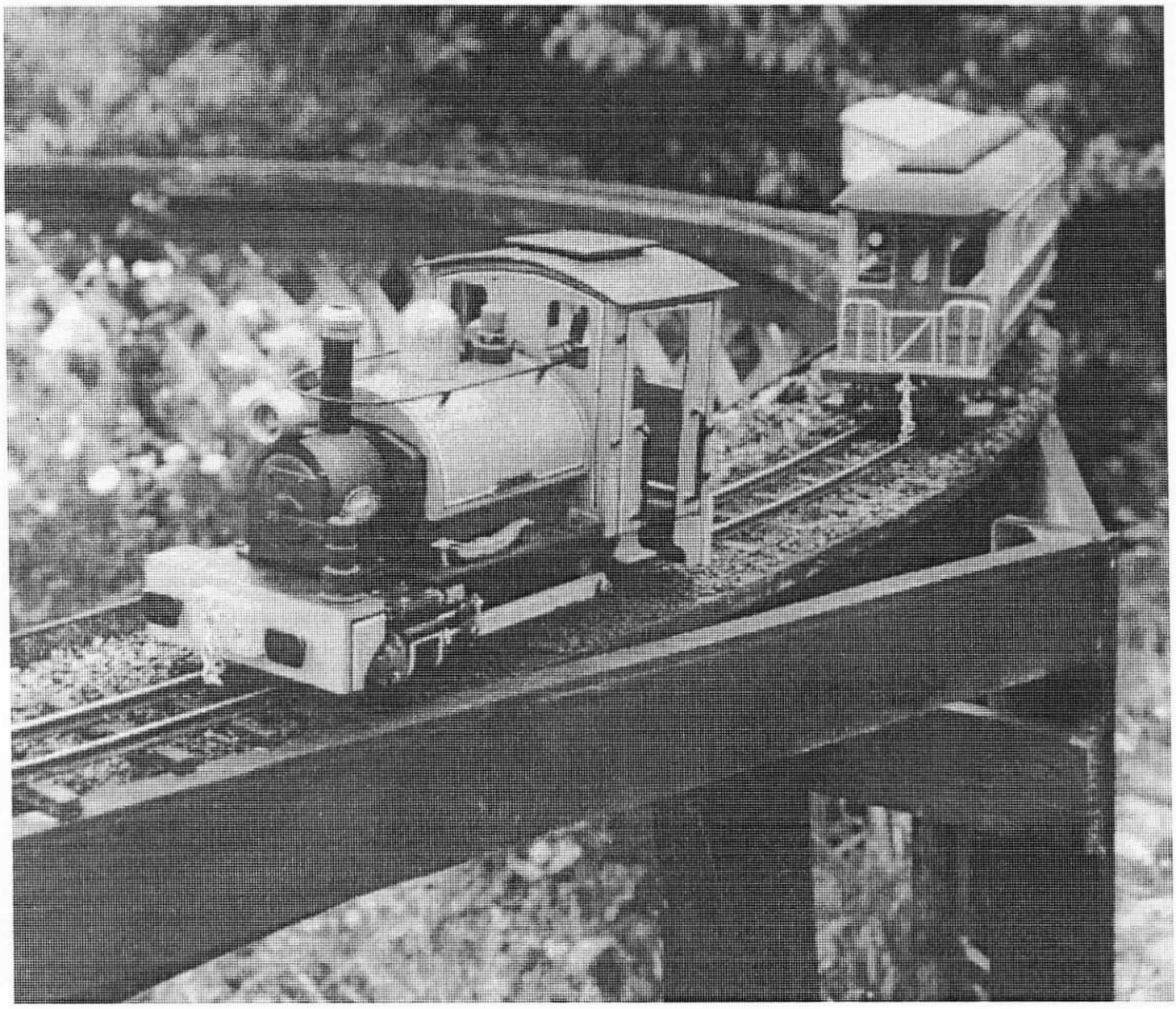
Steam in the Garden

Magazine

Gather, friends, while we enquire,
after trains propelled by fire.....

Volume One Number Five February/March 1991

DEPARTURE TIME ON GEOFF COLDRICK'S GREAT CENTRAL RAILWAY



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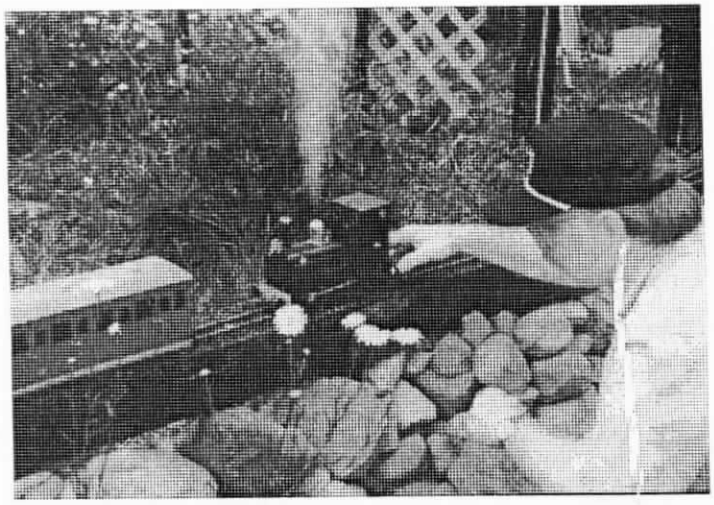

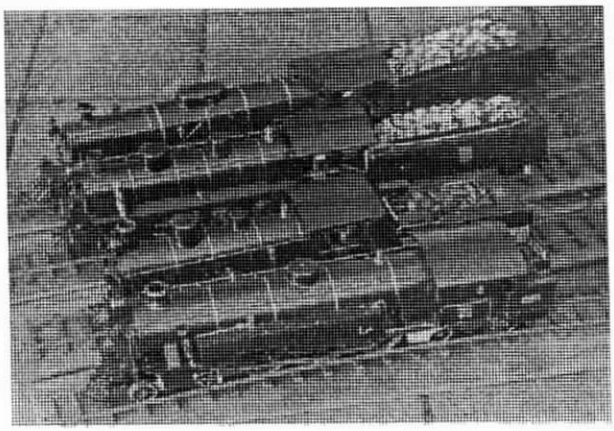

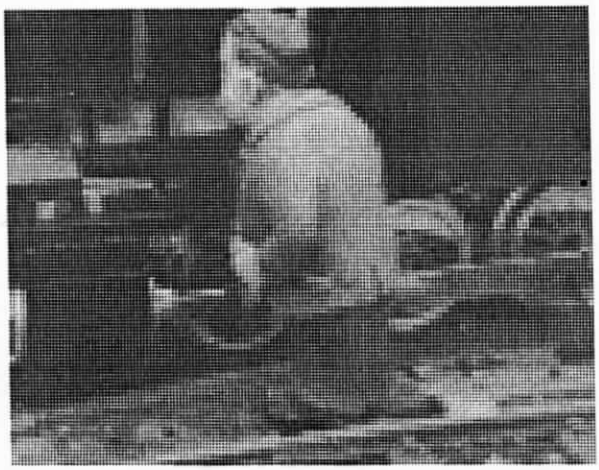

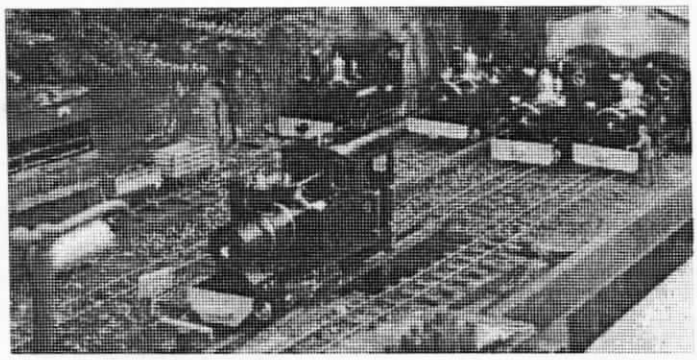

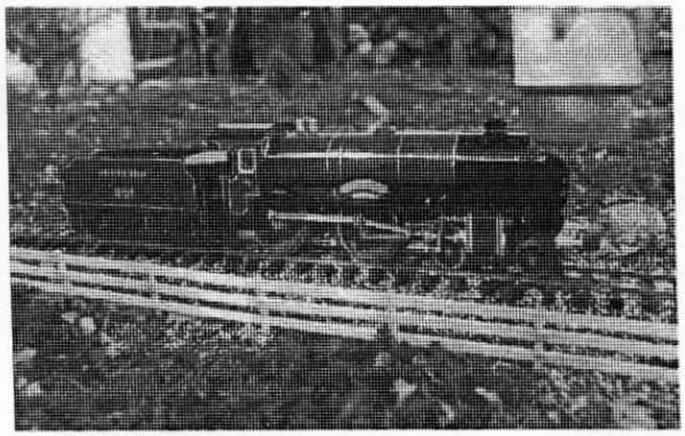

PHOTOS

Clockwise, from bottom left:

Beautiful Aster Schools Class loco. *Photo by Gary Broeder.*

Merlin power on shed at Peter Jones' Compton Down Railway. *Photo by Peter Jones.*

"Prince" pulling a train past a most interesting rock formation on Richard Rees's Portmadoc, Beddgelert and Himalaya Railway in Wales. *Photo by Richard Rees.*

Peter Mesheau prepares to couple his Archangel loco to a vintage coach on Geoff Coldrick's Great Eastern Railway in New Brunswick. *Photo by Ron Brown*

Dutch East Indies in miniature. A flight of superb scratchbuilt steam locos built by Fred Jantzen in Holland.
Photo by Fred Jantzen.

Sam, a loco driver on Peter Jones' CDR, scrutinizes his tiny steed before a run. *Photo by Peter Jones.*

Cover Photo: Goliath, a handsome Welsh saddletank loco scratchbuilt by Geoff Coldrick, poses with a string of Geoff's custom-built coaches on his Great Eastern Railway in New Brunswick.

Photo by Ron Brown

This will be a bit of a ramble, as I have a lot of things to talk about. You may have noticed that the price of SitG has gone up. I'm sure this won't be a shock to anyone, as it has grown up quite a bit since its beginning as a crude newsletter. Many of you asked for photos and drawings, so we've acquired the equipment to include more of both in every issue. Hopefully you'll agree with us that SitG is worth the increased cost.

This issue is also a couple of weeks late, much to my chagrin. During the past few months we've added a new computer, new printer and new software to improve the quality of SitG and give you the features you've been asking for.

After searching long and hard and doing lots of research, we finally settled on a scanner to allow us to include scanned photos, drawings, etc. Since none of this equipment came equipped with a crew, someone had to learn how to use it.....me. It's been interesting, but also frustrating at times. Like the day the new computer died - or the day the laser printer ran out of toner. Things are now well in hand and we're quite happy with the content and appearance of this issue. Hopefully you'll feel the same. Now on to other topics!

Reader Kurt Baty is interested in organizing a coalition to have a mallet, or other articulated loco, built to order by one of the custom builders. If you're interested, write to Kurt at 26 Hill St., Medway MA 02053 - or give him a call at (508) 429-4198.

Our good friend Bob Nowell sent in the following birth announcement to share with SitG readers.

The management of the Coalport Railroad is proud to announce the birth of Miss Randi on Saturday, January 26, 1991. Dr. Steam of the SitG Hospital was the attending physician.

