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railway.co.uk



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Free to members
50p when sold

The Prospectus

February 2015



The Jones brothers lovely 7 1/4 "gauge Britannia Pacific 70004 William Shakespeare is prepared for a run at Prospect Park on 14 December 2014. The editor remembers standing on the footplate of its full size sister at the Festival of Britain in 1951 when it was new. Photo editor.

**DAWSON'S DIARY: LOW ADHESION
MEASURED: TRAINS WITHOUT ENGINES:
FANTASY FOOTPLATES: ANOTHER READ-
ING LANDMARK GONE: DIDCOT IN 1975**

DAWSON'S DIARY

kept by the President

The 4th January was rather cold and dull but the public were out enjoying rides on our track they did not mind the weather at all. The members did us proud with plenty of engines steam and electric with a good turn out once again, a good start to the New Year! The tea bar was very busy the ladies did a good job once again keeping us well supplied with hot tea for all the membership inside and out, many thanks from all those who were about in the cold on Sunday.

The Wednesday Parks and Gardens gang were busy out in the cold in the first working day of the New Year, the track team got stuck I and carried on where they left off before Christmas and what a good ride it is on the 7 ¼" track a good job well done. Some work was also carried out I the steaming bays on the raised track by Mike Sinclair in readiness for the club running day.

We had a very good turn out of members on last Thursday club night, I think it was somewhere near 24 members this time enough to put an extra table for them I all a good start for 2015.

With cold wet and windy start early in the day it looked at first as if we were in for a wet time, anyway club running Saturday turned out fine for the most part. And yet another good turn out of members also some new members as well, Mike and Chris Jones had their Schools class out for a run. It's been some time since its been on the track. John Spokes had his NER S class 4-6-0 it was running well, also the late Ian Jones 5" GWR pannier tank (Pansy) was run by his son in law also named Ian ran this loco pulling a 7 ¼" trolley. It sounded very nice with a load on. On the raised track Mike Sinclair was using his 3 ½" Royal Scot, Pete Harrison had his Black 5, Stuart Kidd had a steam test on his GWR 1500 class tank loco, later he was giving lessons on driving locos to some of the new members of the club. Mike Burke had his class 33 running as well. Bill Roberts paid us a visit as he had moved away from Reading. It was good to see him again.

What was good to see was the younger members with the help of Karl, the track was very oily. They soon got stuck and I and cleaned right round the track well done all of you. In the club house Alf was putting together a very nice model of a church in "0" gauge. He's a good all round model maker. In the tea bar a nice lady called Jacky made tea for us all, many thanks and very kind of you.

Nigel Penford and Mike Sinclair made and fitted a tie back on the club house main door. Now thanks to them you can now secure the door in the open position when its windy. One less job to do. Also we had a visit from Mike Perry now he had had his eyes done and can see well again. We will see more of him I future, he says. Mike is building a 5" Deltic which should soon be finished now things are back to normal for him.

The TEE Publishing London Model Engineering Exhibition at Alexandra

Palace was well supported by the RSME on Friday, once again there was plenty to see and buy. I noticed there more of the clubs supporting younger children as we are aiming to do at Reading which is a good thing for our hobby of ours. One nice touch was on show the part of the full size wheel splasher for the LNWR George the Fifth class 4-4-0 that's being built which will be named "Prince George". This loco is one of the 19 locomotives that are being built around the country. When this engine will be finished is anybody's guess. I hope I am still around to see one of the LNWR 4-4-0 locos in steam! I was surprised that there were so many new loco and part rebuilds on the go. That can't be bad with luck we will have steam locos running well into this century.

PONDERINGS

by 61249

This article does what I threatened last time, and looks at some of the parameters and issues around Low Rail Adhesion, in an attempt to bore readers into quickly passing over into more interesting bits of Prospectus, such as the calendar of events on the back page. Before I do that however, I have to report that the Customer Services part of Audi UK has justified its silly and misleading advertisement for the "Quattro" drive system that was running on Capital radio before Christmas as the result of "Creative Licence". So all we need to solve Low Rail Adhesion is a bit of creative license on the rail to create adhesion where none existed before, that's all right then.

