

## Durham E-Theses

---

*The impact of socio-economic change on Saudi urban transportation, Eastern region : Female transportation.*

Amer Nasser Almetair

### How to cite:

---

Almetair, Amer Nasser (1987) The impact of socio-economic change on Saudi urban transportation, Eastern region : Female transportation. Doctoral thesis, Durham University.

### Use policy

---

The full-text may be used and/or reproduced, and given to third parties in any format or medium, without prior permission or charge, for personal research or study, educational, or not-for-profit purposes provided that:

- a full bibliographic reference is made to the original source
- a <https://etheses.durham.ac.uk/id/eprint/1692/> is made to the metadata record in Durham E-Theses
- the full-text is not changed in any way

The full-text must not be sold in any format or medium without the formal permission of the copyright holders.

Please consult the [full Durham E-Theses policy](#) for further details.

THE IMPACT OF SOCIO-ECONOMIC CHANGE ON  
SAUDI URBAN TRANSPORTATION, EASTERN  
REGION : FEMALE TRANSPORTATION

AMER NASSER ALMETAIR

B.A. University of King Saud  
M.A. University of Pittsburgh, U.S.A.  
Graduate Society

The copyright of this thesis rests with the author.  
No quotation from it should be published without  
his prior written consent and information derived  
from it should be acknowledged.

Thesis submitted for the Ph.D. degree in the Faculty of  
Social Sciences, University of Durham, Durham, England.

November, 1987.



10 MAY 1988

ABSTRACT

From oil revenues have come the massive funds which made possible the rapid economic transformation of Saudi Arabia, in particular some of its regions and some of its cities. During this period of transformation the government devoted a great deal of attention and effort to the strategy of physical planning development, which included the massive road and rail construction programme, the building of airports and sea ports, the growth of industry, housing and schools. However, it devoted far less attention to public transportation systems.

The growth in physical and economic development resulted in a demand by both men and women for increased transport provision, either public or private. To fulfil this demand, there was a rapid increase in the number of private cars in an attempt to satisfy the transport requirements of all members of each household, particularly the employed females. At the same time planning and provision of public transport was, and still is, a long way from understanding and meeting the needs of women, in particular those who are employed, and of their families. The transport of women, who continue to be dependent largely upon the use of private cars, tends to increase the huge disparity between private and public transport use. This has in turn led to further problems.

This thesis addresses itself to a study and discussion of the impact of socio-economic changes on Saudi urban transportation, with special reference to the urban transportation of females, in particular those in employment and suggests measures suited to the cultural traditions of the country which could be applied to alleviate the problems.

ACKNOWLEDGEMENTS

I wish to record here my deep gratitude to my supervisor, Dr. Ray Hudson, whose consistent patience and encouragement, valuable advice, constructive comments and suggestions for improvement have been inestimable value in the preparation of this work in its present form. His advice and encouragement extended to a number of long distance telephone calls from England to Saudi Arabia during my fieldwork.

Also I owe much gratitude to my co-supervisor, Dr. Gerald Blake, for his consistent encouragement and helpful comments.

My sincere thanks go to Professor Clarke and Professor Simmons for accepting me as a postgraduate student; also to the staff of the Computer Department in particular the duty adviser Dr. William; also to the staff of the Drawing Office and Photographic Unit of the Geography Department; also to the library staff of the Centre for Middle Eastern Studies.

Here I must also record my gratitude to the City of Durham Council who provided me with a council house at short notice, when I was in urgent need.

In Saudi Arabia, I wish to thank the King Saud University in Riyadh for enabling me to come to Durham and King Faisal University in Dammam for providing me with a flat during my fieldwork.

My gratitude goes to the Director of the Presidency of Girls' Education in Dammam and its branches for distributing the

questionnaires to their schools, and also to the Ministries of Municipal and Rural Affairs, of Planning, and of Communications. I wish to thank the Municipality of Dammam, the Department of Railways and Dammam Seaport, and Aramco, among many other organizations and authorities which are too numerous to mention.

Last but not least, I wish to express here my deep love and gratitude to my late father, to my late Great Aunt Shekah, to my mother, my wife, my two beautiful daughters and to all my brothers and sisters; I am deeply indebted to them and to many others not mentioned here.

To my beloved family : mother, wife,  
daughters, brothers and sisters.

CONTENTS

	<u>Page</u>
ABSTRACT .....	i
ACKNOWLEDGEMENT .....	ii
CONTENTS .....	iv
LIST OF TABLES .....	ix
LIST OF FIGURES .....	xii
LIST OF PLATES .....	xiv
GLOSSARY .....	xv
<u>CHAPTER ONE</u> : <u>INTRODUCTION</u>	1
1.1 Introduction .....	1
1.2 Socio-economic development .....	1
1.3 Population growth and distribution .....	16
1.4 The significance of the study .....	18
1.5 Transport needs for female employees .....	20
1.6 Purpose of the study .....	22
1.7 Methodological issues .....	25
1.8 Outline of the remainder .....	26
1.9 References .....	29
<u>CHAPTER TWO</u> : <u>A BRIEF HISTORY OF MODERN TRANSPORT IN</u> <u>RELATION TO ECONOMIC DEVELOPMENT</u>	32
2.1 Introduction .....	32
2.2 Roads and motorways .....	32
2.2.1 Road development from the discovery of oil to 1970 .....	33

	<u>Page</u>
2.2.2 Motorway construction under development plans .....	37
2.3 Sea ports crisis and development .....	42
2.4 Railways .....	47
2.5 Saudi airlines and airports .....	57
2.6 SAPTCO (Saudi Arabian Public Transport Company) .....	62
2.7 Summary .....	66
2.8 References .....	69
<u>CHAPTER THREE</u> : <u>TRANSPORT PROBLEMS OF A RAPIDLY GROWING</u>	
<u>CITY : DAMMAM</u>	74
3.1 Introduction .....	74
3.2 The traditional character of the Saudi City before oil exploitation .....	75
3.3 Urban growth in Dammam .....	79
3.3.1 Effect of Aramco as the focal point .....	79
3.3.2 Aramco Home Ownership Program .....	82
3.3.3 The effect of the Real Estate Development Fund .....	85
3.3.4 Housing growth in Dammam .....	88
3.3.5 Land prices .....	91
3.3.6 City boundaries .....	95
3.3.7 Road and street patterns of Dammam .....	97
3.3.7.1 The old road system .....	97
3.3.7.2 The new street system in Dammam .....	102
3.4 Traffic growth .....	107
3.4.1 Private auto transport demands .....	108

	<u>Page</u>
3.4.2 Public transport demands .....	113
3.4.2.1 Public transport before SAPTCO .....	114
3.4.2.2 Public transport competition .....	116
3.4.2.3 Male/female ratio of users of public transport .....	120
3.5 Traffic accidents .....	124
3.6 Summary .....	130
3.7 References .....	133
<u>CHAPTER FOUR</u> : <u>THE EXISTING CONDITIONS OF LAND-USE IN DAMMAM, AND THEIR RELATION TO TRANSPORT</u>	140
4.1 Introduction .....	140
4.2 Alternative planning concepts of the Easter Region ..	140
4.3 Alternative planning concepts of the DMA .....	144
4.4 The current pattern of land-use .....	147
4.4.1 Residential land-use .....	149
4.4.2 Educational facilities .....	155
4.4.3 Commercial land-use .....	159
4.5 Employment .....	163
4.6 Summary .....	165
4.7 References .....	167
<u>CHAPTER FIVE</u> : <u>THE SURVEYS OF TRANSPORTATION OF WOMEN TEACHERS</u>	170
5.1 Introduction .....	170
5.2 Comparison of modes of transport and mobility pattern .....	172

	<u>Page</u>
5.2.1	Introduction and definition ..... 172
5.2.2	Modes of intra and inter city mobility of women teachers ..... 173
5.2.2.1	Dammam ..... 173
5.2.2.2	Khobar ..... 175
5.2.2.3	Dharhan ..... 177
5.2.2.4	Qatif ..... 177
5.2.2.5	Safwa ..... 180
5.2.2.6	Rahima ..... 183
5.2.2.7	Jubail ..... 185
5.2.3	General trends of modes and mobility pattern ..... 187
5.2.3.1	The trends of intra urban mobility ..... 187
5.2.3.2	The trends of inter urban mobility ..... 189
5.3	Attitudes of heads of households and women teachers . 192
5.3.1	Introduction ..... 192
5.3.2	The experience of heads of households ..... 193
5.3.2.1	Household : Mobility patterns of Dammam women teachers ..... 193
5.3.2.2	Attitudes of the heads of households ..... 200
5.3.2.2.1	Reactions as to using a family chauffeur .. 201
5.3.2.2.2	The heads of households attitudes towards women drivers ..... 207
5.3.3	Transport problems in the experience of employed women ..... 212
5.3.3.1	Introduction ..... 212

	<u>Page</u>
5.3.3.2 The experience of the female teacher on her transport problems .....	213
5.3.3.3 Factors affecting women in the use of public transport in terms of their experience .....	214
5.3.3.4 Women's ideas about using family chauffeurs .....	223
5.3.3.5 Women's ideas on women drivers .....	225
5.4 Summary .....	225
5.5 References .....	231
 <u>CHAPTER SIX</u> : <u>POSSIBLE TRANSPORT ALTERNATIVE AND</u> <u>RECOMMENDATION</u>	 234
6.1 Introduction .....	234
6.2 Paratransit : objective and definitions .....	236
6.3 Paratransit : types of system .....	238
6.3.1 The hail or phone service .....	240
6.3.2 Hire and drive service .....	240
6.3.3 Pre-arranged ride-sharing services .....	240
6.4 Advantages of high occupancy vehicles .....	243
6.5 Summary .....	256
6.6 References .....	258
 <u>CHAPTER SEVEN</u> : <u>CONCLUSION</u>	 261
 BIBLIOGRAPHY .....	 270
APPENDICES .....	289

LIST OF TABLES

	<u>Page</u>
1.1 Distribution of the Country's Total Population 1970, 1980	4
1.2 Oil Consumption and Number of Vehicles - 1971-1982	5
1.3 Industrial Consumption of Electricity 1981-83	9
1.4 The Total Consumption of Electricity 1981-83	10
1.5 Average Increase/Decrease in Non-Oil Sectors 1977-1984	15
1.6 Regional Distribution of Settlements by Population Size, 1974	17
1.7 Number of Hours Lost and the Loss to the Economy, 1981	19
1.8 Number of Girls Enrolled in Full-time Education, 1961-1984	21
1.9 Intra-City Female Passengers with Saudi Public Transport Company (SAPTCO) 1981	24
2.1 Volume of Imported Goods 1970-1983	44
2.2 Saudi Ports Situation in September 1976	45
2.3 Ranking of Sea Ports in both the Arabian Gulf and Red Sea	49
2.4 Growth of Passenger Traffic on Saudi Airlines 1975-1984	63
2.5 The Busiest Airports in the Middle East	64
2.6 Capacity of Middle East Fleets	65
3.1 Distribution of Aramco Employees Building Plots 1981-1987	85
3.2 Loans Provided by the Real Estate Development Fund 1975-1983 in millions of Saudi Riyals	87
3.3 The Number of Permits Issued for New Buildings in and around Dammam City 1977-1982	89
3.4 Comparison of Number of Housing Permits Issued in Major Saudi Cities Between 1979-1983	90
3.5 Type of Building Permits Issued in Dammam in 1983	91

	<u>Page</u>
3.6 Consumption of Cement 1970-1983	95
3.7 Driving Licences Issued 1971-1985	109
3.8 Number of Drivers Per Household	113
3.9 SAPTCO's Types of Bus	118
3.10 Nationalities of SAPTCO Employees	119
3.11 Mode of Transportation by Working Males Living in Dammam	123
3.12 Last Use of SAPTCO	123
3.13 Traffic Accidents, Injuries and Death in 1984	125
3.14 Cumulative Percentage of Accidents in Dammam 1984	127
3.15 Correlation of Vehicles Speed and Air Pollution Emission from Road Traffic	132
4.1 Population of Dammam and Dammam Metropolitan Area 1962-1985	150
4.2 Dammam Districts and Forms of Land-Use	152
4.3 Distribution of the Total Number of Pupils in Schools at each level in Dammam 1985	156
4.4 Distance in kms of Schools from Dammam City Centre	157
4.5 Types of Commercial Activities in Two Different Street Locations	162
5.1 Modes of Transport Used by Women Teachers Travelling to and Working in Dammam	176
5.2 Modes of Transport Used by Women Teachers Travelling to and Working in Qatif	179
5.3 Modes of Transport Used by Women Teachers Travelling to and Working in Safwa	184
5.4 Students in Saudi Universities and Girls' Colleges 1983-1984	195

	<u>Page</u>
5.5 Mode of Transportation Used by Women Teachers Within Dammam and between Dammam and Qatif	197
5.6 Average Distance Between the School and the Home of Female Teachers	199
5.7 Attitude by Head of Household to Using Chauffeurs	202
5.8 Heads of Households Attitudes to Women Hailing a Taxi on the Street	205
5.9 Heads of Households Attitudes to Allowing Women to Drive	211
5.10 Correlation of Availability of Family Cars to Women with Transport Problems	216
5.11 Rank Order of Factors that would encourage greater Women's Use of the Public Transport System (SAPTCO)	218
5.12 Number of Women Using SAPTCO in Dammam and Surrounding Areas 1980-1984	220
5.13 Attitudes of Female Teachers to Use of Family Chauffeur	224
5.14 Attitude of Female on Allowing Women to Drive	226
6.1 Decline in Public Transport Revenue United States of America 1945-1974	237
6.2 Comparison of Road Vehicles Per Head of Population in 1984	246

LIST OF FIGURES

	<u>Page</u>
1.1 East-West Industrial Corridor	8
1.2 Industrial and Non-Industrial Electric Consumption by Regions, 1983	12
1.3 Annual Government Income, Expenditure, Daily Oil Production, and Oil Prices	13
1.4 Model of Saudi Arabian Economic and Transport Growth	14
1.5 Saudi Arabia Eastern Region and Survey Location	27
2.1 The Growth of Car Registration in Riyadh compared with Dharhan and Jeddah 1959-1964	35
2.2 Road Development 1938-1970	36
2.3 Road Growth Under Development Plans	39
2.4 Average Daily Traffic (in East-West Corridor 1978)	40
2.5 The Stages of Development of Dammam Sea Port	48
2.6 Alternative Routes for New Infrastructures (Recommended in 1975)	54
2.7 Makkah Public Transport Network Recommended by the Saudi Arabian National Transport, 1982	56
2.8 Riyadh in 1950 and 1960, showing Development Along Road to Airport	59
2.9 The New Airport of the Eastern Region	61
3.1 The Stages of Urban Growth in Dammam	92
3.2 Type of City Streets and Entrances of Dammam	106
3.3 Traffic Distribution By Type of Vehicle 1978 in Dammam	115
4.1 Alternative Development Plans Strategy for the Eastern Region	142

	<u>Page</u>	
4.2	Alternative Development Plans for Dammam Metropolitan Area	146
4.3	Comparison of Population Growth with No. of Cars in Dammam	151
4.4	Dammam Districts	154
4.5	Spatial Distribution of Girls' Schools in Dammam	158
4.6	Commercial Land Use in Dammam	161
5.1	Spatial Distribution of Girls' Schools in Safwa	182
5.2	Intra-urban Comparison of Women's Transport by Private and Shared Hired Transport	188
5.3	Destination of Women Teachers by Shared Hired and Private Transport	190
5.4	Mobility of Women Teachers	191
5.5	Mobility of Women Teachers between Districts in and out of Dammam	198
5.6	Status of Availability of Car to Women Teachers	215
6.1	Paratransit System Types	239
6.2	Route Deviation, Many-to-one, Many-to-few, and Many-to-Many	241
6.3	Average Weekday Regional Traffic Demands in 1995	249
6.4	Type of Daily Person Trips in 1995	250
6.5	Main Exit Routes From Dammam, together with Qatif/Safwa Settlements Distribution	255
7.1	Growth of Establishment and employment by Economic Activities	263
7.2	Age-Sex Distribution of the Dammam Saudi Population	266

LIST OF PLATES

	<u>Page</u>
3.1 Dammam in 1933	78
3.2 Dharhan : Aramco Camp in 1936	80
3.3 Aramco Home Ownership Area in Dammam in 1957 and 1982	84
3.4 High rise flats, new residential district under construction, and land reclamation in progress to the seaward side of the Dammam City	93
3.5 Hufuf in 1951	99
3.6 Hufuf in 1970	100
3.7 Aerial photo of old and new street patterns in Dammam	105
3.8 Second Hand Car Dealers, Weekend Car Market, and Motor Spares Shops	112
3.9 Public Transport Completion, and Photo of Interior of a SAPTCO Bus	122
3.10 Shows - The Official Concern for the High Accidents	128
4.1 Dammam Municipal Building and a typical modern supermarket	153
5.1 American Type of car used in women shared hired transport	174
5.2 A taxi ignoring women and stopping near men	206
5.3 Women's bus shelter in Dammam City centre	222

GLOSSARY

1. Burga : Traditional full face veil having two eyeholes cut out
2. Fatwa : Formal legal opinion given by religious jurist
3. Hazim (or) suffat : An open space in the centre of the town, contained the main mosque, surrounded by bazaars
4. Mahrm : A male whose close kinship to a female forbids their marriage
5. Mujjabab : A mud-roof stretching across the thoroughfare between the street walls of the houses to protect passersby from the heat of the sun. Usually found in Najd (the areas of the Central Region)
6. Sauq Al Hareem : traditional markets selling only female goods are used extensively by women
7. Sekkah : narrow, winding alley
8. Tariq : road way
9. Tariq al Muslomin : a public thoroughfare
10. Tariq Saria : High speed road or expressway
11. Ullama : religious scholars

## CHAPTER ONE

### INTRODUCTION

#### 1.1 Introduction

The significance of this chapter is to introduce the thesis and sketch out the specific areas it will cover. It will show how the growth in oil production produced the growth in government activities and development proposals which were intended to generate an increase in national income and to benefit Saudi society, particularly in an economic aspect. This strategy resulted in the rapid growth of some of the regions and cities, especially during the period of the five-year development plans. This growth in the economy and in the urban infrastructure and population had consequences which meant that increased transport provision, whether public or private, became a necessity felt by every individual, male and female. Therefore, this introductory chapter is divided into sections as follows :

socio-economic development, population growth and distribution, significance of the study, transport needs of female employees, purpose of the study, methodological issues, and finally an outline of the remainder of the thesis.

#### 1.2 Socio-economic development

Saudi Arabia is important in political circles because of its strategic location in the Middle East, lying in the centre between Asia, Europe and Africa. It has access to both the Red Sea and the Arabian Gulf. In addition to its political importance, Saudi Arabia



has rapidly achieved a position of economic prominence among the nations of the world due to its vast supply of oil and the revenues derived from this resource.

The Kingdom's economy has, historically, been largely based on oasis agriculture, small-scale fishing, nomadic herding of livestock, commerce and on the income received from pilgrimage to Makkah. But the discovery of oil in the 1930's and the rapid increase in its production provided the resources required for a total change in the structure of the economy. This paved the way for aspects of development in different fields : industrial, agricultural, social and urban development:

"Oil revenues have become the chief source of government finance and foreign exchange, and oil production the main component of GDP. In the recent years of hectic development in Saudi Arabia construction has been the second most important component of GDP, although most of this output has been directly funded by oil revenues."(1)

Arthur N. Young, the Head of the Financial Mission of Saudi Arabia during 1951-1952, identifies four phases of growth of Saudi's oil revenue:

- Phase 1. increase of oil production from 1945, after having been held back because of World War II.
- Phase 2. increase of the government's share to 50 per cent from January 1, 1951.
- Phase 3. larger production of oil after 1960, reflecting new discoveries and growing world demand.
- Phase 4. the huge increases of prices by OPEC after the oil embargo imposed in late 1973.(2)

Phase 3 can be considered as the time when all aspects of the life of Saudi Arabia began to change in economic, social and urban conditions. There are several reasons for this : world oil demand increased during the 1960's resulting in an increase in oil production in Saudi Arabia. (At that time the price of oil was still less than two US dollars per barrel). This resulted in an expansion of the ports, as well as a demand for labour resulting in population shift to the oil production areas and to the major cities of Jeddah and Riyadh. As the Second Development Plan stated:

"Migration of both Saudi and non Saudi over the past ten years (1960's)... still moved into the western, central and eastern regions."(3)

This change caused a rapid expansion of Saudi cities quite different from that in the 1950's. For example the average annual growth of Saudi cities and urban areas during the 1950's was seven metres in every direction. During the 1960's this was 45 metres in every direction, with Riyadh expanding 100 metres per annum in all directions. In the late 1960's and early 1970's Riyadh grew by more than 2,000 metres per year in every direction.<sup>(4)</sup> While the concept of 'annual average growth in every direction' is not perhaps the most sophisticated measure, the quantitative difference in growth between time periods points to the qualitative differences involved in the pace and scale of urban growth.

With the increase of national revenue, the government instituted five-yearly Development Plans, the first running from 1970. In the middle of this first five year term, oil prices jumped from about US\$2 per barrel to almost US\$11 per barrel. In 1974, as more oil revenues

became available, the government started the Industrial Development Fund, the Agricultural Development Fund, and the Real Estate Fund. As an example of the extent of the subsequent activities of those Funds, by 1983/84 the Real Estate Fund had made 277,850 loans since its establishment.<sup>(5)</sup> The developments resulting from the activities of these Funds led to further population migration.

This can be seen in Table 1.1 which indicates the significant change in the distribution of the Kingdom's population, with a high rate of urban drift and consequent rural depopulation.

Table 1.1                      Distribution of the Country's Total Population

	1970	1975	1980
Percentage of population living in rural areas.	60	49	46
Percentage of population living in small towns	20	16	12
Percentage of population living in Metropolitan areas (population of more than 100,000)	20	35	42

Source: Third Development Plan (1980-1985), p. 56.

In 1975 the Ministry of Municipal and Rural Affairs initiated preparation of master plans for the development of the major cities. The preparation of these plans was largely undertaken by G. Candilis Metra International Consultants. These master plans included provision for housing, street planning, sewerage construction and so on.

Most of the traditional Saudi cities began to disappear and to be replaced by new buildings, constructed of modern materials, separated by new wide streets. Individuals were encouraged to finance the building of new houses etc. by the Real Estate Fund. Between 1970 and 1978 the average annual growth of all Saudi Arabian cities and urban areas was 65.8 metres in every direction; Dammam City's was as high as 185 metres per annum in all directions while that of Khobar was 86 metres.<sup>(6)</sup>

This rapid urban expansion made increased provision of passenger transportation, both private and public, a necessity. This resulted in a dramatic increase in the number of private cars, with a corresponding rise in the domestic demand for fuel. For example, the capacity and production in 1975 of the refineries at Jeddah and Riyadh was more than doubled. For instance it can be seen from Table 1.2 that between 1971 and 1982 the number of vehicle registrations grew by a factor of 20. The number of cars that were imported in the period of eight years from 1974 to 1982 was 2,644,978. This tremendous growth in the number of vehicles reflects the growth of Saudi cities and the consequent increase of commuting distances and high demand for transport. This impact is further illustrated by the increase in the consumption of fuel oil by motor vehicles, which in 1982 was almost 10 times the level in 1971. As an example, between 1974 and 1982 the actual increase in daily fuel consumption was 35,725 barrels, an increase of 463 per cent.

Table 1.2      Oil Consumption and Numbers of Vehicles

Year	Domestic Consumption of petrol (Barrels per day)	No. of motor vehicles registered
1971	4,438	144,768
1972	5,060	180,185
1973	5,938	242,974
1974	6,277	355,022
1975	9,722	514,361
1976	12,934	774,443
1977	16,640	1,112,973
1978	20,145	1,432,909
1979	24,412	1,723,116
1980	31,369	2,069,479
1981	37,347	2,467,907
1982	41,002	3,018,811

Source : The Achievement of Development Plans. Ministry of Planning, 1983.

With the Second Development Plan (1975-80) the government attempted to reduce the country's dependence upon oil revenue by diversifying into other industries. The aim was to:

"Maintain a high rate of economic growth by developing economic resources, maximising earnings from oil over the long term, and conserving-depletable resources.....

Reduce economic dependence on export of crude oil".<sup>(7)</sup>

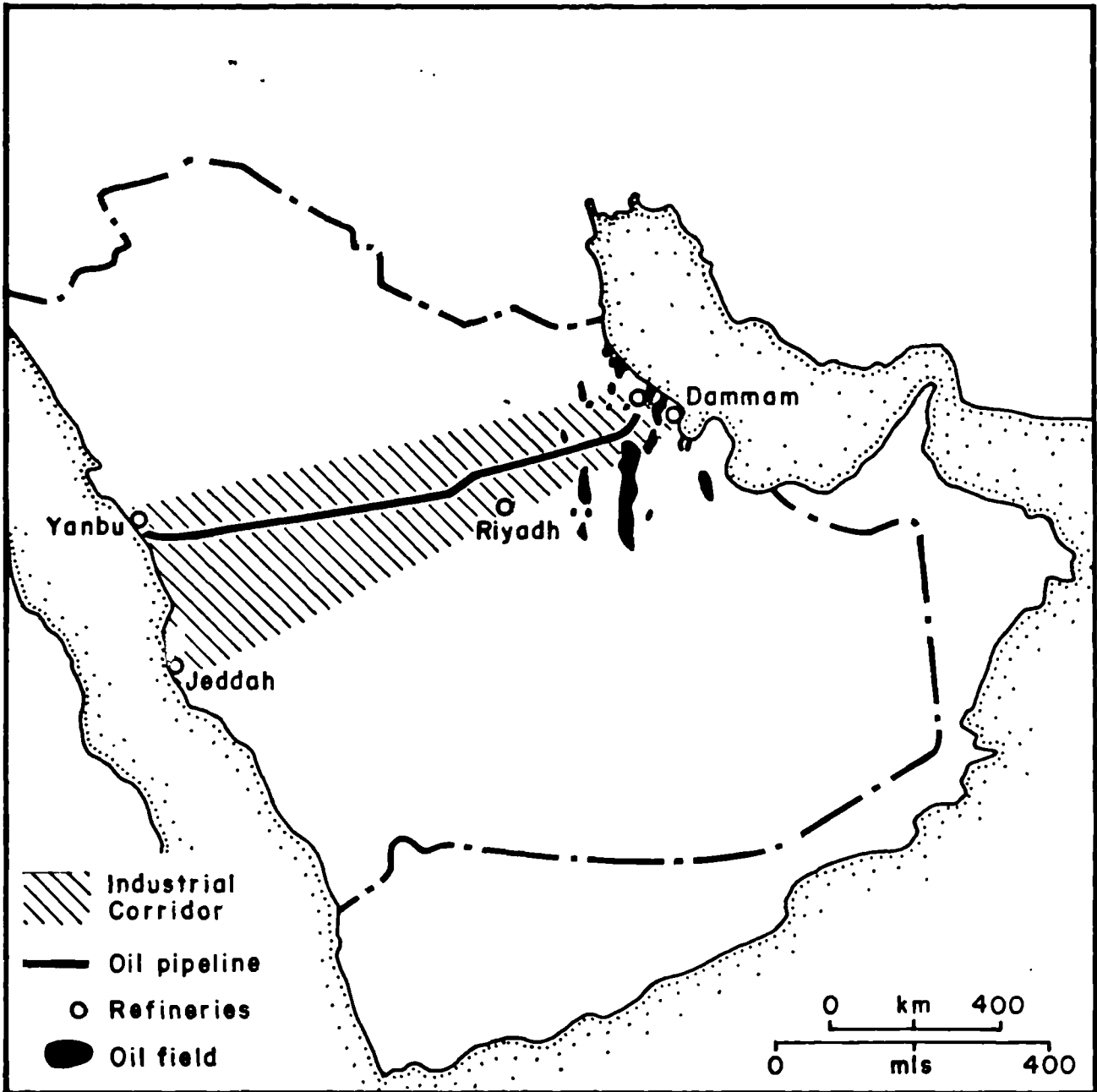
In the same year, 1975, the government decided to build two industrial cities, one in Jubail (Eastern Region), and the other at Yanbu (Western Region). The Royal Commission was established and given full responsibility to plan, implement and operate the physical and institutional infrastructure necessary to transform Jubail and Yanbu from nothing to modern industrial cities<sup>(8)</sup> (Royal Decree No. 75/M of September 1975). The programme of the Royal Commission was to cover a 20 year period and be concerned with the timely provision of adequate infrastructure and trained manpower at the two industrial cities. Infrastructure includes housing, road and other transport, public utilities, telecommunications, commercial markets, schools, medical facilities, training centres and recreational facilities. The primary strategy for the provision of trained manpower involves the construction of training centres and mobilization of both Saudi and non-Saudi industrial employers to train Saudi nationals in all occupations.<sup>(9)</sup>

The main responsibility for developing and supervising the primary industries being installed at Jubail and Yanbu is vested in two government corporations, the General Petroleum and Mineral Organization (PETROMIN) and Saudi Basic Industries Corporation (SABIC). PETROMIN is entering into joint venture agreements with foreign partners for the oil refineries and bulk storage facilities and SABIC is forming joint ventures to install all other hydrocarbon-based and energy-intensive industries.<sup>(10)</sup>

Now, and for the foreseeable future there is an industrial corridor about 150 kms in width stretching from the east coast to the west coast, through Riyadh (see Figure 1.1). The Royal Commission

Figure 1.1

### EAST-WEST INDUSTRIAL CORRIDOR



pointed out that Jubail and Yanbu will speed the regional diversification of manufacturing activities and increase the real income and employment opportunities of the indigenous population - assuming of course that the intended goals of the programme are realised. The future population of Jubail and Yanbu will be 350,000 and 180,000 respectively by 2000 AD.<sup>(11)</sup> As one commentator put it:

"Saudi Arabia is becoming a world force in both refined oil and petrochemical products. The industrial cities of Al-Jubail and Yanbu are at the heart of this revolution."<sup>(12)</sup>

Regionally uneven industrial growth has been reflected in the regional consumption of power.

Table 1.3 shows the industrial consumption of electricity in the east-west corridor.

Table 1.3            Industrial Consumption of Electricity in Million  
of kw per hour (by region)

Year	Eastern Region	Western Region	Central Region	Southern Region	Northern Region
1981	7,355	137	128	4	2
1982	9,683	141	202	9	7
1983	8,246	312	149	12	12

Source : Saudi Arabian Monetary Agency, 1984, p. 112.

This table shows the average hourly consumptions of electricity by industry in each region, and demonstrates the concentration of heavy industry in the Eastern Region, which includes the industrial areas of Jubail, Dammam and the operations centres of the oil industry such as Ras Tanurah and Dhahran. In 1983 the average industrial consumption of electricity decreased in the Eastern Region, as the production of oil decreased. At the same time consumption more than doubled in the Western Region owing to new oil refineries being opened at Yanbu. The Central Region's industrial consumption of electricity was influenced by the decreasing oil production. The Northern and Southern Regions' industrial bases are very weak - and their electricity consumption very small - the imbalance of industrial development in the country is thus demonstrated by these figures.

The industrial consumption of electricity can also be compared to total electricity consumption (Table 1.4).

Table 1.4                      The Total Consumption of Electricity by Region  
(million of kw per hour)

Year	Eastern Region	Western Region	Eastern Region	Southern Region	Northern Region
1981	11,092	150	4,630	474	298
1982	13,996	6,458	5,088	675	413
1983	13,586	8,515	7,497	649	624

Source: Saudi Arabian Monetary Agency, 1984.

A comparison of the figures in Tables 1.3 and 1.4 for the Eastern Region show that 60% of the total consumption in 1983 was by industry. The non-industrial consumption of electricity in the Western, Central and Eastern Regions (obtained by subtracting the figures in Table 1.3 from those in Table 1.4) reflects the concentration of population along the East-West axis, compared with its sparseness in the Northern and Southern Regions. The highest concentration is in the Western Region, followed closely by Central Region and the Eastern Region (see Figure 1.2).

Figure 1.3 shows (on the right) the rise and fall in oil production together with the price per barrel in U.S. Dollars (the price shown is in each case the price prevailing in O.P.E.C. at the end of each year). Opposite is each year's government expenditure, which is based upon it, together with the government's revenues. It will be seen that oil revenue forms over 95% of the government's income and that expenditure has risen and fallen in line with oil revenue based on production and price. For instance, government expenditure in 1981-82 exceeded S.R. 282 billion, compared with an expenditure of less than S.R. 16 billion in 1972-73. These developments in oil production and price levels had a profound effect, causing a boom in population migration, infrastructure, construction, industrial and urban development. As there has been a decrease in oil production and revenue, so the average growth of these sectors has slowed down.

At the time of high oil production and prices, the high revenues resulted in a high demand for labour leading to population migration and urban expansion. This has led to regional imbalance. All these changes resulted in transport and traffic growth and problems. The interdependence of all these factors can be shown in Figure 1.4.

Figure 1.2

### INDUSTRIAL & NON-INDUSTRIAL ELECTRIC CONSUMPTION BY REGIONS, 1983

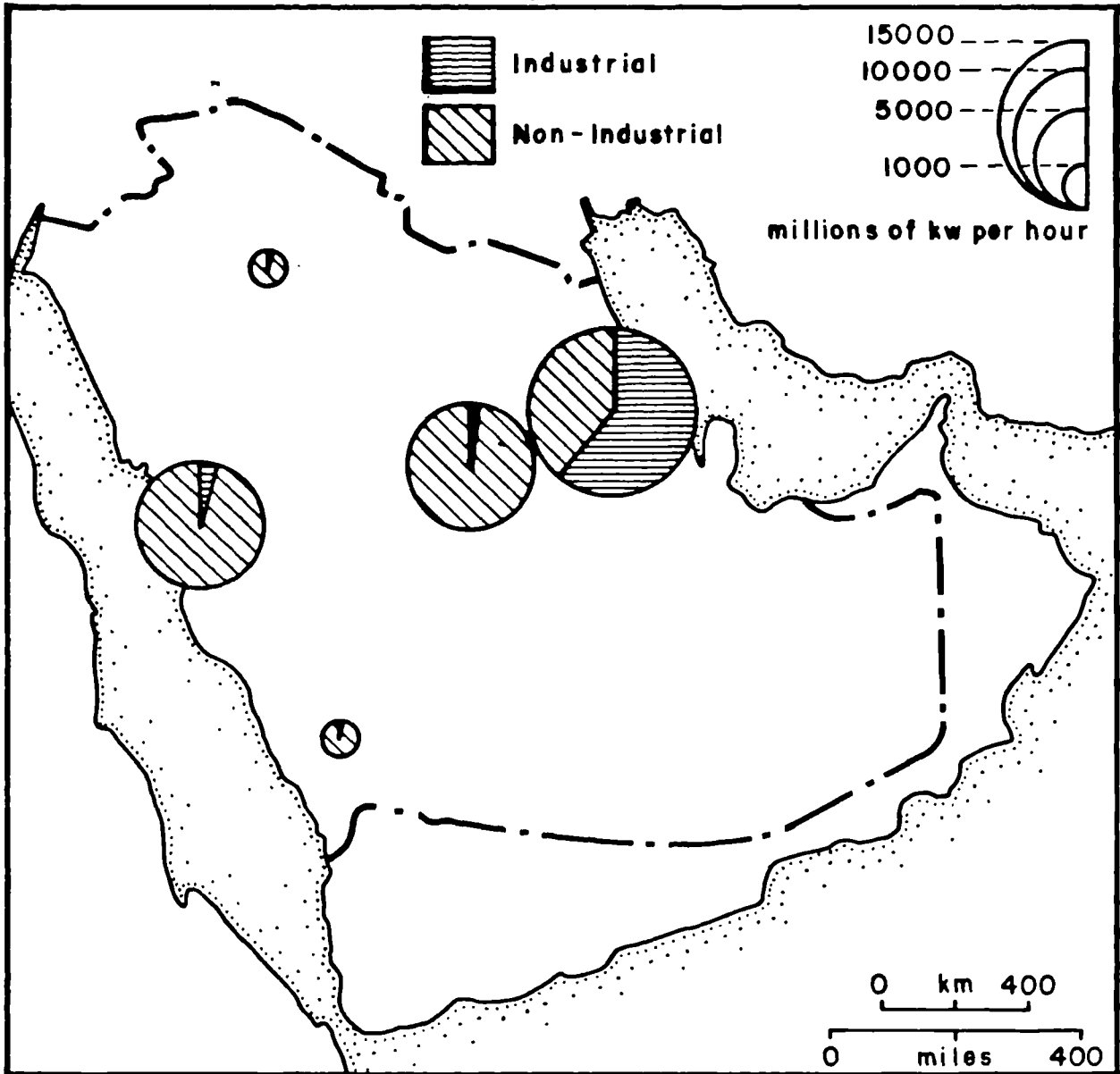


Figure 1.3

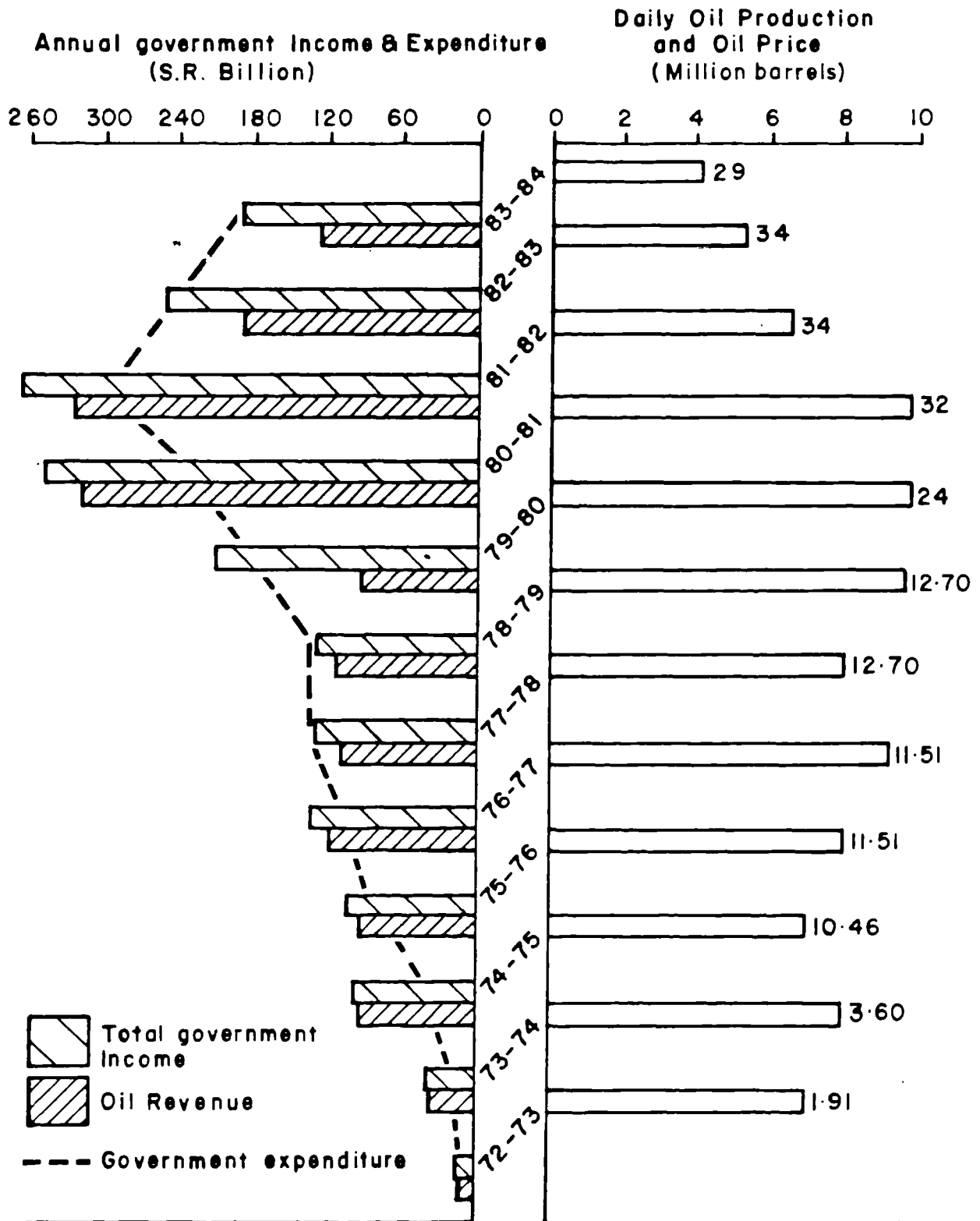
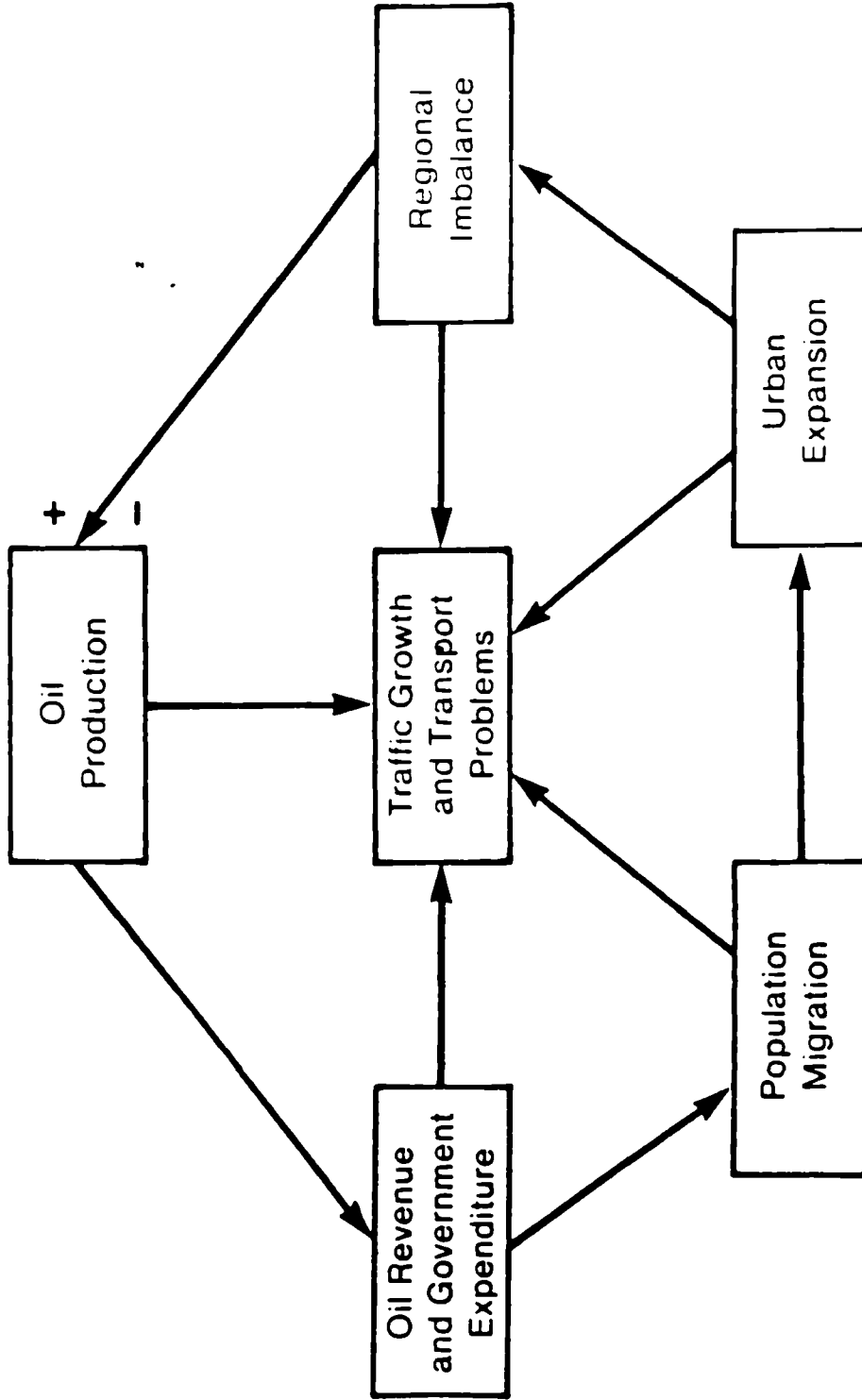


Figure 1.4 Model of Saudi Arabian Economic and Transport Growth



The relationships suggested in this model can also be supported by reference to the figures shown in Table 1.5, which illustrate the effect of oil production on three sectors of the economy. For example, in 1982/3 the building and construction industry of the country decreased by 6.2% following the sharp decrease in oil production in 1981/2. This was followed by a further decrease in the construction industry of 7.9% in 1983/4. This decrease will indeed slow the growth of cities in Saudi Arabia. Other sectors (as shown in the same table) have also been affected, for instance, transport and storage, whose growth in 1983/4 had decreased to 5.4% compared with 8.9% in the previous year and 22.7% in 1977/8. Hotels and restaurants and retail and wholesale trade show similar changes.

Table 1.5            Average Increase/Decrease in Non-Oil Sectors  
(percentage difference from previous year)

Non-oil \ Years	1977/8	1978/9	1979/80	1980/1	1981/2	1982/3	1983/4
Building & Construction	10.5	2.6	9.1	10.2	10.1	-6.2	-7.9
Transport & Storage	22.7	15.3	14.2	8.5	8.2	8.9	5.4
Wholesale & Retail/Hotels Restaurants	33.4	20.2	25.0	18.4	15.1	12.7	5.6

Source : Saudi Monetary Agency Annual Reports, 1983, p. 4 and 1984 p. 3.

### 1.3 Population: growth and distribution

The impact of economic development is reflected in the growth of Saudi Arabia's population and its distribution. This can be seen by comparing the official censuses taken in 1962-3 and in 1974. The first census showed a population of 3,306,600, which had more than doubled to 7,008,544 by the time of the second. Moreover, more recent estimates by the United Nations give a national population of 9.4 million in 1980; in 1982 the Ministry of Planning estimated that population had increased by almost 25% since 1980 to 11.47 million.

According to the 1974 Census the regional distribution of population was as follows, Central Region 23% of the total, Western 32%, Eastern 11%, Southern 20% and Northern 10%. All of the high-density settlements of population are in the Central, Western and Eastern Regions. Table 1.6 shows two settlements of over 500,000, one in the Central Region, and one in the Western Region. Of the five settlements of between one and five hundred thousand people, three are in the Western Region. Thus there is not an even spread of settlement size: there are none of between 10,000 and 100,000 in the Western Region. In the case of the Southern Region, the vast majority of the population live in settlements of under 3,000 people, indicating the fact that this region, like the Northern, has a very scattered population.

Since industrial and economic development is characterised by dense concentrations of population, it can be seen from the table that there is an industrial/economic corridor running from the Western Region through the Central to the Eastern Region. This corridor can be

Table 1.6 Regional Distribution of Settlements by Population Size, 1974  
Number of Settlements by Population Size

Region	As % of the total Population	Over 500,000	100- 500,000	50- 100,000	20- 50,000	10- 20,000	3- 10,000	Less than 3,000
Central	23	1	-	1	3	3	3	658
Western	32	1	3	-	-	-	4	2,687
Eastern	11	-	2	1	1	3	17	111
Southern	20	-	-	-	-	5	3	4,013
Northern	10	-	-	1	1	2	3	336
Total	96	2	5	3	5	13	30	7,805

Reproduced from Al-Ibrahim Abdullah Ali, "Regional and Urban Development in Saudi Arabia", Ph.D. dissertation, University of Colorado, 1982, p.271 compiled by him from the following sources:

- a) For cities of 30,000 and more: The Population Census, 1974;
- b) For cities of 3,000 to 29,000: Societe D'Etudies Sour le Development Economique et Social, Study in Urban, Rural and Bedouin communities, Paris, May, 1979;
- c) For settlements of less than 3,000: Second Development Plan, p.119.

further distinguished by the:

"concentration of the country's industry, finance, commerce, physical and social overhead capital, private investment, capital assets, higher educational facilities, and skilled labour, in the few large cities and particularly in three metropolitan centers (i.e., Riyadh, Jeddah and Makkah, and the adjoining cities of Dammam and Al-Khobar)."(14)

Indeed this axis is considered to be the area of rapid growth during the 1970's and 1980's.

#### 1.4 The significance of the study

Concerning the Arabic City, Asmahan Sofan at a conference in Al Medina in 1981 said that:

"The thoughtless use of modern Western technology in building our modern Arabic cities has contributed to losing the distinctive identity of our own cities. This use includes private and public transport, and we cannot reduce its consequences if it is used without control, especially in residential areas. Our engineers in general planned to get people to their houses using any means of transport. This has resulted in unnecessary widening and lengthening of streets which was the first element in demolishing the historical Arabic cities which were characterised by narrow streets."(15)

In fact most of the planners have laid out cities on the assumption that every individual - women, children, even those who were disabled persons - had their own modern means of transport. Levels of car ownership have risen, but the increase of car ownership has not solved all the problems: for example commuting distances have increased, affecting most of the working population. The car owner not only has his own problems, but also has those of his female household members, for whom he is responsible; for example, in 1981, 73 per cent of a

sample of 1,191 government employees always arrived late for work and 30 per cent gave the fact that they had to drive members of the family to school and women's workplace as the reason for this. The Institute of Public Administration calculated the number of hours lost and the loss to the economy in 1981 (Table 1.7).

Table 1.7 Number of Hours Work Lost and the Loss to the Economy, 1981

Types of indis- cipline in time	No. of lost working hours	Percentage	Cost to the economy of lost hours (Saudi Riyals)
Late arrival a.m.	4,816,524	8.82	126,728,330
Short absences during the day	19,653,136	35.98	516,971,115
Leaving work early	12,340,298	22.60	324,723,379
Absent without leave	17,798,242	32.60	468,406,291
Total	54,608,200	100.00	1,436,829,115

Source: Abdul Razak Abushar ) Staff members, Institute of Public  
Mohammed Saleh Al-Azh) administration

Timekeeping Discipline in Government Offices, 1981 (in  
Arabic)(16)

A large proportion of the costs to the economy shown in the above table are due to transport needs and problems, mostly the transporting of women.

### 1.5 Transport needs for female employees

Since Saudi Arabia has the largest reserve of oil in the world, and since world demand for oil is likely to continue for the foreseeable future, it is possible that oil export may be increased : in addition the government is intent on developing other sources of income such as industry and agriculture.

"Saudi Arabia's oil wealth has provided the driving force for Saudi Arabian self-sufficiency in agriculture. The government has opened thousands of acres of new agricultural land by drilling deep wells, building huge dams to capture seasonal rainfall, and digging thousands of miles of irrigation canals. The Ministry of Agriculture and Water has prepared plans to triple Saudi Arabia's cultivated land area through new artesian wells and irrigation networks, and by using desalinated water at new irrigation sites."(17)

Also the government is concerned to develop the country's human resources, particularly women. Hence, the government has concentrated on women's education, as the increase in oil production has allowed an increase in educational spending. For example, the education budget in 1964 for girls and boys was S.R. 350 m. In 1973 this had increased to S.R. 1,700 m, and by 1983/4 it was S.R. 27.8 billion, i.e. 10.7% of the total budget.<sup>(18)</sup> Despite the reduction in oil production in 1984/5 the education budget rose to S.R. 30.4 billion, or 11.7% of the total budget. S.R. 6.5 billion of this amount is allocated to the General Presidency of Girls' Education.<sup>(19)</sup> Table 1.8 shows the increase since 1960 in the numbers of girls enrolled in full-time education.

Table 1.8      Numbers of Girls Enrolled in Full-time Education

Year	No.	Year	No.	Year	No.	Year	No.
1961	11,753	1966	61,685	1971	149,888	1982	600,000
1962	17,151	1967	79,648	1978	400,000	1983	700,209
1963	25,113	1968	95,729	1979	450,000	1984	782,436
1964	38,141	1969	115,944	1980	500,000		
1965	48,065	1970	132,352	1981	550,000		

Sources: a) Miracle of the sand, by Assah, A.G., 1972, p. 797.

b) Saudi Monetary Agency, 1984, p. 117.

Accompanying an increase in the number of girl students there has also been an increase in women teachers. In the 1960's almost all female teachers were non-Saudi, mostly from other Arab countries. By early 1982 about 25,000 female teachers were Saudis<sup>(20)</sup> and the government intend by the end of the fourth development plan that the whole female teaching force will be Saudi. The number of female teachers in 1984 was 47,000.<sup>(21)</sup>

"The government in conformity with the National Strategy, seeks to improve the responsiveness of the education and training system to the need of the economy by undertaking the following policies (including) (5) emphasize participation of women in appropriate occupations, e.g. teaching and medicine."<sup>(22)</sup>

The government is interested in reducing the country's dependence upon foreign labour, and in this Development Plan (1985-1990) has stated as an objective a decrease in the number of non-Saudis employed in Saudi Arabia by 600,000.<sup>(23)</sup> At the same time 630,000 new jobs will be created for Saudi workers.<sup>(24)</sup> As a proportion of Saudi workers are women in occupations such as teaching and medicine, the implementation of this objective will mean an increase in the number of Saudi women employed. Since women depend upon male members of their households for transport, this will increase the losses to the economy in working hours lost (both by men and women) because of transport difficulties. Consideration by the authorities should therefore be given to alleviating transport problems as well as to providing employment since one is necessary for the other. However, the forms of such improvement of transport must be acceptable to Saudi society.

#### 1.6 Purpose of the study

The increase in the production of oil in the last twenty years has transformed the economy from one of subsistence based on nomadic grazing and traditional agriculture into a strong, modern industrial economy based upon oil revenue. This change in the economic base has resulted in a drift of population to urban areas, depleting the traditional economy of manpower. As a result the Saudi Arabian urban areas have grown very rapidly into modern cities. The consequent change in life-style has meant a corresponding demand for transport facilities, electricity, water and drainage provision.

"Houses which thirty years ago looked onto sand, and passing gazelle are now practically in town centres; houses which were out in the desert when I arrived in Jeddah in 1975 are now in the suburbs."<sup>(25)</sup>

This transformation has caused nearly everyone in the Kingdom to realize the need for urban transport. As an area's economy expanded so did its physical infrastructure, resulting in the transport becoming increasingly complicated. Understanding just one of the problems in the complicated area of transport could lead to the understanding of many problems which seem unconnected. Solving this one problem could lead to the solution of many problems. For example, there is perhaps a high correlation between the value of traffic growth and the number of employed women. Hence, providing public transport for women which is both efficient and acceptable to society could lead to a reduction in the number of cars, less congestion, fewer male hours lost to the economy by male employees transporting their women folk, lower fuel consumption, reduced pollution and fewer accidents. All this would be of benefit to society in general as well as to the national economy.

There is no doubt that in Saudi Arabia, whether travel is by public or private transport, to shop, to visit friends, or to go to work, a woman must rely on someone else, for example, in the case of private transport, on the head of household, relative, or chauffeur, if the family can provide one. However, even some families which can afford to employ a chauffeur do not wish to do so (see Chapter Five). There may be occasions when there is a car available in the household for women, but its use may cause both her and the male household driver to be late for work. It would appear that employed women in Saudi Arabia have a greater need for transport than those who are not employed. In the case of public transport, she must use the public bus, or hire a taxi. Table 1.9 shows the very low numbers and percentages of female passengers using public transport in major

cities, further emphasising their dependence for transport upon members of their households and their private cars. In fact, most of the female passengers with SAPTCO are non-Saudis from other Arab countries.

Table 1.9      Intra-City Female Passengers - Percentage with SAPTCO  
(1981)

City	%	No.
Dammam	1.2	112,983
Gassim	1.3	5,442
Riyadh	1.8	526,931
Jeddah	3.7	1,754,738
Taif	5.2	61,443
Makkah	6.6	1,568,119
Medina	7.3	379,113

Source: The Annual Report, SAPTCO, 1982, p. 16.

Therefore we must study both partners involved in transport, he who drives and she who is driven, and their circumstances. Since teachers form the largest proportion of employed women, this study concentrates on female teachers and their transport situation. The purpose of this study is to define the problems and demonstrate their importance since this is the first time that the transport situation of employed women in Saudi Arabia has been directly investigated. It is intended to make practical recommendations within the limits of what is acceptable. Saudi society traditionally is very conservative and bound in every aspect of life to religion.

