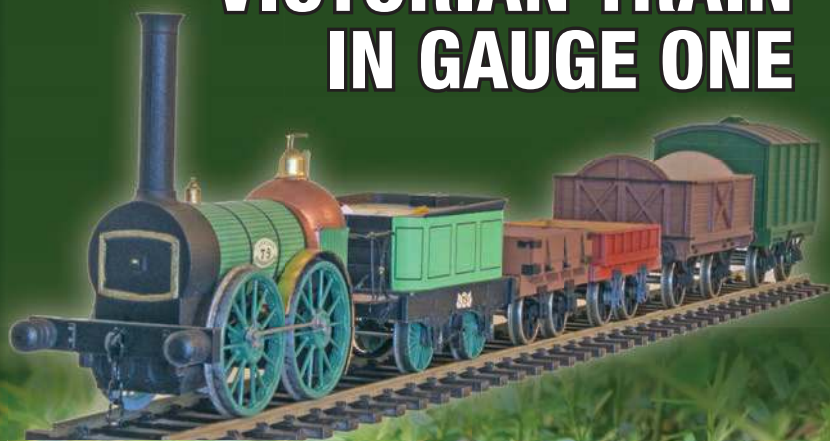


# GARDEN

JULY 2019  
ISSUE 299

# Rail

**3D PRINT A  
VICTORIAN TRAIN  
IN GAUGE ONE**



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|-----------|----------------|
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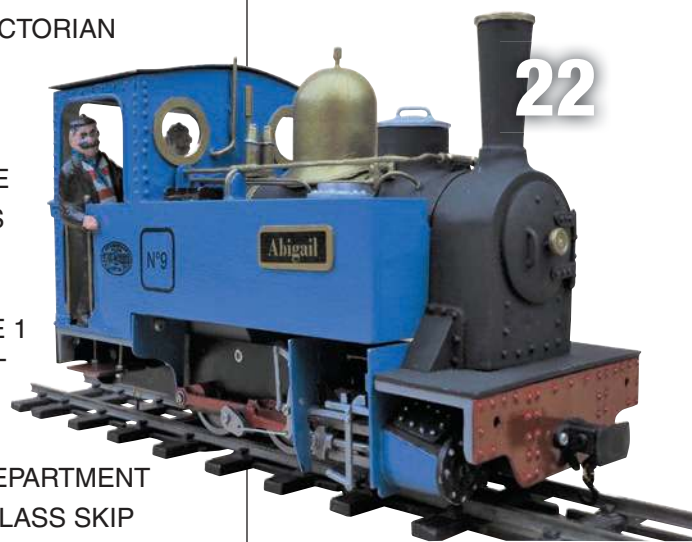
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Next Month: To celebrate Bekonscot Model Village's 90th birthday, Garden Rail has been behind the scenes at the world-renowned model village.





# VIEW FROM THE END OF THE PLATFORM

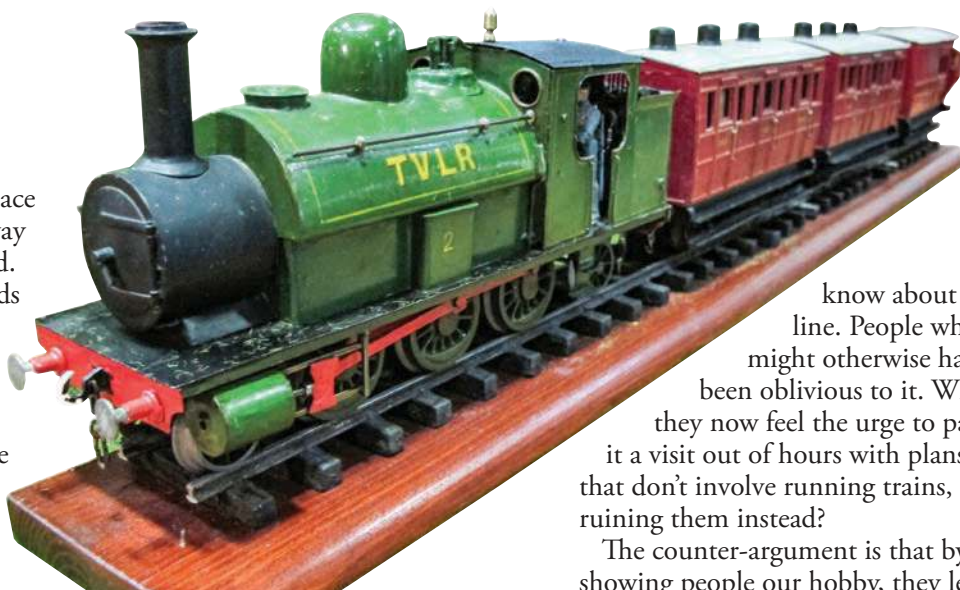


## Safe and secure

I'm sure all **Garden Rail** readers will have been outraged at the wanton destruction that took place at the Market Deeping model railway exhibition in May. Layouts smashed. Rolling stock destroyed. Trade stands upended. Many, many hours of hours works ruined in a few minutes by a small group of youths.

I'm proud to say that the response from the model-making community was swift and generous. Within hours, there were offers of sympathy, and more importantly, assistance from all over the world. People volunteered their time if it would help to restore or replace models.

Then the crowd-funding appeal started. At the time of writing, well over £100,000 has been raised. This hasn't just come from modellers, but from those not involved in our hobby who have been touched by the news story.



know about your line. People who might otherwise have been oblivious to it. Will they now feel the urge to pay it a visit out of hours with plans that don't involve running trains, but ruining them instead?

The counter-argument is that by showing people our hobby, they learn to appreciate it and it's not so appealing to vandalise a much-loved garden railway. When everyone local knows and likes the line, perhaps they are less inclined to turn a blind eye to anything bad happening to it. That might just stop someone thinking of having "fun" by doing harm.

How do readers feel about this?

Do you take security measures? I'm sure we'd all be interested to know, although you might wish to remain anonymous when describing them for obvious reasons.

Drop a line to the letters page and let us know. Perhaps your advice can save someone else's models.

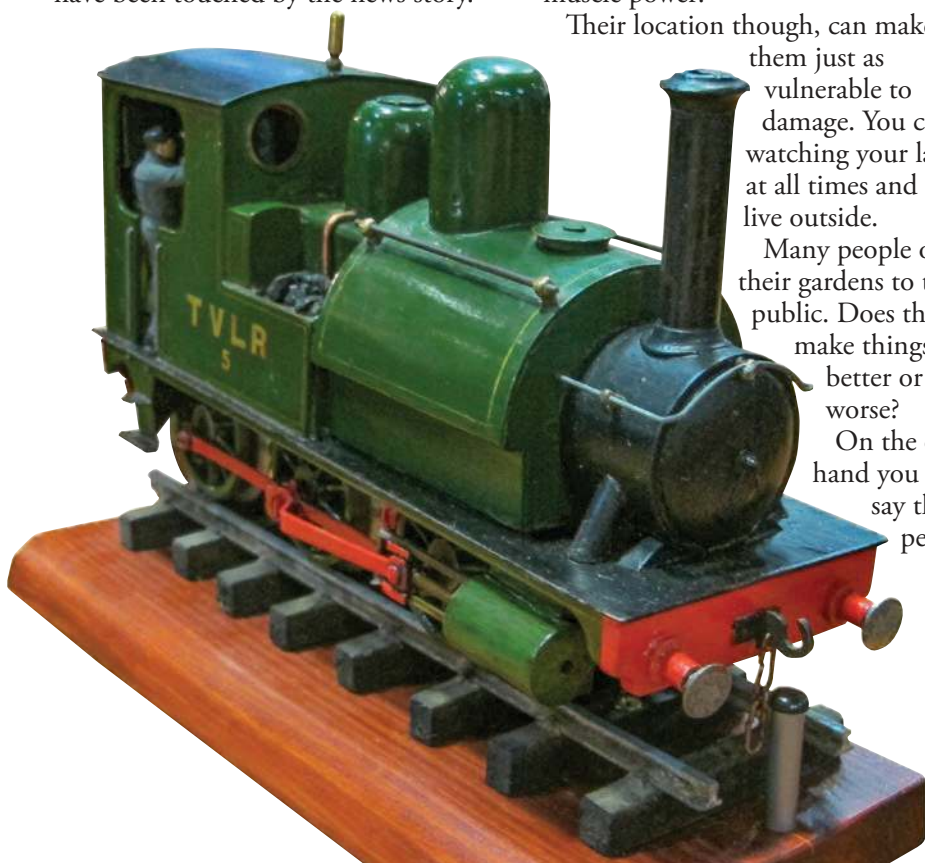
The mainstream media suddenly find model railways a hobby to be cherished and appreciated rather than ridiculed.

We are less vulnerable to this sort of attack. Our models are usually firmly fixed down for a start. If you want to turn over my baseboard, you better bring a JCB or at least some shovels and muscle power!

Their location though, can make them just as vulnerable to damage. You can't be watching your layout at all times and it does live outside.

Many people open their gardens to the public. Does this make things better or worse?

On the one hand you can say that people



## FINDING THE TVLR

Does anyone remember the Rev. Peter Denny's garden railway, the Trepolpen Valley Light Railway?

At a recent model railway exhibition, I was delighted to find some of the locomotives and rolling stock on display and took the chance to chat to Stephen Denny about them. It seems that the models are in excellent shape despite their age and so I'm arranging a feature on them for a future issue.

Readers memories of this line, or indeed any other well-known garden railways would be welcomed. As those who subscribe to the excellent, free Throwback Modeller e-newsletter know, there is quite an interest in these historic lines. ■



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# The Bayfields Light Railway



You never stop learning when building a garden line. Rob Golding shows us how he developed his second railway.

It was May 2015, moving-in day, and I remembered standing in our new back garden and planning the railway. Jump to just over two years later and The Bayfields Light Railway is now open for services. But how did it come into being?

Our first garden railway, The Woodside Light Railway (*Garden Rail* 213) located at my parents house was very much an experiment, and valuable

lessons were learnt from this in what works, and what does not.

I had grown up on Playmobil and LGB, therefore I had initially thought to continue with 45mm gauge for the new line, it meant I would not need to re-gauge my stock for a start.

My plan was to use Peco SM45 track, as it had much more of a narrow gauge look when compared to LGB, which is what I was after. However, after much

Harvest time at Bayfields, with 'No.4' marshalling some sugar cane wagons.

thought and pricing up, it was decided to adopt 32mm gauge.

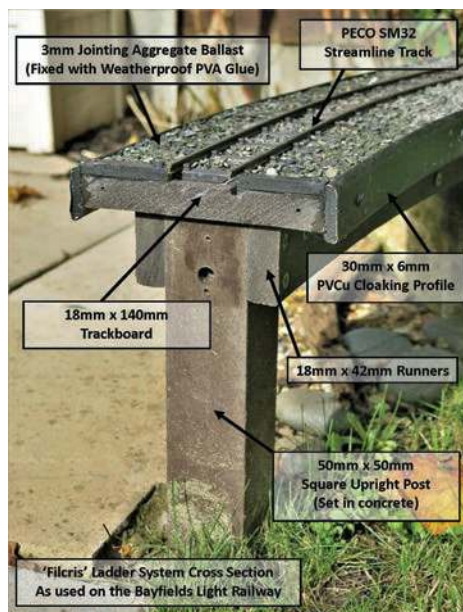
There were a number of reasons for this, the first reason being price, as I found that Peco SM32 worked out less per yard than SM45. Secondly, the range of Peco track produced for 32mm is much larger, with small and large radius points being available when compared to the larger gauge. I did not fancy making my own track and points, and the wider range gave me more options.

Thirdly, 32mm gauge is the gauge for modelling two foot narrow gauge (or thereabouts) in 16mm scale, and as my modelling skills have improved over the years I am much more into creating



The first tracks being laid at Bayfields, with the help of some pre-cut plastic guides to set the correct radius of curve when using Peco flexi-track. The guides clip in between the rails, and although these particular guides were made by a fellow garden railwayer, similar radius guides are readily available and are a worthy investment. Once track was laid, I cast a concrete platform in-situ. I could not resist ballasting and adding the buildings at the stage. A photo shoot then followed!





A cross section of the 'Filicris' Ladder System, complete with track, ballast and cloaking profile.



The general scene at Bayfields, with 'David' at the station with the 'Southern' 4-wheelers.

scale models that have a true narrow gauge look.

My last reason for converting to 32mm was that one of the joys of this hobby was to have others over to play trains. I have since met many like minded individuals on the garden railway scene, and the majority of these do it on 32mm gauge. Therefore, I can have people over who can bring and run their trains too!

The same ethos behind Woodside would also be adopted, in that it was a railway very much in the land and with a function - to serve a quarry of some sort and also the local rural community. I am also a believer that a railway should

disappear into the distance, or at least the train should disappear for a short period. I did not want to see the whole railway at once- something maybe not so easy with a circular line but I knew I could accomplish this with landscaping and other railway features.

So, back to moving in day at the new house. I stood in the garden and mapped out in my mind the route of the railway. I didn't want to take over the already modest garden, but figured out I could get a decent circuit around the outside of the lawn, with two removable bridges for access, a main station/yard area in one corner with a quarry in the opposite corner all using a

minimum of 4ft 6 radius curves.

At Woodside, we used a lot of 'R1' LGB curves, which were found to be too tight and more like a train set than a real railway. As much as I could, I wanted flowing sweeping curves that the majority of rolling stock could run on.

The new garden was generally flat and level, with no major earthworks to remove before construction could begin. I also wanted the railway to be at ground level, or slightly above the ground by a foot or so. This would very much allow the railway to blend into the garden and eventually become part of it.

## CONSTRUCTION BEGINS

The first area constructed was 'Bayfields' station with its yard/steam-up area. This was done by creating foundations, a concrete mixer was a good investment, and laying bricks and blocks to create an outer wall. I was then able to fill this with hardcore rubble, before skimming the top with a thick layer of smooth concrete. This gave me a large flat area for laying a loop, sidings and build platforms. Track was fixed to the concrete base with track rawl plugs and screws, with holes drilled with the SDS drill.

Needing the rest of the track bed to be solid, relatively maintenance free and easy to construct, I investigated using



The Accucraft 'Edrig' that started by interest in live steam. 'David' has been re-built and modified countless times, and has always given good service.





An Accucraft Beyer Peacock tram locos crosses the level crossing after leaving Bayfields.

dense concrete blocks, laid end to end in a trench and fixing the track to these using screws and plugs. This has worked for other garden railways, but I found that drilling into them (even with an SDS drill) was problematic. I therefore looked into using Filcrist 'recycled plastic wood' and their ladder system on posts.

I found this material very easy to use, and I was able to lay the track bed very quickly. Information on the ladder construction is easy to find online, so I will not go into details further here, but I will mention that it is important to space the upright posts evenly and use spacers in-between the 'runners'. I have also used 'trackboards' on top of the runners and the track is then screwed to this.

Working on my own I managed to complete the circuit in about 4 days, and using 'Post-Fix' to set the posts into

holes in the ground (a fence post auger is ideal for digging these) also sped up the process as it sets very rapidly.

I have read from other peoples experiences that 'Filcrist' can expand and distort in the sun. So far, I have not had any problems, however my track bed is low to the ground and I have buried the majority of it with soil, planting and ballast. This helps to protect it from the sun, and other elements. Overall, I am very impressed with the product and despite being pricier than timber, to me it was certainly worth the money.

At the far end of the circuit, I line had to cross a 3 meter circular paving area in-front of the summerhouse. Personally I don't like this feature, but it had to remain and so a removable section was made from Filcrist to bridge this gap. While not originally intended to be a bridge, I have since made this span look

more like a conventional bridge section using wooden cross beams, walkways and handrails.

At the house end of the circuit, and removable bridge was made to gain access to the lawn when the railway is not in use. This was simply made from timber and angle brackets and slots into place, and is stored in the shed when trains are not running.

## TRACK LAYING

With the trackbed of the main circuit complete, it was time to start laying some track. The Peco track was screwed to the Filcrist using blackened screws, via the outside of the sleepers. There was no need to screw down every individual sleeper, but perhaps every 10 or so or where screws were required to hold the curve of the track in place. It was important to leave a small gap between

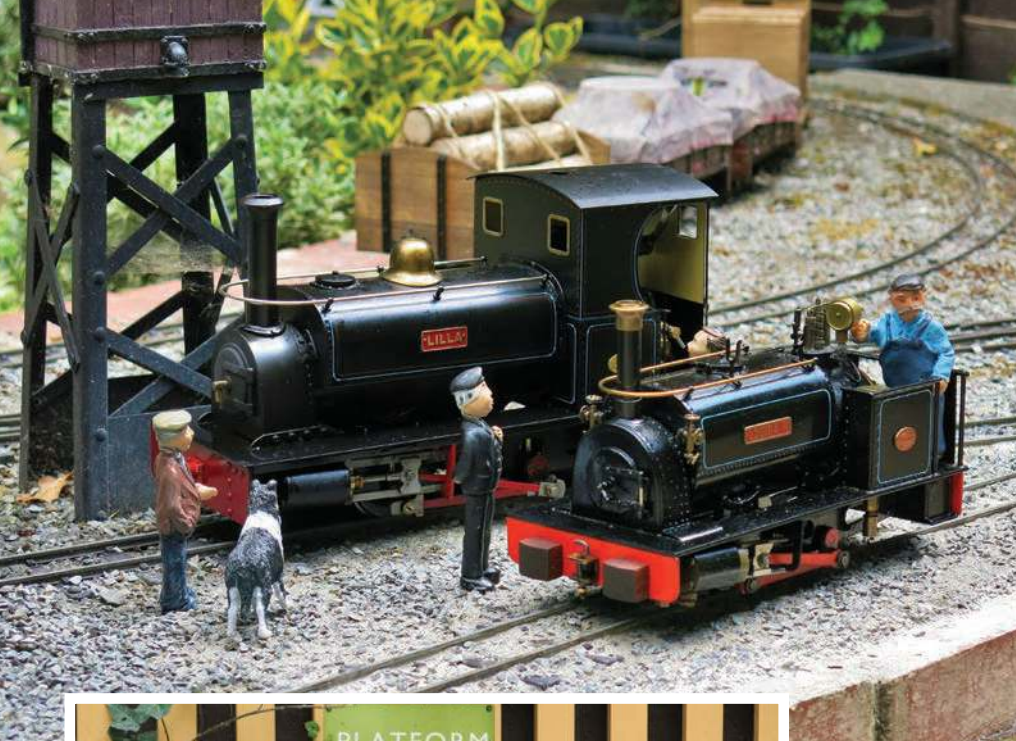
Tilton Quarry, and tunnel in the bottom corner of the garden. The disused Cornish style engine house was made from polystyrene, as was the building next to it. The plant life is starting to take hold and grow over the tunnel.



Visiting locomotive 'Tattybont' winds its way through the greenery.







Bayfields Station-modelled on the building at 'Golf Links' on the Rye and Camber Tramway. I am a fan of these simple Colonel Stephens style buildings.

the joins in each rail for expansion, and on the long curves the joints were staggered at around 50% either side.

Thin plastic glazing packers were used to pack any gaps between the sleepers and the track bed to keep the track stable and level. These glazing packers come in a variety of thicknesses, but it found I used the 1mm thickness the most. They can also be cut easily with a craft knife to the desired length, and although brightly coloured, they would be hidden by the ballast eventually.

The Peco rail can be cut using the junior hacksaw with a suitable blade for cutting metal. The rail ends can then be tidied up with a file. Wire cutting type pliers were also very useful for cutting the joins of the sleepers on the flexi-track, as it always the track to bend easily. A small spirit level was also used to check the levels of the track, and a wagon was always on hand to run over the newly laid rails to test for any bumps and twists.

From my experience, track laying is fiddly and could, and should, take time. I wanted the track to flow nicely and naturally and not look like set-track from a train set. I felt there was no excuse for my, or someone else's, £1000+ plus pride and joy being de-

railed or worse due to poorly laid track, so I took my time.

### ROCKERY AND BALLAST

With the trackwork complete, it was time to start landscaping the garden around the railway. My idea was to use rockery stone to create a border along the grass, and backfill this with soil for the plants. It was difficult to estimate how much rockery stone to order, and the stones had to be of a size that I could carry though the house (as we are mid terrace).

Estimating 2 tons of Purbeck rockery stone, this was delivered one weekday while I was at work. I came home to something looking like Stonehenge on the front driveway! I had purchased far too much, with the larger stones too big to lift! All was not lost, as I carried though the stones I needed, and sold the rest. With hindsight, it would have been best to visit the stone supplier and choose the pieces myself- and it would also have given an understanding visually of how much a ton actually is.

The rockery was created over a few weekends, with my wife helping to create the landscape- as she has a much better decorative eye for this kind of thing than I do. Pockets of soil were

Visiting little and large Hunslets from David Pinnegar's Ambledown Valley Railway. 'Lilla' is a Western Steam built example, and 'Louisa II' is from Finescale.

also created to allow planting along the trackside. It was really a case of place the stones, and the plants in their pots and see what looks best.

I wanted my track ballasted, and for this I used 3mm joining aggregate. This stuff really looks good, and is also very good value from a local landscaping supplier. However, the ballast had to be kept in place somehow, and for this I edged the Filcris trackbed using PVCu Black Cloaking Profile (30mm width by 2500mm length. This is usually used as window trim, and being plastic is both weatherproof and flexible and can be cut with a hacksaw. It is black on one side only, with white on the inside (the side not seen anyway). This was easily screwed to the edge of the track boards with blackened screws and blends in well.

I soon found that the ballast would disappear thought the gaps in the track boards, and this needed to be rectified. In the end I had to remove cloaking profile, and the track, and cover the gaps using weatherproof duct tape. The track was replaced, along with the cloaking profile, and I was ready to ballast.

Ballast was applied to the track, and brushed into place with care being taken around the point-work. Even though it was held in place with the cloaking profile, I did notice it start to vanish, probably due to the weather or the cats using the railway was a pathway to the end of the garden, so I decided to bond the ballast with exterior grade PVA glue. This was mixed with water at the ratio of 2 parts water to one part glue and stirred well avoiding any air bubbles. The mix was carefully poured this onto the track using an old water bottle with a sports type cap on a hot sunny day. On some parts it has taken a couple of applications, but after two seasons it has remained solid and not turned white.

### DEVELOPING THE RAILWAY

With the main line complete, basic landscaping complete and trains running I was able to develop and detail the railway as and when. There was no real plan at this stage, but I knew generally that I would like a tunnel,



Tilton Quarry supplies sand and gravel to the local area. A small Ruston 20hp locomotive awaits the next shipment.

level crossing, quarry and a second smaller station. Over the next year, areas were added, and on occasions removed and re-built again.

A real railway develops over time, as the needs for the line become apparent. This may be more sidings, a bigger station or yard, a branch line to reach and industrial site and so on.

For example, I knew I wanted a goods shed as I find them a very nice feature of any railway. By chance, I picked up a very well build timber good shed second hand, a real bargain. And so, I developed an area for this shed which included laying a new siding and moving the existing platform to the inside of the circuit.

