

Research Essay
Development of Tram Engine Houses

Leigh J. Harding

685079

688 Barkly St.
West Footscray - Vic.
3012

CONTENTS

Page No.

Statement of Aim

Synopsis

A SHORT HISTORY

THE ENGINE HOUSES:

- No. 1 - RICHMOND
- No. 2 - FITZROY
- No. 3 - NICHOLSON STREET
- No. 4 - BRUNSWICK
- No. 5 - JOHNSTON STREET
- No. 6 - ST. KILDA
- No. 7 - TOORAK
- No. 8 - NORTH CARLTON
- No. 9 - NORTH MELBOURNE
- No. 10 - SOUTH MELBOURNE
- No. 11 - WELLINGTON STREET
- No. 12 - NORTHCOTE

ENGINE HOUSE ARCHITECTURE

SIMILAR BUILDINGS

*Richmond
Tramway Employees*

The aim of the following thesis is to present an account of the development of the Tram Engine Houses in Melbourne.

As most people have an extremely limited knowledge of the existence of these buildings, I found it necessary that to do justice to this topic, a lead up to their inauguration was essential. Consequently, it is on an historical note that the thesis commences. To provide an understanding for their unprecedented planning it was imperative that the workings of an engine house be briefly discussed.

From such a discussion, it was then possible to comprehend the actual requirements of such a building. From here, the thesis deals separately with each of the twelve engine houses, documenting their particular histories. As these buildings were unique, it was impossible to make comparisons with reference to their planning. Hence attached to each engine house history is to be found a small sketch plan with occasional comments.

The aim of this thesis, in the second section, which embraces the architecture of the buildings, is to show that they possessed a certain characteristic style - the result of their specific requirements.

As part of this, the relationship of engineer - architect is discussed.

SYNOPSIS

In the early 1880s, Melbourne still consisted mainly of a collection of small scattered settlements from which people moved into and away from the city usually by their own means of transport, as there was still no extensive transport system in operation. Most of the population was concentrated in the inner suburbs of Carlton, Richmond, Collingwood, etc. Except for a small farmer element, those who ventured farther out were members of the more affluent society, who could afford to own horse drawn vehicles. However, leading up to this era, were a few adventurous companies which endeavoured to operate a transport system, based on horse power.

To meet the growing needs of the metropolis, it was realized that a transport system was vitally needed, so much so, that the story of Victorian politics in the 1880's, was synonymous with the development of transport.

One of the stories involves the Service government who were elected to power in 1883 for it was they who were presented with the first bill concerning an organized system of tramways. This bill was passed and the Tramway Act became law. At the same time, it was recommended that the system be based on the tramways in San Francisco and Glasgow - a cable system. So immediately plans and specifications were prepared, routes were marked out, and sites were chosen for their respective power sources - sites on which cable engine power houses or engine houses were to be erected. (These were the buildings which housed the machinery which in turn, actuated the cable around the streets. Attached to this moving cable was the tram.)

Consequently, Melbourne was fast entering a new era, both in transport and building, but it wasn't until after an accident between a dray and a cable tram at the corner of Queen and Collins Streets, on the first day of operation, that the people of Melbourne became tram conscious.

From this day forward, for the next 55 years, the smoke from engine houses and the clanging of trams, became an integral part of Melbourne's way of life.

As distinct from railway development in Victoria, the tramways were all privately owned. Their history can be traced back to the early 1860's, when Francois Boardman Clapp and other business men approached the City Council and requested a permit to build and operate a horse drawn tram service in Bourke Street, but the Council procrastinated. However, although horse buses were running about this time, they did not become regularized until 1869, when Clapp, who had then just returned from an overseas trip, formed with Andrew Rowan, the Melbourne Omnibus Company. This was licensed to operate in the city with new coaches - a type of horse tram called the 'Broadway Stage'. In wanting to install tramways, it planned its buildings to this end many years before the first tram ran. Three years later this company wound up, but it was eventually re-organized as the Melbourne Tramway and Omnibus Company.

