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EDITOR: David Langley, Crichton Street, Avenel, 3664. Phone: (057) 96-2337.

PRESIDENT: Jack McLean, 60 Kenmare Street, Box Hill North, 3129. Phone: (03) 890-6764.
TREASURER AND SUBSCRIPTION MANAGER: Rob Weiss, 40 Shady Gve, Nunawading, 3131. Ph: (03) 874-1521.

NSW GROUP LEADER: Neil Curryer, 20 Elton Close, Adamstown Heights, 2289. Phone: (049) 43-7404.
NSW GROUP SECRETARY: Bob Taaffe, 11 Deribong Place, Thornleigh, 2120. Phone: (02) 848-9994.

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Deadline for July 1987 issue is 21 June 1987.
NEXT MEETING: Friday, 15 May 1987.
VENUE: A.R.H.S. Library Room, Windsor Rly Station.

MINUTES OF MARCH 1987 MEETING

HELD AT: A.R.H.S. Library Room, Windsor Railway Station on Friday, 20 March 1987.

MEETING COMMENCED: at 2103 hours (after Annual Meeting).

PRESENT: Jack McLean, Stephen McLean, David Langley, Wilfrid Brook, Alan Jungwirth, Jim Brough, John Sinnatt, Roger Jeffries, Roderick Smith, Andrew Waugh, Jon Churchward, Tony Kociuba, Keith Lambert, Rod Kent and visitor Andrew McLean.

MINUTES: of November 1986 and February 1987 meetings adopted as read. (Jungwirth/Waugh).

BUSINESS ARISING: Jim Brough asked whether there had been any further action on the question of a signalling museum. The answer was unknown.

CORRESPONDENCE: Alan Jungwirth had a letter from Bob Taaffe which contained, among other things, details of the signalling alterations at Gap (near Werris Creek).

DOCUMENTS TABLED: a) An index for Jack McLean's collection of diagrams on micro fiche (available at the State Library) produced by Andrew Waugh.
b) IRSE Paper on "Yoker Integrated Electronic Control Centre" in Scotland.
c) Blocking Back issue for February 1987.
d) The A.R.H.S. book "CROSS-COUNTRY" of which Jack McLean is co-author.

MEETING CLOSED: at 2115 hours.

SYLLABUS ITEM: David Langley showed some of his slides of four state of Australia. The slides were taken over the last ten years, and not one scene remains the same today. Some examples included Tait trains at Flinders Street, interlocking at Riverton, bracket signals and somersaults at Bolivie, and wrong side somersaults on the Emu Bay Railway.

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SIGNALLING ALTERATIONS

18.3.1987 BRIM was disestablished as a Train Staff and Ticket station and the section became Warracknabeal-Hopetoun. The special instructions contained in A 1174/84 are cancelled. (A 131/87)

23.3.1987 GLENHUNTLY-PARKDALE. Engineer's Diagram No 11/87 became effective and Diagram No 1/87 was cancelled. The alterations in connection with the issue of this diagram are:-
1. The new Down line between Bentleigh and Moorabbin was slued to its final position and brought into service.
2. Up trains will use the new Centre line and the portion of the Up line, formerly in use, was taken out of use until the final commissioning.
3. New Down platforms at Patterson and Moorabbin were brought into use.
4. Automatic signal F 567 was renumbered MRN 604.
5. Automatic signal F 505 was relocated 15 metres in the Up direction.
6. Automatic signals Nos F 515, F 527, F 537, F 549, F 557, F 498, F 506, F 516, F 528, F 538, F 554 and F 568 were abolished.
7. Automatic signals F 523, F 535, MRN 702, MRN 704, FM 502, FM 512, FM 530, MRN 603 and MRN 703 were brought into service.
8. Medium speed indications were provided on all signals.
NOTE - THE MAXIMUM PERMISSIBLE SPEDD OF ALL TRAINS BETWEEN BENTLEIGH AND MOORABBIN WILL BE 60KM/H UNTIL FURTHER NOTICE.

26.3.1987 LYNDHURST. A level crossing predictor was installed at Lyndhurst Road. This is a device that gives constant warning times for the flashing light operation irrespective of the speed of the train. Distinctive indicator boards, as shown, are provided at the start of the Up and Down approaches to the crossing and indicate to the Drivers of through trains that they are not to accelerate within the approach track section. Shunting trains will work normally, using the push button for manual operation of the flashing lights. Downtrains departing after shunting has been completed will require manual operation of the flashing lights. (A 204/87)

28.3.1987 WODONGA. Boom barriers were added to the flashing lights at Hovell Street (301.193Km) and Osburn Street (301.511Km). The operation of the boom barriers is automatic for all trains.

28.3.1987 WODONGA. Boom barriers were added to the flashing lights at Hovell Street (301.193Km) and Osburn Street (301.511Km). The boom work automatically for all trains. (A 170/87)

28.3.1987 WERRIBEE. No 33 points and No 32 Dwarf signal were abolished. Sidings "B", "E" and "F" were taken out of use. (A 2169/87)

WN12/1987 ROAD/RAIL VEHICLES. The opeartion of these vehicles in the Metrail area is governed by the same instructions as for these vehicles operating on V/Line lines as published in A 84/87. In addition to these instructions, three further instructions apply-
a) Vehicles must be accompanied by a Guard unless working under cover of "Absolute Occupation".
b) A signalman or Area Controller must be on duty to grant permission for the vehicle to operate and afford suitable protection for the vehicle to operate.
c) The signalman or Area Controller must confer with the Line Controller or Operations Controller prior to granting permission and both people must comply with the relevant parts of clause 25 of A 84/87 as proscribed for the Train Controller.

29.3.1987 BELL. The Up Line between 11.843Km and 12.073Km was realigned and a turnout placed at 11.838Km spiked for main line running. The realigned curve between 11.965Km and 12.073Km will have a speed of 70Km/h.

1.4.1987 RESERVOIR. The single compound crossover will be spiked for the turnout move and, the back road and Siding "B" will be removed.

1.4.1987 SPOTSWOOD. Flashing lights have been installed at Burleigh Street (10.662Km) and Douglas Parade (10.762Km). These crossings are located on the Oil Sidings which junction at the down end of Spotswood station. (A 172/87)

5.4.1987 MELTON. No 12 points and No 13 Lock Bar were abolished. Levers Nos 12 and 13 were sleeved normal. These comprise the Melbourne end connection to No 3 road. These alterations are, no doubt, a preludeto the provision of a second platform. (A 242/87)

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SOLUTION TO CROSSWORD No 18.
ACROSS: 4. Tabs, 7. Launceston, 9. Adana, 11. Schenectady, 12. Llanelly, 15. Roma, 16. Neuve, 17. En, 18. Keith, 22. Gare St. Lazare, 24. Ins, 25. Est, 28. Olten, 29. Regina.
DOWN: 1. Barcelona, 2. Interlaken, 3. Geneva, 4. Toda, 5. Anadolu, 6. Spa, 8. Tattenham, 10. NY, 13. LE, 14. Yverdon, 15. Reggio, 19. Essen, 20. It, 21. TL 23. Rift, 26. Tr, 27. NG.

AN EARLY HISTORY OF THE HAWTHORN TO CANTERBURY RAILWAY WITH AN EXAMINATION OF SIGNALLING BEFORE AND AFTER DUPLICATION OF THE LINE

by Glenn Cumming.

PREAMBLE

When I first started to research this option, I had planned to cover the entire line from Richmond to Lilydale and the Outer Circle Railway from Fairfield to Oakleigh. However, when I began to look for information, I realised that this would have been an enormous task and it wasn't long before I cut back on what I was researching, I have now completed about 30% of my original plan.

INTRODUCTION

The railway line between Hawthorn and Canterbury is a heavily trafficked line that carries thousands of commuters between the city and the suburbs on fast, efficient electric trains. However, when the line first opened, circumstances were vastly different.

Slow steam trains dawdled over light rails carrying a few passengers between country villages and the growing city. Progress was slow and drawn out. Eventually changes were made and a reliable and seemingly efficient service was introduced. The line was extended and then doubled, more lines were built - some to be closed later when the land boom collapsed.

These were the circumstances that surrounded the Hawthorn and Canterbury railway line at the end of the 1890's.