My wife requested a tunnel, as they are a bit of fun and allow the trains to disappear for a while. This was a case of building a timber 'shell' then building up the landscape around it. Concrete tunnel portals were purchased from Garden Railway Specialists, and fixed to each entrance to the tunnel with a stiff mortar mix of sharp sand and rapid set cement. I was then able to build a rockery up and around this timber shell, cover it with soil and gravel and plant some suitable foliage that would eventually grow over the tunnel and make it look like part of the landscape.

As the tunnel is on a curve, it could not be too long. I also had to be very careful to build it to a generous 'loading gauge', so that my tallest, longest and widest items of rolling stock would fit through it cleanly.

Bayfields, being the principle station on the railway, was developed once the platform was cast in concrete. The Colonel Stephens style station building



came from my previous Woodside Light Railway. It is modelled on 'Golf Links' station on the 3ft gauge Rye and Camber Tramway.

The approach to Bayfields was also an appropriate place for a level crossing and signal box, with the road running parallel with the railway until it curves away. To create the road, I laid some dense concrete blocks in the soil, making sure they were level. These were then covered in a sharp sand and rapid set cement mix to form the surface, which was eventually painted black. The level crossing gates are a resin kit from Modeltown, and have been made to open. The signal box is also by Modeltown, and fencing by Piko.

Motive power on the railway is a mixture of live steam and battery powered locomotives- both based on prototypes and freelance models. My adventures in live steam began 10 years ago with an Accucraft Edrig, and I had a lot of fun with this. This loco was also a way of learning and developing my model engineering skills.

My second steam locos was built

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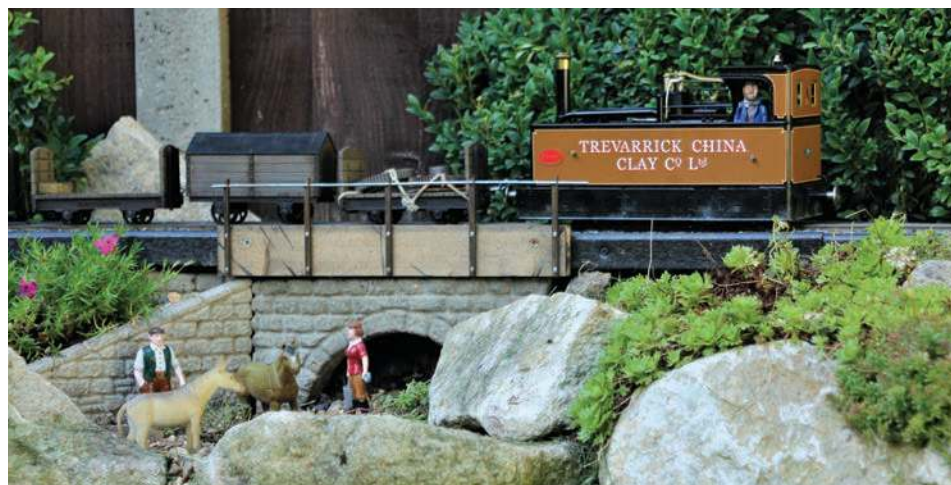
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from a Roundhouse Kit with a body kit from Simply 7/8ths. Both this engines and have modified and improved many times, and are still regularly. I have since acquired a few more locos, mostly second hand, and all of these have been modified, re-built with radio control added.

Bayfields favour 0-4-0 or 0-4-2 type locos, and all locos are appropriate to the railway I have created.

The Bayfields Light Railway has now been in existence for about 3 years, and continues to evolve all the time. Will it ever be finished? Mostly likely not, but that is half the enjoyment. Building, rebuilding and changing are all the part of the process. In the last part of 2018, we have to remove the large summer house and it was rotting way. This has opened up a few possibilities for expansion, with the right permissions of course! ■



The tram crosses 'Cove Brook' with a train of Swift Sixteen wagons. It appears that a couple of horses have escaped and have found their way into the stream.



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**KERR STUART 'WREN' 0-4-0T IN 1:13.7 SCALE (7/8" in: 1 ft.)**

Acccraft Trains in association with KGR are pleased to announce this new locomotive in 7/8ths" to the foot (1:13.7) scale live steam.

The model is internally gas fired and has slide valve cylinders with working Hackworth valve gear. The boiler is fitted with a water gauge with blow down valve, lubricator and pressure gauge. Wren is available in 45mm gauge (gauge 1) only and in black, blue, green and red and is priced at £1650.00.



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The model is 1:32 scale for 45mm gauge track, gas-fired with a single flue boiler. The chassis is constructed from stainless steel, the wheels are uninsulated, the boiler is copper. The model will run round 4' 6" radius curves (TBC). The East Kent Railway version is only available from Kent Garden Railways. The anticipated UK RRP will be £1950.00 or £1995.00 for the RTR version (depending on livery), £1795.00 or £1850.00 in kit form.



**1:19 'DOLGOCH' Talylln Railway 0-4-0T**

The model is built to a scale of 16mm:1' (1:19 scale) and is internally gas-fired with a centre flue boiler. It will not be gauge adjustable but will be available in either 32 or 45mm with non insulated wheels. The axles run in bronze bearings and all the rods and valve gear (piston reverse) will be of stainless steel. The cab roof opens to give access to the gas and water and the lubricator filler is in one of the bunkers. The copper boiler is fitted with a gauge glass (with blow down) and the displacement lubricator has an under-floor drain valve. Although fitted with TR buffers and couplings the model will be supplied with a pair of Z2 chopper couplings for those who wish to use them. The model will be available in TR green, 'Atlas Foundry' green or Crimson Lake. The picture is of an engineering prototype. UK RRP £1550.00, estimated for delivery July 2019



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The model is internally gas fired and has slide valve cylinders with working Hackworth valve gear. The boiler is fitted with a water gauge with blow down valve, lubricator and pressure gauge. It is available in 45mm gauge (gauge 1) only. The model can be ordered in black, blue, green and red with a UK RRP of £1650.00.



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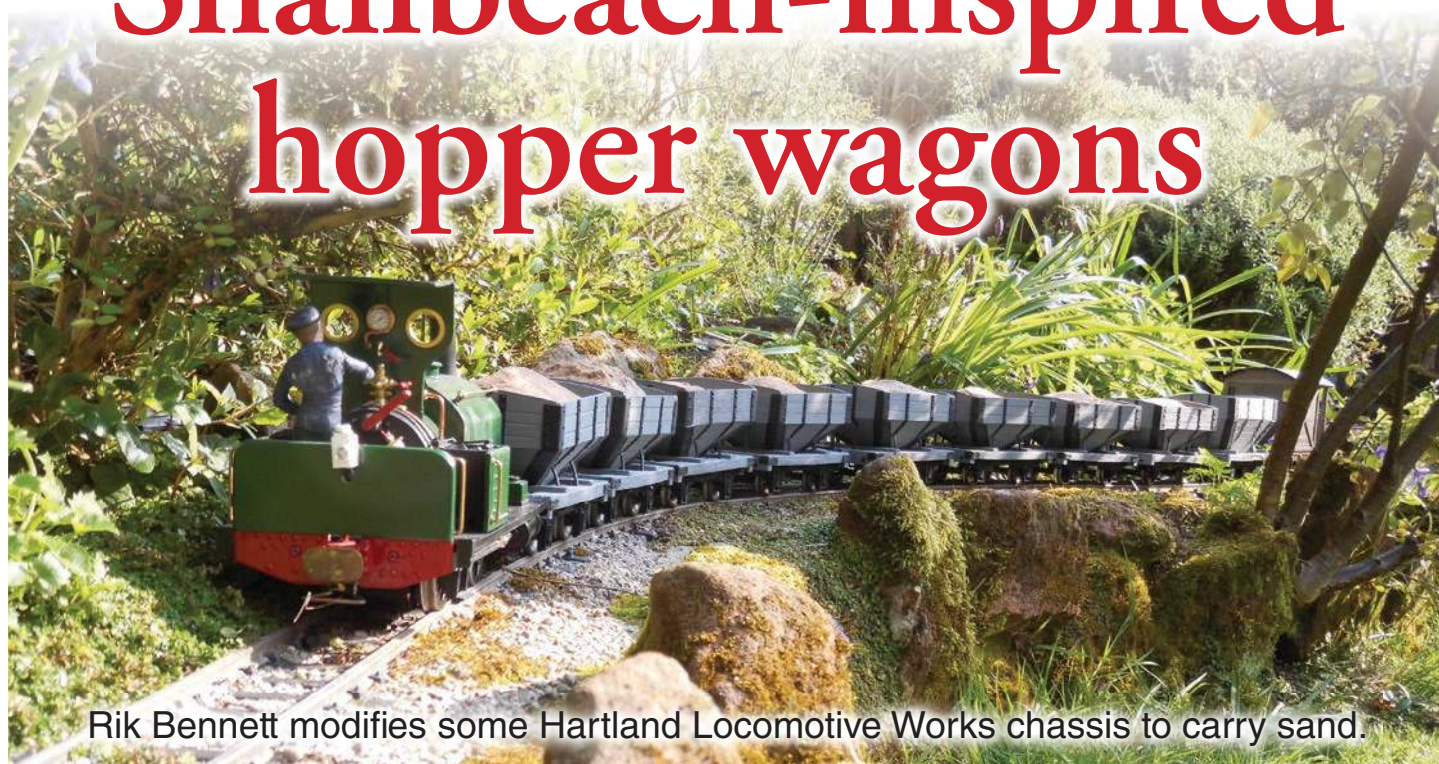
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# Building a rake of Snailbeach-inspired hopper wagons



Rik Bennett modifies some Hartland Locomotive Works chassis to carry sand.

Freight traffic is of great importance to me when running the Peckforton Light Railway and so, after adding three new sidings to my line, I decided one of them would provide access to a sand quarry.

My hypothetical narrow-gauge

railway, set in the 1930s, was ostensibly constructed to serve the copper mines in the Peckforton Hills but, adjacent to the real mainline railway station in Beeston where my line would have terminated, was a rather extensive sand quarry. So, I decided to shift its location to the other

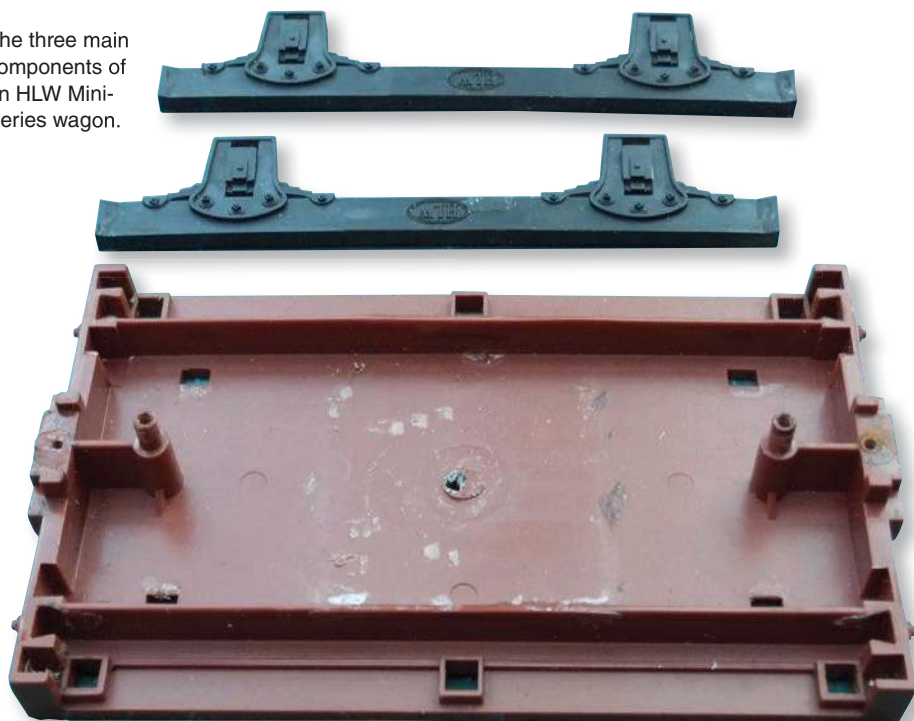
A train of empties approaching Bickerton station where they will be run-round before being shunted into the sand quarry siding on the left. The guard's van is necessary because the PLR is a passenger carrying railway.

end of my railway to provide a reason for sand traffic over the line.

I already have two rakes of LGB tippler wagons to transport copper ore and spoil from the mines to the interchange sidings at Beeston Market and I could have used those to also transport sand, however, I have always been attracted by the distinctive wooden hopper wagons which ran on the Snailbeach and District Railway until it was abandoned in 1959. I was delighted to find scale drawings of one of the wagons in Eric S. Tonks' 2007 reprint of *The Snailbeach District Railways* booklet (pub. Industrial Railway Society) and so tried to figure out a way of making one.

You may have seen from my previous scribbles in this journal that the majority of the rolling stock on my railway was bashed or semi-scratch-built using commercial wagon chassis from LGB, Piko, Newqida or Hartland

The three main components of an HLW Mini-Series wagon.







The wagon deck after the hole has been cut and filler applied to the holes and planking.



The sides of the deck have been deepened with strips of plastic and 'metal' brackets added to the corners with cosmetic 'rivet heads' applied. Note also the dumb buffer and how the coupling mounts have been retained.

Locomotive Works (HLW). It just so happened that I already had around a dozen HLW mini-series wagon chassis which had been donated to me by a fellow modeller and friend in Australia – isn't amazing how this hobby manages to shrink the world? Although not a perfect match for the dimensions of the Snailbeach wagon, I felt the HLW chassis were near enough for me to explore the feasibility of using them – why waste a freely available resource?

After mocking up a wagon body from thin card I tried to modify one of the chassis to make it fit, hacking it about with a razor saw I came up with a design which seemed to work then set about making a total of nine wagons. The designs were progressively tweaked and honed until I felt I had arrived at the definitive version; after all, photos of the Snailbeach wagons suggest that the basic design varied slightly over time.

I decided to construct two rakes of four wagons, plus one extra wagon. This gives me the option of running a train of nine wagons, or eight wagons plus a different wagon such as a tanker for diesel fuel oil sandwiched between the two rakes of four – the siding can hold nine wagons plus a brake van. The rakes of four would be permanently coupled

together with simple chain couplings while the wagons at the ends of the rakes would be fitted with my version of the LGB style hook and loop coupling.

### MODIFYING THE HLW CHASSIS

The Snailbeach wagon chassis were quite simple affairs – half a dozen hefty chunks of timber bolted together and the hoppers being slung between them. To simulate this effect, I needed to cut a hole in the deck of the HLW wagon chassis, but without sacrificing the structural integrity of the chassis.

The largest hole I found I could comfortably cut centrally into the deck of the chassis was 53mm x 114mm. However, for those wagons at the ends of each rake which needed to have an LGB style coupling attached, I retained the mounting pedestal for the coupling by creating a 10mm x 10mm intrusion into the hole in the centre of each end.

The hole was cut out with a razor saw. I found that initially scoring the intended cut line, along a metal rule with the blade of the saw, was the most effective way of ensuring the cuts were straight. Once a decent line had been scored, the ruler was removed and the saw could be repeatedly dragged along the line until it eventually broke

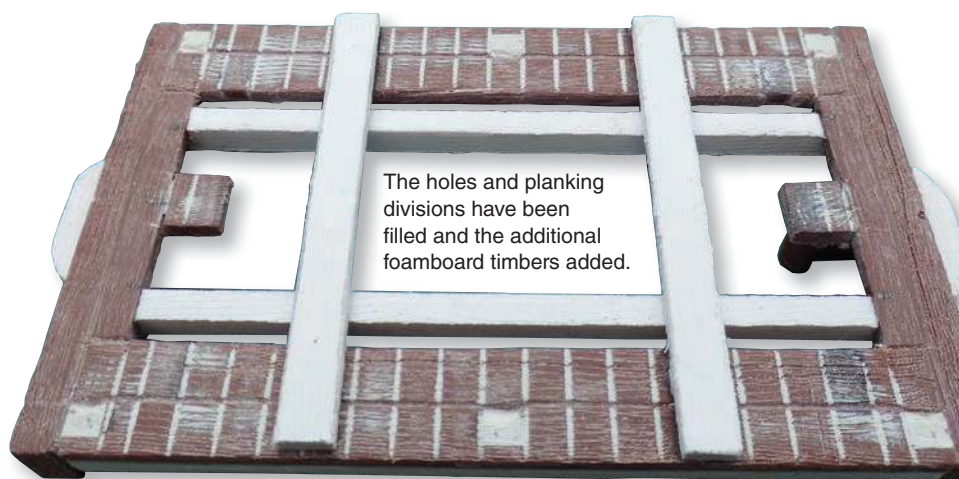
through. The saw could then be used in the conventional way to finish off the cuts.

Once the rectangular hole had been cut, I scored lines on the sides and ends of the wagon deck to simulate planking. The divisions between the planks were made 8mm from the sides of the wagon and 5mm from the ends. The teeth of the razor saw were then dragged sideways along the exposed surfaces of the wagon to simulate wood grain – a tip which I learned from Peter Butler, a friend and accomplished fellow modeller.

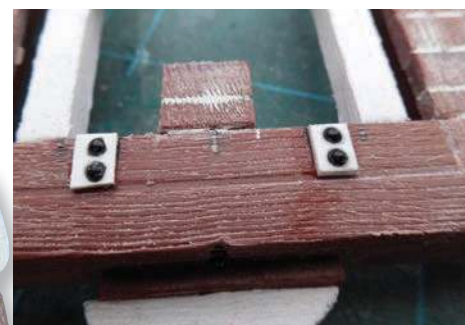
The small square holes in the deck of each wagon were filled with Squadron White Putty filler (from Eileen's Emporium) and sanded smooth when set. Some of the HLW wagon chassis had transverse planking already moulded on to the decks. The plank divisions were similarly filled with White Putty filler and sanded down before the longitudinal planking and wood grain effect were scribed.

To deepen the sides of the deck, two pieces of 127mm x 5mm x 1.5mm thick Plastikard were glued to the sides of the wagon chassis immediately below the deck.

The timber framework beams of

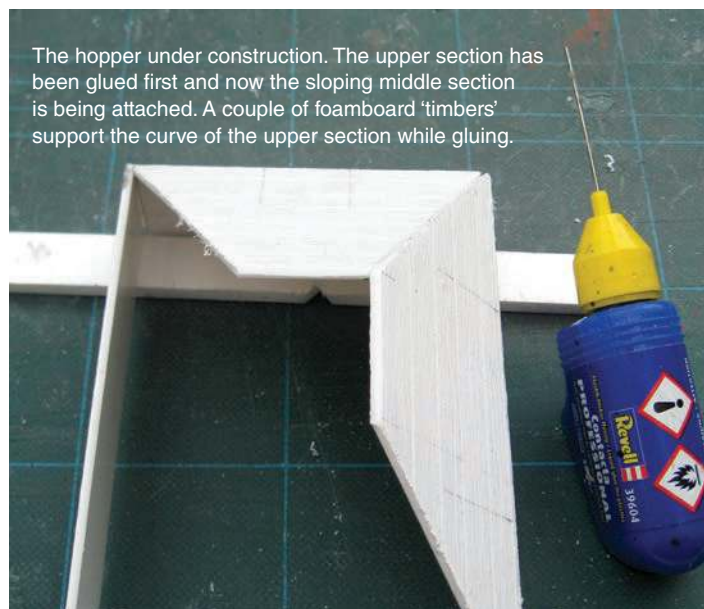


The holes and planking divisions have been filled and the additional foamboard timbers added.



The brackets for holding the hopper to the chassis have been installed. Note also the effect of scraping the plastic with the razor saw blade to achieve simulated wood grain.





the wagon chassis were then cut out. Two 132mm x 6mm longitudinal beams were cut from 3mm thick PVC foamboard (from Simply Plastics). These had 3mm x 18mm rebates cut into their upper faces at each end so they could sit below the deck with their upper edges flush with it.

They were then scored with the razor saw to simulate wood grain and glued on to the underside of the decks of the wagon chassis with thick superglue, 5mm from each side of the hole. Two 85mm x 8mm transverse beams were cut from 3mm thick PVC foamboard, scored for wood grain and glued across the wagon chassis on the upper surface of the deck, 37mm from each end of the deck. Incidentally, I use VitalBond thick superglue which can be bought reasonably cheaply from eBay stockists in 20g and 50g bottles.

Four 9mm x 6mm pieces of 1mm thick plastic were glued on the corners of

the headstocks, 1mm below the upper surface to simulate metal brackets.

Four 14mm x 6mm x 1mm thick pieces of Plastikard were then glued to the sides at each end to simulate the other half of the metal corner brackets. Once the glue had set, the corners of the brackets were rounded slightly with a needle file.

Six 1mm half-round nail art pearls were then glued on to each bracket (three on each side) to simulate rivet heads. Nail art pearls come in a range of sizes (e.g. 1mm, 2mm, 3mm half round) and can easily be glued on with thick superglue. I bought 1000 on eBay for less than £2.00 inc. postage.

I apply a small dot of superglue to the desired position of the rivet head with the point of a cocktail stick, and then use the residual glue on the stick to pick up the pearl. The larger dollop of glue on the model is usually sufficient to entice the pearl to part company with the stick. It's even possible to flip an inverted pearl over while gluing by twirling the stick between your finger and thumb.

Eight 4mm x 5mm rectangles of 1mm thick Plastikard were then glued to the deck to simulate the brackets holding the hoppers to the chassis. These were positioned 45mm from the ends and 8mm in from the edges for the side brackets and 27mm from the edges and 5mm from the ends for the end brackets. Two 'rivet heads' were then glued to each bracket.

Dumb buffers were fashioned from

25mm x 6mm oblongs of 5mm thick PVC foamboard, suitably chamfered and filed, then glued to the middle of the headstocks. For the wagons at the end of the rakes, larger buffers were created to engage with the buffers on locos and other wagons while creating space for the couplings. These were made from three 25mm x 6mm oblongs of 5mm foamboard and one oblong of 3mm foamboard.

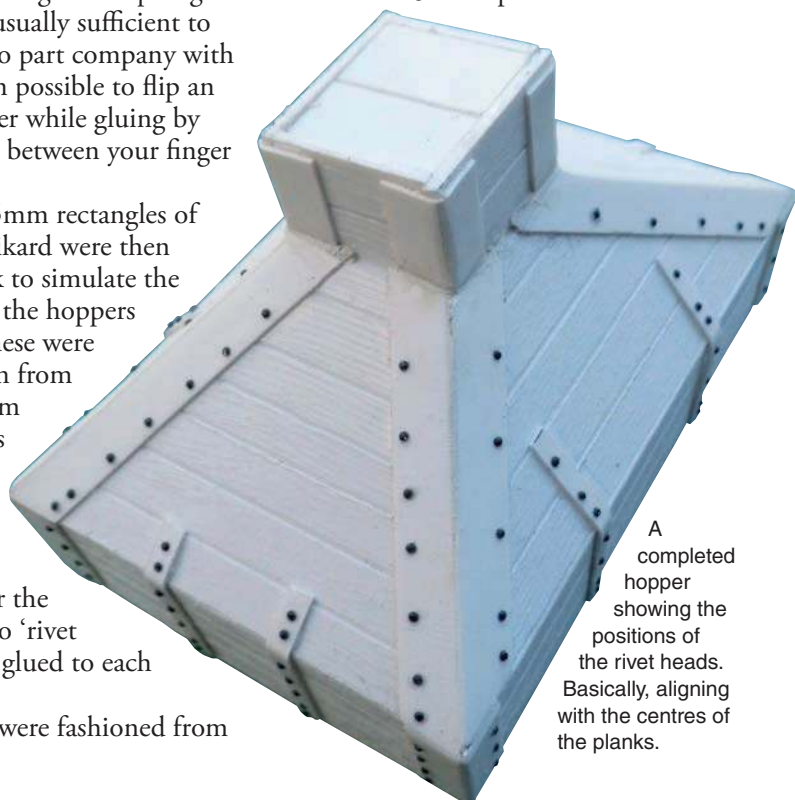
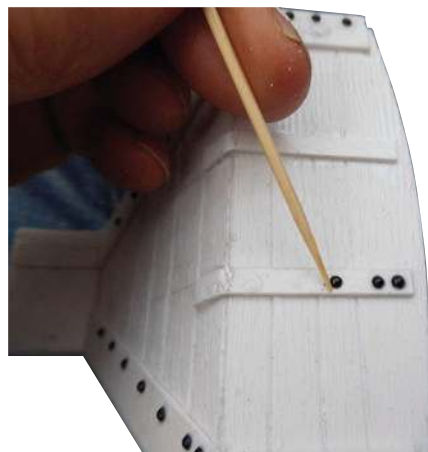
The chassis was then given a couple of coats of Halfords grey primer from a rattle can and the 'metal' brackets picked out with black acrylic paint.

