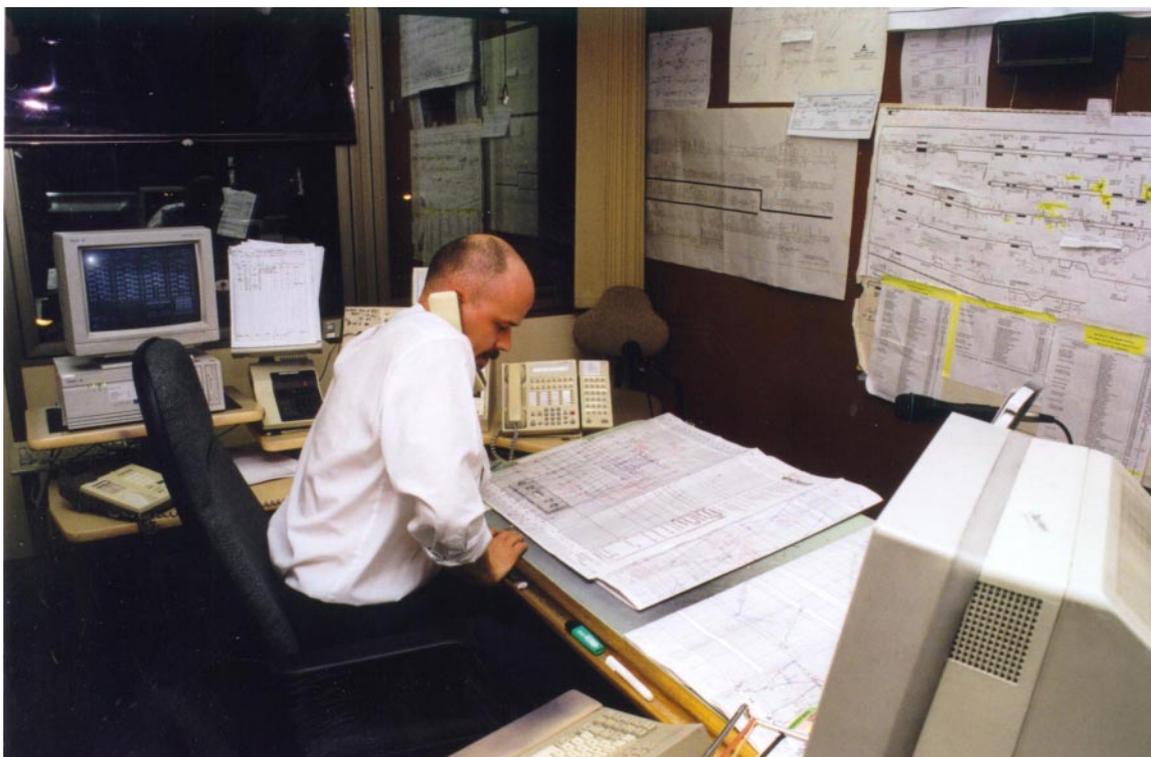


SOMERSAULT

JULY 1999
Vol 22, No 4

SIGNALLING RECORD SOCIETY OF VICTORIA INC



The traditional Train Controller, controlling trains with nothing more than a pen, train graph, and telephone. On the sloping bench in front of the controller is the train graph. The train controller has a separate graph for each line being controlled; on this night there were two graphs, one for the Northern line, and the second for the Eastern line. Preprinted on each graph are lines representing each scheduled train, and the controller marks on the graph the actual running of each train. Notes are added about any unusual occurrence that may occur. Behind the controller can be seen the telephones and radio used to communicate with trains and stations. The computer in the background controls the radio base stations used to communicate with the trains. By using this computer, the controller can switch transmission between base stations and adjust the transmitting power. The computer at the right, in the foreground, is used to enter 'Items of Information'; short descriptions about events that occur during a shift. On the wall are pinned useful information, including heavily amended track charts of the lines controlled. Unseen higher up the wall is the essential electric clock.

SOCIETY CONTACT INFORMATION

Published by the Signalling Record Society Victoria Inc (A0024029F)

EDITOR: Andrew Waugh, c/o CSIRO, 723 Swanston St, Carlton, 3053.

Phone (03) 9457 3795 (AH), (03) 9282 2615 (BH) Fax (03) 9282 2600

PRESIDENT: David Langley, P.O. Box 8, Avenel, 3664,

Phone (03) 5796 2337 (AH), (03) 5792 3288 (BH)

SECRETARY and MEMBERSHIP OFFICER: Glenn Cumming,

19 Peace St, Glen Iris, 3146. Phone (03) 9885 8546 (AH), (03) 9623 2289 (BH),

NSW *PRESIDENT:* Don Allitt,

8 Whites Ridge Road, Annangrove, NSW, 2156. Phone (02) 9679 1741

NSW *GROUP SECRETARY:* Bob Taaffe,

12 Western Crescent, Westleigh, 2120, Phone: (02) 9481 9994.

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MINUTES OF MEETING HELD FRIDAY MAY 21, & FRIDAY MAY 28, 1999

At Centrol (Transport House)

Present: - J.Black, G.Candy, B.Cleak, C.Gordon, G.Cumming, G.Davis, W.Johnston, D.Langley, B.McCurry, I.Michaelson, G.O'Flynn, G.Reynolds, L.Savage, P.Silva, R.Smith, A.Waugh, R.Weiss & R.Whitehead.

Apologies: - W.Brook, J.Churchward, A.Cohn, R.Cropley, W.Doubleday, A.Hinde, J.McLean & B.Sherry.

Visitors: - S.Cleak & B.McLaren.

The President, Mr. David Langley, welcomed everybody to the forecourt of Transport House @ 1930 hours.

General Business: - The May 1999 Meeting was held on two nights & consisted entirely of an inspection of the Centrol Train Control facility on Level 3 at Transport House. No other business was transacted at the meeting.

The meeting commenced at 1930 hours and finished at approximately 2130 hours.

Meeting closed @ approximately 2130 hours.

The next meeting will be on Friday 16 July, 1999 at the Surrey Hills Neighbourhood Centre, Bedford Avenue, Surrey Hill, commencing at 2000 hours (8.00pm).

SIGNALLING ALTERATIONS

The following alterations were published in WN 16/99 to WN 25/99. The alterations have been edited to conserve space. Dates in parenthesis are the dates of the Weekly Notice.

- 15.04.1999 **Upfield** (TS 570/99, WN 16/99)
On Thursday, 15.4, a baulk was provided in No 1 Track 20 metres from the end of the track. No 1 Track is now 165 metres in length.
- 16.04.1999 **California Gully** (SW 1066/99, WN 17/99)
On Friday, 16.4, the existing level crossing control circuits for Nelson Street were replaced by level crossing predictors. HXP Indicator Boards were provided to mark the extremities of the approaches.
- 19.04.1999 **Echuca** (SW 1063/99, WN 16/99)
Commencing Monday, 19.4., and on Mondays - Thursdays thereafter, the Driver of Light Engine 0084 will be in charge of signalling at Echuca.
Prior to ceasing duty, the Signaller must ensure that Homes 6 (E) and 8 (U) are at Proceed, that the points leading from the Rice Growers Siding are secured by the hand locking bar to prevent vehicles running away to No 3 Track, and that the point leading from No 3 Track are secured normal by the hand locking bar to prevent vehicles running away to the Main line. The Train Controller must be informed that this has been carried out and the TRB endorsed.
On arrival in No 1 Track, the Driver must operate the WSa points at the Up end of the station to turn the locomotive onto the Bendigo line and then set the road for the locomotive to stable in 4 Loop track. The signals are track circuited and will revert to stop upon passage of the train. Should either Homes 6 or 8 be at Stop on arrival, the Driver must check with the Train Controller that the station is unattended. If so, the Driver must check the points, and if set correctly, pass the signals at Stop.

- 22.04.1999 **Elaine** (SW 1077/99, WN 19/99)
On Thursday, 22.4., a Healthy State Indicator was fitted to the Up side mast at the Midland Highway crossing.
- 23.04.1999 **California Gully** (SW 1066/99, WN 17/99)
On Friday, 23.4., the Annett locks on the Main line points were replaced by Large Type Master Key locks. The Duplex Locks (Miniature Master/Annett Key Exchange Apparatus) were removed. A notice board lettered "Shunting Trains Maximum Speed 20 km/h to Crossing" was provided facing Down trains at the Down end points.
- 25.04.1999 **Burnley** (SW 1064/99, WN 17/99)
On Sunday, 25.4, the interlocking was altered to prevent Up movements from the Centre line past Up Home BLY343 to No 3 Track. The 'Limit of Shunt' board at the Up end of No 3 Track and the adjacent fixed train stop were removed. Diagram 11/99 replaced 27/98.
- (26.04.1999) **Westall** (SW 1057/99, WN 16/99)
The provision of positive point detection (SW 1053/99) was not carried out on Sunday 11.04.99. SW 21/98 continues to be in force.
- 01.05.1999 **Line Ownership and Safeworking Responsibilities** (SW 1070/99 & 1071/99, WN 18/99)
Commencing 0001 hours, Saturday, 1.5., the Australian Rail Track Corporation became responsible for safeworking on the Melbourne - Albury and Melbourne - Wolsley lines.
The Train Transit Manager, ARTC, now holds the Superintendent's Security Code for the Section Authority System between Newport and Pyrenees Loop. If a mishap occurs between North Geelong C and Gheringhap, the Train Transit Manager must confer with the Manager Rail Safety to determine the appropriate action to take. The Manager Rail Safety will continue to be responsible for the issue of V5PSW keys, the issue or cancellation of Master Keys and Annett Keys, the cancellation of Electric or Train Staffs, and the rephasing of Staff instruments.
Commencing 0001 hours, Saturday, 1.5., Freight Victoria assumed responsibilities for Intrastate train operations on the non Urban Broad and Standard Gauge network. There are no changes in method of operation.
- 01.05.1999 **Melton - Bacchus Marsh** (SW 1051/99 & SW 1067/99, WN 16/99 & WN 17/99)
After Train 8280 clears Rockbank on Saturday, 1.5, the line between Melton (Post 11) and Ballarat (Post 54) will be closed to allow renewal works at Melton Weir Bridge and the bridge at 60.310 km on the Down side of Bacchus Marsh. Posts 11, Melton, and Post 54, Ballarat will be fixed at Stop. Baulks fitted with red and white chevrons will be provided on the line at Post 11, Melton, and 50 metres on the Up side of Post 6, Bank Box Loop.
Melton signalbox will be permanently switched in during this work. The Rockbank panel will be temporarily relocated from Bacchus Marsh to Melton. The Bacchus Marsh Signallers are to be trained and examined in the frame at Melton, and the safeworking staff at Melton are to be trained and examined in the Rockbank panel. The Train Description Bells between Sunshine and Melton will not operate while the line is closed, and Signallers are to use the Telstra phone to transmit train departure messages.
A work train will operate weekly between Ballarat and Bank Box Loop to maintain the rails in a servicable condition. The Supervisor in Charge must pilot the train into the Ballarat - Bungaree Loop section after the Signaller, Ballarat, has issued a Train Authority for the Driver to pass Home 54 at Stop. A Signaller must be on duty at Bacchus Marsh when the work train operates to Bank Box Loop
- 02.05.1999 **St Albans - Bendigo** (SW 1069/99, WN 18/99)
Commencing Sunday, 2.5, the signalboxes will be switched in as follows:
Sydenham
Monday - Friday 0545 hours to clearance of 8047
Saturday - Sunday Switched out
Diggers Rest
Monday - Friday 0610 hours to clearance of 8016
Saturday - Sunday Switched out
Sunbury
Monday - Friday 0525 hours to clearance of 8053
Saturday 0745 hours to clearance of 8021
Sunday 1120 hours to clearance of 8040
Clarkefield
Monday - Friday 0600 hours to clearance of 8024
Saturday - Sunday Switched out
Gisborne
Monday - Friday 0510 hours to clearance of 8017 & 1550 hours to clearance of 8049
Saturday - Sunday Switched out

