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Deadline for May issue is 17 April 1988.
NEXT MEETING: Friday, 18 March 1988.
VENUE: A.R.H.S. Library Room, Windsor Rly Station.

MINUTES OF FEBRUARY 1988 MEETING

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

HELD ON: Friday, 19 February 1988.

MEETING COMMENCED: at 2012 hours.

PRESENT: Jack McLean, Alan Jungwirth, Jim Brough, Warren Doubleday, Stephen McLean, John Sinnatt, Roger Jeffries, Rob Weiss, Colin Rutledge, Keith Lambert, Wilfrid Brook, Andrew Waugh, Rod Smith, Jon Churchward.

MINUTES OF PREVIOUS MEETING: adopted as read (Brook/Doubleday)

NEW MEMBER: Jack mentioned his chance meeting with a young Queensland enthusiast at the Surrey Hills Neighbourhood Centre, and the Queensland branch of the society now has another member.

GENERAL BUSINESS: Rob Weiss gave notice that he is to resign as Treasurer at the Annual Meeting, and explained that he had not sent out the renewal notices for this year as he didn't want his name to be on the inwards mail for the next year.

(a) David Langley will maintain the mailing list. Until the Annual Meeting, Jack McLean will receive money, with 60 Kenmare Street to be used as an address for subscriptions.

(b) The matter of having the Annual Meeting and the subscription year out of step was mentioned but no further actions was taken.

NEWS AND DISCUSSION: 1. Drouin has been closed as a block post.

2. Windermere and Burrumbeet are closed as staff stations and Trawalla is permanent. Beaufort closes soon.

3. The question "Why did Ballan-Warrenheip power signalling take longer to introduce than Melton-Bacchus Marsh?" led to a discussion on the TDM (Time Division Multiplex) System and coded track circuits, and also the difference between ATC and CTC. (Sunshine-Rockbank is CTC and Melton-Warrenheip is ATC.)

4. Colac-Camperdown-Warrnambool is now staff & ticket, with Terang not a staff station. With a local goods trains terminating at Boorcan some nights, the up pass. next morning leaves Warrnambool on a Line Clear Report.

5. Toolamba is now an intermediate instrument, with only one signal (home off the branch). The question was asked "Is this the only example of an intermediate instrument at a station open for passenger business?"

6. Ian Scrimgeour writes that when he is next in London he will visit the South Kensington Museum to see the Winter's Block Instrument. The question the meeting asked was - why is it there? Who had Winter's Block? This list was produced - Victoria, South Australia, Western Australia, New Zealand, India, Silverton Tramway and Argentina. Another question - did South Australia ever use it on double lines?

7. Single line working on the down line (used for passenger trains) between Williamstown Beach and Williamstown in 1916 was discussed - it had track circuits, reversers on the signals and indicators in the signal boxes. Was this in conjunction with Winter's Block? In addition to tablet?

8. The Bulletin's policy on metrication was mentioned. A QR location named 2 1/2 miles was written as 3.__ km (actually it is 4.025). The meeting wondered if we should change the name of the Adelaide suburban station to 1.61 km End.

9. Copy tabled of Reece Jennings article on Wolseley-Mount Gambier in which he strongly states that Electric Staff should never have been used on the line as it was expensive and inefficient.

10. Rod Smith produced a copy of the article "Enigma at Horsham and Murtoa" from Newsrail, April 198x and suggested that the Society give an authoritative reply.

(a) Re two up home signals at Horsham:

1. This might assist shunting outside the home signal (the branch is unsuitable because of the level crossing, and the staff could be away) but there is no down departure home, so this is not the most likely reason.

2. An up inner home signal avoids the need for trains taking the loop to go slowly for one kilometre or more.

3. An up outer home signal allows trains from Pimpinio to approach while trains are going to or from the branch.

4. An up train can come right up to the inner home while a down train is entering the loop at the other end.

(b) Re aspects on approach automatics (sic) at Murtoa:

The meeting was not convinced that the automatic signals do in fact display the aspects claimed (is there an up automatic at all?); in any case Murtoa is different from other stations because it is not a CTC crossing station.

Stephen is to write a reply for Newsrail.

The discussion ended with a question: How many repeating signals can show both green over yellow and yellow over green; and with the observation that at Newport there is no repeating signal for trains arriving off the two-position signalled Williamstown line.

11. Elphinstone has been disestablished.

12. Warren Doubleday produced an actual tramway staff from Ballarat (SEC days).

13. Colin Rutledge explained plans for Seymour simplification and illustrated them on the blackboard.

MEETING CLOSED: at 2139 hours.

SYLLABUS ITEM: Jon Churchward screened 25 slides (mainly of Victoria) from various eras, and members tried to identify the locations. Jack McLean did best, with 21 correct answers. In an interesting selection, Laburnum and Burnley were two locations which many failed to identify.

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MINUTES OF MARCH 1987 ANNUAL MEETING

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

MEETING COMMENCED: at 2014 hours.

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

APOLOGY: Rob Weiss.

MINUTES OF PREVIOUS MEETING: adopted as read (Jungwirth/Brough)

BUSINESS ARISING: Nil

CORRESPONDENCE: Nil

PRESIDENT'S REPORT: Jack reported that the society has once again had a successful year.

