the falsework or staging removed from beneath the shore-arm. The cantilever arm on the
Hilson's Point side is now ready to carry the suspended span as will be described later.

On the Dawes' Point side, the view shows the shore-arm completed, but with the
temporary staging used for its construction still in position.

The Harbour arm of the cantilever is shown nearing completion, also the "travelling
creating gantry", which lifts the bridge members into position after they have been towed
from the fabricating works.

When the last member of the Harbour arm is placed in position, this travelling-
gantry will be dismantled and removed; the further operations in connection with the erection
of the suspended centre span being conducted from the ends of the cantilevers.

Plate No. 80 shows the suspended span, 600 feet long, 100 feet high, and weighing
some 5,000 tons, resting on falsework after fabrication on the harbour foreshores at Lavender
Bay. When completed, it will be carried on pontoons and towed out to the bridge site.

Plate No. 81 shows both arms of the cantilevers completed with the suspended
span 600 feet long being towed to the bridge site.

The lifting of this span into position is a work of great magnitude requiring the
utmost care and engineering skill. Every movement has to be accurately planned, and all the
lifting gear specially designed.

Plate No. 82 shows the centre span as it will be suspended prior to lifting. The
pontoons have been floated away clear of the Bridge.

The lifting of the span is accomplished by means of eight hydraulic jacks, two at
each corner of the span. These jacks, are, of course, operated in unison, and to guard
against accidents will be followed up by heavy screw jacks. The work is carefully watched
throughout, and every man employed has his duties scheduled on a predetermined plan.
lift of the jacks gives a two-foot rise to the suspended span. This again is secured by heavy pins, and the lifting jacks adjusted for the next lift, also of two feet.

Slowly - inch by inch - the great load of some 5,000 tons rises through the height of 170 feet, until at last it is connected to the main structure by specially designed pins.

Making use of that well-known physical property of water - its incompressibility - the operation of lifting is a simple one; the hoisting chains are pinned to the lifting girder when the hydraulic jacks are in their lowest position. The jacks are slightly raised to release the lower pins, which are then withdrawn and the jacks pumped up until the next pin-hole comes opposite a hole in the lower diaphragm. Plates Nos. 83 and 84.

On the extreme upper ends of the cantilever arms of the main bridge are placed heavy erection-girders, supported on specially designed rocker-bearing, to equalise the load on the suspension bars carrying the jacking girder.

On this jacking girder, which is rigidly connected to the erection girder overhead by the suspension bars, are placed the 1,000 ton hydraulic jacks, with the rams down to the lowest point. Both the jacking and the lifting girders are provided rear each end with double diaphragms through which the hoisting chains (or bars) pass. With the jacking girder connected to the suspended bars, it will be evident that the lifting girder is free to move upwards.

In commencing operations the lifting chains (or bars) are pinned to the lifting girder, the lower ends of the chains being, of course, attached to the suspended span. The pin-holes (12 in. diameter) in the chains are spaced two feet apart.

The pins connecting the lifting chains to the rigid jacking girder have to be withdrawn, to accomplish which the jacks are slightly pumped up.

Hydraulic jacks are pumped up to the full capacity of the ram - two feet - and the lifting girder raised a corresponding distance, carrying the lifting chains, which are at this
time free to move through the diaphragms of the jacking girder until the next hole comes up into line. When this occurs, the lower pins are pushed into position, and the gain of two feet secured.

The upper pins are then withdrawn and the ram of the jack, with the lifting girder, run back ready to repeat the operation.

The eye-bars of the main permanent structure are arranged between the suspension bars of the temporary lifting gear. Corresponding eye-bars are also attached to the suspended span. When the lift is completed and the pin holes of these upper and lower sets of eye-bars come into line, the permanent pins are pushed into place, thus permanently securing the suspended span to the main bridge.

When the centre span is in position the erection of the bridge is practically completed. The construction of the railway tracks and roadways has then to be undertaken, and the decking and simpler details attended to; the difficult work, however, is through when the suspended span is secured in its final position.

