

SOMERSAULT

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SIGNALLING RECORD SOCIETY OF VICTORIA INC



The 'panel' at the new Sydenham station. The panel is the computer monitor in the lower right centre. To the left of the panel monitor is the telephone concentrator, and the block instrument to Sunbury is located at the far left. The two television monitors on the shelf above the cameras are the monitor the security cameras. At the extreme right bottom corner can be seen the keyboard of the teletype used as the train describer to Sunshine. Using a computer monitor (driven by a PC) as a panel is considerably cheaper than the construction of a conventional panel, and this cost reduction is maintained if it is ever required to modify the layout. On the other hand, the lifespan of a PC is likely to be much shorter than a conventional panel and it certainly is not nearly as attractive. Photo Chris Gordon.

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MINUTES OF MEETING HELD FRIDAY FEBRUARY 15, 2002,

AT THE SURREY HILLS NEIGHBOURHOOD CENTRE, 1 BEDFORD AVENUE, SURREY HILLS

Present: - J.Black, B.Cleak, G.Cleak, R.Cropley, B.Crosby, G.Cumming, C.Gordon, K.Lambert, D.Langley, B.McCurry, J.McLean, T.Murray, A.Ratcliffe, B.Sherry, R.Smith & A.Wheatland.

Apologies: - W.Brook, A.Hinde, W.Johnston, P.Silva & R.Whitehead.

The President, Mr. David Langley, took the chair & opened the meeting @ 20:10 hours.

Minutes of the November 2001 Meeting: - Accepted as published. A.Wheatland / A.Ratcliffe. Carried.

Business Arising: - Nil.

Correspondence: - A letter was sent to the Surrey Hills Neighbourhood Centre to book the meeting room for 2002.

A letter was received from the National Railway Museum in York announcing the release of the Volume 2 of the History of British Railway Signalling.

An email was received from Bob Taaffe, Secretary of the SRSNSW, advising that the SRSNSW may have to wind up because it can no longer comply with the NSW legislative requirements. Bob has suggested that the SRSNSW & the SRSV discuss combining their activities.

This last item was discussed at length. It was agreed that this matter should be referred to the Committee & be listed on the agenda for the Annual General Meeting.

J.McLean / G.Cleak. Carried.

Reports: - Nil.

General Business: - The commissioning of the Jolimont - Victoria Park resignalling project remains deferred although it has been suggested that commissioning could take place in June 2002.

The cause of the fault in the new tri - colour LED signals between Jolimont - Victoria Park that had caused the delay had discovered & rectified. The fault was a small amount of damage to the wiring of one signal unit when it was being installed.

Discussion took place on the future of the remaining upper quadrant signals in the metropolitan area.

Rod Smith reported on the spread of LED signals through Europe, both as road & rail signals.

Keith Lambert advised that Dwarf Signal No.25 at Camberwell is to be converted to an LED signal & could possibly use purple LEDs.

Keith Lambert noted that the conversion of signals to LED units had taken place between - Richmond - South Yarra - Toorak.

The down end points at Greensborough are to be renewed in March & will be converted to motor operation. The new turnout will be a high-speed turnout on concrete bearers.

Andrew Wheatland noted that the points at Fremantle Junction are to be renewed in the near future.

A report was received concerning an alleged recent collision at Kalgoorlie involving six locomotives.

Brett Cleak reported on arrangements for opening Nobelius Siding as a temporary staff station on days when "Thomas the Tank Engine" trains operate. The trains run in push - pull mode between Emerald - Nobelius Siding & the temporary train staffs are MES style.

Brett Cleak described arrangements concerning the work between Maroona - Pyrenees Loop. The project was to be commissioned on 25.02.2002 but it has been deferred until March. Maroona will become a power signalled crossing loop operated by remote control from Adelaide. No follow on moves will be permitted between Maroona - Pyrenees Loop.

Discussion took place comparing Victorian CTC systems with the arrangements on the CTC system across the 90 Mile Desert in South Australia.

At Maroona, ARTC wants the Departure Signals from No.1 & 2 Roads towards Gheringhap & Portland to show yellow indications rather than green. Discussions are continuing on this matter. The first signals on the down approaching Maroona from Gheringhap & Portland were to be Repeating Signals but ARTC have decided that they should be Automatic Signals. Again, discussions are continuing.

This led to another discussion concerning comparisons between VR & SAR / ANR legacy rules & systems.

Brett Cleak described other works on the Western SG corridor. At Inverleigh & Westmere, Repeating Signals, electric locks & time release are to replace the master key locks on the siding points.

Manor Loop is to be resignalled in preparation for remote control from Adelaide.

Laverton Loop is to be signalled as a conventional power signalled crossing loop in preparation for remote control from Adelaide.

CTC controlled from Adelaide is to be provided between Newport - Gheringhap.

Alex Ratcliffe referred to the SG project notes in the last issue of Somersault & pointed out that the SG line should go through all platforms north of Seymour where a current passenger service is provided because of National Express licence conditions.

Alex Ratcliffe referred to a recent signalling diagram & asked why Automatic Signal No.T470 at Ruthven is shown as being normally at stop. The answer provided was because of the holding section for the boom barriers at High Street level crossing at Reservoir, not shown on the diagram referred too.

Rod Smith drew the meetings attention to the power failure on the Broadmeadows Line before Christmas & the report of an electric train passing dark signals without tripping & asked how this could happen. A possible explanation was given.

Brian Sherry reported on a recent level crossing collision at Murray Street, Preston.

Jim Black reported on the setting up of an investigation into wheel chairs getting stuck when crossing rails tracks at pedestrian crossings.

Meeting closed @ 21:19 hours.

The next meeting will be on Friday 15 March 2002 at the Surrey Hills Neighbourhood Centre, 1 Bedford Street, Surrey Hills, following the Annual General Meeting.

MINUTES OF 2001 ANNUAL GENERAL MEETING HELD FRIDAY MARCH 16, 2001,

AT THE SURREY HILLS NEIGHBOURHOOD CENTRE, 1 BEDFORD AVENUE, SURREY HILLS

Present: - J.Black, W.Brook, G.Candy, J.Churchward, B.Crosby, G.Cumming, C.Gordon, W.Johnston, K.Lambert, D.Langley, B.McCurry, A.McLean, J.McLean, A.Ratcliffe, P.Silva, R.Smith, A.Wheatland & R.Whitehead.

Apologies: - I.Chan, B.Cleak, G.Cleak, C.French, A.Hinde, T.Murray, G.O'Flynn, L.Savage, B.Sherry, & A.Waugh.

The President, Mr. David Langley, took the chair and opened the meeting @ 20:19 hrs.

Minutes of the 2000 Annual General Meeting: - Accepted as published. J.McLean / B.Crosby. Carried.

Matters Arising: - The proposal for a lapel badge was discussed. Proposed artwork for an enameled metal lapel badge was tabled. It was agreed that the proposal should be circulated to all members in the next mailout.

President's Report: - David Langley read his report to the meeting.

In the past it has been a tradition to make a report along the lines of.... Well you know the words; I won't repeat them here. I propose to just expand a little on the good year that we have had.

I note that the usual six meetings were held during the year, one of which was a pure entertainment meeting held at Transport House in May 1999, the purpose of which was to visit Centrol prior to the transfer of the interstate control functions to Adelaide. The remaining meetings were all held at the Surrey Hills Neighbourhood Centre, the March meeting following the AGM whilst the remaining four were combined business and entertainment meetings.

And a diverse collection of entertainment it was too, ranging from Vance Findlay's illustrated talk in January of the Asian signalling scene including a couple of photos of nice looking train hostesses, Noel Reed's talk in September on the spread of safeworking in NSW illustrated by diagrams and maps, and two slides nights - one being the annual screening of Stephen's slides in November and a quiz type night in July where the President tried to trick everyone with 31 slides of mystery locations including a couple of quite obscure slides. To quote the minutes "who takes pictures of clocks on walls and buses without a signal in sight". Thank you to all our syllabus item presenters.

Somersault continues to be published six times per year and we must thank the Editor, Andrew Waugh for his efforts in this regard. I speak from experience when I say that putting Somersault together, whilst rewarding in itself, is also a difficult job given the scarceness of submitted articles. Again thank you Andrew.

To the Treasurer, thank you Peter for keeping the finances of the Society in a professional manner and ensuring that we had sufficient money in the right account at the right time. And thank you Jon for keeping the Treasurer on the straight and narrow although I don't imagine that Peter has given you any cause for concern.

The Archives Committee have appeared to do very little during the year and there are a number of reasons for that. They will be explained in a separate report but I wish to thank Bob for keeping the aims

and aspirations of the Society to the fore when dealing with various officials in the historical area during the year.

Thanks also to the Committee in general which whilst it did not officially meet often probably held many unofficial discussions in meeting rooms located at Wingrove and Scarborough. These places reflect the interest many members have in trying to replicate the real life operation of railways in model form.

Lastly and definitely not least I wish to thank the Secretary for his continued tireless work for the SRSV. I think that if we had to pay him for hours worked we could not afford him and so we will be eternally grateful that it is a voluntary position. His minute keeping and letter writing, along with the hundred and one other little tasks that get shoved his way, ensure that the SRSV paper work is kept right up to date. Added to all that he wears another hat, that of tour organiser and anyone who has been on any SRSV tour will see that these run with military precision - or at least that is the intention - and little is left to chance. During the recent 25th anniversary tour he was regularly seen chatting on the President's mobile phone, tying up final loose ends even whilst the tour was in progress. This is quite an achievement for a self-professed anti-yuppie phone person.

It remains for me to thank the members for their continuing support of the society and its activities, and I note that we gained some new members during the year including three kiwis, as well as Chris French from WA. A truly international society. I trust that you all gain something from being a member of the SRSV.

David Langley, President.

D.Langley / A.Ratcliffe. Carried with acclamation.

Treasurer's Report: - The Treasurer, Peter Silva, presented the Profit & Loss Statement and the Balance Sheet.

The financial statements showed that the Society recorded a surplus of income over expenses.

Peter provided detailed explanations of the financial statements & about transactions & answered questions regarding the financial statements.

P.Silva / W.Johnston. Carried.

Auditor's Report: - The Auditor, Jon Churchward, tabled Auditor's Report. The attention of the meeting was drawn to the action items listed by the Auditor on his report.

J.Churchward / A.Ratcliffe. Carried.

Tours Report: - The Tours Officer, Glenn Cumming, reported on the two tours held during the year.

The SRSV conducted two signal box tours during the year 2000.

The 2nd tour for the year was the annual Showday Tour / Cupday Tour etc, this year held on Saturday 16 September 2000 to meet organisational requirements. Locations visited on this day were Broadmeadows (our last visit before the removal of the mechanical signalling), Burnley (our first official visit) and Electrol (our first visit to Coppin Street). Thanks must go to Keith Lambert & Andrew Wheatland for their assistance in organising aspects of this tour. As usual, this tour was well attended.

However, the year 2000 will be remembered for the 1st tour of the year, the 25th Anniversary Tour held in February 2000 in association with the SRSNSW. In the space of two weeks, over 45 members, friends & guests of the SRSV & the SRSNSW (including two of our international members) participated in a series of signal box inspections and other activities spread across three states of Australia.