Miss Randi let out her first cry at 3:00 pm. She is 12 1/2" long and weighed 6 lbs. 14 oz. at birth.

During her first few hours of life, there were some problems noted and minor surgery is planned for this coming week.

Late in the afternoon she was taken outside in 25 °F weather with a slight wind blowing. Dr. Steam wanted to see if she would crawl, walk or run. After about 10 minutes, she let out a loud cry and then ran up and down a 2.5% grade (from snowbank to snowbank). She drools too much (steam leak) and she wanted to be fed every ten minutes. We will give her a larger bottle (fuel tank).

After seeing her run and play outside we feel she is going to be a real tomboy. All of us on the Coalport RR are very proud of her and feel she will be a welcome addition to our family.

We would like to thank our friends in Canada, Wales and the U.S. for making this happy event possible, and to Dr. Steam for helping make the delivery so easy and painless.

I hope to get her all dressed up in the next few weeks and have her photo taken and will share these pictures with you.

Bob Nowell.....Coalport RR

By the way, Bob and Judy Nowell have generously offered to play host to the **First Annual Steam in the Garden All Steam Meet**, scheduled to be held on Sunday, May 26th, 1991. Look elsewhere in this issue for more information.

Apologies to contributing editor Larry Lindsay for transposing a few paragraphs in his column in issue #4. The column should have started with the second paragraph in column two.

As always, we're going to run out of space in this issue before we run out of material. Actually, that's a happy thought for your editor, as it means that I have a head start on issue #6!

Please take a minute or two right now and look over the photos in this issue. We think our new scanner does a fine job, but we're very interested in your opinion - after all, you're the reason we're doing all of this. Now.....having looked at the photos, would you like to see a couple of pages in each issue devoted to photos of our favorite subject? If so, please take the time to drop us a note and let us know. And if you have any favorite photos you'd like to see featured, send them along. B&W or color, it doesn't matter. Include a SASE if you'd like them returned.

Happy Steaming!

Steam in the Garden
Magazine
Volume One Number 5

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Steam in the Garden is published bimonthly for $12.00 ($16.00 foreign) per year (6 issues) by Steamchest Publications.

Subscriptions should be sent to Steam in the Garden magazine, P.O. Box 335, Newark Valley NY 13811. Parcels can be mailed to the same address, or sent via UPS to RD 3 Box 147, Newark Valley NY 13811. Phone (607) 642-8119 evenings or weekends, before 10 p.m. Eastern time.

Gazing Into the Fire

by Peter Jones

More Design Considerations For Small Dragons

Following on from last time, it might be a good idea to talk about further aspects of loco design. As ever, with me at least, this is going to be short on formulae. If I've learnt nothing else, I'm now positive that theoretical perfection and practical operation are two different things entirely.

Let's start with springing. In theory it should make locos much better at road holding. There should be a smoother ride. Well, I'm going to be blindly dogmatic and say that most of it is baloney. Like compensated axles, if you need springing to keep your engine running smoothly, then you want to look at your track, not your loco.

The problem seems to be that the adjustment of springing is critical. As you go down the scales, the degree of fineness of adjustment moves on an exponential curve. Down in 16mm scale we should be talking of working to an accuracy of microgrammes in upward pressure to get the proper reward; a degree of accuracy not obtainable other than by chance. I've had identical locos, one sprung and one not, and, seen from a few feet away from the average garden track, there isn't a scrap of difference.

Needless to say, folk who have fitted working suspension will swear blind that it is essential, so I won't be surprised if someone writes in and tells me what a heretic I am.

Likewise, there is a lot of hot air expended over the subject of the flange profile of wheels. Forgive me if I remind you that, in the full size vehicle, the flange never normally touches the rail. It is the coning of the tread which makes the wheel self-centralizing. If the flange kept banging against the rail at 60 mph, it would soon disintegrate.

But down in our sizes the forces just aren't there. If you make the tread flat and the flange with flat faces, the train will stay on the tracks, and, with normal domestic use, will pass down to your grandchildren, still running well.

Now I am going to make a forecast. At some time, someone is going to write in to Steam in the Garden or Garden Railways and suggest that we adopt a standard wheel profile to X, Y and Z dimensions (believe me, we have been this route in the UK ad nauseum). Various replies will come in to the effect that this is a wonderful idea which will probably save mankind.

In reality, things just aren't like that. Manufacturers supply us with a variety of wheels and rail sections. We also have our own likes and dislikes. My pet dislike is the size of LGB flanges - but I'm not going to suggest that the rest of the world abandon them in favour of something finer. Nope - if you have got something that works for you, then stick to it. If your engine keeps falling over - again, suspect your tracklaying.

Another theory that wants exploding is that sprung buffers and/or couplings are a good thing. Yes, they look nice; it is impressive to show off the fact that there is springing there. But I always found it a positive menace. With a loco shuttling merrily along the track, if the springs are soft enough to be of any use, you will find that a chain of horizontal bouncing can build up along the train until the caboose is bouncing all over the place.

Boiler pressure has been a subject of much argument. As you know, the amount of power an engine produces is determined by boiler pressure and the diameter of the cylinders. In model form our locos and loads are far too light, usually. There is a super-abundance of power. My single cylindered Archangel Brick hauled me around in the days when I was a svelte, lovable 140 lbs.

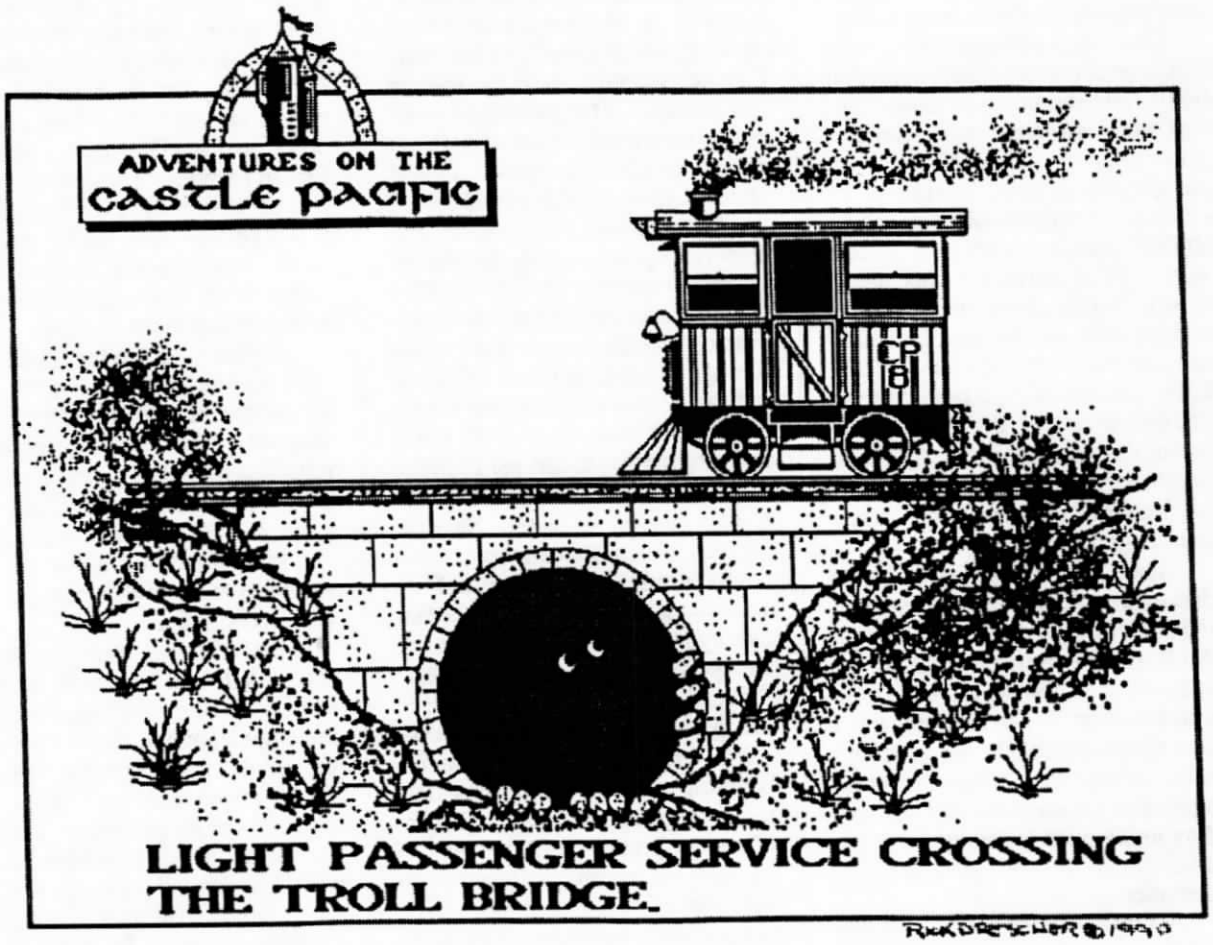
We haul a variety of rolling stock - an ore car can be made of white metal or plastic. We may put together a consist of a couple of light ore cars and a heavy bogie coach. We can rarely put together a train of ten bogie coaches. On several occasions I have had commercial locos which are downright skittish; with full boiler pressure they are difficult to control, and even with a full train behind them they will rush off, flinging the cars to all points of the compass. The inevitable cure is to drop the boiler pressure down to about twenty five pounds. Or in the case of Mamod locos, up the pressure to near that figure.

Actually, lightweight cars are a pest in themselves. If you want an exercise in frustration, try a string of 40 or more little ore cars made from plastic kits. They derail easily, or blow over. Once one is adrift, then the whole lot follows. The engine starts with a jerk and lifts the front car clean off the track in its excitement.

Friends, you see before you someone but a shadow of his former self. Great ambition has been tempered by doing a lot of wrong things. These days I go for the

simple life. The track layout is simple and the trains modest. They run through a pleasing landscape without frequent human intervention. I ask no more.

There was a time when I enjoyed the challenge of the complicated. I reasoned, like so many others, that complicated was obviously better than simple. Nowadays I make the engines simple workmanlike machines. The Compton Down Railway is made up with quite a few features which may look impressive, but when you examine them closely, you see that everything is kept down to workmanlike basics. It is a pleasant surprise to discover that my pleasure is still made up of that same funny mixture of nostalgia, imagination and the rest - and is undimmed.



From the Backshop

by Larry Lindsay

The Sky is Falling!

This quote by the famous philosopher, Chicken Little, reminds us that the reputation of the chicken feed burner system has been sullied yet again, this time by Peter Jones (SitG #4), and I feel that I must spring to its defense. Perhaps it should be renamed "The automatic level control" to give it the legitimacy it deserves. It has long been a part of miniature locomotives and my 1899 copies of the MODEL ENGINEER show that it was in use back then. This is a good time to review how the thing works, and, because I cannot draw chickens, I won't attempt to draw its namesake.

There is a pet watering device that uses a plastic 2 liter soda pop bottle, and the home or office bottled water dispenser works on this same principle. Basically, it is an airtight supply tank; its fittings include a screw down filler cap and a shutoff valve, usually a needle valve. This valve controls meths flow to a sump, or hopper, which is connected to the burners. Incidentally, in the very early days of the hobby, the wick-type burners were known as "lamps", and we can only presume that they were so called because they resembled the domestic lighting used in those days. Ideas, anyone?