The government, for example, is very concerned to continue to segregate men and women at work, to conform with Islamic principle and national tradition:

"A general proclamation, No. 1165/M of 16/5/19403 AH (1983 AD), indicated that allowing women to work in any circumstances that could lead to association with men, whether in Government administrations, public or private establishments and companies or any other employment, is impossible for Saudi and non-Saudis alike. Because it is prohibited by Islamic law and inimical to the custom and tradition of this country. Any establishment employing women in work which is foreign to their nature, or any establishment or agency employing women in such a way that could lead to their association with men is wrong and should be avoided."(26)

### 1.7 Methodological issues

Since there is a lack of data concerning women's transport in Saudi Arabia, it was necessary to conduct a survey as a basis for this study. There are several methods that can be used by an observer in collection of data. These are 1) Personal interviews, 2) Postal questionnaires, 3) Telephone survey.<sup>(27)</sup> In this study personal interviews with heads of households, and questionnaires distributed via the General Presidency of Girls' Education, since many women work as teachers, have been used. Direct contact between the author and Saudi women was ruled out because of the traditions of Saudi society. This survey was conducted in Dammam city, the capital of the Eastern Region of Saudi Arabia. Dammam was chosen because of its economic importance, and because it is a major focus of the government's development policy, as well as because the writer has extensive personal knowledge of the city as a resident. Also, in this survey care was taken to ensure that the population sample was made up entirely of Saudi nationals. This

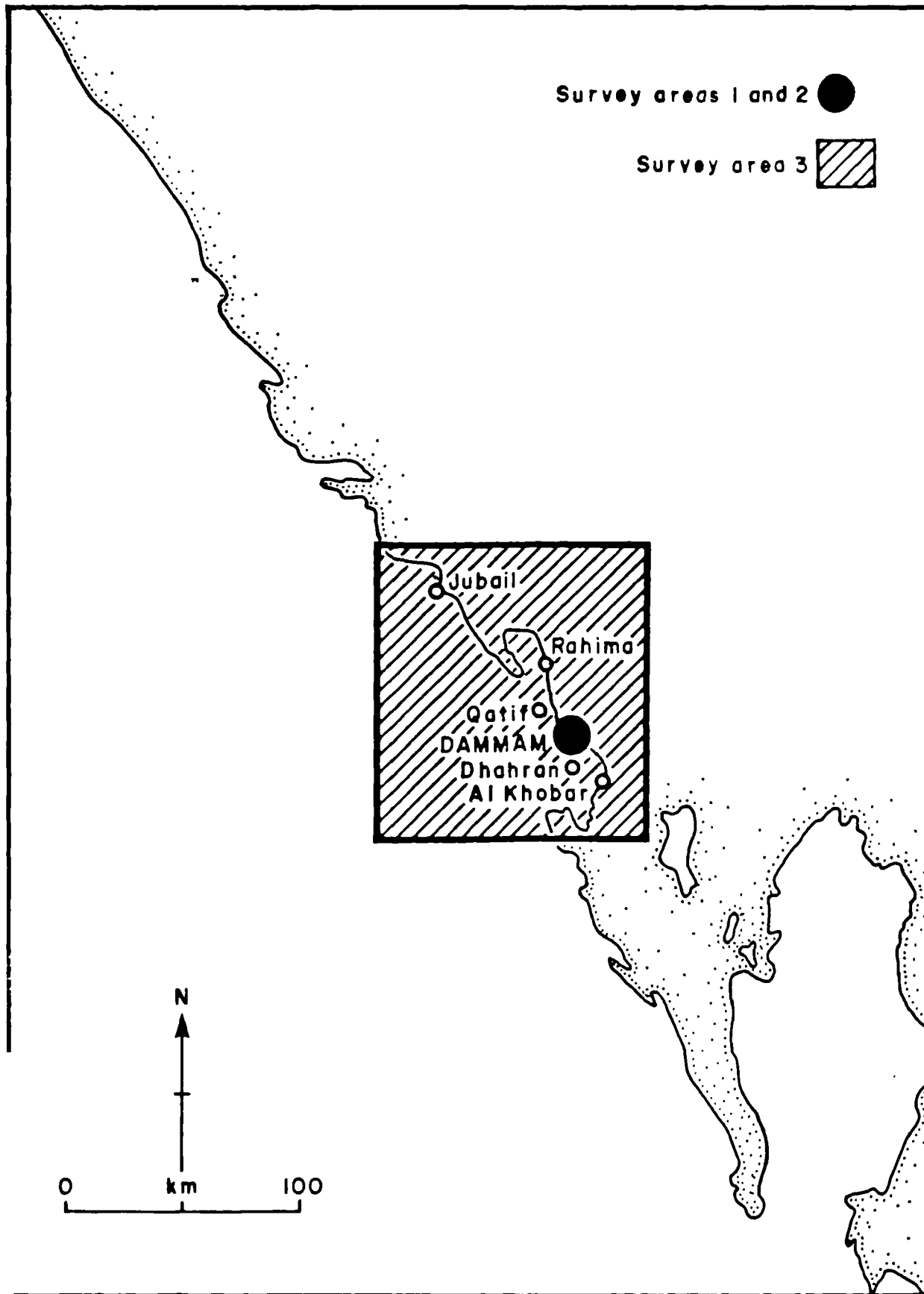
was for two reasons. First, the government's stated intention is to reduce substantially the number of non-Saudis working in the country. Secondly, it is reasonable to suppose that attitudes towards women and transport will vary between nationalities. It is Saudi attitudes that this study is intended to establish in order to make suggestions that are acceptable to Saudi society. Surveys were carried out to establish the availability of transport to household and members, particularly women, and their attitudes towards it, together with any difficulties experienced by the head of household or other male members in providing transport for females. Meanwhile the purpose of the teacher questionnaires was to discover their transport situation and their attitudes to transport. This enabled a comparison to be made between the attitudes of female household members and those of heads of households. In addition, a third survey was carried out via the Presidency of Girls' Education who distributed questionnaires to the Principals of almost all the Girls' Schools in Dammam Metropolitan Area and surrounding towns, asking them about the modes of transport and travel patterns of their schoolmistresses (see Figure 1.5). This was to provide information particularly about the commuting patterns of teachers living in Dammam city, and working there or elsewhere, and to give an idea of the transport situation of women teachers living and working outside the study area (Dammam city), for purposes of comparison.

### 1.8 Outline of the remainder of the thesis

As we have said, there is a correlation between economic development and transport growth. Although a detailed economic analysis of Saudi Arabia is not relevant to this study, we need to look

Figure 1.5

# SAUDI ARABIA EASTERN REGION



at those aspects of the economy which have a direct bearing on the growth of transport, and this will be done in the appropriate chapters of the thesis. The second chapter will outline the history of modern transport in Saudi Arabia - roads and motorways, railways, commercial seaports, airlines and a brief sketch of the Saudi Arabian Public Transport Company. In the third chapter, the transport problems of rapidly growing cities will be studied, as exemplified in Dammam. The fourth chapter will analyse the existing land-use conditions in Dammam as they affect transport. In the fifth chapter, surveys investigating the transport situation, particularly of women teachers in Dammam and the surrounding areas will be described and analysed. Possible alternative solutions and recommendations arising from the studies will be discussed in chapter six. Finally, chapter seven will demonstrate the changing role of women necessitating a demand for available transport for women.

## 1.9 References

1. Quarterly Energy Review, Middle East, The Economist Intelligence Unit, 1985, p. 65.
2. Young, Arthur N., Saudi Arabia, The Making of a Financial Grant, 1983, p.2.
3. Second Development Plan (1975-1980), p. 12.
4. Fathy, M., "Development of the Saudi City", The Arab City Journal, v. 14, July 1985, p. 62.
5. Real Estate Fund, Annual Report 1983-4.
6. Fathy, M. op cit, p. 62.
7. Ministry of Planning, Second Development Plan, p. 4.
8. Ministry of Planning, Third Development Plan 1980-1985, p. 62.
9. Ministry of Planning, Third Development Plan 1980-1985, p. 241.
10. The Royal Commission for Jubail and Yanbu, The Annual Report, 1979, p.7.
11. The Royal Commission for Jubail and Yanbu, The Annual Report, 1980-1981, p. 12.

12. Turner, Louis, "Development of Downstream Industries in Jubail and Yanbu", The Arab Gulf Journal Volume 4, No. 2, October 1984, p. 27.
13. United Nations, Demographic Year Book, "Estimates of mid-year Population", 1981.
14. Al Ibrahim, Ali Abdulla, Regional and Urban Development in Saudi Arabia, Ph.D. dissertation, 1982, p. 264.
15. Sofan, A., "The Residential District of the current Arabic City" in Serageldin, I. and El-Sadek, S., The Arab City : its character and Islamic cultural Heritage, Riyadh, The Arab Urban Development Institute, Proceedings of a Symposium, Medina, 28 February - 5 March 1981, 1982, p. 70.
16. Timekeeping Discipline in Government offices (in Arabic) Institute of Public Administration 1981, p.34.
17. Sannem Nizar Hasen, Saudi Arabia, the Role of the Immarates in Regional Development, Ph.D. disseration, Claremont, 1982.
18. Saudi Arabian Monetary Agency, Annual Report 1984, p.116.
19. Quarterly Economic Review of Saudi Arabia, The Economist Intelligence Unit, No.2 1985.

20. Bahry Louay, "The New Saudi Women" The Middle East Journal, v. 36 No.4, Summer 1982, p.505.
21. Saudi Arabian Monetary Agency, Annual Report 1984, p.118.
22. Third Development Plan (1980-1985) p.2.
23. Quarterly Economic Review of Saudi Arabia, The Economist Intelligence Unit, No.2, 1985, p.11.
24. Ibid, p.12.
25. Niblock, Tim ed. State Society and Economy in Saudi Arabia, Centre for Arab Gulf Studies, University of Exeter, 1981, 174.
26. Al Jazeera Newspaper, Riyadh, No.4617, 20 May 1985, p.19 (in Arabic).
27. Nachmias, David and Nachmias, Chava, Research Methods in The Social Sciences, Second Ed. St. Martin's Press, 1981, p. 181.

## CHAPTER TWO

### A BRIEF HISTORY OF MODERN TRANSPORT IN RELATION TO ECONOMIC DEVELOPMENT

#### 2.1 Introduction

In Chapter One socio-economic development was discussed; this development led to a high demand for transport, both public and private, the provision of which became a necessity. In practice, the number of private vehicles increased to satisfy this demand. Here in Chapter Two, the physical development of road construction in connecting the regions and cities will be considered. Modern road construction can be divided into two distinct periods : the first, from the discovery of oil, and the second, from 1970 until today, 1986. Also to be considered are the history of railway development policy in Saudi Arabia, the commercial development of the sea ports, and the development of air transport. This chapter will close with a brief summary of the establishment of the Saudi Arabian Public Transport Company (SAPTCO), which is the latest form of transport to be introduced into the country. Details of SAPTCO's current activities can be found in Chapters Three and Five, in the sections headed Public Transport Demand, and Factors Affecting the Transport of Women.

#### 2.2 Roads and Motorways

As defined above there were two stages in the construction and development of roads in Saudi Arabia, the first lasting from the discovery of oil until the start of the first development plan in 1970,

and the second covering the period of the development plans. The activity during the second stage greatly exceeds that during the first owing to the existence of co-ordinated plans, high investment and concentration of effort.

#### 2.2.1 Road development from the discovery of oil to 1970

From the rise of Islam in the Arabian Peninsula until the first asphalted road after the discovery of oil, all transport relied on the camel caravan, there was no vehicular traffic, all travel being on foot or with animals. Exceptions to this were Sharif Hussein, ruler of Hijaz, who had a car during the First World war, and Philby who imported a car through Jeddah in 1926.<sup>(1)</sup>

The designation of Riyadh as the capital, the securing of the Hajj routes through central government and the beginning of intensive prospecting for oil in the Eastern Region made asphalted paved roads a necessity.

In 1938, the first asphalted inter city road was completed in the Western region, from Jeddah to Makkah, using money from 'waqfs' of the Holy Mosque.<sup>(2)</sup> In the Eastern Region the first road was built in 1950 by Aramco from Dammam Junction to Ras-Tanurah Terminal.<sup>(3)</sup> During the late 1930's the Dharhan area was the centre of economic development in the Eastern Region. It was in this area that the first car accident, and probably the first in the country, occurred when in 1939 at the Aramco camp at Dharhan an Aramco employee hit a young boy and broke his leg.<sup>(4)</sup>

The first government constructed road was built from Jeddah to Medina between 1951 and 1955.<sup>(5)</sup> This provided access for pilgrims, which at the time yielded a significant part of government revenue. At that time, 1955, there were only two distinct road networks, one in the Hijaz (the Western Region) and the other in the Eastern Region. But the construction by Aramco of roads within the Eastern Region encouraged the government to build a road connection between Riyadh and Dammam which was completed in 1961 and extended to Jeddah by 1965.<sup>(6)</sup>

At that time Dhahran area, which was enjoying very rapid growth, was considered to be the most important developing economic centre, attracting people from other parts of the country (see Chapter Three). Jeddah too was an economic centre because of its port being the main access for goods and for pilgrims. It was obvious that these two economic centres had to be connected, via the capital, Riyadh. This road was completed by 1965 and gave rise to a significant variation in growth of car ownership in Jeddah, Dhahran and Riyadh. For example, in 1959 the number of cars registered in Riyadh and Jeddah was about the same, while Dhahran had about 10% more than either of them. In 1962, a year after the completion of Dhahran-Riyadh corridor, registered cars in Riyadh had leapt to more than 14% over those in Jeddah. In 1963 Riyadh exceeded Jeddah's registrations by 19.8% and exceeded Dhahran for the first time (see Figure 2.1). Following the completion of the East-West corridor road a start was made on connecting parts of the country which did not have the economic importance of the Eastern and Western Regions, with Riyadh.

The total length of asphalted road completed by 1969 (i.e. before the First Development Plan) was 7,880 kilometres, 20% of which was

Figure 2.1

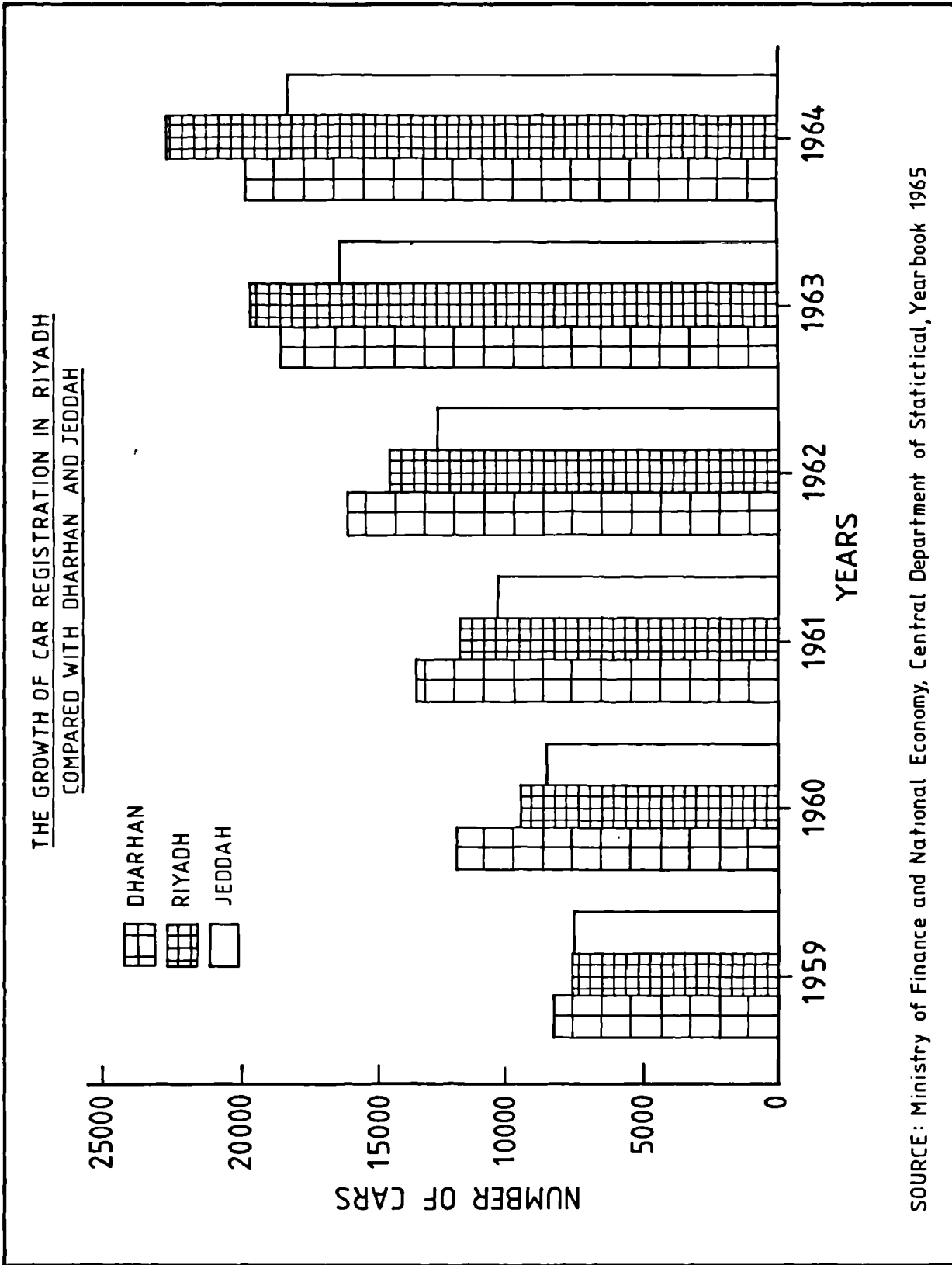
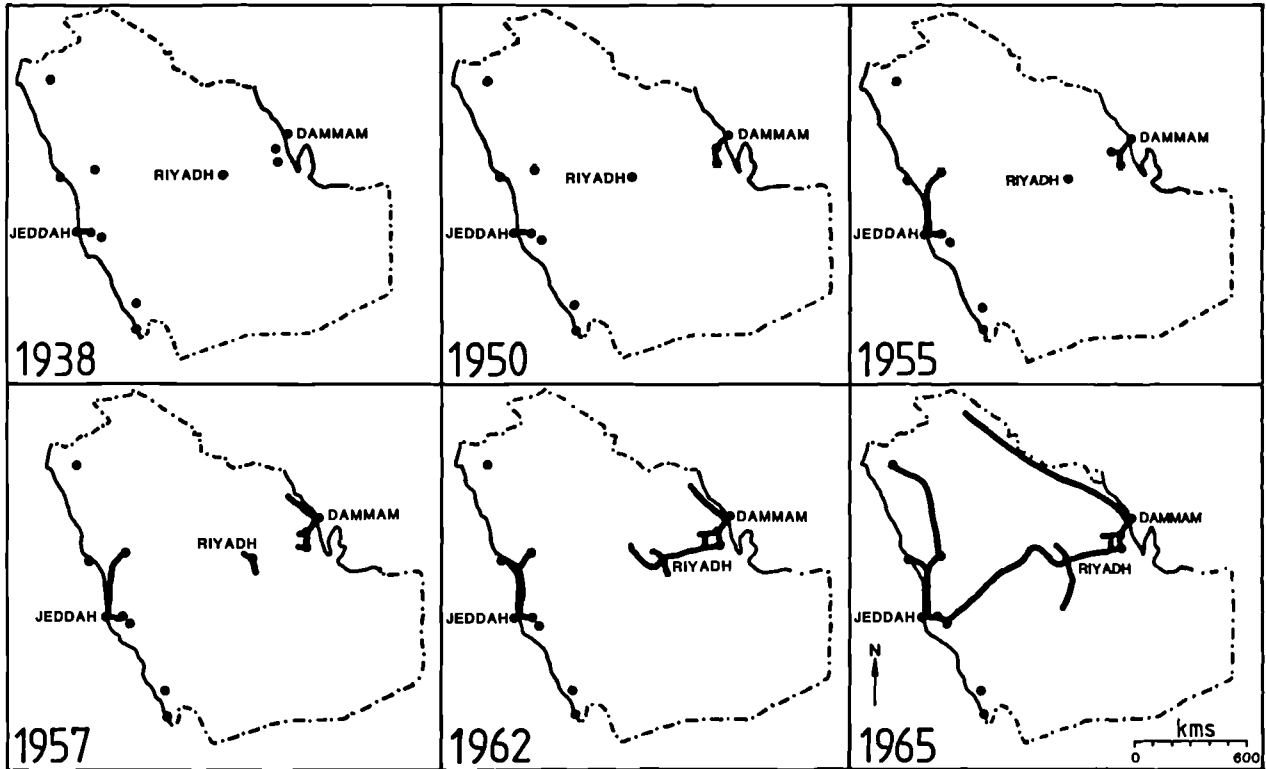
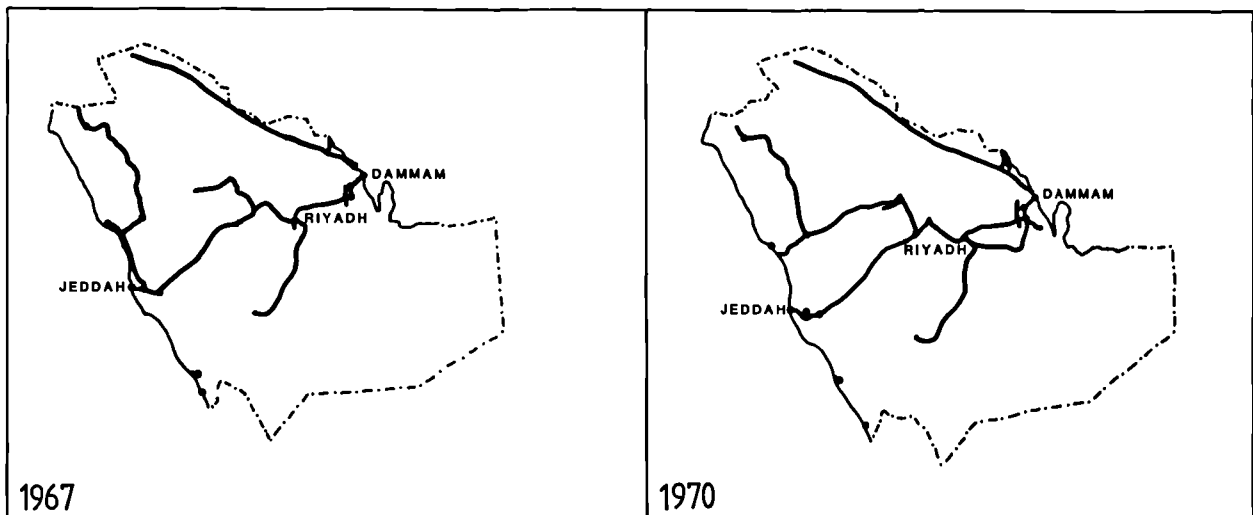


Figure 2.2

## ROAD DEVELOPMENT 1938-1970



Source : Assad Abdo, Thesis, 1969.



Source : Ministry of Finance and National Economy.

built by Aramco.<sup>(7)</sup> The situation prior to the First Development plan is shown in Figure 2.2.

### 2.2.2 Motorway construction under Development Plans

If one looks back at the rapid expansion of roads during the first development plan we can see that prior to 1970 there were no more than 8,000 kilometres of asphalted roads in the Kingdom. During the first plan period (1970-1975) there were 3,221 kms of new roads completed and 908 km of existing roads reconstructed. This total of 4,129 kms represents 79% of the plan target. In addition, 4,338 kms of rural roads were completed during the first plan period, exceeding the planned target and bringing the total length of rural roads to 7,825 kms, providing access to 3,225 villages.<sup>(8)</sup> The main reason for the development of roads in rural areas was to give greater accessibility to and equitable distribution of government services.<sup>(9)</sup> In addition a maintenance programme for paved roads was introduced. Figure 2.3 shows the layout of main roads completed by 1975. Also the situation in 1980 at the end of the second plan is shown in Figure 2.3, together with the projected routes to be constructed during the Third Plan, and also this figure also shows the total length of road completed in 1985. At the end of the second development plan period there were 11,399 kms of paved main roads and 10,053 of rural roads connecting 6,959 villages.<sup>(10)</sup> During the Third Development Plan (1980-1985) it was intended to complete the 1094.4 kms of paved road that was due to have been finished during the second period, and to complete an additional 4,048.7 kms of new main roads, 1,421.6 kms of paved secondary roads and 17,445 kms of rural roads to connect a further 4,579 villages to the system.<sup>(11)</sup> By 1982 a total of 23,794 kms of main roads had been

constructed and all cities and towns had been linked to the road network.<sup>(12)</sup> This is shown in the map road network (Figure 2.3).

From this construction and development of roads and motorways it can be seen that the primary objective during the 1960's had been to connect the Regions, particularly the Eastern, Central and Western Regions. During the development plans, as can be seen from the map showing the motorway network in 1985 (Figure 2.3), the connection of cities with each other and with the capital, Riyadh, was one of the main objectives, together with the linking together of these Regions. More recently another objective has emerged which can be inferred from the Third Development Plan, namely, to reduce both the road distance and travelling times between the cities. This is exemplified by the new motorway opened in 1985 between Dammam, Riyadh and Jeddah. This motorway has two carriageways, each of three lanes. The old road was a single, two lane carriageway following a winding, hilly and indirect route; it carried a very heavy volume of traffic and had a high accident rate. Figure 2.4 shows the average daily traffic in late 1970's flow of the old East-West corridor.

The new road has now reduced the distance between Riyadh and Dammam by about 90 kms (see Figure 2.3). This has resulted in a shortening of the time taken on an average car journey between these two cities to about 3½ hours compared to the five hours taken on the old road. The number of travellers using the air link between Dammam and Riyadh will probably be greatly reduced as a consequence of this and also the fact that Riyadh airport has been moved from the city centre to a new site 50 kms distant, adding to the inconvenience of travelling by air. The time required to travel from the centre of

Figure 2.3

ROAD GROWTH UNDER DEVELOPMENT PLANS

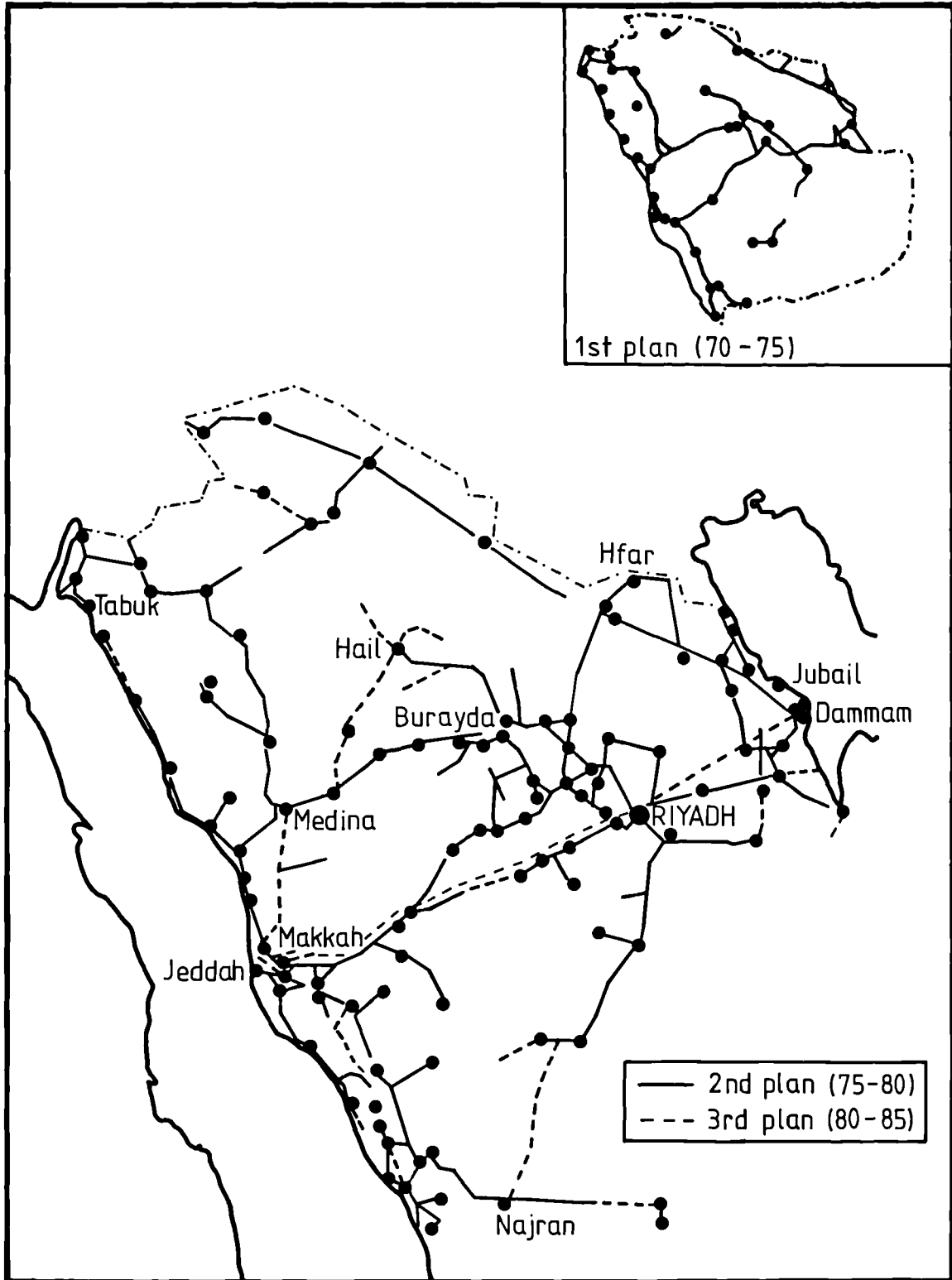
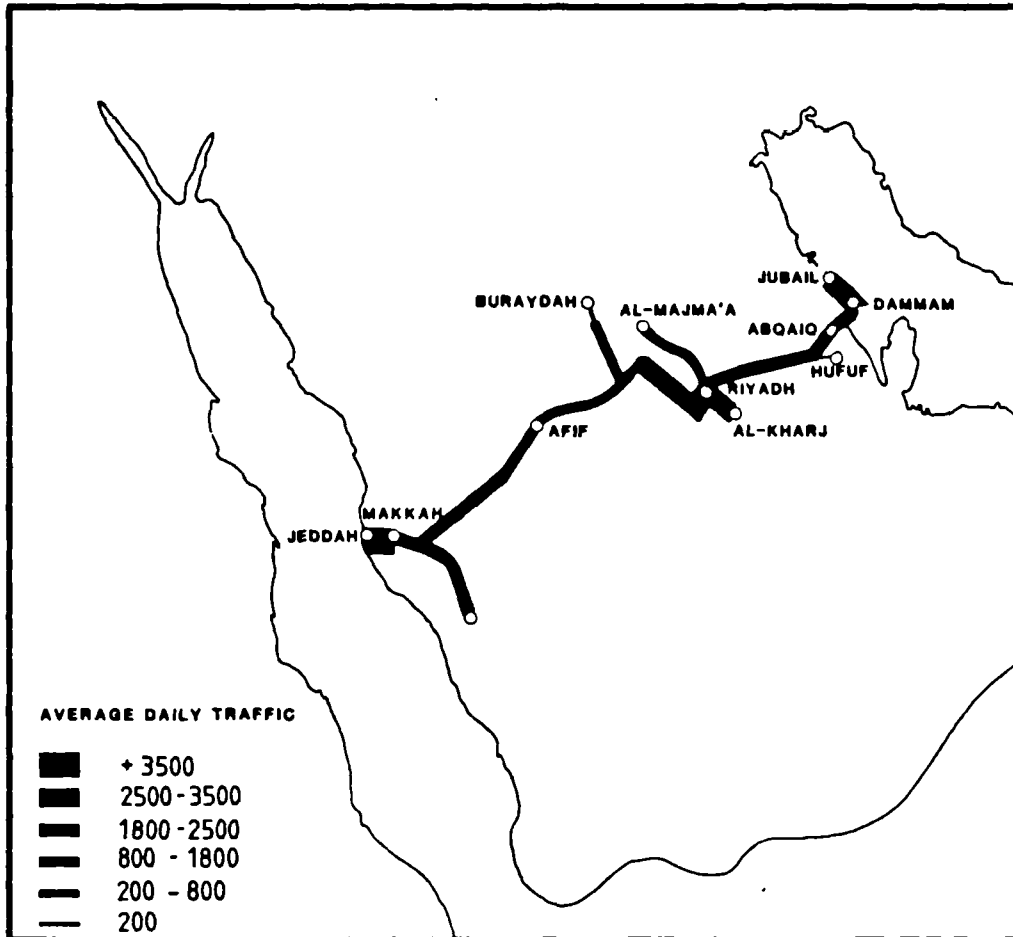


Figure 2.4



Source: SCET International Riyadh Existing Conditions, 1979

Riyadh to the new airport is at least 35 minutes; passengers need to check in one hour before the departure time; and the average flight time is 45 minutes to Dhahran Airport from where it takes about 25 minutes to travel by car into Dammam itself. Taxis at both ends of the journey will cost about 80 Riyals between them and the single air fare is 120 Riyals making a total of 200 Riyals. Since about 30 Riyals buys enough petrol to travel between Riyadh and Dammam, this means that to save just 45 minutes, a single traveller would spend about 170 Riyals, an amount that would increase with the number travelling. Furthermore, the traveller would lose the convenience of having his own car at his destination. The number of families travelling by road is higher because of the privacy afforded by using one's car. For instance the women can unveil, whereas in a plane, women cannot enjoy this freedom. Moreover, many Saudi men travelling by air with their women are concerned that their womenfolk may have to be seated beside a male stranger.

Another example of the advantage of road expansion is that people wishing to travel by road from Hail (population 400,000) to Al Medina can now do so directly instead of having to make the long detour via Burayada. Similarly, around 7 hours has been cut from the journey between Najran in the south, and Riyadh, which formerly involved passing through Jeddah.

The pilgrimage routes have also become much easier and more direct; for example from Jordan the pilgrim can travel straight from Haql, on the border, to Makkah, no longer needing to detour east through Tayma. In addition, there is now a direct motorway link between the two holiest cities, Makkah and Medina. Similarly, pilgrims

from the East of the country and those travelling from Oman, United Arab Emirates and Qatar can now travel directly from Dammam to Makkah. Pilgrims from Iraq coming into Saudi Arabia at Hafr al Batin can now cut off a large part of the southern leg of their journey by cutting across from Al Zilfi to Medina.

As some cities on the new direct route will flourish, other cities on the old round-about route will probably tend to decline, as fewer travellers of all kinds pass through. For example, Afif has many restaurants, a vehicle service station and shops, almost all of them lining the main road which divided the city in half. The shift of traffic to new routes north and south of Afif can be expected to adversely affect their trade. The average daily traffic flow through Afif before the construction of the new straight Dammam-Riyadh-Jeddah corridor was about 1,800-2,800 vehicles per day. Now it seems the average number of vehicles passing would not reach 1,800 per day. No doubt this shows that variety of transportation networks in Saudi Arabia will have a potential effect either on the development or on the decline of cities. A good example is the construction of the interstate highway network system which reshaped the patterns of growth in the United States.<sup>(13)</sup>

### 2.3 Sea Ports crisis and development

One indicator of a country's economic development is the volume of commercial activity at its sea ports, which is defined by economists and geographers as a break-of-bulk point:

"Where cargo is transferred from one mode of transport to another."<sup>(14)</sup>

The suddenness of Saudi economic growth in the early years of the 1970's, resulting from the increase in oil prices and production (Chapter One) did have an enormous effect which was immediately reflected in the activities of the commercial sea ports (Table 2.1). This rapid economic development was in part due to the strategic location of Saudi Arabia between the Gulf and the Red Sea, which in turn led to a greater concern by the government about the importance of the ports.

However, the need to have a more comprehensive development plan with regard to sea ports was only realised during the implementation of the second development plan when the sudden and rapid increase in imports found the ports unable to handle the problem (see Table 2.1). The dramatic crises in the sea ports' inability to cope occurred in 1976 when there were ships having to wait in queues for more than six months to be unloaded either at Jeddah or Dammam ports, and the government had to pay between 3,000 to 6,000 dollars per day to each ship held up which made port operations extremely expensive.<sup>(15)</sup> The shipping crisis cost 1,000 million Riyals net and only 250 million Riyals were generated in ports. Table 2.2 shows the situation of ports in September 1976, from which it may be seen that at Jeddah alone there were 900,660 tonnes of freight waiting to be unloaded and 386,703 tonnes were arriving each month. Only 311,637 tonnes could be unloaded. Without major decisions the delay would have increased, which together with the increased demand, would have resulted in increasing prices. At that time the cost of a bag of cement reached 18-20 Riyals compared to 10-11 Riyals today (1986). Of the tonnage being imported in 1976, 60% was construction material, double the 1975 figure. The main cause of this import crisis in building materials was

Table 2.1

## Volume of Imported Goods 1970-1983

Port Year	Jeddah		Dammam	
	Tonnes	%	Tonnes	%
1970	920,895	100.0	657,656	100.0
1971	998,486	108.4	876,545	133.3
1972	1,021,527	110.9	987,016	150.1
1973	1,302,545	141.4	1,191,912	181.2
1974	1,914,594	207.9	1,482,117	225.4
1975	1,732,502	296.7	2,486,302	378.1
1976	4,402,051	478.0	3,884,769	590.1
1977	7,055,948	766.2	6,388,237	971.4
1978	9,653,012	1048.2	7,472,311	1136.2
1979	11,624,204	1263.4	8,004,627	1217.1
1980	13,398,767	1454.9	6,158,980	936.5
1981	14,694,945	1595.7	10,945,218	1664.3
1982	16,586,377	1801.1	12,877,908	1958.5
1983	18,905,205	2052.9	13,288,394	2020.5

Source : Saudi Arabia, Sea Ports Authority, 1984.

Table 2.2 Saudi Ports Situation in September 1976

Port	Number of waiting ships in Sept. 76	Total weight tonnes in Sept. 76	Monthly average number of arrival of ships (from Sept. 75 to Sept. 76)	Average monthly weight (tonnes)	Average monthly unloading weight (tonnes)
Dammam	125	747,478	85	362,379	270,247
Jeddah	200	900,660	159	386,703	311,637
Jizan	16	29,407	13	38,430	37,258
Yanbu	19	178,790	7	59,618	51,913

Source : Saudi Arabia, Sea Ports Authority, 1984.

the demand generated by the growth of cities through the establishment of the Real Estate Fund, and other infrastructure (see Chapter Three).

In 1977 the government established the Saudi Ports Authority as a separate body from the Ministry of Communications to deal with these problems and implement its own policy.

Changes made to reduce the congestion in ports were as follows:

1. A short term solution was to adopt a shift system enabling unloading throughout the twenty-four hour period.
2. Helicopters were introduced, temporarily, to carry freight from ships to shore.
3. Small boats were introduced to bring goods ashore from the ships.
4. The port authority issued instructions to each importer that all its goods had to be properly packed, and netted together.
5. The authority encouraged the use of containers and the roll-on/roll-off system.<sup>(16)</sup>

One of the short-term measures considered by the authority, which proved to be most effective was allowing the period for storage of goods on the quay to be reduced from six months to fifteen days, after which the imported goods would be sold. What had occurred was that importers had brought in far more material than they could store in their available warehouses and therefore imported goods were left on

the quayside. The subsequent fine was less than the cost of renting extra warehouse space which, as a result of rapidly increasing land speculation, was at a premium (see Chapter Three, Land prices in Dammam).

By the end of 1977, these short-term measures had almost solved the problem of congestion. The long-term plan, implemented by the authority, included increasing the number of docks, installing more cranes, expanding the major ports and also developing the smaller ports as a back-up support. As a result of the long-term measures Yanbu became the secondary port for Jeddah and Jubail for Dammam.

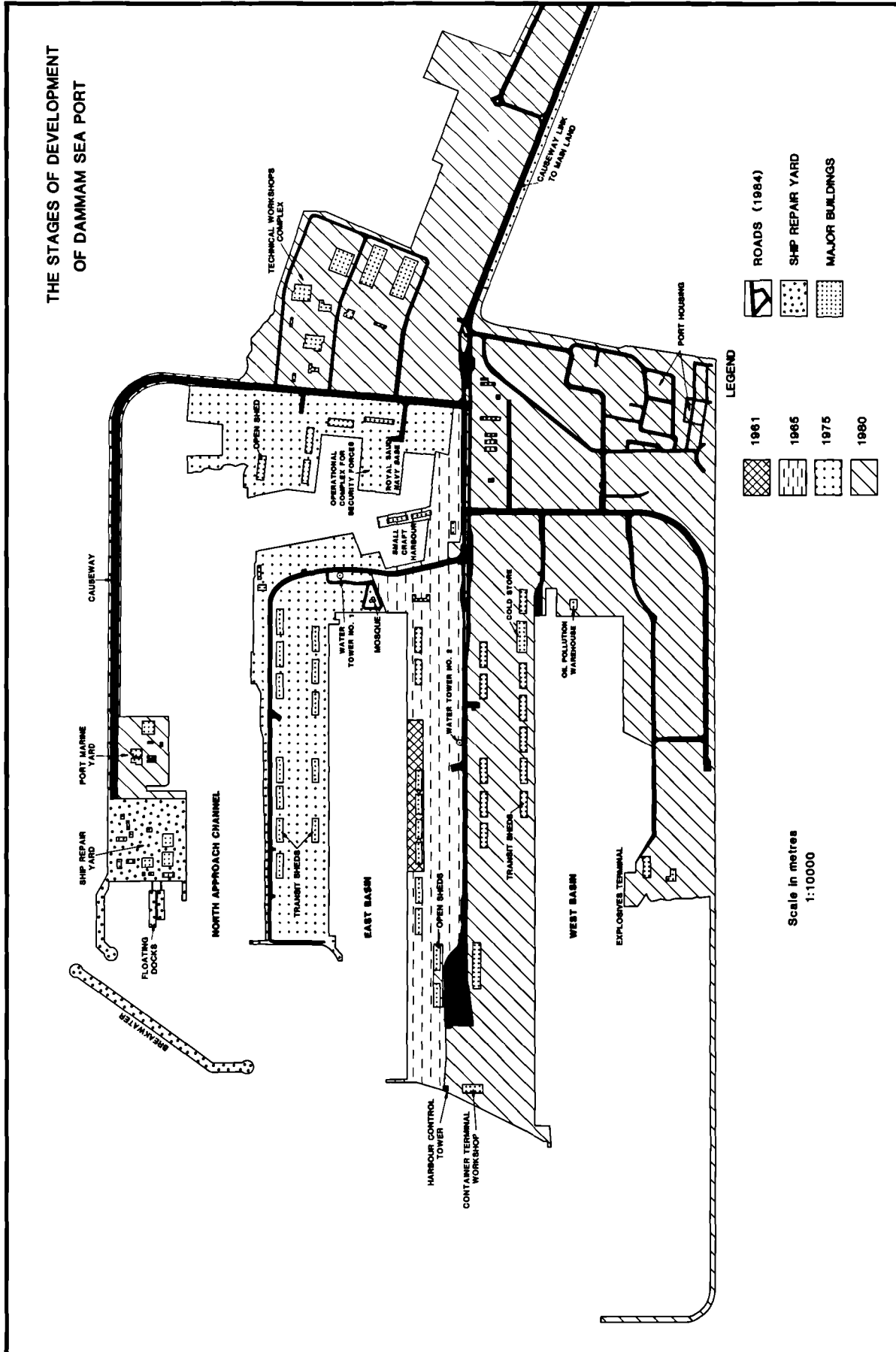
Figure 2.5 shows the rapid physical development of Dammam port. Table 2.3 shows Saudi Arabia's ports rank first among the ports in both the Gulf and the Red Sea.

#### 2.4 Railways

The first railway in the country, built on the order of the then ruler of the Hijaz, Sultan Abdulhamid, ran from Makkah to Medina, and then north via Amman. The track was constructed between 1900 and 1908 and financed by Turkey and individual Muslims from all Muslim countries.<sup>(17)</sup> Unfortunately, it was destroyed during the First World War by Arabs revolting against the Ottoman Empire.

Later, the establishment of Riyadh as the national capital necessitated freight communication with a modern port. Dammam was chosen as the port and railway construction was begun in 1947 between Riyadh via Hufuf. Operations began in 1951 when the 562 kms of track was completed.<sup>(18)</sup>

Figure 2.5



Source : Adopted from Master Plan Development of the Port of Dammam, 1985.

Table 2.3

Ranking of Sea Ports in both the Arabian Gulf and the Red Sea  
(Saudi ports underlined)

		Arabian Gulf		Red Sea		
Rank	Port	Country	Weight Tonnes	Port	Country	Weight Tonnes
1	<u>Dammam</u>	<u>Saudi Arabia</u>	<u>6,400</u>	<u>Jeddah</u>	<u>Saudi Arabia</u>	<u>8,200</u>
2	Bander Shahpur	Iran	5,616	Aqaba	Jordan	7,040
3	Basra	Iraq	4,455	Port Sudan	Sudan	3,300
4	Kuwait	Kuwait	4,000	<u>Yanbu</u>	<u>Saudi Arabia</u>	<u>773</u>
5	Dubai	U.A.E.	3,995	Aden	South Yemen	690
6	Bushire	Iran	3,780	<u>Jizan</u>	<u>Saudi Arabia</u>	<u>654</u>
7	Bander Abbas	Iran	3,074	Hodieda	South Yemen	601
8	Sharja	U.A.E.	1,700	Jibuti	Jibuti	450
9	Abu Dhabi	U.A.E.	1,545	Massawa	Ethiopia	336
10	Doha	Qatar	1,217	Assab	Ethiopia	295

Source : Saudi Arabia, Sea Ports Authority, 1978.

The railway had a significant effect on the transport of goods and passengers between Riyadh and Dammam. But the connection of Dammam with Riyadh by paved road in 1961 led to a considerable decline in goods and passengers carried by rail. In 1960 for example, the amount of goods transported from Dammam to Riyadh was 721,000 tonnes, by 1961 this had already decreased to 671,000 tonnes, i.e. about 7.5% fall. In 1962 this decreased to 650,000 tonnes. The number of passengers was also affected, decreasing from 98,000 in 1960 to 27,000 in 1962, a fall of 72.5%.<sup>(19)</sup>

However, "while impressive gains were made, the railroad was hampered by a route that demands rehabilitation and generates operational difficulties that in turn inhibit a high level of service."<sup>(20)</sup>

The railway system, by the early 1970's, had reached an unsatisfactory position owing to, "First, the decay of the infrastructure; secondly, the age and inefficiency of the rolling stock and thirdly, income and expenditure were out of balance, and operating efficiency was continuously declining."<sup>(21)</sup>

To overcome these problems the railways consultant at that time, Arthur D. Little, recommended that:

"A decision had to be made either to discontinue the railway system altogether and switch its custom to road transport or to expand and modernise the system."<sup>(22)</sup>

According to the railway consultant in his final report "The Future of the Saudi Railroad" this recommendation led to discussion

involving many people within the railway organisation and some government and private agencies. These discussions have been summarized by the railway consultant as follows:

"1) Some people said that the vast size of the country and the concentrations of the population on the coast at each side with huge desert areas between, together with the economic situation as a whole, made it unprofitable and impractical to use railway transport. However, these geographical factors affect road transport at least as much as rail. Further, Iran and Mauritania have similar geographical conditions to the Kingdom of Saudi Arabia, but successfully run railways. Also, the economic argument was invalid since unlike road transport, the cost per mile of rail transport decreases with the distance covered. One might conclude from this that Saudi Arabia would benefit from having a nationwide railway system.

2) The second main argument against railways stated that : since Saudi Arabia is so rich in cheap oil, it might as well use the heavy oil-consuming modes of transport such as road and air, particularly since the kingdom had a good development programme of motorway and airport construction in which the government has invested a lot of money. However, other countries which are rich in oil, e.g. Iraq and Iran, both members of O.P.E.C. (the Organisation of Oil Exporting Countries), have decided to develop their railroad systems which are expanding very quickly.

3) A further argument in favour of railroads was that they are much less labour intensive than road transport since Saudi Arabia has a chronic labour shortage, it made sense to use railroads and release the

available labour for other necessary projects. In conclusion, those supporting the railroad system strongly recommended that a proper feasibility study should be carried out so that the question could be determined in the light of knowledge."<sup>(23)</sup>

As a result, in 1974, a contract was signed with the Saudi Government Railroad Organisation by SOFERAIL and Arthur D. Little to carry out a study. The study completed in 1975 strongly recommended the maintenance, development and geographical extension of Saudi Arabia's freight rail services.<sup>(24)</sup> It also recommended, though more cautiously, the development of passenger rail transport.<sup>(25)</sup>

To appreciate how these recommendations were arrived at, it is necessary briefly to examine the approach adopted by the consultants. Their methodology was based on a 15 year projection while the country was divided into 32 zones considered as nodes. All freight was broken down into 8 major commodity types, 1) Livestock, poultry and fish, 2) Agricultural products and prepared food stuffs, 3) Petroleum products, 4) Transport equipment, 5) Industrial products, 6) Building and construction materials, 7) Consumer products and 8) Ores.

In this study the rail network was divided into four major links:

- Link I     On the Eastern coast of the Kingdom would connect Khobar, Dhahran, Dammam, Jubail, Hafar and Kuwait;
- Link II    would consist of the existing rail network connecting the East coast with Riyadh (with an alternative direct link between Abqaiq, Hufuf and Riyadh to shorten the existing travelling distance);

Link III would connect Riyadh to Jeddah, Makkah;

Link IV would connect Jeddah with Medina and continue to the North towards Jordan, following the old Hijaz railroad<sup>(26)</sup> (see Figure 2.6).

The final report considered that passenger transport by train will face fierce competition from road and air transport, and referred to the recent and forecast road construction projects, air transport development, and the low price of fuel.<sup>(27)</sup> Therefore, estimated passenger transport by train is difficult to predict.<sup>(28)</sup> The study stated that a decision on rail transport for passengers should not in any way affect a decision on rail freight transport because the latter has considerable advantages in fares and socio-economic benefits to the country, which will enable it to successfully challenge road and air freight services.<sup>(29)</sup>

As a result of this study, the administrations of port and railway were separated in 1976 and the railway established a "Dry Port" in Riyadh (the Riyadh Castam Railway Station) which began operations in 1981, resulting in a big shift in freight transport from road to rail which now connects Riyadh directly with Dammam. Formerly businessmen had to send to Dammam to collect imported goods which were subject to much delay : this obstacle was now removed. Another advantage of this railway development was that it stopped the delay and damage to goods caused by the continual loading and unloading between ship and truck. A third advantage was the near halving of freight transport costs."

"The project is a very big extension to Riyadh station, which includes uncovered storage areas to receive the

### ALTERNATIVE ROUTES FOR NEW INFRASTRUCTURES

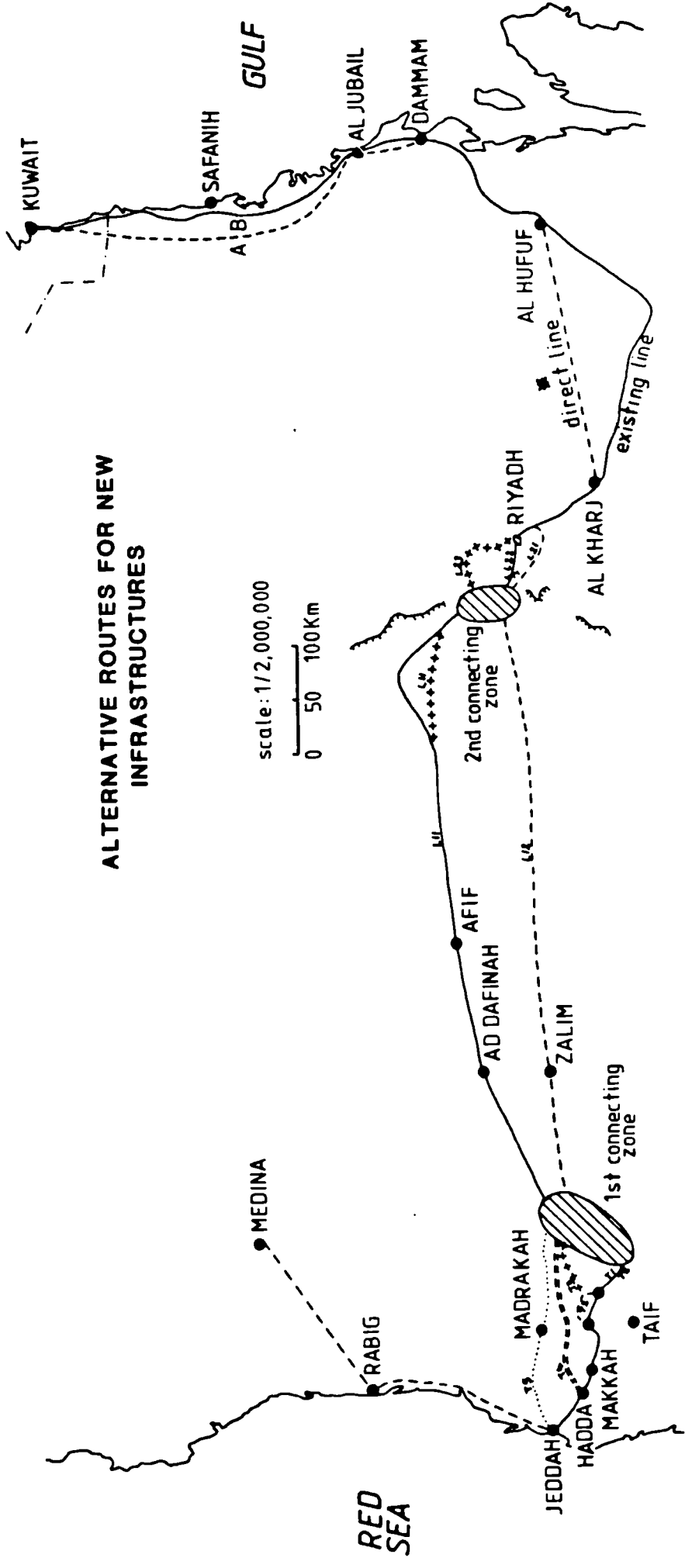
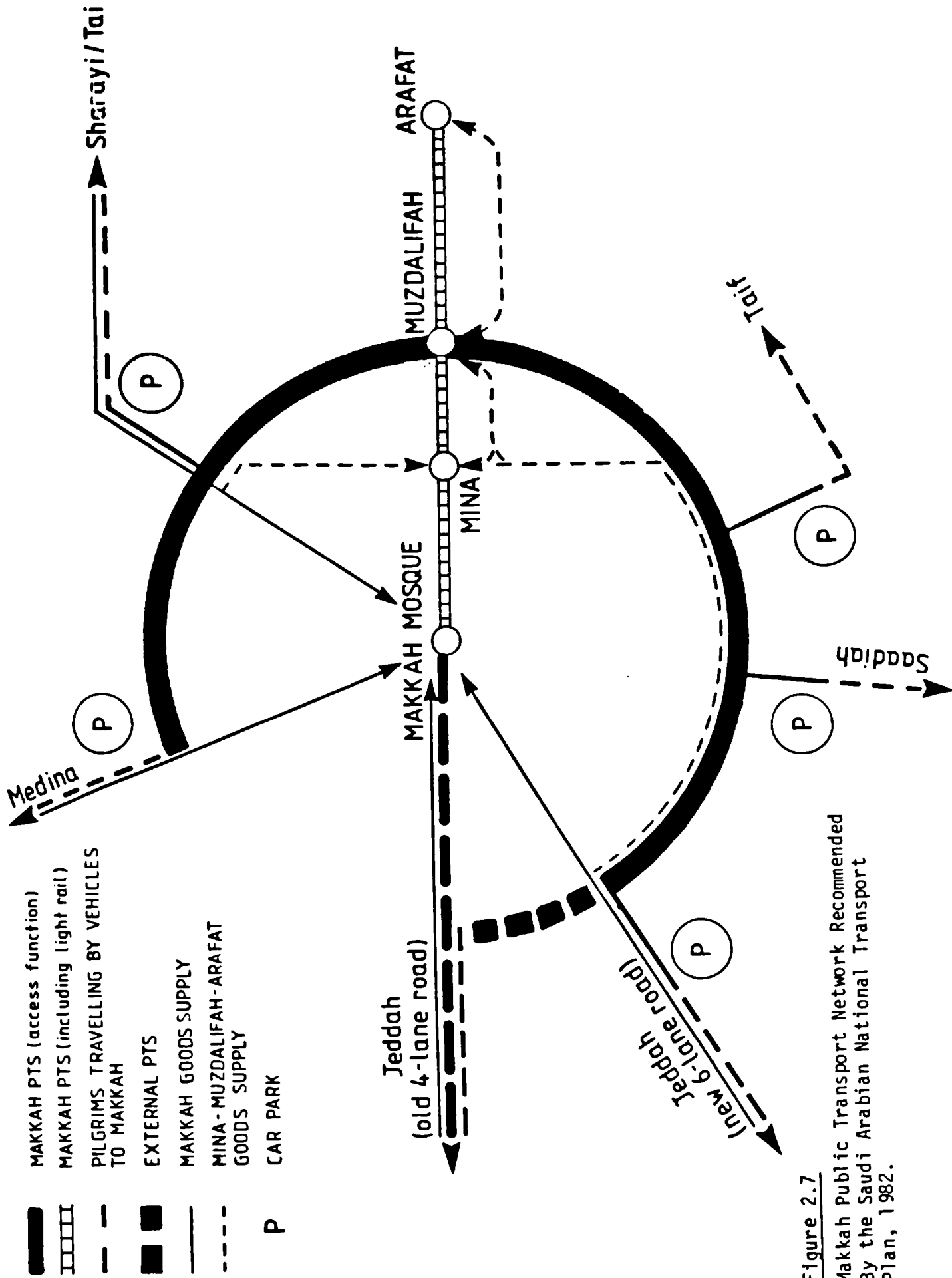


Figure 2.6

■ OPENED 1986  
 Source : Arthur D. Little, The future of the Saudi Railroad, 1975.

containers, warehouses, custom offices, houses for employees and other necessary requirements for this project which saves the merchants and importers in the Central Region from accepting their goods and imports from Dammam port, and opening offices for them at Riyadh station for this purpose. In addition to the arrival of merchandise and imports from the port directly without the necessity to load and unload the same more than one time; the matter that had an impact on the reduction of import costs and the subsequent reduction of sale rates which had benefitted both merchant and consumer."<sup>(30)</sup>

Some time later another study was carried out by the Ministry of Planning called "The Saudi Arabian National Transport Plan". This study supported the conclusions of the previous study in 1975 "The Future of the Saudi Railroad" : that the railway network should be expanded, that railways could provide a solution to the problems of transporting pilgrims between the Holy Places in Makkah, for instance using light railway networks, part of which would be underground. Figure 2.7 shows the network recommended by this study (1982). However, according to the Ministry of Communications Transport Department's consultant, "Unfortunately this recommendation could not be implemented for the following reasons: 1) Many pilgrims would come just for a few days only, in many cases once in a lifetime, and from all over the world. They would be confused by such a modern system of transport. 2) The variety of languages and the cultures of the pilgrims would create problems. 3) Most of the pilgrims want to sightsee, and would prefer surface transport."<sup>(31)</sup> However, it is suggested that further consideration should be given to this idea since the number of pilgrims is increasing all the time and, because light railways are becoming more common in many countries, more and more pilgrims will be familiar with them. Furthermore, the level of education is increasing in all countries, which will increase the pilgrims' ability to understand and cope with a new system.



