

TROLLEY WIRE



No.274

AUGUST 1998

\$7.00

Print Post Approved PP245358/00021



INSIDE: THE TRAMWAY SYSTEM IN TORONTO

TROLLEY WIRE

AUSTRALIA'S TRAMWAY MUSEUM
MAGAZINE

AUGUST 1998

No. 274 Vol. 39 No. 3 - ISSN 0155-1264

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Published by the South Pacific Electric Railway
Co-operative Society Limited, PO Box 103, Sutherland,
NSW 2232.

Editor.....Bob Merchant
Subscriptions and Distribution.....Peter Hallan
Bulk Sales.....Laurie Gordon

Subscription Rates (for four issues per year) to expire
in December.

Australia	\$A27.00
New Zealand	\$A30.00
Elsewhere	\$A35.00

All correspondence in relation to *TROLLEY WIRE* and
other publishing and sales matters should be forwarded to:

PO Box 103, Sutherland, NSW 2232
Phone: (02) 9542 3646 Fax: (02) 9545 3390

The opinions expressed in this publication are those of the
authors and not necessarily those of the publishers or the
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Typeset by National Advertising & Design Studios - Canberra
Telephone: (02) 6239 6287 Fax: (02) 6239 6693

Printed by National Capital Printing - Canberra
Telephone: (02) 6280 7477 Fax: (02) 6280 7817

Front Cover:

A Christchurch steam scene. Kitson 7 is seen with its two trailers at the Reserve terminus, Ferrymead during the COTMA Conference in June 1998.

Bob Merchant

Back Page, Top:

Dunedin 22 pauses at the tram stop in Bowman Street, Ferrymead Historic Park as a visiting school group passes. The sign on the span pole advises 'Out cars stop here if required'

Bob Merchant

Back Page, Bottom:

Birney car 143, originally Fresno Traction No.68, restored from a real derelict, at the San Jose Historical Museum in California. The car is operable but lifeguards are still to be fitted. It is a magnificent restoration achievement.

Dale Budd



Double truck California car San Jose No. 73 (originally San Jose RR 130, later Peninsular Rlys 73) running in tourist service on the San Jose light rail system. Jewett built this car for the San Jose system in 1912

Dale Budd

THE TRAMWAY SYSTEM IN TORONTO, CANADA

By Colin Boylan

During the second half of 1997, my family and I were fortunate to spend five months on work exchange living in metropolitan Toronto, Ontario province in Canada. To our surprise and delight we found that we lived quite close to the St. Clair streetcar line. This streetcar line forms part of the integrated subway, tramway and bus transportation system operating within 'Metro Toronto' as the locals called it. We used this streetcar line every day for commuting to work, shopping or going out for entertainment.

The Toronto Transit Commission, or simply the TTC, operates the Toronto tramway system. The TTC has operated the system for over 75 years. In 1997, there are twelve streetcar routes, numbered 501-512, with a fleet of 200 modern Canadian Light Rail Vehicles (CLRVs) and 50 triple bogie Articulated Light Rail Vehicles (ALRVs). In addition, the TTC has restored and operates for special events or private hire 2 PCCs from the early 1950s and 2 older Peter Witt designed tramcars from the 1920s.



Canadian Light Rail Vehicle 4088 on Dundas Street in December 1997.
Colin Boylan

Some Points of Interest about the System

The track width is 4 feet 10 and 7/8 inches. This unusual and probably unique width seems to have grown out of a decision to stop the interchange of railway freight vehicles with streetcars in the very early days of the development of the system.

All current tramcars, and all purchased from 1938 onwards, are single pole vehicles. Current CLRVs are one-person operated with the driver seated on the left-hand side or roadway centre line side of the vehicle. (Remember they drive on the other side of the road to us). Passengers enter by the front door and exit via the centre door. All routes terminate in a circular loop. The driver, with care, can reverse the tramcars.

All tramcars are heated for the icy winter months and it is sure appreciated!

Fares are \$2.00 per adult and include free transfers between streetcar, bus and subway systems. This makes it one of the cheapest and fastest ways to get around Metro Toronto.

Some History about the System

Streetcars, as they are known in North America, began in Toronto with one horse-drawn route in 1861. Rapid growth of the system including electrification by the two private operators of streetcars occurred over the next 40 years. However, by the end of World War 1, the system, track and wooden tramcars were old and basically worn out. In 1921, the TTC was created and assumed control over the two pre-existing systems owned by the Toronto Railway Company and the Toronto Civic Railway. At this time there were 230 single miles of surface track.

Immediately the TTC began a program of system renewal. Major upgrading of track-work and ordering 575 new all-steel tramcars designed by Peter Witt occurred over the next four years. The TTC has maintained the operation of the tramcar system ever since.

The Arrival of the PCC 'Streamliner' Cars

By 1938, the TTC recognised that many of its older Witt cars needed replacement. An order for 140 PCCs

was placed with the Canadian Car and Foundry Company that built the PCCs under licence. With rationing in World War 2, increased passenger numbers saw another 110 PCCs ordered by the end of 1941. The system had grown to 29 routes and 269.47 single-track miles. It was during WW2 that women conductors were first employed by the TTC (in 1943).

Following WW2, the TTC had ordered another 250 new PCCs by the end of 1949. However, by 1949, the high cost of a new PCC caused the TTC to seek alternative sources of tramcars to replace more of the older 1920s tramcars still in operation. The solution adopted was to buy PCCs from USA systems as they closed in the early 1950s. Fifty-two PCCs were purchased from Cincinnati Street Railway in 1950, 48 from Birmingham Electric Company in Alabama in 1952 and 75 PCCs from Cleveland Transit System in Ohio, also in 1952, which included some PCCs built for, but never operated by, the Louisville Railway Company.

As a result of these purchases, the Toronto PCC fleet grew to be the largest in the world with 714 cars (715 were purchased but one PCC was scrapped in 1947 following an accident). In 1957, the last group of second-hand PCCs was purchased from the Kansas City Public Service, giving a total of 744 PCCs in 1958.

While these tramway developments were happening, the TTC was also building and then expanding the subway system in Metro Toronto. The opening of the main sections of the subway system in 1966 saw the closure of a number of streetcar routes, down to 13, and the retirement from service of 225 older PCCs. Over the next three years 350 older PCCs were sold to Alexandria in Egypt. 155 were scrapped in 1971 and 10 PCCs were sold to Tampico in Mexico.

By 1972, there were 418 PCCs in operation over 11 routes with 48 miles of track.

Planned Closure of the Tramway System

During 1967, the TTC management agreed to gradually replace with buses all streetcar routes commencing in 1972, with the last line scheduled for closure in 1980.

Public Reaction to the Planned Closure

In September 1972, a report to the TTC recommended early closure of many of the streetcar lines. However, when this report was made public, the

An ALRV, PCC 4300 and CLRV 4334 at the Russell Street Depot, December 1997. Colin Boylan





ALRV 4200 operating on route 501 in Queens Street, Toronto.
Colin Boylan

public outcry to the report was large, vocal and articulate. A citizens' committee, called 'Streetcars for Toronto', was formed. Following much research on the claims in the report dealing with the carrying capacity of trams versus buses, cost of maintenance of both fleets, operating speeds along routes, and the life expectancy of each type of vehicle, the 'Streetcars for Toronto' committee was thus able to refute many of the claims in the September 1972 report. The Toronto City Council gave further support for the streetcar system in October 1972, by unanimously supporting a motion to retain all streetcar routes. Andy Biemiller as spokesperson for the SFT committee convinced the TTC commissioners to cancel their planned streetcar phase-out approved in 1967; and start investigating European developments in streetcar design as part of a plan to seek a Canadian builder for a fleet of new streetcars.

Short Term Steps

The TTC was faced with a problem. Many of its remaining PCCs were old and needing rebuilding. The Toronto winter snows and use of salt on roads to remove ice and snow meant that rust is a major problem. In 1973, 75 PCCs were sent to the Hillsdale depot for a major rebuild as a short-term measure to extend the life of the ageing PCC fleet. Also, patronage was increasing on the system by an additional one million passengers per month. While this was happening, the TTC commenced investigations to find a replacement vehicle. The Swiss Industrial Company (SIG) developed a new design and

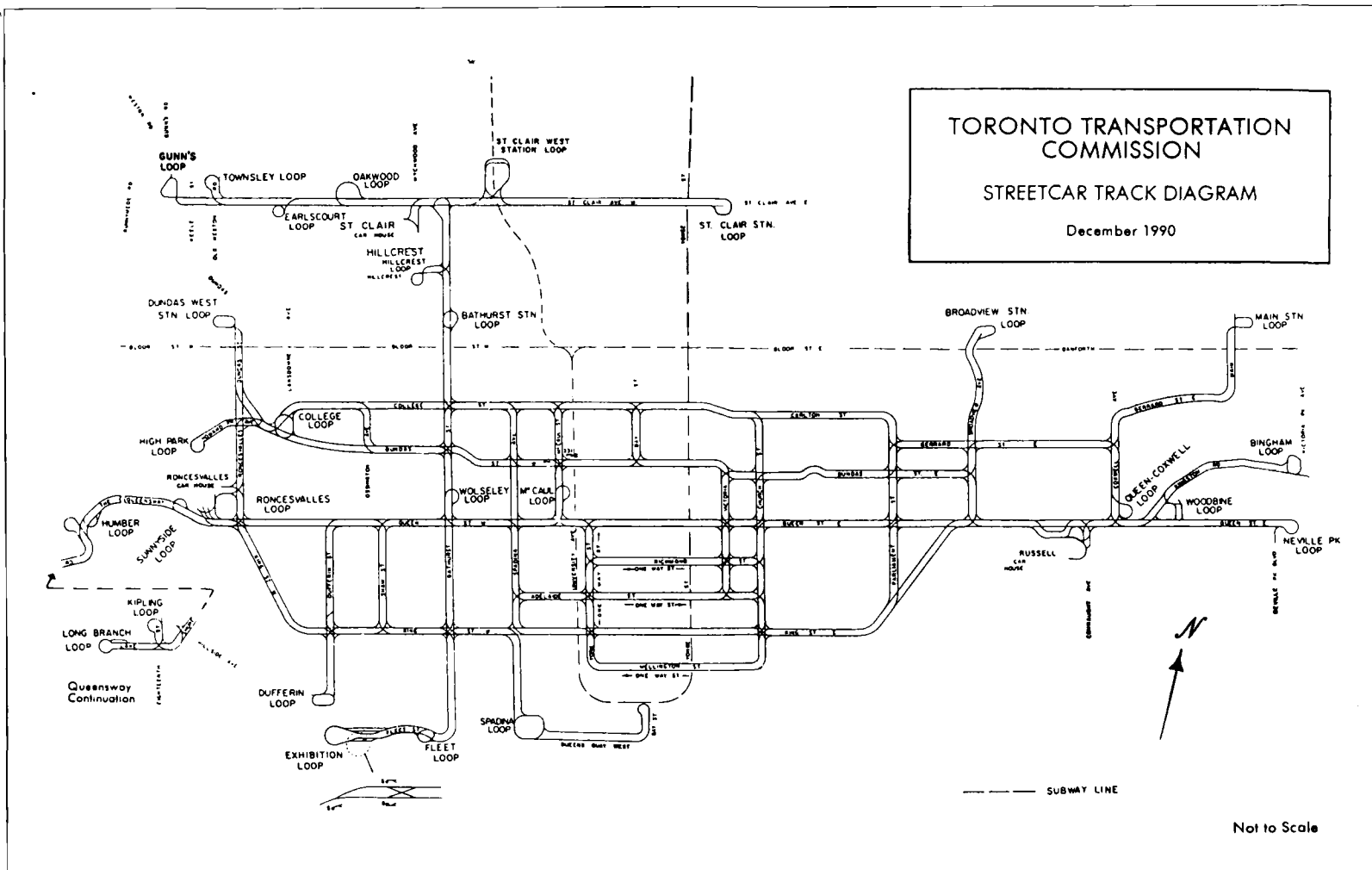
six prototype vehicles were trialed on the Toronto system. By September 1979, the first of the locally built Canadian Light Rail Vehicles (CLRVs) had entered service. The CLRVs now form the backbone of the Toronto tramway system.

The Current System

In 1997, the tramway system consists of 12 routes; 10 running east west across Metropolitan Toronto; and two running north south from the southern Lake Ontario waterfront.

The east-west Queens Street line, route 501, is the most heavily used service and is about 10.5 route miles long while the north south Spadina-Union Station 510 route is the newest route. This 510 line was opened on 27 July 1997 and is just 2.5 route miles long, going through the busy Chinatown section of Toronto. John Thompson described the opening of the Spadina line this way: "The official opening ceremony took place on Spadina Avenue just south of the [Spadina subway] station at 13.00 on July 27. TTC and government officials made speeches. Also present were small Witt 2766 (built 1923) and PCC 4500 (built 1950). Following the ceremony PCC 4549, the TTC's newest PCC (built 1951) came north on Spadina, descended the ramps to the underground loop connecting directly to the subway system, and proceeded southward. The car, which together with PCC 4500, has been retained by the TTC for charters, etc, was operating on a Toronto Transportation Society fantrip. Some of the riders had come from as far as Boston and Chicago for the event."

The Spadina line cost a total of \$105 million. The high cost was due in part to the costly decision to build an underground loop interchange with the



A diagram of Toronto's streetcar track in December 1990. The east-west subway line is under Bloor Street and the north-south lines are the Yonge Street (right) and University Avenue subways.



CLR 4109 descends the ramp to St Clair West subway interchange.

Colin Boylan

subway (\$48 million), the TTC's share of a new bridge over the railway tracks south of Front Street, extensive landscaping, safety islands for passengers, all new track including a major intersection with east-west routes at King Street (routes 503 and 504) and Queens Street (route 501), and the choice of Siemens overhead equipment.

The fleet is stored in two depots. The Roncesvalles Street depot is located at the western end of the system at a major junction of routes 501, 504, 505, 506 and 507 while the Russell Street depot (or car barn) is located near the eastern end of the Queens Street line. In addition there is the Hillsdale works depot where the tramcars undergo routine maintenance through to major rebuilding. This depot is located on the north south Bathurst Street line (route 511).

Current Vehicles

The TTC operates 200 four-axle Canadian Light Rail Vehicles (CLRVs). Each CLRV is 51 feet long, weighs 50,000 pounds and is powered by 390 horsepower motors operating on 600 Volts DC. Each CLRV has a seating capacity of 46 and can

accommodate another 60 passengers standing. In addition to the CLRVs, the TTC operates 50 larger Articulated Light Rail Vehicles (or ALRVs). These are 76 feet long, six axle vehicles powered by four 123 horsepower motors. They seat 61 passengers and have been known to carry up to 250 passengers at a squeeze! The ALRVs are used only on the busy Queens Street line, route 501, and the Bathurst Street line, route 511. The first ALRVs entered service in January 1988. Both the CLRVs and the ALRVs are fast. The CLRV can accelerate at a rate of 3.5 mph per second while the ALRV can accelerate at a rate of 2.65 mph per second. This means that they can reach 50 mph (or 80 km/h) in 50 seconds.

Getting Around Toronto

During peak hour operations all lines operate on a four-minute service frequency. This drops back to a maximum of 10 minutes between services in off-peak times. This means that there is very little waiting for the next streetcar. Because of the extremely cold winter conditions (it can get to -30°C with the wind chill factor), there are passenger waiting shelters at every stop either on islands on the roadway or at the footpath.

The St Clair Route

Our tramcar route was the St. Clair line, route 512.



