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AUSTRALIAN TRANSPORT MUSEUMS

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JUNE 1976

— Continuing... 50 YEARS OF ELECTRIFICATION —

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WHAT'S THE JAPANESE FOR 'WHERE'S THE TRAM DEPOT?'

IN THIS issue of *Trolley Wire* we continue the interesting story of '50 YEARS OF ELECTRIFICATION' the story of the beginnings of the New South Wales electric railway system.

We are also proud to present a major article by a reader of this magazine. This is *TRAMS IN JAPAN* – a recent look at an amazing assortment of tramway systems still in operation in the various cities of Japan. The author discusses the question of just how long these systems will remain in operation, so perhaps those readers wanting something different in the way of tramway interest might like to go and have a look around.

The article will then present a suitable starting point in planning your itinerary, listing as it does, the various tramway centres and describing many in greater detail.

(We still don't know the Japanese for 'Where's the tram depot?'!!)

FRONT COVER:-

An 8 car double deck train, city bound, pulls into Liverpool from Campbelltown. Comprising 4 stainless steel motor cars and 4 aluminium trailer cars, it is typical of the first generation of double deck trains on the Sydney suburban network.

–P.T.C.N.S.W.

At the recent COTMA Conference held in Sydney the Editorial Committee of this magazine were present for various periods and able to discuss with delegates in both official and unofficial meetings just what the various groups thought of the magazine – as a whole, rather than detail or isolated points. We were pleasantly surprised at the overall general approval of our efforts to date.

We were also able to confirm our editorial principles, discuss future policies and immediate proposals, as well as thank in person many of those persons who help with the continuing success of *Trolley Wire* by way of contributing articles, news and photos.

One surprising, surprising to us at least, point made was the number of comments regarding the back page of the magazine. It was almost unanimous in the comments that this should feature a full page photograph and not be just 'another page in the magazine'. We had not really considered this point before and had used full page photos when these were available and the layout allowed their use.

One delegate went so far to back up his comment as to supply enough quality prints of tramway topics to fill the next ten or so issues. Other improvements will be included as and when circumstances permit. In this issue you will see the first examples of the new *Museum Directory* layout. To those correspondents yet to reply to our earlier plea for information please do so as a matter of urgency.

–The Editorial Committee

50 YEARS OF ELECTRIFICATION

continuing....

The Sydney Suburban & Interurban Railway Network

by Laurence Gordon

POWER SUPPLY AND DISTRIBUTION

Apart from the upheaval in the city caused by tunnel and station construction and the ever growing shape of the Harbour Bridge, the most evident sign of the work being undertaken for the introduction of the electric services was the erection of the overhead wires and supporting structures. However, the power supply and distribution system entailed much more than the erection of the overhead.

The N.S.W. Railways owned and operated three large coal fired steam power stations prior to the introduction of electric trains; two in Sydney and one in Newcastle, which supplied power for the tramways and railway workshops in the two cities and coal wharf cranes in Newcastle. Some power was also sold commercially.

Location	*Power Station*	*Output*
Sydney	Ultimo	600V DC & 25Hz AC
	White Bay	25 Hz & 50 Hz AC
Newcastle	Zarra Street	25 Hz & 50 Hz AC

With the increase in power requirements, the generating capacity was increased, mainly at White Bay, and a transmission line was installed connecting Newcastle and Sydney. At a later date a frequency converter (25 Hz to

Construction work on Town Hall station in George Street. Tram traffic continued with the tracks being moved as necessary.

—N.S.W. Government Printer

50 Hz) was installed at White Bay. Power was distributed at high voltage to 15 substations where it was converted to the 1500V DC for use by the trains. The AC distribution voltages initially used were:-

25 Hz 6.6 KV
50 Hz 11.0 KV) Underground Cables
50 Hz 33.0 KV Aerial Transmission Lines

Conversion to DC at the substations was by stepdown transformer and rotary converter or mercury arc rectifier, the first permanent rectifier installation being at Gordon in 1927. The power to the overhead is fed direct from the substation or by feeder cables to the sectioning huts.

SUBSTATIONS	LINE SUPPLIED	SECTIONING HUTS	NOTE
Prince Alfred (Central)	City, Western, Illawarra	Illawarra Junction 1 & 2	(1)
Meeks Road (Marrickville)	Illawarra, Bankstown	Rockdale, Canterbury	
Hurstville	Illawarra	Mortdale	(2)
		Como	(3)
Sutherland	Illawarra, National Park		
Belmore	Bankstown	Bankstown	
Lewisham	Western	Ashfield	
Strathfield	Western, Main North	Lidcombe, Rhodes	
Epping	Main North	West Ryde	
Hornsby	Main North, North Shore	Pennant Hills	(4)
Gordon	North Shore	Turramurra, Chatswood	
St. Leonards	North Shore	Waverton	
Argyle St. (Harbour Bridge)	North Shore, City		
Granville	Western, Liverpool	Guildford	(5)
Cabramatta	Liverpool, Regents Park-Cabramatta	Warwick Farm	(6)
Sefton	Lidcombe - Regents Park - Cabramatta, Bankstown		(7)

NOTES: 1. Separate huts for Illawarra and Western lines.
2. For Electric Train depot only
3. Replaced by hut at Oatley
4. Replaced by huts at Beecroft and Thornleigh
5. Later installation
6. For Racecourse branch only
7. Later supplied Elcar Workshops

The substation shown with the sectioning hut above is only nominal. Supply is usually available from the substation on either side.

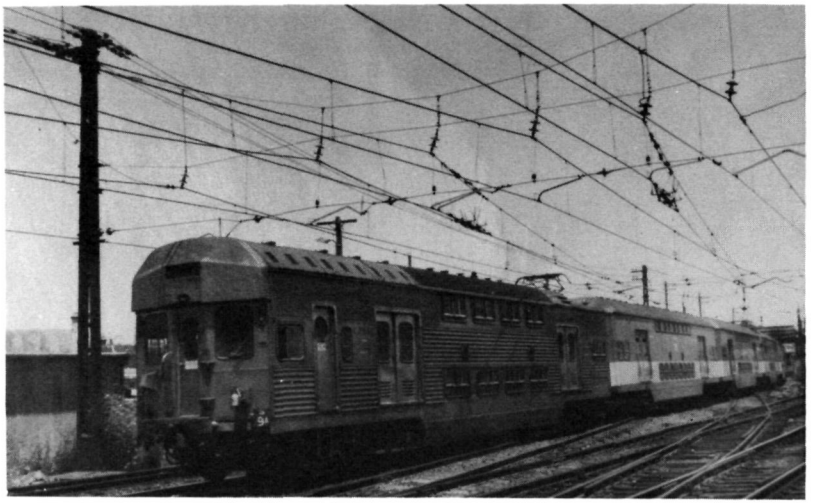
The first overhead erected was between Tempe and Rockdale on the Illawarra line. There are four tracks on this section and polygon (spanwire) suspension was used to support the catenary and contact wires. Lattice, steel masts supporting the overhead and parallel feeders were set in concrete footings. Further sections of this type of construction were used to Hurstville, interspersed with portal structures. These are bolted to the footings. Some of these spanned the four tracks, others two, with bracket arms over the outer tracks. Various types of insulators, fittings, etc. based on different overseas systems were used, although Ohio Brass types were mainly used. The portal structure, spanning two or four tracks was subsequently adopted as standard although other supporting systems were also used. Wooden poles support an inclined catenary on the single track branch from Loftus to the National Park. Polygon suspension was again used on the double track lines from Lidcombe to Regents Park and Cabramatta and from Granville to Liverpool, but here each mast is made from two reclaimed rails set in the concrete footing.

The standard adopted for the catenary wire was 0.4 sq. in section and that for the contact wire 0.21 sq. in. Both phonobronze and cadmium copper wire were used. A stranded, galvanised steel wire was used for the catenary on some sidings and secondary lines. This has generally been replaced by copper of 0.25 sq. in. section although some still remains. This overhead is a fixed anchor design with a working range of 32°F to 120°F. The nominal contact wire height is 16' 6" with 15' 0" minimum and 18' 0" maximum at 70°.

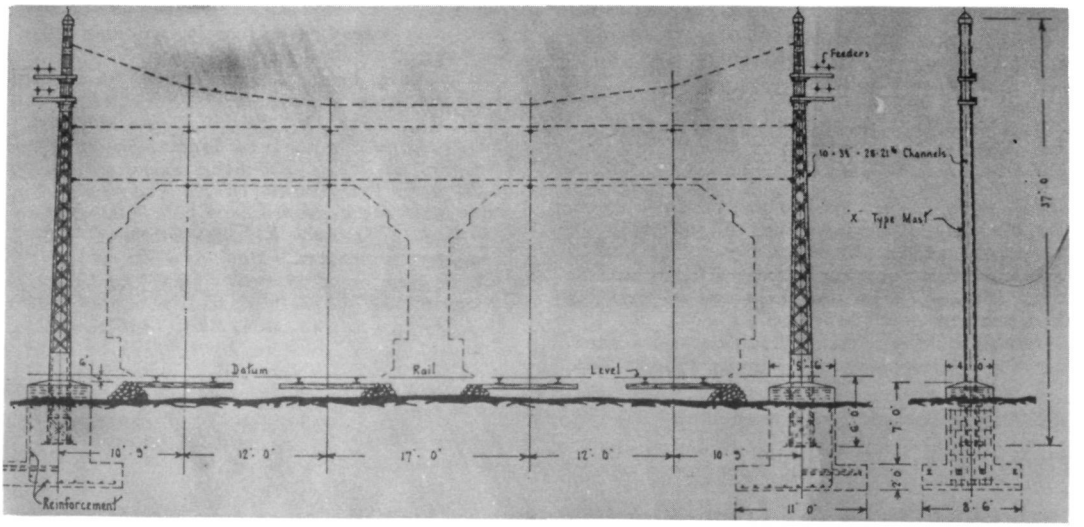
ROLLING STOCK

The first mention of rolling stock for electric use in Sydney was in the comprehensive report on the city and suburban railways and harbour crossing prepared by Dr. J.J.C Bradfield, an engineer with the Public Works Department and later Chief Engineer of the Metropolitan Railway Construction Branch, after an overseas fact finding tour in 1914.

Much impressed with the New York Subway system, he recommended that the then latest design of car in use there should be adopted for use in Sydney. He proposed an all steel, two motor car, 67' 0" long and 10' 6" wide, with three sets of power operated doors on each side. One motor was to be mounted in each bogie, which were to be of the maximum traction type. Multiple unit control was to be

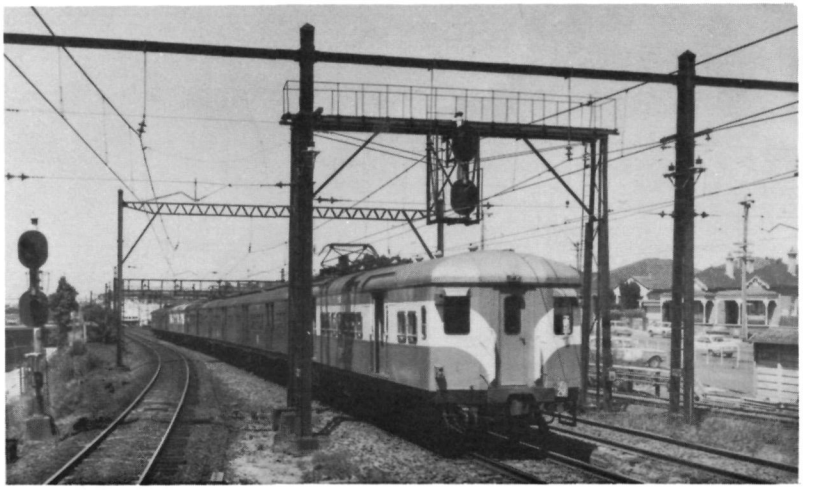


A modern train passes under the polygon overhead suspension at Tempe, early in 1976.

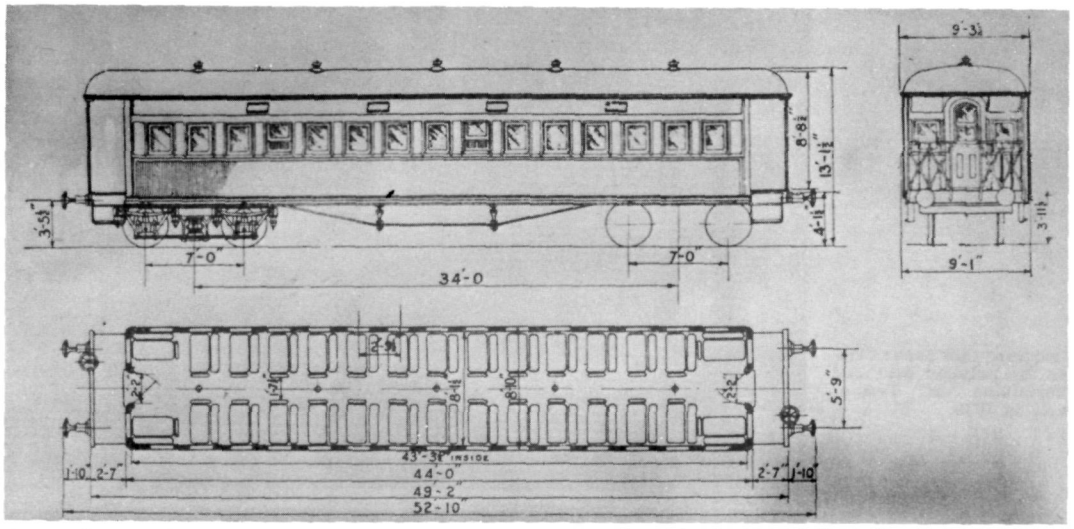


Typical 4 track Polygon Suspension Span as used on the Illawarra line.

(Transactions of the Institution of Engineers, Australia, Volume 7, 1926)



A train approaches Carlton on the down local line. Three different types of portal structure as well as a single track signal gantry can be seen.



