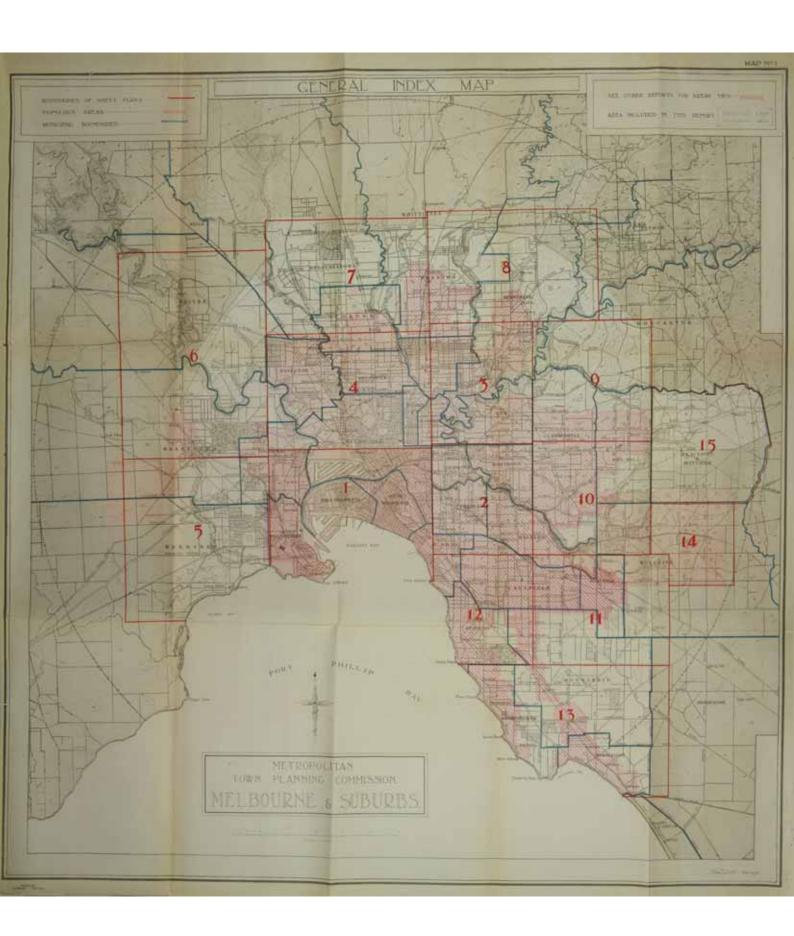
# PART I SURVEYS AND STUDIES



## THE AREA OF PLANNING.

Although the Act under which the Commission was appointed defined the "metropolitan area" as the municipal district set out in the Schedule of contributing and represented Councils, the Commission, from the point of view of its planning studies, has interpreted the meaning of "metropolitan area" in a less arbitrary manner.

Most of the various public authorities operating in the Metropolis of Melbourne have adopted, or had defined for them, different areas or boundaries for their jurisdiction.

The Melbourne and Metropolitan Board of Works area extends to the 13-mile radius from the Elizabeth-street Post Office, Melbourne, and comprises 434 square miles. Large districts within that area are not yet requiring water and sewerage services, however, nor are some of them likely to for many years.

The suburban radius recognized by the Victorian Railways Commissioners is 20 miles from Flinders-street Station.

The Postal Department extends its suburban postal districts scheme over an irregular boundary. The outskirts touch the following approximate mileage radius from the G.P.O.:—

Altona, 9; Sunshine, 8; Maribyrnong, 6; Essendon North, 8; Glenroy, 8; Reservoir, 8; Heidelberg, 9; Balwyn North, 7; Box Hill, 9; Ashburton South, 8; Oakleigh, 10; Bentleigh East, 9; Mentone, 12; Chelsea, 19.

The Melbourne and Metropolitan Tramways Board has no specially defined radius. Its services naturally follow the more extensive development, in the majority of cases.

The Metropolitan Fire Brigades Board's area extends to the 10-mile radius, with the following exceptions:—

South.—To Mordialloc Creek, taking in the whole of the City of Mordialloc, portion of the Shire of Moorabbin, and portion of the City of Sandringham.

East.—Taking in portion of the Shire of Blackburn and Mitcham, the whole of the Borough of Ringwood, and Croydon (which is portion of the Shire of Lilydale).

The Metropolitan District, as defined by the Factories and Shops Acts, incorporates the whole area within the following outer municipal boundaries:—Williamstown, the central and southern ridings of Braybrook, Essendon, the Broadmeadows and Campbellfield ridings of Broadmeadows, Preston, Heidelberg (except the Greensborough Riding), the Doncaster and Templestowe Ridings of the Shire of Doncaster and Templestowe, Blackburn and Mitcham, Ringwood, Camberwell, Oakleigh, Moorabbin, and the Hampton and Sandringham Wards of Sandringham.