Then in 1883, Victorian Parliamentary Powers were sought for the construction of a tramway system in Melbourne, but before such powers were granted, it was arranged (one source says by the Horse Omnibus Company of Melbourne) that Mr. F. B. Clapp and Mr. George Duncan (the future manager and engineer respectively) should visit Europe and America to familiarize themselves with the latest developments in the field of Tramway Traction. On their return (in that same year), a compromise bill was presented to Parliament, and the Tramway Trust Act became law on the 12th of October. Clapp's company now formed a new amalgamation called the Melbourne Tramway and Omnibus Company. Now it was provided by the Act that the option of constructing the tramways should first be given to the municipalities interested, any two of which were required to notify the company of their intention of doing so before the expiration of three months from the passing of the Act, but in case the municipalities should not elect to construct the tramways, the sole right was then to be vested in the company. All the municipalities however (twelve in number), decided to exercise the power conferred upon them, and the necessary notice to the company having been given, a Tramways Trust was formed as provided by the Act. This body had full power to construct the tramways, and to borrow money for that purpose.

The Trust was required by the Act to complete the tramways by the 12th of October 1889, and to grant a thirty year lease of the tramways to the company, dating from the 1st of July 1884. It also had to expend capital (which amounted to £1,705,794) on the Engine Houses and pipes and drains. In all the Trust was to operate eleven Engine Houses. In the northern system there were the Richmond, Fitzroy, Nicholson Street, Johnston Street, North Carlton, and North Melbourne Engine Houses, while in the southern system there were the St. Kilda, Toorak, South Melbourne and Wellington Street Engine Houses. There was a twelfth Engine House at Northcote, but this had nothing to do with the Trust, and was purely a separate venture.

On the other hand, the Company was required to finance rolling stock, tramway offices, and car barns, and to keep the tramways generally. At the expiration of the lease, (the 1st of July 1916), it had to hand back the lines

in thorough order to the Trust. (It is interesting to note that when they were handed over, the Trust successfully claimed £4,500 from the Company for renovations to the Engine Houses.)

At this time, (July 1916), the cable tram system was placed under control of, and operated by, the Melbourne Tramways Board, pending the formation of the Melbourne and Metropolitan Tramway Board on the 1st November 1919. This came about when State Parliament became a little concerned at the development of several isolated systems of differing motive power.

However, before any of this went into operation, there was the matter of raising money. So at the close of October 1884, the Commercial Bank of Australia, and the Royal Bank of Scotland (representing the City of Melbourne Bank), were instructed to negotiate in London, a loan of £500,000 for this business enterprise, under the following title and terms:

"Colony of Victoria. The Tramways Trust Loan, for £500,000, in 4½ debentures, guaranteed by the City of Melbourne and the suburban municipalities jointly and severally.

Issued under Acts of the Victoria Legislature."

The loan was well received in Melbourne.

A second loan for a similar amount was floated in October 1885, and a third for £200,000 in July 1887. And so on this basis, Melbourne's first cable tramway commenced operations in November 1885. "The capital cost of the eleven Engine Houses (Northcote being independent) was £456,534. Of this, buildings totalled £152,862, and the land, £76,692."

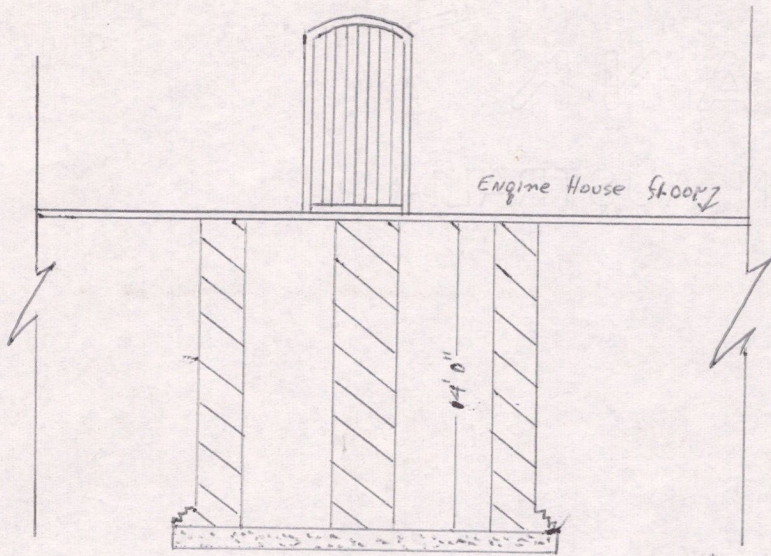
The Engine House was a building housing all the machinery which produced the power for the operation of the cable trams. Perhaps it may have been more correct to label them as "Cable Power Houses". However, they were officially known as Engine Houses, probably due to the original plans, specifications and documents setting them out as such, and referring to the plant and equipment as Engines, boilers, and gearing.

