# LINK

NEWSLETTER OF THE COLCHESTER SOCIETY OF MODEL & EXPERIMENTAL ENGINEERS LTD

**No 58** **Spring 2021**

## Activities since Autumn LINK No 57

Suffice to say that with the lockdown commencing at the start of the year and the limited access at the end of last year there has not been much in the way of normal activities to comment on other than that Members have made use of the limited access permitted on Wednesdays, Fridays and Sundays to run their locos and obtain boiler certs.

It seems hard to believe it is almost a year since we had a "virtual model" night and again a Newsletter was sent out showing what some members had been keeping themselves active with over these lockdown challenging times.

Currently there are no planned visits between other clubs for this year. It remains to be seen if all the restrictions will be lifted by the Government on the 21 June and to what extent the Club will be able to put on any events, such as a family day or even the night run and firework display, will need to be considered nearer the time. Any changes will be advised by Newsletter.

**Don Black**

## Children's Parties 2021

Assuming that we progress out of lockdown in a similar fashion to the Government suggestions, we need to have some kind of plan for parties.

My own thoughts are that we should plan to do four parties in August across two Saturdays with a party in the morning and one in the afternoon. By running a single loco on the raised track and Peter Bohn's yellow peril on the ground track, this would not require too many members to organise and offer enough rides for shall we say twenty visitors. The income of £800 would enable us to catch up a bit financially.

These ideas will need to be agreed by the committee but I see these suggestions as a starting point and would welcome member's thoughts.

.**Graham Willmott**

## Time saving idea

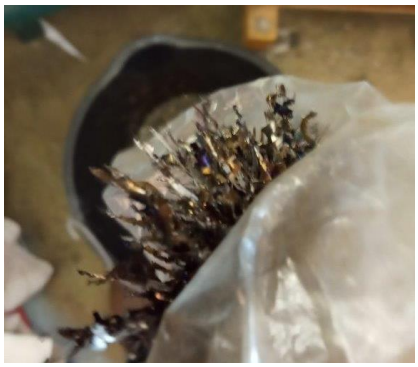
When producing copious amounts of steel swarf in the workshop. What's the easiest way to clean it up? I got fed up unclogging my industrial vacuum cleaner.

So I thought to myself there's got to be something easier. Using brushes and rags are a pain, and spending the next few day digging metal splinters out of my fingers gets tedious.

So I came up with this.

1. Take large bar magnet and stick it in a plastic bag.
2. Collect the swarf on the outside of the bag using your magnet.
3. Empty/release the swarf over your swarf bin by simply pulling the bag away from the magnet, the swarf just demagnetises and drops in the bin.
4. Even works well if you drag the magnet in its bag across the workshop floor.
5. You will eventually need to replace the bag as it wears through or gets cut by the sharp swarf.
6. It also leaves the vacuum free for the finer and non-ferrous swarf.



**Andrew Becker**

**Steaming to the moon and back – well not quite**

Hopefully, the Club shutdown will end in a few weeks [maybe months] time and we can all have a steam up again. Having withdrawal symptoms the other day I got out my log books to remember past days and to check a few things such as boiler certificates and steam certificates to decide which one I would run when lock down ends. All was OK, not all my boiler tickets had yet expired, and I could look forward to a good steam up.

As many of you all know, I keep a log book of my runs over the years. Whilst the log books were out I totalled up the mileage I have done. Added together for all of my locos I have completed 4434 miles on the track. A few of these miles have of course been run on other tracks when we have visited other clubs. This means that when we next meet up for a run I will be steaming up a street in New York.

My wife Liz thinks we are as “daft as a brush”. Yes I am but I will be a happy one again!

| | |
|---|---|
| Hunslet: 806 | Virginia, 3 ½ gauge: 1655 |
| Stirling Single: 361 | Claud Hamilton: 503 |
| LMS 8F, 3 ½ gauge: 590 | LNER B1: 519 |

This equates to 22170 laps of the Colchester Club track over the past 25 years since 1996 which was when I first had a run on my newly built 8F. YES we are as daft as brushes.

**Geoff King**

**How well do you know your members?**

“Name the legs competition"

The legs belong to Julian Staunton on the ground, Martin Courtis on the staging to the right and Graham Willmott on the staging to the left.