The Study Map at page 24, has been compiled by the Commission, to show approximately the extent of present development in this Metropolis. The map indicates the areas which are only 50 per cent. developed, as well as the more extensive settlement up to 85 per cent., and the areas which are still more densely built upon. It is surprising to record that only between 60 and 70 square miles of this extensive and scattered Metropolis is more than 50 per cent. built upon. The opportunity presented to regulate future development along sound lines is, therefore, much more within control than most people realize, when this development is considered in relation to the 434 square miles which comprise the 13-mile radius.

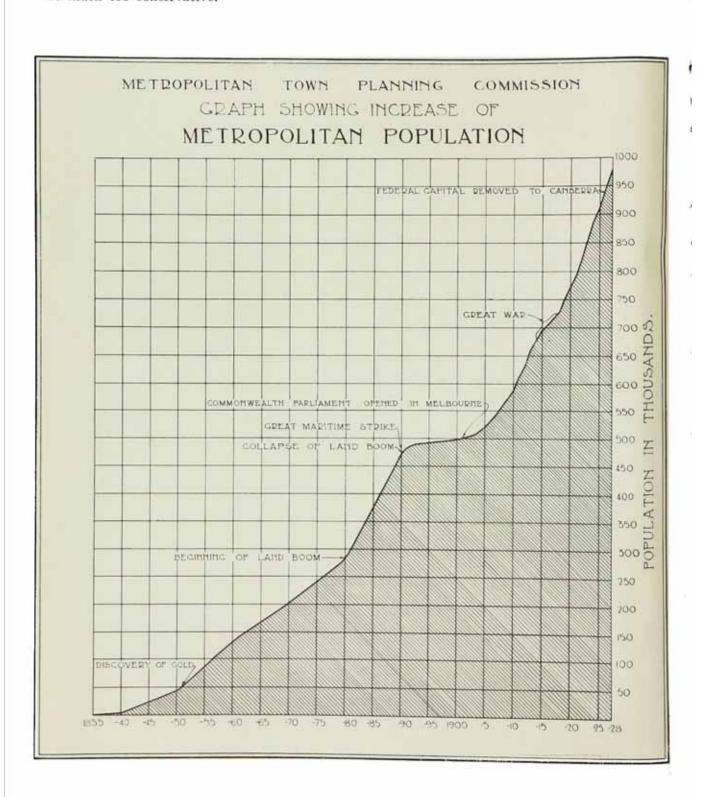
The present population within the 13-mile radius is approximately 1,025,000. If the whole of that area were fully developed on a pro rata basis it would accommodate about 6,000,000 people. This Commission does not consider it necessary, or wise, to attempt at this stage to lay down the plans for such a population. The area adopted for this Report is shown white on Map No. 1, and comprises approximately 257 square miles, which is capable of accommodating about 3,700,000 people on an approved standard of housing. (See Part IV.) While it is unlikely that the metropolitan expansion will be so regular as to approach the definite boundaries set down, it is anticipated that the limits fixed in the different sectors will be proportional to the expansion in those directions.

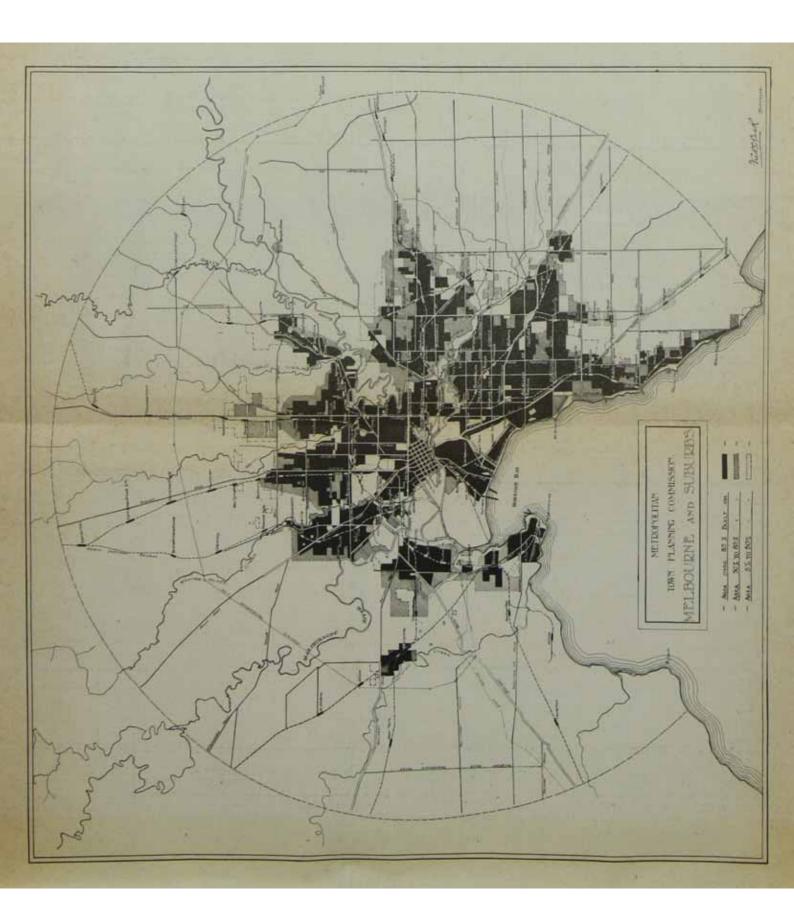
When a central town planning authority has been created it will become its duty, as well as that of the Municipalities beyond the area of planning, to ensure that the main roads, &c., leading to and through these districts are properly continued, and the subsequent development co-ordinated with that set down within the area adopted for the purpose of this Report.

