



January-February 2002

Inside this issue:

| | |
|--------------------|---|
| January Meeting | 2 |
| President's Report | 2 |
| Eccentrics | 3 |
| For Sale | 4 |

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NSWGR C32 Loco Takes to the Track



Ron Date's new C32 loco in the Steaming Bays ready for its inaugural run.

Another 5" gauge locomotive has made its debut on the Society's track!

Built by Ron Date, a NSWGR C32 with Allen valve gear had its maiden run on rails over Christmas/New Year.

The NSW Railways had about 190 of these engines and the last steam loco run in NSW was a C32. This class was also chosen for the Trans Australia service when it opened.

(Continued on page 4)

**Article and photos
by Ron Date**

CALENDAR OF EVENTS

| | | | |
|--|---|-----------------|-------------------------------------|
| Club Run Day and Public Run Day | Club Track Site Vasto Pl, Balcatta | 10:00am—4:00 pm | Sunday 27 January 2002 |
| General Meeting | Laurie Strutt Park Elvire St, Waterman | 8:00 pm | Friday 8 February |
| Club Run Day and Public Run Day | Club Track Site Vasto Pl, Balcatta | 10:00am—4:00 pm | Sunday 24 February |
| General Meeting | Laurie Strutt Park Elvire St, Waterman | 8:00 pm | Friday 8 March |
| Club Run Day and Public Run Day | Club Track Site Vasto Pl, Balcatta | 10:00am—4:00 pm | Sunday 31 March (Easter Weekend) |

Note: There may be additional Birthday Runs or other events scheduled at short notice. Contact Jim Crawford or Andrew Manning for latest details.

January General Meeting

The first General Meeting for 2002 opened with 22 members and 1 visitor, **Keith Watson**, who was welcomed to the meeting

GENERAL BUSINESS — **Ian Allison** advised that only two people had put forward their name for the "Duty Officer" roster. Please advise Ian if you are prepared to act as Duty officer occasionally.

BUILDING REPORT — **Ron Date** advised on the progress of the building (see President's Report). Assistance of the younger, fitter members would be appreciated as the block work from now on is at or above head height. Block work may well be completed by the end of March.

MODEL ENGINEERING — **Neville Merchant** displayed his model steamboat and the damage that can occur if the gas cylinder is overheated!

David Hunter showed a partly completed internal keyway slotting tool for use on the lathe.

Phil Gibbons Presented a price list from EMCO. The prices are very much lower than the equivalent from Wayne Roberts.

Stuart Martyn had a model of an Atkinson cycle engine. Stuart eventually managed to get the engine running (see photos).

Steve Reeves described his night on the replica of the Endeavour.

President's Report

The new Club House continues to rise. We are now on the last five courses of blocks and the window frames are being made. Doors are still coming.

Grounds maintenance is suffering as a consequence of the building activities, so if you feel like a few hours' raking leaves etc., please come on down.

Vandals have made a few recent visits but fortunately nothing of major consequence has been damaged. The City of Stirling Council have come good with some money for palisade type fencing, enough for our south and east boundaries, but we will have to erect it and remove the old fencing. Watch this space for Positions Vacant for this important project starting soon.

On a very sad note, our esteemed Society member and friend **Lindsay Adams** has had a brain tumour removed which has left him with seriously impaired vision. It is early days yet, but **Lindsay's** participation in things will be very limited at best for some time to come. We all hope and pray that life will be good to **Lindsay** in the future. He is one of the best.

minutes of meeting by Andrew Manning

PRESENTATION — **Keith Watson** ran a video taken during a visit to the UK last year. The video included shots of beam engines at Kew Bridge, (see also Supplement article by Dennis Lord), various preserved railways and a steam vehicle rally. We were only able to see a small fraction of the video. Thanks Keith!

RAFFLE — No door raffle this time. Any suitable donations for the next meeting?

Andrew Manning



Stuart Martyn with his "Hit & Miss" and "Atkinson" petrol driven models (left), proving a little difficult to start. Neville Merchant (right) explains how his radio controlled "steam" driven boat was damaged when the gas supply tank exploded. Photos by Ray Shersby

by Ron Date

Lindsay has been one of the most valuable contributors to the Society's activities. His reliable and well-known loco "Waratah" and his blue Diesel outline battery loco have done almost all of the Society's revenue raising work since before I joined in 1993. His absence presents a challenge to all Society members to help fill the void, both for coming Run Days and also at outside events such as AMRA in June, where we will need a reliable gas-fired reversible loco.

