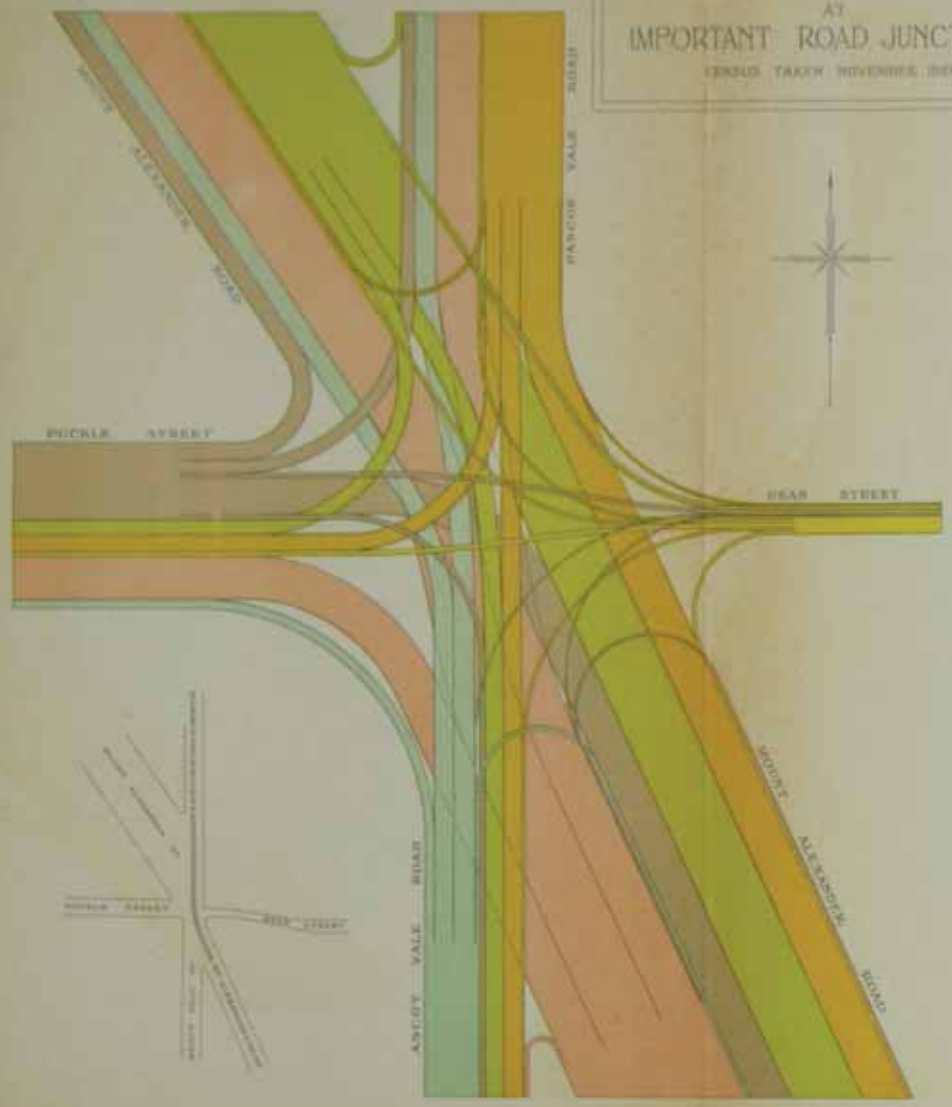
METROPOLITAN TOWN PLANNING COMMISSION

CHARTS OF TRAFFIC FLOW

AT

IMPORTANT ROAD JUNCTIONS.

CENSUS TAKEN NOVEMBER 1929



MOONEE PONDS JUNCTION

SCALE OF VEHICLES

ST KILDA JUNCTION.

SCALE OF VEHICLES

Moonee Ponds Junction.

This is a somewhat confused junction, because of the commencement of the 198 feet width of Mt. Alexander-road at the point of intersection. 5,758 vehicles crossed the junction during the twelve hours, the peak half-hour being between 5.30 and 6.0 p.m.

THE SUBURBAN BRIDGES.

On page 34 is published a diagram showing the volume of traffic which crossed the various bridges in the suburban area on the occasion of the census on 25th November, 1926. In cases where a previous census has been conducted at the same bridge the particulars of that count are given for the purposes of comparison. The classification of the traffic is also given.

Anderson-street Bridge.

The traffic over this bridge is not heavy. 75 per cent. of it is motor car traffic, which crosses the bridge mainly between 8.30 and 9.30 a.m. and 4.30 and 6 p.m. The bridge is only 29 feet wide, including two footpaths, heavy loads are prohibited, and it is so much out of direct alinement for north-south traffic as greatly to affect its usefulness. There is great need for a north–south arterial road skirting the eastern side of the City, but the location and construction of the Anderson-street Bridge renders it unsuitable for this purpose.

Church-street–Chapel-street Bridge.

The value of this bridge, which connects Church-street with Chapel-street, and forms an important north-south thoroughfare, was demonstrated by the fact that 6,294 vehicles used it in twelve hours on the census day. During the 1924 census this route was closed because of the construction of the new bridge, which was then nearing completion. The fact that the Church-street–Chapel-street through route was not available to traffic on the occasion of the 1924 census, and that when the 1926 count was taken the registrations of vehicles crossing the Yarra at this point were much higher than on any other suburban bridge, indicates clearly its effect, not only on the distribution of traffic in the suburbs directly served by the bridge, but also within the city itself. The re-opening of this bridge has no doubt been largely responsible for the fact that between the two censuses the traffic crossing the eastern outlets increased by 37½ per cent. in the 2½ years, whilst the traffic crossing the southern outlets increased by only 22½ per cent.

Chapel-street and Church-street both carry tramways and are only 66 feet wide; moreover they are extremely busy shopping and industrial streets.

Bridges Connecting Richmond and Hawthorn Municipalities.

The Wallen-road Bridge connects Swan-street, Richmond, with Riversdale-road, Hawthorn.

The Hawthorn Bridge connects Bridge-road, Richmond, with Burwood-road and Church-street, Hawthorn.

The Victoria Bridge connects Victoria-street, Richmond, with Barker's-road, Hawthorn.

The diagram on page 34 shows the volume and classification of the traffic across these three important bridges and also shows the comparison with a previous census. It must be remembered that each of these bridges is inefficient inasmuch as the Wallen-road Bridge is too narrow to be of much service, and the others are in a bad state of repair and have more than once undergone extensive repairs and remodelling. The figures show that in less than three years there have been increases in traffic across these bridges of 34 per cent. (Wallen-road), 48 per cent. (Hawthorn), and 30 per cent. (Victoria). As the areas to be served by these routes are being rapidly extended there is no reason to suppose that this rate of increase will not be maintained. It is gratifying to be able to record that the Government has issued instructions for the rebuilding of the Hawthorn and Victoria Bridges. Further reference to them is made on page 149.

Johnston-street Bridge.

This bridge connects the City of Collingwood with the Studley Park reserve and forms part of one of the routes to the municipality of Kew. Although it is not of the same importance as the bridges just referred to, which form part of arterial roads, its value as an inter-suburban link is shown by the fact that 3,647 vehicles used it in twelve hours.

Burke-road Bridge.

This bridge connects the Heidelberg municipality with those of Kew and Camberwell and was only opened for traffic finally during July, 1926, four months before the census. It connects areas which are only sparsely developed at present, but notwithstanding this, and the fact that the approaches to it at the time were in an unsatisfactory state, the bridge carried 409 vehicles.

The Bridges Leading to Footscray and Beyond.

Attention is drawn to the figures and classifications of the traffic at the Dynon-road Bridge over the railway station at North Melbourne. Dynon-road is generally in poor condition, and it is rendered even more unattractive to traffic because of the narrow bridges at each end of the road. The comparison between the census of 1st May, 1924, and 25th November, 1926, at the North Melbourne Station Bridge, shows an increase of 21 per cent. in that short period. Whilst there was a decline in the volume of horse-drawn traffic, its use by commercial motor vehicles increased by 133 per cent. The volume of heavily-laden traffic on this road is increasing and it is only the bad conditions referred to which have kept the total numbers of vehicles down.

