharpened upper ends of the logs. I roughened up these points, since the logs would have been sharpened with axes and would not have had beautifully machined tips; I then added a thin layer of Flexi-Bark to give the logs a slightly roughened finish.

Since the palisade was to be embedded in the ground, I needed a ridge of earth running right around the bailey and extending inside the palisade widely enough to represent the sentry walk around it. To avoid having to lay too thick a mound of Celuclay, I first made up a roll of soft metal mesh and glued this in place on top of the inner edge of the ditch, flattening the top of the roll to take the walkway; then I worked round the edge of the bailey, coating this with the Claycrete a bit at a time. I needed to be able to plant all the logs in the earth, and I obviously could not get them all in place before it dried if I had spread the Claycrete around the whole circumference in one go. Emplacing the logs one at a time was the most laborious part of the whole project, but eventually the entire palisade was finished and could be left to dry.

While I was waiting, I made up the palisade that closed off the inner end of the bailey from the motte – this was a simple log barricade without points at the top. Using more of the wooden skewers, I cut the logs to length and then stuck a few at a time together with white glue, so as to make a number of short runs of logs, which I once again coated with a thin layer of Flexi-Bark. Before the glue had had time to dry I put this palisade in place; since the glue was not completely set I was able to form the sections into the curve necessary to match the base of the motte. I set them in place in the same way as before, pushing them into a low, raised mound of 'earth'. I made a simple timber gate to set in this wall, with plasticard bracing bands and studs, in the same way as the keep door and gate.

By now the main palisade had dried, so I gave it a coat of Vallejo Weathered Wood acrylic, and faired the bottom of the logs into the earth with some more Claycrete. As a final touch I added green scatter for grass and weeds growing up to the logs.

Making up the runs of the plain logs that form the palisade that closes off the rear of the bailey from the mound. Top, plain wood, then with a coat of Flexi-Bark; bottom, a thin wash of green acrylic, and finally a dark brown wash.

The crudely sharpened lengths of wooden skewers used to form the defensive palisade around the bailey, being set into 'soil' – in this case they have not yet been coated with Flexi-Bark.
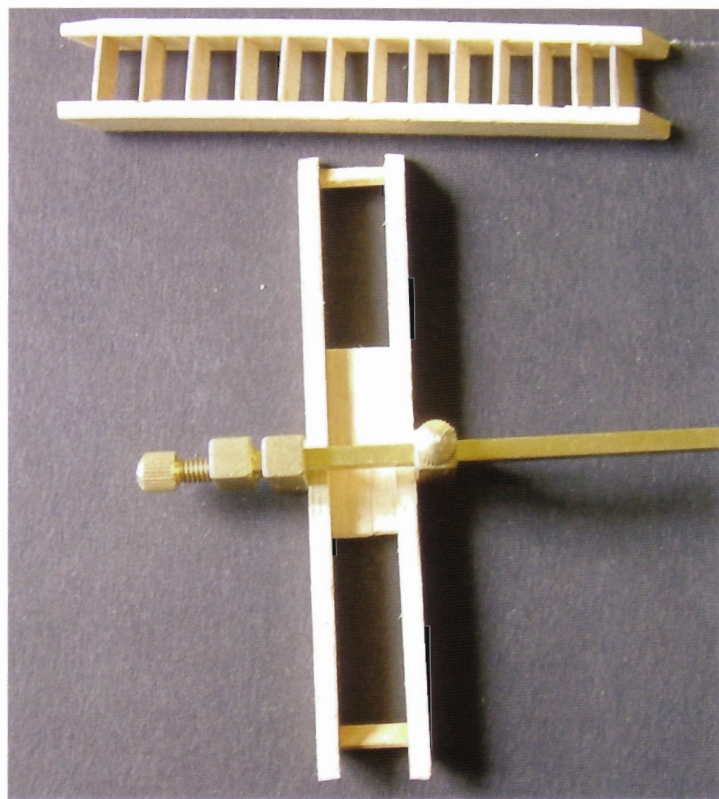
Making the steps for the timber stairs up the mound. By trial and error I found that the easiest method was to clamp a block the same width as the treads between the side rails, then to fix in the first and last steps; when these were securely dry I removed the block and finished putting in the remaining treads.

MOTTE STAIRWAY

Now the main elements were in place, I had to give the folk in the keep a means of getting up and down the motte; this meant constructing a fairly solid timber stairway (too substantial to be called a ladder). Failing to find a ready-built one in the right scale, I had to go back to the drawing board – I could see another laboriously repetitive job looming up. (A guillotine tool is invaluable when you have to cut lots of pieces – of either wood or plasticard – to the same length, and it's also very useful when cutting angles.) Once again using basswood, I started out by making the two side rails, cut the steps and then put the first one in place. This turned out to be a total disaster, since as soon as I applied pressure to hold the first step in place the side rails promptly sprang apart at the other end (a smarter modeller would have thought of that in the first place). I solved the problem by cutting a block of wood the same width as the steps and clamping the side

The stair platform, as finally occupied by the lady of the castle and her bodyguard.

The two sets of steps, together with the platform halfway up, in place on the completed model.

of the hill. Once all the timbers had been stained with Weather-Rite, I glued the runs of steps above and below the platform.

GROUNDWORK

With all the palisades in place, I marked out the areas in the bailey where buildings would be placed, and also – using masking tape – where the pathways would run. Then, using a very thin layer of green acrylic paint and an equally thin layer of ground scatter, I added those areas that would be covered with fairly trodden-down, scrubby grass and weeds. At this stage I also covered the motte with

rails to it, one either side. This enabled me to glue the first and last step in place and, once these had set, I could remove the block and fill in the rest of the steps.

In reconstruction drawings of such assemblies I had seen a sort of landing halfway up a long stairway – presumably a fighting platform to further complicate an attacker's approach to the keep – so I made up two separate runs of steps. I made the platform and its timber bracing and rails from scraps of basswood, and glued it to the face

The small tree that I 'grew' at the rear of the motte, for a bit of variety. I don't know quite why, but I really like the way this turned out.

fairly fine green scatter, and stuck on a shrub growing from the side of the mound. Then I covered the whole of the groundwork around the outside of the defensive ditch with fine ground scatter, and made a small stand of shrubs to the rear of the motte from a rather coarser scatter, in which I planted a small tree (just for the hell of it – I was getting mesmerized by all these flat green bits).

THE BUILDINGS IN THE BAILEY

The buildings were all constructed using the same basic method: a cardboard former with the necessary windows and doors cut out, which was then covered with one of a couple of different finishes.

The cardboard walls and gable ends were cut out and placed on a jig; this consists of a steel plate with the edges turned up at 90 degrees, with a number of strong magnets which can be moved about the plate (in the photos the magnets are the pieces with holes drilled through the middle). I put one end gable and one wall of the first building on the plate, with the joint of the corner set in one corner of the plate. This held the two walls at right-angles to one another. I then placed one of the magnets to hold the end gable against one side of the plate, and the other to hold the wall to the adjacent side. With the walls firmly secured I ran white

glue down the inside joints at the corners, and added a piece of matchstick as a brace. Once they were dry, I put the other wall and gable in place and – using a pair of engineer's steel right-angle blocks on the outside, and a pair of magnets gripping these from the inside – I glued the remaining bits in place, adding matchstick braces in all the corners.

Next came the roofs; these were simply pieces of cardboard cut to fit, but not butting together at the ridgeline – I needed to have gaps for smoke holes in the final roof cladding. I used a sliding clamp to hold the roofs in place, and a pair of jaw clamps to secure the timbers that were to be added to the cardboard formers.

For the wall cladding of a couple of the buildings I needed to reproduce a wattle-and-daub effect. This was relatively easy, since I had made similar buildings for a museum in Switzerland; for that job I had made up panels of woven fibre, and my good friend Gerry Embleton, of Time Machine AG, had made me some silicone moulds from these. I had also had moulds made up for thatched roofs and thatched ridgepoles. I mixed up some Eberhard Faber ceramic casting powder (not plaster of Paris – I find this too soft), and poured this into the moulds. This casting powder sets in a much shorter time than plaster of Paris, and you can tip the mouldings out in half an

hour or so. Using this method I was able in a fairly short time to cast a number of wattle-and-daub panels, some larger straw- and reed-thatched roof panels, and all the ridgepoles that I needed.

The first house was to be a timber-framed building with wattle-and-daub panels between the timbers and a roof thatched with straw. I attached the timber framing directly to the cardboard; then took a panel of the cast infill and cut the shapes necessary to fit between the timbers. Because the ceramic castings are so much stronger than plaster of Paris it was quite easy to shape the panels with a jeweller's saw; I fixed them on with PVA glue.

The ceramic castings of the straw roof halves were put on next; as with the cardboard roof, I did not butt the two halves together, since this gap would be covered by the cast ridgepole. Taking one of the ridges, I cut it in half and then cut a piece off each half, so that when it was placed on the roof I had a gap in the middle for the smoke hole. (I had deliberately cast all the ridgepoles longer than any of the buildings, so that I would always be able to make up the right lengths.) When everything had dried I painted the wattle panels in a thin coat of Off White acrylic to represent whitewash, and let smears of this get on to the timbers as well. The roof was painted a dirty straw colour, and the smoke hole

Making up the cardboard formers for the buildings on my magnetic jig. The metal block with a hole in the centre is a magnet, holding the building tight against the side of the jig, with engineers' right-angle blocks up against the outside of the walls. Note the short lengths of matchstick set inside the corners to provide bracing for the joints; the cardboard formers need to be rigid when I start adding the plaster claddings to the outside.
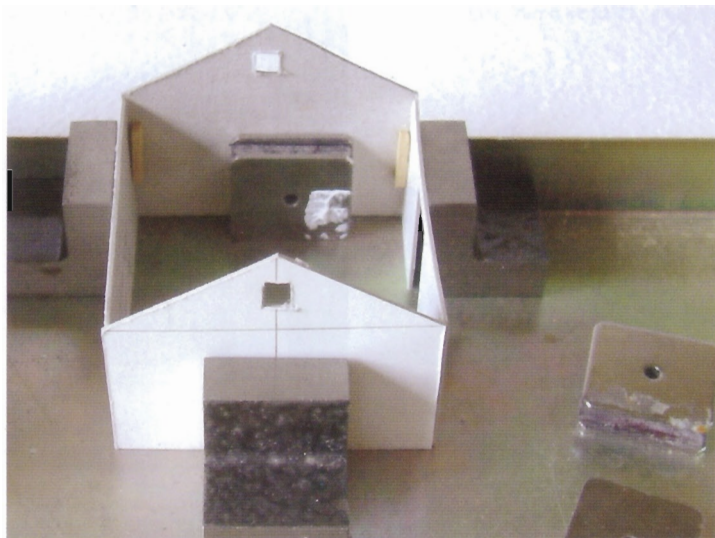
The two types of clamp used for holding the roofs and timberwork in place on the cardboard carcasses
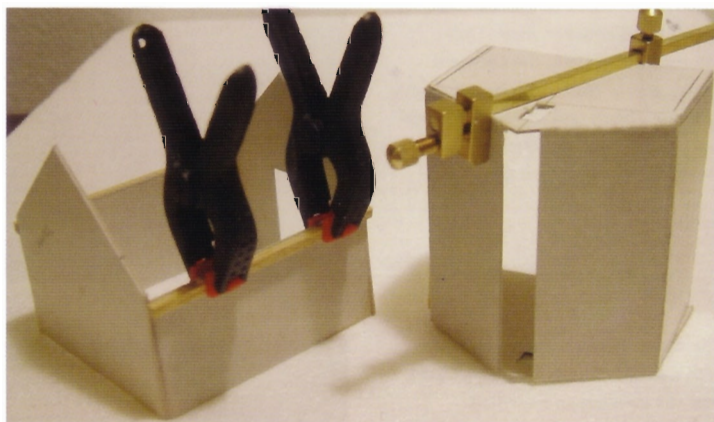
Silicone moulds which I used for casting the plaster panels of cladding. The castings here are a large reed-thatched roof panel (left); a length of wattle-and-daub (top right), above a length of timber fencing; a thatched ridgepole (centre); and a narrow strip of thatching that can be used for several different applications (bottom)

A couple of thatched roof panels.

The timber frame building under construction, with timber uprights glued in place and wattle-and-daub panels fitted between them. Unlike softer plaster of Paris, the Eberhard Faber ceramic plaster can be cut cleanly with a jeweller's saw, so one cast panel can provide enough differently shaped sections to cover quite a large area.

The timber house under construction, with the walls clad but the cardboard roof still awaiting its thatching.
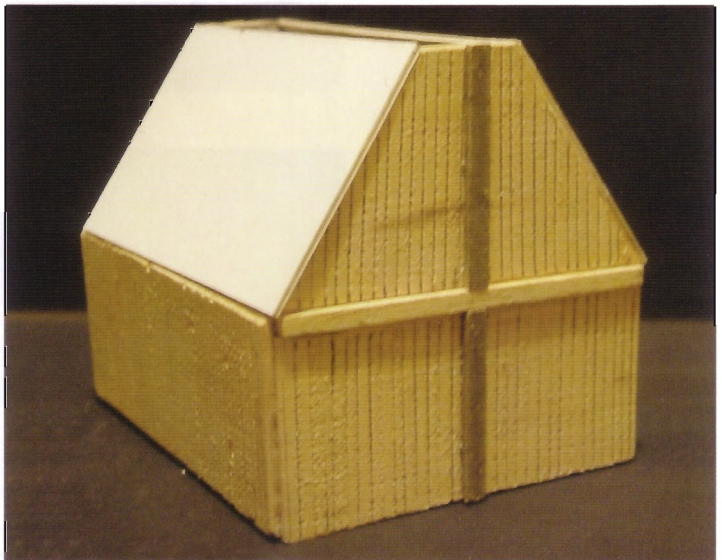
The roof of the timber house represents reed thatching; the two fine twigs laid along it represent the securing poles that were lashed through the thatch to the roof frame. The front gable end has timber framing coated with whitewash (white acrylic), and the plank door fitted in place. Note the thatched end caps on the roof ridge.

was stained inside and around the outer edges using charcoal smudged on with a finger.

The next house was a fully timbered one, and this was built in the same way as the keep, with basswood strips for the planking stuck to the cardboard former. The roof was made up with two panels representing reed, and the same method as before was used for the ridgepole and smoke hole. When finished, this too was painted to look like whitewash, and a greyish shade was used for a weathered reed roof. On both these houses I also added a small peak of thatch at each end of the ridgepole – these were used to help carry the rain clear of the gable ends of the houses and the doorways.

The small chapel came next; this simply had a few timbers stuck directly to the cardboard, which was then whitewashed to look like plain mud or clay lime-washed over. The roof was a bit different in that it was made of wooden shingles; once again, this was cast from one of my moulds, and then coloured with Vallejo Weathered Wood acrylic with a bit of Dark Brown mixed in.
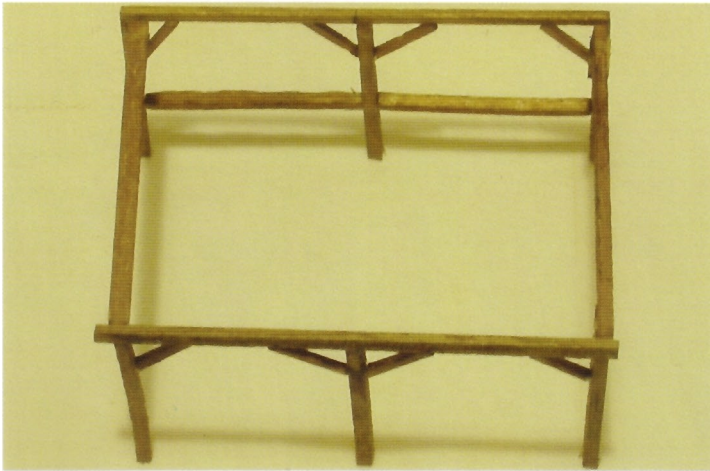
The simple framework of the stable, made with squared strips of basswood.
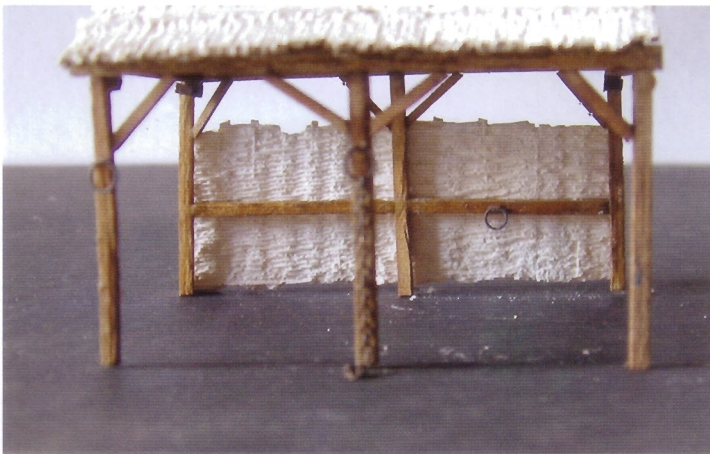
The stable with the rear wall of wattle-and-daub added.

BELOW LEFT The stable with its thatched roof waiting to be painted, and some of the detailing added to the frame.

BELOW RIGHT The stable interior painted and with hitching rings and chains added.

The lowly peasant's hut, with a leather door curtain made from thin lead sheet. The roof is thatched with straw; the timbers are deliberately a bit irregular; and note the damp staining the wattle-and-daub, particularly where it meets the ground.

The smaller hut was again made with wattle-and-daub panels, with deliberately 'wonky'-looking timbers. The leather curtain to cover the doorway was made from thin lead sheet with creases and sags pressed into the back, and coloured with Vallejo Flat Brown dry-brushed with Light Brown and finally dusted with MMP Medium Earth weathering powder.

For these buildings all the door hinges were made from plasticard strip, and the door

Some of the buildings ready to be added to the model. Note the simple whitewashed chapel at the back, and the stone well coping at the front.

handles were carved and shaped from scrap basswood.

Finally, the bailey needed a stable (this did not have to be big: the garrison of such small keeps could be counted on your fingers, with

only a very few mounted men-at-arms). I built the framework from squared strips of wood and then added a partial back wall of wattle, which I painted in natural shades of brown, omitting any whitewash.

The roof was made from two pieces of reed-thatched casting; the larger, rear part was virtually a whole panel of this, with a shorter front section, set at an angle to shed the rainwater. To get this I just cut a section from a whole panel and then stuck the two together, with a strip of wood bracing on the underside to strengthen the joint.

The well installed on the 'poached' ground of the bailey, with its cover in place. This is a simple disc of basswood, scored with planks and grain; as on the keep doors, the iron bands are plasticard strip with punched studs, painted Matt Black and then washed with Rustall.

The whole thing was then stuck on the wooden frame. I added a bit of detail with a length of chain on a hitching ring at the front and another inside; both the chain and the rings were dipped in Blacken-It, the chemical from Micro-Mark, which does just what it says on the bottle.

DETAILING THE BAILEY

It seemed reasonable to give the inhabitants of the bailey a well, to save them from endless trudging back and forth to the nearest river (life is hard enough when you are 28mm tall). I took a piece of

The finished well, made from a scribed ring of Balsa-Foam and coloured with Woodland Scenics Stone paints; note the ring of algae around the edge of the water surface. The pot is from the spares box.

Using a rotary cutter to chop up sisal string, to make straw for the stable and the midden.

The fine art of laying down a dung-heap; behind this first layer of straw is the walkway around the inside of the palisade, awaiting its last layer of MMP Medium Earth powder. The close-up below shows the wet 'manure' added to the midden.

King of all he surveys: a rooster perched on the finished midden, with his wives pecking around the yard, and a dove on the roof of the stable (note the cleaner straw inside).

didn't take long to position them. Once in place I faired them into the ground with Claycrete, and added some weeds along the base of the walls. (Always do this when adding virtually any type of structure to a diorama; it spoils the realism if you leave the buildings just sitting on the ground like so many boxes – look around, and you'll see that any walls other than those rising straight from city concrete have a line of greenery along the bottom.) I also added staining to the bottoms of the walls of the wattle houses, where damp had been absorbed by the daub and whitewash.

After so long spent on major construction and repetitive labour, I had earned the enjoyment of adding some details to the scene. Beside the stable I put a dung-heap or midden – always present wherever there are farm animals – which I made with sisal string. I find sisal the best material to use when modelling, since – unlike modern synthetic string – it will accept colouring. I cut a short length of the sisal and then sliced it smaller and smaller using a rotary cutter, until I had a nice heap. I put this by the stable and poured thinned white glue over the whole pile; after this had set I

'Balsa-Foam', and using a steel punch I gently worked it through the material until I had cut free a plug. (Don't use the tool as an actual punch with this material: Balsa-Foam is fairly friable, and if you try knocking a punch through it, it will just shatter.) Then I took a smaller punch and repeated the process on the plug of material, until I was left with a ring of Balsa-Foam. I used an old ballpoint to scribe the outlines of the stones, and then coloured it with Woodland Scenics Stone paint, darkening some of the stones to give a bit of contrast to the finish. When I'd stuck the well to the groundwork I made a disc of

plasticard and stuck it inside, near the top, painting it Gloss Black. Then I poured in a small measure of Johnson's 'Klear' floor varnish (I think this product is called 'Future' in the USA); this is ideal for creating small bodies of water if you don't want to use resin. When this set, I took some Lime Green acrylic and added little bits of algae around the edge of the water surface. The well cover is a disc of basswood, scored and stained and with plasticard iron bands and studs added.

