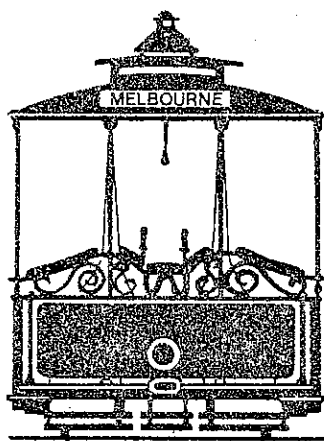
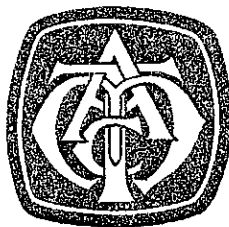


**PROCEEDINGS OF THE SIXTH  
CONFERENCE OF AUSTRALASIAN  
TRAMWAY MUSEUMS**



Melbourne, Australia July 24-27, 1982

EDITED BY Graeme Breydon



**Council Of Tramway Museums Of Australasia**

PROCEEDINGS OF THE CONFERENCE OF AUSTRALASIAN TRAMWAY MUSEUMS

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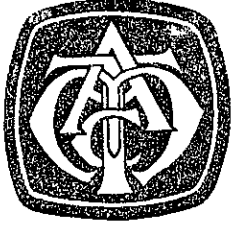
PROGRAMME AND CONTENTS

1:1

<u>Section</u>	<u>Description</u>	<u>Time</u>	<u>Location</u>
<u>ADMINISTRATION</u>			
1.1	Programme and contents		
1.2	Presidents address		
1.3	Convenors welcome		
1.4	Conference participants		
1.5	Venues		
1.6	Transport		
 <u>SATURDAY, JULY 24</u>			
	Registration, Opening Luncheon and opening announcements	Noon	Aust H
2.1	Keynote address	2.00 p.m.	C & L
	Mr. F.D. Snell Dip. E.E., M.I.E. Aust., F.C.I.T., - Chairman, Melbourne and Metropolitan Tramways Board.		
	Afternoon Tea (Bus departs C & L at 3.30 p.m. for Batman Ave.)	3.00 p.m.	C & L
2.2	Tramway Tour	4.00 p.m.	From Batman Ave. Terminus
	Evening Meal (own arrangements)	6.00 p.m.	-
2.3	Illustrated Reports and Demonstrations	8.00 p.m.	C & L
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3.1	COTMA Council Meeting	9.00 a.m.	C & L
	Morning Tea	10.45 a.m.	C & L
3.2	Workshop Discussions - Insurance - Publications	11.00 a.m.	C & L
3.3	Museum Inspection Tour (Refer tour notes for departure and meal arrangements)	Noon	Various

<u>Section</u>	<u>Description</u>	<u>Time</u>	<u>Location</u>
<u>MONDAY, JULY 26</u>			
4.1	M & MTB Preston Workshops (Please assemble at the administrative offices)	9.30 a.m.	Preston
	Lunch (own arrangements)	1.30 p.m.	
4.2	M & MTB Electrical Workshop	2.30 p.m.	Coburg
	Evening Free (You may wish to take this opportunity to inspect the trackwork in progress at Dawson Street Brunswick, on the West Coburg Routes 55 & 63)		
<u>TUESDAY, JULY 27</u>			
5.1	M & MTB "W" Car Running Shed (Please assemble at starters office - Sth. Melbourne Depot)	8.45 a.m.	S. Melb.
5.2	M & MTB Civil Branch Yard	10.00 a.m.	S. Melb.
5.3	M & MTB Driver Training School	11.30 a.m.	Hawthorn
5.4	Closing Luncheon	1. p.m.	Vic H

A guided inspection tour of the 4 tramway Museum Society vehicles stored at Malvern can be arranged in Tuesday afternoon if required. If you wish to visit these tramcars please indicate your interest to the convenors during the conference.



COUNCIL OF TRAMWAY MUSEUMS  
OF  
AUSTRALASIA

1:2

To Delegates,  
Sixth Australasian Tramway Museum Conference,  
Melbourne, 1982.

I should like to express a warm welcome to all delegates coming together for the Sixth Australasian Tramway Museum Conference.

Since our last meeting in Brisbane two years ago, there have been significant developments in most of our museums.

In Sydney, a new depot on a new site is becoming a reality at Loftus. At Ferny Grove, museum traffic operations have settled into a regular pattern after the opening ceremony at our last conference. Electric trams are now running at Bylands, and horsecars are operating at nearby Kilmore. Additions to the tram fleet have continued at Ballarat and Bylands, while a new depot has been erected at St. Kilda.

Formal applications for membership have been received from Haddon and Bendigo, and also from the Perth Electric Tramway Society.

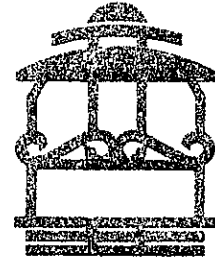
In New Zealand, new depot facilities have been developed at Queen Elizabeth Park in Wellington, while a magnificent restoration project in Boon car 152 has been achieved in Christchurch. A new electric tramway has been completed from Western Springs to the Auckland Zoo.

I should like to express appreciation to our hosts, the Tramway Museum Society of Victoria, for the Conference programme they have arranged, and for the assistance given with it by officers of the Melbourne and Metropolitan Tramways Board. I particularly regret that a change in date of a regular meeting which I must professionally attend has precluded me from being with you for the Conference.

I wish you well in your deliberations.

*John C. Radcliffe*  
(Dr. John C. Radcliffe)  
CHAIRMAN

July 1 1982



The  
Tramway  
Museum  
Society  
of Victoria  
Ltd.

A VOLUNTARY NON-PROFIT SOCIETY PRESERVING VICTORIA'S TRAMWAY HERITAGE

Museum Premises: Union Lane, BYLANDS, Victoria, 3600.

PLEASE REPLY TO:  
Box 4916, Mail Exchange,  
MELBOURNE, Victoria, 3001.

Conference Delegates, wives and friends,

The Tramway Museum Society of Victoria Ltd. is delegated to be your host for the 1982 C.O.T.M.A. Conference in Melbourne. Taking advantage of the strong, healthy tramway system still flourishing in Melbourne, the theme of the Conference will be "Learning from the Professionals". In contrast to past conferences the number of meeting and workshop sessions has been kept to a minimum. Instead we have endeavoured to provide the opportunities for delegates to be able to learn from professional tramwaymen as well as from each other. To enable you to maximise these experiences we have provided these proceedings in advance so that you can familiarise yourselves with the details of the facilities before each visit.

Past conferences have involved considerable administrative effort. We ask that you assist us in our work by paying careful attention to the programme information provided. In particular we draw your attention to those matters:

- (a) the limited access to our principal venue, the Coopers & Lybrand offices, requiring prompt arrival for each session, and
- (b) the requirement for delegates to make their own way to Preston and South Melbourne for the commencement of the weekday sessions;
- (c) the importance of conducting yourself safely and in such a way as to minimise any disruption to work while on M&MTB premises.

A large number of people have contributed to the 1982 Conference and on your behalf we offer our grateful thanks to the officers, members and staff of:

- The Melbourne & Metropolitan Tramways Board
- The Tramway Museum Society of Victoria Ltd.
- Coopers & Lybrand
- The Victoria and Australia Hotels; and
- Shire of Kilmore

We trust that you will have an enjoyable and fruitful time in Melbourne. Please do not hesitate to approach the organising committee with any queries or requests.

Clive Mottram  
Brian Weedon  
Graeme Breydon  
CONVENORS

## COTMA 1982 CONFERENCE DELEGATES - ALPHABETICAL LISTING

<u>Name</u>	<u>Org.</u>
Andrews, Chris	AETM
Atherton, Tim	BTMS
Atkins, Roderick	TMSV
Austin, Philip	WTM
Barbour, Barry	TMSV
Bounds, Lindsay	HTW
Bradley, Allan	BTPS
Breydon, Graeme	TMSV
Burden, Peter	BTMS
Cable-Scott, William	BTPS
Campbell, Donald	SPER
Carter, Brendan	THS
Chipper, Kim	PETS
Cody, T.	SPER
Coop, Craig	TMSV
Day, Larry	THS
Gilbert, Richard	BTPS
Gilmartin, Anthony	BTMS
Gipps, Noel	TMSV
Griffin, Anthony	SPER
Hall, Andrew	BTPS
Hallen, Peter	SPER
Halling, Anthony "Jeep"	MOTAT
Haugh, Hamish	TMSV
Hesse, Ken	BT
Hinman, David	THS
Hudson, John	BTMS
Hyde, Peter,	BTMS
Ireland, Arthur	TMSV
Jones, Richard	SPER
Jordon, Graham	BTPS
Kahn, Peter	SPER
Kerr, Michael	THS
Kings, Keith	TMSV
Kingsley, William	BTPS
Lea, S.J.	THS
Lerk, James	BT
Martin, Ian	BTMS
McAulay, Malcolm	SPER
Mison, Ian	MOTAT
Mottram, Clive	TMSV
Ollerenshaw, Barry	WTM
Parkin, Donald	SPER
Pennack, John	AETM
Rawlings, David	SPER
Richardson, Lindsay	PETS
Sanders, Murray	THS
Sell, Anthony	TMSV
Seymour, Ian	AETM
Shand, Raymond	WTM

<u>Name</u>	<u>Org.</u>
Smith, Anthony,	HTW
Snell, F. Dudley	M&MTB
Stodden, Keith	TMSV
Thomson, Robert	BTMS
Tooke, Craig	TMSV
Ward, Allan	BTMS
Webb, David	TMSV
Weedon, Brian	TMSV
Williams, Newton	TMSV
Withers, John	HTW



COTMA 1982 CONFERENCE DELEGATES - BY ORGANISATION

<u>Org.</u>	<u>Name</u>
AETM	Andrews, Chris Pennack, John Seymour, Ian
BT	Hesse, Ken Lerk, James
BTMS	Atherton, Tim Burden, Peter Gilmartin, Anthony Hudson, John Hyde, Peter Martin, Ian Thomson, Robert Ward, Allan
BTPS	Bradley, Allan Cable-Scott, William Gilbert, Richard Hall, Andrew Jordon, Graham Kingsley, William
HTW	Bounds, Lindsay Smith, Anthony Withers, John
M&MTB MOTAT	Snell, F. Dudley Halling, Anthony "Jeep" Mison, Ian
PETS	Chipper, Kim Richardson, Lindsay
SPER	Campbell, Donald Cody, T. Griffin, Anthony Hallen, Peter Jones, Richard Kahn, Peter McAulay, Malcolm Parkin, Donald Rawlings, David
THS	Carter, Brendan Day, Larry Hinman, David Kerr, Michael Lea, S.J. Sanders, Murray
TMSV	Atkins, Roderick Barbour, Barry Breydon, Graeme Coop, Craig Gipps, Niel Haugh, Hamish Ireland, Arthur Kings, Keith

Org.

Name

---

TMSV (cont)

Mottram, Clive

Sell, Anthony

Stodden, Keith

Tooke, Craig

Webb, David

Weedon, Brian

Williams, Newton

WTM

Austin, Philip

Ollerenshaw, Barry

Shand, Raymond

## VENUES

1:5

<u>Abrev.</u>	<u>Full Address</u>
"Aust H"	Australia Hotel, 226 Collins Street, Melbourne.
"C & L"	Coopers & Lybrand, 2nd Floor, Dalgety House, 461 Bourke Street, Melbourne (note special arrangements for entry)
"Batman Ave"	Corner of Batman Ave & Swanston Streets, Melbourne (near Princes Bridge)
"Preston"	M&MTB Workshops, Miller Street, Preston
"Coburg"	M&MTB Electrical Workshops, Coburg.
"Hawthorn"	M&MTB Driver Training School, Hawthorn.
"S. Melb"	M&MTB South Melbourne Depot, Cnr. Kingsway and Dorcas Street, South Melbourne.
"Vic H"	Victoria Hotel, 215 Little Collins Street, Melbourne.

