Top Link

Issue 1
Autumn 2001

Further motion!

Journal of the A1 Steam Locomotive Trust

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Darlington Locomotive Works tours: Saturdays at 11 am, 12.30, 2 pm.

All visitors need to purchase a Museum admission ticket.

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CONTENTS

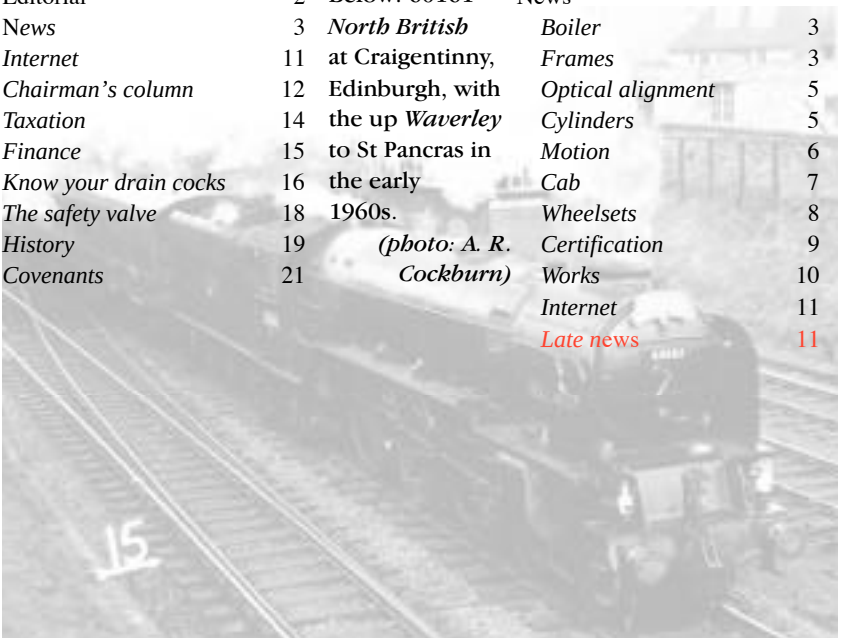
Top Link

Issue 1:Autumn 2001

Editor: Gerard Hill

JOURNAL OF THE A1 STEAM LOCOMOTIVE TRUST

Below: 60161 *North British* at Craigentinny, Edinburgh, with the up *Waverley* to St Pancras in the early 1960s. *(photo: A. R. Cockburn)*



Cover picture: The inside motion bracket set in position with fitted bolts (in lieu of cold-turned rivets as originally specified) using the upper inside slide bar to position it vertically and relative to the back of the inside cylinder. The casting came out distorted (it was straightened by Cooks at Burton-on-Trent) and over width, requiring new flange plates to be welded on. Concessions have been granted in machining to overcome other minor dimensional inaccuracies.

(photo: David Elliott)

EDITORIAL

We have had a newsletter and then a journal for over ten years now, but this is the first time there has been a change of editor. My first task is to offer generous thanks to Phil Champion for having produced the journal single-handed throughout that period, with all the time and effort that required, especially since he was not using a computer to do it. Phil had earned a rest and The Pioneer was due for an overhaul.

Well, it has been through the works and come out with a new name, Top Link – because we are top in our field and this journal is our link. Not only that, but the top link was the group of drivers on the most responsible jobs, the express passenger turns; and, by extension, it was applied to the locomotives allocated to those jobs. Tornado is clearly going to be in the top link of main-line steam for years to come.

With the new name have come some changes in appearance – unfortunately, even colour is not going to make the editor's face look any better, but I thought people ought to know – and, more significantly, changes in policy. There will be new features and the aim is to make it varied and readable. Top Link will have all the latest news, of course, and as many illustrations as we can manage, as well as explanations of technical questions and reports from the directors. There will also be a feature on working drawings but it could not be fitted in this issue because, even with a lot of editing, there was so much news to fit in.

I intend to encourage contributions from as many people as possible, but on the basis that it is the project that matters, not any of us as individuals. Top Link will be open and fair, and every covenantor can have their say – The safety valve is the place for your letters – but there will be no raised voices or snide comments.

If you have something to contribute, you can write to me at the Darlington office or e-mail me at gerard@A1steam.com – good photographs and short items (less than 50 words) are especially welcome. Don't worry if you're not good at stringing words together: that's part of my job! I look forward to editing Top Link with your help and support.

Gerard Hill

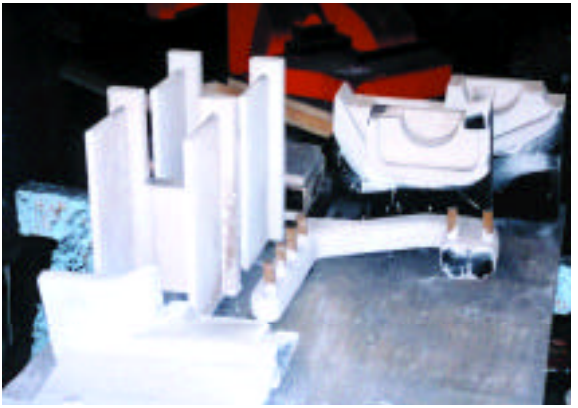
BOILER & FRAME NEWS

BOILER

We sent out seven tendering packs and held serious discussions with two boiler builders. As no-one in Britain has built steam locomotive boilers of this size and complexity for many years, this process has proved time-consuming and difficult, especially as management time has been diverted unnecessarily. Aside from normal commercial issues, we need a firm with the requisite experience and facilities, a chartered engineer and ISO 9002 certification before the boiler design will get approval by our VAB and insurers. No announcement can be expected for some time yet.