They were quite massive in size (varying according to the number of cables and length of each), and were dominated by a chimney 150' more in height. They were also quite architectural, and to my way of thinking, possessed a certain character. (This shall be discussed later.) In most instances they were situated on corners (so ropes would have access to two different streets) at the midway between the outer termini of the routes.

Now the Engine House layouts were all arranged in very much the same manner, with the offices along the front facing the street and having passages giving exit to the footpath. The area behind here is the location of the power source, where the air was "filled with the strident din of machinery.... and was heavy with the stench of oil". However, to fully appreciate an Engine House, I think that it would be worthwhile to briefly discuss the workings of one. Firstly though, I must mention the actuating of the cars.

These were propelled by a wire rope passing along a tunnel underground, and were kept in motion by the stationary steam engine at one end - i.e. by the Engine House. The cars were provided with a gripper, which may be described as a kind of iron hand which extended from the car, passed down through the slit in the road, and grasped the moving cable beneath. Then the gripper was tightened by the driver, the car was dragged along at the speed of the cable; when it was slackened the car stopped.

*A Tramway
pic*



The cable entered the Engine House from the tunnels in the street just mentioned, through a pit or chamber situated below and in front of the Engine House. As seen by the photograph, it contained a bewildering maze of huge pulleys. "Entering one by a convenient passage or staircase, we find it brilliantly lit up by gas or electricity." (However, conflicting with this, a Report and Statement of Accounts (30th June 1918) stated that electricity was used for the first time, in lighting the Engine Houses.) Continuing ... "we see cables passing in various directions, while over our heads the grippers of the cars pass".

The pits, sometimes described as the "catacomb of the Engine House", can be up to fifteen or more feet in depth. Consequently the walls can be up to sixteen inches thick, although in most cases, they were only twelve inches thick. The base, as shown on the sketch, was usually twelve inches in thickness. As with the tunnels, the pits also were cast in solid concrete and because of their position, they were structurally of vital importance. The owners realized this fact which is verified by a report to the Victorian Year Book 1886-7, by the then

Section through Tramway Pit

Secretary of the Tramways Trust, Mr. T. Hamilton. I quote "Great care has to be exercised in seeing none but cement of the very highest quality is used in the tunnels and pits. The tests prescribed are that not less than 90% shall pass through a sieve with 2500 meshes to the square inch, and that small bricks of one square inch of pure cement shall, after having been immersed in water for seven days, bear without breaking, a strain of 350 lb, applied by means of a testing machine."

However, from the pits the cable was fed up into the engine room itself, or to quote the 'Herald' of 28th October 1940, the "House of Wheels". This room, filled with wheels spinning in circles, was dominated by one big wheel called the main driver. (Apparently watching it revolve, was one of Melbourne's favourite past times.) This striking feature was up to 25 feet in diameter, and weighed up to 50 tons.

Inferior of
Tuttyroy Engine
House

It drove the main shaft, which in turn rotated the driving wheels carrying the cables. It also, in drawing up the steel rope from the pit below, fed it onto a cast iron wheel. Then the cable ran away to a tightening wheel, supported on a carriage, and "urged" by a heavy weight, away from the other wheels. This is known as the tension carriage, which travelled along a race or railway 150 feet or more in length, thus taking up the variation in length of the cable due to stretching or expansion by heat or other causes. From here (the tension pits) the endless cable returned and passed under the mechanism it first encountered on entering the engine room, to the pit and then the tunnel in front of the Engine House, to make another of its endless return journeys.

Now the area of these tension pits was thus quite considerable. Often it was on the left hand side of the engine room, and extended from the offices (at the front) to the rear wall of the building. They were separated from the boiler house by a brick wall running from the engine room to the rear of the building, and parallel with the cable race. The number of tension pits, of course, depended upon the number of cables (or lines), the Engine House was pulling.

