THE INFLUENCE OF NATURAL AND CULTURAL ENVIRONMENT ON THE FABRIC OF THE CITY, WITH SPECIAL REFERENCE TO IRAQ

SAHER MOHAMAD AL-KAISSI

B.S.C.,Hon.(Arch); M.A. Urban Design

A Thesis Submitted to the University of Sheffield

for the Degree of Doctor of Philosophy

DEPARTMENT OF TOWN AND REGIONAL PLANNING

1983

VOLUME CONTAINS CLEAR OVERLAYS

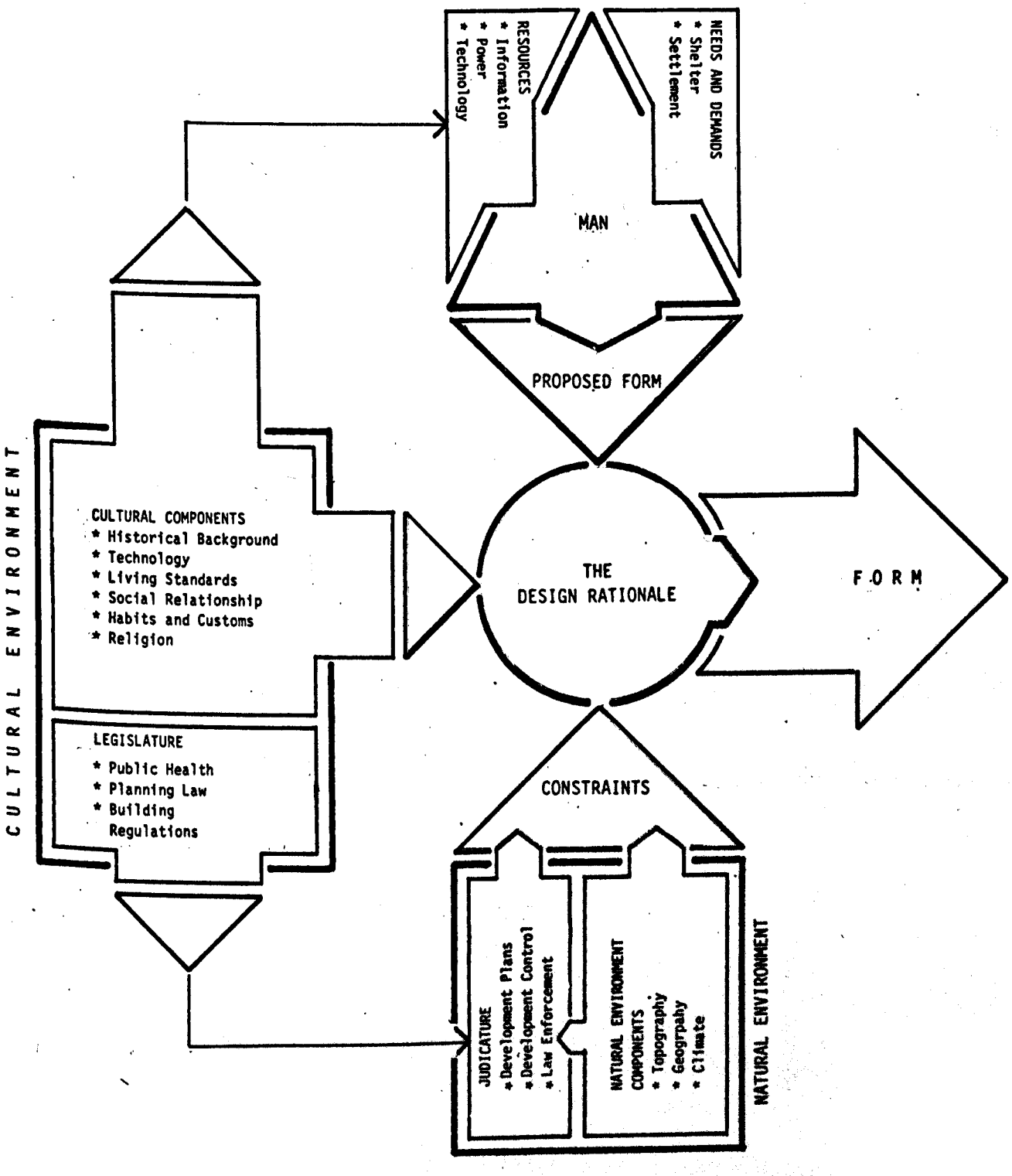
OVERLAYS HAVE BEEN SCANNED SEPERATELY AND THEN AGAIN OVER THE RELEVANT PAGE

G · H

An Analysis Of The Case Study On Both The Micro Level (Individual Building) and Macro Level (Urban Fabric)

VOLUME 3

A MODEL OF THE PROCESS OF DEVELOPMENT OF URBAN BUILT FORM.



G

THE TRADITIONAL URBAN FABRIC

[G.1] URBAN AREA - URBANIZATION

An everyday definition of a town would be in terms of a free-standing residential area with a service core (or very closely linked cores) with sufficient number, variety and status of shops and services, including perhaps a market, to make it recognisably urban. Some definitions have focussed on population size or residential density as criteria for urban classification. In the definition adopted here emphasis is given to service functions and we might expect an urban area to include administrative, commercial, educational, entertainment and other 'central place' functions and, in many cases, evidence of being historically well-established. A local network of roads and other means of transport would focus on the town, and it would be a place drawing people for services and employment from surrounding areas. It might also be a place known beyond its immediate vicinity, perhaps very well known like Stratford-upon-Avon [OPCS, 1981, p.2].

Therefore the expression 'urban area' has a variety of definitions and particularly in the context of different nations. Each of the definitions that have been proposed have emerged in order to serve certain purposes, i.e. administrative, political, historical, or cultural considerations as well as demographic criteria. Some countries adopt a simple measure of population size to identify the urban area; in Denmark a settlement of 200 people constitutes a town, as it does in Sweden and Finland. In Greece a settlement must have over 10,000 inhabitants before it can be called a town. Most other definitions used in disparate countries can be encompassed between these widely different figures: a thousand inhabitants makes a town in Canada and Venezuela, but 2,500 in

FIGURE: G.1.

THE PROPORTION OF URBANIZATION IN MAJOR COUNTRIES

Rank	Country	Population Urban under Local Definition (%)	Rank	Country	Population Urban under Local Definition (%)
			32	South Africa	47.93
2	Australia	85.56	33	Panama	47.83
3	Sweden	81.40	34	Hungary	47.55
4	New Zealand	81.35	35	Iceland	46.48
5	Denmark	79.93	36	Mongolia	46.40
	(England and Wales)	(78.25)	37	Norway	44.86
6	Netherlands	77.71	38	Syria	43.30
7	United Kingdom	76.91	39	Egypt	42.88
8	Canada	76.09	40	Cyprus	42.40
9	Chile	75.97	41	Iran	41.90
10	Venezuela	75.72	42	Korea	41.17
11	East Germany	73.78	43	Romania	41.15
12	United States	73.48	44	Belgium	40.16
13	Japan	72.17	45	Dominican Republic	39.76
	(Scotland)	(70.85)	46	El Salvador	39.43
14	France	69.99	47	Ecuador	39.15
15	Luxembourg	68.40	48	Yugoslavia	38.56
16	Greece	64.84	49	West Germany	38.43
17	Cuba	60.47	50	Turkey	37.55
18	Mexico	60.27	51	Jamaica	37.08
19	Iraq	60.21	52	Paraguay	35.71
20	Lebanon	60.11	53	Morocco	35.18
21	Soviet Union	58.32	54	Albania	33.46
22	Bahamas	59.74	55	Gabon	32.00
	(Puerto Rico)	(56.48)	56	Philippines	31.74
23	Brazil	55.90	57	Zambia	30.38
24	Bulgaria	55.18	58	Guyana	29.53
	(N. Ireland)	(55.11)	59	Ghana	29.00
25	Switzerland	54.59	Selected:	W.Malaysia	28.72
26	Peru	53.97		Sri Lanka	22.36
27	Poland	52.89		India	20.17
28	Ireland	52.23		Tanzania	19.42
29	Austria	51.86		Indonesia	17.42
30	Finland	50.93		Pakistan	13.12
31	Nicaragua	48.61		Uganda	7.67

Vance, J.E., This Scene of Man, 1977, p.11

the United States, whilst there must be 5,000 people to make a town in Ghana and India (Figure G.1).

Urban areas may also be defined in terms of the built-up area 'bricks and mortar' - as areas of continuous physical development but under certain circumstances a numerically small settlement may have urban characteristics. In providing services such as shops, educational facilities, administrative functions, serving as a religious centre or a centre for tourism, employment and other activities, it can be considered as a functional area [Jones, 1966, p.3; Hall, 1973, pp.42-46].

The functional area may embrace not only the town's built-up area but also free-standing settlements outside it, together with tracts of surrounding countryside, if the population in these surrounding areas depends on the town for services and employment, [UN, 1955, p.16].

The United Nations Demographic Yearbook defines urban areas into three major types:

1. Classification of minor civil division on chosen criteria which may include:
   (a) type of local government
   (b) number of inhabitants
   (c) proportion of population engaged in agriculture

2. Classification of administrative centres of minor rural divisions as urban and the remainder of the division as rural;

3. Classification of certain size localities (agglomerations) as urban, irrespective of administrative boundaries [UN, 1955, p.16].

With these approaches to defining urban areas there are problematic fringe areas of transitional characteristics and any eventual boundary must be an approximation. In a formal definition of the city, this fringe area will have 'rural-urban' qualities in which the patterns of land use and the density of population and settlement gradually change from being characteristically urban to rural [UN, 1955, p.16]. However, in Iraq, the definition of urban area, in the last population census of 1965, was taken as any settlement which had been declared as a municipal area regardless of size and available services [Herbert, 1972, p.20].

Urbanization is the process of becoming urban, moving to cities and changing from agriculture to other pursuits common to cities. To create urban areas or to improve existing centres, it is necessary to improve the cultural and physical environments and to provide or refresh the economic resources, in order to meet the needs and demands of society and to create a pleasant setting for work and leisure. This encourages migration and increases immigration. In this sense urbanization and planning are related to each other, since new development and smooth growth need a system of control to create a balance between different needs and demands and different activities for the new urban dwellers on the one hand and in relation to the population of the surrounding areas on the other hand. This marriage between urbanization and planning plays a major role in terms of urban planning, which is identified by Whittick as 'the grouping of

buildings that serve communities and it dates from the dawn of civilization. Yet as a specific autonomous professional activity, subject to legislation and administration, it is largely a phenomenon of the twentieth century' [Whittick, 1974, p.17].

The degree of urbanization of a nation for statistical purposes is generally defined as the proportion of the population resident in urban places. Urbanization involves two processes (according to Hope Tisdale Eldridge [Hauser, P.M., 1965, pp.1-47]:

(a) The multiplication of points of concentration

(b) The increase in the size of individual concentrations

However, settlement size is not an adequate basis for definition of an urban area because urbanization is more than agglomeration and growth of population in a settlement. Urbanization is also a social and cultural process and for this reason it may be more appropriate to define urban areas according to its function or its administrative/hierarchical position within the country.

When urban features become universal and common, independent of physical concentration as a result of media and technological influence, this reduces the large differences between the urban areas in different regions and between urban and rural areas. However, despite urban features of a cultural nature being distributed over wide areas, there are still differences in the physical appearance of the urban fabric. This is because the form of the urban fabric is the result both of natural factors (which are almost constant over time) and cultural factors which are subject to change.

Urbanization and its attendant problems have become primary concerns in modern Iraq and it is to these specific questions that we turn.

[G.2] LEVEL AND PACE OF URBANIZATION IN IRAQ

Iraq witnessed the creation of the first urban settlements during the Ancient period and urbanization increased rapidly during the Islamic period until the mid-thirteenth century when many of the urban population returned to a nomadic, tribal way of life in order to enjoy greater security due to the recurring conquest of the area by Mongols and others (see Section D). But during the seventeenth and eighteenth centuries new urban settlements began to appear, mainly in the southern region [Smith, 1971, p.69] and continued to increase rapidly eventually to be distributed over the whole country at the beginning of this century. The end of the Medieval era was marked by the break-up of the Ottoman Empire. Modernization due to occupation of the country by the British started in the early 1920s and continued into the 1930s [Shafi, 1973, p.16]. In the mid-twentieth century the urban areas of Iraqi society were once again a dominant force in national life as a result of increasing oil revenues and modernisation.

The ecological development of the population of Iraq can be categorised as follows:

The first period stretched from the mid-nineteenth century to the 1930s which witnessed the relative decline in the nomadic population who lived mostly in the desert and steppe lands. The nomads increasingly formed a settled rural population (Table G.1, Figure G.2). After the First World War the change from subsistance to commercial farming and the export of agricultural products meant new employment opportunities in the countryside, which continued until the 1930s. At this time migration from rural areas was on a relatively small scale.

IRAQ'S POPULATION - DEVELOPMENT OF THE NOMADIC , RURAL AND URBAN COMPONENTS, 1867-2000
(EXCLUDING IRAQIS ABROAD)
(MILLION)

Year	Total Population	Urban		Rural		Nomadic	
		No.	%	No.	%	No.	%
1867	1,280	0.307	24.0	0.525	41.0	0.448	35.0
1890	1.726	0.432	24.0	0.862	50.0	0.432	25.0
1905	2.250	0.540	24.0	1.328	59.0	0.383	17.0
1930	3.288	0.822	25.0	2.236	68.0	0.230	7.0
1947 *	4.816	1.734	36.0	2.841	59.0	0.240	5.0
1957 *	6.299	2.445	38.8	3.604	57.2	0.250	4.0
1965 *	8.047	4.112	51.1	3.696	45.9	0.240	3.0
1970	9.440	5.452	57.8	3.988	42.2	-	-
1975	11.124	7.083	63.7	4.040	36.3	-	-
1980	13.214	9.120	69.0	4.094	36.0	-	-
2000	23.0 - 25.0	16.0 - 20.0	70.0 - 80.0	5.0 - 7.0	20.0 - 30.0	-	-

* Census years, the rest are estimates and projections

Sources:

(a) Hasan, M.S. Growth and Structure of Iraq Population 1867-1930, in C Issawi, Economic study of the Middle East, University of Chicago, Chicago, 1966.

(b) C.S.O. Annual Abstract of Statistics, 1971, Baghdad, P.51

(c) Ueda, K., UN Demographer, UNOTC, Report on Revised Population Estimates in Iraq by Rural-Urban, 1957-1980, Ministry of Planning, Baghdad, P.14.

(d) Shafi, S.S., U.N. Planning Advisor, Urban Planning In Iraq, Baghdad, 1973, P.13.

TABLE: G.1.

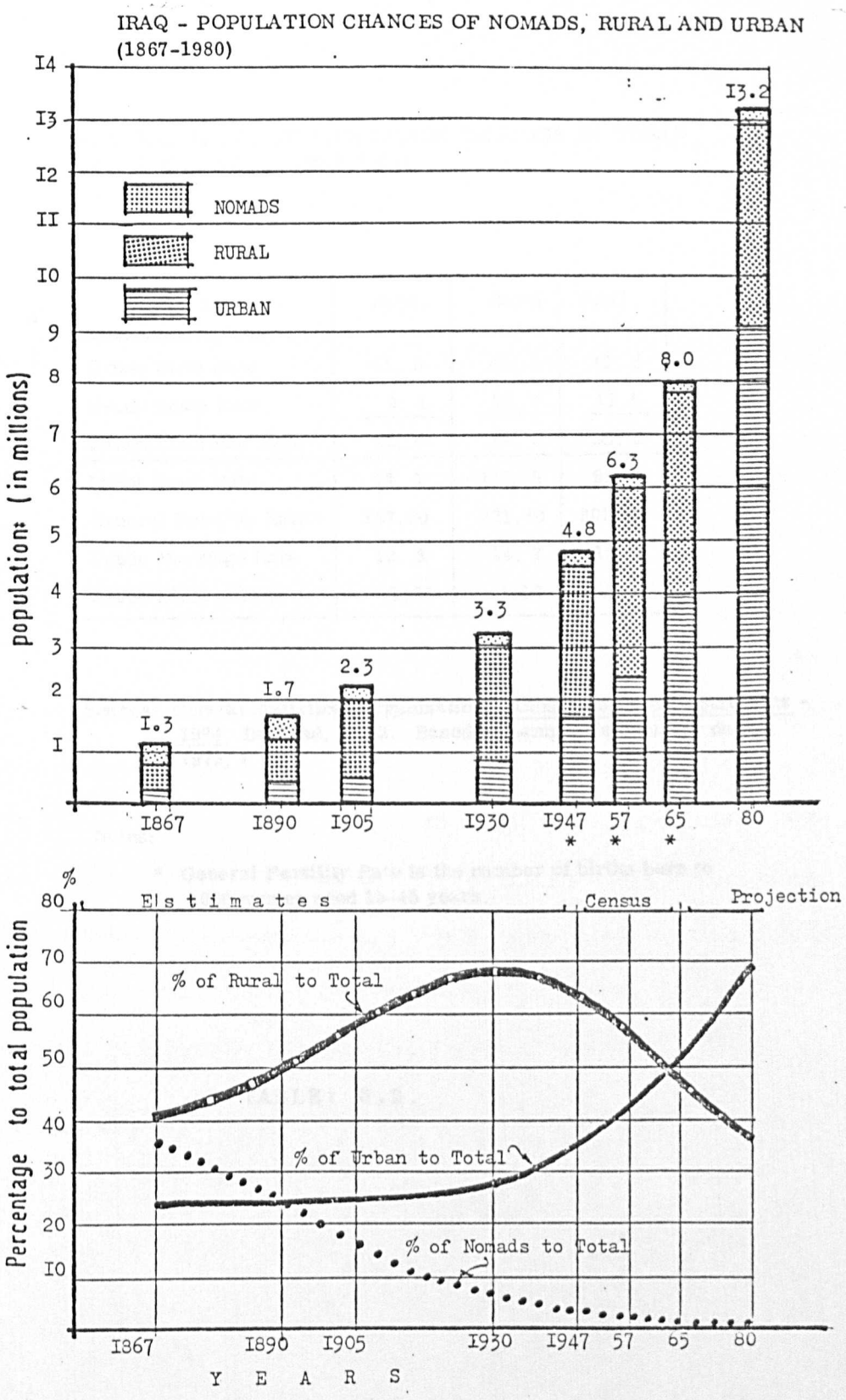


FIGURE: G.2.

Iraq - Population Chances of Nomads, Rural and Urban.

NATURAL RATES OF POPULATION INCREASE IN URBAN AND RURAL AREAS (PER 1000)

Rates	Urban	Rural	Total
Crude Birth Rate	41. 0	47. 5	43. 6
Crude Death Rate	9. 4	13. 3	11.1
Natural Increase Rate	31. 6	34. 2	32. 5
Infant Death Rate	77. 1	111. 3	91. 8
General Fertility Rate *	187.90	221.40	201.04
Crude Marriage Rate	13. 3	14. 2	13. 8
Crude Divorce Rate	1.60	1.10	1.85

Source: Central Statistical Organisation, Annual Abstract of Statistics - 1974, Baghdad, P.52. Based on sample field survey during 1973/4

Notes:

* General Fertility Rate is the number of births born to 1000 women aged 15-45 years.

TABLE: G.2.

From 1930 until the first national population census of 1947, Iraq's population grew from 3.28 to 4.82 million, expanding by 1.47 times. At the same time the urban population grew by a factor of 2.11. Comparatively, in the period between the first population census of 1947 and the latest of 1965, Iraq's population expanded by a factor of 1.67, while the urban component expanded by a factor of 2.37, representing 51.1 per cent of the total population. The urban population was expected to reach 69.0 per cent of the national population in 1980 [Ueda, 1970] (Table G.1, Figure G.2).

The above figures show the rapid increases in the urban population, which is not merely due to rural-urban migration, but to the phenomenon of a high rate of natural increase in urban areas since the Second World War [U.E.D.K., U.N. Demography 1957-1980; Toxes, L.W., 1969, p.213; Jones, 1967] (Table G.2). Population will continue to grow within the towns, requiring careful consideration of basic principles for development to cope with this rapid growth whereby people can live in a good environment.

[G.3] GEOGRAPHICAL DISTRIBUTION OF POPULATION

The distribution of population in the country is highly unbalanced (Figure G.3). Since the middle of the nineteenth century the population of the Central region has been growing at the expense of the Northern and Southern regions and in particular according to a projection [Ueda, 1970, p.23] the regions of Baghdad, Basrah and Kerbela are growing particularly quickly. The national average density grew from 10.9 persons per square kilometre in 1947 to 18.3 in 1965.

If desert areas are excluded, population densities are more dramatic. The contrast between density of total area (18.3 persons per square kilometre in 1965) and the density of cultivated area (107.0 persons per square kilometre) for the same year is great [Berger, 1963]. Generally, the total population of Iraq is still relatively small in relation to natural resources [Ueda, 1970, p.23].

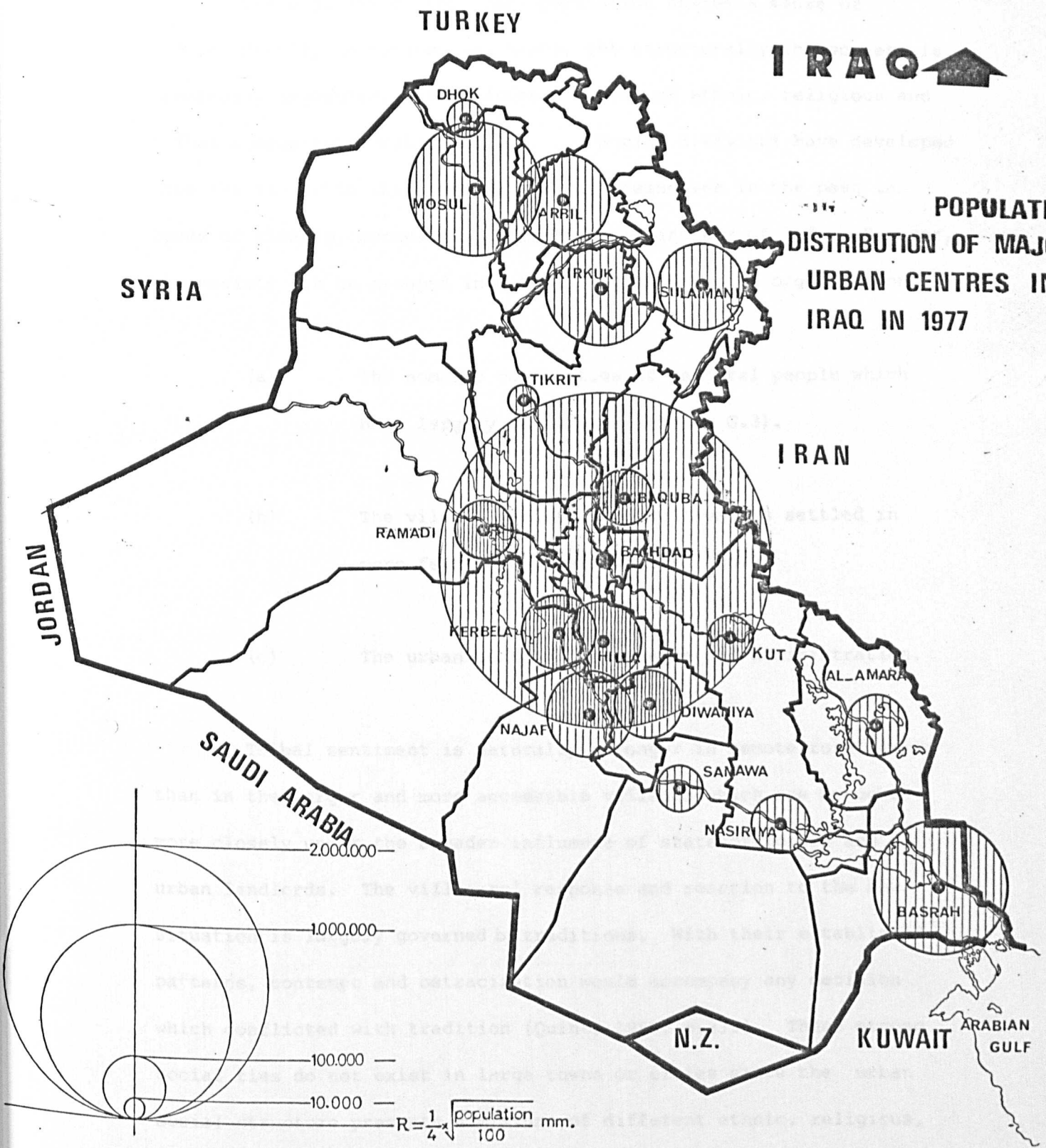

TURKEY
IRAQ
DHOK
MOSUL
ARRIL
KIRKUK
SULAIMANI
POPULATIC
DISTRIBUTION OF MAJO
URBAN CENTRES IN
IRAQ IN 1977
SYRIA
TIKRIT
IRAN
BAQUBA
RAMADI
BAGHDAD
JORDAN
KERBELA
KUT
AL-AMARA
DIWANIYA
NAJAF
SAMAWA
SAUDI ARABIA
NASIRIYA
BASRAH
2.000.000
1.000.000
100.000
10.000
R = 1/4 √(population/100) mm.
N.Z.
KUWAIT
ARABIAN
GULF

FIGURE: G.3.

[G.4] SOCIAL STRUCTURE AND ITS INFLUENCE ON THE URBAN FORM

The majority of the Iraqi population shares a sense of common identity as Moslems and Arabs, yet structurally the society is remarkably segmented; it includes a number of ethnic, religious and tribal communities (Table G.3). Social divisions have developed from the manner in which people grouped themselves in the past in terms of kinship, occupation, neighbourhood and way of life. However, the society can be grouped into three types of social organization:

(a) The nomadic communities of pastoral people which have largely disappeared (Table G.3).

(b) The village societies of cultivators settled in more fertile and well-watered lands.

(c) The urban centres of commerce and administration.

Tribal sentiment is naturally stronger in remote rural areas than in the larger and more accessible villages which are brought more closely under the broader influence of state officials and urban landlords. The villagers' response and reaction to the new situation is largely governed by traditions. With their established patterns, contempt and ostracization would accompany any decision which conflicted with tradition [Quint, 1958, p.375]. These strong social ties do not exist in large towns or cities since the urban social structure presents a mixture of different ethnic, religious, educational and occupational groups.

Generally, the status of an individual in Iraqi society is determined to some extent by the position of his family. Rights and obligation centre on the extended family and lineage. The family is

IRAQ'S POPULATION BY RELIGIONS (1965)

Religion	2 as % of (6)	Urban		Rural		Total	
		No.	%	No.	%	No.	%
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Moslem	50.47	3, 914,884	(94.06)	3, 841,108	(97.6)	7,755,992	(95.79)
Christian	89.18	211,880	(5.09)	25,695	(0.65)	237,575	(2.93)
Jew	95.98	3,080	(0. 07)	129	(0.003)	3,209	(0.04)
Subi	95.24	13,878	(0.33)	694	(0.018)	14,572	(0.18)
Yazidi	12.78	8 ,905	(0,21)	60, 760	(1. 54)	69 ,665	(0.86)
Bahai	84.61	819	(0.02)	149	(0.004)	968	(0.01)
Others	80.52	281	(0.007)	68	(0.002)	349	(0.004)
Unknown	56.23	8, 379	(0. 20)	6,521	(0.17)	14,900	(0.18)
TOTAL	51.40	4,162,106	(100.0)	3,935,124	(100.0)	8,097,230	(100.0)

Source: Author's calculation based on data from:

Central Statistical Organization, General Population Census, 1965, Baghdad, 1973, PP.493.-495

TABLE: G.3.

the primary focus of loyalties, which play an important role in the everyday life of the individuals.

However, great changes are taking place in the Iraqi social system especially in the large urban centres. The ethos of the city tends to emphasize individual achievement instead of birth and kinsmanship. Moreover, the individual becomes gradually less dependent on his family, economically or socially. This phenomenon has helped to break down the importance of the extended family.

The position of men in society is still one of dominance over women, although this position differs within the society from one group toanother, depending upon the educational, religious, occupational and ethnic status [Baer, 1964, p.34]. Social status has a great and direct influence on urban planning and urban developing, especially in terms of urban spatial structure and the design and use of housing.

[G.5] SOCIO-ECONOMIC CONDITIONS

Iraq in general, like other developing countries, faces similar problems of having a lower per capita income, malnutrition, low standards of health, endemic diseases, short life expectancy, high child mortality, high illiteracy and low productivity. In these countries the high standard of living in the cities creates better socio-economic conditions than the national average level of other parts of the country. Even within cities themselves the socio-economic conditions and the share of the available services differ from one city to another depending upon their position within the whole country. The prime city, Baghdad, has the highest share of national resources, especially in economic benefits.

The average Gross National Product per capita grew from 64.9 ID in 1957 to 93.6 ID in 1970 at 1962 prices. That is a growth of 44.2 per cent in thirteen years, in spite of the fact that the total GNP grew by 115.8 per cent during the same period [Farman, 1977, p.50]. The apparent discrepancy is the result of population growth by 49.8 per cent.

The average per capita income for 1956 in rural areas was estimated at 29.7 per cent of that in urban areas [Farman, 1977, p.50]. For 1972, the average annual per capita expenditure for Iraq was 76.3 ID with a spread from 92.4 ID in urban areas to only 55.5 ID in rural areas [CSO, 1972]. These figures show clearly the big differences in the income level between rural areas and the urban centres. In spite of the oil revenues and the new ideas and technology, imported mainly from the Western countries, the rural hinterlands are still moving slowly in comparison with change in the city.

Lack of materials, skills and education in the countryside made the cities centres of attraction for people seeking jobs or families wishing to improve their standard of living, which created the migration to the cities, causing many problems for them. Since then, and with the new governmental system, new programmes have been introduced and implemented in order to enhance standards in the rural areas which have led to some improvement, yet the gap between the cities and rural areas is still wide. The majority of earnings in rural areas are barely above subsistence level [Smith, 1971, p.27].

Urban centralization, movement and growth of population have all created problems of shortages and lacks in services and utilities in both the urban centres and rural areas. The biggest problem is how to get all the growth factors going together at the same time, and also to create a balance in the growth between urban and rural areas. This was, and remains, the main task of the different administrations which have governed the country since 1950. Five national development plans had been prepared over this period.

The first was a very ambitious plan compared with previous programmes of capital expenditure and it also included industrial policy for the first time. The sharp increases in the oil revenues encouraged more ambitious steps towards developing the country [Jabal, 1972, p.36] with the completion of several studies especially in the field of drainage, communications and housing. In addition Lord Salter recommended a more flexible and more diversified programme of development [Development Board and the Ministry of Planning, 1965, p.3]. Increased funds were given to support projects geared to meet immediate human needs such as hospitals, drinking water supply (Table G.4) in addition to development

CONSOLIDATED BUDGET FOR SELECTED YEARS (AT CURRENT PRICES IN MILLIONS IDs)

	1960/61 M.ID. (%)	1964/65 M. ID.(%)	1968/69 M.ID. (%)	1970/71 M.ID.(%)
Revenue:				
Oil income	95.0 (62.9)	129.6 (61.8)	179.4 (61.0)	183.1 (52.2)
Direct Taxes	9.4 (6.2)	15.0 (7.1)	23.4 (8.0)	35.2 (10.0)
Indirect Taxes	33.5 (22.2)	41.2 (19.6)	47.8 (16.2)	65.7 (18.7)
Profits of Govern. Agencies	10.2 (6.8)	18.8 (9.0)	22.4 (7.6)	34.4 (9.8)
Other income	3.0 (1.0)	5.2 (2.5)	21.3 (7.2)	32.3 (9.3)
(A) Total Revenues	151.1 (100.0)	209.8 (100.0)	294.3 (100.0)	350.7 (100.0)
(A) as % in (D)	94.6	83.6	96.1	91.2
Expenditure:				
(i) Ordinary Budget				
National Defence	44.1 (38.6)	67.8 (38.0)	111.0 (45.9)	152.1 (47.7)
Education	24.5 (21.4)	34.7 (19.5)	51.9 (21.5)	61.7 (19.4)
Health	6.2 (5.4)	7.4 (4.1)	10.0 (4.4)	13.7 (4.3)
Pensions	6.9 (6.1)	10.7 (6.0)	16.4 (6.7)	21.2 (6.7)
Others	32.6 (28. 5)	57.5 (32.3)	52.0 (21.5)	70.0 (22.0)
(B)Total Ordinary Budget	114.3(100.0)	178.1 (100.0)	241.9 (100.0)	318.7 (100.0)
(B) As % in (D)	71.5	70.6	79.0	82.9
(ii) Investment Budget:				
Agriculture	10.8 (23.7)	6.7 (9.0)	13.2 (20.5)	11.7 (17.8)
Industry	5.7 (12.5)	16.5 (22.2)	18.1 (28.1)	17.6 (26.8)
Transport & Com.	7.9 (17.4)	18.9 (25.4)	9.9 (15.4)	6.1 (9.3)
Construction & Soc.Services	18.1 (39. 7)	14.6 (19.7)	13.0 (20.2)	8.7 (13.7)
Others	-	17.6 (23.7)	10.1 (15.7)	21.6 (32.9)
(C) Total Investment Budget	45.5 (100.0)	74.3 (100.0)	64.4 (100.0)	65.7 (100.0)
(C) as % in (D)	28.5	29.4	21.0	17.1
(D) Total Expendit - ure	159.8	252.4	306.3	384.4
Deficit	8.7	42.6	12.0	33.7

Sources: Author's calculation based on data from:

(a) Annual reports of the Central Bank of Iraq, cited by Smith, H.H., and others. The American University of Washington. Area Handbook for Iraq, Washington D.C., 1971, PP.324-5.

(b) C.S.O., Annual Abstract of Statistics, 1971, PP.381-2, 396.

TABLE: G.4.

of agriculture in the third pevelopment plan for the period up to 1959. After 1960 a shift from agriculture towards industry is noticeable. The fourth plan for 1959-1962 mainly emphasised housing development (Table G.4). The fifth plan for 1961-1965 gave priority to industry. Then came the sixth plan for 1965-1969 which gave industry as the first priority and agriculture a second focus. Since 1970 agriculture has become the first priority ahead of industry.