Woodend

Monday - Friday 0510 hours to clearance of 8026 & 1730 hours to clearance of 8049
 Saturday 0955 hours to clearance of 8015
 Sunday Switched out

Kyneton (does not switch out, but will be attended:)

Monday - Friday 0415 hours to clearance of 9080 the following day
 Saturday 0600 hours to clearance of 8053
 Sunday 0710 hours to clearance of 9084

Castlemaine

Monday - Thursdays 0550 hours to clearance of 9084 the following day
 Friday 0550 hours to clearance of 8053
 Saturday - Sunday Switched out

Bendigo (does not switch out, but will be attended:)

Monday - Friday Continuously
 Saturday 0001 hours to arrival of 9080 & 0640 hours to 2340 hours
 Sunday 0640 hours to clearance of 9084

02.05.1999 **Broadmeadows - Seymour** (SW 1068/99, WN 18/99)

Commencing Sunday, 2.5, the signalboxes will be switched in as follows:

Somerton

Monday 0340 hours to clearance of 9548 & 0950 hours to 1200 hours
 Tuesday - Friday 0400 hours to clearance of 9548 & 0950 hours to 1200 hours
 Saturday - Sunday Switched out

Donnybrook

Monday - Friday 0650 hours to clearance of 8329
 Saturday - Sunday Switched out

Wallan

Monday - Friday 0550 hours to clearance of 8314
 Saturday 1615 hours to clearance of 8329
 Sunday Switched out

Kilmore East

Monday - Friday 0535 hours to clearance of 9520
 Saturday 0700 hours to clearance of 8314 & 1800 hours to clearance of 8329
 Sunday 1645 hours to clearance of 8336 or 9520

Broadford

Monday - Friday 0535 hours to clearance of 8314
 Saturday - Sunday Switched out

Seymour (Does not switch out, but will be attended:)

Monday - Friday Continuously
 Saturday 0001 hours to clearance of 9354 & 0215 to clearance of 8329
 Sunday 0730 hours to 2400 hours

Benalla (Does not switch out, but will be attended:)

Monday - Friday 0615 hours to clearance of 9357 the next day
 Saturday 0700 hours to clearance of 8305 & 1650 hours to clearance of 8321
 Sunday 0830 hours to clearance of 8305 & 1515 hours to clearance of 8321

16.05.1999 **Burnley Underground Loop** (SW 1080/99, WN 20/99)

On Sunday, 16.5, the speed proving Train Stop timing relays were adjusted and re-commissioned.

21.05.1999 **West Footscray** (SW 1083/99, WN 20/99)

On Friday, 21.5, trailing crossover in the Suburban line (Crossover 14) was spiked out of use. Lever 14 was sleeved.

22.05.1999 **Hastings** (SW 1078/99, WN 19/99)

On Thursday 22.5, the sidings were abolished and the station is not available for crossing trains. The main line points were spiked out of use with the Plunder locks secured in. Drivers must continue to operate the light signals protecting the level crossings.

23.05.1999 **Pakenham** (SW 1082/99, WN 21/99)

On Sunday, 23.5., Boom Barriers were provided at Racecourse Road (58.751 km) and Flashing Lights and Boom Barriers were provided at Ryan Road (60.534 km), both on the Down side of Pakenham. Both crossings are provided with Healthy State indicators. Homes 24, 26, 28, 30 and 32 are interlocked with the Boom Barriers at Racecourse Road. Down Automatic D1919 was converted to a controlled Automatic (lever 38) and is interlocked with the Boom Barriers at Ryan Road. Express/Stopping selection was provided for Down trains. It is necessary for Home 28 to be operated before selecting the class of train.

26.05.1999 **Maroona - Ararat - Pyrenees Loop** (SW 1086/99 & 1090/99, WN 21/99 & 22/99)

On Wednesday, 26.5., the signaller was withdrawn from Pyrenees Loop. The loop is now worked, once again, by the CTC panel at Centrol. Maroona will continue to be operated in accordance with Operating

Procedure 60A, Section 34, Book of Rules.

Ararat

The signalling arrangements at Ararat have not been altered, however the Annett key to unlock the points at each end of Ararat siding is now secured within a locked box at the Down end of the yard.

1. Arrival of trains from Maroona or Pyrenees Loop. The Driver of a train requiring to shunt Ararat or travel to Maryborough must bring the train to a stand at the Down end of the yard. After obtaining permission from the Train Controller, the Annett key may be obtained from the locked box and the points reversed to enter the siding (checking that the derail blocks have been removed). The Section Authority may be relinquished when the train has arrived complete within the siding and the points have been set and secured for the main line. If the train is to proceed to Maryborough, the Staff must be obtained from the Safeworking box, and the Derails must be locked on before the train departs. The Train Controller must make a note in the Workstation when the points are operated, and when they are again secured. The Controller must check that the Driver of a Maryborough train has the Staff before the train departs.

2. Arrival of trains from Maryborough. The train is to be brought to a stand at the STOP board at 273 km and permission obtained from the Train Controller on Channel 2 to enter Ararat siding. The Driver must check the position of the points and derails before passing over them. The Driver must place the Staff in the Safeworking box and replace the Derails. The Train Controller must check that this has been done.

3. Departure of trains to Maroona or Pyrenees Loop.

The Driver must first obtain a Section Authority for the Maroona - Pyrenees Loop section. After obtaining permission from the Train Controller, the Driver will obtain the Annett key and reverse the points to allow the train to depart. Once the train is clear of the points, they are to be restored for the main line and the Annett key returned to its box. The Driver will press the 'depart' button when the train departs complete.

Drivers will be responsible for information the Train Controller of the arrival and departure times, and the time spent in shunting at Ararat.

Ararat - Maryborough

All trains between Maryborough and Ararat will carry the Train Staff. Staff Tickets will not be used, nor will a Train Register be kept at Ararat. The Staff is normally kept at Maryborough, and the Regional Manager must arrange for the Staff to be transferred to Ararat if a train is running from Ararat.

27.05.1999 **South Geelong - Warrnambool** (SW 1095/99, WN 22/99)

From Thursday, 27.5., a second Miniature Master Key was provided for use at Waurm Ponds. The Master Key is engraved 'South Geelong - Warrnambool' and is numbered 12. Miniature Master Keys 12 and 13 will normally be kept at South Geelong.

29.05.1999 **Flinders Street** (SW 1073/99, WN 19/99)

Between the passage of the last train, Friday 28.5, and the first train, Saturday 29.5, the first stage of the commissioning of the Flinders Street B SSI will take place. During this stage, Up Home 585 and Down Home 586 (east end Platform 6), and Up Home 733 and Down Home 736 (east end Platform 7) will be replaced by underground style signals. Homes 585 and 586 will be relocated to the Down side of the track, and Up Home 733 will be mounted on a post suspended from the roof. Up Home 749 and co-acting signal 749P (Up Caulfield Through) will be renumbered 745. Points 486 (east end Platform 6) will be renumbered 634.

29.05.1999 **Ringwood** (SW 1091/99, WN 22/99)

On Saturday, 29.5., new Boom Barriers and Pedestrian Gates replaced the existing equipment at Bedford Road.

31.05.1999 **Flinders Street** (SW 1073/99, SW 1094/99, SW 1096/99, WN 19/99 & 22/99)

Between the passage of the first train, Monday 31.5, the second and final stage of the commissioning of the Flinders Street B SSI will take place. During this stage the following signals will be replaced by underground style signals: Down Home 746 and Up Home 755 (east end Platform 8), Up Home 943 (east end Platform 10), Up Home 945 and Down Home 950 (east end Platform 12), and Down Home 960 and Up Home 965 (east end Platform 13). Home signals 746 and 755 will be wall mounted. Home signal 950 will be ground mounted and located on the Down side of the line. Diagram 9/99 replaced 51/98.

31.05.1999 **Ringwood** (SW 1091/99, WN 22/99)

As from Monday, 31.5, the signalling on the Lilydale and Belgrave lines were altered. The alterations provide a closer spacing of Up signals approaching Ringwood on both lines, and the renewal of track circuits and signal heads. Diagram 13/99 replaced 7/99.

On the Down Lilydale line, Automatic H827 was renewed with a new LED post numbered RWD308 and controlled by lever 10.

