

SIGNALLING RECORD SOCIETY (VICTORIA)

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Deadline for Nov. 1989 issue is 15 October 1989.  
NEXT MEETING: Friday, 15 September 1989.  
VENUE: A.R.H.S. Library Room, Windsor Rly Station.

MINUTES OF JULY 1989 MEETING

HELD AT: A.R.H.S. Library Room, Windsor Railway Station.

HELD ON: Friday, 21 July 1989.

MEETING COMMENCED: at 2015 hours.

PRESENT: J. McLean, S. McLean, W. Brook, J. Churchward, W. Doubleday,  
R. Jeffries, A. Jungwirth, D. Langley, A. McLean, C. Rutledge,  
R. Whitehead, B. Wooding and visitor Arthur Brook.

APOLOGY: J. Brough.

WELCOME: to Arthur Brook.

MINUTES OF PREVIOUS MEETING: adopted as read subject to the addition of the  
words "at Ballarat" to News Item No 4. (Doubleday/Langley)

NEWS ITEMS:

1. More repeating signals capable of showing Reduce to Medium Speed have been installed - at Castlemaine and Seymour.
2. The prefix letter for the up repeating signal at Seymour off the Goulburn Valley line is (unexpectedly) U. In the past U has been used only where there is a definite converging move with another route.
3. Moe now has only two pairs of points, the end of double line and a bank engine siding. This siding has facilities even more basic than a switch lock. The station is now unmanned for some passenger trains.
4. A recent News Item on TV showed the last guards on V/Line running the 1000 down Geelong pass. All goods trains now have a two man crew and all passenger trains are run by conductor/guard.

5. With most lines either already converted to Train Orders, or expected to be converted soon, the removal of all electric staff is a possibility. Interesting sections remaining are: Greensborough-Eltham, Dandenong-Cranbourne, Geelong-South Geelong, Morwell-Traralgon. None are really suitable for Train Orders (not known by MET drivers).
6. Benalla-Yarrawonga becomes Train Orders today or tomorrow (but it is likely that staff and ticket will be re-introduced for the day of the bike specials).
7. Discussions bout SA CTC signalling in light of accidents at Redhill and Long Plains. The system requires points at both ends of a loop to be set for the loop when a train is being turned off the main line.
8. In 1939, Reservoir trains worked empty to Northcote Loop Junction to reverse to even the wear on the wheels.

SYLLABUS ITEM: Brad Wooding handed out circuits and planning diagrams for Solid State Interlocking and explained the theory of the system, and its applications on the Epping line.

MEETING CLOSED: at 2210 hours.

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### SIGNALLING ALTERATIONS

- 30.5.1989 CASTLEMAINE. Signalling diagram No 12'89 became effective and diagram No 13'78 was cancelled. The alterations were as follows:-
1. All mechanical signals and points were abolished together with both signal boxes.
  2. A control panel was provided in the upside station office from which all the points and signals are now operated.
  3. The former block sections Kyneton-Castlemaine A, Castlemaine A-Castlemaine B, and Castlemaine B-Ravenswood were replaced by new block sections Kyneton-Castlemaine and Castlemaine-Ravenswood. Switching facilities were provided.
  4. The interlocked gates at Parker Street were replaced by boom barriers provided with healthy state lights. Healthy state lights were also provided at Rowe Street.
  5. Thompsons Siding is locked by an F pattern lock, the key of which is secured in a switch lock adjacent to the points and released by lever 25 on the control panel. (O 384/89)
- The particulars of signals at Castlemaine is as follows:-

#### CASTLEMAINE Diagram No 12'89.

Post No	Particulars
10	Up three position home (light) signal, from Maryborough line.
M1237	Down repeating (light) signal, Melbourne line.
12	Down three position home (light) signal, from Melbourne line.
16	Down two position home (light) signal, No 2 road to Maryborough.
18A	Down two position home (light) signal, No 1 road to Maryborough.
18B	Up two position home (light) signal, No 1 road to Melbourne.
20	Down two position home (light) signal, No 2 road to Bendigo.
22	Down two position home (light) signal, No 1 road to Bendigo.
26	Up three position home (light) signal, from Bendigo line.
M1280	Up repeating (light) signal, Bendigo line.

- 31.5.1989 SYDENHAM. The goods siding was disconnected from the main line. All points and signals in connection with the siding were abolished. The main line crossover remains insitu. Levers 9, 11, 13, 14 and 15 were sleeved normal. (O 387/89)
- 31.5.1989 MARYBOROUGH. A new level crossing, protected by flashing lights, and named Gillies Street was provided on the Castlemaine line at 178.850km. The flashing lights are automatic for all movements and home signal No 24 will be interlocked with the flashing light cycle. (O 379/89)
- 31.5.1989 DIGGERS REST. The goods siding was disconnected from the main line. No 6 points were abolished and lever 6 sleeved normal. (O 385/89)
- 31.5.1989 FRANKSTON. Boom barriers were added to the flashing lights at Hillcrest Road, McMahons Road and Clarendon Street level crossings. A new two-position down automatic light signal, worked from lever 34 in Frankston signal box, was provided and when at stop, will prevent operation of the boom barriers during shunting movements at Frankston. Amend diagram No 25/88.
- 1.6.1989 BENDIGO. The following alterations were carried out at A signal box:-  
1. Points Nos 18, 19, 20, 21 and 22U were converted to hnd operation.  
2. Points No 23D became 22.  
3. Points Nos 16 and 17, and lockbar No 15 were abolished.  
4. Post No 4B, home and disc, leading from Up Goods Departure road was abolished  
5. Discs worked by levers Nos 12, 13, 26, 30, 32, 33, 35, 36, 37, 39 and 41 were abolished.  
6. Disc 14 was relocated to a position near No 22 points and applies from all goods yard roads to either the up main line or to Siding D.  
7. A closing lever No 15 has been provided so that discs 14 and 28 may be both placed to proceed.  
8. The Up Goods Departure road, Goods Arrival Roads A, B and C, and the Shunting track were renamed the Goods Arrival Roads. Amend diagram No 26/79. (O 388/89)
- 1.6.1989 SPEED. Trailable facing points were provided at both ends of the crossing loop. The up and down home signals and plunger locks were abolished. The lie of the points is for up trains to use No 1 road and downs No 2. (O 407/89)
- 4.6.1989 ESSENDON. The lever control on automatic signal E291 was removed. (O 2245/89)
- 13.6.1989 KYABRAM. The following were abolished.  
1. Up home arrival signal M.  
2. The Kyabram Co-op Fruit Preserving Company Siding.  
3. Atkin's Siding.  
4. No 3 road and dead end extensions.  
5. The up end dead end extension of No 4 road.  
The points were spiked and will be removed at a later date. (O 430/89)