ARCH BRIDGE:

The Arch Bridge will be erected by cantilevering out from either pier until the end meets at the centre, when the final rivetting up will take place. Each half of the Arch will be securely anchored and tied to the shores on either side until the central connection is made.
PROVISION FOR TRAFFIC DURING ERECTION OF BRIDGE.

During construction, the railway passenger traffic using the existing Milson's Point Station will be diverted to the station constructed some years ago along the fore-shores of the harbour near Lavender Bay, and the goods traffic will be diverted from Milson's Point to its final location at North Sydney Station.

To enable the goods traffic to be so diverted the author began the construction of the railway approach to the Bridge from Bay Road Station to North Sydney Station on July 30th last.

A compressor house has been erected at the site of North Sydney station, and a second between Eureka Street and Anorun Street. Three compressors have been installed, electrically driven, each by a 75 HP motor operating on three-phase current, 25 cycles at 440 volts. Each compressor cylinder is 14" diameter, 12" stroke, and working at about 200 revolutions per minute; each machine inducts 464 cubic feet of free air per minute from the atmosphere, compresses it to 100 lb. per square inch, and delivers it to the air-receivers, from whence it is conducted by 3" pipes to the air-driven jack-hammers, which drill the holes in the rock preparatory to blasting.

In the transformer house alternating current at 6600 volts is transformed to 440 volts before it is led to the motors.

A gyrating stone crusher electrically driven has been installed and the hard sandstone will be broken into concrete metal and used in constructing the concrete retaining walls and tunnel lining.

In less than two months after construction was authorised some 34 houses were vacated, sold and demolished and the plant installed, and on September 19th Miss Butler
switched on the current to No. 1 compressor, Plate 55, and set the machinery in motion to begin the construction of this great work.

The land so made available at Milson's Point will be utilized by the Contractor as a yard for building the bridge, in fact it would be almost impossible to build the bridge without the area of land in question. Plate No. 56 shows the position of the new station and the area of land available.

By June 30th, 1924, the present Milson's Point Station will cease to exist, and the Railway traffic will be terminated at the new Station on the foreshores of Lavender Bay. The shunting necessary to marshall the trains will be mainly carried on adjacent to and in front of the Station which will be reconstructed so that the railway passengers will walk off the platforms to the ferry on the level, as at the present Milson's Point Station. The railway passengers will suffer no inconvenience when the new station is again in operation, and will not have to climb up and down the steps as was necessary before, when this station was in operation in 1915.

The tramway traffic will also be diverted to the new station and connected with the ferry there. A short length of tramway will be constructed from Alfred Street along Dind Street and will terminate on the cliffs above the new station. To connect the tramway with the ferry, a bridge 30 feet wide on a grade of 1 in 10 will be provided, the harbour end of this bridge will terminate near the ferry wharf, but 35 feet above the wharf. To negotiate this 35 feet to and from the ferry, three escalators of the latest pattern will be provided. Each escalator will be 4 feet wide, of the reversible type; will be driven by an electric motor; will have a travelling speed of 90 feet per minute, and will have a capacity of 9,000 to 10,000 passengers per hour. In the morning rush hour, the main traffic will be from the tram to the ferry and two of the escalators will be used to convey passengers in that direction, the other escalator will take them up from the boat to the tram. In the evening
rush the conditions will be reversed, and two escalators will be used to convey the passengers up from the boat to the tram, the third conveying them down.

In addition to the escalators there will be stairways for those who prefer walking, and there will be a lift for aged people and others who would prefer not to use the escalators and could not use the stairways. The lift will also be used to convey luggage, mail, etc., between the tram, ferry and train. Railway passengers from the trains will have direct access to the trams, and will not have to walk up Alfred Street as was necessary when this station was in operation before. Plate No. 87 shows the arrangement of the escalators and stairways and the tramway diverted to the new station.

