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Dead line for May 1979 issue is 22 April 1979.

SIGNALLING ALTERATIONS

- 12/12/1978 CROYDON. Nos 3 and 4 road, Cool Store Siding and Goods platform were abolished. Discs on posts 2 and 4 were removed and posts 7 and 9 were abolished. No 15 points were spiked reverse and lever 15 is now a Pilot lever. No 25 points were spiked normal. Levers 17, 20, 22, 25 and 29 sleeved normal.
- 14/12/1978 FLINDERS STREET "A" BOX. The top arm on post 21 now worked by lever 212 inlieu of 206. Lever 206 was removed from the frame.
- 18/12/1978 MOOROODUC. The staff and annett locks and connections to the goods siding were removed. The Staff/Annett Key exchange apparatus was abolished.
- 19/12/1978 CASTLEMAINE. Signalling diagram No 13'78 was issued and diagram No 2'59 was cancelled. The crossover from the Maryborough line to No 2 road (Down Main Line) was removed. The Car Dock siding at the up end of the up platform was also removed. Post 7C, the disc on post 6 and the two bottom left-hand arms on post 4 were abolished. Levers 46, 66, 67, 71, 73, 84 and 85 were sleeved normal.
- 20/12/1978 GALVIN. Two flashing flourescent light signs displaying "ANOTHER TRAIN COMING" has been provided at the flashing lights at Kororoit Creek Road level crossing. The signs work in conjunction with the flashing lights.
- 21/12/1978 LINTON was closed as a staff & ticket station, the new section becoming Linton Junction-Skipton. The plunger locking and home signals were retained.
- WN 2/1979 JOLIMONT JUNCTION-RICHMOND. Signalling diagram No 9'78 was issued and diagram No 1'76 cancelled.
- 27/12/1978 ULTIMA. The railmotor dock and annett locked points were abolished.
- WN 2/1979 MURTOA. A hand locking bar was provided on the points from No 4 to No 5 road at down end. The hand points at the up end of the crossover were altered to lie for No 5 road inlieu of No 4.
- 9/1/1979 LINTON. The plunger locking and home signals were abolished and replaced by staff locks.

10/1/1979 MALMSBURY was closed as a double line block post. All signals and safeworking equipment were removed. The siding points were spiked normal pending removal.

WN 3/1979 TALLYGAROPNA. A composite staff exchange box was provided, together with compo staffs for the sections Shepparton-Tallygaroopna and Tallygaroopna-Numurkah.

15/1/1979 BLACKBURN. The Cool Store siding and Goods Siding were spiked out of use.

21/1/1979 MACLEOD. Post 5 (down home signals) was relocated 21 metres in the up direction a/c future track works.

WN 4/1979 BATMAN-UPFIELD. Signalling diagram No 12'78 was issued and diagram No 23'70 was cancelled.

WN 4/1979 NYORA. A staff exchange box has been provided.

25/1/1979 SEAFORD. The 5P key operated switch for F1257 was relocated onto the wall of the new station building.

WN 6/1979 DANDENONG. Dwarf No 53 was moved in the down direction and is now adjacent to dwarf No 54.

1/2/1979 MARYVALE. Staff locks were provided at both ends of the Shire of Morwell Industrial Sidings. The points are rodded to catch points in the loop siding.

4/2/1979 FLINDERS STREET "E" BOX. Dwarf No 781 was moved 46 metres in the up direction a/c track realignment.

WN 7/1979 WALPEUP. Guard in charge of safeworking unless trains are to cross.

11/2/1979 MELBOURNE GOODS YARD. Flashing lights have been provided at the following locations: Footscray Road; location 23 (including co-ordinated traffic lights), Victoria Dock entrance; location 28, Union Steamship Co. entrance; location 27 and at North Wharf Road entrance; location 26. An automatic security gate was provided at the Melbourne Yard boundary on the Piggott Street line and six dwarf light signals provided to control movements in the area. These signals are controlled by push buttons at various locations and are self cancelling after the movement has cleared. The dwarf signals controlling moves across New Footscray Road are controlled by approach sections and the up signal has a 5P key operated switch to suppress operation as required.

15/2/1979 GISBORNE. Up home signal, post 5, and down home signal, post 2, have been electrically lit.

