The urban geography of Beirut

Hurst, E. W. Eliot

THE URBAN GEOGRAPHY OF BEIRUT

A thesis presented in the Department of Geography, University of Durham for the degree of M. Litt, August, 1966.

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Abstract.

This thesis concentrates on those factors important to the geography of the economic and social organisation of Beirut for which reasonably reliable material could be obtained. This results in three main groups, namely the pattern of land values (III), the socio-economic morphology (IV) and business land use (V). Two minor sections, the physical background (I) and the historical background (II) introduce the physical and temporal setting of the city.

The land values pattern exhibits features characteristic of both western and non western cities, with the direction of change being distinctly towards the western pattern. The same is true of the socio-economic morphology and the business land use. Relics of the old oriental pattern still stand out against the flood-tide of increasing westernisation. Further, there is marked areal differentiation of rate of change within the city itself.

Wherever possible material has been quantified to provide a basis for future comparative studies. Elsewhere comments are based on personal study of the situation with local inhabitants.

The increasingly sophisticated nature of urban theory is recognised by the author but in view of the lack of comparative data this thesis remains a largely empirical study. It is hoped that it will add to the compendium of individual studies of Middle Eastern cities on which comprehensive theories of Middle Eastern urban geography can in future be based.

PREFACE

The trials and tribulations of working in the Middle East are many and diverse. But so also are the rewards, and I shall always be grateful for the opportunity of tackling research problems within an alien but fascinating culture. This was in large part due to Professor W. B. Fisher whose encouragement initiated the present study, and to the Centre for Middle East Studies in the University of Durham whose financial help made it possible.

Throughout the long process of tabulation and interpretation Professor H. Bowen-Jones was constantly patient and encouraging and I am most grateful for his help and advice. So also to the many in the Department of Geography at Durham who gave their time in informal discussion of problems I offer my thanks.

In Beirut itself there are many to whom thanks are due, especially Professor C. H. Churchill whose generosity with his data enabled the socio-economic section to be written, The Municipalité which permitted use of its land values data, and Professor J. Hudson who gave me the use of the facilities of the Department of Geography in the American University of Beirut.

Miss D. Palliser in the Department of Geography at Simon Fraser University coped admirably with the task of typing the final copy.

Last, but not least, my husband though perennially busy with his own research and teaching commitments, gave constant encouragement and help.

To all these, and many others, I offer my sincere thanks.

E. W. Eliot Hurst.
Vancouver 1966.

CONTENTS

MAPS AND DIAGRAMS

INTRODUCTION

This thesis is a descriptive and analytical study of the city of Beirut. It does not seek to establish new general theories of urban geography, but may add, it is hoped, to the compendium of individual urban studies which enables such theories to be deduced. To this end all the information obtained in the field has been used to produce a composite picture rather than to attempt a sophisticated analysis of a particular aspect. Such an analysis in any case demands detailed statistical data which in Beirut would necessitate both intensive and extensive scientifically controlled surveys on a scale not possible with the limited resources of time and man-power available at the time. This became quite clear at the beginning of the fieldwork period when a detailed horizontal and vertical land use survey of a single block in Ras Beirut* took several days to complete.**

Within the limitations imposed, information was obtained by two main methods; simple observation and interview, and spatial interpretation of data already existing but in a non-spatial form, such as directories, municipal statistics, etc. Alone, either method would be inadequate. The first would produce a superficial travelogue consisting largely of a-typical phenomena, since it is inevitably the unusual which catches both eye and ear in non-formalised observation. Models or theories deduced using the second method express an average of a probably incomplete*** set of figures and as such are not reliable predictors of socio-economic behaviour. However in this thesis the two are combined so that general patterns are high-lighted or excepted by individual

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* The most westernized sector, allowing the most freedom of movement.

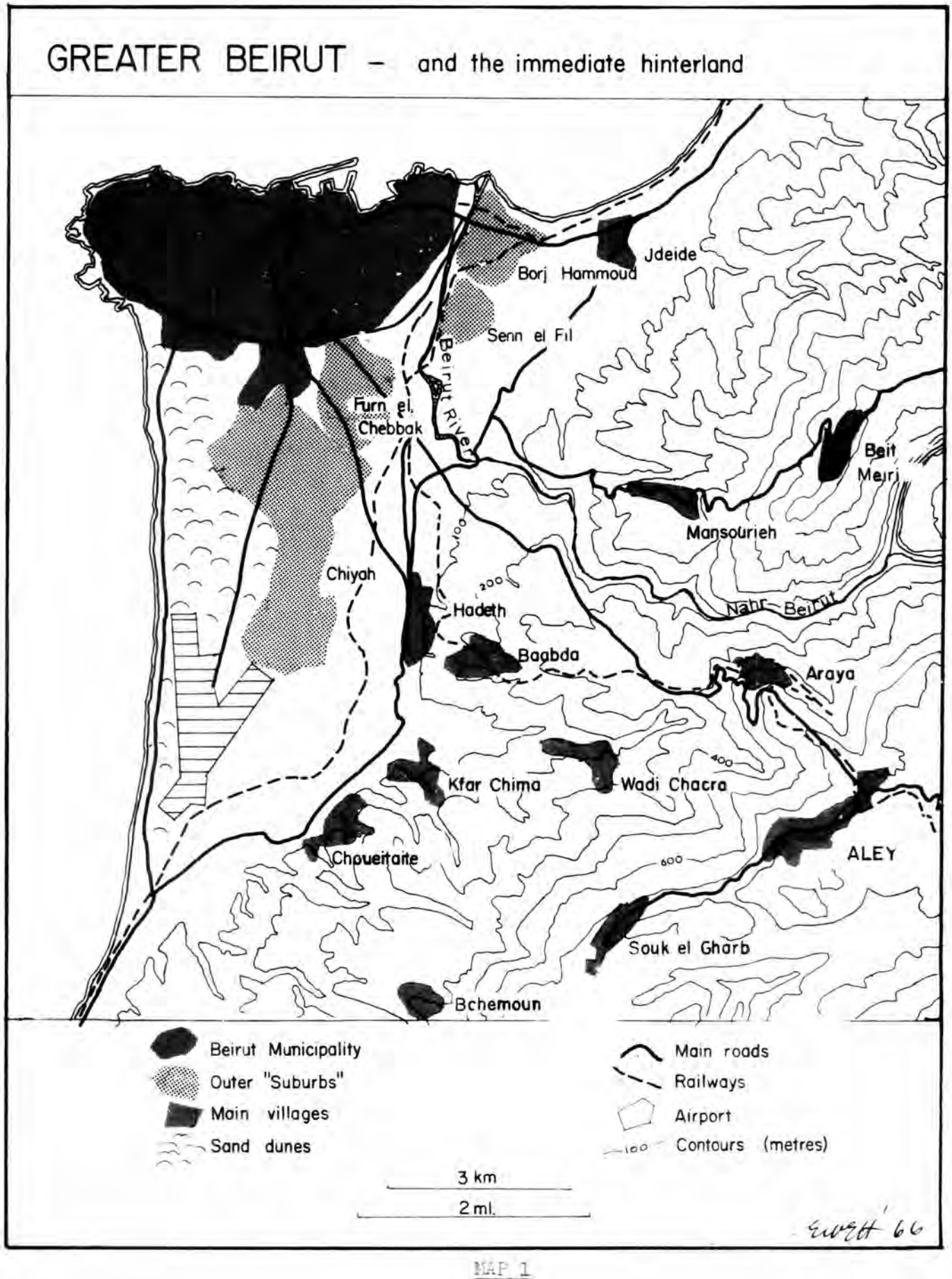
** App. area of this block:- 50,00 sq. m. App. area Beirut Municipality:- 15 sq. Km. App. length of survey therefore; 4 - 5 years!!

*** E.g. The figures compiled from directories, where only establishments having both the desire and the money to advertise are represented.

observation or interview. This complementary relationship appears to produce satisfactory results.

Section 1 places the city in its spatial and temporal setting. The location of Beirut in the Levant and its physiography and the climate of the site itself are included as useful background material, but since they are not regarded as an integral part of the current socio-economic scene, the discussion is not expanded. Similarly, the second part of the first section is more an outline of the development of the site through time than a detailed constitutional or social history. Most social and economic patterns are in some way related to land values and the distribution patterns of this important factor are described in detail in Section II, part 1. The second part of this Section discusses the formalisation of general trends emerging from such patterns, and the comparison of these trends with theories already worked out in other urban areas. There follows (Section III) a discussion of the distribution patterns of a number of socio-economic factors such as family size, income, mobility and so on, and the extent to which areal correlations indicate homogeneous morphological units. Section IV is a study of patterns of occupational distribution, including retailing, commerce and industry, health and educational services etc.

The concluding section (V) consists of a summation of the various parts to produce a complete picture of the city as one of the most important urban centres of the Middle East. This composite whole is compared with other Eastern and Western cities to determine whether Beirut is a typical Arab city, and what features, if any, are attributable to the influence of non-Arab cultures.


GREATER BEIRUT – and the immediate hinterland
Jdeide
Borj Hammoud
Senn el Fil
Beirut River
Furn el Chebbak
Beit Meiri
Mansourieh
Chiyah
Hadeth
Nahr Beirut
Baabda
Araya
Kfar Chima
Wadi Chacra
Choueifate
ALEY
Souk el Gharb
Bchemoun
200
400
600
Beirut Municipality
Outer "Suburbs"
Main villages
Sand dunes
Main roads
Railways
Airport
100 Contours (metres)
3 km
2 ml.
Ewgh 66

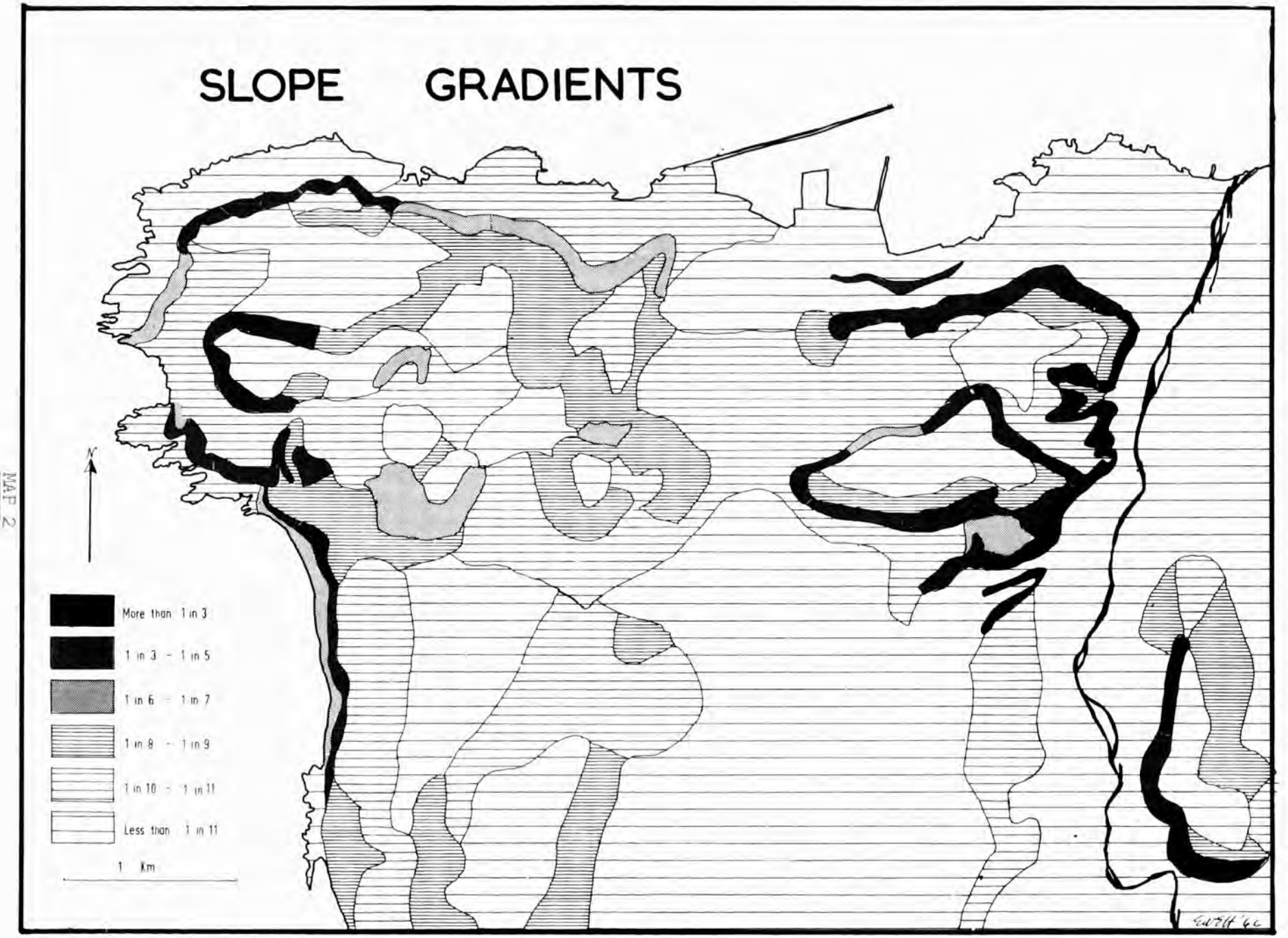
MAP 1

BEIRUT - THE PHYSICAL BACKGROUND

The Republic of Lebanon is situated on the eastern Mediterranean coast between latitudes 33°22'N and 34°40'N and longitudes 33° and 34°E. The total area is approximately 10,400 sq. km. which consists of very varied terrain; in brief a very narrow coastal plain, almost non existent in places, is bounded abruptly by Mount Lebanon, a N.N.E. - S.S.W. aligned chain rising at its highest to 3,090 m. (Kornet el Saouda): the eastern slopes of this range plunge steeply into the Bekaa, a flat floored valley several kilometers across, mainly tectonic in origin, which is bounded on the east by the slopes of the Anti-Lebanon. This is a less rugged chain of mountains, whose highest point is Mount Hermon (2814 m.). But despite the somewhat restrictive character of the terrain, the whole of Lebanon has links of some kind with the capital city, Beirut, which in fact contains between a quarter and a fifth of the country's population. For the rest, the average density of 207 sq. km. is compounded of small areas of very high population density and barren areas which are virtually empty. But even the most isolated areas are within half a day's drive of the capital, which is situated approximately halfway along the coastline. At this point the Lebanon Range drops to 1,250 m. at the pass of Ain Sofar, allowing the construction of the rail and road routes which link Beirut with the Bekaa and Syria.

From the air at high altitudes, the site of Beirut appears as a triangular plain jutting into the sea away from a steeply rising chain of mountains, part of Mount Lebanon. These main boundaries of water and slope constitute major barriers to suburban growth. Although the lower slopes are developing a scattering of single unit buildings, gradients of 1 in 4 and steeper greatly increase costs of construction of both buildings and access

SLOPE GRADIENTS



MAP 2

roads.

Viewed from lower altitudes the configuration of the "plain" resolves into a series of small but distinct physiographic features, which have to a greater or lesser degree influenced the urban landscapes of greater Beirut. The most important of these land forms are the valley of the Nahr Beirut, the hills of Achrafieh and Ras Beirut in the north, and the large sand dune area extending to the edge of the plain in the south.

The promontory is separated from the narrow coastal strip to the north by the Nahr Beirut, at this point a dirty sluggish stream whose braided course is confined within earth and concrete levées. The river has for long acted as an open sewer for bordering settlements and despite current efforts towards improvement, is a distinctly unattractive feature which downgrades the surrounding areas.

Paralleling the north shore of the promontory, and structurally at right angles to the alignment of the main mountain chain, the two hills of Ras Beirut and Achrafieh, are separated by a dry depression running south/north. The eastern side of Achrafieh drops very steeply to the Nahr Beirut valley (See maps.2.&.3..) but elsewhere the slopes are marked by a series of gently sloping platforms bounded by steeper slopes which de Vaumas* suggests are terraces of marine abrasion formed during three periods of relatively stable sea level during quaternary eustatic movements. The highest terrace, which covers the summits of both hills, is discontinuous due to the intervention of the depression between them. Its height varies from 70 - 78 m. in the west, to 85 - 90 m. in the east. The median terrace is also discontinuous, and reaches its greatest

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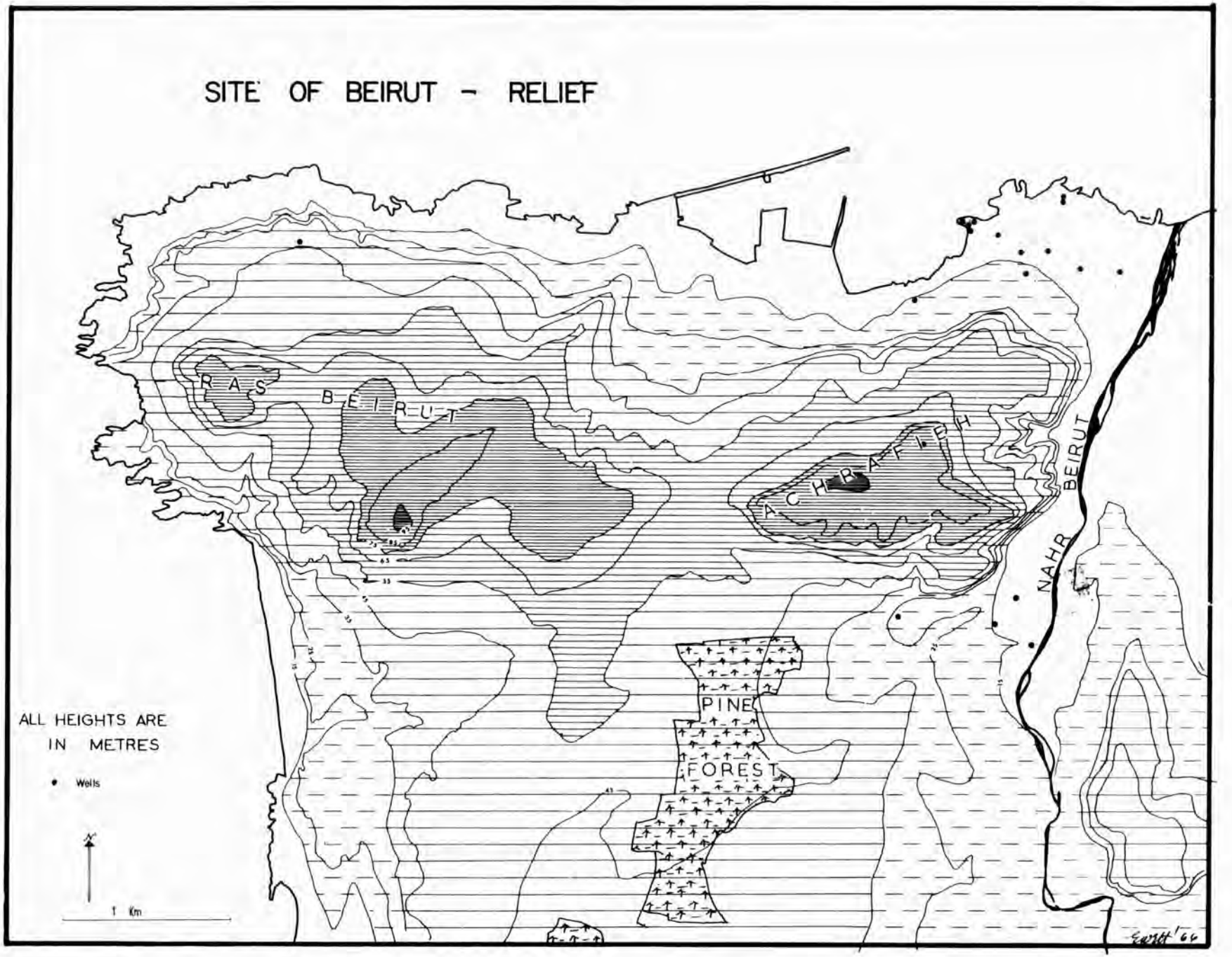
1.* de Vaumas "Le Liban"


SITE OF BEIRUT - RELIEF
RAS BEIRUT
ACHRAFIEH
NAHR BEIRUT
PINE FOREST
ALL HEIGHTS ARE IN METRES
Wells
1 Km

width to the north of Ras Beirut. Here it is 35 - 50 m. in altitude but rises to 50 - 70 m. in Achrafieh. The lowest terrace is uniformly about 20 m. in altitude, and varies in width from 60 to 200 m. The variation in height from west to east in the two higher terraces, de Vaumas explains by eustatic warping, which caused a slight downward tilting towards the west of the whole promontory. The lowest terrace, formed at a later date, was not subject to this warping, and is therefore at a uniform height throughout.

From the evidence provided by these terraces and from various borings in the sand dune area and in the valley floor of the Beirut River, de Vaumas+ has reconstructed the development chronology of the peninsula of Beirut. The two hills were originally one (or two) off shore islands, with the River Beirut debouching to their south. A series of fluctuations in sea level and constant deposition of sand by longshore drift from the south eventually diverted the river to its present course, and caused a considerable accumulation of sand against the southern shores of the islands. Currents were ideal for the gradual infilling of the bay between Khalde point and Ras Beirut, which is now an excellent example of a shoreline of deposition with a graded profile. The older dunes near the hills gradually became fossilized** through mineral heterogenization to form the characteristic ramleh. The rest have formed an area of constantly shifting dunes the stabilization of which has only recently begun to be possible with the advent of modern techniques. These have enabled the airport to be sited on the sand dunes, and the main coastal road south which originally cautiously skirted the dune area, has now been supplemented by

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+ Op. Cit. de Vaumas

2** A. Reifenberg, Journal of Soil Science

a modern motorway cutting south across the coastal dunes. This area, which would once have been considered totally unsuitable for buildings of any kind has mushroomed with multistorey residential blocks floated on concrete rafts, and has become much sought after for sites.

The climate of Beirut falls generally within the "Mediterranean" type, having the typical summer heat and winter precipitation. The main climatic controls* are the depressions moving eastward along the Mediterranean in winter and the stable areas of high pressure in N. Africa and low pressure over the Persian Gulf in summer. A S.W. wind therefore prevails for most of the year. The rainy season begins in October and lasts until late May, during which period Beirut receives most of her annual 681 mm of precipitation.** Most of this is in the form of rainfall, but very rarely snow falls and occasionally there are heavy hailstorms. That of May 1st*** 1963 caused considerable damage in the city, and the weight of hailstones was sufficient to topple a wall, crushing several vehicles. Dew is very common in summer, especially in May, June and July when on average there is a dew one night in three. During the last few decades most of the city has been gradually piped to the main water system receiving its supply from the mountains. Until then however, one of the most important sources was in the form of individual and neighbourhood tanks, so that the amount of precipitation received locally was of great importance. Even now many of the detached dwelling houses have their own tank, but they are mainly for supplemental

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4.** Admiralty Hand book for Syria - note also that the figure given by de Vaumas Op. Cit. in 1954 was 871 mm., and Stat. Bull. Feb. 1962, records the same figure.

*** Reliable eye witnesses.

3.* W.B. Fisher "The Middle East"

purposes.

The January mean temperature for Beirut (old airport) is 14.1°C, which generally drops slightly to 13.9°C in February before beginning to rise. During the course of spring temperatures rise rapidly in Beirut as in other coastal areas due to the fluctuation of differentially heated air masses. August has the highest mean with 26.7°C, but the annual highest recorded maximum may occur in spring or autumn due to the Khamsin (see below) when up to 44°C may be recorded. The diurnal range is at no time as great as it is inland away from the moderating influence of the sea, but it is slightly greater in summer (7°C) than in winter (6°C). However heat alone is not the climatic cause of the mass summer migration to the mountain villages. It is the combination of heat and the high relative humidity which provides such a powerful stimulus to leave the city, for though relative humidity is fairly high throughout the year, (See table.13..)*there is a summer maximum of 74°F in July. Coming down the steep road from the mountains into the city on a summer's evening is like dropping suddenly into a warm bath. Some slight alleviation is afforded in the more exposed parts of the city, namely the hills of Achrafieh and Ras Beirut, by sea breezes. These are active throughout the year but are only really noticeable in summer, when a slight breeze sets in about 10 a.m., increases gradually until noon, and then gradually dies away at sunset. A land breeze sets in about 8 p.m. and lasts until dawn, but this is often not discernable due to the opposing south westerlies, the interaction frequently resulting in a calm.

A wind which may occur in April, May and Early June, and September to October, and which affects both the climate and the tempers of the city's

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* Appendix 13.

inhabitants is the locally called Khamsīn, elsewhere the Sirocco. This originates in the Arabian desert and is very hot, oppressive and dry, causing dust storms and low visibility. Humidity may drop to 30%, temperatures may rise to 44°C and wind speeds of 54 knots have been recorded.

The areal extent and topographic variation of the Beirut peninsula are insufficient to allow much climatic differentiation, but one or two small factors have considerable effect on both the permanent and the temporary population. As mentioned, the seaward facing slopes of the hills of Achrafieh and Ras Beirut are exposed to sea breezes and consequently have been much sought after for residential sites. Ras Beirut also has slightly less chance of winter frosts than Achrafieh or the southern plain. Here especially, the race for space has resulted in such a closely packed mass of high buildings that all but the roof apartments are thoroughly sheltered! The rocky beaches of Ras Beirut are usually slightly cooled by the sea breezes in the summer, and are crowded with tourists and those Beirutis who are unable to join in the summer migration. The tempering effect of the Pine Forest also has recreational value, but though traditionally utilised by the whole city, only the local inhabitants now take advantage of the shady walks.

Some concession is made to the hot summer in the alignment of streets and buildings. The traditional Lebanese house with its thick stone walls tried to avoid facing south, and many of those modern buildings which cannot adjust their alignment have air conditioning anyway. But Beirut, like its Mediterranean counterparts elsewhere, seems unable to accept the

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5. * Le climat de Beyroute. Guy Blanchet.
R.G.L. Vol. 40 No. 2, 1965

fact that there is a winter season, that it is always wet, and that it is frequently cold. The draughty windows and tiled floors of the old buildings, the absence, or inefficiency of central heating in modern buildings, the shortage of fuel generally, and outside, inadequate street drainage, tend to make winter at best, an uncomfortable season. Some Western-orientated lebanese architects have likewise ignored climate and built vast glass fronted office blocks, suitable perhaps in N.W. Europe or parts of N. America, but glaring ovens in the Beirut summer. Where attempts at adaptation in design have occurred, they rarely amount to more than the inevitable balcony.

It is often difficult to assess the relevance of physical factors as far as present day social and economic conditions are concerned, but in as much as the earlier development of the city was undoubtedly influenced by such factors, there is an indirect but important relationship. De Vaumas*, in his discussion of the physical geography of the site of Beirut as related to the city's development, qualifies as favourable or unfavourable various physical factors. He suggests that the gentle slopes of the natural amphitheatre round St. George's Bay guarded by the fortifiable spur of the Grand Serail to the west, and the focus of routes through the central depression and along the coast from the east, formed an ideal site for the nucleus of the city. The good harbouring facilities of St. George's Bay further enhanced this site, and thus, de Vaumas suggests, there was no need for the nucleus of the city to migrate as has happened in many other ancient cities. The main unfavorable factors he considers to be the existence of the marine terraces, the

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6. * Etienne de Vaumas, "La Relief de Beyrouth, et son influence sur la developpment de la ville" Societe des Ingenieurs Francais de Beyrouth, 1947.

steep slopes between which made building difficult and considerably hampered the circulation of traffic. Now, almost twenty years later it is obvious that modern techniques of building and road construction, driven hard by the voracious growth of the city in all directions, have overcome these and most other physical problems. And recent advances in technology can make bearable the less attractive features of the climatic environment. However during the discussion of recent and current socio-economic patterns which forms the main body of this thesis, it should be remembered that it is dealing with a city with a sweltering summer climate, whose inhabitants must frequently move up or down hill to reach their destinations.

HISTORICAL BACKGROUND

Today Beirut enjoys in the Levant undisputed primacy in all spheres of economic activity. Foreign powers automatically locate their official representatives there - witness the many legations, consulates and embassies. Foreign firms establish there regional "head offices"; and foreign correspondents covering the Middle East are almost inevitably based there. Such recognition is only accorded when true primacy is attained, it is hard therefore to imagine that only in the C19 did Beirut begin to forge perceptibly ahead of her rivals.

From the end of the Roman Era Beirut is infrequently mentioned in contemporary travelogues and chronicles, both by Western and Arabic authors. Even in the Pre-Roman period, compared with Tyre, Sidon, Aradus, Byblos etc., Beirut received relatively little mention. This was possibly due to tardy development of a site not quite as favourable as the off-shore island or small headland sites usually chosen. Once the other towns were established they would automatically attract the attention of the contemporary historian and Beirut would be ignored. During the Roman era the city was frequently chronicled as a great centre of learning and administration, but afterwards lapsed once more into documentary obscurity.

Those contemporary references which do exist between then and the C19 do not describe Beirut as "small" but as "dull". Its insignificance in their eyes was a reflection not of a lack of socio-economic activity but a lack of exotic ruins. By 560 A.D. a series of earthquakes had almost entirely destroyed the buildings of Beirut, so later travellers in search of ancient architecture by-passed the site with hardly a mention. Although most cities

with long histories have experienced both periods of prosperity and phases of obscurity, the length of the obscurity suffered by Beirut as indicated by the lack of mention is surely too great. The site has too many obvious advantages for development to be long retarded. The "insignificance" of Beirut between 560 A.D. and the C19 is, I suggest, apparent rather than real.

During the early second millenium B.C. Be-ru-th is documented* as one of a number of autonomous city states lying along the Phoenician coast. By 1370 B.C. it was supposedly "prominent" although only one contemporary account described it thus. In 1300 B.C. it was part of a loose confederation of city states, but was certainly dominated rather than dominant.

In 333 B.C. Beirut opened its gates to Alexander, and the era of Hellenization began. The Phoenician towns generally adopted both the artifacts and the socio-cultural behaviour of the Greeks, and baths, theatres and gymnasia became an integral part of Beirut's life and architecture. In 140 B.C. it was renamed Laodicea and remained thus named for over a century. For most of the Hellenistic period the city was semi-autonomous, which meant that it had the right among other things to settle local disputes itself (even at this time Beirut was noted for its production of iron.)

Although most of the other Levantine cities are mentioned in the Bible, Beirut is noticeably absent. Yet it certainly existed, and was indeed one of the earliest Roman colonies in the area. In 17 B.C. the site was settled by veterans of the 3rd and 5th Legions and remained for a time a garrison town, supplying auxiliaries where they were needed. Seemingly the

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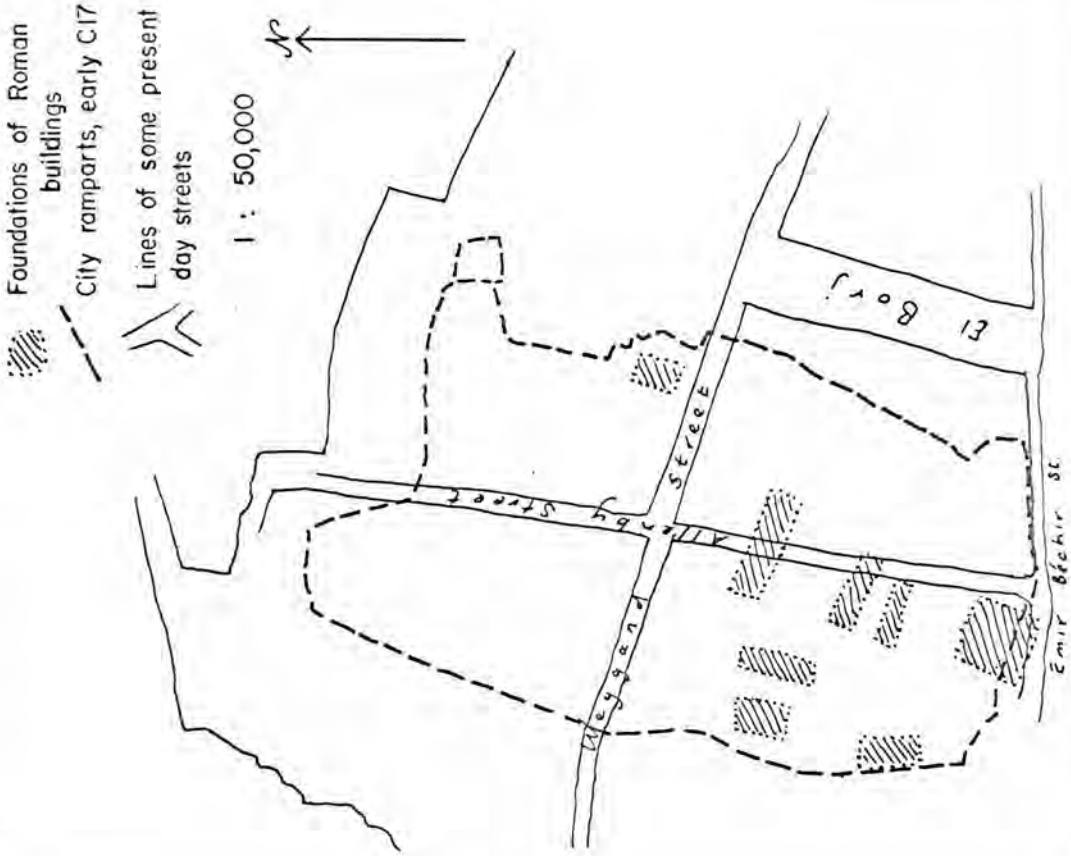
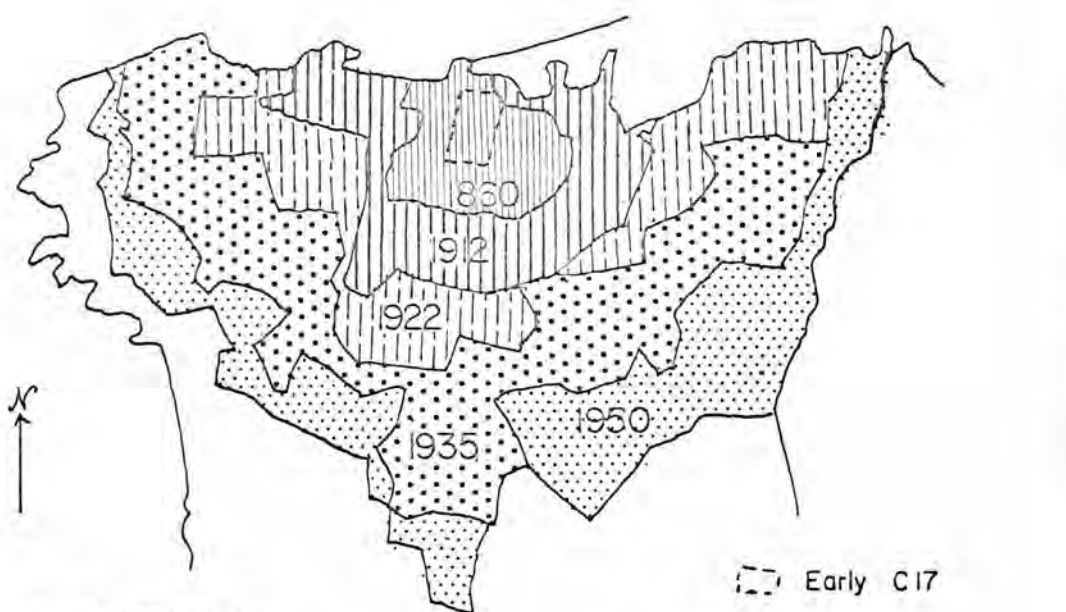
7 * See Hitti, P.K. "The Lebanon in History", 1962

SOME INDICATIONS OF LOCATIONS OF EARLY SITES



THE GROWTH OF THE BUILT-UP AREA



1 : 60,000 (app)

Ewth'cc

Source, Dept. of Antiquities

MAP 4

Romans were able to make more of the harbour potential of the headland than earlier inhabitants, since Beirut or Berytus soon became the base for the Roman fleet in the S.E. Mediterranean.

Perhaps it was a small indication of the ability for rapid assimilation it would exhibit in the future that for a time Beirut was the centre of Romanism in an area which still clung predominantly to Hellenism. Between 12 and 4 B.C. Herod the Great built "fine public buildings"** and the city's architecture was further embellished by his grandson Agrippa in 41 - 44 A.D., who provided an amphitheatre, a theatre, baths and porticoes. Coins of the era show the head of Neptune, who was the city's patron god.

Between 193 - 211 A.D. the Law School was founded whose later fame caused the Emperor Justinian to term Beirut "Mother and Nurse of all Laws." By the end of the fourth century this single school had attracted faculties of letters and philosophy and had practically university status. By this time too, the city was the seat of a Bishop, having become fully christianized by the mid fourth century. The built up area at this time was probably contained largely within the walls of the garrisoned town*** with in consequence fairly high population densities.

The city flourished economically, and was famous for its raisins, wine and linen. In the non-agricultural sphere wooden ships, wagons, tools and engines of war were manufactured and large numbers of looms for silk weaving were also produced.

The first major recorded earthquake had been in 349 A.D. when the city was partially destroyed but had been rebuilt and continued to flourish.

** Ibid. (Hitti)
*** See map 4.

The earthquakes of 494 A.D. and 502 A.D. did relatively little damage, but a series between 551 and 555 A.D. pulverised virtually the whole city. That of 555 was followed by a tidal wave which destroyed all that did remain, and washed away much of the fallen debris. It was reported* that 30,000 Beirutis perished in this catastrophe and those surviving fled the town. A population of well over 30,000 indicated a town of no mean size, at that time.

Although the Law School was temporarily moved to Sidon while a new building was being erected to house it in Beirut, a fire in 560 A.D. destroyed the partially completed building. This proved the final blow to both the institution and the city, which then entered a period of relative obscurity.

In 635 A.D. the Arabian Army captured Beirut and the city became part of the Arabic Empire. In the eighth century several distinguished Moslems were buried near the city, but usually insufficient topographic detail is given to locate these sites. However in 774 A.D. the death of one of these famous men was commemorated by the building of the Mosque of al ' Awazai B'ir Hassan, in the area just west of the present Pine Wood.

During the time of the crusades, Beirut continued to receive much less mention than the other Levantine towns, although what reference there is indicates a fair sized community. In 1110 the city was beseiged for eleven days before it was captured and pillaged by the Franks. During this seige, use was made of a pine grove near the city to obtain wood for constructing "towers and missiles"**for scaling the city walls. As the existing Pine-wood, now engulfed in the southern suburbs of the city was alledgedly partly artificially planted in early C17 by Fahkr al Din it is not possible to

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* Ibid. (Hitti).
** Hitti, op. cit.

assume correlation. It seems most likely that the pine forest mentioned covered part of the dunes and extended much farther north through the central depression* closer to the limits of the town as they were at the time.

In 1187 the anti-crusading armies of Saladin recaptured the city and retained it for ten years until 1197 when it again reverted to the Franks. It was in Frankish hands until 1297, so in all the Franks had 177 years of occupance in which to disseminate Western ideas and to absorb Eastern philosophies.

The economy of the city and its immediate hinterland cannot have remained unaffected by the Frankish occupation. The food requirements of the city must have increased, thus stimulating the efforts of local producers to grow more and more food crops and to keep more animals for meat. This may have been partly at the expense of mulberries, although throughout the period Beirut was famous for its thick silk.

There are no figures to indicate the actual size of the population, but in 1185 a Cretan monk found Beirut a "large and populous city"**. This traveller would almost certainly have visited Athens and Constantinople, perhaps 200,000 strong, and would be familiar with the coastal towns of his native Crete with in the region of 30 - 40,000 inhabitants***. With these for comparison, rather than a loose in vacuo description "large and populous" would indicate a population of at least 50,000.

The actual location of the main part of the city probably differed little from the site of the Roman Town, the Crusading castle, of which no

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*Ibid.
** Ibid.
*** H. Bowen-Jones.

sign now remains, was located in what is now the Borj*, and part of the city walls were in the quarter now called al Sur. The church of St. John, now the main mosque and situated in Rue Maarad, was begun about 1110 and was certainly within the city walls.

In 1285 Beirut became part of the Mamluk empire. The Mamluk Sultans, to ensure the minimum possibility of revolt, caused the decline of the coastal towns. However Tripoli and Beirut were allowed to retain their trading functions to ensure that commerce was carried on. The Bhutans, who had been the rulers of al Gharb**, became the governors of Beirut under the Mamluks after the city was finally wrested from the Franks. Under them the area gained some measure of the prosperity resulting from relative stability. The Bhutans reopened Beirut to foreign trade, and made it the port for a large hinterland as well as officially for Damascus, though Sidon did offer some competition in the latter capacity.***

Apart from attacks by Genoese ships in 1381 and 1404 when amongst others a market near the port was plundered and the inhabitants fled to the mountains, Beirut under Mamluk rule was relatively peaceful.

Early in the C14, European merchants were given freedom to settle in the city, and even allowed to build inns. Not to be out-done, Tankezn,

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* Or "Place des Canons", i.e. the central square

** The nearby mountain district.

8.*** Popper, W. "Egypte and Syria Under the Circassian Sultans, 1382 - 1486." 1957. The Beirut - Damascus route was 64 miles long, with 3 interim post stations; the Sidon - Damascus route 60 miles with 2 post stations. Various of these chronicles describe in great detail Damascus, Tripoli, Cairo and Aleppo, but do not mention Beirut.

a member of the Bhutan family, between 1312 and 1341 built a new inn and public baths and restored some of the city ramparts. At this stage the density of building outside the actual fortified town was low, as the gardens there are described by Abu al Fida in 1331 as fertile and extensive. The same traveller notes that drinking water was supplied to the city by underground channels: these it is presumed, were additional to the old Roman aqueducts which would still be in use.

In the mid C14 Beirut was famous for the wood from its pinewoods and for iron.**** By the early C15 it was, with Tripoli, Sidon and Akka one of the main centres of sugar refining. Some local cotton was exported, and Lebanese fruit was exported to Egypt. But already at this stage the greatest volume of trade was in transit goods. Woolens and linens from the West arrived, for Eastern markets, and from the East came pearls, precious stones and spices on their way to the West. As well as the numerous Franks, it is known that there was a considerable Venetian colony in the city at the time, and in fact the amount of commerce carried on by the local merchants was less than that of the foreigners. However despite the vigorous commercial activity in 1422, a pilgrim described Beirut harbour as"abominable."*

The reign of the Circassian Sultans ended peacefully in 1516 when Beirut passed without dispute into Ottoman hands.

Under the Ottomans, Beirut became a sub-district of the Turkish Wali of Damascus and so still had very much a secondary role as far as

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9. **** Ibn Battūta, travelling between 1325 and 1354, said; "Bayrūt is a small town with fine markets and a beautiful mosque. Fruit and iron are exported from it to Egypt." Tyre he described as a ruin, and Tripoli, "... one of the principal towns of Syria.....has recently been built..."

* Hitti, ibid.

politics and administration were concerned. During the early C17 Fahkr al Din added Beirut to his domain, primarily to enable him to have immediate access to the sea. However his works included the repair of the old fortified tower in the Borj, the bridging of the Nahr Beirut and the replanting of part of the famous Pine Forest. Further, he decided to relocate his winter residence, formerly in Sidon, in Beirut, and built a magnificent palace in Achrafieh. This move must have greatly accelerated residential development of various types in the district. Various relatives who had some claim on Fahkr al Din but not the actual right to live in the palace, would build the best they could afford as near to the palace as possible. Other wealthy citizens, both native and foreign, would see the area as residentially desirable and would build mansions and palaces. In addition there would spring up small hovels and stalls, often propped in odd corners, to house diurnally the variety of foodsellers, shoe repairers, water sellers and other "service" tradesmen attracted by a growing market.

Well aware of the advantages of a flourishing commerce, Fahkr al Din encouraged foreign merchants to settle in Beirut, and even went to the extent of offering their ships protection against local piracy. Then in 1635 France obtained a concession, later extended to other European countries, by which her subjects in the Levant were bound by French legal codes rather than by Ottoman law. This together with the Ottoman Millet** system already in operation, tended to encourage segregation, and the city was divided into distinct ethnic quarters, although the location of these is not recorded.***

** Whereby sects were given autonomy to settle local disputes.

10. *** See the Chronicles of d'Arvieux, translated by Lewis, W.H. and discussed in his book "Levantine Adventurer", 1962.

After the change in administration from Mamluk to Ottoman, Sidon had been quick to reestablish her trading arrangments, and until the mid-1630's was a more important centre of commerce than Beirut, whose recovery was relatively slow. However this was the last time that Sidon was to hold the lead, for in 1634 the harbour was filled in and Sidon rapidly lost ground to Beirut as the port for Mount Lebanon and Damascus. And in 1660 d'Arvieux* finds Beirut the most impressive of the two towns in population and extent, estimating it to be twice the size of Sidon. However Beirut had only established commercial primacy, for d'Arvieux mentions that as far as France was concerned, Beirut was Secondary rank depending on the consulate of Sidon. Her lack of political status was still evident in 1697, when the Ottoman Government placed Beirut under Sidon, which had in fact been the seat of a Pasha for many years.

In the time of d'Arvieux the contrast between the more open suburbs and the congested centre was already apparent. Attractive features of the former were; "... long alleys planted with citrus, well built stone houses, hedged gardens....". Of the town centre he remarked; "... it is in a narrow cleft and is therefore unhealthy in summer, and its narrow streets are dirty in winter...". The built up area did not apparently extend unbroken to the sea as yet, as he mentioned "... a charming avenue which leads from the port to the town..."**. Another line of communication was "... the promenade, previously the city moat."

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* Ibid.

** Probably the present Rue Allenby

The inhabitants of the town were "...mainly Greek Christians and Maronites..."*. but no estimate of their number is given. In view of his enumeration of the French inhabitants, this is probably just as well; "..... the French population is five...." However the reason he gives for their location is useful. They were, apparently, merchants employed by Sidon firms who had sent them to Beirut because it was the entrepot for Damascus and Aleppo. The Beirutis seemed to live together tolerantly; ".... I attribute their manner of life to the fact that they are better off and more hard-working than those in the other Levantine towns". Despite his gloomy prognostications as to the town's future under the Turks, he was forced to admit that the silk trade continued to flourish. Further, although it was "..a dull town generally, it had clean baths and a handsome principal mosque." Already it seemed to be attempting to cater for the traveller, as there was "..good eating in Beirut.." and plenty of local wine, and it is significant that it is the only town in the Levant where a hotel is mentioned.

In 1749 the comparative peace which had prevailed for so long in the city was ruptured by riots, and to restore peace, aid was sought from the Wali of Damascus who then offered the city to the Amir of Lebanon. From then until 1842 this position was held with few breaks by the Shihabs, a Druze family. Although Beirut under the Shihabs became the Druze winter capital, the city was apparently avoided as a place of residence because of its exposure to piratical attacks. This may account for the smallness of

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* d'Arvieux op. cit.

the figure of 6,000 quoted by Hitti as the population at the end of the C18. This population was still contained within the original small walled city measuring "570 metres from north to south and 370 metres from east to west",* so the average density must have been in the region of 28,000 persons per square kilometre.

In 1831, Egypt attacked the Turkish regime in Syria, but after only ten years the area was given up to the Turks again in 1840. However, short though this period was, it had opened up Syria and the Levant generally to European penetration through the intervention of foreign.powers, England opposing and France encouraging Egypt's insurrection. Concomitantly it was important in establishing Beirut as the most important sea port. At last she had wrested from Sidon her remaining importance as a diplomatic power. Now Beirut became the residence for consuls** as well as the main centre of a trade and industry increasingly participated in by Europeans. A new suq*** appeared in which the shops were kept by Europeans,and special rooms were set aside for them in the public baths. European firms began to establish branches in the area, beginning with Scottish and French silk factories in Chemlan and Balatir**** and the English firm of James Black in Beirut. At this time 150 British ships a year were recorded as docking in Beirut, and the number of European families residing in the city rose to 100 in the 1840's. This rapid increase reflected the growth of the whole population, and the continuously built up area began to spread beyond the

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11.*Conte du Mesnil du Buisson. "Les Anciennes defenses de Beyrouth".
12.** Lamartine "Voyages dans l'Orient" 1832...."The European consuls of Syria whom the war has concentrated at Beirut.."
***Market or bazaar.
****Villages in the Mountain near Beirut.

decaying mediaeval walls in all directions. Until then such extraneous growth had been more or less confined to the Western end of Achrafieh hill, as is evident from Lamartine's description of the town but ten years previously.* From on board ship he "....saw the high minarets of the mosques....the fortresses which command the town, the rounded battlements of the fortifications..." and beyond these "...the mulberry trees in the fields, here and there the flat roofs and white walls of country houses, or the huts of the Syrian peasants; and beyond the green banks of the Beirut hills, covered with picturesque edifices of all description, Greek convents, Maronite convents, mosques and sanatoria, and clothed with foliage and tillage..." His own house was "..in the country, being ten minutes walk from the town in a more or less westerly direction." Looking from this house towards Ras Beirut, he saw "...a plain of fields...studded with trees which entirely cover the soil, and here and there houses raising their white roofs in a sea of green.." Beyond was "...a long and agreeable hill with a Greek convent on the summit." This hillside was covered with stone-built terraces growing olives and mulberries. The Pine forest he mentions as being at least a league** from the town. Assuming that the northern edge of the Pinewood today is much further south than it was then, it is obvious that the city proper was still very much confined to a small area near the port. The population of Lebanon as a whole, in fact, was distinctly rural in character. Beirut (8,000) and Tripoli (7,000), the largest towns, accounted for only 15,000 of the total for Mount Lebanon of 213,000***

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* Lamartine, op. cit.
** App. $2\frac{1}{2}$ miles.
*** Hitti, op. cit.

By the 1860's the lack of an adequate communications network was becoming increasingly obvious, and an attempt to improve the road system was made soon after the first carriages began to appear in Beirut in 1863. The Damascus-Beirut-Houran railway was begun in 1892 and finished in 1895. But Miss Isobel Porter could still say of the harbour in 1894 ,"....a difficult and exposed landing.....which consists of a few old steps and a small, dirty, fish-bespattered quay!"* By this time the "charming avenue" which Lamartine had described 60 years previously was a street in the town which now reached down to the waterfront.** The spread of the city in general away from the original nucleus was now proceeding more rapidly, for Miss Porter remarked, "....it straggles along a fair line of coast and crawls up part of the lower hills." She also noted that the foot of the Lebanon mountain was an hour's drive from the town across a populated but basically agricultural area, so that in this direction the continuous built up area was still some distance away from the hills. Probably rather generously, she estimated the population to be 72,000, and noted the extremes of wealth and poverty "..the houses are remarkably handsome,; the bazaars are very poor..." Although she was generally rather scornful of the antiquarian attractions of the city - "Twenty four hours suffices to see everything..." - she was grateful for the city's amenities. Her hotel, the "Bellevue" was "...small and comfortable, facing the sea, and later on became to my eyes the centre, the very acme of civilisation. Beyrout was our Biarritz!" This she attributed to the increasing westernisation; "Beyrout is a demi-civilised, semi-christianised, demi-semi-Europeanised town, with a certain amount of comfort and European manners

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13. *Isobel Porter
**Porter, op. cit.

and customs. It has soldiers and policemen, ships to the West and free communication with Europe by post and telegraph". Her belief that not the coastline but the Lebanon range was "..the boundary line between European and purely Middle Eastern and Mohamotan life" was based on sound principles. Certainly the influence of various Christian foundations must have been fairly widespread by that time, for as well as the Jesuit Seminary which moved to Beirut in 1875, such orders as the Sisters of Nazareth, Sisters of St. Joseph of Marseilles, Sisters of the Holy Family and Sisters of the Good Shepherd were opening day and boarding schools. Hospitals, such as the Hospital Johanniter, Asfuriyah Sanatorium and the Greek Orthodox Hospital were able to exert a strong westernising influence.

In 1834 the printing press of the American Mission was transferred from Malta to Beirut, and this stimulated an increase in the number of book-stores, up to that time 5 only were in existence, selling virtually nothing but very old texts. By 1892, 14 periodicals and papers were being published and distributed in Beirut and the era of mass communications had begun. European literature, drama and science became very popular, and Lebanese overseas who had been forced to emigrate due to population pressure on the land, sent home ideas as well as money. European goods in large quantities began to be imported and the desire for these as well as their relative cheapness led to the rapid decline of home industry. Rural industry practically died out and only in exceptional cases where there were determined efforts made towards modernisation did urban industry survive. Urban life began to seem exceptionally desirable, and there was a steady movement towards the towns in general and Beirut in particular which had a population of about 120,000 at

at the end of the C19.*

The first World War acted as an indirect catalyst in increasing the rate of urbanization in Lebanon. Partly this was due to the arrival of 15,000 Armenian refugees who settled in the city, and another 15,000 who settled round about. However it was largely caused by the creation of a state of famine by the young Turks who refused to let in supplys and annexed the existing food and fuel. The peasants flocked to the cities, especially Beirut, where they begged in the streets to try and keep alive. But thousands died, and Hitti states; "By 1918 the lowest class of society had been practically wiped out and the middle class taken its place."** Many of the towns and villages in the rural areas were deserted. This was especially marked in the south, where al Batrūn dropped from 8,000 (pre-war) to 2,000 (post-war), and the area as a whole lost 33,000 out of 77,000 people by death and migration. These towns and villages have never returned to their former size, and thus the War was one of the initiators of the present imbalance between urban and rural Lebanon.