A new vehicular ferry is to be opened between Dawes' Point and McMahon's Point and consequently the volume of vehicular traffic using the Milson's Point route will be about half of what it would otherwise be.
THE TOWN PLANNING ASPECT.

In designing this great work every possible opportunity has been taken to improve the conditions that exist. The author has recommended that the Harbour foreshores from Lavender Bay to Wilson's Point, now used for railway purposes, should eventually be made into a Park (see Plate No. 88), and no more beautiful or more suitable site can be found in North Sydney.

Grassed lawns, with a little statuary on the water front, the cliffs covered with creepers, bougainvillia, and shrubs, to provide masses of colour as a background, would transform the present wilderness into beautiful gardens in the style may be of the celebrated Italian Gardens, The Boboli, The Pamphilj, The Doria, or the Villa de Medici.

The area above the ornamented cliffs made rich by masses of green and garden bloom, could also be entirely remodelled. Residential flats and other buildings in Italian renaissance to harmonise with the gardens below could be constructed here in charming surroundings, with fine arcaded walks on the edge of the cliffs overlooking the waters of the harbour. Treated broadly, these walks could be made most picturesque spots, and most delightful resorts for the residents during the long summer evenings.

Portions of the walks could be covered in with Pergola roofs supported by dark hardwood timbers and plain white rough-cast arches to harmonise with the buildings in the background and in keeping with the scheme of ornamentation in the gardens below. Plate No. 89.

This is not a visionary scheme for the beautification of the northern shores of the harbour, but a practical proposal which the North Sydney Council or other authority could well carry out with substantial profit to the promoters of the enterprise.

On the City side between the eastern side of the arched viaduct and York Street North, there is an area of ground, where the high bank now is, which will be trimmed off and formed into a Park. (See Plate No. 75).
An area of land of about half an acre will be added to the Girls' High School grounds; the Observatory Park being kept intact. Watson Road will be continued to the main avenue, thus affording direct access for vehicular and pedestrian traffic from Miller's Point to the bridge. Between the railway viaduct and Trinity Avenue there is a piece of land 48 feet below the railway and 27 feet above the street level, of an area of one acre, including the space under the arches. It is proposed to give access to this area by steps, and convert it into a children's playground.

At the bridge head Catherine Crescent will connect the main avenue from the bridge with York, Clarence, and Kent Streets; as shown on Plate No. 90, the Author has recommended that the areas flanking the Crescent be turned into beautiful Parklets.

When the Bridge and City Railway are constructed it will be necessary to widen certain streets to carry the traffic, which must develop.

By Catherine Crescent, York, Clarence, and Kent Streets can be most satisfactorily connected to the bridge approach, and when the Sydney Harbour Bridge and the bridge to Balmain are constructed the crescent will distribute traffic along these high-level streets as efficiently as possible.

Sydney to-day may be divided broadly into three zones; the eastern zone, from Macquarie Street to Elizabeth Street - the professional and residential; the central zone, from Castlereagh Street to George Street - the shopping; and the western zone, from York Street to Darling Harbour - the warehouse and shipping zone.

The professional zone, including as it does the Houses of Parliament, Law Courts, Public Libraries, Sydney Hospital, Royal Society, and various clubs, will always be preferred by doctors, barristers, solicitors, dentists, and other professional men requiring a quiet location near the centre of their activities; the fact that one side of Macquarie Street
and one side of Elizabeth Street is flanked by park lands renders these streets more valuable for professional than for shopping purposes.

The shopping zone embraces Castlereagh Street, Pitt Street, George Street, and Elizabeth Street South, with Liverpool Street and Oxford Street as east-west avenues. With the advent of the City and Suburban Electric Railways and the Sydney Harbour Bridge land in this zone will rapidly increase in value.