In preparation for the boiler, cores for the superheater header mould are seen below being prepared at C. W. Taylor, South Shields.

(photo: David Elliott)



FRAME FETTLING

Non-conformances

Recently there has been criticism of what have been called frame 'defects' but in fact the Trust had become aware of certain non-conformances in the assembly of the frames right from the time of delivery to Darlington.

'Non-conformance' means any variation from the client's specifications (particularly drawings) that can be rectified. In any complex manufacturing process there will inevitably be non-conformances: our inspection procedures allow us to check for them; others have come to light since.

For most non-conformances the procedure is to identify and agree the problem, and then negotiate with the contractors who carried out the work so as to come to a settlement.

In such cases, any publicity is unhelpful: it risks loss of goodwill and the failure to reach any agreement. Negotiations of this kind have been conducted over recent years: agreements have been reached and in fact the resulting remedial work is now almost completed.

FRAME NEWS

Hornblocks refitted

The most serious non-conformance, the fit of the hornblocks in the frames, was rectified during autumn 2000. As a result, the coupled hornblocks were refitted into the frame cutouts using new bolts.

Now that the on-site equipment for the work of trueing up the hornblock faces is in place, the work will be done as soon as the frame rectification is finished and final fitting of coupled-wheel hornstays is complete.

Find out all you need to know about hornblocks on page 16!

Spot-facing complete

One of the technical questions where negotiations and agreement have now been completed was the requirement to spot-face some of the casting flanges to improve the fit of bolt heads and nuts.

It is good engineering practice to provide a perfectly true surface for new bolts to bed on. This is seldom necessary in rebuilding a locomotive because the parts have had years of use to bed in. With a new assembly, we wanted to follow best practice and spot-face wherever needed.

Other non-conformances included a few bolts that were too short to enable the self-locking nuts to lock properly, the use of packing pieces under one or two fabricated brackets and frame stays, some cold-turned rivets not seating properly and the flanges on the LH rear firebox support not sitting correctly on the frames.

Speeding up the job

We had planned to correct these problems in stages during construction of the locomotive, at times that would avoid conflict with other tasks on the project plan.

However, in view of the adverse publicity and an enforced delay in conducting the full measurement and alignment survey of the frames, before final fitting of the coupled wheelsets, the decision was made to correct any outstanding non-conformances as soon as possible.

To this end, the Works staff had been using the spot-facing as a fill-in job. More recently, a procedure was set out to inspect and rectify as necessary every fitted bolt and cold-turned rivet on the frames, and a contractor – in the form of Ian Howitt Ltd – was retained to carry out the work.

This task has now been completed and inspected and is being followed by resetting of the buffer-beam gussets and lengthening of the exhaust injector support stay, in order to eliminate the packers. The LH rear firebox support

has been removed and will be refitted following welding and machining work being done by the original contractors.

Frames complete

Equipment designed to stretch wires from the front centre of each cylinder to the nominal centreline of the driven axles has been made, and this will enable the slide bar brackets and inside motion plate to be fitted accurately to the frames.

These components were finally attached to the frames using fitted bolts, and all work was finished by the end of June 2001. This effectively completed the frame structure.

Optical alignment

Before the wheelsets can be finally set in their correct location in the frames, a full survey of the frames for dimensions and alignment is needed. Discussions with specialist measuring companies made clear that they would want us to make up a number of special gauges and fixtures before they could carry out the survey.

The Vehicle Acceptance Body (VAB) then suggested we contact the Severn Valley Railway, who have a full set of optical-alignment equipment as used at Doncaster and Darlington works in the late 1950s and 1960s. Also, they had recently used it to set up A4 Pacific 60009 *Union of South Africa*, so the equipment could be used for the A1 with minimal adaptation. However, they could not spare staff to do the job until autumn. This influenced the decision to press on with rectifying non-conformances in the frames.

Inside cylinder and motion

It has been known since 1996 that the inside-cylinder casting (back cover picture) 'grew' in the casting process and its front wall is 3/16″ thicker than it should be.

Concessions were granted to enable Ufone to machine the cylinder and to ensure the bore is the correct length and the valve chest ports are positioned accurately. The cylinder was fitted to the frames so that the bracket on the back, where the slide-bars bolt on, is in the correct position relative to the axle.

Small adjustments

This enabled us to use the original design geometry and dimensions for the crosshead, slide bars, piston rod and inside motion bracket (see cover picture), which supports the expansion link and inside slide bars amongst other things and has now been made and fitted.

This decision was made after

study of the motion drawing: the result is that movement of the inside piston is about 3/16″ forward of the nominal position.

To correct for this, Hesketh were asked to forge the small end of the inside connecting rod oversize to allow rod length to be adjusted. Small adjustments are also needed in the length of valvegear rods, but these cannot be determined until the optical-alignment survey has been done.

Outside cylinders

After careful measurement, the outside cylinders are considered to conform to drawing and to be correctly located.

Slidebar fitting

The slide bars will be finally fitted when the piston/crosshead assemblies are delivered to Darlington.

Eccentric Cranks

The eccentric cranks are complete at Ufone and will be delivered shortly.