## THE HOPPERS

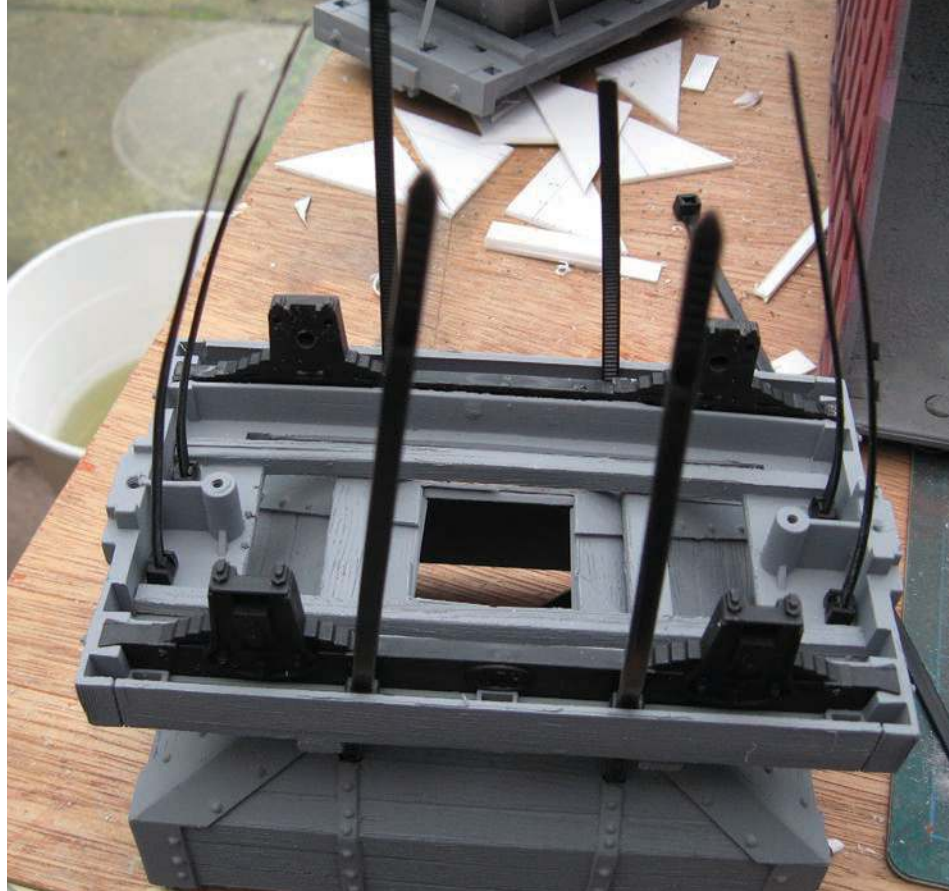
After some experimentation I arrived at the following dimensions for the main structure of the hoppers.

The sides were made from two 26mm x 130mm pieces of 2mm thick

My technique for applying the 1mm nail art half-round acrylic pearls. Residual superglue on the cocktail stick is sufficient to transfer the pearl to the model where a larger dot of glue detaches the pearl from the stick.







4mm wide black cable ties hold the hopper to the chassis – the ratchet heads being used to retain the ties.

plasticard and two trapezium shaped pieces of 2mm plasticard – 44mm wide, 130mm across the top and 32mm across the base, giving diagonals 65mm long.

The ends were made from two 85mm x 26mm pieces of 2mm thick plasticard, plus a curve rising 4mm above the upper edge. The trapezia for the ends were 58.5mm wide, 85mm across the top and 25mm across the base, thus also giving diagonals of 65mm.

Planks were scribed on to the sides alternately 8mm and 10mm wide. The surfaces were then scraped with the razor saw blade to simulate wood grain.

The lower inner edges of the rectangular pieces were chamfered slightly as were the upper inner edges of the trapezium-shaped pieces to enable the angled pieces to be glued together. This was achieved by repeatedly scraping a craft-knife at an angle along the edges until the chamfers were created.

The components were glued together with styrene solvent adhesive. The upper section was put together first; the ends being glued inside the sides. It was important to ensure this structure was square otherwise the geometry of the raked hopper section would have been compromised. Once the upper section was securely glued, it was inverted and the raked section glued to it.

I found it was easier to glue one end and one side at a time. They were mutually self-supporting in a similar way to building a playing-card castle. This process was then repeated with the other end and side. Sometimes, another pair of hands would have been useful but I found that the process became increasingly easier with practice.

The bottom-most section of the hopper was made from two 32mm x 20mm pieces of 2mm plastic for the sides, two 25mm x 20mm pieces of 2mm plastic for the ends and one 28mm x 25mm piece of 2mm plastic for the base. Planks were scribed midway along side and end pieces and the uppermost edge chamfered before being glued together and then glued to the base of the hopper.

To represent the metal corner brackets, four 25mm x 10mm and four 25mm x 9mm pieces of 1mm thick Plastikard were applied to the corners of the upper section. Four 71.5mm x 9mm pieces of 1mm thick sheet with 5mm triangles removed from each end were cut out as were four 76mm x 10mm pieces of 1mm plastic with 11mm triangles removed from each end. These were glued to the corners of the sloping section. Similarly, four pieces of 18mm x 9mm and four pieces of 18mm x 10mm x 1mm were glued to the corners of the lowermost section.

Finally, the straps which hold the hopper to the chassis were made from 4mm wide strips of 1mm thick plastic.



The upper ends of the ties are sliced to leave a small flat head to prevent the ties from pulling through. Rather than covering these with a further sheet of plasticard (the insides of the hoppers were lined with steel), I just painted them grey – for half their lives the hoppers will be filled with sand loads and so invisible.

The four side straps were 45mm in length and the four end straps were 39mm in length. These were glued to the sides and ends, their lowermost ends coinciding with joints between the planks.

The hoppers were then given a couple of coats of grey car primer and the brackets and straps picked out in black acrylics.

To fix the hopper to the chassis, I opted for black 4mm wide cable ties. Abrading them with medium grade sandpaper killed the shine, then the ratchet heads were carefully sliced off, leaving a small section in place.

4mm wide slots were drilled at the base of the straps on the hoppers with a 1mm diameter drill. Similar slots were drilled at the outside edges of the brackets on the chassis. The ties were then threaded into the slots inside the hoppers and then through the relevant slots in the chassis. The ratchets were then threaded on to the lower ends of the ties under the chassis and carefully pulled tight to ensure all ties were evenly tensioned.

The solebars of the HLW chassis were eased back into their respective slots and Bachmann 24.5mm diameter metal wheels installed in the axle boxes. Lengths of chain were threaded through eyelets made from copper wire for the couplings between wagons in each rake, and my own versions of LGB style hook and loop couplings were screwed to the ends of the rakes.

I then fashioned representations of simple manual brake gear from 2mm





The underside of a sand load insert, showing the plywood spacers and bracing.



The thin brass components for the brake gear, waiting to be soldered together.



The upper side of a sand load insert. These are removable so the wagons can run as empties Down the line.

and 3mm wide strips of thin brass shim, fixed to a triangular bracket 8mm wide tapering to 2mm and 18mm tall. This was carefully soldered together and fixed in place with small domed escutcheon pins.

### REMOVABLE LOADS

Because I wanted the hoppers to travel empty Down the line and return loaded Up the line, I needed to make removable loads. For each, a piece of 124mm x 84mm x 3mm plywood was mounted on three strips of 3mm plywood. The width of these strips varied from 20mm to 10mm so that the depth to which the wagons appeared to be loaded would differ.

Normally, I would have sculpted the supports for sand loads from expanded polystyrene, but I had none to hand. So, I experimented with balsa blocks, sponge rubber and foam packaging to make the mouldings. These were glued to the plywood inserts and then coated in exterior PVA. Silver sand was sprinkled over the mouldings and the excess shaken off.

### CONCLUSION

Although they are not true representations of the Snailbeach wagons, I feel they are reasonably reminiscent of the originals and certainly look appropriate when trundling up and down the railway. The bonus for me is that the combination of HLW chassis with Bachmann metal wheels are tried and tested on my railway and I am confident they will cope with all my pointwork, a mix of LGB, Piko and Trainline.

Because the 24.5mm wheels are smaller than the 31mm wheels which are supplied with the wagons, the couplings would normally be lower than other wagons. However, as I make my own LGB style couplings I could

adapt them to compensate for this discrepancy. If you are intending to follow my example but use the original HLW hook and loop couplings, you will have to modify the coupling mount by filing off 3.25mm. By coincidence, this takes the mount down to be flush with the base of the headstock.

To check the feasibility of this, I used a small square section needle file and found the filing took around fifteen minutes for each coupling. For further realism, you could use Tenmille curly spoked wheels (part#AG188), which I would probably have done had the donated HLW chassis not arrived with 24.5mm Bachmann wheelsets – again, why waste a freebie?

So, I now have more freight traffic to squeeze into an incredibly busy freight schedule on my railway – and maybe a legitimate excuse to have yet another locomotive in steam during operating sessions. Having already created a brewery for one of the extra sidings, and

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now a sand quarry, all I have to do is work out what the third siding's purpose will be. In the locality were a brickworks and a boneworks... ■



The finished wagon.



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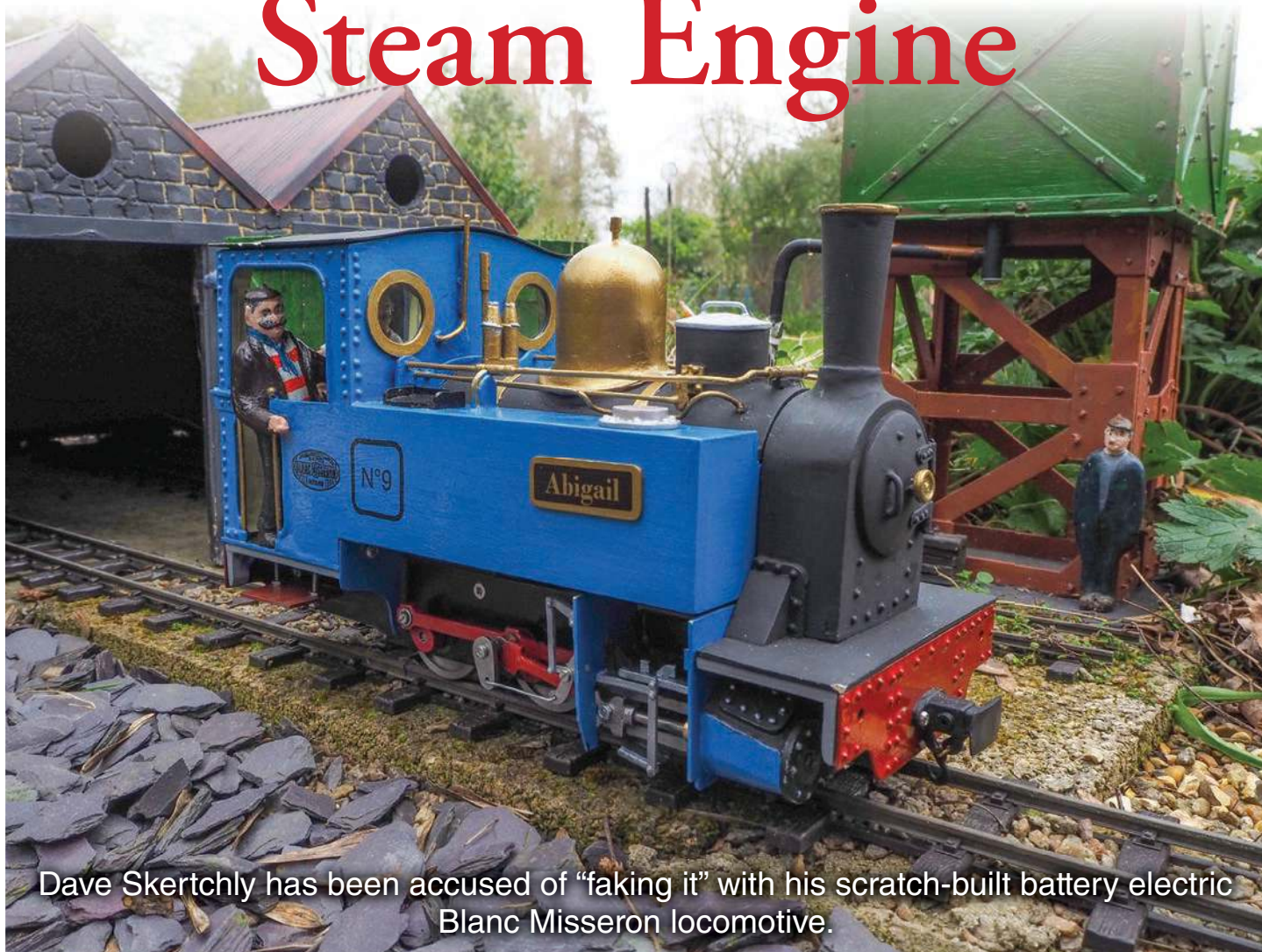
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**Vectis**



# Making and Faking a Steam Engine



Dave Skertchly has been accused of “faking it” with his scratch-built battery electric Blanc Misseron locomotive.

I had intended to build a model of Russel, but Russel alas is a dull brown colour and I wanted

something bright and cheerful but with the same size wheels. I came across the Blanc Misseron tram locomotive in

SMT 155 (August 2015) and liked the superb drawings by Mike Pinder, better still the colour was a cheery blue which would match the spring flowers on my railway.

The story goes that there were in fact two of these locomotives, the first, Le Minihic, ran on the tramway de Rotheneuf near St Malo while the second, Abigail, ran on the Tramway des Fleurs Belles (TdFB) which ran from the quaint Belgian town of Soixante Neuf to the French Coast at St Itery, a suburb of Calais world famous for its ceramics.

Above: Dave's latest creation taking on water at Lost'n Bodge Works.

First step was a test chassis to make sure that the finished locomotive will negotiate the curves.



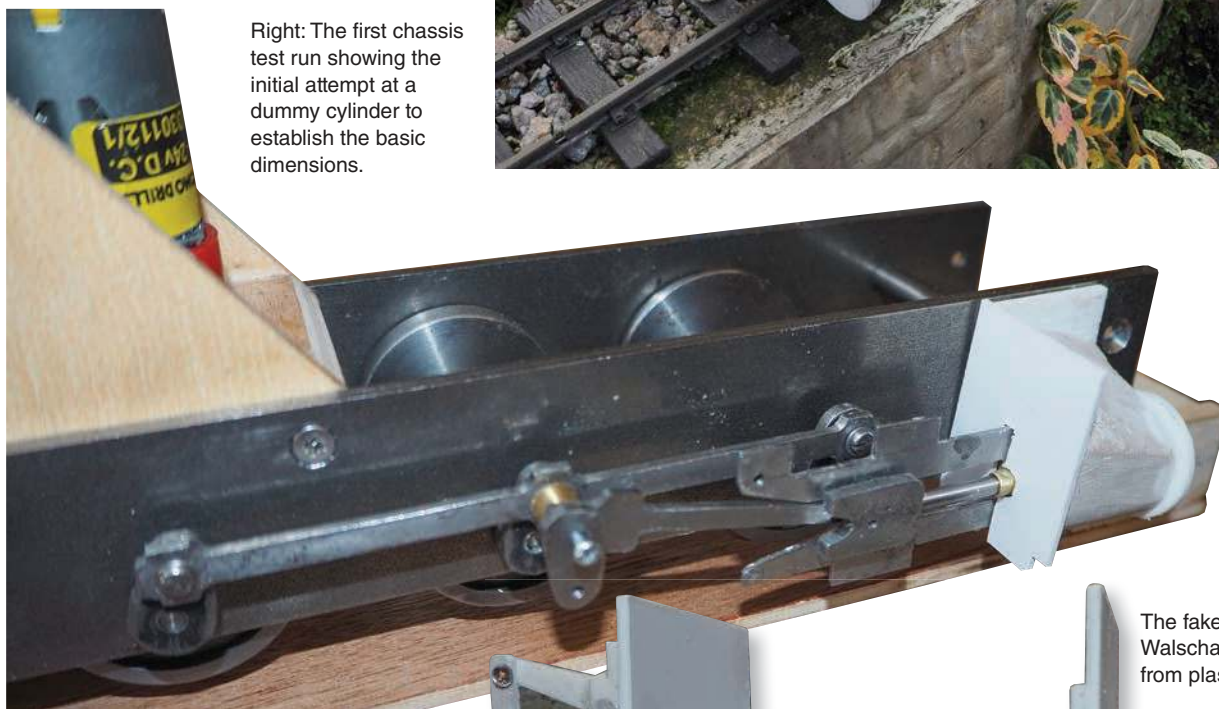




Above: Profiling the cranks to a template.



Right: The first chassis test run showing the initial attempt at a dummy cylinder to establish the basic dimensions.



The revised steel core to the cylinder and guide rails.

In the war Abigail was operated by driver Claud and fireman Marcel on behalf of the resistance shipping leaky ceramics to the Luftwaffe. It seems, that this was done with the unwitting connivance of a homesick German narrow-gauge enthusiast General Wilhelm Rumbletum and his faithful valet Gefreiter Gammelpfeifer. The Locomotive is now preserved on the Vale of Weedol Tramway.

I had become rather self-conscious about my simple 2-wheel drive battery electric locomotives. They look good from 6ft away, which is fine in the garden. A good-looking scratch-built stand-off scale locomotive with minimal detail can be up and running in a couple of weeks, which suits both my pocket and my patience.

So it was that I foolishly decided to prove that a fake battery electric steam



The fake cylinder and Walschaerts valve gear built up from plastic on the steel core.

outline locomotive and more specifically one made by me, could be attractive and detailed. Like a fool I chose a 6-wheel drive design, driven scale like through cranks and walschaerts valve gear.

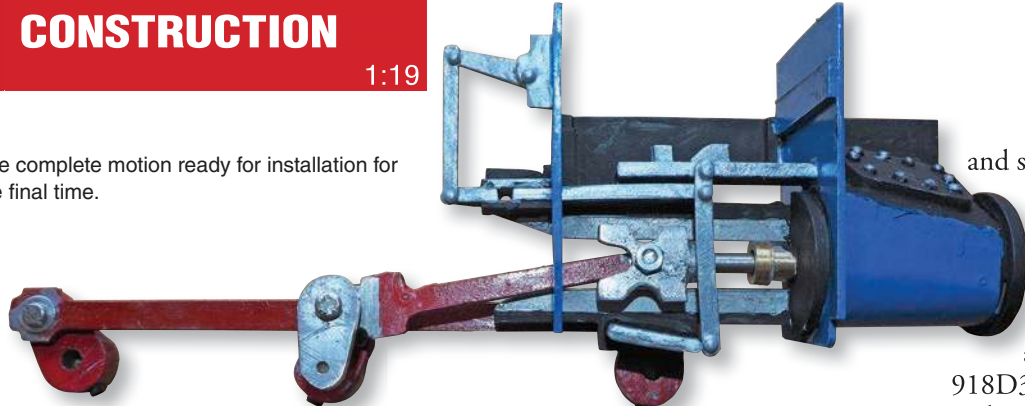
As always, I started with the raw materials. Sourcing the bottom of a beer can for the smoke box door was not thought to be a problem. Various bits

of scrap steel were scrounged from the local fabricating shop, some bright steel bar for the frames and connecting rods bought on-line and some steel, brass and plastic bar, bought as a last-minute bargain lot at the 2018 Peterborough show.

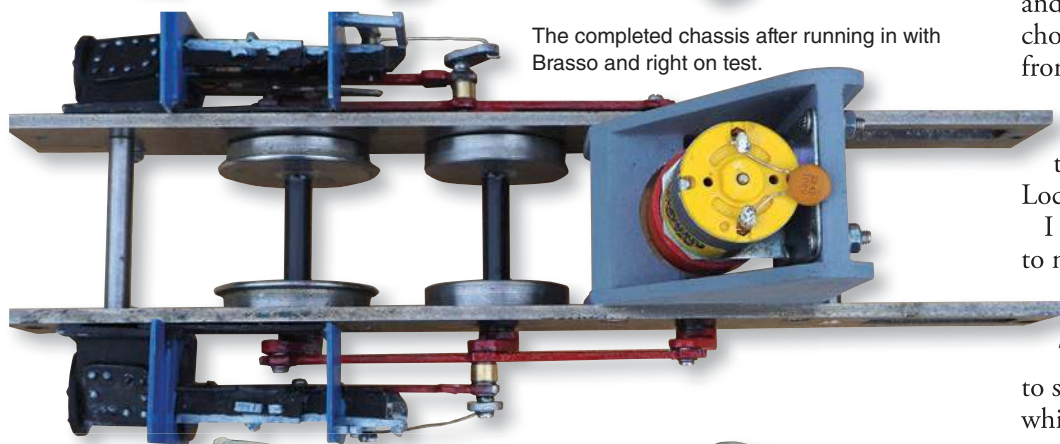
A trip to the model aeroplane shop yielded some 1,5 and 3mm plywood



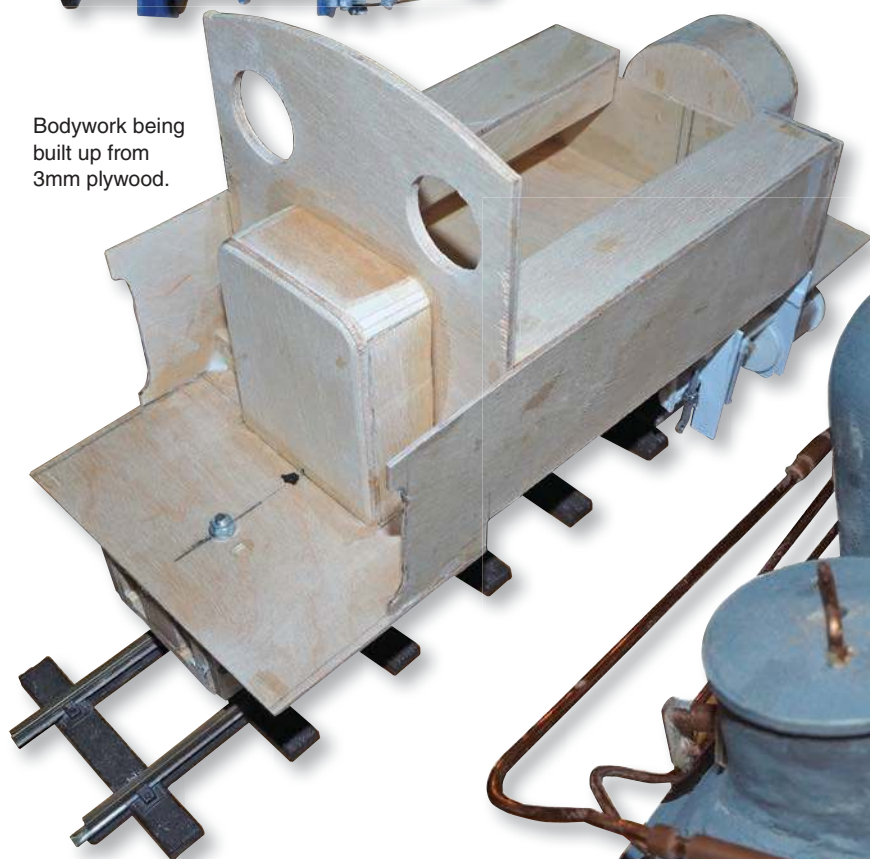
The complete motion ready for installation for the final time.



