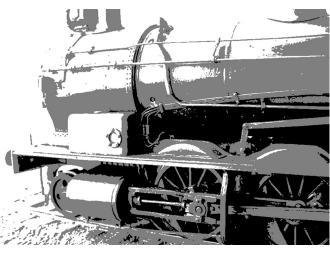
Table Augustine Group Line.

In this Issue:



\$4.00



What's in a Name ?		VR GY	
Trevor Hodges	4	Keith Trueman	1
Building the NSWGR 18 class kit		Track Planning - 'Nymboida'	
John Parker	7	Trevor Hodges	1:
Stringybark Creek at Hurstville		Regular Columns	
Trevor Hodges	11	Group News	
		One Modellers View	

No 12 Summer 2007

Aus7 Modellers Group News

After becoming involved in the organisation of the NSW O-Scale Modellers Forum (BDO), it quickly became apparent that the group needed to set some dates well ahead of time to help with planning and advertising. The next BDO has been booked for the 24th of March at the Nth Sydney Leagues Club.

The venue for the AGM this year needs to be confirmed at this stage but the tentative date is Saturday the 7th of July. At this stage we haven't confirmed that the same venue will be available, however if someone would like to offer to organize an alternative then please contact the President or Secretary with details. Last year's venue was excellent but I don't imagine

Paul Chisholm will be worried at all if we change venues this year.

Because of the need to advertise the Aus7/Waratah Diorama Competition well in advance of the BDO in the second half of the year, the tentative date for this is Saturday the 27th of October. We suspect that this BDO will be a big one, with lots of attendees and plenty of good modelling to see so mark it in your diary.

Finally, Keiran Ryan will be manning an Aus7 stand at the Brisbane model railway exhibition on the weekend of May 5, 6 & 7. He would like to hear from members who would be willing to help out on the stand over the weekend.

The Aus7 Modellers Group Is Proud To Announce:

The 2007 Waratah Model Railway Co.

O-Scale Diorama Competition

All Modellers are encouraged to construct and enter an O-scale, railway themed diorama for the inaugural Waratah Model Railway Co. Diorama Competition

Conditions of Entry

- Entries may be of any size but must be on a single base. If you can carry it through the door, you can enter it
- 2) The diorama must incorporate some track and a Waratah Model Railway Co. wagon in the scene.
- 3) The diorama must be built in O-scale (1:43.5 or 1:48).
- 4) Judging will be by popular vote of attendees at the NSW O-Scale Modellers Forum (Big Day Out) at North Sydney Leagues Club on 27th of Oct 2007.
- 5) The diorama may be a segment of any new or pre-existing home or exhibition layout.
- All entrants must be prepared to allow their entries to be photographed for publication.

Prizes: 1st - Waratah PHG Brake Van kit (value \$550),

2nd - a Waratah rolling stock kit.

3rd - \$50 open order of Waratah products.



tact:

The Secretary
Aus7 Modellers Group
24 Chester St, Warren, NSW, 2824
0432 732 723

trevorhodges@dodo.com.au

VETERAN MODELS

Victorian Railways O Gauge (1/48th)

Magnificent New Kits for 2006!!!



VM02 - GY Open Wagon \$85.00



VM09 - L Sheep Wagon \$220.00 (VMA04 Jig Extra)

VM01 – Z Van 6 Wheel \$255.00	VM06 – UB Van\$160.00
VM02 – GY Open \$85.00	
VM03 - T Class III \$280.00	VM09 - L Sheep Wagon \$220.00
VM04 – E Bogie\$180.00	VM10 - D&K Welded Tender \$275.00
VM05 – U Van\$140.00	VMA04 - L Wagon Assy Jig \$60.00

Phone:- (03) 9687 6205 AH

Email:- veteranmodels@bigpond.com.au Visit our web site http://www.users.bigpond.com/swarm_leeder/ The Aus7 Modellers Group invites you to the NSW O-Scale Modellers Forum AKA The Big Day Out Saturday the 24th of March, 2007

Proposed Topics

- Signaling a layout
- Hands on operation seminar
- Ideas for building dioramas
 - Practical tips for making trees

Plus

- Manufacturers Report
- Traders who specialize in O
- Bring a model if you have one to share

Everyone welcome!

North Sydney Leagues Club, Kamaraigal Room 12 Abbot St, Cammeray – 9.00am Start



For Details Ring Nick 0421 058 945 (02) 9956 6552

One Modellers View

Plastic Ready To Run

Is the hobby of model railways unique in its ability to attract doomsayers, individuals who are ever ready to pronounce that the end of our hobby is nigh? Every so often, via the pages of AMRM, we'll have a rash of letters from concerned individuals on topics such as the decline of the local hobby shop, attracting young people into the hobby or a perceived lack of "entry level" rolling stock items for beginners. In the December 2006 issue of AMRM it was mentioned that Austrains had sold somewhere between 16,000 to 20,000 HO scale NR locomotives! Numbers like these seem to indicate our hobby is in rude good health rather than terminal decline and it wouldn't be too far from the truth to suggest that those HO modellers who follow a local prototype have never had it so good.

For years, as a HO modeller, I was green with envy as friends who modelled US prototypes pulled stunning locomotives out of boxes while I struggled along, having to assemble and modify everything that ran on my NSW prototype layouts. I tried to pretend that this didn't bother me, that I enjoyed my hair shirt, but in reality I would have given anything if just once, I could have taken an item out of its packaging, placed it on the track and watched as it ran smoothly and quietly the first time, without major modifications.

One result of those years of construction and modification was that it turned me into a railway *modeller*; rather than simply a train runner or collector. I'm proud to call myself a *modeller* and in my case this label actually means what it says; for me, and I'm sure for many others, this hobby is a craft based activity where you assemble, build and paint things. Switching to 7mm modelling a few years back didn't faze me in the least because so much of what I was doing in the larger scale - assembling kits, adding pickups to locomotives, painting rolling stock

and scratch-building structures – was pretty much the same type of activity I'd been doing for years in HO.

Will the proliferation of HO plastic ready to run locomotives and rolling stock have an impact on O-scale modelling? Will modellers be attracted away from O-scale by the lure of factory applied detail and superb running? While I don't have a crystal ball I have a sneaking suspicion that the fallout from this revolution on the local HO scene may have some unforeseen consequences. Anything that helps increase the number of people enjoying this wonderful hobby can't be a bad thing, especially if leads them down the path of modelling local prototypes. While the arrival of these HO models will allow a great many people to model a local prototype more easily and accurately than ever before it might also have the unexpected consequence of pushing some modellers into looking around for new challenges. Why do I think this? Because it's one thing to be the only member of a model railway club who owns a NSWGR AD60, painstakingly assembled from a kit over many hours, however it's another thing entirely to roll up to the local club with your latest purchase only to find a gaggle of other people's AD60's infesting the rails.

