

URBAN TRANSPORT STUDY
IN
GREATER METROPOLITAN AREAS
OF
GEORGETOWN, BUTTERWORTH AND BUKIT MERTAJAM
MALAYSIA

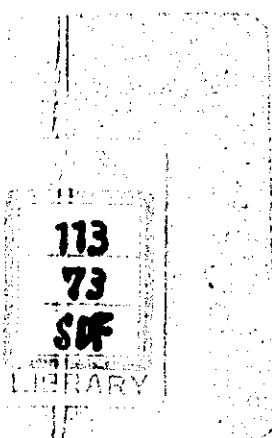
BUS PASSENGERS SURVEY

TECHNICAL REPORT — 05



AUGUST, 1979

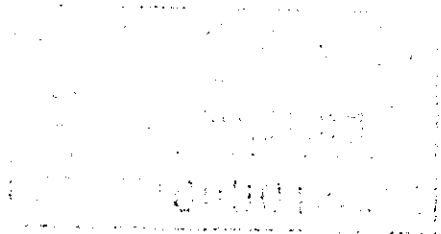
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This report is a supplement to the main report of our study and it is written to meet the pressing demand for a technical report presently. Although this report fails to meet the requirement of a complete technical report, it may be rewritten in a more refined form for future use. This report section by section would be especially useful as a referenece for various purposes, for example, manual of survey, data edition, explanation of methodology, detailed analysis, etc.

BUS - PASSENGER SURVEY

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BUS - PASSENGER SURVEY

INTRODUCTION

This report describes the result of the Bus Passenger Survey which is one of the foundation for the public transport Study.

In order to understand the nature of the frequency of bus trips of passengers, the bus passengers were interviewed on the question of ownership of cars and other modes of which they use as means of arriving at bus stations. This interview was conducted even though there was a lack of time.

1

THE SURVEY METHOD

1-1

The Questionnaire

The survey instrument used was the questionnaire. Bus passengers were interviewed at chosen bus-stations using this questionnaire.

The questionnaire for the bus passengers interview was prepared.

A copy of the Bus Passenger Interview Schedule is given in this report.

1-2

Location

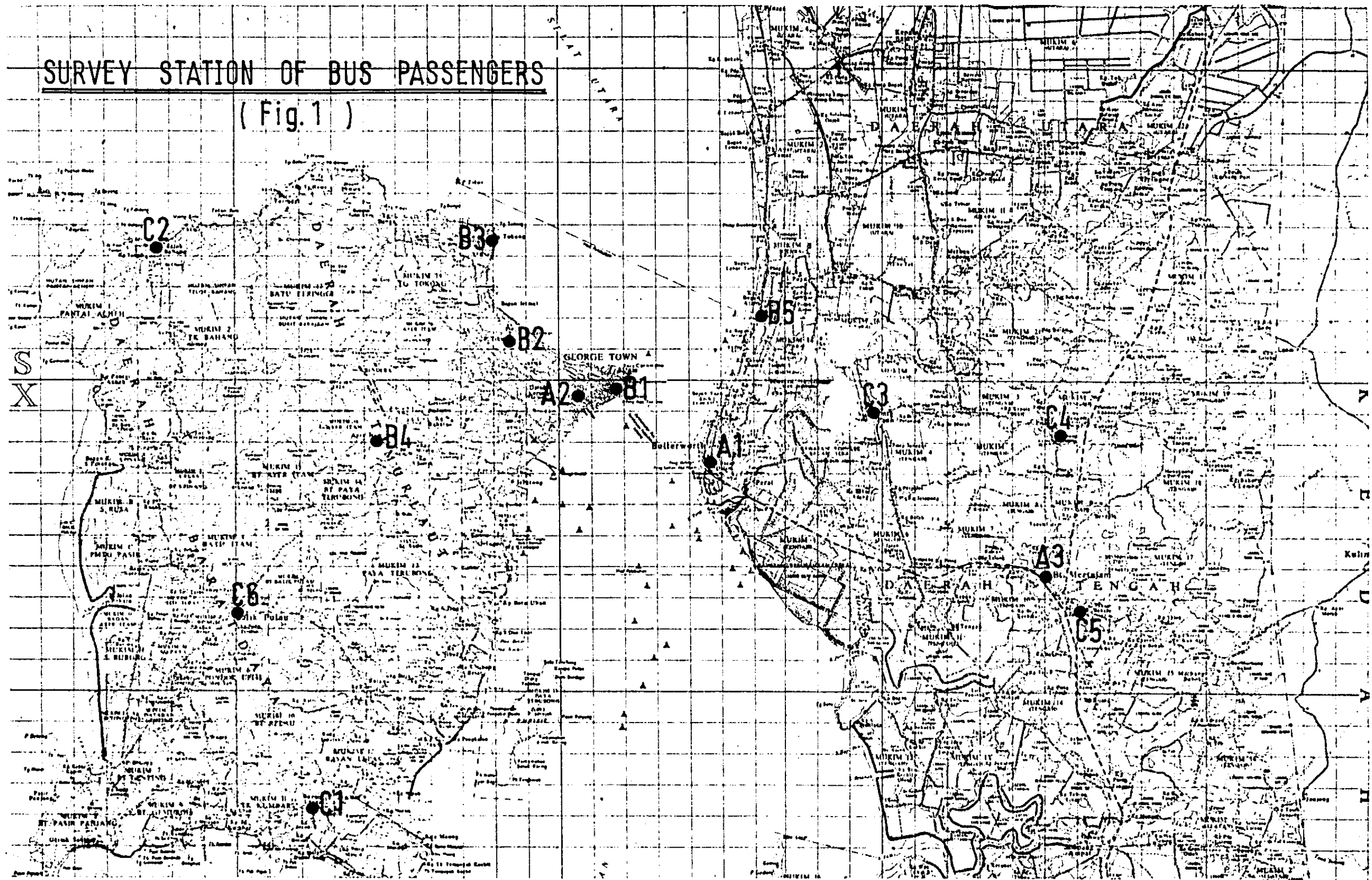
Fourteen Bus Stations in Penang Island and Province Wellesley were chosen for the purpose of this survey. (Figure 1) They are classified into 3 categories:-