I was now ready to start placing all the buildings in the bailey. Since I had already marked out the plots where each building should fit it

poured thinned-out Vallejo Light Brown over it, and added patches of Dark Brown for variation; last of all I placed a cockerel on the top, surveying his kingdom. More chopped-up string provided the rather cleaner straw inside the stable; a couple of chickens were set pecking around on the ground, and I put a dove on the roof and a couple more on the roof of the timber-framed house.
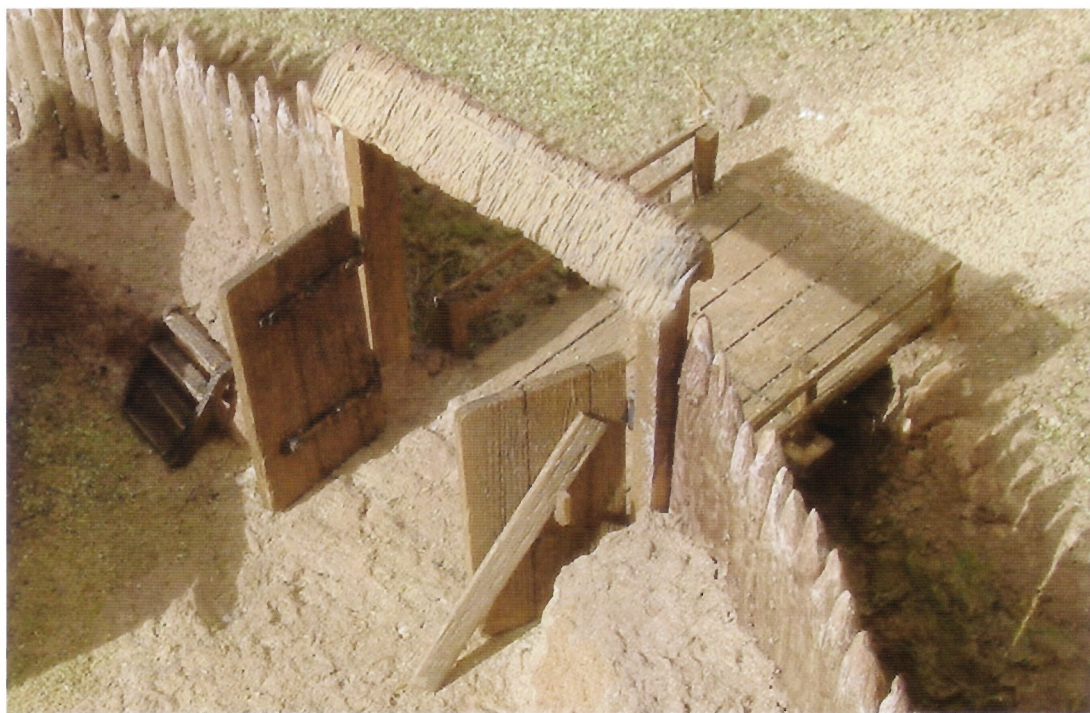
GATEWAY, BRIDGE AND DITCH

It was now time to turn my attention to the entrance of the bailey. I made a gateway roof from scrap wood, and thatched this with a piece from a ridgepole casting.

The gates were made the same way as the doors, with plasticard hinges and studs, painted Matt Black with small spots of rust added. On the backs of the gates I made a couple of brackets for the gate bar, and when I'd fixed the gates open I added this, slotted into one of the brackets. I stained the woodwork with Weather-Rite; then I made two pairs of wooden steps to be placed against the inner side of the sentry walk.

Earlier on in the build I had made up the beginnings of a sturdy timber bridge to cross the ditch to the gateway. I now finished this off with handrails, and dirtied the planking with MMP Medium Earth powder diluted with water

to represent dried mud. When it was finished I spread a little Claycrete on either face of the ditch and pressed the bridge into place. The ditch itself was detailed with scrub grass, weeds, stones, and bright green dried algae, where scummy water had previously dried; this gave a previously rather uninteresting crease in the ground a nice, busy, organic look. (A 1/65th scale frog or two was rather beyond me. Those obsessives who want

The bailey gateway in place, with the wooden steps leading up to the palisade walkway. Note the locking bar leaning in one of the brackets on the back of the nearest gate; the thatching over the lintel, to keep rain off; and the pointed logs of the palisade, shaped to resemble rough axe-work.

me with a number of their Norman period wargame-scale figures to populate the bailey. (I'm no great shakes at figure painting, particularly at this scale, so please don't take these as a good example of the Perrys' work – the figures are excellently made and much better proportioned than most wargames figures, and when properly painted they look great.)

I put the lady up on the stair platform with her bodyguard, looking down after her knight, who is about to leave. Down at the gateway he is leaning from his saddle to speak with his sergeant. In front of the chapel a priest, with his acolyte, is giving a blessing to a man leaving on a pilgrimage. Near the stable another rider is leading his horse in under cover. A couple of soldiers patrol the walls, and one of their wives appears to have her hands full with a bawling child.

I must admit that this is the first time I've built a diorama in this scale. I found it challenging, but a lot of fun, and I look forward to some future project which will give me the chance to profit from some of the lessons I learned this time.

more details might care to remember that the ditch flanking a bridge was usually the place where rubbish got thrown away – to the later delight of archaeologists.)

* * *

With both the motte and bailey complete, it was time to add the inhabitants. I do like a diorama to tell a tale, even if it's not a particularly exciting one, and for the purposes of photography I wanted to add some figures even if they were just placed on the ground on their bases rather than being faired into the surface. The Perry twins of Perry Miniatures were most generous in supplying

A view of the ditch with dead vegetation, reeds and dried-up algae in the bottom.

Looking across the bridge and through the open gateway into the bailey. With care, it is possible to create fairly convincing groundwork effects even at this small scale.

A number of general high-angle views
of the bailey, with all the buildings in
place but before adding the figures.
Spare planks and timbers are piled and
leant here and there in odd corners.
Note the wooden shingle roof of the
chapel – the only one without a smoke
hole. Most simple houses of the
11th/12th century had a fireplace in
the centre of the floor, the smoke
(eventually) finding its way out
through the hole.

BELOW A pleasant view in early morning sunlight, looking down from the motte into the back of the bailey. This shows the convincingly scruffy and trodden effect of grass scatter over earth, with occasional clumps of weeds.
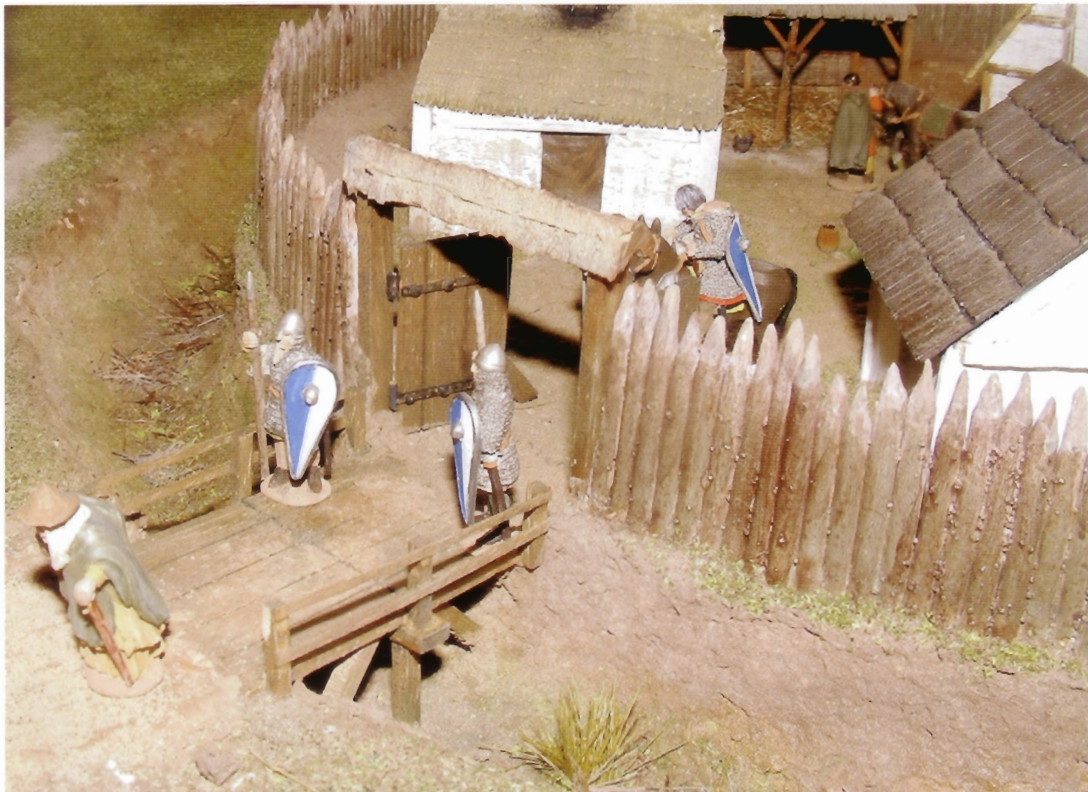
The gateway and bridge with the figures in place: the knight confers with his sergeant before riding out, and two soldiers stand sentry. For a display model, obviously, the figure bases should be cut down and faired into the groundwork.

FALL IN THE FOREST

I had recently been looking at a book illustrated by Richard Hook, with the most wonderful pictures of North American Indians, and this spurred me on to build a diorama I had had in mind for some time. I wanted to create a glade in deep forest; and while this could provide a setting from virtually any time and place, I decided to 'locate it' in the forests of the American North-East at the time of the French-Indian War of the 1750s, by adding as a final touch the figures of a couple of Mohawks scouting for the British Army.

The diorama started in the usual way, with a baseboard made from a block of polystyrene with another, shorter block stuck on top of it at the rear. I had decided to make my scene deeper than it was wide, adding a sloping rock face at the back to give it variation of level and also to provide a cut-off point for the viewer's eye.

BASEBOARD AND ROCK FACE

I first cast the rock face using two different Woodland Scenics moulds, and then joined them together side by side to give the width that I needed. I stuck this to the face of the higher polystyrene block using white glue; then I laid a layer of plaster bandage across the top of the

ridge, blending it down just on to the edge of the rock. When this dried it was given a coat of Claycrete mixed with pre-coloured water.

When the plaster bandage and its covering were dry, I laid a layer of grass matting over the top of the ridge, and added a few rocks poking up through the grass. I painted the rock face with a

The real thing: a typical deciduous woodland scene – though obviously this is open, managed forest with walks and rides left free; natural woodland would be much more crowded, and full of deadfalls. Note the pieces of fallen dead branches mixed in amongst the extensive carpet of leaf litter. If you are modelling a forest scene, you're not confined to making large trees alone – note the lighter growth in the background of this picture.
(Photo Stephen Windrow)

The two pieces of polystyrene that make up the baseboard, stuck together with the hot-glue gun.

The rock face at the rear of the diorama is in place, and the plaster bandage is laid over the layer of Claycrete that forms the ridge; I've just started laying a layer of Claycrete on top of the bandage.

shade of Light Stone colour from the Woodland Scenics Earth Colour paint set, and applied some very light washes of contrasting colours here and there, to represent mineral staining running down the rocks. I then added some more rocks poking up through the 'soil' in various other places, and gave these a coat of green acrylic; this would act as an undercoat for the moss that I would 'grow' on them at a later stage.

Using an old grapefruit knife to carve out a shallow disc of polystyrene that I will need later on.

GROUNDCOVER AND WINDFALL TREE

It was now time to start laying some groundcover over the whole of the Claycrete surface. First I sprayed the whole thing with a very finely atomized coat of Woodland Scenics Scenic Cement, using the refillable Arty's spray bottle from Fibrecrafts (described in Chapter 1). For the first layer I used a fine earth-coloured scatter, which I left for a while to dry off. Then I applied more sprayed adhesive, and laid on a layer of mixed herbs and fragments of dead leaves that I had ground up with a pestle and mortar; these gave me an interesting layer of differing colours and textures (and also smelled rather good). As I intended to scatter a final layer of fallen autumn leaves over the whole diorama, this was the stage at which to add all the general detritus of the forest floor.

I had found some nicely weathered pieces of driftwood on the beach near my home; these were broken into short lengths, and given a mossy coat with soft Olive Green pastel chalk. Next I made some fallen branches, using twisted copper wire for the general shape and covering them with plaster, which I then stained with a wash of thinned Burnt Umber oil paint.

The grass matting (from Silflor) laid over the plaster bandage on top of the rocky ridge; I've added a few rocks embedded in the grass. The rock face is coloured with thin acrylics from Woodland Scenics, including small tinges of brighter contrasting colour for streaks of mineral seepage, and a few weeds have been added here and there around the edges.

The Claycrete base coat is covered with a fine fibre scatter; and individual rocks glued to the groundwork have been given a coat of green acrylic, as undercoat for the moss that will be added later.
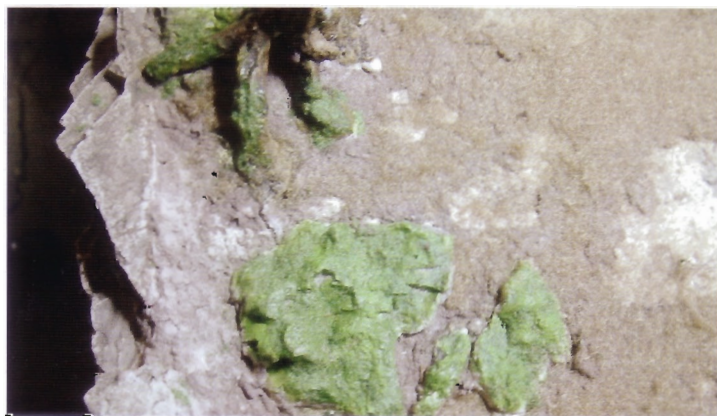
The root ball for the windfall tree is offered up here, and the next layer of groundcover has been applied. This consists of a mixture of dried herbs from the supermarket and dried leaves, ground up with a pestle and mortar.

Close-up of one of the pieces of driftwood that I used for fallen timbers. I added a mossy coating with ground-up pastel chalk, and used Vallejo Hull Red acrylic to add colour to the inside of the dead bough.

The real thing: fallen timber lying over moss-covered rocks in a water-scoured gulley on a forested hillside. In really primeval woodland the earth would be virtually invisible under a deep, chaotic layer of deadfalls in every stage of decomposition, covered with parasitic plants and with secondary growth pushing up between them. Historically, movement on foot through pathless forest was incredibly slow, where it was even possible. (Photo Gerry Embleton)

Copper wire armatures to form the fallen branches on the forest floor; and the armatures after receiving a covering of plaster and washes of Burnt Umber oil paint thinned down with white spirit.

The fallen branches in place on the finished model, under a tree at the foot of the rear rock face.

The real thing: the root ball of a windfall tree. Note the heavy forest litter of dead leaves, small branches and twigs. (Photo Stephen Windrow)

The polystyrene disc, which I had earlier cut out pf the baseboard with a grapefuit knife, is fixed to the base of the windfall with plaster, forming the basis of the root ball; and the top surface of the root ball after receiving a layer of Claycrete, dressed with groundcover and some bracken.

The underside of the root ball, built up with Claycrete with tiny stones and roots embedded before it dried; the roots are made with 'Superfast Wood-Stick' from Sylmasta, coloured with Vallejo Dark Sand. The final step shows the root ball coated all over with MMP Medium Earth powder, diluted with water.

The real thing: one fallen tree that has lost all its bark, invaded by moss; and another still with a scabby partial layer of bark. (Photos Gerry Embleton)

I now returned to the shallow disc of polystyrene that I had cut out from the baseboard earlier, and began turning it into a root ball for a windfall tree. When a shallow-rooted tree like a conifer is blown out of the ground it tears up a sort of 'lens' shape of earth, full of roots and small stones, which remains in place attached to the foot of the trunk. The tree was made in the usual way, with a wire armature covered in plaster – **see the end of this chapter for further notes on making trees.** I then secured the poly disc to the trunk with more plaster. The upper surface was given a thin coat of Claycrete and then dressed up with some groundcover and bracken. I added a thicker ball of Claycrete to the underside, into which I pressed some tiny stones and grit, and added some trailing roots.

The thinnest ones were made from copper wire, but the thicker ones with added rootlets were made from a product called 'Superfast Wood-Stick' from the Sylmasta company. This is a two-part epoxy putty which comes in a roll, with one element of the putty running down the centre of the other like the marrow in a bone. Just cut off the amount needed and work the two together until you have a pale tan-coloured putty; form it to shape, and put it aside to set – which takes a good deal less time than some two-part putties. I coloured the roots with Vallejo Dark Sand and then applied smears of watered-down MMP Medium Earth powder; I also ran this over the whole root ball once all the detailing was in place.

TREES AND BRACKEN

Having completed the recently fallen tree, I went on to make a much older dead tree still standing on its large, exposed roots. Again, I built the tree from copper wire encased in plaster. I left the upper part quite smooth, to give the look of wood with the bark stripped off; I used more plaster, dabbed on roughly with a spatula on the lower part, to represent rough bark. I coloured the upper portion with varying shades of Burnt Umber, Burnt Sienna and Black oil paints heavily thinned with white spirit, until I judged the colours about right. For the lower part I used Pale Grey and Green, once again thinned and trickled over the plaster – which, being absorbent, soaked up the colour nicely. To get a realistically heavy coating of moss on the roots I painted them first with a bright green acrylic and then, while the paint was still wet, I scattered some Woodland Scenics 'Snow' over them. This is composed of tiny micro-balls of polystyrene, which I tinted with green artist's ink; you can get these inks, in a variety of colours, from any good art shop.

The next step in covering the forest floor was the addition of bracken, for which I used Scale Link's photo-etched brass product. Like all this company's etched vegetation, the bracken arrives in a fret, and so to make life easy I sprayed the fret with Automotive Grey undercoat on both sides. Next I gave it an overall coat of Vallejo Dark Sand and, when this dried, I picked out different stems and fronds with Iraqi Sand and a few with Hull Red, to give the varying shades of dying autumn bracken. When everything had dried I cut the stems from the fret and stuck them into the groundwork in various places across the baseboard.

Next I made up two more sections of rock face from Woodland Scenics moulds and stuck them to the front face of the diorama. Once again, I coloured them with Woodland Scenics Light Stone from their Earth Colour set.

It was now time to add the three large trees; again, for the construction method see the notes at the end of this chapter. When they were ready I attached them by setting them in Claycrete, which held them firmly in placed when it dried. I deliberately spread a slightly larger amount of Claycrete so that I could feather the roots of the trees into the ground.

I now returned to the depression in the base from which I had earlier cut the disc of poly for the root ball of the windfall. I added some grit, some more Superfast

The standing dead tree, made with copper wire and plaster. It is coloured with Burnt Umber, Burnt Sienna and Black oil paints on those upper parts where the bark had peeled off, and with green and grey oil paints over the lower, bark-covered portion – see the close-up. I thinned all these colours with white spirit so that they soaked easily into the plaster coating.

A fret of etched-brass bracken from Scale Link. It is much easier to paint these fronds while they are still attached to the fret; if you mark any of them when cutting them off, it's the work of a moment to touch them up after they are glued in place on the model.
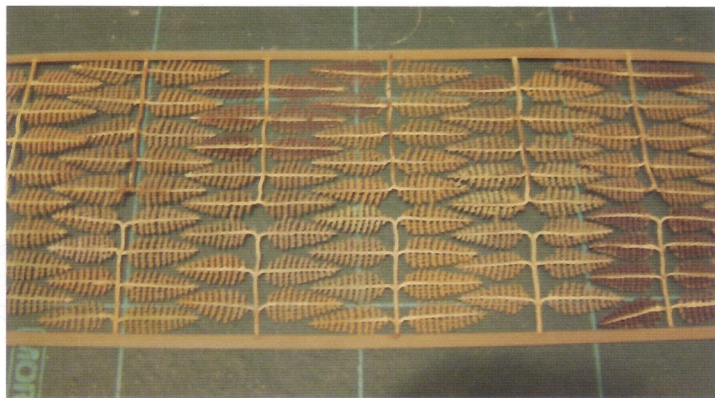
Clumps of bracken in place, growing against the rock face and under the trees at the back of the diorama.

The real thing: a stand of bracken in an autumn wood. (Photo Stephen Windrow)

Feathering the base of the large trees into the groundwork with Claycrete.

BELOW The windfall tree in place, leaning against its neighbour, with the root ball torn out of the earth. Leaving the depression below relatively free of the dead leaves and other litter covering the rest of the forest floor creates an impression of a recent fall.

Wood-Stick roots and earth scatter to the hole; and then glued the windfall tree in place, leaning against its neighbour. At this point I also attached a rotten treetrunk to the rocky outcrop at the front of the diorama.

THE ULTIMATE ROTTEN TREETRUNK

I wanted to have a fairly substantial rotten tree in my scene (largely for the fun of detailing it). First, I liberated three of my wife's hair curlers – the plastic 'hedgehog' type

– taking three different sizes so that I could telescope one inside the other, and clipped off all the little spikes. Next, I cut a section out of the side of the largest one, and a hole a bit further round. I slotted a piece of the smallest roller into this hole, which would become the stump of a bough sticking out to the side. From the middle-sized roller I cut out a section running the full length, and from the smallest a section running about a third of the way up it. I then slotted the three rollers one

The Woodland Scenics Snow cover, tinted with green ink, makes excellent moss texture for tree roots and rocks.

inside the next, with all the removed sections lined up. I now had an armature on which to build the treetrunk.