OWNERSHIP OF THE LINE

The line between Richmond and Hawthorn was opened on 3 April 1861 by the Melbourne and Suburban Railway Company. Being a private company, its basic aim was to make a profit - which it never did. The company got into financial difficulties with the result that it was taken over by the Melbourne and Suburban Railway Company on 1 June 1865.

The MHSUR Co. battled on for another 13 years before being absorbed by the Victorian Railways Department on 1 July 1878. After this date, the Victorian Government controlled all railway lines in Victoria.

HAWTHORN

Hawthorn station opened on 3 April 1861 and for the next 21 years, it was the terminus of the line with extension to Camberwell coming on 3 April 1882. Very little is known about the track layout at the time it was the end of the line, although Geoffrey Blainey (A History of Camberwell, MUP Melb 1964) has suggested that there was a turntable and engine shed at the far eastern end of the station yard. I cannot find, however, any evidence to support these claims and I am unsure as to whether to believe it or not. (It does sound doubtful.)

In any case, we can safely assume that the station would have contained as least one platform road, maybe two loop roads, two stabling sidings and perhaps a goods siding, but there is no evidence to back up this assumption. We know though that the station was not on its present site.

Up until 23 December 1882, there was no convetional safeworking system, the line to Hawthorn being worked under the primitive Time Interval system, where trains run at specified intervals (without any knowledge of the condition of the trains and track conditions in advance). As well, there was also a definite lack of signals to control traffic flow on the line to Hawthorn.

The lack of safeworking and signalling ultimately led to the first major accident on 2 December 1882 when two trains collided head on between Burnley and Hawthorn killing five people and injuring many more. The accident occured when a Melbourne bound train left Hawthorn, after a Hawthorn bound train

had left Burnley. To complicate matters further, the double line between East Richmond and Hawthorn was supposed to be open for traffic the day before but it had been delayed, and yet no-one had bothered to tell the train crews or station staff.

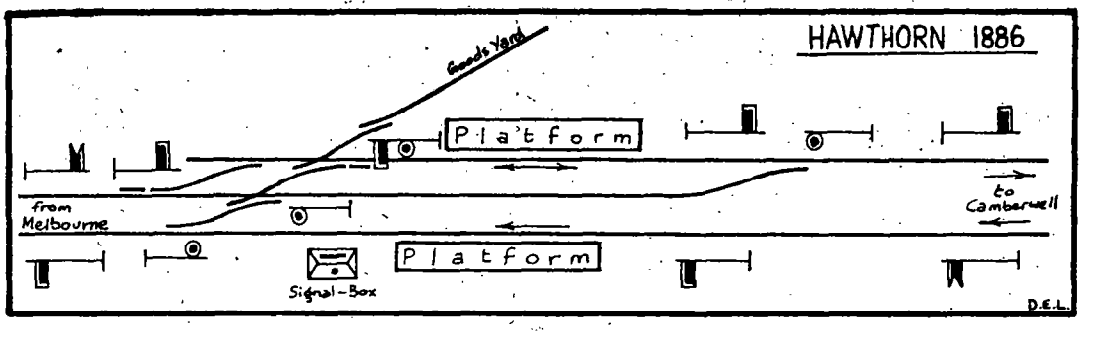
The double line to Hawthorn was eventually opened on 9 December 1882, and staff & ticket working to Camberwell was introduced on 23 December 1882, both as a direct consequence of the Hawthorn accident. (Staff & ticket working would have prevented the head on collision.)

The line from Hawthorn to Camberwell was opened on 3 April 1882. It was a continuation of the platform road and as a consequence Hawthorn received a second platform in time for the opening of the line to Camberwell. Apart from what has already been said, very little else is known about the track and signal arrangements - except to say that there would have been an extra home signal from Camberwell protecting the station.

After the opening of the line to Camberwell, the station staff would have been working flat out dealing with the large volume of traffic generated by the numerous local Hawthorn trains and the frequent service to Camberwell. Indeed, the Booroondara Standard of 27 April 1882, shows that on a normal weekday, there were 37 trains to and from Melbourne (as well as 30 trains in each direction to Camberwell that connected with most of the Melbourne trains). That is to say that Hawthorn dealt with 134 trains each weekday! And after 1 December 1882, there would have been extra trains to Box Hill and Lilydale.

This volume of traffic was probably a factor in deciding to interlock the yard on 11 June 1883, when a 22 lever McKenzie and Holland "rocker" machine was installed in the new signal box on the up (or Melbourne bound) platform. Of the 22 spaces provided, 19 levers were in use and it would be reasonable to assume that at the same time, track and signal alterations would have been undertaken. Unfortunately I have not been able to find a diagram that shows the track arrangements at this time.

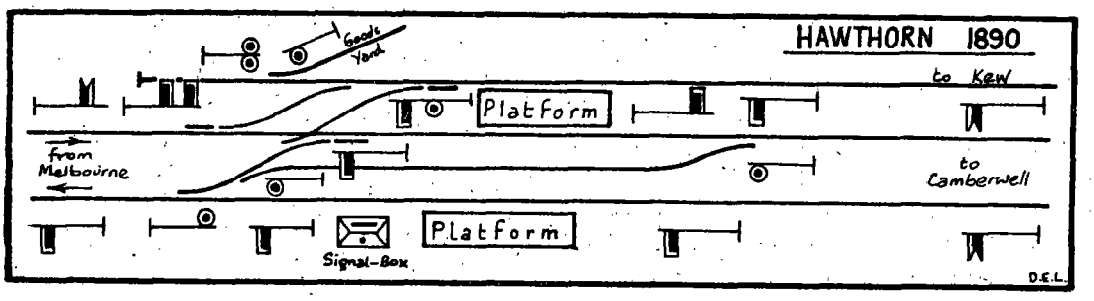
The next major change occured on 3 May 1885, when the double line to Camberwell was opened. This necessitated further track and signal alterations at the Camberwell end of the yard which resulted in an extra four levers becoming spare. Later on, these levers were put back into service with new sidings (some time in 1886), because this is the date of the first plan that I have reproduced below.



Double line block telegraph was introduced on the line at this time and at first, the signalman at Hawthorn worked block with Burnley and Glenferrie. The Glenferrie section was divided on 19 December 1887 when Kew Junction was opened. At the same time, the Hawthorn up distant signal was relocated to the same post as the Kew Junction up home signals. When Kew Junction was closed, following the extension of the Kew line into Hawthorn on 10 August 1890, the Hawthorn up distant signal was placed on the same post as Glenferrie's down distant signal.

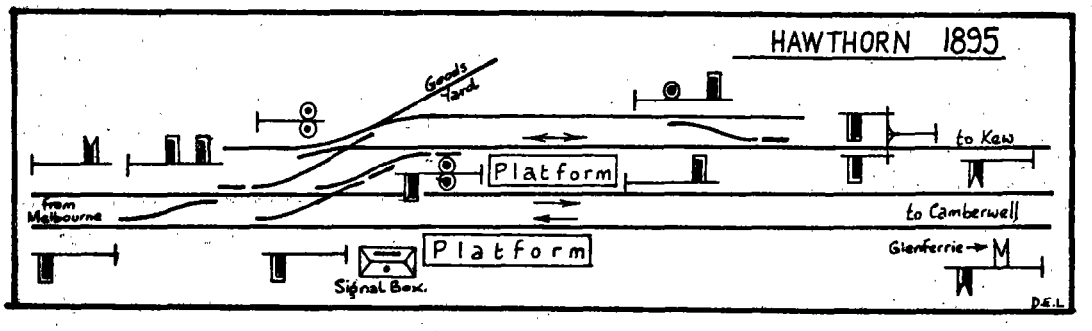
With the Kew line extension came a third platform at Hawthorn at the

back of the down platform. However, before this happened, a new interlocking frame of 34 levers was brought into service on 9 March 1890 but this frame worked the old layout for nine months. The new frame, after December, had 29 working levers and five spare.



Apparently there was some confusion as to what trains went where, when there were than two trains at the island platform and to overcome this confusion, a platform indicator was installed on 1 February 1892. It was linked up to a lever in the signal box and worked by the signalman. This meant that there were 30 levers now working out of 34.

