Reading Society of Model Engineers
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The Prospectus

August 2019

Firebox to thunderbox? Seen at Bodmin General

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Free to members

DAWSON'S DIARY kept by the President

Club running day 13 July was once again very well supported, nice to see Mark Kirton's German 0-6-0 jackshaft drive locomotive, first out on the track. It ran all day. Progress on the lights has moved on, they now have LED lamps fitted all wired up ready for the time to connect to the mains. First of all there is a lot of digging trenches to be carried out by the members who are doing a grand job, when finished it will improve the site for the benefit of the membership.

I was very pleased that real model engineering is still being carried out by Mark Kirton! I owe him a big apology. I thought he made his loco from a kit, as I said before it is so well made it's a credit to his skill and workmanship. He has the tenacity to work with the most basic of tools, amazingly all done on a narrow boat on the Thames! It will be a fine model when finished.

The club's Baldwin is due its 4-year hydraulic test and steam test. Work is ongoing sorting out the axle pumps. We hope to complete it by next month.

There are many jobs being done around our site. New bogies are being fitted to the 5" trollies. When done all wheels will have brakes. Alf's team are on that job. A start will be made to lay down the new track panels on the ground level some time this month. The Parks and Gardens team have been very busy keeping the grass cut which looks very nice when the visitors come for a ride. The A4 hedge has grown up with green all the way along the road. The warm weather really makes all worthwhile.

A VIEW FROM THE CHAIR John Billard

Please can you help? **We would like some more members to volunteer as track marshals on the raised track (our "high line") for public running**. This is an important job to keep the trains operating during our premier public events usually once a month. RSME cannot manage without them.

There is a well-established procedure and every help and assistance will be given to newcomers. At present the task is left to just a few trustees who often tackle the job at short notice. This is in addition to all the other tasks and responsibilities they have to keep the site safe and effective.

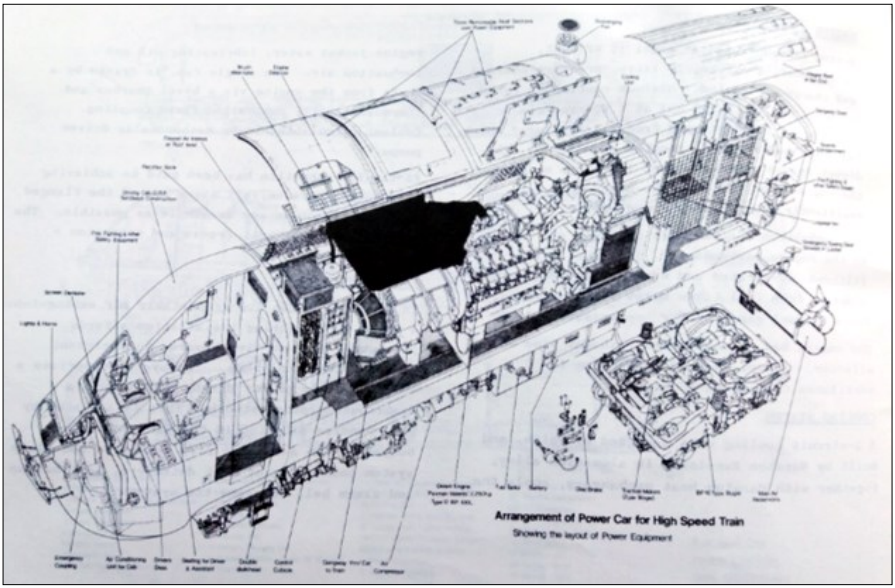
Ideally we would like to set up a rota for the year so members would know exactly when they are required. They would really be doing their bit for the future of the club and it is not onerous. Let us know. **Please speak to any trustee or contact me as editor in the usual way.**

Just to remind you, our trustees are Stuart Kidd, Alf Cusworth, Peter Culham, Nigel Penford, Jim Brown, Mike Chalmers, Peter Harrison and me. Each has a dedicated role within the trustees. I cannot praise enough their commitment to RSME and all the hard work that goes on, often behind the scenes, for the benefit of everybody.

