



NEWSLETTER OF THE COLCHESTER SOCIETY OF MODEL & EXPERIMENTAL ENGINEERS LTD

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The Wednesday Wrinklies Report

It has been some time since we had an edition of Link. I would like to say a big welcome to our new editor Don Black. I am sure that he will do a good job as always. He has a hard act to follow on from Norman Barber, who made the Link so enjoyable in the past. It has not made a great deal of difference to the Wednesday meetings not having a Link magazine; we have been just as busy over the last few weeks. This last week there were six locos waiting to have a run on the raised track, including a new member waiting to try out a Petrolea in 3 ½ inch gauge.

Ian Pryke and Don Green have been busy rewiring the indicator board in the signal box to work with the new track layout. I understand that all is now working and was being used on Sunday for the Families day. It must be said that this was a poor turnout, few people turning up for a ride round.

The Club site looks excellent all round, due to the work of the gardening gang. The piece of ground over the road has been levelled out and is nearly ready to grass seed over. This has been done by Don and Gordon Ager, assisted by Dave Hammond. Now that it has been levelled out it should be easier to keep looking reasonable. Someone was heard to comment on how well the club site looks.

I was rather disappointed at the driver training sessions over the lighter evenings this summer. Although one or two people had brief drives of Sweet Pea, there was very little interest to run any locomotives. Some weeks there was nobody to take advantage of the opportunity to have a drive. However, some weeks Sweet Pea does come out on a Wednesday, as I always bring the grate along so that anyone can have a steam up if they need to.

There has been a lot of activity recently on a Wednesday as regarding boiler testing. Both Dave Cocks and Terry Gardiner have done tests for members needing their test certificates renewed. It goes without saying that we have all missed Mike Gipson on Wednesdays. It was good to see him on the Families day. Get well soon old mate, we need another boiler tester to cope with the demand lately.

I would like to say "thank you" for the support that there was for the Great Bentley show. We did put on a good selection of our models and judging by the comments from the public they were much admired by everyone. I have been invited to write something about the CSMEE for the parish magazine, which I will do in the next week or so.

The garage and tool store roofs have both been replaced with a single pitched roof and are now protected from rain ingress. Thanks to those members who gave up their time over the 4 days it took to complete and hopefully not too many dinners were spoilt with the late working. A special thanks to the club member who donated the roof material.

Geoff King

Indentured

A tale of old time learning in industry

Episode 12

With Denis assisting; that is controlling the air line supply, Edward proceeded to fire up the 6KUDT. As soon as the air was supplied to the air starter it spun the engine over even faster than a 24 volt electric one. The engine started immediately.

As regards starting there were several other possibilities: the firm Bryce-Burgess made a hydraulic starter which fitted to the front of the crankshaft—known as the ‘Handraulic’. This device was the bane of all apprentices as, invariably, it fell to them to pump the thing up. This necessitated a prolonged up and down action similar to that of an old fashioned village pump but probably a bit more strenuous – especially as it approached the requisite pressure that would, hopefully, enable the engine to start. The worst outcome being a failure to start which would mean a repeat performance on the pumping handle. Edward often pondered how well the cast iron crankshaft stood up to the initial movement with this type of starter. After all, when you released the valve that allowed the compressed air to access the hydraulic part of the apparatus the initial force on the crankshaft must have been violent. Nevertheless no-one seemed to know of a case where the crank had failed for this reason.

Another non-electric starter was the Simms clockwork one. This was not known in the Dorman’s test house but was widely advertised at the time. Again, it would need a considerable human effort to wind it up in the first place. Apparently it worked on the basis of compressing a stack of Belleville washers which then released their energy through an epicyclic gear train. It fitted in the same aperture as the electric starter. Like all such devices, including hand starting, it was imperative to make sure that the engine was absolutely ready to go. This meant bleeding the fuel system thoroughly; both high and low pressure parts of it, and engaging excess fuel on the injection pump. (Normally this meant pressing a button which allowed the rack to travel a bit further than usual – this was cancelled automatically as soon as the engine ran up).

Sometimes engines of the size of the 6K would be equipped with a small single cylinder diesel engine purely for starting purposes. This was a Petter and was usually hand started. (A petrol engine would have served just as well and would have been cheaper but certain customers – such as the military--insisted on the use of only one fuel type on the site concerned).

There was, of course, another long established technique for starting engines particularly in cold weather when the battery might be at low ebb. This was often used on lorry parks because it required two or three men to carry it out. Obviously there was a mutual benefit in this. All that was required was to set the starting handle to the ten o’clock position; a rope was then tied to the handle and the men would jointly give it one sharp tug thereby pulling it over TDC firing. Providing it was a direct injection engine and everything was in reasonable order it would start. This technique was not used in the Dorman’s test house.