The station yard then stayed that way until the next series of alterations in 1895. Up til 1895, Kew trains ran direct to and from Flinders Street, and any local trains at Hawthorn had to shunt out of the way each time a Kew train passed through. After the alterations most Kew trains only ran to Hawthorn where they connected with main line trains, however, during the peak periods, a couple of Kew trains went to and from Flinders Street. The track and signal alterations came into service on 6 October 1895 as announced in Weekly Notice No 15 for 1895. These alterations resulted in another lever becoming spare in the interlocking frame. The arrangements are shown below.



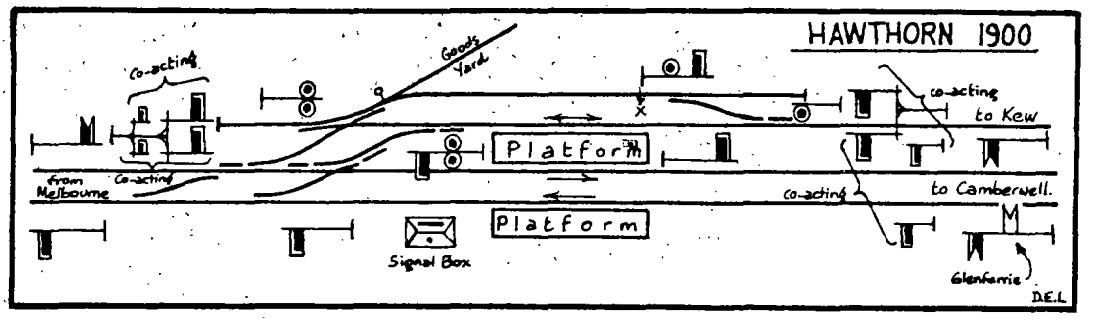
This was the basic arrangement for the rest of the century, however, there were some minor alterations that are worth noting.

On 13 July 1896, Weekly Notice No 2 notes that dwarf signals were provided, co-acting with the up home arrival signals. Co-acting arms were provided for the down home arrival signals sometime before 1900 but I have no specific reference. The down co-acting arms were mounted on the same post as the home signals but the up co-acting arms were on separate posts.

A further alteration involved the provision of a new disc signal on a new post on the Kew line facing up trains entering Hawthorn. It was provided for engines, that were changing ends of Kew trains at Hawthorn, to shunt back into the platform. Trains arriving from Kew ignored this disc signal provided the home arrival signal was cleared for them. The extra lever required brought the number of working levers back to 30. This information was contained in Weekly Notice No 43 for 1899 and the alterations came into service on 20 April 1899.

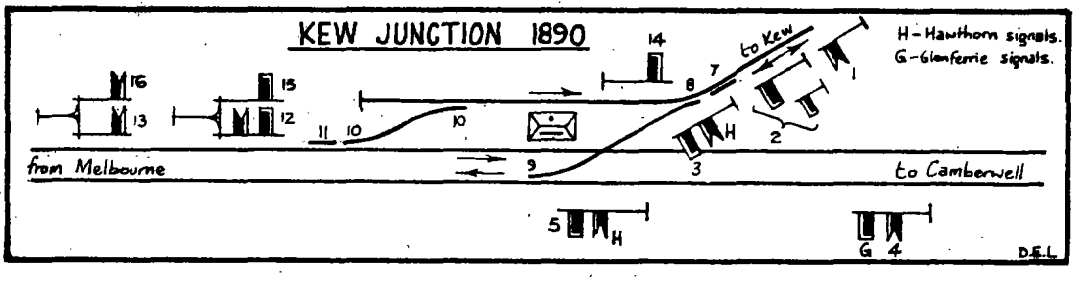
The last note I want to make is that as Hawthorn was the junction for

the Kew line, it was responsible for working the Staff & Ticket section to the station at Barker's Road. This was done by the employee on the Kew platform and he also had a lever to control the departure signal from the platform. This employee would ensure that the driver of every down train had the proper authority to enter the section before reversing the control lever, even if he only sighted the staff retained by the driver of an engine merely running round the local passenger. The arrangements at Hawthorn in 1900 are shown below.



KEW JUNCTION

For its entire life of three years, Kew Junction consisted of a solitary signal box ruling over the junction of the short branch line to Kew with the main line to Ringwood. Kew Junction opened with the branch line on 19 December 1887. An interlocked frame of 16 levers was provided and only one lever was spare. The arrangements are shown below and the information has been taken from an ancient interlocking sketch.



The diagram also shows the Hawthorn distant signals that I mentioned earlier, that were mounted underneath the up home signals. Also shown are two of Glenferrie's signals that shared posts with signals for Kew Junction.

The branch line was worked by staff & ticket while the main line was double line block. The branch line was one of the sections worked by staff & ticket to have Winter's block superimposed on the staff system. An unusual feature about the staff & ticket working on the Kew line was that, according to the 1890 Working Timetable, the staff section actually commenced at Hawthorn and trains carried the staff (or ticket) over the double line between Hawthorn and Kew Junction. (This situation has occured at other places in Victoria at various times - Ed.)

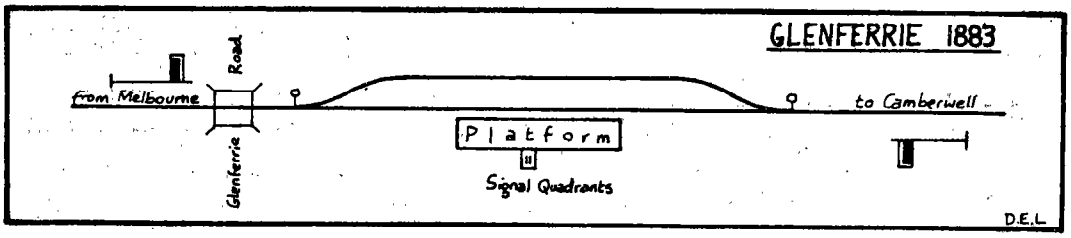
If you look at the diagram closely you will see that there are four signal posts on the branch line. Add to this the two signals at Barker's Road, the staff & ticket with block superimposed and you have what a reporter for The Argus for the period called "the safest mile of railway in the Southern Hemisphere".

Very little changed at Kew Junction from opening to closing and closure came on 10 August 1890 when the Kew line was extended into Hawthorn station as we have already seen.

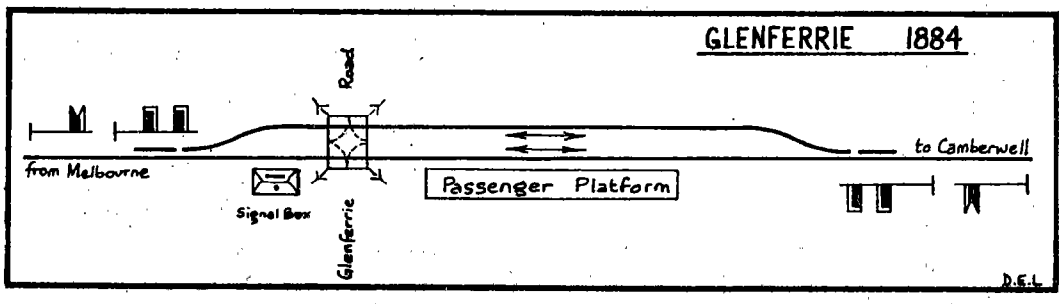
GLENFERRIE

Glenferrie opened with the line and according to the timetable published in the Booroondara Standard was a crossing station right from the beginning as well.

When the staff & ticket was introduced on 23 December 1882, Glenferrie became a staff station and trains regularly crossed each other there. At this time it had the barest of facilities as shown in the diagram below.

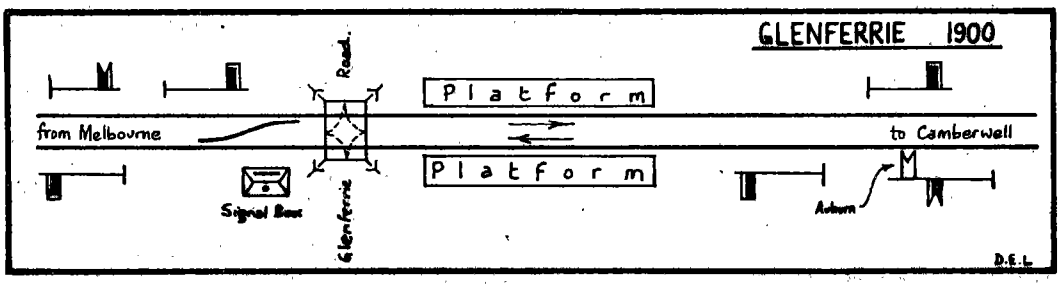


An increase in horse traffic along Glenferrie Road may have been the reason for installing a 16 lever interlocking frame there on 5 December 1883. In any case, four levers were used for the set of interlocked gates and wickets, 10 levers for points and signals, and two spare levers. The arrangements shown hereunder are similar to other locations of the period, such as Parwan.



