

**Reading Society  
of Model  
Engineers  
Charity Number  
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**Free to members**

# The Prospectus

**March 2023**



Harzer Schmalspur Bahnen 2-10-2T 99-7237 takes water at Alexibad on 7 February 2023. Photo John Billard

**TRUSTEE NEWS  
UNIMAT FUN  
ELECTRIC LOCO PROGRESS**

## A VIEW FROM THE CHAIR

**John Billard**

Let me start by wishing Dave Cole all the best for his recent 90th birthday. Dave has been a committed member for many years and until recently looked after our car parking during public events. Well done Dave!

The trustees met again on 13th February. We kept an eye on our continued maintenance projects including the intruder alarm, continuing cladding the building and a look at future activities including erection of lamp posts and building a new 7 1/4 gauge passenger carriage. Add to this will be a workshop refurbishment. It is known that a member has a refurbished Myford Super 7 for sale and it was agreed that this should be pursued.

We're taking a look to see whether it is necessary to continue with guards duties on our trains. It was recognised that their use was limited, particularly on the ground level track where vacuum brakes are now in use. A risk assessment is to be carried out.

The trustees have decided to take a longer look as to how the Society will operate into the future taking into account that our active members will not last forever. A special informal trustees meeting is to be held on the 6th March to look at the priorities.

We want to encourage the engineering side of our membership. Whilst we are highly successful in running our trains we should seek to fulfil our aims as a model engineering society. As part of this an approach has been made to a local organisation employing many hundreds of engineers to see whether we can increase our profile there and encourage some to join us.

The new membership year starts on the 1st of April and a copy of the new membership renewal form will be circulated with this Prospectus. Note the announcement made last month of our new membership system which means that nearly everyone will benefit from a substantial reduction in their subscription. **JOIN NOW for 23/24!**

## Unimat Fun

**by Stephen Millward**

The perennial discussion for model engineering forums is "what lathe should I buy?" and the range of responses typically include, Myford Super 7, or the biggest lathe you can fit in your workshop or buy new and don't waste your time with worn out machinery. There is another approach to this conundrum, which is to have several lathes and then the question changes to "what is the optimum number of lathes to own?" There is a simple solution to this problem, borrowed from cycling enthusiasts who need to determine how many bicycles they require. The answer is  $N+1$ , where  $N$  is the number currently owned.

I already had three lathes when I visited the 2022 Midlands model engineering show and I had no intention of purchasing another, however the  $N+1$  formula meant that I came home with a Unimat 3 complete with a good range of

accessories and a drilling/mill attachment.

I'm not sure there is a rational explanation for purchasing a Unimat 3 with a 46mm centre height, 200mm between centres and a measly 95 W motor. I'm fascinated by lathes of all sizes and as I have recently had lots of experience of using large lathes at work, turning 50 kg steel billets, I think I must have been keen to turn some small stuff on a little lathe.

My initial impressions of the Unimat were good. It's well made (in Austria), with quality materials where required and lighter materials where they will suffice. The tailstock for instance is made of aluminum and hand wheels are plastic, whereas the bed is cast iron and the milling column is steel. The result is a machine where everything fits together as it should and which is truly portable.

In order to explore its capabilities I decided to complete an entire project on the Unimat 3 and chose to build a simple oscillating steam engine, using stock materials and based on the plans available from [www.steves-workshop.co.uk](http://www.steves-workshop.co.uk). This would require turning, milling, drilling, boring, fly cutting and parting off.

Some operations on the Unimat proved to be quite challenging. The drive belts slip whenever torque is anything but minimal, which means drilling large holes or turning large diameters needs to be planned to minimise the torque requirement. This means it is necessary to use a series of increasing drill sizes to achieve the final diameter hole and lathe tools need to be ground with a fine tip so as to minimise cutting forces. The limited tailstock travel of only 23mm often seems too short for drilling a hole and whilst it is possible to achieve accurate dimensions, achieving a good surface finish is difficult when lathe tools are ground to a fine point ( I probably need to experiment a bit more with HSS profiles to achieve a better finish). Parting off works fine with small brass components but proved impossible on 20mm diameter steel.

The headstock spindle nose for mounting chucks is M14mm, which is also used on the tailstock and mill/drill head, which allows for some tooling to be interchanged and some versatile set ups. One such example was mounting a faceplate on the tailstock, to act as a drill pad and holding a 10mm drill in the collet chuck - see photo. This was really beyond the capability of what this little lathe is intended for, but did work.

Overall I found the Unimat rewarding and enjoyable to use. It already feels like an essential part of my workshop set up which will be useful for small jobs.