As the level in the sump lowers due to the meths being consumed, the end of the air pipe is uncovered. Air flows into the tank, breaking the vacuum and allowing meths to flow into the sump. When the rising level covers the end of the air pipe and shuts off the air, a vacuum forms again and the meths ceases to flow. Any unintended air leaks, however minute, can destroy this automatic operation.

To refill the tank while the engine is in steam, close the shutoff valve before opening the filler cap. The system works in theory, but there are some engineering and design details to be taken care of. There should be a gland on the needle valve. Some time ago I looked over an Archangel engine and was rather surprised to note the lack of a gland on this valve.

Also, some sketches by a contributor to the ***16mm Association***'s newsletter, ***16mm Today***, showed no gland on a tank valve that he had designed, and there was no discussion as to its necessity. Without a gland it may work 9 times out of 10, then air will leak, destroying the vacuum and causing flooding.

The gland is similar to that which is fitted to your water faucet spindle. A gland nut compresses packing, which could be a neoprene O ring, graphite yarn or twisted Teflon tape. The packing is compressed around the spindle just tight enough to allow the spindle to seal and still allow it to be turned easily.

After the tank is assembled and soldered up, it is ready for the all important air test. The needle valve is closed and compressed air is admitted through the air pipe using tubing. The filling cap is closed tightly. If you are using air from a compressor line, be sure to use a regulator. Five to ten psi air pressure is applied and the tank is immersed in a tub of water. Now the slightest leak will be obvious. This is a foolproof way to test assemblies such as tanks and built-up locomotive cylinders and it is used in industry where large weldments and fabrications are similarly immersed in tanks of water and pressure tested.

An interesting fact about meths is that it will leak from a tiny hole that will appear to be watertight (but not under pressure). A burner can be soldered up and will appear to hold water and will be thought to be okay. Later it will be fitted to an engine and there is a tiny leak dripping meths and causing an "unexplained" fire.

The air supply pipe, which controls the level of meths in the sump and runs from the tank to the sump, must be carefully designed. It should be at least 3/16" in diameter and the end of the tube should be beveled at about 30° to the vertical. This increases the effective area of the mouth. If left square, capillary attraction can cause meths to "hang up" at the mouth of the pipe, blocking the flow of air and causing fuel starvation. As well as beveling the end, the opening can be chamfered with a 89° countersink drill to achieve a "bell mouth" effect.

Why use an automatic level control when it would be much simpler to fit a tank between the frames? There is not always space and it's not as easy on an American type engine with open bar frames as opposed to the plate frames used on British engines. The constant level is a definite advantage in terms of boiler performance, and if meths is carried in the tender, the automatic level control means that the fuel can be carried up in the bunker.

We have built over 25 engines with automatic level control, and after some initial teething problems, they have all proved to be perfectly reliable. Although not really as simple to build and test as it would seem, it is well worth the trouble to obtain foolproof operation. And the system is still simpler than a butane gas fired system.

One teething problem was a sump that was not high enough, leading to "flash over" and fire when the engine got hot. By the way, the top of the sump can be enclosed (with just a small air hole) or left open. A minor annoyance is that if the meths tank is overfilled, meths will flow down the air pipe and into the sump, overfilling it. With a little practice this can be used to advantage when filling; a little overflow will just top up the sump. Handy when the fire is about to die due to lack of fuel.

THE STEAMCHEST

by Marc Horovitz

Aster's GER 0-6-0T

Aster has become known for very expensive, highly sophisticated live-steam models, but they have produced a few lower-cost engines. One of these was the GER (Great Eastern Railway) 0-6-0T (Fig. 1).

Built to 1:32 scale to run on gauge 1 track, the engine was first introduced five or six years ago. It was designed for Aster by J. T. Van Riemsdijk, a well-known British model engineer. Mr. Van Riemsdijk had perfected the mechanism on a series of scratchbuilt locomotives he had made for himself some years before.

The GER engine is a kind of hybrid. On one hand, it features Aster's usual attention to detail and clean lines. The body work, though not highly ornamented, is well done. It is nicely painted and lettered, primarily in blue and black. (The engine also came in two other versions, one green and one black - both after French prototypes.)

On the other hand, the mechanism is about as simple as it can be; one single-acting oscillator driving the forward axle through a 4:1 reduction gear. Reversing is accomplished through a rotary valve similar to the one used on Mamod locos. It is attached to the distribution block, opposite the cylinder (see Fig. 2).

Control of the locomotive is via a single lever in the cab (see Fig. 3). Center position is OFF, and forward and reverse are accomplished by moving the lever either way. Speed is controlled by the distance the lever is moved - the further away from the center OFF position, the higher the speed. Since the engine has only one single-acting cylinder, starting must always be assisted by a push in the appropriate direction. Radio control is out of the question.

As a kit, the engine was difficult to build and fine-tune. Certain fits were tight, and some fine filing was necessary to get everything to go together properly. Once the engine was built, the problems were still not over. The engine had several bad habits. One of these was that the fuel (alcohol) inlet tube, located behind the cab in the coal bunker, would ignite when the engine got hot. Since an alcohol fire is virtually invisible in daylight, my only clue to this phenomenon came when I tried to start the engine and all the hair was immediately burned off my knuckles. If it happened while the engine was running, I could tell by the paint on the back of the cab turning brown.

The solution to this problem was simple enough. I merely added an

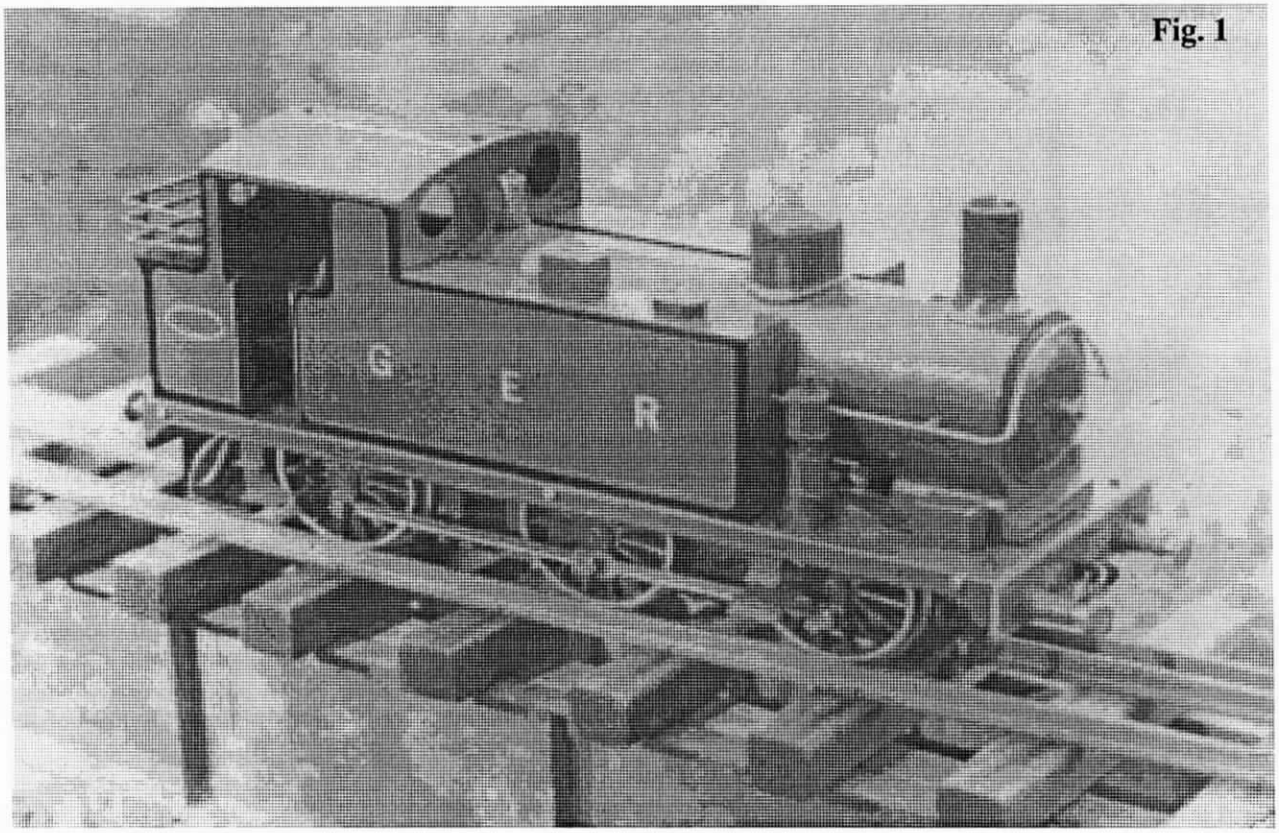


Fig. 1

extension tube to bring the outlet above and away from the burner. It can just be seen behind the cab roof in the photo. Even if it does catch fire (which it hasn't so far), no harm will be done.

Another quirk this engine exhibited was a looseness of the wheels on the axles. This was exacerbated when the engine was hot. The wheels - a zinc alloy - evidently expanded at a greater rate than the axles, becoming quite loose at times. One day when I was running it for some visiting dignitaries, the thing seized up in mid-stride and slid to an abrupt halt. The problem wasn't difficult to diagnose - one of the side rods was at a 30° angle. The only good solution to this problem was to pin the wheels to the axle, which I did. Problem solved.

The control lever in the cab had a little handle soldered to it. This was a handy device until it fell off. The cab becomes quite hot, and the soldered handle suffers. Solution: Leave the handle off.

Adjusting the gears on this engine is critical. If the mesh is too tight, the resulting bind will be enough to prevent the locomotive from running. You should be able to push it across a table, with the wheels rolling, when cold.

The engine is provided with a pot boiler, and I've heard of several

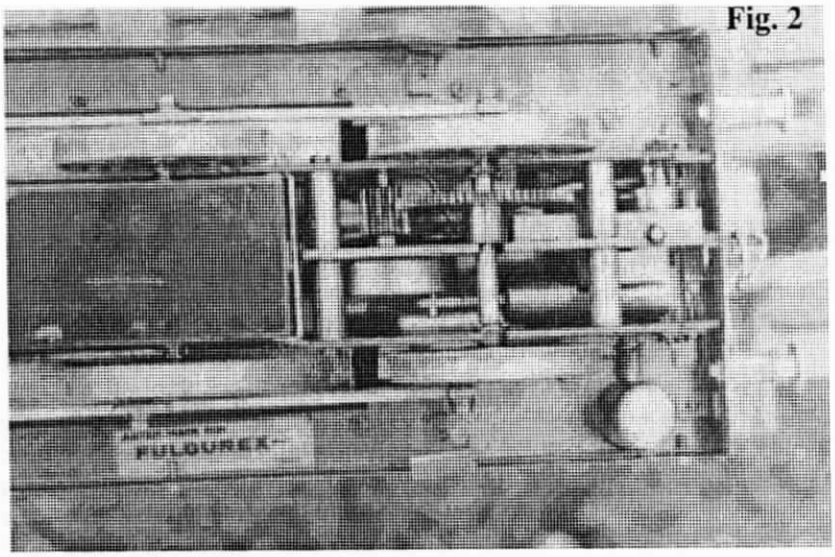


Fig. 2

of these (including mine) that leaked. The steam pipe exits the boiler at the bottom, right in the middle and over the flame. It is soft-soldered into the boiler, and should you have the misfortune of letting the boiler run dry (no excuse - the engine has a water glass!), this solder will surely melt. If it does, the boiler must be removed, the paint and gunk cleaned off the steam pipe, and the joint resoldered. Since the original joint was soft soldered, there is no point in trying to silver solder it. It must be re-soft-soldered.

