



# Clyde

## A Victorian Express Locomotive<sup>1</sup>

**Nick Baines**

I like modelling old engines. In the early days of the railways, engineers did not know how best to design locomotives. Stephenson and his contemporaries had set the basic standards: the tubed boiler, crank-driven cylinder valves, exhaust steam ejector and so on, but beyond that the field was wide open to experimenters. Convergence on a common set of standards came much later. Many have argued convincingly that Churchward was the first major British engineer to do this. But in the middle of the 19th century all sorts of different ideas were being tried. Most of them were ultimately unsuccessful, but such was the state of the locomotive art that no one could be sure that a new idea would or would not work without building and trying it.

Some engineers were more inventive than others. Joseph Beattie was clearly one of the restless ones, endlessly equipping his locomotives with all manner of fittings and features, many to his own patents, to the extent that almost every engine that came out of the shop was different in some way, even from those notionally of the same class.

Clyde was one of a class built in the late 1850s and early 1860s to work the company's express trains on the London-Southampton line. In those days there was a belief in the design office that driving wheel size really mattered, and so locomotives with 7ft driving wheels worked the Southampton line and almost identical locomotives with 6ft 6in or 6ft wheels worked the more heavily graded lines such as the Salisbury and Exeter. (The running department knew differently and was quite happy to interchange engines, but such was the lack of communication within the company that this belief lasted in the design

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<sup>1</sup> This is a slightly edited version of an article that appeared in the *Gauge O Guild Gazette*, Vol. 15, No. 1. I wish to thank two correspondents, Jim Brodie and Brian Harfield, who put me right about feed water pumping arrangements.



office for many years after Beattie.) So at this time Beattie was producing large numbers of 2-4-0 tender passenger engines, all of the same basic design but differing in wheel size, and of course mounted with various of his experimental fittings.

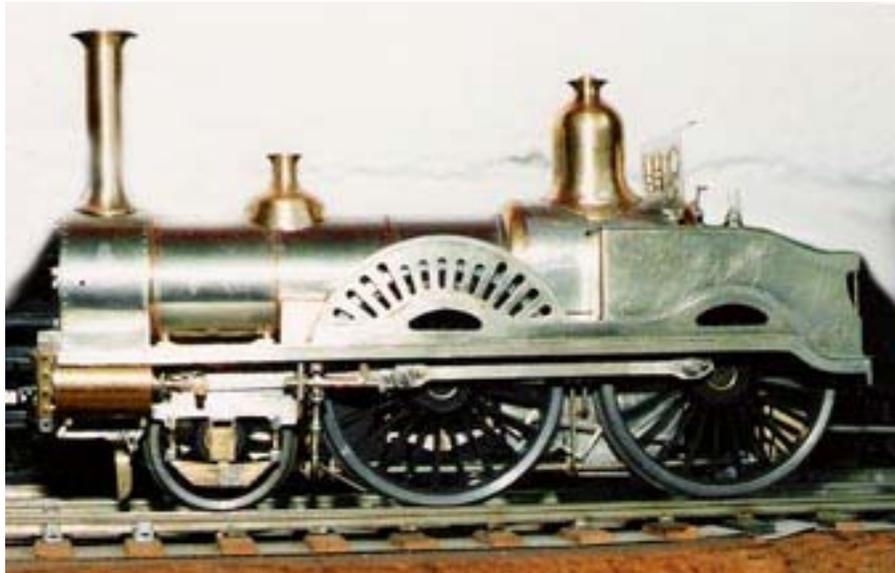
Common among these was the well-known double firebox, that was supposed to provide better steam raising, and various feed water heating arrangements that should have given better coal consumption; and may have done, but almost certainly at the expense of the draught. Prominent on the footplate was a donkey engine for pumping the boiler feed water when the engine was stationary. The engines were also equipped with feed water pumps driven from the crossheads.

For me things like that add to the interest of a model. I chose Clyde as a prototype because a GA drawing survives and is reproduced in D L Bradley's book *LSWR Locomotives Vol 1* (Wild Swan), along with a surprisingly large number of photographs of this and similar locomotives. On examining the photographs, it became apparent that the drawing did not reflect the actual engine in many of the details. Perhaps there were detail drawings that have been lost, perhaps the construction shop had its own ideas about how to build locomotives, or maybe Beattie's imagination was running too fast for the drawing office to keep up. Whatever the reasons, I have used the drawing and the available photographic evidence to make the model, as best I can judge, Clyde as she was in the mid 1860s.