### Access to C & L Offices

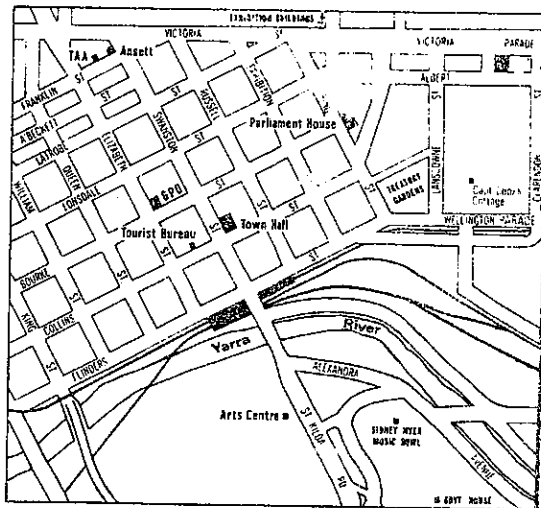
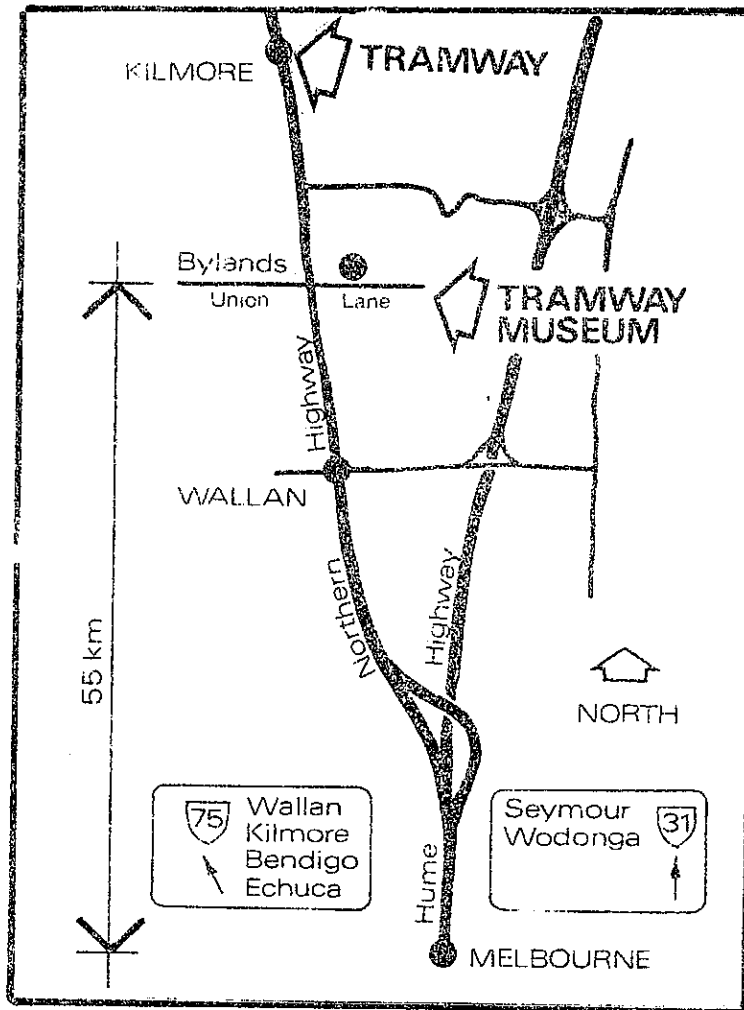
The majority of the indoor events will be held in the Coopers & Lybrand Professional Education Centre, 2nd Floor, Dalgety House, 461 Bourke St., Melbourne.

Dalgety house is locked on the weekends and consequently we will be escorting participants into and out of the building via the after-hours entrance which is located in the laneway immediately east of the building. If you anticipate arriving late for a session please notify the organisers who will arrange to meet you at this door.

### Travel to Weekday Venues

Although bus transport will be provided between locations on the two weekdays delegates are requested to make their own transport arrangements from the city on both mornings:

- (a) West Preston (Routes 10 and 11 from Collins Street) trams pass the Preston workshops where the first session on Monday will be held;
- (b) South Melbourne Beach (Routes 1 and 2 from Swanston Street) pass near the South Melbourne Depot for the first Tuesday session.

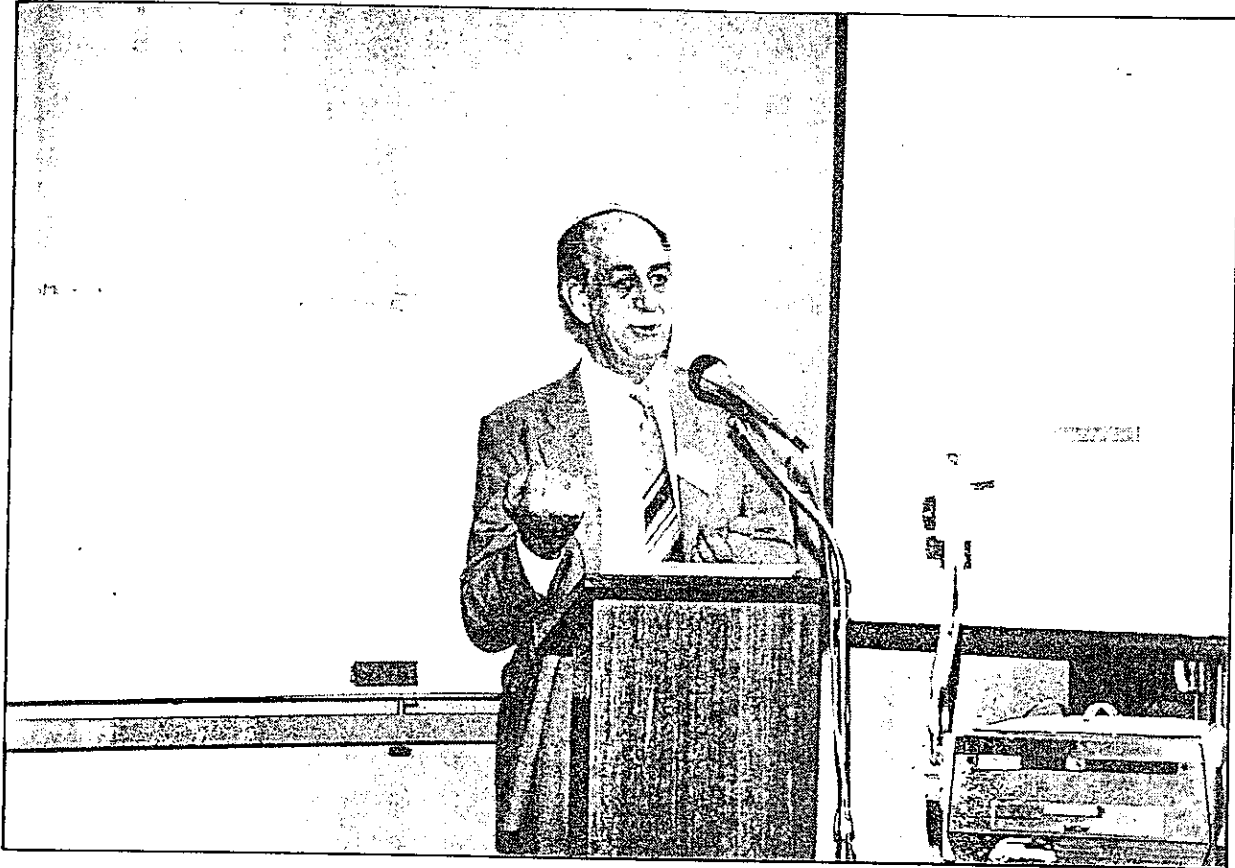


TRANSPORT

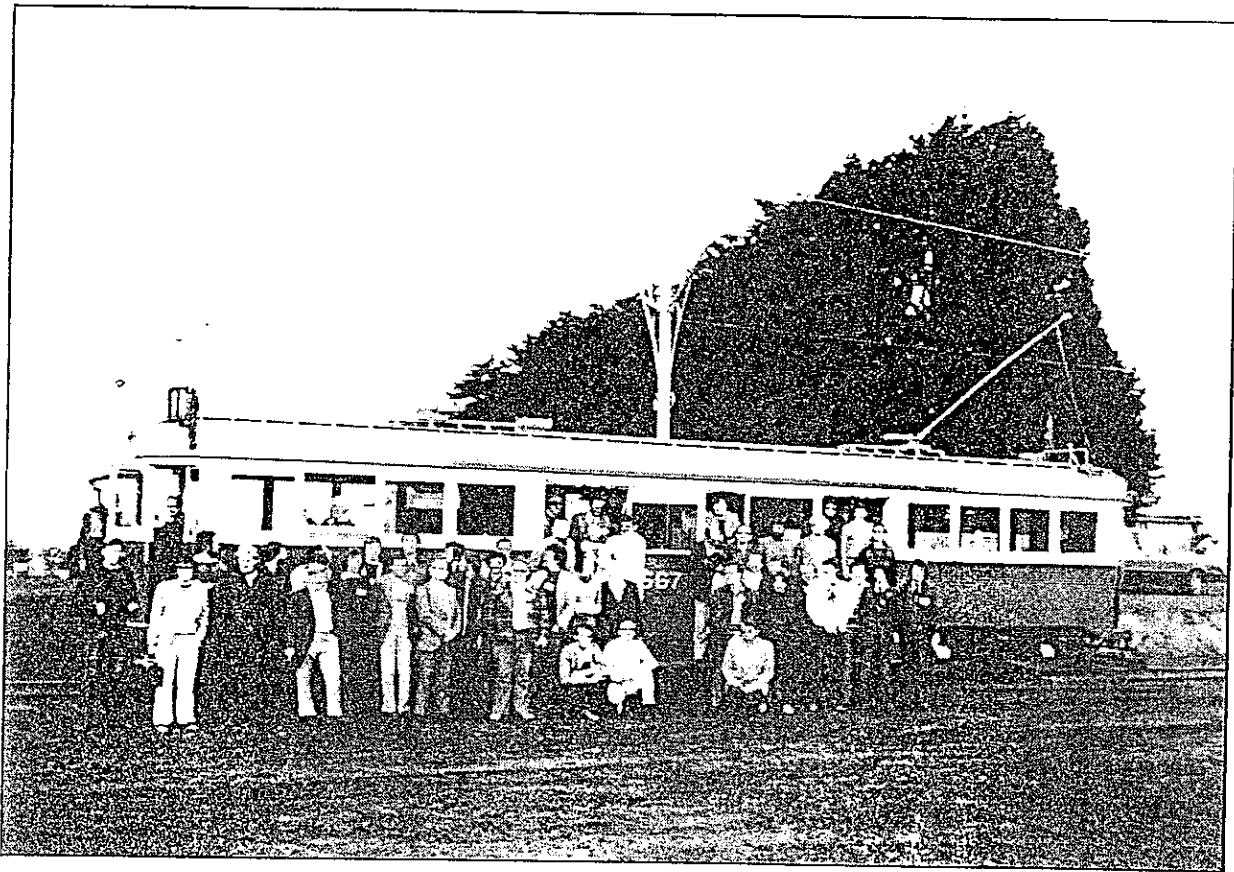
1:6

The majority of the inter-venue journeys during the conference will be made in the TMSV's preserved M&MTB AEC Regal III bus number 537.

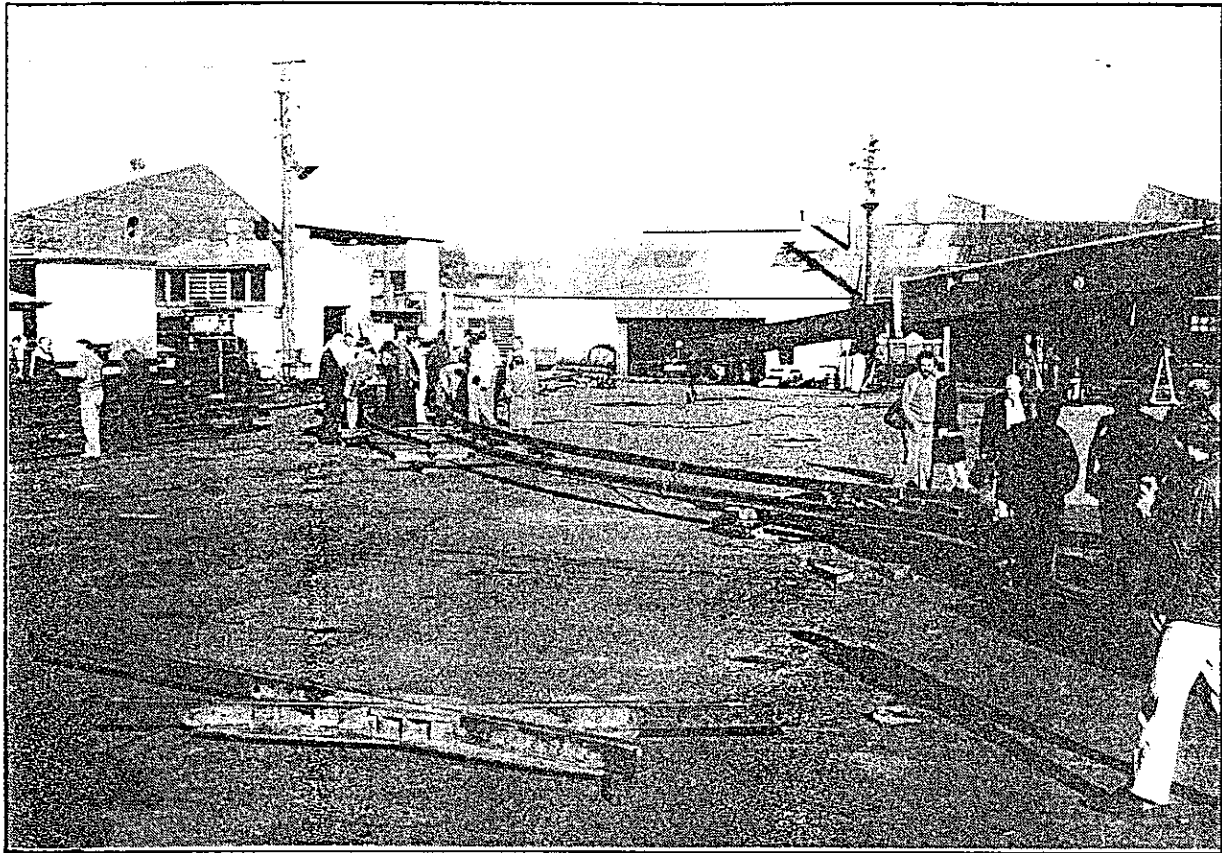
It was in September 1978 that the Tramway Museum Society of Victoria joined the ranks of the other capital city tramway museums in Australia by adding a motorbus to its rolling stock roster. No. 564 had bodywork by the Melbourne firm of Martin & King on an A.E.C. Mk 111 chassis, and was one of 135 M. & M. T. B. buses on this type of chassis. Late in 1981 we had the opportunity to purchase sister vehicle no. 537 which had been partly restored. Consequently no. 564 was sold to help cover the cost of 537. No. 537 entered service on 27th May, 1953 and was sold for preservation on 7th September, 1978 to Haddon Tramway Workshops. It subsequently passed to Messrs. A. Cook and T. Oakley, then to F. Coulson who sold it to the Society last October. No. 537 seats 41 passengers and is rated as a crush load of 80. It has a wheel base of 21'6", an overall length of 33'8", is 8'2½" wide and 9'9" high. Tare is 8 tons 15 cwt.



