AUSTRALIAN
RAILWAY
HISTORICAL
SOCIETY

BULLETIN

Volume XXV
Number 441

July, 1974

Registered for posting as a
periodical – Category B
Recommended Price: 70 cents

A cable tram, with trailer, descends Bayswater Road, Kings Cross at Kellett Avenue on its easterly journey to Edgecliff about 1900. *(Photo: N.J. Thorpe Collection)*

THE CABLE TRAMS OF SYDNEY AND THE EXPERIMENTS LEADING TO FINAL ELECTRIFICATION OF THE TRAMWAYS (NSW)

(by the late R. F. Wylie)

It had been my original intention to deal separately with the cable and electric systems but, when compiling the notes, it was seen that there was not a clean break from steam traction and that over a period of years the cable system rose and declined during the same time as the electric system developed to such a stage as to take over and perform the requirements that had previously been considered the preserve of the cable system.

Although called "cable" and "electric" systems, they were, in fact, steam trams in another guise, being operated by a stationary steam engine by means of wires. In fact, in the case of the North Sydney and Rose Bay electric traction extensions, the electric generators were alongside the driving cable drums and driven by the same steam engine! So that, perhaps, this article should be titled – "Steam – Alternative Transmissions".

The Cable Tram

In 1873, the first commercially-successful cable tram had been opened in Clay Street, San Francisco, (U.S.A.) and lines had later been constructed in London, Birmingham and Edinburgh (Great Britain) and Dunedin (N.Z.), so that there was a somewhat proved alternative motive power to steam traction, as the Clay Street line was operating over 1 in 6 grades.

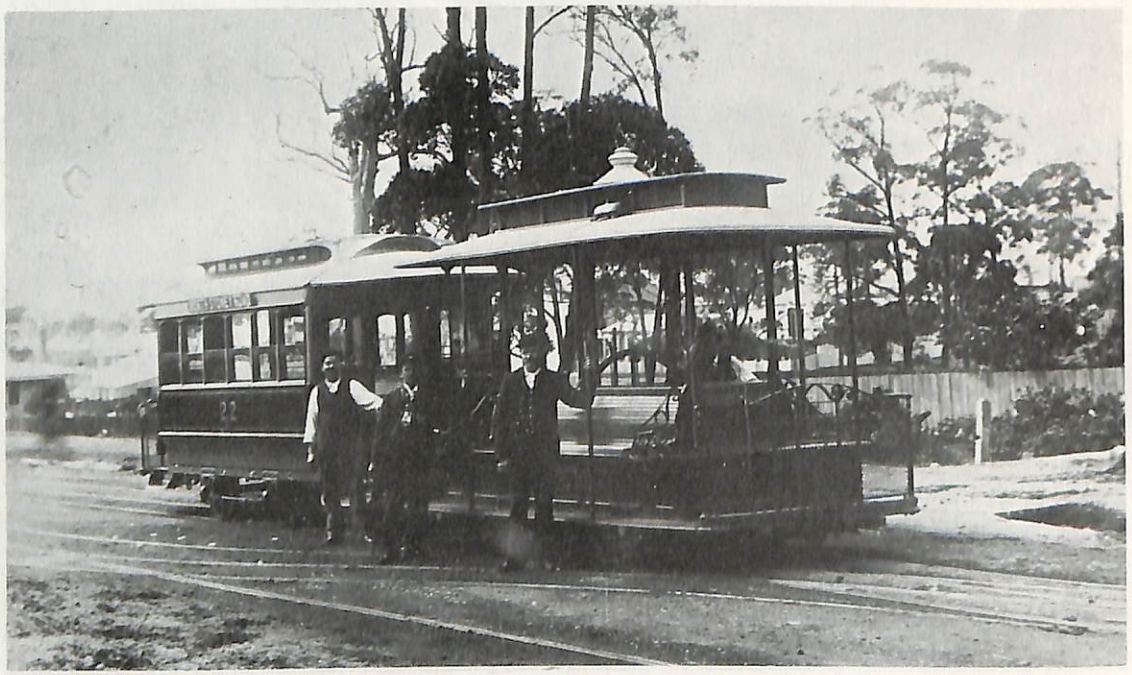
However, the construction of a cable line was not as simple as might appear, traction requiring a cable activated by steam engines driving a "traction" drum or drums by spur or rope gearing.