Some technical musings about HSTs by 3450

61249 has written in his usual very elegant style about the passing of HSTs, so perhaps some more technical details of how they worked will be of interest. I remember having fun as a project engineer with the prototype train, then setting up the facilities for the trains at *The Premier Depot*, not the one at Bristol (!) , then being responsible for the very first entry of the first production train into said depot in 1976. I also had a spell being responsible for technical performance of HST, and classes 50, 37 and 31 locomotives, at Paddington headquarters, and later taking over all traction maintenance activities at the London end prior to privatisation.

The prototype HST was initially trialled on the Eastern Region and later transferred to Old Oak Common and maintained in the Pullman Shed there. The production fleet of 27 trains was shared between London, with even numbered sets plus prototype, and Bristol with the odd numbers. Laira, Plymouth, was let in on the act three years later when more sets became available and the Berks and Hants route got an allocation for working to Penzance. Sets would initially come to roost overnight at London, Bristol and Swansea - and were very strictly controlled to ensure safety inspections took place at required intervals. A good sense of teamwork was needed to run the fleet, and this emerged as time went on with the active participation of maintenance control who were able monitor the fleet during the day, and let the depots know what they would be faced with at night! It should be said that over these fifteen or so early years of my experience the relations between the depots were always competitive but cordial, and mutually supportive when arguments about the need for modifications and procedures took place with the Derby Technical Centre!



It has been said that the HST concept was sketched 'on a fag packet' by two BR chief engineers, probably aided and abetted by a top man at Brush Traction. It was at a time when the APT had been abandoned and there was a big question mark about the future of Inter City trains. It was realised that in order to compete with increasing and very competitive motor transport a 125-mph cruising speed, excellent acceleration and comfortable on board facilities would be needed to lure business travellers away from their cars. The Engineers knew that on non-electrified routes a train would need over 4000 horsepower, and the ability to stop within existing signalling distances, plus daily operational range of about 1000 miles if it was to be cost effective. It would also need to be within the very strict 17-ton axle load limitation set by the civil engineer for 125 running. This was way beyond any existing locomotive capability, where class 47 and 50s with heavy slow-revving diesels, and 'Deltics', all with 20-ton axleloads and a maximum speed of 100 mph.

The solution was to create a semi-fixed 'train unit' with a 'power car' at each end and a rake of seven trailer coaches in between. The consist, with a cab at each end meant terminal reversals could be very quick, with no shunting, so it could bounce backward and forward all day long between London and Bristol and achieve something like 1000 miles on the Western or do a round trip to Edinburgh on the Eastern. If this could be achieved it could be cost effective as it would save a much bigger number of loco-hauled sets.

The problem was that about 2000 hp at each end would be needed in a four-axle vehicle without exceeding a total weight of 68 tons. It was largely solved by fitting power pack comprising a 2500 HP Paxman 'Valenta' engine and Brush AC alternator. The Paxman engine was basically a fairly small lightweight 1100 hp unit similar to the MAN engine fitted to the old Pullman power cars, but this one had a whopping great turbo charger on its back to raise the charge air pressure from about 8psi to 15psi, giving twice as much inlet air that could burn a lot more fuel, and that's how it developed the GGs. It ran at 1500 rpm and drove the alternator which fed a solid-state rectifier bank to feed DC current to the traction motors - if not a complete innovation certainly state of the art at the time. An auxiliary alternator integral with the main alternator incorporated rotating diodes bolted to the rotor to act as an exciter for the main alternator so there was no need for the carbon brushes, heavy commutators and DC switchgear found in existing diesel locomotives. This auxiliary alternator also supplied 3-phase AC for train heating and air conditioning, and a rectified 110 volt feed to control systems and a starting battery. So this very elegant unit was a complete contrast to the slow speed DC generators in locomotives that also needed weighty separate auxiliary and

train heating generators. It weighed in at less than half the 'conventional' diesel locomotive equipment, at around 12 tons if my memory serves me correctly.

