depths up to 36 ft. are guaranteed. A further eight berths, with 32 ft. depth, are provided at Williamstown.

During 1952 the volume of shipping entering the Port of Melbourne was the largest in any Australian port, and exceeded 15 million gross tons, to which overseas vessels contributed 11½ million gross tons. Total imports during 1952 aggregated 6,353,825 tons and exports 1,899,088 tons.

The principal overseas imports are oils and derivatives, vehicles, coal, iron and steel, timber, machinery, phosphatic rock, paper and cement. Chief interstate imports are coal, iron and steel, sugar, timber, gypsum, pyrites, wire, paper and barley. Exports to overseas countries are headed by flour, wool, oats, frozen meat, tinned meat, preserved and pulped fruit, milk and cream, fresh fruit, dried fruit and groceries. Interstate exports comprise principally machinery, metal manufactures, motor cars, lorries and chassis, motor bodies, parts and accessories, paper, and milk and cream.

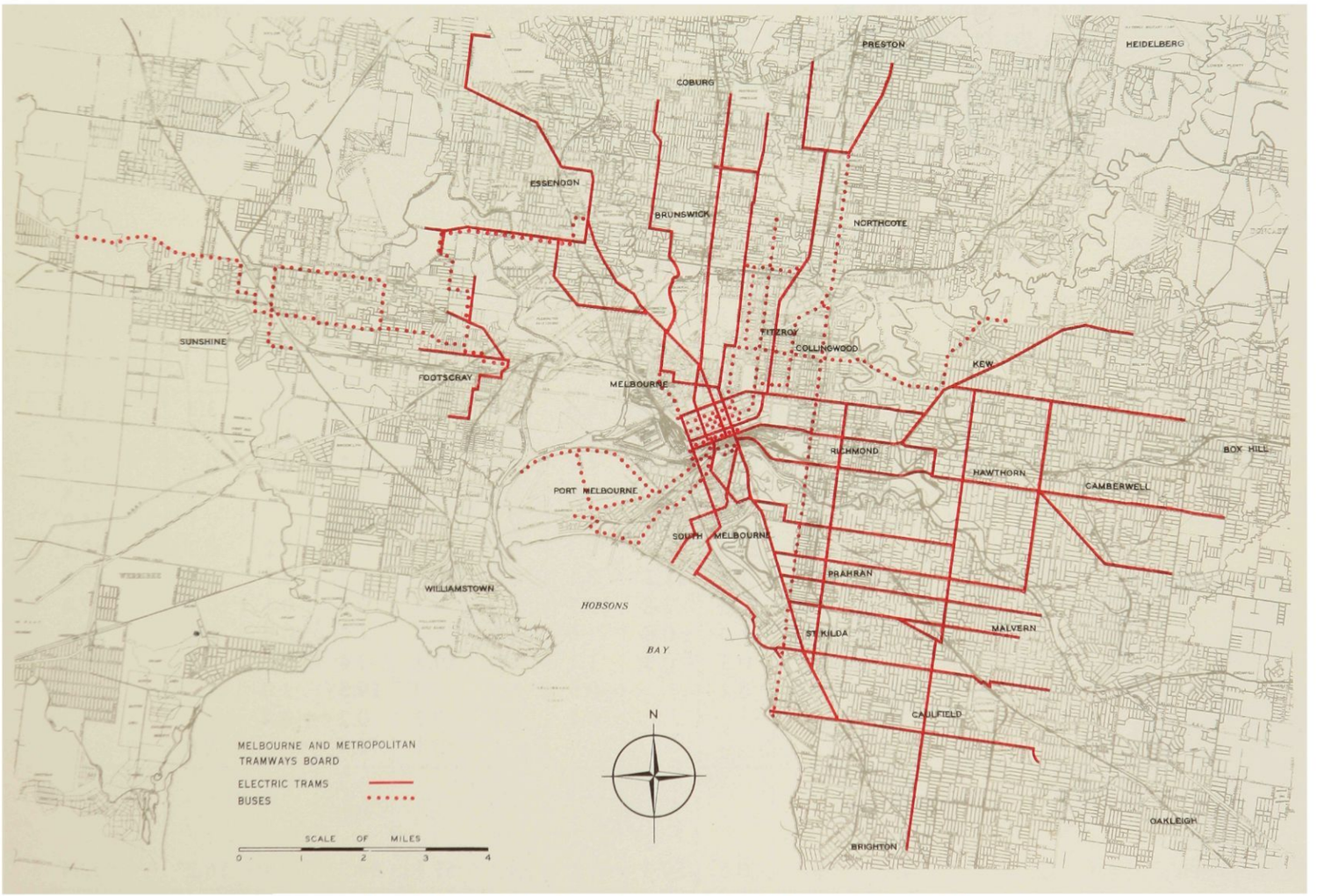
Outstanding features of the development work now in progress are the River Entrance Docks, which will ultimately provide 28 berths for the largest overseas vessels, and the construction of Appleton Dock, west of Victoria dock, where eighteen berths are to be provided, and where an initial five berths are nearing completion.