The Opening: Mr. F.D. Snell, Chairman of the Melbourne and Metropolitan Tramways Board, presenting the keynote address.



Group and W 667 at TMSV's Bylands Museum.



Inspection visit to South Melbourne Per Way Yard.



The Closing: from left, Dave Rawlings: COTMA Executive Officer. Keith Kings:  
Host Society Chairman, Hamish Haugh, TMSV; Ian Mison, MoTAT;  
David Hinman, THS; and Tim Atherton, BTMS.



KEYNOTE ADDRESS

2:1

The keynote address will be delivered by the Chairman of the Melbourne & Metropolitan Tramways Board Mr. F.D. Snell, Dip.E.E., M.I.E. Aust, F.C.I.T. His public and private life have given him exposure to many facets of Victoria's Tramways and some of the problems which the progressional transport operators have in common with the Museum groups.

Frederick Dudley Snell (Dudley) was born in Eaglehawk in 1924 and was educated at Eaglehawk State School and later at the Bendigo School of Mines where he qualified as an electrical engineer. During his time in this area he saw the transfer of the local tramway operations from the private Electric Supply Company of Victoria Ltd. to the State Electricity Commission of Victoria as part of the States scheme to establish an integrated grid.

He joined the State Electricity Commission in Bendigo in 1940 and later completed a cadetship with that organisation before finally leaving the SEC in 1953. This period of his career was interrupted by war service with the R.A.A.F., spent mainly in the New Guinea area and it was shortly after, in 1948 that he married Joan Buckie. They subsequently had two daughters.

In 1953 Dudley joined the Melbourne & Metropolitan Tramways Board initially as an electrical engineer and subsequently in the position of Methods Engineer. His appointment as Chief Engineer occurred in 1969 and the following year he became Deputy Chairman of the Board.

His appointment as Chairman occurred in 1976 for a five year term and was subsequently re-appointed for a further term commencing in 1981.



LEARNING FROM THE PROFESSIONALS

by

F.D. Snell

It is often difficult to adapt the subject of an address to the title that is chosen for you by others.

I could be excused for responding to this title by saying that, in Transport, all of our passengers see themselves as the experts and the Transport Administrators as amateurs. This is probably true of most of the Public Utilities and - according to my friends in Industry - also applies to criticisms of Company activities at annual meetings.

We are moving to the position where every action by a public body is reviewed by the instant expert in the media in critical terms. It appears that good news is no longer acceptable because it does not sell papers or media advertising. It is hardly surprising that we professionals go home tired and despondent.

Perhaps the classic example of this is the "Z" class tram.

I need to take a different approach in discussing this subject before an audience comprised of many who know more of the history of trams and their types than I do - but you will all appreciate that we in Melbourne are operating trams that would be revered as museum pieces in most other places in the world.

The trams that we built in 1956 were built to 1935 or earlier technology. The motors in these trams are axle mounted low speed motors of the same general type as those fitted to 1920 vintage vehicles.

We did not learn from the PCC car that we imported in the 1940's - we even spoilt the one that we had by adapting the controls to simulate the old hand controllers that we had used for years - and did not prepare ourselves for the future.

When, in 1974, our pleas for new vehicles were finally accepted we were faced with the sort of technological gap that could be equated with moving from a "T" model Ford to the latest motor vehicle in one step.

I am not suggesting that the "Z" or the "Z3" are perfect - sure we made mistakes - but the criticism that has been levelled by the media is out of all proportion with the real complaints that we receive.

It is all very well to be nostalgic about the "W2" tram but who in their right minds would suggest that we should continue to operate wooden bodied vehicles with limited acceleration and braking capacity - without doors or safety measures for boarding and alighting - in today's traffic situation. This disregards the labour intensive maintenance procedures that are necessary and the virtual impossibility for introducing a modern fare system.

It is interesting to analyse the complaints that we receive. Almost inevitably they relate to the route on which the vehicles are most recently introduced or to visitors to town who do not understand the operating systems.

There are objections to the conductors sitting while passengers may need to stand. One complaint that we investigated indicated that the real basis of the complaint was the fact that a group of public servants had been using tickets - sold to their Authority - over and over again on the old trams but were forced to surrender them on the "Z" trams. Fare evasion on "Z" cars occurs at a level on 25% of the level on "W" class trams.

The "Z3" tram is significantly better on all counts than the "Z1" and "Z2" trams and most complaints are addressed to the "Z1" vehicles but both types are lumped together by the ill informed. There is still talk of Swedish trams when the body on all series is an Australian design and of course the "Z3" series have German components.

You did not come here today to hear about my troubles but I think that it is important that I get my real message across. Melbourne cannot get the high quality street transport system that it should have if we retain our outdated vehicles longer than is absolutely necessary. They are not capable of the high speed comfortable operation that is necessary to compete with other modes.

We have been frustrated for years in being unable to achieve separation from other traffic and priority at traffic signals. These features have been promised in the Government's Transport Policy and we must be able to take advantage of them by operating vehicles that have the performance to match the new operating requirements.

Beyond that there is the opportunity to enter into a true light rail mode by operating on new routes or possible lightly loaded routes now operating in the heavy rail mode. Articulated vehicles will handle the loading on many short routes.

Given new fare structures with automatic ticketing procedures there is the opportunity to increase productivity on the system so that more services will be available.

We cannot do that effectively with the old vehicles. This message is hard to get across while we retain this love of old trams.

I do not mean to criticise your interest in the rolling stock of the past but I believe we need to replace them with modern vehicles if the transport system is to prosper.

The U.I.T.P. Management Committee at its meeting in Stuttgart in 1977 decided that the International Metropolitan Railways Commission did not truly represent the interests of the light railway mode and set up an International Commission for Light Rail, to study the specific requirements of that mode. The working parties - mainly European - are already making progress with their recommendation and the Commission has presented papers at the Congresses in Helsinki and Dublin.

Light rail is more likely to be the answer to many of the transport problems of big cities than the off shoots of aerospace technology that are developed and promoted from time to time.

If you still want the advice of the professional after this digression of mine from the subject that you gave me, I have a few thoughts to pass on -

1. Do not treat your enterprise as a game - be deadly serious about it and treat it as a carefully controlled business. If you don't, it will not achieve your aims.
2. Think about your aims and document them so that you can refer to them because someone is sure to put interesting proposals to you. Make sure that - no matter how attractive the proposal is - it fits in with your organisation's objectives. If it doesn't, reject it or seriously debate whether the original aims were correct.
3. Make sure that any equipment that you operate is in full working condition. Don't take short cuts.
4. Be very specific about your acquisition list. Don't collect junk just because it is old - it probably was always junk - because the cost of storing and restoring junk will affect your capacity to accept the really valuable equipment that will become available over the next few years.
5. Have a collective opinion on transport matters but take care that the opinion is developed after careful consideration of the issues and that it is not just a nostalgic reaction to retain what exists.

Thank you for the invitation to speak. I hope that your Conference is the success that you deserve.

The tramway tour, using L class tram No. 104, is intended to provide an opportunity to inspect a "Z" class running shed as a contrast to the tour of a typical "W" class running shed scheduled for the last day of the conference.

The tour will depart the city at 4.00 p.m. from the former Hawthorn Tramways Trust terminus at Batman Avenue and Swanston Street, and proceed along Batman Avenue and Swan Street to the Yarra Crossing at Hawthorn. This route is significant as being one of the few electric services to penetrate the city fringe area earlier in the century. Most other major access routes had been occupied by the cable tramway system some two decades prior. After crossing the river we will pass the former HTT depot in Wallen Road before continuing to Camberwell Depot for a brief inspection before returning to the city.

L Class Tram No. 104

Designed by the Prahran and Malvern Tramways Trust, the six L class tramcars have long been a notable although small portion of the Melbourne tram fleet. No. 104 entered service on 3rd June 1921 and was transferred from Malvern Depot to the then quite new Glenhuntly Depot on 21st February 1928. It ran on the routes serviced by this Shed until 2nd June 1969 when it went to Brunswick Depot as a spare car. It subsequently moved to South Melbourne Depot and was stored in May, 1980.

Originally the car had rounded canopy ends with roof-mounted destination boxes and other "P. & M." features. Standard destination boxes were cut in (probably about 1926) and route number boxes fitted in 1929 (but the curtains were not added until 1934). Emergency Exit Doors were cut into the Motorman's Bulkheads in 1927 and extra side doors fitted to the cabins in 1938. Early in 1946 the drop-centre floor level was raised by 4" while the bolsters were altered and 28" diameter wheels fitted in 1950. The shaped and patterned wooden saloon seats were removed in 1959 and replaced with upholstery, and the central "vent" section of the ceiling was sprayed with "Colorflek" in 1968. The interior advertisement panels on No. 104 have been retained in varnished and lined condition as a tribute to a former era.

June and July, 1981 unexpectedly saw major filming work taking place in Melbourne and its suburbs and no. 104 (and sister car 106) became "stars". For the event, set in Melbourne in the mid and late 1920's, these two trams were repainted chocolate instead of green, resulting in a decision by the Board to retain them for other future special events instead of disposing of them together with the other four cars of this class. During most of the summer of 1981-82 one or both of these chocolate cars ran extra trips from Elizabeth Street terminus to the Zoo on Sundays, to cater for a remarkable upsurge of passengers on the several days when the Victorian Government decreed that no fares be charged on public transport in Melbourne.

Introduction

The illustrated reports and demonstration segment of the conference comprises 3 main segments spread over the two weekend evenings and Monday:

- (a) Delegates Reports
- (b) Computerised Membership System Demonstration
- (c) Historical Films and Slides

Delegates Reports

Conference delegates have been requested to prepare illustrated reports summarising the progress of each museum since the last COTMA conference two years previously. It is not proposed that summaries of these presentations be included in the conference papers as the principal events are reported in "Tramway Topics" and "Trolley Wire".

Computerised Membership System

Details of this demonstration are set out in the following paper.

Historical Films and Slides

Although Melbourne still operates a thriving electric tramway network many of the smaller, largely self-contained, services have vanished. To provide an insight into some of these aspects a number of films will be screened throughout the conference. Principal topics will be:

- The Melbourne Cable Tram System
- All-night Tram Services
- The Footscray Routes, and
- The VR Tramways at Elwood and Sandringham.

The cable film to be screened during the Preston worksnops visit, is from the M & MTB collection. Other items were filmed by K.S. Kings and will be shown following dinner on the Sunday.



Introduction

Perhaps the title "Computers in Museums" conjours up visions of the Burroughs Atlas missile control computer in the Smithsonian but I wish to address their use as administrative aids rather than exhibits.

Already several voluntary museum groups make use of borrowed computer facilities and one of the larger organisations, the Emerald Tourist Railway Board operator of Victoria's famous Puffing Billy, is in the process of acquiring an in-house machine for an anticipated expenditure of about \$15,000. One microcomputer now on the market can be purchased for less than \$5,000 including typewriter/printer and programs for such functions as word processing, mailing list processing and budgetting. When compared with the outlay presently made by many Societies for major items of office equipment such as typewriters, addressing machines, etc. the investment is not unrealistic, especially for the larger "composite" groups (such as MOTAT).

What can they do?

