

CHAPTER 8: CHARACTERISTICS OF EXISTING PERSON TRIP

8-1 GENERAL (Procedure of data processing)

8-1-1 Person Trip Survey

- The purpose of the Person Trip Survey is to obtain detailed information on the movement characteristics of residents in the Barranquilla Metropolitan Area. The survey normally covers the travel of a person in terms of trip purpose, transport, mode, origin and destination of a trip, time, etc. It also covers the socio-economic characteristics of the person, such as sex, age, occupation, type of house, car ownership, etc. Consequently, by analysis of the data collected, following classification can be made:
 - 1) Trip generation/attraction level and characteristics.
 - 2) Distribution and flow of person trips.
 - 3) Modal split and traffic demand.
 - 4) Socio-economic characteristics of residents and transport users.
- This Person Trip Survey was carried out by sampling. The samples are necessary to expand to the total number of the population. Then, the above mentioned information and O-D Table can be calculated. This chapter refers to this procedure and results.

8-1-2 Sampling

- The number of population over 5 years old within the city of Barranquilla is estimated at about 843 thousands, and the city of Soledad is estimated at about 118 thousands in 1983.

The number of houses is also estimated at about 156 thousands houses in Barranquilla and 17 thousands houses in Soledad.
- The Person Trip Survey selected the samples from those houses in order to perform the 5% of the total sample rate and 75% of valid sample rate. Sampling was done by means of a unit of house, because of lacking data about the household by zone in Barranquilla. Finally the valid sample of this procedures is as follows:

Table 8-1-1 Result of Sampling

	Population (1) 1983	Sampled (2) Population	Sample Rate
	(Persons)	(Persons)	(%)
Barranquilla	843,125	41,776	4.95
Soledad	117,767	4,707	4.00
Total	960,882	46,483	4.84

- Remark: 1) Study team estimated: Population of 5 years old and above
 2) Study team estimated, based on DANE statistics.

8-1-3 Data Processing

- Data processing of the PT Survey was carried out through the following steps after the questionnaires were collected.

- 1) Manual Data check
- 2) Data coding
- 3) Data entry into magnetic tape
- 4) Logical error check and editing by computer
- 5) Sample Master tape
- 6) Tabulation of samples
- 7) Determination of expansion factor
- 8) Development of sample master tape
- 9) Preliminary tabulation
- 10) Screen line adjustment
- 11) Making up the OD Table

- Expanded master files were made with the following information for the further review and analysis of the present traffic situation in the Barranquilla Metropolitan Area.

a) Socio-economic characteristics in 1983

- Population and household
- Occupation
- Employment by residence/working place
- Car ownership
- Type of house

b) Trip characteristics of Barranquilla residents

- Trip rate
- Trip by occupation and industry
- Trip generation/attraction by zone
- Other trip characteristics

c) Person Trip Flow Information

- Hourly Trip Distribution
- Movement pattern by purpose
- Movement pattern by mode
- Parking information

Based on those expanded and adjusted master tape, computations and tabulations were made according to following output list (which will be mentioned in Supporting Report).

8-1-4 Expansion and Adjustment Procedure

1) Expansion

- This Person Trip Survey is a sampled survey. It is necessary to expand to the existing total population by zone.
- Sampling was not done for the household but for the house in the sampled area . Thus, an expansion factor was induced from the collected number of sampled persons, corresponding to the total number of persons in every zone.
- Expansion factor is shown as follows:

Table 8-1-2 Expansion Factor

Zone	E.Factor	Zone	E.Factor	Zone	E.Factor	Zone	E.Factor
1	7.1	21	-	41	30.3	61	17.1
2	2.8	22	-	42	15.3	62	18.5
3	5.4	23	19.5	43	35.7	63	10.5
4	3.9	24	14.7	44	19.6	64	1.9
5	4.2	25	22.9	45	15.5	65	17.7
6	3.5	26	19.2	46	17.6	66	52.3
7	4.4	27	36.7	47	21.0	67	24.3
8	13.7	28	19.1	48	15.1	68	12.5
9	11.0	29	25.4	49	16.6	69	5.1
10	16.9	30	20.3	50	25.2	70	17.9
11	1.9	31	20.7	51	22.7	71	19.0
12	18.1	32	11.6	52	20.8	72	-
13	6.8	33	24.4	53	24.4	73	45.2
14	7.4	34	28.2	54	23.4	74	24.7
15	-	35	17.7	55	24.4	75	28.3
16	1.2	36	19.3	56	20.1	76	12.1
17	1.2	37	22.6	57	39.9	77	24.4
18	33.7	38	24.8	58	10.2	78	14.2
19	6.2	39	15.0	59	28.0		
20	66.7	40	26.2	60	21.4	Total	20.7

2) Average Vehicle Occupancy

From the Car Occupancy Survey which carried out on October 1983, the ratio of vehicle occupancy can be calculated. The results of this survey are shown in the following table.

Table 8-1-3 Vehicle Occupancy.

	Average Occupancy
Passenger Car	2.1 Persons/Vehicle
Taxi	0.9
Mini Bus	24.8
Large Bus	39.7

Source: Car Occupancy Survey by survey team.

- The average occupancy rate of a Bus, including Mini Bus and Large Bus, was calculated independently by the survey which was carried out as the Bus Passenger Survey. That average rate is 85.7% of the bus's capacity. The average capacity of a bus, including Mini Bus and Large Bus, was calculated by the same survey as 37.7 persons/bus. Therefore, 32.2 persons per bus is induced from this survey.
- The other checked data from the tabulation of the Person Trip Survey according to the average occupancy is shown in the following table.

Table 8-1-4 Average Vehicle Occupancy

	Average Occupancy
Passenger Car	1.52 Persons/Vehicle
Taxi	2.33
Truck	2.42

- The study team figured the average vehicle occupancy as follows in order to convert from person to vehicle.

	Average Occupancy
Passenger Car	2.10 Persons/Vehicle
Taxi	2.33
Bus	32.20
Truck	2.42

3) Rate of Vacant Taxi.

- Also from the original data of the Car Occupancy Survey, it is possible to calculate the ratio of vacant taxis.
- The results are shown as follows:

Table 8-1-5. The rate of vacant taxis.

Survey data	No. of Taxi	No. of vacant taxi	Rate of vacant taxi
5 th. Oct.	935	445	0.476
7 th. Oct.	3561	1460	0.410
Total	4495	1905	0.424

Note: From Car Occupancy Survey.

4) The Share of Commercial Truck

- The main aims of the Person Trip Survey is to obtain data concerning the movements of persons. Therefore, it can be said that the Person Trip Survey has serious difficulty getting enough samples of commercial trucks. Movement of commercial truck bases on a behaviour of company. It will be a very rare case in the Person Trip Survey that the sampled person is a driver of commercial truck.
- Thus, it is necessary to adjust the number of trucks from the Person Trip Survey results, by comparison with the existing traffic composition of truck.
- This adjustment is done by using the results of Screen Line Survey to compare with the share of trucks as follows. The adjustment factor is made as the ratio of trucks to the number of passenger cars.

Table 8-1-6. The Share of Truck.

	No. of Vehicles	(%)
Passenger Car	38,968	31.8
Taxi	43,967	35.9
Bus	19,293	15.8
Truck	20,197	16.5
Total	122,425	100.0

5) Screen Line Adjustment

- The OD Table from the Person Trip Survey should be checked for its accuracy by comparing it with the results of the Screen Line Survey. If the traffic volume and composition of the OD Table would be seriously different from the present traffic flow, the OD Table should be adjusted to suit the existing situation.
- Difference of those two traffics is something due to the following cause:
 - 1) Movements of non-residents in Barranquilla and Soledad are not recorded.
 - 2) Vehicle users could not be caught up enough with Person Trip Survey.
 - 3) Movements of trucks and trailers for commercial use are not reflected existing situation reliably.
 - 4) Vacant taxi movements have not been grasped well.
 - 5) Double count of trips on the Screen Line has high possibility.
- Those problems should be checked and amended by using the result of Screen Line Survey and others.

(Detail is shown in the Supporting Report)

8-2 Characteristics of Metropolitan Barranquilla

8-2-1 Population

The total population of the PT Survey Area is 1,106,625. The number of persons 5 years and older is 961,842.

The population of Barranquilla and Soledad is shown as follows:

Table 8-2-1 Population

	Barranquilla	Soledad	Total
Male	402,232	53,925	456,157
Female	451,022	54,660	505,682
Total	853,254	108,585	961,842

note: Study team estimated

Population by zone is shown in the following Fig. 8-2-1.

8-2-2 Age Structure

- The number of young and working people between the ages of 15-29 is 34.7%. The structure of age group is shown as follows:

Table 8-2-2 Population by Age Group in 1983

Age Group	No. of Population (x1000)	(%)
0-9	124	13.2
10-19	271	28.2
20-29	235	24.5
30-39	133	13.9
40-49	84	8.7
50-59	59	6.1
60-69	35	3.6
70+	18	1.8
Total	961	100.0