First I coated the whole thing, inside and out, with Eberhard Faber ceramic casting plaster and, while this was still wet, I made a small branch from copper wire and plaster and stuck this into the plaster on the side of the stump of

The armature for my rotting tree trunk: three different-diameter hair rollers, 'de-spiked' and telescoped one into the other, with a fourth stuck into a hole on one side to form the stump of a heavy bough.
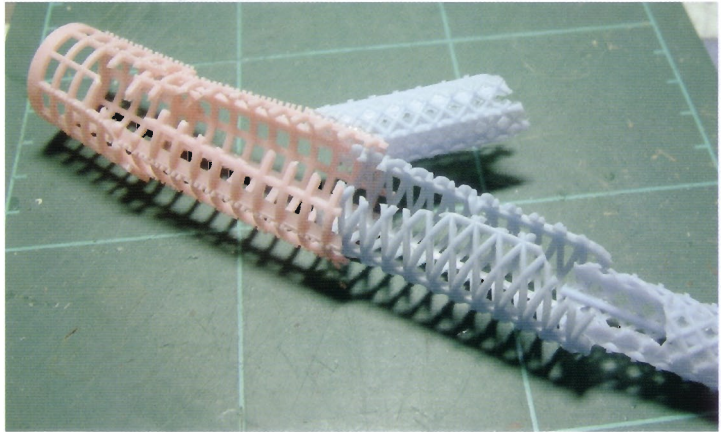
When the armature was covered with plaster, I added some smaller branches made from copper wire.

Starting to add colour: the inside of the trunk was given a coating of Vallejo Buff and then a thinned wash of Iraqi Sand.

The outside of the trunk was coloured with mixed washes of Vallejo SS Camo Black, Grey-Green and Buff, added in no particular order or density – I just played with the colours until they looked right, bringing out the layering and texturing of the plaster bark.
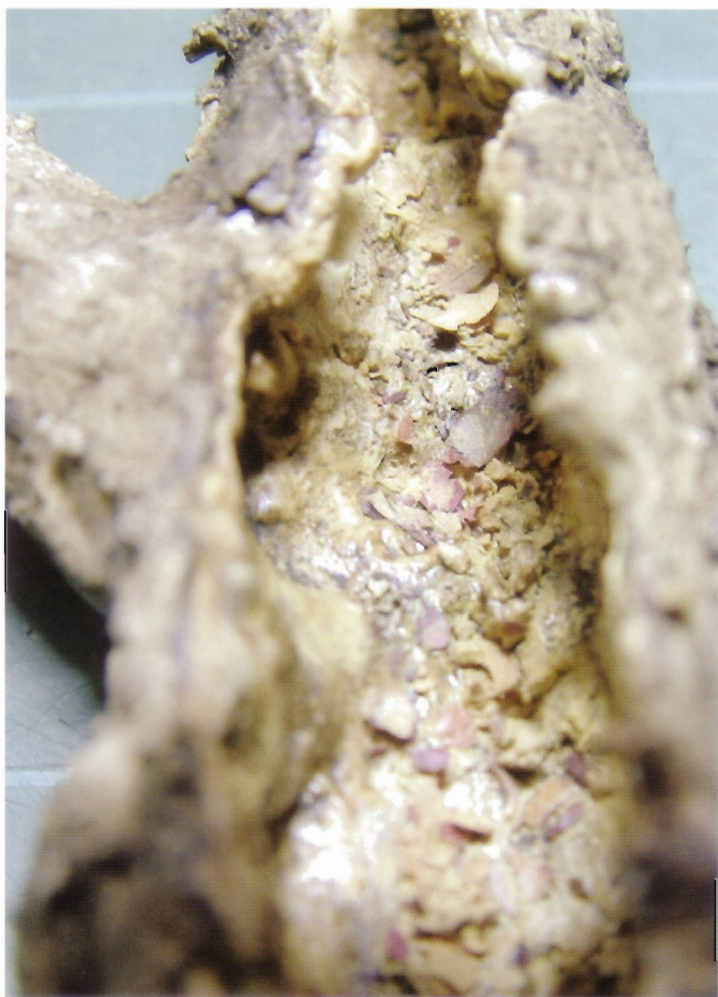
Leaves and other forest litter have been added inside the trunk and secured with a spray of Scenic Cement.

BELOW The real thing: sulphur-coloured lichen growing on a rock – as it also does on dead timber. (Photo Gerry Embleton)

One or two small clumps of lichen have been added to the bark. Also note the clear dividing line between the colours at the edge of the split, where the soft, rotten heartwood meets the tougher remains of the bark.

The real thing: toadstools growing on a mossy tree trunk. (Photo Stephen Windrow)

My toadstools were made from Superfast Wood-Stick, and the tops were coloured with a very thin wash of Burnt Umber oil paint.

The toadstools growing in the damp punkwood inside the rotten trunk. I fixed these with superglue, as they wouldn't stay upright when using the slower-drying white glue.

the broken bough. When everything was dry I painted the inside of the tree with Vallejo Buff, and then a wash of Iraqi Sand. I then added more plaster to the outside, laying it on with a spatula

fairly roughly to give me a nice rugged coat of old bark. This was then given several washes of acrylics, in no particular order, including SS Camo Black, Grey-Green, Buff and any other colour I thought would look right. (I know this isn't the way vehicle modellers approach a paint job, but I'm afraid that Mother Nature doesn't work to NATO Standards! All I can say is that you'll know when it's right.) The next step was to add general leaf litter and organic crud inside the trunk, which I secured with a light spray of Scenic Cement.

After this litter came the *piece de résistance:* scale model toadstools! Once again I used Superfast Wood-Stick for these, moulding the heads on the end of a needle, and just rolling a length of the material out to cut up for the stems. This putty dries to a pale tan colour, so all I needed to do was to wash the tops of the heads with thinned-out Burnt Umber oil paint, and they were ready to be glued in place with little spots of superglue.

The final touch for the rotten treetrunk was to add a couple of stems of ivy growing around the end. The ivy was another Scale Link etched brass fret; like the bracken, I painted it all in place before cutting off the length I needed. The stems were painted in

Scale Link ivy; I built up the stems slightly with white glue, and painted them while still on the fret.

Twist the stems around a bit when you've cut them from the fret, and twist some of the leaves again once they are in place on the model, so they don't all lie in the same direction.
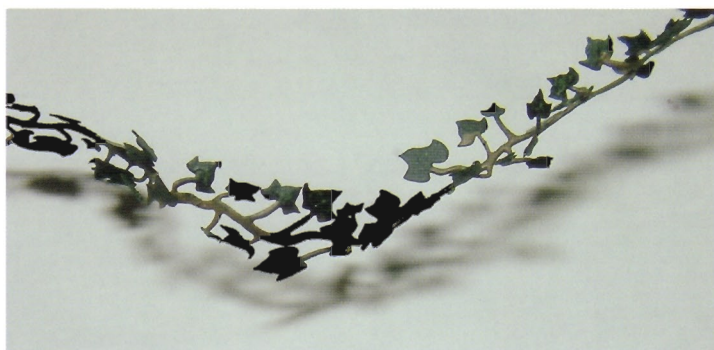
BELOW The rock face at the front of the diorama.

The end of my rotten treetrunk in place on the frontal rock face, with ivy growing around the end.

The real thing: layered rock strata breaking through the earth in woodland, with clumps of vivid green moss. (Photo Stephen Windrow)

The Woodland Scenics Snow added to
the rocks and tinted green for a mossy
cover.

Forest litter under the trees – the final
scattered top coating of leaves is made
with the seeds from silver birch tree
catkins. Both these shots were taken out
of doors in natural sunlight, the
difference from photos taken with
artificial lighting is very noticeable

Looking down at the forest floor through the bare branches.

give a mossy coating to all the exposed rocks in the scene. The last layer of forest litter was then spread over the whole diorama; this was made from silver birch seeds, which can be collected in the autumn. Take the catkins from the tree and simply roll them between your palms; the tiny leaf-shaped seeds separate out, leaving the skeleton of the catkin to be discarded. After scattering these fallen leaves and forest litter by hand, I gave the whole diorama a final touch of Scenic Cement.

FIGURES

With all the natural elements in place, I now had to add my Indians. My knowledge of this period is pretty scant, but I had a word with Richard Hook – probably the leading expert in this country on Native American costume – and he kindly gave me a wealth of information about the type of clothing that could have been worn by Mohawks who sided with the British in the French-Indian War. The white-metal figures are beautifully made by Andrea, and were obtained from Historex Agents in Dover; I painted them with Vallejo acrylics. I then placed them in the scene, but deliberately about halfway back so that they did not 'jump out' visually and dominate the diorama – I wanted their placing to complement the stealthy character of a scouting scene.

Khaki acrylic and the leaves all in Dark Green. Once you have cut the stems free from the fret it is best to gently bend and twist them, and some of the leaves, so that they don't all lie neatly parallel. Before sticking them to the trunk with superglue, I touched in a few of the leaves with some Lime Green

acrylic to represent the newer growth, and used satin varnish to give the leaves a slight sheen. The treetrunk was now ready to fix in place, in all its festering glory, on the rocky outcrop at the front of the diorama.

Before spreading the final coating of fallen leaves to the forest floor, I added some of the Woodland Scenics Snow, suitably tinted with green artist's ink, to

It is only at this final stage that the diorama is identified in time and place, by the Andrea Miniatures figures of two Mohawk Indians scouting ahead of the British Army – perhaps for Brigadier Forbes, around Fort Duquesne in autumn 1758?

Playing with lighting effects: I placed the Mohawks to be less than obvious, to emphasize the 'story' of the diorama. In strong sunlight the figures almost merge into their woodland background.

Even in shadow, where the scarlet coat draws the eye nicely, the figures do not overwhelm the scene – the brooding, timeless forest makes the dominant impression.

FURTHER NOTES ON TREES

Originally I had intended to refer readers to the booklet produced by Barry Bowen for a detailed explanation of how to make trees using his method of wire armatures and plaster coating, as used for the trees in this and my previous book. Unfortunately, Barry tells me that these booklets are no longer available and he doesn't foresee their being reprinted. In view of this I decided to repeat here the basic information that I included in *Terrain Modelling*; it would be a touch arrogant to assume that everyone has read it. I have also added a few pictures which may be of help in sparking ideas for new dioramas.

If you want to make a realistic tree, it's clearly a good idea to have some reference. The two books I

ABOVE The real thing: a heavily wooded cliff of horizontal rock strata. When you plan your woodland diorama, look at nature, or good nature photographs; make sure your groundwork matches the type of trees, and that the different types of trees belong together naturally. (Photo Stephen Windrow)

LEFT The real thing: a slope makes an attractive and controllable backdrop against which you can place the main subject of your model – whether figures or a vehicle – in the foreground. These dark conifers make a good cut-off point for the eye, and there is plenty of litter on the slope to make it interesting. You could even add a small stream running down it, or a ditch or rock wall at the bottom. (Photo Gerry Embleton)

LEFT The real thing: a snow scene on the fringes of woodland, in the blue of a midwinter dusk. This sort of setting gives ample scope for a diorama based around a winter march or an overnight camp – anywhere from Rome's Germanic frontiers, to the 1812 retreat from Moscow, to the Ardennes in winter 1944. (Photo Gerry Embleton)

BELOW An overhead shot of the 'Fall in the Forest' diorama, showing leafless boughs and branches textured with plaster and painted. When applying the washes it is better to use two or three thin coats rather than one thick one. Should you make a complete pig's ear of the paint job, don't despair: just add another thin skim of plaster, and start again – variation of texture is a plus.

The real thing: your trees don't always have to be green. As long as you take nature as your guide, it looks better if you mix your colours. (Photo Stephen Windrow)

originally recommended are both, sadly, out of print, but it is certainly possible to pick up second-hand copies either from the web or from a second-hand book dealer – that's how I got both mine. The first is called *The Complete Guide to Trees in Britain & N.Europe* by Alan Mitchell, published in 1985 (ISBN 1 85028 000 2); the second is *The Oxford Book of Trees* by B.E. Nicholson & A.R. Clapham, published in 1975 by Oxford University Press. This second book not only gives you reference on the

trees themselves, but also valuable information on the type of vegetation and woodland habitat in which they would be found, all in colour. (The subjects are British, but for modelling purposes these apply equally to the habitats of northern Europe and North America.)

One point that has to be addressed before you start making your tree is the question of scale. Assuming this is to be a 1/35th-scale model, you will have to give yourself a bit of artistic

licence: while you can demand absolute accuracy in the measurements of your Sherman or Tiger, you will be unable to do this with your trees. To give you an example: if you were making a beech tree, which could grow to 60 feet (about 20m) in real life, you would need a model tree about 2 feet tall (600mm). If you went completely mad and tried to model a 1/35th-scale Californian redwood, it would be about 9 feet tall (nearly 3m) in scale. In practice, you will have to make up your own mind what to do about this: either blow the tops off your trees with shellfire; blow them over in a hurricane; limit the top edge of your diorama artificially in some way, such as with a box case; or stick to small fruit trees …

Before tackling your tree, consider where it will be growing. If you are creating a conifer-woodland scene, then the ground under the trees should be a spongy mass of greyish-brown dead needles and, apart from conifer seedlings themselves and the odd bramble, virtually nothing else will grow there; the soil is too acidic and the mat of needles effectively smothers everything. By contrast, a deciduous (hardwood) forest has a riot of growth in the rich mulch of

A completed tree, with foliage in place.

dead leaves that has collected over the years, so you can put in bushes, brambles, weeds, bracken and wildflowers to your heart's content. In both cases, do remember that a fair number of fallen branches of various degrees of freshness, dead twigs and perhaps rotten stumps should be scattered about (the latter adding the opportunity for scale model fungi if, like me, you are kinky that way).

Outcrops of rock are also plausible in some forest habitats, but do study proper reference pictures first. You want your diorama landscape to look convincingly integrated – not like the soundstage for a cheap TV drama, with laughably unconvincing chunks of plaster sitting around with no good reason to be there.

ARMATURES

The armature of your tree is made from any type of wire that can easily be bent and twisted to shape with your fingers. Whatever the height of tree you want (let's say an 8-footer), you need about nine lengths of wire two-and-a-half times the finished tree height – so in that case, nine wires about 20in long. Double the wires in half, so that you now have 18 ends. Hold the wires at the bend, and make a loop big enough to fit three fingers through; this will be used to make the base. Now twist the 18 strands together spirally, to start the trunk. Go back to the base, take the large loop you made, and twist it into three smaller loops. Give each loop a twist or two so that you finish up with a

length of twisted wire ending in a smaller loop; this will form the base roots of the tree, giving a 'foot' to anchor into your groundwork.

Returning to the trunk, and moving upwards: take four of the 18 strands, and twist them together for a length of say 1½ in – this will be the start of your first bough. Now divide the four strands into two pairs of two strands; twist these together, leaving two single strands at the end of each. You now have a bough that forks into two branches which, in turn, each fork into two single twigs.

Now twist all 14 of the remaining wires to make some more of the trunk; then repeat the above exercise to create the next bough (obviously, make your branches grow out from different sides of the trunk). Repeat the above steps until you have only six strands left at the top of your trunk. Separate these, and twist three of them together; then two of these, leaving these untwisted at the end, as you've done with all the other branches; you now have a bough with two single branches, each of different thickness. Finally take the last three strands, and repeat as above. I know this sounds complicated, but hopefully Barry Bowen's diagrams reproduced here will

MAKING A LOOP

FORMING THE TRUNK

This section forms the basis of the trunk

MAKING THE BASE

THE FINISHED BASE

FORMULATION OF FIRST BOUGH

A FORKED BOUGH AND BRANCHES

Bowen's diagram of the steps in making up the wire armature for a deciduous tree, as described in the text. This basic pattern can be modified in any way you want, varying the height, the thickness, and the number of boughs.

help you make sense of it; with a bit of practice you'll find it isn't nearly as hard as it sounds.

You should now have 18 single ends on your tree which, if necessary, you can clip back so they don't all look exactly the same length, before bending and shaping the frame to the skeletal outline you want. If you wish to have a tree with a forked trunk, it's easier to make two separate ones and then bind them together with your wire.

PLASTER

The next step is to cover the armature with plaster; you can use Polycell, Tetrion, or any other powder-type filler. I don't recommend using the Eberhard Faber ceramic casting plaster that I have recommended for other applications: this dries too rigid, and you need to retain a bit of flexibility once the coating is in place. To get this flexibility you can add white glue to the mix, but remember that this will extend the drying time. If

your tree is to have fairly smooth bark then this mix is ideal, but if you want a really heavily textured finish then leave out the white glue, and add further irregular areas of plaster on top of the layer. Another useful texturing material is the Flexi-Bark already mentioned.

Mix up your plaster, aiming for a consistency that will flow reasonably freely; then, holding the tree upside down over a dish or paper, apply the plaster to the trunk and the underside of the boughs with an old brush, working your way up the tree from the foot. Now stand the tree on an old plate, which you can use like a turntable, and coat the upper surfaces of the boughs and any parts of the trunk that got missed the first time around. When coating either the underside or topside of the branches, leave the single end wires (twigs) uncoated — when you start adding foliage the bare ends of the wires will take the glue better than plastered surfaces.

Once the whole tree is coated, and just before the plaster has dried, take a scriber or knife blade and score the bark texture into the surface of both the trunk and the larger boughs, adding any knots and hollows as required; then set the whole thing

aside to dry. If you haven't used Flexi-Bark to add a roughened texture, then – again before the plaster has set – take an old toothbrush and stipple the surface of the tree to roughen it up a bit.

PAINTING AND FOLIAGE

When your plaster is set it's time to apply colouring. I use several successive washes of heavily thinned oil paints: Burnt Sienna, Burnt Umber, Raw Umber and, for shading, Black. Hold the tree upside down over your plate again, take a large brush and apply the wash over the trunk and boughs. The plaster tends to soak up the paints like blotting paper; the painting takes little time, and it dries quite quickly. Now stand the tree upright and touch up any parts you may have missed. You can emphasize the textured bark by making up a darker wash with some Black, and use a smaller brush to run the darkened mix down the scoring marks you previously made.

Obviously the foliage you now add will depend upon the type of tree you're making. One of the most useful materials is

The basic construction method can be varied to match any scale. These are an armature and a finished pine tree in 1/72nd, made by exactly the same method as for 1/35th models.

'Rubberized Horsehair', which you can get from the 4D Model Shop. This makes an excellent basis for tree foliage, which you can then overlay with scatter (it's also good for hedges, bushes and so on).

While the measurements suggested above are for a 1/35th-scale model, you can naturally use exactly the same method for 1/72nd and other scales.

TECHNIQUES

This chapter deals with a couple of types of terrain effect illustrated by modestly sized vignettes rather than full dioramas; and it also seems the logical place for a few introductory notes on the technique of 'false perspective' as applied to terrain effects in boxed dioramas.

MUD AND WATER

I had been reading a book that recounted the experiences of people in various walks of life who had lived through the Second World War in Britain. One of them was a man whose age and fitness had prevented him seeing active service, and had been a member of the Home Guard in East Anglia. I was struck by the sheer boredom of his life, at a time when the world was in turmoil. When thinking of models for this book I thought I would try to

create a little snapshot of this chap's service – a day spent guarding a completely unimportant tidal inlet somewhere on the East Coast, long after any threat of invasion had faded. This kind of landscape seemed perfect for creating an impression of sheer monotony, but it also has interesting technical challenges.

As usual, I started off by making the baseboard from a piece of polystyrene, on which I made a rough sketch of the shapes that would become the edges of the flanking

meadowland, the banks and the channel down the centre. I then cut out a shape for one of the banks from a polystyrene ceiling tile, which I traced roughly on to a piece of lining paper. Using this as a template, I cut out three more pieces and stuck them on top of one another, to make the basic shape of one bank. I didn't worry too much about making each piece exactly the same as the first, since the whole thing was going to be covered with plaster later. With one bank in place I repeated the exercise and made up the second one.

The basic layout of the banks of the inlet, with pencilled guides for the positions of the central watercourse, the drainage channels across the mud, and the boat skeleton.
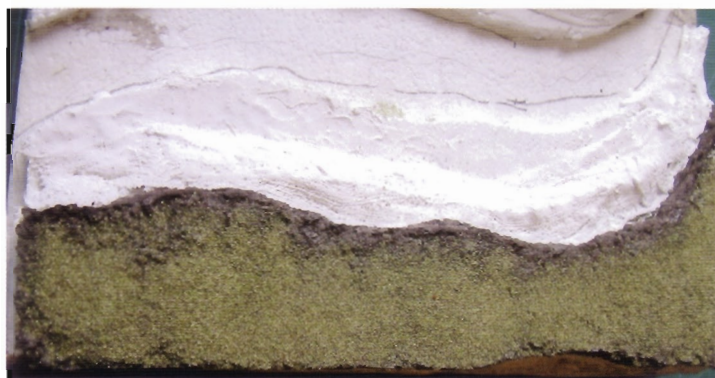
Plaster bandage laid over the rolls of dampened newspaper; and the green scatter undercoat that I applied to the meadow areas before adding the grass matting.

The plaster coating is applied to the inlet; more will be added to smooth over the plaster bandage banks.