- WN23/1989 LITTLE RIVER-CORIO. New signalling diagram No 10'89 was issued and replaces diagram No 18'85. The diagram shows the "As in service" situation. (O 408/89)
- 14.6.1989 KORUMBURRA. The up end staff locked points and the Cattle Yards Siding were abolished. The up end annett locked points and car dock were abolished together with the annett key crosslock. The down home (light) signal is track cancelled when operated from the facing points and non track cancelled when operated from the platform. The up home (light) signal was converted to a non track controlled signal. A notice board lettered: "65 KM/H TO LEVEL CROSSING" was provided at the up end of the platform. The annett locked quadrant lever for the up home arrival became electrically detected. Amend diagram No 4'79. (O 432/89)
- 15.6.1989 SEYMOUR. Posts 27 and 29 at B Box were moved further to the right on the signal bridge. (In actual fact they were relocated to the adjacent posts which had been vacated by previous signal alterations. This is in order that new signal dolls can be erected for the GEC light signals.-DEL) (O 416/89)
- 15.6.1989 RAVENSWOOD was closed as a switching block post the new section becoming Castlemaine-Bendigo A. All signals were removed and the points spiked normal. (O 427/89)
- 16.6.1989 MOE. New signalling diagram No 16'89 (Yarragon-Maryvale) was issued and diagram No 14'88 was cancelled. The principal alterations were as follows:-
1. The signal box and all signals and points in Moe yard were abolished with the exception of the end of double line points.
  2. These points and the up and down home signals are worked by Morwell.
  3. A short Bank Engine Siding was provided at the up end of the platform and the points are secured by an annett lock. The key is secured in an Electric Cross Lock released by lever 9 on the Morwell panel. (O 417/89)
- 18.6.1989 SPRINGVALE. Siding B was restored to service and is available for traffic. [Siding B is the former Cemetery line]. (O 2287/89)
- WN24/1989 DUNDOLLY-MILDURA. In order to provide follow on train movements at unattended crossing loops the following instructions will apply:-
1. The Train Controller must arrange through the Station-master Donald or Ouyen, for a competent employee to attend at the crossing loop and perform a roll by inspection.
  2. The employee after observing the train must radio the driver and report that the train is complete. He must also report to the Train Controller that the train is complete. (O 412/89)
- 19.6.1989 ASPENDALE and CHELSEA. Pedestrian gates were provided at Grove Street, Aspendale and Chelsea Road, Chelsea. (O 2246/89)
- 21.6.1989 NARRE WARREN. Automatic pedestrian gates were provided at Webb Street level crossing. (O 2249/89)
- 21.6.1989 WOOMELANG. All fixed signals and plunger locking were abolished. Trailable point machines and location boards were provided at each end. Non trailable point machines were provided on the connections between No 2 and No 3 road. The trailable points are set for left

hand running. Approach section indicator boards were provided for Sunraysia Highway and Brook Street level crossings. Notice boards and fouling point indicator boards were also provided. The notice boards read:- "STOPPED TRAINS MUST NOT PROCEED TO THE F POINT WITHOUT AUTHORITY" and "STOPPED TRAINS MAXIMUM SPEED TO CROSSING 15KM/H". (D 431/89)

25.6.1989 AIRCRAFT. Automatic pedestrian gates were provided at Aviation Road level crossing. (D 2252/89)

26.6.1989 BURNLEY. Siding A was restored to traffic. The overhead wiring and siding furthest from the down local line was removed and the overhead on the remaining siding was shortened by 130 metres. (D 2273/89)

29.6.1989 DUNOLLY. The following track and signal alterations were brought into effect.

1. The up arrival bracket post No 3 was abolished and the home signals replaced by two up home arrival light signals. Post 3 (Mildura line) is located on the down side of Tweedale Street and is operated from the platform. Post 4 (Inglewood line) is located on the down side of Broadway Street and is operated from the plunger locked junction points.

2. A STOP BOARD was provided on the down side of Rheola Road and trains must obtain permission from the signalman prior to passing the board. A location board was also provided.

3. The plunger lock on the down of the loop points was abolished and replaced by a trailable facing point mechanism normally lying for the right hand road. The mechanism is secured by a F pattern lock.

4. An ST21 to E or F pattern key exchange apparatus was provided on the platform.

5. Flashing lights were provided at Thompsons Road level crossing at 209.341km. The crossing is equipped with healthy state lights and yellow whistle boards. (D 456/89)

WN 27/1989 COLAC. A bitumen pathway has been constructed cross the lines to enable transfer of containers between the platform and the Freightgate. When such a movement is required to occur, the signalman must confer with the train controller and seek permission to restore the home signals to stop. After the movement is completed, the signalman must clear the home signals and normal working can be resumed. (D 474/89)

29.6.1989 SURREY HILLS-MONT ALBERT. Automatic pedestrian gates were provided at Mont Albert Road level crossing. (D 2275/89)

1.7.1989 REGIONS. The North Eastern Region will be amalgamated with the Northern Region and the Eastern Region will be amalgamated with the South Western Region. The new regions will be known as the Northern and Southern Regions respectively.

1.7.1989 CRAIGIEBURN. The administration of Craigieburn has been transferred to the Stations Manager, Southern, under supervision of SM Broadmeadows. Maintenance of the station remains the responsibility of the Regional Manager, Northern.

WN 27/1989 MORWELL - Operation of Bank Locomotive Siding. (NOTE:- The siding points are secured by an annett lock the key of which is secured in an electric crosslock.)

\* BANK LOCOMOTIVE TO BE DETACHED OFF AN UP TRAIN.

The train is stopped clear of the siding points and the driver must communicate with the train controller. The train controller must instruct the signalman at Morwell to reverse the crosslock lever. After 50 seconds delay the key may be withdrawn and the points operated permitting the bank locomotive to enter the siding. When the movement is complete the annett key must be restored to the crosslock and the crosslock lever placed normal. The train may then depart.

\* BANK LOCOMOTIVE TO BE ATTACHED TO A DOWN TRAIN.

The train is stopped clear of the points and the same procedure as above carried out.

\* BANK LOCOMOTIVE TO LEAVE SIDING AND RUN LIGHT.

The driver must advise the train controller when the locomotive is ready to depart the siding. The train controller must instruct the driver to place the emergency track circuit jumper cable on the main line. Then the signalman at Morwell is instructed to reverse the crosslock lever and after 50 seconds the annett key may be released and the locomotive proceed as above. The locomotive must not be released from the siding until the entire single line section between Moe and Hernes Oak is clear.

NOTE: The signalman at Morwell must not operate the crosslock lever without the permission of the train controller and all movements of the crosslock lever must be recorded in the train register book.

(O 1/89)

2.7.1989 MANGALORE-COBHAM-TOCUMWAL, SHEPPARTON-DOOKIE. Train Order working will replace the Electric Staff or Train Staff system on the above lines. The first train issued with a Train Order was No 8330 ex Cobram. Boards indicating the beginning and end of Train Order territory were provided at Mangalore, Cobram, Tocumwal and Dookie. Two miniature master keys Nos 50 and 51, and lettered "TOOLAMBA JUNCTION" were provided and are kept at Shepparton and Seymour B Box. Seven large master keys were provided, four to be kept at Mangalore, two at Shepparton and one at Cobram. The locks on the siding points at Toolamba, Mooroopna and Shepparton Oil Siding were changed from miniature to large.

\* SHEPPARTON is an Intermediate Terminal Station.

\* TOOLAMBA JUNCTION points are secured by miniature special locks and when it is necessary for a train to operate between the Kyabram line and the Goulburn Valley line, a competent employee is to be at Toolamba Junction with the miniature master key at least 30 minutes prior to the passage of the train.

\* STRATHMERTON. When it is necessary for a train to operate to or from the Tocumwal, a competent employee must attend 30 minutes before the train.

\* TOCUMWAL is an Unattended Terminal Station without signals.

\* DOOKIE is an Unattended Terminal Station without signals.

When train are to cross at Nagambie, Murchison East and Numurkah, the competent employee is to be on duty at least one hour before the first train arrives. NOTE:- Until the flashing light equipment has been modified, the maximum speed of up trains approaching the Goulburn Valley highway level crossing at Strathmerton and Murchison East will be 50km/h and 30 km/h respectively.

(continued on page 96)

LEVEL CROSSING PROTECTION6.5 CROSSING STATIONS (LIGHT SIGNALS) (Continued)

The second stage of Flashing Light installation at Tatura (Figure 6.11) occurred in 1976 (11 Nov) when Casey Street (CS) and Hogan Street (HS) were equipped. Whether the former hand gates at Hogan Street were abolished at this stage or earlier is not known. The approach for CS could start from the end of the platform because the distance was about 210 m; the Notice Board imposed a Speed Limit equivalent to 40 km/h. In all, 13 track circuits were now laid, nine being Westraks (The units weren't necessarily on the side of the track shown).

