



FOR ALL WHO ARE INTERESTED IN RAILWAYS

BULLETIN

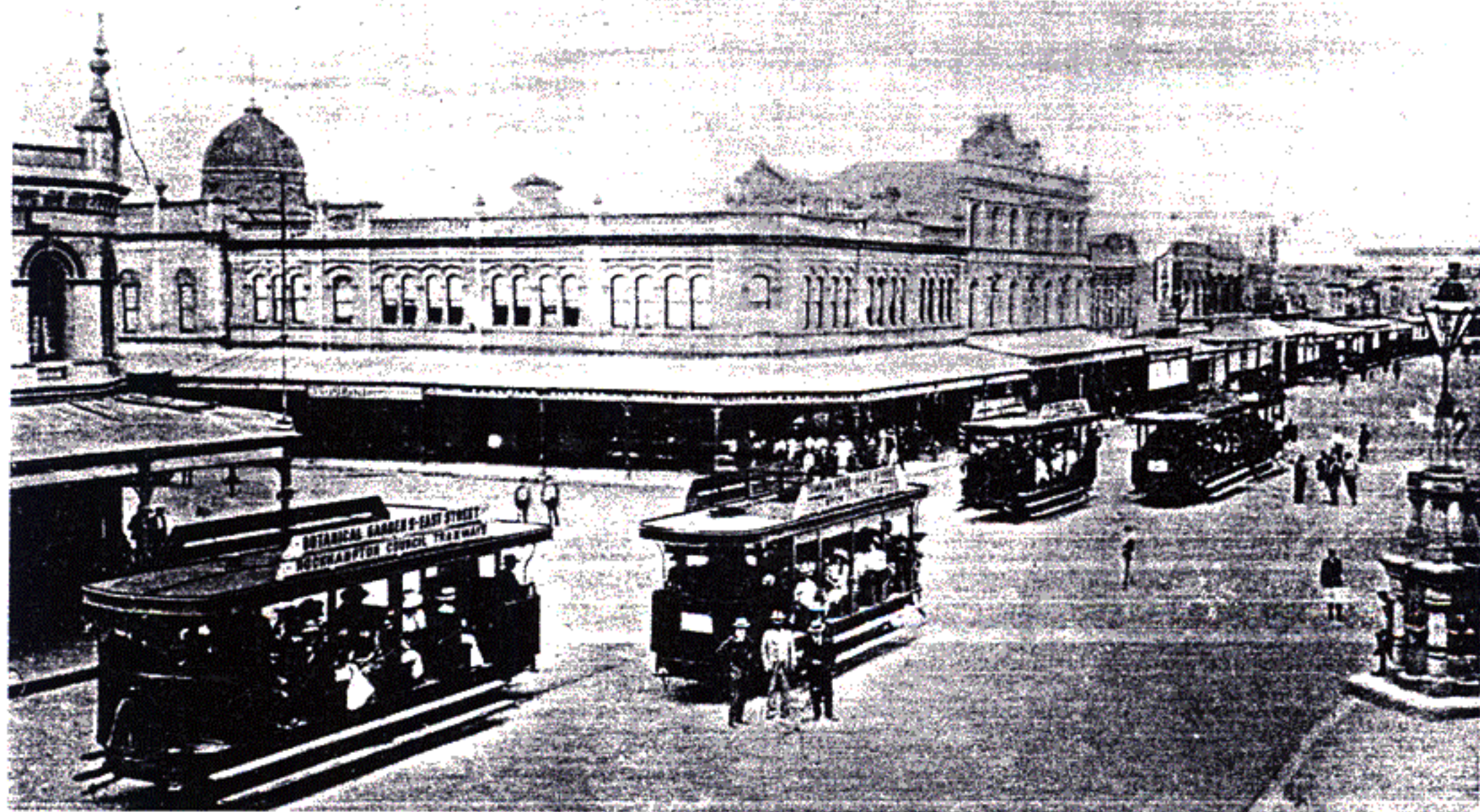
Volume XXV

June, 1974

Number 440

Registered for posting as a
periodical — Category B

Recommended Price: 70 cents



An interesting view of East Street, Rockhampton, from the Post Office corner taken in the pre-World War 1 period. The absence of motor traffic and the roof mounted destination boards on the tramcars are two of the several interesting features of this illustration.

(Photo: R. Thomson Colln. courtesy R. Deskins)

THE ROCKHAMPTON CITY TRAMWAYS

(Qld)

(by J. W. Knowles)

From 1909 until 1939, the City Council of Rockhampton, Queensland (396 rail miles north of Brisbane) provided a street tramway service, with Purrey steam cars running on 3'6" gauge tracks along 6½ miles of City streets. This was the only provincial street tramway in Queensland, although Toowoomba considered a system at one stage, and in 1914 its contemplation of trolley buses inspired the Railless Traction Act of that year.

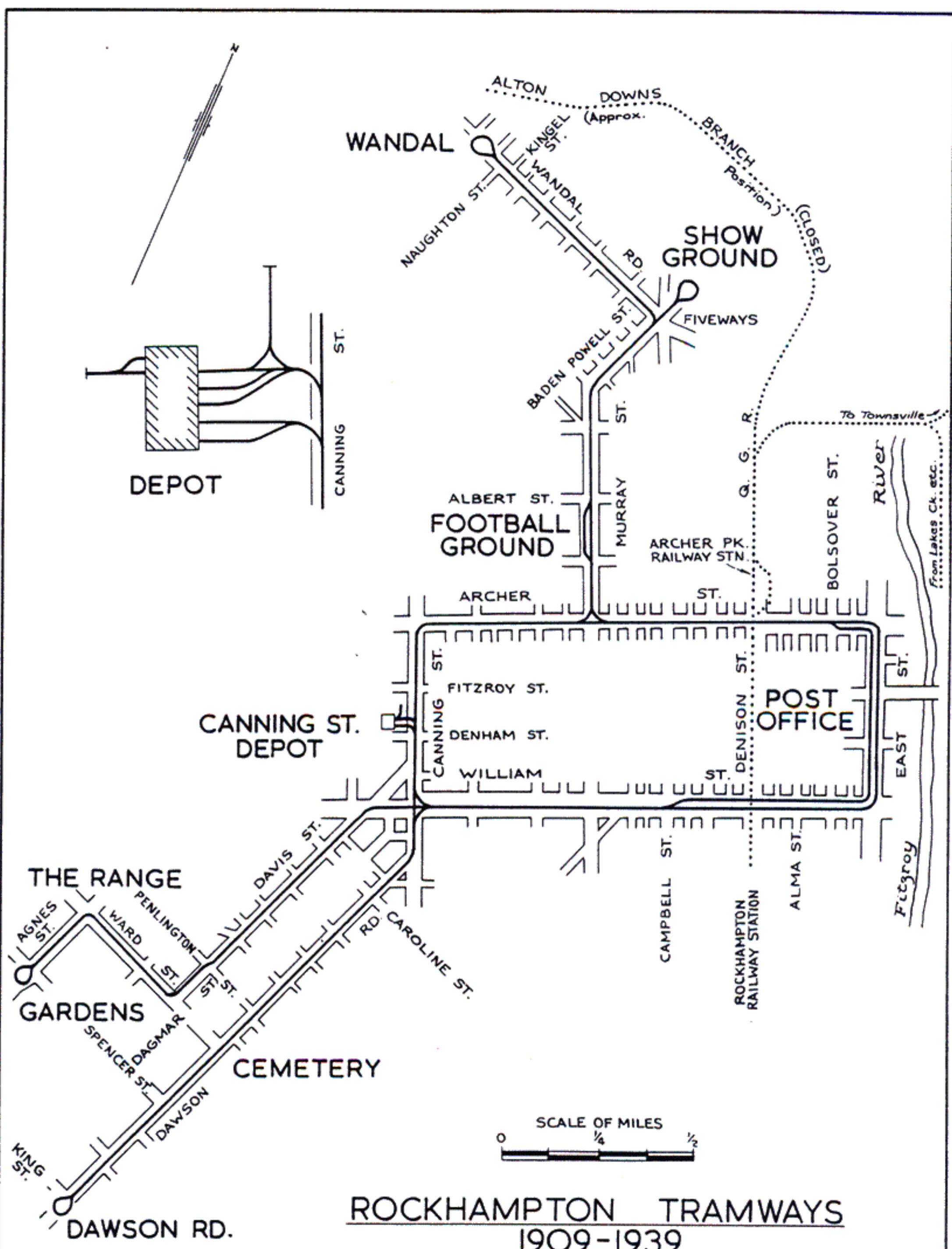
Early Schemes

Suburban public transport was introduced in Rockhampton as early as 1875 in the form of a horse bus and by the 1890's, double deck horse buses were running to

the Botanical Gardens and Dawson Road, both later tram routes.

In 1883, the Rockhampton and North Side Tramway Company applied to the Governor-in-Council for the right to build tramways in the City; approval was granted, but nothing eventuated. In 1897, a Mr. Walklate proposed tramlines along certain streets, a scheme which the Council favoured, and in 1900, a Mr. Hewlett offered to lay four electric routes; neither proposal eventuated.

In 1901, Messrs. Trackson Bros., a long established Brisbane electrical firm, reported to the then Town



**ROCKHAMPTON TRAMWAYS
1909-1939**

Council on an electric tramway system. It would seem that J.T. Badger, Manager of the Brisbane Electric Tramway Investment Company Limited was influential in this move. Tracksons recommended an overhead trolley system, with a powerhouse to be specially provided, which would also be able to sell power for lighting. They suggested a system of 6¾ route miles (1½ miles of double track), and a 15-minute service, using 12 cars, both composite and toastrack, all 50 h.p., without trailers. Gauge was to be 4'8½", rails 76 lb., and power 500-550 volts. Estimated cost was £57,000 (\$114,000).

Again, nothing eventuated, but about this time a poll of ratepayers was held to decide whether the tramways should be provided by private enterprise or by the Council. The verdict favoured a Company, but apparently private enterprise could see little profit in transporting the then 15,000 or so residents of Rockhampton about their business.

The Council was still keen to have the modern amenity of a street tramway, and in 1903 voted unanimously in favour of an application by Mr. E. Ambrose. His scheme apparently inspired the eventual use of Purrey steam cars, for he proposed using "self-contained automobiles" built on the Continent and burning coke. Four of his routes were similar to the system later built, but he also had routes looping along the "Range" and to the Cemetery. Gauge was to be 4'8½" using 40 lb. rails. He claimed that his proposals were cheaper than an electric system and he intended using 10 cars to provide a 20-minute service.

The City fathers were impressed by the promise that

the cars, including boilers and engines, could be built in Rockhampton and by the willingness of the proposer to allow the Council to take over his system after 7 years, although the Act gave the Council absolute power to do this only after 14 years. Ambrose also expressed interest in routes across the Fitzroy River to North Rockhampton then under separate municipal administration.

The Ambrose scheme also lapsed, as did a proposal by a Mr. Parker in 1906, of which no details are known.

Apparently, the Council then became impatient at the lack of success of the various private promoters and decided to build and operate a tramway system on its own account.

Municipal Operation

The Council decided on a 3'6" gauge system of four routes, operated by Purrey steam cars, and borrowed £25,000 (\$50,000) from the State Treasury for the purpose. A contract for construction was let in August, 1908, to Messrs. Stowe and Brand of Sydney, N.S.W.

The Tramways Acts of 1882-1890, under the authority of which the system was built, provided that street tramways were to be built in grooved rails at a gauge of 4'8½", or such other gauge as the Governor-in-Council authorises. The electric (originally horse) street tramways in Brisbane had been built to this gauge but Rockhampton probably thought that 3'6" would be cheaper.

The Council had received favourable reports of the Purrey system in use in France, Italy, Spain, Portugal and the Argentine; the system was also used on steam road lorries. It ordered four tramcars from the firm of



The leading car of the two available on the opening day passes through the ceremonial arch and breaks the opening ribbon on 5th June, 1909.
 (Photo: J.W. Knowles' Collection)

V. Purrey of Bordeaux, France and two trailers from the Brown Engineering Company of London (the latter probably through an agent).

Steam traction for a street tramway at this late date was unusual, although a new Purrey operated line had been opened in Paris in 1907 in a central area where overhead was forbidden. In Rockhampton, the choice was apparently based on the lower estimated capital cost of the steam system, which with revenue of £6,635 (\$13,270) and costs (including debt charges) of £6,000 (\$12,000) per annum, was expected to pay its way.

