

The Bellcord

Journal of the Melbourne Tram Museum



S 164 on tour in Dandenong Road (1998). Built by Duncan and Fraser for the Melbourne, Brunswick & Coburg Tramways Trust, it is now on display at the museum on loan from TMSV. Photo: David J Kemp (see pages 7 & 8)

OPEN HOUSE MELBOURNE: 29-30 July 2017

The museum will again participate in Open House Melbourne on Saturday and Sunday, 29 and 30 July, from 10am until 4pm. This Melbourne-wide annual event gives the public access to 200 private and public buildings of significance.

We are again seeking volunteers to assist at the museum on one or both days. With expected visitor numbers in excess of 1200, volunteers will be providing advice and keeping a watchful eye on our exhibits. If you can help us, please contact Rod Atkins or Carolyn Cleak at the depot, by emailing info@trammuseum.org.au or by responding to an upcoming mailout.

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QUICK QUIZ

Do you know what is meant by the following tramway terms? (Suggested answers next page.)

- Block car
- Insulated tram
- Spearing the pole

Our Collection



One item recently catalogued was this memento formed from a piece of Melbourne cable tram rope and fitted to two brass mountings. It was presented to St Kilda councillor Burnett Gray upon his retirement from the M&MTB's Board, after serving from 1936 to 1954.

Burnett Gray served in WWI and was a St Kilda councillor (1920 to 1948), mayor a number of times, and the State Member for St Kilda (1927 to 1932). The memento was donated by Ron Scholten.

Track Regauging

Work to regauge 3 Road at the back of the depot has been undertaken in the past three months. The rails had been forced out of gauge over time by the seepage of storm water and the swelling of the wooden block walkway. The regauging work was assisted by John Shaw of Victorian Goldfields Railway and committee members Kevin Taig, Mike Ryan and Adam Chandler.

Membership Renewal

Membership renewal forms will be mailed in early July. Early payment would be appreciated.

QUIZ ANSWERS (from page 1)

Block car: Tram positioned at a terminus to assist running to timetable. If at departure time the service tram has not yet arrived, the block car departs collecting passengers. When the late running tram is met, crews swap trams.

Insulated tram: Tram not earthed because of derailment or material covering the track so contact between the wheels and track is lost. This is highly dangerous as full electrical current may be present in all metallic sections of the tram.

Spearing the pole: Driving a tram (slowly) with the trolley pole connected to overhead wire in the forward position. A practice used when shunting in confined spaces.

Coming soon to the Museum Shop

Wrap up warm for Open House Melbourne with woolly tram scarves. In a range of colours, the scarves are pure lamb's wool, knitted in Melbourne by Otto & Spike.

Business Name Change

Readers will notice the use of 'Melbourne Tram Museum' on the masthead, in the business details below and on our webpage. Final approval was received a couple of months ago. The committee is looking at how best to update badges, logos, etc.

AGM

Our Annual General Meeting will be held at the depot on Saturday 23 September at 9.30am.

Upcoming Open Days - 2017

10 June	24 June	8 July
22 July	29 & 30 July (Open House Melb)	
12 August	26 August	9 September
23 September	14 October	28 October
11 November	25 November	9 December

The Melbourne Tram Museum is open on the 2nd and 4th Saturdays of each month (except 4th Saturday of December) and during Open House Melbourne.

Normal opening hours are 11am–5pm. (During Open House Melbourne, hours are 10am–4pm.)

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Editor: Geoff Brown

FROM RON'S COLLECTION



Y1 613 in The Melbourne Tram livery, Spencer St (c1992) Photo: Ron Scholten collection

ABOUT THIS PHOTO: The Melbourne Tram tours did not make it past the planning and testing stages. This photo was taken during timing trials along one of several proposed routes. Y 469 and Y1 613 were decorated in this livery, designated drivers and conductors fitted for special uniforms and drivers asked to draft commentaries telling of Melbourne’s history. The project ceased with a change of government in 1992. In 1994 the City Circle tram commenced.

Tourist trams are not a recent idea. Melbourne had a tourist tram route through the suburbs between 1927 and 1936 using the same Y class trams. (See Russell Jones’s article [The Shilling Tour](#) on our website). The Colonial Tramcar Restaurant commenced in 1982. Then in 2010 the National Trust and tramways union proposed a Grand Circle Line for tourists – but this was not implemented.

Editor

TRAM TICKET CATCHES MURDERER:

Fact or Fiction?

“It is reputed that in the 1930s the body of a murdered man was dragged out of the Thames River in London. The body had been stripped of anything that might have identified him. The only clue to his identity was a portion of a tram ticket hidden in the lining of his coat. The local police did not recognise the ticket but images in newspapers led to it being identified as a Melbourne tram ticket.