**Suzanna Giera**

**Re-boiler my 3 1/2” gauge A3**

After the club had a stand at the Tendring Hundred show, I decided to re boiler my 3 1/2” gauge A3 that I built in 1968. The old boiler was hard work when driving the loco as all the water went into the back head, this pulled the boiler pressure down to around 50 psi, and by the time the pressure was back up to 80 psi, the boiler needed more water.

I got the old boiler drawing out to see how it could be improved. Using the old boiler measurements, I then started to re-draw the boiler. Looking at the old cladding, the back head could be made wider, so I put the old boiler back in the frames and took some measurements with the reach rod in place. It looked like the back head could be three quarters of an inch wider and three eighths wider on the throat plate. The new boiler was drawn up using these dimensions, a combustion chamber was added. When looking at the front tube plate I noticed that the bottom row of tubes had a large space either side of the existing tubes, so redrawing the front tube plate I was able to get two extra tubes in the new boiler. With the drawing finished, I checked my copper stock and found a length of 3/8” tube just long enough for the front part of the boiler and sheet copper for the tapered section and inner fire box and the back head, all I had to purchase was a piece of sheet for the outer firebox plate.

The new boiler was progressing well with all the boiler shell soldered and the inner firebox and tubes done, when along came this dam covid-19 and a lock down, which meant I could not get the boiler finished. So, my attention turned to the chassis, re bushing all the coupling rods and con rods along with all the valve gear bushes. Then I re made the steam inlet to give a curved inlet tube to the centre cylinder, instead of a straight tube as on the Clarkson's drawings. Now to alter the exhaust tubes to give a nice curved exit from the cylinders. The next job was to remake the cab reverser to the correct profile; this is an upright reverser with the column moved over from the cab side, whereas on Clarkson's it was close to the cab side, which made it hard to operate. After this, my next job was to start on new boiler fittings, two water gauges were made, two banjo clack valves left and right hand to put the water over the inner firebox, along with a new regulator. This was a scaled down version of a slide valve regulator as fitted to Brian Upson's A4, that he emailed a drawing to me. The lockdown was lifted so I could now get the boiler completed and tested with cert for the shell test. Now I could make the new brass cladding and some more fittings for the boiler. A manifold had to be made to fit the curve of the boiler top, to clear the underside of the cab roof. We then went back in another lockdown and the A3 is ready for painting, but with the weather wet and damp it is not good for this job, so will have to wait for warmer weather


**Andy Hope**

## MY CLAUD HAMILTON LOCOMOTIVE

In the Club auction in 2003 there was a part built set of locomotive frames for sale. No one appeared to know what the frames were for, as what was there did not match up to any known frame sizes. The frames were fitted with part machined cylinder block, axle boxes, and a crank shaft, with the last trailing axle. No one would make a bid for it, and in a mad moment I bid £5. Bang! Down went the hammer and I had bought the lot for a fiver.

When I had taken the frames home I started to check over what I had bought. To my surprise the crankshaft in the frames had been machined up from a solid steel bar. No mean task!!! The cylinder block was part machined up, but the cylinder bores and piston valves had not been done. There were also four driving wheels, also un-machined. What was the locomotive that someone had started on, done a lot of skilled work and then abandoned? In addition to this there was a selection of wooden patterns in a box. Not knowing what they were for they were put away at the back of my garage and forgotten about for now.

On the frames there was a large oval shaped cut out between the driving axles, consistent with a Claud, but the frames were too short to be from a Martin Evans design Claud. Eventually, I

found a drawing of the full size loco in the Club library. They showed the overall dimensions of the frames and when scaled down they exactly matched my frames. Martin Evans had scaled his locomotive at 1 1/16" to the foot, i.e. to exactly to 1/12$^{th}$ full size for 5 inch gauge. My frames now made sense; they were at 1" to the foot, three inches shorter than the published design in length.

I started to search for clues to find out where the frames had been made, and eventually traced them back. I found that they had been started by an engineer working at the Cambridge engine shed by the name of Jack Partridge, who was working from the original drawings way back in the 1950`s.

This accounted for the cylinder block being for piston valves, which were used on the Super Clauds D16/3 locomotives. I made the decision to continue with building the locomotive. This meant that I would have to rescale the drawings, and lose 1/16$^{th}$ in every 1" of the loco. Also Martin Evans had designed his Claud with slide valves, and I would have to scale some from another design, or design my own piston valves from the original drawings to use the cylinder block already in the frames.