This line is about seven miles long and connects with the St. Clair subway station at its eastern loop end then runs in a westerly direction across to St Clair West subway station where it enters an underground interchange. This was great as it meant you did not get wet or cold when transferring from the downtown subway system. From the station it re-emerges onto St. Clair Avenue West at Bathurst Street and then goes in a straight westerly direction until the terminus loop at Keele Street, called the Maybank Loop. Along the route there are turning loops at Wychwood Street, Oakwood Street, Lansdowne Road and Weston Road. Most services run from St Clair station to Keele. Some services run the shorter St Clair station to Lansdowne route. Occasionally, in peak hour times, there is a short service that terminates at the Oakwood loop. Wychwood Street is not used as a turning loop but it led down the street to the abandoned, but still TTC owned, St Clair Avenue depot where the TTC stored its 1920s Peter Witt tramcars.

We found the drivers (male and female) to be very helpful, friendly and courteous - always ready to help with directions. As the winter closed in, we were very pleased with the high frequency service (no long waiting periods). The tramcars were well maintained and always clean inside.

The TTC has announced that further extensions are scheduled for 1998. A new link between the southern

Passengers board CLRV 4133 before departing Spadina subway interchange for Union Station. It is followed by car 4168.

Colin Boylan

end of the Spadina line (route 510) to go in a westerly direction along the lake front connecting with the Bathurst street line (route 511) is planned.

Overall, we found the experience of using a fast efficient and modern tramway system to be one of our memorable recollections of our stay in Toronto, Ontario, Canada.

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A CLRV arrives at the Maybank loop at the western end of the St Clair route in snowy conditions on 23 December 1997.

Colin Boylan

ST. CLAIR	
TUES DEC 30	
WEEK	1
Thanks for Riding the Rocket!	
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A ticket issued on the St Clair route.

CLRV 4109 stops to pick up passengers on St Clair Avenue West at Winona Street on 22 December 1997.

Colin Boylan



THE 'GREEN GODDESS' - A PERSONAL ACCOUNT

By A.S. Hallett

The 'Green Goddess', Australia's first trolleybus, is well known in the annals of transport development in Australia. It is now on display at the St Kilda Tramway Museum. This article has been edited for publication from a manuscript written in 1932, and delivered to the Museum by a visitor who had been part of the original experiment, and had come to see the vehicle once again.

Introduction

During the nineteenth century, many changes were seen in the modes of public transport. Starting from old-style bullock drays, transport has passed through many revolutions, first to the coach, then to the steam train, then in our cities to the horsecar. Then followed the electric car, electric train, motor car, aeroplane and last but not least, the trolley bus.

The trolley bus is really a motor bus; it is very mobile with the advantage of electric propulsion, all without the expensive permanent way with its high maintenance that a tram requires. The trolley bus requires that it should have a positive and a negative overhead feeder. This is comparatively cheap and it can be erected without interfering in any way with the existing roadway.

Trolleybuses have and are being used quite extensively in Europe and America. They are giving economical and efficient service. They have been in use long enough to obtain accurate running costs. These data show that the trolley bus is well worth considering when new routes are to be opened up or when considering the replacing of obsolete rolling stock. However, no data are available when operating under Australian conditions. In order to rectify this deficiency, the Municipal Tramways Trust, Adelaide, decided to invest in an experimental trolley bus. Estimates of the running costs, maintenance, etc, showed that it would be more economical than the standard Garford bus then in use. These estimates were based on figures from various reports on the cost of running the trolleybus in other countries.

Since the bus was purely experimental, it was essential that it should be put in service at a minimum capital cost. The Payneham and Paradise tramline had not been paying well, so the trolleybus was put on this route. It was put on an existing car route to reduce the cost of overhead, it only being necessary to add two extra wires to the existing span wires. (The same pair of wires, located on the south side of the tramway overhead, was used in both directions.) Every economy was made in the conversion of the bus used.

It will not take much on my part to convince any of you who have ridden on a trolley bus that this is an ideal vehicle in which to ride. You get in, pay your fare, then sit in a well-padded and sprung seat; you can see all around you through the wide windows. The bus starts with smooth yet surprisingly rapid acceleration and rapidly gains its travelling speed. No noise, no vibration; in fact just a delightful sensation like owning your own private Rolls Royce. Because of its lack of vibration and noise, the sense of speed is upset and you hardly realise that you are travelling at between 35 and 40 miles per hour. Then on coming to rest, the deceleration is noiseless, smooth and effortless. Thus you see that trolley buses should appeal to the travelling public.

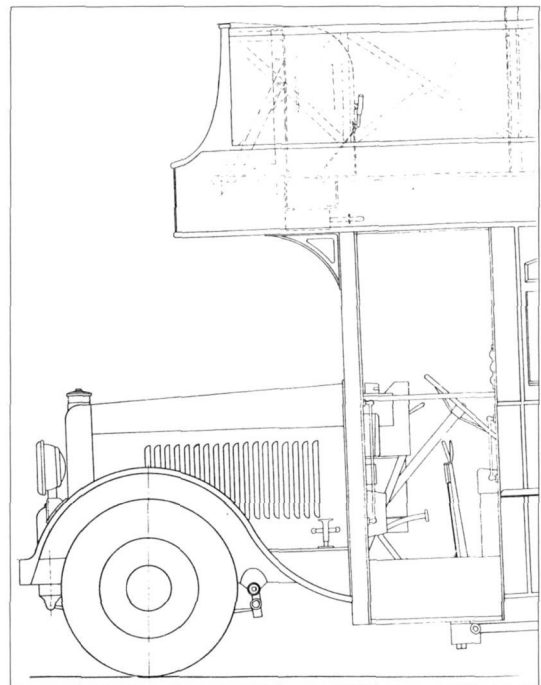
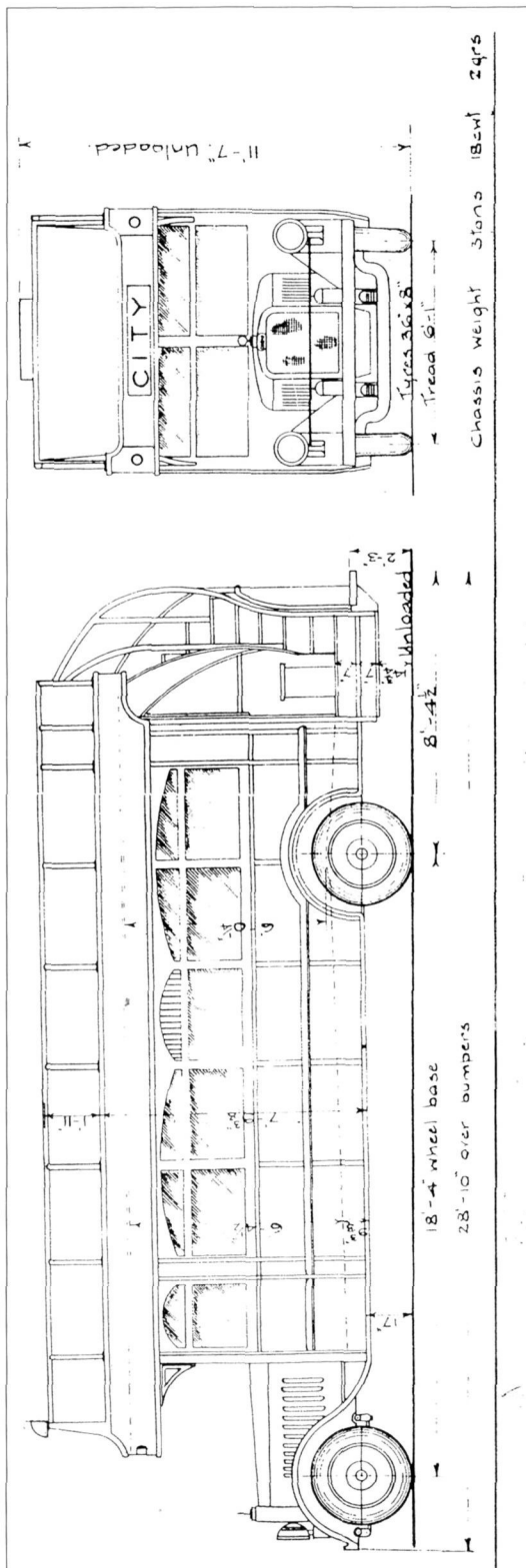
General Description

The Municipal Tramways Trust decided to purchase the motor and equipment and place it in one of the 28 Garford open-top double deck buses (Fig. 1) which had been purchased from the South Australian Railways.

The motor, complete with controller, trolley poles with bases and an air compressor were purchased from the English Electric Company. Garford 216 was chosen as the bus to be converted as it appeared to be in better condition than its fellows.

The body was removed from the chassis and sent to the car builders for overhaul. The engine and gearbox were removed. The front axle, steering gear, air bottles and brakes, back axle etc were thoroughly overhauled.

The body was to be converted with the least amount of work. All the 12-volt electric wiring and fittings were removed, overhauled then replaced. The back stairs, rear platform, top deck seats and front door were removed. The front step was lowered and a shield put in to protect the passengers (Fig. 2). Folding steps were put up the back to allow egress to the top deck. The railing around the top deck was covered with sheet iron for advertising purposes. The body was then replaced on the chassis, the motor and controller fitted and 600 volt wiring put in. The bus now had seating room for 23 people.



Left - Figure 1: Garford double-deck motor bus as built by the South Australian Railways.

Above - Figure 2: View of driving position as seen from the newly created front door.

Detailed Description

The motor was manufactured by the English Electric Company, type DK130. Rated horsepower is 80 at 130 amps. It is wave wound; 4 field poles with inter-poles, 4 sets of brushes and a single commutator. (This is mentioned since trolleybus motors are also manufactured with a commutator at both ends so that the two halves of the motor can be run in either series or parallel, thus giving two speeds without resistances in circuit) There are 105 commutator bars. The resistance of the armature and brushes and interpoles is 0.178 ohm, resistance of interpoles is 0.0388 ohm and resistance of the main field is 0.063ohm. The motor is fitted with roller bearings at both front and rear ends. At the rear there is a drive for the speedometer.

The graph (Fig.3) shows the characteristic of the motor. It will be noted that as the speed drops off, the horsepower increases. There is 92 hp at 15 mph and full field, whereas there is only 25 hp at 35 mph and full field. This is in marked contrast to the petro engine in which horsepower is directly proportional to the speed. The increase in horsepower of the trolleybus at low speed accounts for the acceleration.

The motor was mounted in a sub-frame or cradle (Fig. 4). The three-point suspension was retained, with one at the front of the motor and two at the rear. The rear suspension was varied slightly from the standard Garford in order to lower the rear of the motor to obtain the correct alignment of the tail shaft. This had to be lengthened 21 inches by welding a piece in because of the absence of a gearbox.

The controller, manufactured also by English Electric, is located in front of the operator so that he can grasp the levers thereon. The dash layout is shown in Fig. 5. To obviate the breaking of large currents by manual operation, it is relay operated, there being eleven relays including the brake relays. Circuits are shown in Fig. 6. The maximum current taken by the control circuit with the contact drum on the last notch is 1.2 amperes. There are no blowouts on the controller; the arc may extend as long as one-quarter inch but since the current is small there is no tendency to form 'bugs'.

The controller was sent out with a quick break notch at the fourth notch. This was such that when cutting up to the fifth notch, the controller could not be brought back to the fourth notch without the quick break dropping out. It was necessary to go right back past the first notch to the 'off' position before cutting up again. This proved to be too delicate and was constantly falling out due to road bumps and due to the inability of the operator to hold the control pedal absolutely steady. There was also relative movement between the controller and the floor carrying the foot operating gear, causing the controller to roll even if the foot could be held steady. The cam controlling the quick break finger has now been modified.

There are six notches on the controller and as originally supplied, a star wheel was provided, but subsequent events proved this was unnecessary. Notch 1 has all the resistances in the circuit; they are progressively reduced in notches 2-4 and cut out entirely in notch 5. Notch 6 weakens the field by shunting the main field current. The reversing movement simply reverses the field of the motor. It is obvious that in a job like this, the polarity of the EMF applied to the motor varies, but this reverses both the field and the armature current since the motor is series wound. Therefore the motor rotates in a constant direction irrespective of the change in EMF polarity.

The controller is electrically interlocked with the foot brake. The reversing lever is detachable and can only be taken off when the controller is in the neutral position. This prevents the bus being moved.

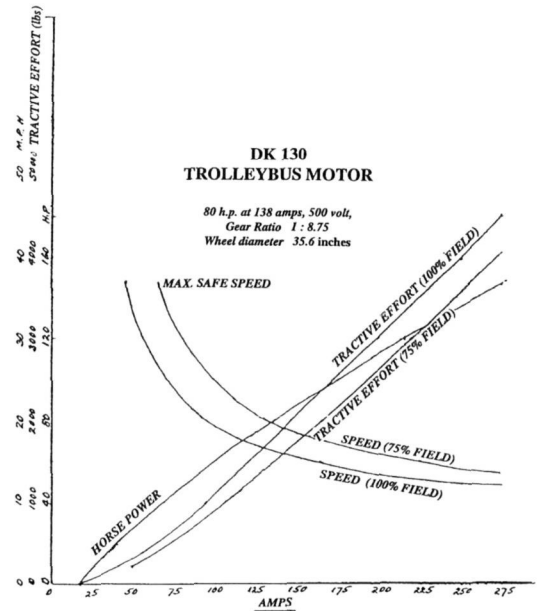
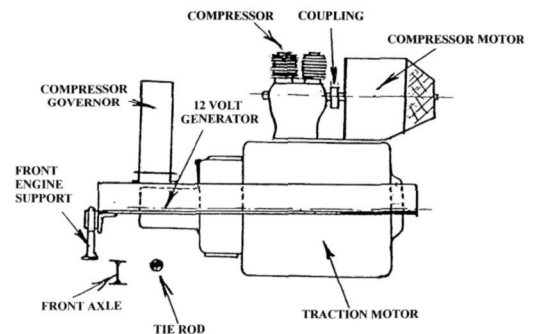


Figure 3: Characteristics of DK 130 trolleybus motor fitted to the 'Green Goddess'.

This lever also fits the changeover switch (see later) so that the bus cannot be changed from double overhead to track shoe with the power on the controller.

The relays are located on the roof of the bus just behind the front advertising board. Originally these were in three separate boxes, but these boxes were scrapped and the relays mounted in a special frame constructed in the MTT workshops. There are 11 relays consisting of a magnetising coil of resistances varying from 4 300 to 5 060 ohms. The brake circuits are constructed so that it is impossible to apply power

Figure 4: Mounting of motor, also showing relationship to compressor and generator.