It would seem that no reconsideration was given to the idea of having an electric tramway; in view of the long delay which had already occurred, this was a pity, for road motor buses were just then becoming reliable (The X-type of the London General Omnibus Company appeared in 1909, and its famous B-type in 1910).

At least one of the cars was delivered as a chassis only and was used as a ballast motor during construction, being fitted up with two hoppers, each carrying 2½ tons of stone. A scarifier and a steam roller were also used during the construction.

Opening

The system was opened with two cars and two trailers which had by then arrived, on 5th June, 1909, by the Premier, the Hon. W. Kidston. A decorative arch was erected in William Street near the corner of Bolsover

Street and the opening performed by the leading vehicle being driven through a ribbon bearing the words "Success to the Rockhampton Tramways". The 200 invitees were then taken in the two trams, each with trailer, to the Botanical Gardens terminus.

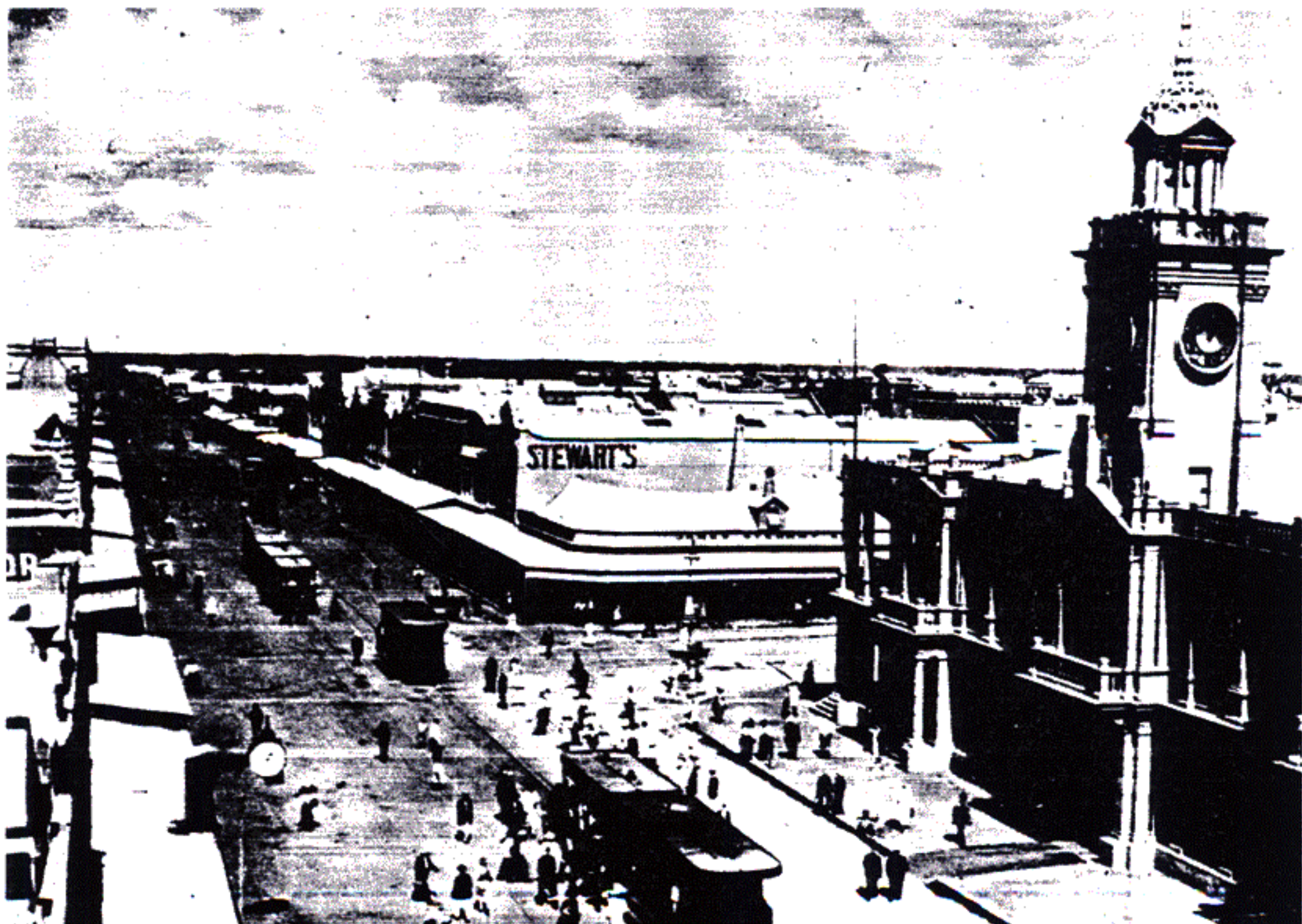
At this stage, however, much track work remained to be done, and it was estimated that another four month's work was required on it.

The Routes

The original system comprised four routes — Botanical Gardens, Upper Dawson Road, Show Grounds and Canning Street, where the Depot was situated, and which was joined to the junction of the Dawson Road and Gardens routes to form a loop, or "belt line" around the inner city.

Trams always operated through services, but as the Post Office, on the corner of East and Denham Streets, was the principal timing point, and the City section point, the routes will be described from there.

The line in East Street was double track and the Gardens/Dawson Road route turned out of it into William Street and continued west along that street for about a mile to its intersection with Canning Street. The double track tramway made a right angle crossing on the level at Denison Street with the double track North Coast Line of the Queensland Railways, which is there located in the street. This crossing was completely un-



Trams on the double track along East Street looking south from the Post Office (on the right) about 1914. Five cars and three trailers are visible. The short chimney can be seen protruding from the roof of the front car.

(Photo: J.W. Knowles' Collection)



Purrey car No. 8 is seen in East Street just after leaving the Post Office in 1932 headed for Gardens or Dawson Road. (Photo: K.J.C. Rogers)

signalled: The double track became single at the Campbell Street intersection about 43 chains from the Post Office.

At the William/Canning Streets intersection, the Gardens line junctioned in both directions for outbound movements with the line along Canning Street, and then crossed it. It continued along William Street for another 12 chains, then turned into Davis Street and commenced to climb. Davis Street becomes Dagmar Street and the gradient steepened on this section to become 1 in 24-28 as the line turned from Dagmar Street into Ward Street on a nasty curve, 50' in radius at its sharpest, and continued along Ward Street at 1 in 23, eventually easing to 1 in 90 before turning into Agnes Street, again at 50' radius, to terminate at the Botanical Gardens, 88 chains from the Canning Street junction and a little under two miles from the Post Office.

Along Ward and Dagmar Streets, the line was laid centrally in the road reservation but originally, the footpath on the north western side of the line extended right out to the tramline. Later, with sealing, these streets were altered so that the tramline was in the carriageway proper.

At the Canning/William Streets junction, the Dawson Road route turned south into Canning Street, but after 8 chains diverged to the south west into Dawson Road, which it followed in the centre of the road for another 75 chains or so, gradually rising to its terminus about 2 miles 13 chains from the Post Office.

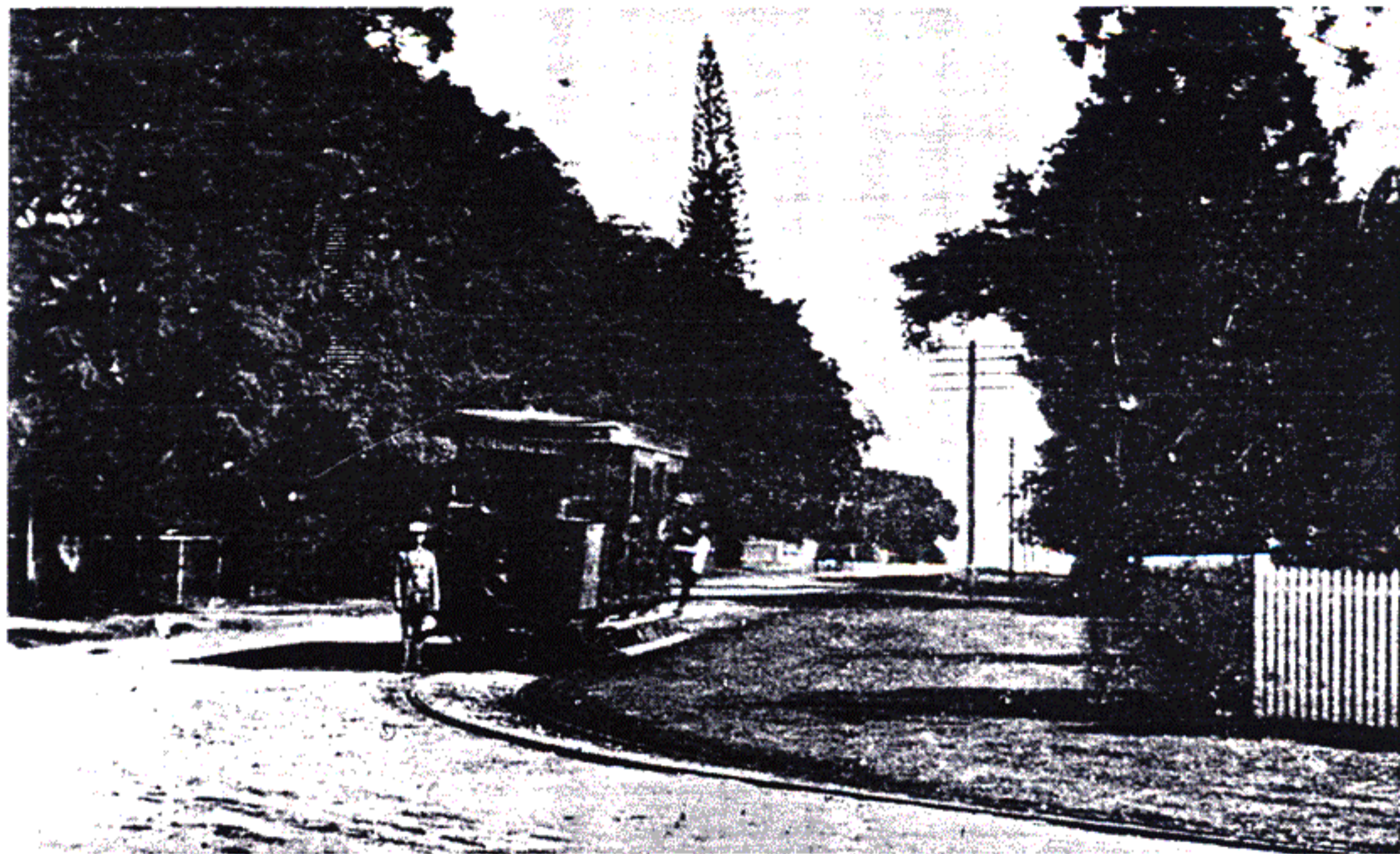
The Show Grounds route was the northern extension of the line along East Street; after some 25 chains from

the Post Office in that street, it turned at right angles into Archer Street, still as double track, which became single about 6 chains beyond, at the Bolsover Street intersection. After crossing Alma Street, the now single track crossed the Queensland Railways' entry line into Archer Park station, followed a few chains beyond by the double track North Coast Line. There were no signals on the tramway for these crossings; they were within the "down" home signals of Archer Park, but the operation of those signals was dictated solely by railway movements and the trams were considered the same as any other road traffic.

Some 50 chains from East Street, the line along Archer Street made a triangular or fork line junction at Murray Street, the line to Canning Street continuing along Archer Street. The Show Grounds line continued along Murray Street for 40 chains, then along Baden-Powell Street for 30 chains to its terminus, about 1 ¼ miles from the Post Office.

The track in Murray Street from Archer Street to Baden-Powell Street was on the right-hand side (outbound) of the originally gravel, later sealed, surface of the street, between it and the footpath. Although in grooved rail, the line was not covered, except at the intersections with Cambridge, Albert and North Streets. About ¼ mile from the Archer/Murray Streets junction, there was a loop at the Football Grounds, on the street side (i.e. between the roadway and the main line), capable of holding three trams, each with trailer. This route was almost level throughout.

The remaining route extended from the junction at



*A car inbound on the Gardens line at the intersection of Ward and Dagmar Streets, the scene of the 1913 accident. This car is fitted with acetylene lighting, which dates the scene as prior to 1916, and the destination is shown by a board suspended below the roof in front.
(Photo: J.W. Knowles' Collection)*

Archer and Murray Streets, along Archer and Canning Streets to the Canning Street Depot, 40 chains. The line continued a further 14 chains along Canning Street to the William Street junction with the Gardens and Dawson Road lines.

Total route mileage was 5 miles 62 chains, of which 74 chains through the city centre was duplicated. Track mileage was 7 miles 44½ chains, including junctions and depot tracks.

