The Warrior

THE MAGAZINE FROM THE LMS-PATRIOT PROJECT

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THE UNKNOWN WARRIOR

FEBRUARY 2025
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THE UNKNOWN WARRIOR

Contents

HERITAGE RAILWAY ASSOCIATION

2020 AWARD FOR COMMUNICATIONS

Editorial

Welcome to the first Warrior of 2025, a year in which we are expecting significant progress with work on the chassis of 5551.

The front cover of this magazine shows the frames now in position within Tyseley Locomotive Works, ready to receive the first package of work that the Engineering Team have been working so hard to arrange since the loco first arrived in Birmingham.

I would like to thank those members who take time to write to us with their observations. We don't always receive positive comments and that is understandable with the delays we have faced over the years. However, we do not shy away from criticism and always respond in a truthful manner. Evidence of this is included in Chair's Thoughts and Members' Corner where we have tried to take on suggestions made by our members.

We have our first 'Illustrated Glossary' in this issue where we have tried to explain what selected parts are called, do and are for, both visually and with the written word. My thanks go to Kevin West who has supplied CAD drawings and text using 'LMS' terminology – our aim is to build up this glossary issue by issue. Please let us have your comments regarding this feature and by all means send in your questions and suggestions as to what you would like to see featured as the locomotive build picks up.

Thank you for your continued membership and support of our project, please enjoy this issue of The Warrior.

Pete Sikes, Editor
email: warrior-editor@lms-patriot.org.uk

FRONT COVER: 5551 in position within Tyseley Locomotive Works.
Photo: Keith Riches

Send your comments to: warrior-editor@lms-patriot.org.uk

To volunteer contact: volunteer@lms-patriot.org.uk

Chairman's Thoughts

FEBRUARY 2025

It's a cold, wet, grey day in mid-February as I write, never an ideal time to think positive thoughts. However, looking back at the Autumn 2024 issue of our magazine, there is evidence of progress in our endeavours. In November we did manage to get insurance for both our assets and our Tyseley volunteers in place. This clarified the relationship with Tyseley's own cover – a first for the project compared to our previous locations. Then we were all buoyed by the news that our chassis was moved into its 'permanent' assembly location in the main workshop in December.

The New Year brought renewed optimism and there has been lots of discussion with Tyseley about getting cracking with the first reassembly work package. You can read all about that in our Project Progress Report update.

Hope always springs eternal, and I had genuinely expected that I would be writing about actual work in progress at Tyseley at this point. That has not quite turned out to be the case – worksite preparation and set-up is definitely not a five minute job – but we are getting ever closer at the time of writing.

We are also needing all our patience in getting all the detail lined up for the wheelset assembly work at Riley and Son – it's a complex, skilled engineering task which we have to get exactly right. Nobody predicted that Riley and Son would be taking weeks out to move their premises and equipment lock stock and barrel from Heywood to Bury – no mean feat that – in the middle of it all. Things are going well with the boiler, though. There is more on that in the Project Progress Report.

I always enjoy getting feedback from our supporters on what we do and don't do – even if sometimes it can be a bit hard-hitting. With this issue of The Warrior, we are planning to respond to members' requests for help with understanding engineering reports as non-engineers. We are going to start with a glossary of some of the terms used in the current issue.

While I am thinking about feedback, I wanted to share with you recent experience with our Members' Monthly Bulletin. Now I know that a good few of you wait for the quarterly print edition of The Warrior for your news and articles. The monthly email Bulletin is a more modest attempt to communicate more frequently on current progress. I have the job of writing it as a non-engineer. It does get some positive feedback. One of our members really deserves a medal, as he never fails to respond in that way. But my heart went out to another member last month, who registered a plea for a style embargo on what we write, on starting paragraphs with the word 'Unfortunately'. This was a new one, and even though it was about the January weather keeping us away from a gala, I took his point. We all long for positive news.

Thank you for your continuing support for our project.

COLIN HALL, CHAIR

chairman@lms-patriot.org.uk

TREASURER'S REPORT

NEIL COLLINSON, TREASURER

Quarter 3 to 31st December 2024 and the financial year-to-date

First thought for the quarter: Another excellent quarter for income which has helped us achieve our annual budget with three months still to go.

INCOME

Total income for quarter 3 is £130,000 (£59,000 in 2023) including expected £7,500 in Gift Aid. As usual, gift aid is not included in the figures in the chart as the funds are not received from HMRC (Charities) until the month following the quarter end. Total restricted funding was £1,474. The total year-to-date figure amounts to £341,000 (£252,000 in 2023) giving us 142% of our total annual budget.

Second thought for the quarter: My quarterly 'Results Comparison Chart.' If you recall my 'Second Thought' in Warrior 63 I was faced with a dilemma as to what to include and what to leave out in this issue as I was running out of space in the portrait format.

Our esteemed editor resolved the issue by converting my original chart from portrait to landscape. That is what you will see in this issue as I include three separate quarterly figures for both years, together with the year-to-date ones. All my own work this time! I do not have a clue where it will appear though. When I look at the final quarter and full year's figures in April it is highly likely that I will amalgamate the first 3 quarters results into one amount – unless you, the reader, would like to make an alternative suggestion.

Third thought for the quarter: Now for the explanation of the figures. Hold on tight.

Total Membership for the quarter including Gift Aid came to £6,148. The year-to-date figure is £17,059 giving 68.9% against budget for the year, a slightly higher percentage than last year. We have approximately 800members but it was mentioned at the board meeting on 1st February that we need to increase the number and hopefully, the progress in making it look more like a locomotive in 2025 will hopefully encourage more individuals to come on board.

Total donations/sponsorships for the quarter was £81,000 and £265,000 for the year-to-date. That is 158% of the original annual budget set.

Regular Donations contributed £22,140 in the quarter and £66,000 for the year-to-date. It is just under budget at 72%. Interestingly, we have had four new ones in the quarter, our best quarter in this category for some time. Even though we have lost five donors, the total amount is up on the previous quarter.

Other donations were £10,500 in the quarter and £47,900 for the year-to-date. 96% of the total budget.

Other income in the donations/sponsorship category in the quarter, such as gift aid, trustee donations, sponsorship and bespoke numbers took our total quarterly figure to the £81,000 mentioned above.

Quarters 1 to 3 and year-to-date comparisons

INCOME	Annual budget 2024-25	Q1 actual 2024-25	Q2 actual 2024-25	Q3 actual 2024-25	YTD actual 2024-25	% of annual budget	Annual budget 2023-24	Q1 budget 2023-24	Q2 budget 2023-24	Q3 budget 2023-24	YTD actual 2023-24	% of annual budget
Membership	£24,776	£5,138	£5,773	£6,148	£17,059	68.9%	£27,519	£5,184	£5,697	£7,022	£17,903	67%
Donations/Sponsorships	£168,301	£145,293	£38,992	£81,093	£265,378	157.7%	£169,522	£71,074	£79,124	£38,375	£188,573	111%
Compensation	–	–	£8,566	–	£8,566	–	–	–	–	–	–	–
Sales/Events	£20,500	£4,049	£8,627	£6,995	£19,671	96%	£18,650	£3,191	£4,828	£4,248	£12,267	43%
Other (interest)	–	£1,791	£2,427	£2,304	£6,522	n/a	–	£1,185	£1,751	£1,609	£4,545	n/a
Wheels settlement	£27,500	£8,250	£8,250	£8,250	£24,750	90%	£33,000	£8,250	£11,000 +£1,037	£8,250	£27,500 +£1,037	83%
Loans	–	–	–	£25,000	£25,000	n/a	–	–	–	–	–	0%
TOTAL	**£241,078**	**£164,520**	**£72,636**	**£129,791**	**£341,947**	**141.8%**	**£248,692**	**£88,884**	**£103,437**	**£59,504**	**£251,825**	**101%**
EXPENDITURE												
Locomotive	£94,927	£2,816	£17,864	£16,657	£37,337	39%	£128,542	£43,835	£83,439	£27,808	£155,082	118%
Tender	£1	–	–	–	–	–	£5,000	–	–	–	–	0%
Boiler	£40,000	£23,548	£49,210	£25,300	£98,058	245%	£30,000	£5,173	£552	£25,793	£31,518	105%
Insurance	–	–	–	£5,327	£5,327	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Other Engineering	£1,000	£128	–	£1,209	£1,337	134%	£8,000	£2747	–	£870	££3,617	45%
Crane repayment	–	-£1,741	-£612	-£1,588	-£3,941	n/a	n/a	-£541	-£79	-£779	-£1,399	n/a
Sub-total	**£135,928**	**£25,669**	**£61,193**	**£46,906**	**£138,118**	**102%**	**£171,542**	**£51,214**	**£83,912**	**£53,692**	**£188,818**	**77%**
General expenses	£48,150	£13,587	£15,906	£10,914	£40,407	84%	£49,150	£8,801	£16,822	£10,850	£36,473	74%
Loan(s) interest	**£57,000	£520	£1,255	£54,838	£56,613	99%	*£28,000	£445	£1,205	£4,819	£6,469	23%
TOTAL	**£241,078**	**£38,857**	**£83,623**	**£112,657**	**£235,138**	**98%**	**£248,692**	**£60,460**	**£101,939**	**£69,361**	**£231,760**	**92%**

*The £28k shown in the 2023-2024 figures included an interest free loan of £20k which was due to be repaid or rolled over in December. However, it was eventually repaid in January 2024..

**The £57k shown in the 2024-2025 budget figure included a rolled over short term loan of £50k, which was repaid in December 2024. However, and as mentioned in the December emailed bulletin, the lender asked whether we would like to keep £25k for a further year so a new agreement was drawn up and that £25k is reflected in the quarter 3 income figures with the loan interest paid in the quarter.

The usual comparison table for regular donors follows. If you are not a regular donor, please sign up to help us with the final push. Forms are available on our website, or the editor may include one in this publication, if he has the space.

2024/25 Donors			
	New Donors	Lost Donors	Total (£) for Quarter
Quarter 3	4	5	**£22,140**
Quarter 2	2	3	**£21,706**
Quarter 1	2	3	**£22,462**

In comparison to 2023/24			
	New Donors	Lost Donors	Total (£) for Quarter
Quarter 4	1	6	**£21,873**
Quarter 3	1	3	**£22,313**
Quarter 2	0	3	**£22,238**
Quarter 1	1	13	**£22,596**

In comparison to 2022/23			
	New Donors	Lost Donors	Total (£) for Quarter
Quarter 4	3	9	**£22,966**
Quarter 3	3	5	**£22,845**
Quarter 2	0	5	**£23,201**
Quarter 1	2	14	**£23,226**

My usual quarterly bank balance comparisons are provided. They continue to increase and at the time of writing (7th February) they exceeded £415,000. However, I am convinced that they will substantially reduce between now and 31st March 2026 as the chassis reassembly resumes.

Bank Balance Comparison		
	Q3 (2024/25)	Q3 (2023/24)
Opening Bank Balance – 1st October	£363,231	£228,937
Closing Bank Balance – 31st December	£389,796	£255,682

Sales and events income is 94.7% against forecast, Quarter 3 is significantly higher than last year with an income of £5,217 for the quarter. There were £832 Pictorial book sales generated. Raffle tickets have seen a further return of £962 to the end of the quarter, making a total of £5,378 for the year.