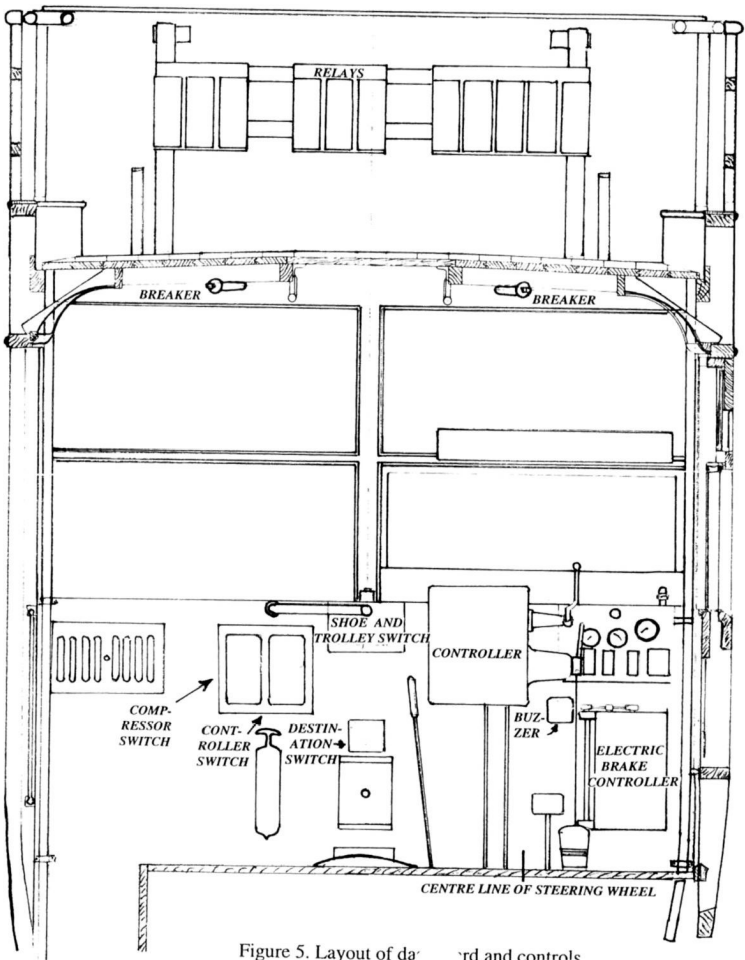
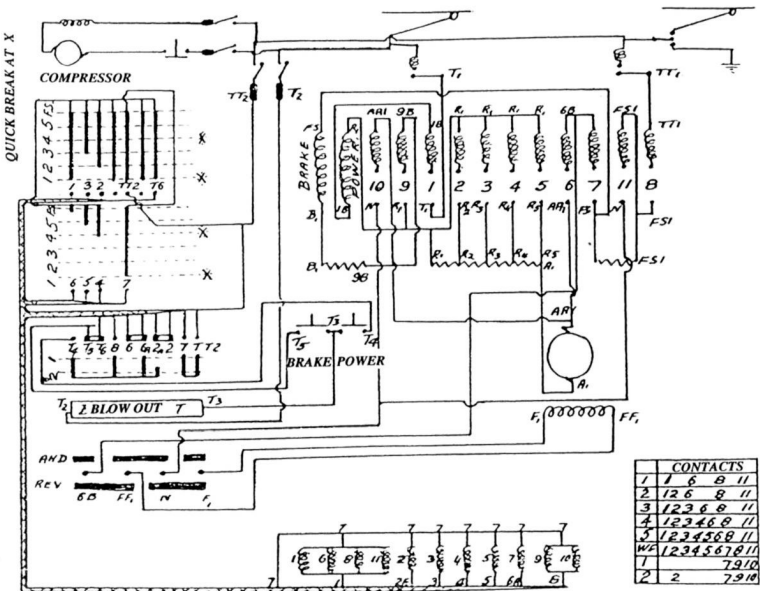


Figure 5: Layout of dashboard and controls.

Figure 6: Electrical wiring diagram for trolleybus 216.

Figure 5. Layout of dashboard and controls



to the motor when the rheostatic brake is on, or to apply the rheostatic brake when the power is on. There is a coil in the motor circuit in series with the armature so that when current is flowing, the brake circuit is opened. Magnetic blowout and arc shutes are provided. The minimum operating voltage is 197 volts, so there is little fear of thee contacts falling out due to low voltage.

The braking controller is located inside the lower right side of the bus near the operator's right foot. This brake is not powerful compared with the air brake. However, it would be useful in the remote case of the air brake failing or when running down long hills. Since all control is through relays which depend on 600-volt circuits, the rheostatic brake fails when power is lost, for example when the trolley poles are dewired. The rheostatic brake operates in conjunction with the foot pedal that operates the air brake. The rheostatic brake comes in first, then the air brake. There are four notches on the brake controller.

The grid resistances are found on the roof under the trolley pole base supports. They are covered by a sheet iron canopy fitted directly to the base support to keep out most of the weather but allow ample cooling, since a large amount of running is on the resistances.

The changeover switch is found in the centre of the dash, and is simply a modified single pole knife switch. The bus is constructed to operate normally on double overhead, but in order to make the bus more serviceable on the ordinary car system, with positive overhead and negative return rail, it is necessary to have a negative return shoe. One pole, the off-side, and generally termed the negative for convenience of identification, and this shoe, are connected to the change-over switch. When running with the positive overhead and negative rail return, the offside pole is pulled down and the return shoe dropped onto the rail and the changeover switch is put over to connect the shoe to the bus circuit. When double overhead is encountered, the shoe is taken up, the negative pole raised and the changeover switch is then put to the other position, connecting the pole to the bus circuit.

The circuit breakers are mounted under the overhang outside the windscreen. They were put outside since they are not the best things to have where there is a danger of them spitting at any of the passengers. The handles have been extended so that they project into the bus, thus allowing the operator to reach them without going outside the bus.

They are standard English Electric breakers, set to

trip at 275 amps. One breaker is on each pole, the compressor and control circuits being taken off before the breakers.

There are two trolley poles mounted upon a tower on the roof of the bus. The tension on the poles is maintained with two helical springs, which can be adjusted with an adjusting nut. They are adjusted to 30 pounds tension at a height of 21 feet 6 inches from the ground. The length of the poles is 18 feet 6 inches. This length allows the bus to deviate 15 feet on either side of the overhead without losing the poles. The maximum deviation is now set at 12 feet 6 inches. The poles have a swivel head, allowing the axis of rotation of the trolley wheel to run at right angles to the trolley wire. In order to keep the wheel in this position, it is essential that the trolley wheel profile should fit the wire. Thus, if the trolley wire is 3/8 inches in diameter, the bottom of the wheel profile should have a diameter of 3/8 inches.

At 30 mph, the trolley wheel rotates at 4150 rpm - viz on a round trip from Payneham to Paradise, it rotates 45 600 times. The bearing pressure is 20 pounds / square inch. The bearing is a casehardened steel pin running in a phosphor-bronze bush.

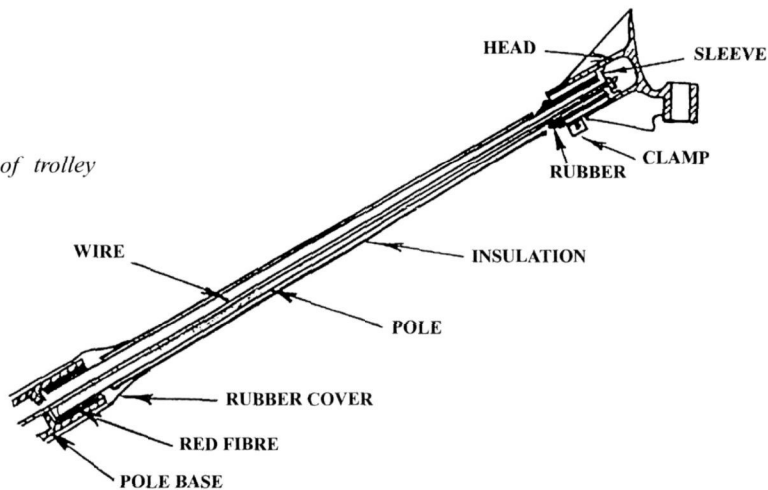
The ring on the end of the head is for the purpose of handling the pole. A long stick is carried, 15 feet 9 inches in length, and this has a hook on the end, which is put in the ring. This gives the operator good control over the pole; he can put the pole anywhere and can twist the swivel head in any desired direction.

The pole is hollow. The head is insulated from the pole. The pole is insulated from the base. The base is insulated from the bus. The trolley pole wire (insulated) passes up the hollow pole and is anchored to the head. The other end is on a terminal on the trolley pole base. The pole itself is covered with rubber hose. The rubber covering at the base of the pole is to prevent water running on to the red fibre which breaks down when wet. The pole is one of those places where the weather can so lower the resistance that the bus can become dangerously charged. Every precaution has been taken to insulate the trolley head. Details are shown in Figure 7.

The trolley pole bases are located 3 feet 6 inches from the front of the bus. When down, the poles are secured by two hooks.

On top of the instrument board is a red light. This is in a circuit (12 volts) connected to two switches on the trolley pole tower. These two switches, one on each

Figure 7: Diagram of trolley pole insulation.



pole, are connected to their respective trolley pole bases in such a manner that should the operator drive the bus to either side of the overhead in such a manner as to endanger the trolley wheel leaving the wire, the light glows, thus warning the operator that he must return to the overhead. They are standard stop light switches and are connected to the trolley pole bases by a piece of cord.

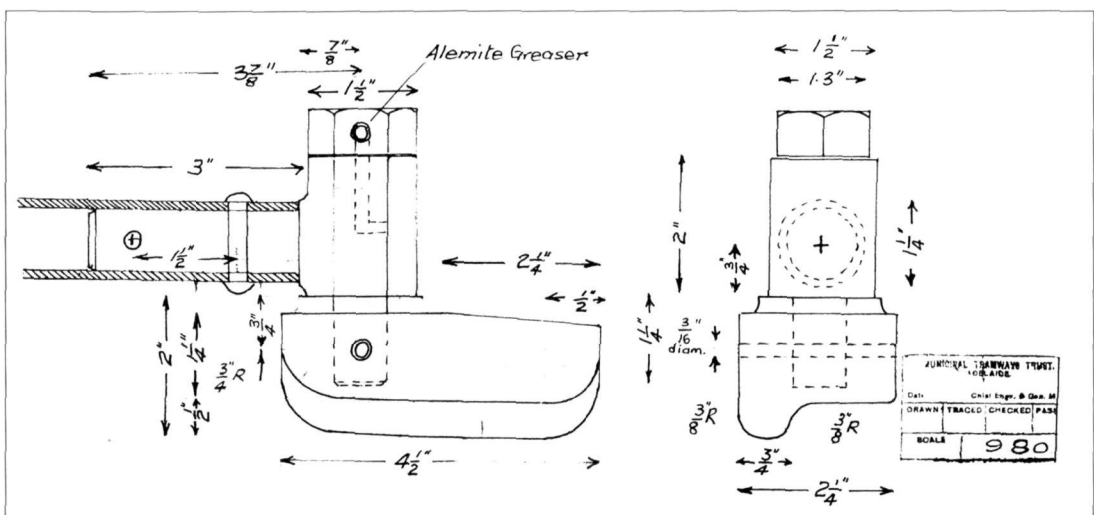
The negative return pole is located under the bus on the left-hand side chassis member over the off side rail. The bus must track on the tramway when using this pole. The base is insulated from the chassis. It is an Ohio Form 4 base as used on the type H car, but without the springs. The pole is 10 feet long and the

bus can run 9 feet on either side of the offside rail without 'deshoeing' itself. The force between the shoe and the rail is 22 pounds. This is simply the weight of the pole and shoe. The shoe is made of gunmetal (Figure 8). It is swivelled on the pole so it can always remain in the correct position relative to the rail. The shoe is handled with a stick 4 feet long. This is carried on the off side of the bus. When not in use, the pole is hung on a hook.

It is readily seen that in the case of the shoe leaving the rail, it is at 600 volts until the changeover switch is put in the 'off' position, thus the necessity of always handling the pole with the stick provided.

The control drum as explained above, is designed to be operated by foot or by hand and foot lever

Figure 8: Side and end elevation of Negative Skate Assembly.



combined. The apparatus as supplied, consisted of a system of levers. There was a star wheel on the control spindle, the idea being to hold the controller in a definite position. It was found that this gear would not work. One pushed the pedal and nothing happened. So one pushed harder and still nothing happened. One pushed with increasing pressure until something did happen. All at once, the apparatus worked, turning the controller through several notches before it stopped. The bus gave a big jerk and then the circuit opened. This invariably happened. To overcome this, it was decided to alter the leverage but this exhibited the same faults. A new and different gear was designed at Hackney Depot and patented. With this gear, the operator cannot cut more than one notch at a time, and due to the time required to operate the gear, it was found to be impossible to blow the breakers, even when cutting up as quickly as possible on an up grade.

The air brakes are standard Garford brakes and are the chief source of braking power (Figure 9). The working pressure is of the order of 75 pounds / square inch. The air is supplied by a 600 volt air compressor. The compressor is a two-cylinder single stage air cooled compressor mounted on top of the main motor. [This motor, albeit without the compressor, is held by the AETM.] The motor is a two pole series motor, _ horsepower at 700 rpm. Its rated consumption on 600 volts is 1.1 amps, but on test it consumed 1.8 amps. The compressor governor is a standard electric car governor.

In order that the motor should run at the required speed, the gear ratio at the back axle had to be altered. The Garford ratio was 1 : 6.8, but the new ratio is 1 : 8.75. The new gear was manufactured by the Richardson Gear Company of Melbourne. This alteration of gear ratio was the only change made to the back axle assembly.

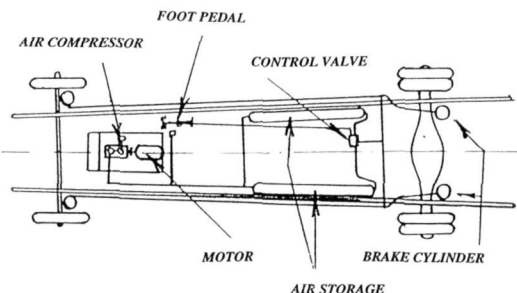


Figure 9: Diagrammatic layout of the air brakes.

Lighting of the bus is all 12-volt with the exception of the destination sign, which is 600 volt with 3 globes of 25 watt on 200 volts in series. A mirror is so placed so that the operator can see one of the lights. He can thus tell by glancing at the mirror if the power is on. This is useful since a failure of the pole nearly always means a pole lost.

A standard Garford generator is situated at the front of the motor. The front bearing cover was removed, a special housing constructed, and the generator joined to the motor by a special coupling.

There is much to be said for a low voltage system since it reduces the amount of high voltage wiring, the lights do not fail, with consequent inconvenience and danger should a pole be lost, and it permitted the use of standard Garford fittings.

There is also a socket on the top deck for use of the electrician. The battery is located under the near side back seat. It is an ordinary bus battery. Since there is no self-starter to operate, the generator charging rate had to be cut down to very low or the battery would be overcharged.

Trolley pole retrievers were tried, but to date they have not been successful owing to the long length of rope to be dealt with. The rope must of necessity be long to allow the poles to swing to their limit.

The speedometer is located on the instrument board. It is the standard Stewart speedometer. A speedometer drive is supplied on the rear of the motor. This was obviously not correct to drive a Stewart since the gear reduction was not correct; it required a further reduction of 1 to 3.105. This is accurate enough since the wear of the tyres would more than make up the difference.

When the trolleybus first became wet due to rain, it was possible to receive quite heavy shocks from the metal body and various handrails. The handrails have been isolated from the other metal work; this overcame any danger from these. Special precautions have been taken with the trolley pole and bases. The chief trouble was that a sheet metal canopy over the resistances was connecting the trolley pole base to the chassis. This would be all right but apparently the trolley pole head is not well enough insulated from the base. This defect was remedied by lowering the canopy. The insulation when tested under the altered conditions went 2_ to 3 meg-ohms depending on the weather.

The metal panels on the trolleybus tend to make the danger greater. If these were to be replaced by wood plywood panels, the chassis could not be so easily

The bus was weighed by suspending it, one end at a time, on the dynamometer in the truck shop. This gave a total weight unloaded of 6 ton 19 cwt.