The comparison of the 1924 census with that of 1926 in respect of the western end of Dynon-road—at the Hopkins-street Bridge—shows a reduction in the numbers of vehicles, but this was principally due to the decline in horse-drawn traffic. The number of heavy motor lorries shows an increase of 22 per cent. The volume of traffic using this bridge has been greater in each census than in the case of either of the other bridges across the Maribyrnong River.

The Napier-street Bridge forms part of the western entrance to Melbourne via Dudley-street. The road connecting Dudley-street and this bridge is now to be abandoned consequent upon the provision of a new road now in course of construction as authorized by the *Melbourne to Footscray Road Act* 1927. The comparison shows that there was an increase of 48 per cent. in the traffic across this bridge in about 2½ years. The greater part of the traffic is of a heavy type.

Traffic on the Smithfield-road Bridge, which is of bad construction and is frequently closed for repairs, increased by 80 per cent. between the two counts, although its total volume is still less than that using either of the other bridges.

CONDUCTING THE CITY CENSUS.

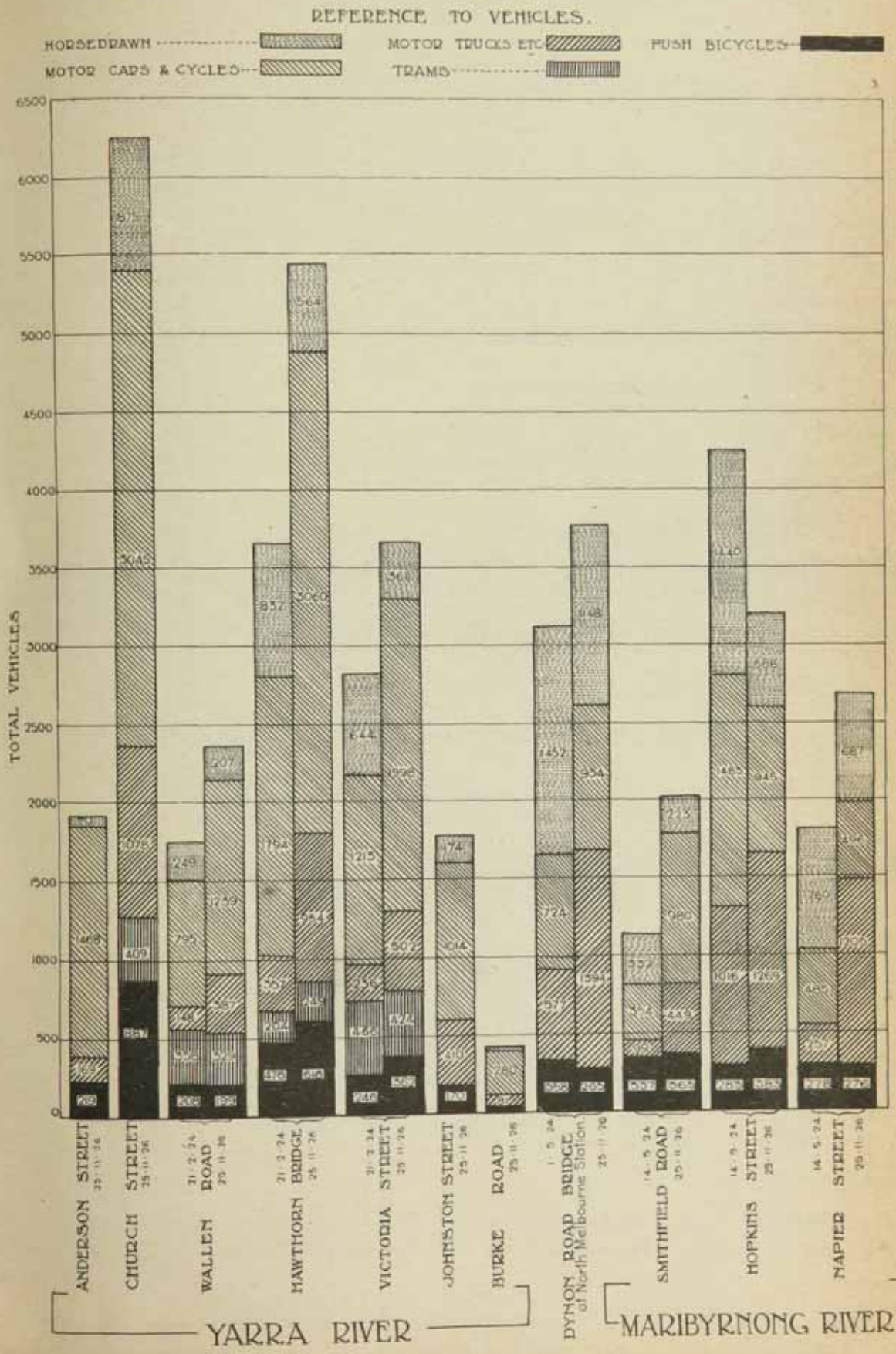
When the census of the vehicular traffic which crosses the boundaries of the City was taken on 29th April, 1924, the boundaries adopted were Flinders, Spencer, Spring, and Latrobe streets. The same boundaries were again adopted for the census taken on 2nd December, 1926. The day was again fine and warm. The same hours as for the suburban census were recorded, viz., 6.30 a.m. to 6.30 p.m., with half-hourly intervals.

At points Nos. 8, 14, and 5 (Prince's Bridge, Queen's Bridge, and the corner of Aikman and Bright streets respectively) the count was made by the use of forms similar to those shown on page 28. In order to obtain the information, as defined on page 27, it was found necessary to institute a card system for the remaining 30 points and to stop the vehicles momentarily whilst the cards were issued and collected from drivers. Much press and wireless publicity was conducted beforehand. Various transport clubs and organizations were advised of the proposed arrangements. As the drivers became accustomed to the scheme, only very few vehicles actually stopped at the checking stations. 110 constables were used on this occasion.

METROPOLITAN TOWN PLANNING COMMISSION.

CHART SHOWING VOLUME, CLASSIFICATION, AND INCREASE OF TRAFFIC.

IMPORTANT SUBURBAN BRIDGES.



Geo. C. Cook Surveyor.

By Authority: H. J. Gross, Government Printer, Melbourne.

All points where vehicles were counted were numbered and the necessary policemen were allotted to each station.

Cards as reproduced below were handed to all drivers entering the City as they passed the recording stations :—

DRIVERS—DO NOT MARK THIS SIDE.

Station No.....

a.m.	6.30	7.0	7.30	8.0	8.30	9.0	9.30	10.0	10.30	11.0	11.30	12.0
p.m.	12.30	1.0	1.30	2.0	2.30	3.0	3.30	4.0	4.30	5.0	5.30	6.0

MOTORS.

CAR.
LORRY (INCLUDES VAN).
TAXI.
CYCLE (INCLUDES SIDE-CAR).

HORSE-DRAWN.

LORRY (COMMERCIAL).
BUGGY (PASSENGER).

PUSH BICYCLES.

The officer recorded the time of inward journey by cancelling with **blue** pencil the half-hour space coinciding with the time of entry, whilst the time of outward passage was recorded by cancelling the half-hour space with **red** pencil.

DRIVERS—PLEASE FILL IN THIS SIDE OF CARD.

Drivers who come to the City and return to the same suburb should write the name of that suburb on each half of card.

Write on this half of Card name of Suburb where journey *started :*

Burnley.

Write on this half of Card name of Suburb where journey is to *end:*

Kensington.

This reverse side of the card shows how it had been filled in by the driver whilst he was in the City. He supplied the information that he had come from Burnley and was bound for Kensington.

The information thus obtained supplied an accurate record of the volume, classification, points of entry and departure to and from the City, the origin, destination and times of travel of all vehicular traffic.