“Serendipitously, the serial number on the ticket was intact. Victoria Police in Melbourne, acting as agents for The Met in London, contacted the Melbourne and Metropolitan Tramways Board. From the serial number, the M&MTB was able to tell which tram depot had issued the ticket, on what day, on which specific tram and in which section of a particular route (North Balwyn).

“Police then interviewed regular commuters and discovered the identity of a man who, they believed, had recently travelled to London. This led to the arrest and conviction of the murderer. Decades after the event, the M&MTB were still citing the incident in training courses as a reason for tram conductors, etc., to keep proper and efficient records.”



M&MTB ticket from 1950s

Roger West, a museum tour guide at The National Tram Museum, Crich, UK recently enquired of the veracity of the above story. He wishes to tell the tale to visitors if authentic. So far we at Hawthorn have not verified it. If a reader can assist, please make contact. As Roger notes, he is sometimes asked for information about the largest tram system in the world, and would like to tell the story with confidence, if it is authentic.

Warren Doubleday

VIMY HOUSE:

A tramway hospital and its WWI links

Vimy House Private Hospital – now part of St Vincent's Health Australia – had a long connection with the tramways, being owned by the Tramway Employees' Mutual Benefit Society (TBS) for more than 50 years.

Prompted by a recent enquiry from St Vincent's on the origin of the hospital's name, we uncovered a fascinating story.

Vimy House started life as a stately mansion at 25 Queens Road, Melbourne. Constructed in 1883, *Bendigonia* was the residence of John Edward Gard (1840-1920), a prominent member of the Bendigo mining community.

The property was registered as a private hospital in 1914. It was renamed Vimy House in 1920 after being acquired by two nurses, Leah Rosenthal and Isabella (Belle) Jobson, who had recently returned from service on the Western Front. They served with the Queen Alexandra Imperial Military Nursing Service (QAIMNS) Reserve – the elite of the British Army's military nurses.

Battle of Vimy Ridge

Why would Australian nurses commemorate the 1917 Battle of Vimy Ridge? No Australian troops fought in this offensive. But for Canadians this battle is viewed as a defining moment in the history of their nation – as Gallipoli is for Australians.

At their postings in northern France they would have treated thousands of sick and wounded from some of the major actions of the Western Front, including the Battle of Arras, of which Vimy Ridge was a key part. On 9 April 1917 four Canadian infantry divisions successfully took the ridge, but at a great cost. On that one day 3598 Canadians were killed and 7004 wounded.

Before returning to Melbourne, in February 1919 Jobson and Rosenthal were conferred with the Royal Red Cross (second class) by King George V at Buckingham Palace. The RRC is awarded for exceptional services in military nursing.

Jobson and Rosenthal ran Vimy House for ten years, until Rosenthal's death in 1930. Jobson continued as Matron of Vimy House, until her own death in 1943.

Read the full story of Vimy House, appearing soon on the museum's website.



Bendigonia, Queens Road, Melbourne, (c1890).

Photo: State Library Victoria

Tramways hospital

In 1949, Vimy House was acquired by the TBS for 23,500 pounds, of which 13,500 pounds was contributed by the Melbourne & Metropolitan Tramway Board (M&MTB). One condition of the sale was that the name of Vimy House was to be retained in perpetuity.

The TBS was a workplace-based friendly society, established in 1888 to provide various benefits to its members and their dependants. It was funded by members' contributions and also received an annual subsidy from the M&MTB. At its new facility, TBS provided free hospital care to its members.

In 1961 TBS purchased the adjoining property, *Bathurst*, which was used for an ear, nose and throat clinic, physiotherapy department, dental clinic and administration offices.

In 1970 the two properties were sold, the proceeds being used to finance the construction of a new hospital at 5 Studley Avenue, Kew, which was opened in 1975.

Although the hospital's facilities were upgraded in the mid-1990s, the TBS's ability to maintain and operate a modern health care facility was limited. So after a 53-year association with the tramways, Vimy House Private Hospital was sold in 2002 to a private firm. Then in 2008 Vimy House was sold to St Vincent's.

And the original Vimy House? Bendigonia has been converted to apartments and is classified by the National Trust as a place of State level significance. It is one of the few remaining examples of the private residences that once lined St Kilda and Queens Roads.

Noelle Jones



An early tram motor 'cracked open' at Bendigo Tramways showing the field coils and brush holders. Photo: Mal Rowe

HOW FAST CAN SHE GO?

Controlling the speed of electric trams

The technologies used by tramways have become more sophisticated over time. Mal Rowe provides a layman's overview of how controlling electric motors has developed.