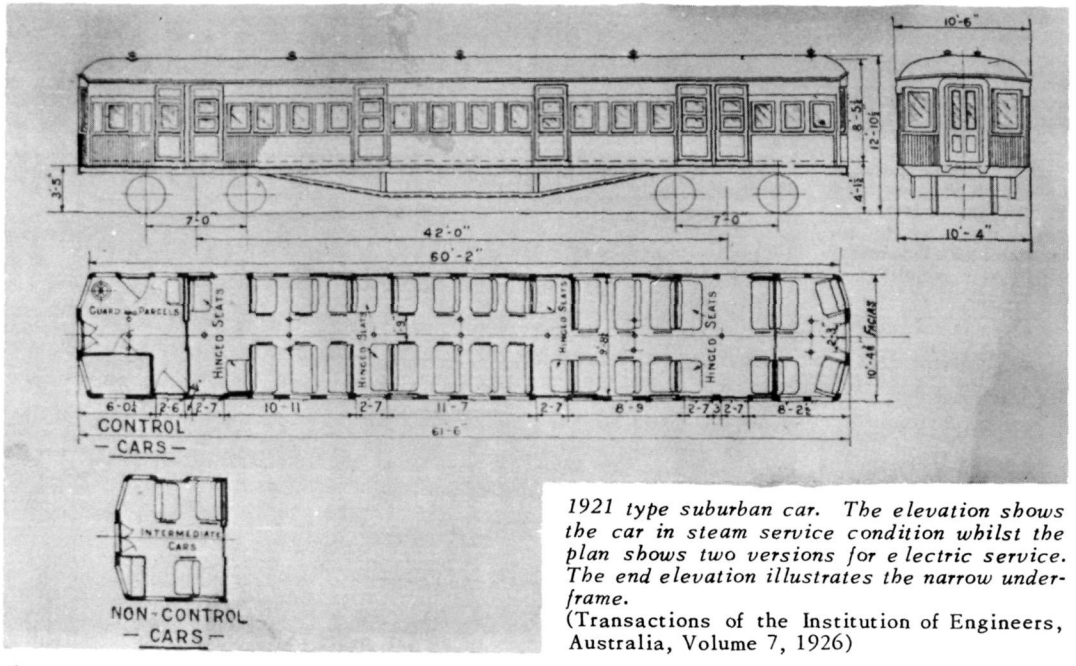
Typical end platform suburban car. Although seating arrangements and roof design varied, the basic dimensions are representative of the period 1877 to 1916.
(Transactions of the Institution of Engineers, Australia, Volume 7, 1926)

used with 7 cars, all motored, in a train, Recognising the high cost of providing all motored cars, he suggested that as an interim measure, 3 motor cars and 4 trailers could be used instead. The trailers would be existing end platform steam stock.

Neither of these train formations were used, but the trailer cars, in a heavily rebuilt form, were later incorporated into the electric fleet, becoming the oldest cars therein.

The steam stock cars considered for use by Bradfield were a group of 196 built from 1913 to 1916. They were 49' 2" long and 9' 3½" and conformed to the end loading, open platform design, which had been built, with only minor variations, since 1877. The orders for these cars were shared by Clyde Engineering Company (75) and Ritchie Brothers (121). Steam stock numbers were:-

Clyde cars	1783 to 1807, 1875 to 1924
Ritchie cars	573, 582, 652, 656, 629, 631, 745, 804, 888, 1808 to 1823, 1855 to 1874, 1995 to 2034, 2050 to 2057, 2076 to 2130



1921 type suburban car. The elevation shows the car in steam service condition whilst the plan shows two versions for electric service. The end elevation illustrates the narrow underframe.
(Transactions of the Institution of Engineers, Australia, Volume 7, 1926)

Although wooden bodied, the cars had steel underframes and automatic couplers. Lighting was still by gas. Classed BB (First) and FA (Second), they were marshalled into 5, 6, 7 and 8 car sets. Terminal cars had guards compartments and screw couplings at the outer ends. (Although auto coupled between cars in the set, side buffers as well as centre buffer/tread plates were fitted.) Being auto coupled they were not normally mixed with older cars which were mainly close coupled by a link. Sets 72 to 91 have been identified as comprising these cars. Some cars were loose, presumably screw coupled at both ends, but the marshalling arrangements of others have yet to be determined. Three 5 car sets, Nos. 81, 82 and 83 were used in Newcastle. This, however, does not accord with figures quoted for the total number of cars in steam service in Sydney prior to electrification. Four cars, Nos. 2023/4/5/8, were used as hospital cars during the First World War.

Three cars of this group were used for experimental purposes. FA 1864 was converted into a railmotor in 1921 and renumbered 2. Not entirely satisfactory, it reverted to its original use late in 1925. In 1924 BB 1865 and BB 1866 were converted as prototypes for the rebuilding of the group for electric service. Both were rebuilt without platforms and with flat roof ends. No. 1865 was widened to 10' 6" and provided with 2 pairs of double doors in each side. This layout was a shortened version of the steel cars then being built but the car was not equipped for electric service or renumbered and languished out of use at Elcar until the early 1950's. No. 1866 was provided with a door at the end of each side as well as one in the centre. It was not widened and subsequently was used in this condition in steam service for a further 40 years.

The remaining 193 cars of this group were widened and enclosed and became the wooden electric trailers. It is interesting to speculate why No. 1864 was not likewise converted after it had reverted to steam service.

The cars proposed by Bradfield appeared in 1920. Designed under the direction of E.E. Lucy, Chief Mechanical Engineer, N.S.W. Railways, about the only recognisable feature as originally proposed was the width of 10' 6". The cars were 61' 6" long with a wooden framed body on a steel underframe. There were 6 hand operated doors on each side, either single or grouped in pairs. One on each side was an inwards opening swing door, the remainder were sliding. The two sides of a car were not symmetrical. Designed for conversion to electric motor cars, a compartment at one end had windows and doors placed accordingly. Seating was transverse, mainly two on one side of a centre aisle and three on the other, with a capacity of 90, or 82 in those cars with a guard's compartment. Eighteen seats were of the tip-up type and were fitted in the doorways. Although referred to as the wooden cars because of the matchboard side panels, the sheathing below the windows was actually steel. Specification 902 of 1919 for Electric Cars stated, inter alia, "---The sheathing below the windowsill will be of interlocking steel or iron, which will be supplied by the Department cut to length, but it must be assembled and secured in position by the contractor---." Electric lighting was fitted when the cars were built, the first large group of suburban cars to be so treated. Instructions issued for the operation of the electric light indicated that the connection between cars was by a wire in the car end near the roof. Examination of a photo of car 2172 in Eveleigh workshops shows this wire above the end window, but also prominent are two jumper sockets, one below each end window. These are of a type used on other vehicles for lighting and would appear to be the more likely connection in this instance also.

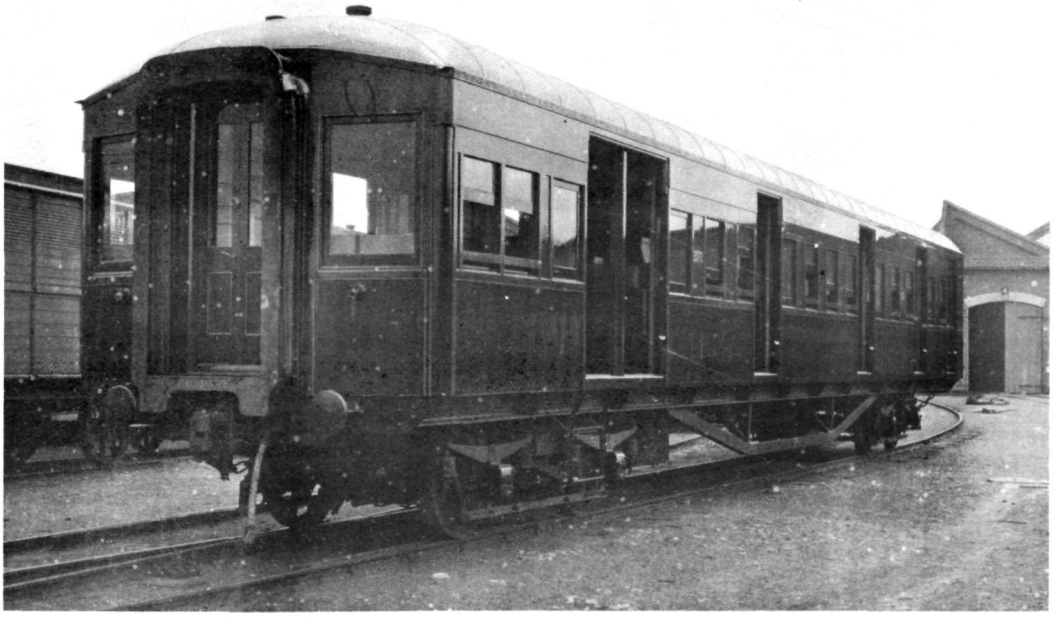
Three manufacturers shared the order for 100 cars:-

Clyde Engineering Co.	—Nos. 2112 to 2153 (42)
Ritchie Brothers	—Nos. 2154 to 2193 (40)
Meadowbank Manufacturing Co.	—Nos. 2194 to 2211 (18)
Total	100

In addition, Eveleigh workshops built one car, No. 2212. Fiftyseven cars were second class and coded EFA, while the remaining 44 were first class and coded EBB. First deliveries of these cars was made in December 1920 to the Clyde Wagon Works. They were, at this time, out of gauge for most lines and the Wagon Works were the more readily accessible from the manufacturers. As mentioned previously, the North Shore and Bankstown lines were the first converted to the wider loading gauge and the cars were assembled into 22 sets, numbered from 92 to 113, to work on these lines. Sixteen sets for the North Shore were made up of 4 of the new cars with an end platform car at each end because of weight limitations on that line. Nevertheless, it was still necessary to raise the boiler pressure and enlarge the cylinder diameter of the C30 class tank locomotives used there to enable them to cope with the new trains. The end platforms of the older cars used in these sets were extended out to reduce the gap to the station platforms. The remaining 6 sets were for the Bankstown line and each comprised 6 of the new cars. These 22 sets accounted for 100 of the new cars. The Eveleigh built car was the odd one out and will be dealt with later.

As with the 1913-16 cars, automatic couplers, side buffers and centre buffing/tread plates were fitted to these cars with screw couplings at the outer ends of sets. In addition, diaphram connections were provided between the cars in the set.

The first recorded movement of the wide cars to Hornsby for North Shore working was on 9th January 1921. Special instructions were issued for this and all subsequent moves.



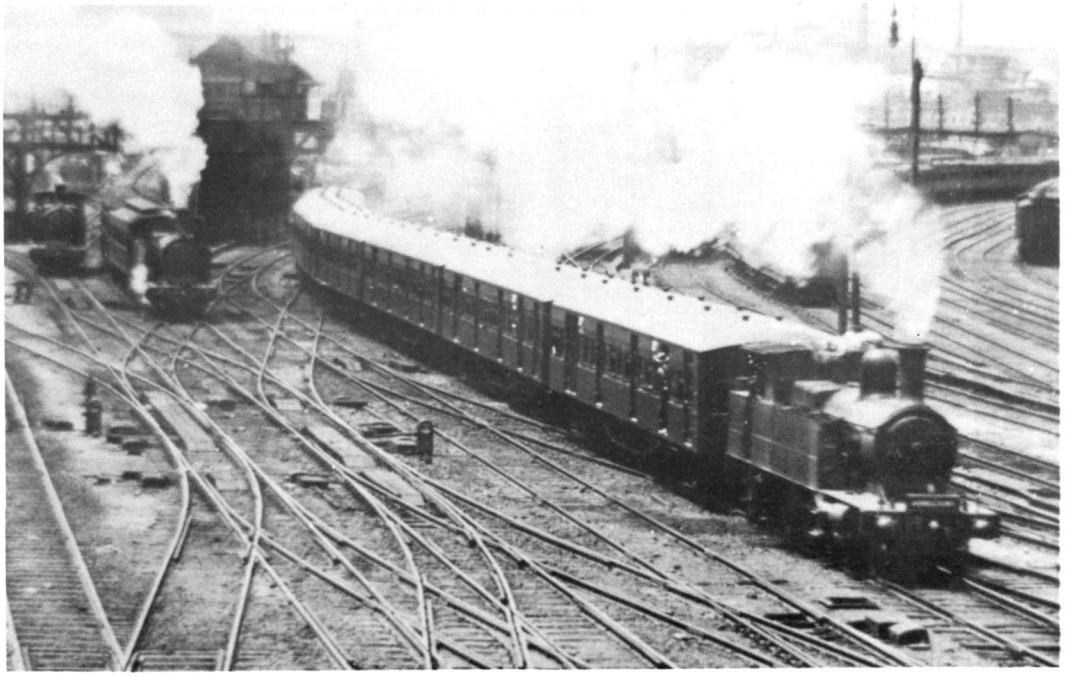
1921 type suburban car No. 2172, in steam service condition. Items of note are the automatic coupler, side buffers and diaphram and twin end doors. The two types of lighting connections are visible as are the rivets at the lower edge of the exterior steel sheathing. When equipped for electric service (as C3080) the trailer bogie at the left hand end was replaced by a motor bogie. The driver's and guard's compartments were fitted at the other end of the car. —P.T.C.N.S.W.

Speed was limited to 25 mph, with 4 mph through stations, bridges, etc. There were to be no movements on adjoining lines. Although built to 10' 6" over the bodies, the underframes of these and later electric cars were narrower. This was undoubtedly a design feature to help alleviate difficulties when it was necessary to move them over lines built to older loading and structure gauges. Prior to the adoption of the Australian standard loading gauge in 1912, which, with amendments, was adopted for the forthcoming electrification, platform faces were 5' 1¼" from the track centre line, but the height was only 2' 9" above rail level. Thus the wide cars could overhang the platforms. The cars entered service between Hornsby and Milsons Point on Sunday 23rd January 1921. The Bankstown line first saw these cars on Sunday 18th December 1921 when stock was moved from Clyde to Sydney Yard via the Enfield goods lines which had recently been built to the 1912 gauge. They were scheduled to take up running the same day. This commencement on a Sunday, the same as the North Shore line, was unusual for the period, major changes normally being introduced on a Monday.

With the introduction of the wide cars to the Bankstown line transfers of cars to and from Hornsby were then made to Eveleigh via Enfield, instead of to Clyde. Other lines were gradually widened and the use of these cars extended. Sutherland and The National Park were reached in 1924 and Waterfall in 1925 in the widening programme, but it is doubtful if the wide cars ever ventured there. Their use on special trains to Warwick Farm Racecourse via Canterbury and Enfield, commenced on Saturday 27th March 1926. They did not, however, use the main line between Redfern and Homebush until electrification.

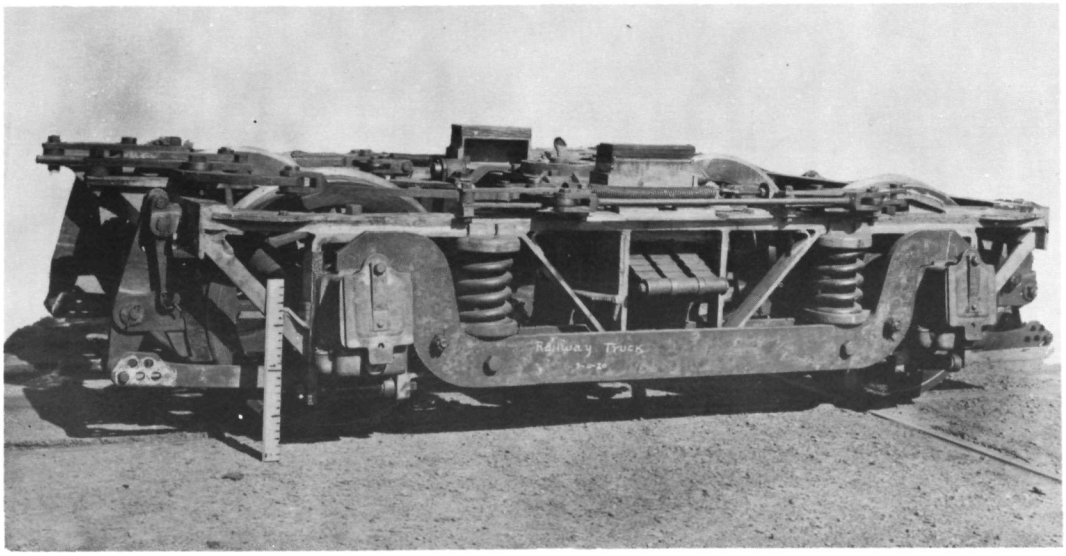
The last car of this group to enter service was No. 2212, built by the railway workshops at Eveleigh. It has generally been assumed that this car was intended to be a prototype, which it probably was, but not in the accepted manner. Shop Orders C6016 and C6017 for the construction of the body and underframe, resp. were issued in 1919 about the same time that the contracts were let for the 100 other cars. These orders were shown as complete on 10th February 1923, the day the car was issued to traffic, a very long time just to build one car.