The depot and workshops were located in Canning Street. From the single line along that street, two tracks, with points facing William Street, led into the yard. That nearer William Street branched into two roads both of which ran into the "trailer" part of the shed.

The second branch from the street had two branches on the William Street side, and a fork line or triangle for turning cars on the other. It continued through the shed and before it terminated, made a trailing junction with a short track from inside the shed, which track was the principal mechanical repair road.

There were thus six tracks in the shed, four for motors and two for trailers. The workshops were equipped with lathe, wheel, emery, drill, cutter and a hydraulic wheel press. The points on the fork line were so set that cars, on entering, were able to turn if necessary (as they usually did) with only one point (apparently that entering the fork at the street end) having to be held.

Points on the system were of the single switch type with spring loading for trailing movements. There were

no crossovers on the double track, all services being "through". Rails were 74 lbs. to the yard, with flanges of the normal tramway girder type. Points and crossings were in manganese steel. Original sleepers were of iron-bark and, except along Murray Street, track was covered to street surface level. The original turnout on to the double track in Archer Street was 1 in 4, but this caused excessive flange wear and had to be lubricated; accordingly, it was replaced by a 1 in 6 turnout in 1913. It would seem from measurement of track in recent times that there was no gauge widening on curves.

At each of the three outer termini, there was a turning circle, which removed any necessity for cars to reverse and in fact, they could be driven from one end only. (At the depot there was the fork line for reversing). The turning circle at the Gardens was the sharpest in radius, about 40', and even then required the corners of Spencer Street and Agnes Street to be cut back to contain it; that at Dawson Road was of about 50' radius and could hold three trams, each with trailer, while that at the Show Grounds was larger and could hold four trams, each with trailer. There was ample room for these circles in the entrance areas to the Gardens and Show Grounds, but at the Dawson Road terminus, the circle left the street, ran on or across the footpath and entered what is now a residential allotment.

Early Problems

The service which commenced in June, 1909, was announced as half-hourly on each route, to give a 10-minute service along East Street. Just how this could be

done is not clear; a half-hourly service on each route would occupy all four cars and at best would give only a 15-minute headway in each direction along East Street. During Carnival Week (the week of the annual Rockhampton Show and Rodeo) a 20-minute frequency was to be provided.

It would appear that the Council was in a great hurry to open its tramway in time for the 1909 Carnival, despite its incomplete state, and apparently without anyone knowing very much about how to operate or maintain it. Thus, the service lasted only until about the end of 1909. The track was then still unfinished and Government inspecting engineers refused to pass it. The depot was incomplete and had no tools or machinery. With no equipment to maintain them, and apparently little knowledge, the cars had been run to a standstill.

A Brisbane daily newspaper described this sorry state of affairs as "one of the most melancholy failures of municipal trading on record".

To rectify the position, the Council engaged a Frenchman, Monsieur F. Boussignon, who had experience with Purrey cars, as Tramway Manager and Engineer, and borrowed further from the State Treasury. An additional £8,000 (\$16,000) loan was arranged for completing the car shed, restoring the cars to serviceable condition and ordering two additional cars (the last mentioned to cost £1,500 (\$3,000) in all). The work of restoring the cars and converting the ballast motor to a passenger car cost £4,120 (\$8,240). By the end of 1910, borrowings totalled £37,032 (\$74,064).

Apparently, the service was either completely discontinued or operated only irregularly in 1910 until 24th October, when a full service was restored. It has been suggested that horses pulled trailers to maintain some sort of service during this problem period, but there is no confirmation of this.

Early Years

There were two cars in service at the opening, the ballast motor was converted to a passenger car in 1910, and Mr. Boussignon erected the last car of the original order in 1910. He cabled for chassis for two additional cars and immediately commenced work on bodies for them, thus demonstrating an urgent need for additional capacity. These two cars were Nos. 5 and 6, and entered service in 1911.

Apparently, Boussignon saw need for more powerful cars, especially for the Gardens line and ordered two tandem compounds, which were also fitted with local bodies and which entered service as Nos. 7 and 8 in 1912. These eight cars provided all services until 1922. The original two trailers were added to by the local construction of another described as a "summer open trailer" in 1911. No further trailers were added until 1921.

M. Boussignon, having set matters aright, returned to France in 1911 and was replaced by Mr. W.E. Tozer as Engineer and Mr. A.E. Mills as Traffic Manager. The Council administered its tramway through a committee, which was until 1918 the whole Council, but thereafter of only three Aldermen. In 1919, Mr. Tozer resigned as Manager, to be replaced by Mr. J.H. Bennett.

In 1911, the depot was completed, three years later a wheel press was added to its equipment and in 1917

an oxy-acetylene plant and a new office.

In 1912, it was reported that "half the permanent way needs to be lifted and straightened" and that the washing of earth and clay on to the track was causing delays. These problems were apparently rectified, for in 1913, the tramways were reported to be giving "very general satisfaction". By 1913, there were at least three waiting sheds and two more and seats were provided at stops in 1914. The trackwork was under the control of the Tramway Manager until 1919, when it passed to the Works Department of the Council, only to be returned to Tramway control in 1920.

For most of 1911, three cars operated daily, but by the end of that year, the number scheduled each day was four. From March, 1913, a fifth car was added. In 1912, ten tram drivers were employed.

So pleased was the Council now becoming with its tramways that extensions were proposed. In 1911, the Mayor hoped for a connection between the Gardens and Dawson Road routes and for an extension to the railway station in Stanley Street via Bolsover Street which would provide a balance for the Show Grounds services. Land was actually purchased in 1913 for the connection between the Gardens and Dawson Road routes, presumably to make a loop, and apparently as reserved track.

In fact, a Lands Department map of 1929 shows a line branching from the Gardens line in Dagmar Street at the Penlington Street intersection, with points facing the Post Office, and running at right angles to the Gardens line until it met the Dawson Road line, with which it made a junction with points facing Dawson Road terminus, near the intersection with the then Cemetery Street (now Prospect Street).

The same map shows the line along Dawson Road as described earlier, but at the Canning/William Streets junction, the only turning movements possible are those from the Depot into William Street both ways. It seems almost certain that the arrangements shown on this map never existed; the Gardens and Dawson Road routes as described in the Press at the opening were the same as existed in 1939, no mention is made of construction or modifications on these lines in Mayors' Reports, and former tramway employees and residents have no memory of such a line.

So flourishing was business that in 1913, there was insufficient capacity to handle all demand during Carnival week, and during that year "Midnight Excursions" were being run, using the open trailer. More double track was suggested.

An Early Accident

These rosy thoughts were disturbed by an unhappy accident on 28th September, 1913. On this particular Sunday, a large crowd had gathered at the Botanical Gardens to hear the Lakes Creek Brass Band and an extra car was provided, No. 6 with the open trailer, No. 11.

This special followed the regular 4.30 p.m. car from the Post Office, and on departure of the regular car on its return from the Gardens at 4.50, commenced to load passengers. The special waited at the Gardens for the next regular car (No. 7 and trailer) to arrive at about 5.17 and then departed at 5.20. A total of 102 tickets had been sold.

On the long steep downgrade commencing in Ward Street, speed was not checked and the car took the sharp curve down to 50' radius into Dagmar Street at an excessive speed. About 1½ times its length beyond the curve, the car derailed and then capsized, taking the trailer with it. One passenger was killed and four seriously injured; two of the injured later died.

The driver, a fitter used temporarily in that capacity, claimed that the brake had failed to work, but on the run back to the depot after the car had been rerailed, it was found satisfactory, as it was during a test a few days later at the location, when the vehicles were loaded with sleepers of approximately the same weight as the passengers. The track was examined by the local Maintenance Engineer of the Queensland Railways who found it satisfactory, but that the curve, although canted at 2½ to 3 inches, should not be taken faster than 8 m.p.h. The inquiry revealed that the same car, No. 6, had previously derailed on this corner, on account of bad flanges, and had hit a fence.

The accident brought the trams back into disrepute and the local press again found them to be a source of "continued trouble and vexation". Complaint was made of the mechanical engineer in charge of the cars (the Manager) also looking after the track.

The War Years

During World War I, some supplies became short, especially those parts imported from France. Some were lost in a ship sunk under war conditions. The cost of importing parts became so high that it became cheaper to make them in the workshops, and in 1918, boiler

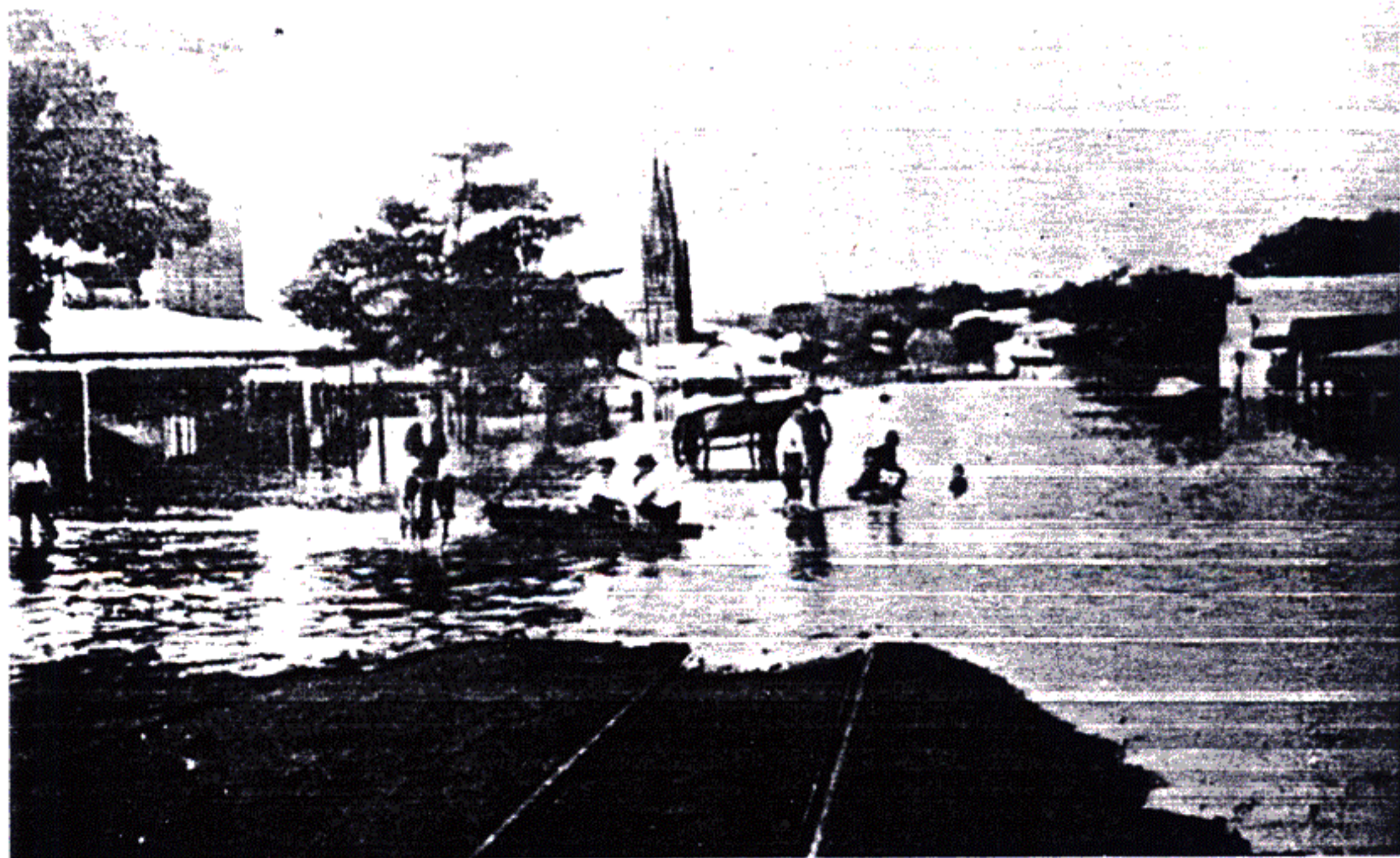
tubes were in such short supply that old ones, previously discarded, were taken from the scrap heap and worked on to make them suitable for further use.

In 1916, the system suffered its only strike, when some employees, alleging victimisation of their fellows, withheld services for 16 days, resulting in a £400 (\$800) loss of revenue.

In 1914, the water supply for the cars was improved. Previously, the town supply had been used, but in that year, a spring of very pure water in Ward Street, between the Gardens and Dawson Road routes, was tapped. A pumping plant with gas engine was erected and the water piped to tanks at the corner of Dawson Road and Ward Street on the Dawson Road line and on the Gardens line in Dagmar Street immediately above the well. The purer water resulted in a reduction in boiler troubles.