Crossheads/piston rods

A backlog of work at Rileys' of Bury caused some delay in fitting piston rods to their crossheads and in white-metalling the crossheads. Meanwhile, Ufone requested a crosshead back to check the fit of the gudgeon pins. This has now been returned to Rileys and completion is expected soon.

Outside Radius Link Brackets

Machining of the radius link brackets, cast some time ago from polystyrene patterns, is nearly done, with pressing in and boring of the bronze bushes supporting the reverser cross-shaft.

Fitting the radius link brackets to the frames is a high-precision job as the two-part reverser cross-shaft is over 8ft long when assembled. As the bearings in the radius link brackets are about 7″ long, the brackets need be only slightly out of square to cause the reverser cross-shaft to lock solid.

In the old days brackets were machined to drawing dimensions and then riveted or bolted to the frames. If frames were not truly flat and straight any misalignment would be corrected by boring or reaming bushes *in situ.*

We do not possess equipment to do this, so we have made a detailed survey of the frames in the area of the brackets and this indicates that they are leaning inwards slightly towards the top. We also have to allow for the slightly greater overall width of the frames, made of 30mm-thick plates rather than the original 1⅛″ thick.

As a result, the frame-contact faces of the radius link brackets need to be machined to fit the frames, not as original drawing. Any remaining misalignment of the bearings will be corrected by final hand fitting of the brackets to the frames.

CAB NEWS

Cab windows

Alan Lusby and the East Anglia team are progressing with the timber cab-side window frames, which have now been modified to accept 8.5mm-thick laminated glass to comply with the current Railtrack standard.

Similarly, the design of the spectacle windows is being adapted for the 8.5mm laminated glass, and this is being done in such a way as to minimise any change in the external appearance of the windows.

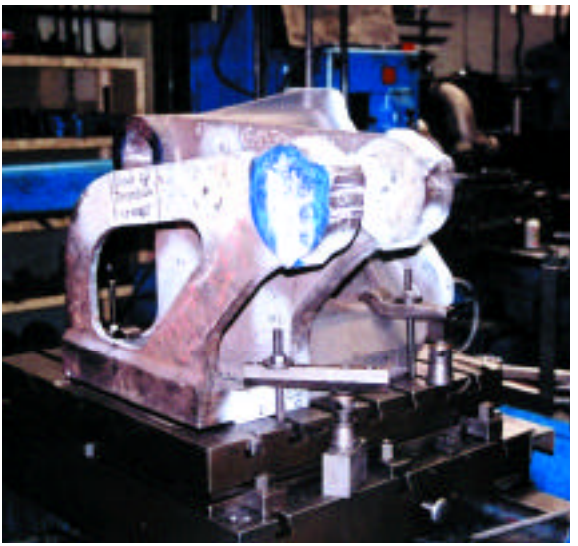
Reversing Screw Shaft Bracket

It may not sound exciting, but this robust casting forms the base of the reverser stand in the cab and now its machining is near completion. The size of finished steel castings can be unpredictable, and in this case a non-conformance has arisen.

The casting incorporates two bearings that support the shaft of the reversing bell-crank assembly. At one end the bell crank is attached to a nut-and-screw assembly that turns the rotary motion of the reverser handle into an up-and-down motion for the bell crank.

The other end of the bell crank provides fore-and-aft motion for the reversing rod, which can easily be seen under the LH side footplating. In between the two levers of the bell crank, a shaft sits in the bearings of the screw shaft bracket. A casting non-conformance means the two bearing housings are ⅜″ further apart than on the drawing.

As we have not yet made the bell crank, the solution has been simple: amend the drawings for the screw shaft bracket and the



The left-hand radius link bracket seen awaiting machining on the borer at North View Engineering, Darlington.
(photo: David Elliott)

bell crank to move the journals ⅜″ further apart.

This is a far cheaper option than scrapping the existing casting and making a new pattern and casting, and just as good. It would only ever be a problem in the unlikely event that we needed to interchange this part with other A1s.

Timken roller bearings

Following a visit by Gary Thornton, Timken Service Engineer, a new procedure has been written to cover the adjustment and final fitting of roller bearings to the cannonboxes.

Timken's original document has been modified because *Tornado's* wheels are already on the axles. In 1949 Timken supplied complete axle/bearing/cannonbox assemblies, and the wheels pressed on afterwards.

Temporary adjustment rings are being procured to measure end float on the assembled cannon/axleboxes, so the permanent rings can be ground to the correct thickness.

Performing seals – no extra cost!

Trial of the intermediate and trailing cannonboxes on the bearings and seal assemblies showed the fit of the outer labyrinth seal rings was too tight.

Examination showed the grooves in the seal rings to be some 0.004″ narrower than the bottom limit on the drawing. Corresponding flanges on the ends of the cannonboxes were within tolerance.

The rings are designed to be a good fit (0 to 0.004″ clearance) on the cannonboxes to minimise the risk of them moving in use. In this case the fit was actually interference.

The obvious solution? Send the rings back to the contractor who machined them for further machining. But this was not practical, as they are inside the wheels and hard to remove.

Instead, Ufone skimmed a little (0.005″) off each end of each cannonbox and the firm who machined the rings paid. The fit is now acceptable.

Cartazzi wheelset

The Cartazzi axlebox bodies have now been cast and are shown (right) whilst being inspected at Kings Heath Patterns at Cotteridge, Birmingham. They were selected as our usual source, William Cook PLC, were quoting very long lead times. The bodies have come out well, being remarkably accurate for steel castings.