Lindsay also tended to the reticulation system at the track site, and amongst many other jobs, he was going to do the electrical work for the new Club House.

Also a casualty of modern life, our newsletter editor **Jim Clark** is recovering from a heart attack, and is now on the mend.

So members, something for you to chew on, and even more so than usual, plenty to be done in the coming year.

Ron Date

Making Eccentrics — Another Method

by Doug Baker

Many years ago, I spent some considerable time studying a subject known as Organised Methods. During that time the lecturer made a statement that I have never forgotten. In principle he stated, "Give three men a job to do and each one will do it differently, and no one way is more correct than the other, providing the job is done according to specifications and within budget". I felt it is necessary to state this from the very outset, as I do not want any misunderstanding to the purpose of the following. Phil's recent article on machining eccentrics is a good way to do it and as a consequence of his article it has generated my enthusiasm to divulge my method. It is also my hope that you, the reader, will also have another approach that you will advise us of.

When building the marine engines I had 16 eccentrics to manufacture and because of production tolerance I wanted them all to be the same within $\pm .002$ ". I chose to manufacture these eccentrics in bronze with stainless steel straps. The stainless steel straps I will put to one side, as that is really the subject of another discussion. Like Phil, I like to make jigs to hold things when machining more than one off. I respect that most of you have seen these jigs at the club meetings, however the barrow I am pushing is: if you have more than one item that have to be the same tolerance, make jigs.

The bronze that I used was Pb1 cast at the foundry in green sand, therefore it was a rough finish. The first operation was to turn the outside diameter to size; this was done by the following method. Firstly I cut the end off clean in the saw removing as little material as possible. Marking the centre on each end I then drilled a centre at the intersecting line with a centre drill. The centre was established using a centre square and I drilled the centres using a portable electric drill, as the casting was 80dia x 450mm long.

Once this was done I was ready to turn the outside diameter. I then offered the job up into the lathe by

holding one end in the four-jaw chuck, the other supported by a live centre. With the lathe spindle rotating at a moderate speed, a clean up cut was machined. At this stage all I wanted to do was machine the casting round. The diameter didn't really concern me as long as it wasn't smaller than the specified finished diameter. After the overall length was cleaned up, I then finished the diameter to size between centres, checking to ensure the diameter was parallel.

Having completed the first stage it was necessary to cut the eccentrics off to length plus a clean up factor. I like to + 3mm to the finished dimension—this will take care of any out of square cuts the saw may make. There is no power cut off saw that I have ever seen that will cut perfectly square and to size, hence the caution.

As cut the discs have a burr on the edge: it essential that it is removed either with a file or a finishing machine. When I was satisfied all was OK I then faced one side only as a clean up, ensuring the OD was running true in the chuck. I like to use the three-jaw chuck with the reversing jaws for this operation as it holds the job nice and square. After facing and before removal, take the sharp edge off, either with a file or the turning tool. Removing all sharp edges and burrs is a must because if you don't the burr will influence the next operation, apart from cutting your fingers. That brings me to a warning—don't run your finger on the sharp edge to see if it is sharp—I assure you it is. Not only is it sharp, it also serrated and believe me it does cut deep before you realise you have even done it.

Having faced all 16 discs on one side the other side has to be faced to size.

This was straight forward as I had made a saddle stop that clamps to the bed ways and by winding the saddle in until it hit the stop all the discs are then machined to the same width. I like to lock the saddle in place for the last facing cut so there is no chance of any error due to movement. Like the previous facing exercise, take the burr off before removal.

The advantage of owning a milling machine will be evident with this, the next operation, as this stage is when I bore the eccentric hole. Clamp a three-jaw chuck to a rotary table and clock the chuck up to be concentric to the rotation of the rotary table and spindle. This is a relatively simple operation as I hold a piece of bright mild steel about 50mm diameter in the chuck and with a dial indicator held in a drill chuck, I rotate the clock around the material until it shows no run out. The same could be done with a vertical slide if a milling machine is not available.

(Continued on page 4)

Get Well Lindsay Adams

Lindsay Adams has recently undergone some major surgery as noted in the President's Report.

We all wish you a speedy recovery, Lindsay, and hope to see you back soon, whenever you feel up to it.

Those of you who want more up-to-date information on Lindsay's progress, or who want to send personal wishes for his recovery should contact either Ron Date or Doug Baker first for the latest news and contact details. Please don't contact Lindsay directly at the moment, give him and his family some space to cope.