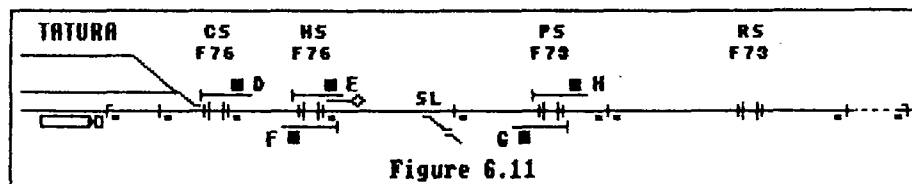


Figure 6.11

Existing signal F was re-designated H, Up Home D was replaced by new Light signal F close to the PS crossing, and new Light signals D and E were provided. These two are controlled by miniature levers on the platform and push buttons at D. For working new Light signal F the quadrant lever for former Up Home D was retained along with the mechanical detection of the points and plunger, and a "wire-operated circuit controller" provided near the latter. Existing semaphore Down Home signal A (not shown) remained unchanged.

Figure 6.12 is included to show a station where the Light signal had to be in the rear of the points, rather than in advance. Flashing Lights were installed at Mornington in 1978 at Elizabeth Street (not shown), Vale Street (VS) (18 Apr), and Barkly Street (BS) (20 Apr); the last crossing previously had hand gates. The main line point blades as well as the plunger were electrically detected, the mechanical detection for signal A being retained. The points had to be normal for Signal C to be cleared from either the platform or the points; they also had to be normal for signal B to be cleared from the platform, but reverse for it to be cleared from the points. The plunger could be either "in" or "out". This may not however have been the usual arrangement at a similar station, because at Leongatha and Heywood, which both have the signal corresponding to C in the rear of the points, only the plunger is detected and operation is similar to that described for Figure 6.8.

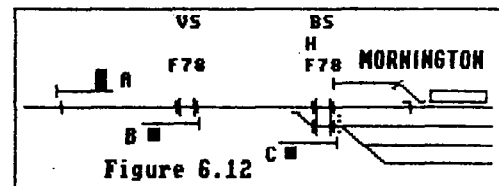
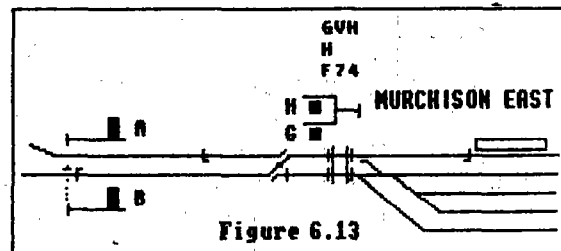


Figure 6.12

Another feature of interest at Mornington is that, although the calculated Up approach for Vale Street commenced a short distance on the platform side of Barkly Street, insulated joints were not provided at this point. Rather, the F/Ls at VS started a certain number of seconds after an Up train entered the approach for BS. Similarly, for a Down train the F/Ls at BS started a certain number of seconds after the approach for VS was entered. Winchelsea was another non-interlocked station where time delays were used to avoid insertion of insulated joints. Here F/Ls and Light signals were provided at both ends of the station yard, and because the calculations were based on a speed of 115 km/h, the approach for the second crossing started before the first crossing was reached. The solution here was to start the Lights at the second crossing 16 seconds after the train entered the approach for the first, provided of course that the Light signal was at Proceed. (But all passenger trains in both directions currently stop at Winchelsea.)

A non-interlocked junction station, Murchison East, is illustrated in Figure 6.13. Flashing Lights superseded hand gates at the Goulburn Valley Highway (GVH) crossing in 1974, the bracket post at the junction points being moved to the other side of the crossing and the arms replaced by Light signals. The junction points were still worked by an ordinary WS lever but were now electrically detected normal and reverse, and the plunger was electrically detected "in both ways". Signals G and H were each worked by a push button rather than by a quadrant lever through a wire-operated circuit which meant that the route was not now held by mechanical detection. Apparently this arrangement was considered safe enough as speed here was not to exceed 40 km/h. The points immediately to the rear of signals G/H were treated as usual, i.e. with only the plunger electrically detected.

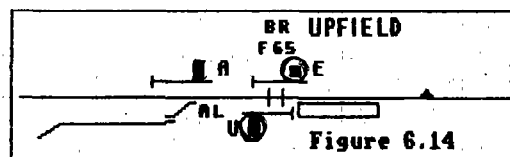


A bracket Light signal was installed later at Elmore, another facing junction, in 1982 (16 Sep). This was the first time that a Down signal was provided here to protect the junction.

#### 6.6 CROSSING STATIONS (ANNETT-LOCKED POINTS)

Points secured by an Annett lock are usually protected by two signals, one on each side. Where both signals are Semaphores, as a general practice the lever working each signal is fitted with an identical Annett lock. If one is a Light signal, the lock must work, directly or indirectly, an electrical switch included in the circuit of the signal. A problem arises if circumstances require that both the Light and the Semaphore signal be off at the same time, i.e. that both signals should be released by the same Annett lock. Four different or variant solutions found in Victoria are considered here. But first a station with no special requirement is described.

When the new Upfield station (Figure 6.14) was first opened in 1959 (17 Aug) only an "industrial" type service was provided. No siding existed and a single Down Home signal sufficed. A "residential" service was introduced in 1965 and Flashing Lights were installed at Barry Road (BR) in the same year (29 Jul), together with a semaphore Up Starting signal. Then in 1969 (30 Jan) the Annett-locked siding was added. Down Home signal A was moved back to protect the points, new Light signal E was provided to allow shunting without unnecessarily operating the F/Ls, and Light signal U replaced the Up Starting. Miniature levers to control the Light signals were provided in the station office, along with an Annett lock operating an electrical switch to control signal U. These arrangements mean that, after every train arrives, the signalman must remove the Annett key from the quadrant lever on the platform and take it into the office to insert in the lock there; after the train departs he must take it back outside again. (Action at Crib Point was similar, but there were fewer trains.) This procedure would be reasonably practical only where a station is attended for every train.



Rochester (Figure 6.15) is interesting not only in the Annett locking arrangements, but also in having a separate Departure signal from No 2 road. Flashing Lights were installed at the Northern Highway (NH) and Elizabeth Street (ES) crossings in 1970 (30 Sep), together with Light signals G/H and K and the usual push buttons. An Annett-locked pilot lever had been provided about five weeks earlier (28 Aug), replacing separate locks on each Home signal lever (A

dock siding secured by Annett lock existed at the Up end). The pilot lever is an ordinary quadrant fitted with a crossbar, and is mounted between the two Home signal levers; these levers are retained at Normal until the pilot lever is unlocked and pulled over, when either or both signal levers may be operated. The pilot lever here also works an electrical switch ("circuit controller B625"), probably the first such arrangement in Victoria. Contacts made when the lever is Reverse release signals G/H. Thus Annett-locked signals A (Down Home), G and F can all be off at the same time; this is understood to be safe for a station that does not switch out provided that a staff is left in the exchange box.

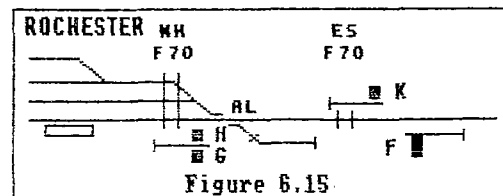


Figure 6.15

The crossing is only about 136 m ahead of the platform, so that the Down approach starts from the entering end. Although notified as a "bracket" signal, the searchlight units for G and H are mounted one on each side of the post at the same level - a signal of unique appearance. The blades and plunger of the points ahead are detected electrically. Signal H applies only from No 2; for movements from No 3 push buttons near the crossing must be used. The Annett-locked siding serves the Murray Goulburn Co-op Co; the writer believes that this was probably provided at the same time as the Flashing Lights. An Annett lock working an electrical switch is mounted near by, as an alternative to using the pilot lever for releasing the Light signals.