(continued on page 18)

V.R. SIGNALLING HISTORYNo 8. HORSHAM

by Jack McLean

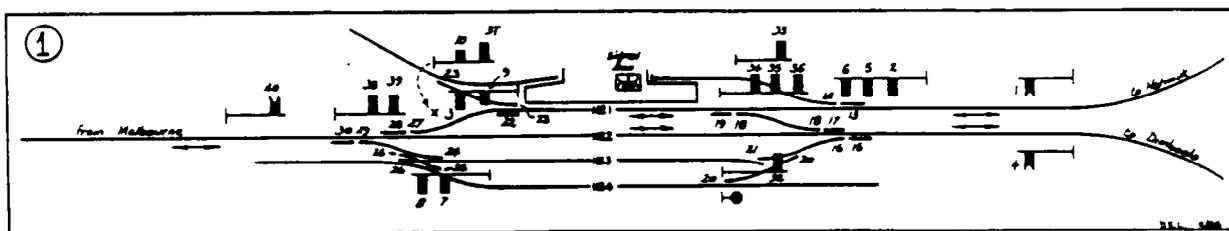
The line from Murtoa to Horsham was officially opened on 5 February 1879, making Horsham one hundred years old this year. Jung Jung was opened on 14 April 1879 and Dooen on 1 August 1879. The line to Dimboola was officially opened on 1 July 1882, with Pimpinio and Wail opening on 1 August 1883. Dahlen Siding opened on 15 March 1910.

Staff and ticket working applied from the outset, the section shown in the WTT of 1 March 1879 being Murtoa-Horsham with Jung Jung becoming a staff station later that year (perhaps on opening?). The 1883 WTT shows the sections on the down side to be Horsham-Pimpinio-Dimboola. Pimpinio was closed as a staff station on 17 August 1893 and Wail was opened as such, six days later.

When the staff and ticket was replaced by large electric staff on 22 June 1898, the sections were Jung Jung-Horsham-Pimpinio; Pimpinio replacing Wail as a staff station that day.

Miniature electric staff replaced large electric staff in 1913, being listed from Jung (renamed in 1904) in Weekly Notice No 25 and to Pimpinio in Weekly Notice No 30. Dooen, which became an electric staff station on 21 December 1911, was provided with switching instruments on 12 July 1934 with the long section being Jung-Horsham. Pimpinio was similarly equipped on 6 September 1934 in the long section Horsham-Dimboola. On 22 March 1961, Jung was also provided with switching instruments, together with a new frame in the new station building, making a (very) long section Murtoa-Horsham. This gave Horsham five miniature staff instruments, the only place in the state (perhaps Australia) to have such an array.

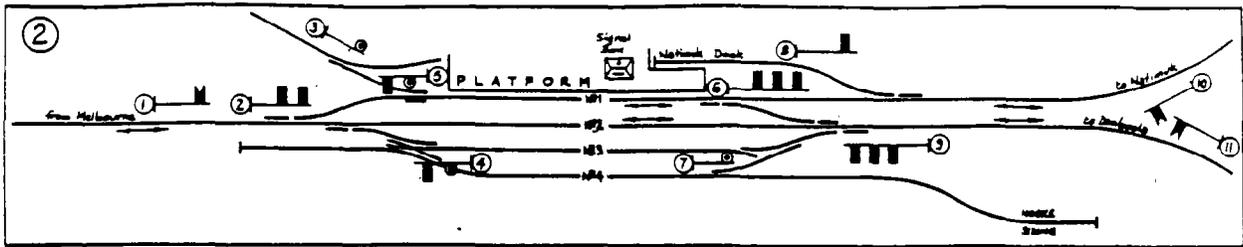
On the branch, which was opened to Noradjuha on 25 August 1887, staff and ticket has been worked on a number of different sections, except for the period 1927 to 1944 when Horsham was the Controlling Station for the Division Horsham-Balmoral under Train Section Orders.



It is fortunate that a copy of the interlocking sketch dated 21 November 1887, that showed the interlocked points and signals which were to be worked from the 40 lever No 6A pattern rocker interlocking frame, has survived. It is from this sketch that Figure 1 has been drawn but the sketch has some pencilled additions which, when the interlocking was installed on 25 September 1888, show that the multiple armed home signals along with the up distant signals, were not the bracket signals originally envisaged.