## GROWTH OF THE METROPOLIS.

## Population Studies.

Although not quite so phenomenal as, for instance, that of Chicago, U.S.A., the growth of Melbourne has been remarkably rapid. The graph below shows the actual rate of this progress. Some references to this matter are contained in the Introduction to this Report. The Commission has studied the methods adopted by various authorities in calculating the rates of prospective population. When the Commission issued its First Report early in 1925, the calculations of the Government Statist were quoted and accepted in this regard. They have already proved to be much too conservative.





No doubt, in due time, the rate of increase will diminish, but for some years now there has been an almost constant increase, at an approximate rate of 3.5 per cent. per annum. There are various factors operating which should tend to a maintenance of this expansion for a good many years, viz.:—

- (a) Natural increase.
- (b) Immigration.
- (c) Melbourne as a capital city.
- (d) Central location of Melbourne in relation to the State of Victoria.
- (e) Favorable location of Melbourne as the "clearing house" for the island State of Tasmania.
- (f) Encouragement of secondary industry.
- (g) Extensive improvements in harbour facilities.
- (h) The attractions of a large city.

In view of these considerations the Commission considers it wise, from a town-planning point of view, to base its calculations of future population upon the average of 3.5 per cent. per annum increase. The population of the Metropolis should on this basis reach the following approximate figures in the years indicated:—

1930	* *:	**	**	• • •		1,083,000
1940	2.2					1,528,000
1948	***	**	200	*:e:	**	2,012,000

This would mean the doubling of the present population in 20 years' time.

The population of Melbourne is 56 per cent. of that of the State of Victoria.

## GENERAL SURVEY OF METROPOLIS.

## Topography of Metropolis.

The general configuration of the metropolitan area has been studied with relation to its influence on the character of its past growth with the object of ascertaining, so far as practicable, the suitability of the different classes of country for the various activities which are likely to form part of the future Metropolis of Melbourne.

The plan at this page shows the local topography within the 13-mile radius by 50-feet contour intervals. A considerable portion of this area is not included in this Report.

It will be seen from a study of this map that the Metropolis is subdivided into distinct areas of configuration. Eight well-defined streams, apart from numerous small creeks and watercourses tributary to them, extend in a somewhat radial direction from the low-lying lands fringing Port Phillip Bay.

The whole of the lands included in Port Melbourne and South Melbourne and extending about 1 mile inland from the eastern shore of Port Phillip, and from 2 to 3 miles from the western foreshores, as well as the flat lands along the Maribyrnong and Yarra Valleys, are below the 50-feet contour level.

From these flat lands along the eastern shores of the head of Port Phillip, a stretch of beautiful undulating and hilly country extends as far as the Yarra River, attaining at Surrey Hills an elevation of 400 feet above sea level.

Excepting the area lying between the Yarra River and the Darebin Creek, and embracing the hilly and picturesque Heidelberg districts, the whole of the remaining lands are more regular.

Between the Maribyrnong River and the Darebin Creek a gradual rise is maintained until the highest point within the 13-mile radius is attained by Mt. Gellibrand (663 feet), on the northwest of Broadmeadows village. This area is, however, intercepted by the Merri and Moonee Ponds Creeks and the small areas of broken land in their immediate vicinity.

The land from the western shores of the head of Port Phillip, and extending north-westerly towards the Maribyrnong River, only rises 200 feet in a distance of 9 miles. This is less attractive for residential purposes than those previously described.

## DEVELOPMENT AND TOPOGRAPHY.

A study of the character and growth of Melbourne clearly illustrates the effect of topography on city development. The heavy industries have been attracted to the low-lying areas of Port Melbourne and South Melbourne, and those adjacent to the lower reaches of the Yarra and Maribyrnong Rivers. This is, no doubt, brought about by the comparative ease of haulage and the nearness to water and land transport systems.

The undulating and hilly areas of the southern and eastern suburbs have attracted the best residential development, and the expansion of Melbourne in this direction is most pronounced, as will be readily seen from the plan at page 24. (Density of Development).