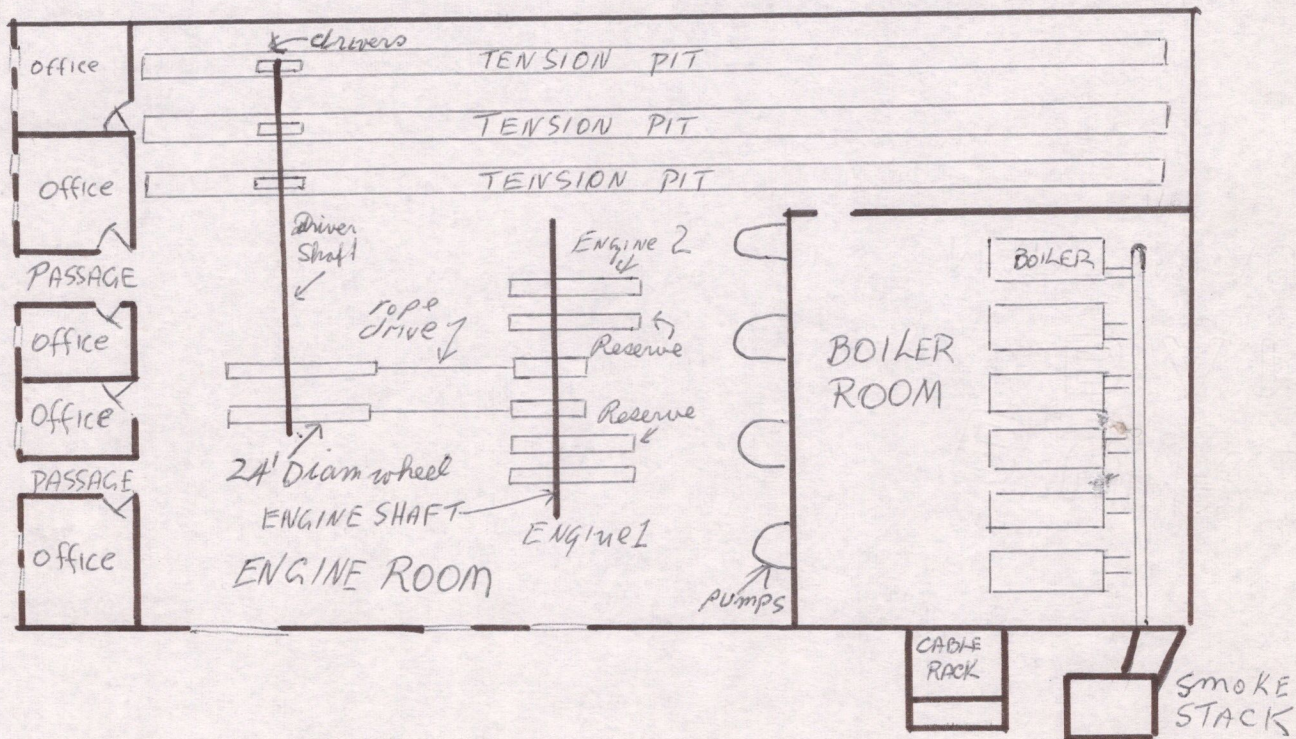
The power for the various wheels came from a pair of engines situated in the engine room along with all the wheel mechanism. Space had to be provided for these engines to be duplicated, so that one set were on standby when the other broke down. (I read in The Melbourne Tramway and Omnibus

Company Annual Meeting of the 13th August 1907, of a serious accident in the St. Kilda Engine House, which, had it not been for these duplicate engines, would have made this particular Engine House non-operational for three weeks).