The axleboxes are now at North View Engineering for machining, along with their other components – the backplates, spacer and adjustment rings, labyrinth-seal and abutment

rings, and the big nuts and locking plates that hold the bearings onto the ends of the axles.

The hornblocks, spring guides, wedges and hornstays are also being machined. Soon we should have a full kit of parts to fit the wheelset.

Total anti-corrosion wax

David Dobbs of Total Oil has kindly donated some OSYRIS A – a wax-based anti-corrosion compound – to coat the narrow gaps between the end of the bearing assemblies and the wheel centres, and the co-located stress-relief grooves on the axles.

This wax was recommended to us by David Ward of Serco Railtest, our VAB specialist throughout the wheel/axle manufacturing process.

Vehicle Acceptance Body visit

The Engineering Link, as VAB, sent us a schedule of the sections of the A1 they wished to use as 'milestones' for certification. The first two were the frames and wheelsets, including bearings and axle/cannonboxes.

Cartazzi axleboxes *(photo: David Elliott)*

Their visit proposed for March was postponed until 17 July, after the coupled-axle cannonboxes returned from Ufone and the final framestay, the inside motion bracket, had been fitted. Having received minutes of the meeting, we await a formal response.

The frame non-conformances were pointed out, and there was discussion of the need to commission independent stress calculations to confirm the superiority of single plate frames over the spliced design used originally and to examine a form of additional bracing more structurally efficient than that retro-fitted to the previous A1s.

Documentation

Before the VAB visit, David Elliott produced five lever-arch files of component certification information (some 1,300 pages) and a large summary spreadsheet, and these were delivered to Derby on 27 June 2001. This mass of data, covering construction of the locomotive to that date, has been assembled in line with the VAB recommendation we received in 1994 when construction started.

As a result of the Derby meeting

and the Darlington visit, we have prepared electronic registers of design changes and non-conformances so they can be tracked more easily. A Trust Management Plan is now being prepared to comply with the requirements of Railtrack and the Steam Train Operating Companies (mainly EWS).

New height restriction

The VAB noted Railtrack's intention to reduce the permitted maximum height of rail vehicles from 13′1″ (4m) – the height of the original A1s, and deemed acceptable in previous VAB meetings – to 13′0″.

This will mean modifying the design of the dome, safety valves and cab roof, and possibly a new reduced-height chimney. We may be granted a derogation to allow 13′1″ height, but this is likely to mean route restrictions working under the wires.

At the same time the VAB recommended that we should obtain a full set of the Railtrack Group Standards, Manuals and Guidance Notes relating to a new steam locomotive, a total of 46 documents, and the Board has since agreed to their acquisition.

New width de-restriction

The span of the straddle crane at the Darlington Works has always been a bit narrow for lifting some items, such as the smokebox. When the synchro jacks were acquired, we found that the crane could not be moved past them.

Luckily, the crane's design allows one of the 'A' frames to be rotated through 180°, which has the effect of increasing the span by about two feet. This was done by a team consisting of Nigel Facer, Barry Wetherell, Barry Thompson, Ian Howitt and David Elliott. The crane was then re-certificated for the design load of 5 tonnes, by TL Lifting Limited of Middlesbrough.

The crane (below) can now be moved over the entire length of the Works with the jacks in place and can lift the smokebox clear of the cylinders.

The works crane (right) *(photo: David Elliott)*

INTERNET & LATE NEWS

The Trust's site www.a1steam.com continues to be popular. Please note you will now need new access details to reach the Covenantors' Area. As soon as this copy of *Top Link* is delivered, the user name and password will be changed to:
User Name: SUPPORTER
Password: STEPHENSON
As now, all letters will be capitals.

Technical help wanted

Can you help commission a Guest Book for the *Trust's* WebSite? I have a set of Guest Book scripts for use with my Internet Service Provider, PlusNet, but have found the intracacies of cgi-bins are a little beyond me. So, if you are an Internet 'techie' and willing to offer a bit of help and advice, contact paul@a1steam.com

Paul Ambler

Independent audit

Both the independent inspection of the frames and the audited accounts were almost ready to be posted to all covenantors as we went to press.

Convention reminder

The 2001 convention of the A1 Steam Locomotive Trust will be on Saturday 24 November, when we meet at Darlington Locomotive Works in Hopetown Lane from 10.15 a.m. David Elliott, Director of Engineering, will give an update on construction. Then vintage buses will take covenanters to the Blackwell Grange Hotel for lunch, followed by the presentation of annual reports and a question-and-answer session, to finish about 4 p.m. The buses will then take covenantors back to the Works or to Darlington (Bank Top) railway station. See you there!

Bachmann model

As this issue went to press, the Bachmann 00-gauge model of 60163 *Tornado* was almost ready for release. We intend to include an order form with this issue.

On-train marketing

If you could find time in 2002 for a day out, to do some on-train marketing and recruit new covenantors, please contact Alan Dodgson in the new year.

Readers write

Do write to the Editor if you have an item of news or history, a topic to air in a letter or a technical question, a suitable picture (print or slide) or an anecdote.

CHAIRMAN'S COLUMN

At our last Convention we set ourselves some very stretching targets for 2001 in terms of covenantor recruitment, converting the money raised into metal and so bringing forward the day that *Tornado* first steams.

Unfortunately, the events of 2001 have meant that these targets will not now be achieved and our growth in income, and therefore progress, will be slower than had been hoped for. Thankfully, however, we have continued to grow at our historic rate and we have lost only a handful of covenantors whilst at the same time recruiting many new ones.