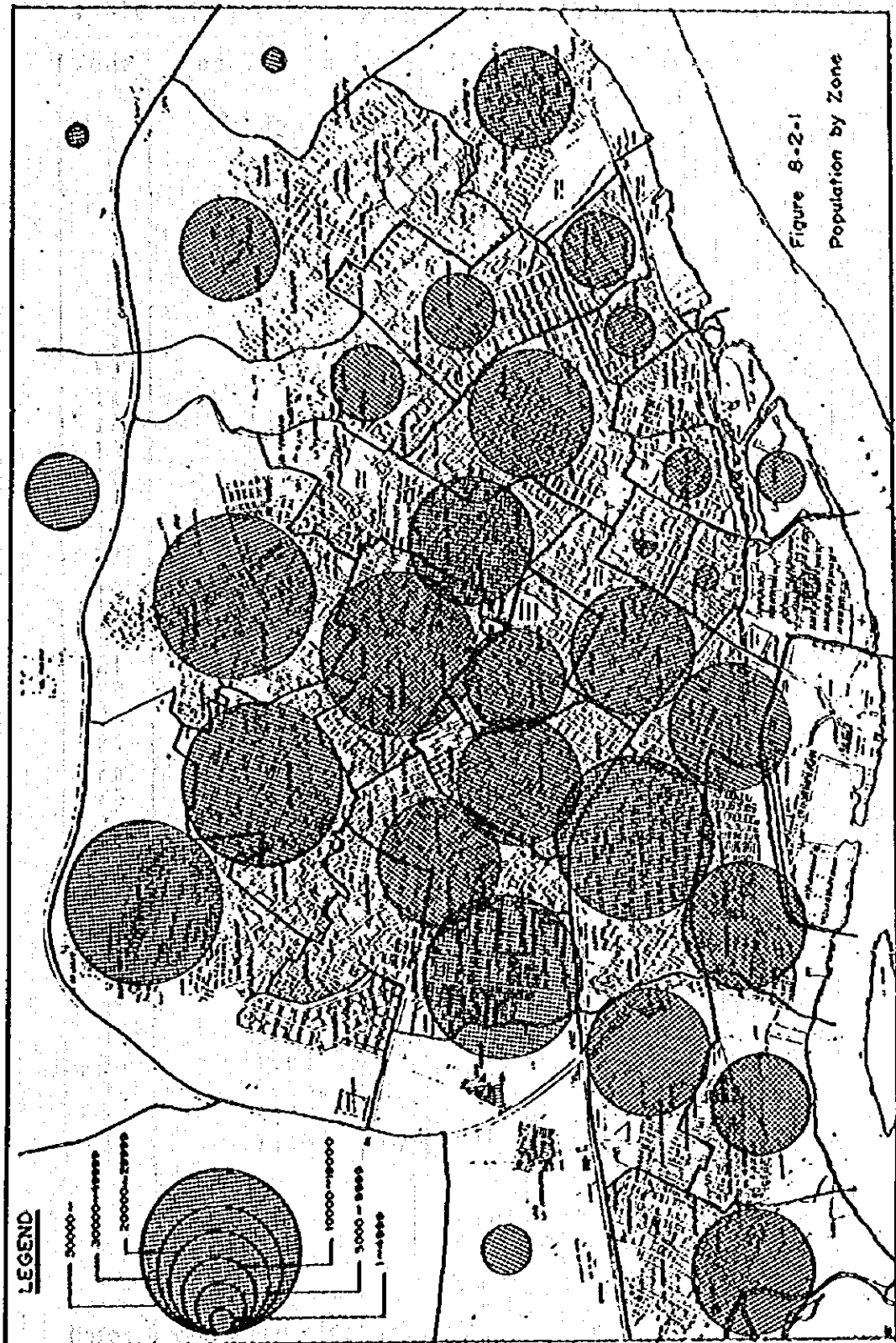
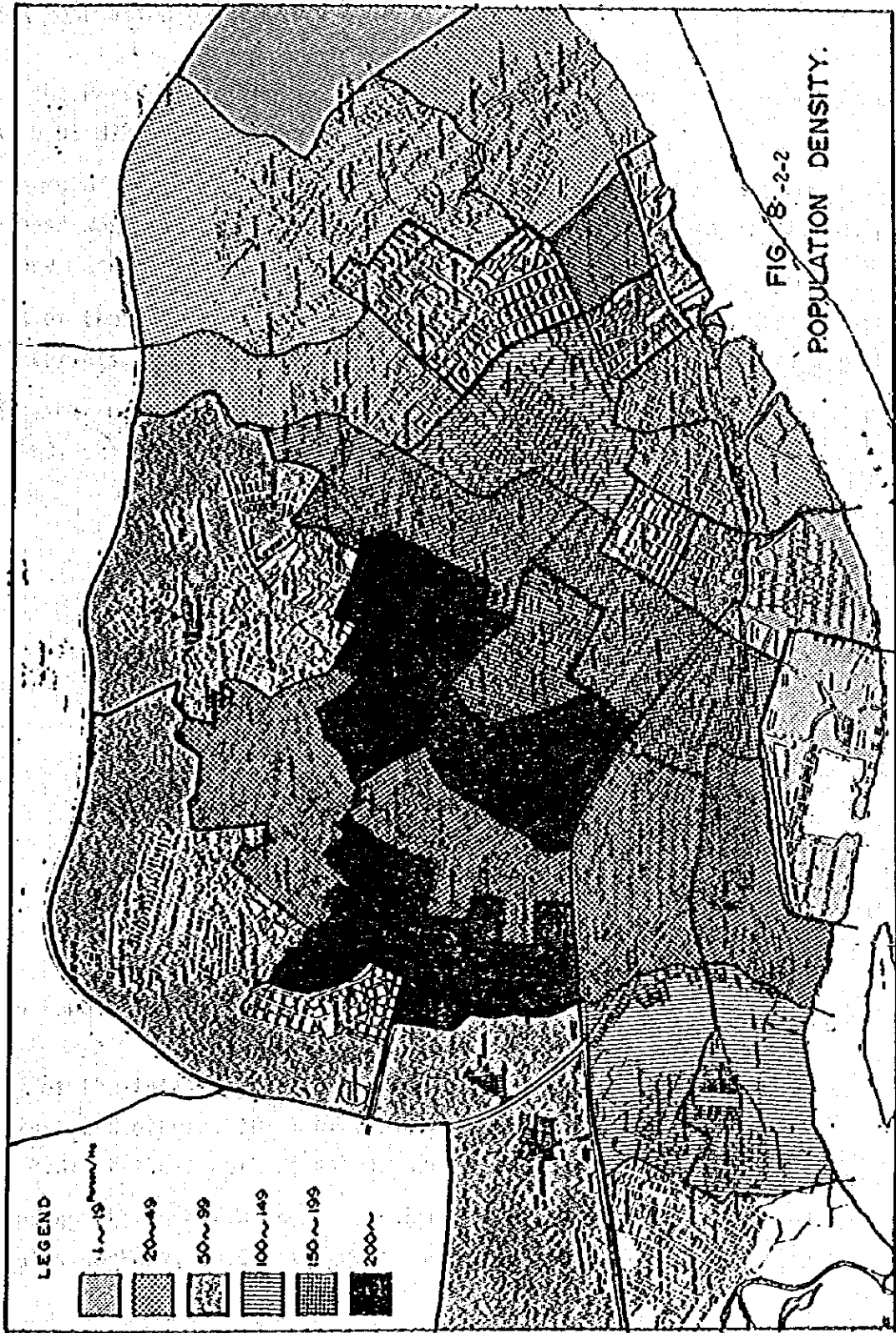


Table 8-2-3 Population by Zone

Zone	Population	%	Zone	Population	%
1	234	0.02	40	19,755	2.1
2	112	0.01	41	9,969	1.0
3	988	0.1	42	10,970	1.1
4	238	0.02	43	18,743	1.9
5	1,512	0.2	44	11,309	1.2
6	1,425	0.2	45	11,424	1.2
7	1,122	0.1	46	9,645	1.0
8	754	0.08	47	11,823	1.2
9	1,243	0.1	48	13,499	1.4
10	287	0.02	49	21,514	2.2
11	25	0.003	50	17,338	1.8
12	1,828	0.2	51	27,989	2.9
13	2,700	0.3	52	36,442	3.8
14	4,137	0.4	53	21,911	2.3
15	0	0	54	40,927	4.3
16	125	0.01	55	32,769	3.4
17	44	0.005	56	10,532	1.1
18	9,335	1.0	57	27,651	2.9
19	186	0.02	58	13,739	1.4
20	11,339	1.2	59	16,968	1.8
21	0	0	60	27,991	2.9
22	0	0	61	12,124	1.3
23	19,598	2.0	62	18,408	2.0
24	11,304	1.2	63	15,446	1.6
25	16,786	1.7	64	63	0.007
26	8,237	0.9	65	11,558	1.2
27	28,810	3.0	66	14,853	1.5
28	7,716	0.8	67	21,992	2.3
29	8,237	0.9	68	3,150	0.3
30	26,471	2.8	69	138	0.001
31	35,459	3.7	70	6,748	0.7
32	9,814	1.0	71	9,937	1.0
33	15,006	1.6	72	0	0
34	11,224	1.2	73	7,639	0.8
35	8,142	0.8	74	31,221	3.2
36	21,037	2.2	75	24,706	2.6
37	25,832	2.7	76	4,102	0.4
38	18,278	1.9	77	48,556	5.0
39	7,185	0.7	78	1,022	0.1
			Total	961,842	100.00

Note: 5 years and older population



8-2-3 Population by Industry

- From the Person Trip Survey, the number of workers (excluding others/unknown) was about 312 thousand people in 1983.
- In terms of the composition of workers excluding those in non-industry, 38.5% of these work in the service industry, such as government officials, maintenance factory mechanics, medical doctors, lawyers, etc.
- 26.4% of those work in the commercial industry, such as shop workers, sellers of materials and goods, etc. 16.4% of those work in the manufacturing industry.
- The number of gainful worker (15 years and older) was about 112 thousand people in 1983, that number of workers was 43% of gainful workers.

Table 8-2-4 Population by Industry

	No. of Persons	(%)
Agriculture	4548	1.5
Mining	18741	6.0
Manufacture	51287	16.4
Commercial	82605	26.4
Finance	9699	3.1
Transport	19305	6.2
Public Service	5952	1.9
Service	120265	38.5
Total	312402	100.0

8-2-4 Population by Occupation

- 67.4% of the total population is non-occupational, such as students, housewives, militars, and others. 10.1% of these work as factory workers, drivers, mechanics, etc. 8.3% of these work as sales workers, and 6.7% work as service workers.
- Excluding the number of non-occupational, 31.1% work as factory workers, 25.4% as sales workers, 20.6% as service workers, and 10.9% as professional workers.

TABLE 8 -2-3 COMPOSITION OF INDUSTRY BY OCCUPATION

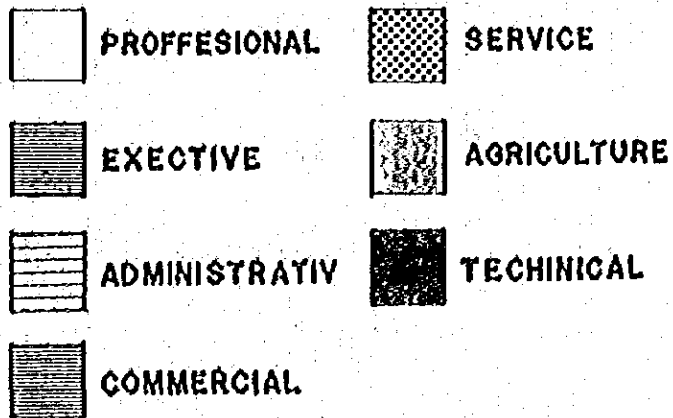
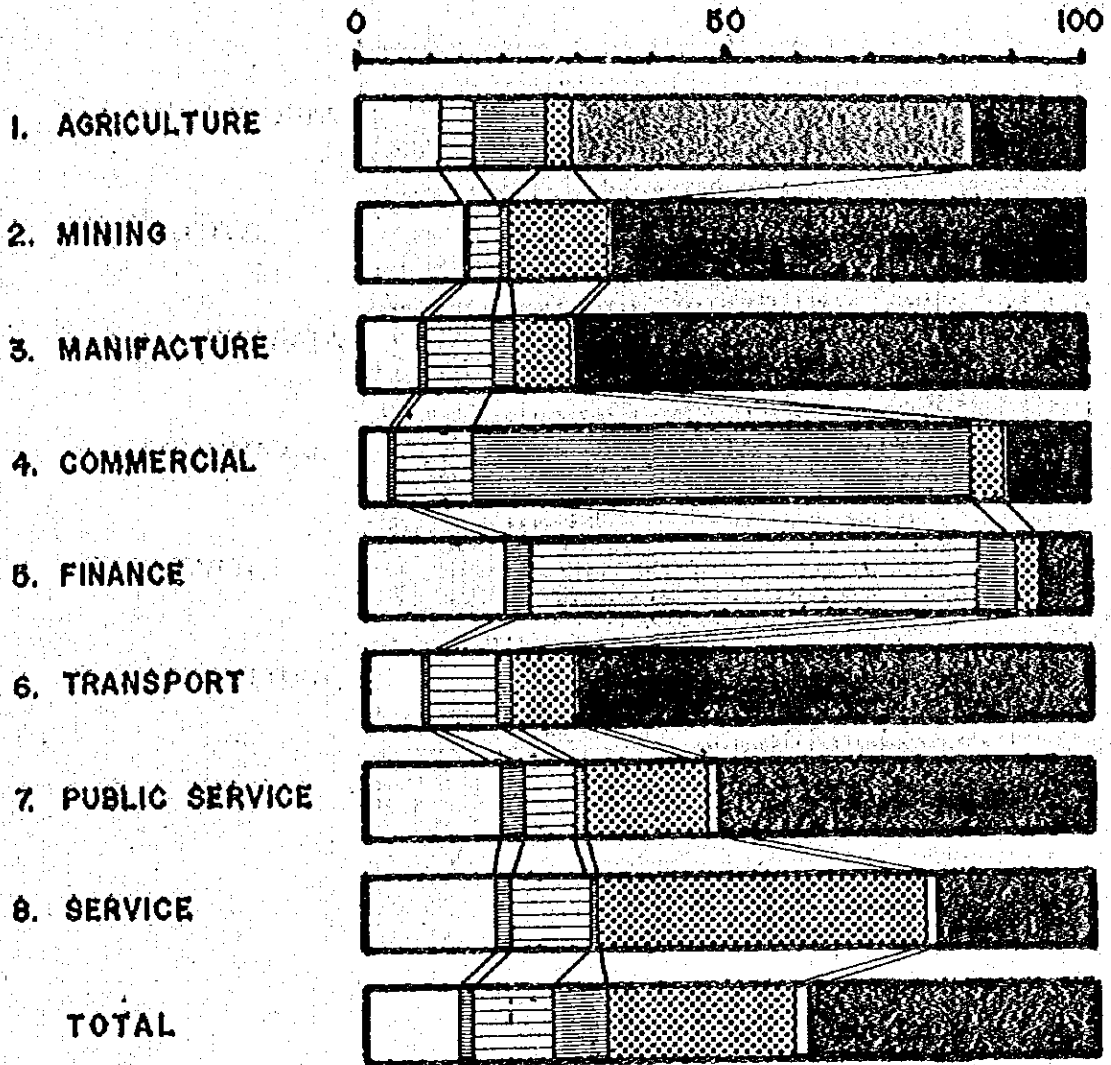