Life, engineering and railway operations are not, of course that simple, being annoyingly dependent on the laws of physics, which trump even those of the European Union. By way of example, the specification for testing Wheel Slide equipment for Europe is specified by the UIC (Union Internationale Chemin de Fer - Beware of any organisation that gives it name in French would be my advice). It specified a test for Wheel Slide Prevention equipment that is based on paper tape on the rail that gives a nice consistent low adhesion to adequately test the ability of the braking system to respond. Sounds OK? WRONG ANSWER. What BR knew about low adhesion in 1980s was that it varies wildly from spot to spot through a given site, with fluctuations of over 100% in grip levels within 100 metres. So a system that meets the European spec and may come as standard on your average French or German train is about as much use as a chocolate teapot when it comes to stopping at Tilehurst, for example. The likelihood is that it will react too slowly to meet the changing conditions, or alternatively will fluctuate with the adhesion, applying and releasing the brakes with such rapidity that it uses all the available air in the main reservoir within 30 seconds or so, at which

point it will go into “lock the brakes” mode and lose control of the wheelset altogether. A clear example of how knowing and measuring any phenomenon being essential to understanding the remedy.

So what is Low Adhesion? A dry wheel on a dry rail can deliver values of μ as high as 0.35. In normal running figures of 0.20 are common, but in leaf fall at a bad site or through other (sometimes industrial) rail pollution it may fall as low as 0.01. In practice, thanks to physics, Newton et al, we know that the wheel-rail friction level provides an upper limit on the longitudinal force that can be available for braking. If all wheels are braked then the available braking force (max) is the friction times the train weight and therefore the deceleration rate is friction times the gravitational acceleration. For example with a friction coefficient of 0.1 the maximum achievable deceleration would be $0.1 * 9.81 \text{ m/sec}^2 = 0.98 \text{ m/sec}^2$. This can be written as 10% of g. If not all wheels are braked, as on unfitted freight trains (remember them?) then this has to be adjusted for the vertical load on the braked wheels, - which is why class 37s ran around with brake tenders in the 1970s, to get the available brake force up.

In normal operation a full service brake application will give a deceleration of 9% g. Most BR stock has a three step brake and the third step is “Full Service”. This is the position of the brake handle to achieve 9% g. Those of you who understood the paragraph above will realise that to achieve this μ must be at least 0.09. It follows that if the available adhesion μ is only 0.01, then the train will take 9 times as long to stop. This is basically what happened to 165102 at Slough in November 1994.

These “very low” adhesion events are pretty rare, and probably apply to less than a mile of the whole network at any one time. Additionally, the condition varies with time so the train before that used the bay at Slough stopped normally, and within 30 minutes of the incident I passed through Slough on the main at 125 mph on an HST, so no-one was worried about our ability to stop! The Slough train misfortune was to need to brake at that time on that stretch. LRA is clearly the railway equivalent of black ice, we all know it may be there, but most of the time it isn't even when the temperature is low. The result is that it catches drivers out – why this amuses the press with trains and not with cars always puzzles me but I will resist the temptation of Railways and the Media for another article.

The cause of the low adhesion is also known, although the chemistry of it is a little obscure still, as far as I know. Leaves are rolled between the wheel and the rail and form a “Teflon” like deposit on both, more rail than wheel. Two comments here, it is probably slipperier than Teflon, and is a damn sight harder to get off. Trains are, of course, designed to give good airflow around the wheels and discs for cooling reasons, since disc temperatures are the limiting factor on train braking from speed. This good airflow probably helps to draw leaf material into the interface. Humidity is clearly an issue as well, and this changes quite rapidly with time and location in the UK “Micro cli-

mate” where the topography varies along with the density of vegetation and the location of factories. Lots of changes have made it worse in modern times, houses have been built closer to railways, but the owners put tree screens at the bottom of their garden so that they can pretend the railway is not there. Goods yards have been sold off for housing, right in the place near stations where acceleration and deceleration take place. In steam days one bank was always kept clear by the fact that the telegraph wires had to be kept away from branches that would bring them down, a clever S&T engineer decided to bury the signalling cables so then we could let the vegetation run wild. Conservationist thinking limits the opportunity to disturb bird nests etc.etc. – I could go on, and probably will.