Assuming a load of 25 passengers, 135 no. 1 brake shoes were packed on the floor of the bus, care being taken to distribute them as evenly as possible, so as to be as near as possible to the actual loading. The bus was then taken out on the road and put through all its manoeuvres without a hitch. The maximum current observed was in the vicinity of 160 amps and the consumption when running on weak field was between 70 and 80 amps. The maximum speed on the level was about 35 mph. The trolleybus consumed 1.8 units per vehicle-mile compared to a consumption of 1.65 units by a combination car (type A), 2.5 units by a dropcentre car (type F) and 3.15 units by a Glenelg car (type H).

Operating costs are set out as follows:

	Pence per vehicle mile	
	Garford	Trolley bus
Power or petrol	3.841	1.062
Servicing and cleaning	0.363	0.300
Lubricating oil and grease	0.296	0.060
Tyres	0.954	0.954
Body repairs, maintenance, painting	0.534	0.534
Chassis maintenance	1.250	1.100
Engine maintenance	1.633	0.300
	8.871	4.310

Cost of overhead maintenance	0.136
	4.446

Nett difference of 4.425 pence in favour of the trolleybus, assuming the overhead costs £1 300 to erect.

The present bus is not registered under the *Motor Vehicles Act*. It is treated as a tramcar.

The MTT makes a practice of allocating a badge to every vehicle in traffic. Each type of vehicle has a different shape for its badge. A star-shaped badge was adopted for bus 216.

The erection of the overhead was perhaps the most experimental of the lot. With only one pair of wires, the positive trolleybus wire was proximal to the double tramway overhead, (the Paradise tramline beyond Payneham was single track with three loops), and the

negative wire was distal to the tramway overhead. It was certainly the most troublesome, the great difficulty being to persuade the trolley-wheel to stay on the wire at intersections etc. Section insulators were used in the overhead at the point where the polarity of the overhead was reversed with respect to the vehicle trolley poles when it reach one or other terminus. The original overhead design is briefly described along with the alterations to overcome the difficulties.

Payneham: A wye existed here. This proved to be very difficult to negotiate and every endeavour will be made in the future to eliminate these in future designs. The spring frogs were the most troublesome. They were ultimately removed (Fig 10), and operators change their poles before returning to Paradise.

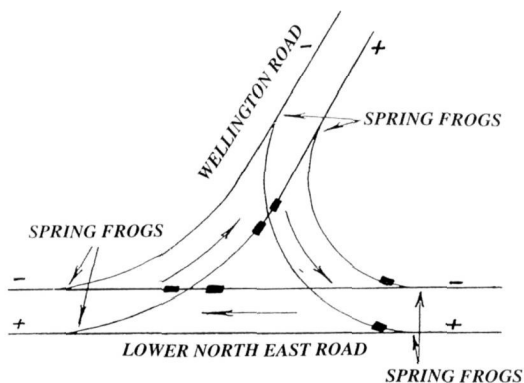
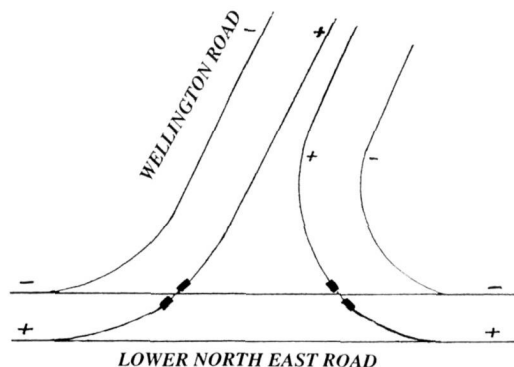
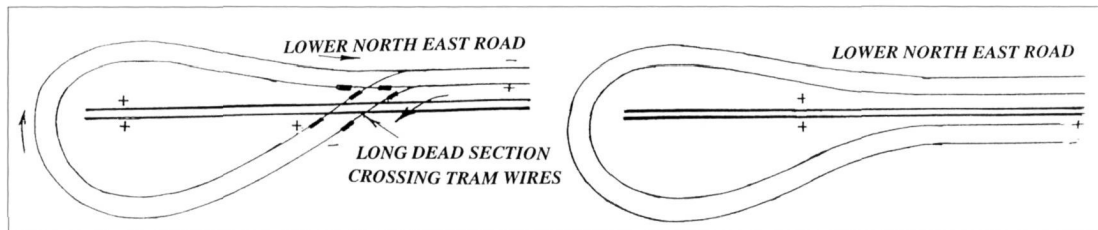


Figure 10: Payneham 'wye' as originally built (above), and as later modified (below).





Paradise: This is a loop. Trouble was experienced where the trolleybus wiring crosses the tram wiring. There were dead places in the overhead which could not be removed. Since it was necessary to take the turnout at low speeds, the operator often found himself in the middle of this dead section with the bus stopped. He would then have to obtain the assistance of the general public to push the bus on a few yards. To overcome this, the wiring was altered so that the poles now are changed over while the passengers are getting out (Fig 11).

Tramway loops: Here the positive tramway overhead had to cross the trolleybus overhead, since the trolleybus wires were being kept near to the middle of the road, and the loops were all on the south side of the single track tramway. These crossings gave trouble

Figure 11: *Paradise terminus circle as constructed (left) and as later revised (right).*

so that the whole overhead of the trolley bus was shifted to one side of the tram wires rather than passing through the centre of the loop.

North Terrace and Hackney Road: Special overhead work (Fig 12) was suspended to enable the bus to proceed around this corner with little difficulty.

The 'Green Goddess' trolleybus No. 216 at Hackney Depot.
MTT





When not using the special overhead work, the bus travelled over the ordinary tram route using the positive overhead and the negative return shoe.

The 'Green Goddess' at Paradise terminus on what could be a training run. Some admiring members of the public and the crew of the water sprinkler tram are looking on. The operator is attired in a cream dustcoat, hallmark of the rank until the mid-1950s.

C A Andrews Collection

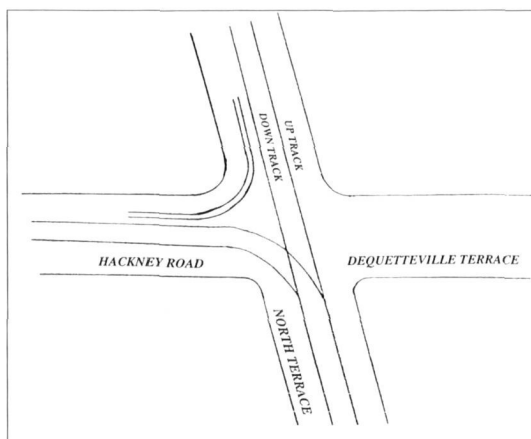


Figure 12: Disconnected trolleybus wiring erected adjacent to tram tracks at the intersection of Hackney Road and North Terrace.

Thanks are expressed to Sir William Goodman for his permission to prepare this paper, to staff for their ready assistance in helping with its preparation, and especially to Mr Duncan who kindly pointed out errors in the manuscript.

The 'Green Goddess' operated in the day-time off-peak hours between Payneham and Paradise from 18 May 1932 to 11 August 1934. It later became a grease bus for the overhead when the main Adelaide trolleybus system was built, then was handed to the Perway Department to use as a lunch room at track laying jobs. It was the first item acquired by the AETM in 1957.

AN INNSBRUCK INTERLUDE

By Robert Merchant

Innsbruck, the fifth largest city in Austria, is the capital of the province of Tyrol. Steam trams were introduced in 1891 to provide local transport to the neighbouring town of Hall (Solbad Hall). From June 1893, the metre gauge line was managed by a newly formed company, *AG Localbahn Innsbruck-Hall in Tyrol* (LBIHiT).

By 1900, a connection between Innsbruck and the nearby health resort of Igls was planned and a new company, *Innsbrucker Mittelgebirgsbahn* (IMB), was formed to construct the steeply graded and sharply curving line 8.4km from Berg Isel through the woods to the mountainside plateau. It was opened on 26 June 1900 with steam traction, the small 0-6-2T locomotives hauling tiny horse-tram-like cars.

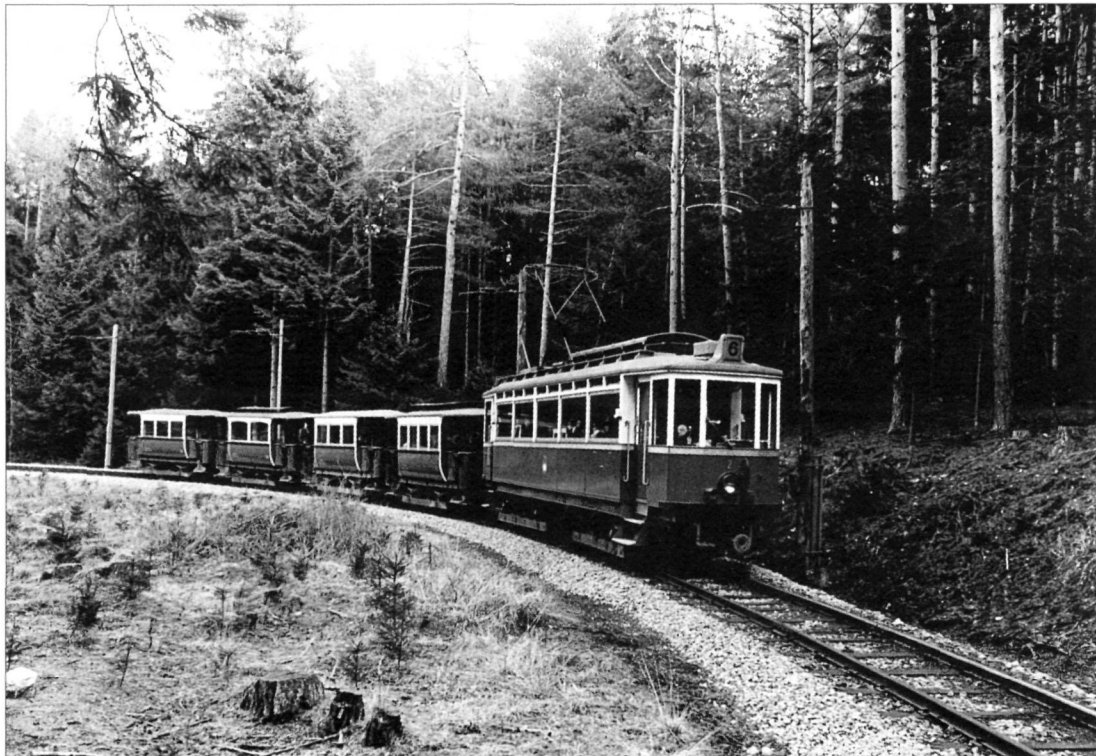
Electrification of the city and urban lines took place between 1904 and 1910. It was planned to electrify the line to Igls but World War I thwarted these plans.

The IMB was incorporated into the LBIHiT from 1 January 1927 and planning for the electrification of

the Igls line was resumed. It was not until 1936 that work started and the conversion took only 3½ months. The first electric tram to carry passengers to Igls ran on 28 June 1936 bearing the route number 6. No additional rolling stock was required; instead a pair of two-motor bogie trams, from an order for eight delivered from *Grazer Wagen- und Waggonfabrik AG* of Graz in 1909, were fitted with four motors to haul the ex-steam tram trailers up the steep gradients. The line was electrified at 1200 volts (as was the line to Hall) and the bogie cars were fitted with a semi-automatic changeover switch to enable them to operate over the 600 volt city lines.

The entire tramway system was acquired by the municipality on 30 May 1941 and the new title *Innsbrucker Verkehrsbetriebe AG* inaugurated. Gradual

Innsbruck motor car 2 and former steam trailers 101, 102, 111 and 112 climb through the woods towards Tantegert, the halfway point on the line to Igls, on 26 January 1975.
Bob Merchant



updating of the tram fleet took place using mostly second-hand cars from Switzerland and Germany. The old bogie cars and the ex-steam trailers continued to be used on route 6, operating in up to five-car sets.

Following a 1976 decision to retain and modernise the tramway, six-axle Duewag cars from Hagen in West Germany were obtained. Since they were double-ended, they could be tried on route 6 once the voltage had been standardised, but the capacity of a six-axle car would not meet the peak demand; an eight-axle car was needed. Another German city, Beilefeld, had some eight-axle single-ended cars available. These were converted into six-axle cars and the centre sections of these were used to make the ex-Hagen cars into eight-axle cars for use on Route 6 and elsewhere.

The old rolling stock was retired from the Igl's line. Car 2, in our photograph, was withdrawn in 1981. It had been fitted with four motors from 1940 and had its original bow collector replaced by a pantograph in

1957, at which time the car was undergoing rebuilding. Its capacity was 30 seated and 30 standing. Trailers 101, 102, 111 and 112 were built by *Grazer* in 1900 and could seat 16 with 32 standing. The open platforms had been enclosed in 1930 to protect passengers from smoke and soot, but the cars were rebuilt to original condition in 1936, probably to facilitate the carriage of skis during winter.

The subjects of our photograph are still in Innsbruck. Motor car 3, trailers 102, 103, 106 and 147 (Graz, 1907) are in store. Subaitalbahn motor cars 1 and 2 (Graz, 1904), 4 (Graz, 1905), and ex-steam trailers (2nd) 101 of 1891, 104, 105 and 111 of 1900 are in the care of the *Tiroler Museumsbahnen Innsbruck* at the Stubaitalbahnhof, Innsbruck. Innsbruck 4 (Graz, 1909) trailer 14 (1904) and goods wagons 32 (1904) and 262 (1900) are also in the museum's collection. The museum is open 9:30am to 11:30am and 2:30pm to 4:30pm, Saturdays and Sundays from May to October.

HERE AND THERE

NEWS ITEMS OF INTEREST FROM ALL OVER

Melbourne Tram Notes

The four Z class trams which were previously excluded from the up-grade program have now been added to it. Car No. 5 is already back in service, and the others will take their place in the program in due course.

The overhaul work being undertaken by Goninan on Z1 and Z2 cars has been cut back. The truck overhauls are being carried out, and dot matrix indicators installed. Roofs are being modified for pantographs. However, cars are no longer having other work undertaken, nor are they being painted. Car 58 was the last to receive the more extensive overhaul and repaint, in April 1998.

As of 13 May, all Ws not modified for OPO were withdrawn. Ten cars are on open tracks at Glenhuntly, and nine at Preston.

Car 897 is at Southbank for driver training - of relatively little value, as it is unrepresentative of the

modified Ws in service. 1008 is at Malvern, also for driver training.

Car 843 has been allocated to Malvern for charter work. Car 785 has been set aside at Malvern for possible inclusion in the historic fleet.

There have been many transfers from depot to depot in recent months, particularly Z3 cars from Brunswick to Malvern, these being cars with trolley poles rather than pantographs. Also many Z1 and Z2 cars are often transferred between Glenhuntly and Malvern.

Car 1011, out of service since its use in October 1997 to promote Workcover Health and Safety Week is regarded as available for promotional work. Like other Ws not modified for OPO, any further service would involve a second person as an additional crew member. As at early July 1011 was being considered for a further promotional activity.

The abolition of conductors has meant that the service from the City to the Zoo on Sundays, using an L or Y class tram, has been withdrawn.

The four companies, two trams and two trains that have replaced The Met were incorporated on 1 July. The future of Preston Workshops remains uncertain.

The State Government has given some undertakings about the maintenance of services. The winning bidders for the network would be given 7 or 15-year leases. The lease conditions would stamp out capricious fare hikes and the closure of unprofitable routes. It is a central part of the Government's privatisation agenda that the network will be protected in its entirety and, where possible, expanded. Passenger services would be improved through legally binding contracts, with penalties for poor service.

While the penalties are still being developed, they would be likely to include extensions of weekly and monthly tickets to passengers inconvenienced by late services or cancellations. Fares would not rise beyond the rate of inflation, concession eligibility would not alter in any way, and the one-ticket system for trams, trains and buses would remain.