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NSW C32 Loco

by Ron Date

(Continued from page 1)

Painted blue, one hauled the train for the Duke of York in 1923 for the opening of the Australian Parliament House. During the war, it pulled the train for the Duke of Gloucester.

With little variation, this design of boiler and valve gear was fitted to the D50, 51, 52, 53 and 54 standard goods engines. In NSW, that was about 700 engines with the straight expansion link. Why play

about with Stevenson's?

In 5" Gauge the engine is 36" long, weighs 200lbs, and with a 24" tender measures 5 feet overall. That's Hernia Gauge all right! The loco has about 1200 rivets in its tender — all properly cropped to length and riveted.

On its first run day the lubricator didn't work properly, but what a steamer — six complete circuits of the track (over 2km) on the one firing with steam to spare when it had to come off.

A new replacement lubricator has since been made and fitted in front of the smokebox and out of sight, instead of the original lubricator, which is between frames and under the boiler, and nearly impossible to get at.

Another new loco to have its first trial run over the Christmas holidays was George Palmer's un-streamlined NSWGR C38 loco.

With a big plastic bottle playing at being the tender, it ran beautifully, but probably won't be seen again on track for a while until the tender is built (more rivets galore!)



Ron Date taking
Elsie for a few
laps round the
track behind his
new loco.

It goes as well
as it looks!

Photo by
Ron Date

Ron Date

Eccentrics

by Doug Baker

(Continued from page 3)

Having set the chuck concentric to the quill, I then move the table to the offset distance that the eccentric throw requires. Chucking one of the discs and using a centre drill, I then very lightly make a witness mark. This enables me to check the offset to ensure I haven't made a mistake with the indexing. Satisfied that all is kosher, all the discs are then drilled, allowing at least 10% material clean up. For example if the finish diameter of the hole is 16mm then I would drill a hole that is 1.5-1.6mm smaller. A little helper to relocate the position after drilling is to put a stripe mark on the OD, using a pen or scriber, that you can line up with a jaw edge or any other convenient reference.

Now that all the holes are drilled, return the disc back to the chuck and line up the reference mark. This operation is the finish operation in that the hole is bored to the required size. A straightforward machining, job just be careful of the finish size, that's all. When all the holes are done remove the sharp edge with a scraper or a deburring tool. If the equipment is not available in the workshop to adopt this method then that is the beauty of Phil's system as it can all be done in the lathe.

FOR SALE

MYFORD LATHE — as previously advertised is still available, with accessories and various hand tools and so on. Includes a polished wooden toolmakers cabinet.

For full details of what is available and the prices, please contact Doug Baker on 9341 1630.

In my case the eccentrics have a rib located in the central position that marries into a groove in the strap. For this operation I considered it was easier to machine the edge to size using an end mill and the rotary table. Once again the three-jaw chuck was clocked up on the rotary table and the disc held firmly in the reversing jaws. One side was machined to depth and diameter and after all were done, they were turned over and done again. After all sixteen were done the chuck was returned to the lathe and all the sharp edges were removed and chamfered. Total time of operation was 8 hours and every dimension measured are all the same.

Doug Baker

Kew Bridge Steam Museum

by Dennis Lord

Kew Bridge Steam Museum is a collection of steam driven water pumps. It is located at Green Dragon Lane not far from Kew Bridge over the river Thames. It is open every day but only at weekends are the café open and the engines in steam. It was originally a pumping station for London and housed two 90" Cornish beam engines. The general layout of the site has been altered over the years to accommodate other pumping engines. In particular what was the original boiler house now has a number of other types of pumping engines and the present day boiler house is not open to the public. It is probably smaller than the original, having an intermittent duty cycle, and most certainly more up to date.

The entry to the museum depicts the history of public water supply from about 1840 to the present time. There is a collection of old water-using domestic equipment to modern times such as baths, toilets, showers washing machines and even a washing up machine. It also displays pipe work such as pipes made from timber and a great variety of valves and taps.