I don't intend to dwell here on these recent events, since they are being covered in separate communications, other than to say that those who seek to damage the Trust have effectively lost the project over six months in income growth and management focus, all at a time when we are preparing for our next major leap forward – the boiler.

As this project progresses it periodically breaks through another in a series of 'credibility barriers'that have to date prevented the curious from becoming committed covenantors and sponsors. I believe that the last of these barriers to be broken through was the wheeling of *Tornado* and that the next – and the biggest – will be once the boiler is ordered. In my view it is therefore essential that we regain the momentum that we had built up earlier this year and that we meet and wherever possible exceed our targets for the next year.

You may remember the covenantor recruitment targets we set at the last convention were 300 new covenantors during 2001 – 100 by Easter; 200 by August Bank Holiday; and 300 by this year's convention. As well as needing to grow our number of covenantors next year at this rate to fund on-going work on the locomotive and tenders, we also need to start the construction of the boiler. If we decide to fund this by a covenant scheme over three years (like a super dedicated covenant), this would need every current £5 worth of covenant to be matched by another £5 per month in order to raise the £250,000 to £300,000 we will need. I make this point to illustrate the size of the task ahead and because the Trustees are aware that calls on our existing supporters have a limit. With our auditors and advisers, we are also looking at other ways of funding the boiler. We have an awfully steep hill to climb and we'll all need to pull together if we are to achieve it.

However, there are still many areas where each and every one of us can help to bring forward the day that *Tornado* first steams – and many of these are covered in more detail later:

1. sign up a friend – surely we all know someone who loves steam (and A1s) as much as we do who we can persuade to sign up. Perhaps you've been working on them for a while and they just need one more push!
2. take out an additional covenant – remember that £5 in 1990 is the same as £7.50 today. We now get much less back from the Chancellor on each covenant – and where can you still buy a pint for £1.25! And remember that all additional covenants count towards the awards scheme.
3. take out a dedicated covenant – we have dozens of essential components for *Tornado* that need immediate help in sponsoring, ranging from £60 to several thousand pounds and payable monthly just as with a regular covenant. Just think how proud you'll feel pointing out your component when *Tornado* first steams!
4. take out a heritage covenant for your child, grandchild or anyone else you know who is under 18.
5. become an active covenantor and give of your time in a number of areas, be it helping with on-train marketing or fettling the rods in the Works. We are looking for skilled volunteers to help with a wide variety of tasks: please call the hotline for further details.

One area where our growth is still quite a lot down on last year is in dedicated covenants. In fact many of the components on the 'critical path'for construction that we hoped to get 'sponsored'by covenantors have not been supported and have had to be paid for out of existing covenant income. So, if you do decide to take out a first (or even additional) dedicated covenant, there are a number where the component has already been completed and is still available for 'sponsorship'.

I'd like to take this opportunity of thanking you all for your continued support of the project and I look forward to seeing as many of you as possible at our Annual Convention on 24 November.

Mark Allatt

TAXATION

Gift Aid for those with larger figures

In 1990, few people paid higher-rate income tax. Successive chancellors have raised this tax threshold only grudgingly, so that more and more of us find our incomes have stepped over the threshold. For the A1 project, the good news is that many covenanters are now in these once-exotic realms. For those who pay higher-rate tax, the bad news is that you probably don't feel rich.

Higher-rate tax is paid on taxable income over £29,400. With the personal allowance, this effectively means any gross income over £34,000. This figure may be beyond many people's wildest dreams but many others now earn this or more, particularly among those helping to finance a fantasy (soon a reality, we hope) such as ours!

If you sign a covenant or make a donation, we ask for a Gift Aid Declaration – you fill in the form and we get both the gift and the basic-rate tax you have already paid on it. So, for every £100 you give, we reclaim £28.21 income tax. This we do about every three months. The mystical figure of £28.21 comes about because the amount paid is deemed to be the amount after deducting tax at 22 per cent.

If you earn more than £34,000 or are self-employed (or have complications such as rental income), you have to fill in a self-assessment return: at Box 15.6 you should enter all gift aid payments (which include covenants started before April 2000), giving the amount actually paid.

Whoever calculates the tax will find a box for the deduction of 100/78 of Box 15.6, giving tax relief at the top rate. This is on top of the £28.21 per £100 paid, the basic-rate tax we get back. Thus a payment to the Trust (or any charity) of £100 will mean we get £128.21; but we can get the same amount from a higher-rate taxpayer who gifts just £76.93 (60 per cent of £128.21).

In view of this, if you are a higher-rate taxpayer, why not share the benefit with the Trust by making an extra payment of, say, £20? This is further gift aid and we start all over again! I hope these notes have made things a little clearer, and not confused anyone further.

Wreford Voge
Taxation Adviser

FINANCIAL

At the special meeting of covenantors of 9 June 2001 the Board were asked to make available to all covenantors the Trust's financial statements. A decision was made that audited financial statements will, in future, be published with the issue of our magazine just before the Autumn Convention, so that everyone can consider the accounts and ask any questions at the Convention. This also avoids the cost of separate mailing and printing.

The auditors are KPMG in Newcastle and, like most large auditing firms, their busy period is January to June each year. As our year-end is 31 March, past practice has been to send the draft accounts to the auditors in June. This year KPMG advised they would like to begin the audit in mid-July and files, papers and draft accounts were sent to KPMG as usual.