On the Up Lilydale line, Up Home 58 was relocated 14 metres in the Down direction and renumbered RWD315. The existing co-acting post remained in its existing position but was also renumbered RWD315. Both posts had new LED heads. A new Up Automatic H822 with LED heads was provided 295 metres in the rear of RWD315. A new Up Automatic H834 with LED heads was provided 417 metres in the rear of H822. Up Automatic H858 at Ringwood East was altered to only display Normal Speed indications.

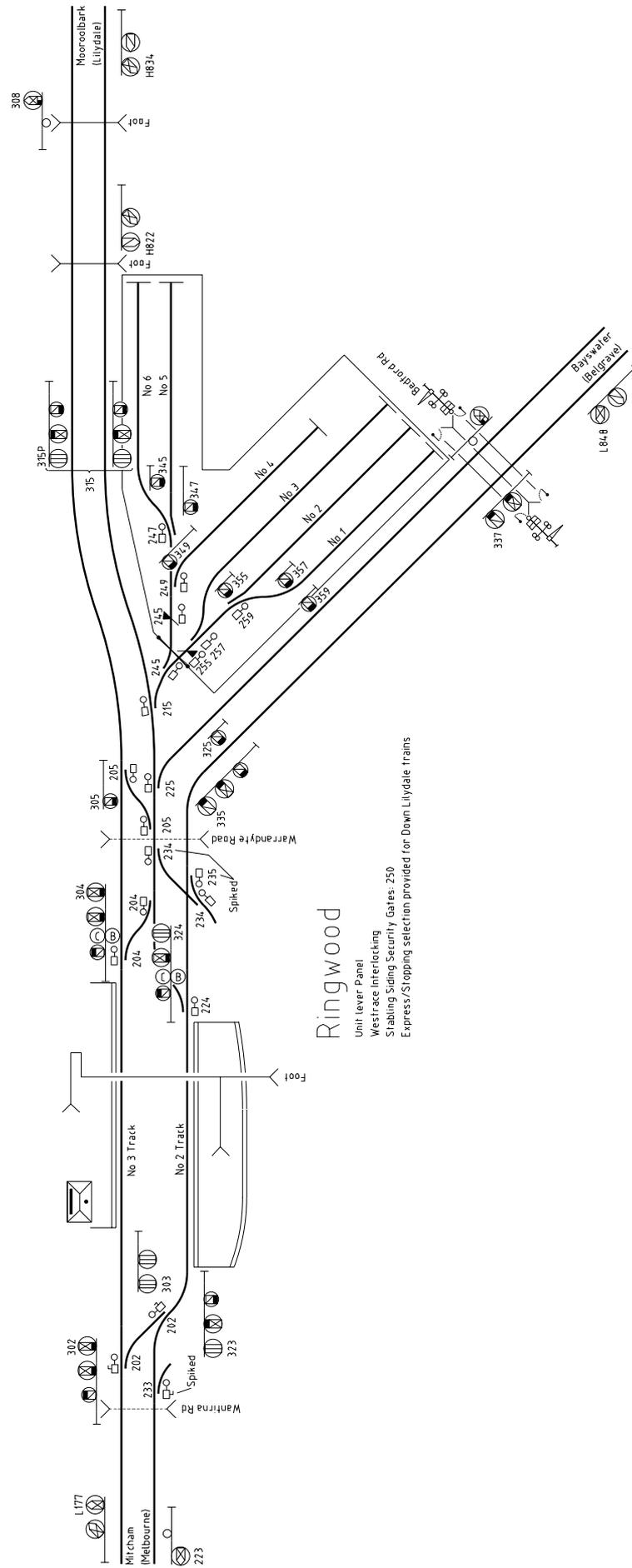
On the Down Belgrave line, Down Automatic L318 was renewed with a new LED post numbered

RWD328.

On the Up Lilydale line, Up Home 45 was replaced by a new post numbered RWD335 situated 240 metres from Platform 2. The co-acting signal was abolished. Up Automatic L828 was abolished. A new Up Home RWD337 was provided 628 metres in the rear of RWD335 (24 metres on the Down side of the site of L828). Up Home RWD337 is not controlled by a lever. A new Up Automatic L848 was provided 703 metres in the rear of RWD337. Up Automatic L870 was altered to only display Normal Speed Indications. All of the new posts are fitted with LED heads.

Track circuits 306T, 308T, 315T, and H822T (Lilydale line), and 326T, 328T, 337T, L809T, L816T, L824T, L825T, L835T, L848T, and 335T (Jeumont type) (Belgrave line) were commissioned.

- 03.06.1999 **Newport (Goninans Sdg)** (SW 1101/99, WN 23/99)
On Thursday, 3.6., the illuminated diagram and panel were altered to reflect the new track and signal arrangements at Goninans Sdg.
- 04.06.1999 **South Geelong - Warrnambool** (SW 1097/99, WN 22/99)
On Friday, 4.6., the Ordinary (Large) Master Key No 12 (South Geelong - Warrnambool) was withdrawn. Three Master Keys are now provided: No 12 and 13 (Miniature Type) and No 69 (Ordinary Type).
- 06.06.1999 **West Tower** (SW 1100/99, WN 23/99)
On Sunday, 6.6., a crossover was provided leading from the Broad Gauge Transfer Track to the Reversing Loop. The points are temporarily equipped with WSa levers. The points leading from the Reversing Loop towards the Gantry area are secured by a Point Lever Locking Cap and normally lie towards the Reversing Loop. The keys to the cap are held by BHP staff who must unlock the points when releasing the area to the NR/MST Shunt or NR Train crews. Stop Board 1 (applying to moves from the Reversing Loop to the North Lead) will now also apply to moves around the Reversing Loop. Drivers of trains proceeding clockwise around the Reversing Loop must obtain permission from the Signaller, West Tower before passing Stop Board 1.
- 07.06.1999 **Deniliquin** (SW 1108/99, WN 23/99)
On Tuesday, 7.6., the Deniliquin Freighters Siding was provided. This siding leads from the main line outside the Down Home. It is situated on the Up side of the line and consists of a loop with a short dead end. The siding is 670 metres and the loop is 300 metres in clear. The main line points are secured by a Master Key lock. A hand operated Hayes Derail is provided in the siding. No point lever has yet been provided on the main line points, and a Signal Maintenance Technician must attend when it is necessary to shunt the siding. The points must be secured by a point clip when reversed.
- 12.06.1999 **Melton - Ballarat** (SW 1106/99, WN 23/99)
On Saturday, 12.06., the line between Melton and Ballarat was re-opened. The Rockbank control panel was relocated back to Bacchus Marsh signal box on Sunday 13.06.
- (14.06.1999) **West Tower** (SW 1098/99, WN 23/99)
The trackwork at the southern (Dudley street) end was rearranged to provide a Dual Gauge shunting neck leading to a high capacity buffer. The South Hump Avoiding Track, the Broad Gauge Transfer Track, the Standard Gauge Transfer Track, the Standard Gauge Billet Track, and the Run-around Track are all connected to the shunting neck. The neck is considered part of the BHP Steel Terminal and is under the control of the NRC Shunt Crew. Before signalling any move past Signals 122 or 124 the Signaller, West Tower, must obtain permission from the Shunt Crew. The Shunt Crew must be informed when the movement has been completed.
- (14.06.1999) **Pyrenees Loop - Portland** (SW 1099/99, WN 23/99)
From Friday, 06., all trains between Pyrenees Loop and Portland will be run using ETAS instead of TAILS. The instructions in SW 376/95 will apply, except that Drivers must not relinquish their rear Section Authority until the ETAS consistency fluctuating reading is achieved. The ETAS test is not to be performed until the train is in clear of the fouling point (determined by a roll-by inspection), or the train has entered the next section and the locomotive passes the opposing Location Board. At Pyrenees Loop, the Train Controller can determine that the Train is in clear from the panel and advise the Driver accordingly.
- 15.06.1999 **Ringwood** (WN 24/99)
On Tuesday, 15.6., the existing signalbox, mechanical frame, and Bayswater panel were replaced by a new Westrace interlocking. The unilever panel is located in the stationbuilding on No 3 platform. No 1 Track has not yet been installed. Diagrams 15/99, 17/99, and 19/99 replaced 13/99, 9/92, and 63/98 respectively.
All signals at Ringwood between RWD233 and H834 (Lilydale line) and L848 (Belgrave line) have been replaced with new masts with LED heads.
- 20.06.1999 **Newport - Goninans Sdg** (SW 1114/99, WN 25/99)
On Sunday, 20.6., the points at Goninans Sdg were motorised and are now operated from Newport. The Intermediate Electric Staff instrument remains in service at Goninans Sdg. Diagrams 10/99 and 21/99 replaced 16/98 and 45/97 (respectively).
Home NPT701 (East Line Arrival Home) was replaced by a new post situated beyond Kernot Street. To prevent routing main line movements into the siding, the low speed aspect on this post only applies into



the siding. The low speed aspect electrically detects standard gauge trains and is approach released 40 seconds after the approach track is occupied.

The Staff lock was removed from the points and a M23A dual control point machine was provided. The points are worked by lever 600.

Dwarf NPT700 was provided for movements from the siding to the East Line. It is not possible to clear this signal unless a staff has been proved out. The Staff Proving is via a Miniature Staff Lock which has been modified with a micro switch. The Staff is placed in the drawer of the lock and the drawer closed. Operating the handle will move the plunger and close the contact. A green LED will light to indicate correct operation, and an indication will illuminate on the panel. Should the staff proving fail, the Signaller must check that the indicator for the Intermediate Instrument is showing 'Staff Out', that the Driver has obtained a Staff, and that Points 600 are detected reverse, before verbally instructing the Driver to pass Dwarf 700 at Stop.

Should the Electric Staff instruments fail, the instructions contained in Rules 9 and 10, Section 23, Book of Rules, are to be followed. Should Points 600 fail at the same time as an Electric Staff instrument failure, the Signaller must instruct the Driver to operate the points and, if it is necessary for the train to depart from the siding, enter on the Train Authority details of the authority to pass Dwarf 700 at stop.