Whilst I think it is perfectly feasible to set up a workshop with just a Unimat lathe/mill/drill, some of the limitations might be enough to put off someone setting out on the model engineering learning curve. So, if you have space for a permanent workbench and machinery I would advise something a bit bigger. However, if you want something that can be kept in a cupboard and brought out when required, then the Unimat 3 is definitely an option.



**Top Left** The simple oscillating engine

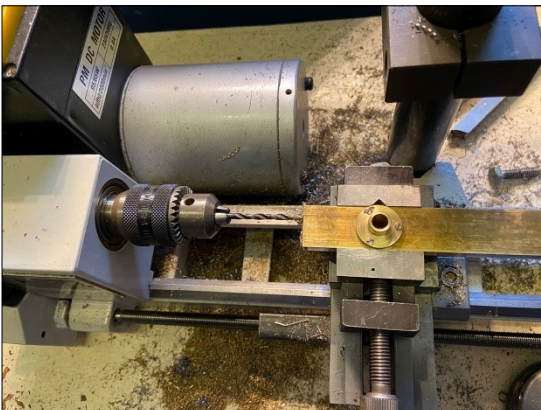
**Top right** Drilling the engine frame with the faceplate mounted on the tailstock



**Left** Milling a recess in the fly-wheel for a grub screw

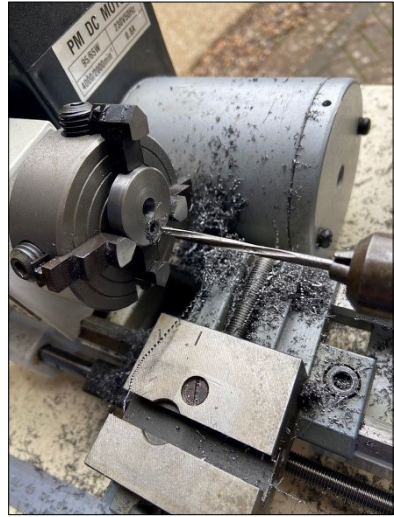
**Bottom left** Drilling from the headstock

**Bottom right** Milling and drilling the cylinder block on the milling table, which is attached to the lathe cross-slide





**Above left** An M14 - T nut adapter is provided to allow the chucks to be mounted on the cross-slide. The 3 jaw Chuck is holding the main bearing for coordinate drilling.



**Above right** Eccentric reaming the crank disc in a 4 jaw Chuck.



Left The completed crankshaft

Photos Stephen Millward

## **A NEW 7 1/4" ELECTRIC LOCO      Part 3      by Terry Wood** **The motor and transmission**

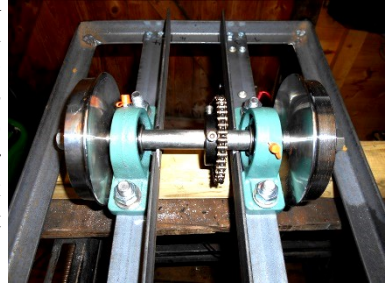
The motor I am using to power the loco is a Bosch disc motor originally used to power the cooling fan on a German car or van. The brushes are mounted in an unconventional way being mounted at the back of the armature instead of the usual way on the shaft also the motor was originally mounted on a framework using the three bolts that hold the motor together. So, in order to mount the motor to the chassis some form of bracket will have to be made. I decided to use a thick piece of aluminium strip mainly because the motor has very strong permanent magnets for the field and using metal



may weakening them, I discovered how strong they were when I took the motor apart and tried to re-assemble it if you don't wear gloves when you put the armature back in the magnets will take the skin off your hand!

The aluminium strip was bent in a circle and then bent at right angles in a very gentle curve otherwise it would break as I found out when I attempted to bend it sharply this had the advantage of fitting a clamping screw to it so that it could be clamped tightly to the motor otherwise it would start to spin under load. It took quite a few attempts to get the right shape and I used up a lot of aluminium strip.

Once I got the clamp in the right shape I then



drilled two mounting holes in it to bolt to the chassis. These mounting holes were then slotted in order to adjust the position of the motor to get the right chain tension. I decided to mount the motor at the front of the loco and then fit the battery in the middle between the wheels.