I started work later in 2003 machining the wheels that had come with the frames. At the same time I ordered a set of castings for the front bogie frames from Norman Spink and then started work on the bogie. The driving wheels did not have the balance weights cast in, so false weights were made and fitted in.

Before proceeding with the rear axle, I checked the centres of the axle boxes in the frames. Tool makers buttons were made to fit into the axle boxes. The coupling rods were then roughed out and tapped 2 BA where the bearings were intended to be. The buttons were then inserted into the axle boxes and screwed onto the coupling rods. The coupling rods were then set up on an angle bracket in the lathe, where the ends were drilled and machined for the bushes. This way I knew that my coupling rods and the axles were at exactly the same centres. All went well and when the wheels had been quartered, and the coupling rods were on, the wheels turned freely.

Work then started on the cylinders and valve gear. The original motion plate was scrapped and a new one made to the Martin Evans design after adjustments to the dimensions. The cylinder bores were done and pistons were turned to fit. At this point I obtained a set of Great Eastern drawings for a Claud D16/3 locomotive. Work continued on the valve gear, making the required dimensional changes as I went along. The connecting rods were also made with changed dimensions, being 5/16$^{th}$ inches shorter than the published design.

I had already made a locomotive with piston valves [LMS 8f] and had learnt a lot from this. The 8f pistons had cast iron piston rings and piston valves and although a good runner the valves were not totally steam tight. I had already had experience of pneumatic valves using O rings passing over a large number of small holes and these had been no trouble and had a long life. I then designed piston valves for the Claud with PTFE piston rings on the valves passing over ports consisting of many small holes [1/16$^{th}$ inch] in diameter. Each port on the piston valve sleeve consisted of 90 holes in three rows of 30 holes. This eventually proved to be a great success and was published in Model Engineer.

To be continued in the Autumn edition of Link

**Geoff King**

## The Wednesday Wrinklies Report

In between the lockdown periods and various levels of restricted operating conditions some maintenance tasks have been carried out while members have had access to the raised track for running locos

The task of changing out the decaying timber track edge timbers around the raised track for pressed concrete path edging sections continued and so far 106 have been installed leaving 190 remaining to go. Members were still able to run locos during the work whilst observing safety measures and sounding their whistle when approaching the work area.

In December the access bridge started to miss-behave with an intermittent electrical fault leaving the bridge in the raised position. Having removed the cover to the electrics, the 4 members concerned (names withheld to protect the innocent!) scratched their heads to find the source of the problem. In best engineering practice, inspection was carried out by tapping the various relays with the end of a screwdriver and low and behold one of the relays tripped and the hydraulic motor ran. A new relay was purchased and fitted only to have the same intermittent problem occurring. Further inspection (by wriggling the wires) found a lose wire connection in the chocolate block connectors and having tightened all connections for a short time this seemed to solve the problem but unfortunately it didn't. The inspection was upgraded to using an electric meter to try and trace the loss of power and finally it was found to be the 12 / 6 volt change over switch on the 12 Volt charger which had badly corroded. The action of tapping the relays had vibrated through the support frame and made the switch activate! The solution was simple – as the 6 volt circuit was never used the switch was bypassed to leave the charger permanently in 12 volt operation. The old saying of how many engineers does it take to change a lightbulb comes to mind!!

One task that needs to be carried out as soon as the club reopens is to replace the two steel water tanks at the clubhouse with reinforced plastic tanks. The one sited at the end of the clubhouse has corroded and split at the centre brace and as the one at the rear of the clubhouse is of the same vintage, it is deemed sensible to replace both. While this work is going on the opportunity to replace the pressure pump is also being taken.

Finally, when the weather improves, the raised track steelwork needs repainting and volunteers will be requested to help complete this task in as short a time as possible to minimise the restriction to using the track.

**Don Black**

## Experience at the Locomotive Drawing Office, Swindon.. Part 1

The letter said: "Turn right out of the station and proceed until reaching the tunnel entrance to these works; whence the gatekeeper will give you further directions". This was in response to my seeking employment in the Locomotive Drawing office a week or two previously. Naturally, I was pleased to get the interview and was now somewhat apprehensive as to the outcome. The Locomotive Drawing Office was situated on the top floor of a fine Victorian building of three storeys. At the top of this edifice one can see some bas-relief images of locomotives carved into the stonework-- the identity of which has been much discussed and the consensus is that they represent the broad gauge locomotive 'Premier'.