**Figure 2.7**  
**Makkah Public Transport Network Recommended**  
**By the Saudi Arabian National Transport**  
**Plan, 1982.**

Finally both studies reflect the fact that Saudi Arabia is concerned about the development of the railways system. It seems the success of freight transport between Dammam and Riyadh has encouraged the government to look further at the possibility of expanding the railway system; an improvement in the national economy may encourage the government to reconsider.

## 2.5 Saudi Airlines and Airports

Saudi Airlines was formed in 1947 following the acquisition of three DC3 planes,<sup>(32)</sup> one of which was a gift from President Franklin D. Roosevelt to King Abdul Aziz at their meeting in the Suez Canal Zone in 1945,<sup>(33)</sup> and the signing, also in 1945 of a technical and management assistance agreement with T.W.A.<sup>(34)</sup> Jeddah airport was constructed in 1947, Dharhan airport having already been built by the U.S. Air force as a World War II airbase.<sup>(35)</sup> Using these and some landing strips air services were established along the main east-west axis corridor.<sup>(36)</sup>

Owing to the fact that Saudi Arabia had then no roads, railways or inland waterways, there was a considerable demand for air transport. Since the construction of the necessary infrastructures for land surface transport services would obviously take time, Saudi Airlines had to expand rapidly until by 1968 its fleet numbered 26 planes, including two Boeing 707s. Saudi Airlines had to expand into international services in order to connect with other Arab countries, and in 1960 established routes to Tripoli, Tunis, Rabat and then to Geneva, Frankfurt and London in association with B.O.A.C.<sup>(37)</sup>

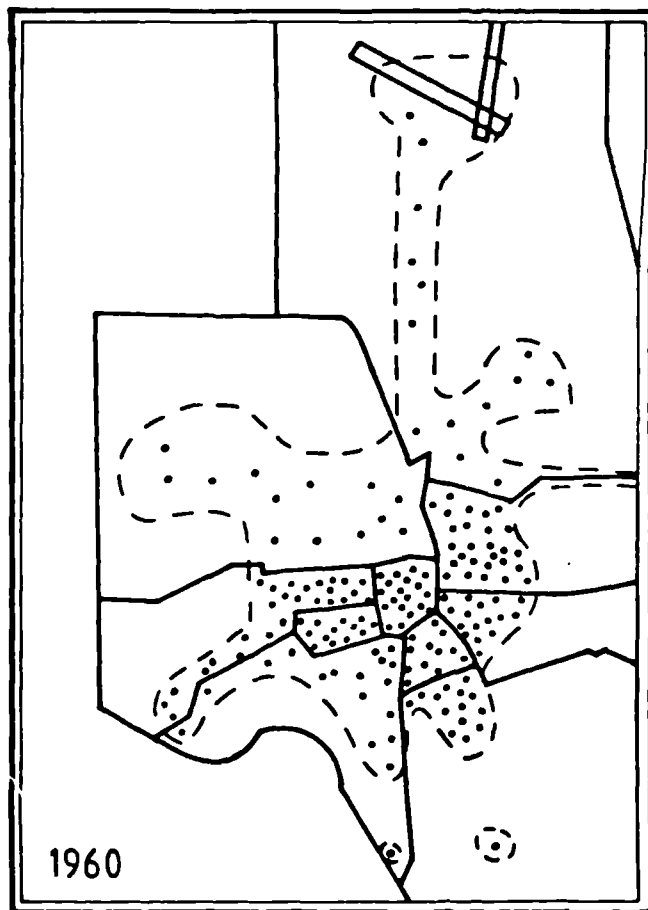
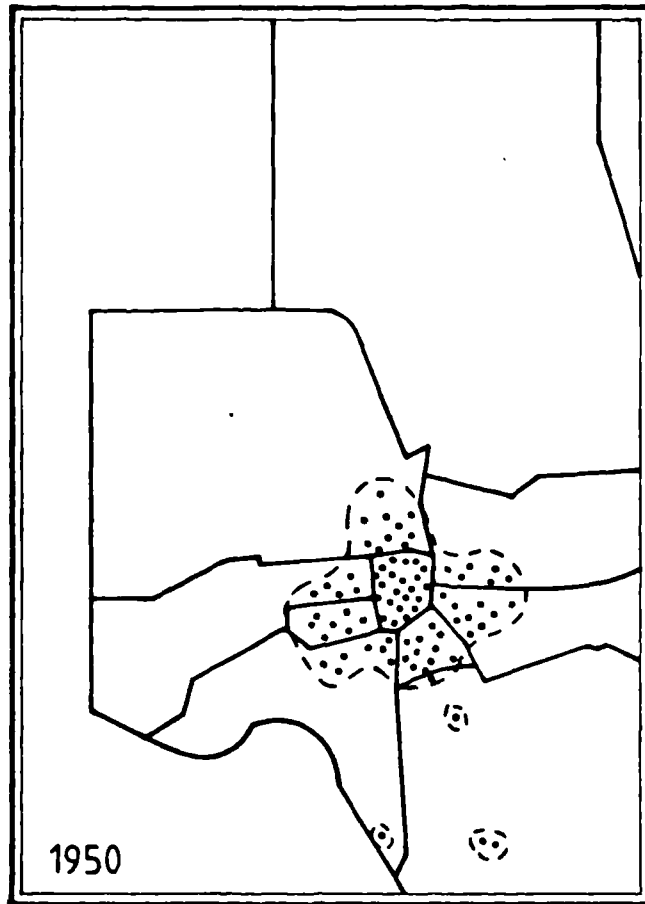
Moving towards the present, in 1979 Saudia had 38 modern planes, increasing to 62 in 1984.<sup>(38)</sup> Moreover, the important world position of Saudi Arabia because of its oil production and holy places of pilgrimage made communications with East and West essential. Therefore, Saudi Arabia now has 23 airports, of which three, Dharhan, Riyadh and Jeddah, are international. All are maintained and managed by the Presidency of Civil Aviation (PCA).

Following the expansion of cities and urban areas new airports have been constructed : the King Abdul Aziz International airport in Jeddah opened in 1981, and the King Khaled International airport in Riyadh, begun in 1978, opened in 1984.<sup>(39)</sup> The latter occupies a new site 50 kms north of the capital, and was built because the old airport had been surrounded by the expanding city making any expansion of its facilities difficult as well as causing noise disturbance to residents.

The old airport was constructed in the early years of 1950's 8 kms from the old city centre. Later, a road was built 8 kms from Riyadh's old city centre to the airport through Wadi Batha to the north. Since there was at that time no comprehensive development policy for the city, new developments emerged along the new road causing a shift from the city centre towards the airport (see Figure 2.8). In 1968 Doxiadis recommended to the airport administration that they should bear in mind that the airport was established to serve the city, not to stand in the way of its development and that if the city were allowed to develop, the airport would also develop.<sup>(40)</sup> Therefore as a result of Doxiadis, and other studies, the present new Riyadh airport stands in a 225 sq.kms. reservation designed to allow for further airport expansion, and to exclude urban expansion so as not to repeat the experience of

Figure 2.8

Riyadh in 1950 and 1960, Showing Development Along Road to Airport



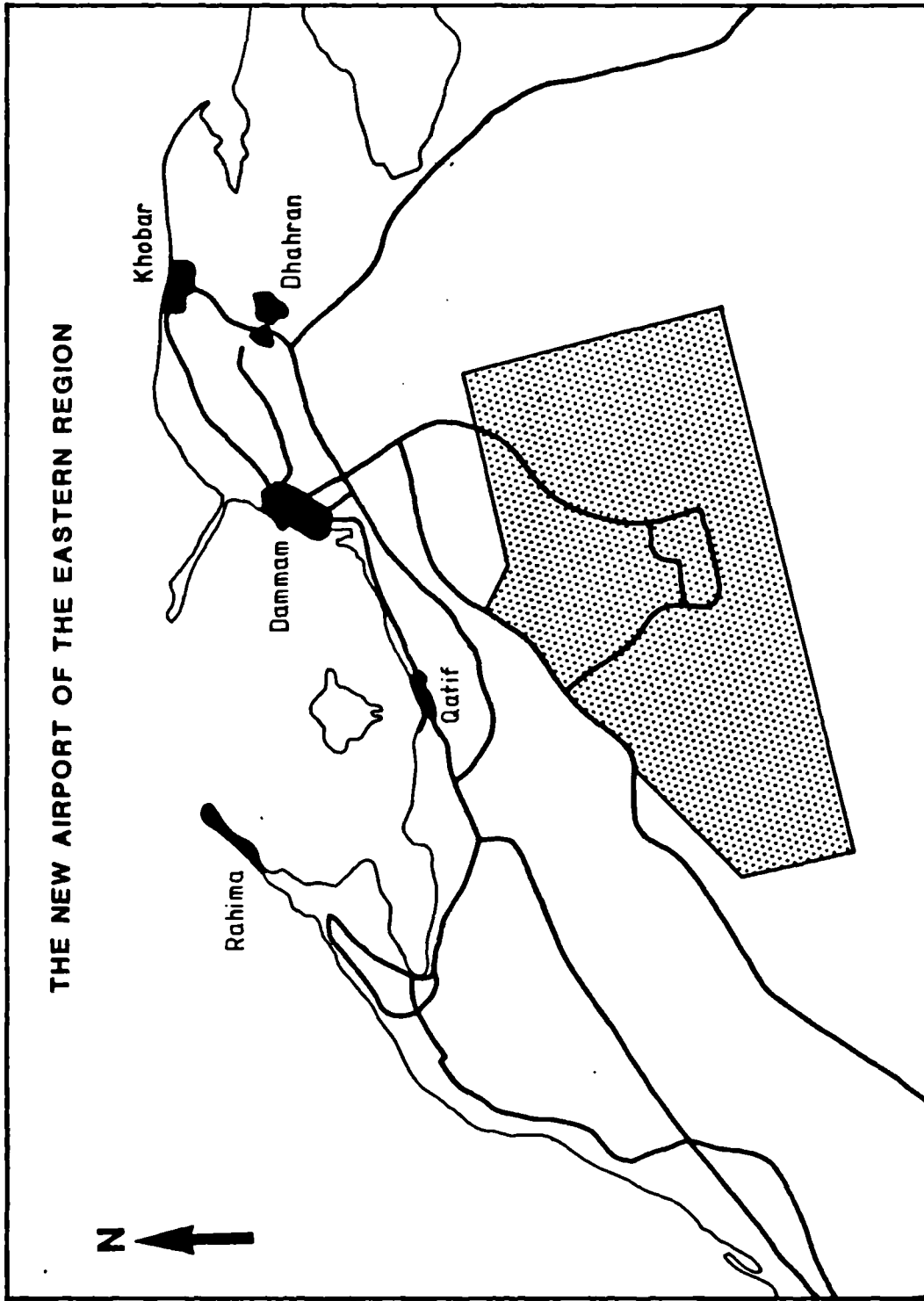
Source : SCET International, Riyadh Existing conditions, 1979.

the old airport which is now so close to the city centre. The airport was placed on its present site (north of Riyadh) because of its flat open countryside : the country elsewhere around Riyadh, particularly to the south, is mountainous and unsuitable. There is a motorway ringroad connecting the new airport to all parts of the city, parking for 7,700 cars under cover and 3,200 on the roof, a water desalination plant, 295 villas and 219 flats for its employees, and a mosque which can accommodate 5,000 worshippers. The anticipated traffic is 18 million passengers per annum by the year 2000.<sup>(41)</sup>

The new airport in the Eastern Region, located 36 km north west of Dammam City, is still under construction and due to be completed in 1989. The site selected is on a 525 sq.km. area, including residential districts, construction areas, and land set aside for possible future development. Figure 2.9 shows the new airport location. A multi-level terminal will be located at the centre of this new airport with two commercial passenger terminals, one for the Saudi airline, SAUDIA, and one for other International airlines. Each terminal is designed to have 22 gates served by air bridges.

This project will develop in two phases. Phase One will meet minimum operation requirements until 1995. Phase Two will be implemented according to the future demand. According to the Presidency of Aviation's projections seven million passengers annually will use this new airport by 1992 and 12 million travel passengers by the year 2002. The old airport which was constructed in the mid 1940s at Dhahran will be retained for use by the Saudi Air Force. This airport was updated as recently as 1980 to accommodate increased passenger traffic and air cargo.<sup>(41)</sup>

Figure 2.9



The three major airports at Jeddah, Riyadh and Dhahran handle more than 61% of the country's total air traffic (Table 2.4). Of the ten busiest airports in the Middle East in 1981, Saudi Arabia's three International airports rank 1st, 4th and 9th (Table 2.5). In 1984 Saudia carried 3,600,000 international passengers and 4,906,700 domestic (see Table 2.4). Saudia is amongst the leaders in the number of planes and seats (Table 2.6) and has a greater number of seats per plane than most others. In the number of seats Saudia leads its nearest competitor by more than 50%, showing the importance of the Saudi airline in the area.

As a result of the Saudi airline's development, and the construction of the new airports, the number of employees with Saudia has grown rapidly. For example, the number employed in 1974 was only 5,000; by 1983 this had grown to 23,356, more than fourfold increase in less than ten years.<sup>(42)</sup> In 1985 the number employed was 24,266.<sup>(43)</sup>

## 2.6 SAPTCO (Saudi Arabian Public Transport Company)

The development and rise in income during the 1970s, particularly after the increase in oil production, and the establishment of the Real Estate Fund, caused a massive migration of labour, largely from other countries, to work in the construction sectors. This led to the idea of public transport which emerged in 1977 : SAPTCO was formed in 1979 following a Royal Decree dated 14.8.1409H, and started operating in 1980.<sup>(44)</sup> SAPTCO is a public private joint venture with ownership distributed 40% to the government, 31% to Saudi co-founders and the balance to the general public. Authorized capital is 1,000 million

Table 2.4 Growth of Passenger Traffic on Saudi Airlines

Year	Airport			Total passengers millions	Saudia's percentage shares	Other 20 domestic airports (total passengers)
	Jeddah	Riyadh	Dharhan			
1975	729	170	356	1,255	28.2	552.6
1976	1,162	303	511	1,976	27.9	1,135.4
1977	1,796	552	837	3,185	24.4	1,566.9
1978	2,178	790	1,113	4,081	24.8	2,409.7
1979	3,320	969	1,319	5,608	22.1	3,213.4
1980	3,499	1,098	1,560	6,157	38.6	4,008.2
1981	3,740	1,183	1,865	6,788	39.4	3,910.0
1982	3,970	1,289	2,322	7,851	40.0	4,398.1
1983	3,866	1,513	2,128	7,507	45.4	4,931.4
1984	4,001	1,748	2,042	7,791	46.2	4,906.7

Source : Presidency of Civil Aviation, 1985.

Table 2.5 The Busiest Airports in the Middle East

(in 000s)

(Saudi airports underlined)

Airport	Rank	International Passengers
Jeddah	1	3,740
<u>Kuwait</u>	2	2,100
<u>Ammam</u>	3	1,880
<u>Dhahran</u>	4	1,864
Bahrain	5	1,850
Beirut	6	1,600
Dubai	7	1,560
Damascus	8	1,200
Riyadh	9	1,183
Baghdad	10	1,100

Source : Presidency of Civil Aviation, 1985.

Table 2.6                      Capacity of Middle East Fleets

Scheduled Passenger	Total Aircraft	Total Seats
Saudia	71	14,809
Iran Air	33	8,499
Kuwait	20	4,599
Alia	20	4,504
Gulf Air	18	3,817
MEA	20	3,512
Syrian Airlines	20	3,091
Iraqi	44	3,080
Alymeda	7	936
Yemen	6	846
Iran Asseman	2	168

Source : Presidency of Civil Aviation, 1985.

Saudi Riyals, on which the government guarantees a return of 15%.<sup>(45)</sup> SAPTCO is given an annual subsidy by the Deputy Ministry of Transportation under the provision of the Third Development Plan,<sup>(46)</sup> though SAPTCO's operations themselves are not included in the plan.

By April 1982 SAPTCO had established intra-urban services in seven cities, with immediate proposals for four more, and had instituted some inter-city services. Also by 1982 SAPTCO had 1,100 passenger buses and 4,845 employees of whom 80% were non-Saudis,<sup>(47)</sup> (see Chapters Three and Five).

## 2.7 Summary

In this chapter road development, the crisis of sea ports, the railway, air travel and the establishment of public bus transport have been discussed.

The initiative to develop the road network started after the discovery of oil. However, the rapid development of road construction started with the development plans which were associated with the high oil production and prices. El Mallakh (1980) stated that:

"Recent studies on the absorptive capacity of the Organization of Petroleum Exporting Countries (OPEC) have added other dimensions to the definition given to resources to be absorbed. One interpretation is the absorption of oil revenue. Then, to the extent that oil revenues in these countries accrue to the governments in the first instance, the concept of absorptive capacity becomes the ability of the government to spend the oil revenue within a given productivity criterion. On the other hand, since the domestic market for both crude oil and oil-based products is limited in these countries, there exists almost a one-to-one correspondence between oil revenue and foreign exchange which accrue to the country concerned. Consequently it has also been fashionable to interpret absorptive capacity in terms of the ability to utilize the foreign exchange effectively."<sup>(48)</sup>

This can explain how the high oil revenue was reflected in the large number of construction projects undertaken in a short period; hence the rapid increase in the road network during the development plans. The highest priority of the early road building plans was to connect together the regions and cities. When this was achieved, the next objective was to reduce the distances and travel times between cities.

Road development has affected that of the railways : for example in 1961 when the road link between the Eastern Region and Riyadh was completed, much freight traffic left rail for road transport. After that the railways started to be modernised and developed to respond to this challenge. Faisal Al Sheheel, the President Director of the Railway said in Al Yammamh (1986):

"as a result of increase in development activity in all forms of transport the railways have started to implement new development projects to increase their efficiency in operations."(49)

For example, at present a new railway following a much straighter route is being built which will reduce the distance between Dammam and Riyadh from 562 to 450 kms and passenger travelling time from seven hours to four.<sup>(50)</sup>

However, the reduction of road distances between cities, the relocation of airports away from cities, and fluctuation in oil prices and production will directly and indirectly affect transport, particularly the airlines and railway. For example, a reduction in oil production will lead to a decrease in the amount of goods imported,

reducing freight traffic on the railway. In 1982 the volume of goods imported through the major ports grew 20.6%, in 1983 it declined by 7.2% and in 1984 by 6.2%. The value of goods imported in 1983 was 136,000 million Saudi Riyals decreasing to 128,000 million in 1984.<sup>(51)</sup>

This decline will affect the number of non-Saudis working in the country, and, since many travel between their home countries and Saudi Arabia and between Saudi cities by Saudia Airlines, this will probably affect the airline's business. Also, the reduction may well have an effect on the airline in the future. This conclusion is confirmed by Stratford (1967):

"The use of air transport is strongly affected by other forms of transport, especially the motor car. This is not only true of the U.S.A. but applies also to Europe and Australia, and indeed to any country where an adequate road system allows full scope for the use of the motor car journey."<sup>(52)</sup>

The significance of this chapter is that Saudi Arabia has made great advances in road construction and transport infrastructure in a very short time which has changed the fundamental transport of the country from caravan routes to modern systems of highways. Therefore, the next chapter will study the transport problems in a rapid growth city, exemplified by Dammam.

## 2.8 References

1. Abdo Assad A geographical study of Transport in Saudi Arabia, Ph.D. Thesis, 1969, University of Durham.
2. Abdo Assad The Evolution of Modern Roads in Saudi Arabia, Extrait Du Bulletin De La Societe De Geographie d'Egypte, XLI-XLII, 1972, p. 24.
3. Ibid, p. 26.
4. Stegner Wallace Discovery, 1971, p. 137.
5. Abdo Assad, 1972, p. 28.
6. Ministry of Finance "Progress of Road Construction up to 1388/1389 (1968/1969)", Statistical Yearbook 1979, p. 266.
7. Ibid, p. 266.
8. Ministry of Planning Second Development Plan 1970-1975, p. 432.
9. Ministry of Planning Third Development Plan 1980-1985, p. 393.
10. Ibid, p. 403.
11. Ibid, p. 405.
12. Ministry of Planning Achievement of Development Plans, 1983, p. 36.

13. Lamb, Richard Metropolitan Impacts on Rural America, The University of Chicago, Department of Geography, Research Paper No. 162, 1975, p. 25.
14. Small, John and Witherick, Michael A Modern Dictionary of Geography, 1986, p. 24.
15. Saudi Arabia Ports Authority Annual Report No. 1 (in Arabic), 1978, p. 15.
16. Ibid, p. 17.
17. Abdo, 1969, p. 56.
18. Ministry of Communications Land and Marine Transportation, 1984, p. 117.
19. Ministry of Finance Statistical Yearbook, 1965.
20. Saudi Government Railroad Organization The Future of the Saudi Railroad, Final Report, (in Arabic) prepared by Arthur D. Little, November 1975, p. 5.
21. Ibid, p. 5.
22. Ibid, p. 6.
23. Ibid, pp. 6-7.

24. Saudi Government Railroad Organisation The Future of the Saudi Railroad. Annexes and Appendices (in English), prepared by Arthur D. Little, November 1975, p. 52.
25. Ibid, p. 3.
26. Ibid, p. 4.
27. The Future of the Saudi Railroad, Final Report, November 1975, p. 5 (in Arabic).
28. Ibid, p. 21.
29. Ibid, p. 19.
30. Ministry of Communications Land and Marine Transportation, 1984, p. 132.
31. Ministry of Communications Transport Department, Riyadh, 1985.
32. Abdo Assad, 1969, p. 204.
33. Aramco Aramco World Magazine, January/February, 1984, p. 6.
34. Third Development Plan (1980-1985), p. 416.
35. Abdo, 1969, p. 204.
36. Abdo, 1969, p. 214.

37. Abdo, 1969, p. 205.
38. Ministry of Planning Fourth Development Plan (1985-1990), p. 392.
39. Ibid, p. 393.
40. Ministry of Interior The city and the present airport (Riyadh) (In Arabic) Doxiadis Associates, Consultants on Development and Ekistics of Athens, Greece, 1968, p. 6.
41. Ministry of Defence and Aviation, Presidency of Civil Aviation, 1984.
42. Saudia Airline, Annual Report, 1983, p. 22.
43. Ministry of Planning, The Fourth Development Plan (1985-1990), p.
44. Saudi Arabian Public Transport Company (SAPTCO) The Annual Report, 1981-1982, p. 32.
45. Third Development Plan (1980-1985), p. 394.
46. Ibid, p. 396.
47. SAPTCO The Annual Report 1981-1982, p. 23.
48. El Mallakh, Ragaei and Atta, Jacob K., University of Colorado, The Absorptive Capacity of Kuwait Domestic and International Perspective, 1980, p. 2.

49. "Transportation Achievement and challenges : a documentary attachment about transportation" special issue in Al Yamamah Magazine (Saudi Arabia) No. 903, 1986, p. 70.
50. Ibid, p. 70.
51. Saudi Arabian Monetary Agency The Annual Report, 1984, p. 62.
52. Stratford, Alan H. Air Transport Economics in the Supersonic Era, 1967, p. 103.

CHAPTER THREETRANSPORT PROBLEMS OF A RAPIDLY GROWING CITY : DAMMAM3.1 Introduction

The Industrial Revolution in the West had a profound effect on the distribution of the population and in the growth of cities. This impact is no longer restricted to Europe and America. As James H. Johnson (1972) has pointed out,

"the growth in the number of people who live in cities and the diffusion of urban life to every part of the habitable world is one of the characteristic features of twentieth century life. Although there have been towns in some restricted parts of the earth since prehistoric times, the modern situation, in which a substantial part of the population of many parts of the world has become urban dwellers, and in which cities increasingly dominate social and economic life, had its origins in western Europe only two centuries ago" (1).

This Industrial Revolution also led to the rapid development of urban transport modes, compared to the time when all transport was either pedestrian or animal. During the Industrial Revolution transport developed from the horsecar, via the steam train, the street tram and the motor bus to motor cars, each development occurring as further technology became available.<sup>(2)</sup> These developments in the modes of transport caused the cities to grow outwards from the centre : the shape of the cities was governed by the mode of transport available at the time. For example, during the hundred years to the First World War, most large cities in Western countries had grown from a small town in which nothing was more than walking distance away from anything, through the star shaped, tentacular city with ribbon development along

major rail and road arteries, to the "flexible" city of sprawling conurbation in which to travel requires motor cars or buses.<sup>(3)</sup>

The widespread use of the motor car allowed people to live further and further from their work places in the newly built suburbs. The use of the motor car rapidly overtook all other modes of transport. This increased use of motor transport required ever increasing supplies of fuel. And in Saudi Arabia, the vast growth of cities was caused not so much by an Industrial Revolution but by an oil Revolution resulting from the Western fuel demand. Most Saudi cities jumped from pedestrianised towns to flexible, radial cities in a very short time span, around 20 years, achieving all their growth during the era of the motor car.

Therefore, this chapter will discuss the transport problems of rapidly growing cities as exemplified in Dammam. First, we will look briefly at the character of the typical traditional Saudi city before the discovery of oil and the widespread use of the motor car. Secondly, we will examine the main factors influencing the development of Dammam; thirdly the old and new types of street pattern will be compared and studied. Fourthly, the growth of traffic in cities will be examined. Finally, the relationship between the rapid growth of cities and their traffic, and the increased rate of traffic accidents will be studied.

### 3.2 The traditional character of the Saudi city before oil exploitation

Before the First World War Saudi Arabian cities were characteristically groups of houses around wells. They were not

suitable for further growth and development partly because the wells were liable to dry up, and partly because these nodal settlements were frequently at war with one another. The economy and level of population were therefore unstable.<sup>(4)</sup> This situation continued until King Abdul Aziz consolidated the Kingdom in the 1930's, and enforced peace between the warring tribes. These nodal settlements were characterized by defensive walls, very narrow streets and congested housing centred upon a mosque, surrounded by a market place to which all streets led. The only way of getting about was either on foot or using animals.<sup>(5)</sup> The growth of housing was very slow, the only building materials being mud and timber from the palm tree.<sup>(6)</sup> Furthermore, there was no concept of planned development, for example in Riyadh in the early 1930's, buildings could be constructed at random within the walls, creating narrow, winding streets, some of which never saw the sun.<sup>(7)</sup> In the early 1940s building began outside Riyadh's city walls to accommodate the increasing population which had outgrown the limited space within. However, the style of building and character of the city was the same outside the wall as it had been inside. The city walls of Riyadh were later demolished in the 1950s, allowing inside and outside to be connected to each other.<sup>(8)</sup>

This model of development was repeated in most inland cities in Saudi Arabia, but with less rapid growth. However, in coastal cities, particularly in the Eastern oil areas, the pattern of growth was different; although some, such as Hufuf and some Qatif towns were early walled cities, most are generally of more recent establishment and unwallled. However, they were built with similar characteristics,

and the same modes of transport were used. Hufuf was vividly described by American geologists exploring for oil in 1933 in these terms:

"It is a very old town, and then it still had three walls around. There were no lights. At night when it was dark, and when somebody asked us to dinner, they'd send a messenger with a couple of kerosene lanterns to guide us. With the walls ... and those narrow street ... we were in a different land.(9)

Western and North American cities at that time were suffering from congestion and noise pollution; for example a study of traffic in 1933 showed that per day around 277,000 vehicles entered downtown Los Angeles, 113,000 entered Chicago, 66,000 entered Boston and 49,000 St. Louis.<sup>(10)</sup> At that time most Saudi towns were still in a pedestrian stage where everything was located within a walking distance. An aerial photograph of Dammam in 1933 shows (Plate 3.1) a typical Saudi town. It was estimated that Dammam and Khobar consisted of around 250 randomly scattered houses in each town, built of mud and wood similar to those in Riyadh.<sup>(11)</sup> The first people to settle in Dammam were a tribe called Al Dawasser who came from Bahrain in 1921.<sup>(12)</sup> Until then the site on which Dammam stands was an uninhabited desert. They chose this site because it was near to Bahrain, and these people were fishermen trading with both Bahrain and Ahsa. The character of all towns in the Eastern Region, in particular Dammam and Khobar, did not begin to change until the discovery of oil, and the establishment of Aramco in the area of Dharhan. It can be considered that Aramco had two kinds of effect on the development of almost all the towns in this region, especially Dammam city; the first was during the build up of Aramco facilities which indirectly caused a great deal of activity and economic growth in the whole area around Dharhan which was the focal

Dammam in 1933



point of development; the second important effect of Aramco was the house building under its Home Ownership Programme, established in 1953. The second stage of impact on the growth of Dammam was as a result of the operation of the Real Estate Fund which was established in 1974 to provide funds for constructing houses.

Therefore the urban growth of Dammam will be explained according to these major factors : Aramco as the focal point and sponsor of growth in the area, and the Real Estate Fund.

### 3.3 Urban growth in Dammam

#### 3.3.1 Effect of Aramco as the focal point

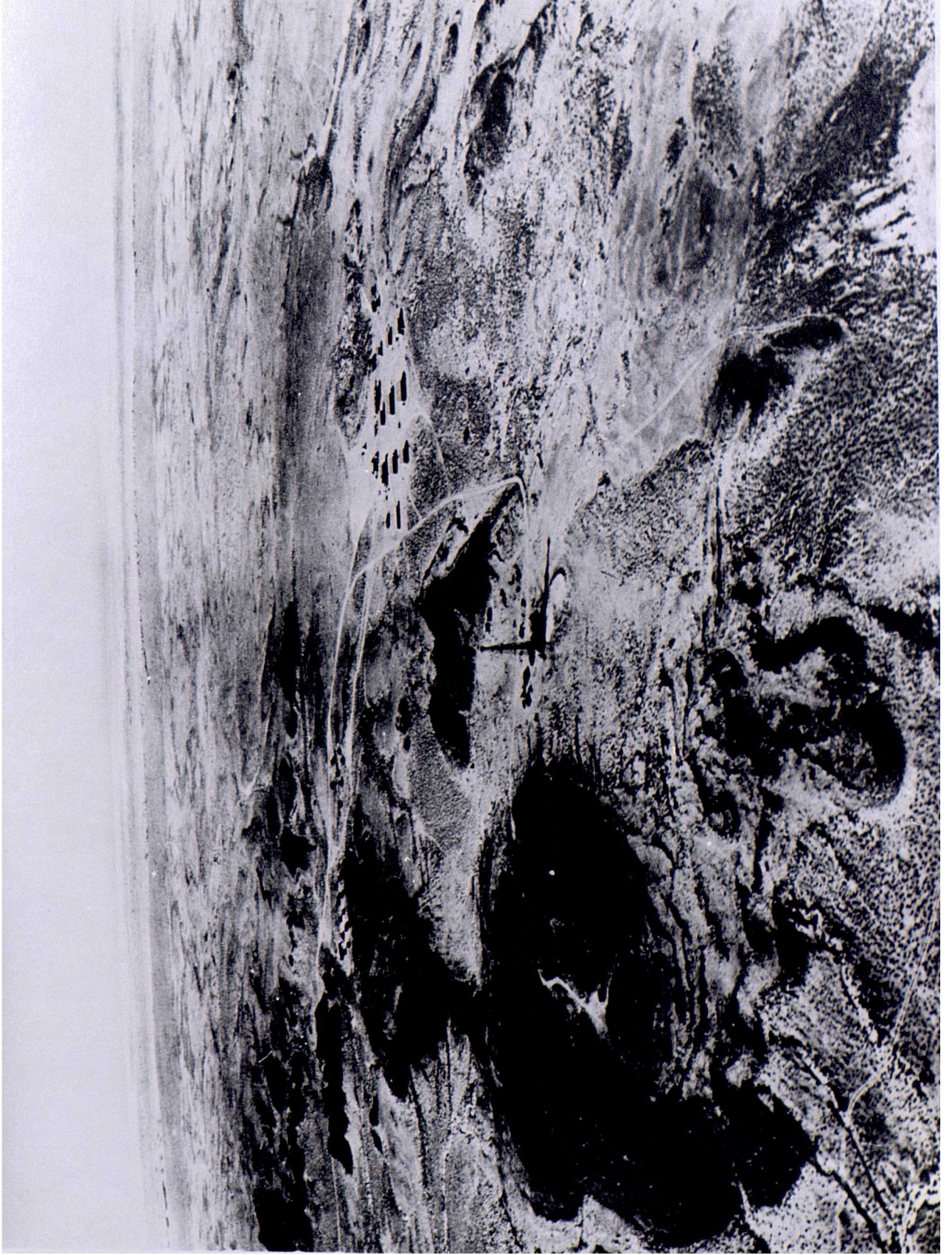
As previously mentioned, Dammam was a small fishing village of less than 300 houses when the commercial extraction of oil began, after the exploitation of petroleum agreement was signed with Standard Oil of California under Royal Decree number 1135 of July 1933.<sup>(13)</sup>

From this time Dhahran began to change from a mining area in the desert to a small settlement. It became the headquarters of Aramco and permanent buildings were constructed, these were offices, laboratories, wells, roads and also housing for single men and families. In 1937 six American wives arrived to join the 53 American employees and a new community began to emerge.<sup>(14)</sup> (See Plate 3.2 of Aramco camp in 1936 in Dharhan).

The first contact local people had with Aramco was during the construction of the basic facilities in Dharhan, Abqiq and Ras Tanurah,

Plate 3.2

Dharhan : Aramco camp in 1936



people were contracted by Aramco using their own animals to move stone, sand, cement and other building materials. Also some bedouins were used as guides by the geologists conducting explorations.<sup>(15)</sup>

In the early 1940s Aramco was still constructing the basic infrastructure: roads, ports, pipelines and refineries, and also overseeing the construction of the railway from Dammam, via Dharhan, Abqiq and Hofuf to Riyadh, including the construction of a two berth deep water port at Dammam.<sup>(16)</sup>

In 1950-51 as Aramco increased oil production to meet the demand resulting from the start of the Korean war and the nationalization of the Anglo-Iranian Oil Company by Iran, an increase in the work-force to 24,000 meant further immigration into the oil field areas, including Dammam.<sup>(17)</sup> More houses were built there to accommodate them. At that time (1950) Aramco built the first asphalted roads linking Dharhan with Khobar. By 1952, Dammam, Khobar and Dharhan were linked by paved roads<sup>(18)</sup> allowing commuting between the cities and the Aramco area, and permitted passenger and goods traffic to develop between the expanding cities.

In the late 1950s the policy developed by Aramco was to involve many more Saudi contractors in the construction of pipelines, buildings, roads and services. By "taking advantage of Aramco's loans, advice and equipment some of these men started by providing Aramco with goods and services unobtainable in the Eastern Province, and then later, started to provide the same goods and services to Saudi Arabia and in some cases to the whole of the Middle East."<sup>(19)</sup>

Aramco was at this time encouraging the economic growth of the area by attracting the local people to participate in this development. It also increased the economic trade between the Eastern Region and other parts of Saudi Arabia. Indeed this economic activity and employment opportunities in the Aramco field attracted many people towards the Eastern Region, mainly in the area near to the oil fields. Dammam became the main base for most of the newcomers, and accommodation became one of the main problems for the immigrants who were looking for work with the oil company. Aramco, at that time, decided to build suitable housing to attract more employees from all over Saudi Arabia and to accommodate their existing employees.

### 3.3.2 Aramco Home Ownership Program

A tentative housing plan for Aramco employees emerged in 1946-47, this was discussed with the government which gave approval to the scheme in 1949. A committee from Aramco visited a number of oil companies in Venezuela and Iran to look at their facilities. This committee recommended that Aramco should adopt the idea of developing natural family communities as opposed to work camps.<sup>(20)</sup> In 1952 the government agreed to the designation of Dammam Townside Reservation number 19 to Saudi employees under the home ownership programme.<sup>(21)</sup> Approximately one third of Aramco's Saudi employees chose at that time to live in Dammam.

The policies of the Home ownership programme were as follows:

- a) Houses were to be built by Aramco for sale to its employees with loan facilities provided by Aramco.

- b) Alternatively, houses would be built by the employees with financial help, technical assistance and supervision from Aramco.
- c) The third option allowed employees to design their own houses, employ their own contractors with loan facilities still available from Aramco.<sup>(22)</sup>

The responsibility for paving the streets and lighting was through the Municipality of Dammam.<sup>(23)</sup>

In 1955 Aramco began the construction of 200 houses under the programme, for allocation to their employees. At the same time it was preparing a further 600 plots for housing.

An employee could also purchase, at his own expense, a plot of land outside the designated site, for example near his family home, and apply for a loan from Aramco to help him build the house.

By 1956 Aramco had completed 253 houses which were for sale, and had prepared 579 building plots. By 1959 Aramco had built 450 in Dammam alone.<sup>(24)</sup> The aerial photographs, (Plate 3.3), taken in 1957 and 1982 clearly show the rapid development of Dammam urban area under this program. This district is considered one of the largest districts in Dammam, and is distinguished further by the Western style of street pattern, with recreation areas, green areas and also school layout and designs. By 1985, the number of building plots provided by this program in Dammam and surrounding towns was 11,245, of which about one third were in Dammam itself. Thus Dammam has the largest population of



Plate 3.3

Aramco employees in the area because up to 1985 3,500 building plots had been completed and handed over to Aramco employees and a further 188 plots planned to be ready by the year 1989 (See Table 3.1).

Table 3.1    Distribution of Aramco Employees Building Plots

City	Prior							Total
	to 1981	1981	1982	1983	1984	1985	1986-89	
Dammam	3,074	43	-	225	-	158	188	3688
Qatif	-	-	-	-	-	-	1000	1000
Khobar	1,476	28	-	-	108	-	415	2027
Dharhan	485	199	-	-	345	378	-	1407
Rahima	1,521	-	288	-	-	-	936	2745
Safwa	316	-	-	-	-	500	936	1752
Abqiq	676	-	302	-	-	-	1000	1978
Hasa	167	335	609	-	12	-	2144	3267
Total	7,715	605	1199	225	465	1036	6619	17,864

Source : Community Development Division, Aramco, 1985.

### 3.3.3    The effect of the Real Estate Development Fund

The Real Estate Fund has played a major part in the development of Saudi Arabian cities and towns enabling them to grow very rapidly. Dammam, along with all other major urban areas has benefitted from the fund. The Real Estate Fund was established in 1974 following the

increase in oil prices and production. It was set up by Royal Decree, numbered M/23, dated 11.6.1974 as a financial institution attached to the Ministry of Finance and National Economy, with an initial fund of 250 million Saudi Riyals. By 1983 the Fund's working capital had been increased to 62,400 million Riyals through favourable years of oil development and production, and to meet an increased demand for loans.<sup>(25)</sup> The Fund was set up to provide loans to married Saudi men and women of eighteen years of age to build houses. This was modified after a year to include married men of eighteen and over, single men of twenty three and over, unmarried women over 40 years. Divorced women and widows could apply for a loan. Furthermore, for the latter, after consideration of her financial situation, the loan would become a grant.<sup>(26)</sup>

The maximum private housing loan is 300,000 Riyals; twenty-five per cent can be subtracted from the loan if the borrower maintains his repayment schedule.<sup>(27)</sup> For example, on a loan of 300,000 Riyals the repayment is 12,000 Riyals per annum, reduced to 9,000 if the payment is made on time. The loan is made in stages : 30,000 Riyals advanced initially and on completion of the foundations the borrower may apply for the second stage of 120,000 Riyals. The third stage of 120,000 would be provided when the structure of the house was completed and the fourth stage payment of 30,000 Riyals is paid for decoration on completion of the house.<sup>(28)</sup> Borrowers have to purchase the plot, and also they are responsible for ensuring that the design and construction of the house satisfies cultural demands for privacy. An example of these requirements are the building of private apartments for visitors outside of the family (a guest room, guest dining area and a separate bathroom).

Table 3.2 shows the annual amount of loans that were provided by the Real Estate Fund from 1975 to 1983. The increasing amounts of expense on housing arise from the scale of enlargement of urban areas in a short period of time; on average, 7,000 million Saudi Riyals per annum. The average number of housing units that were built in the same period was approximately 37,000 units per annum throughout the country.

<u>Table 3.2 Loans provided in Saudi Arabia by the Real Estate Development Fund 1975-1983 in millions of Saudi Riyals in Saudi Arabia</u>									
1975	1976	1977	1978	1979	1980	1981	1982	1983	Total
2,159	8,749	7,198	5,309	8,085	7,157	6,764	7,974	8,522	61,914

Source : Real Estate Development Fund, 1984.

The Real Estate Fund has also made loans for investment since 1976 to enable private and public developers to build housing estates, blocks of flats, offices and shopping centres. For example, the Real Estate Fund would lend 50% of the cost of such development up to 10 million Riyals. A total of 2,077 million Riyals of investment loan money had been made by 1983 on 23,133 housing units, 1,417 offices and 2,552 commercial centres. (29)

### 3.3.4 Housing growth in Dammam

In the mid 1970s a number of Western consultant companies were involved in studying and analysing the future housing demand in cities. In 1975 the International Land Development Consultant (ILICO) of the Netherlands stated that Dammam would need between 1,948 and 2,148 hectares to meet the demand of local inhabitants, or the normal population, for housing units, and for the migrant population from other parts of the country. 12,942 housing units were estimated for the "normal population" and 15,608 housing units for the migrant population,<sup>(30)</sup> i.e. 54.6 per cent of the new areas would be occupied by the migrant population. The Real Estate Fund would be an important mechanism enabling the targets to be met. The activities of the Real Estate Fund caused an acceleration in the expansion of Dammam City and surrounding towns. The total construction activity financed by the Real Estate Fund in Saudi Arabia during the Second and Third Development Plans were distributed as follows : 42% in the Central Region, 22% in the Western Region, 15% in the Eastern Region, 11.6% in the Northern Region and 9.4% in the Southern Region.<sup>(31)</sup>

By 1986 the Real Estate Development Fund had made about 13,000 loans in Dammam Urban area for private housing units. On the assumption that each housing unit is occupied by five to six people on average, 65,000 to 75,000 people have benefitted from the fund. Also, the activities of the Fund are reflected in the number of permits issued for new buildings in Dammam compared with surrounding cities and towns (Table 3.3).

Table 3.3 The Number of Permits Issued for New Buildings in and around Dammam City 1977-1982

City	1977	1978	1979	1980	1981	1982	Total
Dammam	1900	1979	2147	2396	2070	1841	12333
Khobar	1265	936	1121	1183	1864	1319	7688
Qatif	539	300	267	305	486	424	2321
Safwa		189	205	349	412	405	1560
Rahima	93	136	116	146	150	168	809
Jubail	205	168	165	267	360	451	1616
Total	4002	3708	4021	4646	5342	4608	26327

Sources : Ministry of Finance and Dammam Municipality.

Table 3.3 indicates that construction activity in Dammam city was higher than in the surrounding cities and towns from Khobar to Jubail : 47% of the total construction activity in that area from 1977 to 1982 took place in Dammam, while 29% took place in Khobar. Therefore Khobar and Dammam between them accounted for 76% of the area's building activity. This reveals the fact that Dammam-Khobar complex is the heart of the economy and population of the coastline, on the other hand, it shows the effects on the region of the government's plans (see Chapter Four). Looking at the overall construction activity in the country it can be seen that Dammam and Khobar represented 13% of total construction activity which took place in the major cities of the country, i.e. it ranks third after Riyadh and Jeddah. But, if we

include Qatif with Dammam/Khobar, the larger area ranks second to Riyadh (Table 3.4). The considerable demand on private house construction meant that spatial development of Saudi cities was horizontal rather than vertical. Furthermore, the cultural requirements for privacy and sex-segregation increase the space needed in each dwelling. Table 3.5 shows the numbers of building permits issued in 1983, and land area involved.

Table 3.4 Comparison of Number of Housing Permits Issued  
in Major Saudi Cities Between 1979/1983

City	No. of permits	%
Riyadh	41,239	32
Jeddah	18,759	15
Dammam & Khobar	16,442	13
Medina	15,286	12
Makkah	11,554	9
Ahsa	10,184	8
Taif	9,912	7
Qatif area	5,799	4

Source : Ministry of Municipal and Rural Affairs Statistics Department,  
1984.

Table 3.5 Type of Building Permits Issued in Dammam in 1983

Types of building	No. of permits	Total area in square metres
Villas	2,120	1,109,622
High rise flats	254	456,520
Government buildings	52	177,092
Total	2,426	1,743,234

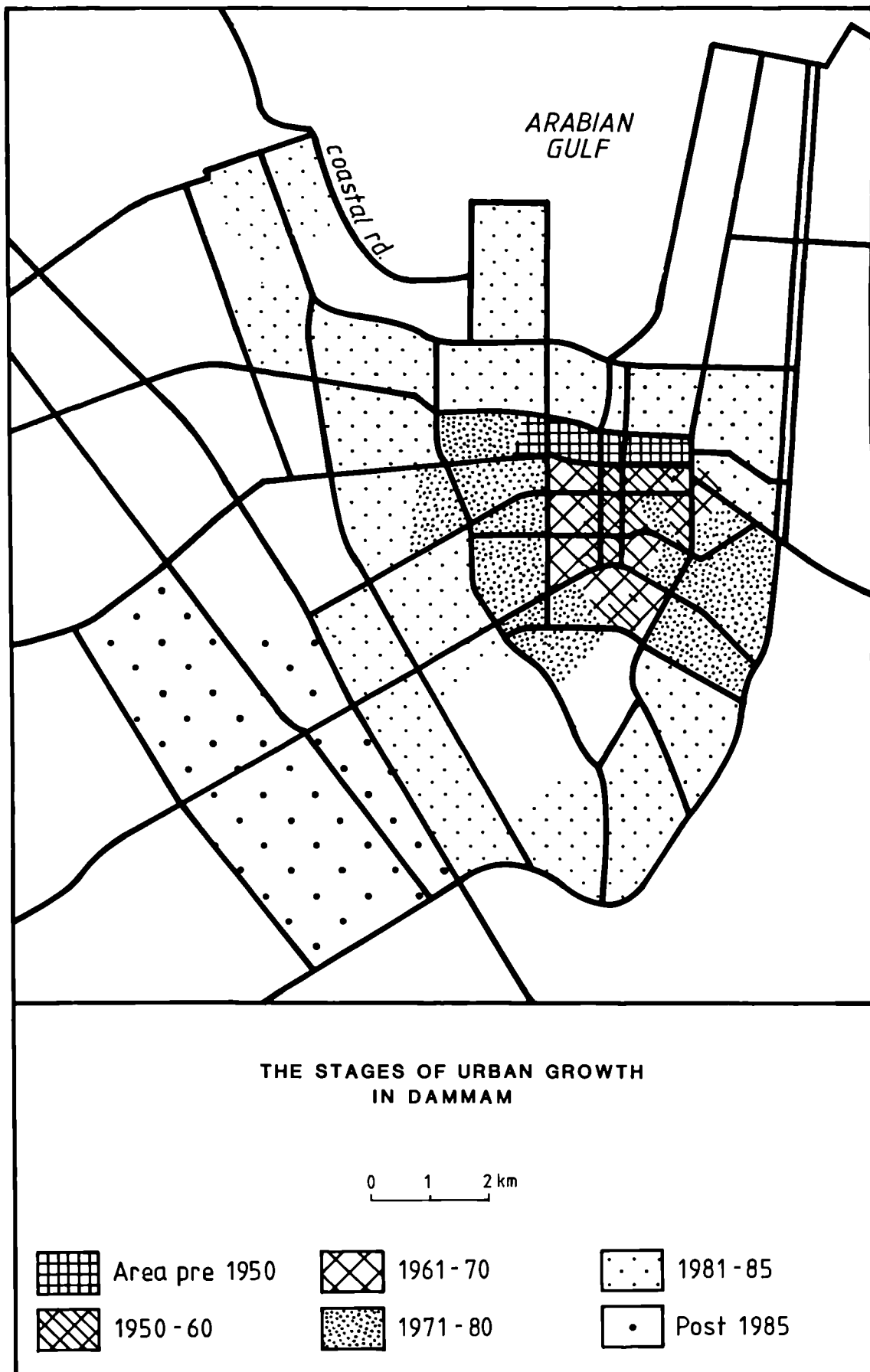
Source : Dammam Municipality, 1985.

The above figures indicate that the average villa in Dammam City occupies a site of more than 523 square metres. Therefore, the availability of housing loans and cultural traditions of Saudi Society meant that intra urban travel distances have lengthened rapidly. Figure 3.1 shows the history of Dammam's expansion. In central Dammam change was largely in the form of redevelopment. From 1975 to 1985 the area of land covered by Dammam city has increased approximately fourfold. Today, the land under development stretches about five kilometres from the city centre both to the South West, and the North West : to the south development stretches three kilometres, while in the direction of Khobar the built-up area extends to about seven kilometres from the central area.

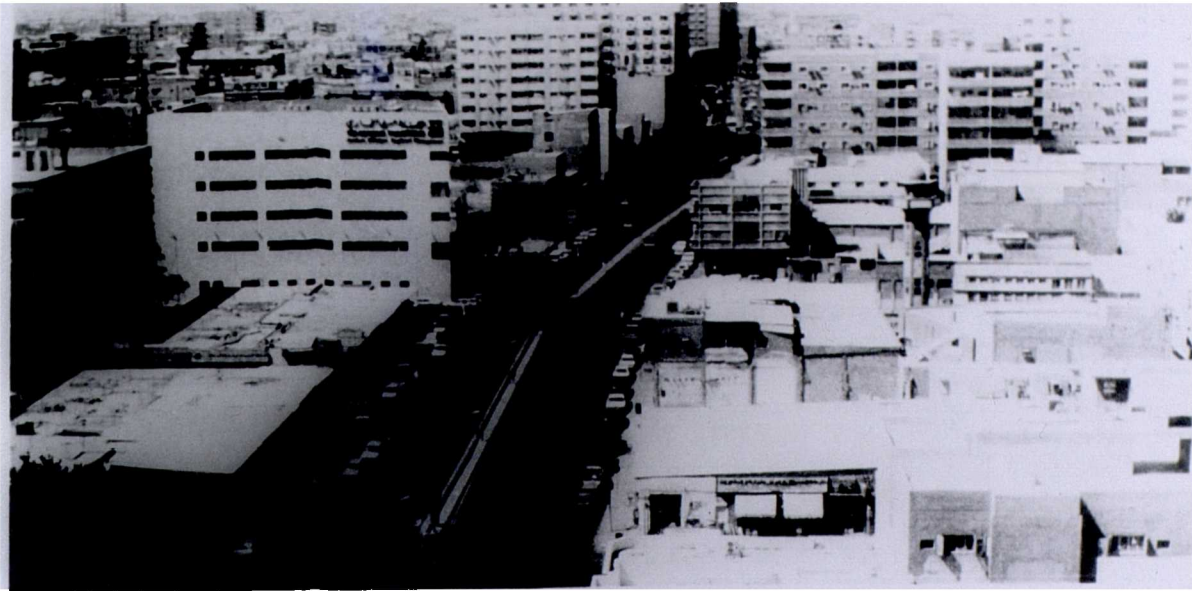
### 3.3.5 Land prices

The considerable demand for land for housing, buildings and commercial development had an enormous effect on land prices during the economic boom, particularly after the establishment of the Real Estate

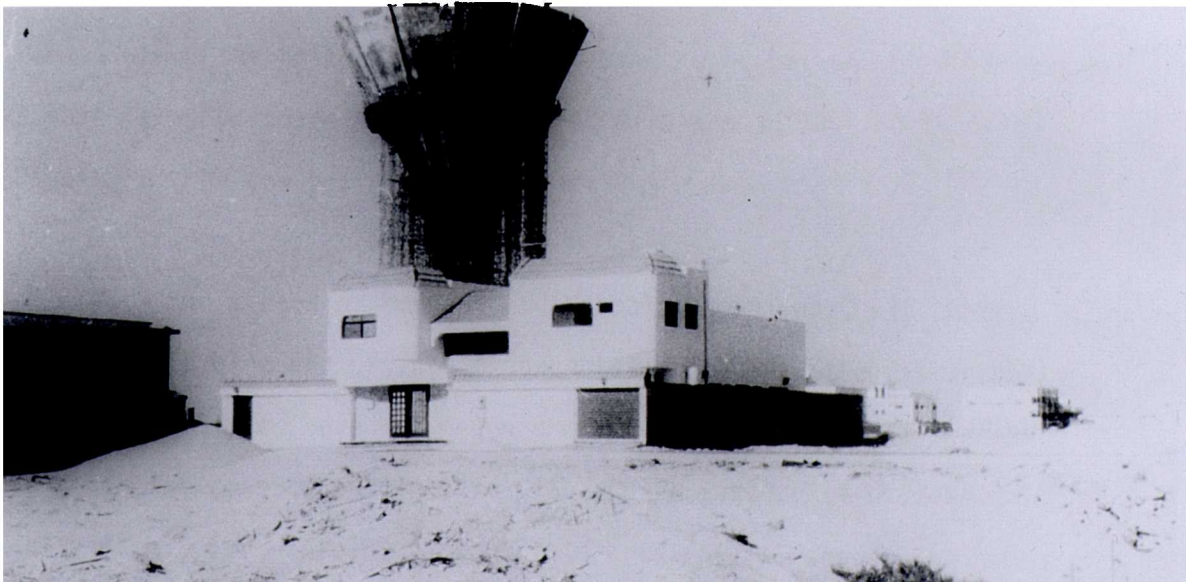
Figure 3.1



FIELD WORK, DAMMAM 1985



High rise flats, financed by the Real Estate Fund, Saud Street, Principal arterial road through the city centre.



New residential district under construction to the southwest of the city, along the Dammam-Riyadh motorway.



Land reclamation in progress to the seaward side of the city.

Fund. According to some estate offices in Dammam the price per square metre of building land in and around the business district was nearly 600 Saudi Riyals in 1973, jumping to more than 2,000 Riyals after the fund began operations. After one year, the price per square metre had reached about 5,000 Riyals and even more in some areas. The variations in cost of building plots meant that some parts of the city grew rapidly but there were also a number of vacant plots between the developed areas. Since 1983 prices have started to decline because of the economic crisis and the fall in the demand for oil, and a tailing off of housing demand as needs have been met. But still there is a demand for plots for building housing to the west and southwest of Dammam where the prices are more realistic, e.g. between 60-70 thousand Riyals per 400 square metres, compared with around 120-160 thousand Riyals for the central part of Dammam.<sup>(32)</sup>

With the spread of housing and schools, hospitals, etc. came a demand for public and private transportation because the distances to various facilities have increased dramatically from the city centre, which is the core of public life with a wide variety of different activities. For example, part of this area specialises in the needs of the female population, another in wholesale stores or bazaars and vegetable markets. Therefore, major stores or commercial streets in the suburbs cannot replace the city centre and travelling to it will continue whether people live nearby or at a distance (see Chapter Four). Even in developed Western countries the cities, as well as suburban shopping developments, have central city areas of shops and stores accessible to all. As Dietrich Sperling (1980) pointed out:

"the most beautiful suburbs need 'urbs'. They need central cities; downtown centres, not central suburbs. The shopping centre cannot replace the city. And the city is a place which mixes the different activities of private and public life."<sup>(33)</sup>

### 3.3.6 City boundaries

The government intended that 730,000 housing units should be completed during the first three development phases, including 230,000 during the Third Development Plan.<sup>(34)</sup> This involves other agencies as well as the Real Estate Fund : the Defence Ministry, the Royal Commission for Jubail and Yanbu, the Exterior and Interior Ministries. Also, 51,000 temporary housing units have been built by companies.<sup>(35)</sup> One indication of the growth in house construction is the increased amount of cement used in Saudi Arabia from 1970-1983 (Table 3.6).