The cable, after entering the engine house, passed half-way round an idler drum to the traction drum and, after making several turns, passed to a tensioning device, which comprised a large wheel mounted on a railed trolley and held by suspended weights, which provided the necessary adhesion for the driving drum and also to take up slack and shock. It also took up the slack in the cable due to its stretching. Even with this device, the cars, when running, had a jerky movement.

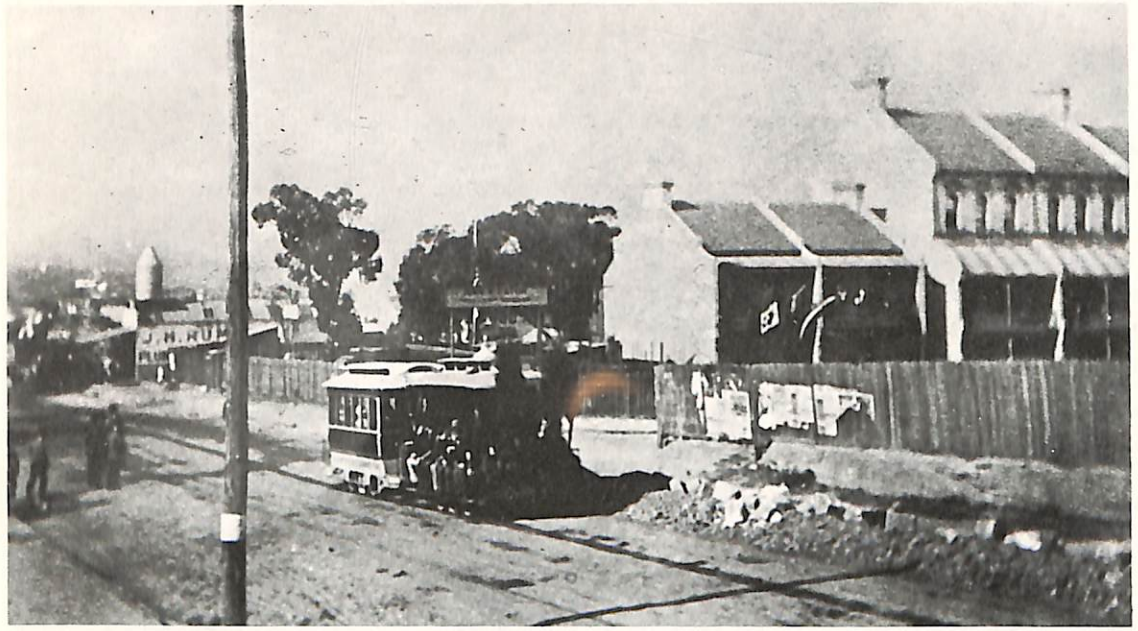
The traction drums and idlers were, if possible, of the overhung type, i.e., bearings on one side only to permit the convenient removal or replacement of the cable. These drums were set at a slight angle to each other to allow the cable to enter the grooves without side wear.

It was also necessary to provide a warning device, through which the cable passed, to detect any broken or projecting strands. In addition, the cable had to be lubricated and cleaned, running as it did directly below the roadway slot, where it collected all imaginable roadway grit and dust.

Under the track, it was necessary to provide suitable tunnels for the cable which, in the case of the Melbourne cable trams (constructed 1884-1890), were framed in concrete six to nine inches thick, the base being 3'9" below the road surface. This tunnel was just deep enough to cause interference with water, sewer and gas pipes, while, in rocky formation, excavation was costly. As far as can be ascertained, the cable tunnels on the Sydney systems were not as deep.