The operators would be required to pay for regular independent customer satisfaction surveys, with the results published biannually. Information about punctuality and reliability would be published quarterly. The Department of Infrastructure would monitor the contracts and apply penalties for breaches.

The contracts would also ensure that Melbourne's fleet of 53 W-class trams was kept in service and the City Circle trams were free. The Government would require franchisees to invest in rolling stock.

Corrections to 'Melbourne on the Brink of Change'

The following are corrections to the major article on the Melbourne tram system, in the May 1998 issue of *Trolley Wire*.

On page 3, eight cars were inadvertently omitted from the list of B2s attached to Brunswick Depot. The list should have included 2097, 2098, 2100, 2102, 2104, 2105, 2106 and 2130, bringing the total to 24 as shown.

On page 11, the list of trams converted for driver-only operation should have included car 852, to bring the total to 43 trams as shown.

On the same page, the list of trams repainted in M&MTB colours should not have included 1011. This was the last advertising W class in service, painted most recently for St George Bank. It was then used in October 1997 on the City Circle to promote Workcover health and Safety Week. Only 50 Ws were painted into the M&MTB livery without the driver-only conversion.

On page 18, in the Swanston Trams table, 'Note 3' in the column headed 'Trams with Pantographs' should have read 'Note 2'.

Our thanks to John Burne for pointing out the majority of these errors and omissions.

Hobart News

A car for the waterfront tramway has been purchased and was retrieved on 24 April from a tram enthusiast's back yard in the Midlands where it had stood for the last ten years. It is car 39, a 30ft, single-truck and single-deck with clerestory roof, drop-end combination built by the Hobart Municipal Tramways in 1917. It was converted to one-man operation in 1926 and withdrawn in 1948.

Car 39 was delivered to the Selfs Point Parks and Recreation Depot where it joins bogie car 118, which was donated to Hobart Metropolitan Transport in 1993 and later passed to the Hobart City Council. Both cars are under tarpaulins until funds can be raised for their restoration.

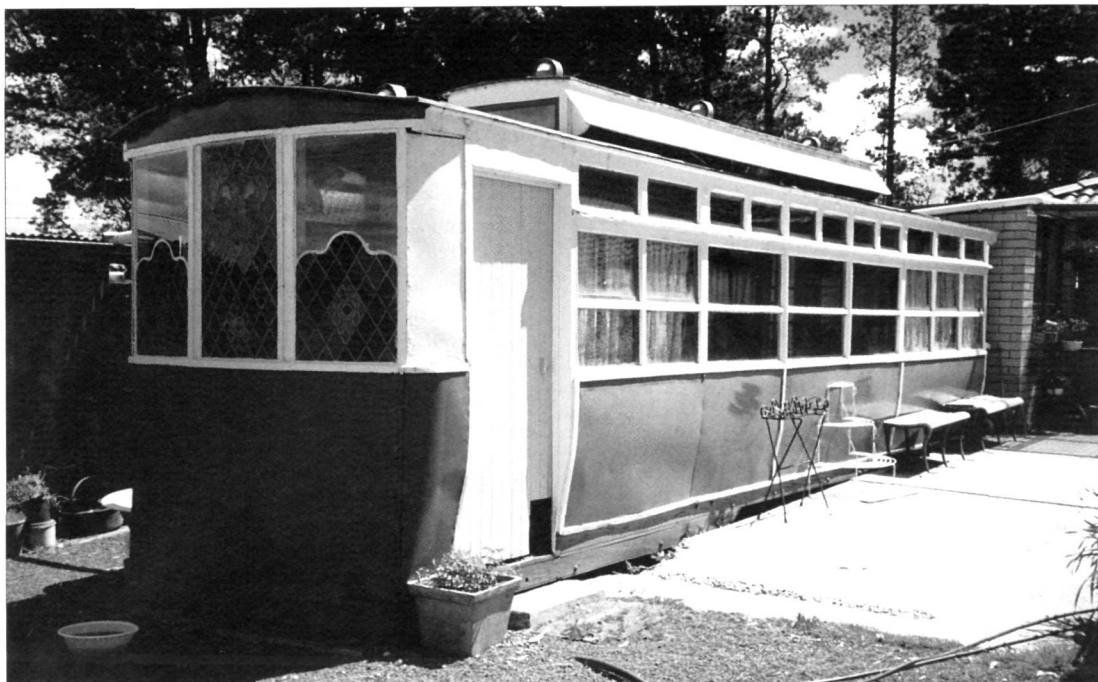
Letters to the Editor

Peter W. Duckett writes:

The article 'Vale Ballarat Powerhouse' (*Trolley Wire*, November 1997) by Alan Bradley and Richard Gilbert, does the authors great credit. The history of this establishment is known to few outside those connected with its daily operation.

The fact that a special siding was provided for use of the Brush sprinkler car, purchased in 1906, would suggest that the appearance of this car on the streets of Ballarat would have attracted the attention of the many postcard and other photographers active during this era. But to the writer's regret no such photographic evidence of the Brush sprinkler car has yet come to light.

Prior to the closure of the SEC Ballarat Tramways, I learnt from the depot staff that the tank from the Brush



Hobart car 39 is seen at its Midland location before recovery by the Hobart City Council. Two tram seats can be seen at the side of the car.

This view inside the car shows the interior is in good condition.
Both: Alderman Darlene Haigh



sprinkler had been sold to a private buyer following dismantling of the car. However, on pursuing the matter, I found that the tank had been sold a second time. My hunt finally proved successful when the tank was located on a farm property northeast of Ballarat where the accompanying photograph was one of several taken. The owners were amazed to learn that their tank at one time graced the streets of Ballarat, serving as the essential component of the Brush sprinkler car!

In researching their fine article, I was keenly interested to learn that contact had been made with Mr Tom Pringle, son of the former general manager and chief engineer of the Electric Supply Company of Victoria Limited, Mr Percival John Pringle.

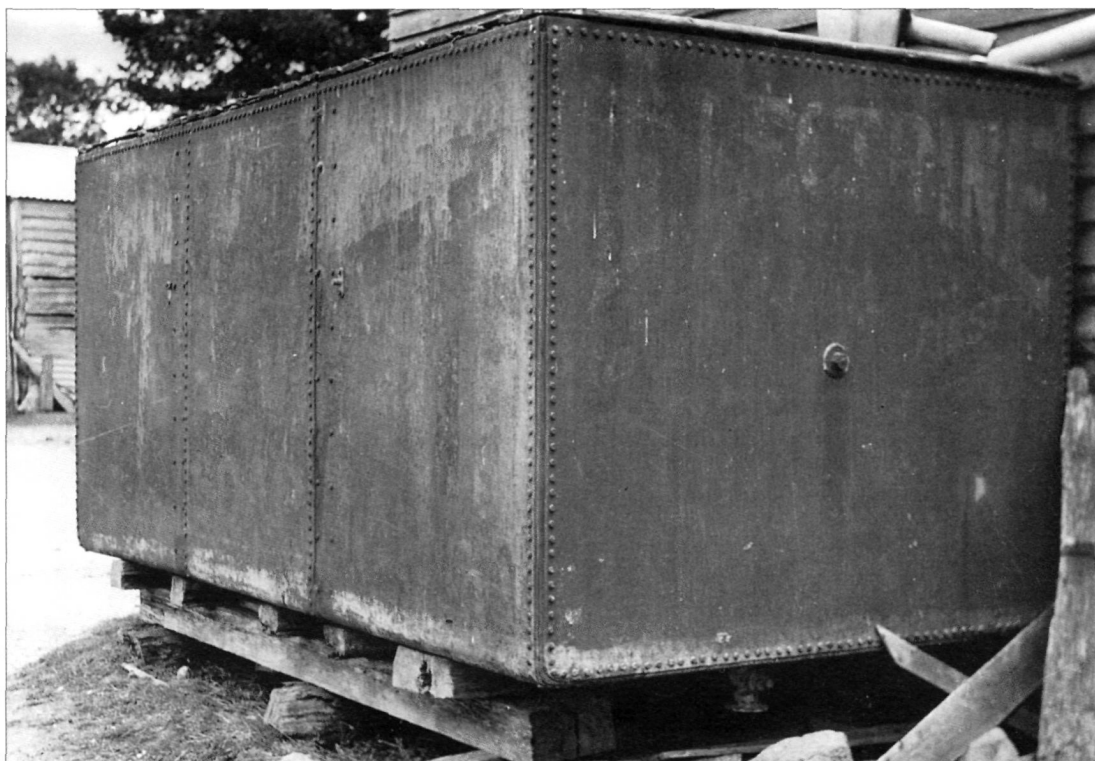
The calibre of P.J. Pringle was such that the ESCo could consider itself most fortunate in being able to attract him away from the United Kingdom, where he had been general manager and electrical engineer of Burton-on-Trent Corporation Tramways. In early life Mr Pringle attended the school of electrical engineering in Hanover Square, London, going from there to Glasgow to serve as a pupil on locomotive works. Subsequently he assisted Prof. G. Forbes in electrical research. Following experience gained with

Messrs Drake and Gorham and the Brush Electrical Engineering Co., Mr Pringle supervised the equipment of power stations at Wandsworth, Watford, Sheffield, Huddersfield and Leicester. Then for three years he was associated with Messrs Kincaid Waller, Manville & Dawson, consulting engineers and was engaged in the task of setting up the Midland Electric Power Corporation's works ⁽¹⁾.

Mr Pringle's appointment at Burton-on-Trent came in 1903 and in the eight years that he spent there he was successful in inducing breweries and works to adopt electric power, whilst he patented several inventions in the electricity and tramways departments. His industry associations included membership of the Institution of Electrical Engineers, the Institution of Mechanical Engineers and of the Council of the Light Railways and Tramways Association.

Mr Pringle received his appointment at Ballarat and Bendigo in 1911. He was reported as having safely arrived in Melbourne by the British transport press on 31 December 1910 ⁽²⁾.

The tank from the Brush sprinkler car was found on a farm property north east of Ballarat. Peter Duckett



In 1930 Mr and Mrs Pringle planned a long vacation in the United Kingdom, but after motoring through Spain and France, they stopped in Zurich, Switzerland, where Mr Pringle was seized with illness and sadly died on 10 June 1930⁽³⁾.

References:

- (1) *The Tramway and Railway World*, 17 July 1930.
- (2) *Ibid*, 31 December 1910.
- (3) *Ibid*, 17 July 1930.

Memphis and New Orleans

Van Wilkins, author of the article 'W2s in the United States' (*Trolley Wire*, February 1998) writes:

I was in Memphis for a 24-hour period in June. Three W2s from New Orleans are stored in the service facility and were acquired for use on a planned extension from Main Street out Madison Street to the Medical Center. Full funding for the extension has not yet been secured, but authorities are confident that they will get it. Funds are available for preliminary engineering. The line will also serve as an entrance for a planned light rail line (with modern equipment) from eastern suburbs.

In addition, Rio de Janeiro cross bench open car 1794 is being rebuilt to enclose the sides up to elbow

level for safety reasons. This car came from New Orleans along with the W2s.

The other seven W2s at Memphis are in regular use on both Main Street and the new Riverfront Loop. The total of eleven comprises the largest fleet of W2s in the USA. As both lines are scheduled at ten-minute headways, this means that northbound on Main there is a car roughly every five minutes. Schedules are not as carefully kept as they might be. Operators take time to accommodate riders. The evening I left I was on a Porto car that supposed to turn back at Beale Street. However, there was also a blind passenger aboard. Both of us had luggage, and the operator asked if we were going to Union Station. We said, "Yes", so he extended his run to the end of the line at the station.

The Riverfront Loop uses the west track of the former Illinios Central main line along the river bluffs. Amtrak and an occasional IC freight use the east track. The west track is welded rail; the east is jointed. Wire is hung at 6.7 metres above the rail owing to a level crossing at the north end where the trolleys cross the east track to get to the west one. The height is necessary to meet railroad clearance requirements. This accounts for the unusually long trolley poles. All cars, including the six Porto cars, have them. Porto cars are used on the Loop when traffic is light.

Each W2 is painted a different scheme, as is also the case with the Porto cars. Obviously the present operations are tourist-oriented, but this will change when Madison opens (several years in the future). Indeed, Main Street may take on a circular role sooner. There will be transit centres for city buses at both ends of the line. The one at the north end is now in operation.

The centre entrance of the W2s, except in Memphis, was seen by most operators in the USA as requiring a two-person crew. This is false economy. In Memphis, operators simply call out, "Put your fare in the box," and riders do. Operators tell me there is virtually no cheating. I suspect the same thing would have worked in New Orleans, but apparently the 'bean counters' had their way. Spend a dollar to save ten cents.



Former M&MTB 417 is seen on the newly-opened Riverfront Loop at Memphis. The second track is used by Amtrak and occasionally by the Illinios Central Railroad. Cars run south on the loop, returning north on existing track on Main Street. Van Wilkins

In New Orleans the newly-built cars which replaced the W2s and three Perley Thomas cars are well done. The CKD bogies and controls work well. One Perley Thomas car from Riverfront is to go to San Francisco for use on Market Street. Carrollton Station has started work on the first of 24 new cars, also using the 1923 Perley Thomas pattern, for use on Canal Street when rail service is restored there. There is one difference. These cars will be air conditioned, with the units

mounted in a 'monitor' roof. Target date is 2001 for commencement of service.

Former M&MTB 503 is in storage at Memphis, Tennessee. The transit authority obtained it from a museum at Green Bay, Wisconsin for use on a planned extension along Madison Street to reach a medical centre.
Van Wilkins



Book Reviews

Fares Please!

The Horse, Steam & Cable Trams of New Zealand
By Graham Stewart.

Size 285mm depth x 210mm width, 216 pages,
More than 400 black and white plates plus line drawings and maps,

Case bound with French folded laminated jacket,
ISBN 1 86934 064 7

Published by Grantham House Publishing.

Price NZ\$69.95 less NZ GST = NZ\$62.18 plus
Economy International Post (10 to 15 days) NZ\$11.00,
Total cost posted to Australia in stout carton is
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Available from Best Collector Books, PO Box 17-256,
Wellington 6033, New Zealand.

Phone 011 64 4 476 4625, Fax 011 64 4 476 3048.

This book is about the pioneer tramway vehicles of the 19th century – the horse, steam and cable trams of New Zealand. The publication of this volume has been eagerly awaited and complements Graham Stewart's *Always a Tram in Sight – The Electric Trams of New Zealand 1900-1964* (reviewed TW, Feb 1997) which covers the electric rolling stock. It is a smorgasbord of information and illustrations of the pre-electric trams that operated across the Tasman and it tells the story of the vehicles themselves.

The vehicles of some 29 tramways and 20 descendent companies are described in this volume. These are based on Auckland, Thames, Wanganui, Wellington, Paeroa, Nelson, Westland, Christchurch, Dunedin and Invercargill.

New Zealand companies imported American, English and European built horse trams. The first horse car was built by a little-known builder with premises in Pitt Street, Sydney. Not only was it New Zealand's first tramcar, it was also the first tram built in Australia. As local skills developed, orders for new cars were placed with New Zealand coach building firms who often copied the American and English designs.

Steam power was first introduced in 1871 at Thames, followed by Wellington in 1878. Builders include Chaplin, Merryweather, Henry Hughes, Baldwin (including a couple of second-hand steam 'motors' from Sydney), Kitson and Kerr Stuart. Some, like Merryweather and Kitson, had to prove their success on the streets of New Zealand before the tramway companies in the large centres of the world purchased them. The last steam tramway engine was placed in service on the Takapuna Tramway, serving Auckland's North Shore, in 1924.