Table 3.6 Consumption of cement 1970-1983 (000 tonnes)

Year	Domestic Product	Imported	Total
1970	666.9	463.7	1,130.6
1971	703.4	549.9	1,253.3
1972	911.1	299.5	1,210.6
1973	1,008.3	280.5	1,288.8
1974	1,056.6	1,510.7	2,567.3
1975	1,125.4	1,825.8	2,951.2
1976	1,143.0	2,795.0	3,938.0
1977	1,292.4	5,356.0	6,648.4
1978	1,790.7	6,679.0	8,469.7
1979	2,647.6	6,280.4	8,928.0
1980	2,910.6	10,002.0	12,912.6
1981	4,753.0	9,501.4	14,254.4
1982	7,090.4	10,605.1	17,695.5
1983	8,264.9	15,543.6	23,808.5

Source : Ministry of Finance, 1984

This huge consumption of cement indicates the rapid growth of demand for building materials in urban areas, particularly after the establishment of the Real Estate Fund. For example, in 1975 the domestic consumption of cement was approximately three times the 1970 level. In 1983 it increased to over 23 times the consumption of 1970, i.e. a total consumption of approximately 24 million tonnes. One implication of this construction boom is that cities have more than doubled their size within a short period of development. This rapid expansion of cities led the Ministry of Municipal and Rural Affairs to be concerned about establishing boundary limits:

"Establishing limits on urban development has become one of the most important issues to be considered in developing cities. It has become the one urgent necessity in many of our cities which have reached very extreme growth. The Minister of Municipal and Rural Affairs is very concerned about this matter."(36)

The Municipal Authority in Dammam is starting to study this issue of limits to development and has submitted recommendations to the Ministry : it recommends that the experience of Dammam could be used by other cities, and suggests that any drawing of boundaries should not affect the current land market but should take into account current supply and demand, and current and future population expansion, to ensure stability in land prices. The setting of an urban limit should not preclude people from building outside it, only the developers themselves must be responsible for providing all the necessary services and facilities.<sup>(37)</sup>

However, one could argue that a consideration of limits to development should also take account of the vacant building plots and empty houses and flats within the developed areas. There are also old

buildings standing empty which people are unwilling to sell, preferring to wait for municipal demolition and the consequent very favourable compensation. There is also the problem of housing developed with Real Estate Fund money under the investment loan programme, with a number of them still standing empty : this has caused problems of repayment to the fund, and should also be investigated. In other words, it would be sensible to explore the existing capacity for development within present urban areas in drawing urban boundaries.

### 3.3.7 Road and street patterns of Dammam

Before looking at the road system in modern Dammam, the types of roads which existed before the development following the discovery of oil will be discussed, and how the old system changed under the pressure of the motor car.

#### 3.3.7.1 The old road system

The development of Saudi cities is illustrated by the change in the nomenclature and function of their road network. For example tariq or sekkah applied to a narrow, winding blind alley, or court, possibly gated at its open end, particularly where all the dwellings in it were occupied by one extended family. Such an alley or court would open onto a tariq al Muslomin; a public thoroughfare.<sup>(38)</sup> Every so often there might be a mud roof, mujjabab, stretching across the thoroughfare between the street walls of the houses to protect passersby from the heat of the sun. This pattern of thoroughfares produced a semi-privacy

in which women could move and walk freely. As Frank Costa and Allen Noble (1986) stated:

"Thus an Arabic neighbourhood is highly autonomous. Its streets, markets, and other public spaces possess the characteristics of semi-private areas. Extended families, kinship groups, and related individuals can move about a neighbourhood freely, but an outsider is immediately recognized and frequently treated as an intruder. A neighbourhood is often the physical focus for a large kinship who can move freely within the confines of a neighbourhood, whose semi-private nature offers both a release from domestic confinement and preserves the requirements of privacy dictated by Islamic cultural life."(39)

These thoroughfares led to a central square which is called a hazim or suffat, which contained the main mosque, surrounded by the bazaar. However, with the development of modern cities, these have fallen into disuse. There are new terms used to describe the new environment. For example tariq saria means a high speed road. Furthermore, American terms have also entered the colloquial language, for instance, expressway, highway. For example, it can be seen from the aerial photographs of Hufuf in 1951 and 1970, (Plates 3.5 and 3.6), how the urban development and the advent of motor vehicles have changed the character of the street patterns and ripped apart the fabric of the old towns with their tightly interwoven buildings, particularly those cities which were in existence before the discovery of oil.

It has been said that the dangers of designing a city around the motor car were only realized after the event. Abd Albagy Abraham (1982) mentioned that numerous conferences have been held, with practical and theoretical suggestions being made without any effect, because development had attained its own irresistible momentum too fast

Plate 3.5

Hufuf in 1951

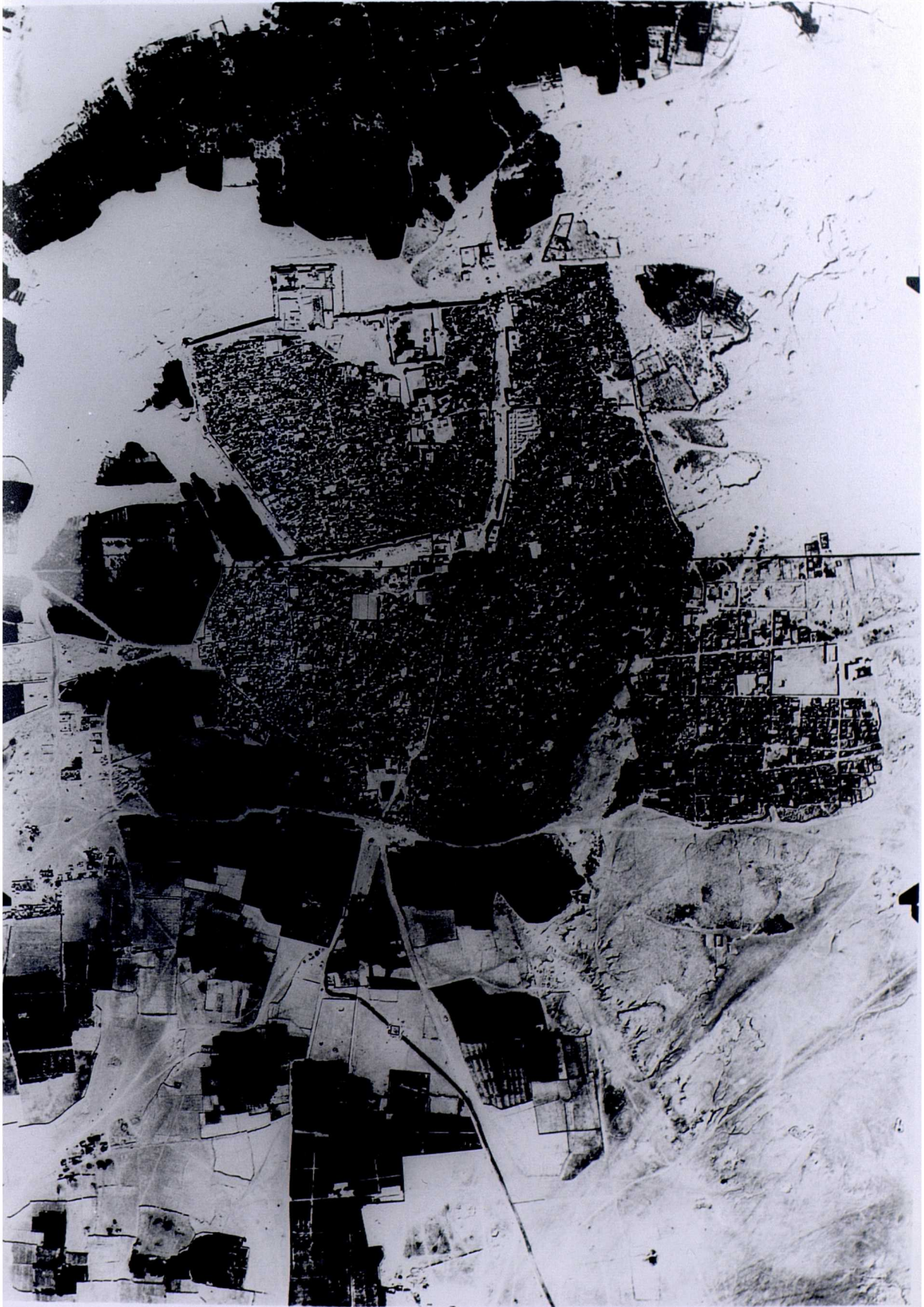


Plate 3.6

Hufuf in 1970



for the experts (planners, decision makers) to keep pace with.<sup>(40)</sup> According to Abd Albagy (1982) the international leaders in architecture and planning warned of the consequences of rapid change and its impact on traditional Arabic architecture and city life at the international conference on planning held at Cairo in 1961 which included contributions by Rodgers from Italy, Maxwell Fry from England, Brant from Holland, Costa from Brazil, Doxiadis from Greece and Hassan Fothy from Cairo.<sup>(41)</sup>

However, Ahmed Mostafa F. and Frank Costa (1983) stated that "the current development in Saudi Arabia is not Arabic/Islamic in the traditional sense, but an international contemporary style. This style emphasizes a gridiron street pattern easily penetrated by fast moving vehicles."<sup>(42)</sup> Moreover, Jon Boon (1983) considered that "while Saudi Arabia is demolishing its traditional centres and building sprawling suburbs and high rise apartment blocks, these same models are being increasingly rejected in the west."<sup>(43)</sup> Indeed, building suburbs and high rise flats will change the traditional Arabic cities and increase distance between families and their workplaces, and this will cause a need for transport provision. Kaizer Talib (1984) described the current development "in most of the rapidly urbanizing oil countries, the new has developed without any relationship to the past ... the link between the past and the present is broken, ... [new developments] are imported along with television, cars, pepsi cola, popcorn and chewing gum. In such rapidly changing environmental conditions vernacular architecture which is appropriate for the local climatic and cultural context is being rapidly replaced by so-called 'modern' architecture of the international style."<sup>(44)</sup>



These developments, from a historical perspective, are extremely rapid. Jean Gottmann (1986) described this century as follows:

"The twentieth century has seen forests of skyscrapers, large and high blocks of flats, and frequent use of glass and metal structures arise in many cities in various countries. In the past, it took at least a century for a new architectural style to be accepted for a few monumental buildings. Then, it may have spread to a certain cultural zone. The speed of the diffusion of the new styles has been such both in time and in space, particularly since 1920 and even more since 1950, that the evolution of cities in the twentieth century took on a completely different allure and significance from what these may have been in past ages."(45)

However, many planners in Saudi Arabia, as well as in other Middle Eastern countries, criticise the current urban development and are becoming concerned about the need to preserve the traditional architecture. There is no doubt that conservation is good. But conservation of the traditional street pattern, without tackling the problem of slowing down the rapid growth of private cars and replacing them with a more suitable form of transport, would create more problems than it would solve. R.I. Lawless (1980) has made this point clearly:

"A conservation area should not be a dead area. What are urgently required are conservation policies which not only maintain the essential quality of the historic city through urban forms, height of buildings, character and scale, but which also encourage change and modernisation, providing facilities necessary to improve the lives of the inhabitants."(46)

### 3.3.7.2 The new street system in Dammam

The above discussion showed there are criticisms of the current development of the new Saudi cities. But before criticising the new development or seeking to preserve the traditional, the question should

be raised. What were the main reasons for Saudi cities developing as they have? Certainly the facts showed that one of the major reasons for this development was the rapid rise in the number of motor cars, due to economic growth, coupled with the lack of effective public transport systems, indeed the city planners using their experience and knowledge of development elsewhere to plan the cities in this way. Therefore, the traditional pattern of narrow winding streets has been replaced by modern wide gridiron roads to allow for the motor car. Dammam city is one of many Saudi cities which now has wide paved roads and a gridiron street system. This type of system is classified hierarchically as follows:

- a) Principal arterial : these are designed to serve the major centres of activity in Dammam. Their function is to carry the greater number of vehicles into and out of the urban area and are for long distance journeys.
  
- b) Minor arterial : these are designed to provide journeys of intermediate length and to interconnect the principle arterial road system.
  
- c) Collector streets : these are to distribute traffic between the arterial system and traffic generators such as schools and local shopping centres.
  
- d) Local streets : these provide direct access to properties. Their function includes parking provision and space for loading and unloading

of goods. In 1978 collector and local streets totalled 313.6 kilometres.<sup>(47)</sup> This indeed was doubled in the years from 1978 to 1985.

This system covers all Dammam's urban area excluding the remains of the old city which still represents the traditional Arabic city (see Plate 3.7 showing aerial photograph of the old and new systems). In fact this new street system allow car drivers to escape the traffic jams, particularly during rush hours, by using residential back streets : this is becoming a habit for many drivers. In the household questionnaires 188 (60.8% of those surveyed) had drivers who said that they did this, and only 31.9% said that they waited in the traffic queues - thus 2 out of 3 drivers were prepared to use the local residential streets, in a way for which they were not designed.

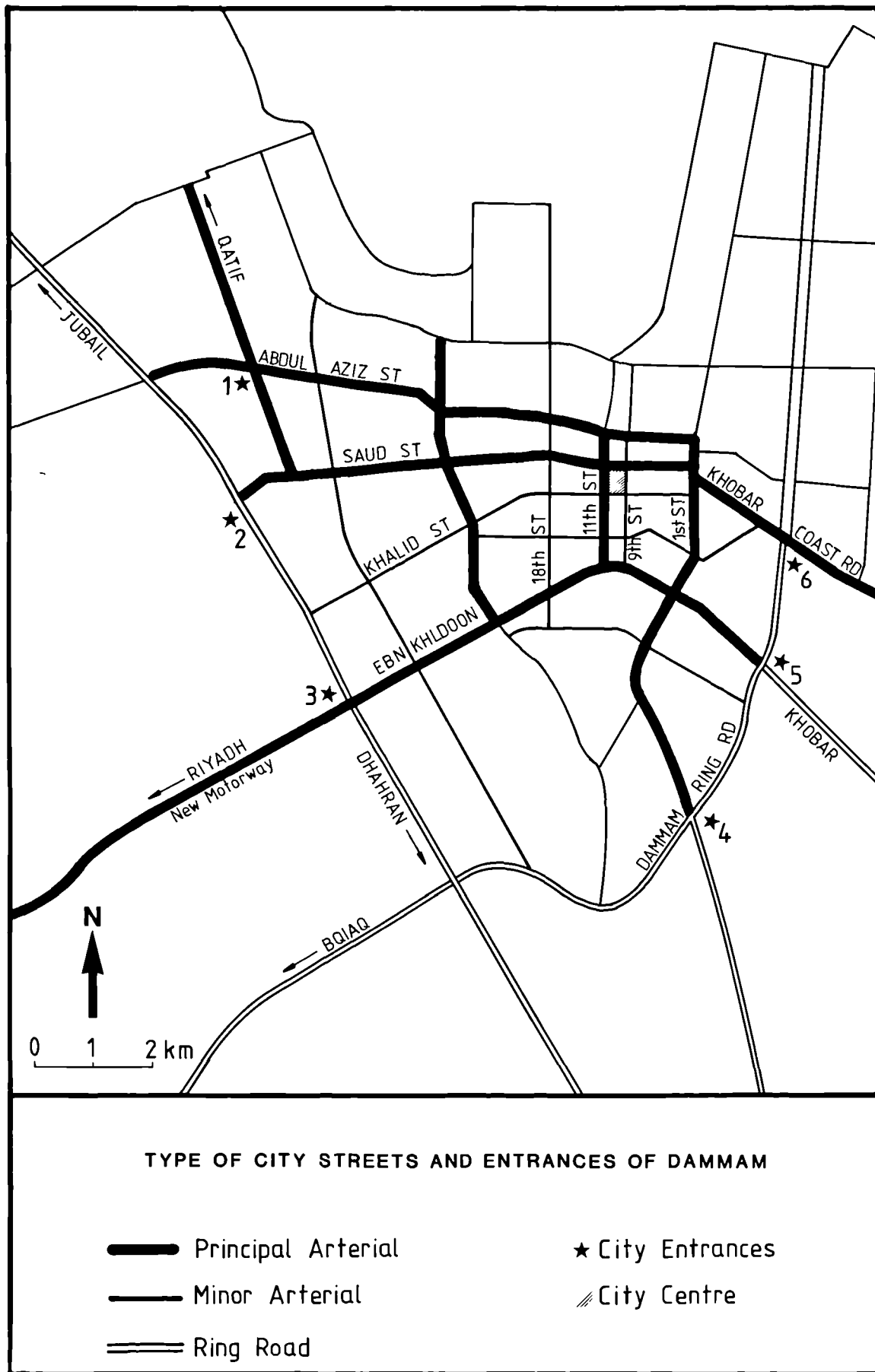
This new system of roads opened up the city, and gave rise to multi-access connections with neighbouring cities as well as the major motorways. There are now several main entrances and exits along the arterial roads, leading in and out of the city (see Figure 3.2). These are:

- 1) First road between Dammam and Qatif. This distance between the cities is shorter than by the motorway.
- 2) The second road is called King Saud road and passes east-west through the city centre. This road runs to and from the motorway and goes to Jubail.

Plate 3.7

Aerial-photo of old and new street patterns in Dammam





FIELD WORK, DAMMAM 1985

- 3) The third main road is called Ibn Khaldoun road. This is the most important road leaving the city of Dammam. Because it has two main exit junctions, one in the south west connects with the expressway, Dammam-Khobar, the second is located to the north-west and connects with the Jubail, Dharhan and Riyadh motorway.
- 4) The fourth main entrance road is situated to the south of Dammam. This road runs from north to south on the western side of the city, giving access to Aramco and Dharhan areas and is called the Dammam-Aramco expressway.
- 5) The fifth main entrance road is called Dammam-Khobar expressway. This entrance is located in the same street as Ebn Khldoon on the west side.
- 6) This road runs parallel to the coast and also leads to Khobar city, King Faisal University, the sea port of Dammam, Dammam dry port, Qussaby Hotel and to some new districts which are developing along the side of the road.

Also, Dammam city has a new ring road to which all city entrance roads are connected. However, some districts are growing beyond this road, especially in the South and the South West. It seems that this rapid large-scale development of the city in these areas was beyond the expectations envisaged by the city planners.

### 3.4 Traffic Growth

The segregation of land use in different areas of the Saudi city, consequent with the radial growth of the city, has led to residential

areas being located further and further away from the city centre. This means that journeys from home to work, or from home to the shops are now further than a normal walking distance, therefore either private or public transport is needed for mobility.

#### 3.4.1 Private auto transport demands

The demands for private transport are reflected in the rise in the number of driving licences issued. For example, the statistics regarding the number of driving licences that were issued in the Kingdom since 1971 gives a clear impression of the demand for private auto transport (Table 3.7). In 1975, 89,239 driving licences were issued, nearly four times as many as were issued in 1971. In 1978 the number of driving licences issued more than nine times as many as were issued in 1971. The number of licences issued in 1978 was more than double the number issued in 1975.<sup>(48)</sup> However, after 1978 the number of driving licences issued had fallen since the introduction of regulations by the General Department of Traffic, which restricted the issue of driving licences to persons who had received training at driving schools, and to foreigners who were car owners.<sup>(49)</sup> As a result of this plan the number of driving licences declined from 222,685 in 1978 to 171,024 in 1982 (i.e. a decrease of 23.2 per cent). However, this plan did not reduce the growing demand nor the growth in the number of vehicles in the country. For instance, in the years 1983, 1984 and 1985 the number of driving licences increased dramatically as a result of extensive traffic campaigns against unlicensed drivers, as it was found that large numbers of people were driving without a licence. This shows that there is a very significant demand for car ownership, and also a considerable need for transportation.

Table 3.7Driving Licences Issued

(1971 - 1985)

Year	No. of Driving Licences
1971	24,064
1972	26,203
1973	40,868
1974	52,322
1975	89,238
1976	104,959
1977	149,166
1978	222,685
1979	204,321
1980	172,818
1981	123,662
1982	171,024
1983	200,578
1984	240,076
1985	290,370

Source : Ministry of Interior, 1986.

The rate of growth of car ownership has increased exponentially during the 1980s. Shirley Kay (1979) pointed out that in the early 1970s only a relatively small percentage of the population owned their own cars, many city streets were still quiet sand tracks. She followed by stating that in the past few years the change in the city streets has been overwhelming, now that nearly every family owned a car.<sup>(50)</sup> This phenomenon of rapid growth in a relatively short time was referred to by Jaleel Al Saif in "Traffic Development in Saudi Arabia" in which he said in 1974 the ratio of car ownership was one vehicle per 48 persons, which by 1982 had reached 3 persons per car.<sup>(51)</sup> This meant that a large number of people became car owners within a very short time. Car ownership is encouraged by the availability of cars from different types of car markets, with different prices. Motor vehicles in Saudi Arabia are usually sold in three ways: firstly, through an agent, who imports and sells new cars; these agents do not accept used cars in part exchange. Secondly, through used car dealers some of them having attractive showrooms, full of imported second hand cars from Western Europe and the United States. The import of all new cars is controlled by the manufacturer's agent mentioned above. Thirdly, through the weekend market which occurs in nearly every city, particularly the major ones where in an open space private buyers and sellers meet at weekends and arrange individual car sales. Bargains can be obtained in these places since the buyer and seller negotiate a price which tends to be much lower than that of a dealer. Therefore selling and buying motor cars through this kind of market is usually very active. Furthermore, many cars in this market are in good condition. Because there are some owners who like to replace their cars with a new model every year, and since part exchange arrangements

are unknown, these second hand cars appear in the weekend car market. This system serves to keep up a good supply of cheap used cars (See Plate 3.8).

Another example which illustrates the growth of car ownership is in the annual issue of vehicle registration plates. These indicate the number of new vehicles added to the total number in the whole country each year. According to the Ministry of Interior Statistical Department 350,862 were issued in 1984, of which 184,556 were for private cars, and the number of private registrations had increased by more than 6 times compared to 1971. In the same year, 1984, Riyadh accounted for 31.7% of the total number of new plates. Western Region 33.5% and Eastern Region 13.8%. The three areas accounted for 79% of the total for the kingdom. Therefore, these three regions in particular are considered to have a high proportion of car ownership and high demand for individual auto-transport. Dammam urban area is one of the Saudi cities with a considerable demand for private car transport. For example, the findings from 289 households surveyed in Dammam revealed that the approximate car ownership rate in Dammam in 1985 was one vehicle per four persons, or two cars to every three men over 16 years of age. Also this survey showed that more than 95% of the households have at least one driver, and more than 51% of the households in Dammam City have two or more drivers (Table 3.8).

Plate 3.8



Second hand car dealers



Weekend car market



Concentration of motor spares shops

Field work, 1985

Table 3.8                      Number of Drivers per Household

Drivers per household	No. of households	Total No. of drivers	Percentage of households
1	127	127	46.0
2	58	116	21.0
3	56	168	20.3
4	22	88	8.0
5	11	55	4.0
6	1	6	0.4
8	1	8	0.4
Total	276	568	100

Source : Field work in Dammam, 1985.

#### 3.4.2 Public transport demands

In the United States it has been pointed out that several areas, especially those of moderate size, are confronted with difficult planning problems precipitated by the need to plan for public transit systems. Many urban area planners have concentrated on highway construction and have left public transit users to the private sector or to the public operation agency. Even the largest regional planning agencies that have been involved in planning transit systems have not developed policy sensitive procedures for evaluating public transit

needs.<sup>(52)</sup> In Saudi Arabia this situation was further aggravated by the late formation of a national public transport operator, SAPTCO, which was not established until 1979.

To understand the current state of the Saudi Public Transport Company, one needs to understand the type of public transport which existed before its establishment.

#### 3.4.2.1 Public transport before SAPTCO

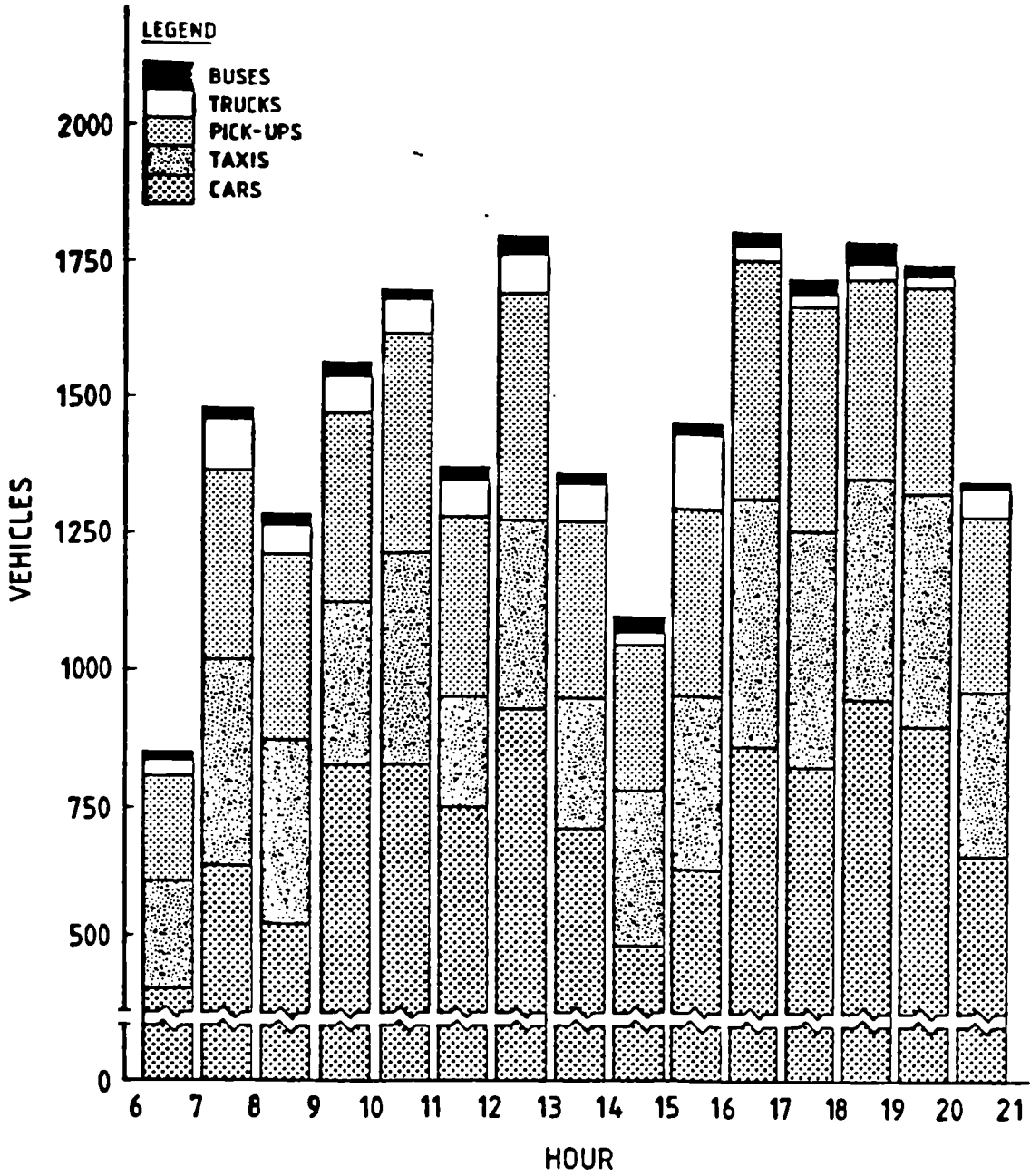
In the years before 1979 the only modes of public transport were taxis and buses (small traditional vans). In 1971 the number of new taxi plates issued was 2,249, while the private car plates numbered 9,689: i.e. the ratio of new private cars to new taxis in 1971 was about 4 to 1. 1977 was the peak year for the registration of taxis, at 19,244, though the rate of private cars registered had risen to over 133,717. The ratio of new private cars to taxis had risen to about 7 to 1, despite the fact that the number of new taxis registered had more than doubled.

Figure 3.3 shows the result of a traffic survey in Dammam in 1978 from which the importance of taxi to public transport can clearly be seen.

In 1980 the number of new taxis represented 0.5% of the total number of newly issued plates. This decline is due to the new regulations issued by the Ministry of Interior which intends to reduce substantially the number of taxis in the country, as a consequence of SAPTCO starting their operation in many cities.<sup>(53)</sup> The new

Figure 3.3

TRAFFIC DISTRIBUTION BY TYPE OF VEHICLE  
1978 IN DAMMAM (11TH ST NORTH)



regulations required the taxi drivers to be at least 35 years of age; consequently many of the younger taxi drivers converted their taxis into private cars.<sup>(54)</sup> This regulation can be seen as an attempt by the government to force those who in the past had often used taxis into using the SAPTCO. This means influencing the choice of travellers. In other words the main aims of any public transportation policy is to provide for people without cars as well as to be sufficiently attractive and available to encourage those who own cars to use public transport system.

#### 3.4.2.2 Public transport competition

Following the establishment of SAPTCO in 1979, the company asked the Ministry of Transport for it to reduce the number of licences granted to other bus operators. The Ministry complied, but traditional buses started to increase again in 1983 some with, and some without, permits. It appears that SAPTCO was unable to meet all of the demand for public transport. According to SAPTCO in their annual reports of 1984 and 1985, the decline in their passenger numbers was due partly to the extreme competition from traditional buses, and partly to the decline in commuting resulting from the labour force leaving the country on completion of construction projects. SAPTCO stated that the traditional buses are travelling on the same routes : the company suggest that the main roads should be served by SAPTCO and the smaller traditional buses should serve only the smaller branch roads, and the rural areas not served by SAPTCO. The company has tried to recruit the drivers and operators of the traditional buses into its employ offering them a good salary of 3,700 Saudi Riyals (being twice that paid to foreign chauffeurs). They also offered to purchase their vehicles at

market price, but, unfortunately, many refused the offer.<sup>(55)</sup> The facts are that the traditional buses are more successful in serving their customers as is illustrated in the following examples.

- 1) The routes operated by SAPTCO are limited to the profitable main city routes.
- 2) A number of SAPTCO buses are double deckers which are too large and cumbersome for smaller cities and some routes and are seldom filled (see Table 3.9 showing types and number of vehicles operated by SAPTCO).
- 3) A high percentage of SAPTCO drivers do not speak Arabic which causes difficulty in communication between driver and passengers. Table 3.10 shows the nationalities of SAPTCO employees (see Plate 3.9(a)).

The fact that the private-owner traditional buses in Saudi Arabia are more successful in serving customers than SAPTCO is confirmed by the fact that, worldwide, "the bus companies afflicted with major financial and operational problems are most frequently publicly owned, a fact that has led World Bank transportation specialists to urge cities whose bus companies have large deficits to take a serious look at the success of private bus systems in places like Buenos Aires, Colombo, Hong Kong and Seoul."<sup>(56)</sup>

Table 3.9

SAPTCO's Types of Bus

Types of Bus	Number	
Neoplan SDN 414	720	Intra cities
Neoplan DDN 424/2	130	Intra cities
Neoplan Articulated N 421	2	Intra cities
Neoplan DDN 326/3	17	Between cities
Mercedes Benz D 303	188	Between cities
Nissan RA-SO-TXL 40	38	Between cities
Total	1,095	

Source : SAPTCO 1985 Annual Report.

The SDN 414 Western style large single decker bus is many times larger and more unwieldy than the small traditional types of bus used by the private operators.

Table 3.10

Nationalities of SAPTCO Employees

Nationalities	Number	%
Saudi Arabia	835	24.0
Other Arab countries	752	21.61
Indonesia	334	
Philippines	353	
Thailand	191	
Pakistan	199	
Bangladesh	32	
Kenya	58	
India	123	
Sri Lanka	40	
Other	62	
Non Arabic speaking	1,892	54.39
Total	3,479	100

Source : SAPTCO 1985.

Most of the Saudi Nationals are working in administration, maintenance or other support work.

"In most places where we've looked at both private and public bus services, private systems cost about one half that of public ones for moving the same number of people", says Alan Armstrong-Wright, the World Bank's transport adviser. "The quality of private service", he adds, "generally seems more effective than public systems", in fact, he says, "privately owned bus and paratransit systems flourish in many Third World cities and their share of the market is growing significantly."<sup>(57)</sup>

#### 3.4.2.3 Male/female ratio of users of public transport

There is an extreme imbalance between the numbers of men and women using the public transport system run by SAPTCO, as well as the small, local buses. Most of the passengers are males, despite the fact that females are very dependant on others for their transport needs (see Chapter Five).

However, in 1980 the Ministry of the Interior gave as one of the main reasons for the increase in the number of vehicles in Saudi Arabia, in particular, private cars, the fact that "cultural traditions of society have obliged the people to have their own cars to provide transport for their families, so that they need not mix with other people on public transport."<sup>(58)</sup>

By "mixing with other people" they meant travelling on the same vehicle with strangers. However, this cultural requirement is not met even though the seats for men and women are segregated on SAPTCO buses, as can be seen from the following extract from the conductors' training manual. "Special care shall be given to Saudi ladies or other ladies

who may travel individually. In such a case, he shall do his utmost to seek the suitable person to sit beside the lady. As a general rule a lady shall be seated beside another lady not a strange man."<sup>(59)</sup>

When the company abolished the conductor system because of a labour shortage and to save money, it reserved rows of seats on each bus for women, separated from the rest by a partition, and with direct access through the rear door (see Plate 3.9(b)). This has caused a problem for the driver when collecting fares, as many women get in and out without paying. It seems that SAPTCO is not that concerned about women passengers because it feels that there is insufficient female demand for public transport. Perhaps a study of women and transport might reveal the reasons for the low percentage of women users of SAPTCO services (see Chapter Five, Factors affecting Women's transport).

The usage of SAPTCO is very low among Saudi men: for example, the household survey of Dammam city showed that 88% of workers used their own private cars to commute to work, 7.4% travel in friends' or relatives' cars, 4% walked, and less than 1 in a hundred travelled by bus (see Table 3.11).

The men who use buses gave as their reasons for doing so their inability to drive: these men fully intended to learn to drive, purchase their own cars and leave public transport. Of 289 heads of household in Dammam city, 268 (92.7%) had never used SAPTCO since its establishment; only 21 (7.3%) had used it at various times (Table 3.12).

Plate 3.9

(a)



This plate shows public transport competition. In the background stand SAPTCO's double decker buses.

(b)



Interior of a SAPTCO bus showing rear partition used to make a segregated female compartment.

Fieldwork 1985.

Table 3.11      Mode of Transportation By Working Males Living  
in Dammam (to and from work)

Type of mode	No.	%
Private car	366	88.0
Travel as Passenger with friends or relative	31	7.4
On foot	16	3.6
Traditional bus	1	0.2
SAPTCO	3	0.8
Taxi	-	-
Total	417	100.0

Source : Fieldwork in Dammam, 1985.

Table 3.12                      Last Use of SAPTCO

When used	No.	%
This week	4	19.06
Last week	6	28.56
Long time ago	11	52.38
TOTAL	21	100.0

Source : Fieldwork in Damman, 1985.

70% of those who had used SAPTCO did so because their cars were being repaired. Of this 289, only 10% said they would use public transport if they had a need. These figures certainly indicate that SAPTCO is almost entirely dependant on foreign labour for its custom because as the number of non-Saudi passengers declines, so too does the number of passengers. The lack of concern by SAPTCO for women passengers will increase the use of private cars in the Kingdom. If women made more use of public transport it might encourage Saudi men to use the SAPTCO buses as they would no longer have to be available to transport their womenfolk. So the expense of attracting women onto the buses would be repaid and the decline in passengers caused by the loss of foreign labour would be mitigated. It may also help to solve many other transport and traffic problems.

Despite the great advantages of the private car, including its suitability for the transportation of females and its optimal convenience and flexibility, as Alan Altshuler (1979) pointed out, "it may break down from time to time ... It may have to be shared among the members of the household, or may be difficult to park at congested locations"<sup>(60)</sup> or it may be involved in an accident.

### 3.5 Traffic Accidents

The high usage of the private car in Saudi Arabia has produced a high annual rate of accidents. The official figures for the period from 1971 show that as a whole, the accident rates have increased rapidly : 4,147 accidents were reported in 1971 these more than doubled to 9,808 by 1973. In 1980, the figures were four times those of 1971, at 18,758 and by 1985 it had leaped to seven times that recorded in

1971, while in 1986 the figure has risen to 32,092, an increase of about eightfold. Almost all these accidents occurred within the development corridor, between Khobar, Dammam, Riyadh and Jeddah/Makkah. For example in 1984, 70.6% of the country's total number of reported accidents were in this corridor, of these : 43.6% occurred in Riyadh, 21.8% in Jeddah/Makkah, and 5.2% in the Eastern Region. In the same year, 1984, the percentage of people who were injured in road traffic accidents was 20.8% in Riyadh, 24% in Jeddah, 9.1% in the Eastern Region. These three areas accounted for 63.9% of the national total road traffic accident injuries. Turning to fatal accidents, 12.8% of the national total occurred in Riyadh, 34.8% in Jeddah/Makkah, and 13% in the Eastern Region. In the Eastern Region in 1984, 28 deaths were recorded from traffic accidents. In Jeddah/Makkah the number was 18 and in Riyadh 3, compared with a figure of 11 deaths and 80 persons injured per 100 accidents in the Kingdom as a whole (Table 3.13).

Table 3.13      Traffic Accidents, Injuries and Deaths in 1984

Area	No. of vehicles	Accidents		Injuries		Deaths	
		No.	%	No.	%	No.	%
Riyadh	1,270,110	11,932	43.6	4,553	20.8	389	12.8
Jeddah-Makkah	1,312,440	5,953	21.8	7,514	34.1	1,047	34.5
Eastern Region	656,917	1,419	5.2	1,987	9.1	395	13.0
Total	3,239,467	19,304	70.6	14,054	64.0	1,831	60.3

Source : Ministry of Interior, Statistical Yearbook 1984.

The official statistics on reported accidents of all kinds show that of road traffic accidents in these regions, a very high proportion were either fatalities, or resulted in injuries requiring hospital treatment. For example, in Jeddah/Makkah in 1984, 126 people were injured per 100 reported accidents, rising in the Eastern Region to 140 people injured per 100 accidents. However, this high ratio of injuries to accidents might mean that only serious accidents, those involving injury or death, were reported; or even that an incident is only defined as an accident when it is very serious, or when injuries or death result. If, for example, the figures for Riyadh are compared with those for Kuwait, since they have about similar population sizes, it can be seen that Kuwait had 3,368 injuries in 1984,<sup>(61)</sup> when Riyadh had 4,553. However 22,703 accidents were reported in Kuwait, compared with 11,932 in Riyadh, i.e. around one half of Kuwait figure. This suggests the possibility that a large number of accidents in Riyadh went unreported. This idea is supported by the Home Interview Survey in Dammam in 1985 which revealed that out of the 289 households owning one or more cars, 127 or 43.9% were involved in an accident in 1984. These 127 households had had a total of 255 accidents, which on the whole gives an average of nearly 1 accident per household (see Table 3.14).

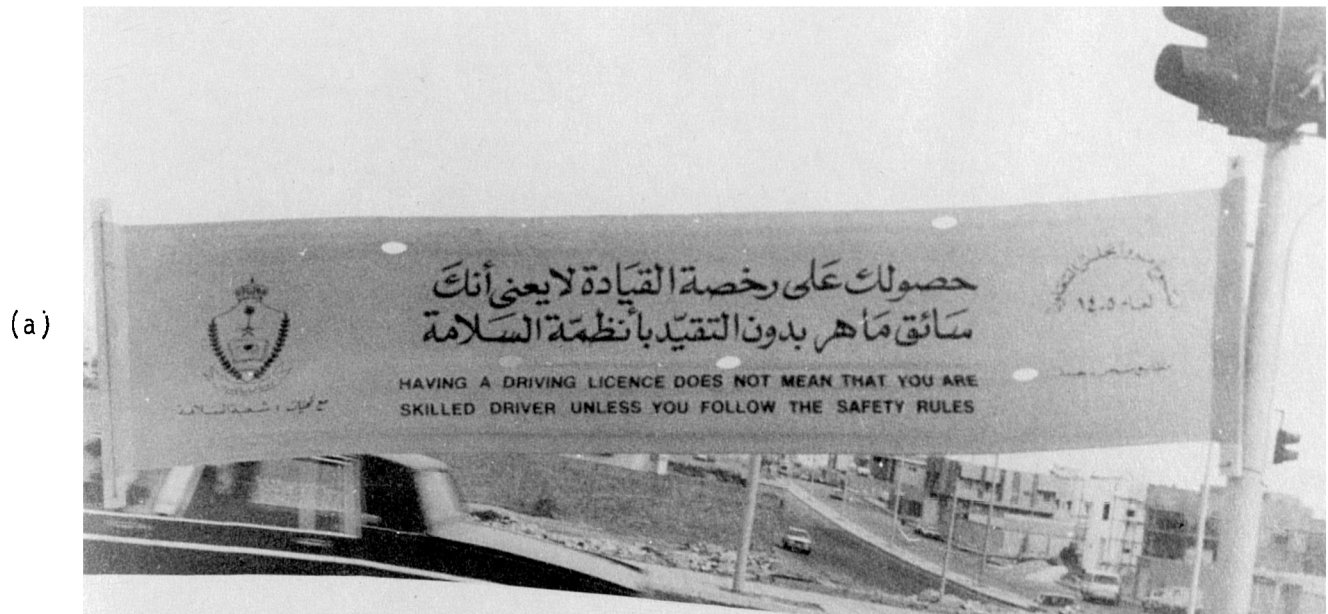
There is no doubt that if the country's accident ratio continues to increase, the numbers killed and injured will also rise. An example of official concern about accidents was the establishment in 1973 of a treatment centre for the handicapped in Riyadh, which manufactures and fits artificial limbs, a high proportion of which are, according to its director, for men injured in road accidents (see Plate 3.10).<sup>(62)</sup> Another example was the imposition of safety specifications for

Table 3.14      Cumulative Percentage of Accidents in Dammam 1984

Number of households (A)	Accident per household (B)	Total Number of accidents (A X B)	% of households	% of total accidents
64	1	64	50.4	25.1
29	2	58	22.8	22.8
16	3	48	12.6	18.8
9	4	36	7.1	14.1
5	5	25	3.9	9.8
4	6	24	3.1	9.4
127		255	100.0	100.0

Source : Fieldwork, Dammam, 1985.

Plate 3.10



The official concern for the high accident rate is illustrated by these notices, (a) and (b) displayed during the "Traffic Week" in 1985.

FIELD WORK, 1985

imported vehicles. "The Council of the Chamber of Commerce and Industry has announced to motor vehicle importers a warning received from the Saudi Arabian Specifications Organization advising that motor vehicles imported starting from 1985 models should conform to the specifications drawn up by the Organization for the protection of drivers' and owners' lives."<sup>(63)</sup>

According to the Organization's statement on this score, no motor vehicle from 1985 models will be cleared for entry unless they meet the following conditions:

- 1) It carries a certificate of compliance issued by the manufacturer and endorsed by the Saudi Arabian Specification Organization to be attached to the bill of lading.
- 2) The statement of compliance should be affixed to the door's edge.
- 3) The compliance phrase should be mentioned in the bills of lading in addition to the passing of the external test conducted by the Customs Department at the points of entry.<sup>(64)</sup>

K. Abdulghani (1982) found in interviews that one in every two drivers aged 18 years or younger had been involved in one or more accidents over the past two years. He considered this group to be a high risk group and recommended that the issue of special driving permits which are allowed for drivers below 18 years of age (the legal age) should be reviewed.<sup>(65)</sup> Also, Abdulghani followed by stating that,

"It is recommended that local police introduce more surveillance patrols to cover remote roads, and better enforcement action be promptly and strictly applied to traffic violators to reduce the risk of accidents."<sup>(66)</sup>

Despite the fact that parents understand the dangers of allowing their young sons of under 18 years of age to drive, they need transport for their families, particularly when the head of the household and older male members are at work. Before prohibiting the issue of driving licences to younger male drivers, the question should be asked : why are so many permits issued to young drivers, and what are the pressures on families to allow their young sons to drive at such a risk? One of the most important reasons is the need to transport women in privacy; in other words, there are considerable social factors associated with the numbers of cars and accidents in the country (see Chapter Five).

### 3.6 Summary

It has been shown in this Chapter how the rapid growth of Saudi cities has significantly transformed the small towns, characterised by narrow winding streets of traditional buildings, into large urban areas of modern Western style, with wide streets of gridiron pattern, and modern buildings constructed in new materials. As understood from modern transport theory the growth of the cities should have been accompanied by the development of public transport systems. However, this did not happen and in the vacuum created by the absence of public transport, the demand for transport was partly satisfied by an increase in the use of taxis and of the local traditional buses. When SAPTCO was established and imposed onto the transport system, the numbers of taxis and local traditional buses were reduced to accommodate it. Following its establishment the passenger ratio composition of SAPTCO was found, in survey, to be catering for more non-Saudi than Saudi passengers and to be carrying more male than female passengers despite

the fact that the latter were not permitted to drive cars. From these considerations, several questions arose regarding the reasons why there were so few women using the public transportation buses (see Chapter Five, section regarding factors affecting women in the use of public transport). The significance of the non-effective use by Saudi men and women of SAPTCO buses together with the expected decline of male foreign workers as passengers, because of reduction in their numbers, could mean that the company would fall into considerable economic difficulties. Therefore it is recommended that the current policy of SAPTCO should be reviewed in order to establish a viable market, aware of the fact that the number of cars would continue to increase to supply the demand for male and female transportation. Figures show that in 1982, 333 vehicles were estimated per 1000 persons, compared to the planners forecast that in 1990 there would be only 280 cars per 1000 population. Therefore, without a carefully considered development of the public transport systems there would be a very severe imbalance between the public and private systems, leading to further expansion of the latter probably causing more accidents, congestion and pollution. Table 3.15 shows a correlation between low average speed as would occur in traffic congestion and the levels of pollution.

Table 3.15 Correlation of Vehicles Speed and Air PollutionEmissions from Road Traffic

(U.S.A. 1972)

Types of pollutants, grams/veh-mi			
Speed mi/h	Carbon monoxide	Hydro Carbons	oxides of nitrogen
Pollutants emitted on freeways			
60.0	30.89	6.08	7.39
55.0	31.66	6.31	6.85
50.0	33.75	6.67	6.35
45.0	34.33	6.80	6.35
40.0	37.20	7.03	5.90
35.0	41.91	7.71	5.67
30.0	47.17	8.16	5.44
25.0	56.25	8.66	5.22
Pollutants emitted on arterial streets			
30.0	46.95	8.16	5.44
25.0	55.79	8.85	4.90
20.0	68.95	9.53	4.54
15.0	84.10	10.75	4.54

Source : Morlok, Edward, Introduction to Transportation Engineering and Planning, Present and expected air pollution emissions from road traffic in the U.S., 1978, p. 546.

### 3.7 References

1. Johnson, James H. Urban Geography : An Introduction Analysis, second edition, 1972, p. 1.
2. Grant, Keith "Changing Transportation Technology and Urban Development", in Ealing Papers in Geography for Sixth Forms, Volume 1, Ealing College of Higher Education, Geography Division, 1981, p. 4.
3. Ibid, p. 8.
4. Fathy, Mohamad The Character of Saudi City, 1985 (in Arabic), p. 82.
5. Ibid, p. 85.
6. Al Jasir, Hamad Riyadh City through History, 1966 (in Arabic), p. 117.
7. Ibid, p. 122.
8. Rugh, William A. Riyadh History and Guide, 1969, p. 42.
9. "Aramco a celebration" in Aramco World Magazine, Vol. 35, No. 3, May 1984, p. 12.
10. Wachs, Martin "Autos, Transit and the Sprawl of Los Angeles : the 1920s", Journal of the American Planning Association, Vol. 50, No. 1, Winter 1984, p. 304.

11. Ministry of Municipal and Rural Affairs Dammam Action Master Plan, Report No. 3, Project 204, January 1978.
12. Wahaba, Hafiz Arab Peninsula in the Twentieth Century, 1946 (in Arabic), p. 75.
13. The Carven Journal Aramco, May 1984, p. 6.
14. "Aramco a celebration" Aramco World Magazine, Vol. 35, No. 3, May 1984, p. 12.
15. Aramco and its World, Aramco, 1980, pp. 200-201.
16. Ibid, 206.
17. "Aramco a celebration", Aramco World Magazine, Vol. 35, No. 3, May 1984, p. 49.
18. Ministry of Finance The Statistical Year Book, 1967.
19. "Aramco a celebration" Aramco World Magazine, Vol. 35, No. 3, May 1984, p. 13.
20. Community Development Division, Aramco, Operations Guide Manual No. 35C4, 1984.
21. Ibid.

22. Al Shuaiby, A.M. The Development of the Eastern Province, Ph.D. Thesis, University of Durham, Department of Geography, 1976, p. 295.
23. Operations Guide Manual No. 35C4, Aramco, 1984.
24. Al Shuaiby, A.M. Ph.D. Thesis, 1976, p. 295.
25. Ministry of Finance Real Estate Development Fund, Annual Report 1983-1984.
26. Real Estate Development Fund, Riyadh, 1985.
27. Real Estate Development Fund, Annual Report 1983-1984.
28. Real Estate Development Fund, Riyadh, 1985.
29. Real Estate Development Fund, Annual Report 1983-1984.
30. Report to Dammam Municipality, by International Land Development Consultant, 1975.
31. Fourth Development Plan, 1985-1990, p. 432.
32. The approximate figures of plot prices obtained from several Estate Offices in Dammam, 1985.
33. A report on the seminar on : Urban Transport and the Environment, held July 10-12 1979, by the Organization for Economic Cooperation and the European conference of Ministers of Transport, published by National League of Cities, Washington D.C., July 1980, p. 5.

34. Pendleton, Scott "A house for every citizen", Saudi Business and Arab Economic Report, March 28, 1980.
35. Hud International Country Profile, Housing and Urban Development in Saudi Arabia, Washington D.C., U.S. Government, 1977, p. 6.
36. Report conducted by Dammam Municipality area, submitted to the Ministry of Municipal and Rural Affairs on : Limitation of the Saudi Urban Development, (in Arabic), 10 May 1984, p. 1.
37. Ibid, p. 14.
38. Al-Hathloul, Saleh A. "Design principles for housing development in Arab-Muslim cities", Housing Problems in Developing Countries, Vol. 2, proceeding of IAHS International Conference 1978, University of Petroleum and Minerals, 1978, p. 512.
39. Costa, Frank J. and Noble, Allen G. "Planning Arabic Towns", Geographical Review, Vol. 76, No. 2, published by the American Geographical Society, April 1986, p. 165.
40. Abd Albagy Ibrahim Establishing Cultural Values in Building a Modern Islamic City, (in Arabic), Centre for Planning and Agricultural Studies, Jeddah, 1982, p. 10.
41. Ibid, p. 11.

42. Ahmad, Mostfa and Frank, J. Costa "Al Jarudiya a model for low rise/high density development in the Eastern Province of Saudi Arabia" in Islamic Architecture and Urbanism, selected papers, 1983.
43. Boon, Jon J. "Legislative controls and housing policy as development from residential pattern in Saudi Arabia", in Islamic Architecture and Urbanism, selected papers, 1983.
44. Talib, Kaizer Shelter in Saudi Arabia, 1984, pp. 11-12.
45. Gottmann, Jean "Transatlantic Orbits : The Interplay in the Evolution of Cities", World Patterns of Modern Urban Change, The University of Chicago, Department of Geography, Research Paper No. 217-218, 1986, p. 458.
46. Lawless, R.I. "The future of historic centres : conservation or redevelopment", in The Changing Middle Eastern City, by G.H. Blake and R.I. Lawless, 1980, p. 205.
47. Ministry of Municipal and Rural Affairs Dammam Master Plan, Technical Report No. 5, January 1979, pp. 158-162.
48. Ministry of Interior Statistical Year Books.
49. Ministry of Interior Statistical Year Book, 1984, p. 143.
50. Kay, Shirley Saudi Arabia, 1979, p. 45.

51. Al-Saif, Jaleel Traffic Development in Saudi Arabia, presented to Medical School Seminar, University of King Saud, 19 October 1984, p. 13.
52. Carmen and Marshall, F. Transit Sketch Planning Procedures : New Approaches to Travel Forecasting" in Transportation Research Record, 569, 1975, p. 1.
53. Ministry of Interior, Statistical Book, 1980, p. 138.
54. Ibid, p. 138.
55. Aljazeera Newspaper, No. 4580, 13 April 1985, p. 13.
56. Austin, Jan "Bus Systems Key to Urban Transport", Urban Edge, World Bank, Vol. 9, No. 5, May 1985, p. 1.
57. Ibid, p. 2.
58. Ministry of Interior, Statistical Book, 1980, p. 136.
59. SAPTCO Training manual for SAPTCO's conductors, 1979.
60. Altshuter, Alan The Urban Transportation System : Politics and Policy Innovation, 1979, p. 118.
61. The Kuwait Economist Economic magazine (in Arabic), published by Chamber of Commerce and Industry, Kuwait, No. 254, February 1986, p. 23.

62. Riyadh Newspaper, No. 8532, 11 June 1984.
63. Saudi Economic Survey, 24 April 1985, p. 5.
64. Ibid, p. 5.
65. Abdulghani, K.M. Driver characteristics and their Relation to Traffic Occurrences, Ph.D. Thesis, Michigan State University, 1982, p. 60.
66. Ibid, p. 60.

CHAPTER FOURTHE EXISTING CONDITIONS OF LAND-USE IN DAMMAM,  
AND THEIR RELATION TO TRANSPORT4.1 Introduction

In the previous Chapter we discussed the rapid growth of Saudi cities, as exemplified by the development of Dammam which in less than three decades grew from a small fishing village of about three hundred houses into a large modern city. In this Chapter, before examining the current spatial patterns of land uses and employment of Dammam urban area, it is necessary to examine the alternative planning concepts that were considered for the Eastern Region, and the Dammam Metropolitan Area in particular. This is because the concepts used in planning policy have affected the present situation, as well as being intended to influence future elements such as land-use and employment which, in turn, affect transport and traffic.

4.2 Alternative planning concepts of the Eastern Region

In the late 1960s, the government of Saudi Arabia felt the need to control and direct the growth of urban areas, particularly the main cities, Riyadh being the first city which attracted the attention of the authorities because of its rapid growth. In 1968 the government signed a contract with Doxiadis (Associates, Consultants on Development and Ekistics of Athens, Greece). The contract provided for the formation of a master plan and programme that would guide the development of the city up to the year 2000. The final master plan for Riyadh was completed in 1971.<sup>(1)</sup>

In the early 1970s, the government decided to extend this policy to cover the other major Saudi cities, particularly those in areas which were attracting population. The Eastern Region was among those it was particularly concerned with because of its significance as an economic centre, and, as the centre of oil production, as well as its importance as a commercial port and its agriculture. In the mid 1970s Candialis provided four alternative planning concepts for the Eastern Region, as described below and illustrated in Figure 4.1.

a) "Maximising use of Coastline." In this alternative almost all the development and industrial activities would be located on the coast and several new towns would be created there. This is described as the most desirable for import/export orientated industrial activity as well as the most attractive for the population.