- (21.06.1999) **Hurstbridge** (WN 24/99)
 Drivers will be in charge of signalling after 2000 hours Monday to Saturday, and all day Sunday. Specific instructions are given for the arrival of Down trains 1993 (Ticket), 1997 (Ticket) and 1999 (Staff) on Monday to Saturdays (all of which stable), the departure of Up trains 1200 (Ticket) and 1202 (Staff) on Sunday morning (which dock from the sidings), and the arrival of Down trains 1211 (Ticket) and 1213 (Staff) on Sunday evening (which stable).
- 24.06.1999 **City Circle Loop** (SW 1112/99, WN 25/99)
 On Thursday, 24.6., the pilot keys were removed from Homes 121 (Spencer St) and JLI187 (Jolimont). Amend Diagrams 21/94, 13/91, and 13/92.
- 26.06.1999 **Mooroopna** (SW 1115/99, WN 25/99)
 On Saturday, 26.6., Flashing Lights were provided at Riverview Road (177.951 km) on the Down side of Mooroopna. The crossing is operated by HXP level crossing predictors.
- 27.06.1999 **Nagambie** (SW 1116/99, WN 25/99)
 On Sunday, 27.6., Flashing Lights were provided at Goulburn Street (125.837 km) on the Up side of Nagambie. The crossing is operated by HXP level crossing predictors.
- 03.07.1999 **Deep Lead** (SW 1117/99, WN 25/99)
 On Saturday, 3.7., Flashing Lights were provided at Deep Lead Road (247.682 km). The crossing is operated by HXP level crossing predictors.
- 03.07.1999 **Crib Point** (SW 1074/99, WN 18/99)
 On Sunday, 3.7., the sidings were abolished and the station is not available for crossing trains. The main line points were spiked out of use with the Plunder locks secured in. Drivers must continue to operate the Up Departure Home (light) signal protecting the level crossing.
- 04.07.1999 **Safety Responsibilites** (SW 1110/99, WN 25/99)
 As from 0001 hours on Sunday, 4.7., Freight Victoria will assume responsibility for some of the Safeworking functions currently performed by the Manager Rail Safety, VicTrack. The Manager System Safety, Freight Victoria, will become responsible for the transferred functions.
 In general, safeworking policy related issues, real time safeworking management within Victoria (excluding the two Interstate corridors), and management of the Rules and Operating Procedures will remain with the Manager Rail Safety. All SW Circulars will continue to be issued under the signature of the Manager Rail Safety. This includes all new or altered signalling and track arrangements. The Manager Rail Safety will continue to be responsible for reviewing and approving all altered or new Signalling and Safeworking arrangements.

SPEAK SO AND SO (TRAIN CONTROL IN VICTORIA)

With the transfer of the Victorian interstate main line boards to the Australian Rail Track Corporation in Adelaide, it is opportune to look back on nearly eighty years of train control in Victoria. Very little has been written about train control, even the Weekly Notice rarely noticed alterations to Train Control sections. As a result, the following can only be regarded as the beginning of a history and the editor would be very pleased to receive submissions that expands or corrects information in this article. This particularly applies to the recent era: when did the original NE CTC machine get replaced, for example.

Before train control

The running of trains before the introduction of train control was an ad hoc affair. For important trains and emergencies, there was what amounted to a train controller at Head Office as the 1919 GA shows:

Movement of Important Trains. - The General Superintendent's Office is open continuously from 6.30 a.m. Monday till 11.30 p.m. Saturday. During this period, an officer is in attendance, who must be kept in touch with the movements of important trains. There is a Telegraph Instrument in the Office, and any of the Telegraph Lines connected with Spencer-street may be switched on to it. The call is "T.K.," and, when used, it is to be regarded as having the same importance as the "G.M." signal, which indicates urgent business. As a rule the "T.K." call should be used only for telegraphing information in respect of the particular trains of which Stations are from time to time advised, but in cases of unusual or prospective delays to any Passenger, Mixed, or any Goods train conveying Live Stock or Perishable loading, from whatever cause, the Station at which the detention occurs or is likely to occur, must immediately call "T.K.," and advise the Officer-in-Charge of the Train Running Room full particulars. [...]

This arrangement is for the purpose of enabling the Head Office to keep in close touch with the running of certain trains, so that in the event of it being necessary to take any special action in regard to any one them, it may be taken promptly. It will be seen, therefore, that in order to be of value, the required information must be telegraphed without delay.

The capacity of this officer to control any more than a few "important trains" using just the telegraph is highly doubtful. For the remainder of the traffic, the WTT instructed that:

[Conditional trains] are put on and off by special orders from the General Superintendent of Transportation or Depot Stations.

On lines where experience showed that traffic fluctuated significantly, the specific instructions could be given in the WTT. Examples in the May 1916 WTT include "When special trains are running [between Ballarat, Maryborough and Castlemaine], S.M.'s Ballarat, Maryborough and Castlemaine to arrange work to be done at the various station, and to reduce the work allotted to mixed trains where possible", "S.M.'s at intermediate stations [between

Maryborough and Castlemaine] to keep S.M.'s Maryborough and Castlemaine advised as to the number of trucks they will have ready for the respective trains which work at their stations so that loads can be arranged accordingly", and "S.M., Ararat, may run Goods train to clear surplus down or up loading between Ararat and Avoca if 70 per cent of full load obtainable."

At a local level, the GA instructed Signalmen:

(a) When a Signaller receives the "Is Line Clear" Signal for a Goods or Ballast Train or a Light Engine and according to the schedule running time allowed for the Section there is sufficient margin of time to enable it to clear the Section without interrupting the despatch of a more important train, and the Line is clear according to the Rules or Special Instructions, he must accept the train or engine unless he has received instructions to the contrary from the Stationmaster or Yard Foreman.

Goods trains, thus, had to be accepted provided they could be worked clear of traffic. If a yard became congested, trains would be worked as close to the yard as possible, but there was no overall oversight that could hold trains back.

The first train control boards

The first train control board was brought into service in late 1924 and controlled the section of line between Dandenong and Nyora. The Commission's Report for 30 June 1924 noted "The installation of selector telephones between Dandenong and Nyora, which are primarily required in connexion with train control was almost completed." This first board was located at Dandenong, then the headquarters of the Eastern and South Eastern District. In the 1924/5 Report, the Commissioner noted that "[s]atisfactory results attended the installation of Selector telephones between Dandenong and Nyora, which was completed during the year." Despite this rather lukewarm success, the report continued "and similar facilities are now being provided between Melbourne and Geelong and between Dandenong and Warragul."

By 30 June 1926 the control office in Head Office was open controlling the lines to Geelong, Woodend, and Seymour. In addition the board at Dandenong had been extended to control Dandenong to Warragul and Nyora to Korumburra.

During the following year, 1926/7, the Head Office control area was extended from Woodend to Bendigo. In addition, district control offices were opened at Bendigo and Seymour. Bendigo train control initially supervised Bendigo to Echuca, and Bendigo to Kerang. The Seymour office supervised Seymour - Albury, Seymour - Numurkah, and Toolamba - Echuca. The Commissioners Report for 30 June 1927 noted

One of the most interesting and important developments in the operation of the traffic is the Train Control System, under which the movement of trains over a number of the busiest sections of line is regulated by Control Officers, located at Melbourne, Bendigo, Seymour, and Dandenong, by means of direct telephone communication with the operating staff.

The system is now in operation [on 719 miles of track] and its extension to many other sections of line

in the northern and western areas is at present in hand. The whole of our Trunk lines were the traffic is densest will then be operated under the Train Control System.

[...] The movement of every train on the controlled area is entered on a train working diagram, and by this means the Control Officer has before him a complete progressive picture of all train working operations, which enables him to effectively direct the working of the traffic, instead of merely making a subsequent review of the operating results. [...]

The reference to the 'train working diagram' shows that the train control graph was in use by this date. It would be interesting to know where the idea for a graph originated; as they are not used by US despatchers.

By May 1928 the title 'Control Officer' to had been altered to 'Train Despatcher' and 'Chief Train Controller' to 'Chief Train Despatcher'. The 'Train Control Office, Spencer-street' was noted in the WN as being open continuously except for 0030-1630 Sunday.

The Train Control network grows

The 1927/8 financial year saw the opening of the fourth regional office at Geelong. The Geelong office, probably opened towards June 1928, only supervised Geelong - Cressy by 30 June but was rapidly extended the following year. The Central Control area was completed with the provision of selector telephones between Melbourne and Ballarat. Minor extensions were also made to the Bendigo control area which was extended from Kerang to Swan Hill, and the Seymour control area which was extended from Numurkah to Tocumwal.

A grand total of 507 miles - an increase of 50% - was brought under the train control system during 1928/9. The Geelong office was extended to additionally control Geelong to Terang, Cressy to Ararat, and Geelong to Ballarat. A control office was opened at Maryborough. The Commissioner's Report only listed it controlling the line between Castlemaine and Maryborough, but selector telephones were probably provided at this time between Ballarat and Maryborough. The Bendigo control office was extended to control Bendigo - Wycheproof, and Korong Vale - Ultima. The same year saw the relocation of the first Train Control office from Dandenong to Flinders Street. This probably co-incided with the extension of control from Warragul to Traralgon, Nyora to Wonthaggi, and Melbourne to Dandenong.

The Ararat office was opened on 25 September 1929, and initially controlled Ballarat - Ararat and Ararat - Murtoa. By 30 June 1930, control had been extended from Murtoa to Dimboola, and Ararat - Hamilton. No other extensions were made that year.

During 1930/1 a further 99 miles of line was controlled. The actual section were not listed in the Commissioner's Report, but are probably Terang to Warrnambool (28.75 miles), controlled from Geelong, and Maryborough - Donald (70.5 miles), controlled from Maryborough. The following year (1931/2), 63 miles were added; probably Dimboola - Serviceton (controlled from Ararat). The control area of the Ararat office was probably completed in 1932/3 when a further 54 miles were opened - almost certainly representing Hamilton - Portland. At some time during 1931/2/3, the section between Donald and Birchip (32.25 miles) were added to the Maryborough control district.