Am I predicting the end of the hobby as we know it? Hardly, but I wouldn't mind betting that if the number of O-scale modellers grows over the next few years at least some of this growth will come from slightly jaded HO modellers who are looking for something a bit more challenging from their hobby than unpacking a box. Then again, maybe I'm just jealous.

Trevor Hodges

7th HEAVEN

Editor: Kim Mihaly

Editorial Address

120 Folkestone St Stanthorpe Qld Ph (07) 4681 1031 kim.mihaly@tpg.com.au

Advertisement**S**

Full page: \$100 Half Page: \$50 Quarter Page: \$25 Eigth Page: \$12.50

Please contact the Secretary or the Editor for any advertising enquiries.

All advertisements must comply with the Trades Practices Act.

Back Issues

Please contact the Secretary to obtain back issues.

Issues 4-8 are \$3.00 each.

Issue 9 + are \$4.00 each \$1.50 p&h for one or two copies.

\$2.50 p&h for 3 or more copies.

Aus7 Modellers Group Inc.

President

Keiran Ryan 39 Coachwood Cres, Picton, NSW, 2571 (02) 4677 2462 krmodels@gmail.com

Secretary

Trevor Hodges 24 Chester St, Warren NSW, 2824 (02) 6847 3453 trevorhodges@dodo.com.au

Web Site

www.aus7modellersgroup.com

All opinions expressed are those of the respective authors only, and do not represent any official view of the Aus7 Modellers Group Inc.

On the cover:

5163 waits patiently for permission to pull into Stringybark Creek Yard

What's In A Name?

Trevor Hodges

While Juliet claimed that a "rose by any other name would smell as sweet", for most of us names really do matter. Since the formation of the Aus7 Modellers Group the executive of the group have tried to encourage as broad a cross section of O-scale modellers as possible to join up and contribute. At times this has been made more difficult because the name of the group, and of this newsletter, makes specific reference to a scale: the 7 in the title of the group and the newsletter refers to 7mm scale (1:43.5). It is difficult to argue that we represent all O-scale modellers, including those working in $\frac{1}{4}$ " to the foot (1:48) scale, when our very name implies otherwise.

The split in the scales between NSW on one hand (1:43.5) and Queensland and Victoria on the other (1:48) isn't about to change so we may as well accept it. However, as an organisation that claims to represent all Australian O-scale modellers of both scales, it could be argued that we will never be seen as a truly national body until we choose a name that reflects this national aspiration. It is worth noting that our statement of aims, lodged with the NSW Department of Fair Trading in our incorporation application, states that we strive to "Promote Australian 7mm/O-scale modelling". Interstate modellers, who I've encouraged to join up, have been quite explicit when they say they'll join on the day the name changes to reflect the scales (note the plural) we all work in, not just the scale that most NSW modellers work in. Any proposal to change the name of the group would have to be notified to the full membership, discussed at the next AGM and then voted on.

Pros (for changing)

 We could genuinely make the claim to being a national body, representing all Oscale modellers, not just

- NSW 7mm modellers.
- We would significantly broaden the group's potential membership base.
- A larger membership base would help keep the cost of membership to a minimum and would broaden the pool of advertisers willing to place ads in the newsletter.
- If we make the change we should do it earlier rather than later; the longer we keep the name as it is, the harder it will be to change.

Cons (against changing)

 We would have to go through the Incorporation process again, which has a relatively small cost associated with it.

- All the caps and shirts we've sold would be out of date as would a rather expensive banner we own with the groups name on it.
- Even if the name is changed there is no guarantee we'd pick up a single new member.

There may be other implications to this issue that I haven't considered but I'll leave it there for the moment. Please have your say by writing or emailing your responses to the editor so that these can be printed in upcoming issues of 7th Heaven.

Gwydir Valley Models

EasyDCC

TCS DCC Decoders

Irdot INFRARED Train detection systems
EasyDCC systems from \$445.00
TCS DCC Decoders from \$29.00
Soundtraxx Decoders
Miniature Speakers for DCC

Fast-Tracks Track Building Kits go to, http://gwydirvalleymodels.fast-tracks.net

NEW

AIM Weathering Powders
Drills & Modelling Tools, tweezers, files etc.
Kadee Couplers & Tools - Billboard Decals
Constant Brightness headlight units for DC
Golden White (prototype) LEDs 3mm & 5mm
0.8mm Golden White LEDs with leads
Pin Connectors - Fibre Optic 0.5, 0.75, 1.0, 1.5mm
Miniature Globes 1.5v, 12v, 14v, from 1.2mm dia.
Rustall & Weatherall

Other Brands Stocked:

Brass Wire & Strip - Kappler Scale Wood - KR Models - Zap-a-Gap Solder & Fluxes - Carrs Metal Black- Tortoise Point Motors Uneek detail parts - Railey Paint – Bachmann Locos & Track Machines Framed Prints of Railway Art

> P.O. Box 740 Glen Innes NSW 2370 Ph. 02 6732 5711 Fax. 02 6732 1731 www.gwydirvalleymodels.com Mail Order Specialists

Visa

Mastercard

Building the NSWGR Z18 Class kit

John Parker

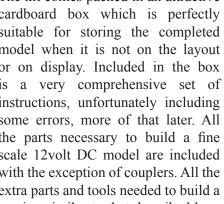


John Parker found the building of the Berg's Hobbies/Greg Waldon Z18 0-6-0 a most enjoyable exercise even though there were some minor frustrations. It is hoped that his experience and construction hints will assist you to build your own version.

If you are eager to attempt your first 7mm steam locomotive you will find that this is a good starting point with some challenges but no insurmountable hurdles.

The final result is a DCC sound equipped locomotive for under \$1200 and importantly the kit is also normally available ex stock.

The kit comes packed in an attractive cardboard box which is perfectly suitable for storing the completed model when it is not on the layout or on display. Included in the box is a very comprehensive set of instructions, unfortunately including some errors, more of that later. All the parts necessary to build a fine scale 12volt DC model are included with the exception of couplers. All the extra parts and tools needed to build a version similar to that described here are detailed in the adjacent table.



PARTS LIST Z18 kit from Berg's Hobbies Soundtraxx Tsunami Light Steam Decoder Medium Oval Dream Speaker 20x35mm 3-link couplings MV Lenses L408 & L402 4 LED's (2 - 3mm Proto white, 1 - 2mm red & 1 - 2mm yellow) 4- 1000 ohm 1/4 watt resistors

TOOLS REQUIRED

Craft knife or similar Medium flat file Set of needle files Metric drills sizes 0.7, 0.9, 1.5, 2.25, 2.5 mm Pin vice Razor saw Jewellers saw Scriber, or fine centre punch Tapered reamer, or several sizes of broaches Small engineer's square Dremel or similar power-tool (optional) Soldering iron 40 to 50 watts, (Preferably temperature controlled) Solder & flux Wet or dry abrasive film or paper Fibreglass brush or pencil Cyrano adhesive (superglue) Epoxy resin (5 minute) Side cutters Toolmaker's clamp Sheet of lead, or lead block

Surface plate (glass or laminated MDF)



Where to start?