Investment programmes followed the development plans. Expenditure on all the mentioned development plans was less than originally planned. The ratio of expenditure to allocation over the period 1951 to 1958 was 54.6 per cent, dropping to 50.9 per cent for 1950 to 1965 [Jalal, 1972, p.63]. But for the 1965-1969 period, the ratio climbed up to 58% per cent [Ministry of Planning, 1971, p.28]. Data from the first three years of the 1970-1974 plan show that in all sectors the ratio of expenditure to allocation has risen to 67.0 per cent in 1970 and 95.5 per cent in 1972. The failures in the early period were due to over ambitious plans, administrative inefficiency and political instability [UN, 1969]

Public building investment was the highest area of allocation of all sectors in the development plans but construction was much below the target as a result of the limited capacity of the building industry.

Certainly the need for new building and renovation of older urban neighbourhoods is a high priority but Iraq needs a strategy for urban development and urban design which goes beyond investment planning.

[G.6] PATTERN OF SETTLEMENTS

Small settlements, cities and large towns in Iraq are almost always located on water courses, usually on the major rivers or their larger tributaries. Most cities and towns are often also strategically located on a major highway.

The main concentrations of urban population in modern Iraq appear in five locations: Ninevah and Kirkuk in the north, Baghdad the capital and Kerbela in the middle, and Basrah in the south. Together these five cities held 60 per cent of Iraq's urban population in 1965 while the remaining 40 per cent of the urban population are held by the remaining eleven provinces.

The city of Baghdad stands out among the urban centres of the country and the Middle East. In 1965, the city held 1.490 million inhabitants representing 18.5 per cent of the country's total population or 36.3 per cent of its urban component (Table G.5) Basrah's population was 0.311 million and Mosul city supported 0.264 million inhabitants.

In general, half the population of Iraq during the 1955 census were living in settlements of more than 2,000 people which numbered 145 (Table G.6, Figure G.4). Small settlements (villages) averaged 265 inhabitants per village in 1957. Villages in the north-eastern part of the country in general are smaller than those in the southern lowland.

The most important feature of the settlement pattern of Iraq is the predominance of a large urban centre with a scarcity

INTERCENSAL POPULATION CHANGE OF URBAN COMPONENT

Category	Population (million)			Annual Rate of Growth %			Percentage to Iraq's Total			Percentage of Iraq's Urban		
	1947	1957	1965	1947 to 1957	1957 to 1965	1947 to 1965	1947	1957	1965	1947	1957	1965
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
1. Iraq Total	4.816	6.299	8.047	2.7	3.1	2.9	100.0	100.0	100.0	-	-	-
2. Iraq -Urban	1.734	2.445	4.112	3.5	6.7	4.9	36.0	38.8	51.1	100.0	100.0	100.0
3. Four Main Cities	0.819	1.256	2.241	4.3	7.5	5.8	17.0	19.8	27.8	47.2	51.4	54.5
4. Cities over 100,000	0.750	1.356	2.375	6.1	7.3	6.6	15.7	21.5	29.5	47.3	55.5	57.8
5. Towns over 50,000	0.875	1.613	2.900	6.3	7.6	6.9	18.2	25.6	36.0	50.5	66.0	70.5
6. Towns over 20,000	1.077	1.901	3.232	5.9	6.9	6.3	22.4	30.5	40.2	62.1	77.8	78.6
7. Towns over 10,000	1.245	2.083	3.565	5.3	7.0	6.0	25.4	33.1	44.3	71.8	85.2	86.7
8. Towns over 5,000	1.406	2.309	3.842	5.1	6.6	5.7	29.2	36.7	47.7	85.1	94.4	93.4
9. All urban except Baghdad	1.219	1.652	2.621	3.1	5.9	4.4	25.3	26.2	32.6	70.3	67.6	63.7
10. Baghdad City (Urban only)	0.515	0.793	1.491	4.4	8.2	6.1	10.7	12.6	18.5	29.7	32.4	36.3

* comprise Baghdad, Mosul, Basra and Kirkuk

Sources: Author's calculation and tabulation based on:

a - 1947 Census
b - 1957 Census
c - Ministry of Planning, Iraq General Population Census of 1965, Bagbdad 1972, PP.3-28

TABLE: G.5.

IRAQ - PERCENTAGE OF POPULATION AND NUMBER OF URBAN SETTLEMENTS IN EACH SIZE GROUP FOR 1947, 57 and 65

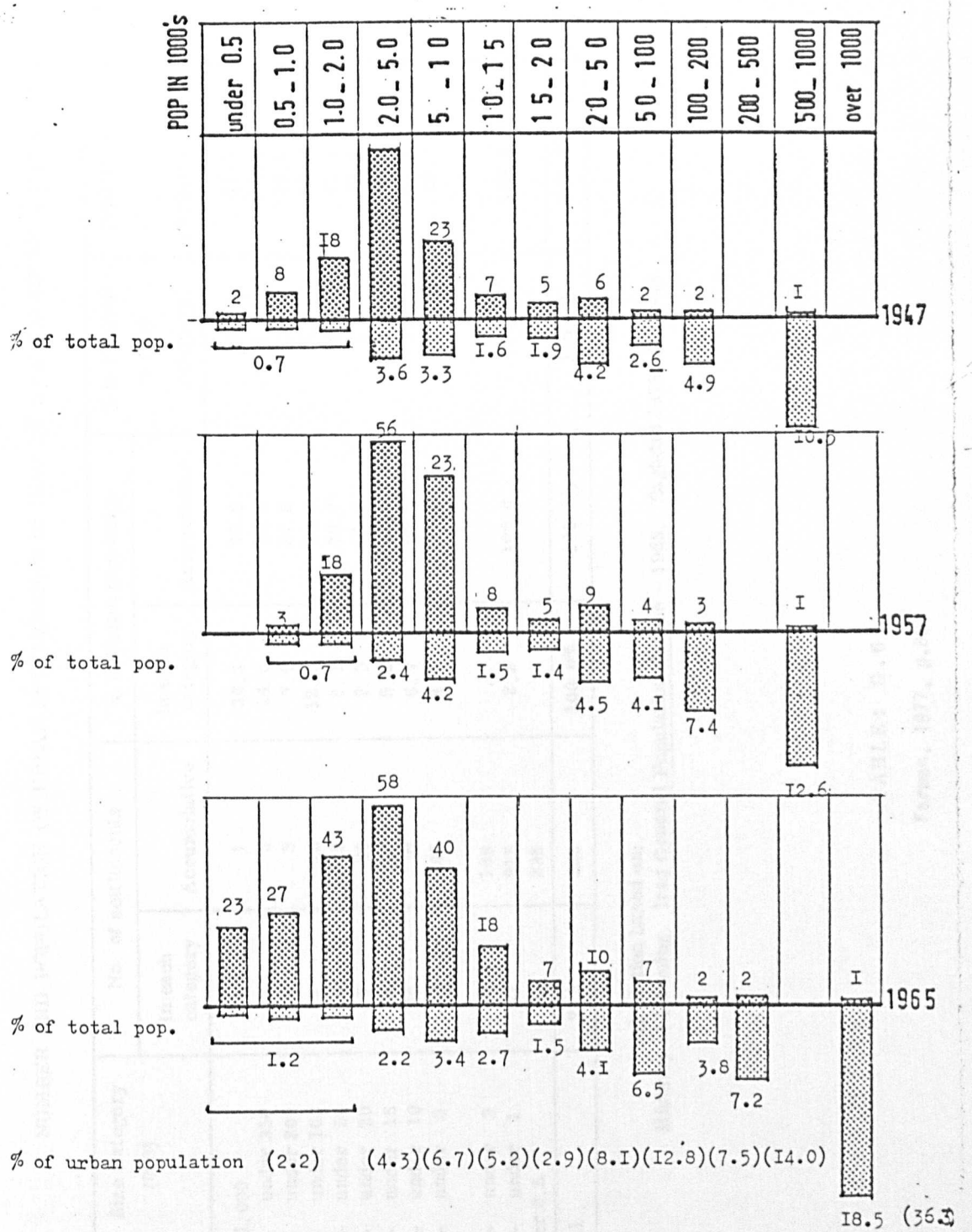


FIGURE: G. 4.

Farman, 1977, p.90

NUMBER AND POPULATION OF URBAN SETTLEMENTS IN IRAQ BY SIZE CATEGORY (1965 CENSUS)

Size Category (000)	No. of settlements		% to Urban population		% to National in each category	Population Accumulative
	In each category	Accumulative	In each category	Accumulative		
Over 1,000	1	1	36.3	36.3	18.5	18.5
200 - under 350	2	3	14.0	50.3	7.2	25.7
100 - under 200	2	5	7.5	57.8	3.8	29.5
50 - under 100	7	12	12.8	70.6	6.5	36.0
20 - under 50	10	22	8.1	78.7	4.1	40.1
15 - under 20	7	29	2.9	81.6	1.5	41.6
10 - under 15	18	47	5.2	86.8	2.7	44.3
5 - under 10	40	87	6.7	93.5	3.4	47.7
2 - under 5	58	145	4.3	97.8	2.2	49.9
1 - under 2	43	188				
0.5 - under 1	27	215	2.2	100.0	1.2	100.0
Under 0.5	23	238				
Total	238	238	100.0%	100.0%	100.0%	100.0%

calculation based on:
Ministry of Planning, Iraq General Population Census - 1965, Baghdad 1972, PP. 3-28.

TABLE: G.6.

Farman, 1977, p.88

of medium sized settlements (Table G.6, Figure G.4).

In 1965 only seven towns were found with populations between 50,000 and 100,000 people. This is essentially a manifestation of uneven development and of economic opportunities within the country.

[G.7] HOUSING TYPES AND THE URBAN FABRIC AND THE CHARACTERISTICS OF DIFFERENT HOUSING FORMS

Factors of the natural and cultural environment have a major impact upon the form and the type of the urban fabric in Iraq over time and space. However, in general, the typical dwellings which are mostly one or two-storey buildings can be grouped into two categories:

1. Traditional courtyard housing within a compact layout represented by mixed social classes and different standards of living. This kind of fabric is usually found in the older parts of the cities such as Erbil in north-east Iraq, Baghdad in the middle, Najaf in the west and Basrah in the south of Iraq. This type of housing was usually built privately.

2. Modern compact housing within a loose layout; this type of housing usually includes more open spaces in the form of gardens surrounding each house, wide roads and playing fields in the neighbourhood. Socially this type of housing represents spatial segregation in the society according to economic and social status. These modern types are usually found in the more recently developed parts of the cities and are built by both government and the private sector. Each of these sectors consists of housing for the low and middle income people and in addition, the private sector provides for people with high incomes.

Due to the hot dry climate of the country, and in order to create comfortable spaces within the dwelling for the different seasonal and daily activities, urban houses generally require:

(a) Enclosed spaces which act as rooms

(b) Semi-enclosed or roofed spaces where shade can be provided as porches and verandahs

(c) Open spaces that belong to the house in the form of courtyards or gardens or accessible roofs

Socially, family privacy both indoors and outdoors is highly esteemed among the Iraqi people as among other Middle Eastern communities.

A purpose of the thesis is to assess the extent to which these forms of housing meet the functional and cultural needs of households in modern Iraq. Assessment is made by a case study of several housing areas in Baghdad preceded by general analysis of the main housing forms in the country.

[G.8] THE CITY OF BAGHDAD

G.8.1 THE DEVELOPMENT OF BAGHDAD

The previous chapters showed the influence of cultural factors on city development. The growth and expansion or deterioration of cities, their development or weakness and shrinkage, usually depends upon the power and importance of the specific urban area and its relation to its surroundings. But in both cases, of urban expansion or shrinkage, natural environmental factors play a major role complementary to the cultural factors in forming the city and its components.

Baghdad is one of the cities which has witnessed these complex determinations throughout its long history. The golden days of the city's development and expansion were during the Islamic empire when the city had the position of power as a capital of the Abbasid Calipha. The city showed first expansion in the tenth century when Al-Rashed embarked upon development outside the walls of the round city at Rassafa on the other bank of the Tigris river. This expansion was to accommodate his son and his soldiers when they came back from the war. However, in a later period, Baghdad deteriorated and shrank in size and importance under the Mongol invasion in 1258 AD when the city lost its powerful position (see Section D).

During the Abbasian period although cities were preconceived on the old planning principles there were features which reflected the effect of changes in cultural environment, particularly the effect of Islam. One of those settlements that saw development in this period was the city of Baghdad which was founded in 762 AD as the capital of the Abbasian Empire. It was the fourth capital of Islam

after Medina , Kufa and Damascus . This period was characterised by extensive patronage of the arts, learning and science, producing astonishing beauty, particularly in architecture.

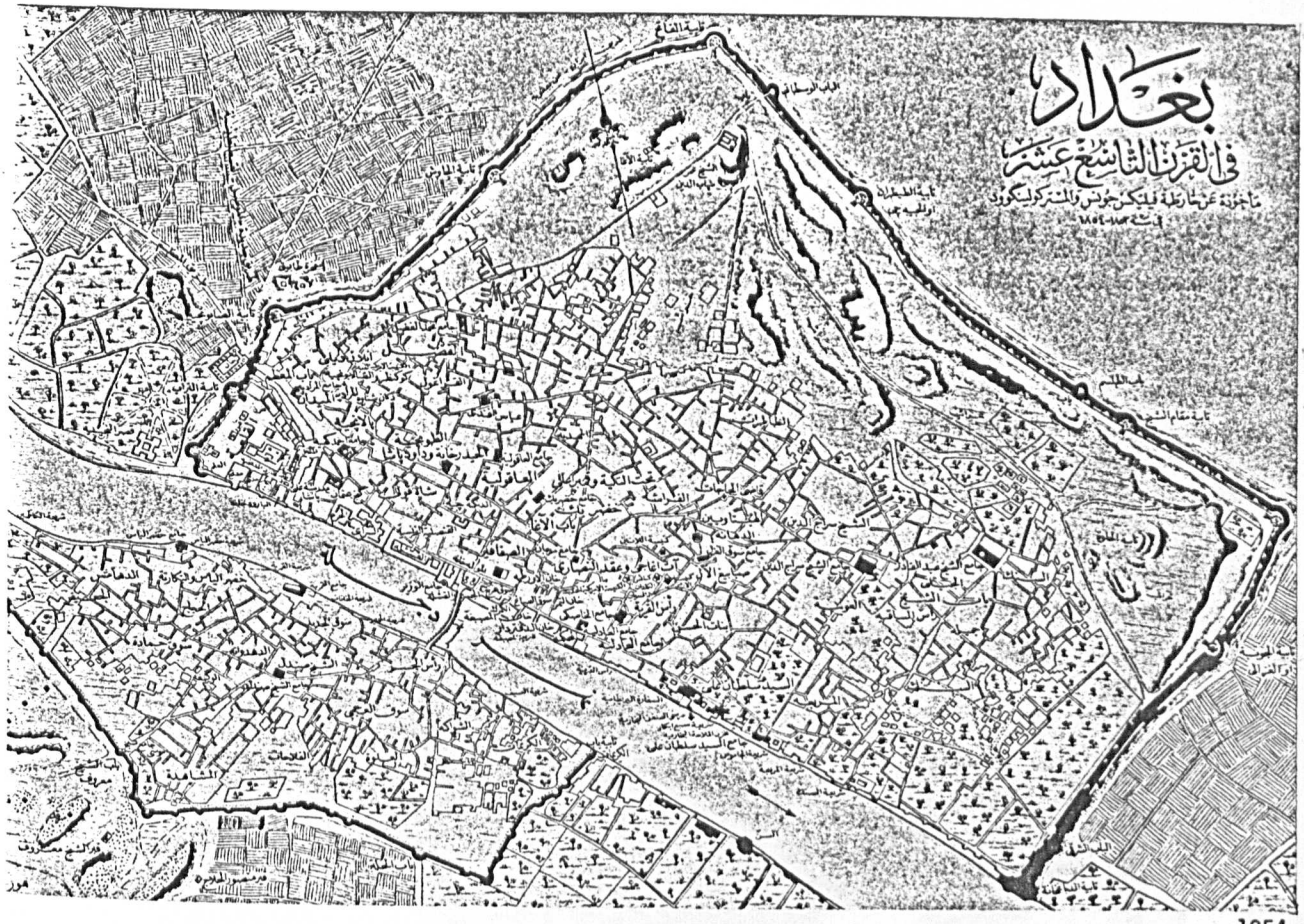
Both parts of the city of Rassafa situated on the East bank of the Tigris and Karkh on the opposite side, were walled from the fourteenth to the middle of the nineteenth century, as a defence precaution. By the middle of the sixteenth century in Europe the cannon had been introduced and henceforth city walls became inefficient as a protection against these new and more powerful weapons. Accordingly, the city walls of Baghdad and other settlements became useless against this kind of attack.

Also Baghdad was plagued many times by floods which destroyed its mud-brick buildings [Coke, 1927, pp.323-329]. By the middle of the nineteenth century most of the buildings were of recent origin because the city had been ruined by a major flood in 1832. It was rebuilt in the architectural style on the traditional principles of town planning and building technique [Gulick, 1967, p.246]. However, during the last century not less than six floods devastated the city. In 1869 [Jawad, 1969, p.118] dykes were constructed around Baghdad to protect it from the floods. From this date dykes replaced the city walls as the determinant of its boundaries (Figure G.5).

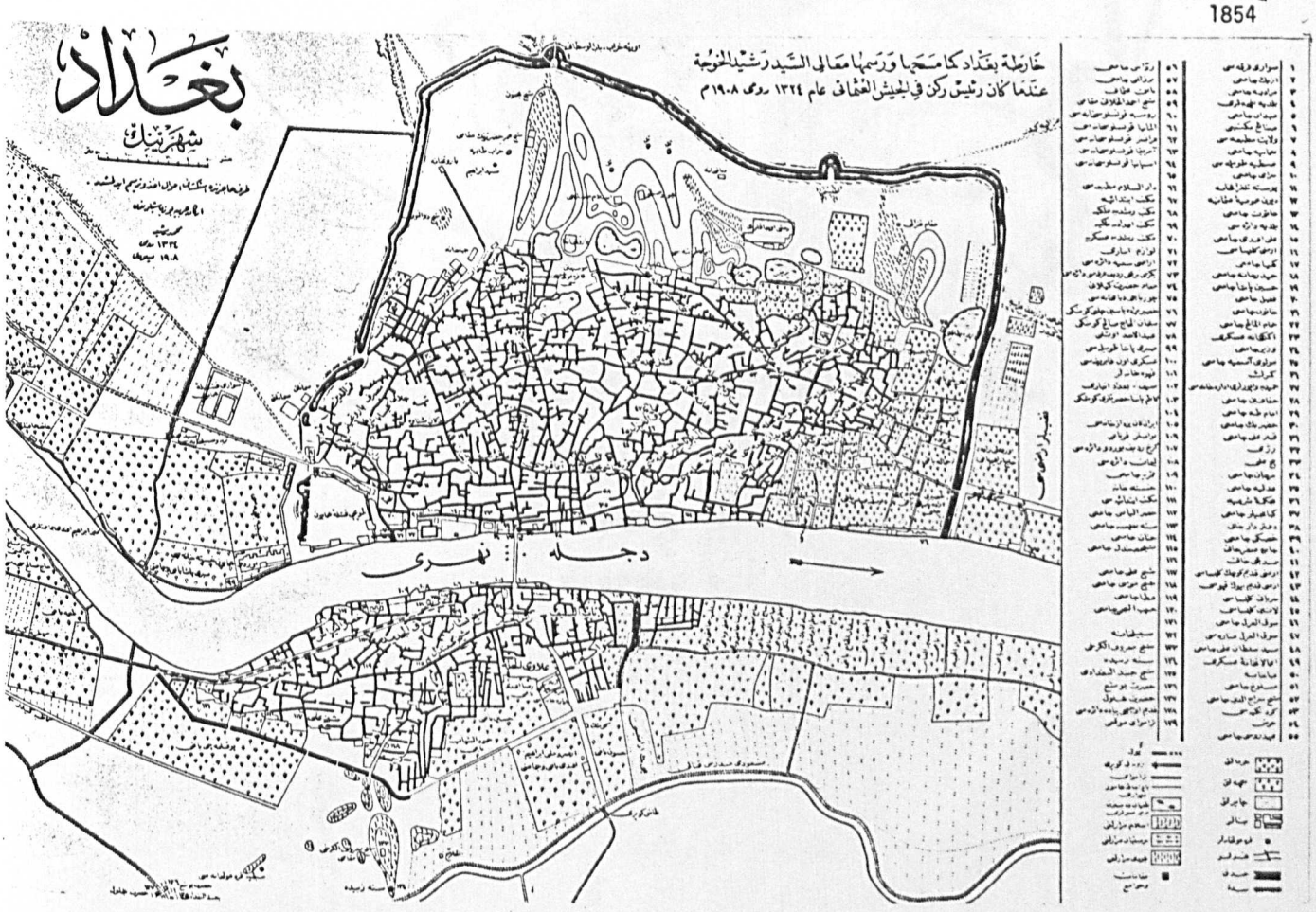
After the First World War and due to population growth, all the vacant land within the city had been built up. Then the city continued to expand along the River Lavin northwards towards Adhamiya town and southwards towards the Diala River. A series of dykes were constructed that produced the long and narrow type of expansion along the River Tigris (Figure G.6). In 1956, by controlling part of the water which fed the river, the expansion and

FIGURE: G.5.

The Influence of the River on the Form of Baghdad.

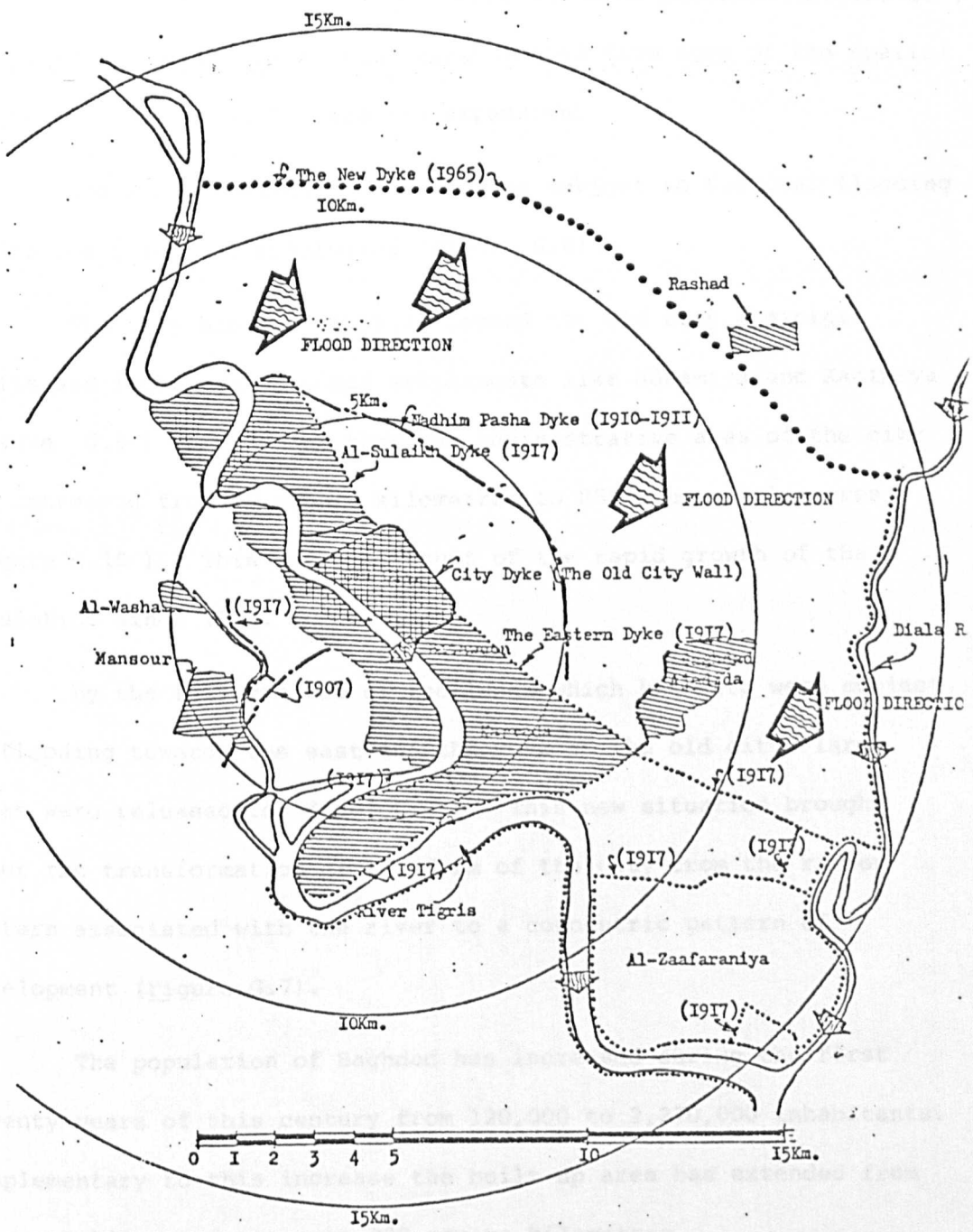


1854



1908

Jawad, 1969, pp.72 & 74



Source: Jawad, M., Baghdad, I969 , (Arabic), pp. I20 & I24

FIGURE: G.6.

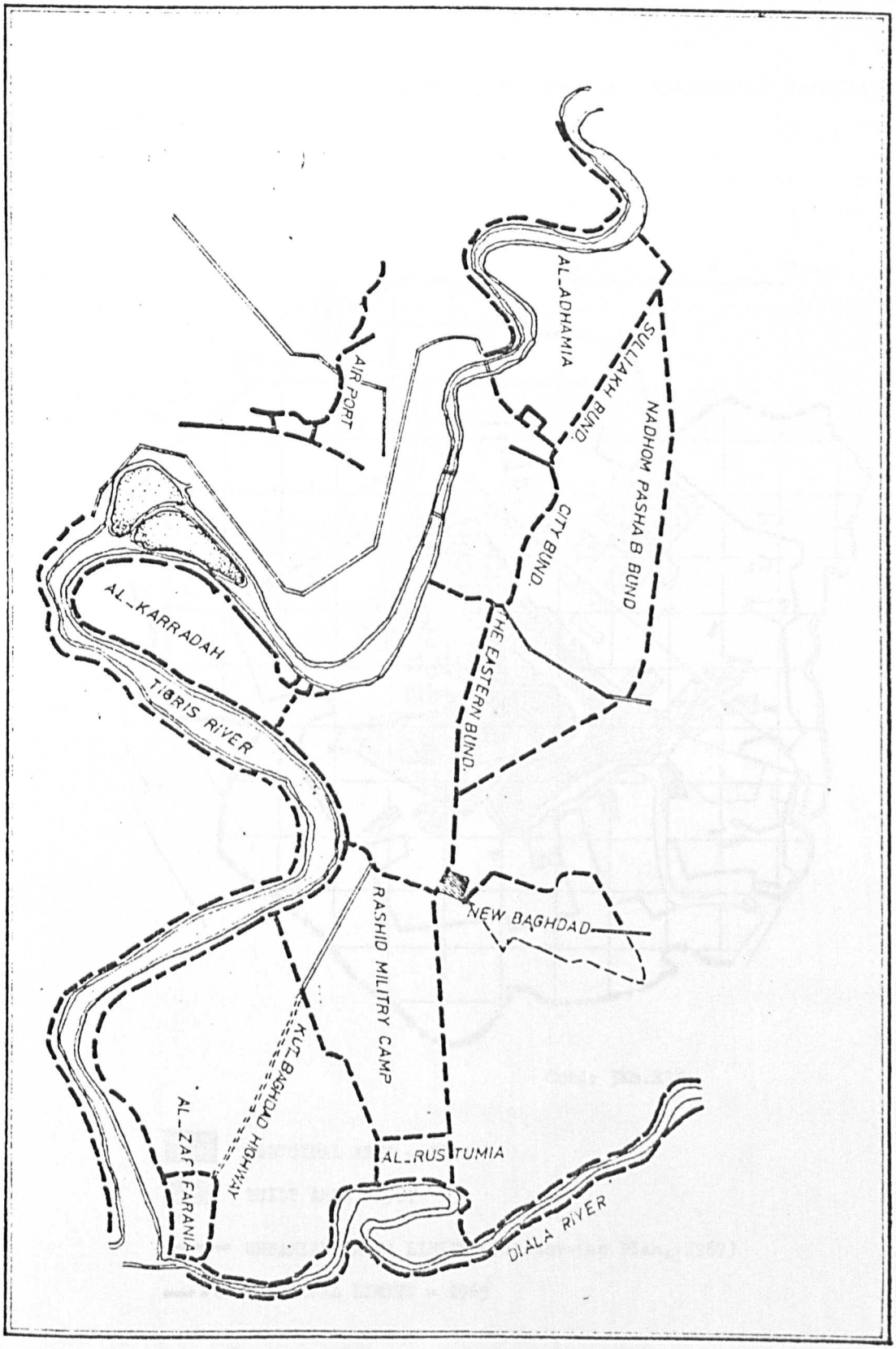
the development beyond the eastern dyke was made possible (Figure G.7) and the city for the first time was released from some of the spatial constraints which had limited its expansion.

The areas outside the dykes were subject to frequent flooding before the river was controlled (Figure G.8).

The city has now expanded beyond the old city municipal limits and incorporated other settlements like Adhamiya and Kadimiya (Figure G.9) which means that the administrative area of the city has increased from 98 square kilometres to 850 square kilometres (Figure G.10). This is as a result of the rapid growth of the population since 1945.

By the full control of the lands which hitherto were subject to flooding towards the east and the west of the old city, large areas were released for development. This new situation brought about the transformation of the form of the city from the ribbon pattern associated with the river to a concentric pattern of development (Figure G.7).

The population of Baghdad has increased during the first seventy years of this century from 120,000 to 2,270,000 inhabitants. Complementary to this increase the built-up area has extended from 5 square kilometres to over 220 square kilometres
the gross city density of 24,000 persons per square kilometre at the turn of the century can be compared with the density of 1972 which was 10,300 per square kilometre [Polservice, 1972, p.15]. As Polservice estimated [Polservice, 1969, p.86] by taking into consideration the current trends of preference for detached houses on large plots, the city requirement would be 2,000 square kilometres in 1990 (Table G.7).



MAN-MADE BARRIERS - FLOOD PROTECTION
BASED ON DR. A. SOUSA'S MAP

FIGURE: G.7.

THE EXPANSION OF THE MUNICIPAL BOUNDARIES OF BAGHDAD

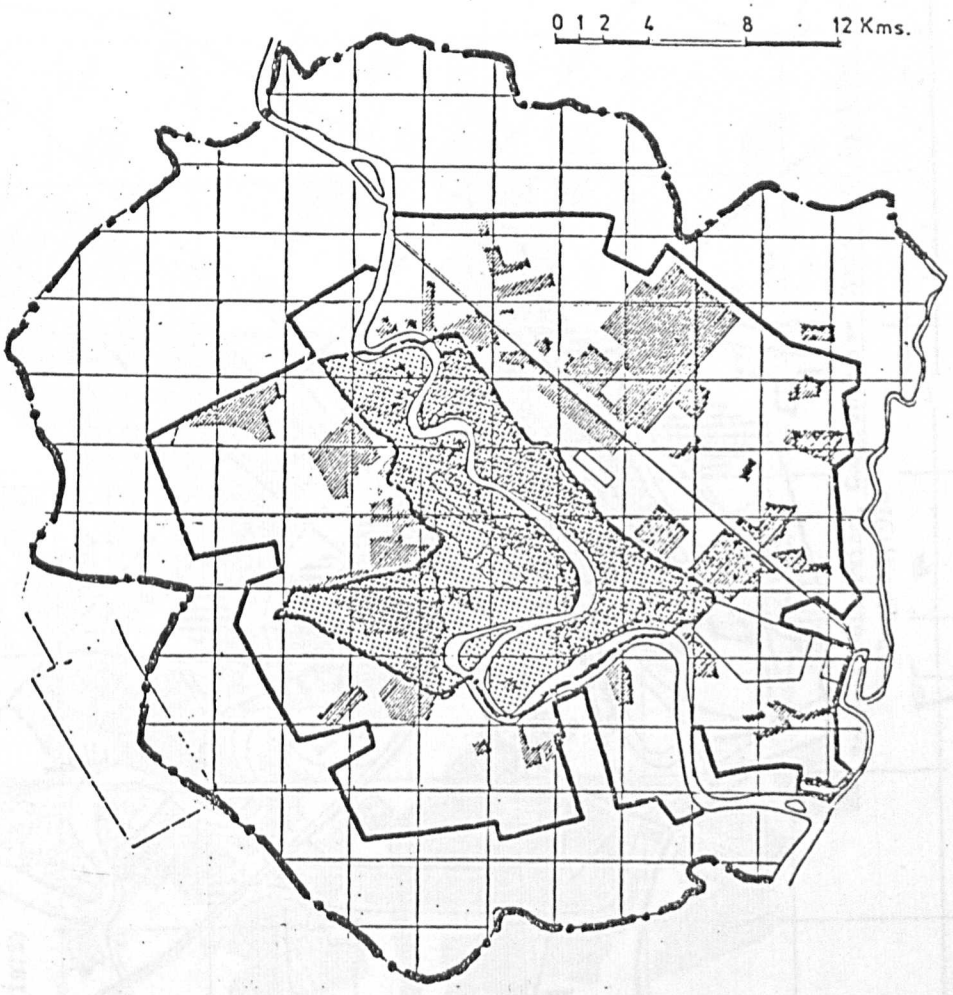


FIGURE: G.8.