While everyone who participated will have their own memories, the 25th Anniversary Dinner, journey in RM58, copious tour notes and especially the almost continual social interaction between all the participants stands out in the eyes of the Victorian Tour Officer.

A tour of this size cannot be organised by one person, so I must thank the following people for their assistance with this tour: - Keith Lambert, David Langley, Adrian Ponton, Colin Rutledge, Bob Taaffe, David Ward, Andrew Waugh & Bob Whitehead. Special mention must also be made of the SRSNSW Tours Officer, Andrew Hayne, who organised the New South Wales portion of the tour.

My thanks to all members & friends who participated & helped to ensure the success of the tours.

Special thanks must go to the officers of the various railway operating & engineering companies who allow the SRSV to visit areas not normally open to the general public. Their assistance is very much appreciated. Without their co - operation, SRSV tours would not occur.

The Tours Officer always welcomes suggestions & comments regarding the conduct of SRSV tours, especially ideas for future tours.

Glenn Cumming, Tour Officer

G.Cumming / W.Brook. Carried.

Membership Report: - The Membership Officer, Glenn Cumming, tabled the Membership Report.

Type	2000	1999	Movement
V	64	60	+4
K	29	27	+2
N	2	3	-1
KL	4	4	-
VH	5	5	-
Total	104	99	+5

Analysis of Movement

Additions: - G.Lambert (K), I.Chan (V), T.Godwin (V), S.Malpass (V), A.Wheatland (V).

Deletions: - Nil.

Transfers: - M.Drew (N - K).

The Membership Officer answered a number of questions regarding membership categories & other membership matters.

G.Cumming / R.Whitehead. Carried.

Editorial Report: - In the absence of the Editor, Andrew Waugh, the Editor's Report was read by Glenn Cumming.

To quote our former President: we've had a very good year. Six issues of Somersault were produced, and two sets of tour notes. One set of tour notes was produced for the Geelong tour, and the second set (at very short notice) for the 25th Anniversary tour. The Editor would like to thank David Langley for producing the suburban part of the 25th Anniversary tour notes.

Efforts re continuing to improve the production quality of Somersault as the Editor learns more about tweaking the computer tools that are available today.

The project to scan twenty-one years of Somersault was completed, but it was decided that access to the articles would be improved by including an index of articles.

When the Editor finds the time to obtain, markup (in HTML) and test this index, we will release a CD of the issues. Members interested in a 'pre-production' version of the CD (without the index) can contact the Editor.

Andrew Waugh, Editor.

G.Cumming / W.Johnston. Carried

David Langley noted that Somersault required more contributors & contributions.

Alex Ratcliffe asked about articles published in previous issues & the availability of back issues. The Secretary advised that back issues were available on request.

Jon Churchward suggested that an item be placed in Somersault regarding the availability of back issues.

David Langley suggested that a stocktake of the back issues stored in the Archives Room at Seymour would be done when building works had been completed.

Moved Bill Johnston, seconded Wilfrid Brook, that a vote of thanks be given to the Editor. Carried with acclamation.

Archives Report: - The Archivist, Bob Whitehead, presented the Archive's Report.

During the year, a small amount of material was added to the collection. Sorting of the collection continued, despite the current cramped conditions in the room.

Negotiations have continued with various parties with a view to completing the renovations of the other room in the building. Completion of this project will improve conditions for the storage & sorting of the collection considerably.

R.Whitehead, Archivist.

R.Whitehead / P.Silva. Carried.

Elections: - The President stepped down from the chair & the meeting invited Bill Johnston to take the chair for the election of the new President.

The following verbal nomination was received: -

President: - D.Langley, nominated by R.Whitehead and seconded by J.Churchward.

There being no further nominations, the nominee was declared duly elected to the position.

Bill Johnston invited David Langley to resume the chair for the remainder of the elections & the meeting.

The following verbal nominations were received: -

Vice President: - W.Johnston, nominated by J.McLean and seconded by W.Brook.

Secretary: - G.Cumming, nominated by J.Churchward and seconded by A.Ratcliffe.

Treasurer: - P.Silva, nominated by W.Johnston and seconded by J.Churchward.

Committeeman: - J.McLean, nominated by J.Churchward and seconded by P.Silva.

Committeeman: - W.Brook nominated by B.McCurry and seconded by G.Candy.

There being no further nominations, all nominees were declared duly elected to their positions.

Auditor: - The meeting agreed that Jon Churchward be appointed as Auditor of the society.

General Business: - Museum. Bob Whitehead tabled a document regarding the establishment of a railway signaling museum & spoke to the document. There is a need to define the ongoing policy of the SRSV involvement in a Victorian Railway Signalling Museum.

Rod Smith noted the establishment of a museum at Newport.

Peter Silva described a Department of Infrastructure report into the management of railway heritage & noted that there was an opportunity to join in the development of a railway museum at Newport.

Wilfrid Brook noted that in the past the society had written to Alan Brown when he was Transport Minister and that proposals for signaling museums at Puffing Billy & East Ballarat had failed to materialise.

Jim Black asked if it would be appropriate if someone (eg David Ferris or Mike Ryan) was asked to speak at a future meeting.

Bruce McCurry believed that there was little likelihood of a stand alone signaling museum. Bruce noted

(Continued on Page 36)

CAULFIELD 26 MAY 1926

C.L.Rutledge

In amongst the court and legal news of the Argus newspaper for 30 September 1926 was a 5 column inch article on the jury's decision in relation to the railway accident at Caulfield on Wednesday 26th May last. Mr. William Milvain and Mr. James Hargreaves, motorman and guard respectively had been charged with manslaughter following the collision of the train they were manning with the train ahead. As a result, three passengers died and about thirty others sustained injuries.

The jury determined that the motorman and guard were not culpable in such a degree as to render them guilty of manslaughter. The paper went on to say that the jury in their judgement pointed out that a feeling of insecurity had been created in the minds of some of the travelling public. It was pointed out that the accident occurred at a busy junction during the evening peak. It was felt that such key places in the suburban system would be so arranged as to eliminate human weakness. Railway officers pointed out that automatic signalling had not as yet been applied at Caulfield (it was to be another 7 years) but the jury thought that those officers must have been aware of the potential dangers at Caulfield, and that safety of the public should be their first consideration.

At the time of the accident two mechanical signal boxes controlled Caulfield. "A" Box stood at the up end of platform 4 while "B" Box overlooked the down end junction of the Frankston and Dandenong Lines. There were 6 running lines between the boxes with 4 platforms. Tracks 2 & 5 were not provided with platforms but were fully signalled. Electric interlocking between A & B boxes prevented a train being sent towards the other box without the respective control levers in that box being pulled over. On the down side of B box to Carnegie on the Dandenong line and Glenhuntingly on the Frankston line, double line block telegraph was in operation. From South Yarra to Caulfield there was four lines. The southern pair of lines were and still are known as the through lines while the other or northern lines are the local lines. These tracks were operated under the rules for three position signalling. Upper quadrant semaphore signals spaced at around 1000 to 1200 feet apart automatically regulate the passage of trains. Signals on the local lines have a prefix D while the through lines are prefixed by an F. A train departing Malvern on the down local line will pass automatic signals D285, D295, D307, D319 then six mechanical two position signals on post 1 and controlled by Caulfield A Box. Signal 74 is the top left-hand arm and admits trains to No 6 road, platform 4. The next signals at the down end of the platform are on post 10 and consist of 4 arms and 3 discs controlled by B Box.

When signal 74 on post 1 is at stop with no train between there and post 10, automatic signal D319 displayed the warning aspect with the arm elevated to 45 degrees. The signals in the rear of D319, that is back toward Malvern, would show proceed with the arms vertical. With 74 signal at proceed, D319 signal will also show proceed with its arm vertical. Each automatic signal reverts to stop with the front wheels of a train passing the signal and remains at stop until the track circuits to the next signal are un-occupied and an additional overlap distance beyond that signal is also un-occupied. Between South Yarra and Caulfield the overlap distance extends to the next signal ahead. Approaching Caulfield, D319 signal is controlled by a track circuit up to post 1. The overlap distance for D319 extends from post 1 about two thirds of the way to the up end of platform 4, which is approximately 285 yards. Therefore a train stand-

ing in platform 4 is only protected by signal 74 on post 1.

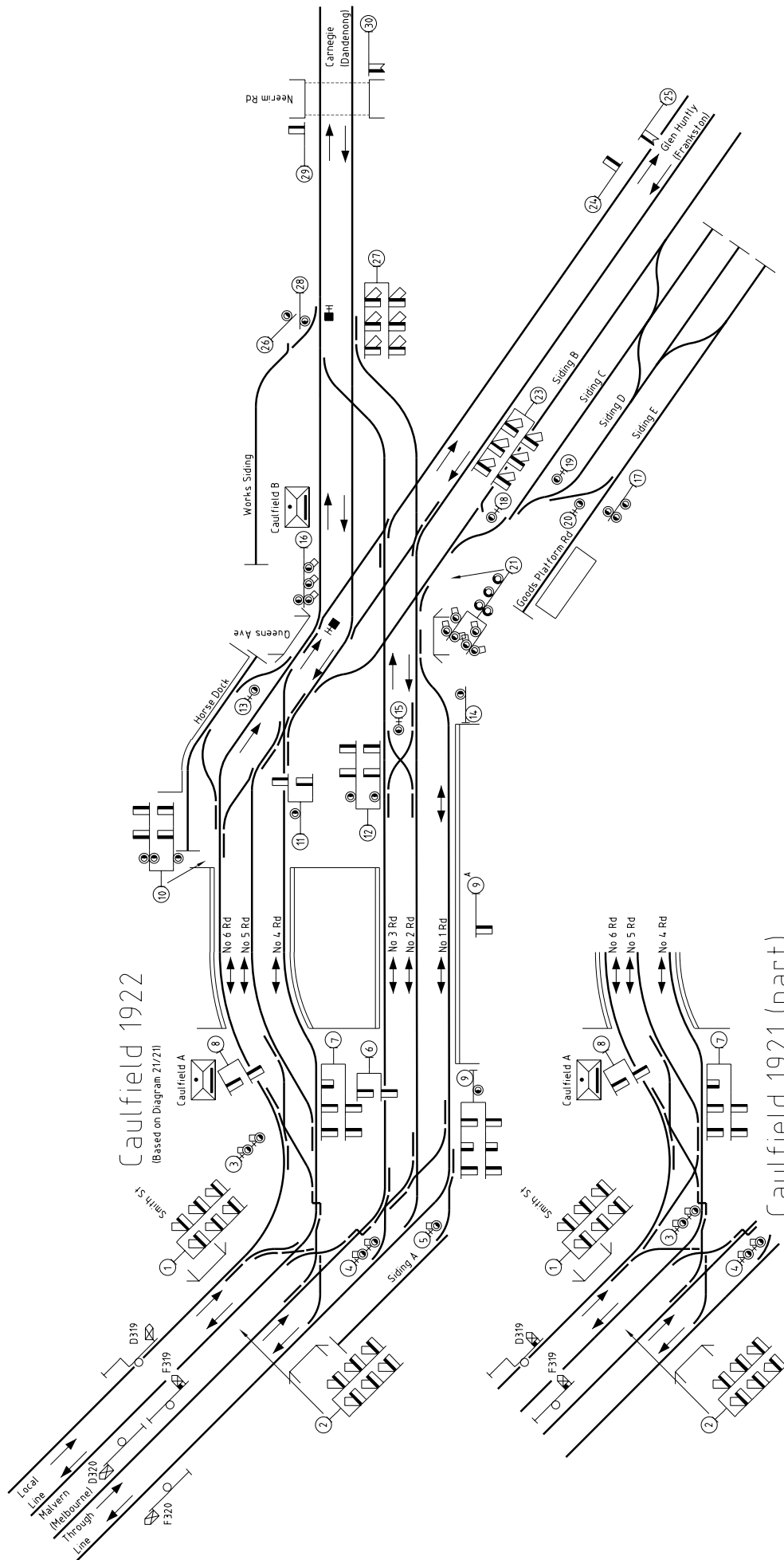
On the evening of 26 May 1926 the 5.57pm down Carrum train from Flinders Street to Carrum was made up from the front of cars 273M, 218T, 29G, 407M, 394T, 319T, 289M. The train was in charge of Motorman H W Mummery and Guard HP Stubbs. It left Flinders Street at 5.58pm, one minute late as it had come in from Williamstown late. As was usual, the signalman at South Yarra turned the train on to the down local line since it was scheduled to stop all stations. The train register book at South Yarra stated that the Carrum train departed at 6.04pm. Arrival at Caulfield No. 4 platform was 6.15pm. Normally a platform stop would last in the area of half a minute or so but on this evening the stop was to have been about 5 minutes. The previous train through Caulfield was the 5.33pm Oakleigh, which ran 2 1/2 minutes late. Assuming that the Carrum train would also be around 3 minutes late the signalman at Caulfield B decided to give permission for an up Oakleigh train to leave Carnegie. As the Carrum train had to cross the path of the up Oakleigh train, and this was not permitted until that train had cleared, the Carrum train waited. The up Oakleigh train arrived into No 3 platform at 6.19pm.

