

# LIONSHEART



Photo 1

by David Neish

## David Neish's new LIONSPower Dynamometer System

From left to right: Lion Tender; The Pull Device; Speedometer; Electronics & Display Box

See it at Lionsmeet 2011 on Saturday, 30th July at Chelmsford.

(For details, refer to Lionsheart no 70, or contact Editor, see page 7)

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### Late News

Just found this on the Internet:

**Locko Amateur Dramatic Society**  
OUR NEXT PRODUCTION IS:

### 'The Titfield Thunderbolt'

A play by Philip Goulding  
Based on the original Ealing comedy screenplay by T.E.B Clarke  
20th, 21st & 22nd October 2011  
at Spondon Village Hall, Sitwell Street in Spondon, Derby.  
<http://www.theladsdrama.co.uk/page2.htm>

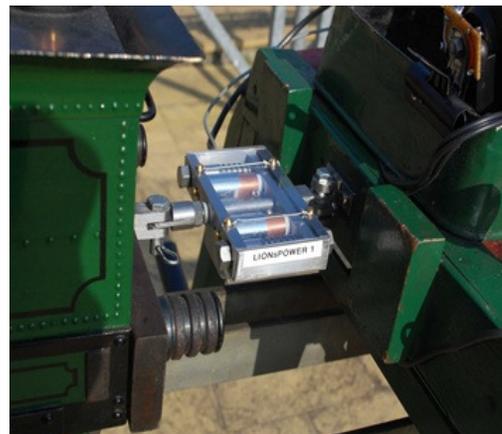


Photo 2

Photo - David Neish

The Pull Sensor, showing connection to Tender (left) and Driving Trolley (right)

For many years OLCO has organised an annual LIONSMEET at different tracks. By the goodwill of our friends, we have borrowed dynamometer cars from Guildford, Bristol, Kinver & several other clubs, but these are all quite heavy & bulky.

LIONsPower is an attempt to provide a more portable device for measuring the work done by a LION during a ten-minute run. It has a pull sensor and a display box.