TABLE 8-2-4 COMPOSITION OF OCCUPATION BY INDUSTRY

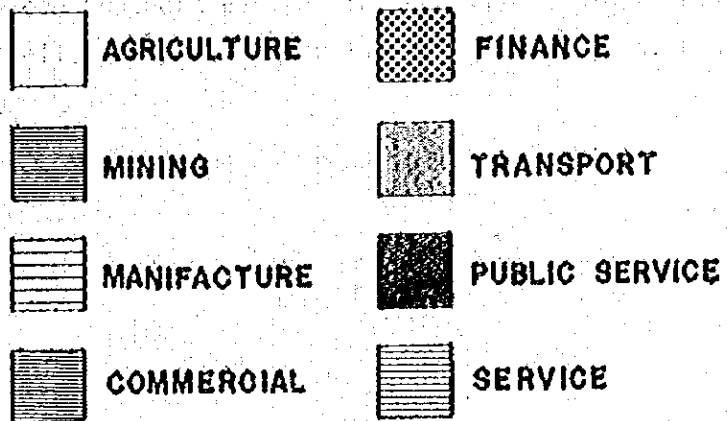
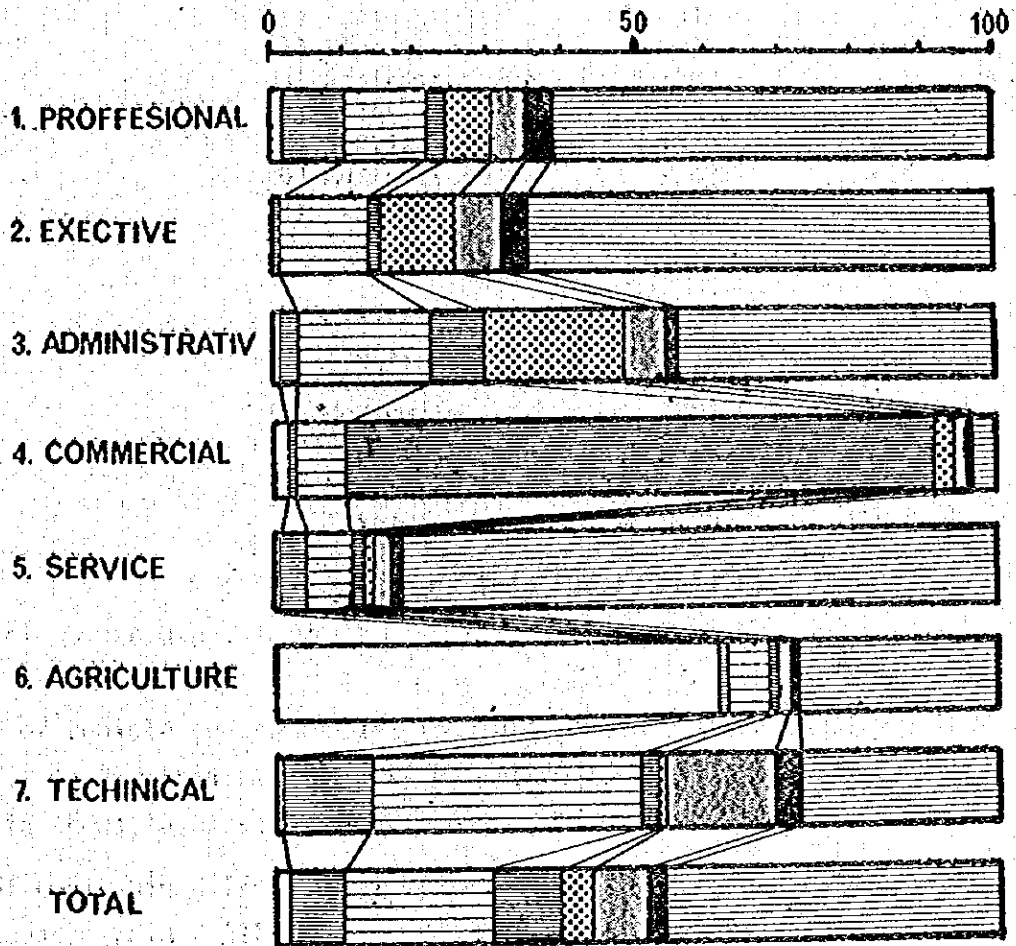


Table 8-2-5 Population by Occupation

Occupation	No. of worker (x1000)	Percentage (%)	
1) Professional	343	3.6	10.9
2) Executive	33	0.4	1.1
3) Administrative	302	3.1	9.6
4) Sales	797	8.3	25.4
5) Service	646	6.7	20.6
6) Agriculture	42	0.4	1.3
7) Technical	976	10.1	31.1

8) Military	25	0.3	(100.0)
9) Pupil	1554	16.2	
10) Student	2188	22.8	
11) Housewife	1608	16.8	
12) Jobless	1039	10.8	
13) Others	56	0.6	
Total	9609	100.0	

Note: Person Trip Survey results.

8-2-5 Vehicle Ownership

- The number of vehicle owners are 142 thousands person . The rate of vehicle ownership is 14.8%. This rate differs between Barranquilla and Soledad. Barranquilla shows 16.0% and Soledad 5.6%.
- The rate of ownership differs severely among zones. The northern areas of Cra. 38, Ciudad Jardín - Alto Prado - La Concepción - Urbanización La Cumbre - El Golf, show the highest value of more than 50%.
- The above mentioned Soledad and southern part of Barranquilla indicate a low value ratio, under 10% generally. This structure is due to the structure of income distribution by zone.
- The distribution of vehicle owners by zone is shown in the following Fig. 8-2-5

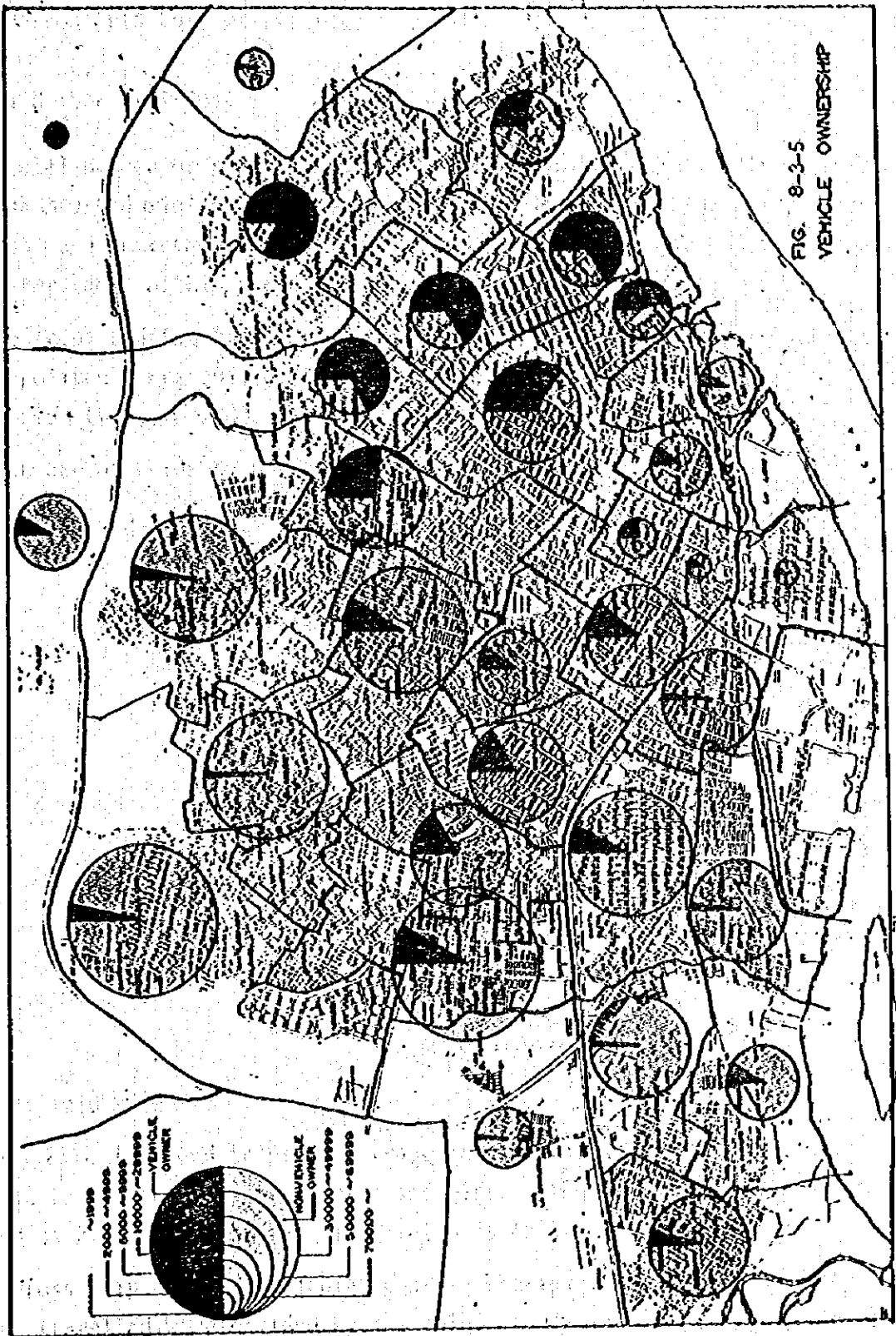


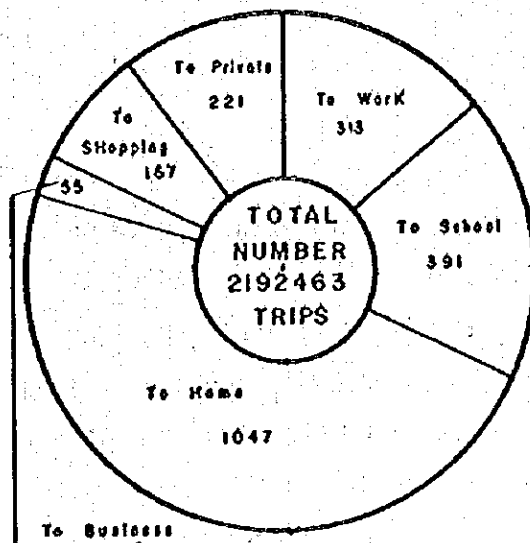
FIG. 8-3-5
VEHICLE OWNERSHIP

8-3 Person Trip Characteristics

8-3-1 Number of Trips.

- The total number of person trips in metropolitan Barranquilla is estimated to be 2192 thousand trips on the average week day. These trips for daily urban activities are defined as linked trips, which do not take into consideration any transfers done within a trip.
- These trips consist of the elements of the daily urban transport activity in metropolitan Barranquilla. They represent the total transport demand in terms of person trips in 1983.
- The number of trips by purpose is shown as follows.