Whereas the production cars rode on bogies similar to those under the earlier suburban stock, a pair of bogies constructed at the Randwick Tramway Workshops were used for No. 2212. The drawings for these bogies were issued on 19th November 1919 and manufacture was completed by November 1920. Of all welded construction with outside equalisers,



Sydney yard in steam suburban days. A C30 class 4–6–4 tank loco hurries a six car train of wide 1921 type carriages toward Bankstown. —P.T.C.N.S.W.

Milsons Point station in the early 1920's with a North Shore set of 1921 cars in the platform and another on the siding with the end platform terminal cars. —from an old postcard



Interurban type motor bogie built at Randwick Tramway Workshops and initially used, in steam service, under 1921 type car 2212.

—P.T.C.N.S.W.

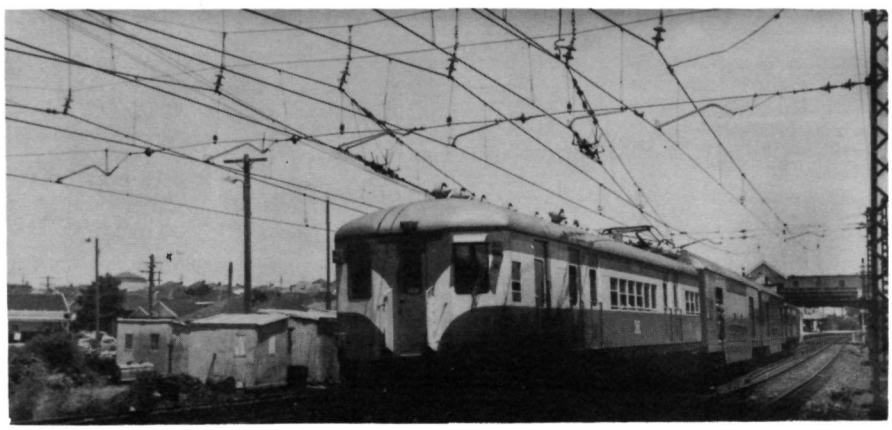
coil primary and elliptical secondary springs and 36" wheels they were an adaption of a Baldwin MCB type 84, or similar, interurban motor bogie.

It is not unnatural that tramway technology should be drawn upon as it was highly developed by this time and the proposed 1500V DC suburban system could be seen as an extension of 1200V DC heavy interurban operation. Trials with this higher voltage were carried out on the Sydney tramways in 1915 and there were proposals for interurban type lines in Sydney and Newcastle. It is thus possible that the 1921 cars owe their origin partly to interurban practice.

Whilst there is a slight possibility that this car was trapped in the workshops due to loading gauge problems, it is more likely that it was used to determine equipment layout and weight distribution for the envisaged use of this class as motor cars. It is also possible that some 1200V DC equipment was on hand for such deliberations. Although inconclusive at this stage, research on this subject is continuing.

Before being issued to traffic No. 2212 was steam hauled to Bankstown, on trial, on 19th December 1922. The car was a terminal one, being fitted with an automatic coupler at one end only. The Randwick bogies remained under this car until 18th December 1924 when they were transferred to the State Governor's car. From there they went (together with the underframe of the SG) to the new Dining Car, AB 90 where they remained until removed from service in March 1935. Thus they ventured as far afield as Broken Hill, nearly 700 miles from the lines to which they would have been confined if they had served their original intended purpose.

.... to be continued



TRAMS IN JAPAN

by W. A. Pearce

THE tramway systems of Europe and North America have been well documented, and so are familiar to many Australian tram enthusiasts. Closer to home, but much less well known, are the Japanese tramways.

In September 1975, the author spent three weeks in Japan, and in the following article describes some of the tramway systems of that country.

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As with most other visitors to Japan, my first stop was Tokyo, on the main island of Honshu, and the national capital. In size, this city is overwhelming, its population exceeding 11 million people. To transport these multitudes about their business there is a vast and complex public transportation system, including above ground and underground railways, a monorail line, buses, taxis and even a solitary tram line.

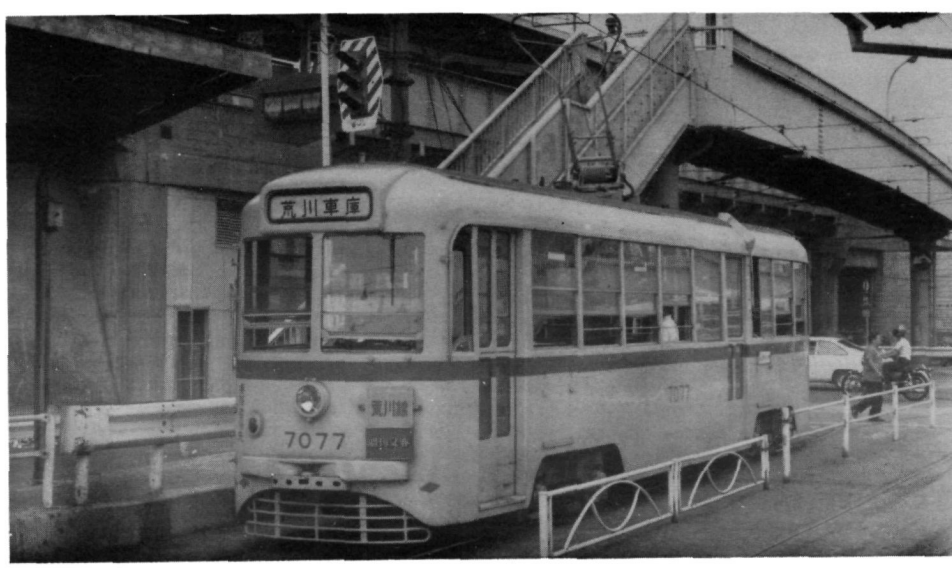
Encircling what was originally the built-up area of the city, the Japanese National Railways (JNR) has an above ground loop line, vaguely elliptical in shape and about 36 km in circumference, called the Yamate (sometimes given as Yamanote) Loop Line, and handling suburban traffic. Coming in from the outer suburbs are a number of private railways, all of which run to terminals adjacent to the Yamate Loop. For many years public transport within the Loop was mainly handled by a large tramway network, but with the build-up of road traffic, trams have given way to buses and an extensive underground railway system.

The surviving tramline, in the northern part of the city, is the last remanentof the tramways of the Tokyo Metropolitan Transportation System. This line, known as the Ara-Kawa line, runs northwards from Waseda, crossing the Yamate Loop at Otsuka and the Tohoku Line of the JNR at Oji. From here it turns east and terminates at Minowa-bashi after traversing a distance of about 12 km. An unusual feature of the Tokyo Metropolitan system is its gauge of 1372 mm (4' 6"), which as far as I know is peculiar to Japan.

After arriving at Tokyo I went by train to Oji to have a look at this tramline. Alongside Oji station, and connected to it by a footbridge, is Oji Ekimae tram stop. Here the tracks going east are in a reserve, whilst those going south are in the street. Lack of time prevented me from riding this line; I would have liked to find out if most of it is on reserved track, its continued survival suggests that this might be so.

During my stay at Oji I saw TMT cars of the 7000 and 7500 classes. These are neat looking modern bogie trams in a livery of

Tokyo Metro 7000 class car at Oji Ekimae. This car has terminated after arriving from the eastern end of the line, and will shortly set off eastwards again, destination Ara Kawa depot.



In 1973, Hakodate's most modern trams were the 800 class, and here No. 806 is seen in the forecourt of Hakodate station.

yellow with a red waist band. Current collection is by bow collectors, these being very convenient when the car reverses, as some do at Oji. After stopping, the motorman shifts his controls from one end of the car to the other, and on moving off the collector just swings up and over to the trailing position; no fiddling around with ropes and trolley poles. The trams themselves are clean and appear in good repair, the tracks in the vicinity of Oji are in good shape, and the service is quite frequent, although lightly patronised, this perhaps being due to it being a Sunday.

With regard to tram classifications, these are generally numerical on most Japanese systems, as their method of writing does not have an alphabet. However, in some cases Roman letters are used as well as numbers.

From Tokyo I travelled to the northern island of Hokkaido. From Honshu there is a JNR ferry service to Hokkaido, which lands at Hakodate, a city of about half a million, and one of two cities in Hokkaido with trams. I had been in Hakodate in 1973, and this time intended to make a short stop to have another look at its trams, but the after effects of a typhoon in the area made this impossible. However, I believe that there has not been much change since my last visit. The tramway, of about five main routes, is run by the Hakodate Municipality, and is of 1372 mm gauge. In 1973 there were three or four classes of bogie cars in service, the older ones being in a livery of dark blue and buff, and the more recent cars in a grey-green and cream.

Having to miss Hakodate, I flew directly to Sapporo, an attractive city of about one million, and the capital of the island. As Japanese cities go Sapporo is not old, having been founded in 1871, and it is laid out with numbered streets in a right-angled grid pattern. At one stage it had a fairly extensive 1067 mm (3' 6") gauge municipally run tramway, but in 1973 this was down to two routes, and by 1975 only one was left. This starts in the city, goes out in a big loop to the south-west, then returns to the city, terminating two blocks from its starting point, and covering a distance of about 9 km.

Sapporo's trams are modern attractive looking bogie cars, one man operated, with a livery of green with buff or light grey upperworks. As well as the ordinary trams, two car articulated sets are run during peak hours, these having a conductor as well as a motorman. There is still quite a variety of classes in use and cars numbered in the 210, 220, 250, 320, 700 and A820 series were seen, the A820's being the articulated sets.

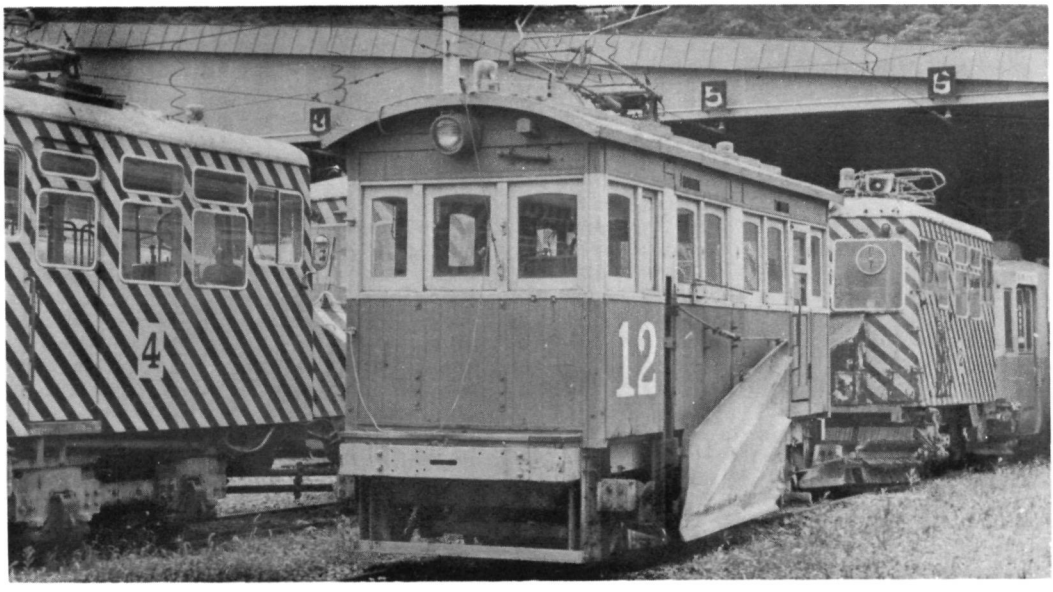
The system is all street trackage, and has large paving stones laid between and outside the rails, a method of construction much used on Japanese tramways. Grooved rail is not often seen, except on curves, and the rails are usually standard flat-bottom railway rails, sleeper laid. With poor maintenance the paving stones can get out of place, giving a rough road surface, and this is now happening in Sapporo. The trams themselves are looking a bit grubby and rundown.

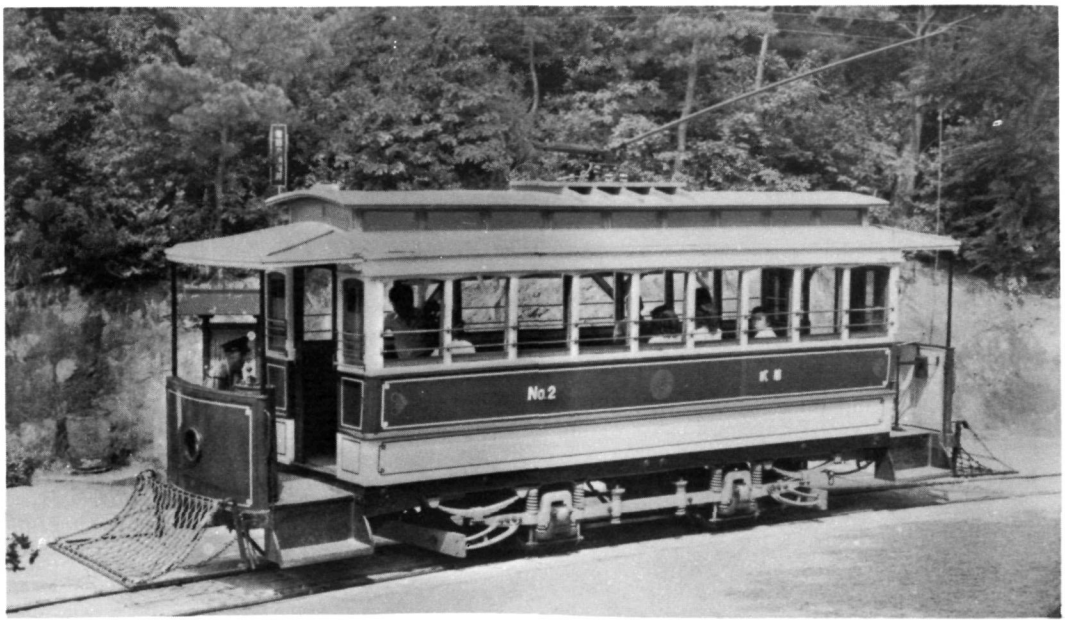
Having plenty of time in Sapporo I was able to travel right round the system, at a total cost (flat fare) of 30 yen, about 8¢ (Aust.), and also to visit the tram depot. Whilst taking photos through the depot fence I was approach-

In Sapporo, a Nishi 4 Chome bound 250 class car passes an A820 class articulated set near Kotsukyoku Mae tram stop.

ed by one of the depot employees who indicated that it was all right to come in and look around, which I did. There were quite a few trams inside, including several of the articulated sets standing dusty and obviously out of use, a sad sight. As well there were some interesting service cars. Sapporo is at a latitude of about 43 degrees north, and gets heavy snowfalls in winter. Thus there is need to keep the tram tracks clear of snow, and these service vehicles included about ten snow sweepers; four wheel cars with odd shaped black and yellow striped bodies, fitted at front and rear with large, power driven, rotating cylindrical brushes mounted at an angle across the track. Another four wheeled car had hinged side

Snow clearing cars at Sapporo depot. No. 12 is a plough, Nos. 2 and 4 are snow sweepers. These cars are fitted with rotating clear-view screens in their end windows, one such device can be seen in the window of No. 2.