The completed chassis after running in with Brasso and right on test.



Bodywork being built up from 3mm plywood.



and some fine brass tube. A scrap cooker cable completed the body materials not including the free coffee stirrers, MDF offcuts and cereal packets.

The motor chosen was a geared Como Drills 918D30112/1 rated at 12-24 volts and running at 7.4 volts. The spur gear chosen was in Hostaform (polyacetal) from HRC gears. Throughout the build I bought what felt like thousands of metric bolts, nuts, washers, taps, tapping drills, clearance drills and Loctite from RS components.

I first made a wooden dummy chassis to make sure that the locomotive would indeed run around the tight curves of the Vale of Weedol Tramway.

The trick to making the chassis is to start with a jig, just a strip of steel which has the axle spacings marked out very accurately. I used a magnifying glass to check that the centre pops for the drill were accurately placed and then drilled the jig to the size of the crank pins, not the axles.

The two frames are bolted together and then drilled through using the jig.

Once the jig is removed the holes in the frames are opened-up to the axle size. The procedure is repeated for the connecting

rods but drilled to the connecting rod bearing size. By this

method you can be sure the connecting rods, wheels and axles have identical spacing. The frames and connecting rods can now be filed to shape.

The cranks too can now be drilled on a jig and then finished to size against a template.

Dave's solution to making a a smoke box door - the bottom of a beer can!

The boiler top was made from a Wilko filler/adhesive tube with dome and sandbox screwed and glued on. It is removable to give access to the batteries. The external pipework, so typical of a French locomotive, has been subject to artistic interpretation and bent up from 30 amp copper wire. Yes Dave is faking it again.



The dome laminated from MDF, turned and sanded to fit the boiler top.





The valve gear is fake or as I prefer to put it *tromp d'oeil*. The valve gear can only be viewed from a limited angle of view and if any structure is in the eyeline it can be painted matt black which will in effect make it disappear. This is the same technique used for stage sets. The fake valve gear was built up in layers of plastic sheet and steel, then finished off with body filler.

The motor and its pinion were mounted on a wooden motor mount and matched to the drive axle. The drive was then assembled and tested, just don't believe it will run perfectly when finally assembled on the completed locomotive, the law of cursed perversity still prevails.

The bodywork was made up from plywood. The boiler top is removable and is made from a section of plastic glue tube stuck to the ply hatch with some of that incredible acrylic glue.

The dome and sand box were turned from a laminated MDF stack and then screwed and fitted to the boiler with acrylic adhesive before finally blending in with body filler.

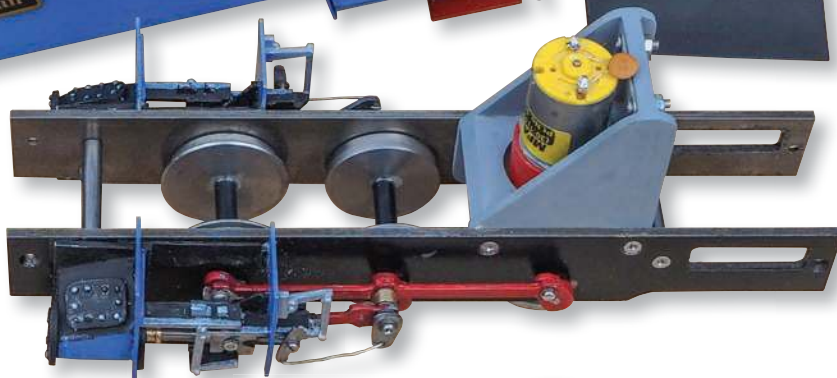
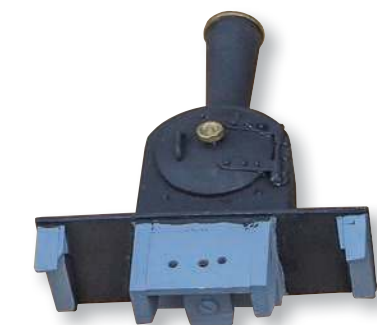
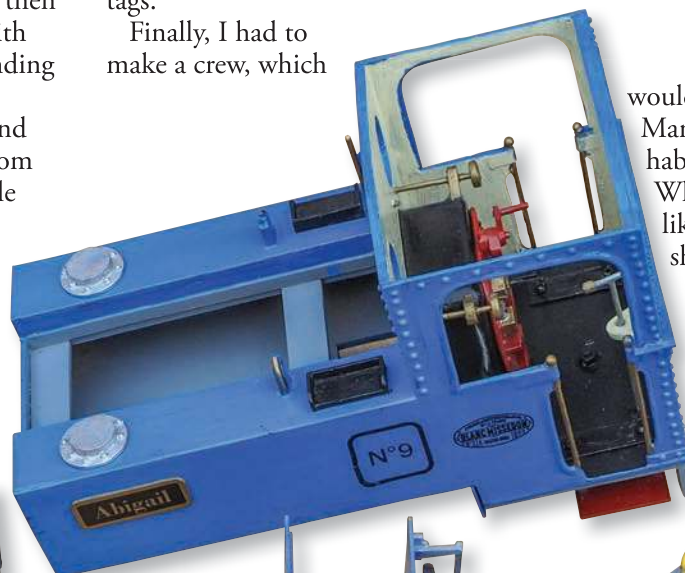
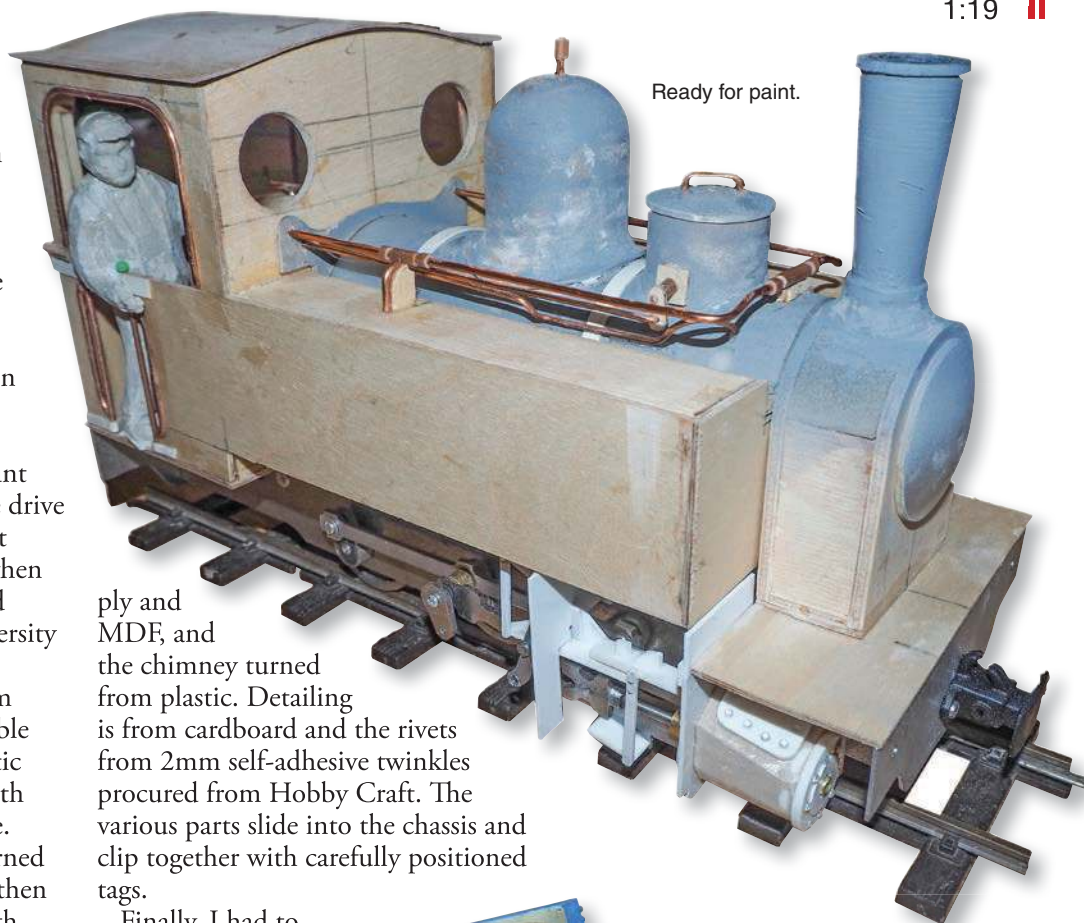
Detailing, including the pipes and safe edging for the cab, is made from 30-amp copper wire from the cable off-cut.

The smoke box is made from

ply and MDF, and the chimney turned from plastic. Detailing is from cardboard and the rivets from 2mm self-adhesive twinkles procured from Hobby Craft. The various parts slide into the chassis and clip together with carefully positioned tags.

Finally, I had to make a crew, which

would be two men, Claud and Marcel obviously, since the French habitually over-man their railways. What would a French crew look like? Well that is obvious, striped shirts, stylish scarves, berets



Parts ready for final assembly.



The French crew Marcel and Claud can be easily identified by their berets, moustaches, scarves, and striped T shirts. Maybe Dave tends to stereotype people.



The radio receiver and speed controller are tucked into the side tanks while the 6 rechargeable batteries power the locomotive at a scale 24km/hr (15mph).

and moustaches. Let me assure you that making an authentic 16mm scale French moustache is not as easy as one might at first think.

The body finish was rattle can primer followed by various hobby enamels. The chassis was painted with wood-stove enamel which was baked at 100°C for 20 minutes, come to think of it all the metal parts required baking, I wonder why? The decals were homemade on the ink jet printer.

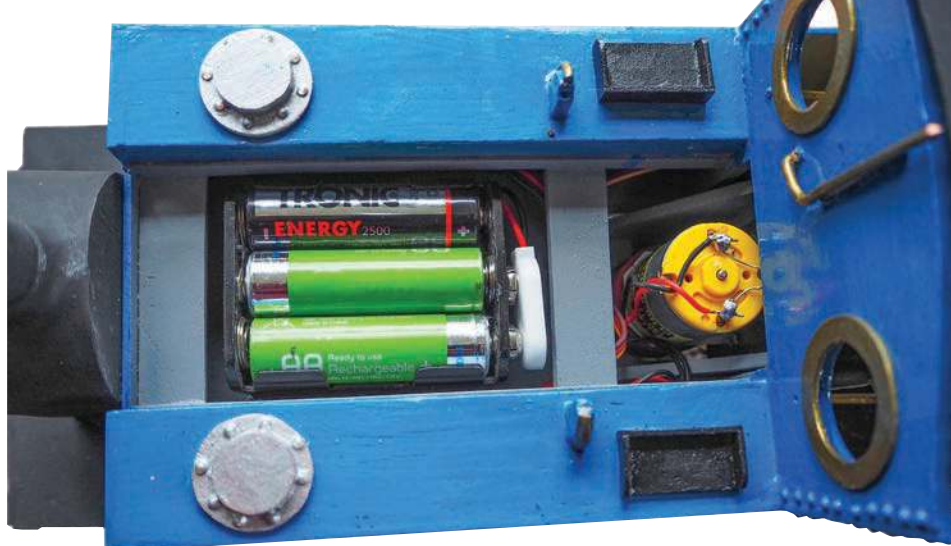
The chassis was assembled with its proper brass bushed crank pins and spacers and you guessed right, it was stiff. All the tiny misalignments had added together to create a disaster. There was only one answer:- Brasso dripped onto the bearings then the whole lot run up and down a length of track by hand for 20 minutes which lead to success.

After fitting the motor, the Blanc Misseron now runs beautifully at a scale 24kn/hr (15 mph), it is quiet and stable. The long wheelbase still just about causes the slightest binding on the Vale of Weedol Tramway's tight curves but then Abigail is indeed a surprisingly big locomotive.

My locomotive took about 6 months to make and cost about £200 including radio, motor, materials and small tools. I have enough materials left over to make another 6 locomotives if I should ever live that long.

So as I sit on my rustic park bench

The finish is not strictly to scale but Dave likes a bit of well-polished brass. Bits that are likely to be broken off have been omitted.



Transfers for name and works plates were printed in Dave's ink jet printer.



outside the Sheep Shearers Arms I sip thoughtfully at my pint of Fine Auld Phagbutt. I contemplate how, since the days when an anonymous caveman first drew a buffalo on the wall of his cave, human beings have appreciated non-functioning but beautiful objects, which we now call works of art.

In our hobby there are indeed

connoisseurs, collectors and makers of the very finest art. Whether the names of Roundhouse and Accucraft may yet be spoken in the same breath as Faberge and Tiffany we shall have to wait and see, but for now my fake steam locomotive is my own very personal artistic statement, and I hope that you like it too. ■





## Starter Sets



PK37151 GE25t Diesel Industrial Starter Set

## Locomotives



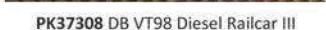
PK37222 DR BR24 Steam Locomotive III  
(Analogue-Smoke)



PK37240 DR BR50 Steam Locomotive  
(Analogue-Smoke)



PK37241 DR BR50 Steam Locomotive  
(Analogue-Sound/Smoke)



PK37308 DB VT98 Diesel Railcar III



PK37525 DB BR360 Diesel Locomotive IV



PK37543 HSB BR199 Diesel Locomotive V



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PK38504 Union Pacific GE 25t 825 Diesel Loco  
(Battery Powered RC)



PK38505 PRR GE 25t 924 Diesel Loco  
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PK38506 MOW GE 25t Track Cleaning Loco  
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## Coaches



PK37660 DB Bpmz 2nd Class Coach IV



PK37661 DB Avmz 1st Class Coach IV



PK38648 Union Pacific Wood Coach



PK38649 Union Pacific Wood Combine

## Wagons



PK37743 DB Eaos Gondola IV



PK37751 DBAG Flat Wagon with 20' Containers Load VI



PK37924 DB VTG Tank Wagon with Brakemens Platform IV



PK37925 DR Simson Box Wagon with Opening Doors IV



PK38763 D&RGW Bulkhead Stake Wagon



PK38764 US Army Flat Wagon with Humvee Load



PK38765 VWBX Flat Wagon with VW Beetle Car Load



PK38766 CR Bulkhead Stake Wagon



PK38887 Santa Fe Ore Wagon 2508



PK38888 PRR Ore Wagon



PK38889 Union Pacific Ore Wagon



PK38890 Mighty Hauler Ore Wagon



PK38891 D&RGW Rib Side Hopper Wagon



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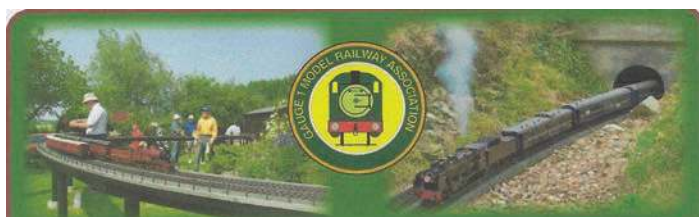
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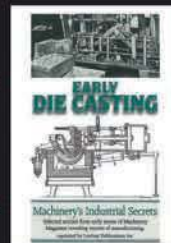
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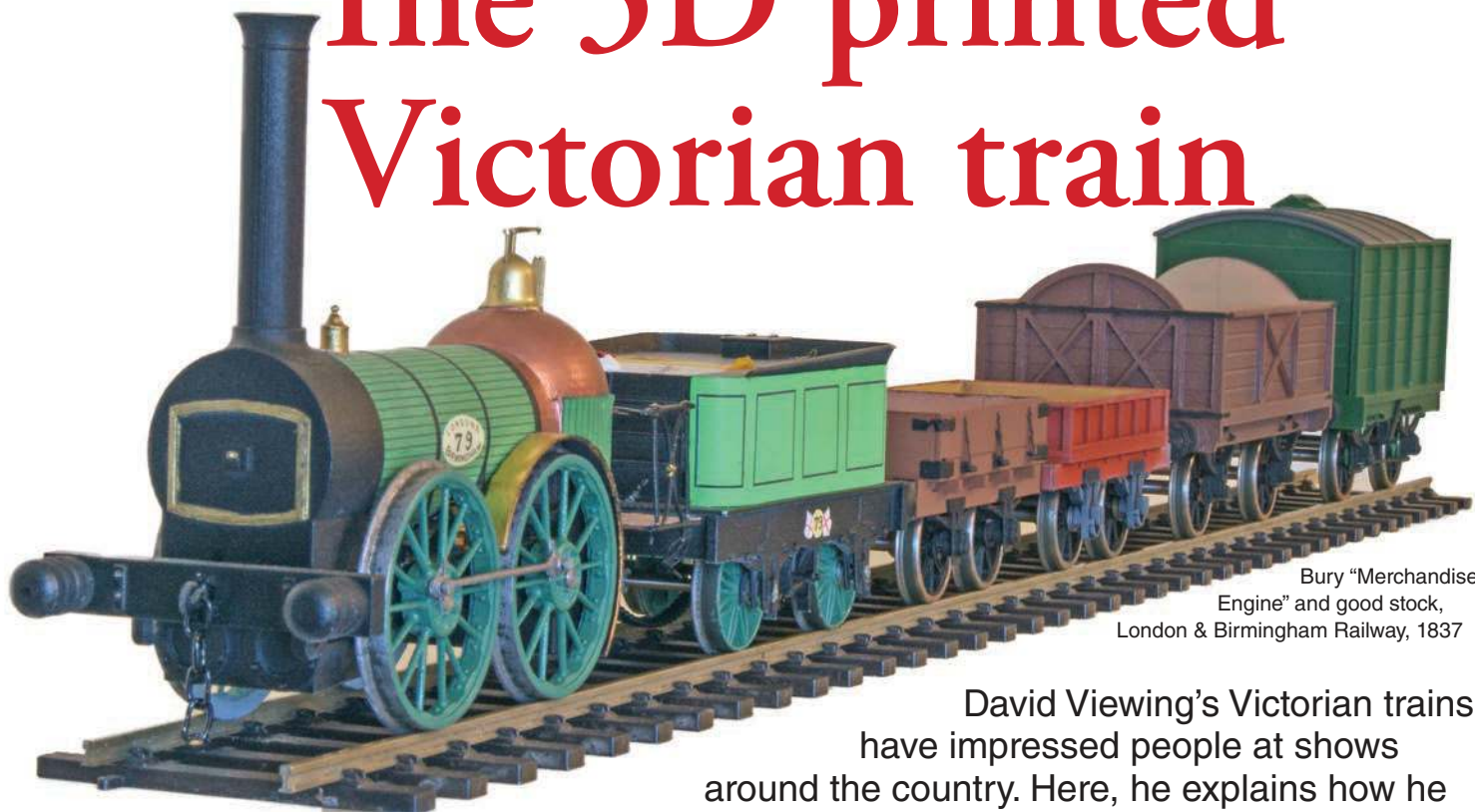
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# The 3D printed Victorian train



Bury "Merchandise Engine" and good stock, London & Birmingham Railway, 1837

David Viewing's Victorian trains have impressed people at shows around the country. Here, he explains how he produced them, with ideas applicable to all scales.

I've had an ambition for many years to model the first locomotives of the London & Birmingham Railway. Designed by Edward Bury during 1836-7, these locomotives were the first to run in Inter-City service and quite literally, they changed the world. They were the first mass-produced locomotives to be produced from drawings by sub-contractors and as such set out the

course which all manufactured products were to follow.

We are very fortunate that some of Bury's drawings, issued to sub-contractors, have been passed down to us since all of his companies' records have long since vanished. In particular, exquisite drawings of his 0-4-0 'Merchandise Engine' have survived and when an original copy came into my hands there were no more excuses about producing a model.

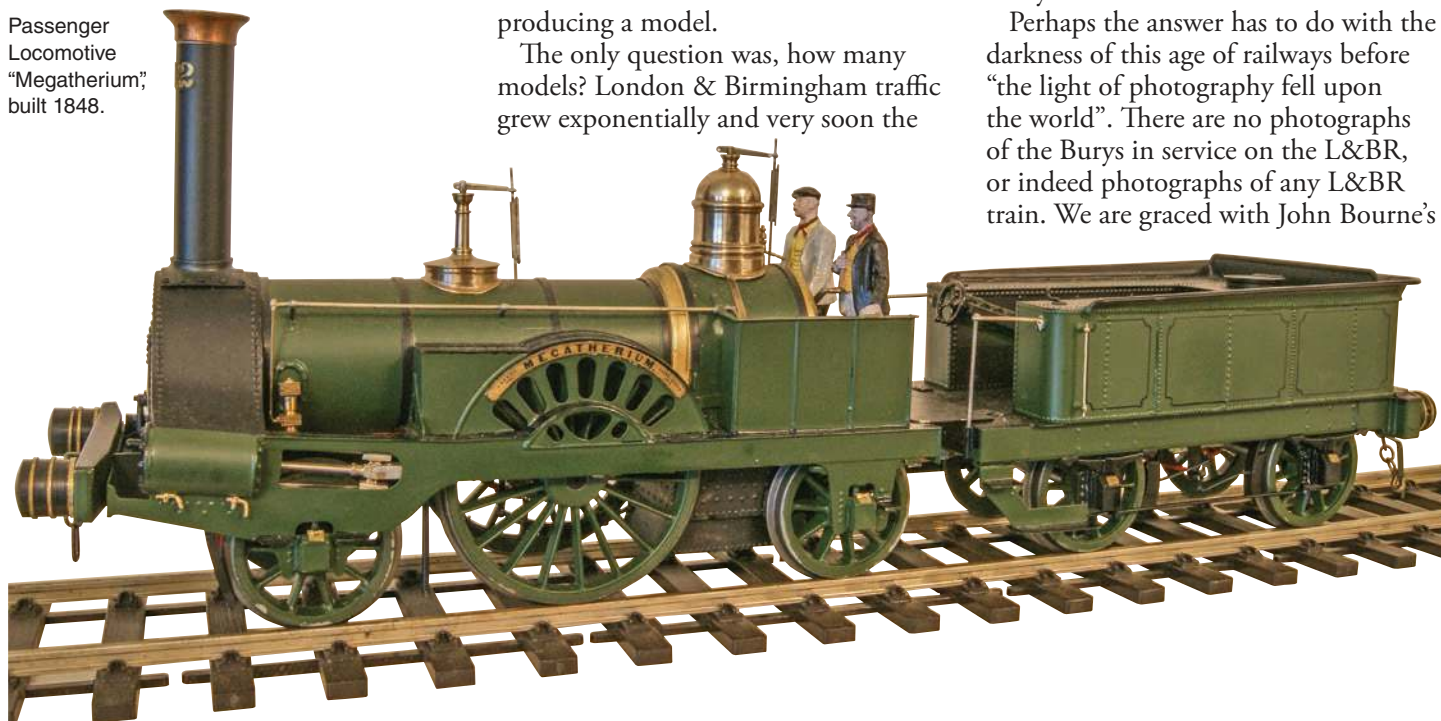
The only question was, how many models? London & Birmingham traffic grew exponentially and very soon the

tiny Bury engines were having to be put on in pairs, and reputedly as many as seven were needed in a single train! So any model of a Bury engine needs to be capable of replication!