The boat skeleton was made up from scrap basswood; it was first stained with Weather-Rite, and I then added various applications of different shades of green pastels over the whole thing.
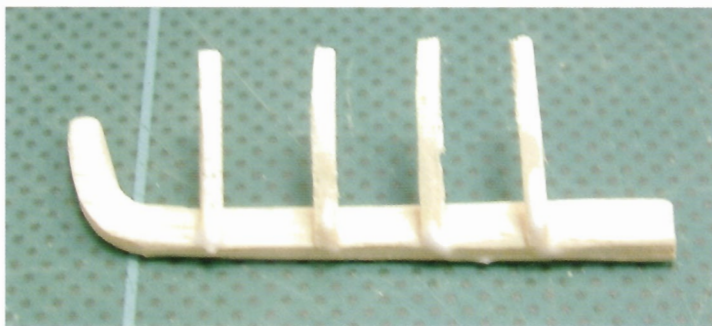
The remains of the boat half-buried in the mud. At this stage the overall satin varnish coating has not been applied.
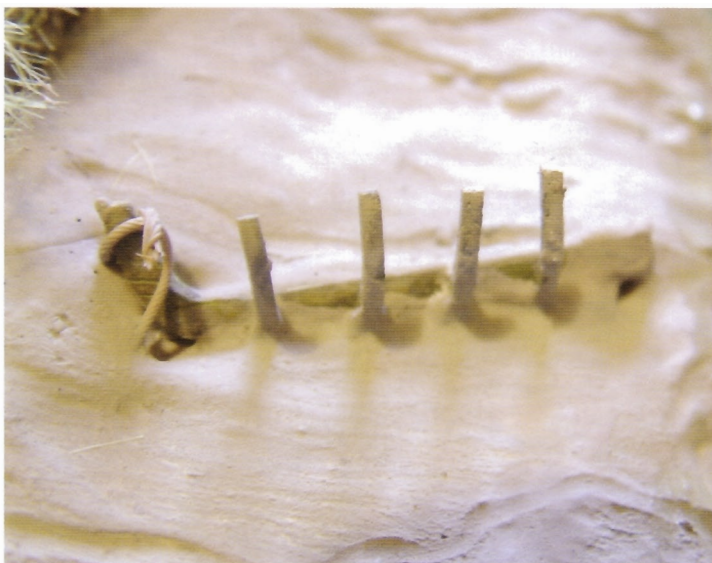
Carving the channels in the mud where the water has drained down. These follow the line of least resistance through the sloping mud, and naturally adopt a sort of sinuous tree-pattern.
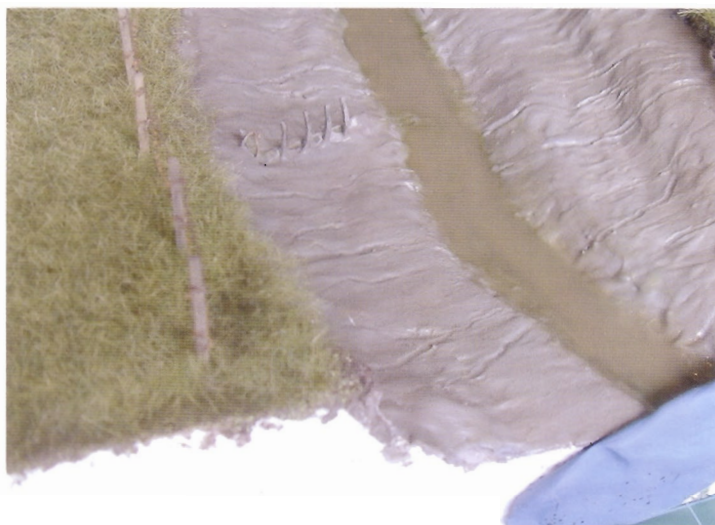
Before pouring on the Realistic Water I stuck a 'dam' of Plasticine at each end of the model to prevent any leaks.

In this close-up it is just possible to see the coloured swirls in the tinted resin layers, where 'mud' is being gently tugged downstream.

Fence posts made from headless matchsticks, supporting Scale Link barbed wire

The next step was to create a gradual slope from the level of the fields down across the mud to the bottom of the watercourse, since there would not have been any sharp transitions on this sort of ground feature. I took some pieces of newspaper, dampened them, rolled them into rough sausage shapes, and laid them along the sides of the inlet, tucked up under the edges of the bank. While they were still damp I took lengths of plaster bandage and laid them over the newspaper, blending the whole thing into a gentle slope. This was repeated for the other bank. The

Looking through the fence at the opposite bank.
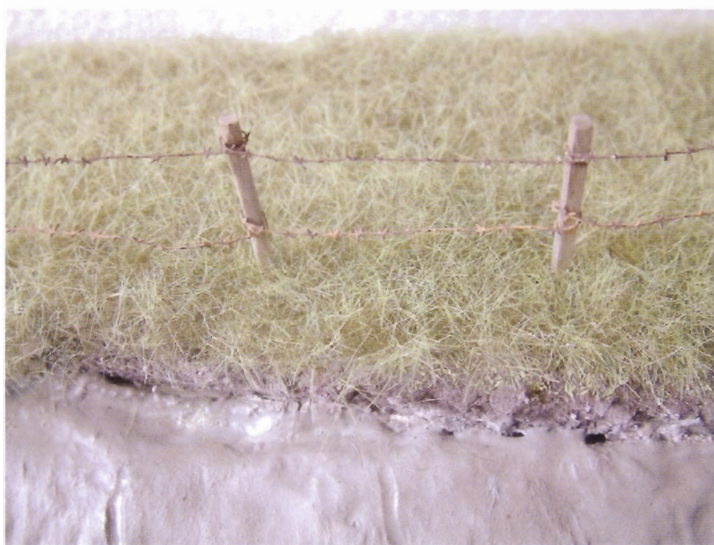
last layer of plaster bandage was used to round off the last step down into the bottom of the water channel.

As all the plaster was drying, I first of all covered the area of the meadows either side of the river

with green scatter, to act as an undercoat for the next layer, for which I used Silflor grass matting. This is a fairly open-weave matting, and the green scatter would prevent any of the white polystyrene tile from showing through. On one

ABOVE The mooring post with its rusty chain.

side I used some fairly long grass, in which our bored sentry would be standing; on the other I used the same grass and then added clumps of coarser growth, to give the appearance of a pasture that had not been grazed for some time.

I decided that two stretches of wet mud would need a little something added to break up the monotony, so I used some scrap basswood and fashioned part of the skeleton of an old boat, to be half submerged in the mud. I also made an old mooring post, complete with a rusty chain, to be set at the river's edge.

The mud was made with Polyfilla powder, since I wanted a fairly slow-drying plaster, giving me

plenty of time for shaping. I mixed it with water already coloured with Grey acrylic paint, and laid it along the inlet with an old ½ in paintbrush before smoothing it out with an artist's palette knife. While it was still damp I used the handle of a paintbrush to create the sinuous grooves running down the mud to the central channel, formed by the water draining off as the tide receded.

Before starting to add the water to the channel I 'dammed' both ends of the model with Plasticine

BELOW Close-ups of the Hornet figure modified for me – with his usual patient good humour – by Gavin Haslup. This lonely Home Guard sentry doesn't look any happier from the back.

to stop any overflow — it peels off easily once the resin has set. For the water I used Woodland Scenics Realistic Water, with the addition of a mix of Khaki and Olive Green acrylics to give a nice muddy look. I poured it on in progressive layers about $\frac{1}{16}$ in to $\frac{1}{8}$ in thick, allowing each to set before adding another layer, if needed. Before the top layer had set, I dragged a toothpick through the water, disturbing the colouring to create the appearance of swirls of silt being pulled from the mudflats and flowing down towards the sea.

When the water had set, I went back over the muddy areas and gave them a couple of heavily thinned Brown acrylic washes, to tone down the slightly unrealistic grey colour. Once this had dried I added two coats of satin varnish. I deliberately did not use a

Bored, hungry, dying for a cuppa – and if he's any judge, any minute now it's going to p*** down …

high-gloss varnish, since this would be an unrealistic finish for mud that has been exposed to the air for some hours and has had time to dry off a bit.

The fence posts along the bank were made from headless matchsticks (you can pick up bags

of these from most arts-and-crafts shops very cheaply, and unless you start getting ambitions to build St Paul's Cathedral or the Chrysler Building they'll probably last you a lifetime). The strands of Scale Link barbed wire were suitably weathered with a mixture of an old FX rust colouring and MMP's Rust weathering powder, both let down with water. I used the same mix for the chain hanging on the scrap basswood mooring post.

Our bored and hungry Home Guard man is a white metal Hornet figure that I got from Historex Agents in Dover. I decided to make him a pipe-smoker. His briar was scratch-built by heating a length of Evergreen plastic rod and forming

the bowl by letting the molten plastic droop slightly from the horizontal; when cool, it was shaped with a very fine file (originally intended for cleaning up the points in a distributor cap). The white metal Tommygun came from the scrap box. The photos were taken against a painted cloudy backdrop, for a windswept effect.

ICE AND SNOW

I made this small vignette primarily to underline the excellent effects of snow and ice that can be achieved with 'Snow-Coat' and 'Ice-Coat', two products that I have only recently come across thanks to The Small Shop EU (see final chapter, 'Sources').

Like the rock faces in the 'Fall in the Forest' diorama, I made the lowering background outcrop by moulding two separate rocks and gluing them together with white glue, attaching a strip of plasticard up the back as a brace. While these were drying, I cut the semicircular base from a piece of polystyrene and covered it with an undercoat of plaster. Before this set, I marked out the edge of a track at an angle across the foreground, using an old cartwheel from the spares box. When this had dried, I glued the rock and the polystyrene base together using white glue.

Once the rock face had set, I masked off the base and sprayed the whole thing a dark Slate Grey
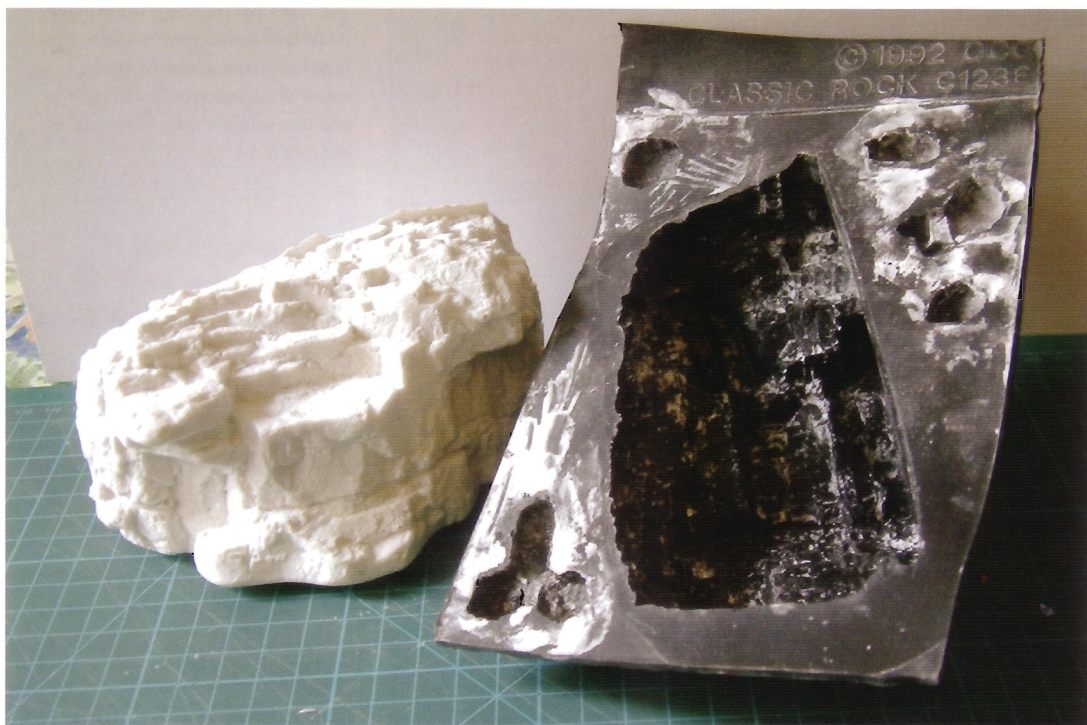
Casting one of the rocks for this vignette, using one of the Woodland Scenics rubber moulds and Eberhard Faber ceramic casting powder – I wanted them to withstand a fair amount of handling.
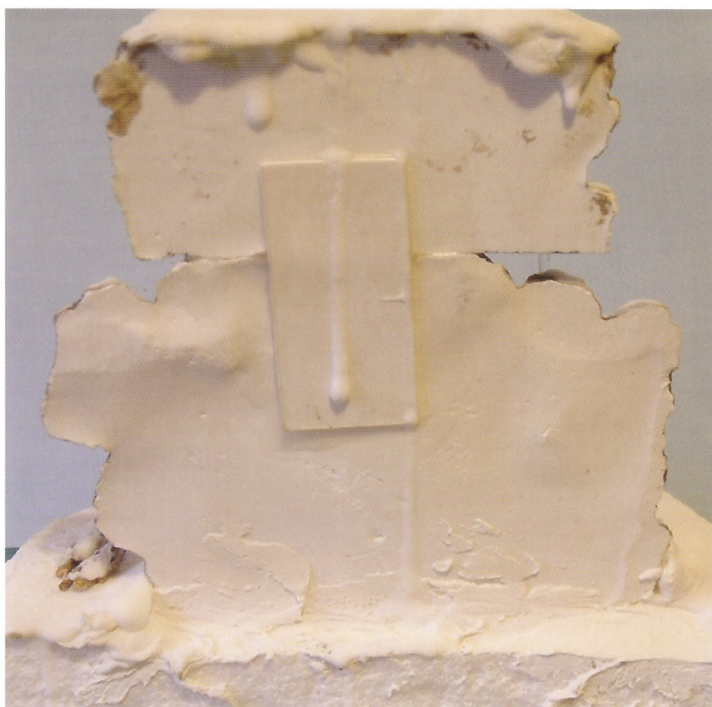
Rear view of the two rock castings stuck together, with additional support from a strip of plasticard bracing across the joint.

The rock castings stuck together and secured to the polystyrene base. The base has a coat of plaster, which serves as an undercoat for the snow and also seals the joint at the foot of the rock face.

colour, using the Arty's pressurizeed spray bottle with paint from the Woodland Scenics Earth Colour set.

I then made up a mixture of some of the Snow-Coat and water in a bowl. This was a very thin mix: I wasn't looking to create a thick fall of snow at this stage, but simply to make the rock look as though a thin layer of old snow had melted and then refrozen as ice. Snow-Coat is very versatile and can be mixed to give a number of different effects, from deep snow to a thin icy glaze.

The icicles hanging from the rock ledges were made from pieces of an old clear plastic CD case, warmed up with a gas pencil torch to the point where I could stretch them out into thin filaments. When they had cooled, I gave them a coat of Ice-Coat and cut them to length.

When the first frozen coating of snow had set on the ledges I added more of the Snow-Coat powder to

The rock face coloured with Slate Grey acrylic, and glazed here and there with a very thin layer of Snow-Coat to give the effect of old frozen snow. Unfortunately this photo does not show the reflection of light from the icy sheath on the rock face – but I promise you that Snow-Coat gives a most authentic 'glitter'.

After adding more Snow-Coat to the mix I built up a nice fat lip of snow at the top of the rock face. You can try for a bit of overhang, but not so much that it is in danger of breaking away the first time you move the model. More snow has also been added to the horizontal ledges.

my mix, thickening it up quite a bit; I laid this liberally on most of the horizontal ledges of the rock face, and very thickly on the top. Because you can build Snow-Coat up layer by layer, I was able to achieve a nice bulging 'lip' of snow at the top edge of the outcrop, where it had settled heavily enough that its own weight was on the point of causing it to split off and fall. When doing this you'll need a bit of practice to get the consistency of the mix just right: too thin and it will just drip over the edge; too thick, and you don't get the 'lip' effect.

When Snow-Coat dries you get a perfect scale finish, with a slight glitter or frosting to the surface. This is better than some other artificial snows, where the glitter is achieved by adding separate particles which always look too large – in some cases, almost like little pieces of broken glass.

With the rock face treated, I laid a couple of layers of snow on the base and then, with a damp brush, worked it up to the bottoms of the

The first layer of Snow-Coat laid over the entire base; the cart ruts on the track in the foreground are stained with a thinned mix of Burnt Umber and Black acrylic.
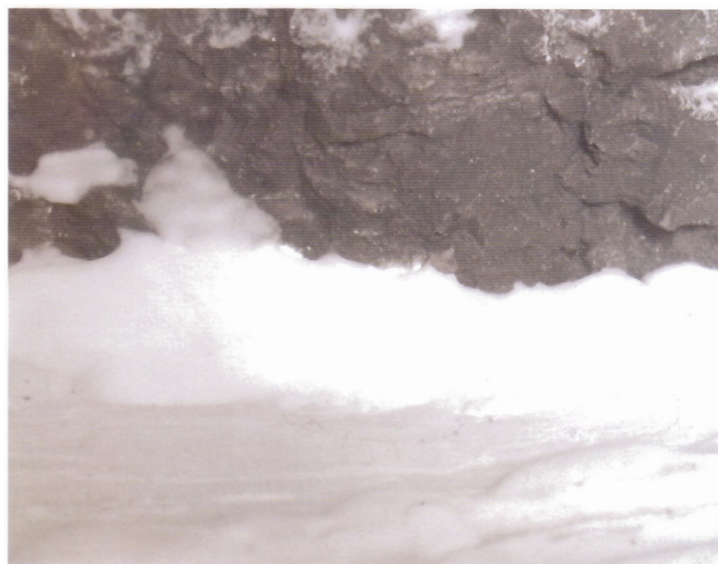
Here icicles have been added, made from melted and stretched clear plastic coated with Ice-Coat.

rock face to give the impression of wind-blown drifting. Then I laid a layer of snow between the rock and the track; and once this had set, I slightly hollowed out the area where the fire was to be sited and the figure would be standing.

I added a small area of grey-coloured Claycrete as a basis for the fire, and then sprinkled on some grey ash scatter. The glowing embers are little spots of Revell Day-Glo paint, which I undercoated with matt white to make the Day-Glo stand out better.

When the paint was dry, I made up the logs from small pieces of driftwood and painted them Matt Black. I added them to the embers, and then sprinkled them with White Ash powder from the old FX company. The same firm also made a Grey Ash powder; I scattered this around the edges of the fire, to give the impression that the heat had died away in this area. I also added some of The Small Shop EU Ice-Coat around the very edge of the fire, to get the look of melted snow that had refrozen. I used some more of my driftwood to make a small pile of firewood set to one side, and applied a layer of Snow-Coat to this.

More Snow-Coat is used to build up a thick drift at the base of the rock face. The wind will usually pile snow in smooth slopes against the base of any upright obstacle.

The hollows carved out to take the fire (with the base layer of Claycrete and dark ash added) and the figure; the sharp edges of the hollow for the figure base show where I've carved right through the Snow-Coat and plaster to the polystyrene beneath.

After adding more snow to deepen the layer on the flat areas of the vignette, I placed the figure next to the fire – a Napoleonic French grenadier, kindly painted for me by Charles Davis. With all the extras in place, I added a final layer of snow, churning it up a bit and pressing in footprints where the soldier had moved back and forth between his fire and the log pile.

This was an easy vignette to make, and I was pleased with the result. The cold atmosphere is created by the effects of both Snow-Coat and Ice-Coat and the dark colour of the rock face. This is also emphasized by the fact that the only bright colours are the glow of the embers, and the small flashes of red on the grenadier's shako pompon and epaulettes.

An added advantage to Snow-Coat is economy: if it dries in the bowl while you're using it, you can just add a little more water and it's ready to go again -- you don't have to throw it away and start with a fresh batch.

* * *

For comparison, I have included here photos of a couple of snow scenes that I made some time ago.

The pictures of the small-scale scene of an Iron Age village in the depths of winter are from a diorama that I built some years ago as part of a series for the museum in Zug, Switzerland. At that stage of my modelling I only had plaster to work with to create deep snow. One drawback in using plaster was that – unlike the effects possible with Snow-Coat – I could not achieve the 'fluffy' look you get when people have walked through fresh snow. Nonetheless, the result looked sufficiently cold. This model was made to a wargaming scale of about 1/65th.

The photos of a Roman legionary in the snow are from an old vignette inspired by reading a marvellous

Building up the fire in stages. A blob of grey Claycrete, with a first layer of grey ash scatter, forms the fire bed. Spots of Humbrol Day-Glo paint on white undercoat give the effect of glowing embers. 'Fire-blackened' logs are added on top, placed so that the Day-Glo spots are overshadowed – this seems to make them glow 'hotter'. The logs are then sprinkled with white ash powder, and the fire is surrounded with a narrow rim of grey ash. Finally, a little Ice-Coat round the edges gives the realistic effect of melted snow.

A fire in the open must always have spare firewood stacked ready – in this case, with a nice soft top dressing of Snow-Coat.

novel by Wallace Bream called *Eagle in the Snow* (after long being out of print, I'm delighted to hear that it is now available again as a Cassell paperback – heartily recommended). Although the novel is set on the banks of the Rhine in AD 406, and my model depicts a legionary of the 2nd century at latest, this discrepancy was irrelevant to the 'feel' of the scene. The figure is an old one from Series 77, slightly modified, which was created by Pat Bird after he had seen a painting I had commissioned from Gerry Embleton.

When I made this vignette I had not heard of Snow-Coat (if it was even on the market); I used a snow cover made from micro-sized poly balls, laid over plaster. Unlike Snow-Coat, this type of cover has to be fixed after adding it to the groundwork; the only way to do this is to overspray the snow layer with a hairspray, since I wanted to get the effect of snow lying on vegetation. Hold the spray about 6in away from the model and horizontally, so that the spray drifts gently down on to the surface. If you point it directly, and from too close up, you will simply blast the poly-ball snow away.

The hollow tree stump is a short length of balsawood dowel, which I drilled out for most of its length; I then used a Dremel cutter to tear up the inner surface to make it look like rotten wood. The ivy leaves on the stump, and the banks of bracken around it, are both from

Scale Link; and the reeds at the water's edge are dried stems from a florist. The birch trees are made with two different thicknesses of copper wire, the thicker one from my spares box and a very fine one from an old telephone wire.

A villager splitting logs behind the palisade in the Zug diorama. You can build up snow drifts and a 'snow lip' at the edges of roofs with plaster, but this lacks the glitter, lightness and fine control you can achieve with Snow-Coat, and thick edges look a bit too much like cut cake icing.

The diorama built for the museum in Zug, Switzerland, in wargaming scale, showing a corner of an Iron Age village in winter. At this time I was only using plaster to represent snow; this will still give a chilly look to your model, but it does lack the sparkle of real snow.