The sad thing is that in all its joined up glory, BR lost sight of this interface, and bought the idea from the train manufacturers that good use of available adhesion is all that is required. Just like the Quattro advertisers. We then built a whole generation of trains with no sanders, in the knowledge that sometimes they would not be able to stop.

It has taken the privatised railway to do two important things

1. To fit equipment on the trains that allows them to modify adhesion as and when they need to. (Sanders)

To get the Infrastructure Manager to take his responsibility to provide a reasonably grippy rail seriously.

Once again, Private beats Public, a bit of a theme to these articles!
(to be continued)

RSME CLOTHING

Reading Society of Model Engineers clothing is now available at Cavaliers in Weldale St, Reading, RG1 7BX. Prices are competitive with Polo shirts at £12:50, Sweat Shirts at £15:00, Fleece at £19:50. All of the above prices are dependant on the quality required. Other items are available, please see their web site cavaliersT-shirts.co.uk or visit their premises in [Weldale Street](#) opposite the entrance to [Iceland](#), or contact Tel 0118 9574885. Cavaliers are open until 17:00

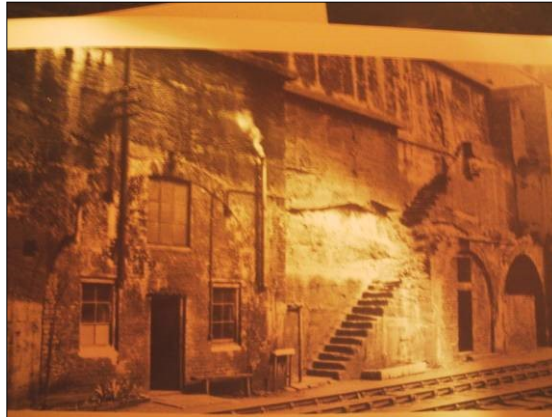
A LITTLE BIT OF HISTORY - TRAINS WITHOUT ENGINES

By Mike Burke

It was during the late sixties and at the very end of steam when I was appointed as Inspector Regulator at Edge Hill Power Box, a state of the art push button all singing all dancing electronic signalling complex.

Gone were the levers large and small and, trains many miles away, and unseen by us, were indicated by coloured lights on a large map of the area we controlled. It was my job to ensure that the trains were regulated in the correct path and route which included at this time the regular very sad groups of redundant steam locos destined for Cashmore's yard and the cutters torch.. I was told that the scrap was melted down and turned into motor cars or razor blades so perhaps I have shaved with an old LMS steam loco,(Well some blades certainly felt like it.)

What many goodly folk don't realise is that the birth of railways started adjacent to what is now Edge Hill station at a place called Wapping, which is situated in a deep cutting. At the sides of which are the remains of the old staircases cut into the rock down which the first passengers came to ride between Liverpool and Manchester. Also here and cut at right angles to the line are the original hollowed out engine sheds and workshops which look like semi circular caves. Other later cave like openings were where the boilers and winding engines sat which cable hauled wagons up the steep gradient from the Mersey riverside goods depot at Park Lane and, many deeply grooved pulley wheels were still in evidence between the rails.



VIEW OF THE STAIRCASE DOWN WHICH THE FIRST PASSENGERS CAME AND THE SHUNTERS CABIN (Also note the circular openings of the engine sheds)

Because of the length of the cable, wagons worked on a counterbalance system with a mixture of loaded and empties running up and down the double

tracks. As river traffic expanded and the steam engines became life expired one peculiar method of working was developed and still persisted in my time. A diesel shunter ran down light engine and was used to take wagons up the hill (usually no more than 5 at a time) due to the steepness of the gradient between Park Lane Goods and Wapping and, the fact that the tunnel had no ventilation shafts to clear exhaust fumes and smoke. Instead several specially designed six wheeled brake vans fitted with sanders were used to take mixed trains of wagons down the hill using gravity as the engine. This was too good to miss and one day I scrounged a lift in a descending train.