Do you find a sense of excitement when opening the box containing a new kit for the first time? (Perhaps I need to get out more!)

I strongly recommend that you read the detailed instructions provided with the kit at least twice, familiarizing yourself with the various components as you read. Don't separate individual items from the etch yet, as it is too easy for a small part to loose its identity.

I found the instructions helpful but I did find some points of disagreement and also places where I felt there was a better way to achieve the same result. These notes do not replace, but should be read in conjunction with the kit's instructions and they will highlight where departures were made or additional steps included.

It will be assumed that you will be building the loco with a DCC sound decoder, if you are not interested in including sound, (why not?), some of the suggested modifications can be ignored when building a DC non sound version.

I built my model with the optional Slaters sprung horn blocks, they are probably not essential, but I felt worth while. I am sure the model would be perfectly satisfactory as designed with non-floating axles but the sprung horn blocks do ensure that the final model has 6 wheels on the track at all times!

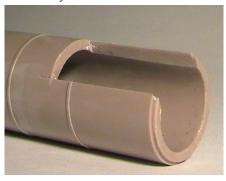
The Z18 is a small locomotive, even in O scale, so the first decision to be made is the ultimate location of the speaker and the DCC sound decoder. The boiler seemed the obvious location but how would access be achieved after the model was constructed?

The solution was a simple modification to the solid cast resin smokebox, permitting access to the interior of the boiler after the model was completed. It is also necessary to modify the boiler to provide space for the motor and gearbox. These changes should be carried out before any assembly is undertaken. It would be much more difficult, if not impossible later.



(Figure 1)

1. Using a ¾ inch spade bit in a bench mounted drill, gently bore a hole through the centre of the smokebox. This is actually easier than it sounds as the resin material used for the casting cuts easily.



(Figure 2)

2. A rectangular section (19 X 39mm) should be removed from the rear of the boiler to clear the motor. This will ultimately be completely hidden from view. The dimensions of the slot are approximate, just make sure there is adequate clearance.



(Figure 3a)

3. A small baffle can be constructed for the speaker from styrene. Dimensions can be scaled from the photograph taken after painting matt black to ensure it is not visible. The semicircular ends fit snugly into the boiler so that the speaker is ultimately mounted above the motor.



(Figure 3b)

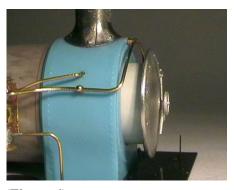
Make it as long as possible to provide the largest baffle whilst still providing space for the decoder and associated wiring which will fit at the front of the end of the boiler.



(Figure 3c)

It is important that the baffle fits snugly in place in its final location without intruding into the cab.

This view shows the assembly temporarily in place before the boiler backhead has been fitted.



(Figure 4)

4. The instructions suggest gluing the smokebox door to the smokebox but it will need to be removable to allow access to the decoder. This is achieved by gluing a small piece of 20 mm (outside diameter) plastic conduit, slit lengthwise to the inside face. The door will be held in place under a slight tension, but can still be easily removed.



(Figure 5)

- st. A sensible change to the gearbox will allow it to fit without requiring major modifications to the cab floor. The photograph of the assembled modified gear box shows the result of removing a rectangular shaped piece from each side resulting in a maximum overall side height of 17mm. It is preferable to make this change before assembling the gearbox. After assembly it is a good idea to run a fillet of solder in the corners.
- The assembly instructions, commencing on page 5, for the Footplate/Valance Plate should be followed but be aware of a couple of possible traps. There are no holes for the bunker fixing screws and you may also find that the holes for only one set of pickups are included (later production is expect to correct these small omissions.) The location of the additional holes can easily be calculated by measuring the distance of the existing hole from the axle bearing hole. It really is much easier to drill all of these extra holes before the etch has been folded or assembly commenced.

Parts 11 & 12 can be put into your 'bits & pieces' box as they are not required. An old drill bit of suitable size can be ground to a rounded end and used as punch for the rivets on the footplate. Experimentation on a piece of scrap brass will be helpful if this is your first attempt.

Referring again to the instructions page 6 commences with the following paragraph.

In order to accommodate the gearbox, the cut-out in both the footplate and the valance must be extended back level with the rear end of the rear wheel cut-outs. Further adjustment may be necessary once the chassis is assembled. Make the cuts with a fine saw and files, ensuring both parts are well supported to avoid distortion.

This really is a bit of an understatement. The modification made to the gearbox (See Figure 5.) has ensured that it will not protrude through the cab floor, but all the wheel and motor cut-outs are too small. You will find it is necessary to enlarge the slots by 2-4mm to provide clearance for the wheels, particularly if you have elected to use Slaters horn-blocks due to the greater vertical travel of the wheels. These enlarged cut-outs may also need to be accompanied by the removal of a small amount from the underside of the water tanks.

When assembling my model I did not solder the valance plate to the footplate, choosing instead to permanently attach the footplate to the body, resulting in three main components, the chassis, the valance plate and the footplate/body. I found this made it easier to test a working chassis and valance plate combination, but the method suggested in the instructions would also work well, I guess it is your choice.



(Figure 7)

7. The chassis assembly instructions commencing on page 10 are fairly straightforward. You may feel as I did that it is a little flimsy due to the gauge of brass chosen but the chassis is quite strong when fully assembled and braced in the way suggested in the assembly drawings.

The side elevation drawing shows the location of the various chassis spacers

and also guard plates 11 &12 which as mentioned earlier should not be included. Although the location of the front and rear spacers are defined, the locations of the others need also to consider the ultimate location of the motor and gearbox, so some trial fitting is recommended before finally soldering in place. The firebox sides can be soldered in place and you might like to consider the addition of the firebox flush pipes as shown on the prototype in Figure 7.

8. My model was built with the steps provided in the original kit which did not include the 'turn-up' on the ends, if you have a similar early model you could add this detail with brass strip. I understand later kits will include this enhancement



(Figure 8)

9. Page 11 includes detail on fitting the brakes. There is some confusion here, but don't worry as most of the included parts are correct, even though the instructions don't appear to be. The kit includes 12 brake hangers, (part number 15), only 6 are required, the spares can go in that 'bits and pieces' box. The two-part moulded brake shoes are assembled around a brake hanger not between two brake hangers as suggested in the instructions.



(Figure 9)



(Figure 10a)

10. As indicated in later versions of the kit the prototype only had one brake pull-rod not the more common twin rods.

It is not too difficult to modify the components provided to provide a reasonable representation of the



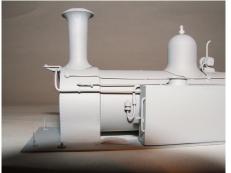
prototype.

