

CHEE TOR

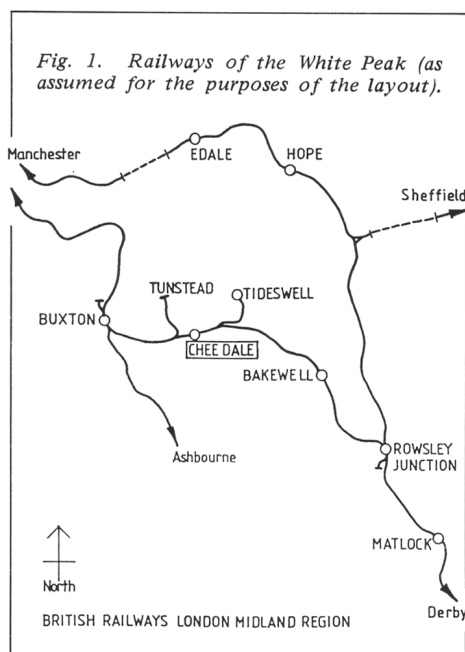
2MM ON A GRAND SCALE

It's been talked about for years, but rarely seen. Now, Manchester Model Railway Society's breathtaking 2mm project is finished. On behalf of the Society's 2mm group, MIKE RAITHYBY tells the story:

Imagine the scene: it is high summer and a group of modellers are slaking their thirst, sitting in the sun on a stone wall at Monsal Head, overlooking Monsal Dale in Derbyshire. Below them stretches the valley of the River Wye, cutting a deep trough through the limestone plateau as it threads its way around interlocking spurs. The rock gleams almost white in the sun where it forms outcrops on the valley sides. On one side of the valley the trackbed of the old Midland Railway line to Buxton and Manchester is cut into the hillside, alternating between tunnels, rock-sided cuttings in deep shadow, and high embankments above the sparkling waters of the river. Immediately below them, the trackbed crosses the valley on a mighty stone viaduct, before plunging into a tunnel linking the scene to the outside world. Even though the track has gone, it is not difficult to imagine an '8F' thrashing over the viaduct on a heavy freight train.

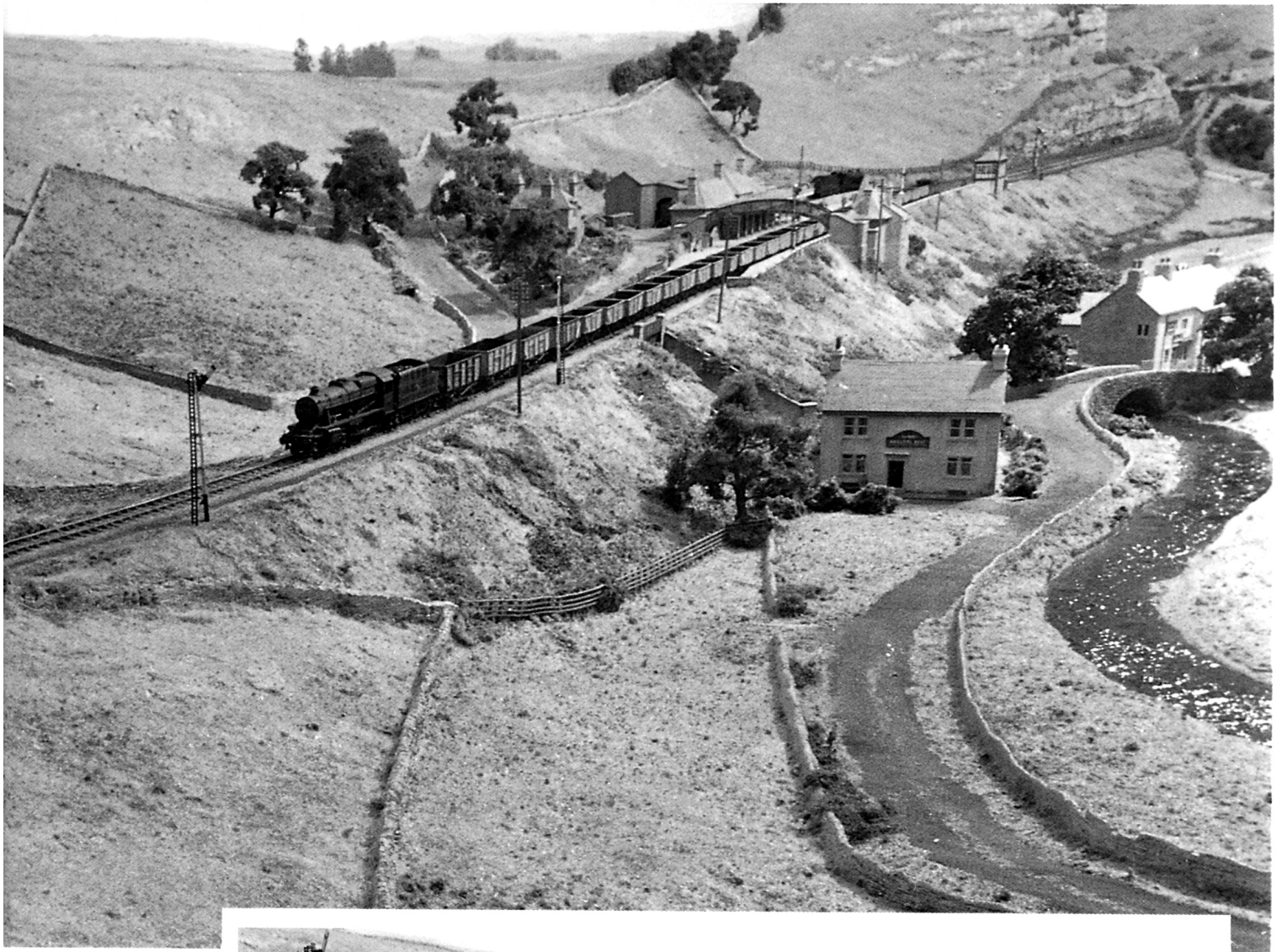
At this time, our group of modellers has recently decided to retire the Manchester Model Railway Society's N gauge layout and to start on a replacement in 2mm finescale. The sun rises higher until one member of the group puts into words what all of them have been thinking: "What a great layout this would make if we had the space." Someone else casually mentions that the line gets even more spectacular further up the valley, beyond Millers Dale.