Cable grip car No. 12 and trailer No. 22 on arrival at the Crows Nest terminus in what is now Falcon Street, circa 1890. In the foreground can be seen the cable groove for the up track which commences at this crossover. *(Photo: N.J. Thorpe Collection)*



A North Sydney cable tram in Miller Street passing McLaren Street on its way to the Ridge Street terminus on the opening day in 1886. The structure in the left background is Holterman's Tower from where many of Sydney's famous early photographs were taken. Note the decorations on the grip car, supplied by Mrs. Holterman for the special occasion.
(Photo: P.T.C. of N.S.W. Archives)

Every 3½ feet, yokes, made from 50 lb. railway rails, were embedded into the concrete. The yokes were open at the top and carried longitudinal beams which gave a continuous opening of 7/8" for the "gripper" of the car. Every 30 feet, brackets were placed to carry the cable pulleys while, on curves, special gear was necessary. Each pulley site had to have a special arrangement to permit examination, lubrication and replacement, if necessary. In addition, this tunnel complex had to be efficiently drained.

At the bottom of hills, it was necessary to instal special pulleys to prevent the cable rising to the top of the slot and to provide a device, operated by the grip gear on the car, to lift the pulleys clear of the cable, while the car was passing and to return them after its passage.

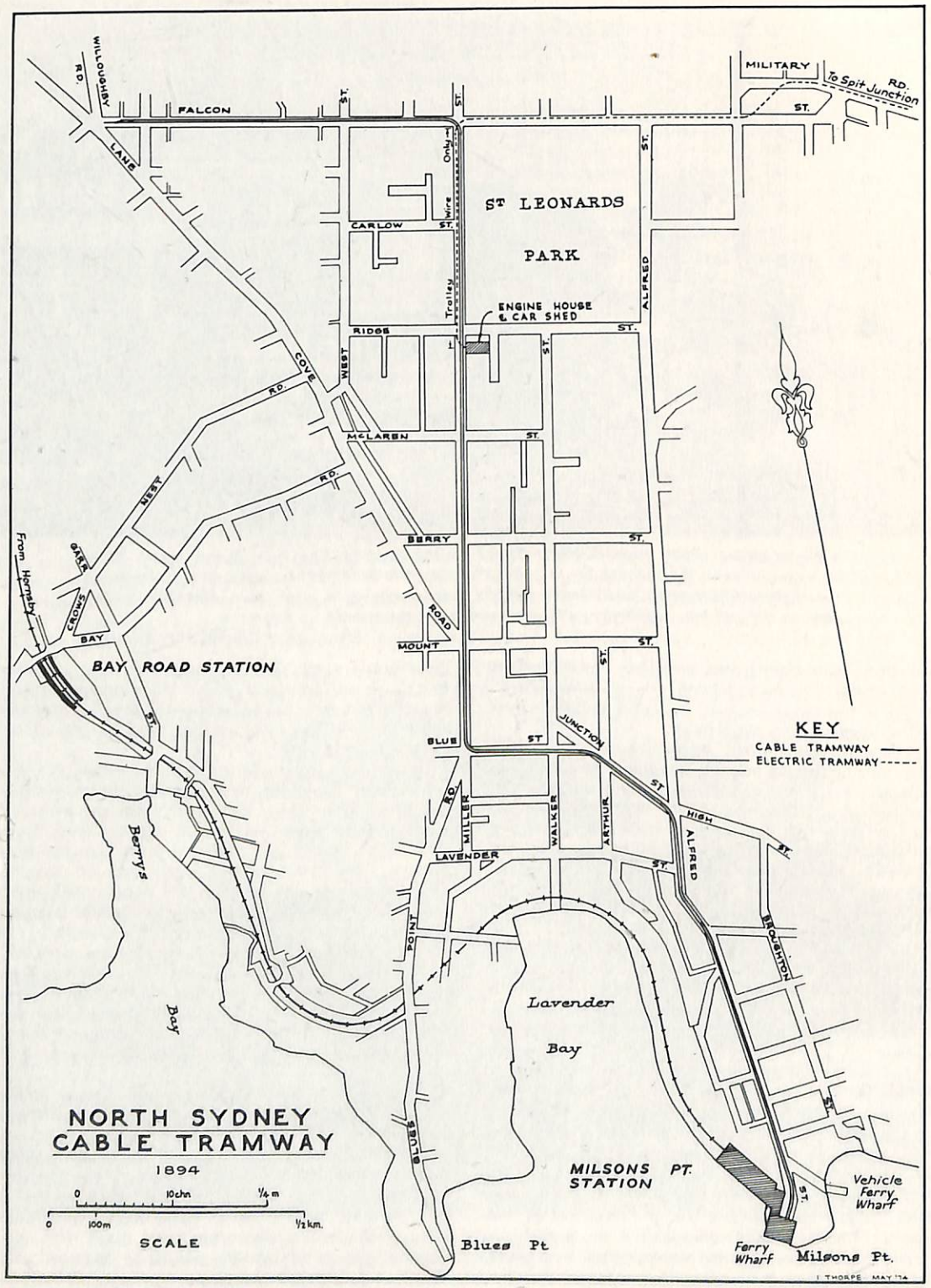
Devices had to be incorporated to lay the cable on the gripper and to lift it off when necessary and to provide some form of alarm, to warn the gripman to release the grip. A brass gong, operated by the gripman, was installed on the roof of the grip car to warn other vehicular traffic of the tram's approach.