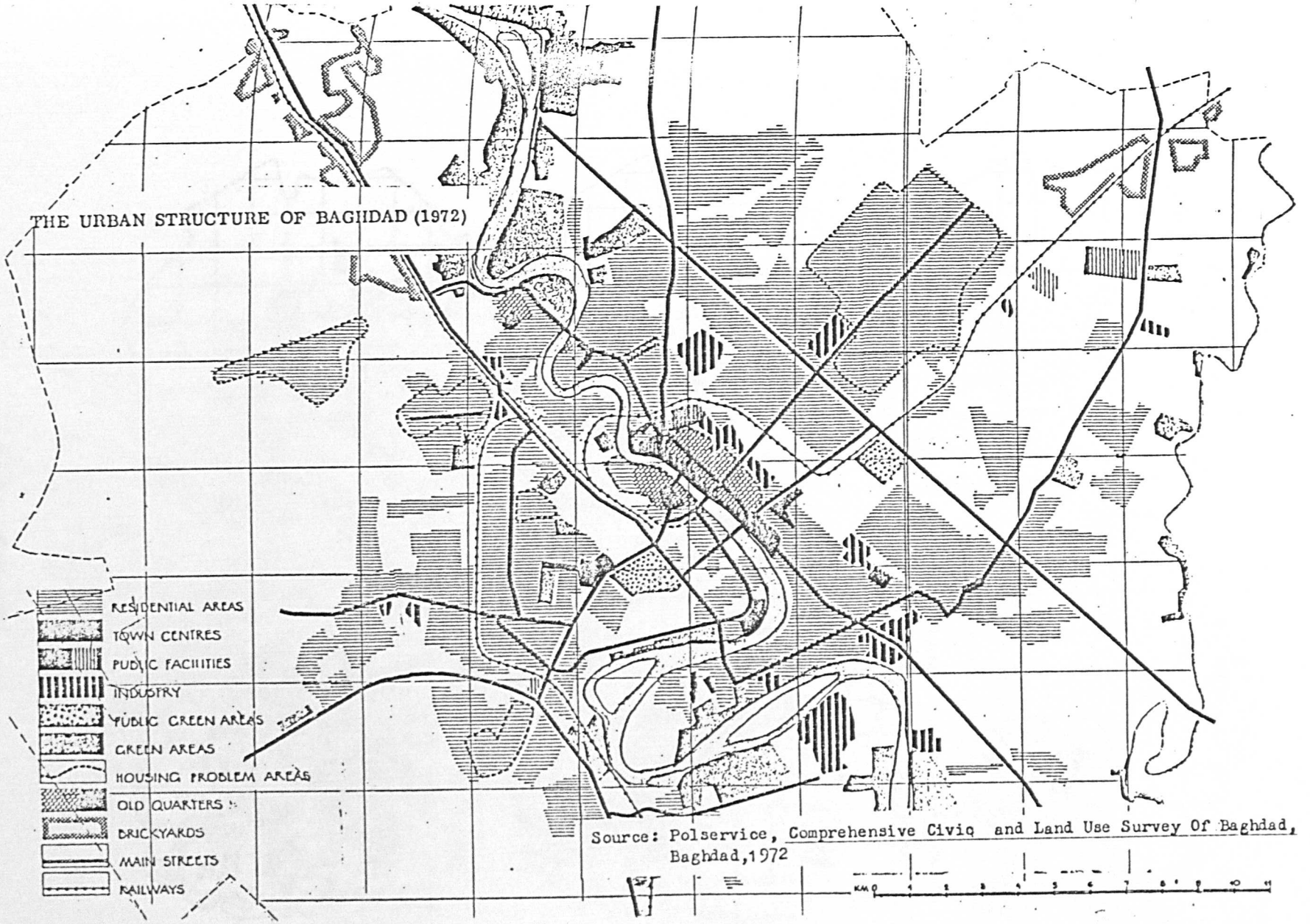

THE URBAN STRUCTURE OF BAGHDAD (1972)
RESIDENTIAL AREAS
TOWN CENTRES
PUBLIC FACILITIES
INDUSTRY
PUBLIC GREEN AREAS
GREEN AREAS
HOUSING PROBLEM AREAS
OLD QUARTERS
BRICKYARDS
MAIN STREETS
RAILWAYS
Source: Polservice, Comprehensive Civic and Land Use Survey Of Baghdad, Baghdad, 1972
KM

FIGURE: G.9.

THE GROWTH OF BAGHDAD THIS CENTURY

Note : The grid is 3 X 3 Km.

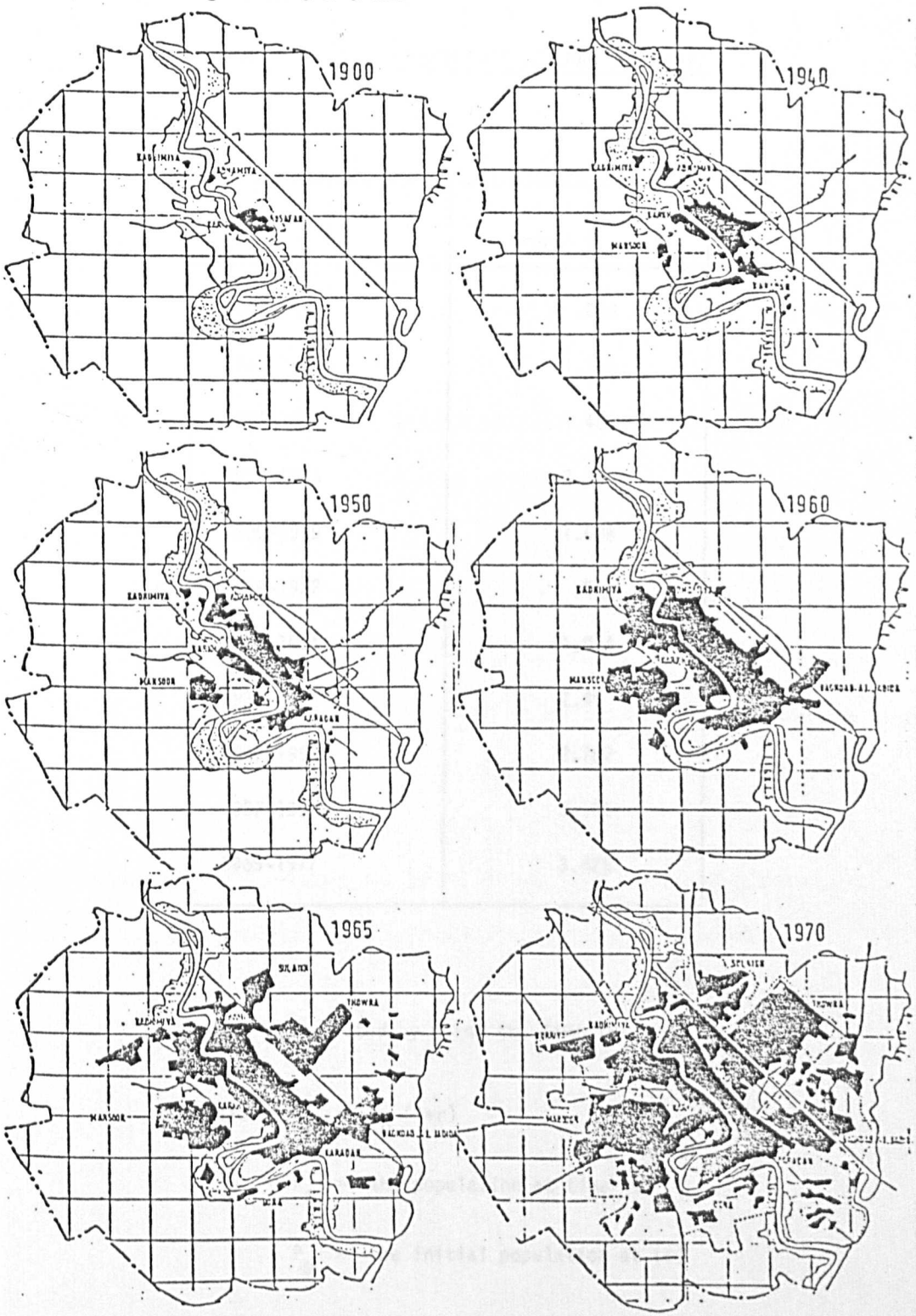


FIGURE: G.10.

TABLE: G.7.

ANNUAL POPULATION GROWTH RATE OF IRAQ 1800-1977

Period (t)	Annual Rate of Growth % *
1800-1867	.869
1867-1890	1.308
1890-1900	1.483
1900-1905	2.384
1905-1919	1.698
1919-1927	.517
1927-1934	1.874
1934-1947	2.45
1947-1957	2.787
1957-1965	3.105
1965-1977	3.425

* Calculated by using the formula:

where $P_t = P_o (1+r)$

P_t = the population at time (t)

P_o = the initial population at (o)

Thus, the area and form of the city has enormously expanded in different unrelated directions without careful planning. Such a process has led to a scattered urban structure with the lack of adequate consideration of the needs of the urban population (Figures G.9 and G.10). These premature subdivisions have added much to the cost of public services and have brought other problems due to rapid urban expansion. As Shiber reported: "The Arabs under the impact of technology, transportation and the well known 20th century expansive forces, have fallen prey to all the fetish, faults and foibles associated with a superficial understanding and application of the concept behind 'modern architecture and town planning.'

The unplanned and arbitrary expansion of the whole urban area over the past five centuries appears to be due to an understanding of the role of the natural and cultural environment and of population needs. Recently, these considerations seem to have been neglected. In order to produce the effective planning remedies for the city, foreign ideas and the influence of a highly centralised government machinery will have to be used sympathetically and carefully controlled in the interests of the people of Baghdad otherwise subdivisions and design are likely to be introduced which have no relevance to the local situation, its problems and opportunities.

G.8.2 THE CASE STUDY

In order to measure the degree of success and adequacy of the traditional and the modern urban fabric, particularly the different housing types, a case study of housing areas in Baghdad was undertaken. The chosen samples were intended to present findings on different types of housing under the same natural and cultural circumstances.

As Baghdad has a character which includes various different types of housing, it can also be considered as representative of housing schemes which exist in various other urban parts of the country.

Because of Baghdad's location in the alluvial plain which covers most of Iraq, the city naturally represents a neutral natural condition (i.e. topographically and climatically), within the extreme conditions found in the other parts of Iraq (i.e. the northern mountains, the western desert and the southern hot humid marsh zones) (See Section E.2.3.3).

Socially, Baghdad represents a cross section of Iraqi society including people from different parts of the country, Arabs, Kurds, etc.

Accordingly, Baghdad has been chosen as the case study for examination of characteristics and performance of the urban fabric.

Ten residential districts in Baghdad represent the different types of urban fabric chosen. These districts are located mainly on

the west bank of the Tigris river and include Karkh and Kadimiya Qadhas.

The urban fabric types which are studied in each of the mentioned Qadhas are:

1. The traditional types of housing in the centre of Kadimiya Qadha and Kārama which is in the centre of karkh Qadha (Figure G.11).

2. Contemporary types of housing located extensively in Karkh Qadha and divided into two sectors: the governmental sector which consists of Andlus and the Block of Flats in Karama (low income) and Yarmouk (mid-income) estate, whilst the private sector includes Ta'mim (low income) and Mansur (high income), whilst the semi-governmental private sector consists of Qadisiya, Firdaws (mid-income) and Umal (low income).

In order to measure the representativeness of the surveyed sample population and the relationship between the sample and Baghdad city's population [Ministry of Planning, 1977] a comparison between Baghdad and the surveyed sample population has been carried out which shows that:

In general terms there is some similarity between the city population profile and the overall sample as both of them stand on a large base with a small apex.

However, on the detailed level and in the age range 1-29 yers old Baghdad and sample show large comparative differences. Baghdad's

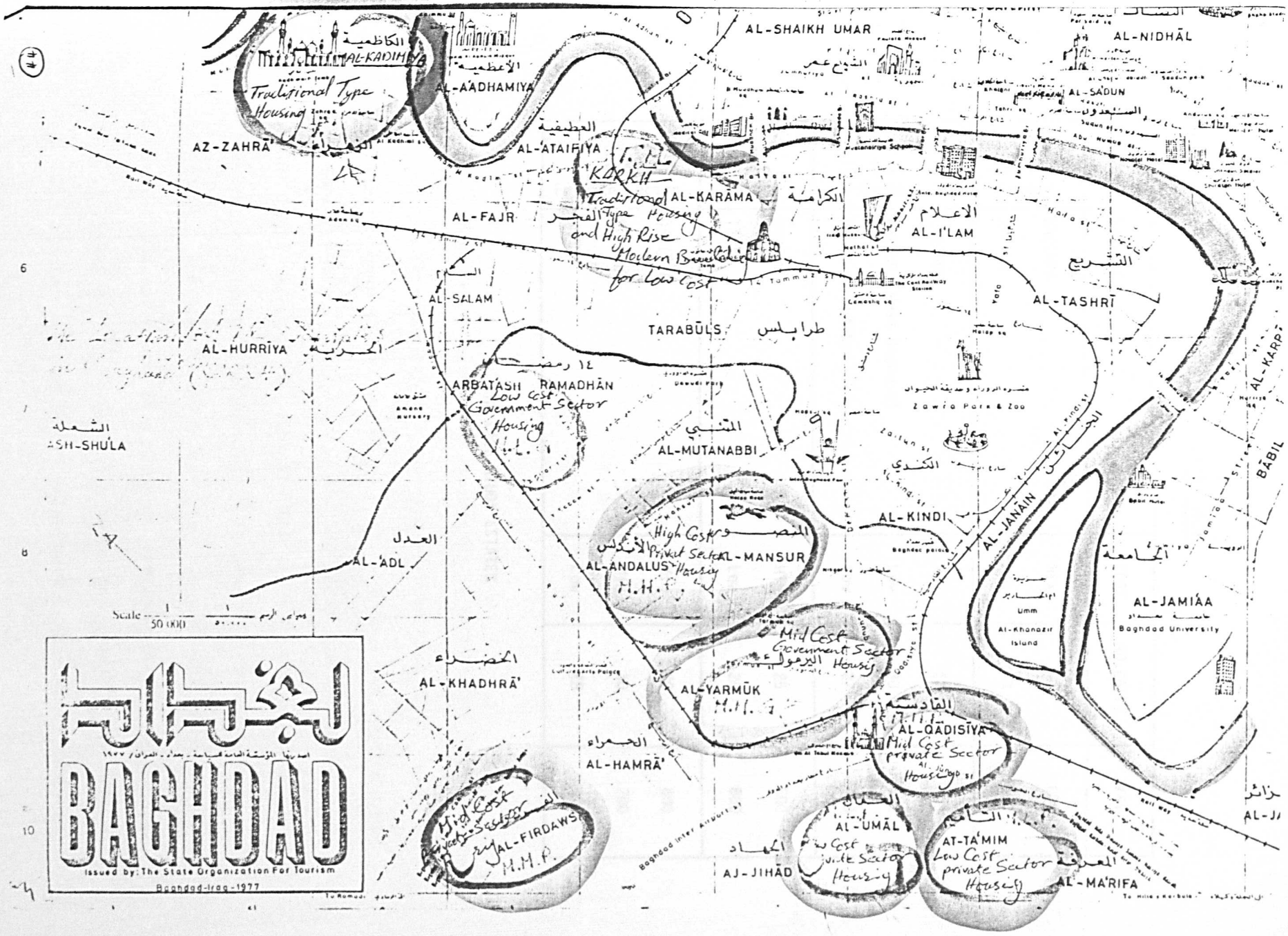


FIGURE: G.11. Locations of the Case Study Estates.

TABLE: G.8

	NAME OF THE ESTATE	COST	NO.CASES	KEY
Traditional Type Private Sector	KADIMYA	Mix	40	000
	KARAMA	Mix	23	100
Governmental Type Sector	YARMOUK	Mid	27	200
	ANDLUS (West Baghdad)	Low	30	300
	BLOCK OF FLATS	Low	27	400
Private Type Sector	MANSUR	High	25	500
	TAMIM	Low	25	800
Semi-Governmental and Private Sector	QADISYA	Mid	30	600
	FIRDAWS	Mid	30	700
	UMAL	Low	28	900

THE CASE STUDY ESTATES

population pyramid indicates a hierarchy in this age group which can be seen clearly in the large base of the population pyramid aged between 1-9 years old, among the population aged between 10-19 years and 20-29 years. This phenomenon is a result of the newly established Baghdad settlements usually occupied by the young families from the Baghdad region or by migrant families from the other regions of Iraq, as Baghdad represents a major target for in-migration (Figure G.13). The same category of age between 1-29 years old in the surveyed sample shows a small base of people aged between 1-9 years old and the larger group of the population aged between 10-19 years followed by a large group of people aged between 20-29 years. This phenomenon shows that the chosen sample estates are mostly occupied by indigenous nuclear families with older children in the households.

Despite the large differences between the population pyramids of Baghdad and the surveyed sample in the age range 1-29 years, the age distribution in the range 30-60+ is remarkably similar between city and sample.

Table G.9 indicates the age-sex structure for both Baghdad city and the surveyed sample: this table shows that 52.4 per cent of the surveyed sample population are males and 47.6 per cent of them are females, with an average age of 25.2 years for both males and females. This average confirms the picture of young population with a large proportion of the population falling into the 10-30 years age group. The same table shows that 51.6 per cent of Baghdad city's population are males and 48.4 per cent are females with an average age 21.41 years and 23.38 years for males and females, respectively, e.g. with a total average age of 22.4 years. This again confirms

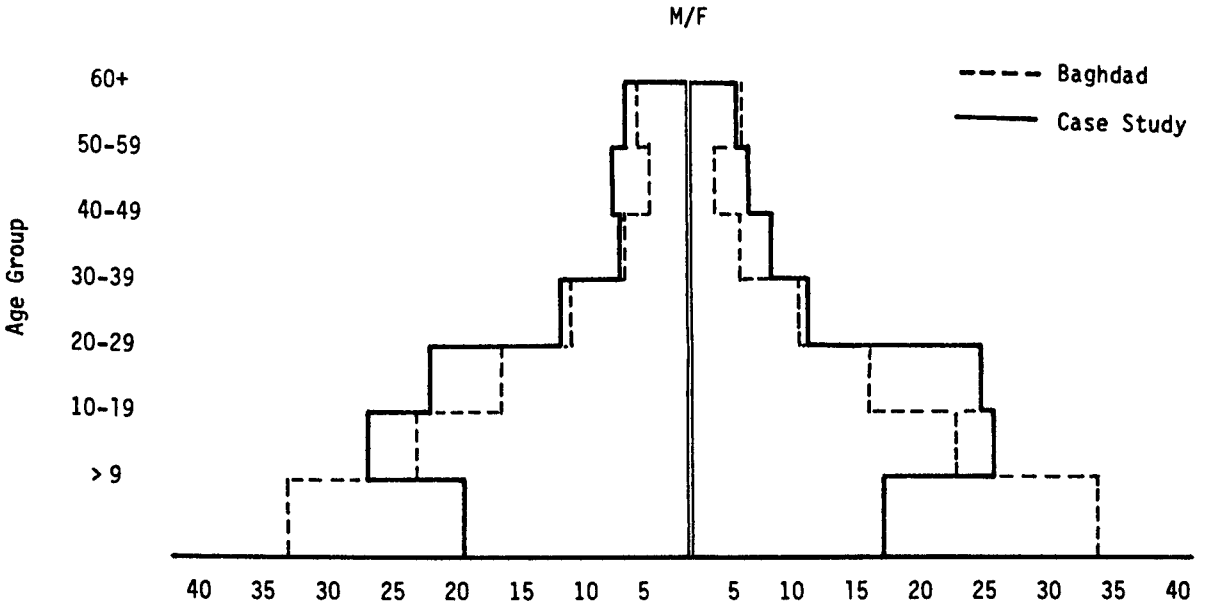
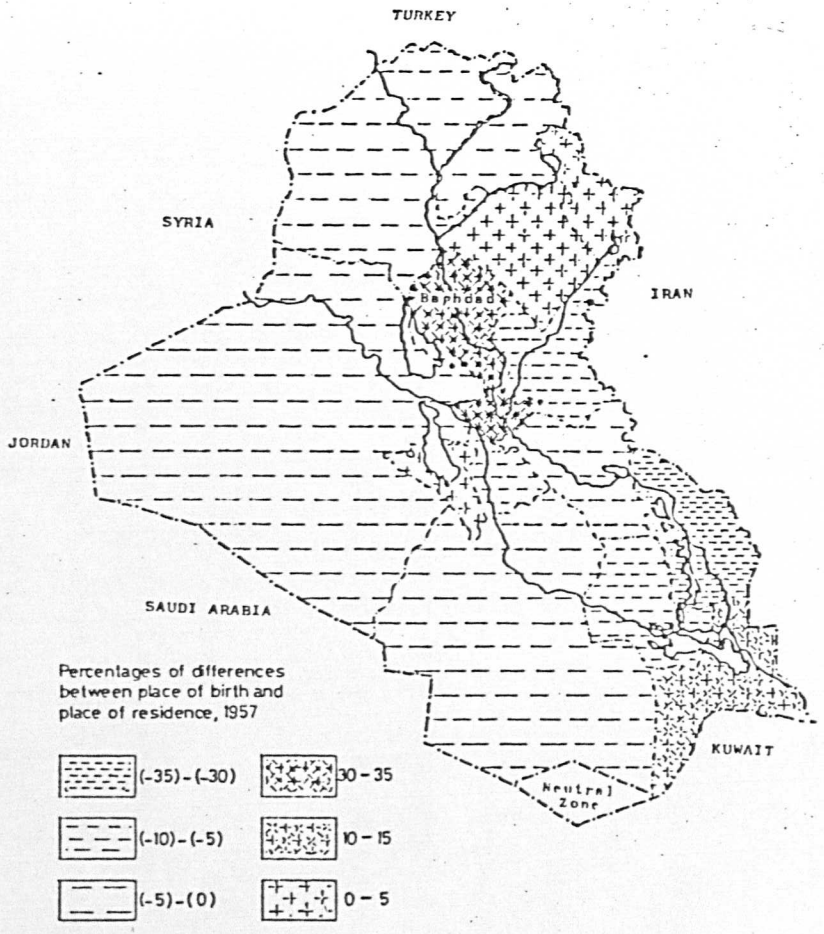


FIGURE: G.12.

THE CHOSEN SAMPLE AND BAGHDAD POPULATION

Population / Age Group	Sample Population				Baghdad Population 1977			
	Male	%	Female	%	Male	%	Female	%
>9	214	19.7	176	17.9	556,970	33.2	526,786	34.13
10-19	293	27.0	256	26.0	382,604	23.2	358,770	23.2
20-29	242	22.3	246	25.0	272,698	16.6	247,338	16.1
30-39	125	11.5	114	11.6	175,675	10.7	148,643	9.630
40-49	71	6.6	94	9.6	106,524	6.5	102,420	6.6
50-59	74	6.9	65	6.6	70,623	4.3	72,137	4.7
60+	65	6.0	33	5.3	81,141	4.9	87,371	5.7
Total	1,084	100%	984	100%	1,646,235	100%	1,543,465	100%
Average Age	25.26		25.21		23.38		21.41	
Grand Total	2068				3,189,700			
Percentage of Each Sex	52.4		47.6		51.6		48.4	

TABLE: G.3.



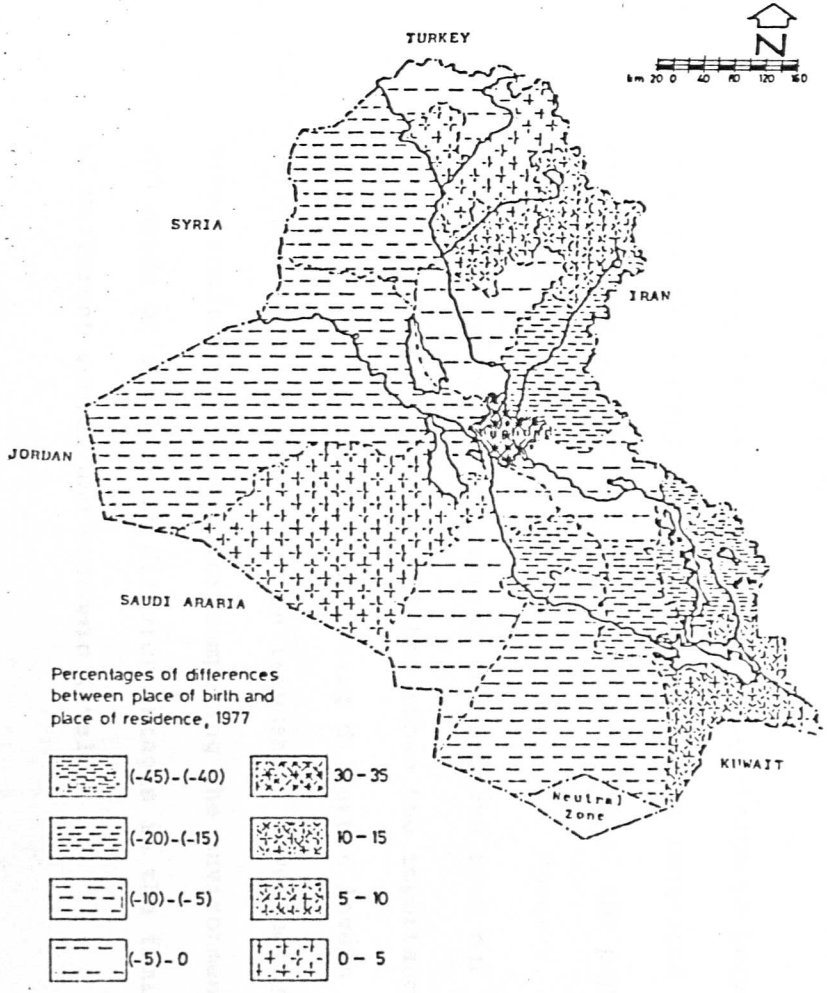


FIGURE: G.13.

The Flow of Internal Migration in Iraq: 1957 and 1977.

that the population age structure of Baghdad city is more heavily skewed to younger groups.

Despite the differences in age structure between Baghdad city and the surveyed sample population as indicated in Table G.9 similarities are shown in the distribution of the population age-sex percentages on individual estates. However, some caution is necessary in drawing general conclusions from our case studies particularly as European work has shown the importance of stage in the family life cycle in explaining different levels of family satisfaction with the urban environment. Nevertheless, the sample gives considerable scope for comparing the environmental satisfactions and needs of families at different stages in the family cycle and of different social and economic levels.

G.8.3 THE TRADITIONAL AREA STUDIES

The physical form of Baghdad has been dramatically changed by the interaction of two main factors:

Firstly, the new technology, i.e. modes of transportation, sources of energy and networks of infrastructure, which were introduced mainly at the beginning of the twentieth century and secondly, the rapid population growth resulting from a natural increase in population plus internal migration as shown in Figure G.13 based on the Iraqi census.

The parts of the city most affected by these changes are the traditional areas, in particular those parts within the boundaries of the city centre, such as the Karama district (Figure G.11). The district's location caused it to be a victim of the new changes (i.e. the technology and city expansion) which transplanted its physical form from a unified residential area into fragmented pieces with the building of a by-pass for the transportation between Baghdad city centre and the other newly built residential districts. This situation resulted in Kārama district losing most of its traditional physical features and characteristics, which made it impossible to study the original physical form. Accordingly, the survey carried out in this district confined itself to 23 questionnaires only.

In comparison considerable attention has been given to Kadimiya's traditional area. This is because it still retains most of its traditional physical form despite changes which have taken place in the main parts of the district (Figure G.14). In addition, Kadimiya can be considered as one of the important

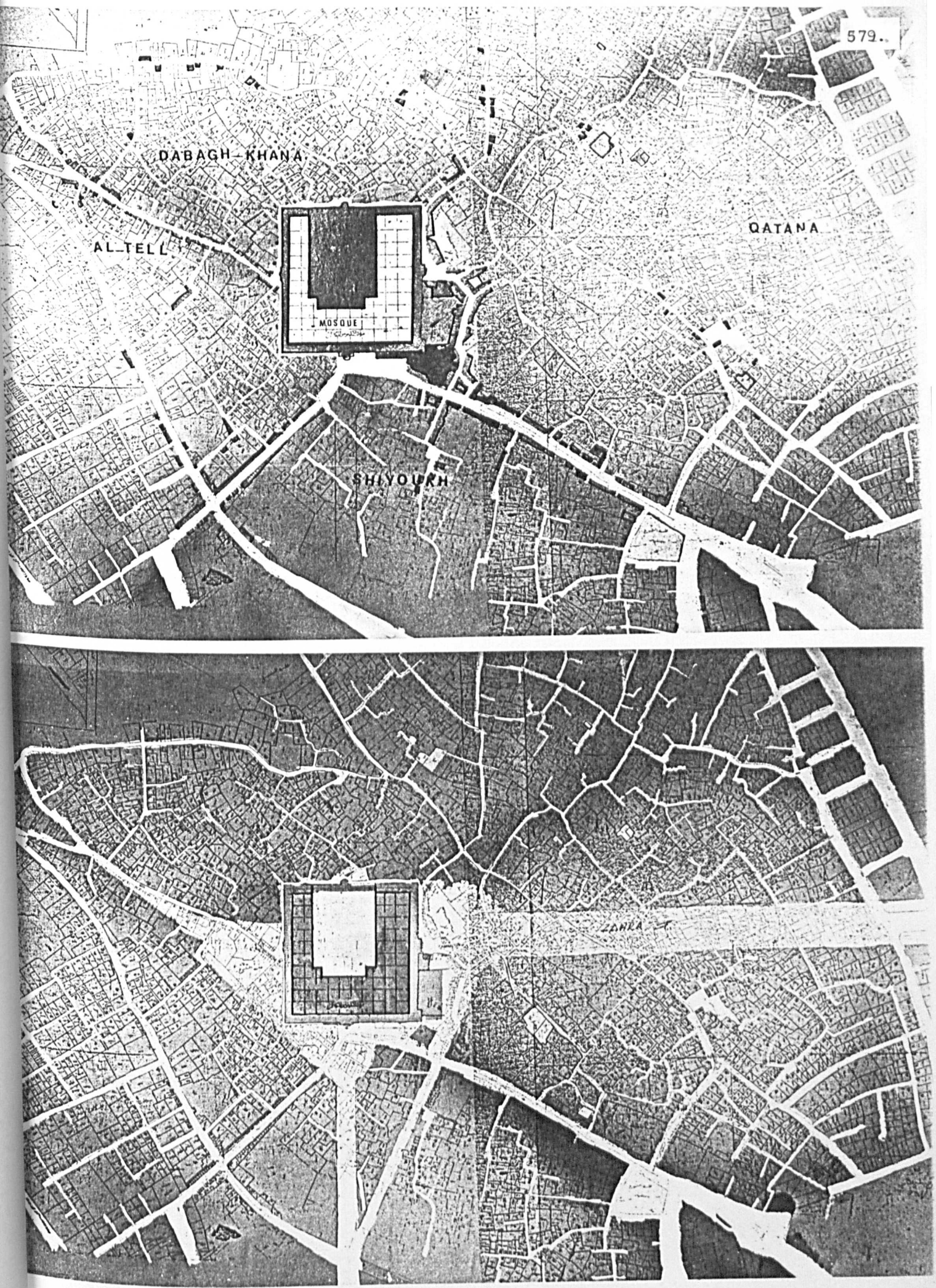


FIGURE: G.14.

religious centres within the Islamic world. Furthermore, its location near the river and big palm groves adds natural surroundings to these old preserved values, offering at the same time recreational places for inhabitants as well as improving the climatic condition of the district.

The studies carried out in Kadimiya include 40 completed interviews, 1/50 scale drawings, records for the temperature and humidity for different spaces inside some of the dwellings and calculations for the solar energy inside the same dwellings.

G.8.4 THE TRADITIONAL AREAS [KADIMIYA AND KARAMA]

G.8.4.1 Age-Sex Structure

The age-sex structure, educational status and occupation which indicate the population characteristics of Kadimiya and Karama estates are given in Tables 10 and 11, and Figures G.15 and G.16. These estates are mainly low income, private sector traditional residential areas.

This table shows that 50.32 per cent of Kadimiya estate population are male and 49.68 per cent are female, with an average age of 25.91 years and 26.96 for males and females, respectively, which gives a total average age of 26.47 years, whereas Karama's age structure shows that 52.5 per cent of its population are male and 47.4 per cent are female, with an average age of 23.8 years and 25.7 years for males and females, respectively. This gives a total average age of 24.75 years. The above average ages show that the populations in both Kadamiya and Kārama estates are young.

Despite both estates being occupied now by low income people in general their age and sex structure are different, as indicated by the population pyramids. In Kārama the population pyramid stands on a relatively small base of population age between 1-9; this is due to the phenomenon of the immigration of young families from this area, A fact which is also marked by the large deficit in the population age group between 30-49, particularly males. These age groups usually represent the parents of the above mentioned young age group i.e. 1-9. The main reasons for the people migrating, however, are the overcrowding and high population density, in addition to a deteriorating physical environment. These factors will be discussed in more detail in the following sections. Moreover, the

STATUS / NO.	AGE GROUPS				EDUCATION														OCCUPATION														
	MALE		FEMALE		ILLITERATE			LITERATE			P.SCHOOL			S.SCHOOL			UNIVERSITY			HOUSEWIFE/ UNEMPLOYED			STUDENT			CIVIL SERVICE			WORKER			BUSINESSMAN		
	No.	%	No.	%	M	F	%	M	F	%	M	F	%	M	F	%	M	F	%	M	F	%	M	F	%	M	F	%	M	F	%	M	F	%
>9	32	28.0	26	23.6	17	15					15	11								17	15		15	11										
10-19	31	22.9	35	23.0	3	3			1		16	17		11	14		1			2	6		27	28					2	1				
20-29	26	21.7	25	21.8	1	3		4	5		6	5		9	8		6	4			12		6	8		12	5		5			3		
30-39	16	14.0	13	12.7	2	6		3	2		3	2		5	3		3				16					7	3		8			2		
40-49	9	6.4	12	7.9	5	10		1	1		1			1	1		1			4	12					2			2					
50-59	4	3.2	8	6.7	3	7		1	1											2	8								1			1		
60+	10	3.8	6	4.3	4	6		2												3	6					1			2					
TOTAL	128	100	125	100	35	50		11	10		41	35		26	26		11	4		28	69		48	47		22	8		20	1		6		
RELATIVES												3																						
>9	12		13		10	9					2	1								10	9		2	4										
10-19	5		4								2	2		3	2								4	4					1					
20-29	8		11			5		2	1		2	4		3	1		1				11		3			2			3					
30-39	6		2		1	1		4			1	1									2								5			1		
40-49	1		2		1	2															2								1					
50-59	1		1			1					1										1											1		
60+			1			1															1													
TOTAL	33		34		12	19		6	1		8	11		6	3		1			10	26		9	8		2			10			2		
% within the whole sample	50.32		49.68		36.2			8.75			29.6			19.0			5.0			41.5			35.0			10.0			9.68			2.5		
Average age	25.97		26.96																															
Total Average age = 26.47																																		

TABLE: G.10.