(Figure 10b)

11. As suggested it really is desirable to be able to refer to appropriate photographs of your desired prototype. The kit now includes all of the detail items, headlights, back up light, sandbox levers etc to complete your model. I did fabricate one small item (I am afraid I don't know what it is called), and also used a couple of castings from my own stock to provide the connection back to the steam chest. Not all locos require these parts, it will dependent on the date and the specific prototype being modelled.

12. 1803 is controlled by a Soundtraxx Tsunami Light Steam Decoder. This particular decoder was chosen as it includes a whistle which sounds about right to me. It is possible to program CV115 to select any one of eight whistles. I chose #3, a 'Heisler'. MV lenses, modified by drilling a small hole in the reflector back to simulate

the globe on the prototype, were used for both the headlight and the back-up light. The front headlight is illuminated by 3mm 'prototype white' LED. The back-up light is much smaller, it is possible to squeeze-in a 3mm LED, but it would be preferable too use one of the newer 'prototype white' 1.0mm x 0.8mm surface mount LED's. The associated resistor and wiring is camouflaged by the coal in the rear bunker. Two small 2mm LED's, 1 yellow and 1 red were mounted in the firebox to provide 'firebox flicker'. One of the excellent Tsunami features is the ability to synchronise the flickering yellow and red LED's to simulate flames in conjunction with the sound of coal being shovelled into



the firebox by the fireman.

(Figure 11)

13. All wiring which included rail pick up, motor connections, speaker and lighting, was run through the boiler and out the front of the smokebox. Connections were made to the decoder outside the model using multi-pin connectors cut from 32 way socket strips (Jaycar #PI 6470). The decoder is placed in the boiler first with all the wiring behind it. The smokebox door can then be pushed in place. You will find that it is necessary to keep excess wire length to a minimum as there really isn't much space.

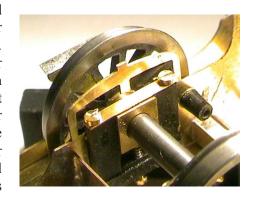
14. Painting and Weathering is subject to a fair amount of personal choice and is too large a subject to be covered in much detail in this article. On this model I used grey self-etch primer, followed by Engine Black then Weathered and Grimy Black from Floquil. Real coal was shovelled into the bunker and under the bunker door

in the cab. Most of the weathering on this 'old' loco was carried using Rustall.

15. I enjoyed building this kit. It is good example of a kit designed around a combination of materials including etched metal, cast resin, pewter and brass. The boiler and side tank resin castings are very good and certainly make the construction task easier than if all the components had been produced from brass. The designer and manufacturer are to be congratulated on the way constructive criticism has been accepted, with improvements and additional components incorporated into later versions of the kit all without increasing the cost.

[Prototype photographs used with the permission of Peter Berg, other photographs by the author]







Other Sources for Components and Information

Berg's Hobbies Pty. Ltd. Tel. 02 9635 8618 www.bergshobbies.com

Email: bergshobbies@pnc.com.au

Source of the Z18 kit and 3-link couplings

Model Railroad Craftsman

Tel. 02 9831 8217 http://mrrc.com.au

Email: sales@mrrc.com.au

Soundtraxx Decoders and speakers

MV lenses

DCC Concepts Tel. 08 9455 6419

Email: sales@DDCconcepts.com

Source of special LED's.

Jaycar

Tel. 1800 022 888 www.jaycar.com.au

LED's, resistors and I. C. socket strips.

Keiran Ryan Models

Tel. 02 4677 2462 www.ardp.net

Email: krmodels@ozzienet.net

Australian Railway Detail Photos Volume 3

(Detailed sets of photographs for 1803 & 1804 as stored).

Soundtraxx Tsunami Steam Users Guide http://www.soundtraxx.com/documents/manuals/ tsunamisteam users guide.pdf Tsunami Steam Users Guide

A.R.H.S. Resource Centre Tel. 02 9699 4595 www.arhsnsw.com.au Email: mail@arhsnsw.com.au

The source for photographs of operational locomotives.

Aus7 Modellers Group www.aus7modellersgroup.com The place to go for 7mm modelling in Australia.

http://groups.yahoo.com/group/7mmAusmodelling/ The internet group dedicated to discussion and distribution of information on 7mm modelling in Australia.



The Waratah Model Railway Company

First In Quality - Second To None

The Waratah Mk IV Scale Working Coupler



Features:

- Solid, lost wax brass castings
- True scale dimensions for an authentic, prototypical appearance
- True prototypical operation
- All parts required for assembly supplied with kit
- No need to modify wagon kits to install couplers
- \$17.50 per pair

Waratah Model Railway Company, PO Box 509, Revesby, NSW, 2212 Ph: (02) 9785 1166 email: david grizzler59@msn.com or charris@nigelbowen.com.au

O-Aust Kits & Century Models

www.oaustkits.com.au

What's New?

The arrival of the first production batch of the NSWGR BCH coal hopper is imminent

The kit will be supplied with North West Short Line wheelsets as standard

Alternatively and by prior arrangement it can be supplied with Slaters wheelsets (some minor adaptation of the bogies will be necessary)



A new production run of the NSWGR ACM Branchline Sleeper kit is currently underway and it should be available shortly

We already have a number of backorders to fill but there are still a few left for those who are quick enough





A pre production sample of the NSWGR SRC 4 wheel refrigerated wagon was on display at Hurstville. For those who missed it here it is



KITS AVAILABLE		KITS BEING DEVELOPED			
Century Models	O-Aust Kits 7mm	O-Aust Kits 1:48	Century Models	O-Aust Kits 7mm	O-Aust Kits 1:48
NSWGR Z19 NSWGR D50 (to order)	NSWGR S wagon NSWGR CW NSWGR UME NSWGR BHG NSWGR BCW NSWGR MRC	QR QLX	NSWGR C30T NSWGR C32	NSWGR MLV SHELL 3000 tank SHELL 5000 tank NSWGR LLV NSWGR CR	QR K wagon QR BBV van

O-Aust Kits & Century Models

PO Box 486Ashgrove Qld 4060 Phone (07) 3366 5307 (7.00pm to 9.30pm ONLY) Fax (07) 3366 4378 (24 hours) Mobile 0419 680 584

Email pa_rl_krause@bigpond.com

www.oaustkits.com.au

Stringybark Creek at Hurtsville

Trevor Hodges



Things can get quite busy in the yard at times. 5163 shunts the goods line while double headed 19's sit in the loop.

If you were to ask any railway modeller to nominate their favourite layouts it probably wouldn't take too long for them to come up with a list. If, on the other hand, you were to ask them to nominate those layouts they felt were "important", how would this alter the choices? Furthermore what qualifies a layout as important in the development of the hobby? There are a myriad of elements layouts can be judged on and the combination of these and the success or otherwise of their execution give the viewer an impression about whether a layout "works" for them. The scenery, presentation, era modelled or perhaps some new technological marvel may set a particular layout apart, however it takes a special combination of factors - timing, ambition and design are some of these - to push a layout beyond simply being good and mark it as something really special.