Dunedin became the centre of cable traction in New Zealand. The Roslyn Tramway Company introduced this form of traction in 1881. It was the first cable tramway constructed outside the United States where some four installations were already operating in San Francisco. It also became the last steam-

A well loaded cable car 103 and trailer 110 climbs from the city terminus in High Street, Dunedin. Glaister & Clarey of Dunedin built the cable tram in 1903. The builder of trailer 110 is unknown but it dates from the 1880s.

A.B. Hurst & Son 7695

powered endless wire rope tramway in the world when it ceased operation in 1951.

A young Dunedin-born engineer, George Duncan overcame the problem of having a cable grip tram negotiate a curve while still retaining its grip on the moving cable and introduced the 'pull' curve to the world. Duncan also invented an emergency brake known as the 'dolphin' brake, which is still used today in San Francisco. Gerald Ditchfield describes the grips, cables and powerhouses of the Dunedin cable tramways and the 'pull' curve and the 'dolphin' brake in two of the four informative appendices.

A glossary of New Zealand horse, steam and cable tram terms and a listing of preserved vehicles complete this work. It highly recommended to all readers with an interest in the tramcars and tramways of New Zealand.

-- RIM

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Price \$24.95

Every interested enthusiast keen about the history of tramways will be delighted by the reprinting in 1996 of



Cable Car Tram, Dunedin. N.Z. 7695. A.B. Hurst & Son Photo.

John Keating's book on Melbourne's long-gone cable tram system. It has a fascinating text and is an ideal gift for any occasion.

Author John D. Keating had a brilliant mastery of English prose and an attentive memory for detail. These qualities are noticeable in *Mind the Curve*, a well-written and thorough work first published in a hard cover edition by Melbourne University Press in 1970 and reappearing in a soft cover edition in 1972. It is well worth reprinting again.

Mr Keating, a member of the Australian Railway Historical Society, was brought up in Melbourne where his father, a Tasmanian senator and Cabinet Minister, attended the Federal Parliament then located in Melbourne. His father took him everywhere but by some oversight, never into the engine house of a cable tramway.

This was in the hey-day of the cable tram in the Victorian capital. The title of the book recalls the shout of the conductors of the cable trams as swung about the corners at the constant speed dictated by the speed of the cables. Melbourne had an extensive system, as Mr Keating relates. The cable system was a street railway, and steam powered too, although the transmission was somewhat lengthy! It would have been a tragedy if the service of the cable trams had been forgotten, for it was instrumental in the development of Melbourne's transport, and an aspect that few today can recall. Indeed I have only vague memories of the cable trams in Bourke Street, the last line to go.

Mr Keating details the background of the growth of the system, the routes, the meetings with the ever spreading electric traction lines, and the day to day operation of the system. The book provides extensive accounts of the technical aspects of powering the cars. All those interested in the flanged wheel on steel rail will be unable to put this book down. Likewise the book provides many insights into the development of Melbourne itself, for an efficient transport system in the early years of any developing city affects the potential growth rate in the years following. In Melbourne it was the cable trams and the railways which laid the foundation for this.

Mr Keating devoted his retirement to the thorough preparation of what I regard as an historical masterpiece, an essential reference book for every tramway enthusiast. Its new publishers must be congratulated in making this long out-of-print work available once again.

-- Darren Room

Trade and Share Video Offer

A one for one exchange video offer is being made by Saul Nadler of PO Box 732, Hillside, New Jersey 07205, USA, operator of a free railroad video exchange library of 700 tapes of steam locomotives and streetcars. The offer is to send your sample video and he will send one from his collection. Tapes are in PAL and NTSC formats. The NTSC format tapes are not such a problem these days. Most new video machines can play NTSC tapes on PAL televisions. The tapes are for educational purposes only and are not to be copied. Saul Nadler has an Internet site at <http://www.centurypress.com/railvid.html>

LATE NEWS FROM BRISBANE

The new Premier of Queensland, Mr Peter Beattie, has officially dumped the Briztram project but will investigate another light rail network for Brisbane's inner city. There will be no cross-river link between West End and the St Lucia campus of the University of Queensland if the new Government gives the go-ahead.

Briztram, serving the central business district and suburbs including Herston, Bowen Hills and Newstead, was to have been built by the former coalition government. The \$225 million cost was to have been partly met by a Centenary of Federation fund contribution of \$65 million from the Federal Government. The private sector was to fund about half the cost.

The 13 consortia that had expressed an interest in constructing and operating the project will have their unopened proposals returned to protect the intellectual property of the proponents.

A light rail system would be needed in the future but would have to be developed in conjunction with other transport programs such as a busway network, heavy rail and ferries. The new Transport Minister, Steve Bredhauer, stated it was his view that no light rail system should involve a bridge over the Brisbane River to the University of Queensland and there should be no service down Boundary Street, West End.

The Premier said that Labor was now looking at a 'futuristic' light rail concept rather than the coalition's model, which involved old technology.



A Nicholson Street grip car and trailer swing into Bourke Street bound for the terminus at Spencer Street. Eight other cable trams can be seen in this late morning view; the nearest is bound for Clifton Hill. The lines to Clifton Hill and Nicholson Street opened for service on 10 and 30 August 1887 respectively. The cable line down Bourke Street was the last to close on 26 October 1940.

Valentine M.1229

This busy scene is in Elizabeth Street at the Collins Street intersection in Melbourne. A grip car hauling Brunswick bogie trailer 184 approaches the intersection bound for the terminus at Flinders Street. The line to Brunswick opened on 1 October 1887 and was electrified in three stages over six months from September 1935.

Rose P/18





Eleven unmodified W class trams are in storage at Glenhuntly Depot. This view was taken on 28 May 1998. Cars 865, 880, 895, 998, 916, 1018 and 984 are on road 10 at left, while cars 918, 949, 930 and 883 are on road 11.

Steve Altram

Opposite: A view of the completed but not yet wired new terminus at Port Melbourne on 13 June 1998. A crossover is being constructed beyond the former station building.

Ray Marsh

The curves at the intersection of Flemington Road and Abbotsford Street have been reconstructed. This view of the reconstruction work was taken on 14 June 1998.

Ray Marsh





COTMA

Council of Tramway Museums of Australasia

Executive Officer, 5 Felicia Street, Mordialloc, Victoria 3195

From Bill Kingsley

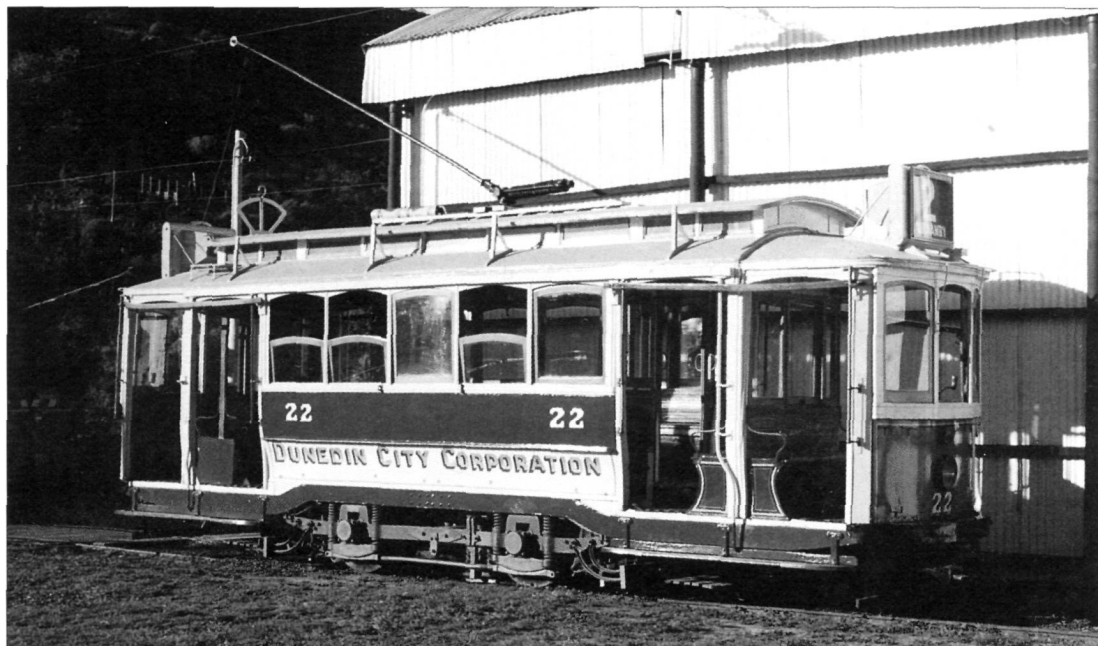
COTMA / NFRS Conference, Christchurch 1998

The combined Conferences of the Council of Tramway Museums of Australasia and the National Federation of Rail Societies (New Zealand) was hosted

Christchurch Boon 152 stands at the tram stop in Cathedral Square at 7:30am on 30 May 1998 ready to transport delegates to the conference venue at the Arts Centre. Early arrivals huddle in the comparative comfort of the tram saloons while others stand talking in the crisp 6°C morning air, awaiting the arrival of their fellows from the Camelot Hotel in the background.

Bob Merchant





by the Tramway Historical Society in Christchurch and elsewhere from 29 May to 3 June and attracted some 121 delegates.

Phil A'Vard from the Puffing Billy Preservation Society was again our Keynote Speaker. Phil has a wealth of experience and knowledge, which he is keen to pass on, which we are keen to hear, and which he delivers with great eloquence and enthusiasm. His after-dinner speech following the Conference Dinner was a highlight, the hilarity of his stories being all the more potent due to similar, and often embarrassing, experiences that many of us have also shared.

Most Conference Sessions were held at the Arts Centre (formerly the Canterbury College) and included a varied range of topics, speakers, discussions and presentations. Meals varied from the YMCA, Canterbury Brewery, Noah's Hotel, Papanui Railway Station, on-train, the excellent country pub at Woodend, Ferrymead, etc.

Ah! Ferrymead Historic Park. We rode the trams, drove the trams (electric and steam - we all love Kitty), invaded the barns, and opened the first operative trolley bus circuit at a COTMA Member Museum. Congratulations THS.

The Christchurch Tramway was our main means of mobility around town, while THS preserved buses

Dunedin 22 was one of 14 California combination cars built for the Dunedin City Corporation Tramways by the J.G. Brill Co. in 1903. The 14 cars of the class were withdrawn from service between 1953 and 1955. Car 22 is seen at Ferrymead waiting for its turn to carry conference delegates over the museum tramway.

Bob Merchant

took us to Ferrymead, CTL buses to Waipara, the steam tug 'Lyttelton' around Lyttelton Harbour, and Mainline Steam's steam loco Ka 942 to Arthur's Pass.

Arthur's Pass! A day of steam in the crisp cold sunshine, snow on the alps, scarves, gloves and beanies on the humans, scenic views of great grandeur, photographic delights, refreshments at the 1870 coaching house at Jacksons, hot pumpkin soup and snags at Arthur's Pass Station. Fantastic!

Where is Waipara did you ask? Just north from Christchurch we steamed up the Weka Pass in late afternoon sunshine behind A class 428 of 1909, spending a short but delightful time on this very friendly railway.

At the COTMA Conference General Meeting many important issues were discussed and directions for the next two years determined. Office Bearers for 1998-2000 are Lindsay Richardson (Chairman), Bill Kingsley (Deputy Chairman), Craig Tooke

(Executive Officer), John Lambert (Assistant Executive Officer), Carolyn Dean (Treasurer), Howard Clark (Australian Executive Member), Dave Hinman (New Zealand Executive Member), and John Radcliffe (Immediate Past Chairman). The only change was to the most important position of Executive Officer. Richard Gilbert stepped aside as Executive Officer after four years of sincere and dedicated service for which we owe Richard our appreciation. Craig Tooke takes on the role with a freshness of determination and we wish Craig all the best in this demanding but satisfying responsibility.

Richard, as President of Ballarat Tramway Museum, will now concentrate on the planning of the next COTMA Conference, to be held in Ballarat in 2000. The first COTMA Conference was held in Ballarat in 1975. It is very important that we return to our birthplace for our 25th Anniversary. It is planned to have a purposeful, worthwhile, relaxing and fun Conference.

Conference delegates mill around steam tram 7 (Kitson, 1881) with New Brighton Tramway Co trailer 10 (Boon & Stevens, 1894) and Cage 74 (1890s) on the reversing triangle at the Square Shelter, Ferrymead in preparation for the taking of the official conference group photograph, 30 May 1998. Bob Merchant

In 2002 we will journey to Brisbane and Rockhampton.

But back now to 1998 and Christchurch. Prior to the Conference, THS conducted a six-day tour of the South Island ('The Mainland') and all involved (there were many partners on the tour and at Conference functions) had a really wonderful time.

For the Aussies, getting to and from the South Island was fraught with challenges. Those that travelled to Christchurch from the North Island at earth level were alarmed when 8 to 10-metre waves invaded Cook Strait two nights before the Conference and all inter-island ferries were temporarily cancelled. But most travellers flew directly from Oz to Christchurch and 'flu' back afterwards (being a reference to the 25% or more of delegates who delighted in souveniring a Kiwi virus).

Congratulations and thanks are extended to Max Taylor as THS President, and to Bruce Dale, Dave Hinman and the large team of efficient helpers who planned and provided for us and for all the aspects of the Conference. This includes their outstanding scheduling of the weather, which remained bright, sunny, and energetically brisk throughout.

Well done, THS! Thanks from all of us.