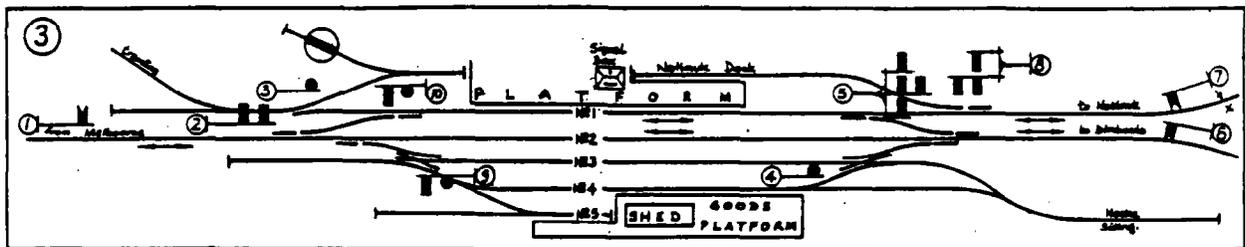
Figure 2 is drawn from information in Weekly Notice No 31 of 1902 and shows that the aforementioned posts were, in fact, single posts at that time. The diagram seems to have been issued for the lengthening of the platform road at the up end.

Horsham, like so many staff stations of that era, was one



where the platform road was on the loop, No 2 road being the straight road. The Noradjuha line was an extension of the platform line at the down end.

The 1909 lithograph DIAGRAM, depicted in our Figure 3, shows the bracket signals at the down end, the down home arrival signals did not become bracketed until 1914.



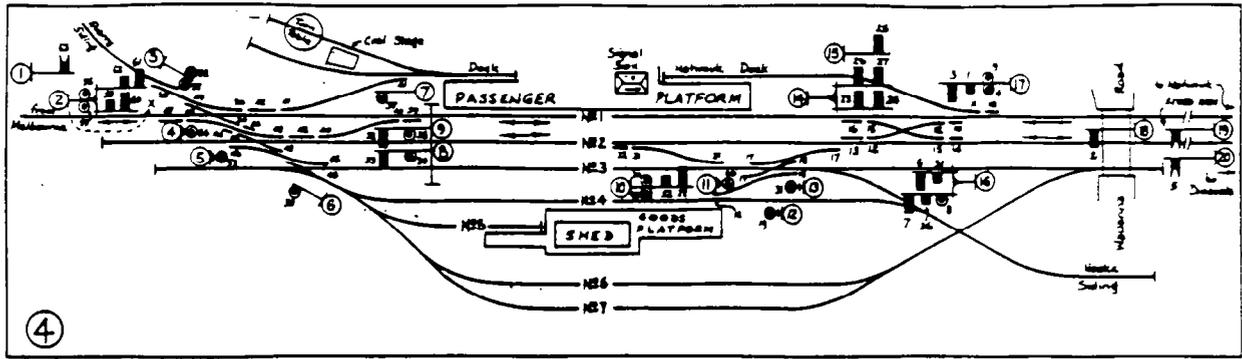
On 2 February 1922, a crossover was installed between Nos 2 and 3 roads, which increased the working levers by 3, the size of the frame remaining at 40 levers.

A new interlocking apparatus of 63 levers was installed, apparently in the same building, on 13 December 1925 and the yard re-arranged, the main line at the up end becoming an extension of the platform road. The number of signals was increased to 35. Tracklocking was completed on 23 August 1935 and with the addition of the calling-on arms, the number of signals was increased to 40. The results of the 1925 and 1935 alterations are shown in Figure 4 which is on the next page.