In total, sales raised £6,995 for the quarter and a total of £19,600 for the year giving 96% income against budget (65.8% last year.) Our initiative of selling model railway components entrusted to us at varying commission rates is paying significant dividends in terms of income.

Other funding amounted to £35,000, including interest, the penultimate wheels settlement figure and a 1-year loan of £25,000.

Fourth thought for the quarter: I have not provided a detailed breakdown of our various individual expenditure budgets at the risk of overloading the brain. However, I have included the total engineering expenditure but if any reader would like the breakdown, please email me at the usual address of treasurer@lms-patriot.org.uk. Hence the summary.

5551 ENGINEERING EXPENDITURE FORECAST	Q3 – 2024/25			Q4 – 2024/25			Q1 – 2025/26		
	October 2024	November 2024	December 2024	January 2025	February 2025	March 2025	April 2025	May 2025	June 2025
	£	£	£	£	£	£	£	£	£
Current Bank Balance	**£363,231**	**£393,006**	**£424,461**	**£389,796**	**£415,807**	**£408,776**	**£384,345**	**£369,342**	**£336,899**
Income (Budget) excluding Gift Aid	£18,182	£18,182	£18,182	£18,182	£18,182	£18,182	£16,236	£16,236	£16,236
New Bank Balance	£381,413	£411,188	£442,643	£407,978	£433,989	£426,958	£400,581	£385,579	£353,136
Other Expenditure (Budget – excludes loan repayments)	£4,013	£4,013	£4,013	£4,013	£4,013	£4,013	£4,679	£4,679	£4,679
Loan Repayments	–	–	£60.000	–	–	–	–	–	–
Engineering Expenditure	£9,600	£8,263	£27,310	£6,600	£21,200	£38,600	£42,200	£44,000	£54,800
Gift Aid Return	£5,396			£7,573			£4,960		
VAT Refund (Estimated)	£12,305			£5,394			£10,680		
Forecasted Bank Balance	**£385,501**	**£398,912**	**£351,320**	**£410,332**	**£408,776**	**£384,345**	**£369,342**	**£336,899**	**£293,657**
Revised Bank Balance assuming interest on 75% of Boiler Loans is donated back plus Gift Aid	**£387,571**	**£400,982**	**£353,390**	**£412,402**	**£410,846**	**£386,415**	**£371,413**	**£338,970**	**£295,727**
Actual Bank Balance (last day of month)	**£393,006**	**£424,461**	**£389,796**	**£415,807**					
Actual Income in Month	**£46,076**	**£62,440**	**£42,234**	**£35,783**					
Actual Outgoings in Month	**£16,501**	**£31,025**	**£78,986**	**£9,755**					

EXPENDITURE

Engineering spend is £118,000 in total. Over budget but no concerns as plenty of cash in the bank.

General running expenses or overheads for the year-to-date are at 84% of the budget set.

Finally, we had an email discussion with our accountant in December over whether an independent financial examination was sufficient to satisfy the regulatory bodies. After some discussion and a review of the rules of both the Companies Act and Charities Act, our accountant confirmed that a full audit would be required. This was completed free of charge by them, but it will cost us more next year as it replaces the independent financial examination.

It concerned the value of our assets and our turnover exceeding certain amounts and as expected the rules of the two different bodies are slightly different.

Final thought for the quarter: I suppose that is the price of our success.

Best wishes as always.

NEIL COLLINSON, TREASURER *treasurer@lms-patriot.org.uk*

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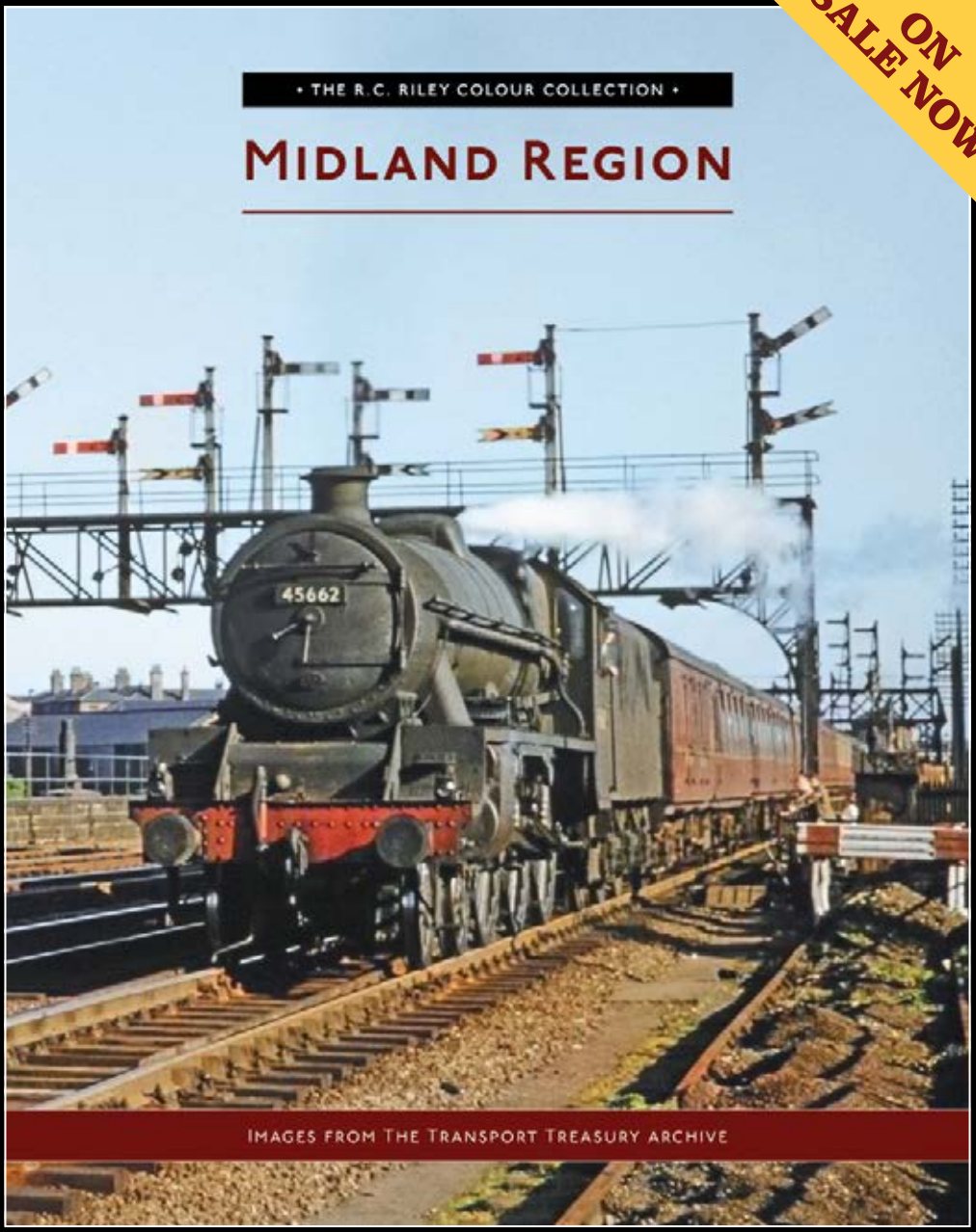
- Start shopping. Every time you shop online, head to **easyfundraising** first. They have over 3,000 retailers on board, so simply pick the one you want to visit and start shopping.
- Now the third and best thing, after you've checked out, the retailer will make a free donation to the project and it won't cost you a penny extra!

All you need to do is remember to go back to **www.easyfundraising.org.uk** before you shop to keep collecting donations, or you may find it easier to download the Easyfundraising Donation Reminder from their website and a reminder will pop up automatically on the shopping website you are using.

"It doesn't cost you a penny extra when you shop online the easyfundraising way with a choice of 3,300 shops and sites. They give us a commission for your purchase, we turn that into a donation and give it to your good cause."



Dick Riley's visits to the Midland lines were rare compared to the Southern and Western which thus makes this album all the more interesting. The LMR is represented with a variety of motive power from mighty Duchess and Princess class engines down to the humblest of shunters, many taken so the background and landscape can be appreciated in addition to the principal subject matter. Produced and compiled by The Warrior editor Pete Sikes.

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PROJECT PROGRESS REPORT

BY KEITH RICHES, PROJECT DIRECTOR AND THE ENGINEERING TEAM

GENERAL

There have been two important developments at Tyseley in the last three months. First, on 10th December 2024 the locomotive chassis moved into position on Number 1 road in the main workshop at Tyseley (see front cover) where we can start the process of recovery and assembly. The space had been freed up by progress on other third-party contracts at Tyseley.

Second, now that our insurance cover is in place, we will be able to get our Volunteer Warriors back in action. The first volunteer day was expected to be Thursday 20th February. Priority will be to move components from our containers in the secure car park and from the carriage workshop into the main workshop and on to the shelves adjacent to the engine, as soon as space on the shelves is made available; and also to continue with cleaning and preserving components as required. In preparation for work to start, the TLW and Patriot CMEs will carry out a 100% audit and identify any remedial work needed before any components are finally fitted.

ENGINEERING UPDATE

LOCOMOTIVE CHASSIS

The first set of refitting tasks has been identified for Tyseley Locomotive Works to commence, and a purchase order has been issued so that work can commence as soon as practicable.

Tasks for Tyseley Locomotive Works include, but are not limited to, the fitting of the horn guides including the production of fitted bolts, finishing of the inside cylinder bolts and the final fit of the inside cylinder plus the repair and fitting of the Inside Motion Support Stretcher.

A pre-production drawing of the machining required on the spring hanger brackets has been supplied to Tyseley Locomotive Works for pricing.