In 1916, the acetylene lighting on the cars was replaced by electricity, operated from storage batteries on the cars.

In January and February, 1913, a very high flood in the Fitzroy River covered the rails in William Street to a depth of 5' necessitating a cessation of traffic. During the same year, William and Davis Streets were improved by asphaltting their surfaces. Part of the cost of the work was debited to the trams, although responsibility for both fell under the same council. Additional services requiring a sixth car to be in service on weekdays commenced on 25th November, 1918; by the end of the year it was just breaking even. In 1919, in the first Anzac Day parade held in Rockhampton, trams formed part of the procession along East Street as they did in many later street processions.



Rails were covered in William Street by floodwaters up to five feet deep from the Fitzroy River in January and February, 1913.
(Photo: J.A. Bell)

A Second Accident

On Wednesday, 8th January, 1919, the last tram to the Show Grounds left the Post Office on time, car No. 7 well filled, with about 40 in the trailer. It stopped for passengers on the city side of the corner of Archer and Denison Streets, beyond which was the unprotected level crossing of the single track tramline with the North Coast Line. The driver of No. 7 waited while a goods train from Emu Park to Rockhampton passed slowly along Denison Street on the set of rails nearest him, and as soon as its brakevan cleared the crossing, started out across Denison Street behind the van.

At that moment, on the other track, an outbound Rockhampton (Stanley Street) to Lakes Creek "Tram Train" (see later) with its locomotive running tender first, was approaching the Archer Street intersection. It was travelling relatively slowly, partly on account of the low speed limit for trains along Denison Street, but also because it had to stop for passengers just beyond the Archer Street intersection.

Neither driver could see the other. The tram itself cleared the railway line, but the locomotive tender hit the trailer in the middle. The footboards on the trailer caught in the road and prevented the vehicle from overturning. The roof came off however, and fell on top of the passengers, along with other broken timber and glass, as they fell out. One passenger was caught between the trailer and the tender, many were dazed, but fortunately none was killed, although there were babies in the trailer.

As there were no deaths, there was no public enquiry, although the Council and the Q.G.R. did hold an enquiry "in camera". The local press was outraged by this secrecy. It was noted in one editorial that outbound Lakes Creek Tram Trains stopped after crossing each intersection, whereas those inbound stopped before. There was also a rule that trains running in opposite directions along Denison Street were not to cross intersections simultaneously, a rule difficult to observe precisely. One correspondent suggested that tank engines be used on the Tram Trains to improve visibility.

The Council suffered law costs of £1,172 (\$2,344) from this accident. No safe working system was set up for the two tramway/rail crossings, not even something similar to that at the many crossings of Queensland Railways' lines and cane tramways, but the Council adopted a rule that the tram was always to stop before crossing Denison Street and the conductor walk to the railway lines and look both ways, a rule that was usually observed only if the need for it was obvious. The trailer involved in the accident was rebuilt.

Traffic and Finances to 1920

In 1911, the first full year of operation, 774,856 passengers were carried. Passenger numbers grew every year until 1919, when 1,654,971 were carried, despite an influenza epidemic for three months of that year. Numbers fell slightly to 1,617,922 in 1920.

Tram mileage in this period was highest in 1914 at 154,329 for the year. With parts and supplies short, mileage fell during the war years to only 136,274 in 1917 and 137,810 in 1918. With heavier traffic, the 1918 figure meant that on the average almost 12 passengers were picked up for every tram mile run.

Peak times could be very busy. In 1912, 8,489 passengers were carried on the Saturday of Carnival Week, and in 1920, every vehicle was needed on Saturday nights to meet the demand.

The financial position fluctuated. In 1911, revenue was £5,897/16/8, (\$11,795.67), and working expenses excluding capital charges, £5,879/1/8 (\$11,758.17) (of which wages accounted for £3,484 (\$6,968)). The Council was considering a special tramway rate to pay the interest and redemption on its borrowings, which in 1912 totalled £42,730 (\$85,460), £233 (\$466) from a Bank and the remainder from the State Treasury. By 1913 however, all but £204 (\$408) of all expenses, including interest and redemption, was met, and this after £839 (\$1,678) of accident claims and building waiting sheds from revenue. In 1914, all expenses were paid, including debt charges and £92 (\$184) of the City Engineer's salary and £249 (\$498) profit made.

In 1916, revenue met the working expenses, but not capital charges.

In 1917 and 1918, revenue was sufficient to meet those charges, but in 1919 and 1920 was not. Wages were increased in 1918 and 1920, and with post-war prices for supplies dearer, the Council was forced to increase fares in 1920.

An Extension

In 1920, the Council planned two extensions, one from the Show Grounds along Wandal Road to the then developing Naughton Estate, and the other a continuation along East Street south from the William Street intersection.

The East Street extension was not proceeded with, but in 1921 a Treasury loan of £5,335 (\$10,670) was obtained for the Wandal Road extension. Tenders were called for rails and construction was apparently carried out by the City Engineer's Department.

The 52-chain extension left the Show Grounds line a few chains before its terminal turning circle, and ran as single track without curves along Wandal Road, generally undulating. It was laid centrally along the road reservation, in grooved rail, and was originally covered with gravel to the top of the rails. Wandal Road reservation however, was so wide that through road traffic generally ran only on the western side, and local traffic to houses along it on the other, so that normally the tram line was crossed by road vehicles only at intersections.

When Wandal Road was later sealed, the tramline was unaffected for most of the distance, being either between sealed pavements on each side of the reservation, or where there was a sealed pavement on one side only, on the eastern side of it. The line was nominally still covered with gravel, although more like reserved track, except where it crossed intersecting streets. The usual turning circle and waiting shed were provided at the terminus. The new line, known as Wandal, was opened in 1922, increasing the total length of route to 6 miles 34 chains.

The Twenties

Mr. J.H. Bennett, who became Manager in 1918, was succeeded by Mr. M. Torazzi in 1922. The latter resigned the following year, and joint temporary managers were given the responsibility of the system in the persons of Messrs. A.E. Ayling, formerly the clerk, and W.G. Stenhouse, formerly the mechanical foreman. Mr.

Ayling was then Manager from 1924 to 1926 when he was succeeded by Mr. Stenhouse, who remained Manager until the closure. The Council exercised control through its 3 or 4 man Tramway Committee. Staff during the decade numbered about 44.

In the same expansionary spirit as that which included the Wandal extension, four new items of rolling stock were added in 1921—financed by a £3,000 (\$6,000) Treasury loan. A new roofless trailer, No. 12, entered service early in 1921, and two trailers with roofs Nos. 13 and 14, the following year. All three were built at the workshops. In 1929, the roofless trailer, No. 12 was fitted with a roof.

In 1922, tramcar No. 15 entered service. This car was a 4-cylinder simple, larger again than Nos. 7 and 8, and was provided with a saloon body. It was built locally, the body by the firm of Burns and Twigg, who built many passenger carriages for the Queensland Railways, and assembled at the depot. The boiler was imported and it is likely the engine unit was also. In 1924, No. 15 was converted to a toastrack type, similar to the other cars, although retaining the rear wall and off-side half-wall of its saloon body.

All the earlier cars were substantially rebuilt during the earlier part of the decade — Nos. 4 and 6 in 1920, Nos. 7 and 8 in 1921 at a cost of £1,600 (\$3,200), No. 3 in 1922, Nos. 2 and 5 (reported in 1922 to be "unfit for passengers") in 1923, and No. 1 in 1924. During the reconstruction of No. 2 in 1923, its engine was altered to a compound. The rebuildings include certain mechanical improvements to add to the reliability of the operations, and from 1922, all cars were fitted with improved illuminated destination signs. In 1925, No. 15 was fitted with a Pyle National turbogenerator, as was No. 8 in 1926.

From 1925, the supply of local coke proved insufficient, and thereafter, additional supplies were obtained from Mt. Morgan, Bundaberg, Mackay, Maryborough, Gympie, Brisbane and Dinmore.

The Queensland Railways had been operating suburban trains from Stanley Street and Archer Park stations in Rockhampton to Lakes Creek on the Emu Park line since the early years of the century (see "Provincial Suburban Trains on the Queensland Railways", Bulletin No. 420 — October, 1972, page 201), and where the line passed along Denison Street, these services stopped at street corners. Hence they were officially known as "Tram Trains".

Apparently impressed by the economy of the Council's trams, the Q.G.R. became interested in applying a similar form of traction to its own tram services. To test the scheme, tram No. 8 was borrowed from the Council, and transferred to Q.G.R. rails at the crossing at the corner of William and Denison Streets by a Q.G.R. steam breakdown crane. For the test, railway tyres were fitted to the wheels, and the car probably performed runs to and from Lakes Creek, the only Council tram to run on the north side of the Fitzroy River.

The Q.G.R. were apparently impressed and ordered Purrey equipment to build its own cars. The tram tyres were refitted to the wheels of No. 8 before it was returned to the Council, but apparently not properly, for not long after the car resumed its more mundane runs, the

tyres flew off the wheels!

From 1920 until 1922, track maintenance was again under the control of the Tramway management, only to revert in the latter year to the City Engineer. The track apparently continued to give trouble. In 1920, attention had to be given to prevent it sinking, and in 1921, 48 chains were completely reconstructed.

In 1924, it was reported that much of it needed straightening, and in 1930 that the condition of the rails was making maintenance difficult. In 1922, buses were causing asphalt to knead over the rails in East Street while three years later, four new steel tongue point pieces were bought for renewals and spares. In 1928, silt, washed on to the rails by rain storms, caused several derailments. At these times, the conductor would walk in front of the car and clear at least one rail with a cut down shovel.

In 1923, an additional tank was provided at Dawson Road/Ward Street watering point. Water was still being provided by the spring in Ward Street at this time. From June, 1926 however, that supply was superseded by water from the new town supply, drawn from Yaamba, and standpipes were provided at all termini.

In 1922, a coke depot was erected at Dawson Road terminus, on the corner of King Street to reduce the need for cars to return to the depot. A special tram towed No. 12, the roofless trailer, loaded high with about 80 bags of coke, from the Depot to Dawson Road each Monday, Wednesday and Friday, and the crew unloaded the bags into the shed.

This operation took longer than the half hour interval between regular cars and it was necessary for the "coke tram" to shunt to allow itself to be overtaken. On return to the Depot, No. 12 was hosed out to be ready for peak hour running. With this supply available, coke hoppers on the trams were replenished at Dawson Road on each run by the conductor while the driver attended to the fire.

Advertising boards were erected on waiting sheds, etc. in 1925, the same year that the Gardens shelter was moved to a more convenient site.

Bus competition caused something of a setback in 1922, but provided a spur to improving the reliability and performance of the cars, and the construction of car No. 15 and two trailers. This competition continued throughout the decade, despite protests by the Council to the transport licensing authority in Brisbane. Timetables were changed and in 1922 fares reduced; signs were placed on the cars "Patronize the Trams — They belong to You". These early buses however, had solid tyres, and were very rough riding; the trams were really more comfortable, but they saved some people a deal of walking.

The 1924 timetable provided for Wandal services to run to the Gardens instead of Dawson Road, and for Canning Street or Archer Street services to run to Dawson Road instead of Gardens. This was apparently to allow the more powerful cars to operate the longest and hilliest routes as a through run. A change in business hours in 1926 required a further timetable revision. Perhaps this revision was the reason for moving the convenience provided for crews from Dawson Road to Wandal in that year! In 1930, a 6d. (5c) return ticket

was introduced for through travel between 7.45 and 10 p.m.

In the overall history of the system however, the 1920's were the busiest years, although revenue was sufficient to meet only working expenses, up to £3,000 (\$6,000) annually having to be obtained from general rate revenue to pay interest and redemption. Generally rising wage levels until the reductions in 1930, and the freight on coke from distant places (more expensive than the coke itself) added to the working expenses.

During the first half of the decade, passenger numbers displayed a generally rising trend to a peak in 1925, and thereafter were in decline. Numbers carried in selected years were:— 1,617,922 in 1920, 1,763,007 in 1922, 1,817,174 in 1925 (the busiest year), 1,752,936 in 1928 and only 1,510,748 in 1930.

Car mileage was about 152,000 in 1921 and 1922, was maintained at slightly over 180,000 from 1925 onwards, with a peak of 182,428 in 1926.