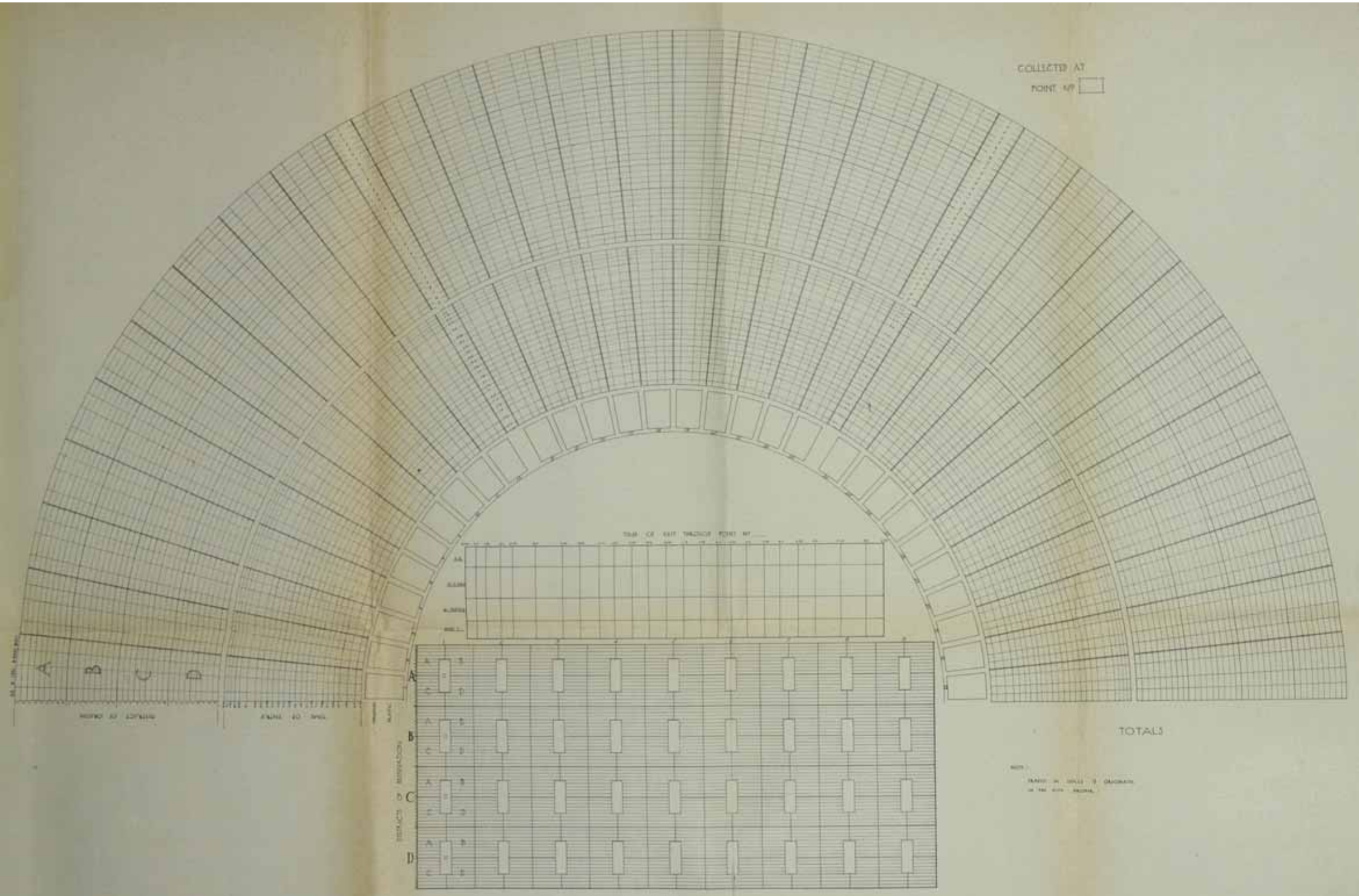
In order that the counting and recording could be carried out with only one handling of the cards a special system was devised. The whole of the metropolitan area was divided into four groups of districts and these groups were re-subdivided into nine sub-districts. A statement of the sub-districts is as follows :—

A1. West Melbourne, Victoria Dock and North Wharf.
A2. Kensington, Flemington, Ascot Vale, Newmarket.
A3. Footscray, Seddon.
A4. Yarraville, Spotswood.
A5. Williamstown, Newport.
A6. Altona, Laverton, Werribee.
A7. Sunshine, Braybrook.
A8. Moonee Ponds, Essendon.
A9. Pascoe Vale, Glenroy, Broadmeadows.

B1. North Melbourne, Parkville.
B2. Carlton, North Carlton, Fitzroy.
B3. Collingwood, Abbotsford.
B4. Fairfield, Alphington.
B5. Brunswick, Moreland.
B6. Northcote, Thornbury, Croxton, Merri.
B7. Coburg, Fawkner.
B8. Preston, Bell, Regent, Reservoir.
B9. Heidelberg, Ivanhoe.

C1. East Melbourne, Jolimont.
C2. West Richmond, North Richmond.
C3. Richmond, East Richmond, Burnley.
C4. Prahran, Toorak, Armadale, Kooyong.
C5. Hawthorn, Glenferrie, Auburn.
C6. Kew, Studley Park.
C7. East Kew, Balwyn, Doncaster.
C8. Camberwell, Canterbury, Surrey Hills, Box Hill, South Camberwell.
C9. Malvern, East Malvern, Tooronga, Darling, Glen Iris.

D1. South Melbourne, Albert Park.
D2. Port Melbourne, South Wharf.
D3. St. Kilda-road, South Yarra, Prahran, Windsor.
D4. St. Kilda, Balaclava, Ripponlea, Elwood.
D5. East St. Kilda, Caulfield, Armadale.
D6. Elsternwick, Gardenvale, North Brighton and Middle Brighton.
D7. Brighton Beach, Hampton, Sandringham, Black Rock, Beaumaris.
D8. South Caulfield, Glenhuntly, Ormond, Bentleigh, Moorabbin.
D9. East Caulfield, Carnegie, Murrumbeena, Oakleigh.



CITY TRAFFIC CENSUS.

A reproduction of the chart on which was recorded the information shown on the cards collected at each point in the City Traffic Census.

Traffic coming from or going to places beyond the suburban radius was recorded against the outer suburb through which it would have to pass.

A reduced copy of the chart upon which the data was assembled from the collected cards appears on page 36. Dots, or strokes, were inserted in each of the allotted spaces in respect of the district of origin, classification of vehicles, time of entry into City, point of entry, time of departure, destination, and also whether the vehicle passed direct through the City. There were separate charts prepared in respect of each of the 30 points where the cards were collected.

Exclusive of tramcars, which were separately counted, 64,813 cards were issued. 52,576 of these cards were returned to the officials. After allowing a reasonable percentage for losses, errors, &c., it is assumed that between 10 per cent. and 15 per cent. of the vehicles went into the City proper without passing out again, or on the other hand, left the City for suburbs or country, without returning, during the hours of checking.

As each of these cards involved two journeys across the City boundary, it means that 105,152 registrations of vehicular traffic were made, to which must be added 9,721 tramcars and Tramway Board's buses, and not less than 10,000 vehicles in respect of which the cards were not returned. **This makes a total of about 125,000 vehicles crossing the City boundaries between 6.30 a.m. and 6.30 p.m. on Thursday, 2nd December, 1926.**

The checking of the cards gave the results shown below in respect of the total of the inward and outward traffic at each point. The points of issue and collection of cards are shown on the plan on page 42.

Point No.	Point of Checking.	Total Inward and Outward Traffic.	Percentage of Total Traffic.
9	Batman-avenue	2,614	2·3
7	Jeffries-parade	1,222	1·1
6	Alexandra-avenue	2,009	1·7
1	St. Kilda-road	13,017	11·3
2	Sloss-street	457	·4
3	Sturt-street	2,895	2·5
4	City-road	1,322	1·2
10	Maffra-street	1,785	1·6
11	Queen's Bridge-street..	11,531	10·0
12	Whiteman-street	910	·8
13	Yarra Bank-road	3,254	2·8
31	Siddeley-street	720	·6
15	Flinders-street Extension	9,011	7·8
30	Railways Goods Sheds	2,086	1·8
32	Latrobe-street West	512	·4
16	Spencer-street North	4,457	3·9
17	King-street North	2,757	2·4
18	William-street North	4,545	4·0
19	Queen-street North	3,129	2·7
20	Elizabeth-street North	8,333	7·3
21	Swanston-street North	7,408	6·4
22	Russell-street North	3,700	3·2
23	Exhibition-street North	1,812	1·6
24	Latrobe-street East	1,707	1·5
25	Spring-street North	2,265	2·0
33	Albert-street	2,571	2·3
26	Evelyn-street	4,335	3·8
27	McArthur-street	5,021	4·4
28 } 29 }	Wellington-parade and Wellington-parade south ..	9,488	8·2
	Total	114,873	100·0

When the count of the same points was taken on 29th April, 1924, the period of checking was between 7 a.m. and 8 p.m.—13 hours. On the occasion of the census of 2nd December, 1926, the period was 12 hours only—from 6.30 a.m. to 6.30 p.m. **On a proportional 12-hour basis calculation, the traffic crossing the boundaries of the City proper is shown to have increased by 31 per cent.**

Prince's and Queen's Bridges.