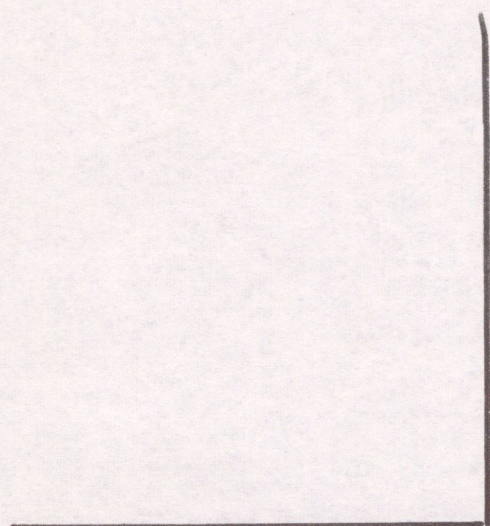
Now the source of power for these engines, came from steam generated in a series of boilers above large furnaces, situated at the rear of the boiler house "the doors of these furnaces are occasionally opened for coaling, and given then a shock to the beholder in the amount of heat thrown out, and of coals shovelled in". These boilers were also duplicated, so giving a complete change over of all Engine House machinery. Then, the fumes from the furnaces were taken away by a flue to the tall chimney stack situated outside the building.

and so on the following page we see the above discussion in the form of a plan, with the office along the front (for the chief engineers and overseer), the tension carriage along the side, the engine room beside this as well as behind the offices, and the boiler house at the rear. The chimney stack, of course, is away from the building. An aspect yet to be mentioned was the various facilities placed around the Engine House. One of these was the sheds. Now, as will be seen by various plans, some of these were for storing equipment for the Engine House itself (e.g. cables, tools, reels, etc.), while others were for storing equipment for the maintenance of tracks (e.g. rails, sand, road metal, etc.). The former were owned by the Trust, while the latter were owned by the Company. Outside in the yard was an area allocated for the storing of coke. Now, between this and the entrance off the street, there was a weigh bridge for weighing all incoming drays carrying coke. Something not shown by the plan was the water tank (for the boilers) which was placed underground.

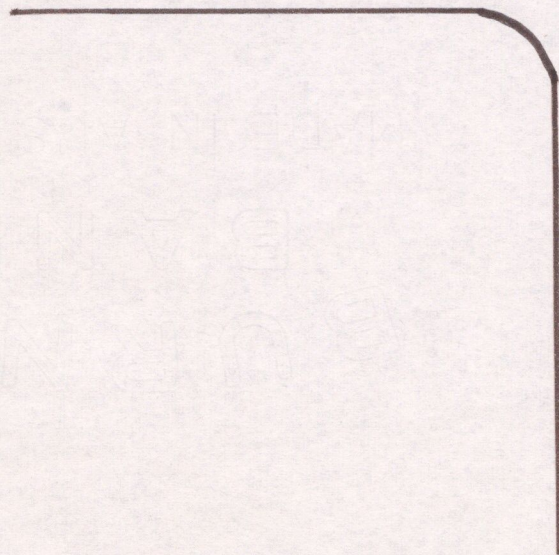
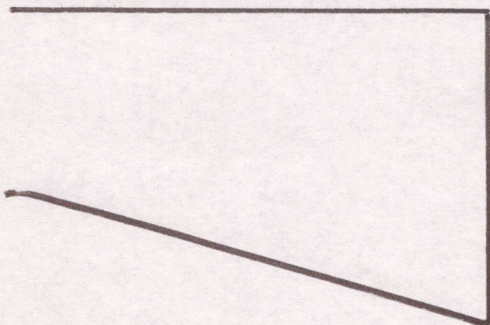
The whole of the structure was, of course, made of brick - even the interior walls, which were painted white. The foundations for the building were bluestone, while the foundations for the engines were concrete. Wooden flooring existed in the offices while in the engine rooms, floors were of asphalt, and in the boiler rooms they were brick. The ancillary sheds were made of galvanized iron, and the surrounding paving was either of stone or asphalt. So much for the description and requirements of the Engine House.