Entrance to this building was via a small porch (later I was to find that they stored failed components of the hydraulic locomotives here - whilst the drawing office was working to rectify the issue). From the porch one proceeded to the stairs -- no lifts here at that time, though many years later they were installed by Railtrack. I'm sure that the Victorians felt that if you were fit enough to work in the Drawing Office then you would have no problem climbing a few stairs. It was a fair plod to reach the top floor and I learnt that some of my future colleagues, with respiratory difficulties, would go up one level and then traverse the length of the building before ascending further. On reaching the top there was a small landing giving access to certain offices. Straight ahead was that of Mr. Gordon Thorpe who handled administrative matters for the Drawing Office. To the right was a short passage leading to the drawing office, on the left of this was the Chief Draughtsman's office and to the right that of Mr.Scholes. I was now shown to the first of these and introduced to Mr.Sly; the Locomotive Chief Draughtsman. He proved to be a very pleasant man and the interview proceeded on conventional lines but I was surprised to be mildly grilled on steam engine knowledge rather than that of diesel engines. After all, the sole reason for my being there was that I had ‘hands on' knowledge of the operation of diesel engines. Nevertheless, the interview went well and I accepted the offer and agreed a starting date.

All this was conditional upon the railway medical, which I undertook the same day, and passed without difficulty. Incidentally, part of the medical was an eyesight test including colour recognition; this involved asking you to identify a particular colour from an image of multiple dots wherein lay a very slight figure of a dissimilar shade. If you could discern the figure then it meant that you could 'see' that colour. In due course, having arranged lodgings in Swindon, I reported for duty. Previously I had worked in two drawing offices, and visited several more, but this place was very impressive. The office itself was large, well-lit and airy. The equipment was second to none -- all drawing boards were equipped with proper draughting machines and each draughtsman had a decent desk area on which to work. There was a gangway down the centre with two rows of boards on each side then two more gangways, somewhat smaller, followed by single rows of boards next to the windows. These were regarded as premium positions and were occupied by the most senior men.

My board was 'one in' from the windows on the left hand side. The main London to South Wales line was visible from this side. Three tracers occupied the boards nearest the entrance. Further down, beyond the confines of the Locomotive Office, was the General Drawing Office which dealt with items such as turntables, locomotive depots and the equipment therein. To the right was another whole wing which belonged to the Carriage and Wagon people. The headcount of the Locomotive Office would be around 50. I was put to work on the section headed by a Mr. Slade. This section seemed to have a wide range of coverage. Indeed I never did discover what the boundaries really were. Initial jobs were on the D1000 locomotive. Although there was occasional mention of a 'Type 1' loco -- as the next project -- it was some time before anything really started on this. Nevertheless, I think a wooden model was on Mr.Schole's mantelshelf before we did any drawing. Possibly a second model was made later.

Work on the D1000 was progressing well and I couldn’t help but admire the way the calculations for the stressing of the monocoque structure were methodically carried out. So often this kind of work would be held in the draughtsman's own note book which, whilst officially accessible to anyone, so often proved difficult to access just when required. No such problems here however, everything was recorded as though it was a drawing and was therefore properly registered in the appropriate system. The general stress level of these structures being around one ton per square inch --- this made due allowance for the rigours of railway service. Few people, when observing the construction, realised that the locomotive had to be built with a camber along its length. Namely, a point midway along the body was higher than at the ends until such time as all the major components were in place when, hopefully, it would assume a straight line. This was achieved on both the Warships and the Westerns.