FIG. 8-3-1 TRIPS BY PURPOSE
(X 1000 Trips)



8-3-2 Trip Rate

- As the 2192 thousand trips were travelled by a population of 847 thousand people (moving persons of 5 years and older), the total trip rate was calculated as 2.59 trips per day. This ratio is called the Net Trip Rate.
- The Gross Trip Rate was calculated as 2.28 trips per day. The 2,192 thousand trips travelled were divided by the total population (5 years and older) of 962 thousand.

- Thus, the trip maker ratio is 0.88, which is the ratio of persons who traveled to the total population.

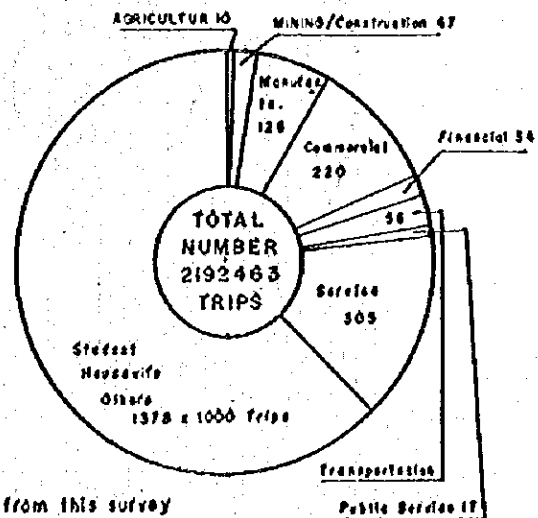
Table 8-3-1 Trip Rate by Occupation

Occupation	Trips/Person/Day
1) Professional	3.29
2) Executive	3.26
3) Administrative	3.30
4) Sales	2.70
5) Service Worker	2.20
6) Agriculture	2.49
7) Factory Worker	2.55
8) Pupil (Elementary)	2.16
9) Student (Highschool College)	2.45
10) Housewife	1.97
11) Jobless	1.83
12) Others	2.08
Total	2.28

8-3-3 Number of Trips by Industry

- More than half of the total trips are made by non-industrial workers, such as students, housewives and others, which represent about 137 trips (62.2%).
- The service industry has the largest number about 305 thousand trips (37.3%) in the eight categories of industry (that is excluding the non-industrial workers). Commercial industry is second, with less than 85 thousand people in the Service industry.

Fig. 8-3-2 Trips by Industry

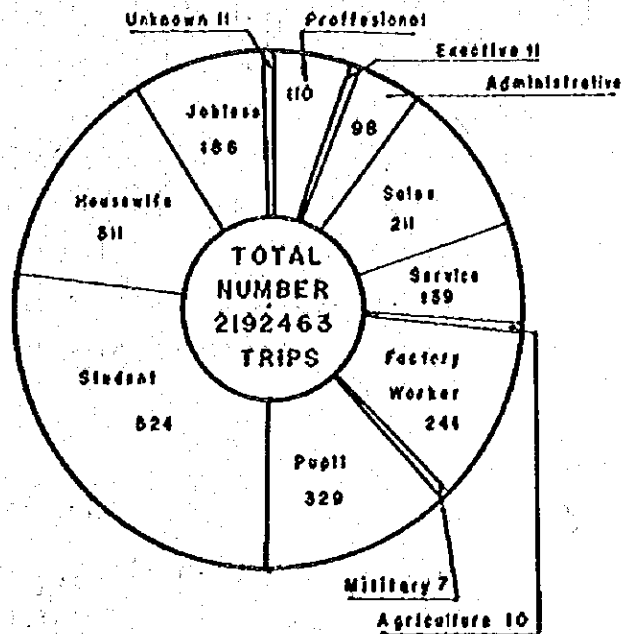


8-3-4. Number of Trips by Occupation.

- The largest number of trip makers by occupation are pupils and students, representing 329 thousand trips and 525 thousand trips, respectively: a total of 854 thousand trips. Also, it can be easily imagined that housewives make 311 thousand trips per day.
- Among the 7 categories of occupations, the largest number of these are technical workers with 244 thousand trips, and the second is sales workers with 211 thousand trips.
- Number of trips per person of professional, executive, and administrative workers are more than 3 trips per person. Housewives and jobless show more than 2 trips per person.

Fig. 8-3-3. Trips by Occupation.

FIG 8-3 -3 TRIPS BY OCCUPATION



8-4. Trip Mode.

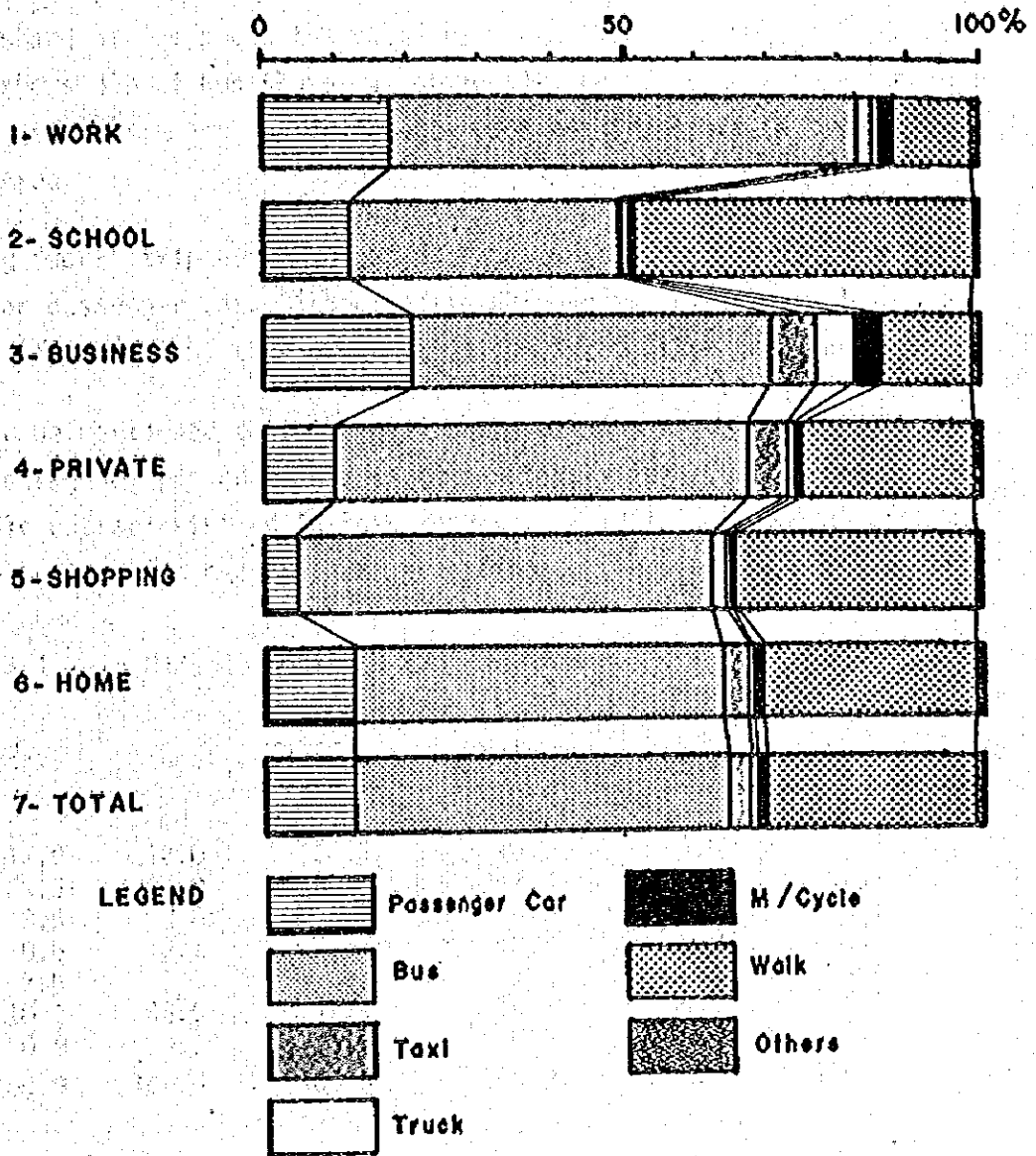
8-4-1. Modal Split.

- Modal split means the share between transport modes. Modal split shows the present situation of urban transport in the Barranquilla Metropolitan Area. That is, this composition expresses the characteristics of selection for transport means which is due to income, car ownership, trip purpose, trip length, etc.
- In this tabulation, mode is given the priority to define the trip mode because the tabulation is done by linked trip. The first priority is given to public transport means, the second one to vehicle, and third to personal means. Thus, the priority is (1) Bus, (2) Taxi, (3) Passenger car, (4) Truck, (5) Motorcycle, (6) Walk, (7) Others in the order named.
- It should be mentioned that the results shown below are the first tabulations of the OD Table which has not yet been adjusted.
- The Bus is the most useful mean of transport for the people, which numbers 1127 thousand trips (52%), and about 30% of the trips is walk (excluding means of access to Bus or Taxi). Passenger Cars number 3% of trips.
- One must notice the low percentage of truck and taxi usage. This low percentage results from the survey of persons in the sampled residence. Movements of truck depend on their companies activities, it is difficult to catch in this survey. Movements and volume of vacant taxis also have not been caught exactly. These conditions will be adjusted by later amendments.

Table 8-4-1. Modal Split.

Mode	No. of trips	%
Passenger Car	274 (x 1000)	12.5
Bus	1,127	51.7
Taxi	74	3.4
Truck	10	0.5
Motorcycle	36	1.6
Walk	652	29.9
Others	9	0.4
Total	2,182	100.0

FIG. 8-4-2 TRIP MODE COMPOSITION



8-4-3 Trip Purpose by Transport Mode.

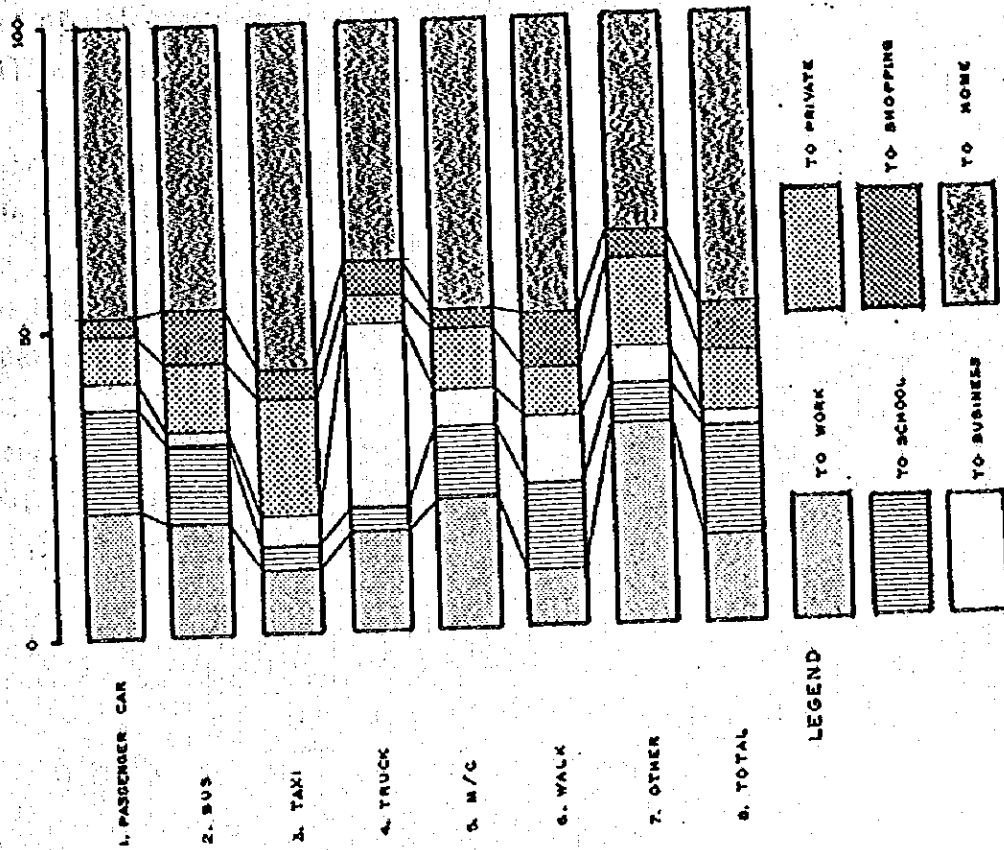
- Average share of Bus shows the value of more than 50% and only "School" Trip purpose shows 33% of bus share. It obviously certifies the importance of a public transportation means and the dependence upon bus transport in Barranquilla Metropolitan Area.
- Regarding "Work" trip purpose, "bus" is the major transport means and "walk" has a lower value than passenger car. "School" Trip purpose is mainly by walking, so the usage of bus shows the lowest value comparing other trip purpose.
- It should be mentioned that the half share of "Business" is using bus, and the percentage of passenger car is comparatively low. That is one of the remarkable characteristics in this results. "Private", "Shopping", and "Home" show the position is nearly equal according to the share of modes.