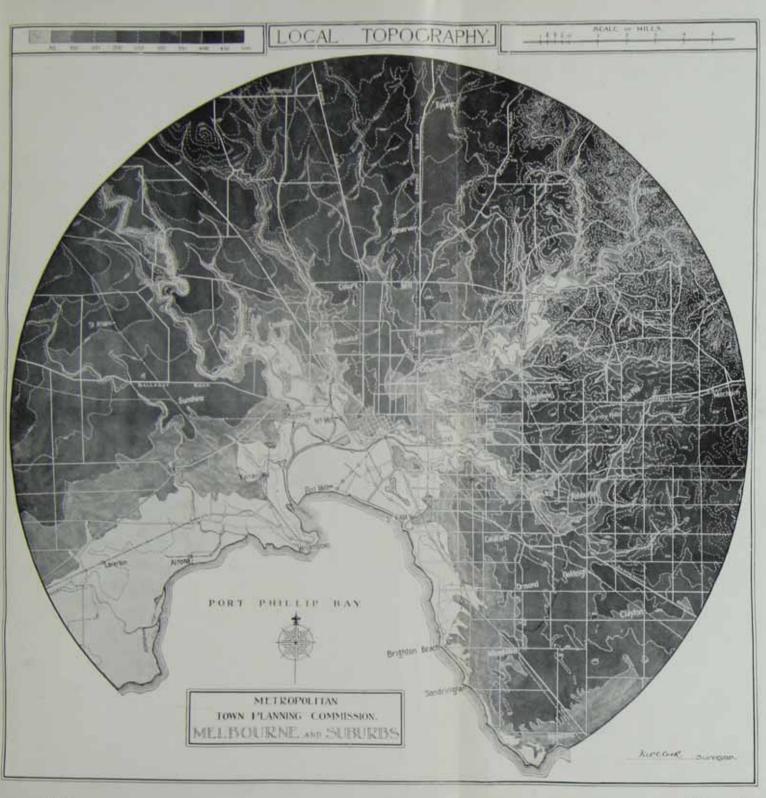
Owing to the existence of large clay deposits, many industries have been established in the northern suburbs. Notwithstanding the presence of these industries, these suburbs have encouraged a large population on account of their accessibility to the established industries and the central business district.

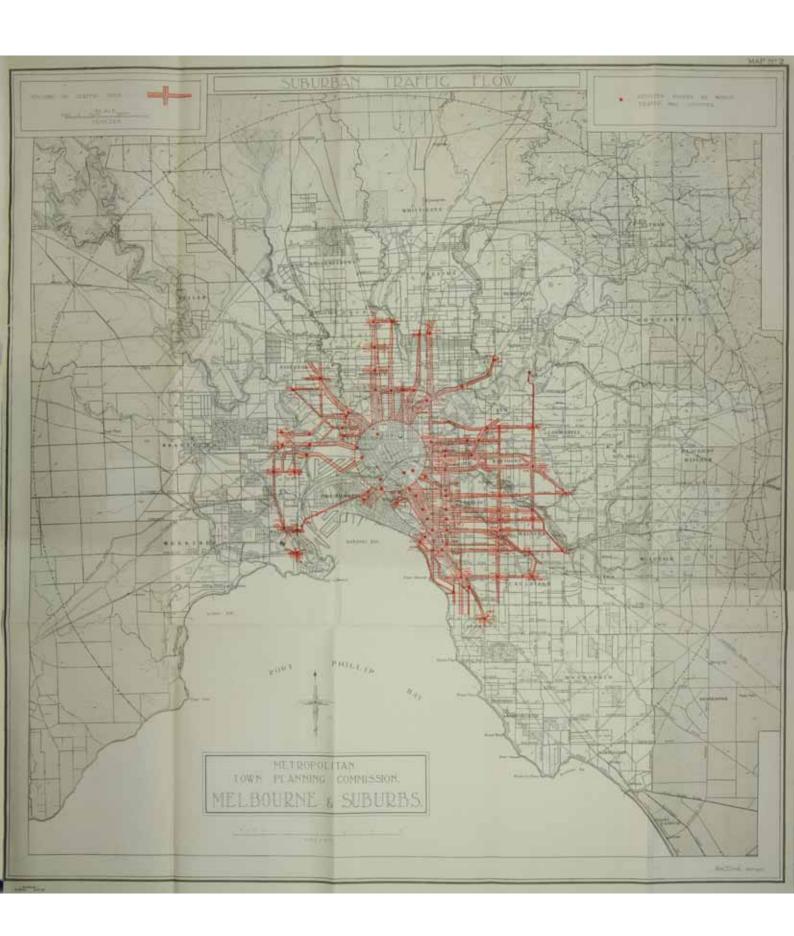
## CLIMATIC CONDITIONS.

The average annual rainfall of Melbourne over a period of 84 years is 26.04 inches, which falls on an average on 138 days in the year.

The temperatures over the same period have averaged as follows:-

The Victorian Year Book 1927-1928 states, on pages 1 and 2, that the maximum shade temperature recorded is 111.2, and the minimum 27. On the average, on only four days during the year does the thermometer rise above 100 degrees in the shade, and generally on about two nights during the year it falls below freezing point.





## THE VEHICULAR TRAFFIC SURVEY.

The traffic system of a large city is of such magnitude and complexity that it is impossible, by observation alone, to gauge accurately its volume and direction of movement at numerous points simultaneously. It is essential to obtain a comprehensive graphic survey of all traffic movements before proposals of a satisfactory nature can be advanced. It is because the Commission has felt this necessity for definite data that it has undertaken traffic surveys at different times. The traffic conditions do not appear to vary materially from day to day. Nevertheless, a change is continually going on, and one has only to look back a few years to realize how rapidly the changes have taken place.