Despite their diminutive size, the Bury's remained the mainstay of the L&BR, and after 1846, L&NWR motive power for the first ten years of the mainline railway. So why are they so rarely modelled?

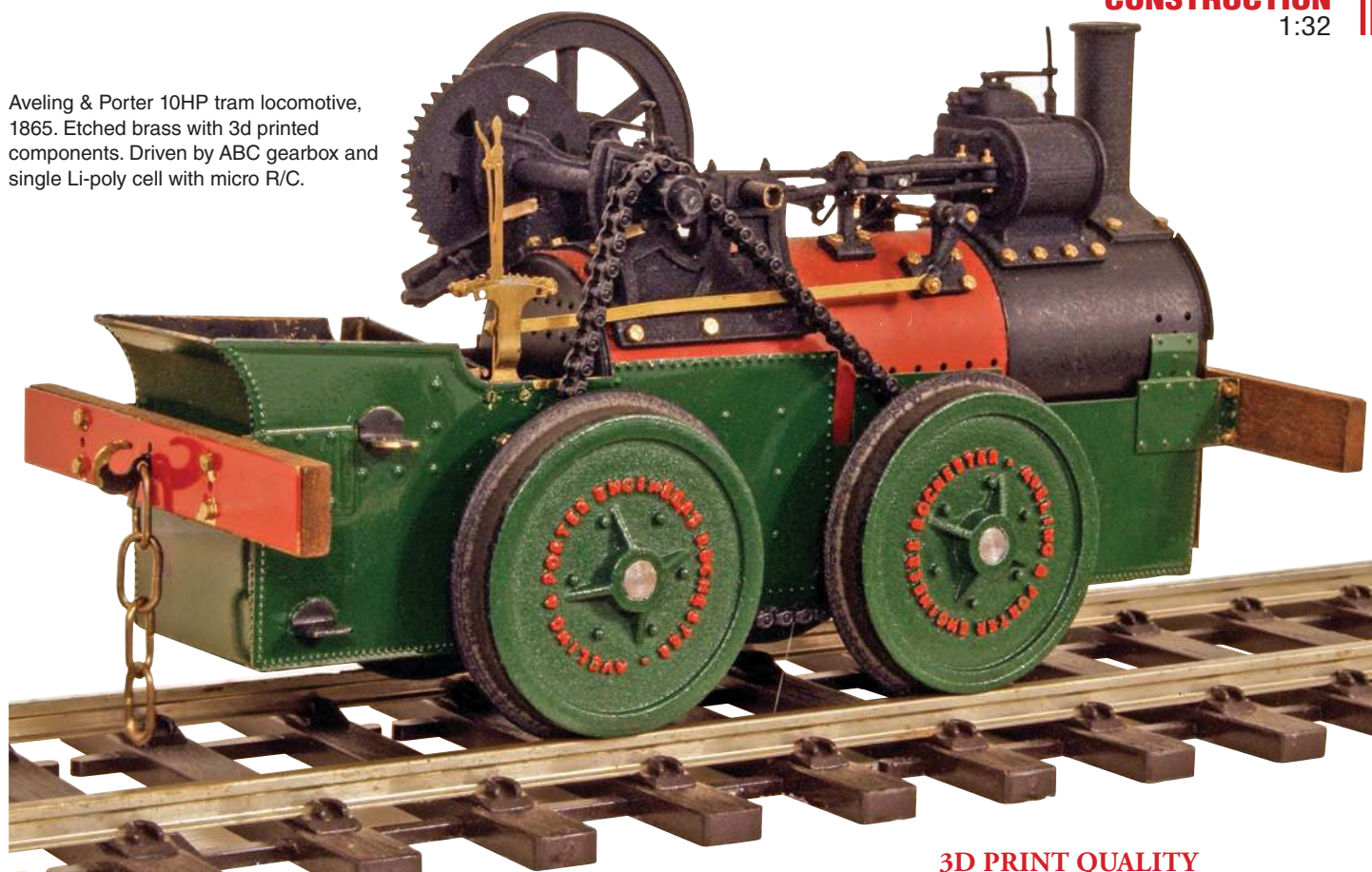
Perhaps the answer has to do with the darkness of this age of railways before "the light of photography fell upon the world". There are no photographs of the Burys in service on the L&BR, or indeed photographs of any L&BR train. We are graced with John Bourne's

Passenger Locomotive "Megatherium", built 1848.





Aveling & Porter 10HP tram locomotive, 1865. Etched brass with 3d printed components. Driven by ABC gearbox and single Li-poly cell with micro R/C.



beautiful engravings, and a couple of contemporary watercolours, and that's it. So what I have set out to do is make it possible for people to see again the spectacle of the L&BR, at the time "The biggest engineering project since the pyramids", in reasonable fidelity.

### WHY 3D PRINTING?

The Bury design is very simple and could certainly be produced by conventional means. However, the wheels, with their circular, tapered and staggered spokes present a particular challenge. The great Mike Sharman once told me how he made these wheels by turning tapered spokes individually, soldering them into the rim and hub, and machining the whole lot in the lathe! This was in 4mm, but in G1? And I needed multiples of them.

In 3D, the wheels are one of the easier jobs. The spokes, complete with taper and fillets at the end, are 'spun' from a 2D template, itself created by tracing over the original Victorian engraving. (It happens that in G1 the thickness of the spokes is just within the 'wall thickness' limits for 3D manufacturing). The spokes are attached to the hub, which is itself drawn as a 2D tracing and 'extruded' to form a cylinder, and staggered to represent the bicycle wheel arrangement that gives the whole assembly immense strength.

Once at the correct angle, the spokes are simply stepped and repeated around the diameter of the wheel, a process that takes the blink of an eye, and presto! A wheel. The final process is to 'spin' the rim from a solid cross section that includes the G1MRA standard profile, although the manufacturing process can just handle the finescale profile by slightly thickening the flange. When printed in my chosen material of SLS Nylon, these wheels are surprisingly robust and can be lightly turned simply by mounting on a stub axle.

### 3D PRINT QUALITY

All present day 3D processes suffer from similar problems of surface finish and minimum part dimensions and although some technologies (like resin printing) offer relatively better results than others, the finished parts never approach the quality achieved by injection moulding with traditional toolmaking. This limitation has to be borne in mind right at the beginning of any model project using 3D printing.

The surface quality offered by 3D materials has as much to do with the laws of physics as the quality of



London & Birmingham Railway Break wagon. Possibly the earliest known railway brake van. One-piece 3D print.



"Sweet Chariot" 2 ½ compartment mail coach, London & Birmingham Railway, 1837. Etched brass body on 3D printed underframe.

individual printers, meaning that the overall result has changed very little in recent years and offers only limited future improvement, at least until new technologies come into play. The limitations to quality are mainly the 'stepping' involved in building up the print, which inevitably leaves striations in the end result, and the granular nature of the fused powder in the Laser Sintering process which coalesces to a texture like sandpaper.

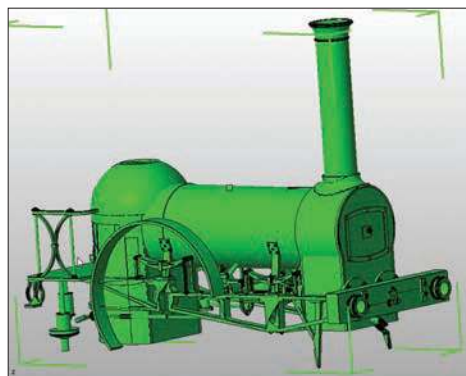
Despite these limitations, 3D printing technologies come together in something of a 'sweet spot' for G1, where overall model sizes are compatible with typical printers and achievable finishes are acceptable in some model subjects – goods wagons, for instance – but not highly polished passenger stock. Of course, some finishing will help, and the level of this work tends to form the boundary between the usefulness of 3D printing contrasted with conventional modelling techniques like etched brass.

### WHY NYLON?

There are innumerable 3D printing materials, literally ranging from chocolate to concrete. In our world, the most common are PLA, an extruded plastic used in most home printers, and resin, a curable liquid. However, these materials often lack long term stability which is not generally an issue in the fast moving world of 3D printing, but might be a drawback in G1 where some of our models are already decades old.

The Selective Laser Sintering (SLS) process fuses powdered material directly and offers good long term

The .stl file for Bury 2-2-0 viewed in Netfab.



stability because no chemical reactions are needed. The SLS process is generally beyond the scope of amateur installations, but is readily available through on-line services. SLS can work directly with metals, but in our case sintered nylon represents a more cost effective solution with better surface finish and much lower cost than metal.

The fused nylon has very similar mechanical properties to injection moulded nylon and offers amazing strength in apparently flimsy assemblies like the Bury wheels. At present, no other 3D material can offer the integrity and durability of SLS nylon, which means that in our world of working scale models it is an obvious choice. It does have some drawbacks though:

### WHY ONE PIECE MODELS?

I started out making detail parts like axleboxes and springs for etched models in SLS nylon, especially as the properties of the nylon allows components like springs to actually function. My thoughts very quickly turned to making the entire model in one piece because of one particular property of nylon – nothing sticks to it!

Early models, like the tiny Aveling 10HP tram locomotive, were assembled with numerous 10, 12 and 14BA bolts but it became obvious that models of these overall dimensions would fit within the machine size limitations and cost, in one piece, little more than the sum of the components.

An important factor in gaining

confidence in the one piece approach was the excellent stability of the SLS nylon parts, which show no signs of distortion or creep. The acid test was the first one piece wagon, a tiny London & Birmingham vehicle traced from an original 1838 engraving, produced with everything except wheels and couplings.

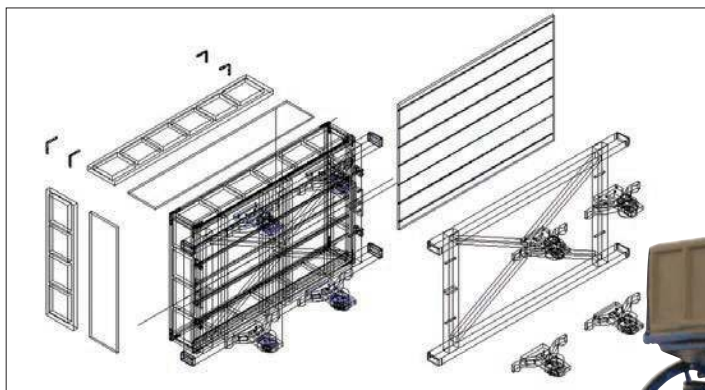
The lack of any distortion in the little vehicle added considerable confidence, leading to larger and larger designs using minimum wall thickness (typically 1mm) over steadily increasing spans. Ultimately, a complete roofed vehicle (A London & Birmingham break van from about 1845, traced from an engraving discovered in the Great Northern archive) proved that the SLS process can offer precise results, with no slumping, distortion or crabbing, in our scale. And all of this at an affordable, if not trivial budget.

So now the road was clear to produce that ultimate goal, a complete locomotive. But before that, another hurdle had to be overcome – the software minefield.

### 3D CAD SOFTWARE

Just like the 3D printer industry, the CAD (computer Aided Design) business has become bogged down. A couple of dominant players, Solidworks and Autodesk, control the market and set prices accordingly. Those prices are far beyond the reach of hobbyists, although some people seem to use older bootleg or perhaps Academic versions. To control this leakage, both companies (and many others) have





The stages in the 3D assembly of a small London & Birmingham wagon.

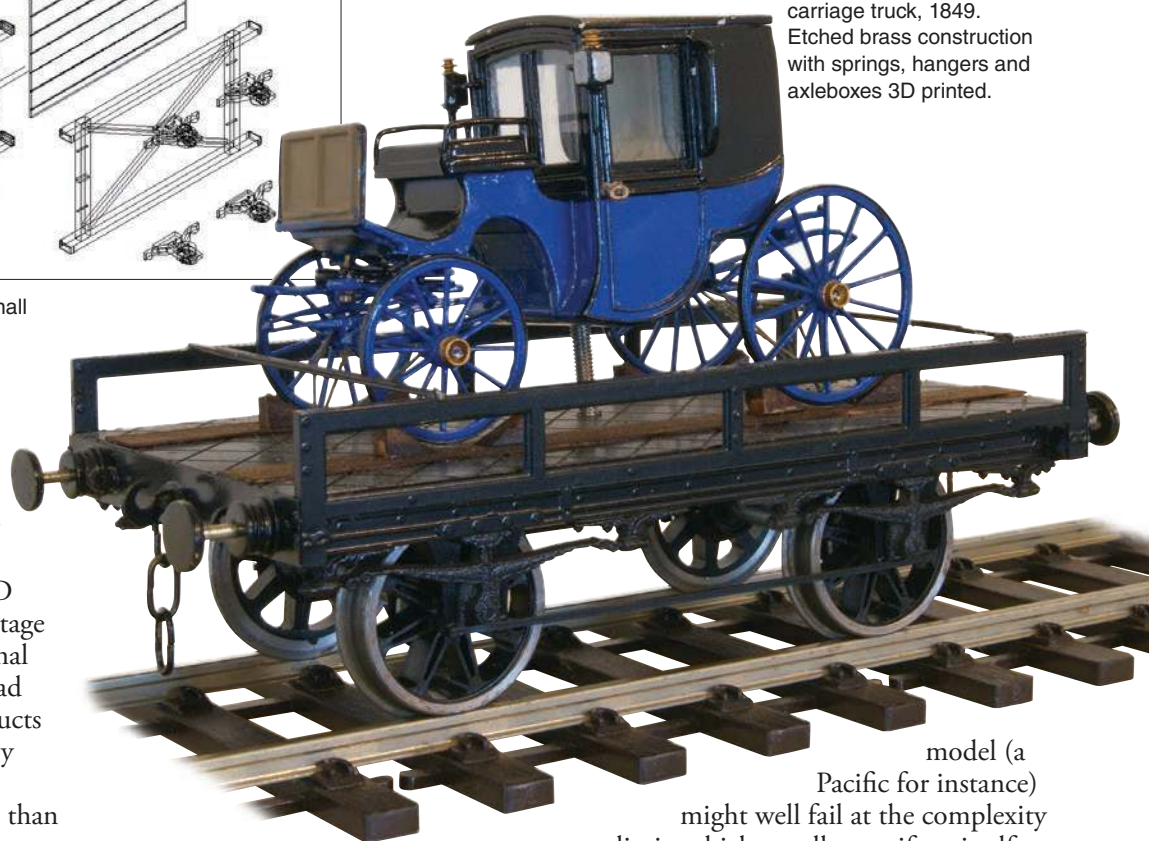
adopted a 'software as a service' or rental model which forces users into regular payments, again beyond the reach of many (most) hobbyists.

This leaves the rest of the CAD market, which seems to be a cottage industry of more or less functional products typified by the Turbocad which I use. Most of these products offer 3D design capability at very modest acquisition prices (older versions of Turbocad sell for less than £100!) but at the cost of limited productivity because of the many glitches and limitations that typify this end of the market. (This means a job may consume three times the man hours that would be needed at the top end of the market).

A separate issue is the 'walled garden' effect of limited file compatibility which means that design files in the product's native format are almost never portable to other brands. Transferring a complex design like a railway model to a different CAD will almost always mean a complete re-design.

Normally It's good to try out a variety of software solutions in order to choose which suits, but in our world the issue of 'compound complexity' comes into play. This unwritten rule says that the first 90% of a project consumes 10% of the effort, while the next 9% consumes the rest. The last 1% would truly consume 99% of the effort, but in practice never gets done!

In terms of CAD with it's ferocious learning curve this means that it's impractical to 'evaluate' several brands. Because our models (even simple ones) are incredibly complex compared with typical toy and jewellery projects the 3D design and printing vendors like to demonstrate, you are by definition a pioneer on day one. You just have to



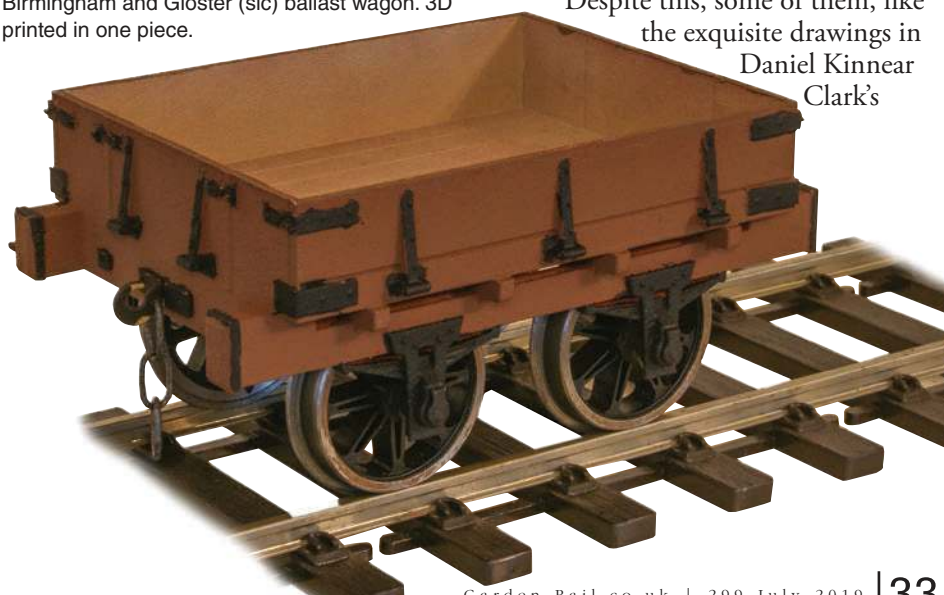
Great Northern Railway carriage truck, 1849. Etched brass construction with springs, hangers and axleboxes 3D printed.

dive in and hope for the best.

So what's my recommendation in this vexed area? If you can, get an affordable copy of one of the 'big two' and stick to it. If that's not possible, Turbocad (the only one that I have actual experience of) is capable of producing workable results as you can see here.

Please be aware that some of my models are right on the limits of complexity for this type of package and that a one piece design for a larger

Birmingham and Gloster (sic) ballast wagon. 3D printed in one piece.



model (a Pacific for instance) might well fail at the complexity limit, which usually manifests itself as a series of inexplicable behaviours and quite likely fatal file corruption, which may turn out to be present way back in the backups when you try to restore.

However, I've not lost an entire project for some time!

### FROM ENGRAVING (OR WOODCUT) TO CAD

Our subjects almost always start out as flat sheets of paper, in my case antique engravings or woodcuts that have already survived for more than 150 years of distortion, fading and bleeding of ink.

Despite this, some of them, like the exquisite drawings in Daniel Kinnear Clark's



monumental tome “Railway Machinery” (1855) have come down to us in almost pristine condition. Others were less well prepared in the first place, or horror of horrors have been re-drawn by modern authors.

In fact all of the drawings we have now are tracings, made by hand from originals perhaps using a pantograph to translate from larger formats into the published versions we have now.

Fortunately many of the drawings also have key dimensions written in, although these are often only visible in the original and are lost in subsequent reproductions or scans. For instance, David Joy’s original drawing of “Jenny Lind”, drawn in his home parlour one Saturday afternoon in 1847, has pencil dimensions that are completely illegible except for the indentations in the paper viewed at an acute angle. (I should say that I have been given privileged access to this wonderful drawing by the library staff at the ImechE).

Many CAD packages allow a scan of a drawing to be inserted into the background of a drawing, and then overlaid with construction lines. My own process is to import the drawing and then decide on a scale to calibrate it by.

If there is a printed scale on the drawing then that is a good start, but often one has to refer to other known dimensions like the distance between rails to get a reference. It’s often fruitless trying to correct the entire drawing for accuracy and



Chaldron Wagon. One-piece 3D print.

orientation because the paper and the original drawing process are likely to be distorted.

A good test is to spot in the wheel rims: the underlying original is likely to be distorted from circular and it may be possible to correct some of this by altering the x/y scales in the image.

At some point you just have to start drawing in lines and constantly matching them with aspects of the drawing to get the best possible representation. In this way I’ve even been able to use photographs of drawings as a basis for reasonably accurate drawings.

In the case of rolling stock it’s often possible to establish centrelines, using published wheelbases for instance, and

match these up with the drawing. The centreline then allows a symmetrical design to be built out, as in the case of a wagon or coach side, knowing this is likely to be how the original was designed. It’s usually during this process that the gross distortions in the original material become obvious!

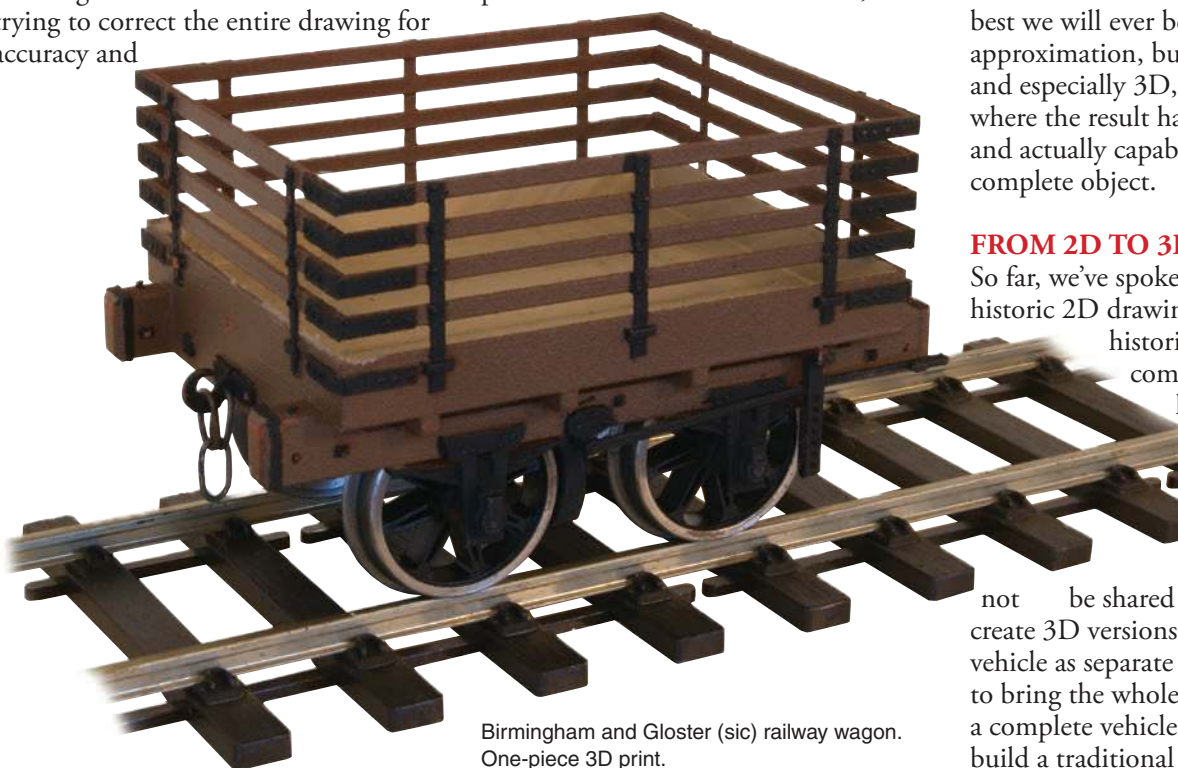
Early Victorian drawings are not always consistent, meaning that side and end views may not tie up and dimensions given on the drawing are sometimes impossible to verify against the scaled representation. For instance, the Clark drawings are virtually faultless, whereas those provided by Wishaw (virtually the only reference we have for the earliest railways) leave a certain amount to be desired. So the best we will ever be able to achieve is an approximation, but working in CAD, and especially 3D, enforces a discipline where the result has to be consistent and actually capable of assembly into a complete object.