[redacted] (KARKH)

STATUS / NO.	AGE GROUPS				EDUCATION														OCCUPATION													
	MALE		FEMALE		ILLITERATE			LITERATE			P.SCHOOL			S.SCHOOL			UNIVERSITY			HOUSEWIFE/ UNEMPLOYED			STUDENT			CIVIL SERVICE			WORKER			BUSINESSMAN		
	No.	%	No.	%	M	F	%	M	F	%	M	F	%	M	F	%	M	F	%	M	F	%	M	F	%	M	F	%	M	F	%	M	F	%
>9	13	17.4	10	12.8	6	5					7	5								6	5		7	5									
10-19	36	41.3	20	25.5	1	1		1			17	11		16	8		1			1	3		24	17		3			8					
20-29	14	16.3	22	29.8		1					1	4		7	10		6	7			6		4	11		7	5		1			2		
30-39	4	5.8	12	17.0		2			2		1	3		3	4		1	1			6					1	4		2	2		1		
40-49	3	4.8	7	7.4		6		1	1		1			1						1	7					1			1					
50-59	9	9.6	2	3.2		2		5			3			1						2	2					1			1			5		
60+	5	4.8	1	4.3	3	1		1									1			4	1											1		
TOTAL	84		74		10	18		8	3		30	23		27	22		9	8		14	30		35	33		13	9		13	2		9		
RELATIVES																																		
>9	5		2		4						1	2								4			1	2										
10-19	7		4		2						2	3		3	1						1		2	3		1			4					
20-29	3		6			3								2	3		1				4					2	1		1	1				
30-39	2		4			1								1			1	3			2					2	2							
40-49	2							1						1												1						1		
50-59	1		1			1		1													1								1				
60+			3			3															3												
TOTAL	20		20		6	8		2			3	5		7	4		2	3		4	11		3	5		6	3		6	1		1		
% within the whole sample	52.5		47.4		21.2			6.5			30.8			30.3			11.1			29.7			38.3			15.6			11.1			5.05		

Average Age 23.8 25.7

Total Average Age = 24.75

TABLE: G.11.

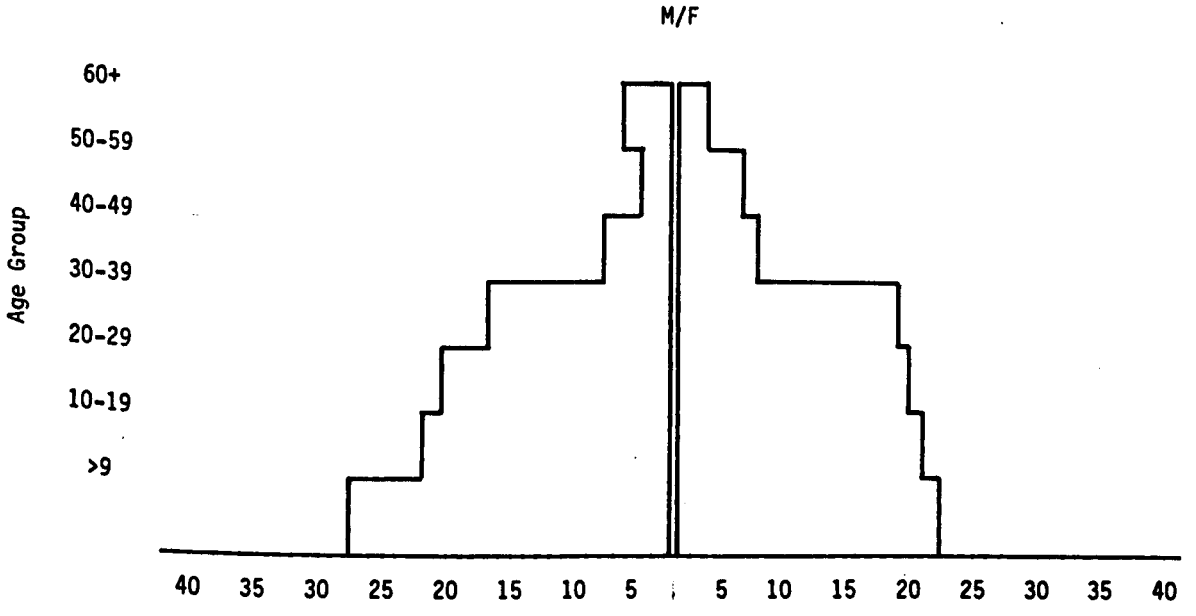
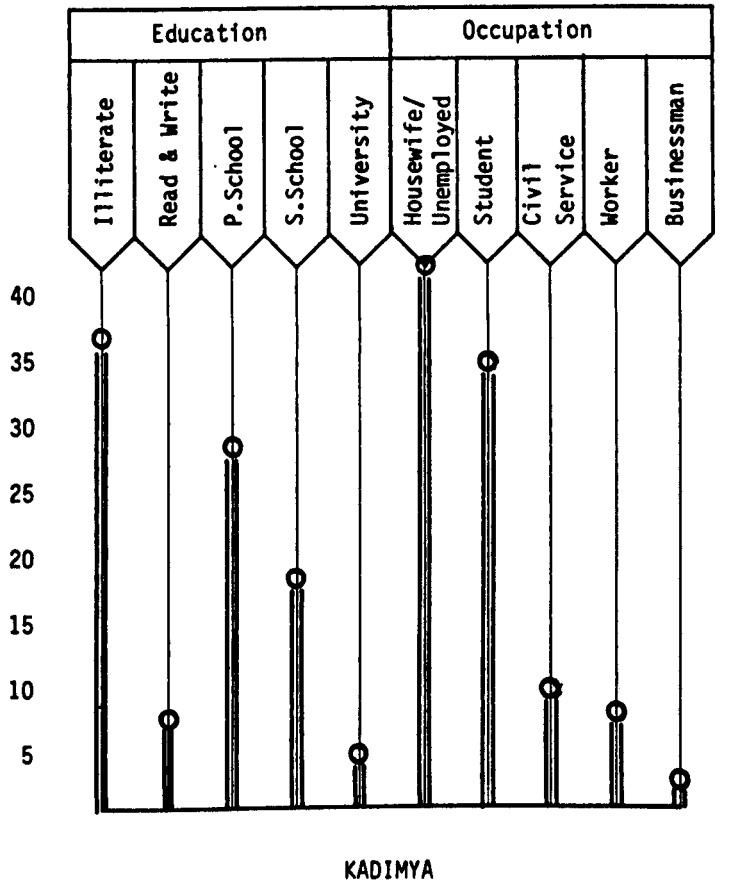


FIGURE: G.15

Population Pyramid, Education and Occupation Status: Kadimya



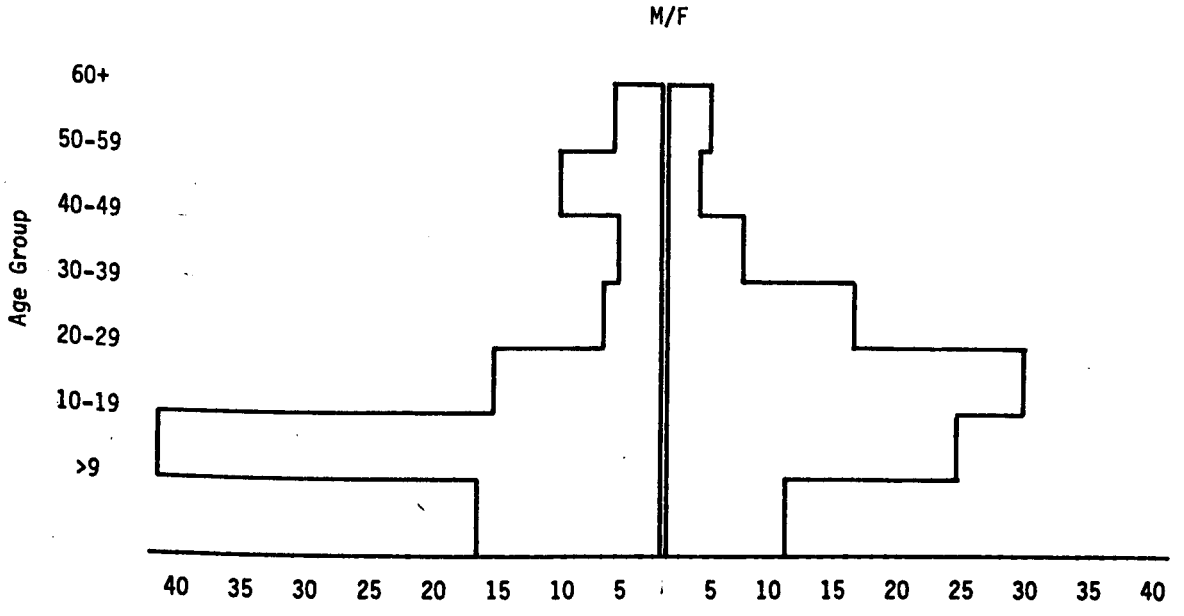
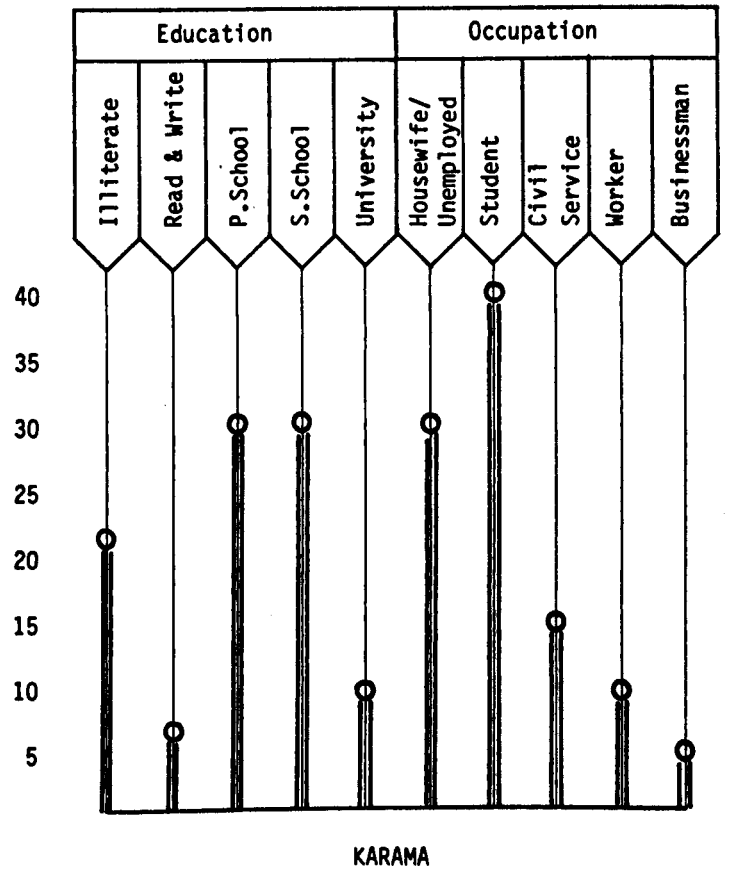


FIGURE G.16

Population Pyramid, Education and Occupation Status: Karama



population pyramid also indicates a large representation in the population age group between 10-29 which creates a dominant feature in the pyramid. The parent generation for such younger people usually forms an age group between 50 - over 60 and this can be seen clearly in the population pyramid by the representation in the aforementioned age group, especially the male profile. The steady profile for females in the 20-49 age range is due to the tendency for unmarried females to remain in the family home whereas males in this age group who are unmarried are likely to move in search of work. Consequently, the male population profile is less smooth in outline, especially in the 20-49 age range.

Kadimiya's population pyramid is totally different from Kārama because Kadimiya Estate presents an attractive place for people to live due to its religious position. This has the effect of revitalising the population structure. Accordingly, a homogeneous and balanced age-sex structure occurs in the population of this area which is indicated in the steady profile of the population age group between 1 - over 60 years.

Newcomers to this area are mainly low income people. Their educational status is very low, which indicates clearly in the histogram (G.15) that 36.2 per cent of the population are illiterate and 8.75 per cent can merely read and write. 29.6 per cent of the population only attended primary school, 19.0 per cent secondary school and only a small proportion have attended University (i.e. 50 per cent).

Age and sex of the population, together with their educational level has an influence on the occupational status of the population which can be seen clearly in Tables G.10 and G.11 and the histograms G.15 and G.16.

Accordingly, 41.5 per cent of the population are unemployed and housewives, 35.0 per cent are students; these two aforementioned groups represent unproductive population whilst the productive members are 10.0 per cent civil service, 9.68 per cent manual workers and 2.5 per cent businessmen. In other words, the proportion of productive labour in the population is 22.18 per cent, whereas 77.82 per cent are economically dependent.

As the age structure of Karama estate is older than Kadimiya the situation of both educational level and occupational status are different. As indicated in Table G.11 and Histogram G.16 21.2 per cent of the population are illiterate and 6.5 per cent are only able to read and write, whereas those having been educated in an institution are 30.8 per cent primary school, 30.3 per cent secondary school and only 11.1 per cent having university education. This picture of the educational level of the population, coupled with the age structure, determines occupational status. 29.7 per cent of the population are unemployed and housewives and 38.3 per cent are students. These groups represent the unproductive population, whereas the productive population are 15.6 per cent civil service, 11.1 per cent manual workers and 5.05 per cent businessmen. This means that 31.75 per cent of the population are productive, whereas 68.25 per cent are economically dependent.

The overall population of both Kadimiya and Karama indicate a large number of expanded families in both areas, i.e. 20.9 per cent are in Kadimiya and 31.2 per cent are in Kārama. This can be seen from the population profiles.

G.8.4.2 Design and Social Criteria at the Neighbourhood Level

As discussed in the previous section, the privacy and security of the inhabitants within the residential area have in the past and still do today, play the major role in forming the basis for social life of the society and the organisation of the urban fabric. In traditional residential estates as a whole and within the individual units, privacy and security are important determinants of built form and the areas are further structured by the hierarchical function of the roads system.

However, the scale and dimensions of these estates were based essentially on the human manual capacity, the environmental natural resources and the available technology at that time. Until the British forces captured Baghdad in 1917 transportation modes were by foot, domestic animals and by boat and goatskin rafts along waterways, whilst communication modes were mainly by word of mouth, printed books. A government newspaper was introduced in the late nineteenth century. The first telegraph line opened in 1870. These factors determined the time scale and the rhythm of life until the earlier periods of the twentieth century.

The traditional road and communication network can be seen clearly within the case study area of Kadimiya. Two main access roads are linked with the city centre of Baghdad, i.e. from the west through Karkh via Al-Salam and Al-Huriya districts, and from the east through Rasafa via Al-Aadhmiya. These routes provide important daily services in and out of the area (Figure G.17).

Accordingly, two initial access points on opposite sides of the district have been created. A direct arterial link between them

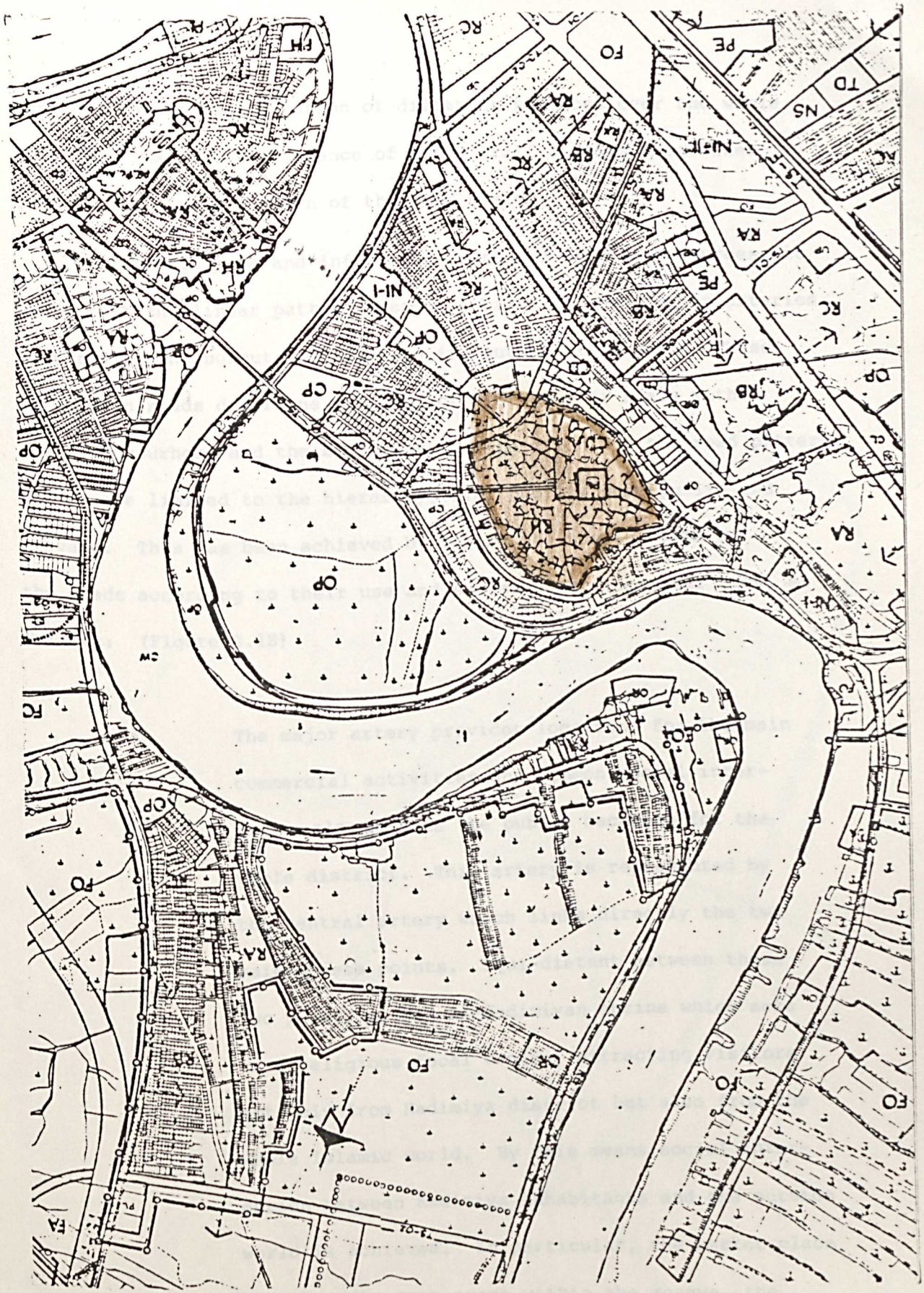


FIGURE: G.17.

The Estate of Kadimiya Within the City of Baghdad.

provides for the distribution of different services over the whole district. Hence the existence of these traffic modes determines the overall linear pattern of the road system.

From old maps and information gathered from many sources, it seems that the linear pattern system is based on three major arteries penetrating throughout Kadimiya and its outside ring road. These three main roads determine the kind of hierarchy of scale within the neighbourhood and the socio-physical functions of the road pattern system are limited to the hierarchy, i.e. public, semi-public and private. This has been achieved by separating the function of the roads according to their use and social activities over time, as follows: (Figure G.18)

(a) The major artery provides locations for the main commercial activities and common social interaction also acts as the public backbone for the whole district. This artery is represented by the central artery which links directly the two main access points. Equi-distant between these two points is the Al-Kadimiyan shrine which acts as a religious focal centre, attracting visitors not only from Kadimiya district but also from the whole Islamic world. By this means social interaction between Kadimiya inhabitants and the outside world is achieved. In particular, the market place and the main open space within the mosque, the largest open space within the district, encourages social meetings.

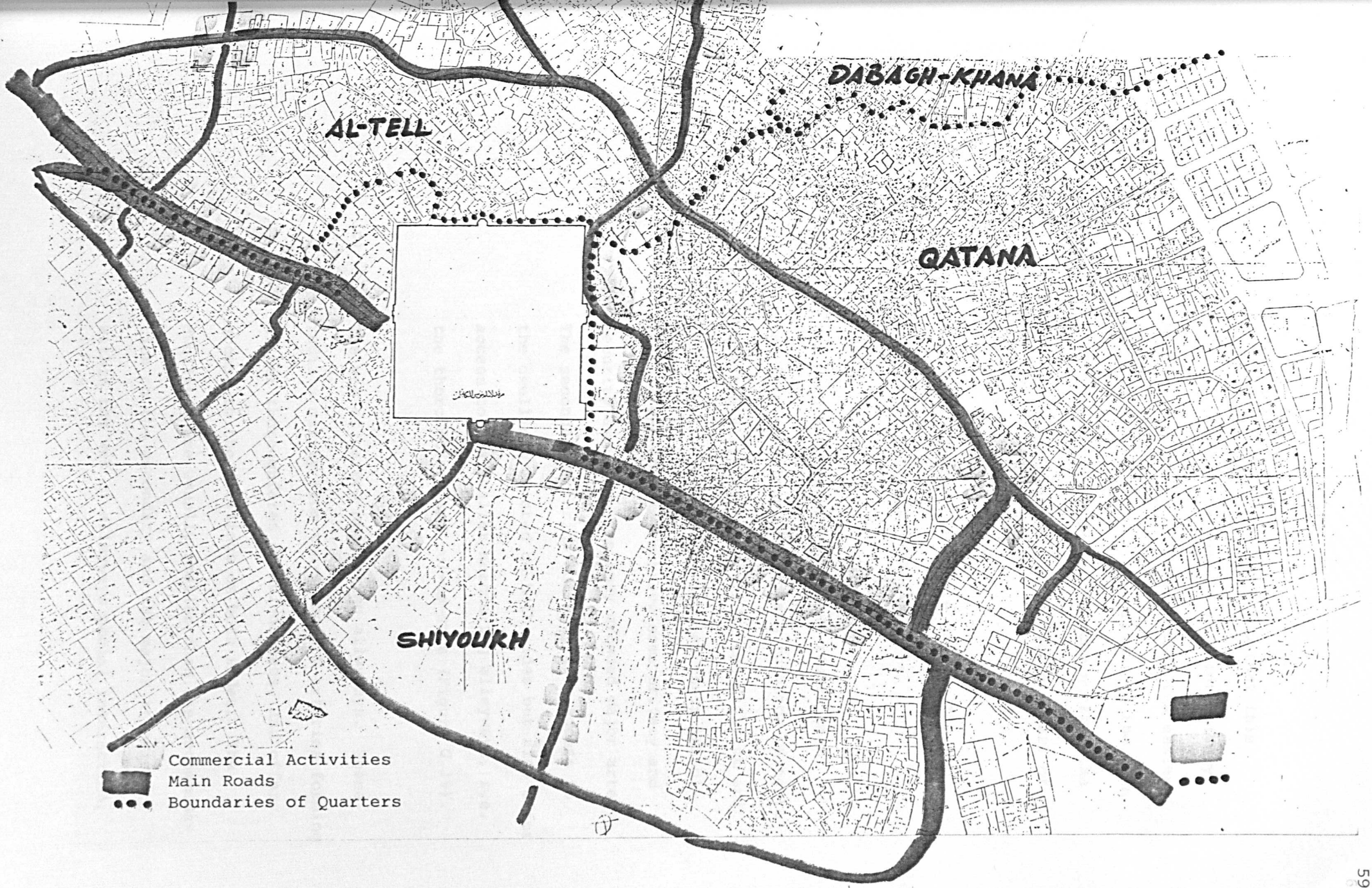


FIGURE: G.18.

The Road Network and the Zones of Commercial Activity.

In addition, it should be noted that this part of the major artery is more intensively developed in commercial terms than the eastern part (Figure G.18). This is due to the main flow of visitors and services coming from the centre of Baghdad towards the western part of Kadimiya.

Secondary arteries originate near to the two main entry points to the district.

(b) The secondary arteries. These routes take the form of a loop, their main function being to link the different quarters of the district and allow social interaction between their inhabitants. These routes achieve some privacy and security away from the busy crowded major artery. The secondary arteries not only give access to the dwellings located on both sides but also offer access to the smaller meandering alleyways, i.e. the thoroughfare and cul-de-sacs (Figure G.19).

(c) The web of narrow meandering alleyways. These radiate mainly from the secondary arteries forming either thoroughfares or cul-de-sacs, and offer access to the dwellings on both sides. The dwellings are usually smaller than the accommodation on the secondary and the major arteries. Within the web of alleyways social interaction,

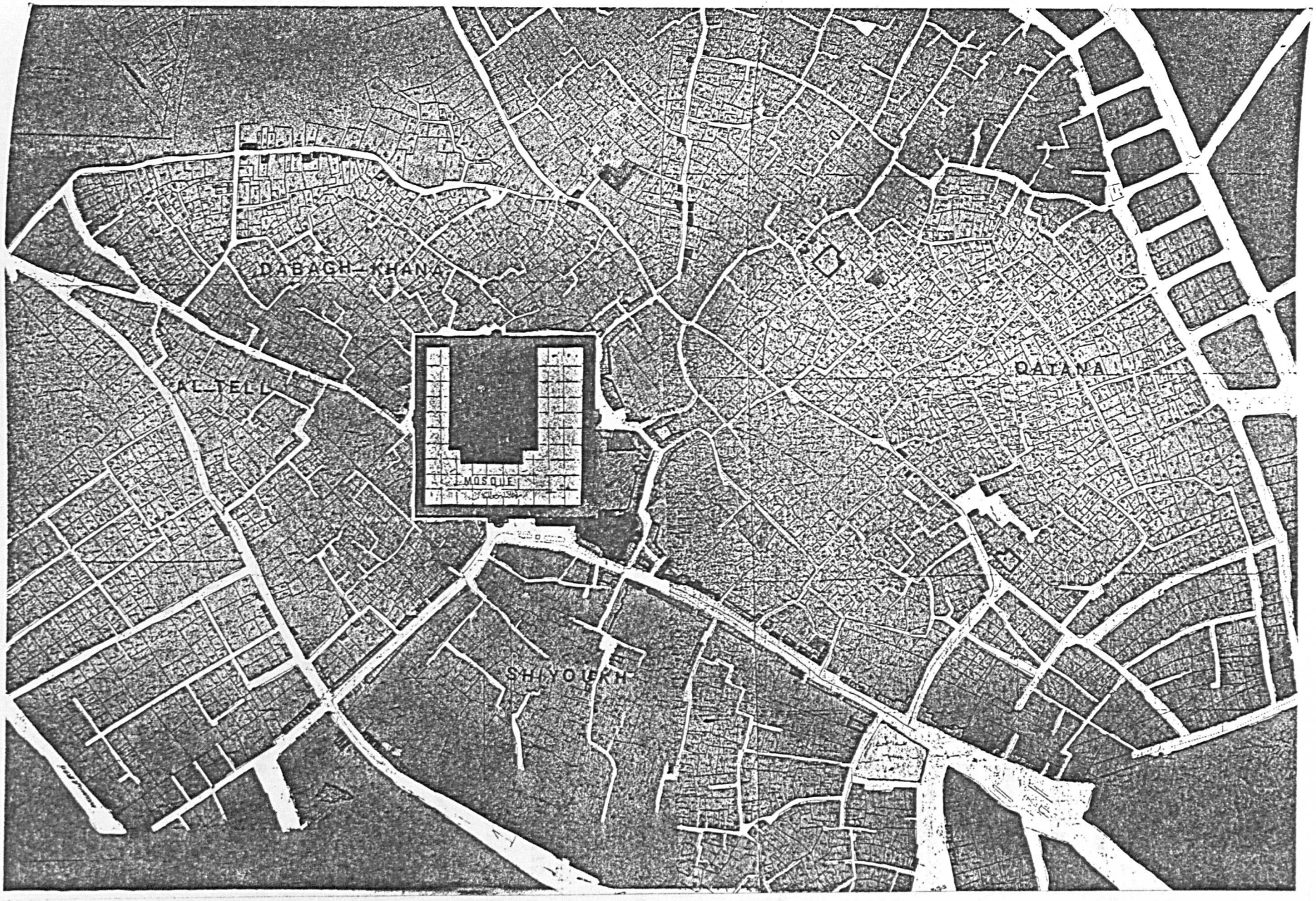


FIGURE: G.19.

The Road Network and the Main Access to Dwellings.

privacy and security for the individual is achieved. These act as intimate spaces for the inhabitants, discouraging strangers penetrating or entering and encouraging social relationships between neighbours and inhabitants. The narrow meandering alleyways and the close location of the dwellings' main entrances enable the housewives especially within the cul-de-sacs, to sit on their doorsteps in the afternoon and make conversation with each other whilst simultaneously watching their children playing and the passers-by. This phenomenon developed the identity of the alleyway in the traditional residential quarter as a sub-community socially and physically, in which the alleyway becomes a socially integrated space between families sharing the same values and needs.

This phenomenon can be clearly seen in Table G.12. This table shows the high degree of social relationship between the inhabitants. Accordingly, the people suggest that there is no need for further social facilities to increase social relationships or ties between the inhabitants, as indicated in Table G.13. In addition, Kadimiya is one of the biggest religious centres in the Islamic world and such social facilities may not be acceptable in close proximity to the mosque.

TABLE: G.12.

SOCIAL RELATIONSHIP

Response		Kadimiya		Karama	
		No.	%	No.	%
Social Relationship	(No)	10	15	23	100
	(Yes)	30	85	23	92
Knowing Neighbours' Name	(No)	8	10		
	(Yes)	32	30	23	95
Speaking with Neighbours	(No)	7	17.5		
	(Yes)	33	82.5	23	100
Meeting Neighbours	(No)	13	29.5		
	(Yes)	27	70.5	23	85.25
Visiting Neighbours	(No)	13	32.5		
	(Yes)	27	67.5	23	83.75
Feeling Lonely	(No)	36	90.0	23	100
	(Yes)	4	10.0	0	0

TABLE: G.13.

SOCIAL FACILITIES TO BE PROVIDED ON THE ESTATE

Response		Kadimiya		Karama	
		No.	%	No.	%
Open Space (Garden)	(No)	12	30	2	8.7
	(Yes)	28	70	21	91.3
Youth Social Centre	(No)	40	100	23	100
	(Yes)	-	-	-	-
Culture Centre	(No)	39	97.5	23	100
	(Yes)	1	2.5	-	100
Cafe	(No)	40	100	23	100
	(Yes)	-	-	-	-
Cinema	(No)	40	100	23	100
	(Yes)	-	-	-	-
Women's Social Centre	(No)	36	90	22	95.7
	(Yes)	4	10	1	4.3
Family Social Centre	(No)	34	85	20	87
	(Yes)	6	15	3	13

(d) Cross arteries. These arteries present a group of parallel roads penetrating through the main arteries, i.e. the major and secondary arteries. Since the direction of these routes are opposite to the direction of the main arteries, access and cross points have been created. These points provide sub-commercial areas concentrated about the nodes located along the secondary arteries, rather than extended in a linear form as found along the major artery (Figure G.18).
As the sub-commercial areas are situated in the middle of the estates they perform a valuable function for bringing together the inhabitants at the sub-district level.

In conclusion, we have identified four types of roadway in Kadimiya which correspond with four types of socio-physical space, namely public, semi-public, semi-private and private. Together they provide an important hierarchy which is crucial to the pattern of social life in the district. At the same time the roads appear to perform the social function of dividing the whole area up into identifiable local areas, each with their own characteristics.

However, the social and physical effects of the hierarchy of roads on the inhabitants can be seen clearly in the traditional area of the case study, i.e. Kadimiya and Kārama. Table G.14 shows that 60 per cent of Kadimiya and 74 per cent of Kārama people surveyed do prefer to live on these estates for social reasons.

Table G.14 indicates that 60 per cent of the sample of Kadimiya people are living on the estate for economical reasons (because accommodation is cheap) in contrast to 29 per cent of the residents of Kārama. This is because of the higher rent and living expenses in Kārama due to its location adjacent to the city centre of Baghdad.

TABLE: G.14.

LIVING ATTRACTION FACTORS FOR LIVING ON THE ESTATE

Estate / Response	Kadimiya		Karama	
	No.	%	No.	%
Social	24	60	17	73.9
Economic	24	60	6	26.1
Preference	6	15	11	47.8
Near Work	7	17.5	5	21.7
Ownership	2	5	-	-
The Area of the House				
Adequate	21	53.5	11	47.8
Not Adequate	19	47.5	12	52.2

G.8.4.3 The Existing Situation

Kadimiya and Kārama residential areas can be considered as parts of the oldest residential districts in Baghdad, since most of their dwellings were built more than 150 years ago.

Due to the increase in the water table level over time in these areas as a result of frequent flooding and additionally, the absence of proper insulating material in the buildings' construction, the walls of these houses, in particular at ground level and in the basement, are heavily affected by water absorption which makes them technically inefficient (Figure G.20) and creates unacceptable living conditions inside some of the basements (e.g. some of these basements become full of water during winter).

The houses mainly consist of two-storey buildings, usually built of brick and wood and their sizes vary between 30-300m². Table G.15 shows that 50 per cent of the dwellings solely on the ground floor in Kadimiya are less than 50m² whereas in Kārama only 21.8 per cent of the dwellings on the ground floor have an area of less than 50m². Furthermore, 23 per cent and 35 per cent, respectively of dwellings sized between 50-99m² and located on the ground floor are found in Kadimiya and Karama. These figures revealed an average size of dwelling in Kadimiya of 76.25m² and 105.4m² in Karama at the ground floor, whilst the average size of the dwelling area on the first floor is 39.4m² and in Karama 63.6m². This means that an average dwelling in Karama is bigger than in Kadimiya as a result of a high density of development around the Kadimiyan religious centre and lower economic levels within the population.

TABLE: G.15.

APPROXIMATE BUILT-UP AREA

Level / Area m²	Kadimiya				Karama			
	Ground Floor		First Floor		Ground Floor		First Floor	
	No.	%	No.	%	No.	%	No.	%
>49	20	50	12	30	5	21.8	11	47.8
50-99	9	22.5	6	15	8	34.8	8	34.8
100-149	7	17.5	4	10	4	17.4	1	4.3
150-199	1	2.5	-	-	4	17.4	11	4.3
200-249	1	2.5	-	-	14	4.3	1	4.3
250-299	1	2.5	-	-	1	4.3	-	-
300-349	1	2.5	1	2.5	-	-	-	-
Average	76.25		39.375		105.4		63.6	

TABLE: G.16.