Once the copper steam line leaves the boiler, it is connected to a silicone- rubber line that leads to the cylinder. From this line is a "T", with another line (also silicone) leading to the lubricator. The lubricator line has been okay, but the silicone steam line has been no end of trouble. The silicone tubing is rather fragile and subject to injury. The slightest fault causes it to fail (usually in front of a crowd). I tried a variety of different plastic and rubber replacement tubes without success. One just melted. Another looked like it would work, and indeed, the engine ran quite well with it for awhile, but all of a sudden there was a loud explosion followed by a distinct hissing noise, at which point the engine ground to a halt. The plastic tube had blown up like a balloon and finally ruptured.....all very dramatic.

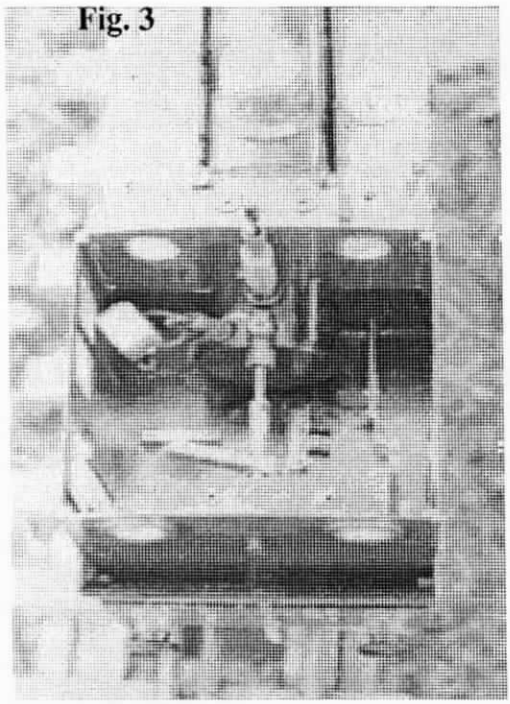


Fig. 3

I finally disassembled the engine and replaced the silicone tubing with copper. Because of the way the locomotive is designed, replacing the lubricator line would have been nearly impossible, so I have lived with it. Since that time there has been no further trouble.

Now this may sound like a tale of woe, but the Aster GER is pretty high on my list of favorite engines. Aesthetically it is very attractive. Even though it is Japanese built, it is of classic British design in many ways. When all the bugs are worked out of it, it is an excellent runner, and will pull a respectable train at a realistic speed. Since the single-acting oscillator is geared to the axle via a 4:1 transmission, the proper number of exhaust beats can be heard. The engine exhausts at the stack, and steam effects are good. It has a blind center axle, letting it negotiate relatively tight curves. Its simple mechanism makes it easy to work on when maintenance is required.

When the engine first appeared, it could be had for under $500 in kit form, though the price has gone up since those days. If you are lucky, you may still find a kit around. Otherwise, keep your eye on the secondhand market. It's an engine worth considering, and it's a pity that Aster doesn't make more locomotives along the lines of this one.

Weedy Side Tracks

by Fred Kuehl

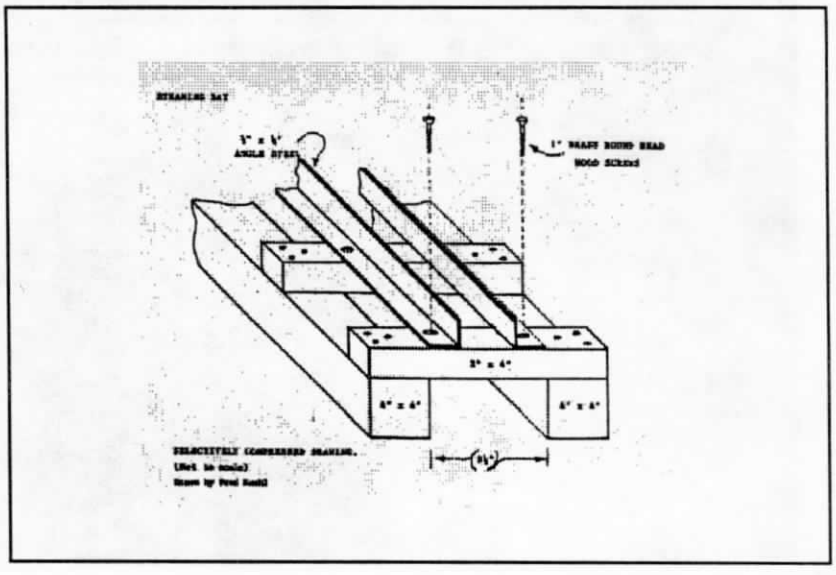
Steaming Bays

I am a traditionalist when it comes to operating live steam locomotives. I like all the pomp and circumstance of the pre-run preparations that are required before the throttle is cracked and the locomotive eases out of the yards and onto the main line. I take the position that live steam locomotives should have a place where they are cared for, both indoors and on the garden railway. During the early days of construction of my Stoney River R.R., an old picnic table was used for the outdoor care, steaming and wipe down of the lines' steam locomotives. During an operating session, this table quickly became a clutter of tool boxes, locomotives, water and methanol jugs, butane gas cans, rags, steam and lube oil bottles, water syringes and I don't know what all. When locos were being steamed up, safety valves would lift, spraying everything on the table with water and steam oil even if they didn't want to be sprayed. The table also had to be near the track. As a result, it often showed up prominently in photographs of the locomotive servicing facilities, which created a rather disturbing background. The whole situation seemed undignified and I was getting nervous about carrying hot locomotives between the track and table. The risk of dropping one was always in mind. At times, I would be caught carrying a loco that had a grouchy safety valve. It seemed to prefer to spray me rather than the table. Something had to be done.

While I like to take a casual approach to garden railroading, I prefer to follow prototype practices when it is feasible and compatible with nature to do so. With this in mind, I decided to incorporate the hands-on affair of pre-run and post-run locomotive servicing into a prototypical setting on the Stoney River Railroad. Prototype steam powered railways perform general engine servicing at their main shops, where water tanks, water columns, coal, oil and sanding towers, grease and lubricating oil sheds, ash pits and crew shacks are located. Within these facilities there was always a designated track where locomotives were steamed up, serviced and made ready for the road. This gave me a prototypical and practical reason to install a steaming bay as part of the Stoney River Railroad's locomotive shop and servicing facilities at Springfield. Except for a hand operated trackside water pump, everything in the locomotive shop area was there for scenic or cosmetic effect. The steaming bay, however, would add purpose to the area and the structure itself would be functional.

I didn't want to interrupt train operations in the locomotive shop area while engines were being serviced, so I put a switch in ahead of all others that led to the engine house and coaling tracks. From this switch, I ran a separate siding past the engine house and car shop, over to where the steaming bay would be located. Once this siding was in place, I took the time to do a little research on steaming bays. I found that steaming bays were quite simple to make and that they could be as plain or complex as their builder desired. Since a steaming bay is a place of hands-on activity, I decided not to get too fancy with mine and chose to build a simple structure that would have enough bulk to withstand nature, and, at the same time do its job and not overpower the area scenically.

During my research, I noticed that many steaming bays were very short and only one locomotive at a time could be serviced, so I designed mine to hold three in the steaming-up process and one in the process of being wiped down and retired for the moment or for the day. My steaming bay was located under trees that



provide all day shade, and I positioned it so that it was accessible from both sides so that at least two operators could tend to their locomotives at the same time. This is a distinct advantage when double or triple heading locomotives for a heavy train, since they all have to be steamed up at the same time! There is always room for a friend to help out or get involved if his or her locomotives are part of the loco consist.

I wanted the steaming bay to be sturdy and resistant to an occasional kick from a foot or pressure from elbows and knees that may come in contact with it, so I decided to build it out of pressure treated 4"x4" and 2"x4" lumber, heavy gauge nails, 1" brass round head wood screws and 1/2"x1/2" 90° angle steel. All the materials were easily obtained from a local building supply house and hardware store. It took but a single morning to cut up the materials, drill out the rails, assemble the steaming bay and install it on the railroad. The drawing shows how the structure went together and how it looks when finished.

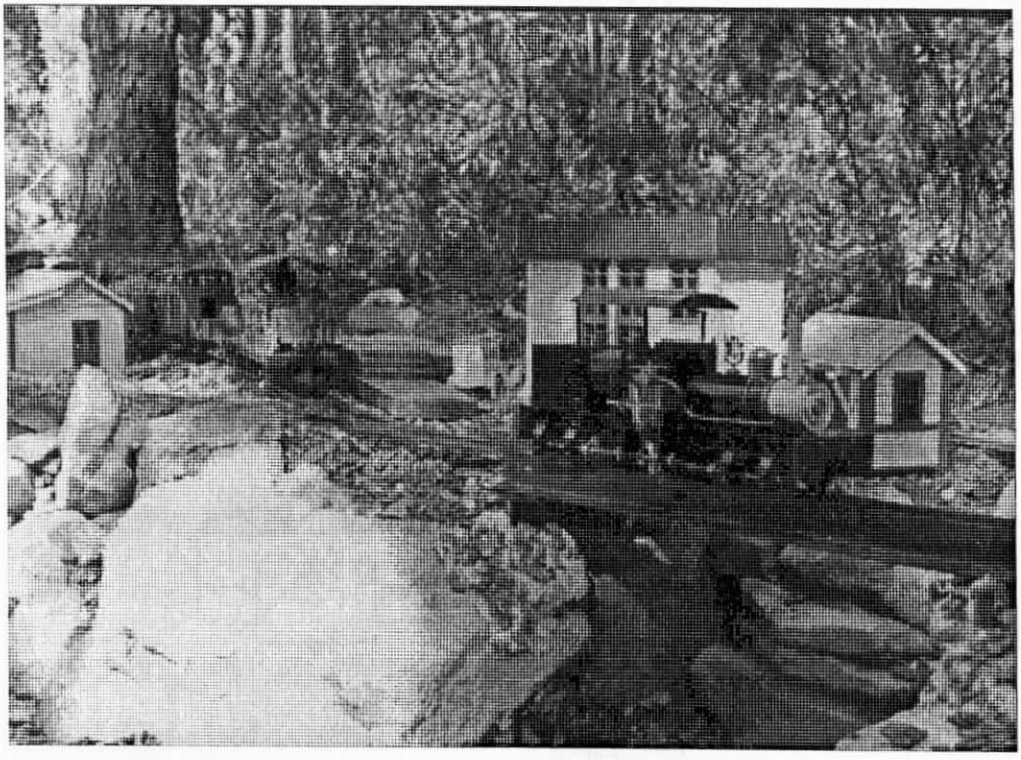
Making the parts was simple. The 4x4's were cut to a length of 52" and spaced 8 1/2" apart. Next, four 2x4's were cut to fit across the 4x4's as shown in the drawing. They were spaced out evenly over the 52" length of the 4x4's and nailed down, making sure everything was square in the process.