Parliament placed great pressure on the railways during the thirties to reduce the railway's annual loss. The Commissioner's reports consequently highlighted actions

they were taking to make the railways run more efficiently. The train control system was one such measure, and the report for 1933 covers Train Control extensively:

Recognising the need for a more intensive oversight of train movements, &c., particularly of goods trains, and following proved practice on modernly administered overseas railway systems, we introduced a selector telephone system towards the end of 1924 to permit of the centralized control of trains, but it was not until some years later that the advantages of the new method commenced to make themselves apparent. This was mainly due to the fact that officers had to be specially selected and trained for the work and to the advisability of making the change a gradual rather than a revolutionary one.

To-day the selector telephone system covers 1,836 mile on the following sections:-

<i>Spencer-street Control Centre-</i>	
Spencer-street - Seymour	61 miles
Spencer-street - Bendigo	101 miles
North Melbourne - Geelong	44 miles
North Melbourne - Ballarat	73 miles
<i>Flinders-street Control Centre</i>	
Flinders-street - Traralgon	98 miles
Dandenong - Leongatha	60 miles
Nyora - Wonthaggi	31 miles
<i>Seymour Control Centre</i>	
Seymour - Albury	129 miles
Mangalore - Tocumwal	88 miles
Toolamba - Echuca	42 miles
<i>Bendigo Control Centre</i>	
Bendigo - Echuca	56 miles
Eaglehawk - Swan Hill	109 miles
North Bendigo - Ultima	119 miles
Korong Vale - Wycheproof	39 miles
<i>Geelong Control Centre</i>	
Geelong - Ballarat	54 miles
Gheringhap - Maroona	100 miles
Geelong - Warrnambool	121 miles
<i>Ararat Control Centre</i>	
Ararat - Ballarat	57 miles
Ararat - Serviceton	156 miles
Ararat - Portland	120 miles
<i>Maryborough Control Centre</i>	
Maryborough - Birchip	102 miles
Maryborough - Castlemaine	34 miles
Maryborough - Ballarat	42 miles
Total	1836 miles

No more important change has been made in railway technique on our lines than the introduction of this control system, which has resulted in substantial savings in respect of train working and staff expenses. It has also been the means of improving the capacity of the lines and of avoiding large expenditures that would otherwise have been necessary for yard and signalling extensions.

The officers operating the system are graded at Train Despatchers, and each Train Despatcher, with his ready means of contact with stations, yards, signal boxes, &c., is able to deal directly with the employees actually associated with train working and to record on graphs the movements of all trains and engines over the sections allotted him for supervision. Being

in a position to visualize possible delays, he is able to take immediate corrective action.

The advantages of the system can best be appreciated by the fact that the standing time of locomotives has been reduced from 22.4 hours per 1,000 miles run in 1925-26 to 17.3 in 1932-33.

The speed of trains in "Miles per train hour" improved from 9.9 in 1925-26 to 11.2 in 1932-33, whilst the "gross ton miles per train hour" figure, which is the index of efficient goods train operating, advanced from 3,500 in 1925-6 to 4,444 gross ton-miles in 1932-33, an improvement of 27 per cent. This figure is the summation of load, distance of haul, and speed, and represents a valuable improvement, towards securing which the provision of larger engines and the installation of automatic couplers have played a part.

The Train Despatchers also watch the movement of loading and the supply of trucks to individual stations. The organization will assist materially in meeting heavier demands upon the goods and live-stock equipment when they arise, without a commensurate increase in rolling-stock, and has enabled more effective use to be obtained of the available engine power.

Completion of the network

Ballarat was in an odd situation. Although the District headquarters, it was without a train control office, the four main lines approaching it were controlled by other control rooms: Melbourne - Ballarat by Control, Geelong - Ballarat by Geelong, Ballarat - Ararat by Ararat, and Ballarat - Maryborough by Maryborough. Passing trains from one control room to another must have been awkward. On 4 March 1934 the Maryborough office was relocated to Ballarat. Control of the Ballarat - Ararat line was transferred to the Ballarat office at roughly the same time. Either just before or just after this relocation, selector phones were provided between Birchip and Ouyen. The same year, 1933/4, saw the station service line between Echuca and Balranald adapted to allow it to be connected to Seymour control. Henceforward, this line was counted as worked under train control, even though selector telephones were not provided.

The Eastern board was extended to control Traralgon - Bairnsdale (by both Maffra and Sale) in 1934/5; and this extension marked the completion of the original train control network. No further extensions were made until June 1938 when the line between Benalla and Yarrawonga was brought under the control of Seymour. The following year, 1938/9, saw the final pre war extension with the extension of the Geelong control area from Warnambool to Koroit. These last two extensions were probably made possible by the freeing up of equipment due to the closure of staff stations in the controlled areas.

The Eastern and South Eastern control office was transferred from the District headquarters at Flinders Street to Head Office in 1936/7. The previous year the Commissioner's Report had noted these plans:

Of the five train control districts, that comprising the Eastern and South Eastern and suburban lines, and supervised from Flinders-street, is the only one not directly linked with the train control room in the administrative offices. With a view to consolidating and improving the value of the system, arrangements are in course for this section to be transferred to the administrative offices and amalgamated with the

main control and other associated staff.

When this scheme has been completed, all sections of the organization connected with train running activities such as time tabling, rostering, distribution of engine power, cars, and tracks, live stock traffic, records and statistics of all train operation, &c, will be grouped together on the ground floor alongside the staff actually engaged on the control of train movements through contact with the station and other staff employed in train working.

In this way, a complete train operating unit will be established incorporating all sections at present not conveniently in contact with each other, effecting economies in staff and still greater efficiency.

The financial year 1936/7 also saw the provision at Albury to connect the Victorian selector line with the New South Wales line, thus allowing the Train Control Offices at Seymour and Junee to directly speak with each other. When the Commissioner's Report was written, provision was about to be made at Serviceton to similarly connect the Victorian line (Ararat Control) with the South Australian line (Murray Bridge Control).

October 1938 saw the culmination of a massive project to equip the suburban area with a selector phone working to three boards at Head Office. A grand total of 234 control points were provided, and the new boards worked all the suburban lines, except those beyond Eltham, Reservoir, Upper Ferntree Gully, and Lilydale. Provision was made, however, to link the selector system to the station service telephone on these four lines. Three boards were required due to the relatively inflexible technology used in the selector system. Nos 2 and 3 Boards were used at busy times and controlled half the suburban network each. No 2 Board controlled the Broadmeadows, St Albans, Williamstown, Sandringham, Dandenong, Frankston, Mornington, Stony Point, St Kilda, and Port Melbourne. No 3 Board controlled the Healesville, Warburton, Upper Ferntree Gully, Glen Waverley, Alamein, Kew, Fawkner, Hurstbridge and Whittlesea lines. No 1 Board controlled the entire suburban system and was used in the quiet times. Initially, Nos 2 & 3 Boards were only in use during the peak hours, but by 1953 they were in use from 0600 to 2230 on weekdays.

Train control in operation

The instructions for the Train Control System were right at the front of the section on the Working of Trains in the 1936, 1953, and 1979 General Appendices. Some excerpts from these instructions are:

1 (a) The movement of all trains and Light Engines (Electric trains excepted) and of Rolling Stock within the sections mentioned [...] is under the direction of the Chief Train Despatcher, located in the Train Running Room, at the Head Office, Spencer-street, Melbourne. The Train Control Office is open continually.

(d) District Train Despatchers are required to keep in close contact with Central Control, who will advise them from time to time of the anticipated times at which Down trains will arrive at their Depots. In the case of Up trains, District Officers must advise Central Control immediately it is known that there will be any delay in the arrival at or prospective departure from their depots so that the necessary adjustment of the programmed services may be made. [...]

(e) The Control Sections attached to the offices of the respective Superintendents and Locomotive

Depots must function as directed from time to time by the Chief Train Despatcher, and in every case prior to the despatch of Relief Crews, the Central Office must be consulted respecting the necessity therefor, and the train by which the Relief Crews are to be sent.

(f) In every case of accident, engine failure, or any other irregularity affecting the regular movement of traffic, the Train Despatcher concerned must be promptly advised of the circumstances by the Station-master and Signaller who first receive intimation of such an occurrence, and the Train Despatcher will then make the necessary arrangements for the working of traffic in conjunction with the respective Depots and Stations concerned [...].

2 (a) To speak to the Train Despatcher the employe at the Station or Signal-box concerned must lift the receiver of the Selector Telephone and if the line be not engaged, push in the black button, call the name of his Station, and wait until the Train Despatcher replies "So and so speak." When the communication is completed the employe concerned must say "So and so finished," and when the Train Despatcher replies "So and so finished" the employe concerned must replace the receiver on the hook.

(b) The Officer or employe in charge of the Station, or Signaller, in the case of a Signal-box, must promptly advise the Train Despatcher the time of arrival and departure of all stopping trains, including Passenger, and also the time of passing of non-stopping trains.

(c) The advice of the Train Despatcher must be obtained in connection with all questions of train movement, immediate or prospective, and the instructions of the Train Despatcher must be promptly and implicitly obeyed by all members of Station Staffs and Trainmen.

When the Train Despatcher has instructed the Signaller or Officer in Charge to side-track a train for another, or other trains to pass or cross, and definite instructions have not been received from him when the side-tracked train may depart after the crossing or passing trains have passed through, the Signaller or Officer in Charge must, before despatching the side-tracked train, obtain the permission of the Train Despatcher.

3 (a) At terminals and intermediate points, loading will be detached and attached by Goods Trains in accordance with the Special Instructions issued from time to time by the General Superintendent of Transportation in respect of "Regular Goods Trains and Roadside Work". Such arrangements must not be departed from without the direction or consent of the Train Despatcher.

(b) Station-masters on the sections of lines in which traffic is under the direction of a Train Despatcher, must (in addition to notifying their depots the loading on hand to be moved by Up or Down trains) notify the Train Despatcher by 4.0 p.m. daily the number of trucks and gross tonnage for both Up and Down directions. The details of Van-goods offering must also be communicated to the Train Despatcher in respect of each train as soon as such details are known.