With the aid of a Special Constabulary Force which existed at the time, the Commission took a traffic census in the city in April and May, 1924. Particulars are recorded in the First Report issued in 1925.

During June, 1926, the Commission came to the conclusion that a more detailed and comprehensive traffic survey was necessary before the plans for the guidance of future development could be laid down with accuracy. It was considered essential that the services of the Police Force be secured for the purpose, and the Chief Commissioner of Police (Brigadier-General T. A. Blamey) readily consented.

The information which the Commission set out to obtain was as follows:-

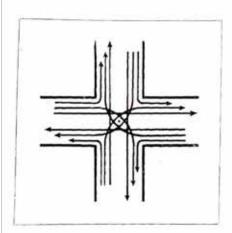
Suburban Traffic.—The volume, classification, direction and time of travel of all wheeled traffic across all the most important intersections and bridges.

City Traffic.—The origin and destination of all kinds of wheeled traffic passing through the city business area, together with details of—

the time it crossed the points of entry and exit and the time it remained in the City. the volume and classification of such traffic;

the direction of its travel to and from and through the city business area.

With the experience of the counts taken  $2\frac{1}{2}$  years earlier, and the desire for a much more extensive check on this later occasion, a search was made of all records available as to the steps taken in any other city in Australia or in other countries to secure somewhat similar information. No trace of a census even approximating that proposed by this Commission could be found, with the consequence that all details and methods had to be devised. The funds at the disposal of the Commission made it imperative to secure the maximum of service and co-operation from other bodies. This necessitated abandoning any attempt to conduct both the suburban and city counts on the same day. It was, therefore, decided to take the census of the suburban points on one Thursday and the city points on the following Thursday. Thursday was chosen because no abnormal conditions were expected. The times of counting chosen were from 6.30 a.m. to 6.30 p.m., with half-hourly records.



Eighty-seven points were selected for counting on the day of the suburban check. Many of these were ordinary street intersections, or bridges, but five of them were specially important junctions at which five or six different main roads converged. In the case of an ordinary intersection of two streets crossing each other, there are twelve different directions of traffic to record, as shown inset:—

As St. Kilda Junction has six important roads converging on one point, there are 30 different directions to record. There were other difficult intersections involved, namely:— Haymarket Junction, Camberwell Junction, Moonee Ponds Junction, and Elsternwick Junction.

The Form used for the counting of 82 of the suburban intersections is reproduced below:

	at No.						TRAFFIC	CENS	US.						
Con	ner of				25th	Nove	mber, 1926.	6.30	a.m. to 6.30	) p.m.			Sh	eet No	i.
	Horse-drawn.					3	loter Po	nor.				Bicycles, Barrows, Total Vehi			
Fime.	Light.	Total.	Heavy,	Total	Light Cars and Taxis.	Total.	Commercial Trucks.	Total.	Buses and Charabanes.	Total.	Motor Cycles.	Total		Total	Total Vehicle
					Direction o	f Truffic		1							
											-				
															li i
					Direction of	t Traffic									
					5									- 1	

In order that the census should be successful it was considered vital to give publicity to it, and also to ensure that those who were to do the actual counting should be carefully instructed. The Police Department supplied 210 constables, and municipalities were also approached for assistance with the result that 88 men were also made available from this source for use in their own localities. These men were assembled at convenient stations, allotted their duties, and supplied with written and detailed instructions. They were then addressed by a representative from the Commission, and by this means it was ensured that every man knew what to do, and where to locate himself before 6.30 a.m. on the selected day. There was little need to concern the general public with this form of counting, because no vehicles were to be stopped. Officials were located on footpaths at street corners to record the passing traffic.

The taking of the census at the five intersections specially referred to was much more difficult. Small cards, of distinctive colours for each street, were handed to drivers approaching the intersection. Drivers carried these cards across the intersection, and handed them to the officials collecting in the exit streets, and thus the direction of travel of each vehicle was automatically registered. The type of vehicle and the time of receipt were recorded by the issuing official and collecting official respectively by striking a line through the corresponding type and time on the card. A reproduction of a completed card appears below :-

	**	
HORSE-DRAWN. Light. Heavy.	7.M. 6.30 7.0 7.30	P.M. 12.30 1.0 1.30
MOTOR POWER.  Light-Cars-and-Taxis.  Commercial Trucks.  Buses and Charabanes.  Motor Cycles.	8.0 8.30 9.30 9.30 10.0 10.30	2.0 2.30 3.0 3.30 4.0 4.30
PUSH BICYCLES AND BARROWS.	11, 0 11, 30 12, 0	5, 0 5, 30 6, 0
I Front 3		6.3

[Back.]