- A) Major bus terminal (Major bus station)
 - A1 - Ferry terminal at Butterworth
 - A2 - Bus terminal at Maxwell Road
 - A3 - Bus terminal at Bukit Mertajam.

- B) Bus stations located within urbanized areas. (Medium Bus Stations)
 - B1 - City Council bus terminal
 - B2 - Bus stand near the Roman Catholic Church at Burmah Road.
 - B3 - Bus stop at Tanjung Tokong.
 - B4 - Bus stop at Ayer Itam
 - B5 - Bus stop at Bagan Ajam.

- C) Bus stations located within the rural areas (Minor Bus Stations)
 - C1 - Bus stand at Bayan Lepas
 - C2 - Bus stand at Teluk Bahang Village.
 - C3 - Bus stand at Permatang Pauh
 - C4 - Bus stand at Kubang Semang
 - C5 - Bus stand near the development area in Bukit Mertajam (Kampung Baru)
 - C6 - Bus stand at Balik Pulau.

SURVEY STATION OF BUS PASSENGERS
(Fig.1)



1 - 3 Time of Interview

The interview were conducted during three peak hours.

They were:-

- A) The morning peak hours : 7.00 a.m. - 8.30 a.m.
- B) The noon peak hours : 12.00 p.m. - 1.00 a.m.
- C) The afternoon peak hours : 3.00 p.m. - 4.00 p.m.

1 - 4 The survey Procedure

The survey was conducted by ten interviewers and the assigning of the interviewers to the various stations was dependent on the accessibility of that particular station in terms of transport etc. to the interviewers.

1 - 5 The Interview Procedure

The interviewers were given the questionnaire schedules and they first recorded the characteristics of the bus station e.g. location of the bus station the name of the bus company etc. into the questionnaire before they started on the interviewing.

The selections of bus passengers for the interviews was done on a random basis. Only those who were about to board and those were alighting from the buses were asked for an interview.

2 THE RESULTS OF THE SURVEY

2 - 1 The Sample Size

About 600 subjects were interviewed from the Survey Stations. A breakdown of the samples at each stations is shown in Table 1.

2 - 2 Trip Purpose

With reference to Table 3 and Figure 2 the most frequent answer given to the question of purpose of trip was "Going home" followed by "Going to Work".

At major bus terminals, one of the main functions of which is to distribute commuter to their destinations, 32.3% of those interviewed had their trip purpose as "going to work". On the other hand, at bus stations located within urban areas, the trip purpose of most of the passengers was "going home". It can be infered, therefore, that in urban areas, bus passengers have more trip purposes, viz, they make use of the bus service for more purposive reasons than those at bus terminals.

TABLE 1 A BREAKDOWN OF THE SAMPLE

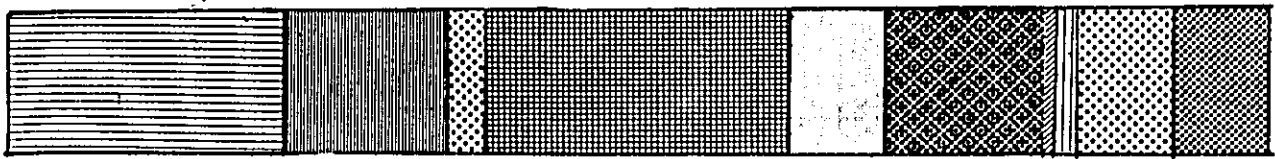
	<u>SURVEY POINTS</u>	<u>SAMPLES</u> <u>SIZE</u>	<u>TIME</u>		<u>SEX</u>	
			<u>MORNING</u>	<u>AFTERNOON</u>	<u>MALE</u>	<u>FEMALE</u>
MAJOR	Ferry terminal at Butterworth	99	46	53	57	42
	Bus terminal at Maxwell Road	74	28	46	52	22
	Bus terminal at Bukit Mertajam	50	30	20	35	15
	Subtotal	223	104	119	114	79
MEDIUM	City Council bus terminal	50	25	25	20	30
	Bus stand near Roman Catholic Church at Burmah Road	75	30	45	41	34
	Bus stand at Tanjung Tokong	27	12	15	12	15
	Bus stop at Ayer Itam	30	14	16	16	14
	Bus stop at Bajam Ajam	30	15	15	20	10
	Subtotal	212	96	116	109	103
MINOR	Bus stop at Bayan Lepas Town	28	9	19	14	14
	Bus stop at Teluk Bahang Village	30	20	10	17	13
	Bus stop at Permatang Pauh	20	11	9	12	8
	Bus stand Kubang Semang	20	10	10	11	9
	Bus stop at New Development Area in Bukit Mertajam (Kampung Bharu)	30	19	11	17	13
	Bus stand at Balik Pulau	31	14	17	19	12
	Subtotal	159	83	76	90	69
	TOTAL	594	283	311	343	251
	RATIO %	100	47.6	52.5	57.7	42.3