It is no surprise, therefore, that a similarly hot summer's day a little while later sees the same group tracing its way along a river footpath upstream of Millers Dale station, in Chee Dale. The old trackbed is on a shelf cut from the rock overhead and, as they round a bend, the valley becomes so constricted that the footpath is no more than a line of stepping-stones in the fast-flowing river below a huge overhanging limestone cliff. A little further on, the old railway line is briefly visible as it emerges from Chee Tor No. 2 Tunnel to leap across the gorge on a bridge some 60ft above the river, before disappearing into Chee Tor No. 1 Tunnel – all in the space of less than 100 yards. Beyond the bridge, the gorge opens out a little to reveal views of the limestone



cliff face of Chee Tor itself, rising nearly 200ft above the river.

Our return to the flatter and more urban setting of Manchester saw us making a detailed comparison between the 1:25,000 Ordnance 'White Peak' map and ideas for a track plan using a space 18ft x 7ft 6in. The main topographical features were plotted along an imaginary River Wye valley, following a basic oval track plan. Two sides of the oval were seen as fiddle yards, leaving an 'L'-shaped area for the scenic section, with a central operating well. By infilling part of this operating well, and with some compromise in height and distance, it would be possible to incorporate many of the features of the prototype, albeit not in accurate juxtaposition. There was considerable excitement: here was a prototype which offered what the group had sought, the chance to exploit the scenic possibilities of 2mm scale in spectacular fashion. Not only would the railway be modelled in its



An '8F' 2-8-0 trundling through Chee Dale station on its way north with a heavy coal train.

PHOTOS:
BARRY NORMAN

setting, with an impression of height and depth, but the landscape would completely dominate the railway, just as on the prototype. To an outsider, the process must have looked strange; the layout plan consisted mainly of contour lines, and prototype station track plans were augmented by geological survey maps.

The layout design began to crystallise as a series of scenes, each based on a

particular prototype. Considerable licence was taken with this planning; some scenes were depicted in mirror image, the station buildings came from Cromford, well to the south of Chee Dale, whilst various cottage groups were taken from Clapham and Malham in Yorkshire. Similarly, a bridge was re-located from the Buxton branch.

Whilst geography and geology were being re-written in this way, so too was

railway history. This was necessary to explain the proposed track plan, quite unlike that of the real Midland main line. The plan had been devised to give operating potential with a relatively small number of trains, by depicting a secondary railway line, with a single track section at one end of the station. This feature would slow down operation and would give a reason for stopping trains at signals, awaiting a path through the single line.

The prototype main line would have produced a procession of trains in both directions, most of which would have run through without stopping. An exhibition viewer would soon have seen all the trains available and operators would quickly have become bored. The single line section would require the station to be operated properly to a simple sequence. A lay-by siding and small goods yard would add further interest. We were very anxious to ensure that Chee Tor should be more than just a scenic diorama, however interesting the scenery might be. A convincing story was required to explain this change in status of the railway.

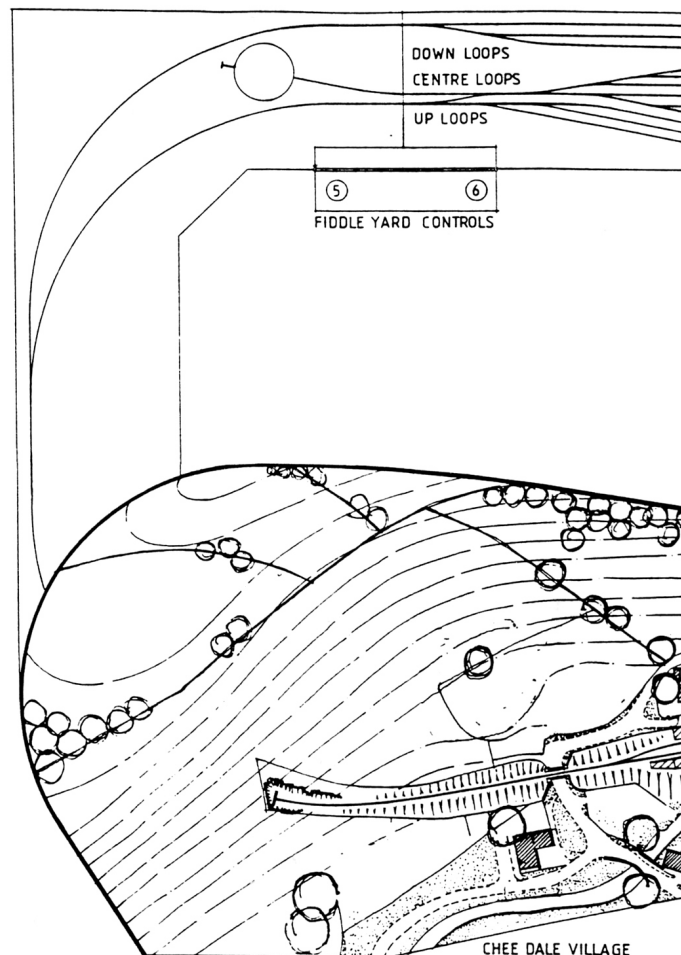
Supposing that the Midland Railway had built its main line to Manchester through the Derwent valley, via Chatsworth, the company might have built a secondary line to Buxton using the valley of the River Wye. Supposing also that this line had finished in a joint MR/LNWR through station at Buxton, then, by British Railways days, it would have been possible to have a railway in Chee Dale forming part of a secondary route from Derby to Manchester, via Buxton (see Fig. 1).

The period of the railway had already been fixed for the years 1960-65 to give the maximum variety of rolling stock and locomotives, much of which could be readily converted from proprietary N gauge models. This was an important consideration in adopting 2mm finescale for a club layout. The dates chosen would allow a mixture of steam and early diesel locomotives and would include some distinctive items such as the blue Midland Pullman train (conveniently diverted for the day from its main line route!). For exhibition purposes, because the trains would be a very small feature in the landscape, it was considered essential that each train should be noticeably different in appearance.