Air Transport Services

The chief commercial airport is at Essendon which, on the basis of arrivals and departures, is the busiest in the British Commonwealth. Future expansion of Essendon is, however, limited by physical features and it is probable that another major commercial airfield will be required in the future. This move appears desirable also as houses have already been built right up to the edges of the aerodrome. An airfield at Moorabbin is used for training purposes and is the headquarters of flying clubs. Service airfields are located at Point Cook and Laverton.

Long-Distance Road Services

Privately-operated road services for conveying both passengers and goods to country and interstate destinations are growing in number and importance, and must be looked upon as part of the public transport system. Both for passengers and goods the vehicles used are large freight vehicles carrying loads up to 15 tons. Because of the size of the vehicles and the traffic associated with loading and unloading, terminals for their use are necessary to minimise interference with other traffic. Proper terminals are completely lacking in Melbourne.



66 TRAMWAY AND BUS SYSTEM 1951

MOVEMENT OF WORKERS

The demands for land transport in a city are primarily determined by the needs of workers travelling between their homes and their places of employment. Not only do they constitute the largest number of travellers, but the times at which they travel are confined to short periods in the morning and evening, resulting in the peak conditions which tax public transport systems. If workers can be satisfactorily provided for, then other classes of travellers can usually be accommodated without difficulty. A knowledge of the movements of workers throughout the metropolitan area is therefore important when considering public transport problems.

Origin and destination of workers' journeys

Data relating to the movement of workers obtained from the Gallup statistical survey are shown in Table 91 and diagrammatically in diagram 67 for the statistical subdivisions shown in map 59.

The table shows the number of resident workers, the number of jobs in each statistical subdivision, and the number who travel between each subdivision. A study of these movements shows that workers may be divided into four classes:

(a) Those who work in the central city area.
(b) Those who work in the balance of the central district.
(c) Those who work in their own residential region. (Shown in the table in heavier type.)
(d) Those who work elsewhere within the planning area. A small proportion work outside the planning area.

It was found that workers in class (a) are drawn in fairly uniform proportion from all residential regions irrespective of distance, and the same is largely true of those in class (b). On the other hand, workers in class (d) show evidence of a "distance" effect, the numbers travelling to work in any subdivision varying approximately inversely as the square of the distance from the subdivision in which they live. Factors besides distance, such as convenience of transportation on the respective routes, characteristics of resident population and predominant types of industry in work areas, tend to obscure the relationship for journeys between individual subdivisions, but when journeys of the same distance are combined the relationship can be clearly seen. It is of interest to note that the "inverse square" distance law, which applies to those working in the suburbs but not in the central area, has also been demonstrated by the industrial survey of Baltimore, United States of America.(1) A similar tendency is visible in the graphs included in the report of investigations in the Sydney area by the New South Wales Department of Main Roads.(2)

Generally the percentage of jobs filled by local residents was found to be related to the ratio of available jobs to resident workers in the relevant subdivisions, although the relationship is subject to substantial variations due to local transport and other characteristics.

(1) Reference J. Douglass Carroll, Jr., "The Relation of Homes to Work Places and the Spatial Pattern of Cities." Social Forces, 1952, Vol. 30, No. 3, pages 270-282.
(2) Main Road Development Plan for Sydney Metropolis and County of Cumberland, Part 1.