After a week or so it became obvious to me that my rate of working was considered to be rather swift. Curiously, some people hinted that this constituted 'letting the side down'. This was silly. If one worked in a commercial drawing office you were under constant pressure to get the thing done and without mistakes either. This lethargy manifested itself in different ways. When the D1000 entered service a number of teething troubles showed up and, naturally, the management wanted things sorted as quickly as possible. To this end I stayed late one night to complete drawings for an access panel cut into the stressed skin giving access to (I think) the exhauster brush gear. Slightly tricky job because it required a frame to be set into the skin in order to maintain the requisite stress level, (You couldn't cut holes in the stressed skin willy-nilly!). I went home around ten o'clock having finished the job and first thing next morning gave the drawing to the section leader (Les Slade). After briefly checking it over he 'phoned for a production man to come and collect it with a view to hastening the work. This guy turned up about half an hour later took the drawing and I got on with the next job. An hour or so later I looked up and saw him talking to someone further down the office. I called to Les Slade and said: 'it wasn't much point my working late then was it?' and so he went and 'had words', (Apparently they were yacking about football). I saw the man leave but later a fellow draughtsman came up to me with my drawing and said: 'I found this on the desk behind me.....! Anyway, in the end, the thing got done and you will see that panel now on the D1000s. There was a sick joke going around at the time: viz: 'How many people work at (nationalised) Bristol Siddeley?' Answer: 'About ten per cent'. I'm sure the Locomotive Office was not as bad as that but you get the drift.

Apart from many jobs on the D1000s I also did work on the D6300s and the Hymeks. On the Hymek there was a problem in that the sand box lids could blow off when the air sanding was in operation. This was quite dangerous in that the heavy cast iron lids -- retained by a chain -- could go jangling down a platform where the public may be standing. I was asked to devise some means to prevent this, which just meant arranging a bayonet style attachment for the lid. A more colourful difficulty arose on the D1000. Because of the limited space available it was decided that a full toilet facility could not be provided; we would have to settle for a urinal. For some reason the board objected to this word and wanted it to be called a 'partial convenience'. Anyway, it was duly installed and at a level appropriate to its intended use. As chance had it, this coincided with one of the few windows in the side of the loco body. In hot weather, the temperature within could get pretty oppressive and so the windows were arranged to slide open. Alas, one day at Bristol Temple Meads, a man was making use of the 'partial convenience' when he heard screams from two women standing on the platform..... well, at least the solution was obvious -- use frosted glass and stop it from opening.

Inevitably, from time to time, one could feel somewhat awed by the history of the place. Above the entrance door hung Isambard Brunel's drawing board; of course, no one could prove that this was his but on the other hand it was a reasonable possibility given the early history of Swindon. Then, remember that all the locomotives designed by G.J.Churchward were conceived in this very room, and that that influence spread far and wide. In fact, the drawing office was an addition to the existing building -- being added around 1903. The Bas-Reliefs were transferred here from another building -- they were carved in 1841.

A major issue at this time was the unacceptable ride quality of the Warship Class at high speed. When new there was not a problem and the machines showed themselves capable of 100mph plus. But as the mileages mounted the ride progressively deteriorated. The lateral oscillations were quite severe being readily felt in the first coach of the train. Finally, a maximum speed of 80 mph had to be imposed for safety reasons. Meanwhile a cure was sought. The culprit was soon identified -- namely that of the Kraus-Maffei linkage which constrained the bogie to pivot (in plan view) about an imaginary centre point. This enabled the designers to position the output of the transmission in the mid-point of the bogie wheelbase thereby allowing the cardan shafts to

radiate outwards to drive the axles. All these K-M linkages had to be scrapped. A 'mountain' of them gradually built up in the yard outside; doubtless this 'mountain' represented a fair amount of cash bearing in mind that the licence fee included the use of the K-M patents. Many alternatives were considered and some tested but eventually two self-centering Woodhead Monroe hydraulic shock absorbers were used to tie the bogie to the body.

This plan was successful in enabling a 90mph maximum to be restored. (As per the magazines it seems that 100mph was often achieved when the Warships operated out of Waterloo). The system was also applied to the D1000 Class. This plan additionally involved a slight modification to the manganese steel pads which transferred the traction and braking forces from the bogies to the main body. It was significant that the Germans did not run at such high speeds as we did. This may genuinely explain why they declared that they had no problems.