MAKING IT HAPPEN

Our group were next to be seen huddled over a drawing board, far away from the sunshine of Derbyshire but with a huge collection of photographs to remind them of their enjoyable days out. As a basis for construction, the whole layout was drawn out full-size, with contours plotted at 1 inch vertical intervals. The design was also tested by constructing an eighth scale model of the layout, complete with little coloured blocks of balsa to represent trains. This was a very useful exercise which showed a number of detailed alterations to be necessary, particularly to improve the views of the railway. Such adjustments were incorporated into the

Fig. 2. Layout plan.



full-size drawings before construction started.

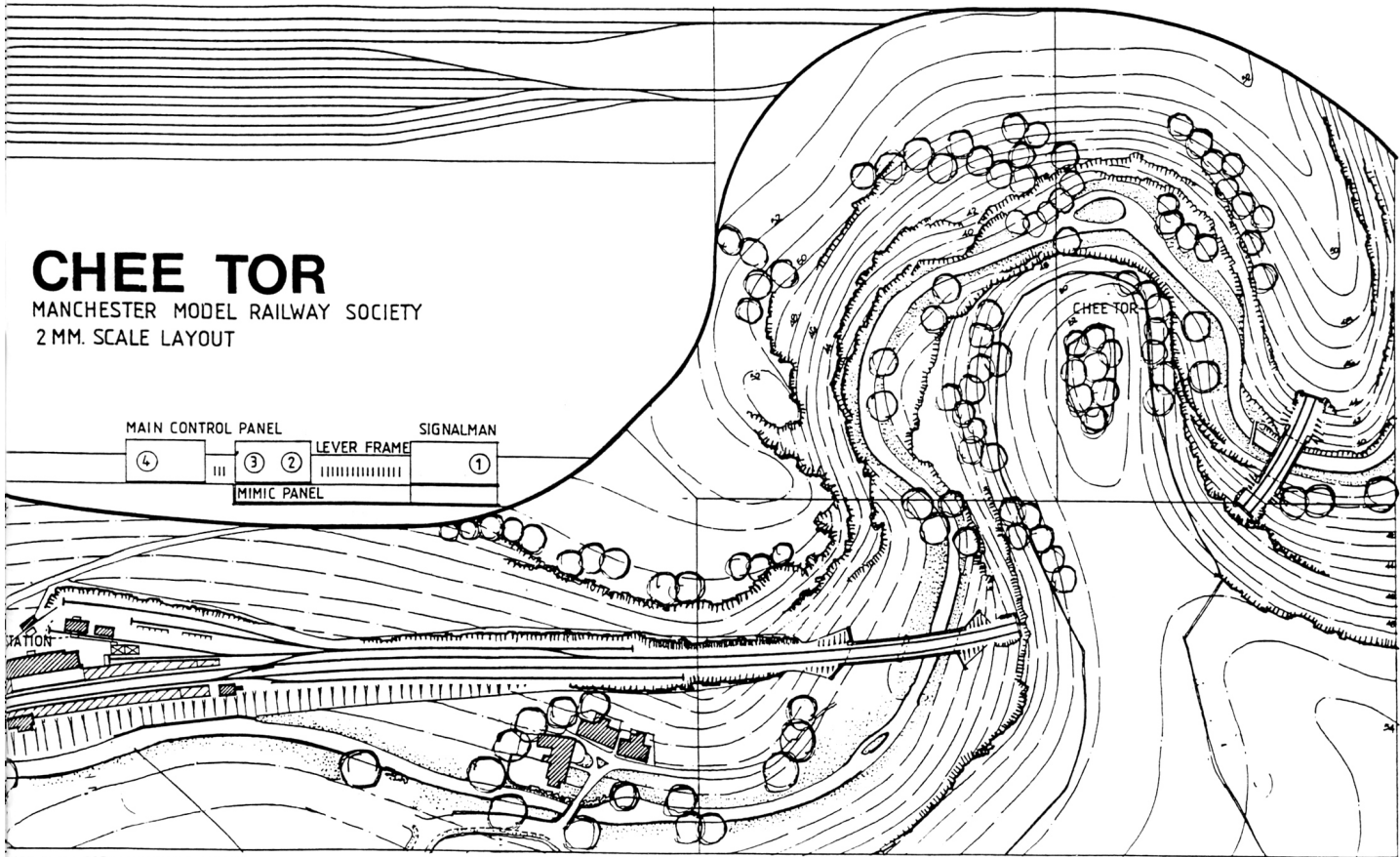
The operation of the station area was tested by laying-out the drawings on the clubroom floor and moving trains around them. Whilst other members speculated on the de-stabilising strength of the sun in Derbyshire, we found the exercise very helpful in positioning trackwork, signals and uncoupling solenoids. We were also able to check the capacity of sidings, run-round loops and so forth.

Some thought had been given to how this not-so-miniature chunk of limestone scenery was to be supported, and several ideas using plywood geodesic frame structures were tested, frequently to destruction. The frame would have to be rigid, without a solid top, and would have to support a scenic depth of almost two feet, with the railway base some 4ins above lowest scenic level. The frame system ultimately adopted was based on $\frac{3}{8}$ in thick plywood members, held in machined timber connectors to give