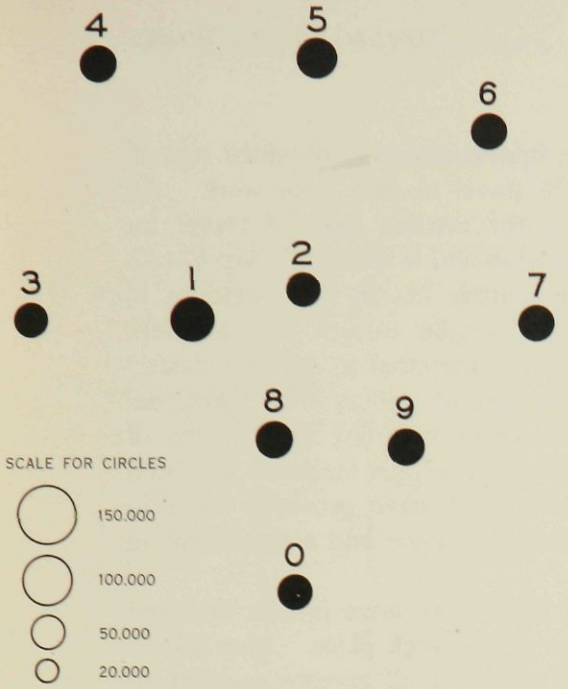
Table 91

MOVEMENT OF WORKERS (1951)

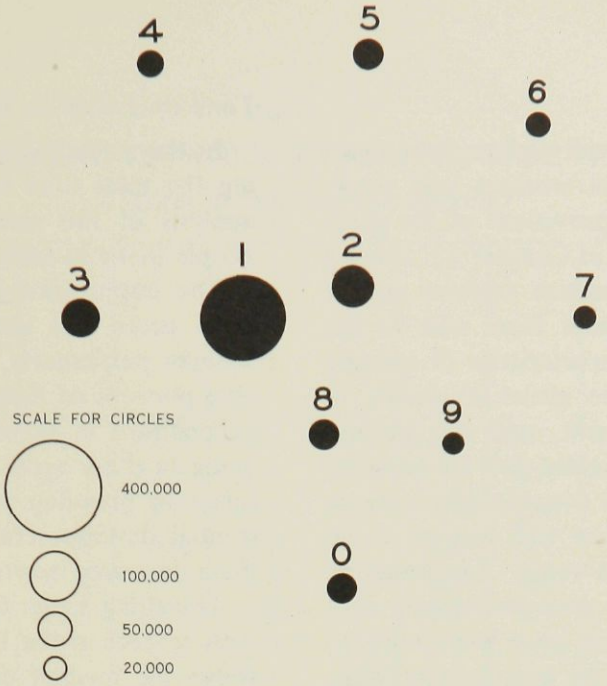
Number of workers in thousands travelling between each subdivision

Subdivision of Residence / *Sub-division of Work Place*	*1(a)*	*1(b)*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*0*	X_c	X_s	*Total Jobs (thousands)*
1 (a)	**4.1**	17.7	9.7	4.0	16.3	16.7	17.1	16.6	20.4	21.2	14.5	2.0	3.3	163.6
1 (b)	1.0	**36.1**	8.5	6.2	11.2	11.8	9.2	7.4	10.2	9.7	9.7	1.3	2.3	124.6
2	1.0	4.5	**21.8**	0.7	1.7	10.1	6.8	4.4	3.7	4.2	3.2	0.6	0.5	63.2
3		5.0	0.9	**32.4**	4.0	2.9	0.5	0.8	1.9	0.9	1.1		0.4	50.8
4		2.9	0.5	0.9	**16.3**	2.4	0.5	0.4	0.2	0.4	0.3		0.1	24.9
5		2.0	2.5	0.4	5.3	**23.2**	2.1	0.3	0.8	0.5	0.6	0.2	0.2	38.1
6		0.8	1.3	0.3	0.4	1.7	**11.2**	3.1	0.7	0.7	0.3	0.1	0.2	20.8
7		0.4	0.2		0.2	0.3	1.8	**12.7**	1.0	0.4	0.2	0.1	0.1	17.4
8		2.1	1.3	0.1	1.1	1.0	0.8	1.6	**16.8**	5.4	2.2	0.2	0.5	33.1
9		0.5	0.3		0.1	0.3	0.3	1.1	1.0	**10.3**	2.4	0.2	0.4	16.9
0		0.3	0.1	0.1	0.2	0.1		0.5	1.5	3.0	**19.5**	1.0	1.2	27.5
X_c			0.1	0.1				0.1	0.1	0.3	0.2	**3.4**		4.3
X_s										0.1	0.1		**7.0**	7.2
Total Resident Workers (thousands)	6.1	72.3	47.2	45.2	56.8	70.5	50.3	49.0	58.3	57.1	54.3	9.1	16.2	592.4