Each power car had four DC traction motors. DC was needed in those days because they had high starting torque, which AC motors did not. They were rigidly mounted to the bogie frame and drove lightweight aluminium reduction gearboxes through a flexible drives. These drives were a patented innovation, where an additional drive shaft ran right through the motor armature with flexible rubber couplings at each end to give sufficient vertical gearbox movement. Its advantage was that most of the motor weight was supported by the bogie frames and consequently the primary suspension springs. It was in contrast to conventional locomotives that had 'axle hung' motors where most of the weight was not sprung and was 'heavy on the track'. An electronic load regulator for the alternator control and the traction motor current was fitted and this did away with conventional field weakening and series/parallel switching arrangement for the traction motors, but still gave sufficient starting tractive effort for the train to run in 'top gear'. Starts from stations were a little slow until acceleration built up, but of course that acceleration was then available at speed. (As an aside the tractive of one power car was not quite enough for the Devon banks and if one power unit become inoperative the train would have to be assisted.) A massive cooler group incorporating very large radiators and an engine-driven fan were needed, and the crew, originally two, were provided with air con. and sat in a very strong fibreglass cab surround and impact resistant windscreen.

So weight limitations were complied with, and the result was awesome performance with the speedo visibly creeping all the way up to the 125 limit. It meant, a set starting from Reading would be doing 112-115 mph by Pangbourne and 125 by Goring. This was quite unprecedented for a diesel train and was going some way to that of electrics that could command far higher horse power when accelerating. I believe the record set in 1976 was to cover the 111 miles from Paddington to Bristol Parkway within the hour, and of course the prototype train manged 143mph which may well still be a world record for a diesel train.

So how did the train stop without running past the existing signal network? The answer was a new braking system that comprised fitting every wheel with disc brakes instead of cast iron brake blocks. The reason being that cast iron blocks give best friction at fairly low speed-they tend to jerk just before standstill, and don't give so much brake force at high speed, whereas discs are the opposite and so stops are gentle but perceptive deceleration can be

felt at full speed. Cast iron blocks were, however, fitted to the power car bogies to assist stopping from low speed, and to act as 'handbrakes for the whole train. Every axle was fitted with 'wheelslide' prevention equipment that would make the most of available adhesion, whatever the weather. This sensed when each wheel started to slide, and would bleed off the brake pressure until rotation was restored, the theory being that any sliding at the front of the train would tend to 'condition' the railhead and give better adhesion for wheels behind. But it didn't stop (!) there. The power for the disc brakes is provided by compressed air housed in reservoirs in each vehicle, and the brakes are applied by the driver reducing the pressure in the brake pipe that runs along the length of the train. But the train is 160 metres long and it can take a precious couple of seconds for the loss of pressure to be registered at the rear, so brakes are applied later than at the front. The resulting 'extension' of stopping distance was reduced by around half by providing an electrical signal on the drivers brake controller so that the brakes front and rear could be applied simultaneously. This was in fact a similar system which had been used on Southern Region EPB (electro-pneumatic brake) electric trains since the 1950s. This gave a significant reduction in stopping distance, which was less than a mile from 125mph and met the requirements of the signal engineer.

I guess that covers the main power car details - there is more about the trailer vehicles next time -if it so pleases the editor!

(It does… Editor)

IN THE GARDEN AT RSME by George Saffrey

Those of you who drive on the raised track may have noticed that the left bank of the curved cutting had a good crop of small yellow nettle like flowers in May and June, and slightly less grass than usual. The flowers are Yellow Rattle, an old meadow flower which is parasitic on grass roots. It has been eliminated from most pasture as it reduces the grass available to feed livestock. In our case we have sown it to reduce the amount of grass we have to mow and provides more opportunities for other wild flowers to grow. It is also known as Hay Rattle - when the seed pods rattle it's time to make hay.