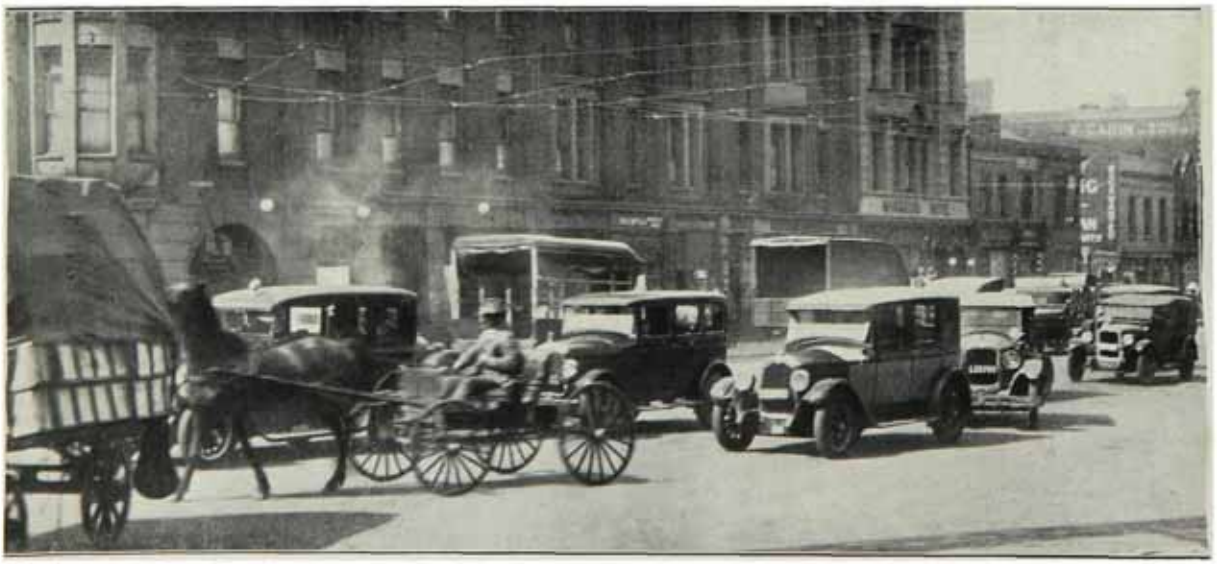
Independently of the card collecting and distributing points just named, a check count was also conducted of the traffic crossing the Yarra at Prince's and Queen's Bridges during the same hours on 2nd December, 1926. The actual points of collecting and issuing cards were arranged in the converging streets to those bridges so as to cause less interference with the traffic and at the same time secure data as to the directions of travel. The census on the bridges showed that the traffic, compared with the counts of 29th April, 1924, had actually decreased by 5·3 per cent. on Prince's-bridge, but there was an unexpected increase of 25·6 per cent. in Queen's Bridge traffic. The then recent prohibition of certain turning traffic at the intersections leading to Prince's Bridge had no doubt contributed largely to this result.

The diagrams on page 40 illustrate the changes in the classification of the traffic using these bridges; the total figures are also given. Graphs indicate the half-hourly fluctuations in the volume of traffic. It will be seen that Queen's Bridge now carries more traffic than Prince's Bridge. The reduction in horse-drawn traffic is very marked. The reduction in the number of tramcars in the case of Prince's Bridge is due to the substitution of large electric cars for the cable cars, whilst the slightly differing hours of census have caused lower figures in each instance. The small proportion of tramcars in the total traffic is noteworthy. The half-hour 5.0 to 5.30 p.m. has again proved the busiest on each bridge, there being 35 vehicles per minute across Prince's Bridge and 51 across Queen's Bridge. An interesting feature of Queen's Bridge traffic is that this half-hour was the busiest in each direction of travel.

Traffic on Approach Roads to City.

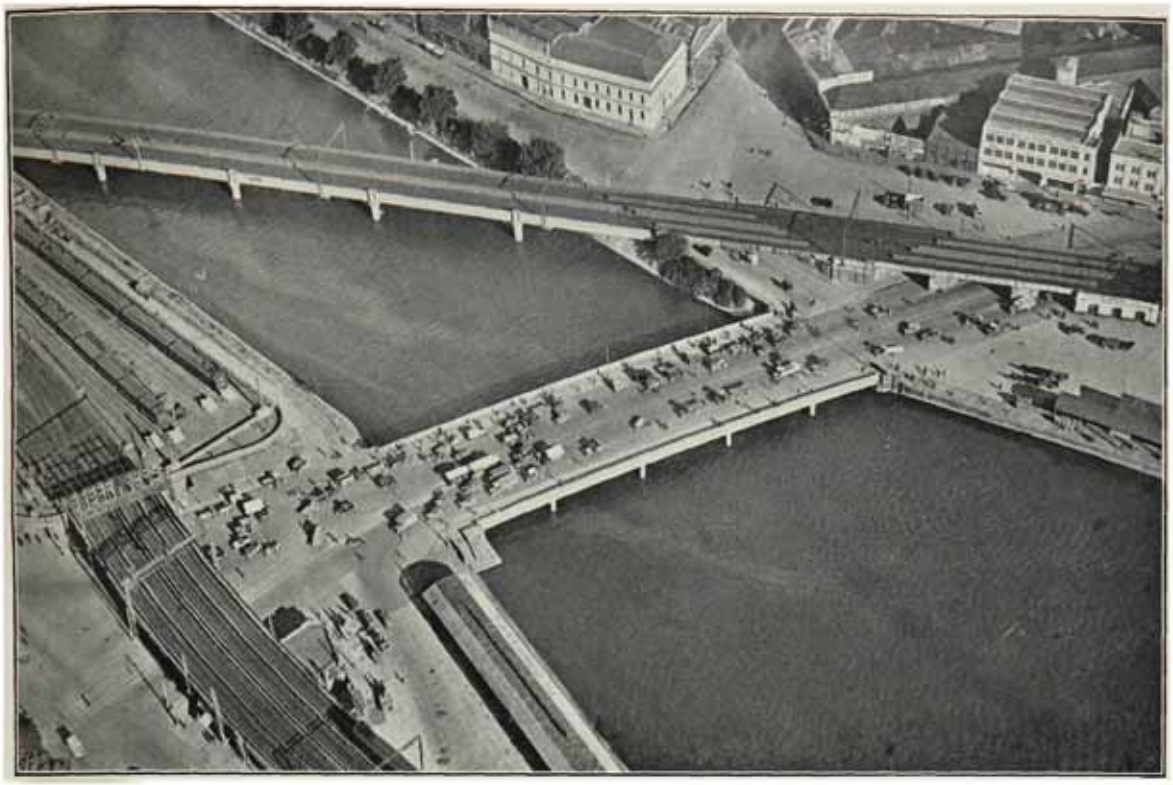
The statement on page 37 shows that **St. Kilda-road carries more traffic than any other road converging on the City business area, with Queen's Bridge-street second.** These are the principal southern outlets, and the census has proved again the urgent need for relief.

The high percentage of traffic at the intersection of Flinders-street and Spencer-street is noteworthy. It comes from Flinders-street Extension, Siddeley-street, and the Railway Goods Yard, in addition to which there is a large volume of traffic turning between Flinders and Spencer-streets which would not be counted in this census.



Traffic at the intersection of Flinders and Spencer Streets, City.