While this was happening, guard Stubbs of the Carrum train was standing on the platform, a little away from his train in order to see the signal aspect on post 10. In his cab at the front of the train motorman Mummery no doubt saw the up Oakleigh train arrive and concluded that was the reason for his train being held. He had released the brakes on his train anticipating the signal to depart. Guard Stubbs on hearing a slight noise from behind, turned and was surprised to see the front of a train appear past the signal box and collide with the rear of his own stationary train at about 5 miles per hour.

In the signal box was signalman G.R.Wright and block recorder J.W.Loftus. Signalman Wright had been working at Caulfield for the last 13 years of his 25 year career. After operating 74 lever to place the signal on post 1 to proceed he watched the Carrum train pull up in the platform and noted that the home signal had correctly been placed to stop by the train. This he could observe by watching the backlight that was clearly visible from the box. At the rear of the train in the platform both Loftus and Wright noted that the red taillight and the two red sidelights were clearly visible. There was no fog, mist or any other hindrance to their view from the box.

The approach of the Oakleigh train was announced in the signal box by the sounding of a bell indicating that the train was in the vicinity of D295 signal. The next time signalman Wright's attention was drawn to the Oakleigh train was upon looking out the window he exclaimed to recorder Loftus "this Oakleigh train is passing the Home Signal at Danger". At this point of time the train was perhaps half way past the signal running at its normal speed of around 20 miles per hour. Wright grabbed the hand lamp and rushed to the window exhibiting a red light to the on-coming train while Loftus jumped up and went to another window raising his arms to signal danger. They noticed that the train appeared to be slowing under the influence of a brake application and watched helpless as the trains met with a crash just beyond the box.

The 6.02pm Oakleigh train appears to have departed Flinders Street on time as it departed South Yarra at 6.08pm with motorman Milvain and guard Hargreaves in charge. Motorman Milvain stated that after leaving Malvern he accelerated some distance before closing his controller and



Caulfield 1922
(Based on Diagram 21/21)

Caulfield 1921 (part)
(Based on Diagram 21/21)

allowed the train to roll. He passed D307 and D319 signals showing proceed aspects. The top left arm on post 1 was not visible in the dark but a green light was clearly visible where upon the train was allowed to continue rolling. Some distance after passing the home signal Milvain sighted a red light that appeared to belong to a train standing in No 5 road. As his train neared the signal box another red light came into view causing him to come to the conclusion that all was not right. The brake was immediately applied in the emergency mode and the dead mans feature on the controller released. Milvain saw someone in the signal box with hands raised but at that time the brake was already applied. He was still in his cab when the front of his train struck the Carrum train at 3 to 4 miles per hour. In the guards' compartment, Heagreaves stated that he only briefly saw the automatic signal D319 and home signal on post 1 and noted them to be green. Shortly after when the speed was about 10 miles per hour he felt a brake application and within 2 or 3 seconds the collision occurred.

The rear car of the Carrum train, 289M, was estimated to be standing about 40 feet inside the up end of platform four. Motorman Mummery, anticipating the signal being placed to proceed, had released the brakes on his train. No.4 platform at Caulfield is curved and level therefore the Carrum train was at rest with minimum resistance to movement. Expert evidence suggested that just prior to the collision, with an emergency brake application in force along the cars of the Oakleigh train, the train would behave as a rigid mass. The train would be inclined to behave as though it was one long carriage even though it was actually seven separate carriages.

By contrast, the Carrum train would behave as seven separate loosely tied carriages. A shove at the rear end of the train standing on a moderate curve would propel the train forward. On a sharp curve there would be a risk of sideways derailment. In the course of the collision, the air brake cocks and pipework at the rear of the Carrum train were damaged. The experts suggested that the brakes would apply almost instantly, converting the freestanding train to a much more resistant obstacle. The thrust transmitted to the rear car is relayed from vehicle to vehicle through the buffers. The mass of the front portion of the stationary train becomes relatively immovable with the brake application with the back being driven into it.

As the Oakleigh train struck the Carrum train, and the latter's brakes applied, the rear car was propelled forward against the mass of the rest of the train. The second car from the rear was trailer 319T which being lighter than rear motor car 289M, reacted to the compression of the buffers between the cars by being pushed upwards enough to disengage the buffers. The frame and body of the trailer entered the body of the motor car by about 10 feet. In turn the roof of the motor car entered the end wall and body of the trailer car by a similar distance. This action is usually referred to as telescoping and was limited to this distance by the bogie of the trailer car striking the end of the underframe of the motor car being derailed in the process. The three deaths and the majority of the injured were in the motor car and suffered their injuries through the action of the telescoping.

Since the accident occurred during the evening peak, as might be expected, both trains were about three-quarters full. First aid help was on the scene within a minute or so. A doctor on the platform rendered immediate assistance. Further doctors arrived in the following fifteen minutes followed by ambulances about 25 minutes after the collision. 7.15pm had removed all casualties whereupon arrangements were made to clear the debris. The railway Ambulance Officer reported that one man was killed outright and 25 persons were injured. Two further passengers died in hospital as a

direct result of injuries sustained.

The force of the collision propelled the Carrum train forward a couple of feet. Damage to the air pipes and fittings caused the pantographs to fall plunging the train into darkness. Driver Mummery after feeling a shove in the rear of his train went back along the track. Upon observing the damage to his train he decided to light as much of the train as possible. Closing the air cocks behind the fifth carriage he raised the pantographs on the front portion of the train before assisting with the rescue work. Guard Stubbs assisted with casualties. Guard Heargraves initially went back behind his train to protect in the rear prior to proceeding forward and assisting. Driver Milvain assisted briefly with casualties before being taken home.

Signal and Telegraph Branch Electrical Fitter Fredrick Whiting was on duty at Caulfield that evening. Upon being advised of the collision he left his depot and went straight to A Box and noted lever 74 to be normal. He then went to signal post 1 and observed signal 74 to be showing a red light and the arm horizontal. There was no sign of any interference with the apparatus. Further S & T staff arrived during the evening along with senior Traffic Branch personnel. By 11.00pm both trains had been cleared away and arrangements were made to do some tests of the signalling.

The first movement through platform 4 was a goods train and this train was utilized to do the initial testing on signals 74 and D319. Control was given by B Box to A Box to permit lever 74 to be reversed. The moment the leading wheels of the goods train passed the insulated joints controlling 74 signal, the signal was replaced to stop. With the train being fully past the signal lever 74 was repeatedly worked to attempt to clear the signal. Although the lever could be pulled to reverse the signal arm remained horizontal. With the goods train moved ahead it was stopped with its guard's van in the same position as the rear of the Carrum train. The test was retried but again the lever would operate by the signal arm remained at stop. When B Box took back control it was found that lever 74 could not be moved from the normal notch. At the moment the goods train moved beyond the signals on post 10 at the down end of the platform it was noted that lever 74 when reversed, the signal arm followed and showed proceed. These observations confirmed that the signalling worked as intended. The following day senior Signal & Telegraph staff attended. Further tests were undertaken to establish if all track circuits and other devices were correctly adjusted and that all circuit wiring was as designed with cable insulation intact. Mr. Samuel Percy Jones, Assistant Chief Engineer of Signals certified all tests were satisfactory and the installation was in correct order.

With the carriages of the Oakleigh train back at the Jolimont depot extensive tests were carried out. The air brake apparatus underwent detailed examination along with the pilot valve (dead mans handle) and other controls of 319M. On the 4th and again on the 9th of June running tests were carried out between Malvern and Caulfield. As carriage 319M received significant damage, 211M replaced it in the formation of the Oakleigh train. The train was operated in the same manner as described by Motorman Milvain. After powering, coasting and braking as stated by Milvain, the train was pulled up before reaching the end of the platform. Various trials with different amounts of power and braking could produce a result where the train over-ran the presumed rear of the Carrum train by about 10 feet. The inference drawn was that there was no fault on the train and on the evening of the accident the train was driven considerably faster than stated.