In 1920, Lebanon and Syria came under French Mandate. Despite frequent criticism, the French administration did much to improve social and health services, instituted public education, and devised and introduced judicial and administrative codes. Beirut was made the capital of Mandatory Lebanon, and much needed attention was given to providing better facilities for shipping. The harbour, which had been neglected since its construction in 1889 - 94, was now greatly improved. In 1924 - 25, 200 m.

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* Hitti op. cit.
** Hitti op. cit.

of quayage was added, and the width of the entrance was extended from 25 m. to 125 m. In 1934, the Free Trade Zone was established, and in 1934 a new dock was excavated, 300 m. of new quays were built, and a 300 m. long protective pier was constructed. Thus by 1938 there were 2,294 m. of quays, ranging from 3 to 13 m. in berthing capacity.*

In 1908 the first trams had started to run in the city along very much the same routes as they follow at the present time.** Under French mandate an efficient system of frequent services was organised, and by 1945, nearly 40,000,000 passengers were being carried annually.***

In 1923 the city had between a quarter and a fifth of the total population of Lebanon, with 150,000 out of 626,000 inhabitants.**** Tripoli had fallen well behind with 30,000 and had dwindled to relative insignificance with only 13,000. The built up area of Beirut extended to the River Beirut and covered much of Achrafieh in the east, but only part of Ras Beirut was built up to the west.*****

During the Second World War, in 1941, Britain occupied Lebanon, and the coasts were blockaded and cities and airports bombed. However, despite these hardships, the country actually flourished under conditions of war. The occupying troops provided a market for food and goods and stimulated production. Supplies for the troops further to the east added to the volume of transit trade, and the Beirut - Jaffa, and Beirut - Tripoli railways were

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14.*Chehabe ed-Dine "Geographie Humaine de Beyrouth" 1960
** See map
***ed-Dine, op. cit.
**** ed-Dine, op. cit.
***** See map 4.

built.

Although the country had been declared a republic in 1926, it was not until 1946 that the last troops left and true independence was acquired. Since this time the building boom initiated during the War continued to gain impetus, and the city has expanded rapidly in every available direction. The population has grown from 180,000 in 1947 to app. 400,000* in 1957 and an estimated $^3/_4$ M at the present day. Between 1945 and 1962 a total of 14,906 building permits covering over $6\frac{1}{2}$ M square metres have been issued by Beirut municipality alone, and a similar high rate of building activity has been evident in the extra-Municipality suburbs. Trade and commerce have likewise flourished and millions of Lira change hands daily in the city.

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* Chehabe ed-Die, op. cit.

LAND VALUES AND AREAL SPECULATION IN BEIRUT

Basic to any study of socio-economic relationships in the N. American or W. European city are the values of the lots which make up the urban base map. High and low land values mirror faithfully the land use category and areal status of a given location. Whether or not the same types of relationship exist generally in Middle Eastern cities is not yet certain, but a study of Tehran - in 1962* suggested that certain basic similarities obtain for at least one Middle Eastern urban area. In view of this, although the rapid rate of change in Beirut makes it an exceptional city from many points of view, it was considered important to delineate and assess the pattern of land values in the city. This would not only form a useful matrix for the socio-economic studies, but would make possible comparison between land value phenomena in Beirut and the various distribution theories determined for Western cities.

The main sections on areal intensity of land speculation and spatial patterns of land values follow an introductory section outlining the main phases of building activity in Beirut over the last twenty-five years.

15.* TEHRAN. Les prix, le marché des terrains et la société urbaine. Institut d'Etudes et de Récherche Sociales, Université de Tehran. 1961

1. AREAL INTENSITY OF LAND SPECULATION

The total number of building permits issued within the Municipality in 1945 was 390.* In 1962, 869 were issued. Although this shows an over-all increase,** the annual fluctuation in the time/quantity curve is considerable. Curves showing time/average building area m^2, time/total building area m^2, time/total no. of floors, and time/average no. of floors per building, also show annual fluctuations, the average area per building maintaining the most steady increase.

Most of the striking fluctuations reflect faithfully cycles in the over-all economy of the country itself, and indeed of the area generally. The economic prosperity immediately after the Second World War encouraged speculation, but the first steady growth was temporarily halted by the high cost of living (Index; 462)*** and price inflation in 1951 - 1952. A marked drop in the number of permits issued, and to a lesser extent (*4) in total floor area reflects this nationwide economic trend. Recovery was gradual over the next two or three years, but very rapid in the stable, prosperous conditions obtaining in 1954-55, when the highest ever number of permits, 1261, was issued. The unsettled political conditions of late 1956 and 1957,

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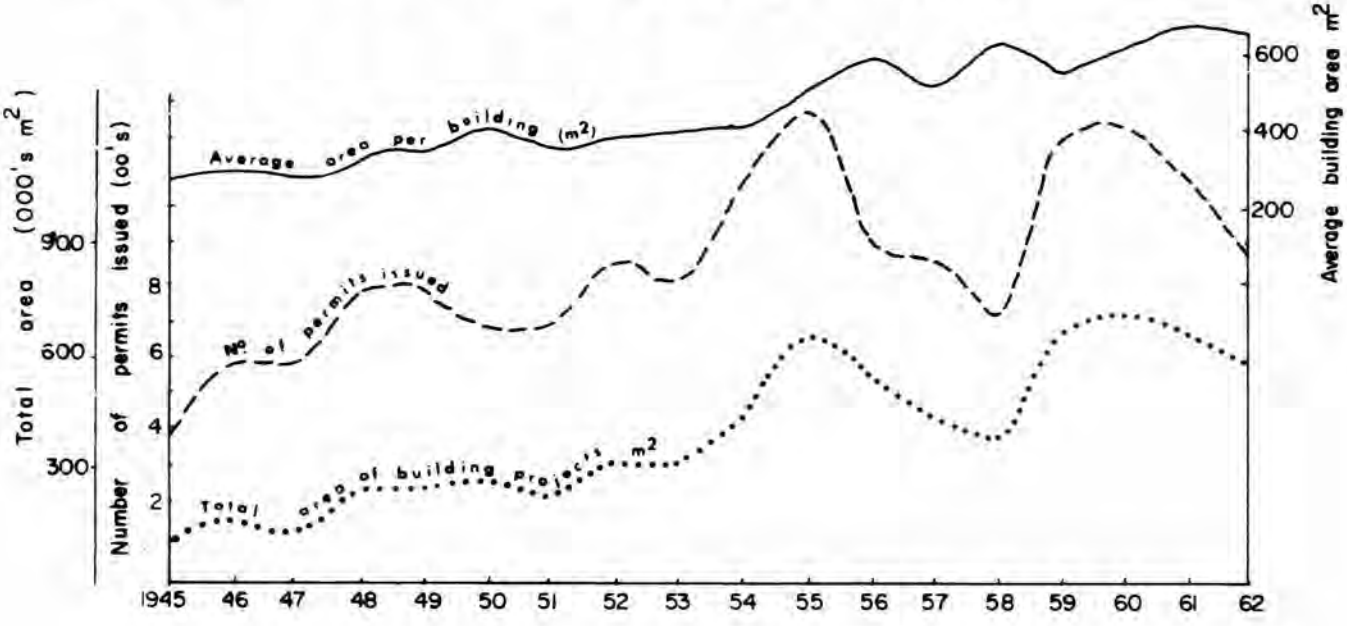
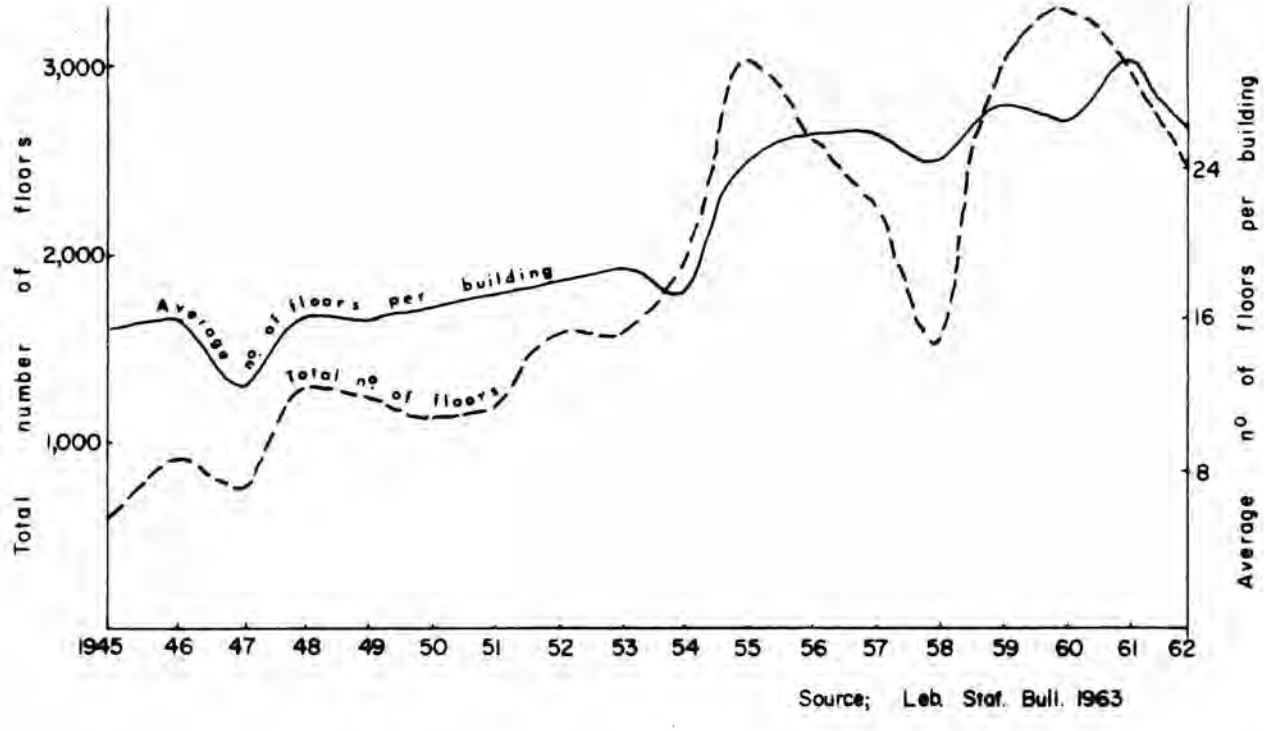
* Appendix, table 1.
** Graph 1.
*** Appendix, table 2.
**** Due to the fact that the small scale investor would be hardest hit by adverse economic conditions.

RATE AND SIZE OF NEW BUILDING PROJECTS.





Source; Leb. Stat. Bull. 1963

GRAPH 1

culminating in the crisis of 1958 (*), were faithfully reflected by the downward movement of all the curves. However by 1959-60, conditions were optimal for land speculation, with political and economic stability and liberal foreign investment operating to cause a land boom, as shown by the peaks in all graphs. Although the total area remains high in 1961-62, a slight recession from the peak figures of the 1959-60 boom is becoming apparent. This, in the American experience, is a normal "post boom" phase. A number of American cities exhibit at their periphery areas divided into plots, dissected by paved roads, and with water, drainage and electricity laid on, but no sign of building. These are the barren relics of a former land speculation boom, and while there are no strictly comparable signs of recession in Beirut, there is some indication that the type of speculation for which many of the permits were issued is no longer so profitable. The most attractive proposition for the investor, the quick profit, multi-storey, luxury or semi-luxury block, is, it seems, losing its attraction. It is, after all, a limited sector of the community which can afford rents of 5,000 Lira**p.a. and upward, and a number of the new blocks in S.W. Ras Beirut now contain unlet apartments, a sure sign that a once seemingly insatiable market is now saturated.

This decline is not reflected in the suburban areas of Beirut

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* Rioting, strikes, etc. and ultimately the deposition of President Chehape.

** App. 8.5 Lira to the pound sterling.

without the Municipal boundary, where by 1962, the total number of permits issued by the local Permit Offices reached 787, with a total floor area of 295,874 m .* This is just over half the total floor area of speculation within the Municipality, and over 3/4 the number of permits, a remarkable achievement for what were until ten years ago peripheral villages. However it is obvious from the figures that a different type of speculation is occuring in the suburbs, in the form of a larger no. of smaller buildings with more moderate rental values. And as the demand for lower rent apartments is likely to continue for some time, large scale investors may turn their attention increasingly to this type of speculation.

The differential spread of the numbers of permits issued and the total area they represent, by extra-Municipality suburb, gives a fair indication of the main directions of the lateral growth of Beirut. From these, it appears that the lowland areas continue to be the most attractive as suburban sites, with Borj Hammoud (along the Tripoli coast road) and Chīah (along the Saida road) issuing the greatest number and area of permits** The fact that both areas are linked to Beirut by good through roads, and further have easy access to the main 'estivage' villages, also plays an important part in their favourable land speculation differential.

Within the Municipality of Beirut itself, there are also areal differences in numbers and areas of permits issued.*** In 1962, Mazra'a (217 permits) had overtaken Ras Beirut (134 permits) in no. of permits issued, but the areas represented by these permits were almost equal in the

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* Appendix, table 3.
** Table 3.
*** Table 4.

two divisions, (Mazra'a 154,570), Ras Beirut (152,360) indicating a marked difference in the type of building constructed. An average building floor area of 1,140 m. in Ras Beirut shows the predominance there of large, multi-storey blocks of residential or mixed residential/commercial use. On the other hand, the average permit floor area for Mazra'a, 703 sq. m., means that though there may be occasional large blocks, on the whole more modest residential, 2, 3, or 4 storey buildings predominate. The remarkably high average permit building size in Zokak el Blatt (1,920) is due to the construction of a few very large multi-purpose office-cum-retail blocks. The northern part of this area just falls within the central commercial area where the "highest and best use" concept,* is most powerfully operative and is best fulfilled by the large block. It is in this section of the centro-peripheral zone that urban blight as experienced in Europe and America is most apparent, so that in the major part of Zokak el Blatt there would be very little building, the average for the division being thus maintained high.

The only other division with an average per building floor area markedly above the Municipality mean of 689 sq. m., is Mouseitbeh (905 sq. m.). Here are immediately apparent the difficulties inherent in using the old French Administrative division so internally heterogeneous socio-economically and so disparate in size and population density. In fact the major part of the Mousseitbeh permits would be for fairly small buildings, but the few multi-storey blocks in the west and south of the sector would immediately inflate the average building area to well above the Municipality average. A similar type of occurrence in reverse in Minet el Hosn (123)

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16. * Ashton, M.B. "Highest - Best Use" J.A.I.R.E.

Bachoura (303) Saifi (467), and Port (270) causes larger buildings nearer the town centre to be counterbalanced by smaller buildings in the centro-peripheral zone where there is more building activity than in Zokak el Blatt, unnaturally deflating the whole divisions to below the city average.

The remaining areas, Ain Mreisse (647), Mazra'a (703), Achrafieh (710) and Rmeil (776) conform fairly well to the city average. This seems reasonable in the case of the two latter, relatively homogeneous residential areas. However it is surprising that Ain Mreisse, with attractive sites for large residential blocks along the Corniche du Paris, does not indicate a higher figure. In Mazra'a it is again obvious that the higher average building areas expected co-incident with the area of recent development in the south, are masked by the large number of smaller projects in the of the district.

Maps showing the distribution of plots for which permits were obtained in three periods, pre 1959, 1959 - 61 and 1961 - 63,* provide some indication of the changing spatial intensity of land speculation within the Municipality. It is immediately obvious that while some building activity, either in the form of new construction or re-structuring, occurs everywhere in Beirut, there are marked concentrations indicating the attracting or positive character of the area. There also exist areas with markedly little land speculation, which may be termed repellent or negative areas. The pattern of distribution of positive and negative areas is immediately apparent from the maps showing maximum and minimum intensity of speculation,**

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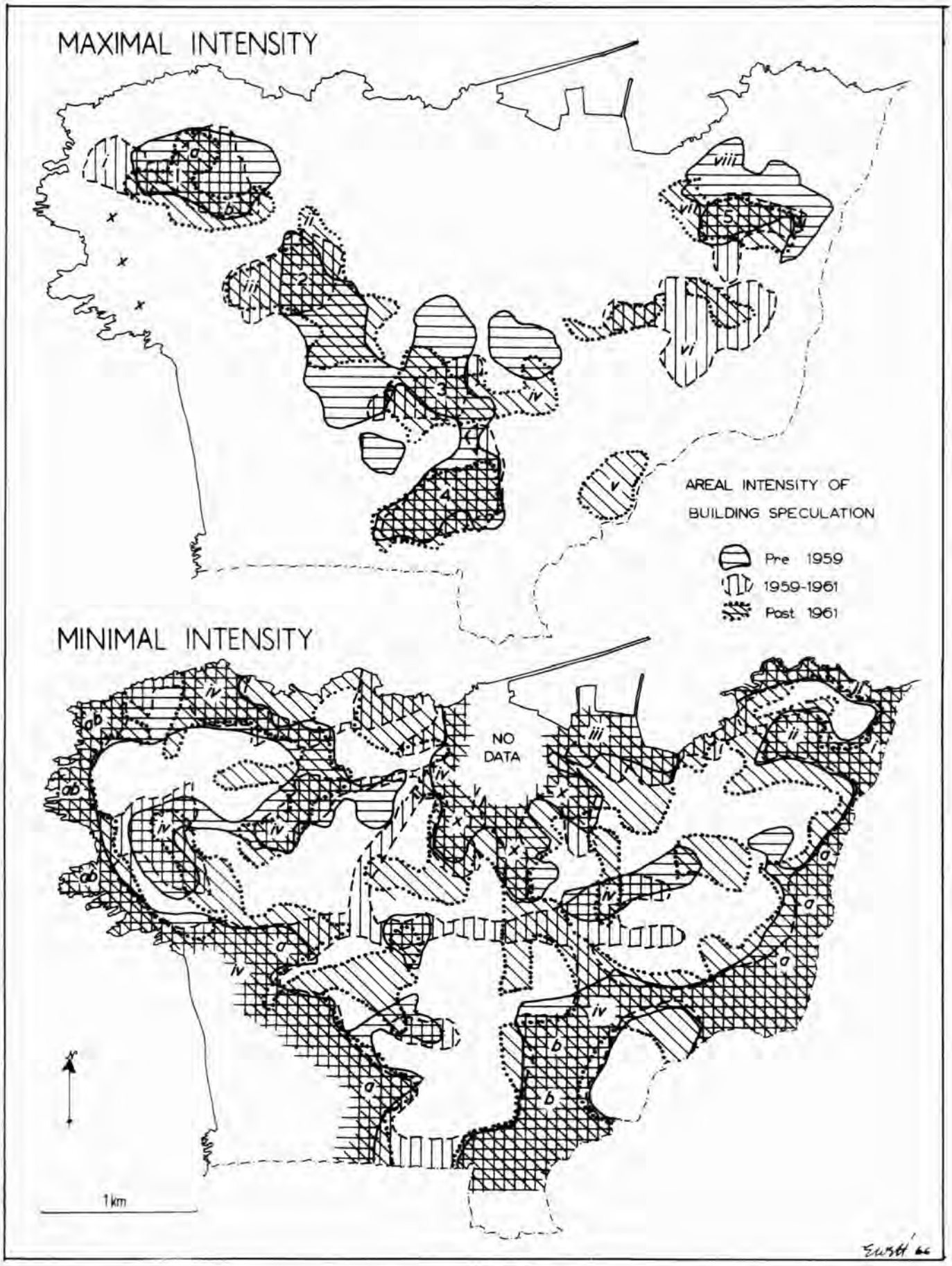
* Maps not included - information summarised in Map 5.
** Map 5


MAXIMAL INTENSITY
AREAL INTENSITY OF
BUILDING SPECULATION
Pre 1959
1959-1961
Post 1961
MINIMAL INTENSITY
NO
DATA
1 km

MAP 5

in both of which the distribution for the three periods are superposed.

The most marked feature of Map 5 is the fairly regular occurrence of the most intense permit scatters in a semi-circular band, approximately 1 km. wide, with its main limits between 1 and 1½ km. from the city centre. To the south of this band, separated from it by a narrow trough of low intensity, there lies an area of similar high intensity. There are five areas of stable high intensity in the main band and the outlier (darkest shading on the map); core areas where land speculation has continued at a high frequency for at least eight years. Area 1 really consists of two parts, 1a being a favourable commercial and residential area, and 1b a desirable residential area with immediate access to the Hamra shopping and office artery. Areas 2, 3, 4 and 5 represent the infilling of previously lightly built over land, mainly by medium quality housing of various types, and with the additional incentive in area 3 to Autostrade Mazra'a, a dual carriageway circle road.

It seems therefore, that the two main conditions necessary for a continuously high intensity of land speculation are a sufficiency of sites, and maximum accessibility to the city centre. Where these alone cannot explain a building boom location, areal prestige is usually the most important factor. This is the case in area 1, which through the snowballing of attractive residential characteristics and the growth of commerce has become an area of high social prestige. Thus, although it is already sufficiently built up for new building to cause overcrowding, and cross city access is difficult, a continuous high intensity of land speculation is operative.

That part of the main semi-circular band without the core areas of stable intensity, represents periodic fluctuation in size and direction of the areas of attraction. These are explicable locally in terms of such factors as complete infilling allowing no more building, with subsequent contraction, and development towards new commercial and residential prestige areas. (E.g.'s i - viii)

As with the stable positive areas, there are a number of negative areas which have been consistently unattractive to speculation throughout the three periods. (Map 5) These fall into various categories:-

1. Densely built over areas of declining property immediately round the centre (x)
2. Peripheral land with difficult building conditions (a) or recreational functions (b)
3. Enclaves of land containing or adjacent to nuisances such as industry, transport terminals, docks and warehouses (i) slums, shanties, refugee clusters and poor quality and deteriorating housing generally (ii)
4. Enclaves of estate belonging to religious foundations, educational institutions and Govt. depts. (iv)

Where boundaries of the negative areas for the three periods differ, such differences may again be explained in terms of changing concepts of desirability. The shift of a fashionable area even slightly leaves behind a temporary vacuum for new building which shows up on map 5 as a

negative area. Greatly increased traffic, and the consequent noise and dirt along a main through route may outweigh all the advantages of living near such a route, and parallel strips of very low building speculation (mainly commercial) will result. Apparently repellent areas may in some cases be areas which are so desirable in commercial terms that only very large blocks will justify the expense of the land, and only a very slight scatter of permits will appear. In some cases temporal fluctuation of negative areas is simply due to land becoming so densely built over that saturation point is reached and nothing further can be built without preliminary demolition, so permit density fades away altogehter.

If the two maps showing positive and negative areas are superimposed the unshaded parts represent areas of stable average land speculation intensity. This includes a semi-circular strip between the inner negative zone and the main band of attraction where some of the activity is due to replacement, and a number of fairly isolated areas throughout the city. The location of these is unremarkable except perhaps for area x.* The average Beirut citizen is convinced that this is where the greatest building activity is concentrated, and it is indeed an impressive area with its stands of luxury blocks. However the size and newness of the blocks deceives the casual observer into assuming a high building intensity which does not in fact exist there. In whatever way the data are treated, this still emerges as an area of average building intensity.

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* See map 5

At this point it might be well to explain the blank covering the central area (R). This is not intended to depict a positive, negative or neutral area. The unfortunate fact is that data are not available, mainly for political reasons which despite enquiries were never clearly explained. As it has many of the other characteristics of a central area*, it is fairly safe to assume it has to some extent an equivalent pattern of land speculation, that is intense competition for a relatively small number of sites. However this is greatly complicated by the existence of the "suqs", many of which occupy fairly dilapidated two and three storey buildings, and of the older commercial areas between Rue Wegand and the Port where three and four storey buildings are densely occupied by literally thousands of different concerns. For speculation to occur here, these buildings must be replaced and the difficulties in the way of acquisition and demolition are enormous. Part of the western "suqs" have already been demolished by the Municipality and the land cleared for the building of new office and bank blocks (Rue Riad Solh), but this has been a very slow process. Onemore reason is multiple ownership which has not yet been recorded in quite the same degree as Damascus where one large, ancient block traced ownership to 2,000 people, but never-the-less is a potent obstacle. Due to all these factors and the mounting pressure from speculators, the Municipality deems it wisest not to publish appraisals of central area sites in its records.

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* See later chapter.

THE SPATIAL PATTERN OF LAND VALUES IN THE MUNICIPALITY OF BEIRUT

Areal distribution of land values by block* averages are shown for the three periods pre 1959, 1959 - 61 and 1961 - 63.**

The basic data for map 6 represent a slightly longer period than that of the other two maps, and consequently the averages are compounded from a wider range*** of values. However this range is insufficient to affect the general picture and the areal differentiation depicted may be taken as fairly accurate. The most striking features of this map are the widespread areas of land valued at less than 100 sq. m., and the prominence of Ras Beirut, emerging already as an area of high values. Within Ras Beirut very high values occur adjacent to Rue Hamra, the office, retailing and recreational artery of the area, and along Rue Bliss, also with important commercial functions and in addition served by the tram line. Between the western end of Hamra and the sea there is an area of fairly high value representing very desirable residential sites. The area to the S.E. of the central commercial area, where values are slightly higher than average, corresponds with what was once the most highly sought after residential area of Achrafieh, with a number of palaces, mansions and other tokens of gracious living. The district is sufficiently elevated to escape the worst of the heat and noise of the Damascus Road Depression, (****) and yet offers quick access to the more attractive attributes of the town centre. (Specialised shops, suqs, cinema). The line of the Damascus road is marked by higher

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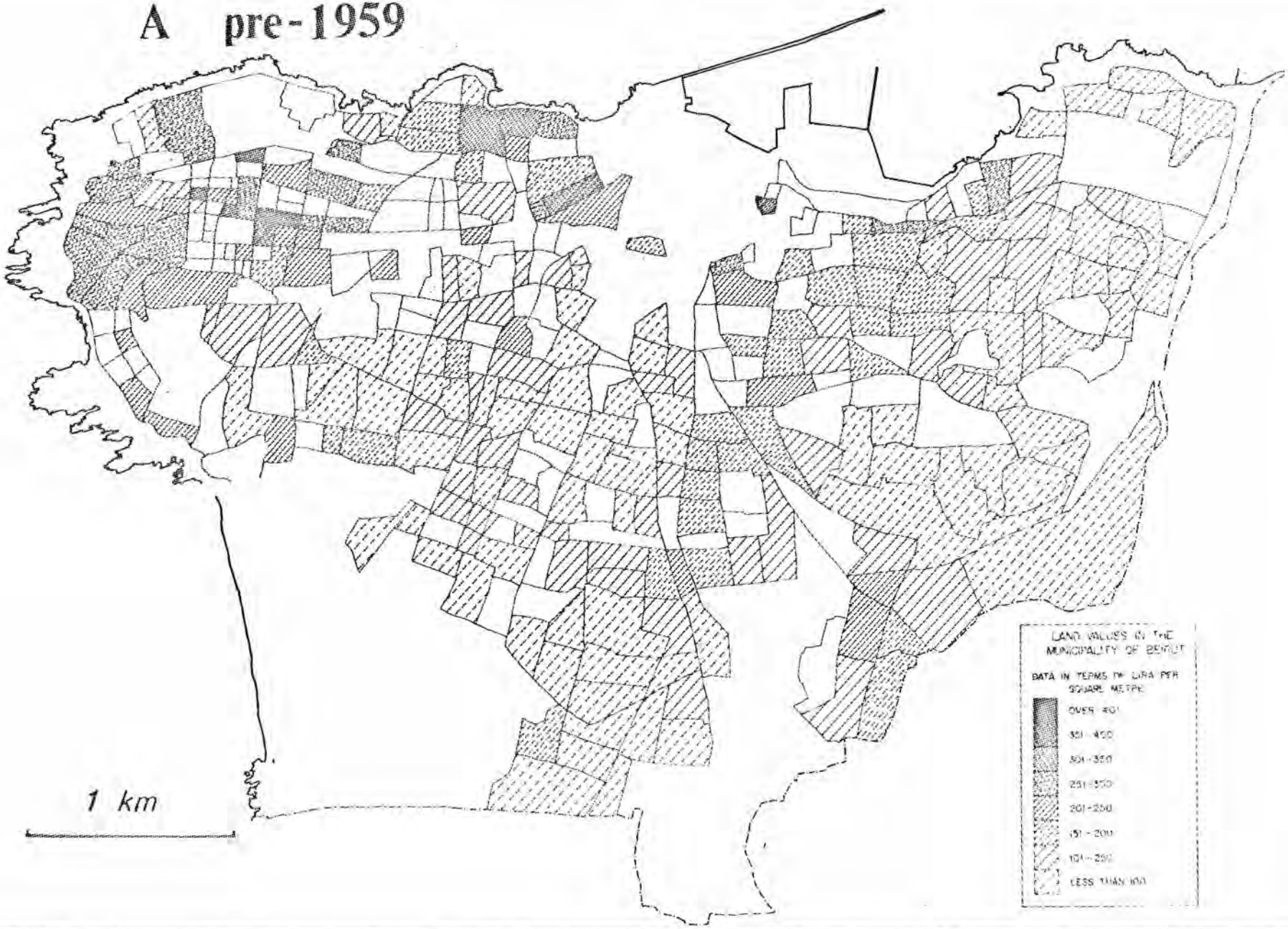
* Minimal areas enclosed by paved roadways.
** Maps 6, 7 and 8.
*** Probably at least 5 years - but with a steady increase throughout.
**** See Section I, Physical Site Characteristics.

A pre-1959



MAP 6

values in the adjacent blocks, as is the Tripoli road. Both these illustrate the commercial value of route front sites, and the residential value of blocks near a main road with tram and taxi services. At this time the nuisance value of traffic was rarely considered, mainly because with much less traffic* the problem had hardly become apparent. What data are available show that towards the centre values were high, as would be expected. The area of high value to the north west of the central commercial area, near St. George's Bay, is one of the main entertainment areas, with numerous restaurants, clubs and hotels.

It is immediately obvious from map 7 that there has been an over-all increase in values in this period, which is in fact the general economic boom shown on the graph** Most of the widespread areas with an average of less than 100L/sq. m. are now elevated to an average of 101 - 150L/ sq. m., with the lowest category remaining principally in the peripheral areas. The Hamra - Bliss area continues to stand out very clearly as an area of exceptionally high values, with a number of blocks now with an average of over 401L/ sq. m., and this ridge of high values has extended eastward almost to the edge of the centro-peripheral replacement zone. Most of these high value blocks represent the increasing need for high quality residential accommodation, with a scatter of offices (especially medical) and some retailing. The line of the Damascus road again stands out clearly due to adjacent high values, but as these are nearly all blocks on the east of the road, and the plots for

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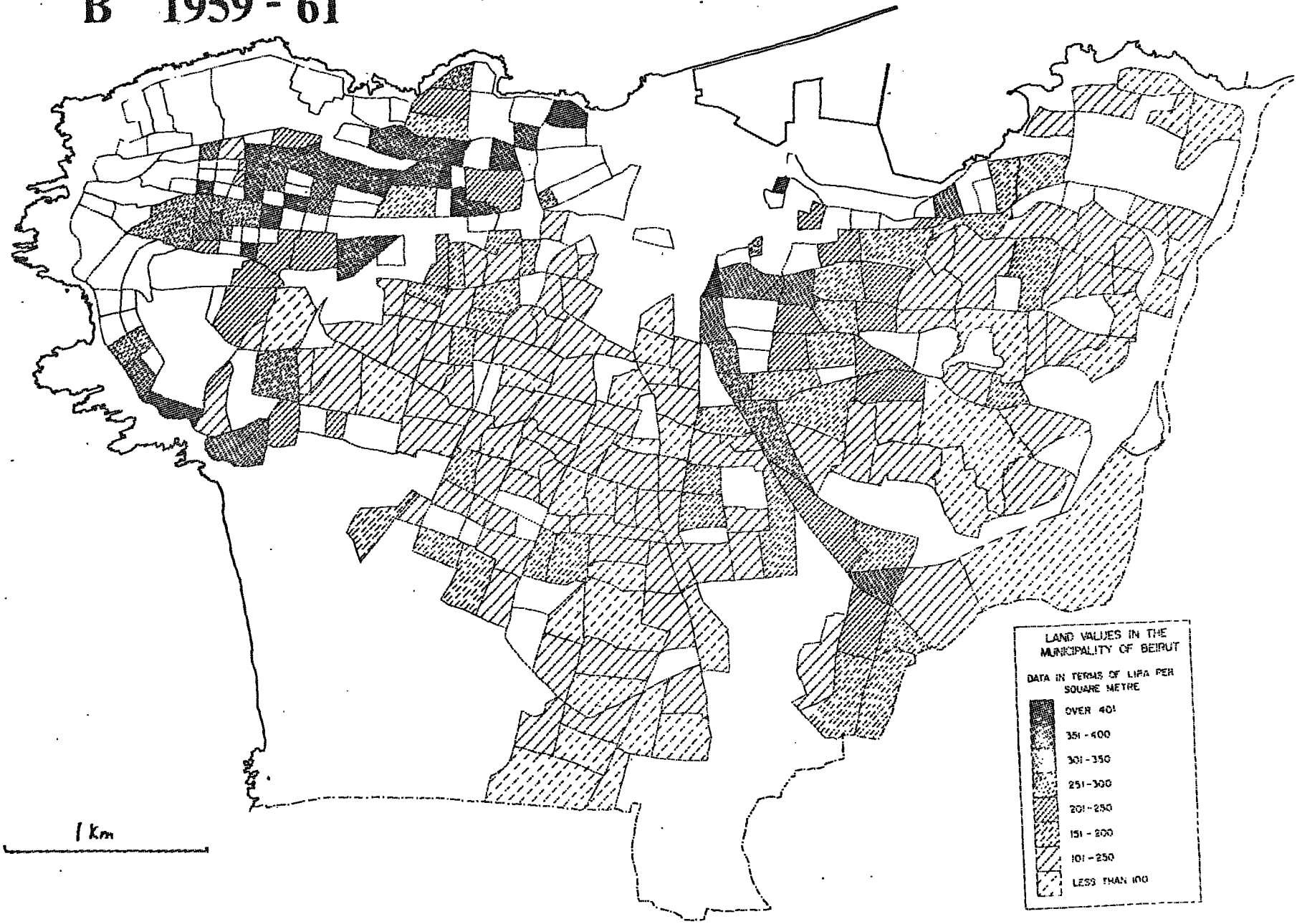
* Appendix, Table 5. No. of Vehicles registered in Lebanon over some years.
** Graph no. 1.

B 1959 - 61



MAP 7

which the permits were issued are not fronting the road, it is obviously attracting residential rather than commercial high values. N.W. Achrafieh remains an attractive residential area; but for this period again high central area values can only be assumed. The most marked change from the previous period is the emergence in S.W. Ras Beirut of a high value area along Boulevarde Chouran. Here are attractive, hilly sites overlooking the sea, ideal for multi-storey, luxury apartment blocks, and the occasional expensive hotel, and able to command very high prices.

In the last period* only a few areas remain with an average value of less than 100L/sq.m. and these are mainly very peripheral, sometimes on very rough terrain, with few service roads, or occasionally where industry has lowered the value of the block for other purposes. A large proportion of those blocks for which data area available have average values between 100 and 200L/sq.m. The Ras Beirut - Hamra - Bliss high ridge has extended westwards to the sea and southwards to Rue Madame Curie, reflecting continuing pressure for residential use, itself remains the commercial artery of this high ridge, but a small concentration of shops and restaurants etc. is emerging at Raouche to bolster values still higher in this district. Again high central area values must be largely assumption, but information was obtained to the effect that a central area site to the S.W. of the Borj was valued at 7,000L/sq. m. in 1963. The inflating effect of the Tripoli road is again apparent, but lack of data mask the effect of the Damascus road. However the increased efficiency of transport has elevated the value of the peripheral

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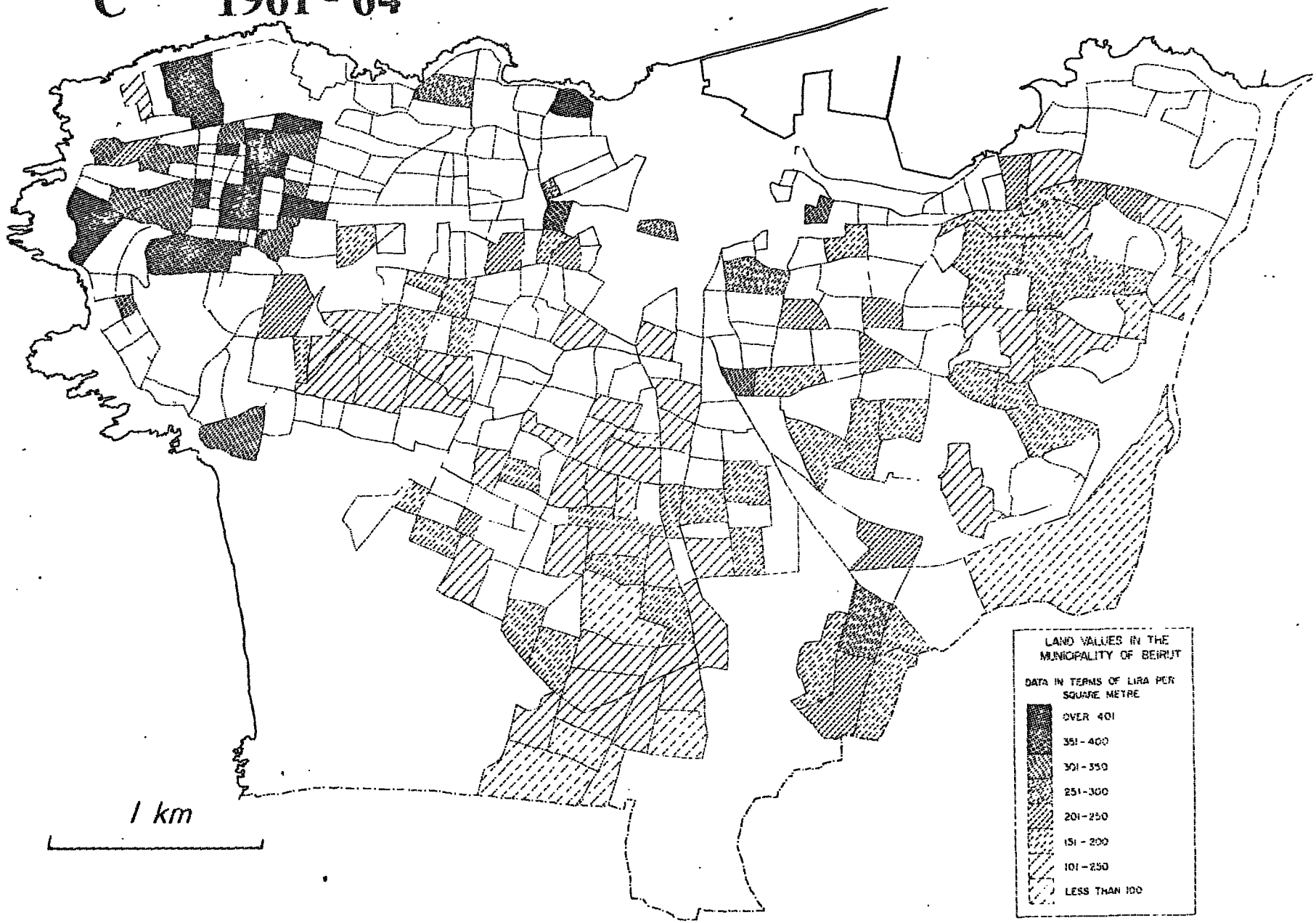
* Map 8.

C 1961 - 64



MAP 8

area to the S.W. of the Damascus road, where values have increased steadily in the past few years. The isolated high value to the west of the port lies along a retailing off-shoot of the central area, the Avenue des Francais.

From these three maps it appears that other things being equal, land values throughout the Municipality appreciate with the passage of time.* The main factors influencing areal differentiation in land value in Beirut are:-

1. Whether the dominant use is commercial or residential
2. Distance of block from town centre
3. Proximity of block to main routeways
4. Topography and climatic conditions
5. Proximity of block to retail facilities, recreational facilities, estivage routes, and
6. Availability of services (water, drainage, gas, electricity etc.)
7. Social prestige of area.

Of the seven blocks showing depreciation, some are due to environmental change, but most to a change in the location within the block of the larger portion of permit issues. Thus a block for which the average for an early period is compounded mainly from high value frontage sites and the average for a later period mainly from lower value interior sites, will record an apparent decrease in value.

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* Seven blocks show depreciation.

In order to examine in more detail the structure of land values in Beirut, permission was obtained to extract from the Municipality records all available data for one period.* Because a more complete areal coverage was apparent in period 1959 - 61, the land speculation boom era, the choice of this period seemed to be the most logical. The main points to be ascertained were:-

1. How does frontage value vary along streets and routeways?
2. What relationship exists between block interior averages and block front averages?
3. Do cross street values vary?

1.

A number of longitudinal street profiles were constructed,** both along roads radiating from the city centre (A-B,A-F,A-C,A-G,A-D,A-H), along intra district roads (R-S,M-N,P-Q), and the main ring road (B-C-D-Q-F).

In profile A-B, the steep curve from the central peak high within the first kilometre is slightly less pronounced than the comparable sector of profile A-F. This is due to the slight but definite unilateral spread of the central commercial area Westwards. Bab Edriss and Rue Georges Picot contain a large number of small specialised shops selling high quality goods, and the erection of the "Starco Centre", a

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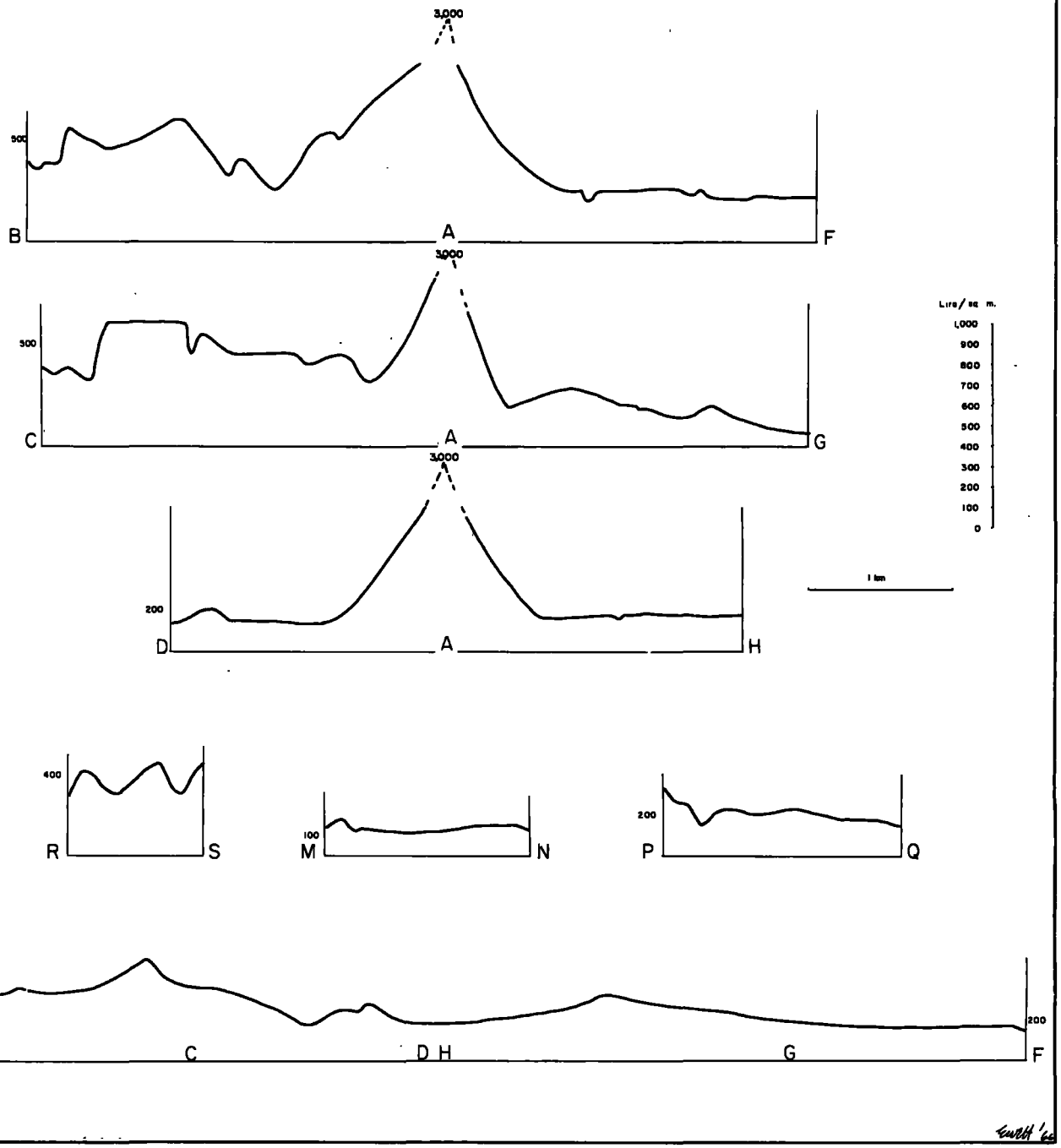
* See appendix for availability of material and method of collection (6)
** Graph 2.

LAND VALUES

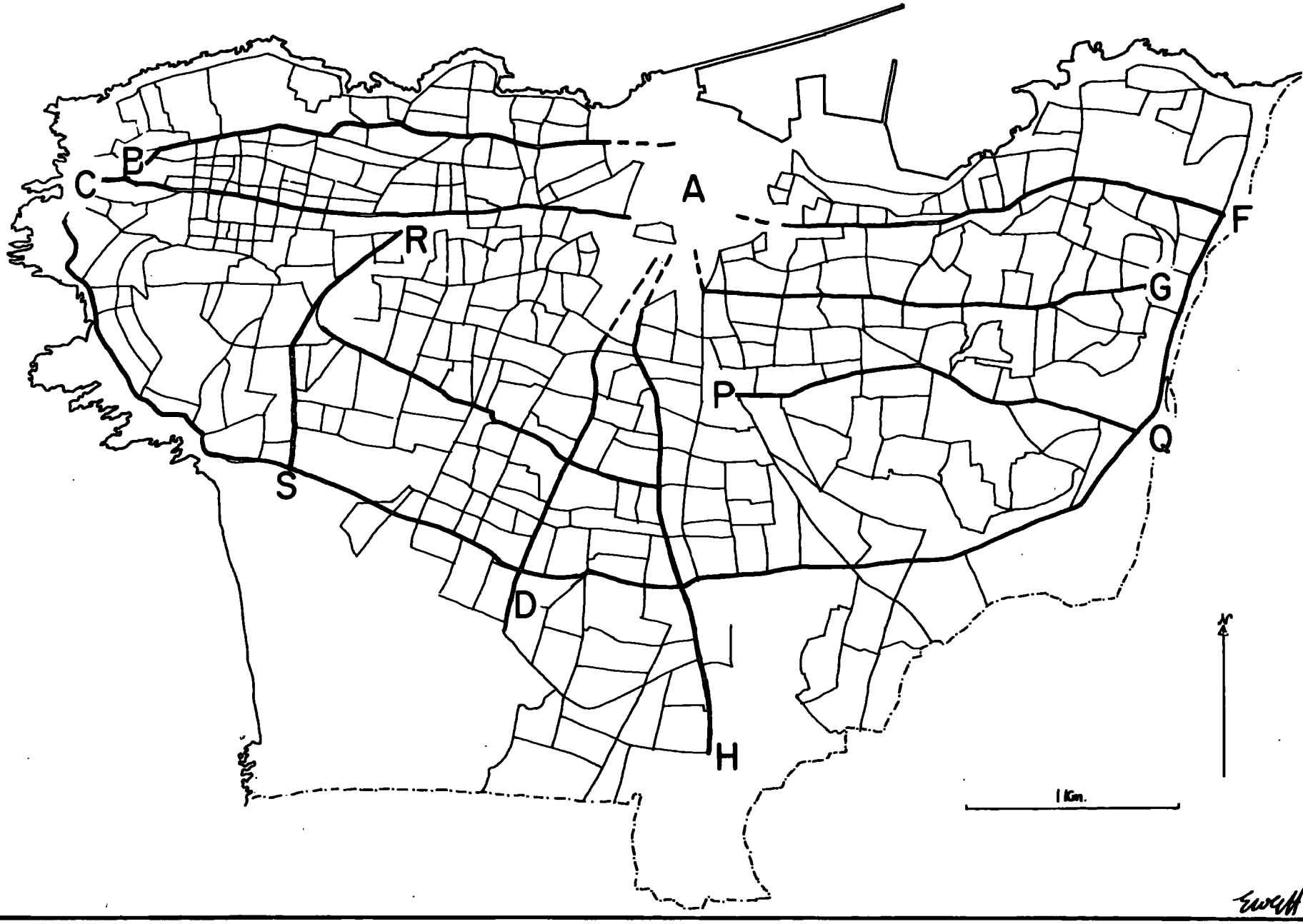
LONGTITUDINAL STREET FRONTAGE PROFILES



GRAPH 2

LAND VALUES

LONGTITUDINAL PROFILE LINES



MAP 2

huge multi-storey retail and office block, both reflects and further encourages this trend. The trough of low value into which this curve then descends (to 250L/sq.m.) coincides with an area of older, deteriorating buildings in Ave. Perthuis. At this point there is an absence of commercial frontage use due to the intermediacy of the area between the two main commercial areas, and from the point of view of residential use, such sites are undesirable because of the noise and dirt of traffic in general and the clanging of trams in particular. Thereafter values rise to a subsidiary peak of 600L/sq.m. at the beginning of Rue Bliss, at a highly desirable commercial site at a junction served both by trams and two service routes, and opposite one of the two main entrances to the A.U.B. campus. High values are maintained along Rue Bliss, but at the junction with Manarah, where there is an abrupt change from mixed commercial to purely residential land use, there is an equally sharp fall in values to the 350 - 400L/sq.m. range, though this is still very high for residential land.

A-F, the approximately corresponding radial to the east, shows a very steep drop in the first $\frac{1}{2}$km. This is because the eastern side of the commercial core is flanked by the deteriorating property of the "Red Light Quarter", which passes imperceptibly into a general zone of decaying houses and multi-purpose buildings used as stores, workshops, shops, dwellings etc. In Rue Gouraud a couple of blocks away from the Borj, even the free accessibility so favourable to commerce is unable to offset

the general undesirability of the area. For the rest the frontage value is maintained remarkably even at between 200 and 250L/sq.m., with occasional fluctuations not exceeding in amplitude more than 25 - 50L/sq.m. due to very local factors.

Profile A-C broadly reflects A-B as would be expected, since the parallel lines of section are nowhere more than 600m apart. There are however some notable exceptions. Firstly, the gradient of the drop from the central peak high is shorter and steeper than that of A-B, since the westward spread of the commercial centre is not evident in this precise direction. Here in fact there is the classical straight drop into the "blight" area low value trough. This would be even more pronounced without the ameliorating influence of the Rue de l'Armée itself as an agent of penetration and the fact also that here the rate of replacement is constantly accelerating thus pushing up values. From this "trough" there is a rapid rise to a well maintained "Plateau" of even high values (400 - 500L/sq.m.) along this important "service" taxi and general traffic route. The "plateau" is followed by a pronounced rise, marking the beginning of the main commercial and retailing section of Rue Hamra. High values (600 L/sq.m.) are maintained thence to the end of the street, when a very steep drop marks the abrupt transition between high grade commercial and high grade residential property.

Profile A-G shows a sharp drop in the first $^1/_3$km. into a slight trough possibly marking an area of debilitation. The following 100L rise to 290L/sq.m. reflects the attractive residential area of N.W. Achrafieh

already shown on the block averages maps. Thereafter there is a gradual fall in value, halted temporarily by a slight but pronounced rise to 200L/sq.m. in Rue St. Louis. This is due to a small enclave of land with attractive views, and afterwards values continue to drop steadily to 80L/sq.m. near the Nahr Beirut.

The southward radials, A-D and A-H, have remarkably even profiles. A-D maintains a level of 140 - 150L/sq.m., rising to 200L/sq.m. where this route crosses the ring road, but falling again on the southern side. A-H with an even level of 160 - 180L/sq.m., shows no apparent increase where it bisects the ring road, but this may well be due to lack of figures for this sector. Certainly, values actually fronting this section of the ring road are at a level of 160 - 180L/sq.m., and values of this order are recorded in roads adjacent to the profile as they approach the ring road.