Melbourne was one of the last cities in the world to build a cable tram system. Not long after the Melbourne cable cars started running to Richmond, Victoria, Frank Sprague demonstrated a reliable electric system in Richmond, Virginia and the world of street transport rapidly moved into a whole new era.

Electric trams work on electromagnetism. This is the principle that moving a wire in a magnetic field causes an electric current to flow in the wire. Passing a current through this wire in a magnetic field makes the wire move.

Direct Current electric motors have two parts: the field coils (the fixed bit) which produces a magnetic field, and the armature (the bit that turns) which also produces a magnetic field that makes it turn.

Above is a picture showing an old tram motor 'cracked open' at Bendigo Tramways. The curved 'plates' are the magnetic poles of the motor and they are made magnetic by the coils of wire wrapped around them (between the poles and the outer case in the picture above). The bronze pieces in the case behind the poles are 'brush holders' – they hold carbon brushes that connect electricity to the armature.

The picture below shows an armature – this time at Ballarat Tramways. The dark blobs in the middle are more magnetic poles. These are made magnetic by an electric current running through wires wrapped around them. They are buried in a mass of insulation and varnish strong enough to hold them in place while the motor spins around. The segmented shiny copper band at left is the commutator. It connects the electrical current to the armature – from the brushes attached to the motor case, as shown in the first picture.



The interaction of the magnetic fields causes the coils to turn in the direction caused by the magnetic attraction between their poles. However, as soon as they get close, the brushes connect up to a new pole on the armature and it's the next pole that is now attracted – so the motor keeps spinning.

An armature at Ballarat Tramways showing the commutator. Photo: Mal Rowe

Controlling speed with resistors

The motor would go faster and faster until it flew apart unless something stopped the motor or the current. Those two 'somethings' are the weight of the tram – which slows the motor – and the build-up of an opposing voltage (called back EMF) in the motor as speed increases – which reduces the current.

The traditional way to control the speed of an electric tram was to put electrical resistance into the circuit to restrict the current flow to the motors. The diagram at right from the wall of the driver training room at Hawthorn museum shows this well.

The big circular figure at bottom left is the controller. As it is gradually rotated ('notched up') it changes the connections to the motors. Initially there is a full set of resistors reducing the current to the motors and the current is forced to flow through one motor then the other. That's called a 'series' connection which minimises the current flow and thus the speed. From the beginning up to 'notch 5' the resistors are gradually taken out to allow more current and speed.

On the sixth notch the motors are connected in 'parallel' where the current flows through each motor side by side. Then the resistors are gradually removed again until both motors take full voltage. That's called 'full parallel'.

Some readers will have come across the term 'weak field' – a strategy to get trams to go a bit faster. This involved reducing the current in the field coils so that the armature had to go faster to get up to the point where the 'back EMF' matched the voltage available.

This all works fairly simply, but the resistors are a bit of a problem. They get hot as a result of the current flowing through them. That's a safety issue and also wasteful. However, every tram from Frank Sprague's Richmond, Virginia trams right up to the Melbourne Z2 uses this system.

Improvements have consisted of having more 'notches' and having some form of automatic acceleration control (the speed of 'notching up') as in the PC5 controllers of the Adelaide H class trams and controls in Melbourne's PCC cars 980 and 1041.

Thyristor controls

Modern electronic devices called 'thyristors' allowed a new approach. Instead of using resistors to reduce

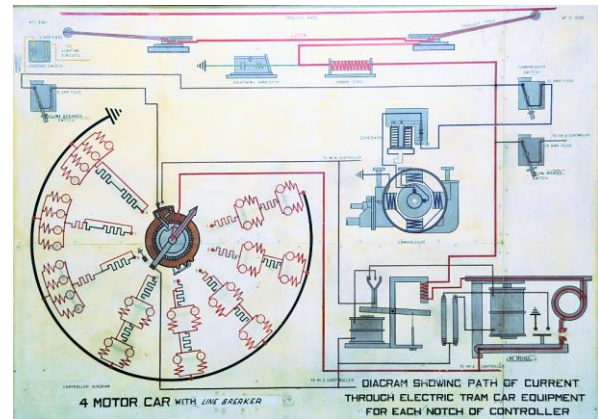


Diagram from driver training room Hawthorn museum.

Photo: Mal Rowe

current flow, fast thyristor switches are used to rapidly turn the current from full ON to full OFF many times a second. By varying the proportion of time ON, the **average** voltage and current is controlled. This gives current control without waste heat or damage. You can hear it when listening to AM radio on a tram line. The whine in the radio is from the chopper – the electronic switch performing this function. This technique still used DC motors with commutators, and was used in the Z3, A and B class trams in Melbourne. But something better was coming.