Almost anything - at a cost, but to perform a task economically it usually means buying a "software package". A software package is a complete suite of application programs designed to perform some common function (such as maintaining an accounting general ledger) and available "off-the-shelf" rather than having been written especially for the organisation concerned using a conventional programming language. Packages provide the benefits of mass production (with costs often in the low hundreds rather than the tens of thousands) but often still require some tailoring to suit each particular user.

Some of the more common applications, which may be of interest to museum groups, include:-

- (a) Membership/mailing list maintenance
- (b) Word Processing
- (c) Basic accounting
- (d) Archival indexing/cataloguing
- (e) Budgetting
- (f) Marketing/Revenue statistics

Membership/Mailing List Maintenance

This application will be demonstrated to the delegates. It is presently being implemented for the TMSV. The particular facility use is a general purpose Data Management System called "Visifile" but many other packages perform similar functions. Besides producing mailing labels (either in postcode sequence or any other desired order) of the complete membership file this system can

- (a) produce the same, or summary, information on a printed report in any cross-reference sequence desired, such as;
  - (i) surname, (iv) postcode (including state),
  - (ii) membership no., (v) others such as below
  - (iii) renewal date,

- (b) Include on the lists or labels additional information such as occupations, society qualifications (eg board member, trained driver), telephone numbers, etc.
- (c) Produce labels or listings of any part of the full list for special purposes (eg. qualified safeworking staff due for re-testing), often even if the particular need was not recognised when the system was established.

### Word Processing

Word processing facilities greatly improve productivity of trained typists through error correcting routines, ability to insert "boilerplate" paragraphs into letters, right margin justification, and even routines which will review the work for spelling errors! Just imagine the productivity gains than can be made by two-fingered volunteers trying to produce "perfect" masters for magazines, etc! In combination with mailing list software it can also produce personalised form letters. The "computer-printout" problem can easily be overcome by connecting the computer to a conventional electronic typewriter which is often cheaper (although slower) than conventional computer printers.

### Basic Accounting

The Emerald Tourist Railway Board runs a sizable business; 17 paid staff, 300,000 passengers per year, and gross revenues approaching \$400,000 per annum. Its major administrative problem is maintaining its basic accounting records, chiefly the general ledger and monthly reporting. The full-time accountant and assistant just do not have any spare time to provide the detailed reporting desired by the volunteer branch managers. Their answer is to acquire a package designed for a commercial business, and after all that's what we are all running - a business not a hobby! Business packages range from complex with 5-digit account numbers and elaborate forms (for an ETRB sized operation) down to something for a non-expert treasurer working at nights pounding on an adding machine for a group one-tenth of the size. One word of warning though - beware of some American packages that don't suit Australian conditions.

### Archival indexing/cataloguing

The same sort of data management systems suggested for mailing list use can also be applied to other museum functions, especially those where the alternative would be some sort of register or card index.

For example:

- indexing of society periodicals,
- cataloguing of library collections,
- cataloguing of archival materials (with cross reference by operator, city, builder, date, etc),
- listing of spare parts
- recording of sponsors and donors.

### Budgetting

Not only budgetting but also checking of ticket journals and many other calculation/valuation exercised can be performed with "spreadsheet" packages such as Visicalc or Supercalc. These packages save the enormous re-calculation effort required in "What-if" type processes where changing of one or two figures on a worksheet requires extensive re-working of the rest of the numbers in a budget. Your treasurer will love this one.



### Marketing/Revenue Statistics

Museums are unlikely to find applications to suit their needs in these areas but with general purpose packages to build data files (eg: Visifile), calculate results (eg: Visicalc), graph the answers (eg: Visiplot) and prepare reports and letters (Mailmerge and Wordstar) can be used as the basis for such systems. At Puffing Billy the statistics officer already uses his home computer to produce the monthly marketing reports.

### But What Sort of Equipment?

The equipment obviously must be inexpensive, accessible, likely to remain on the market, and use languages and facilities which are fairly standard. To me that restricts the smaller volunteer based organisation to

- (a) Tandy
- (b) Apple, and
- (c) Some of the more common "CP/M" based systems.

For the larger organisation (Spending \$15,000 rather than \$5,000) the choice is somewhat broader but it should still look for features such as an industry - standard operating system (CP/M or Unix) and programming language (Basic or Cobol) if it expects the computer trained volunteers in its ranks to help establish and maintain the systems.

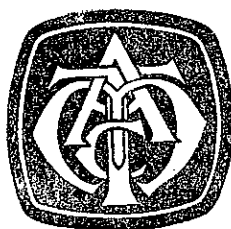
### Acquisition and Operation

If I have aroused your interest don't go to your local computer shop for a demonstration or you will end up being told that their particular product is just what you want. Of course they will not have bothered to ask what you want to do with it or anything about your organisation and its business. Instead first search your membership list for two members with computer experience. Why two? Well, computer buffs like most other specialists have their own favourite hobby horses (their own favourite hobby horses and also tend to be so specialised that they are not familiar with anything outside their own super-speciality). Two people should counterbalance each other and provide some continuity to ensure that you don't end up with an expensive bit of gear that nobody in the society knows how to use. Second task is to work with your specialists to develop a statement of requirements (Why you want a computer and what you want it to do.). Only then should you start talking to salesmen and measuring their products against your list. Your advisors will guide you through the subsequent stages.

### Conclusion

Members of museums are used to looking into the past. For the benefit of your organisation I am asking you to look into the future, but not the distant future because these functions I am discussing and demonstrating are just around the corner.

FIFTH REPORT  
OF THE  
COUNCIL OF TRAMWAY MUSEUMS OF AUSTRALASIA



Sixth Australasian Tramway Museum Conference, Melbourne

July 25 1982

Council of Tramway Museums of Australasia

Chairman: Dr. John C. Radcliffe  
Executive Officer: Mr. K.S. Kings

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Member Organisations as at March 31 1982:

Australian Electric Transport Museum (South Australia) Incorporated  
Box 2012, G.P.O., Adelaide, South Australia, 5001  
(Operating site: St. Kilda Road, St. Kilda, South Australia)

Ballarat Tramway Preservation Society  
Box 632, Ballarat, Victoria, 3350  
(Operating site: Wendouree Parade, Ballarat, Victoria)

Brisbane Tramway Museum Society  
2 McGinn Road, Ferny Grove, Brisbane, Queensland, 4055

Museum of Transport and Technology (Incorporated)  
Great North Road, Western Springs, Auckland 2, New Zealand

South Pacific Electric Railway Cooperative Society Limited  
Box 103, G.P.O., Sydney, New South Wales, 2001  
(Operating site: Princes Highway, Loftus, New South Wales)

Steam Tramway and Railway Preservation (Coop) Society Limited  
Box 108, Kogarah, New South Wales, 2217  
(Operating site: Parramatta Park, Parramatta, New South Wales)

Tramway Historical Society Incorporated,  
Box 1126, Christchurch, New Zealand  
(Operating site: Ferrymead Historic Park, Bridle Path Road  
Heathcote, New Zealand)

Tramway Museum Society of Victoria Limited,  
Box 4916, Mail Exchange, Melbourne, Victoria 3001  
(Operating site: Union Lane, Bylands, Victoria)

Tasmanian Transport Museum Society Incorporated  
Box 867J, G.P.O., Hobart, Tasmania, 7001  
(Operating site: Anfield Street, Glenorchy, Tasmania)

Wellington Tramway Museum Incorporated  
Box 2612, Wellington, New Zealand  
(Operating site: Queen Elizabeth Park, McKay's Crossing,  
Paekakariki, New Zealand)

Council Address:- 135 Through Road, Burwood, Victoria 3125

## CHAIRMAN'S REPORT

It is a pleasure to present to you the fifth report of the Council of Tramway Museums of Australasia at our Sixth Australasian Tramway Museum Conference. I very much regret that I am unable to be present in person to lay this report before you.

### Previous meeting

The previous meeting of the Council of Tramway Museums of Australasia was held in Brisbane, Queensland on June 17 1980.

### Membership

Membership currently stands at ten organisations, with three other groups being serviced. During the period under review, the West Australian Transport Museum relinquished its membership as a consequence of its tramway preservation activities being separated off for management by a new body, the Perth Electric Tramway Society. This body has since applied for COTMA membership. The Council also has before it two other formal applications for membership - those from Haddon Tramway Workshops and the Tramways Committee of the Bendigo Trust. All of these applicant groups have been serviced by COTMA over the past two years.

### Communications

Eight memoranda were circulated in the two year period - the same number as in the previous period. The majority of these memoranda were circulated in 1981, having to do with a range of cars and equipment then becoming-available from the Melbourne and Metropolitan Tramways Board. The physical action following these memoranda largely took place in the first six months of 1982.

COTMA Office-bearers have continued to visit constituent museums over the past two years. It proved possible for calls to be made to museum sites at Brisbane, Ballarat, Haddon, Loftus Bylands, Bendigo, Glenorchy, St. Kilda, Perth and Western Springs.

### Equipment

A wide variety of equipment has been shared between museums in the past two years, the majority of it coming from the M&MTB. We are most grateful to the Board for its cooperation in these matters. W-2 class tramcars 220, 331 and 472 have been supplied complete to TMSV while 407 went to Haddon. W-3 class 657 was acquired complete by the TMSV for parts, while one set of trucks from each of the two remaining cars of this class went to SPER and THS. Bodies of VR 52 (701), and L class 101 and 102 together with PCC 980 were acquired by TMSV, though trucks were not supplied complete. L class 103 and 105 were acquired by Haddon. A complete W-2 car was presented to MOTAT by the Victorian Government, while a newly formed body, the Newcastle Tramway Museum, and which is not associated with COTMA, is known to have purchased W-2 class car 247.

Complete trucks from W-2 cars were reserved for TMSV, Haddon and AETM and also for the South Australian State Transport Authority. Brake shoes were provided to Haddon, SPER, TTMS, THS, AETM, Bendigo and TMSV. Trolleybases were made available to AETM, TMSV, Haddon and STA, and numerous lesser parts were also provided.

The W&MTB continued its very helpful policy of making redundant tower waggons available to COTMA museums when in late 1981, its tower waggon No. 15 was acquired by AETM. This was the fourth COTMA museum to benefit from the opportunity of purchasing such specialised equipment.

Bundy clocks which have been replaced by the STA have been made available for TMSV, STRPS and AETM. Two H type cars are to be shortly transferred on long term loan to the AETM at St. Kilda.

The Wellington City Council has offered to make surplus trolley-buses available to COTMA members, while MOTAT is holding a considerable quantity of surplus Auckland trolleybus equipment.

#### Transport Heritage Developments

The Victorian Government has continued to sponsor its successful Australia Day transport cavalcades, involving the use of trams provided by TMSV, BTPS and the Bendigo Trust as well as the historical cars of the W&MTB.

In Brisbane, the BTMS contributed several vehicles to a Transport Week celebration in November 1981. In Sydney, SPER car 1111 has participated in UTA-sponsored historical displays at Manly and the Sydney Snowgrounds.

Cooperation is continuing to develop between transport authorities and COTMA museums. In Sydney, the State Rail Authority has agreed to rebuild former Sydney trolleybus 19 for SPER and former Camden-Yass tramcar KA 778 for STRPS at its Chullora apprentice college. In Adelaide, the STA has initiated several heritage projects including some with the AETM. The body of F-1 type car 264 was salvaged in a joint STA/AETM project for ultimate restoration. The storage of the two H type cars at St. Kilda has mutual advantages for the STA and AETM, and the Authority is contributing a track connection from the AETM's new depot to the St. Kilda tramway in order to make this transfer possible.

In 1981, the Commonwealth Department of Home Affairs and Environment conducted an enquiry into Cultural Property, specifically examining the adequacy of existing controls on the export of movable objects of historic merit. Eleven formerly Australian tramcars are known to have been exported over the last twenty years, including at least two of some recognised historic merit (Victor Harbor horsecar 6, Ballarat 30). COTMA made a submission to the enquiry on behalf of its Australian affiliates.

An approach to the Australia - New Zealand Foundation for support in operating COTMA Conferences was unsuccessful.

#### Operations

Museum tramways have continued to operate in Adelaide, Ballarat, Bendigo, Brisbane, Sydney (2), Auckland, Christchurch and Wellington. Horsecar operation was recently introduced at Kilmore, Victoria, and this has been followed by the recent connection of power and initial trial operation at the TMSV site at Bylands.

There have been progressive developments at most affiliated museums over the past two years. In Adelaide, the AETM has erected a new tram depot, and also recently celebrated the silver jubilee of its establishment in 1957. Ballarat has been fitting out a major new depot and has brought additional ex-Melbourne bogie cars into traffic. In Brisbane, the first two years of full traffic operations have been successfully completed and much effort has now turned to car restoration. Bylands has seen a significant increase in the number of cars on site, and with the recent completion of a power supply, attention has now turned to completing a further depot to initially house six more bogie cars. In Sydney, after many frustrations, the new museum site at Loftus has been secured and a number of vehicles are already stored in the impressive new depot. At Parramatta Park, rebuilding of trailer 74B is progressing steadily.