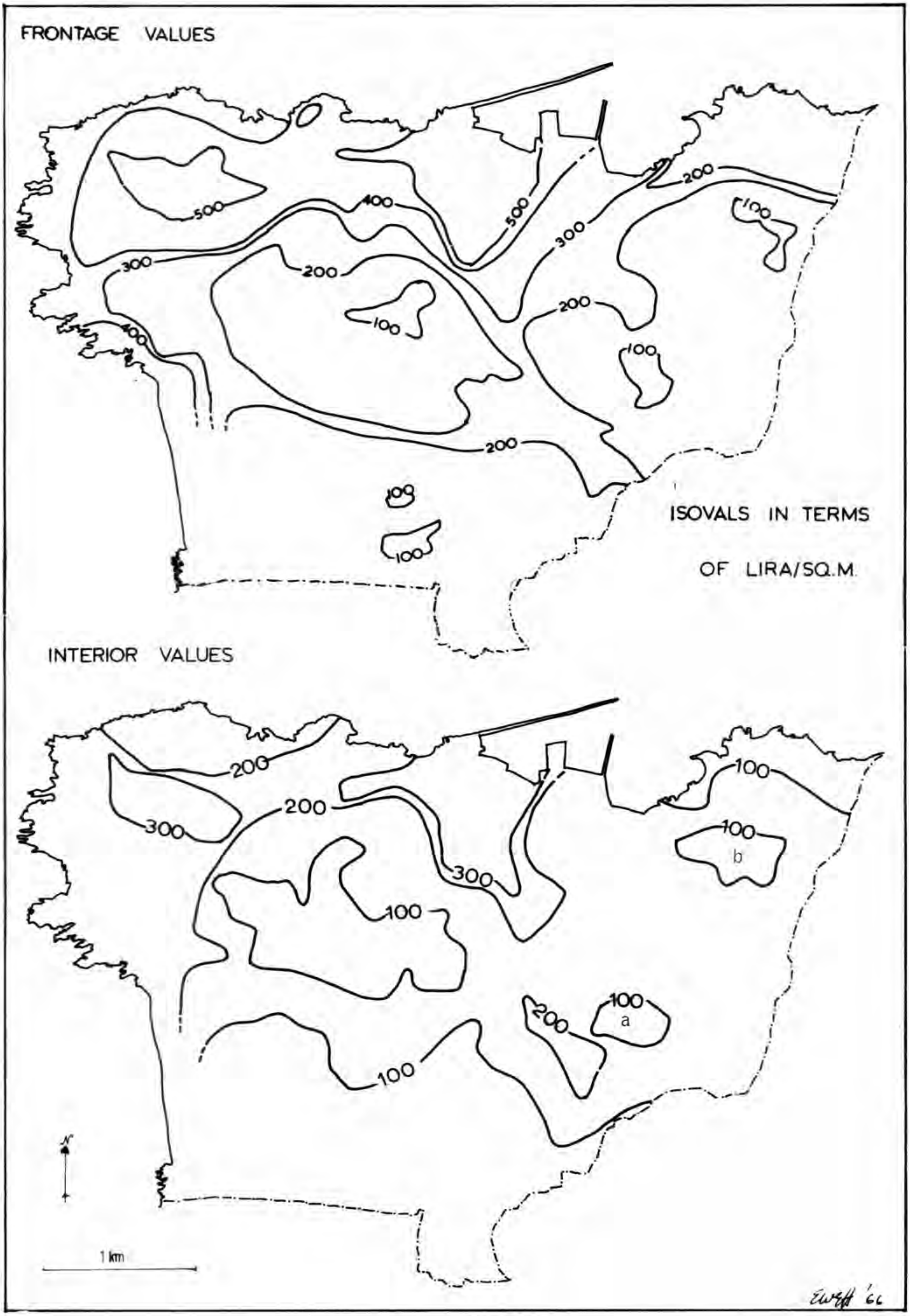
The longitudinal profile of the ring road itself fits in well with the general pattern of land values. The peak in the west coincides with the high value residential area of S.W. Ras Beirut, and the following drop to 180L/sq.m. reflects a small area of undeveloped sand dunes. After a minor peak (280L/sq.m.) between Mar Elias and Mousseitbeh the level drops slightly, then rises to another peak (320L/sq.m.) in the desirable residential sector between Rues Ouzahi and Damas where the south side of the road is unbuilt, and the north side faces over the Pine Forest. The profile curve then falls to 160L/sq.m., and maintains this level until the ring road meets the Tripoli road at point F.

Of the intra district profiles, R-S fluctuates the most violently

due to very localised environmental conditions such as proximity to Army territory, sand-dune terrain, a high class luxury hotel etc. M-N acts to some extent as the local commercial artery for the district of medium quality residential housing across which it cuts. The values are slightly elevated at the western end due to proximity to higher prestige residential areas, but otherwise is fairly even. P-Q is a similar local commercial artery forthe largely residential area on either side. Proximity to the major radial route, the Damascus road, elevates the values at the western end. Thereafter there is a slight and gradual drop eastwards towards the Nahr Beirut.

Correlation of the characteristics of these longitudinal profiles reveals certain general tendencies.

1. The central area reaches a peak high value grossly disproportionate to all other frontage values.
2. There is slight evidence of a trough of low values in the cento-peripheral zone, this being displaced westwards where the central area is spreading in this direction.
3. Values decrease away fromthe central area, with minor fluctuations due to local conditions such as important road junctions, good building terrain, accessibility to fast through routes etc.
4. This rule is excepted where a route crosses a very important secondary commercial nucleus causing thereby considerable elevation of values.
5. Since an exceptional low may occur in areas of generally


FRONTAGE VALUES
500
400
500
300
200
300
200
100
200
100
400
100
200
100
100
ISOVALS IN TERMS
OF LIRA/SQ.M.
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200
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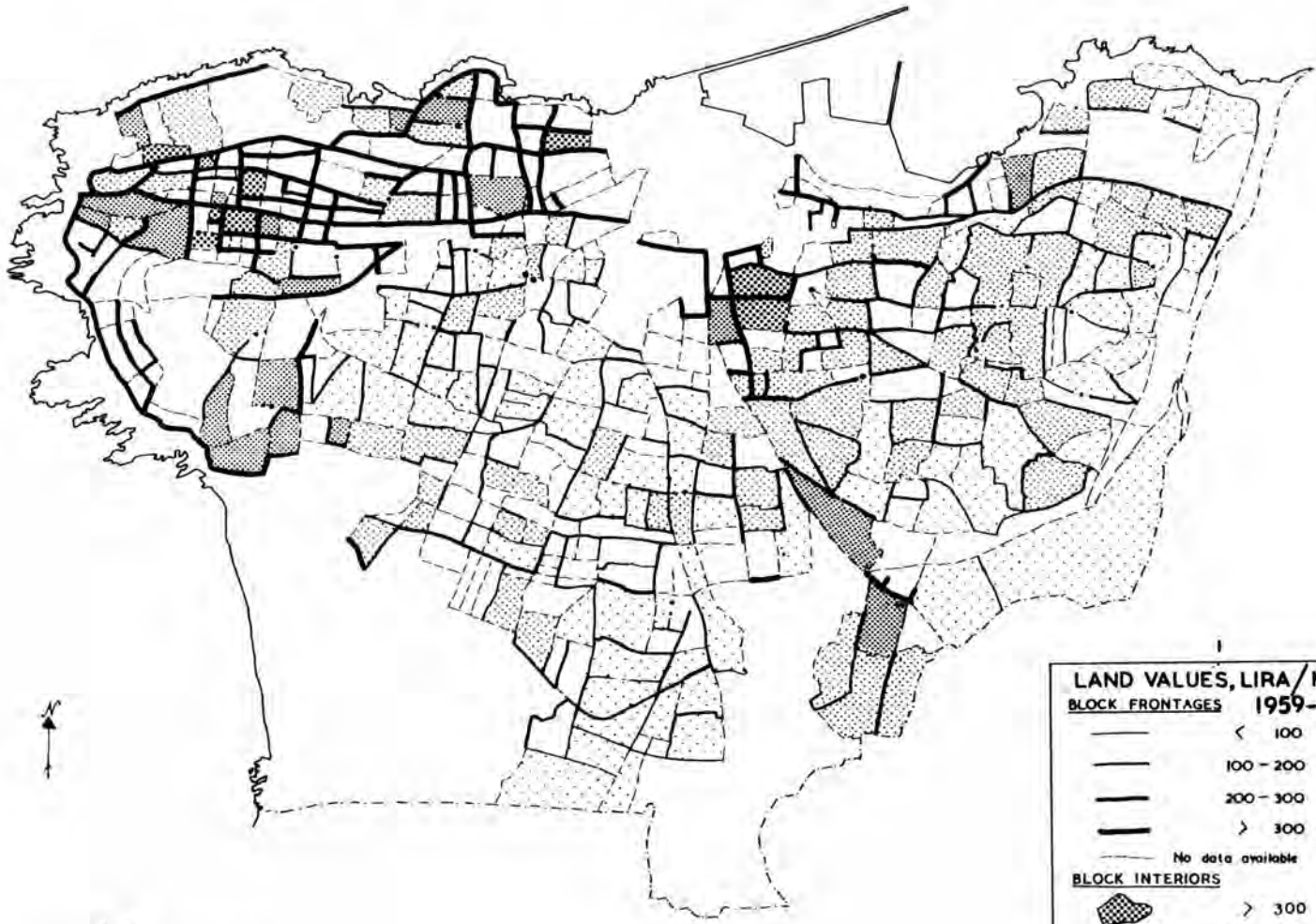
MUNICIPALITY OF BEIRUT



MAP 11

high value but the converse never occurs, longitudinal profiles are more liable to rapid fluctuction in high value areas than in low value areas.

From the maps showing isovals for interior and frontage lots for the period 1959 - 61*, it is immediately apparent that there is an over-all disparity between the two categories. Throughout Beirut frontages are higher than interiors. The latter never rise above 400L/sq.m. while there are quite large areas where frontages are above 500L/sq.m. From these maps, and the map** showing frontage and interior block averages, it appears that there are three well-defined value-structure regions.

1. N.W. Beirut, with high interior values (300L/sq.m.+) and very high frontage values. (500L/sq.m.+)
2. Southern and S.W. Beirut with low frontage (100 - 200L/sq. m.) and very low interior values. (less than 100L/sq.m.)
3. E. Beirut, with medium to low frontage (100 - 200) and interior (100 - 200L/sq.m.) values with much less difference between the two.
4. The central area with high frontages, (over 500L/sq.m.) and it is presumed high interiors (over 300L/sq.m.), with both types dropping sharply in value to the S.W. interiors dropping sharply to the east and much gentler gradients

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* Map 10.
** Map 11.

to the N.W. and S.E.

Within the first region, the areal limits of the highest frontage values and the highest interior values are coincident except for a slight tongue of high frontages extending further to the west to take in the whole of Rue Hamra, with its valuable commercial frontage lots. The whole of western and S.W. Ras Beirut falls within the 200 -300 category as far as interior values are concerned, reflecting a generally high residential desirability. Frontages are more diverse, since they tend to drop away from the Hamra commercial artery towards the south, but rise to a ridge of high frontage values along the line of the Boulevarde Chouran, which is rapidly becoming a subsidiary service centre for the very recent apartment blocks in S.W. Beirut. The disproportionate high frontage values along Avenue de Paris, a wide, pleasant boulevard open on the north to the sea, reflect in this instance high residential rather than purely commercial desirability.

On the whole, in the second region an area of medium quality residential building, frontages rarely rise above 200L/sq.m., and interiors are mainly less than 100L/sq.m. with most interior lots valued at 80 - 90L/sq.m., but occasional ones dropping to 60 - 70. The most marked feature of the land value structure is the ridge of high interior and frontage values cutting right across the region in the same direction as the ring road. In the case of the frontage values, this high ridge is more or less exactly coincident with the line of the road, and is very narrow. The interior value ridge is more diffuse, and lies mainly just

to the north of the ring road, reflecting its general attracting power but its local undesirability. i.e. It is useful to have quick access to a main road but unpleasant to live next to one.

In area 3, the tongue of relatively high frontage values extending from the central area southeastwards promotes a more gradual transition between areas 4 and 3 than between either 4 and 2 or 2 and 1. Thus values grade outward from 300 - 400 in the north west of the region, through areas of 200 -300 extended in two ridges along the lines of the Tripoli road and Rue Furn el Hayek/Sioufi, to the main area of the region at 100 - 200. There are also in this region two small pockets where both frontage and interior values drop to below 100L/sq.m. a* is a sparsely built up peripheral area with a number of squatters huts and b, an old Armenian quarter with poor quality, decaying property. The S.E. extending tongue of higher interior values in the N.W. of this region, represents the desirable residential quarter of Achrafieh mentioned before.

Areas 2 and three are separated on the frontage isoval map, by a ridge of high values which follows exactly the line of the Damascus road, an important route between the city and its hinterland. That the elongated area of high interior values interior isoval map is parallel to, but not exactly coincident with this road again reflects the access/attraction, nuisance/repulsion dichotomy already exhibited along the ring road.

From this brief discussion, certain general tendencies concerning the spatial distribution of interior and frontage block values in

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* : Map 10.

Beirut emerge.

1. High frontage values are generally coincident with commercial land use, though in high amenity areas frontage can be valuable for residential purposes.
2. Low frontage values occur in the less heterogeneous areas of medium quality residential property not directly served by important routeways.
3. High interior values (usually residential use) are normally coincident with high frontage values, but where there are very favourable residential sites away from a main routeway, may occur independantly of them.
4. Low interior values occur in relatively homogeneous, medium quality residential areas.
5. On the whole, areas with a high frontage value have a high interior value, but frontage is disproportionately high;
    a. Along important routeways, especially when these are important tram, taxi, and bus routes,
    b. In the central area where only frontages have value for commercial use,
    c. In the secondary commercial nucleus (Hamra) for the same reason.
6. Interior values are nowhere higher than frontage values, and only rarely are they equal. These exceptions can occur in those areas well away from arterial streets where the properties front on to narrow, irregular roadways.

Examination of the available data reveals no significant differences in land values on opposing frontages of the same street. This is hardly surprising since firstly, such differences would probably only appear on a very fine grain image reflecting at least a 50% sample of all plots, and secondly, such differences usually affect commercial land use in very competitive areas, namely central areas, for which no data are here available.

It is in any case doubtful whether even with a 100% sample any difference sufficiently significant to enable generalisation would emerge. Certainly there are central area streets where traffic congestion impedes customer flow more to the detriment of concerns sited on one side than those on the other. There are also blocks containing nuisance value use* whose frontage value for residence may be lower than that of an adjacent block with no such nuisance. But for a concomitant drop in land value to be proved a number of cases where exactly opposite lots are of similar size and use would have to be found and tested. Coincident value differences would then be more significant, but very difficult to actually prove.

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* Shacks, industries, waste areas,

LAND VALUES SECTION - CONCLUSION

Probably the most surprising fact to emerge in some ways is the apparent similarity between trends in Beirut and in N. American cities. Here in the occidental fringe of the Orient, with its spasmodically harmonious jumble of churches and mosques, there ought surely to be a different pattern of land values and speculation from N.W. Europe and N. America; a pattern in which could be traced the centuries of Arabic and Ottoman rule, as well as the commercial adventurousness of the modern Lebanese. In other Middle Eastern cities, such as Jerusalem, Damascus and Aleppo, relics of the expected oriental pattern still exist, with central area suqs valued low and numerous scattered nuclei of high values surrounded by low, where occasional opulent palaces and mansions are surrounded by the simple dwellings or even hovels of the poorer relatives. However even in these towns such phenomena are playing a constantly decreasing role as far as the over-all pattern of land values is concerned. Beirut, with its earlier and more intensive exposure to western material culture, has lost even these manifestations of the Orient in its land value pattern. The city seems, in fact, to be superficially organised in a sufficiently western way for theories evolved in N. American and N.W. European cities to be at least examined in relation to Beirut. Whether they hold true, is another matter.

Hoyt* quotes general economic cycles as the "hidden persuader" behind booms and slumps in land speculation. He divides these into types according to length, with the shortest being the seasonal cycle, and the

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17. * Hoyt. "Urban Growth and Real Estate Values." J. Real Estate App. 1940

longest the "major war cycle. All types influence land speculation, some more than others, but the causal relationship is virtually immediate, with a time lag being rare. From the analysis of land speculation figures for Beirut over a period of time, it seems that Hoyt's theory holds true here. It may of course, be coincidence that the curve of the land speculation graph rises with economic prosperity, and falls with adverse economic conditions, but the correlation is so close that the chances of it being true are high. Concerning the spatial distribution of land speculation, Hoyt considers that activity will be highest in the suburbs and stagnant in the periphery of the central area. Again this is broadly true for Beirut, though the existence of secondary commercial nucleus in Ras Beirut rather disrupts the pattern.

This secondary nucleus in fact is a major stumbling block for most of the N. American speculation and value distribution theories, such as those relating them to proximity to markets*, street tramways**, transverse main radial junctions***, commercial sub-nuclei, and social prestige.

It is true that in the central area, near Bab Edriss, exotic high class fruiterers and florists jockey for position in the limited space available, and that they are all relatively near to the wholesale markets. But they are competing not for proximity to these markets but for proximity to the customer. A site practically on top of the markets but in a sidestreet or less frequented alley, is virtually valueless

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* Wendt.
** Hurd.
*** Mackenzie.

} See Land Values section in General Bibliography.

compared to the site on a main pedestrian thoroughfare with maximum customer potential. And this is also true for other types of specialised retailing such as high class confectioners, haute couture, footwear boutiques etc. None of them seem to care particularly whether they are sited near the relevant wholesale market, but all compete desperately for the main street frontages, helping to push up land values there. And the whole concept collapses for Beirut when it is realized that the proprietor of a specialist establishment will compete just as happily for a site in Rue Hamra, well over 2km. from the markets, as he will for a site in the central area.

It was in 1903 that Hurd produced his theory that tramlines had an elevating effect on land values in certain parts of a city. "Street railroads add value to the circumference by rendering it accessible for residences, and to the centre by concentrating traffic within it."* And from such relatively simple but basic early statements there grew the controversy, as yet unresolved, between those who believed that increased efficiency in transport methods devalued urban land by decreasing the pressure on it,** and those who insisted that improved transportation brought central city areas within reach of a greater catchment area and increased pressure also on suburban land, thus elevating land values in both localities.*** It seems that Beirut stubbornly refuses to exemplify either theory wholeheartedly, although of course scientific application would in any case depend on the availability of data for at least 25 years.

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* Hurd.
** Haig, Ely, Dorau, Ratcliff.
*** Wendt et al.

} See Land Values section in General Bibliography.

When tramways were first constructed in Beirut in 1907-09, they extended well beyond the then built up area of the city to east, west, and south. Before long, growing clusters of settlement at and near the terminals of the east and south lines became apparent, and speculation spread, fingerlike, along the lines, both citywards from these new nuclei, and outwards from the city's main built up area. But although the newly opened up areas undoubtedly attracted vigorous residential speculation of a limited type, this did not mean that the main built up area did not continue to grow steadily both outwards and in density. Nor were the specialised retailers tempted away from the central area. It would seem, in fact, that land values within the city continued to appreciate at a fairly even rate, the pattern disrupted only slightly by differential elevation along the tram routes, and not significantly affected either by the "improved catchment" or "decreased pressure". The areas most radically effected were the terminal clusters themselves, where land values rose suddenly from the very low of average agricultural use to the relative high of average urban residential use. It was not until the slight initial clustering near the end of the westward tramline developed into the powerful secondary nucleus of Ras Beirut, beginning in the 1940's, that the spatial pattern of land values within Beirut was significantly altered. Now, at last, the merchant would leave the long founded security of custom of the central area for the dazzling possibilities of Hamra. The exclusive westerner, the social elite, and the nouveaux riches fought to reside in Ras Beirut. Plots were divided and subdivided in the efforts of both large and small landowners to capitalise and land prices

soared. But what had mushroomed largely because improved transport in the way of trams, taxis, and the private motor car brought it within easy reach of the city centre, now, after this initial impetus, continued to flourish almost independantly. Values in Ras Beirut continue high for both commercial and residential use and are likely to remain so. But again it must be stressed that this has had no over-all lowering effect on the rest of the city, although by its strong attractive power it has marginally affected the spatial pattern. An example is the westward elongation of the commercial centre high value area.

The theory that land values rise in marked but ever decreasing peaks marking the junctions of important lateral routes with the main radials, with a resultant land value topography rather like a three dimensional spider's web*, is often cited and tenderly nursed by land economists. What they do not always make clear is that this pattern, on this scale, only really applies to very large metropolitan areas of connurbations, where there is a strongly formalised concept of local commercial centres. In this case the site for such a centre <u>is</u> carefully located at a point of maximum customer accessibility, i.e. a radial/main lateral junction. Where such planned-local-centre consciousness does not exist, secondary nuclei are just as likely to coincide with other factors, such as the pre-existing core of an engulfed settlement, as with radial/main lateral junctions. This is certainly the case in Beirut, where secondary nuclei occur either in semi-absorbed villages like Chiyah,

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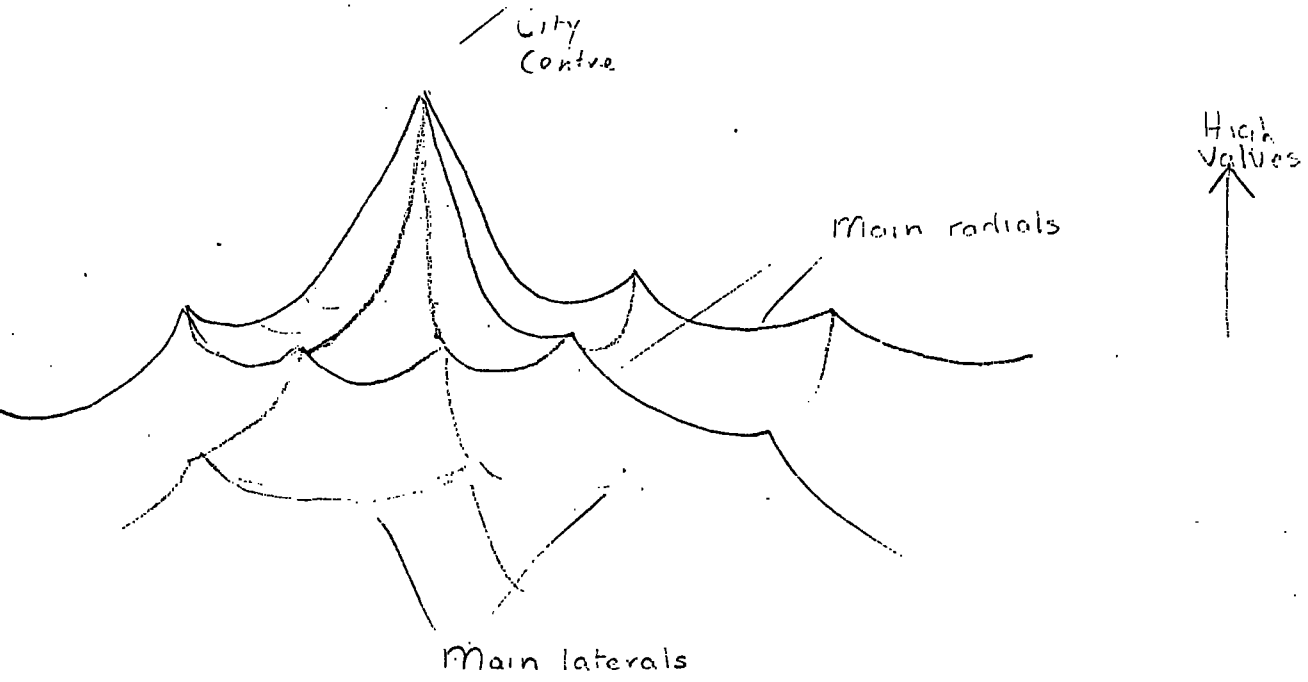
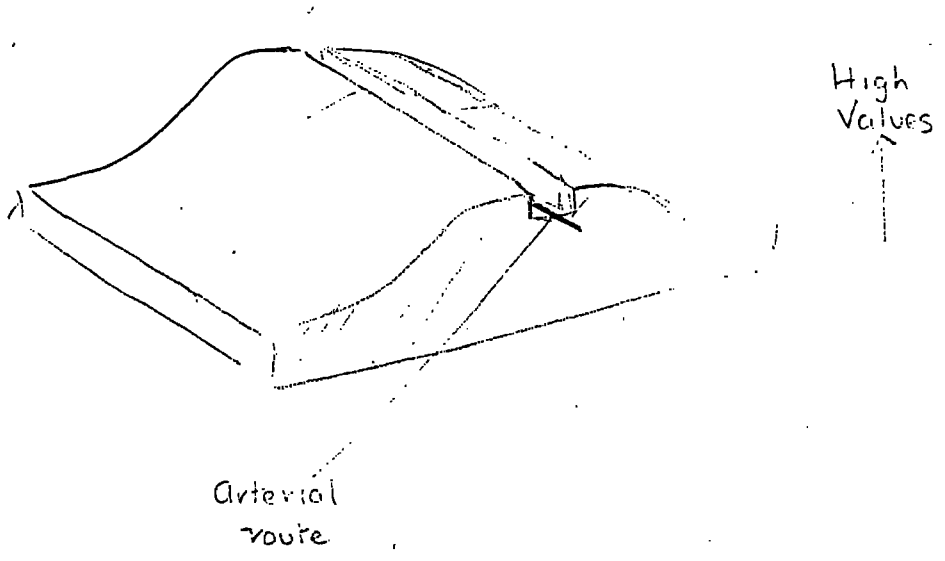
* Sketch a



Sketch a.



Sketch b.

Furn ech Chebback, Sin el Fil or Borj Hammoud, or in the midst of the major residential areas, - R. Sioufi, R. Rachid, R. Badaro, Rue Lebbos. For the rest, the Hamra complex is so powerful that it can hardly be classed as a "local commercial centre", and a liberal scattering of small scale grocers and vegetable barrows throughout the city provide for everyday alimentary needs. The only place where the radial/main lateral junction may be at all effective as an agent of land value elevation, is along the main ring road. Slight peaks are here evident where the streets Mar Elias, Ouzahi and Damas cross this route.

However it does appear that Beirut conforms fairly well to the idea that commercial land use prices are elevated along the main routeways. And in fact most of these in Beirut are well lined with small retail establishments, suggesting that the local nucleus is subordinate to the commercial ribbon in this city. There is even some indication of the dented ridge profile* of residential use so prominent in the sophisticated studies of Chicago**, where the general lines of the main radials are marked by elevated residential land values, but the road itself is sunk in a trough of lower values due to its nuisance value.

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* Sketch b
** Berry, Hoyt, et al.

THE SOCIO - ECONOMIC MORPHOLOGY

Introduction

Although the landscapes of Beirut are heterogeneous and often chaotic, the average inhabitant is able to locate and describe a number of distinctive features. Even the casual visitor soon becomes aware of such areas as Ras Beirut, Quarantine (Tinshack), Hamra and the sūqs, and attaches to the names specific characteristics. However, valuable though this designation of what are in essence socio-economic areas may be, common misconceptions frequently obscure the true pattern. These may arise from an exotic cultural approach, or may be due to a time lag of reputation behind fact. An example of such a misconception was quoted in the land values section* where the belief that S.W. Ras Beirut had the fastest building rate in the city prevailed, though the actual rate was just above the average.

The need therefore was for some form of factual analysis to a eliminate such casual errors. In the absence of official census statistics it was decided to approach Dr. C.W. Churchill for permission to analyse the interviews** gathered by his 7% (app.) survey in 1954. His own requirements from the data had been the deduction of over-all trends and in the social and economic life of the inhabitants of Beirut; i.e. a non-spatial study.*** For the present study, emphasis was to be entirely on spatial patterns.

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* Page 36

** These were entirely in Arabic

18. *** "The City of Beirut" C.W. Churchill, 1954

The question then arose as to the utility of detailed analysis of material ten years old, especially in the context of a city developing as rapidly as was, and is, Beirut. The balance was heavily weighted in favour of the project by two main factors. Firstly, a spatial study of many of the data chosen had not been done for a Middle Eastern city in any stage of development. Secondly, once the material was analysed, any future survey of Beirut could be accurately compared with it and the valuable temporal dimension thus introduced. However though the deduction of quantified rates of change must wait for a future survey, comments on certain trends already observable from recent fieldwork have been included where appropriate.

With Dr. Churchill's generous permission, the original interview documents were studied and data translated and abstracted in a form which allowed spatial interpretation. Maps were first drawn up to show areal distributions using the blocks as delineated for the original survey as* unit bases. However although some very general trends were apparent from these,** they could be interpreted only very loosely due to the smallness of the units. At such a size it would really be desirable to have a much greater sampling rate. Accordingly, using land value maps and the pilot maps based on Churchill's blocks as a guide, the small blocks were grouped together as objectively as possible into twenty five large divisions. When the data was re-mapped according to these divisions, distinct groupings became apparent. The "Chi squared" test of significance was then applied, and it became clear that in most cases there was only a very small possi-

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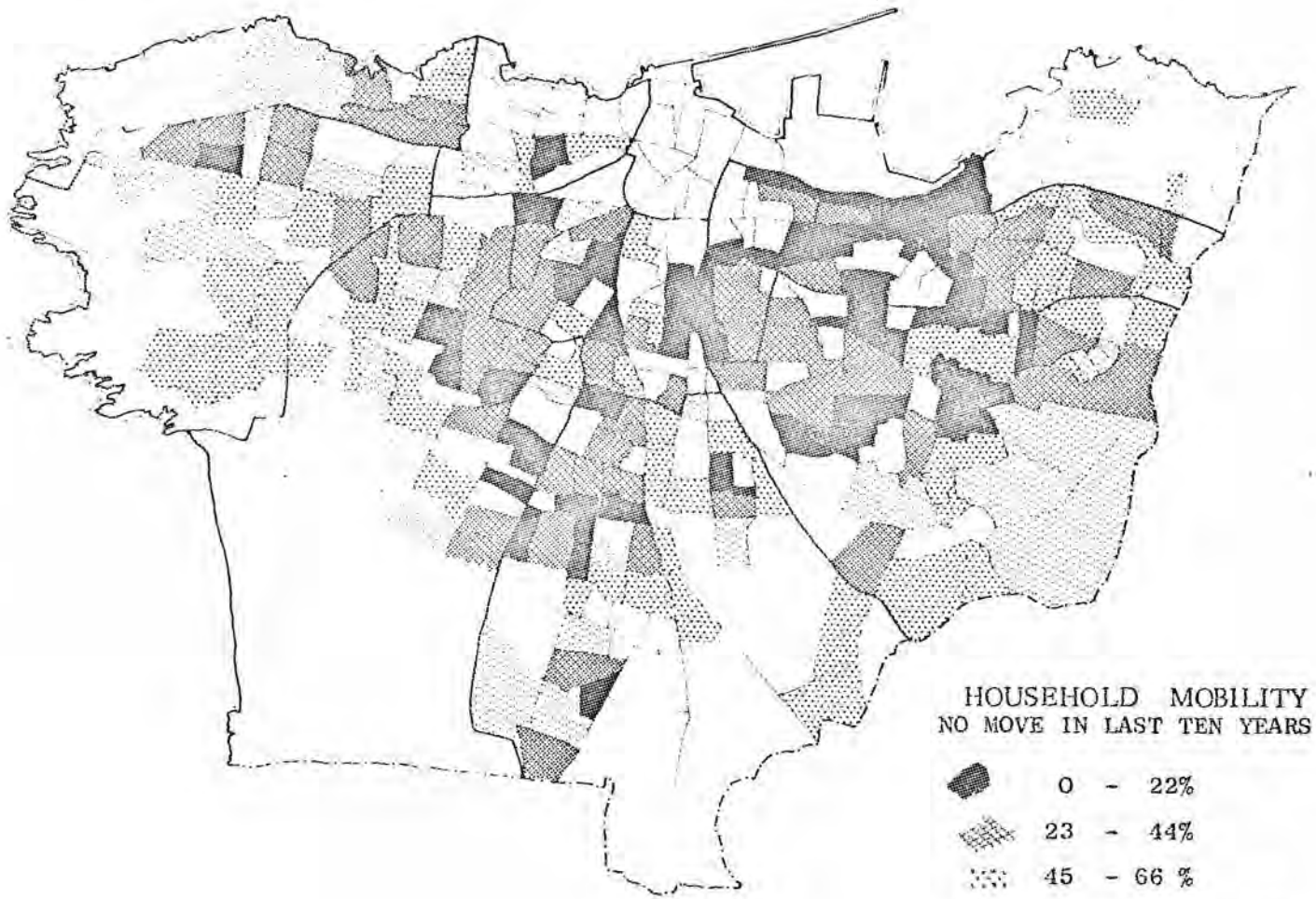
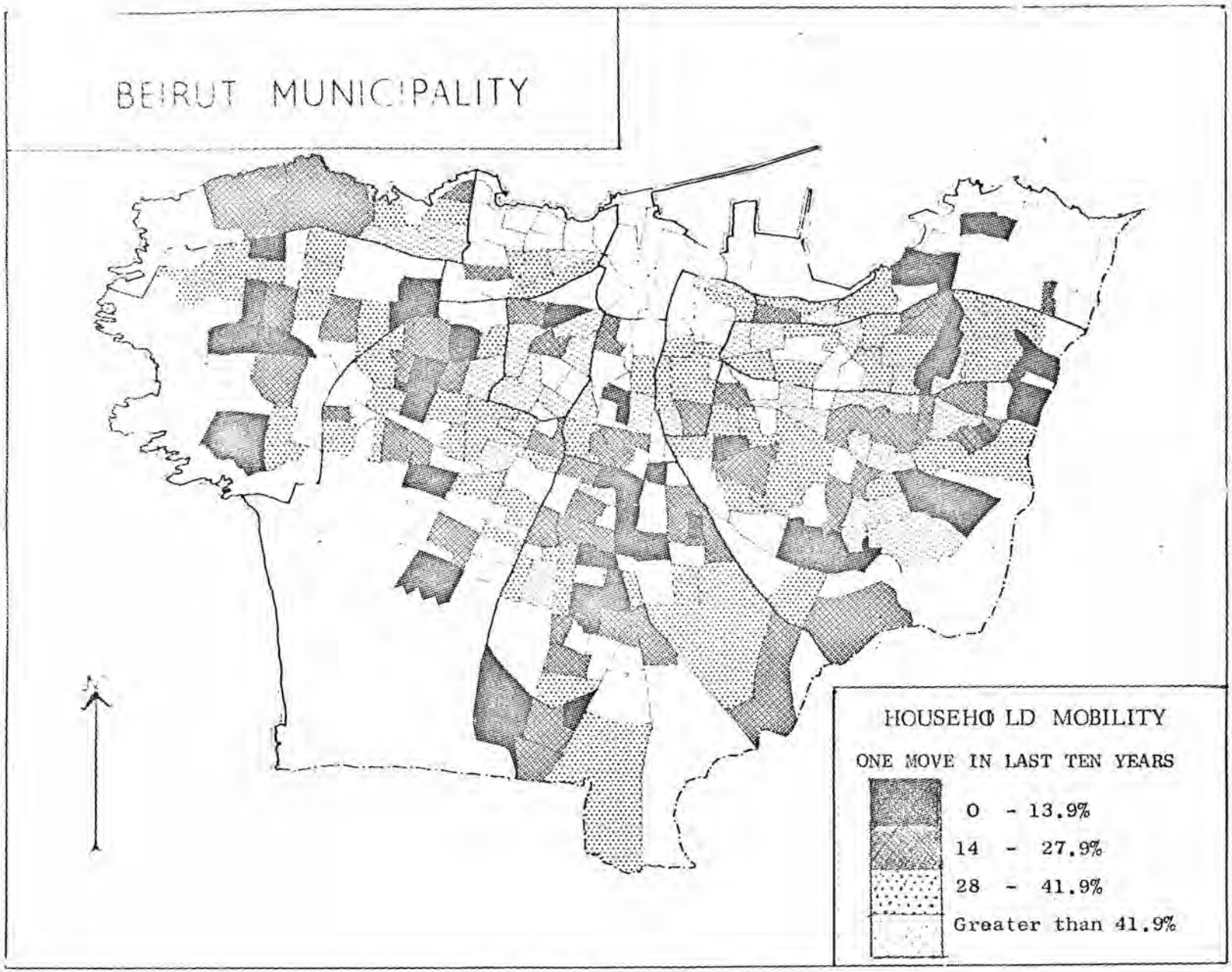
* See Churchill, op. cit. chapter on "Methodology".
** See e.g.'s of test maps, maps 12, 13 and 14.

BEIRUT MUNICIPALITY

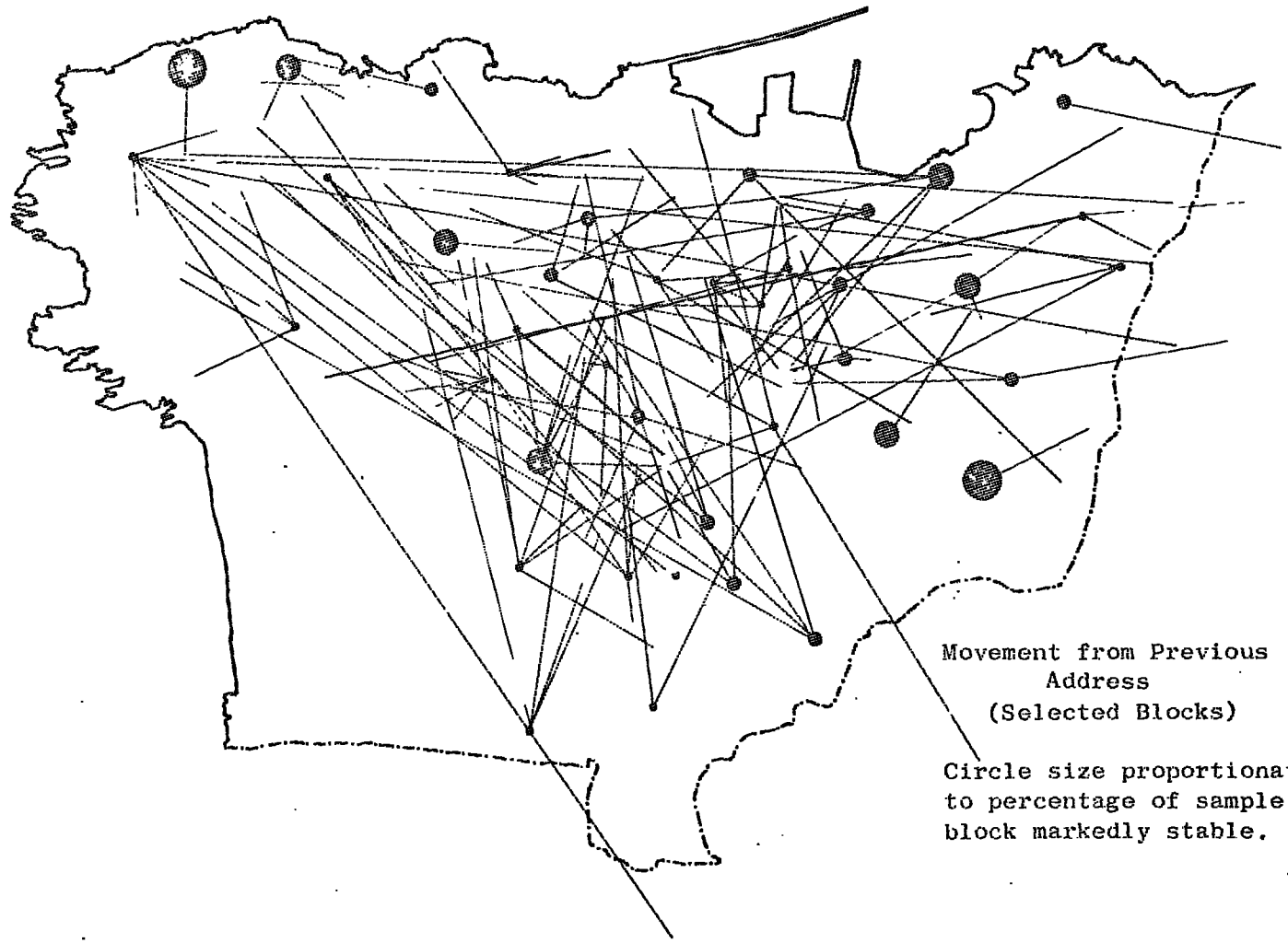


MAP 12


BEIRUT MUNICIPALITY
HOUSEHOLD MOBILITY
ONE MOVE IN LAST TEN YEARS
0 - 13.9%
14 - 27.9%
28 - 41.9%
Greater than 41.9%

MAP 13

BEIRUT MUNICIPALITY



MAP 14

-bility that these groupings could be due to chance.* In other words the spatial patterns were highly significant.

The description of spatial patterns has been sectionalised and grouped as follows;

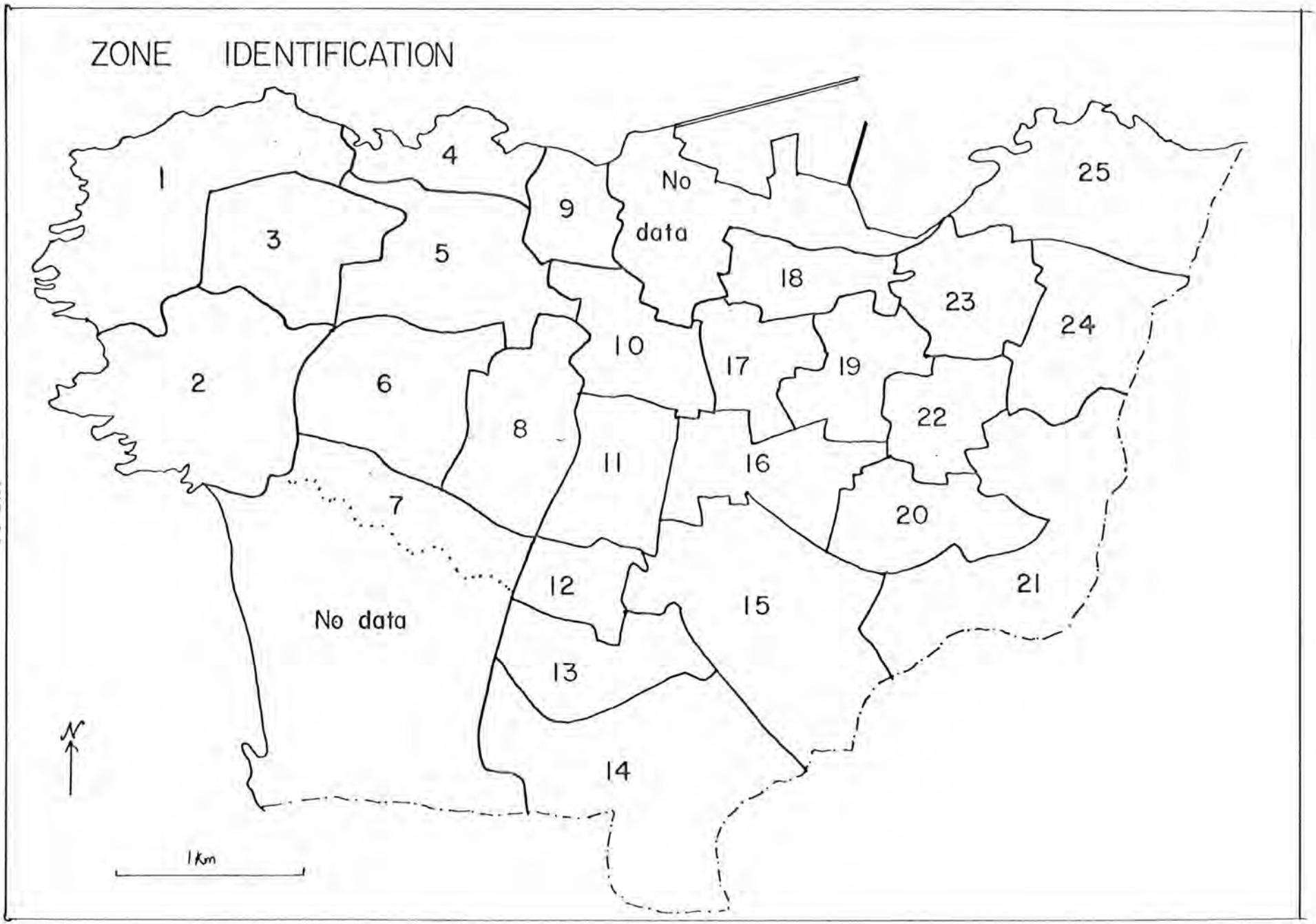
Housing.....	Age of Building; Size of Building; Incidence of Attached Gardens; Rate of Owner-Occupance:
Demog. and Educ.....	Educational Level; Family Size; Pop. Density per Room:
Economic.....	Income of Household Head; Rental Value of Dwelling:
Mobility.....	Rate of Change of Residence; Location of Previous Address; Incidence of Estivage or Summer Migration:
Ethnic Origin.....	Birthplace of Head of Household.

This is followed by a discussion of areal correlations and the emergence of socio-economic morphological units.

Building Age.

The map series showing the percentage of buildings in various age categories (Map 15), indicates broadly the rate and direction of growth of the Municipality in the last fifty years. Further, the highest quartile on each map may be said to represent the location of "building boom" areas for the period concerned. This intensity of land speculation is especially interesting when it is not apparently asso-

* See results on folded computer tables at back.


ZONE IDENTIFICATION
1
2
3
4
5
6
7
8
9
No data
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
No data
1km
N

MAP 15

-ciated with the advancing periphery, as for example is the case area 17*. This appears on both the map for the 11-20 year group and the 6 year group as an area of marked intensity of building, isolated as an "inlier" from the main ring of high intensity nearer the periphery. This was due to periodic rebuilding in a highly desirable residential area, and though not of course comparable to the vast redevelopment schemes of N. America and W. Europe, was really an earlier, simplified form of urban renewal. The anomaly on the map for the 21 - 50 year category where the north eastern zones show an unexpectedly high building intensity, is explicable in terms of the influx of Armenian refugees in the early 1920's, and of Lebanese fleeing from famine conditions in parts of rural Lebanon during and just after the first World War period.** These migrants naturally gravitated to the cheapest available land near the Municipal Boundary and the "building boom" here consisted of the hasty erection of thousands of shanties, many of which are still in existence.***

Although there has been a marked growth of the built up area towards the west since the beginning of the century, the high percentages of buildings >50 years old in zones 1 and 2, are really outside the expected figures for this period. They are explicable in terms of three types of relict; the old farm-houses relating to the pre-existing terrace agriculture of the peninsula, country houses which belonged to the elite at the city centre, and developments associated with the expanding

---

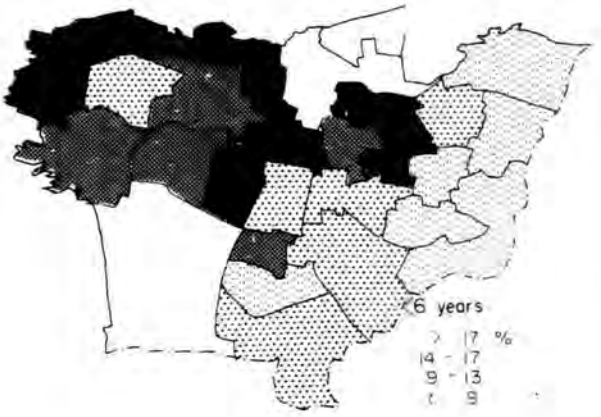
* See Zone Enumeration Key map (15)
** See Historical Geography section.
*** Though a large area was recently burnt to the ground in Quarantina "Times" Feb. 64

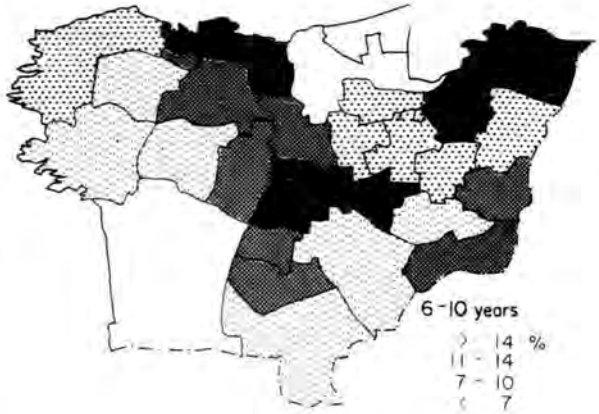
BEIRUT MUNICIPALITY

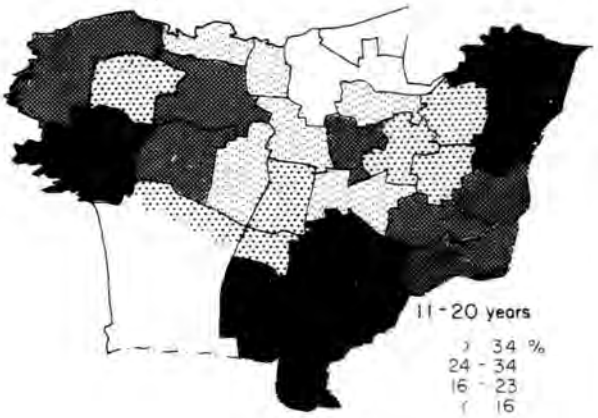
Data based on revised socio-economic divisions

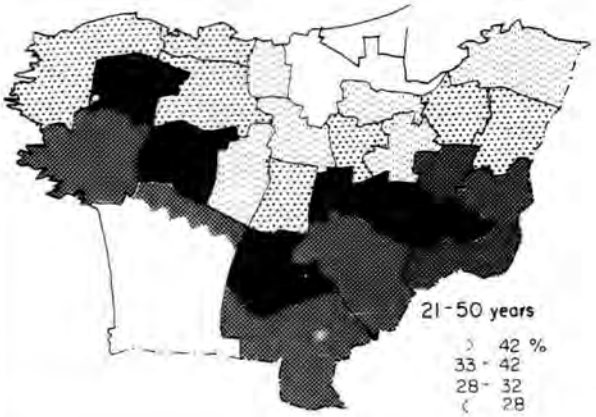
BUILDING AGE

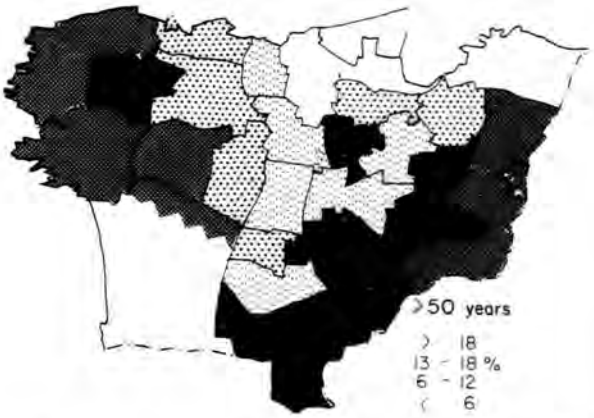
Upper Quartile
Upper Medial Quartile
Lower Medial Quartile
Lower Quartile











MAP 16

American University. Relicts of the first type could of course also be found elsewhere in the more fertile parts of the Municipality, but alone were insufficient to boost the percentage of buildings in the >50 year category to a significant level.

Generally however the highest percentages for each age group lie in a sequence of semi-circular bands, and the growth pattern indicated by their changing location mirrors fairly faithfully that suggested earlier*; that is, a steady outward growth from the centre with differentially more rapid growth along the ridges of Ras Beirut and Achrafieh, and a gradual infilling as the most desirable locations were built over.

Some comparison of the over-all percentages of houses in various age groups with those for a western city is possible if the figures given by Duncan and Hauser** are examined.

Figures in Percentages

	Buildings 20 yrs	Buildings 5 - 20 yrs	Buildings 5 yrs
Beirut	47	34	15
Chicago	84	9	7

These show clearly the relative recency of the building boom in Beirut compared with the American city, where a comparable mushrooming of buildings took place much earlier in the century.