My 77mm Roman legionary in the vignette 'Watch on the Rhine' This was built some years ago, before the advent of Snow-Coat and Ice-Coat; I used another snow cover made with micro-beads of polystyrene, fixed after application with a drifted coat of hairspray. An effect of snow caught up on top of bushes and bracken is attractive and lifelike; as long as the surface is carefully finished using high quality materials like Scale Link bracken and Snow-Coat, you can economize by making the basic bulk of the vegetation underneath from something cheap and light. Remember that if the weather is windless enough to leave snow lying on top of bushes, it will probably also lie in ridges along the tops of tree branches

FALSE PERSPECTIVE

This diorama was built some while ago, for the Bronze Age Museum at Unterühldingen in Switzerland. I decided to include it simply as an introduction to a method for creating false perspective, which you can use should you wish to build a boxed or 'shadow-box' diorama. You can create an illusion of great depth in such models, but there are one or two rules that don't apply to the normal type of diorama.

The first essential is that the visibility of the model must be controlled: viewers should only be able to see it from one direction, and with a restricted view – rather like looking through the slot of a letter box. While an ordinary diorama in, say, 1/35th scale may be designed to be seen from one side in particular, it can still be

viewed from all sides without destroying the illusion of a slice of the real world in miniature – in other words the scale holds good from any angle. If you look at a false-perspective model from any angle other than the front, the illusion of realism is instantly lost; this is because false perspective is achieved by combining features made to different scales.

For a military subject, you can of course buy ready-made figures, vehicles, complete or partial buildings and other accessories in a wide range of scales, and combining these for a 'deep-focus' effect is certainly tempting – and achievable. But placing these subjects in a miniature landscape with a convincing sense of distance is emphatically not a simple matter of sticking a 1/72nd tank a couple of inches behind a

1/35th one, and calling it a battlefield …

This model was built to represent a Bronze Age lake village on the shores of Lake Constance on the borders of modern Germany and Switzerland. Keeping as close as possible to the archaeological evidence, the museum authorities are gradually building a full-scale replica of the village, which stood on pilings in the shallows at the shore.

My brief was to build a model of the area, looking down from high ground inland across tracks and fields to the village at the

The real thing – sort of: part of the full-size reconstruction of a lake-dwellers' village that is being built by the Pfahlbau Museum at Unterühldingen on Lake Constance, Switzerland (to whom I am grateful for permission to reproduce the photos in this section).

MAIN PHOTO The scene as visible through the 'letter box slot' in the front of the boxed diorama. The leaves showing at the top left of the picture are not, in fact, attached to a model tree; they are stuck to the inside of the box so that just the end of the branch is visible, giving the impression of trees growing out of your line of sight. The same effect was created on the right-hand side; and there were also branches hanging down from inside above the viewing slot, helping with the illusion that the viewer was standing in the edge of a wood.

water's edge, and on across the lake towards the far shore. The viewpoint was set at the edge of a wood, where two of the villagers – a father and son – were chopping wood; and the village had to appear to be 2 to 3 miles away (4km to 5km).

The only way to give an impression of this sort of distance is to incorporate a number of areas of 'dead ground' into the front-to-back depth of your model; so I designed the scene to drop away in six levels, with each drop created by a ridge in the groundwork. The actual diorama measured about 3½ ft wide by about 5ft from front to back (roughly 1m by 1.5m). Building this in my flat provided me with a few headaches – not the least of them being, 'How am I going to get this out the door?'

The whole of the groundwork was initially laid in plaster, over which I used Claycrete for the tracks, and scatter for the rough areas of vegetation. In the

foreground I used static grass, silver birch catkin 'leaves', and very fine sawdust under the log that is being cut up. As the view fell away, I used finer and finer scatter until I got to the fields by the village, which are simply painted directly on to the groundwork with no texture at all.

MAIN PHOTO, FROM FRONT
For what follows, refer to the main photo with the figures in the foreground; this is the controlled viewpoint. The figures themselves are about 7in to 8in tall. The felled tree that the man is cutting up, and the log that the boy is hauling along the track, were made using the wire-and-plaster method described in 'Further Notes on

Trees' in Chapter 4. This track is on the first step down and back from the viewer, and the boy was made a little smaller than the man. Both these figures were scratch-built by Gillian Roberts, who made their clothing following reference provided by the museum.

The next step down can be seen where the track curves round by the tree on the right of the picture; this tree is also a wire-and-plaster job, with Woodland Scenics foliage attached with white glue; it was made considerably smaller than those in the foreground, to continue the illusion of distance. The track continues across behind the figures from right to left, and disappears from this viewpoint; it then reappears in the middle distance, running away from the viewer more or less straight towards the village across the rough ground – it is visible in the photo just left of the axeman's head and hands. Unfortunately, because of the angle from which this shot was taken by the museum photographer, you'll have to take my word for the fact that I had made a small cart, being pulled by two oxen and loaded with timber; but you can get some idea of the scale I used by the tiny figure walking down the centre of the track, just visible as a dark stroke left of the axeman's forehead.

Still moving away from the viewer, the track now disappears over the next ridge, and reappears beyond it slightly further to the left; they probably can't be made out at this size, but in fact there are a couple of horses beside that run of track – very small models from the Preiser company, who make model railway accessories.

Now the land falls away for the last time, and the track is a tiny thread where it leads to the gate in the palisade surrounding the village. The village houses are just small cubes of basswood cut to house shape and painted with a variety of colours. Outside the palisade, I created a beach by painting the plaster underlay with light sand-coloured acrylic; the lake itself was coloured a very pale blue-grey.

As the scene moved progressively further away from the viewer, I used finer and finer Woodland Scenics foliage and scatters to make the hedges dividing the fields diminish in size; finally, the hedges on the furthest piece of land around the village are merely green-painted sisal string, rolled in the finest turf scatter before the paint was dry, with small clumps of foliage stuck in to represent trees.

SECOND PHOTO, FROM RIGHT

This picture was taken from the right-hand side before the model was boxed in – an angle that the viewer through the front 'letter box' would never be able to see when the model was installed in the museum. Once again, you can see the tiny dark uprights of Preiser figures in the central grey area – villagers at work burning off vegetation to create a new field. On the nearside of the near hedge around this area, cows graze on grassy slopes beyond the edge of the forest. The trees in the foreground were made up with Woodland Scenics Fine Leaf Foliage. When seen through the viewing slot at the front of the box this area of forest appears to be in correct scale; of course, if seen from the lake end of the model, the forest, figures, animals and everything else would look very strange, with the giant woodcutter and his helper looming on the horizon.

This picture also suggests how unrealistic the ridges in the groundwork look when seen from the wrong point of view: a series of abrupt drops instead of gentle folds or slopes.

* * *

The final elements of this model cannot be seen in either of these photos. The sky and the far shore of the lake had to be painted on a backdrop, which curved right the way round the model; its ends were then attached each side of the flat front face of the box. It also had to curve up towards the front in the vertical plane, to be fixed above the viewing slot out of the sight line, thus giving a seamless appearance.

The whole scene was lit with natural daylight-coloured fibre optics. Fibre optics are the best way to light a model, if you can: they produce no heat, so there is

SECOND PHOTO Looking from the right side of the model; the designed viewpoint and viewing slot are at 90 degrees to the left. Beyond the forest, grazing cattle can be seen on the hillside, and workers in the fields. This shot also gives a slightly better view of the palisaded village, which only measures about 6in (150mm) from end to end; it also gives a hint of the painted beach at the fringe of the water.

no danger of damage to any of the more delicate parts used for your scene. Fibre optics are very easy to use: you just fix the end under or behind the model, mounted over a light source. This can be anything from one simple bulb to more interesting coloured bulbs for different effects. The fibres can be bent into fairly sharp curves if necessary; lead them through small holes in the box container and fix the 'business end' inside a suitable element of your model. You can place them individually in a 'point' light source, such as a streetlamp, lantern or candle; or you could lead them up through the base under a truck, say, and divide them between the headlights; or you can use a whole bunch of them in a number of positions for an 'area' source to give general illumination – as in the model illustrated.

I realize this is a very potted description of how to create false perspective and light the result; but I hope it will fire your enthusiasm to explore this fascinating aspect of modelling more closely. In closing, I apologize for the dearth of pictures; in truth. once they have gone to a client abroad I very rarely get to see the finished results of my work set in place. The museums are normally still building the display rooms in which they will be installed, and at that stage taking photos of the dioramas for the record is the last thing on their harassed minds. (Indeed, the van that arrived at my home to take this model to Switzerland proved to be too small, and passers-by were entertained by the sight of a frantic modeller sitting on the kerbside sawing about 6in off the length of a huge diorama!)

A WALLED GARDEN

When I first thought of building a model of a formal garden, my idea for the 'story' was a shocking contrast between peace and destruction, to be achieved by smashing great holes through the walls and gouging the tracks of a tank across the lawn; I even toyed with the idea of underlining this by including some casual military looters. But then it occurred to me that not all dioramas involving soldiers had to be scenes of 'muck and bullets'. The model turned out to be a celebration of English tranquility – the only military touch is an officer of the King's German Legion, back from the Waterloo campaign and telling the tale of his adventures to the gardener's boy.

BRICK WALLS

As this was to be a walled garden, I started by making all four walls from a material called 'Balsa-Foam'. This used to be available from Micro-Mark in the USA, in blocks measuring 9in × 6in × ½in (about 230mm × 150mm × 13mm); but it appears that they have dropped this item from their catalogue and I am currently trying to find another supplier. For the benefit of American readers, I believe you can get it from Dick Blick Art Materials (see 'Sources' chapter).

This material is ideal for sculpting to represent brick walls, building façades and many other surfaces. You need no special tools – just a toothpick, or any other

BELOW A photo taken at a later stage of the work, inserted here to clarify the layout I had chosen. I used Gatorfoam board for the base of the model – it is lightweight, but very strong. Two of the walls are in place here, with the areas for the paths between the four small lawns left clear to be 'gravelled' later.
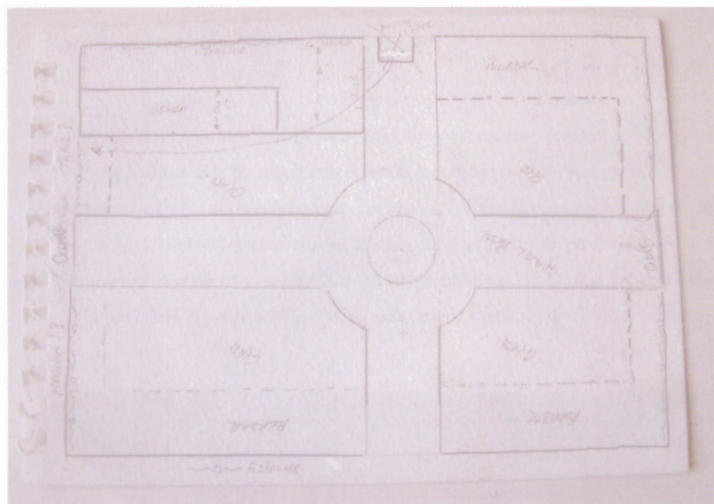
I first made a rough layout sketch to give myself a clear idea of how I wanted the finished model to look. The more complex a diorama, and the more component parts have to fit together accurately, the more important this planning-and-measuring stage.

pointed object. I first measured the length and depth of a standard brick, and scaled this down to 1/35th. I then used a pair of dividers to scribe the horizontal lines first, then the

short vertical lines – and there was my brick wall.

As these were to be old walls, I gouged out some holes to represent missing bricks, before giving the whole thing a base coat of Pale Grey acrylic paint. The idea was for the grey paint to sink into the courses between the bricks and to look like the mortar. Once this had dried, however, I was not too happy with the result, so I tried a new method. I got some doll's-house mortar from Acorn Crafts, and actually pointed the bricks with

A block of Balsa-Foam from which I made the walls for the garden.

Scribing the courses of the bricks into the Balsa-Foam 'wall' with a pair of dividers
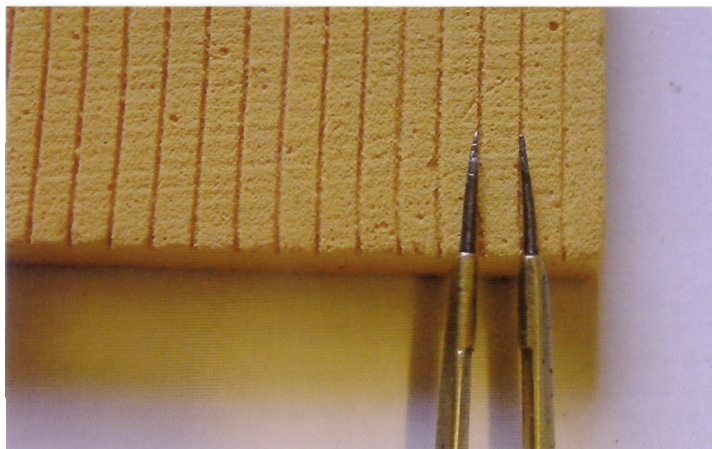
Dry-brushing the brick colour over the wall, after applying 'mortar' between the courses. Lightly drag the brush across the surface so that the paint only lays on the high spots and does not stain the mortar colour

for this coat to dry I used a fine brush to pick out individual bricks with different shades, ranging from purple to dark red and pale orange; this gave the overall appearance of the wall a range of realistic contrasts. Where I had gouged out 'fallen bricks' I used a stronger orange: the inside of a broken brick, not having been weathered so long, looks much brighter.

With the brickwork finished, I made a series of half-round coping stones from the same material; coloured them with an acrylic Stone colour from a Woodland Scenics set; and stuck them along the tops of the walls, using white glue.

A sample of the effects you can achieve with Balsa-Foam. In this case I've tinted some of the bricks different colours, some darker, some lighter, to give a varied appearance to the wall; and I've gouged out one or two bricks, as you often see in old walls.

draw the colour across the surface – rather like dry-brushing – to keep as much brick colour out of the mortar as possible. After waiting

The left and rear walls are in place, and the basic structure of the lean-to greenhouse begins to take shape; I have added the low brick walls at the front and end of the building. In the left foreground are the two brick pads that will later support the lead water cistern

this. The result looked rather better than the first attempt. When it was dry – which took no time at all – I airbrushed a coat of matt varnish over it, both to seal it and to prevent the next layer of colour from tinting the mortar.

The next colour was made up from a child's powder poster paint that was just right for the brick tone. I applied this with a fairly broad foam spatula, so that I could

LAWNS

I was going to use a pair of etched-brass gates from Scale Link at either end of the garden, so I measured their width and drew up the widths of the paths accordingly. With these set, I then laid out the lawns between them. This was a very simple task: I just cut four pieces of grass matting to shape and glued them down on to the baseboard with white glue. (By the way, don't overdo the glue: too heavy a coating will actually come up through the matting and stain the grass, as I discovered. This was corrected by adding a bit of grass scatter over the stained areas.)

I glued three of the walls in place, leaving one side of the baseboard open for ease of working. It was then time to start making the lean-to greenhouse in a corner of the rear wall.

GREENHOUSE

The reference for this was quite easy to find; the basic layout has hardly changed at all over the years, and I found plenty of pictures of early ones to study. For framework I used Plastruct plastic strip, channel and angle, with a small amount of sheet for the panelling.

Firstly I painted the brickwork of that part of the garden's rear and side walls that would be enclosed inside the greenhouse, to give the appearance of the whitewash that was often used in older greenhouses to reflect the

sunlight and help keep the temperatures up. I then cut a strip of Balsa-Foam brickwork to make the low wall at the front of the greenhouse, followed by two smaller pieces to go either side of the doorway in the end of the building. I topped these three sections of wall with strips of plastic; I also added a long strip along the back wall near the top, and a shorter piece, sloping down at an angle on the end wall – these two strips were to support the roof in due course. I also made two brickwork 'pads' that would sit against the front of the building, on which to place a lead water cistern. I then started putting in place anything that would be enclosed once I added the framework and glazing to the structure.

I used terracotta flagstones from a doll's-house shop for the main flooring, edging these with slates; then, mixing up some Claycrete, I made a narrow planting bed against the back wall. On top of this I laid a mixture of brown, fibrous scatter material that I've had for years (I can't remember where I got it, or what it's called, but it does give an excellent appearance of freshly dug soil); I topped this off with some MMP Medium Earth powder. Next, I used some ground-down Olive Green pastel chalk powder to stain the bottom of the greenhouse walls, where damp and algae had discoloured the brickwork.

With the bed laid, I took some Scale Link brass etched foliage and built up the flat brass branches with white glue, applied with a toothpick, until the fronts had some 'body'. Once the glue was dry I painted the stems with a Dark Brown acrylic and the leaves with various shades of green. These were then 'planted' in the bed and tacked back against the wall with white glue.

To add a bit of interest to the inside, I wanted some tools and one or two bits and pieces to hang on the end wall. I made the rim for a sieve by heating a strip of plasticard in hot water and forming a circle around a wooden dowel, glueing the ends together with liquid cement once it had cooled. I then added a piece of Verlinden mesh to complete the job.

I still had lying about some of the items I'd got from Scale Link for the First World War trench diorama; fortunately these included a spade, which I hung on a hook on the wall (together with some fine twine to represent a coil of rope), and a broom – which I used later. Obviously, the gardener would need a workbench, so I built this along the inside of the front wall of the greenhouse, once again from basswood stained with an Old Oak wood stain. The axe on the bench was from an old Historex tool set, as was the bow saw, which joined the spade on the wall. The watering can is from a

maker called S&D Models and is also available from Scale Link (honestly, I don't have shares in this company!).

It was now time to build the framework and add the glazing to the greenhouse. The frame was constructed using T-section, L-section, channel and square strip from Plastruct. The main uprights and the strip along the centre of the roof were from square-section. With these in place I added the smaller glazing bars running from the front and rear edges to the centre, made from T-section turned upside down.

When all this had set, I cut the individual panes of glass from transparent plastic sheet and set them in place, sitting on the ledges of the upturned T-section glazing bars. The next step was to cover the ends of the glass panes at the centre of the roof; this was done simply by gluing one square strip along the length of the roof and then the same again where the glass met the back of the roof; for decoration I added another length of T-section, upside down, on top of each of the two square lengths. The final touch was the addition of a couple of white metal finials at either end of the roof where it met the rear wall; these again came from S&D Models. I painted the whole building with Off White acrylic, and then added small patches of Vallejo Weathered Wood, to simulate spots where the paint had peeled.

For the panes of the roof I thinned down some Off White and streaked it over the glass to look like old whitewash; then I added small amounts of Olive Green acrylic, once again heavily diluted, to give the appearance of the algae that you often see on old greenhouses.

TOP Two pieces of Scale Link brass etched foliage. The one on the right is cut straight from the fret; the one on the left has had the stems built up with white glue, applied with a toothpick.

BOTTOM A finished piece of the foliage, coloured with acrylic paints.

Close-up of the interior of the greenhouse, with the walls whitewashed and green damp-staining added along the bottom. The terracotta tiles for the floor and their slate edging both come from Acorn Crafts. A narrow earth bed for planting is left along the rear wall.

The foliage in place, 'planted' along the back wall of the greenhouse. Different sizes of plant are simulated simply by snipping differently sized bits from the fret.

Next, I needed a door for the end wall. I couldn't find a ready-made one that would look right with this model, so I built one from plasticard and glazed it with transparent sheet. The box lock is just a small block of plasticard, and I made the knob by taking a strip of thin plastic rod and holding one end near a small gas lighter. As the heat melts it the plastic curls away from the flame and forms itself into a neat knob;

RIGHT The sieve hanging on the end wall is made from a strip of plasticard and a piece of Verlinden mesh. The spade comes from Scale Link's First World War Pioneer Tool set, and the bow saw is an old plastic one from Historex. At left is the basswood workbench along the front wall of the greenhouse.

BELOW A plastic axe from Historex, lying on the workbench of stained basswood; and a white metal watering can from Scale Link, with some very minor additions of my own.

just cut this off and you have a doorknob. (I suppose that I am obliged to add the obvious — if you use any kind of naked flame when modelling, take great care to ensure that you have no volatile liquids or any other highly inflammable materials on the workbench at the time. Explaining to the representative from the insurance

company, as you survey the smouldering ruins of your house, that 'I was just making a 1/35th-scale doorknob', probably won't sound convincing.)

The glazing to the front of the greenhouse is quite simple. T-section uprights were glued to the main frame and the clear sheet cut to size and glued in place,

Building the main framework of the greenhouse, using Plastruct square section strip.

Plastruct T-section strip, placed upside down as glazing bars, gave me a ledge on either side of each bar on which to locate the glazing.

The squared and T-section centre strips in place on the roof, to cover the joints of the panes of glass; note also the bargeboards along the top and bottom of the side windows, and the cistern in place on the brick pads.

An overhead shot showing the completion of the glass roof, with white-metal finials at either end of the rear edge.

BELOW LEFT The scratch-built door, with its box lock, handle and weathered and blistered paint job. The broom is a white metal piece from Scale Link's First World War tool set.

BELOW A close-up of the white metal tap and standpipe from Scale Link, installed outside the corner of the greenhouse.

The whitewashed glass on the roof, coloured with heavily thinned Off White acrylic applied by dragging the brush from back to front. I then added a little Olive Green acrylic around the edges of the panes to simulate algae.

once again set vertically on the ledges of the T-section. A decorative bargeboard was glued along the top facia, and a couple more added to the plastic sheet panel below the windows, giving the impression of six

individual panels rather than one long one. The final touch was the addition of some weathering to the vertical panes of glass; this was done with heavily diluted Buff acrylic, streaked down the panes where the rain had cut through accumulated dust.

BOX HEDGES AND PATHS

With the lawns in place, I needed some edging to go around them. This was made from N-gauge

hedging strips from Javis Countryside Scenes; after coating them with white glue, I scattered loose leaves over them to represent small box hedges – the leaves came from the German company Noch, available from Scenic Express in the States and Gaugemaster Controls in Britain. I then cut the strips into various lengths to make it easier to curve them around the lawn edges, and once again used white glue to stick them down.