AREA OF THE WHOLE PLOT

Estate / Area m²	Kadimiya		Karama	
	No.	%	No.	%
>99	26	65	9	39.1
100-199	9	22.5	9	39.1
200-299	3	7.5	5	21.7
300-399	1	2.5	-	-
400-499	1	2.5	-	-
	105		132.6	

* The average courtyard size in Kadimiya = 28.75m²
whilst the average courtyard size in Karama (Karkh) = 27.2m²

Average family size in Kadimiya = 8.25
Average family size in Karama = 8.869

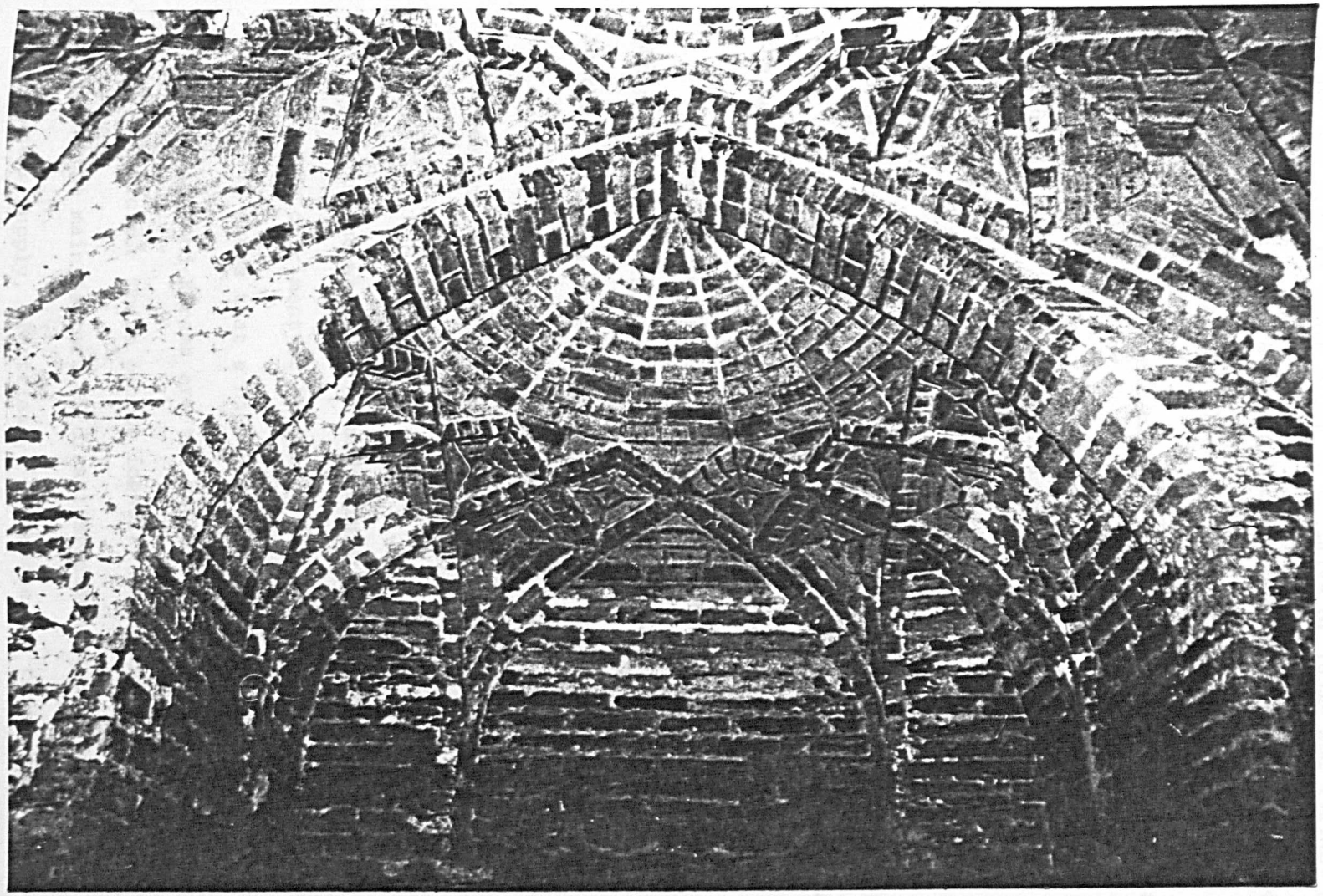


FIGURE: G.20.

The Effects of Rising Damp in a Basement.

By comparing these results with the whole plot areas of the dwellings in both districts as obtained in Table G.16 this gives an average size of whole plots in Kadimiya of 105m² and 132.6m² in Kārama. This suggests an estimated average size of the courtyard is 28.75m² in Kadimiya and 27.2m² in Kārama.

The increased water table level affects the sanitation of the dwellings, which is based on an individual cesspool system, by decreasing its capacity. In addition there are maintenance problems in keeping these cesspools operative. This is because the new forms of maintenance equipment (e.g. tankers) cannot penetrate the existing narrow meandering alleyways. These factors force the inhabitants to spread or channel their waste water into the nearest alleyway.

Domestic refuse is collected from individual dwellings by municipal dustcarts. The collection has become very difficult in the traditional areas since these carts cannot penetrate most of the twisting alleyways. This causes delay in everyday collections which results in refuse accumulation in the alleyways near the dwellings.

Both the waste water and refuse has created unacceptable odour to the detriment of health or convenience in the alleyways. Table G.17 shows that a high proportion of the inhabitants in both Kadimiya and Karama are not satisfied with the maintenance of their districts. These people identify their feelings in Table G.17 in which the main factors of dissatisfaction towards urban services (i.e. water supply, electricity, telephone and paving) are sanitary conditions and refuse collection.

TABLE: G.19.

FEELINGS OF DISCOMFORT WHEN WALKING ON THE ESTATE'S ROADS

Response \ Estate		Kadimiya		Karama	
		No.	%	No.	%
No		2	5.0	1	4.3
Yes		36	90.0	18	78.3
Don't know		2	5.0	4	17.4
Reasons for Discomfort					
Long distance	(No)	37	92.5	23	100
	(Yes)	3	7.5		
Unpaved	(No)	31	77.5	23	100
	(Yes)	9	22.5		
Climatic Factors	(No)	37	92.5	22	95.7
	(Yes)	3	7.5	1	4.3
Children playing	(No)	9	22.5	4	17.4
	(Yes)	31	77.5	19	82.6
Traffic	(No)	33	82.5	22	95.7
	(Yes)	7	17.5	1	4.3
Odour	(No)	5	12.5	2	8.7
	(Yes)	35	87.5	21	91.3

TABLE: G.17.

FEELING ABOUT ESTATE MAINTENANCE

Response \ Estate	Kadimiya		Karama	
	No.	%	No.	%
Alright	6	15	5	21.7
Satisfactory	5	12.5	2	8.7
Unsatisfactory	29	72.5	16	69.6
Cause				
Services \ Estate	Kadimiya		Karama	
	No.	%	No.	%
Refuse Collection (No)	14	35	16	26.1
(Yes)	26	65	17	73.9
Paving (No)	35	87.5	23	100
(Yes)	5	12.5	-	-
Water Supply (No)	40	100	23	100
(Yes)			-	-
Sanitation (No)	7	17.5	5	21.7
(Yes)	33	82.5	18	78.3
Electricity (No)	39	97.5	23	100
(Yes)	1	2.5	-	-
Telephone (No)	39	97.5	22	95.7
(Yes)	1	2.5	1	4.3

In addition to the above mentioned factors, it is also difficult to maintain the dwellings due to a lack of skilled labour, particularly with regard to this type of housing and high expense. Added to this is the difficulty of transporting building materials through the narrow alleyways which has exacerbated dereliction (Table G.18).

The negative factors against living in the traditional areas are the converse of the positive situation in the modern estates, which offer their inhabitants new forms of living conditions based on modern building construction techniques and materials and design concepts, to include gardens and wide streets through which cars can be driven easily. These conditions attract many of the inhabitants of the traditional areas to migrate from their areas to the newly built districts.

Baghdad has been a target for migration from other parts of the country (Figure G.13). These migrants are mostly manual labourers with a low standard of living. Thus the vacant accommodation in the traditional areas becomes the focal point in the city for them to reside, since the rents in these areas are very low in comparison to the newly-built parts, and in addition more than one family can share the living space in one house. A further benefit is in the relatively cheap shopping facilities available within these residential areas [University of Baghdad, 1976, p.18]. The religious centres which exist in some of these areas also play a major role in attracting migrants to live in these districts.

TABLE: G.18.

FEELINGS ABOUT ESTATE DENSITY

Response \ Estate		Kadimiya No.	Kadimiya %	Karama No.	Karama %
Too crowded		23	57.5	2	8.7
Crowded		10	25	10	43.5
Just right		6	15	11	47.8
Don't know		1	2.5	-	-
Reasons					
Near to Services	(No)	32	80	22	95.7
	(Yes)	8	20	1	4.3
Family Size	(No)	32	80	19	82.6
	(Yes)	8	20	4	17.4
Multi-Family	(No)	17	42.5	15	65.2
	(Yes)	23	57.5	8	34.8
Children	(No)	32	80	14	60.9
	(Yes)	8	20	9	39.1
Feeling About Estate Maintenance					
Alright		6	15	5	21.7
Satisfactory		5	12.5	2	8.7
Unsatisfactory		29	72.5	16	69.6

As a result of all the above mentioned factors, the population density in these areas has become very high, which makes the whole situation even worse.

The urban form of these traditional areas was basically developed on a compact layout based on internal open spaces and a narrow pedestrian road network which thus excluded outer open spaces and vehicular access (Figure G.21) as is typical of Middle Eastern traditional housing.

The dwellings in these areas are occupied by more than one family and in most cases houses have a large floor area. Consequently, the houses become very congested and noisy due to the number of families and their children contained therein with no space left for them to play (Table G.18). Consequently, the families begin to encourage their children to play in the alleyways which thus become playing fields and disturbs the flow of pedestrians. This is another factor which can be added to the negative factor in the alleyways, i.e. odour and waste water, as shown in Table G.19.

The survey shows that a majority of the inhabitants suffer from the effects of odour and the noise of children playing. Other constraints, such as long distances to travel through the area with unpaved roadways, climate and traffic are disliked. The inhabitants also suffer from the effects of noise (Table G.20) with half of the inhabitants in Kadimiya and Karama affected, which is mainly due to children playing in the alleyways and the crowding of the area, as indicated in Tables G.20 and G.21.

TABLE: G.20.

DISTURBANCE FROM NOISE

Estate / Response	Kadimiya		Karama	
	No.	%	No.	%
No				
Yes	26	65	13	56.5
Cause of Noise				
Crowdedness	11	24.5	-	-
Children	17	42.5	13	56.5
Services	1	2	-	-
Source of Noise				
Inside the House	8	20	4	17.4
Outside the House	20	50	9	39.1
No Noise	12	30	10	43.5

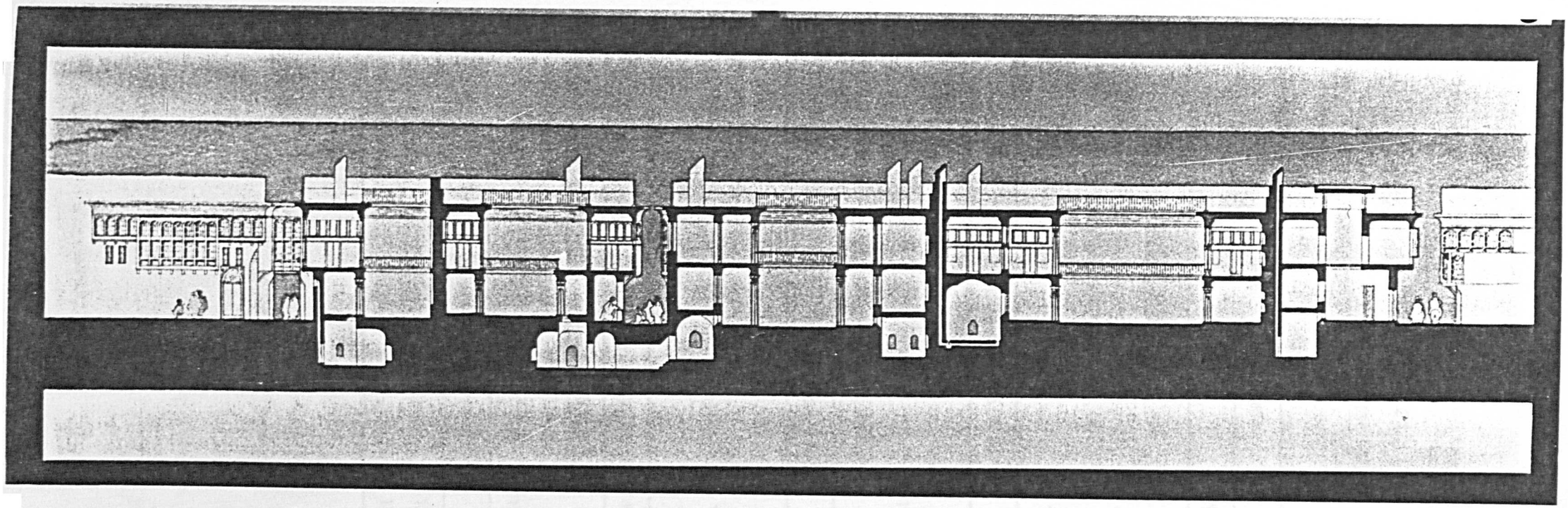


FIGURE: G.21.

Section of the Compact Layout of the Traditional Dwellings.

TABLE: G.21.

SOURCE OF NOISE

Response \ Estate	Kadimiya		Karama	
	No.	%	No.	%
Next-door House	16	40	5	21.7
Above	-	-	-	-
Below	-	-	2	8.7
Street	6	15	-	-
Noise from Traffic				
Don't Know	2	5	1	4.3
No	28	70	15	65.2
Yes	8	20	7	30.4
Sources of Outside Noise				
Front of the House	12	30	3	13
Back of the House	-	-	-	-
Side of the House	1	25	6	26.1
Noise from Children Playing Outside				
Don't Know	4	10	3	13
No	5	12.5	2	8.7
Yes	31	77.5	18	78.3
Does It Bother You?				
No	12	29	12	42.1
Yes	28	70	11	47.8

The existing narrow meandering alleyways usually act as a constraint against new modes of services, infrastructure, emergency services, dust carts and individual cars.

One of the main characteristics of the traditional area is the concentration of services and utilities along the main artery and with sub-centres at crossroads. This brings local facilities either near or within walking distance of the inhabitants as indicated in Table G.22(a). This table shows that more than three-quarters of the population are near to services and utilities, whilst the rest are within easy walking distance with only a few of them using a car.

It seems that the people in the traditional areas are satisfied with the services and utilities which already exist within the estate (i.e. education, social services, public services), except for the environmental and health services as shown in Table G.22(b). This is a reflection of the poor sanitary conditions.

Due to the low incomes of the inhabitants, compared with other estates, the availability of services within a short distance, the level of car ownership is very low as shown in Table G.23.

The traditional areas therefore show a high standard of social relationship. Table G.23 shows that 85 per cent of Kadimiya's inhabitants and 100 per cent of Kārama's have social relationships with other people on the estate which give an average of 92 per cent on both estates.

In a comparison between the inhabitants, different degrees of social relationship in relation to different activities, the

TABLE: G.22a.

SERVICES AND UTILITIES

Distance Between House and Services

Services \ Estate	KADIMIYA						KARAMA					
	Near		By Walking		By Car		Near		By Walking		By Car	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Primary School	34	85	5	12.5	1	2.5	23	100	-	-	-	-
Secondary School	27	67.5	11	27.5	1	2.5	3	13	20	87	-	-
Clinic	23	57.5	17	42.5	-	-	20	87	3	13	-	-
Public Bath	31	77.5	5	12.5	4	10	19	82.6	4	17.4	-	-
Shops	38	95	2	5	-	-	23	100	-	-	-	-
Cafe	37	92.3	3	7.5	-	-	23	100	-	-	-	-
Religious Centre	38	95	2	5	-	-	23	100	-	-	-	-

TABLE: G.22b.

Services and Utilities Needed on the Estate

Services \ Estate		KADIMIYA		KARAMA	
		No.	%	No.	%
Education	(No)	40	100	20	87
	(Yes)	-	-	3	13
Social Services	(No)	34	85	23	100
	(Yes)	6	15	-	-
Environmental Services	(No)	26	65	23	100
	(Yes)	13	32.5	-	-
Health Services	(No)	24	60	22	95.7
	(Yes)	16	40	1	4.3
Public Services	(No)	37	92.5	22	95.7
	(Yes)	3	7.5	1	4.3

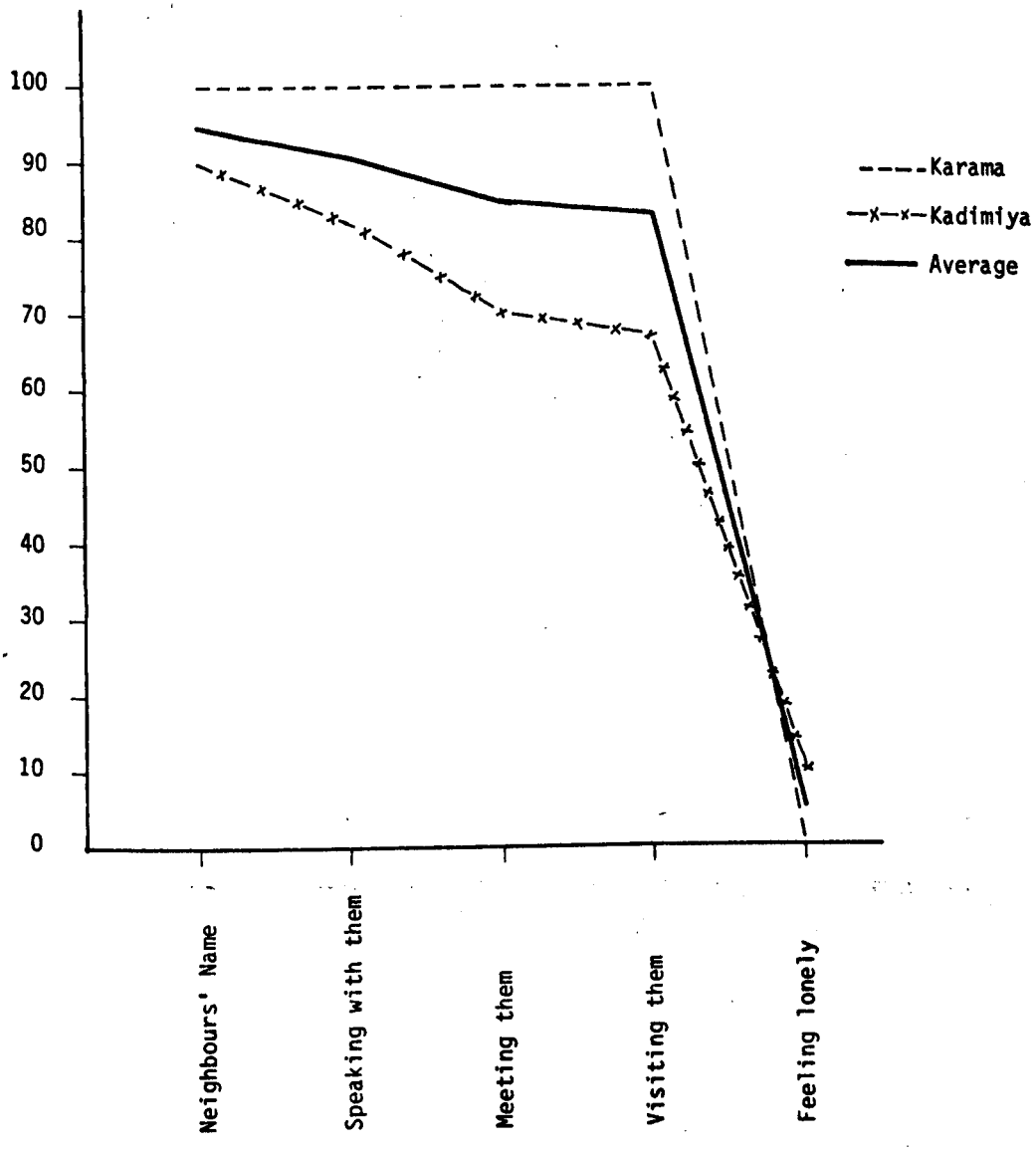
TABLE: G. 23.

CAR AND TRANSPORTATION

Response \ Estate	KADIMIYA		KARAMA	
	No.	%	No.	%
Having a Car				
No	36	90.0	6	26.1
Yes	2	5.0	1	4.3
Don't Know	2	5.0	1	4.3
Problems of Car Parking				
No	2	5.0	1	4.3
Yes	38	95.0	22	95.7
Parking Space in Relation to the House				
Inside	1	2.5	-	-
Outside	1	2.5	1	4.3
Preference for Car space in Relation to the House				
Private	1	2.5	22	95.7
Public	1	2.5	1	4.3
Don't Know	38	95.0	-	-

table below shows that Karama estate has a higher degree than Kadimiya. This is because the former still contains a large number of its original families who have lived for a long time on the estate, whereas for Kadimiya the social relationship has been affected by the level of immigration. However, in order to gain a clear picture of the degree of social relationship between the inhabitants in the different levels of activities within the traditional urban fabric, a composite diagram of social interaction for Kadimiya and Karama has been produced (Figure G.22). This shows that the inhabitants in this type of urban fabric enjoy a high level of social relationship.

FIGURE: G.22.



G.8.4.4 Design and Social Criteria Within the Dwelling

In the case of individual units (the dwellings) privacy and security have been achieved within another hierarchical system. Such a system is dependent upon the function and the use of the space and its relation to public or private status (see Figure G.23). We have developed a diagrammatic representation of privacy/security areas in the traditional house.

To achieve these aims the function and independence of the use of the space becomes the basic concept in the design. Accordingly, the houses' elements are formed and located in relation to each other in such a way as to achieve maximum privacy and security. This is created by dividing the house into groups of spaces, according to their related functions and social status. The spaces of each group are separated from each other and the only link between them is through special circulation areas. This arrangement not only allows control over the privacy and the security inside the dwelling, but also controls the micro-climate as well.

These circulation spaces are inter-connected to form a hierarchical chain of private spaces going from a low level (hierarchically as well as literally, i.e. the ground floor spaces) of privacy and security (i.e. main entrance) to a median level of family privacy (i.e. courtyard) up to the highest level of individual personal privacy in the bedrooms.

In general, the spaces of the house are grouped according to their social and functional status, as follows: semi-public private space (reception rooms), private family spaces (enclosed, semi-

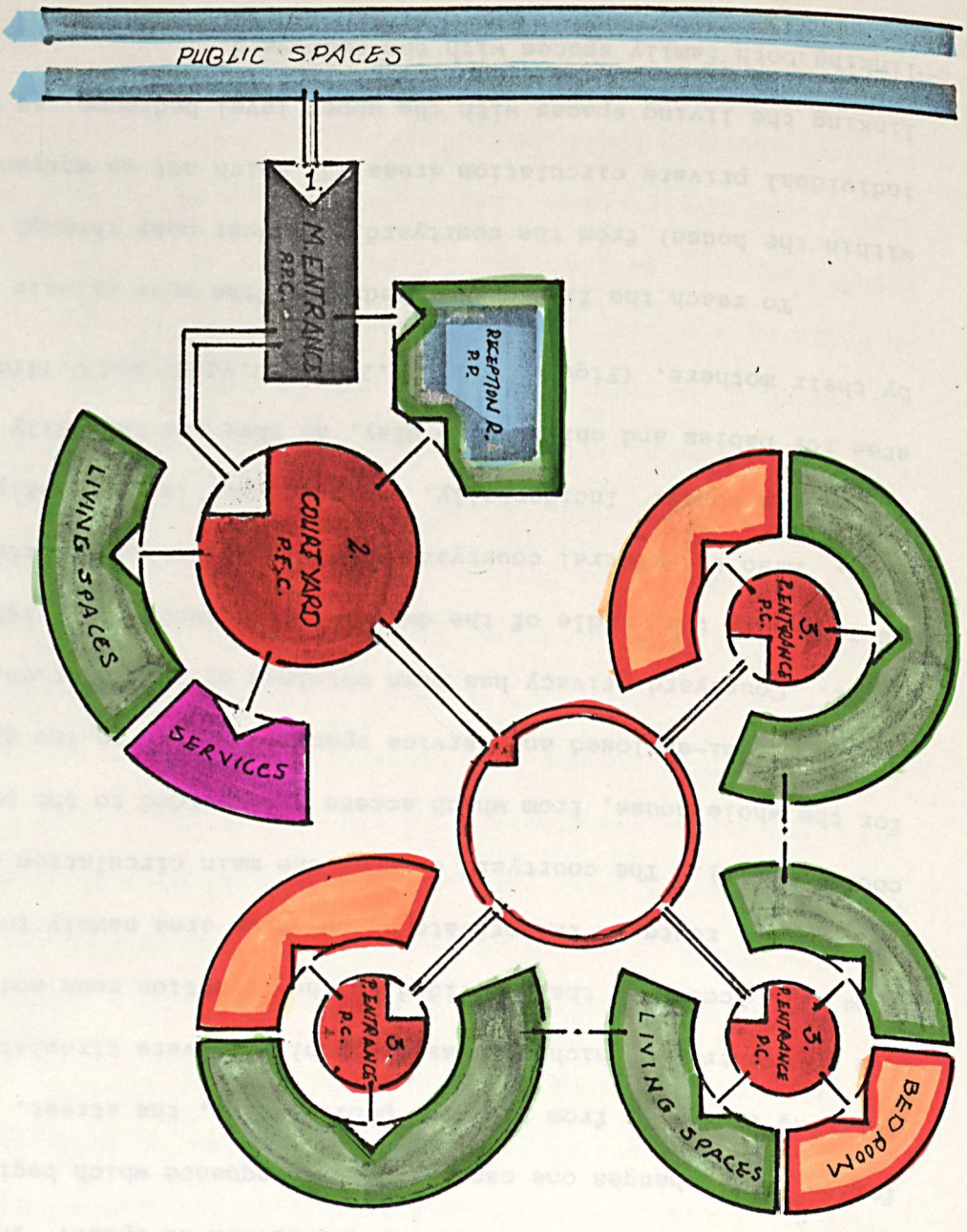


FIGURE: G.23.

The Functional Arrangement of Privacy/Security Areas in the Traditional House.

enclosed spaces and other service spaces) and individuals' private spaces (bedrooms) (Figure G.23).

Between these groups of spaces the circulation areas have been developed.

The change in the degree of privacy throughout the house is accompanied by articulation in the transition of space. In order to follow these changes one can follow the sequence which begins by entering the house from the most public space, the street, through the main entrance which acts as the public/private circulation area (1). Access is then provided to the reception room and also by an indirect route to the private circulation area namely the courtyard (2). The courtyard acts as the main circulation area for the whole house, from which access is provided to the private enclosed semi-enclosed and service spaces, located on the ground floor. Courtyard privacy has been obtained by its location, which is almost in the middle of the dwelling, far away from neighbours' eyes. Also the central courtyard helps to reduce circulation space within the house. Incidentally, the courtyard is an ideally safe area for babies and children to play, as they can be easily watched by their mothers. (Figures G.23, G.24(a), G.24(b) and G.24(c)).

To reach the first floor bedrooms (the most private spaces within the house) from the courtyard, one must pass through the individual private circulation areas (3) which act as entrances linking the living spaces with the upper level bedrooms, as well as linking both family spaces with the courtyard.

By this arrangement of the space in relation to the social and physical functions, privacy, security and identity for the internal spaces have been achieved.

The effectiveness of this arrangement can be seen clearly from the survey responses in both of the traditional areas of Kadimiya and Karama, as summarised in Table G.25. The table shows that 42.5 per cent of Kadimiya and 56.5 per cent of Karama population felt that the arrangement of the house is good and 7.5 per cent of Kadimiya and 4.3 per cent of Karama felt that the arrangements are alright. That is half or more of the sample were satisfied with the arrangement of the house. 45 per cent in Kadimiya and 34.8 per cent in Karama were not satisfied.

The answers of people can be considered as a reasonably positive result in favour of the traditional house arrangement, if three factors are taken into consideration which could influence the responses of the people: (i) the time of the survey, i.e. socio-technology changes have occurred which increase dissatisfaction with the wider environment of traditional areas (ii) people's experience in housing design, i.e. most of the people surveyed in both traditional areas have no living experience of the alternative to traditional dwellings except from their ideas about recent housing accumulated through visits and the visual and status attraction of new housing. It seems that 75 per cent of the sampled population in Kadimiya have been living in courtyard houses for some time, with 73 per cent of the majority residing for more than 15 years. (iii) house construction, quality and size, affects residents' satisfaction with their dwelling. (Table G.25).

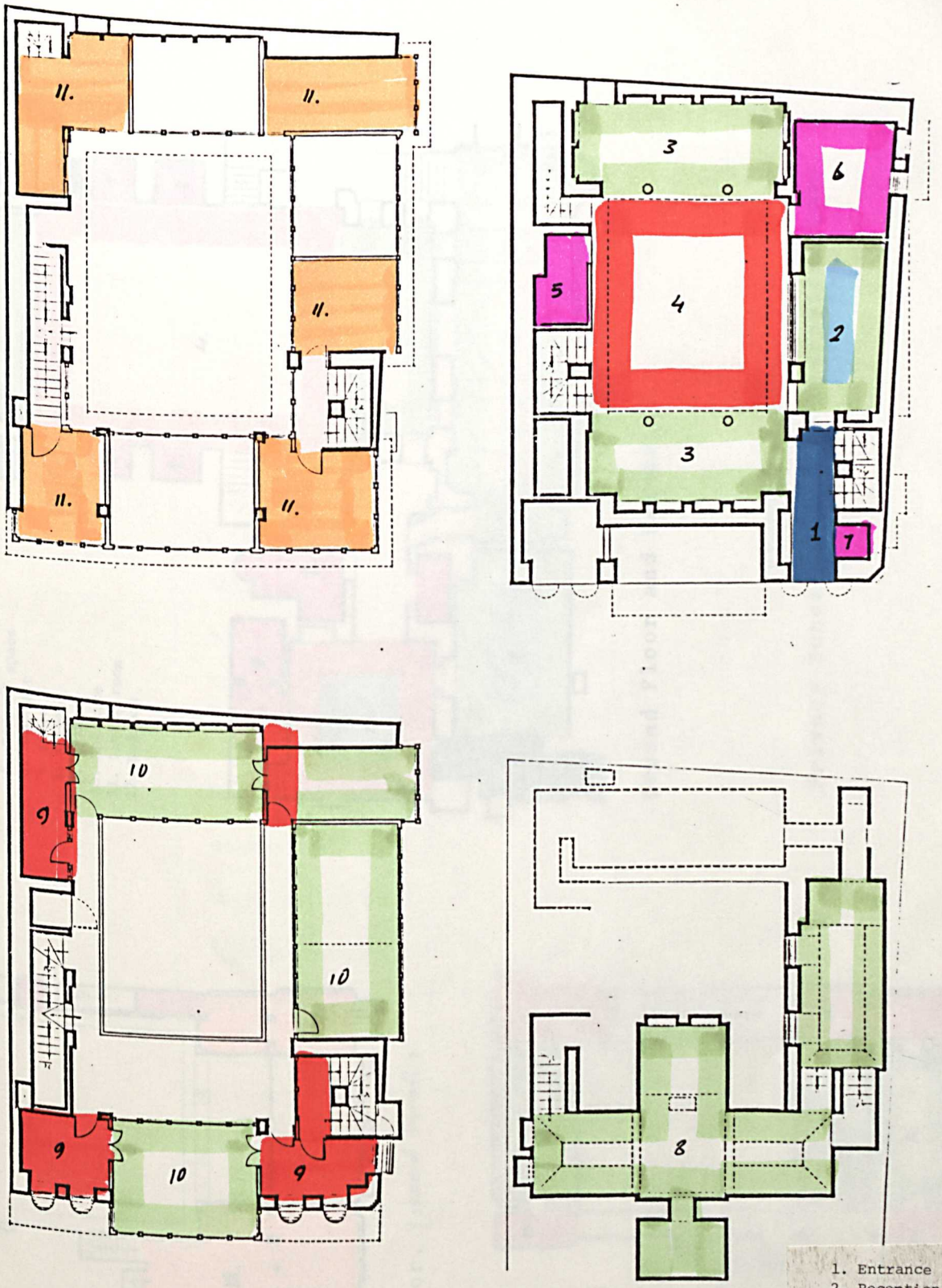
TABLE: G.24.

PRIVACY

Response \ Estate	KADIMIYA		KARAMA	
	No.	%	No.	%
Visitors and Feeling of Privacy				
No	15	37.5	9	39.1
Yes	24	60	13	56.5
Don't Know	1	2.5	1	4.3
Reason				
Design	24	60	11	47.8
Size	13	32.5	3	13.0
Disturbance by Neighbours Overlooking				
No	26	65	19	82.6
Yes	13	32.5	3	13
Causes				
Adjacency of Houses	5	12.5	-	-
High rise Nearby	-	-	2	8.7
Outside Fence	2	5	-	-
Roof Fence	1	17.5	1	4.3
Level Differences	5	12.5	2	8.7
Looking Inward	-	-	-	-

FIGURE: G.24a.

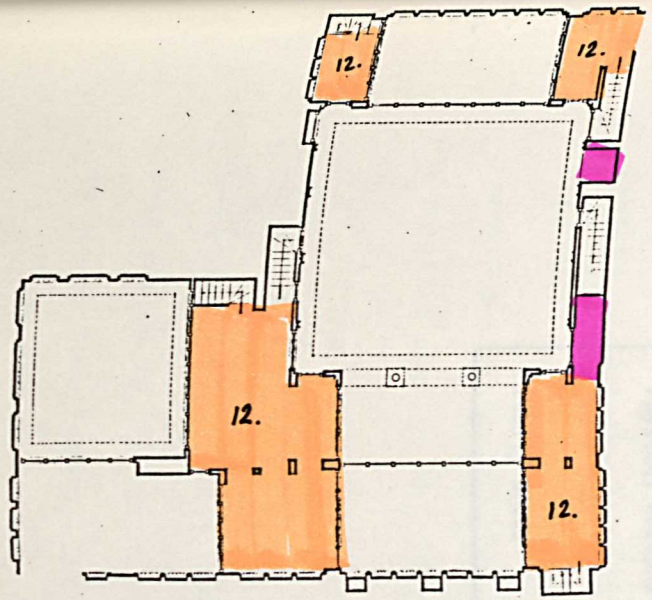
Privacy Zones within the Courtyard House.