In Auckland, the tramway linking MOTAT at Western Springs with the Auckland Zoo was recently opened - a significant achievement in a city whose trams had been gone for a quarter-century. Wellington has continued to develop its depot facilities which are much improved over earlier years. A highlight in Christchurch has been the completion of Boon car 152. This is the first car in any COTMA museum to have had completely new trucks fabricated for it to the original design. The Ferrymead project as a whole has been under close scrutiny for possible development as a major New Zealand tourist enterprise, and this could lead to further opportunities for tramway operation.

Projects in New Zealand have continued to receive support under job creation schemes. These opportunities have not been available in Australia during the past two years.

No significant traffic accidents have been recorded by COTMA affiliates in the past biennium.

Transport museums continue to develop in overseas countries. The COTMA Executive have been involved in correspondence with several groups about the availability of tramway equipment in Australia and New Zealand.

#### Operating urban tramway systems

The public sector urban tramway scene has continued to strengthen over the past two years. The M&MTB has continued to produce cars in its Z series, and is currently planning to place new orders. Track maintenance has continued at its long-established high standard and consideration is being given to route extensions.

However, the M&MTB as we have long known it is about to disappear in the creation of a Metropolitan Transit Authority operating trams, buses and suburban trains in a manner somewhat similar to the role established for the South Australian State Transport Authority in the early 1970s.

In Adelaide, where the Glenelg line has continued to operate on a survival basis since the other street tramways closed 25 years ago, there has finally been significant investment in track and overhead renewal for the first time in many years. In 1981-2, nearly one-third of the reserved track was completely renewed, and much of the overhead has been rehung using modern techniques. Tenders have been called to relay the Jetty Road track in mass concrete.

Developments in the trolleybus scene are less happy. Although there have been suggestions to introduce trolleybuses in Sydney and Melbourne, nothing of substance has eventuated. Far-sighted proposals to develop a completely new trolleybus system in Auckland were abruptly abandoned in 1981, and the remaining trolleybus routes in Dunedin finally closed in 1982. Although new Volvo trolleybuses are entering service in Wellington, serious commissioning problems have had to be overcome. On a brighter note, however, Wellington has been able to secure the new trolleybuses which had been intended for Auckland.

#### The Future

Economic conditions within Australia and New Zealand are not buoyant, and prospects for the immediate future offer little encouragement. However, most of our museums are close to large urban populations and represent value-for-money in the tourist day-trip field. At the same time, we are as a group, developing a reputation for historical responsibility and achievement in our chosen field.

It is essential that we do not seek to over-extend our projects and our voluntary resources during the next few years. At the same time, we should try to maximise the opportunities that historical anniversaries such as some of the Australian State Sesquicentenaries and the Australian Bicentenary bring forward.

#### Acknowledgements

In conclusion, we should like to acknowledge and recognise the help received from officers of the various urban transport authorities in Australia and New Zealand, especially those of the Melbourne and Metropolitan Tramways Board. It is a pleasure to express our appreciation to our hosts at the 1982 Melbourne Conference, the Tramway Museum Society of Victoria, and once again to note the contribution being made by the M&MTB, this time to our Sixth Australasian Tramway Museum Conference.

As we meet, however, we should not lose sight of the efforts of all the individual members of our constituent museums, since it is only with their continued commitment and contribution that our museums will continue to progress.

K.S. Kings  
EXECUTIVE OFFICER

John C. Radcliffe  
CHAIRMAN

July 25 1982

# K. L. Paroissien & Associates

Public Accountants . . . Chartered Secretaries  
14 Wakefield Street, Hawthorn, 3122 (P.O. Box 226) Telephone 810 0460

K. L. Paroissien, F.A.S.A., A.C.I.S.  
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R. G. Paroissien, A.A.S.A., A.C.I.S.  
A. K. Paroissien, A.A.S.A., A.C.I.S.

## COUNCIL OF TRAMWAY MUSEUMS OF AUSTRALASIA

### BALANCE SHEET AS AT 31ST MARCH, 1982

<u>1981</u>			
	<u>\$</u>		
		<u>COUNCIL FUNDS</u>	
		<u>Accumulated Fund</u>	
1394		Balance brought forward 31st March, 1981	1157.34
-		Add Surplus for Year	289.85
(237)		Less (Deficit) for Year	-
			<u>1447.19</u>
\$1157			\$1447.19
====			=====
 <u>THESE FUNDS ARE REPRESENTED BY:-</u>			
		<u>Current Assets</u>	
1014		Australia & New Zealand Banking Group Ltd.	1384.44
143		Members Subscriptions in Arrears	62.75
			<u>1447.19</u>
1157			1447.19
Nil		<u>Less Current Liabilities</u>	Nil
			<u>1447.19</u>
1157			1447.19
		<u>Plus Non Current Assets</u>	
1800		Electrical Former	1800.00
(1800)		Less Government Grant	1800.00
			<u>-</u>
			-
\$1157			\$1447.19
====			=====

### INCOME & EXPENDITURE STATEMENT FOR YEAR ENDED 31ST MARCH, 1982

		<u>Income</u>	
354		Members Subscriptions	300.25
38		Interest Received	45.26
25		Sundry Fees	100.12
			<u>445.63</u>
417			445.63
		<u>Less Expenses</u>	
79		Printing & Stationery	20.42
58		Postage & Telephone	104.97
500		Conference Expenses 1980	-
17		Sundry Expenses	30.39
			<u>155.78</u>
654			155.78
(237)		<u>(Deficit) Surplus for Year</u>	\$289.85
===			=====



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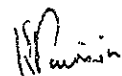
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COUNCIL OF TRAMWAY MUSEUMS OF AUSTRALASIA

AUDITOR'S REPORT

In my opinion the accompanying Balance Sheet as at 31st March, 1982 and the Income & Expenditure Statement for the year ended 31st March, 1982 are properly drawn up to give a true and fair view of the affairs of the Council of Tramway Museums of Australasia.



7th July, 1982

R.G. Paroissien A.A.S.A., A.C.I.S.  
Registered Company Auditor

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A. K. Paroissien, A.A.S.A., A.C.I.S.

## COUNCIL OF TRAMWAY MUSEUMS OF AUSTRALASIA

### BALANCE SHEET AS AT 31ST MARCH, 1981

1980		
<u>\$</u>		
	<u>COUNCIL FUNDS</u>	
	<u>Accumulated Fund</u>	
1363	Balance brought forward 31st March, 1980	1394.16
31	Add Surplus for Year	-
-	Less (Deficit) for Year	(236.82)
<u>\$1394</u>		<u>\$1157.34</u>
=====		=====
	<u>THESE FUNDS ARE REPRESENTED BY:-</u>	
	<u>Current Assets</u>	
1394	Australia & New Zealand Banking Group Ltd.	1014.34
-	Debtors & Prepayments	-
-	Members Subscriptions in Arrears	143.00
<u>1394</u>		<u>1157.34</u>
Nil	<u>Less Current Liabilities</u>	Nil
<u>1394</u>		<u>1157.34</u>
	<u>Plus Non Current Assets</u>	
1800	Electrical Former	1800.00
(1800)	Less Government Grant	1800.00
<u>-</u>		<u>-</u>
<u>\$1394</u>		<u>\$1157.34</u>
=====		=====

### INCOME & EXPENDITURE STATEMENT FOR YEAR ENDED 31ST MARCH, 1981

	<u>Income</u>	
203	Members Subscriptions	354.35
33	Interest Received	37.81
-	Sundry Fees	25.00
<u>236</u>		<u>417.16</u>
	<u>Less Expenses</u>	
41	Printing & Stationery	78.64
145	Postage & Telephone	57.67
-	Conference Expenses 1980	500.00
19	Sundry Expenses	17.67
<u>205</u>		<u>653.98</u>
<u>\$31</u>	<u>Surplus (Deficit) for Year</u>	<u>(\$236.82)</u>
===		=====

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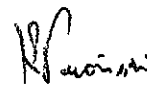
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A. K. Paroissien, A.A.S.A., A.C.I.S.

COUNCIL OF TRAMWAY MUSEUMS OF AUSTRALASIA

AUDITOR'S REPORT

In my opinion the accompanying Balance Sheet as at 31st March, 1981 and the Income & Expenditure Statement for the year ended 31st March, 1981 are properly drawn up to give a true and fair view of the affairs of the Council of Tramway Museums of Australasia.



25th September, 1981

R.G. Paroissien A.A.S.A., A.C.I.S.  
Registered Company Auditor

MINUTES OF THE FIFTH GENERAL MEETING OF THE COUNCIL OF TRAMWAY MUSEUMS OF AUSTRALASIA HELD AT THE OFFICES OF COOPERS AND LYBRAND, 461 BOURKE STREET, MELBOURNE ON 25th JULY, 1982.

The Meeting was opened at 9.15 a.m. by the Executive Officer, Keith Kings, in the absence of the Chairman of Council, John Radcliffe.

PRESENT:

Barry Ollerenshaw (WTM), Mal McAulay (SPER), David Hinman (THS), Clive Mottram (TMSV), Andrew Hall (BTPS), Ian Mison (MOTAT), Tim Atherton (BTMS), Chris Andrews (AETM). Richard Gilbert arrived a little late and took over as the BTPS delegate.

Executive Officer Keith Kings, Minute Secretary Bill Kingsley.

Representatives from non-member but applicant member societies Tony Smith (HTW), Ken Hesse (BT), Lindsay Richardson (PETS).

Many observers from various member and applicant member societies.

CHAIR: Moved Andrews/Mison that Keith Kings chair the Meeting. Carried.

APOLOGY: John Radcliffe.

MINUTES OF THE FOURTH GENERAL MEETING:

Draft minutes had been previously circulated.

Moved Hinman/Atherton that the Draft Minutes be taken as the Actual Minutes and that they be taken as read. Carried.

Moved Hinman/Mottram that the Actual Minutes be confirmed. Carried.

BUSINESS ARISING FROM THE MINUTES:

Post Card Folder:

Recommended by Dave Rawlings (SPER Observer) that no further action be taken. Moved

MacAulet/Ollerenshaw that this be so. Carried.

Fire Sprinklers:

Advised by Dave Rawlings that information to be able to produce a common report was not yet completely to hand but work was continuing.

Safety:

Dave Rawlings advised that no correspondence had been received from museums. As each museum had separate requirements a common form was not really applicable. Matter held over.

Disciplinary Measures:

Tim Atherton reported that action had been taken this year under BTMS Articles Section 19 requiring a member to show cause why action should not be taken against him. (At this juncture Dave Hinman invited observers to participate in discussion).

Regulations:

Dave Rawlings reported that work has been proceeding and there had been pressure put on Tony Griffin (SPER) to complete this work. There should be a mail-out to museum in three months. Comments were made on the need for ex-Melbourne W2 tram 321 now at MOTAT (Auckland) to have a separate bell cord for passengers, emergency stop valves in the middle of each tramcar (does this include

trailers?), temporary permits from year to year (Ian Mison); Murray Sanders to advise (Dave Hinman); annual and rigorous inspection of vehicles and track being imposed (Tim Atherton); the Department of Labor and Industry not really interested in Ballarat as the SEC had been exempt from restriction and control (Andrew Hall/Gragam Jordan); but the DLI did involve itself in pressure vessels (i.e. air reservoirs) (Keith Kings.)

Patterns:

Mal McAulay reported that some patterns are held and Dave Hinman that Peckham patterns are held by THS. Determined that all museums should forward a list of their patterns through the Executive Officer to Mal McAulay for tabulation and continual update.

Archives Responsibilities:

No further comments.

Census Form:

Dave Hinman had two copies of surveys submitted. Determined that this Agenda Item was an unknown mystery.

COTMA Membership Fees:

Discussion concerned problems of defining "member", "tramway member", or telephone costs to and from NZ, of complications due to folk who are members of several museums. The Executive Officer is the largest cost area of COTMA and an honorarium may be appropriate. Three alternatives presented by the Executive were the present levy per member of each society, a flat fee per museum, and a minimum fee plus supplementary rate per member. Moved Mottram/Ollerenshaw that the fee be fifteen cents per member with a minimum of \$10.

Driver Training Scheme:

Discussion compared the BTPS and BTMS type schemes. The Executive Officer reported that there was yet no reply to his letter on this matter to the MMTB. However the MMTB had verbally advised that full training of members may have to be curtailed. Matter to be dropped.

Society Information Update

Data sheets requested by the Executive Officer today.

House Magazines:

Chairman John Radcliffe and the Executive Officer both thanked the THS, BTMS and TMSV for forwarding same. Other Societies requested to do likewise.

FINANCIAL REPORTS:

Reports for 1980/81 and 1981/82 were published in the Conference Programme. Moved Mison/Atherton that the Financial Reports as published be accepted and confirmed. Carried.

CHAIRMAN'S REPORT:

This was also published in the Conference Report. Moved Mottram/Hinman that the Report be taken as read. Carried. Moved McAulay/Atherton that the report be accepted and confirmed. Carried.