By carefully recording the number of cards of each colour collected in each outward direction, an accurate check was obtained of all the vehicles crossing these important junctions, as well as the times and classification. Policemen were mainly used at these junctions, and the traffic was not held up at all.

Before the appointed day much publicity was given to the census so that drivers would not be surprised, or be given cause to impede the free movement of traffic because of curiosity. Wireless addresses and announcements were given. The various transport organizations were communicated with, and requested to issue instructions to all their drivers.

Tramcar and motor-bus traffic was not recorded by these officials. The figures in this regard for all points were obtained from the Melbourne and Metropolitan Tramways Board from their official time tables.

The date finally selected for this suburban counting was Thursday, 25th November, 1926. The day was an excellent one for the purpose, the weather being fine and warm.

## SHORT ANALYSIS OF THE SUBURBAN CENSUS.

The census supplied all the information the Commission set out to obtain. It was specially gratifying because all the police and municipal officials concerned had had no previous experience. All told, 766 directions of traffic were recorded.

In due time the recording of this census was completed, and it was ascertained that 373,416 vehicles had crossed the intersections, where counts had been taken, during the twelve hours. The percentages of each kind of vehicle comprising this total were:—

Horse-drawn-								
Light ve	ehicles	13.3			$6 \cdot 7$			
Heavy	**	0.63	* * * *		7.8			
						14.5	per	cent.
Motor Tracti	on-							
Motor c	ars and	1 taxis		* *	$37 \cdot 4$			
Commer	cial tru	icks			17.0			
Motor c	ycles,	including	sidecars		7.1	61 .5	per	cent.
Passenger Co	urrying	-						
Tramcar	S	* *			6.9			
Motor b	uses				1.4			
						8.3	per	cent.
Bicycles						15.7	per	cent.
						100.0	per	cent.
							Local	

Whilst this represents the percentages of the total traffic checked, the proportions of vehicles of each class varied considerably at the different points.

Map No. 2, on page 26, shows graphically the results of the suburban census. The width of the lines along the routes indicates the proportions of vehicles which used those thoroughfares during the twelve hours of that particular day.

The census has shown the need for many improvements in the main roads system, and the following comments are submitted pursuant to an analysis of Map No. 2. The remedies which the Commission suggests for overcoming the disabilities revealed are dealt with in Part II. of the Report.

One of the most striking features of the traffic flow is the lack of continuity of direct movement between the northern and southern suburbs on the east side of the City. There are large registrations of traffic in various north-south streets in the localities referred to, but they do not link up, mainly because there is not a suitable thoroughfare with a bridge across the Yarra

in the vicinity of Punt-road. The inefficacy of the Anderson-street Bridge when compared with the Church-street-Chapel-street Bridge is clearly apparent. In its First Report (page 27), the Commission submitted a scheme for a direct north-south route on the east of the City proper, and the census has proved that the adoption of that scheme would provide a most valuable traffic artery.

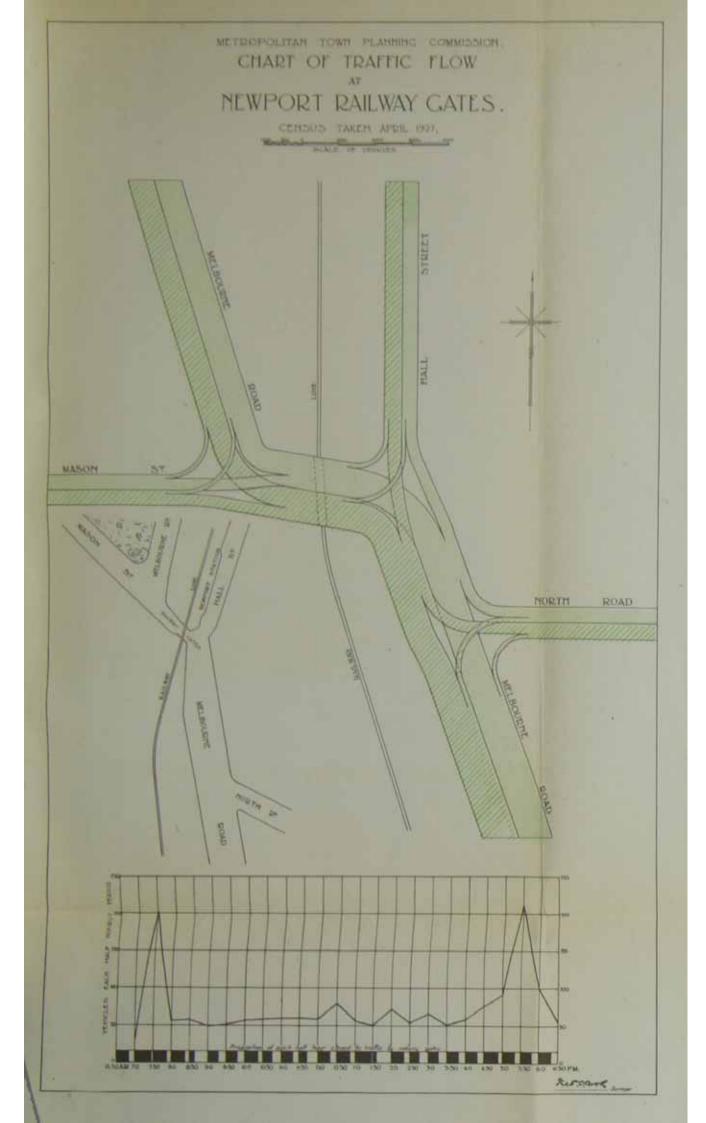
It will be observed from the map that the total quantity of traffic on St. Kilda-road practically corresponds with a combination of the traffic volumes on the several thoroughfares which join that boulevard on its eastern side. The greater part of this traffic is compelled to travel westerly, and then northerly along St. Kilda-road, to reach the city. There is no question that, as the areas on either side of Point Nepean-road become more densely populated, St. Kildaroad will, in the future, be called upon to carry a much greater volume of traffic. St. Kilda-road is the natural artery for the Point Nepean-road traffic. It is, therefore, essential that the equally intensive development which is to be expected in the south-eastern suburbs shall have some other and more direct route, or routes, for delivering its quota of traffic into the city. The map clearly indicates the advisability of intercepting the traffic from the south-eastern suburbs and diverting it in such a way as to prevent the overloading of St. Kilda-road, Prince's Bridge, and Swanstonstreet. St. Kilda-road is not intercepted by any important streets between Domain-road and the City; consequently a uniform volume of traffic uses that part of the boulevard. Almost the whole of this traffic is discharged into Swanston-street, and then turns into cross streets. This turning traffic disorganizes the regular flow in Swanston-street, and every effort should be made to discourage such movements in congested areas. There is no doubt that traffic for the western half of the city should be given more direct access from St. Kilda-road. The Spencer-street Bridge now being constructed will assist materially when effective southern approaches to it are provided. Other bridges, especially one opposite William-street, are needed. Schemes to overcome these disabilities were recommended in the First Report of the Commission, and are shown on Plan-Sheet No. 1 of this Report. The traffic census substantiates the views and recommendations then outlined.