We have also sown strips in the main meadow beyond the car park. We plan to mow the grass earlier this year so that the mowings are less alarmingly flammable than they were last year.

Many people think that a wild flower meadow will be spectacularly colourful, like the swathes of poppies growing on the earth works of the raised track extension. In practice wild flowers are normally more low key and in many cases require a hands and knees approach to appreciate the diversity of growing plants, including many different varieties of grasses. If you look closely at the banks of the curved cutting you will see a number of different types of plant, including pea like purple vetches, seeding cowslips,

and large white daisies. Of course there are also self sown sycamores and ubiquitous brambles.

See the photo of the cutting bank in case you missed the real thing!

FROM CLUB NOTICE BOARD TO WORKSHOP
(Or, a dream come true)
by David Scott

The piece of paper sat pinned to the notice board for months and months. I looked at it several times and let it go. The lack of allocated money still prevented me from SUPER 7 Ownership. The house still needed things doing to it! As they do. Or could we just get on with something to steam for a change. More months passed. Then I could get some pension as a lump! More mortgage got paid off with a letter asking the moneys origins? Me putting HSBC in the BOX kept them quiet.

HOWEVER, The piles of used notes slowly extracted over a week from our local hole in the wall £250 at a time, was not questioned by John who was selling his pride and joy. These made a nice line over the kitchen table. We were about a furlong from Kempton park with a temptation of a sure bet. I was buying without any photos, AND I had not studied the form prior to arrival!

We moved outside and joined his son now arrived, who was having some time off from fixing aircraft undercarriages for Lufthansa. We were in good hands for making machinery lighter for ease of handling. First to go were the mass of toolboxes stacked in front. Workshops are either too big or too small. When you are heating one up in the winter or covering a repaired roof they are too big! When a new piece of machinery or new project arrives. They are too small! Today this workshop was too small and eventually we got to the lathe. It was in superb condition and upon starting I thought the motor was not on? NO, a go with the clutch said that it was working.

We got it moved out and the first off was the very heavy motor... AH a Brook Compton Parkinson proudly made in Doncaster. This is why the quiet! No we had several things to talk about thanks to a grounding in aircraft problems over the years from Les! Oh we do need one of the jacks!

Everything off except the counter-shaft Which was not going to fly off without a fight, so it got strapped to the mirror like bed on some towel. Up off the studs and a quick march round to the car. Slide in over slim flooring boards that were slightly warped. Followed by the cabinet once emptied. This was 32 1/2 inches with the Raglan ones at 30 inches so had to go on its side.

Then came the accessories in their many boxes. And the several heavy boxes of the removed parts! The chucks got stowed back in the cabinet and new to me a swivelling vertical slide with RAISING BLOCK! LUXUURY! Fixed steady. Milling spindle for ½ inch cutters and a Dickinson tool-post with 4 loaded holders. “Do not forget The SIM-

PLEX PARTS!" He reminded me. Two more boxes of chassis and superbly turned wheels, 2 axles, 4 axle boxes, smoke-box tube, saddle, axle-pump, set of drawings and the 1967 and 1968 Model Engineers covering the original articles. Plus a PROBLEM BOOKLET? Of course. There was a (I can't even give them away) look in his face. I know of at least two owned by friends who can't get rid of them at the moment... And another who runs a rescue workshop for them and currently has five in various states. Bit like some of the 7s on E-bay or Gumtree. £350 was one of the worst, they do not make very good garden ornaments by the look of the rust! The poor old Simplex needs reworking NO Super Simplex was not the answer and the design took on all the old problems but just made them bigger. The rear axle still makes the ash-pan difficult to remove and clogs up part of the fire!

We returned home via Brooklands for lunch and a look at Concorde. I had once had a design teacher who worked on part of the machining of them and would bring in his collection of almost milled parts. The first time we had heard of early CNC! Another inspiration towards my career among machines, design and problem solving. (I still love calling it Brookley!)