TABLE 2 PURPOSE OF TRIPS

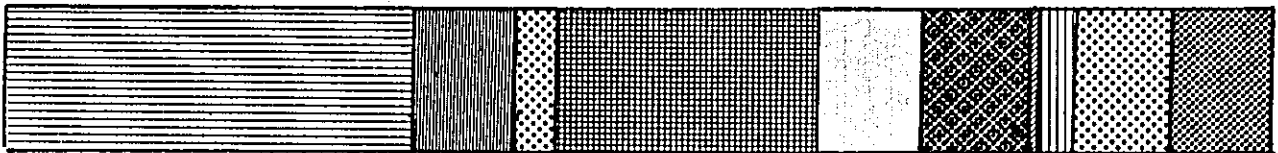
STATIONS	PURPOSE OF TRIPS											Cars	Motorcycle	None
	Going To Work	Going To School	Business Entertainment	Going Home	Entertainment	Social Visit	To Religious Centre	Hospital/Clinic	Shipping/Marketing	Others				
MAJOR BUS STATION														
Ferry Terminal At Butterworth	43	5	2	20	7	6	0	2	4	10		4	3	87
Bus Terminal At Maxwell Road	18	4	5	17	7	11	1	3	7	1		3	8	63
Bus Terminal At Bkt. Mertajam	11	9	0	9	3	3	0	1	8	6		1	0	49
Sub Total	72	18	7	46	17	20	1	6	19	17		8	16	199
RATIO %	32.3	8.0	3.1	20.6	7.6	9.0	0.4	2.7	8.5	7.6		3.6	7.2	89.2
MEDIUM BUS STATION														
City Council Bus Terminal	6	10	1	13	5	3	0	1	6	0		1	6	43
Bus Stand Near R.C. Church At Burma Road	21	6	3	16	4	12	2	0	9	2		9	7	59
Bus Stop At Tg. Tokong	8	2	0	8	4	3	0	0	2	0		2	2	23
Bus Stop At Ayer Itam	3	7	2	4	3	2	0	2	3	4		1	2	27
Bus Stop At Bagan Ajam	1	5	1	13	1	3	0	1	2	3		0	0	30
Sub Total	39	30	7	54	17	28	2	4	22	9		13	17	182
RATIO %	18.4	14.1	3.3	25.5	8.0	13.2	0.9	1.9	10.4	4.2		6.1	8.1	85.5
MINOR BUS STN. (RURAL AREA)														
Bus Stop At Bayan Lepas Town	2	3	2	5	3	7	1	0	1	4		1	2	25
Bus Stop At Teluk Bahang Village	7	2	0	7	3	6	1	0	2	2		1	3	26
Bus St. At Permatang Pauh	3	0	0	11	4	0	0	0	2	0		0	0	20
Bus Stop At Kubang Semang	0	10	0	6	0	1	0	0	0	3		0	0	20
Bus Stand At New Devt. Area Bkt. Mertajam (Kg. Baru)	6	12	1	5	0	3	0	0	0	3		4	4	22
Bus Station At Balik Pulau	4	3	0	10	2	7	0	0	0	2		1	6	24
Sub Total	22	30	3	44	12	24	2	0	8	14		7	15	137
RATIO %	13.8	18.9	1.8	27.8	7.5	15.1	1.3	0	5.0	8.8		4.4	9.4	86.2
TOTAL														
TOTAL	133	78	17	144	46	72	5	10	49	40		28	48	518
RATIO %	22.4	13.1	2.9	24.2	7.7	12.1	0.8	1.7	8.2	6.7		4.7	8.1	87.2

Fig 2 PURPOSE OF TRIPS IN PERCENTAGE.