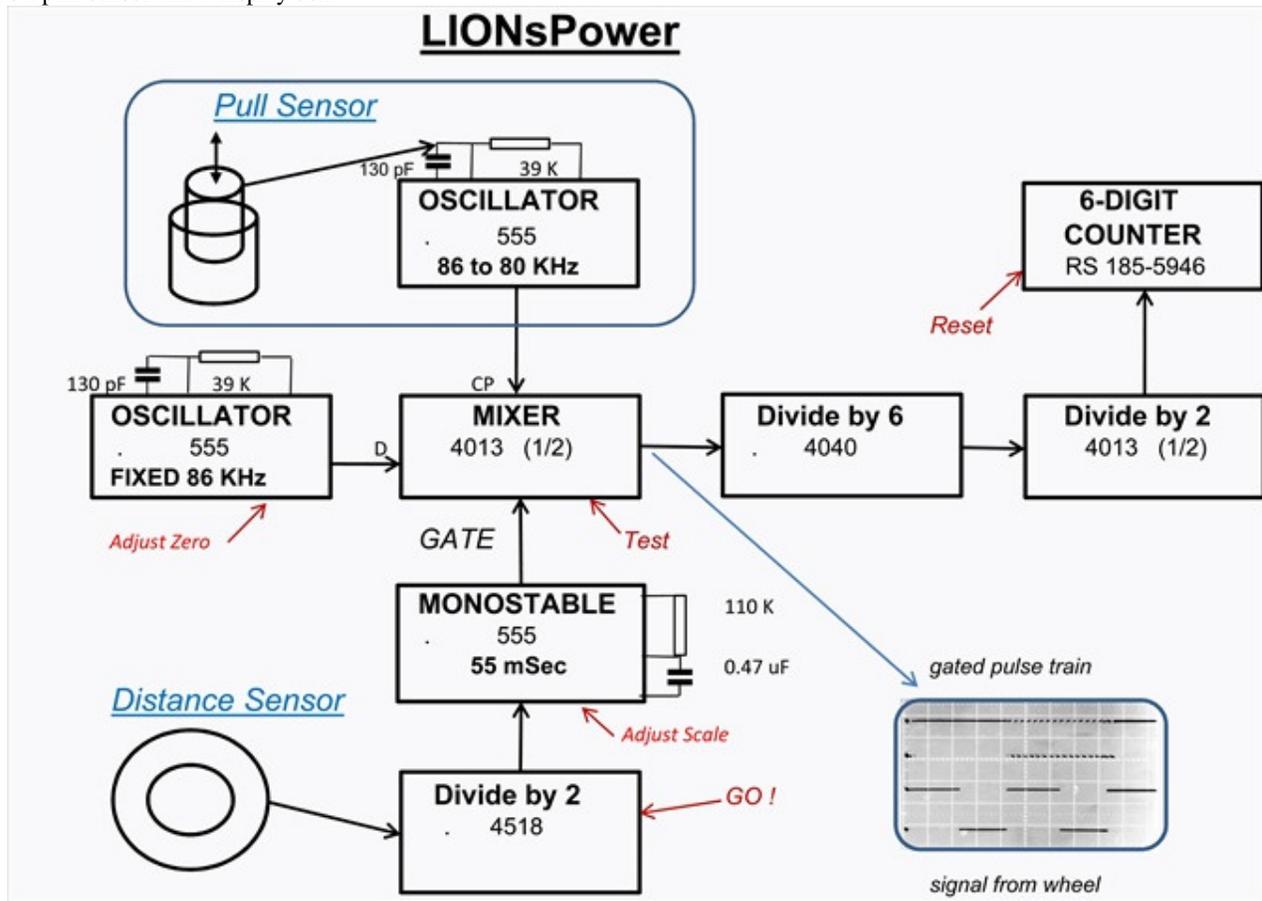


Fig 1. David's Schematic of the LIONsPOWER circuitry

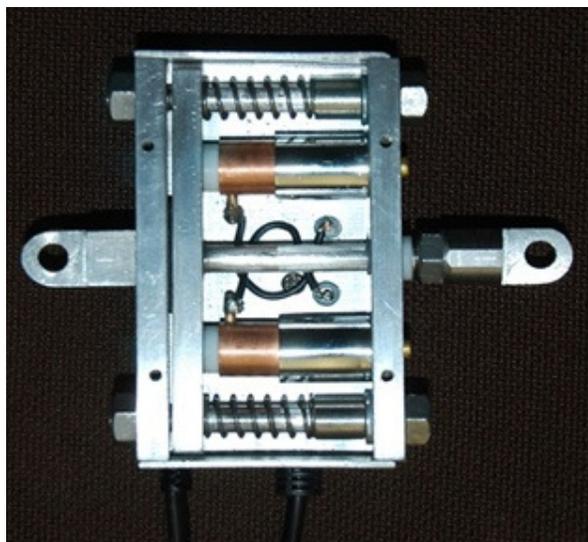


Photo 3. The Pull Sensor with cover removed, showing springs and capacitors. The drawbar pull from the tender is exerted on the right side coupling.

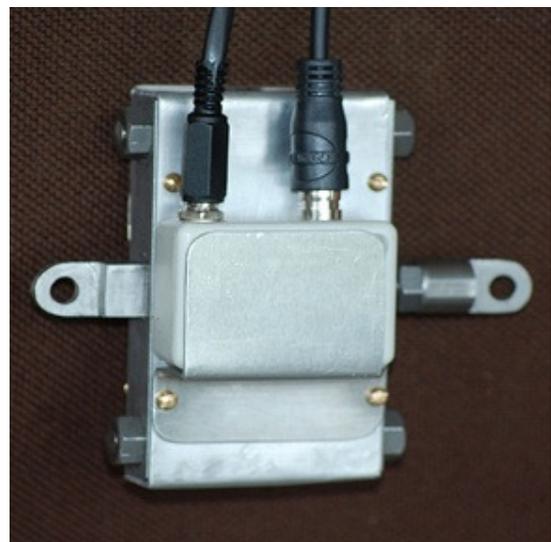


Photo 4. Underside of Pull Sensor, showing signal input and output cables. Photos by David Neish

The pull sensor is based on a co-axial capacitor, in which one tube is inserted axially into another slightly larger tube, without contact. The capacitance between the tubes varies with insertion, under the control of a pair of springs. (See photo 3)

This co-axial capacitor controls the frequency of an R-C oscillator so as to vary it over the range 86 to 80 kHz. The pulses from another similar oscillator fixed at 86 kHz are mixed with those from the variable oscillator, so that the beat, or heterodyne, varies over the range 0 to 6 kHz for a maximum pull of about 20 lbs

The other input is from a wheel on a trolley. At present this is taken from the speedometer on my driving trolley, which has a magnet on an axle & an encapsulated reed switch on the trolley body. This signal is divided by 2, & then triggers a monostable to give a 'gate' pulse of 55 milliseconds for each pair of wheel revolutions. This 'gate' allows some beat pulses to pass, thus giving a burst of pulses proportional to pull, and a total pulse count proportional to pull multiplied by distance.