(d) The Officer or employe in charge of the Station must take the earliest opportunity of inquiring from the Train Despatcher the intended movements for

approaching trains, so that all may be in readiness to expedite such movements.

Do not wait for the Train Despatcher to call you - this is a loss of your time and his; he is in constant attendance to advise and function with you as a unit in train working operation.

4 (a) Depot Yards, Junction Stations, or other commencing Stations at which Goods trains enter upon controlled territory, must, prior to the despatch of such train, telephone the Train Despatcher the following information:-

(i) Number of the trains, or in the case of extra trains working under Special Train Notice the booked time of departure of same.

(ii) Number of vehicles and gross tonnage of train.

(iii) Number and class of engine.

(iv) Name of Driver.

(v) Name of Guard.

(vi) Details of roadside loading to be attached or detached en route.

(b) In the case of Passenger trains the following details must be telephoned the Train Despatcher prior to the despatch of the train:-

(i) Number of the trains, or in the case of extra trains working under Special Train Notice the booked time of departure of same.

(ii) Number of vehicles on train.

(iii) Number and class of engine.

(iv) Name of Driver.

(v) Name of Guard.

(c) Immediately it is known that a train cannot be despatched on scheduled time the Sectional Yard Foreman (Melbourne Yard) or Officer or employe in charge at the Station concerned, must advise the Train Despatcher of the anticipated late departure, and the reason therefor.

(d) In the case of Depot Yards requiring to work extra Goods Trains through controlled territory, the officer or employe in charge of the Depot must telephone the following "Preliminary Advice" to the Train Despatcher, seeking his approval for the working of such extra train. An "Extra Train" means any train other than one scheduled in the Working Time Table, or in any Special Time Table to regularly run, or to run until further notice.

(i) Number of train desired if it be a "when required train" shown in the Working Time Table, or, if not, the time it is desired to despatch the train.

(ii) Destination of train.

(iii) Class of engine

(iv) Estimated tonnage of loading at commencing Station.

(v) Proposed work of train en route, if any.

(e) If the Train Despatcher approve of the suggested time of departure and the working for the train he will advise accordingly, or, if not, he will indicate the time at which he is prepared to despatch the train; as soon as the train is prepared ready to depart the details of the loading must be telephoned to the Train Despatcher.

9. Movements of Important Trains on Sections [not controlled]. - (a) In all cases of actual or

prospective delay (from any cause) to any Passenger or Mixed Train, or to any Goods Train conveying Live Stock or perishable loading, the Station at which the detention occurs, or is likely to occur, must promptly telegraph particulars to the Train Despatcher for the District. [...]

Post War

Towards the end of the Second World War, two short extensions of the Train Control system were made. In the middle of July 1944, the selector telephone was extended from Murtoa to Warracknabeal (Ararat Control). At the end of August 1944, the selector telephone was extended from Tallarook to Yea (Centrol).

CTC

On 21 January 1963 the CTC was brought into use to control the new Standard Gauge line between Alumatta Loop and Wodonga Loop (control over the rest of the Standard Gauge line was brought into use on 4 March 1963). For the first time in Victoria the Train Controller directly signalled trains instead of operating through Signalmen. Some indication of the pride of the VR in the new CTC panel can be gained by the fact that the boards in Central Control were renumbered from the end of February 1963 with the CTC panel becoming the No 1 Board. The responsibilities of the remaining boards are not known for certain, but appear to have been:

No 1 Board	NE Standard Gauge
No 2 Board	NE Broad Gauge to Seymour and Mansfield, and the Bendigo line;
No 3 Board	Ballarat, Yarram, and Wonthaggi lines
No 4 Board	Orbost line
No 5 Board	Geelong line
No 5 Board	Williamstown, St Albans, Broadmeadows, Dandenong, Frankston, Stony Point, Mornington, Sandringham, St Kilda, and Port Melbourne lines
No 7 Board	Suburban area at quiet times.
No 8 Board	Upfield, Epping, Hurstbridge, Healesville, Warburton, Belgrave, Glen Waverley, and Alamein lines.

By 1979 there was also a Brooklyn board which controlled the goods and pilots working the Brooklyn area.

A second CTC machine was provided on 11 November 1983 to work the Western line between Murtoa and Dimboola (control of the Western line beyond Ararat was not completed until 20 July 1985).

Metrol

On 13 September 1980 the suburban Train Controllers were relocated to the new Metrol building in Batman Avenue. Instead of the three boards, there were now two Operations Controllers and two Line Controllers. An Operations Controller supervised the areas Metrol directly operated. Operations Controller No 1 controlled North Melbourne to Caulfield and the Sandringham, Port Melbourne, and St Kilda lines. Operations Controller No 2 controlled Flinders Street to Burnley and Clifton Hill. The Line Controllers were the equivalent of the old Train Controllers at Centrol and supervised train operations on the remainder of the suburban network. The Western Lines Line Controller controlled North Melbourne to Williamstown Pier, Altona, St Albans, Broadmeadows, Flemington Racecourse and Upfield and Clifton Hill to Epping and Hurstbridge. The Eastern Lines Line Controller controlled Burnley to Healesville, Belgrave, Glen Waverley, Alamein, and

Caulfield to Dandenong and Stony Point.

The new Centrol and the new railway

Centrol was moved from the old Administrative Building to Transport House in February 1986. This probably marked the replacement of the 1963 CTC machine with a new, slower, computerised machine.

Late 1987 and early 1988 marked the beginning of a new epoch in train operation in Victoria. With the exception of the two CTC panels, Train Controllers had previously directed train movements through Signallers. Henceforward, the Train Controllers would directly control train movements over much of the network via Train Radio.

The first step was the closure of the regional train control offices with control moving to Centrol. The office at Geelong was the first to be closed on 20 December 1987 with Ararat control following on 31 January 1988. Seymour control closed on 8 May 1988. Ballarat control closed on 1 July 1988. Bendigo control was closed during 1988, but the exact date is not known.

Beginning in late 1988, the traditional UK safeworking systems of Staff and Ticket and Electric Staff were replaced by Train Order Working with the orders being dictated by the Train Controllers directly to the Drivers over the radio. The first lines were brought under Train Orders on 13 November 1988 and covered the three South Western lines: South Geelong - Warrnambool, Maroona - Gheringhap, Ararat - Portland, and Heywood - Mount Gambier. The two Eastern lines were next with Traralgon - Bairnsdale and Cranbourne - Leongatha being converted on 11 December 1988. Most of the remaining lines were converted during 1989: North Bendigo - Piangil (17 February 1989); Dunolly - Mildura (19 March 1989); Mangalore - Cobram, Shepparton - Dookie, and Strathmerton - Tocumwal (2 July 1989); Benalla - Yarrowonga (21 July 1989); Dunolly - Ultima, Eaglehawk - Inglewood, and Korong Vale - Kulwin (21 August 1989); Bendigo D - Deniliquin, Barnes - Moulamein, and Toolamba - Echuca (21 October 1989); Murtoa - Hopetoun and Dimboola - Yaapeet (26 November 1989); and Yarrowonga - Oaklands and Ultima - Robinvale (15 December 1989). The Seymour - Wodonga line was converted to Train Orders in September 1993.

Section Authority Working was introduced followed around six years later. The first section in service was North Geelong C - Warrenheip on 29 December 1994 (all dates are of the start of the 'trial period'). This was extended through Ballarat to Maryborough on 21 May 1995. Maroona - Portland was next, on 7 July 1995, and was the first section of Train Orders replaced. The new Standard Gauge across the plains was next, with the sections between Manor Loop and North Geelong C, and Gheringhap and Maroona opening on 5 June 1996. This was extended from Manor Loop to Newport on 21 June 1997. Section Authority working was then extended north along the Mildura corridor: Maryborough - Donald on 21 September 1997, and Donald - Yelta on 12 October 1997. The final extension to Section Authority working was on 28 June 1998 when the section from Maroona to Pyrenees Loop was brought into service.

The Offices and Lines

Centrol

Opened during week ended 9 March 1926 to control Melbourne - Geelong and Woodend (WN 10). Control extended during 1925/6 to Seymour. Control extended 1926/7 from Woodend to Bendigo. Control extended from Spencer Street to Ballarat in 1927/8 (25 points) and an additional 8 points provided on the Spencer Street - Geelong

line. By 18 June 1929 located in Room 221 Head Office. Eastern board relocated from Flinders Street in 1936/7. Suburban Train Control was transferred to Centrol in October 1938 and all suburban lines worked under train control. Control extended Tallarook - Yea in August 1944. CTC panel provided 21 January 1963 to work NE standard gauge. Brooklyn board provided by 1979. Suburban boards transferred to Metrol on 13 September 1980. Train control transferred to Transport House in February 1986. Control of regional offices taken in late 1987 and early 1988.

Transport House

Opened in February 1986.

Metrol

Took over responsibility for suburban area from 13 September 1980.

Geelong

Provided during 1927/8 to control Geelong - Cressy (16 points). Control extended from Cressy to Ararat (12 points) in 1928/9 and the lines from Geelong to Terang (22 points) and Geelong to Ballarat (15 points on 10 February 1929) were controlled. Control of Maroona - Ararat transferred to Ararat control in 1929/30. Control extended from Terang to Warrnambool probably in 1930/1. Control extended from Warrnambool to Koroit in 1938/9. Closed 20 December 1987.

Ararat

Opened 25 September 1929 to control Ballarat - Murtoa. Three Assistant Train Running Officers transferred from Ballarat. Control by end of 1929/30 to control Ballarat - Dimboola (42 points) and Ararat - Hamilton (6 points). Control extended from Dimboola to Serviceton probably in 1931/2. Control extended from Hamilton to Portland probably in 1933/4. Control of Ballarat - Ararat line transferred to Ballarat on 4 March 1934. Control extended from Murtoa - Warracknabeal in July 1944. Closed 31 January 1988.

Maryborough

Provided during 1928/9 to control Maryborough - Castlemaine (12 points). Control probably extended from

Ballarat to Maryborough in 1929/30. Control probably extended from Maryborough to Donald in 1930/1. Control extended Donald to Birchip by 1931/2/3. Control extended Birchip - Ouyen in 1933/4. Office relocated to Ballarat 4 March 1934 (WN 8)

Ballarat

Office transferred from Maryborough on 4 March 1934 (WN 8) and control of Ballarat - Ararat line transferred to Ballarat. Closed 1 July 1988.