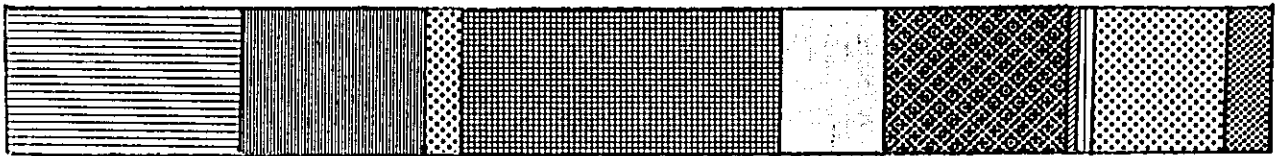
Total



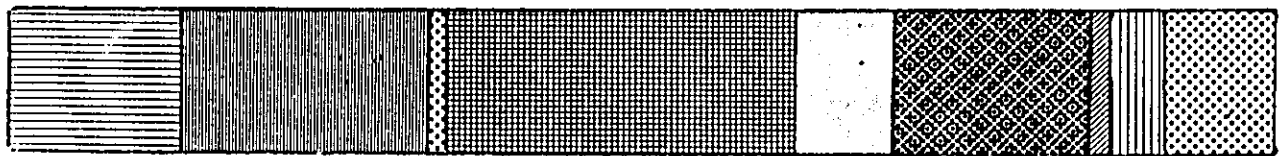
Major bus stations.



Medium bus station.



Minor bus station.



0 10 20 30 40 50 60 70 80 90 100



GOING TO WORK



GOING HOME



RELIGIOUS CENTRE



OTHERS



GOING TO SCHOOL



ENTERTAINMENT



HOSPITAL / CLINIC



BUSINESS ENGAGEMENT



SOCIAL VISIT



SHOPPING / MARKETING

2 - 3 Ownership Of Vehicles

In comparison to the average ownership ratio for vehicles in the state of Penang which is about 24%, only about 13% of bus passengers are vehicle-owners.

CATCHMENT AREA OF BUS STATIONS

Interviews were conducted on the time-taken to bus stations in order to find out the radius of the catchment area of the bus stations.

It was found that there was a clear difference between the length of time-taken in rural areas and that of urban areas. In rural areas, 50% of the passengers take only 10 minutes to arrive at the nearness bus station whereas in urban areas, it takes them 15 minutes to arrive at the medium stations and the bus terminals.

Fig 3. Cumulative curve of catchment

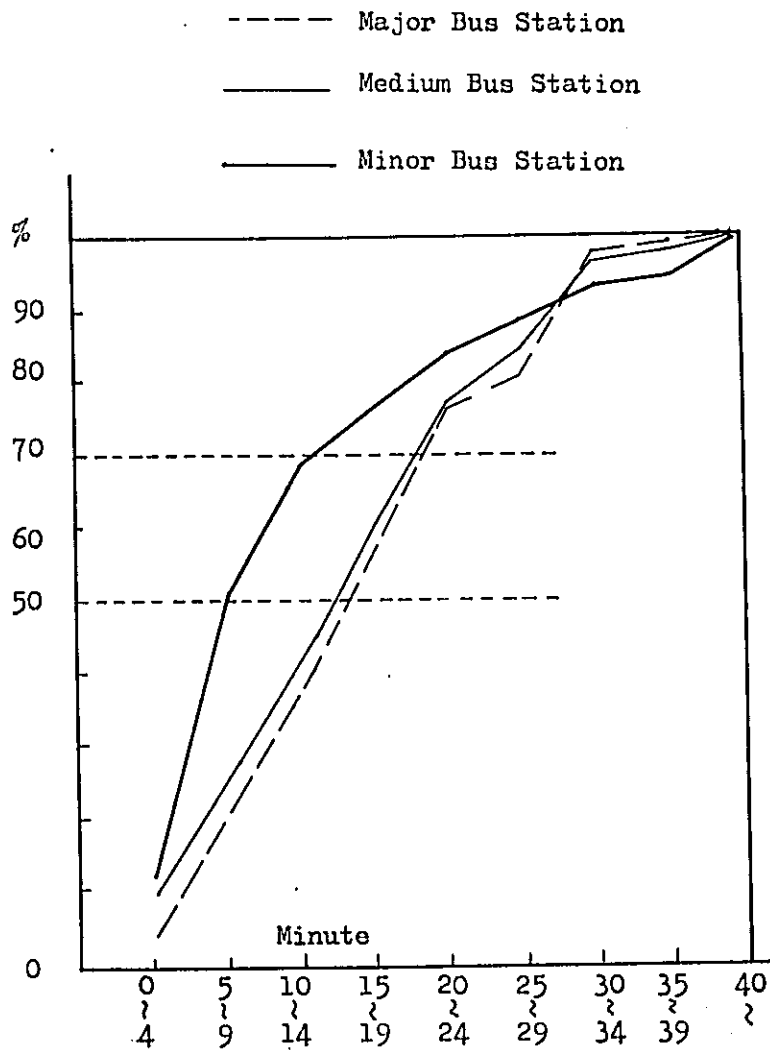


Table 3: CATCHMENT AREA OF STATIONS.