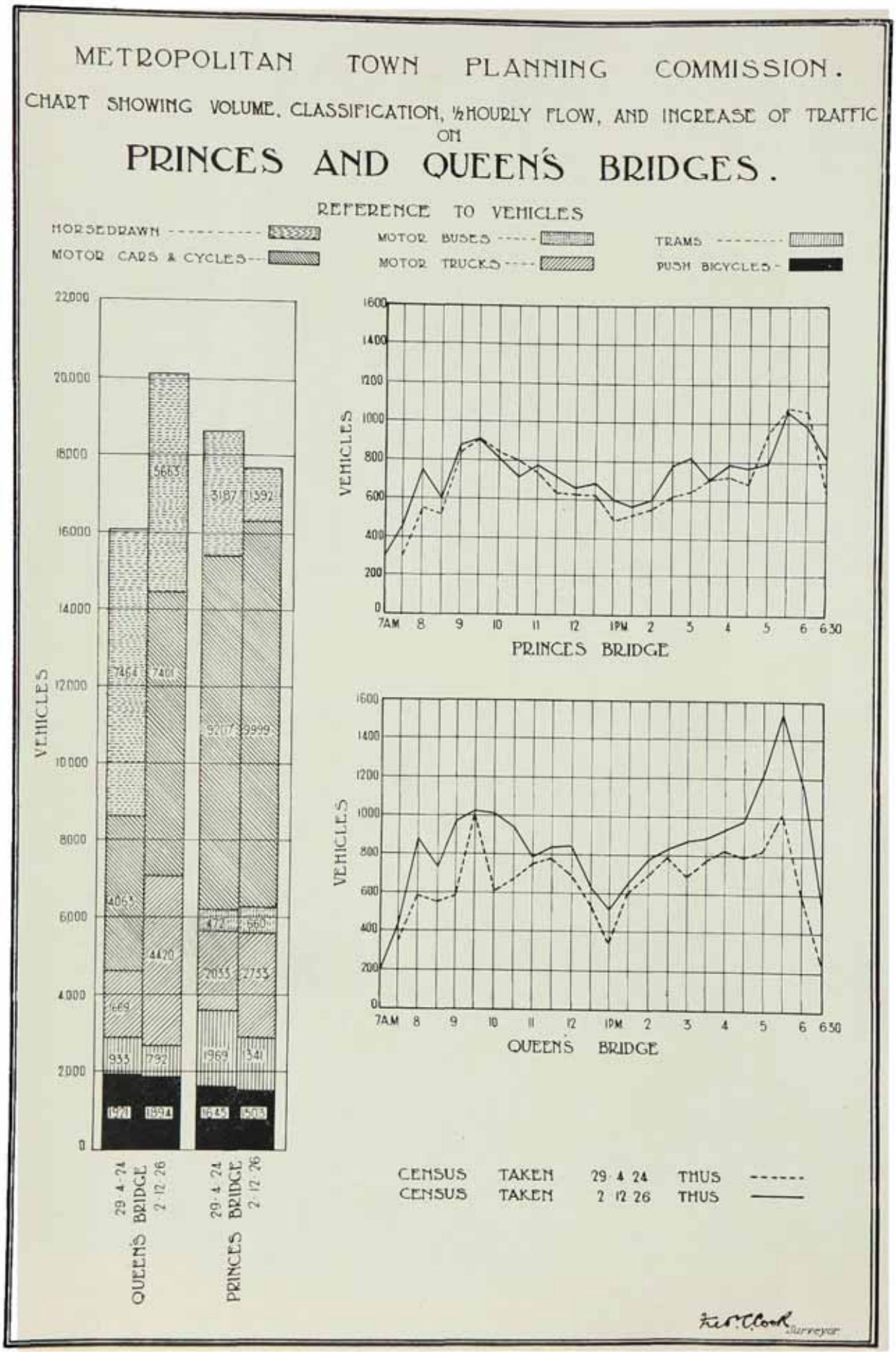
Brown Photos.]



Aerial View of Traffic on Queen's Bridge.

By "Airspy" Shaw Aviation Co.]

View of Prince's Bridge. "Inward" bound traffic at 9 a.m.


METROPOLITAN TOWN PLANNING COMMISSION.
CHART SHOWING VOLUME, CLASSIFICATION, ½HOURLY FLOW, AND INCREASE OF TRAFFIC ON
PRINCES AND QUEEN'S BRIDGES.
REFERENCE TO VEHICLES
HORSEDRAWN
MOTOR CARS & CYCLES
MOTOR BUSES
MOTOR TRUCKS
TRAMS
PUSH BICYCLES
VEHICLES
22000
20000
18000
16000
14000
12000
10000
8000
6000
4000
2000
0
5663
7464
7401
4065
4420
1669
933
792
3187
1392
9207
9999
472
660
2055
2753
1969
341
29·4·24
2·12·26
QUEENS BRIDGE
PRINCES BRIDGE
1600
1400
1200
1000
800
600
400
200
7AM 8 9 10 11 12 1PM 2 3 4 5 6 6.30
PRINCES BRIDGE
QUEENS BRIDGE
CENSUS TAKEN 29·4·24 THUS
CENSUS TAKEN 2·12·26 THUS

While there is a good stream of traffic at this intersection, including heavily-laden and slow moving vehicles, it is considered that, when the bridge at Spencer-street has been built, and the wharfs to the east of it and the Little Dock are closed, with efficient regulation, more facility can be given to through traffic. A considerable percentage of the traffic at this point, which now has to turn, should become through traffic, and consequently there should be more freedom of movement.

Wellington-parade is an exceedingly busy throughfare but as it is wide, and its frontages are not built on, traffic flows freely and safely.

The streets converging on the City from the south carried 35·7 per cent., those from the north 33·5 per cent., from the east 20·2 per cent., and from the west 10·6 per cent. of the total traffic. Compared with the previous census these proportions show little variation, though in each case the volume is greater. The principal changes are a slight falling off proportionately on northern and a slight addition on eastern thoroughfares.

A chart is published on page 42, which shows the principal traffic routes entering and leaving the City proper. Whilst no information was obtained as to the routes followed by vehicles within the boundaries of Spring, Flinders, Spencer, and Latrobe streets, the chart shows the volumes of traffic which enter the City at all points, and the proportions of it which left by various outlets after traversing the business area. The traffic is shown to be heaviest in those streets which lead directly across the City proper. Another important fact is that the larger proportion of the traffic which enters at the main points uses the same street for exit purposes.

Through Traffic.

The time which elapsed between the issue and collection of cards from vehicles which crossed the City from one side to another, gave a fair indication of the volume which could be classed as through traffic. In a certain number of cases the vehicles may have stopped for a few minutes for the transaction of business whilst passing through the city, but in the great majority of cases it is unlikely that this occurred. The figures show that **43 per cent. of the total traffic traversed the City within such limits of time as to warrant its classification as through traffic.** This 43 per cent. comprises 22,634 out of the total of 52,576 vehicles which crossed the boundaries of the City twice during the 12 hours. Assuming that one-quarter of these vehicles stopped for business in the City in the short period elapsing between entry and exit, the remaining 17,000 need not have traversed the city streets, if more direct, or by-pass routes had been available.

Districts of Origin and Destination.

The examination of the cards to ascertain the directions of travel of all vehicles according to the origin, and destination, of the particular journeys for which the cards were issued, showed that the principal movements were in the order named :—

1. South Melbourne and Albert Park to the City, and back to the same district.
2. Carlton and Fitzroy and Prince's Hill to the City, and back to the same district.
3. West Melbourne, North Melbourne and Parkville to City, and back again.
4. West Melbourne, North Melbourne and Parkville to South Melbourne and Albert Park.
5. South Melbourne and Albert Park to West Melbourne, North Melbourne, and Parkville.
6. South Melbourne and Albert Park to Docks and Wharfs on north bank of Yarra, and the Spencer-street Railway Goods Yards.
7. Docks and Wharfs on north bank of Yarra and Spencer-street Railway Goods Yards to the City and return to same locality.
8. Docks and Wharfs on north bank of Yarra and Spencer-street Railway Goods Yards to South Melbourne and Albert Park.

The principal suburbs of origin or destination of traffic entering the City area were as follows :—

District.	Percentage of Total.
1. South Melbourne and Albert Park	17·2
2. West Melbourne, North Melbourne, and Parkville	14·7
3. Harbour docks and wharfs on north bank of Yarra and the Spencer-street Railway Goods Yards	9·4
4. Carlton, Fitzroy, and Princes Hill	9·3
5. St. Kilda, Elwood, Balaclava and Ripponlea	5·3
6. Richmond and Burnley	4·9
7. Municipality of Brunswick	3·4
8. South Yarra, Prahran, Hawksburn and Windsor	3·2
9. Collingwood, Abbotsford, and Clifton Hill	2·9
10. Port Melbourne and wharfs on south of river, west of Clarendon-street	2·4

Classification of the Traffic.