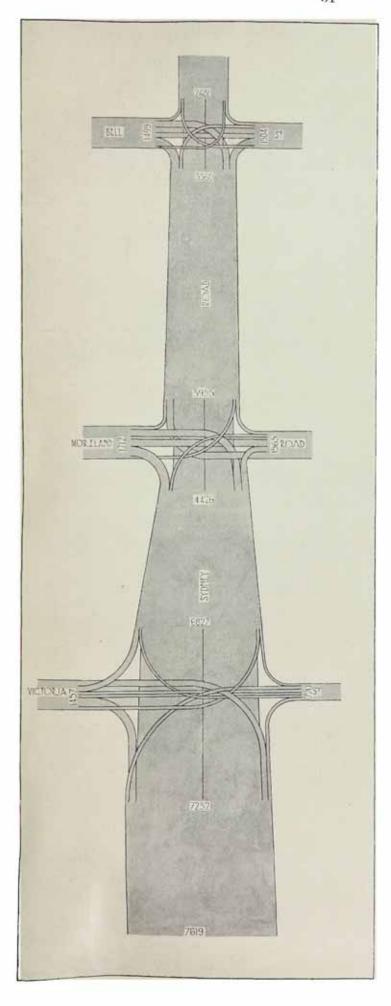
It is significant that the flow of traffic which converges at North Fitzroy, via Queen's-parade, St. George's-road and Nicholson-street north, and enters the business section from the north-east, is almost identical in volume with that which enters via St. Kilda-road. Yet there is no sign of congestion in any street nearer the City, or in the streets of the City itself, due to this traffic. This is because the northern and north-eastern outlets are numerous, thus allowing the traffic to distribute itself. No better case for the provision of more bridges and approaches to them from the south side of the City could possibly be made out.

The census reveals the seriousness of the problem of providing for the free movement of the increasing traffic from the eastern suburbs. The rapid increases of traffic during the years between the 1924 and 1926 censuses in respect of the Yarra bridges leading to the east are shown in detail on the diagram on page 34, and are referred to on page 33. The population in the eastern suburbs is constantly growing. This, with the increases of the travel habit and the ownership of motor vehicles, calls for immediate action with respect to the narrow and inadequate number of roads nearer the City. In its First Report the Commission submitted detailed schemes for the widening of the narrowest portions of Victoria-street and Bridge-road, and the subsequent census has shown that these works are urgently necessary to give relief to these already overtaxed thoroughfares.

Although in comparison with routes from other suburbs, those leading to the western suburbs do not carry such large numbers of vehicles, the industrial establishments in the west encourage heavy and slow-moving traffic which requires relatively greater road space. Fortunately an excellently located new road is in course of construction to replace the existing road via Dudley-street to the Napier-street Bridge. The extensive industrial development which is now taking place to the west of the Yarra in this neighbourhood will soon demand much better communication, and the recommendations contained in the First Report of this Commission will, when acted on, overcome the disabilities. The value of Dynon-road, portion of which the Railways Department desires to close, is illustrated by the traffic census figures, and the desirability of its retention is clearly indicated.