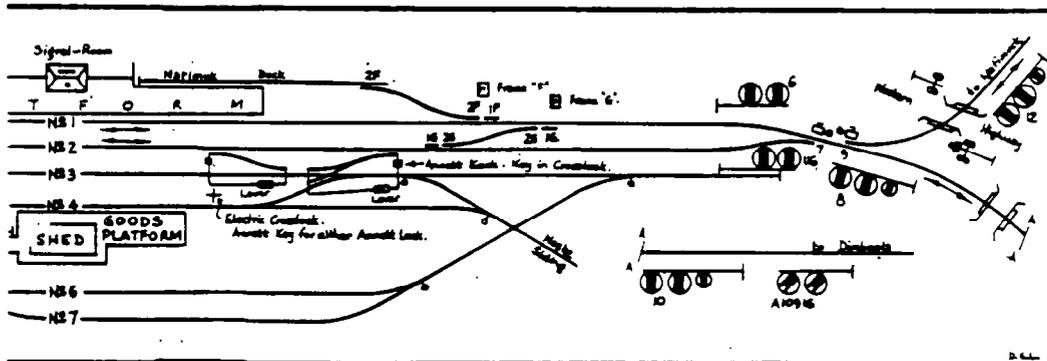
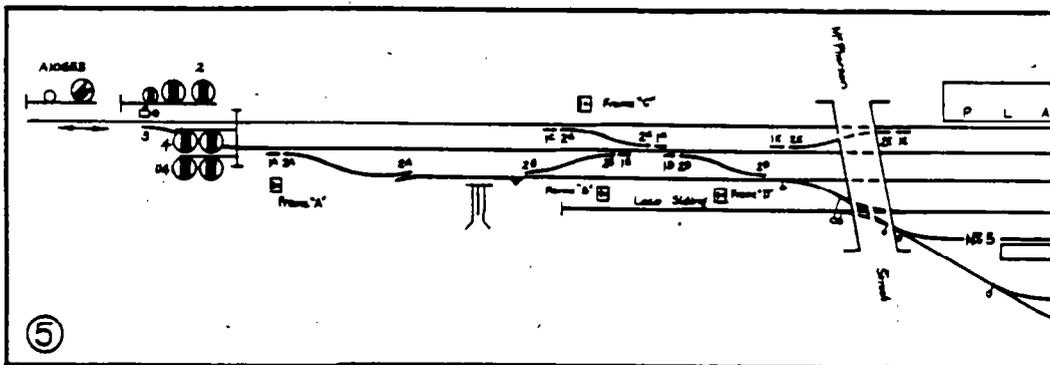
On 8 November 1965, post 8 & 9 were replaced by a lop bracket (post 9) erected on the platform side of the track. These posts were formerly on a signal bridge that was demolished by a shunting accident.

On 9 March 1970, the car dock, coal stage and turntable roads, together with associated signals, were taken out of service to enable the provision of the over bridge now at the up end of the platform and the alterations to the interlocking were made on 12 May 1970. With the opening of the road overbridge on 20 December 1971, the hand gated level crossings at McPherson St and Wawunna Road were closed.

The wooden signalbox (which during the last decade of its 80-odd years of service was prevented from falling by a huge timber beam) was replaced by a relay interlocking panel on 13 March 1976. The panel, together with the five staff instruments and associated equipment, are located in a relatively small room on the platform and leave little room for the signalman. The connections with the main line and the crossing loop, other than the outer facing points and the Natimuk junction points (at the point of divergence), are worked by lever frames electrically released from the control panel. Horsham is now listed as having six signals, two crosslocks,



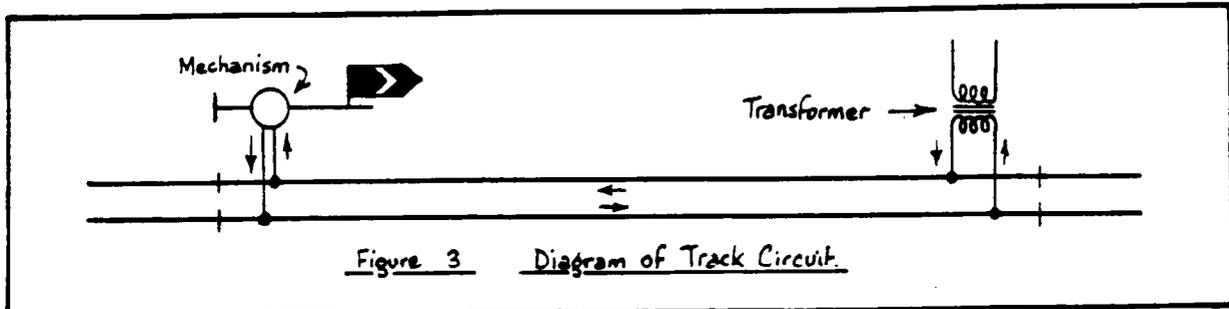
three points and one spare, giving a total of 12 levers. Three position searchlight signals replaced the semaphore signalling and the crossing loop was lengthened to about 1200 metres (1225 yards). Concurrently, automatic staff exchangers were provided.