### FROM 2D TO 3D

So far, we’ve spoken about converting historic 2D drawings into slightly less historic 2D CAD. Now comes the real challenge: lifting these creations out of the paper and into the real world of solid objects!

My own technique here, which might

not be shared by everyone, is to create 3D versions of each side of a vehicle as separate assemblies, and then to bring the whole thing together as a complete vehicle – just as we would build a traditional model. (Designers



Birmingham and Gloster (sic) railway wagon. One-piece 3D print.





London & Birmingham Railway hopped wagon. One-piece 3D print.

with more intellectual horsepower or perhaps access to more dimensions of space than me might prefer to work with the complete 3D representation from the beginning).

To give form to the individual panel, I use a tool called 'extrude' (may have other names in different CAD's) which raises a selected outline into a thickness, or solid sheet.

For the side of a wagon or carriage for instance I use a standard dimension of 1mm, which happens to be the minimum wall thickness for the 3D printing process as well as 1 1/4" in full size, very similar to the thickness of a real wagon plank. (Remember what I said about G1 being a 'sweet spot' for 3D models?).

With the basic side in place (remembering to include openings for windows and other details) I then 'raise up' other details like outside framing so that they stand proud of the underlying side. Since the minimum

detail thickness for many 3D printers is around 0.7mm, this means that the framing extrusion is often raised 1.7mm high, or 2" in real life.

### SERENDIPITY

A convenient aspect of the 3D process comes into play: where two 3D objects, like the panelling and the framing overlap, the resulting solid objects just merge into one in the final print. It's not necessary to separate them, or merge them into one object, before printing.

However, bugs in the software (there are plenty!) mean that this merging of objects may not be as seamless as you might hope! This is a powerful argument for preserving all the 3D objects that you create as separate pieces that you can go back to, rather

than merging (Called 3D adding) or subtracting them in the CAD software, which can be difficult to undo when (please note when, not if) you hit a bug.

A typical Victorian coach needs 4 separate layers for framing, panelling, window frames and droplights and this illustrates the power of 3D: the same thing in etched brass needs very delicate spidery overlays to be soldered or glued in place, which is why most coach kits feature only 2 layers: half and full etch. If only 3D printing offered the same surface finish as etched brass....

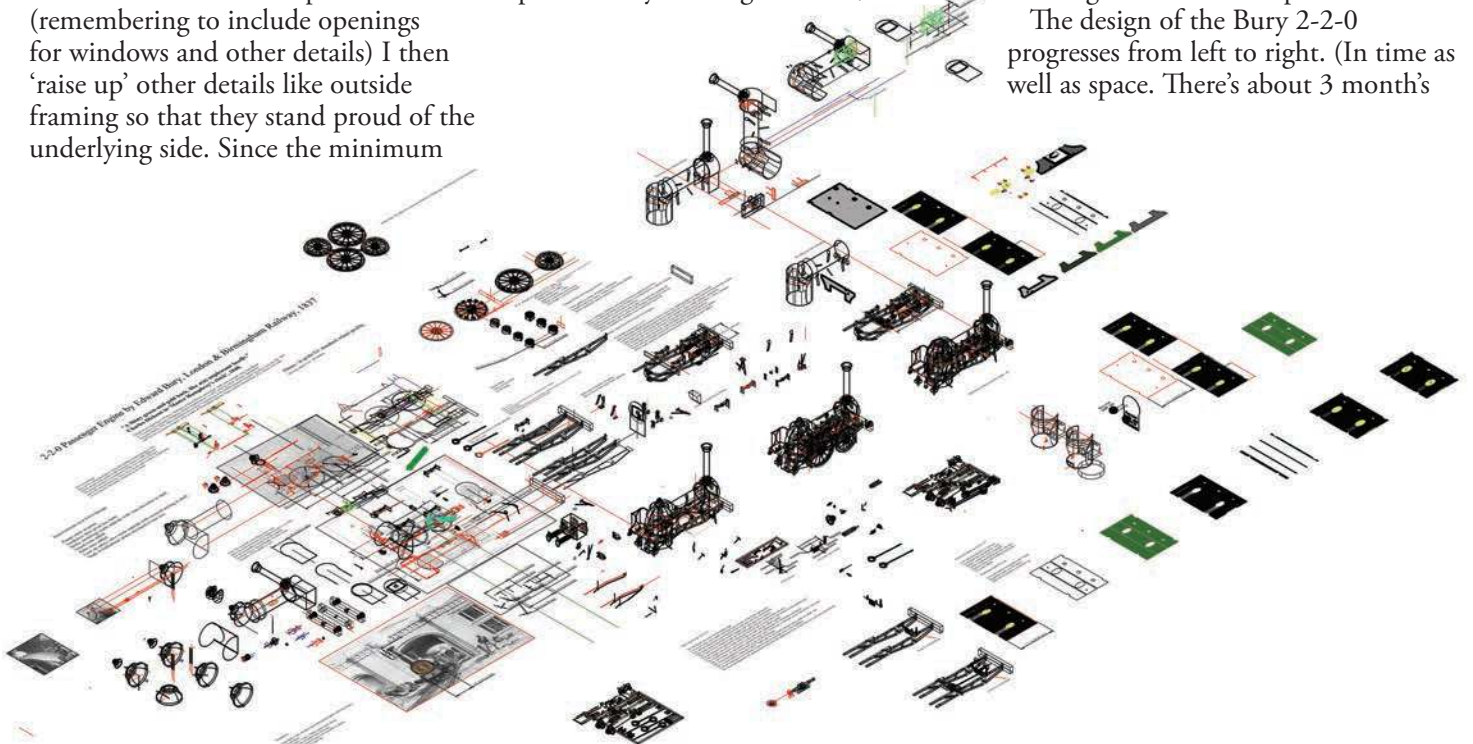
### ASSEMBLING THE MODEL

Some CAD's are good at assemblies, where you can bring 3D components together to form an assembly whilst preserving the integrity of the individual parts in case you have to make a change later on. Unfortunately in Turbocad this is not a safe procedure and use of it leads to many strange behaviours.

Fortunately, it's possible to group component parts together in space without actually merging them to form a single 3D object. As model makers, this is something we should be good at! The important concept here is to plan reference points in the components so that they can be accurately positioned relative to the other components in the model we are building up.

My own style (probably not shared by more professional Cad designers) is to lay out all of the working drawings and component sub-assemblies in one large drawing. Here's an example:

The design of the Bury 2-2-0 progresses from left to right. (In time as well as space. There's about 3 month's





Great Northern Railway timber wagon.  
One-piece 3D print.

work on this page!).

At top left are historical notes, followed at left by scanned engravings which have been scaled to 10mm / ft.

Overlaid on the engravings are 2D Cad tracings adjusted to be geometrically accurate with 90 deg angles and measurements based on the 'best fit' to the engravings.

To the left, the shape of the boiler is 'pulled' into 3D by extruding the 2D shapes. The firebox crown (the definitive feature of Bury's engines) is 'Spun' from a 2D section to form a hemisphere which is then combined with the 'D' shaped firebox.

Moving to the right, the 2D bar frames are extruded into 3D sections and 'assembled' with stretchers and buffer beams. The frames are spaced at scale dimensions, despite the G1 back to back being only 4'. This means that the driving wheels are recessed into the firebox side, fortunately disguised by the splashers and the 'steam roller' wheel profile which brings the outside faces close to scale overall width.

Note the cylinder block under construction before being positioned between the frames. The cylinders are strongly braced to the frames and not suspended from the smokebox as some

London & Birmingham Railway goods wagon.  
The wagon, which may date from the earliest days of the L&BR, has removable side and end planks. The rounded end is to carry a tarpaulin.  
One-piece 3D print.



of Bury's critics claimed at the time.

At top the wheels are developed from single spokes that are spun from tapered 2D cross sections and then repeated around the extruded wheel hub, leaving them strongly cast into it just like the original! The outer ends of the spokes, which are staggered as in a bicycle, join the wheel and tyre which is spun in one piece from a 2D section complying with G1MRA wheel standards.

At centre various minor components are drawn in 2D before being expanded into 3D objects and test assembled with frames and boiler. Note that the various progressions of frames, boiler and other assemblies are regularly spaced at exact steps of 6, 12 and 24" so that components tested in one sub-assembly can instantly be copied 'down the line' just like in a car plant!

The rightmost assembly is the one actually used for 3D printing – the

others serve to test the fit and alignment of components. At right, the surfaces of the boiler barrel and firebox are opened out into 2D form to allow the design of covered overlays representing lagging and other details. These are printed on photographic paper and cut out to form a high quality 'wrapping' of the completed model.

Once the model is assembled in 3D space, a remarkable piece of good fortune kicks in. To output the model in a manufacturing format (almost always .stl, or Stereo Lithography file format) the CAD software uses the outline of the complete object, not the internal structure. So the fact that the components are separate pieces free floating in space doesn't matter, almost. I say almost because Turbocad and I'm sure other CADs behave strangely at this level, occasionally leaving minor pieces from individual components out of the file for no explicable reason.

The answer to this behaviour is to check the .stl file very carefully in a third part visualiser like the free to use Netfabb. This will catch most Turbocad anomalies, but it's not over yet because Shapeways' ingestion software may behave strangely with more complex models as well. So it's essential to use their visualisation software to check the model meticulously as a final step. If a buffer beam is missing in the Shapeways visualisation, it will be missing from the printed model as well. Oops!

All the time these irrational behaviours serve to remind us that we are right on the bleeding edge with our models, typically larger, more complex and certainly more accurate than most other 3D activity. But it's worth it! The results speak for themselves: here's a complete London & Birmingham train, a sight not seen for 170 years. ■



# A little treasure from the valleys

Mark Thatcher builds a 1/19th scale 16mm 'Corris' style cottage from Modeltown



Imagine tramping through the snow on a crisp winter's eve, and in the haze of the dusk, you spot a little cottage nestling in the valley, smoke from its chimney reminding you there is a welcoming fire inside. That scene is memorable to many of us who have taken a cottage let-based holiday in and around the UK. In fact a quick internet search for the word 'Corris' brought up more results from holiday letting agencies than anything else! I can tell you this Modeltown cottage kit captures the style and essence of the Corris cottage perfectly. As it happens I trundled past many during a ride on the Ffestiniog railway some time ago. Perhaps I should go back just to re-check this model's authenticity!

Out of the bag, this cottage is up to the usual fine standards that I am well used to with this manufacturer. In the kit is the main cottage itself, plus three further walls to make up an annexe, two roof sections, a length of plastic angle to act as ridge tiling, a chimney and even

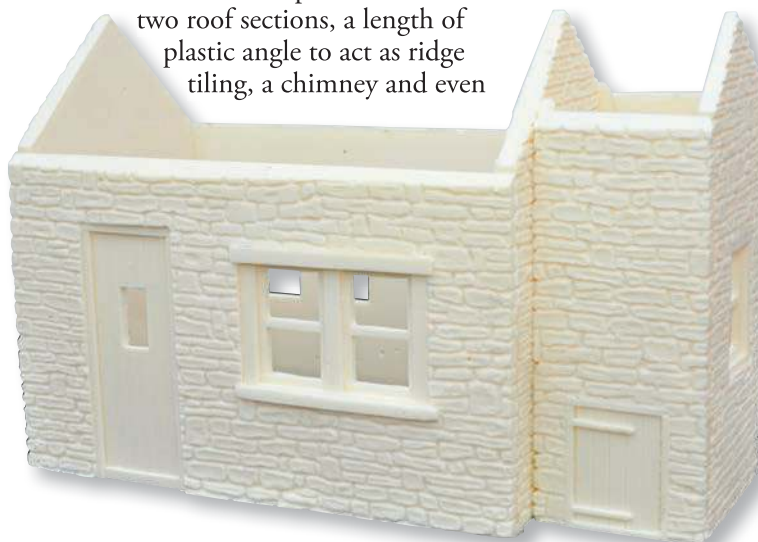
a tin bath. That bath is a really nice touch.

The cottage has a front and back door, the moulding to the front and rear elevation being common. As usual the mouldings contain great stone detail, with the mortar lines chiselled really deep into the thick mouldings. This makes sponge-painting easier as there is less chance you will inadvertently sponge the stone detail into the mortar lines. Modeltown do not scrimp on materials either. Each resin section is around 8mm thick, making for a very solid and substantial building that won't blow away on a gusty day. The main doors and coal bunker door on the lean-to are ripe for creating a faux wooden effect finish and I will show you how I do that later on.

## SPRAYING ONTO A SHOVEL

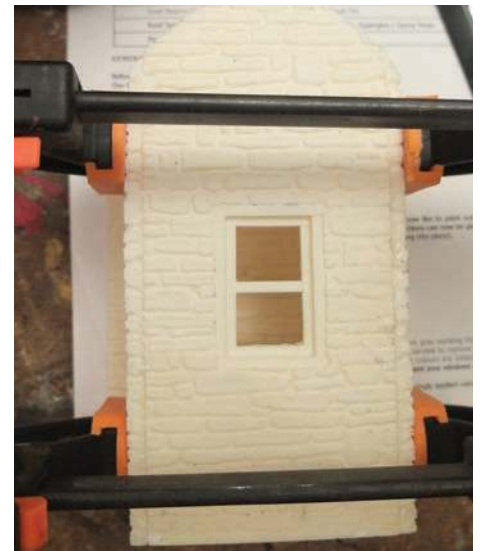
The build is totally un-get-wrong-able. The main building has a front and rear elevation that is common, and it does not matter which way round you put it together, but the annexe parts are handed. The annexe can go onto either end of the building. You need to choose a front and back elevation before you build it, as one annexe side has a full size door, and the other has a smaller door, perhaps resembling a coal bunker. The bath sits above this section according to the instructions although I placed mine elsewhere.

I chose to model the cottage with the smaller door and bath to the rear, with the annexe door and the porch roof over the main door to the front of the building. I tack-glued each



The main carcass of the cottage and annexe was completed very quickly as everything was a perfect fit and I did not even need to pull a file or rasp out of the toolbox.

I did clamp the end of the annexe to keep the end wall true whilst the glue went off.





A quick blast of grey primer sorts out the inside of the building in no time at all.



The exterior walls after being blasted with a coat of U-POL dark grey etched primer.



piece together with superglue and then usually reinforce the joins on the inside of the building with 'No More Nails' or a similar instant-grab adhesive filler. However, this stuff ain't cheap. I have been experimenting recently with waterproof PVA (ie. wood glue) with some surprising results. It is much cheaper, and the nozzle regulates just the right amount of glue which is ideal when running down a seam line, and it creeps into and fills any crevices too. The resulting bond is strong and clean.

Once the building carcass was completed it was time for a base coat of paint. Resin is funny stuff and sometimes even when cured has a sticky feel to it. To get each piece out of the mould, a release agent is added. This release agent sits on the cast piece, and dependent upon how much is used, can form a barrier between what you are trying to paint and the paint itself. It is laborious washing each part in warm water, then making sure it is 100% dry, then when painting you find you have

The quick and easy steps to painting the wooden doors at the rear of the building.



I wanted to keep the colourway simple here, so just sponged the stonework with Valspar's 'Mountain Boulder' grey.

missed a bit and the paint does not adhere, so it is back to stage one.

I have however, had great success using various etch-primers, designed to help paint stick to car bodywork, as used in the automotive industry. I have four different varieties of such primer. The one I chose to use on the cottage is made by U-POL. It is a very dark grey which is perfect to fill the etched mortar lines in the walls and if you sprayed it onto a shovel - enough said! When coating the building, try to spray at right angles to the surface, up and down with one coat, left and right with another. You need to make sure you are covering every inch of mortar. Don't worry about the windows, but it

is worth priming the doors if they have plank-lines scribed into the moulding, as they will be visible when you paint the doors later.

## MY TURN TO DO THE WASHING UP

Painting the building is where I have the most fun, as it springs to life, and sponge-painting is very easy and quick too. Just grab a washing up sponge/scourer and cut it into six 2cm squares. Try to keep the edge square though. I get through loads of these and on the rare occasion it is my turn to do the washing up, I usually retire the old sponge and replace it. I can't think why! I use tester pots of exterior and/







Starting to breathe life into the building by picking out the details.

The roof was sponged with a light grey and then just darkened a little in places with a darker grey.



or interior emulsion paint, Valspar, available from B&Q, being my favourite brand. They are cheap and you can get any colour of the rainbow.

The secret to sponging is once you have dipped the sponge into the paint, dab most of it off onto a newspaper, then just start dabbing away on the building. If you load up your sponge too full of paint you risk applying too much and it running into the mortar lines between the stones or bricks. You can always sponge over the area again if it looks too light.

I used Valspar's 'Mountain Boulder' grey for the stonework, mixing the same colour with matt white to give a slightly lighter finish to the slate roof. After I painted the roof I dabbed over it at random with a darker grey to add some texture. The L-shaped angle that represented ridge tiling was cut up into 2cm lengths then stuck to the apex of the cottage and sponged with Valspar's 'Dante's Cardigan' red over black. I find it easier to paint the ridge tiles black after I have cut them, then lay them onto the apex and mask the edges, so Dante does not dribble his cardigan over the slate roof!

Creating the faux wood effect is very easy too. I always mask around the doors as the painting process invites you to drag paint easily onto the stonework. I just use a matt mid-brown and a cream enamel. Two pots of paint and three brushes. I paint in the brown quite liberally over the door firstly, then with a small brush, drag on a little cream, going with the grain, from the top to the bottom of each plank of wood. Then with a large soft brush and one or two 'swishes' per plank, pull



Creating the line of ridge tiles. There were picked out in an earthy red colour by sponge-painting.

the cream down into the brown. Don't blend the two colours too much as you will just create a lighter shade of brown. The result is a little like real wood.

### READY TO LET IN AROUND THREE HOURS!

If you follow my quick and easy painting methods, you will have this cottage built in no time.

Just out of interest I kept a build log, which went something like this:

- Filing, filling and fettling: 0 minutes as it was perfect out of the bag. Result!
- Constructing the carcass: 20 minutes as I use an accelerator to help set the glue
- Spray-painting the etch primer base coat: 5 minutes
- Sponge-painting the walls and roof sections: 30 minutes
- Painting the windows doors and other details: 1 hour 30 minutes
- Adding the ridge tiles and painting: 20 minutes
- Adding the real lead to the porch and chimney stack (I provided the lead): 5 minutes

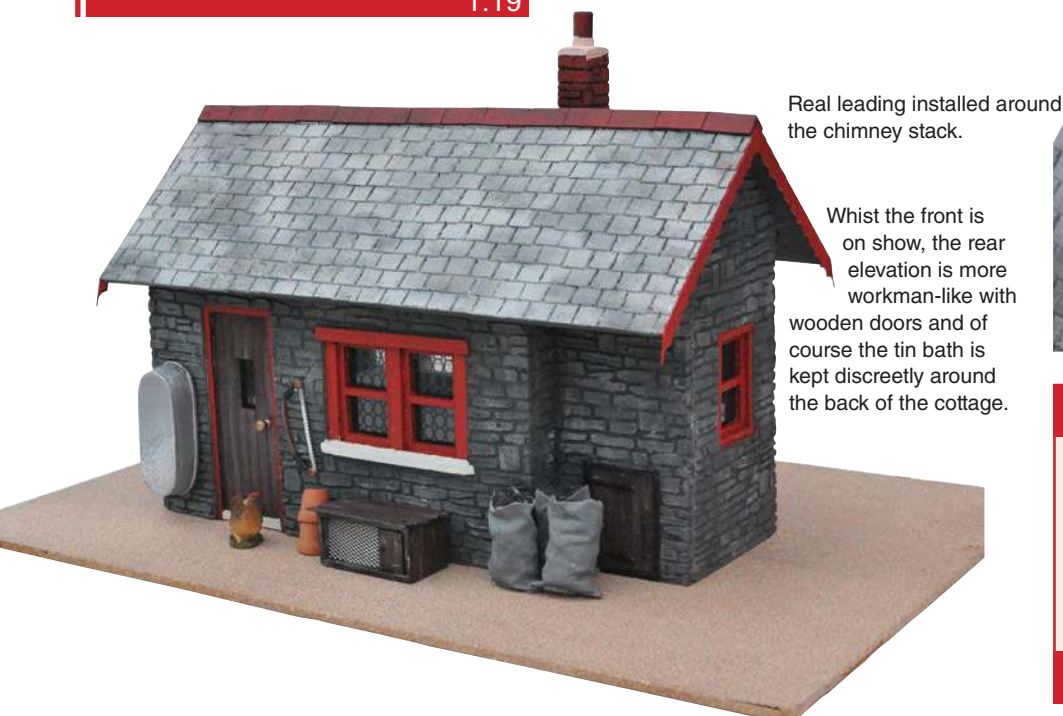


Adding the barge boards to the gable ends.

The leaded windows are begging for this building to be illuminated.







Real leading installed around the chimney stack.

Whilst the front is on show, the rear elevation is more workman-like with wooden doors and of course the tin bath is kept discreetly around the back of the cottage.



## Garden Rail Resource

### Modeltown

6 Station Road, Halton Holegate,  
Spilsby, Lincolnshire, PE23 5PB  
[www.modeltown.co.uk](http://www.modeltown.co.uk)  
Corris stone cottage kit, unpainted -  
£45.00 + P&P

Please mention **Garden Rail**  
when contacting suppliers.

So as you can see, this cottage was ready to let in around three hours! In fairness, a lot of this was due to the awesome quality of the kit. I felt as if I could have almost thrown a pot of glue at it and it would have built itself.