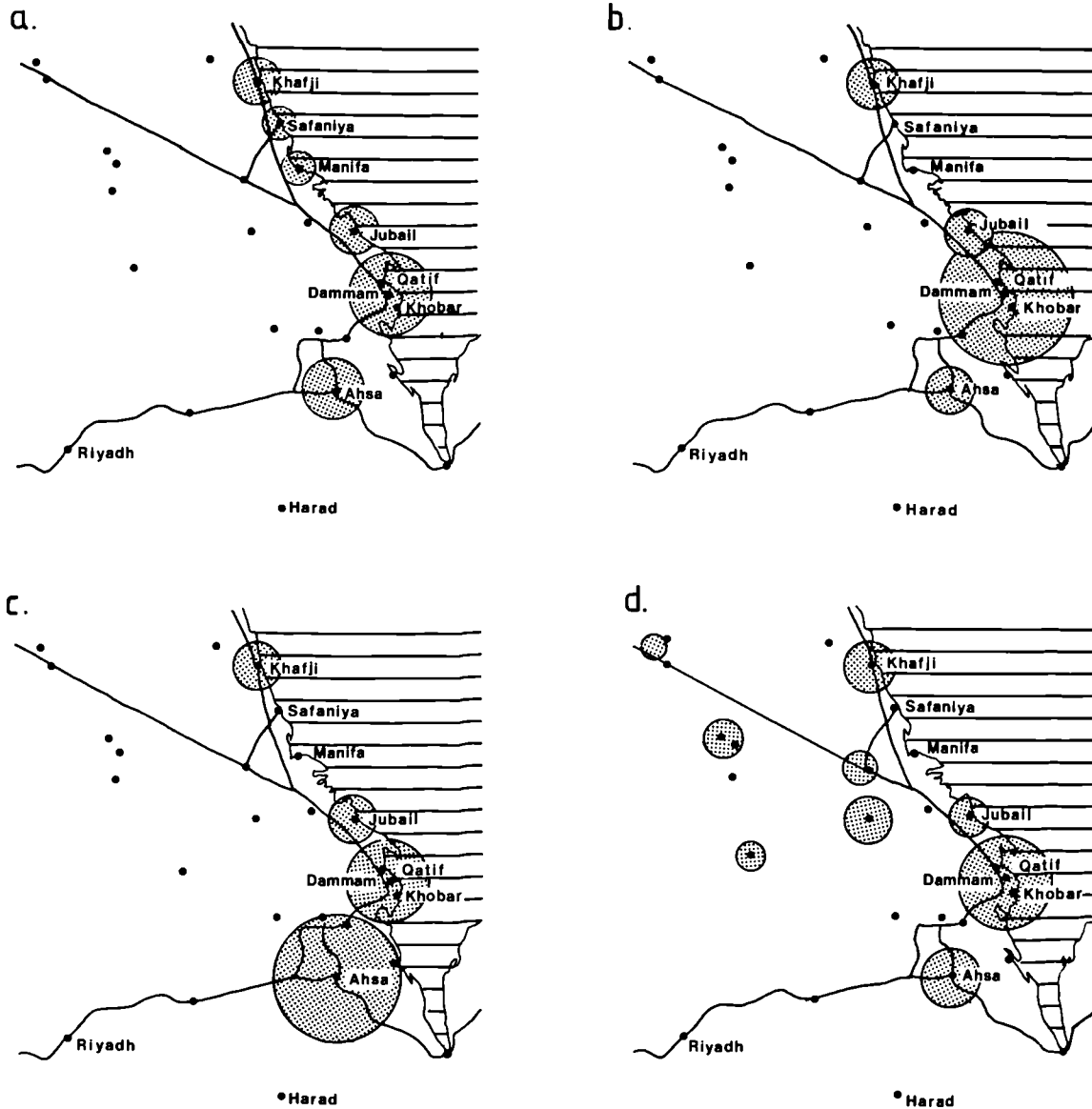
b) "Strengthening the Structure of the Region with the Creation of Major Coastal Metropolis." Under this concept a new large metropolitan area would be created incorporating Dammam and Al Khobar.

c) "Preservation of major urban concentration in Ahsa." According to this concept or scenario Ahsa would be the major metropolitan area and the administrative centre for the whole Eastern Region. The greater part of the industrial activity would be located along the coast.

d) "Decentralization". Internal migration would be minimised. Development would be spread over a number of new towns inland and along the coast.

The Ministry of Municipal and Rural Affairs decided to adopt the first concept. There were several reasons for this:

**FIGURE. 4.1** ALTERNATIVE DEVELOPMENT PLANS STRATEGY FOR THE EASTERN REGION



**SOURCE:** Ministry of municipal and rural affairs, master plan ad Dammam.  
 Candillis Metra International 1976.

The grounds for this recommendation and its adoption were that alternative (a) involved:

- the maximum use of the most important physical asset of the region;
- the easy provision of water desalination plants;
- reduction of the inland population by the creation of coastal new towns and limited growth of the Dammam-Khobar complex.

Following the acceptance of this by the Ministry, the consultants described in depth the future development of the Eastern Region, according to a detailed schedule divided into three periods running from 1975 to 1995. The first two periods correspond to the second and third national five-year development plans.<sup>(2)</sup>

There is no doubt that the regional planning concepts for the Eastern Region reflect the Government's initial concern for developing Saudi regions. However, the regional plans only concentrated development on those regions which had the greatest potential; the oil region in the East; the Holy Cities in the West; and the capital city in the Centre (see Chapter One). If we study alternative (a) of the four planning concepts for the Eastern Region, which located all the development along the coastline, it can be seen that it entails economic imbalance within the region, and moreover it gives greater emphasis to the development of that part of the coastline between Khobar and Jubail. The economic base of these settlement nodes depended upon government administration, construction and related light industry, as well as the oil industry. The result of this development is to attract population from elsewhere within the region, and from the country as a whole. This meant that the life style of the rural

population underwent a fundamental change from an economy based on agriculture and grazing to that of urban living. Indeed, the coastline became more attractive than the inland settlements, because of good housing and infrastructure, for example roads and medical facilities. Janet Abu-Lughod (1983) supported this view when she described the current urban development in "the oil wealthy states":

"Cities serve as sites for consumption other than as centres for production. They are the arenas in which patrimonial and/or state largesse is chiefly distributed in the form of housing, utilities, schools, health care and the like. Cities exert an irresistible attraction for citizens. Nomads become sedentary there. Agriculturalists abandon their poor yielding farms to resettle there."(3)

Of these considerations alternative (d) should have been preferred, which would have resulted in a more even spread of development and of population, and avoided neglecting sectors of the economy, particularly food production. Instead of heavy immigration to the cities of people in search of work (a picture repeated in all developing countries), the work should have been brought to the people, for example, by the construction of small industrial towns which could have co-existed with agriculture. The argument that water provision was easier on the coast, with desalination plants, does not have much force when it is remembered that in some developed countries, particularly the United States, fresh water supplies are piped hundreds of miles.

#### 4.3 Alternative planning concepts of the DMA

As a result of the adoption of the first concept (a) which specified a concentration of urban and industrial development along the coast, G. Candilis of Metra International Consultants, in "Master Plan

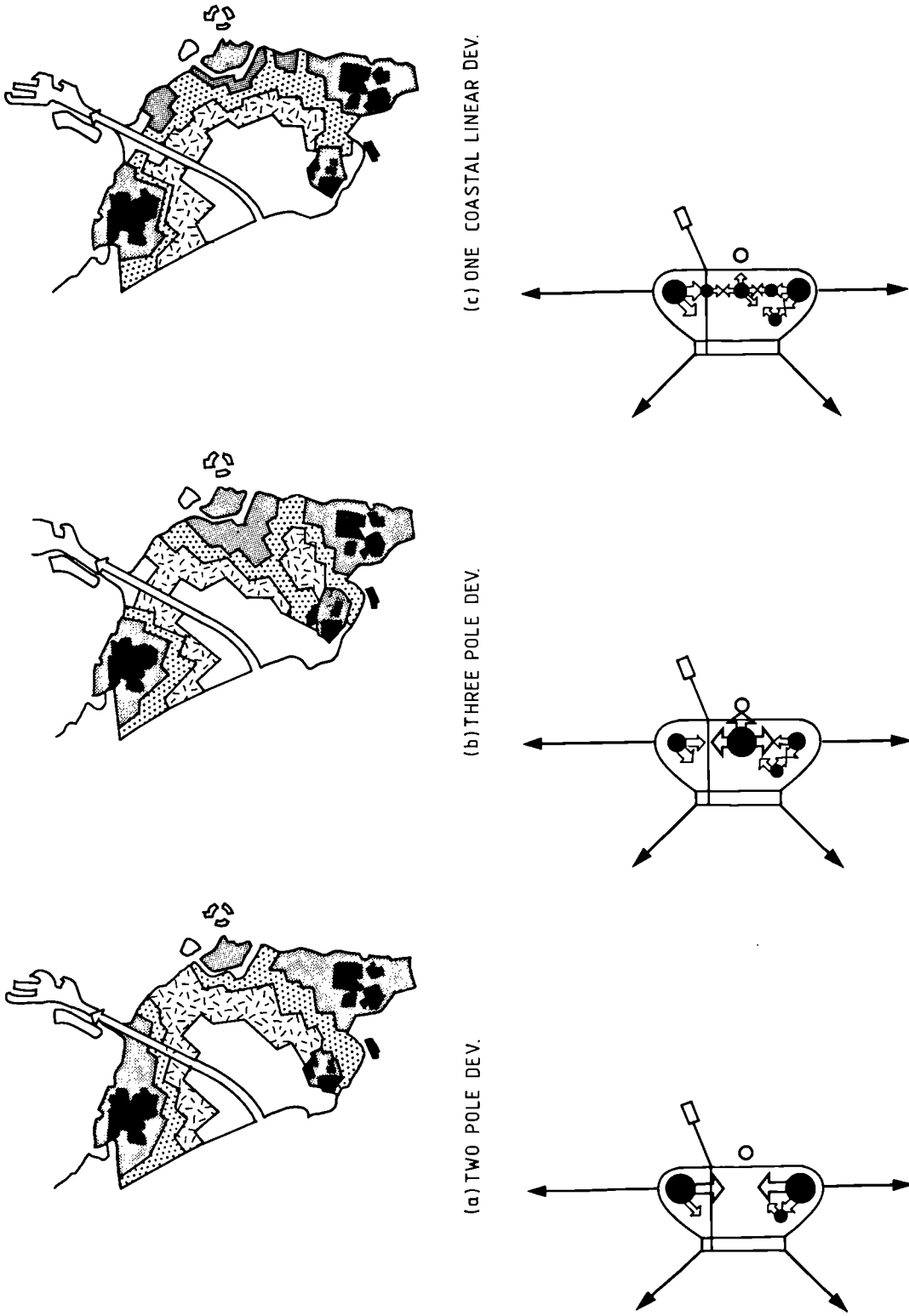
Ad Dammam", presented three alternatives for the development of Dammam Metropolitan area as follows:-

a) Under this plan the poles of development would be Dammam and Khobar, leaving the open space between for fringe development (see Figure 4.2, Pattern a). According to this model all commercial growth would centre on Khobar, institutional and educational development would take place between Dhahran and Khobar and heavy industrial activity would be located around Dammam.

b) "Three Pole Development" is here described with a third growth pole on the coast between Dammam and Al Khobar in a new urban centre with development effort divided between the three centres (see Figure 4.2, Pattern b). If this alternative is to be successful, a start must be made by the government who should build at least the first node of development of the third centre, and locate in this new urban centre administrative offices, residential areas, centres of cultural activity and main services in order to attract people to live and work there.

c) Under this alternative, development effort would be spread along the coast without particular concentrations; government projects and functions would also need to be spread (see Figure 4.2, Pattern c). The problem here would be the probability that development along the coastal axis would be too thin and inadequate to allow provision of higher order services, and all non-residential development and activity would still be concentrated in Dammam and Khobar as in Pattern a.<sup>(4)</sup>

FIGURE. 4.2 ALTERNATIVE DEVELOPMENT PLANS FOR DAMMAM METROPOLITAN AREA



SOURCE: Ministry of municipal and rural affairs, master plan ad Dammam. Candilis Metra International 1976.

The establishment of King Faisal University and the sports complex, Sport City, on the area between Dammam and Khobar indicated that alternative (b) was chosen. This meant that this choice had contradicted the regional planning concept (a), because one of the objectives was to limit growth of the Dammam-Khobar complex. The establishment of these projects on the other hand will tend to encourage development between them, drawing the two cities together. For example, Arrakh, one of the new districts of Khobar, emerged to the north of the city; also, a new district emerged to the south of Dammam. Therefore, it can be said that this concept has encouraged both cities to spread along the coast as well as inland. As mentioned in Chapter 3, the Ministry of Municipal Affairs, concerned at the unrestricted urban growth of the major cities, established limitations on that growth. This shows that the growth of Dammam has exceeded the planned limitations.

Finally, from the point of view of road traffic, alternative (a) generated high levels of inter-intra urban transportation demands and created greater transport problems (see Chapters Three and Five), all of which could have been reduced, or at least limited under alternative (d), see Figure 4.1.

#### 4.4 The current pattern of land-use

The above discussion shows that Saudi Arabia is beginning to undertake more regional planning, but its focus has mainly been on several cities. For example:

"In 1979 The Ministry of Municipalities and Rural Affairs has established a central department and seven regional offices

for town planning; however their functions are limited to physical planning for individual cities. The town planning is, to a large extent, weak and ineffective ... it lacks a national comprehensive policy for urban development and it fails to recognize the social and economic impact on the urbanization process and the relationship between urban and rural development."(5)

Furthermore, transport planning comes under the Ministry of Communications which has transport departments located in the major cities (Riyadh Transport Department, Jeddah Transport Department, Makkah Transport Department and Dammam Transport Department).

Transport planning is, however, separated from land-use planning. On the other hand, many planners in the United States and Western Europe are now recommending ideas, and for many years have argued that, the concept of transport planning, "must be conducted concurrently with, and cannot be separated from landuse planning has become more accepted over time."(6) As Dick Sargon (1975) stated:

"Transport planning and development are closely tied to the overall general plan. Personal mobility and goods movement routes are an integral element of the plan of development. Transportation is one of several uses of land. This approach in administering transportation development is similar to that in many European countries especially Western Germany and the United Kingdom."(7)

Population and employment distribution, as well as the infrastructure of road network, schools and so on, are associated with land-use. This spatial distribution, indeed, leads to interaction between those activities. Therefore, the land-use patterns in Dammam, particularly the residential, commercial and educational land-use will be examined, because these three patterns are relevant to the issue of women's transport.

#### 4.4.1 Residential land-use

The implementation of various alternative plans for Eastern Region, and Dammam Metropolitan Area in particular, led to a rapid concentration of population, particularly in the coastal area from Khobar to Jubail, which now contains 59% of the total Eastern Region population. Of that population 39% is concentrated in the Dammam Metropolitan Area.<sup>(8)</sup> As has been mentioned this area has become a centre of education, of health services, and of commerce. The fact that 65% of the Saudi population of Dammam Metropolitan Area was born elsewhere shows the extent of the migration to the coastal area.<sup>(9)</sup>

The increase in the population of Dammam was 43.2% (about 54,000) between 1974 and 1985. Over twenty-three years (1962-1985) the population increased fivefold (see Table 4.1). This rapid increase in population was shown by the spatial expansion of the city (see Figure Chapter Three). Figure 4.3 shows how the number of people and the number of cars have grown from 1974 to 1985, revealing that the number of cars has grown more than nine times as fast as the number of people; in calculations, the average annual increase in vehicle numbers and in population was found to be 37.5% and 3.95% respectively. This reflects the significant increase in demand for private transport. Yacov Zahavi (1976) has observed:

"Two kinds of population explosions have been worrying the authorities in many parts of the world during recent times - of people and of cars. The two explosions seem to be reciprocally related in most cases so that when the average size of households decrease, people seem to adopt more cars. The most critical situation, however, is when the two population explosions take place simultaneously. This usually happens in cities of developing countries, where both the birth rate and household size are high, where the added

migration of people to the cities may double a city's size in a decade, and where the increase in motorization is exceptionally high."(10)

If, in addition to those factors is added the cultural traditions of Saudi society, indeed it can be said that the average number of vehicles in Saudi Arabia has increased more rapidly even than in other developing countries.

Dammam city has grown so as to contain several districts, but not all those districts are officially designated : some have acquired local names and identities. For example, Al Dawasser district is named after the tribe of Al Dawasser who live there, and the district of Skat Al Hadid means "railway district" because both the offices of the railway and its terminus are located there. As the city has grown the districts have expanded to join one another in a conurbation and are now difficult to distinguish from one another; some kind of official classification is therefore needed. Table 4.2 shows the current Dammam districts and the main forms of land-use in each district. The location of the districts can be seen on the accompanying map, Figure 4.4.

Table 4.1 Population of Dammam and Dammam Metropolitan Area

Year	Dammam Population	%	Dammam Metropolitan Area Population	%
1962	35,404	100.	66,245	100.
1974	124,300	351.0	212,363	320.6
1978	130,000	367.2	283,000	427.2
1985	178,000	502.8	433,000	653.6

Sources : Population Survey 1962, Population Census 1974, CH2M Hill International 1979.

Figure 4.3

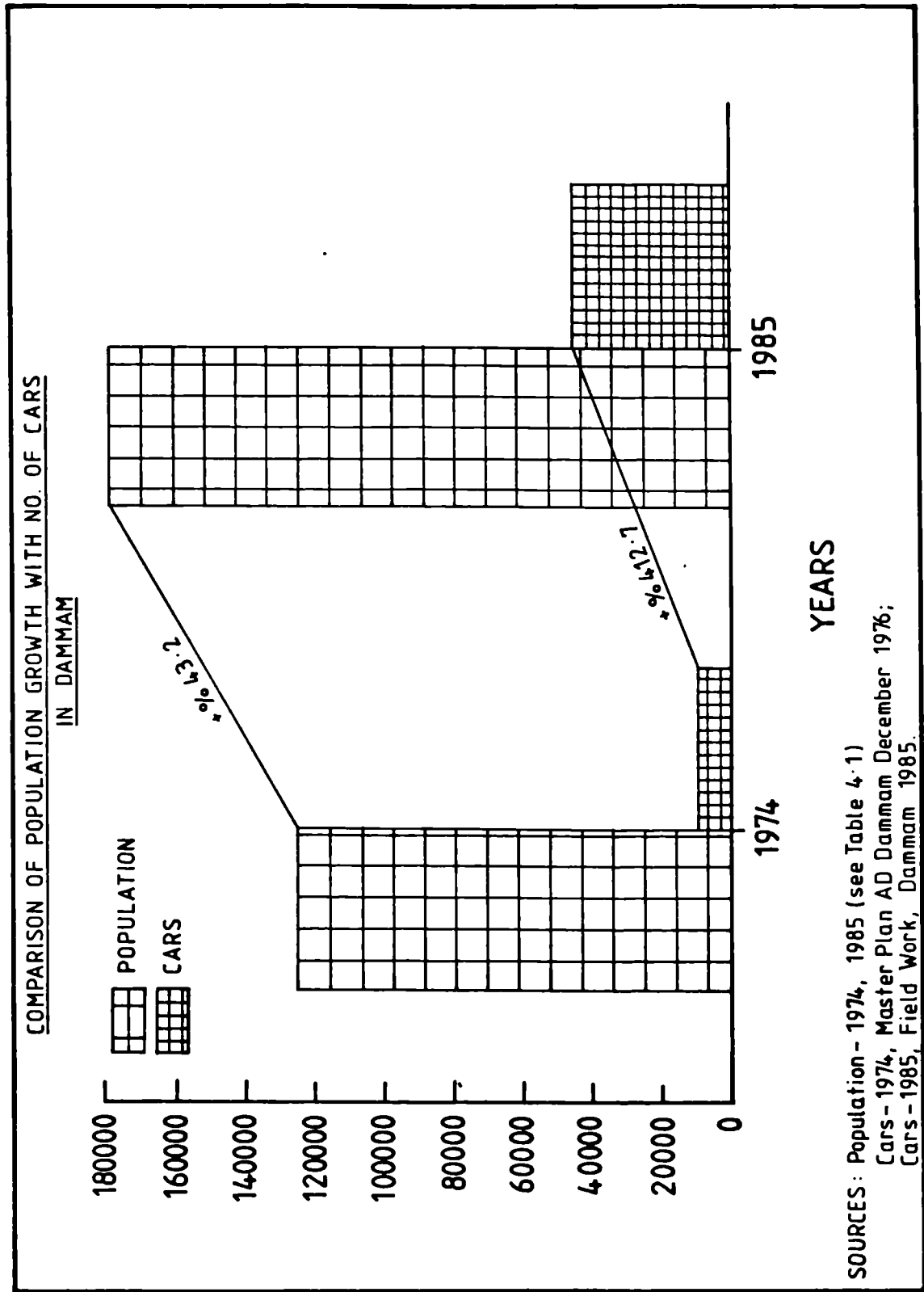


Table 4.2 Dammam Districts and Forms of Land-Use

District	Major land use
1. Al Dawasser & Wast Almedina	This district is medium and high density. Intensive commercial use particularly in Wast Almedina. Major administrative buildings (see Plate 4.1a). Hotels, wholesale and retail women's clothing firms.
2. Al Adamah	Mixed density, residential and city overspill. This district was established between 1960 & 1970.
3. Al Badiyah	High density residential. Modern supermarket located in this district (see Plate 4.1b). Most of this district settled during the first year of the establishment of R.E.F. (1975).
4. Skat Al Hadid	Medium density residential. Railroad yards and storage facilities. Railroad employees residences located along the port road. Dammam stadium located in the south east corner.
5. Al Nasriah	Medium density residential. Many railway employees are located there.
6. Madinat Al Ummal and Ben-Kldoon	Medium and high density. This district developed by Aramco. Most residents are Aramco's employees. Abd Lulah Fuad Hospital is located in the north Ummal district.
7. Al Jaluiah & Salamah	Medium density residential. New modern villas located in Al Jaluiah. Upper class residences in this district.
8. Al Tubashi	Mixed densities residential. Many non Saudi professional people live in this district.
9. Districts : 75, 8 and 37	Low and medium density residential: characterised by modern houses. New commercial strip located between Districts 8 and 75. Most residents are new immigrants from all over the country, particularly Ahsa.

Sources : Adapted from Hill International Classification Ministry of Municipal and Rural Affairs 1979.

Plate 4.1



(a) Dammam Municipal Building in foreground.

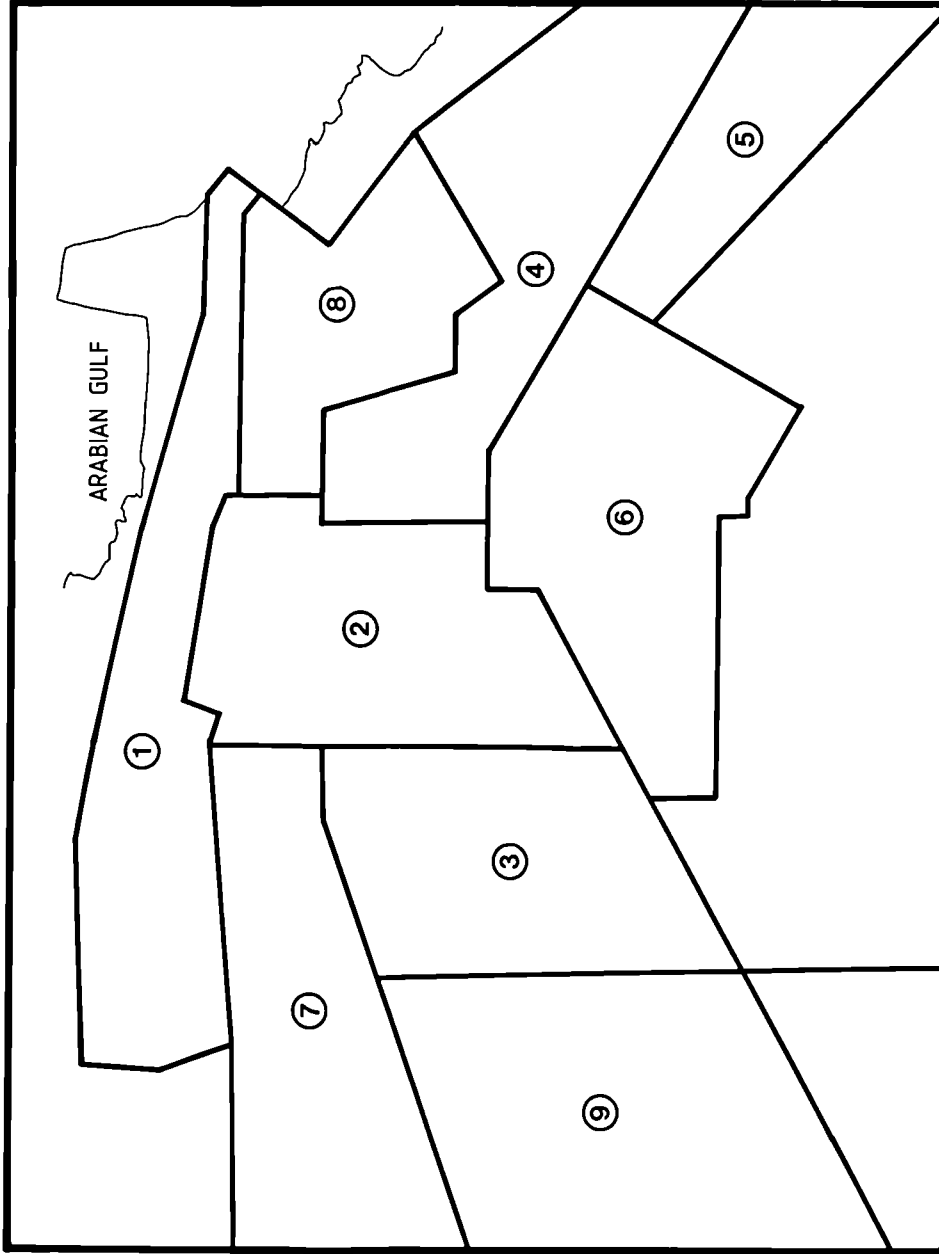


(b) Typical modern supermarket with car park in front.

Dammam : Fieldwork, 1985.

Dammam Districts

Figure 4.4



Source: Adopted from CH2M Hill International, 1979

#### 4.4.2 Educational facilities

State education in Saudi Arabia has been provided for boys over a longer period of time than for girls. Modern education for boys started in the mid 1930s, while girls' education started in the early 1960s.<sup>(11)</sup> There are several reasons for this difference, one being that families believed it to be more important to educate boys than girls. The girls were only allowed to attend traditional schools in order to learn religion and to train in domestic skills. When the government decided to introduce a new and radical education system for women in the late 1950s, it was attacked as being contrary to the cultural tradition of the Saudi Society. The government, with the help of scholars, proposed that women's education was a requirement of the Islamic religion and furthermore women's education would be a completely separately administered system. These premises are contained in the Royal Decree which reads as follows, "Thanks be to Allah alone. We have decided to open schools that teach girls religious subjects such as the Quran, monotheism, jurisdiction, and other sciences that are harmonious with our religious beliefs such as home management, the upbringing of children, and others that are not feared, presently or at a later date, to introduce change in our beliefs. These schools are to be remote from any influences that might affect the youngsters' manners, health, beliefs, or traditions. We have ordered the formation of a commission made up of the chief Ulama, who are known for their protective jealousy of religion and their compassionate love for Muslim children, to organize these schools, establish their programs, and supervise their good behaviour. The members of this commission will be subordinate to their (spiritual) father His Religious Excellency the Grand Mufti Shaikh Muhammad Ibn

Ibraheem Al ash-Shaikh who will select Saudi and non-Saudi female teachers whose true Islamic beliefs can be ascertained. To the new schools will be added schools that had already been opened throughout the Kingdom. They will all be subordinate in guidance and organization to this Commission under the supervision of His Religious Excellency. This formation, however, requires time enough to prepare the means necessary to the establishment (of the new schools) and we hope that this will be in the near future. Allah is the true guide and there is no power but from Him" (Al Yamamah No. 193, Year 7, 1, 23, 1379 A.H-1959, p. 7).<sup>(12)</sup>

Even though the education of girls started later than that of boys, 1961 as opposed to 1936, demand for girls' education is very high. Table 4.3 shows that, although the total number of girls at secondary schools in Dammam is higher than the number of boys, the number of boys in elementary and intermediate schools is greater than the number of girls. As education is not compulsory this shows that girls are keener to continue their education to a higher level. One reason for this is that employment opportunities always exist for boys with low qualifications whereas for girls a degree is often required.

Table 4.3      Distribution of the Total Number of Pupils in  
Schools at each level in Dammam

Type of School	Girls		Boys		Total	
	School Number	Students	School Number	Students	School Number	Students
Elementary	37	10,270	31	12,279	68	22,549
Intermediate	12	4,818	12	4,932	24	9,750
Secondary	8	3,044	5	2,784	13	5,828
Total	57	18,132	48	19,995	105	38,127

Source : Presidency of Girls Education, Office, Dammam, 1986.

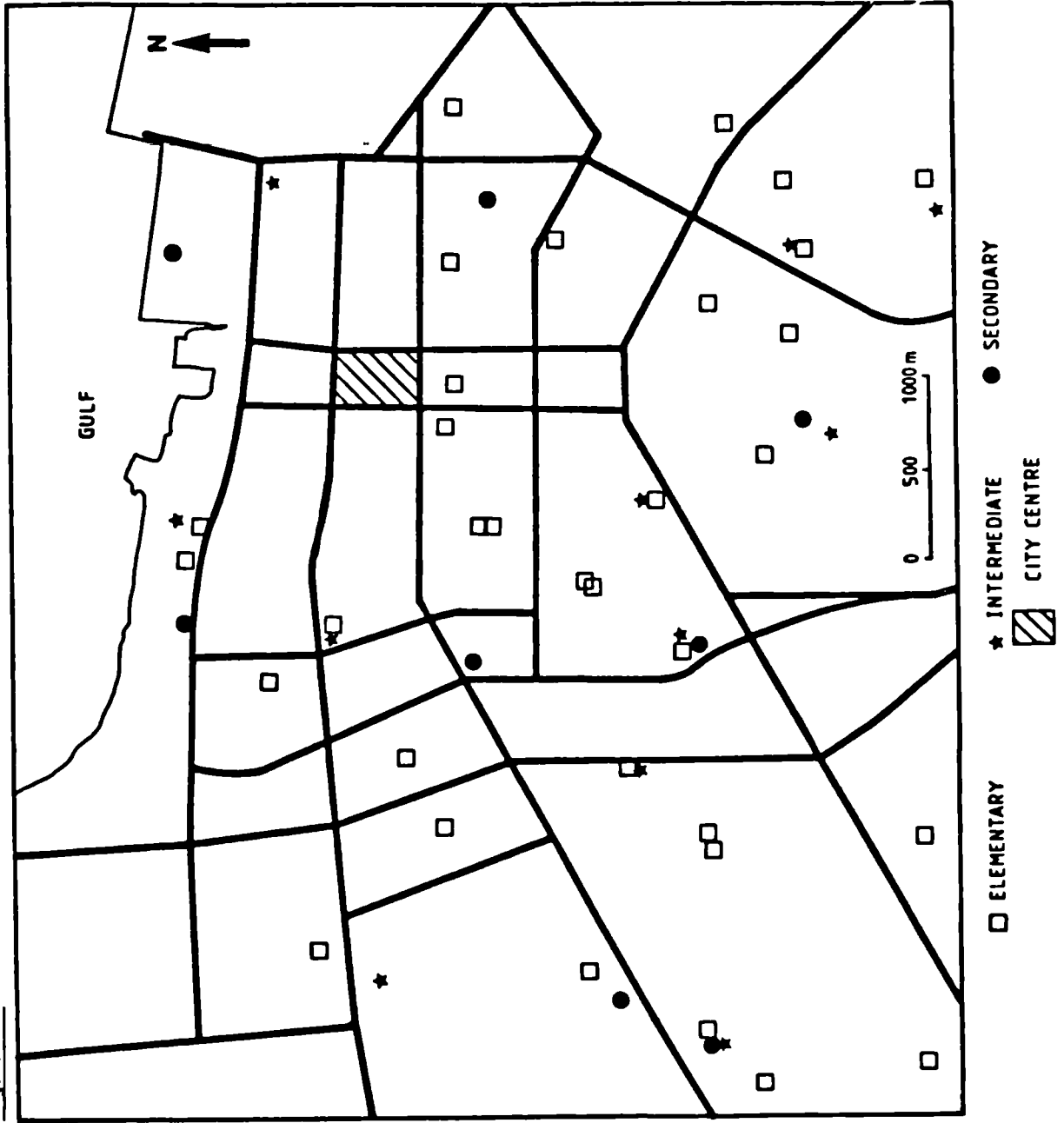
Although there are more boys than girls in Dammam's school population there are more girls' schools in Dammam than boys' schools. It appears that heads of household and communities feel that girls' schools, particularly elementary schools, should be located in every residential area to reduce the need for girls to walk long distances from home to school since transportation is available only to female intermediate and secondary schools. Figure 4.5 illustrates the distribution of girls' schools in Dammam. It can be seen that the size of the catchment area rises with the educational level of the school. The mean distance from the city centre of all girls' elementary schools is 2.66 kms, of intermediate schools 2.83 kms, and of secondary schools 3.00 kms, which, together with the number of schools at each grade, indicates the rise in the size of the catchment area according to the grade of schools (see Table 4.4).

Table 4.4      Distance in Kms of Schools from Dammam City Centre

Distance Kms	Elementary		Intermediate		Secondary	
	School	(%)	School	(%)	School	(%)
less than 1	3	8.1	-		-	
1 - 2	11	29.7	4	33.3	2	25
2 - 3	9	24.3	2	16.7	3	37.5
3 - 4	8	21.6	4	33.3	1	12.5
more than 4	6	16.3	2	16.7	2	25
Total	37	100	12	100	8	100

Source : Fieldwork in Dammam, 1985.

Figure 4.5 SPATIAL DISTRIBUTION OF GIRLS SCHOOLS



#### 4.4.3 Commercial land-use

According to Hill International's classification Dammam has six kinds of retail areas which can be identified as follows:

- 1) The central core, or central business district contains a wide variety of retail and wholesale businesses, and services that meet the needs of the surrounding areas, as well as supplying goods to retailers throughout the entire city and Metropolitan area.
- 2) The fringe around the central core contains supportive uses needed for the core which are excluded for economic reasons.
- 3) Strip commercial developments located along the major traffic arteries which offer both convenience and domestic goods for a large market area. For example King Saud Street (see Table 4.5).
- 4) Single specialised stores standing by themselves and serving a wide area (e.g. furniture and automobile accessory stores).
- 5) Local food markets, housing a variety of shops and usually built by the municipality, offering convenience goods for their immediate neighbourhood.
- 6) Grocery stores and supermarkets located in and serving residential areas. (13)

This model of commercial land-use seems to be similar to that found in some cities in the United States, as analysed by Brian Berry in his literature dealing with The Commercial Structure of American

Cities (1962). His model comprised four basic components:

- 1) A hierarchy of business centres
- 2) Highway-oriented commercial ribbons
- 3) Urban arterial commercial developments
- 4) Specialized functional areas.<sup>(14)</sup>

The existence of this model of commercial land-use in Dammam can be explained by the fact that in the early stage of Dammam's development most commercial activities were concentrated in the centre. When Dammam city expanded the older residential areas around the centre declined and new residential areas emerged on the fringe, further out of the centre, and, in addition, there was also an influx of new settlers from home and abroad. This led to an increase in traffic with a corresponding decrease in accessibility to the commercial areas in the city centre together with inflationary rental charges in the city centre. Commercial development grew along the arterial roads, with uncontrolled expansion. Figure 4.6 shows the commercial structure of Dammam city and Table 4.5 shows a comparison of commercial undertakings in King Saud Street close to the city centre, and away from the city centre in the commercial street dividing districts 8 and 75 in the south west of Dammam. It can be seen that Government Departments and offices, banks, travel and shipping agencies, stores retailing luxury goods, electrical shops and a number of restaurants are mainly centrally located, while such establishments as furniture shops, estate agents, construction and decorators suppliers and domestic services are

Figure 4.6

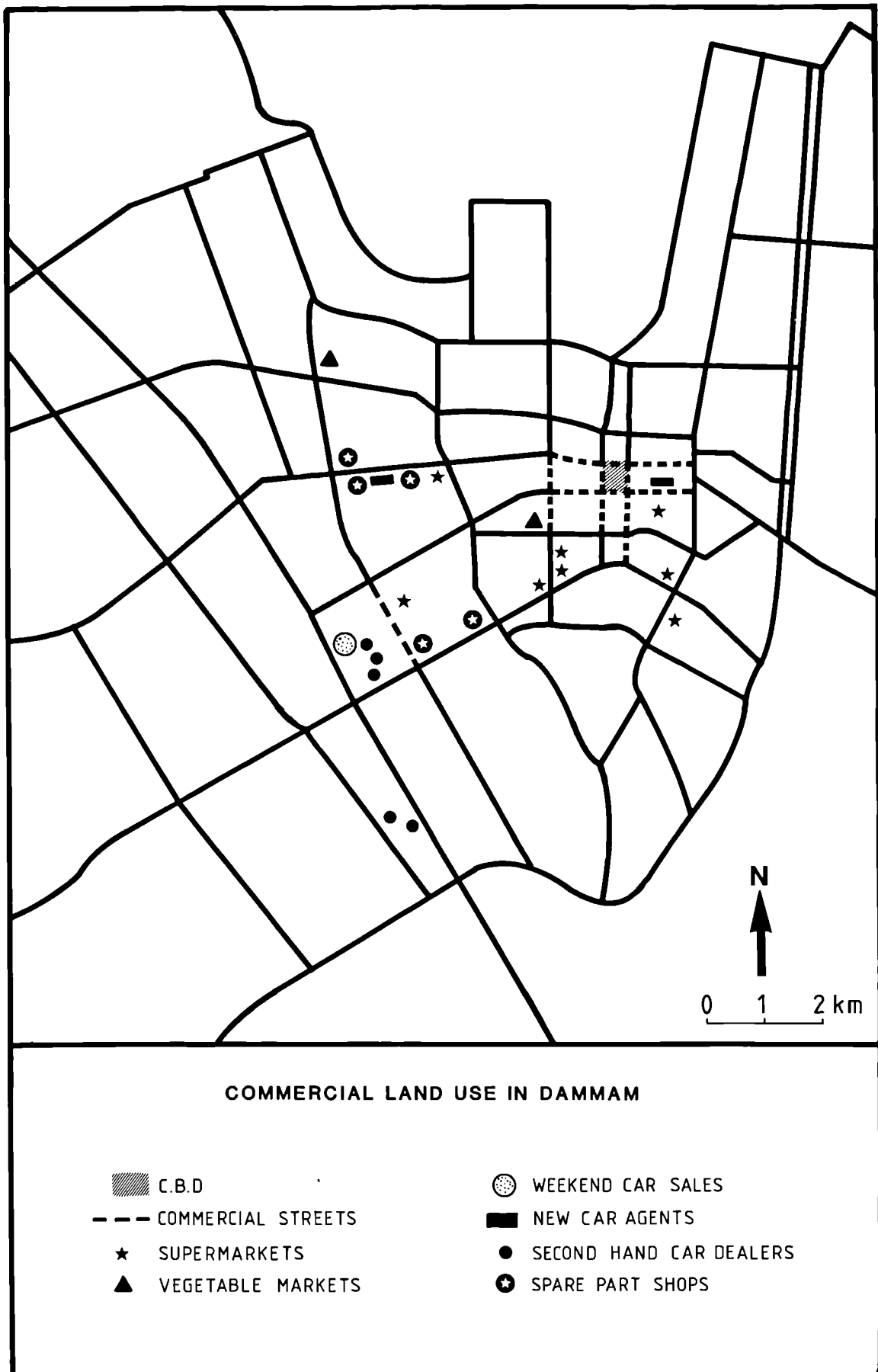


Table 4.5 Types of Commerical Activities in Two Different Street Locations

Types of activities	King Saud Street	(8-75) Districts Street
1) Government offices	2	-
2) Banks and Bureaux de change	13	1
3) Estate Agents	3	8
4) Travel and shipping agencies	20	-
5) Stationers, printers and book shops	5	2
6) Audio, TV and Electrical goods	18	1
7) Luxury goods, watches, clocks and perfume	28	1
8) Men's clothes	7	3
9) Children's clothes	6	-
10) Children's toy shops	5	1
11) Sports Equipment shops	2	-
12) Construction materials and decorators' supplies	-	10
13) Hardware shops	16	1
14) Car spares and accessories	27	3
15) Car Service stations (No petrol)	-	1
16) Sewing machine shops	2	-
17) Agricultural supplies	1	-
18) Cabinet makers	-	2
19) Furniture shops	-	20
20) Record shops	6	1
21) Photographers and photographic suppliers	4	-
22) Wholesale grocers	9	1
23) Retail grocers	13	14
24) Tobacco shops	-	1
25) Butchers	-	16
26) Bakers	1	5
27) Kitchenware and crockery shops	-	9
28) Restaurants and cafes	23	2
29) Men's hairdressers	1	1
30) Laundries	-	5
31) Electrical service	-	15
32) Plumbers shops	-	5
<b>Total</b>	<b>212</b>	<b>129</b>

Source : Field work, 1986.

to be found mainly in the commercial street near a developing area. The commercial undertakings which cater exclusively for women are located to the north of King Saud Street reflecting the cultural tradition of segregation. This means that women have to travel from their homes outside the centre to reach their Female Market "Suaq-Alharem" (see Chapter Five).

#### 4.5 Employment

The total number of people employed in Dammam Metropolitan Area in 1978 was 119,600, including 77,800 non-Saudis.<sup>(15)</sup> 27% of the total employed population worked in public service and utilities, 20% in commerce, 16% in construction, 13% in manufacturing and only 2% in agriculture.<sup>(16)</sup> By 1985, 173,000 people were employed in Dammam Metropolitan Area,<sup>(17)</sup> i.e. a rise of 44.6% in the seven years. However, it seems that the proportion of non-Saudis to Saudis will have declined, particularly in the construction, transport and commercial sectors. This is largely because of new policies adopted by the government:

- 1) An alien expert's permit will only be renewed at the end of a contract period if the Ministry of Labour and Social Affairs is satisfied that no Saudi can fill the relevant job.
- 2) All temporary transfers to employers and all transfers to employers with only temporary licences to operate in the Kingdom are terminated.
- 3) On the employees' side, transfers are only possible between employers with full commercial registration.

4) Only transfers by employees with specialist qualifications will be granted.<sup>(18)</sup>

It is to be expected in the light of (4) above, that the proportion of non-Saudi unskilled workers will decline relative to the professional employees. There has been a drop of 200,000 in the number of visas issued to expatriate workers during the year 1984-85, indicating that, while the composition of the population of Dammam is very changeable and is partly dependent upon the economic situation, this is particularly true of non-Saudi numbers.<sup>(19)</sup>

For example, the 1970s was a period of very high population growth in Dammam, and in the region as a whole, because of high immigration internally and externally. The percentage of the non-Saudi population in Dammam city, according to the 1974 census, was 24.62%; in 1978 the estimate for the whole DMA was 42.4% (120,000 people). In 1985 the estimate of non-Saudis in the DMA was 44.57% (193,000) of the total population of 433,000.<sup>(20)</sup>

The household interview survey in Dammam revealed that around 27.4% of the Saudi population are employed or self-employed. Most of the Saudi labour force was found to be concentrated in government or government owned concerns, for example, Government Ministries, the railways and Aramco. Most Saudi workers are men; working women comprise only 20.3% of the total number of Saudis employed in Dammam. Of these almost all (i.e. over 96%) work in education, whether in teaching, administration or other related activities. In the next chapter we will look at the transport situation as it affects employed women, and their male family members who have to transport them.

This study should have application throughout the country since transport problems in Dammam are likely to be similar in any other city in the Kingdom. For example, the Education Office in Khobar recorded 110 resignations of women from schools in its area between 1980 and 1985. Of these, 78 were teachers, 26 administrators, 5 headmistresses and one assistant promoted to headmistress. This comprised 21% of the total number of its female employees in that area in 1985. The Education Office in Khobar conducted a survey to discover the reasons for such a high turnover of staff; 31 possible factors leading to individual resignations were identified. As a result of the survey of 215 women employees, 14 major factors emerged from the 31, as possible causes of resignation. Transport difficulties affecting the teacher and her husband (or other relative upon whom she relied on for transport) were among these 14 factors.

#### 4.6 Summary

This chapter has examined the four alternative planning concepts that have been significant in the development of the Eastern Region. The concept that was chosen involved locating large amounts of the development activity, particularly industry, along the coast. Dammam Metropolitan Area was at the heart of the planned development. Three alternative development plans were considered for the DMA. The establishment of King Faisal University indicated that the government applied the plan involving three poles - Dammam, Khobar and the new centre (the University itself). The chosen planning concepts for the Eastern Region and Dammam Metropolitan Areas, played a major part in shaping the present and future land-use patterns, for example, road networks and housing which have, in turn, affected population levels

and distribution and employment locations. For instance, the distribution of residential areas and schools has influenced the employment of women and the resulting need for mobility.

The next chapter will examine the transport situation of employed women in Dammam City and its surrounding areas.

#### 4.7 References

1. Al-Hathloul, Saleh A. "Development of the Contemporary Physical Environment in Riyadh", Modern and Traditional Architecture in Riyadh, ALBENAA No. 28, Vol. 5, April-May 1986, p. 48.
2. Ministry of Municipal and Rural Affairs Eastern Region Plan, Master Plan Ad Dammam, G. Candilis International Consultants, Paris, December 1976.
3. Abu-Lughod, Janet, "Urbanization and Social Change in the Arab World", EKISTICS : the Problem and Science of Human Settlements, 1983, p. 228.
4. Eastern Region Plan, Master Plan Ad Dammam G. Candilis International Consultants, December 1976.
5. Al Ibrahim, Ali Abdullah, "Regional and Urban Development in Saudi Arabia" Ph.D. dissertation, University of Colorado, 1982.
6. Schulz, David F. "Long-range Transportation Planning in Southeastern Wisconsin", Transportation Research Record, 707, 1979, p. 11.
7. Sagron, Dick S. "Transportation in Developing Countries : Some Sensitivity Considerations", in Clark, Mildred, ed, Transportation and Land-Use Planning Abroad, Transportation Research Board Special Report 168, Washington D.C., 1975, pp. 71-73.

8. Ministry of Municipal and Rural Affairs, Water and Sewerage Directorate of the Eastern Province, Annual Report, 1984, p. 21.
9. Central Department of Statistics, Population Census, 1974.
10. Yacov, Zahavi, Travel Characteristics in Cities of Developing and Developed Countries, International Bank for Reconstruction and Development, Paper No. 230, March 1976, p. 1.
11. Ministry of Education, General Department of Education, Education in the Eastern Region, Dammam, 1985.
12. Al-Baadi, Muhammad Hamad, Social Change, Education and the Roles of Women in Arabia, Ph.D. Thesis, 1982, Stanford University, p. 96.
13. Ministry of Municipal and Rural Affairs, Deputy Ministry for Physical Planning, Dammam Action Master Plans, Technical Report, Project 204, No. 5, prepared by CH2M Hill International, January 1979, p. 65.
14. Berry, Brian J., Commercial Structure and Commercial Blight, Retail Patterns and Processes in the City of Chicago, University of Chicago, Department of Geography, Research Paper No. 85, 1963, p. 19.

15. Ministry of Municipal and Rural Affairs, Deputy Ministry of Town Planning, Dammam Action Master Plan, Technical Report, Project 204 No. 9, July 1979, p. 31.
16. Ibid, p. 35.
17. Ibid, p. 36.
18. Saudi Economic Review, 1986, p. 6.
19. Ibid, p. 7.
20. Ministry of Municipal & Rural Affairs, Dammam Action Master Plans, Technical Report, Project 204, No. 9, July 1979, p. 24.

CHAPTER FIVETHE SURVEYS OF TRANSPORTATION OF WOMEN TEACHERS5.1 Introduction

As has been mentioned in Chapter Four, education is the largest field of employment for Saudi women. There are a number of reasons for this. First the field of education is still in the development stage since the formal education of females only began about thirty years ago. Consequently work in education is expanding rapidly. Secondly, for women to work in education is culturally acceptable by Saudi Society, being totally segregated : in women's education 100% of the teaching staff, administrators and students are female. Thirdly, working in the education field has better financial benefits for its employees than any other sector. For example, a woman graduate is appointed at Grade 6 with a monthly salary of 3,815 Saudi Riyals for civil service jobs, while a woman graduate who seeks an educational job is appointed at Grade 6 with a salary of 6,090 Saudi Riyals which increases over 25 steps, while the comparable civil service appointment carries promotion for 10 steps only. Moreover, a woman graduate who enlists in education enjoys the mid-year and the long summer holidays. Also, on starting work, she gets a lump sum award of SR 50,000 as well as her month's salary plus a transport allowance.<sup>(1)</sup> Despite all the benefits of working in the education field mentioned above, the Civil Service Employment Office (Diwan) has pointed out (Saudi Economic Survey, 1986) that "certain fields have been covered in the urban areas and some of the women graduates do not desire to be posted outside main cities or even away from the quarter where they live despite the availability of appropriate positions in other towns and areas."<sup>(2)</sup>

This availability is illustrated by the fact that there were 19,662 new vacancies for women teachers announced in 1986, of which 3,714 were in secondary schools and teacher training colleges, 5,861 in intermediate schools, and 9,992 in elementary schools.<sup>(3)</sup> This represents an increase of 36% over the number of posts for women in education in 1985, which was about 54,000.<sup>(4)</sup>

This unwillingness of some women to work away from where they live reflects the rapid growth of Saudi cities and the consequent increase in distances within the cities which caused great difficulties for commuters, particularly for the man who has to drive his womenfolk to work in various locations. The unwillingness of some women to work outside the main cities means that the problems are even greater for women who have to travel between cities to work, than for those travelling between districts within a city. Even the fact that women get 30% to 50% extra salary as an allowance if posted to remote areas, is insufficient inducement.

Therefore, this chapter will illustrate the women's transport situation as it currently is in Dammam city, as well as, for comparison, in the neighbouring towns. Therefore this chapter will be divided into two sections according to type of survey as follows: the first section of this chapter will illustrate all the modes of transport that are used by women teachers from Alkhobar in the south to Jubail in the north and will give the number of teachers who use each mode. The second section of this chapter will discuss the transportation situation in Dammam using the data collected from the household survey, and questionnaires that have been sent to 200 women teachers.

## 5.2 Comparison of modes of transport and mobility pattern

### 5.2.1 Introduction and definition

This section will contain the study of the questionnaires that were distributed to all school principals in Dammam and neighbouring towns and cities (see Appendix D). The objective of this survey was an attempt to find the overall picture of the modes of transport used by female teachers in getting to and from work in Dammam and the neighbouring towns, and to find any differences, or any similarities between the individual locations. Since such a survey has not previously been undertaken, not even by a governmental department, it could produce important information and be used as a foundation for any future study that may relate to the transportation of working women in Saudi Arabia. The questionnaire asked the principals for the total number of women teachers in each school, their area of residence, and the mode of transport used by every woman teacher for getting to and from work. It was considered that there were five possible modes of transport available for women teachers and they were as follows: the family car, a limousine type taxi, a shared hired car, on foot, and 'others'.

The family car was defined as a car belonging to the household of a teacher and driven by a member or employee of the family. Limousine taxis are a special type of taxi normally found providing transport between airports and cities: they are fleet-owned, employing paid drivers, most of whom originate from South East Asia, for example Pakistanis, Indians and Phillipinos. The average monthly hire charge for a limousine for a twice daily journey within the urban area would

be around 1,000 Saudi Riyals. Hence journeys to work between cities are relatively expensive. Shared hired transport is an owner-driven American car with a carrying capacity of 10 to 12 passengers, usually a "G.M.C." (see Plate 5.1). These are hired by groups of teachers living in the same area and working in the same neighbouring schools. On average the number of teachers using this facility is from 10 to 12. The fifth option, 'other', allowed other modes to be specified, for example the bus of the Saudi Public Transport Company (SAPTCO).

A total of 179 schools out of 207 returned their questionnaires. This gave a percentage of 86.5. This survey showed that 3,916 women teachers worked in the 179 schools, of whom 34.5% were in Dammam city. Also, this survey showed that travel to schools within the cities of Dammam, Khobar, Dharhan, Rahima and Jubail was predominantly by family car. However, to travel to schools in the Al-Qatif, and Safwa, women mainly used shared hired cars. This information is now going to be presented in a more detailed form, comparing city with city, and then the general trends of this section will be explained.

## 5.2.2 Modes of intra and inter city mobility of women teachers

### 5.2.2.1 Dammam

At the time of the survey there were 58 schools in the Dammam urban area. This represented 28% of the total number of schools in the survey area. 55 schools out of 57 returned completed questionnaires, of which 36 were elementary, 12 intermediate and 7 secondary schools.\*

---

\* Footnote - Elementary schools cover 6 to 12 year olds, Intermediate 13 to 15 and Secondary schools 16 to 18 year olds.

Plate 5.1

American type car used in shared hire transport.  
Side view showing 4 door access.



As above showing rear door access.

The three schools which did not return the questionnaire were one secondary, and two elementary. The total number of teachers in the 55 schools was 1,436, of whom 829 were in elementary schools, 395 in intermediate and 212 in secondary schools. Table 5.1 shows the number of women teachers using each mode of transportation in journeying to and from schools of Dammam urban area. This survey revealed that around 67% of the women teachers were transported by their family car. However, these 959 female teachers were responsible for approximately 1,800 daily working time journeys within the city. Thus, it is possible that about 900 extra vehicles could be in the city area during this restricted time span. Some were travelling more than 20 kilometers, for example, those commuting every day to Dammam from Khobar, using male members of their family as drivers and also those using limousine taxi cars. This meant that teachers using limousines would have to pay more than a fifth of her income to cover transport cost.

#### 5.2.2.2 Khobar

The survey showed that 29 schools out of 35 returned completed questionnaires, and a total of 637 women teachers working in those schools. Again, this survey showed that there was a high number (435) of females who used their family transport, 68.3% of the total. This proportion is slightly higher than that in Dammam. 172 of the 637 teachers (27%) working in Khobar used shared hired transport, while 3.3% (21 out of 637) went to their schools on foot - this was less than Dammam, probably because of the greater average distances between schools in Khobar than in Dammam. Also, this percentage is variable

Table 5.1 Modes of Transport Used by Women Teachers Travelling to and Working in Dammam

Originating area Mode of transport	Dammam		Khobar		Qatif		Jubail		Dharhan		Total No. of teachers %
	No. of Teachers	%	No. of Teachers	%	No. of Teachers	%	No. of Teachers	%	No. of Teachers	%	
Family cars	912	67.5	41	59.5	5	55.6	-	-	1	20	959 66.8
Limousine	15	1.1	6	8.7	-	-	2	100	4	80	27 1.9
Shared hired transport	259	19.2	22	31.9	4	44.4	-	-	-	-	285 19.8
On foot	165	12.2	-	-	-	-	-	-	-	-	165 11.5
Total	1351	100	69	100	9	100	2	100	5	100	1436 100

Source : Fieldwork, 1985.

according to climatic conditions; for instance when it becomes very hot women are more likely to use their family cars. Finally, this survey revealed that there were 1.4% (9 out of 637) commuting by limousine car, of which 2 female teachers travelled from Dammam.

#### 5.2.2.3 Dharhan

This survey revealed that there were only 6 schools in Dharhan, used mainly by families of the Saudi air base. This is a smaller number compared to other cities and towns of this area, for example Rahima and Safwa, this being due, primarily, to the high number of Aramco employees settled in the urban areas of Dammam and Khobar. [See Chapter Three, section of Aramco]. Only two schools returned the questionnaire, one elementary, and the other secondary. Their total of female teachers was 78. 16 (20.5%) of this total commuted from Khobar, 8 of them travelled by family transport and 8 used shared hired transport. This survey showed one teacher who travelled from Dammam by her family car. Also, this survey revealed that about 63% (39) of those women living in Dharhan used their family cars, 21% (13) shared, and 16% (10) walked to their schools.

#### 5.2.2.4 Qatif

Qatif has the largest number of schools in the study area. This is due to the geographical structure of Al Qatif which results in schools being spread among the villages spatially and in the total number of pupils in schools being small compared to other cities in the area. There were 62 schools in Qatif, of which 55 returned the questionnaires sent to them. Of those which did not return it, 4 were

elementary and 3 were secondary. Those which did included, 38 elementary schools, 13 intermediate and 4 secondary. This survey showed that there was a high number of women teachers commuting from areas outside Qatif, some as far as 50 kilometres distant, for example Khobar. Table 5.2 shows the number of teachers travelling from different places to Qatif and their modes of transport. From the table we see that most of the teachers travelled from Dammam, followed by Qatif and then Khobar. Dammam and Khobar made up more than 68% of the total. Also, this survey revealed that the shared hired transport was the mode most used by women teachers working in Qatif. This was because the travelling distances of the women teachers involved were high. When distances are as high as this, it becomes a problem to use family transport as it means that a male member of the family must spend more time in going and returning twice a day. Therefore, in these cases many of the women teachers working outside their own cities joined together with other women living and working in similar places and hired shared transport. But, cultural and family requirements dictate that the driver of such transport must be a Saudi national known to the family of one of the teachers and preferably married. Many women have difficulty in finding such a driver. For example, Table 5.2 indicates the number of teachers travelling from different towns in their family cars. Of a total of 137 women, 118 came from Dammam and this reflects the teachers' difficulty in finding a suitable driver for shared transport. Often such shared hired transport carried more passengers than it should which is inconvenient and is also dangerous, particularly when overloaded. For example, an accident occurred on 1st of February, 1986 at the end of the school day. It happened in the Al-Qasim area involving a shared hired car carrying sixteen women teachers when its capacity was for twelve. The accident

Table 5.2 Modes of Transport Used by Women Teachers Travelling to and Working in Qatif

Originating area Mode of transport	Qatif		Dammam		Khobar		Safwa		Rahima		Jubail		Dharhan		Total No. of teachers %	
	No. of Teachers	%	No. of Teachers	%	No. of Teachers	%	No. of Teachers	%	No. of Teachers	%	No. of Teachers	%	No. of Teachers	%		
Family cars	157	49.8	118	22	11	5.8	3	50	3	100	-	-	2	100	294	28.0
Limousine	-	-	3	0.6	-	-	-	-	-	-	-	-	-	-	3	0.3
Shared hired transport	81	25.7	413	77.4	179	94.2	3	50	-	-	2	100	-	-	678	64.4
On foot	77	24.5	-	-	-	-	-	-	-	-	-	-	-	-	77	7.3
Total	315	100	534	100	190	100	6	100	3	100	2	100	2	100	1052	100

Source : Fieldwork, 1985.

was caused by a burst tyre on the way to their main city. (Hospital Director, Al Jazeera Newspaper, 1986). Two of the teachers died immediately; one on her way to hospital and seven were seriously injured. All of the injured were transported to hospital in Riyadh for more specialised treatment at the King's request (Al Jazeera, 1986).<sup>(5)</sup> A month after this accident the General Presidency of Girls' Education issued a Proclamation to all its branch offices in the Kingdom, prohibiting shared hired cars from carrying more passengers than they were designed for.<sup>(6)</sup> This order meant that more women teachers had to depend upon male members of the family for their transport to schools. If this was not available or possible, then they had the choice of moving nearer to their school, which would have meant relocating their homes, with all the consequent upheaval, or to request a transfer to a school nearer their homes. If neither of these were possible, they were faced with the final dilemma which would be resignation from teaching and this would have retrograde effect upon the target set by the Government in Fourth Development Plan (1985-1990). It would mean that the main government objective of reducing the number of non-Saudi teachers would not be reached.