In submitting details of the classification of the City traffic the percentages of the previous census are given for comparative purposes :—

	Census, 29.4.1924.	Census, 2.12.1926.
Horse-drawn	33·7 per cent.	20·6 per cent.
Motor and taxis	29·4 ,,	36·3 ,,
Commercial trucks	12·2 ,,	20·4 ,,
Motor cycles, bicycles	15·6 ,,	14·5 ,,
Tramcars	9·1 ,,	8·2 ,,

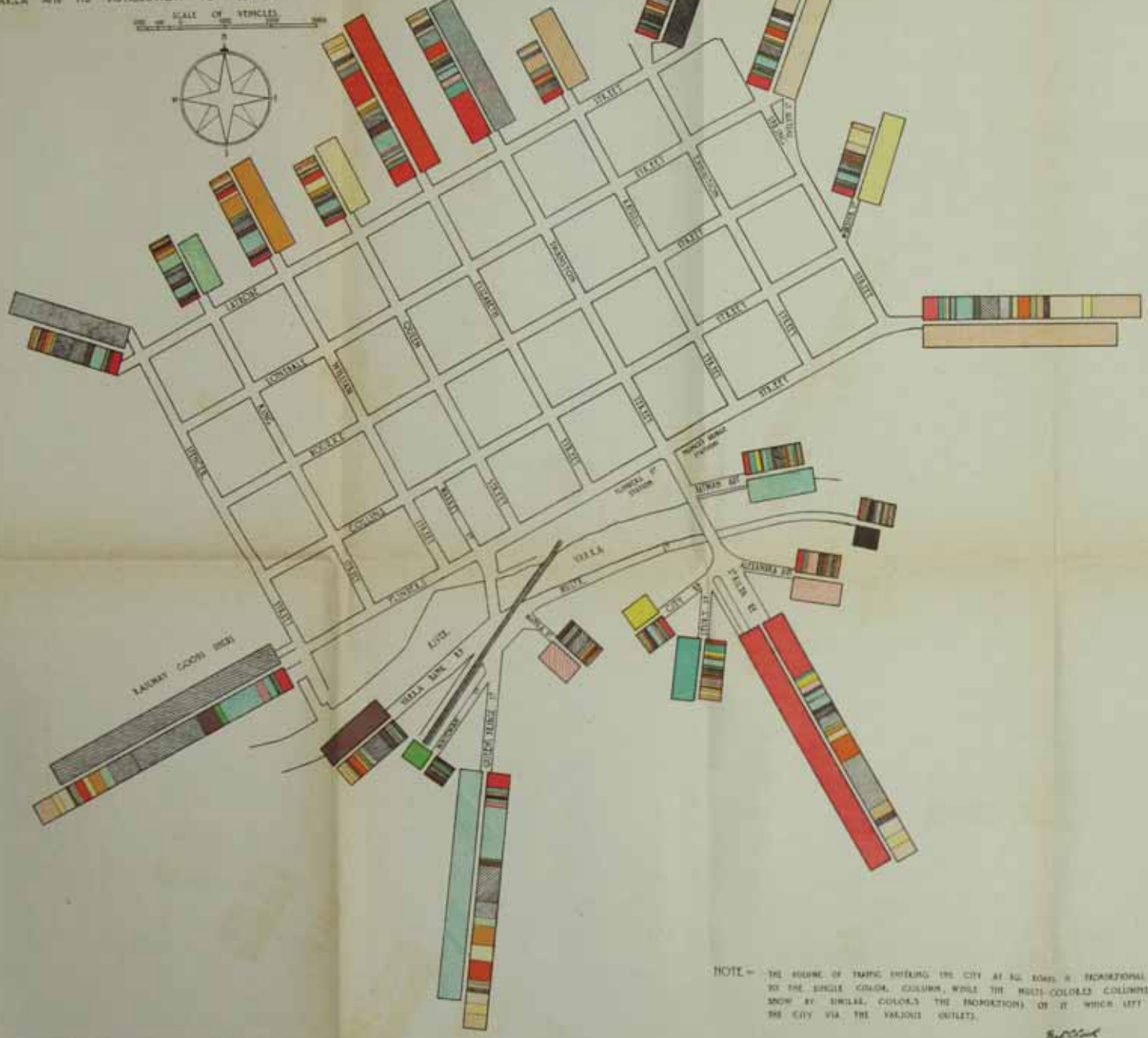
The figures are instructive, especially with respect to the change in the volume of horse-drawn traffic. The graphs published on page 40 show the large proportion of horse-drawn traffic which uses Queen's Bridge compared with Prince's Bridge. The figures of the traffic at Flinders-street Extension, and adjoining thoroughfares, also show large proportions of horse-drawn vehicles. The traffic at this end of the City is very heavy, and is the area in which the remaining horse-drawn vehicles are still largely used. This is also on account of the short haul for a large proportion of the loading.

The comparison of City with suburban figures in respect of classified transport, provides some interesting contrasts. The horse-drawn traffic of the City is 6 per cent. higher than in the suburbs. The motor cycles and bicycles are 8 per cent. more plentiful in the suburbs. The only other notable difference is in regard to the commercial motor vehicles which are 3 per cent. to 4 per cent. more numerous in the City area.

METROPOLITAN TOWN PLANNING COMMISSION.

CITY TRAFFIC SURVEY.

CHART SHOWING VOLUME OF TRAFFIC AT ALL INLETS TO CENTRAL AREA AND ITS DISTRIBUTION TO ALL OUTLETS.



NOTE:- THE VOLUME OF TRAFFIC ENTERING THE CITY AT ALL ROADS IS PROPORTIONAL TO THE SINGLE COLOUR COLUMN, WHILE THE MULTI-COLOURED COLUMNS SHOW BY SIMILAR COLOURS THE PROPORTIONS OF IT WHICH LEFT THE CITY VIA THE VARIOUS OUTLETS.

GENERAL TRAFFIC SURVEY.

Vehicular Traffic.

In many instances large increases of traffic were noted, especially across the bridges, but these figures are in excess of the general average because of the limited number of crossings over the rivers. An illustration of the great advantage of additional bridges in the inner areas is afforded by the use made of the Church-street–Chapel-street Bridge, which was re-opened in the interval between the censuses of 1924 and 1926.

During the period between the traffic counts referred to there was an increase in the population of the metropolis of approximately 10 per cent. In nearly all municipalities increases in population took place, but the greatest increases occurred in the outer suburbs, three notable instances being the municipalities of Preston (48 per cent.), Camberwell (36 per cent.), and Moorabbin (35 per cent.). A comparison of the figures of vehicular traffic crossing the City boundaries shows that the volume has increased in the corresponding period by about 33 per cent. These figures take no account of tramcars. The horse-drawn traffic declined by 28 per cent., whilst the motor vehicles increased by 60 per cent. It is, therefore, evident that **the vehicular traffic of the metropolitan area passing through the City has increased at a rate about three and a half times faster than the population.**

Tramway Traffic.

In the Commission's First Report, figures were given showing the increases in passengers carried on tramways operated by the Melbourne and Metropolitan Tramways Board over a period of 20 years. These figures showed that the number of passenger journeys per head of population per annum increased from 92 in 1903 to 266 in 1923.

The volume of tramway traffic has remained fairly steady during the last few years, as indicated in the appended table :—

Year (30th June).	Miles Open.	Passengers.	Passenger Journeys per Head.
1923	121	226,999,954	266
1924	122	221,892,070	260
1925	128	228,752,078	258
1926	131	226,900,053	249
1927	136	218,837,383	232
1928	139	215,810,431	221
1929	139	211,762,137	212

(Motor bus figures not included).

The Melbourne and Metropolitan Tramways Board explains that the apparent falling off in passengers in the years since 1925 is largely due to—

(*a*) Passengers on lines undergoing conversion from cable to electric working being carried by motor buses during the conversion period.

(*b*) the amalgamation of services obviating the necessity for changing cars, in consequence of which only one passenger journey is now recorded in place of two, as formerly.

As the Tramways Board is still operating 30 miles of double-track cable tramway, there is likely to be considerable interference with the free movement of passengers for some years on those routes when conversion work is in progress.

Suburban Railway Traffic.