The system suffered further accidents. In November 1928, a man who had been attempting to board a tram in motion at the corner of William and Canning Streets fell and was run over by the trailer and killed. There were three accidents on the Wandal extension, some probably in the 'thirties. A man was run over near the junction at the Show Grounds on 4th April, 1929. Another man tried to pass from a trailer to the motor of a tram in motion, but slipped, was run over by the trailer and killed. A third man who had left a bicycle near the Wandal turning circle one wet night rushed to rescue it as a tram ran around, but was struck by the

tram and killed; the driver could not see him in the light of the headlamp, which shone straight ahead and not on the track of the turning circle.

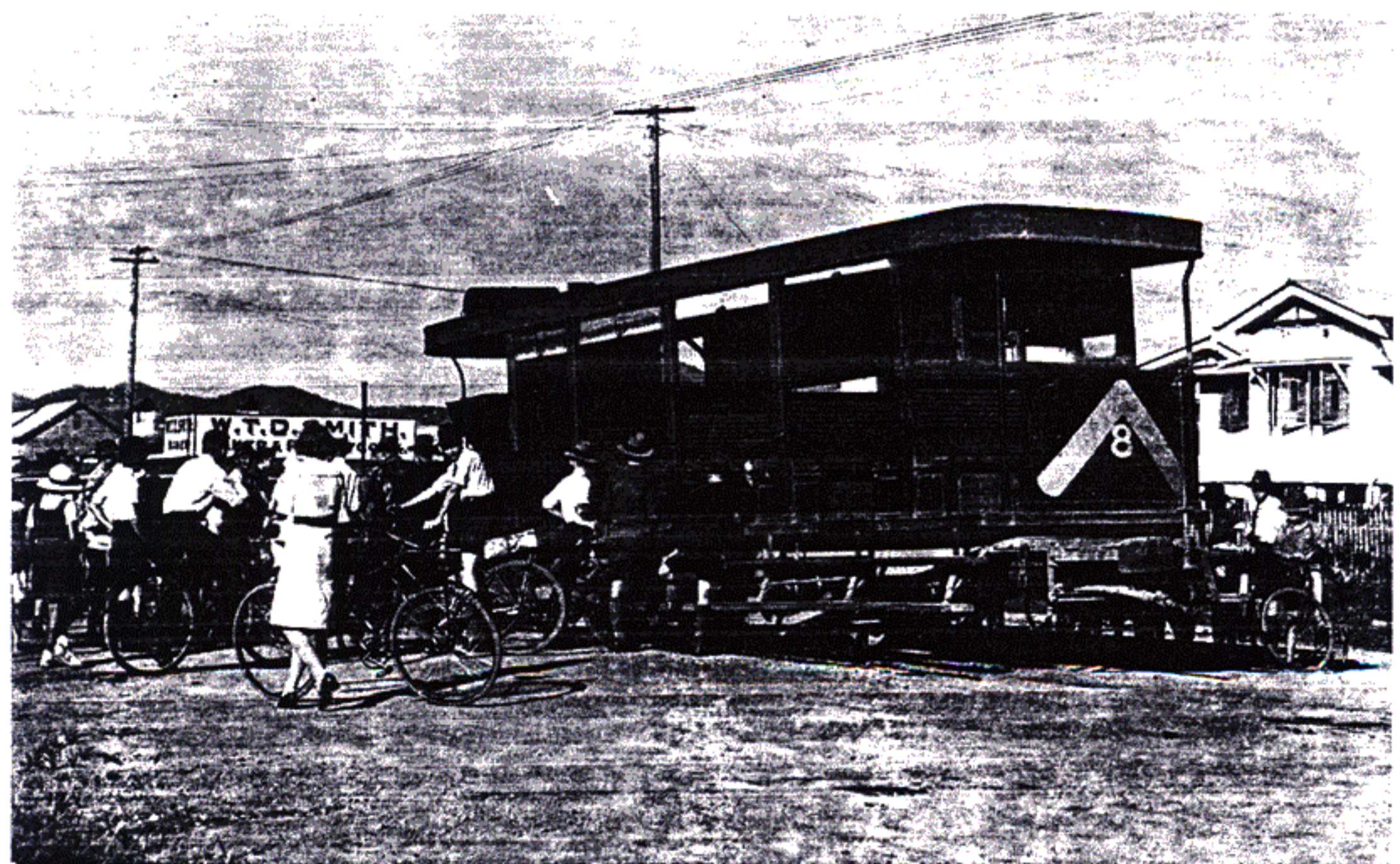
The Thirties

The last decade of the system before its closure in 1939 was characterised by a worried Council wondering what to do about losses, and a steadily deteriorating track.

The relief from wage reductions in 1930 did not continue long. Passenger numbers fell by over 160,000 in 1931 compared with 1930, and a subsidy of £2,187 (\$4,374) was called from the General Fund to meet even the working expenses, before debt charges were considered.

The Council viewed this with alarm, and in 1931 obtained quotations for buses. Rather than accept any of them however, it asked the Commissioner for Railways for a representative of his Department to report on the tramway operation. The officer appointed was Mr. P.R.T. Wills, Inspecting Superintendent, later General Manager of the Central Division (in Rockhampton), Secretary of the Department, and Commissioner for Railways from 1941 to 1948.

Mr. Wills submitted his recommendations in March 1932. As a railway officer he seemed to be determined that all things which ran on rails were good, and that as long as his recommendations were carried out, all would be well. Some of his suggestions did indeed reduce working expenses, but it would probably have been better for the hapless Council if he had recommended conversion to buses there and then. However, his report



A view of the rear of car No. 8 after it had suffered a broken axle in April, 1939. The seats, rear partition, buffer and coupler can be clearly seen. (Photo: J.W. Knowles' Collection)

did not mention anything at all about bus operating costs.

He asserted that the tramways owed the ratepayers nothing, because land values along the routes had increased. This, of course, was so, but bus services on the same routes would have done nothing to reduce them. Substitution of buses for trams was likely to lead to a loss, it was claimed, and handing over to privately operated bus services against the public interest.

Rockhampton was said to be well served in terms of frequency, and speed was as good as in larger places. Mr. Wills felt Rockhampton had no need to be apologetic and that it was bad in any case to change at a time of stress. The private buses competing with the trams were said to be competing unfairly and removal of their depredations would cause revenue to rise by £2,000 (\$4,000) per annum (about 250,000 passengers). He suggested that fares be generally left unchanged.

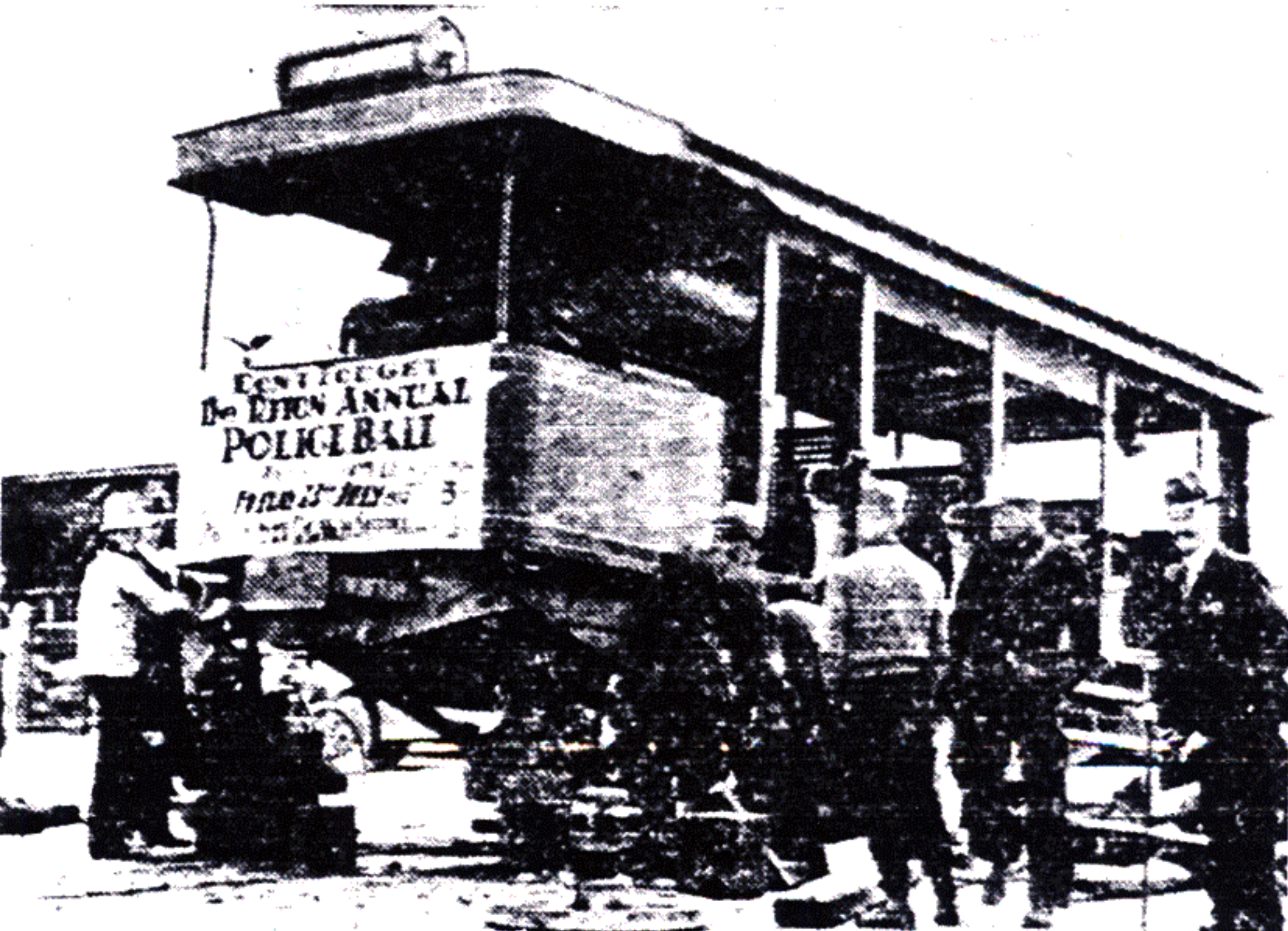
He recommended that the E roster traffic car be eliminated, saving £1,125 (\$2,250) per annum, the "pooling" of one fitter £255 (\$510), one car attendant £245 (\$490), one blacksmith and striker £128 (\$256) and one track boy £130 (\$260). Dispensing with one driver and one conductor and working the remainder for 48 hours per week, would save £487 (\$974). Economies in coke consumption were promised to save a further £750 (\$1,500). To achieve this, all coke was to be weighed and bought dry (apparently the Council

had been buying a lot of water in freshly drenched coke) and a coking stage was to be erected so that drivers could coke their cars without an attendant. (Debt charges on the weighbridge and coking stage were not mentioned). All cars were to run for 8 hours before returning to the depot.

The above savings and relief from unfair competition, would result in a gross improvement of £5,100 (\$10,200) per annum. From this had to be subtracted loss of revenue from elimination of the E roster car £100 (\$200) and "less time for painting" £57 (\$114) giving a net improvement of £4,943 (\$9,886) per annum.