#### 5.2.2.5 Safwa

Safwa is located 15 kilometres to the north of Qatif area. It is dissected by the main road from Qatif to Rahimah running through it. The older city is in the eastern part, characterised by traditional Arabic architecture, a narrow winding street pattern and mud houses randomly sited. The western part is the new city characterised by modern buildings and wide streets. However, most of Safwa's schools are located in the new part. According to the head of the Education

Office in Safwa, the availability of suitable sites for schools in the old part of the town is extremely limited. This is a fairly common problem in the rapidly expanding Saudi Arabian cities,<sup>(7)</sup> of which Safwa is an extreme example. Hence most of the students from even the elementary stage and upwards are transported across the town, under the Authority of the General Presidency of Girls Education. This is considered to be an exception to the usual practice because transport is normally available for intermediate and secondary students only. But if we look at the spatial distribution of schools in the new part of this city (see Figure 5.1), we find that the schools are clustered on one site. There is no doubt that this spatial distribution of the schools would lead to transporting a high number of girl students and female teachers, particularly those working and living in the city. Donald W. Maxfield (1972) in "Spatial planning of school districts" states that, where the future need for a school is known, its site should be carefully chosen for its efficiency in terms of population distribution, in order to reduce as far as possible the distances to be travelled by students. Data required for such a choice include the distance between, and capacities of existing schools, the number of students living within each school catchment area, and the distance between school and each student's home.<sup>(8)</sup>

Indeed application of such principles could reduce the walking distance of staff. For example, a comparison between the northern neighbouring towns of Rahima and Safwa shows that both have a similar population size and land use pattern. Although Rahima has fewer schools, they are randomly distributed. However, 21.9% of the women teachers walked to their school in Rahima, while in Safwa only 11.2% went to school on foot.

Figure 5.1

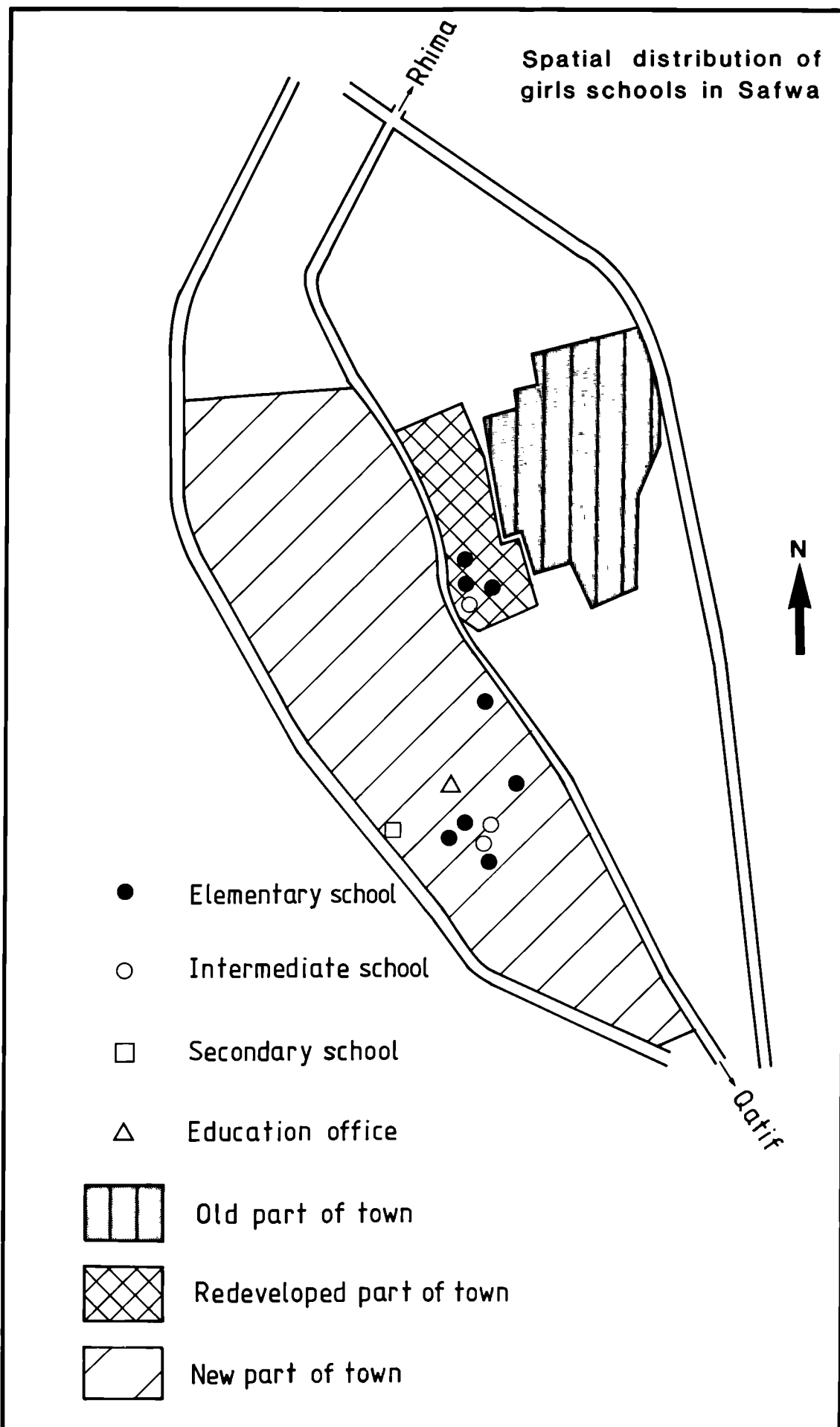


Table 5.3 shows that there were 318 women working in 18 schools, out of 20, coming from 6 different areas, including Safwa. As we noted in Qatif, most of the teachers commuted over large distances. Also this survey showed that more than 63% of the total commuted from outside the city; some travelled about 50 kilometres and nearly a third came from Jubail, about 40 kilometres away. Therefore these large distances between the women's areas of residence and of work led to an increase in the number of women that used shared hired transport rather than private family transport, as is also the case in Qatif area. Because girls' education has started to spread rapidly in these oasis areas, it has generated the development of more schools.

#### 5.2.2.6 Rahima

Rahima city is about sixty kilometres north of Dammam and 2 kilometres from the largest oil terminal and export port in the world, Ras Tanurah. Rahima has 9 girls schools, of which 6 are elementary schools, 2 are intermediate, and one is a secondary school. Of these, 8 replied to the questionnaire. This survey revealed that about 4% of women teachers (6 out of 161) travelled from three different areas to work in Rahima city. These areas were Qatif, Jubail and Safwa; 2 of them were transported by family car and 4 by shared hired transport. Out of 155 female teachers living and working in Rahima 112 used the family car with a male member driving. This figure represented 72.3% of those teachers living in the city. This clearly indicates that private transport is the major mode while shared hired transport was used by only 5.8% of the total. It appears that this is because of the working time schedule at Aramco; its hours of work allowed many people to transport their female members of the family either to school or for

Table 5.3 Modes of Transport Used by Women Teachers Travelling to and Working in Safwa

Originating area Mode of transport	Safwa		Dammam		Khobar		Qatif		Rahima		Jubail		Total No. of Teachers
	No. of Teachers	%	No. of Teachers	%	No. of Teachers	%	No. of Teachers	%	No. of Teachers	%	No. of Teachers	%	
Family cars	72	62.1	8	13.8	6	54.4	9	47.4	4	18.2	3	3.3	102
Shared hired transport	31	26.7	50	86.2	5	45.5	10	52.6	18	81.8	89	96.7	203
On foot	13	11.2	-	-	-	-	-	-	-	-	-	-	13
Total	116	100	58	100	11	100	19	100	22	100	92	100	318

Source : Fieldwork, 1985

other purposes. In the Aramco system, there is a one hour lunch break. This is ideal for the Aramco employees, who take this break to transport their female relations who teach back to their homes. Aramco hours of work are almost similar to those of Western European companies, starting at 7.30a.m., lunch time from 1.00p.m. to 2.00 p.m. and leaving time at 3.30p.m. These times of working are not the same for Government Department employees who start at 7.30 and end at 2.30p.m., with no lunch break. Government employees who have to collect the female members from schools have to be absent from work at one o'clock in order to collect their female members and take them home. This results in loss of working time which has economic repercussions. [See Chapter One]. Therefore, it would be useful to standardise all Government Departments' working hours to those of Aramco.

#### 5.2.2.7 Jubail

Jubail City is about 20 kilometres north of Rahima and 7 kilometres further north is the new city of Jubail. However, one important effect of the new city on the old city was to transform it from a small traditional fishing port into a developed commercial urban area because many foreign and Saudi employees living in the new city prefer to do their shopping in the bazaars and markets of the old city. This has caused the economic activity of the old town to grow quickly into a city providing many types of services, for example food markets, clothing stores, banks, modern restaurants and hotels, including the Sheraton Hotel. This means that if the Government succeeds in reaching one of their main economic targets by increasing the number of employees from 47,000 in 1985 to 144,000 by the year 2000<sup>(9)</sup> in the new

town there would be a considerable impact on the physical development of the surrounding areas, particularly in the sister town of old Jubail.

As a consequence of this development there would be an increase in the number of students in old Jubail which would require more women teachers who would have to come from different areas to work in the old city of Jubail : They would most likely be recruited in New Jubail, since there is a reservoir of highly educated women in the town as one of the job requirements for the new areas is for workers to be fully trained and educated, and this means that the current male working population in the industrial area is young and well educated and that their wives and possibly sisters too are educated, and therefore there are, on average, more educated females in this area than other comparable towns. For example, this survey of Jubail of schools in the old city showed that about half of the women teachers of a total of 234, spread between 12 schools, 7 elementary, 3 intermediate and 2 secondary, commuted from the new city of Jubail. Therefore, it is expected that by the year 2000 there will be a greater number of educated women who will be teaching and living in the area with insufficient posts for them in the immediate neighbourhood, so it is likely that there will be an increase in the number of women teachers who would have to travel out of the new town of Jubail to distant schools, including the old city of Jubail. Also, the number of women who would walk to schools could decline as a result of the growth of the urban areas which would be affected by any future expansion of the new industrial city. This survey revealed that the proportion of women teachers who walked to their schools was 36.4% of the total women

working and living in this town and this is considered to be on average high compared to teachers who walked to their schools in other towns of the surveyed area, while the female teachers who used private transport was 63.6%.

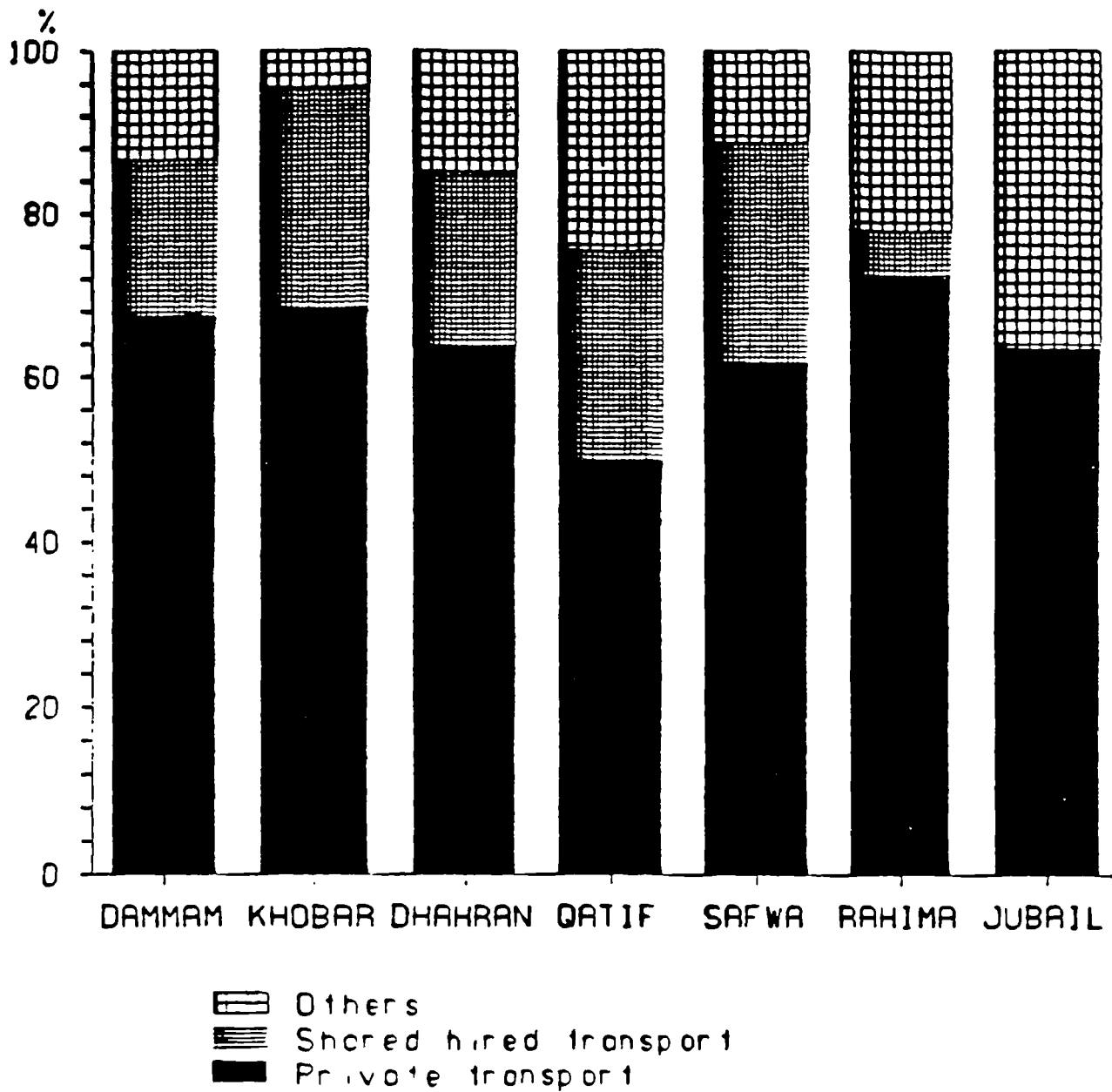
There is a Royal Saudi Naval establishment about 5 kilometres south of Jubail where there is a pool of female teachers who travel south to teach because most teaching posts in Jubail are given to those women who travel from New Jubail. A large proportion of the teachers involved work in schools in Safwa.

### 5.2.3 General trends of modes and mobility pattern

#### 5.2.3.1 The trends of intra urban mobility

The survey findings revealed that the predominant mode of transport used by women to commute between home and work within the cities was the family car. About 63% of the total movements were by this mode. However, Qatif had less than 50% of total journeys by private car. This was due to the large number of women teachers who walked to schools in Qatif, where the school have smaller catchment areas. Therefore, the findings from the survey of transporting women within cities in the study area allow us to generalize and say that most women teachers depend upon their family transport to travel to their workplaces, certainly in not less than 63% of cases as indicated in the survey, in most cities in Saudi Arabia, and about 50% in rural areas or small towns, [see Figure 5.2]. Shared hired transport accounted for an average of 18% of trips and, exclusive of Jubail, 21%. (see Figure 5.2). It appears that there is a demand for share hired transport, but there is shortage of suitable drivers. Most drivers who

Intra-urban comparison of women transport by private & shared hired transport

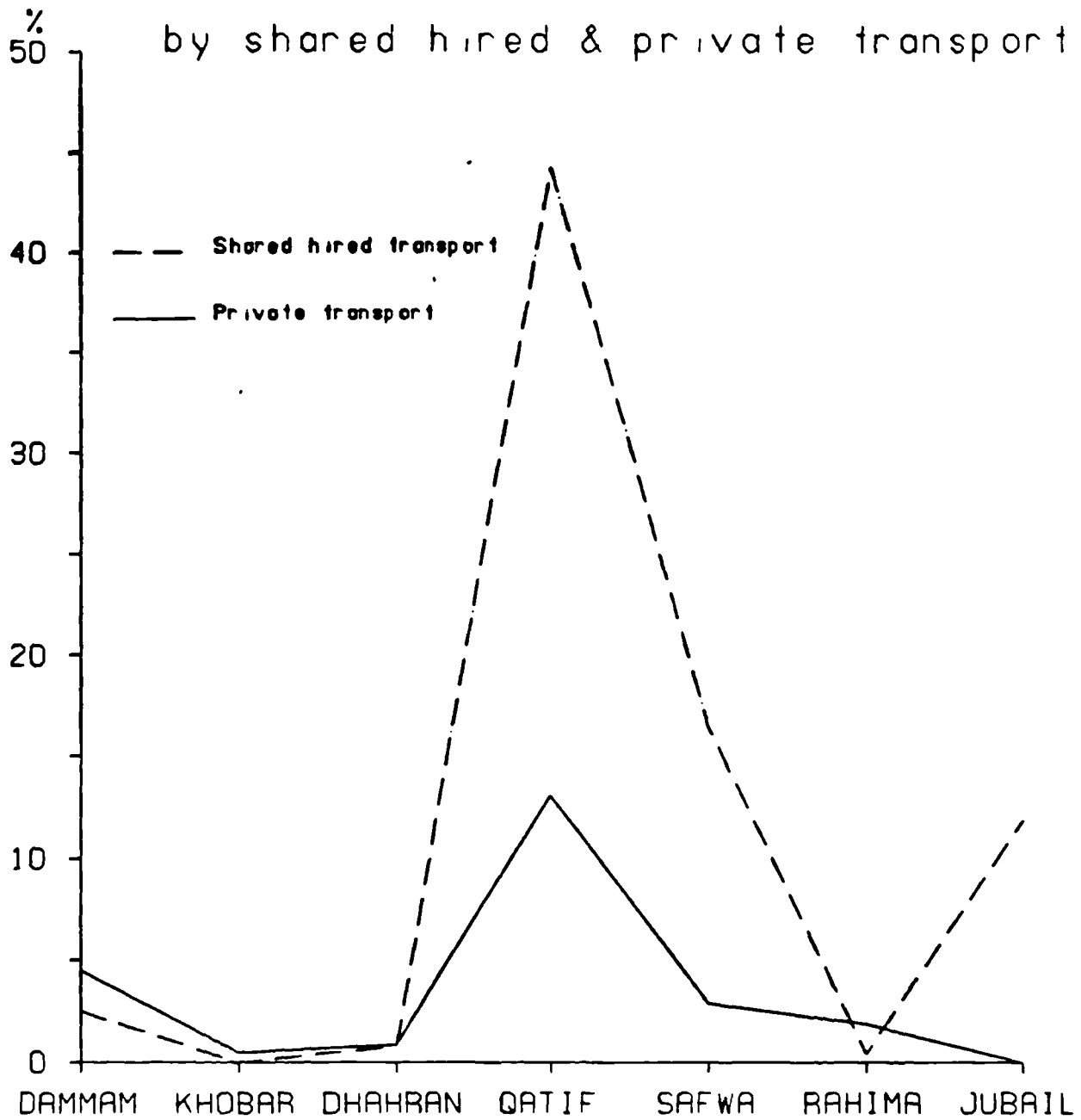


are available prefer to carry teachers longer distances from the towns or cities. The average monthly hire charge for each teacher for a twice daily journey between cities is around 500 Saudi Riyals whereas only 250 Riyals is charged for intra-urban journeys. Given an average capacity of 10 teachers the cost of shared hired transport would be at least 5,000 Riyals per month; moreover the low cost of fuel is an incentive for most drivers to prefer long distance travel. The survey also showed that, on average, more than 17% of women teachers walked to work, whereas less than 1% used limousines for such journeys. Not one single woman teacher used the SAPTCO public transport system. The reasons why will be discussed later, in this Chapter.

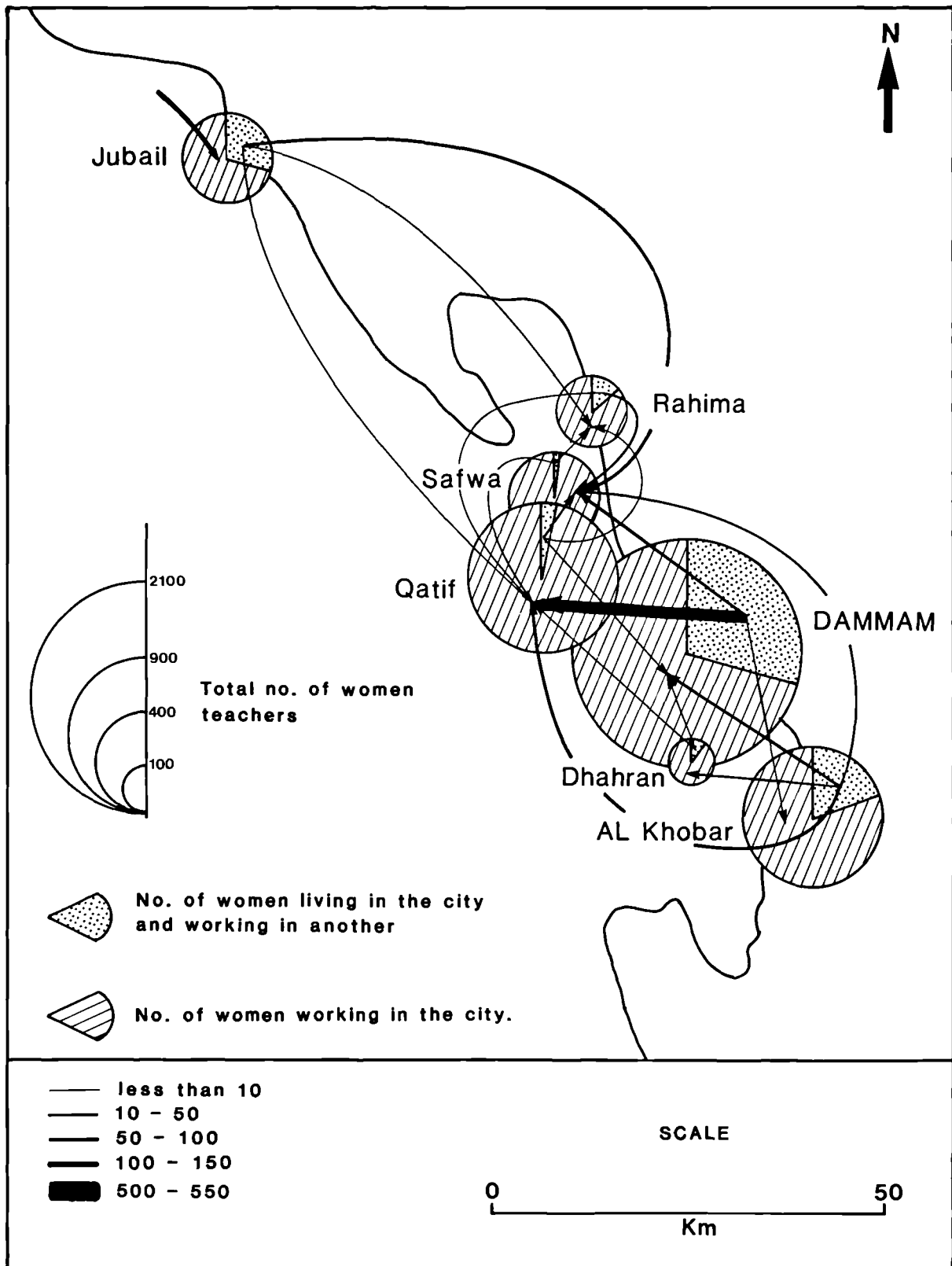
#### 5.2.3.2 The trends of inter urban mobility

The surveys showed that 1,178 females travelled between the urban areas, representing about one third of the total employed women teachers in the whole study area. It was also found that 79% of the journeys between cities were made in shared hired transport, and 19.5% of the journeys in family transport. Although the latter appears to be small in comparison, it involves a great deal of time and effort by the male members of the teacher's family. A simple example is found in the journey to Qatif from Dammam, which takes about 30 minutes, making a total of around 2 hours every day spent by a male member of a family in transporting a teacher to and from work. Figure 5.3 shows the proportions of women teachers using private cars and shared hired transport for journeys to each city. Figure 5.4 illustrates the flow pattern of women teachers between cities. There is, however, a reverse flow of trips between pairs of cities; for example, between Khobar-Dammam, Qatif-Dammam, Safwa-Qatif, and Safwa-Rahima. It seems that part of the transport problem arises from the fact that women

Destinations of women teachers  
by shared hired & private transport



Mobility of women teachers.



FIELD WORK, DAMMAM 1985

teachers initially accept a job away from where they live, expecting that within a short time they will be transferred nearer their home.

### 5.3 Attitudes of heads of households, and women teachers

In this section we will look at Dammam city, and consider the transport situation there, the modes of transport most commonly used, transport problems, the attitudes of the heads of households and the attitudes of the women teachers themselves. All this information was derived from the completed questionnaires and interviews (see Chapter One and Appendices B and C).

#### 5.3.1 Introduction

The religious and cultural tradition of Saudi Arabian society gives men the responsibility for supporting their wives, daughters and mothers and, moreover, they are obliged to meet the costs of their food, clothing and other necessities. Meanwhile, women in Islamic religion are not obliged to contribute to these costs from their income whether they work or not.<sup>(10)</sup> Some do contribute to these costs, particularly towards the cost of housekeeping, especially when someone is employed to do the household jobs.

Transporting working women becomes one of the responsibilities of the male members of the family. In many cases the men have been unable to transport the women to work, and women have been unable to find shared hired transport : in such cases women requested employment near their homes. Therefore it is essential to consider both the male and female points of view regarding the transport situation for women. Therefore this section will be dealt with in two parts.

### 5.3.2 The experience of heads of households

#### 5.3.2.1 Household : Mobility patterns of Dammam women teachers

We have examined, in the early section of this chapter, various modes of transport used by women teachers in every city and found that the private car was by far the predominant mode (see Figure 5.2). In this part we will discuss the journeys of women teachers between districts within Dammam and between Dammam and other cities.

The total population of the total surveyed households (289) in Dammam city was 2334. The survey showed that there were 106 women employed, of whom 96.2% (102) were in education with those remaining proportion being in medicine. This extreme variation between the two professions reflects the impact of culture and tradition on the choice of work, even though there is a tremendous shortage of Saudi females working in the field of medicine, particularly nursing. But as Louay Bahry (1982) stated:

"Most families have a traditional point of view about the nursing profession, regarding it as a servile occupation not suitable for a girl of good reputation. Although the government and the press have launched extensive campaigns to encourage girls to become nurses, the problem remains."(11)

This high proportion of women working in the field of education will lead to a surplus in many subjects in a few years time. This, in turn, could induce many women teachers to seek work further and further away from home, particularly women who teach Geography, History and the Arabic language, because it was found in this survey that most of the female commuters between cities taught these subjects. This is

confirmed by figures in Table 5.4 which show a sharp increase in the number of women attending university compared with the growth of male student numbers. However, there are 83% of women studying the humanities compared with 63% of men. Since most female graduates seek employment in the field of education, this indeed will result in a surplus of female humanities teachers but shortages of science teachers. This should mean that female science teachers should be able to find jobs near their homes. Other employment agencies, for instance, Ministries or Departments of Industry have not yet made any culturally acceptable arrangements for women employees. Should a woman find work a great distance from home, the cultural tradition of families would not allow her to live away from her own household near her work and therefore she would have to commute between the schools and home every day. The household survey indicates that 32.4% of the total number of teachers living in Dammam work outside, mainly in Qatif area, and this percentage is very close to that revealed in the questionnaires returned by school principals, i.e. 31%. This correspondence between results from the two separate surveys is a reassuring one.

The modes of transport used by women teachers for journeys within Dammam were as follows: 75.36% were in family cars, 18.84% in shared hired transport, 5.8% on foot. There was no use of limousines, buses or taxis revealed by the survey. These figures are also confirmed by those revealed by the school principals in the questionnaires, particularly the use of private and shared hired cars. As to inter-city journeys, the survey of the household showed that 66.6% of the women teachers were transported by the shared hired transport and 33.4% used family cars. Women using family transport fall into one of

**Table 5.4** Students in Saudi Universities and Girls' Colleges

Sex	Number of students		Increase	
	1983	1984	No.	%
Total	75,118	80,469	5,351	7.1
Male	50,638	51,997	1,359	2.7
Female	24,480	28,472	3,992	16.3
Female %	32.6	35.4	74.6	

Source : Ministry of Higher Education, 1984.

three categories: women teachers driven by the heads of their households, those driven by a relative, and those driven by a family chauffeur. Table 5.5 illustrates the proportions of teachers using different modes of transportation in and outside Dammam urban area. Also this survey showed that the commuting pattern of the women teachers occurred between almost all Dammam districts and Qatif and consequently the journey times to and from Qatif were considerably higher for those living in the south and east of the city than for those in the west districts of Dammam (see Figure 5.5). Moreover, the survey showed that there were some teachers living and working in Dammam travelling more than 7 kilometres to their schools. The findings of this survey reveal that about 87% of the total women teachers in Dammam have to travel more than 500 metres to school (see Table 5.6). However, some families desired that their women should be transported to and from their homes rather than have them walk, even when they lived only about 200 metres from the school. Reasons given were that they did not want their females to walk through an area where there was mostly foreign male labour, or they did not want them to cross the major arterial roads. Also the extremely hot climate made walking to school, however short the distance, uncomfortable for the women teachers and transportation is a much more attractive alternative. Therefore, for cultural and religious reasons, along with the climate and the open plan of the new street system, which reduces the semiprivacy which was found in the older narrow streets, are all deterrents to women walking, and one finds that the proportion of women pedestrians to men in these new areas is extremely low.

**Table 5.5** Mode of Transportation used by Women Teachers within Dammam and between Dammam and Qatif

Mode of transport	<u>In Dammam</u>		<u>To Qatif</u>	
	No. of teachers	(%)	No. of teachers	(%)
Women teachers transported by their head of household	27	39.13	6	18.2
Women transported by another male relative other than head of household	10	14.5	-	
Women transported by family chauffeurs	15	21.73	5	15.2
Women transported by shared hired transport	13	18.84	22	66.6
On foot	4	5.8	-	
Total	69	100	33	100

Source : Household Survey, Fieldwork, Dammam 1985.

Figure 5.5 Mobility of women teachers between districts in and out of Dammam



FIELD WORK, DAMMAM 1985

Table 5.6 Average Distance Between the School and the Home of Female Teachers

Resident area Distance in km.	Dawasser	A1 Adamah	A1 Badih	Skat Al Hadid	Nassriah	Madinat	Jalawih	Tubashi	District	Total
	No. of teachers %	No. of teachers %	No. of teachers %	No. of teachers %	No. of teachers %	No. of teachers %	No. of teachers %	No. of teachers %	No. of teachers %	No. of teachers %
Under 0.5	2 12.5	3 25	-	1 7.1	-	2 11.1	1 7.1	-	-	9 8.82
0.5 - 1.5	1 1.3	1 8.3	3 30	1 7.1	-	1 5.6	-	-	-	7 6.8
1.5 - 3.0	3 18.8	2 16.7	1 10	2 14.35	-	2 11.1	7 50	-	-	17 16.7
3.0 - 5.5	5 31.2	1 8.3	1 10	1 7.1	2 50	-	2 14.3	-	4 33.3	16 15.68
5.0 - 7.5	-	-	3 30	2 14.35	-	6 33.3	1 7.1	-	3 25	15 14.7
Over 7.5	5 31.2	5 41.7	2 20	7 50	2 50	7 38.9	3 21.5	2 100	5 41.7	38 37.3
Total	16 100	12 100	10 100	14 100	4 100	18 100	14 100	2 100	12 100	102 100

Source : Household Survey in Dammam, Fieldwork 1985.

Another point revealed by the survey as a reason why a high proportion of women have to use modes of transport is that a large number of women are working outside their home districts because, as mentioned earlier, there is an uneven spatial distribution of schools in many Saudi cities, including Dammam (see Figure 4.5, Chapter Four).

Female teachers are allocated to schools without regard to where they live, so that some teachers may have to travel from one district to another, while, at the same time, other teachers may be travelling in the opposite direction; for instance, the survey showed that of 26 teachers working in the Al-Dawasser district, 24 came from outside the district, and of 16 teachers living in Al-Dawasser, 14 work elsewhere. It is obvious that this situation exists between cities, and within cities and there are many examples of two-way flow of journeys. Therefore there is a need for a policy to rationalise the allocation of teachers according to their subject and home location in order to reduce the length of the journey undertaken by those teachers, and this could eventually lead to the situation where a greater number of teachers could be able to walk to their schools.

#### 5.3.2.2 Attitudes of the heads of households

We have mentioned above that a number of chauffeurs were involved in the transport of women; in this part we will discuss the reactions of the heads of the households surveyed regarding their views on the use of chauffeurs and as to whether women should be allowed to drive.

### 5.3.2.2.1 Reactions as to using a family chauffeur

Before the late 1960's chauffeurs were unknown in Saudi Arabia. They first appeared in the major cities during the mid 1970's as a result of an unforeseen economic boom which eventually was to involve many people from all walks of life. Many business careers were started at that time, leading to many people having to spend long hours away from their homes and families, and causing them to work both by day and night. There were even government employees who ran their own businesses after completing their day time work by working illegally at night under another title. This led to some heads of households passing the responsibility for the transport of their womenfolk onto chauffeurs, especially if the women were working. The survey showed that families with employed women were more involved in using chauffeurs than those without. In households with employed women 16 in every 100 had chauffeurs while among those households without employed women only 4 households in 100 had chauffeurs. Furthermore, in this survey all the heads of households have been asked whether the use of family chauffeurs solved the problem of transporting women. 285 out of 289 answered this question and 5% (14) strongly agreed that they did, 22.8% (65) agreed, 54.7% (156) disagreed, 17.5% (50) strongly disagreed. The group who agreed said that the transport problem itself was solved but there were often problems such as accommodating the chauffeur within the household, which is a departure from the cultural norm. On the other hand, the findings showed the reactions of families that have women teachers; 42.6% (29 out of 68) suggested that the use of chauffeurs has eased the problem, 27.6% (8 out of 29) strongly agreed that they had. [See the reactions of those heads of household with employed teachers in Table 5.7].



Usually the chauffeur has separate living quarters within the family home or villa. His presence makes transport for the women members much easier because he can be available at all times of the day. Also it is often cheaper. A woman using shared hired transport pays on average 250 Saudi Riyals within the city and 500 Saudi Riyals for out of city transport. On the other hand, a chauffeur's salary is between 700 and 1,000 Riyals per month which is shared among the women whom he drives to work. In addition there are other advantages, i.e. the convenience of having a large car, of travelling directly between home and destination, of availability and of safety. However, there were a large number of families who preferred not to employ a stranger who would have to live within the household because most of the chauffeurs are from South East Asia with a different culture and often a different religion. However, the contractual salary is not sufficient to allow them to live out. There were some cases of families with as many as four or five women teachers, each of them being transported daily by the head of the household. The reactions of all those who strongly agreed were based upon their own experience in the use of family chauffeurs, while those who disagreed said that the use of chauffeurs did not solve their transport problems. Reasons given were the need for another car and the cost of the chauffeur himself with both salary and board and lodging. They felt that households employing a chauffeur were not being true to their cultural traditions which forbid the employment of a strange man in the household with whom women had to communicate. Some said they preferred to forbid their womenfolk to work rather than allow them to travel with a strange man. They cited as an authority a famous Saudi religious

scholar who was asked (1986) about the use of chauffeurs who said:

"It should not be allowed for women to travel alone in a car with a man unless he is mahrm : close kin who could not marry her, because Prophet Mohammed, Peace upon him, said 'it is not allowed for a man to be alone with a woman unless he is mahrm, close relative of hers.' However, where there is more than one woman it is permissible but, the chauffeur is to be honest and trustworthy and the journey should be intra city."(12)

Although the proportion of those using chauffeurs is still fairly low, as we have seen, it is still considered a major change in Saudi society, though not to be compared with the major physical and economic development. It seems that the proportion of families using chauffeurs will increase unless there is a change in policy regarding alternative forms of transport (see Chapter Six).

This survey also revealed that people's reactions to women travelling alone depends upon the mode of transport used by the women and varies according to cultural and religious traditions, as well as individual opinion. For example, it is unusual for a woman out on her own to hail a taxi because many people would consider this shameful since she would be travelling alone with a complete stranger. While some people agree with the idea of a chauffeur, they would not support the idea of a woman travelling alone by taxi: the chauffeur, unlike the taxi driver is not a complete stranger because he would have been selected by and contracted to her family. Table 5.8 shows the strength of opinion against the idea of a woman travelling alone by taxi (more than 95%). Plate 5.2 shows a typical street scene with segregated bus shelters, the female shelter being ignored by taxi drivers.

**Table 5.8**      Heads of Households Attitudes to Women Hailing a Taxi  
on the Street

Reaction	Families without female teachers		Families with female teachers		Total	
	No.	%	No.	%	No.	%
Strongly agree	4	1.8	2	2.9	6	2.1
Agree	7	3.2	-	-	7	2.5
Disagree	114	52.6	31	45.6	145	50.9
Strongly disagree	92	42.4	35	51.5	127	44.6
Total	217	100	68	100	285	100

Source : Fieldwork in Dammam, 1985.

Plate 5.2

Bus shelters in Dammam city centre. The female shelter is seen above the taxi roof, which is passing it by.



The taxi is stopping at the male bus shelter  
**FIELD WORK, DAMMAM 1985**

#### 5.3.2.2.2 The heads of households attitudes towards women drivers

Because of the use of chauffeurs by some families in Saudi Arabia, there arose a heated public discussion in the newspapers in the early 1980s as to whether women should or should not be allowed to drive. When the newspaper Al-Jazeera interviewed the Vice-President of King Saud University in Riyadh in December 1981 on the subject of education and social life, he said that "we allow strange chauffeurs in households, but we do not allow women to drive. Where is the balance? I know that many people will disagree with this idea, but I would like to give a balanced view and examine whether there is not more danger in allowing a chauffeur in the household than allowing a woman to drive."<sup>(13)</sup> This interview led many people to write letters to the editor expressing their opinions on this subject. For example, ten days after this interview there were two letters, one from a woman and one from a man. The woman asked that women should be allowed to participate in all areas of life to the benefit of society. She concluded that "my words are not limited to the question of women driving, but apply to all aspects of life : women can be active, useful participants in many areas."<sup>(14)</sup> The second letter, from the man, considered this idea with the principle of religion in mind that it would have a detrimental effect on society, as he said "There is no doubt that this call to allow women to drive, if followed, would lead to many harmful effects. For example, when driving she would have to remove clothing from around the head in order to have clear vision resulting in breaking down family tradition. The positive effects of women driving are insignificant compared to the negative effects."<sup>(15)</sup> Three days later another letter appeared from a man which suggested that the subject should be thoroughly studied in all its aspects but

considered that complete freedom for women is not a good thing. On the other hand, to doubt a woman's religion and honesty without evidence is not acceptable. He suggested that the reasons for the existence of chauffeurs should also need to be examined. "Not all people live near schools : most fathers have their own responsibilities, for example to their employers and so their times for leaving and returning home are governed." He asked that all people participate in this discussion in order to clarify all ideas on the subject.<sup>(16)</sup> The next day two letters appeared, one from a man and one from a woman. The man headed his letter "we don't need women drivers, or foreign chauffeurs." He said that allowing women to drive would lead to their associating with men contrary to religion."<sup>(17)</sup> While the woman said in her letter, "In my opinion, as a woman in this conservative society, the men who give as their excuse for forbidding women to drive, that women drivers would leave their religion and modesty, should understand without argument that a woman can preserve her modesty and religion better when driving herself in the car than alone for hours with a chauffeur."<sup>(18)</sup> Another letter, from a man, suggested the idea that a woman involved in an accident would be bothered by crowds gathering. Furthermore, what would become of her children if she were jailed following an accident. Also, her menstrual periods and pregnancy and childbirth could lead to nervous states that would be dangerous when driving.<sup>(18)</sup> Other writers suggested that women should remain veiled, and have two eyeholes cut (Burqa); and another suggested restricting their driving from 6 a.m. to 9 p.m. within city limits. Some people, including one newspaper editor, suggested that one foreign female housekeeper only per household should drive, transporting female members and this would reduce the need for foreign male chauffeurs.<sup>(20)</sup> On 22nd December 1981, a letter suggested that allowing women to drive would cause

economic problems e.g. inflation in car prices, and social problems including more congestion and accidents, as well as the contravention of religious and cultural traditions.<sup>(21)</sup> Four correspondents writing on 23rd, all looking at the problem from a cultural and religious stance, stated that the fire lit by this discussion should be speedily extinguished.<sup>(22)</sup> Three letters appeared the following day, rejecting the idea of women driving, and the idea of female housekeepers driving, since the same laws should apply to foreign as to Saudi women.<sup>(23)</sup> On the 25th December, someone wrote that there are accidents everywhere, and a constant noise of squealing brakes and tyres and smashing glass as cars were involved in crashes, and wondered that any woman could drive in such conditions.<sup>(24)</sup> In the same issue, Al-Jazeera apologised for not printing the forty letters they had received on this subject, but only printing an official long letter on 11 January 1982, from the Supreme Religious Council citing the view that women driving a car, or vehicle, would lead to an association of the sexes without a caution and create a situation which would be against Islamic law. They therefore considered that "the ways and means that lead to prohibited activity is considered to be forbidden."<sup>(25)</sup>

This long discussion in the newspaper reflected the real fact that women driving in Saudi Arabian society are not yet acceptable or desirable. This belief or attitude towards women drivers is going to continue for a long time because three years after this public

discussion, the idea has been stated in the survey to find people's reactions and the results have again shown that there is no agreement. Even when the question of women driving was restricted to built up areas 91.1% out of 282 heads of household were against, of whom 61.7% completely rejected the whole idea (see Table 5.9). Although the proportion of heads of household who agreed was low, this survey found that people in households with working women were less opposed compared to those without working women. In the former the ratio was 2 out of every 15 households, while in the latter only 2 out of 27 households agreed. This is because 56.3% of the driving male members of the families with working women teachers were disadvantaged by having to transport women, particularly those women who were completely dependant upon the male members of their families, and this group stated that transporting women to their work places had a deleterious effect upon their working time, for they were late on arrival at work and also had to leave work early. Families with employed chauffeurs were much less affected in their working time compared to families without chauffeurs or families of female teachers who were using shared hired transport. This survey showed that 90% of the families with chauffeurs were not affected in their jobs, but at some times they had to transport the females when the chauffeur was away on vacation. On the other hand families who used shared hired transport found great difficulties, particularly when there was no alternative driver available, or if the regular driver was absent through illness or his car had broken down. In these cases a member of the family would be obliged to transport the female teachers. Also some families complained that when the hired driver was running late he was impatient and was not keen to wait long for the passenger, he would sometimes pip his horn, then drive away before the woman was able to get to the car creating a difficult

**Table 5.9**      Heads of Households Attitudes to Allowing Women to Drive

Reaction	No.	%
Strongly agree	12	4.3
Agree	13	4.6
Disagree	83	29.4
Strongly disagree	174	61.7
Total	282	100

Source : Household Survey in Dammam, Fieldwork, 1985.

situation for the teacher. It was found that in families with female teachers who had experienced traffic congestion, 15 drivers out of 20 had followed alternative routes around the congestion off the main arterial roads. In families without female teachers only 12 out of 20 had followed similar deviations. This implies that drivers of women teachers tend to take chances by driving on smaller local roads, increasing the probability of causing accidents.

### 5.3.3 Transport problems in the experience of employed women

#### 5.3.3.1 Introduction

In the first part of this section we explained the situation concerning the transportation of women in relation to the heads of their households. In this section we will discuss the matter from the points of view of the women. Therefore this part will complement the first because there are two simultaneous elements involved in the transportation of females, the woman herself as the passenger and the person who is involved in her transportation. Therefore it is important to recount both perspectives to gain a more complete idea of female transportation in Saudi Arabia, particularly that which relates to teachers. This part will start by attempting to define the size of the problem, then the main factors which affect women using public transport, and finally their own ideas on the use of chauffeurs and on women drivers.

### 5.3.3.2 The experience of the female teacher on her transport problems

We mentioned above that about 56.3% of heads of the households containing women had experienced difficulties in transportation. While the findings of the survey of the women teachers of Dammam schools showed that their situation was further aggravated since nearly 70% of them stated that they have transport problems, despite the fact that over 97% of the total surveyed women teachers said that within their households some members of their family owned a car. This shows that in many cases the ownership of a car does not mean that the transporting of female teachers has been solved because some other relevant factors were involved such as the location of school, availability of a male member of the family with regard to the journey time involved and if there was a family chauffeur. This survey showed that the women teachers' transport problems appeared at every level of female education, but on average were considerably higher among the female teachers in the secondary stage, followed by those in the intermediate, and those in the elementary stages. The figures were 82.9%, 72.3% and 44.9% of the total women teachers in the secondary, the intermediate and the elementary school respectively, who said that they have a transport problem. The survey also showed that an important factor of the transport dilemma was due to the distance between the household and the school, and that this problem is more acute at the secondary level because there are fewer secondary schools. Pupils are fed into the secondary schools from a large catchment area, greater than that of the intermediate or elementary ones and there are greater distances between the secondary schools. Teachers living in one secondary school catchment area may find themselves having to

travel a further distance to another secondary school, thereby creating difficulties for the male members of the household in their role and availability as driver (see Figure 5.6). This survey showed that only 16.8% of the women teachers had a family car available to them whenever they were in need of it. On the other hand it has been found that those who have a family car available to them only for more than half (usually) or less than half (occasionally) of the time or no car available had a fundamental transport problem. Table 5.10 clearly indicates a significant correlation between the transport problems and the non-availability of transport; i.e. the less available family transport is to an individual woman, the higher her probability of experiencing transport problems. Although there were problems of access to family cars, at the the same time there were only small numbers of women who used SAPTCO buses. For example, this survey showed that only 9 out of 185 i.e. about 5% of the total women teachers used SAPTCO, and 95% appeared never to have used the official SAPTCO buses. This was because of the cultural tradition, the attitude of the women against the use of public transport, particularly the SAPTCO official buses, and factors related to SAPTCO itself (see Table 5.11). However, only the cultural tradition will be discussed because it has been found in this survey to be the predominant factor.

#### 5.3.3.3 Factors affecting women in the use of public transport in terms of their experience

Before conducting this survey, several questions arose regarding the reasons why there was a small proportion of women using public transport buses. One could be that the SAPTCO transit system was in its initial stage and had not yet fully developed its services. The

Figure 5.6

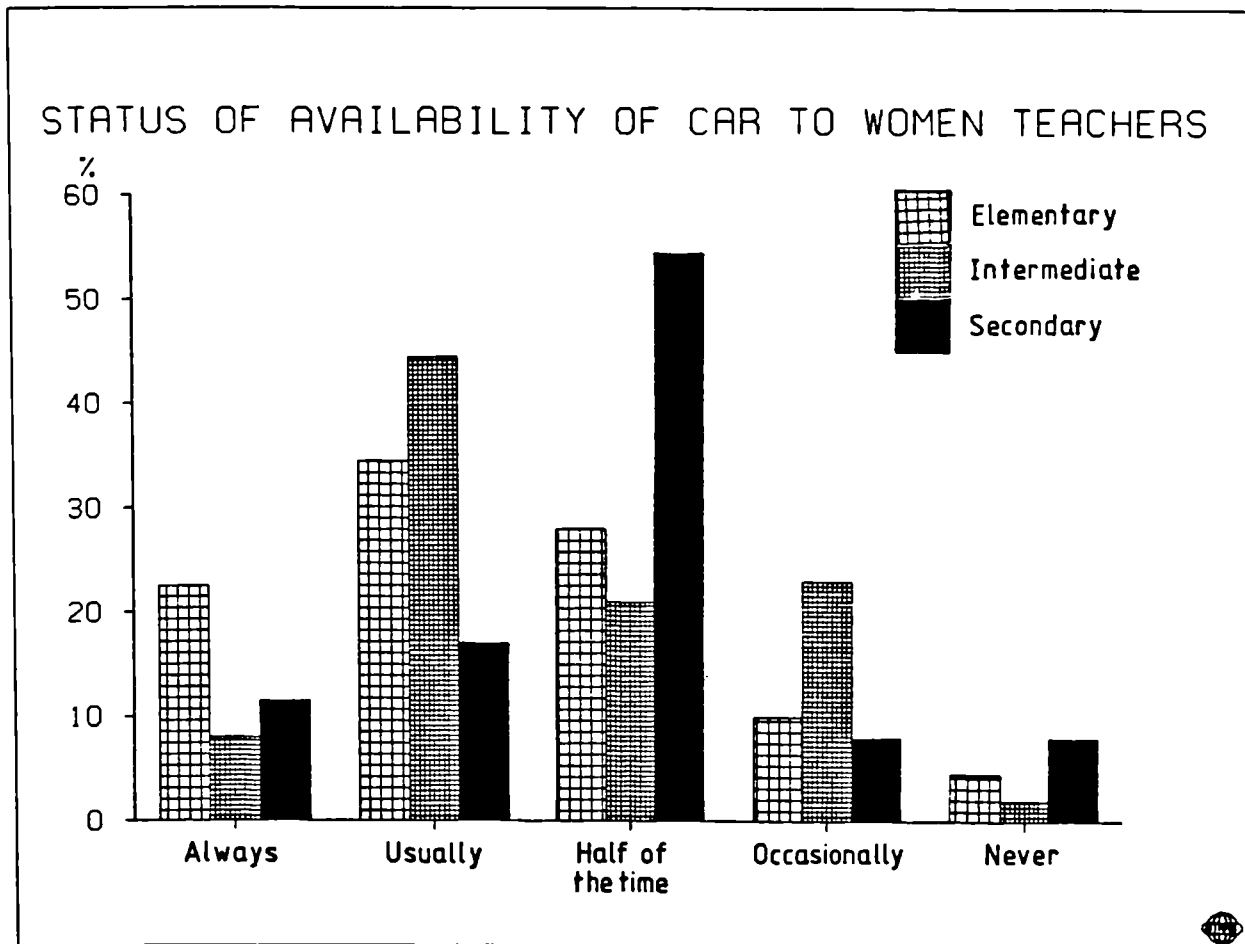


Table 5.10      Correlation of Availability of Family Cars to Women  
with Transport Problems

Status of availability of car	Total No. of Women	% of status of availability	Transport problems		% of women having problems
			Yes	No	
Always available	30	16.8	2	28	6.7
Usually available	60	33.7	22	38	36.7
Half of the time available (i.e. available for about 50% of journeys required)	56	31.5	50	6	89.3
Occasionally available	24	13.5	24	-	100
Never available	8	4.5	8	-	100
Total	178	100	106	72	

Source : Women Survey, Dammam, 1985.

second reason was grounded in the cultural traditions of Saudi society as it meant that in using public transport women had to travel with males, including many male foreign labourers, although there were segregated seats available. It therefore appeared that the real reason why so few women used public buses was because of the fact that they felt that they would be embarrassed when travelling by public transport. Of the women teachers, 67.3% (113 out of 168) agreed that this was the reason why they did not use SAPTCO. An even larger percentage of women teachers, 91.4% (149 out of 163), gave the same cultural reason for not calling or waving down a taxi. As stated earlier for a woman to hire a taxi is very rare in Saudi Arabia because it meant that she would have to travel with a male who was a complete stranger. The survey showed that 96% (171 out of 178) of female teachers agreed that it is unacceptable for them to hire a taxi and travel alone. Although the questionnaire results revealed that women teachers were not availing themselves of SAPTCO public transport even when provided with segregated seating, not just because of the reason just stated earlier but also because there were also family considerations. For instance the survey revealed that one important factor that could induce women to begin to use the bus, or use it more often, was if there were more women riding on the bus; 77.4% (137 out of 177) female teachers agreed that that was an important factor in their reasons why they do not use SAPTCO, but there also was the significant factor of the attitude of their families regarding them using the bus, which 62.4% (111 out of 178) mentioned. Table 5.11 shows the rank of those factors that are against women using SAPTCO and clearly illustrating that the first two statements are the predominant reasons. However, persuading families to put their trust in women using public transport buses is going to require a change in attitudes

Table 5.11 Rank Order of Factors that would encourage greater Women's use of the Public Transport System (SAPTCO)

Rank	Factor	No. of response	( Yes )	%	( No )	%
1	If more women rode the bus	177	137	77.4	40	22.6
2	If it was satisfactory to my family	178	111	62.4	67	37.4
3	If buses operated on their schedules	176	84	47.7	92	52.3
4	If buses operated more frequently	178	48	27.0	130	73.0
5	If the bus went to my destination	178	39	21.9	139	78.1
6	If it were cheaper	175	26	14.9	149	85.1

Source: Women Teachers' Survey in Dammam, Fieldwork, 1985.

which will take a lot of time and effort. One recommendation to the SAPTCO authority is that it should make full use of all the media outlets to demonstrate the importance of public transport to all members of society to provide an alternative mode of transport in times of need, for example having to take a child or adult to hospital when the heads of household were not available or for making an essential visit to the shops. With the eventual decline of male foreign workers using the buses, it will be essential for the development of the SAPTCO system that it attracts local people as passengers, of whom many could be women. For instance, if we look at some of the developed countries we find that the bus transit systems to some extent depend upon female passengers although they have the opportunity to be both a car owner and a driver. One of these countries is the United Kingdom : the General Household Survey carried out a survey over a large population sample of 9,210 males and 10,644 females to find out the male:female ratio of bus users in households with no car, one car and two cars or more. It showed that 84% of the males in the households with no car had used the buses during the six months before the survey compared to 86% for females. The households with one car stated 41% for males and 69% for females. The household with two or more cars stated 28% for males and 48% for females.<sup>(26)</sup> Calculation of these figures reveal that a little more than half of the passengers were females (57%). This is in complete contrast to the female passengers in Saudi Arabia where the figures were extremely low and still declining.

Table 5.12 shows the percentage of females using SAPTCO in the urban areas which lie between and include Khobar in the south and Jubail in the north. These show an average monthly rate of 2.5% in

Number of Women Using SAPTCO in Dammam and Surrounding Area 1980-1984

Month	1980		1981		1982		1983		1984	
	Women passen- gers	Total No. of passen- gers	Women passen- gers	Total No. of passen- gers	Women passen- gers	Total No. of passen- gers	Women passen- gers	Total No. of passen- gers	Women passen- gers	Total No. of passen- gers
January			17006	742047	8369	941404	5082	909542	5073	661795
February	7344	93350	17823	720113	9724	875921	6560	919694	4071	661802
March	4356	205877	13099	817672	9971	1023088	7435	1059798	5299	691191
April	4671	263302	14785	824560	10343	1070430	6472	1187042	4980	638396
May	5078	408776	14766	829843	9718	1111112	5719	1084822	6203	671670
June	9289	482783	14290	816872	6987	1052039	2815	902521		
July	7533	418107	6026	530972	5246	1014755	1877	992655		
August	7524	475729	7258	738431	6262	986906	2640	914184		
September	10975	523543	11159	709658	4392	906590	2220	614329		
October	12043	581672	8893	723251	4216	930655	3543	650271		
November	12885	582443	7429	771946	5681	979984	2730	662148		
December	17603	671043	8124	881932	5195	987822	5063	714786		

Source : Women's Passenger Profile, SAPTCO, Dammam, 1985.

1980, decreasing to 1.5% in 1981, 0.7% in 1982 and 0.5% in 1983. As a result of this continuing decline, those few women who are using the system would find themselves in a more embarrassing position as less and less of their number are now travelling on the buses. Even the positioning of the permanent partition which is currently in use in every bus, to separate and reserve a few seats for women gives the impression to women that they would always be regarded as minority travellers when compared to the greater number of places reserved for males. A more flexible partition could be installed on the buses which could be changed to increase the number of places available for women passengers if and when there is demand for more places, so that women passengers will not feel that they are a minority group. Also this survey showed that 74.4% of the women teachers would use the bus if there were more women only bus shelters. It appeared that this idea would encourage them to use buses, particularly in the city centre area. As the largest concentration of passengers are those travelling to and from city centres, the number of people at each bus station within this area is large and many women avoid using the bus shelters because of the presence of a large number of males. There is only one female bus shelter in Dammam catering for women (Plate 5.3) which is in great demand and there is clearly a need for another. Also, another significant point which should be considered is that SAPTCO uses driver-only buses and there are difficulties of communication between women and drivers, as the women have to use the rear access which would cause delays on the journeys. A solution would be to employ a woman conductor on every bus route to the city centre, particularly during the busy shopping time which the survey showed to be between 4-6 p.m.