Unlike Parwan, however, Glenferrie never had a siding for goods traffic even though it was planned to provide a siding for wood traffic at Glenferrie, at least the Booroondara Standard says so. Wood was a major commodity carried by goods trains of the period.

The layout at Glenferrie changed again on 3 May 1885 when the double line was extended from Hawthorn to Camberwell. This rendered another three levers spare leaving 11 still in use as can be seen by the accompanying diagram. As with many other stations on double line railways, Glenferrie was provided with a trailing crossover for emergency use.

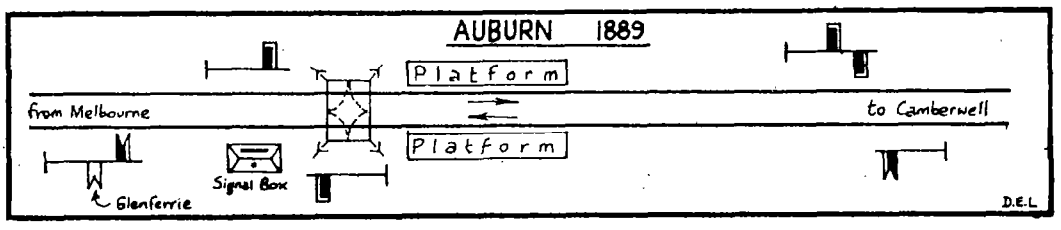


The station was completely resited to its present position in 1915 with the completion of the grade separation project and the elimination of the level crossing.

AUBURN

The station at Auburn Road opened with the line on 3 April 1882. Although I'm not sure, Auburn may have possessed a loop siding but I do not believe it was a crossing station as it was not a crossing station when the staff & ticket was introduced on 23 December 1882.

Nothing much of interest occured until duplication in 1885 when another platform was provided. We are not sure when the station became a block station using Winter's instruments but they were certainly there by 8 March 1889 when a signal box with 14 levers (four spare) was opened. The layout is shown in the diagram below.



Note that the down distant signal was on the same post asthe up distant for Glenferrie, the up Auburn distant signal had a co-acting arm and the up home and the down starting signals shared the same post. These arrangements lasted until the station was relocated to the high level in 1915.

CAMBERWELL

Camberwell was the terminus of the line when it was extended from Hawthorn in April 1882 and remained this way until the line to Lilydale was opened in December 1882. From the start, Camberwell had its own local trains, which ran at regular intervals to connect with trains to and from Melbourne at Hawthorn, however, problems were experienced in running between Hawthorn and Camberwell due to the steep grades.

It became a crossing station when the staff & ticket system was introduced and would have been provided with a home signal in each direction as well. No diagram of Camberwell exists for this period but we can say that the yard consisted of a loop and a couple of sidings for train storage.

The opening of the double line from Hawthorn would have led to an increase in traffic and as a result, an eight lever interlocking frame was brought into service on 7 May 1885. All levers were working and on 2 October 1887, a further eight lever frame was added to the original but I don't know why. The register doesn't help either in that regard.

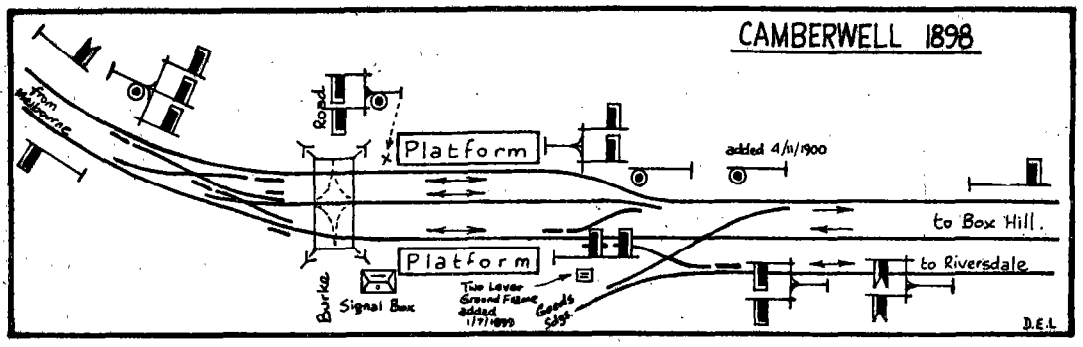
The double line to Box Hill opened on 9 December 1888 and resulted in a big change in the shape of the yard. The increased size of the yard was to much for the existing 16 levers and on 24 February 1889, a new 32 lever frame was brought into use, 12 of these levers being spare. Then on 29 July 1889, the interlocked gates at Burke Road were brought into use and this accounted for another four levers in use.

On 19 February 1890, the branch line to Riversdale and the Outer Circle Railway was opened and a new signal box was erected to work the junction of this line. This box, called "Camberwell B", had a 40 lever frame of which 10 were spare. As well, it took over some of the functions of the other signal box now called "Camberwell A". The line to Riversdale was double but unfortunately the Outer Circle line was doomed from the start.

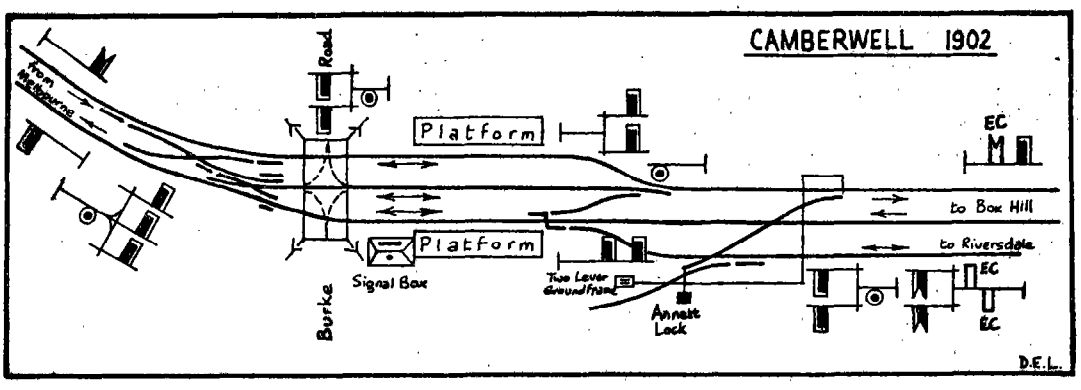
Traffic predications for the Outer Circle did not eventuate and as a consequence, the line to Riversdale was made single on 28 June 1893 and then totally closed on 30 July 1897. (For further reading on the Outer Circle Railway, A.R.H.S. 1970). With the closure to Riversdale, six levers in "B" Box became

spare and the signal box itself lasted only until 6 March 1898 when it was replaced by a temporary frame on the platform but the register does not tell us how many levers. Then on 20 March 1898 both the temporary frame and the signal box at Burke Road were replaced by a new 44 lever signal box at the Melbourne end but this time on the east side of the level crossing.

A portion of the Outer Circle line was re-opened to Ashburton on 1 July 1898 and now only two levers in the signal box were spare and my first diagram of Camberwell dates from this period.



This lasted until 1 July 1899 when control of the points leading to the sidings was taken over by a two lever ground frame located near the points. This frame was cross locked from the signal box and an extra lever was added to this ground frame on 4 November 1900 to work a disc signal for the sidings. The diagram below is taken from signalling diagram No 390 of 1902.



Grade separation at Camberwell came into service in 1915 when the level crossing at Burke Road was abolished.