Building Height

The four maps*** showing areal differentiation in building

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* See section on Historical geography

19. ** Duncan and Hauser; "Housing a Metropolis"

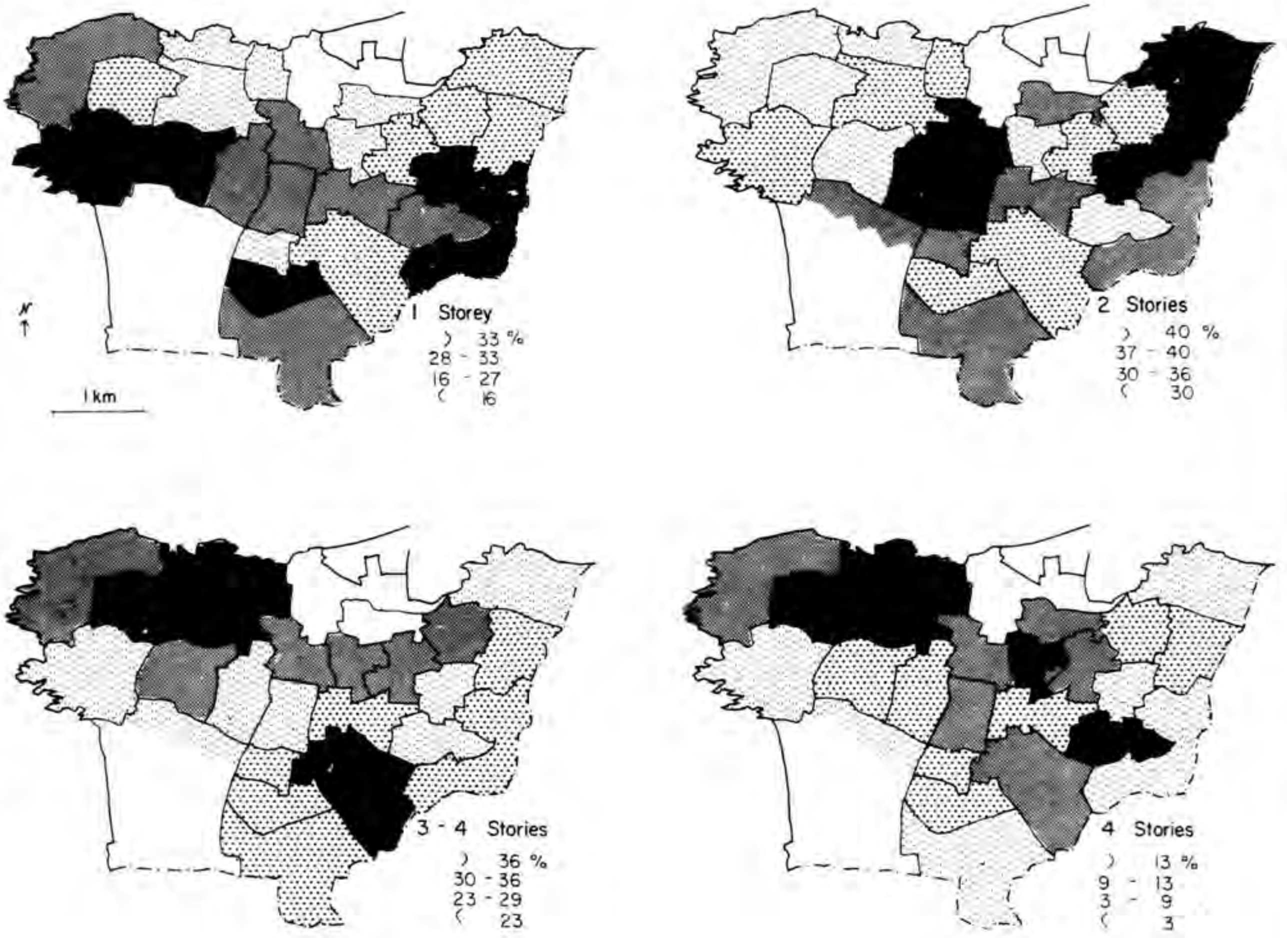
*** See map 17

BEIRUT MUNICIPALITY

Data based on revised socio-economic divisions

BUILDING HEIGHT

Upper Quartile
Upper Medial Quartile
Lower Medial Quartile
Lower Quartile



EWEH '66

MAP 17

height, present, as would be expected, a picture of higher buildings at the centre where pressure of space forced upward movement, to lower buildings at the periphery where land is less scarce. However to say that building height reflects directly the pressure on land is to over simplify, since it is obvious that other factors must be brought in if certain anomalies in the pattern are to be satisfactorily explained. Thus, why should zone 15, in a reasonably peripheral position, show a high percentage of 3 and 4, and >4 storey buildings? The answer here would seem to be that an earlier developed prestige residential area is creating its own pressures. A section of the urban elite (mainly French incomers in this case) was attracted by the amenity value of the Pine Forest, and a row of tall buildings along the ring road overlooking the Pine Forest lies within this zone tending to raise the over-all percentage of high buildings in the zone. Here there has been clear modification of rough concentricity by socio-economic response to a simple physiographic element in the landscape. Social prestige is also one of the factors causing a high incidence of tall buildings extending along Ras Beirut westwards from the central area. Here it was not a matter (at least in the early 1950's) of insufficient space, but luxury and semi-luxury apartments were highly prized as prestige living accommodation and large blocks to western designs were a socially favoured as well as rewarding investment. Here there is no simple physical spatial causation.

Two storey buildings, the predominant type, are common in most parts of the city, but there is a noticeably lower concentration in Ras Beirut where the southern part consists of scattered, poor quality,

single storey buildings, and the northern part of the new high-rise development mentioned above. The urgency of growth in this direction allowed no time for the suburban sprawl of two storey buildings prevalent elsewhere in the Municipality.

Households with Gardens Attached.

The incidence of households with gardens attached* is directly related to pressure on land, so that fewest gardens are found at the centre and most at the southern periphery. However these gardens are not the symbolic few square yards of the western suburban garden, for the average Beiruti does not look upon a detached house in a garden as the ultimate goal. Apart from a few exceptions like the formal gardens of former palaces, the attached "gardens" are in most cases quite large plots on which vegetables are grown to supplement a poor income, and are relicts of the farmholdings which originally lay without the built up area. As more and more apartment blocks are built in these peripheral areas the attached gardens are gradually being swamped or else they disintegrate into semi-waste land. The most recent** developments continue this trend, and a very few luxury villas are the only new buildings with attached gardens. The only area which seems anomalous to the general pattern is near the north east periphery. Here the great pressure on land exerted by the low income immigrants caused the area to be built over rapidly, and the overcrowding tended to swallow up even the

---

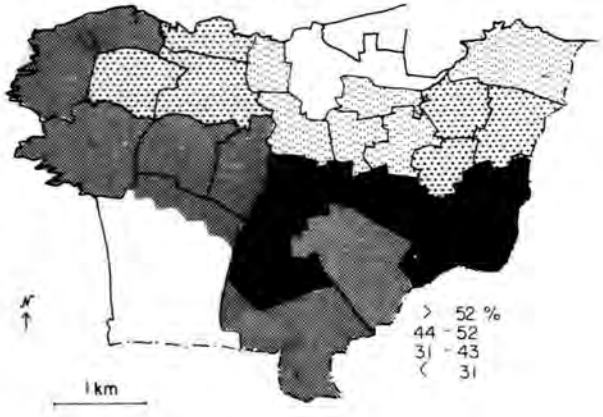
* See map 18
** Up to 1964

BEIRUT MUNICIPALITY

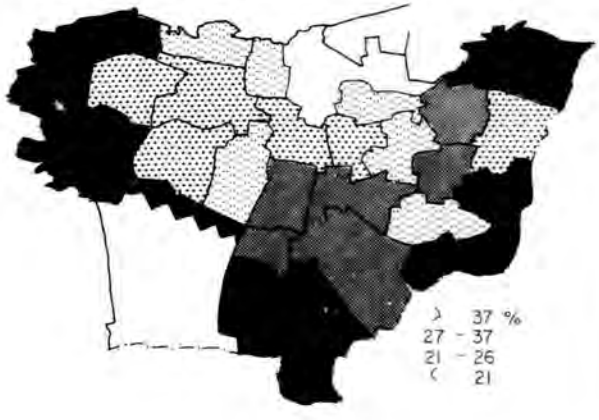
Data based on revised socio-economic divisions

Upper Quartile
Upper Medial Quartile
Lower Medial Quartile
Lower Quartile

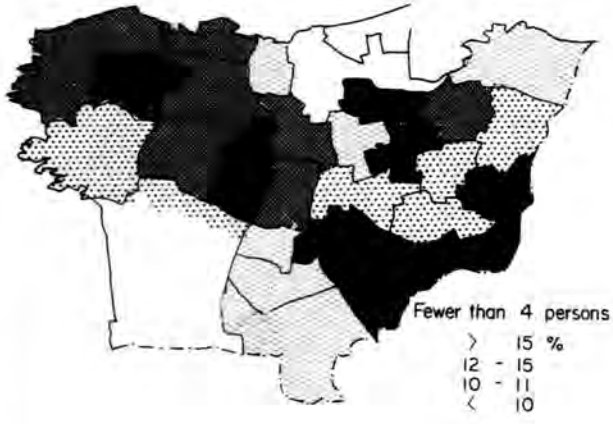
HOUSEHOLDS WITH ATTATCHED GARDENS

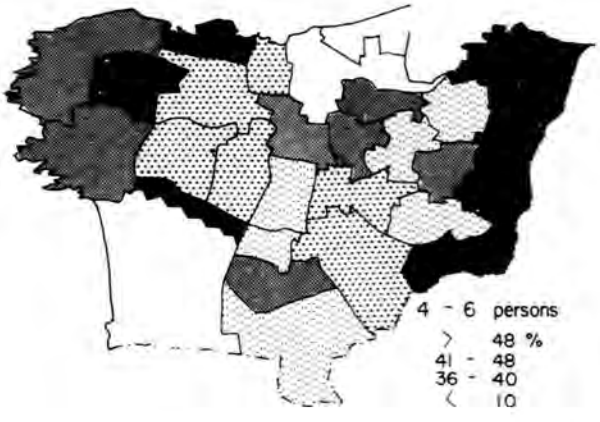


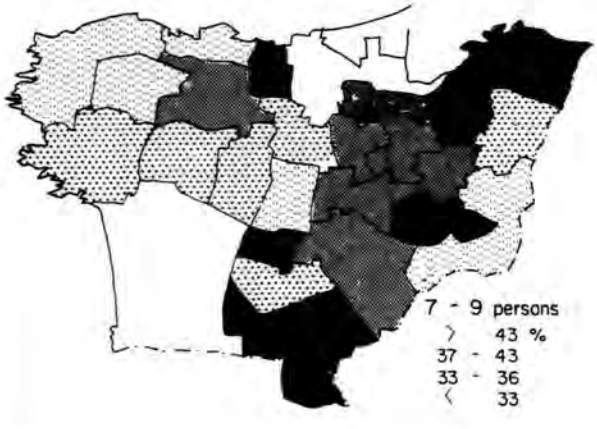
OWNER - OCCUPIERS

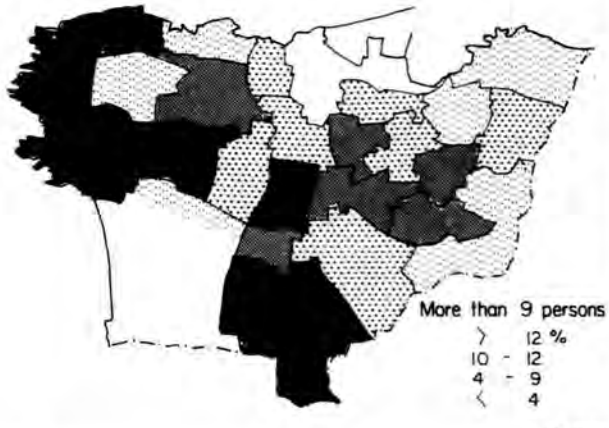


HOUSEHOLD SIZE









EWGH '66

MAP 18

tiny plots round the shanties.

Home Ownership.

The pattern of home ownership also shows a distinct peripheral grouping of high incidence, with areas nearer the centre having a smaller percentage of owner-occupiers.+ This seems logical enough, since most home owners occupy single family dwellings*. Although some of these peripheral owner occupiers are relict small-holders who still cling to their land rights, most, having insufficient capital to develop the land themselves, have been forced to sell the land in small parcels to individual families, or, if favourably situated, in large lots to large scale speculators. Where the latter has occurred the percentage of owner occupiers may be expected to show a decline since 1954, but lack of detailed information prevents a quantified measurement of decline.

Education.

The mapped distributions** of educational levels are strongly supported by the application of the Chi-squared test*** which indicates a high level of significance. Inter-relation analysis**** for the various categories of education shows that with fine categories, areas with a high percentage of household heads:- the top educational categories tend with a few exceptions to have a low percentage of household heads

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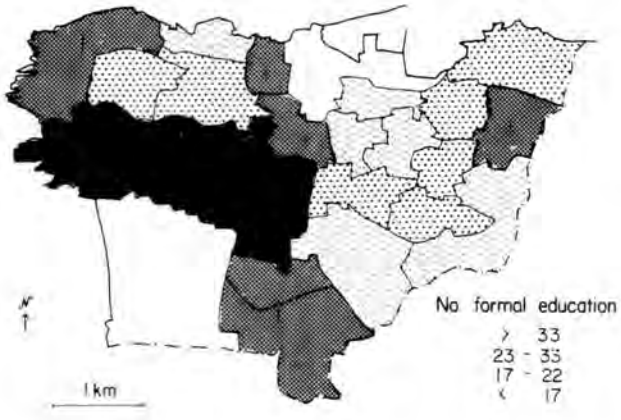
* See Duncan and Hauser, op. cit.
** See map 19
*** See statistical appendices.
**** Cope-Chat. Appendix no. 8.
+ Map 18

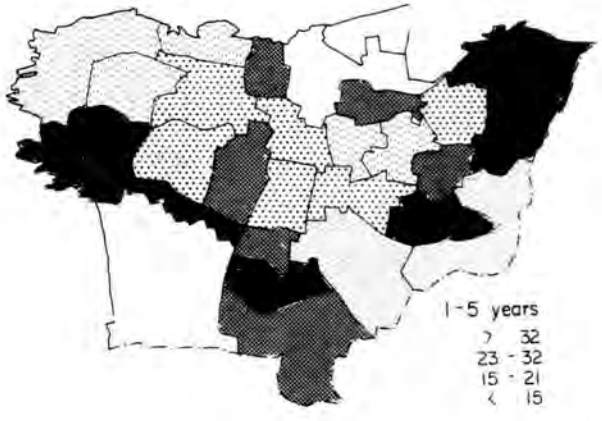
BEIRUT MUNICIPALITY

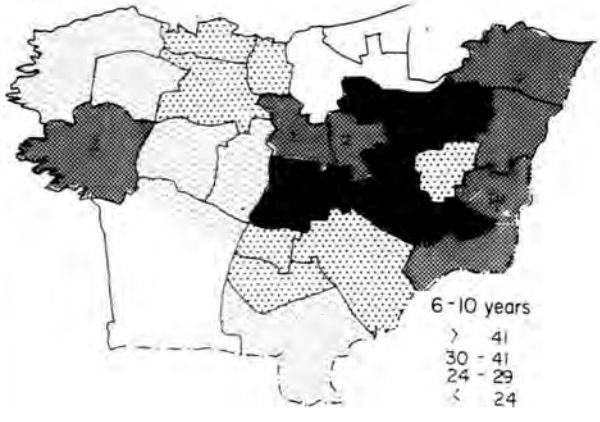
Data based on revised socio-economic divisions

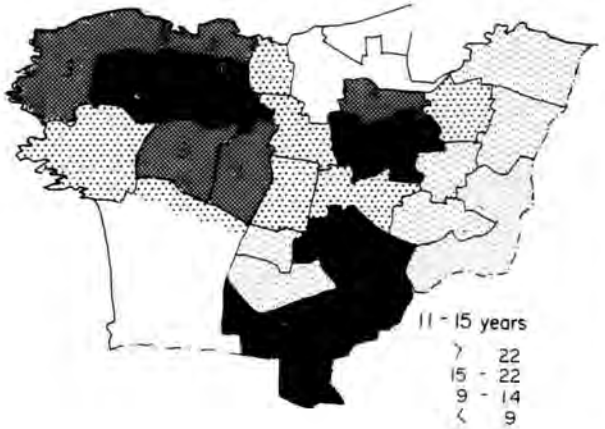
LENGTH OF EDUCATION

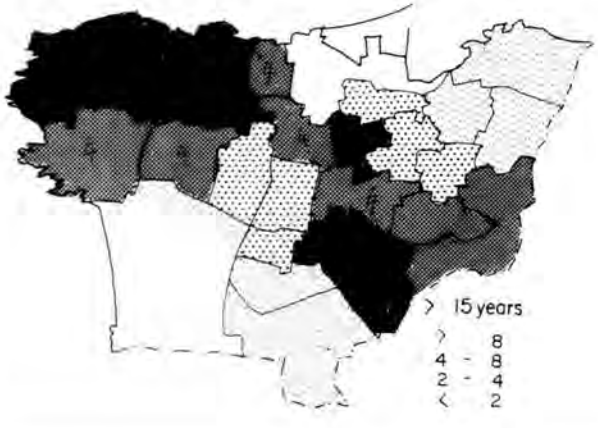
Upper Quartile
Upper Medial Quartile
Lower Medial Quartile
Lower Quartile











MAP 19

who are poorly educated so that high and low education can be considered as mutually exclusive. On this basis, the population of the peripheral areas and the older suburbs of Mousseitbeh (zones 6, 8, 11), tends to have little or no formal education; the eastern and east central part of the Municipality have a high percentage of people with some form of secondary education; and people with higher and post graduation training are mainly concentrated in northern Ras Beirut, in a broad band stretching from the city centre towards the south east and in the three zones immediately to the east of the centre (zones 17, 17, 19). There are, however some interesting cases of intermixture of high percentages of extreme educational categories in one area. Thus in zones 1 and 2, there are high concentrations of both people with graduate and postgraduate training and people with little or no formal education. This can be explained logically enough in terms of the fact that the well educated elite, adopting the prestige symbol of the high class suburban apartment block, has invaded an area of relict small holdings and scattered pockets of peripheral shacks. This is true too for block 14, at the southern periphery, though here neither the educational achievements nor the building quality of the invading group is as high as in zones 1 and 2. An admixture of high and low values in some of the centro-peripheral zones (9, 11, 17, 18) may be attributed to a similar phenomenon with the educational positions of the invader and the invaded reversed. Here relatively illiterate migrants are beginning to move into the old-style gracious

dwellings, thereby helping to accelerate the process of deterioration, but as yet there are still sufficient numbers of the lebanese urban elite to maintain a high level of incidence of well educated household heads at the centre.

Household size.

Despite the apparent incoherence of family size groupings, analysis* shows that with four categories, on the whole blocks with a high percentage of high values have a small percentage of small households. The maps (**Map 18**) can therefore be used to determine areas of high and low average family size, since the two are mutually exclusive. Further the spatial patterns represented are generally significant according to the Chi-squared test**. These patterns consist, in general terms, of larger households in the western and southern peripheral areas and in a solid band towards the south from quite near the centre. Contiguous to this area, another fairly exclusive band extends from the centre through the older built up areas of eastern Beirut. The smaller households, on the other hand, are found in Central and northern Ras Beirut, in the eastern and south eastern peripheral zones, and (apart from zones 17 and 9) in the areas surrounding the city centre and extending just east of it. However there are areas which do not fit happily into this categorization, and instead of showing an exponential relationship between the various size groupings, may contain high per-

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* "Cope-Chat" edge punched card system
** See statistical appendix.

-centages of both large and small households, for example, zones 1, 6, 15, 17, and 23. Any explanation of the distribution of household sizes must bear in mind that it is not a simple index of birthrate, but is partly an indication of the number of extended as opposed to simple families. On these terms, household size is associated with a multiplicity of sociological and cultural phenomena, and further analysis of the spatial patterns will be left to the section on correlations and inter-relationships.

Population Densities.

The map* showing population densities in persons per room are based on two different sets of data. The first shows persons per room per household, and the second persons per room per building. Since for the latter the number of rooms and the number of people in the building were in some cases estimates of the enumerator, the discussion is limited to the persons per household room densities. However despite the suspect basis of the person/building room data, the emergent pattern is in many ways similar to the persons/household room pattern, so the map has been included for supplementary information.

Apart from two breaks, one in the high status area of Ras Beirut and one in the south where zone 15 contains (as previously mentioned) a fashionable residential suburb, there is an even band of high densities along the Municipal boundary, and low densities in the centre.

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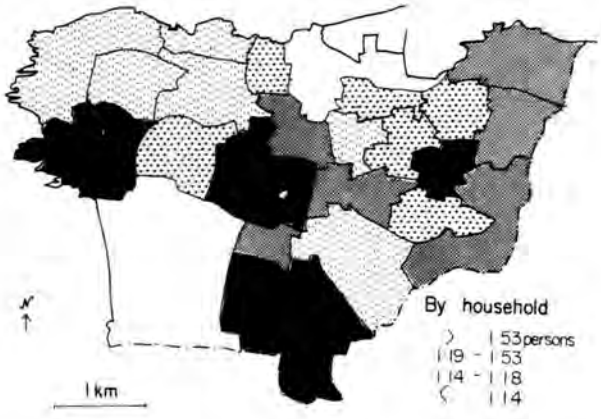
* See map 20

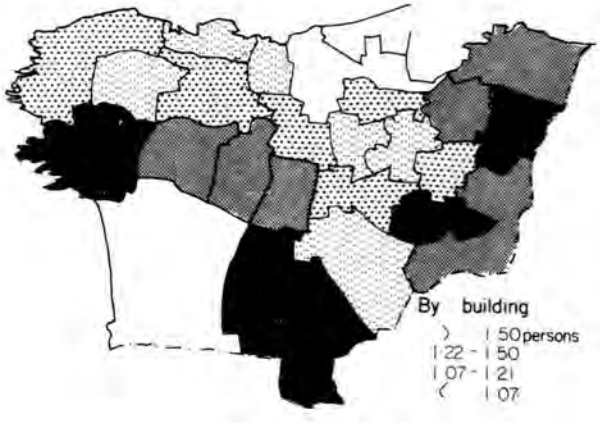
BEIRUT MUNICIPALITY

Data based on revised socio-economic divisions

DENSITIES
PERSONS PER ROOM

Upper Quartile
Uoper Medial Quartile
Lower Medial Quartile
Lower Quartile



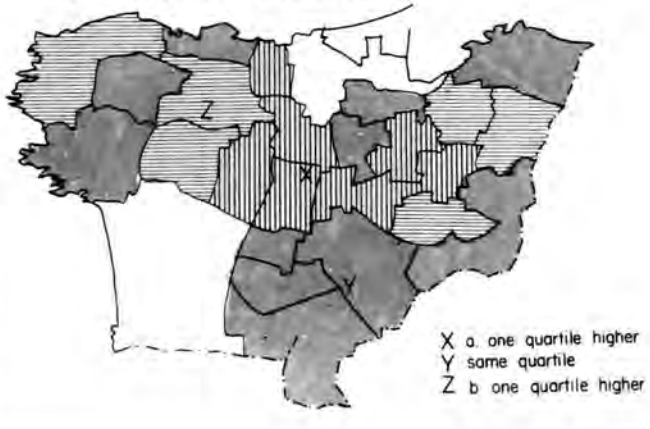


Degree of correlation between

a. density per room per household

&

b. density per room per building



MAP 20

This pattern conforms well to that stated (unproven) to be the norm for the pre-industrial city where ".. the urban poor live closely packed.." except near the centre where ".. crowding... is alleviated somewhat by the spacious dwelling units of the wealthy."* The two zones of low density surrounded by high mentioned above, represent the beginning of the break-up of this classic pattern with increasing westernisation. In the ten years since 1954, there has been an increasing tendancy to sub-divide the old gracious homes near the centre into numerous and often overcrowded apartments. Further many of the peripheral areas, especially to the west and south, are the sites for the rapidly mushrooming new apartment blocks, which tend to pull down the person per room averages there. Thus though there may never be a complete transition to the generalised western pattern of high central densities declining towards the periphery, the increasing awareness of suburbia as a prestige residential location is causing a rapid breakdown of the 1954 pattern.

Rental value.

Although rental distribution patterns** are significant***, rental value categories are not completely spatially exclusive.**** However there is a sufficiently marked clustering of the high values and of the low values to enable the delineation of relatively homogeneous rental

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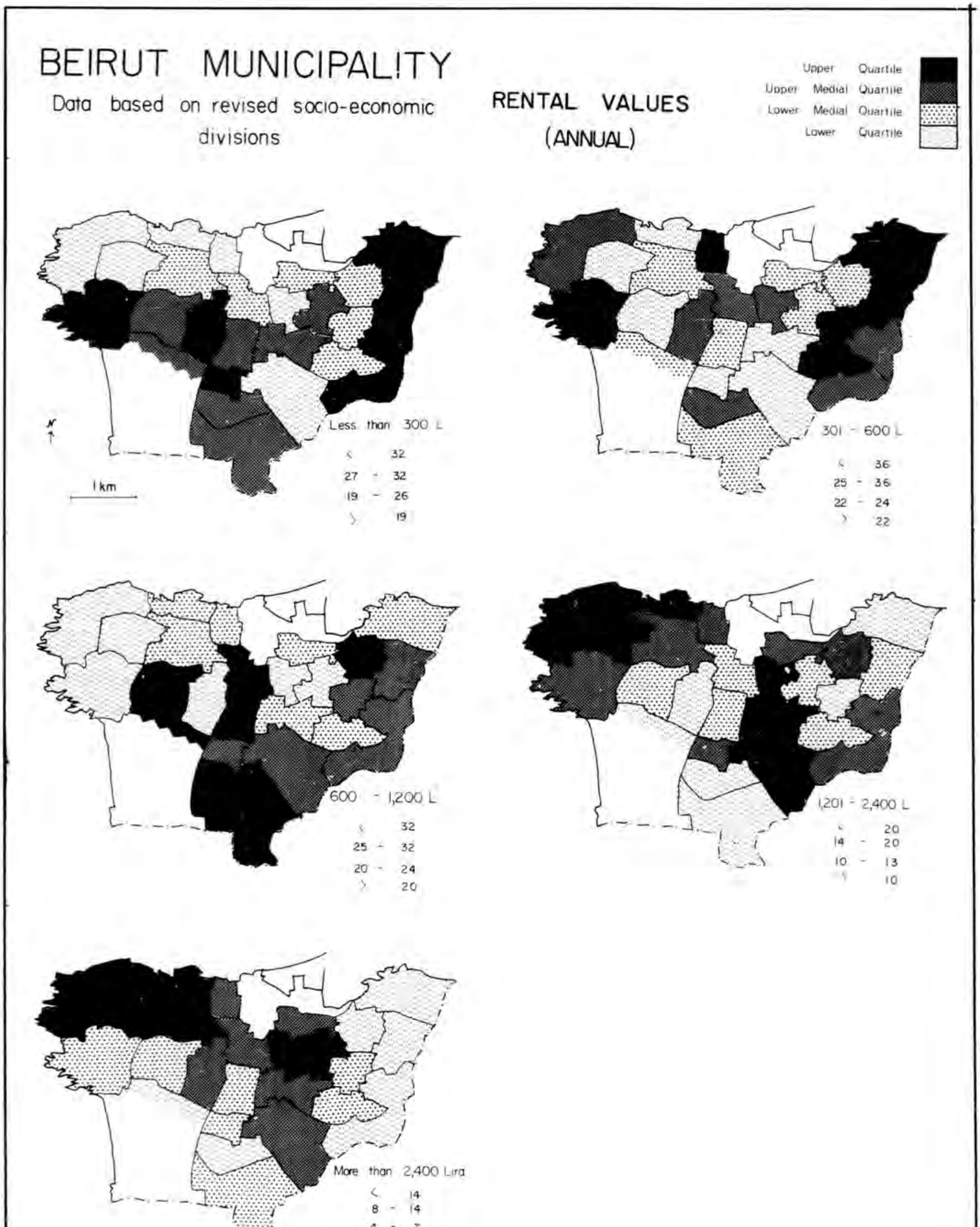
20. * Sjoberg, "The Pre-Industrial City", Free Press, 1960
** See map 21
***For chi-squared analysis see statistical apped.
****Cope-Chat analysis.


BEIRUT MUNICIPALITY
Data based on revised socio-economic divisions
RENTAL VALUES
(ANNUAL)
Upper Quartile
Upper Medial Quartile
Lower Medial Quartile
Lower Quartile
Less than 300 L
< 32
27 - 32
19 - 26
> 19
1 km
301 - 600 L
< 36
25 - 36
22 - 24
> 22
600 - 1,200 L
< 32
25 - 32
20 - 24
> 20
1,201 - 2,400 L
< 20
14 - 20
10 - 13
> 10
More than 2,400 Lira
< 14
8 - 14
4 - 7
> 4

MAP 21

areas. The highest rents (>2,400) are concentrated round the central area, in northern Ras Beirut, and stretching to zone 15 in the south west - a pattern which is emphasized and slightly extended by the second highest category (1,201 - 2,400 lira). The lowest rents are mainly concentrated in the peripheral areas (except zone 15), and the medial rents, though occurring throughout the city tend to form the predominant categories in the intermediate zone between the centre and the periphery. That some of these medial zones should also contain quite large proportions of high and low categories, is not surprising. What is more unexpected are certain zones which are predominantly of either high or low values, and yet contain large percentages of the opposite extreme. Like the similar anomalies in the educational pattern, these tend to occur in some of the areas of greatest change, that is in the central area (zones 9, 10, 17) and certain parts of the periphery (zones 1, 2, 22). There is also some indication of the growing influence of the Damascus road (zone 16), and the as then incomplete ring route (12). The occurrence in zone 19 of a concentration of greater than 2,400 lira values and values of less than 300 lira, may in this area of historic presitge, indicate some remnants of the eastern traditional system (extant still in parts of Damascus) where the wealthy potentate attracts a number of poorer dependants.

Income.

The income ranges are distributed spatially* in a pattern

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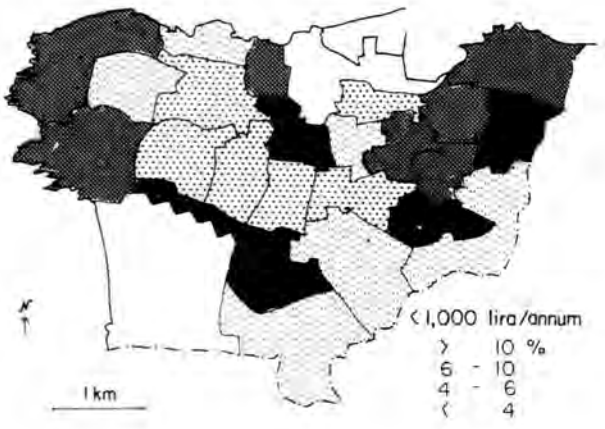
* See statistical index for Chi-squared tables. High and low values are mutually exclusive (Cope-Chat). Map 22.

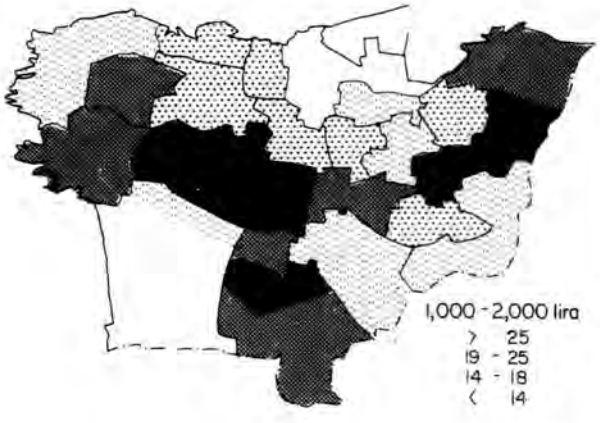
BEIRUT MUNICIPALITY

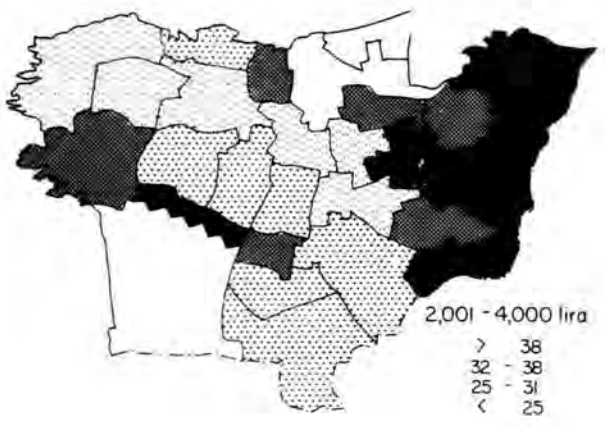
Data based on revised socio-economic divisions

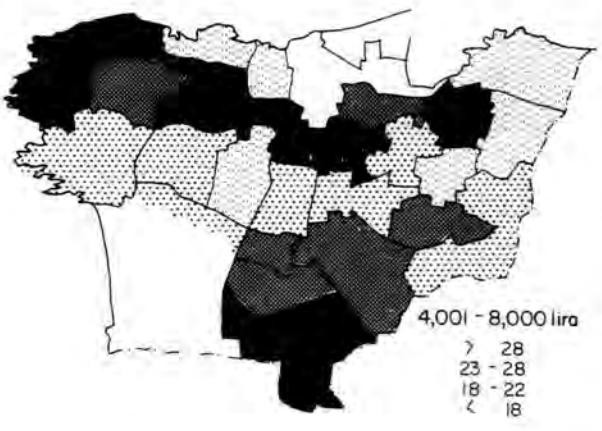
ANNUAL INCOME

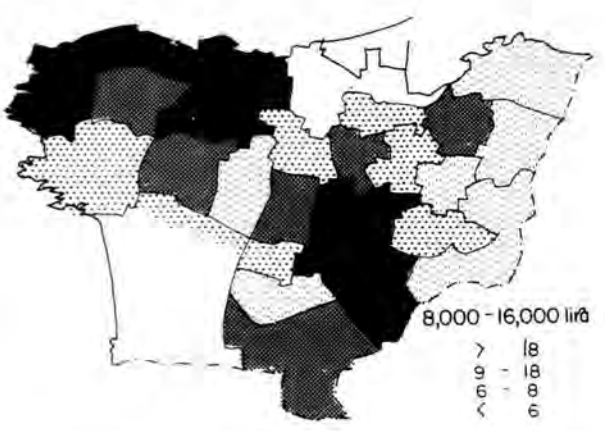
Upper Quartile
Upper Medial Quartile
Lower Medial Quartile
Lower Quartile

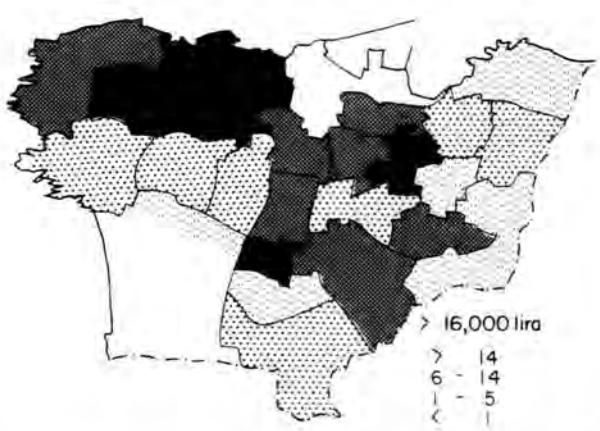












MAP 22

remarkably similar to that of rents. Highest percentages of high income groups are found in the north west, round the city centre and, more irregularly, but quite definitely towards the S.S.E. Low income groups are concentrated at the periphery and in the intermediate areas between the central and peripheral zones (6, 8, 11, 20, 21, 23). Intermixtures of concentrations of high and low are found at the western periphery (1 & 2), the southern periphery (14), and the western centro-peripheral zones (9 & 10). As these are the areas of change where also are found intermixtures of high and low education and rental values, the location here of a mingling of high and low income groups is expected rather than anomolous. However two other zones, 19 and 21, which also exhibit a cross-section of income groups, need to be explained in slightly different terms. Zone 19 is the long established area of "palaces and hovels" mentioned previously in terms of rental values. Zone 21 does not fit either explanation and most probably is only apparently heterogeneous, the sample taken for income groups in this zone being too small to allow any high degree of significance.*

Although Beirut has reached an advanced stage in the breakdown of traditional modes of life, the income distribution patterns are still more typical of Sjoburg's** "pre-industrial" city than of the fully evolved western city. In the latter, despite the recent move back to luxury apartments in the centre, the general pattern is of high percentages of low income groups near the centre and high income contrations

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* See statistical index.
** Op. Cit.

in the outer suburbs, with some of these having higher concentrations than others. Certainly Beirut is developing a high income suburb area (Ras Beirut, Raouche), but for the rest the peripheral land so sought after for single unit high cost dwelling in the West, is in Beirut synonymous with squatters, refugees, and, since 1954, utility low-to-lower middle income housing. Conversly, the centre, in Britain and N. America symbolic of an overcrowded, highly mobile low income population together with the more static but even lower income slum dwellers, has been in Beirut the conveniently central location of the mansions and palaces of the high income groups. This has only recently begun to break down and in 1954 a high percentage of high income groups was still evident at the centre of the city.

Mobility.

Although both the "no move" and the "more than twice" groups are quite highly significant, the "one move" group falls just below the 5% level of significance*. This should be born in mind during the following discussion and any explanations of "one move" category patterns treated as possibilities rather than assertions. Application of the Cope-Chat system shows that on the whole high mobility and stability are mutually exclusive.** Thus the centro-peripheral zones together with the contiguous zones 19 and 23 and the peripheral zone 22, have a high percentage of people who have not moved at all in the last ten years,

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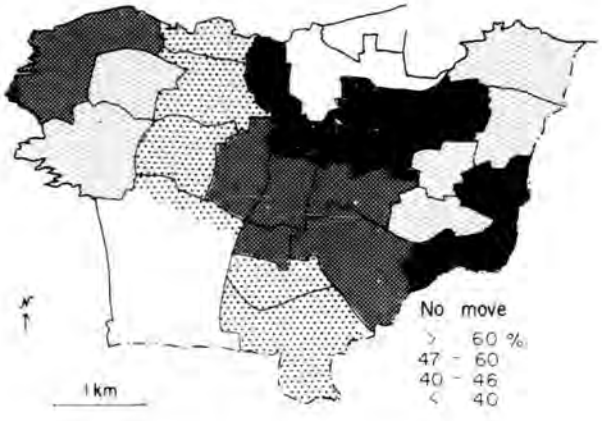
* See Chi-squared tables in statistical appendix.
** Map 23

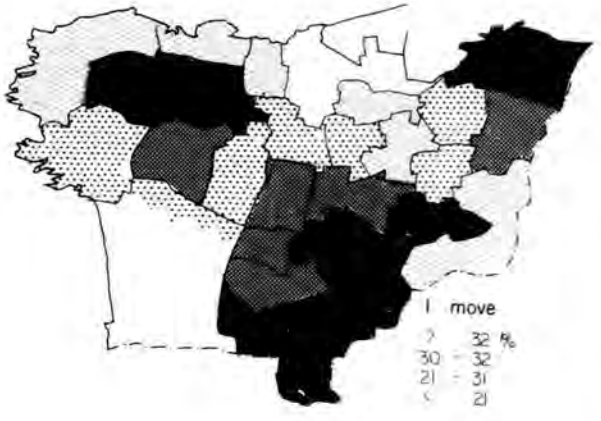
BEIRUT MUNICIPALITY

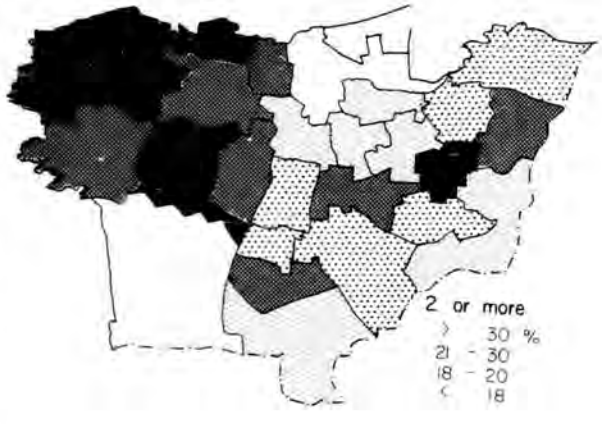
Data based on revised socio-economic divisions

MOBILITY
CHANGES OF ADDRESS IN THE LAST TEN YEARS

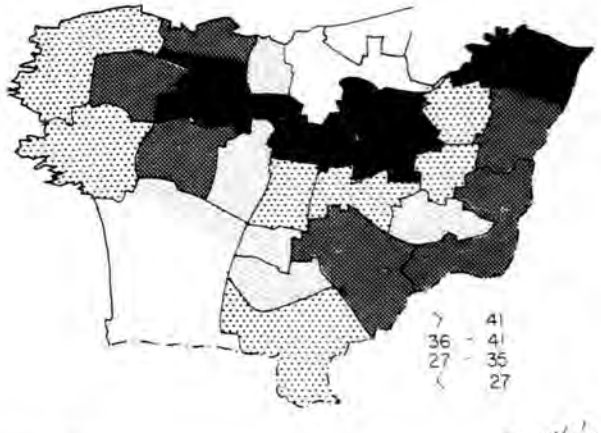
Upper Quartile
Upper Medial Quartile
Lower Medial Quartile
Lower Quartile







INCIDENCE OF SUMMER MIGRATION



Haugh '66

MAP 23

whereas the whole of western Beirut is highly mobile (twice and more), and north eastern Beirut is fairly mobile (one move). The zones extending from the centre in a broad sector to the southern periphery show the most heterogeneity with some fairly high values of both high and low mobility, but on the whole there is a predominance of fairly mobile households. The distinct concentration of the least mobile households near the centre is an interesting confirmation of the belief that the socio-economic morphology of Beirut is decidedly non-Western. One of the most frequently cited characteristics of the larger N. American and N.W. European city is the housing at the centre in rented accommodation, rooming houses and small hotels of a highly mobile population which arrives and departs at a remarkably high rate.* On the other hand the areas of high mobility in Beirut are not the low income low education areas but the most rapidly developing high income zones of western Beirut. This, in a sense, is logical enough, for since many of the buildings are less than ten years old in this area, a large proportion of the households sampled are bound to represent a mobility of at least one move in the last ten years. It is interesting to note that the inner zones of Ras Beirut (3, 5, 6,) show a high percentage of the "one move" category as well as some "twice or more", whilst the outer blocks show a predominance of those who have moved at least twice. This probably reflects continued movement of the wealthier status seekers, who, happy at first in the then newly developed inner area, could not

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21. *"American Geography: Inventory and Prospect", Ed. by James and Jones, section on Urban Geography, also, Colby "Centrifugal and Centripetal Forces Urban Geography" pp. 287 and section in "Readings in Urban Geography", Meyer and Kohn.

resist the temptation of even newer and more high status apartment blocks being built further west.

The area to the south, with its intermixture of high and low mobility rates is a region where small high prestige areas (e.g. zone 16) are mixed with areas of rapid development (14, 15), and interspersed with stable pockets of long established medium to low income groups. As these various pockets are usually quite small and often transgress the zone boundaries, their locations are not accurately reflected in the general heterogeneity of the region. However it must be noted that the whole area is of comparatively recent development with high percentages of buildings in the "less than six years" the "6 - 10 year" and the "11 - 20 year" categories* and this is probably the over-riding factor in the emergence of the area as one of medium mobility. The fact that high mobility in Beirut is related to recency of development means that no strict comparisons can be made between Beirut and a western city where the length of time at the present address is dependant not only on the age of the building (in the suburbs) but also on the turn-over in the temporary, rented accommodation at the centre. The only generalisation that can be made from the table below is that Beirutis tend to remain longer in a particular residence than do the "Chicagans".

Length of Time at Present Address

	Less than 1 yr.	1 - 3 yrs.	4 - 6 yrs.	more than 6 yrs.
Chicago	18%	App. 30%	12%	36%
Beirut	3%	25%	16%	47%

* See map 16.

Previous Address.

The intent of the breakdown of previous address into the categories as mapped* was to try and determine from where various parts of the city attract new residents. It was thought that a definite directional pattern would exist; for example the movement of the rural migrant towards the poorer parts of the city, of the rich foreigner directly to the high status areas, and over-all an indication of movements within the city westwards and southwards towards the newer suburbs. However any such trends, if they existed at all, were heavily masked by the multi-directional forces of many socio-economic factors, such as kinship ties, differential availability of mortgages, change of workplace, promotion, degree of empathy with Western culture and so forth. Thus several respondents (1963) pointed out that though there was no legal restriction, it was virtually impossible for a Muslim to obtain a house in a certain exclusively French and Lebanese Christian part of Achrafieh, either the owner or his agent would immediately tell such a prospective buyer that the property was not for sale or already sold. Another factor mentioned quite frequently but not considered an ultimate deterrent is again fundamentally religious. Apart from the state-run schools, each sect has its own schools, both primary and secondary. These are scattered fairly widely throughout the city though there are concentrations in specific areas. Although a household is unlikely to move towards a particular school for that incentive alone, a household contemplating a change of residence might delay for a while if there was a suitable school nearby the present, but not the proposed location.

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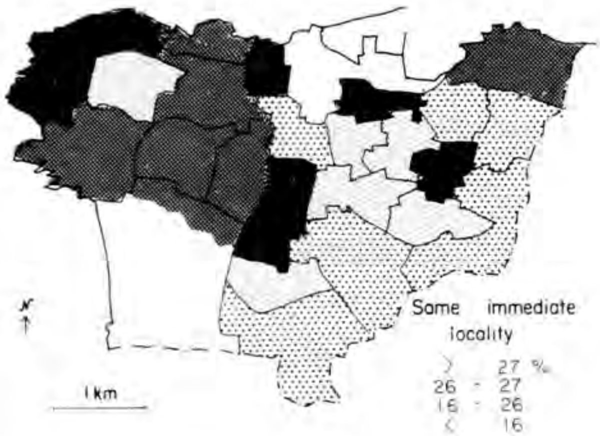
* See map 24. For degree of significance, see Chi-squared tables in the statistical appendices.

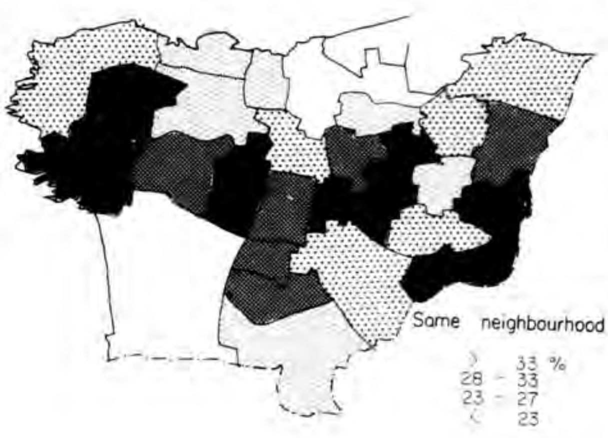
BEIRUT MUNICIPALITY

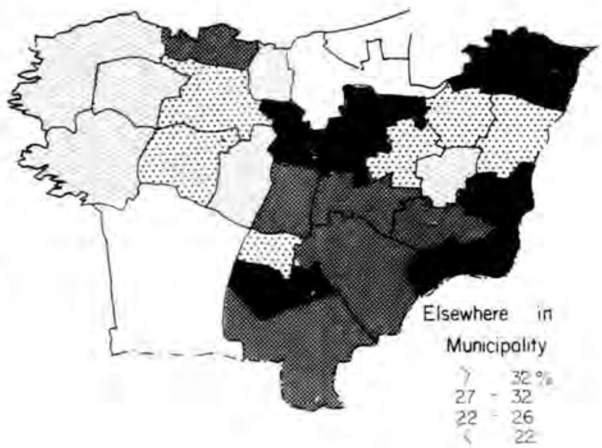
Data based on revised socio-economic divisions

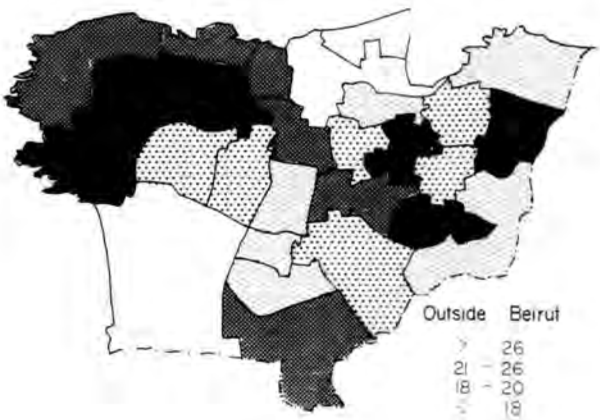
PREVIOUS ADDRESS

Upper Quartile	(black)
Upper Medial Quartile	(dark shading)
Lower Medial Quartile	(dotted)
Lower Quartile	(light)









MAP 24

Of a number of respondents who were asked informally if they would change their place of residence if they became wealthier, about half said they would remain where they were, and the rest declared they would move immediately. Those who wanted to move, usually expressed a desire to reside in Ras Beirut, partly because it is a prestige area, and partly because in such a cosmopolitan community the personal acceptance necessary for a bearable existence in other parts of Beirut is neither offered nor expected here. These on the whole were the more Westernised lebanese. It was significant that the one highly educated and Western-orientated respondent who claimed he would not move was in fact Jewish, and in all probability would find it difficult to move from the "Jewish Quarter" anyway. The main body based their answer on two beliefs. Firstly, they would not want to leave all their friends and go from a closely knit community to either the impersonality of Ras Beirut or another closed community where they would be outsiders. Secondly, their newly found wealth would win them far more prestige if they stayed in the area where they were known and built a new house there than if they moved to an area where everyone was fairly well-off.

As far as the migrants whose previous place of residence was outside Beirut (Ch. data, 18%*) are concerned, by far the largest number move to Beirut for economic reasons, with "political motives"* as the second largest group. The expected spatial pattern of this "outside Beirut" category would be high concentrations in the poorer peripheral areas,

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* See Churchill, op. cit.

since the majority of the migrant households come from Rural Lebanon, and, having relatively low incomes might go to the areas where land is most readily available at relatively low prices. In fact the pattern is much more varied than this*, largely due to the fact that rural migrants tend to go first to that part of the city where friends or relatives are living, expecting and usually receiving temporary accommodation and help in finding a job. Further, the category "Previous Address Outside Beirut" includes wealthy migrants and immigrants who gravitate immediately to the cosmopolitan area of Ras Beirut.

Estivage.

The main concentrations** of a high rate of summer migration are round the centre, continuing westward through central Ras Beirut, and in the eastern peripheral zones. This coincidence with the richest and poorest sectors of the community is in many ways logical enough, since the rich can afford to own or rent a mountain house and many of the poor are in any case migrants from Rural Lebanon and are thus able to stay with close relatives in various of the mountain villages. The concentrations in the centro-peripheral area may further be explained by their very location in the most densely built up, oppressive heart of the city, which in itself offers a strong incentive to move away in the summer.

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* See map 24
** See map 23

Ethnic Origin.

Analysis by the Cope-Chat system shows that the various ethnic* groups do have distinct concentrations but that these are often inter-mixed,** that is, they have some common territorial limits.*** In fact the only region where there is an overwhelming predominance of one group is in the N.E. (zones 24 and 25) which is the old Armenian shack quarter. Though many of the shacks in zone 24 are now being replaced, even the newer buildings are occupied almost exclusively by Armenians. Ras Beirut is the foreign quarter "par excellence", with high percentages of non-Lebanese arabs, Europeans and Americans. Even so, the area is by no means ethnically exclusive, since almost a third of its population are indigenous Beirutis. The excluding factor in this case is the prohibitive cost of accommodation which tends to deter the provincial migrant. These latter, both urban and rural lebanese, tend to congregate in the area stretching towards the S.E. of Beirut (C), with the zones nearest the boundary containing mainly Rural Lebanese. The concentration of urban provincials, though closely coincident with the rural, tends to stretch further to the west where there is an over-lap with a mixed area where Beirutis and Non-Lebanese Arabs predominate. North West of this (E) is an area where the population is mainly indigenous Beirutis but where neighbouring areas with concentrations of Armenians (10) have tended to spread, causing an increase in the non-Beiruti population of this area.

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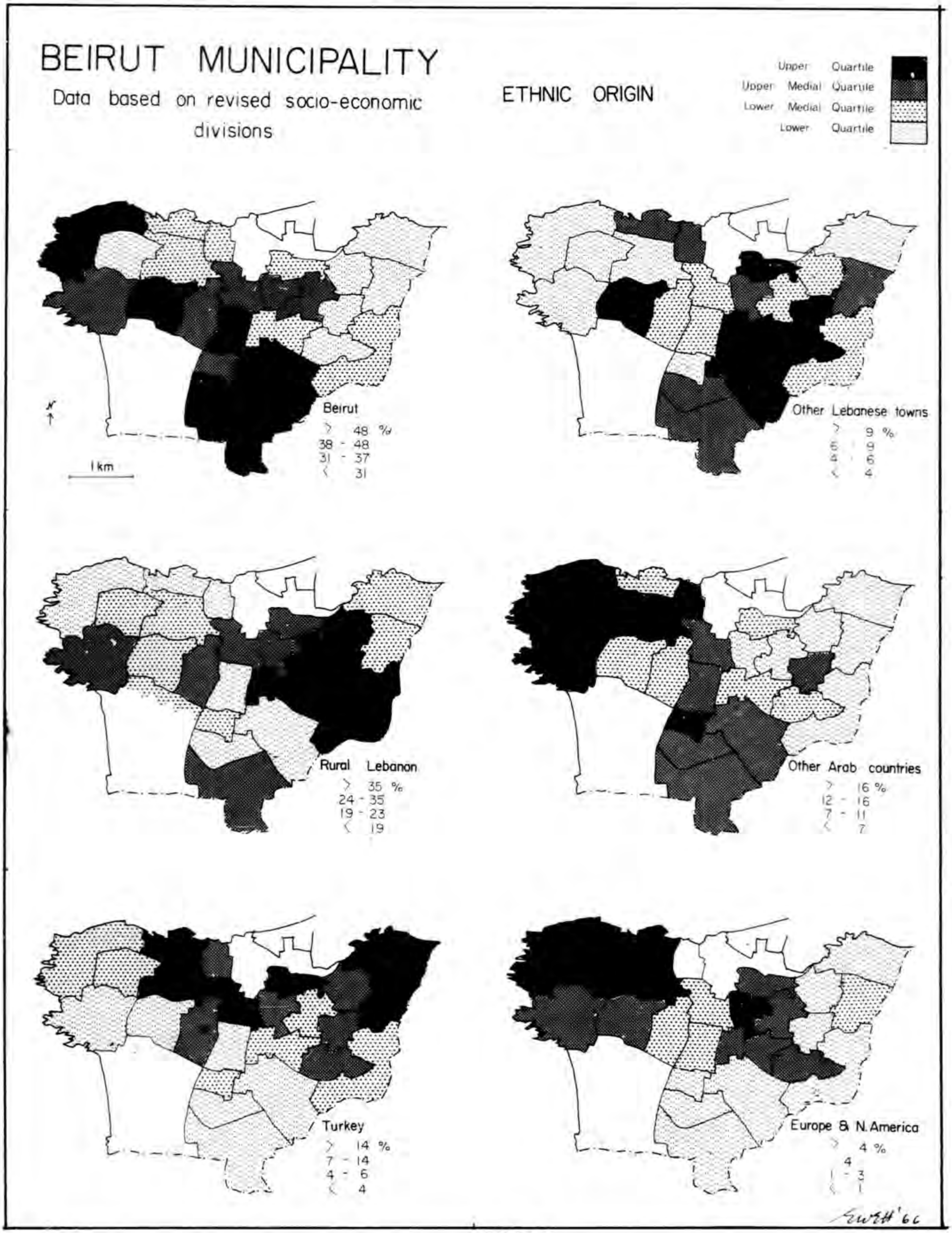
* By birthplace.
** See statistical tables
***See map 25



BEIRUT MUNICIPALITY
Data based on revised socio-economic divisions
ETHNIC ORIGIN
Upper Quartile
Upper Medial Quartile
Lower Medial Quartile
Lower Quartile
N
1 km
Beirut
> 48 %
38 - 48
31 - 37
< 31
Other Lebanese towns
> 9 %
6 - 9
4 - 6
< 4
Rural Lebanon
> 35 %
24 - 35
19 - 23
< 19
Other Arab countries
> 16 %
12 - 16
7 - 11
< 7
Turkey
> 14 %
7 - 14
4 - 6
< 4
Europe & N. America
> 4 %
4
1 - 3
< 1

MAP 25

An interesting extension of this high Beiruti concentration area, is the peripheral blocks of Ras Beirut (1 and 2), where displacement of the smallholders had not advanced to the same extent as in central Ras Beirut. Now (1964) this peripheral area is being rapidly built over with high cost apartment blocks, and the composition of the population is probably as cosmopolitan as the earlier developed areas, with high percentages of Non-Lebanese immigrants, both arab and non-arab, and a drop in the number of Beirutis.