Yarrowonga (Figure 6.16) goes one better than Rochester in having two quadrant levers working electrical switches. Flashing Lights were installed at the Murray Valley Highway crossing in 1974 (5 Sep); at the same time the Up Home signal B protecting the Annett-locked points leading to the stockyards siding was replaced by a Light signal on the station side of the crossing. The quadrant lever working the former Semaphore was retained to control the new Light signal; mechanical detection was not required, and the lever was coupled direct to an electrical switch. Control of the Light signal from the two plunger-locked points was however by push buttons. A pilot lever as described above was also provided to allow signals A and B to be released together. This lever also was coupled to an electrical switch and had to be operated to prove the Annett key "in" before signal B could be cleared from the push buttons. Length of the Up approach was 198 m, and a Speed Limit equivalent to 32 km/h was imposed.

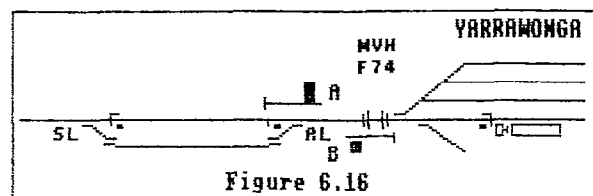


Figure 6.16

A much later change at Yarrowonga was that Up Home E from Oaklands (not shown) was replaced by a Light signal in 1988 (7 Mar), still worked by a quadrant lever. The points at the Down end of the yard were secured only by hand locking bars and padlocks and not detected, so that a wire-operated circuit controller was not required. Although not stated in the notification it is understood that this quadrant lever also is now coupled direct to an electrical switch, thus making three such unusual lever/switch combinations at Yarrowonga.

Cobram has a different unusual arrangement. Flashing Lights were installed at the Murray Valley Highway crossing here one day before the ones at Yarrowonga, and an Up Departure Home Light signal provided. The Light signal is controlled by push buttons and there is no pilot lever; the unusual feature is that the quadrant lever has mounted on it not only an Annett lock but also an electrical switch connected to the lock. Thus if the lever is put back to normal and the key turned and withdrawn, in the one action the lever is locked mechanically and contacts in the switch are broken and the Light signal held at Stop.

Willaura (Figure 6.17) had another different unusual arrangement. Flashing Lights were installed at Edgarley Road (ER) and Wickliffe Road (WR) in 1983 (5 May), together with a Light signal at each crossing controlled by the usual push buttons. Although these signals do not directly protect the Annett-locked grain siding points, they are put to Stop before the points can be released. A pilot lever was provided here in 1970 (22 Dec), long before the F/Ls were installed, and signal C protecting the points at the end of the platform was abolished.

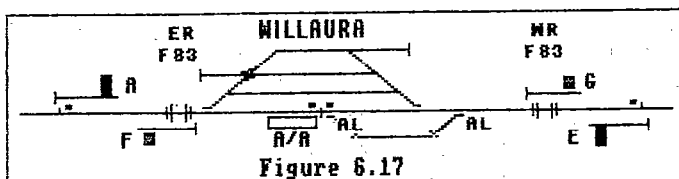


Figure 6.17

In the 1983 alterations the A pattern Annett lock on the pilot lever was replaced by a B pattern one and an Annett key A/Annett key B exchange apparatus installed, the unusual feature. All four signals can be cleared at the same time. To shunt, the B key from the pilot lever is turned in its lock in the exchanger; this action operates a switch to secure the two Light signals at Stop and also releases the A key to unlock the points. (Actually, an Annett key A/B exchanger had been installed at Pyramid in 1969 (13 Mar), with a Light signal which also protected an A/L siding. The A lock on the points was replaced by a B lock; removing the B key from the exchanger secured the Light signal at Stop.)

The arrangements described lasted only until 1986 (4 Jun), when Willaura station was superseded by Willaura Loop on the other side of Edgarley Road. All facilities in the station area were abolished except the Annett-locked grain siding and the two Light signals. These were converted to automatic working and fitted with reflectorised letter "A" signs; push buttons were provided at the points to allow clearing after shunting. (The signals would behave similarly to the one described under Figure 19 (c).) Although not stated in the items in SOMERSAULT or *Newsrail* (and so probably not in the Weekly Notice) a Staff/Annett key exchanger must have been installed at each end of the siding.

#### 6.7 INTERMEDIATE SIDINGS

A problem where shunting is required at an unattended intermediate siding situated along the approach track to a level crossing equipped with Flashing Lights is how to stop the Lights from operating until the train is ready to proceed. Before installation of CTC between Ararat and Wolseley the theoretical answer in Victoria was to provide a timing track circuit, but this idea was implemented at only one or two locations. On the Wolseley line an Automatic signal may be located at a level crossing beyond the siding, and be put to, or held at, Stop by the CTC operator before the shunting train arrives. This may also be done locally by operation of a 5P key switch. An example is signal 378/24 protecting the crossing at the Up end of Gerang Gerung.

At crossings on other lines the general practice is to allow a false alarm to be given as the shunting train approaches, but to provide facilities to turn off the Lights as soon as possible after the train stops, and to start them again later. Figure 6.18 represents a typical siding part-way along an approach track. A train intending to shunt stops clear of the points or the Approach Section Indicator. The points are electrically detected, and reversal picks up a relay which bridges out the track circuit in the rear of the ASI and so stops the Lights; the relay sticks up whether the points are N or R until the track circuit is vacated. The Lights start again when the train departs and passes the ASI. The Indicator is usually located not less than 121 m in the rear of the crossing; at this minimum distance a speed limit equivalent to 24 km/h is imposed.

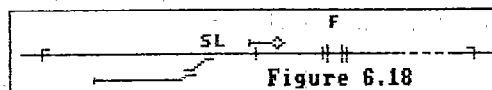


Figure 6.18

Staff-locked sidings of this type were found at Fowler's Siding (Down end) within the Keon Park Up Distant (F/Ls installed 1961), Cave Hill Siding outside the Lilydale Down Distant (1968), Caltex Siding (Mildura), and MilduraCo-op Fruit Siding, both on the Up side of Mildura (1976), and no doubt elsewhere. A similar example was COR (later BP) Siding on the Geelong line (1943). The points here were secured by electric switch lock, and the Lights at Kororoit Creek Road stopped when the releasing handle was operated.

Where a shunting movement would encroach within 121 m of the crossing the method described cannot be used, and the train crew must take special action to switch off the Lights. To allow this, the staff lock is replaced with an Annett lock, and a Staff/Annett key exchange apparatus installed (This was at first known as a "Duplex Lock", but the later name is more specific). In one of these devices the writer has seen, the three main components are mounted vertically: The staff lock is at the top, the Annett lock with the key normally "in" is next, and the necessary electrical switch is at the bottom. A locking rod runs from the staff lock down past the Annett lock to operate the switch below.

Inserting and turning the staff in the top lock enables the rod to be moved up by hand, and contacts in the switch to be made. A relay then picks up and cuts the approach sections out of the F/L controls so that the Lights stop, and disables the usual stick relays. Moving the rod also enables the Annett key to be turned and withdrawn for the purpose of unlocking the points; turning the key locks the rod and holds the staff in, and also the switch operated. Push buttons for manual control of the Lights are provided if a shunting move would foul the crossing; the Lights stop automatically when the shunt clears. The relay controlled by the switch needs to be proved down after the staff has been recovered; if it stays up the approach sections will remain cut out.

Table 6.2 lists locations where Staff/Annett key exchangers were provided at siding points in conjunction with installation of new F/Ls, and shows widespread use except in the North-Eastern area. However, as mentioned later two de-interlocked stations there with existing F/Ls also gained S/A exchangers.