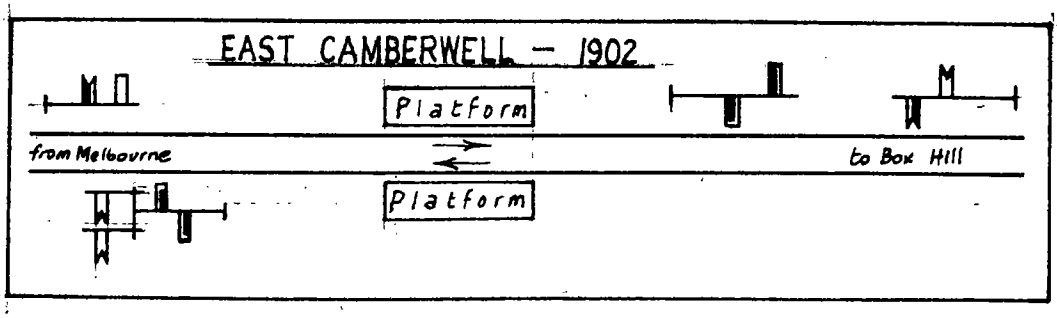
EAST CAMBERWELL

East Camberwell opened for passenger traffic sometime in 1900 as it listed in the 1901 timetable. As well as having platforms for the Box Hill trains, there was also a low level platform at the 'country' end of the station that served the Outer Circle trains that ran between Riversdale and Deepdene.

It became a block station on 5 May 1902 and the interlocking register tells us that six signal levers were provided. The diagram on the next page depicts the layout at this time.

The six levers lasted until 1915 when a 20 lever signal box was opened at the up end of the up platform. This box was provided to control the temporary Ashburton line junction but more of that another time.

The station still occupies the same site except that the Outer Circle line has long since closed, again.

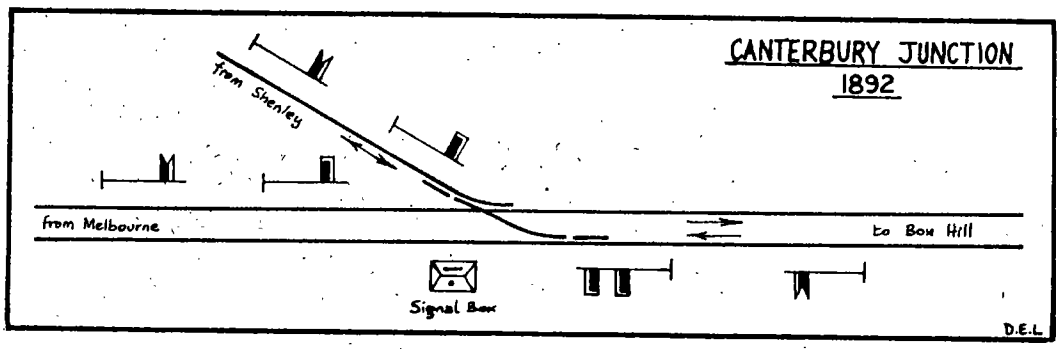


CANTERBURY JUNCTION

Canterbury Junction was the junction with the main line for a short connecting branch line that ran to Shenley on the Outer Circle line. It was located just to the east of East Camberwell.

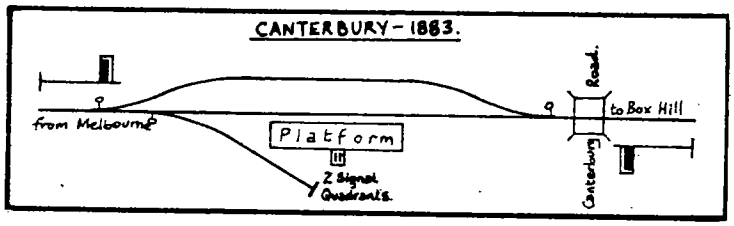
The junction opened on 15 March 1892 along with a signal box and an 18 lever frame, although only 12 levers were working as the diagram below shows us.

The junction was only ever used once for a special picnic train that ran from Collingwood to Ferntree Gully via Fairfield and return. As a result, the junction was closed altogether on 12 April 1893.



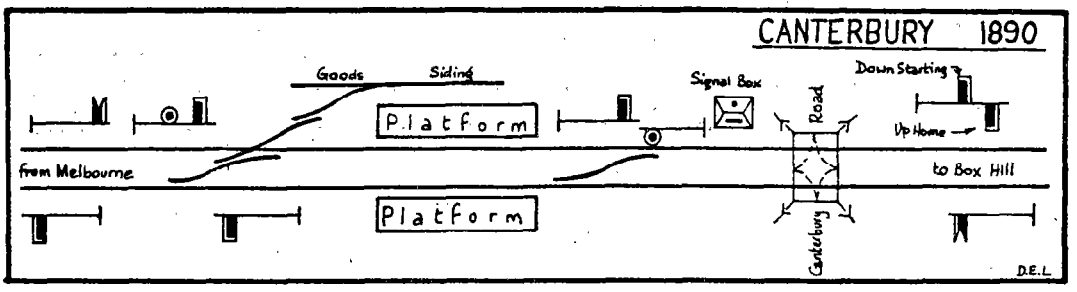
CANTERBURY

Canterbury opened with the line on 1 December 1882 and became a staff station when the staff & ticket was introduced 22 days later. At this stage it possessed a carriage dock siding as did a few stations at this time. The arrangements are shown below.



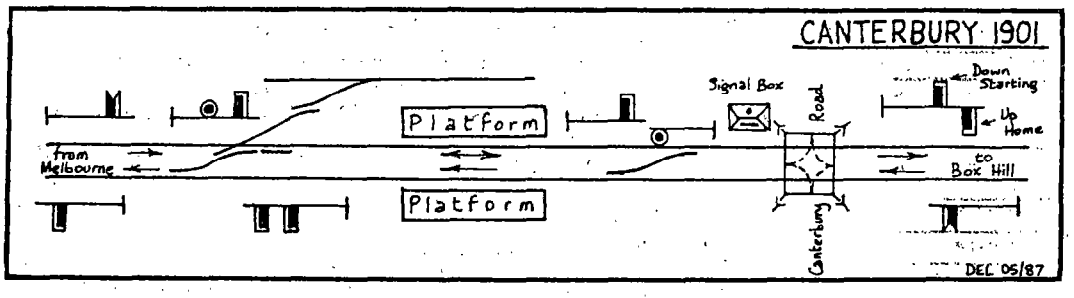
The double line from Camberwell to Box Hill opened on 9 December 1888 and this gave Canterbury an extra platform. Supposedly, the carriage dock was still there but I don't actually know. There may have been a crossover there as well. We do know, however, that Canterbury had a pair of Winter's block instruments and as there was no signal box, the instruments would have been in the station master's office and the signals worked from platform levers.

The signal box opened on 4 August 1890 and it had a 20 lever interlocking frame with 14 levers working. The gates at Canterbury Road were connected on 2 September 1890 and this took up another four levers. The arrangements at this time are shown on the next page.



During the time that Canterbury Junction was about, there would have been one or two signals from both boxes on the same posts.

By 1898, Canterbury had its own local trains which terminated at the north side (down) platform and originated at the south side (up) platform. Special instructions were issued for the shunting of these local trains. The 1901 timetable gives the local trains between three and eight minutes at Canterbury before they returned to Flinders Street. In this short time, the engine would have to change ends and then shunt the carriages to the other platform. This was quite a hectic piece of shunting even for those days. Eventually the authorities did something about it by allowing the local trains to depart from the same platform that they had arrived at. To do this, the two spare levers were brought into service on 4 April 1901 to work a lock bar and an extra home signal. Later on, a platform indicator was installed on the down platform. The arrangements are as below.



Canterbury station was resited in the 1960's when the grade separation project at Canterbury Road was brought into service.

CONCLUSION

When the century turned, the line between Hawthorn and Canterbury was starting to become the suburban passenger line that it is today. To show the change in traffic on the line, in 1901, there were 148 trains through Camberwell each weekday while in 1983, 342 trains passed through. Indeed, by 1910, the number had risen to 158.

The Hawthorn to Canterbury line is part of the heavily trafficked railway line that serves the densely populated eastern suburbs of Melbourne. It has grown from being a country branch line to become a major part of the Melbourne suburban rail system.

ACKNOWLEDGEMENTS

I would like to thank the following people who helped in the compiling of this article. Ian Powell of the Hawthorn Library who provided notes and films of the Booroondara Standard and Jack McLean of Box Hill who allowed me to constantly refer to his enormous collection of documents relating to railways in Victoria. My thanks to you both.