Sydney is going skyward, for these streets now flanked by two, three, and four storey buildings will have to be fronted by much higher buildings for the owner to get an adequate monetary return; already there is evidence there is evidence of the advent of the tall building. And what will the traffic then be like? To-day vehicular traffic is allowed in one direction only in Pitt Street and in Castlereagh Street, whilst the footpaths are far too narrow. The footpaths will have to be increased in width, by arcing the shop fronts, or by narrowing the widths of the roadways, or by straight-out resumptions, and the trams must be removed from these streets or placed underground, and vehicular traffic allowed to proceed in both directions. In some of the busiest shopping areas, as the block bounded by King, George, Market, and Pitt Streets, an upper level footpath, above the street level, will without doubt be constructed in the future, as it will be required to give the necessary shopping facilities. George Street will be the main shopping thoroughfare, and will be flanked by tall buildings from the Quay to the Broadway.

SUBURBAN GOODS STATIONS.

The warehouse and shipping zone is and always will be occupied by warehouses, by produce merchants, as in Sussex Street, and similar commercial establishments, which must of necessity be close to the wharves and the railway goods yard. With the advent of the system of City and Suburban Railways there will be railway goods stations probably at North Sydney, Mosman, Manly, Narrabeen, Balmain, Bondi, Randwick, Dee Why, etc., and the produce and goods which
now arrive at Darling Harbour by train and along the sea-front by boat, instead of being distributed through the streets of the city and suburbs, as at present, will be carried to the suburbs by railway, except in the warehouse area in the city and in Pyrmont, where it will be taken, as at present, by vehicular traffic using the streets. With the inevitable increase of vehicular traffic to and from the railway goods yard and the wharves it is essential that adequate means should be provided to cope with this traffic.

Here it will be interesting to note the traffic counts of vehicles made on July 2nd, 1923, between the hours of 7 a.m. and 6 p.m., the numbers given being the average daily traffic in both directions. At the Fort Macquarie ferry, 1,776 vehicles; at Dawes' Point ferry, 472 vehicles; at the intersection of Boomerang and College Streets, 3650; William and College Streets, 2434; Oxford and College Streets, 10,550; Elizabeth Street and Eddy Avenue, 23,752; Central Railway Square, 17,112; and Pyrmont Bridge, 15,106 vehicles - a total of 80,934 daily in both directions.

The return herewith furnished by the Inspector-General of Police showing the volume of traffic passing over various points during eight hours of any one day is instructive. There were sixty-one checking points, and the totals for the whole of those points represent:

**MOTORS.**

105 steel-tyred wagons above 3½ tons.
6,935 wagons with solid rubber tyres above 3½ tons.
15,539 wagons with solid rubber tyres under 3½ tons.
1,379 trucks with pneumatic tyres above 3½ tons.
16,393 trucks with pneumatic tyres under 3½ tons.
50,333 motor-cars.

**HORSE-DRIVEN.**

29,633 four-wheeled vehicles with steel tyres.
28,633 two-wheeled vehicles with steel tyres.
GROSS TOTAL OF HORSES.

61,696 horses, whether included in above figures or not.

MISCELLANEOUS VEHICLES.

14,603 wheel traffic, not included in the foregoing figures.

The number of pedestrians where the count could be taken totalled 99,661. Pedestrians were counted at 44 points in the city, but at 17 points no count was taken, as the great number of foot passengers rendered it impossible to check them with any reasonable degree of accuracy. It is considered, however, that the pedestrian traffic was probably more than double that recorded.

The grand total of vehicles, motor and horse-drawn, horses, and pedestrians, as well as miscellaneous vehicles, is shown to be 345,001.

The density of the tramway traffic, particularly during the morning and evening rush, when the headway on George, Pitt, and Elizabeth Streets is 17 seconds per tram in one direction, and the headway on one track in each street at the intersection of King and George Streets is six seconds, greatly increases the difficulty of satisfactorily handling the vehicular traffic of the city, and this traffic is now assuming very serious proportions, as the figures above, given by Superintendent Brack, indicate.