In the sylvan surroundings of the Meiji Mura Museum, ex-Kyoto Electric Railway Brill four-wheeler of 1895 awaits its next load of passengers.

wings that could be swung out to act as snow-ploughs, and would probably be used in conjunction with a snow sweeper. Hakodate also has similar snow removal cars.

From Sapporo I flew back to Tokyo, and there caught a JNR 'Bullet' train to Nagoya, which with three million inhabitants is Japan's third city, and is the headquarters of the Nagoya Railway Company, also known as Mietetsu, which is one of Japan's biggest privately owned railway companies. Nagoya is also a handy base from which to visit other places of railway and tramway interest.

One such place is the Meiji Mura Museum, about 20 km north of Nagoya. This Museum shows the adoption of Western technology by Japan, which commenced with the accession of the Emperor Meiji to the Japanese throne in 1867. It comprises a village (mura) of about forty historical buildings from all parts of Japan, reconstructed in extensive grounds along the shores of a lake. There is also an operating railway with a 2-4-0 tank engine of 1875 hauling three four wheel passenger cars, and an electric tramway of about half a kilometre or so.

This tramway has two end-platform four wheel Brill trams of 1895, apparently the first electric trams to run in Japan. They were originally supplied to the 1067 mm gauge Kyoto Electric Railway, and ran on the Kitano line there until about 1961, entering the Museum in 1965.

I visited the Museum in the morning, firstly catching a Mietetsu train from Kami-Iida station in Nagoya to Meiji Mura Guchi station, and from there by bus. Entry to the Museum cost 500 yen, and once inside a five minute walk brought me to the tramway. Both cars have been beautifully restored, with rope net lifeguards fore and aft, and in their livery of chocolate and white, with white and gold lining, they really look good. The out and back tram ride costs 100 yen, and the conductor gives a commentary on what you see along the way, which raised gales of laughter from the Japanese passengers. Although both cars are on view it seems that only one is normally in use, there does not appear to be any passing loops on the single track line, and the second car is apparently on standby.

After an interesting morning at the Museum, I returned to Meiji Mura Guchi station, and there caught a train travelling via Inuyama to Gifu, a city of half a million people, and about 30 km to the north of Nagoya. Gifu has a city tramway and two interurban railways, all part of the Mietetsu empire. The tramway system, of 1067 mm gauge, is fairly small, apparently having only two main routes. It operates at least three different tram classes, the most modern of which are the 570 class, fairly squat looking bogie cars. Earlier cars are of the 550 class, similar in layout to the 570's, but more angular in appearance. The third class seen, the 560's, are not original Gifu cars but are second-hand, coming from Kanazawa, a city on Honshu's north coast, whose tramway closed in 1967. The 570 class cars are usually in an all green livery, the others are green and cream, and all appear to be one man operated.

Both of the interurban railways run their cars into Gifu over the city tram tracks, but during my stay there I saw only the cars of the

Ibi line, which runs to Hon Ibi, west of Gifu. These cars, with their rounded ends, folding steps, bottom equalizer bogies, m.u. equipment and red and white livery are a marked contrast to the city trams. The other interurban line operates modern but surprisingly narrow cars to Mino, a town to the north of Gifu, but I was not in the right place apparently to see any Mino line cars. From Gifu I returned to Nagoya by the direct Nagoya Main Line of the Mietetsu Company.

Next day saw me at Kyoto. This city, pleasantly situated at the foot of a range of hills, was the capital of Japan for over 1000 years. It has many palaces, shrines and other buildings of historical importance, and also has what is probably the largest tramway system in Japan. This is of standard (1435 mm) gauge, and is run by Kyoto Municipality. The system comprises a large rectangular loop, about 4 km by 8 km, right round the outskirts of the city, a smaller loop to the east, and one north-south and three east-west cross town lines within the main loop. There are also two privately owned interurban lines, both of which do some street running.

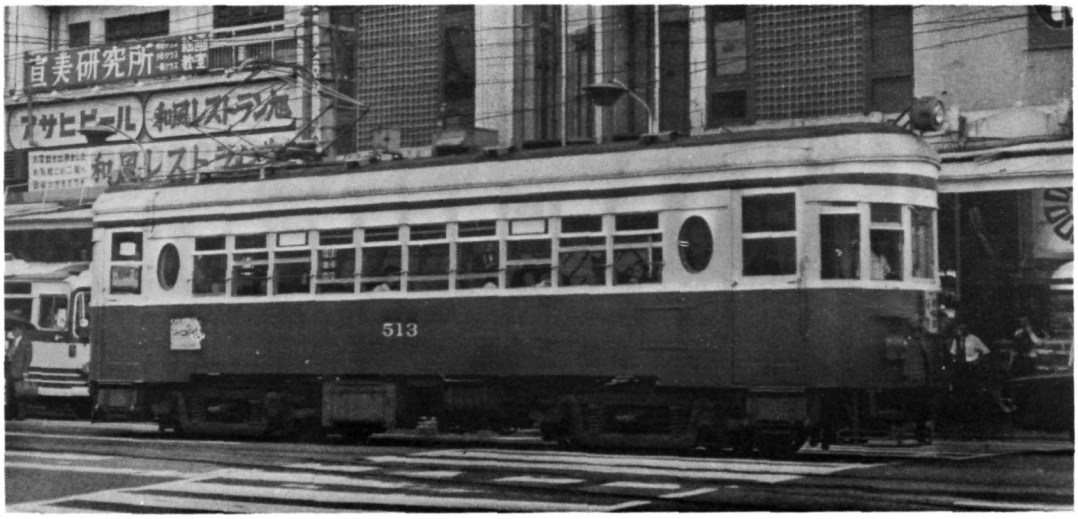
At its peak, Kyoto had 70 km of route and and about 400 trams. Increasing road traffic has caused the closure of some routes, and I would guess that it is now down to about 45 km of route and 200-250 cars. Kyoto's trams apparently underwent re-bodying some years ago, and they all look fairly similar externally. Only four classes were seen:- 600, 800, 900 and 2600. The livery is green and cream, and they are fitted with air horns - very useful for blasting taxis off their tracks. One man *Pay As You Enter* operation is used. Once again, lack of time prevented me from exploring the whole system, and I had to confine my travels to the south-eastern part of the city. Six routes were seen here, and it is possible that there could be up to ten routes in the whole system.

Kyoto's two interurban railways are both of standard gauge. The smaller of the two is the Keifuku Electric Railway, which has two separate systems. One of these, operating solely on reserved track, will not be touched on here, but the other, on the western side of the city, does some street running. It operates dark green and cream bogie cars with two man crews from Shio Omiya in Kyoto out to Arashiyama, a scenic area with many temples and shrines. A particular feature of interest of the Keifuku E.R. is that it is now the only electrified system in Japan to still use trolley pole current collection.

The other interurban line is the Keihan Electric Railway, which comes up from Osaka and runs out to various towns to the east of Kyoto. From its main Kyoto station of Keihan Sanjo it does some street running in its eastward journey. A fleet of bogie vehicles are operated; modern cars in dark and light green livery, with folding steps to pick up from the street stops, and older cars in dark red and buff which run the express services to the more distant places.

About 40 km to the south-west of Kyoto is Osaka, Japan's second city, with a population of over four million. This city has a JNR loop line, similar to Tokyo, and a large collection of underground and private railways. Up till 1968 it also had a municipally run city tramway, but buses have now taken over. However, there are still trams in Osaka, operated by one

Car No. 573 of the Gifu city tramway stands at Shin Gifu Ekimae tram stop.



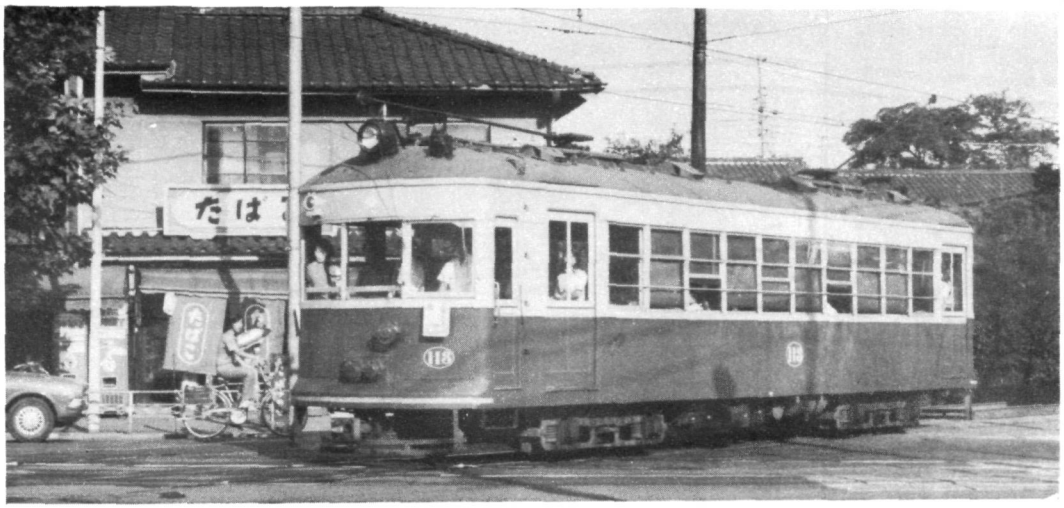
Mietetsu Ibi line car No. 513 in its red and white livery adds a splash of colour to Gifu's streets as it rolls towards Shin Gifu Ekimae.

of the private railway companies, the Nankai Electric Railway Company. These trams, of standard gauge run in the southern part of the city on three main routes, totalling about 16 km.

Running between Kyoto and Osaka there are four separate railway lines; the JNR Shinkansen, JNR Tokaido Line, Keihan Elec. Railway and Hankyu Electric Railway. To travel to Osaka I chose the latter, which delivered me to Hankyu-Umeda station, on the north side of the Loop line. Travelling around the Loop my first stop was at Bentencho to visit the Modern Transportation Museum there, this being mainly devoted to railway exhibits, but also having a San Francisco cable tram on display. From there I then went further round the Loop at Tennoji. Alongside the JNR station here is a Nankai E.R. station, and in the street outside is the Tennoji terminus of one of the Nankai tram lines.

Boarding a Nankai train I travelled out to Sumiyoshikoen, about half-a-dozen stations to the south. Here one of the tram routes runs into a terminus beside the railway station, and about 50 metres away there is also a main street with another tram line, altogether a good spot for tram watching and photography. The Nankai trams have a slightly old-fashioned look, but there is one modern class, the 501, introduced in 1962. These have air suspension bogies, and were the first Japanese trams

Kyoto Municipal car No. 1801, of the 800 class, approaches Higashiyama Shichijo tram stop. A distinctive feature of Kyoto's trams are their high mounted, dual headlights.



Keifuku Electric Railway car No. 113 crosses Nishioji Dori, en route from Shijo-Omiya to Arashiyama.

to be so fitted. The livery is a simple one of dark green and cream, with some cars in an overall dark green.

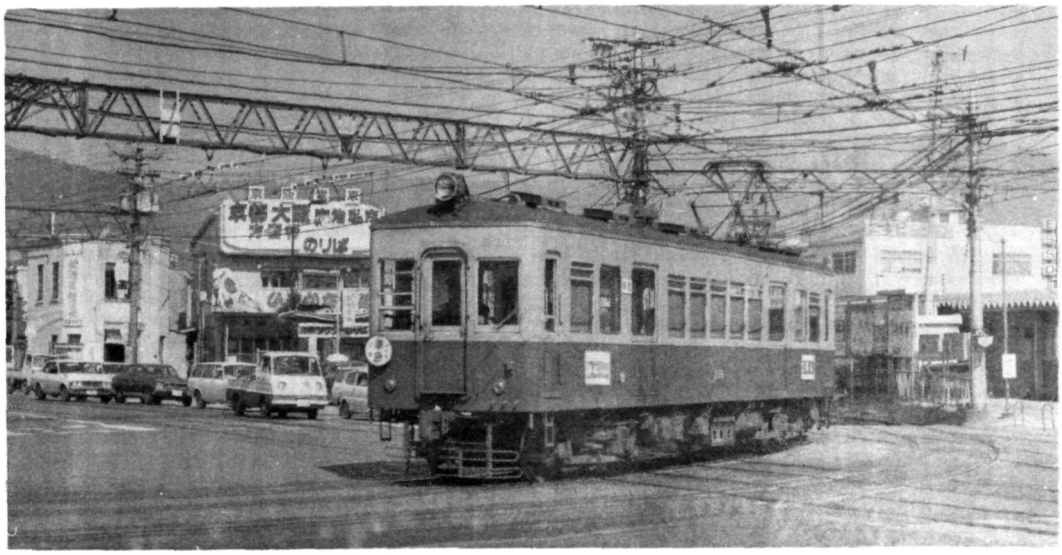
The Nankai system does not appear to use route numbers, and indeed some cars do not have destination rolls as such, but instead small destination boards are hung beneath the driver's window at front and rear. All cars appear to have two-man crews.