EDITOR'S REPORT: Recent delays in the production of SOMERSAULT have been caused by the Editor taking time to become familiar with word processing methods of production. David stated that as most of the work is done on his own, such questions as to whether to retain the present format or not, have to be thought out by himself, with no second person for encouragement or feedback. At present there is no month shown on the front cover. The supply of address labels from the Treasurer has been most helpful.
The report was received (Brough/Kociuba) with thanks to David for all his work, and appreciative comments on the latest drawing (by Peter Brook) to appear in the magazine.

TREASURER'S REPORT: Not presented due to Rob's absence but the society's financial position remains healthy.

TOURS REPORT: The tour during the year to stations Stratford Junction to Yarragon went well.

ELECTION OF OFFICE BEARERS: Jim Brough took the chair and the following were elected to office for 1987:

GROUP LEADER	J.McLean	(Jungwirth/Kociuba)
DEPUTY G/LDR	A.Jungwirth	(Langley/Brook)
SECRETARY	S.McLean	(Churchward/Sinnatt)
TREASURER	R.Weiss	(J.McLean/Churchward)
EDITOR	D.Langley	(Jungwirth/Brook)

GENERAL BUSINESS: 1. David Langley was elected a Life Member of the Society for his work in producing SOMERSAULT. He probably does more work for the Society than any other member.
(Jungwirth/Brook)

2. Since we are no longer a group which is part of the SRS (UK), the title Group Leader is no longer appropriate. The positions will now be known as President and Vice President.
(Langley/Brough)

3. Bearing in mind that <u>if</u> we have to pay full printing costs for SOMERSAULT we will be looking at around $1000 per year, the subscription will remain unchanged at $5 Victorian and $12 for Vic. and UK.

MEETING ADJOURNED: at 2100 until the Treasurer's Report can be received.

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SIGNALLING ALTERATIONS

WN 2/1988 MURTOA. A Hayes hinged derail was provided at the down end of No 2 siding. (O 20/88)

WN 2/1988 BIRCHIP. Down trains when arriving into No 2 road must not exceed 40 km/h and when departing must not exceed 40 km/h until train clears the points. Up trains departing No 1 road must not exceed 65 km/h until locomotive clears trailing points. (O 19/88)

WN 2/1988 STANDARD GAUGE LINE. In association with the renumbering of all standard gauge signals, the following signalling diagrams are cancelled and replaced by the new diagrams shown.

	Old Diagram	New Diagram
Glenrowan	28'68	56'86
Wangaratta	3'69	6'87
Baddaginnie-Wangaratta	21'62	-
Bowser-Wodonga Loop	17'62	-
Glenrowan Loop-Wodonga Loop	-	10'87
Wodonga and Coal Sidings	10'80	14'87

8.1.1988 SEYMOUR "B" BOX. The disc signals on posts 21 and 22 leading along the Engine Road and Siding "E" were abolished. Levers Nos 5 and 9 were sleeved normal. In addition, the Annett lock on lever 47 previously provided for Bank Engine movements on the Down line, was removed. (O 6/88)

11.1.1988 ARARAT. The Mobil Oil Company siding was abolished. (O 13/88)

11.1.1988 BANDIANA. The Gas and Fuel Company siding was abolished. (O 8/88)

12.1.1988 WODONGA "A" BOX. The annett locked broad gauge siding leading to Uncle Ben's was abolished. The annett lock on lever 23 was removed. (O 7/88)

14.1.1988 TOCUMWAL. The following alterations took place:-
1. The Down Home signal worked from the Gateleepers cabin at the Murray River and the down and up home signals at the station were abolished.
2. The Annett locked points leading to the Transhipping sidings and the goods yard, together with the associated point rodding and catch points were abolished.
3. Hinged Hayes derails were provided in Nos 2 and 3 roads, and the lead to the Transhipping sidings.
4. A reflectorised location board was provided 800 metres on the up side of the facing points. (O 14/88)

17.1.1988 BALLARAT CONTROL was transferred to Transport House, Melbourne. (O 18/88)

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150 YEARS OF SAFEWORKING
The History of European Railway Safety

by Peter Brook.

INTRODUCTION

In Europe, the first railways were constructed in Britain [1]. As far back as 1758, the Middleton colliery railway was first opened [2]. These early railways employed the use of horses, and later stationary steam engines to haul the wagons. For more than two centuries, these primitive railways existed both on the Continent and in Great Britain. Richard Trevithick was the first to develop the 'mobile' steam engine in 1804 [3]. Other engines were developed including a primitive rack adhesion type in 1812 [4], three years before the battle of Waterloo [5].

The Stockton and Darlington Railway in England was the first public railway in the world, being authorised in 1821 [6], and opened in 1825 using steam engines from the outset [7]. The first type of steam engine as we know it today was built by George Stephenson called the 'Rocket'; it ran on 8 October 1829 [8]. Following these very early beginnings other railways soon opened up, not only in the United Kingdom, but also on the Continent of Europe.

It was in Great Britain that railways were born, so too was the history of signalling and general safeworking practices [9].

HUMBLE BEGINNINGS

In Great Britain right from the beginning most railways consisted of double line operation, with closely spaced stations and numerous "policemen" [1]. With the slow speeds at which trains were operated, a system evolved called the time-interval system for the protection of trains from each other. "Policemen" were placed at intervals along the line, displaying hand or arm signals to protect train movements. To visually complement these, flags were used by day and lanterns by night [2]. With this system a policeman would allow a train to follow another only after a certain time had elapsed.