Controlling AC motors

The latest technology takes it all a step further. Tram engineers have always liked the idea of being able to use 3-phase AC (Alternating Current) motors because they don't need any brushes or a commutator. The magnetic field is created by electromagnetic induction. Sometimes a permanent magnet may be used in the motor itself.

The problem is that this sort of motor only has one speed – determined by the frequency of the AC. That problem has been overcome by combining the chopper type thyristor with a polarity changing circuit which 'manufactures' 3 phase AC power at whatever frequency you want and controls the tram speed by that means. This means that fully sealed, waterproof, brushless motors are the norm on trams like Melbourne's C, D and E class trams. The audible high pitched whine as they pass is their signature.

For a heritage tramway it's a lot easier to keep a tram with the old style controller. The equipment, parts and maintenance of modern controllers makes them a real challenge for on-going operation.

Thanks to Warren Doubleday for his assistance.

Mal Rowe

BEHIND THE CAMERA

Building a diverse collection of tramway photographs takes time and persistence. Museum guide David Kemp tells of the steps he has taken to build his extensive library.

As a very young boy in the 1950s, a trip to the city on the North Balwyn 48 tram, or to Grandma's house utilising the Camberwell route 7 (now 72) tram through the Junction, formed the beginnings of my love affair with trams. Receiving a very simple camera at my eleventh birthday party commenced another love affair with photography.

The two affairs came together when I worked as an engineer with ICI in their landmark skyscraper 'glass house' at 1 Nicholson Street. This afforded marvellous views of trams trundling around the city streets and I would ride on trams once again. I became friends with a couple of rail enthusiasts in 1979 and was loaned a copy of the out-of-print 'Destination City'. Armed with a photocopy of this Melbourne tram bible, I decided to systematically take photos and super 8 movies of each class of Melbourne tram that still existed, utilising the trusty Pentax and Bell & Howell cameras that my Dad passed down to me. I will now share some of my favourite photos and their stories.

My first assignment was to find out what had happened to those four beautiful trams with the angled windscreens, fine coachwork and open driver's compartment that I would see as a youngster travelling through Camberwell Junction on the Wattle Park and Burwood routes. I learned that they are identified as Y1 class, nicknamed "Yappers", were removed from service in 1965 and were currently used for driver training out of the Hawthorn Depot. So one of my first intentional tram photos was of 610 and 613 being marshalled for a training run.



The little sister of the "Yapper" trams was the four-wheel X2 class. Tram 676 which had been hiding for years at Camberwell Depot had just been refurbished and was running a Sunday tourist service along Batman Ave. My favourite tram photo of all time is the one I took of it shunting at Riversdale Junction in 1979. Not only did I get to ride it on this day but I had a sly drive of it when the driver kindly acceded to my request and let me take the controls along a section of Swan Street.



Next job was to sight an oddity on the Moonee Ponds – Footscray route 82. Tram 700, the former Victorian Railways tram 53, awaits at Footscray Station in 1979.

The L class 104 was used on a tour in 1979 and poses under the rail bridge in Royal Park.



Mishaps do occur, and I just happened to have the camera in the car on 4 May 1979 when I spotted Wattle Park bound Z 22 on the side of Riversdale Road having been derailed on the rail-crossing catch point. Note 'Football' as the destination.



Scrubbers in action made interesting photos. This one of 8W was taken in Plenty Road in 1980, a sight never to be repeated these days.



Photo opportunities occurred during tram tours. One memorable occasion was a brilliantly designed tour travelling on all twelve possible movements though the Grand Union at Balaclava Junction in 1981, utilising trams SW2 275 and W5 736. Here's a photo of W2 275 on the rarely used NE curve.



Camera buffs also have opportunities for photographing unusual workings during industrial strikes. The Hawthorn Heritage Fleet was put back into service at Camberwell during a maintenance strike in 1987. I left for work very early on a wet Monday 3 August to photograph this impressive line-up about to commence the day's service.



Camberwell Depot had its fan tracks replaced on the weekend of 11 and 12 of December 2013. Early on the Sunday morning, I arose to photograph this splendid line of B class trams stored along Burwood Highway, east of Blackburn Road.



With my dedicated photo album containing selected shots of every existing M&MTB class of tram, either operational or museum, I wrote to the M&MTB requesting official photos of the remaining tram classes no longer in existence. They kindly obliged, allowing me to complete my collection in the early 1980s.

Since then I have updated the album and taken many more photos and videos of trams – and also buses. These are filed systematically into folders and onto video DVDs, to leave a legacy for future generations.

Text and photos: David J Kemp