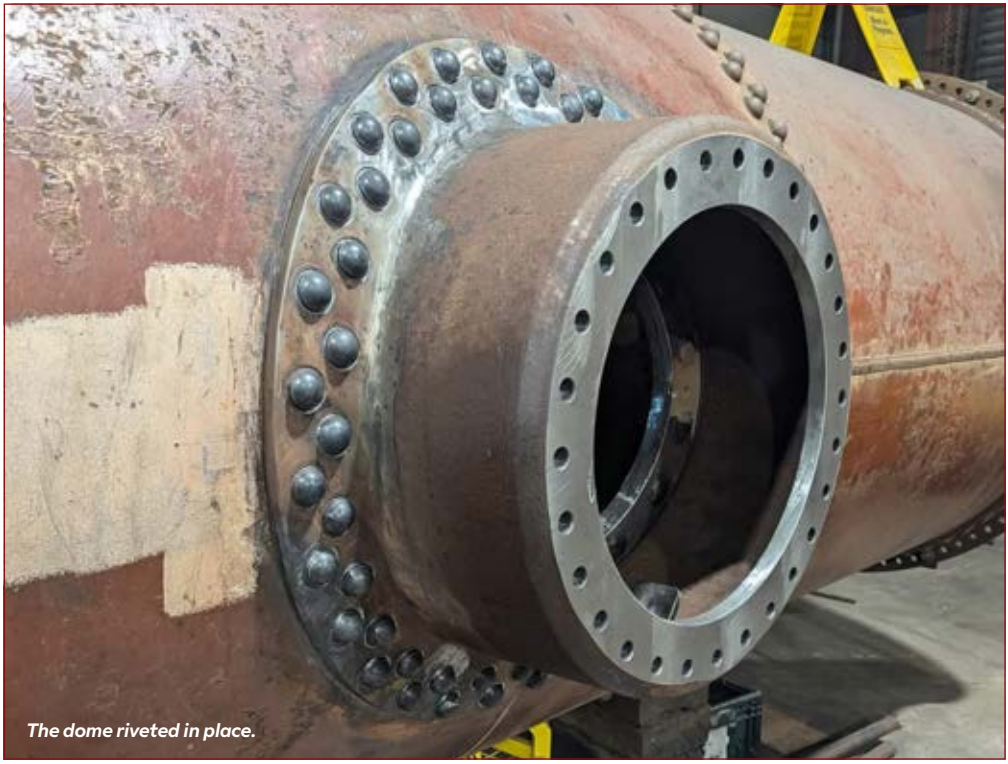
CYLINDERS AND WHEELS

Riley and Son carried out a complete relocation to new premises in Bury in recent weeks so no further progress has been made on the cylinders and wheels. We have been advised that work on our components is expected to restart in mid-February.

FOCUS ON QUALITY

We have come a long way to get to the point where we are ready to start rebuilding our engine. It is vitally important that we take the time to check and recheck everything before we fit any component parts. The process includes but is not limited to ensuring the correct standards are applied, checking configuration, signing off drawings (CME), carrying out risk assessments as required and making sure all supporting paperwork is in place. Everything is reviewed and a final release certificate is issued having been signed off by the CME and QA, only then will a component be released for fitment. It is going to mean we take a little more time, but we need to be sure that everything is to a good standard. So, check, recheck and fit once is the aim.

The regulator and dome trial fitted.



The dome riveted in place.

BOILER

As you will see in the following photographs, good progress is continuing to be made on the boiler work packages. The latest work being undertaken has been on the refurbishment of the regulator valve and the fitting of the shoulder stays.

Meanwhile it has been agreed that a meeting will be held at Heritage Boiler Steam Services (HBSS) to discuss and agree on the technical details and boiler configuration which will enable us to move forward to the completion of the boiler.

TENDER

No further progress has been made with the tender at Leaky Finders. However, a review meeting with them is well overdue and will take place as soon as practicable.

The port face of the Regulator Body being lapped in to provide a tight seal (more on this in Warrior 65).

Regulator body being overhauled and lapping in.


Holes drilled for shoulder stays.
LYTE

ILLUSTRATED GLOSSARY

TEXT AND CAD DRAWINGS, KEVIN WEST, PROJECT DESIGN ENGINEER

Following several requests for a layman's description of some of the terms used in the Project Progress Reports it has been decided to build up a Glossary for the benefit of members and volunteers. Descriptions of the parts will use the official LMS terminology.

It is intended to continue this in future issues of The Warrior, so we can build up, over time, a comprehensive list. Alongside this glossary will be a number of articles describing the main features of locomotive construction. The first in next issue will cover the locomotive chassis.

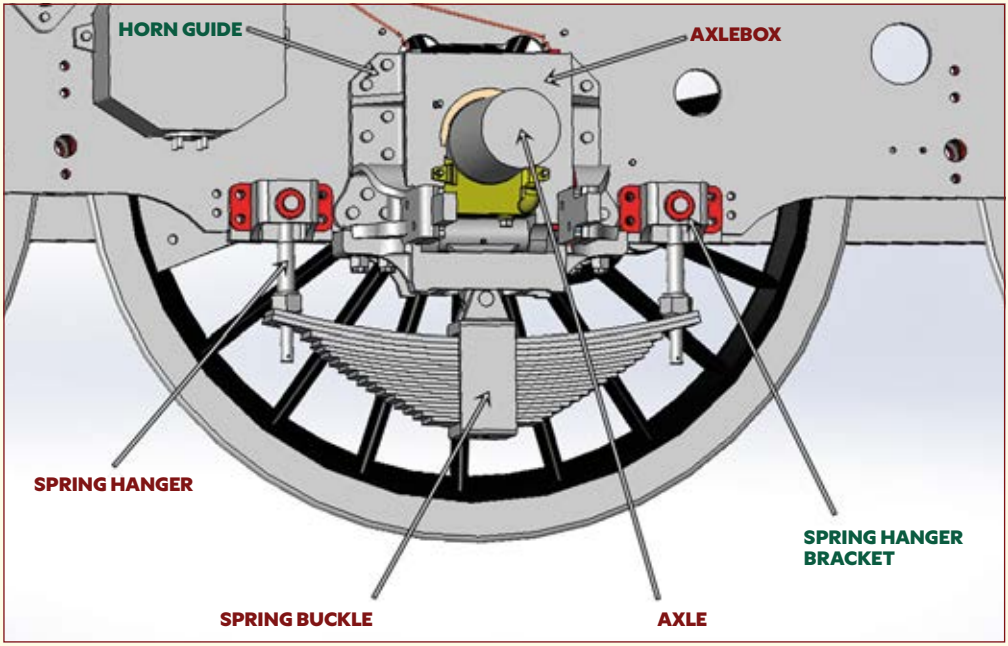
We start the glossary with a few items from this issue.

SPRING HANGER BRACKETS

The Driving Wheel Springs on the Patriot class are steel leaf springs, mounted in a buckle, which is attached to the bottom of the Axlebox. Each end of the top spring leaves are suspended from the chassis on adjustable Spring Hangers. The attachment at the top of the Spring Hanger is a casting, the **Spring Hanger Bracket**, which is riveted to the Main Frames.

HORN GUIDES

The **Horn Guides** are castings, normally either of cast iron or steel, that are fitted rigidly to the Main Frames or Bogie Frames and provide a precision guide for an Axlebox to slide up and down in.



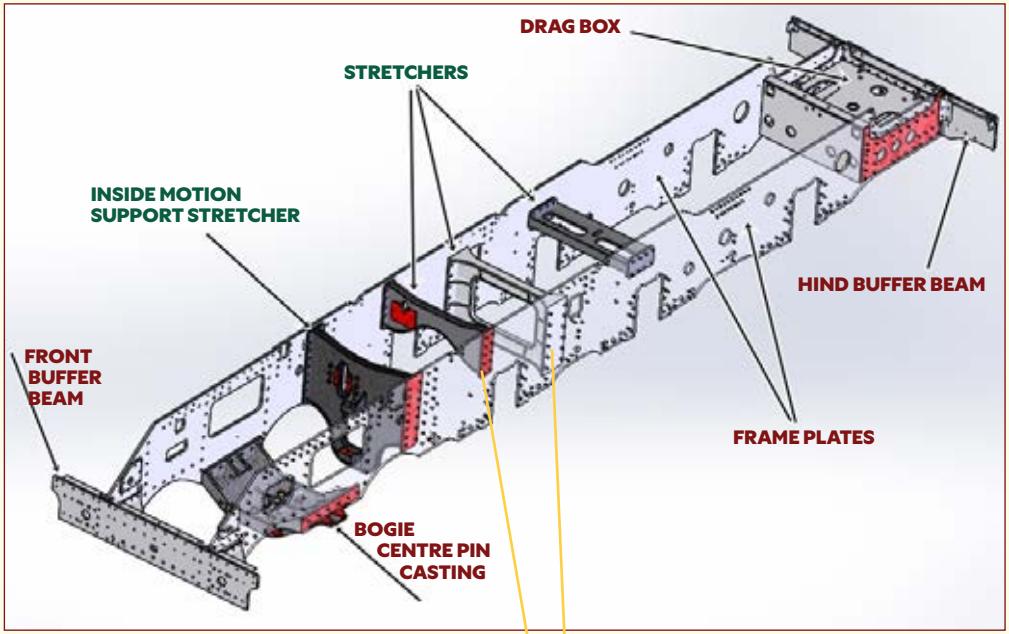
Green text in the description relates to the part highlighted with matching green annotations.

FITTED BOLTS

A **Fitted Bolt** is a fixing used for attaching parts that are not regularly removed from the finished locomotive. The bolt comprises a head, a plain precision turned diameter body with a threaded end for fitting a Nut. The parts to be attached will be drilled and the holes then reamed for a high precision size and finish. The **Fitted Bolt** is then turned with the body diameter a few thou (thousands of an inch) larger diameter than the reamed hole to give a slight interference fit. The bolt is driven into the hole and then a nut is fitted onto the threaded end.

STRETCHERS

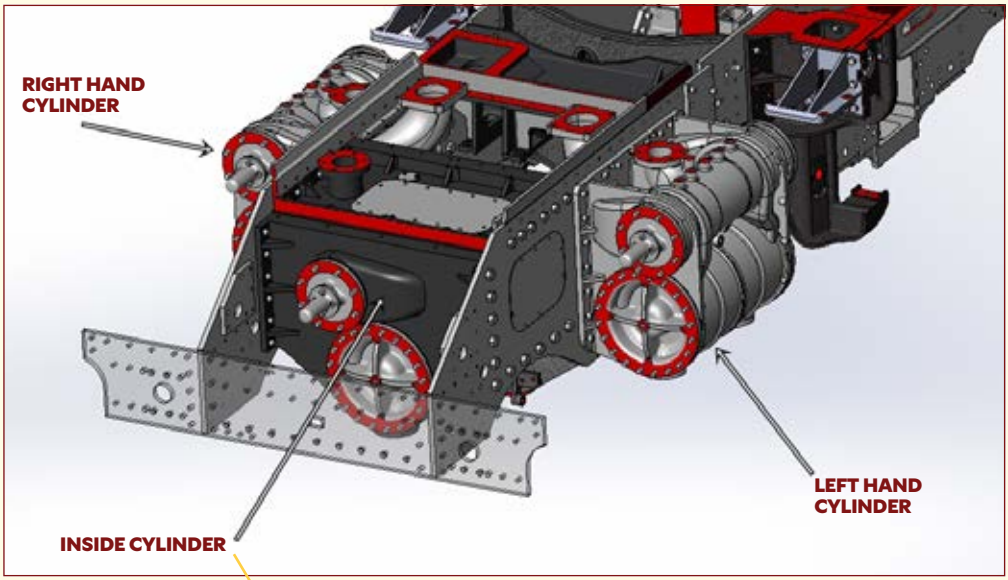
In very basic terms, a locomotive chassis consists of a pair of plate Main Frames that stand vertically and run the length of the locomotive, with Buffer Beams at the front and hind (rear) ends. Between the Frame Plates are fitted **Stretchers**, to strengthen the structure,



keep the frames aligned and straight and also provide locations and mountings for other components. These stretchers can be castings, as on the Patriot, although the GWR fabricated stretchers from plate and angle section steel. This will be covered in more detail in the next Warrior's feature on the Locomotive Chassis.