About this time I was given the job of scheming out the Class 14, (Known then as the type 1). This was something of a 'cream job' for me and I was mildly surprised that it was given to me. (I now think that this was due to the intervention of Mr. Sly -- the Chief Draughtsman. I had often done investigation jobs whereby I reported directly to him -- presumably he was impressed!). In laying out this locomotive a key issue was the total wheelbase. Since it was to be like a diesel pannier tank, I thought that the 15'-6" wheelbase of the 57xx class would be a good start because it would need to traverse the same sort of curves. The tightest curves normally were four and a half chains (with gauge widening). However, around loco depots etc. there was no certainty as to what you might get. Of course, the panniers had proved themselves over many years but it remained to decide the permissible lateral play on each axle. In this respect all panniers were not the same. Having fixed the wheelbase the next step was to position the centre axle. The shape of the Voith transmission came into this -- it proving very convenient to let the front part drop down over the trailing axle. This also allowed room for the generator behind the Voith. Next thing: If the jackshaft is to come between the axles, what is the shortest coupling rod that is feasible? 5 ft. would be fine but possibly we can get down to 4 ft. 6 inches giving a 9ft space to the centre axle and, therefore 6 ft. 6 inch to the leading one. The pannier again had a similar spacing though for entirely different reasons. All this seemed reasonable though there is still the length of the final Cardan shaft to consider. Additionally, it must operate at an angle between 3 deg. and 5 deg. for good durability. For this, a final drive box with the flange fairly far forward would be suitable and this was available. Cardan shafts were a source of some difficulty on most hydraulic locomotives; generally some additional axial compliance was needed. Also, Hook joints must be aligned to match each other -- usually the correct alignment is given by arrows stamped on the adjacent parts. If they were dismantled at a depot, were the fitters aware of this? (I don't think they used asymmetric splines).

At this point it may be appropriate to digress into the question of purchasing expensive items from commercial companies. This was something that the Great Western rarely did. The coming of the diesel era meant that this policy was radically altered. It came as a surprise to me to find that there seemed to be no proper inspection of incoming goods. Examples that came to my knowledge were: hoses (for the cooling system) where I saw that the canvas reinforcement didn’t complete a full 360 deg. inside the rubber. Any pressure in service would lead to failure. Then the Laycock-Knorr compressors had oil dippers on the con-rod caps -- a simple mode of lubrication but quite commonly used. These fell off in service due to them fatiguing at the weld where the dipper was joined to the cap.

Without the dipper the bearings wouldn't receive oil and so bang! Then how about the thermostats -- some of these opened way above the specified temperature. Why did the management allow this kind of rubbish to be fitted to their locomotives? This surely explains why it has been said that the most reliable locomotives on BR were those built wholly by private enterprise; such companies would have had a proper goods inwards inspection procedure. The best ones, like English Electric, made most of the major assemblies themselves anyway.

Amongst the hydraulics, I would think that the Hymeks enjoyed the highest build quality; with North British the worst and Swindon somewhere in between.

It really was a pity that NBL became licensees for the MAN engine -- this engine was not favoured by the Germans either. The Deutsche Bundersbahn used the Maybach and the Daimler-Benz. I always had the feeling that the MAN was an older design that wasn't really happy at anything greater than 1000 BHP. At this rating in the Blue Pullmans it seemed to work moderately well whereas at 1100 BHP in the Warships it was overstressed. It was surprising to me to learn that the MAN did not feature piston cooling by oil jets. (Automotive engines of any reasonable rating would have this feature -- usually by pressure feeding the 'small end' and sending a proportion on to impinge on the piston underside). For NBL to take on the manufacture of such a diesel engine having previously been steam engine builders was surely a step too far. In fairness it must be said that they made a better job of the Voith transmission which itself was a fairly complex piece of equipment. Regarding the engine they made some serious mistakes: how come they made the exhaust manifolds of mild steel? The repeated thermal cycling of such a component was to prove disastrous. Once the manifold had split, the turbocharger would not get its proper gas supply and serious damage would be done to the engine.

Then there was the question of price. I actually overheard a senior person on the engine section saying to the rep, 'We want quality first and are willing to pay a bit more to get it'. That rep. must have gone home rejoicing! Another case: The firm that supplied the Cardan shafts also supplied the bolts that went with them. Someone in the office suggested that Swindon could make the bolts 'in house' and therefore save money. Hence a letter was written to the supplier asking how much they would reduce the price if we were to supply the bolts. The reply came back saying they would take off one penny per bolt. The man who made the original suggestion then said: 'O.K. let's order a thousand bolts from them at a penny each. The letter was never sent because the old windbag over that section said: 'You can't do that -- you'll offend them'. Clearly he had no idea about commercial practice -- yet he occupied a senior position. When the tenders for the Class 14 final drive gearbox came in, it was interesting to note the range of prices quoted: Stones of Deptford offered the German Gmeinder box at around £8000. David Brown was somewhat cheaper but the lowest was Wiseman Gears at about £3300. The interesting thing here is that the people who did regular business with the railway charged the most. (Ref. the previous paragraph). We did not buy the Wiseman box so we don't know about the quality -- it's a fair bet that it was as good as any -- they simply put in an honest quote.