The centro-peripheral zones (9, 10, 17, 18) are probably the most ethnically heterogeneous in the city, since all groups are fairly strongly represented in some or all of them.

INTER-VARIABILITY ANALYSIS

The multiplicity of the various factors which help to determine socio-economic behaviour induces a highly complex matrix of interrelationships. How far certain of these are direct, inverse or non-existent is frequently used to deduce the degree of "westernisation" or "industrialisation" of a city, since the western and non-western city are supposed to exhibit intervariability patterns which are very different.* The validity of this argument is not yet proven, since there are insufficient studies of non-western towns using enumerated data; but what does exist suggests that there is a high probability that it is valid for certain combinations of factors. In this case, Beirut, very much a city in transition, ought to exhibit variables characteristic of both western and non-western cities, or alternatively, of neither. A summary of

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*Sjoberg. op. cit.

trends emergent along these lines will be included in the conclusion to this section.

Although only thirteen socio-economic variables have been chosen, the forty-seven component subsections (originally required to provide more accurate frequency distributions) provide a correlation matrix of 47 x 46 possibilities. But although multiple regression would seem the most rational mode of analysis, the data were not in a suitable form. In any case the advisability of applying highly sophisticated techniques to relatively unsophisticated data seems dubious. The following observations are therefore the results of combining cartographic methods and "Cope-Chat" card index analysis. Where it was obvious that several interpretations were possible, linear regressions and Spearman's Ranked Correlation Coefficient formula** have been applied in an attempt to eliminate the less probable ones.

Income, which is considered universally an important factor in determining socio-economic behaviour, varies directly with educational level, rental value and building height, and inversely with persons per room density*. There is a partial relationship with ethnic origin since the non-Lebanese ("Other Arab," "Turkey" and "Other" categories, see maps.) Population tends to have a higher income level than the indigenous Lebanese ("Beirut", "Rural Lebanon" and "Urban Lebanon" categories). The exception to this is the Armenians ("Turkey"), within the main concentrations of which group there is a wide range of incomes, varying from the poverty stricken shack-dwellers of Quarantina (zone 25), to the wealthy shop-keepers in the centro-peripheral areas (zones 9, 10, 18).

** Appendix.

* Hereafter simply referred to as "density"

There is some correlation between low income and a high rate of attached gardens where the "gardens" consist of small plots attached to many of the peripheral shacks. However a high income does not necessarily mean a low incidence of attached gardens since some of the old mansions with their formal gardens bias the relationship. In the middle income group, availability of space is such a predominant determinant that all other factors are submissive.

Income shows no significant correlations with family size, estivage, mobility, previous address, house ownership or building age. The family size case is partly due to the fact that the degree of westernisation is not yet sufficient to induce smaller families among the wealthy, who still often support large extended families in the true tradition of Islam. In the case of building age, there is a tendency for the lower income groups to occupy the more recent buildings, (6 - 20 year, category) while the higher groups occupy the older buildings (<20 year). However this tendency is offset by the fact that high income groups occupy the very recent luxury blocks, so that in different parts of the city new buildings may be synonymous with extremes of both poverty and wealth. To a certain extent a similar occurrence affects the oldest houses, which can be roughly split into two categories; old, central area mansions, mainly with wealthy occupants, and the relict farmhouses nearer the periphery which nearly always house low income families. Recent* observations show a tendency towards a definite inverse relationship between income and building age, since many of the relict farmhouses

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*1964.

have now been demolished, and the old buildings at the centre are being invaded by low income groups. However the picture may again become confused if the rate of construction of low price utility apartment blocks in the southern and eastern peripheral areas increases.

Rental value varies directly with educational level, income and building height, and inversely with density. There is a marked tendency for income rental value to vary directly with the proportion of population in the "Other Arab" and "Other" ethnic categories in any given area, in a manner similar to the ethnic origin-income relationship. Likewise there is a complex relationship between rental and building age, with both old and new buildings having high rental values, and medium age buildings tending to have low rental values.

There is an interesting variation in the ownership-rental value correlation which is direct from the middle rental groups, inverse with the higher groups and shows no significant correlation either way for the lowest rental groups. The unexpectedly high percentage of high rental owner-occupied homes is due to the increasing desire of the wealthy to live in luxury apartments which are nearly always rented. This trend is becoming more pronounced as the old mansions and palaces gradually lose prestige value. Whether the wheel of Westernisation will turn full circle and boost the image of the detached home is not yet apparent, though at the southern periphery and on the lower slopes of the mountains luxury modern villas are beginning to appear.

There is no significant correlation of rental value with family size, mobility, previous address, estivage or attached gardens.

Educational level, in terms of years of schooling, varies directly with income, rent and building height, and inversely with density and building size. There is a partial relationship with ethnic origin, since the "Other Arab" and "Other" categories tend to show the largest percentages of people with a higher education. Mobility also seems to be slightly affected, the groups with a secondary education remaining relatively stable while both illiterates and semi-literates and the groups with college or university education are much more mobile. The full extent of the rate of mobility of the highly educated groups cannot really be appreciated from the data given, since a very high percentage of this group moves overseas. There is no correlation between education and previous address, estivage building age and incidence of attached gardens.

Family size varies inversely with education and building height, and directly with density per room. In addition, local born population is coincident with a high proportion of the largest family groups while the "Turkey" and "Other Arab" ethnic categories tend to have medium sized families. As far as mobility is concerned, the "9 person" families seem concomitant with high mobility rates, but otherwise there is no significant correlation. Family size shows no correlation with income, rental values, previous address, estivage building age, house ownership or incidence of attached gardens.

Density in terms of persons per room varies directly with income, rental value, education and house ownership, and inversely with family size and building height. There is a tendency for ethnic category "Other" to be related to low density, and for medium age buildings (11 - 20 years) to

correlate with high density. There seems to be no relationship between density and mobility, previous address, estivage, and incidence of garden attachment.

Although correlations between birthplace and the other factors are not completely straightforward, certain visible tendencies do appear. Thus the groups "Other Arab", "Turkey" and "Other" often have their previous address as per categories "Elsewhere in Beirut" and "Outside Beirut", while the local born population, "Beirut", Urban Lebanon" "Rural Lebanon") tends to change residence within a smaller radius, ("Same Place" "Nearby"). On the whole the Lebanese born population live in taller buildings* than the non-Lebanese, a large percentage of whom live in one and two storey buildings. There is a marked coincidence of gardens with the "Rural Lebanon" category, and though this seems quite logical, it has only a very low measure of statistical significance. For the rest there is little or no correlation between birthplace and density, mobility, estivage, building age and house ownership.

Apart from the fluctuating relationship with birthplace and family size mentioned above, mobility rate is not significantly correlated with any of these other socio-economic factors. Previous address does have a tenuous relationship with ethnic origin (see above) but otherwise this too varies independently. In general terms, even where the total number of moves within a city for a given time span is large, the greater

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*This statement should be treated with caution since the building height distributions have a relatively low degree of significance in the (2 tables.

part of the moves concerned consist of repeated movement of a relatively small number of migrants rather than infrequent change by a large percentage of the population.* Although it is possible to categorise to some extent the type of man who constantly changes his address, this habit of high mobility is adhered to by a remarkably broad cross-section of socio-economic groups. This creates a concomitantly wide spectrum of factors generating movement, and ultimately of possible destinations, so that it is difficult to make generalisations concerning the direction of movement within this highly mobile group. Nor does the group which moves occasionally** follow any set pattern, since this is even more heterogenous than the highly mobile group. On these terms the independence of both rate and direction of mobility is expected rather than extra-ordinary.

Like mobility, estivage varies independently, the reasons for which are quite clear from the previous discussion concerning the socio-economic heterogeneity of the households which take part in summer migration.

Building height varies directly with income, rent, birthplace and education and inversely with family size, density per room, rate of house ownership and the attachment of gardens. The complexity of the relationship of height and age of buildings is increased by the fact that both the older and newer buildings are multi-storey, while the oldest and medium age buildings comprise the large majority of

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* See Goldstein "Norristown Survey"

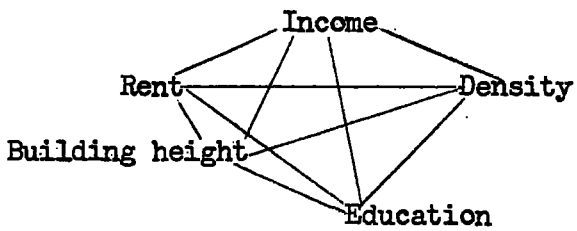
** Once in ten years. This forms about half of the households which have made any change of residence at all in the last ten years.

two-storey houses. The curve of relationship thus resembles an extended cubic parabola. There is no apparent correlation between building height and mobility, previous address and estivage.

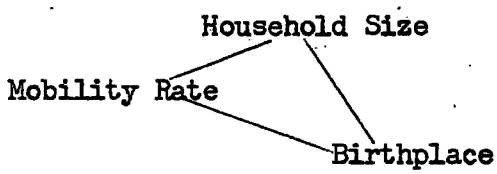
Building age has a complex relationship with income, rental value and building height, and a just visible relationship with garden attachment to the extent that the newest buildings tend to have a low incidence of gardens. It shows no correlation with the other factors.

CONCLUSION

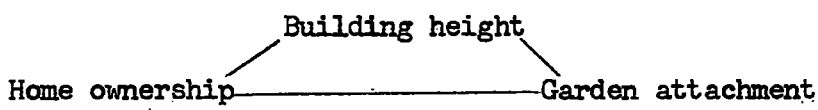
From the foregoing, two main categories of conclusion can be drawn. Firstly, there are certain social and economic factors which are broadly linked in groups.* Thus:-



and:-



and:-



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* Cope-chat analysis.

Some queries do arise, the solution of which would require more detailed study of the social systems operative in Beirut, but in general these inter-relationships are those which would be expected in the light of current information.

Secondly, the spatial interpretation of these inter-relationships allows the construction of broad socio-economic morphological units.* For clarity these are bounded by finite lines on the map but it must, of course, be remembered these "lines" represent in reality elongated zones of transition with little exact coincidence of the various boundaries.

From this there appears to be in Beirut four reasonably distinct morphological units. A and B are generally high income, high rent, high education low density areas - in other words the so called "high class" districts, D and E are the low income, low rent, low education high density areas - the "lower class" districts. The remaining areas do contain both high and low values, but generally are composed of medium values of the various categories. The relatively small extent of such areas is some mndication of the lack of the "middle class" so frequently cited as a characteristic of the non-Western society. *

BUSINESS LAND USE

The previous section dealt with socio-economic patterns with

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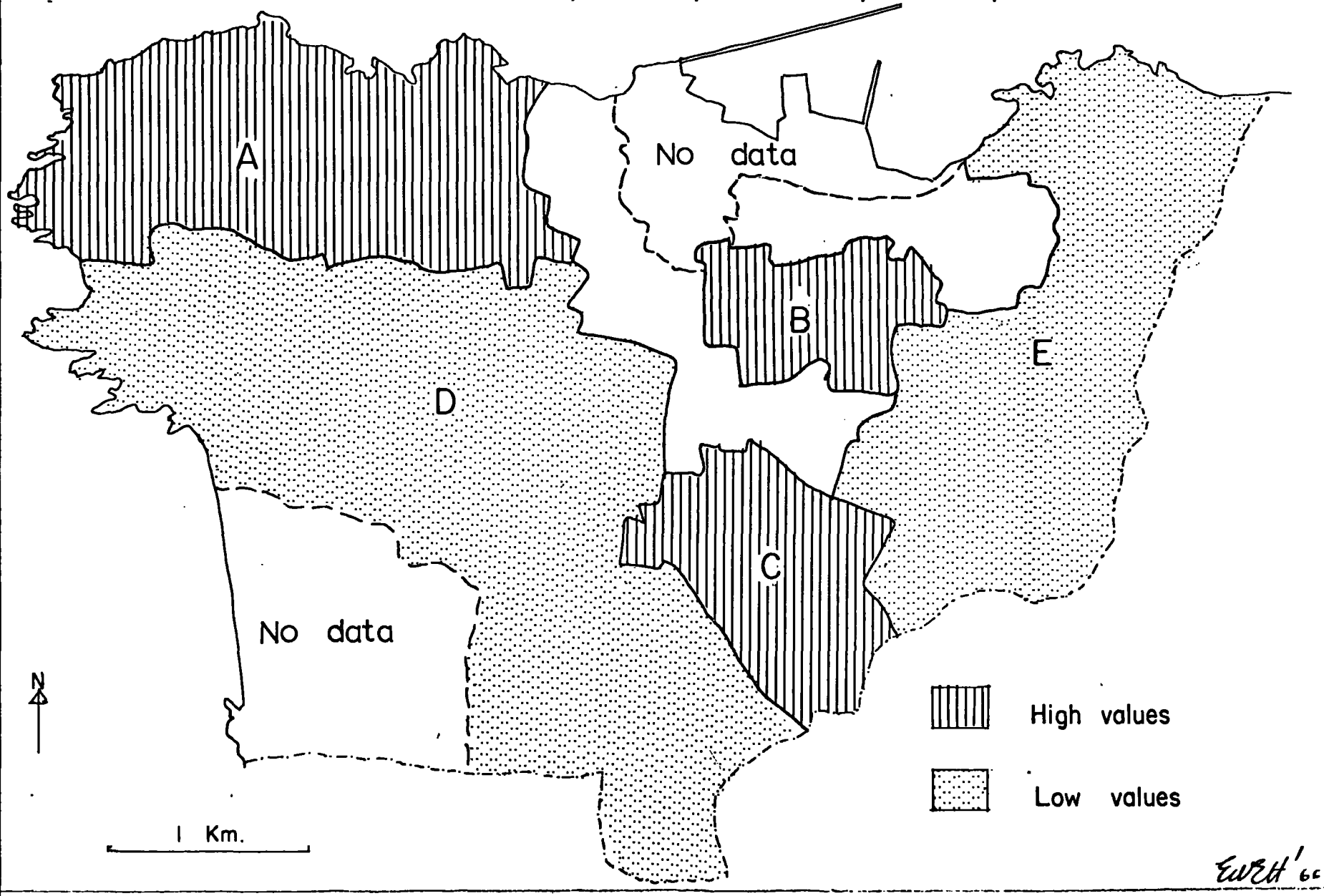
* Map 26

** e.g. Sjoberg. op. cit. Morro Berger "The New Arab World Today".

MAP 26


MORPHOLOGICAL UNITS
RENT, INCOME, EDUCATION, DENSITY, BUILDING HEIGHT.
A
No data
B
E
D
C
No data
N
1 Km.
High values
Low values
EWH '66

the home, or place of residence, as the unit base. The intent here is to examine the distributional patterns of some of the establishments which serve the daily and occasional needs of the city's permanent and temporary inhabitants.

A simplified version of the City of Spokane's "Classification of Business Types"* was used as a basis and establishments representative of each category were selected according to their importance in the eyes of local business men and potential customers**, and within the limitations imposed by the directories used.*** The most important of these limitations was of course the prevention of mention of the poorest establishments by the charging of a low but distinct insertion tariff. However the directory method was used because it is the only way of obtaining a large coverage of information without employing a team of research workers. As noted in the introduction, directory and similar data in combination with personal observation would seem to provide an accurate and balanced picture. In addition personal interviews with business men were utilised to provide background sample information on decision making.

The classification used and establishments chosen were as follows;

A. Food group.
- Grocers
- Bakers
- Butchers

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22. * See W.L. Garrison et al "Studies of Highway development and Geographic Change" p. 67 - 60
** Informal interview.
23. ***Annuaire des Professions au Liban
Arab World and International Directory
Beirut Shopping and Trades Directory.

B.	Eat and Drink group.	Restaurants and Cafes
D.	Apparel.	Couture
E.	Furniture.	Furniture stores Electric light fittings
F.	Automotive.	Sales and Repairs Garages Petrol Service Stations
I.	Other retail.	Pharmacies Bookstores Printers
J.	Office and bank.	Airline Offices Travel Agents Taxi Companies Doctors Banks
K.	Service.	Men's hairdressers Women's hairdressers Cleaners, Dyers and Laundries
L.	Hotel etc.	Hotels
N.	Amusement.	Cinemas Clubs - sports, international, night Bowling Alleys
O.	Schools.	Primary Secondary and Colleges Universities

Using a street directory and the various trades directories, the location of establishments in the various categories was plotted, and the distribution pattern of each type of establishment was analysed. When all categories were plotted on one map, it was obvious that rather than being evenly distributed, establishments tended to cluster in distinct concentrations. These shopping centres may be classified for analytical convenience as follows;

1. Central commercial area, subdivided into
   a. Central business nucleus - A
   b. Central business string streets I - IX
2. The major sub-centre of Ras Beirut - B
3. The mid-city and suburban business concentrations 1 - 60

The location of these is shown on map 44 . The composition of the three main types was examined, beginning with the most simple, i.e. the mid-city and suburban centres and proceeding to the most complex, the central business nucleus. The most useful analytical method proved to be ranking, and this was applied frequently so that general comparisons rather than individual descriptions could be made. Finally, the need for a model to explain the emergent patterns was considered, the utility in this case of already existing models was examined, and tentative conclusions were drawn for the formulation of a new model.

FOOD GROUP

The term "grocer"* here embraces stores of varying size and stock content, frequently very different from the "grocer" envisaged in Britain. The actual size of the shop varies from quite large establishments in Ras Beirut, through small recesses in the central area to corners of shacks in Quarantine, though very few of the shops in this slum quarter are represented on the map. The average floor area is probably in the region of 7 sq. m. In many cases the vendor lives on or near the premises, which are usually rented rather than owned. The exceptions to this are in the central area food markets, and in some of

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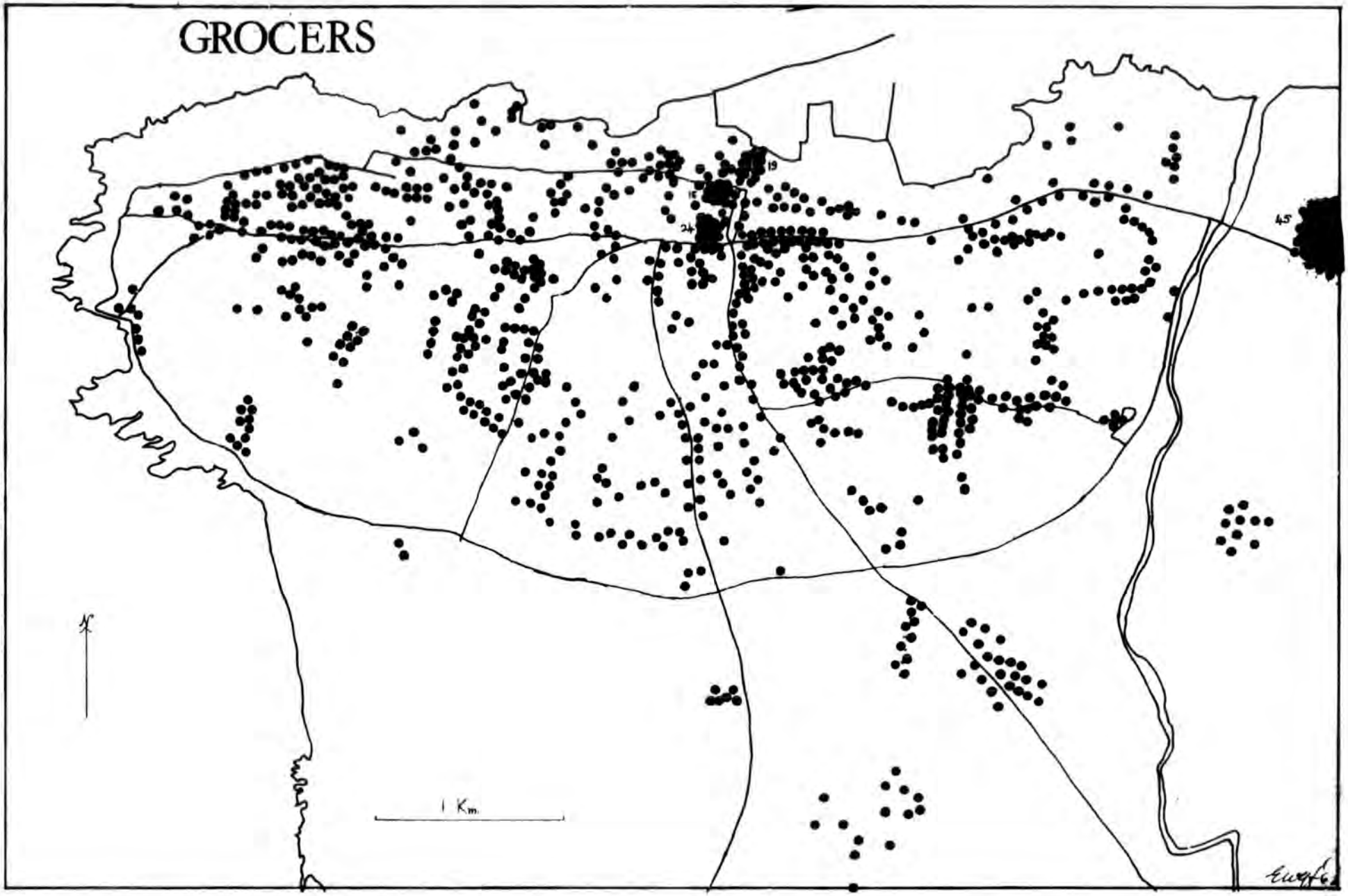
* See map 27

GROCERS



MAP 27

the stores of Ras Beirut, where a number of semi-self-service stores, - embryonic supermarkets - represent the break-up of the traditional system of personal service. Such stores, which must have a high capital backing, cater primarily to a western-orientated market. This is reflected in the stock they carry, which is largely composed of European and American canned, frozen and dried foods. As yet meat and vegetables are unpacked, and an open slab meat and vegetable counter provides a sharp contrast to the hygenic rows of precision-packed goods. Prices in these grocers are the highest in the city, partly because they are selling imported goods, and partly because the prices are pushed to the upper limit the vendor believes his on the whole high-income customers will pay.

The small grocers of the lower income residential areas generally have a small basic stock of cereals, such as rice, burghol (cracked wheat), flour, dried chick peas, sugar and salt, all of which are generally kept in sacks. Frequently olives, sesame oil and soap are stocked, and in addition a few canned goods. Those stores which are slightly better off have a refrigerated cabinet in which is kept leban (yoghurt), lebni (soft cheese), milk and the inevitable Coca-Cola. Besides his basic stock, the grocer, in common with most Lebanese storekeepers will obtain almost any item requested within a few hours. However this traditional service is gradually succumbing to the increased pace of life everywhere in the city, and as the impatient customer increasingly prefers to go to the store with the larger selection where he can obtain what he wants immediately, the

small retailer with insufficient capital to enlarge his stock must gradually be eliminated.

There are more grocers in Beirut than any other type of retailing establishment, and as would be expected of a shop supplying daily needs, they are distributed throughout the city. However within this widespread occurrence, definite concentrations indicate a nucleated rather than a dispersed pattern. In fact only 0.08% of the grocers plotted are found outside the various centres in isolated locations.

Of the mid-city and suburban concentrations, a higher density of grocers is found in some than others; higher, that is than the number expected according to the general size and scope of the shopping centre. Thus area 50 ranks (12)* for variety** and number of stores but for the number of grocers within the centre it ranks (2). The same is true for centres 14, 15, 16, 11, and 45. which cater for a fairly dense residential population. Centre 9, ranked high for variety (1) of services generally has relatively few grocers (33), and is in fact an area of hotels and restaurants with a fairly high temporary population.

The large numbers of grocers in areas 60 (rank 1 for grocers) and 41 (grocers rank 4) are proportionate to their general size (rank (1) and (2) respectively) and variety of services ((3) and (2) respectively). They should perhaps be more properly regarded as small

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* Hereafter rank numbers appear in brackets.
** See page 112 for a definition of "variety" according to $R = \frac{\Sigma}{y} (x \times w)$

sub-centres rather than local shopping centres, since they form the nuclei of the major suburbs of Borj Hammoud and Furn el Chebbak respectively, both of which were originally villages in their own right.

The Ras Beirut major sub-centre B also has a large number of grocers catering to an extensive residential population. The actual number at present within this subcentre has probably reached its limit and may be expected eventually to show a decline. But the optimism with which the vendor believes that any store established in the high income-high spending area of Ras Beirut is bound to succeed, has not yet recognised the existence of a saturation point. Although a couple of quite large grocers stores have closed down recently, the rest cling tenaciously each to a small portion of a no longer increasing market.

Perhaps the most unexpected feature of the distribution pattern is the intense concentrations of grocers within the central commercial area. In British cities, the only grocers usually found in the C.B.D. are highly specialised high-price establishments. In Beirut this concentration is a phenomenon closely related to the eastern system of suqs or bazaars whereby similar types of establishment, in close spatial association, attract custom from all over the city by their highly competitive prices. Many of the central area grocers are in fact in the grocers suq, Suq Abou Nassr, the rest locating mainly in Rue Argentine near the wholesale markets and in

Rues Maarad and Foch.

The lack of isolated grocers has already been mentioned. Further it should be noted that in only two centres are grocers not represented. This is due to the fact that in many cases the grocer has been the first retail service to become established in a residential area, daily food being a prime requirement, and has formed the nucleus to which other types of establishment have then been attracted.

Like grocers, butchers shops* are distributed throughout the city, and in a hot climate where by no means everyone has a refrigerator, may be classed as providing daily necessities. Most butcher shops are small, with the vendor living on or near the premises. Animals, excpet for chickens, are not slaughtered on the premises but meat is brought daily from the abbatoirs in Quarantine (in the N.E. near the River) or the wholesale meat market in the town centre.

Most of the mid-city and suburban centres have one or more butchers, but only three, 45, (3) 50 (2) and 60 (1) have six or more. Centre 1, commensurate with its relative lack of grocers, and in keeping with its character of tourist and night life area, has no butchers at all. Meat needed by the permanent residents of the area is bought from a self-service grocers or delivered from a neighbouring centre.

Sub-centre B also shows a proportionately low number of butchers shops, and again meat is obtained from a large scale grocer.

In the central area, distinct concentrations are apparent, mainly in the butchers suq, Suq el Lahmine, but also in Rue Argentine

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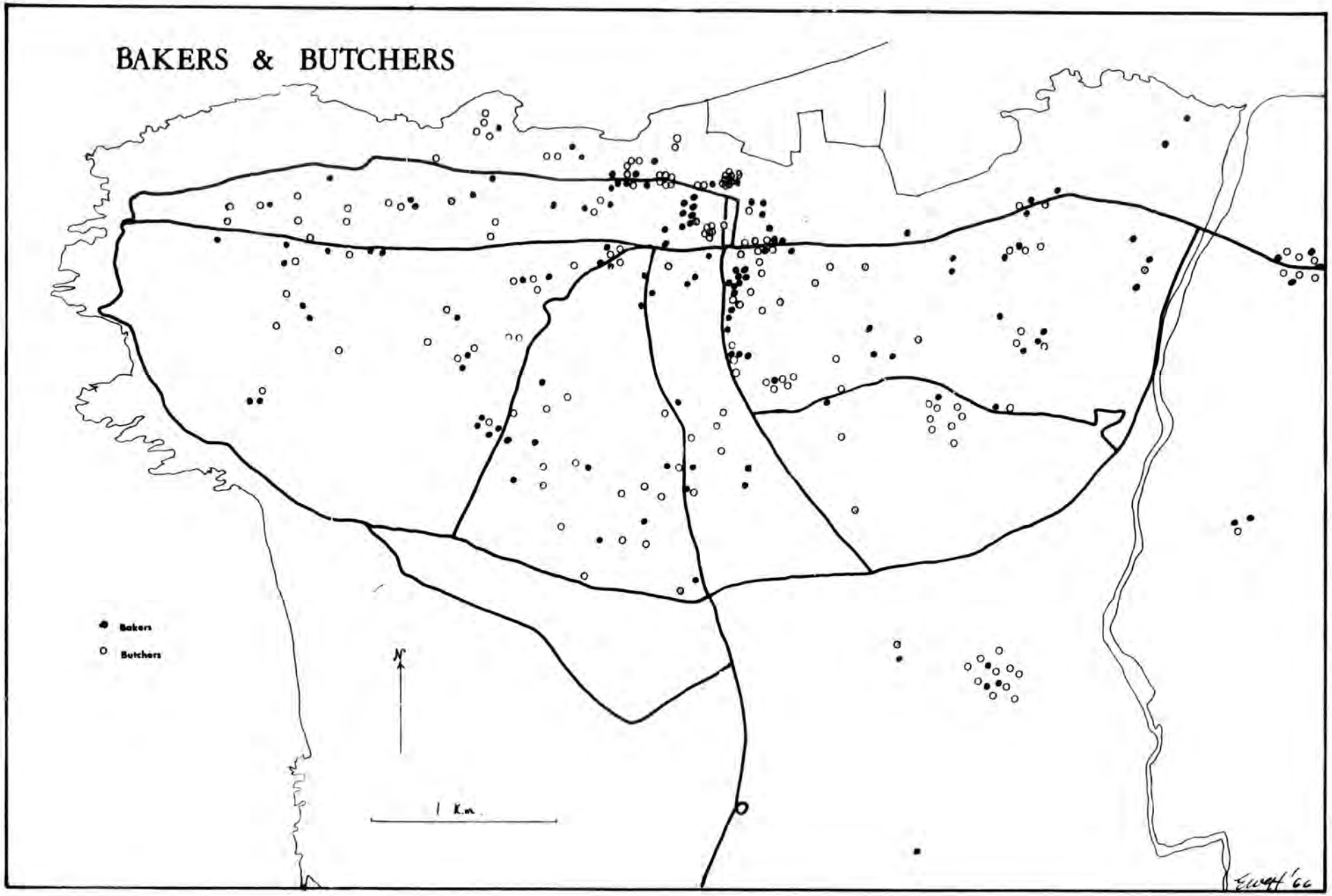
* Map 28



MAP 28

and near Suq es Savahine. Very few butchers are found in the central area outside these concentrations.

A bakers* shop in Beirut is generally synonymous with an actual bakery. Very few are distribution centres only. However most bakers supply bread daily to grocers, and many employ a boy or man to hawk arabic bread and rolls in the streets. The initial crack in the system which appeared when Europeans and Americans living in the city demanded western-style bread, is widening with the pressures of an increasing demand for non-Arabic bread. Several large scale non retail bakeries supply wrapped and sliced bread to grocers and thus reach a wide market. At present the relative cheapness of labour and the desire for freshly baked bread ensures the continued existence of the small home-baker, at what rate the economics of large scale manufacture will alter the situation is difficult to forsee. The transition will inevitably be delayed since the Lebanese traditionally regard themselves as quick turnover tradesmen rather than entrepreneurs.

Bakers are fairly widely distributed, but are all in commercial nuclei; none are in isolated locations. A marked feature of the distribution pattern in the mid-city and suburban centres is that ranking in terms of bakers is frequently not commensurate with ranking according to general size and variety of the shopping centre. This is particularly the case with centres serving middle and low income populations such as centre 16 (bakers, rank (1) general, rank (32)) in a predominantly Muslim area, where there is a high consumption of

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* Map 28

the traditional breads and pastries. Some areas with an unexpectedly high number of bakers such as centre 58 (3), have a high percentage of Armenians in the population of the market area who also favour specialised traditional pastries and confectioneries. Centre 1 is void of bakers as of butchers, and again it can be assumed that the bread requirements are fulfilled by grocers of by neighbouring centres.

There are relatively few bakers in sub-centre B, where self-service stores have maximum usage. Most of the existing ones are patisseries producing western-style cakes and pastries. A notable exception occurs opposite the American university on Rue Bliss, where an oriental bakery caters to the desires of arab students.

There is a marked absence of bakers shops in the central area. This is partly due to the fact that no alternative site was found when the old Suq Katayef was demolished with a number of other ancient suqs about ten years ago. However the beginnings of a concentration is becoming apparent in the northern part of Rue Damas around Place Debbas. These are ideally situated for the commuter returning to the suburbs or to Achrafieh by way of the Damascus road to collect bread on his way home. The southern part of Rue Maarad also has quite a large number of bakers shops but these are not apparent on the map since most are too small to advertise in the directories.

EAT AND DRINK GROUP

The establishments in the eat and drink* category vary

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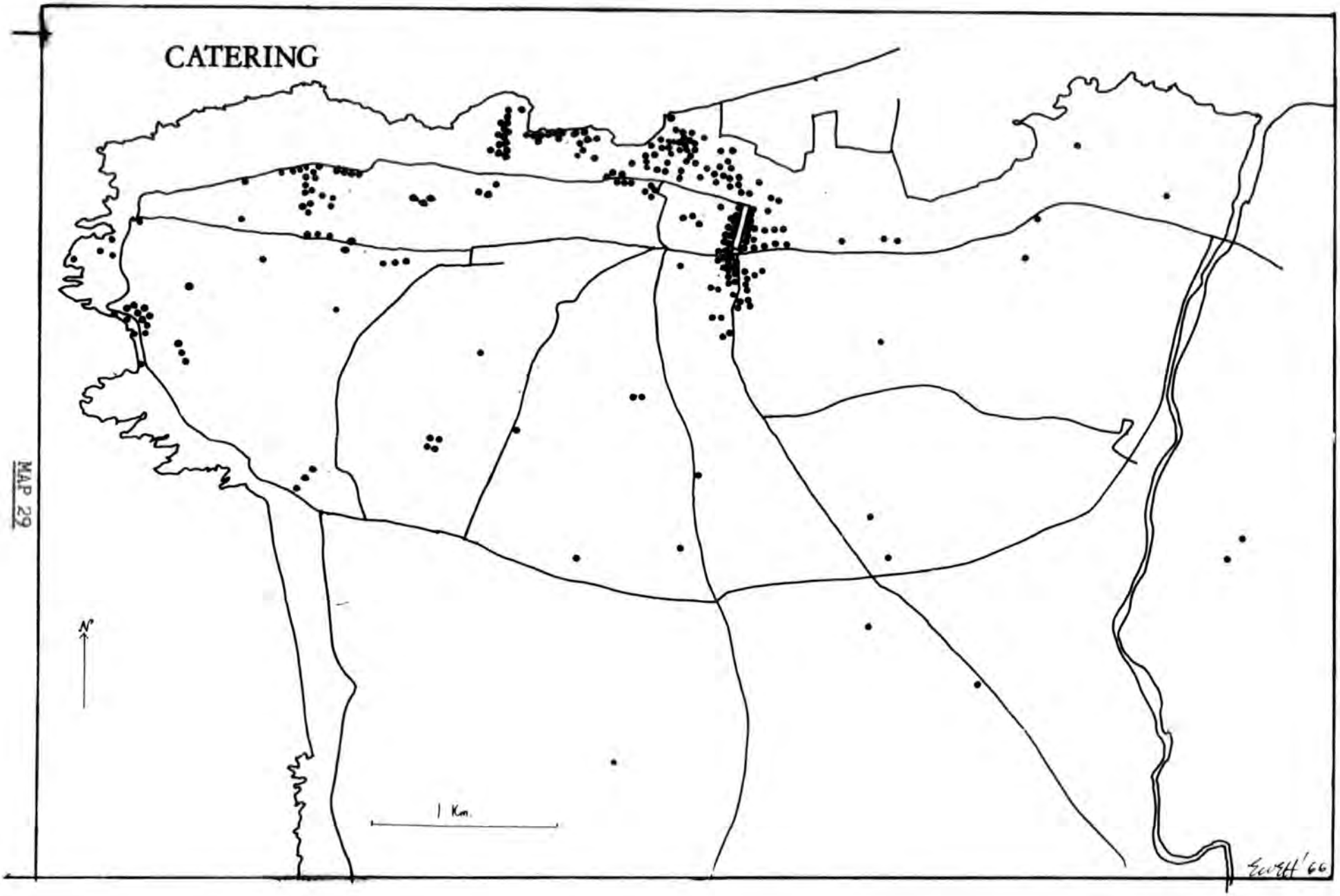
* Map 29


CATERING
MAP 29
N
1 Km.

considerably in size and facilities offered. In the Muslim area of Mousseitbeh to the SW. of the central area and in the S.E. of the central area itself, they are mainly coffee shops serving men only. These have a definite social function, since customers may remain for hours drinking coffee smoking argileh (hookahs) and gossiping. In parts of the centre they are small stalls offering cool drinks, such as carrot juice, to the passer-by and have little or no seating accomodation. These stalls do a considerable trade in delivering coffee and cool drinks to offices and various other business establishments. Sometimes small cafes spring up near new office buildings entirely in response to this stimulus. At the other end of the scale there are large luxury restaurants in both Lebanese and foreign style, offering a wide range of international cooking. In fact it has been calculated* that there are restaurants serving the specialities of over twenty different countries in Beirut.

Seven of the 200 restaurants and cafes plotted are in isolated locations, that is they are not associated with other facilities. These are nearly all in scenically attractive sites on the coast of Ras Beirut and are mainly restaurants attached to hotels.

On the whole the eat and drink category is not well represented in the mid-city and suburban centres. The main exceptions are centres 1 and 9. Both of these have an exceptionally large

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* Souhail abu Jamra, of a commercial research firm.

number of restaurants and cafes, which, together with extensive entertainment facilities attract a large number both of tourists and non-local Lebanese customers. For the rest some quite large centres, such as 50, 54, and 58 have no eat and drink facilities. This forms a marked contrast to North American cities, in some of which drugstores** rank third in mid-city and suburban centres.

Sub-centre B has a considerable number of restaurants and cafes, and here the American-style grill predominates, with a number also of establishments serving traditional arab food in such a way as to appeal to western tourists. Along Rue Bliss and in the northern part of Rue Jeanne D'Arc, a number of small cafes and shawarma* stalls have sprung up in response to the demand from students.

The most pronounced concentration, and indeed the larger number of eat and drink establishments are in the central area, both in the commercial nucleus itself and in the central business string streets stretching away from it. In the north west of the central area and along the Avenue das Français (Ia), these tend to be of the more exclusive type catering to the tourist and to the wealthy business man. Here in fact are found some of the longest established restaurants in the city. These restaurants serve the true Lebanese delicacies, like fried small whole song birds, as opposed to the less exotic oriental foods served to the more conservative tourists in Ras Beirut. Round the Borj are mainly small cafes and the refreshment stalls mentioned earlier. These are also found in Bechara el Khoury (VI), but in

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* Sliced lamb grilled on spits.
** Usually containing snack bars.

addition there are a number of bigger restaurants and grills which do a considerable business in conjunction with the concentration of entertainment facilities in this area. This larger type of establishment is also beginning to appear in Rue Weygand, and Georges Picot (Ib), where a considerable part of their trade is in "coffee and cakes" for women shoppers. This type of business is a direct result of constantly increasing westernisation. It was relatively rare as recently as two decades ago for women to go shopping without a male chaperone, let alone patronise a cafe.

APPAREL.

Strictly "couture"* should include actual dressmaking and tailoring establishments only. However under this category two of the directories used include boutiques which sell some ready made dresses and underwear as well as making garments to customers requirements. As far as can be ascertained, establishments selling only ready made and branded garments are not included. Since these are relatively few in number in any case, establishments plotted under "couture" provide a fair representation of the distribution of the clothing trade.

A higher percentage of clothing establishments are dispersed than of most other services. In fact 6.7% are in isolated locations away from other stores. These are usually small home-dressmakers, whose market is the immediate neighbourhood. This is usually the case

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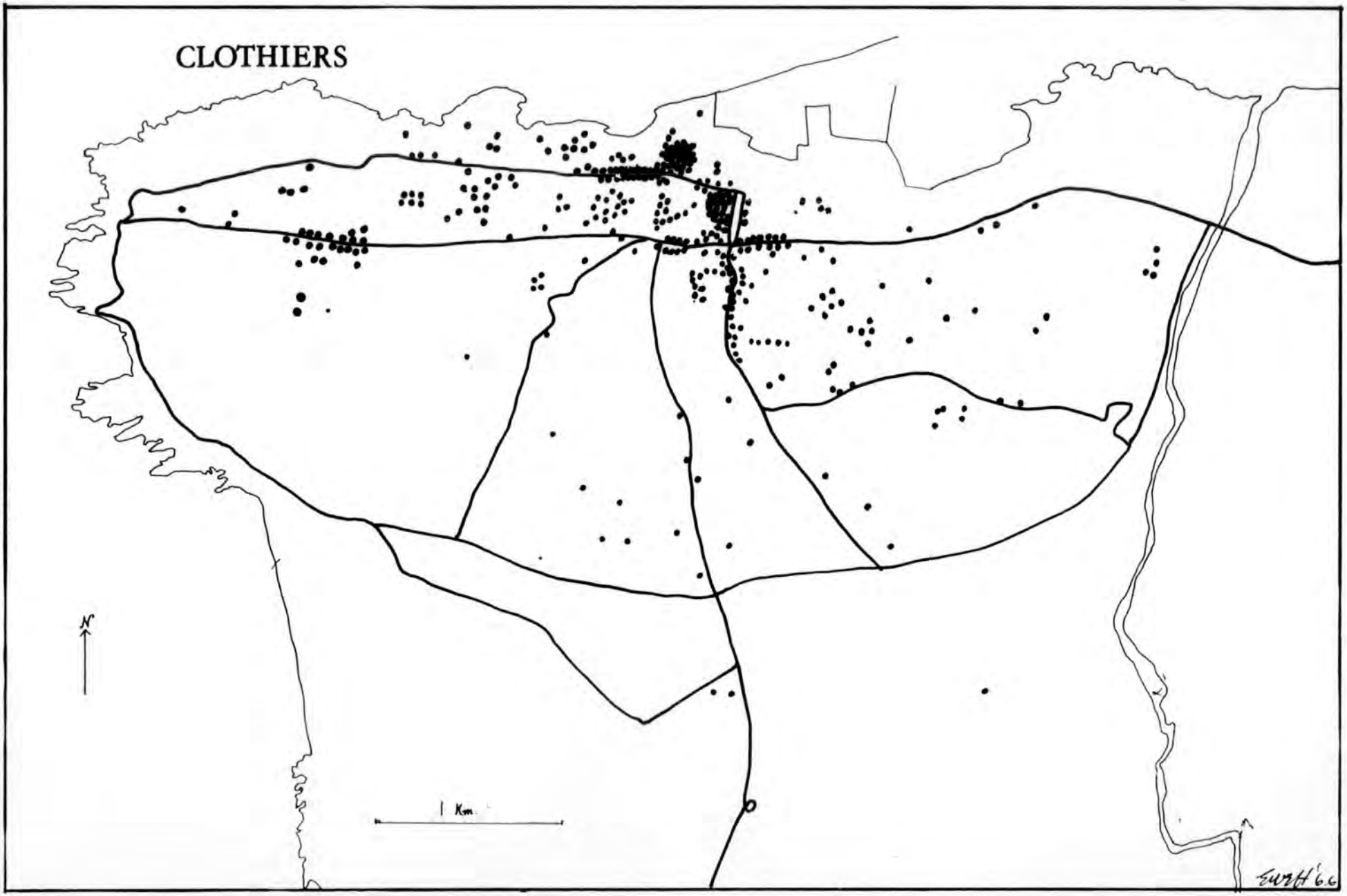
* Map 30



MAP 30

too with those clothing establishments in the smaller mid-city and suburban centres; here in addition a few articles of underwear, smocks etc. often compose a small stock of "readymades" supplying some basic needs of the neighbourhood. There are unexpectedly high concentrations of clothing establishments in centres 10 (general rank 4, clothing 1), 7 (general 11, clothing 2), 43a (general 15, clothing 2), and 45 (general 9, clothing 4). These are all centres sited in the longest established residential areas, and now situated between the central area and the major residential areas of Ras Beirut and Achrafieh. The newest areas further to the south, south west and south east have not yet attracted local dressmakers, and in view of the increasing interest in ready-made clothes may never in fact do so. In other words the distribution pattern has probably reached the point of crystallisation.

Sub-centre B has a large number of clothing establishments and the highest percentage of any area of those selling ready made articles of clothing. Most establishments are found near or on Rue Hamra, the main shopping artery of the sub-centre, and show a definite tendency to cluster within the street after the manner of certain types of establishments such as haute couture boutiques in western city C.B.D.s.

The clustering of clothing establishments apparent within the central area is however definitely that of the suq system. Suq Sursock, Suq Ayass and Rue Fahkrey Bey have the more traditional open fronted stalls displaying rolls of various materials. Suq Jamil and Suq Tawileh, also specialising mainly in clothing stores, boast larger

shops and usually a considerable stock of ready-made clothes, and invariably demand higher prices. The concentration in Rue Emir Bechir and Rue Bechara el Khoury (business street V1) is mainly composed of medium size establishments of tailors and dressmakers catering more to the population of the southern and south eastern residential areas than to the city-wide market encompassed by the other central area clothing establishments.

FURNITURE.

The stores plotted in the furniture* group vary from quite large showrooms exhibiting both local and foreign manufactured items in the central area and sub-centre B, to individual craftsmen making simple furniture to order in the smaller shopping centres. Some of the larger stores are affiliated to furniture factories on the outskirts of Beirut in such places as Chiyah and Senn el Fil. The manufacture of furniture is one of the few industries which, with the help of a severe tarrif on foreign goods, flourish in Lebanon.

Six point five percent of furniture establishments are not in shopping centres, and these are mainly in the S. and E. residential areas. They consist partly of craftsmen working on a similar scale to home dressmakers, and partly of small manufacturing concerns selling some products on their premises and others through agents more centrally located.

Most of the mid-city and suburban centres have some kind of furniture establishment, but there are exceptionally dense concentrations in the N.E. of the city along the Tripoli road. These

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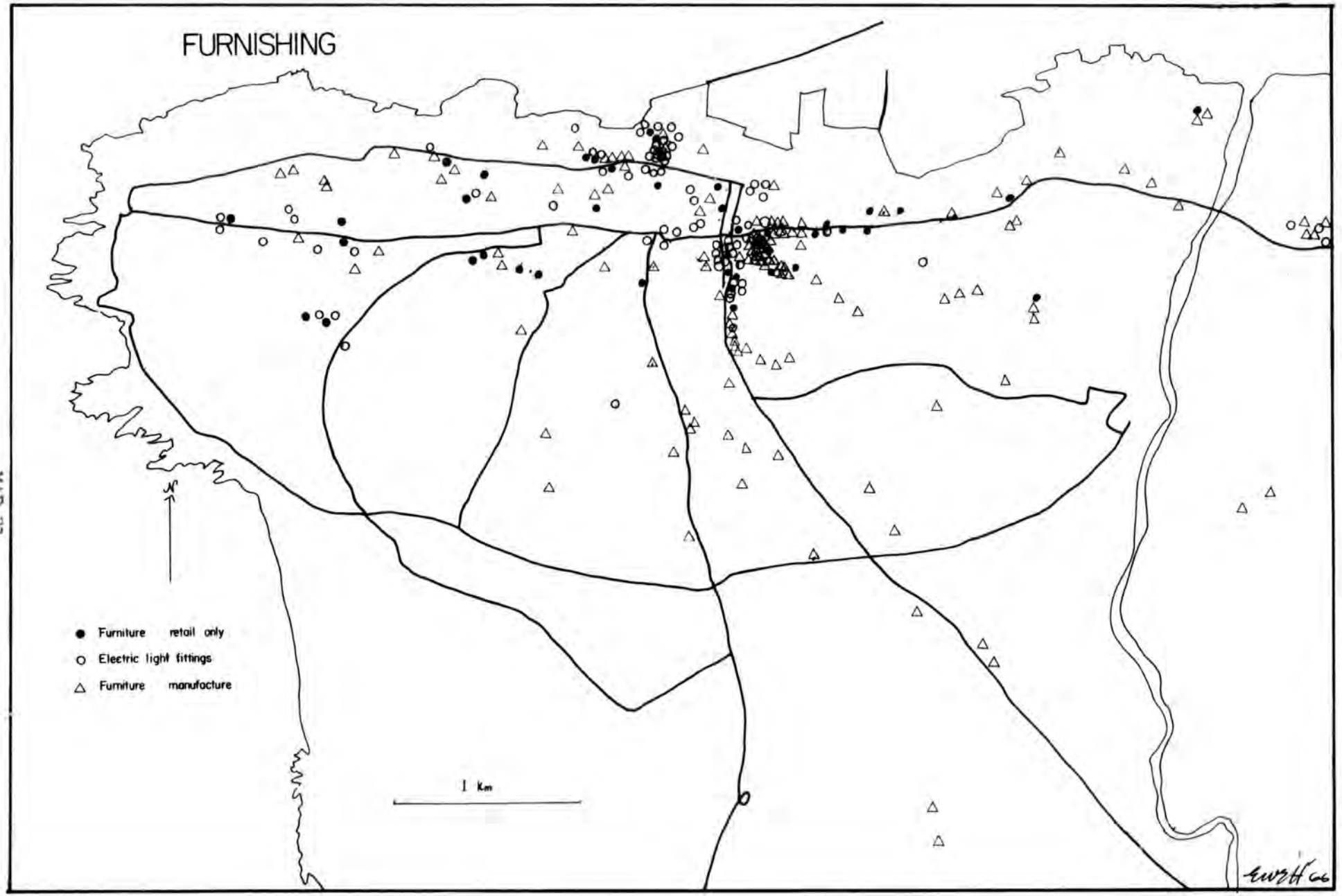
* Map 31


FURNISHING
Furniture retail only
Electric light fittings
Furniture manufacture
1 Km

MAP 31

are mainly small manufacturing - cum-retailing concerns. Considering that in the average western city there are very few furniture stores outside the centro-peripheral area, there is a remarkable number scattered through the centres in residential areas in Beirut, and the phenomenon is a reminder that despite the rapid rate of modernisation almost everywhere in the city, Beirut is still quite definitely the product of Arab culture.

Sub-centre B has 16 furniture establishments. This is not excessive, and in fact considering the high-income clientele is probably lower than would be expected.

There is no furniture suq "per se", but there is a marked concentration of furniture stores in the S.E. Central area, notably in business streets VI, VII, and VIII. They probably located originally in this district to serve the old residential area of Achrafieh, and stayed there because this was a viable location in terms of modern economics. Soaring central area land values dictate that establishments requiring fairly large showrooms and with a relatively small turnover such as furniture stores shall be located in the areas peripheral to the peak land values of the central shopping area. This is reflected again in the less dense but distinct concentration in the N.W. of the area. Those in Rue Patriarch Hoyek and Rue Georges Picot, near the high value intersection of Bab Idriss are mainly stores selling smaller items of furniture such as electric light fittings, the larger stores only occur in these streets further away from the intersection.

AUTOMOTIVE.

With the "automotive" * group, the distributions patterns of both repair and sales garages and of petrol service stations have been considered. The former range from quite large concerns employing a number of men dealing with general repairs, to small workshops specialising in various individual jobs such as bodywork repair, electrical systems, transmission systems, etc. These often share any expensive machinery that may be needed. Petrol stations are usually individually owned but one or two are leased by major companies to local proprietors. Most of them have several grades of petrol but there are one or two single pump concerns. Many service stations credit petrol to taxi drivers, who return later in the day to pay out of their earnings.