The traffic on the suburban railways, which showed rapid advances with the conversion from steam to electric services, has steadied during the last few years, as the following figures show :—

Year (30th June).	Passengers Carried.	Journeys per Head per Annum.
1924	157,969,667	185
1925	156,678,519	177
1926	158,589,397	174
1927	160,154,499	170
1928	156,393,635	160
1929	152,840,373	153

Notwithstanding the greatly improved services provided by electrified trains there has been a gradual decline in the number of passenger journeys per head of population in the suburban services. The improved tramway services combined with the rapid extension of the use of private motor cars and taxis, have also had considerable influence upon railway traffic.

Railway and Tramway Travelling Times.

Map No. 3, opposite, shows the shortest time required to reach the City from any part of the metropolis, using either railway or tramway for the whole journey, whichever is the faster service. The times shown on the plan may be considerably lessened if tramways are used in conjunction with the railways.

The map shows the lack of rapid transport facilities in some areas which are comparatively close to the City, and also that some parts of the metropolis within 5 or 6 miles of its centre are as far distant in time by rail and tram as other parts 13 miles from the centre. The concentration of population adjacent to the lines of rapid transit is shown in the plan on page 24.

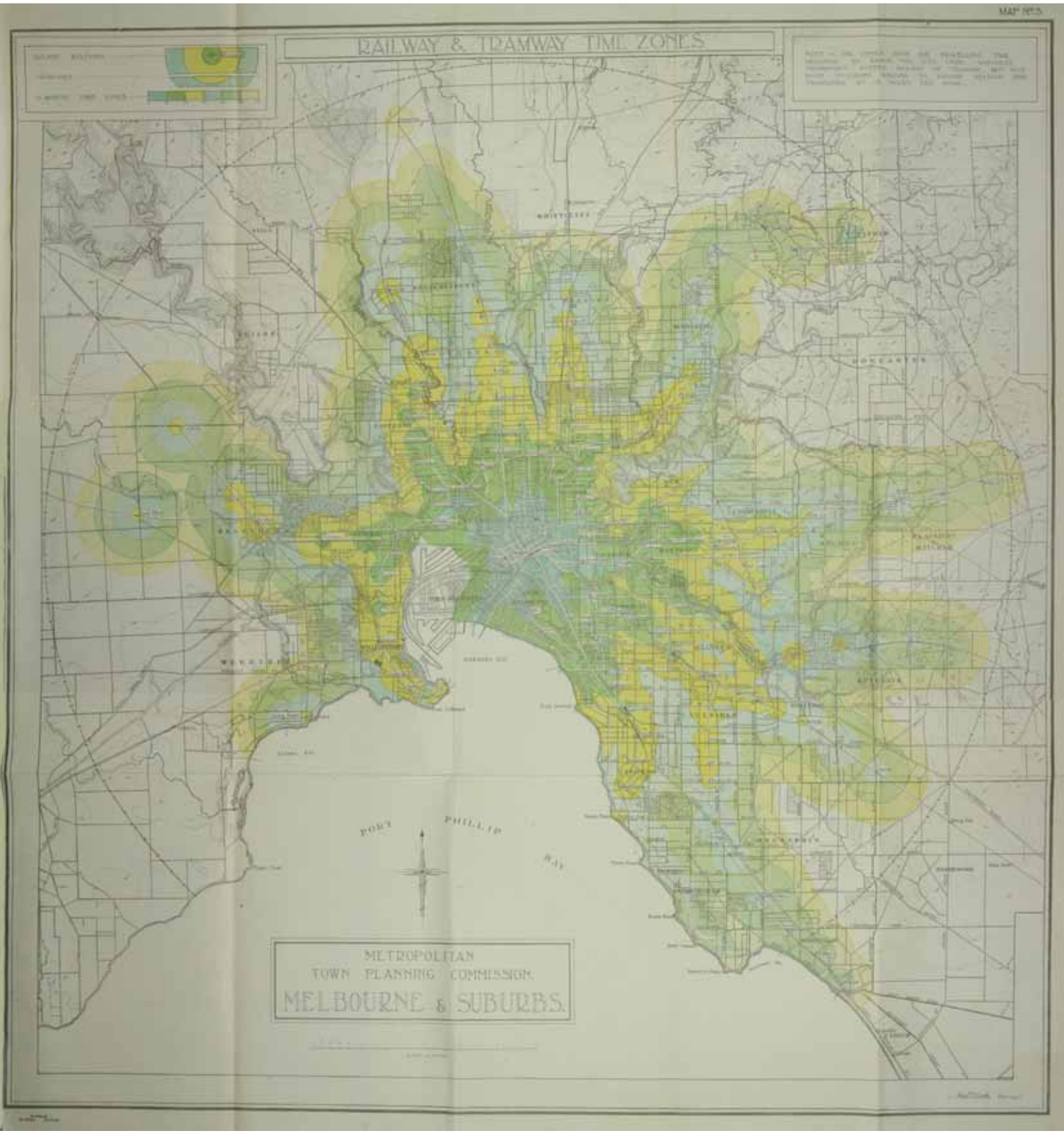
The Commission considers that the adoption of the scheme of development recommended in this Report will contribute materially to savings in travelling time. It is recognized that the provision of efficient transport systems for a large and widely spread metropolis, such as Melbourne, must necessitate a degree of convergence of all forms of transport at points of approach to the centre. Overlapping of services in the inner areas is unavoidable, but unnecessary and wasteful duplication should be prevented. It is most desirable that supervision be exercised, because the duplication of services and their running costs have some effect upon travelling times. A single transport authority would consider proposals for eliminating certain of the inner suburban railway stations, or of some sections of tramway routes, the extensions of these services, a reduction in the number of tramway stopping places, and so on.

Motor Vehicles.

During the last 10 years the registrations of motor vehicles have increased rapidly. The first year in which registrations were accurately recorded was 1917, when 21,152 motors were licensed. The registrations advanced by 3,500 to 7,000 annually until 1922. In 1923 there was an increase of over 15,500, making the total State registrations 60,257.

Further heavy increases in motor vehicles have occurred since then as follows :—

1924	77,386
1925	96,533
1926	117,891
1927	143,855
1928	158,468


RAILWAY & TRAMWAY TIME ZONES
PORT PHILLIP BAY
METROPOLITAN
TOWN PLANNING COMMISSION.
MELBOURNE & SUBURBS.

At the end of 1928 there was one motor vehicle registered for every 11·1 persons in the State of Victoria, and it is believed that the proportion in respect of the metropolitan population is considerably greater.

The following statement shows the ratio of motor vehicles to population in the undermentioned countries :—

United States	(December, 1927) ..	1 to every 5·1 persons
New Zealand	(December, 1927) ..	1 to every 9·1 persons
Canada	(December, 1927) ..	1 to every 10·1 persons
Australia	(December, 1927) ..	1 to every 12·5 persons
Federal Capital Territory ..	(June, 1927) ..	1 to every 5·7 persons
South Australia	(June, 1927) ..	1 to every 8·1 persons
Victoria	(December, 1927) ..	1 to every 12·1 persons
Western Australia ..	(June, 1927) ..	1 to every 12·3 persons
Queensland	(June, 1927) ..	1 to every 12·9 persons
New South Wales ..	(June, 1927) ..	1 to every 13·5 persons
Tasmania	(June, 1927) ..	1 to every 17·2 persons
South Africa (White) ..	(December, 1927) ..	1 to every 15·7 persons
Great Britain	(1927)	1 to every 21·0 persons
France	(December, 1927) ..	1 to every 41·8 persons
Argentina	(December, 1926) ..	1 to every 43·0 persons

When the Commission undertook the traffic census in 1924 it found that 46·6 per cent. of the total street transport were motor-propelled vehicles. The percentage rose to 61·5 per cent. when the census was taken in December, 1926, the largest proportional increase being in commercial trucks.