Table 8-4-4 Trip Mode Composition (%)

	Work	School	Business	Private	Shopping	Home	Total
P. Car	17.9	12.0	20.5	10.0	4.5	12.6	12.6
Bus	65.3	37.9	50.2	57.3	57.5	50.7	51.6
Taxi	2.5	0.8	6.5	6.3	2.1	4.1	3.4
Truck	0.5	0.1	5.7	0.2	0.3	0.4	0.5
M/C	2.5	1.1	3.7	1.5	0.6	1.6	1.6
Walk	10.4	48.0	12.4	24.1	34.8	30.3	29.9
Others	0.9	0.1	1.0	0.6	0.2	0.3	0.4
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0

note: non-adjusted OD Table by study team.

TABLE 6-4-1 COMPOSITION OF TRIP PURPOSE BY MODE



8-4-4. Trip Generation/Attraction.

- The number of trip generation/attraction by zone moved by residents in Barranquilla Metropolitan Area is shown in the following figure.
- The number of trip generation by zone is almost equal to trip attraction by zone because of going and returning (to "home" purpose) trips are counted in terms of all mode and all purpose.
- About 226 thousand trips generate and also the same number of trips attract to the medium zone No. 1, such as the Centro Area. The second one is the medium zone No. 8, Boston and El Prado, generating 131 thousand trips. It can be said that this area has recently been developed quickly as the sub-center of Barranquilla.
- The third one, generating about 124 thousand trips, is the medium zone No.19 such as Urb. El Limón, La Magdalena, and José Antonio Galán. This area is a massed residential area.

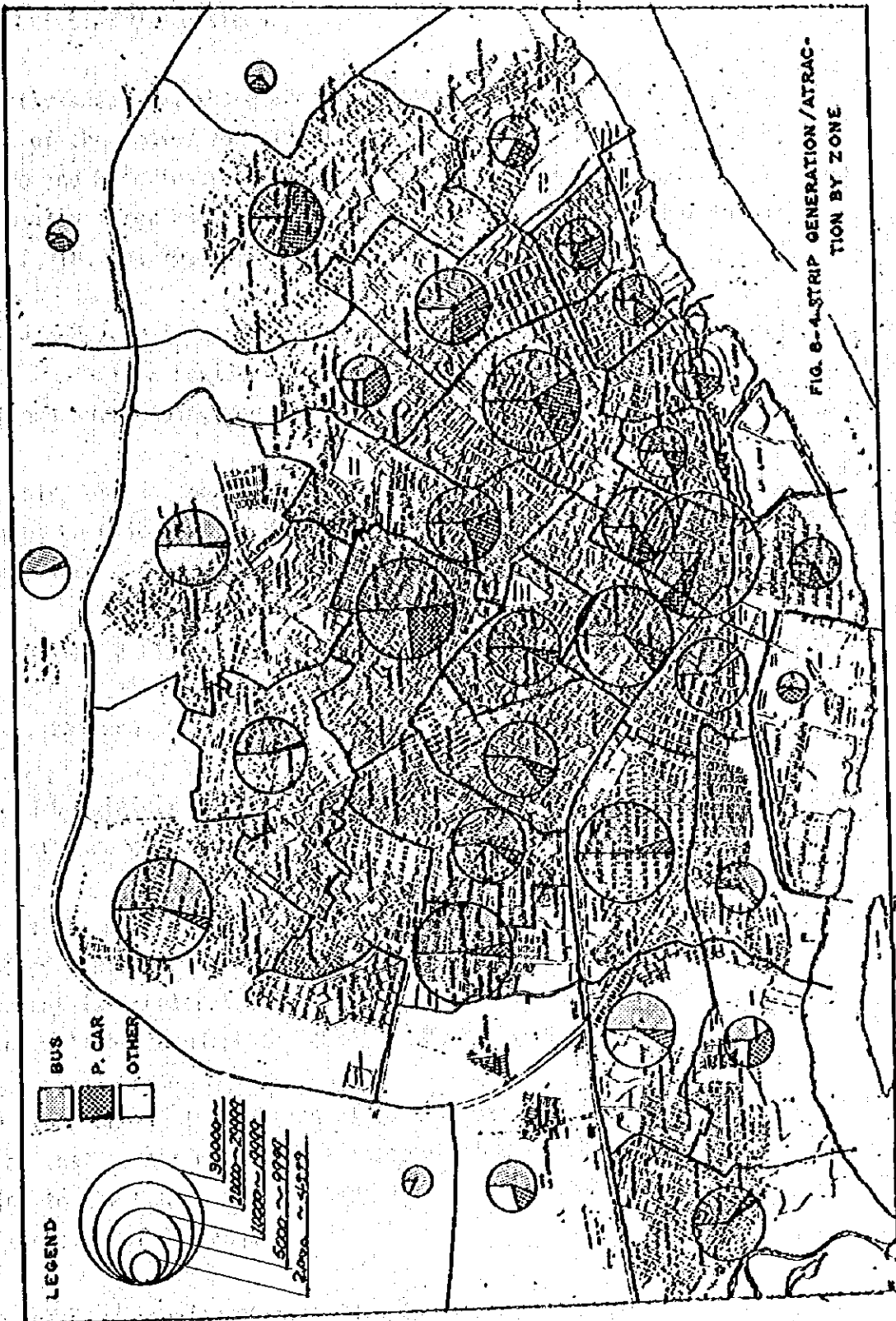


FIG. 8-4. STRIP GENERATION/ATTRACTION BY ZONE

8-5. Existing O-D Pattern.

- Roughly speaking, there are three concentrated points in Barranquilla. In terms of the medium zone level, the first one is zone No. 1 and 2, the Centro and Rosario area, where has the central function of the city. An especially large number of people from southern part of Barranquilla, zone No. 17, 18, 19, 20, 21 and 22, come and back to this area.
- The second zone is zone 8, Boston and El Prado, which is a recently developed upper class residential and commercial area. The number of people in the northern surrounding zones concentrate to this zone.
- The third one is zones 19 and 20, Urbanización El Limón, La Magdalena, San Felipe, La Ceiba, and El Valle, there is a high population density of low and middle income class residential area.
- The following Fig. 8-5-1 shows the pattern of total Mode by total purposes.

8-5-2. Pattern of Bus Users.

- It can be plainly found that there are two important characteristics of bus users figure of desired line.
- One is the concentration pattern of bus users. Almost all bus users in every zone concentrate to the Centro area. It can be said that this inclination of movement is accelerated by the bus-route-network. The another concentrated point will be found at the Zone No. 8, El Prado and Boston area.
- The other one is the pattern of zone location concentrating to the Centro area. That is the majority of zones which generate a large number of bus trips to the Centro are located in the southern half-side from Carrera 38 in the city of Barranquilla.
- The bus-users moving pattern is shown in Fig. 8-5-2.

8-5-3. Pattern of "Work" Purpose.

- More than half the number of residential zones generate the work trips over 10 thousands with trips. On the contrary, the work trips attract mainly only 7 zones, such as zone No. 1, 2, 3, 4, 8, 9 and 17.
- The medium zone No. 1 attracted the largest number of work trips about 78 thousand trips. The attractions to zone No. 1 have been induced from every zone. Especially the largest number of work trips were attract from zone No. 19 (Urbanización El Limón, El Santuario, La Magdalena), and zone No. 22 (Estadio Metropolitano and Santamaría).
- The attractions to zone No. 2 are different from those of zone No. 1. Especially, those attractions are mainly the zone No. 20 (San Felipe, La Ceiba and El Valle), No. 22 (Estadio Metropolitano, Santa María) and No. 8 (Boston, El Prado).
- The attraction to the zone No. 8 are mainly zone No. 20, No. 22, and No. 27 (Paraiso). The attractions to the zone No. 9 are mainly zone No. 7 (La Concepción), No. 12 (La Florida), No. 27 (Paraiso), and No. 26 (El Golf, Urb. La Cumbre).
- These movement pattern is shown in following Figure 8-5-3.