Whilst the 6K was warming through he reflected, for a few moments, on his personal situation -- Julie had indicated that he would be welcome at the Lewis house on the forthcoming weekend. This prospect pleased him enormously. He pondered the fact that they actually seemed to think that he was a suitable companion for their daughter. Most of his friends seemed to be experiencing a very different situation; something along the lines that the boy-friend wasn’t good enough for their daughter.

This bit of daydreaming reminded him of the need to collect the brass pump device, retrieved from the scrap heap by his friend Mike, with a view to showing it to Mr. Lewis on the weekend.

Meanwhile the 6K was ready to work through the running in period. This consisted of increasing load and speed in pre-designated increments until full power was reached. With the additional caution applying to the turbocharged engine this could take four hours or so – and that assumed that there was no need to stop and check something. He was very cautious over this task because he realised that he was probably being assessed as to his capabilities and he had no wish to be found wanting. He especially kept his eye on the turbocharger –this was something new to him – but so far it seemed to be working well. This one was made by Eberspacher and unusually, by later practice, was water cooled. The main thing was to make sure that it got its lubricating oil from the start. (Despite having primed the system he took no chances and so removed the feed pipe and fed plenty in with his oil can). He had Denis watch over it whilst he went outside to check for noise and smoke but all seemed satisfactory. (Nor, apparently, had Mr. Lemon received the usual phone calls from the office across the road. This bode well for the new exhaust system).

He carefully monitored the oil, water and exhaust temperatures -- noting them as required in the log. He also checked for leaks, this would include the fuel system, but all seemed well. Then he became aware of a certain amount of activity down the far end of the shop. It was apparent that a 4L engine was being brought up the shop on the overhead crane; nothing surprising about this except they clearly wanted to move it along the lateral corridor of the factory where no such provision was available. In the event they called up one of the Lister trucks and had the crane lower it onto the flat trailer. It was only then that he noticed that there was something seriously amiss. No 4 bigend was protruding through the crankcase complete with the most of the crankthrow to which it was still attached. Alas! More bother from a Meehanite crankshaft. He later learnt that it was being returned from Priestman of Hull who were regular Dorman's customers. This was a very serious failure of a cast iron crankshaft.

Apparently it was operating in an excavator at the time when this mishap occurred. Priestman had made excavators and draglines for years – at one time they even made their own engine. This was what was called a hot bulb oil engine. Remarkably, some of these were double acting and one was known to be fitted in a North Sea trawler where it was the only source of propulsion. At this time, such a vessel would normally have been steam powered. There is, on record, a description of life at sea by the engineer who looked after it.

He said that he had developed the knack of sleeping with his mind still conscious of the engine note; when this changed he would wake up and investigate. Because it was a double acting unit his main worry was that one of the glands would blow out. If you could catch this before it was completely shot it was a much easier task to repair it. In any case the boat had to be stopped whilst such a repair was affected and this was a situation that made the captain very nervous indeed.

Priestman certainly wouldn't be pleased about this latest incident but Dorman's would automatically give them a new engine and may even offer to pay the cost of re-installation. (Dorman's would still benefit from the undamaged parts which they could remove from the stricken engine and as this would include the injection equipment things could have been worse). Fortunately, although some would claim that cast iron crankshafts were always going to be a bit of a gamble, this kind of failure was very rare indeed.

He had now brought the 6K up to full power and was interested to note that the boost pressure at this point was 30" HG – say 15 lbs/sq". Of interest to him was that this represented (in absolute terms) a doubling of the normal naturally aspirated intake air pressure yet the power was only increased by about 25%. He reflected on this and then realised that the level of supercharge at the low speeds was nowhere near this figure and that the defining factor in the engine rating was the smoke level exhibited at these low speeds. He also noticed that the specific fuel consumption was little different to that of a naturally aspirated engine of the same general type. As ever when he was daydreaming who should turn up but Mr. Lemon. Naturally, in the absence of Mr. Lance, he'd come to put the seals on the injection pump.

Edward mentioned his observation to which Mr. Lemon replied: ‘Yes, he said – all wind and p--- at the top and barely a f---t at the bottom’. Clearly not an enthusiast for turbocharging. Nevertheless, it’s only fair to add that it was early days and a colossal effort would go into the development of turbochargers in the years ahead. This effort was destined to go a long way towards mitigating Mr. Lemon’s complaint.