The detailed layout of the signalling at Caulfield concerned with the accident is illustrated in figure 1. It is ap-

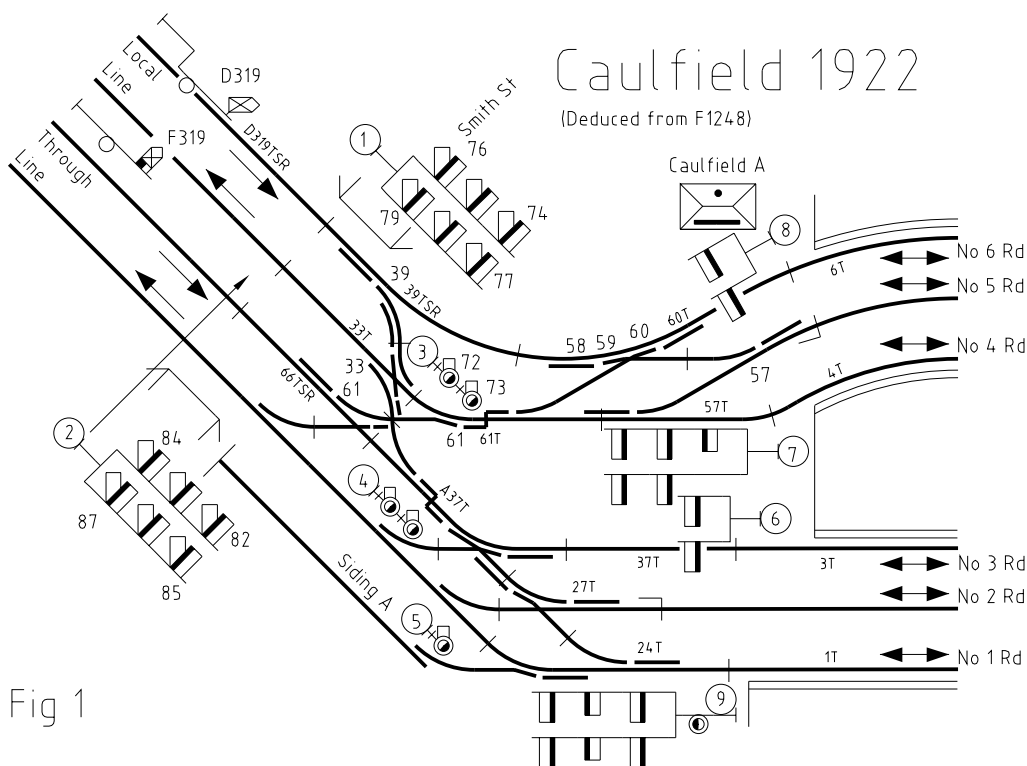


Fig 1

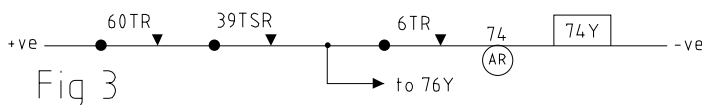
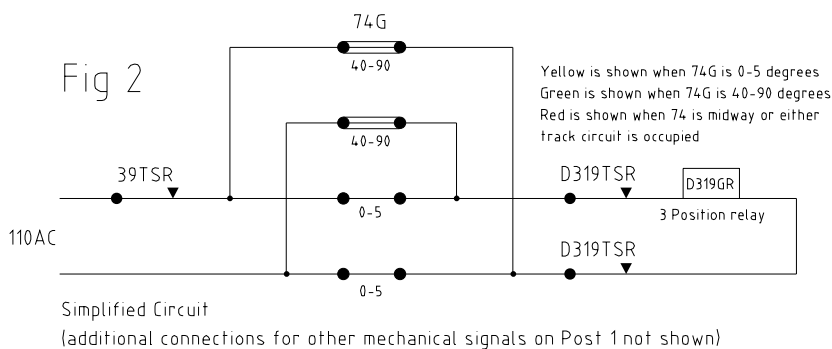


Fig 3

parent that a train standing in platform 4 is standing on track circuit 6 (6T). There is one track circuit (D319T) between D319 signal and post 1. Beyond post 1 there are two track circuits (39T & 60T) before a point opposite the up departure signals on post 8. The circuit controlling signal D319 is shown in figure 2 while the circuit for the signal replacer for signal 74 on post 1 is shown in figure 3. Attention is drawn to the fact that signal D319 is not controlled by Caulfield A and therefore normally shows "normal speed warning". On the through line signal F319 signal is controlled and therefore its normal aspect is stop.

The net result of the various arms of the investigation into the events surrounding the collision at Caulfield was that there was no fault with the operation of the signalling or with the trains or their braking systems. Total blame for the accident rested with the motorman and to a lesser extent the guard of the Oakleigh train. During the investigation process some interest was shown in the fact that al-

though automatic signal D319 was equipped with a train stop and at one time was controlled from Caulfield A box, it no longer was controlled. Some discussion also took place as to signal 74 being the sole protection in the rear of the Carrum train and that signal not being equipped with a train stop.

When power signalling was introduced between South Yarra and Caulfield on 18 December 1921 there was control of D319 signal. At that point of time electrification was not complete between South Yarra and Caulfield. The spread of electrification created considerable work for the Signal & Telegraph Branch. Not only did track circuits need to be altered from the existing DC types to AC types to be immune to traction current interference, but the electrical connections to the rails for the traction return current was also the responsibility of the S&T branch. A whole division known as the Bonding Division had been established to undertake this work and look after ongoing maintenance.

At a number of places including the up end of Caulfield yard some track alterations were needed in order to configure point connections, traction return paths through the relevant rails and preserve insulation of rail from each other for track circuits.

The Engineer of Signals wrote to the Chief Engineer of Way and Works on 3 October 1921 pointing out the need for issue of formal instructions to undertake the agreed track layout modifications in order that arrangements for electrification could be completed by the scheduled date. It appears that the delay in the instructions being issued and therefore material supply delayed the completion of the South Yarra to Caulfield power signalling and electrification. When commissioned in late December 1921 the signalling featured control of D319 because the existing placement 60 points near A Box was within the overlap distance beyond 74 signal for D319. Evidently the instructions were issued because the Engineer of Signals wrote to the Superintendent of Goods Train Services requesting attendance of a representative at the testing of the modified interlocking at 11.00am on Friday 27 January 1922. Weekly Notice entries tell that as from this date compound points and crossover alterations were effective at Caulfield A. The Signalling Arrangements drawing records the change on 28 January noting that lever control of D319 signal has been removed. Weekly Notice 28 of 1922 contains a note that the existing diagram 21/22 should be amended as automatic signal D307 is normally at "Normal Speed Clear" and D319 at "Normal Speed Warning".

The rearrangement of the crossovers now puts the end of the overlap clear of conflicting moves. It should be noted that where an overlap extends into turnouts and crossovers, the existence of such are not considered significant unless another train could be directed through the overlap. By way of example on the down through line approaching Caulfield, F319 is controlled because it is possible for an up train to be signalled from 4, 5, or 6 tracks to the up through line and thereby occupy the overlap for F319. On the down local line it is not possible for a fouling move to take place within the overlap as the relocated 60 crossover is beyond the overlap. The length of the overlap is derived from tables themselves derived from train braking characteristics. A medium speed overlap (25mph) on level track is 300 feet. A 40mph overlap (normal speed) as on the down through line is 750 feet. Because there is a permanent speed restriction through some of the crossing work at Caulfield of 25mph, in this case the calculation of train braking for the speed restriction compensates the overlap length to approximately 450 feet.

It is interesting to observe that one of the reasons the trackwork was altered was to eliminate the curved K crossings in the non-symmetrical single compound turnouts then in use. These type of structures were adopted to allow the through tracks to form the best possible alignment and thereby keep line speed up. Track engineering staff detests such beautiful examples of turnout work because of their individuality making maintenance difficult and the complexity of the geometry also complicating maintenance. The preferred option is always to use a standard geometry turnout and as necessary use curves on all extremities to blend into existing trackwork. Invariably with this course of action the curves are of tighter radius than otherwise with inherit speed restrictions. The only acceptable alternative is massive track redesign and curve improvement.

Following the track alterations at the up end, electrification was completed on the local lines between South Yarra and Caulfield in mid February 1922. Completion to Oakleigh and Glenhuntly was in mid March with the through lines being finished in early April.

In a statement to the formal Coroners Inquiry into the

accident Samuel Jones Assistant Signal and Telegraph Engineer reported that:-

"Automatic signalling has been brought into use on the following lines,

- * Melbourne to Essendon
- * Melbourne to Elsternwick
- * Melbourne to Canterbury
- * Melbourne to Caulfield
- * Melbourne to Clifton Hill
- * Melbourne to St. Kilda
- * Melbourne to Montague

and the extension of this system is progressing steadily: during the last 3 years the following work has been carried out,

- * Spencer Street to North Melbourne - Automatic Signals including power installations at Spencer Street and Franklin Street Junction.
- * North Melbourne - Kensington - Essendon line
- * Power installation at Camberwell and Hawthorn
- * Electric mechanical installation at Burnley
- * Automatic Signalling, Seymour to Tallarook

Work in progress includes,

- * Automatic Signalling - Footscray to Newport
- * Automatic Signalling - Elsternwick to Sandringham
- * Automatic Signalling - Burnley to Heyington
- * Automatic Signalling - Clifton Hill to Westgarth and Northcote Loop
- * Automatic Signalling - Castlemaine to Maldon Junction
- * Track control of Signals - Heyington to Darling
- * Track control of Signals - Alphington to Heideburg
- * Completion of track control of signals at Caulfield

The installation of Automatic and Power Signalling requires skilled labour, it is highly specialised and considerable training and experience are required in the drawing office where the circuit designs are prepared.

In the circumstances it is considered the progress made is satisfactory."

Elsewhere is the same statement Jones says that "the completion of control of all Home Signals at Caulfield by means of track circuits is the next progressive stage and this work is well in hand, the track circuits have been arranged so that they will be suitable for the power signalling scheme which it is intended to install at a later date, and a building which will form the lower storey of the Power Signal Box is to be erected immediately, to house the greater portion of the electrical apparatus used in the track circuits."

The signalling arrangements drawings refer to design being done on 8 June 1926 for track locking at the down end of Caulfield for signals 75, 78, 83 and 86 but the format of the notation indicates the work was never carried out.

A list was prepared of locations with similar characteristics to Caulfield where automatic signals lead up to two position homes. The places were Clifton Hill A, Essendon and Flinders Street. At Flinders Street signal F14 is reported as having time element release (approach clearing) of 25 seconds over 722 feet while B14 is similar with 22 seconds over 620 feet. At Viaduct Junction signals W24 and E24 have 20 second timing over 500 feet. The last noted location is

(Continued on Page 35)

HAWTHORN

Hawthorn was opened on 13 April 1861 as the terminus of the short line from Richmond. The line was built and operated by the Melbourne and Suburban Railway Company, which also built the line from Princes Bridge to Windsor. The line from Richmond to Pic-Nic (located north of Swan Street) had been opened on 24 September 1860, but the extension to Hawthorn had been delayed until the bridge over the Yarra River had been completed. The ownership of the line was then passed to the Melbourne Railway Co in 1862 and then to the Melbourne and Hobson's Bay United Railway Company in 1865. This company was eventually sold to the Victorian Railways on 1 July 1878, but it continued to be operated separately until 1881.

I know almost nothing of Hawthorn station during private ownership, not even the actual location of the station. It is possible that it was located on Burwood Road on the site of the later goods yard. Before 1882 the ex M&HBUR Co lines were not even shown in the VR Working Timetable.

In the February 1882 WTT, Hawthorn is shown as being open for passenger traffic only. There was a daily service of thirty seven trains. The line from East Richmond was still single and working was strictly by timetable.

Takeover by VR and extension to Lilydale

With the takeover by the Victorian Railways the Hawthorn line was extended through Camberwell and Box Hill to Lilydale. A contract was let on 30 September 1881 to C&E Millar for £79865/10/0 for the construction of the railway. A contract was subsequently let for water supply works at Hawthorn and Camberwell on 17 February 1882 (to J.E. Cottew for £435/6/6). No contract has been found for erection of new station buildings. This suggests that the buildings (and verandah) on the Up platform may date from the private company's time.