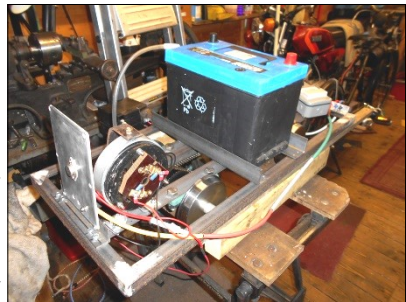
Once I sorted that out I ordered the chains and sprockets and when they arrived I discovered that the

one on the motor fitted perfectly but the other three that go on the axles were too tight and after trying to fit them on the lathe chuck (too small) I then proceeded to open the holes out slightly with emery cloth

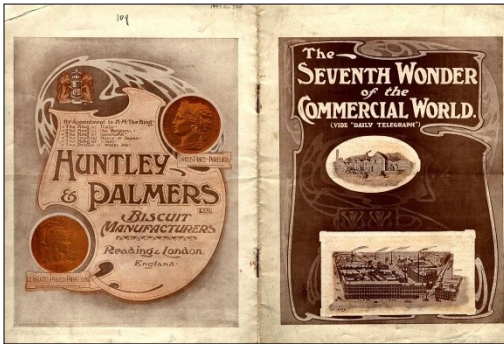


wrapped around a suitable

piece of pipe. Eventually I got a nice sliding fit so that the sprockets could slide along the axles, and I could line up both chains one for the drive axle and one for the other axle giving drive to all four wheels. Once I lined the driving chain up and cut it to the



right length and connected it all up I noticed that the motor was moving under load due to the mount flexing so I took the mount off and then drilled a hole in the top of it in order to fit a counter sunk screw so that I could fit an extra steel bracket to make a three point fixing to the chassis which cured the flexing problem. The chain wheels are held on to the axles by grub screws two on each chainwheel so once I lined up all the chains I drilled a dimple in one of the grub screw holes so that the chainwheels are fixed more securely. I then degreased the grub screws and their threads and screwed them in using Loctite. The next problem was how to hold the 60 amp/hour leisure battery to the chassis, in the end I used some of the 1 1/2 " angle iron I had left over and cut two pieces slightly longer than the battery and then drilled two holes at each end to accommodate two pieces of studding which clamped the battery to the chassis using another smaller piece of angle iron at the top. The whole lot was then bolted to the chassis using four M6 screws. *To be continued*



“THE SEVENTH WONDER OF THE COMMERCIAL WORLD”

**HUNTLEY AND PALMERS  
of Reading**

**A talk by Anne Garrison**

Clubhouse  
23rd March 2023 at 8 pm

## **Birthday parties, school visits etc**

After our winter break, parties will resume on Sunday 12th March. Several bookings have been made right through to September already and there will be plenty of opportunity to be involved. Please let Peter Culham know if you are interested in helping.

The editor adds “We really do want some regular help with this. Peter and his gang maintain a splendid service on behalf of the club and it keeps the funds flowing in.”

Peter can be contacted on [peteculham@gmail.com](mailto:peteculham@gmail.com)

## **To all members**

**I am short of articles for Prospectus.** Previously we have had up to 24 page issues but now we are down to eight. Please let me know if you have a story. Actually, everyone has!

**We are resuming Thursday night talks.** Please let me know if you could help with this or know someone who can. Our recent presentation on the Harz trip filled the room—so more please!

## DIARY

### March 2023

|          |      |  |                                |
|----------|------|--|--------------------------------|
| Sunday   | 5th  | Public running   | 12.00<br>Setting up from 09.30 |
| Saturday | 11th | Club running   | 10.30 onwards                  |
| Monday   | 13th | Trustees meeting   | 19.30                          |
| Tuesday  | 21st | Club running   | 10.30 onwards                  |
| Thursday | 23rd | Biscuit Town A presentation on Huntley and Palmers<br>by Anne Garrison |                                |

### April 2023

|          |      |                  |                                |
|----------|------|------------------|--------------------------------|
| Sunday   | 2nd  | Public running   | 12.00<br>Setting up from 09.30 |
| Saturday | 8th  | Club running     | 10.30 onwards                  |
| Monday   | 10th | Trustees meeting | 19.30                          |
| Thursday | 13th | Special needs    | 13.00-14.30                    |
| Tuesday  | 18th | Club running     | 10.30 onwards                  |
| Thursday | 20th | Speaker (tbc)    | 20.00                          |

For club running enquiries please contact [mikesinclair118@yahoo.co.uk](mailto:mikesinclair118@yahoo.co.uk)

### WEDNESDAY WARRIORS EVERY WEEK FROM 09.30

**Note from the Editor. Thank you to all contributors. Please remember that the copy deadline is now 20th of the month and material, unless previously notified, can be held over if received after that date.**

**Please provide photographs as separate files and not embedded into the text. No pdf files please.**

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

#### **The deadline for the May issue is 20 April**

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

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Prospectus are welcomed by the editor.***