Bendigo

Provided during 1926/7 to control Bendigo - Echuca and Bendigo - Kerang. Control extended from Kerang to Swan Hill during 1927/8 (6 points). Control extended Bendigo - Korong Vale (14 points), Korong Vale - Ultima (10 points) and Korong Vale - Wycheproof (11 points) during 1928/9. Closed early 1988.

Seymour

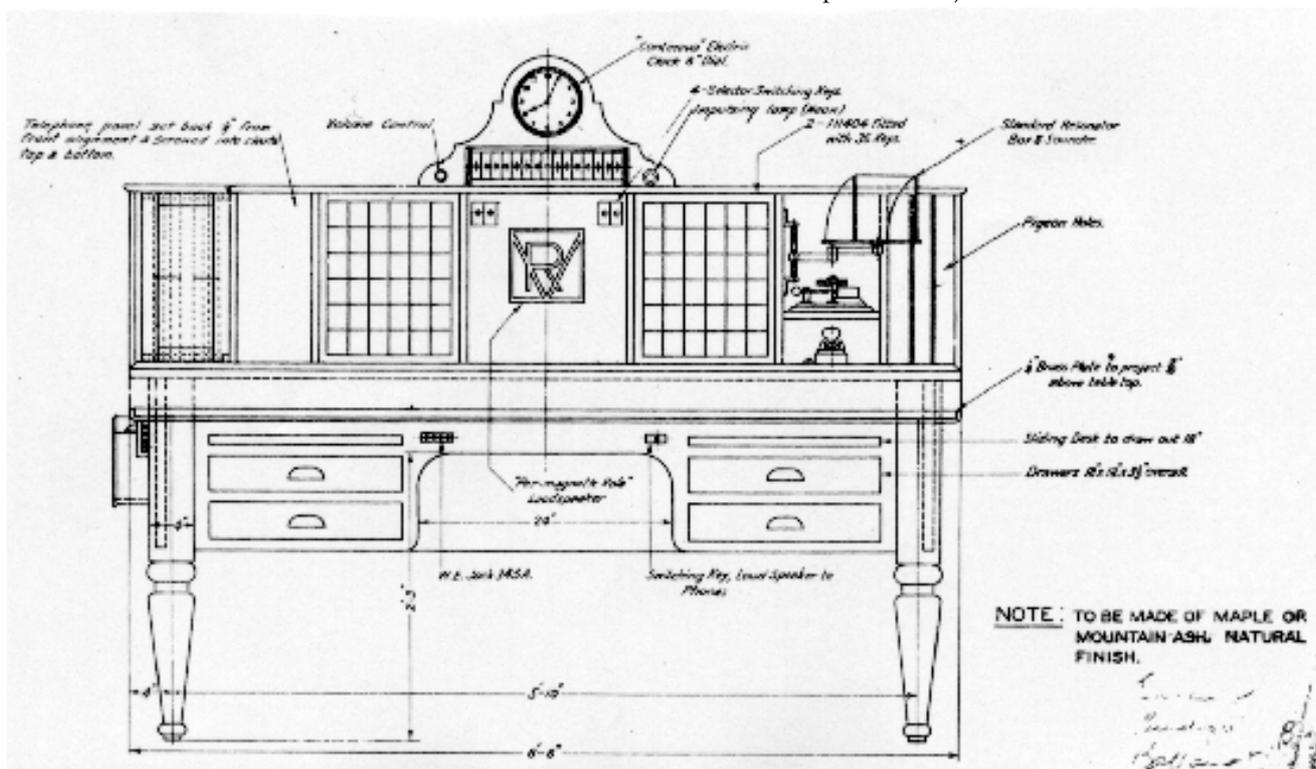
Provided during 1926/7 to control Seymour - Albury, Seymour - Numurkah, and Toolamba - Echuca. Control extended from Numurkah to Toolamba during 1927/8 (3 points). Western Electric line between Echuca - Balranald converted to connect to Seymour Control 1933/4. Control extended to Benalla - Yarrawonga in the middle of June 1938. Closed 8 May 1988.

Flinders Street

Relocated from Dandenong 1928/9. Control extensions opened that year were North Melbourne - Dandenong (8 points), Warragul - Traralgon (11 points), and Nyora - Wonthaggi (6 points). Control extended from Korumburra to Leongatha by 1932/3. Control extended from Traralgon to Bairnsdale (via both Maffra and Sale) in 1934/5. Control extended from Korumburra to Leongatha by 1938. Boards transferred to Centrol in 1936/7.

Dandenong

Provided during the 1924/5 financial year to control Dandenong - Nyora. Extended to control Dandenong - Warragul and Nyora - Korumburra in 1925/6. Removed to Flinders Street 1928/9 (District amalgamated with Metro District 16 September 1929).



LETTERS TO THE EDITOR

Peter Fisher writes:

I was very interested to read Chris Wurr's account of his and Trevor Penn's research into the red A arm of repeater signal Y at Maldon Junction. My research has run in parallel on the same topic. Trevor and I both got a photo set from Ian Barkla and on meeting back at Windsor, drew each other's attention to the red top arm. We had one or two rather drawn out speculative sessions on the issue, at one stage taking Sinatt's booklet, *Clear Normal Speed*, out of the rack and finding the same photo of 'Y' sporting its red A - something that John missed or thought of little import or knew but didn't formally comment on! Alas we can't check back with him in regard to his thoughts on the issue.

One of the areas Trevor and I pushed around was the 'Great War shortage of red paint' tale as a possible explanation of WN 37/15 assuming that it was put into practice on the new upper quadrant signalling system. Bob Taaffe in ARHS Bulletin, No 474, April 1977, says such a shortage of red pigment (here (?) or in the place from which they came, America) was the reason that, from December 1917, automatic two position lower quadrants and (then) upper quadrants in Sydney were turned out in yellow. A few examples lasted until 1926 (is there any photographic evidence around of this?).

Gavin Duffy in ARHS Bulletin, No 206, December 1954, refers "... to a very short period about the first World War when the front of all signals was painted yellow with a black bar." My assumption is that the "all" refers exclusively to upper quadrants. If this never happened, why would Gavin Duffy make the assertion? I believe he was living in the Brighton area at the time, travelling the line through Balaclava-South Yarra, and signals were hardly a casual interest of his - or was he away at the front or just being whimsical as he could be at times?

As for how the arms got to be yellow, both Trevor and I agreed that there were arms thus painted, and still are, in their native America and the consignment could have arrived so decorated - oh my gosh, they're yellow! It thus may have been a short term expedient, lasting only until 1917 (WN53/17).

But I wonder, like Chris Wurr, that the yellow arm thing may have never been in Victoria. If there is definitive evidence that they existed in NSW then the case for strengthens a bit. And if Trevor can find his long lost official inauguration photos of South Yarra Box and surrounds or if photos showing lineside features in the Balaclava-Hawksburn-South Yarra stretch are uncovered from some non-descript garage, clearly identifiable as being taken in the two year window, then we'll all be put out of our misery!

But there are some other aspects of this story so far unrelayed. Maldon Junction was, after all (apart from the those put in on the new pair of tracks at Cremorne in 1960) a very late installation of power signals with semaphore arms. (There was another, Goulburn Junction-Tallarook, one year earlier in 1925). The last full installation was Jolimont-Clifton Hill in 1921 and the experimental, single line application, Upper Ferntree-Gully-Belgrave late in the same year. Extension of upper quadrants from Elsternwick to Sandringham took place in 1926. But this seems to have been done to maintain homogeneity with the 1915-18 installations further up the track - a policy repeated 34 years later at Cremorne. By 1926 daylight colour signals were well entrenched, starting with Richmond - Burnley in 1919 and extended as far as Canterbury in 1922 (with an earlier, 2 position, pilot on the Flemington Racecourse line).

Significantly, when the new flyover was built to Kensington in 1924 it was equipped throughout with colour lights and so too was the Franklin Street-North Melbourne stretch. Footscray - Spotswood and Sunshine followed in 1927, then Geelong (with ATC) in 1928, and Caulfield-Carnegie and Sunshine-St Albans in 1929. Thus, the semaphore had become all but abandoned for new power signalling installations.

So why was it adopted at Maldon (and Goulburn Junction-Tallarook) in lieu of the then and now normal colour light? For the answer to this question we turn to the pictures on p281 in 'Single Line Automatic Working' within the June 1924 issue of *The Victorian Railway Magazine* showing the installations between Upper Ferntree Gully and Belgrave. The signals were described as being lit by long burning oil lamps and their distinctive square shape can be seen below the lenses. These same lamps are visible on post Y. And here we have a clue as to why arms were used when they had all but been abandoned in Metropolitan Melbourne for new signalling: Because approach lighting was never practiced by the VR and engine generated electric power was non-existent, unreliable or remote from installation sites at that point in time, the soda batteries, held in the battery cabinet near the signal, could only be relied upon to operate the track circuits/relays and run the signal motor mounted behind the blade, not to provide continuous aspect illumination as well. The colourlight was thus not an option. The signals installed at Maldon Junction and Seymour-Tallarook, by the way, could have featured the lamps retrieved from the narrow gauge experiment - maybe even the posts as well, with appropriate arm changes of course.