TABLE 6.2: STAFF/ANNETT KEY EXCHANGERS PROVIDED IN C/W NEW F/L INSTALLATIONS  
(P = Private Siding)

Sth Geelong	76-	D	Bendigo P	60- 7 Apr D	Toongabbie	69-18 Sep UD
Waurin Pnds P	84-28 Jun D		Sandhurst P	68-10 Apr D	Sale	69- 5 Feb D
Camperdown	81-16 Dec D		Calif Gully	60- 5 May U	"	81- 9 Jul ?
Dennington	55-20 Jul U		"	60-26 May D		
Port Fairy P	67-20 Dec U		Teddywaddy	78- 7 Jun D	Dandenong ?	
			Wycheproof	85-24 Oct D	Lyndhurst	68- 9 May UD
Cressy	69-14 May D		Swan Hill	69-16 Oct U	Koonwarra	66-16 Aug U
Westmere	69- 1 May D				Fish Creek	80-20 May U
			Epsom	80-16 Oct U	Hedley	68- 6 Jun
Ardeer P	69-16 Sep UD		Bagshot	67- UD	Alberton	70-24 Feb U
Dunnstown	69-23 Oct UD				"	70-12 Feb D
Heathmere	68-19 Mar					
Minyip	81-28 Oct U		Stanhope	80-20 Nov U		
			Byrneside	72-18 Dec U	Brooklyn P	68-30 Jun
Nth Creswick	78-17 May U		Mooroopna	82- 7 Jul U		
Massey	78-25 May D		Shepparton P	56-16 Oct U		
Irymple	81-26 Aug D		"	66-15 Jun D	Moorooduc	66-23 Sep U
Mildura P	76-29 Jan U		"	73-21 Nov D	Tyabb	66-19 Jul D
			Katunga	80-27 Nov D	Bittern	84-28 Aug D

Figure 6.19 gives typical examples of the application of the Staff/Annett key Exchange Apparatus (S/A). In all of these the Lights start when a Down train enters the approach section on the left. In (a) the train stops at the Approach Section Indicator at the end of the platform. The apparatus is then operated to switch off the Lights and release the Annett key. The push buttons at the crossing are then operated as required. After shunting or station work is completed and the staff re-gained the Lights still stay off so long as the whole of the train is to the rear of the ASI. They start again when the engine passes the Indicator. Balmattum after de-interlocking (1965) and Tyabb (1966-1977) were examples of this type of station. The S/A relay was proved down by making the track relay over the crossing a stick relay. This would not pick up again after a departing train cleared if the S/A relay was still operated. The Lights would then flash continuously until the fault was fixed.

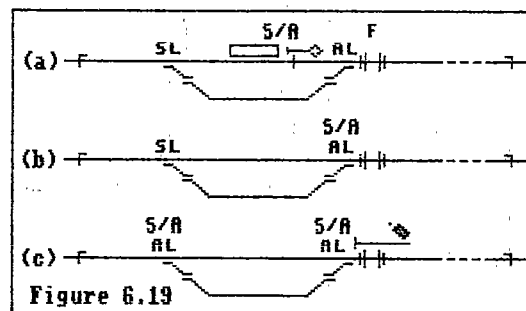


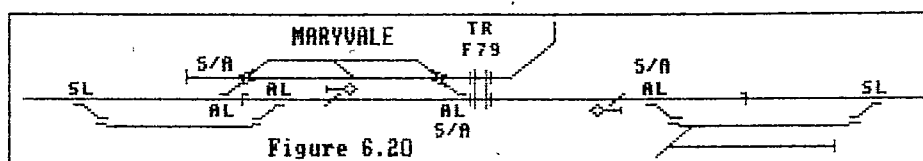
Figure 6.19 (b) shows a simpler arrangement where a train stops solely to shunt the siding and the S/A apparatus is located near the points. The Lights here re-start immediately the staff is recovered after shunting. Locksley after de-interlocking (1973 - 1977) was an example of this type. Four-minute timing had been introduced and this was used to prove correct functioning not only of the stick relays but also of the S/A relay. But it also caused a complication in that an Up train which was shunting the siding at the other end would be occupying the receding approach section, and if it was there for too long the Lights would suddenly start again. To counter this the points may be fitted with an electric detector (circuit controller), or the staff lock may be fitted with a contact, or an S/A exchanger may be installed as shown at the Up end of (c). In each case the contact when made would cause the timing to be inhibited.

Figure 6.19 (c) shows a siding where the crossing is protected by a Light signal. The first layout notified of this type was provided at Hickey's Road on the Up side of Sale in 1981 (9 Jul). Later examples were Minyip, Waurin Ponds, and Bittern. These were all new F/L installations, but some down-graded staff stations with existing F/Ls and Light signal may have been similarly treated; Toora is thought to be an example. The signal is normally at Proceed and remains so when a Down through train passes. Contrary to the practice at a crossing station where a non-track-cancelled signal is at Proceed, the signal also does not go to Stop when an Up runs through, at least at Hickey's Road.

A Down shunting train stops at the S/A and obtains the Annett key. The S/A relay causes a shunting stick relay (SS) to pick up and put the signal to Stop, which in turn stops the Lights. Operating a push button or 5P key switch when ready to shunt starts the Lights again and after a 12 seconds delay clears the signal. When cleared in this way the signal goes to Stop when the train passes. After shunting is completed and the staff has been recovered the SS still stays up; it drops and clears the signal when the approach track is vacated by an Up train or the signal button has been pushed for a Down, or after four minutes when forced by the action of a timing device. The S/A relay itself is not proved down; apparently improvements in relay design introduced in the 1970s ensure that a relay will always drop when its circuit is broken.

At Lyndhurst the Down end was as at (a), and the Up end as at (c). The two existing S/As were retained when the Predictor referred to in 6.2 was installed, but it is understood that ordinary staff locks would be satisfactory. The great advantage of providing a Predictor at sidings such as shown in Figure 6.19 is that a Down train timed to shunt will not give an initial false alarm at the crossing.

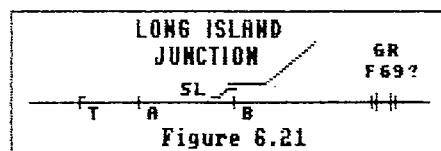
The two roads on the Down side of Maryvale (Figure 6.20) were opened in 1937 as exchange sidings for traffic to and from the APM Paper Mill which was served by a private branch line. The middle crossover obviated the need for the Company's locomotive to occupy the main line via the staff locked points while running round. An intermediate Electric Staff instrument in the section Morwell - Traralgon was installed in a hut near the dead-end extension. The sidings on the Up side were not opened until many years later - Hazelwood Siding at the Up end some time during the 1970s (?), and the Shire of Morwell Industrial Sidings at the Down end in 1979 (1 Feb). Flashing Lights were installed at the Tramway Road (TR) crossing later in the same year (4 Oct). This installation is of interest in that all six turnouts in the main line affect the F/L controls and that four AFO track circuits are provided, fed from two transmitters.



The staff lock on the outer turnout at each end was fitted with an electrical contact. The other four staff locks were replaced by Annett locks, the two at the Up end being released by an A pattern key, the one near the crossing by a B key, and the one at the Down end by a C key. Three Staff/Annett key exchangers (S/A) were also provided, each with an associated shunting stick relay (SS). The SS relays here are not forced to drop until eight minutes after the staff is recovered. For long departing trains which shunt at the staff locked points, the eight-minute timing is inhibited while vehicles occupy the track-circuited section. The approach sections for through trains are designed to give 22 to 25 seconds warning at a speed of 100 km/h, while those for trains which have shunted start from the Approach Section Indicators. For trains leaving from the points near the crossing a push button has to be operated.