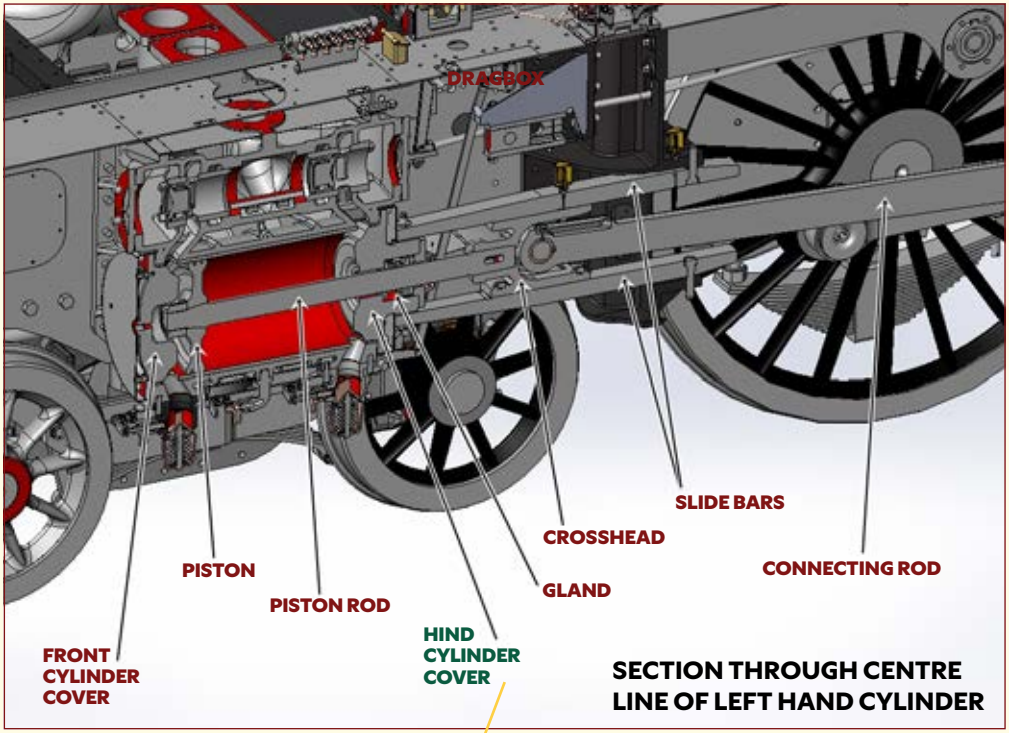
INSIDE CYLINDER

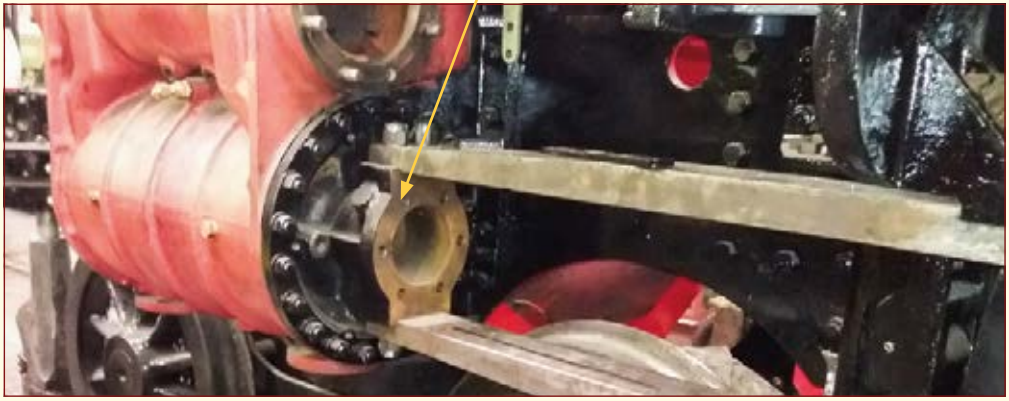
The Patriot class locomotives are fitted with three Cylinders, two outside each Main Frame Plate and the third, the **Inside Cylinder**, is fitted between the Frames under the Smoke Box.



HIND CYLINDER COVERS

The cylinder bores are sealed at each end with cast iron castings, the Cylinder Covers are held in place by 20 studs and nuts of 1 inch diameter. The Front Cylinder Cover is normally fairly plain and is a removable service part. This is to allow the Piston and Piston Rod to be removed out the front of the Cylinder for servicing. The **Cylinder Cover** at the hind (LMS railway terminology for rear) end of the Cylinder is normally not disturbed after initial fitting as the cover usually also carries the mountings for the Slide Bars. There is also a gland and steam tight packing for the Piston Rod to pass through.





Railway 200

200™ Years of Train Travel Since 1825

As most of you will be aware by now, September 2025 will mark the 200th anniversary of the opening of the Stockton to Darlington Railway. To commemorate this anniversary, a year-long series of national events are planned. The highlight of these events is a three-day open weekend at Derby Litchurch Lane carriage works which is operated by the train builder Alstom. The open weekend, titled 'The Greatest Gathering', will run from 1st to 3rd August and tickets have already gone on sale. Over 50 items of railway rolling stock are expected to be on display at the event showcasing iconic vehicles from the past, present and future of Britain's railways. The LMS-Patriot Project has applied to be an exhibitor at this event and we are hoping to have a display promoting the Project as well as having our sales stand at this event. Railway 200 will be an ideal opportunity to promote our Project in what promises to be a year-long series of events which will gain national attention and hopefully bring some publicity to the Project.

Another event at Polmadie Depot near Glasgow, also operated by Alstom, is planned for September and we are awaiting details of this.

We are also looking at other opportunities to promote the Project and having a display and our banners at some prominent locations around the country.

Railway 200 aims to celebrate 200 years of the modern railway as well as commemorating the opening of the Stockton to Darlington Railway. Four main themes will be explored: skills and education; innovation, technology and the environment; heritage, culture and tourism and celebrating railway people. The LMS-Patriot Project intends to be very much part of this national event.

Further information about Railway 200 is available from: https://railway200.co.uk

THE NAMING AND RENUMBERING OF 5513 TO 5551

Our 3½ inch gauge Patriot live steam model — which some of you will have seen accompanying our sales stand around the country — has been given a change of identity from No. 5513 to now represent our loco, No. 5551 The Unknown Warrior.

To enable us to transport the model safely we have also had a case manufactured and thanks to a very generous donation, plus a couple of smaller amounts, we have covered just under half of the total cost. If anyone would like to make a contribution to help us cover the full cost, please contact us at: **office@lms-patriot.org.uk** or call us on **01785 244156.**

FROM THE OFFICE

OFFICE DETAILS

LMS-Patriot Company Ltd.,
Civic Centre, Riverside,
Stafford ST16 3AQ.

01785 244156 or 07801 945689
email: membership@lms-patriot.org.uk

Over the last couple of months we have been kept reasonably busy with membership renewals but we have not signed up any new members. In previous years, especially during the festive season, existing members have arranged for a friend or family member to join as a gift and have asked us to send the membership pack out. It is a very good way to encourage new interest in the project. If you are looking for something different to give, then please think about a subscription. The pack can either be sent to you or direct to the recipient.

We are asked the following questions quite often, so I thought it would be a good idea to include the answers here.

What should be quoted as the reference on a bank transfer?

Your unique reference number (URN) or membership number is ideal and if there is space, please also indicate what the payment is for e.g. subscription, donation, goods, draw, etc.

Please note that in the office we don't have access to the bank statements so if you could email *membership@lms-patriot.org.uk* after you have made a bank transfer the finance volunteer will be able to look out for it.

I haven't received a new membership card this year.

To cut postage and administration costs, cards are no longer sent on an annual basis.
The card you have remains valid if the annual subscription has been paid.

N.B. If you have lost your card or it is damaged, just let us know and a replacement can be sent at any time.

I left a message on the answerphone and no one has responded the same day.

Due to the limited number of volunteers there may be a delay and occasionally this could be longer than we would like but rest assured someone will get back to you as soon as possible.

How do we send used ink cartridges for recycling to raise funds for the project?

Recycle4Charity stopped providing envelopes for this purpose some years ago. To find out how to send your cartridges, log on to *www.lms-patriot.org.uk* and from the home page click on 'Support Us' then 'How you can help'. At the foot of that page you will find details of how to print a label to attach to your own envelope or package. Alternatively head directly to the recycle4charity.co.uk website.

The online renewal system isn't straightforward.

If, when you are using the online renewal facility you encounter a problem please make a note of what happens and let us know so that it can be investigated. Should you opt to 'pay later' you will need to make a transfer to our account from your bank or send a cheque. Online payments are dealt with by debit or credit card through PayPal. You do not need a PayPal account to complete the transaction although the procedure you are asked to follow may give that impression.

Why has the renewal invitation letter changed?

The letter has ben updated to give more information and to show the various options for renewal. If printed, it now covers two sides of A4 paper. If you receive it by email please don't feel that you need to print the whole letter and post it to us – we don't want you to use up lots of paper and ink. A simple note or email confirming you wish to renew, including how the payment has or will be paid is quite sufficient.

I hope that you find the information above is helpful. If there is anything else you would like me to cover in future magazines, please let me know.

Finally, it would be great to have some new faces join us. Volunteers are needed for various roles and if you live within travelling distance of Stafford, please consider joining our small team looking after the ever increasing amount of paperwork.

Contact details can be found at the top of the opposite page.

Linda Westerman, Office Manager

LAST FEW LMS BESPOKE NUMBERS REMAINING

For a donation of £80 change your membership number to one of the remaining Patriot LMS loco numbers. We will then issue you with a new membership card and a certificate with your chosen number, plus the donation you make goes towards your ticket for the first train.

Numbers are sold on a first-come, first-served basis, those that remain are listed below. BR numbers in Locomotive Green or Lined Black and LMS numbers are available in either Crimson Lake or Lined Black as per the examples shown below.

Any bespoke numbers that become available through non-renewal will be offered for sale again. It is also allowed to pass your bespoke membership number on providing the person you pass it onto remains a member and renews their membership.

45509	45532
5505	5535
5508	5539
5516	5540
5523	5545
5530	5547
5531	5549
5534	

Call the office on 01785 244156 to order your bespoke number

SALES REPORT

SALES@LMS-PATRIOT.ORG.UK
EVENTS@LMS-PATRIOT.ORG.UK

In January, we were booked into The Battlefield Line Winter Warmer Gala but we decided to cancel our attendance at this event due to the predicted extreme weather conditions. The GCR Winter Gala at Quorn was our other booked event for the month.

Behind the scenes we were extremely busy collecting several large book donations and arranging a very generous donation of N gauge locomotives. With the help of Dave Westerman all these locos were tested ready for sale at the aforementioned GCR Winter Gala.

Other work done in January has been requesting attendance forms from various venues and events for us to attend later in the year.

January 23rd arrived and we set off for the marquee at Quorn, the weather again was very cold and rain set in later in the day. Friday 24th arrived along with Storm Eowyn giving us the benefit of its very strong winds. The marquee just about managed to remain grounded, but an experience I'm not sure I enjoyed, or will I forget.