The brake van was leading with several wagons in the rear and I watched with interest as the shunter/guard lit a paraffin handlamp and positioned it by the open veranda door facing out towards the wall. "Don't worry Lar" he said "Its only the speedometer". Needless to say I was puzzled by this as he quickly wound off the handbrake and we rumbled off down the hill and into the murky blackness of the tunnel.

The only noise was the odd six wheels of the brake van crossing the rail joints and the rumble and squeals of the wagons in rear. I asked him what kind of speedometer was a hand lamp? And he said "Look Lar" and pointed at the circle of light from the lamp shining onto the tunnel wall. Suddenly a large painted number appeared on the wall. Then at every twenty yards or so another number and these numbers got progressively lower and lower. He said that the noise of the wheels and how quickly he passed a number told him how fast we were travelling. I watched as he wound the handbrake on and off to keep speed steady.

He added that sand would be used if the train ran away, but not today, and this was how he controlled the trains speed.. Also the numbers told him when he was getting near the bottom. I asked if any trains had run away and he said "Yes, and several shot through the goods depot across the dock and into the river Mersey.

Since then a short headshunt was cut into the tunnel side and a throw off point installed to ensure that future runaways piled up before entering the depot. (No small comfort for me as we were on the leading vehicle.) Finally the shunter screwed on the handbrake hard and we came to a stand near a signal bolted on the wall, which due to the restricted clearances comprised a spectacle plate but no arm. The shunter reached out and pressed a plunger on the wall which told the signalman we had arrived safely.

After a few moments the signal cleared with a clatter and the brake was released to allow our engineless train to run the final few yards into daylight and enter the depot.

It was a huge place with numerous powered capstans and flat wagon turntables. Several men appeared and our train was quickly split and shunted using just ropes and capstans. The method was to have a loop of rope thrown over the wagon hook and the remaining rope run out to the nearest capstan where

a quick couple of turns and use of a treadle spun the capstan, tightening the rope and pulling the wagons forward. The speed at which these shunting moves were accomplished left me gob smacked. And I decided to leave them to it and visit the signal box to await my ride back up the hill.

Once again another Liverpool oddity for this box was cut into the rock wall and was entered by climbing a ladder and through a hole in the box floor.

Eventually I arrived back at Wapping and was asked if I'd like a cup of tea? On saying Yes I was handed a large pan and told that as they had no running water on site I would have to enter a narrow tunnel on the right hand side and fill the pan from the HORSE TROUGH sitting several yards inside the tunnel. This trough was kept filled by a natural spring dripping through the rock and was crystal clear and, never froze. The tunnel was still in use for empty wagons but the horse power had gone. The final indignity occurred when the head shunter asked me to choose a used tea bag from several dry ones suspended from a piece of string across the window opening. Needless to say I respectfully declined.

Finally, there were three tunnels at Wapping. A double track one on the left hand side, dug in the 1900s to give better access to Crown Street goods yard as the (third) single track horse worked tunnel was too small for a locomotive. The second was the steeply graded double track tunnel to Park Lane.



A VIEW OF THE THREE TUNNELS- THE ONE WITH THE HORSE TROUGH IS ON THE RIGHT Also note one of the special six wheeled brake vans waiting its train

The site is now marked as a Heritage Centre with a museum at Edge Hill station.

The main goods yard at Edge Hill was on the opposite side to Wapping and relished in the Name of 'The Gridiron sidings' due to its large grid like layout. But once again gravity was used as the shunting engine to sort the wagons into trains for the numerous destinations served.

Trains normally arrived facing Liverpool and were steam hauled. The procedure was for the train then to be propelled up a long gradient to the top of the

grid (approx $\frac{3}{4}$ mile away. This activity was impressive as a fully laden train takes some moving up a long hill and with full gear and full regulator it meant a symphony of sound and vision that I can still visualise.

At the top of the grid the loco was detached and sent to shed whilst the wagon destination labels were checked by the foreman shunter. He would chalk a large number on the front buffer beam of each cut of wagons and signal the under shunter to uncouple them. The wagons would then set off down the gradient rapidly gaining speed as they headed for one of the several groups of sidings. Waiting for them was a shunter called a 'chaser' who's job it was to read the number on the approaching raft and run ahead setting the points for the siding required. Waiting a little further down the sidings were several men known as 'catchers' who's job it was catch the wagons as they passed and pin down brakes to slow them down before they ran away or collided with other wagons stabled ahead.