The single line to Camberwell was opened on 3 April 1882. The first subsequent timetable I have is dated 1 December 1882. In this timetable there were 39 trains daily to Hawthorn. Of these, 31 continued on to Camberwell or Box Hill (there were also 2 mixed trains to Lilydale each day). The through suburban trains divided at Hawthorn, the trailing carriages being left and being subsequently picked up by an Up train. The timetable notes that all trains meet at Hawthorn.

The single line continued to be worked by timetable only, Staff and Ticket working was only provided beyond Camberwell; the Staff system was apparently thought impracticable for suburban lines. The timetable of 1 December 1882 was supposed to mark the bringing into use of the duplication between Burnley and Hawthorn but at the last minute it was decided to retain single line working on this section to allow the original Yarra River bridge to be redecked. The lax safeworking methods were directly responsible for the Burnley collision the next day when an Up Land Sale special collided with a regular train. The double line between Burnley and Hawthorn was finally brought into use on 9 December 1882 and Staff and Ticket working was provided between Hawthorn and Camberwell on 24 December 1882.

Hawthorn was interlocked on 11 June 1883. A signalbox was provided on the Down platform containing a 22 lever Rocker frame

with 19 working levers. Unfortunately nothing is known about the layout at this time.

A contract was let on 29 June 1883 to R.M. Bennett for the erection of a shelter shed and booking office for £227/16/0.

Duplication to Camberwell and opening for goods

The line to Camberwell was duplicated on 3 May 1885. This resulted in 4 levers in the frame becoming spare. However, on 17 July 1885 'new sidings' were provided and the number of working levers increased to 18. A locking sketch from this period has survived and is the basis for the diagram below. This alteration almost certainly marks the provision of the goods sidings which lay on the north side of the line between the passenger station and Burwood Road. The actual date of opening Hawthorn for goods traffic is not known. The WTT of 3 December still records the station as being open for passenger traffic only, however, tenders closed on 21 December 1885 for the lease of firewood allotments at Hawthorn, and the Commissioners' Report of 30 June 1886 recorded goods revenue from Hawthorn. By January 1887 Hawthorn was recorded as being open for goods in truck loads not requiring shed accommodation. Tenders were closed on 17 January 1887 for construction of the foundations of a cart weighbridge and associated road approaches.

The December 1885 is the first I have after the duplication and this timetable records that there were 58 daily suburban trains from the city, of which eight terminated at Hawthorn. There were also 2 passenger trains and 1 mixed train to Lilydale.

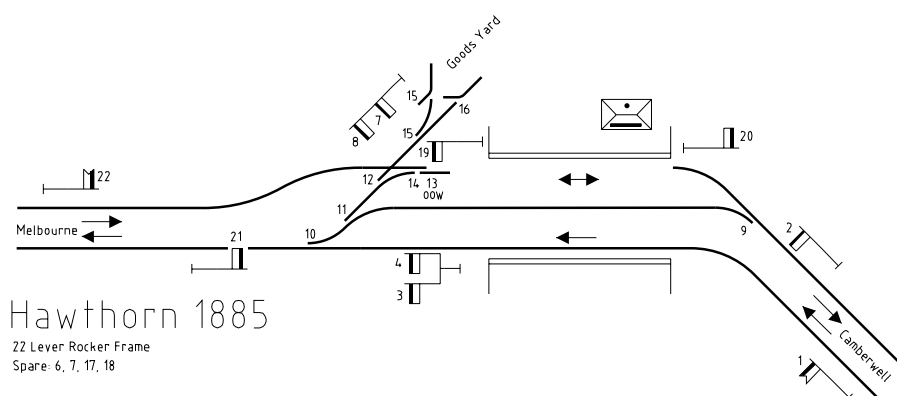
By 19 January 1887 Double Line Block working was in force with the sections Burnley - Hawthorn - Glenferrie. There were now 46 daily suburban trains (6 of which terminated at Hawthorn) together with two Lilydale trains, and a number of through goods. Hawthorn goods yard was served by a daily local goods train from Melbourne which arrived at 1030 and returned to Melbourne at 1055.

The Kew Line

On 19 December 1887 the branch line to Kew was opened. This event did not mark any changes at Hawthorn as the junction was located at the physical point of divergence of the branch line. Kew Junction signalbox was provided to control the new junction and this box divided the Hawthorn - Glenferrie block section.

Kew line service, 39 trains per day, ran through to Melbourne. As there were still 46 daily suburban trains for the Camberwell line the service through Hawthorn became far more intense. No trains now terminated at Hawthorn, but the local goods service to Hawthorn remained unaltered.

By 1 October 1888 the number of suburban trains on the



main line had increased to 67 each day, together with the 39 daily Kew trains. The goods services are slightly confused. It appears that the local Hawthorn goods had been extended to serve Kew and shunted Hawthorn between 1005 and 1055 on the Down. On the Up the Kew Goods was scheduled to be at Hawthorn from 1136 to 1146; this could have been a straight pickup or waiting a path. The WTT also showed two local Hawthorn goods trains. One of these was the 1030 arrival, but no corresponding Up goods was shown and this may have been included in error. In addition there was an 'as required' goods which arrived at 1130 and returned at 1155.

By this timetable the Staff for the Kew branch was being worked from Hawthorn. The Staff was overcarried between Hawthorn and Kew Junction.

Extension of Kew line to Hawthorn

In 1890 Kew Junction was abolished and Kew line was extended into Hawthorn. The branch line was taken to a new platform behind the Down platform. The new junction was at the Up end of the platforms and incorporated the lead to the goods yard. All Kew line trains continued to run through to Melbourne and so no provision was made for terminating branch trains at Hawthorn.

A contract was let to J. Dunton on 28 September 1888 for additions and alterations to the road overbridges at Burwood Road, Elgin Street, Power Street and the platform at Hawthorn in preparation for this extension. On 3 April 1890 a contract was let to J.R. Fischer for the relocation and extension of the shelter shed on the Down platform.

In preparation for the abolition of Kew Junction, a new signalbox was provided on the Up platform at Hawthorn on 9 March 1890. No contract for the construction of this box was recorded so the 'new' box was probably second hand from another location. It contained a 34 lever Rocker frame with 29 working levers.

The Kew line was extended to Hawthorn on 10 August 1890. This was recorded in the interlocking register, but there was no alteration to the number of working levers. The extension of the Kew line into Hawthorn had little effect on the timetable. The WTT dated 11 August 1890 did not even acknowledge the changes; Kew Junction was still shown as a block post. The number of main line suburban trains had increased to 69 each day and the number of Kew trains to 41. The Kew line goods train was unaltered, but the conditional Hawthorn local goods services had been deleted.

Despite the WTT, it is known that Kew Junction was closed and so the block sections would have become Hawthorn - Glenferrie and Hawthorn - Barkers Road (the later single line block). As the Staff section was already Hawthorn - Barkers Road this would have remained unaltered. Around 1892 it was recorded that the Hawthorn - Barkers

Road Staff was of No 1 Pattern with a blue Ticket box.

Barkers Road was closed as a Staff station on 17 December 1894 ; the section becoming Hawthorn - Kew. The Staff was of No 2 Pattern with red Ticket boxes. The single line block section Hawthorn - Barkers Road was abolished and all trains were required to carry the Staff.

On the 1 February 1892 a pedestrian access was provided at the Up end of the island platform. This crossed the tracks on the level and two wicket gates, worked from the signalbox, were provided.

Provision of runaround facilities

Until 1895 all Kew trains had run through to Melbourne. Apparently to save money the timetable was altered and the Kew trains now terminated at Hawthorn outside the peak hours. Passengers were required to change trains.

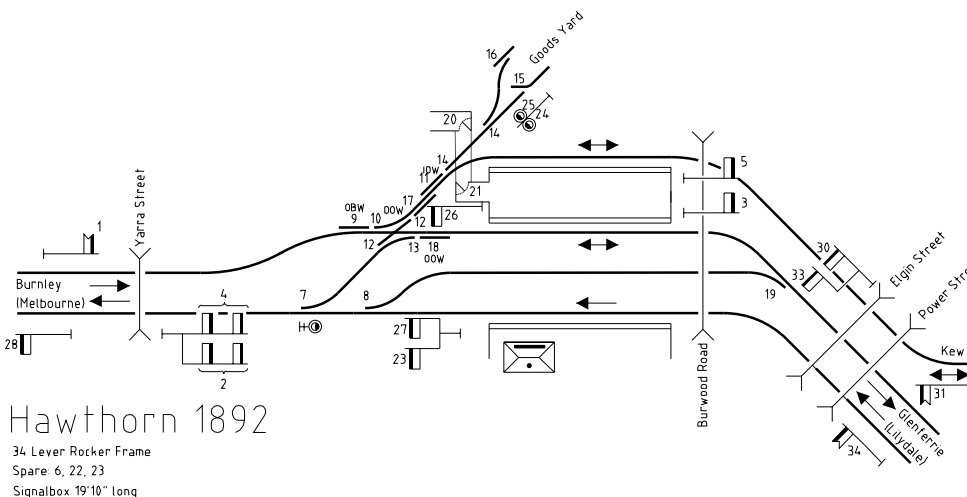
Hawthorn was extensively altered to provide the facilities for the branch trains to terminate. The main requirement was for a run around and this was provided on the north side of the branch platform. The island platform was widened by abolishing the middle siding and extending the platform over the site of the former Down line. The current footbridge was provided to allow passengers from Kew to cross to the Up platform. A photo taken shortly after this alteration, however, shows that little protection from the weather was provided and the current iron verandahs were not provided until 1901. The junction at the Up end was completely remodelled and a head shunt was provided for shunting the goods yard and running around.

In preparation for the provision of the run-around, alterations were made to the interlocking on 18 August 1895 to the 'Kew line junction', but no further details are known. On 6 October 1895 the new layout was brought into service. The signalbox was retained, but there were now 30 working levers.

The December 1896 WTT showed that service levels on the Kew line had actually been increased to 49 daily trains. Of these 23 of these were through trains; these ran in the morning and afternoon peaks. The main line service remained at 69 suburban trains each day and so no attempt was made to use the capacity freed up by the removal of the through Kew trains. The Kew goods had been retimed to run at night and now shunted Hawthorn on the Up between 0130 and 0140 and on the Down between 0220 and 0235, although these times would have been purely nominal.

WN 46/96 issued in the middle of May contained a set of special instructions for Hawthorn. After Line Clear had been granted for a Down train to approach, no obstruction of the Down line could occur (e.g. crossing an Up through Kew train to the Up line) unless the points were set for No 4 Road and that road was clear. (It should be remembered that the block rules in force in 1896 normally allowed trains

to be accepted if the line was clear to the home signal.) No 4 Road was not to be used as a siding and it was to be kept clear for running around the engine of the Kew train. Goods trains were not to be shunted from one line to the other except in an emergency, and then only with the permission of the SM. By the last we may infer that the former middle siding had been used to refuge main line goods trains. In October 1896 Drivers were instructed to obscure their green light



when running around Kew trains.