As it turned out Dr.Beeching intervened at this point and gave the job to his pal John Alcock at Hunslet. However, he also instructed him to put in a quote below the lowest of the tenders received. From memory: £2,850. It will be clear from this that Swindon paid over the odds for much of the externally purchased equipment. No wonder that locomotives built at Swindon were high priced. It will be evident from the foregoing that the British Transport Commission (BTC) was quite incompetent at managing an engineering industry. Surely they should have tried to emulate the proper policies regarding 'bought in' quality and adopt a realistic attitude to prices paid. When Beeching came, there was some tightening up on pricing but nothing else.

Returning to the Class 14 frame, the next decision was to decide the spacing. Typical steam frames were brought close to the backs of the wheels -- sometimes shiny arcs would be visible where contact had been made. After some thought it seemed a good plan to put the springs outside of the frame to simplify access and this meant a frame spacing of 3ft. 2 inches. Curiously, this brought it into line with the Britannia locomotive -- a definite frame cracker. But an important difference here was that the Britannia used an arrangement of 'welded in' arches of steel -- possibly somewhat better than horn cheeks but not equal to horn blocks. The latter were cast in steel at Crewe and, of course, spread the stress over a reasonable area. When Mr.Scholes saw that I was using horn blocks he stated that I was incurring too much weight. Of course, he

was correct in that they weighed more than the horn cheeks but even with inch and a quarter thick frames we had to recourse to the 5" front buffer beam to get the correct weight distribution. (We had a drawing from North British showing a 0-6-0 with a 9" buffer beam! This, a locomotive they had built for export). As an aside, I had visited Crewe works previously and recall seeing the Britannia: 'Hereward the Wake' in the yard -- fresh from overhaul. On looking at the trailing axle horns it was clear that they had welded a number of radial strips (probably 1/2" mild steel) from the top of each corner. Clearly a rather crude attempt to allay the inevitable cracking.

The frame stretchers were hot riveted in place -- this being a standard Swindon procedure. The holes were drilled 15/16" Dia. and the 7/8"Dia. rivet was knocked down when red hot. On cooling, of course, this further contracted and added to the strength of the joint. (This process was a favourite with visitors as the man heating up the rivets would literally throw the glowing rivet to his colleague who would deftly catch it with his tongs and place it in the hole). Whilst on rivets, I should mention that the upper half of the jackshaft housing was retained by six 1-1/4" Dia cold rivets. These were a precision job fitting into reamed holes. (Unlike the hot rivets). The lower half was retained by bolts of similar size and provided with shoulders to facilitate removal. The final drive gearbox had a multiple bolt fixing at the forward end -- this plan came from Hunslet because they made the point that if we were to locate the box with a slightly flexible mount at the front we would probably incur fretting corrosion within the circular housing. However, I asked them to move the bolt pattern as far forward as possible to keep it away from the centre horn block.

At this time, a fairly comprehensive description of the German V60 locomotive was circulated within the Drawing Office. There was no particular motive to copy this loco and indeed the ultimate Class 14, with its riveted construction, owed more to Swindon tradition than anything else. As it turned out the V60 was a welded frame which fell short on some of the criteria considered to render a frame crack proof. In this context I would mention the Dean goods 0-6-0 which stood out in the yard. Here was a locomotive some 75 years old with a frame free from cracking. Of course it had horn blocks and the frame was braced in a manner aimed at preventing stress concentrations. The pannier tanks were broadly similar.

It seems impudent to criticise the Churchward locomotives in this respect but the fact was they were frame crackers; in point of fact the skill of Swindon in cutting out the damaged portion, complete with its horn cheeks, and replacing it with a new piece of identical size (from the stores) meant that many people never realised this. The welders at Swindon were highly skilled.