The garage was not ready for us to land flight SK45147so the lathe lived in the car for at least 3 Wednesdays. Eventually we just slid it out onto the stand via the blue rope round a long lever. Three inches from the wrapped round rope to the fulcrum and you can move most heavy things. Meanwhile. flights of fancy led to a sorting out of SIMPLEX via a clean sheet of card. If I am ever questioned "as to why she is this size?" I can tell them with a straight face. "That this was the size of card, and this is what will fit on the drawing board. Removing the imaginary card cut out ash-pan after an imagined run, was the first thing drawn. Having moved the rear set of wheels so that my favourite box horn-blocks and keep could be used. These also help keep oil from falling onto the track. Followed by a vague outline of the boiler which kept moving up. This made the tanks much bigger in proportion which are level with its top.

My current quest is to find Harold Barton's Locomotive Draughting Which will help the front end. Found it! His solution for Butch will do nicely for Fowler Complex. Seen at Stoke Row this year.=

A workshop grows round the machinery and the space for projects. And another project was occupying where the Myford was going to live. The stacks of metal and chucks and stuff had grown. These reducing the chances of gliding the lathe into the depths on its trolley.

The solution for full workshop and bulging garage came from our neighbour who being a builder seems to acquire all sorts... Today came a tower for £120 better than half price! It arrived the next day with a spare water-butt that I had agreed on the previous week. Free! BUTT it needed a new £4.00 tap of course! The tower in two stacks became an outside racking and we soon had the garage converted from 7 ¼ to 18 inch gauge for movement through. The stack from the workshop filling part of the other side. A roof was slid in place and a blue tarpaulin covered it just before all the rain. Yes the water

butt is also full! As was the garage with many USEFUL bits of timber that have future projects.

We assembled the planks and slid the lathe down onto the trolley. Yes a chicken and egg moment. The lathe now in the utility room was jacked up on blocks. The base leaned over and onto the now released trolley. See sawed over the door base as per moving of the mill, Heavy Metal. And down to the moved planks resembling a mini sky jump into the workshop. There in MOMENTS. Followed by the lathe. Then the slow bit... yes moving all the lightweight concrete blocks ready for the lift. I have a cunning plan involving a pair of scissor jacks and a pair of steps but not ready for today. It is of course hot, and it is what I call a 25 day. These are units of generated power from the solar panels. A total of 6 is a wet miserable day in January! I keep a record which is interesting!

Two battens are screwed into the feet holes for the whole operation so a block at a time is slid under as I do a short five inch lift at each end. These run out so a long walk to get some more. Moral is not to store them in the front garden. And it slides over and levers into position. Then removing slim battens gets it down onto the raising blocks. And importantly not damaging any thread. And it is far too high. In my haste I have left the base of the old movable bench ready to hold the lathe cabinet, initially for strength through the timbers into the castors.

Ah, if I bolt the lathe down on the adjusting studs I can slide everything over and work out on what to do. Eight blocks return and work begins on an idea. I use the bases one hole on a lug to bolt a corner of my castors into using M8. Then cut some MDF for a support corner and mark and drill two more fixing holes. I catch sight of some brown painted sliding door channel in my collection, so cut off 14 ½ inches to strengthen the board at the very end. One inch angle could have done.

Then to relax I remove the saddle and clean the oil-ways and some swarf.

Then we run out of day! The morning brings the cross slide to polish while the grub screws are out. Then the top slide.

I like a slightly looser top slide than it was, so adjusted once cleaned and polished.