The 90° angle steel is used for the rails on the steaming bay. Two rails were cut into 52" lengths, and, after center lines were drawn on the 2x4's, the rails were placed evenly on the frame and the center lines transferred to the foot of the rails with a pencil. Holes that would clear the 1" long brass roundhead wood screws were then drilled through the angle steel rails where the pencil lines were. Rails were brought into gauge (45mm in my case) and screwed to the 2x4's. I used 1" brass wood screws for a good bite into the wood and a secure locking force when tightened. All the wood was treated with Thompson's Water Seal® and the steaming bay was installed on the railroad that same morning.

My steaming bay has been in place for five years now, and it is as strong and square as the day it was made. It stands 12" off the ground and there is a nice, long mirror underneath for keeping watch over methanol burners, pesky spiders and caterpillars. The old picnic table became history and the Stoney River Railroad has a more dignified place where locomotives are serviced. Over the years, the steaming bay has taken on a pleasantly rustic and well-used look. Drops of steam and lubricating oil add to the overall effect, and the kerosene which I use to wipe down locomotives and degrease bearings and valve gear after operating sessions add a locomotive shop aroma (Sigh...!).

Actually, the steaming bay became one of the highlights of the railway and a favorite spot for shutter bugs and camcorder buffs to record the interesting and exciting hands-on activities of live steam garden railroading. I like watching several locomotives sitting up on the steaming bay - hissing, bubbling and blowing off steam as they wait for their trains. I think that spectators get a kick out of it, too. Since it's mid-winter, now would be a good time to design a steaming bay for your garden railway, then get into your shop and start building it. This way it will be ready to install when Spring arrives. It will make for a nice cabin fever break-out project!

See you in the Spring! I'll be down the track a ways.....just over there on that weedy side track.



A Lindsay Shay passes over the Coalport Railway's steaming bay in Jim Thorpe, PA.

Photo by Bob Nowell.

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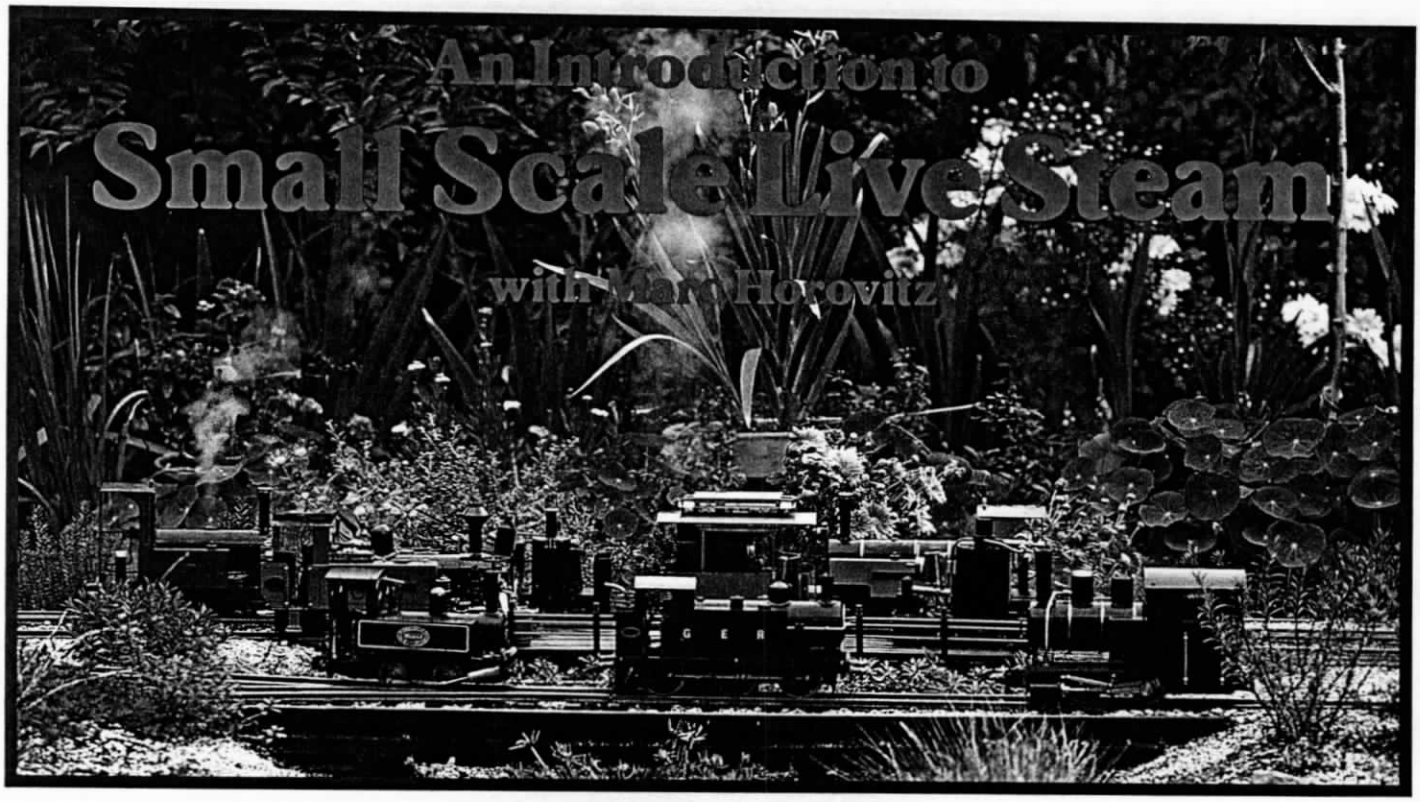

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Basic Tinplate Work

by Murray Wilson

Steam in the Garden readers are possibly the last remaining group in the USA likely to have any interest in working with light gauge sheet metal. If a steam loco needs a new cab, or a Mamod a tender, then sheet metal is probably what will be used.

Tinplate is the natural choice. It's difficult to find in large sheets, so usually has to be reclaimed from tin cans. One gallon cans are ideal, but smaller ones are useful too. Alternatively, brass or steel shim stock can be bought. For steel, .010" thickness is adequate, for brass, .015" is preferable.

For simple work only a few special tools are needed in addition to those the typical workshop will already contain. They are: straight tin snips, scriber, center drills & a nibbler (Radio Shack part no. 64-823A).

Tin snips are not used much, as they distort the metal. Most straight cuts are made with the modified piece of hacksaw blade shown in the sketch. A knife edge is ground on the last couple of teeth at one end and the tool is held like a pen. Where a straight cut is to be made, the line of the cut is deeply scored with the tool until the line is visible on the reverse side. Then, holding the piece in a vise if possible, the metal is flexed until it breaks along the scored line.

Curves can be cut with the nibbler, or perforated and fatigued, or cut with the snips. Perforation holes are drilled with a center drill. The advantage of this type of drill is that it does not flex or wander and usually does not require a punch mark. Unlike straight cuts, curves usually have to be filed to the final line.

When making a pair of parts it is normally convenient to solder them together while shaping so they are identical. Cut-outs such as cab windows are made with the nibbler, or with the center drill and files.

Marking out what is to be cut from the sheet is done with the scriber. Painting the sheet first with Dykem marking out lacquer will make the scribed lines more visible. A thin coat of flat black paint works almost as well if Dykem is not available.

Design is outside the scope of this article, but it is similar to the design of cardboard models. In fact, if in doubt about how to do something, try it in stiff paper first. Flares, cones etc. require extra knowledge. Most libraries have books explaining this geometry.

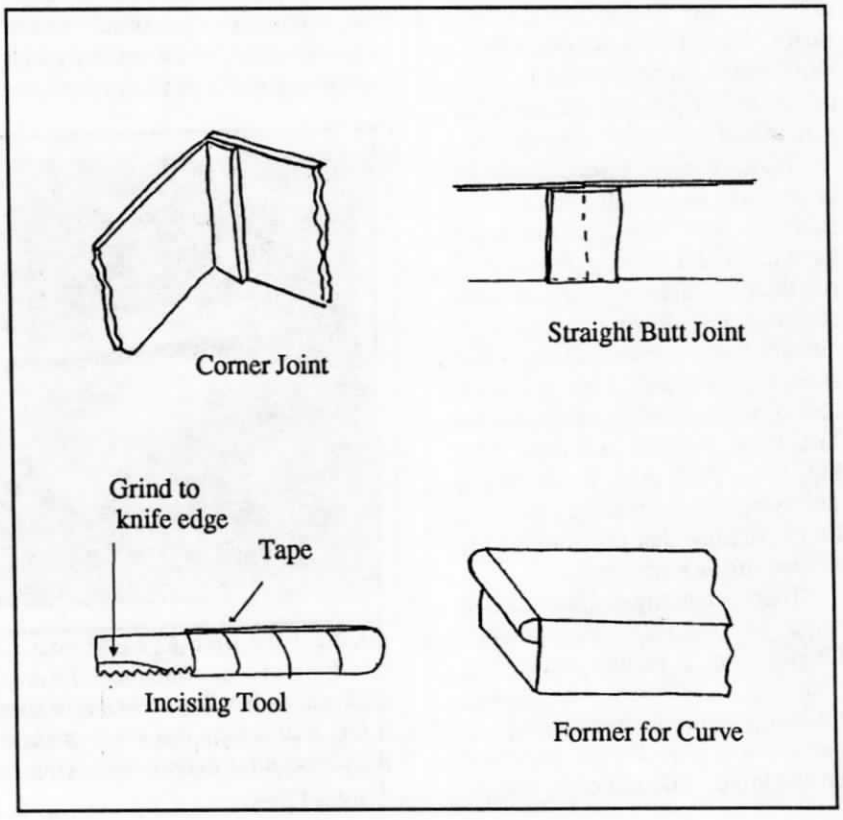
Assemblies are put together mainly with solder, and perhaps a few mechanical fasteners, too. Soldered butt joints are not satisfactory. At the corners there must be a flange and in flat expanses there must be a splice plate or doubler.

Wire or half round strip can be used for edge reinforcement or appearance improvement. Half round is not always available, but the solder fillet makes round wire's appearance satisfactory.

When soldering up an assembly it sometimes helps to use temporary formers to hold alignment. Tacking with solder before soldering the full length of any joint will help to ensure that twists are not built into an assembly.

Bends or curves in the tinplate are made with the aid of wooden formers, or in the vise. Sharp bends should not be hammered in, it is better to "iron" them in with a steel block such as a piece of key steel.

Tinplate is inexpensive, so if a piece or assembly is not quite right it should be discarded. In this way, satisfyingly good items can be made by any modeler at the cost of only a few pennies - and a few minor nicks on the fingers.