The four day event was again very successful and returned good sales for the Project. The team for the four day event was myself and Janet Elson over Thursday and Friday. Brian Taylor, Ian Kinsey, Neil and Karen Kinsey and Neil and Sue Collinson worked the Saturday and Sunday shifts. Many thanks indeed for their help and time given. The total sales for this event and January in total (at the time of writing) amounted to an impressive £4,000.

I would like to pass on our sincere thanks to Philip Gartside from Jersey for his very generous N gauge donation and Richard Sant for his large donated book collection.

There are no February events booked to date but March is looking very busy indeed. See the events chart opposite to see if you can come and help out. These shows are provisional upon volunteers giving their time to help man the stands. Please make contact on **events@lms-patriot.org.uk** if you can offer some of your time to help out.

KIND REGARDS, ROGER BATEMAN/JANET ELSON • *sales@lms-patriot.org.uk*

ARE YOU LOOKING TO SELL YOUR MODEL RAILWAY?

If you are thinking of selling your model railway, or you are a member of a model railway club and know of others who are, then why not consider selling it to us?

Model railway sales have been a great source of income for the Project on our sales and publicity stand. While we are extremely grateful and love the fact that many of you have made generous donations over the years we have decided that we are also happy to give quotes to buy collections.

All profits from the sale of models go directly to The LMS-Patriot Project.

PLEASE GET IN TOUCH AT

sales@lms-patriot.org.uk or call 01785 244156

2025 SALES EVENTS CALENDAR

Event	*Date*	*✓ = Booked P = Provisional*
GCR Spring Mini Gala	Saturday 1st March Sunday 2nd March	✓
Statfold Barn Steam Enthusiasts Weekend	Saturday 8th March Sunday 9th March	✓
London Festival of Railway Modelling, Alexandra Palace, London	Saturday 15th March Sunday 16th March	✓
Keighley & Worth Valley Railway Spring Gala	Thursday 20th March Friday 21st March Saturday 22nd March Sunday 23rd March	*P*
Dostill Boys Club, Tamworth (by request)	Saturday 29th March	✓
GCR Road, Rail and Steam	Friday 18th April Saturday 19th April Sunday 20th April Monday 21st April	*P*
Statfold Barn Mini Steam Event	Saturday 10th May Sunday 11th May	*P*
Staffordshire Regimental Museum	Monday 26th May	*P*
GCR Railwayana Swap Meet	Sunday 22nd June	*P*
Soar Valley Model Railway Club, Model Railway Exhibition, Loughborough	Saturday 16th August Sunday 17th August	✓
Gauge 'O' Guild Bingley Hall, Stafford County Showground	Saturday 6th September Sunday 7th September	*P*
Leigh Festival of Model Railways & Transport Modelling Leigh Sports Village Leisure Centre	Saturday 13th September Sunday 14th September	✓
Lichfield Model Show	Saturday 20th September	✓
LMS-Patriot Project Members Day and AGM Tyseley Locomotive Works	*Suggested date: Saturday 20th September (TBC)*	*P*
Stafford Railway Circle Annual Model Railway Exhibition Bingley Hall, Stafford County Showground	Saturday 27th September Sunday 28th September	*P*

Patriot 4-6-0 No. 45509 ***The Derbyshire Yeomanry*** *stands in Manchester Victoria station, c.1959.*

Photo: Kenneth Field © Rail Archive Stephenson

MEMBERS' CORNER

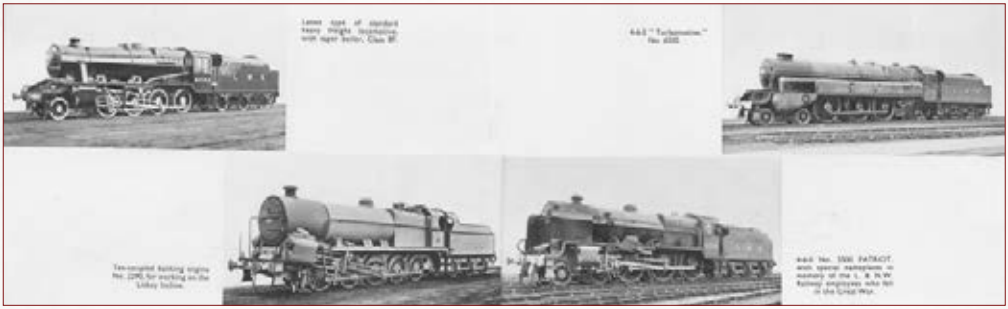
Please note that the views expressed by contributors are not necessarily those of the Project.

OBSERVATIONS AND SUGGESTIONS

Dear Mrs. Westerman

I have four points to raise – and this appears to be the point of contact for each, so I am sorry to load you with these queries/observations– but here goes:

1. In sorting out my father's papers (he died 35 years ago, so you can see how organised I am!) I found the enclosed sheet of photographs, and I wondered if they were of interest to our splendid editor of *The Warrior*. By their orientation on both sides of the sheet they might have been intended for a booklet. I don't know anything about their origin and there is no attribution on the sheet. All images are marked LMS so it probably dates from prior to 1948. Several are obviously 'posed' with their coupling rods in the classical down position, and seem to be in workshop grey i.e. just outshopped from the works. The photo of Royal Scot (actually three years its junior renamed and renumbered from No. 6152 *Kings Dragoon Guardsman*) obviously dates from after 1934 as do the portraits of the Princess Royals and Jubilees. It's nice to see 5500 in original format apparently in 'service' livery. Please use these illustrations as you wish and don't bother to return them, as I cannot justify keeping them any longer.



The images referred to above are in fact on a printer's 'running sheet' prior to trimming and binding into a book.

2. My second point concerns the Members' Day. While I can appreciate the frustration of the long waits between 'events', I think the occasion must have presented huge logistical difficulties and so thanks are due to our Club administrators in working around the onerous restrictions imposed by our 'hosts' Tyseley Loco Works. I personally greatly appreciated the opportunity to see the actual 'steelwork' having only been able to read about it for several years.

   But two things spring mind about this event:

   a. In the, chaired, general discussion after lunch a very good point was raised by a member of the audience. He pointed out that many (most?) of the membership are not professional engineers and so more (or detailed) explanation of what is reported in the engineering section of the splendid journal (The Warrior) would be welcome. This idea was welcomed by the chair – but has it been transmitted to the Editor? A case in point appears in the latest

Thank you to all who contributed their articles that appeared in Warrior 63, we are grateful so many of you decided to contact us. Remember that you can send anything Patriot, memorial, war or railway related and photos are always good to receive (if you do send photographs please supply a return address). Preferably send your contribution by email to **office@lms-patriot.org.uk** or post directly to the office:
Linda Westerman, LMS-Patriot Company Ltd., Civic Centre, Riverside, Stafford ST16 3AQ.

edition (November, issue 63) where reference is made in the Engineering section (para 6) to "machining the wheelpans". I can find no definition of 'wheelpans' in my own loco literature or on Google. The only illustration relevant to the driving wheelsets – on the opposite page – shows obvious machining of the HUBS – but what are wheelpans, please?

b. I was disappointed in my own workshop tour (B) to find our guide unable to explain the nature or function of several items among the 'Patriot' components on the floor of the carriage shed – indeed several queries about components and assembly processes could not be answered as our guide was a 'Tyseley' man. Could future tours be co-led with someone involved in the actual construction of 'our' locomotive?

c. Perhaps a display of the various photographs from the engineering section of The Warrior (supplemented if possible or necessary) be on display in the 'holding' area of the event,- manned perhaps by a member of our engineering staff (perhaps in rotation) to give explanation and this might afford a useful and helpful feature/distraction for those awaiting or returning from their tour and awaiting refreshment? This is intended as a helpful suggestion for, hopefully, a not too distant future Members Day event.

3. I am fascinated by the account of the visit to LSL Crewe Depot. I didn't learn about this one on time to apply; but I would really welcome the opportunity to visit LSL (or 'similar places of railway interest') should the occasion arise.

4. I apologise for this long missive– but I hope that at least some of it proves useful. Please find enclosed a donation to celebrate the New Year.

KIND REGARDS,
(DR.) JOHN D. LILLEY, MIDDLEWICH, CHESHIRE. MEMBERSHIP NO. 5548/04

OBSERVATIONS AND SUGGESTIONS – CHAIR'S REPLY

Dear Dr Lilley,

Linda Westerman has shown me your letter of 2nd January 2025 and I am much obliged to you for raising these various points, and I comment as follows (using your paragraph numbers for reference.)

1. Thank you for sending us your father's photographs. I will make sure our Editor gets to see them and decides how we might use them.
2. Thank you for these general comments. We learned a lot from our first experience at Tyseley. We have yet to discuss how we can improve for next year, with 5551 now in the main workshop area (which you will recall was barred to visitors in September). Access to the locomotive is crucial.
   a. Your comments about technical explanation for non-engineers are very well made, not least because, owing to other pressures, I did not follow up after the Members' Day discussion.

I am very much in that category myself, as is our Warrior Editor. My first thought is that this is not a straightforward matter: our volunteers with engineering knowledge are in short supply and they are not technical journalists. Also, I have listened in on expert discussions about what the correct term for an individual component actually is: some of these may be down to differences in historic railway company approaches. Options at the generic level could include a glossary of terms or an annotated diagram. I am sure you have seen that there are several of these on-line, but scrutiny of them reveals that – while they are helpful – the level of detail included falls short. We do not have the resources to produce comprehensive versions for ourselves. However, after initial editorial discussion prompted by your letter, we intend to explore with our two engineers how we can work with them to start to add some kind of explanatory glossary for terms used in the current Warrior issue. Oddly this hasn't been a burning issue for us up to now, but it's well worth a shot.

In the meantime, I think even I can comment about your wheelpan question. You are right: the specific on-line steam locomotive glossaries/diagrams I could find are silent on the subject. Our own master parts list makes no reference to wheelpans *per se*. However when I Googled 'locomotive wheelpan' and scrolled down several links, I spotted – somewhat bizarrely – a link to an old South Devon Railway article (ignore the current date if you have a look) describing our own original 'wheels' as 'wheel pans: i.e. the whole wheel casting, which, in their parlance at least, becomes a wheel only when tyres are added and, possibly, axles fitted. (SDRE are one of the very few heritage experts in this area – in 2023 we asked them to quote for wheelset assembly but they were not interested.) So, if we accept their parlance we have machined only part of the wheel pans.

b. We too were disappointed that our two volunteers with steam railway engineering expertise were unable in the end to attend the Members Day. This left our risk assessment expert volunteer on his own in the carriage shed: he did his level best in the circumstances. We do not want that to happen again.

c. I very much like the idea of a photo display. We will build this thinking into our planning for the next event.

3. I will pass your comments on to the organiser of the LSL visit.

4. I think I too should apologise for this 'long missive'. Rest assured that yours has given us food for thought. Last but not least, may I thank you not only for your current donation but your very significant financial support over the years. Thank you for staying with us.