At Central Station the passenger traffic is very heavy between the hours of 4 p.m. and 6.30 p.m. In those 2½ hours on May 6th, 1920, 56,122 passengers entered and 10,372 passengers left the station, the maximum hourly traffic being between 5.10 p.m. and 6.10 p.m. when 37,800 passengers entered and 5760 passengers left the station. Based on the traffic statistics of other cities, this represents a daily traffic of 250,000 passengers = i.e. 125,000 passengers in and out of the station daily. Liverpool Street Station, London, has a daily traffic of 200,000; Gare Saint Lazare, Paris, 250,000 per day; and South Station, Boston, 270,000 per day; so that
the passenger traffic at Central Station is equal to, if not greater than, any other station
in the world. Central Station is a tram terminus as well as a train terminus, and is a trans-
fer point rather than a terminal station. Sydney Central will not always be the only terminal
in the metropolis; a terminal station to deal with the northern and north-western traffic will
probably be situated at St. Leonards in the years to come.

The construction of the City Railway, with its five projected stations in the heart of
the city - viz., Town Hall, Wynyard Square, Circular Quay, St. James', and Liverpool Street - in-
volves the reclamation of Darling Harbour. (Plan No. 11.) Twenty-three acres of water are now
being filled in and the area added to the railway goods yard; a road 100 ft. wide is being con-
structed around the foreshores of the harbour, from Jones Bay to Bathurst Street, with a bridge
over the railway tracks to Union Street; access to the new goods yard will be obtained from Barter
Street, which is to be widened to 60 ft., whilst the Harbour Trust is constructing a road along
the foreshores of Darling Harbour from Bathurst Street northwards. When the reclamation and
these roads are complete Pyrmont Bridge will be removed.

Traffic in this vicinity at present is badly catered for, and with the growing traffic
to the goods yard and the wharves the congestion will rapidly become worse. Present conditions
force the traffic along the narrow north-south streets parallel to the harbour, and thence into
or across George Street to reach the northern, eastern, or western suburbs. To relieve George
Street of this traffic, especially from Market Street via Railway Square to the University corner,
the Conference has adopted the proposal made by the author to construct a new road from the
intersection of Dixon and Liverpool Streets, thence on viaduct across the low-lying land reclaim-
ed when Cockle Bay was filled in, and over the Darling Harbour Railway, reaching the surface at
Harris Street. From Harris Street to Wattle Street the road would be continued along MacArthur
Street, which street would be cut down and regraded to a ruling grade not steeper than 1 in 30,
whilst Bulwara Road and Jones Street would be carried by bridge over the cut of regraded MacArthur Street. From Wattle Street the new roadway would be on the surface, following the route shown, and would junction with the Broadway beyond Glebe Point Road; Dixon Street to be widened and extended to the new avenue, so that the traffic from this busy commercial area would have ready access to the avenue.

On the western side of the viaduct, a low-level street between Dixon Street and Little Quay Street would connect the cross streets, whilst William Henry Street would take the traffic from this low-level area across the railway to Harris Street. From the intersection of the new avenue and Broadway a new road to be constructed through Victoria Park to Cleveland Street.

A roadway was provided for some two years ago in the agreement arrived at between the City Council and the University Senate, the University exchanging some 7½ acres of land, including the ornamental lakes, for a similar area of land owned by the City Council.

The facilities proposed should effectively relieve George Street of its present congestion from Market Street to Broadway.

**FORECAST OF A SECOND HARBOUR BRIDGE.**

In endeavouring to provide for the traffic of the future, the vehicular traffic in the central or shopping zone must as far as possible be confined to the vehicular traffic legitimate to that zone, and all extraneous vehicular traffic compelled to traverse the eastern and western zones. With the advent of the Sydney Harbour Bridge, and probably for 25 years thereafter, all the traffic which now uses Macquarie, Elizabeth, or other streets in the eastern zone to proceed via the ferry to Milson's Point will of necessity be compelled to use the western zone, as the vehicular ferry from Fort Macquarie to Milson's Point will cease to run.