The interrupted pulse train is then divided by a total of 12 so as to drive a 6-digit counter, reading directly the work done in ft-lbs. (A typical run is 50000 ft-lbs)

Fine adjustment of scaling can be done by setting the exact length of the 'gate', as can adjustment for trolley wheel diameter over a limited range.

One design detail is that, because the frequency of an R-C oscillator is inversely proportional to capacitance, the co-axial capacitor has to have slightly shaped tubes. A 'V'-shaped slot provides a theoretical correction within 0.2% of full scale pull.

The 'Pull Sensor' is housed in a small box 4 ins by 2.3 ins by 1.5 ins, with 1/2 X 1/8 in lugs at front & back, each with 1/4 in holes so that it can be used as a loco to trolley coupling bar some 4 ins long.



Photo 5.

The Main Electronics & Display Box.

Photo David Neish

The main electronics, display counter & battery are at present in a box 6 ins x 3.5 ins x 2 ins, which can be carried anywhere on the train within the cable length of 5 ft. This box carries switches for on/off & go/stop, plus sockets for test & reset.



Photo 6. Driver's Eye View. Top to bottom: Tender; The Pull Device; Speedometer; Electronics and Display Box

Photo David Neish

After some further testing at Guildford, I intend to bring this device to Lionsmeet, so that OLCO members can see it.



**Excuses, excuses!**

A pretty short issue this time, I'm afraid, since I want to get it out before Lionsmeet at Chelmsford on 30th July. (Hope to see you there). I had hinted that my investigations into valve gear would appear in this issue, but time has beaten me. Other things I've had to put by for now are a report on the filmed interview Jan Ford and I had regarding Lion, the AGM report and notes on the opening of part of the new Museum of Liverpool.

The second part of my visit to New Zealand will appear in LH72, I hope. Hints of what happened may be gleaned from Jock Miller's letter below. Although Jock isn't (yet) an OLCO member, his letter is of great interest.

We send best wishes to senior conservator David Letsche, during his current illness. David is one of the dedicated team looking after Lion at Juniper Street. We all signed a card to him at the AGM. He has been a great help to me during measuring sessions.

**Lionsheart by Email?**

If you are reading this on paper and would like to receive Lionsheart by email, just let me know. Contact details on back page. Advantages are:

- a) It gets to you more quickly than by post;
- b) All photos are in colour;
- c) No paper to file;
- d) No back issues to lose;
- e) You can zoom in to study details in photos;
- f) It's a lot cheaper for OLCO, therefore keeping costs (and membership fees) down;
- g) It's less trouble to me, avoiding the chore of printing a first copy, petrol and time used going to a copy shop and back, collating, stapling, envelopes, address labels, stamps, petrol and time going to post office and back, etc. And some of these operations involve queuing!

For the technical, the average size of Lionsheart by email is 4.5MB. (This one's 2.38MB)

**Welcome to New Members**

We extend a warm welcome to the following new members:

\*\* Mr John Dalton – Chelmsford, Essex;

Mr Robert Shackle – Woodbridge, Suffolk;

Mr Martin Hoyle – Knottingley, West Yorks;

Mr Peter Webb – Runcorn, Cheshire.

\*\* John Dalton is to be our host at Lionsmeet, Chelmsford, on Saturday, 30th July. We look forward to seeing as many of you as can get there for what promises to be an exciting day of competition and friendship.

**Apologies, Errata and such Matters**

I try to attribute photos, sketches, articles 'n all to those kind people who send in items to be published, but sometimes I forget. In the last issue, I forgot to mention that the photos on pages 5 and 9 were submitted by our Chairman, John Brandrick, so apologies, John. I don't always know who has actually taken a given photo, so, in the absence of that information being supplied, the attribution goes to whoever sent it in, hence the 'Submitted by...' on occasions.

I also owe an apology to John Martin. He brought his 7 ¼" Lion to Lionsmeet 2010 at Kinver and I never even mentioned it. Thing is, it wasn't on the photos that I published, so, out of frame, out of mind. Anyway, he's bringing her to the Bristol Exhibition (see page 8), so you can get up close and have a good look.