STATION	TIME TAKEN TO BUS STATION (MINS)								
	0 - 4 mins	5 - 9 mins	10 - 14 mins	15 - 19 mins	20 - 24 mins	25 - 29 mins	30 - 34 mins	35 - 39 mins	40 Above
MAJOR BUS STATION									
Ferry Terminal At Butterworth	1	12	11	24	18	3	24	1	5
Bus Terminal At Maxwell Road	5	13	14	15	8	5	6	3	5
Bus Terminal At Bkt. Mertajam	1	4	8	5	16	5	8	0	3
Sub Total	7	29	33	44	42	13	38	4	13
RATIO %	3.2	18.0	14.8	19.8	18.9	5.9	17.0	1.8	5.9
MEDIUM BUS STATION									
City Council Bus Terminal	0	1	11	17	14	4	2	1	0
Bus Stand Near R.C. Church At Burma Rd.	5	16	15	6	9	9	11	2	2
Bus Stop At Tanjung Tokong	15	5	2	1	2	1	0	0	1
Bus Stop At Ayer Itam	1	11	2	1	2	2	8	3	0
Bus Stop At Bagan Ajam	0	1	1	13	10	1	4	0	0
Sub Total	21	34	31	38	37	17	25	6	3
RATIO %	10.0	16	14.6	17.9	17.5	8.0	11.8	2.9	1.4
MINOR BUS STATION (RURAL AREA)									
Bus Stop At Bayan Lepas Town	5	9	2	1	1	2	5	2	2
Bus Stop At Teluk Bahang Village	14	14	0	0	0	0	1	0	1
Bus Stand At Permatang Pauh	0	3	2	1	6	2	1	0	5
Bus Stand At Kubang Semang	1	3	6	5	4	1	0	0	0
Bus St. At New Devt. Area At B.Mertajam	0	17	9	3	0	0	1	0	0
Bus St. Balik Pulau	0	15	10	4	1	1	0	0	1
Sub Total	20	61	29	14	12	6	8	2	9
RATIO %	12.4	37.9	18.0	8.7	7.5	3.7	5.0	1.3	5.6
TOTAL	48	124	93	96	91	36	71	12	25
RATIO %	8.1	20.8	15.6	16.1	15.3	6.0	11.9	2.0	4.2

Figure 4 shows the time-taken by the bus passengers to walk to reach the nearest bus stations. This graph has been plotted based on the figures tabulated in Table No: 3. The three categories of bus station are minor bus station, medium bus station and major bus station. The graph shows that most of the passengers spend about 15-24 minutes compared to those from medium bus station who spend only about 5-10 minutes to reach bus station.

Figure 5 shows the time-taken to walk to reach the bus station for various purposes. Form here we can infer that most of the passengers from major and minor bus stations used the bus for going home and going to school (time taken for walking being between 15-25 minutes). As for the medium bus station, it was found that most of the passengers used the bus for social visit, shopping and marketing.