As you will all know from our letter of 20 September 2001, KPMG were visited by David Champion, Stuart Palmer and Bill Brown who, armed with a string of fanciful allegations, tried to persuade KPMG to resign as our auditors. Their efforts initially met with some success, but Mark Allatt and I invited the senior partner of KPMG to Darlington on 14 September and we were then able to demonstrate to his satisfaction that much of what had been said to him by our project's detractors was without foundation.

As a result, I am pleased to say that KPMG are happy to continue with our audit. As we are charged 'special'rates (being a charity), we avoid placing undue pressure on the auditors for early completion as this would undoubtedly lead to increase in the audit fees. The situation is analogous to engineering companies that produce parts for us at slack times at lower cost.

There is no doubt that – thanks to the efforts of Messrs Champion, Palmer and Brown – the audited financial statements would not have been ready for this mailing had we not rescheduled this issue of the magazine for mid-November. At present it is still touch and go whether the auditors will be sufficiently far advanced in their work to meet the deadline. If they have made it, many thanks to them – if not, you all know whom to blame and the financials will be included with the next issue. As usual the figures will be presented at the Convention in summary form and, if possible, I will arrange to have copies on display there.

Barry Wilson
Finance Director

Know your drain cocks

None of us likes to admit we don't know, especially when everyone else seems to know. However, next time you itch to ask somebody, "What's a drain cock?" – don't do it.

Avoid embarrassment: this is the page where you can find out – just ask – (borrowing the memorable title of that probably-quite-dreadful 1960s film) Everything You Ever Wanted To Know About Steam Locomotives, But Were Afraid To Ask.

So, taking the bull by the horns, we begin with – well, horns. *Tornado*'s hornblocks have been in the news: what are they? On older locomotives, looking from the side, the horns really were shaped like horns and they stuck down from shallow frames to form an opening for the axle.

From the 1860s, the horns were simply metal angles placed on each side of a cut-out in much deeper frameplates, like those of the A1. In the gap between the horns the axle (in its axleboxes) would be slid into place. The axleboxes were then free to slide up and down with movement on the springs.

However, a frameplate little more than an inch thick (30mm in our case) is too narrow to take shock loads from rail ends, bumps and balance weights, or the twisting (torsional) forces created by uneven or curved track, never mind the huge torsion loads from cylinders alternately pulling and pushing.

Enter the hornblock – a casting about six inches (15cm) wide, bolted or riveted to the frameplate. The hornblock gives a much broader surface to take axlebox loads. The frame assembly is then strengthened by a hornstay across the foot of the cut-out.

In the old days, each axlebox/hornblock assembly was adjusted and fitted by hand, followed by careful running-in. This meant that, for example, the six axleboxes of identical design on an ex-Midland 0-6-0 were hardly ever interchangeable.

Such locomotives quickly developed axlebox knock, and would rock and roll, bump and grind their way along, suffering 'hot boxes' and cracking frames, and gradually shaking themselves to pieces.

A1 trailing coupled hornblock casting, seen in February 1995 *(photo: Bob Meanley)*

The locomotive would have to be taken out of service and lifted off its axles (or the axle dropped) whenever the problems caused a breakdown. A great deal of delay and expense, not to mention unpleasant and repetitive work, could be caused by poor fit of axleboxes in hornblocks.

The hornblocks and axleboxes for *Tornado* have been manufactured and machined to far greater accuracy than was practical in the 1940s, and we hope to invite comparison with sewing-machines rather than sledgehammers.

Compared to previous A1s, this care in manufacture should greatly increase the mileage run before repairs or overhaul, perhaps eliminating intermediate axlebox repairs altogether, cut general wear and tear (fewer loose bolts, for example), avoid delays or failure in service, and so cut running costs. It will also improve working conditions for the crew.

And why this full-frontal view of no. 60124? I put it in only because it shows cylinder drain-cocks in action, tastefully veiled in a cloud of water vapour. Indeed, I suspect the driver was asked to leave his cocks open longer than usual, to make a better picture.

A1 60124 *Kenilworth* leaving York yard on a down freight in the late 1950s *(photo: Revd. J. David Benson)*

'Cock' is just another word for valve, and these cocks release any steam and water vapour in the cylinders. While the locomotive is standing, steam in the cylinders turns to water vapour and then water; but water is incompressible and so has to be ejected before the pistons start to move – or else the cylinder-ends will be blown open.

Small-bore pipes from the drain cocks emerge (in modern British locomotives) just above rail level and facing forward, to keep them away from people on the platform.

THE SAFETY VALVE

The Editor welcomes letters from covenantors, especially if they are succinct and polite, but reserves the right to edit for length and content.

This is your page. Since covenantors have never had a letters page before, the Editor might have invited one or two letters for this first issue; but all letters here will be genuine. This is not the place for forging things – the only forging will be the kind shown below. There is no guarantee your letter will be printed, but letters that do appear will be unsolicited.

Now the drive motion is being assembled, but here is a reminder of some of the special skills and plain hard work that have helped to get the project this far: the middle connecting rod is seen being forged from a 5-ton steel billet, using a 1-ton air hammer and about 1000°C of heat, at John Hesketh & Son, Bury, Lancashire. *(photo: Ted Parker)*

What's in a name? A4s and A1s

All 49 Peppercorn A1 Pacifics carried nameplates with a wide variety of names. Four carried the name and crest of one of the constituent companies of the LNER; another group took their names from the novels or, in the case of Sir Walter Scott, the man himself; others were named after railway engineers or continued the (original A1) sequence of racehorses.