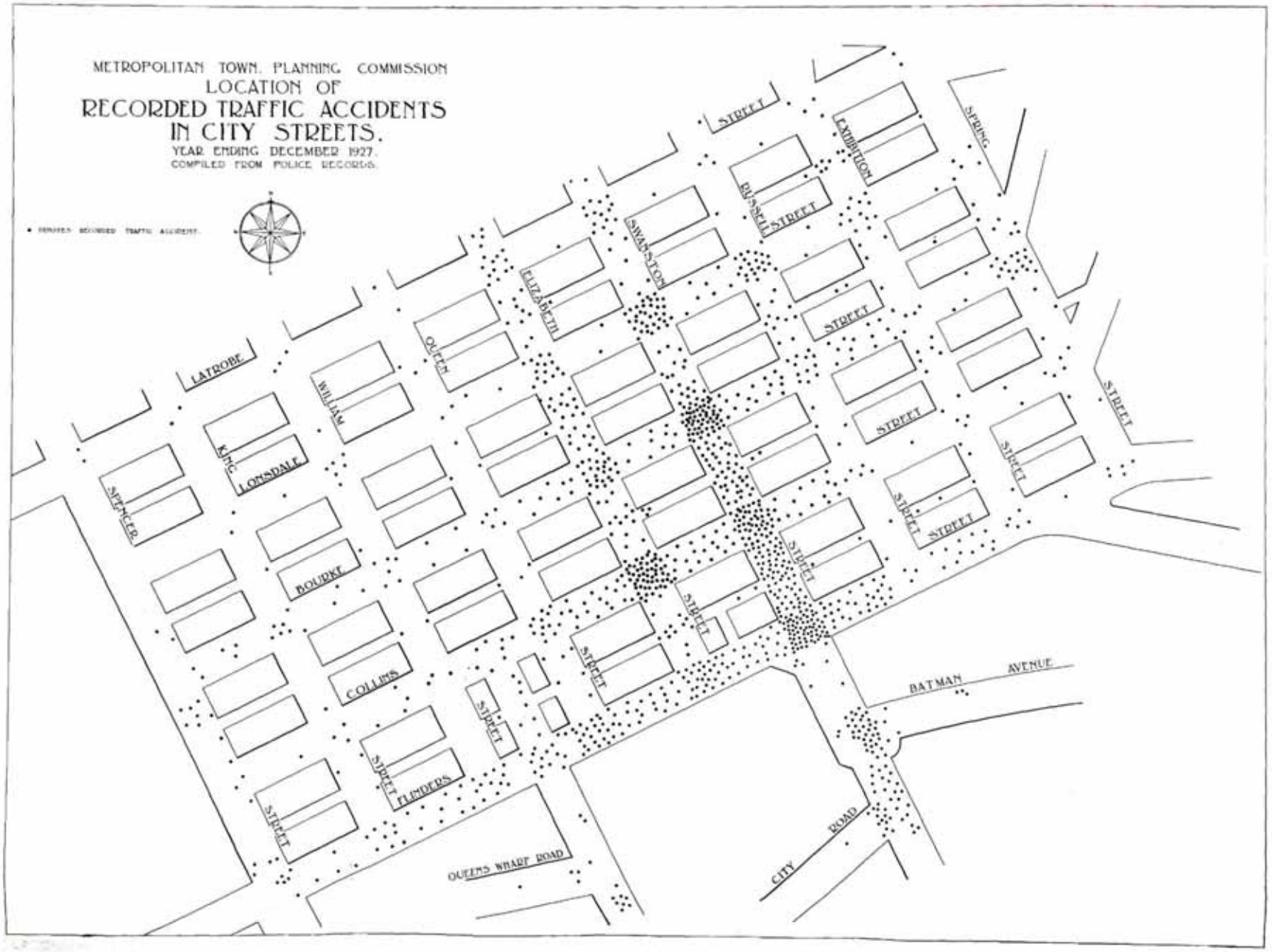
STREET ACCIDENTS.

Attention was drawn, in the Commission's First Report, to the increasing number of street accidents, and some recommendations were made with a view to their alleviation.

The Traffic Control Branch of the Victorian Police Department has kept some useful records during the last few years in this regard and year by year their scope has been increased. On page 46 is published a diagram showing the *recorded* accidents (as compiled by that office) in the principal city business area, for the year 1927. This chart shows the points of greatest danger to be in the busiest streets. Traffic control in these streets enables the police to obtain reasonably complete records of all accidents. Although accurate records are available of fatalities, many collisions and other accidents occurring in streets not so fully controlled by traffic police are not recorded. Nevertheless the chart contains sufficient evidence to show the seriousness of this aspect of city life. The last four years has greatly increased the hazard in the principal streets and at the main intersections, notwithstanding the increase in numbers and efficiency of the policemen engaged on traffic duty, and the partial substitution of electric for cable trams.

The Traffic Control Branch has also supplied the following comparative figures for the State of Victoria :—

Year.	Number of Recorded Accidents.		Number of Injuries.		Fatal Accidents.	
	Motors.	All Other Vehicles.	Motors.	All Other Vehicles.	Motors.	All other Vehicles.
1922	1,014	636	Not kept		61	64
1923	1,715	679	,,		97	77
1924	2,943	815	,,		141	83
1925	3,491	865	2,008	629	189	104
1926	4,915	799	2,919	486	224	92
1927	5,587	679	3,153	476	242	87
1928	6,395	559	3,211	560	277	82


METROPOLITAN TOWN. PLANNING COMMISSION
LOCATION OF
RECORDED TRAFFIC ACCIDENTS
IN CITY STREETS.
YEAR ENDING DECEMBER 1927.
COMPILED FROM POLICE RECORDS.
LATROBE
KING
LONSDALE
SPENCER
WILLIAM
BOURKE
COLLINS
QUEEN
FLINDERS
ELIZABETH
SWANSTON
RUSSELL
EXHIBITION
SPRING
BATMAN
AVENUE
CITY
ROAD
QUEENS WHARF ROAD
STREET

The Police Department's records of the cause of the 5,587 accidents during 1927 in which motor vehicles were involved show that 3,260 of those accidents were due to negligence in some form on the part of motor drivers. Pedestrians were responsible for 1,005 accidents in which motors were also involved.

The annual reports of the City Coroner show the following particulars of fatalities he has investigated in which motor vehicles were involved :—

1921	..	31	1922	..	51
1923	..	87	1924	..	110
1925	..	134	1926	..	131
1927	..	162	1928	..	193

This problem is world-wide. Mr. Morris Knowles, Chairman of the City Planning Commission of Pittsburgh, Pa., in a paper contributed to the International Town Planning Conference, New York, in 1925, gave convincing statistics in this regard. He showed that, whereas the total accident death rate in the United States is gradually decreasing, the motor accident death rate has increased almost as much as the total death rate has decreased. The satisfactory reductions in the railroad and tramway fatalities and of accidents due to other causes have been largely offset by the increase in motoring fatalities.

Recent figures show that 44 per cent. of the road traffic fatalities during 1927 in the United States were the responsibility of motorists whilst 43 per cent. were caused by negligent pedestrians.

The Commission has analysed the figures of Victorian motor registrations and the traffic accidents, in order to ascertain the proportion applicable to Melbourne and suburbs. The result is given in the following table, which shows the recorded motor vehicle-involved accidents for every 10,000 of the metropolitan population, and per 10,000 motor vehicles registered.

Year.	Accidents per 10,000 Population.	Accidents per 10,000 Motor Vehicles.
1922	9·9	303
1923	16·1	380
1924	26·5	507
1925	30·6	482
1926	41·7	556
1927	45·8	518
1928	51·2	538

The motor vehicle registrations have increased during this period by 255 per cent., and the population by 22.4 per cent. The above figures show that the recorded accidents in which motor vehicles have been involved have increased nearly five times faster than the population, whilst the proportion of accidents to vehicles registered has not even doubled. The figures in respect of population and motor registrations are accurate, but, as recorded accidents are only a proportion of the total, an analysis of the statistics must make allowances accordingly. An analysis of the above figures may give rise to a variety of views as to causes. It has to be recognized that the human element enters into this matter to such an extent that accidents are bound to occur. **The greatest need is to reduce the risk as much as possible, and, apart from mechanical improvements to vehicles, the education of pedestrians and drivers must be constantly aimed at.**

There are too many accidents due to faulty driving and it is a matter for serious consideration whether stricter control over the issue of licences and greater penalties should not be enforced. The vastly increased number of vehicles using the roads each year should not be accepted as a reason for a proportionate increase in the number of accidents.

The proposals set out in this and previous reports of this Commission, which aim at a segregation of vehicle and pedestrian traffic as far as possible, if carried out, will give easier, quicker and safer movement in the streets and materially assist in reducing the risk of accidents. It will permit of a better classification of roadways, thus facilitating improved methods of traffic control and regulation, and the institution of uniform traffic laws. (See also pages 118 to 126 of this Report.)