SIGNALLING ON MELBOURNE ELECTRIFIED RAILWAYS
(continued from Nov 1978)

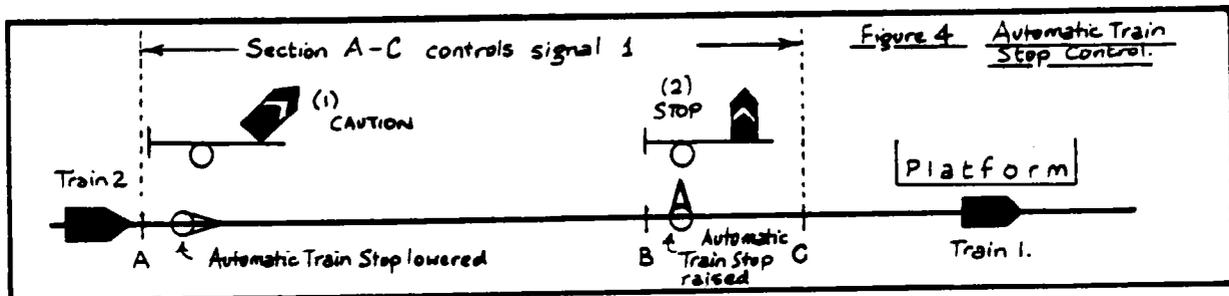
TRACK CIRCUIT CONTROL AND SIGNAL OPERATION

Track circuits used on the Melbourne electrification are operated with alternating currents at six volts. The circuit is shown in Figure 3. The signal mechanisms are operated by induction motors at 110 volts. The signals are lighted by six volt, half-candle power lamps, which are supplied with current from a small transformer mounted on a signal mast close to the lamps. The lamps burn continuously and two electric light globe are provided for each signal in order to reduce the chance of failure lamps burning out, the second one remains alight.



LIGHT SIGNALS AND AUTOMATIC TRAINSTOPS

A few signals have been installed which give indications by coloured lights by day and night. These consist of electric lamps with different coloured lenses, namely red, yellow and green, the whole arrangement being heavily hooded as a shield against daylight. Higher candle power lamps are used for these signals and they can be distinguished in brilliant sunshine at a range of several hundred yards. Automatic trainstops are used in electrified territory consisting of a moveable arm operated by an electric motor located on the track, which, when in its upward position, comes in contact with a trip arm on the engine or leading car of the electric train; which is connected with the air brake pipe and sets the brakes when ever it is tripped. The idea is shown diagrammatically in Fig. 4., where signal 1 will



only operate when section A-C is clear, signal 2 and its train stop remain at danger because of a train at the station. Should the second train attempt to pass signal 2, it will be stopped in the overlap, B-C. With such apparatus there is always the possibility of the trip arm on the train stop being carried away by train obstructions, etc., and as a check on such contingencies, the Victorian Railways have introduced a new feature in which a detection rod coupled to the end of the train stop arm actuates electrical contacts in the circuit of the signal, the signal being unable to operate unless these contacts are made. If the arm has been broken then these contacts are

forced open, holding the signal at Stop.

POINT OPERATION

While it was decided to operate some of the points by electrical power, this has not been done on account of the fact that material could not be obtained as a result of the war. An improved mechanical arrangement for point operation has been introduced and, by means of an escapement movement, the points are unlocked, thrown over and relocked by a single stroke of one lever instead of using separate levers for the locking and operating movements. A sensitive electrical detector invented by two officers of the department is fitted to the arrangement so that a very small movement of either the points or lock will suffice to break the circuit and cause the signal governing over the points to show the danger indication.

SIGNAL LEVERS AND WIRING

Signal levers of the mechanical interlocking machines have been adapted for power signalling by having them fitted with electrical contacts through which current is transmitted to the signals.

The levers divested of mechanical wires and weights are very easy to work and are perhaps disproportionately large for the work they are called upon to do. The arrangement, however, is economical and obviates the provision of new machines. A special electro-mechanical frame is installed at South Yarra, where the points are worked by the usual type of lever, and the signals by a miniature lever or slide. This is a very neat arrangement and is probably the best possible, short of operating both points and signals by electric power, in which case an interlocking frame of miniature levers throughout would be used. The electro-mechanical system has given very great satisfaction and it is intended to extend its use.

The wiring for the signalled area, is carried where ever possible, in twin paper insulated lead sheathed cables laid in wooden trunking, supported on stakes about one foot above the ground. In some cases, it was impossible to use lead cable, as for instance to the rail connections, wiring from control relays to the signal motors, etc. As for absolute safety, so much depends upon the integrity of the insulation of the signal controls, it is desirable to use the highest class of insulated wire practicable.