Mechanical alternatives existed plus an amazing machine called the ‘Comprex’ – the latter offering some advantages over the turbo but in the end the turbocharger was the winner and justly so. The snag with mechanical superchargers was the penalty that they took in terms of the power required to drive them. Of course, this did not show itself as a shortfall in power (the very reason for supercharging in the first place) but as a serious shortfall in engine efficiency. In other words the specific fuel consumption was significantly worse.

Having sealed the injection pump Edward asked what he should do next; Mr. Lemon said he’d have to enquire. These big turbocharged engines had not as yet become a routine job and it may well be that someone would seek more data before it was removed from the test bed.

However, he seemed in no haste to pursue this matter and remained chatting for some time. He explained that more than two decades ago he had been given the task of taking a car down to Cowley (Oxford) with a view to demonstrating it to William Morris (later Lord Nuffield). The car was fitted with a Dorman petrol engine and Morris was keen to select an engine manufacturer to supply his factory. Other makes were also present. In view of the importance of this matter, great care had been spent on building this particular engine. All clearances had been kept to a minimum to ensure no extraneous noise.

Mr. Lemon had first to drive the car with Morris sitting alongside him then Morris would drive it himself. Initially, all this went well but then with Morris driving it suddenly it came to a stop. The engine had seized. Disaster! Lemon swiftly identified the cause and said he would put it right within twenty minutes. But Morris said no, -- it had failed the test and that was final. He, Lemon, was welcome to fix it but its next journey would be the one back to Stafford. Lemon was mortified and didn’t look forward to explaining things to his superiors. In fact, it was the camshaft end float that had been set too tightly (it was set by shimming) in the quest for minimum mechanical noise and although he was able to correct this quickly the decision was now made and back to Stafford he went.

This was a defining moment in Dorman’s history. Had Morris chosen the Dorman then it would have meant the end for Dorman’s as a separate company. In due time they would have been absorbed into the Morris empire with manufacture probably moving to Oxford. So, from the point of view of their own history, it was perhaps a blessing in disguise.

After this dissertation, Mr. Lemon returned to his office but more tales of historic interest were to come from this remarkable man in the days ahead. Edward now had a moment or two free whilst waiting for a decision as to what was to be done with the 6K. So he wandered around to the capstan shop to see his friend Harry the setter. As usual Harry was glad to see him and his first question was to ask how the Morgan was faring. He craftily added: ‘Now that you have to carry an extra passenger we must make sure everything is in good order’. This, of course, was an oblique reference to his going out with Julie. As ever in Dorman’s nothing remained secret for long. But at least with Harry the comment was made in a blend of gentle humour and a real willingness to do anything that he could to help with the car. They chatted for a few minutes and then he returned to Mr. Lemon’s office to see if the 6K would require any further action.

It had been decided that, in view of the still novel nature of a turbocharged engine, it would be prudent to extend the test period prior to it being supplied to a customer. Thus he was told to run it for four hours at peak torque and then another four at peak power. Naturally, he was to record all the data such as boost pressure and temperature as well as the routine test criteria. At the end of the eight hours he was to drain the sump and pass the contents through a gauze strainer. This was a practice adopted when the ‘L’ type engine had its bearing problems. If there was no suspect debris in the

strainer he was to refill the sump with fresh oil and the engine could go then go to the customer. He was also required to monitor the oil consumption by noting the oil level at the start of the eight hours and again at the end. This was a crude check and would only serve to show that something was amiss rather than be a serious measure of consumption. (Oil consumption was a difficult thing to measure – especially over a short time period, in years to come devices were available that accurately determined such a figure but even those gave best results over at least ten hours of running). As it was the end of the day, he decided not to start the test until next morning; this would allow it to be covered in one continuous session. Additionally, he decided to top up the oil level to exactly meet the mark on the dipstick – this was to facilitate checking the oil level at the end of the eight hours tomorrow.

Having a few minutes to spare, prior to the end of the shift he wandered over to the electrical shop where, fortuitously, Mr. Harvey was firing up their 6K to take on the factory load during the ‘load shedding’ routine that was about to begin. Edward noticed that the engine drove the alternator through a multiple Vee belt and Mr. Harvey explained that this enabled the engine to operate at 1800 rpm whilst the alternator ran at 1500. This latter speed, of course, matched the national grid’s frequency of 50 cycles whereas the 1800 allowed the engine to produce a higher horsepower.