Plate 5.3



Women's bus shelter, the only one, in Damman city centre.

Source : Fieldwork Damman, 1985

71% (out of 186) women favoured this. Therefore, utilization of female conductors would increase the demand for female passengers for public transportation and could also provide information for passengers and help women with children in getting in and out of the bus.

Finally, if the above ideas were implemented, it would lead to a significant reduction in the number of foreign chauffeurs in the country, particularly in those households with no employed women.

#### 5.3.3.4 Women's ideas about using family chauffeurs

One significant result also has arisen from this survey : that is, the large difference between the points of views of the females and the heads of households on the statements about using chauffeurs : 70% of the males were against this idea whereas 74% of females (134 out of 181) said that chauffeurs would solve women's transportations problems (see Table 5.13). This tremendous contrast of ideas between the two sexes was a reflection of female demands for transportation which also produces pressure on many families to accept the idea of using chauffeurs. If this situation continues it would indeed result in widespread use of foreign chauffeurs in many households. This case is very similar to that of using servants. This is considered by many Saudis to be an important social problem, because many Saudi families, those who live in small villages, have employed foreign females to help in taking care of the household and the children. Most of these housekeepers are Thais, Phillipinos and Sri Lankans. However, many Saudis say such foreign influences can have a considerable effect on the young children : some even complain that their children speak

**Table 5.13** Attitudes of Female Teachers to Use of Family Chauffeur

Reaction	No.	%
Strongly Agree	46	25.4
Agree	88	48.6
Disagree	31	17.1
Strongly Disagree	16	8.9
Total	181	100

Source : Women Teachers' Survey in Dammam, Fieldwork, 1985.

better Thai or Phillipino than Arabic.<sup>(27)</sup> This social problem could be repeated in the widespread use of family chauffeurs unless the whole question of the transport problem is seriously considered.

#### 5.3.3.5 Women's idea on women drivers

This survey showed another significant point : that four times as many women agreed with the idea of allowing women to drive than there were males who agreed with this proposition. The figures for women were 36.2%, of whom 11.8% were completely in agreement, i.e. about 100 female teachers out of 276 would agree to this idea (see Table 5.14). Most of those women teachers who agreed had experience of transport problems, while of those females with constantly available cars, about 66% rejected this statement, around 37.5% strongly disagreed with it. The implication of these figures is that as long as the number of women needing transport increases, the number of women who would accept the idea will grow. In future they may persuade their children, whether male or female, to accept the idea. Therefore, the lobby to allow women to drive may grow.

#### 5.4 Summary

The study has been divided into two sections. The first showing the modes of transport between cities in the study area, and the second discussing the current transport situation in Dammam, based on household surveys and questionnaires returned by women teachers working in schools in Dammam.

**Table 5.14**      Attitude of Female Teachers on Allowing Women to Drive

Reaction	No.	%
Strongly Agree	20	11.3
Agree	44	24.9
Disagree	48	27.1
Strongly Disagree	65	36.7
Total	177	100

Source : Women Teachers' Survey in Dammam, Fieldwork, 1985.

The studies in the first section revealed that the use of family transport by female teachers was much higher for journeys within the city than for journeys between cities. The survey discussed in the second section confirms the findings shown in the first concerning the high use of private transport within cities and shared hired transport between them. The study revealed a great mal-distribution of teachers' homes and schools, with high number of teachers having to travel long distances to school, while others were making a similar journey in the opposite direction. These tendencies were present in journeys within, and between cities, and there is a need for this mal-distribution of teachers to be reviewed by the relevant authorities. The survey also found that teachers of the Humanities were most affected, and their situation will worsen as an increased number of teachers qualify in Humanities. Thus such teachers will have to accept posts away from their homes, which may lead to either the employment of chauffeurs or to male members of the family having to drive them to their schools. This would simply mean that there would be more journeys and more vehicles on the roads, at those times of the day when people are travelling to and from work and an increase in the traffic density. The General Director of Traffic in Saudi Arabia has stated during the traffic week campaign (1986) that the police alone cannot solve all the traffic problems. Every one has to make an effort, and co-operate with every one else. He then went on to pose the questions, why do we entrust the car to the young and inexperienced sons of the family? Why do we bring into the country foreign drivers who act as chauffeurs without any certain knowledge of their driving ability?<sup>(28)</sup> Although at the present time there are comparatively few chauffeurs it is expected on the basis of this study that their number will increase as more and more female teachers need transportation.

The survey reveals that 42 households out of every 100 containing an employed woman, either used a chauffeur or would use one, whereas 26 out of the same 100 agreed with the principle but did not employ a chauffeur, leaving a rate of 16 per 100 employing chauffeurs. Therefore the future rise in the number of chauffeurs will be within this group. However, those who disagreed with chauffeur driven transport for their womenfolk are expected further to involve their young males in driving the car. This was confirmed in the survey by relatively higher numbers of male drivers in those families with working females, as compared with families without working females.

The use of family chauffeurs led to controversy in the domestic newspapers: there were more letters from people who disagreed than from those who agreed with the idea of women driving, stating that it was against the dictates of culture and society because it would lead to women associating with men. This indicates the fact that segregation is still regarded, particularly by older people, as a culturally essential element in inter relationship as described by Soraya Al Toriki (1986), who states that:

"No structural change in these relations has taken place, however, segregation and asymmetry continue to be the principal elements male-female relations. Thus, evasion of a husband's orders prohibiting unveiling is out of the question."(24)

The households survey has also shown that the majority of the heads were against the idea of women driving. But the ratio who did agree and had employed women was higher than among those who agreed and had not.

The survey of employed women has shown that more than half had a real transport problem, despite the fact that most of their households own at least one car. Thus, the number of cars does not imply a solution to the transport problems. The survey also revealed that those employed in secondary schools had more difficulties in transport than those in elementary and intermediate schools. Also this study found that female teachers to whom the car was available all the time much fewer than those to whom it was usually available or available half of the time or only occasionally, which revealed a transport problem and unequal access to this mode of transport. Furthermore this study indicated that there is a group of women teachers who never have a car available. Although the survey shows there is a transport problem, it also shows that very few women use SAPTCO and women would be very embarrassed to hail, wave down or call a taxi, and travel in it alone. This was expected because Saudi Society considers this to be a strange behaviour for women. This feeling of embarrassment appears also in the survey of women travelling on SAPTCO buses, but to a lesser extent. The reason for the embarrassment of women at using buses is that they feel themselves very much in a minority. Two main factors were revealed by the survey as to why there was little use of the bus transit system; more women would use it if there were more women using it, and if there was greater acceptance of women using buses by their families. These two factors should be considered by the authorities if they wish to encourage women to use the bus system. There were also differences between attitudes towards the use of chauffeurs by employed women, and heads of households : the former thought it would be a solution to their transport problems, but the latter rejected the idea. With regard to women drivers, more than one third of the women teachers were in favour of women drivers, but more than 90% of the males heads

of household were not. Most of those women who agreed did not have a chauffeur available and had transport difficulties. It is probable that those women who favour allowing women to drive will be amongst the group of women who are likely to put pressure on their families to employ chauffeurs, and will extend their influence on their sons and daughters, to accept the idea of women drivers. An increase in the number of women employed will lead to a corresponding increase in the number of women who would be in favour of women drivers.

Finally the implication of this chapter is that women, particularly employed women have transport problems, and that the awareness of these problems is spread throughout society; and today Saudi society is concerned to find a solution to this problem within the limitations of its social and cultural tradition. Further, a solution which does not fit the cultural requirements, or meet the needs of women and the demands of Saudi society will be rejected. People want women to engage in education and suitable employment, but, at present, the lack of transport is the main obstacle. The next chapter will look at alternative possible solutions.

## 5.5 References

1. Saudi Economic Survey, February 12, 1986, p. 8.
2. Ibid, p. 8.
3. Al Jazeera Daily Newspaper, Riyadh, No. 4878 February 5, 1986, p. 1.
4. Al Jazeera Newspaper, No. 4879, February 6, 1986, p. 4.
5. Al Jazeera Newspaper, No. 4879, February 6, 1986, p. 4.
6. Al Jazeera Newspaper, No. 4904, March 3, 1986, p. 27.
7. General Presidency for Female Education, Jeddah Office, Education in Saudi Arabia 1975-1980, (in Arabic), 1980, p. 119.
8. Maxfield, Donald W., "Spatial Planning of school districts," in Annals of the Association of American Geographers, Vol. 62, No. 4, December 1972, pp. 582-590.
9. The Royal Commission for Jubail and Yanbu, The Annual Report, 1980-1981, p. 12.
10. Saabiq, Said, "Fugh Alssenah", (in Arabic), Al Mujlad Al Thani, (Part 2), p. 157.
11. Bahry, Louay, "The New Saudi woman : Modernizing in an Islamic Framework", The Middle East Journal Vol. 36, No. 4, 1982, p. 509.

12. Fatwa, (in Arabic) by Mohamed Saleh Alothamin signed in 19,6 1406 AH, (1986AD) (see Appendix E).
13. A1 Jazeerah Newspaper, No.3379, December 4, 1981, p. 8.
14. A1 Jazeerah Newspaper, No. 3389, December 14, 1981, p. 27.
15. Ibid, p. 27.
16. A1 Jazeerah Newspaper, No. 3392, December 17, 1981, p. 27.
17. A1 Jazeerah Newspaper, No. 3393, December 18, 1981, p. 19.
18. Ibid, p. 19.
19. A1 Jazeerah Newspaper, No. 3395, December 20, 1981, p. 27.
20. A1 Jazeerah Newspaper, No. 3396, December 21, 1981, p. 31.
21. A1 Jazeerah Newspaper, No. 3397, December 22, 1981, p. 31.
22. A1 Jazeerah Newspaper, No. 3398, December 23, 1981, p. 31.
23. A1 Jazeerah Newspaper, No. 3399, December 24, 1981, p. 27.
24. A1 Jazeerah Newspaper, No. 3400, December 25, 1981, p. 19.
25. A1 Jazeerah Newspaper, No. 3417, January 11, 1982, p. 31.

26. Department of Transport Scottish Development Department Welsh Office, Transport statistics, Great Britain 1974-1984, published September 1985.
27. Bahry, Louay, "The new Saudi woman", 1982, p. 507.
28. Al Iktisad, G., Monthly economic magazine (in Arabic), published by Chamber of Commerce and Industry Eastern Province, Dammam, Issue No. 155, March 1986, p. 32.
29. Al Turki, Soraya, Women in Saudi Arabia Ideology and Behaviour Among the Elite, Columbia University Press, 1986, p. 94.

CHAPTER SIXPOSSIBLE TRANSPORT ALTERNATIVE  
AND RECOMMENDATION6.1 Introduction

In Chapter Five it has been shown that the cultural traditions of Saudi society had an enormous impact on female transportation because it cannot be assumed that social and cultural traditions will change with economic and physical development. The cultural traditions of Saudi society have affected women's choice of profession, predisposing them towards education, despite the urgent need for women in medicine, particularly as nurses. Furthermore, the requirements of culture and tradition dictated the location of women's workplaces, which must be within daily commuting distance of their homes. Also, cultural tradition prescribed the qualifications of the drivers of, for example, shared hired transport (see Chapter 5). Thus it can be said that the requirements of Saudi society, particularly concerning women, have remained almost unchanged despite the sweeping physical and economic transformation of the country. However, this transformation has brought with it a need for modern transport, but the requirements of cultural tradition on women have meant that this transport has had to be based on the private car since it is not culturally desirable for women to travel by public transport. Possible future alternatives or improvements to the present arrangements regarding women's transport in Saudi Arabia must take account of these factors. Moreover, any delay in implementing a solution to the problems of employed women and transport which is acceptable in Saudi society will have some kind of

adverse effect on the success of the development plans, since women will not be able to play their full part in the economy. The government is very concerned to employ more Saudi nationals than it does at present and to replace the foreigners it now employs. Its training and education programme is designed to that effect. For instance, in 1983 the government spent about 56,000 Saudi Riyals per student, male and female, in the field of higher education. The failure to reach a solution will mean that men in families with working women will have to spend a lot of their time unprofitably transporting womenfolk to and from their place of employment, probably having to take time off from their own employment to do so. There could also be a greater demand for shared hired transport, a possible increase in the number of serious accidents. A woman's family would employ a driver within the cultural norms of Saudi society (for instance, he must be known to some of the families of the women who would be travelling with him); the family would not consider his competence as a driver, nor the state of his vehicle. Without an adequate solution to the problem there would be further increase in the use of chauffeurs, and the consequent problems that would result. As Anne Boer (1986) concluded,

"unequal access to transport ..... must be regarded as a considerable social problem."(1)

Many developed countries have used a variety of modes of transport to solve their problems. They have retained urban public transport which has helped to reduce congestion, pollution, and the accident rate, all of which were high when only the private car was used, and the system is providing those without cars with adequate means of travelling from home to work. It may be that part of the system

adopted by developed countries may be acceptable in Saudi Arabian culture with its emphasis on segregation. As Jean Gottman (1986) pointed out that

"each country, each region must be allowed to search for its own solutions, its own style of life. No stereotyped recipe will do for a diversity of communities.(2)

## 6.2 Paratransit : Objectives and definitions

The widespread use of private cars in developed countries caused a dramatic decline in the number of passengers using public transport, which had always been considered to be the backbone of a passenger transport system. Table 6.1 shows its decline. However, the increase in the number of private cars has caused most developed cities to suffer traffic congestion and air pollution. Since the mid 1960s four major problems have dominated the American transport policy debate : the rate of injuries and fatalities, air pollution, congestion and the rapidly increasing demand for personal transport.(3)

The oil crisis in 1973 increased further the concern to develop alternative forms of transport. One expression of this concern is a statement by Milton Pikansky, Chairman of Chicago Regional Transport Authority:

"... one of our important goals should be to provide the embryo transit system, so that our society can move away from the excess of use of petroleum energy. We must put into the place the buses, rail systems and other electrically-operated transit systems and increase the needed operating assistance. We must put the system in place now, even though today, in some cases it is underutilized; even though today, many say that the nation needs to plug more money for highway funds for repair bills and services and leave public transportation as it is."(4)

**Table 6.1**      Decline in Public Transport Revenue  
United States of America 1945-1974

Billions

Year	Streetcar	Rapid transit	Bus
1945	7.1	2.6	8.3
1950	2.8	2.1	7.7
1955	0.8	1.7	5.7
1960	0.3	1.7	5.1
1965	0.2	1.7	4.7
1970	0.2	1.6	4.1
1974	0.1	1.4	4.0

Source: Wilfred Owen Transportation for Cities, 1976, p.17.

Therefore, all these problems have led many of the developed countries to concern themselves with urban transport systems. Along with improving buses, there is also concern to develop alternative transport systems for the public, particularly those which fall between public and private transport : this is called paratransit. This term was introduced in the United States and this system has been defined as

"forms of passenger transportation available to the public, that are distinct from conventional (scheduled) transit, that can operate on the highway and street systems, shared hired taxi, car pooling, rental cars, subscription bus clubs are often included in the definition."(5)

All these forms of transport are quite different from the conventional transit , which is defined as,

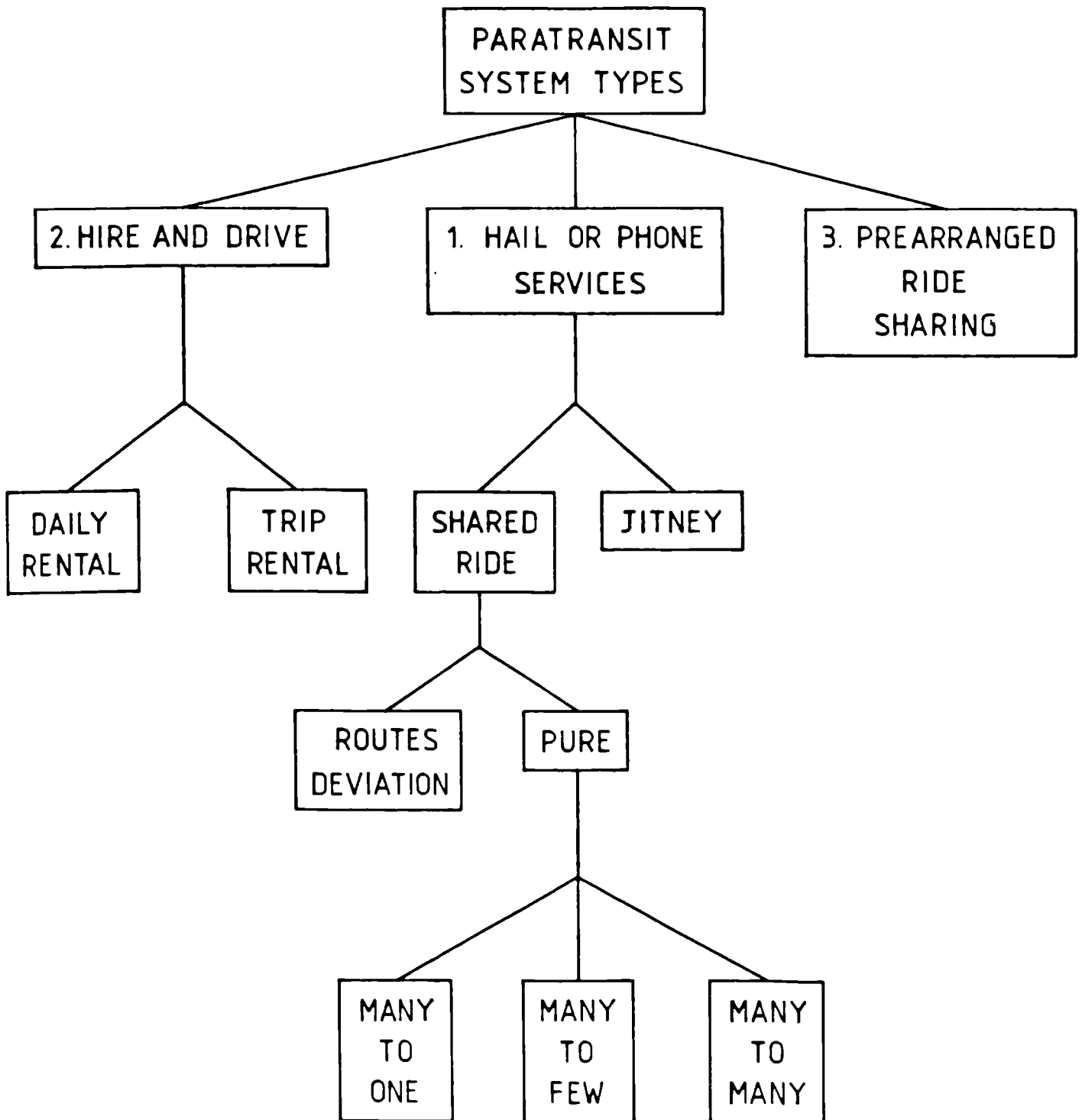
"a system refers to those transit systems serving urban areas mainly by urban buses on fixed routes and schedules available to all interested users and charging a published set of fares."(6)

Conventional buses seem less effective for the transport of employees from home to work. For example, in 1984, in the U.S.A. only 8.3 per cent of all women, and 4.6 per cent of all men were using public transport.<sup>(7)</sup>

### 6.3 Paratransit : types of system

The paratransit system falls into three main types illustrated below and in Figure 6.1.

Figure 6.1



Source : Compiled by this author from Public Transportation An Element of the Urban Transportation, Technology Sharing Report, U.S. Department of Transportation, pp.55-59, 1980.

### 6.3.1 The hail or phone service

These may be of two kinds:

- a) Share-ride-service : the service can answer new calls, and collect new passengers, while other passengers are still in the vehicle.
- b) Jitney vehicles : these run fixed routes, but is unscheduled and can be hailed in passing.

In both systems a) and b), as well as a conventional taxi, small vans or minibuses may be used. The demand-responsive shared-ride service can fall into two types : pure and route-deviation. The former, in turn, falls into three kinds depending on pattern of requirements : many-to-one, many-to-few, and many-to-many (see Figure 6.2).

### 6.3.2 Hire and drive service

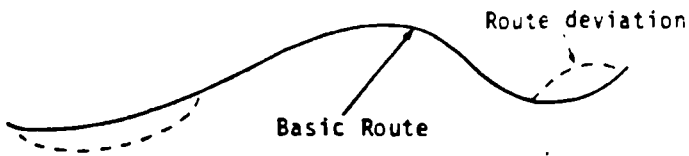
This system is either a) daily car rental : cars are rented without drivers, for agreed periods from a day to a year or b) short-term car rental : cars may be hired trip by trip. One future option for such a system could involve the use of small electric vehicles.

### 6.3.3 Prearranged ride-sharing services

This term is used to describe services in which a group of passengers arrange to travel together on a regular basis. There are

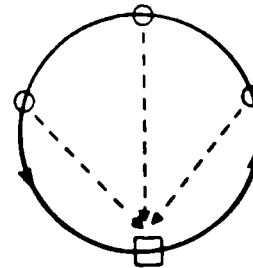
Figure 6.2

Route Deviation



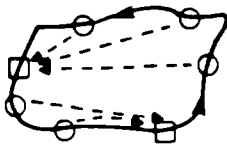
Here the vehicle will follow a generally fixed route, making limited detours to pick-up and set-down as required

Many-to-one



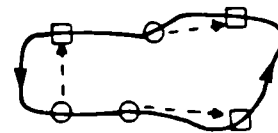
Provides transport from many origins to one destination e.g. bus terminal, airport, shopping centre.

Many-to-few




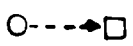


Provides transport from many origins to a few destinations such as major activity centres, or points on a city centre route.

Many-to-Many



Provides transport between any origina-destination paid within the operating area without limit.

INDEX

-  Route
-  Original destination point
-  Pick up
-  Set down

two common forms of this service in North America and Western Europe, car- or van-pooling and subscription buses.<sup>(8)</sup> G.R. Green (1978) defined these American terms -

"Since virtually all the literature is from the US most of the terms originate there and need to be explained to British (non-American) readers."<sup>(9)</sup>

a) Car-pooling is a system wherein a number of car owners agree to run each of their cars in turn from adjacent origins to adjacent destinations with, usually, no money changing hands.

b) Van-pooling is a system under which a minibus is owned or hired privately by a group of employees to convey them to and from work. A subscription bus is a coach hired with driver and with or without company help, by a group of employees for the journey to and from work.<sup>(10)</sup>

Earlier in this chapter we discussed paratransit in developed countries. A question can be raised about the similarities and differences between the forms of transport used by commuting employees in developed countries and in Saudi Arabia. First, car pooling does not exist to any extent in Saudi Arabia : a male member of a family may give a lift to a female neighbour or close female friend of his sister or daughter particularly if they work at the same place. However, this comes under the head of "giving a lift", rather than "car-pooling". In terms of van-pooling or minibuses, however, a comparison can be made with the use made, in Saudi Arabia, of shared hired transport, which we defined above as a mode of transport carrying a number of female teachers, sometimes in excess of the vehicle's carrying capacity. The

difference between van-pooling in developed countries and shared hired transport is that in the former, the vehicle is driven by one of the employees, while shared hired transport uses a hired driver. Social and cultural factors dictate this difference from van pooling's *raison d'etre* which is the reduction of individual transport costs, while shared hired transport exists because of cultural factors.

#### 6.4 Advantages of high occupancy vehicles

A number of urban transport planners consider that the adoption of a high occupancy vehicle programme would give an advantage to the community as a whole as well as to the commuters. The benefits that commuters would gain include reduced costs of travelling to work, for example lower fuel costs and less parking fees. Also, those people without cars, particularly in rural areas, would have an economic benefit nationally.<sup>(11)</sup> Even in an oil-producing country, oil is better saved than squandered. In addition, traffic congestion can be reduced, and the demand for land for parking will decrease and there would be less air pollution. Furthermore, people will get into the habit of leaving their cars at home, which may make them more likely to consider using public transport for other journeys.

The factor that has encouraged the success of the high occupancy vehicle programme, particularly in some American cities is the reservation of free-flow lanes, following the close observation of travel patterns. One example of this is the approach to the San Francisco - Oakland Bay Bridge, where vehicles merge into five lanes to cross it. One lane is reserved for buses and two for pooled cars, neither of which need to stop at the toll-gates, and therefore have

free access to the bridge. This allows a saving of five minutes at peak periods for such priority vehicles. Another example is along the I-93 to the Central Business District in Boston in which up to 10 minutes per high-occupancy vehicle was saved through the use of reserved lanes.<sup>(12)</sup>

The high occupancy programme clearly reflects a belief that transport planning should not be separated from land use planning, a view-point which is currently held by many western transport planners (as has been mentioned in Chapter Four).

However, the application of high occupancy programmes in developed countries is because the main concerns there are fuel and environmental factors, not social ones. The current approach of a number of transport planners is to pay more attention to the social element, and they want this to be recognised as an important factor in the success of any transport plan. For example, Kit Mitchell (1981) points out:

"many of the criticisms of current methods of transport planning are concerned with their lack of social content."<sup>(13)</sup>

Stephen W. Town (1981) refers to the reasons for this lack of interest in social factors in the field of transport planning, when he states,

"transport planning is very pragmatic in approach. This stems from its origins in highway construction and the engineering profession; such a background is almost essential for many local authority jobs. This pragmatic engineering background can be contrasted with that of the landuse planner."<sup>(14)</sup>

Enne (1986) said:

"if we want to go ahead with transport planning in sensible and successful ways, we will have to devote more attention to social aspects than in the past."<sup>(15)</sup>

The social factors that transport planners have been concerned with until now include provision for the handicapped and disabled, and for those whose economic status restricts their access to transport. However, the cultural traditions of a society have not yet been considered as social factors in the field of transport. It is essential, particularly for a conservative Islamic country, seriously to take into account the demands of its social cultural traditions in its transport planning. The transport of women, particularly of employed women, is based upon the private car, because of the lack of any culturally acceptable form of public transport (as has been mentioned in the conclusion to Chapter Three). This is shown in the fact that the number of private cars per head of the population has exceeded the planners predictions; for example, in 1975 it was estimated that, in 1995, there would be 300 cars per 1,000 people in Dammam,<sup>(16)</sup> while in fact according to Al Saif there were 333 cars per 1,000 in Saudi Arabia as a whole, in 1982.<sup>(17)</sup> The home survey in 1985, put the figure of 250 cars per 1,000 people, which is quite close to Candilis' projection of 215 per 1,000 in 1985. The rate of increase over the 1975 figures (70 per 1,000 persons) shown by these counts is 375.7%, 257%, and 207% respectively. All three represent vast increases and mean that car-ownership in Saudi Arabia now exceeds that in some western countries (see Table 6.2). Also, since women cannot drive in Saudi Arabia the figures indicate that male car-ownership is very high indeed. This increase is reflected in the rapid increase in

**Table 6.2 : Comparison of Road Vehicles Per Head of Population  
in 1984**

Country	Vehicles per 000 Population	~
France	528	52.8
Belgium	410	41.0
Finland	382	38.2
Denmark	369	36.9
United Kingdom	365	36.5
Saudi Arabia	333	33.3
Spain	308	30.8
Irish Republic	234	23.4
Portugal	210	21.0
Greece	191	19.1

Source : All vehicles per 000 people in Western countries adopted from Transport Statistics, Great Britain, Published September, 1986, p.186.

demand for roads, particularly for their use by private cars. This huge increase in private car ownership reflects the inadequate provision of public transport.

Therefore, the application of a policy to encourage high occupancy vehicles which took account of social and cultural traditions would create a number of advantages that have been mentioned by planners, including solving the problem of transporting women teachers. For example, advantages include the conservation of energy which is the backbone of the country's economy. As has been mentioned in Chapter One consumption of fuel in the country increased almost 600% between 1973-1982 (Table 1.2). Since what is not used for transport can be used for other purposes, or made available for export there are powerful reasons to check domestic consumption. Also the application of such policy might reduce the need to import cars, and alleviate congestion and pollution. The benefits to the male employee will include punctuality at work because his responsibility for transporting his womenfolk will be reduced. Also women, particularly employed females, will have a more personal benefit in using high occupancy transport for they will no longer have to involve their menfolk in their transportation. Furthermore, the application of such a policy will be beneficial not just to employees, but to the providers and consumers of all services, for example, leisure, shopping and personal business, particularly in areas of high urban and economic concentration. Such areas generate a higher number of personal trips for both social and economic purposes. This indeed applies to the concentrated urban areas between Khobar and Jubail. It can be said that the travel patterns of women teachers between the nodes of this area are one of the reasons for proposals to concentrate the development along the coast of the Eastern Region (see "planning

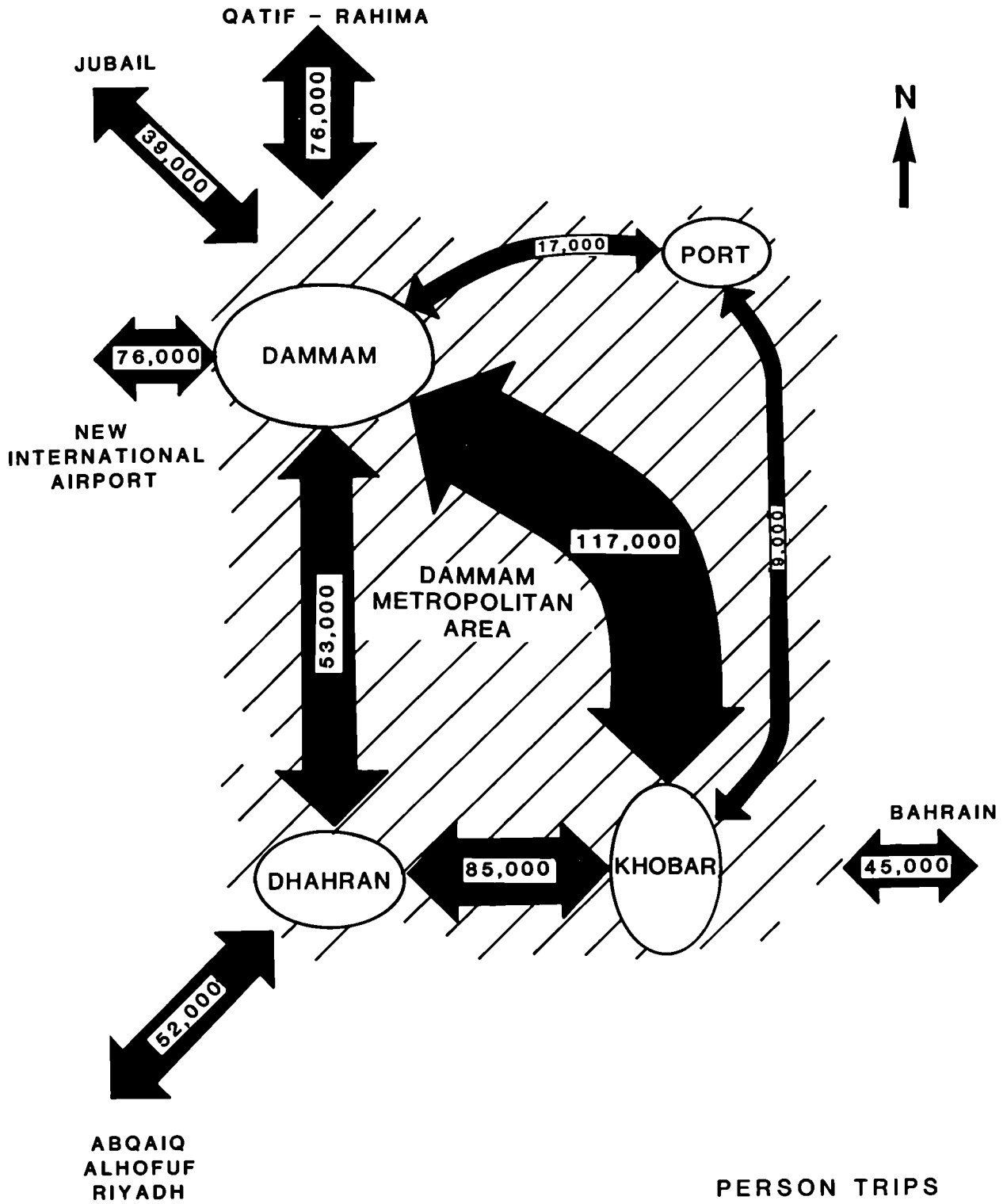
concepts" in Chapter Four). Therefore, the further growth of these economic nodes will tend to increase the traffic between them, both for travel to work and other purposes. Figure 6.3 shows the expected total of journeys in 1995, indeed a proportion of which will be made by women teachers. Furthermore, if there is to be a modification in work patterns so that women had career choices other than education, the number of journeys undertaken by women could increase. Figure 6.4 shows a breakdown of journeys in 1995.

Now it has become clear from the survey and from the above discussion that if there is to be general implementation of a high occupancy programme, and of one for women in particular, in Saudi Arabia and in and around Dammam especially, three factors need to be considered. Firstly, the overall aspects of cultural traditions in Saudi society; secondly, the mode of transportation; and, finally, the infrastructure, in particular the road network.

With regard to the cultural element; as has been mentioned in the conclusion to Chapter Five, the segregation of men and women is one of the principal elements in male-female relations in Saudi Arabian society. This characteristic can be seen in the daily life of this society : in education, at work, and even at home. In the household, men and women have separate living rooms so that if guests arrive the sexes are received separately. This tradition has its roots in Islamic practice, and has become part of the cultural tradition of Saudi society. As Ibrahim al-Naffiz (1985) stated,

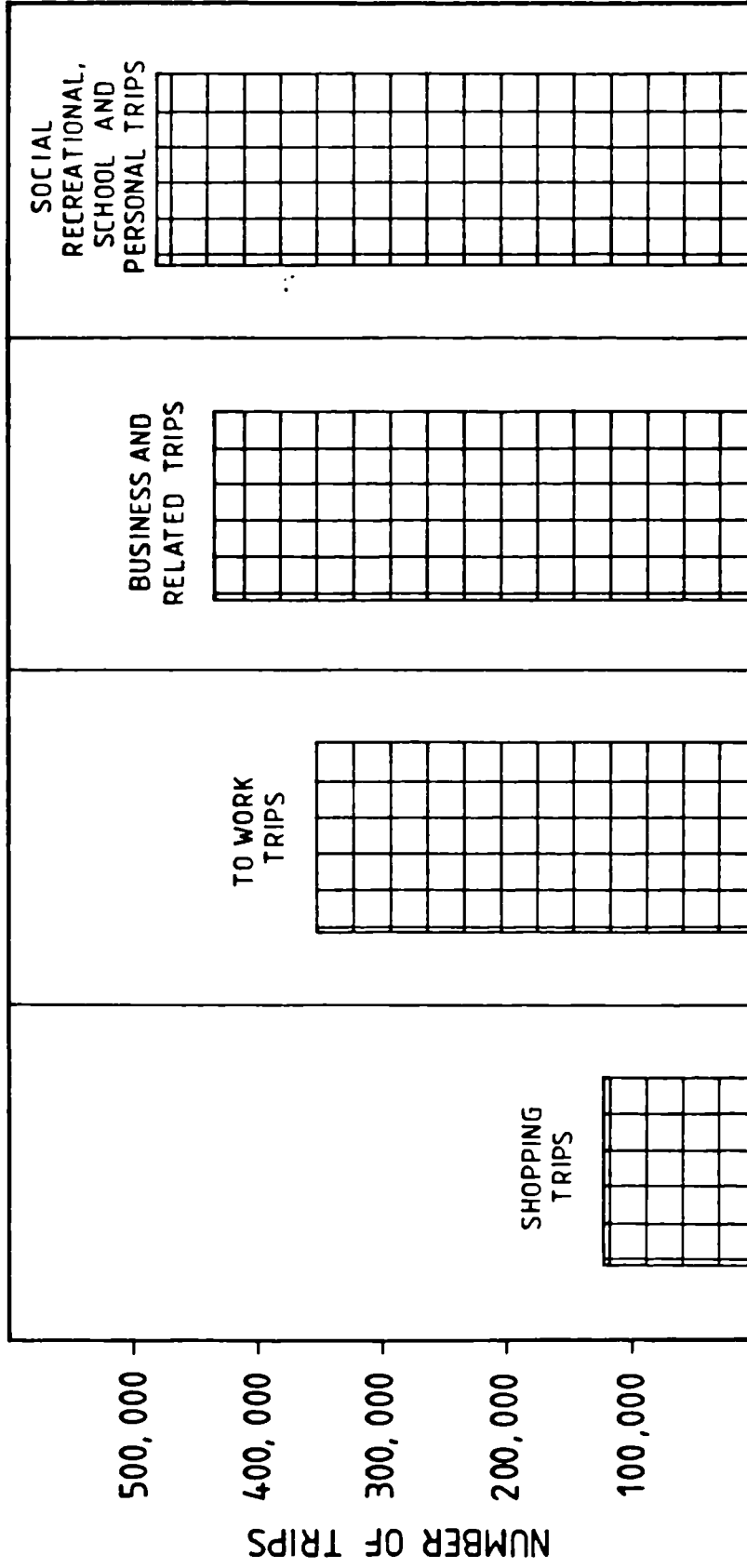
"The degree of privacy varies from society to society, depending upon religion, and social and cultural values. Privacy has its roots in religious teaching : the main issue is sex segregation."(18)

**Figure 6.3**                    **AVERAGE WEEKDAY**  
**REGIONAL TRAFFIC DEMANDS 1995**



**TYPE OF DAILY PERSON TRIPS 1996**

Figure 6.4



Source : Adopted from CH2M Hill International, 1979.

Therefore, it is accepted that sex segregation plays a significant role in the cultural tradition in Saudi society. Soraya Altorki (1986) in her book "Women in Saudi Arabia" found a degree of changing attitudes to strict segregation in the fact that interrelationship between the sexes in private houses was acceptable to the youngest of three generations she studied. However, it must be said that her conclusions were based only on research carried out in Jeddah, which is a relatively open city, with many of its people originating from other Arab countries, particularly Egypt and Palestine, and also from South-East Asia, Pakistan and India. Therefore the situation regarding segregation is quite different in Jeddah compared to that pertaining in other parts of the country. For example, the use of chauffeurs to transport women is more acceptable in Jeddah than in Dammam. A survey carried out by the Education office in Jeddah (1986) which questioned 200 women teachers in 20 schools revealed that 25% of women teachers relied upon the family chauffeurs for their journey to work;<sup>(19)</sup> this compares with 21.7% in the survey in Dammam schools. However, these figures imply that while Jeddah is more open, it is not so very different from Dammam, or other major cities. Also, it was found that 53% of the Jeddah women surveyed depend upon male members of their household to transport them, which is very close to the figure for Dammam (53.7%). All this shows that sex-segregation is still significant in Saudi Arabian society's cultural traditions. For example, when the heads of households were asked about whether SAPTCO should provide special buses for women commuters, the survey revealed 98.5% (67 out of 68) of those with employed women said they should, and of those 75% strongly agreed with the idea. Furthermore, 92.6% out of a total of 217 heads of households without working women agreed, 76% agreeing strongly. In the survey of women teachers 181 of the 186

answered this question. 92.3% of the women teachers agreed that SAPTCO should provide special buses for working women, 38.9 agreeing strongly. Despite the fact that working women could benefit from such a service; the proportion of those women who were strongly in favour was only about half that of heads of households who held such an opinion. These figures imply that even the heads of households without working women recognize that there is a problem concerning the transport of working women. The enthusiasm is probably due to the question mentioning "special buses" i.e. buses exclusively for women, therefore fitting the requirement of social and cultural traditions. Also, the heads of household supported the idea of one officially recognised company being responsible for the provision of transport for women. It would be known to the public and to employers and could take responsibility for punctuality; at the moment individual teachers are blamed when the driver of their shared hire transport is late. Furthermore, such a company could take responsibility for the proper selection of drivers who would satisfy cultural requirements. This would remove a heavy responsibility from the heads of households. There is no doubt that the availability of a respected company running transport exclusively for women would alleviate the problems experienced both by working women and by their families. For example, the survey of the women teachers revealed that 65% of those who strongly agreed with the proposal of "SAPTCO special buses" had severe transport problems, and 55.7% of those who agreed had a transport problem. The two figures can also reflect that even women without transport problems would welcome such a service.

Questions remain as to the carrying capacity and characteristics of alternative modes of transport. The selection of vehicle type

should be based on a study of the characteristics of the present shared hired transport. This would suggest that the capacity of the adopted vehicle type should be between 14-16 people. The capacity of the current shared hired transport vehicles is ten to twelve people, but is often exceeded, causing danger to the occupants and other road users (see Chapter Five). There is also a need to consider the use of curtains over windows in many shared hired cars. This is to protect the women from the sun and to provide them an element of privacy. Also all such vehicles should have radios so that they can report accidents, breakdowns and other delays to central control which can then inform the teachers' families or schools.

Furthermore, implementing this idea of a women's transport service provided by an official company would be consistent with the policy of encouraging high occupancy vehicles. Also, the survey reflects that there would be a good market for SAPTCO if it decided to invest in women's transport.

Another way of encouraging high occupancy vehicles, particularly for women teachers, is to institute a car pooling scheme. To succeed, such a scheme must involve schools, teachers and heads of households: the schools could coordinate lifts according to area. In this case, for example, the twice-daily journey by a member of each teacher's family could be reduced to one trip a week. This scheme could be really successful within a city because the survey has revealed that there was a high proportion of female teachers who depend upon their family cars (see Chapter Five).

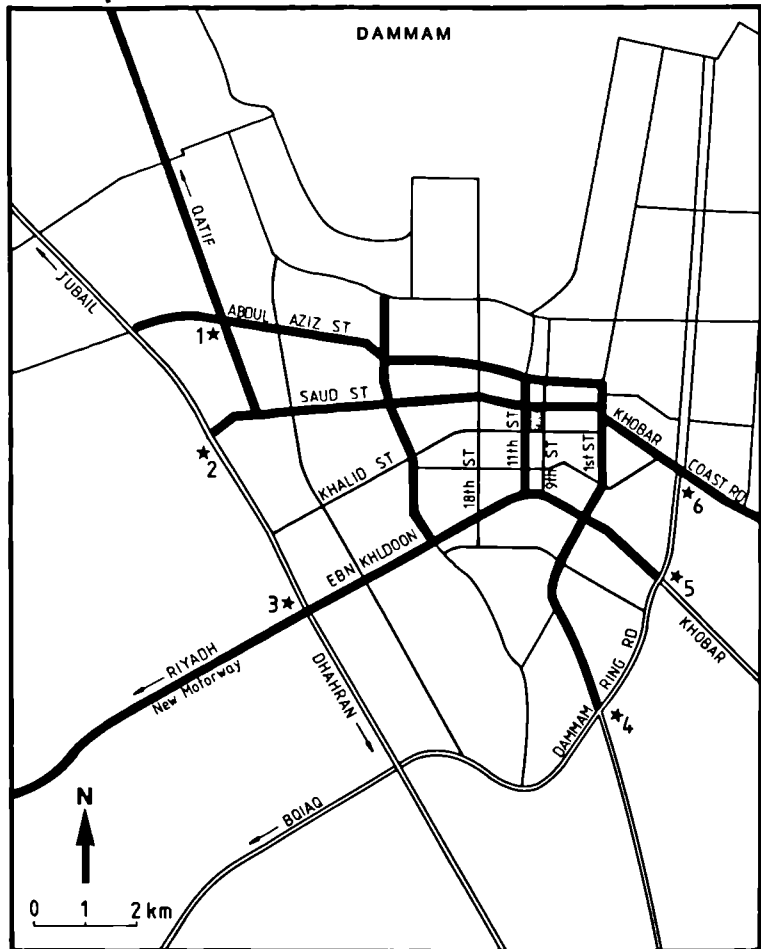
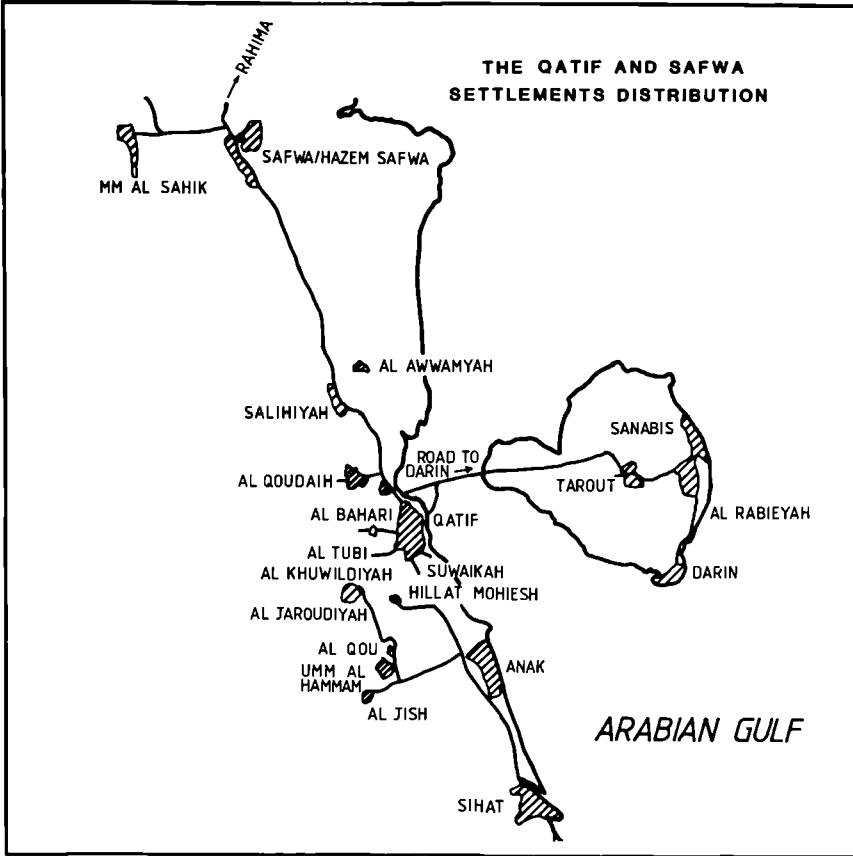
On the road network considerations for high occupancy programme; Daniels and Warnes (1980) said:

"social priorities for transport planning are undoubtedly important, but much will have to be achieved through modifying the existing transport infrastructure and its use rather than restructuring cities in the way implied by advocates of social transport planning.(21)

In the Saudi Arabian cities, the road network infrastructure is an accomplished fact and the significant question is therefore how best to use it. Systems that have been applied elsewhere, for instance, the reserved lane system in the U.S.A. and Western countries could, in theory, be applied in Saudi Arabia. The Dammam-Qatif road (Exit 1 on Figure 6.5), which is a short, but winding, road much used by commuters could be reserved, at least during rush hours, for high occupancy vehicles - for example, a minimum of four travellers per car - leaving the longer, motorway route (Exit 2) for vehicles with lower occupancy. This would benefit women teachers using shared hired transport travelling to the Qatif area, both in time saved and by reducing the possibility of accidents by reducing congestion on what is a narrow, single carriageway, inadequate for the traffic it currently carries. Also, there are two roads leading to Khobar (Exits 5 & 6) of which the coast road (Exit 6) also carries traffic to the port which could be reserved for high occupancy traffic. On Ebn Khldoon and Abdul Aziz arterial roads it is suggested that of the two lanes each way, one should be reserved during the rush hours for high occupancy vehicles. This would be of great advantage, particularly to teachers at schools located around King Abdul Aziz street which has a high student population.

Figure 6.5

MAIN EXIT ROUTES FROM DAMMAM, TOGETHER WITH QATIF/SAFWA SETTLEMENTS DISTRIBUTION



★ CITY EXITS AND ENTRANCES

Finally, if the above three elements were considered together (cultural tradition, mode of transport and the road network infrastructure) it would lead to a significantly acceptable solution both to the employed woman and to their families.

## 6.5 Summary

The significance of this chapter is that any possible solution should be looked at in the light of social and cultural tradition. Concentration only on the physical transport planning, for example road widening schemes, does not imply that the social aspects of transportation problems have been solved. Today in Western countries, transport planners realise that social aspects of transport problems must be tackled as well as the physical aspects. Saudi Arabia has made great advances in road and street construction; yet despite the adequate infrastructure, further road construction is not likely to solve the problem of a largely social nature which arises from the cultural tradition. It has become necessary for planners to consider the social aspects of women's transport because in addition to prohibiting a woman from driving, cultural tradition also discourages her from travelling by public transport. It has been suggested in this chapter that one official company, such as SAPTCO, could consider providing special buses exclusively for women, which will satisfy the cultural tradition of sex segregation, and could take advantage of reserved high occupancy traffic lanes. There does not seem to be an alternative solution which solves so many aspects of the problem.

However, the role in society of women is changing, for example, they are becoming involved in education and employment, which means women now need to commute, sometimes over large distances. Only 20 years ago were women limited to their own households or immediate neighbourhoods. In the next chapter, therefore, we will discuss how the role of women is changing and the growing significance to women of available means of transport.

## 6.6 References

1. Boer, E. de, "Transport Deprivation as a social problem", In Transport Sociology : social aspects of transport planning, Urban and regional planning Vol. 35, 1986, p. 135.
2. Gottmann, Jean, "Transatlantic orbits : the interplay in the evolution of cities", In Conzen, M.P. (ed) World Patterns of Modern Urban Change, essays in Honour of Chauncy D. Harries, The University of Chicago, Department of Geography research paper, No. 217-218, 1986, p. 471.
3. Altshuler, Alan with James P. Womack and John R. Pucher, The Urban Transportation System, Politics and Policy Innovation, The MIT Press, 1981, p. 2.
4. Pikarsky, Milton Public Transportation, an Element of the Urban Transportation System, Technology sharing report, U.S. Department of Transportation, Federal Highway Administration, Urban Mass Transportation Administration, February 1980, p. 2.
5. Ibid, p. 54.
6. Ibid, p. 49.
7. Fox, Marion B., "Working women and travel, the access of women to work and community facilities," Journal of the American Planning Association, Volume 49, No. 1, Winter, 1983, p. 159.

8. Pikasky, M., Public Transportation, An Element of the Urban Transportation System, February 1980, pp. 54-57.
9. Green, G.R. Car-sharing and car-pooling - a review, Transport and Road Research Laboratory, TRRL Supplementary report 358, 1978, p. 2.
10. Ibid, p. 2.
11. Ibid, and Greening, P. and Jackson, R., "Minibus pooling in Great Britain : legal and economic aspects", Transport and Road Research Laboratory, TRRL Supplementary Report 726, 1982, p. 2.
12. Pikarsky, M., Public Transportation : an element of the Urban Transportation System, February 1980, pp. 66-67.
13. Mitchell, Kit, "An application of the social sciences to transport planning." In Banister, D. and Hall, P. (eds) Transport and public planning, Mansell, London, 1981, p. 230.
14. Town, Stephen W., "The sociologist's perspective on transport", in Banister, D. and Hall, P. (eds), Transport and public planning, 1981, p. 30.
15. Boer, Enne de, "Summary", in Boer, (ed), Transport and public planning, 1986, p. 4.

16. Ministry of Municipal and Rural Affairs, Master Plan Ad Damman, Prepared by G. Candilis-Metra International, December 1976, p. 105.
17. Al-Saif, Jaleel, Traffic development in Saudi Arabia, Presented to Medical School seminar, University of King Saud, March 9-10, 1984, Al Saif consultant for National Highway Program Committee, p. 13.
18. Al Nafeez, Ibrahim A. Privacy and Thermal comfort in the Saudi House, Thesis, Howard University, School of Architecture and Planning, Washington D.C., March 1985, p. 70.
19. UKAZ Daily Newspaper, No. 7475, December 15 1986, p. 10.
20. Ibid, p. 10.
21. Daniels, P. and Warnes, A., Movement in Cities, Spatial perspective on urban transport and travel, University Press, Cambridge, 1980, p. 344.

CHAPTER SEVENCONCLUSION

As has been discussed above some of the urban transport planners in the developed countries regard it as essential to consider social elements in urban transport planning because they found that concentration on physical factors alone was unlikely to provide solutions to transport problems, particularly those having a social aspect. In this study it has been shown that cultural aspects of Saudi society have a profound effect on the form and pattern of female urban transportation. For example, the considerable involvement of male members of their families in female mobility, the employment of family chauffeurs, and the existence of shared hired transport. Furthermore changes in the economy do not imply that the fabric of Saudi society will change. Robert Lonney (1982) observed that:

"This involves economic development inside the country, investment in the West, and the resulting exposure to alien social and political systems without damaging the fabric of Saudi society which is based on the tight rules and regulations of a fundamentalist interpretation of Islam."(1)

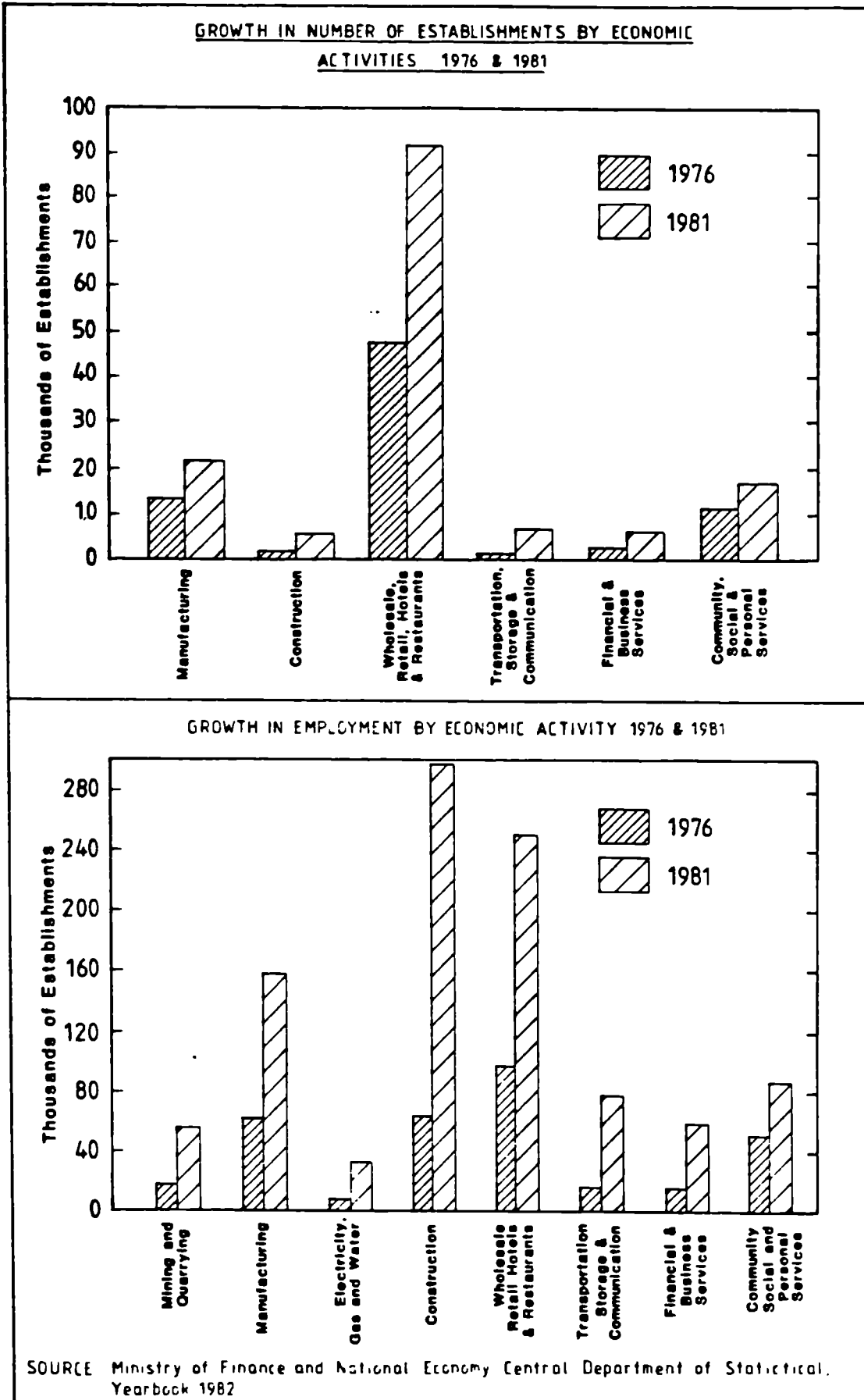
Therefore the solution to transporting employed women which was suggested in Chapter Six is generally based upon an understanding of the cultural traditions of Saudi society, with less sophisticated technology used in urban transport planning. Desmond McNeill (1978) had a similar alternative approach to urban transport planning in developing countries

"which would depend on less sophisticated planning technology, involve more and more continuous local consultation, and encourage 'intermediate' (i.e. paratransit system) transport far more than presently happens."(2)

The suggested solution could more likely alleviate the transport difficulties of women, as well as helping their menfolk, and it is fully recommended to be implemented as soon as possible since the female urban transportation problems could more likely increase through time as the demand by women for transport increases. The indications of growth in demand by women for transport can be explained as follows : the sharp rise in Saudi economic development and the rapid involvement of women in education have considerably changed the role of women in Saudi society without affecting the principal elements of male-female relations which is based on sex segregation. The role of women, including those who have not had the opportunity of benefitting from education, has changed because of the results of the economic development which has seen the rise in personal income and, also, the greatly increased availability of consumer goods, which are now in demand by women who have acquired a large disposable income, much greater than that available before the early 1970's. Figure 7.1 clearly shows the increase in economic activity from 1976 to 1982, in particular the growth in the wholesale and retail sectors as shown by the increase in the number of establishments, and, also in the number of people employed by them. The numbers of wholesale and retail businesses have increased 100% over the 1976 figure.