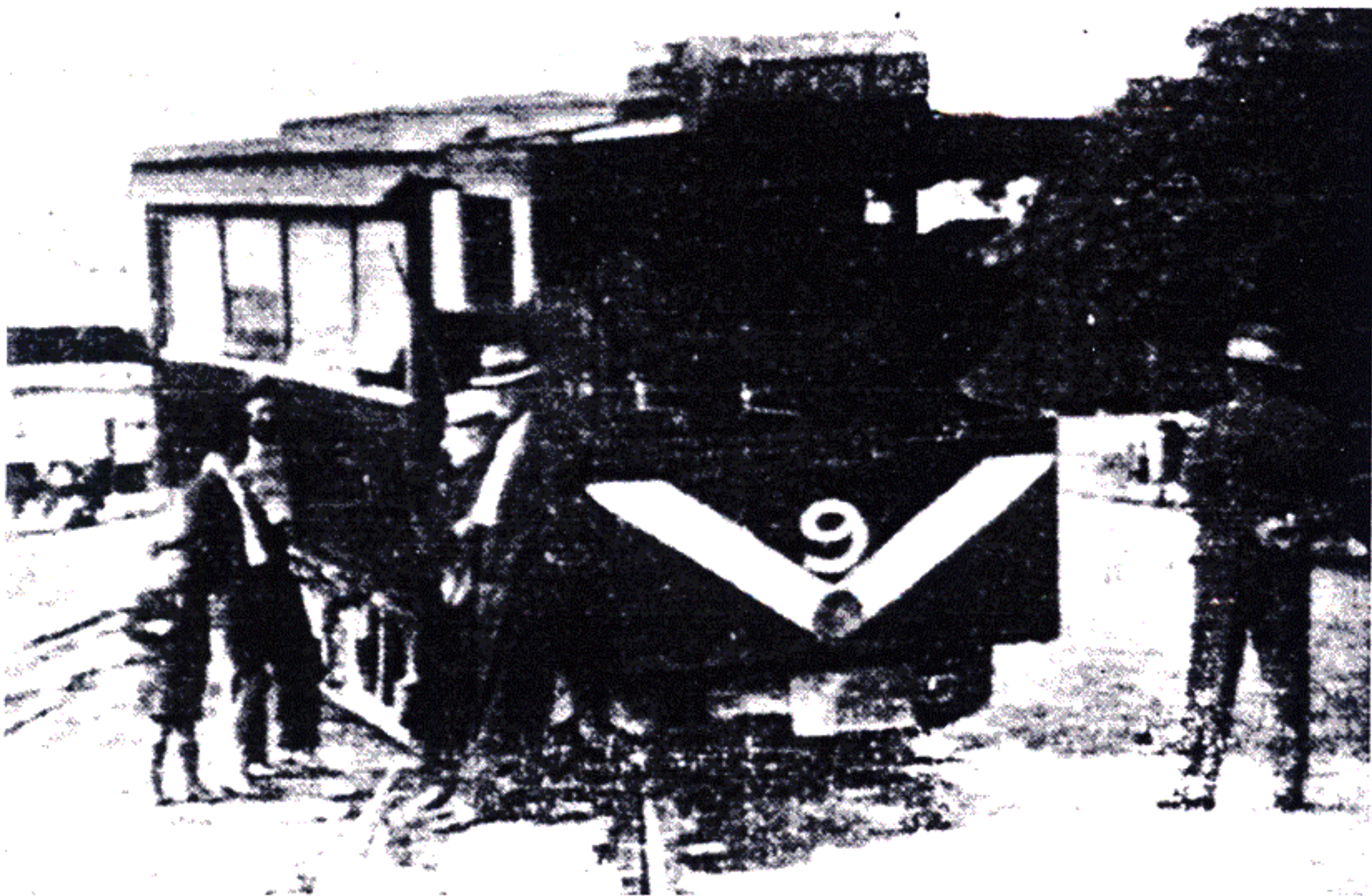
The Council accepted the advice and from 14th May, 1932, it reduced weekday services from 5 cars to 4 and constructed the weighbridge and coking stage. It also reduced the fare from the Post Office to North Street from 2½d. to 2d. Staff, which had numbered 44 in 1930, was reduced to 36 in 1933 and remained about 36-37 thereafter. In consequence, working expenses fell, and the loss before debt charges was reduced to £1,000 (\$2,000) in 1933.

The Council was unsuccessful in obtaining relief from private bus competition until June, 1934, when the Transport Board routed all such operations so that they were 250 yards or more away from tramlines and forced the closure of the Wandal bus service. At the same time the Council restored the 5th car for 5¼ hours on Mon-



A tram which derailed after an axle broke in 1937. This view shows the coke hopper on the right hand side of the car very clearly.

(Photo: J.W. Knowles' Collection)



No. 9 derailed after it broke an axle on the double track in August, 1938. The throttle and brake handles and V on the front are readily identifiable. The poor state of the track is also obvious.
(Photo: J.W. Knowles' Collection)

days to Saturdays (although one was removed for 8 hours on Sundays).

Business increased in the following 6 months at an equivalent annual rate of about 66,000 passengers, but fell away in 1935, when 1,210,930 travelled, only two-thirds of the number travelling in 1925. In 1934, however, the trams were still important in carrying people to and from the Carnival and a 6 minute service was provided to the Show Grounds during the gala week.

Losses on working expenses continued to rise and in 1936 amounted to £2,688 (\$5,376) on a revenue of £11,391 (\$22,782) in addition to which £2,557 (\$5,114) was found from the special loan rate account to meet debt charges. Debt then totalled £34,492 (\$68,984) Cycle and car competition was complained of, but nobody could expect to restrict those forms of transport.

The timetable was kept at the 1934 level of service, requiring about 172,000 car miles per annum, right to the closure.

Seeing no way out of continuing losses and apparently now believing buses could be cheaper, especially if one-man operated, the Council decided in 1937 on a combined bus-tram operation, apparently to wear the trams out. In January, 1938, however, it was decided to do away with the trams completely. At some stage, the ratepayers were asked for their views in a poll and declared themselves overwhelmingly in favour of doing away with the trams.

The Council's decision was no doubt prompted by

further declines in passenger numbers and revenue and by the then apparent need to renew much of the track. Wills had reported in 1932 that the track was in good order, not needing replacement for a number of years, but except on the actual branch of the Gardens line and on the Wandal extension, most of it was very rusted in the web, a condition brought about by the yellow clay in which it was laid. Some had already been relaid in railway type rail without grooves. All points were very worn.

The Council applied to the State Treasury for a £22,000 (\$44,000) loan to purchase diesel buses for the conversion and although the decision was taken in January, 1938, it was not until April, 1939, that the first buses arrived and not until June, 1939 that the last tram ran.

Although economy was the watchword and the cars and the track allowed to run down somewhat, the system was not entirely static during the 1930's. Extensions were made to the coke hoppers of cars 8 and 15 in 1932 and cars 5 and 8 were closed-in below waist level on the off-side by which passengers did not join at any time and some other cars were so treated in 1935. Car No. 15 and trailer No. 9 exchanged numbers in 1933, to maintain consistency.

In 1934, safety zones were provided at six inner city locations and in 1936, the diamond crossing of the double track tram and railway lines at the corner of William and Denison Streets was renewed at a cost to



Covering some of the tram tracks in July, 1939, just after the closure.

(Photo: J. W. Knowles' Collection)

the Council (probably half the total) of £429 (\$858). Apparently, the need for attention to the two sets of level crossings in Denison Street provoked much argument between the Council and the Queensland Railways as did apportioning the cost.

Coke still had to be obtained from distant places right to the end. The general running down of the system was demonstrated by cars suffering broken front axles, one each in 1937, 1938 (No. 9), and 1939 (No. 8).

The Closure

The first of the ten Albion diesel buses arrived in Rockhampton on 15th April, 1939. Six days later, a tram derailed on the Dawson Road line and its passengers received a foretaste of the future when they were brought into town by bus.

On 26th April, buses commenced operating the basic tram schedule, with some trams used at peak times. While this arrangement persisted, the buses used the tram safety zones in East Street. Revenue immediately increased and from May, as more buses arrived, they were given the privilege of the shelter of the depot and the trams stabled outside.

The complete cessation of tram services was held over until the end of the 1939 Carnival Week, on 24th June. By then, all 10 buses had arrived. Hence, at 10.40 p.m. that night, the last Rockhampton tram, No. 6 and two trailers, operated by driver Sanders, left the Post Office for the Depot, the end of a most unusual street transport service. In contrast to the opening, the departure of the last car was watched by only a dozen or so people.

The staff, including men who had served almost as long as the tramways had existed, were mostly transferred to bus operation, but as those vehicles were operated one-man at all times, some had to be offered employment in some other departments of the Council.

The Council had no reason to regret the conversion. In August, 1939, revenue was about £100 (\$200) per fortnight higher than in August, 1938 and in the 1939-40 financial year, a profit of £4,300 (\$8,600) was made on working expenses, more than enough to pay debt charges on the bus capital of £20,618 (\$41,236) and on a special loan of £12,835 (\$25,670) raised in July, 1939 to seal the bus routes. Passengers carried amounted to 1,271,334, compared with 1,145,555 in 1937-38, the last all-tram year.

During the war years, the buses did very good business, not only in the city, but also to and from army camps. In 1948, the Council used its power to take over the private bus services in the City with the result that its operations have since extended well beyond the old tram routes.

By the 1960's however, the buses were facing the same problems of reduced patronage as public transport operations in other cities and evening and week-end services were all but totally removed. In 1966, the former Wandal, Gardens and Dawson Road tram routes each had 17 services per weekday, the last at 10.40 p.m. compared with 28 to 31 trams per day in 1934.

The Council decided not to remove the rails, as it was cheaper to seal them over and most were very poor anyhow. The first route to be sealed was Dawson Road.

East Street had not been treated when, as part of war-time emergency arrangements, it was decided to erect air-raid shelters down the centre of the street, along the tramlines. After the war, the site of these shelters was converted into a series of garden beds.

The better rails on the Wandal route were sold in 1941 to Mourilyan Sugar Mill, near Innisfail, which could not obtain rails on account of wartime conditions and that line was removed from the terminus back to Kingel Street. These were used by the Mill on tramline bridges which were merely headstocks, piles, rails and spacers. In these, the strength of the rail was very important. A few of the rails were still spare at the Mill in 1968.

The remainder was sealed over. In the 30 years or more since, bitumen on some streets has worn through, leaving the rails or their shape visible in places, while sleepers have rotted, leaving a series of corrugations. The Queensland Railways asked the Council if they had any objection to the removal of the diamond crossings in Denison Street. The Council replied that it had none, and the crossings were removed, presumably at the cost of the Q.G.R.

In June, 1940, the Council wrote off its remaining tramway assets — £20,461 (\$40,922) of permanent way, £5,772 (\$11,544) of rolling stock and £116 (\$232) of water purifier, a total of £26,349 (\$52,698). The debt owing still exceeded £31,000 (\$62,000). Assets were sold as far as possible — cars and trailers as mentioned

below, the hydraulic wheel press for £53 (\$106) including other small items and the wheel lathe for £100 (\$200). The lathe, emery, drill and cutter, and the servicing pits all remain at the depot to this day for bus maintenance as does the weighbridge.

In their 30 years, the Rockhampton City Tramways carried 40,614,924 passengers, ran 4,526,932 car miles and collected £355,475 (\$710,952) revenue.

The Tramcars

The Purrey tramcars used in Rockhampton were basically 4-wheel toastrack type with a platform on the front for the boiler and driver and an underfloor steam engine. The Purrey system however, was unusual in many ways, and as Rockhampton (Council and Q.G.R.) saw its most extensive and possibly only use on rails in Australia, a reasonably full description is warranted.

The boiler: The boiler was of the water tube type and was contained within a large casing immediately in front of the passenger compartment. This casing was basically square to waist height, and then sloped inwards from all directions except the back, to the square exhaust orifice or chimney which protruded only a few inches through the roof.

On the left side of the casing was a coke hopper which curved downwards to meet the side of the casing; the curve of the outer side of the hopper continued on to the sloping grate, which sloped downwards from left to right.

On the right side of the car, immediately opposite



The 10.30 a.m. departure for Dawson Road as No. 8 leaves the Post Office in East Street. The short wheelbase of the cars can be appreciated from this view.

(Photo: R. Deskins' Collection)



*Nos. 7 and 8, each with trailer, progress along East Street in the early 1920's, when canvas curtain blinds were still fitted.
 (Photo: J.W. Knowles' Collection)*

the driver's entrance, was the fire door. This arrangement was designed to allow coke to make its own way out of the hopper in to the grate while the car was in motion and to facilitate the pulling of coke down from the hopper on to the fire by a "slice", which was inserted through the fire door by the driver standing beside the car. There was thus no shovelling of fuel on to a fire as in a locomotive. The front of the casing could be removed, as could the rear, from the front passenger compartment. The bulkhead between the boiler casing and passenger casing was lagged.

The chimney was basically square. The original chimneys scarcely protruded through the roof at all. By the mid-1920's, they were slightly higher and were fitted with various shapes of capuchon, or small lip on the front, a feature of Queensland Railways' locomotive chimneys. On No. 15 as built, this capuchon was quite high, and the sides were triangular, sloping down to meet the back of the chimney.

Within the casing was the boiler proper. This comprised two drums, both horizontal across the width of the car, and many tubes. The lower, or bottom boiler drum was shaped as a narrow box with sloping ends, about 36" x 3.3" x 4.6", while the upper was cylindrical, 3'3" long and 11.8" in diameter. These were joined by a nest of 43 serpentine tubes, each folded back and forward on itself 8 times, 3/4" diameter and about 13' long overall, which passed through the combustion space of the boiler, and by two direct water tubes, about 1 1/2" internal diameter, designed to promote circulation of the water.