Italian railways, as did most railways, first worked along this principle until the early 1850's when it was superseded by electric telegraph [3].

As train speeds increased, it was found that the driver of a train could not see a man with a flag or lantern standing at track level in time to act. Thus visual signals on masts were required. The first to develop were swivelling discs, when edge on to the oncoming train they meant that the track ahead was clear, that is at "proceed" [4]. The Liverpool and Manchester Railway installed rotating disc signals by 1834, and the London & South Western Railway introduced them in 1840. An alternative was also tried in 1840, a ball was hoisted to the top of a mast to indicate when the line was clear. While this did not develop to a great extent in Great Britain, it was popular in the United States [5].

The French adopted the disc signal from Britain. Unlike the United Kingdom, however, they were shaped and coloured differently meanings. But like Great Britain, they were placed on the left hand side of the track, on the right side in Alsace Lorraine. The absolute stop signals were the red and white carre or chessboard, the warning and distant signals were round and triangular discs painted red or yellow. Where the track was complicated, the discs were mounted in a "forest" upon the poles. At night these were a maze of lights, each signal showing a light corresponding with its indication [6].

The first semaphore signal, supposedly derived from signal arms used by the Royal Navy (more likely to be developed from the Chappe land relay chain) was installed by C.H.Gregory on the London and Croydon Railway in 1841. It was a "slotted" semaphore, where the arm was horizantal for Stop, 45 degrees down was Caution and vertically in the slot was All Clear [7].

While locomotives had developed in power and became faster, safeworking had not advanced. A distinguished engineer, Edwin Clark, devised what was called the Two-Mile Telegraph. It was installed on the London and North Western Railway and was the first example of a space interval system. In 1861 a serious accident in the Clayton tunnel on the Brighton Line in Britain, using the time interval system, convinced the then Board of Trade to use the space interval system [8].

Each section between stations or signal boxes became known as "block sections" and a telegraph system was used, giving signalmen a positive indication of whether the section of line they controlled was occupied by a train, much better than the time interval system where there was no communication. The principle rule was that there should not be more than one train in a block section on one line at one time. Communication was via a bell code, like morse code but only patterns of bell rings were used [9].

Italy worked on the time interval system until the early 1850's when it was superseded by electric telegraph. The opening of the first single section between Padua and Vicenza in 1846 saw the first use of electric telegraph on Italian soil [10]. Single red painted discs with a red light were rotated for 'clear' and displayed a green light at night. These discs were brought in during the 1850's [11].

Single lines were few in the United Kingdom and existed not much more on the Continent. With the block system and rules governing it, a system was developed to ensure that it was infallible. From 1860 the single line 'baton' was introduced. The driver of a train could not proceed through the next block section without being given the staff or baton. Soon becoming electrically interlocked so only one staff could be used in a block section, tis becoming a very safe method of single line working [12] still being used today.

To escape the rigidity of the staff system, the staff and ticket system was brought in. In this case the driver may proceed on receipt of a suitably worded ticket provided that he sees the staff is also at the station from which he is leaving [13].

Several patent electric replacements of the staff were invented, permitting the issue of only one token at a time from electrically interlocked "Single Line Electric Token Instruments". These were introduced by Edward Tyer in 1878. Their use became universal through British influenced railways and like the staff, is still used today [14].

Up until now, Britain used the slotted semaphore and on the Continent, a combination of different types of discs were employed. However, in 1876, a terrible accident occured at Abbots Ripton in Britain, where the slotted semaphore type of signal froze over in the cold weather. It gave a false indication of clear, sending the 'Flying Scotsman' into a stationary goods train. With bad visibility, another train plowed into the wreckage.

Another form of semaphore signalling was needed. The slotted type was abandoned. Centrally balanced semaphores were adopted on the Great Northern Railway a few years later to counter the problems of snow [15]. Other semaphores were developed, including a lower quadrant type with the arm at horizontal for Stop and 45 degrees down for Proceed. Similarly, the upper quadrant type had the arm at horizontal for danger but 45 degrees up for Proceed.

In 1882 the British type lower quadrant semaphore signal was introduced into Italy [16] and began to replace the then current disc signals.

Along with the development of signalling and other safeworking practices, the operation of signals themselves developed. It became clear that to avoid signals giving incorrect indications and producing conflicting moves, a form of interlocking between signals, points and other signals was required. Several different types of mechanical interlocking were developed.

John Saxby and John Farmer patented a "rocker interlocking frame" in the early 1870's. In 1871 Saxby and Farmer opened up their firs continental factory in Brussels, Belgium [17]. At Pontedecimo in Italy a primitive form of interlocking between points and signals was attempted in 1865, and the first proper interlocking frame in Italy was installed by Saxby and Company at Genoa Porta Principe station in 1874 [18]. In 1878 John Saxby established a signal worksat Criel near Paris [19]. Many French frames were fitted with Saxby rocker interlocking.

British influence is seen in the actual interlocks provided between points and signals which are often identical to ordinary British practice [20]. By 1886, Riccardo Bianche, a signal engineer in Italy had devised a hydraulic signalling installation with Servettaz and Company at Abbiategrasso, near Milan [21].