The concentration of women's shops in the city centres offering a wide variety of consumer goods has attracted more and more women to shop there. This, in turn, has generated a greater number of women

Figure 7.1



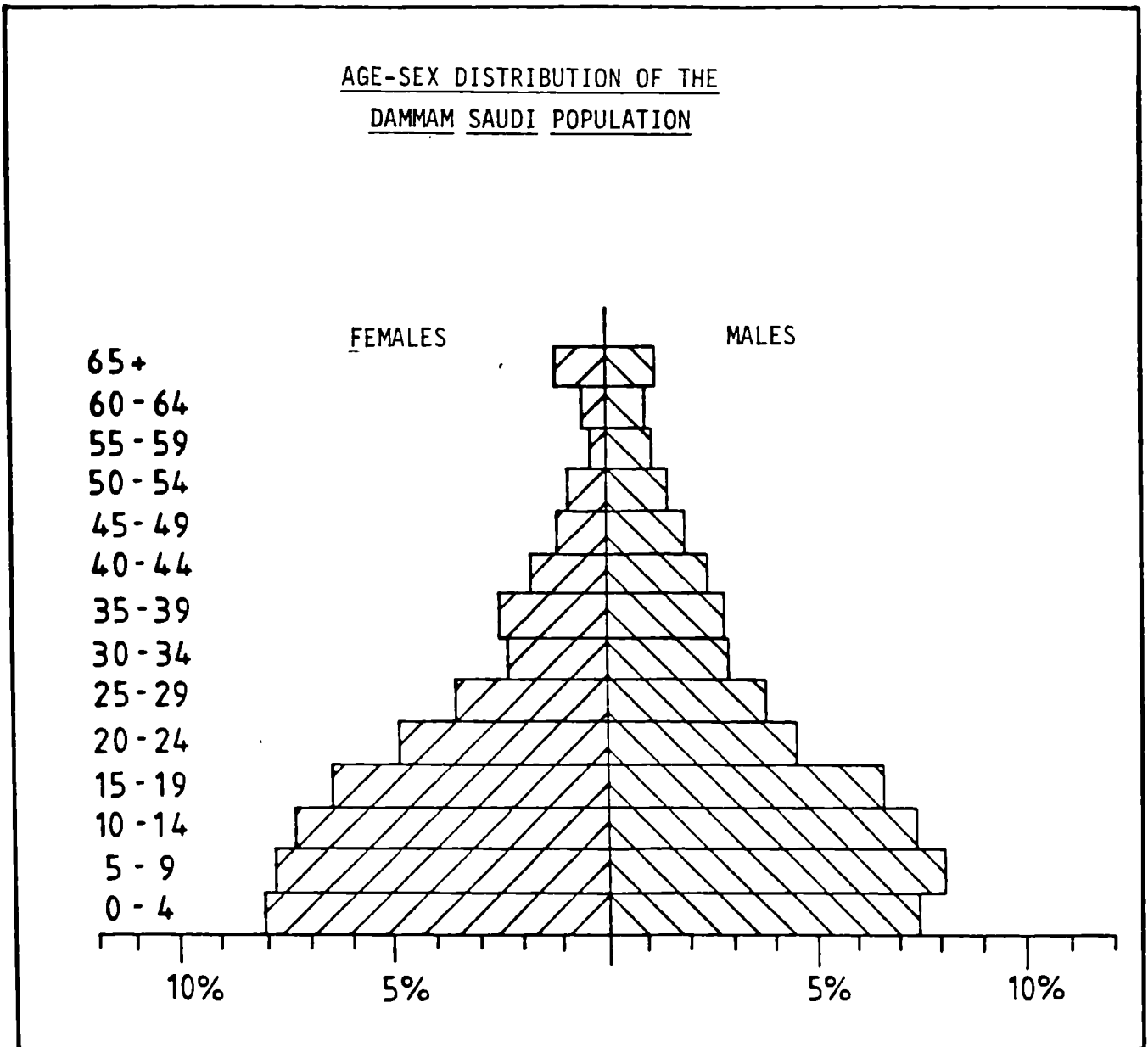
making longer shopping trips. Even those women who live close to city centres became users of some mode of transportation, because the modernisation of Saudi cities has meant that women no longer have the safety of being known in their neighbourhood, there is no longer the semi-privacy of the narrow, winding streets, and also the new wide streets offer no protection from the sun. Furthermore, the concentration of foreign workers, particularly into areas near the city centres, makes women fearful of walking any distance (see Chapter Three).

Also this demand for transport by women is further increased by the fact that they have, through their involvement in full-time female education, developed friendships with other women, who, because of the wide catchment areas of the schools, particularly the secondary schools, live scattered in the other districts of the urban area. For example, in 1961 there were only 11,753 girls in full time education in the whole of Saudi Arabia, while in 1984 the figure was 782,436, (Table 1.8, Chapter One), increasing the probability of student friendships by girls, and thereby increasing the desire by girls and women for transport to visit each other. On the other hand, the continuing population drift to urban areas will give more and more girls the opportunity to be involved in full-time education (see Table 1.1, Chapter One). In Dammam, for example, the 1974 population census showed that only 43.25% of the Saudi population were female, whereas by 1985 the home interview survey conducted in this study revealed that 48.7% were female, this close to Hill International's 1978 figures (49%). This was because men moved alone to cities to find work, only bringing their families when they have become established. In addition, the pyramid shape showing the high birth rate, revealed by

the age-sex distribution in Figure 7.2 indicates that there will be more and more girls coming into full-time education. Although in Saudi Arabia the number of girls in education has risen sharply, when the total number of female students is compared to the whole Saudi population there is an indication that there are a large number of females who are not attending school. This can be confirmed by a comparison with Libyan data. Libya has a similar social and economic background to Saudi Arabia, and has compulsory female education. It had 556,000 females in full-time education out of a total population of about 4 million,<sup>(3)</sup> i.e. 13.9%, while out of a total population of more than 11 million (Ministry of Planning, 1984) Saudi Arabia has only 782,436 females in full-time education, i.e. 7.1%.

Therefore these figures suggest that the female school population in Saudi Arabia will continue to increase steeply, certainly in the urban areas, leading to further transport demand by girls. This could mean that the number of girls completing secondary education is likely to exceed the Fourth Development Plan (1985-1990) forecast of 25,000 in 1990.<sup>(4)</sup> This would strongly indicate that at least 20,000 female students per annum will be graduating from Universities by the mid 1990's which, without a wider choice of jobs for women, would lead to increased competition for jobs in female education, and, as posts in their home cities are filled, women will have to travel further and further away from their home cities to find work (see Chapter Five). Therefore many employed women will have to commute greater distances than employed men. Even today, for instance, the numbers of women commuting between Dammam and Qatif show that their average journey is longer than that of males. This comparison differs in many other

Figure 7.2



Source : CH2M Hill International, 1979.

countries, for example, in the United States women travel, on average, 7 miles to work every day compared with 11 miles for men, although they have the freedom to drive themselves, and can use all types of public transport systems.<sup>(5)</sup>

The changing role of women in Saudi Arabia, because of their involvement in education and in the economy as a whole, has drawn attention to the importance of women's transport. The implication of all these considerations is that women will present an ever increasing demand for intra- and inter-urban transport. Therefore a plan to provide solutions acceptable to Saudi society is needed for implementation as soon as possible, rather than waiting for the complexity of the problems to become more involved. Those problems would entail more and more private cars being used, more drivers under eighteen years of age, and more men involved in women's transport, and possibly more accidents and injuries. All this could increase economic costs, in vehicle imports, spare parts, police and medical services, fuel and employees' time keeping discipline, and the human cost in main drivers and passenger. Indeed, all these costs are to some extent involved in the present modes of female urban transportation.

Finally, further research needs to be carried out by planners in all disciplines involved in urban transport because, firstly, the issue of women's mobility has never been adequately investigated in developing countries including Saudi Arabia, and secondly, there is no complete picture of the social and human aspects of people's mobility since most research has concentrated on small groups with particular problems, for instance, the handicapped, the disabled or those whose economic status restricts their access to transport. Therefore, more

research needs to be carried out which should include all potential transport users and those social aspects governing transport use; for example the effect of cultural traditions on women's mobility in Saudi Arabia. Moreover, social studies relating to transportation are an important but underdeveloped aspect of geography and, indeed, of other disciplines. Humanistic transportation geography as Peter O. Muller calls it, only began to emerge in the early 1970's.<sup>(6)</sup> As Anne Boer said (1986)

"Transport sociology is probably one of the most remarkable of sociological sub-disciplines not, primarily, because it covers a very complex field but because it is as much underdeveloped as it is of great potential importance, both for sociology and also for physical and transport planning."<sup>(7)</sup>

As mentioned above consideration of social factors could lead to greater success in urban transport planning, with the possible reduction in both economic and human costs.

References

1. Robert Lonney, Saudi Arabia's Development Potential : application of an Islamic growth model, 1982, p. 1.
2. Desmond McNeill, "Urban transport in developing countries" Development Research Digest 2, 1978, p. 47.
3. Ibrahim, A., The Labour Force in Libya : Problems and Prospects Unpublished Thesis submitted for the degree of Ph.D., University of Durham, 1987.
4. Fourth Development Plan, (1985-1990), p. 299.
5. Marion B. Fox, "Working women and travel", Journal of the American Planning Association, Winter 1983, Vol. 49, No. 1, p. 159.
6. Peter O'Muller, "Social transportation geography", Progress in Geography, International Reviews of Current Research, 1976, p. 208.
7. Enne de Boer, Transport Sociology, Social Aspects of Transport Planning, 1986, p. 7.

BIBLIOGRAPHYA. Books and Articles

(1986) "Transportation achievement and challenges: a documentary attachment about transportation" Al Yamamah Magazine Special issue No. 903.

(1984) "Transportation and movement II : Human dimensions and settlement patterns "Ekistics, the problems and science of human settlements (special issue) Vol. 51, No. 306, May/June.

ABDO, Assad (1969) A geographical study of transport in Saudi Arabia, Ph.D. thesis, University of Durham.

ABDO, Assad (1972) "The evolution of modern roads in Saudi Arabia" Bulletin de la Society de Geographie d'Egypt, XLI-XLII.

ABDULGHANI, K.M. (1982) Driver characteristics and their relation to traffic occurrences, Ph.D. Thesis Michigan State University.

ABU-LUGHOD, Janet (1983) "Urbanisation and social change in the Arab World" Ekistics: the science and study of human settlements, 50 (300) p. 223-231.

AHMAD, M.F. & COSTA, Frank J. (1983) "Al Jarudiya: a model for the low rise/high density development in the Eastern Province of Saudi Arabia" in Islamic Architecture and Urbanism selected papers.

AL-BAADI, Muhammad Hamad (1982) Social change, education and the roles of women in Arabia, Ph.D. Thesis, Stanford University.

AL-HATHLOUL, Saleh A. (1978) "Design principles for housing development in Arab-Muslim cities" in Housing Problems in Developing Countries, Volume 2, Proceedings of IAHS International Conference 1978, University of Petroleum & Minerals.

AL-HATHLOUL, Saleh A. (1986) "Development of the contemporary physical environment in Riyadh" Modern & Traditional Architecture in Riyadh, Albenaa, 5 (8) April-May.

AL IBRAHIM, Ali Abdullah (1982) Regional and urban development in Saudi Arabia, Ph.D. dissertation, University of Colorado.

AL JASIR, Hamad (1966) Riyadh city through history (in Arabic).

Al Jazeera Newspaper, Riyadh (in Arabic), 1982-1987.

- AL NAFEEZ, Ibrahim A. (1985) Privacy and thermal comfort in the Saudi house Thesis, Howard University, Washington D.C.
- AL-SAIF, Jaleel (1984) Traffic development in Saudi Arabia, presented to Medical School Seminar, Kind Saud University, 19 October.
- AL SHUAIBY, A.M. (1976) The development of the Eastern Province, Ph.D. Thesis, University of Durham.
- ALTORKI, Soraya (1986) Women in Saudi Arabia: ideology and behaviour among the elite, Columbia University Press.
- ALTSHULER, Alan et al (1981) The urban transportation system: politics and policy innovation, The MIT
- ANKER, Richard & HEIN, Catherine (1986) Sex inequalities in urban employment in the Third World, New York: St. Martin's Press.
- ARAMCO, Aramco World Magazine.
- ARAMCO, The Carven Journal.
- ARAMCO, Community Development Division (1984) Operations guide manual No. 3565.

- AUSTIN, Ian (1985) "Bus systems key to urban transport" Urban Edge,  
World Bank, 9 (5) May.
- BAHRY, Louay (1982) "The new Saudi women" Middle East Journal, 36 (4),  
505-515.
- BERRY, B.L.J. (1963) Commercial structure and commercial blight,  
Chicago: University of Chicago  
Department of Geography research  
paper No. 85.
- BOER, E. de (ed) (1986) Transport sociology: social aspects of  
transport planning, urban and  
regional planning, Vol. 35, London.
- BONSALL, P.W. (1979) Car pooling in the USA: a British perspective,  
Transport and Road Research  
Laboratory, TRRL supplementary  
Report 516.
- BOON, Jon J. (1983) "Legislative controls and housing policy as  
development from residential pattern  
in Saudi Arabia" in Islamic  
Architecture and Urbanism, selected  
papers.
- BRITISH PETROLEUM (1985) Statistical review of world energy.

- CARMEN & MARSHALL, F. (1975) "Transit sketch planning procedures: new approaches to travel forecasting" Transportation Research Record, No. 569.
- CHAMBER OF COMMERCE & INDUSTRY, EASTERN PROVINCE, Dammam, Aliktisad, monthly economic magazine (in Arabic).
- COSTA, Frank & NOBLE, Allen G. (1986) "Planning Arabic towns" Geographical Review, American Geographical Society 76 (2), April.
- CREIGHTON, Roger L. (1972) Urban transportation planning, University of Illinois.
- DANIELS, P. & WARNES, A. (1980) Movement in cities, spatial perspective on transport and travel, Cambridge: CUP.
- DASGUPTA, M. (1982) Access to employment opportunities by car and by bus in inner and outer areas of Manchester, Transport & Road Research Laboratory. TRRL supplementary report 741.
- DICKEY, John W. & MILLER, H. (1984) Road project appraisal for developing countries.

ECONOMIST INTELLIGENCE UNIT, Quarterly Energy Review, Middle East.

EL MALLAKH, Ragaei & ATTA, J.K. (1980) The absorptive capacity of Kuwait domestic and international perspective, Lexington Books.

FATHY, Mohamad (1985) The character of the Saudi city (in Arabic).

FATHY, Mohamed (1985) "Development of the Saudi city", Arab City Journal, 14, July.

FOURACRE, P.R. (1977) Intermediate public transport in developing countries, Transport and Road Research Laboratory, TRRL supplementary report 772.

FOX, Marion B. (1983) "Working women and travel, the access of women to work and community facilities" Journal of the American Planning Association, 49, (1) Winter.

GOTTMANN, Jean (1986) "Transatlantic orbits: the interplay in the evolution of cities" in M.P. Conzen, World Patterns of modern urban change, Chicago: University of Chicago, Department of Geography, Research Paper No. 217-218.

- GRANT, Keith (1981) "Changing transportation technology and urban development" Ealing Papers in Geography for Sixth Forms, Volume 1, Ealing: Ealing College of Higher Education.
- GREEN, G.R. (1978) Car-sharing and car-pooling - a review, Transport and Road Research Laboratory, TRRL Report 358.
- GREENING, P.A.K. and JACKSON, R.L. (1982) The Basingstoke taxi and private hire car, Transport and Road Research Laboratory, TRRL Laboratory Report 1062.
- GREENING, P.A.K. and JACKSON, R.L. (1982) Minibus pooling in Great Britain: legal and economic aspects, Transport and Road Research Laboratory, TRRL Supplementary Report 726.
- GRILL, N.C. (1984) Urbanisation in the Arabian Peninsula, Durham: University of Durham, Centre for Middle Eastern and Islamic Studies, Occasional Paper No. 25.
- IBRAHIM, Abd Albagy (1982) Establishing cultural values in building a modern Islamic city, Jeddah: Centre for Planning and Agricultural Studies (in Arabic).

IBRAHIM, A. (1987) The labour force in Libya : problems and prospects,  
Unpublished Thesis submitted for the  
degree of Ph.D., University of  
Durham.

JACKSON, R.L. (1982) Minibus pooling: the Ilford experiment,  
Transport and Road Research  
Laboratory, TRRL supplementary  
report 739.

JACOBS, G.D. and HUTCHINSON, P. (1973) A study of accident rates in  
developing countries, Transport and  
Road Research Laboratory, TRRL  
report 546.

JOHANY, Ali D. et al (1986) The Saudi Arabian economy, London: Croom  
Helm.

JOHNSON, James H. (1972) Urban geography: an introduction analysis.

KAY, Shirley (1979) Saudi Arabia.

KUWAIT CHAMBER OF COMMERCE AND INDUSTRY, The Kuwaiti Economist.

LAMB, Richard (1975) Metropolitan impacts on rural America, Chicago,  
University of Chicago, Department of  
Geography, Research Paper No. 162.

- LAWLESS, R.I. (1980) "The future of historic centres: conservation or redevelopment" in G.H. Blake & R.I. Lawless, The changing Middle Eastern city.
- LOONEY, R.E. (1982) Saudi Arabia's development potential: application of an Islamic growth model, Lexington Books.
- MANNING, Ian (1984) Beyond walking distance: the gains from speed in Australian urban travel, Australian National University Press.
- MAXFIELD, Donald W. (1972) "Spatial planning of school districts" Annals of the Association of American Geographers, 62 (4), December, 582-590.
- McAUSLAN, Patrick (1986) Urban land and shelter for the poor, Earthscan, Russell Press.
- McNEILL, Desmond (1978) "Urban transport planning in developing countries" Development Research Digest, 2.
- MITCHELL, Kit (1981) "An application of the social sciences to transport planning" in D. Banister & P. Hall, Transport and public planning, London: Mansell.

- MORLOK, Edward (1978) Introduction to transportation engineering and planning, McGraw-Hill Kogasha Ltd., International Student edition.
- MULLER, Petter O. (1976) "Social Transportation geography" Progress in Geography International Reviews of Current Research, vol. 8.
- NACHMIAS, D. and NACHMIAS, C. (1981) Research methods in the social sciences, St. Martin's Press.
- NIBLOCK, Tim (1982) State, society and economy in Saudi Arabia, London: Croom Helm.
- OECD (1980) Urban transport and the environment, Report of a seminar held by the OECD and the European Conference of Ministers of Transport, 10-12 July 1979, Washington D.C.: National League of Cities.
- OWEN, Wilfred (1976) Transportation for cities: the role of Federal Policy.
- PELLY, Lewis (1976) Report on a journey to Riyadh in Central Arabia, with a new introduction by R. Bidwell, Middle East Centre, University of Cambridge.

PENDLETON, Scott (1980) "A house for every citizen" Saudi Business and Arab Economic Report, 3 (52), 22-23.

PIKARSKY, Milton (1980) Public transportation an element of the urban transportation system, US Department of Transportation Technology Sharing Report.

RAJAB, U.F. (1983) "The education system and the requirements of the labour force in Saudi Arabia" (in Arabic) Journal of the Gulf and Arabian Peninsula Studies, vol IX, No. 33, January.

RIYADH NEWSPAPER.

RUGH, William A. (1969) Riyadh history and guide.

SAABIQ, Said (n.d.) Fugh alssenh al-mujallad al-thani (Part 2), Cairo (in Arabic).

SAGRON, Dick S. (1975) "Transportation in developing countries: some sensitivity considerations" in M. Clark, Transportation and Land use planning abroad, Ph.D. dissertation, Claremont.

SAUDI ECONOMIC REVIEW.

SAUDI ECONOMIC SURVEY.

- SCHULZ, David F. (1979) "Long-range transportation planning in south-eastern Wisconsin"  
Transportation Research Record,  
Regional Planning Commission,  
Waukesha, No. 707.
- SERAGELDIN, I. and EL-SADEK, S. (1982) The Arab City: its character and Islamic Cultural Heritage,  
Riyadh, The Arab Urban Development  
Institute, Proceedings of a  
Symposium, Medina, 28 February - 5  
March, 1981.
- SHAPCOTT, Mary and STEADMAN, Philip (1978) "Rhythms of urban activity" in Carlstein, T. et al, Human activity and time geography.
- SMALL, John and WITHERICK, M. (1986) A modern dictionary of geography.
- STARKIE, D.D.W. (1973) "Transportation planning and public policy,"  
Progress in Planning Vol 1, Part 4,  
eds. D. Diamond and McLoughlin.
- STARKIE, D.M.N. (1976) Transportation planning policy and analysis,  
Urban Regional Planning Series Vol.  
13.

STEGNER, Wallace (1971) Discovery.

STRATFORD, Alan H. (1967) Air transport economics in the supersonic era, London: Macmillan.

STRATFORD, Alan H. (1974) Airports and the environment, London: Macmillan.

TALIB, Kaizer (1984) Shelter in Saudi Arabia.

TOWN, Stephen, W. (1981) "The sociologist's perspective on transport" in D. Banister and P. Hall, Transport and public planning, London: Macmillan.

TURNER, Louis (1984) "Development of downstream industries in Jubail and Yanbu", Arab Gulf Journal, 4 (2), October.

UNITED NATIONS (1981) Demographic yearbook.

UKAZ daily newspaper, 1986.

WACHS, Martin (1984) "Autos, transit and the sprawl of Los Angeles: the 1920s" Journal of the American Planning Association, 50 (1).

WAHABA, Hafiz (1946) Arab Peninsula in the twentieth century (in Arabic).

WORLD BANK (1975) Urban transport: sector policy paper, May.

YACOV, Zahavi (1976) Travel characteristics in cities of developing and developed countries,  
International Bank for  
Reconstruction and Development Paper  
No. 230.

YOUNG, Arthur, N. (1983) Saudi Arabia: the making of a financial giant.

B. Official Publications

Department of Transport / Scottish Development Department / Welsh Office, UK, Transportations, Great Britain 1974-1984, 1985.

Fatwa, by Mohamad Saleh Al-Othamin signed on 19/6/1406 AH (1986) (in Arabic).

General Presidency for Female Education, Jeddah Office, Education in Saudi Arabia 1975-1980, (in Arabic).

Institute of Public Administration, Saudi Arabia, Timekeeping discipline in Government Offices, 1981 (in Arabic).

Ministry of Communications, Saudi Arabia, Land and Marine transportation, 1984.

Ministry of Communications, Transport Department, Saudi Arabia.

Ministry of Defence and Aviation, Presidency of Civil Aviation, Saudi Arabia.

Ministry of Education, Dammam, Education in the Eastern Region, 1985.

Ministry of Finance, Saudi Arabia, Statistical Yearbooks.

Ministry of Interior, Saudi Arabia, The city and the present airport, prepared by Doxiadis Associates, Athens, 1968 (in Arabic).

Ministry of Interior, Saudi Arabia, Statistical yearbooks.

Ministry of Municipal and Rural Affairs, Saudi Arabia, Eastern Region plan, Master plan Ad Dammam, prepared by G. Candilis International Consultants, 1976.

Ministry of Municipal and Rural Affairs, Deputy Ministry for Physical Planning, Saudi Arabia, Dammam action master plan report No. 1a Project 204, CH2M Hill International, 1979.

Ministry of Municipal and Rural Affairs, Deputy Ministry for Physical Planning, Saudi Arabia, Dammam action master plan report No. 1b Project 204, CH2M Hill International.

Ministry of Municipal and Rural Affairs, Deputy Ministry for Physical Planning, Saudi Arabia, Dammam action master plan report No. 3, Project 204, CH2M Hill International, 1978.

Ministry of Municipal and Rural Affairs, Deputy Ministry for Physical Planning, Saudi Arabia, Dammam action master plan technical report No. 5, Project 204, CH2M Hill International, 1979.

Ministry of Municipal and Rural Affairs, Deputy Ministry of Physical Planning, Dammam action master plan, technical report No. 5A, Project 204, CH2M Hill International, 1979.

Ministry of Municipal and Rural Affairs, Deputy Ministry for Physical Planning, Dammam action master plan technical report No. 5C Project 204, CH2M Hill International, 1979.

Ministry of Municipal and Rural Affairs, Deputy Ministry of Physical Planning, Dammam action master plan, technical report No. 5D, Project 204, CH2M Hill International, 1979.

Ministry of Municipal and Rural Affairs, Deputy Ministry of Town Planning, Saudi Arabia, Dammam action master plan technical report No. 9, Project 204, CH2M Hill International, 1979.

Ministry of Municipal and Rural Affairs, Saudi Arabia, Limitation of the Saudi urban development, report by Dammam Municipality, 1984 (in Arabic).

Ministry of Municipal and Rural Affairs, Deputy Ministry for Physical Planning, Riyadh action master plans technical report No. 6, Project 201, prepared by SCET International, 1979.

Ministry of Municipal and Rural Affairs, Water and Sewerage Directorate of Eastern Province, Saudi Arabia, Annual Reports.

Ministry of Planning, Saudi Arabia, Achievements of the development plans, 1983.

Ministry of Planning, Saudi Arabia, Second Development Plan (1975-1980).

Ministry of Planning, Saudi Arabia, Third Development Plan, (1980-1985).

Ministry of Planning, Saudi Arabia, Fourth Development Plan  
(1985-1990).

Ministry of Planning, Saudi Arabian National Transportation Plan  
(SANTRAPLAN) Final Report vol I :  
Executive summary, prepared by Kocks  
Consult GMBH, 1982.

Ministry of Planning, Saudi Arabian National Transportation Plan  
(SANTRAPLAN) Final Report Vol II :  
Main Report, prepared by Kocks  
Consult GMBH, 1982.

Ministry of Planning, Saudi Arabian National Transportation Plan  
(SANTRAPLAN) Final Report VI : Air  
transport, prepared by Kocks Consult  
GMBH, 1982.

Real Estate Development Fund, Ministry of Finance, Saudi Arabia, Annual  
Reports.

Report to Dammam Municipality, by International Land Development  
Consultants, 1975.

Royal Commission for Jubail and Yanbu, Saudi Arabia, Annual Reports.

Saudi Arabia Ports Authority, Annual Reports.

Saudi Arabian Monetary Agency, Annual Reports.

Saudi Government Railroad Organization, The future of the Saudi railroad, final report, prepared by Arthur D. Little, 1975 (in Arabic).

Saudi Government Railroad Organization, The future of the Saudi railroad, annexes and appendices, prepared by Arthur D. Little, 1975.

Saudi Arabian Public Transport Company (SAPTCO), Annual Reports.

Saudi Arabian Public Transport Company (SAPTCO), Training manual for SAPTCO's conductors, 1979.

Saudia Airline, Annual Reports.

UNECWA (1979) The population situation in the ECWA region: Saudi Arabia, United Nations Economic Commission for Western Asia, Beirut.

US Department of Housing and Urban Development, Housing and Urban development in Saudi Arabia, HUD international country profile, Washington D.C.: USGPO, 1977.

APPENDICES

APPENDIX A

FIELD WORK AND SURVEY

As mentioned earlier in this thesis, this is the first known study in Saudi Arabia of women mobility. To collect data on which this thesis was constructed it was necessary to carry out original field work. This included a household survey and sending questionnaires to girl's schools in Dammam and surrounding areas and acquiring data from Government Departments in Riyadh and Eastern Region. The field work was conducted between 10th of October 1984 and 20th of March 1985. There was a follow-up short visit in July 1986. The surveys methodology was as follows:

1. Household survey

The household survey, which involved personal interviews with the heads of households, was based upon the distribution of mosques. Because there is no registration of buildings nor means of identifying them to select household it was decided to use the random distribution of mosques in the Dammam as reference points. From a list of 120 supplied by the religious authorities "Al-Hajj and Al-Awqaf" in Dammam, 31 were chosen by random selection. Five days only were spent in the immediate vicinity of each mosque. The nearest house to each mosque was visited, and then every fifth house after that moving leftwards, provided that it was occupied by a Saudi household. The planned intention was to interview about 500 households, averaging 17 per mosque, however, 289 households were actually visited. The reasons for the difference between the chosen figure and the actual figure was firstly, there was a confusion over the names of the mosques, the ones given by the authorities were the officially recorded names but these were not the same as those names known by the local people, thus a great deal of time was lost in correctly identifying the selected mosques. Secondly, the survey required a personal interview, which

could only be carried out in the afternoon, that is after work and also several visits were needed in order to secure an appointment and interview with the same household. Thirdly, since some of the questions dealt with sensitive cultural issues, the interviews could not be rushed, and had to be handled with tact and diplomacy.

## 2. Individual Questionnaires

As referred to earlier, the Questionnaires were distributed to female teachers through the official channels of the Presidency of Girls Education; direct contact between the author and Saudi women was ruled out through the traditions of Saudi society. Of 57 girls schools in Dammam, 20 were chosen according to their geographical distribution. This selection was conducted by the Presidency, 11 of the chosen schools were elementary, 6 intermediate, and 3 secondary, and 10 individual questionnaires were sent to each school. Since the average number of teachers per school was 25, more than one third of Dammam's women teachers received a questionnaire. Of the 200 questionnaires distributed, 186 were completed and returned, 102 from elementary schools, 55 from intermediate and 29 from secondary schools.

## 3. Questionnaires to school principals

Official channels were also used to distribute these Questionnaires, and completed Questionnaires were received from almost all schools in the area between Khobar and Jubail, including Dammam. This was handled by the General Presidency of Girls Education in Dammam, and its branches. Of the 208 Questionnaires distributed, 177 were completed and returned by school principals to their local education offices.

APPENDIX B

HEAD OF HOUSEHOLD QUESTIONNAIRE

جامعة الملك سعود  
كلية الآداب



استبيان تنقل الأسرة

في مدينة الدمام  
١٤٠٥ هـ - ١٩٨٥ م

## عزيزي المواطن ...

تحية طيبة وبعد .

كما تعرف بأن هناك العديد من المشاكل التي ترتبط بالنقل وخاصة فيما يتعلق بنقل افراد الاسرة .

أني طالب دراسات عليا احضر الدكتوراه بجامعة درم . ببريطانيا ومبتعث من قبل جامعة الملك سعود واقوم حاليا بجمع مادتي العلمية والمتعلقة « بتنقل افراد الاسرة وخاصة النساء » .

وحتى احصل على صورة وافية عن تلك الدراسة لا بد ان اقوم بجمع عينات لبعض اسر مدينة الدمام والتي بدورها ستعكس نفس الصورة لبقية مدن المملكة .

والاستبيان هو احد الوسائل العلمية التي على ضوئها تبني الحلول . لذا فان تعاونكم مهم وفعال ودونه لن تكون هناك اي حلول .

شاكرا ومقدرا تعاونكم لما فيه خدمة العلم .

والله الموفق

*Dear Citizen,*

*As you will be aware, there are many problems associated with transport in Saudi Arabia particularly concerning families.*

*I am a postgraduate student at Durham University, England, researching these problems in order to make suggestions for improvement.*

*The objective of this survey is to build up a picture of the transport situation in Dammam which will give information relevant to the country as a whole. Your cooperation is required, since, if such information is not gathered, there can be no progress.*

*I am not asking people's names, and households are coded only by area, so your confidentiality and anonymity are assured. I have no connection with any government agency.*

**Thank you for your assistance.**

Name of District

اسم المنطقة (الحي)

Mosque

اسم المسجد

## PART ONE الجزء الأول

1 Number of Persons in Household

١ عدد افراد المنزل

M

F

A. Over (16 years)

١ - فوق ١٦ سنة

B. Under "

ب - اقل من ١٦ سنة

2 Total Number of Persons in household working outside house:

٢ عدد افراد العائلة الذين يعملون خارج المنزل

A. Number of Males

١ - عدد الذكور

B. Number of Females

ب - عدد الاناث

3 Types of employment: Fill in the number of male persons employed in each category

٣ نوع العمل: اذكر عدد الافراد الذكور العاملين في الحقول التالية

Types

نوع العمل

A. Teaching

١ - تعليمي

B. Government

ب - حكومي

C. Private Office

ج - عمل خاص

D. Factory

د - مصنع

E. Shop

هـ - محل

F. Coffee Place

و - مقهى

G. Restaurant

ز - مطعم

H. Others

ح - اخرى

4 Total Annual Income for all members of household combined:

٤ مجمل الدخل السنوي لكافة افراد العائلة تقريبا:

5 Annual Income of each household member:

A.	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	١ -
B.	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	٢ -
C.	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	٣ -
D.	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	٤ -
E.	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	٥ -

٥ الدخل السنوي لكل فرد  
من افراد العائلة:

## PART TWO الجزء الثاني

### Transportation

### النقل

6 How many persons in this household drive?

٦ كم عدد السائقين في هذا البيت  
يقود سيارة؟

7 Number of vehicles owned by members of household

٧ عدد السيارات (المراكب) التي يملكها  
افراد هذا البيت:

A. Saloon Car	<input type="text"/>	١ - سيارة صالون
B. Small Truck	<input type="text"/>	٢ - وانبنت صغيرة
C. Large Truck	<input type="text"/>	٣ - سيارة كبيرة
D. Own Taxi	<input type="text"/>	٤ - تاكسي خاص
E. Minibus	<input type="text"/>	٥ - باص صغير
F. Motor Cycle	<input type="text"/>	٦ - دراجة نارية

8 How do male members of the household travel to work?

٨ كيف يتم تنقل افراد المنزل  
الذكور من البيت الى العمل؟

- |                    |                          |                       |
|--------------------|--------------------------|-----------------------|
| A. Own Car         | <input type="checkbox"/> | ١ - سيارة خاصة        |
| B. Taxi            | <input type="checkbox"/> | ب - تاكسي             |
| C. S.A.P.T.C.O.    | <input type="checkbox"/> | ج - نقل جماعي         |
| D. Bus (Small Bus) | <input type="checkbox"/> | د - باصات شعبية صغيرة |
| E. Motor Car       | <input type="checkbox"/> | هـ - دراجة نارية      |
| F. On Foot         | <input type="checkbox"/> | و - مشيا              |
| G. Others          | <input type="checkbox"/> | ز - اخرى              |

9 How many accidents have the drivers been involved in during 1984

٩ ما عدد الحوادث التي حطت للسائقين  
خلال ١٩٨٤ م تقريبا؟

10 On average, how long does it take you to find a parking space?

١٠ كم من الوقت تستغرق للحصول على  
موقف للسيارة؟

- |                         |           |                          |                |
|-------------------------|-----------|--------------------------|----------------|
| A. At Home              | (minutes) | <input type="checkbox"/> | ١ - امام البيت |
| B. At Work              |           | <input type="checkbox"/> | ب - امام العمل |
| C. Shopping Town Centre |           | <input type="checkbox"/> | ج - في السوق   |

11 At what times do you think there is the most congestion

١١ في رايك متى تكون الحركة المرورية  
في اوج (اشد) زحمتها؟

- |              |                          |
|--------------|--------------------------|
| A. 7-8 a.m.  | ١ - بين ٧-٨ (صباحا)      |
| B. 9-8       | ب - بين ٨-٩ (صباحا)      |
| C. 9-10      | ج - بين ٩-١٠ (صباحا)     |
| D. 10-11     | د - بين ١٠-١١ (صباحا)    |
| E. 11-12     | هـ - بين ١١-١٢ (صباحا)   |
| F. 12-2 p.m. | و - بين ١٢-٢ (بعد الظهر) |
| G. 2-4       | ز - بين ٢-٤ (بعد الظهر)  |
| H. 4-6       | ح - بين ٤-٦ (بعد الظهر)  |

- 12 How do you avoid the congestion area? كيف تتحاكى (تبتعد) عن المناطق المزدحمة أثناء اوقات الازدحام (مثال أثناء الدوام الرسمي) ؟
- A. I find my way around  ا - ابحت عن طريق آخر
- B. I wait in the traffic jam  ب - انتظر في الازدحام
- C. Others  ج - اخرى
- 13 Have you (personally) been using public transportation within the D.M.A. هل استخدمت المواصلات في مدينة الدمام وفواحيها (المدن المجاورة) ؟
- A. No  ا - لا
- B. Yes  ب - نعم
- 14 When did you last use public transport within the D.M.A. متى اخر مرة استخدمت النقل العام داخل منطقة اقليم الدمام ؟
- This week  هذا الاسبوع Last week  الاسبوع الماضي Long time ago  من زمان
- 15 What was the purpose of your trips on public transportation ما هو الغرض من استخدامك المواصلات العامة (النقل الجماعي , تاكسي... ) ؟
- A. Travel to/from work  ا - الى العمل ومنه للبيت
- B. Shopping  ب - غرض التسوق
- C. Personal Business  ج - استخدامات شخصية
- D. Recreation  د - لغرض الترفيه
- E. Others  ه - اخرى
- 16 What was your reason for using public transport اذكر سبب استخدامك للمواصلات العامة (النقل الجماعي , التاكسي... الخ) :
- A. Own car under repair  ا - سيارة في التصلح
- B. Because public transport is cheaper  ب - رخص المواصلات العامة
- C. Because public transport is safer  ج - عدم خطورة المواصلات العامة
- D. Because public transport is dependable  د - المواصلات العامة اكثر اعتمادا

17 Are you planning to use public transport in the future?

١٧ هل تنوي استخدام المواصلات العامة في المستقبل؟

A. Yes

١ - نعم

B. No

٢ - لا

### PART THREE الجزء الثالث

These questions are to be answered only by family households with employed women.

هذا الجزء (الثالث) من الاسئلة يخص الاسر التي بها موظفات فقط.

18 Number of women in the household

١٨ ما عدد النساء بالمنزل؟

19 Number of women working outside the household

١٩ ما عدد النساء العاملات خارج المنزل؟

20 Number of women not working outside the house

٢٠ ما عدد النساء غير العاملات خارج المنزل؟

21 Occupation of working women

٢١ وطيفة النساء العاملات (ضع عدد النساء العاملات في اسرتك في الفراغ المقابل لكل مهنة) :

A. Teaching

١ - التدريس

B. Hospitals

ب - المستشفيات

C. Private Office

ج - مكتب خاص

D. Company Office

د - مكتب شركة

E. Others

هـ - اخرى

22 Relationship to Head of Household?

٢٢ ما هي طبة القرابة من رب الاسرة ؟ (النساء اللاتي شغلن فقط). املأ الفراغ بعدد النساء :

A. Wife

١ - زوجة

B. Daughter(s)

ب - بنت (بنات)

C. Sister(s)

ج - اخت (احوات)

D. Others

د - اخريات

23 Method of Women's travel to work and the time they leave for work

- ما هي وسيلة انتقال المرأة من البيت الى مكان عملها ( وما زمن ذهابها اليه )  
( ضع لي الفراغ المناسب من الوقت عدد النساء ) .

الوسيلة Method	الوقت Time	٦-٧	٧-٨	٨-٩	٩-١٠	١٠-١٢	اخرى Others
أ - توصل بواسطة رب الاسرة ( سيارته الخاصة ) A. Driven by head of house in his own car							
ب - توصل بواسطة قريب لها يملك سيارة B. Driven by male relative							
ج - توصل عن طريق سواق العائلة الخاص C. Driven by family chauffeur							
د - انها مؤمنة بمواصلات من قبل العمل D. Transport provided by employee							
هـ - النقل الجماعي E. S.A.P.T.C.O.							
و - اخرى F. Others							

24 Method of women's return trip from work to home

- ما هي وسيلة عودة النساء من العمل الى البيت وما هي فترة العودة الى البيت ؟

الوسيلة Method	الوقت Time	١-٢	٢-٣	٣-٤	٤-٥	٥-٦	اخرى Others
أ - ترجع بواسطة رب الاسرة ( سيارته الخاصة ) A. Driven by head of house in his own car							
ب - ترجع بواسطة قريب لها يملك سيارة B. Driven by male relative							
ج - ترجع عن طريق سواق العائلة الخاص C. Driven by family chauffeur							
د - انها مؤمنة بمواصلات من قبل العمل D. Transport provided by employee							
هـ - النقل الجماعي E. S.A.P.T.C.O.							
و - اخرى F. Others							

25 Distance of Women's travel from home to work

٢٥ مع في الفراغ المناسب البعد التقريبي  
لمسافة الرحلة من البيت الى العمل :

- A. Less than 0.5 Km
- B. 0.5 Km - 1.5 Km
- C. 1.5 Km - 3 Km
- D. 3-5 Km
- E. 5.7 Km
- F. More than 7 Km

- ١ - اقل من نصف كلم  
ب - من نصف كلم الى واحد ونصف كلم  
ج - من واحد ونصف كلم الى ٣ كلم  
د - من ٣ الى ٥ كلم  
هـ - من ٥ الى ٧ كلم  
و - اكثر من ٧ كلم

26 List the District in which work place is situated and fill in blank the number of women in each district

٢٦ ضع امام الحي الذي يقع فيه عمل النساء  
وعددهن اذا امكن :

عدد النساء

District	Number of Women	الحي / او المنطقة
A. AL-DAWASSER WASAT AL-MEDINA	<input type="text"/>	١ - الدواسر
B. AL-ADAMAH	<input type="text"/>	ب - العدامة
C. AL-BADIAH	<input type="text"/>	ج - البادية
D. SKAT AL-HADID	<input type="text"/>	د - سكة الحديد
E. AL-NASRIAH	<input type="text"/>	هـ - الناصرية
F. MADINAT AL-UMMAL BEN-KLDOON	<input type="text"/>	و - مدينة العمال
G. Al-JALUAIH SALAMAH	<input type="text"/>	ز - الحلوية
H. Al-TUBAISHI	<input type="text"/>	ح - الطيش
I. DISTRICTS 75, 8 and 37	<input type="text"/>	ح - حي : ٧٥ ، ٨ ، ٣٧

- 27 If the women working in the household do not work in Dammam, in which of the following places do they work?

٢٧ مع في المكان المناسب عدد النساء اللاتي يشتغلن خارج مدينة الدمام :

	Number of Women	عدد النساء
A. Al-Khobar	<input type="text"/>	١ - الخبر
B. Al-Dhahran	<input type="text"/>	ب - الظهران
C. Al-Qatif	<input type="text"/>	ج - القطيف
D. Al-Jubail	<input type="text"/>	د - الجبيل
E. Others	<input type="text"/>	هـ - اخرى

- 28 Does this obligation to drive the women to work make it difficult for males in the household to do their jobs.

٢٨ هل تعتقد بان عملية نقل النساء عندكم قد أوجدت بعض المعوقات لافراد الاسرة الذكور في تأدية عملهم الوظيفي ؟

A. Yes	<input type="text"/>	١ - نعم
B. No	<input type="text"/>	ب - لا

#### PART FOUR الجزء الرابع

- 29 Please indicate your reaction to the following statements

٢٩ ما رأيك بالعبارات التالية :

1. SA (Strongly agree)	١ - موافق جدا
2. A (agree)	٢ - اوافق
3. D (disagree)	٣ - لا اوافق
4. SD (Strongly disagree)	٤ - لا اوافق اطلاقا

- A. Using a family chauffeur solves women's transport problems, especially travel to and from work.

ا - استخدام سواق العائلة حل مشكلة نقل النساء لا سيما من البيت الى العمل وبالعكس

SA	A	D	SD
1	2	3	4

- B. It is shameful for women to ride in a taxi without their husbands or, brothers.

ب - انه شيء مخجل اذا ركبت المرأة التاكسي بدون زوجها او احبها

SA	A	D	SD
1	2	3	4

- C. S.A.P.T.C.O. should provide special buses for women from home to work.

ج - من الافضل لو ان شركة النقل الجماعي اعدت باصات خاصة تخدم نقل النساء من العمل الى البيت وبالعكس

SA	A	D	SD
1	2	3	4

- D. The best solution for women transport is to allow them to drive within built up areas (cities).

د - أفضل حل لمشكلة نقل النساء هو السماح لهن بالقيادة ولكن ضمن المناطق المعمورة فقط (اي داخل المدن)

SA	A	D	SD
1	2	3	4

APPENDIX C

WOMEN TEACHERS IN DAMMAM QUESTIONNAIRE

جامعة الملك سعود  
كلية الآداب



استبيان تنقل النساء الموظفات

في مدينة الدمام

١٤٠٥ هـ - ١٩٨٥ م

بسم الله الرحمن الرحيم

اختي الموظفة،،،

كما تعرفين بأن هناك العديد من المشاكل التي ترتبط بالنقل وخاصة فيما يتعلق بتنقل أفراد الأسرة .  
 أنني طالب دارسات عليا احضر الدكتوراه بجامعة درم ببريطانيا ومبتعث من قبل جامعة الملك سعود واقوم حاليا  
 بجمع مادتي العلمية والمتعلقة « بتنقل افراد الاسرة وخاصة النساء » .  
 وحتى احصل على صورة وافية عن تلك الدراسة لا بد ان اقوم بجمع عينات لبعض اسر ومدارس تعليم البنات لمدينة  
 الدمام والتي بدورها ستعكس نفس الصورة لبقية مدن المملكة .  
 والاستبيان هو احد الوسائل العلمية التي منها تبني الحلول . لذا فان تعاونكم مهم وفعال ودونه لن تكون هناك اي  
 حلول .  
 شاكرا ومقدرا تعاونكم لما فيه خدمة العلم .

والله الموفق

بيانات عمل المرأة  
SURVEY FOR : EMPLOYED WOMEN

- 1 Level of Education: 1 المستوى التعليمي:
- |                        |                          |             |
|------------------------|--------------------------|-------------|
| A. University          | <input type="checkbox"/> | 1 - جامعية  |
| B. Secondary School    | <input type="checkbox"/> | ب - ثانوي   |
| C. Intermediate School | <input type="checkbox"/> | ج - اعدادي  |
| D. Elementary School   | <input type="checkbox"/> | د - ابتدائي |
| E. Others              | <input type="checkbox"/> | هـ - اخرى   |
2. Do you feel that you have any transportation problems? 2 هل تواجهين مشاكل في التنقل من (المبيت الى العمل وبالعكس) ؟
- |        |                          |         |
|--------|--------------------------|---------|
| A. Yes | <input type="checkbox"/> | 1 - نعم |
| B. No  | <input type="checkbox"/> | ب - لا  |
- 3 Does your household own a car? 3 هل تملكون سيارة في بيتكم؟
- |        |                          |         |
|--------|--------------------------|---------|
| A. Yes | <input type="checkbox"/> | 1 - نعم |
| B. No  | <input type="checkbox"/> | ب - لا  |
- 4 Put Mark ( ) by availability of a car as a passenger: 4 ضع علامة ( ✓ ) في العنايات التي توافق مدى توفر السيارة لك:
- |   |                          |                                 |
|---|--------------------------|---------------------------------|
| A. Always available when I need it.                 | <input type="checkbox"/> | 1 - موجودة دوما عند الطلب       |
| B. Usually available when I need it.                | <input type="checkbox"/> | ب - عادة موجودة عند الطلب       |
| C. Available about half of the time when I need it. | <input type="checkbox"/> | ج - موجودة احيانا (لبعض الوقت)  |
| D. Occasionally available when I need it.           | <input type="checkbox"/> | د - تكاد تكون موجودة            |
| E. Never available when I need it.                  | <input type="checkbox"/> | هـ - لا تتوفر ومتعدرة عند الطلب |

5 Do you use public transportation?

٥ هل تستخدمين المواصلات العامة  
(النقل الجماعي/ تاكسي الخ)؟

A. Yes

١ - نعم

B. No

٢ - كلا

6 How many times per week?

٦ كم مرة في الاسبوع؟

A. Bus

١ - باص

B. Taxi

٢ - تاكسي

7 Do you feel embarrassed or  
ashamed when you take the  
bus or taxi?

٧ هل تشعرين بالخجل او الاحراج عند استخدامك  
الباص او التاكسي؟

A. Bus Yes

١ - باص نعم

No

كلا

B. Taxi Yes

٢ - تاكسي نعم

No

كلا

8 Do you think it is shameful  
for a woman to ride the bus  
or taxi alone?

٨ هل تعتقدن بان استعمال المرأة الباص او التاكسي  
بدون رفقة احد افراد الاسرة عمل محجل؟

A. Bus Yes

١ - باص نعم

No

كلا

B. Taxi Yes

٢ - تاكسي نعم

No

كلا

9 If there were a "women-only" bus  
shelter within walking distance  
from which buses operated a shuttle  
service to the shopping center, or  
to your place of work, would you  
use it?

٩ لو كان هناك محطة باصات خاصة بالنساء  
قريبة من بيتك وتقوم برحلات متتابعة الي  
السوق ومكان عملك هل ستستخدمين الباص؟

A. Yes

١ - نعم

B. No

٢ - لا

10 What would induce you to use the bus or use it more often?

- A. If it were cheaper  
B. If more women rode the bus  
C. If buses operated on their schedules  
D. If buses operated more frequently  
E. If the bus went to my destination  
F. If it was satisfactory to my family

١٠ ما الذي يمكن ان يؤثر عليك لكي تستخدمين ركوب الباص؟

- ١ - اذا كانت الاجرة رخيصة   
ب - اذا هناك فعلا نساء يستخدمن الباص   
ج - اذا كانت الباصات ملتزمة فعلا في مواعيدها   
د - اذا كانت حركة الباصات منتظمة   
هـ - اذا كان الباص يأخذني الى المكان المطلوب   
و - اذا كانت مقنعة لاسرتي

11 Please indicate your reaction to the following statements

١١ ما رأيك بالعبارات التالية :

1. SA (strongly agree)  
2. A (agree)  
3. D (disagree)  
4. SD (strongly disagree)

- ١ - موافقة بمعنى الكلمة  
٢ - اوافق  
٣ - لا اوافق  
٤ - لا اوافق اطلاقا

- A. Using a family chauffeur solves women's transportation problems.  
B. It is shameful for women to ride in a taxi without their husbands or brothers  
C. S.A.P.T.CO. should provide special buses for women (from home to work)  
D. The best solution for womens transport is to allow them to drive within built up areas (cities).

- ١ - استخدام السواقين في السيارات حلت مشاكل تنقلات المرأة وخاصة الى العمل  
ب - مخجل ان تركب المرأة التاكسي او الباص بدون زوجها او اخيها  
ج - ما مدى موافقتك لو ان شركة النقل الجماعي وفرت باصات خاصة بالنساء لنقلهن من البيت الى العمل وبالعكس؟  
هـ - هل تؤيدن لو ان المرأة اعطيت حق القيادة ولكن ضمن المناطق المكونة (المدن) ؟

موافقة

بمعنى الكلمة اوافق لا اوافق لا اوافق اطلاقا

	بمعنى الكلمة	اوافق	لا اوافق	لا اوافق اطلاقا
١ -				
ب -				
ج -				
د -				

12 Fill in the Appropriate Boxes with the approximate number of trips you make per month:

ضعي في الفراغ المناسب عدد الرحلات التي تقومين بها شهريا مع ملاحظة نوعية الرحلة ونوعية النقل .

Trip Purpose Mode	العمل Work	تعليم Education	تسويق Shopping	عمل خاص Private Business	زيارة عائلية / واستجمام Social Recreation	اخرى Others
يوصلني رب الاسرة A. Driven by head of household						
يوصلني قريب ( اوانح ) B. Relative						
بواسطة سواق الاسرة C. Driven by family chauffeur						
نقل متوفر من قبل عملي D. Transportation provided by employee						
بواسطة النقل الجماعي E. S.A.P.T.C.O.						
بواسطة التاكسي F. Taxi						
مشي G. Walking						
اخرى H. Others						

APPENDIX D

SCHOOL PRINCIPAL IN DAMMAM AND

SURROUNDING AREAS QUESTIONNAIRE

School Location (city)

موقع المدرسة (البلدية):

الجمع الكلي للمعلمات:

ما وسيلة قدوم ونهاب معلمات مدرستكم/القائيات من المناطق التالية:

Jubbail	Ruhine	Safve	Qatif	Khober	الخبير	Dehrahs	Dannan
<p>ما عدد المعلمات القادمات من جبيل:</p> <p>No. of schoolmistresses coming from Jubbail</p>	<p>ما عدد المعلمات القادمات من رحينية:</p> <p>No. of schoolmistresses coming from Ruhine</p>	<p>ما عدد المعلمات القادمات من صفوى:</p> <p>No. of schoolmistresses coming from Safve</p>	<p>ما عدد المعلمات القادمات من القطيف:</p> <p>No. of schoolmistresses coming from Qatif</p>	<p>ما عدد المعلمات القادمات من الخبر:</p> <p>No. of schoolmistresses coming from Khober</p>	<p>ما عدد المعلمات القادمات من قطيف:</p> <p>No. of schoolmistresses coming from Dehrahs</p>	<p>ما عدد المعلمات القادمات من الدمام:</p> <p>No. of schoolmistresses coming from Dannan</p>	
<p>الرجاء ذكر نوعيات الوسائل المستخدمة في نقل معلماتكم:</p> <p>Please state means used in transporting your schoolmistresses. 1. In family cars</p> <p>No. of schoolmistresses</p>	<p>الرجاء ذكر نوعيات الوسائل المستخدمة في نقل معلماتكم:</p> <p>Please state means used in transporting your schoolmistresses. 1. In family cars</p> <p>No. of schoolmistresses</p>	<p>الرجاء ذكر نوعيات الوسائل المستخدمة في نقل معلماتكم:</p> <p>Please state means used in transporting your schoolmistresses. 1. In family cars</p> <p>No. of schoolmistresses</p>	<p>الرجاء ذكر نوعيات الوسائل المستخدمة في نقل معلماتكم:</p> <p>Please state means used in transporting your schoolmistresses. 1. In family cars</p> <p>No. of schoolmistresses</p>	<p>الرجاء ذكر نوعيات الوسائل المستخدمة في نقل معلماتكم:</p> <p>Please state means used in transporting your schoolmistresses. 1. In family cars</p> <p>No. of schoolmistresses</p>	<p>الرجاء ذكر نوعيات الوسائل المستخدمة في نقل معلماتكم:</p> <p>Please state means used in transporting your schoolmistresses. 1. In family cars</p> <p>No. of schoolmistresses</p>	<p>الرجاء ذكر نوعيات الوسائل المستخدمة في نقل معلماتكم:</p> <p>Please state means used in transporting your schoolmistresses. 1. In family cars</p> <p>No. of schoolmistresses</p>	
<p>2. By limousine</p>	<p>2. By limousine</p>	<p>2. By limousine</p>	<p>2. By limousine</p>	<p>2. By limousine</p>	<p>2. By limousine</p>	<p>2. By limousine</p>	<p>2. By limousine</p>
<p>3. By shared hired cars</p>	<p>3. By shared hired cars</p>	<p>3. By shared hired cars</p>	<p>3. By shared hired cars</p>	<p>3. By shared hired cars</p>	<p>3. By shared hired cars</p>	<p>3. By shared hired cars</p>	<p>3. By shared hired cars</p>
<p>4. On Foot</p>	<p>4. On Foot</p>	<p>4. On Foot</p>	<p>4. On Foot</p>	<p>4. On Foot</p>	<p>4. On Foot</p>	<p>4. On Foot</p>	<p>4. On Foot</p>
<p>5. Other types, please state</p>	<p>5. Other types, please state</p>	<p>5. Other types, please state</p>	<p>5. Other types, please state</p>	<p>5. Other types, please state</p>	<p>5. Other types, please state</p>	<p>5. Other types, please state</p>	<p>5. Other types, please state</p>

Remarks made by your schoolmistresses on the means of transportation currently used:

1- ملاحظات معلماتكم حول وسائل نقل المستخدمة حالياً:

Any suggestions you think essential:

2- ملاحظات الاقتراحات التي ترونها ضرورية:



APPENDIX E

FATWA: (in Arabic) SALEH MOHAMED

ALOTHAIMIN, 19, 6 1406 AH

سئل الشيخ محمد الصالح العثيمين عن استخدام  
السائقين نأجها بموت

بسم الله الرحمن الرحيم

أقول وأنا لآلئته من الصالح العثيمين إنه لا يجوز للرجل أن ينفرد بالمرأة  
الواحدة في السيارة إلا أن يكون محرماً إلا أن النبي صلى الله عليه وسلم قال لا  
يخلون رجل بامرأة إلا مع ذي محرم أما إذا كان معه امرأتان فأكثر  
فلا بأس لأنه لا خلوة حينئذ بشرط أن يكون مأموماً وأن يكون في غير  
سفر وأنه الموقوف حرمة ٤٠٦١٦١٩