An Inclination to Play Trains

by Richard Rees

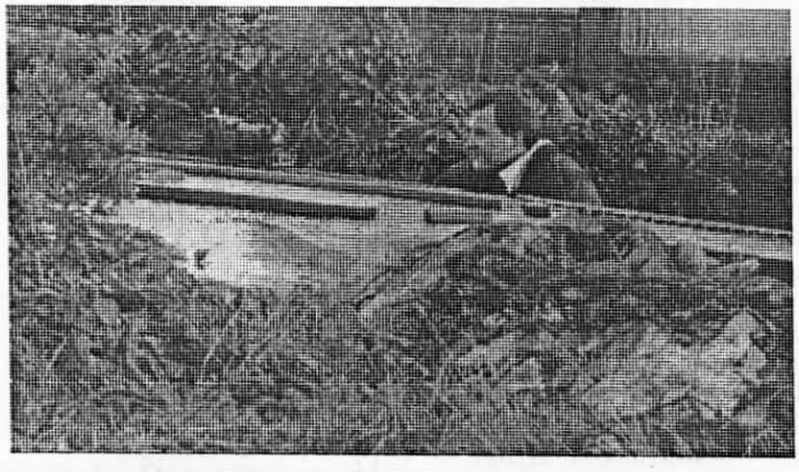
Planning a Garden Railway For Live Steam Power

We come to this hobby of small scale live steam from different directions. There is the model engineer who, for various reasons, may want to get involved with the smaller scales. Perhaps he is getting on in years and finds it increasingly difficult to manhandle his 5" gauge loco into the back of his car, or maybe he doesn't want to spend the years it takes to build a loco of that size before being able to enjoy its many delights. On the other side there is the railway modeller who might be fed up with his indoor "electric mice" and wants to partake of the experience of hauling his trains the way God intended - with steam. I don't think for one minute that these instances cover every last one of us, but I believe that it is a fair generalization for the majority of us.

Which ever way we come to be interested in small scale live steamers, if we want them to run, we have to build a railway on which to run them. Unless of course there is someone just down the road who already has a garden railway. But even then we each have our own idea of what a garden line should be like, what practice to follow, how big, etc.. And there is something satisfying about creating your own bit of paradise that previously only existed inside your head.

There are many skills needed in order to transform your mental Utopia into a reality: surveying, planning, carpentry, gardening, building, painting, engineering - to name just a few. I'll put my cards on the table. I do not enjoy any of these, I just like playing trains. So building the line and making the models, as far as I am concerned, are just means to an end. Not that I could easily make a steam loco that worked. I leave that bit to the experts - making rolling stock is as far as I will go in that direction. As my enjoyment comes from driving the trains, I have put much thought into laying out my line for the enjoyment of the driver. I would like to make operation easy and problem-free - not only for myself, but also for the visiting driver so that he will want to come again.

Now there seems to be a belief that manually controlled steam locos can only run on perfectly flat track and that if you want your loco to negotiate any gradients then it has to be fitted with radio control. I can understand the reasoning behind this. The idea of constantly chasing one's train and altering the throttle setting every few seconds can be off-putting. If the line is laid out without much thought for manual control, this can be the case. But it need not be that way. I prefer to run manually controlled engines, the main reason being that a box of electronics seems to me out of place in a machine belonging to the steam age, and controlling the loco by means of a "magic box" seems one step away from two wires connected to the track and electric mice. But don't get me wrong - that is just my personal preference. I know R/C is



Here I have tried to show how I have made my station, where much handling of locos and stock takes place, easy to work. The whole length of this area is within reach of a standing person. Crouching or sitting on a low seat brings the eye to train level. Since these photos were taken, platforms have been constructed and trackwork is being laid. **Photo by John Giles.**

This is a stretch of level trackwork where a train can chuff along unattended. Although it is at ground level, the loco is still within fairly easy reach if the need arises to intervene. This is because the natural slope of the land has been used to its best advantage. **Photo by John Giles.**

popular.....any such visiting loco is welcome on my line, and if I had a daughter I wouldn't prevent her from marrying a chap simply because he drove an R/C loco.

In planning my railway I decided that laying the trackbed would be very carefully engineered so that the level sections would be absolutely flat and so that the grades would be even and constant. The number of hills to climb would be kept small (one up and one down, as it turned out) and therefore the number of transition points between level and grade would also be kept to a minimum - for it is at these places that the intervening hand opens or closes the regulator. This brings me to the subject of access to the track. All the length of the trackbed should be accessible without having to cause damage to plants, structures, trains or oneself. A twig, a leaf or even insects can stop or derail a train anywhere, and to know that without great difficulty you can get at a loco in distress helps to sustain peace of mind.

I have planned my line so that I can start a train from the terminus and, with a little experience and knowledge of the loco, I can set the throttle so that the train chugs off at a gentle pace along the level. The track takes the train on a wide curve while I walk in a straight line to the place at the foot of the climb where I know I will have to open up the regulator. This is at one of the key access points along the trackbed. These key access points are positioned at the foot and at the head of each grade. Although all parts of the line should be reasonably accessible, these key places should be arranged to bring the loco within easy reach of the hand and to avoid as much as possible any bending over or crouching. It is therefore good if it can be arranged for the line to be raised here - perhaps on a low wall, or to cut away a part of the ground where the driver will be standing, or a combination of both in order to provide the driver with ease of control. Careful use of the natural contours of the garden (if you are lucky enough to have them) can possibly provide opportunities for such arrangements without an excess of backbreaking landscaping.

As the train approaches its climb, the regulator can be opened up. It doesn't take long to get to know just how much more steam is needed to tackle the hill, and if the grade is constant all the way up, then the loco shouldn't need any more adjustment until it reaches the summit and the next key access point.

The section of line that I am constructing at the moment is based on the Darjeeling Himalayan Railway, which abounds in spiral loops and reversing zig-zags in order to gain altitude. On my line, the first hill to climb takes the train around a copy of the double loop at Batasia, near the summit of the D.H.R.. The train goes around two loops while I walk a shorter distance than the train travels to the next key access point, where I can close down the throttle where the track levels out.

So my way of making a happy marriage between manual control steamers and railways with grades is to keep the grades constant and the levels flat, identify the trackside positions where access is vital and make them comfortable to use, and lastly, make the train travel further than the driver has to walk between these positions so that he is not racing it.

My previous garden railway, which was never completed due to a move, did not have any level track at all. I only had a very small part of the garden that I could use for the line. So, in order to give myself something like a decent length of run, I had to lay the track around the available area twice, crossing over itself once. This gave me a summit on top of the bridge where the track crossed over itself. The track descended from the bridge in both directions until it reached the lowest point on the line which was immediately under the same bridge. To drive my trains on this line I had only to stand by the bridge where I could close the regulator as the train crossed over and then, after the train had circuited the garden once, open up the regulator as it dived under the bridge and began its climb again.

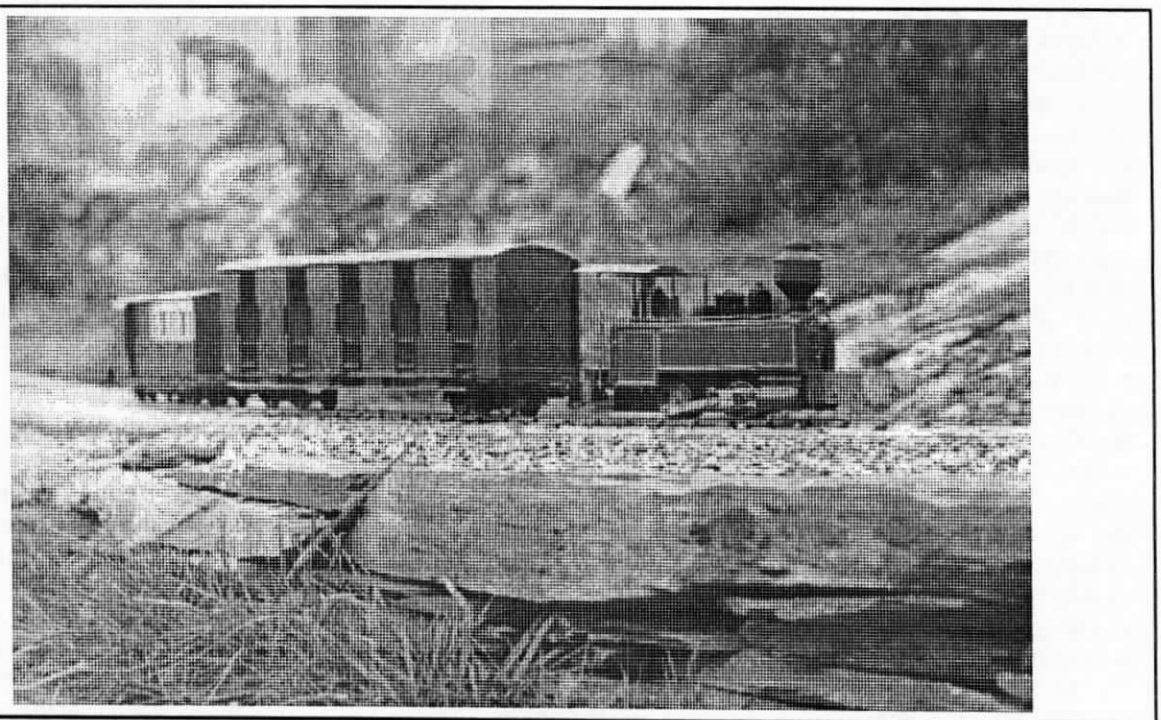
The grade was a steady 1 in 55. My Roundhouse loco could cope with the climb without any trouble, as could my unmodified Mamod, but that was one of the early production models, built before their quality went downhill. Not only could my locos climb this grade, but they could also take the downgrade

under control without running away. It does take a little practice to get to know just the right setting for the regulator when descending a grade. Of course, the margin between stalling the train and having it run away gets narrower as the grade increases. Deryck Goodall tells me that a loco should not tend to run away downhill if the cylinders are properly made with correctly fitted O-rings. It is a good idea, before planning a railway, to try out the engines that are to be used on various grades to see how they perform both climbing and descending. Some track can be laid on a long plank, which can then be propped up at one end at various heights to give a range of test grades.

Before I started construction of my present line, I tried one of my Mamod locos that had been through Deryck's works. It pulled away from rest with two wooden bodied bogie coaches up a 1 in 20! As this was far in excess of the grades that I planned to use, I knew that I could then go ahead with the intended route. It has to be remembered that with a very extensive climb, a pot-boilered engine may run short of steam (this goes for R/C locos too). With a gas-fired loco the heat can be turned up to cope with the demand for more steam at the same time that the regulator is opened. With a spirit fired loco it may be necessary to set the wicks to give a bigger flame which means that we may have to put up with excess steam blowing off when running on the level. But I think that will only be the case if there is a very long climb to handle.

My first garden railway did not take too long to build as it was all at ground level. This type of line can look very effective and doesn't need as much construction work as one built on a supporting structure or built-up earthworks. But a ground level line is not good for the back. Even if you use only R/C locos, there are times when you have to get down to their level. Shunting, making up trains and servicing the engine are all made easier and much more pleasurable if they are not done at the level of the feet. Even if it means digging a pit to stand in (don't forget to provide for drainage), it is worth making stations and loco servicing areas at a reasonable working height.

Well, these have been some of my thoughts on the planning of a garden railway for steam powered locomotives. Of course there are many factors which dictate how anyone's line will turn out. The potential garden railwayman usually has a strong idea of what he wishes to recreate in miniature, and however many "do's" and "don'ts" are cited, in the end it all comes down to the raw material one has to work with - the garden. Each one is different from the next, and its shape, size, contours, existing flora, etc. will all have an influence on the outcome. Consequently, it is usually best to try to utilize its features for the best effect. Before I have got into the basic planning stage, I have just gone out into the garden, sat down and soaked up the atmosphere of the place and let my mind run riot with all the possible track formations and alignments. Eventually one scheme rises to the surface and then it is time to get out the spirit level, tape measure, paper and pencil. Good luck to you all!