While interlocking developed, two distinct types of signal actuation appeared. Signals and points were and still are worked by levers in a signal box or ground frame, however two types of operation evolved. The standard practice in Britain and on British influenced railways was the use of single wire working.

In Switzerland as in Germany and Holland the double-wire system of mechanical operation was uniform [22].

Bt the turn of the century, railways had developed from next to nothing to a fast growing efficient system. It had opened up areas and provided the best form of transportation available. Train speeds had reached a maximun of about 80 miles an hour, and safe-working had developed considerably. To cope with the demands of the day new ideas and innovations were to make their mark in signalling history.

NEW IDEAS, NEW INNOVATIONS

By the turn of the century the Belgian State Railways had one of the most comphrehensive systems of signalling anywhere on the continent of Europe. All the main line stations were fully interlocked using the "rocker" and "grid" type of lever frame [1] manufactured by Saxby and Farmer in England [2]. Saxby and Company supplied much of the original equipment using the mechanism by which two semaphore arms controlling traffic in opposite directions were mounted on the same spindle [3]. In 1903 the distinguished Belgian engineer Louis Weissenbruch designed and installed a system of electric signalling for the Antwerp Central Station [4].

Saxby and Farmer were not the only people who designed forms of interlocking. One of the simplest forms of interlocking is the use of the Annett key. The Chief Signal Superindendent of the London and South Western Railway was Mr. J.P.Annett. The Annett Key would have first been used before 1904 when its patent expired. The original use of the key was to control a groundframe that was beyond the effective distance controllable from a signal box. It was only able to be used when all applicable sihgnals were at danger and the points were in the correct position [5]. The removal of the key from the signal box lever would prevent that lever being operated, but would unlock the groundframe lever.

The Great War of 1914 saw a general halt to railway signalling progress, as with progres elsewhere. Louis Weissenbruch had been exiled to Great Britain from the outset of the war. On Sunday 23 August 1914 the British Expeditionary Force first met the armies let by General Moltke, under direction of the Kaiser [6]. The war lasted until November 1918 when the armistice was signed and the League of Nations was set up [7].

During the 1920's there was a complete revision of signalling practice, in Europe with the introduction of techniques that were becoming normalin Britain, France and elsewhere. Now there was the application of modern science to automatic train control [8]. On the Liverpool Overhead Railway an entirely new type of signal was brought into service in 1920. This was the daylight colour-light aignal which, by the use of a powerful lens combination enabled light signals to be displayed and seen in strong sunlight from distancrs of up to one mile. The Institute of Railway Signal Engineers decided in 1922 to set up a committee to make recommendations as how the use of three-position signalling could be applied to the future benefit of the railways of Great Britain. In 1924 the committee recommended the use of thre-position semaphore :- red for "stop", yellow for "caution" and green for "proceed". They recommended an additional aspect, two yellows which would provide a preliminary warning for a fast express train [9].

In Belgium the original signalling was very much along Britisg standards and during the First World War this was altered to agree with German practice [10]. The Chief Signal Engineer , Weissenbruch, was back afte the armistice and, following a study of the signalling practices in the United Kingdom, decided on a new system for Belguim when the time for reconstruction came. With the introduction of power signalling at the turn of the century the upper-quadrant type signal was used at certain large stations, though it was not extensive [11].

However extensive replacement was needed after the war, so the Belgians set themselves the task of designing one universal type of colour light signal [12]. The progress of resignalling after World War One was rapid in Belguim as in the rest of Europe and by November 1919 the line from Brussels to Antwerp was completely resignalled [13]. Up until now Spain used the methods of France with discs, but began to install semaphores by 1923 [14].

On British main lines, the Great Central was the first to adopt automatic colour light signalling out of doors in 1923, as opposed to in tunnels [15]. As technology imporoved more advances were made. In England the way for the signalling revolution had been set. In 1929 at North Kent East Junctio on the Southern Railway the first power interlocking frame in the world was installed. It was the first to have lever interlocking accomplished electrically rather than mechanically [16].

In Italy the signalling developments had progressed with the first electric signal box being installed in 1924 at Sestri Lavante by Italiana Westinghouse [17]. All over Europe, including in Germany where mechanical signals similar to Switzerland were used, changes were rapidly taking place, as in Switzerland when by 1929 more than half the route mileage of Swiss Federal Railways had been electrified. At first there was no corresponding change from semaphore to colour light signals. In due course however electric traction brought higher running speeds [18]. Operating distances for both "warning" and "home" signals increased beyond the limits of existing double-wire working, so a change to colour light signals was therefore initiated.

It was clearly impossible to change all the mechanical signals into colour light signals at one stroke, thus here and elsewhere mechanical and colour light signals operated side by side. In Switzerland the colour light

aspects were thus made the same as those displayed at night by the semaphore signals [19].

During the 1920's and indeed until Holland became involved in World War Two signalling was by semaphores, but with a code of practice very different from anything elsewhere. The home signals were painted red and had a circuar disc at the end. The arm at horizontal meant "stop", while when it pointed diagonally upwards it gave the "all clear" indication, similar to the standard British upper quadrant. White was the night indication for "all clear". But it was with distant signal that the Dutch had something quite different. The clear indication was inclined upwards, however the "caution", signifying that the nest home signal was at danger, was inclined downwards with a green light at night. There was no horizontal position, and the code of night indications was red for "danger", green for "caution" and white for "all clear", being the same as that previously used by Britain [20].