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BIBLIOGRAPHY NOTES

PRIMARY SOURCES

All the primary sources were very useful in the researching of this article and provided a firm foundation for collecting material. The Latrobe Library held the Harrigan and Rolland collections, BRADSHAW'S GUIDE, and the Public Timetables. The Harrigan and Rolland collections were subject to limited public access and as time went on, access was shut off altogether. The Public Timetables and BRADSHAW'S GUIDE were freely accessible at any time.

Information from the V.R. INTERLOCKING REGISTER came directly from the railways themselves and was only available during office hours and when the railways were not using thme. The other V.R. items came from the three collections mentioned. I have already mentioned the restrictions placed on the Harrigan and Rolland collections but with the McLean collection I just could not get round there enough. The BOOROONDARA STANDARD is held by the Hawthorn Library and was freely available.

SECONDARY SOURCES

All the books I used are freely available at either the Hawthorn Library or the Latrobe Library. All were helpful to some degree but THE OUTER CIRCLE RAILWAY by Beardsell wasgood because it concentrated on railways as did RETURN TO ROSSTOWN by Jowett but that was a bit out of the way.

The periodicals all had items of information relevant to the topic. All these issues are available at the State Library, although I own some of them. Overall, the periodicals were better than the books because they concentrated on railway history and railways in general.

Finally, in regard to both primary and secondary sources, my research was often restricted by the rules of the boarding house at Scotch College.

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BALLARAT TRAMWAYS
"FOREST CITY" SIGNALS

The following comprise the complete installation of signals to incidate movement of trams over single tracks between the blind loops of the Gardens route.

Between Victoria Park Loop and Carlton St. Loop
" Carlton St. Loop and Gardens North Loop
" Gardens North Loop and Car Sheds Loop
" Car Sheds Loop and Martin Ave. Loop
" Martin Ave. Loop and Macarthur St. Loop
" Macarthur St. Loop and Mill St. Loop
" Mill St. Loop and Sturt St.

The signal system is operated by the contact of trolley wheel with insulated strips called contactors; those in the postion of a tram about to leave a loop are known as setting contactors, and those near the entering end of the loop are restoring contactors. The necessity of the trolley wheel remaining in contact with the trolley wire when running through the contactors, requires that the speed of the tram shall not exceed 10 km/h., and to avoid arcing, power should be cut off at controller.

The arrangement of this signal is such that when a RED light is showing at one end of a single track section, there must be a GREEN light showing at the other end, and vice versa. It is necessary for motormen to clearly understand that these signals are a self operated system and give only an indication of the condition of the section of single track concerned. When no light is showing it indicates that the section is empty of trams. When a RED light is showing it indicates that there is a tram in the section movind towards the RED signal. When a GREEN light is showing it indicates that there is a tram in the section moving away from the GREEN light.

It is now to be understood that a motorman arriving at a loop finding a RED light showing, is not free to proceed any further until the tram in the section arrives and restores the signal to blank. Should the motorman however, ignore the RED (danger) signal, he cannot get a GREEN (all clear) signal owing to the interlocking of signal circuits. When the signals are black (No lights), the movement of tram under the contactor near the leaving end of the loop gives the GREEN signal and the motorman is all clear to proceed to the next loop.

The location of contactors and signal boxes is arranged so that, should the GREEN signals not be obtained or a RED signal light up, the tram can be stopped before arriving at the points at the leaving end of the loop. In the former instance, no light would indicate one of the two faults:-

1. Trolley wheel did not make the necessary contact with contactor.
2. That the signal circuit is out of order.

To prove which fault exists, the car must be reversed so that the trolley wheel runs back into the contactor. If still no signal this would indicate a fault in the signals and the tram cannot proceed. In this case word should be sent at once to the traffic office, and providing no RED light shows up meantime, it may be possible to obtain the services of a passing motorist to act as pilot to the tram over the faulty section.

If in passing over the contactor a RED signal appears, this indicates that another tram has entered into the section from the opposite end first, and inasmuch as the tram has passed the setting contactor it will be necessary to return to the contactor so that a signal be obtained as soon as the other tram arrives and clears the RED signal.

In connection with trams running in duplicate, such as to and from the depot, in which case the first tram will operate and clear the signal, the general rule to be observed is that no tram will follow another tram through a

single section unless it is within 100 yards of the preceeding tram and advises the preceeding tram accordingly. If a greater distance separates trams, the second tram will wait until the first tram clears the signal before it enters and obtains its own proceed signal. Thus the showing of a GREEN light does not give all clear unless it is switched on by the tram entering the section, or as stated, the second tram is within 100 yards of the tram which did operate the signal.

If the power goes off, all signals are immediately put out and in this respect the resumption of power requires special consideration. When a tram is in a signal section and power goes off, the motorman must realise that the RED signal will not be showing at the loop he is approaching, and with continuous use of gong around any curves and blind spots, and by extremely cautious driving, he will resume his progress through the section. There must be no attempt at this juncture to make up any lost time.

Similarly any tram not in a signal section when power goes off, must, upon resumption and approach to signal controlled section, make as certain as possible that there is no tram in the section he is about to enter by referring to time schedule, and as to where other trams are normally passed. If possible make use of a passing motorist to act as pilot through the section and proceed through the section very cautiously, and by use of gong and reduced speed in blind areas, be prepared to stop at the shortest notice.

In order that all motormen be aware that power has been off, the power if interrupted, will not be restored in less that 1 1/2 minutes in daytime.

To meet special requirements of trams running to Victoria Park only and Haddon St. only, the circuits are arranged so that the trams returning to the city from the intermediate terminus restores the signal originally set when passing from the Victoria Park Loop or Haddon St. Loop as the case may be.

Additionally, to meet the requirements of trams running to and from the depot, the circuit between the Car Sheds Loop and Gardens North Loop is arranged so that:-

1. Trams from Gardens restores the signal near depot entrance so that when the tram does not go further than the depot the signal is cleared.
2. Trams from Car Sheds Loop clear the signal near the entrance to the depot so that if "running in" the signal is cleared, but if continuing to the Gardens the signal is re-set after passing the points.

A supplementary signal box is installed at the depot entrance to govern the tram's progress beyond the depot.

This signal which is in circuit with the boxes at the Car Sheds Loop and Gardens also governs cars commencing from the depot and running out via Sturt St. West.

Trams running out from the depot via Drummond St. North do not operate any signal until leaving the Car Sheds Loop. It is important to remember that a depot tram must not clear the signal at depot entrance if following a service tram running to the Gardens. In this case the pole must be changed to the depot wire before reaching the contactor.