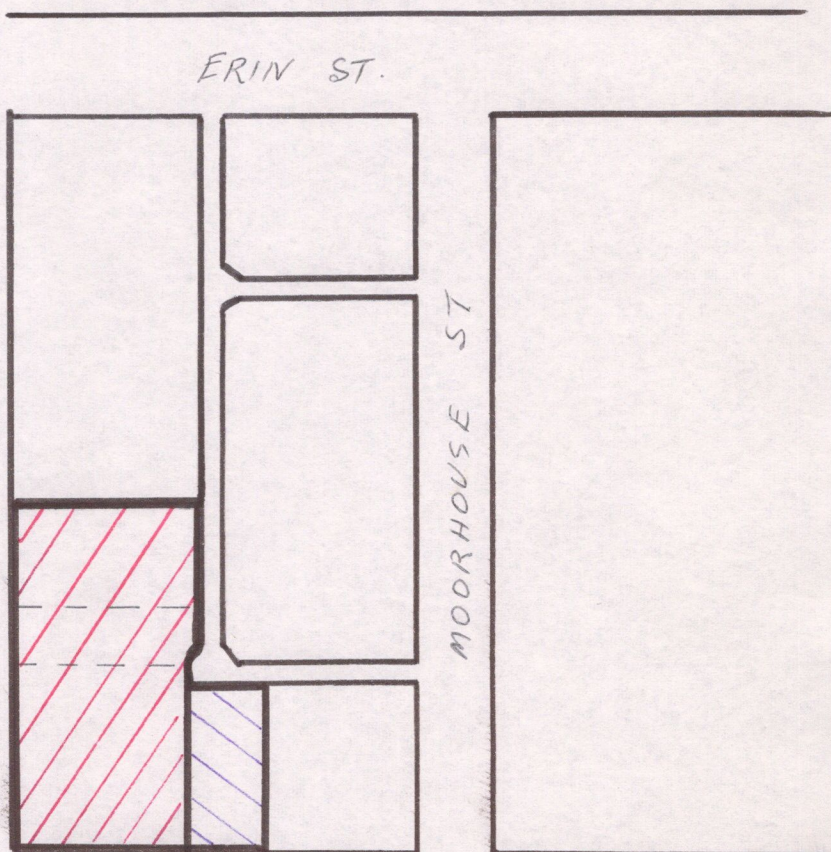
PLAN OF A TYPICAL ENGINE HOUSE.



WELLINGTON PDE



HODDLE ST.

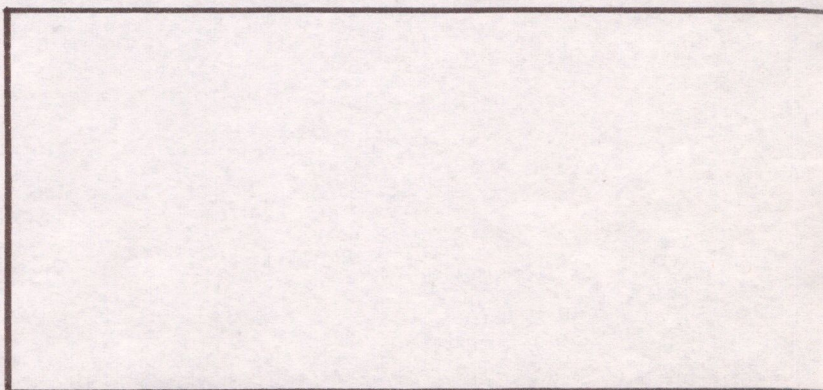


ERIN ST.

MOORHOUSE ST

BRIDGE RD

PUNT RD



SHERWOOD ST.

The first cable trams which ran in Melbourne, on the 11th November 1885, were powered by a medium sized Engine House situated at the corner of Bridge Road and Hoddle Street, Richmond. Logically referred to as the Richmond Engine House, it was faced onto Bridge Road, and was at first greeted with a barrage of protests. For example, in the Richmond Guardian, November 1885, there were letters complaining of the adverse affects which the smoke from the chimney stack had caused. Apparently residents also complained of the noise, to such an extent that some of the machinery had to be changed.

However, with reference to its development, it can be seen from the site plan that there were two distinct blocks of land which made up the area needed for the building and its operation. The larger area, shaded red, was composed of three lots - their original owners I unfortunately did not discover. However, the whole of this block (192 ft x 184 ft 4 ins) was registered on a title on the 10th April 1885, the owners now being the Melbourne Tramway Trust.