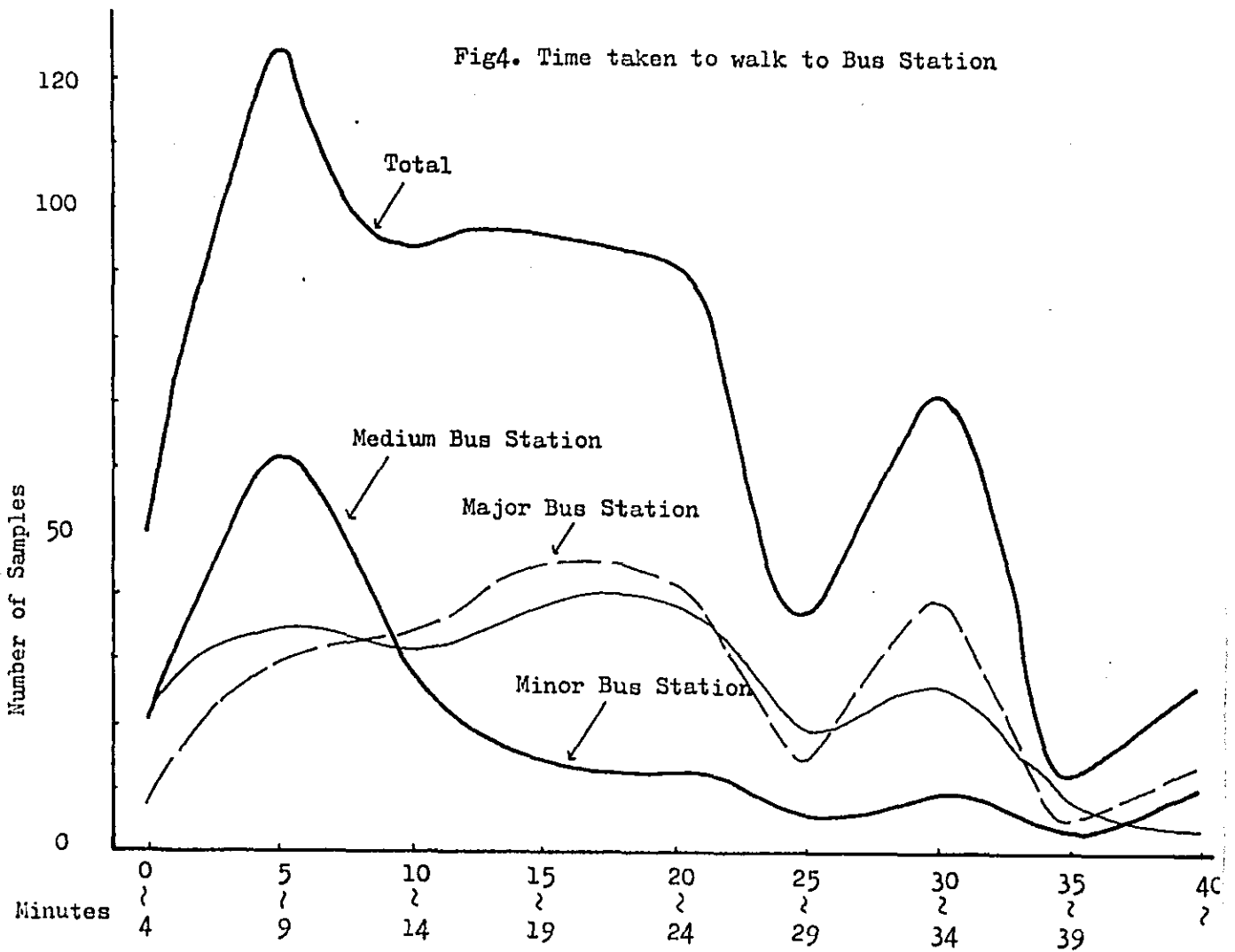


Fig 5. Time taken to walk to Bus Station by Purpose

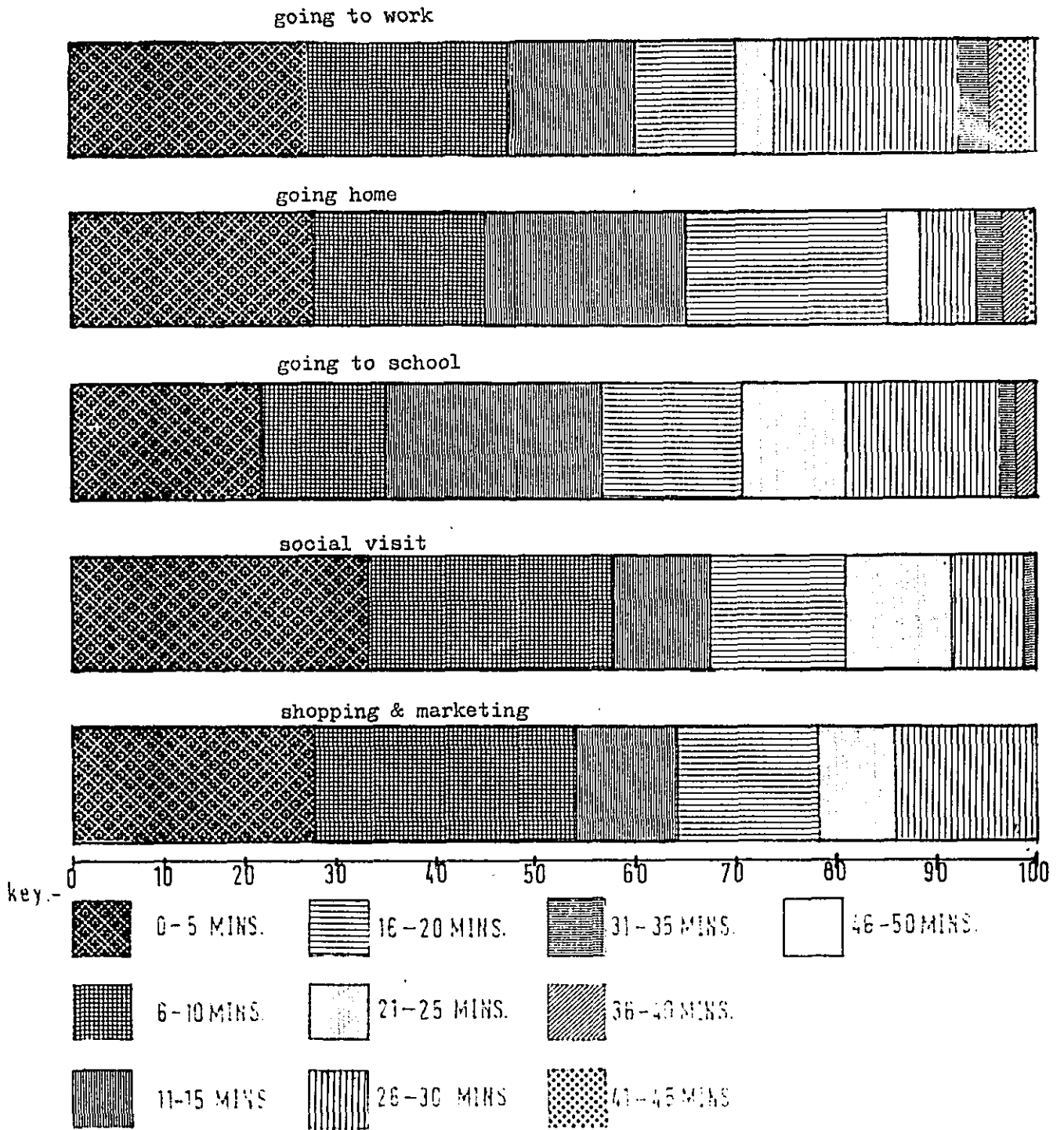


Table 4: TRIP PURPOSE BY MINUTES TAKEN TO REACH BUS STATION.