The bottom drum had water compartments and steam space. About 30 of the serpentine tubes were water

tubes, passing from below water level of the top drum to the water compartments of the bottom drum, while about 13 were superheater tubes, joining the upper drum above water level to the steam compartment of the lower drum. The steam supply to the engine was throttled from this lower steam compartment. The throttle was controlled by a radial lever on the very front of the platform, moved by the driver with his left hand in very much the same way as the controller of an electric tram.

The exhaust from the engine was directed up through the boiler casing so that it was superheated before being ejected into the atmosphere through the chimney. As the fuel was coke, there was normally no visible exhaust while the car was in motion, apart from heat waves.

Originally, the cars were fitted with feedwater heaters (probably additional tubes inside the boiler casing, located between the water tanks and the feed pump) and blowers, but these were removed about 1920. The water feed was automatic; a float in the upper drum was attached to a rod which penetrated the drum and moved the valve of the small horizontal steam pump located on the left hand front corner of the platform. There was no gauge glass. The exhaust from the feed pump was directed under the fire bars and combined with the carbon gases produced by the burning coke to form water gas, which passed out the chimney.

When the car was stationary and the pump working, this gas would burn at the mouth of the chimney; the blue flame thus produced was visible at night and resembled a flame from a blow torch, extending from 3 to 4' above the chimney. This led to the cars being known locally as "pie carts". As soon as the car moved, the



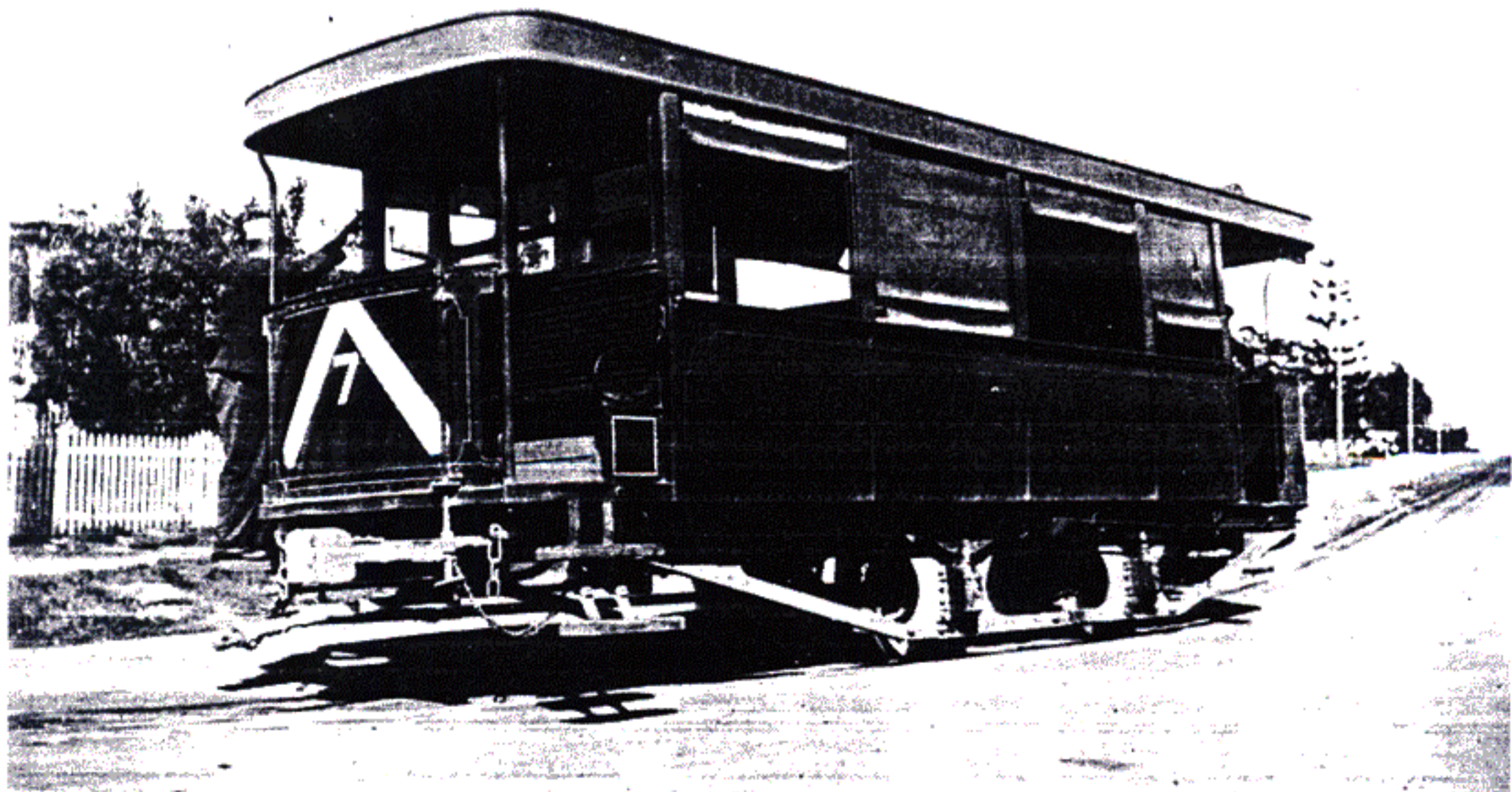
No. 15 as built in 1922 with saloon body and 'stairways' overhanging the road. The long rear overhang of the cars is clear from this view.
(Photo: J.W. Knowles' Collection)

blue flame would be dissipated by exhaust steam from the engine. The cars have been known to set fire to Christmas bunting erected across East Street!

Beneath the firebars was an ashpan, with dampers in the side of the casing and this normally needed cleaning

only once daily.

At one stage, presumably when good quality local coke became short after 1925, at least two cars were fitted as oil-burners. An extra pump was installed to compress air to force the oil through the burners. How-



Car No. 7 taken from the rear shows the offside appearance of this and four other cars which were semi-enclosed on that side in 1934-5.
(Photo: K.J. Magor)



A depressing scene three months after closure as both motors and trailers lie disused inside and outside the depot awaiting their final disposal.
(Photo: D. Murray)

ever, the boilers would not hold pressure while the car was on the move with fuel and the cars concerned were re-converted to coke burners.

The small cars, Nos. 1 to 6, had 8.5 h.p. boilers supplying steam to 36 h.p. simple engines, and cars 7 and 8 had 9.5 h.p. boilers supplying steam to 75 h.p. compound engines. The system was obviously designed for fairly numerous stops, during which the boilers would make more steam for the next burst of power. The Queensland Railways found the boilers could not keep steam up to the engine when they tried to use them on country runs. (Early in the century however, three French railway companies had operated Purrey railcars of 260 h.p., capable of 53 m.p.h., and satisfactorily as long as they were not pushed too hard). The pressure on all Rockhampton cars was 240 p.s.i. or 17kgs. per square centimetre, the way the pressure gauges on the cars showed it, the highest boiler pressure used on rails in Queensland.

If the coke was good, the cars had no trouble steaming, even on the hills on the Gardens line. While the local gasworks used Newcastle coal, the coke was very good indeed and the cars would run with the dampers closed and steam excellently. The other cokes used when the local supply was insufficient were not as good and that from Dinmore very poor indeed, not only that steaming was poor and that it needed mixing with other cokes, but that it clinkered and even burnt out the fire-bars.

When the supply of these inferior cokes was plentiful, at any time the driver noticed a large piece of wood on or near the road, the tram would be stopped and the wood taken aboard and consigned to the fire to help maintain steam. Similarly, crews having this trouble would surreptitiously raid the pile of lighting-up wood at the depot.

Not only was fuel a problem, but so was the effect

of bad water on the tubes. On the average, one tube blew out every day on the system. Most commonly, it was a superheater tube which blew, as the result of scale on the inside of the tubes burning through; this was not so very serious, as the car could continue to run, although some of the production of the boiler was going to waste.

From time to time, however, a water tube would blow. The pressure thus released would be sufficient to blow the lid of the coal hopper into the air and coke on to the roadway and for the fire to be put out; the car then had to be towed. Fortunately, it was not difficult to replace tubes – an expert fitter could do the job in ten minutes with the fire still burning, or fit a blank, for the tubes were held in the drums by screwed sections.

Naturally, efforts were made to avoid these blown tubes, but the tubes were difficult to inspect. Whole sets of tubes would be replaced from time to time; depending on use, superheater tubes were replaced every 6 to 8 months, water tubes about every 12 months and bottom boiler drums every two to three years. The change to well water in 1914 was prompted by a desire to reduce tube blows.

The frequent renewal of tubes was a heavy expense, and after 1932, it became the practice to cut off defective parts of tubes and weld useful parts together. In 1919, when the supply of tubes was cut off, old ones were recovered from the scrap heap to keep the cars running.

It took some three hours to raise steam from dead cold. Hence, a spare car was usually kept at the depot in steam.

It would appear that coke hoppers on all cars were enlarged over the years, no doubt to reduce the need to run to the depot for refuelling. Those fitted to Nos. 3, 7, 8 and 9 by the 1930's were larger than those fitted to the other cars, with those on Nos. 8 and 9 overhanging the side of the driving cabin.

The engine: The engine was mounted in its own frame, attached to the frames of the car beneath the floor at an angle of about 12½% from the horizontal. The cylinders were located in the front, above the leading or driving axle and drove on a crankshaft, on each end of which were sprockets from which the drive was taken to sprockets on the driving axle between the wheels by two inch wide roller chains, one on each side. To allow for wear in the chains and sprockets, there were keys on the front axlebox horns, allowing the wheelbase to be extended by about half an inch.

The engine was unusual in a number of respects. It was extremely compact, especially in the case of the 4-cylinder tandem compounds on Nos. 7 and 8, and the 4-cylinder simple on No. 9 (Nos. 1 to 6 were two cylinder simples). Nos. 1 to 6 had cylinders of 7" diameter and 6 3/8" stroke (approximate dimensions; probably 18 cm by 16 cm) and Nos. 7 and 8, 5¼" and 7 7/8" diameter by 7 7/8" stroke (13.3 and 20 cm by 20 cm). The cylinder dimensions of No. 9 are not known to the author, but it would appear that its 4 cylinders operated as 2 sets of 2 in tandem.

The Purrey engine used a common steam chest (or chests in the tandem compounds). The slide valve faces were vertical and springs pressed on the valve blocks to prevent the valves lifting off their faces when the regulator was shut. An unusual feature for a nonmarine engine was that the crossheads moved in cylindrical guide bars.

The arrangements for reversing were very unusual. There were no links at all. On the crankshaft, between the cranks, was a squared section, on each face of which were grooves running the length of the crankshaft. On this portion were mounted the two eccentrics, one for each cylinder. Each eccentric had a rectangle in its centre, the shorter side of which corresponded to the dimension of the squared section of the crankshaft. The eccentric was thus capable of sliding on the squared section in the direction of the longer dimension of its rectangular centre. As one eccentric was at 90° to the other, so the rectangular centres were at 90° to each other.

The movement of the eccentric on the squared section of the crankshaft, from one end of the rectangle to the other so to speak, changed the position of the valves, and hence the direction of the car. The movement was controlled by wedges, one on each side of the squared portion of the crankshaft, so arranged that when the car was moving in one direction, the thin end of one wedge was on one side and the wide end of the other wedge on the other. Sliding the two wedges together along the crankshaft reversed their relative positions and moved the eccentric linearly, changing its position relative to the centre of the crankshaft.

The wedges of course turned with the crankshaft, but they were large enough to fit between the cheeks of struts protruding from runners on the engine frame. Moving the runners sideways altered the position of the wedges as desired. The runners were connected to a reversing lever in the driver's cabin.

In effect, this system could have been used to alter cut-offs, but Purrey cars were normally driven on full cut-off and the lever was used only for reversing. On

the Rockhampton cars, it was normally only at the Depot, or between it and the William/Canning Street intersection, that any reversing was necessary at all.

Originally, there was an oil bath for the big end, and oil cups for other moving parts, but before 1920, all cars were fitted with an oil trough between the cylinders, from which all points were fed with oil; in this arrangement, the big ends took their oil from a wick by means of a scraper. This system was very reliable and hot big ends were unknown.

The original crankshafts on all cars were strengthened in 1927-28 and new crankshafts were fitted at various times. Access to the engine was obtained through trapdoors in the floor.

The sprockets and chains were so arranged that the drive was geared down. The crankshaft sprocket of No. 1 as built had 14 teeth and if the usual Purrey ratio of about 1 to 1.875 was employed, this would have required 26 teeth on the axle sprocket. The gearing down gave increased torque at starting, but added to the engine revolutions needed for a given speed and made the exhaust very rapid. On all cars, the diameter of the wheels was 32", which made the floor 3' above rail level, necessitating two footboards on each side. With wheels of this size however, the cars were quite speedy and could travel at 35 m.p.h. or so quite readily (over 750 engine r.p.m.). The tractive effort of cars 1 to 6 was about 3,200 lbs., and of the compounds 7 and 8, about 4,500 lbs., so that while steam was sufficient, they were indeed quite powerful.