ELECTION OF OFFICE BEARERS:

Chairman: John Kadcliffe nominated McAulay/Ollerenshaw. Elected unopposed. Bill Kingsley was then asked to take the Chair for the next election.

Executive Officer: Keith Kings was nominated Mottram/Hinman. Elected unopposed. Keith Kings resumed the Chair.

Treasurer: Allan Harnwell nominated Mottram/Gilbert. Elected unopposed.

Auditor: Robert Paroissien nominated Gilbert/Ollerenshaw. Elected unopposed.

PROCEEDINGS OF 1980 CONFERENCE:

Tim Atherton advised that the later arrival of Workshop reports and the laxity of the compiling co-ordinator had delayed publication but that the Proceedings would be available by the end of this year.

APPLICATIONS FOR MEMBERSHIP:

Haddon Tramway Workshops: Draft Memorandum and Articles of Association had been sent to the Executive Officer twelve months ago. Tony Sell (TMSV), a solicitor practicing in Victoria, was charged to consider this document and the amended document had been returned to Tony Smith. A retyped document had been sent to the HTW solicitor and then the Solicitor General. Richard Gilbert (BTPS) asked if membership would be open to all to which Tony Smith replied that numbers would be kept small. Moved Ollerenshaw/Atherton that the status quo of the previous Minutes be maintained. Carried.

Bendigo Trust: Moved Gilbert/Hinman that the Bendigo Trust be admitted to membership. Carried. Ken Hesse (BT) spoke with thanks.

Perth Electric Tramways Society Moved McAulay/Mottram that the Perth Electric Tramway Society be admitted to membership. Carried.

Newcastle Tramway Museum A letter from the Executive Officer to the NTM of May 2 had not yet been reciprocated. No further action could be taken at this stage.

AGENDA ITEMS:

Brussels Trucks: A suggestion was made that Opporto and Lisboa controllers and trucks be obtained. THS has written re GE B controllers and will advise the Executive Officer and BTPS particularly.

77E (L class) Trucks: THS expressed concern over the manner of disposal of four L's from the MMTB as they had had an application with that body since 1964. THS seeks a set of trucks if 104 or 106 should be off-registered.

Junk mail: Executive officer to take steps towards curbing same.

Publishing Reports:

Trolley Wire

Peter Hallen (SPER) reported on catching up with the backlog. Some 68% of the published material came from the pen of Ken McCarthy but major articles from other states would be welcome. Please send more museum news. A price rise is imminent. Andrew Hall asked why an article on Forest City Signalling has not been printed to which Peter Hallen replied that it had not been received. Mal McAulay to follow up. Suggestions were made as follows: Andrew Hall (BTPS), that it was not a picture book but a historic record; Tony Smith (HTW), that every member society could send one article a year; Craig Coop (TMSV), that museums retain publishing rights over their own material (Mal McAulay agreed to this); Peter Hallen (SPER) said that back issues were available; Mal McAulay said that way goes into the magazine is up to the member societies.

Tramway Topics

Dave Hinman reported on an Omnibus Bulletin recently launched in NZ which could be good.

NEXT CONFERENCE:

A letter had been received from A.J. Curtis, Secretary, Tramway Section, MOTAT, welcoming the Conference to Auckland for 1984. Executive Officer to provide MOTAT with notice of Australian Public Holidays that winter although comment was made that if a two or three week tour was also envisaged then the public holidays would not be relevant. Moved Atherton/McAulay that MOTAT host the 1984 Conference. Carried unanimously.

OTHER BUSINESS:

Itinerant Visitors: Tim Atherton commented on disruptions caused by unexpected visitors to museums and requested that for reasons of courtesy and organisation the Secretary of the museum be contacted at least a week ahead. The Executive Officer asked that all museums convey this matter to their members (frequently). Members are also asked to identify themselves with their membership card as there are bogus "members" around.

Sales Tax Exemptions: If any museums enjoy such, please inform the Executive Officer.

Concessional Electricity Charges: Executive Officer doubted whether there was any possibility.

Deadwood members: Tim Atherton reported on the new BTMS \$50 membership charge, \$30 of which was refundable after 48 hours of work. The Executive Officer asked to be informed of any success of this scheme.

Brisbane Conference 1980: Tim Atherton also thanked those delegates to the Conference who had submitted comments, all of which had been acted upon.

GENERAL COMMENTS ON 1982 CONFERENCE:

Mike Kerr (THS) and Tony Smith (HTW) said that the AGM must have an expanded time allowance. Murray Sanders (THS) said that the lack of Workshop sessions was a real loss.

THANKS:

Moved Hinman/Atherton that the TMSV as 1982 host museum be thanked and the MMTB particularly. Carried. Hamish Haugh (Chairman TMSV) to be thanked and the Executive Officer to write to Mr. Dudley Snell (Chairman MMTB). 'Jeep' Helling (MOTAT) presented a plaque.

CLOSURE:

The meeting was closed at 11.15 a.m. by its Chairman who thanked all concerned for their attendance and participation.



# Tramway Topics

OFFICIAL JOURNAL OF

3:2

Western Springs Tramway,  
Museum of Transport & Technology,  
Western Springs,  
Auckland. 2.

Tramway Historical Society Inc.,  
P.O. Box 1126,  
Christchurch.

Wellington Tramway Museum Inc  
P.O. Box 2612,  
Wellington.

## Report for C.O.T.M.A. '82 Conference

Now in its 21st year of publication, TRAMWAY TOPICS magazine, which originally started out as an inter-Museum news bulletin has, owing to the great progress and revival of the overseas Tramway World and that of the Museum field as well, developed into a reporting agency now covering the many aspects of operation in those fields and we believe this has assisted the communication between members of Societies as well as that between Societies and Tramway undertakings generally.

The magazine is at present produced by 2 Editors, Bruce Maffey (Southland) and Richard Cannemeyer (Christchurch) and is published on behalf of the Wellington Tramway Museum (Inc.), the Tramway Historical Society (Inc.), Christchurch and the (Western Springs) Tramway Division of the Museum of Transport and Technology, Auckland. Our third editor of years standing, Russell Grigg of Wellington has unfortunately had to resign early 1980, due to pressing personal commitments and we were sorry to have lost his valuable services.

After being assembled and typed in the South Island, the magazine is then printed, collated and distributed in Wellington, some 425 copies being produced. Christchurch receive a bulk supply of just over 200 copies for distribution to its (THS) membership, while both centres take care of overseas postings.

Although the format has not undergone much change since 1966, the magazine's content consists of 28 pages of script and 10 photo pages which include both inside covers. TRAMWAY TOPICS contents are roughly divided into the following categories:

- (a) Museum News (New Zealand)
- (b) Articles on Tramway History & Operations (N.Z. and Overseas)
- (c) Technical reviews, reports from Operating Tramways
- (d) Trolleybus topics (N.Z. and overseas).

New sources are varied, ranging from periodicals and personal accounts from persons returning from overseas trips, newspaper reports etc. to the efforts of individual subscribers, who have put pen to paper. Although no direct shortage of copy has been experienced of late, the need for continued support from interested readers must be stressed, even if the information were to consist of some notes and it would be appreciated if readers would co-operate with their assistance, thus lessening the work load of those responsible for the production every 2 months.

Owing to a growing interest in developments in the motor-bus field, a request to incorporate a section devoted to this interest into TT, led, after discussion, to the publication of a new magazine 'OMNIBUS BULLETIN', which commenced early 1981, (Editor P. Rendall, P.O. Box 3353, Wellington). It was felt that existing TT policy, along with the practise of many similar overseas museum publications, did not warrant a change, because coverage of this rapidly growing interest would be better served by a separate publication, with a view to future expansion.

Subscription rates for TRAMWAY TOPICS have of late and unfortunately will in future be subject to the ever increasing Postal charges. Present rates are: \$9 (N.Z.) and \$10.50 (O'seas), subscriptions available from: Wellington Tramway Museum (Inc.), P.O. Box 2612 Wellington. The magazine is produced bi-monthly, 6 copies per year.

In conclusion I would like to remark that the magazine is apparently being sent on by subscribers, for it was discovered that copies even reach libraries of overseas societies, which up till now did not receive directly posted copies from New Zealand. This calls for a continuing high standard of presentation, (as much as available finances of course allow!) and it is hoped that through conferences such as COTMA, new (or improved) contacts may be established, in our particular section of the publication field.

Richard Cannemeyer  
Assistant Editor  
TRAMWAY TOPICS  
19 Leacroft Street  
CHRISTCHURCH 5 - N.Z.

## MUSEUM INSPECTION TOUR

### The Programme

3:3

Departure by bus from the C&L offices will be at noon with a lunch stop at McDonalds family restaurant - Campbellfield. This store is decorated on a tramway theme, including simplified scale models constructed by A. Culpeffer-Cooke. The models include:

- A Bendigo birney tram,
- A Brunswick Cable set,
- A Coburg horse tram; and
- A Hobart double-deck electric tram,

all built to 1:24 scale ( $\frac{1}{2}$  inch to the foot).

The group will then travel to the horse tramway at Hudson Park, Kilmore. Travel is free for delegates on production of your COTMA name-tag.

After riding the horse tramway the group will retrace its route to the main museum premises on Union Lane Bylands where the facilities can be inspected until 5.30 p.m. Detailed notes about the history and facilities of the Bylands site are attached.

Prompt departure at 5.30 p.m. is necessary. Dinner will be at the Daraweit Guim Restaurant and will be followed by a film presentation by K.S. Kings. These films include scenes of the VR tramways at Sandringham and Elwood, the Footscray routes and other long-since vanished aspects of Melbournes tramways.

### The Museum Properties

The society is in the unusual situation of having two operating sites:

- The main premises was part of the now closed Wallan to Heathcote Railway. We first leased a section of this right-of-way and the station area at Bylands in 1970 and have recently obtained the freehold to the main area. Bylands is the proverbial "sleepy little town" situation just over Pretty Sally Hill in the Great Dividing Range, 33 miles north of Melbourne on the Northern Highway. Our land is 4200 yards east of the highway on Union Lane. This is the major storage location construction site and more recently also the base for initial electric tramway operation.
- The newer, second site, in Hudson Park Kilmore provides an operating site for the horse tramway away from the major construction and storage site and in a location more suited to attracting passing custom.

### Bylands Facilities

The lease from the Victorian Railways, the Bylands Station area (38 miles 11 chains from Spencer St. Melbourne by rail); comprised of 4 acres of cleared property and the right-of-way 15 ft either side of the rail, from the level crossing at the Southern extremity of the station area for one mile northwards to the next level crossing. Included in this lease was the 5ft. 3 inch gauge trackwork (rail, sleepers, fittings etc.) laid on the one mile area, and this track is now the only track remaining of the Heathcote Railway. The trackwork is in good condition, has been rebuilt

to standard gauge and currently requires little maintenance. The ganger in charge of the section before the line closed gained top award for this trackwork. The rail is 22ft. 6ins. lengths of 60 lb/yd 'D' class rail. Beyond the northern extremity there was a quarter of a mile of extra trackage which we dismantled to use for depot roads. Re-laying of the heavier rail has taken place in the station area.

The buildings on the site comprise:

- Former Departmental Residence No. 899, a five room house which is now used by our caretaker;
- A 2 track (15 car) depot constructed by volunteer labor with substantial assistance from the CMF; and
- Several smaller service buildings (sub-station, storage, etc).

The first stage of a second depot (to eventually house a further 20 vehicles on 3 roads) is now under construction.

Electrical plant comprises an SEC-provided step-down transformer, society-owned isolating transformer and silicon diode rectifier and overhead within the museum grounds. Extensions to service the depot area and mainline are planned.

#### Historical Notes

The Railway between Heathcote Junction (33 m. 16 ch.) (on the North Eastern Line) and Kilmore (42 m. 56 ch.) was opened on the 1st October 1888. This line was later extended to Heathcote (1889) connecting with the line from Bendigo. Bylands Station (38 m. 11 ch.) was opened with the first section of the railway with a 200 ft. passenger platform and goods loop. It had a quite career, existing as a staff and ticket station for a short time from 1889 with home signals provided for this purpose, (signals removed 1906).

Passenger services were initially provided by passenger and mixed trains, however, as a matter of economics these were replaced in 1922 by A.E.C. Railmotors (the wellknown "Beetles") operating between Wallan and Heathcote.

In 1949 the "Beetles" were replaced by 153 h.p. Walker Railcars which operated the service until passenger workings were withdrawn on 26th June, 1965. In later years, with the introduction of Railmotors, the platform was shortened to 30 ft. With declining goods traffic, (originally mainly timber - the forests have long been cut out), the goods service was also withdrawn, and the line officially closed with the passing of the Australian Railway Historical Society's Heathcote Special on 9th November, 1968. The Heathcote-Bendigo Section was closed in 1958.

#### Kilmore Facilities

The horse tramway includes a commercially built 2 track depot housing trams 253 and 256 together with a single-track running line along the creek at the perimeter of Hudson park on the far side to the main road. Potential exists for southward extension of the running line.