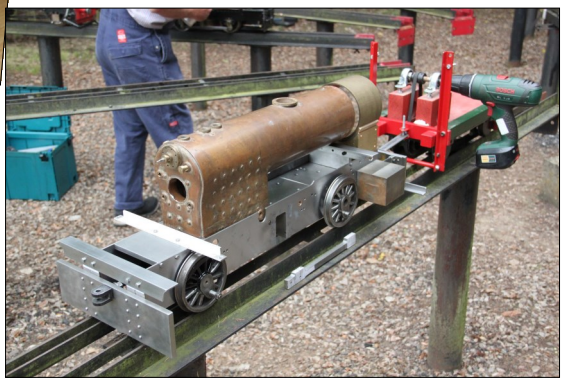
The assembly got turned round so that the counter-shaft and motor could go back on.

You always get at least two tricky bolts that fit in the deepest corner and of course fit behind a pulley. But having an assistant when the spanner is just out of reach helps enormously having got it finally in position. Again some thought and a plank resting on the tray and the bench for the motor to sit on made the job a pleasure. See the various photos.

The 4 jaw chuck seemed to have had a rough life. So once in place was given a skim over its edge. Next a face off so it looks like new. The big 3 jaw is in a super condition but needed the rear backplate bolts changing for countersunk ones. This done I go and find my bobbin test bar... Two adjusting goes later we have both the test turnings coming out the same so we are ready for action. I have a pair of cylinders ready for a boring first job. The chuck is far out of proportion and is limited because of the bed. It will instead reside on my home made one, where the bed of vee and flat has space between for ex-

tending the jaws well past the outside diameter. However ONE INCH TALLER Myford's with a ONE INCH BORE and we would have gone beyond a dream!

All photos
David Scott



Right - David's power drill driven locomotive.

MORE DIGGING! Alf Cusworth reports

The path round to the track has now been made good by the Wednesday Warriors. Many thanks to John Evans for digging the post holes and everyone else involved. As you can see from the photos it needed quite a bit of shoring up to get it level.

VISIT TO THE SPINNEY RAILWAY SATURDAY 21 SEPTEMBER 2019

RSME has received a special invitation to visit the Spinney Railway situated in a garden of a private house in Surrey. This is a 7 ¼" gauge line and visiting locos are welcome up to two or three with a visitor total of about 25-30.

Running starts around 13.30, so guests in by 13.00. If there is demand there may be a run after tea and shut up around 18.00. Tea is around 4.15 and the gates open then (they are closed for normal running).

There is no charge for visits, but the best guests put in a tenner to help the railway, less if it rains, more if they have a drive or driver tuition. There is also the opportunity to donate for tea and cake provided at tea time.

Driving experiences may be available.

Please contact Peter Harrison to put your name on the list for which will be an interesting afternoon or add your name to the list on the club notice board. Further details will follow.

WINTER TALKS IN THE CLUB HOUSE

Following a request at the AGM the trustees are pleased to announce that there will be a series of winter talks and presentations by members in the club house. This will be a regular event on the last Thursday evening of the month starting in October.

Further details of the programme will be announced next month.

DIARY

AUGUST 2019

Friday	2nd	Play Day Running	11am to 16:00
Sunday	4th	Public Running	11am
Saturday	10th	Club Running	11am
Sunday	11th	Birthday Party	14:30 to 17:00
Monday	12th	Special Needs	13:30 to 16:00
Saturday	17th	Birthday Party	11:00 to 13:30
Sunday	18th	Birthday Party	11:00 to 13:30
Saturday	24th	Young Engineers and Club running	11am
Monday	26th	Public Running	13:30
Friday	30th	Special Needs	13:30 to 16:00
Saturday	31st	Birthday Party	14:30 to 17:00

SEPTEMBER 2019

Sunday	1st	Public Running	13:00
Saturday	7th	Club Running	11am

*** All times subject to alteration

Comments by RSME members on any subject appearing in Prospectus are welcomed by the editor.

Opinions expressed in PROSPECTUS are the personal views of the contributor and cannot be taken as reflecting the views of the club committee or editor.

The deadline for the September issue is 18 August. This is the final date.

Contributions may be submitted in hard or soft copy to the editor.

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