A significant group, however, carried the names of birds. These were numbers 60120 *Kittiwake*, 60122 *Curlew*, 60130 *Kestrel*, 60131 *Osprey*, 60139 *Sea Eagle* and 60146 *Peregrine*. This is where the connection between the Peppercorn A1s and Gresley's streamlined A4s occurs.

In all, 34 A4s were built and the history of their names and numbers has arguably been the most complicated and various of any class of British locomotive. The first four were built in 1935 for the new streamlined train, which took its name from King George V's Silver Jubilee of that year, and their names – *Silver Link, Quicksilver, Silver King* and *Silver Fox* – were an inspired choice.

It was then the intention to name the rest of the class after British birds noted for their power and swift flight. It is said that Nigel Gresley made a list of possible names on the back of an envelope; another version has it that the names came from his daughter, Mrs Violet Godfrey.

In the event only 23 of the A4s carried 'bird' names but even then the scheme was put aside three times, for very different reasons. The next seven A4s, built in 1936–7, did follow the original idea, with names from *Golden Eagle* to *Woodcock*, but then came the Coronation of 1937.

Once again, the new streamlined train had its own link of locomotives with appropriate names, this time on the imperial theme. Four A4s were named from new after major dominions of the empire and a fifth, 4489 *Woodcock*, was renamed *Dominion of Canada*. In the event no less than 14 A4s were renamed.

With the naming of *Osprey* in 1937 it seemed the bird names had been reinstated, but the success of the named streamliners led to a third train, the *West Riding Limited,* and two A4s were allocated to this service. No. 4495, *Great Snipe,* bore that name for only a month before it was renamed *Golden Fleece* and no. 4496 was named *Golden Shuttle* from new. No. 4497 *Golden Plover* then linked the 'Golden'pair with the 'Birds'.

As no. 4498 was the hundredth Gresley Pacific, the company decided to celebrate this milestone by naming the locomotive *Sir Nigel Gresley* – an unprecedented honour for a serving engineer. Later, ten more people had A4s named after them – or, rather, renamed. With one exception, the others had previously carried names in the 'Birds' series. The next A4 recycled the name *Great Snipe,* after which the last thirteen in the class were all given names of birds. The last was 4903 *Peregrine* in July 1938.

Ten years later, Arthur Peppercorn introduced the first of his express Pacific locomotives, 60114 *W. P. Allen,* named after the ex-Great Northern driver who became trades union representative on the new Railway Executive. The rest of the class received names in 1950. The choice of bird names was among the last decisions of the Locomotive Naming Committee of the LNER, and it made amends for the names lost from the A4 'Bird' series by re-using them on another class of superlative East Coast Pacific, the Peppercorn A1.

Four names were brought out again (though the nameplates were new) – *Sea Eagle, Kestrel, Osprey* and *Peregrine* – and two more – *Kittiwake* and *Curlew* – came from the bird names originally intended for further A4s.

There are two tailpieces (if you will pardon the expression) to this tale. There was no particular reason why *Mallard* was chosen for the speed record run, except she was at that time one of the few A4s fitted with Kylchap blast-pipe and double chimney. By then this series of names was no longer restricted to birds that were swift as well as powerful. It is ironic, however, that this fleetest of locomotives should have been named after one of the slowest birds on the wing: hence its nickname 'the mighty blue duck'.

Had more Peppercorn A1s been built, as was at one time contemplated, they would probably have been given the names left over after the A4 renamings, and the fiftieth A1 could have carried one of them: *Herring Gull, Gadwall, Pochard, Garganey* or *Capercaillie*, instead of the far more felicitous and appropriate *Tornado*.

John Wall

(Ed: Grateful thanks to Andrew Dow for additional information in this piece. Editor's afterthought to John Wall's article: If those choosing bird names in or after 1938 had started to look overseas, 'the mighty blue duck' might have been joined by its transatlantic cousin, *Oxyura jamaicensis.* Gresley would surely have savoured a *Ruddy Duck* as much as its crew would.)