An AFO transmitter connected across the rails ahead of the Approach Section Indicator on the Up side sends a frequency of 930 Hz in both directions; receivers are connected inside the insulated joints between the two A/L turnouts, and inside the one at the crossing. This arrangement yields two independent track circuits. Two similar track circuits are provided on the Down side, with 2162 Hz being fed just ahead of the ASI. These AFOs were not overlaid on other track circuits, but the railway at the time was electrified, and use of conventional a.c. track circuits might not have been economic, although these are used for the two short crossing tracks.

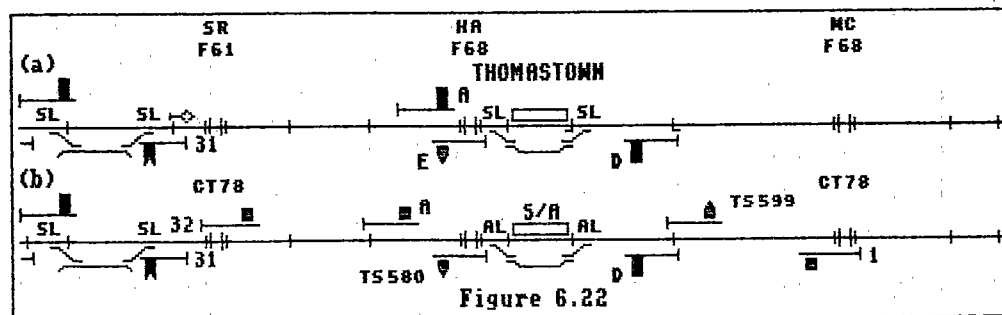
The industrial branch from Long Island Junction, located about 300 m in the rear of Graydons Road (GR) crossing (Figure 6.21), was opened in 1969 (27 Feb); Flashing Lights were installed at GR at about the same time (?). They were installed also at Flinders Road, just beyond the portion of branch line shown in the Figure, and an Up Home Light signal provided on the far side. The interest here arose because a member while waiting to see the branch Goods noticed that the Stony Point DERM started the Lights at GR when it passed point A, but the Goods, which had to stop at the junction, did not start the Lights at all, although the staff locked points were necessarily set normal. Provision of a timing track circuit TA was postulated, and a further visit confirmed its existence. If a train took more than a certain number of seconds to traverse TA, then AB would be cut out of the approach section for the crossing. This provision is unusual for an intermediate siding or junction.



### 6.8 CO-ORDINATION WITH ROAD TRAFFIC LIGHTS

Co-ordination of railway Flashing Lights with road Traffic Lights may be required where a road intersection occurs close to the level crossing. In general a 35-second outer approach or "call section" is provided on the railway, somewhat similar to the outer approach or "holding section" at a boom barrier crossing. When a train enters the outer section a "call" is sent automatically to the Traffic Lights Controller (TLC), just as though a signalman had pressed a call button. The 35 seconds give time for any road vehicles on the crossing to clear, and for the Traffic Lights to cycle round to show Red across the line before the train enters the normal approach to start the Flashing Lights. At this stage a "force" signal is sent to the TLC; if the TLs have not cycled correctly they are forced into showing Flashing Amber, the emergency indication, otherwise the TLC ignores the force signal. A "release" signal is sent a few seconds after the train clears the crossing and the F/Ls have stopped.

An application which had a marked effect on the railway signalling (but none at all on the safeworking) took place in the Keon Park - Thomastown - Lalor area in 1978. Referring to Figure 6.22(a), Flashing Lights had already been installed at Settlement Road (SR) (1961-26 May), Heyington Avenue (HA) (1968-2 Oct), and Mann's Crossing (MC) (1968-22 Aug). Co-ordinated Traffic Lights were provided in 1978 at Settlement Road (24 Sep) and Mann's Crossing (25 Oct). These crossings are so close to the parallel High Street that T/Ls are required on the other side of the line.



The Down approach for SR started from near the staff locked points at the Up end of Fowler's Siding, and the Up one from near Down Home A for Thomastown. New 35 second call sections would extend back through the platform at Keon Park (just off the Figure to the left) towards the Down outer Home, and at the other end through the platform at Thomastown to Up Home D. The Down approach for MC started from opposite D, and the Up one from joints seen on the extreme right. New call sections would extend back through the platform at Thomastown to the Down Home, and at the other end through to the far end of the platform at Lalor. Thus both call sections for SR and both for MC would include station platforms, so each would generally be occupied for much longer than 35 seconds.

The 1977 WTT showed only three electrics not stopping at Thomastown, two Empties from Reservoir to Lalor in the early morning and one back after the evening peak, but it was evidently decided to make provision for both expresses and stopping trains. Referring to Figure (b), a new Down "Advanced Starting" signal for Keon Park, Post 32, was provided at Settlement Road, and a new Up "Home" for Lalor (Post 1) at Mann's Crossing, each being controlled through Stop and Non-Stop push buttons. A new Down automatic Light signal, TS599, was also provided at Thomastown, and existing Up signal E renumbered TS580. TS599 clears about 25 seconds after a stopping train enters the platform, or when an express enters the call section for MC (signal A) or earlier. TS580 clears about 20 seconds after an Up stopper enters the platform (see also text with Figure 5.3), or when an express enters the call section for SR (signal D) or earlier.

Flashing Lights had been installed at Paschke Crescent, Lalor, in 1964 (26 Nov), so that, as shown in (a), with completion of the 1968 installations at HA and MC track circuiting extended for most of the way from Keon Park to Lalor, with only a short gap left beyond Thomastown platform. Although this gap was filled in 1978 Train Staff & Ticket working was retained, and a man was still required at Keon Park to carry the staff along the length of every Down train.

Provision was made in the co-ordination to prevent a third class of train, the local Goods, from placing a call with either crossing while shunting at Thomastown. The staff locks were replaced with Annett locks and a Staff/Annett key exchanger installed on the platform. Notice Boards at each end stated that shunting trains were not to pass until the staff had been exchanged for the Annett key. Withdrawal of the key holds the two Automatics at Stop and prevents a call from being sent; it also puts to Stop the Down Home, which had been replaced by a Light signal some distance further back. This signal is not track controlled and is normally at Proceed, but as might be expected from earlier descriptions of similar signals it does go to Stop when an Up train passes (the writer saw this one day while watching from the SR crossing). Up Home D remained a Semaphore and still detected the points at its end normal. Push buttons were provided near the S/A to clear the required Automatic after shunting was completed and the key returned.

Co-ordination of the Flashing Lights at Paschke Crescent, with Traffic Lights at the intersection with High Street was also effected in 1978 (10 May). The Down approach starts from the second pair of joints back from the right hand end of the Figure, so that the call section probably starts from TS599. The co-ordination is apparently intended primarily to prevent cars travelling north along High Street from turning right into Paschke Crescent while the F/Ls are operating. (Room exists for about five motor cars between the crossing and the intersection.) But it was noticed that during this period cars in Paschke Crescent which had already crossed the railway and were waiting to enter High Street were trapped until the train went through and the Flashing Lights stopped, which seems rather unfair. A similar observation with respect to T/Ls co-ordinated with interlocked gates was noted in Part 2.

A curious feature about signals TS580 and TS599 was that they were evidently numbered from a different zero point from that normally used for automatic signals. This fact was realised at the time, not by making calculations but simply by noticing that the numbers were inconsistent with those on the overhead structures. Of course the system might have been changed, but it was estimated that if the traditional scheme had been followed the signal numbers would probably have been TS572 and TS591. The three-position signal which replaced TS580 in 1988 was sited close to the end of the platform and was numbered T576, which is consistent with T572, not T580, at the crossing. The earlier numbers TS580 and TS599 were therefore probably wrong.