At this point in its development I have no doubt that Stringybark Creek is something special; in terms of size, construction methods and the sheer audacity of its design this layout stands out as a very bold endeavour. One thing the group is pretty sure of is that nothing quite like Stringybark Creek has ever been tried in Australia before. The layout has become such an important part of its builders hobby lives that it is easy to forget it has only existed for a little under two full years. Layout projects often have a way of invading our lives to a greater degree than we'd intended; their building joins that set of events, like the birth of children and the assassination of presidents, that we come to use as punctuation points in our lives. It goes without saying that making a commitment to such a large project has an impact on family life for those

involved and every one of the SBCk crew appreciates the support of their families. None of us should ever forget that an hour spent on hobby activities can often mean an hour away from partners and children.

The layout is not yet ready to be judged in terms of its importance to the hobby but that doesn't mean it hasn't had an impact. In spite of being in a very incomplete state, Stringybark Creek has won several awards and mesmerized crowds at the 2005 and 2006 AMRA Hurstville exhibitions.



5163 rounds the curve, past the loco servicing facilities south of Stringybark Creek yard.



A close up of 5163 at the head a short wheat train.

From the start the builders decided to use exhibition deadlines as a way to spur construction and give a diverse group of modellers a focus for their efforts. Due to its size and volume the layout is unlikely to be "complete", in any traditional sense of the word, for several more years. Holding the layout back from the exhibition circuit for several years to enable it to be revealed in a completed state was not considered viable and as such the decision was taken early on to exhibit the layout as soon as trains were running. It must be admitted however that the relative inexperience of the builders combined with some wildly optimistic estimates about what could be achieved in 12 months also played a role in the decision to display Stringybark Creek as early as nine months after construction started.

The construction methods used in the layout, while not totally new, are quite cutting edge when considered in the context of the sheer size of this project. The use of aluminium tube and plastic connectors has been advocated by a couple of different modellers but, as far as we know, no one has attempted to build a complete layout of this magnitude using this system. The aim from the start was to use ultra lightweight materials - square aluminium tube and blue extruded foam - for the entire sub structure of both the module frames and scenery. Except for some 3mm mdf on the fascias backdrops there is virtually no wood used in the frame construction and the stated intention is to use little or no plaster in the scenery. These lightweight materials have their own strengths and weaknesses and the group have learnt some valuable lessons about how to get the best out of them along the way however few would question the success of the philosophy of deliberately setting out to make the layout sections as light as possible.

The group of modellers who make up the SBCk crew are a diverse mix of men from a wide variety of professions and backgrounds. Before the start of the project they were largely strangers to each and this, combined with the wide geographic spread of those involved, has presented its own set of challenges and problems. One early problem was communication among the members and this has been partially overcome by the group having its own Yahoo! internet group, where members can keep in touch and let others know what they're up to. Another challenge has been simply getting the group together to set the layout up for testing purposes, an activity know within the group as "bolt up days". These days take a bit of planning and the size of the layout can present transport and access problems when the group is attempting to get together. Transporting the end modules in particular has been a large logistical and financial burden and the owners of these modules are hoping to have trailers built in the near future.

All the photos that accompany this article were taken by the author at the 2006 AMRA Hurstville exhibition. The primary focus of the intervening twelve months between the 2005 and 2006 exhibitions had been on trackwork, electrics and trying to ensure that no blue foam was showing. In these aims the group was largely successful because only those involved know just how thin the thread holding together the elements that kept the trains running was stretched the previous year. For instance it probably



5163 prepares to depart the station after safe-working procedures have been completed.



The passenger platform is always a great place to take the odd photograph



Passenger trains, no matter how short, always get priority over goods

isn't widely known that, due to problems with the track, trains could only run in one direction at the 2005 exhibition and the radio controlled DCC system caused the group some major headaches. There was more scenery on show this year and some of the buildings were in place but a great deal more development needs to take place. Hopefully next year I will be able to take photos of the scenic marvels this layout holds in prospect.

The future of this layout is bright as long as the commitment and drive of the group building it remains high. Two main goals for next 12 months are the construction of the branchline modules and the building and installation of working semaphore signals. The group also hopes to have the backdrop painted and for a lot more trees to be made and installed. The layout is most definitely set on

the North coast of NSW, not the Central West as some observers seem to think and trees have been identified as a primary focus for the group if the layout is ever going to get away from a rather arid look. A 52' long layout can swallow up a lot of trees! If you're in Sydney during the Oct long weekend next year try to get to the Hurstville exhibition to see the layout, you won't be able to miss it.



It's almost time to depart on this south bound passenger train.



A 50 class locomotive pulls a string of CCH coal hoppers through the yard.





1938 eases out of Stringybark Creek yard with a short mixed goods

Victorian Railways GY Open Wagon (1/48th)

Keith Trueman

Prototype notes:

Introduced from 1939, the Victorian Railways GY four wheel open wagon had become numerically the largest group of general purpose goods vehicles in its fleet. At the end of the 1970's, there were still approximately 6,100 in service after many withdrawals. Apart from general freight commodities, the GY was used in great numbers for block grain traffic after having leak proof seals fitted to their doors and were painted red. Yellow diagonal stripes were applied at one end of the sides and on the ends. Later, vellow liveried wagons carried a red diagonal stripe. Tarpaulins were the means to keep the grain dry, supported by raised hinged brackets placed at each end of the body. Even after unloading, and whilst still in grain traffic use, the wagon was kept clean and dry by retaining its canvas covering.

The model:

Veteran Models, manufacturers of 1/48 scale Victorian Railways models, have provided a very nice kit of the numerically strong GY outside sill version. The 1/48 scale is apparently the adopted scale for modellers of 0 gauge Victorian Railways (VR) prototype.

This is not a review of the kit as such but rather is intended as a "show and tell" of my first foray into railway modelling in scale. I usually model the VR in H0 scale, you see. The Veteran Models GY kit, as I found, provides a good initiation for any newcomer to this larger scale due to its simplicity of design. The main kit parts are white metal castings, and are very clean with

little or no flash. Brass etchings cater for other details such as steps, and brake lever bracket. Slaters wheels are also provided in the kit, as are decals.

Kit assembly was straight forward, the only skill requirements above basic kit assembly is to have some soldering skills if that is your preferred bonding method. Before any assembly was undertaken, I decided to make some minor adjustments to the kit commencing with the removal of the already moulded in place tie rings and brackets. This was so I could fit separate tie rings that would be seen in the raised attitude when securing ropes are in use. If you are running the wagon as empty, or with no tarpaulin, then one could leave these in place. The only other replacement part to be knocked up was a new handbrake lever, cut from brass sheet rather than using the cast one supplied.