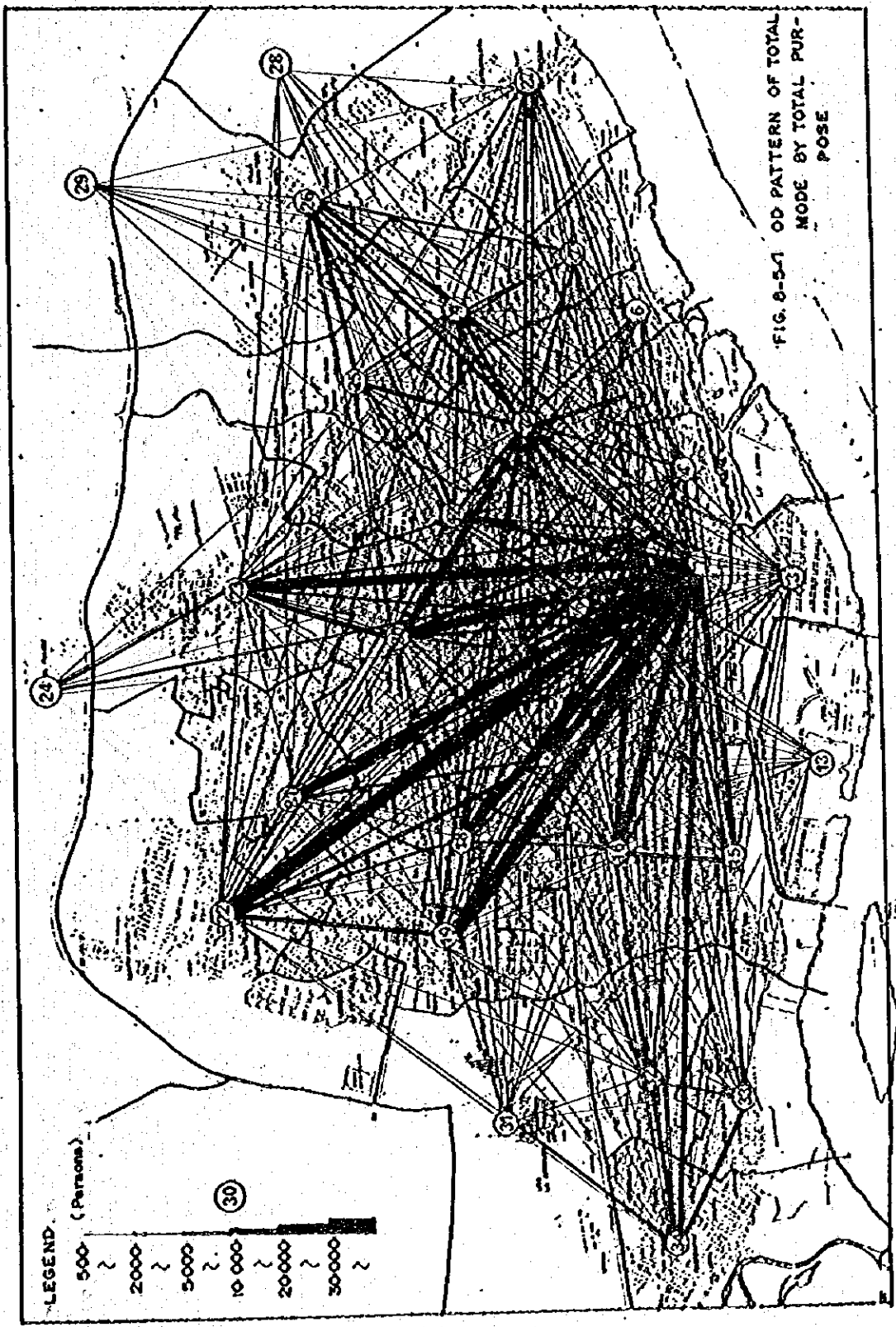


FIG. 6-5-1 OD PATTERN OF TOTAL TRIPS MADE BY TOTAL PURPOSE

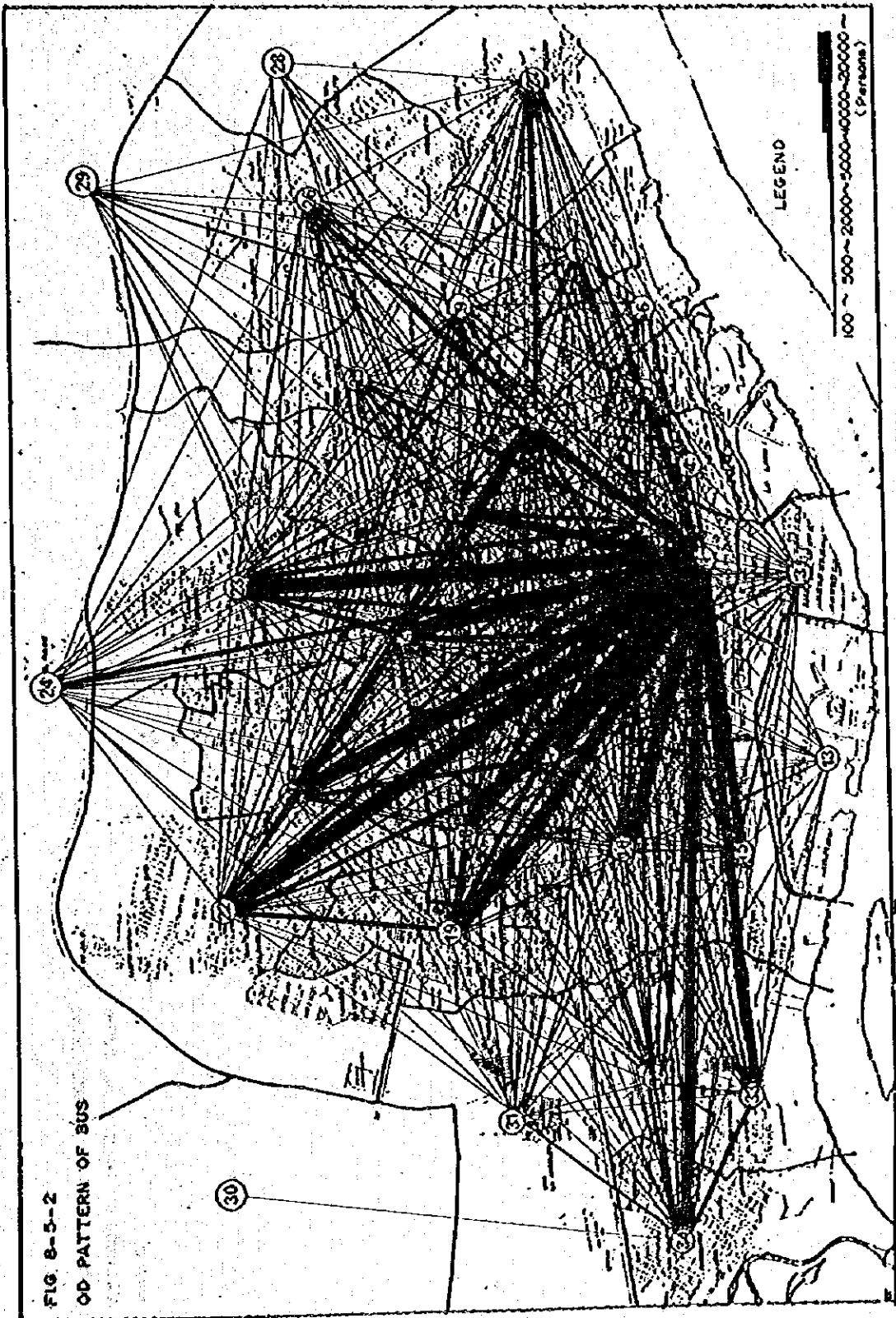


FIG. 8-5-2
OD PATTERN OF BUS

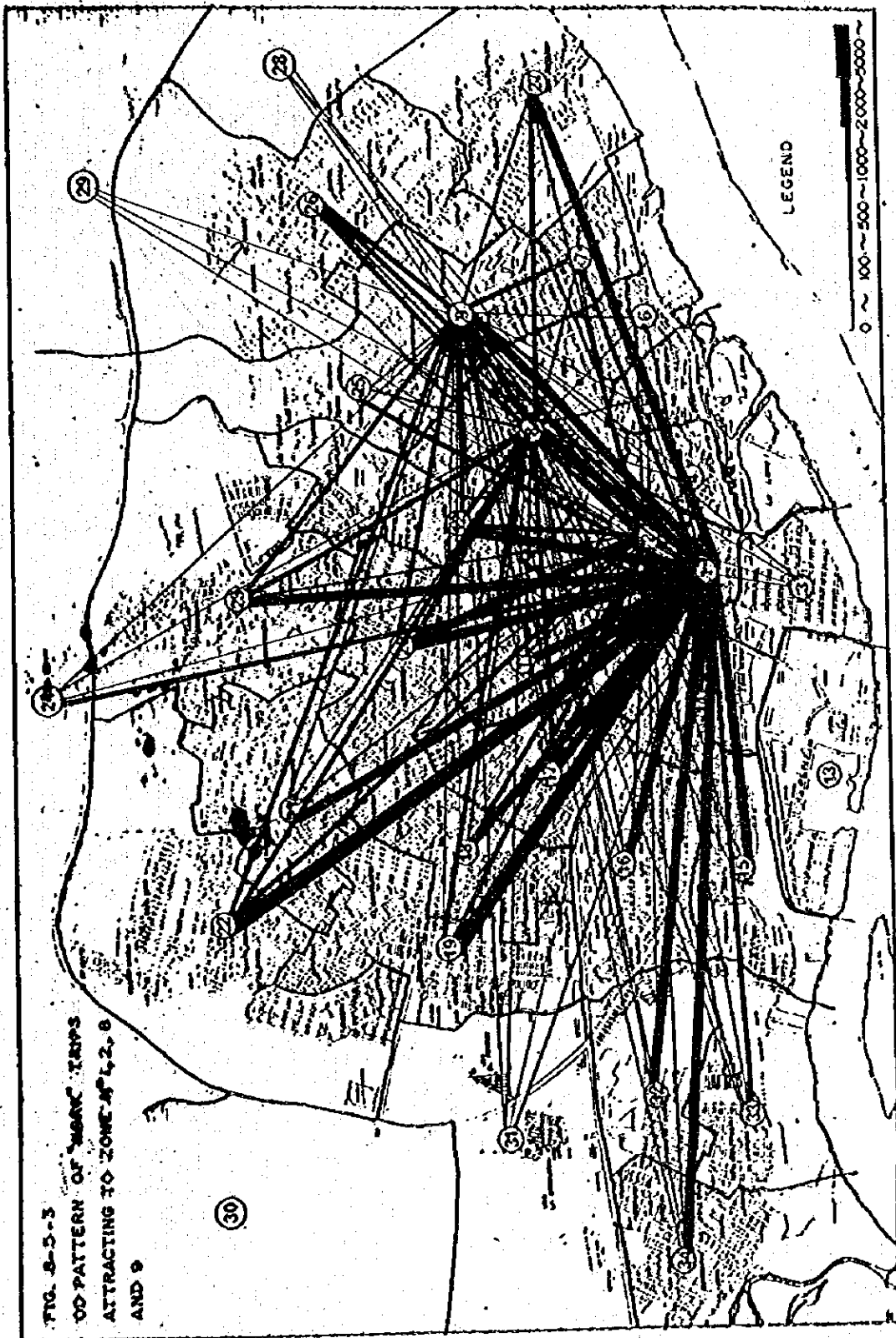
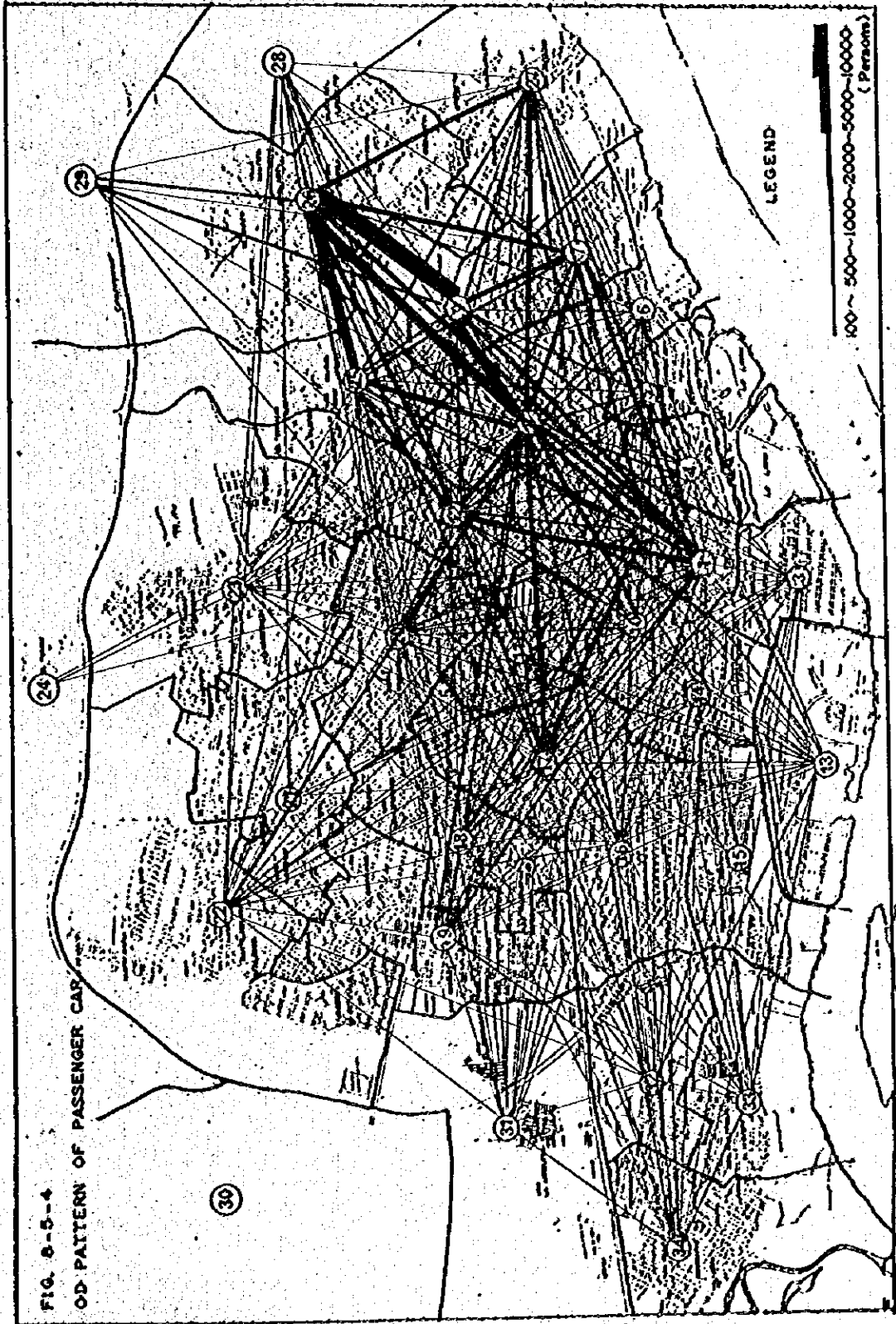