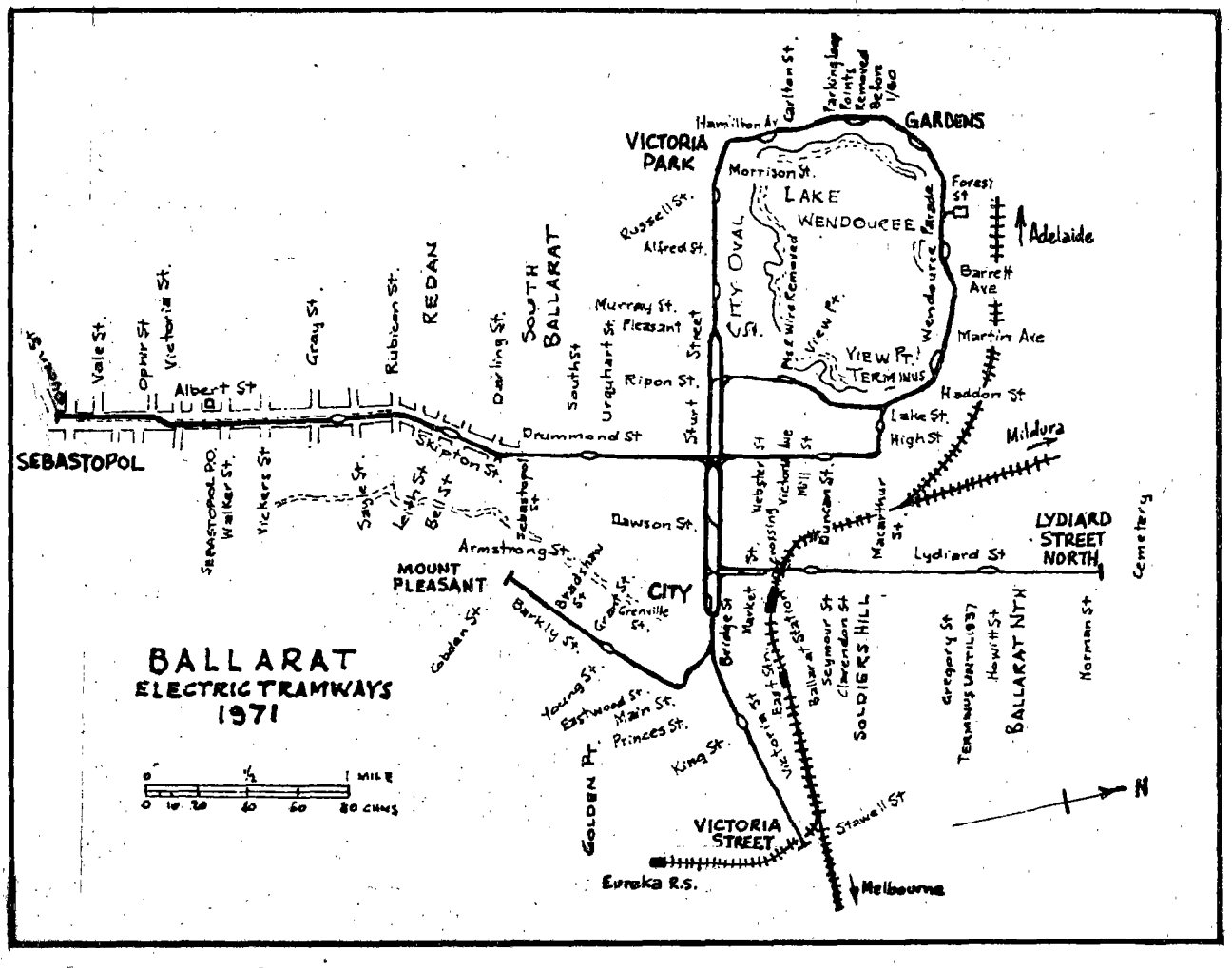
The Victoria St. and Mt. Pleasant routes will be signal controlled between Grenville St. and the Loops at King St. and Grant St. For trams from the city, the contactor is situated near the points at Grenville St. and an additional signal is incorporated for the section from Grenville St. to Main Rd.

A selector switch is placed on this pole at Grenville St. which can be operated without leaving the tram. This has three positions, Victoria St. -Off - Mt. Pleasant. Trams to the East routes will be required to set the switch to their respective Route, and trams only shunting at Grenville St. will set the switch to the "off" postition so that no signal is operated.

On the North side of Bridge St. will be seen two signal boxes, the left hand or north box being the Victoria St. box; the other box, Bridge St. only.

On the South side pole is the Mt. Pleasant box. No car can proceed to the east against a RED signal in the Bridge St., but so long as both the Bridge St. box and the route box required are clear, the tram can get his signal and proced. The arrangement of circuits is that the Bridge St. signal is cleared near Main Rd., and the other signal at the Loop concerned according to route.

On the trip into the City, the usual signal will be obtained at the outer Loop, but at Bridge St. the signal there will indicate the condition of this street. If box is clear, a proceed signal is obtained from setting contactors suitable placed and later restoring contactors clear the outer Loop signal. Near Grenville St., the Bridge St. signal is cleared by a restoring contactor.



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GLENELG TRAMLINE DEVELOPMENTS

During October a prominent Adelaide landmark virtually ceased to exist. Known to many tram travellers on the Glenelg line as that place in Angas Street which housed the tram cars and, officially, as City Depot, it despatched its last car into serivice on 18 October 1986. Inside its massive timber beam and iron clad shed the fleet of trams were stored and maintained on the 10 parallel tracks which fanned into the depot from a single track in the middle of Angas Street. Trams entering and leaving the Depot did so at some risk to motor vehicle traffic in this busy Adelaide thoroughfare. The structure of the Depot was completed in 1923 and the first tram worked out of it on 9/12/23.

The Administrative Offices facing Victoria Square were opened on 6/5/33 and the Depot continued as an exclusive tram depot with 19 tram bays until late in 1958 when, following the closure of the remainder of Adelaide's street tramway network, it became Adelaide's only tram depot housing the H class tramcars which were retained to operate the Glenelg line. In 1965 a number of tracks in the Depot were removed to alow it to take in 30 buses. In 1966 the tram tracks in Victoria Square were altered to fit in with the redevelopment of the Square by the City Council. Prior to that time the Glenelg cars arriving in Adelaide terminated at a the aproximate location that they do today. The empty cars then proceeded in an anti-clockwise direction to a loop next to the old Moores store on the western side of the Square. Departing trams turned left into Gouger Street and then right into King Williams Street. A track proceeded across the intersection into Angus Street to the Depot.The track arrangement in the Square allowed tramcars to be turned and before the loop was closed in December 1966, some of the cars were run around as necessary so that the No 1 end of the car was at the City end of the tram. The purpose of this excercise was to facilitate the maintenance of the car's compressors in City Depot.

Staff and vehicles from the Depot actively participated in the celebration of the Centenary of Adelaide Street Transport in 1978 and again late in 1979 for the Silver Jubilee of the electric Glenelg Tramway. By 1980 the structure of the Depot was beginning to show its age and, also, STA management began to realize that the depot was located on a prime piece of Adelaide real estate, the value of which was escalating rapidly as more new buildings were being built in the in the Victoria Square precinct. The Hilton International Hotel overlooks the expansive tin roof of the old Depot.

The question of the ultimate fate of the Depot was raised in 1983 when the option of re-development or re-siting of the home of tramway operations in Adelaide was considered by STA. Traffic studied seemed to indicate that if re-siting of the Depot was contemplated, then it should be at a site nearer to the Glenelg end of the line to reduce "dead" running. STA already owned a large block of land situated between Anzac Highway and the Morphettville Racecourse at Glengowrie. The land was a former terminus of a branch from the old North Terrace line to Glenelg which was closed in 1929. The land was being used on race days as a car park. Although this land was suitable for a Depot it was not as ideal as the land also being used as a car park on the southern side of the tramline and adjacent to the western side of Morphett Road. Negotiations began between STA and the owners of the site (Highways Department) and the SA Jockey Club (to whom the land had been promised should the Highways Department wish to divest). At one stage the Jockey Club went public with its objections to the sale, however, agreement was reached and STA acquired a long, narrow site with its western boundary being the Sturt River. A significant advantage for the site was that a depot constructed thereon could be administered from the nearby Morphettville Bus Depot thus reducing costs.

Consultants were appointed for the project in June 1984 and the planning submission was made to the State Planning Commission in December 1984.

Construction of the Depot began in September 1985 and all main building works were completed by August of this year. The Depot was officially opened on 9/10/86 by the minister of Transport, the Hon. Gavin F. Keneally.

Tram tracks extend the full length of the 500 metre site and cross Maxwell Terrace to link the Depot with the main City to Glenelg tramline. The Administrative Building, catering for tram crews and revenue staff, is located at the northern end of the Depot. A combined Tram Barn and Workshop situated approximately half-way along the site, has facilities for housing 17 of the 21 trams in the fleet. Four will be stored outside . Trams enter on the Eastern line where they are inspected then marshalled into the barn from the southern end of the Depot on either of the two through tracks, or placed on the maintenance siding. Two storage sidings are provided at the south end for trams awaiting repairs and a body or major overhaul track runs into the barn from the northern end. Glengowrie Depot has 1350 metres of tracks (320 metres inside the barn and 1030 metres outside) and nine switches. The Depot is connected to the tramline by means of a triangle with one leg of it being Down or Glenelg-bound track. Crossovers in the tramline at the eastern and western ends of the triangle connect the Up track into the Depot. A rudimentary signal system has been installed at the junction. The signals are the same as motor vehicle traffic signalsl and display only stop and go indications. Three of the signals have green arrows to indicate the route set by the automatic switching system. The system is activated by a motorman from a control box in each driving cab of a tram.