Look closely - this is a Mamod. The waggling cylinders are hidden behind dummy cylinders, slidebars and crossheads. This is the loco that took part in the gradient trials mentioned in the text. The train shown is the test train. No doubt when the train reaches its destination, the driver will set off back down the line to see if he can find the front coupling! Loco by Mamod, re-engineered by Deryck Goodall, cosmetic surgery by David John. **Photo by Richard Rees.**

Radio Controlling Your Steam Loco

by Ron Brown

A decision that many of us are faced with when we get our first live steam loco is whether we want to operate it under manual (hands-on) control or fit it with radio control. Both methods have their advantages and disadvantages, and if you've been a regular reader of SitG you have already heard from both sides. The purpose of this article isn't to continue this debate, but rather to discuss the installation of radio control in a live steam locomotive for those that have made their decision and want to give R/C a try.

I'll just offer this brief explanation for those that may not have seen any of the discussions pro/con on radio control. If you have a ground level garden railway - and especially if you have any grades exceeding 1% - radio control of live steam locomotives is a fine idea. If you have a raised railway (waist high or higher) that is dead flat (no grades), then you may want to consider manual control. Advocates of manual control of live steamers maintain that this method of control is more satisfying, as it keeps the loco driver in close contact with his/her loco.

My reasons for choosing to try R/C were many. Since the early 50's I've been involved with radio control in airplanes, cars, boats and anything else that was large enough to carry the necessary equipment. I've also been an avid model railroader for a good part of that time, but the tiny HOn3, Sn3 and On3 locomotives I was using then just weren't large enough to accomodate the radio equipment available at that time.

Having had a taste of the freedom of movement that R/C allows, I leaped at the chance to try it in a large scale model railroad setting. Another reason was that our Silo Falls Scenic Railway is at ground level (ankle level in the higher places), and has some steep grades that make throttle setting changes absolutely necessary in order to avoid stalls on the upgrade and suicidal, supersonic fireballs vaulting into the bushes at the bottom of the downgrades. This would not go over well with the SFSR's landscaping supervisor!

The first experience with R/C in a live steam loco came when I purchased my first live steamer - a Roundhouse Charles Pooter. The Pooter R/C setup worked reasonably well, although glitching was not unknown. Being brand new to live steam and not knowing what to expect (or what I was doing), I overlooked the glitches in my fascination with the steam experience itself.

Not long after Pooter arrived, a good buy on a Maxwell Hemmens Porter kit presented itself. This loco proved to be an excellent steamer of very high quality - but capable of speeds that could make it difficult to operate with manual control on our garden railway. The solution was obvious - fit it with R/C.

We don't have a good local train shop, but the airplane, car and boat enthusiasts are much more fortunate. At their well equipped shop I found a 2-channel radio of the 2-stick variety. There are many good brands of radio control sets. I prefer the Futaba brand, which costs about $50, including everything you need except batteries.

Batteries are a whole subject unto themselves, but suffice it to say that you can use dry batteries (preferably the alkaline engergizer variety) or rechargeable Nicad batteries.

The receiver and batteries fit neatly into the tender, but the standard servo (the Porter only needed one servo, as it uses a rotary valve for both direction and speed control) was too bulky to fit neatly in the cab. Fortunately, Futaba makes servos in many sizes and shapes, and I found a mini- servo that worked out very well.

I didn't want to make any permanent modifications to the Porter, just in case it should ever be returned to manual control. So I used a razor saw to remove the mounting lugs from both ends of the servo, then applied double-sided foam tape (the kind the R/C airplane guys use to mount servos) to the bottom and the end nearest the servo output arm.

The servo was then mounted transversely in the cab, with the output arm closest to the right side of the cab. The double-sided tape firmly holds the servo to the cab floor and the inside of the cab on the engineer's side. This stabilized the servo nicely and positioned the output arm right in line with the throttle/direction lever.

Borrowing another piece of hardware from the model airplane rack, I mounted a swiveling aileron

horn on the throttle/direction lever and attached it to the servo arm with a piece of stiff brass wire.

Trial and error adjustments determined the position of the horn on the lever and the best hole in the servo arm to match up the throw for maximum throttle movement in both directions. With so little space between the servo arm and the throttle lever, there was no room for a threaded clevis for adjustments. A 90° bend at each end of the brass wire and a wheel collar to secure it to throttle arm and servo arm took care of keeping the wire in position, and a "V" bend at midspan in the wire was used to give me a method of adjustment so that the throttle lever would be in the OFF position when the servo output arm was in the neutral or center position.

Let me move off on a tangent at this point and talk about a couple of minor modifications that I like to make on my transmitters to enhance the operation. As furnished by the manufacturer, the control sticks on the transmitter are spring-loaded to the center - or neutral - position. For controlling the moveable surfaces on an airplane or the steering on a car, this makes sense. For controlling the throttle or direction on a locomotive, it becomes awkward and unwieldy.

Removing the back of the transmitter is a simple task, involving only a few screws. With the back off, the stick gimbals and other innards are easily seen. I remove the centering springs and their mounts from the stick gimbals, then attach a ratchet plate that can be purchased for a few cents (or made from thin metal stock if not readily available). This gives the control stick a satisfactory ratchety click....click....click as you move it up and down. The loco driver quickly learns how many clicks each loco takes to pull a grade or to brake for a downgrade.

The other transmitter modification is even easier. I replace the long, telescoping antenna with a base-loaded flexible whip designed for use by the R/C car racers. It furnishes more than adequate range for our use, and it eliminates the long, awkward, eye-poking telescoping antenna that comes as standard equipment on most transmitters. This is mostly a screw-in replacement, although on some transmitters it may be necessary to enlarge the hole in the transmitter case that the antenna passes through.

When you're purchasing radio control equipment to use on your locomotives, don't forget that the Federal Communications Commission has established specific frequencies for use on the ground (trains, cars, boats) and others for use in the air (helicopters, aircraft). Your hobby dealer can advise you on the proper frequencies for ground operation.

Now let's get back to our little Porter and its newly fitted R/C gear! As mentioned in an earlier paragraph, the receiver, batteries and switch all fit nicely inside the tender, under the removeable wood load and out of sight.

The first runs were not encouraging. The radio worked great with the loco on the bench or sitting cold on the track. The servo tracked smoothly and was completely glitch-free, even when I took the transmitter and moved away 100' or more. But under steam it was a different story altogether. As soon as the loco began to move, the servo arm - and attached throttle/direction lever - began to jitter and jump. Speed changes and violent direction changes were the norm. This was obviously unacceptable.

Having had a lot of experience with R/C since the early 1950's - and a lot of antenna and RF experience in the course of my job - I had a pretty good idea about the source of the problem. Metal-to-metal contact has always been a demon for R/C, causing problems ranging from minor glitching to total loss of control. Unfortunately, there's no getting away from the RF noise generated by metal-to-metal when dealing with a small steam locomotive, so we must deal with this problem in other ways.

There are plenty of other sources of trouble for radio control in the garden besides the metal to metal problem. If your railway is located close by a metal shed or mobile home, reflected radio signals can confuse your receiver, causing it to send erratic signals to the servo. Large rocks or tunnels can blank the signal when the train disappears from sight, causing temporary loss of control.

Before you call the movers to haul your mother-in-law's mobile home away, let's take a look at what you can do with your equipment. The first and most effective change that can be made to overcome these gremlins is to the receiving antenna. On most commercial locomotives with factory installed R/C, the receiver antenna is either wadded up and stuffed inside the tender, or, if the loco is one of the tenderless variety, stuffed inside the cab or attached to a piece of metal on the engine, such as a false roof vent.

With all this metal around the receiver antenna, it loses most of its effectiveness and provides a very weak signal to the receiver. This leads to the dreaded GLITCH, or even temporary loss of control.

My fix for this is to replace the standard receiver antenna wire with a base loaded vertical whip antenna - another product developed for use on R/C model cars, boats and helicopters. And if you think we've got problems with metal to metal noise, take a look at a model helicopter sometime and you'll feel much better. At least we don't have to contend with having our locomotives several hundred feet in the air when the glitch monster attacks!

The base loading on the vertical whip antenna fools the receiver into thinking that an antenna of optimum tuned length is fitted, while allowing the use of an antenna only a few inches long. The antenna is best fitted as far from any significant metal mass as possible, although it will provide improved reception even when attached to a metal locomotive or tender body.

For those that find a visible antenna wire on a locomotive or tender offensive, it could also be hidden away inside a plastic or wooden boxcar, gondola, coach or whatever. It works best if oriented vertically, but will also work well enough in the horizontal plane.

The antennas that I use are made by Deans, cost about $9.00 and come in two choices of mounting styles - bolt on and stick on. I've used the stick-on variety so that I don't have to drill any mounting holes in my beloved locomotives. Also because this allows me to move the antenna around to different places on the loco or tender to find the location for best reception.

So far I have used the base loaded vertical whip antenna on 3 locomotives in the SFSR's engine shed, and all three have been totally cured of glitching with this method.

It's also worth mentioning that this extends the useable range of the radio by more than enough for our needs. I like to walk along with my trains as they're running, but if the need arises I can maintain full control from one end of the yard to the other.

Other methods of eliminating the dreaded glitch that have been tried and found wanting are bonding the rails together and to ground, changing frequencies (this did help a bit on one loco, but I had to make a drastic switch, all the way from 75 mhz to 27 mhz) and shielding the receiver and servo wires. There are more sophisticated radios (FM and PCM systems built by several of the radio manufacturers) that will help to eliminate interference, but they are very expensive and, to the best of my knowledge, aren't available on the ground-based frequencies that we can legally use.

That's it then. You can have radio control of your steam locomotives without having to sell your firstborn into slavery to afford it - or hire a rocket scientist to install it. It's an affordable, easily installed, reliable method of control - particularly useful for those with ground level railways or for railways with steep grades. Give it a try and let us know how it works for you.

STEAM-IN!