The next move was to lay the gravel paths, which were made from Woodland Scenics Small Talus. This is a material intended for use as scree at the foot of a model rock face but, in this scale, it makes excellent gravel. I took the talus and shook it through a fine flour shaker to separate out the smallest pieces for the paths; then I painted the path shapes on the baseboard with white glue, and used the shaker to scatter the gravel into place.

A length of the Javis N-gauge hedging, with additional leaves from Noch, to create a low box hedge.

A close-up of the leaves from Noch that I used to give more texture to the hedging – without them the N-gauge hedging strip is too small for a proper scale appearance. Note, too, that even this close up the grass matting has a realistically varied appearance.

Starting to lay the gravel paths, using sieved Woodland Scenics talus. The circle in the centre is to take the sundial in its flowerbed.

A length of the box hedging put in place around the edge of one of the lawns. This hedging is quite flexible and conforms easily to the outline of the grass. White glue holds it in place.

Close-up of the gravel, laid between the 'box hedging'

SUNDIAL AND STATUE

I had left a circle uncovered in the middle as a space for the sundial. I cut up some miniature clay tiles and glued these 'wolftooth' shapes around the circumference of the circle; I then used scatter to make a small flowerbed inside this edging, in which I planted some wax flowers for a bit of colour. The sundial itself was a piece of wood, turned to shape and then painted a Stone colour. The dial is in fact a clock face from a Scale Link brass etched set, and I made the tiny gnomon (the blade which casts the shadow on the dial) from a small piece of scrap brass. When the sundial was in place, I added the last gravel around its flowerbed.

While making decorative bits I thought I would add a touch of class; I was starting to feel proprietorial about my garden, and fancied something in the classical line – why not a nymph? Taking the top half of a Viet Cong girl from the Verlinden VC set, I removed the seams and collar of her jacket and, using Vallejo Plastic Putty, I gave her a (sort of) Grecian hair-do. I stuck the finished article on another shaped piece of stone-coloured dowel as the plinth. I then used

My 'Grecian' bust, now far from her native Mekong Delta .. She is finished with lead paste made by the French company Pebeo, which is used by glass-painters to get the effect of the leading on a stained glass window; it is easily applied with an old brush and then buffed up. The company can be contacted at www.pebeo.com on the web if you want to find your nearest distributor, but quite a few arts-and-crafts shops carry it.

The sundial in place in its circular flowerbed. The pedestal was scratch-built, the face was from Scale Link and the gnomon is from scrap brass. The bed is edged with clipped tiles, and planted with wax flowers.

ABOVE The basic 'soil' for the flowerbeds, made with Claycrete.

BELOW The Claycrete layer in the flowerbed dressed with a fibrous scatter from my spares box, which gives a good 'earthy' look.

a lead-coloured paste to make the bust the right colour; this comes in tube form from a company called Pebeo, and can be found in most arts-and-crafts shops. The final touch was the addition of some Scale Link etched brass ivy leaves twining up from the base. The finished article was then glued in place, and the last bits of gravel were scattered over the white glue around it.

DOING THE GARDENING

It was now time to add the rest of the flowerbeds. These were laid along the foot of the walls, with Claycrete dressed and a top coating of the same fibrous scatter that I used in the greenhouse. Then I made up lengths of 'shrubs', which again came from railway scenery supplied

Javis 'shrubs' against the wall came from the spares box. The middle row of planting is just Medium Coarse foliage from Woodland Scenics; and the front row of the border is clippings of heather matting from Green Scene.

The bunches of mauve 'aubretia' on the walls come from the Acorn Crafts doll's-house shop, as do the tall green things (whatever they're supposed to be!) in the corner.

Another angle on the flowerbed and the interior of the greenhouse; obviously, depending upon season you could liven up the border plantings with spots of colour for flowers. Note that the brick piers against the walls are capped with slanting tiles; these were both for decoration and to shed rainwater, preventing it from penetrating the tops of the brick columns.

by Javis. They can be stretched to a certain degree and will hold their shape. In front of these I added some coarse Woodland Scenics green foliage scatter; and for the front row of low ground-covering border plants I used a matting from Green Scene, which actually represents heather but looked fine for my present purposes.

Many old walls have plants actually growing out of the courses between the bricks, so I randomly added small clumps of fine green foliage to all three walls; then, for a special touch of colour, I placed a couple of larger clumps, painted mauve to look like flowering aubretia (which can grow where you so much as spit on a cracked stone).

MAPLE TREE

The small decorative tree was made – once again – by the Barry Bowen method: a doubled and twisted wire armature, covered with plaster after adding a little white glue to the mix to make the plaster more flexible. I painted some Scale Link etched-brass maple leaves with acrylics, cut them off the fret and stuck them in place using superglue. As you can see from the photo on page 144, at this stage the flat brass stems of the leaves are still unrealistically visible, so I went over the whole tree with another layer of the plaster/white glue mix to blend these into the branches.

Once dry, I thinned Burnt Umber oil paint with a lot of white spirit, and let it flow over the trunk and branches. As the tree is coated in plaster this wash soaks in and dries almost instantly; should you wish to darken the effect, just repeat until you get the colour you like. The finished tree was then glued into the flowerbed with white glue.

GATES

As mentioned above, I wanted to use a couple of Scale Link etched-brass gates, one at either end of the garden. I had already fixed the two end walls to the baseboard, allowing the right size of gaps for the gates to fit, and had built gateposts for the back gate. For these I used basswood (which I much prefer to balsa – it's considerably less 'hairy', and takes

LEFT The maple tree in the corner started off as a wire armature divided into many spindly branches, covered in a plaster and white glue mix, so that I could still manipulate the branches when the plaster had more or less dried.

BELOW Starting to add the Scale Link photo-etched leaves, using superglue.

The pre-painted leaves are attached; you can see in this close-up how the attachment strips of the etchings stand proud of the branches.

To hide the attachment strips of the leaves, go over the whole tree again with another layer of plaster to fair them into the branches.

OPPOSITE Two angles of the finished maple tree in place, in the corner flowerbed by the back gate.

The gates are etched-brass pieces from Scale Link; this is the front gate, set in grooves in the brickwork. The gates were painted with acrylic Matt Black over an undercoat of Automotive Grey.

A pleasant sunshine-and-shadow effect, from the outside of the front gate.

The doll's-house bricks used as brick sets for the front path outside the gate. After laying these I added a few tiny clumps of weeds in the cracks.

paint better). I painted the gateposts matt black, and then used some MIG Products weathered wood paint to simulate where the black had peeled off.

Now I extended the gravel path at the back of the garden so that it reached a little bit further than the gateway, and laid a path of brick sets outside the front gate. The bricks came from Acorn Crafts and are actually 1/12th scale, but in this case they looked fine. I painted the gates in acrylic Matt Black over an undercoat of Automotive Grey. Having made a groove in the inside face of the back gateposts and in the brickwork for the front gate, I stuck the gates in place with superglue, and finished off by adding tiny clumps of weeds between some of the bricks of the front path.

CISTERN

The water cistern that I placed on the brick pads at the end of the greenhouse was made from thick cardboard and thin lead sheet. I cut a strip of the cardboard and scored it so that I could fold it into a hollow square, which was then stuck together with white glue. I cut four strips of half-round plastic rod and stuck them on the cardboard former to give me a half-round shape along the lips of all four sides of the cistern. I had already cut a long strip of the lead sheet, which I had made twice as deep as the cardboard; I stuck this strip around

the former and then slit the top half vertically, in line with each corner of the cardboard former, thus allowing me to bend the four sections down separately to cover the inside of the cistern. I could then press the lead into place over the top edges, using the rounded end of a paintbrush, to give me the rolled-edge appearance that I wanted.

The decorative plaque on the front was just a small disc of lead punched from the sheet, and scribed with a design on the back to give me raised decoration on the front; this was then fixed with white glue. The whole thing was then given a

The lead cistern set on the brick pads, filled with water set off by floating leaves; barely visible here are the decorative plaque and some tiny green ferns growing out from the damp shadow under the side of the tank. Note, too, the streaky stains and weathered paintwork on the greenhouse.

dull, weathered finish with some MMP powders, and soft pastel chalk for the streaks of greenish staining often found on old lead.

Once it was all dry I stuck a square of thick plasticard inside the cistern about 5mm from the top. I was going to add water but I didn't want to have to pour a layer of resin, wait for it to set, and keep repeating this until the cistern was full; by making a false bottom to the tank I could just pour one or two layers at the most. I mixed some Olive Green glass-painter's paint into Woodland Scenics Realistic Water, and poured it in. It took two layers, and while it was drying I added some floating fallen leaves.

BRICK PIERS, AND IVY

I had now reached the point where I needed to fix the fourth wall in place on the baseboard to enclose the garden. I had left this wall aside, and now set about adding detailing to the inner face. I made a couple of brick piers in the same way as I had made the walls, by carving the courses of bricks into a piece of Balsa-Foam, and painted them to match the rest of the brickwork. I added clay tiles, bought from the local doll's-house shop, set at a slant on top of each pier. I stuck the piers in place with white glue; and then started adding tendrils of ivy to the wall.

For this I took some Spanish moss, which I got from a florist's shop, to make the fibrous-looking

stems of the climbing ivy. I stuck the base of the stems to the wall with white glue and then, using a toothpick dipped in the glue, I trailed tracks where I wanted the rest of the stems to go. I then simply laid the Spanish moss in place over them; this is much easier than trying to put the glue on the fiddly bits of moss before placing them.

The next step, I'm afraid, is inescapably rather slow, but I believe that it's the only way to achieve a realistic 'layered' look to the ivy. You can get bags of pre-coloured ivy leaves from the 4D Model Shop; these are stuck on to the Spanish moss stems with white glue, one at a time. Start at the bottom of the stems, so that as you progress up the plant the leaves cover each other in layers. The easiest way to do this is to use a fine paintbrush: moisten the tip and pick up a leaf; transfer it to a pair of small tweezers; dip it in a drop of white glue, and place it in position on the stem. When you have finished, brush- or spray-paint them with

The 4D Model Shop supplied these bags of individual ivy leaves by The Little Leaf Company, 'for the discerning modeller'; they contain many more than the ones you can sometimes get from Hudson & Allen Studios in the USA.

satin varnish; real ivy leaves are quite glossy, but high gloss varnish tends to overdo the effect.

Once all the detailing was in place on the wall I stuck it in place with white glue. The last bit of 'gardening' left to do was to model the flowerbed that ran along this last wall, for which I used the same materials and method as for the previous ones. It wasn't quite as easy with the last wall in place, since access was more restricted, but by working mostly over the wall I got the job done.

It only remained to add the figures of the officer and the gardener's boy, both kindly provided by Charles Davis, and my garden was finished. I rather wished I could put a deckchair on the shady lawn, and enjoy a long tinkling glass as the shadows lengthened.

Sticking the Spanish moss 'ivy stems' to the walls. It is much easier to decide where you want the stems to run, apply the white glue to the wall first, and then lay the moss along the trail of glue, than it is to try applying glue to the moss.

BELOW The easiest way to apply the ivy leaves is to pick them up one by one with the tip of a moistened brush, pick them off with a pair of tweezers, dip the very edge of the leaf in white glue, and then apply it to the Spanish moss stems.

LEFT Adjust the leaf so that it is angled downwards and half covers the last one you added; that way you gradually build up a realistically overlapping layer along the stem. The leaves come pre-coloured, but add a few variations of green yourself: lighter green for the young ones at the tips of the growth, and a brown tint for a few which are dying off.

OPPOSITE TOP Now I had to add the vegetation to the flowerbed along the foot of the fourth wall, which was a bit trickier than the other beds since I had restricted access and had to work almost from above. (I confess that during this process I managed to break the pointer off the sundial not once, but three times.) Note, behind the 'Grecian bust' at top centre, ivy stems standing proud of the top of the wall; I used Scale Link ivy for this, to give the necessary rigidity.

OPPOSITE BOTTOM Looking towards the end of the greenhouse and the back gate.

BELOW The detailing of the fourth and last wall is finished and it is glued in place, enclosing the garden.

These photos of the finished model were taken out of doors, and you can see what a difference natural light can make. Some of the foliage beyond the wall is my own '1/1-scale' garden, but the trees nearest the walls are models.

For this picture I laid out a large piece of grass matting and placed a couple of model trees on it, to give the appearance of parkland beyond the garden wall.

This overhead view of the completed model is included largely for orientation. The diorama measures about 12in × 18in (300mm × 460mm).

ABOVE Natural daylight, blue sky, real background foliage and a hint of a neighbour's roof seen in the distance all helped create this illusion of reality.

Looking down into the garden from above the model trees placed outside the wall.

The figures added, for scale. Here the redcoat regaling the gardener's boy with stirring tales from the battlefield is a Napoleonic officer, but in this model any Victorian or Edwardian figures would have done just as well: officers and gentlemen, ladies with parasols, children with hoops, nursemaids, lapdogs, his grace the bishop, a butler with a tray – take your pick.

A SECOND WORLD WAR STREET

One thing that always strikes me when I see models of battle-damaged houses or streets in Second World War dioramas is that there isn't nearly enough rubble for realism. A three-storey, double-walled house of that period would have contained 30,000–35,000 bricks, and after aerial bombing or sustained shelling most of them would have wound up in the street. In this model I've tried to give a better idea of what a couple of smashed-up buildings might really produce, though even this is understated.
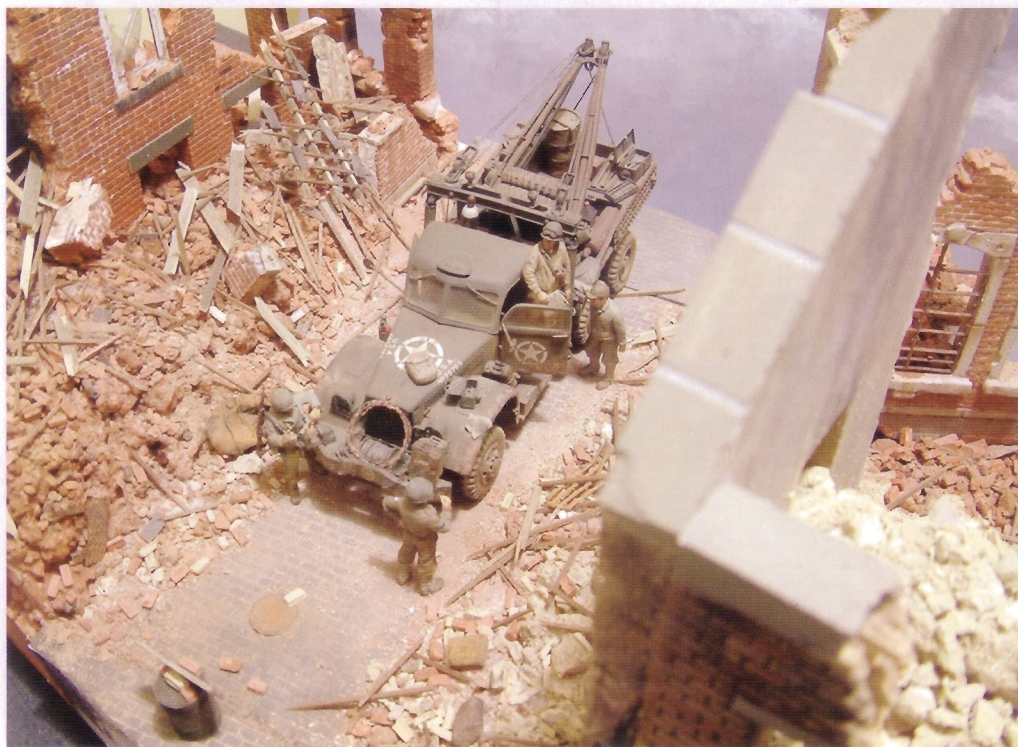
Reference is easy to find in magazines such as old wartime copies of *National Geographic*, *Life* or *Picture Post*, which can often be found at militaria shows or car boot sales. Probably the best reference of all is to be found in the book *The Blitz: Then and Now* edited by Winston Ramsey and published by *After the Battle*. To give you some idea, however, just look at the wartime photo on page 158 of the aftermath of an air raid on Norwich in the Blitz of late 1940.

My model shows a street in a bombed-out town in the US zone of Germany in 1945, with the rubble partly cleared to allow motor traffic.

I started in the usual way, with a base made of two blocks of polystyrene stuck together side by side. Since most of the groundwork that would show would in this case be metalled road, and the rest would be hidden under the rubble, I didn't bother with an initial layer of Claycrete, but started on the buildings straight away.

The real thing: a British suburban house after an air raid in the 1940 Blitz. The rubble pile reaches the second storey; and note that most of the timber elements of a modern house are high up – in the roof, bedroom floors and partition walls – so their wreckage naturally finishes up near the top of the heap. This photo was taken before any of the rubble had been cleared up: our model is of a street that has been roughly cleared by bulldozer to allow traffic through. This photo is from the Osprey title *Roy Porter's Model Buildings Masterclass,* which is highly recommended. (Photo Eastern Daily Press)

With one exception, the buildings in this model all came from the Great North Roads company; I am most impressed with the excellent quality they have managed to achieve. Unlike the early plaster castings on the market the detailing is crisp and, since they are cast from ceramic plaster rather than plaster of Paris, they are much stronger. They also have the advantage of not needing any undercoating – acrylics or enamel can be applied directly to the casting.

TOWN HOUSE

The first building I tackled was made with the Great North Roads 'Town House' casting, for a house that had been virtually destroyed. This consisted of a gable end, chimney breast and chimney three storeys high, and a section of side wall with window apertures.

I painted the brickwork on the chimney breast with a powdered poster paint that is almost exactly the right brick colour. When it was dry I went over this with acrylics and picked out a number of the bricks in different shades to add realistic variety. I coloured the plaster surrounds of the fireplaces in the two upper storeys, but I didn't bother to detail that at ground floor level since this would be hidden by rubble in the finished model.

An example of one of the ceramic castings by Great North Roads, straight from the box; note the sharpness of the cast detail.
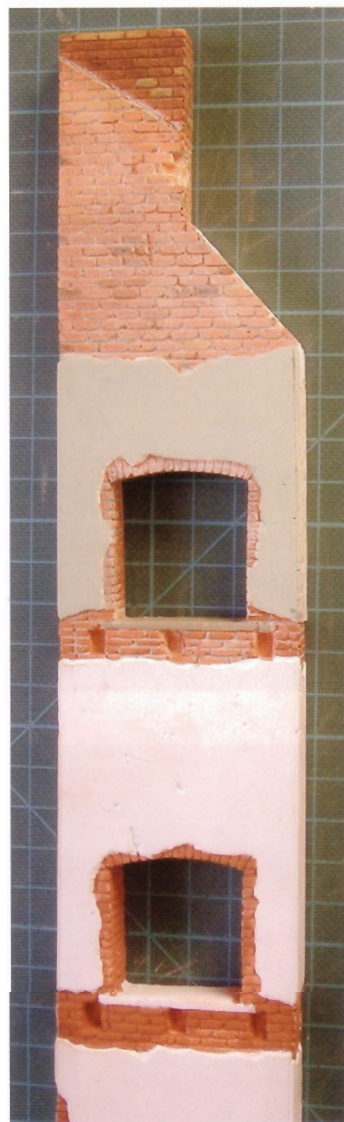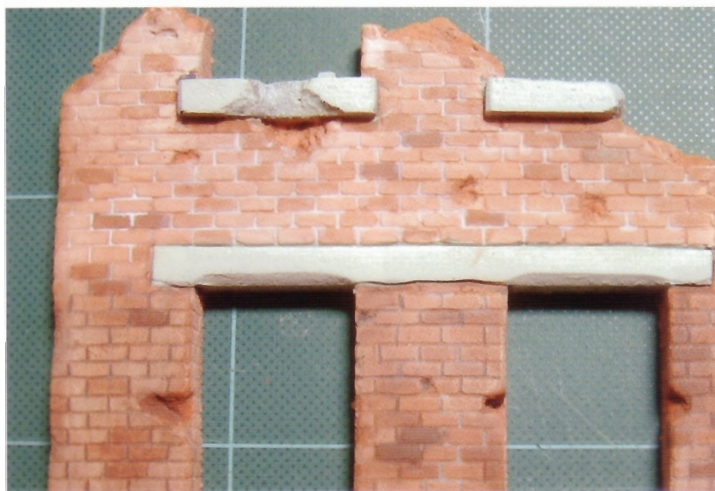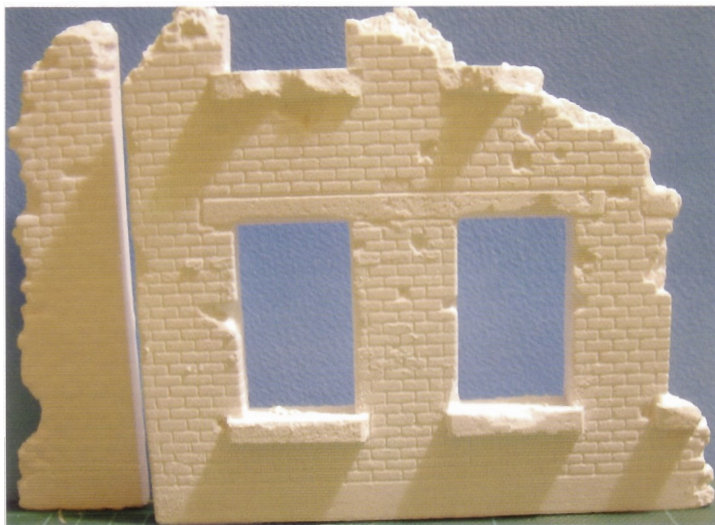
ABOVE The first building for the model was the town house, which has a two-piece gable end – a wall, against which this separate chimney breast is fixed so as to give a decent depth to the fireplaces.