By way of a diversion, I should mention that the load bearing sides of the Warships were only 16 swg thick and yet with an overall length of near 50 ft. they managed to get a near perfect flat finish over the whole length. After it had been tacked to the light inner frame it was uniformly heated and water was thrown at it with distemper brushes somewhat in the manner of straightening the tissue on a model aircraft wing. Alas, when NBL embarked on their batch -- they did not have this skill and used filler to make good the external appearance. After a few weeks in service large grey patches appeared when the filler just fell off! Subsequently Swindon sent a group of men to Glasgow to show them the technique.

Returning to the Class 14, it occurred to me that the Bullied type of wheel centre might be a good idea -- after all they were claimed to offer better support to the tyre and to weigh about 10% less than the spoked variety. Hence I got a Q1 drawing up from Eastleigh. Alas, this notion was short lived and I think it was Arthur (Sly) who said we don't need Eastleigh to tell us how to make driving wheels -- we have been making them here for over a hundred years! So that was that. Part of the Bullied philosophy entailed avoiding use of a Gibson ring. He arranged things so that a lip was machined on the tyre which would only just pass over the wheel when the tyre was heated -- this in contrast to the inside diameter of the rest of the tyre which was a

slightly easier fit. This was a clever idea but it was found that if the wheel became really hot in service, the tyre would move round the wheel itself. In practice the Gibson ring offered some security against this.

The concluding part of this story will be in the Autumn edition of LINK

**Paul Davies**

## Chairman's ramblings

As nothing has been happening at the club due to Covid, I will keep this short.

2021 is our Clubs 75th anniversary. I have some ideas on how we could celebrate this milestone in the club history, however before any decisions are made, I would appreciate any comments you may have. Please remember this is your club! Any comments/suggestions regarding the running of the club, made to any member of the committee, will be raised at the next committee meeting and if it is thought to be of benefit it will be acted upon. If you don't tell us about your concerns then we cannot resolve them.

Finally during the recent lock down, weekly security checks of the club premises have been carried out.

**Ian Pryke**

## Secretary's Report

I look forward to meeting you all again when the club fully re-opens so I can start to fulfil my role as the new Secretary and help get the club fully operational again

All being well I will soon begin to organise the evening talks programme to commence in September when we are allowed more than 6 members inside!

Feel free to contact me if you think I can help in any way to promote the club and encourage new members.

**Jim Hollom**

I would like to thank those members who have contributed articles for inclusion in this edition of LINK during these unsettling times and without their efforts the Magazine could not have been produced.

**Don Black**
**Editor**

***COLCHESTER SOCIETY OF MODEL & EXPERIMENTAL ENGINEERS Ltd***
Limited by Guarantee. Incorporated in England Registered No 3052023

Registered Office:
The Club House, 13a President Road, Colchester, Essex, CO3 9ED.
Tel: 01206 769192

Affiliated to: Southern Federation of Model Engineering Societies.

**Note: All correspondence to Officers to be addressed via the Club House.**

## OFFICERS and OFFICIALS of CSMEE Ltd

| | | |
|---|---|---|
| **Chairman of Council and Director** | | |
| | Ian Pryke | Tel: 01206 211540 |
| **Company Secretary and Director** | | |
| | Jim Hollom | Tel: 01206 574813 |
| **Treasurer and Director** | | |
| | Peter Bohn | Tel: 01621 815556 |
| **Membership Secretary and Director** | | |
| | Don Black | Tel: 07769 048789 (ask for Don) |
| **Event's Organiser and Director** | | |
| | Ian Pryke | Tel: 01206 211540 |
| **Directors / Council Members** | | |
| | Alan Illett | Tel: 01787 460620 |
| | Dave Hammond | Tel: 01206 242150 |
| | Graham Willmott | Tel: 01206 382256 |
| | Martin Courtis | Tel: 07742 698366 |
| | Suzanna Giera | Tel: 07919 220807 |
| **Boiler Inspectors** | | |
| | David Cocks | Tel: 01206 298661 |
| | Terry Gardiner | Tel: 01206 397388 (ask for Terry) |
| **Club Badged Clothing** | Geoff King | Tel: 01206 822735 |
| **Web Master** | Andrew Cartwright | Email: webmaster@csmee.co.uk |
| **Link Editor** | Don Black | Email: linkeditor@csmee.co.uk |