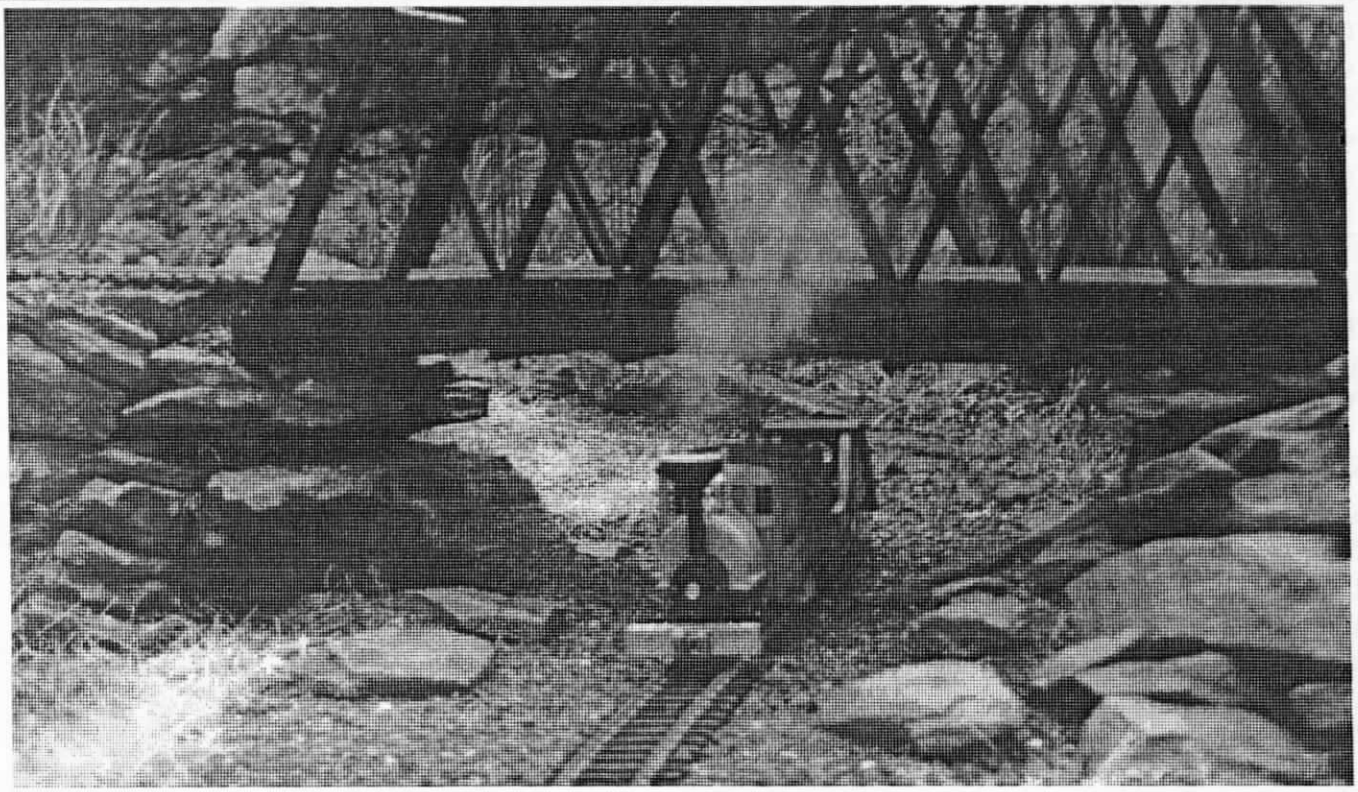
May 26, 1991
11 a.m. til ??
Light lunch & dinner served

An all-steam garden railway meet, sponsored by *Steam in the Garden* magazine and hosted by Bob & Judy Nowell on their Coalport Railroad in Jim Thorpe, Pennsylvania.

The Coalport RR consists of 300' of LGB track with LGB wide radius curves. There is a dead-level 150' loop and a mainline with a 2.5% grade (the grade may be removed before May 26th). The railway can easily handle 2 or 3 trains running simultaneously. There is also a steaming bay (see photo this issue) and train storage tracks.

Send SASE for details & map. Limited parking available for motor homes, campers or trailers. Call Bob at (717) 325-8246 to reserve space if interested.

Bob Nowell
Woodside Dr.
Jim Thorpe, PA 18229



Maxwell Hemmens Porter under steam on George Brown's outstanding garden railway near Scranton, Pennsylvania.
Photo by Bill Campbell.

WHAT'S NEW?

Ffestiniog Railway 125th Anniversary Celebration, by John Cocking. BUY THIS TAPE! It'll be the best videotape money you ever spent. This videotape was mentioned and highly recommended previously, but a lot of new readers have come on board since then that really shouldn't miss it - and there may even be one or two of you charter subscribers that haven't bought a copy yet. Lots of steam and loco action, including shots of a recently restored Prince, the oldest working steam locomotive in the world. Also plenty of footage of the unique Double Fairlie locos. If you like Welsh narrow gauge, you'll love it. Even if you don't think you like Welsh narrow gauge, I promise that you will after watching this video. I've watched it more than any other video in my collection and never tire of it - especially the last few minutes, which are guaranteed to bring a smile to your face and maybe even a tear to your eye - if you love steam engines as much as I do. Get your copy from Samuel Muncy at Railway Garden Ltd., 4210 Bridge St., Cambria CA 93428 - or call him at (805) 927-1194. Ask Samuel about another fine tape by John Cocking, **Steam in Wales, Volume One.**

Steamlines has really done it! You may remember that in the last issue I mentioned that Tom Cooper had reported a breakthrough in exhaust engineering? Well, check out the Steamlines ad in this issue for glorious proof of their success! And the best news of all is, you can buy the smoke generator as a separate unit and add it to the steam locos that are parked in your engine shed or roundhouse. There won't be any doubt about whether you're running a live steam loco or an "electric mouse", as Richard Rees so aptly puts it! I hope to make arrangements with Tom to get one of his units over to this side of the pond so that we can test it and give you a full report in the next issue.

Peter Jones, internationally recognized authority on garden railways, steam power and related subjects, has just released an audio cassette tape entitled, ***Peter Jones Talks About Garden Railways.*** In this one hour tape , Peter discusses a variety of topics of interest to garden railroaders. As is the case with all of Peter's work, this tape is interesting and entertaining and will definitely give you your money's worth. $10.00 direct from :

Peter Jones
Rheingold, Simpson Cross,
Haverfordwest, Dyfed SA62 6ER
Wales, United Kingdom

7th Annual Garden Railway Convention is slated to be held in Cincinnati on June 27-30, 1991. Continuing a tradition from past National Conventions, there will be a Steamup on Sunday morning, the last day of the Convention. In addition to that, there will be an indoor track available for operation of live steam in the display area all during the Convention. Way to go, Cincinnati! Don't wait until the last minute to make your reservations, or you may miss out. For more information, write to Lynn Meiners, 7th Annual Garden Railway Convention, P.O. Box 3045, Cincinnati OH 45202.

End of the Line

That's it for this issue - hope you've had as much pleasure in reading it as we've had in putting it together for you. We have some great material already set aside for the next issue (ran out of room in this one!) - the long-promised Roundhouse Fowler loco review, along with the first of a series of articles by Stumpy Stone on Americanizing the Fowler. We've also had an LGB Frank S. (made by Aster for LGB) for a couple of months now, and will be sharing our impressions and the technical details with you.

As mentioned in our opening comments, SitG now has a scanner that does a decent job on photographs - even color photos. So don't hesitate to send in your favorite photo of live steam in action or at rest! We'd love to share it with all the other SitG readers.

We've recently received some letters from readers offering to write an article on some aspect of live steam that they have some expertise in. Please do! This magazine can't survive without your input, so don't hesitate to share something with us.

That's it until next time then.....and until we meet in the next issue, keep your wicks dry and your crown sheet wet!

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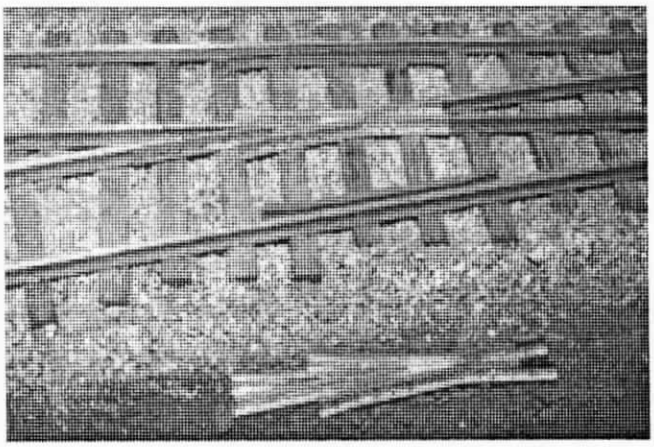
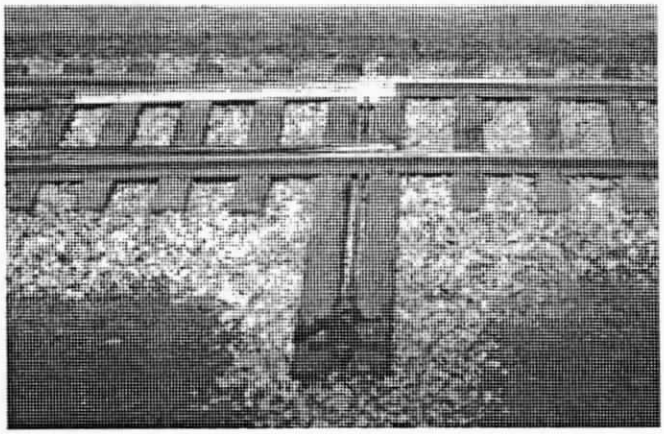


#6 Frog



Points

Part#	Description	Price Each
2506	Code 250 Aluminum Flextrack - 6' section	$18.00
2503	Code 250 Aluminum Flextrack - 3' section	9.00
2501	Cast Dow Rovel Ties - (use 6 per foot)	.40
TF6	Nickel Silver Frog - #6	15.00
PTLR	Nickel Silver Point Set	15.00
SSRJ	Stainless Steel Rail Joiners - 10/pack	7.00
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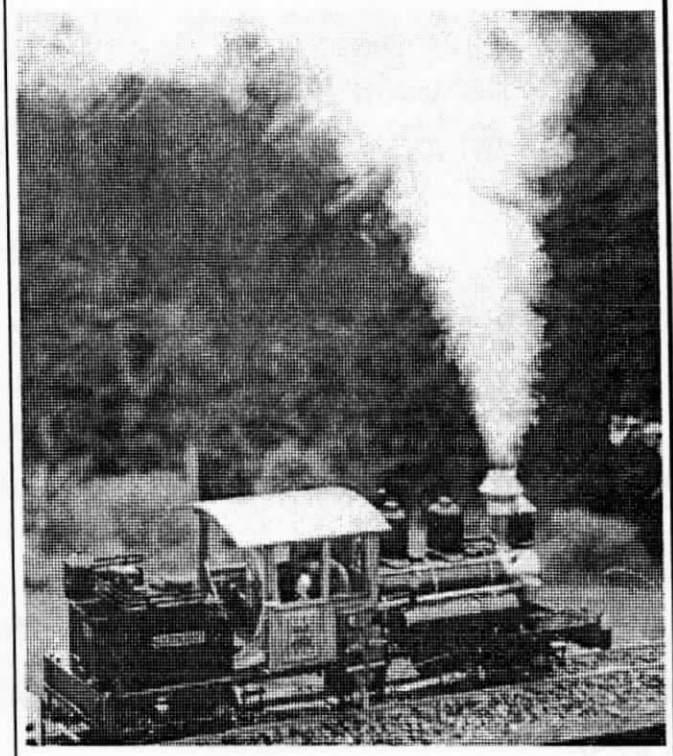

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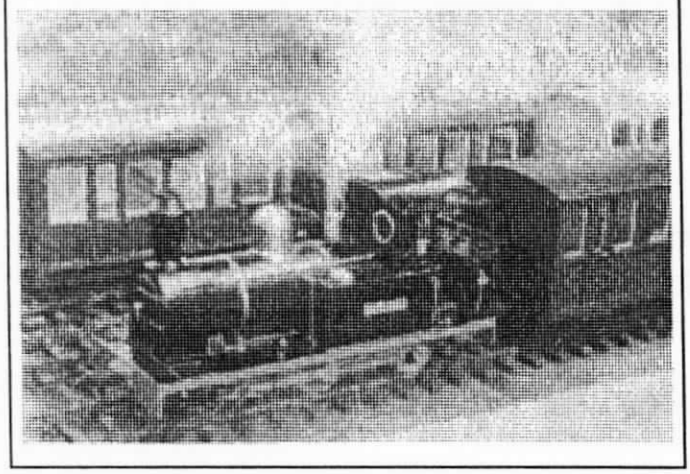

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