### THE FINISHING TOUCHES

I did not like the look of the bare gable ends on the roof but there is a quick and easy fix for creating your own bargeboards. I bought a pair of 'pinking shears' for around a fiver from Dunelm Mill some time ago. These scissors are used by dressmakers to create a patterned edge to material. They come in a variety of styles. The shears I used created a nice scalloped pattern. I just grabbed some thin Plastikard and cut a length of this, then cut the lengths of plastic to size. The finished effect I think is quite good when painted to match the windows and front door. I also added a little of my real leading around

the chimney pot to finish it off. Door knobs were added to the three main doors and I used a piece of brass wire to fashion a small pull handle for the coal bunker too.

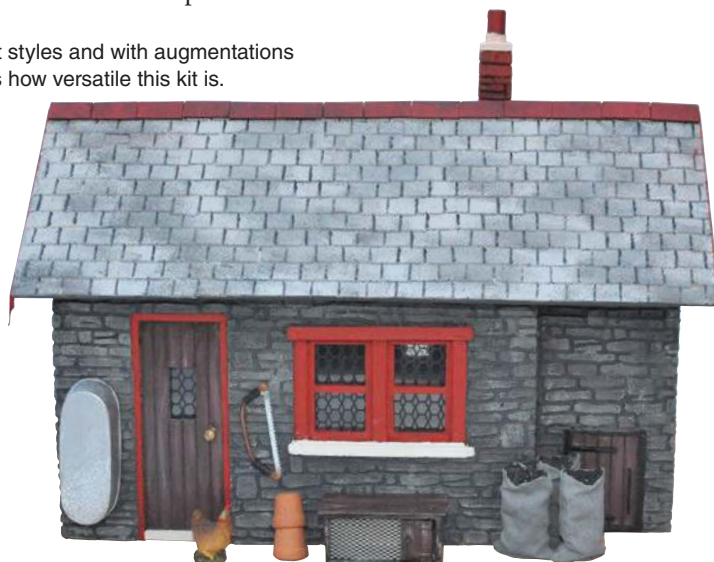
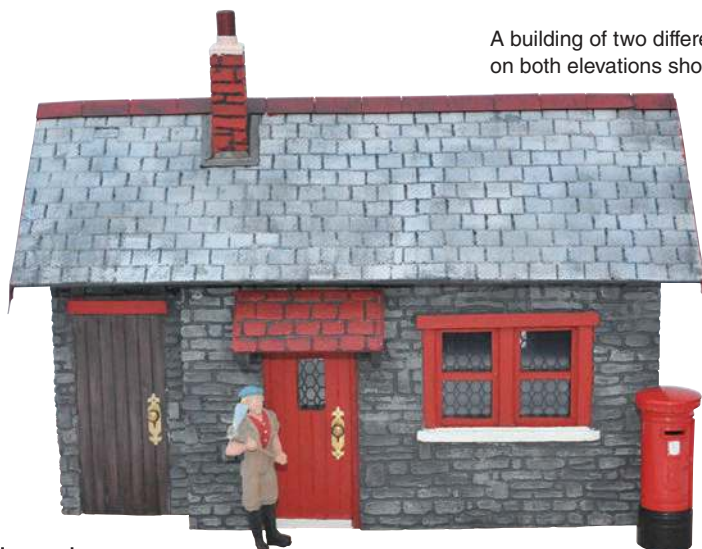
I did have some nice faux lead window glazing material left over from Modeltown's Methodist chapel kit, which I acquired at the same time as this cottage, and as I figured that these buildings work well as a pair, I decided to glaze the cottage with this spare glazing. I had more than enough, so if you buy the pair of buildings together, so will you!

Finally I raided my spares box to find a few suitable bits and pieces to add even more character to the finished building. To the front aspect there is a post box and a farmer with a hoe. I am sure you could make a little general store out of this building if you wanted to. Around the back, things are a little more industrious, with a chicken coop

(an old Hornby O gauge item), a saw, two plant pots, three coal sacks and of course a chicken too! I seem to have inadvertently created a building of two styles, but it does reflect the many finished options that this kit is well-suited to.

So, all in all, a very simple kit to put together and a lovely building to paint and decorate too. So, if you fancy a prototypical Corris cottage to tuck away on your line, then look no further. This kit captures the very nature of these stone buildings without question, and, like most of Modeltown's range, is full of character and great detail. As previously mentioned, Modeltown also produce a very nice Methodist chapel kit too in the same stone-effect finish, which would make an ideal partner to this cottage. They also supply the leaded-effect clear plastic sheet for the windows too. It is in the accessories section of their website. ■

A building of two different styles and with augmentations on both elevations shows how versatile this kit is.





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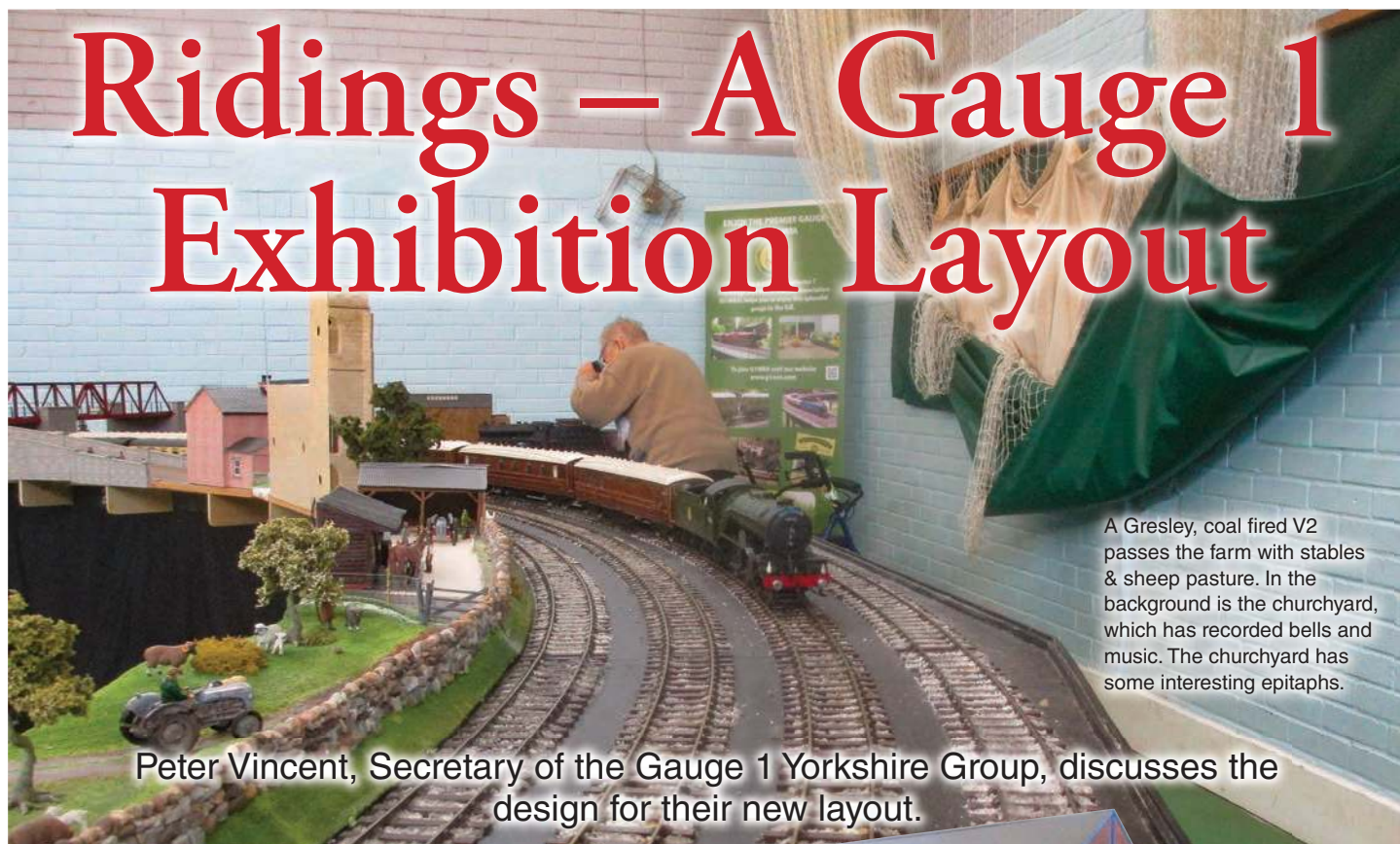


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# Ridings – A Gauge 1 Exhibition Layout



A Gresley, coal fired V2 passes the farm with stables & sheep pasture. In the background is the churchyard, which has recorded bells and music. The churchyard has some interesting epitaphs.

Peter Vincent, Secretary of the Gauge 1 Yorkshire Group, discusses the design for their new layout.

The Gauge 1 Yorkshire Group, most of whom are members of the Gauge 1 Model Railway Association, is a group well experienced in promoting G1MRA at exhibitions, and it was becoming apparent that the track we were using most often, “Dobson Bridge”, was getting increasingly more difficult to erect and maintain, although perhaps our increasing ages had an indirect influence on this point of view!

So it was at an EGM of the Gauge 1 Yorkshire Group in September 2014 that the idea of building a new exhibition track was first considered, and a preliminary working budget was agreed.

A working party was set up to investigate the potential of the idea and to estimate the cost. This was very quickly done, and a discussion document outlining the concept was circulated to all YG members in November.

The main features of the proposed track were:

- It should have at least three and possibly four tracks (for additional runners or for stock movements).
- The baseboard units should be a maximum of 1200mm x 800mm for ease of movement and erection.
- Maximum length should be 25m: maximum width 8m.



Burnard Colliery

- Baseboard units should be as light as possible – easily lifted by one person.
- Height of the baseboards would be adjustable.
- Sections should be removable to vary the overall length of the layout.
- Sections should be stackable, so units needed to be standardised.
- It had to have a WOW! factor, so scenic section additions were essential.
- Plenty of storage sidings should be available.
- A bridge over the track for inside access.
- Sponsorship would be sought.
- The project would be completed for May 2016.

Three months and 300 man hours later, the 48 boards, giving an overall size of approximately 60ft x 30ft were ready for track laying.

The winter months were dedicated to track laying: four full circuits and several storage sidings. The corner sections at the end of each straight would be used for specific scenic sections: namely, engine shed and steaming bay, goods yard, colliery and wharf, with additional individual scenes added to the inside of both curved sections.

The track would be called “Ridings”. The first outing for testing was at the beginning of January 2016, well ahead of schedule and the layout made its public debut at the National Model Engineering and Modelling Exhibition in May 2016. ■

See “Ridings” at Gauge 1 North in Bakewell -13th July 2019.  
More information: [www.gauge1north.org.uk](http://www.gauge1north.org.uk)





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# Building a War Department Light Railways K Class skip

The Editor assembles a Slater's kit for an essential, but overlooked, part of the war effort.

While the classic V-shaped skip wagon wasn't invented during World War One, Robert Hudson of Leeds built large numbers of  $\frac{3}{4}$  cubic yard capacity vehicles that found their way to the conflict zone running on 60cm gauge field railways. .

In 1875, the firm patented its "rolling triple centre pivot" which provided three points at which the skip on the wagon could sit securely, in the centre for movement and tipped over 90 degrees to either side for unloading.

Many thousands of skips were produced and as with much of the wartime railway equipment, those that survived their time on the battlefield returned to the UK for a life in industry.

At least two K class skips survive into preservation.

The original livery is a bit of a mystery. They were probably delivered in red-oxide or grey. If they were painted, it was probably black, but rust soon took over than those operating them didn't have time to worry about niceties such as paint.

Slater's kit is injection moulded in plastic and supplied complete with steel 32mm gauge wheels. Assembly needs few tools and is a pleasant job for an evening. If you can ignore the aroma of plastic solvents, you could happily carry out the work on a tray by the fireside with the rest of the family. ■



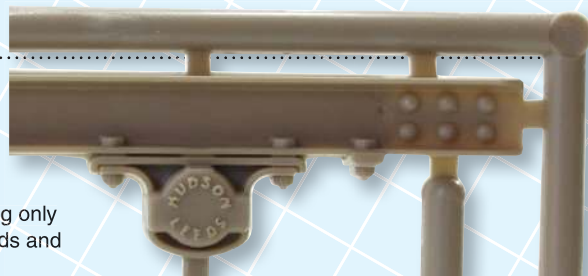
1.

Moulded in plastic, if you've ever stuck an Airfix Spitfire together, you'll be able to manage to build this kit. Wheels are Slater's own make – 32mm gauge only. Four A4 pages of instructions and history are included in the stout cardboard box that is big enough for the finished model.

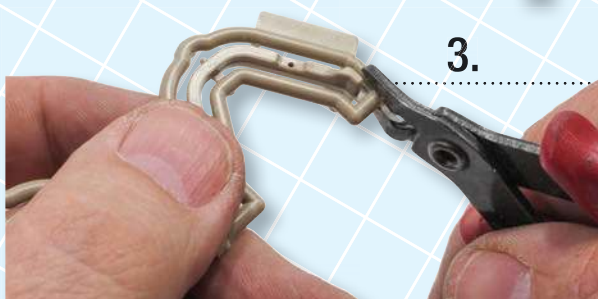


2.

This is a hi-fi kit which will suit the growing band of large scale modellers looking for finer standards and more detail. Raised writing on the the axleboxes is clear and easy to read despite being only 1mm tall. There's plenty of bolt heads and rivets to be counted too.



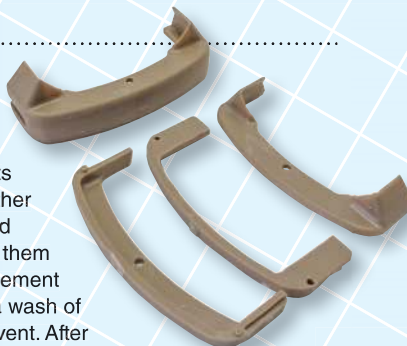
3.



Removing some of the parts from their runners needs more than a modelling knife. Careful modellers will use a fine tooth saw, but I've always found that a set of flush wire cutters too worn for use on metal do a perfectly good job.

4.

The substantial headstocks are made up for three parts located together with pegs and holes. I fixed them with plastic cement followed by a wash of Mek-Pak solvent. After a few hours, when this had hardened, the faces were sanded smooth to look like a single pressing.



5.

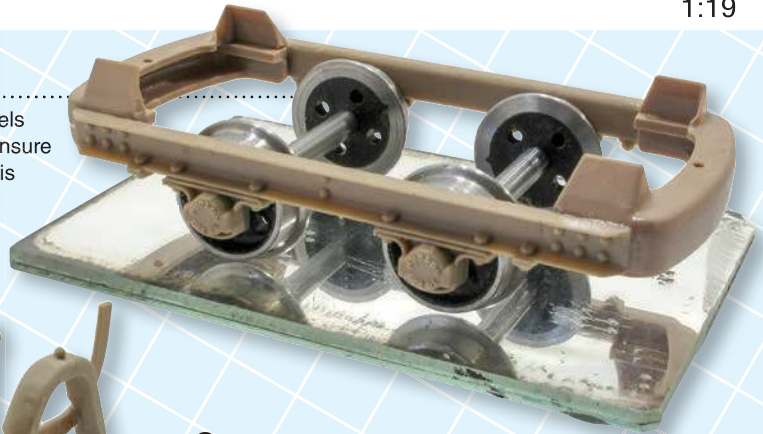
Tiny, brass bearings are fitted into the axleboxes. The instructions say you might need a little superglue to hold them in place, on my model, I felt this was essential. Once fixed and dry, I ran a drill bit by hand down the bearing to ensure it was free of glue – a trick I've learned is important over the years.





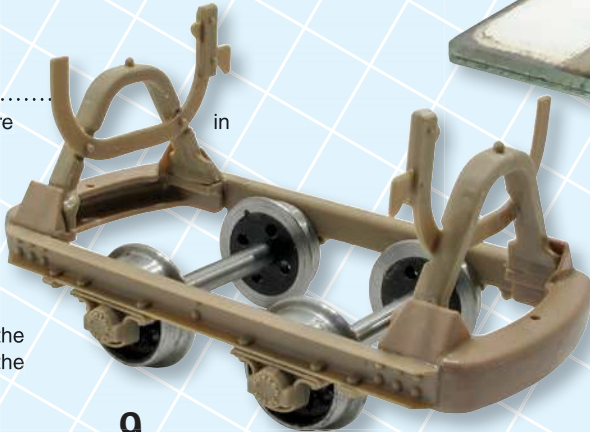
**6.**

Sideframes and headstocks are brought together, trapping the wheels inside. While the glue is soft, the model is stood on some glass to ensure it sits flat. I eyeballed the squareness of the axles to the side and this seemed OK.



**7.**

The skip supports are two parts and once assembled, locate under the recesses in the headstocks. The body brackets are handed, there should be a lock on opposite corners of the wagon, not both on the same side.



**8.**

One of the harder jobs is attaching the cradle brackets on to the skip body. There are slight recesses in the ends, but you need to look carefully and in good light to see it clearly.



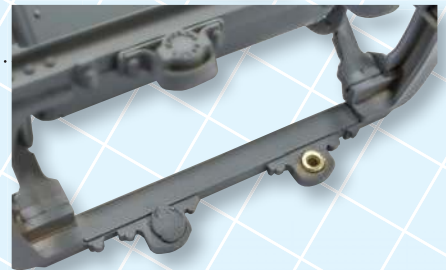
**9.**

If everything is in the right place, it's possible to tip the skip prototypically to the side. While it's nice to be able to do this, I preferred to glue the thing in place so it stays put while running.



**10.**

Before spraying the model with grey car aerosol paint, the wheels are dropped out (there is enough spring in the sideframes to allow this) and bearings masked with a blob of Blu-Tak. No need to be neat, just keep paint out of places it's not wanted.



**11.**

As suggested by the instructions, I've tried a little metal-black chemical on the steel parts of the wheels.

**12.**

Compared to the classic Binne skip on the right, the Slater's model is smaller (Binnie 10mm long, Slater's 86mm) and lighter (38g to 47g), but thanks to the steel wheels, the centre of gravity is as low as it could be.



A pair of preserved K class skips running at the Tracks to the Trenches event last year.



## Garden Rail Resource

### Slater's Plastikard

Old Road, Darley Dale, Matlock,  
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16W06 - WDLR K Class Skip Wagon  
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## LGB

### G scale Golden Spike locomotive set

*Note: Photos show pre-production models.*

The set contains two steam locomotives as they looked at the opening of the first transcontinental railroad in the USA.

The construction, paint schemes, and lettering are the same as the two replicas - Union Pacific RR locomotive "119" and the Central Pacific RR "Jupiter" locomotive currently at the memorial site at Promontory Summit in Utah.

Each is a finely detail models with heavy metal construction including many separately applied details driven

by a powerful motor, has an mfx/DCC decoder with light and sound functions such as headlights, cab lighting, firebox lights. The running sounds and a whistle and bell activated by reed switches will also work in analogue operation.

The locomotives have built-in smoke units with steam exhaust synchronized with the wheels as well as cylinder steam and steam exhaust at the whistle, when the latter is activated.

The cab doors and smoke box doors can be opened. There is a detailed working link & pin coupler on the tender and the cowcatcher on the

front has a separately applied, movable drawbar.

The running gear mounted inboard on the locomotive frame is fully modelled and moves.

The coupling between each locomotive and its tender can be adjusted for two lengths. Length over the couplers for locomotive "119" 55 cm / 21-5/8", for "Jupiter" locomotive 52 cm / 20-1/2".

A gold-plated metal reproduction of an American track spike - is included with the models. In addition, there is also a flagstaff to go on the locomotives and it includes an American flag. The locos are packaged in a quality wooden case and figures of locomotive engineers and firemen are also included.

Only 299 sets will be produced. RRP is 8.999,99 € - check UK dealers for prices. Delivery is expected to be in the autumn of 2019.

## LGB

Kundenservice, Postfach 960, D- 73009 Göppingen, Germany  
[www.lgb.com](http://www.lgb.com)





## ACCUCRAFT

### 16mm scale 'Lawley' 4-4-0

Newly announced is this 1:19 scale model for production in 2020, the iconic South African 'Lawley' 4-4-0.

Between 1895 and 1898, the Beira Railway ordered 42 Falcon type F2 and F4 4-4-0 tender locomotives, supplied in six batches by Falcon Engine and Car Works Limited in England and the Glasgow Railway Engineering Company in Scotland.

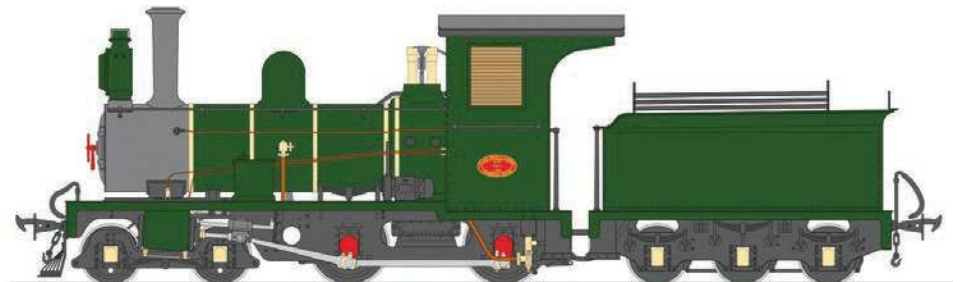
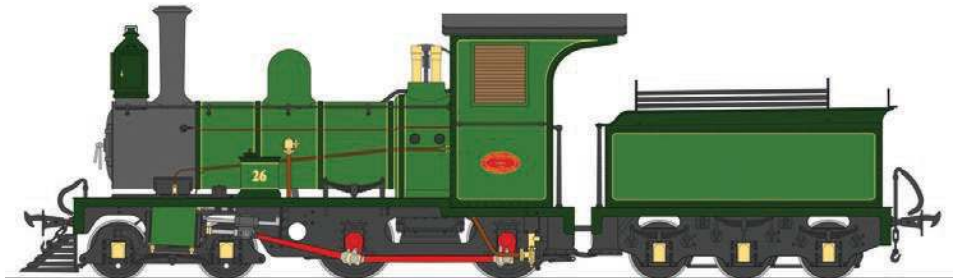
In service, these locomotives were soon nicknamed 'Lawleys', after the Beira Railway construction subcontractor. They enjoyed colourful careers, when the railway was converted to Cape gauge in 1900 the majority were stored apart from half a dozen which were sent to the Ayrshire Railway until this, too, was converted to Cape gauge in 1914.

WW1 saw some of the class used by the military and most ended up in South African Railways ownership, operating existing and new 2' gauge lines in that country. While in SAR service they acquired the classification NG6 but the Lawleys were gradually superseded by bigger locomotives until the last one was withdrawn from SAR service in 1935

Several have been preserved with two operational at the Sandstone Trust line in South Africa and two repatriated to the UK as part of the Rampton Trust collection.

#### Specifications

- Scale: 16mm to 1 foot (1:19)



- Min Radius: 1.2m (4 foot)
- Gauge: 32mm or 45mm – gauge adjustable
- Length: 460 mm (18.5 inches) over buffer beams
- Width: 105 mm (4 inches)
- Height: 152 mm (6 inches)

- Weight: TBA
- Boiler: Centre Flue
- Working Pressure: 60 psi
- Valve Gear: Slide Valve
- Reversing Gear: Simplified Stephenson's link, reverse by lever in the cab
- Fuel: Butane Gas
- Boiler Fittings: Safety valve, pressure gauge, water level glass, Goodall valve
- Cab Controls: Steam regulator, gas regulator, reverse lever, Displacement lubricator

## BOLE LASER CRAFT

### 16mm scale Beech Forest Station

A laser cut 1:20 kit for a typical Australian wooden station building suitable for any impoverished light railway in the world. Laser cut wood and vacuum-formed plastic construction.