By the 1930's the London North Eastern Railway introduced the first all electric signal box control panel which laid the foundations for the present day power signalling. Instead of levers for operating signals and points, switches and buttons were employed [21].

In 1934, a type of automatic cab signalling was equipped to all electric and multiple unit trains in Switzerland. With the faster speeds signals were found to be harder to see in time to react accordingly. If an approaching signal was at "warning" a horn sounded in the driver's cab, and immediate action was required, or after travelling 60 metres the emergency brakes would be applied and the train stopped [22].

Like Britain, Switzerland also adopted the electric control panel, but a notable feature of many new installations was the build up of "dominos". That is, a build up of units rather than having the representation of the tract layout on a solid sheet of steel [23].

By 1947 colour light signals were standardized in Italy [24].

While signalling principles did not advance a great deal in this period which saw two world wars, the advent of electricity and advances in technology enabled existing systems to be improved. The foundations of safe operating practices had been laid, and with increased speeds of trains signalling advanced into a new era.

ADVANCES INTO A NEW ERA

Right throughout Europe changes of existing safe-working practices were taking place. Colour light signals were being introduced and mechanical interlocking was being replaced by electric control panels. The face of railway safe-working was changing forever.

The first phase of rconstruction after the Second World War in Holland was a code of complicated instructions being devised. Unlike the established practice in Britain, the Dutch considered it essential to advise the driver, by signal, of the speed he must travel - "maximum", "medium" and "low" speed - with variations according to the particular line he was travelling on. In 1952 the General Manager of the day asked the Signal Engineer, H.A.E. de Vos tot Nerderveen Cappel to draw up a comprehensive colour light signalling system for the entire Dutch network [1].

Under the engineer's direction a simple system was developed to replace the older one. The three basic colours of green, yellow and red were used. Their internationally understood functions, respectively, were "travel at maximum speed permissible of the line","slow down" and "stop". These were

accompanied by illuminated figures displayed below the signal telling the driver what the maximum permissible speed over that section was when less than normal. This was adopted for the national resignalling plan, put into effect from 1954 onwards [2].

In 1957 the Italian Railways inaugurated its first Centralised Traffic Control center at Bologna [3]. Now instead of separate signal boxes controlling their immediate areas, an electric panel controlled a large area otherwise worked under several boxes. This development greatly reduced the number of paid employees and began to increase the efficiency of railways.

Soviet Railways have tended to lag slightly behind the rest of Europe with the development of signalling and safe working practices. In the 1960's seventy to seventy-five per cent of the railway route mileage was single line and the train staff was the most common form of train movement control [4]. A train order system also governed some single lines [5]. In both of these the train despatcher is responsible for train movements, but with the train order system his responsibilities are rather more numerous. He has telephone communication with the stations, locomotive depots and train conductors. His order is necessary for the departure of any train, the opening and closing of sections and for the cancellation of trains. The orders are given by telephone to the chief conductor, who repeats them back word for word before the despatcher. Both the conductor and the despatcher enter the order into their journals, the conductor also writes it on a special form which he hands to the driver.

Mechanical signalling had all but been replaced by colour light signals. On about 2,000 miles of the busier single track lines the train staff and ticket had been taken over by Centralized Traffic Control and colour light signals. the train staff apparatus was similar to that used in Brtain, infact its design probably derived from apparatus imported from England before the First World War.

Elsewhere in Russia, the so-called semi automatic block is used. This is almost identical to the block system of other countries, with electrical interlocking between adjacent block posts, and is used mainly on single lines [6]. The colour light signals are train operated, that is they normally show green but change to red and then yellow as they are passed by a train. Apart from colour light signalling, there are also semaphore and disc signals in use. Signals are placed to the right of the train as in Germany and are of the upper-quadrant type.

Advance warning of approaching signals is given by different types of cab signalling in the Soviet Union. When a train approaches a signal, a coded signal is pulsed through the rails and causes the colour lights in the driver's cab to show the position of the next signals. If the next signal should be showing yellow or red, a whistle sound and the brakes are applied. There is a "vigilance handle" through which the driver can avert the automatic brake action. If he does not, his inaction will be recorded by an instrument which registers the occasions when the brake is applied in this way. When the signal is "clear" no indication is given, with one exception [7]. This is at signals controlling the entry into stations which give a stop indication irrespective of whether the signals are clear or not, thus testing the driver's vigilence when entering a station. By 1960 this system had been equipped along 1,500 miles of track [8].

During the 1960's morse code and teletype apparatus were still in use, however, telephones were beginning to replace them in Russia at this time. It was not until the late 1950's when V.H.F. became available, that radios became more widespread. Some locomotives were being fitted with radios allowing despatchers to talk to the drivers while between stations [9].

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All railway systems were now continuously upgrading existing 19th century technology and replacing the instruments of safe working from one hundred years ago. European railways were looking at today and tomorrow, as were others all over the world.

TODAY AND TOMORROW

Railways of Europe had changed and were still changing. Practices and regulations were being revised and the introduction of cab signalling is greatly enabling safe high speed running of trains.