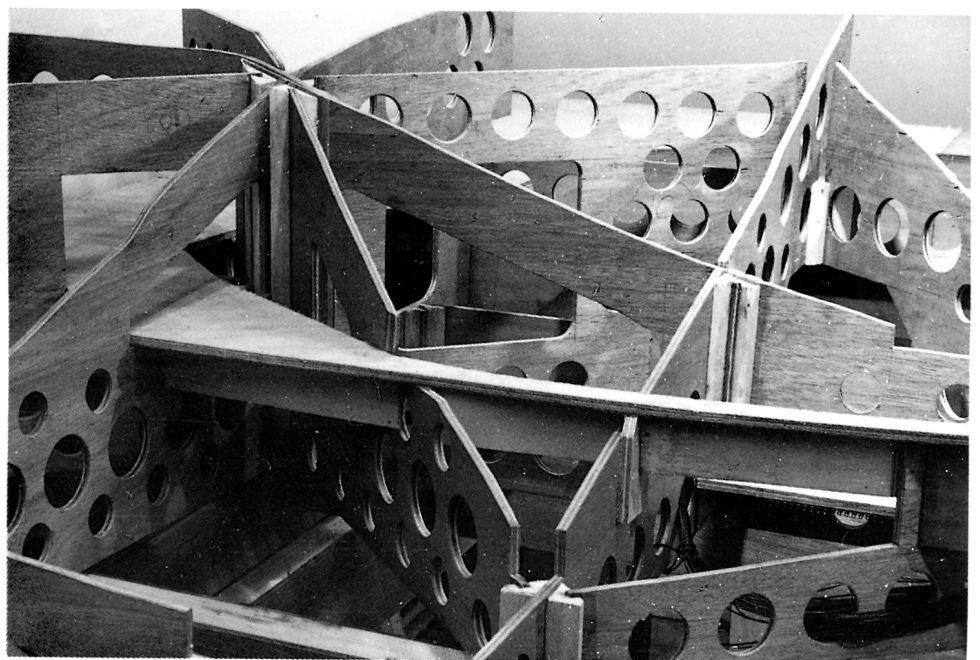
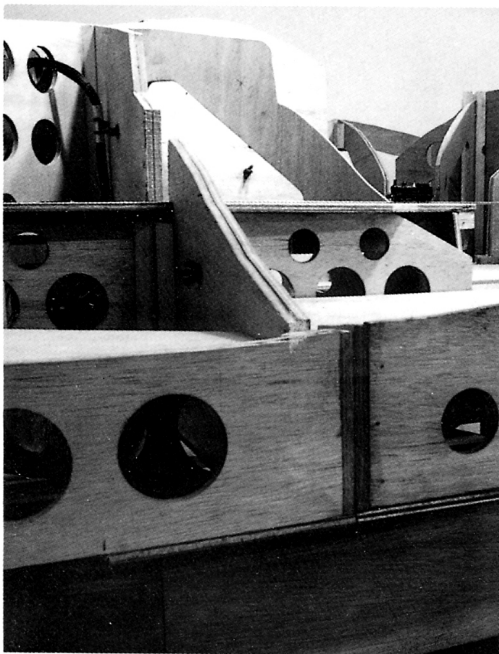
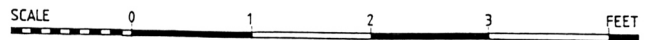
roughly 18in square structural bays, each bay having a diagonal cross brace. Further stiffening was provided to baseboard ends. This framing pattern had been superimposed onto the full size layout drawings, so that it was possible to derive a scenic profile for each frame member. In many cases the frame members were of considerable depth and large holes were cut away to give access to trackwork in tunnels and to help reduce overall weight. The whole construction was likened to aircraft technology, although subsequent scenic work, using large quantities of plaster, made lift-off most unlikely. In fact we were offered certificates with some of the very thin plywood used for track bases stating that the material was suitable for the granting of an air-worthiness certificate. Such thin ply has been used to lift trackwork off the $\frac{3}{8}$ in plywood structural base to give ballast shoulders. Experience has shown that cork, which is normally used for this purpose, is rather too flexible in 2mm

CHEE TOR

MANCHESTER MODEL RAILWAY SOCIETY
2 MM. SCALE LAYOUT



CHEE DALE FOR TIDESWELL STATION

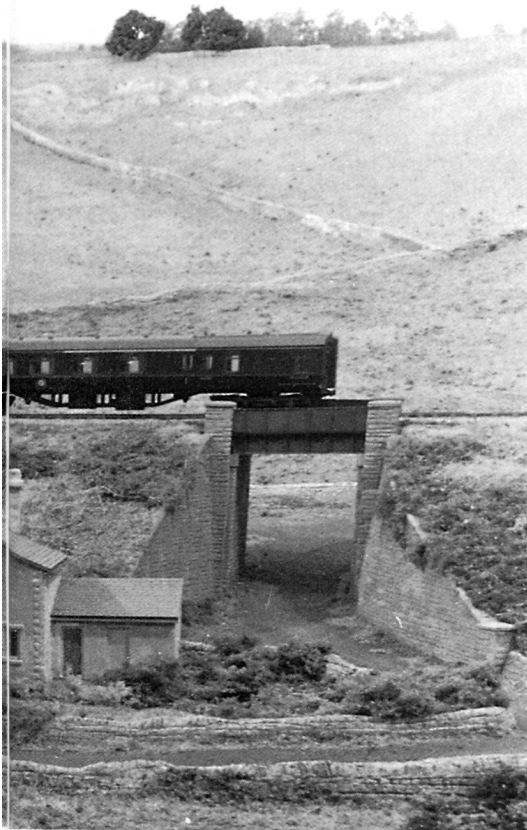


The frame system: profiled plywood members joined by timber connectors.



A BR/Sulzer Type 2 diesel approaching Blackwell Tunnel with a Derby-Manchester train.





scale and that a solid base is to be preferred, even if this is more noisy.

Trackwork was fabricated in sections, using prints of the full-size layout plans as templates. Construction has followed conventional techniques, using Code 40 rail soldered to printed circuit board sleepers. Etched brass chair plates (from the 2mm Scale Association) have been used between the rails and the sleepers, to lift the rail and to allow daylight to show below it. Various attempts were made with 'cosmetic' chairs but eventually solder-blobs were accepted as reasonable representations of chairs from normal viewing distances.

Point operating units were designed and fabricated using machined 3mm square Tufnol bar running in a slide unit mounted from below the track bed. The sliding bar was connected to the switch blades by soldered pins to give a pivoted joint and operated by a rocking lever built into the unit. In case of failure the unit can be unbolted and removed from below the baseboard, minimising disturbance to trackwork and ballast. Point operation in the station area is by lever frame, using mechanical linkage as far as possible. This has been found to be reliable and is easily adjusted should this

be necessary. In case of complete failure, the points can be operated manually, without the exhibition viewer being aware that anything is amiss; what cannot be achieved by engineering reliability may be achieved by good showmanship!