I suspect that Head Office would have been aware of the contemporary inability to deploy daylight colourlights or similarly visible marker lights at remote country locations where electric light could still be a novelty! Nonetheless the editor's marker light interpretation might well be correct! To understand why, recall the less than conventional indication (in terms of the Rule Book) for the repeater on post Y, yellow-over-green, reduce to medium speed rather than the conventional or true repeater, green-over-yellow, indicating that the next, and first speed signal, is clear. The reduce-to-medium-speed, followed by medium speed warning on (home signal) post UAL, is to take, at 40km/hour, the curved trailing points into the Castlemaine-Maryborough line and at night, or with colourlights, was synonymous with a conventional 5 position home signal. In daylight, the marker light of a conventional repeater (or 3-position home or auto semaphore for that matter) is almost incidental (with the exception of it being to the left or right of the post), it is the shape, inclination and from 1928-30, colour of the arm, that signals the instruction. Post X is a conventional repeater so a yellow marker light below the arm is only important at dusk/night/dawn. With post Y, the marker light would have been above the arm and, being small and of feeble beam and facing into a north sun (no electric lamps possible) could, from a distance, be mistaken in daytime for the aspect of a conventional repeater. Thus putting a fixed arm (A) in place of the marker light and above the working arm (B) would remove the prospect of this confusion. (The same tactic was used on post UAL with a fixed A home arm and in fact, Sinatt indicates it was normal practice for 5 position arm signals when proceed indications were permanently medium speed). Such a problem of course never arose with colourlight versions of post Y, then or thereafter. Returning to the marker light theory, recall that

by late 1926 there were no arm repeaters anywhere else (see below), the only image of a semaphore repeater in the minds of a head office clerk would have been the one in the 1926 issue of Rules & Regulations(?), which was identical with post X. Whoever it was, had overlooked the earlier precautionary installation of a fixed arm in lieu of a marker on post Y. Could it be that the Y version of the repeater never made it to Rules & Regulations because it fuzzed the unique repeater aspect of green over yellow (proceed) and replicated the reduce to medium speed aspect which could sometimes be found on a 5 position home (eg. post 51 at Castlemaine) insofar as night observation or colourlights were concerned? Shades of this duality can be gleaned from The Railway Magazine article, Speed Signalling on the Victorian Railways, where the reduce to medium speed "...may be considered as a distant to.." proceed at medium speed (p376). Even after they disappeared from the system altogether in 1952, the arm continued to be used in the Rule Book to illustrate the repeater indications, likewise for conventional 3 and 5 aspect signals.

As noted above, by 1926 there appear to be no other semaphore repeaters left - the last pair disappearing from Viaduct Junction in 1924(?) according to Trevor. As far as I am aware there is no picture in existence of a single arm repeater like post X at Maldon Junction (if there was it might help to solve the conundrum). This would explain why John Sinatt used post Y, a rare/sole double arm instance of a less conventional repeater, to illustrate the repeater in Clear Normal Speed. Since the fishtail arm was not standard in the manner of the pointed arm, two of the three arms at Maldon Junction might have come from Viaduct Junction, another from the conversion of the up Elsternwick repeater B285 to an auto in 1919. But this is pure speculation and there could well have been a repository.

I believe that the Barkla/Sinatt photo was taken in the early thirties as judged by the extent of the deterioration of the silver gloss on the soda cell cabinet. So the errant red A arm lasted at least this long after the system-wide changeover to yellow arms and lights during 1928-30. And, in partial answer to Chris Wurr's question "I wonder when it (post Y) received the first yellow arm?" at least by the early thirties! My guess is that there never were yellow repeater arms before 1928-30 - if you discount the Gavin-Duffy assertion covering all (upper quadrant) semaphores. The combination of yellow lenses with red arms was not seen as incongruous in the teens - although from where we now sit, with some 70 years of universal denotation of yellow-for-caution, it does appear odd. But remember at that time, apart from the Metropolitan (and America) all fishtail arms (at least of the mechanical type) were red and there were a hell of a lot of them. Apart from the red upper quadrant autos and homes having a yellow aspect, some earlier distant experiments used yellow lenses with red arms, such as at Malvern and Spencer Street in 1907 (WN24/07) while in Britain, whose practice still acted as a benchmark, the GWR was using yellow lenses in its otherwise red distant signals between Marylebone and Neasden in 1917.

The yellow for caution mentality didn't take full hold in Victoria until after the British Institute of Signal Engineers Inquiry reported in 1924, recommending inter alia, the changeover to yellow arms and lights. Despite the use of yellow arms and lights by the Metropolitan Railway in London from 1905, local thinking remained conservative on this front although there was a deviation in the early adoption of the track circuit and other paraphernalia of American signal technology. But, this was primarily for the operation of a densely trafficked suburban system upon

electrification and Britain, through its Manchester, Metropolitan and District Railways, had already gone down that path. It would follow that yellow repeater arms were not in the culture of the teens(?). If, on the other hand, we accept the Gavin-Duffy assertion, then in 1917 all upper quadrant arms were re-enamelled red (or replaced by new red arms?) except for the fishtails. There is a bit of a problem with this because porcelaining doesn't seem to have been adopted until 1922 (GG20.12.1922 (2194) Somersault Vol 21, No 6, p107) and there appear to be no faded arms among the relic populations (?).

Finally, regarding Chris Wurr's speculation as to the age and origin of the red A arm photograph: It could have been Les Poole, John Buckland or others recording the rail scene of the thirties. Gavin Duffy doesn't spring to mind, he was focussed on signalling equipment rather than their lineside adornments. I received essentially the same prints from Ian Barkla at the same time as Trevor, There are three pictures of Post Y, one with the red top arm and taken in the thirties as theorised above, the others are sporting yellow arms and taken respectively, trackside and from a train and probably recorded a year or so apart as indicated by resleepering. These last two pictures are in the same set as the (referred) Tyabb signal, in fact, in the same photo album held by Mr Barkla and put together by a keen observer of signal nuances - whoever that may have been? The Tyabb signal was removed on 5/12/47 (WN49/47) although it may have initially just been crossed as shown in the photograph. The latter pair of yellow arm pictures of post Y were taken quite a while after the first because a mill in the left mid-field fronting the road has fallen into a major state of disrepair and there is also much tree/vegetative growth between red-yellow and yellow-yellow arm versions. Moreover, the top arm of the latter is decidedly a brighter yellow suggesting that it had been fitted at a much later stage. The strong inference is that these pictures were taken in the late forties/early fifties. The visit to Tyabb may have eventuated because the signal was already removed from service and under threat of being taken away for trashing at Spotswood. The unusual motor-driven up Frankston distant, also recorded in the collection, was around this vintage too. Maybe, just maybe, the fitting of the second yellow arm prompted the first of the later photographs of post Y - viz. the one before resleepering? Could it be that it took so long to get around to changing the errant A arm because all spare fishtail upper quadrant arms were red (there must have been a cache of sorts from redundancies)?

In summary, I am inclined to agree with Jack Maclean that: yellow arms for all upper quadrant signals were never acted upon as a result of C 8/15; further, that repeaters were conventionally coloured (viz. red with white chevron) until 1928-30 when they were changed during the conversion to yellow arms for mechanical distants; that the peculiar Y post situation arose from the lack of engine generated power in the country requiring arm signals for daytime indication and a curve into a trailing point mandating the usual reduce to medium speed aspect for these circumstances; the anomalous red arm arose from unfamiliarity with an unconventional (in terms of the Rule Book) repeater, leading two arms only to be sent to the signal fitter for installation on posts X & Y as suggested by the editor; and finally, this situation was not corrected until late in the life of the signal.

Andrew Waugh writes:

Some more interesting fragments of information can be found in articles published by the UK Railway Engineer and Railway Gazette. An article on the Caulfield resignalling

(1933), which I have unfortunately misplaced, specifically stated that upper quadrants were installed both to match the signalling on the Richmond - Caulfield section, and to use up a stock of upper quadrant signal motors which had been purchased and never used. As the Commissioners were periodically rapped over the knuckles by the Auditor General over excessive capital tied up in stock, the need to 'use up' this equipment may be one reason for the use of upper quadrant semaphores in some schemes in the late twenties and thirties.

An article describing the Tallarook - Seymour resignalling (Railway Engineer, June 1928) shows that the power for that scheme was obtained from the Seymour Council's plant at 230 volts, 50 Hz. The signal lamps were lit by two 12 volt 2.5 watt lamps burning continuously. Battery backup, trickle charged from the mains supply, was provided with automatic changeover in case of failure of

the main supply. The same article, however, mentions that the Maldon Junction installation depended on soda cells.

Finally, an article on "Power Signals on the Victorian Railways" (Railway Engineer, April 1920) states "The signal blades are of enamelled steel, 3 ft. 6 in. long, with square ends for interlocked signals and pointed ends for purely automatic signals. They are enamelled red on the front with a white stripe following the contour of the end, and white with black stripe for the back." Clearly enamelled blades were in use by late 1919. Although the quote does not mention repeaters (though they are shown in a table of aspects), the clear inference is that all arms were red by that date.

Des Jowett has communicated that

There was an Engine Shed at Coburg. It was constructed by the local Workmaster, and was eventually relocated to Queenscliff.

CENTROL

The society was fortunate to be allowed to visit Centrol before control the two Interstate corridors was transferred to Mile End. These three photos (and the cover photo) show the four different types of control rooms in Centrol. The cover photo shows a traditional control room, where trains

are controlled with nothing more than telephone, radio, and paper. The photo on this page shows an SAW (or ASW) control room, while the two photos on the back page show the two CTC panels.



Compared with the other Control Rooms, an Section Authority Working control room appears dull with nothing more than a bank of large computer monitors. This room was controlling the Mildura corridor (Gherinhap - Yelta) and the Portland corridor (Maroona - Portland). A second SAW room next door was controlling the Standard Gauge between Newport and Pyrenees Loop. The controller has a variety of screens that he can call up on the monitors. The main screen is an electronic version of the train graph. The electronic graph shows the projected running of each train, the current authorities under which each train is running, and any next authorities that have been granted. A second screen shows a track diagram with the authorities granted to each train. Section Authorities are granted and returned to the system using popup windows.



The two CTC boards at Central. The board shown above is the older, controlling the Western line between Pyrenees Loop and Wolseley. The points and signals are controlled from the small panel to the right. The flat round buttons at the top of the panel select the location, while the tall buttons on the lower half of the panel select the function being addressed at that location. The board shown below is slightly newer and controls, ironically, the older CTC installation, the NE Standard Gauge between West Footscray Junction and Wodonga Loop. The points and signals on this panel are controlled from the keyboard to the right of the photo. The computer monitor behind the head of the controller shows one location. Both train controllers have the usual train graph, telephones, radio, and event logging computers. Control of both interstate corridors will be transferred to Mile End (Adelaide) in the near future.