The Great Western Railway with its installation of a system of automatic train control had been ahead of other British railway companies. This provided an audible signal in the cab on the approach to each distant signal at the lineside. If that signal was clear a bell was rung; if the signal was at warning a siren was sounded which the driver was required to acknowledge. If he failed to do so the siren would continue sounding and the brakes would be automatically applied [1].

In Holland the intensity of running trains over certain sections and the experience of a serious accident in 1962 led to the decision to install automatic train control. After a series of studies in other countries, it was decided to adopt a system of continuous indication in the driver's cab [2]. The Dutch employed a more elaborate and more expensive system than the British due to the superiority of the information given to the driver in adverse weather conditions.

From an early date in the history of the Dutch railways, an aid to signal sighting was provided at the lineside on the approach to signals. Known as BAAKS, the long wooden planks were inclined and the top surface was painted white with a series of horizantal black stripes across the board. They were greatly useful in the days of steam and the leisurely running, but with todays multiple unit electric and diesel locomotive locomotives travelling at speeds of more than 129 km/h, they were not sufficient warning.

The continuous indication provided in the cab is a panel of six illuminated indications advising the driver of not only what the next signal is showing, but also the maximum speed permissible in the next section [3]. Like in Britain if the driver does not act according to the indication given, even if it

is only a speed restriction, control is taken out of his hands and the brakes are automatically applied bringing the train to a stop [4].

With advancing technology, whole large city stations can be controlled from one place, in such towers all the points and signals are operated by only a few people. Frankfurt was the first to be operated in such a style [5], Munich following in the same way. There are firstly two overall supervisors whose chief concern is the running in the outer approaches to the area. All signalling and point setting is normally automatic but the supervisors are able to intervene and override the system if necessary. Secondly there are two station supervisors who regulate all train working in the station and its immediate approaches. Thirdly there are operators at five desk type panels where the signals and points are operated and they are co-ordnated by the station supervisors [6].

As far as the signals themselves are concerned, the German code of aspect is based on the fundamental use of the colours red, yellow and green. Elaborations are derived from the upper quadrant signalling practice, still in use on some main and subsidiary lines.[7]

The Deutche Bundesbahn was one of the first railways in the world to begin active development towards regular running of trains at 160 km/h. Similar to British and Dutch practice, a form of cab signalling was iniated and fitted to all locomotives working at 200 km/h.[8]

Today on high-speed trains a system known as the Automatic Warning System is used. The A.W.S. is effective and reliable on all British high speed trains.[9] Although trains running in excess of 160 km/h are now followng each other at five minute intervals, the highest degree of safety is ensured with the continuous colour light signalling and the A.W.S. in the locomotive cabs.

Centralised Traffic Control was introduced between Weaver Junction, Cheshire and Glasgow in May 1974, resulting in control of 370 kilometers with no more than five signal boxes. The line travels through some desolate mountain country, yet the trains are under continuous surveillance on, the illuminated track diagrams in the central signal boxes.[10]

The Norwegian railways are one of the very few, anywhere in the world, to be completely equipped with a system of colour light signalling.[11] The radio Electric Token Block was introduced in 1984 on the Dingwall to Kyle of Lochalsh line in Britain. It is likely to be the forerunner of other radio signalling schemes. With this system all conventional signals have been removed and points are protected by a yellow electric indicator telling the driver if the points are in the correct position. The sidings at the stations are controlled by a ground frame locked by an Annett Key.[12]

To send a train, the driver asks verbally on the radio for the token and the operator at the staton types the correct interaction on his computer. He then tells the driver to hold down the "Receive Token" key on his Cab Display Unit (C.D.U.) and the operator holds down the key on his panel to send the token. The C.D.U. then records the successful issue of the token with the name of the section the driver wishes to travel in appearing on it. In a sense the driver has received the token. The train may not go on, but the driver needs a verbal authority to proceed as well, the equivalent of a clear section signal.[13]

Railway safe working has gone from the primitive hand signalling of policemen, through different forms of mechanical signalling and interlocking. The well laid practices of operation in Europe are now being upgraded to cope with todays demands. High speeds have facilitated the need for cab signalling and radios, but it is only recently that the long established staff and token system is being replaced. Advancing technology will see railways well into the future providing the safest mode of transport available. Safety has and always will be of paramount concern to not only railways of Europe, but railways world wide.

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PORTLAND LINE

The following short article is in fact a Departmental submission and recommendation for the renaming of Miakite Loop owing to the possibility of Miakite being confused with Myamyn during a telephone conversation.

Names of Crossing Loops between Hamilton and Portland

HAMILTON	- 318km	
Coleraine Jcn	- 319km	
Grange Loop	- 321.5km	not constructed
MIAKITE LOOP	- 337.166km	
Branxholme	- 343km	closed to all traffic
Green Hills Loop	- 348km	not constructed
Condah	- 356km	closed to all traffic
MYAMYN LOOP	- 363.76km	
Milltown	- 365km	closed to all traffic
HEYWOOD	- 379km	
Gorae Loop	- 395km	not completed
PORTLAND	- 403km	

MIAKITE and MYAMYN could be/MLS understood in a telephone conversation.

MIAKITE was named after a creek of that name and a former railway station on the Branxholme - Casterton branch line - now closed.