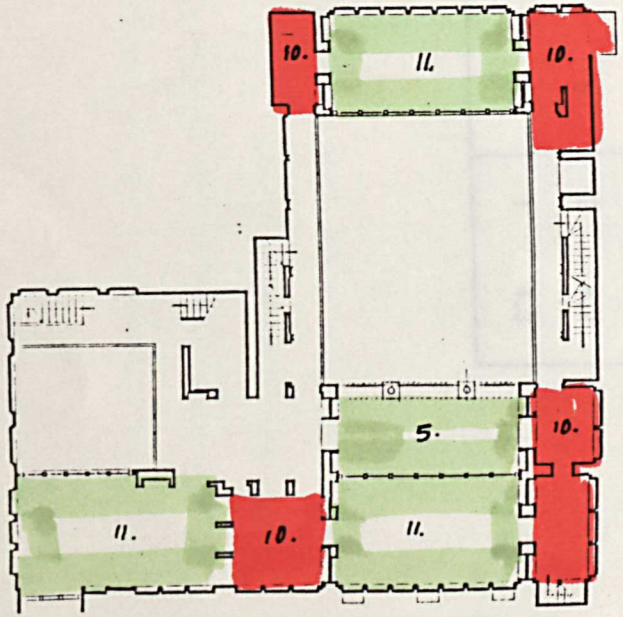
1. Entrance
2. Reception
3. Covered space
4. Courtyard
5. Bath
6. Kitchen
7. Toilet
8. Basement
9. Entrance
10. Living room
11. Bedroom

FIGURE: G.24b.

Privacy Zones Within the Courtyard House.

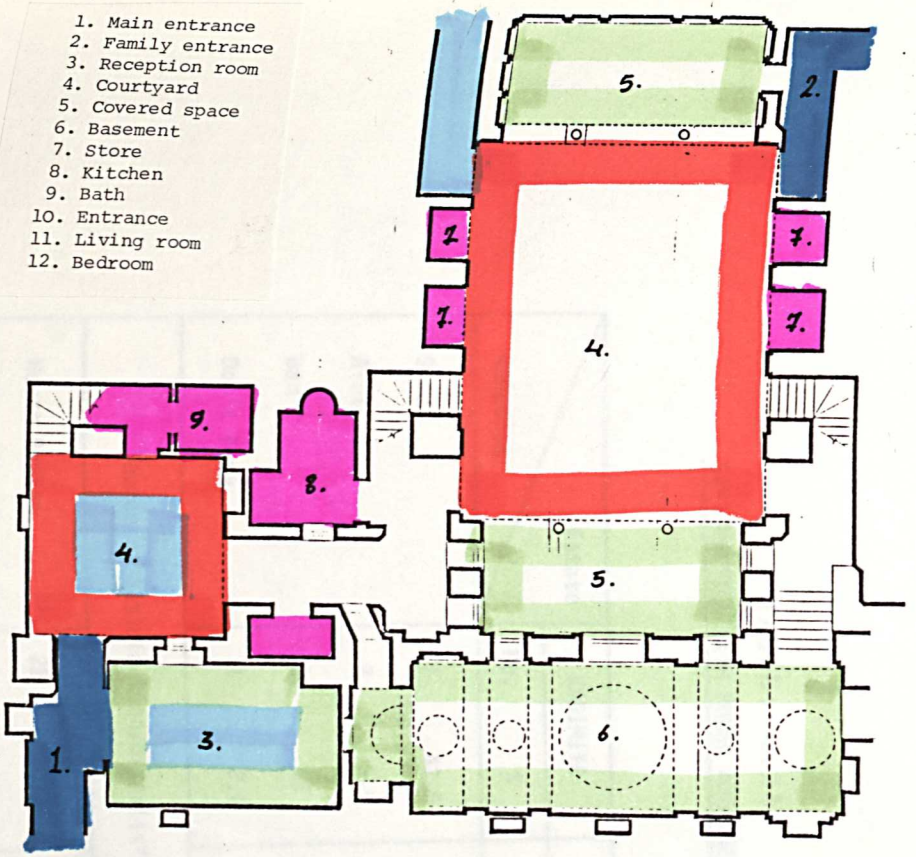


Second Floor. (second level)



Second Floor. (first level)

1. Main entrance
2. Family entrance
3. Reception room
4. Courtyard
5. Covered space
6. Basement
7. Store
8. Kitchen
9. Bath
10. Entrance
11. Living room
12. Bedroom



Ground Floor and Basement.

FIGURE: G.24c.

Privacy Zones Within the Courtyard House.

TABLE: G.25.

SATISFACTION WITH HOUSE ARRANGEMENT

Response \ Estate	KADIMIYA		KARAMA	
	No.	%	No.	%
Good	17	42.5	13	56.5
Alright	3	7.5	1	4.3
Bad	18	45	8	34.8
Don't Know	1	2.5	1	4.3
Source of Satisfaction/Dissatisfaction				
House Design	22	55	8	34
House Size	18	45	5	21.7
House Facilities	4	10	1	4.3
Physical Reasons	1	5	1	4.3
House Quality	1	5	2	8.7
Family Needs	2	5	1	4.3

G.8.4.5 Evolution

As an analysis of the relation between the form and the arrangement of the house and the inhabitants' privacy and security in different contexts, Rapaport [Englewood Cliffs, NJ, 1969, p.68] classified housing types into two contrasted categories: the first is the Japanese type, which achieves a high level of privacy from the outside by surrounding the dwelling with a high fence with its own blank facade whilst inside the high fence there is little concern with privacy. People inside the dwelling can hear one another or the house can be seen right through. The second category, the Western house, in contrast offers little concern for privacy from outside and seeks to increase separation between the different quarters of the house.

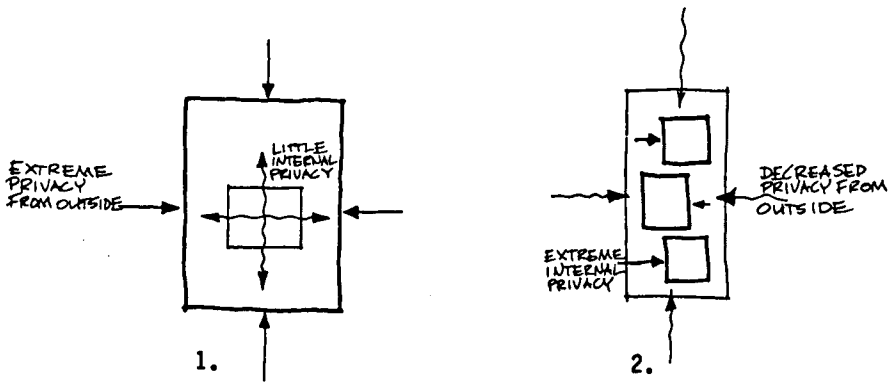
In relation to this classification the traditional courtyard house in the urban areas of most Middle Eastern cities can be seen to form a third category. This type of dwelling achieves the same high degree of privacy and security for the inhabitants from both outside and inside, by combining the two approaches. That is, a high blank wall achieves privacy from the street and neighbours and careful articulation of space achieves considerable internal separation and privacy (Figure G.25).

Comparable considerations also motivated Western designers in 19th where privacy and security were necessary between the family and their domestic servants [Kerr, 1864]. An example of the achievement of this design is the row of houses designed on the courtyard principle in London (see Figure G.26).

DESIGN FOR A ROW OF LONDON HOUSES.

Prepared for the Marquis of Westminster.
By the Author, 1864. (See Appendix)

FIGURE: G.26.



Privacy realms. Left: Japanese house. Right: Western house (Anglo-American).

Rapaport, 1969, p.68

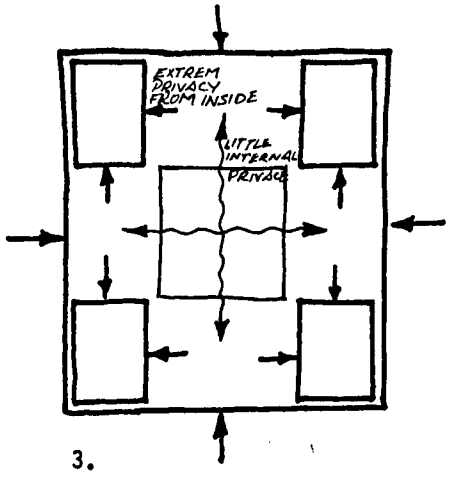


FIGURE: G.25.

Classification of Housing According to Family Privacy.

(a) House - Physical Design

(i) Flexibility in the Use of the House

Kinship relations are very strong in the Arab world and close ties exist between the members of the family. The growth in size of the family by both birth and marriage, with consequent pressure on the limited space of the house within urban areas adds another constraining factor to the design. This difficulty has been solved by adding another dimension to the design concept; flexibility in the use of space in order to meet changing social needs and demands and to make maximum use of the available area.

To achieve this flexibility expansion or subdivision of the internal space has been considered within the design. This concept of flexibility is not only utilized in space arrangement but also includes other elements of house design, i.e. the doors and windows.

This concern with flexibility can be seen in different parts of the dwelling. On the ground level and especially in small houses, which suffer from shortage of space, the facade of the living room, facing the courtyard, is screened by wooden frame panels, fitted with plain and coloured glass in different patterns. These panels are moveable. Thus, the enclosed living area can be converted to a semi-enclosed space. In other contexts the space can be opened up and expanded to include the whole courtyard. These dividing panels are moved occasionally when more space is desirable and during the hot season when it becomes impossible to sit inside the enclosed spaces.

Flexibility has also been achieved by increasing the number of the private circulation areas between the living spaces of the lower level of the first floor. The result is seen in the dividing of the living space into smaller units when required. The design of the traditional house allows the living spaces to be connected by more than one access, whilst separating the bedrooms on the upper level with only one access in order to achieve maximum privacy. In the case of one family occupying the house, this arrangement offers the occupants the opportunity and possibility to share the use of the living spaces, whilst offering separation and privacy in their sleeping quarters. In the case of the extended family, light partitions can be used to divide the living spaces in order to convert the first floor into smaller units (flats). Each unit has its own entrance, with living space in the lower level and a sleeping space on the upper level (Figure G.26(a)).

Also, on the detailed level, the complementary elements of the space (doors and windows) are designed in a grid frame pattern whose fitting can easily be changed in relation to the desired use of the space. This situation can be seen in the windows overlooking the first floor enclosed space, where the base of windows usually start 50cm above the floor level and the top frame is 50cm below the ceiling. In the case of using the space for living, such as sitting and eating, the whole windows are fitted with glass and in the case of converting the space into a bedroom, the lower half of the window will be fitted with wooden panels in order to obtain the necessary privacy.

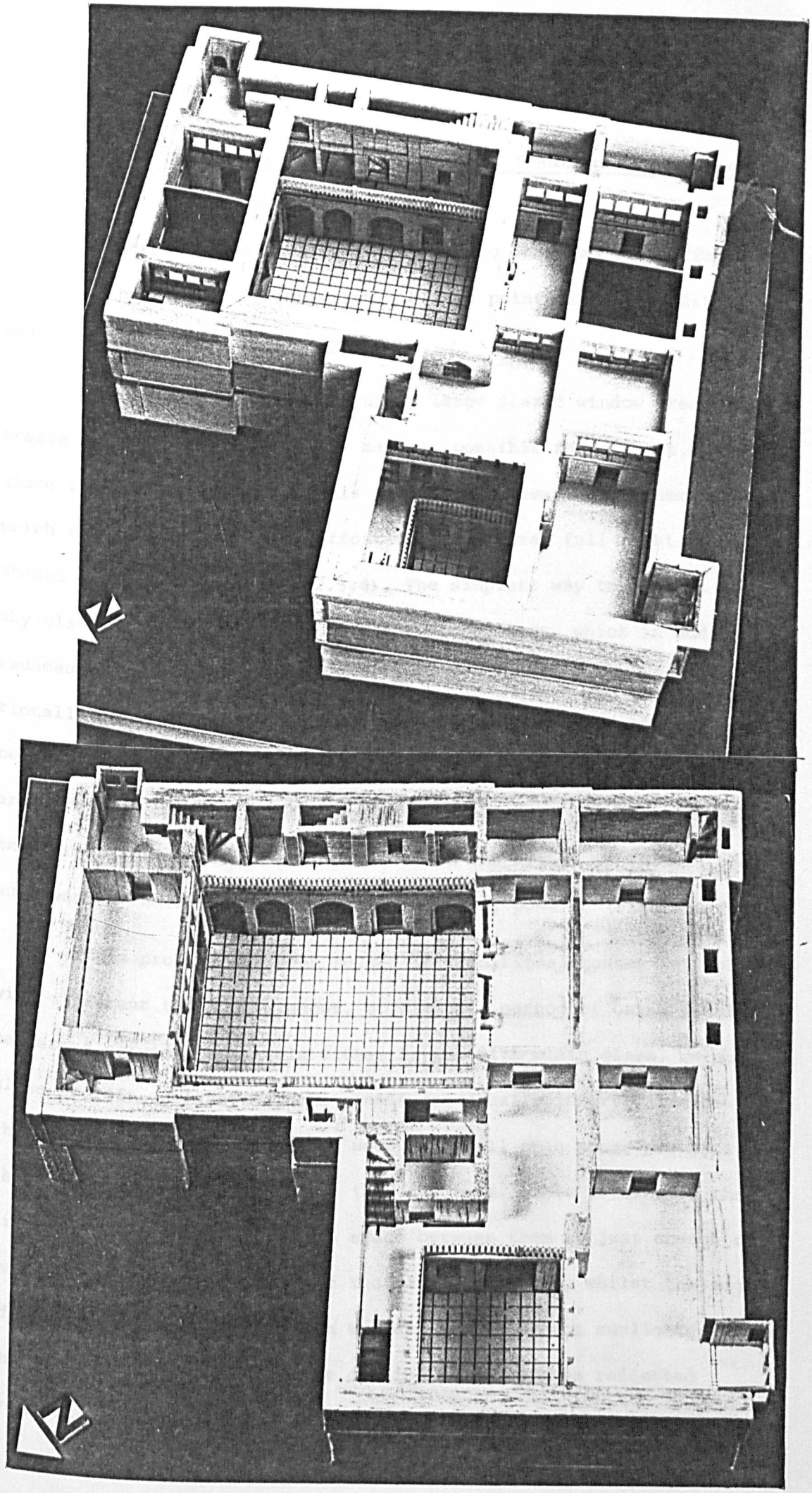


FIGURE: G.26a. The Flexibility of Separation.

(ii) Complementary Elements With the Traditional Dwelling

(*) Sun Control

These elements were usually added to increase the efficiency of the whole design, by improving the weak points in the traditional house design.

Apart from high temperatures, large glazed window areas also create problems of glare. They make it possible for a great deal of glare to enter the room and this creates problems for the human eye which requires considerable effort to adjust from full light to shaded areas (see Section E.2.3.4). The simplest way to control sky glare is by reduction in the size of openings, which in addition reduces the sunlight penetration. This method has been used traditionally but although it limits the entry of light it does not necessarily solve the glare problem in all cases. Unless windows are carefully designed and located, the problem of glare can be grossly exaggerated by increased contrast between the light opening and the surrounding inside wall surface [Saini, 1980, p.46]. (Figure G.27(a)).

This problem has been solved in traditional houses in Baghdad with different types of windows, utilizing a method of using finely patterned carved wood panels either fitted with plain glass, coloured glass or left unglazed. These panels are usually inserted inside the windows. The finely carved wood and small open areas prevents the direct sunlight penetrating into the room. This is because the width of these elements and the space between them is just enough to cut off the different angles of the direct sunlight, whilst the edges of these tracery elements which are exposed to direct sunlight diffuse the light by radiation onto the ceiling which is then reflected indirectly to the different parts of the room. (Figure G.27(b)).

Another element which has been used in the traditional houses in order to control direct sunlight is mirror glass. This use can be clearly seen in Figure G.27. The second storey facade of the eastern face of the large courtyard, being fitted with a big window, nearly occupying the whole facade, is divided horizontally into two parts. The lower part consists of permanent and sash panels, fitted with a pattern of wooden mullions and transomes and plain glass. The upper part of the window consists of double glazed panels. Both inside and outside frames are finely carved wooden panels, most of the outer glazing is fitted with mirrors not merely for decoration but mainly to reflect natural light to the opposite shaded side of the courtyard and also to reduce the penetration of direct sunlight to the inside. The other casement panels of the upper window facing inwards are normally fitted with plain and coloured glasses (Figures G.27(d) & G.27(e)).

Once again, one of the benefits of the compact layout is the control of glare. As the buildings are close together and their windows look out onto opposite walls the design naturally modifies the degree of glare by taking indirect light reflected off adjacent buildings rather than the direct rays of the sun (Figure G.27). In modern times this phenomenon has attracted the attention of the architect Louis Kahn in his travels in Africa where he was constructing a building in Angola. Kahn came to the realization that every window should have a free wall to face. This wall, receiving the light of day, would have a bold opening to the sky. The glare is modified by the lighted wall and the view is not shut off.
[Vincent, 1962, p.119]. This method of using indirect daylight has also been adopted by a number of Iraqi architects in the designs for Al-Mostanseria University.

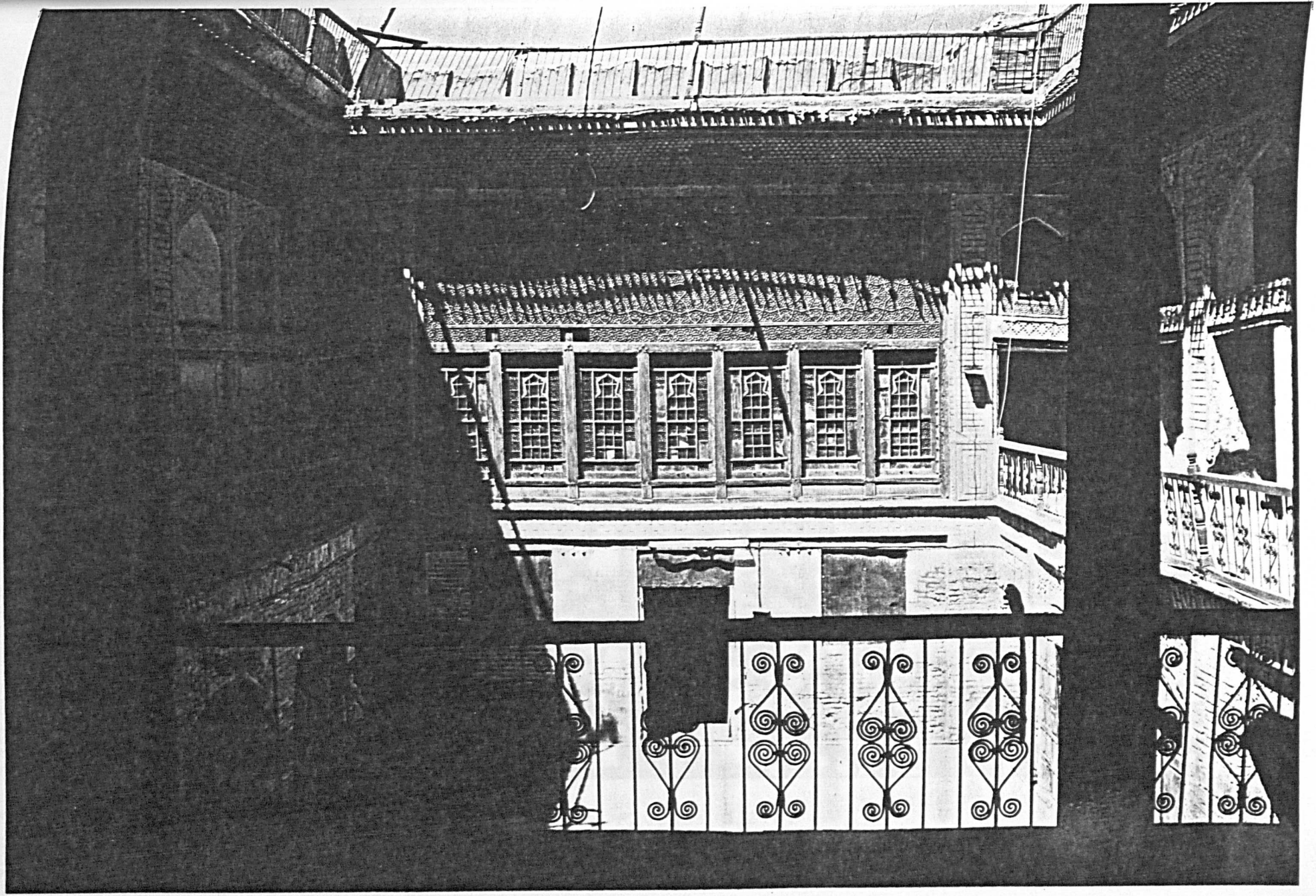


FIGURE: G.27a. Windows Overlooking an Interior Courtyard.

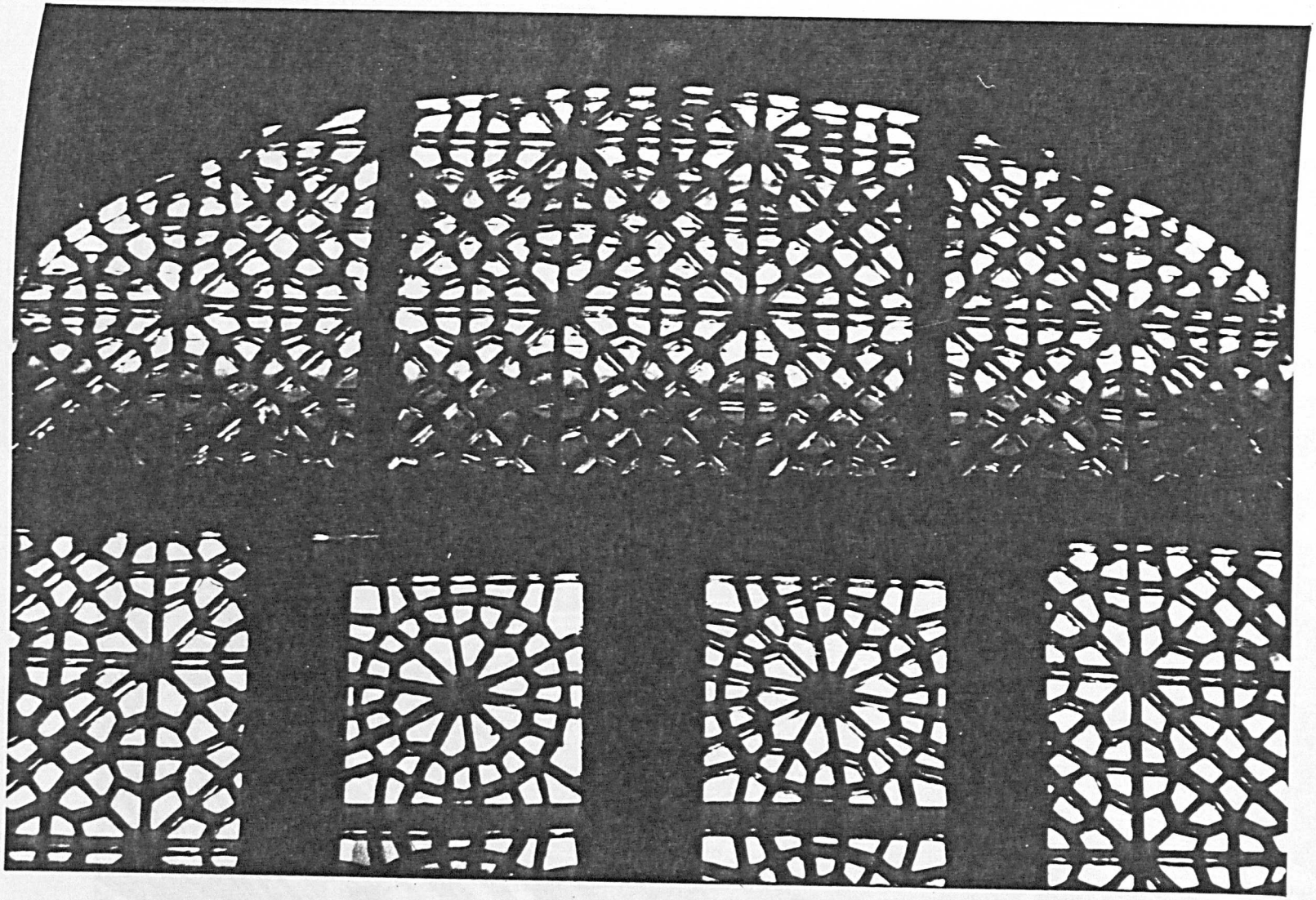


FIGURE: G.27b.

The Edges of the Tracery and the Diffusion of Light.

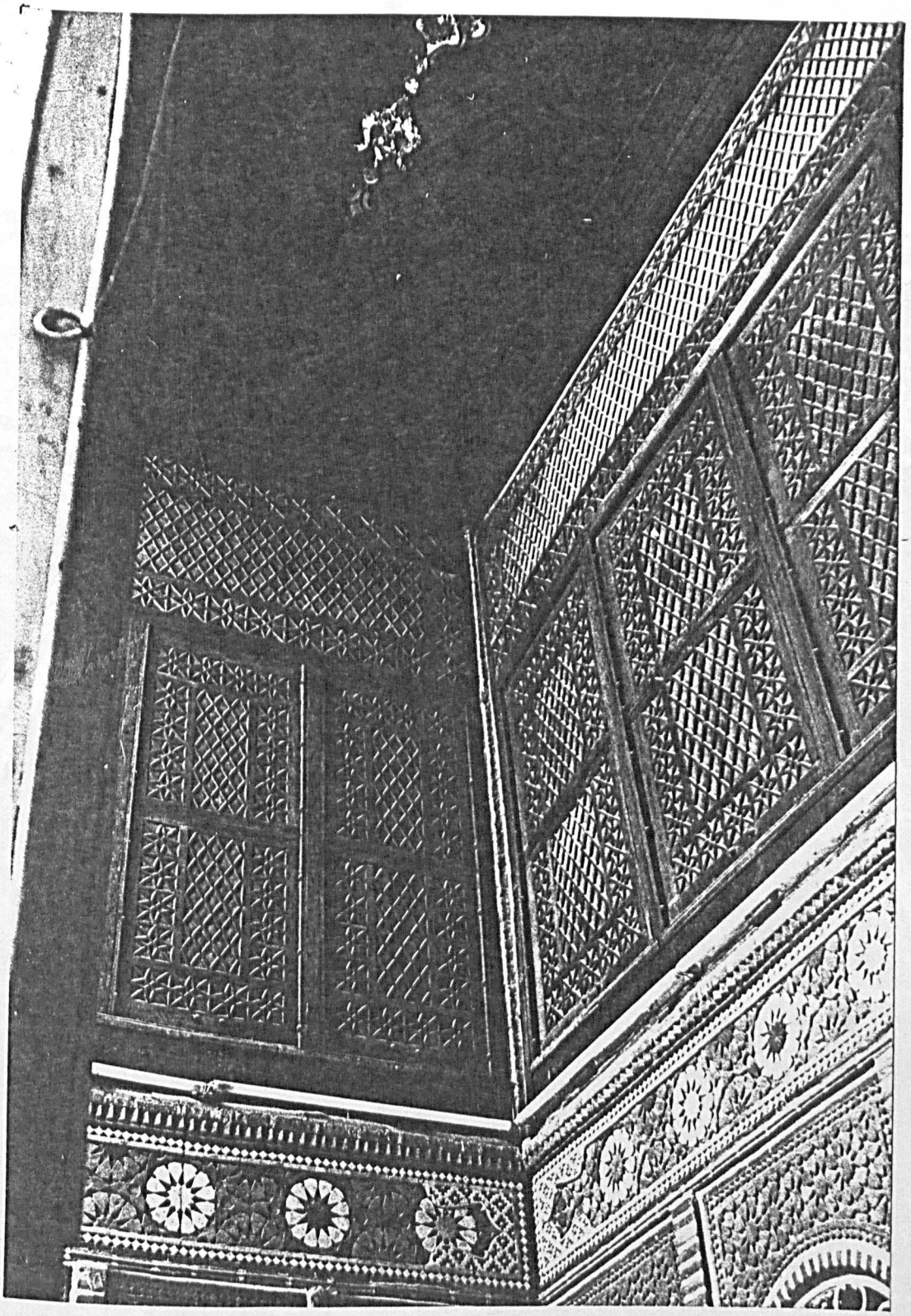


FIGURE: G.27c.

A Window Detail.

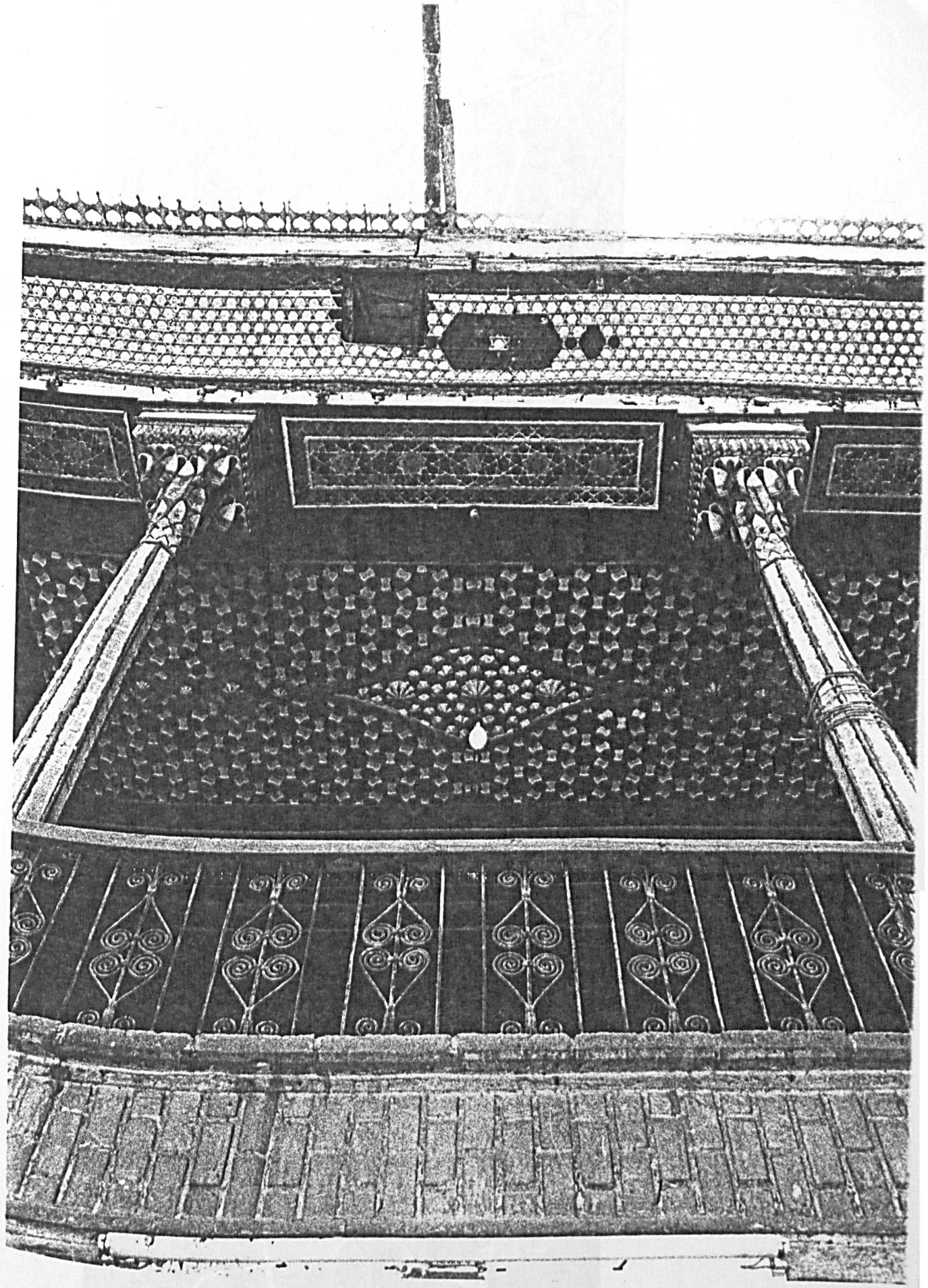


FIGURE: G.27d. The Reflection and Diffusion of Light Using Mirrors.

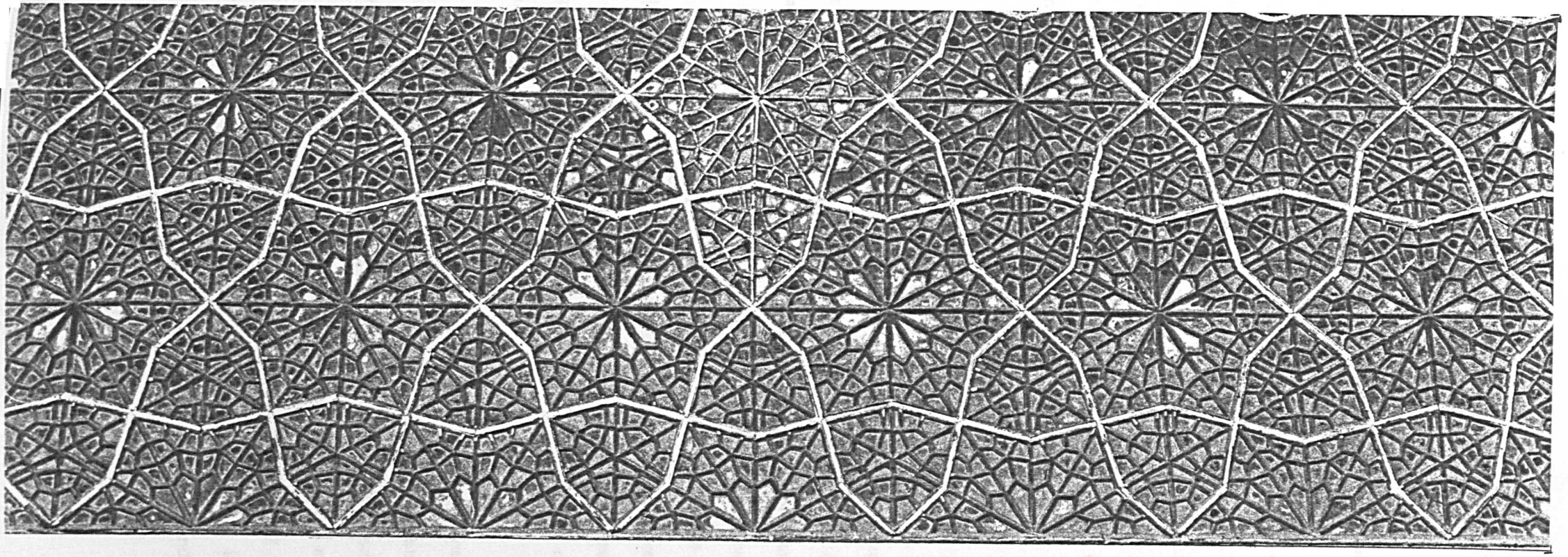


FIGURE: C.27e.