In the middle of July 1896 co-acting signals were provided for the Up Homes on Post 27 which was located on top of the cutting approaching the station. The co-acting arms were located on short posts adjacent to the Kew and Camberwell lines. On 30 August 1897 a platform indicator was provided. This indicated on which platform the next Melbourne train would depart. This was worked from the signalbox which now had 31 working levers. Ground Disc Post 26 was replaced by a disc on a post on 20 April 1899. This required an additional working lever in the frame, but why is not clear.

The use of the 'Section Clear but Station or Junction Blocked' signal was prohibited for the acceptance of Up Camberwell trains from the middle of January 1899. As this rule had only been introduced with the 1898 rulebook, its application at Hawthorn was very short lived. Up trains approached Hawthorn down a 1 in 50 bank and around a blind corner so it is quite possible that there was an incident.

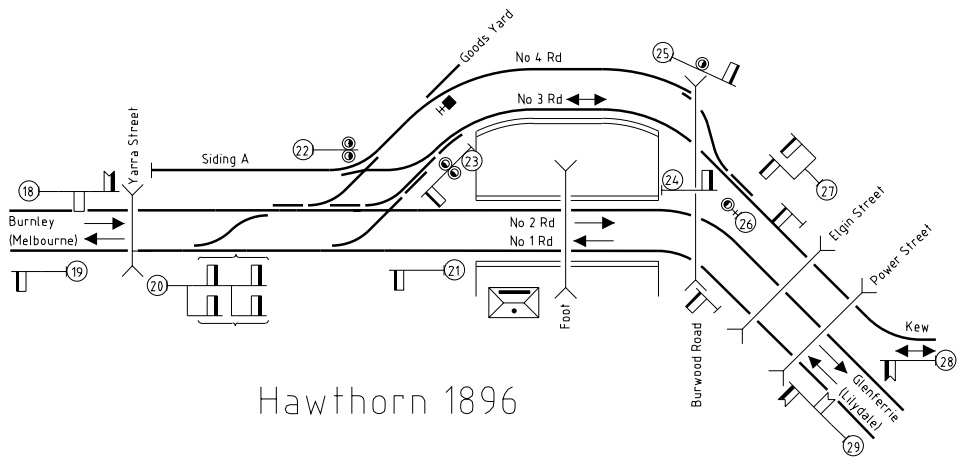
On 28 May 1901 the old style Staff for the Kew line was replaced by a No 1 Pattern Lock Staff. There is some evidence that a No 2 Pattern Lock Staff was subsequently used, at least briefly. By the issue of the 1908 GA trains on the Kew line could travel on Staff Ticket with the telephone being used to exchange the requisite messages.

The iron verandahs at Hawthorn were provided in 1901. A Challingsworth was granted a contract on 22 February 1901 to take down the iron verandah from the Port Melbourne platform at Flinders Street and to re-erect a part of it at Hawthorn. A second contract was granted to Challingsworth on 28 June 1901 to construct iron verandahs on the Up platform and over the footbridge that connected the platforms.

A trial of semi-automatic signals between East Richmond and Hawthorn was brought into service on 8 December 1907. This trial is described in more detail in the history of Burnley (Somersault Vol 23 No 6). At Hawthorn the Down Distant on Post 18 was converted to a Home signal, and both it and the Starting signal on Post 19 were track controlled. The Down line was track circuited up to Post 20 and the Up line was track circuited beyond Post 19. As described in the article on Burnley, this system was not a success and block working was quickly reverted to, although a second trial was attempted in April 1908.

By the December 1909 WTT there were 77 daily main line trains (plus two additional trains that ran on Friday evening only). The Kew service was 50 trains a day; 23 of which ran through to Flinders Street. The goods service at Hawthorn was provided by the Kew goods Tuesday to Saturday. It arrived on the Down at 0300 and departed for Kew at 0330 and, on the Up, from 0420 to 0430.

By 1912 the Staff working on the Kew line was the re-



Hawthorn 1896

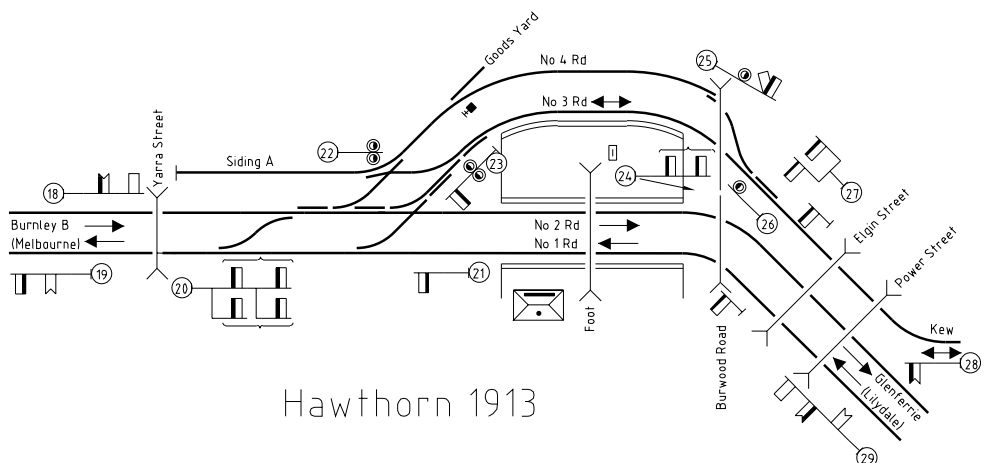
sponsibility of an employe on the island platform as the signalbox was too remote from the Kew line. To prevent confusion between the employe and the signalman, a quadrant was provided on the island platform in late March 1912 to control the Down Home on Post 25. To make sure that the quadrant was actually worked the home was also fitted with a reverser worked by a treadle in the Kew line.

At the beginning of April 1912 the special instructions at Hawthorn were extended so that vehicles were prohibited from standing in either dead end extension of No 4 Road.

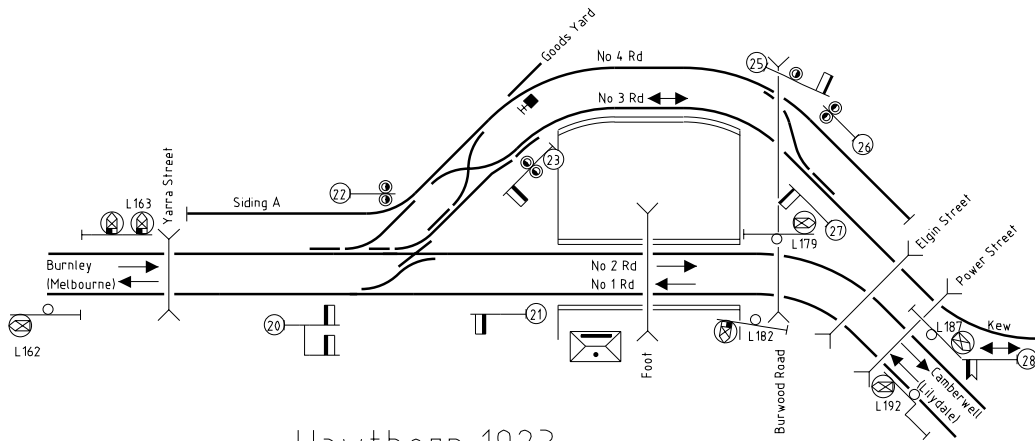
In the middle of June 1913 the main line was track locked between East Richmond and Glenferrie. Unlike the previous attempt, the block instruments were retained and the signalling was unaltered. At Hawthorn the Home signals on Posts 19, 20, 21, 23, and 24 were provided with reversers and controlled by the track in advance of them. Note that trains standing in the Up platform or the Back Platform were not protected from Up trains. Although it is not mentioned, it is likely that the Up and Down Distant signals were also fitted with reversers at this time.

As part of the regrading works between Hawthorn and Camberwell a Works Siding was provided at the Down end of the station on the Down side on 12 June 1917 (but not notified in the Weekly Notice for nearly a month). The Works Siding was an extension of the dead end extension of No 4 Road. An additional disc signal was provided on Post 26 to control moves from the siding, and an additional point lever was brought into use, probably to work a set of catch points in the siding. The siding was probably used to load filling from the cutting. There is no record of the removal of the siding, but it was probably removed by the end of the year.

By the issue of the 1919 GA a set of keys for Barker were kept at the signalbox for use by the Guard of the Kew goods.



Hawthorn 1913



Hawthorn 1923

Electrification

In 1922 the Camberwell and Kew lines were electrified. As part of this the double line block working on either side of Hawthorn was replaced by three position automatic signalling. As was common in the metropolitan area, however, the mechanical signals in the station itself were retained.

The first alteration occurred on the 22 September 1922 when the connection from No 3 Road to Siding A was relocated 20 yards closer to the platform. Post 23 was also relocated to suit. On 8 October the connections at the Up end were rearranged. The main line crossover was removed and replaced by a new crossover formed with a double slip in the Down main line. A delta (scissor) crossover was provided in Nos 3 and 4 Roads to allow goods trains to get to the Up line from No 4 Road or the Goods yard.

Three position signalling replaced double line block working between East Richmond and Hawthorn on 15 October 1922. The Down Distant was replaced by a controlled automatic (L163) and the Up Starting signal abolished. The double line block between Hawthorn and Camberwell was replaced on 29 October. The Down Starting, Up Home, and Up Distant were abolished in consequence, but an Up controlled automatic (L182) was provided to protect movements to the Up line from No 3 and 4 Roads.

The new electric service was introduced on 17 December 1922 on both the main line (to Box Hill) and the Kew line. According to Dornan & Henderson, the new main line service beyond Hawthorn was only slightly improved with a 20 minute service to Box Hill. However, as all of the Kew services were extended through to Flinders Street with a 20 minute service, the service from Hawthorn itself had been dramatically improved. A major improvement to the service levels on the Down side of Hawthorn did not occur until

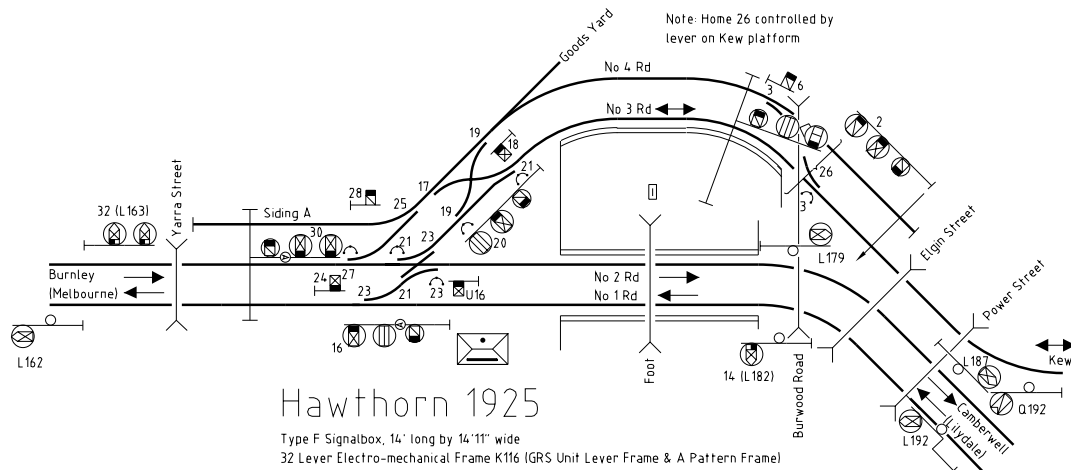
late 1924 (with the extension of electrification to Lilydale and Upper Ferntree Gully) when a 15 minute service was provided to both Box Hill and Kew. This timetable gave a total of 179 Down electric services through Hawthorn each day. Hawthorn goods yard continued to be shunted daily by the Kew goods, which shunted on the Down between 0045 and 0110, and on the Up between 0205 and 0245.