Only two service stations are in isolated locations, and these are both on the new ring route. Whether or no the other mid-city and suburban stations do appear in centres depends on whether the centres are situated along a major routeway, for the immediate impression from the distribution map is of a linear pattern. The only exceptions are centres 53 and 2, both of which serve important residential areas. The stations concentrated in centre 20, though not on a through routeway are on an important "service" route**.

Although there are a number of service stations in the central business streets notably, Ia, Ib, IV, VI and VIII, there are, as would

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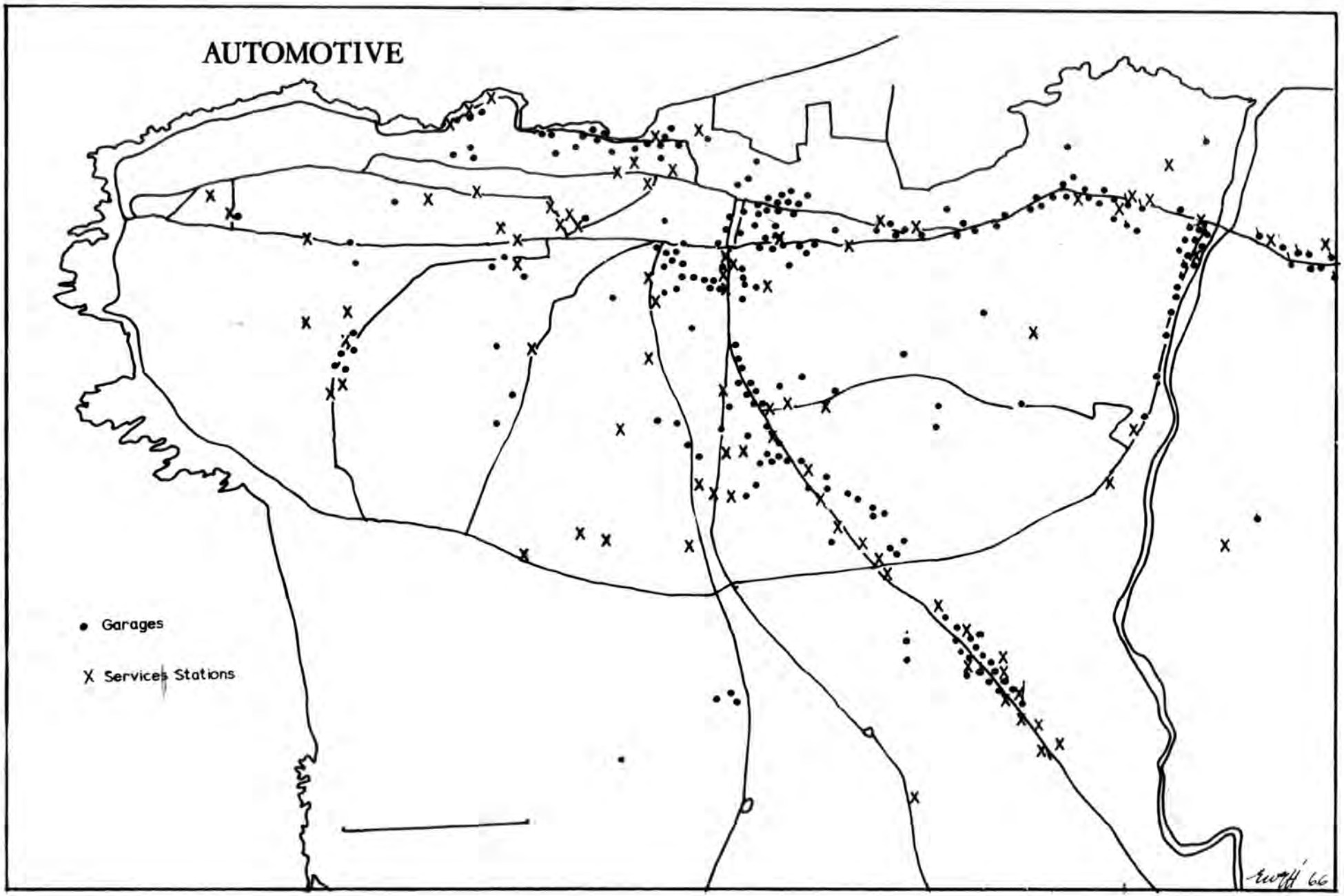
* Map 32.
** Fixed price, fixed route, shared taxis.

AUTOMOTIVE



MAP 32

be expected no examples of this space consuming function in the central area nucleus.

Sales and repair garages are represented in a few of the mid-city and suburban centres where they cater for a small local market, mainly in repairs. Centres 9 and 4 and 38 are the only non-arterial centres with several garages. For the rest, the main routeways, especially Rue de Damas, Furn el Chebak and Rue el Nahr together with the Nahr Boulevard in the N.E. attract the most intense concentrations. Along these routes garages and workshops appear in clusters, having a very strong tendancy to agglomerate, partly to better serve a common market and partly because of the cooperation (already mentioned) needed to secure the use of expensive equipment.

Like service stations garages tend to locate in the centro-peripheral rather than the central business area in V, VII and LX. They tend to avoid the main through routes like IV and VI with their high rents, since unlike service stations they do not depend mainly on attracting passing traffic: nor do they have the necessary turn-over to pay the higher rents of the main routes. The most marked concentrations are Rue de Syrie (V) and Rue el Arz (IX) which are very much areas of small workshops of various kinds.

OTHER RETAIL GROUPS.

Despite the tendancy of the directories to categorise quite a wide variety of establishments under a single heading, pharmacies* as plotted are in fact primarily for making up drugs to prescription and

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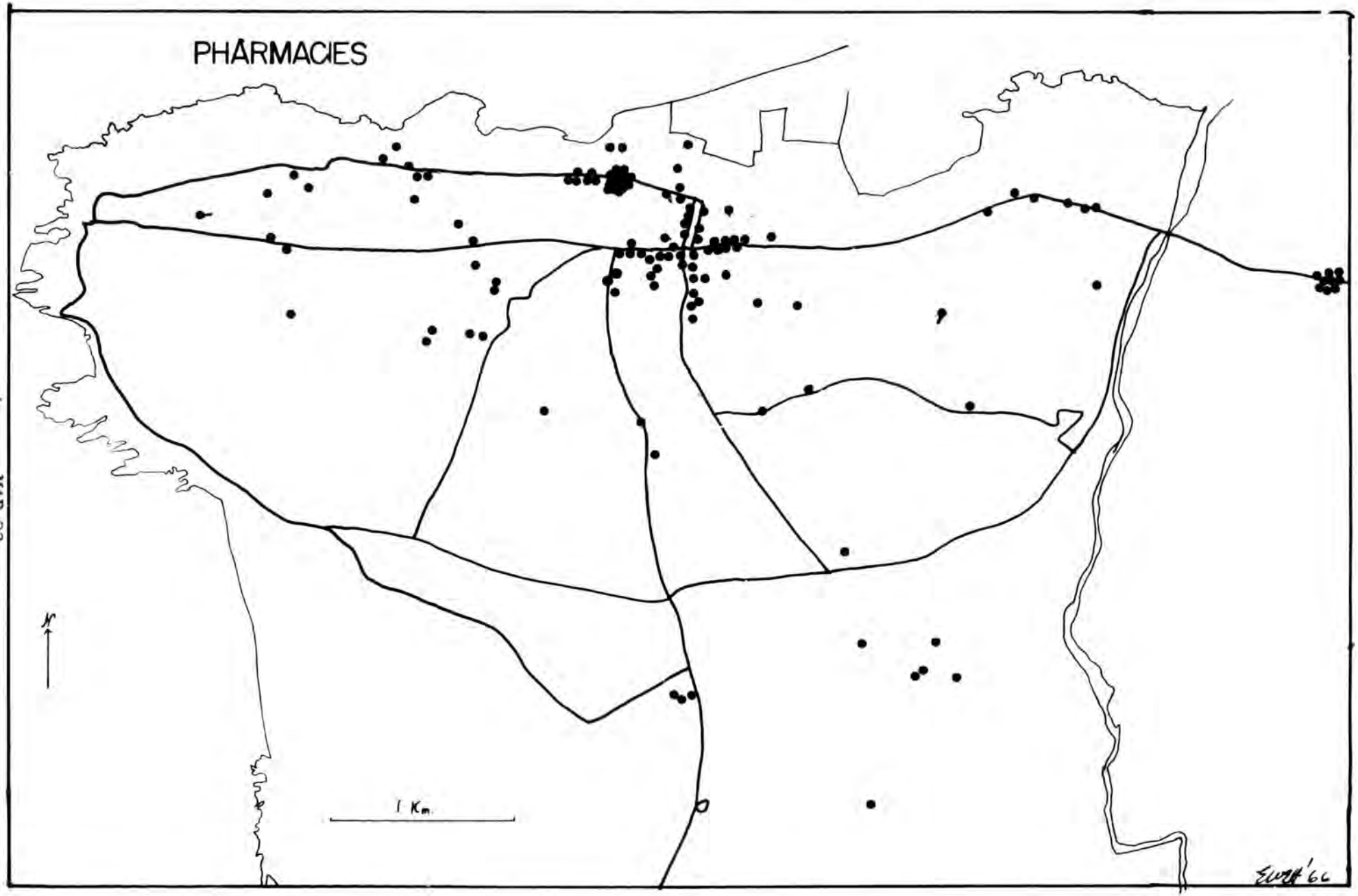
* Map 33



MAP 33

for selling branded medicines of various kinds. They also have a considerable trade in beauty products for which there is an increasing market. Although there are two or three quite large firms with more than one branch, the majority are single establishments owned by the proprietor.

On the whole pharmacies are fairly widely scattered through the residential areas; few centres can support more than one such establishment. Exceptions are the largest centres such as 10, 11, 41, 51 and 60. Ras Beirut sub-centre has itself only six pharmacies, fewer than centre 60. In fact the number probably fits the market fairly well. This is relatively rare in Beirut where the market is frequently oversupplied by a given type of establishment. The reason probably lies in the fact that in the case of pharmacies, a more recent phenomenon than most other services, greater attempts may be made to pre-judge the potential market before locating in a given area. (See also concluding paragraph).

Within the central area the most pronounced concentration of pharmacists is at Bab Iddriss. There are in addition concentrations round the borj and in the S. and S.W. business string streets, notably IV, V, VI and VII. Comparison of the distribution pattern of pharmacies with that of doctors shows as would be expected, marked similarities.

The stores within the category "bookstores"* vary from quite

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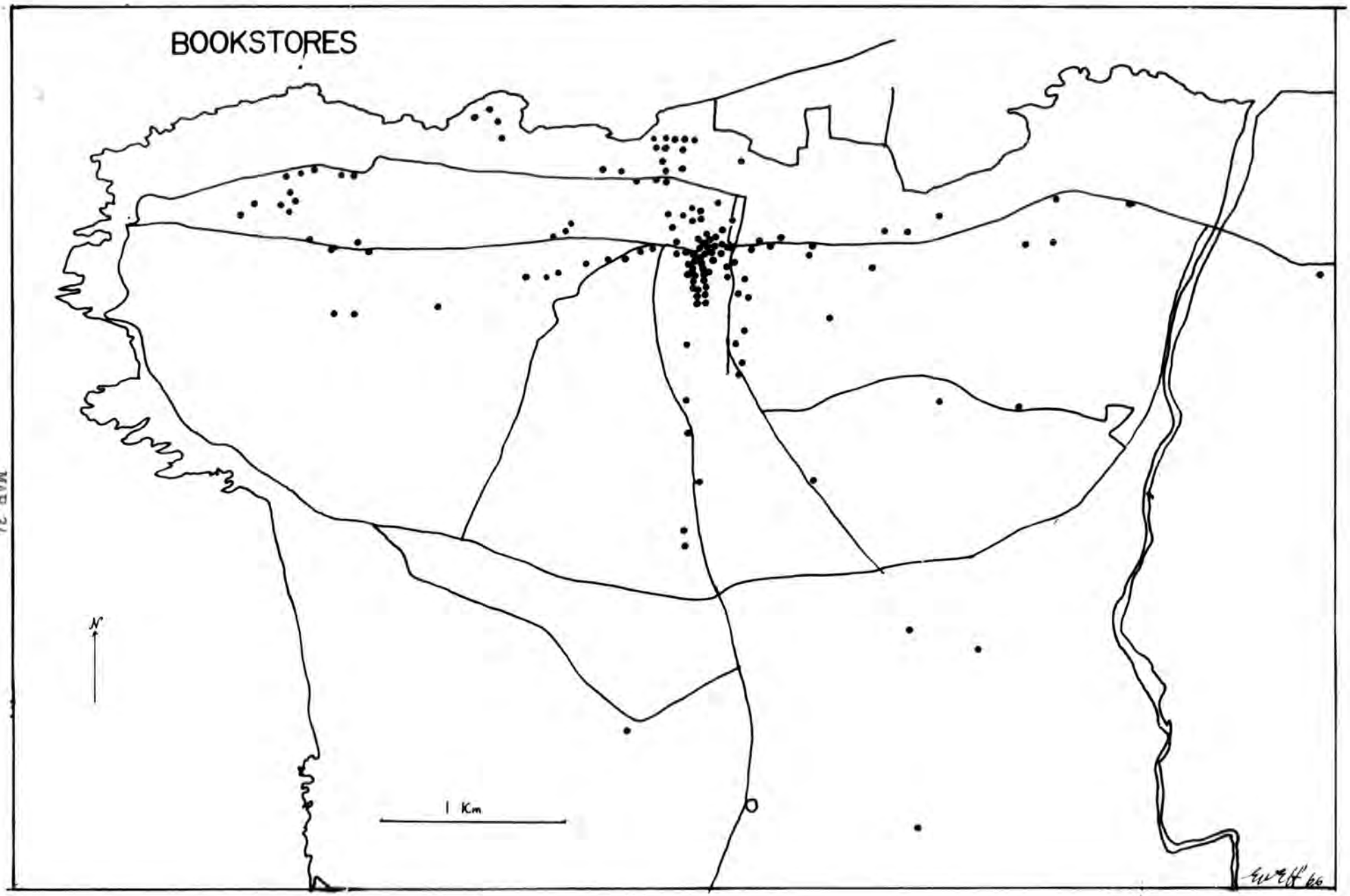
* Map 34



MAP 34

large establishments selling foreign language hard and softback texts and scientific journals to stalls with a small but rapidly changing stock of Arabic paperbacks, magazines and newspapers. The large stores also generally sell newspapers, especially airmail editions of European and N. American issues.

Variations of the smaller type, selling stationery in addition to reading material, are usually found serving the centres in the mid-city and suburban areas. Rarely can such a centre support more than one bookstore. An exception is centre 9 (bookstores,rank 1) where reading matter and stationery is provided largely for a transient market of tourists. The scatter of bookstores along the main arterial routes would seem to cater to motorists as well as to the neighbouring residential areas.

Sub-centre B is well endowed with bookstores. Those along Rue Bliss mainly stock foreign language texts, having been located there in apposition to the American University. For the rest, paper-backs, newspapers and magazines are brought by a large tourist as well as local market. English is the main language of foreign literature.

In the central area most of the literature is in Arabic. The two or three bookstores in this area specialising in foreign language texts concentrate mainly on those written in French. This is directly a result of the much earlier influence of France on both the political and educational systems. The main area of Anglo-American influence in Ras Beirut, is too far out to provide any market for English texts in the central area, which consequently has no bookshops concentrating on

such literature. The main concentration of bookstores within the central area is in Rue Emir Bechir and Rue de Syrie (business string street V). Most of these are very small scale establishments concentrating on a heavy turnover of papers and periodicals. Additional custom in Rue de Syrie is probably received from waiting taxi passengers, since this street is also the main rank for "service" taxis serving the southern and south western areas of the city. The minor concentration in the Avenue des Francais (Ia) provides a similar service to people returning to Ras Beirut and to tourists.

The large number of firms classified as printers*, includes a considerable number of small one press firms concentrating mainly on advertising and commercial printing, e.g. labels and cartons. There are however some larger printers which produce newspapers, magazines and books and even foreign language texts in French and English.

The printing firms in the mid-city and suburban areas are mainly concentrated in those centres near the central area, such as 30 and 42. They are not on the whole related to retailing facilities since their trade does not depend on the passing customer. Consequently a centre's rank by number of printers may be very different to a centre's general rank. For example 30 ranks (1) for printers but (27) generally; 42 ranks (2) for printers, (31) generally; 58 ranks (3)for printers, (13) generally.

Sub-centre B has very few printers. The main concentrations

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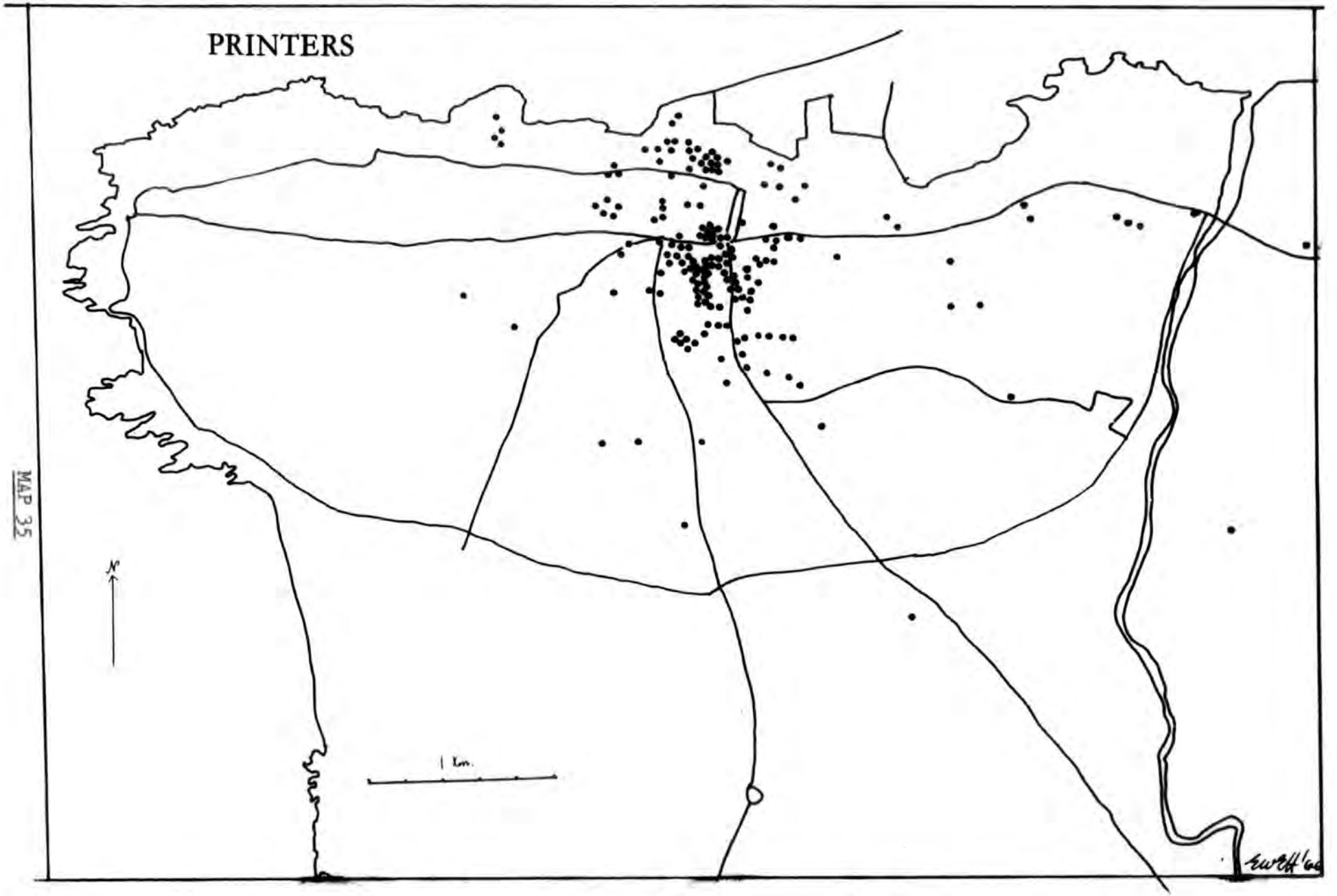
* Map 35

PRINTERS



MAP 35

are in the centro-peripheral areas. Business streets IV, V and VI have the most marked concentrations but printers are also represented in VII, VIII and Ia and Ib. Previously elaborated reasons account for this siting, namely that printing firms require a large amount of space relative to their turnover.

OFFICES AND BANKS.

Travel agents, taxi companies and airline offices* were plotted on the same map since they tend to serve the same market. There are however various types of establishment within each group. Airline offices, having considerable capital backing, are mainly large and luxuriously decorated, and can afford to occupy very expensive central area sites, though some of the establishments plotted represent branch offices which may be quite small. Taxi companies are of two main types; those owning the "service" or public taxis, and those concerned with private hire. Since taxis are the most utilised form of public transport within the city itself** the number of taxi companies is higher than would be the case in a British city. Travel agents may be individually owned or branches of international companies such as Cook's. As well as arranging bookings on scheduled routes, the smaller companies especially arrange car trips within Lebanon and to neighbouring countries. In this they sometimes co-operate with taxi companies, but often compete using their own cars. Since frequently different taxi

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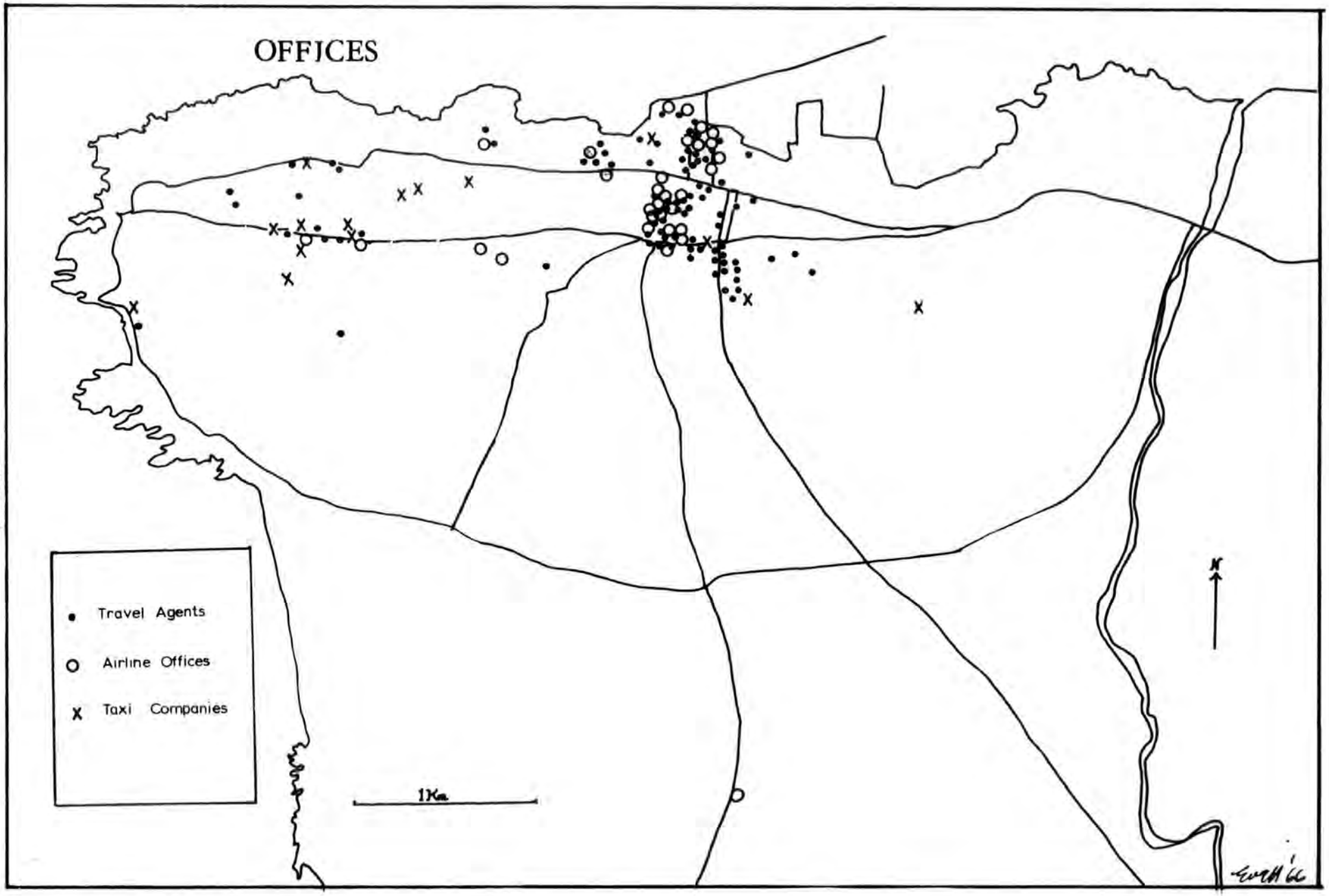
** Trams, replaced by buses in the last 6 months are heavily used but there are only four routes.

*** Map 36



MAP 36

companies and travel agents offer trips to the same tourist attractions such as Baalbek and the Cedars, prices are competitive and location important. Most large Middle Eastern cities are becoming increasingly conscious of the benefits of tourism, but the great number of formalised tourist orientated enterprises in Beirut are yet another indication of the business initiative of the Lebanese.

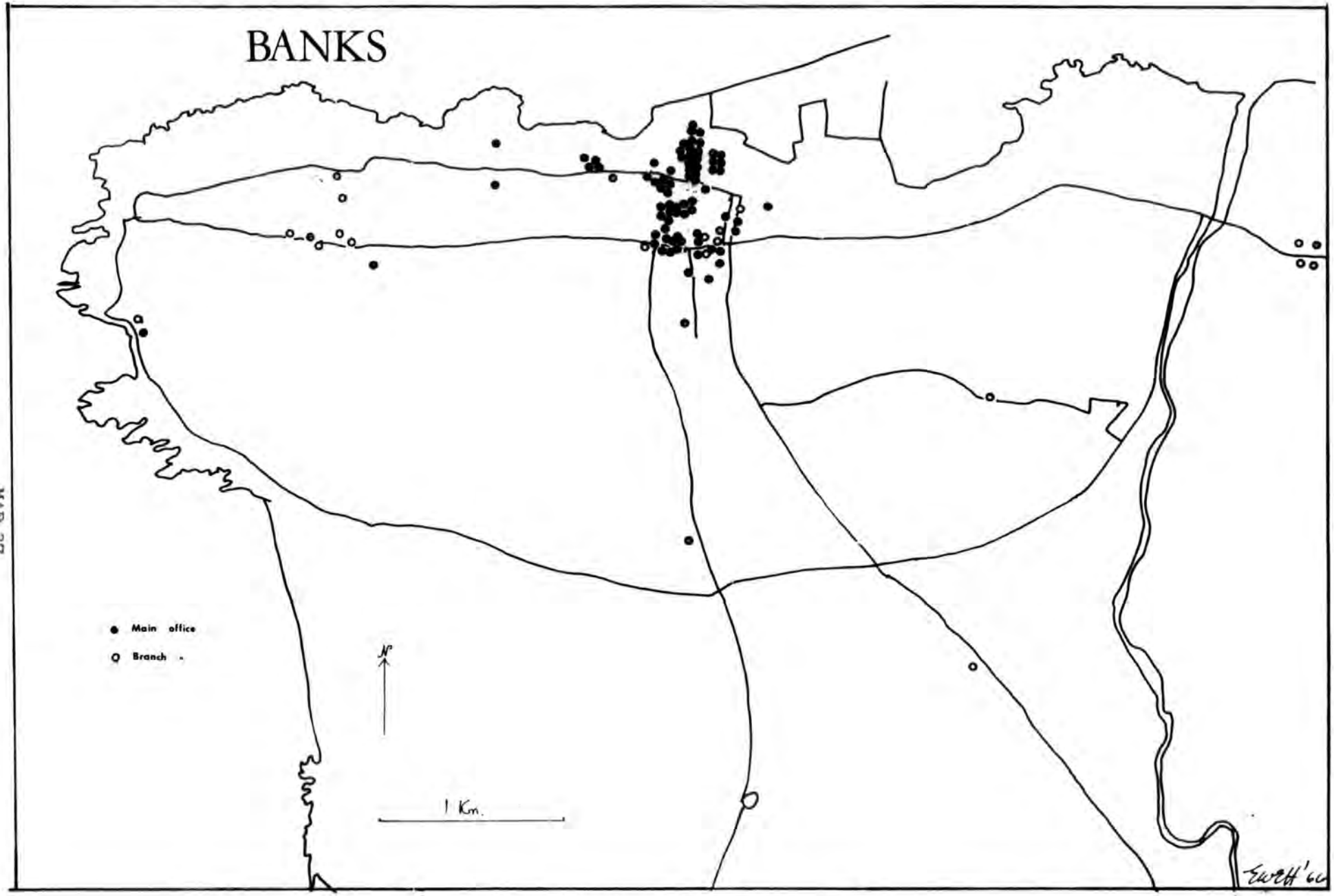
Very few offices are found outside the central area and the Ras Beirut sub-centre. Only areas 1 and 9, important tourist centres, and area 7 have more than one travel agent or taxi company. Within sub-centre B, most of the offices are concentrated along Rue Hamra, where the prices of the various trips offered are widely advertised.

Within the central area, taxi companies and travel agents are found mainly in Rue Allenby, Rue Foch, Rue Riad Solh and Place Riad Solh. There is also a marked concentration in Rue Bechara el Khoury (VI). Very few airline offices are found outside the central area, and these are always branch offices. Since a prestige position is important, the airline offices in the centre are situated in the main banking and business streets, Riad Solh, Jouvenel, Foch and Allenby.

Of the banks plotted on map 37, a large number are Lebanese owned, with capital assets ranging from 2 to 30 million lira. The rest are Area Branches of foreign banks such as the Banco di Roma, British Bank of the Middle East etc.

There are very few banks in the mid-city and suburban areas, but centres 1, 9, 25, 41, 54 and 60 have small branch offices. The Ras Beirut sub-centre B has several branch banks and two head offices.

BANKS



MAP 37

This is indicative both of the increasing number of business firms located here and of a residential market increasingly orientated towards the use of banking facilities.

The head offices of most banks were originally all in Rue Allenby, where they were in close proximity to the port and free trade zone and the associated commercial activities. After the demolition of the suqs in the western part of the central area, Rue Riad Solh and Rue Jouvenel gained increasing prestige as large new buildings were erected, and a marked concentration of banks appeared in this area. Of the banks situated in Rue Emir Bechir and around the Borj, 50% are branch offices and probablk located there in response to the needs of retail establishments and their customers.

Doctor's* establishments vary from a single room attached to the residences of G.P.'s to quite elaborate clinics and small hospitals. Sometimes a practice is run in partnership with another doctor, but in keeping with the Lebanese tradition of independence most are individually run with the assistance of administrators and nurses.

The distribution of doctors, next to that of grocers provides the most fine grained pattern of all the various retail and business establishments. In a very few areas is any significant proportion of the population more than ½km. from a doctor. Rather surprisingly in N.W. European terms, only 1% of doctors are dispersed, the rest being

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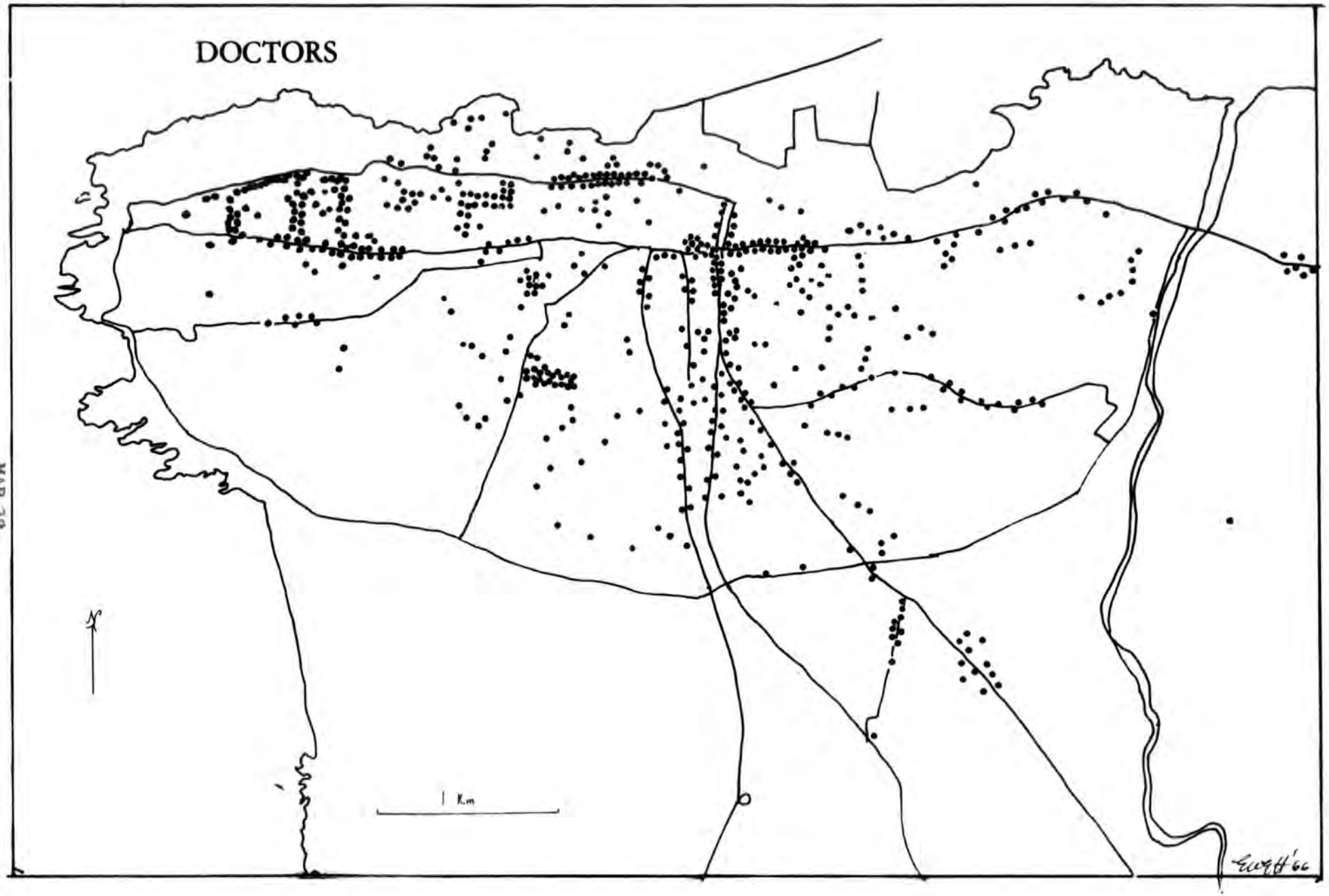
* Map 38

DOCTORS



MAP 38

located in association with other services in centres. However this appears to be the usual N. American tendency and the pattern would seem to be developing along similar lines in some other Middle Eastern cities.* Of the mid-city and suburban centres, only the very newest residential areas e.g. centres 1 and 27, have no doctors. Otherwise they are represented in most centres with 10 and 11 having overwhelmingly the densest concentrations. These are both centres for important residential areas, but even more important are also in close proximtiy to the largest hospital in Beirut, the American University Hospital, where many of the doctors receive their training.

There is a large number of doctors in sub-centre B, including a high percentage of specialists such as obstetricians, orthopaedists etc. The pattern throughout the city shows a direct relationship between high income populations and the incidence of doctors. There is no equivalent to a National Health Service in Lebanon, so medical attention must be paid for. Since many young doctors in addition to a natural wish for a high standard of living, must repay their families which had struggled to provide their education, there is intense competition for wealthy clients.

The central area nucleus has relatively few doctors, but there are intensive concentrations in some of the central business streets,**

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* E.g. Tehran and Ankara. H. Bowen-Jones.
** Also in Tehran and Ankara. See note above.

notably Ib, VI and VII. These provide slightly cheaper sites than in the actual central area, but are nevertheless accessible to a city-wide range of potential patients. Here as in sub-centre B there is a high percentage of specialists which other areas in the city are unable to support.

SERVICES.

Men's hairdressers* may be tiny cubicles along main streets, or quite large establishments with several assistants where a number of customers can be attended to at the same time. Most barbers do a steady trade in daily shaving as well as hair-cutting. Women's hairdressers are often combined with beauty salons selling cosmetics. Nearly all are owned and operated by men, usually fairly young, and any assistants are also male. Some are quite small establishments, but the great majority have electric hairdryers and modernised plumbing. Some of the most enterprising salon proprietors visit Paris or Rome from time to time in search of the latest trends to impart to the fashion-hungry Lebanese women and to impress foreign clients.

Most of the mid-city and suburban centres have a hairdressing establishment of some kind. Twenty centres have both men's and women's hairdressers, nine have men's only and eight have women's only. It is noticeable that those areas having only men's hairdressers tend to serve the more conservative muslim areas. The centres with only women's

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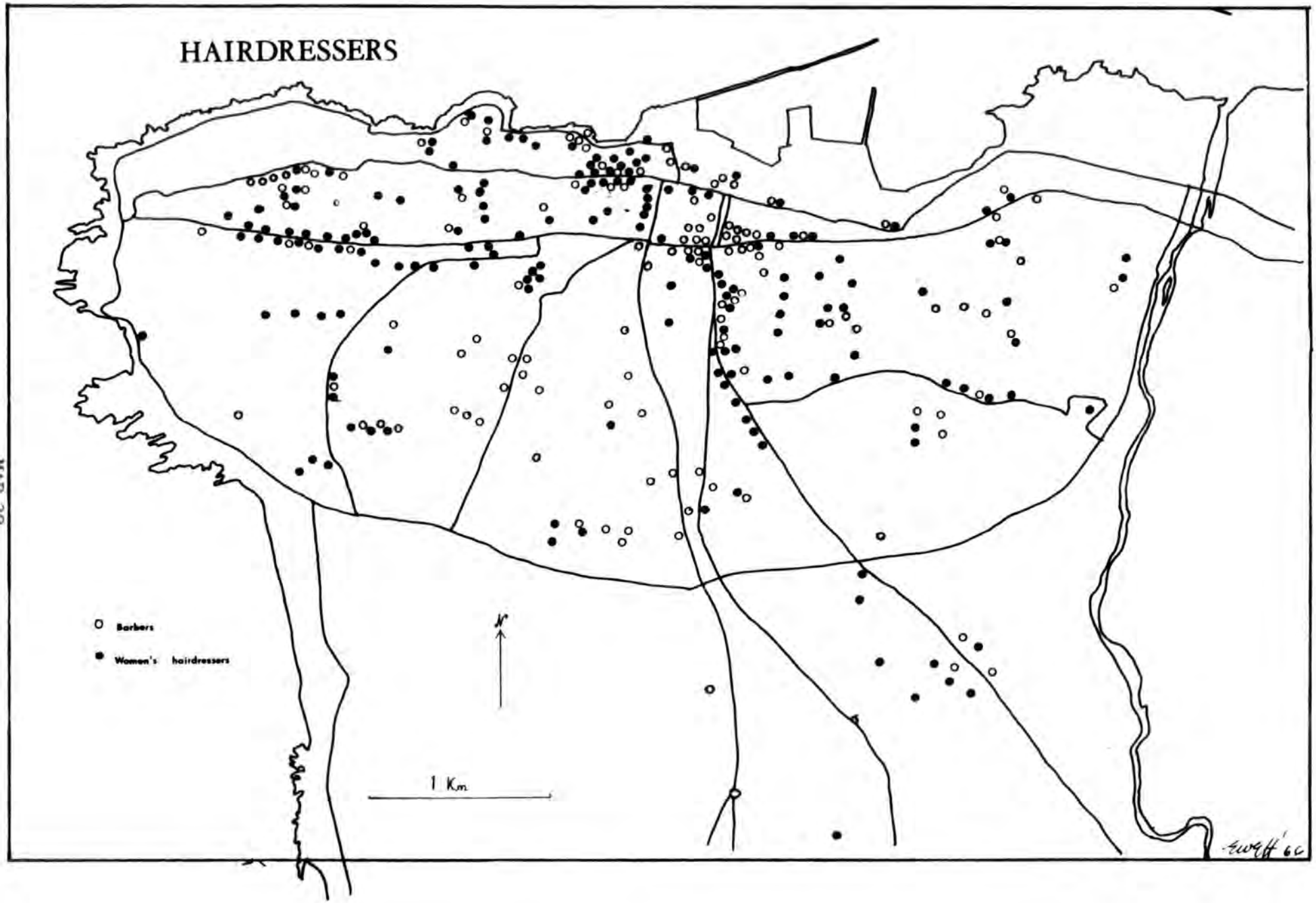
* Map 39

HAIRDRESSERS



MAP 39

are usually in the newest residential areas and in the long established high income areas between the central area and Achrafieh and Ras Beirut. The centres of the latter area in fact have the highest numbers of hairdressers of any centre, centre 10 ranking(1)for hairdressers and centre 11 ranking(2.)

The Ras Beirut sub-centre B has large numbers of both men's and women's hairdressers, concentrated mainly along the main shopping streets, Hamra and Bliss.

There is a marked dichotomy between the locations of men's and of women's hairdressers in the central area. Women's hairdressers are established in business street Ib and at Bab Idress, that is at that end of the central area stretching towards the highly modernised, high income, western orientated areas of Ras Beirut. Men's hairdressers on the other hand are located at the opposite end of the central area in Rue Emir Bechir, Rue Nahr and behind the Borj, particularly in the Red Light Quarter just to the east.

Although laundries, dyers and cleaners* are plotted on the same map they have in fact rather different siting requirements. Dyers, which cope both with the dying of threads and with woven cloth, prefer to be fairly near to the central area cloth markets, but cannot afford the high rents paid by rapid turnover establishments. Consequently nearly all the dyeworks are situated in the areas peripheral to the main

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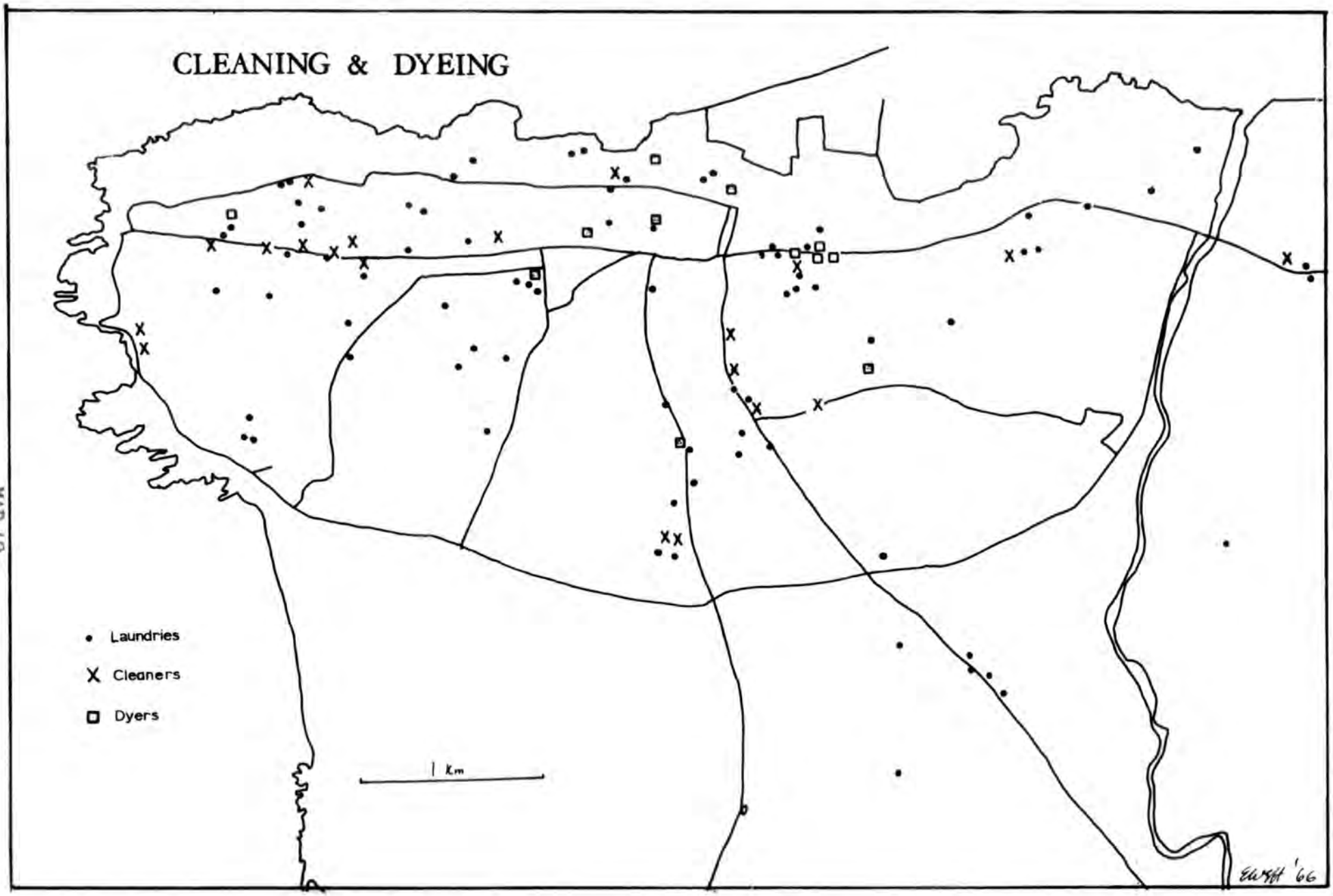
* Map 40


CLEANING & DYEING
Laundries
Cleaners
Dyers
1 Km
MAP 40

commercial centre. Only four are sited elsewhere in the city. Laundries are distributed throughout the residential areas. They are represented in many of the mid-city and suburban centres where they are mostly small, family concerns coping with the requirements of the immediate vicinity. There are very few of the large, factory style laundries typical of Britain. The sub-centre B has a number of laundries, but there are very few in the central area.

Dry-cleaners need a wider market than can generally be provided by a single neighbourhood. Consequently virtually all the dry-cleaners are located in the centres along the main routeways where they are more readily accessible to a larger number of customers. Sub-centre B has the largest concentration of dry-cleaners in the city. This is largely due to the existence there of a market conditioned to mechanised dry-cleaning. As with laundries, few dry-cleaners are found in the central area. Both are in fact very much neighbourhood functions in Beirut, and obviously to carry a bundle of clothing jammed in a taxi and then along the crowded pavements of the central area is not an attractive proposition.

HOTELS.

The establishments in the hotel category vary from small pensions with a few beds and a tarrif often less than 5 - 7 lira a night, to vast, luxury hotels with air-conditioning, swimming pools, restaurants etc. which may charge anything up to 100 lira per night.

Very few hotels* are found outside the central area and sub-centre B. The exceptions are a number along the coast of Ras Beirut and in centre 9, an important tourist area. Prices of accommodation are generally high in this centre, where are situated the two most expensive hotels in the city, the Phoenicia and the St. Georges. Centre 1 is becoming increasingly important for tourism, and two large luxury hotels were being built there in spring 1964.

The hotels in the Ras Beirut sub-centre are not on the whole in the luxury class, but are still expensive, modern establishments catering for the tourist and for Western business men staying for longer periods.

In the central area, hotels are concentrated mainly in the Avenue des Francais, (Ia) where they are some of the oldest establishments in the city, and round the Borj, where small, cheap hotels cater mainly for a non-western clientele.

AMUSEMENTS.

The distribution of various sorts of entertainment** establishments is rather similar to that of hotels. The main concentrations are centre 1, centre 9 coterminous with business street 1a, and the south end of the Borj. In addition there is a liberal scattering through the Ras Beirut sub-centre B. One or two cinemas are

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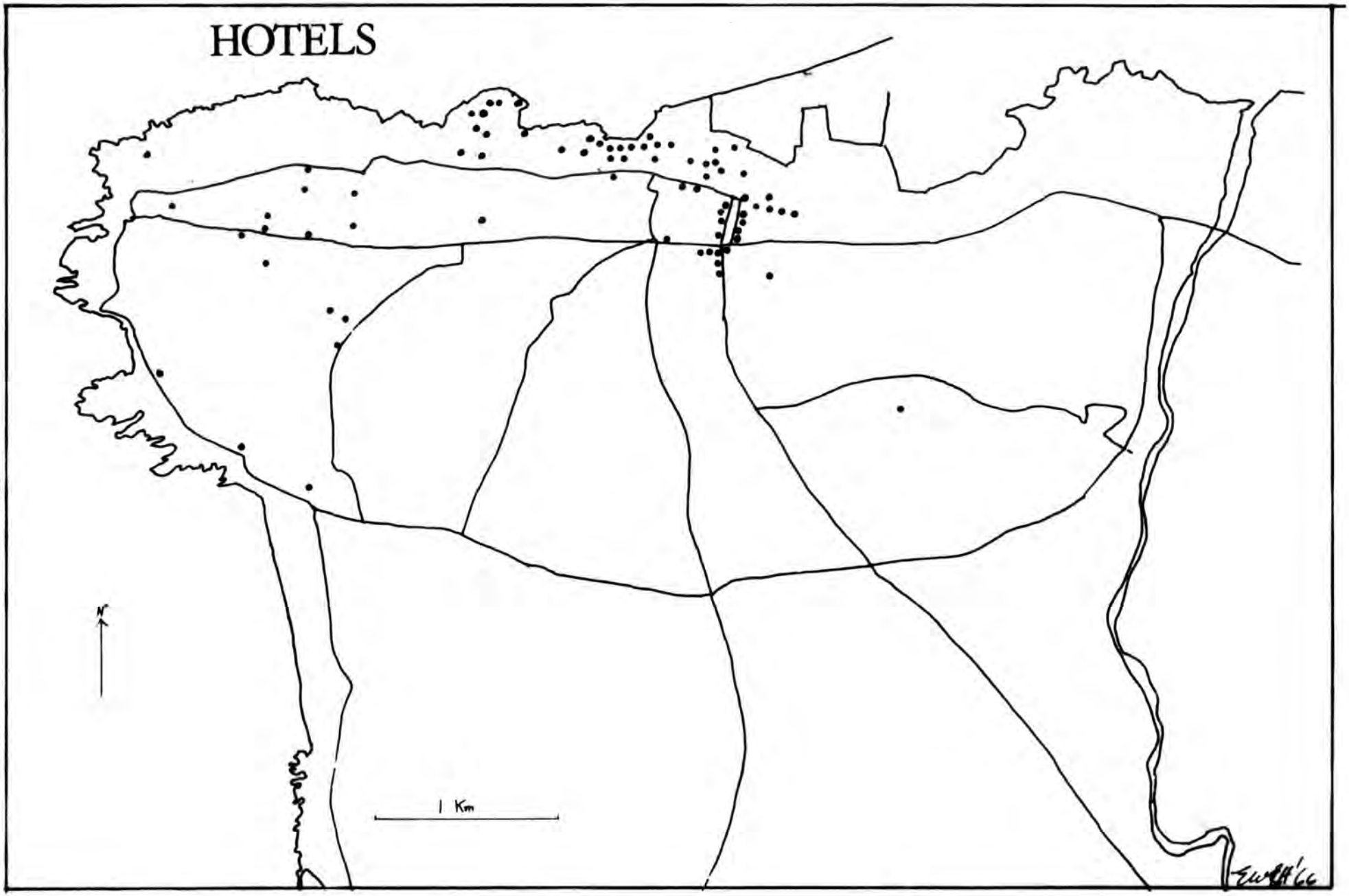
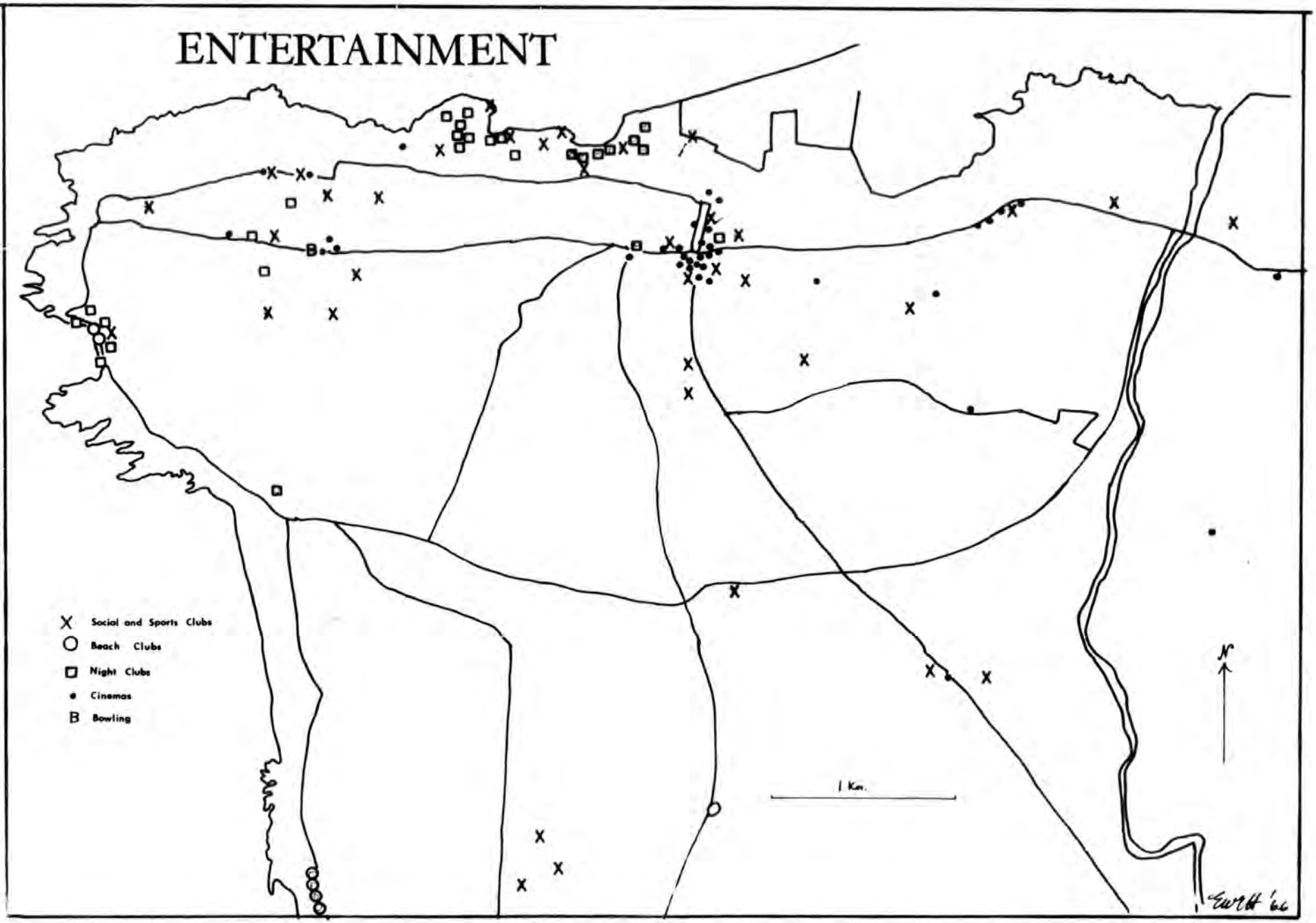
* Map 41
** Map 42

HOTELS



MAP 41

ENTERTAINMENT



MAP 42

located in the mid-city and suburban areas, mainly in Achrafieh and in the important suburban centres of Furn el Chebbak, centre 41, Senn el Fil, centre 56, and Borj Hammoud, centre 60. A number of clubs, notably sporting clubs are in peripheral situations, otherwise all the entertainment facilities are in the concentrations cited above.