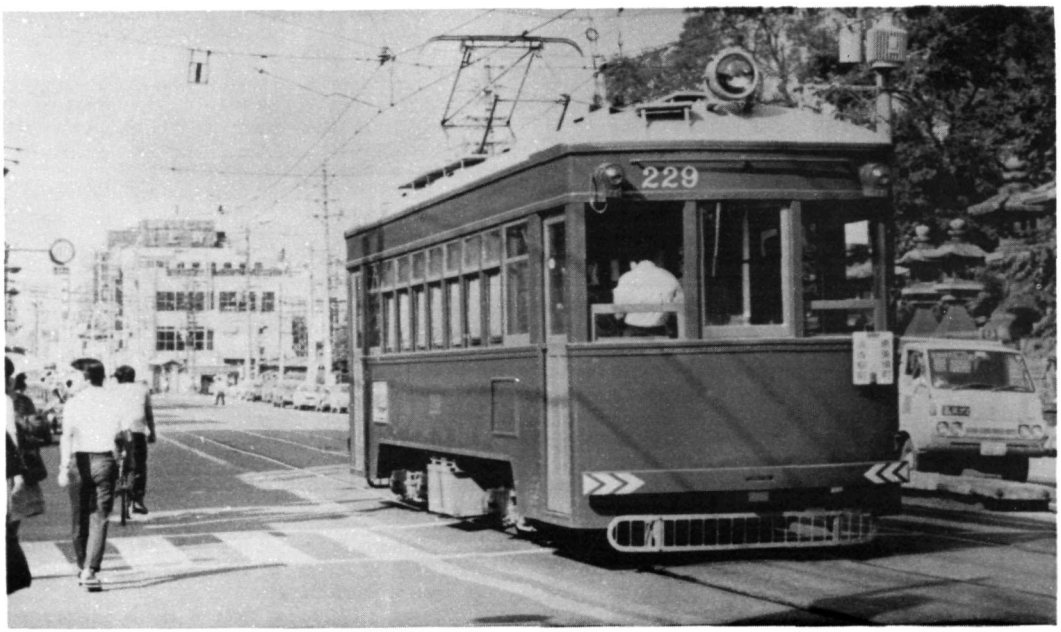
By now time was getting on, so I boarded a 501 class car bound for Tennoji. Its air suspension gave a smooth and level ride, but could not fully control yawing when it occurred. Arriving at Tennoji I then returned to Kyoto via the Loop line and the Hankyu Electric Railway.

Perhaps at this stage it might be of interest to look at some of the features of Japanese trams in more detail.

Most city trams have a fairly standardised internal layout, with longitudinal seats, often covered in red or blue plush. Floors generally are unpainted boards, and often hump up and down in places to clear various bits of underfloor gear. For standing passengers plenty of overhead grips are provided, sometimes these are spring loaded to swing up clear of the centre aisle. Almost all cars have power operated doors, either sliding or folding, sometimes both. One man operation is common, usually with a flat fare rate. Some cars have

A two car train of the Keihan Electric Railway leaves Hama Otsu terminus on its return journey to Kyoto.





No. 229 of the Nankai Electric Railway's 200 class passes Sumiyoshikoen en route to Tennoji terminus in Osaka.

front entry and pay as you enter, others have rear or centre entry and pay as you leave. Entry and exit doors are marked with the appropriate Japanese characters; luckily for Westerners these are simple and so are easy to remember.

On one man cars a fare box is located beside the motorman, and this usually has a clear plastic top with a slot in it, into which you drop the correct fare. The motor man checks that the amount is correct, and if so he pushes a lever which drops the coins into a cash box below. Change giving is done in several ways, some fare boxes have a change giving arrangement incorporated in them, others have a money changing machine mounted alongside that will give ten 10 yen coins for a 100 yen piece, and in some cases the motorman has the correct change from 100 yen made up in transparent envelopes which he gives out as required. As a matter of interest, in 1973 adult flat fares on most tramways were 30 yen, now (1975) they are generally 60 yen. Child fares are usually half those for adults.

From the illustrations it can be seen that the Japanese make wide use of Arabic numbers, and in most cases the fare is marked on the fare box in these numbers. However, Japanese can be written vertically, and when this is done Japanese numerals are used instead. At least one system does this.

Many trams have an internal public address system over which the motorman can make announcements, using a microphone clipped to the peak of his cap. These systems also play recorded advertisements and can be arranged to announce the names of approaching stops. A system of internal mirrors enables the motor man to watch the rear door, and in addition there are usually photo-electric cells at these doors, actuating buzzers as passengers enter and leave.

Most tramways use Arabic route numbers, generally displayed on boards at the front and rear of the cars, and sometimes these boards have distinctive colours and shapes. Tram stops are usually named, with nameboards on roadside poles or at the ends of safety zones where these are used, but these names are almost always in Japanese characters, as are the car destination indicators.

On the mechanical and electrical aspects of Japanese tram design I can make but little comment. Some cars have roller bearing axleboxes, and there is quite a variety of bogie designs in use, some with air suspension systems. Little information is available in English regarding the builders of Japanese trams, but it is probable that some of the larger tramways would have built some cars in their own workshops.

From Kyoto I went to Hiroshima, whose main claim to fame is its destruction in 1945 by the first atomic bomb, and a visit to the Peace Memorial Park and its Museum is a sobering experience. However, for the enthusiast the big interest here is the tramway system. This fairly extensive standard gauge network of eight routes covering about 20 km in the city area is operated by the Hiroshima Electric Railway Co. (Hiroden). This tramway is of interest in the variety of cars operated, and also in the variety of their liveries. As well as their own cars, Hiroden also has second-hand trams from other systems, and of eight classes seen during my visit, two were ex-

Osaka Municipal cars and one ex-Kobe Municipal. Current collection methods are varied too, and one can see bow collector, articulated bow collector and pantograph side by side.

The basic Hiroden livery seems to be dark green and light green, but the ex-Osaka cars still retain their Osaka Municipal chocolate and cream colours and there are quite a few cars painted in gaudy advertising schemes. In a cream and pink livery, which actually does not look as bad as it sounds, are some articulated and two car sets, which operate over the 16 km line to Miyajima.

Hiroshima is at the head of a long bay, and down this bay is Itsuku Island on which is the small town of Miyajima and the Itsuku Shima Shrine, one of the most beautiful and famous of Japanese shrines. The Miyajima line is a reserved track interurban line, starting from a terminus in the suburb of Nishi Hiroshima and ending at Hiroden Miyajima, a small port with a ferry connection across to Itsuku Island. Services from Nishi Hiroshima to Hiroden Miyajima are run by orange and cream interurban cars, but as there is a connection from the city tramway at Nishi Hiroshima, the cream and pink cars can go all the way from Hiroshima station to Hiroden Miyajima. These cars have a conductor (or conductress) and stage fares, whereas the city cars are one man with a flat fare.

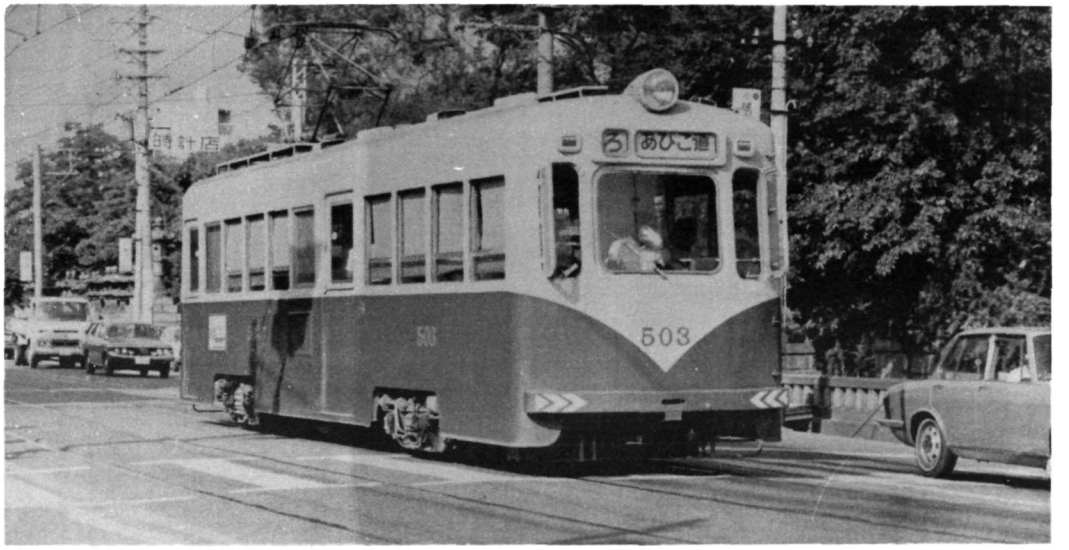
After photography at the tram terminus in front of Hiroshima station, I boarded an articulated set for the run to Miyajima, fare 180 yen. On the reserved track, stops are made at small stations which have two-level platforms-high level for interurbans, low level for trams. Needless to say there is always someone who waits on the wrong platform and has to scamper to the other end when the cars arrive. As it was a warm Sunday, traffic was heavy and there was plenty to see along the line, with trams and interurbans passing at frequent intervals, so a pleasant day was spent before returning to Hiroshima.

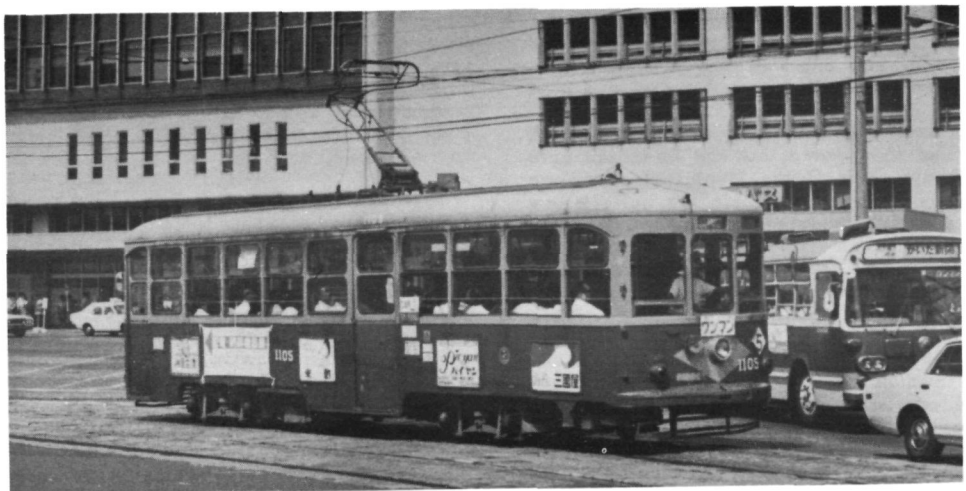
Shimonoseki, at the southern tip of Honshu, was my next stop. Here I had hoped to see some JNR steam locos still at work, but they had all gone, so I had to find an alternative attraction.

Across the Kammon Strait is Kyushu, Japan's southernmost island, and opposite Shimonoseki is the city of Kita-Kyushu, formed in 1963 by the amalgamation of the cities of Moji, Kokura, Tobata, Yahata and Wakamatsu. This is an area of heavy industry, with large steel works and the like, and a network of industrial railways. It also has an interesting tramway operated by the Nishi Nippon Railway Co. (Nishitetsu). This standard gauge system basically comprises a long main line, street running parallel with the JNR Kagoshima Main Line from Moji to Kurosaki, a distance of about 27 km. At Kurosaki there is a junction from which a 5 km branch goes to Orio and a longer branch of about 20 km turns south to Nogota, both of these branches being in reserved track. There is also a 1067 mm gauge street tramway at Kokura, but I did not find out about this until my return to Australia.

As I had especially wanted to travel over the Kurosaki-Nogota section, known as the Chikuho Line, I caught a JNR e.m.u. train from Shimonoseki to Kurosaki, where I got my first close look at the Nishitetsu tramways. The line here is right alongside Kurosaki station, and trams were passing at frequent intervals. The service is run by short bogie cars and two car articulated sets, these latter generally running to Nogota. The standard Nishitetsu livery is a rather sombre one of

Air suspended No. 503 of the Nankai Electric Railway starts from Sumiyoshikoen stop, bound for Abiko Michi.

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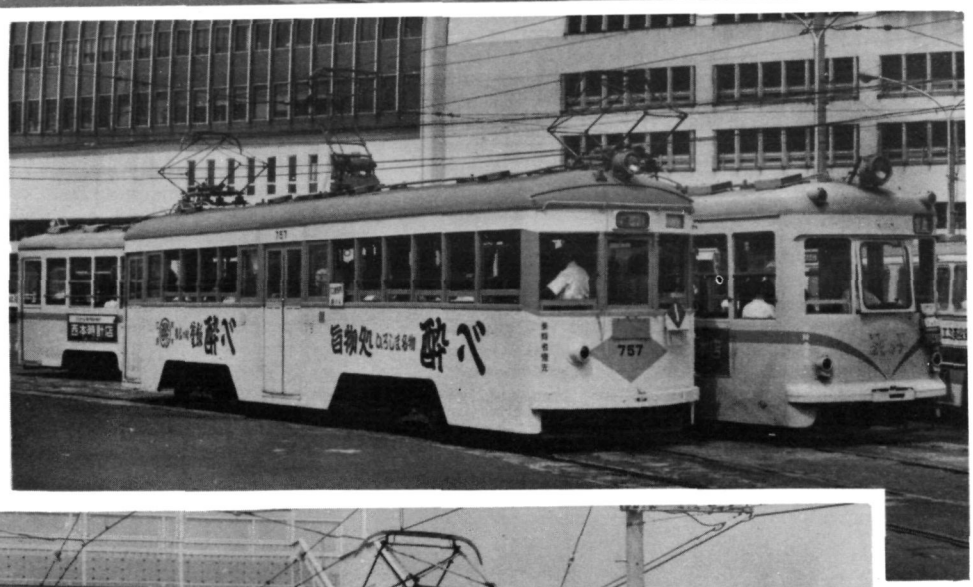
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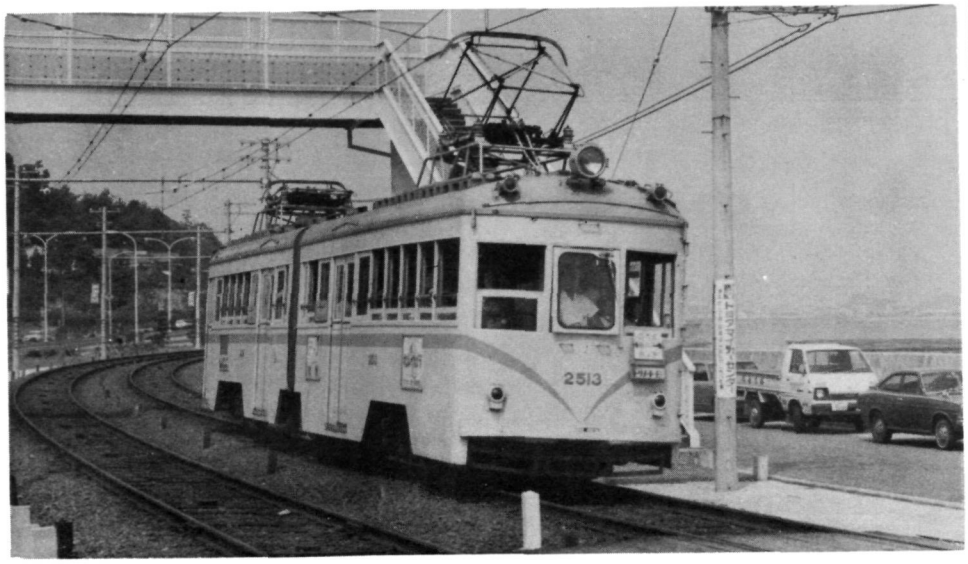
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dark red and buff, which in this case is quite suitable for the smoke and dust of an industrial area. Most of the ordinary bogie cars are one man operated, but because of the long distances involved it is unlikely that there is a flat fare. The articulated cars have conductors and fare stages.