#### Vehicles

The museum vehicles are detailed in a separate guide-book.

## The Future

Most tramway museums have progressed serially through major stages of site and exhibit acquisition (often in conjunction with the closure of a nearby tramway system), pilot operation using horse, steam or railmotor, establishment of major electric tramway operating facilities and then consolidation. Although the Tramway Museum Society of Victoria has not had to cope with the pressures of closure of its principal tramway system the continued upgrading of the M & MTB system has resulted in a flow of acquisitions (largely unpredictable rate) that has prevented such an orderly development. As this is likely to continue a comprehensive programme of future works cannot be given. However, major engineering tasks envisaged include:

- Completion of the second depot;
- Expansion of electrification;
- Upgrading of visitor facilities; and
- Possible provision of a longer mainline with crossing loops and associated works.



By 1923 the then recently formed Melbourne & Metropolitan Tramways Board had decided that a modern and centralised electric tramway workshop was essential to its future operations. Work was then scattered amongst Depots at Malvern, Hawthorn, Coburg, Essendon, Preston and Footscray, varying from quite minor to major operations. These locations were caused historically from the individual systems the Board had taken over. Further, the cable tram workshops were at North Fitzroy, and it had been decided to convert that system to electric trams whilst concurrently expanding the electric tram system. A 17 acre block of land at Preston was purchased running from St. Georges Road to the railway line and south from Oakover Road. Construction of buildings commenced in 1924. Northwards extensions were made to the three main buildings at the end of World War II, while four separate buildings were constructed in the northern yard from about 1950. Sundry minor alterations and modifications have been made to buildings, track and grounds from time to time.

Offices. This two storey structure houses management, administrative, draughting, production control and laboratory staff, as well as the Running Sheds Engineer and his immediate staff.

Mess Hall. This building is used for meals by staff, and includes a small canteen, with other areas devoted to the Printing Department, Photographer and Nursing Sister.

Store. The Preston Store houses all the items necessary to maintain the Melbourne tram fleet, plus many for other sections of the Board's undertaking. It is well laid out with stock bins and racks, as well as bulk areas and a loading dock with overhead crane.

Blacksmiths. This workshop houses the blacksmiths forges and hammers, plate shop, welding area, foundry and pattern making room. Tramcar frames were assembled in the jigs still mounted in the floor, while No. 15 truck frames were assembled nearby. The tramcar straightening bay is outside in the northern area of open land.

Engineering. This very large building actually houses three sections: machine shop, truck shop and electrical shop.

The machine shop is notable for rows of general and special purpose lathes, turning, grinding and milling machines. There are also many benches for fitters to work at the multitude of items that need hand finishing and assembly. Specific locations are set aside for brake valves, relay valves, governors, etc. The Tool Room is a wire enclosure containing the machines needed by the highly skilled tradesmen who work in this area to build and maintain the tools and jigs necessary for precision engineering work.

The truck shop basically assembles new and overhauled trucks. A special area was built for assembling the ASEA trucks, and it is now used for the Duwag trucks. Overhead cranes facilitate the transfer of materials throughout the length of the work area. Many improvements have been made to trucks and brake rigging over the years, especially in the last two decades and very impressive results are now being achieved.

The electrical shop is presently undergoing a substantial re-arrangement. It is, of course, concerned with the electrical equipment of the trams and, in the last few years, some of the electronic items. Some of the work on the electronic equipment of the Z series trams is performed in a separate air-conditioned work-room near the Paint Shop. The overhaul and rebuilding (and formerly building) of controllers, motors, contactor boxes, resistances, etc., are carried out in this area together with the rewinding of armatures and manufacture of wiring looms. A new testing room has recently been built, and a new electronics room and store are under construction.





Body Shop. This building is also very large and houses three sections.

The wood mill and joinery sections are at the south end of the building. They include various wood-working machines and benches for joinery work of various items. The timber stacks and main saw are outside to the west.

The lifting shop runs along the east side of the building, adjacent to the main traverser. A fifteen ton overhead travelling crane is ideal for lifting and lowering tramcar bodies. This takes place in connection with overhaul, accident repairs, and defective motors, or to receive a new tram body or despatch an old one.

The body shop fills the rest of this building. Trams receive overhauls, accident repairs, re-canvassed roofs or conversions. As well as bodymakers, there are men from other trades in this area - small groups from other shops either on a permanent or as required basis. As well as body items, electrical and air gear are removed and replaced while trams are in the body shop and lifting shop. Some painting is also done, especially that of a "touch up" nature.

Paint Shop. This is the smallest of the main buildings, and is to the west of the small traverser on the west side of the body shop. Trams which have been overhauled or repaired are washed down, primed if necessary, undercoated and final coated in this area. Monogram and numeral transfers are applied and signwriting affixed. Sundry tramcar and other items are painted and varnished and destination and route number curtains manufactured.

Northern Area. Four main buildings were erected north of the extended workshops from 1950.

Trimmers Shop. Upholstery for new and overhauled trams is carried out here, as well as repairs from the Running Sheds. Strap Hangers, Conductors Bags, Ticket Wallets, etc. are also handled.

Degreaser. This chemical cleaning plant mainly handles tramcar parts, especially truck components from tramcars under overhaul.

Sheetmetal Shop. Sheetmetal items are manufactured and repaired in this shop.

Amenities Block. This building houses washing, changing, locker and toilet facilities for the Engineering Building. Note the main columns on its southern side for any possible future extension from the main building.

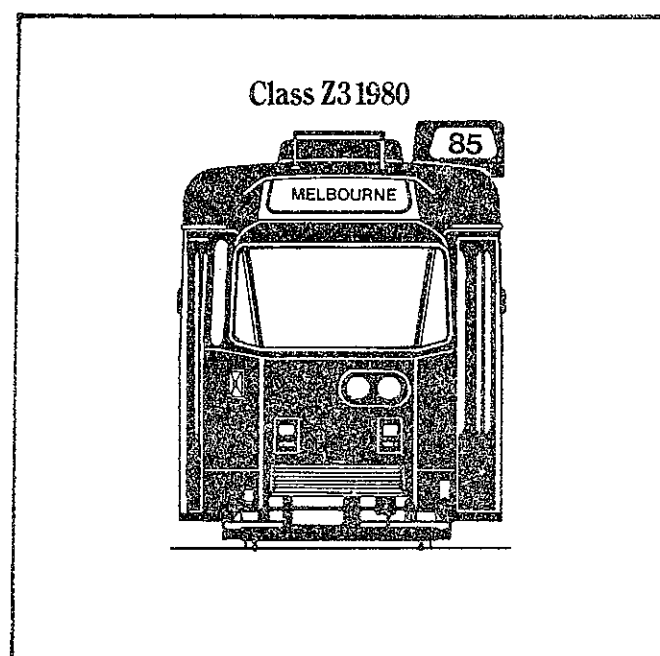
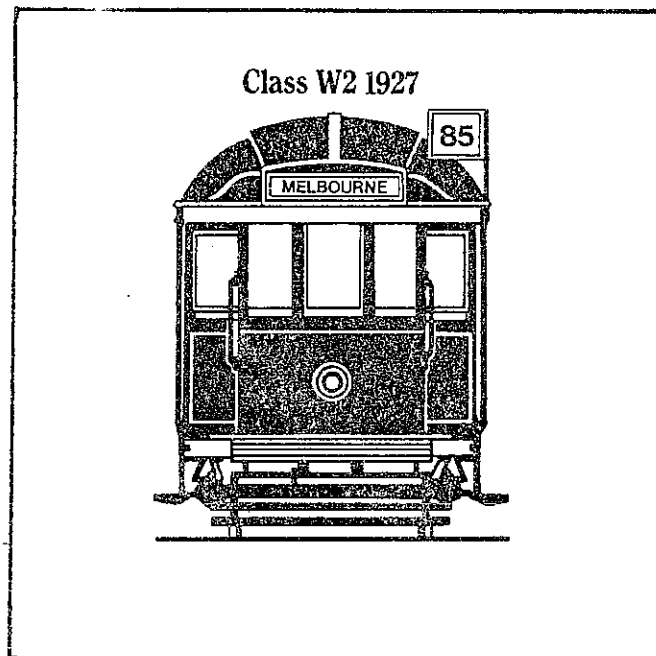
The Test Tracks and Storage Area are to the north of the foregoing four buildings. The tracks are used to test overhauled and repaired trams as well as to commission the new Z series cars. The original test track is along the Oakover Road fence while the two lower tracks were built in 1953. The former has been used for storage in recent years. A new test track is being built along the railway line and access will be from the original test track.

Sundries. A new amenities block has recently been built on the south side of the paint shop to serve paint and body shop staff. The building branch have permanent accommodation for their maintenance staff south of the trimmers shop. A bulk store is situated south of the foundry, while the Preston (traction) sub-station is in the south east corner of the property adjacent to "the hump". The small brick building immediately north east of the office block is the workshops electrical sub-station, outside which is a standby diesel generator.

#### COBURG DEPOT.

Coburg Depot was built by the Melbourne, Brunswick and Coburg Tramways Trust to service the two electric tram routes it built to East and North Coburg. It was sited in Nicholson Street, Coburg, a few yards north of Moreland Road, which intersection was the junction of the two routes. It consisted of red-brick offices and amenities building and sub-station on the street frontage, with a five-road running shed behind and parallel to it. A small workshop area was also provided. Later another five-road car shed was built, but this was longer than the first shed.

The early 1950's saw operating economies instituted by the MMTB as post-war passenger figures declined and expenses rose. One event in this programme was the closure of Coburg Depot as a running shed on Saturday night 11th October, 1952. Its operations were absorbed by Brunswick Depot, about a mile distant. Coburg was used as a store for surplus and new trams for a while, and also withdrawn buses and other materials for a while. It was then converted into a centralised area for the then Distribution (now Electrical) Branch. The sectional workshops, stores and staff were brought together as much as possible (some tower wagons still operate from South Melbourne and Melbern yards). Over the years a good workshop and store has been built up and this 1916 structure still serves a very useful purpose, from which the overhead network and sub-stations are maintained.



NEW NON-ARTICULATED TRAMCAR FOR MELBOURNE

CLASSIFICATION: Light Rail Transit

OTHER NAMES: D.C. Tramcar

DEVELOPER: Commonwealth Engineering (Vic.) Pty. Ltd.  
Frankston Road  
Dandenong, Victoria, Australia  
Tel: Melbourne 792 0171  
Telex: 33253  
Telegram: "Comeng" Dandenong

In conjunction with -

Allmanna Svenska Elektriska  
Atiebolaget (ASEA)  
S-721 83 Vasteras,  
Sweden  
Tel: Vasteras (021) 10 00 00  
Telex: 4720 aseava 5  
Telgram: ASEA Vasteras.

DESCRIPTION:

A specifically designed tramcar for use in Melbourne, Australia. The vehicles can be operated as single units only and are not equipped to be coupled. The vehicle is non-articulated with 4 axles in 2 bogies. The car may be driven from either end and current collection is via trolleys. The vehicle incorporates the latest technological improvements in tramcars, including electronic wheel slip control. The cars are being built by Commonwealth Engineering (Victoria) Pty. Ltd. incorporating ASEA control equipment and motors.

DEVELOPMENT HISTORY:

Designed to replace some of the existing fleet of tramcars of the Melbourne and Metropolitan Tramways Board. The first unit was delivered in December 1974. The car is a new design based upon M28 bogies and traction control equipment previously supplied by ASEA for Gothenburg.

DEVELOPMENT STATUS:

115 - Delivery complete.

SYSTEMS USING VEHICLE:

Melbourne and Metropolitan Tramways Board - 100 vehicles on order.

COSTS:

Contract Price - A\$12 million for 100 cars (signed March 1973).

WARRANTY:

Basic vehicle - 12 months.

VEHICLE PERFORMANCE:

Max. Velocity .....	45 mph, 72 km/h
Max. Grade .....	8.9%
Service Acceleration .....	5.74 ft/s <sup>2</sup> , 1.75 m/s <sup>2</sup>
Service Deceleration .....	4.92 ft/s <sup>2</sup> , 1.5 m/s <sup>2</sup>
Emerg. Deceleration .....	12 ft/s <sup>2</sup> , 3.7 m/s <sup>2</sup>
Max. Jerk .....	6.89 ft/s <sup>3</sup> , 2.1 m/s <sup>3</sup>

Minimum Horizontal Turn Radius	
Single Vehicle .....	53 ft, 16.3 m
.....	

Minimum Vertical Turn Radius	
Single Vehicle .....	600 ft, 138 m
.....	