About twenty-five years after the first bridge is completed a second bridge will be required; it will probably be a suspension bridge carrying vehicular and pedestrian traffic,
located between Kirribilli and Fort Macquarie; when the second bridge is constructed Macquarie Street will again carry traffic to and from North Sydney.

**FUTURE OF THE CROSS STREETS.**

Upon completion of the Bridge now in contemplation, the traffic from the eastern, south-eastern, and southern suburbs will endeavour to reach the main bridge approach by the roads having the easiest grades, and the heavier and slower-moving vehicles will attempt to cross the city immediately north or south of the Town Hall; the choice of street lies between Goulburn, Liverpool, Bathurst, and Park Streets. One of these streets must be widened. Goulburn Street is narrow, crooked, has steep grades, and has no direct access to Taylor Square, which is the focal point of the eastern suburbs traffic, nor is the street axial to the traffic to and from the railway goods yard and the general scheme of wharfage. From the town planning aspect it would be highly desirable to remodel Goulburn Street. The property is of a poor class; it is a second-class residential district, which must become a commercial area. From Taylor Square the traffic would probably be best served by following Campbell Street to Riley Street, thence along a new road to be constructed through the centre of the area already resumed by the City Council for remodelling purposes to the intersection of Goulburn and Commonwealth Streets, and thence the traffic could travel along Goulburn Street to the new avenue.

Liverpool Street via Oxford Street has good access to the eastern suburbs, but it also is not axial to the goods and shipping traffic, whilst the advent of two busy passenger stations under Hyde Park, with entrances from Liverpool Street, will throw a heavy pedestrian traffic along and across Liverpool Street, making it desirable to minimise the vehicular traffic in Liverpool street if possible.

Park Street has good grades, and connects with York Street, which is one of the best graded north-south streets in the city; but the right-angle crossing of the heavy vehicular and
tramsway traffic in George Street, also the right-angled turn from Druiit Street into York Street would seriously reduce the efficiency of this route as traffic avenue, would unduly congest the traffic, and would be a constant source of danger and confusion, whilst via this route there can never be any adequate connection with the goods yard and wharves, as the grades in the east-west streets are too severe.

Then now remains Bathurst Street. It has good grades, has direct access to the railway and shipping, and will accommodate the traffic better than any of the other mentioned streets. It has the disadvantage, however, that it is not a through street, but by connecting it with Oxford Street and with William Street and Haig Avenue by two diagonal roads through the Hyde Park it will become a better traffic than any of these streets.

NORTH SOUTH TRAFFIC.

After deciding on the widening of Bathurst Street and the diagonal roads through Hyde Park, the north-south traffic must next be considered in relation to the bridge, the shipping, and the railway goods yard. This north-south traffic must be diverted from the shopping zone if possible. In the eastern zone, Macquarie Street and Elizabeth Street have been widened, and will accommodate much more traffic than they are called upon at present, whilst the abandonment of the vehicular ferry from Port Macquarie to Milson's Point will throw this traffic into the western zone in the near future.

In the western zone three streets require consideration — viz., York Street, Clarence Street, and Kent Street. The two first named have better grades than Kent Street, but are open to the very serious objection that they are dead-end streets, effectively blocked from future extension by the Town Hall itself, and there is the further fatal objection that the traffic to and from the Darling Harbour goods yard and the wharves would have to negotiate the very steep side streets, viz., Druiit Street, Market Street, King Street, and Erskine Street, or proceed
via Bathurst Street into George Street, and thence into York or Clarence Street.

Kent Street, on the other hand, although it is not as well graded a street as York Street or Clarence Street, can be regraded satisfactorily, can be extended through to George Street, and can be connected with the road across the reclamation at Darling Harbour, with a widened Bathurst Street, and with the new high-level road proposed from Dixon Street to the Glebe, much better than any other north-south street in the city can. It can also be satisfactory connected with the avenue in approach to the Sydney Harbour Bridge, and was, therefore, recommended to be widened to provide for six lines of vehicular traffic and two footpaths, each 12 feet wide - i.e., 61 feet in all.