Detail of Window Showing Use of Glass and Mirrors.

(**) Dust and Sand Control

The compact layout can be considered as a mass of buildings with small open spaces (courtyards and alleyways). This form of urban development provides a barrier which elevates the passage of wind movement above the roof level. This, in turn, creates a low pressure condition inside the urban fabric (see Section G-33) resulting in an upwardly mobile air column (suction). This phenomenon reduces the presence and accumulation of the dust and the sand particles within the dwellings and streets.

(iii) Complementary Elements

(*) Air Scoop (Badgir)

As in most hot dry lands buildings are frequently closed for long periods to prevent the entry of hot, dusty and dry air. Some ventilation is necessary for hygienic reasons and for creation of relatively cool free air movement for physical comfort. In order to achieve this an air scoop system has been devised as a complementary element to the courtyard which represents the main ventilation system in the compact urban fabric. The form of the air scoop varies from region to region in the Arab world according to the climatic conditions which prevail.

The air scoop is a vertical shaft which opens high above the roof level and has another opening at the basement close to the lowest floor inside the building. Air scoops are normally orientated to catch the favourable breezes. Some of them are multi-directional particularly when they are found in settlements near the desert edge like Najaf. They are specially suited to buildings in desert climates where the winds continually change direction, day and night.

In summer, when the outdoor temperature is higher than the indoor temperature, the air is scooped at a high level and travels down the shaft and out into the buildings at a low level. In the cold spells or seasons this process is reversed. There are air scoops which are fitted with air cooling and humidifier filters (Figure G.28(a)). The dry and dusty wind is scooped down into the vertical shaft and as the air passes through the shaft its temperature drops down before entering the interior of the dwelling. Cooling occurs because of the direct contact between the hot air and the cold walls of the shaft. Also cooling can occur where the air passes over porous wet pottery jars. By this system the air is not only cooled but given moisture and the dust is removed by dampening. This cooling system has been developed further in some houses. The air is passed under the basement floor in order to distribute the cold air through different parts of the basement. This air makes its way into the interior through specially carved and perforated bricks in the floor. Through this latter process the air becomes cooler still and more humid as the draughts pass through damp cavities under the ground. (Figures G.28(b), G.28(c), G.28(d) and G.28(e)).

(**) Walls

Kuba [Zaini, Z.1976] found experimentally that an 80cm thickness of solid mud or brick wall would be the optimum from the point of view of housing construction in a hot climate in that the inner surface of the wall remains relatively unaffected by the heat flow from the outside wall's surface and is therefore able to give cool internal conditions.

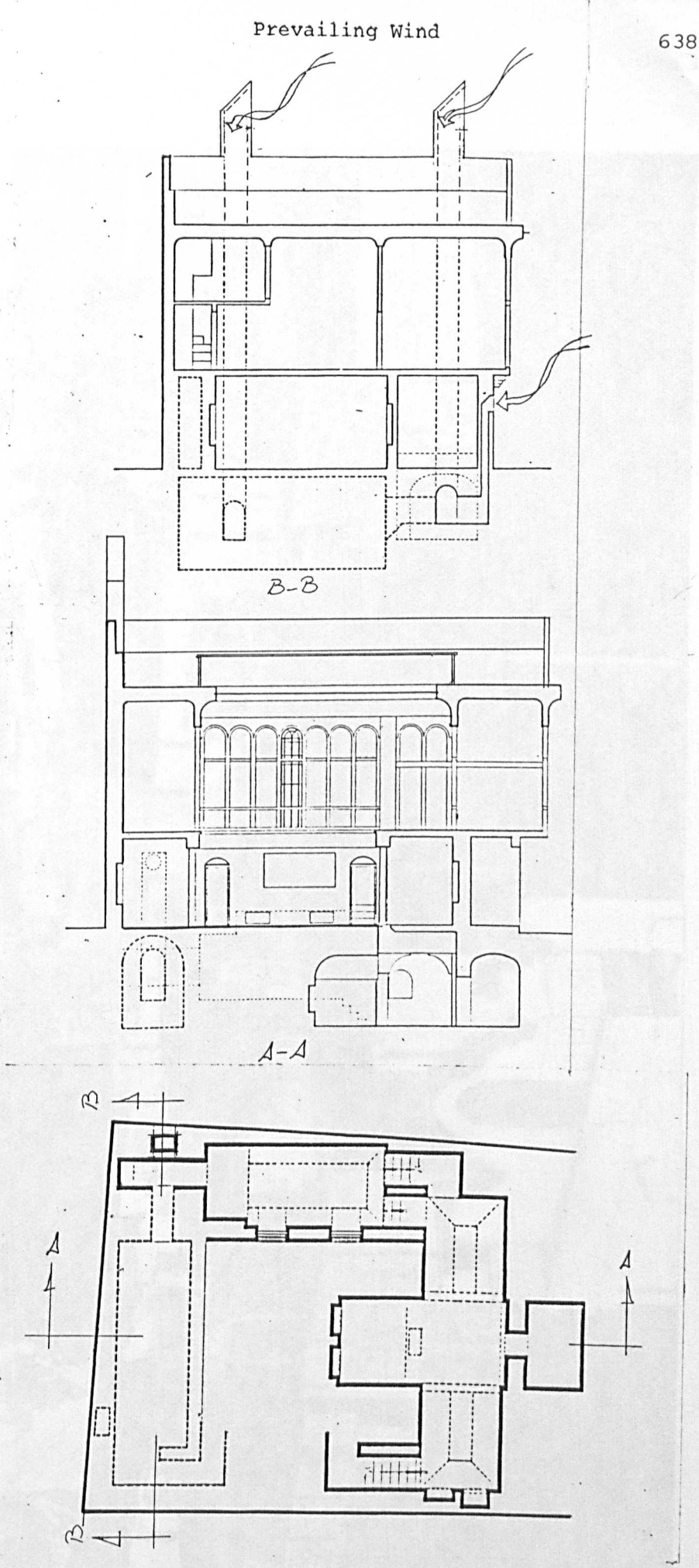


FIGURE: G.28a.

Basement Sections and Plans for the Mechanism of the Air Scoop.

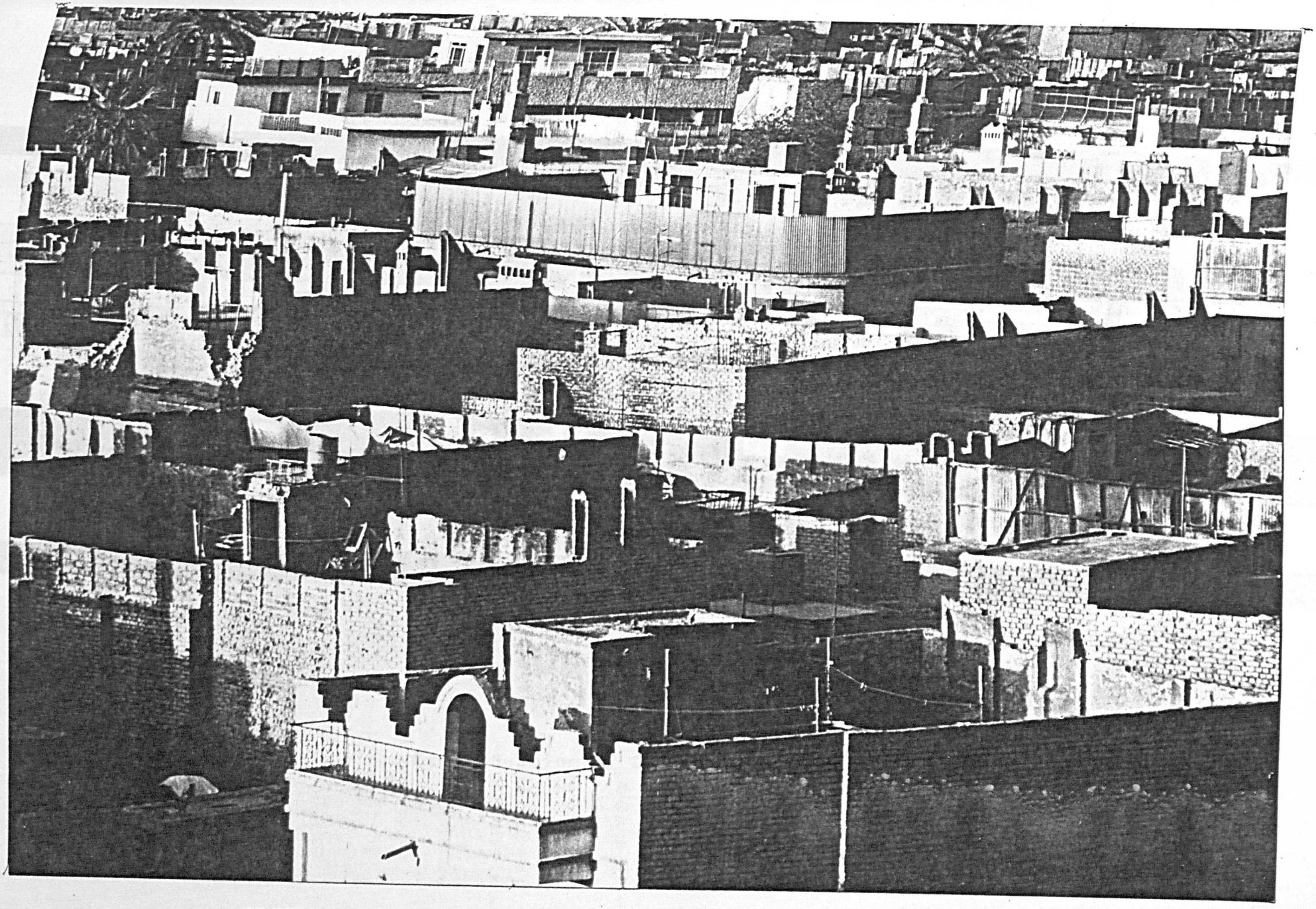


FIGURE: G.28b. General View of Air Scoops.

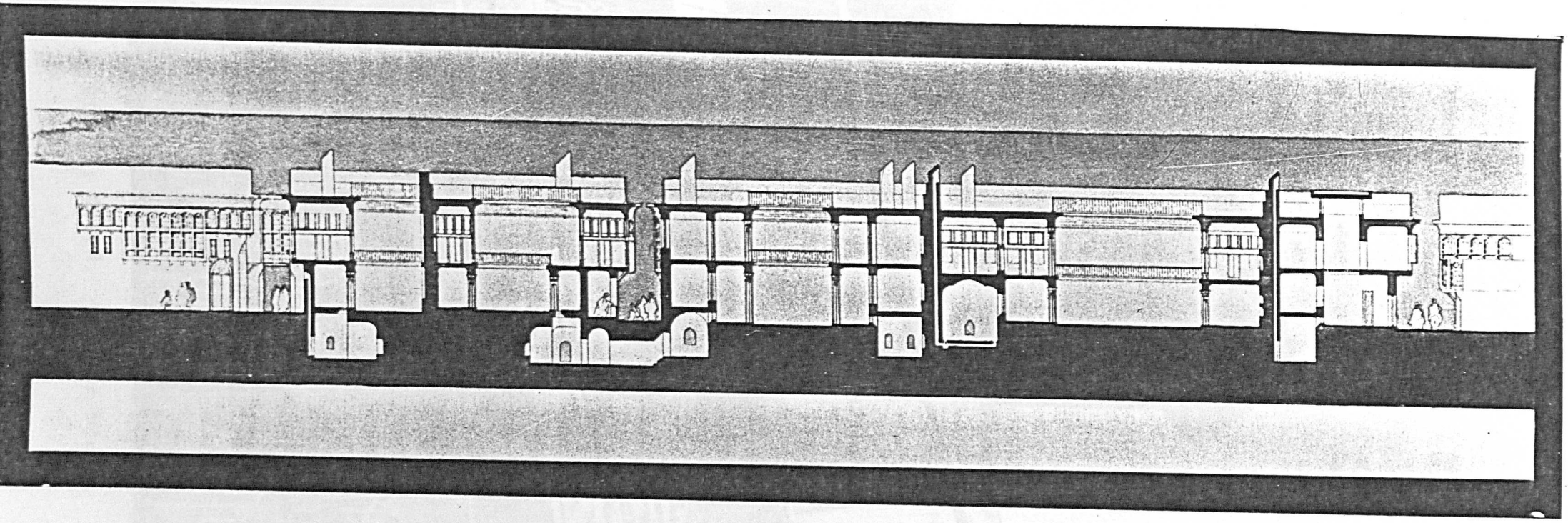


FIGURE: G.28c.

Cross Section of Different Types of Air Scoop.

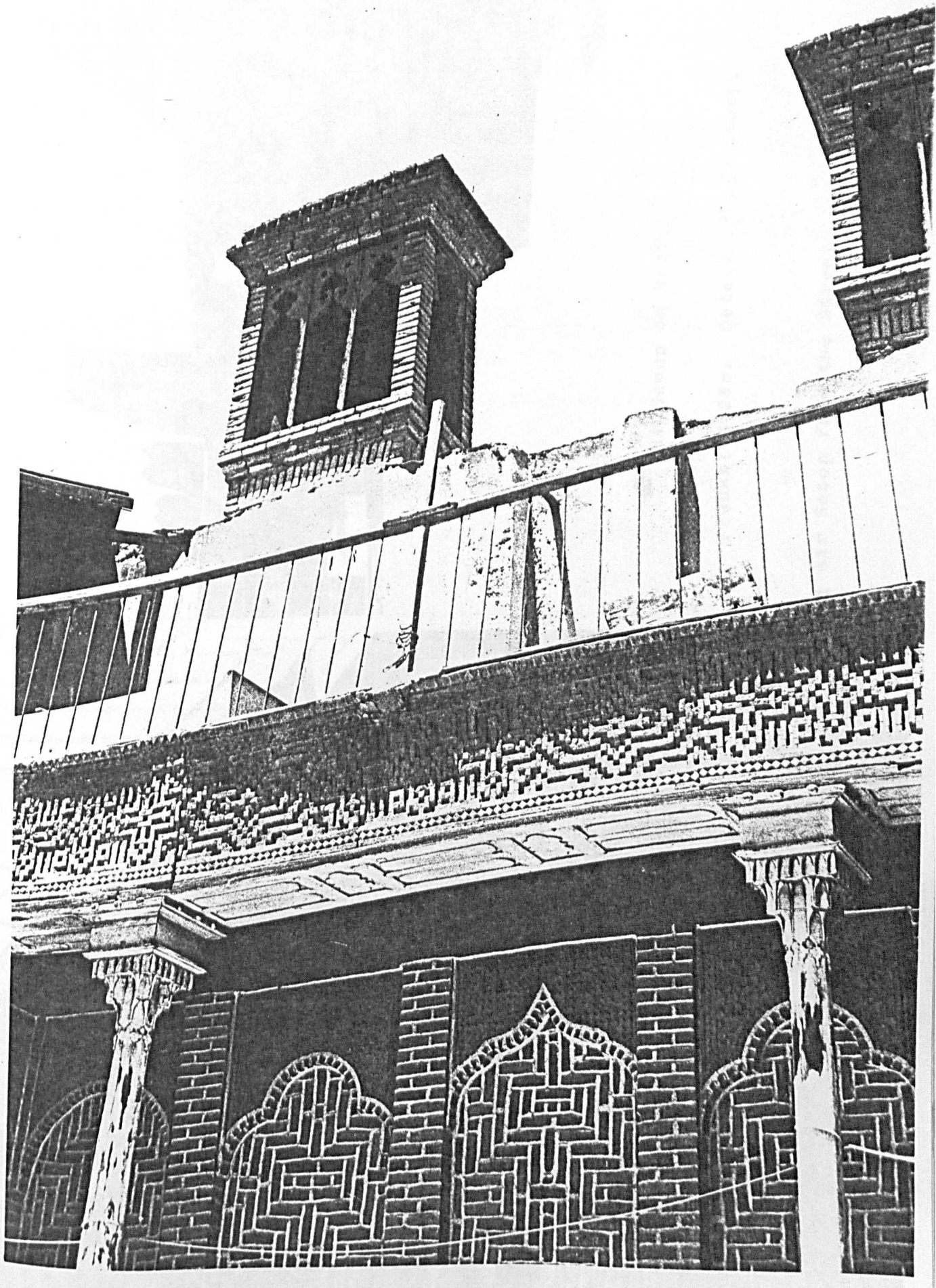
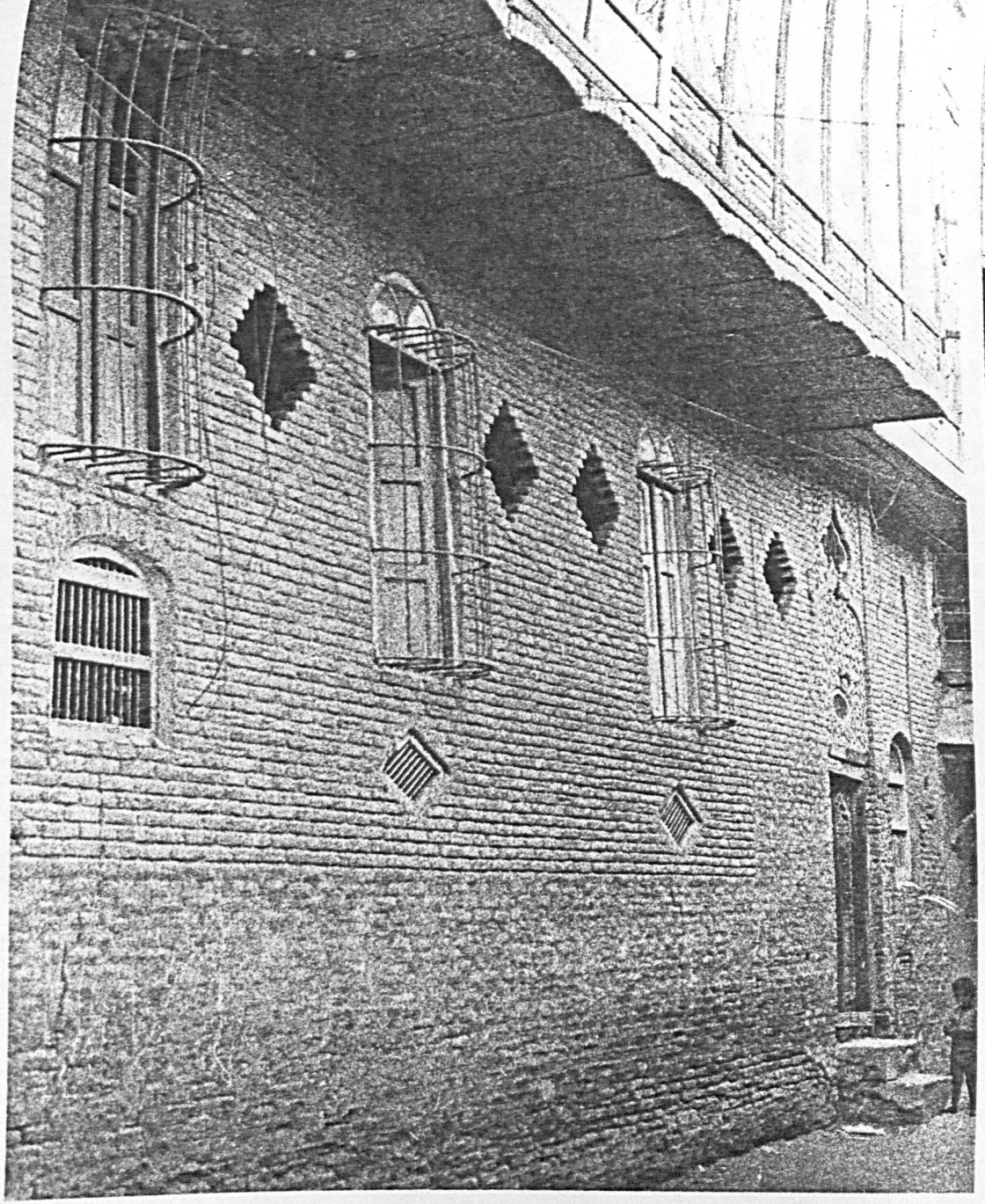
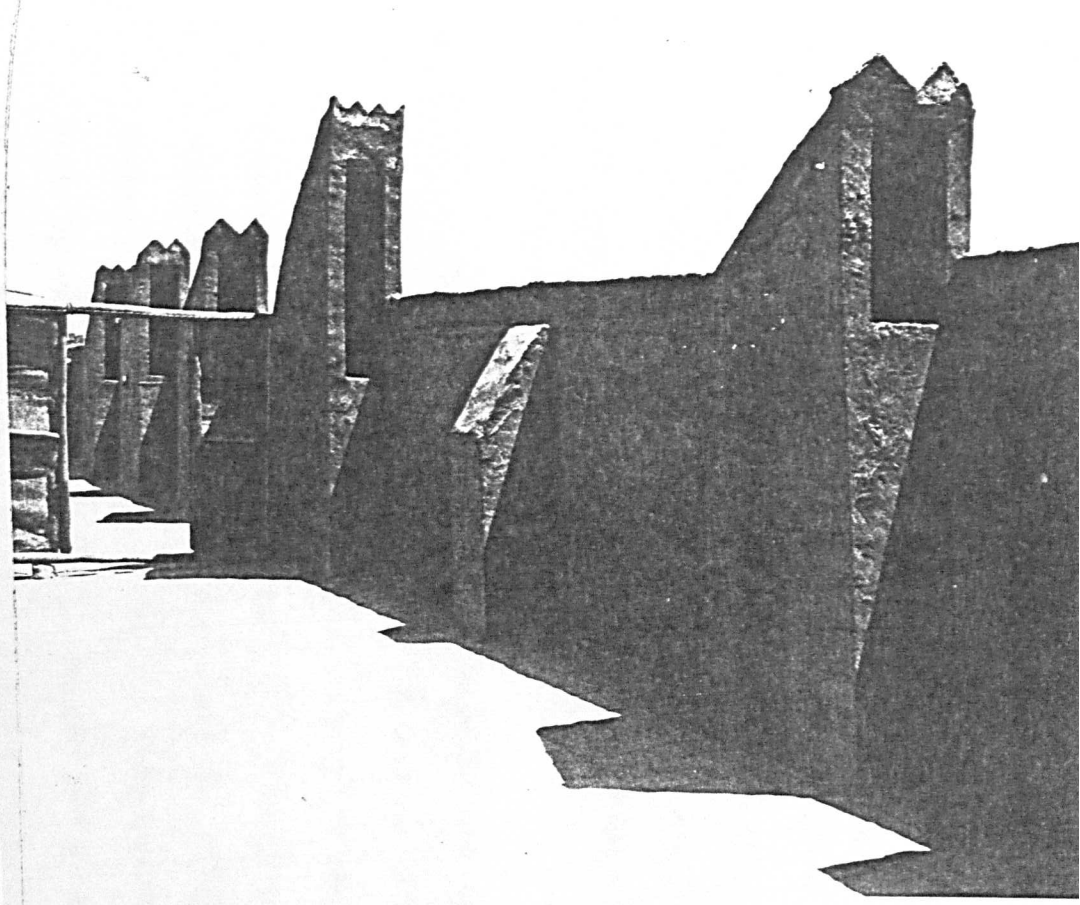


FIGURE: G.28d. The Air Scoop.





Air Scoop on Roof.

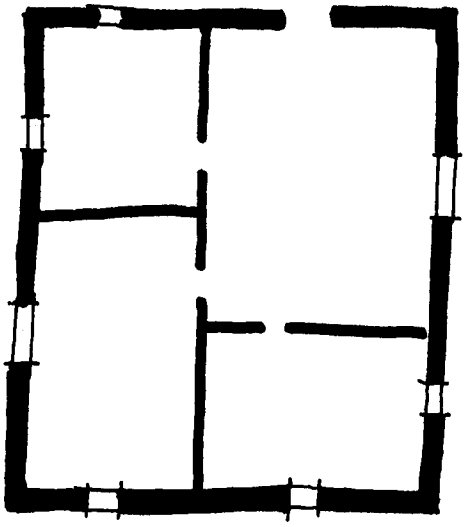
FIGURE: G.28e. Detail of Air Scoop.

Air Scoop from the Street.

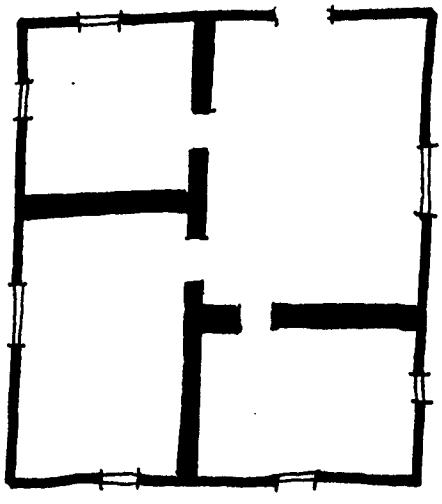
At ground level, heavy walls (mud, brick) with high heat capacity provide a cooling environment for the occupants (as heat exchanges by radiation from the body to the cooler wall surface (see Section E.3). The walls also have the property of absorbing any surplus heat from other sources, especially those not exposed to the sun.

Kuba also advocated the idea which has been suggested by many authors like Leroux in 1952 [Zaini, Z., 1976] and Oakley in 1969 [Zaini, 1976], regarding the location of the mass. Leroux believes that the thermal capacity of the building should be concentrated in the internal partitions and floors (Figure G.29). contrary to some traditional advice. Different reasons have been given by all of these authors to support their ideas. Apart from the fact that the internal surfaces are in general larger in area than the external wall and they are not subjected to the direct exposure to solar radiation, the coolness stored in this heavy structure during the night will provide a cooling effect for the interior next day, assuming that windows remain closed during the day.

These ideas by Leroux are not contrary to the experience of conditions in traditional courtyard houses. If one considers that the traditional house acts as a part of a large compact layout and is not free-standing adjacent dwellings create a party wall more than one metre in thickness between the dwellings. These walls are not exposed to the external thermal heat but form a considerable internal mass which acts as cool storage for the dwellings throughout the day. (Figures C.42, D.45 and G.21).



Traditionally.



Suggested Improvement.

FIGURE: G.29.

The Location of the Mass of the Walls Within the House.

On the first floor, the lightweight construction of traditional housing (wood and brick partitions and large wooden windows) creates a direct effect on the internal temperature, heating up quickly whenever solar radiation falls on the building and losing heat rapidly at night. There is no insulation provided in the lightweight construction, which means that it does not retain the heat at night.

(***) Roof

Since intense solar radiation generates considerable heat during the day, the roof can be a major source of heat gain in a building. This is because the roof receives a larger amount of solar radiation than any other building surface (1080 w/m-h on 22nd June in Baghdad). After transmission through the structure such radiation raises the temperature of under-roof surfaces from which heat flows to the interior. The roof also provides a major potential route of a heat loss from the building during cold season nights. Roof design, therefore, needs special attention in order to avoid negative effects on the occupants.

The amount of heat flowing outward and inward depends upon the thermal resistance of the material used in construction and the insulation quality. Massive and heavyweight flat roofs are a feature of the traditional dwellings usually constructed from wood of date palm trunks as joists covered with mats followed by a thick layer of earth covered by a layer of mud. This method is utilized in order to create a necessary time lag in heat transmission by high heat capacity. The direct effect of heat gain through the roof will be

to the second floor which is usually not used during the hot period. In addition, the whole mass of the first floor will act as insulation body, providing excellent protection to the ground floor from solar heat.

As wood has better insulation quality than brick or concrete, and since it is used internally, this will help to trap the heat inside.

This method of roofing the building can hardly fit the present method of roofing, since new lightweight efficient insulation materials can replace the heavyweight traditional way of roofing, but the principle of the traditional design is significant.

G.8.4.6 Orientation-Functional Space Arrangement of the Courtyard House

The plots of land in the traditional areas are differently orientated in relation to the sunlight, wind movement and the main accesses as discussed in the previous sections.

Accordingly, the arrangement of the used spaces inside the dwellings is shaped and located in various forms and situations to achieve a maximum use of natural resources, in order to create a comfortable atmosphere for inside living.

Consequently, open (courtyard), semi-open (covered) and enclosed (rooms) spaces are distributed throughout the mass of the house in relation to the prevailing natural resources and their constraints. In hot periods the enclosed and semi-open spaces, which are created for sitting and eating, are usually orientated as much as possible towards the prevailing wind (north or north west) and air breeze circulation which is created by the adaptation of the micro climate (see Section E.4.3.2). These spaces (i.e. courtyards, semi-open and enclosed spaces) are arranged at ground level for use in the morning when the sun is at a low angle. Maximum shade and cool conditions prevail on this level where breakfast, other activities and lunch take place.

In order to study the effects of natural conditions and climate on the families living in the traditional urban fabric of the city, 65 households were chosen in two main traditional residential areas in Baghdad city, namely Kadimiya and Karama. The study was intended to consider the relationship amongst three components; the daily family activities, the micro climate of the various parts of the house and time.

To achieve this study, Abada's house in Kadimiya was selected as an experiment. This house represents a typical traditional dwelling, is occupied by its owners, no alterations have been done in its construction and it contains almost all the traditional house elements.

During the period from 30th June until 7th July 1980, the temperature and the humidity for Abada's house were recorded daily on special charts. The record was carried out by using the Casella hygrographic instruments. These instruments had been distributed throughout the house as shown in Figure G.30.

The temperature and the humidity charts of the 6th July 1980 have been chosen randomly to analyze the relationship between the three components mentioned above. (Figures G.31(a), G.31(b), G.31(c), G.31(d)).

Accordingly Table G.26 has been constructed. In this table the time during the 24 hours has been grouped as AM and PM. The AM line included the hours 9 to 12 AM on 6th July and 0 to 9 AM for the next day (7th July) whilst the PM time included 12 noon to midnight on the 6th July. This classification may simplify the required analysis.

By following the activities of the family and their movements throughout the day, it seems that during the morning time in summer the family activities are usually taking place in the courtyard or in the semi-enclosed spaces (Tarma). This is because of the continous air draft in these spaces. The relatively large size of the courtyards in relation to the other elements of the urban fabric acts as a hole penetrating throughout the mass body of the urban fabric, creating air movements circulating the air inside and outside

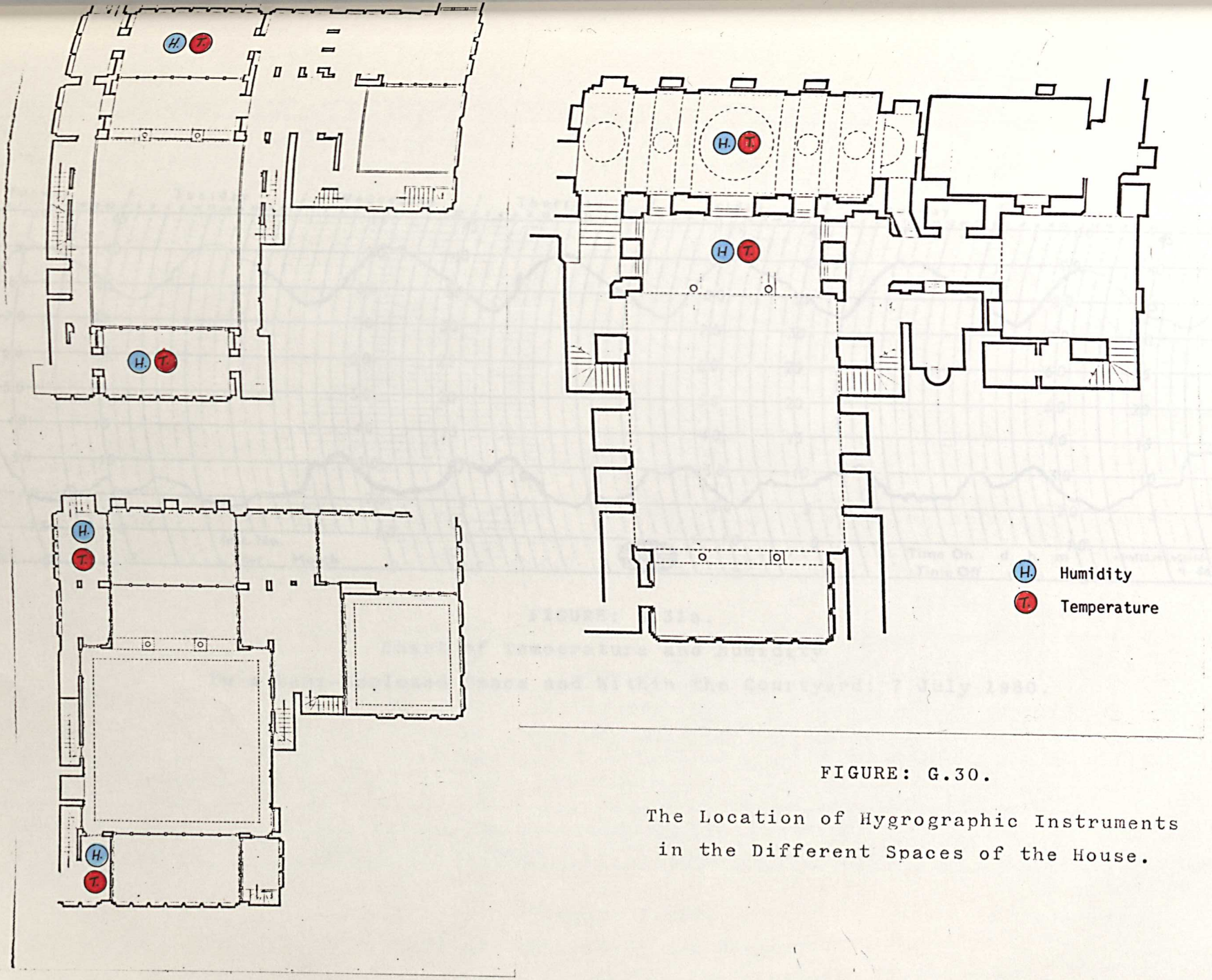


FIGURE: G.30.