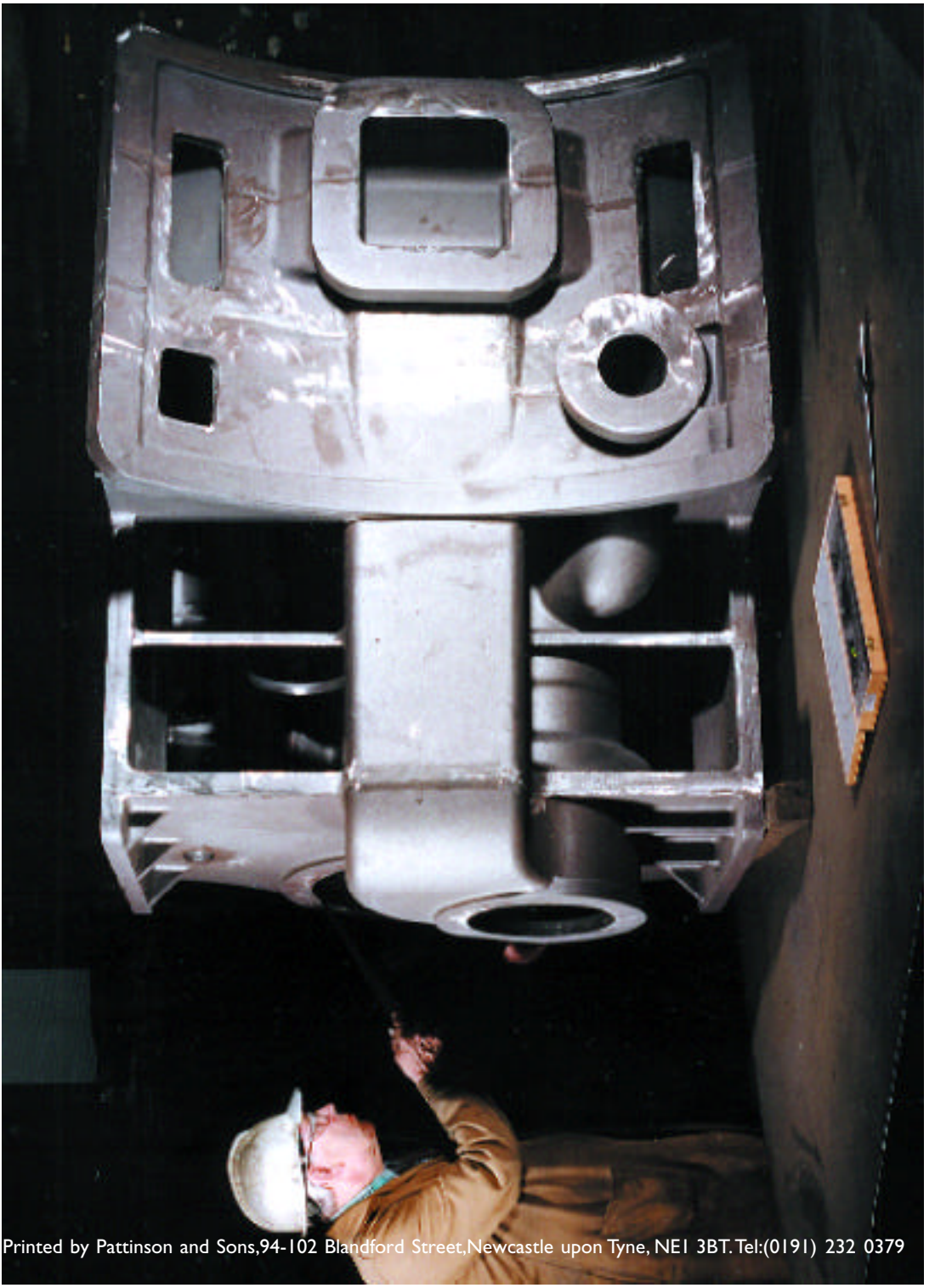
COVENANTS

To become a covenantor, or to start an extra covenant, a heritage covenant or a dedicated covenant, contact Alan Dodgson at **enquiries@a1steam.com** or 01325 460163, giving your name and contact details (phone/e-mail/address).

We are in sight of our target of a complete rolling chassis by the time of the convention, and the cab is well advanced, but many components can still be paid for by dedicated covenant. Items over £1,000 can be sponsored by an individual or a group of people. For PS61M, see the end product on page 9. Other components are also available: contact Alan Dodgson for details.

PS52M	cylinder cover, right – machining	£600/1 x £10 pm
PS53M	cylinder cover, centre – machining	£600/1 x £10 pm
PS61M	Cartazzi axlebox pattern	£2,400/4 x £10 pm
PS350–1	eccentric crank bolt/nut/locking pin – L, R	£60 each
PS356–7	crank pin nut/locking pin – Ltrailing, R trlg	£120 each
PS378–81	coupling rod oilbox cover – Mid/L/R, L/R trlg	£150 each
PS394–8C	piston valve spindle crosshead guide (5)	£60 each
PS394–8M	piston valve spindle crosshd guide – machining	£60 each
PS399–410	machining of coupled hornblock liners (12)	£150 each
PS410	machining of inside motion plate	£600/1 x £10 pm
PS433–4	coupled cannonbox set castings (2)	£2,100/4 x £7 pm
PS441–2	Cartazzi axlebox casting – L, R	£800 each
PS443–4	Cartazzi axlebox machining – L, R	£1,600/1 x £26 pm
PS445	Cartazzi axlebox cover pattern	£500/1 x £9 pm
PS446–7	Cartazzi axlebox cover casting – L, R	£150 each
PS448–9	Cartazzi axlebox cover machining – L, R	£450/1 x £7.50 pm
PS450–1	Cartazzi axlebox backplate & machining – L, R	£950/1 x £16 pm
PS452–3	cab spectacle glass frame patterns – L, R	£600/1 x £10 pm
PS454–5	cab spectacle glass frame bronze castings – L, R	£300/1 x £5 pm
PS456–7	cab spec glass frame castings, machining – L, R	£600/1 x £10 pm
PS458–9	cab spectacle safety glass – L, R	£450/1 x £7.50 pm
PS460–1	cab side windows (complete) – L, R	£600/1 x £10 pm
PS462	cab side screen frame pattern – L, R	£300/1/ x £5 pm
PS463–4	cab side screen frame casting – L, R	£150 each
PS465–6	cab side screen frame machining, hinges – L, R	£450/1 x £7.50 pm
PS467–8	cab side screen safety glazing – L, R	£300/1 x £5 pm

Back cover: This shows something of the complexity of the inside cylinder casting, which 'grew' while being cast. This is one of the non-conformances recently remedied, as reported in the news pages. *(photo: Richard Handley)*



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