YOURS SINCERELY,
COLIN HALL, LMS-PATRIOT COMPANY CHAIR

Dear Colin,

My thanks for this month's update holding out the prospect of better progress during 2025 than in some recent years. But please, please, do not include any further paragraphs beginning with the word 'unfortunately'. It has been used many times in Warrior reports and appears again here under Sales. I doubt that I'm the only reader to whom it conveys a wholly negative message at a time when some really positive news is longed for.

BEST WISHES, GRAHAM BENTLEY, MEMBERSHIP NO. 837/07

Dear Mr Sikes

I am an LMS-Patriot member (No 5550/04), and wonder whether you might wish, at some stage, to include the attached image as a 'filler' in the magazine. I provide below the information taken from the back of the card. The railway cards produced by Photochrom are often, shall we say, 'lacklustre' but they do after all record steam railway history and are therefore of value.

Every good wish to The Unknown Warrior cause, which I heartily support.

KIND REGARDS, DOUGLAS D'ENNO, BRIGHTON

THE RED ROSE

12.30 p.m. from Euston to Liverpool at Hatch End, Middlesex. Rebuilt 'Patriot' class engine 45521 *Rhyl.*

Published by Photochrom Co. Ltd., Graphic Studios, Tunbridge Wells. By courtesy of British Railways.

2025 CALENDAR ERROR

It came to light in January that there was an error in the 2025 calendar, those of you who purchased the calendar may have noticed already. I am sure though that when March comes around plenty of you will notice.

The error is on the weekend of 29/30 March where 1/2 has been typed instead. As I produced the calendar I can only apologise for the error and promise to ensure that it doesn't occur in the 2026 version.

PETER SIKES, WARRIOR EDITOR

REORGANISATION OF CREWE LOCOMOTIVE WORKS, L.M.S.R.

One large shop equipped with the latest appliances replaces nine older erecting shops

Processing or 'belt' system of building and repairing locomotives introduced

Production and transport methods reorganised – time for a heavy locomotive overhaul reduced to a maximum of 12 working days.

General Introduction

The maintenance of a large stock of locomotives in an efficient state of repair, with, in addition, the building of new engines on a fairly wide scale, is a task involving many difficult problems, and the prevailing conditions of the railway industry demand that the closest possible investigation be applied to the solution of these problems. It is not alone sufficient that the plant available should be of a modern character and that the methods followed in the various shops suffice to ensure a tolerably satisfactory output in what may be termed a "reasonable" amount of time.

Today conditions are such that a railway company, and particularly a grouped railway system owning large numbers of locomotives, must explore every possible avenue of economy, whilst striving at the same time to increase output and always to maintain, if not actually improve, the standard of locomotive upkeep. In point of fact, any new method or system aiming at the betterment of shop conditions in the productive sense must not only reduce the amount of time and labour necessary to achieve the required output, but must, at the same time, increase, wherever possible, the factor of safety as represented by added stringency of inspection and an equal standard of workmanship in the various operations involved. As those acquainted with large locomotive building and repairing establishments are fully aware, such a problem in its every phase demands the closest scrutiny, and not the least of the difficulties to be met is that of co-ordinating efforts throughout the shops and the distribution of the labour forces to the best advantage. Such outstanding matters as transport of material, progressing of work operations, departmental production methods, time and piecework studies, and other items are inseparably bound up with any far-reaching scheme aiming at the systematisation of works operations throughout a large and largely self-contained plant, and these points – to which might be added many more – must be kept in mind in reviewing what has been done at the Crewe works of the London Midland & Scottish Railway, where during the last three years a complete reorganisation, which might aptly be termed a metamorphosis of the whole system of operations, has been carried out. Even a brief survey of this programme of reorganisation suffices to demonstrate the effectiveness of what has been achieved and to indicate the enormous amount of work and study that has been devoted to the problem.

With the exception of one new main building known as the Erecting Shop South, little has been done in the way of adding to or rebuilding the existing shops, the scheme relying for its effectiveness upon the complete recasting of the methods followed in all departments for the purpose of expediting work at every stage, increasing the output of repaired locomotives, in addition to building new ones, at the same time developing an even more thorough system of inspection during repair, and by these combined means securing longer periods of service from locomotives between heavy repairs, which in turn means greater individual engine mileage and more profitable use made of the locomotive stock in general.

Close acquaintance with all that this means and an investigation of the system adopted at Crewe serve conjointly to impress one with the degree of thought and ingenuity with which all the difficulties necessarily arising from such a complete reorganisation have been disposed of. The method adopted of erecting new and repaired locomotives is that known as the processing, or 'Belt' system, one which has hitherto been associated more particularly with automobile construction, the main principle being that every movement and every task associated with the work shall progress in strict accordance with a pre-concerted plan, everything that

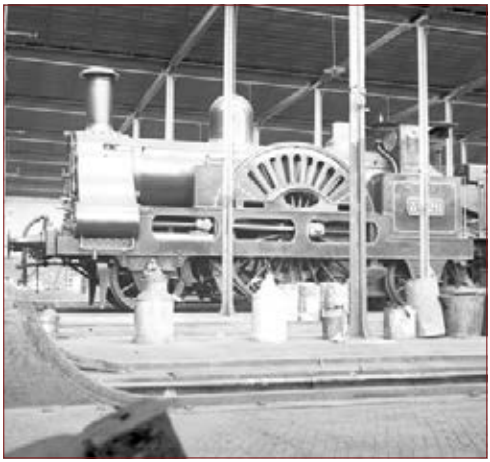
Crewe Works façade as seen on 3rd April 1966.
PHOTO: A. E. BENNETT
© THE TRANSPORT TREASURY

might be even partly haphazard being rigorously exorcised, and wastage of all kinds ruthlessly cut out. All movements of material and parts are co-ordinated and provided for in a special system of transportation, a time schedule provided for each important movement, and a rule enforced that work once taken up shall not be put down until completed. In the description of the system which follows we shall endeavour to elaborate these points by actual instances of what occurs at various stages of production in the Crewe works, commencing with a general survey of the 'Belt' system, and proceeding thereafter in further articles to individual studies of the methods employed in the numerous departments responsible for the production of new and repaired units, all combining to ensure the objects aimed at as enumerated above.

By the courtesy of Mr. R. W. Reid, C.B.E., Vice-President for Works and Ancillary Undertakings, and of Sir Henry Fowler, K.B.K, Chief Mechanical Engineer, London Midland & Scottish Railway, we were enabled recently to spend some time in the works at Crewe investigating the new system, every assistance and facility being placed at our disposal by Mr. H. P. M. Beames, Mechanical Engineer, Crewe, and members of his staff.

FACTORS GOVERNING REORGANISATION

In reorganising the Crewe works, particular thought and study were devoted not only to the processing of locomotive building and repair operations but also applying the same principle to the production and repair of individual parts. This system ensures that the locomotives in the erecting shop and the components in the various departments pass forward from stage to stage, where all operations are carried out in the correct sequence, the main underlying principles being: (1) that of moving the work to the men rather than the men to the work, and (2) that work shall be carried out continuously – that is to say, any task taken in hand shall be pushed through to completion without any intermediate delays. The need of reorganising the shops was very fully realised after the war when it became possible to resume, on something like normal lines, the maintenance of locomotives, the general condition of which had naturally fallen below the usual standard due to concentration on war work. In 1921 a commencement was made with the building of a new erecting shop at the



Webb designed LNWR 'Dreadnought' class 2-2-2 No. 3020 pictured on display inside Crewe Works on 23rd February 1936.
PHOTO: GEORGE BARLOW © THE TRANSPORT TREASURY

west end of the works area, this being a definite part of a scheme of improvement in the building and repairing of heavier classes of engines, the intention being to liberate the older erecting shops, of which altogether there were nine, and adapting them for other operations. Owing to the urgent need of economy felt throughout the country, it became necessary to suspend work on the erection of the new shop, and the scheme then in mind was revised, a definite start being made in March 1925, and carried to completion in the comparatively short time of two years. A main difficulty at Crewe in regard to the expansion of the site and buildings is the narrowness of the limits of the works area, expansion being only possible in a westerly direction. The works boundaries in any other direction are represented by the town of Crewe itself and the railway lines to the east and south.

In planning the new system of working it was decided to concentrate in one extensive and modern shop all operations connected with the erection of new and repaired locomotives and of altering, as found necessary, certain other buildings to meet the fresh conditions. An entirely new range of steel-melting furnaces, housed in a new building having the most up-to-date electrical equipment, was laid down. It being found impossible, as already indicated, to expand the works other than longitudinally, and even then only in a limited sense, a scheme to improve the internal system of working and reorganisation of shop methods was concentrated upon, particular regard being paid to the cutting out of all unnecessary transportation. The then existing erecting shops, nine in number, were spread from one end of the works to the other, and there were also two main machine shops, one in the old works at the east end of the site and the other at the west end, the two being probably some 1½ miles or more apart. The nine erecting shops aggregated between them 256 engine pits, but with the new progressive arrangement, incorporating the belt system, there are only 72 pits, from which, however, a much larger output is secured, due to the improved methods followed, by means of which the time spent in a heavy overhaul has been reduced from 30, 40, or even 50 days to a present maximum of 12 working days for the largest engines and eight for small 0-6-0 classes.

The reorganisation of individual shops has, wherever necessary, been very completely carried out, the machinery rearranged and much modern plant laid down; whilst, with a view to concentrating definite

LNWR Class 3I7 0-4-2ST No. 47862 stands outside the Signal and Tin Shop (61 and 65 on works layout) shortly before withdrawal from service in 1956. Also known as Saddle Tank Shunter, Dock Tank or Bissel Tanks the class consisted of 20 square saddle-tanked steam locomotives built by the LNWR at Crewe Works between 1896 and 1901. They had a very short coupled wheelbase, with a trailing Bissel truck to carry weight. All passed to the LMS in 1923, who initially allocated them the numbers 6400–6419 in the passenger tank sequence. Only five had been renumbered before the numbers were changed to 7850–7869 in 1927, thus moving them into the goods and shunting tanks, changing their power classification from 1P to 0F at the same time. Only two, 47862 and 47865, survived to enter British Railways service in 1948; 47865 was withdrawn in November 1953, and 47862 three years later. PHOTO: © THE TRANSPORT TREASURY

Webb Class G2A No. 49361 being prepared for its duties outside the Steel Foundry (24 on works layout), on 16th February 1964. It was during this week that the loco was transferred from Crewe South (5B) to Bescot (2F). PHOTO: TONY COUSINS © THE TRANSPORT TREASURY

classes of operations in the same area, complete sets of plant have been moved from one shop to another, the result being seen in greater economy and expedition in building and repairing operations, redundant transport being eliminated and work efficiency improved all round. An entirely new system of reinforced-concrete tractor paths has been laid down to provide roads from the part shops to the erecting shop or finished work stores, as the case may be. Electric and petrol trucks are utilised for the conveyance of material and parts, other than heavy units, from one section of the works to another. The transportation methods previously employed involved the use of steam shunting locomotives hauling wagons on standard-gauge tracks, a system obviously making for considerable unavoidable delay and lack of economy. The whole of the permanent-way layout in the works area has been remodelled, and now provides accommodation sidings, also facilitating the movement of heavy material such as boilers, etc., taken direct from the erecting to the boiler shop, and vice versa, clear access being provided to any of the bays in the erecting shop, whilst all tracks are interconnected. The locomotives repaired at Crewe belong to the western division of the L.M.S.R., incorporating the whole of the original L.&N.W. and North Staffordshire systems.