The widening of York Street to 61 feet from Grosvenor Street to Wynyard Street can readily be done at the present time, as the Scots' Church is about to be rebuilt; the Government owns the land at the corner of Margaret and York Streets; the remaining land is portion of Lang and Wynyard Square Parks, some Government land in the Rocks area, and a strip from St. Phillip's Church, which is necessary to realign York Street on the western boundary.

Watson Road will form an adequate getaway for the traffic wishing to reach Miller’s Point and the Quay.

Minor street alterations necessary to facilitate traffic are the widening of the roadway to 76 feet at the Registrar-General's corner and Hyde Park. The City Council has approved of extending Elizabeth Street to Bent Street.

When the City Railway is constructed at the Quay Barton Street will be closed, but Alfred Street will be extended to George Street, whilst Pitt Street will be widened as shown.

The crescent connecting the avenue from the bridges can be treated architecturally, whilst the two areas of land available on either side of Clarence Street can be formed into two beautiful parks/lets. These would more than compensate for any land taken from Wynyard
Square and Lang Parks, whilst the crescent could be made one of the beauty spots of the city.

Plan No. 91 shows the new streets and the street widening decided upon. Those tinted in red have been adopted as the policy of the City Council, and were originated by the Author.
THE FINANCIAL ASPECT.

The complete cost of the Sydney Harbour Bridge will be about £6,000,000 sterling, of which two-thirds or £4,000,000 - the cost of providing four lines of railway across the Bridge, including the approaches from Bay Road Station to Wynyard Square Station is the railway portion of the cost, and is to be added to the Railway Capital Debt - whilst the remaining one-third, viz., £2,000,000 - the cost of providing the main roadway, and footways, is the Municipal portion of the cost - and is to be defrayed by a tax of one half-penny in the £, imposed on the unimproved capital value of the lands situated in the City of Sydney, in the Municipalities of North Sydney, Mosman, Manly, Lane Cove, and Willoughby, in the Shires of Ku-ring-gai and Warringah, and in that portion of the Shire of Hornsby directly served by the railway system.

Assuming the railway can be opened for traffic on 1st January, 1931, the Chief Railway Commissioner estimates that, after paying interest at 5½ per cent on £4,000,000 and all working expenses and maintenance, the revenue derived from the passenger traffic across the Bridge for the first twelve months would yield a surplus of £262,826, charging a fare of 3d. for the run from Kirribilli Station to Wynyard Square Station, a distance of over 1½ miles.

At present for this distance, allowing the passenger to walk 18 chains to the boat on the North Sydney side, the fare is by tram 2d., by ferry 1 1/3d., season ticket, or 2d. ordinary fare, making the total fare either 3 1/3d. or 4d., whilst the time of journey will be reduced by at least twelve minutes.

The Act provides for the Municipal portion of £2,000,000 to be defrayed by a tax on the unimproved capital value of the land in the City of Sydney, and the Shires
and Municipalities on the northern side of the Harbour, viz., part of the Shire of Hornsby, and the Shires of Ku-ring-gai and Warringah, the Municipalities of North Sydney, Mosman, Manly, Lane Cove, and Willoughby. The tax was imposed this year, 1923, and is paid to a special account. This account will be credited or debited with interest, as the case may be, at the average rate of interest paid by the State for loan money that year.

In 1901, the unimproved capital value of the City of Sydney was £20,207,812; in 1911, £23,940,030; and in 1921, £35,687,376. For the twenty-year period 1901-1921 the unimproved capital value increased at the rate of 2.92 per cent per annum, and for the ten-year period 1911-1921 at the rate of 4.19 per cent per annum.

In 1901, the unimproved capital value of the Shires and Municipalities on the northern side of the Harbour enumerated above, stood at £4,701,742; in 1911, at £7,247,436; and in 1921, at £16,523,208. For the twenty-year period 1901-1921 the unimproved capital value increased at the rate of 6.49 per cent per annum, and for the ten-year period 1911-1921 at the rate of 8.59 per cent per annum.