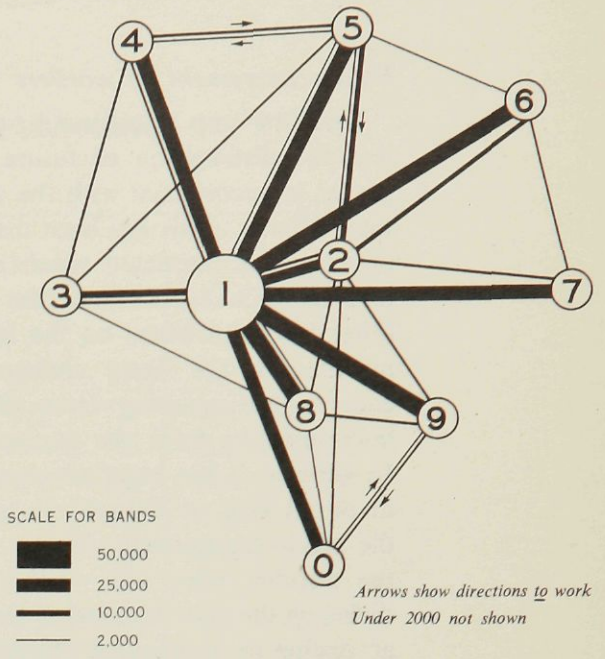
PRESENT (1951)