LEFT The casting painted overall with brick-coloured poster paint, with contrasting bricks picked out in different shades of acrylic. The lintel and window sills are in cement colour.
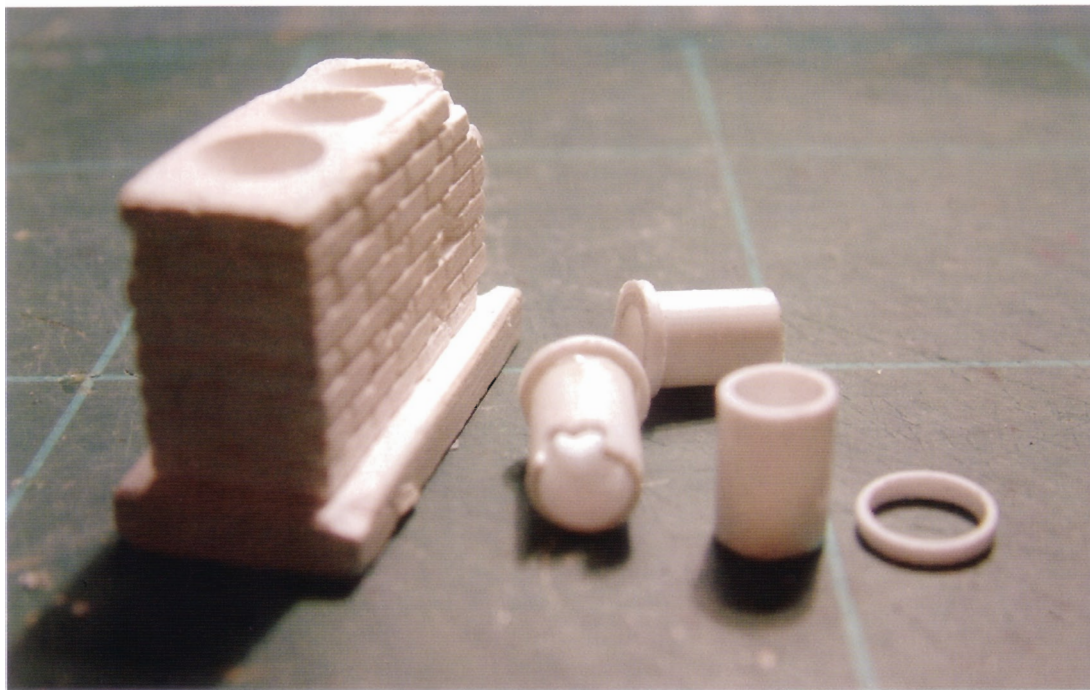
The final portion of the chimney stack didn't have any chimney pots, so I made them from Plastruct tubing with rings added as the lips, and cut slightly oversize holes in the cement cap of the brickwork to accept them The chimney was finished with one pot damaged, and charcoal 'soot stains'

With the bricks and plaster of the chimney breast painted, I start adding the timbers for the upper floor. Here the spacing struts are in place between the joists, and thin laths have been added underneath for the ceiling of the room below – see below.
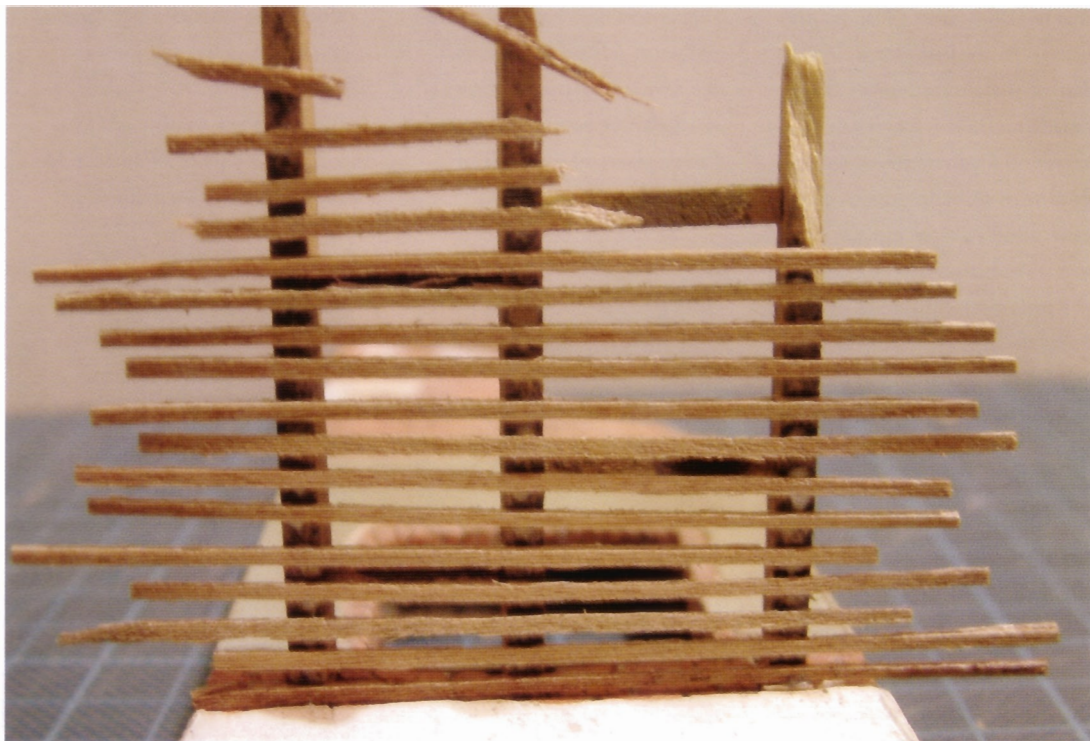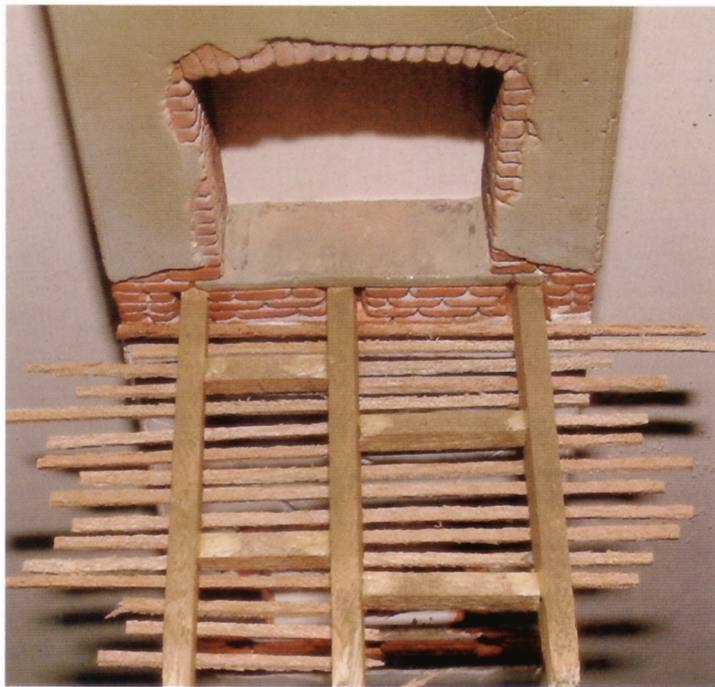
Looking up at the remains of the ceiling plaster on the underside of the wrecked floor.

The chimney stack needed the addition of chimney pots: these were simply made from short lengths of plastic tubing, with larger rings cut to add for the lips of the pots. I drilled out three shallow holes in the brickwork of the chimney top and secured the pots with PVA. They were coloured with Orange Brick acrylic, and touched up with charcoal for a suitably sooty look.

UPPER FLOOR AND INNER WALLS

Both the chimney breast and end wall have recesses cast into them to take the floor joists (a thoughtful touch). As the basis for a small part of the wrecked upper floor I made up broken lengths of basswood for these joists, joining them with short lengths of the same wood to represent the spacers in between.

I then stuck thin strips of wood under the joists to represent the laths in the ceiling of the room below. I mixed up a fairly thin solution of plaster and poured it on to a sheet of glass, leaving it to set. When it was dry I lifted it off carefully with a thin knife blade, and stuck it to the underside of the laths. Floorboards for the upper
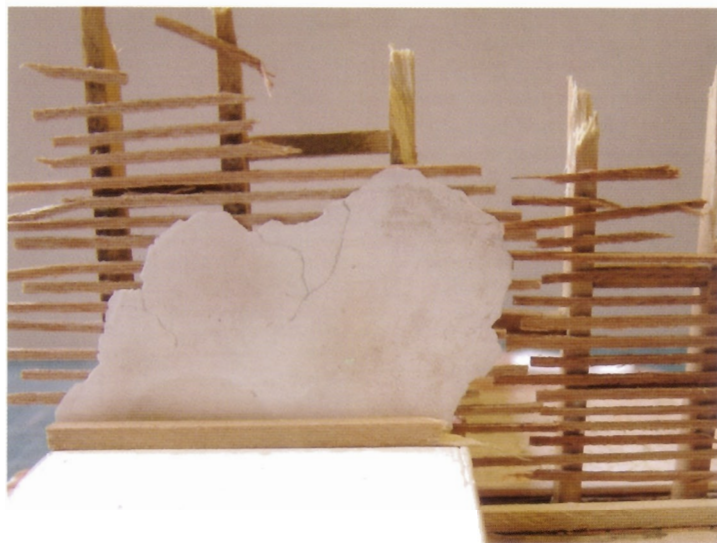
room were made with strips of basswood stained with Weather-It, and secured to the joists with PVA.

I decided that there would almost certainly have been some wallpaper left on the end wall – in the 1940s patterned wallpaper was far more common than today. I took pieces of a couple of different patterns from a doll's-house set, and scanned them into my computer; I scaled them down with the help of the Photoshop programme, and also altered the colours a bit. I pasted the results – suitably torn and distressed – to the walls of the rooms using Copydex adhesive.

To add a point of interest to the end wall I also scanned a

The original dollshouse wallpaper, with the scaled-down version on the right.

Wallpaper stuck to the rear wall of the upper room.

A second pattern of wallpaper in place in the downstairs room; a portrait of a German officer hangs in the alcove flanking the chimney breast, complete with a mourning ribbon across one corner.

The basis of the upstairs room, waiting for the floorboards to be laid.

black-and-white portrait photo of a wartime German officer, scaled it right down, and stuck it to a cardboard frame. I then added a narrow black diagonal strip across a corner, made from adhesive tape used for printed circuit boards; this represents a piece of mourning ribbon, often seen on the portraits of loved ones who had been killed. (You might think that all such details would have been obliterated in a house so comprehensively destroyed, but you would be wrong – wartime photos show some amazing survivals. One Blitz photo of a house completely chopped in two shows a china waterjug still standing on a bedside table right beside the yawning drop.)

RUBBLE AND GLASS

The major piles of rubble for both the buildings and the street were made by a process illustrated in the photographs later in this chapter. The basic foundation is squared blocks of polystyrene for bulk, with small broken-up lumps added on and between them to give irregular profiles. The result is painted with basic brick colour; then sprayed with successive layers of Scenic Cement, to hold the second element. This is pieces of real red and yellow brick, suitably reduced with a heavy hammer, with a final coloured dressing of soft

pastel chalks. When this was all in place I added a detailed top visible layer, and for this I had to make individual bricks.

I had an RTV rubber mould, into which I poured pre-coloured plaster; once this had set I simply tipped out my bricks. I broke a few to stick to the upper floor, and also added a couple of slates made from charcoal-grey cardboard (these came from Hudson & Allen Studios). To lighten things up a bit, I also sprinkled broken-up plaster to look like ... broken-up plaster. The next move was the addition of more bricks, followed by a good layer of brick dust, plaster dust, some timbers, and finally shattered glass.

I have always found glass difficult to represent realistically on a model. Transparent poly sheet

still looks like plastic; it isn't thin enough, and it doesn't shatter the way glass does. But at last I've found the answer – use glass! I came across some glass slip covers for a microscope – the glass pieces that they use in laboratories to place over a specimen on the microscope slide itself, to secure it in place. As you can see from the photo on page 167, they are incredibly thin – fractions of a millimetre – and, when required, they smash just like the real thing. (I must point out here that breaking these thin wafers of glass is not something that should ever be left to a child; this is a job that must be carried out by an adult, and with great care. Fragments so tiny could all too easily get rubbed into the eyes with a thoughtless finger.)

Three stages in dressing the upper floor: with floorboards laid, and the addition of the first pieces of brick, grey slates and plaster dust; with a thicker covering of bricks (note too the soot-blackening in the back of the fireplace); and the final dressing of rubble, broken ceiling plaster and laths.

ABOVE The sort of rubble pile you would find inside a house; although almost invisible in the photo, there is broken glass mixed in here.

BELOW Close-up of individually cast bricks, and shards of the ultra-thin 'window glass'.
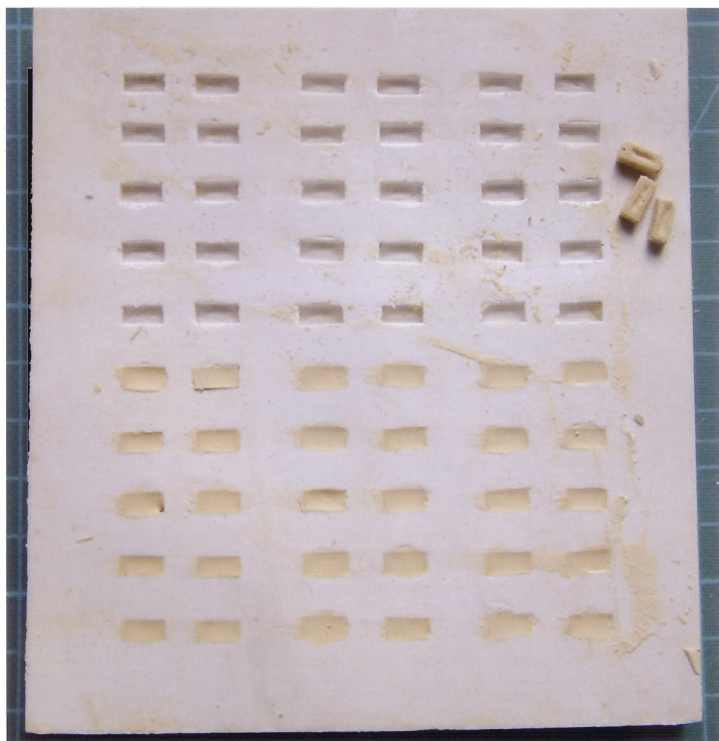
The RTV rubber mould in which I cast my bricks, complete with 'frogs'. These yellow bricks are for the Brewery.

The components I made up for the frame of the broken window in the side wall of the town house.

My method is to lay three or four pieces on a fairly thick paper napkin; fold it over so the glass is inside the fold; and then crush it with a small wooden roller, applying a fair amount of pressure. You can vary the pressure so as to finish up with anything from fairly large pieces – such as those I used in the window frames later on in construction – down to virtually powdered crystals, which are useful to scatter across piles of rubble and in the street.

Sadly, as with the Snow-Coat product described in an earlier chapter, the resulting very satisfactory glitter that you get doesn't show up well in my photos, and the larger pieces reflect the light and just look like a piece of white plaster; but I can assure you that they look excellent when seen with the naked eye.

The broken window came next. I made the frame up with basswood, and then carefully stuck some shards of my micro-thin broken glass in place with a light application of PVA – I didn't want the glue to spread out over the glass. The frame was painted with Off White acrylic and the Weathered Wood paint from Vallejo's Panzer Aces set; and the window was glued into place in the opening in the side wall of the town house. To finish it off I
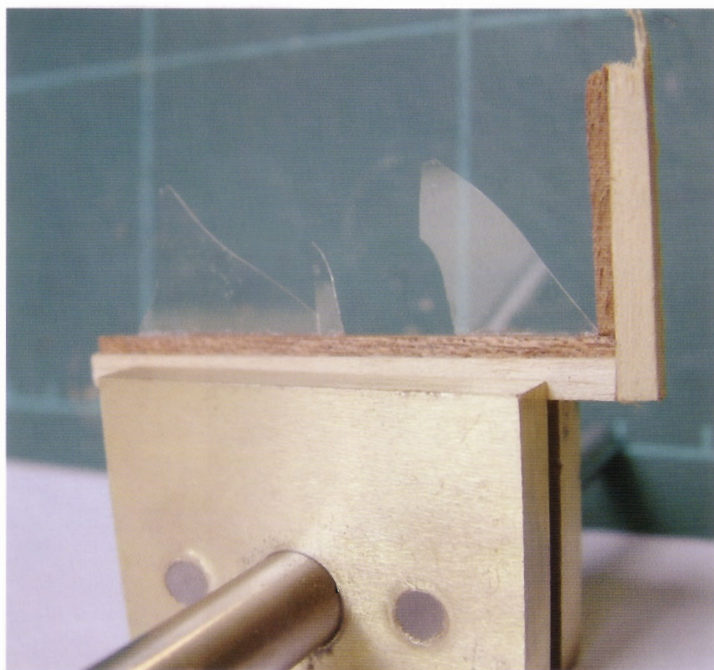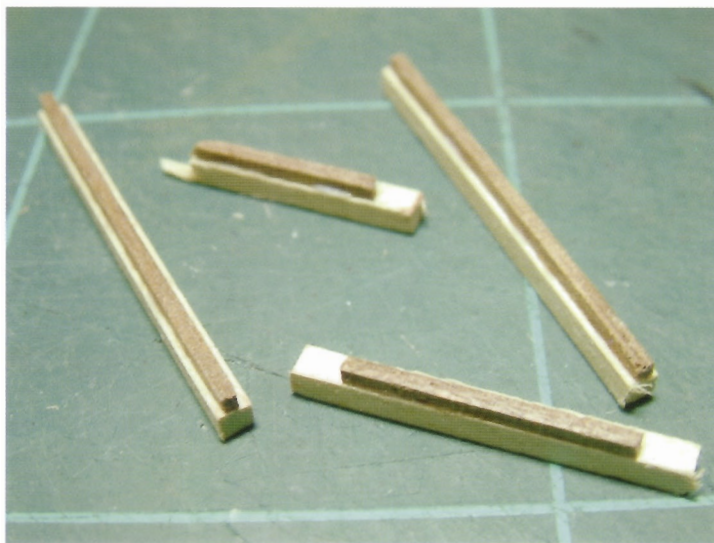
added a tattered lace curtain on a rod – the curtain was also from Hudson & Allen Studios.

The final touches to the inside of the wrecked house were the

Glazing the window frame with slivers of broken glass made from laboratory microscope slip covers. These come in 22mm (⅞in) squares, and are only 0.13mm thick.

The broken window completed, seen from the street and from inside the room.

LEFT The same view but with the lace curtain added.

The completed section of the upper floor of the bombed-out house, with a fractured pipe hanging down and a lampshade made from paper.

addition of a broken chair in the corner of the bedroom; a ruptured gas pipe hanging down from under the bedroom floor; and a dangling cable with a lampshade made from paper, hanging from the ground floor ceiling. How much of these 'furnishings and fittings' you add to any particular model of a wrecked house is naturally up to you, and depends on the subject, but these domestic details can 'humanize the story' of a diorama.

STREET SURFACE

I now had to make the cleared lane of street surface that showed up between the bulldozed rubble piles. The cobblestone sections were again from Great North Roads, as were the crisply cast manhole covers; I chose to use the round cover in my street. I drilled a hole through the casting and then opened it out to the right diameter with a circular cutter in my Dremel drill. This done, I painted the cover in shades of rust, rubbed it over with my graphite stick for the metallic highlights, and offered it up to the recess in the road to check for size. I took it out; painted the road in shades of Neutral and

Close-up of a rush-bottomed chair among the debris in the upper room – this comes from Historex.

Two manhole covers from Great North Roads. Once again, note the crisp detail that has been achieved with the ceramic plaster.
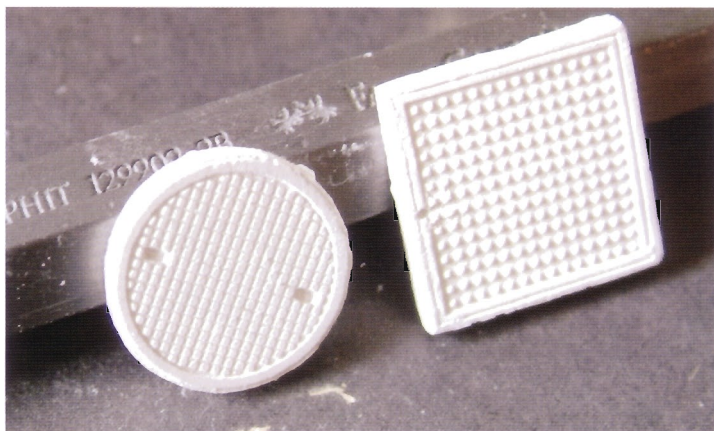
The two covers painted and weathered. The solid stick of graphite is useful for rubbing over the raised detail of many different kinds of model pieces to get a worn, metallic look.
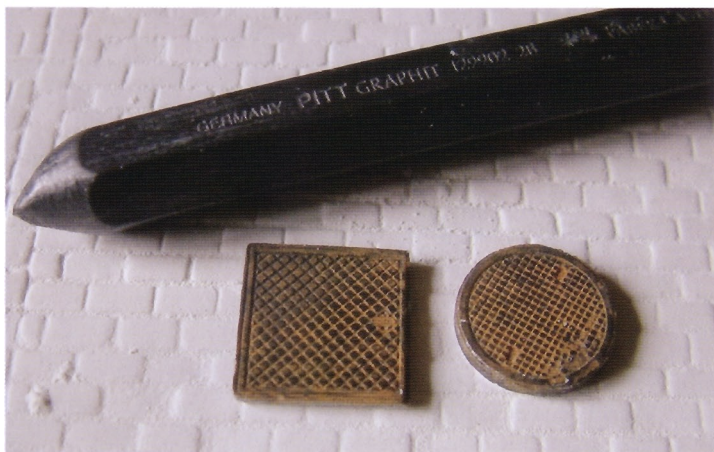
BELOW The hole drilled into the cobbled street surface casting to accept the circular manhole cover.