**Readers' Letters**

Please do make contact and let me know what you think on any topic. Your comments may be published, but I reserve the right to edit as I see fit. If there are comments in your letter that you don't want me to publish, please say so. Letters are published in chronological order.

Needless to say, OLCO may not agree with your views. My views? Oh, I'm just the Editor!

I don't pass on contact details unless I check with you first. However, if you wish to direct a legitimate comment or query to another member, I may forward your communication directly to that member, in the assumption that you are happy for your contact details to be passed on to that person.

If you've written to me in the past and waited in vain to see your letter in print, then please let me know, with, if you can, an idea of the date and topic.

And now for the letters. Some were sent ages ago and I can only apologise for their late inclusion:

From **Alan Bibby**

By email

Bolton, Lancashire

14<sup>th</sup> January

Thank you for the new issue of Lionsheart. (*This was LH LH69. See how far I've got behind!* – Ed) You asked for comment on the content and I wondered if I might make a few observations.

On the model valve gear, I have had no problem with the LBSC design re the valve spindle support, though my engine has probably run well in excess of 1500 miles since I built it, though I agree that from a purist point of view the spindle should be supported. I used the Saxby form of gab. It is also important to have a polished finish on the sliding faces. A problem not mentioned is the change of section on the LBSC valve rocker shaft, which resulted in fatigue failure on my model, and probably others. I changed the design to 3/16" dia over the whole length.

You have obviously put a huge amount of work into a very interesting issue. I was pleased that Jan's report of last year's Lionsmeet included details of the Kinver dynamometer car, something that seemed likely to be overlooked, but very interesting. David Neish and I have been exchanging ideas on a dyno car for OLCO, which David will build, hopefully, making us independent of borrowing.

Fewer pictures would probably have sufficed for Lionsheart, with the rest on the website.

In the next bibliography update, you may care to mention my report in Model Engineer on the Brighthouse Lionsmeet. I also did an article for EIM on the Erewash event.

It took me 40 minutes to print out this issue, with indifferent colour rendering, which led me to wonder if, accepting increased costs (which we can afford I think), we would prefer to have laser printed hard copy, as in the past, maybe as an option? More work for you, I agree, but (with apologies) would this be a possibility?

With best wishes, and, again, enjoy your trip to the antipodes!

Best wishes, Alan

*(Oh, if only LBSC were still here to comment on all the angst that's arisen over his valve gear for Titfield Thunderbolt! Alan's reports on Brighthouse and Erewash were in Model Engineer Vol 196, Iss 4264, Pg26, dated 6<sup>th</sup> Jan 2006 and Engineering in Miniature Vol 25, Pg 249, dated February 2004 respectively. I urge readers to come along to Lionsmeet at Chelmsford, even if they have no model with which to compete. Bring along part completed work if you can, since we have a display of 'Work in Progress'. As for hard copy of Lionsheart, the whole idea of sending by email is that it's – oh, see 'Lionsheart by Email?', above! I'll report on the antipodes in a later issue. – Ed)*

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From **Tony Parsons**  
By email

Leamington Spa, Warwickshire  
14<sup>th</sup> January

I had another thought about the nutted grub screw. It was better to make a stud to sit in the cylinder block so that the valve casing and gasket were not disturbed when the top valve cover was removed, if you see what I mean.

Have a good time in New Zealand - Tony

*(This is in reply to my query underneath the photograph of Adrian Banks's Lion on page 3 of LH69. Of course, it's just the sort of thing you'd see on a car cylinder block, or many another similar item, come to that, where a gasket is fitted. – Ed)*

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From: **Stephen Fletcher JP FRSA**  
By email

Ledsham, Cheshire  
3<sup>rd</sup> May

The photograph on (Lionsheart No 70) page 11 is one I gave to Jon Swindlehurst to pass around. It was part of the collection of items belonging to my grandfather W M Fletcher who was instrumental in the rediscovery and restoration of Lion. He was also the founder of OLCO. Most of Grandfather's papers were presented to Merseyside Museum over 30 years ago by my father Stanley Fletcher and his elder brother Gardner Fletcher OBE

I am horrified that C W Reed is still given any credit regarding Lion as his story was fictitious as exemplified by Adrian Jarvis's book and his article in Railway World in 1980.