MYAMYN was named after an original railway station located at 360km and closed on 1 November 1971.

MIAKITE LOOP is located 6km on the up side of the former Branxholme station, situated between the HENTY Highway level crossing and CHROME Road level crossing. Miakite Loop it is situated in the parish of AUDLEY.

Therefore the suggestion is to retain MYAMYN LOOP name as this is the older of the two loops and change MIAKITE LOOP name.

Alternative names for suggestion:-

BRANXHOLME - former station 6km on the down side.
AUDLEY - parish name on east side of the line.
CHROME - name of road which crosses the line at the down end of the loop.
DUNDAS - loop is situated in the Shire of Dundas.
ARRANDOOVONG - large pastoral property through which the line was built established 1844. Has a large historic homestead. Owned by the Cameron family at the time the line was built. There is a creek of this name nearby. Estate later cut up for closer settlement.
ARRANDOON - originally part of the Arrandoovong property. The name is derived from 'Arrandoovong'. This property is close to the line.
ARRANDALE - same as Arrandoon. This property backs onto the line.
NALLANGA - a property on the west side, originally a part of Chrome Park.
ALMORA - A small property west of the line.

The name CHROME PARK was given to a large property to the west of the line by Thomas R. Philp in 1916, who bred a racehorse of that name (CHROME 1915-1916) The road takes its name from the property Chrome Park. The property was sold to the Closer Settlement Board in 1923. The area to the west of the line is now known locally as CHROME.

CHOICE OF NAME

BRANXHOLME - Too far away and name of township and therefore a well known locality along the line might give rise to confusion in the transmission of telephone messages.

ARRANDOOVONG - Historically, a suitable name. There is ample precedence for railway stations taking the name of a local property. However, the name is considered to be too long.

NALLANGA - Could be used but there are nicer sounding names and does not have much claim to historic worth.

ARRANDOON - Has a suitable historic claim as a derevation of the original estate name through which the line passes. Might be possible to be confused with similar sounding names elsewhere on the system.

ARRANDALE - Same as for Arrandoon.

ALMORA - A smaller property, some distance from the line. Could be confused with WILLAURA in telephone converstion.

DUNDAS - Name of the Shire.

CHROME - Probably the most suitable as this is the name of the area and would not be confused with other loop or station names.

AUDLEY - Again, could be confused with other station names and is a name which is not well known compared with Chrome, or some of the property names.

CHROME LOOP is recommended as the most suitable because:-

1. It has a different sound to all other loops on the line.
2. A common local name for the area.
3. The name of the road giving access to the loop.
4. Short and easy to pronounce.

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TRAIN CONTROL - ALTERED AREAS OF COVERAGE

Over the last couple of years and particularly in the latter half of 1986, the SRA made some alterations to the Telephone Train Control System. The changes had the effect of reducing the area of coverage of some Train Control Centres and the complete elimination of another.

Virtually all lines in the northern half of NSW now come under the control of Broadmeadow. The area covered extends from Wyong (exclusive) to Casino (exclusive), Port Waratah to Gulgong via Muswellbrook (including the Merriwa branch) and Mudgee to Troy JUnction (inclusive). Train control at Werris Creek had been gradually wound back over recent years and it has now ceased to exist. The main northern line between Muswellbrook and Armidale is now also part of Broadmeadow's area, as is the North West line from Werris Creek to Moree, and the line Werris Creek and Merrygoen.

North of Casino, South Grafton continues to exercise control over the main line to South Brisbane.

To the west, Lithgow Control has been cut back to cover the area from Lithgow Coal Stage to Mudgee (inclusive). West of the junction with the Gwabegar

branch at Wallerawang West, the main line is now under the control of Orange until it reaches Broken Hill. Orange Control is also responsible for Orange East Fork to Nyngan, Molong to Dubbo, Goobang Junction to Narromine and the Bogan Gate to Tottenham branch.

Goulburn Control has also seen its area of coverage reduced. It now only serves Goulburn to Cooma and Canberra. South of Joppa Junction, Junee Control takes over, its coverage extending to Albury. (Goulburn Control previously went as far as Wallendbeen.) Junee also looks after Junee to Griffith, Cootamundra to Temora and Stockinbingal to Parkes (excusive).

The Demondrille to Blayney cross country line comes under the controk of the Stationmaster's at Harden and Newbridge, the division of responsibility being at Cowra.

The train controllers at Sydney guard the area bounded by Wyong, Lithgow (exclusive), Goulburn (exclusive) and Nowra, including the Unanderra to Moss Vale link and the Port Kembla branch.