Bodies: Except for No. 15 in its original form, all cars had open side toastrack bodies. The first compartment behind the boiler had only one bench, facing forward; the second, third, and fourth compartments had two benches, one facing each way; while the rear compartment was on a rear platform, with one seat only, facing backwards. Seating capacity was 40, at five to each bench. All seats had guards on the ends and were made of wooden slats, some with open and some with closed slats.

The bulkhead behind the boiler had a window at the top on each side, while a bulkhead between the fourth and rear compartments (except on No. 15) was glassed-in above the level of the seats. No. 15 had a glassed-in rear wall, whereas all other cars had an apron at the rear. The cars were 27' long, 7½' wide, and 11' high.

On Nos. 1 and 5 at least, the bodies were strengthened, possibly during their rebuilds in 1923 and 1924, by fitting two internal transverse arches bridging the uprights behind the first and third compartments.

The two cars in service at the opening, and at least two of Nos. 3 to 6 had what appears to have been a one-piece roof with a fascia and one beading strip on both sides and ends. Later roofs were apparently in two pieces, one piece over the compartments sloping down at the rear (distinctively curved laterally on No. 8 and a double roof on No. 15), and one over the driving cabin; it is possible that the portion over the rear compartment was separate on some cars. Except on No. 15, with these later roofs, there was a fascia right around, with beading at the top and bottom, although on 1 and 2 the beading was thinner. On No. 15, there was a fascia around the front of the driving compartment only.



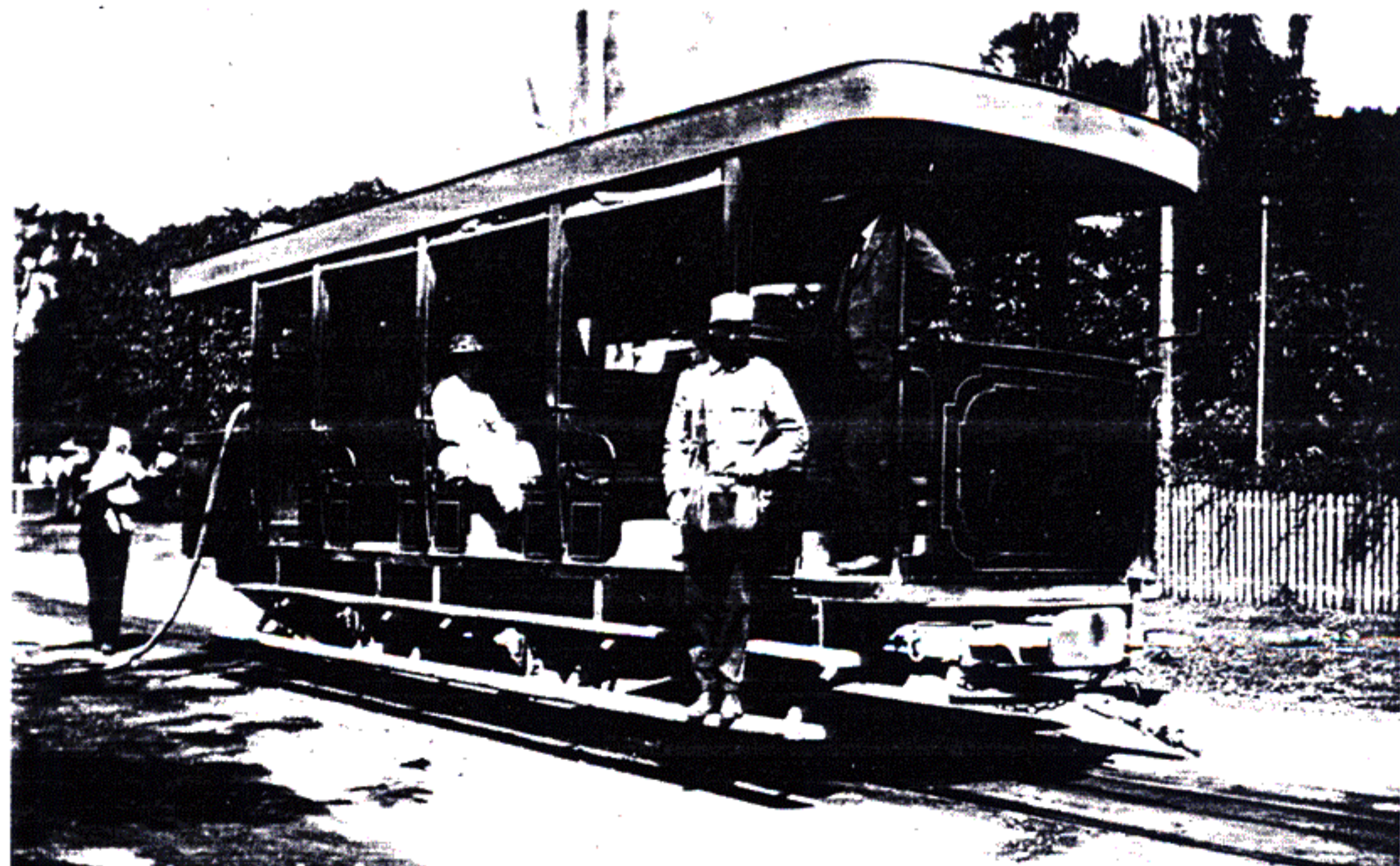
*In addition to providing a good close-up of the end of the car, this early view shows the differing uniforms worn by drivers and conductors.
(Photo: Late C.C. Singleton Colln.)*

Protection from the elements was afforded on cars 1 to 6 when built by pull-down roller type blinds on each side, one for each compartment except the rear one, which was open at all times. These blinds were pulled part-way down at times to act as sunshades. On No. 3 at least, the blinds at their fullest extension left a gap of about one foot above the floor. Nos. 7 and 8 were fitted with side curtains, tied back to the stanchions when not in use, from about 1918 to the late 'twenties; No. 4 was at one time similarly fitted until 1929, No. 15 also on the boarding side after conversion to a toastrack, and perhaps others also. On the off-side of the cars fitted with half-walls, the roller blinds extended only to the tops of the walls.

On the off-side, where it was not partially enclosed by a half-wall, there was the usual longitudinal barrier. On the boarding side, a horizontal grab rail, some 18" long, was attached to each stanchion for the use of passengers and conductors.

Water was carried in three tanks under the seats. The filling point was located near the driver's entrance and the tanks were connected by pipes.

No. 15, when built in 1922, was a saloon car, with the passenger section enclosed by half-walls on each side, and a rear wall, the top half of which was glazed. It had longitudinal seats, accommodating 24. Entry was through two "stairways", one at each end of the saloon on the boarding side; each had three treads and a handrail, and overhung the roadway, not being at all recessed into the body. On each side, pull-down blinds could be extended to the tops of the walls. A large mirror adorned the



*This view from the rear of car No. 2 is thought to have been taken at the watering location on the Gardens line in Dagmar Street immediately above the well from which the water was pumped.
(Photo: Late C.C. Singleton Collection)*

bulkhead behind the boiler.

In 1924, after only two years of service as a saloon, No. 15 was altered to a toastrack type mainly in order to increase its seating capacity. In this form, the seats were arranged similarly to the other cars, but the off-side half wall and rear wall were retained, there thus being no open rear compartment, nor bulkhead between the fourth and rear compartments; the mirror was apparently removed at the same time.

All cars had an open driving compartment, with a metal shield or apron to waist height only. There were no windscreens. The apron met the bulkhead at the front of the passenger compartment a few inches in from the outer edges of the body. The driver's entrance was on the right or off-side, reflecting the Continental origin of the cars, which were designed for right-hand running. The roof above the driving/boiler compartment was supported by stanchions.

There was a number of differences among the cars in the details of this compartment, some of which were: No. 9 had a wider entrance; No. 2 had a lower, more curved apron, with vents on each side of the headlight, fitted between 1914 and 1925, but a particularly squared apron with the same vents by the closure; No. 5 had an identical squared apron with vents by the 1930's; No. 15 was built with the stanchions at the very front corners, whereas on the other cars these had been thinner and approximately opposite the front of the boiler; Nos. 2 and 5 later had thicker stanchions in the front corner position also; handbrake lever spindles or shafts were mostly behind the apron, but on No. 8, the shaft was outside after 1918, on No. 2 it was outside in 1914, but with the later curved apron it was inside, and on No. 7, it was outside in 1922 and during the 1930's;

When No. 15 was altered to a toastrack type in 1924, it retained its off-side half-wall. By about 1930, car 4, in 1934 cars 5 and 8, and at some other time car 7, were altered to be somewhat similar, with a waist-high wall on the off-side, except for the rear platform; the off-side footboards were removed, except for short boards for the rear platform. These half-walls were slightly curved with the side of the body and were of flat metal sheet, except on No. 4, on which the wall was of corrugated sheet. On Nos. 5 and 8, the wall was low and did not reach the protection barrier above it. On Nos. 4, 7 and 9, it was higher, reaching almost to the tops of the seats.

Cars 1 to 8 were originally lit by acetylene. A generator provided gas for a headlamp, a light in the driver's cabin and internal lamps. The two cars in service on the opening day had three internal lamps, as did No. 1 in 1914, but in that year, most cars had only two. In these early days, the cars carried a bag for posting letters. A Chinaman posted his letter one day by error in the acetylene generator! Fortunately, his no doubt inscrutable communication was salvaged.

From January, 1916, electric lights were fitted, powered by a 6 volt battery under one of the seats, charged daily. Each car had a headlight, cabin light and three lamps in the passenger section powered by this source. It was said that this saved £2/2/6 (\$4.25) per car per week, for a total installation cost of £308 (\$616). No. 15 was fitted with a Pyle National turbo generator in

1925, and No. 8 in 1926. With this system, illumination was bright while steam was shut off, but as soon as the car powered, went dim. It was eventually removed from both cars, which reverted to battery power for lighting.

Originally, all cars were permanently fitted with roof boards along and above each side, showing "Botanical Gardens — East Street" or "Dawson Road — East Street" and "Rockhampton Council Tramways". (Presumably there were also side boards with "Show Grounds — East Street"). There was apparently no way of changing these boards for actual destination; either the whole board assembly was changed, or each car kept to one route and the boards were changed only at the depot. In front, the destination was shown by a board beneath the roof above the driver's head. Four such boards were fitted to a transverse axle and the destination exhibited was changed by rotating the assembly. There were perforations in the boards along the lines of the letters; light from the acetylene lamp in the driver's cabin shone through these perforations at night and enabled passengers to discern the destination.

In 1922, a transverse cylindrical destination indicator was fitted on the roof in the front of each car, No. 15 having this fitting from new. Inside each indicator was a glass prism, with a destination on each face, the prism being rotated to change the indication. Each destination had a separate colour scheme to assist identification; white letters on green for Gardens, red letters on white for Canning Street, amber letters on blue for Wandal, and white letters on red for Dawson Road.

The upper destination side boards above the roofs were removed prior to 1914, and the lower board reading "Rockhampton Council Tramways" shortly after. The cars do not appear to have shown any indication of their ownership for some time thereafter, but were later marked "Rockhampton City Tramways" on the side fascia boards. This, too, was later dropped, but the cars enclosed after 1934 with a half-wall on the off-side carried the same words on that wall.

Considering that they were steam powered units, the cars were relatively light. Nos. 1 to 6 weighed 9½ tons in working order without passengers, Nos. 7 and 8 about 11½ tons, and No. 15 (9) about 13 tons.

The wheelbase was only 6'4" to 6'5", or only about a quarter the length of the car. The overhang was less in the front to compensate for the weight of the boiler. The rear overhang was about 11½', which could provide a certain amount of "tail wagging" on bad track, but the boiler on the front, weighing about 30 cwt, provided a steadying influence.

With a very heavy load of passengers aboard, the rear of the car would be weighed down, the front would rise and the driving wheels would slip, which, apart from greasy rail, was the only time slipping was experienced. At times, with a very heavy load, the rear ends of the footboards normally about 8" above the road, were known to scrape the road surface. The long rear overhang could be a little frightening to motorists as the cars took sharp radius curves, and at one of the turning circles, the rear of the footboards cleared a telegraph pole by a mere whisker. The conductor was usually inside at that point!

(To be continued)