Photo 1 shows a Hathorn Davey triple expansion engine of 1910. Whilst it was running, the pressure in the HP cylinder was 10psi, the MP cylinder at 5" Hg vacuum and the LP at 20" Hg vacuum. The engine is in three sections, one for each cylinder of course. I was talking to the fitter who was running it and he said it took them 8 days to line up the 3 beds before they could fit the crankshaft, which is in 2 parts. Each cylinder crosshead is connected to a lift pump, which was underneath the engine, and the vacuum pump was connected to the LP crosshead. The valve gear, which can clearly be seen as the long rod just above the guard rail, drives a Corliss valve system. This is essentially a quarter turn valve method driven by 2 cams on each cylinder. Like all engines of this type it had a governor to maintain constant speed. This engine, in service, ran on 40psi of steam, which seems to have been a fairly universal figure for this type of work. This engine was not of course pumping, hence the low figure of the cylinder pressure now. It ran with a constant loud clicking noise generated by the valve system.

Photo 2 shows a James Simpson cross compound pumping engine of 1910. The LP cylinder is on the left and the HP can be seen through the flywheel. The condenser is above the fitter's head. He is operating a small two-cylinder donkey engine to turn the toothed flywheel. This was an alternative way of getting a compound engine into a starting position instead of using a simpling valve. Both cylinders had piston rods at both ends of the cylinder, one end connected to the flywheel and valve gear as can be seen. On the LP



Photo 1 – Hathorn Davey Triple Expansion Engine c.1910



Photo 2 – (above) James Simpson Cross-Compound Pumping Engine c.1910

Photo 3 – (below) Easton & Amos Beam Engine c.1863



cylinder the back end drove a cantilever, which operated the below-ground lift pump. The HP cylinder drove the delivery pump, which can be partly seen behind the condenser. In service the delivery pump had a 100ft vertical pipe on its outlet that overflowed back to the well if the pressure or delivery was too high. A very early form of pressure regulator and flow control no doubt. This engine again was designed for 40psi working. It was almost silent in operation. The condenser was not essential to compound working but it saved a lot of time and expense on water treatment for boiler use by reusing the condensate and they did not have any problem in the supply of coolant water. Some idea of its size can be gained from the fitter who was getting on for 6' tall.

Photo 3 shows an Easton & Amos beam engine of 1863. This one was not fitted with a condenser. The drive to the lift pump is the pair of vertical rods from the beam just to the left of the flywheel. The belt drive to the governor can be seen. On this beam engine the valve drive was taken of the flywheel shaft as a single drive and linked to the two valves. As you can see, these engines are kept in show condition and all the engines in the museum do actually work.



Photo 4. This is a James Kay twin beam engine of 1867 driving onto a single flywheel. Each cylinder has its own valve drive system which of course was relatively simple as it did not include reverse running.

The two lift pump on this engine are connected to the cylinder end of the beam. The governor seems to be a

very grand affair, as indeed does all the supporting ironwork. This of course was typical of Victorian engineering at the time. Some of them were extremely ornate as can be seen at Papplewick Pumping Station at Nottingham (see Model Engineer 166 4137).

Photos 5 and 6 are of one of the 90" Cornish pumping engines around which the building was erected. The engines are of 1846 vintage and they are huge. They must be more than 12 metres in height and are serviced from 3 floors.

Photo 5 shows the head of the 90" cylinder and the valve chest on the ground floor. These engines were designed to run on 40psi wet steam and could pump 10 million gallons of water per day. The valve gear looks somewhat complicated and there is a notice requesting

visitors not to ask the fitter questions whilst he is in the process of starting the engine!

Photo 6 (below) shows the beam on the third floor. The beam is cast iron and weighs 25 tons. This particular engine ran for 7 days on it's first start-up and then the beam cracked lengthwise. What a job that must have been to replace it.



Above the main hall there is a second floor that contains static displays. One of these is a half scale model of the first successful screw-cutting lathe produced in the UK around 1870. The leadscrew first bearing is underneath the headstock and runs between the frames of the bed. It must have been quite a problem in those days to produce a screwed rod of that type. A bit like who produced the first wheel? In two showcases there are half scale models of Brunel's 6 semi-automatic block making machines, reputed to be the world first attempt in mass production - all driven by an overhead pulley system driven by a steam engine. The Navy at the time required a huge quantity of blocks for the sailing ships. When you consider that one square sail on a man'o'war required between 12 and 16 blocks to handle it, the problem begins to appear, and the existing hand production methods just could not cope with the demand.

Kew Bridge Steam Museum provides a good day out, even wives and girlfriends find something of interest. Kids need to be on a length of rope to haul them out of prohibited areas.

Dennis Lord

All photos in this article have been reproduced from a postcard set with the kind permission of the Kew Bridge Steam Museum.