Electrical wiring has also been engineered for maximum reliability but with easy fault-finding in the event of a failure. 2mm finescale trackwork does not use fishplates to connect rails and soldered rail joints have proved to be notoriously unreliable, even when bonded with wire connections. Such unreliability is not too surprising when one considers the effect on the layout of moving from an unheated three-ton van into a crowded, centrally heated exhibition hall or, worse still, vice-versa. Care has been taken, therefore to ensure that, in addition to bonded rail joints, each piece of rail has its own feed wire, connected together on numbered tag-strips below the baseboard.

SCENERY ON A GRAND SCALE

Since the idea of a scenic model had been inspired by the landscape of Chee Dale and Chee Tor, it was natural that the modelling itself should be based on the use of photographs. No one would contemplate modelling a loco or a coach



The delivery boy arriving back at the village stores in Chee Dale. The buildings are based on prototypes at Malham in Yorkshire.

without a photograph to work from, so why not extend the idea to the setting for the railway? After all, it is unlikely that the modeller will be able to improve on nature; certainly we would have been hard-pressed to design a better limestone gorge! A large collection of photographs was amassed, covering each rock face, outcrop, cliff and similar feature, together with a few panoramic shots taken from particular vantage points. Reference to a book on rock-climbing gave us many

interesting names for particular features and greatly helped in sorting out the photographs later by enabling us to refer to 'Runyon's Corner' or 'The Third Lift'. Each area of the model landscape has been worked from particular prototypes selected from these photographs.

Most of the scenic modelling on Chee Tor employed familiar construction techniques, albeit on a grand scale. The basic topography was established in the base-board framing. This was infilled with

blocks of rigid polyurethane foam, which could be carved to a final shape, allowing the appearance to be judged as the shaping was progressed. Having experimented with chicken wire to support the scenic shell, this was found to be an important consideration. It was much easier to make minor adjustments if the actual shape of the ground could be seen while it was being modelled and before the shell itself was applied. In this case the shell consisted of a good thick layer



A general view of Chee Dale station from the meadows down by the River Wye. The Midland Pullman bound for St. Pancras had been diverted from its main line route. The station buildings are based on those at Cromford.

of Modroc – plaster-of-Paris bandage. Areas to receive rock faces were left back about 2in from their final line and this was built out in several thick coats of lightweight gypsum plaster (Carlite finishing). Lightweight in this context is a bit misleading – we used two 1cwt bags! The rocks were then carved into the plaster, often to the full 2in depth, working from photographs and using a variety of woodworking chisels which needed

break in the scenery. The same material has been used for all the many yards of dry stone walling which is such a characteristic feature of the limestone uplands, and also for the rubble rough limestone walls on buildings. When used on



'4F' No. 44046 shunting the yard at Chee Dale station with the daily Buxton to Rowsley Junction pick-up goods. The coal merchants' offices are based on a building at Haworth whilst the goods shed is based on a standard Midland timber building.

frequent sharpening. Care was taken to ensure that prominent bedding planes ran through from one feature to the next and to keep the natural rock faces with a 'softer' appearance than man-made cutting sides, which are more angular. It was found easier to 'rough-in' the main features as soon as the plaster had started to set, leaving the final carving until it had hardened. Further texture was added by the use of files, surforms and a variety of wire brushes. This was both a very slow and a very messy job. In many cases access was difficult and, on more than one occasion, it was necessary to climb onto the model to sit on one hill whilst carving the next.

The landscape shell and rockfaces were kept back about 1/2in from all baseboard edges and these were filled in with Milliput epoxy putty. This material can be easily worked when wet and can be carved and shaped when set but provides a much more durable sharp edge to the

buildings, Milliput can be applied in a very thin layer onto a Plastikard shell.

Colouring has been done in artists' acrylic paints, using a very restricted palette of base colours for everything. In this way all the rocks, stone walls, buildings and roadways have a unified appearance and look as though they all belong in the same locality. Great care has been exercised in the colours used, particularly in the avoidance of black. Limestone is light grey in colour, but if this is depicted by mixing black and white, the results would be flat and unnatural in appearance. Light grey has been produced by mixing blue, brown and white, so that variety of colouring is achieved, ranging from blue-greys to brown-greys. In fact most rock faces also have yellows, greens and red-browns in the colouring. Details of colouring were again based on photographs.

Colouring was undertaken under the same lighting as would be used for

exhibition and display, in this case a mix of warm white fluorescent tubes and tungsten spotlights. By this means it was possible to judge the final appearance more accurately. This applied not only to the painted surfaces such as the rock faces but also to the application of self-coloured textures used for soft landscape work. On previous layouts such soft landscape areas have been spray-painted after application. In the case of Chee Tor, such painting was not possible because the scenery is a mix of limestone and grass/plants, with the underlying rock showing through in many places. The textures have therefore been used in self-coloured form, as-bought, and this has given both a richer colour and a greater variety of colouring. Spray painting tended to mute all the colours down to similar shades.