It has been shown by the experience of other countries that a very much greater increase may be anticipated with the construction of the Bridge.

The Rapid Transit Commissioner for Philadelphia in his Report of 1913 pointed out that while it is very difficult to estimate the exact amount of enhancement due to Metropolitan Railway Construction, the available figures for American cities show remarkable results. The accelerated increase in the land values of the section containing One Hundred and Thirty-fifth Street, New York, was about six times the cost of construction through this District. The assessed value of unimproved property in the 46th Ward, West Philadelphia, increased 546 per cent during the 12 years following upon the construction
of the Market Street Subway Elevated Line.

"This shows the enormous enhancement of value of land only, in outlying districts, due in large part to the Rapid Transit Lines, amounting in twelve years in this Ward to over 500 per cent to the great benefit of the owners, also of the City in point of increased assessable values and tax returns."

The report of the Special Sub-committee on the Passenger Transportation Problem of Manchester (1914) states, inter alia:

"An enlightened policy as regards the carrying out of street improvements and improved transit facilities brings considerable benefits to the city in the shape of increased ratable values. As an illustration, the Whitworth Street improvements may be cited. After the completion of the works, the ratable value of the property in the immediate vicinity showed an increase of 245 per cent."

In determining the taxation, the author assumed that the Unimproved Capital Value of the City would increase at the rate of 4% per annum and the suburbs on the northern side of the Harbour at the rate of 3% per annum on this basis.

Fifteen instalments of the tax if imposed in 1923 would yield a sufficient sum to liquidate the Municipal moiety and all interest charges, also lighting and maintenance for the first five years after the Bridge is completed, leaving a balance in hand, the interest on which would defray the upkeep, maintenance, and lighting of the Bridge for all time, as provided for in the Act.

If the tax were not imposed until after the Bridge was opened for traffic, accrued interest during construction, £522,234, would have to be liquidated as well as the Municipal portion of £2,000,000. In addition, the upkeep and lighting of the Bridge would have to be provided for, and for all time afterwards, and the taxpayers would be called upon to find at least £1,250,000 more than if the tax had not been imposed this year. It is clearly to the advantage of the taxpayers to impose the tax at once instead of waiting until the Bridge is opened for traffic, whilst the tax so raised will materially assist in financing the Bridge during the next three years.
CONCLUSION.

As required by the by-laws, in concluding this thesis I certify that all the proposals herein contained and approved for construction were originated by me.

(a) The Metropolitan Railways as located.

(b) The extent of the electrification.

(c) The location of the City Railway partly elevated and partly underground, notwithstanding that the Royal Commission on the Improvement of the City of Sydney and Suburbs reported in favour of the wholly underground scheme put forward by the then Chief Commissioner, Mr. T. R. Johnson, who subsequently concurred with my location.

(d) The Bridge as located and designed from Dawes' Point to Milson's Point notwithstanding a Royal Commission on Communication between Sydney and North Sydney had reported in favour of three separate subways for railway, tramway, and vehicular traffic.

(e) The location and design of all stations on the City Railway, and on the railways proposed to the eastern, western and northern suburbs.

(f) The proposal to convert the Milson's Point Railway from Lavender Bay to Milson's Point into a Park, the proposal for Catherine Crescent at the Bridge head connecting the main avenue from the bridge with York, Clarence and Kent Streets and the parklets shown.

(g) The portion of the scheme of new streets and street widenings coloured red, necessary in connection with the future traffic of the City and recommended to the City Council.
The estimated cost of the above scheme at present day prices is in the vicinity of £50,000,000 sterling, and by degrees the whole of it should be carried into effect. At present the two principal proposals, the City Railway and the Sydney Harbour Bridge, are under construction by me; the estimated cost of these works is £11,000,000.

J. J. C. Bradfield
Chief Engineer,
Metropolitan Railway Construction & Sydney Harbour Bridge.

26.12.23.