Sub-centre B, which also boasts the only bowling alley in the city, has very modern, air-conditioned cinemas which show programmes composed almost entirely of western films. The central area cinemas on the other hand, have a much higher percentage of arabic films and generally cater to a less sophisticated audience. In both areas clubs and cinemas suffer a considerable decrease in attendance figures in the summer due to summer migration. The entertainment facilities in centres 1 and 9 do not suffer from this phenomenon to the same extent since they cater mainly for tourists and depend less on the custom of the resident population.

EDUCATION.

Educational institutes* are important inductive services, and since in Beirut many of them are profit making organisations, it was felt that they should be included in this assessment. They are divided into primary schools, secondary schools and specialised colleges, and universities. Although a number in each category are state owned, many educational establishments are sectarian and have a strong religious basis.

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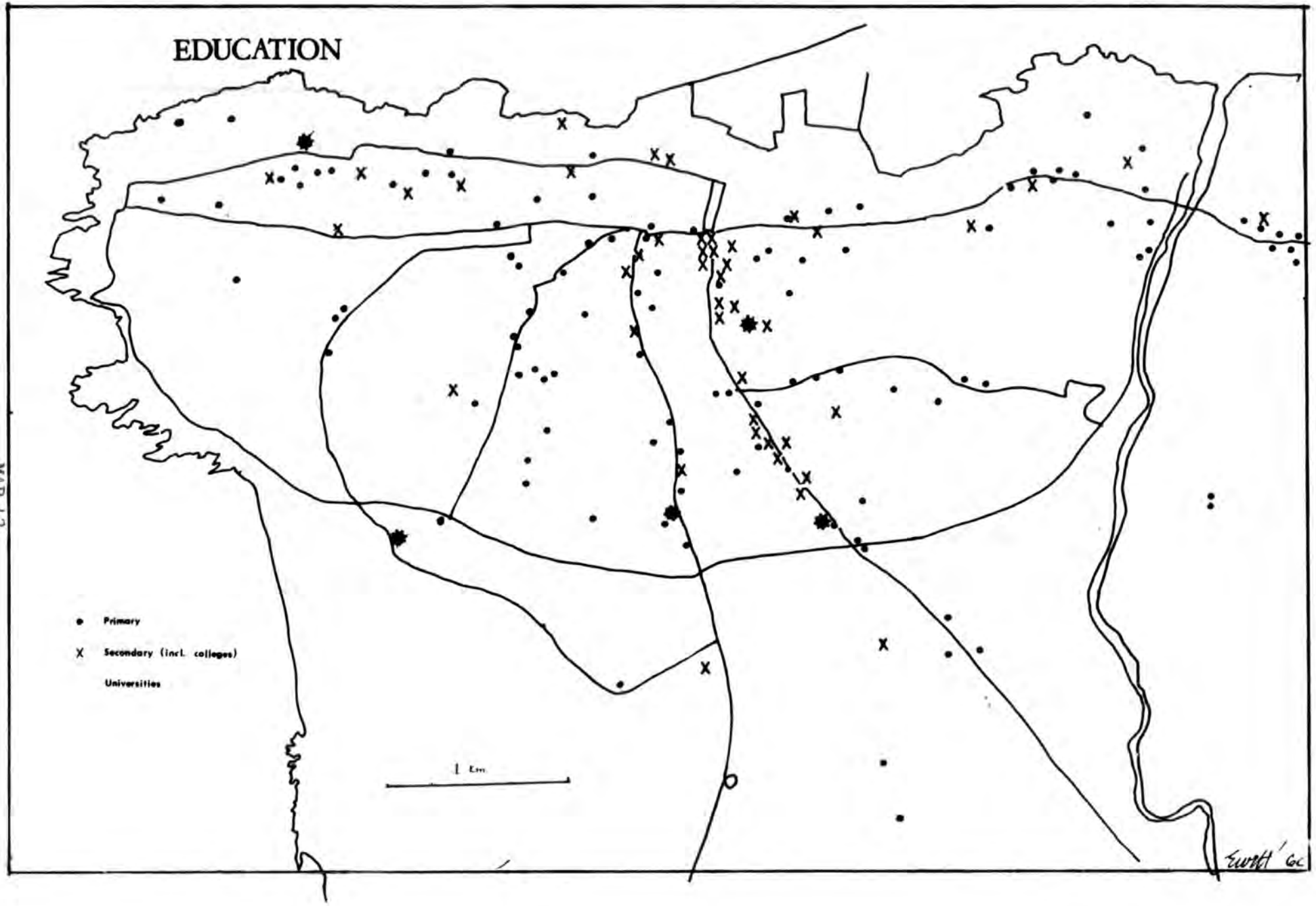
* Map 43

EDUCATION



MAP 43

This may partly account for the unusual distribution pattern. Many educational establishments are situated along the main routeways instead of being located centrally within the main residential areas. This renders them more accessible to pupils from all over the city who attend the establishment run by their own sect rather than simply the nearest to their place of residence. If it were possible to map "journey to school or college" for Beirut, it would show an incredibly complex pattern of interlacing and opposing movements.

The universities themselves are not as central as might be expected. The American University was founded in the 1860's on a large tract of land on Ras Beirut. Not only did it remain firmly ensconced on this peripheral site but it became a focal point in the development of a strongly western-oriented residential and commercial area. The Lebanese national University has virtually no alternative to a peripheral site since it was founded relatively recently, by which time land nearer the centre was no longer available in large enough tracts to build a University.

From the preceding descriptions of individual commercial categories it is apparent that the different mid-city and suburban centres vary considerably in size and composition. "Size" here refers simply to the number of establishments plotted for a given centre. Areal extent and consequently retail density or percentage of business footage are not considered since the directory plotting method does not give exact

locations within a street. Nor, for similar reasons of lack of sophisticated data, could the field of influence of a given centre be ascertained, though careful consideration was given to the possibility of applying Huff's* model for determining consumer possibility:

$$P(cij) = \frac{Sj}{\frac{Tij}{\sum_{j=1}^{n} \frac{Sj}{Tij}}}$$

where $P(cij)$ = the probability of a consumer at a given point of origin i travelling to a given shopping centre j

Sj = the square footage of selling space devoted to the sale of a particular class of goods by shopping centre j

Tij = the travel time involved in getting from a consumer's travel base i to shopping centre j

λ = a parameter estimate to reflect the effect of travel time on various kinds of shopping trips appropriate to the type of product class.

Sj could be represented by a figure representing the multiplication of a chosen unit by the number of establishments within the category in the centre, since the floor area of establishments in the centres 1 - 60 is fairly similar. However Tij could only be estimated very approximately due to the present lack of "travel habit" data for Beirut. The

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24. * Huff, D.L. A Probabilistic Analysis of Shopping Centre Trade Areas. Land Economics. Feb. 1963.

inevitable inaccuracies in the resulting pattern would parody the use of a mathematical formula. A simple method of ranking of centres was therefore used and the results plotted in tabular and cartographic form.*

The scatter of shopping centres shown on these maps indicates a high frequency (interval 200 - 400 metres) immediately to the south and to the S.E. of the central area, in what are in fact some of the oldest established residential areas. They occur least frequently (interval more than 600 metres) towards the S.W. periphery and in the slum and shack quarter of Quarantina in the N.E. In the latter case this is certainly only an apparent lack. Service facilities certainly exist there but on too small a scale to appear in directory entries and consist not only of very small permanent stalls but also of itinerant hawkers and pedlars.

The ranking of centres according to the number of business establishments (i.e. all services previously discussed) is shown on map 44. The largest centres by this criterion are situated in three main types of location:

a. Along major routeways, 41 (2) 51 (4), 33 (9) 40 (1)

b. Between the town centre and Ras Beirut, 9 (6) 10 (3), 11 (5)

c. In the still developing parts of Achrafieh, 45 (8) 50 (7).

Map 45 shows the importance of centres according to both size and variety of service offered. For this was applied the simple

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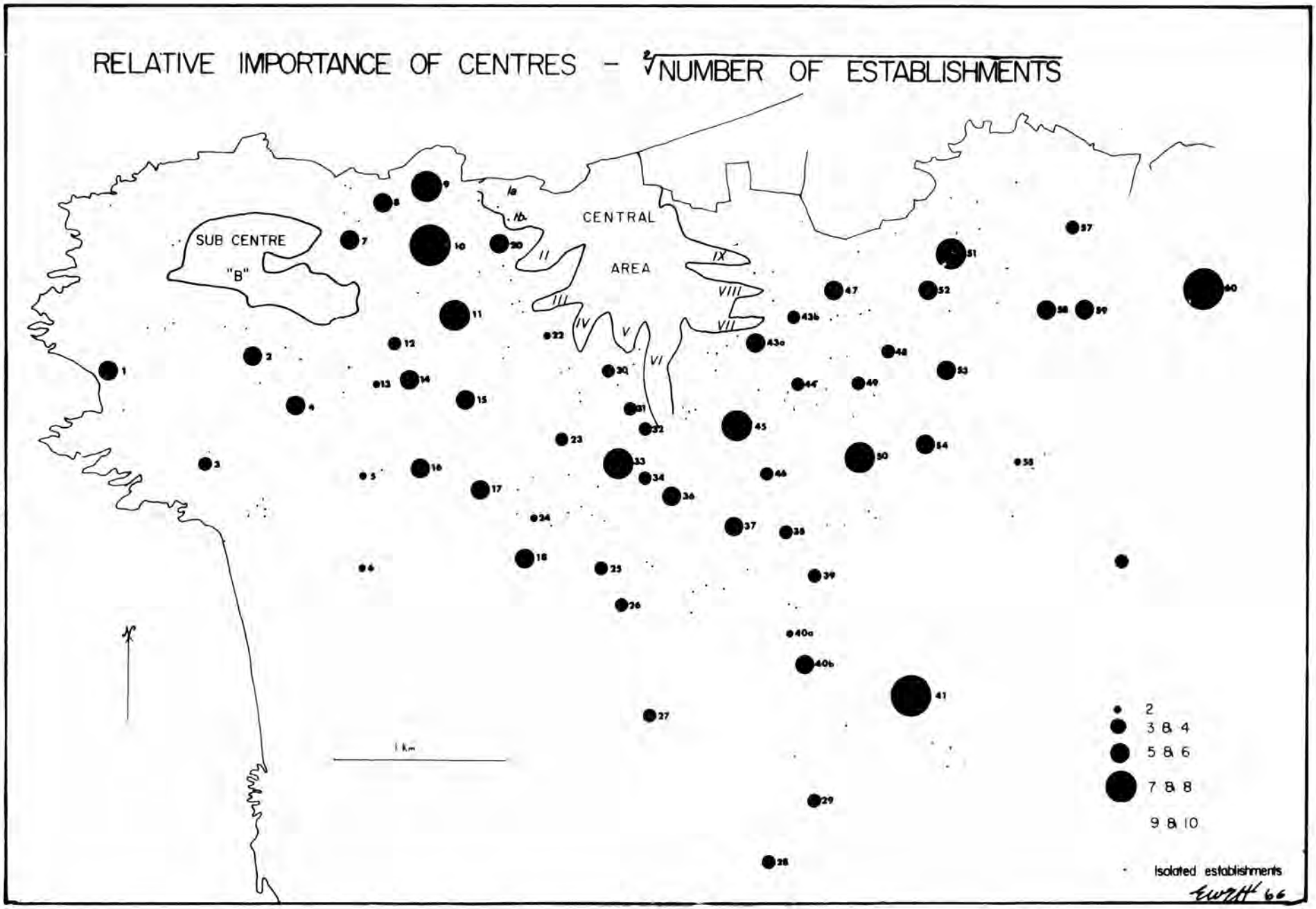
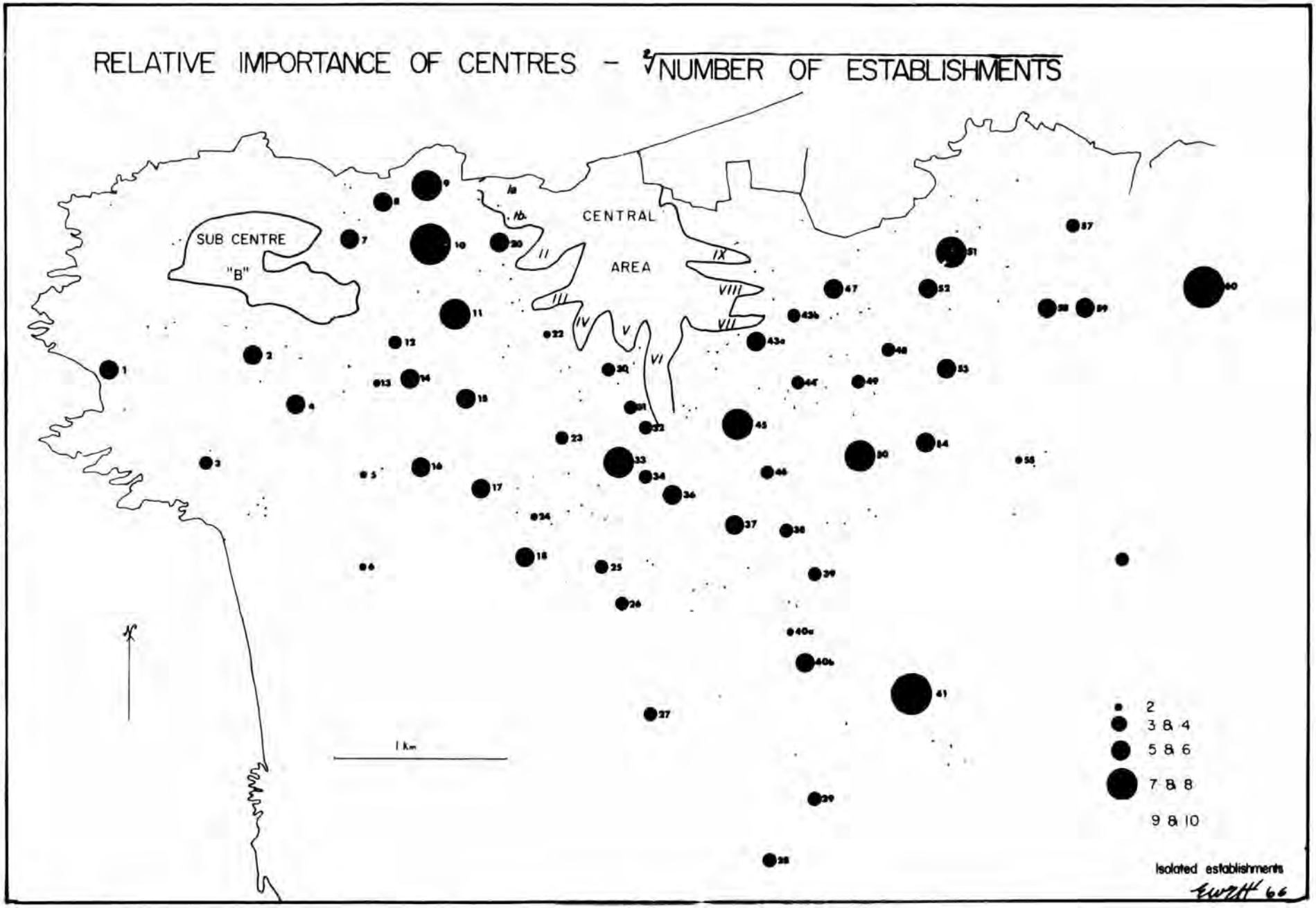
* Maps 44, 45 Also Appendix 11


RELATIVE IMPORTANCE OF CENTRES - $\sqrt[2]{\text{NUMBER OF ESTABLISHMENTS}}$
SUB CENTRE "B"
CENTRAL AREA
I
Ia
Ib
II
III
IV
V
VI
VII
VIII
IX
1 km
2
3 & 4
5 & 6
7 & 8
9 & 10
Isolated establishments
EWJH '66

MAP 111


RELATIVE IMPORTANCE OF CENTRES - $\sqrt[2]{\text{NUMBER OF ESTABLISHMENTS}}$
CENTRAL
AREA
SUB CENTRE
"B"
I
II
III
IV
V
VI
VII
VIII
IX
1 km
2
3 & 4
5 & 6
7 & 8
9 & 10
Isolated establishments
EWHH 66

MAP 45

formula;

$$R = \sum_{y} (x.w)$$

where R = rating of service centre

y = any given service centre

x = number of establishments of a specific business category in centre y

w = weighting according to the business category

The most important centres seemed to be;

a. the main routeway centres, 33 (8), 41 (2), 51 (5), 60 (3)

b. the centres between the central area and sub-centre B, 10 (4), 11 (6)

c. centres in densely populated residential areas, 2 (10), 45 (8), 47 (10)

Differences in the importance of the centres according to the method of ranking are shown in detail on table 11 *. There are however a number of cases where the magnitude of the difference warrants special emphasis. One of the most marked is centre 1 which ranks considerably higher for R (7) than for the number of establishments (26). This is mainly due to the fact that this centre is catering to a specialist tourist market, ranking high for restaurants (2) entertainments (1), hotels (3), banks (2), offices (3) but low for grocers (25), bakers (34) butchers (35), schools (36) hairdressers (30), clothing (31), automotive (42) and furniture (32). For a similar reason centre 9 ranks high (1) for R but low for number of establishments (6), being especially low in

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* Appendix 11

grocers (33), bakers (27) and primary schools.

Area 16, with a greater number (22) than variety (R = 32), ranks high for bakers (1), quite high for grocers (11) and low for everything else. Centre 53 follows a similar pattern with bakers (3), butchers (7) and furniture (7) high, and the rest low. Centre 30 is at the opposite extreme, ranking high for printers (1) but low for everything else.

Overall the ranking of retail services in the mid-city and suburban centres in Beirut is as follows;

Grocers 1	Doctors 2	Automotive 3
Butchers 4 (7)	Clothing 5	Primary Schools 6
Furniture 7	Bakers 8 (7)	Women's hairdressers - 9 (7)
Restaurants 10 (3)*	Men's hairdressers 11 (10)	Laundries etc. 12 (3)
Pharmacies 13	Printers 14	Bookstores 15 (3)
Entertainment 16 (10)	Sec. Education 17	Banks 18
Offices 19	Hotels 20	

Some equivalents estimated for "unplanned shopping centres" in American cities are shown in brackets.**

The only service not represented in the Ras Beirut sub-centre is that of printing. It is this wide variety together with sheer number of establishments which entitles centre B to special consideration as a major sub-centre rather than a district service centre. Within the area certain

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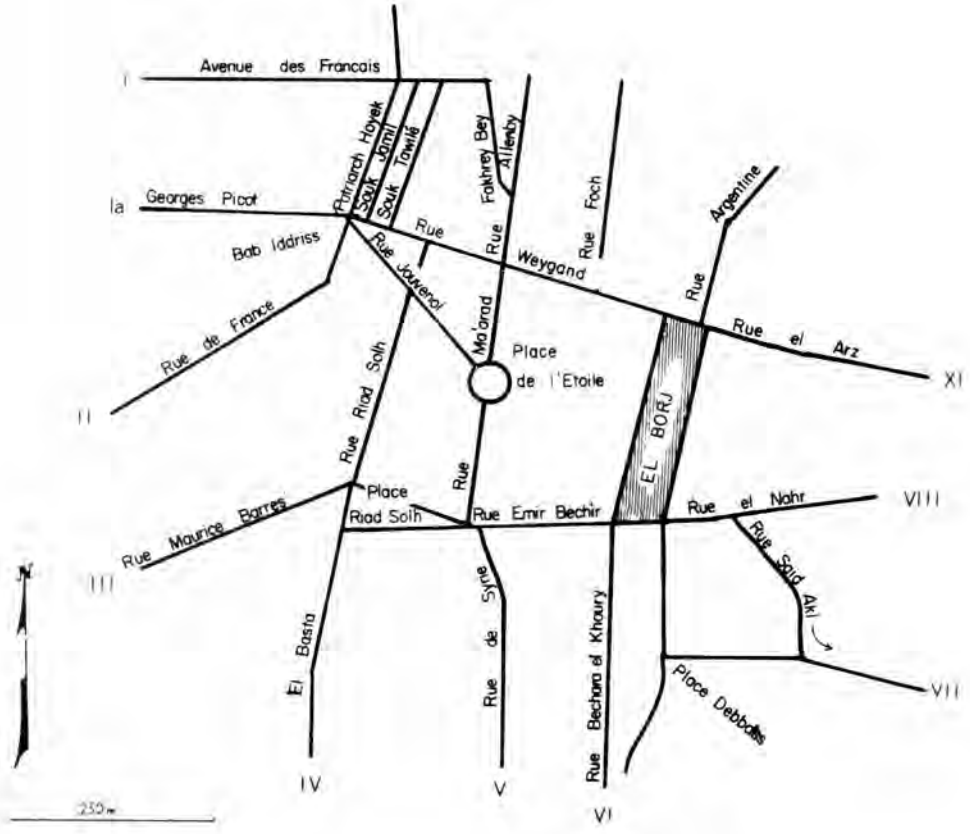
* Drugstores are included here.
** Berry, Garrison, et al "Studies of Highway Development and Changes.

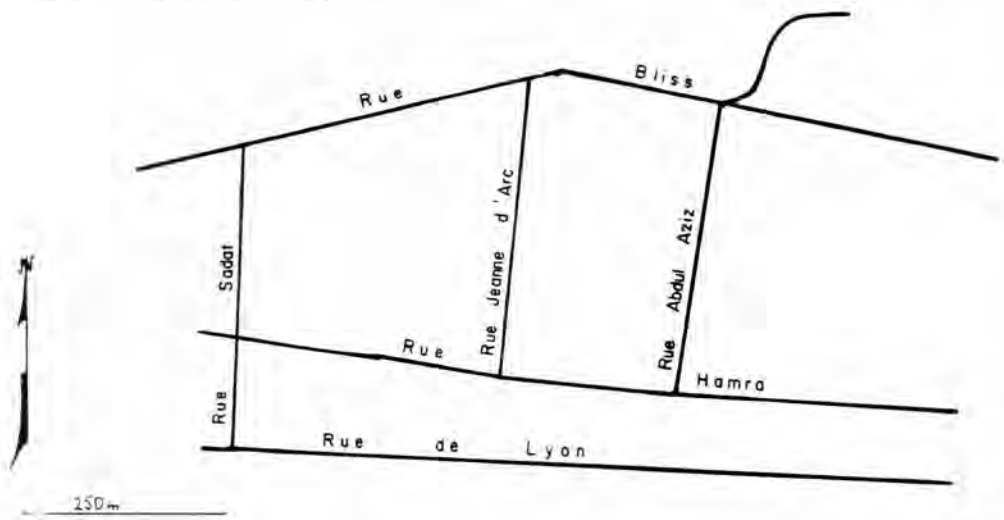
services tend to concentrate in specific streets. This is especially noticeable in the case of clothing establishments, 80% of which locate in Rue Hamra. Hamra also contains concentrations of grocers, restaurants, furniture stores, offices, women's hairdressers, cleaners, banks, hotels and entertainments, and it is in fact apparent that this street forms the business artery of the sub-centre. Running parallel, to the north, is Rue Bliss, the next most important business street in the area, with especially large numbers of restaurants, doctors, book-stores, men's hairdressers and entertainments. The types of service offered in this street are greatly influenced by its proximity to the American University which lies along the northern side of the street. Of the other streets in the sub-centre, Rue Jeanne d'Arc has a large number of both restaurants and doctors, which latter also tend to concentrate in Abdul Aziz and Sidani. The remaining streets are not specialised but form link roads between the main streets and carry a number of stores stocking daily requirements such as grocers, bakers etc.

In the central commercial area, the central business district 1.A (discussed later), is composed of blocks of buildings almost entirely non-residential in character. In contrast the central business streets (I - IX Map 46) are separated by buildings of which a marked percentage are residential ----- Superficial examination would suggest that these latter are merely linear extensions of the nucleus but an examination of establishment groups shows that they possess characteristics which

CENTRAL AREA AND BUSINESS STREETS I TO IX



SUB-CENTRE "B"



MAP 46

distinguish them from the nucleus proper, and hence require a separate discussion.

Bechara el Khoury (VI) ranks first both for number and variety (R) of establishments, and in fact for no type of service does it rank less than 3. Rue Georges Picot 1b has a similarly wide variety (R = 1) of services but the actual number of establishments is lower (2). Rankings of individual services may be lower in this area, for example furniture ranks 9 and printers rank 6. It is noteable that both area 1b and area VI estend along routes linking the centre to important residential areas. That of which Bechara el Khoury is part is in fact one of the main commuter routes for traffic from the outer suburbs and the mountain villages.

Rue el Nahr ranks high for number of establishments (3), but offers less variety (R = 4), mainly due to a lack of travel and taxi offices, banks and hotels. This area too lies astride an important arterial routeway.

Rue el Arz (IX) ranks medium low for variety (R = 6) but lower for number of establishments, having no banks, hotels or bookstores and very few doctors. For a similar reason area VII also ranks medium low, (number = 6, R = 7).

Area 1a ranks low for number of establishments (6), but the variety (R = 3) is boosted by large numbers of hotels (1), restaurants (1) and entertainments (1). Area V also has a large number of establishments (4) relative to the variety (R = 5), ranking high for

printers (1), booksellers (1) but having no banks, clothing stores, hairdressers, cleaners, hotels or entertainments.

Areas II, III and IV rank low for both number and variety, with III and IV extending into a zone of marked debilitation. However certain services do tend to concentrate in these areas, noteably printers, clothing stores, bookstores and pharmacies.

Summarising the composition of the central business streets, it might be said that 1b and VI are high-quality, high-cost specialised streets drawing customers from a city-wide market, VII, IX and V depend more heavily on passing traffic, both pedestrian and vehicular, and 1a caters to a high percentage of tourists. The other central business streets tend to act more as centres for neighbouring residential areas than as specialised central area streets.

The C.B.D., as functioning within a western city, tends to have a variegated selection of high-turnover business, such as multiple stores, women's apparel, drug and cigar stores, fanning out from a peak land value intersection. In Beirut there are no large scale department stores, and instead of composite clustering, certain types of business tend to become concentrated in specific localities within the central area so that distinct patterns of areal differentiation occur. Thus although Rue Allenby has a high number of establishments (2) the variety is limited (R = 16). It ranks high for both offices (1) and banks (1), but is void in virtually everything else. Similarly Rue Riad Solh ranks (2) for offices and (3) for banks, (R = 13), Rue Foch (R = 12) ranks 4 for banks,

6 for offices and 3 for restaurants, and Rue Jouvenel also ranks high for offices and banks. These four streets compose the main bank-and-office business areas, and are not so important for retailing. Rue Patriarch Hoyek ranks high for furniture and offices, and since Bab Idriss and Suq Jamil also rank high for furniture stores this may be termed the main "furniture area". Partially coinciding with this is the area most noted for clothing stores in Rue Jouvenel, Rue Fakry Bey, Suq Jamil and Suq Tawileh. Rue Argentine, Suq Abou Nassr and some of the other suqs* have high concentrations of food stores such as grocers and butchers. N. part of Rue Maarad and the Place de l'Etoile form a mainly "literature" area, ranking high for bookstores and printers.

Although this pattern, inherited directly through the suq system, is still very marked, a breakdown is becoming apparent in some of the mainstreets such as Rue Weygand, Rue Emir Bechir, Place Riad Solh and the Borj. Here the concept of "highest and best use" is unconsciously being adapted, and a variegated pattern of high-price establishments is appearing. In the Borj, for example, ranking first for both number and variety (R) of establishments, nearly all services are represented, with hotels (1), entertainments (2), men's hairdressers (2), pharmacies (2), automotive (2) doctors (1) and furniture (3) all ranking high. In Rue Patriarch only men's hairdressers, pharmacies, banks, cleaners and entertainments are missing, though the large number of furntiure stores

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* As previously explained, the suqs cannot be adequately represented by this method of analysis as they do not advertise.

draws this street partly within the "furniture area". Weygand has furniture stores, cleaners and men's hairdressers missing; Rue Emir Bechir has no furniture stores, cleaners or women's hairdressers. It will be noted that the services absent from these streets are those usually missing in the peak land values areas of the western C.B.D.

CONCLUSION Although this study has by no means fully unravelled the complexity of business and retailing patterns in Beirut, it is sufficiently detailed to permit some general interpretation in summary.

The most obvious phenomenon is the grouping of business functions in nucleated centres throughout the mid-city and suburban areas. These vary in size from the small street corner group of groceries to lengthy commercial ribbon developments with up to ten or eleven types of establishment and several examples of some categories. The overall pattern* of these centres shows no very definite trends in terms of size/distance spacing. In other words, one area may contain two large multi-functional centres while another may be virtually void of facilities save for an isolated grocery or workshop. Nowhere is this more marked than in the contrast between the area located between the centre and Ras Beirut and the newly expanding suburbs of the south. The former area has three of the largest centres in Beirut (Nos. 9, 10, 11). The latter, apart from the old village centre of Furn el Chebak, has very few centres of any size. Looking at the map showing size of centres by "R"**, there appears

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* See map 44
** See map 45

some slight trend towards concentric grouping. There is a semi-circle of larger centres roughly 1 km. from the heart of the central area, and at the periphery of the Municipality there are several more large centres. Between lies a scattering of smaller centres. The grouping is however too nebulous to justify the erection of theories to account for ;it.

The very existence of these centres in Beirut is something of a surprise. Although the western urbanite has long been accustomed to the existence of planned and un-planned shopping centres in mid-city and suburban areas, it is customary to think of Middle Eastern towns in terms of central area sūqs. These theoretically supply most needs of the town's inhabitants, while street vendors with barrows ply residential streets offering additional vegetables, fruits, nuts, breads, etc.

An area which markedly affects retailing patterns in Beirut is sub-centre B, the important business district of Ras Beirut. Here are found functions usually restricted to the city centre, such as taxi companies, airline offices, "haute couture" boutiques, specialist food stores and so on. This centre is so important that a bi-polar force of attraction exists in the city, with movements both towards the downtown area and to Ras Beirut from all parts of the city.

The central business area itself has some interesting characteristics, due to the partial mutation of traditional Arab phenomena resulting from increasing western orientation. For example, a non-western pattern of areal specialisation within the centre, epitomized by the sūqs, is being superimposed on the new high value, prestige thorough-

-fares. Thus, though the enclosed sūqs are being replaced by main business streets.

This suggestion of bi-culturalism is further substantiated in the distribution of certain categories of retail functions. Large concentrations of bakers, grocers and butchers, not usually considered typical of the central area in the European or N. American city, are inherent features of the central business area of Beirut. On the other hand, these functions are also found in the mid-city and suburban areas of the city, their usual location in Western terms, so that the distribution pattern is partially Western and partially non-Western. The same dichotomy can be seen in the distribution of furniture stores and couturiers. These are found in a considerable number of centres in residential areas of Beirut, while in western cities they are usually largely confined to the central area.

The size "R" of centres is considerably affected by the touristic function of the area. Thus a centre with no particularly large hinterland may offer a wide variety of services stimulated by the demands of foreign tourists, for example centres 10 and 14.

Of the many dangers inherent in attempting an interpretation of business patterns in Beirut, one, which must be borne constantly in mind pervades the whole retail structure. This is the lack, except in a very few individual cases, of locational planning based on surveyed or even estimated customer potential. It is thus unwise to assume that stores are necessarily sited to supply demand, since both tradition and local prestige are influential in determining location.

THE URBAN GEOGRAPHY OF BEIRUT - CONCLUSION

During the course of this study, it has become apparent that while a fine grained spatial pattern is not visible in Beirut, there is a blurred but extant general pattern. Within this pattern certain features stand out both as spatial phenomena in themselves, and as mobilising factors influencing the whole pattern throughout the city.

The central area may be described in such terms. With its exceptionally high land values and predominantly commercial useage, not only is it a distinct areal unity in terms of socio-economic land use and function, but it influences the spatial patterns of virtually the whole city. Centro-peripheral areas decline in residential prestige because of their proximity to the noise and bustle of the centre. Specialist, space consuming functions such as printers, dyers, automobile retailers etc. are forced by the high land values of the central area into these centro-peripheral zones. Areas near and astride main through routes with good access to the centre gain or maintain value for residential purposes, In negative terms, lack of good communications between mid-city or suburban residential areas with the central area helps to immobilise potential consumers and encourage the development of localised retail and other facilities.

The secondary nucleus of Ras Beirut also stands out as a distinct area in terms of spatial patterns, and it too is a dominating influence within the city. It is here that the gradual dissolution of

traditional standards of prestige is most fully realised. Here are concentrations of high income, well educated groups, highly mobile, well imbued with the impersonality of western metropolitan life, which is further emphasised by adding to this a high percentage of Europeans and Americans. Families tend to be small, with the conjugal rather than the extended family being characteristic, and live at low person-per-room densities in modern multi-storey buildings for which they pay some of the highest rents in the city. Retail facilities are extensive and expensive. Virtually all wants can be supplied within the area, which specialises in the fulfillment of western orientated needs. The effect which Ras Beirut has on the rest of the city is marked and pervasive. Not only does the socio-economic pattern of peripheral areas of surrounding zones become blurred in contact with this vigorous, volatile unity, but more distant groups observe, absorb and consciously or sub-consciously struggle to imitate.

A third area which is very distinct is the "tin-shack" district of Quarantina in the north west. Originally a temporary refugee camp on the outskirts of the city, this is now engulfed by urban sprawl, with the large suburb of Borj Hammoud bounding it to the east. On nearly all the spatial distribution maps the district stands out distinctly; distinct, however in terms of unattractive rather than favourable features. Overwhelmingly the population is Armenian in origin; land values are low, and in many cases changes in land ownership is never even recorded. Income is low, educational level is low, room densities are high. Buildings are

usually one room shacks with relatively few facilities*, small gardens producing a few vegetables to supplement the diet are prevalent, and formal retail facilities are virtually non existent. This area has no obvious influence on the rest of the city, but that the city is sensitively aware of this blighted part of its landscape is undoubted. This city-wide recognition is in fact accorded to all three areas mentioned. The extent to which an individual is aware of such features as the centro-peripheral, the traditional low income area of central Mousseitbeh, the growing suburban areas of Furn el Chebbak, depends partly on where he lives. But regardless of this he recognises the distinctiveness of the central area, of Ras Beirut and of Quarantina.

Accepting that a recognisable spatial pattern does exist, it is both inevitable and necessary to attempt comparisons with western cities. The question as to whether the observable pattern is generally western or eastern is relatively straightforward. However the extremely rapid rate of change leads to confusion as to whether specific characteristics are basic eastern or superimposed western.

There are many factors which point to differences due to cultural variation. As far as land values are concerned, one factor is that in Beirut there is no marked elevation of values at important

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* A number of independant informants stated that a surprising number of shacks with no running water or sanitary facilities had television sets. This is indicative both of an attitude of mind, whereby a strong need for neighbourhood familiarity prevents movement, and also of the great lack of cheap new apartment blocks to bridge some of the gap between slum and luxury penthouse.

transects. From the socio-economic data it is obvious that ten years ago centro-peripheral areas showed quite high rents, high income, high educational levels, low densities and low mobility. This accorded well with Sjoberg's* suggestions regarding the pre-industrial city, and Ibn Khaldun's** description of the city as a place of peace and refuge. It is also the sort of pattern typical of Western cities a hundred and fifty years or more ago. It was in marked contrast to the spatial organisation common in most modern N. American and W. European cities, where the centro-peripheral zone forms the ill-famed area of debilitation and urban blight, the "twilight zone". However changes in Beirut in the last decade have proceeded at a concomittant rate, (if in a different direction) to cities of the west. Where the latter has shown an increasing desire to revitalise the central areas of its cities by providing high quality residential accommodation downtown, the erst-while gracious homes of centro-peripheral Beirut have been hastily abandoned. Some remain empty and decaying; others are invaded and overcrowded by numerous low-income families. Never the less it is to be expected that profit hungry landlords will attempt to reproduce the down-town luxury block in the near future, and it may well be that the typical western blight zone may never develop in full in Beirut.

With regard to the physical morphology of the city there is, surprisingly, more resemblance to the North American city than to the N.W. European. Predominant building types are one or two storey single unit

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* "Pre-Industrial City"

25. ** Al"Muqqadimah"

housing and expensive high-rise apartment blocks. There are some continuously built streets in the downtown area, mainly commercial, but generally the terrace and the semi-detached so pervasive in the U.K. are very uncommon. The remarkably high percentage of buildings less than 5 years old (15%) shows a current urban growth rate higher than anything in the West to-day, being more parallel to the rates obtaining in Britain and the U.S. during the first part of this century. With respect to gardens the average Beiruti appears quite indifferent. Even public gardens and parks, although regarded in the abstract as a good idea, are scarcely considered an actual necessity. The mountains are close by, the sea is near, why make work or pay extra rates by having gardens?

As far as the retail pattern is concerned, the most remarkable feature is perhaps the existence of mid-city and suburban retail centres in a distinctive pattern comparable to unplanned centres in N. America and Britain, rather than the expected dependance on the central area souks and district street vendors. The point of issue is however whether these local clusters of shops are an alien feature developing concomitantly with increasing westernisation, or whether they are perfectly normal features of the Arab urban scene with the element of surprise issuing from the imperfect aquaintance of urban geographers with Middle Eastern urban geography. An answer will only emerge when numerous studies of Middle Eastern towns have been made and collated.

The marked areal differentiation of various retail functions within the central area, very different from the large department store

complex of the western C.B.D., accords well with the normal Middle Eastern pattern originating in the sūq or bazaar. So also the fact that there are large mono-concentrations of such functions as bakers, grocers, fruiterers, butchers and so on, now alien to the western urban scene, is really an expected rather than an anomalous feature.

The central area differentiation is however showing definite signs of disintegration, paralleling the slow but irresistable erosion of the old sūqs. A number of central area streets are increasingly functioning as main shopping thoroughfares with soaring land values permitting only the most affluent firms in a variety of business categories to locate there. Smaller concerns are also affected to some extent, since they are beginning to align themselves with these high prestige streets, their relative location depending on their prosperity.

The high number of banks, at first glance exceptional is not really excessive in view of the fact that Beirut is not only a primate city, but it is the capital of a nation for which commerce and trade are the prime sustainers of the economy. Similarly the apparent super-abundance of taxi companies and travel agents is directly related to tourism, the country's next most important industry.

To the casual observer, the urban landscape of Beirut offers a rich, bewildering palimpsest of cultural influences. The burgeoning apartment blocks overshadow but have not obliterated traditional Arab buildings and orange French pantiles. The domes and spires of mosques and churches mix freely with the towers and balconies of modern hotels and office blocks. But it is increasingly obvious that the assimilation

and adoption of western patterns of urban living, and more particularly those of North America, is currently the dominating force.. That Beirut is a city in transition is indubitable. That the transition consists in a progression towards the patterns characteristic of the west is freely recognised. It is the direction from which it is emerging which is still obscure. This may be clarified when the interpretation of more methodical studies of Arab cities, especially the smaller, more remote cities, has produced a theory of Middle Eastern urban geography. Then, and only then will it be possible to talk in terms of relative degrees of Westernisation. Present interpretations can only be viewed as tentative suggestions.

APPENDIX I Table:

Building Permits Taken Out In Beirut

Year	Number of Permits	Total Floor Area m^2	Number of Floors
1945	390	107.246	626
1946	591	176.864	978
1947	572	149.456	734
1948	780	257.710	1.283
1949	780	253.729	1.263
1950	673	268.953	1.149
1951	676	234.140	1.198
1952	851	321.539	1.583
1953	798	317.681	1.536
1954	1.055	423.037	1.848
1955	1.261	642.393	3.063
1956	884	530.480	2.599
1957	846	430.929	2.221
1958	609	389.321	1.499
1959	1.083	606.230	2.934
1960	1.226	704.211	3.231
1961	982	664.845	2.987
1962	869	572.184	2.271

Source: Beirut Municipality.

APPENDIX 2 Table:

Cost of Living
(Base: 1953 = 100)

Year	Lebanon	Syria	Egypt
1950	99	88	99
1951	107	102	108
1952	107	109	107
1953	100	100	100
1954	95	92	96
1955	97	91	96
1956	102	104	98
1957	109	114	102
1958	114	109	102
1959	118	106	...
1960	122	111	103
1961	121	121	103
1962	123	...	...

Source: Bulletin Statistique Trimestriel du Liban.

APPENDIX 3 Table:

Building Permits Taken out in "Suburban" Beirut in 1962

"Suburb"	No. of Permits	Total Floor area m^2
Borj Hammoud	173	76,321
Al Chiyah	183	97,561
Al Hadeth	118	26,020
Al Dekowān	50	22,245
Al Chouaifaite	86	23,007
Borj Barajni	83	26,372
Furn Chebbak	43	24,348
Haret Hreck	77	17,055
	787	295,874
For Comparison:- Tripoli	427	184,047

Source: Lebanese Soc. for Engineers and Architects.

APPENDIX 4 Table:

Building Permits taken out in Beirut Municipality 1962 by Old French Administrative Divisions

Division	No. of Permits	Total Floor area m^2	Average Building Floor area m^2
Minet el Hosn	36	4,438	123
Zokal el Blatt	18	34,482	1,920
Bachoura	40	12,112	303
Saifi	24	1,123	46
Medawar	27	8,205	304
Achrafieh	140	99,462	710
Mazra 'a	217	154,470	703
Mousseitbeh	121	10,980	905
Ras Beirut	134	152,636	1,140
Ain Mreissé	18	11,681	647
Port	65	17,728	270

Source: Lebanese Soc. for Engineers and Architects.

APPENDIX 5 Table:

Vehicles Registered in Lebanon

	1960	1961	1962
Private Cars	43,678	53,744	62,355
Taxis	3,200	3,200	3,200
Buses	1,399	1,446	1,512
Lorries	7,079	7,915	8,849
Motorcycles	4,450	5,005	5,326

Source: Bull. Stat. Trim. Leb.

APPENDIX 6

Collection of Data for Land Values Section

The Municipality of Beirut issues permits for all construction projects within the Municipal boundaries. The lot site of each project is noted on a cadastral map together with an indication of the land value (per square metre) of the lot. Theoretically this value is arrived at objectively by the application of a formula which computes such factors as size of lot, magnitude of building, likely revenue from building and actual market value. In fact the latter factor is most heavily relied on, the evaluator being strongly influenced by the actual cost of the lot and the prices recently paid for nearby lots in the same block.

The temporal breakdown of the three periods, pre-1959, 1959-61 and 1961-64, was dictated by the term the records were in. While this limitation was rather frustrating the three periods fit quite well into the fluctuating cycle of land speculation.

Since the material could not be officially copied, and a photo-copy removed from the premises, the work had to be done in the corner of a busy office. Much gratitude is due to M.G. Zaitouné for his co-operation and allowing the use of his name which carried the researcher daily past the armed guards at the Municipality Office's entrance.

APPENDIX 7

The Chi-Squared (x^2)* test was used to determine the significance of the mapped distributions. With a few exceptions, e.g. first 3 categories of "Family Size" and last 3 categories of "Previous Address", the deviations of the actual from the expected were such that within confidence limits of over 90% the spatial patterns must be considered significant. The material was fed into the computer at Durham University using a simple "algol" program, and the results as printed out by the computer are here included. They are in folded form in the pocket inside the back cover.

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* $x^2 = \sum \frac{(O-E)^2}{E}$

where O = observed frequency

E = expected frequency.

APPENDIX 8

Cope-Chat Analysis of the Socio Economic Data

5 x 3 edge punched Cope-Chat cards were used. Each card represented a quartile category of each subdivision of the various socio-economic factors. Twenty four holes were numbered to represent the zones, and the cards were then punched so that zones with similar characteristics would drop. By taking separately each socio-economic group the degree of areal exclusiveness of high and low values was established. Using all the cards, the number of times given categories fell together was tabulated and an estimate obtained of the degree of correlation.

APPENDIX 9

Test of Socio-Economic data by Spearman's Rank Correlation Coefficient

Further tests of the socio-economic data, to supplement the Cope-Chat analysis, were carried out using Spearman's Rank Correlation Coefficient formula. By this means quartile of subdivision of the main socio-economic factors were ranked among the spatial zones in various combinations and the formula applied:-

$$R = 1 - \frac{6\sum d^2}{n^3 - n}$$

where $\sum d^2$ = the sum of the squares of the rank differences

n = the number of zones ranked.