Please ensure that credit is given where credit is deserved.

Stephen Fletcher JP FRSA

*(Yes, this has been a contentious issue among Lion fans. I think the C W Reed story is now well and truly debunked by Adrian Jarvis in his article 'Untwisting the Lion's tale', by Adrian Jarvis, in Railway World Vol 41 (1980), No 477 (Jan), Pgs 21 – 24. Watch this space - Ed)*

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From: **Rich Garich**  
By email

New Jersey, USA  
3<sup>rd</sup> May

This note is in response to the AGM (*Notice of, in Lionsheart No 70 - Ed*)

As might be imagined, living in the US, I won't be able to attend the AGM, though I'm sure that I would certainly enjoy it.

Here are 2 items that I'd like you to broach, if you deem it appropriate:

1) It would be really nice if all previous versions of "Lionsheart" were archived on the website. I believe this would be an aid in furthering research for the next generation. I'm sure that early edition copies are scarce and members from outside the UK would probably never come across them.

2) Mike, at Station Road Steam, has some photos of one of the nicer 3 1/2" gauge Lions he's had, posted in the Archives section of his website: <http://www.stationroadsteam.com/archive/2059.htm>. He's always been an easy person to deal with and inclusion of these photos in the website would show one of the smaller models that are out there. If OK'd, I'd be happy to send him a note.

BR to all, - Rich

*(The prospect of putting previous versions on to the web site was discussed at the AGM. Watch this space – or the web site of course! As for that very nice photo at Station Road Steam – over to you, Web Master? - ED)*

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From **Alan Bibby**  
By email

Bolton, Lancashire  
6<sup>th</sup> May

A very good Lionsheart once again!! I was very interested to read David Royle's contribution and to hear of the drawings he has passed to you, I hadn't realized Charles was involved in that project, though you have mentioned David's work in the past. I was particularly interested in his claim to have obtained a copy of the original Lion tender drawing, and would be very pleased if you could forward a copy of that, may at the AGM or by email if it is digital.

*(I did email David about this tender, but so far... - Ed)*

From **Mike Lee**  
By email

Amesbury, Wilts  
17<sup>th</sup> May

I am in receipt of your Sketches and am frankly amazed at the amount of detail you have obtained. Thank you so much.

Presently I am talking to someone regarding the possibility of producing the 'correct' pattern of wheels for Lion and the Tender. This will be at five inch gauge and using a novel casting material, of sufficient strength, to enable the slender wheel design of the full scale locomotive to be replicated for the model and capable of withstanding normal track use. I would be interested to know without any commitment whether there would be any enthusiasm from OLCO members should these become available.

Simply, I wish to get some idea as to whether it is worth producing more than my requirements should patterns become available. At this stage I am not happy to proceed with the type of castings currently being offered as suitable for Lion as they depart so strikingly from the original design. I presume I am correct in my assumption there are no correct castings on the market?

*(Mike's reply to info I'd sent him on the bolts along Lion's main side frame. They were hex headed when she was removed from the pumping house, but, as noted in the 'Yellow Book', they were replaced by square headed bolts. Since that letter, Mike wrote again, on 19<sup>th</sup> June... - Ed)*

I wondered if you have had an opportunity to sound out any interest in correct wheels. Further to my last email I have discovered castings can be produced capable of withstanding the usual punishment you would expect on a track. There are now better materials available superior to cast iron. I am not expecting any commitment, just a view as to whether it's worth retaining any patterns beyond my own requirements at 5 inch gauge.

Best regards, - Michael.

*(Well, Mike, you'd be amazed at the number of times I've been asked a question on something I've already covered, but not to the extent that answers the query. So now I try to record everything. Thank you for your comments, though. As for the wheels, you are correct in your assumption that there are no correct castings in 5" gauge. Don't forget that the two forward coupled wheels have 16 spokes, while the crank axle wheels have 18. Also, wheel standards in modelling do not permit accurate scaling on wheel thickness and back-to-back dimensions. Would anyone out there like to follow this up with Mike? I can pass on contact details if you are happy for me to do so. - Ed)*