Catching a Nogota bound articulated set at Kurosaki Eki we headed west on reserved track, passing a depot at Kurosaki Shako, and then swinging away to the south, and were soon rolling through pleasant hilly country dotted with small towns, the set running up to about 70 km/h between stops. Just before Nogota terminus the line crossed the Onga River on a 500 metre long plate girder bridge. From the terminus it was just a short walk back to this bridge for a session of photography. All too soon it was time to leave for Shimonoseki, and so I retraced my journey by tram to Kurosaki and by train across to Honshu.

Next morning I was on the move again, recrossing the Kammon Strait into Kyushu and bound for Kumamoto, population about half-a-million, and possessor of a municipally run standard gauge tramway system. Kumamoto's tramway operates over two main routes arranged roughly in the shape of a 'T', covering about 12 km. Although small, the system looks to be in good condition, with well maintained cars and track, and fairly frequent services. The trams are modern bogie vehicles and a pleasant livery of all-over cream with a dark blue waist band. There are also a number of cars with multi-colour advertising schemes.

Three classes of cars were seen in service:- 1050, 1200 and 1350, all one man operated, but there are some older two man cars, in blue and white livery, which are sometimes used in times of heavy traffic.

Route No. 3 runs to Kami-Kumamoto, where there is a terminus of the Kumamoto Electric Railway, an interesting interurban line that still operates mixed trains, these comprise a passenger motor car hauling a bogie goods van.

After a pleasant couple of days riding the KER and the trams and visiting the picturesque Kumamoto castle it was time to be moving again, to Kagoshima, the most southerly of Japan's major cities, and of about the same size as Kumamoto. This city is situated on the shore of Kagoshima Bay, in which is the island of Sakura Jima, whose main geographical feature is a large active volcano, which drops ash and dust on the city when the wind is in the appropriate direction. Here is another standard gauge municipally run tramway, with three main routes totalling about 18 km. The bogie trams, of classes 500, 600 and 800, are not as distinctive as those of Kumamoto, but they have a nice green and orange livery, with once again some advertising cars in various colour schemes. The operation is one man, and this system uses Japanese numerals on its fare boxes, which is a bit disconcerting at first approach. My 1½ days in this city sufficed to explore the whole system, which is basically a loop from which three branches spring. Most trackage is in the street, but the long southerly branch to Taniyama, route No. 1, is on reserved track. Some of the 600 class cars, apparently those numbered 610 and upwards have air suspension bogies, and there are also some articulated sets, class unknown, seen in the depot but not on the road.

By now the end of my holiday was near, so it was back northwards to Kyushu's capital, Fukuoka, population about 1 million. This city comprises the old port and commercial centre of Hakata, which is also the name of the JNR station serving the city, and the newer area of Fukuoka itself. It has Kyushu's main international airport, and is also another Nishitetsu stronghold, this company operating there a 1067 mm gauge interurban line, a standard gauge electric railway running south for about 90 km to the town of Omuta, and the Fukuoka city tramways, covering about 27 km with seven main routes. Here again there is a loop system with a couple of crosstown lines, and branches radiating from the loop, two of which are quite long. One of these, running to the interurban terminus at Kaizuka, is on reserved track, but most of the remainder is street running.

Trams used include two man operated two car articulated sets of the 1300 class, similar to those seen in Kita Kyushu, and apparently only run during peak hours, and a collection of somewhat elderly looking short bogie cars, of at least four classes, the most numerous of which seem to be the 500 class. Livery is the same dark red and buff as Kita Kyushu.

I arrived at Hakata station in mid-afternoon and lost no time in getting out to look at the tramways. An interesting feature is the route boards carried by the trams. These, as well as showing the route number, also show a diagrammatic map of the route indicating the major stops along the way. One of the illustrations shows the board for No. 8 route, which is quite complicated, a car doing one trip over this route passes Hakata station twice in the same direction and returns to the terminus from whence it started.

The next, and final, morning of my holiday, saw me travelling out to the Kaizuka terminus. This has three tram platforms, each of which can take two ordinary cars or one articulated set, and backs directly onto the two platforms of the interurban terminus, so that transfer from one to the other is quickly done. It was

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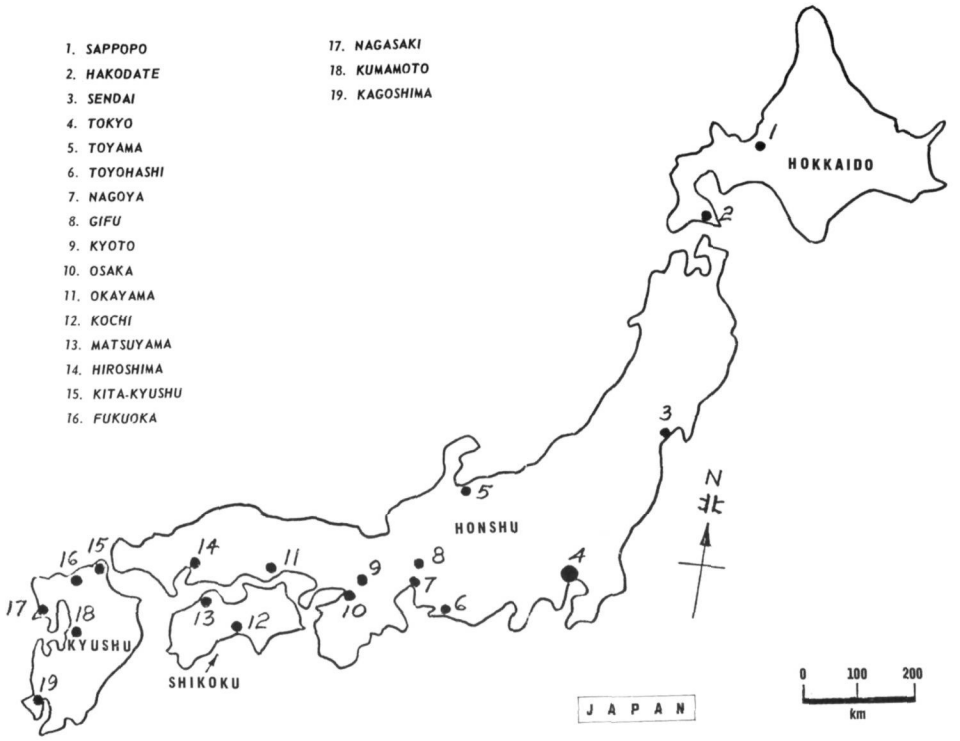
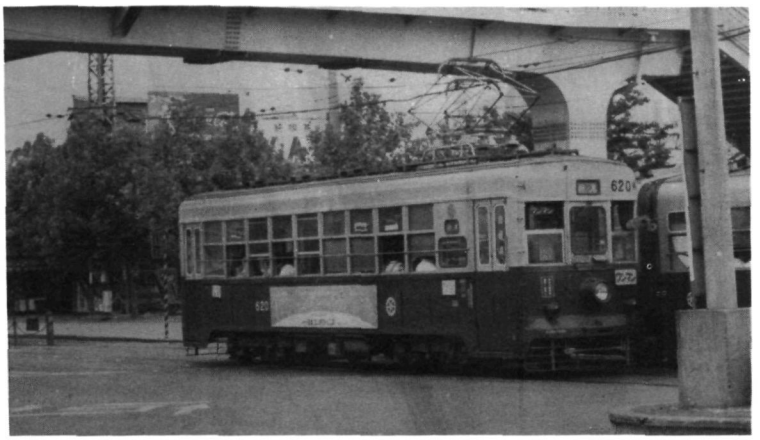
Hiroden's large windowed 1100 class cars originally ran in the city of Kobe, some 250 km to the east.

In the forecourt of Hiroshima station, No. 757 of Hiroden's 700 class stands alongside Miyajima bound 2000 class two car unit.

One of Hiroshima's cream and pink 2500 class articulated sets, in this case No. 2513-2514, approaches Ajina stop on its way to Hiroden Miyajima.

A scene in Kumamoto's main street. The 1350 class car on the left is bound for Kengun, whilst the 1050 class on the right has Kami Kumamoto as its destination.





TOP: No. 809 of Kagoshima Municipal 800 class in advertising livery of white and orange, stands at Route No. 2's Shimizucho terminus before setting off for Korimoto.
MIDDLE: Outside Kurosaki station, a Nishitetsu 600 class tram passes beneath the pedestrian overbridge that is a feature of many Japanese cities.
BOTTOM: Kaizuka terminus, Fukuoka, and a 1300 class articulated set runs through the car washing machine on its way to the depot.

A high numbered member of Nishitetsu's Fukuoka city tramways 500 class runs out onto the street on its way to Nishishin Machi.

A close-up of the front of a Fukuoka tram, with its route board showing the route number and diagrammatic route map; in this case the complicated No. 8 route. The characters displayed on the board above the headlight are seen on many Japanese trams and read – literally – Wan Man Kaa!

morning peak whilst I was there, and it was a very busy place, with trams and interurbans coming and going at short intervals. Unfortunately its cramped location and end-on alignment with the morning sun made photography difficult.

At Kaizuka there is a large depot, serving both trams and interurbans, and while I watched, some of the articulated sets were going out of service, passing through a car washing plant on their way to the depot. From Kaizuka I returned to the city centre for a final photography session, and then it was time to go to the airport to catch a plane home, after a most interesting three weeks of trams and trains.

Before closing, a few comments on the general tram scene in Japan might not be out of place. In this article I have mentioned tramways in eleven cities visited in either 1973 or 1975. To the best of my knowledge, seven other cities also have trams; these are Sendai, Toyama, Toyohashi and Okayama on Honshu; Nagasaki on Kyushu and on the fourth and smallest island of Shikoku, Kochi and Matsuyama. Thus, with 18 tramway systems, Japan has much to offer the tram enthusiast.

How long this state of affairs will last is hard to say. As far as I know no city system is extending routes or buying new cars, the most recent cars dating from the mid 1960's, so it is probably correct to say that most tramways are in a static phase of their development, and some, like Sapporo, are in decline. Perhaps the continuing oil crisis might lead to a renewal of interest in street tramways, but it appears some cities are looking to underground railways for the future; Sapporo has one line in operation and another under construction. Fukuoka has just started work on one, and Kyoto is planning an underground. However, it does seem that Japan will have trams in some of its cities for some years yet, so there is still time to learn the Japanese for 'Where is the tram depot?'

Photos by the author.

A Report on

THE 1976 COTMA CONFERENCE

by W.M.Denham

THE FOUR days, 30th April to 3rd May 1976, saw the gathering in Sydney of some 45 delegates representing the major tramway museums in Australia and New Zealand.

This, the first annual conference of COTMA, was hosted by the South Pacific Electric Railway, and set in the Sutherland Shire, south of Sydney, in which area the SPER's museum activity is located.

The convenor was David Rawlings, General Manager of the SPER, whose job was made rather difficult in the organisational stages of the conference by mail delays. Delays of one kind or another were to plague the conference but, in spite of setbacks, the delegates voted the exercise an overall success and are look-forward to the next conference, to be held in Adelaide in the middle of 1977.

The Friday activities got off to a flying start when a major contingent of visitors from Victoria were delayed four hours in the arrival of the Southern Aurora and the Spirit of Progress. They were hurried to the first official function, the introductory luncheon at the Astron Lounge at Gymea, where the delayed meal had already reached main course. The opening speech was given by Councillor Michael Tynan, President of the Sutherland Shire Council. He welcomed delegates to the Shire and declared the Conference to be opened.

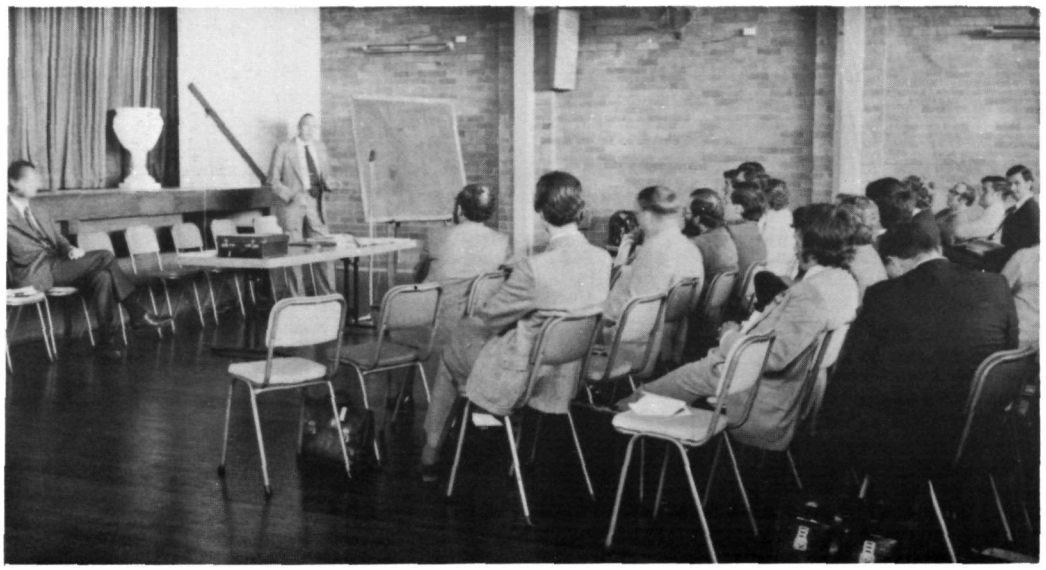
The visitors were then transferred to the Jannali Community Hall where the opening address was to be delivered. The first speaker had been unable at the last minute to attend, but the second speaker, Mr. H.H.G. McKern, Deputy Director of the Museum of Applied Arts and Sciences, Sydney was fortunately able to condense the two topics into one and talk on *How Volunteers Can Learn from Professional Museums* and *Analysis of a Report – Museums in Australia, 1975.* In the first part Mr. McKern was able to show that in many respects the reverse might apply, while in the second area of his talk indicated the present not-to-hopeful situation of the Federal sphere and touched on the somewhat better results being achieved in New South Wales.

Following dinner the delegates again gathered at Jannali for the evening session of *reports of the progress made by each museum* since the last meeting at Ballarat. Highlight of the evening was a slide projector which continued to function after having been swept off the table onto the floor!

The conference continued on Saturday with further guest speakers: David Hinman of the Tramway Historical Society, Christchurch who presented a most interesting talk on *Planning and Constructing a Tramway,* and Chris Steele (AETM) who detailed *Track Construction.* Slotted around these speakers were workshops and other formal sessions including a brief resume by representatives of the groups present of their formal Policy Objectives; and an introduction to a Bibliography of Australasian Tramway Publications.

Late in the afternoon the delegates arrived at Loftus to inspect the progress at the Sydney Tramway Museum. Here various examples of work in progress were examined and several of the Sydney and interstate cars were run for the visitors. A bar-be-que was held in perfect weather and as the evening drew to a close, more trams were brought out for display, including the oldest, Sydney C car 290, and the newest, Brisbane Phoenix car 548, trams in the fleet operated in convoy, and the rail grinder showed its paces as a passenger vehicle (18 people clung wherever they could get a toe-hold) but proved rather recalcitrant in displaying its rail grinding capabilities.