LOFTUS

South Pacific Electric Railway Co-op Society
PO Box 103, Sutherland, NSW 2232

From David Cooke

Works Report

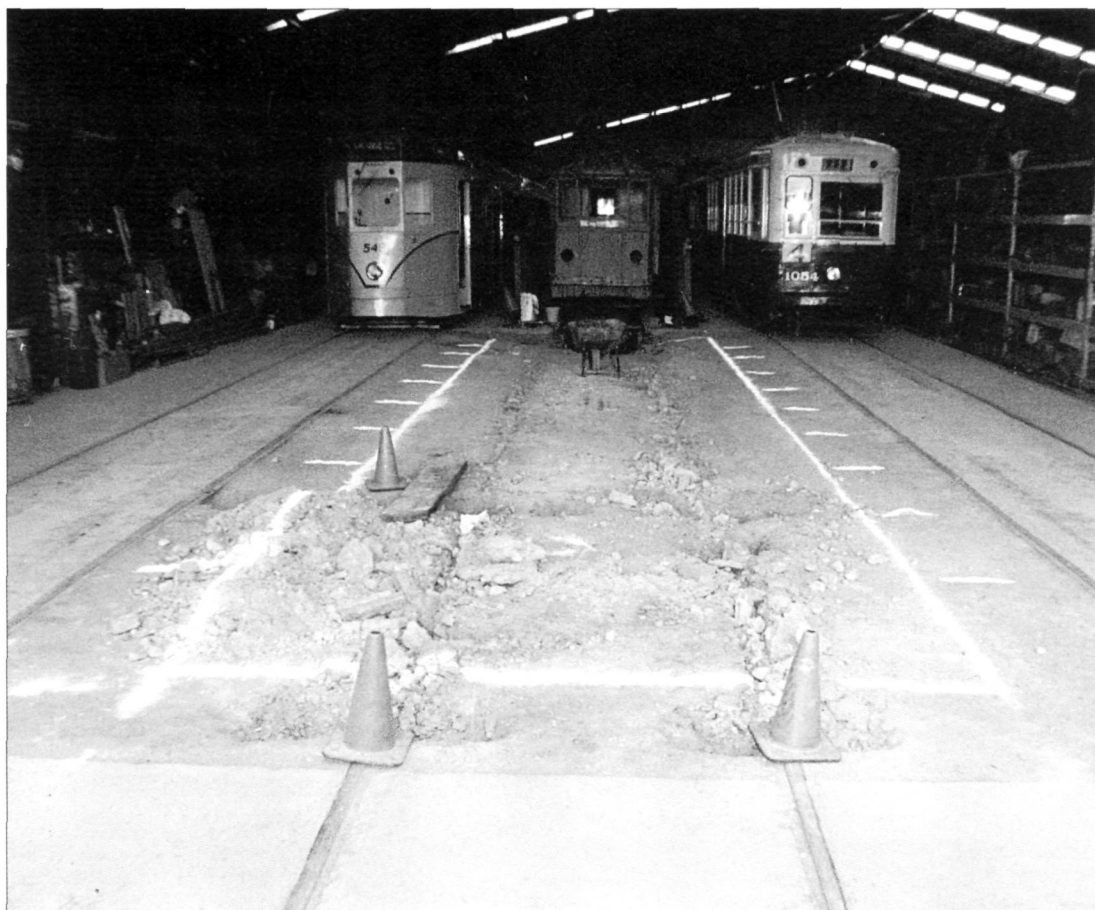
Although wet, Saturday 2 May saw a lot of work being carried out inside the shed. The steel beams for the pit in road 2 were moved from the workshop, where Joe had expertly welded columns, to the running shed. The move was carried out using the bogies from under R class 1892. Two forklifts were used, one driven by Chris Olsen and the other by Bill Parkinson. During the move a heavy shower of rain passed – Bill was soaked to the skin but still carried on regardless. To make way for temporary storage until the pit area is prepared rearrangement of various items between road 1 and the shed wall was carried out. The tricky lifting

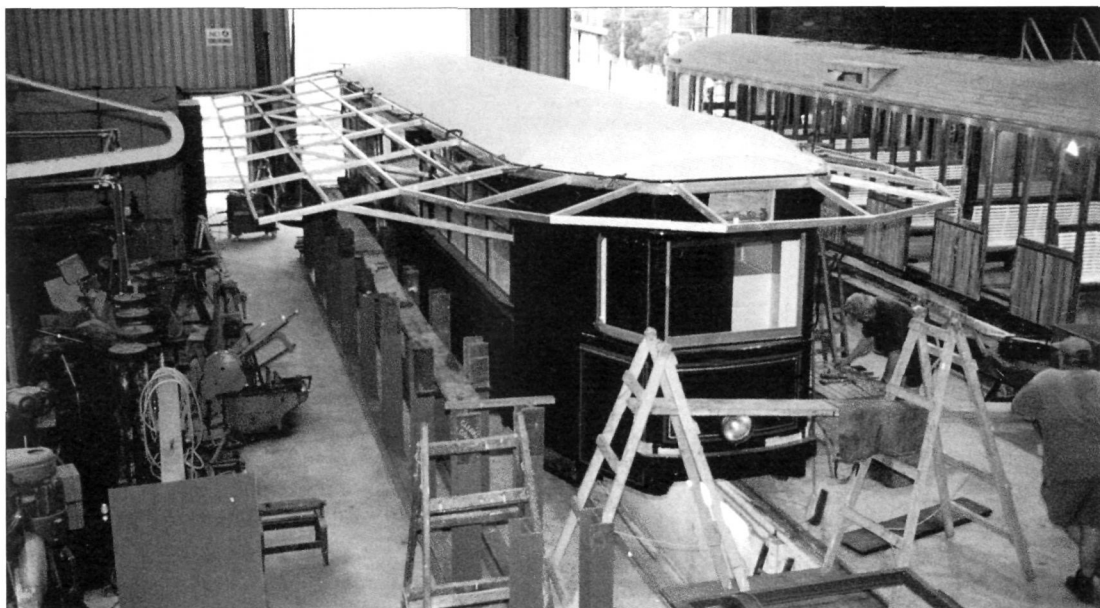
of the beams was carried out under the watchful eyes of Bob Cowing and Mal McAulay.

Meanwhile back in the top shed David Rawlings was busy sorting out overhead equipment for storage on the new shelving. During this exercise many unsafe items were consigned to the scrap bin. In the afternoon Tom Tramby, Bob Cowing and Chris Olsen were busy

The site of the pit extension on road 2 is marked out and the rails have been lifted ready for digging out early in July.

Ken Stockdale





The framework for an awning around R 1892 is being test-fitted in early April. The steelwork beside the tram (pie shop?) is for the pit extension on road 2 of the running depot.

Ken Stockdale

Excavation for the pit commenced on 11 July. A small spring was discovered right in the middle of the excavation, which requires that all clay is removed to bed rock. The spring will be piped to a sump to ensure waterlogging and 'pumping' does not occur under the completed pit.

Bob Merchant





were consigned to the scrap bin. In the afternoon Tom Tramby, Bob Cowing and Chris Olsen were busy erecting new shelving between roads 3 and 4. This will enable further items to be stored adequately.

Concreting the rails in the traverser pit is proceeding as and when possible. To date about half the track has been done.

Car News

Our pie shop project for 'Harry's' with R car 1892 was completed on 23 April when it left Loftus in pouring rain for its new home on Hunter Street, Newcastle. The owner, Michael Hannah is very pleased with the work carried out by our extensive workshop team who were special guests at his official opening on Friday, 15 May. A visit on Sunday 24 May revealed business to be extremely busy with all four staff run off their feet selling their specialty pies, pasties and drinks, etc. to an eager and hungry public. This project provided the museum with much needed funds to proceed in particular with the long awaited extension of the road 2 pit. All the people involved in this project must be congratulated for their supreme efforts on behalf of the museum.

With the departure of R class 1892 to Newcastle, the opportunity was taken to shuffle cars around. The O/P now resides back in the workshop along with C class 290 and Brisbane crossbench 71. This last-mentioned car is undergoing assessment prior to rebuilding. Melbourne W2 class 392 has been moved under cover.

Brisbane former ten-bench 71, seen here on the traverser, is now trapped on road 2 until the pit is completed. It is to undergo an evaluation of the work to be done to restore it to a passenger car and to record the changes made to convert it to an advertising car.

Bob Merchant

Opposite: The Museum's two Bedford tower wagons are seen in Tramway Avenue on a wet day. The embankment in the background is already displaying the tender loving care administered by John McFarlane and his assistants.

Bob Merchant

General News

The increasing attraction of our museum to group visits continues to gather momentum. Sunday 22 March is a case in point when a group in excess of 100 parents and boys from Kings School, led by Housemaster Phil Brewer, were taken by tram to Royal National Park for a bush walk and picnic at Audley with a return to the museum mid-afternoon. The boys selected the destination themselves.

A St George district social travel group was on a mystery coach tour on the same day. Instead of a short stay at Loftus they elected to travel to the Park, barbecue at the museum and stay most of the day. Both groups had a great day and promised to be back again! Our traffic staff is thanked for their efforts on the day.



ST KILDA

Australian Electric Transport Museum

GPO Box 2012, Adelaide, South Australia 5001

From Colin Seymour

Around the Workshops

The last few months have been a little quieter around the AETM, partly as a result of the exodus to Christchurch for COTMA. Having said that, John Pennack has repainted C 186 and Ian Seymour continues to work on No. 1's truck.

The completion of the repainting of car 186 means that all of our eight Tuscan red trams, excepting A 1, have been repainted in the last four years. Although No. 1 has not been repainted recently (it was repainted in 1983-84) it retains its gleam as it is only used on special occasions. As well as the Tuscan cars, W2 294 was also repainted of course, giving us a gleaming fleet at the moment.

Some further dismantling of E 118 has continued.

The armature bearings on No. 1's motor at the Museum have been re-metalled and bored to the new sizes for the now parallel shafts on our ex Preston

Workshops vertical borer. The armature has now been reinstalled in its casing and a test 'spin' took place using the Museum's tractor battery.

After various sealing methods were tried on the metalling moulds, car muffler putty was the final choice, performing perfectly. The motor suspension bearings from car 42's original truck are almost new in size and will save time with the truck re-assembly. Red fibre washers, trepanned on a lathe to be a press fit on to the axles, were installed to prevent oil trickling down the wheels. Thanks to Bill Parkinson and Mal McAulay from SPER for their information on the washers.

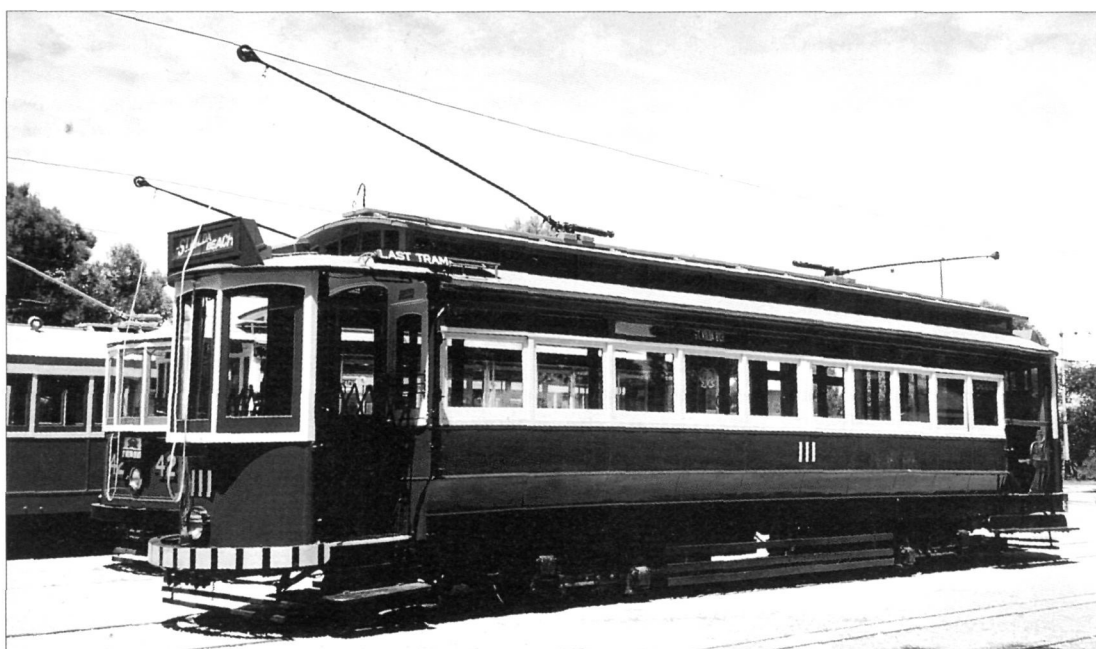
The Archdale milling machine is now in service helping with various phases of the bearing work on No. 1. Repairs took place on the Coolart pump and repairs and improvements have taken place with the other workshop machines.



Tuscan Adelaide dropcentre tram F1 282 in this posed shot is standing on the curve from the lake towards Samphire Road. Car 282 was repainted in 1995.

Neville Smith

Tuscan E1 bogie tram 111 on the depot fan at St Kilda at the start of another day's operations. Car 111 was repainted in 1997. It is a sister car to car 118, which is our current major reconstruction project. Car 118 is being returned to the original Type E half saloon and half-open crossbench configuration. Colin Seymour



Annual General Meeting

At the AGM held at the Museum on Saturday 16 May 1998, the following officers were elected:

President - COLIN SEYMOUR
 Vice President - PAUL SHILLABEER
 Secretary - DAVID WILLIAMS
 Treasurer - BARRY FOX
 General Manager - CHRIS DUNBAR
 Operations Manager - BEV SMITH
 Rolling Stock Manager - KYM SMITH
 Site and Safety Manager - IAN SEYMOUR
 Track and Overhead Manager - JOHN PENNACK

No Trustee elections were due. The Trustees are Christopher Steele, Ian Seymour and Chris Andrews.

It's good to see some new blood with David and Barry on the committee.

Dispatcher's Rules

Operations staff has received the new Dispatcher's Rules. These rules are particularly important because they detail our major traffic incident procedures. Plastic coated copies of the Incident Procedures have also been located in key areas of the Museum. All Operations staff and current site volunteers also received a copy of the Museum's Safety Management Policy.

WHITEMAN PARK

Perth Electric Tramway Society
 PO Box 257, Mount Lawley, Western Australia 6050

From Michael Stukely

Another new acquisition - WAGT 2nd A Class 125

The second former WA Government Tramways (Perth) tram body from Bullaring, WAGT 2nd A Class 125, has now been moved to Whiteman Park following the acquisition of K Class 130 in March (see TW May 1998).

No.125 was one of two cars of the 2nd E Class (reclassified 2nd A in 1947) built at the WAGR Midland Junction Workshops in 1930. These trams, Nos 124 and 125, differed from earlier cars in having steel side sheathing and Brill 77E trucks, in common with the later K class for which they were designed as prototypes. Car 125 was withdrawn from service and its body sold in April 1958, just before the closure of the Perth tramways in July of that year.

Member Trevor Phillips, son John and friend Warwick loaded the tram body in the morning of Sunday 21 June. Progress was delayed when the low loader became bogged in the saturated soil while manoeuvring to leave the property where the tram had been in use as workers' accommodation. Arrival at Whiteman Park was at about 5:30pm, and unloading was done in record time, being completed by 7:00pm with assistance from a group of members. Trevor has continued his most generous support of the society by

carrying out the move of No. 125 for the cost of his fuel only – thank you, Trevor!

New Crane

The Society's crane has been traded in for a more versatile type of unit. The replacement is a Proline crane, which has four-wheel steering, a feature that will enable it to reach the more inaccessible sections of track and enhance its ability to manoeuvre in confined spaces in the carbarn area. The Oketon Geddes Trust funded the changeover.

The new crane arrived on 22 April. Servicing has been carried out and Vic Sweetlove's team assisted by Ray Blackmore has repaired a number of hydraulic oil leaks. The rope has been replaced. This unit has already given valuable service.

General

Another new acquisition in recent months was the purchase from Westrail of a quantity of surplus level crossing lights and associated equipment, following an extended period of negotiation by our late member Charlie Bite. This equipment will be installed to protect the three level crossings of the tramline over



*The Proline crane arriving at Whiteman Park on
22 April 1998.*
Lindsay Richardson

*The newly acquired body of WAGT 2nd A class 125
(recovered from Bullaring by the Society on 21 June
1998), on the fan outside the Lindsay Richardson
Carbarn.*
Michael Stukely



protect the three level crossings of the tramline over public roads in the Park (one at the Village and two at Bennett Brook). We thank Park Management for their major contribution towards the acquisition costs, which enabled us to take this opportunity to secure the equipment, and record our appreciation of Charlie's efforts in this successful project.

More ex-tramway and trolleybus steel traction poles have been acquired from Western Power as they are progressively replaced in Perth's streets. Twelve arrived in May and 26 in June, and Noel Blackmore reports that several of the latter came from storage depots where they had been fully Dimet treated, and minimal preparation will be needed for their installation at the Park. These poles will be invaluable in the progressive replacement of our wooden poles, and also for possible future tramway extensions.

Patronage on the tramway in April – May was better than in the equivalent period last year, and loadings on public holidays have been consistently good. Our neighbours, the Bennett Brook Railway held a 'Friends

The body of WAGT K class 130 (the last tram built for Perth, which was acquired by the Society on 7 March) stands on the main line prior to being towed through the Oketon Geddes Car barn to its new home in the W.P. Pennenburg Workshop on 6 May 1998.