If as sometimes happened a raft of wagons did not stop then a large hook positioned at the exit to each group of sidings would catch on the wagon axle. Attached to this hook was many yards of heavy ships anchor chain and its drag, weight and friction would bring the wagons to a stand in a cloud of rust and dust without damage. Well that was the theory but such incidents with the hook engaged frequently pulled the wheelset out of the wagon and a derailment ensued.

Sets of solid steel wheel ramps and wooden packing were strategically placed to quickly rerail the wagons whilst the damaged leading wagon was jacked up and the wheelset re-installed so that it could be shunted into a 'cripple' siding for repair. (this siding was always full).

Hump shunting with retarders was never installed at Edge Hill and despite many accidents the highly dangerous practice of 'chasers' and 'catchers' persisted until the yard closed.

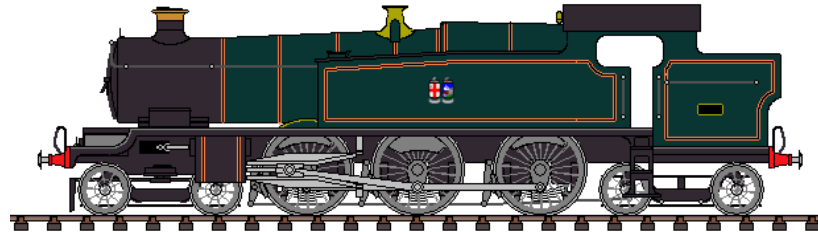
(Photos courtesy of N R Knight)

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Fantasy Footplates

What locomotive is this?

by Alec Bray



Those with an interest in things “Great Western” may see this locomotive as a strange mix of the “Star” class 4 cylinder express locomotive type and the heavy goods tank locomotive of the 72xx class. The idea was to create a fast Suburban tank locomotive.

In fact, this locomotive never existed, although there was a GWR proposed design for a very similar 4-6-2T drawn up in the nineteen thirties (Swindon diagram rolls 558 and 592). This, and other proposed designs, have been described by Les Summers of the Great Western Society in an article in “BackTrack” issue dated June 2014, Vol 28 No 6.

These proposed designs – and others, for example those reproduced in the RCTS “Locomotives of the Great Western Railway” Volume Nine – are usually presented in a similar form to the “Locomotive Diagrams” (or “Weight Diagrams” as some companies called them) of existing locomotives. These are outline, left elevation diagrams with little detail: brakes and brake rigging is usually omitted, as are wheel spokes, and valve gear may be radically simplified for these drawings.

The “GWR Locomotive Sketchpad” computer software produced by RSME club member Alec Bray attempts to show what these proposed locomotives may have looked like in service. The locomotives can be shown in full livery and in right elevation, and with a variety of backgrounds (including the user’s own supplied backgrounds).

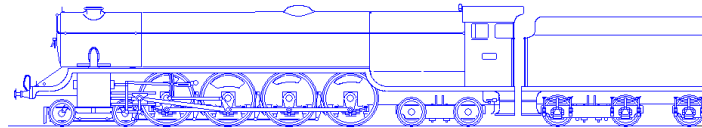
The idea behind the “GWR Locomotive Sketchpad” is to allow users to put themselves in the position of one of the draughtsmen in the GWR Swindon Drawing Office during the first half of the twentieth century. This has been made easy, as the Great Western Drawing Office had a set of standardised components, courtesy of G. J. Churchward and his successors Collett and Hawksworth (although some parts were more standard than others!) The GWR Drawing Office also had a very strong “house style” when it came to locomotive design. This “house style” makes it possible to “guesstimate”,

using rules and algorithms, the positioning of many locomotive features, using a minimum number of measures (leading dimensions) and some specific option choices. This “house style” is not referenced in any document, but becomes clear when locomotive drawings are analysed: for example, approximately 10% of the firebox length is inside the cab front sheet (as “empirically” determined). There is an interesting algorithm for the placement of the safety valve of a tank locomotive firebox: by inspection, the position of the safety valve on the firebox moves from halfway down the firebox length towards the cab as the firebox increases in length!