RIGHT The street was painted with neutral grey and then had powdered brick dust rubbed in generously – it would get everywhere after an air raid, and it brings out the detail of the cobbles.

The beginnings of the heaps of rubble encroaching on the street. Note that the finest debris sifts down to the bottom of such piles, and is seen along the edges.

Dark Grey acrylic; replaced the manhole cover, and worked brick dust into the detail of the cobblestones all over the street.

BREWERY

The other main building was listed as a 'Warehouse' in the Great North Roads catalogue, but I thought the occupying forces might be happier finding a brewery.

I decided to paint this casting in a shade of dirty yellow for industrial brick, so I made up a mixture of Doc O'Brien's Weathering Powders (available from Micro-Mark) in Dirty Yellow,

Detailing the front wall of the brewery. The entrances to bombed sites were routinely blocked off for safety reasons. The notice to the right of the doorway reads 'Zum öffentlichen/ Luftschutzraum' in two lines above and below the red arrow – this was a direction sign to the nearest open public air-raid shelter, and was seen in various forms in almost every city street in wartime Germany. Again, I scaled suitable lettering down with my computer.

The completed front face of the Great North Roads 'Warehouse', which I converted into a brewery – just for fun. Again, a basic paint job of yellow industrial brick colour was touched up in contrasting shades.

wash of dirty white spirit (basically Black oil paint, heavily diluted). Having made up a nameboard from an old Verlinden sheet of German signs, I hung this at a cock-eyed angle on the wall. I then repainted the bricks that would have been covered – and thus cleaner than the surrounding brickwork – when the sign was still in place.

The doorway in the front of the building was blocked off with a couple of sheets of corrugated iron and timbers, with some Scale Link barbed wire added at the top. I got the grilles that I used in the windows from a small company who made car batteries – these are actually the soft lead bars used to divide up the battery cells. The last touch on the front wall was to attach one of the ubiquitous German signs indicating the direction to the nearest public air-raid shelter.

When I moved on to consider the side wall I decided that it needed a bit more detail for interest, so I made up an array of external pipework. This is a white metal set from Hudson & Allen Studios; I set the various lengths up in a Helping Hands jig and soldered them together, using low-melt 'Solder-It' (once again from Micro-Mark). This comes in a syringe and just squeezes out on to the work piece like toothpaste. It melts at a very low temperature – you can even use a match flame.

and painted the whole thing in this shade. Next I went over it picking out different bricks with contrasting colours of acrylics; and finally I gave the whole thing a

The brewery sign came from an old Verlinden sheet of German commercial signs. Tilting it as if half torn from its bolts meant that I had to clean up the bricks behind its original horizontal position, which would have been shielded from years of grime.

The Helping Hands jig I used to put together the pipework on the brewery wall. The Micro-Blazer lying in front is, I think, intended as a cigarette lighter, but it makes an excellent miniature blowtorch, running on ordinary gas lighter fuel. The Solder-It is a low-melt solder in paste form that you just squeeze out as needed.
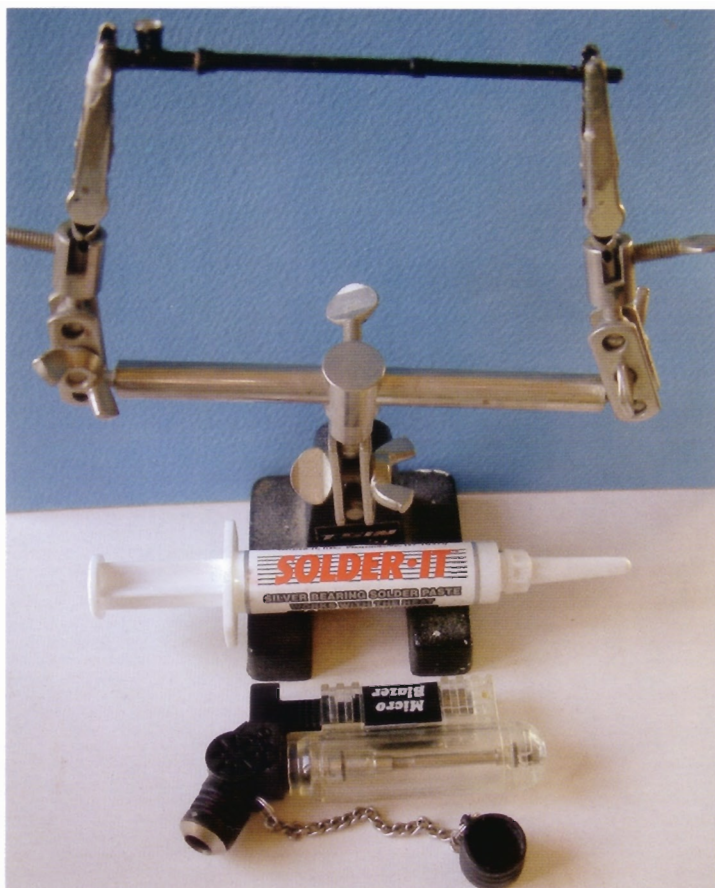
A view of the finished pipe runs. This set came, I believe, from Hudson & Allen Studios and is made of white metal. The window grilles came from my spares box – they are soft lead bars, originally used to divide the cells in a car battery.

The battered lamp on the side wall of the brewery. The bracket came from a Scale Link brass etched sheet; the lamp itself is a partially scratch-built job, based on a small-scale street light.

Next I made up an old lamp to go on the corner of the wall; this was made with the lantern from a very small scale street light with all the plastic glass removed, short lengths of brass wire added, and a bracket from a sheet of Scale Link brass etchings.

RUBBLE: THE FINER POINTS
With the main buildings completed as far as they could be at this stage, I set them up on the base with the road section, and started adding lumps of polystyrene to form the bulk for the piles of rubble I needed. With these blocks in place, I then added a layer of poly fragments broken up to a smaller size. I secured the

ABOVE With the buildings basically finished, it was time to set them up to check the overall layout. The extra ruins in the far corner were old Verlinden castings, dug out of storage and recycled.

BELOW The two sorts of polystyrene scrap that I used to bulk up the large areas of rubble. The square blocks are laid first, and then the more fragmented pieces are added on top.

Starting to fill up the ruins of the town house with rubble: both types of polystyrene packing are being put in place inside and around the walls.

lot with a generous application of PVA, and gave it its basic paint job. Then I scattered the first pieces of real brick rubble over the resulting piles. On top of these went a judiciously placed layer of my *de luxe* hand-cast individual bricks. Throughout, I added generous scatterings of brick dust. Remember to mix up the different colours of bricks; although in this diorama I have a red building on one side of the road and a yellow one on the other, the rubble would still end up muddled together.

High in the piles, and lying on top of them, I added from scrap a selection of broken timbers of different shapes and sizes – beams, planks, thin laths, even bits of mouldings. These were finished in various colours; some were burnt, others painted or dark-stained, but much of the construction timber in a house is not finished at all and remains natural-coloured, and of course any splintered ends or edges are still bright. Much more timber was used in the construction of houses in those days than today, and frankly I could realistically have smothered the whole model with broken wood, but this would have spoiled the overall effect.

There is one last important point to make about the remains of knocked-down buildings. When

Laying the largest size poly blocks around the shell of the brewery.

Outside the brewery a layer of broken-up real brick has been scattered over the polystyrene, and then top-dressed with some bricks cast in my RTV mould.

The second stage of bespoke rubble – broken-up real bricks in red and yellow.

Dark Grey and then rusted with pastels. A jerrycan outside the brewery was given the same treatment, and another one, a bit further along, was altered to give it the 'ballooned-out' look of a can that has exploded, and pierced with a couple of splinter holes.

Nearby I added another of the window grilles; a rusted length of angle-iron made from a short length of brass angle strip; and the road name sign at the corner of the brewery, which was from another Verlinden set. Photos show the signs for wrecked streets sometimes just stuck on poles in the rubble, and mine was mounted to a piece of plastic tubing. A ruptured cast iron pipe sticks out of the rubble close by, made from a plastic drinking straw, and elsewhere I added a broken gas pipe made from bent plastic tubing and coloured with Pebeo lead paste.

On my computer I printed up a scaled-down US Corps of Engineers warning sign and propped it up on a barrel to block the street. The sign bore the Engineers' bomb symbol and

you shake earth through a sieve, the large lumps remain on the top and the fine stuff sifts through to the bottom – and rubble behaves in the same way. The fine stuff slips and slides down the piles, or is shaken down through the larger chunks by vibration. The edges of the resultant piles can be seen to 'peter out' gradually until, on the very edges, they are almost dust; so use your mostly finely crushed materials for this outer margin.

I now enjoyed myself adding a few smaller touches and odd accessories to my street. I started off with a crushed steel drum from Resicast, painted a base colour of

These soft pastel chalks have lasted me for years, and are invaluable for adding interesting shades of colour to your models. I rub them down on a piece of coarse sandpaper, and apply them with an old brush or sometimes with my fingers. The charcoal is ideal for re-creating the effect of fire-stained, soot-covered features.

A shot of the bombed-out house filled up with rubble A few patches of discoloured plaster still cling to the interior part of the chimney stack and the wall of what would have been the attic.

'Warning/Unexploded Ordnance' in two lines of stencilled white capitals (I believe the Americans did also use the more familiar 'UXB', but I fancied a change). This provided a reason for my US Army Diamond T wrecker, with its crew of irritated GIs, to be halted in the midst of all the chaotic destruction wrought by the 8th USAAF and RAF Bomber Command.

BELOW The ruined house should seem to *emerge from* the huge heaps of brick rubble and shattered timber – not simply to stand there with a few bits of rubble stacked *against* it.

Two angles on the brewery, after the same treatment. This diorama shows little more than the facades of the buildings, since my aim was to demonstrate techniques more by 'quality' of rubble than its quantity. In reality, the rubble of this kind of industrial building would be much more extensive inside the shell of the walls. If you plan a diorama showing troops or a vehicle inside such ruins, remember that the collapsed upper floors and roof had to go *somewhere* – to say nothing of machinery and all the internal fittings like pipework, ventilation flues and staircases.

A more detailed shot of the street rubble, with brickwork, timbers and a few slates; occasionally quite solid chunks of brickwork fall still in one piece. Note the crushed 45-gallon steel drum at the edge of the road.

A street sign lies in the ruins. In photos you often see signs propped at a drunken angle in the rubble, but for some reason I could not get the wretched thing in focus until it was flat on its back.

A fractured cast-iron pipe, made from a plastic drinking straw; these can be split or cut to give a good shattered effect.

Some more discarded items, under the suspicious gaze of one of the victors – GIs had long learned that such things might be booby-trapped. A couple of rusty jerrycans lie amongst the bricks and, on the left, a grey German civilian petrol can. The details of this can are not visible here, but it bears the lettering 'Kraftstoff 20L' in black on a blue stripe, and below this in red the word feuergefärich ('inflammable').

Although I didn't make the crater for this model, I thought it might be of help to anyone building a ruined street if I were to explain how it was made. The earth is mud-coloured Claycrete and the water is resin, poured in a drop at a time, which I tinted with a tiny drop of Olive Green glass paint. To create the effect of foam under the surface, I used matt white acrylic – gently 'stabbed' on with a stubby brush, rather than painting a smooth area – before pouring the final layer of resin. I also added some bricks and old pieces of iron at the same time, so they could be seen through the surface of the water. The stream of water from the pipe is tinted resin again, allowed to set around a thin piece of curved transparent rod to help keep the shape. Once set, I glued it into the mouth of the pipe, and added some more foam on the surface layer of resin.

The old Verlinden casting of ruined walls that was dug out of storage and recycled to occupy the empty corner behind the brewery. The added drainpipe was made from a drinking straw, with plastic strip brackets and Grandt Line securing bolts.

The model is finished, in time for the US Army to roll into town ...

... but they are going no further down this particular street. Note that the rubble on both sides of the road is a mixture of both the red and yellow bricks: when a lane was bulldozed clear down the middle, the rubble was not carefully separated!

LEFT A sniper's eye view?

BELOW An overhead view of the Diamond T 969 wrecker amongst the ruins.

OPPOSITE PAGE Just one damn thing after another ... it's time for the driver to get out his maps and try to find an alternative route through this mess.

SOURCES

Naturally enough, several of the British firms listed below – alphabetically – are those local to me in South-East England, which I use for obtaining books, materials, tools and so forth. Enquiries to the manufacturers of the various products will help readers in other parts of the country to find suppliers. Most of those listed also provide a catalogue and mail order service.

If calling a number in Great Britain from overseas, add (44) to the beginning of the dialling code and drop the first (0). If calling a number in the United States from Britain, add (001) to the beginning of the dialling code.

GREAT BRITAIN

Acorn Crafts
139b High Street
Hythe, Kent CT21 5JL
Tel: 01303 265401 Fax: 01303 2257210
e-mail: info@acorn-crafts.demon.co.uk
website: www.acorn-crafts.demon.co.uk
Supplier of doll's-house items (1 / 12th scale), but several of the tiles, bricks, and one or two other products can be used to good effect in smaller scale dioramas. They sell obeche wood in strip and sheet form, as well as various mouldings.

Alex Tiranti
(mail order/showroom:)
3 Pipers Court
Berkshire Drive
Thatcham, Berkshire RG19 4ER
(London shop:)
27 Warren Street, London W1T 5NB
Tel: 0845 123 2100 (mail order); 020 7636 8565 (shop)
e-mail: enquiries@tiranti.co.uk
website: www.tiranti.co.uk
Materials, supplies and equipment for home casting. Catalogue available.

Cross's Graphic Arts
119 Sandgate Road
Folkestone, Kent
Tel: 01303 252391
website: www.crosssfolkestone.com
(NB: the number of 'esses' in this address is correct)
They carry the full range of Vallejo acrylic paints and 'Model Air' range for airbrushing; a good selection of Faber Castell soft pastels; 'Claycrete'; the soft metal expanding mesh illustrated in Chapters 2 and 3; and also some Humbrol paints, and adhesives.

Fibrecrafts
Old Portsmouth Road
Peasmarsh, Guildford, Surrey GU3 1LZ
Tel: 01483 565800
e-mail: sales@georgeweil.co.uk
website: www.georgeweil.co.uk
Suppliers of the Arty's refillable plastic pressurized bottles recommended in this book for fine spraying of water and adhesives.

4D Model Shop Ltd
The Arches
120 Leman Street, London E1 8EU
Tel: 020 7264 1288
Fax: 020 7264 1299
e-mail: info@modelshop.co.uk
website: www.modelshop.co.uk
Stockists of a huge range of modelling materials, including a number of recommended groundwork products by Green Scene such as Flexi-Bark; miniature leaves marketed under the name of The Little Leaf Co; and resins for making bodies of water (also very good filter masks). To see the full range, download their free catalogue.

Gaugemaster Controls plc

Gaugemaster House
Ford Road
Arundel, West Sussex BN18 0BN
Tel: 01903 884488
website: www.gaugemaster.com
Main stockists of Noch, Faller, Peco and Jordan products, Preiser figures, and their own range of groundcovers.

Great North Roads

12 Redburn Close
Paignton, Devon TQ3 3LB
Tel: 01803 405430
e-mail: svfarrugia@yahoo.co.uk
(NB: mail order only)
Maker and supplier of recommended ceramic castings of buildings, roads, etc.

Historex Agents

Wellington House
157 Snargate Street
Dover, Kent CT17 9BZ
Tel: 01304 206720 Fax: 01304 204528
e-mail: sales@historex-agents.co.uk
website: www.Historex-Agents.co.uk
Stockists of books (including Terrain Modelling Masterclass*),* Military Miniatures in Review *magazine, publications by Euro Modelisimo and Andrea (all of which are recommended sources for diorama ideas); also the supplier of the two Historex punch-and-die sets for forming rivets, studs, etc, and of a wide range of figures from all the major names including Hornet, Wolf, Andrea and Verlinden.*

Hythe (Kent) Model Shop

153A High Street
Hythe, Kent CT21 5JL
Tel: 01303 267236
Stockists of basswood and balsawood, brass wire and tubing; some Woodland Scenics products; Javis Countryside Scenics; Tamiya acrylic paints, and a range of the Plastruct formings.

LSA Models

151 Sackville Road
Hove, East Sussex BN3 3HD
Tel: 01273 705420
e-mail: orders@lsamodels.co.uk
website: www.lsamodels.co.uk
Stockists of Tamiya weathering compounds including the extremely useful 'Mud Stick'; CMK weathering powders; Warrior Custom Dioramas; static grasses and Mod-Roc plaster bandage, as well as a large range of plastic and resin kits.

Model World

Newnham Court Centre
Bearstead Road
Maidstone, Kent ME14 5LH
Tel: 01622 735586 Fax: 01622 735581
website: www.modelworld.uk.com
Stockists of most of Woodland Scenics' range of groundwork materials, and of The Scenery Manual *— the fully illustrated instruction book on the use of their products, which is also available on VHS video; the full range of Evergreen styrene plastic sheet, strip and rod; Tamiya paints, and some adhesives.*

Penkraft

304 Cheriton Road
Folkestone, Kent CT19 4DP
Tel/Fax: 01303 279292
e-mail: penkraft@online.co.uk
A well-stocked arts-and-crafts shop, supplying Eberhard Faber ceramic casting powder in white; terracotta is also available, and useful when casting some sections for buildings that are going to be brick-coloured.

Perry Miniatures

PO Box 6512
Nottingham NG7 1UJ
Tel: 01159 168307
e-mail: perryminiatures@aol.com
website: www.perry-miniatures.com
Manufacturers of a wide range of white-metal wargaming-scale figures, recommended for their well-designed proportions and sculptural detail.

Scale Link Ltd

Unit 19B, Applins Farm Business Centre,
Farrington, Dorset DA11 8RA
Tel/Fax: 01747 811817
e-mail: info@scalelink.co.uk
website: www.scalelink.co.uk
Makers of a wide range of white metal figures and accessories, and an equally large choice of fine etched-brass foliage, barbed wire and other accessories; also full resin kits and resin detailing parts. Catalogue available for downloading.

The Small Shop EU

4 Woodpecker Meadow
Gillingham, Dorset SP8 4GB
Tel: 01747-825646 Fax: 01747-825646
e-mail: info@TheSmallShopEU.com
website: www.thesmalllshopeu.com
Probably best-known as the supplier of the four types of Hold & Fold tool, this company also markets the unique Etch Grip photo-etch adhesive system. Suppliers of highly recommended Snow-Coat and Ice-Coat for replicating snow and ice; and Cast-a-Coat — primarily used to provide a 'cast surface' texture for AFV models, but also useful for texturing stonework and bricks and replicating render on buildings.

Sylmasta

PO Box 262
Haywards Heath, West Sussex RH16 2FR
Tel: 01444 415027 Fax: 01444 458606
e-mail: Sales@Sylmasta.com
website: www.sylmasta.com
Suppliers of Superfast Wood-Stick, and a large range of epoxy putties, adhesives, casting materials, etc; see on-line catalogue for details of their stock.

UNITED STATES

Dick Blick Art Materials

PO Box 1267
Galesburg, IL 61402-1267
Tel: (309) 343-6181
website: www.dickblick.com
Suppliers of Balsa-Foam.

Micro-Mark

340 Snyder Avenue
Berkley Heights, NJ 07922-1595
Tel: (800) 225-1066
website: www.Micro-Mark.com
One of the best suppliers for a wide range of tools for the modeller, plus scenic materials and weathering agents. Full catalogues available.

Scale Motorsport LLC

Newtown, CT 06470-2023
website: www.scalemotorsport.com
Manufacturers of Faux Fabrix spray for adding cloth texture.

Scenic Express Inc

175 Sheffield Drive #100
Delmont, PA 15626
Toll-free sales tel, US & Canada only: (800) 234-9995
Sales tel: (724) 468-3106   Fax: (724) 468-3879
e-mail: sales@scenicexpress.com
website: www.scenicexpress.com
This company handles several of the best makes of grasses, foliage, leaves, flocks and turf from Noch, Woodland Scenics, Silflor and Heki, as well as supplying their own products.

Timberline Scenery

PO Box 57
Platville, CO 80651
Tel: (970) 785-0321
website: www.timberlinescenery.com
Makers of Weather-Rite weathering agent for old timber, this company also sell a range of groundcovers and trees (their 'forest floor litter' is recommended).

Woodland Scenics

PO Box 98
Linn Creek, MO 65052
Tel: (573) 346-5555
Fax: (573) 346-3768
website: www.woodlandscenics.com
Suppliers of first-class groundwork materials, primarily for the railroad modeller but equally good for dioramas. They carry a very large range, all under their own brand name; and also publish The Scenery Manual, a recommended 'how-to' book (plus a version on VHS video), which show how to make the best use of their products.

Index

Advanced Terrain Modelling offers further
ideas and techniques for creating miniature
landscapes by the author of the best-selling
Terrain Modelling Masterclass, whose work is
displayed in British and European museums.
The materials and methods that Richard
Windrow explains here can be applied to any
kind of scale model layout or diorama, for
civilian or military subjects of any period.

Major dioramas created for this book, described
and illustrated stage by stage, are a First World
War trench scene; a timber medieval castle and
outbuildings in small scale; a stunning forest
glade; the tranquillity and colour of a superbly
convincing walled garden, complete with plant
effects, trees and a greenhouse; and the chaos
a bomb-damaged street in the Second World W

There is also advice on how to model water an
mud effects; ice and snow; fires; and even an
introduction to 'false perspective' techniques
for advanced boxed dioramas.