Lindsay Richardson

of Thomas the Tank Engine' day on Sunday 17 May, and this test of the demand for a second such event in six months was clearly successful. Three trams were hired for the day by the Railway to provide 'free' rides, and carried good loads.

Park Management has provided new edging to the low-level platform at Bennett Brook and the surface on the landing area at Stockmans Crossing has at last been improved. Safety lines have also been painted at Village and Village Junction stops, and these have made a big difference to crowd control on busy days.

The Wednesday group has put in a major effort to transfer large quantities of spare parts from the W.P. Pennenburg Workshop to the newly installed shelving in the Spare Parts Storage Shed. This is freeing up much needed space in the Workshop.

Lindsay Richardson has continued infilling of the track on the bogie storage siding with road base topped with limestone. No further trackwork can now be done here until the laying of the rails for the pit is completed. Geoff Morrison has started installing the electrical conduits for the pit.

A soak-well has been installed near the rainwater tank alongside the bogie storage siding. Recent heavy rains have highlighted the need for additional drainage in the rear compound.



Approval has been received from Park Management for the erection of a vehicle port to house the tractor, Toyota and mobile compressor in order to overcome congestion in the sheds. It will back onto the traction sub-shed, to the east of the Engineering shed, at the south side of the compound.

The body of WAGT K class 130 was relocated to A Road in the Workshop on 6 May after stored materials were removed from the area. Bill Gilbert and helpers have removed the sheeting covering the saloon windows as well as the two added internal partitions, and they are making good progress stripping the steel sheeting off the saloon sides so that the body can be assessed for restoration. As a result of the excellent weather protection of the body during its 40 years at Bullaring, the exposed woodwork and steel fittings appear to be generally in very good condition.

The new western end apron has been fitted to the body of Perth G class 35 by Ric Francis, and the other is ready to fit. Work is now in progress on the roof, where there has been severe dry rot. Clerestory uprights and roof arch supports are being replaced.

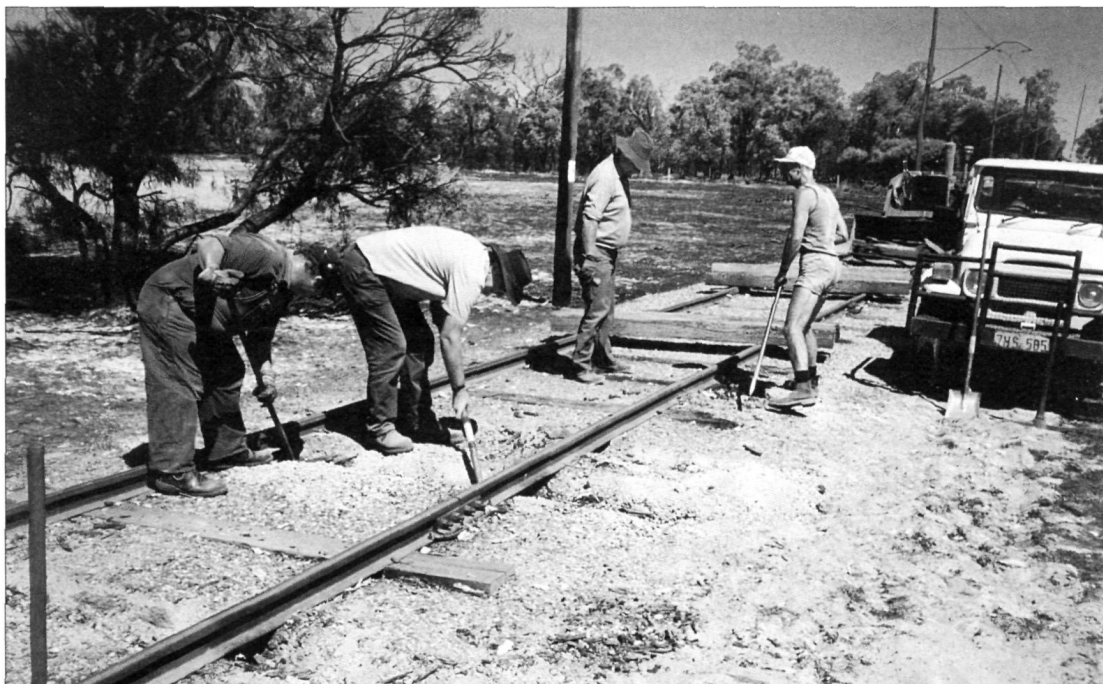
Roy Winslow has started stripping the roof of Brisbane 550 to assess the need for repairs. The body has been cleared out and a list of parts needs compiled.

Track maintenance work has been carried out at Bennett Brook stop and eastwards to the cattle grid by the team. Kevin Clarke and Garry Barker secured all loose spikes between the Car barn and Village Junction in June.

The Society mounted a newly completed display of photographs at the annual Australian Model Railway Association exhibition at Claremont Showgrounds over the June long weekend, and again Scott Parker's model tramway layout was operating alongside. The display was ideally placed directly inside the main entrance, and attracted a lot of interest.

A total of ten PETS members and partners attended the June COTMA Conference in Christchurch, New Zealand. By all accounts, the Conference and associated tours and functions went very well and were greatly enjoyed by all. We congratulate the Tramway Historical Society, Conference Convenor Bruce Dale and the organising committee, and thank them for their excellent work.

The track team replacing sleepers in the fire-damaged section north of Red Dam on 14 March 1998, in preparation for Classic Car Show the following day - John Stone (left), John Shaw, Kevin Clarke and Trevor Dennhardt.
Lindsay Richardson



FERNY GROVE

Brisbane Tramway Museum Society
PO Box 94, Ferny Hills, Queensland 4055

From John Lambert

Premier's Visit

On Saturday 23 May, the then Premier of Queensland, Mr Rob Borbidge visited the museum to launch the Heritage Tram and TAFE section of the Briztram project. This visit was one week into the four-week election campaign and the usual media scrum was in attendance along with a large number of Society members.

The evening television news however did not mention the museum at all, as all the press interviews at Ferny Grove and the subsequent reports dealt with the One Nation political party in the upcoming state election. The Sunday newspaper only mentioned the Premier's visit to the museum in brief (four lines) and then stated that the museum was located at Samford, which is 8 kilometres away from Ferny Grove!

Briztram

Following a state election in Queensland on 13 June, which saw a major shake up in Australian politics, the

previous Coalition Government was not returned at the ballot box and accordingly a new Labor Government now holds power in Queensland. Media reports during the election campaign indicated that if elected (as they subsequently were) the then Opposition would consider scrapping the Briztram project. In early July the new government put the Briztram project on 'hold'. The new Beattie Government, in consultation with the Brisbane City Council, is giving priority to the construction of several busways and the City/Valley bypass in the Brisbane area. The Briztram project has been suspended pending further discussions with the City Council and the community regarding the future role of a light rail system. As readers will understand, the Heritage Trams and TAFE are part of the overall Briztram project and the Society is awaiting fresh

The former Premier of Queensland, Mr Rob Borbidge is about to change the pole on dropcentre car 341 on 23 May 1998.

Ian Martin



Editor's Note: The events reported in the Brisbane Tramway Museum Society's news (above) have been overtaken by the announcement by the Premier of Queensland on 28 July that the Briztram project has been cancelled. See our Late News from Brisbane report on page 28.

discussions with the State Government and the Brisbane City Council.

Ferny Grove Site

On Friday 3 July, Project Services (a section of the State Government Works Department) completed the design work for the infrastructure for the new workshops at Ferny Grove. Included in this are items such as TAFE facilities, sewer lines, tram loading ramps, sealing of the museum driveway and providing a new car park, etc. This project for the improvements to the site at Ferny Grove is ready to go to tender and is now only awaiting official approval to proceed. However this will depend on the future of the Briztram project itself, as previously mentioned. Special thanks go to Bill Kingsley who assisted the Project Services staff with the design of various track sections. Additional thanks must go to John Lambert for the long hours and late nights he put into this project with meetings, discussions and fine-tuning of the design plans for the site improvements.

Workshops

Bevan Burnes, Jim Campbell, Nicholas Clark and Bob Deskins completed repairs to dropcentre 341 and

it was returned to traffic service in readiness for the Premier's visit to the Museum. Its place in the workshops building has been taken by Four-Motor 494 in readiness for the massive workshops clearout in the coming weeks. Saturday 4 July saw the start of the clearout with several large items including the Blitz Welding Truck being moved into the store building. Concurrent with this task, the old railway wagon near the store building was emptied of all the bus spares contained therein, which were then moved into the mobile training unit (bus) for further storage. The railway wagon is to be used to temporarily store equipment out of the workshops after which it is to be disposed of as scrap. The workshops are being cleaned out in preparation for demolition as mentioned in the last issue of Trolley Wire. Should the Briztram project not proceed, the museum will have a very clean and tidy workshop ready to commence repairs to Baby Dreadnought 99 and the restoration of further trams.

The media scrum surrounding the Premier at the museum on 23 May.
Ian Martin



BALLARAT

Ballarat Tramway Museum

PO Box 632, Ballarat, Victoria 3353

From Dave Macartney

The Ballarat Tramway Museum achieved accreditation under the program managed by the Victorian Division of Museums Australia during May. This followed an extensive series of inspections and written submissions, culminating in a formal announcement by Lorraine Elliott, MLA and Parliamentary Secretary to the Premier for the Arts. Only nine museums throughout the State received accreditation under the program, covering a wide range of activities. The onus is now on the Museum to maintain its standards of presentation and archival activity. The accreditation runs for a three-year period, with a report to be submitted annually. An analysis was received from the Accreditation Panel, detailing areas where improvements could be made. The next hurdle will be Rail Safety Accreditation, an even more time consuming project soon to be undertaken.

A grant of \$5000 has been received from the City of Ballarat to install a water main under Gillies Street in connection with providing fire-fighting capability at the depot. With Gillies Street due to be rebuilt during the coming months, it was felt to be an appropriate time to install the water main so that the rest of the equipment can be acquired and installed over a period of time.

Around the depot, the motor gremlins have stuck again, with No. 33 coming down with an armature failure early in May. This follows similar failures to No. 40 and No. 13 in recent years, and underlines the problems associated with old equipment, particularly operating in a street environment with the associated hazards of dust and puddles of water. It has been decided to send both of 33's armatures away for attention in an effort to get ahead of the problem. The defective motor ex No. 13 is almost ready to return, at which time it will be installed in No. 28. The motor from No. 40, which had been returned to the car, has now been removed again due to unsatisfactory performance. It is thought to have a winding installed incorrectly. Trying to assess the situation using a magnet revealed an interesting fact; controllers have a very strong magnetic field. Don't leave video tapes on controller tops!

Tramalan (UK) kits assembled by Darren Hutchesson, who also scratch-built Sebastopol-type cross-bench 21 and W3 car 661, are seen on the depot fan.

Darren Hutchesson



The rocker panels on No. 26 have been repainted in a stronger shade of yellow, and look most striking. Work continues at a measured pace on the refurbishment of No. 28 and the total rebuild of No. 12.

Some of the junior members took it upon themselves to prepare a model layout based on the Ballarat system for the Model Railway Exhibition organised by the Ballarat & District Model Railway Club over the Queens Birthday weekend. The decision was taken fourteen months beforehand and, in typical junior style, was discussed endlessly for many months, with the whole layout then having to be built from scratch in just six weeks. A budget of \$200 was provided and, remarkably, there was money left over at the finish. The layout is L shaped, measuring some two by three metres. The baseboards were scrounged from a failed restaurant project in a Tait suburban car, the plywood

was offcuts from the carbuilder's shop at the locomotive depot, the buildings were manufactured from cardboard obtained at no cost and so on. Only the track components and the perspex for the lake were purchased, and even some of that was donated.

The layout represents the Sturt Street, Drummond Street, Lake Wendouree area, and incorporates replicas of many well-known Ballarat buildings, such as the post office, fire station, hospital, banks, etc. The layout was the only one at the Exhibition based on a local prototype, and received much favourable comment. It is currently back at the depot in storage while a decision is made regarding the possibility of having it on some sort of permanent display, rather than just once a year. Meanwhile, the juniors are back to their usual laid-back ways, the sixteen-hour days being over for the time being.



Overall view of the L shaped model tramway which captures elements of the original street tram system. A 'small' Lake Wendouree (glassy smooth) with tram depot and Forest Street church to the left. Bifurcated Sturt Street with plantation, Ballarat Base Hospital, former fire station, ANZ Bank and Post Office. Trams operate clockwise around the lake, down Ripon Street, left into Sturt Street, left up Lydiard Street North and onto hidden trackage to re-emerge in Sturt Street. Only Ballarat trams were operated. Behind the layout were photos and signage about Ballarat's trams and the Ballarat Tramway Museum. Souvenir sales items traded well. Staff was in uniform. In this view Alastair Reither looks over to the depot to bring another car out 'for the evening peak'. Darren Hutchesson

BYLANDS

Tramway Museum Society of Victoria
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From Running Journal

Museum Works

We had a forklift at Bylands on 29 March to relocate a number of electric tram motors from the bus shed and the new tram shed to the old tram shed. At the same time, a replacement engine was positioned under bus 759 and the old engine relocated under cover. We thank Peter Fatchen of Kilmore for this work.

Repairs have been undertaken to the vehicle storage shed roof trusses following damage caused by high winds earlier this year. Fitting the final roof is now a matter of urgency.

The former Ballarat Jelbart road roller had a day out of the bus shed on 14 March. Doug Wiseman and his family members achieved this after many years of mechanical repairs and with Russell Jones at the controls. The roller has been out of the shed in recent years but minor faults were found that required attention.

The ongoing clean up of the site, mainly in the public areas, has now seen the removal of building materials from the western side of the kiosk building. Repacking materials on the inside of the east wall of the old shed to store more materials has also been completed, together with clearing of main walkways in the tram and bus sheds. The removal of bus 759 from in front of the caretaker's house has also improved the general site appearance. The depot fan area is the next area for attention with the removal of firewood and other materials.

Doug Prosser has been leading a group of members in tramcar maintenance and repairs. The immediate repair of the governor switch on car 427 late last year started the ball rolling. W3 car 667 had its first run under power on 12 April. Some work remains to be done on this car to return it to full traffic condition. Ballarat 36 has also been moving about several times this summer. The car had no problems except when negotiating some of Bylands' curves.

Graham Jordan has been replacing a number of sleepers down the main line around poles 22 and 23. This was a part of the line where we have never

installed sleepers since the railway closed and the track was regauged in the early 'seventies.

Bylands Tramway Accreditation

Russell Jones and his team have been putting together the necessary documentation for submission to the Ministry of Infrastructure. Some time in November all members will be asked to attend an information day or night to bring every one up to speed on all current new requirements for Bylands.

Cable Car 190

In May last year we were approached about a cable car trailer west of Geelong. On investigation we found former bogie trailer 190 in very good condition under a roof in a back garden of a property. Negotiations, which have taken nearly a year to complete, were entered into to purchase the car body. To gain access to the tram for a crane, and our truck and trailer, we have had to wait until this year to move.

With final negotiations to purchase the tram completed, the movement to Bylands was executed on 25 and 26 April. The removal of the protective roof that had been over the tram since 1936 was routine, and the trip to Bylands and unloading into the vehicle storage shed was surprisingly straight forward. We wish to thank the Davis and Curry families in Geelong for selling below what prospective local purchasers were offering and who were only going to dismantle the tram.

The tram is a sister to our car 192 in that it has been constructed from two six-window trailer cars, either horse or cable. What we have not established yet is whether one or both are former Stephenson cars. Our thanks are extended to all who assisted with the tram's recovery.



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