(The writer gratefully acknowledges assistance given by members David Langley and Colin Rutledge in supplying technical information, David on crossing stations, Colin on the Level Crossing Predictor, and both on intermediate sidings. He thanks also Jack McLean for lending Signalling Arrangements Plans, and Roger Jefferies for drawing attention to certain features seen during the 1970s which warranted further investigation; these included the signals at Rochester and Tatura, the circuit controllers on both plunger and points at Mornington, and the mind-exercising arm contact on the Up Home at Thomastown.)

(End of Part 6)

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SIGNALLING ALTERATIONS  
(continued from page 86)

- WN 28/1989 SHEPPARTON. Through train orders may be issued for all passenger trains except Nos 8308 and 8324 on Mondays to Fridays. When a through train order has been issued, the signalman must ensure that the home signals at proceed at least 20 minutes prior to the passage of the train concerned. When trains are to cross at Shepparton, the signals are worked in accordance with Rule 3, clause h of the Train Order Rules. When the signalman at Shepparton ceases duty, he must advise the train controller, place all fixed signals to proceed and make the necessary entries in the train register book. (O 497/89)
- 1.7.1989 EMU LOOP. A trailable point banner repeating signal was provided on the down side of St Arnaud Road level crossing to repeat the position of the down end points at Emu Loop. (O 503/89)
- 3.7.1989 CRIB POINT. The up end lead of the triangle was restored to use and is used for specially authorised movements only. The main line points are secured by a staff lock. A Hayes derail was provided near the boundary fence and is secured by a 4D padlock, the key of which is attached to the Train Staff. (O 2290/89)
- 6.7.1989 DONALD. The mechanical down departure signal was abolished. The plunger locking and two lever ground frame at the down end points was abolished and replaced by a non trailable point mechanism fitted with an F pattern lock. The A pattern annett lock was abolished and the main line points leading to the loco sidings were also fitted with a non-trailable point mechanism secured by an F pattern lock. The signal quadrant operating the up home signal was abolished and a 5P key switch provided on the platform and at the down end points to operate the signal. (O 470/89)
- 7.7.1989 SEYMOUR. No 24 crossover at the down end of the yard leading from the Back Platform Road to the down line was abolished in order to facilitate the final track work in the rationalisation of the yard i.e. the laying in of 37D points. The home signal on post 18, lever 2 and the left hand disc on post 27, lever 67, were abolished. The plunger levers 23 and 25 were converted to pilot levers and levers 2, 24 and 67 were sleeved normal. (O 500/89)
- 11.7.1989 SEYMOUR. The up home signal Post 17 on the signal bridge at A Box was relocated two metres to the left. (O 496/89)
- 12.7.989 SURREY HILLS. Automatic pedestrian gates were provided at Union Road level crossing. (O 2303/89)
- 12.7.1989 SEYMOUR. Post 10 two position light signal, lever 44, and disc signal, lever 36, were abolished and replaced by a three position signal post 10. The new signal will display the following aspects:-  
Top light - fixed red aspect.  
Middle light - red or yellow aspect to up line towards post 46.  
Bottom light - normally extinguished or yellow aspect to No 1B road towards post 35. Amend diagram No 2/89. (O 499/89)
- 19.7.1989 MERLYNSTON-FAWKNER. Boundary Road level crossing was relocated 30 metres in the down direction account road relocation. (O 2351/89)

- 21.7.1989 BENALLA-YARRAWONGA-OAKLANDS. The Train Staff section Benalla-Yarrawonga was converted to Train Order working. The section Yarrawonga-Oaklands will remain a Train Staff section until the Absolute Occupation vide circular 0266/89 (19.4.1989 until 15.9.1989) has been cancelled and the train staff, currently in the Road Foremans possession, has been returned. Two large master keys Nos 60 and 61 lettered "Benalla-Oaklands" will be normally kept at Benalla B Box. (O 520/89)
- 23.7.1989 GEELONG B BOX. The following alterations took effect:-  
(NOTE: The actual alterations were carried out some time late in 1988 or early in 1989 and certainly prior to Easter 1989. This notice just makes it legitimate.)
1. The connection from No 2 road to the main line and Siding A were abolished.
  2. Disc signals worked by levers 9, 10, 11, 27, 28 and 40 were abolished.
  3. Points 14 and 21U, derail 14 and catch points 24 were abolished.
  4. Plungers 16 and 17 became pilot levers.
  5. Levers 2, 9, 10, 11, 14, 24, 27, 28 and 40 were sleeved normal. (O 529/89)
- 25.7.1989 INGLEWOOD was closed as a staff station. The staff and ticket sections Inglewood-Bridgewater and Inglewood-Dunolly, and the electric staff section Inglewood-Korong Vale were replaced by a staff and ticket section Dunolly-Korong Vale-Bridgewater. All trains proceeding to Bridgewater must be in possession of the staff but tickets may be issued for the Dunolly-Korong Vale portion. At Inglewood Nos 3, 4 and 5 roads, and Siding A were abolished. The junction points and the points leading to No 2 road at both ends were converted to WSA levers and staff locked. The interlocking machine and all mechanical signalling was abolished. Location boards are provided. (O 541/89)
- 26.7.1989 SEYMOUR. On Wednesday 26.7 (actually commencing Tuesday 25.7 and continuing until Friday 28.7-D.E.L) signalling diagram No 18'89 (Seymour) was issued and diagrams Nos 2'89 (Seymour) and 50'86 (Mangalore) were cancelled. The alterations were as follows:-
1. The signal boxes at Seymour A, Seymour B and Mangalore were abolished together with all mechanical signalling.
  2. Mangalore was closed as a station/junction with the double line becoming two single lines - the former down line is now the Cobram line and the former up line the Wodonga line.
  3. The points and signals at Seymour are now worked from a relay interlocking control panel located in the station building utilising the former SMS office.
  4. The safeworking is now double line block Broadford-Seymour (inlieu of Seymour A Box) and electric staff Seymour-Avenel (inlieu of double line block Seymour B Box-Mangalore and electric staff Mangalore-Avenel). The Goulburn Valley line beyond Mangalore had previously been converted to Train Order working and the system was extended back to Seymour.
  5. The "Commence Trin Order Working" and "End Train Order Working" boards located at Mangalore were relocated to near post 62 at Seymour.
  6. A closed circuit television monitor will be provided in the signalbox at Seymour and will enable the signaller to observe the End of Train markers on up goods trains. When the up goods is observed to be complete, in the case of the Cobram line train, the

driver will be able to "Fullfil" his train order when the signalman advises him via the End to End radio.

7. Boom barriers were added to the flashing lights at High Street level crossing.
8. Healthy state lights were provided at O'Connors Road and High Street level crossings.
9. The emergency procedures to be adopted in the event of a failure of signals on the single line section between Seymour and Dysart is unaltered. (O 523/89)

31.7.1989 EPPING. Signalling diagram No 17'89 (Ruthven-Epping) became effective and diagram No 1'89 was cancelled. The principle alterations are as follows:-

1. The signalling at Keon Park, Lalor and Epping was transferred to a new signal control panel at Epping located in the Train Maintenance Centre.
2. The signalman can operate the signal and points from either an Entrance-Exit type panel or from a keyboard.
3. The signal control panels at Keon Park and Lalor will be switched out and will only be used in emergencies. Both panels are fitted with SP key operated closing switches. The section between Lalor and Epping is worked as part of Epping yard but the section between Keon Park and Lalor is still worked as a single line section (hence no low speed aspects on the departure signals leading to the section) although both ends are worked from the same control panel most of the time.