Price: £80

#### Bole Laser Craft

Yew Tree House, South Street, Bole, Retford, Nottinghamshire, DN22 9EJ  
[www.bolelascraft.com](http://www.bolelascraft.com)



Versions available, subject to production batch:

- S19-36A Lawley NG6 4-4-0, Live Steam, Beira Railway Green
- S19-36B Lawley NG6 4-4-0, Live Steam, SAR Green
- S19-36C Lawley NG6 4-4-0, Live Steam, SAR Black

Estimated Price: £2950.00 inc. VAT

#### Accucraft (UK) Ltd

Unit 4 Long Meadow Industrial Estate, Pontrilas, Herefordshire, HR2 0UA  
[www.accucraft.uk.com](http://www.accucraft.uk.com)



## DELUXE MATERIALS

### Grime 2 Shine cleaner

Described as a "specially developed foaming cleaner that will removed effortlessly unsightly dirt & oily grime from non-porous surfaces", this should be a useful product for anyone with a steam, or real diesel engine. It's water-based and non-flammable, safe on plastic and paint and easy to use.

I tried it on the oily bits of my Ragleth which haven't been cleaned for months (yes, I know I'm a bad person. I've been busy...) so should be a perfect test.

The cleaner foams nicely when pumped out of the bottle. It's smell isn't unpleasant. Wearing protective gloves in accordance to the instructions, I liberally coated the rods, cylinders and footplate, then left it to do it's work.

Initial results didn't look great when I simply wiped the foam away with a paper towel. The metal was a bit cleaner, but hardly shiny. A light rub with an old toothbrush and it was a different matter. The grime was gone and it looks, if not like new, at least like the model was very well cared for. To be fair, the grime was extremely well dried on and I suspect that cleaning after a running session would be a quicker and easier task.

The paintwork has come up well with no damage other than to the dirt. I can't see any reason I wouldn't be happy to foam an entire model occasionally.

Keeping stream engines clean is good for them and helps to retain their value. After drying the model, I lightly oiled up to protect the clean metal again and returned it to it's dustproof box.

Price: £7.50 for 225ml

### Deluxe Materials

Available from all good model shops  
[www.deluxematerials.co.uk](http://www.deluxematerials.co.uk)



## GARDEN RAIL OUTLET

### Unpainted G scale figures

A pack of four very nicely cast resin seated figures from Massoth. Two female and two male figures. The clothes look sufficiently timeless to work for most periods.

Price: £9.50

### Garden Rail Outlet

7 Rosebery Avenue, Hythe,  
Southampton, SO45 3HJ  
[www.gardenrailoutlet.co.uk](http://www.gardenrailoutlet.co.uk)





**BRANDBRIGHT**  
**16mm scale Oldbury Coach Kits**

Based on coaches supplied to both Malta and New

Zealand railways. The wooden models include full interior detail and can be supplied for 32 and 45mm gauges.

Price: TBC but around £80

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Holland Way, Blandford, Dorset,  
DT11 7TA  
[www.brandbright.co.uk](http://www.brandbright.co.uk)



**16mm scale Bowsider coaches**

Freelance coaches with clerestory roof. Internally there are compartments with details including door inlays and seating. The roof glazing and designation transfers are included, but bogies must be purchased separately.



**LINESIDE HUT**

**16mm scale FR coaches 17 and 19**

Coaches are supplied as wooden kits but with carpeted floor, foam seats, leather straps and other internal detail. Brass balcony ends and transfers are included but wheels and bogies are not.

To assist modellers, a separate jig kit is available to aid getting the bow sides correct, although this isn't essential for the braver builder.

Price:  
Coach kit £119  
Whitemetal fittings £15 (not available separately)  
Bodyside jig £12

Length 300mm  
Width 100mm  
Height 125mm

Price  
Three compartment with guards compartment £48  
Four compartment £49

**The Lineside Hut**  
43 Rope Lane, Wistaston, Crewe,  
Cheshire, CW2 6RD  
[www.thelinesidehut.co.uk](http://www.thelinesidehut.co.uk)



## BOWATERS MODELS

### South African Railways Class 91

The South African Railways Class 91 was a class of 2ft gauge diesel built for operation on the Avontuur line out of Port Elizabeth in the eastern cape.

These engines at first operated alongside then replaced the Beyer-Garratts which were then sent to work on Natal. Until recently, most of the class survived however in recent times, a number have been scrapped with a number surviving into preservation.

### RNAD 60hp diesel

The Royal Naval Armament Depot 60hp Diesel was a type of engine that operated on the wide array of rail connected depots used by the British Government specifically for the Navy. A small number were built but they saw long and useful service in their intended role.

As the depots they served closed, a number have been sold into preservation with examples being found at the Ffestiniog Railway, Lynton and Barnstaple Railway and the Sittingbourne and Kemsley Light Railway amongst others. The RNAD is based on the preserved Barton Hall on the Sittingbourne and Kemsley Light Railway and can be offered with one or two belt covers to allow for a wide range of these engines to be modelled.

Both feature models feature laser cut construction, 3D printed sections, plenty of etched detail and are suitable for 32mm gauge and 45mm gauge. Motive power will be from PDF Models



power units and kits come complete with Accucraft Chopper Couplings as standard.

The RNAD diesel will be released at Sittingbourne later this year and the Class 91 being at Exeter. Prices: TBA

### 16mm scale SAR coaches

Bowaters next 2019 releases cover a range of different models for the South African Railways Avontuur Line Rolling stock. The released kits consist of the following items:

- BMP-000B SAR B Wagon Train Pack (4 Wagons and 1 Brake Van)
- BMP-000C SAR C Wagon Train Pack (4 Wagons and 1 Brake Van)
- BMP-101 SAR B Wagon
- BMP-102 SAR C Wagon
- BMP-201 SAR V2 Brake Van
- BMP-202 SAR V5 Brake Van
- BMP-203 SAR V16 Brake Van

These are scale kits coming complete with HGLW bogies produced under license in the gauge of your choice (32mm or 45mm) and Accucraft couplings where appropriate.

All kits include postage to mainland UK only with shipping to other countries being at cost. Please note, these are sold as advanced scratch aids and will require some details to complete them although they are designed to be run as is for those who wish to do so.

The range is available now and priced between £75 and £105 per coach in MDF or £90 and £120 in Plywood. They're available to order from the website with a 3-4 week estimated turnaround.

### Bowaters Models

[www.bowatersmodels.co.uk](http://www.bowatersmodels.co.uk)



have laser cut bodies and Binnie wheels and axles.

### SIXTEEN MILLS

#### Gauge One Industrial/Contractor's wagons

Laser-cut from MDF, these wagons have working tipping bodies and hinged doors where appropriate. Kits

TM017 – End tipper  
TM018 – Side tipper  
TM019 – Water tank  
Price: £30

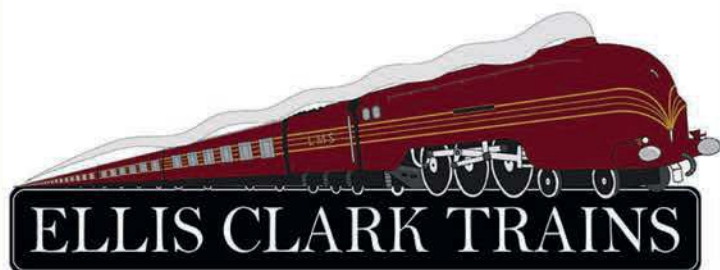
### Sixteen Mills

45 Millbank, Llandegfan, Anglesey, LL59 5RD

[www.sixteenmills.co.uk](http://www.sixteenmills.co.uk)







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We have been working in conjunction with the National Railway Museum to ensure that these iconic locomotives are brought to life in O Gauge so people can have a piece of the National Collection in their own home.



3D printed samples shown

Each locomotive will measure around 50cm in length and weigh in excess of 2kg.

## Variations available to order

### Class A3 4-6-2 - £750

- H7-A3-001** 2750 "Papyrus" in LNER Grass green
- H7-A3-002** 4472 "Flying Scotsman" in LNER Grass green
- H7-A3-003** 2745 "Captain Cuttle" in LNER black
- H7-A3-004** 60072 "Sunstar" in BR Express blue
- H7-A3-005** 60035 "Windsor Lad" in BR green with early crest
- H7-A3-006** 60077 "The White Knight" in BR green with late crest
- H7-A3-007** 60103 "Flying Scotsman" in BR green with late crest



### Class A4 4-6-2 - £750

- H7-A4-001** 2509 "Silver Link" in LNER silver
- H7-A4-002** 4468 "Mallard" in LNER Garter blue - Record Breaking condition
- H7-A4-003** 4468 "Mallard" in LNER Garter blue - As Preserved
- H7-A4-004** 4489 "Dominion of Canada" in LNER Garter blue
- H7-A4-005** 4464 "Bittern" in LNER Garter blue
- H7-A4-006** 60007 "Sir Nigel Gresley" in BR express blue
- H7-A4-007** 60012 "Commonwealth of Australia" in BR green with early crest
- H7-A4-008** 60009 "Union of South Africa" in BR green with late crest
- H7-A4-009** 60008 "Dwight D Eisenhower" in BR green with late crest



For more information check out our website at: [www.hattons.co.uk/recordbreakers](http://www.hattons.co.uk/recordbreakers)



## CAMBRIAN 16mm Narrow Gauge

Cambrian Models is now Cambrian Model Rail Limited. There is a new website with fully integrated online shop. Postage from £1.50.

### Loco and rolling stock parts

Rivets, nut & bolts, handwheels, headlights, coach doorhandles & vents, and more...

### Bogies, axleguards, brake gear

Five types of bogie, loco, coach & wagon axleguards; and two types of brakegear.

### Wheels

Loco and rolling stock wheels.

### Signal parts

Signal parts, signal ladder and brackets.

See the website for details or send C5 SAE for catalogue



Over 100 4mm Wagon Kits spanning many eras are also available  
[www.cambrianmodelrail.co.uk](http://www.cambrianmodelrail.co.uk) [cmr@cambrianmodelrail.co.uk](mailto:cmr@cambrianmodelrail.co.uk)  
 01322 515672 2pm to 4pm PO Box 85, Greenhithe, Kent. DA10 9DN

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 lay figure.

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## Timpdon MODELS

### Timpdon Coaches



For the ones not familiar with our coach range, they're available as a kit or as a finished ready to run model – which are proving very popular.



It's now becoming quite common for people to re-order more stock, telling me (and hopefully others within earshot) how pleased they've been with their purchase. In fact over the years we've only had one complaint – that they were too cheap! (I offered to rectify this for just that one customer, but he immediately withdrew his comment).



They are available as a tiny one compartment, right up to the four compartment bogie version. A Parcel Van, Guard's Van and Composite Coach compliment the passenger coaches perfectly so you can make a train to suit your line.



Of course they all have real glass (even in the little windows of the guard's duckets) and the hard-wearing nylon wheels make for smooth running.



**Kit:** Not too hard to make, with easy to follow illustrated instructions. Everything's included.

**Pre-Made:** Available in either maroon or green.



Visit the website to see the full range and click on the pictures for a clearer view. Be warned though, my photography skills are pathetic and the colours really do match across the range – just not in the pictures.

See this and more at: [www.timpdonmodels.co.uk](http://www.timpdonmodels.co.uk)

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Letters are welcomed on any aspect of large scale railway modelling. Please e-mail the Editor: phil.parker@warnersgroup.co.uk or post to The Editor, **Garden Rail Magazine**, Warners Group Publications, West Street, Bourne, Lincolnshire, PE10 9PH

## HIGH LEVEL LAYOUTS

My father, Rev. Peter Denny, who is better known for his Buckingham Great Central layout also had a garden railway.

In an article published in 1955 he wrote "A height of 2ft. 6in. was considered desirable if backache was to be avoided in the station area, and in order to obtain this a pit 15ft. long and 3ft. wide was opened up beside the station site".

He went on to describe the construction of the pit and how the line between the stations should be on a low level embankment so the trains could run through their natural environment.

The original layout consisted of two terminus stations separated by a length of track.

Regarding the second station he wrote "Whereas there is an operating pit at Harrowbarrow Station there is no such luxury at Danescombe, the reason for this being that Danescombe will be for the time being under the control of a junior member of the family, so no such pit is necessary".

This would have been me aged 5.

**Stephen Denny**

## CHEAP RADIO CONTROL

David Anderson writes about his Tri-ang shunter fitted with a cheap radio control system in the June issue of **Garden Rail**, and I've read other modellers suggesting ways of controlling models for under ten pounds – but try as I might, I've never been able to pin down all the details so I can have a go myself.

I've also heard scare stories from friends who build model aircraft about charging David's preferred Li-Po batteries. I understand that they can explode! Is this true?

Could I ask if anyone would be willing to write the process of building a budget control system for a small battery electric locomotive, something like the IP Engineering models, for us? I'm sure there would be lots of interest.

**Bailey Harper**

*Editor: Fellow model boat builders are using Li-Po batteries and recommend charging them in a special bag in case they explode. My understanding is that this happens if the charging system isn't balanced. Personally, I've always steered clear of them, but then I'm not really into racing boats.*



Barbara Martin

*Getting Up Steam*



## DIARY DATES

**Date:** 22nd & 23rd June  
**Event:** Open Weekend  
**Venue:** Butterley Garden Railway, Butterley Station, Ripley DE5 3QZ  
**Organiser:** Butterley Garden Railway Association  
**Additional Info:** Plant stall and traders

**Date:** Saturday 22nd and Sunday 23rd June  
**Event:** Hollycombe Steam in the Country Steam Festival  
**Venue:** Hollycombe Steam in the Country GU30 7LP  
**Times:** 1:00 to 17:00 (Rides operate from 12:30)  
**Web:** [www.hollycombe.co.uk](http://www.hollycombe.co.uk)  
**Exhibitors:** Prayle Grove 16mm scale layout and Hampshire Area Groups of the Association of 16mm Narrow Gauge Modellers modular layout will be operating. Other exhibits include traction engines, miniature traction engines, fairground models and toy steam.  
**Additional info:** Admission includes rides on 2ft gauge quarry railway and fairground rides Free car parking, refreshments

**Date:** Saturday 17th and Sunday 18th August 2019  
**Event:** Model Tram, Trolleybus, Bus and Railway Exhibition  
**Venue:** The National Tramway Museum, Crich Tramway Village, Crich, Derbyshire, DE4 5DP  
**Times:** 10am to 5pm Both Days  
**Additional info:** The Manchester Model Railway Society tramway layout will be the main feature of this exhibition and will be a total length of over 80 feet in the main Exhibition Hall. The track gauge is 2 7/16inch and the rail is standard coarse 0 gauge rail and chairs, mounted on a hardboard base, many pieces of which are over 50 years old

**Date:** Saturday 31st August and Sunday 1st September  
**Event:** Hollycombe Steam in the Country Model Weekend  
**Venue:** Hollycombe Steam in the Country GU30 7LP  
**Times:** 11:00 to 17:00 (Rides operate from 12:30)  
**Web:** [www.hollycombe.co.uk](http://www.hollycombe.co.uk)  
**Exhibitors:** Hampshire Area Groups of the Association of 16mm Narrow Gauge Modellers modular layout will be operating. Other exhibits include miniature traction engines, fairground models and toy steam.  
**Additional info:** Admission includes rides on 2ft gauge quarry railway and fairground rides Free car parking, refreshments

**Date:** August 31st and 1st September  
**Event:** Llanfair Garden Railway Show  
**Venue:** Llanfair Careinion Leisure Centre, SY21 0HW  
**Times:** Sat 10am-5pm Sun 10am-4pm  
**Exhibitors:** Layouts in 16mm and G scale. 40+ Traders

## SUBMISSION NOTES

Garden Rail welcomes articles submitted via posted disc, e-mail, Dropbox (or other large file sending system on-line). Please ensure that your name, e-mail address, telephone number and postal address for payment on publication are included. Send to [phil.parker@warnersgroup.co.uk](mailto:phil.parker@warnersgroup.co.uk) or to the contact address on the Contents page.

Articles should be submitted in MS Word or other word processing format. Please do not use fancy formatting or embed photos in the piece, these should be sent separately at the highest resolution possible and in JPEG format. Printed photos of a historic nature will be accepted. Captions for all photos should be included as part of the submission. You must own copyright to any material submitted.

**Date:** 7th September  
**Event:** Himalayan Day  
**Venue:** Woodseaves Lake Light Railway, Sydnall Lane, Woodseaves, Market Drayton, Shropshire TF9 2AS  
**Times:** 11am - 6pm  
**Additional info:** Prototypical running for the theme is preferred. The Woodseaves Lake Light Railway is a 32mm gauge line with over a scale mile of track located within the grounds of a garden nursery and miniature railway. Parking and other facilities are on site. Refreshments available - tea and tiffin?

**Dates:** 7th & 8th September  
**Event:** Steam in Miniature  
**Venue:** Bure Valley Railway, Aylsham Station, Norwich Road, Aylsham, Norfolk NR11 6BW  
**Organiser:** Bure Valley Railway  
**Web:** [www.bvrw.co.uk](http://www.bvrw.co.uk)  
**Additional information:** Aylsham Minor (32mm gauge) and Prayle Grove (32/45mm gauges) will be operating in the Workshop and Fabrication shop. A celebration of steam in action and on display

**Date:** 14 September 2019  
**Event:** Wiltshire Model Steam Gala (previously White Horse Model Engineering and Garden Railway Show)  
**Venue:** White Horse Country Park, Coach Road, Westbury, Wiltshire, BA13 4LX  
**Organiser:** West Wiltshire Society of Model Engineers  
**Web:** [www.wwsme.org.uk](http://www.wwsme.org.uk)  
**Times:** 10am - 4.30pm  
**Admission:** £5.00, children under 16 free  
**Exhibitors:** See website for full details  
**Additional info:** Free parking, refreshments, bar, traders, 16mm and G layouts, engineering society displays, train (5 inch gauge) and traction engine rides

**Date:** 28th Sept  
**Event:** The Yorkshire Garden Railway Show  
**Venue:** Elsecar Heritage Centre, Wath Rd, Elsecar, Barnsley S74 8HJ  
**Organiser:** The Yorkshire Group of 16mm Narrow Gauge Modellers Ltd

**Date:** 12th October  
**Event:** GIMRA Trade Show and AGM  
**Venue:** Statfold Barn Railway, Ashby Road, Tamworth, Staffordshire. B79 0BU  
**Organiser:** The Gauge One Model Railway Association  
**Web:** [www.g1mra.com](http://www.g1mra.com)

**Date:** 17-20 October 2019  
**Event:** Midlands Model Engineering Exhibition  
**Venue:** Warwickshire Event Centre, A425, Southam Road, Leamington Spa, CV31 1XN  
**Organiser:** Meridienne Exhibitions Ltd  
**Web:** [www.meridienneexhibitions.co.uk](http://www.meridienneexhibitions.co.uk)  
**Times:** 10am - 5pm (Thurs-Sat) 10am-4pm (Sun)  
**Admission:** Adult £10.50 Senior £9.50 Child £4.00 (on-line booking discount available)  
**Exhibitors:** See website for full details  
**Additional info:** Free parking, refreshments





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# Seen at the Association of Larger Scale Modellers show – Reading 2019

The Editor visited the ALSRM show and while most of the exhibits were 7mm scale, he found some very impressive Gauge 3 modelling to photograph.

## Who are the ALSRM

The Association of Larger Scale Railway Modellers was founded by a group of experienced Modellers, Traders and Exhibition Organisers as the result of concerns about the strategic direction of the hobby.

It was recognised by all the founder members that specialist single scale shows above 4mm (OO/EM/S4) were becoming little more than "members only" trade events and not attracting new entrants to the hobby or passing trade from the general public.

The ALSRM organises shows around the UK with its primary focus on the annual Reading Rivermead show and provides equipment and logistical support to a number of other shows.

For more details, visit: [www.alsrm-events.co.uk](http://www.alsrm-events.co.uk)

Roger Sailsbury's Chalfont represents a fictitious Great Western branch line terminus set in the Buckinghamshire countryside of the 1930's to 1940's. The line is lightly used, passenger services being handled by steam hauled autococh or diesel railcar. Freight traffic mainly serves the local dairy together with local coal and general produce requirements. The layout was constructed to bring Gauge 3 to exhibitions and to show that this gauge can be accommodated in a relatively modest area.



The Gauge 3 Society had a fine display of models, including this ex-GWR 14xx tank and coach.



An O8 diesel and short goods train trundled back and forth on a shuttle so visitors could appreciate the realistic weight of 1:22.5 scale models.

Right: A Southern 02 with coaches and rake of BR freight stock.





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**NEW! Lawley Beira/SAR 4-4-0** tender, due late 2020 or later, estimated price £2950, available in Beira Green, SAR Green and SAR Black.



**NEW! Dolgoch 0-4-0WT** Due 2/3rd quarter 2019, £1550 manual only. Available in 32 or 45mm gauge, colours are TR Green, Atlas Green or TR Red.



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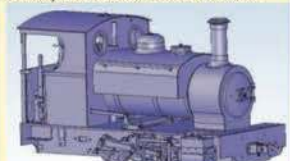
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**Talgarth 0-4-0T** Booking Now - Delivery expected 2nd Quarter 2019 - (April - June) - date and price may vary. Manual Control: £950, Radio Control: £1250



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**Little John 0-4-0D** R/C Battery electric, £602

**Merseysider** R/C £755, with sound £875

**Harlech Castle 0-6-0D** R/C Battery electric £919, with sound £1055, FR yellow band additional £40

**Darjeeling NDM6, 0-4-0D**, R/C battery electric £1252, sound £1355

**Bulldog 0-4-0D** R/C Battery electric £634

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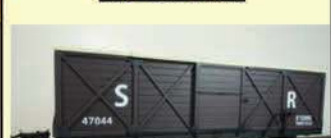


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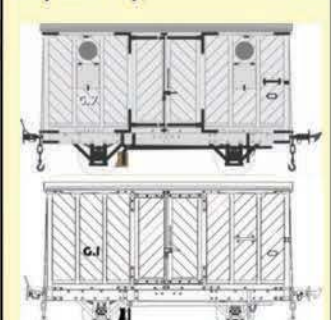


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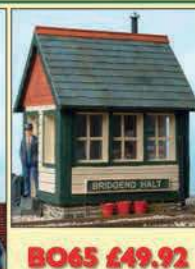
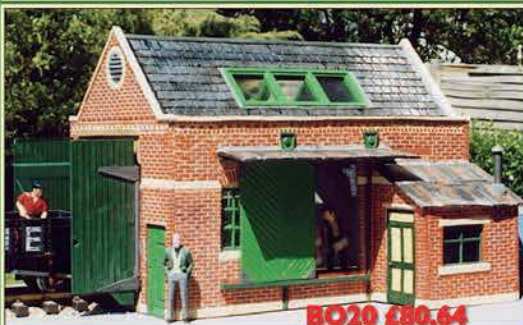
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