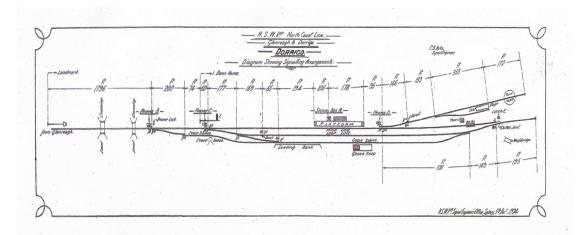
For the actual assembly process, I utilised a combination of soldering for the body sides, and ends, including some under floor details. Brass etched detail parts were bonded with either Superglue, or Bostik Contacta Cement. To finish off the model, I opted for a spray mix of Gunze red brown, with a dash of Tamiya X7

red added for the VR wagon red. The wagon's tarpaulin was made from masking tape. This method I adopted after reading an article in Model Railway Journal some time ago by Martyn Welch. Here, the masking tape was cut into strips relevant to the seams that make up a GY tarpaulin. They were assembled as a whole onto a glass sheet before peeling off in one piece, then very carefully applied over the tarp support. It took two attempts to get it in place because of the tendency for the strips to unglue themselves and fall apart. The tarp supports were furnished from 1mm piano wire, shaped to conform not only to the end support brackets, but also to mimic the sagging across the middle, all as one piece. The tarpaulin colour was achieved by applying several shades of Humbrol green; then grey and yellowish browns were dry brushed across the surface to give that worn look. Finally, cotton was used for the tie ropes and secured into place with dabs of Superglue. The kit came supplied with Kadee knuckle couplers, and after fitting them, the wagon was ready for traffic. All that I need now is to lay some track!



Track Planning - 'Nymboida'

Trevor Hodges



On the surface, model railway track planning looks like a relatively straightforward exercise dimensional geometry: take a few pieces of track, move them about within a defined space and eventually you end up with an acceptable track plan, right? If only it were so simple! Two factors this limited vision of track planning ignores are the topography surrounding the track and the human element. The actual planning for a layout is relatively simple compared with trying to accommodate the competing human demands placed on the final arrangement, especially if you're working on a layout with a group of people such as in a model railway club.

Up until fairly recently I've been on the fringes of a group of talented modellers known loosely as the "Barkers". In spite of what you might be told by those who know them, this is not a nickname derived from "barking mad", but rather from the layout they are building, Stringybark Creek. This enormous layout has been shown to the public twice and, as if it isn't big enough already, the group have

decided to expand it by installing a branch-line. In a moment of weakness I volunteered to become involved in the design and construction of this part of the layout. While the following plans are my own designs utilizing suggestions made by other members of the group they do not represent any sort of finalized plan. At this stage nothing has been settled upon so what the final arrangement of the track will look like is anyone's guess. In spite of this I think there are some interesting lessons to be gleaned from this design process, even at this early stage of development.

The Givens

The *givens* of any layout plan, according to John Armstrong, are those things in the environment and context within which you are building that you can't really change: from the size of your shed and the location of a waste pipe to the prototype you are modelling. The *givens* of this layout might at first glance seem to be quite generous: 32' X 2'8" (10.8m X 800mm) of layout real estate just waiting to have track laid on it. The

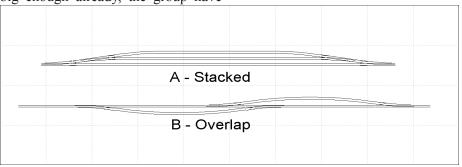
branch line is broken into six segments, all of equal size, approximately 6' X 2'8" (1.8m X 800mm). At this early planning stage we don't even have a name for the branch so we tentatively named it after a NSW north coast river, the Nymboida, which is located in the general region where the

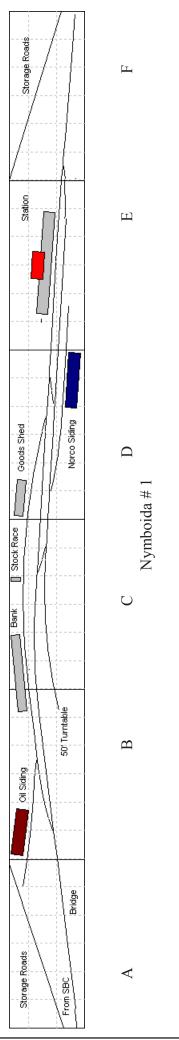
layout is set. This may change but it's surprising how names seem to stick once they start being used.

At the point we had reached in the planning process at the time of writing there was only one scenic element that was a must have: this was a bridge, of wooden construction, that was to be built on the far left hand module. labeled A in the plans. The exact size and design of this bridge is yet to be finalised. One other design constraint is that modules A and F are bisected by two backdrops which hide the point ladders leading to the storage sidings for the rest of the layout. This doesn't reduce the length of the available space on the branch line, however it does mean that at the extreme ends of these modules the space available front to back is reduced to about 6" (150mm).

The Druthers

The *druthers* of a layout design process are the things you'd rather (i.e. I'druther) have and John Armstrong always recommended that you should place these in priority order because, no matter how much room you have, you're never going to fit them all in. If the prototype, bridge and the general geographic location were givens, just about everything was up for grabs and what goes into the final design will come as the result of some compromises.





While you're simply dreaming of a layout everything is possible and you can let your imagination run free. When you're confronted with the hard edged reality of finite available space, in combination with having to work in scale, you soon start to see the limits of what can be achieved. Probably the secret here is to realize very early on that you can't have it all and this probably won't be the last layout you build. Try not to pour 20 years of layout planning dreams into one layout, there's always the next one.

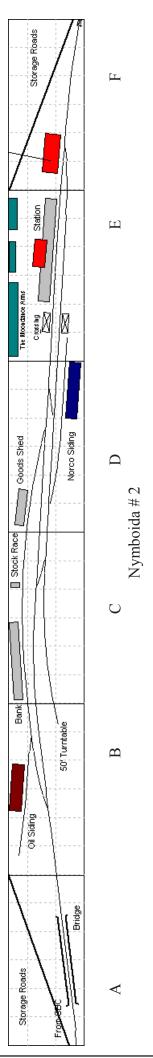
Some of the druthers the group had are listed below and it needs to be pointed out that these are the ones I thought worthy of inclusion: I live 500km from most of the other members of the group so I may have missed or ignored others. These aren't even in priority order:

- We want a subtle but recognizable distinction drawn between the main line station of Stringybark Creek and the yet to be built Nymboida. This would include touches such as a "mountain" location in the spirit of Dorrigo, a different style of bridge from the one on the other side of the layout in Stringybark Creek proper, a station building facing the viewer, straight track in front of the station (the line running Stringybark past Creek station is gently curved) and a simpler design to the yard in general.
 - We wanted a couple of industries that reflected the proposed mountain location. There would probably be only room for two industries, in addition to the yard, so a saw mill was pretty high on the priority list and a fuel oil siding was at the top of the list too. A butter factor was already slated for Stringybark Creek so in the finite space available it's more than likely the Norco butter siding shown on the plans will have to make way for a mill siding.