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LINES CLOSED SINCE DECEMBER 1986
(as at 9 February 1988)

CIRCULAR	LINE	DATE OF CLOSURE
WTT 1033/86	Ballarat East-Eureka	1 December 1986
WTT 1034/86	Piangil-Koolonong	8 December 1986
WTT 1034/86	Wedderburn Junction-Wedderburn	8 December 1986
WTT 1034/86	Nth Creswick-Allendale	8 December 1986
WTT 1034/86	Jeparit-Yanac	8 December 1986
WTT 1034/86	East Natimuk-Carpolac	8 December 1986
WTT 1034/86	East Natimuk-Noradjuha	8 December 1986
WTT 1034/86	Hopetoun-Patchewollock	8 December 1986
WTT 1034/86	Elmore-Diggora West	8 December 1986
WTT 1034/86	Numurkah-Picola	8 December 1986
WTT 1034/86	Bowser-Peechelba East	8 December 1986
WTT 1034/86	Dookie-Katamatite	8 December 1986
WTT 1034/86	Traralgon-Cowwarr	8 December 1986
WTT 1034/86	Moe-Yallourn	8 December 1986
WTT 1034/86	Camperdown-Timboon	8 December 1986
WTT 10/87	Bowser-Myrtleford	13 April 1987
WTT 21/87	Bairnsdale-Orbost	31 August 1987
WTT 21/87	Cowwarr-Maffra	31 August 1987
WTT 25/87	Murchison East-Stanhope	12 October 1987
WTT 25/87	Rushworth-Colbinabbin	12 October 1987
WTT 27/87	Welshpool-Yarram	26 October 1987

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Solution to Crossword No 22

Across: 1. Loop, 4. Cam, 7. Pay, 9. Kagaru, 11. GP, 13. Reservoir, 14. Hall, 16. Train, 18. Maffra, 19. Tramway, 21. Team, 22. BS, 23. Bed, 25. Ed, 26. EC, 28. Square, 31. ANRC, 32. Poste, 34. Motive, 35. EC, 36. Wurr, 38. Sleep, 39. Night.

Down: 1. Light, 2. OK, 3. Parliament, 4. Cash, 5. ARE, 6. Murray, 7. Proof reading, 8. Yarram, 10. GE, 12. Parted, 15. Laura, 17. NM, 18. Mass, 20. WB, 21. Tempe, 23. BU, 24. DR, 27. Crewe, 29. Quorn, 30. Exert, 31. AS, 33. OCS, 34. MR, 37. Up.

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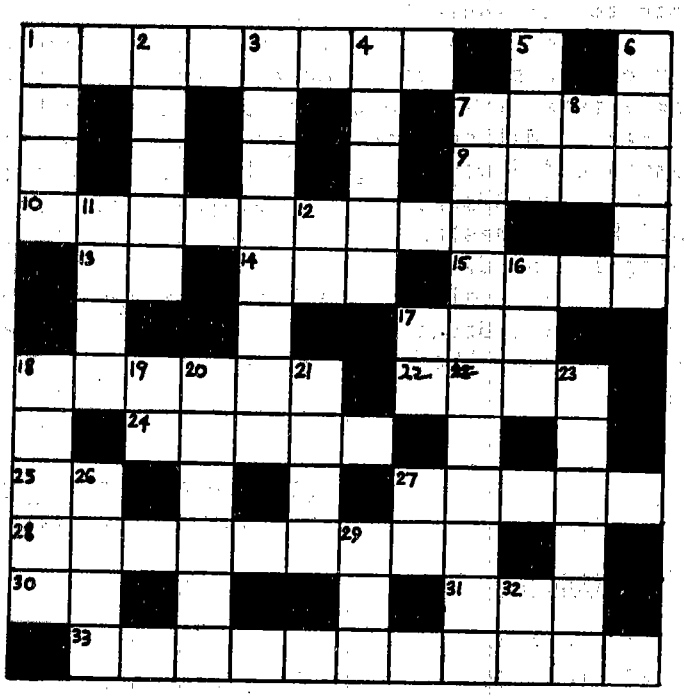
S.R.S.V. Crossword No 23
compiled by Stephen McLean

Across

1. The station next to Mitcham (8)
7. Garth takes this, and Dennis is next (4)
9. Revolutionary feature of railway carriage (4)
10. Surprisingly, a line on which you won't find a light engine (5,4)
13. Initially a US RR seen in Croton Harmon? (2)
14. Half of a long tunnel (3)
15. Not inclined to expect this response at board level (4)
17. Spot the famous named train (3)
18. Stops on the bank but avoids answering the question why (6)
22. Accident where motorway runs beside this famous climb (4)
24. SRS member noticed in scenic Olinda (5)
25. Before lunchtime in Camberwell (2)
27. His product was round when token systems were introduced (5)
28. Somehow leave VR GA by the cylinders (5,4)
30. Safeworking system seen (much less often now) in the west (2)
31. Descriptive of station well S. out of Adelaide (3)
33 and 7 down. Two versions of 28 (11,11)



Down

1. Loco once seen in Plymouth all months of the year (4)
2. Andrew found just over 1000 miles north of Brisbane (5)
3. Right! Time we divided 1 down on the Alamein line (8)
4. Change tracks; change crews; change early (5)
5. Southbound overnighter doesn't run on Mondays (3)
6. Expensive uphill climb (5)
7. See 33 across.
8. Slow line from Islington (2)
11. The type of elec. fail. which occurred this month (4)
12. Relieving officer comes up with an alternative (2)

17. Spot the famous named train

16. Cook has this with sugar each week (3)
18. Cabless loco - keep about 50 (5)
19. Common feature of each ACN and ACZ (2)
20. A van for moving glass? (6)
21. Make notes of NSW enthusiast and writer (4)
23. Strangely, Le Pont is the name of an Australian colliery (6)
26. How heavy locos are in this US state (4)
27. Write up article on narrow-gauge loco (2)
29. Sounds like I see the middle of a garratt (3)
32. When to expect something to arrive at Croydon (2)