MINUTES	TOTAL	GOING TO WORK	GOING TO SCHOOL	BUSINESS ENGAGEMENT	GOING HOME	ENTER-TAINMENT	SOCIAL VISIT	TO RELEGIOUS CENTRE	HOSPITAL CLINIC	SHOPPING MARKETING	OTHERS
0 - 5	147	32	15	7	35	11	21	3	2	12	9
6 -10	111	27	10	4	25	7	18	1	2	13	4
11-15	100	18	17	2	29	12	7	0	2	5	8
16-20	91	14	11	2	31	7	10	0	4	7	5
21-25	37	6	8	0	5	2	8	1	0	4	3
26-30	72	24	12	2	8	6	6	0	0	6	8
31-35	12	4	2	0	3	0	1	0	0	1	1
36-40	7	1	0	1	4	0	1	0	0	0	1
41-45	9	4	2	0	2	0	0	0	0	0	1
46-50	2	1	0	0	1	0	0	0	0	0	0
51-55	1	0	1	0	0	0	0	0	0	0	0
56-60	2	0	0	0	0	1	0	0	0	1	0
61-65	0	0	0	0	0	0	0	0	0	0	0
66-70	0	0	0	0	0	0	0	0	0	0	0
71-75	0	0	0	0	0	0	0	0	0	0	0
76-80	0	0	0	0	0	0	0	0	0	0	0
81-85	1	0	0	0	1	0	0	0	0	0	0
86-90	1	1	0	0	0	0	0	0	0	0	0
91-95	0	0	0	0	0	0	0	0	0	0	0
96 & ABOVE	1	1	0	0	0	0	0	0	0	0	0
TOTAL	594	133	78	18	144	46	72	5	10	49	40
RATIO %		22.4	13.1	3.0	24.2	7.7	12.1	0.8	1.7	8.2	6.7

MEANS OF TRANSPORT

The difference in the length of time-taken to the bus stations between the rural area and urban area can be partly explained by the difference in the means of transport used to reach the station. With reference to Figure 6, it can be seen that about 80% of the people use the bus as a means of transport and only 10% walk to major bus stations, but this takes them both 15 minutes (as shown earlier). This could be due to long bus routes in the urban areas. In the case of the time-taken to medium bus stations, it was found that there was really no difference between the percentage of people who walked and took the bus but they both arrive in the same time. Here, there seems to be a larger time-taken to walk and the possible explanation could be that there are many distractions that alert the pedestrian in the Central Business District area and this slows him down.

Also the main difference between walking and taking the bus could possibly be due to poor bus services - terms of the population of the area.

In the case of the means of transport used to arrive at minor bus - stations, it was found that 40% of the people arrive at these stations by walking and 50% of passengers arrive by bus and this takes them 10 minutes. The reason for this difference could be that there are too few stations in rural areas.

Frequency Of Bus Trip

In most stations, almost 70% of the passengers travel by bus more than once a day. Unfortunately the answer for frequency of travel by other means of transport could not be obtained due to lack of responses pertaining to this.