Sunday morning's activities got under way with a paper *Museum Motivations* by Dr. John Radcliffe, this being, in fact, the keynote address of the Conference. The formal part of the Conference for that day ended with a report from the Expert Panel on Spare Parts by



Mr. Howard McKern makes a point during his talk to the assembled delegates at the 1976 Conference of the Council of Tramway Museums (COTMA) held in Sydney. —Keith Kings

Keith Kings and Graeme Breydon.

The party then boarded a Jannali Bus Lines coach and set out for Parramatta Park, stopping at Engadine for lunch. The driver was well versed in local and transport history and gave a continued commentary until the bus reached Parramatta Park where the travellers piled out and dispersed to explore the wonders of the steam tram era. After official rides, official photos and the near demolition of the magnificent afternoon tea graciously supplied by the Steam Tram Preservation Society, the COTMA group continued their investigations , until the setting sun decreed that it was bedtime for the little four wheel steaming tea kettles and the bus headed back to the motel at Sylvannia. where the majority of delegates were staying.

Monday morning commenced with the final formal speech: *What an Educationist Looks for from a Museum – Primary Age* presented by Mr. B. Sargent from the Education Department for the Sutherland area. The morning concluded with the General Meeting of COTMA and then delegates adjourned to the Astron Lounge for a concluding luncheon.

Those who had time to spare then went back to Loftus for a further look at the museum, others headed straight for the airport and home.

The convenor would like to thank all those people who attended the conference, who read papers. chaired meetings and helped in the many and varied ways to make the conference an overall success.

Published proceedings of the conference will contain details of the papers read, the 20 or so workshop seminars and the General Meeting.

Out of the Meeting came the desire to hold conferences annually, for the time being at least, and the next conferences will take place in Adelaide, S.A. in 1977 and Christchurch, N.Z. in 1978.

BALLS HEAD COAL LOADER

a sequel —*by Ken McCarthy*

THE END of an era for cable traction arrived on Sunday 4th April 1976 when the Balls Head Coal Loader cable railway ceased operation (see *T.W.*, December 1975). The last ship to be served by the 55 year old installation was the *Lunar Venture* destined for Japan with its cargo of export coal.

During the final days of operation hopper cars 1 to 17, 20, 25, 21 to 24, 26 to 32, a total of 30 vehicles, were on the rope in that order while car 18 was noted on the repair siding. Wagon 19 had been removed from the premises prior to the closure, being the subject of a derailment accident around Easter 1975. A closer examination of the rolling stock revealed that hopper 9 was previously car 33 while 22 once carried number 5.

Observations of the railway in operation revealed why the rolling stock was usually on the rope in numerical order, or why some cars

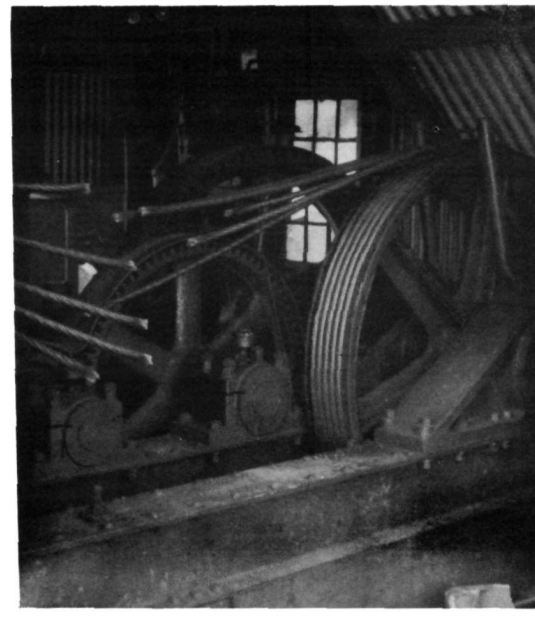
Loaded hopper wagon 15 passes over the weighbridge beyond the change of cable point, as the ship Lunar Venture *rapidly fills with export coal. The cable railway only had another 24 hours of activity when this photo was taken on 3rd April.* —Ken McCarthy

were renumbered to make it so. This greatly simplified the job of the tally clerk who noted the weight of each loaded wagon as it passed the weighbridge located just beyond the change of cable point.

By clocking the cars in action it seems that one complete circuit occupied 8 minutes, a slightly faster pace than that calculated in the recent *T.W.* article. The phenomenon of starting the cable under maximum load is also worth noting, as this would have rarely been experienced in street tramway practice. When starting operations under these conditions, the cars would be observed to start one after the other along the rope, the hopper nearest the winding house moving first. As this 'take up' occurred the counterbalanced tension pulley would move along its tension run, until all hoppers were moving and then settle back to an equalised position.

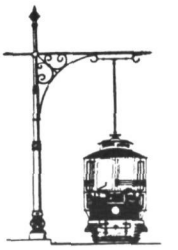
During the last week of operation numerous visitors from kindred societies visited the undertaking filming the interesting operations, but only SPER member Ben Parle was on hand to record the departure of the last load. This left the hopper bins at 3.08pm on 4th April being carried by car number 27.

Early during the following week the cars were hauled off the jetty and stored in the bin tunnels leaving the wharf free for the demolition of the elevated track and coal elevators, and at 11am on Saturday 10th April, Mr. Bill Preston, a principal in the demolition firm, cut the cable.... so the end had definitely arrived!



The inside of the winding house at the Balls Head Coal Loader after the traction cables had been chopped through. —Paul Simpson

MUSEUM Notes & News



from LOFTUS

SYDNEY TRAMWAY MUSEUM
Princes Highway, Loftus
(South Pacific Electric Railway Co-operative Society Limited)

Tram Rides:- Sundays & Public Holidays - 10.30am to 5.00pm. Five minutes walk south from Loftus railway station.

Correspondence:-
The Secretary, S.P.E.R.,
Box 103, G.P.O., Sydney 2001

Car News

R 1740 – during April this car was returned to service. F 393 – the south end bogie on this car has been removed and partially dismantled for cleaning. The motor from this bogie, a GE 67A, has been placed in the workshop and dismantled, possibly the first occasion this has occurred since the 'forties. The spare Brisbane drop centre bogie has been temporarily placed under No. 393.

Site Works

During April, clearing was carried out on the new site.

On the National Park site, fencing of the rear yard is now complete, the toilets have again been relocated, this time, hopefully, in their final location. The front of the shed has received a further facelift in the form of a gravel surfacing.

The yard has been tidied up and the bogies have now been placed on their special siding.

Offsite Activities

Recent work off-site has seen the recovery of useful spare parts to aid restoration of the museum's tramcars. Parts were obtained from E class car 521 at St. Marys and material to aid the restoration of R1 1979 was obtained from R car 1803 at Old Toongabbie.

General Meeting

Due to the proximity of the Annual General Meeting, the regular meeting of the Society which would have fallen due on 12th July has been cancelled.

Details of the A.G.M. will be forwarded to members in due course.

from PARRAMATTA

STEAM TRAM & RAILWAY PRESERVATION (CO-OP) SOCIETY LIMITED
Parramatta Park Steam Tramway

Steam Trams are operated on the Third Sunday of every month. The Society possesses one steam tram motor, two steam locomotives and five various trailer cars. The trams are operated for rides from 1.30pm to 4.30pm on steaming days.
The surrounding parklands are suitable for picnics, barbeques, etc. and contain historical buildings. Public transport is available. Rail to Westmead station then walk across parklands to depot.

Correspondence:- (SAE would be appreciated)
The Secretary, S.T.&R.P.S.,
P.O. Box 108, Kogarah, NSW 2217

Australian-American Festival

On Sundays 4th and 18th April, the Society was invited to participate in this Festival. On these days our two American-built steam locomotives, Nos. 103A and 1022 hauled our tramcars with eager passengers wanting to ride behind the 'American engines'. The days were extensively publicised by the Festival organisers in their literature as well as a small item published in *The Sydney Morning Herald.*

Patronage on both days exceeded our expectations making the Festival, to us, a worthwhile exercise.

COTMA – Conference and Visit

The Society was pleased to welcome to the Parramatta Park Tramway, on Sunday 2nd May, delegates to the 1976 COTMA Conference. The tramway was placed at the disposal of the delegates although regular passengers were also being carried. Over 40 delegates

travelled to Parramatta Park by coach, the driver of which, incidentally, constructs O gauge models of steam trams in his spare time. Several trips were operated for the exclusive use of the visitors. These were followed by several photo run-pasts using motor 103A hauling 74B and 1022 hauling 37C and the partly restored 191B. Unfortunately one photo run was marred by an erring motorist who chose to park his vehicle amidst the photographers. After a polite request to 'go full astern' by our intrepid Commander and much verbal oratory from the photo line, the Valiant cowboy eventually 'cast off'. Following the last run-past, a group photograph of all the delegates that Dave Rawlings could round-up was taken with 103A and 74B providing the backdrop.

After afternoon tea, prepared and served by our everwilling ladies, the visitors enjoyed an afternoon of riding the 'trams that work by steam'. It is thought that several delegates were forming plans of a devious nature to spirit away the Peckham trucks on the C cars back across the Tasman.

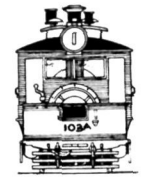
Two delegates from the S.T.& R.P.S. attended conference sessions and gained valuable insight into the problems of restoration programmes and operating procedures being experienced by other tramway museums. We sincerely hope, in return, delegates have benefitted from our experiences in preserving steam trams.

It may be of interest to our visitors that, during the COTMA visit to Parramatta Park, in excess of 700 fare-paying passengers were also carried. Our Treasurer is well satisfied.

Works Report – Car 191B

This project is progressing steadily. All doors are now off-site and being reconditioned and repainted under the capable hand of Peter Chambers. The side panelling, cover strips and handrails are now receiving attention prior to preparations for repainting. The Society is grateful to Dulux Australia for a generous donation of their products for this project. The flooring is now complete as are the seats. The handbrakes have been reconditioned and reconnected and are in full working order.

The restoration has now progressed to the stage whereby the car can be used for revenue service should loading be too heavy for our other cars.



A race between 1022, 2 boys and their father on 18th April 1976. The freshly painted 1022 is in charge of Frank Moag. —Peter Stock.

from BYLANDS

VICTORIA'S TRAMWAY MUSEUM
Union Lane, Bylands, Victoria.
(Tramway Museum Society of Victoria, Limited)
Horse tram rides; museum site; trams, exhibits, photo displays, etc. Sundays – 11.00 am to 5.00 pm.
Correspondence:-
The Secretary, T.M.S.V.,
Box 4916, Mail Exchange,
Melbourne, Vic. 3001

Depot

The permanent switchboard was installed in the south-east corner of the building and wiring connected by Noel Gipps on 25th April. The temporary wiring was then removed allowing the permanent lighting to be switched on. This is a significant step forward and provides better facilities for our volunteers and makes our works program more flexible. It also enhances the internal appearance of the Shed.

At the front of the depot cladding has been completed around the corner and centre columns leaving only the gable above the doors to be filled in. Further spare parts have been neatly stacked along the western wall. This involved moving quantities of parts from the store shed into the depot. A filing cabinet and several chairs were transported from the store shed to our Malvern rooms.

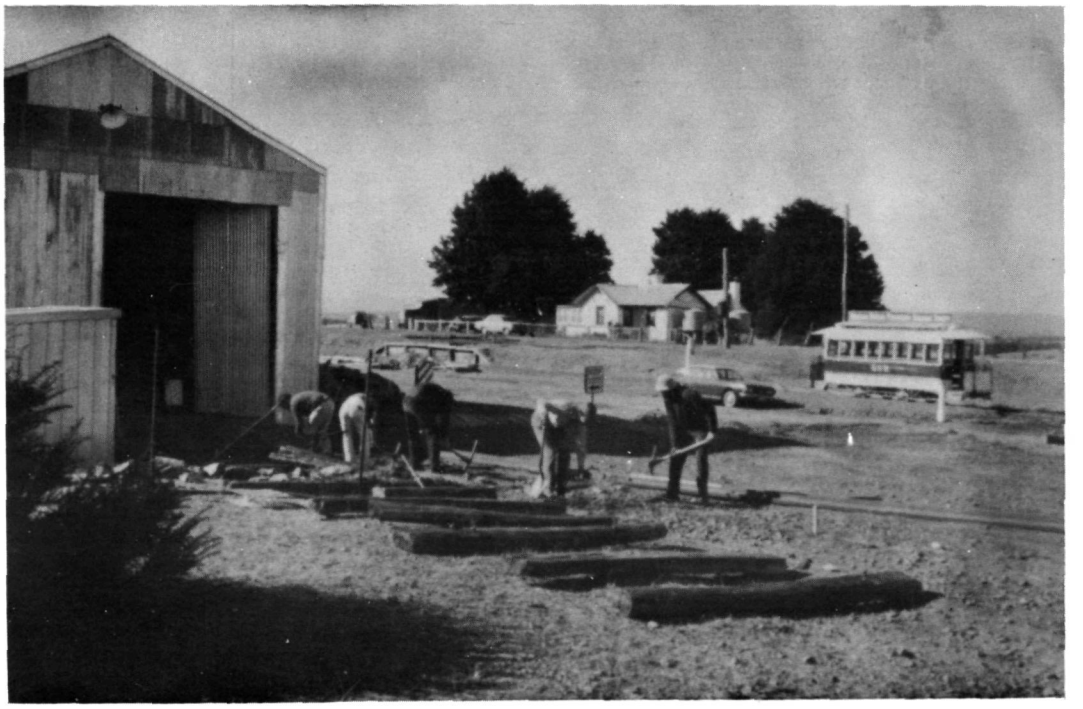
Track

Depot Road No. 2 has been extended by 14.5 m through the back of the depot. This new track, completed over two Sundays, has been filled to rail head for use initially in the unloading of our W3 and W4 cars. Provision for this extension was made with the fitting of the rear doors to the depot so that vehicles could be moved out of the workshop for either display or work. The only other trackwork has been confined to the fitting of the interconnecting mechanism into the boxes for the No. 1 and 2 road points.

Site Works

In late March a roadgrader was hired to form a proper car park south of the sub

Members hard at work excavating into the gentle upward slope to enable 14.5 metres of track to be laid south of the depot. This extension of No. 2 road was used to unload W3-667 and W4-673. —Keith Kings



The hills of Bylands form a backdrop to the tractor being used to consolidate the earth of the carpark after levelling by the grader.
—Keith Kings

station. The grader was also used to improve the entrance road into the museum. Final levelling was carried out by our volunteers so that the car park could be first used by the public on Sunday 4th April. Old power poles have been placed along the eastern edge as barriers. Time is being spent improving the visual appearance of the site. To date, the entrance gate posts have been repainted and more rubbish moved or burnt.