APPENDIX 10 Table:

Mid-City and Suburban Centres Ranked According to Existance of Various Types of Establishment

No. of Centre	Grocers		Catering		Couture		Furniture		Automotive		Pharmacies		Bookstores		Printers		Offices		Doctors		Cleaners Dyers, et al	
	Number	Rank	No.	Rank	No.	Rank	No.	Rank	No.	Rank	No.	Rank	No.	Rank	No.	Rank	No.	Rank	No.	Rank	No.	Rank
60	45	1	4	3	0	31	7	1	11	5	9	1	1	10	1	7	0	8	6	18	3	6
9	6	33	15	1	4	5	0	32	8	7	0	18	4	1	4	2	3	1	7	16	1	16
41	22	4	1	9	1	19	2	10	30	1	4	3	1	10	0		0	8	11	5	4	1
51	14	13	1	9	3	10	6	2	22	2	6	2	2	6	1	7	0	8	12	4	2	9
10	22	4	3	4	13	1	6	2	3	16	3	5	0	10	0		1	4	27	1	2	9
33	14	13	1	9	3	20	3	7	4	12	2	7	3	2	1	7	0	8	15	3	4	1
11	19	7	0	23	4	5	6	2	4	12	4	3	3	2	0		3	1	20	2	4	1
54	18	9	0	23	2	14	1	17	1	28	1	10	1	10	1	7	0	8	9	8	0	27
2	11	17	1	9	2	14	4	6	2	22	1	10	2	6	0		1	4	5	21	1	16
40b	10	19	0	23	0	31	1	17	3	16	1	10	1	10	1	7	0	8	9	8	1	16
1	7	25	11	2	0	31	0	32	0	40	0	18	1	21	0		2	3	0	42	2	9
7	10	19	3	4	6	2	1	17	2	22	0	18	0	21	0		1	4	10	6	2	9
8	5	37	0	23	3	10	3	7	1	28	3	5	0	21	0	.	0	8	6	18	0	27
25	5	37	1	9	1	19	1	17	1	25	0	18	2	6	1	7	0	8	3	29	4	1
39	3	46	1	9	1	19	1	17	3	16	1	10	0	21	0		0	8	3	29	1	16
45	26	3	0	23	5	4	1	17	6	10	2	7	0	21	2	4	0	8	9	8	1	16
47	6	33	2	6	1	19	5	5	10	6	0	18	3	2	2	4	0	8	8	12	0	27
50	38	2	0	23	4	5	1	17	2	22	0	11	1	10	0		0	8	8	12	0	27
56	10	19	2	6	0		2	10	2	22	0	18	0	21	1	7		8	1		1	16
14	14	13	1	9	1	9	0	32	0		2	7	0	21	0			8	3	29	2	9
45	22	4	0	23	1	19	0	32	3	16	0	18	0	21	1	7		8	9	8	1	16
36	7	25	0		1	19	1	17	7	9	0	18	0	?	0			8	10	6	2	9
43a	8	24	0		6	2	2	10	0	40	1	10	0		1	7	1	4	7	16	0	27
52	15	11	0		0		2	10	0	46	0	18	2	6	1	7		8	4	22	3	6
58	19	7	0		4	5	0	32	3	16	1	18	0		3	3		8	8	12	0	27
4	9	23	0		0		1	17	8	7	0	18	0		0		1	4	2	37	1	16
16	11	17	1	9	0		0	32	1	28	0	18	0		0			8	4	22	1	16
17	18	9	0		0		2	10	0		1	10	0		0				6	18	0	27
18	7	25	1	9	2	14	0	32	2	22	0	18	0		0				3	29	0	27
27	6	33	0		2	14	0	.	3	16	0	18	0		0				0	42	0	27
29	7	25	0		0		1	17	1	28	1	10	1	10	0				0	42	4	1
30	3	46	0		0		0	.	1	28	0	.	1	10	6	1			2	37	0	27
48	2	53	0		1	19	2	10	1	23	0	.	0		2	4			0	42	1	16
53	12	16	0		2	14	3	7	1	28	0	.	0		0				0	42	0	27
3	10	19	0		0		0	.	0		0	.	0		0				0	42	3	9
12	4	40	0		0		0	.	0		0	.	1	10	1	7			2	37	1	16
20	7	25	0		4	5	2	10	4	12	0	.	3	2	0				2	37	0	27
23	4	40	2	6	0		1	17	1	28	0	.	0		0				3	29	0	27

APPENDIX 10 a - k cont. -

32	2	53	0	.	1	19	0	.	1	28	0		0		1	7			4	22	0	27
34	5	37	0	.	0		1	17	2	22	0		0		0				8	12	0	27
38	4	40	1	9	1	19	1	17	5	11	0		0		0				3	29	0	27
43b	4	40	0	1	1	19	0	.	0		0		1	10	0				4	22	0	
57	6	33	1	9	0		0	.	4	12	0		0		0				0	42	1	16
59	2	53	0	.	0		1	17	18	3	0		0		0				1	41	0	
22	3	46	0	.	0		0	.	1	28	0		0		0	7			0	42	0	
28	7	25	0	.	0		0	.	0		0		0		0				0	42	0	
40a	0	57	1	9	0		0	.	0		0		0		0				0	42	0	
42	0	58	0		5		0	.	0		0		0		4	2			2	37	0	
44	7	25	1	9	3	10	0	.	1	28	0		0		0		0		4	22	2	9
46	7	25	0		0		0	.	0		0		0		1		0		4	22	0	
31	3	46	1	9	0		0	.	0		0		0		1		0		3	29	0	
26	3		0		1	19	1	17	0		0		0		0		0		0		0	
37	0	59	0				0	.	16	4	0		1	10	0		0		4	22	0	
55	3	46	0		0		0	.	0		0		0		0		0		0	42	0	
5	3	46	0		0		0	.	0		0		0		0		0		0	42	0	
6	2	53	0		0		0	.	0		0		0		0		0		0	42	0	
13	4	40	0		0		0	.	0		0		0		0		0		0	42	0	
24	4	40	0		0		0	.	0		0		0		0		0		0	42	0	
49	3	46	0		0		0	.	0		0		0		0		0		3	29	0	

APPENDIX 10 Barbers to Sec. Schools

No. of Centre	Barbers		Womens Hairdressers		Banks		Hotels		Entertainment		Bakers		Butchers		Prim. Schools		Sec. Schools	
	Number	Rank	No.	Rank	No.	Rank	No.	Rank	No.	Rank	No.	Rank	No.	Rank	No.	Rank	No.	Rank
60	0	30	0	30	4	1		6	2	4	2	4	3	6	1	7	4	1
9	3	3	0	9	1	4	10	1	8	1	22	1	5	4	19	1		
41	3	3	4	3	1	4			3	3	3	3	1	10	6	3		
51	3	3	2	9		9				13	3	3	12	2	2	6	4	1
10	2	9	6	1	1	4	1	3		13	8	2	7	3	6	3	4	1
33	2	9	0	30		9				13	8	2	5	4	4	4	4	1
11	1	15	5	2		9				13	8	2	7	3	6	3		
54	1	15	4	3	1	4			1	6	22	1	19	1	13	2		
2	0	30	4	3		9		22	1	6	8	2	12	2	19	1		
40b	0	30	1	17		9				13	22	1	19	1	36		4	1
1	0	30	1	17	2	2	1	3	8	1	34	0	35		36			
7	0	30	2	9		9			1	6	8	2	12	2	19	1	2	2
8	1	15	2	9		9			1	6	34		19	1	36			
25	1	15	0	30	1	4				13	34		19	1	19	1	4	1
39	1	15	0	30		9				13	34		35		13	2		
45	0	30	3	6		9			1	6	8	2	3	6	6	3		
47	1	15	1	17		9				13	22	1	35		13	2		
50	3	3	2	9		9	1	3		13	8	2	2	8	13	2		
56	0		0	30		9		6		13	8	2	19	1	13	2		
14	2	9	0	30							8	2	12	2	36	0		
45	5	1	0	30							22	1	19	1	4	4		
36	1	15	1	17							8	2	35	0	19	1		
43a	2	9	3	6					1	6	34		35		19	1		
52	1	15	2	9							8	2	7	3	19	1	4	1
58	1	15	2	9							3	3	19	1	19	1		
4	1	15	2	9									19	1	6	3		
16	3	3	0								1	5	12	2	19	1	4	1
17	1	15	0								8	2	12	2	6	3		
18	4	2	3	6							22	1	12	2	19	1		
27	1	15	0									0		0			4	1
29	0	30	0									0		0	13	2		
30	0	30	1	7	1	4						0		0	19	1	4	1
48	3	3	1	17					2	4	22	1		0				
53	1	15	2	9							3	3	7	3				
3	1	15	0		2	2					8	2	19	1				
12	0	30	0								22	1	19	1				
20	1	15	1	17							22	1		0	19	1		
23	2	9	1	17								0		0				

APPENDIX 10 Barbers to Sec. Schools cont. -

32	0	30	0						1	6		0		0				
34	0	1	0									0	7	3				
38	0		0									0	19	1	19	1		
43b	0		1	17								0	19	1	19	1		
57	0		0								22	1		0	19	1	4	1
59	0		0									0		0	6	3		
22	0		0									0		0	19	1		
28	0		1	17								0		0		0		
40a	0		1	17								0		0		0		
42	0										3	2	1	0			2	2
44	2	9	0		0						3	3		0				
46	0		0		0							0	19	1			4	1
31	0		1	17	0							0		0				
26	0		0								22	1	19	1	19	1		
37	0		0									0		0	3	5	1	9
55	0		1	17								0		0				
5	0		0									0		0				
6	0		0									0		0			4	1
13	0		0										19	1				
24	0		0								22	1		0				
49	0		0									0	19	1				

APPENDIX 11 Table

Ranking of Mid-City and Suburban Centres

1 Centre	2 Rank - No. of types of facility	3 $\sum$ Rank x existance x of facility	4 Rank of 3	5 Total No. of stores previous centre	6 Rank of 5	7 $2\sqrt{}$ of 5	8 R ($R = \frac{\sum(x \times w)}{y}$)	9 Rank of 8	10 $2\sqrt{R}$
60	1	85	3	93	1	9.6	411	3	20.2
9	1	112	1	65	5	8.1	676	1	22.29
41	1	94	2	87	3	9.3	414	2	20.35
51	4	74	6	44	9	6.6	363	4	19.05
10	5	78	4	90	2	9.5	378	3	19.44
33	6	64	8	52	8	7.2	230	7	15.17
11	6	57	10	73	4	8.5	325	5	18.03
54	6	67	7	41	11	6.4	141	14	11.87
2	9	56	11	37	13	6.1	188	10	13.37
40b	9	55	12	28	17	5.3	89	26	9.43
1	11	78	4	26	19	5.1	280	6	16.73
7	11	37	22	35	14	5.9	181	11	13.45
8	11	32	28	25	20	5.0	116	19	10.77
25	11	60	9	17	31	4.1	114	20	10.68
39	11	50	14	15	35	3.9	73	32	8.54
45	11	43	17	56	7	7.5	197	9	14.04
47	11	37	22	40	13	6.3	198	8	14.07
50	11	32	28	60	8	7.7	145	13	12.04
56	11	55	12	19	30	4.4	89	26	9.43
14	20	35	25	25	20	5.0	83	28	9.11
15	20	40	19	42	10	6.5	111	21	10.54
36	20	29	32	30	15	5.5	111	21	10.54
43a	20	50	14	31	15	5.6	147	12	12.12
52	20	40	19	30	16	5.5	97	23	9.85
58	20	37	22	41	11	6.4	138	15	11.75
4	26	36	25	25	20	5.0	94	24	9.69
16	26	27	36	21	26	4.6	53	37	7.28
17	26	28	34	28	17	5.3	58	35	7.62
18	26	32	28	22	24	4.7	78	30	8.83
27	26	29	32	12	41	3.5	44	43	6.63
29	26	40	19	15	35	3.9	67	33	8.18
30	26	44	16	15	35	3.9	92	25	9.59
48	26	42	18	13	40	3.6	33	46	5.74
53	26	25	37	21	26	4.6	54	36	7.35

Appendix 11 cont. -

1	2	3	4	5	6	7	8	9	10
3	35	20	42	16	33	4.0	49	49	7.00
12	35	32	28	9	47	3.0	38	44	6.16
20	35	19	44	24	23	4.9	131	16	11.45
23	35	20	42	14	39	3.7	53	37	7.28
32	35	34	27	10	46	3.2	50	39	7.07
34	35	14	46	16	33	4.0	45	42	6.71
38	35	28	34	15	35	3.9	65	34	8.06
43b	42	21	41	11	44	3.1	38	44	6.16
57	42	24	38	12	41	3.5	47	41	6.86
59	42	22	40	22	24	4.7	117	18	10.82
22	45	16	45	5	50	2.2	18	50	4.24
28	45	7	51	8	49	2.8	9	51	3.00
40a	45	13	47	2	58	1.4	8	52	2.83
42	45	23	39	11	44	3.3	76	31	8.72
44	45	11	48	20	29	4.5	81	29	9.00
46	45	13	47	12	41	3.5	28	48	5.29
31	51	10	49	9	47	3.0	32	47	5.66
26	51	5	52	17	31	4.1	25	49	5.00
37	51	9	50	21	26	4.6	120	17	10.95
55	51	3	53	4	51	2.0	5	53	2.24
5	55	1	55	3	55	1.7	3	56	1.73
6	55	1	56	2	57	1.4	2	58	1.58
13	55	1	57	4	51	2.0	4	54	2.00
24	55	1	58	4	51	2.0	4	54	2.00
49	55	3	53	3	55	1.7	3	56	1.73

APPENDIX 12 Table:

Ranking of Central Business String Streets

1	2	3	4	5	6	
Street	"R"	Rank	No. of times service offered	Rank 4	Total No. Services	Rank 6
1a	603	3	12	6	61	5
1b	671	2	16	1	117	2
II	135	8	8	9	47	8
III	85	10	7	10	16	10
IV	135	8	10	7	36	9
V	442	5	9	8	68	4
VI	1219	1	16	1	239	1
VII	181	7	13	3	62	6
VIII	565	4	13	3	132	3
IX	276	6	13	3	61	7

APPENDIX 13

Coincidence of types of establishment in centre

Key -

a - grocers

bu - butchers

ba - bakers

b - catering

d - clothing

e - furniture

f - automotive

i - pharmacies

ir - bookstores

ip - printers

j - "offices"

jm - doctors

js - banks

k - bankers

ka - womens' hairdressers

z - cleaners, dyers etc.

l - hotels

n - entertainment

sch - schools.

APPENDIX 13 cont. -

a a/i a/jm a/ba a/bu

ba ba/bu ba/sch ba/z ba/jm ba/ir ba/i ba/e ba/d ba/a

bu bu/ba bu/i bu/f bu/e bu/d bu/a

b

d d/e d/i d/ir d/j d/k d/ka d/l d/ba d/bu

e e/f e/i e/ir e/jm e/ka e/ba e/bu e/d

f f/i f/ir f/sch f/e

i i/jm i/k i/ka i/z i/ba i/bu i/sch i/e i/d i/a

ir ir/ka ir/ba ir/e ir/d

ip ip/ka ip/e ip/n

j j/ka j/l j/n j/d

jm jm/ka jm/ba jm/i jm/e jm/a

js js/a

k k/ka k/i k/d

ka ka/l ka/n ka/bu ka/k ka/jm ka/j ka/ir ka/i ka/e ka/d ka/a

z z/ba z/i

l l/n l/ka l/j l/d l/b

sch sch/i sch/ba.

Results obtained using Cope-Chat cards.

APPENDIX 14 Table:

The Climatic Regime in Beirut

	Met Station AIRPORT TO 1962			Met Station NAZARETH (ACTIV.) TO 1945		
	Air Temp. °C	Relative Humidity	Precipitation m.m.	Air Temp. °C	Relative Humidity	Precipitation m.m.
Jan.	14.1	66	147.1	12.6	68	225
Feb.	13.9	67	122.4	12.2	74	148
Mar.	15.4	66	84.7	12.5	68	121
Apr.	18.2	69	31.0	16.1	71	41
May	21.2	71	17.3	21.9	79	8
June	23.8	72	.6	24.1	73	0
July	25.8	74	0	26.4	72	0
Aug.	26.7	72	0	-	-	0
Sept.	25.6	67	5.9	26.2	68	0
Oct.	23.4	65	30.7	22.7	66	14
Nov.	19.9	64	115.7	19.3	61	117
Dec.	16.2	65	127.7	15.2	69	183

Sources: Leb. Stat. Bull. 1962
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houses with gardens

Div. No.	Observed Freq.	Expected Freq.	Z	Chi-squared
1	17.00	14.49	0.28	0.28
2	22.00	17.81	0.77	0.77
3	33.00	36.86	0.31	0.31
4	15.00	16.57	0.07	0.07
5	31.00	38.52	1.28	1.28
6	51.00	42.66	1.44	1.44
7	22.00	17.81	0.77	0.77
8	38.00	30.23	1.75	1.75
9	6.00	11.60	2.24	2.24
10	19.00	28.58	2.88	2.88
11	51.00	40.59	2.42	2.42
12	26.00	17.81	3.32	3.32
13	36.00	28.58	1.68	1.68
14	20.00	18.64	0.04	0.04
15	34.00	28.99	0.70	0.70
16	29.00	23.19	1.21	1.21
17	16.00	22.78	1.73	1.73
18	9.00	20.29	5.74	5.74
19	15.00	21.54	1.69	1.69
20	18.00	19.46	0.05	0.05
21	15.00	11.18	0.98	0.98
22	29.00	21.54	2.25	2.25
23	29.00	29.40	0.00	0.00
24	32.00	39.76	1.32	1.32
25	2.00	16.15	11.54	11.54

Chi-squared
column 1 46.46

owning house

Div. No.	Observed Freq.	Expected Freq.	Z	Chi-squared
1	15.00	8.58	4.09	4.09
2	16.00	10.79	2.06	2.06
3	20.00	23.52	0.39	0.39
4	5.00	11.34	3.01	3.01
5	19.00	24.90	1.17	1.17
6	27.00	28.50	0.03	0.03
7	17.00	10.51	3.41	3.41
8	16.00	22.13	1.43	1.43
9	2.00	7.75	3.55	3.55
10	15.00	19.09	0.68	0.68
11	36.00	27.67	2.22	2.22
12	10.00	8.85	0.05	0.05
13	23.00	14.94	3.83	3.83
14	16.00	11.90	1.09	1.09
15	18.00	17.43	0.00	0.00
16	15.00	15.77	0.00	0.00
17	14.00	16.60	0.27	0.27
18	8.00	14.11	2.23	2.23
19	10.00	15.22	1.46	1.46
20	15.00	13.00	0.17	0.17
21	4.00	7.19	1.01	1.01
22	17.00	14.11	0.40	0.40
23	26.00	21.03	0.95	0.95
24	25.00	27.39	0.13	0.13
25	13.00	9.68	0.82	0.82

Chi-squared		
column	1	34.45

estivage

Div. No.	Observed Freq.	Expected Freq.	Z	Chi-squared
1	12.00	16.50	0.97	0.97
2	15.00	16.13	0.02	0.02
3	33.00	33.38	0.00	0.00
4	15.00	15.00	0.02	0.02
5	46.00	34.88	3.23	3.23
6	37.00	38.26	0.02	0.02
7	11.00	15.75	1.15	1.15
8	22.00	29.63	1.72	1.72
9	6.00	10.50	1.53	1.53
10	29.00	25.51	0.35	0.35
11	30.00	36.76	1.07	1.07
12	10.00	16.13	1.96	1.96
13	13.00	27.01	6.75	6.75
14	14.00	16.50	0.24	0.24
15	29.00	24.38	0.70	0.70
16	19.00	20.63	0.06	0.06
17	41.00	20.25	20.24	20.24
18	26.00	18.75	2.43	2.43
19	28.00	19.13	3.66	3.66
20	15.00	17.25	0.18	0.18
21	7.00	10.13	0.68	0.68
22	20.00	19.13	0.01	0.01
23	26.00	26.26	0.00	0.00
24	37.00	36.38	0.00	0.00
25	16.00	12.75	0.59	0.59

Chi-squared
column 1 47.57

previous address

Div. No.	Observed Freq.	Expected Freq.	Z	Chi-squared
1	13.00	9.87	0.70	
	11.00	11.62	0.00	
	8.00	11.62	0.84	
	10.00	8.88	0.04	1.58
2	11.00	10.58	0.00	
	16.00	12.45	0.74	
	5.00	12.45	3.88	
	13.00	9.81	0.94	5.57
3	10.00	20.92	5.19	
	35.00	24.63	3.95	
	16.00	24.63	2.69	
	28.00	18.82	4.01	15.84
4	11.00	9.40	0.13	
	8.00	11.07	0.60	
	12.00	11.07	0.02	
	9.00	8.46	0.00	0.74
5	24.00	21.86	0.12	
	17.00	25.74	2.64	
	23.00	25.74	0.19	
	29.00	19.66	3.97	6.93
6	28.00	23.74	0.60	
	28.00	27.95	0.01	
	26.00	27.95	0.08	
	19.00	21.35	0.16	0.84
8	21.00	18.57	0.20	
	28.00	21.87	1.45	
	16.00	21.87	1.32	
	14.00	16.70	0.29	3.26
9	13.00	6.58	5.32	
	6.00	7.75	0.20	
	3.00	7.75	2.33	
	6.00	5.92	0.03	7.88
10	11.00	15.75	1.15	
	18.00	18.54	0.00	
	24.00	18.54	1.32	
	14.00	14.16	0.01	2.48
11	26.00	22.80	0.32	
	30.00	26.85	0.26	
	28.00	26.85	0.02	
	13.00	20.51	2.39	2.99
12	14.00	10.34	0.96	
	13.00	12.18	0.01	
	11.00	12.18	0.04	
	6.00	9.30	0.84	1.85
13	9.00	16.22	2.78	
	20.00	19.10	0.01	
	31.00	19.10	6.81	
	9.00	14.59	1.77	11.37
14	11.00	10.34	0.00	
	9.00	12.18	0.59	
	14.00	12.18	0.14	
	10.00	9.30	0.00	0.74
15	20.00	16.45	0.56	
	18.00	19.37	0.04	
	22.00	19.37	0.23	
	10.00	14.80	1.25	2.09
16	7.00	13.16	2.44	
	21.00	15.50	1.61	
	17.00	15.50	0.06	
	11.00	11.84	0.01	4.12
17	7.00	12.93	2.28	
	14.00	15.22	0.03	
	24.00	15.22	4.50	
	10.00	11.63	0.11	6.92
18	15.00	12.46	0.33	
	11.00	14.67	0.68	
	20.00	14.67	1.59	
	7.00	11.20	1.22	3.84
19	7.00	11.52	1.40	
	18.00	13.56	1.14	
	11.00	13.56	0.31	
	13.00	10.36	0.44	3.30
20	25.00	10.81	17.33	
	2.00	12.73	8.22	
	10.00	12.73	0.39	
	9.00	9.72	0.01	25.95
21	4.00	6.35	0.54	
	7.00	7.47	0.00	
	8.00	7.47	0.00	
	8.00	5.71	0.56	1.10
22	9.00	11.52	0.35	
	16.00	13.56	0.28	
	18.00	13.56	1.14	
	6.00	10.36	1.44	3.21
23	15.00	13.87	0.03	
	19.00	16.33	0.29	
	15.00	16.33	0.04	
	10.00	12.47	0.31	0.67
24	17.00	23.03	1.33	
	27.00	27.12	0.01	
	23.00	27.12	0.48	
	31.00	20.72	4.62	6.44
25	10.00	8.93	0.04	
	6.00	10.52	1.53	
	13.00	10.52	0.37	
	9.00	8.03	0.03	1.97

Chi-squared		
column	1	44.10
column	2	24.31
column	3	28.81
column	4	24.47

mobility

Div. No.	Observed Freq.	Expected Freq.	Z	Chi-squared
1	22.00	21.83	0.00	
	9.00	13.00	0.94	
	14.00	10.17	1.09	2.04
2	13.00	20.86	2.60	
	19.00	12.42	2.97	
	11.00	9.72	0.06	5.63
3	22.00	43.66	10.25	
	38.00	26.00	5.08	
	30.00	20.34	4.13	19.46
4	18.00	19.40	0.04	
	8.00	11.56	0.81	
	14.00	9.04	2.20	3.05
5	40.00	43.66	0.23	
	30.00	26.00	0.47	
	20.00	20.34	0.00	0.70
6	41.00	49.48	1.29	
	31.00	29.47	0.04	
	30.00	23.05	1.81	3.13
7	19.00	20.37	0.04	
	10.00	12.14	0.22	
	13.00	9.49	0.95	1.21
8	42.00	39.78	0.07	
	17.00	23.69	1.62	
	23.00	18.53	0.85	2.54
9	16.00	12.61	0.66	
	5.00	7.51	0.54	
	5.00	5.88	0.02	1.22
10	47.00	32.99	5.54	
	15.00	19.65	0.88	
	6.00	15.37	5.12	11.53
11	50.00	46.02	0.05	
	32.00	28.60	0.29	
	17.00	22.37	1.06	1.40
12	22.00	20.86	0.02	
	13.00	12.42	0.00	
	8.00	9.72	0.15	0.17
13	31.00	34.44	0.25	
	22.00	20.51	0.05	
	18.00	16.04	0.13	0.43
14	19.00	21.83	0.25	
	20.00	13.00	3.25	
	6.00	10.17	1.32	4.82
15	34.00	33.96	0.01	
	23.00	20.23	0.26	
	13.00	15.82	0.34	0.60
16	28.00	27.65	0.00	
	17.00	16.47	0.00	
	12.00	12.88	0.01	0.01
17	34.00	25.71	2.36	
	13.00	15.31	0.21	
	6.00	11.98	2.50	5.08
18	38.00	25.71	5.41	
	7.00	15.31	3.99	
	8.00	11.98	1.01	10.40
19	36.00	26.19	3.31	
	9.00	15.60	2.39	
	9.00	12.20	0.60	6.29
20	15.00	22.80	2.34	
	13.00	13.58	0.00	
	19.00	10.62	5.85	8.18
21	9.00	13.10	0.99	
	13.00	7.80	2.83	
	5.00	6.10	0.06	3.88
22	40.00	26.19	6.76	
	9.00	15.60	2.39	
	5.00	12.20	3.68	12.83
23	43.00	36.38	1.03	
	18.00	21.67	0.46	
	14.00	16.95	0.35	1.85
24	38.00	46.08	1.25	
	29.00	27.45	0.04	
	28.00	21.47	1.69	2.98
25	15.00	18.43	0.47	
	16.00	10.98	1.86	
	7.00	8.59	0.14	2.47

Chi-squared		
column	1	45.19
column	2	31.58
column	3	35.14

ethnic origin

Div. No.	Observed Freq.	Expected Freq.	Z	Chi-squared
1	22.00	17.33	1.00	
	1.00	2.73	0.56	
	7.00	11.31	1.28	
	7.00	5.65	0.13	
	2.00	5.22	1.42	
	5.00	1.81	3.98	8.37
2	18.00	17.33	0.00	
	1.00	2.73	0.56	
	12.00	11.31	0.00	
	11.00	5.65	4.15	
	0.00	5.22	4.27	
	2.00	1.81	0.05	9.04
3	30.00	38.60	1.70	
	4.00	6.09	0.42	
	20.00	25.18	0.87	
	24.00	12.59	9.45	
	6.00	11.63	2.27	
	14.00	4.04	22.17	36.87
4	12.00	14.18	0.20	
	3.00	2.24	0.03	
	7.00	9.25	0.33	
	4.00	4.63	0.00	
	7.00	4.27	1.16	
	5.00	1.48	6.14	7.86
5	27.00	33.87	1.20	
	2.00	5.34	1.51	
	18.00	22.10	0.59	
	16.00	11.08	1.79	
	16.00	10.21	2.74	
	7.00	3.54	2.47	10.30
6	53.00	40.17	3.78	
	10.00	6.34	1.58	
	22.00	26.21	0.53	
	10.00	13.11	0.52	
	3.00	12.11	6.12	
	4.00	4.20	0.02	12.54
8	37.00	30.33	1.26	
	4.00	4.79	0.02	
	19.00	19.79	0.00	
	6.00	9.89	1.16	
	10.00	9.14	0.01	
	1.00	3.17	0.88	3.34
9	10.00	10.63	0.00	
	2.00	1.68	0.02	
	3.00	6.94	1.70	
	8.00	3.47	4.68	
	3.00	3.21	0.03	
	1.00	1.11	0.14	6.57
10	25.00	26.78	0.06	
	3.00	4.23	0.12	
	19.00	17.47	0.06	
	8.00	8.74	0.01	
	11.00	8.07	0.73	
	2.00	2.80	0.03	1.02
11	58.00	38.60	9.26	
	6.00	6.09	0.03	
	16.00	25.18	2.99	
	16.00	12.59	0.67	
	1.00	11.63	8.83	
	1.00	4.04	1.59	23.37
12	20.00	17.72	0.18	
	1.00	2.80	0.60	
	10.00	11.56	0.10	
	11.00	5.78	3.85	
	2.00	5.34	1.51	
	1.00	1.85	0.07	6.31
13	46.00	26.39	13.84	
	4.00	4.16	0.03	
	6.00	17.22	6.67	
	11.00	8.61	0.42	
	0.00	7.95	6.99	
	0.00	2.76	1.85	29.79
14	22.00	17.72	0.80	
	3.00	2.80	0.03	
	12.00	11.56	0.00	
	7.00	5.78	0.09	
	1.00	5.34	2.76	
	0.00	1.85	0.99	4.68
15	34.00	24.42	3.38	
	6.00	3.85	0.70	
	11.00	15.93	1.23	
	10.00	7.97	0.30	
	1.00	7.36	4.67	
	0.00	2.85	1.65	11.93
16	20.00	22.05	0.11	
	3.00	3.48	0.30	
	23.00	14.39	4.57	
	4.00	7.20	1.01	
	2.00	6.65	2.59	
	2.00	2.31	0.02	8.59
17	18.00	18.51	0.00	
	3.00	2.92	0.03	
	14.00	12.08	0.17	
	2.00	6.04	2.07	
	5.00	5.58	0.00	
	5.00	1.94	3.39	5.70
18	18.00	20.09	0.13	
	3.00	3.17	0.56	
	13.00	13.11	0.15	
	4.00	6.65	0.64	
	7.00	6.03	0.03	
	2.00	2.10	0.08	1.58
19	23.00	19.69	0.40	
	2.00	3.11	0.12	
	20.00	12.85	3.44	
	2.00	6.42	2.40	
	3.00	5.94	1.00	
	0.00	2.06	1.18	8.54
20	8.00	18.51	5.41	
	3.00	2.92	0.85	
	21.00	12.08	5.87	
	8.00	6.04	0.35	
	5.00	5.58	0.00	
	0.00	1.94	1.07	13.56
21	7.00	10.63	0.92	
	4.00	1.68	1.98	
	11.00	6.94	1.83	
	2.00	3.47	0.27	
	2.00	3.21	0.16	
	1.00	1.11	0.14	5.29
22	22.00	21.27	0.00	
	3.00	3.36	0.01	
	23.00	13.88	5.36	
	4.00	6.94	0.86	
	2.00	6.41	2.39	
	0.00	2.22	1.34	9.95
23	20.00	27.67	1.81	
	4.00	4.35	0.01	
	32.00	17.99	10.15	
	1.00	8.99	6.24	
	10.00	8.31	0.17	
	3.00	2.88	0.05	18.43
24	10.00	37.02	19.00	
	8.00	5.84	0.47	
	21.00	24.16	0.29	
	6.00	12.08	2.58	
	46.00	11.16	105.68	
	3.00	3.87	0.04	128.05
25	4.00	14.57	6.96	
	0.00	2.30	1.41	
	6.00	9.51	0.95	
	2.00	4.75	1.07	
	25.00	4.39	92.05	
	0.00	1.52	0.69	103.13

Chi-squared		
column	1	71.41
column	2	11.98
column	3	49.14
column	4	44.71
column	5	247.86
column	6	50.02

rental value

Div. No.	Observed Freq.	Expected Freq.	Z	Chi-squared
1	7.00	12.21	1.82	
	12.00	12.00	0.02	
	8.00	11.69	3.27	
	11.00	6.29	2.81	
	11.00	3.84	11.53	19.45
2	14.00	10.89	0.63	
	15.00	10.69	1.36	
	8.00	10.42	0.35	
	3.00	5.61	0.79	
	1.00	3.43	1.08	4.21
3	17.00	23.63	1.59	
	13.00	23.21	4.06	
	17.00	22.61	1.15	
	19.00	12.17	3.29	
	23.00	7.44	30.51	40.60
4	7.00	10.89	1.05	
	7.00	10.69	0.95	
	9.00	10.42	0.08	
	12.00	5.61	6.19	
	6.00	3.43	1.26	9.53
5	18.00	24.69	1.55	
	23.00	24.25	0.02	
	20.00	23.63	0.41	
	19.00	12.72	2.62	
	15.00	7.77	5.83	10.44
6	33.00	27.61	0.87	
	22.00	27.12	0.79	
	33.00	26.42	1.40	
	12.00	14.23	0.21	
	4.00	8.69	2.02	5.28
7	12.00	11.15	0.01	
	9.00	10.95	0.19	
	19.00	10.67	5.75	
	1.00	5.75	3.14	
	1.00	3.51	1.15	10.24
8	35.00	20.71	9.18	
	23.00	20.34	0.23	
	10.00	19.82	4.38	
	3.00	10.67	4.82	
	7.00	6.52	0.00	18.61
9	8.00	7.43	0.50	
	11.00	7.30	1.40	
	6.00	7.11	0.05	
	4.00	3.83	0.03	
	2.00	2.34	0.01	2.00
10	15.00	18.32	0.43	
	23.00	17.99	1.13	
	17.00	17.53	0.00	
	8.00	9.44	0.09	
	6.00	5.77	0.01	1.67
11	26.00	26.02	0.01	
	25.00	25.56	0.00	
	32.00	24.90	1.75	
	10.00	13.41	0.63	
	8.00	8.19	0.88	3.27
12	14.00	11.15	0.49	
	7.00	10.95	1.09	
	12.00	10.67	0.06	
	7.00	5.75	0.10	
	2.00	3.51	0.29	2.04
13	23.00	19.91	0.34	
	22.00	19.56	0.19	
	26.00	19.05	2.18	
	4.00	10.26	3.23	
	0.00	6.27	5.31	11.25
14	13.00	11.15	0.16	
	10.00	10.95	0.02	
	16.00	10.67	2.19	
	1.00	5.75	3.14	
	2.00	3.51	0.29	5.80
15	10.00	15.93	1.85	
	9.00	15.65	2.41	
	19.00	15.24	0.70	
	16.00	8.21	6.48	
	6.00	5.01	0.05	11.49
16	16.00	14.34	0.09	
	11.00	14.08	0.47	
	12.00	13.72	0.11	
	11.00	7.39	1.31	
	4.00	4.51	0.00	1.99
17	7.00	14.34	3.26	
	16.00	14.08	0.14	
	10.00	13.72	0.76	
	13.00	7.39	3.54	
	8.00	4.51	1.98	9.68
18	12.00	12.74	0.00	
	12.00	12.52	0.00	
	10.00	12.19	0.24	
	9.00	6.57	0.57	
	5.00	4.01	0.06	0.87
19	15.00	14.34	0.00	
	13.00	14.08	0.02	
	10.00	13.72	0.76	
	6.00	7.39	0.11	
	10.00	4.51	5.51	6.40
20	12.00	12.21	0.01	
	18.00	12.00	2.53	
	12.00	11.69	0.00	
	2.00	6.29	2.29	
	2.00	3.84	0.47	5.29
21	5.00	7.17	0.39	
	11.00	7.04	1.70	
	5.00	6.86	0.27	
	3.00	3.69	0.01	
	2.00	2.26	0.03	2.39
22	17.00	13.54	0.65	
	13.00	13.30	0.00	
	14.00	12.96	0.02	
	7.00	6.98	0.03	
	0.00	4.26	3.32	4.03
23	19.00	20.18	0.02	
	17.00	19.82	0.27	
	27.00	19.31	2.68	
	11.00	10.40	0.00	
	2.00	6.35	2.33	5.31
24	30.00	25.49	0.63	
	34.00	25.04	2.86	
	22.00	24.39	0.15	
	10.00	13.13	0.53	
	0.00	8.02	7.05	11.22
25	12.00	7.96	1.57	
	11.00	7.82	0.92	
	6.00	7.62	0.16	
	1.00	4.10	1.68	
	0.00	2.51	1.61	5.91

Chi-squared		
column	1	27.12
column	2	22.79
column	3	28.87
column	4	47.61
column	5	82.58

Div. No.	Observed Freq.	Expected Freq.	Z	Chi-squared
1	2.00	2.00	0.12	
	4.00	6.40	0.56	
	6.00	9.61	1.01	
	9.00	7.13	0.26	
	7.00	3.60	2.34	
	3.00	2.26	0.03	4.32
2	3.00	2.59	0.00	
	10.00	8.26	0.19	
	15.00	12.40	0.36	
	9.00	9.20	0.01	
	3.00	4.64	0.28	
	0.00	2.92	2.00	2.84
3	3.00	5.56	0.76	
	17.00	17.75	0.00	
	19.00	26.65	1.92	
	21.00	19.78	0.03	
	12.00	9.98	0.23	
	14.00	6.28	8.32	11.26
4	1.00	2.59	0.46	
	6.00	8.26	0.37	
	12.00	12.40	0.00	
	5.00	9.20	1.49	
	8.00	4.64	1.76	
	8.00	2.92	7.19	11.27
5	4.00	5.88	0.32	
	13.00	18.78	1.49	
	14.00	28.20	6.66	
	27.00	20.93	1.48	
	17.00	10.56	3.34	
	16.00	6.64	11.82	25.11
6	6.00	6.59	0.00	
	28.00	21.03	1.97	
	31.00	31.61	0.00	
	22.00	23.46	0.04	
	14.00	11.84	0.23	
	1.00	7.44	4.74	6.99
7	7.00	2.46	6.66	
	4.00	7.84	1.42	
	16.00	11.78	1.18	
	8.00	8.74	0.01	
	3.00	4.41	0.19	
	0.00	2.77	1.86	11.32
8	3.00	5.11	0.50	
	31.00	16.31	12.36	
	25.00	24.49	0.00	
	14.00	18.17	0.74	
	2.00	9.17	4.85	
	4.00	5.76	0.28	18.73
9	2.00	1.81	0.05	
	4.00	5.78	0.28	
	9.00	8.68	0.00	
	1.00	6.44	3.79	
	7.00	3.25	3.25	
	5.00	2.04	2.95	10.34
10	9.00	4.59	3.33	
	12.00	14.65	0.32	
	15.00	22.01	1.92	
	23.00	16.33	2.33	
	5.00	8.24	0.91	
	7.00	5.18	0.34	9.15
11	4.00	6.40	0.56	
	27.00	20.43	1.80	
	31.00	30.68	0.00	
	19.00	22.77	0.47	
	12.00	11.49	0.00	
	6.00	7.22	0.07	2.91
12	3.00	2.00	0.12	
	6.00	6.40	0.00	
	11.00	9.61	0.08	
	8.00	7.13	0.02	
	2.00	3.60	0.33	
	1.00	2.26	0.26	0.82
13	6.00	3.49	1.16	
	15.00	11.15	1.01	
	16.00	16.74	0.00	
	15.00	12.42	0.35	
	2.00	6.27	2.26	
	0.00	3.94	3.00	7.79
14	2.00	2.91	0.06	
	10.00	9.29	0.00	
	13.00	13.95	0.01	
	14.00	10.35	0.96	
	4.00	5.22	0.10	
	2.00	3.28	0.19	1.32
15	1.00	3.94	1.51	
	6.00	12.59	2.95	
	17.00	18.91	0.10	
	16.00	14.03	0.15	
	16.00	7.08	10.02	
	5.00	4.45	0.00	14.73
16	3.00	3.68	0.01	
	13.00	11.76	0.03	
	13.00	17.67	0.98	
	13.00	13.11	0.01	
	12.00	6.62	3.61	
	3.00	4.16	0.10	4.76
17	2.00	3.94	0.53	
	10.00	12.59	0.35	
	8.00	18.91	5.73	
	21.00	14.03	2.98	
	11.00	7.08	1.65	
	9.00	4.45	3.68	14.92
18	3.00	3.17	0.04	
	6.00	10.11	1.29	
	17.00	15.19	0.11	
	12.00	11.27	0.00	
	4.00	5.69	0.25	
	7.00	3.58	2.39	4.08
19	3.00	3.23	0.02	
	6.00	10.32	1.41	
	19.00	15.50	0.58	
	9.00	11.50	0.35	
	4.00	5.80	0.29	
	9.00	3.65	6.45	9.11
20	5.00	3.10	0.63	
	14.00	9.91	1.30	
	22.00	14.88	2.95	
	4.00	11.04	3.88	
	3.00	5.57	0.77	
	0.00	3.50	2.57	12.10
21	3.00	1.42	0.82	
	4.00	4.54	0.00	
	7.00	6.82	0.01	
	5.00	5.08	0.04	
	1.00	2.55	0.43	
4	2.00	1.61	0.01	1.31
22	0.00	3.43	2.50	
	8.00	10.94	0.54	
	31.00	16.43	12.06	
	11.00	12.19	0.04	
	3.00	6.15	1.14	
	0.00	3.87	2.93	19.21
23	4.00	4.65	0.01	
	10.00	14.86	1.28	
	25.00	22.32	0.21	
	22.00	16.56	1.47	
	10.00	8.36	0.16	
	1.00	5.25	2.68	5.81
24	12.00	6.20	4.52	
	25.00	19.81	1.11	
	37.00	29.75	1.53	
	17.00	22.08	0.95	
	3.00	11.14	5.24	
	2.00	7.00	2.90	16.25
25	2.00	2.26	0.03	
	8.00	7.22	0.01	
	17.00	10.85	2.95	
	6.00	8.03	0.30	
	2.00	4.06	0.60	
	0.00	2.55	1.65	5.53

Chi-squared		
column	1	24.73
column	2	32.08
column	3	40.37
column	4	22.15
column	5	44.25
column	6	68.43

schooling

Div. No.	Observed Freq.	Expected Freq.	Z	Chi-squared
1	11.00	7.18	1.54	
	2.00	7.01	2.90	
	6.00	9.30	0.84	
	6.00	4.95	0.06	
	5.00	1.58	5.39	10.73
2	13.00	9.09	1.28	
	13.00	8.88	1.48	
	6.00	11.78	2.37	
	4.00	6.27	0.50	
	2.00	2.00	0.12	5.74
3	16.00	20.10	0.64	
	7.00	19.63	7.50	
	28.00	26.04	0.08	
	23.00	13.86	5.38	
	10.00	4.43	5.81	19.41
4	4.00	8.85	2.14	
	5.00	8.65	1.15	
	10.00	11.47	0.08	
	8.00	6.11	0.32	
	10.00	1.95	29.23	32.92
5	20.00	21.29	0.03	
	17.00	20.80	0.52	
	23.00	27.59	0.61	
	21.00	14.69	2.30	
	8.00	4.69	1.68	5.14
6	37.00	24.64	5.71	
	21.00	24.07	0.27	
	24.00	31.93	1.73	
	16.00	17.00	0.01	
	5.00	5.43	0.00	7.72
7	12.00	9.33	0.50	
	17.00	9.11	5.98	
	6.00	12.09	2.58	
	4.00	6.44	0.58	
	0.00	2.06	1.18	10.83
8	28.00	19.38	3.40	
	24.00	18.93	1.10	
	10.00	25.11	8.50	
	17.00	13.37	0.73	
	2.00	4.27	0.73	14.47
9	8.00	6.70	0.10	
	7.00	6.54	0.00	
	7.00	8.68	0.16	
	4.00	4.62	0.00	
	2.00	1.48	0.00	0.26
10	17.00	16.75	0.00	
	10.00	16.36	2.10	
	29.00	21.70	2.13	
	11.00	11.55	0.00	
	3.00	3.69	0.01	4.24
11	35.00	23.45	5.21	
	19.00	22.90	0.51	
	29.00	30.38	0.03	
	13.00	16.17	0.44	
	2.00	5.17	1.38	7.56
12	11.00	7.42	1.28	
	8.00	7.24	0.01	
	9.00	9.61	0.00	
	2.00	5.12	1.34	
	1.00	1.63	0.01	2.64
13	15.00	12.92	0.19	
	20.00	12.62	3.75	
	15.00	16.74	0.09	
	4.00	8.91	2.18	
	0.00	2.85	1.93	8.15
14	13.00	10.53	0.37	
	13.00	10.28	0.48	
	8.00	13.64	1.94	
	10.00	7.26	0.69	
	0.00	2.32	1.43	4.90
15	7.00	14.83	3.63	
	14.00	14.49	0.00	
	17.00	19.22	0.15	
	17.00	10.23	3.84	
	7.00	3.27	3.20	10.81
16	11.00	13.64	0.33	
	11.00	13.32	0.25	
	25.00	17.67	2.64	
	8.00	9.41	0.09	
	2.00	3.00	0.08	3.40
17	7.00	14.36	3.27	
	8.00	14.02	2.17	
	22.00	18.60	0.45	
	16.00	9.90	3.16	
	7.00	3.16	3.52	12.59
18	6.00	12.20	2.66	
	13.00	11.92	0.03	
	21.00	15.81	1.39	
	10.00	8.42	0.14	
	1.00	2.69	0.53	4.75
19	7.00	12.68	2.12	
	8.00	12.39	1.22	
	23.00	16.43	2.24	
	13.00	8.75	1.61	
	2.00	2.79	0.03	7.22
20	9.00	11.01	0.21	
	21.00	10.75	8.84	
	12.00	14.26	0.22	
	3.00	7.59	2.21	
	1.00	2.42	0.35	11.82
21	5.00	6.22	0.08	
	4.00	6.08	0.41	
	13.00	8.06	2.45	
	2.00	4.29	0.75	
	2.00	1.37	0.01	3.70
22	9.00	13.40	1.13	
	13.00	13.09	0.01	
	24.00	17.36	2.17	
	7.00	9.24	0.33	
	3.00	2.95	0.07	3.72
23	15.00	17.70	0.27	
	13.00	17.29	0.83	
	36.00	22.94	6.88	
	10.00	12.21	0.24	
	1.00	3.90	1.48	9.70
24	22.00	23.21	0.02	
	37.00	22.67	8.44	
	32.00	30.07	0.07	
	6.00	16.01	5.65	
	0.00	5.11	4.16	18.34
25	7.00	8.13	0.05	
	12.00	7.95	1.59	
	12.00	10.54	0.09	
	3.00	5.61	0.79	
	0.00	1.79	0.93	3.45

Chi-squared		
column	1	36.18
column	2	51.54
column	3	39.89
column	4	33.35
column	5	63.27

number in family

Div. No.	Observed Freq.	Expected Freq.	Z	Chi-squared
1	4.00	4.10	0.04	
	14.00	12.74	0.04	
	7.00	11.28	1.27	
	6.00	2.88	2.40	3.75
2	4.00	5.42	0.16	
	17.00	16.86	0.01	
	15.00	14.92	0.01	
	5.00	3.80	0.13	0.30
3	14.00	11.36	0.40	
	46.00	35.35	2.91	
	25.00	31.31	1.08	
	1.00	7.98	5.26	9.65
4	6.00	5.55	0.00	
	22.00	17.27	1.04	
	13.00	15.29	0.21	
	1.00	3.90	1.47	2.72
5	11.00	11.89	0.01	
	36.00	37.00	0.01	
	33.00	32.76	0.00	
	10.00	8.35	0.16	0.18
6	17.00	13.61	0.61	
	37.00	42.34	0.55	
	37.00	37.49	0.00	
	12.00	9.55	0.40	1.56
7	4.00	5.02	0.03	
	19.00	15.62	0.53	
	14.00	13.83	0.01	
	1.00	3.52	1.16	1.76
8	14.00	10.83	0.66	
	33.00	33.71	0.00	
	28.00	29.85	0.06	
	7.00	7.61	0.00	0.72
9	1.00	3.30	0.98	
	10.00	10.28	0.00	
	12.00	9.10	0.63	
	2.00	2.32	0.01	1.64
10	7.00	7.27	0.01	
	23.00	22.61	0.00	
	20.00	20.02	0.01	
	5.00	5.10	0.03	0.05
11	12.00	13.08	0.03	
	34.00	40.70	0.94	
	29.00	36.04	1.19	
	24.00	9.18	22.32	24.48
12	3.00	3.96	0.05	
	8.00	12.33	1.19	
	16.00	10.92	1.92	
	3.00	2.78	0.03	3.19
13	3.00	6.87	1.65	
	23.00	21.38	0.06	
	19.00	18.93	0.01	
	7.00	4.82	0.38	2.30
14	4.00	5.81	0.30	
	10.00	18.09	3.18	
	20.00	16.02	0.76	
	10.00	4.08	7.19	11.43
15	11.00	8.19	0.65	
	23.00	25.49	0.16	
	23.00	22.57	0.00	
	5.00	5.75	0.01	0.82
16	6.00	7.00	0.04	
	20.00	21.79	0.08	
	21.00	19.29	0.08	
	6.00	4.92	0.07	0.26
17	3.00	7.40	2.05	
	23.00	23.02	0.01	
	24.00	20.39	0.48	
	6.00	5.19	0.02	2.56
18	10.00	6.74	1.13	
	24.00	20.97	0.31	
	13.00	18.57	1.38	
	4.00	4.73	0.01	2.83
19	13.00	7.00	4.32	
	17.00	21.79	0.84	
	21.00	19.29	0.08	
	2.00	4.92	1.19	6.42
20	4.00	6.08	0.41	
	20.00	18.91	0.02	
	17.00	16.74	0.00	
	5.00	4.27	0.01	0.44
21	3.00	3.43	0.00	
	8.00	10.69	0.45	
	12.00	9.46	0.44	
	3.00	2.41	0.00	0.89
22	10.00	7.40	0.60	
	28.00	23.02	0.87	
	18.00	20.39	0.17	
	0.00	5.19	4.24	5.89
23	9.00	8.59	0.00	
	23.00	26.72	0.39	
	31.00	23.66	1.98	
	2.00	6.03	2.07	4.43
24	12.00	12.95	0.02	
	48.00	40.29	1.29	
	33.00	35.67	0.13	
	5.00	9.09	1.42	2.86
25	3.00	5.15	0.53	
	19.00	16.03	0.38	
	17.00	14.20	0.37	
	0.00	3.62	2.69	3.97

Chi-squared		
column	1	14.70
column	2	15.27
column	3	12.26
column	4	52.87

no. of floors

Div. No.	Observed Freq.	Expected Freq.	Z	Chi-squared
1	13.00	11.19	0.15	
	13.00	16.44	0.53	
	15.00	13.72	0.04	
	4.00	3.65	0.01	0.73
2	18.00	10.44	4.77	
	15.00	15.34	0.00	
	9.00	12.81	0.85	
	0.00	3.41	2.48	8.10
3	20.00	24.37	0.61	
	28.00	35.80	1.49	
	30.00	29.89	1.05	
	14.00	7.95	3.88	7.04
4	4.00	9.95	2.98	
	11.00	14.61	0.66	
	18.00	12.20	2.30	
	7.00	3.24	3.27	9.22
5	11.00	21.63	4.75	
	31.00	31.78	0.00	
	32.00	26.53	0.93	
	13.00	7.06	4.20	9.88
6	36.00	25.36	4.05	
	30.00	37.26	1.23	
	33.00	31.11	0.06	
	3.00	8.27	2.75	8.09
7	18.00	10.69	4.33	
	17.00	15.71	0.04	
	8.00	13.11	1.62	
	0.00	3.49	2.56	8.56
8	23.00	20.14	0.28	
	34.00	29.59	0.52	
	18.00	24.70	1.56	
	6.00	6.57	0.00	2.35
9	2.00	6.96	2.86	
	9.00	10.23	0.05	
	12.00	8.54	1.03	
	5.00	2.27	2.19	6.13
10	10.00	17.65	2.90	
	29.00	25.93	0.28	
	25.00	21.65	0.37	
	7.00	5.76	0.10	3.62
11	27.00	24.12	0.23	
	40.00	35.43	0.47	
	21.00	29.58	2.21	
	9.00	7.87	0.05	2.96
12	12.00	10.69	0.06	
	17.00	15.71	0.04	
	13.00	13.11	0.01	
	1.00	3.49	1.13	1.24
13	27.00	17.65	4.43	
	21.00	25.93	0.76	
	20.00	21.65	0.06	
	3.00	5.76	0.89	6.14
14	13.00	10.94	0.22	
	17.00	16.07	0.01	
	13.00	13.42	0.00	
	1.00	3.57	1.20	1.43
15	10.00	15.67	1.70	
	20.00	23.01	0.27	
	26.00	19.21	2.06	
	7.00	5.11	0.38	4.41
16	16.00	13.68	0.24	
	21.00	20.09	0.01	
	15.00	16.77	0.10	
	3.00	4.46	0.21	0.55
17	7.00	11.94	1.65	
	13.00	17.53	0.93	
	16.00	14.64	0.05	
	12.00	3.89	14.87	17.49
18	4.00	12.68	5.28	
	19.00	18.63	0.00	
	21.00	15.55	1.57	
	7.00	4.14	1.35	8.20
19	11.00	13.43	0.28	
	19.00	19.73	0.00	
	19.00	16.47	0.25	
	5.00	4.38	0.00	0.53
20	17.00	11.69	1.98	
	21.00	17.17	0.65	
	9.00	14.33	1.63	
	0.00	3.81	2.88	7.14
21	8.00	6.47	0.17	
	7.00	9.50	0.42	
	6.00	7.93	0.26	
	5.00	2.11	2.71	3.56
22	19.00	12.93	2.40	
	20.00	18.99	0.01	
	12.00	15.86	0.71	
	1.00	4.22	1.75	4.87
23	20.00	18.40	0.07	
	24.00	27.03	0.24	
	25.00	22.57	0.17	
	5.00	6.00	0.04	0.51
24	18.00	23.62	1.11	
	49.00	34.70	5.49	
	25.00	28.97	0.42	
	3.00	7.70	2.29	9.31
25	7.00	8.70	0.17	
	20.00	12.78	3.53	
	8.00	10.67	0.44	
	0.00	2.84	1.93	6.08

Chi-squared		
column	1	47.67
column	2	17.59
column	3	19.76
column	4	53.11

age of building

Div. No.	Observed Freq.	Expected Freq.	Z	Chi-squared
1	6.00	5.46	0.00	
	4.00	4.26	0.01	
	9.00	9.48	0.00	
	12.00	13.85	0.13	
	8.00	5.63	0.63	0.77
2	6.00	5.46	0.00	
	3.00	4.26	0.01	
	15.00	9.48	2.66	
	8.00	13.85	2.07	
	5.00	5.63	0.00	4.74
3	24.00	12.61	9.40	
	19.00	9.83	7.65	
	14.00	21.88	2.49	
	24.00	31.96	1.74	
	9.00	12.98	0.93	22.22
4	4.00	5.60	0.22	
	3.00	4.37	0.17	
	2.00	9.73	5.37	
	20.00	14.20	1.98	
	11.00	5.77	3.88	11.61
5	12.00	12.61	0.00	
	9.00	9.83	0.01	
	23.00	21.88	0.02	
	35.00	31.96	0.20	
	11.00	12.98	0.17	0.40
6	15.00	14.29	0.00	
	18.00	11.14	3.63	
	29.00	24.80	0.55	
	26.00	36.22	2.61	
	14.00	14.71	0.00	6.80
7	6.00	6.02	0.04	
	6.00	4.70	0.14	
	10.00	10.45	0.00	
	18.00	15.27	0.33	
	3.00	6.20	1.18	1.68
8	9.00	10.65	0.12	
	5.00	8.30	0.94	
	12.00	18.48	1.93	
	33.00	26.99	1.13	
	17.00	10.96	2.80	6.93
9	1.00	3.08	0.81	
	1.00	2.40	0.34	
	3.00	5.35	0.64	
	13.00	7.81	2.81	
	4.00	3.17	0.03	4.64
10	7.00	9.67	0.49	
	0.00	7.54	6.57	
	9.00	16.78	3.16	
	22.00	24.50	0.16	
	31.00	9.95	42.43	52.80
11	6.00	13.03	3.27	
	7.00	10.16	0.69	
	19.00	22.61	0.43	
	50.00	33.02	8.22	
	11.00	13.41	0.27	12.89
12	4.00	6.02	0.39	
	7.00	4.70	0.69	
	10.00	10.45	0.00	
	15.00	15.27	0.00	
	7.00	6.20	0.01	1.10
13	4.00	9.81	2.87	
	12.00	7.64	1.94	
	29.00	17.02	7.74	
	23.00	24.86	0.07	
	2.00	10.10	5.72	18.35
14	11.00	6.45	2.55	
	5.00	5.02	0.03	
	16.00	11.18	1.67	
	11.00	16.33	1.43	
	3.00	6.63	1.48	7.17
15	12.00	8.69	0.91	
	7.00	6.77	0.01	
	14.00	15.07	0.02	
	15.00	22.02	1.93	
	4.00	8.94	2.21	5.08
16	4.00	7.71	1.33	
	8.00	6.01	0.37	
	7.00	13.37	2.58	
	31.00	19.53	6.16	
	5.00	7.93	0.75	11.19
17	9.00	7.15	0.26	
	3.00	5.57	0.77	
	14.00	12.40	0.10	
	16.00	18.11	0.14	
	9.00	7.36	0.18	1.44
18	5.00	7.43	0.50	
	3.00	5.79	0.90	
	8.00	12.89	1.49	
	15.00	18.82	0.59	
	22.00	7.64	25.11	28.60
19	4.00	7.01	0.90	
	4.00	5.46	0.17	
	9.00	12.16	0.58	
	15.00	17.75	0.29	
	18.00	7.21	14.68	16.61
20	15.00	6.02	11.92	
	6.00	4.70	0.14	
	9.00	10.45	0.09	
	13.00	15.27	0.20	
	0.00	6.20	5.24	17.59
21	5.00	3.64	0.20	
	6.00	2.84	2.49	
	8.00	6.32	0.22	
	3.00	9.23	3.56	
	2.00	3.75	0.42	6.89
22	7.00	7.15	0.02	
	7.00	5.57	0.16	
	16.00	12.40	0.78	
	18.00	18.11	0.01	
	3.00	7.36	2.02	2.98
23	10.00	10.51	0.00	
	5.00	8.19	0.88	
	15.00	18.23	0.41	
	36.00	26.63	2.95	
	9.00	10.82	0.16	4.41
24	15.00	13.03	0.17	
	7.00	10.16	0.69	
	40.00	22.61	12.61	
	30.00	33.02	0.19	
	1.00	13.41	10.58	24.25
25	3.00	4.90	0.40	
	2.00	3.82	0.46	
	14.00	8.51	2.93	
	15.00	12.43	0.35	
	1.00	5.05	2.49	6.63

Chi-squared		
column	1	36.78
column	2	29.91
column	3	48.46
column	4	39.25
column	5	123.37

LEBANON CITY PLANS 1:12,500

EDITION 6–AMS

BEYROUTH

REFER TO THIS MAP AS:
BEYROUTH
SERIES K921

PORT Old French admin. divisions

Street tramways

Fold-out reference map for M.Litt. thesis:-
"The Urban Geography of Beirut....."

US Army map 1962, additions EWEH 1965.