- A 50' turntable is thought by some members to be a good candidate for the givens list. However at this stage the argument that there's already a 60' turntable, also yet to be built, in the yard at Stringybark Creek seems to suggest to other members that the layout is likely to be overpopulated with turntables if we place another at Nymboida. The problem is that the prototype probably would have placed one in a yard like Nymboida and this is supposed to be a layout based on prototype practice. The argument against one seems to be based on aesthetics and the fact that its presence takes up valuable real estate which could be used for another industry or simply to allow some space between the bridge and the vard. This is not going to be an easy decision to make.
- We want a classic, north coast country pub in the township at Nymboida.
- I think all the builders (there are three of us in this instance) and the rest of the Barkers want this section of the layout to suggest a bucolic simplicity that isn't quite so apparent on the Stringybark Creek section of the layout. Things on the branch will be a little less crowded, a little more spread out and run at a slower pace.

The Design Process

I enjoy fiddling about with track plans and this project gave me a perfect opportunity to fire up my track planning software. Before I started designing anything I did a little research and took a look at the layouts of prototype yards in the approximate area to be modelled. The closest branch line terminus station to Nymboida's notional location is that at Dorrigo (diagram 1). The only other true branch line on the north coast is the line to Murwillumbah, so I found a diagram of its yard and compared it



to Dorrigo. To broaden the sample I went looking for some other branch line termini in the western part of NSW, where branch lines abound, and carried out some comparisons with through stations at several north coast locations.

I discovered that two basic yard designs seem to predominate and I've labeled these as the Stacked and the Overlap which I've illustrated in diagram 2. Most yards seem to be based on one of these designs although Merriwa is one example I found that utilizes both types. The Stacked design is the classic, three line yard consisting of main, loop and goods line and examples of this can be found at Dorrigo and Macksville. The Overlap is a design that has the same three elements, however these features are stretched out and overlapped and I found examples of this at Murmillumbah and Kyogle. For all intents and purposes the two designs operate exactly the same, with trains arriving on the main, the loop being used to run around and the goods line used to park wagons at various lineside facilities. Any other industries that qualify for their own siding have lines radiating to them from various locations around the yard.

I liked the design of Kyogle yard, as it seemed to have the basic elements that we were looking for, however it was oriented in the wrong direction. I started my design for the track layout at Nymboida by flipping the diagram I had of Kyogle's yard in a paint programme and printed out the resulting plan. Using this as a starting point I transferred the dimensions of the available space to the track planning software I use and got stuck into developing a track plan.

Nymboida #1

This plan is my first go at a track plan for the branch line terminus. It includes a 50' turntable, fuel oil and butter factory sidings, along with a loading bank, stock race and goods shed on the goods line. As the first attempt

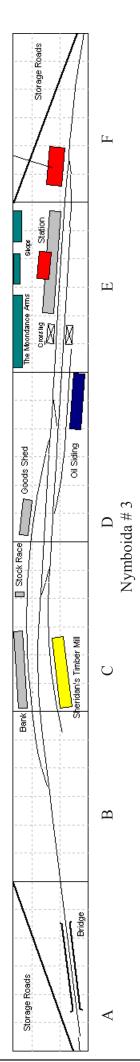
to impose some scale discipline on the competing elements the Barkers wanted on the final plan, this plan showed me that getting it all in was going to be a challenge. I discovered after I'd finished this design that I'd overestimated the amount of space available on modules A and F. This was adjusted in plans 2-4.

Nymboida #2 & #3

After the first plan was examined by the Barkers several changes were made to accommodate some druthers they'd mentioned and I added a bit of detail regarding where some things might go which hadn't appeared in the first plan. These two plans are essentially developments of #1, one with a turntable and one without. The logical place for the turntable is on module F in the far right hand corner, however there simply isn't the room for a turntable on this module because of the constraints imposed by the backdrop. Because of this the only other space for it is module B and this is reflected in both plans #1 and #2.

In plan #2 I've shifted the oil siding off module A and I've also pushed the point to the goods siding further to the right to provide a little more clearance between the yard and the bridge. I would prefer that locos shunting the vard did not have to run onto the bridge as they made run around moves. On module F I've shifted the point to the loop further to the right and adjusted the location of the station along to the right. This change provides just enough room, with a little judicious pruning of the Norco siding, for a level crossing to the left of the station. The main effect of these changes is to allow the bridge to have the whole of module A to itself.

Plan #3 is a modification of plan #2 with the changes essentially restricted to module B. The oil siding has been removed and the point leading to the goods line has been shifted further to the right to give even more clearance between the bridge and the yard. The most dramatic change is that this plan has no turntable, this being replaced



with a timber mill. The butter factory has also been changed to an oil siding as this is an industry that we don't have in the yard at Stringybark Creek.

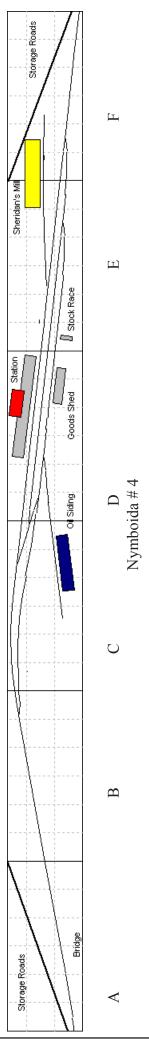
Nymboida #4

Plan #4 is essentially a compressed version of the track plan at Dorrigo, with an oil siding added and the timber mill replacing the turntable. I've deliberately emphasized the bend in the mainline, making the radius quite small. I don't want any part of the yard to sit parallel to the front of the layout. It would be a relatively simple matter to ease the radius on this curve a little if this was needed. In this plan the yard is more compressed so I've taken the opportunity to shift the point leading to the yard on Module B as far to the right as possible to further separate it from the bridge. The oil siding could be replaced with a turntable and the mill could be any type of industry one might desire, however there is little room for anything else as the yard is crammed onto modules C-F in a way that is not the case in plans 1-3.

One unresolved problem with this design is that the middle point behind the oil siding crosses a joint between modules. If this ladder of points is shifted to the right the yard becomes ridiculously foreshortened. Alternatively if it is shifted to the left the advantages of the stacked design, namely a shorter yard footprint overall, begin to be dissipated as it impinges on the space we want to preserve around the bridge.

The Final Plan?

As mentioned earlier the final arrangement of the track on the Nymboida modules is far from settled. By the time you read this the Barkers plan to have track laid and trains running so we'll keep you posted on progress. There is one thing that is certain; none of the plans accompanying this article will be what ends up on the layout. While the possible variations are almost limitless the time available isn't so the group have some hard decisions to make.