When the line was opened as an electric tramway in 1929 the then Municipal Tramways Trust had intended to equip the then new H class with pantographs instead of the usual trolley pole current collector. The overhead between South Terrace and Brighton Road was strung in a catenary fashion to allow for the use of pantographs. In 1935 the M.T.T. installed different pantographs on some of the H class cars and conducted experimental operation with them. Car 376 was equipped with a German Siemens Schuckert pantograph,377 had an English Ficher Bow Collector fitted, 378 was fitted with a Swedish ASEA pantograph, car 379 had an English Metropolitan Vickers pantograph on a raised tower and car 380 was fitted with an English Electric unit. The pantographs were only used during single unit operation and trolley poles had to be used for coupled set operation. From photographs of the cars it appeared that the experimental pantographs were fitted in the centre of the roof of each car and thus each car would have had the two trolley poles in addition to the pantograph. The cars on which the trials were carried out are generally not the same as those which carry those numbers today due to re-numberings and scrapings that have been made to the fleet since 1929. The trials were not successful due principally to the straight overhead which caused uneven wear on the collector plates. The overhead of an electric train system is staggered so that when the train is moving the wire zig-zags across the collector bar of the pantograph to even out the wear on the carbon shoes. The catenary overhead remained in position until its removal in 1953. The end support towers for the catenary wires are still sta nding at the Brighton Road stop. The trolley pole collection system does have its disadvantages. Apart from the time-consuming exercise of changing poles every time the tram was required to change the direction of travel, a dewiring pole could be both spectacular and damaging to the overhead system. A pole which dewired at speed usually provided an interesting display of arcs and sparks as it contacted various parts of the overhead wiring. Dewires were most likely to occur at switches where the trolley pan in the overhead system directed the trolley wheel onto the right wire. When it missed a dewire would result

From the outset the design of Glengowrie Depot did not allow for the use of trolley poles within the site and all tramcars were to be fitted with a

pantograph current collection system. The overhead has been progressively renewed with newer suspension materials to allow for the efficient operation of pantograph equipped tramcars.

Tram services operated from City Depot on 18/10/86 and from Glengowrie on 19/10/86. Very little time for relocating equipment, rolling stock and employees was allowed but STA arranged the move with no noticeable effect on tram services. The majority of the conversion work on the tramcars was undertaken on 18/10/86 and early on the morning of 19/10/86 the overhead wires in Victoria Square were completely renewed and rearranged for pantograph operation. Tramcars 355 and 378, which are still painted in the old silver and carnation red livery common on the entire H class fleet between 1956 and 1973, still remain in the old City Depot. The future of these cars is unknown.

The Public Office at City Depot closed on 17/10/86. Glengowrie Depot has no public office facility and all such enquiries should be made at the Morphettville Bus Depot further south along Morphett Road.

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LETTERS TO THE EDITOR

From Jack McLean

Dear David,

Further to all that stuff about Time Interval and Telephone Block, I would like to add that in Victoria, we had a system of block working, which for want of an official title, most have called "Sight Block". Not only was it used on Staff and Ticket, but I actually travelled on a train on sight block sections in 1939.

The Altona Line use to have a shuttle service which caused no one any trouble from one week to the next, but every now and then, they had races at Williamstown Racecourse. Located a little south of Mobiltown stations, this stations also now closed, there was an island platform and an interlocked signal box. On race days, Williamstown Racecourse was opened as a staff and ticket station, working with Newport South Junction on the Up and with Altona on the Down.

I was lucky to be able to go to the races on Saturday, 26 August 1939. My copy of S 2754/39 shows that there were eleven seven car electric trains, some of them Dog Boxes and some Taits, as well as a Horse Box train from Newmarket and another from Mordialloc. When the races were over, the patrons wanted to get home as quickly as possible and the idea was to get them into a train and get it away so that another could come into the platform. It seemed that it didn't matter how far the train got on its way, as long as it left the platform fre for another train.

Between Newport South Junction and the Racecourse, there were three little Block Posts called Levers "A", Levers "B" and Levers "C". I think Levers "B" had a telephone but the other two had nothing except the two lever ground frame and a small hut for the bloke to get in out of the rain or sun. These three were 'Sight Block Posts', my term. The two Home signals, one each way, were on the same post. When a train on ticket departed from the Racecourse, it went past Levers "C" and when it passed, the bloke there put his Home signal to Danger, and that was the signal for the signalman at the Racecourse signal box to let the next train go. When the first train had gone past Levers "B", the bloke there put his Home signal to Danger, and that would be the signal for the bloke at Levers "C" to lower his Home signal for the second train to go from Levers "C" to Levers "B". Now this was a Staff and Ticket section, but the same idea was in use until just after World War 1 on the Flemington Racecourse line (including Franklin Street to Newmarket-Ed) and until about 1915 on the Caulfield line.

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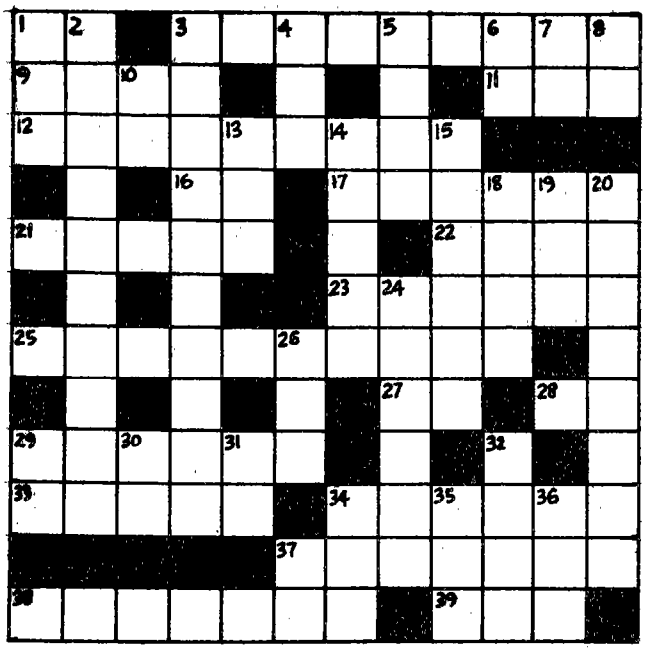
S.R.S.V. CROSSWORD No 19
compiled by Stephen McLean



ACROSS:

1. Notice a SAR car (2)
3. Found on double lines, and on the Noojee line (9)
9. Rubbish! Nothing to see at this remote NSW location (4)
11. He won't be seen at stations with 2 down (3)
12. Battle urn dug up in loco depot(9)
16. Breakvan was part of Bruce's train (2)
17. Early locomotive on the Rock Island RR (6)
21. "Eagle" or "Owl" could be suitable name for a train (5)
22. Rare speed for 3 across in Victoria (4)
23. Where video has replaced the piano as entertainment (6) (6,4)
25. Safety device worked with clocks
27. Late arrival - last thing you'd expect at Dimboola (2)
28. Tour group is removed from fourth carriage on Intercapital Daylight (2)
29. Colourful NSW station (6)
33. State of a QR terminus (5)
34. "Up in by..." could be message to control from this end of double line (6)
37. Is final arrangement of signals(7)
38. A tram terminus whichever way you look at it (7)
39. When broken down, this power van is often seen in graphs (3)

DOWN:

1. Hobart half closed - what a picture! (3)
2. Point operating system could be wide or blue (6,4)
3. The connection between two carriages (10)
4. No batchelor seen where the Trans-Canada line crosses the Algoma Central (3)
5. Shift soil to make grain storage area (4)
6. Once you could find this at Flinders Street - now you need to go to Helsinki (2)
7. One of the old electrics used at Arthur's Pass (2)
8. Track seen in Mordialloc and Seaford, Gardiner and Jordanville (2)
10. A diesel and a steam loco on the point of entering traffic (2)
13. Spanish railcar set seen in the terminus (3)
14. The sort of railcar which makes British Rail sick (5)
15. On average this station is 241.5 km from Melbourne (6)
18. Victorian opposite of straight!(4)
19. There's always a scramble for this in the buffet car (3)
20. A lot of lines have had this lately, but the Blue Mountains line has had it for years (3,5)
24. From cool Bundaberg, go north to this closed commuter terminus (6)
26. Pencilpoint abbreviation for a suburban terminus (3)
29. To return on time (2)
30. This counter is not found in a refreshment room (4) (1,1)
31. Two locos return to standard gauge
32. Adjacent location to Wood Wood in V/Line public timetable (4)
34. Boy seen on UP (3)
35. To be expected from a Japanese ticket checker (3)
36. Type of fogsignalling not used on our railways (3)
37. NSW car near flashing lights on fast line (2)