#### LALOR

4. Home signals LAL104 and LAL106 were converted to three position signals with low speed aspects.

#### EPPING

5. New home signals EPP121, EPP122 and EPP123 were brought into service.
6. Existing home signals EPP125, EPP126 and EPP127 were converted to three position signals with low speed aspects.
7. Dwarf signal EPP128 was relocated to the exit of No 25 road.
8. The baulks at the up end of Nos 14, 15 and 16 roads were removed permitting access to these roads from that end.
9. No 18 road is baulked 161 and 159 metres from dwarf signals 131 and 142 respectively.
10. Dwarf signals 124, 128, 130, 131, 132, 134, 135, 136, 137, 138, 139, 140, 142, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 161, 163, 165, 169 and 171 were brought into service.

NOTES:- 1. All points in Epping yard are fitted with electrohydraulic dual control clamp locks.

2. The interlocked security gates, the Maintenance Shed and the Washing Plant will be commissioned at a later date.

3. Siding A situated on the down side of the station will remain in service until further notice even though it not shown on the diagram. (O 2333/89)

WN 30/1989 HURSTBRIDGE. On Sundays the safeworking will be Guard in Charge all day and additional instructions have been issued regarding the staff and ticket working for the first two up and the last two down trains for the day. (O 2320/89)

WN 31/1989 EPSOM-ECHUCA. Signalling diagram No 4'89 was issued and diagram No 4'88 is cancelled. The new diagram represents the "As in service" situation. The only apparent alteration between the diagrams is the commissioning of the new Murray River bridge and associated

signalling alterations - removal of the Cobb Highway flashing lights and the relocation of post 8 (up home signal) to the Victorian side of the river. This signal is now 322 metres out from post 6 instead of 943 metres. Post 7 (down departure signal towards the river) is now 341 metres instead of 369 metres out from post 5. (O 542/89)

- WN 32/1989 INGLEWOOD. The junction points of the Dunolly and Bridgewater lines are normally set for the Dunolly line and secured by a staff lock. A notice board is to be provided 100 metres in the rear of the points on the Bridgewater line lettered "STOP. OPERATE POINTS BEFORE PROCEEDING" as protection of the points. Until the board is provided an employee is to attend and place audible track warners (is that what they are now!) down when a move from Bridgewater is taking place. The employee is to obtain the staff from the driver, operate the points, signal the train onto the Korong Vale line and then relock them and return the staff to the driver. (O 580/89)
- WN 32/1989 UNDERBOOL. The crossing loop was extended to 419 metres standing room by connecting the down end dead end extension of No 2 road to the main line. The down end points were relocated accordingly. The main line points are secured by locking bar, pin and padlock. (O 579/89)
- WN 32/1989 BRIGHTON BEACH. Sidings A and B have been restored to service. (O 2350/89)
- WN 32/1989 SPOTSWOOD. The crossover at the up end has been wired for electric traction. (O 2352/89)
- 3.8.1989 BUANGOR. No 3 road was abolished. The points at either end of No 3 road were removed together with post 4. Levers 3, 11, 12, 15 and 17 were sleeved normal. (O 560/89)
- 3.8.1989 SOUTH GEELONG. Post 8 up home signal and worked by lever 19 was converted to a light signal and relocated 150 metres in the down direction. The signal is interlocked with the Swanston Street boom barriers. (O 575/89)
- 8.8.1989 MOULAMEIN. All signals and plunger locks were abolished, and replaced by hand locking bars and a location board. (O 585/89)
- 10.8.1989 HATTAH. The down end main line points were relocated 193 metres in the down direction. No 2 road was extended to provide for a loop of 485 metres standing room. The existing connection from No 2 road to the main line was abolished. The new points are plunger locked and there is no alteration to the signalling. (O 578/89)
- WN 32/1989 BALLAST AND PLANT TRAINS. When it is necessary for a ballast or plant train to be pushed on the main line to or from a work point, the Ganger in charge of the train must ride on the leading vehicle and control the movement. The ganger will be responsible for carrying out the duties of the secondman in relation to the pushing movement. (O 586/89)

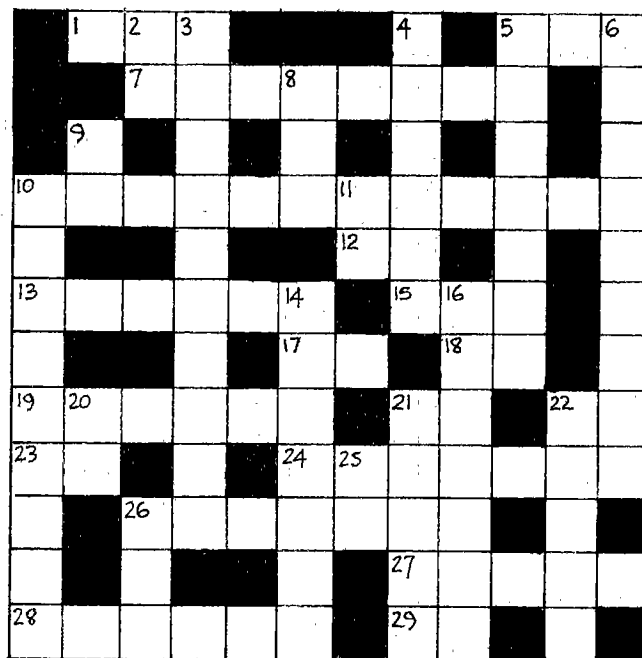
S.R.S.V. CROSSWORD No 28.  
Compiled by Stephen McLean.

ACROSS

- 1 and 5. Created locks, and card for level crossing protection (3,3)
7. Theme is introduced, then long variations (on Kulwin line) (8)
10. Awfully long month spent without N or T on Portland line (4,8)
12. This line is seen in Creighton, Euroa or Violet Town, etc. (2)
13. Near new bridge, and reasonably accessible (by bus) from Newbridge (6)
15. Commuter terminus could start serving Geelong line.
17. 31 was a Walker, and 61 a good runner (2)
19. What the standard-gauge line did in 1962 (6)
21. Cafe closes on Monday to Thursday (2)
22. Runs when required on US line (2)
23. Price loses pie in this car (2)
24. Station could be redesigned to give 2 across glory! (7)
26. Go backwards (7)
27. It is obvious the signal has been pulled off (5)
28. Navigtors came past this location (6)
29. Staff cutbacks, for example (2)

DOWN

2. American soldier came up in a gas-lit car (2)
3. LE being run around sidings near Mount Gambier (10)
4. Seen with Watson in Queensland and (with theme) on the Waverley Route (6)
5. Board greatly respected in Victoria (7)
6. Gerry Lang built a now closed station in Gippsland (9)
8. Swingdoor carriage still in use on Belgrave trains (3)



9. NSW car on fast line could be a replacement for 1 and 5 across (2)
10. Leghorn Youth Club leaders plan to be at this station in the Wimmera (9)
11. Board uninclined to let trains pass (2)
14. Fifty in awful danger on the way to Werris Creek (7)
16. A tram terminus whichever way you look at it (7)
20. Onetime North Eastern system (2)
21. Parry can be seen at the end of the platform (5)
22. Car (associated with theme in North East) (5)
25. Number of first special train starting Linton-wards. (2)
26. Work in South Australia or USA (3)

SOLUTION TO CROSSWORD No 27

ACROSS: 2. SR, 4. Barnes, 9. Isambard, 11. Abt, 13. RI, 14. Finial, 16. Dwarf, 17. Risk, 19. Langi, 20. MTH, 22. RC, 24. HL, 26. Hilltop, 29. Flashing, 31. TR, 32. Seat, 33. Ascot, 36. The, 37. Single.  
DOWN: 1. Kingdom, 2. Saltash, 3. RM, 4. Brunel, 5. AD, 6. NA, 7. EBR, 8. Stick, 10. Buffer, 12. Barn, 15. Lights, 18. Silo, 21. Tablet, 23. Chairs, 25. Poste, 27. Logan, 28. Port, 29. FS, 30. AAH, 31. Toe, 34. SB, 35. CL.