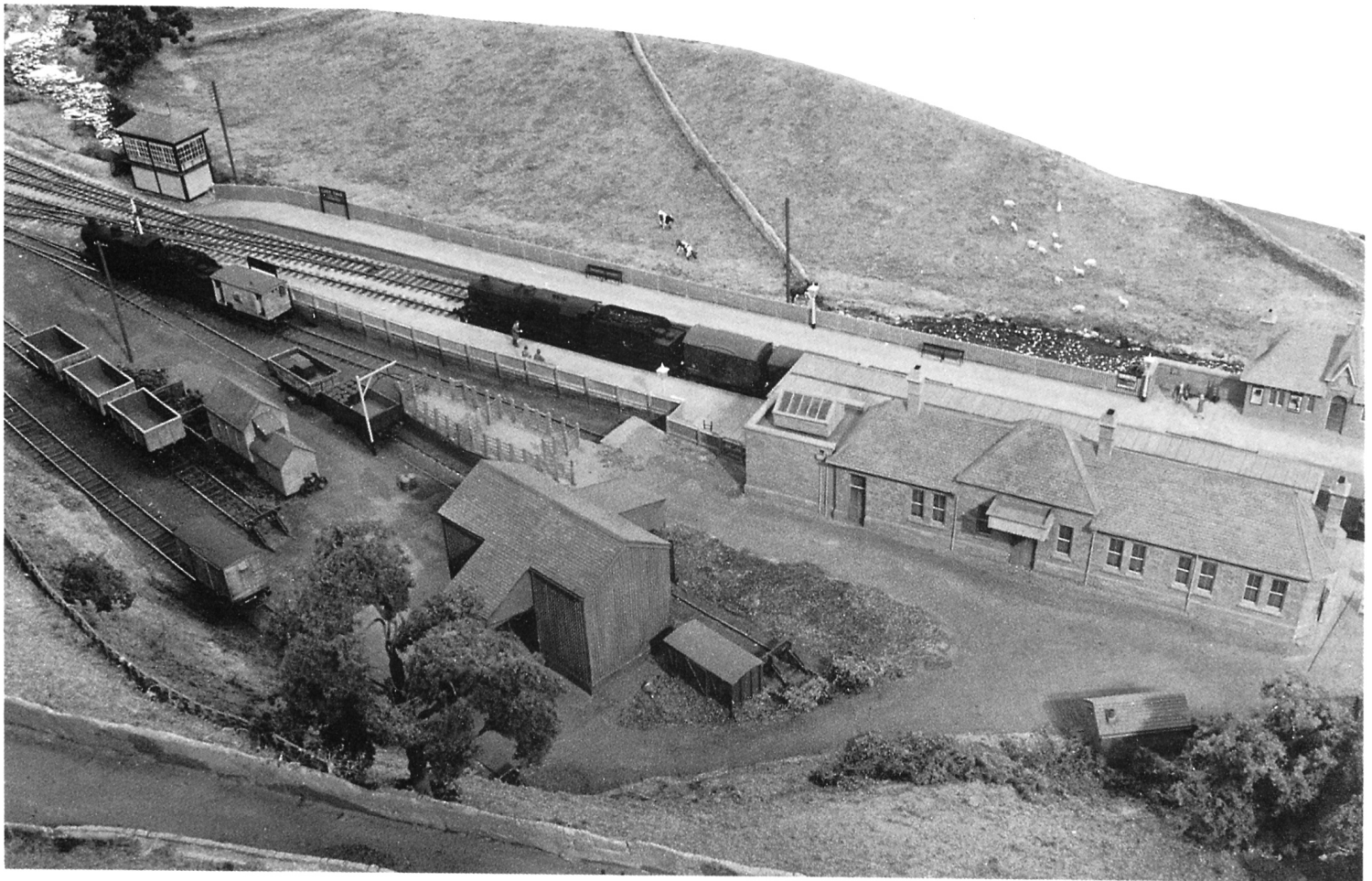
The texture materials used came from a variety of manufacturers and sources. Over a period of some years the group

had been purchasing whatever suitable materials could be found on exhibition trade stands. These were mainly various flock fibres but also included some longer fibre flocks and several grades of chopped and dyed foams. Mixtures of these were made up for use, together with a lighter and a darker variant of each mix. Different shades of green flock were used with other colours such as fawn, yellow-brown, and dark brown. Colours of each mix were determined by location – grass growing on the limestone would be rather scrubby and yellow-brown whilst the grass in the valley, near the river, would be quite lush and much brighter. The brightest greens of all were reserved for cottage gardens in the village; obviously the inhabitants know a thing or two about gardening.

Colours of flock were also varied to give colour recession in the landscape, to complement the false perspective used



The approach to Chee Tor Station . . .



. . . and a bird's eye view.

in the sizes of stone walls and trees and, where applicable, buildings. Thus the landscape towards the backscene gets progressively lighter and more muted in colour; the light fawn flock fibres were very useful in achieving this effect. Textures of ground cover were used in a similar manner, with the ground nearest the backscene having the finest texture, becoming gradually more coarse towards the front of the scene.

We found that the best results were obtained by applying a variety of colours and textures at the same time so that material from about half a dozen different pots would be sprinkled onto PVA adhesive together. In many areas the grass was dabbed on in small clumps, often using tweezers, to allow the limestone to

show through where the soils are obviously very thin. The trick here was to remember to paint the ground in a limestone colour first. The same comment would apply to grass growing by the roadside or next to the ash cess by the trackside; the grass should be added after other areas have been painted.

Further textures were added to represent uncultivated ground and bushes/shrubs. Almost any material with a fibrous texture was employed, ranging from carpet underfelt to hemp or to shaved carpet tiles – anything that came to hand.

It was realised at an early stage in the planning of the layout that certain elements would require the use of etched brass components if they were to be

effectively modelled, particularly the wrought-iron segmental arches of Chee Dale bridge. A total of ten of these arches would be needed so it seemed sensible to prepare artwork for a single arch and have at least ten etches produced. In fact, using a standard sheet size of 18in x 12in, it was found that four etches could be arranged on a sheet. Three etched sheets would give us twelve arches. The remainder of each etch would be made up of other components required for Chee Tor. These would include the main part of the footbridge, together with telegraph pole tops, signal components and so forth. Initial thoughts also included some locomotive parts such as a Stanier '8F' cab, Stanier tender, Fowler tender and the like. In the event, each of these infills



Chee Dale signal box is located on a high embankment above the river. The valley side rises up behind the railway, to the windswept limestone uplands.

developed into a separate project for a complete loco with chassis. The '8F' and '4F' locomotives seen in the photographs were derived from this source, using wheels, gears and other fittings obtained from the 2mm Scale Association. This still left space on the bridge etch, the artwork for which remained incomplete. Items such as signal box nameboard, station seats, and tunnel nameboards used

some of the space but eventually the remaining space was filled by a representation of the leaves of the plant known as Devil's Rhubarb; this is very characteristic of the whole river valley during the summer months and grows to a great size, with leaves more than 2ft across. Even in 2mm scale, this gives a large distinctive leaf which would be conspicuous by its absence — hence the etched brass leaves.

The only problem now is that the etchings obtained do not produce anything like enough of the stuff and we may be faced with getting many more bridges to fill the valley with leaves.

DISPLAY TECHNIQUES

Much has been written of late on the subject of display techniques for exhibition layouts. The days of spotlights



A Black Five on a down parcels train approaching Chee Dale station from Derby. At this point the railway is perched on the hillside above the River Wye. Much of the landscape in the distance is painted onto the backscene.