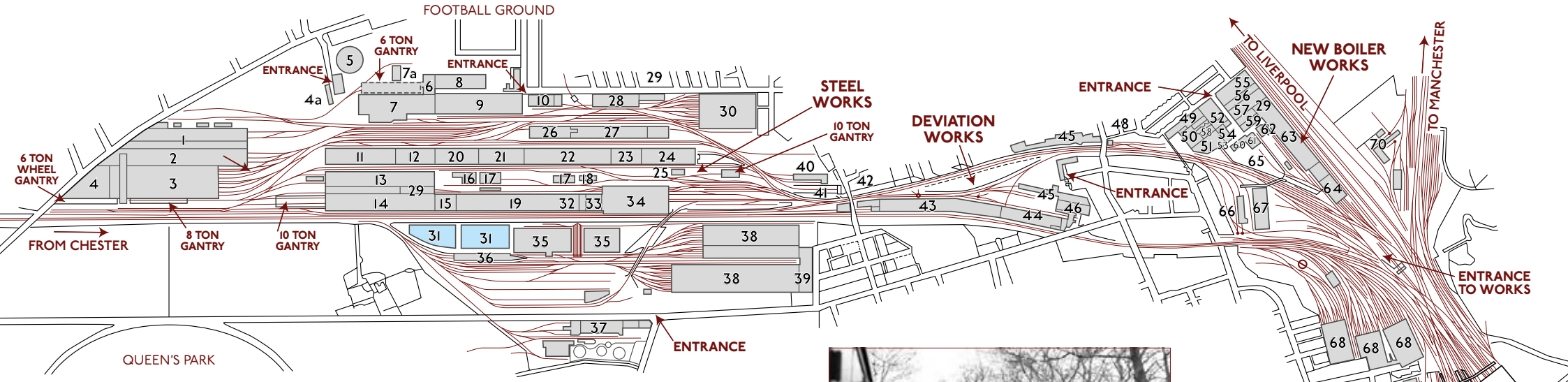
The Processing, or 'Belt' System of Working

Reference was made above to the association between the processing, or belt system of working and the automobile industry, but the application of this principle at Crewe necessarily differs somewhat in detail from that followed in a motor car factory, for the reason that the size and weight of the individual units and their parts are greater and the number of operations increased, whilst movements are naturally slower. The new erecting shop consists of three bays, the greatest length of the building being 910 ft. and the total width 194 ft., the height to the eaves being 35 ft. The building is located at the extreme west end of the works area, parallel with the machine shop and old (No. 9) erecting shop. The new erecting shop is fully equipped with compressed-air appliances, the mains being carried along the floor parallel to the pits and tapped at engine lengths. The whole of the shop is electrically wired for power and lighting, and electrically operated portable cylinder-boring and port-facing machines are employed.

Each of the three bays has two pit roads or belts. Four of the six belts are at present in use, three of them having 12, and the remaining one, eight stages. Each belt provides one completed engine per day, or six per week, whilst in addition, six heavy repairs are completed on the "group" system, these being of irregular types. Under this latter system of repairing engines, the men are employed in groups doing regular work, such as stripping groups, assembling and finishing groups, various stages of the work being undertaken by the particular groups allocated to these specific parts. The stripping groups are stationary, but the assembling and finishing groups pass from engine to engine within certain areas. As the belt system is developed, these types will also be repaired in accordance therewith, and the group system discontinued. An additional centre road, without pits, traverses the length of the bay, this being used for traffic purposes, i.e., conveyance of material, etc. The complete shop provides on the six belts, 72 repair stages in all, but, as previously explained, only four belts are at present employed. Each stage is allocated for specified classes of repair operations. Of the 12 stages, the first two are devoted to the work of stripping an engine, when it is completed, being moved forward to one of the succeeding four stages, where it stands for four days, during which time repairs are carried out to the frames, cylinders, etc. On completion of stripping, one engine frame is placed on its stand on one of the four adjoining positions in the bay, these positions being numbered stages 1, 2, 3 and 4. The work gangs, of which there are four, move between stages 1, 2, 3 and 4 as they finish their own particular tasks at a stage. As explained, four working days are allowed for an engine frame to remain on its stand. On the fifth day the intermediate and bogie wheels have been returned duly repaired, and ready for the frame and boiler from one of the four stages to be lifted on to the wheels.

Engine Movements and Output

The movements so far are effected by means of overhead electric cranes which span the pits in each bay. These cranes, which are of 50 tons capacity, have each four motors, and there are also three 10-ton, 3-motor overhead cranes, with an additional crane in the south bay to deal with wheels. These cranes were manufactured by Sir William Arrol & Co. Ltd. On reaching the fifth stage the engine is lowered on to its intermediate and bogie wheels, and then moves forward to stage 6, at which it becomes one of a series of six engines connected together



L.M.S.R. CREWE LOCOMOTIVE WORKS AFTER REORGANISATION

1. Fitting and Machine Shops
2. No. 9 Erecting Shop
3. New Erecting Shop
4. Machine Shop
4A. Progress Office
5. Brick Kiln
6. Pattern Shop
7. Iron Foundry
7A. Chair Foundry
8. Pattern Stores
9. Tender Shop
10. Brass Foundry
11. Finished Part Stores and Welders Superheater Element Tubes
12. Mounting Shop
13. Smithy
14. Boiler Shop Repairs
15. Points and Crossings Shop
16. Electric Power House
17. Boilers
18. Gas Machines
19. Rail Mill
20. Tube Shop
21. Frame and Cylinder Shop
22. Axle Forge
23. Iron Forge
24. Steel Foundry
25. Laboratory
26. Coppersmiths' Shop
27. Wheel Shop
28. Brass and Finishing Shop
29. Stores
30. Paint Shop
31. Cooling Ponds
32. Millwrights' Shop
33. Spring Mill
34. 45- and 65-ton Steel Furnaces
35. Carriage Repairing Shops
36. Carriage Washing Shed
37. Gas Works
38. Carriage Store Sheds
39. Clothing Factory
40. Mortar Mill
41. Stone Yard
42. Testing Shop
43. Millwrights' Shop
44. Joiners' Shop
45. Timber Shed
46. Saw Mills
47. Locomotive Offices
48. Pay Office
49. Smiths' Shop
50. Drop Hammer Shop
51. Iron Stores
52. Tube Shop
53. Die Sinking Shop
54. Spring Shop and Copper Store
55. Boiler and Finishing Shop
56. Roof Bar Shop
57. Mounting and Assembly Shop
58. Boilers
59. Stay Shop
60. Galvanising Shop
61. Tin Shop
62. Power House
63. Flanging and Machine Shop
64. Plate Stores
65. Signal Shop
66. Locomotive Stores
67. Stores
68. Locomotive Sheds
69. Electric Power House
70. Grease Works

Bottom Right:
Fowler 4F Class 0-6-0 Nos. 4563 and 4564 under construction at Crewe Works in 1937. Photo: A. W. V. Mace © The Transport Treasury

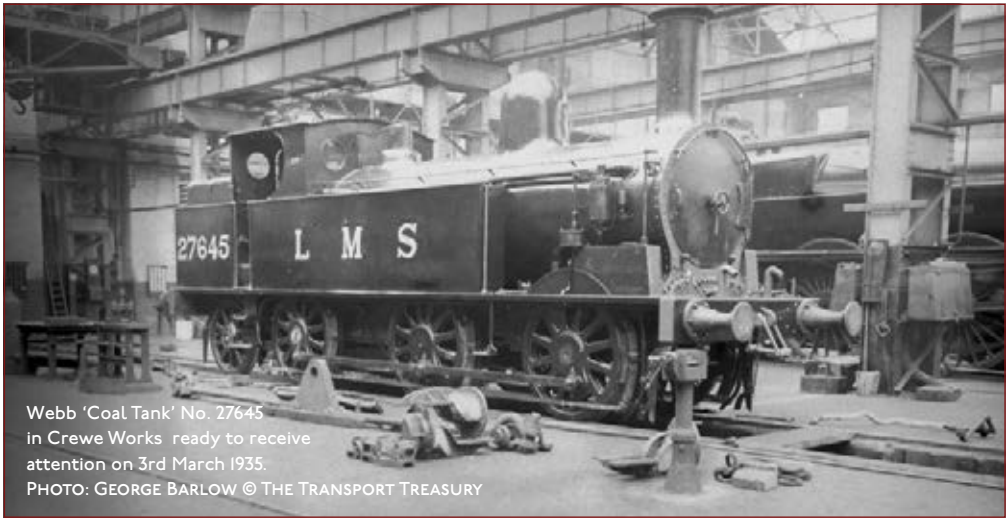
Above: A view from a train on the Crewe Works branch (the original Chester & Holyhead line) on 3rd April 1966. Photo: A. E. Bennett © The Transport Treasury

Below:
Clocks are placed in conspicuous positions in the shop, showing for each belt the time of the next movement of engines.

by a steel cable operated by 10-ton winches at ground level outside the shop, the engines being moved forward from stage to stage by the winches at a definite period during the day, until on the 12th day an engine has reached the final stage, and is pulled out of the shop by the winch as a completed unit. These winches were supplied by S. H. Heywood & Co. Ltd, of Reddish, Stockport. By this means it is possible to keep a certain amount of specified work at definite points in the shop. The result is seen in the liberation from each belt for every day of 7 hours 50 minutes working time of an engine completed and ready for test, having been completely repaired within 12 days from the time it arrived at the first pit. This applies to the largest and heaviest types, whereas for the smaller types the time occupied is reduced to eight days. The capacity of the shop as a whole is 66 engines, taking the engine length, plus an allowance for a gap between each engine, as 42½ ft., and the output from the shop is equal to 30 to 35 heavy repairs per week and 100 new locomotives per annum.

Since the first engine was turned out by this system on 5th May 1927, over 850 locomotives have been repaired without any delay whatsoever. It is possible to have as many as five different classes of engine on an individual belt at one time, this being alone made practicable by the fact that the repairs to all the component parts are processed in the same manner, the processing of the locomotive itself being the final result of the system generally. Stacking grounds are provided for storing wheels, and another for cabs, panels, splashers and other material not immediately requiring repairs. These spaces are provided with overhead gantry cranes, by means of which the transference of the various units and classes of material from point to point is quickly effected. These storing grounds are immediately adjacent to the erecting shops. A feature of the erecting shop is that very few fitters' benches are in evidence, whilst in no case is there cupboard accommodation or tool receptacles provided, tools being contained in portable iron chests mounted on wheels, which enable them to be moved about to the job where the men are engaged. A strong point in connection with the shop is that no material is allowed to lie about, all material and parts being brought, as already stated, to the stages at which they are required two hours before being wanted. This ensures that there shall be no congestion of material that is either not required or will not be required for some time ahead.