POWER SUPPLY AND ACCESSORIES

The signal power is taken from the Newport power station plant, transmitted to the electrical substations at 20,000 volts and from these points delivered to the signal power transmission mains at 2,200 volts. From 2,200 volts it is stepped down to 110 volts for signal operation and to six volts for track circuits. The 2,200 volt cable is carried in the same trunking as is the signal control cables.

The signal boxes are provided with illuminated diagrams showing the whole of the track arrangement, points and crossings etc. The approach of a train is automatically intimated to the signalman by a ring of a bell. Indicators worked by small electric lamps show the signalman whether his points are correctly set, as the current for operating the signal also is taken through detectors on the points, which ensures the latter being tightly closed and locked before the signal is given. Electric locks are provided on the levers of the interlocking frame which prevents the levers from being moved unless track

conditions are safe for such a move. Over each signal lever is fixed an indicator which shows a red light when the signal is at "Stop" and a green light when the signal is "Clear". A special push button is provided for giving the low speed light signal.

Time releases are provided which afford the signalman a means of releasing signal levers in the event of cancellation or change of road being necessary while a train is approaching him. The operation of the time release sets the affected signals to "danger" and no alterations can be made in the route until a certain predetermined time has expired. This ensures changes only being made by the signalman with great deliberation. The under portion of the signal box, in addition to the usual interlocking apparatus, contains switchgear for the electrical power, electrical contacts fitted to the levers, a rack carrying relays operated from the track and a multiplicity of wires, all of which are carefully labelled.

The three position signal and automatic train-stop mechanism, impedance bonds, alternating current relays, time release mechanisms and Kerite insulated wire were imported from America. The high tension switchgear, mainly transformers and lead cable were obtain from Great Britain.

Considerable quantities of apparatus has been designed by the department's officers and manufactured at the Newport signal shops, among which may be enumerated-signal masts and fittings, signal lamps, light signals, illuminated diagrams, relay and transformer boxes, relay boxes, low-tension switchboards, annunciating bells, electric lever locks, a variety of circuit controllers and many other miscellaneous fittings.

Owing chiefly to the inability of obtaining essential material at the present time, it was not possible to provide three position signals throughout the entire electrified area.

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SIGNALLING ALTERATIONS (continued from page 12)

WN 9/1979 UNDERBOOL. Guard in charge of safeworking unless trains are to cross.

WN 9/1979 KILMORE EAST. Radio telephones have been provided for assisting the loading operations of Apex Quarry trains. The driver and guard are issued with a radio by the SM Kilmore East and the radios are returned to the SM as the train proceeds back to Melbourne.

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THE COMPETENT STAFF WORKERS

by Jack McLean.

(Reprinted from Newsrail)

The late Mr. Gavin Duffy's writings have frequent references to the competent staff workers who were detailed for special traffic for somewhere like Bayswater on Cup Day or Williamstown Racecourse on Foundation Day.

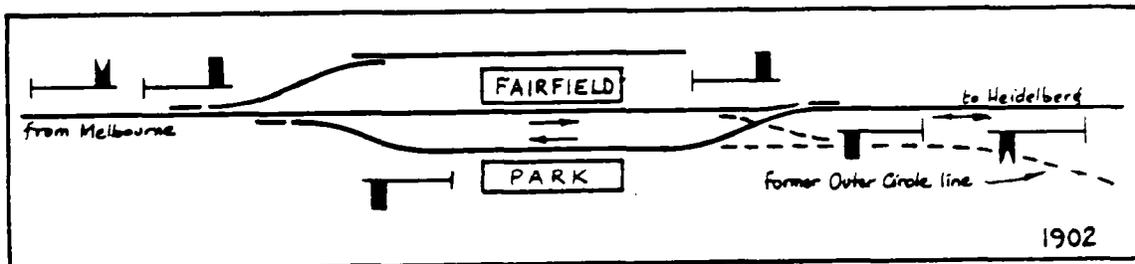
The timetables of that era show many examples of near miraculous train working every day (on paper, if not in fact) which tends to show how good the trainmen and signalmen were. If I'd been 30 years older, I could have spent a lot of time finding out if the timetable compilers' confidence in them was justified and if the staff workers were indeed competent.