Commercial News

Trevor Hodges

Berg's Hobbies

Berg's Hobbies, 181 Church St Parramatta, NSW, 2150, (02) 9635 http://www.bergshobbies. 8618, com/ has passed on some details of the Milestone Miniatures 7mm scale. Malcolm Moore built TGR U Class. These kits come in two basic configurations; standard gauge and narrow gauge, the customer must specify. Both are supplied as one piece resin body moulding with some detail parts and wire and they ride on Black Beetles of the gauge specified. The standard gauge price is \$395 and narrow gauge price \$375. Peter Berg has been supplied with a very limited number of full sized cast plaster replicas of the builder's plates for the builder of these locomotives. Any customer who contacts the store, orders a kit and mentions 7th Heaven can have one of these plates for free.

The planned 24 class locomotive project has been started with initial pattern work being carried out. The decision has been taken to ensure that the requirements for modellers using DCC will be taken into consideration in the design of this kit. This should ease considerably the installation of decoders and speakers in the 24, which provided quite a challenge in the 18. John Parker, Aus7 member and well known DCC aficionado, is being consulted on these aspects of the design. Of course this will not mean that the model can't be built in

an ever reliable DC configuration

Bergs wanted me to mention that they stock a range of wire of assorted types, brass, nickel silver, copper and phosphor bronze in a wide variety of dimensions. They also carry a large range of North Yard brass strip.

O-Aust and Century Models

Peter Krause of *O-Aust Kits/Century Models* can be contacted at pa_rl_krause@bigpond.com, and via the web site at www.oaustkits.com. au 0419680584 anytime or on (07)

33665307 between 7 and 9 pm, has passed on some news about some of the projects he has on the go at the moment. At the most recent BDO he had pilot samples of three of his new NSWR outline kits; an SRC, a 3,000 gal SCA tank wagon and an LLV/GLV louvered van.

BCH should be available for sale as you read this. The 5,000 gal tanker will be finalised and released after the successful release of the 3,000 gal tanker. Peter understandably wants to avoid flooding the market with too many kits at once.

The LLV bogie wagon pilot was on show at the November BDO and this is going to be one large van. These wagons were supplied in batches with the first 300 coming from the UK in 1951-53. The next batch of 75 were built in Australia by Tullochs in 1958-59 and a final batch of 200



The SRC has reached the stage of test shots and there have been a few difficulties with the application of the roof. The sides will be supplied as separate castings to be assembled by the modeller and, at this stage, the roof is going to be supplied as a set of formers over which a skin of styrene will be applied by the modeller. The

SCA tank wagon reached has complete stage with the only hold up being sets of etched details which are being supplied by Keiran Ryan Models. Appropriate Wiron assemblies for this kit are being assessed at the time writing. The of

GLV's were supplied from 1961-65. The 75 Tulloch built LLV's were later upgraded to GLV standards by having their floors strengthened to carry heavy tinplate. All three designations will be able to be built from the upcoming kit, although the kit is being patterned on the middle batch of 75 Tulloch built wagons. Pricing and release details are yet to be determined. The type of bogie this kit will be supplied with is currently being assessed but an appropriate bogie will be provided as standard with the kit.

On the Century Models front Peter mentioned that he probably should have castings from the upcoming Beyer Peacock built Class P(6) 4-6-0 (32 class) locomotive at the BDO in March 2007. These locomotives were one of the truly outstanding success stories of the NSWGR system, being



one of the most numerous classes (191 in class) and also one of the longest lived. They first went into service in February 1892 and, in this author's humble opinion, no other steam locomotive says NSWGR quite like the P(6).

Finally Peter mentioned that he is in the middle of a house move and that some of his contact details will have changed by the time you read this. The main change will be to his phone number and eventually his postal address. For the short term mail will be re-directed but he asked his customers to keep an eye on his web site for details, and of course the pages of 7th Heaven.

Prototype Model Engineering

Prototype Model Engineering (PME), PO Box 644 St Ives, NSW 2075, Ron Sebbens on (02) 9449 6605 had a partially built pilot model of the (Z)12 4-4-0 steam locomotive on display at the November BDO. The locomotive will be all etched brass construction with some cast detail parts such as the dome and stack and will be supplied complete with wheels, motor and gearbox. PME hope to have the kit for the (Z)12 available for sale in the second half of 2007. If you're wondering why the dome and chimney are very shiny in the accompanying photos because this is a requirement of the manufacturing process.

Gwydir Valley Models

Warren Herbert of Gwydir Valley

Models, PO Box 740, Glenn Innes, NSW. 2370 or on (02) 6732 5711 info@gwydirvalleymodels.com wanted me to pass on the news that he now stocks a full range of DCC equipment, including Easy DCC components. Gwydir Valley Models is now an agent for the range of TCS decoders but he can also supply Soundtraxx, Lenz and NCE equipment. He is also selling the range of Tony's Train Exchange bits and pieces such as The Hare (which is teamed with Tortise switch machines) and Rramp Meter which is used to boost the voltage on programming tracks. Evidently some of the newer DCC decoders such as those from QSI need a little more juice to allow the modeller to programme them, the Rramp Meter delivers this extra current.

GVM is also carrying a range of Golden White LED's which are excellent for marker lights and the like. Warren drew my attention to the 0.8mm sized ones which have 15cm long leads and are evidently being used by some modellers to fit into the marker lamps of a certain new plastic HO r-t-r NSWGR loco just released onto the market. If they fit into HO models they should have a wide range of applications in O.

Warren mentioned in passing that he was negotiating to become an agent for the Canadian company Fast Tracks and its excellent range of track building products. With the lack of readily available points suitable for use on Australian outline layouts, the tools and jigs produced by this company ease the construction of points considerably. Their products are of excellent quality and both Warren and I know this because we both own some of their equipment. More details on this as they come to hand.

Waratah Models

Waratah Model Railway Company, PO Box 509, Revesby, NSW, 2212 (02) 97851166 charris@nigelbowen. com.au and davemorris59@yahoo. com have passed on the information that they have received stocks of the Mk IV coupler. The proprietors of Waratah have decided, as they are paying for the ongoing development costs of the coupler, that it will now be known as the Waratah Mk IV coupler. The version number is an acknowledgment of the connection between this coupler and the older Gago coupler. Pairs of couplers will retail for \$17.50 and Waratah is offering a four pack discount for \$65 and a better price can be negotiated for a ten pack if there is interest in this option.

At the time of writing Waratah was taking delivery of their most recent kit, the NSWR S wagon. The first batches were being used to fill pre-orders but by the time you read this there should be stocks available for retail sale. The kit comprises a cast polyurethane body, wheels and details to complete the model, although it does not include a pair of Waratah couplers. There will be a four pack discount available to purchasers similar to that offered on

the RU. The kits will sell for \$120 each and \$450 for 4.