WORKERS RESIDING IN REGIONS



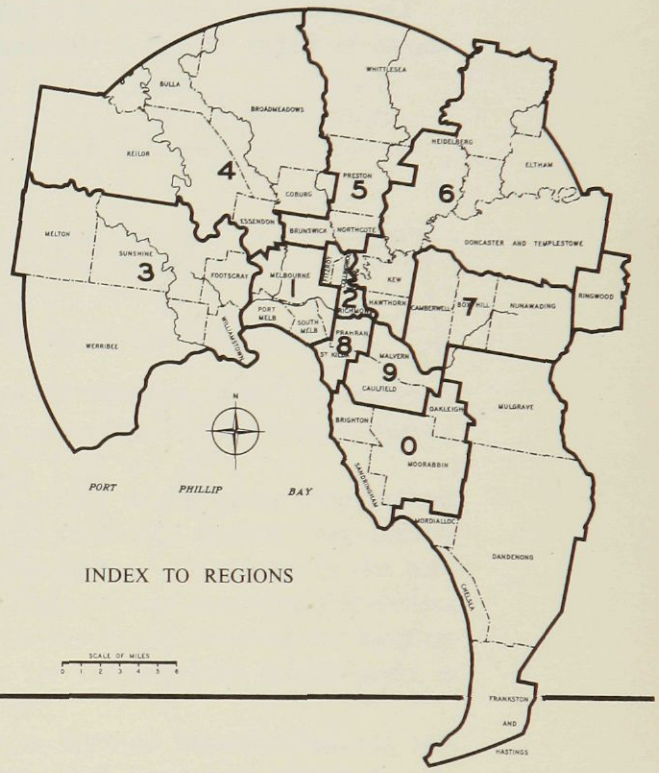
WORKERS WORKING IN REGIONS



WORKERS TRAVELLING BETWEEN REGIONS

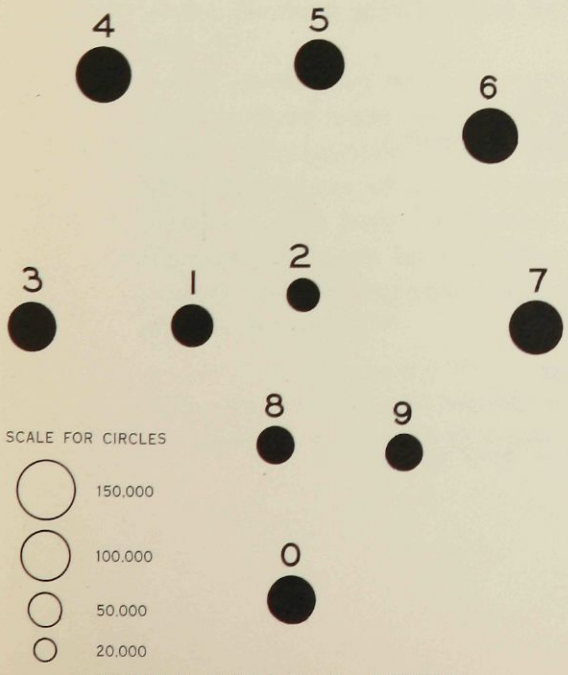
67 MOVEMENT OF WORKERS

Present and Future

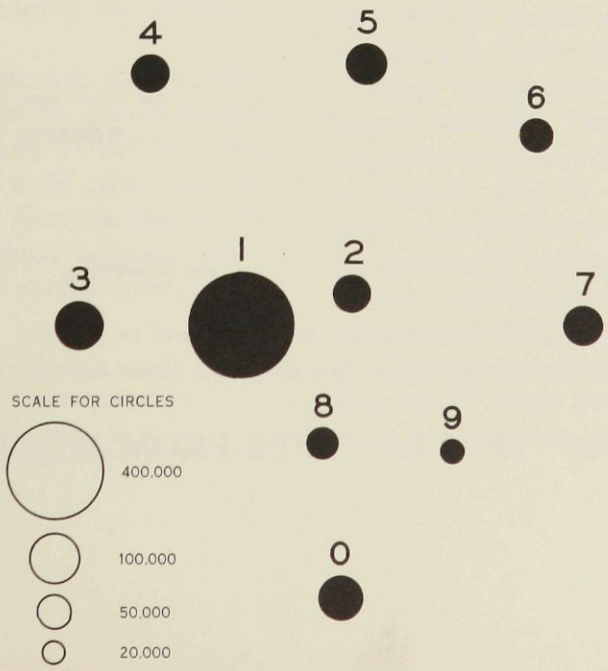


INDEX TO REGIONS

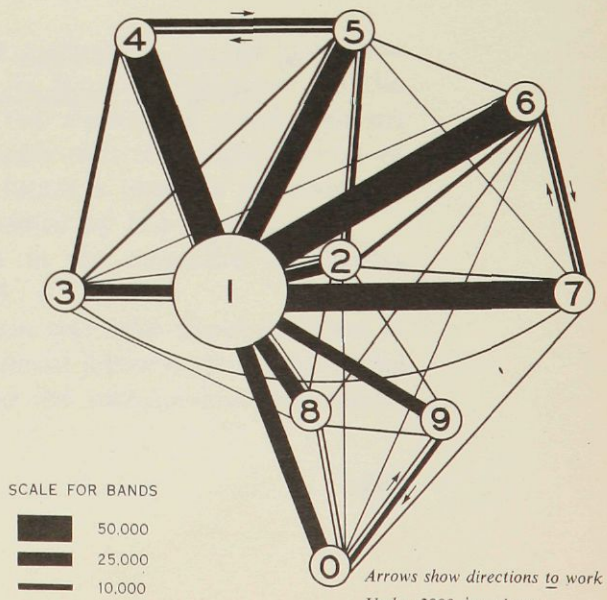
FUTURE (POPULATION 2,500,000)



WORKERS RESIDING IN REGIONS



WORKERS WORKING IN REGIONS



WORKERS TRAVELLING BETWEEN REGIONS