In 1908, I might have spent a morning or two on the Heidelberg line, which was then single line beyond Clifton Hill. The double line between Princes Bridge and Clifton Hill had been open for only seven years and the extension from Heidelberg to Eltham for six. Large electric staff was in use on the sections Clifton Hill-Fairfield Park-Heidelberg and Heidelberg - Eltham was one section of staff and ticket.

The May 1908 WTT shows a regular service of passenger trains leaving Princes Bridge in the morning, more or less on the hour and half hour, returning not quite as regularly. Trains met on the double line near North Richmond and on the single line at Fairfield Park. Running time between Princes Bridge and Heidelberg was generally 33 minutes; varying runaround times were allowed at Heidelberg; and trains probably formed and were formed by Preston, Reservoir and North Fitzroy trains.

FAIRFIELD PARK

The facilities at Fairfield Park were frugal. The diagram shows that there was a loop on the south side of the line and the signalling for up and down working was controlled from a 25 lever frame installed on the up platform in 1902. Goods traffic was handled in a dead end siding, accessible at the up end.



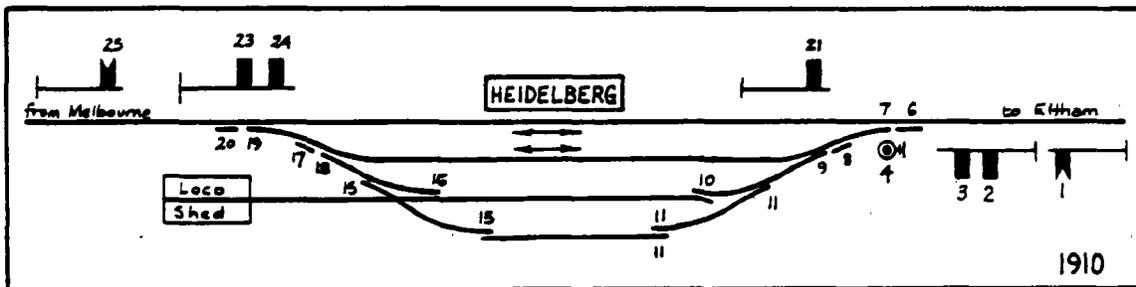
The actions of the busy signalmen at Fairfield Park must have been something like this: lower the down home signal for the down train to arrive, stand in the pit and receive the staff from the fireman, watch the guard wave to indicate that the train was complete; take the staff to the signalbay; insert it; give train arrival; ask line clear for the up train; get out a Clifton Hill staff; put back the down home; make the road for the up train and pull off the two homes and the distant; exchange the staffs with the fireman of the up train when it arrived; watch the guard to indicate that the train was complete; give train departure to Clifton Hill; insert the Heidelberg staff; give train arrival; ask line clear from Heidelberg; get out a staff; make the road and pull off the down departure signal; hand the staff to the fireman of the down train from the pit; return to the signalbay to give train departure to Heidelberg. During all of this

activity, he would be expected to enter all signals in the train register book. For all of this, the time allowed varied from one minute to three minutes (e.g. the 7am down was tabled to arrive at 7.21 and depart at 7.22, the 7.11am up was given only a departure time of 7.22).

About December 1909, a new train started running; the 7.39am Princes Bridge to Fairfield Park local. This was in addition to other similar trains. It waited at Clifton Hill from 7.54 to 8am for the 7.41am up Heidelberg to clear the single line. The timetable compilers seemed reasonably confident that it could arrive Fairfield Park, run round and depart on the up at 8.09am. The signalman would have had another busy spot getting the staff, noting that the train was complete, inserting the staff, giving train arrival, asking line clear, getting another Clifton Hill staff, making the road for the engine to runaround; giving the staff to the fireman as the engine passed through the up platform and probably giving train departure in anticipation.

HEIDELBERG

The activity at Heidelberg was no less interesting, as end on connections were made at the single platform. In addition to the main line, there were three loop roads, as well as the dead end to the engine shed. The station had been interlocked in 1905 and the 19 levers in the 25 lever frame controlled distant and two-arm home signals from both directions. The up home signals were half-way to the tunnel. This distance enabled engines of terminating trains to run round while the Eltham train was approaching. A ground disc close to the points was used to signal engines from the main line to No 2 road and did not apply to arriving trains, for which the top arm was used.