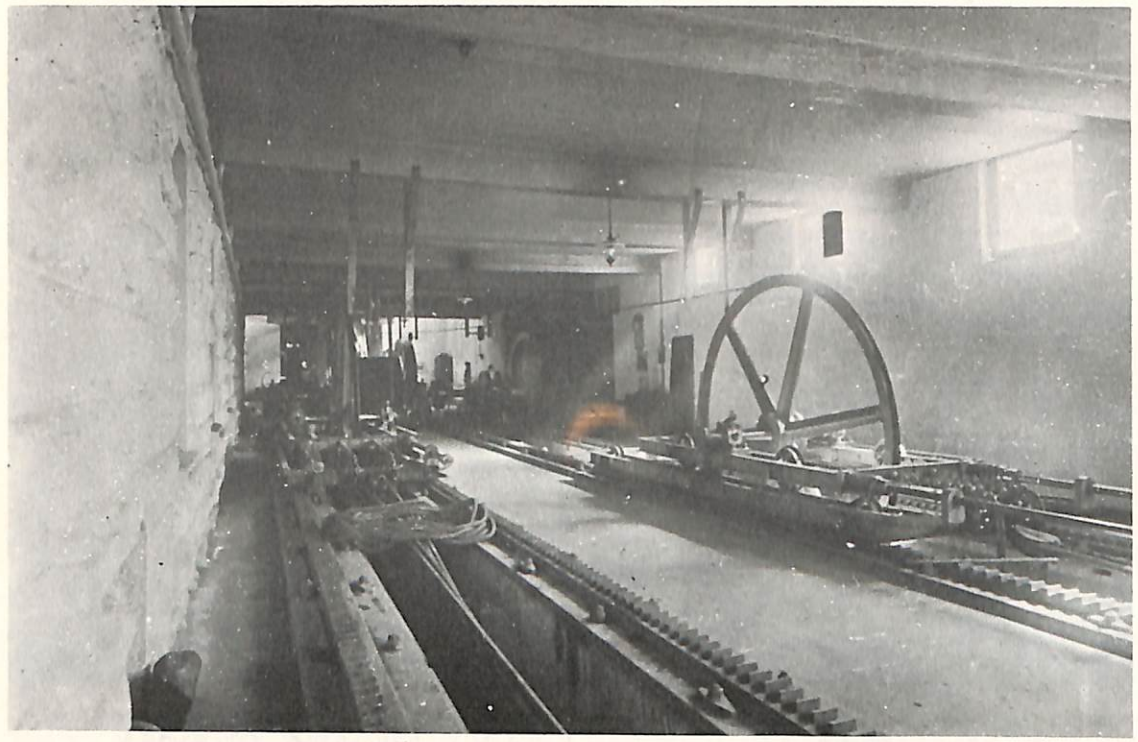
These weaknesses were supplemented by the necessity to provide a double track, irrespective of the density of traffic; shunting could not be carried out "under power", necessitating manhandling; time could not be made up, as cars could not travel faster than the cable speed (cars generally held the cable downhill which was usually 8 or 9 m.p.h. At certain places such as sharp curves, it was necessary to run on momentum and if the cars had to be stopped, it was a case of "all out and push".