The second block of land shaded blue (42 ft x 91 ft) was not purchased by the Trust, but by the Melbourne Tramway and Omnibus Company. They registered ownership of this land on the 7th January 1887, some twelve months after the opening of the line. The reason for this extra land remains unknown, although bought by the Company, it may have been associated with the running of the lines rather than the Engine House itself - e.g. it would have been an area for storing materials for line repairs. This is seen later on with respect to the Nicholson Street Engine House. Here (as with other Engine Houses), the land serving the Engine House was owned by the Trust, while the land serving as storage for line maintenance materials was owned by the Melbourne Tramway and Omnibus Company. However, in both titles, right of way over the adjacent roadways was granted. Now the total cost of the whole of this corner block was £4,008.5.5. Prior to the Trust's and Company's ownership, it was vacant. (From titles and directories).

Actual building must have commenced immediately after April 1885 (if not before), if it was to be completed some seven months later for service. This is also verified by the 1886 directory which was the first to list the Engine House as such. Now the actual cost of the building alone was £7,893.11.4, while the total cost of the Engine House (including the plant) was £28,274.13.4. Out of this, the small amount of £838.0.0. was incurred in various expenses including legal and administrative. Contractors associated with the Richmond line were Robert Gaolin and the Kenny Bros., who actually did the line.

Nearly three years after the opening of the Engine House, an addition was made to its rear section. The sketches which show this were taken from drawings dated the 23rd July 1888. Apparently it was realized that extra space was needed for the storage of cables and reels, for as the plan later on shows, there was only one small shed for storage. Even then it was in

the middle of the yard. Consequently, with the problem of a sloping yard (which possibly would have had to have been excavated), and the resulting limited space, the authorities must have thought it best to build another storey over the rope race area. This is shown by the following sketches. Now, although it was used as a store for the Engine House, I think it must also have been used by the Melbourne Tramway and Omnibus Company for serving the lines, for the drawings of these additions were stamped Melbourne Tramway and Omnibus Company.

Many years later in a Report and Statement of Accounts (30th June 1917) to the Honorable Minister of Public Works, the newly formed Tramways Board stated that there was a 7% increase in traffic in their first financial year, and in order to cope with it, the speed of the cars had to be accelerated. So, through the advice of its Consulting Engineers, the Board decided to reconstruct the Richmond Engine House by the installation of a modern plant. According to the same report, the job was nearly complete, but in actual fact it was some years before this was so. Twelve months later the finishing date was extended to January 1919. But again it was not completed. Apparently the reason for the slow progress was that there was a delay in the delivery of some electrical plant for the North Carlton Engine House, and therefore, it was not practicable to transfer the steam plant from that station to the Richmond Engine House.

Then in February 1920, the Chief Manager, Mr. H. S. Dix, stated that he hoped the building would be finished in a "few months". He gave the difficulties as being the shortage of fuel (because of industrial trouble), and that the making and supply of cement and castings, was slow and uncertain.

The work was carried out by a Mr. Frank Stapley (F.R.V.I.A.) of 101 Swanston Street, Melbourne. Now the extent of the reconstruction work can be seen from the accompanying photograph, and sketch plan. This was sketched off drawings (signed by F. Stapley) dated the 22nd September 1919, a date somewhat later from that made by the Board in its first proposals, in 1917. However, by looking at the original Engine House at the beginning of this section, and then at the photograph, it can be seen where the new part of the building was built on. This extension was built in a very similar style to the original Engine House - the windows and gabled roof being in complete uniformity with the rest of the building. But there was one major contrast when the architect employed a square opening, instead of the customary arched one.

However within the six months of 1925, plans and specifications were being made for the conversion of this line to electrical - that is - plans were being made for the closing of the Richmond Engine House. Then on the 15th May 1927, with the stopping of one rope, the era of the Richmond Engine House began to come to a close. Finally on the 29th June 1927, after nearly 42 years of operation, it ceased its service.

In a Report and Statement of Accounts (30th June 1928), it was briefly mentioned that the Engine House was leased at satisfactory rentals. Today it is still leased, and is still owned by the Melbourne and Metropolitan Tramway Board.

Now from the accompanying plan, and with reference to what I have already mentioned about the additions, it appears that whoever was responsible for its design (discussed later) did not realize the space required for storage and maintenance. Being the first Engine House built, this is understandable. This then was perhaps a precedent to others, which as we shall later see, allocated specific areas for storage.