The warming of the erecting shop is effected by means of steam, the heating pipes being located overhead. This proves effective as it operates on the principle of warming the upper air first, so that the warmth may descend instead of rising to the upper level and losing some of its value by dissipation, as is so often the case when the heating arrangements are placed at ground level. The system is split up into 12 sets of pipes, each set consisting of one steam-flow pipe and two return pipes. Two sets are located on either side of each erecting shop and machine-shop bay, and are placed above the bottom tie of the roof principal. The condensate is returned to the



Webb 'Coal Tank' No. 27645 in Crewe Works ready to receive attention on 3rd March 1935.
PHOTO: GEORGE BARLOW © THE TRANSPORT TREASURY

boiler as feed water. The whole of the system is divided into four main portions for the purpose of providing efficient circulation, main steam supplies being taken at three points. With this system it has been found possible to maintain an inside temperature of 55 degrees Fahrenheit when the temperature outside is at freezing point. Four water-tube boilers are installed, three working and one stand-by. These, in addition to supplying steam for heating the new erecting shop, also provide for the heating of No. 9 Erecting Shop, the machine shop, and all boshes.

It is interesting to record that the use of daylight has been exploited to the full in the design of the new erecting shop at Crewe. The whole of the six slopes are entirely covered with glass, which, in addition to offering the required lighting facilities, acts as a permanent roof covering free from maintenance charges beyond cleaning and replacement of occasional breakages. The glazing contract was entrusted to Mellowes & Co. Ltd, of Sheffield, who executed the work on their 'Eclipse' system of patent glazing. The total area of glazing involved is approximately 181,000 sup. ft.

Timing and Material Schedules

Clocks are placed in conspicuous positions in the shop, showing for each belt the time of the next movement of engines. These, of course, are merely dummy clocks, the indications being made by moving the hands to the required setting. The clocks are painted bright red with white lettering and figures. The illustration below shows clocks in adjoining bays set to indicate that the next moves will occur on Thursday at 11.30 and Friday at 9.15. It is definitely laid down that specified classes of work are to be performed only at each stage, the necessary material and parts being delivered from the various shops at those stages two hours before the engine is due to arrive at that stage. This rule, strictly enforced, ensures that no delay is caused in going on with the work as soon as the engine reaches any particular stage. Schedules are issued for separate classes of engines, stating what material has to be at each stage in anticipation of requirements, thus giving the shop concerned ample notice in advance. Special appliances to enable work to be carried out quickly and easily are employed. With a system such as this greater use can be made of such appliances, as they are needed at only one point in the erecting shop and there is no necessity, therefore, to spend time in looking for a tool or appliance, or, indeed, for anything required for the execution of the task. Platforms provided with wheels are used to enable the men to reach the tops of the boilers and other elevated positions, these platforms being readily moved from point to point or from engine to engine as required. In addition, there are numerous other special appliances designed to facilitate work of various kinds and reduce the amount of time and labour involved. Some of these, notably a wheeled trolley for placing ashpans in position, raising appliances for vacuum cylinders and so forth, the purpose being to reduce to a minimum manhandling of material and parts.

The location of the engines at their different stages on a belt, from the first, or stripping stage, to the last, or completion stage are reproduced in a simplified form herewith and in correct sequence. These, of course, are additional to the stripping operations which occur prior to reaching stage 1.

Stage 1. Cleaning tops of cylinders, ends and covers; examination of frames and cylinders. Removing steam-chest liners; drilling studs, set-screws, etc., on cylinders and frames, and welding any cracks. Welding frames; replacing drag box; (boring cylinder); fitting studs.

Stage 2. (Fitting steam-chest liners); refitting pivot casting; (chipping and grinding frames after welding). Boring steam-chest liners; replacing hornblock patches. Remaking back cylinder cover joints.

Stage 3. Setting slide-bars; fitting hornblock keeps; straightening front end. Setting radius-rod brackets; fitting studs for guide brackets; filing hornblocks. Mounting boiler in frame and bolting up.

Stage 4. Fitting 3½ in. exhaust-pipe brackets, wash-out plugs, and blow-off cock; mounting whistle stand. Mounting cylinder cocks and gear, intermediate oil pipes, safety-valve and fitting crossheads. Fitting pistons and rings, cylinder covers and packing. Lagging ashpan and fitting damper doors.

Stage 5. Adding radial truck and intermediate wheels under engine. Mounting vacuum sack and brackets, buffer plank, draw bar hook, increased brake guide or rocking-shaft brackets, piston valves, damper gear and part of lubricator gear.

Thereafter the locomotive is hauled down the shop to stages 6, 7, 8, 9 and 10, moving one stage per day. Each day the following work is carried out:

Stage 6. Mounting buffers, stiffening plates, lamp brackets, snifting valves, and air pump. Fitting panels,

expansion brackets, dirt plates, reversing screw and rods, reversing-shaft quadrants, etc., and rocking gear.

Stage 7. Carrying out part of smokebox work, mounting steam pipes and bolting up smokebox. Mounting injector and cab, locking gear, sand gear and lubrication to axleboxes. Refitting splashers, sand boxes and footsteps.

Stage 8. Completing smokebox work; finishing cab and footplate; fitting 3½ in. exhaust pipe. Mounting mechanical or Detroit lubricator and pumping oil through.

Stage 9. Mounting wheels and setting in position. Fitting up motion and connecting rods. Wheeling engines, bolting up hornblock keeps, stays, centre-bearing wedges and cap. Fitting radial truck pivot studs and nuts, cylinder-cock pipes and brackets, oil pipes and brackets.

Stage 10. Fitting up brakework, coupling rods, crank-pin washers, sand pipes and stays. Assisting valve setters. Fitting steam-chest covers, covering plates and door. Adjusting weight and lifting engine off pit.

How Engines enter and leave the Shop

The engines are brought into the erecting shop from outside by means of an electrically-operated traverser fitted with electric wind for hauling locomotives on or off the tracks. This traverser runs the whole width of the shop and also that of the old (No. 9) erecting shop, or erecting shop north, as it is marked on the plan, the total traverse being 300 feet. Reference has already been made to the fact that electrically operated winches are employed for actuating the steel wire cables which draw the engines along the belt. The two winches are suitably housed to protect them from the weather, and each operates cables for three belts and centre roads, the cables running around bollards which guide them and allow them to exert a direct pull in alignment with the string of engines moving along an individual belt.

It has thus been briefly shown how the belt system of locomotive repair operates in principle, but it may be added that the men engaged at each stage along the belt are expert in the particular tasks to be performed. Having had the opportunity of observing the work in progress in the erecting shop, we are able to state from personal observation that everything appears to work with the utmost smoothness and regularity, the time-keeping being throughout of the most accurate description. Before the winches are put into operation to effect the movement of a locomotive along the belt in accordance with the clock indications, a loud buzzer is sounded to give the signal, the various gangs of workmen then being made aware of the fact that the movement is about to take place. A locomotive after leaving the shop has its tender attached and is then steamed, afterwards going for a trial trip. It is then either taken to the paint shop or retained by the Motive Power Department for service.

No. 45506 The Royal Pioneer Corps pictured at Crewe Works on 29th May 1960.
Photo: © Manchester Locomotive Society

This article originally appeared in Midland Times, issue 2, published by The Transport Treasury. Part 2 of this article will appear in The Warrior, issue 65.

BE MY VALENTINE

BY JANET ELSON

In the years leading up to D-Day in 1944 certain manufacturers of tanks began the task of designing and producing the 'swimming' tanks which could be launched at sea and then driven onto beaches.

In Normandy, Omaha beach in particular has a long shallow angle of rising of the sea bed creating a very long tidal zone. Landing craft full of soldiers could be joined by rolling artillery. If all went well.

It was never going to be an easy task, and leading up to the main event there was a disastrous practice run on Slapton Sands, later known as Operation Tiger. The exercise involved 30,000 men and many ships, including tank landing ships (LSTs). Unfortunately, the operation ended tragically when it was attacked by German E-boats, resulting in the deaths of approximately 700 U.S. soldiers.

As well as the Sherman tanks from America the British manufactured many variants of Valentine tanks, most of which saw service in Russia and North Africa. But one variant was called the Valentine DD, a duplex drive which had a propeller and was able to pump up a canvas 'tent' around the body of the vehicle. For swimming. The description on Wikipedia reads thus:

VALENTINE DD

Valentine Mk V, IX and Mk XI, made amphibious by the use of Nicholas Straussler's 'Duplex Drive'. Conversions by Metro-Cammell of 625 tanks delivered in 1943–1944. Used by crews training for the M4 Sherman DD tanks for the Normandy Landings as well as training in Italy and India. A few were used in Italy in 1945.

I myself worked at the Metro Cammell site in Washwood Heath, Birmingham, where the factory produced rolling stock for both underground and overground railways (note in the background of the photograph below that there are brand new undelivered Pendolinos in Virgin livery).

During the war years this had become a shadow factory where tanks were produced, some walls around B Shop still show signs of the camouflage paint on the exterior walls (visible on one photo).

In my time at that site, one of the ladies I worked with was married to a chap who restored many

Valentine tank being unloaded at Washwood Heath.

tanks and he had a Valentine just about ready to be delivered to the Bovington Tank museum. But he also had a photo of 'his tank' as it rolled out of the production shed at B Shop at the Metro Cammell site in Birmingham.

He wondered if there might be an opportunity to recreate that photo?

Upon production of a Method Statement and various other documents, he was given permission to bring the beast on a low loader and drive it into the site on a Sunday morning. No 24/7 working in 2004.

The beast roared into life and made it's way up the central driveway to be parked outside B shop, where it was positioned exactly as in the 1943 photograph. There were one or two amazed and bemused workers on site, one of whom asked the owner "would you like to bring it into the shop?..."

...OF COURSE he would!

The workers were also able to hook it up to an air line to raise the tent too. So it truly had gone back to the production line where it had been born.

I wish I could find the photograph of the big gun pointing up at the windows of the first floor in A shop where I was working at the time. I ran a caption competition for the office and got some funny results:

"Halt or I will shoot"

"You don't do it like that" and

"I told you not to annoy me" being just some of the suggestions.

The Valentine tank posed outside B shop.

Inside B shop, the tent is attached to an air line.

The tent fully inflated.

The tent half-way up.

A Sherman tank with a tent fitted.

The Valentine tank runs past B shop.

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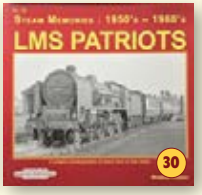
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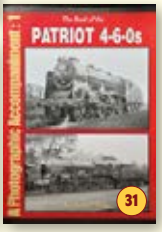
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Account Details for Direct Donations: CAF Bank Ltd. • **Account No:** 00092990 • Sort Code: 40-52-40

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The Warrior

Showing its LMS heritage, Standard Class 2MT 2-6-0 No. 78018 powers away from Loughborough towards Woodthorpe with a van train at the GCR Winter Gala on 26th January 2025. Photo: © Chris Ainscough