Design Capacity .....	48 seats 77 stand
Area per standee .....	1.72 ft <sup>2</sup> , 0.16m <sup>2</sup>

DIMENSIONS:

Length .....	54.3 ft, 16560 mm
Width .....	8.75 ft, 2667 mm
Height, Rail Over Roof .....	11.64 ft, 3550 mm
Height, Rail to Floor .....	2.78 ft, 850 mm
Empty weight .....	19,000 Kg
Gross weight .....	27,000 Kg
Inside width .....	8.33 ft, 2540 mm
Headroom, Centre Aisle .....	6.88 ft, 2105 mm
Width, Centre Aisle .....	2.23 ft, 690 mm
Doorway Width .....	5.08 ft, 1550 mm
Clear Opening .....	4.36 ft, 1330 mm
Doorway height .....	7.61 ft, 2320 mm
Step height .....	11 ins., 285 mm

SUSPENSION, PROPULSION & BRAKING:

Truck (Bogies) .....	Frames by Commonwealth Eng., Sydney,
Truck (Bogies) .....	Assembly - M.M.T.B.
Truck centres .....	27.88 ft, 8500 mm
Wheel base .....	5.89 ft, 1796 mm
Wheel diameter .....	2.23 ft, 680 mm
Track Gauge .....	4.708 ft, 1435 mm
Motors, No. & Type .....	4, one each per axle; by ASEA Electric (Aust.) Pty. Ltd.; Series Field
Rating per Motor .....	52 kw, 75 HP
Voltage per Motor .....	300 vdc

Gear Ratio	....	1 : 7.24
Type Drive	....	Motor connected to double
reduction gear via a resilient		double coupling
Service Brakes	....	Electric dynamic & motor shaft disc brakes, spring applied, hydraulically released.
Emergency Brakes	....	Same disc brakes & magnetic rail brakes
Emergency Brake Reaction Time	....	0.5 secs.

ELECTRICAL & CONTROL SYSTEMS;

Line Voltage	....	600 vdc
Power Collection	....	Trolley with height range of 12.6 - 19.5 ft 3860 mm - 5944 mm
Exterior Lights	....	Each end equipped with dual headlights, tail lights, and turn signals
Interior Lights	....	40W Fluorescent tubes operating on 600 V DC
Type Control	....	Electronic "TRAMIAC" with 41
starting steps and 17 braking		steps
Instruments & Controls	....	3 separate pedals (braking, accelerating and safety), speedometer, indicator lights, battery voltmeter

BODY SPECIFICATIONS:

Frame	....	Steel - all welded
Exterior walls	....	Aluminium sides, fibreglass roof
Interior walls	....	Stressed steel covered with teak finish laminate
Insulation	....	2 in (51 mm) thick fibreglass insulation throughout
Floor	....	covered with cork and neoprene
Doors	....	2 four-leaf folding doors on each side, electrically operated
Windows	....	7 per side with upper portion on slides for ventilation
Heating	....	Resister box exhaust heat-forced air
Ceiling Fans (6)	....	6000 cfm blown in above 24°C ambient
Seats	....	Upholstered over high resilience polyurethane foam.

MELBOURNE AND METROPOLITAN TRAMWAYS BOARD

Z3 CLASS TRAM - MELBOURNE, AUSTRALIA

CONTRACTOR:

Commonwealth Engineering (Vic.) Pty. Ltd.  
Frankston Road,  
Dandenong, Victoria, Australia.

In conjunction with -

A.E.G.-Telefunken (Berlin)  
DUWAG (Dusseldorf)

DESCRIPTION:

A tram designed for use in Melbourne. The tram is double-ended non-articulated with four axles in two trucks. The trams can be operated as single units only and are not equipped to be coupled. They are fitted with thyristor (Chopper) control electrical equipment which provides smooth, jerk free acceleration and regenerative braking.

These trams are being built to continue the replacement of W2 class trams. The body is an improved form of Z1 and Z2 Class previously supplied by Comeng.

DEVELOPMENT STATUS:

Order placed 3 April, 1978  
First tram into service on 25 September, 1979.  
100 trams on order to be delivery at approx. rate of 25 trams per year.

PERFORMANCE - SEATED LOAD:

Speed (Max.)	70 km/hr
Grade (Max.)	9%
Acceleration (max.)	1.6m/sec <sup>2</sup>
Retardation (service max. cont.)	1.6m/sec
Retardation (emergency)	3.0m/sec <sup>2</sup>
Jerk (max.)	1.3m/sec
Horizontal curve radius (min.)	16.3m
Vertical curve radius (min.)	138m

CAPACITY:

42 seats  
83 standees (Area per standee based on 6 per metre<sup>2</sup>)  
125 total

### DIMENSIONS:

Length	16,740 mm
Width (outside)	2,670
Height - rail to roof	3,410
Floor height above rail	850
Width (inside)	2,540
Headroom at centre line	2,140
Aisle width	690
Doorway width - clear opening between handrails	1,260
Doorway height	2,264
Step heights -	
Ground to first step at tare (new wheels)	334
Other 2 steps	258

### MASS:

Tare	21,800 Kg
Laden (crush load)	30,130 Kg

### TRUCKS:

Type	In-board bearing, monomotor
Design	DUWAG, Dusseldorf, West Germany
Construction of frames and bolsters	Welded steel by Comeng (Vic.)
Assembly	M.M.T.B. at Preston Workshops
Gauge	1,435 mm
Axle centres	1,800 mm
Wheel	Bochum 54, resilient
Wheel diameter	660 mm
Motors	Monomotors (1 per truck)  A.E.G. - type ABS 3322 self ventilated designed for thyristor control, laminated stator. Continuous rating 195 kW at 600 volts.
Gears	Thyssen Henschel - Hypoid, right angle drive, hollow shaft with spider type flexible rubber coupling. Ratio 1:5:666.
Service Brakes	Electro-dynamic, regenerative operation down to 8km/hr.
Low speed, parking and stand-by brake	Spring applied caliper pads, to ventilated brake disc (knorr-Bremse), one per each axle. Pads hydraulically released.
Hydraulic system	Hydraulic pump and actuator mounted on truck (Hanning and Kahl).

## TRUCKS (cont)

Emergency brakes	Electro dynamic plus electro-magnetic track brakes
Suspension	Primary - Chevron Rubber Secondary - Clouth rubber rolling ring type plus rubber plate springs.
Axle bearings	SKF twin spherical roller races.
Dampers	2 vertical, 1 transverse
Couple to body	Large diameter roller race incorporating angular movement stops.
Mudguards	Fibreglass.

## ELECTRICAL CONTROL SYSTEM:

Line voltage	600 volts, D.C.
Line current (max)	550 Amps
Power collection	Trolley pole with MMTB carbon block collector head
Power control system	A.E.G. Thyristor "Chopper" using independent chopper systems to each truck. This power system also provides the regenerative braking capability.
Control system	Siemens electronic control.
Emergency control	In addition to the duplicity of the chopper system, a switch is provided to by-pass most of the electronic control system and thereby provide "get home" capability at reduced performance.
Overspeed control	Automatic power shut-off and brake application held down to 7 km/hr.
Wheel spin and slip	Detection and correction provided with automatic sanding.
Controls	Foot operated, 3 pedals (accelerator, brake and safety pedals).
Indications	Hand operated sand, gong, disc brake, points, turn indicators, and doors, speedometer, battery voltmeter and indicator lights.
Motor alternator	3 phase claw pole generator without slip rings. Outputs at 220V and 22V at 100 Hertz. Coupled to 600V D.C. motor. Rating 3.3KVA.
Battery	Lead acid, 171 Amp.hr.



BODY:

Numbers	116 to 215.
Frame	Steel - all welded
Truck centres	8500 mm
Exterior walls	Aluminium
Roof	Fibreglass
Interior walls	Stressed steel covered with teak finish laminate.
Lining, ceiling & coves	Fibreglass
Insulation	50mm glass fibre
Floor	Plywood over corrugated steel surfaced with "Treadmaster" (cork and neoprene rubber).
Windows	7 per side Beclawat "Tempest", half drop (anti-sun) glass
Doors	Aluminium framed, Beclawat, 2 four leaf folding doors per side.
Door operators Door system	Electric (Vapor Corporation U.S.A.) Safety interlocked with tram motion. Uses step treadle mats and pressure pulse sensitive door edges.
Ventilation	Four exhausting fans mounted in pods above ceiling, each 50 cubic metres per minute operating on thermostatic control above 25°C ambient at half speed and at full speed above 30°C ambient.
Heating	8 electric heaters, individually thermostatically controlled located under passenger seats and conductor's stations. Fans operated on 220V system and heater elements on 600V, 1kW each. Driver's heater-demister 2 kW each.
Seating	Upholstered over high resilience fire retarded polyurethane foam, (Hendiform)
Destination equipment	"Brose", polyester blind type, back lit, lower case letters.

WORK EXECUTED AT PRESTON TRAM WORKSHOPS

Truck assembly

Manufacture - fibreglass dash and canopy  
Manufacture and installation of -  
    all passenger seat frames and upholstery  
    conductor's consoles (45° type)  
    fibreglass seat surrounds  
Installation of staunchions and rails  
Manufacture and installation of current collection equipment.

SOUTH MELBOURNE PROPERTY - "W" Car Running Shed and Civil Branch Yard

This property covers the whole block bounded by Kingsway (formerly Hanna Street), Dorcas, Wells and Bank Streets, and is on a 99 year lease. Its most prominent feature is the large, nine track running shed and adjoining red-brick offices and amenities block. The running shed has individual pits to each track; a few years ago the rails on some tracks were raised to provide greater pit depth for shed-men working underneath trams. The Depot was completed in 1926. Accommodation was provided from inception for a breakdown wagon, and a wheel grinder was later added at the rear of the Shed (probably in the early 1930's). South Melbourne Depot ran a full shed of trams for many years, but modifications to rosters some years ago reduced the allocation. Some of the "spare" space is used to accommodate trams from other Depots between the peaks on week-days, and to house works trams and stored trams.

The south western section of the property contains buildings which house some tower wagons and a new electrical sub-station built last year to replace a nearby unit. The remainder of the property is devoted to the Civil Branch - a new amenities building, the store and offices, vehicle parking area, rail stacks and construction area and associated buildings. All the Boards track construction and maintenance staff work from this yard, as well as their emergency vehicle. Turnouts, crossings and curves of all shapes and sizes are manufactured in the works area almost continuously to keep pace with the replacement programme. Manganese castings were formerly used for points and crossings, but recent years has seen a change to fabrication of these items, the most recent of which are two "three-way" crossings for the northern side of Balaclava Junction (Melbourne's only "Grand Union"). Curve rail in recent years has featured a "bolt-on" check rail.

HAWTHORN DEPOT

Hawthorn Depot was built by the Hawthorn Tramways Trust to serve its tramway from Batman Avenue, City, to Burwood. It is situated at the western end of Riversdale Road, at the junction of Power Street and Wallen Road, Hawthorn. Opened in April 1916 as a five-road shed sited behind an impressive multi-storey red-brick office, an amenities building, a second four track shed was soon added, and provision made for yet a third shed (which was never built). The Depot served the Burwood, Wattle Park and Hawthorn Bridge routes initially and, subsequently, the Hawthorn, Prahran-City and North Richmond routes with some peak runs to North Balwyn. As a rationalisation move, and to remove shunting trams from Wallen Road in peak periods, the Depot was closed on Saturday 13th February, 1965. The sub-station and the portion previously converted for use by the Clothing Department continued to be used, together with the original tram driving school. The latter was replaced by a new and enlarged area which much more equipment, which has been subsequently supplemented. The remainder of the up-stairs rooms were converted into a training centre with offices and lecture rooms in 1974. Large wire-mesh gates were fitted to the southern shed in 1965 and it was used to store buses for about three years, when W2 class trams began to be stored there. The gates were clad with galvanised corrugated iron in 1972, but the north shed did not receive its gates until 1979. The south shed has housed the trams and buses that are allocated to the Training School in recent years plus several stored W2 class trams.

## Camberwell Depot

This running shed and its adjacent office and amenities block was built during 1929-30. It featured a 115 feet clear-span roof over nine roads in the car shed. It was claimed that this saved space and gave greater safety by eliminating intermediate columns. The pits consisted of a sunken floor from which rose steel cross frames to support heavy rails instead of the conventional arrangement of individual pits to each track. This arrangement allowed greater freedom of movement for the shed staff and better lighting.

Camberwell Depot has housed many types of trams down the years, including C and CW5 cars, W3 and T. During the early 1940's it shared almost the whole of the sliding door cars with Hawthorn Depot. It would probably still be a typical Melbourne "green tram" running shed but for the decision to build the East Burwood extension. It was decided to operate this new trackage with the modern Z class trams, and the first two cars appeared on Saturday 4th July 1977 to enable training of crews to commence. The first passenger operation began on 1st August to the old Burwood terminus, and the route was fully serviced with the opening of the extension on 20th July, 1978. It was decided to make Camberwell a fully Z-car Depot and the first change on the Wattle Park route took place on Monday 13th November. The week-end of 4th/5th August 1979 marked the removal of the last W cars and Camberwell became an all Z-car Shed. The "Camberwell - Route 72" services were transferred to Malvern Depot as they were to remain W car operated.