Initially it appears that only the main lines and No 3 Road were electrified. In February 1923 an Annett lock was provided on the lever that worked the crossover to the Kew line. The Annett key was a loose key (i.e. not kept in a lock) and was normally kept in a 'place of security'. Such Annett locks were provided on unwired crossovers and were intended to make the signalman think about his actions before he sent an electric train across the crossovers.

Power Signalling

Full power signalling at Hawthorn was provided on 14 June 1925. A new 32 lever GRS electromechanical 'pistol grip' frame was installed in a new brick signalbox 50 yards closer to Melbourne than the second box. All main line mechanical signals were replaced by three position light signals and the shunting signals were replaced by motorised dwarfs. A closing lever was provided and illuminated letter 'A's were provided on Homes 16 and 30. No closing hours were listed in the October 1929 WTT, and the box, of course, would have to be switched in during suburban traffic and when the goods was shunting.

The goods sidings, including Siding A and No 4 Road (except the dead end at the Down end) were electrified in late January 1929. This was in preparation for running the goods service using the new electric locomotives.



Hawthorn 1925

Type F Signalbox, 14' long by 14' 11" wide
32 Lever Electro-mechanical Frame K116 (GRS Unit Lever Frame & A Pattern Frame)
Spare: 4, 5, 7-11, 13, 15, 22, 29, 31
Closing: 12

Return of the Kew shuttle

On 24 November 1930 the off-peak through service to Kew service was cancelled. Off peak services were now provided by a single ABM car shuttling between Hawthorn and Kew. Through trains to Flinders Street continued to run during peak hour. By 1936 the through service was ran until the departure of the 0857 Up Kew from Hawthorn. The single ABM motor came on at Hawthorn at 0902 and shuttled back-wards and forwards at roughly 20 minute intervals until 1647 when through services resumed. The car came on again at 1850 and continued the service until the last train at night. No attempt had been made to use the paths this freed up to improve the service on the Down side of Hawthorn; in 1929 there had been 106 Down services to Camberwell; by 1936 this had only increased slightly to 108 (110 on Friday). The goods yard continued to be shunted by the Kew goods, but the frequency had been cut back to three nights a week.

The instructions for working the Kew line were (from the 1938 GA):

During certain hours the service between Hawthorn and Kew is operated by a Single Electric Motor stationed at Hawthorn. On each day when the Local Service is to be brought into operation the Signal Port at Hawthorn must hand the Driver the Staff for the Hawthorn-Kew Section and thereafter, until Through running is reverted to, the Driver operating the Local Service must retain possession of the Staff and will be responsible for its safety, and for complying with the Rules and Instructions for carrying out the Train Staff System.

When a Driver is relieved before the Single Electric Motor is taken out of running, he must personally hand the Staff to his relief, and the latter will be responsible for obtaining it.

The Officer-in-Charge at Hawthorn and the Transportation employe accompanying the train must, on arrival of the Up local train at Hawthorn, sight the Staff and see that it is in the Driver's possession prior to the train departing on the Down journey.

On arrival of the last Up local train at Hawthorn each night, the Train Staff must be obtained from the Driver and taken to the Signalbox for the operation of the Kew Line Goods train.

Automatic working of the Kew line

Although a closing lever had been provided in the frame when the new signalbox was provided in 1925 it was of little use as the box had to be staffed for each Kew train, even if it was only a shuttle that arrived in the platform and re-

turned immediately to Kew.

On 1 May 1931 automatic working was provided for the Kew platform. Full details were not recorded, but it is likely that levers 2 and 26 could be left reverse when the box was switched out. Normally the arrival home (Home 2) would be at proceed and Home 26 at Stop. The arrival of the ABM at the platform would restore Home 2 to Stop and release Home 26. It would not clear, however, until the Signal Porter on the Down platform reversed the miniature lever for the train to depart. Illuminated letter 'A's were provided on Homes 2 and 26, however that on Post 26 only illuminated if the Home 26 was held at Stop with the control lever on the platform at reverse.

A bell key was also provided on the platform to allow the Signal Porter to bell the departure of trains to Barker. The Porter who accompanied the ABM (note, not a Guard) was instructed to remind the employe in charge of the platform to do this prior to each departure; I bet this didn't happen!

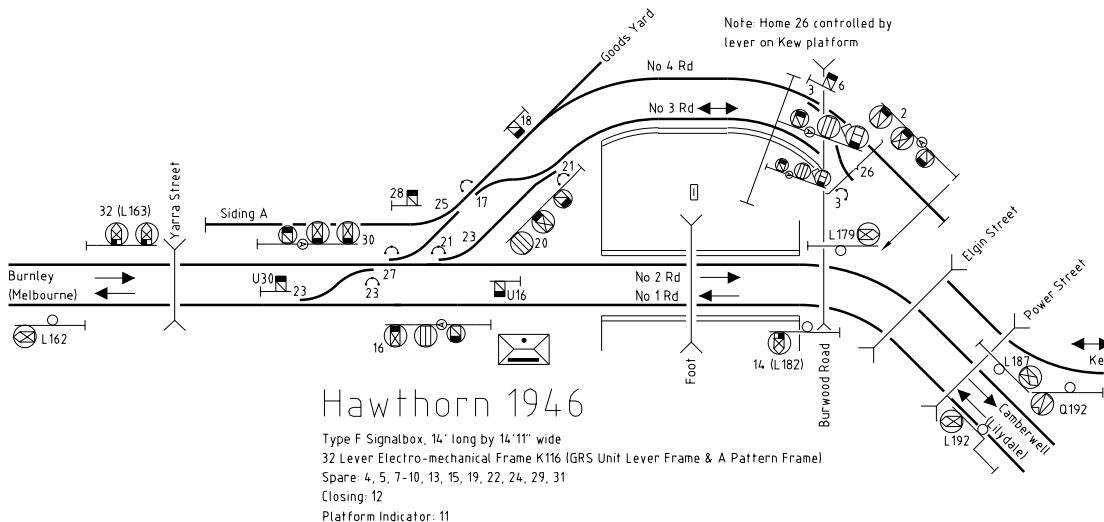
An illuminated 'Signalbox closed' sign was provided in September 1931.

This automatic working allowed Hawthorn signalbox to switch out for lengthy periods each day. In 1936, Hawthorn box was switched in for the through Kew trains in the morning and evening peaks, for 10 minutes just after midnight (to stable the ABM in the goods siding) and as required for the running of the Kew goods.

From 29 November 1937 through services were eliminated in the afternoon peak period. Dornan and Henderson state that their paths were taken by through trains to Ashburton, but the main line service through only increased to 110 trains per weekday. The WTT for 29 November states that "Hawthorn is switched in as required for the operation of through trains to Kew and for the purpose of shunting the local Kew train to and from the yard, and also the running of Kew goods trains." Patronage subsequently declined to such an extent that a bus replaced the off peak shuttles from 5 June 1939. A train service to Kew was only provided in peak periods and on Sunday morning. The Sunday morning services only lasted until 2 October 1939 when they, too, were replaced by a bus. In the WTT for 2 October 1939 there were still 5 through Up trains in the morning, and one through Down train on Friday evening. The shuttle ran in the early morning and in the evening peak between 1535 and 1904. This service was maintained until the late '40s.

Minor alterations were carried out to the signalling in the thirties. Dwarf 18 was relocated to the righthand side of the line on 29 October 1934. The interlocking was altered on 26 April 1935 to allow Down trains to be routed to No 3 Road via Crossovers 17 and 27. On 23 August 1935 a co-

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LETTERS TO THE EDITOR

Colin Rutledge writes:

I enjoyed reading in Somersault Vol 24 No 6 Chris Wurr's article on switch stands. It got me thinking about the principles and some of the points he made. My observations and contributions are therefore made as a supplement and not as a criticism.

There is a brief reference to an arrow indicator used by the Melbourne and Geelong Railway in an article in Somersault Vol 15 No 5 page 85.

The reason that switchstands were not provided with the first installation of double wire working in Victoria at Glen Iris was that they were not required. In two-position signal application theory is the principle that for every route past a signal post, a separate signal is provided. As an economy measure and obviously in places where the route and speed applicable are similar for two or more moves past a disc signal, a point indicator can be provided to convey route information to a driver saving a signal, its lever and associated interlocking. Such a device is not suitable for differentiating higher speed moves and I can think of no place where a point indicator was used to indicate which route was to be taken by a train passing a two position home signal at proceed. At Glen Iris the need did not arise as each platform was set up for one direction running only. Therefore any train in normal working after passing a signal at proceed could only run into the left-hand platform.

When the installation was designed for Pakenham around three years later, the scheme called for one home signal to admit trains to the station. As No 2 road was a crossing loop, frequently used and considered as a running line, a point indicator was unsuitable. A driver of an approaching train after passing the distant at caution needed to be able to tell from some distance into which road he was being admitted. Therefore the switchstand or perhaps the "point indicator for use at double wire locations where the home signal applies to two routes" was called for.

The other double wire locations on the eastern line are the same situation. The last location in service on the line was Longwarry that didn't have a switch stand as the points were the junction from single to double line. Trains in the facing direction could only take the diverge being the only route to which the signal applied. The Geelong Ballarat line stations all featured switchstands as the signals could admit a train to the loop. Eaglehawk, which could be defined as fully interlocked as far as the running lines were concerned, featured a signal for every route. In this case there is no need for any form of indicator and none were provided.

Trailable Facing Points which is the correct title for what we generally refer to as trailable points are actuated by a large helical spring. The spring is incorporated in a hydraulic damper correctly called a "switchman". The spring is the force used to return the points to normal while the hydraulic cylinder component is configured to have no effect when the points are trailed from normal to reverse. When the spring pushes the points from reverse to normal, in the hydraulic cylinder damps the action of the points. This is done to prevent the points closing up following the passage of each bogie of the train. There are three reasons for this. Firstly the operation of the points under each bogie of a train increases the wear and therefore maintenance required on the points. Secondly to ensure correct operation of the mechanism, the points are "broken" at a moderate speed and to allow efficiency in train running trains may then accelerate to line speed as the remainder of the train follows over the points. Finally the damping action of the switchman ensures the point blades come against the stock rails com-

fortably without any tendency to bounce which would make it difficult for the mechanism to insert the plunger.