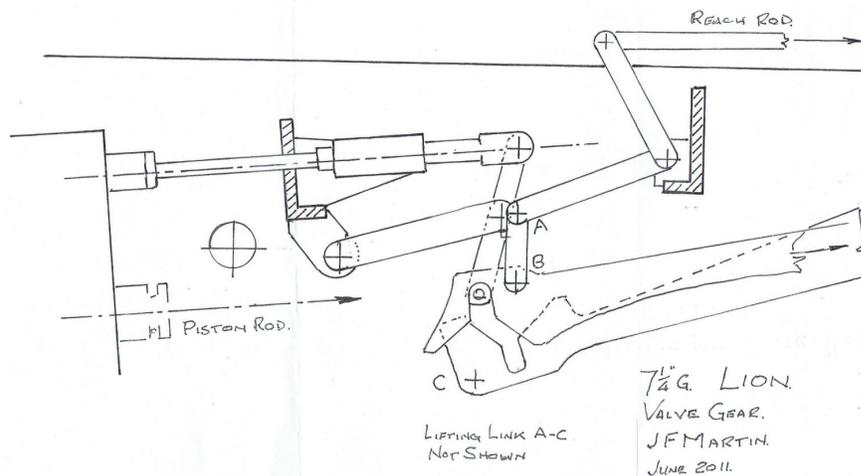
From **John Martin**  
By post

New Radnor, Powys  
8<sup>th</sup> June

I hope you have received my photos via email from my son and have found them of interest.

So far the loco has not got off the bench, due to other works. The engine has run on air. Steam to follow soon. I enclose a sketch of my valve gear for your interest.

John F Martin



From **Jock Miller**  
By post

Christchurch, New Zealand  
24<sup>th</sup> June

It was nice to meet you earlier this year and for you to visit the CSMEE track at Halswell.

We are still getting aftershocks, which don't lead to 'peace of mind'. The centre of the city is, to put it mildly, 'Buggered', or to use a South African expression - 'Munted'. Yesterday, the Government announced that at least 5000 houses in East Christchurch would be demolished (owners paid at Valuation) with the land to be cleared, never to be built on again. There are still about 10,000 that are marginal, including some in hill suburbs, where rocks have fallen (one rock 60 tons inside a house!!)

This house is OK - chimney in sitting room has been removed and 2 1/2 tons of bricks removed and gas heater relocated. Six feet square window to west replaced. No damage to workshop other than a fluorescent light fitting fell and broke the tube. Very lucky. Some of our members (Model Engineers) have had lathes, etc fall over, homes damaged, liquefaction, etc

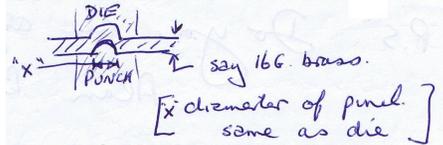
No damage to club facilities.

Could you advise if there are 7 1/4" drawings for LION? I could make this my next major project after the little 7 1/4" Canterbury Railways 0-4-0 Nelson is completed (next year now!!). I was going to build GLADSTONE (LBSCR) in 7 1/4".

When you saw my 3 1/2" Lion I don't think I pointed out that while the design detail was to LBSCR ex Model Engineer, the original castings were from Wilwaugh, York, UK and wheel castings never used.

- 1) Wheels fabricated from steel with brazed spokes (Eutectic 16);
- 2) Boiler as LBSCR but with 1/16" hardwood lagging;
- 3) Gabs of valve gear altered slightly so reversing possible;

- 4) Tender sides with dummy rivets:-



- 5) Background of  (Nameplate) green as photographed at BR Crewe works 1961. Not red as now!  
Regards – Jock Miller

*(There you are – told you I'd been to NZ! Part two of my report will appear in a later issue and will cover my experience of the earthquake of 22nd February and the subsequent visit to the CSMEE track. There are no 7/4" drawings available for Lion. When I do mine, I'll scale down the full size drawings, as far as possible. – Ed).*

From **Barrie Larke**  
By email

Plealey, Shropshire  
6<sup>th</sup> July

Jon (*Swindlehurst*) has raised an issue about the odd number of bolts holding the main driver horn plates on one side of the frame to the other side. Ten on the RHS and eight on the LHS. Hmm, what can one say, other than at some date in the past surely a repair has been done and whoever did it had no regard for symmetry or good engineering practice. It could also be that at some time someone found one side had come loose so they decided to put two extra bolts on that side, having no regard for the other side.