Horse Tram

As an additional benefit from the A.M.R.A. Exhibition our visitor numbers at Bylands have improved. The appearance of the loading platform has been enhanced by the placing of a 'Cars Stop Here' sign on one end and a fire hydrant (unconnected) and post box at the opposite end. They are the beginning of a small display of cast iron street furniture planned for this area.

Tramcars

The M.&M.T.B. recently offered its W3 and W4 class cars for disposal, and granted our long-standing request for one car of each type. Monday 17th May saw W3 667 and W4 673 (together with one car set of spare No. 9B trucks) loaded onto motor trucks at Preston Workshops and transported to Bylands. The two trams were both moved into the rear of No. 2 road in the depot as soon as they were unloaded, and have since been thoroughly cleaned for public display.

COTMA Conference

Eight members travelled to Sydney for this event, and wish to record their thanks to the SPER team for their organisation of a most interesting and informative period. We won't go into detail here as it will be dealt with in a special report elsewhere in this issue.

BRISBANE TRAMWAY MUSEUM SOCIETY
McGinn Road, Ferny Grove, Q'ld.
Correspondence:-
The Secretary, B.T.M.S.,
McGinn Road, Ferny Grove,
Q'land. 4055

from ST. KILDA

AUSTRALIAN ELECTRIC TRANSPORT MUSEUM (SA) INC.
St. Kilda, South Australia

Tramcars – Trolleybuses – Electric Locomotive

Trams operate Sundays & Public Holidays - 2–5 pm. (No public transport available. Interstate visitors please contact the AETM if transport is required. In emergency, 'phone (Adelaide) 297 4447.)

Correspondence:-
The Secretary, A.E.T.M. (S.A.), Box 2012, G.P.O., Adelaide, S.A., 5001

Telethon Benefit Day

On Saturday 27th March, a special benefit day in aid of Adelaide television station Channel 9's telethon appeal was held. Extensive publicity was provided during the previous week by Channel 9 in prime time at 7 pm, and after all expenses of operating the tramway had been met, over $400 was earned for the appeal. Twenty-three members were involved in operating the Museum on that day, and 35 runs were made on the line. Two bands played at the Museum, on trams operating on the line, and at St. Kilda terminus. A didgeridoo player was a highlight of the afternoon's entertainment. Reg Earl brought his Yorkshire steam bus to the Museum and operated a service from the depot to Samphire Road. Adelaide retailer John Martin and Company loaned their London RT double deck motor bus for display – its first visit to St. Kilda since the official opening of the tramway in March 1974. The Austin 7 club also organised a rally to St. Kilda on the same afternoon, and the AETM organised a supporting bus service from the Museum to St. Kilda, operated by Lewis Brothers' former British double decker.

Conductor Mark Skinner sells a ticket to an incredulous young man about to sample Reg Earl's Yorkshire steam bus. This vehicle is well known at the Lake Goldsmith steam rallies, and also participates each year at Adelaide's Christmas Pageant.

—John Radcliffe

The Klemzig Band (left) completes an item prior to boarding car 21 to play their way down the line during the Telethon benefit day. Car 282 awaits visitors coming in through the Entrance Hall, while the remainder of the fleet were operating on the line.

—John Radcliffe

Annual General Meeting

At the Annual General Meeting of the A.E.T.M. held on Friday 9th April 1976, the following Office-bearers were elected for 1976-77:-

President	Dr. J.C. Radcliffe
Vice President	Mr. M.J. Butler
Secretary	Mr. C.J.M. Steele
Treasurer	Mr. R.T. Wheaton
General Manager . ..	Mr. M. Skinner
Assistant General Manager	Mr. J.R. Pennack
Operations Manager	Mr. L.M. Fenner
Auditors	Messrs. Cambrell and Allen, Chartered Accountants

An amendment to the Constitution was passed at the AGM allowing the appointment of proxies to represent office-bearers at Executive Meetings. This was primarily to allow some delegation of responsibilities in the operation of the position of Treasurer. During 1976-77, it is intended that the Treasurer, Mr. Wheaton, will be responsible for all receipts, but that responsibility for handling payments will be delegated to Mr. J.W. Hoffmann who will also be able to attend Executive meetings as a proxy for the Treasurer when necessary.

Depot Improvements

A light has been installed in the bracket fitted to one of the span poles supporting the overhead for the depot fan. This light effectively illuminated the entire area of the fan and will be particularly convenient during winter.

Minor works remaining to complete the Stores Shed were recently finished by Ron Jenkins. These included fitting of the fascia panels at the front of the building and concreting of the door runners. The initial relocation of stores to the new shed has been completed, and further funds have been budgeted in the coming financial year to provide additional shelving.

A concrete pad for the installation of one of the newly acquired tram stop beacons has been laid near the Entrance Hall, adjacent to track No. 6.

Trackwork

Additional ballast has been laid along the main line from Lines Road to Samphire Road to permit additional packing of this section of track. Little attention has been required by this section of track since its original construction in 1973.

Following the success of the automatic spring loaded point mechanism installed between the rails at the western end of Mangrove Loop, the point at the eastern end is being converted to a similar design by Robert Magnussen.

The annual weed spraying campaign has begun along the main line. It has been found that treatment with Vorox AA is very effective in keeping the ballast tidy, using the specially constructed spray unit. External store areas and shed surrounds are also treated.

Major excavations took place under the main line between Samphire Road and Mangrove Loop

in April when I.C.I. laid a new 3' 0" diameter flume to connect the evaporation basins on each side of St. Kilda Road. During the programme, the trolleywire was dislodged from its ear at pole 23 by the jib of an excavator, but repairs were quickly effected by Max Fenner, and there was no disruption to the Museum's operations.

from ALBION PARK

ILLAWARRA LIGHT RAILWAY MUSEUM SOCIETY
Albion Park.

Inspection of exhibits by arrangement (phone Wollongong 71 3707)

Correspondence:-
The Honorary Secretary,
P.O. Box 1036, Wollongong
NSW

Krauss-Leyland

The labours entailed in the restoration of the ex Newbold's 2ft gauge Krauss-Leyland petrol loco were repaid late in the afternoon of Saturday 3rd April, when the 55 years old Leyland motor fired into action for the first time in perhaps 25 years. The temptation was too great not to run the loco., so on that occasion it was coaxed a few feet along the permanent way. Initial major running trials took place on the following weekend after the gear boxes and chain transmission had been checked and lubricated.

As reported earlier in these pages, this unit is mounted on an 1889 Krauss steam loco underframe and has proved to be a steady rider, even at speed on the narrow gauge tracks. Many Society members have been involved in the restoration, but we are particularly grateful to members A. Moore, K. Mayhew, and M. Paynter for the specialist work undertaken in this restoration. To the list of firms which have aided this job and which have been mentioned in *T.W.* before, must be added the local distribution centre of Mobiloil. The ILRMS has been pleased to receive specialised oils and lubricants, as well as fuel donations for this unique locomotive from that source. By mid May the stage of restoration had been reached where the final paint coat and the fitting of minor accessories, such as grab rails, only remained to complete this interesting project.

Yallah Station

Another recent major achievement was the delivery of the Yallah station building to the Albion Park Museum on Saturday 8th May. This station, situated between Dapto and Albion Park, was closed to traffic during 1974 and the 30ft x 10ft timber structure was purchased by the ILRMS last year. The Shellharbour Council gave its approval for transfer to the museum site with the added comment by the Council Engineer, that it was in sounder condition than many structures being erected today!

Members jacked up the building during late January, but the long spell of wet weather prevented any movement until May. Local carrying contractor, Mr. John Ward, who has been most generous to this Society over the last three years, carried out the movement and it is to his credit that it was done with such efficiency when one considers the soft nature and cramped location of its original location and the final position. The building was moved in one piece, which is a noteworthy event, as the station has 5ft awnings overhanging on both sides and is almost 14ft high.

The building will be the central item in a small station complex to be built at the museum, a task to which it is most suited, for, besides a 10ft x 20ft waiting room, the structure includes a 10ft x 10ft ticket office and parcels room.

The isolated Wollongong to Clifton railway was opened to traffic on Queen Victoria's Golden Jubilee Day, 21st June 1887 and to enable the maximum amount of people to celebrate the occasion the contractors for the construction of the incomplete section between Wollongong and North Kiama (Bombo) made available their loco and trucks to bring people northwards from Marshall Mount Road, Dapto and Unanderra. The initial railhead was the site of the later Yallah platform, this being erected as a result of an 'enthusiastic meeting held at Marshall Mount on Monday evening last (23rd May 1887) for the purpose of taking steps .... to have a platform erected at Mr. Evans' ' (Illawarra Mercury 26th May 1887).

Additional Bogies Arrive

On Friday 23rd April a further load of 2ft gauge bogies arrived at the museum, consisting of four bogies from the CSR mill railway at Condong, N.S.W. and six others from the former Alexandra to Rubicon tramway in Victoria. Those bogies purchased from Condong were brought to Sydney by road while those from the Ruoak Timber Company arrived in Wollongong by rail. With 14 bogies now on hand the Society has an adequate number to meet its immediate needs.

Yallah station, looking south. This view was taken last November, prior to the building being jacked up in preparation for removal to the ILRMS museum. —Ken McCarthy

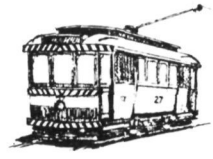
Site Progress

With the arrival of the station building, work has been able to continue on the erection of the remaining panels of the large loco compound security fence. All materials are now on hand for the completion of this major project.

With the arrival of former Corrimal rail, work is rapidly progressing on the construction of 2ft gauge sidings in the loco enclosure. the 100ft long southern most track was completed, and occupied during April and by mid May work was being carried out on the lead lead points and track for two further engine roads of similar length. With the rapid expansion of the ILRMS rolling stock roster, these facilities will be filled to capacity in the near future.!

Readers wishing to inspect the progress at Albion Park are requested to plan the visits for Saturday Afternoons. At other times appointments should be made by phoning (042) 71 3707 or (042) 95 1776 after business hours.

from BALLARAT



BALLARAT TOURIST TRAMWAY
Ballarat Botanic Gardens, Wendouree Parade, Ballarat, Vic.
(Ballarat Tramway Preservation Society Limited)

Tram rides; static display of trams, photos; Sales department; etc. Operates Saturdays, Sundays and Public Holidays (Christmas Day excepted) and most days during Victorian School Holidays and the Ballarat Begonia Festival – 11.00am to 5.00pm. Telephone: Tram depot (Ballarat) 34 1580; Bungaree House (Ballarat) 34 0296.

Correspondence:-
The Secretary, B.T.P.S.,
P.O. Box 632, Ballarat, Vic. 3350

No. 2 Shed

Plans are well in hand for a submission to Ballarat City Council for the Society's No. 2 depot. It will be erected adjacent to the existing building.

The usual depot facilities are well catered for; as will be the comforts of members.

No. 28

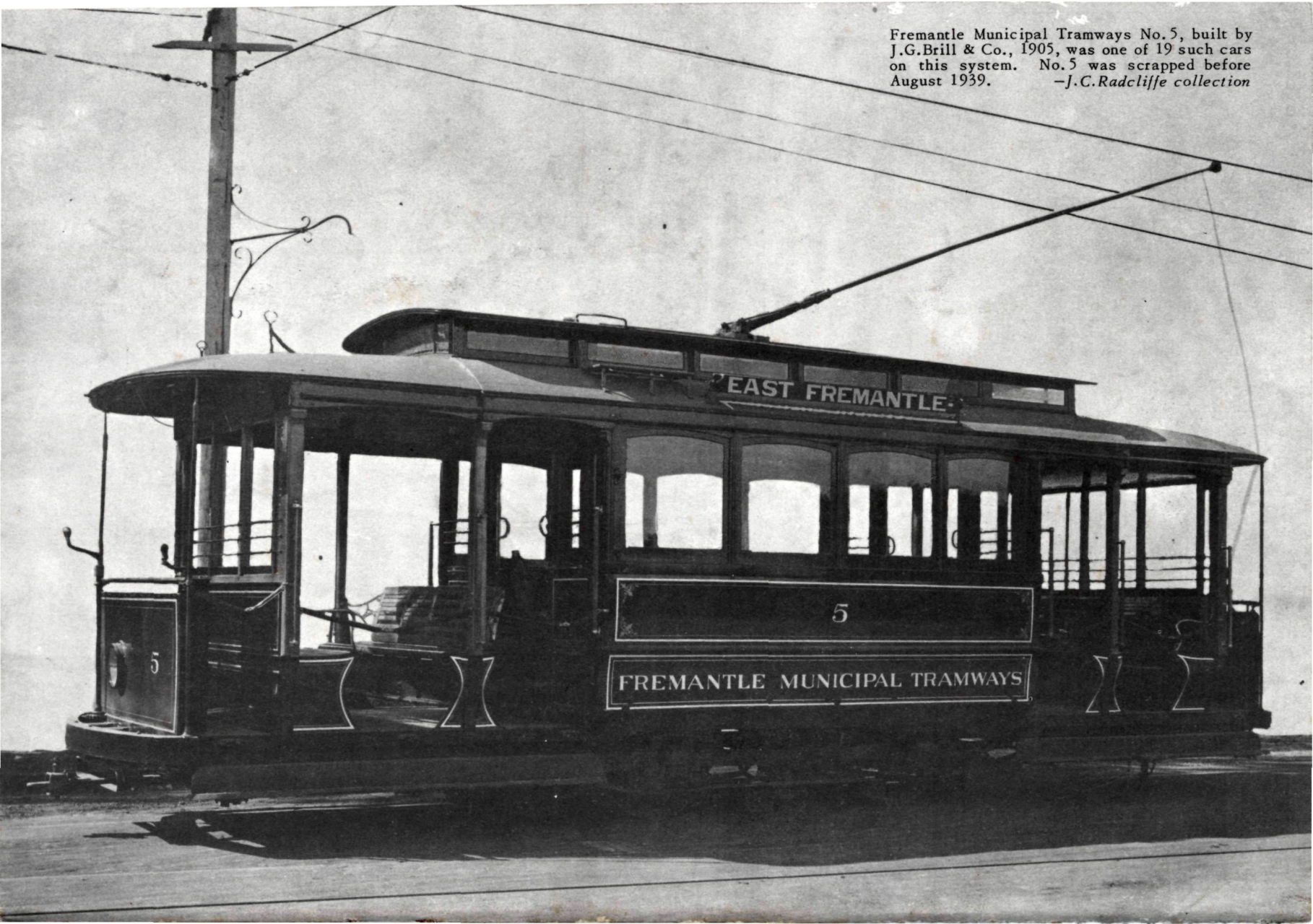
Body repairs to this tram are progressing steadily; it has been predicted that completion is only a matter of a few months away.

Bungaree Residence

Painting is proceeding satisfactorily; a gang worked over Easter removing loose and blistered surfaces. The bare wood has been primed to afford protection against the winter weather.

School Holiday Traffic

The trams were in service most days over the school holidays. Traffic offering made the operation a success.



Fremantle Municipal Tramways No. 5, built by J.G.Brill & Co., 1905, was one of 19 such cars on this system. No. 5 was scrapped before August 1939. —*J.C.Radcliffe collection*