FIG. 8-5-3
 PATTERN OF MAGNETIC TRAPS
 ATTRACTING TO ZONES A, L, 2, 6
 AND 9



APPENDIX A STAFFING

1. Coordinating committee. Government of Colombia

- (1) Dr. Jacobo Acosta Bendek
Alcalde de Barranquilla.
- (2) Dra. Nohora Bateman Durán
Jefe de la División de Cooperación Técnica.
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2. Technical Committee

- (1) Dr. Luis A. Cervantes
Secretario de Colpuertos.
- (2) Dr. Adriano Mobil Arias
Director del INTRA.
- (3) Dr. Luis Ernesto Bejarano C.
Policia Vial
- (4) Dr. Alfredo Saade.
Director del Ministerio de Obras Ppublicas.
- (5) Dr. Jesús Polo Payares
Dirección de Transporte y Tránsito
- (6) Dr. Guillermo Sarmiento
Corporación Financiera de Transporte.

3. Study Team. Counterparts.

- (1) Dr. Adolfo Támara Pastor
Secretario de Urbanismo Fomento y Planeación
Municipal de Barranquilla.
- (2) Dra. Mary García de Blava
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Asesora Ejecutiva del Proyecto.
- (3) Dr. Gabriel Arévalo Q.
Jefe de Desarrollo Urbano del Municipio.

- (4) Dr. Luis F. Cuello
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- (5) Dr. Mario Hernández S.
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- (6) Dr. Armando Meza A.
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- (7) Dr. Rafael Peña De Castro
Ingeniero de Transporte.
- (8) Dr. Ricardo Fabregas Escorcía.
Ingeniero Civil.
- (9) Dr. Oscar Narváez Martínez
Economista.

3. Supervisory Committee, Government of Japan.

- (1) Profesor Kazuhiro Yoshikawa
Profesor Kyoto University.
- (2) Mr. Tatuó Ogiwara
Ministry of Construction.
- (3) Mr. Masaaki Tanaka
Ministry of Construction.
- (4) Mr. Akira Uezono
Ministry of Transport.
- (5) Mr. Haruo Enomoto
Ministry of Transport .
- (6) Mr. Kazuo Yamazaki
Metropolitan Expressway Public Cooperation.
- (7) Mr. Kimiaki Yamaguchi
(Japan International Cooperation Agency)

4. Study Team.

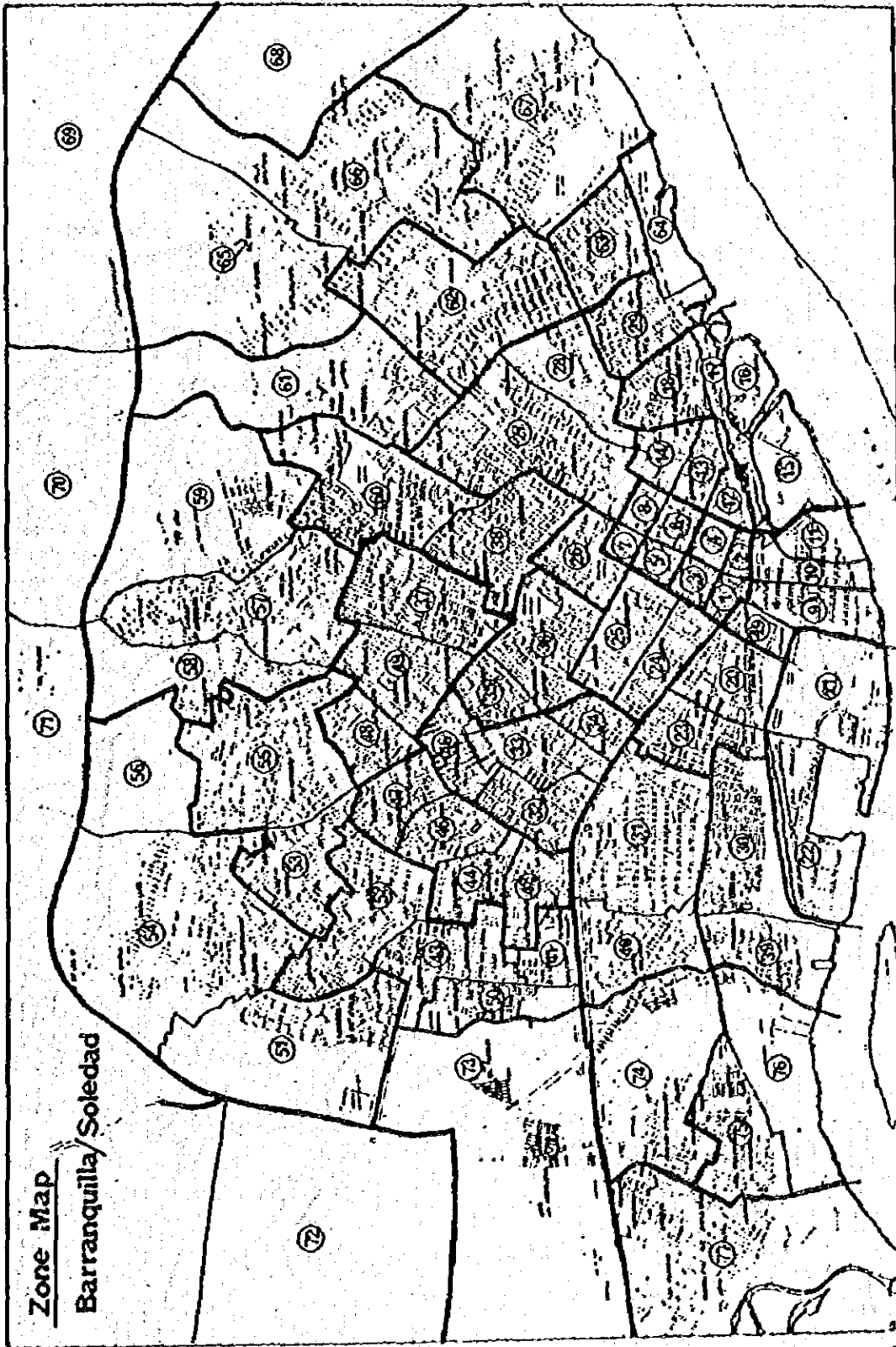
- (1) Mr. Takeo Sato
Project Manager.

- (2) Mr. Toshisada Katsurada
Project Coordinator / Transportation Planner.
- (3) Mr. Yuji Morioka
City Planner.
- (4) Mr. Kanenari Ijuin
Highway Engineer.
- (5) Mr. Koichi Kaneko
Public Transport Planner.
- (6) Mr. Iwane Mizuno
Land Use Planner.
- (7) Mr. Kimio Kaneko
Traffic Engineer.
- (8) Mr. Isaō Sagae
Traffic Survey Planner.
- (9) Mr. Yusuke Kajimura
Traffic Survey Planner.
- (10) Mr. Masayuki Ishiya
Computer Engineer.