And now the connection to Model Engineering!

A Canadian modeller, J. A. Joslin, published a drawing of a 4-8-4 locomotive for use on British railways, and this drawing, together with a full constructional article for a 2.5 inch gauge locomotive written by LBSC (“Curly” Lawrence), was published in “English Mechanics” in December 1931 and into 1932. The locomotive was called “Uranus”.

The Sketchpad version of “Uranus” as a blueline (Diazo) print:



and as it may have appeared in service:



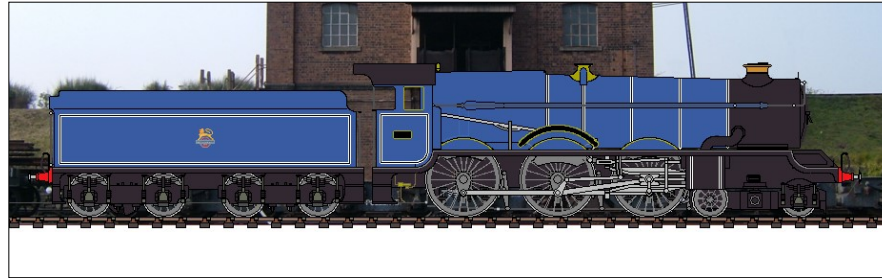
There are errors. As one example, the trailing wheels should be in an outside framed, plate frame bogie (like the tender). The “Sketchpad” works on rules and algorithms for GWR locomotive design, and this “Planet” is outside the general run of GWR designs.

However, there are discrepancies in the available drawings for this locomotive. The drawing reproduced by the National 2½ Inch Gauge Association, and the drawing in “LBSC – His Life and Locomotives” (Brian Hol-

lingsworth) show RIGHT hand drive, whereas the blueprint in the GWR archives shows LEFT hand drive. Yes, the GWR Archives. A blueprint for “Uranus” was found in the rolls of drawings rescued from the Swindon Drawing Office and now presently at York. The 2.5 inch gauge drawings were ‘leaked’ to full-size railway circles and it seems that a number of loco men were hoaxed into believing the monster was a real project and official policy. It is sometimes described as a GWR locomotive (the Swindon blueprint has “Great Western” on the tender), although it bears no resemblance to anything from Swindon. It was probably “leaked” to Swindon to show what possibly could be done.

A model of “Uranus” (with left hand drive) was displayed by the North London Society at the 2014 exhibition at Alexandra Palace. The cylinder castings are available from the 2.5 inch Gauge Association.

Now, I wonder what a “King” would look like with outside Walschaerts valve gear and a bogie tender ... ?



“GWR Locomotive Sketchpad” runs on Windows XP, 7 and 8, Raspberry Pi, Suse and Debian Linux.

This may be purchased at £12.50 from Great Western Retail Sales, Didcot Railway Centre, Didcot, Oxfordshire, OX11 7NJ.

<http://www.didcotrailwaycentre.org.uk/sales/shop.html>



Another Reading landmark gone. The former Metal Box headquarters, and latterly occupied by the energy firm Energis, was demolished late last year. Built in the 1970s it won awards at the time and the architecture was surely influenced by the Pressed Steel DMUs that then passed by constantly. A rumoured conservation listing clearly came to nothing. Photos John Billard



**FORTY YEARS AGO -
GWS DIDCOT 1975**



4942 was dismantled as part of the Saint recreation project.

7808 is an invaluable source of spare parts to keep other engines working today.





Few of the engines seen here are working at present and some have not been steamed since my visit.

**PHOTOS BY
JOHN BILLARD**



One of the few engines to leave Didcot permanently D7018 is now on the West Somerset Railway



DIARY

February 2015

Sunday	1st	Public running	13.30 to dusk*
Saturday	10th	Club running	11.00
Monday	12th	Committee meeting	19.30

*setting up from 11.00

Opinions expressed in PROSPECTUS are the personal views of the contributor and cannot be taken as reflecting the views of the club committee or editor.

**The deadline for the March PROSPECTUS is
18 February. This is the final date.**

Contributions from all members are greatly welcomed
They may be submitted in hard or soft copy to the editor.

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