A typical busy period was about 8am. At 7.58am, the first train for the day from Eltham (a pass) arrived in the platform. The engine would cut off, run round via No 2 road, pull the cars onto the Burgundy Street bridge and shunt them to No 3 road. The 7.30am from Princes Bridge arrived in the now vacant platform at 8.06am. The engine cut off and ran round via No 2 road, the disc being used to signal the engine back. After the brakes were tested, the up departed at 8.11am. Meanwhile, the Eltham engine may have taken coal and water, coupled onto some of the wagons in No 4 road and shunted them onto the cars in No 3 road. When the up had departed, the Mixed would shunt onto the down main and back into the platform for an 8.20am departure.

(to be continued)

VICTORIAN RAILWAYS THREE POSITION SIGNALS
DATES OF INSTALLATION
COUNTRY LINES

SOUTH WESTERN

Newport "B" - Manor (S)	1928 - Mar 15 (1)
Newport "B" - Rock (S)	1967 - Oct 22 (2)
Rock - Laverton (S)	1965 - May 30 (2)
Laverton - Werribee (S)	1968 - Sept 1 (2)
Werribee Station	1973 - Oct 28
Werribee - Little River (S)	1970 - Oct 25 (2)
Manor - Lara (S)	1928 - July 15
Little River Station	1972 - Oct 8 (9)
Lara Station	1973 - May 25
Lara - North Geelong "A" (S)	1928 - Sept 4
Corio - North Geelong "A" (S)	1959 - Feb 8 (2)

WESTERN

Sunshine - Rockbank (S)	1976 - Oct 4 (10)
Sunshine - Deer Park West Jcn (S)	1976 - Oct 4 (11,12)
Bacchus Marsh - Ballan (S)	1963 - April 7
Horsham Station	1975 - Mar 13
Salisbury Loop	1970 - Aug 6

NORTHERN & MIDLAND

Castlemaine "A" - Maldon Jcn (S)	1926 - Nov 28 (3)
Maryborough Station	1969 - June 28

NORTH EASTERN

Somerton Station	1962 - Aug 5
Tallarook-Goulburn Jcn	1925 - Aug 16
Goulburn Jcn - Seymour (S)	1925 - Aug 16
Goulburn Jcn - Seymour (D)	1942 - May 17
Goulburn Jcn - Seymour (S)	1961 - Nov 26 (4)
Wodonga - Coal Sidings (S)	1964 - May 10 (5)
Coal Sidings - Albury South (S)	1962 - May 14 (5)

STANDARD GAUGE

Spencer Street - Sth Dynon Jcn (S)	1962 - Apr 12
West Footscray Jcn - Somerton Loop (S)	1962 - Apr 15 (6)
Somerton Loop - Broadford Loop (S)	1962 - July 9 (6)
Broadford Loop - Seymour Loop (S)	1962 - Apr 8 (6)
Seymour Loop - Benalla Loop (S)	1962 - Aug 20 (7)
Benalla Loop - Alumatta Loop (S)	1963 - Feb 4 (7)
Alumatta Loop - Wodonga	1962 - Mar 18 (8)
Wodonga - Coal Sidings (S)	1964 - May 10 (5)
Coal Sidings - Albury South (S)	1962 - May 14 (5)

EASTERN

Dandenong - Narre Warren	1956 - Nov 18
Narre Warren - Berwick	1962 - Feb 25
Berwick - Officer	1956 - Mar 13
Officer - Pakenham	1955 - Feb 27
Pakenham Station	1954 - Dec 19
Pakenham - Nar Nar Goon	1954 - Oct 10
Nar Nar Goon - Tynong	1953 - June 28
Tynong Station	1957 - Apr 17
Tynong - Bunyip	1956 - Aug 19
Drouin Station	1958 - July 29
Yarragon - Trafalgar	1958 - Mar 23

Trafalgar - Moe
Moe - Morwell (S)

1960 - June 27
1966 - July 3

NOTES:- (S) - Single Line, (D) - Double Line.

1. Rock and Dromæ Loops remote control 1931 (Aug 16 & Oct 18).
2. West Line.
3. Abolished 1952 (Mar 4).
4. Dysart-Seymour.
5. Lever Locking & Track Control.
6. CTC from Spencer St 1963 (Mar 4).
7. CTC from Spencer St 1963 (Feb 4).
8. CTC from Spencer St 1963 (Jan 21).
9. CTC from Werribee 1973 (Dec 7).
10. North Line Sunshine-Deer Park West Jcn.
11. South Line.
12. Deer Park & Deer Park West Jcn CTC from Sunshine Box.

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