As soon as the engine was producing electrical power he noticed that all six light bulbs were illuminated but in rotating sequence. Mr. Harvey explained that they should be considered as three pairs since any pair was powered by 440 volts which the alternator produced across opposing pairs of its poles. (Two ordinary 220 volt bulbs in series met this requirement). After allowing the engine a little time to warm through he explained that he would now be setting the engine speed to synchronise with the national grid.

To do this he made fine adjustments to the governor – and the speed of the sequential rotation progressively slowed until only the centremost pair of bulbs remained lit. The thing was now synchronised with the national grid. He then invited Edward to have a go himself. This he found absolutely fascinating – you could watch the light bulbs which so clearly told you whether the speed was too high or low and incrementally bring the thing to be spot on. This gave him a feeling of controlling vast power -- especially when Mr. Harvey said, ‘You are now driving half of the machine shop so leave it where you’ve set it’. The sensation of controlling vast power was strange in view of the fact that he had been running a similar engine all day anyway! But that was how it felt – presumably the visible evidence of producing the electrical power had something to do with it. He thanked Mr. Harvey for his kindness in letting him do the ‘phasing’ and, as he returned to the test house through the machine shop, pondered the thought that half the shop would come to a standstill if the 6K didn’t keep going.

The next day proved to be of limited interest as his engine behaved perfectly. To allow the job to be accomplished in the day Mr. Lemon had arranged for someone else to watch over it during Edward’s lunch time.

At the end of the test, he shut the engine down and gave it some time to settle before dipping the oil to check for any loss. Reading the oil level on the dipstick he could only conclude that it hadn’t consumed anything. So he then drained the sump and passed a portion of the oil (drawn from the last 10% or so) through the strainer as requested but there were no signs of any bearing metal so he re-filled it with fresh oil and proceeded to remove the engine from the test bed.

The weekend was nigh and he remembered to go and collect the hydraulic device from his friend Mike so that he could show it to Mr. Lewis on the Sunday.

Paul Davies

Generating Flat Surfaces

There have been a number of discussions recently regarding leaking regulators, in particularly those that use two flat surfaces that slide or rotate over each other. I have now had the boiler tester's comment on more than one occasion on the fact that my own regulators are water tight when on test.

Perhaps some words on generating dead flat surfaces to make a water tight regulator would be of benefit to some club members. When you require two flat faces to seal you must NOT lap the two faces together. If you do you will NOT get a seal because the faces are not flat and will leak water by. Obtain a piece of plate glass about one foot square, and scratch the surface all over with a sharp tool. The tip of a carbide tool or a glass cutter is the ideal for this job. Scratch in all directions on the glass so that the scratches are about 1/4" or so apart.

Now all that is needed is to wet the glass plate with Brasso and rub the component that you require to be flat over the scratched glass applying pressure with the fingers. Keep going until the surface has a matt finish all over, when it should be flat. If it is not matt all over you need to clean the glass plate, apply fresh Brasso, and continue. When two surfaces are dead flat, they will stick together by suction if they are polished to a sufficient finish. This can be seen if you can get access to a set of engineers slip gauges. Any dimension can be made up by sticking the various gauges together, the only thing holding them together being suction between the flat surfaces.

In the past, when engineers needed a DEAD FLAT surface they had to scrape three surface plates together with engineers marking blue. Plate A was scraped to plate B which was then scraped to plate C. Plate C was then scraped to plate A, which corrected any errors. This procedure was then repeated over many times until all three plates matched each other, when they were all dead flat. This procedure gradually removed any errors in flatness. Surface plates made by this method were very expensive owing to the time it took to produce a true surface and were only found in the tool room standards room in large factories. If you could justify the expense some surface plates were made from granite rock. Tool rooms having this grade of surface plate were the holy grail of standards, needing a pass to enter the double door air lock entrance to keep the temperature constant. I never did have such a pass!

Geoff King

Treasurer's Report

We welcome the following to our Society:-

K Bateman	Full
Graham Beard	Full
Miss Amber Charman	Junior
Colin French	Full
Rodney Griffin	Full
Robin Hackshall	Full
Robert King	Full
Luke Morling	Junior
Nigel Wesley	Full
Robin Wesley	Full
Graham Wilmot	Full

Membership stands at 133 including 14 juniors and 1 student.

David Cocks

Secretary's Report

I hope you all were able to get your locos out and operating during the lovely warm summer we have just had.

Four members went to Gilling in Yorkshire for the annual bank holiday rally. A good time was had by all and the weather was very kind to us. Both Andy Hope and Ian Pryke took charge of a yard at different times keeping the flag flying for CSMEE.