Cottages in Chee Dale village, stepping up the hill from the river in the foreground. The cottages have been transported in model form from Clapham in Yorkshire (another limestone area). The grouping of the various buildings was irresistible.

clipped to the back of a layout to plunge the front of the exhibit into shadow appear to be almost over and we are into the world of proscenium arches and letter-box viewing slits. We have worked on the basis of a fascia to contain the scene and to conceal the lighting units, but mounted at a height to frame the view rather than to block it. The fascia has been constructed as a complete unit, assembled in sections, which extends around all four sides of the layout, supported on four posts, one in each corner. The main span of about 16ft has been achieved by using two interlocking plywood box beams, about 10ins deep, with lighting units mounted on the inner face. Each lighting unit contains one fluorescent light and a length of lighting track to take adjustable spotlights. For exhibition purposes, some eight fluorescent lights (5ft long) are used, together with about 16 spotlights, varying from 75 watt wide beam spots to

100 watt Par 38 floodlights. The latter are used to throw more light into the deeper scenic section around the gorge. To counter the yellow colouring effects of the spotlights, particularly on the rear sections of scenery and the backscene, a number of blue Par 38 floodlights are used. This helps to reinforce the impression of distance and recession by rendering the rear areas of scenery in blue.

Use of this amount of lighting creates considerable impact and attracts the eye in an exhibition setting. By flooding the layout with light, the surroundings are less distracting. The effect is particularly effective when seen in a relatively dark exhibition hall.

The lighting fascias have been left in varnished plywood and the front edge of the baseboards is painted in a neutral beige colour. This avoids the overpowering effects of black layout edges and black lighting units, so that the viewer is less

aware of these elements and can concentrate on the scene itself; after all, few pictures are displayed in black frames. This was particularly important in the case of Chee Tor where the front edge of the baseboards can be over 2ft in depth.

The scene is framed at the back by a fixed backscene which is run in a series of curves around the layout, as shown on the plan. For most of its length, this backscene extends up to about 5ft above floor level, although this is reduced somewhat in the station area to allow the operator to see the trackwork. Considerable attention has been paid to the junction of the backscene with the three-dimensional scene. The hills sweep into the vertical painted scene and the line of the joint has been broken by means of the lines of stone walls, areas of woodland and similar devices to avoid a straight joint. The effect can be judged from the photographs.



The larger cottage with the porch has a cellar with access from ground level through the opening in the retaining wall, next to the adjoining cottage.



Chee Tor Gorge with Chee Dale Bridge, seen from the hillside near Chee Tor No. 2 Tunnel, with an '8F' 2-8-0 crossing the bridge on a goods train bound for Rowsley Junction.

THE NEXT TEN YEARS

It is sobering to think that ten years have now elapsed since the group first sat in the sun at Monsal Head. The results may be a very good case for keeping out of the harmful rays of the sun. However, this does not quite represent ten years' continuous work on the project because the group have been involved in other MMRS activities in this period.

After making an initial outing at the Manchester Show last year, and an appearance at the Rochdale show earlier this year, the layout will start its exhibition career proper at the Manchester show this year, at its new dates and venue: 29th & 30th November, 1st December 1991, at New Century Hall, Corporation Street, Manchester.

Much development work remains to be done in future years, including many more buildings and a few hundred trees. In addition, the locomotives and rolling stock need further work to illustrate some of the distinctive traffic on the line and to increase the number of trains avail-

able up to the full limit of the fiddle yards.

In the meantime we trust that these notes give some broad idea of the project. We make no apologies for concentrating on the scenic side of the layout; perhaps we may be able to expand on some other aspects at a later date.

We would close by acknowledging the forbearance of the remainder of the MMRS as this large chunk of Derbyshire has taken shape all around them, and particularly that of our patient exhibition manager who has agreed to wait until the layout was reasonably complete. Thanks are also due to Barry Norman for his excellent photographic work; it would be safe to say that we presented him with a few challenges.

Next time we sit on a wall admiring the view, it will be in the fens or somewhere flatter than Derbyshire.

*Chee Tor will be on display at
Manchester Model Railway Society
Annual Exhibition*

on

Friday 29th November 1991
5.00 p.m. - 9.30 p.m.

Saturday, 30th November
10.00 a.m. - 8.00 p.m.

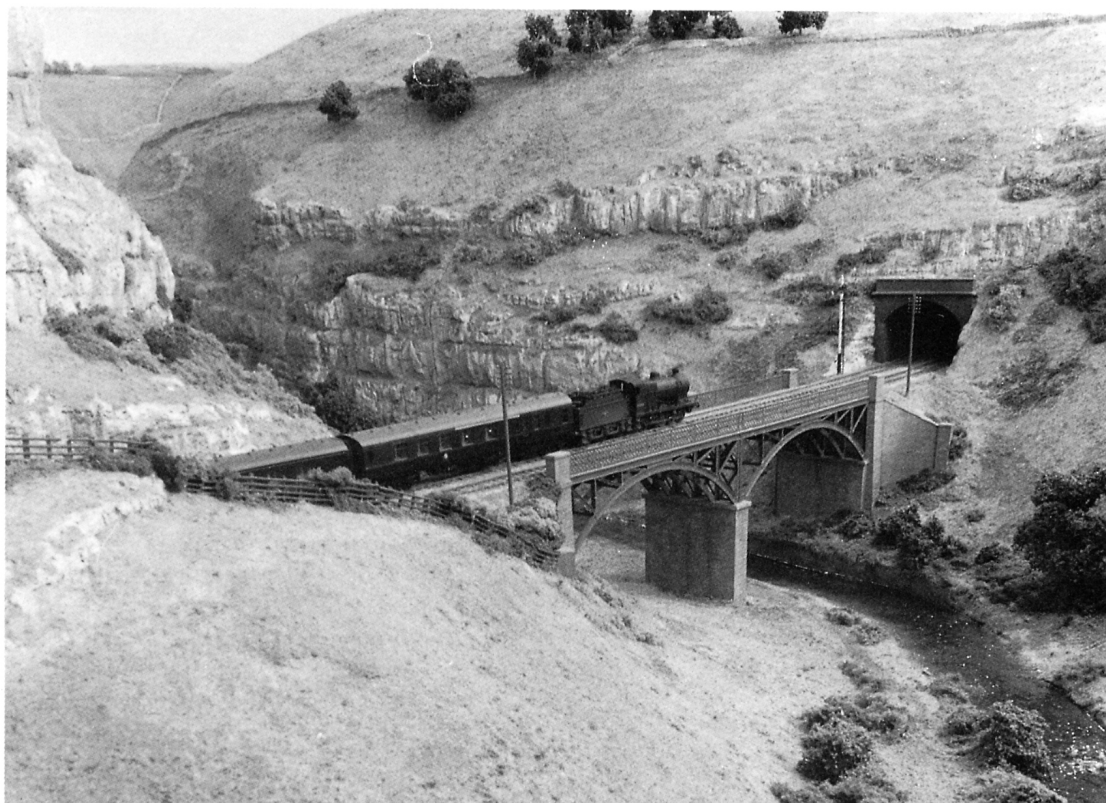
Sunday, 1st December
10.00 a.m. - 6.00 p.m.