When two cable routes crossed, one cable, "A", was permanently depressed, necessitating momentum crossing always. The other cable, "B", was depressed by automatic gear when cars on "A" had to cross. Only cars on "B" cable used power over the crossing. Fortunately, the need for this costly type of crossing arrangement did not arise on the Sydney cable-tram systems, before their replacement by electric traction, but was quite common on the Melbourne systems.

Emergency call boxes had to be provided every 200 or 300 yards so that, if necessary, the cable could be stopped (or started) and on the North Sydney cable system from Milson's Point to Ridge Street, a distance of 1m. 32c., there were seven of these boxes! All of which appears today to be a Heath Robinson-type of layout!

There were, however, some bright aspects in the system. The cars were small and light, so that it was possible to run a very frequent service, as it did not seem to make much difference to the steam engines whether there was one or 40 cars on the line. Perhaps the main point in its favour, **at that time**, was that it was the only "power" which could operate quietly up steep grades at any reasonable speed. Each tram consisted of a passenger-carrying grip car or "dummy" and, usually, an attached trailer car.





The tensioning gear at the Ridge Street depot under construction in the basement of the engine house. *(Photo: P.T.C. of N.S.W. Archives)*

To fill in some background to the cable tram picture, in Victoria, Act Vic. 765 of the 12th October, 1883, authorised the Melbourne Tramway Trust to raise loans and construct some 47 miles of double-track tramway (practically all cable-operated), which was to be leased to the Melbourne Tramway & Omnibus Company for 30 years.

Clause 22 of the Act stated — " . . . . . all vehicles shall be moved by animal power or by means of stationary engines with an endless rope . . . . . or such other motive power except steam locomotives." Could it be that Sydney's steam trams were not acceptable for street tramways in Victoria? The New South Wales Act authorising the 1861 Pitt Street tramway, assented to on the 30th April 1861, states, inter alia, ". . . . . no locomotive engine shall be used on the said tramway, carriages thereon shall be drawn by horses or other animals of draft . . . . . "

The Victorian arrangement was that the Melbourne Tramway Trust would construct the track (1890 cost, approximately £20,000 per mile), supply engine houses and machinery and the first cable — in all, about £35,000 per mile — all the necessary equipment to permit the operation of the cars.

The Melbourne Tramway & Omnibus Company provided the rolling stock, staff, operated and maintained the equipment and made certain repayments until the expiration of the agreement in 1916.

Early North Sydney Tramways

Probably the earliest move for railed transport on Sydney's North Shore was on the 8th December, 1876, when the then Colonial Treasurer (Mr. Sutherland) minuted Mr. Whitton, Engineer-in-Chief (Railways) in regard to an application by private enterprise to lay down a tramway on the North Shore's Military Road and on to Manly, via The Spit, and asked Mr. Whitton to give consideration for a rough survey for, if The Spit line offered insuperable difficulties, it would be useless to give it further consideration. Following this, Mr. Whitton instructed Mr. Surveyor Palmer "to make a trial survey taken from Kurraba Point, on Sydney Harbour, to Manly." Nothing seems to have eventuated from this.

The popularity of the Sydney steam trams (see Bn. No. 377 — March, 1969) re-opened the question as to a service for North Sydney, for which a survey from Milsons Point, via "The Reserve" (now St. Leonards Park) and Military Road to Middle Harbour and from there to Brighton (Manly) Beach had been made in 1882.

However, the grades between Milsons Point and "The Reserve" were severe and beyond the capacity of the Baldwin steam motors and, as electricity had not then proved itself as a motive power, the tractive power to be employed caused some concern. The first quarter-mile consisted of 1 in 13 and 1 in 14, followed higher up by two lengths of 21 chains and 10 chains of 1 in 15.

During 1883, enquiries were instituted into the relative advantages of steam and cable systems for North