Thank you to the volunteers who helped Geoff King at the Gt Bentley Fete, the day went very smoothly with plenty of you helping to get the gazebo up. As usual, there was a lot of interest in what we do.

In September a group of about 17 CSMEE members went to Thorrington Tide Mill, kindly arranged by Ian Pryke. We viewed all three levels of the Mill and the big water wheel was put in operation for a short while during our visit. As well as the Mill itself we also saw one of the grinding stones used to grind corn. The countryside surrounding the Mill is also very picturesque and together with the lovely sunny day an enjoyable time was had by all.

The minutes will be back on the notice board soon and they will cover the last three meetings held by Council together with the accounts. Apologies for not getting them back sooner.

Don't forget to keep any eye on the web site for the latest planned events, including the Christmas Quiz.

Look forward to seeing you all at some of the planned winter talks.

Yvonne Chappell

Past Events

The Colchester Society members are having a busy time. In the past months they have visited a car manufacturer for a conducted tour of the works. This was followed by another visit, this time to a company making precision sand casting in alloy and other metals. Our members watched the staff moulding the sand around the patterns, followed by the pouring of the molten metal into the mould. After removal of the sand from the moulding, the castings were then finished machined on high speed CNC machines ready for dispatch to the customer. Members watched in awe as the CNC milling machine changed the tools in half a second after each operation.

There was a good turnout of members on 28th June when Tim Cole brought his gas turbine locomotive to the Society. He gave a lecture on the locomotive describing the internals of the gas turbine and the final drive system and gearbox. The high light was when the locomotive was taken outside onto the ground level track, fired up and run for a few laps of the track.

Geoff King

Winter Talks and Events

11th and 12th October 2014: GL5 Night run weekend

It starts at 14.00 and you can add your name to the list of people purchasing a fish and chip supper which is usually eaten around 18.00. The evening is spent on night runs and the whole event is good fun with everyone welcome. A few more loco runs take place the following morning with many people departing for home shortly after lunch. (Please let Ian Pryke know if you are coming.)

19th October 2014: Midlands Exhibition – includes coach trip

Ian will give out further details shortly and those wishing to book the coach will need to do so early as this trip is very popular. The Midlands Exhibition is considered to be one of the best exhibitions in the year.

25th October: Club night run

Our own Club night run starts at 14.00 with a similar format to the GL5 event that is a fish and chips supper and night driving. Come and join us, it is fun driving in the dark, especially through the tunnels. All members welcome. (Please let Ian Pryke know if you are coming.)

Our Club Quiz night will also be announced by Ian shortly. It was very successful last year but we could have done with a few more teams.

Thank you to all members who attend and support our events, if there is anything you would like us to arrange for the future, please let us know.

Yvonne Chappell

Winter Talks 2014-2015

3 rd Oct	Water Jet Cutting	
17 th Oct	Bure Valley Railway	R King
31 st Oct	Policemans Lot	B Pirie
14 th Nov	10 Minute Talks	Members
28 th Nov	Photography	C Farndell
12 th Dec	History Micrometer	P Bohn
19 th Dec	Xmas Party	B Taylor
9 th Jan	Building the KELPIES	Film
23 rd Jan	Distilling Black Gold	D Black
6 th Feb	Financial Presentation	D Cocks
20 th Feb	Auction No 1	
27 th Feb	Auction No 2	
13 th March	Models Night	
27 th March	V.T.O.L.	J Pyle
10 th April	History C.S.M.E.E. Pt 1	M Gipson
24 th April	A.G.M.	



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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

President, Chairman of Council and Director

Andy Hope Tel: 01206 303357

Company Secretary and Director

Yvonne Chappell Tel: 01255 860765
Email: yvonne.chappell@hotmail.com

Treasurer and Director

David Cocks Tel: 01206 298661

Membership Secretary

Yvonne Chappell (Temporary)

Event's Organiser and Director

Ian Pryke Tel: 01206 211540

Club Badged Clothing and Director

Geoff King Tel: 01206 822735

Directors

Alan Illett Tel: 01787 460620
Alex Walford Tel: 01206 503207

Boiler Inspectors

Gordon Ross Tel: 01255 552584
Alex Walford Tel: 01206 503207
Mick Shiell Tel: 01255 886139
David Cocks Tel: 01206 298661
Terry Gardiner Tel: 01206 397388 (ask for Terry)
Mike Gibson Tel: 01206 547668

Web Master

Brian Alderman Email: webmaster@csmee.co.uk

Link Editor

Don Black Email: linkeditor@csmee.co.uk
donbmag@talktalk.net