at the New Century Hall,
Corporation Street, Manchester.
(next to CIS building and near Victoria
station)

*It can also be seen at the East Midlands
Model Railway Exhibition, Nottingham,
on 7th & 8th March 1992.*



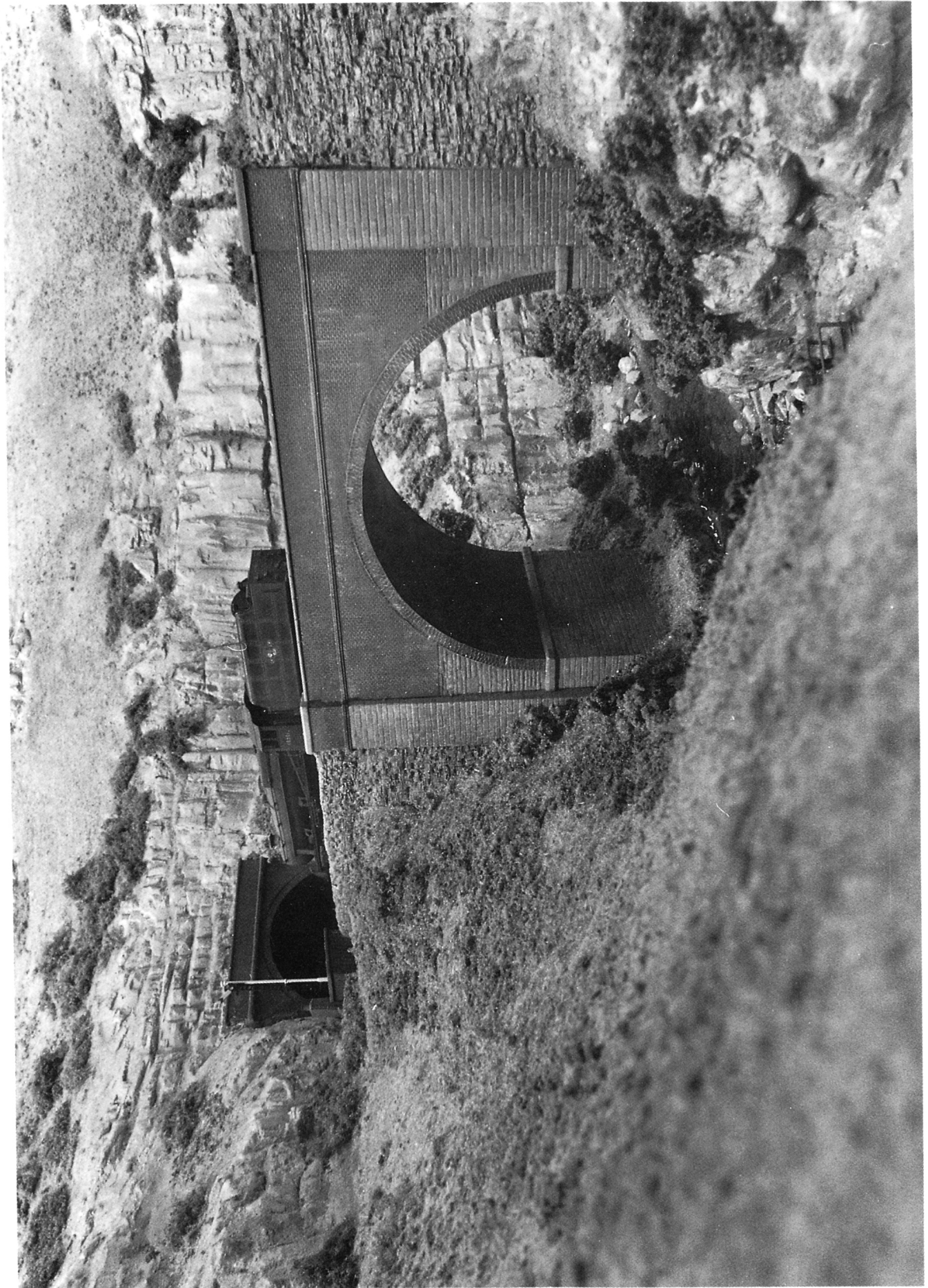
A rebuilt 'Royal Scot' bursting out of Chee Tor No. 2 Tunnel with a St. Pancras—Manchester Central train, onto Chee Dale Bridge. Chee Tor Gorge closes in on the river behind the bridge.



'4F' No. 44046 approaching Chee Tor No. 2 Tunnel with a local passenger train.



Water has been modelled in plaster, complete with ripples, rocks and so forth, which has been painted and varnished.



Chee Tor Bridge No. 77 with Chee Tor No. 2 Tunnel in the background. The gorge is very restricted at this point, with limestone cliffs rising straight out of the river.



Chee Tor itself. Above the gorge the windswept plateau reaches away into the distance. The River Wye makes an enormous loop around Chee Tor as it leaves Chee Dale and enters Millers Dale.



BR/Sulzer Type 2 diesel crossing Chee Tor Bridge with a Buxton-Derby semi-fast train which is about to enter Chee Tor No. 1 Tunnel. This double track bore was driven through a short limestone spur. The limestone cliff face of Chee Tor rises up behind the bridge.