A matter of serious consequence revealed by the census is the interference to vehicular traffic caused by the level crossing at the Newport Railway Station. A careful check was taken of the time that the gates were closed to traffic during the 12 hours. It showed that the total closed period was 7 hours 21½ minutes, and that the longest period of any single closure was sixteen minutes. The effect of this level crossing on vehicular traffic is seen from the graph opposite.





Sydney-road. Brunswick, proved to be the most congested 66 feet road in the Metropolis. The number of vehicles using it over the twelve hours was 7.619 at Park-street, and 2,481 north of Bell-street. As there is very little suburban development beyond Gaffney-street, it is reasonable to suppose that a considerable proportion of the 2.481 vehicles comes from the country areas. This traffic could by-pass Sydney-road with advantage. Bell-street, west of Sydney-road, contributed 1,499 vehicles to the traffic of Sydneyroad. Moreland-road west supplied an additional 1,712, and Victoriastreet still further increased the main flow by 1,457 vehicles. these roads leading to Sydney-road from the west cross a suburban railway line on the level. quite evident that a by-pass road on the west of the railway would not only intercept this traffic which now, of necessity, enters Sydneyroad, but it would, by connecting with Sydney-road beyond Gaffneystreet, provide an entirely new route for the through traffic. The traffic entering Sydney-road on its eastern side is lesser in volume than that on the western, and this is because there are other suitable roads east of Sydney-road which assist in handling the traffic on that side. The diagram published on this page shows the proportion of through traffic on Sydney-road, which the census has proved could be diverted into a by-pass road with distinct advantage.

GRAPH OF TRAFFIC IN SYDNEY-ROAD BETWEEN BELL-STREET AND PARK-STREET.

Note the large volumes of traffic north of Bell-street and entering Sydney-road from the west which would be intercepted by Arterial Route No. 8.

### IMPORTANT ROAD JUNCTIONS.

Opposite, are published charts showing the distribution and direction of travel of traffic across the five important intersections which were specially recorded on the card system referred to in earlier pages. The charts show the proportion of traffic in each converging street. Comments in regard to each junction are given below:—

## HAYMARKET JUNCTION.

Haymarket Junction consists of extremely important connecting streets at the northern gateway of the City proper. With the exception of St. Kilda-road, opposite the Police Barracks, this intersection was the busiest tallied on the 25th November, 1926. 13,496 vehicles crossed the junction in the following proportions:—

Horse-draw			* * *			16.3	per cent.
Light cars,	taxis,	, and me	otor cycle	**		43.8	***
Commercia	l truck	83			10.4	19.1	23
Bicycles		12.0	500	***	36.04	$12 \cdot 2$	33
Tramcars		1919	***	***		8.6	122

The "peak" half-hour was between 5.0 and 5.30 p.m., when 1,128 vehicles passed across, or more than 37 a minute.

### ELSTERNWICK JUNCTION.

Somewhat the same features exist at this junction as those referred to at St. Kilda Junction in respect of the importance and widths of the converging streets. The "peak" half-hour was between 6.0 and 6.30 p.m. 6,355 vehicles crossed the intersection during the twelve hours in the following proportions:—

Horse-drawn		4740	* *	 11.8	per cent.
Light cars, taxis,	and me	otor cycle	8	 50.9	,,,
Commercial truck	s		4.4	 $17 \cdot 1$	
Bicycles				 $13 \cdot 3$	**
Tramcars and bu	ses		***	 6.9	**

## Camberwell Junction.

The volume of traffic crossing Camberwell Junction almost corresponded with that of Elsternwick Junction, in that 6,232 vehicles traversed it. The proportions of the different kinds of vehicles was also much the same, there being a slightly higher percentage of tramcars and bicycles. 5.0 to 5.30 p.m. was the half-hour of heaviest traffic.

## St. KILDA JUNCTION.

Not only is this junction the intersecting point of several most important thoroughfares, but the converging roads are of three different widths, and of diverse construction and treatment. This renders the regulation of the traffic at St. Kilda Junction a particularly complex matter. A comparison given hereunder of the traffic crossing this junction on 13th May, 1924, and on 25th November, 1926, is interesting, especially as the volume of traffic during twelve hours was almost identical.

				19	24.	1926.		
Horse-drawn				11.7	er cent.	7·2 p	er cent.	
Light cars, tax	cis and 1	notor cyc	·les	66 · 1		60 • 4		
Commercial to		***	7.4	$10 \cdot 1$	33 27 71	15.8		
Bicycles	200	* *	30.4	9 • 0	77	7.4		
Tramcars	200	(a) (a)				8.4	1	
Motor buses	* *		4.9	3.1	27	.8	31 23 33 24 24	
To	tal vehi	cles	* 4	10,287		10,266		

N.B.—Owing to a strike, the Tramway services on the occasion of the 1924 census, were not operating and motor buses (privately substituted) were partly utilized as the public service.