The idea of me following suit on my model somewhat offends me as I have a strong sense of symmetry (perhaps too strong) so am left with a quandary which way to jump. From a purely engineering point of view it seems more likely that the main driver axle would carry heavier loads than the other axles and therefore two extra bolts (each side) would have been considered. On the other hand the original designer could have simply made all horn plates to look the same with eight bolts. LBSC shows ten but he only gives one view. I have seen photos of the full size Lion and Jon is right, the sides are odd. Never noticed that before and for some reason I only have eight both sides on my model so far. It's easy enough to add two more but on one side only? Not happy about that.

Do you know if the horns have ever been removed from both sides of Lion recently to see if there is evidence either way?

Regards, - Barrie

*(Don't worry too much about symmetry, Barrie. There are lots of asymmetrical features on Lion. I think I'm right in saying that the coupled axle hornplates haven't been off since the 1930 restoration, if then. Does anyone have information? We do know that those for the trailing axle were repaired, since we can see that the rear half of each had been cut away, perhaps for her pumping duties (See LH 70, Pg 12). The new material is thicker (0.53") than the old (0.45"), probably first spotted during my measuring trip to Juniper Street on 21<sup>st</sup> July, 2009, along with Canadian member John Coop. Incidentally, I was once told that the right hand crank axle hornplate had ten bolts because that area was more highly stressed than the left, but I've since had a funny pain in my leg! It could be argued that, since the drive is shared between both coupled axles, via the flycranks and coupling rods, no one hornplate is stressed more than another. I could quote from the 'Yellow Book', but it's on loan at the moment and in any case, there may be copyright issues.*



## Snippets

Lion has moved from Juniper Street! Or at least, I am assured so from reliable sources. She is now installed in the new Museum of Liverpool, but is not yet on display. I suspect the move was brought forward so that features important to the Grand (partial) Opening could be put in place. I was honoured to be invited to this event on Tuesday, 19th July and hope to give a full report in a future issue. Needless to say, I had a good look for her, but there were certain areas I could not reach.

The new museum is right on the waterfront – a prime position. It is an angular 'modern' building and I'm sure there was (and will be) plenty of controversy regarding the design. It's certainly not the worst modern building there. However, once inside, it's a fascinating display of all sorts of 'Liverpoolian' and I look forward to making further visits.



## Dates for your Diary

1. **Lionsmeet 2011** - 30th July, Chelmsford. For details of Lionsmeet, see LH70, Pgs 10 & 11.
2. The **Bristol Model Engineering and Hobbies Exhibition** – Fri, Sat & Sun, 19<sup>th</sup>, 20<sup>th</sup> & 21<sup>st</sup> August. See poster, next page.



## Editor's Contact Details

If you would like to contact the Editor on any issues raised in this newsletter, or for any other reason, the details are below: I'm always glad to receive your notes, comments, articles, etc. In descending order of preference they should be:

- a) typed on a computer and emailed;
- b) typed on a computer then printed and sent by post;
- c) typed on a typewriter and sent by post, or
- d) if you want to find out how desperate I am, try a good old fashioned handwritten letter.

Just run a spell checker over your computer work first though and always read through what you're sending, even if hand written, to avoid subsequent mis-understandings. I am not keen to receive contributions via floppy or CD

As for photos, the advantage of sending them by email is overwhelming – I can put them straight into the document, scale them, crop them and all sorts, getting a 'first generation' print. If you send a photo by post, then I have to scan it (losing quality) and possibly send it back, which I cannot guarantee. Photos which have been printed onto plain paper and sent to me don't really work, especially via the scanning process. When sending pictures, include the photographer, or details of the publication from which it was taken, so that I can bestow the proper accreditation.

John Hawley, Rock House, Downside, Backwell, Bristol, BS48 3DH. Tel: 01275 472023. Email: ringjph@talk21.com

Also, please, if you change postal or email address, don't forget to let me know. *Ed.*

## The Bristol Exhibition

OLCO will be there. Please call at the stand. If you need details of how to get there, contact me. Contact details on page 7. I look forward very much to seeing you and I hope you enjoy the show. It's a few miles north of Bristol, just off the M5, so city traffic will not be a problem.

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# The David Royle Drawings

On page 6 of LH70 I printed a letter from OLCO member David Royle, who said he had come across some 1930 drawings of the Lion, which he found at Derby works before it closed down, also the drawings of some of the coaches related to the Lion.

I promised to have a look at them and I now publish two of those that are in fairly good condition. These are the Fall Plate, between Tender and Footplate and the Closing Bar for the Smokebox Door. There are some others, which I will publish in a later issue.

This is the Fall Plate.