FIG 6 MEANS OF TRANSPORT USED TO REACH BUS STATION
in percentage

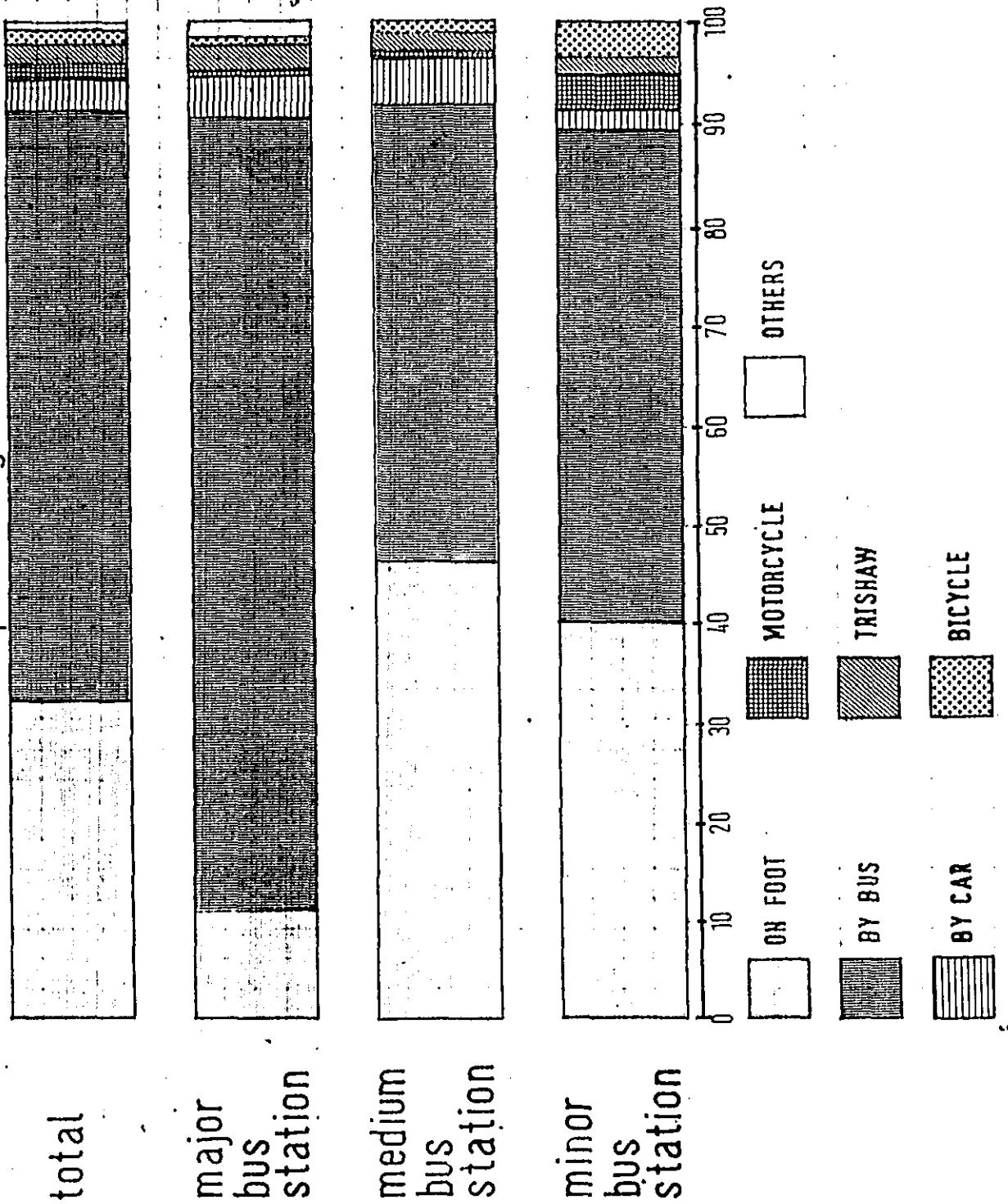


TABLE 5 MEANS OF TRANSPORT

MINUTES	TOTAL	ON FOOT	BY BUS	BY CAR	BY M. CYCLE	BY TRISHAW	BY BICYCLE	OTHERS	TOTAL
0- 5	147	96	38	7	4	0	2	0	147
6-10	111	50	53	3	2	1	2	0	111
11-15	100	23	70	3	0	1	1	2	100
16-20	91	7	80	2	1	0	1	0	91
21-25	37	4	30	3	0	0	0	0	37
26-30	72	9	58	4	0	0	1	0	72
31-35	12	2	9	1	0	0	0	0	12
36-40	7	1	4	0	0	0	0	1	7
41-45	9	0	9	0	0	0	0	0	9
46-50	2	0	2	0	0	0	0	0	2
51-55	1	0	1	0	0	0	0	0	1
56-60	2	0	2	0	0	0	0	0	2
61-65	0	0	0	0	0	0	0	0	0
66-70	0	0	0	0	0	0	0	0	0
71-75	0	0	0	0	0	0	0	0	0
76-80	0	0	0	0	0	0	0	0	0
81-85	1	0	1	0	0	0	0	0	1
86-90	1	0	1	0	0	0	0	0	1
91-95	0	0	0	0	0	0	0	0	0
96 ABOVE	1	0	1	0	0	0	0	0	1
TOTAL	594	192	359	23	7	2	7	3	594
RATIO%		32.4	60.5	3.9	1.2	0.3	1.2	0.5	

TABLE 6 FREQUENCY OF BUS TRIP

<u>SURVEY POINTS</u>	<u>MORE THAN ONCE/DAY</u>	<u>ONCE/DAY</u>	<u>FREQUENCY</u>		
			<u>ONCE FOR EVERY 2 DAYS</u>	<u>ONCE OR TWICE/WEEK</u>	<u>OTHERS</u>
Ferry Terminal At Butterworth	80	8	2	6	3
Bus Terminal At Maxwell Road	52	4	0	10	8
Bukit Mertajam Bus Terminal	24	9	2	4	4
Subtotal	<u>156</u>	<u>21</u>	<u>4</u>	<u>20</u>	<u>15</u>
City Council Bus Terminal	29	1	2	11	6
Bus Stn. Near RC Church At Burma Rd.	58	1	0	13	3
Bus Stop In Tanjung Tokong	21	2	0	2	2
Bus Stop At Ayer Itam	12	1	0	5	7
Bus Stop At Began Ajam	29	0	0	0	1
Subtotal	<u>149</u>	<u>5</u>	<u>2</u>	<u>31</u>	<u>19</u>
Bus Stop At Bayan Lepas	9	1	0	4	11
Bus Stop At Teluk Bahang	12	0	2	12	3
Bus Stop At Permatang Pauh	20	0	0	0	0
Bus Stop At Kubang Semang	16	1	0	0	3
Bus Stop At Kg. Baru Bkt. Mertajam	24	4	3	0	0
Subtotal	<u>102</u>	<u>8</u>	<u>5</u>	<u>17</u>	<u>24</u>
TOTAL:-	<u>407</u>	<u>34</u>	<u>11</u>	<u>68</u>	<u>58</u>
RATIO:-	<u>70.4</u>	<u>5.9</u>	<u>1.9</u>	<u>11.8</u>	<u>10.0</u>