In Victoria there are two types of mechanism in service. Both are self-contained and take the form of a point machine type of enclosure. The Portland line was fitted with Union Switch & Signal Company (US&S) S20 mechanisms which come with electrical detection as standard. Most machines had the electrical detection units removed and a locally designed and constructed Westinghouse Signals Australia (WSA) mechanical detection unit installed working in conjunction with a US&S mechanical banner. Although plagued with initial problems the mechanical detector now days give reasonable service. The machines feature a cast iron case and cover and are generally painted black. As well as the Portland line they can be seen at Warrenheip Loop, Korong Vale Loop, Dunolly and Riggs Creek Loop. All are fitted with banners (switchstands) with the exception of Riggs Creek Loop and the Portland end of Heywood, which have electric detection only in conjunction with light "signals". I am not sure if all machines at Dunolly have banners. The Heywood machine has a signal in place of a banner for sighting reasons on the curve while Riggs Creek has light "signals" to enable a greater sighting distance as it is a 115kph line and trains can traverse the points in the facing direction at line speed. The route indicators provided here are a reaction to driver demands.

The S20 mechanism with electric detection is a beautiful piece of work. Breaking (initial trailing) speed in Victoria is limited to 65kph but under trial I have seen them work perfectly at 95kph. It was decided to keep the speed instruction at 65kph to reduce wear and to ensure that excess stress factors could be avoided. By comparison the mechanically detected WSA S21M has trouble operating at speeds over about 55kph due to the inherent design handicaps with the mechanical linkage and the banner drive.

On the Mildura line the trailable facing points are WSA S21M types. They have a cast iron base and sheet metal cover and are generally painted grey. Their mechanism is very similar to the US&S S20 mechanism but differs principally due to metrication. A non trailable version called a T21M is used for working sidings connected to main lines and have the ability to work the siding end rod lead to drive a catch, set of points or a derail assembly.

The discs and arrows on the trailable points were all originally intended to be aluminium as some were. The action of a train trailing a set of points causes the point to travel from normal to reverse in about a quarter of a second. The banner only detects the points locked in normal therefore as soon as a trailing move commences and the plunger of the mechanism is withdrawn, the banner turns and completes its 90 degree turn before the toe of the points has moved any appreciable distance. This action takes around 0.1 of a second causing a huge twisting effect on the aluminium banners. To overcome the very short life of the aluminium, a moulded fibreglass version was experimented with and the version in use today is a refinement of that style.

Semaphore Masts in Victoria

Some years ago I started to collect information on this subject in a similar manner to Andrew Waugh. The areas where I do know some details are the areas in which Andrew speculates. I can contribute what I currently have to fill some gaps.

There are two illustrations about showing the first station on the north bank of the Yarra River as the Melbourne terminus of the Sandridge railway. In both images a slen-

der wood appearance mast is shown with semaphore arms on each side of the post.

I agree that most early semaphore masts were wood as most photographs show this to be so. There are photographs of the following places showing station semaphores generally quite tall erected on wood masts.

Castlemaine	Harcourt
North Geelong	Woodend
Moama	

There is another photograph showing the semaphore at Echuca with an iron mast riveted up from angles and flats. The down starter at Malmsbury was one of these masts. They were slightly tapered from bottom to top. A four cornered cast iron base supported the mast which had a lever plate on each side about 3 feet above ground. The mast that survived at Malmsbury is now in my collection albeit without the original arm and fittings as these were replaced by somersault parts probably before the turn of the century before last.

There are very few photographs available showing signals in the days just before interlocking in Victoria (1876). There are however three images that are very similar of Spencer Street Station just before interlocking. Two of these photos are somewhat prior to the latter which shows the new signal box with signalling work in hand. The earlier shots show a mast numbered "5" with one arm and a large lamp about 6 feet down the mast. In the background is a signal platform sprouting one mast with four arms and possibly two lamps. The masts are wood and in the case of signal 5 the top of the diagonal braces forming the foot arrangements can be seen above ground level. The latter photograph shows a number of more conventional masts some with multiple arms and spectacles with a red glass only. This type of signal features in a number of photographs of places such as

Flinders Street	Ringwood
Richmond	Windsor
Princes Bridge	Bendigo
Brighton Beach	Lower Level

CAULFIELD 26 MAY 1926

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Caulfield F319 signal with no time shown but a distance of 220 feet but the relevant signalling arrangements drawing shows the distance to be 289 feet. In each case the approach clearing is controlled by certain conditions.

With all the evidence presented you now have the opportunity to form your own conclusions as to where the responsibility for the death, injuries and damage to rolling stock lies. As for me I have always found it hard to understand the reasoning that permitted a signalling scheme to exist where a driver could be regulated by automatic signals with train stop protection and just before a significant junction revert to two position signals without train stops. I fail to see any significant difference to the locations on the Darling line where the loop departure two position signals were train stop fitted. One presumes that on the Darling line this was done to prevent driver errors in passing the departure signal at stop and entering the single line irregularly. Considering train frequency and crossover moves, many of the arrival signals at Flinders Street, Caulfield until power signalling in 1933, Oakleigh, Essendon, Newport and so on, should have been more adequately protected.

It is true that the driver of the Oakleigh train passed Caulfield A's home arrival at stop and only commenced to brake to avoid a collision in response to warnings waved and yelled from the signal box. This should have been a

The drawing published in Vol 14 No4 of this distinguished journal is of a signal either the same or slightly modified there from. Fortunately one of this type survives, also in my collection.

The most interesting semaphores of all are those Andrew refers to as cast iron. I have in my collection copies of the drawings with the tender's signatures thereupon for three of the contracts for these masts. They relate to complete signals on cast iron circular masts with cast and wrought iron fittings. Each set of drawings is of a similar yet different signal. The nominal heights are 20 feet, 30 feet and 36 feet 8 inches. Each has a windlass arrangement to raise and lower the lamp from the ground and the two taller types have foot spigots to enable climbing. The main portion of the mast looks similar to the upright portion of the C class water columns that feature foot spigots. A good friend remembers the signal masts at Tyabb in the days of his youth (I suspect about 55 years ago) were of the 20-foot type. Fossicking around about 15 years ago I recovered the cast iron ground socket base from one of these masts from the down end at Tyabb. I wish I could say that I have one of each type in my collection but I don't so the drawings will have to do.

In the days when I was a boy (1972 approx) wandering the network looking at mechanical signals I noticed the occasional riveted steel mast with lighter angles and thinner ladder styles. An examination of the fittings on these masts always revealed all parts to be genuine McKenzie and Holland. It was explained to me by old hands that these were genuine McK&H signals. This could also be determined from their full name appearing on each part or by a number corresponding to the item number from their catalogues.

There were also around the state at least three masts that had the angles reversed, ie facing outwards instead of inward. In a McK&H catalogue of 1902 there are on offer either wood masts or iron masts of the reverse angle type complete with their characteristic two part split cast iron base. Of the three masts of which I know I have two of them in my collection and the third still stands at Strathmerton.

predictable event and at a minimum following a signal passed at danger in such circumstances, either the home arrival signals should have been altered to three position types or train stops be fitted to the existing mechanical installations.

In the compiling of this article I have drawn upon the following:

- * Book of Signals 6 March 1923
- * Signal circuit drawing F1248 Caulfield A Slot Circuits
- * Signalling Arrangements drawing RH33 South Yarra - Caulfield
- * Signalling Arrangements drawing RA151 Caulfield
- * Litho Diagram 21/22
- * Victorian Railways accident reports and correspondence from S&T files
- * Weekly Notice
- * S&T Memos and standards

MINUTES OF THE 2001 AGM

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that around the world signaling museums were part of a larger railway museum.

Discussion continued on this subject with reference to the railway dining room at Seymour as a possible location for a signalling museum, SRSV participation in a future railway museum, SRSV involvement in the enterprise at Newport, possible SRSV member involvement & the possible involvement of private collections.

Peter Silva suggested that a list of material to be retained or collected needed to be compiled.

Alex Ratcliffe asked about the nature of the name of the society & asked if it is relevant? Does it reflect our activities? Is "Record" appropriate? Alec suggested that the name of the society should reflect the aims & aspirations of the society.

Meeting closed @ 22:00 hrs.

The Annual General Meeting was followed by the March 2001 Ordinary Meeting.

SIGNALLING ALTERATIONS

The following alterations were published in WN 01/02 to WN 6/02. The alterations have been edited to conserve space.

Dates in parenthesis are the dates of publication, which may not be the date of the alteration.

- 21.12.2001 **Keon Park** (WN 1/02)
On Friday, 21.12., pedestrian gates were provided at the Hickford Street/Church Street foot crossing (16.781km). Diagram 33/01 replaced 13/95.
- (15.01.2002) **Wodonga - Wodonga Coal Sidings** (SW 1004/02, WN 1/02)
Permission is granted to push up to 8 bogie vehicles on the Standard Gauge line between Wodonga and Wodonga Coal Sidings.
- 20.01.2002 **South Yarra** (WN 2/02)
From Sunday, 20.1., Automatics D124, F124, B124, D131, F131, B131, D140 and F140 were fitted with LED units.
- 23.01.2002 **Lascelles** (TS 1004/02, WN 3/02)
From 23.1., the Down end points were booked out of use account derailment damage.
- 03.02.2002 **South Yarra - Hawksburn** (SW 14/02, WN 3/02)
From Sunday, 3.2., Automatics D145, F145, D152, D153, F153, F154, D161 & F161 were fitted with LED units.
- (05.02.2002) **Dandenong** (SW 17/02, WN 4/02)
Automatic D1007 has been replaced by a new mast with a Westinghouse RX8 210mm LED light unit.
- 10.02.2002 **Glenbervie** (SW 18/02, WN 4/02)
Automatic E340 has been replaced by new mast with a Westinghouse RX8 210mm LED light unit.
- 10.02.2002 **North Richmond** (SW 501/02, WN 6/02)
On Sunday, 10.2., Automatic S93 was relocated 25 metres in the Down direction. Amend 13/92.
- 10.02.2002 **South Yarra - Hawksburn** (SW 16/02, WN 4/02)
From Sunday, 10.2., Automatics D164, F164, D171, F171, D178, F178, D183, & F183 were fitted with LED units.
- 20.02.2002 **Maroona** (SW 1016/02, WN 6/02)
From Wednesday, 20.2., the WSA point levers on the points in No 2 Track leading to No 3 Track (at the Down end) and No 3 & 4 Tracks (at the Up end) were replaced by Westinghouse manually operated non-trailable point machines. The point machine at the Down end is rodded to the derail in No 3 Track and the the machine at the Up end is rodded to derails in Nos 3 & 4 Track. Amend Diagram 6/00.

HAWTHORN

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acting signal was provided for Home 26. The co-acting signal was provided on the platform opposite the post.

On 8 December 1946 the crossing work at the Up end was renewed and simplified. Crossover 19 was abolished, allowing the delta crossover to be replaced by a simple crossover. The double slip was replaced by a new main line

crossover further out. Home 30 was replaced by a new post located 60 yards further out, and Dwarf 24 was located the same distance out and was renumbered U30 as it was now worked by lever 30. Dwarfs U16, 18 and U30 were prevented from showing 'Clear Low Speed' aspects.