The model is entirely scratchbuilt and the construction was quite conventional in most respects, but some points may be of interest. On the prototype, the front wheels are not a pony truck and they have no side play. This was not acceptable in the model if it was to go round curves tighter than scale. The obvious solution, which was to give the leading driving wheels some side play, would not work because in locomotives of that era the boiler was located between the driving wheels, usually with very little clearance. Instead, the frames were made in two parts. The two driving axles run in the main part of the frames which were set at a spacing that left the wheels with next to no side play. The leading axle runs in frame extensions which overlap the main frames slightly and are soldered to their inside faces. This allows the leading axle to move sideways by the thickness of the frame, and that is enough to get the engine round the sort of curves that we have to use. The join between the frame and the frame extension occurs at, and is concealed by, the motion bracket. I suppose I could have joggled the frames inwards at the leading axle rather than making them in two parts, but I was concerned that I might not be able to joggle the two frames identically and thus end up with a skewed chassis. As it was I made a simple jig (a

piece of wood with some small nails hammered into it (it's not that sophisticated here) to hold each frame and its extension in exactly the same relative position in order to solder them up.

The wheels are Slater's. They do not exactly capture the spindly-spoked appearance of the prototype, but nor do any of the other products on the market, so the only alternative was to make my own wheel centres, and I shied away from that. The motor is an 1833 with a 30:1 gearbox, a fairly high reduction ratio which suits the large diameter wheels. The drive is to the leading driving axle. It had to be the leading axle because the drawing shows almost no clearance between the trailing axle and the floor of the cab. Since the cab is just a weatherboard and is therefore extremely visible, I did not want to fill it with a very non-prototypical worm and wheel.



The motor is small enough to sit horizontally between the frames and this left the firebox free for weight, which makes for a very nice arrangement. Unfortunately there was no room at all for a flywheel, and another time I would be tempted to try using a slightly smaller motor to allow space for one.

Because the boiler fits between the driving wheels, and because of the finescale back-to-back dimension, I had to compromise on boiler diameter. It is actually 1mm smaller in diameter than it really should be, but nobody has commented on that so I think I must have got away with it. The firebox and smokebox are also scaled down in diameter to maintain the proportions.

The firebox is made in the usual way as a skeleton with an inverted U-shape wrapper over it. Forming the front and rear plates proved to be quite a chore. The firebox is the same width as the boiler overall, but is considerably taller. When viewed from the side, the front plate is curved on a large radius at the top to bring it down to the level of the boiler, and the curve gradually diminishes to nothing at the boiler centreline. The back plate is similarly shaped. The plates were hacked out of 1/4 in. brass, and then carefully filed to shape, starting with a coarse file to get the basic shape, then moving through progressively finer files and finally polishing with wet-and-dry paper.

The smokebox, boiler, and firebox are each separate assemblies which spigot one into another. The tubular feed water heaters that run along each side, with a linking pipe between them just in front of the firebox, comprise another assembly that clips into place and in doing so holds everything together. The smokebox assembly includes the frame extensions in front of the cylinders and the front buffer beam, and the whole thing is attached to the footplate by means of a bolt under the smokebox.

The splashers and cab sides are an interesting complex of levels, with separate splashers for the leading driving wheel and the coupling rod. The large splashers with their decorative slots (they did that sort of thing in Victorian times) on the leading drivers are so prominent that they just had to be right. I

was frightened away initially and thought about getting them etched, but since I only wanted two that was not a very economic proposition. So one quiet Sunday afternoon I soldered two pieces of nickel silver sheet together, very carefully marked out and drilled holes at the inner and outer ends of each slot (different sizes, of course), and joined them up with a piercing saw. Once they were cleaned up with needle files they did not look too bad.

Photographs of the prototype show that the various splasher sides and tops were all held together with riveted angles. The angle iron can be seen, which is bad enough, but at least the LSWR used flush headed rivets so that it was not necessary to reproduce those. The angle iron curved around the splasher tops, and I have always found it all but impossible to curve commercial brass angle successfully. So each angle was cut out as two separate pieces, side and top, and soldered in place. Needless to say, the strips were quite flimsy and it was a relief when finally everything went together.

The model has the two firebox doors on the backplate for the double firebox. The drawing shows rather scanty controls: just a regulator, reversing lever, and an anonymous tap on the boiler backplate. I added a steam pressure gauge and a water level glass because I can not believe that a locomotive would have been allowed in public service without them even in those days. There is no brake control; the only brake was a handbrake on the tender. I think it really needs a crew in suitable Victorian attire and perhaps one day I will get round to that. On models of locomotives with enclosed cabs their absence is not too noticeable, but with an open cab like this it is that much more difficult to suspend your disbelief.

Clyde is finished in the red livery that she carried at that time, and that never fails to surprise all those people who think the LSWR painted its engines chocolate brown. It did, but only in later years. The red is probably a shade or two too red, but since nobody alive today can remember the original shade I have decided to live with that. Gullplates provided its usual excellent service in making the plates for me.

Clyde has probably attracted more attention than any other loco I have built, but then she is a mid-Victorian type and very different from the models that abound of 20th century prototypes. The body in particular posed a number of interesting challenges, and just about everything had to be made from scratch. The tender axleboxes are Shedmaster and are the only castings used anywhere. But I was pleased to be able to get everything in and only had to compromise in the matter of the boiler diameter.