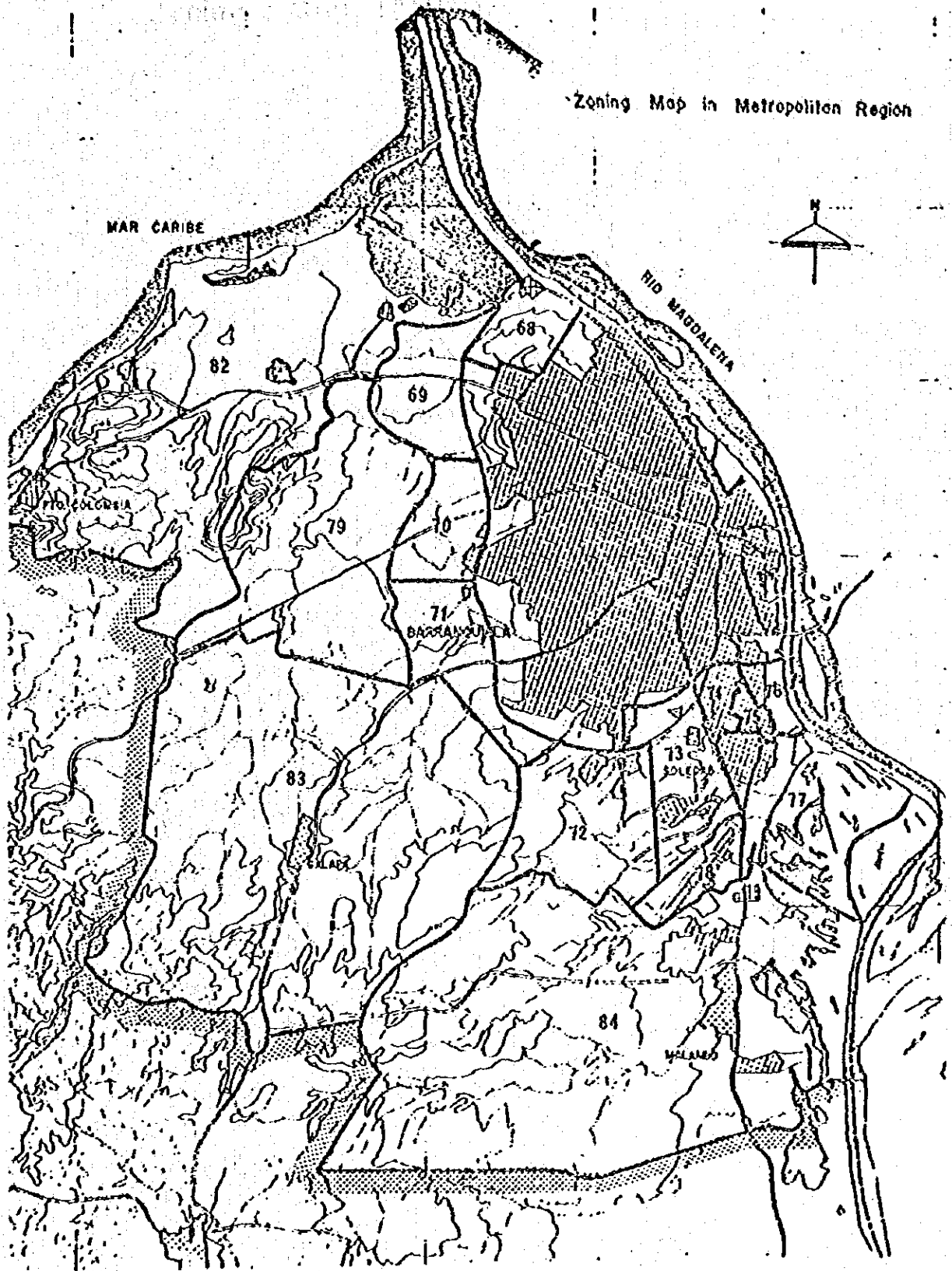
APPENDIX B ZONING SYSTEM

Zone No.	Zone Name		Zone No.	Zone Name	
1	Centro	B/Q	51	Estadio Metropolitano	B/Q
2	Centro	B/Q	52	El Santuario	B/Q
3	Centro	B/Q	53	Las Américas	B/Q
4	Centro	B/Q	54	Santa María	B/Q
5	Rosario	B/Q	55	El Bosque	B/Q
6	Rosario	B/Q	56	Las Malvinas	B/Q
7	Rosario	B/Q	57	Nueva Colombia	B/Q
8	Rosario	B/Q	58	Evaristo Sourdis	B/Q
9	Villanueva	B/Q	59	Mequejo	B/Q
10	Villanueva	B/Q	60	La Florida	B/Q
11	Villanueva	B/Q	61	Ciudad Jardín	B/Q
12	Barlovento	B/Q	62	Alto Prado	B/Q
13	Barrio Abajo	B/Q	63	La Concepción	B/Q
14	Monte Cristo	B/Q	64	Unión Industrial	B/Q
15	La Loma 1	B/Q	65	Urb. La Cumbre	B/Q
16	La Loma 2	B/Q	66	El Golf	B/Q
17	Vía 40	B/Q	67	Paraiso	B/Q
18	María Modelo	B/Q	68	Las Flores	B/Q
19	Cervecería Aguila	B/Q	69	Univ. del Norte	B/Q
20	Zona Negra	B/Q	70	Los Olivos	B/Q
21	Puerto	B/Q	71	El Pueblo	B/Q
22	Zona Franca	B/Q	72	Gran Abastos	B/Q
23	Rebolo	B/Q	73	Urb. La Arboleda	Soledad
24	San Roque	B/Q	74	Hípódromo	Soledad
25	Chiquinquira	B/Q	75	Centenario	Soledad
26	Univ. Atlántico	B/Q	76	Temponorte	Soledad
27	Boston	B/Q	77	Centro	Soledad
28	El Prado	B/Q	78	Aeropuerto	Soledad
29	Santa Ana	B/Q	79	Juan Mina	
30	La Chinita	B/Q	80	Unknown	B/Q
31	Las Nieves	B/Q	81	Unknown	Soledad
32	Boyacá	B/Q	82	Pto. Colombia	Atlántico
33	San José	B/Q	83	Galapa	Atlántico
34	Montes	B/Q	84	Malambo	Atlántico
35	El Carmen	B/Q	85	Tubará	Atlántico
36	Alfonso López	B/Q	86	Baranoa	Atlántico
37	San Felipe	B/Q	87	Polo Nuevo	Atlántico
38	Tanque El Recreo	B/Q	88	Sto. Tomás	Atlántico
39	Pasadena	B/Q	89	Candelaria	Atlántico
40	Simón Bolívar	B/Q	90	Sábana Larga	Atlántico
41	Urb. El Limón	B/Q	91	Juan de Acosta	Atlántico
42	La Unión	B/Q	92	Remolino	Magdalena
43	La Magdalena	B/Q	93	Fundación	Magdalena
44	El Campito	B/Q	94	Ciénaga	Magdalena
45	La Victoria	B/Q	95	Santa Marta	Magdalena
46	Cevillar	B/Q	96	Others	Magdalena
47	La Sierra	B/Q	97	Guaajira	
48	La Ceiba	B/Q	98	Cosar	
49	El Valle	B/Q	99	Cartagena	
50	José Antonio Galán	B/Q	100	Bolívar	

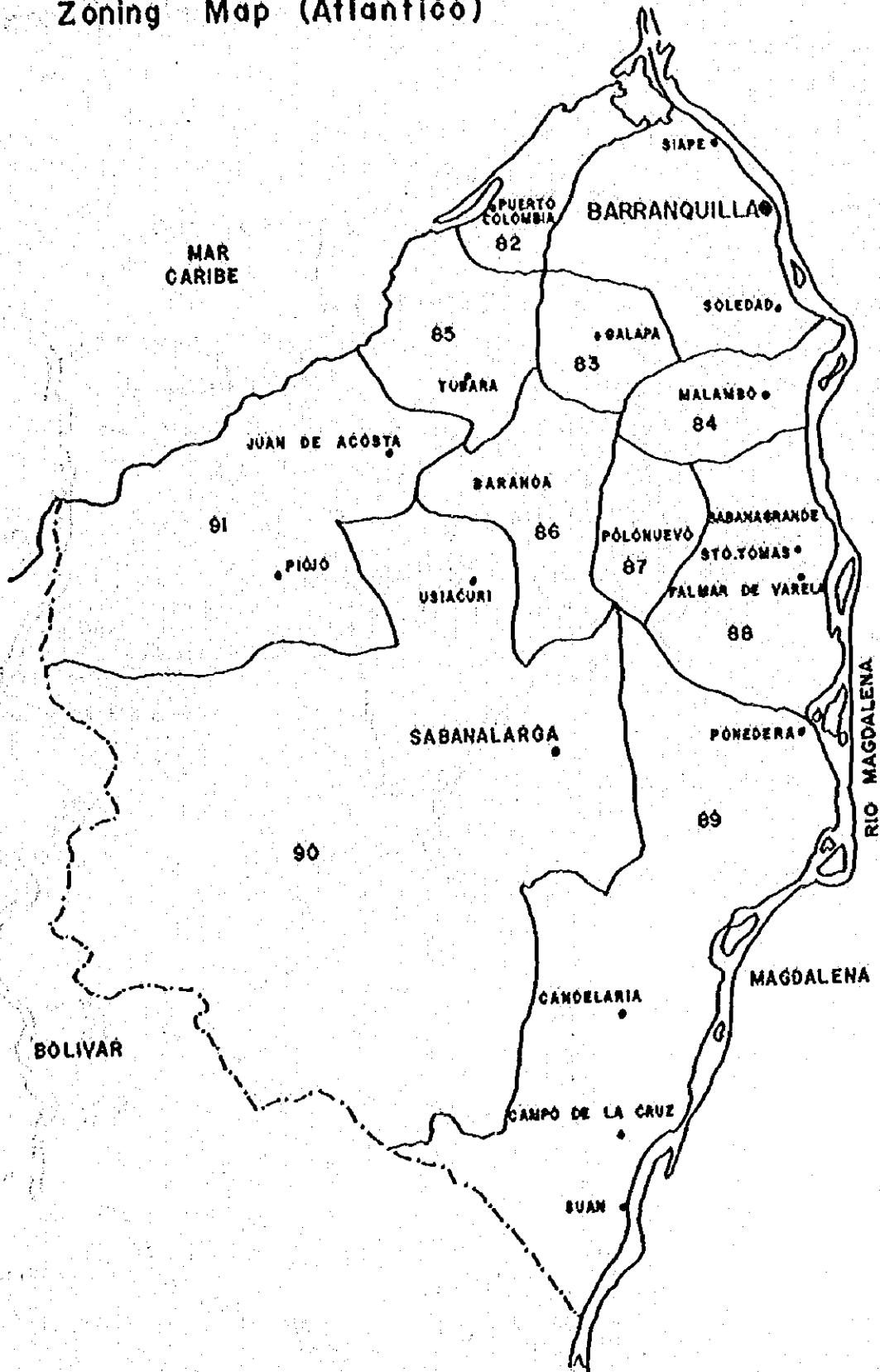
Zone No.	Zone Name	Zone No.	Zone Name
101	Norte de Santander	107	Bogotá
102	Santander	108	Amazonas
103	Boyacá	109	Venezuela
104	Antioquia	110	Brasil
105	Sucre	111	Ecuador
106	Valle	112	Panama



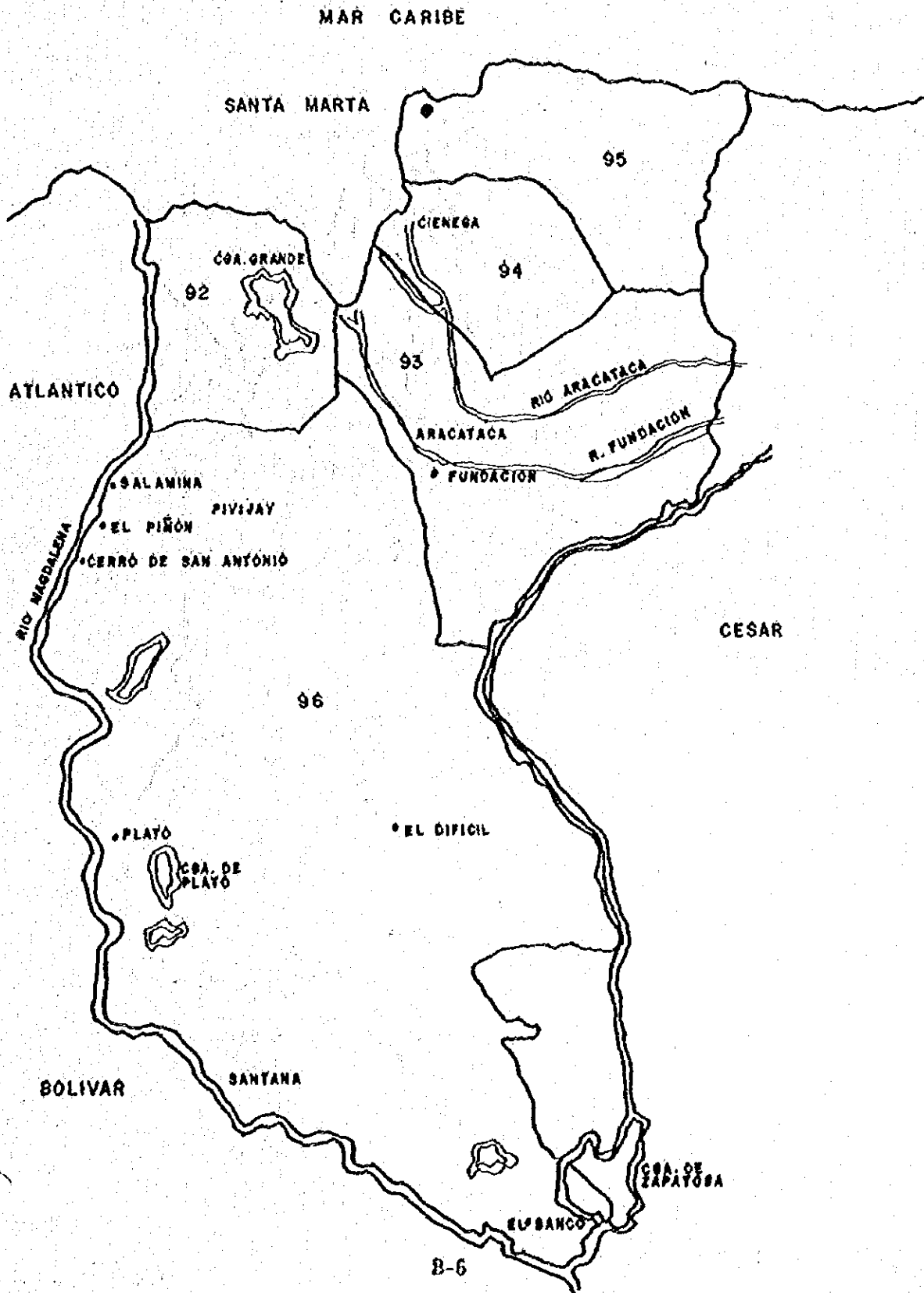
Zoning Map in Metropolitan Region



Zoning Map (Atlantico)



Zoning Map (Magdalena)



Zoning Map (Colombia)