The Location of Hygrographic Instruments in the Different Spaces of the House.

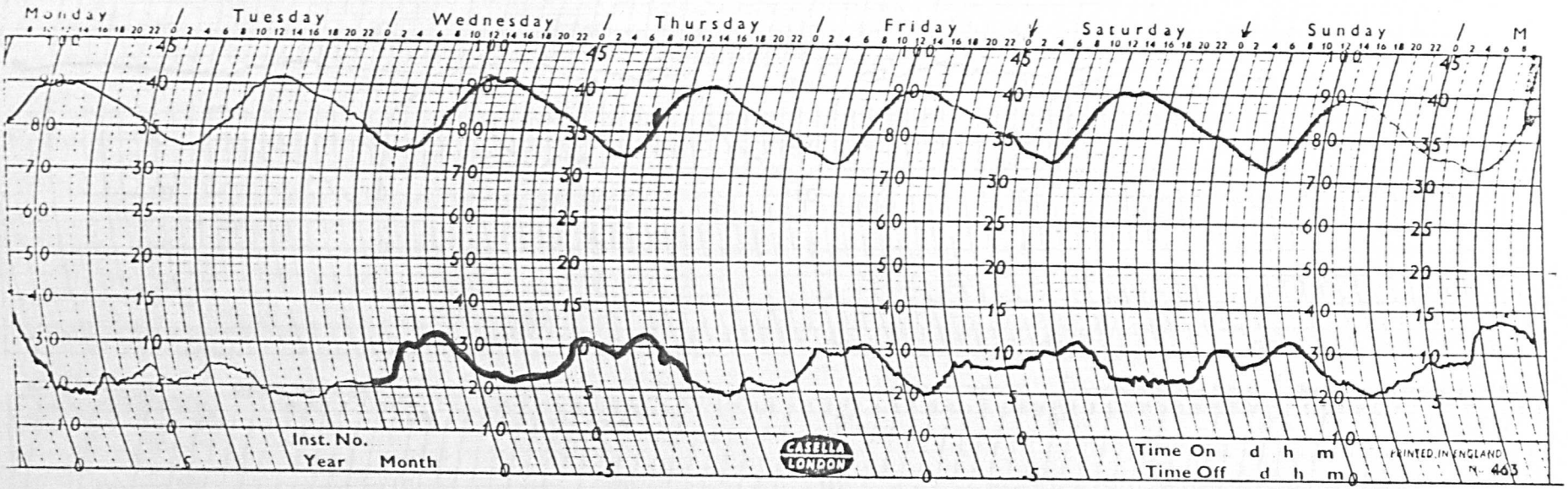


FIGURE: G.31a.

Chart of Temperature and Humidity

In a Semi-Enclosed Space and Within the Courtyard: 7 July 1980.

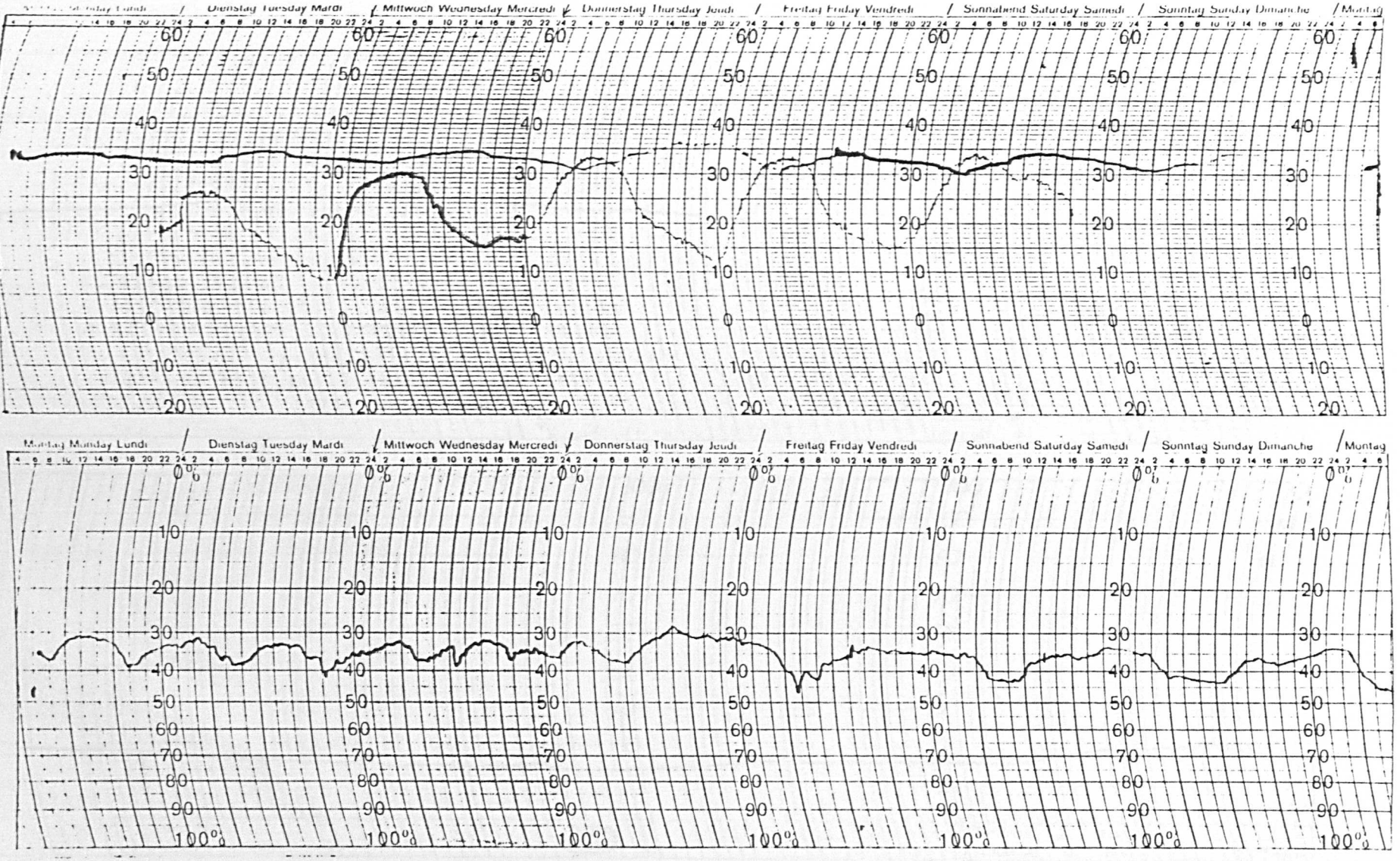


FIGURE: G.31b.

Chart of Temperature and Humidity

Within the Basement: 7 July 1980.

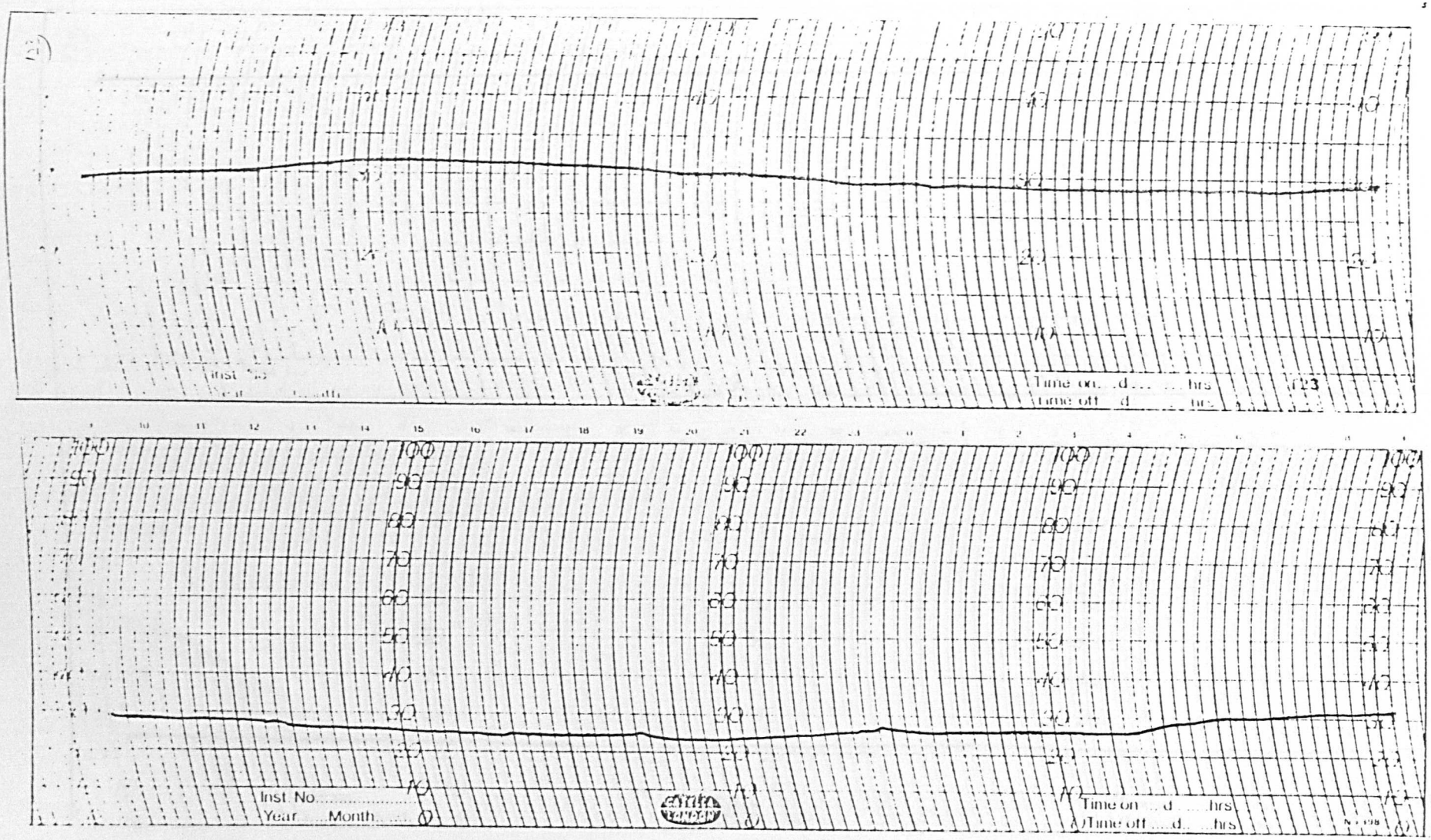


FIGURE: G.31c.

Chart of Temperature and Humidity

Within the First Floor Living Room: 7 July 1980.

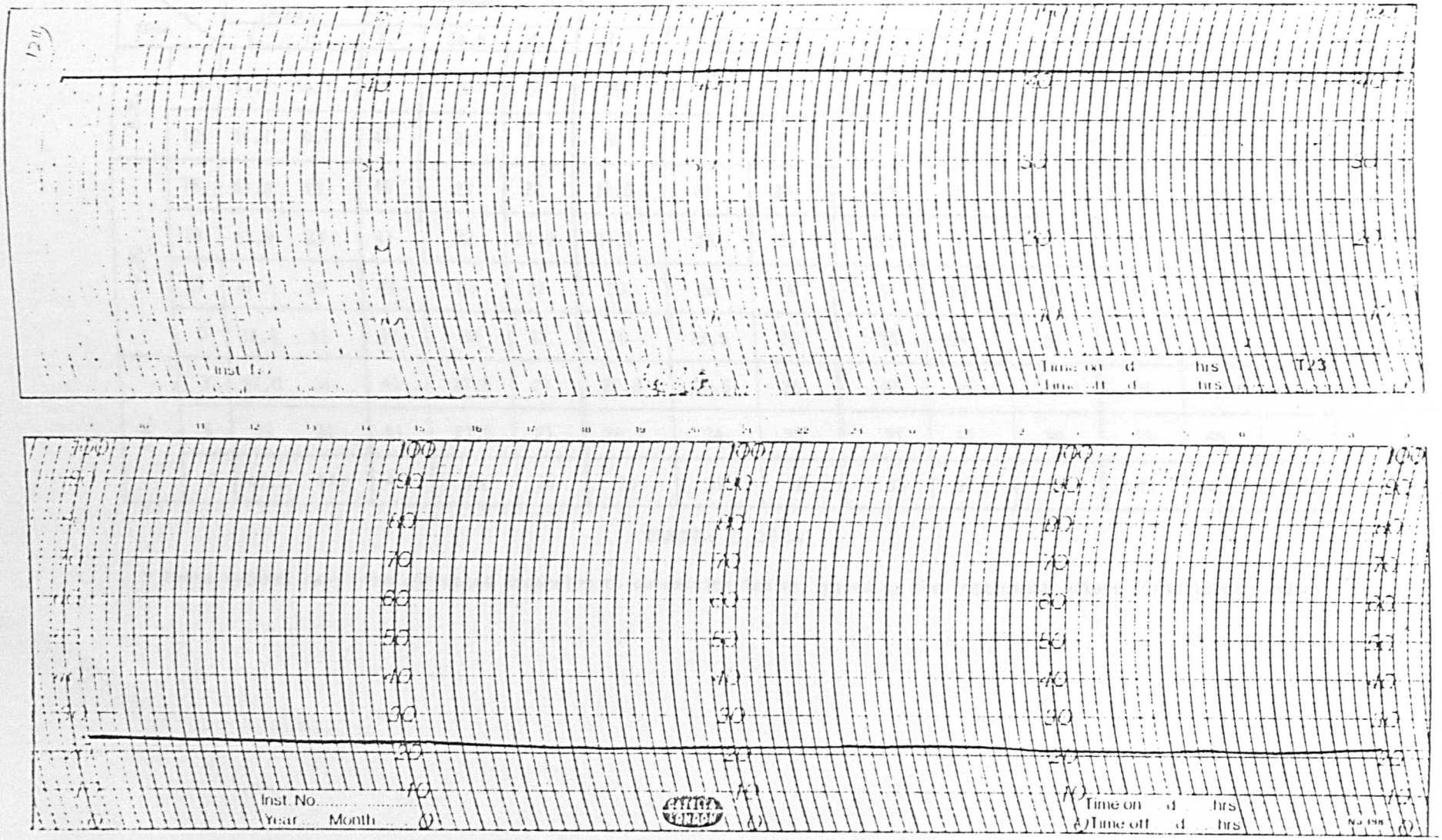


FIGURE: G.31d.

Chart of Temperature and Humidity
Within a Bedroom: 7 July 1980.

Time		OPEN AIR (ROOF)		FIRST FLOOR						GROUND FLOOR					
				BEDROOM			LIVING ROOM			SEMI-COVERED SPACE			BASEMENT		
		T.	H.	T.	Co.H.	H.	T.	Co.H.	H.	T.	Co.H.	H.	T.	Co.H.	H.
A.M.	9	41.7	14.1	41	26	24	29	33	29	37	37	32	30	44	37
	12	44.1	9.7	41	24	23	30	31	28	40	26	24	26	40	34
P.M.	15	41.8	10	41	23	22	31.5	27	25	40	26	24	18.5	37	32.5
	18	33.9	23	41	22	21.8	31.1	26	24	38.5	26	24	15.5	37.5	32.5
	21	27.8	29	41	23	22	30	26	24	37	26	24	17	40	34.5
	0	27.8	31	41	23	22	29	27.5	26	35	34	30	17	31	35
A.M.	3	27.0	34	41	21.5	21	28.8	27.5	26	33	30	27	24	37.5	32.5
	6	35	24	41	21.5	21	28.1	34	30	31	34	30	31	40	34
	9	41.7	14	41	23	22	29	37	32	35	37	32	32	44.5	37.5

TABLE: G.26(a)

* These records have been corrected according to correction tables issued by the instrument makers (Casella of London)

Correction Table
for
Hair operated instruments

CASELLA
LONDON

ADD
this correction algebraically
to Relative Humidity reading

°C	↓	°F
-5·0	-10	23·0
-2·5	-9	27·5
0	-8	32·0
2·5	-7	36·5
5·0	-6	41·0
7·5	-5	45·5
10·0	-4	50·0
12·5	-3	54·5
15·0	-2	59·0
17·5	-1	63·5
20·0	0	68·0
22·5	1	72·5
25·0	2	77·0
27·5	3	81·5
30·0	4	86·0
32·5	5	90·5
35·0	6	95·0
37·5	7	99·5
40·0	8	104·0
42·5	9	108·5
45·0	10	113·0
47·5	11	117·5
50·0	12	122·0

TABLE: G.26b.

during the whole day. The traditional design also allows for direct sun radiation to hit the courtyard facades which are facing east and south. During the morning the sun's rays reach the ground floor only by midday in smaller courtyards during the summer. This is due to the angle of the sun which is near its zenith at this time of year, causing the heating up of the courtyard atmosphere and thus the heated air by convection and radiation will move upwards, creating relatively low pressure (-) inside the courtyard. (Figure G.32).

Simultaneously the enclosed spaces of the house (i.e. surrounding the courtyard) and also the alleyways are mostly protected from the direct sun's radiation or receiving little radiation from the courtyard and the semi-enclosed spaces, which makes the temperature in these spaecs almost always less than those in the courtyard. The exceptions are the bedrooms (Table G.26(a)) which will be discussed later. However, the cool air that accumulated during the night will remain cool during the day in the spaces which are predominantly in the shade, and will be under relatively high pressure (+) and thus near the ground surface.

Accordingly, during the day the differences in air temperature between the courtyard (i.e. low pressure) and the surrounding enclosed areas (i.e. high pressure) encourages air circulation from the positive to the negative (see Figure G.33). This phenomenon allows the courtyard to act as an air suction shaft from the surrounding areas (i.e. from the enclosed spaces and the alleyways into the courtyard). This operation increases the efficiency of the air scoops in the basement and creates a continuous draft via the enclosed and semi-enclosed spaces of the dwelling, when the openings of the external

To trace the movement of the sun and the air circulation through a courtyard house in Baghdad (Latitude 33°N) a model was constructed and set on a hilidon in the University of Strathclyde, Glasgow, with the large court-yard at the centre and with angles of +23.5° for summer and -23.5° for winter.

The following figures show the results obtained.

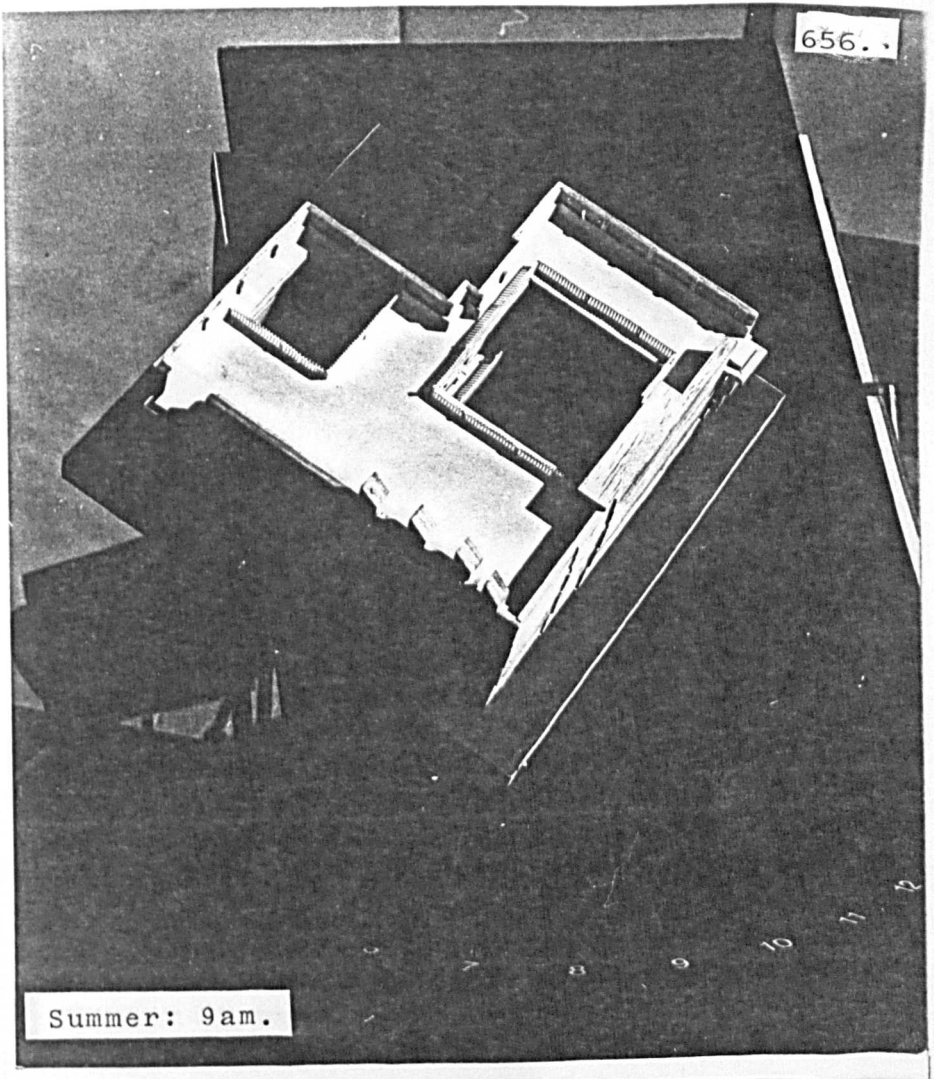
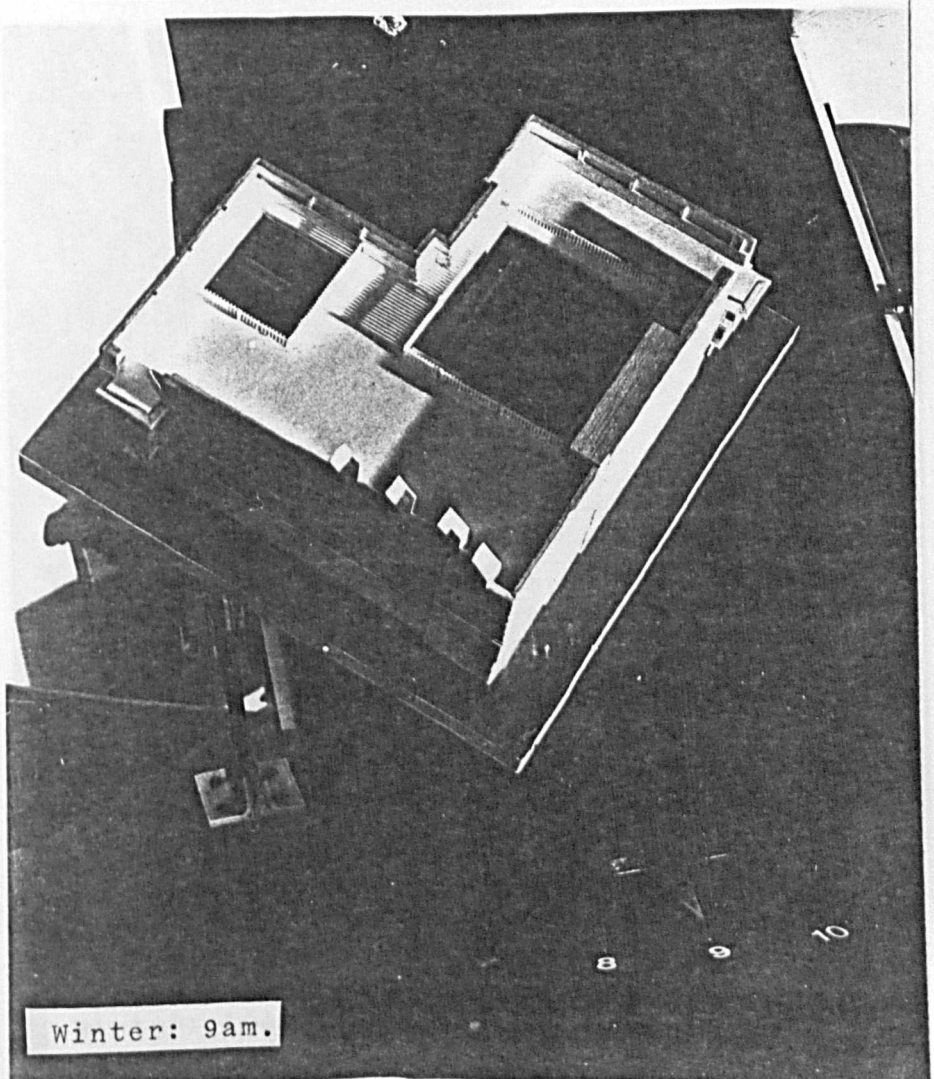


FIGURE: G.32a.



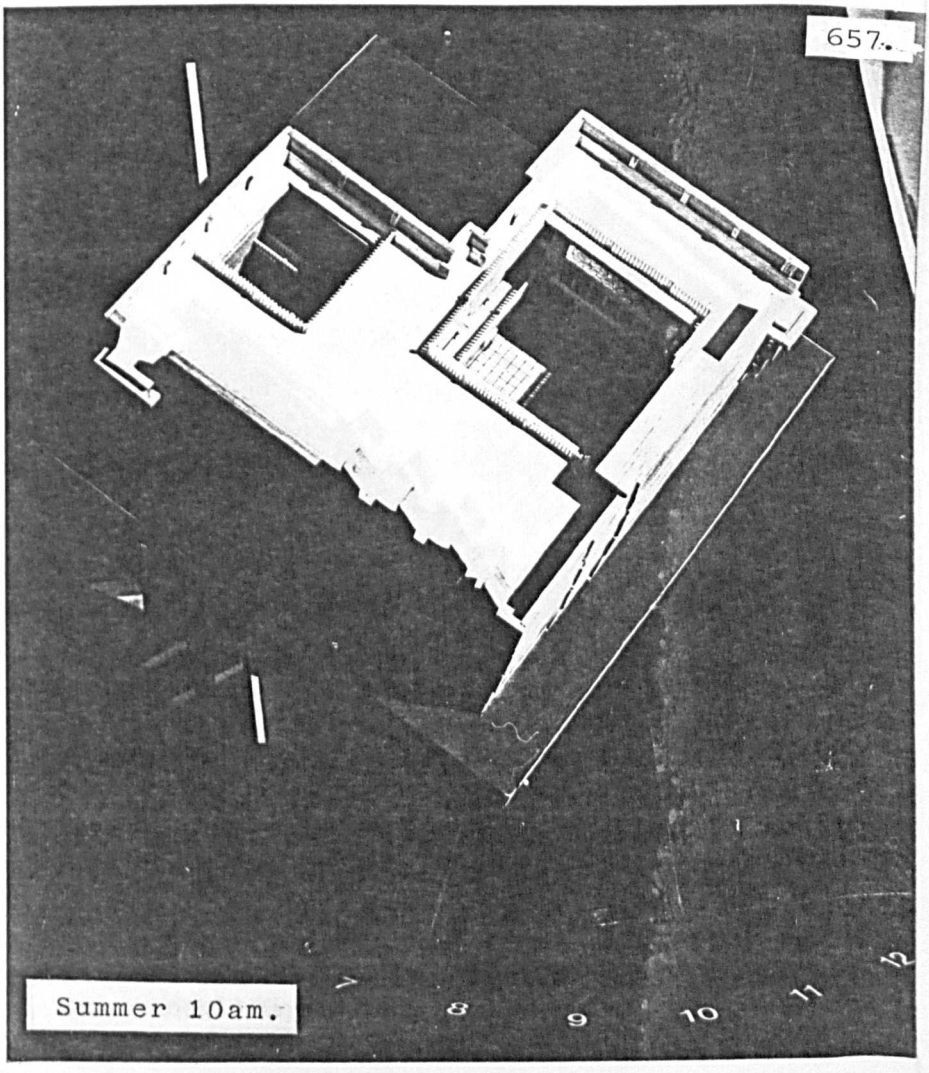
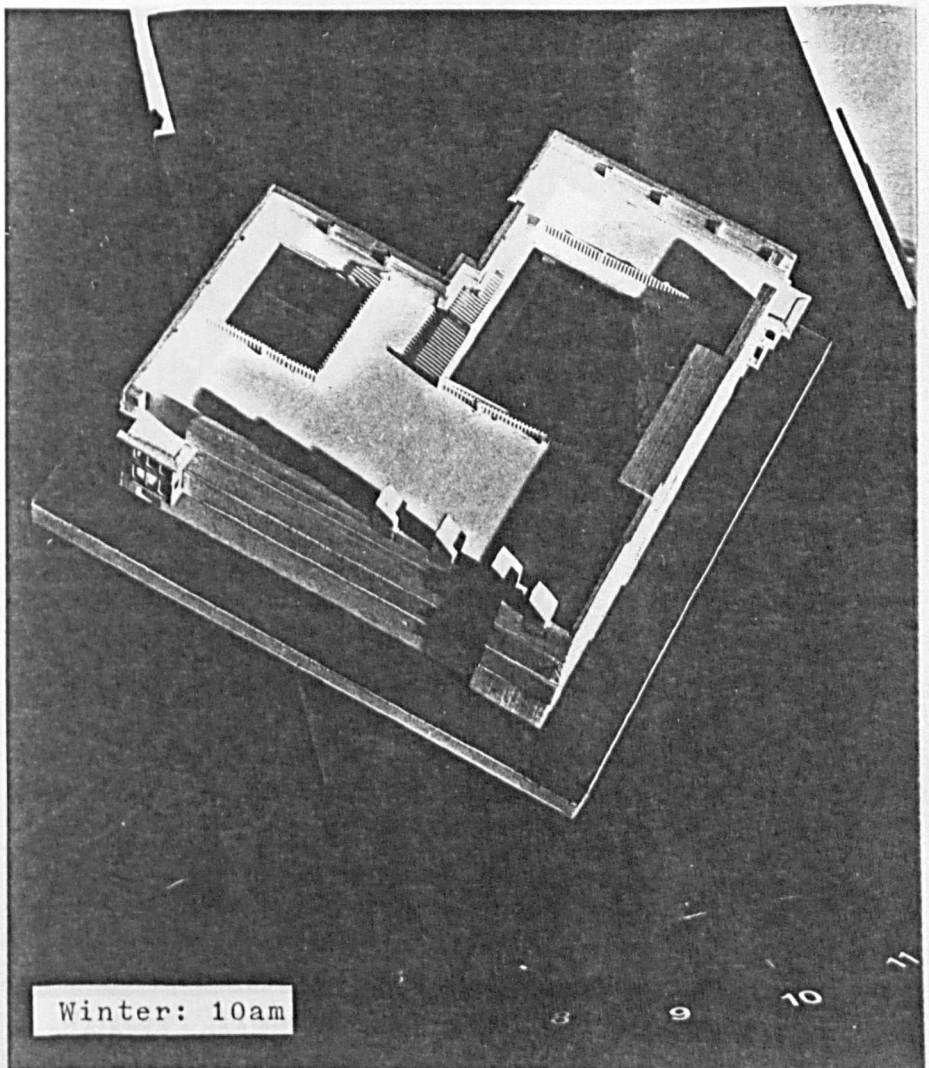


FIGURE: G.32b.



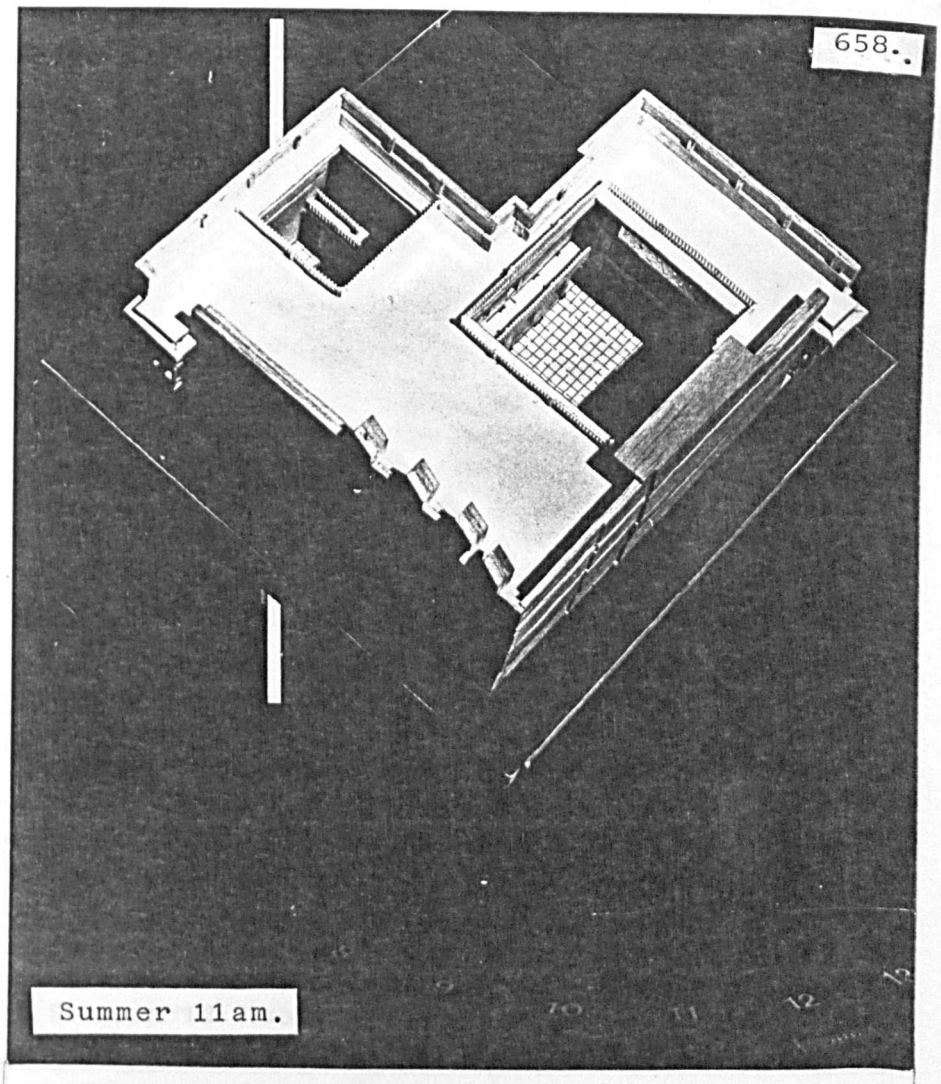
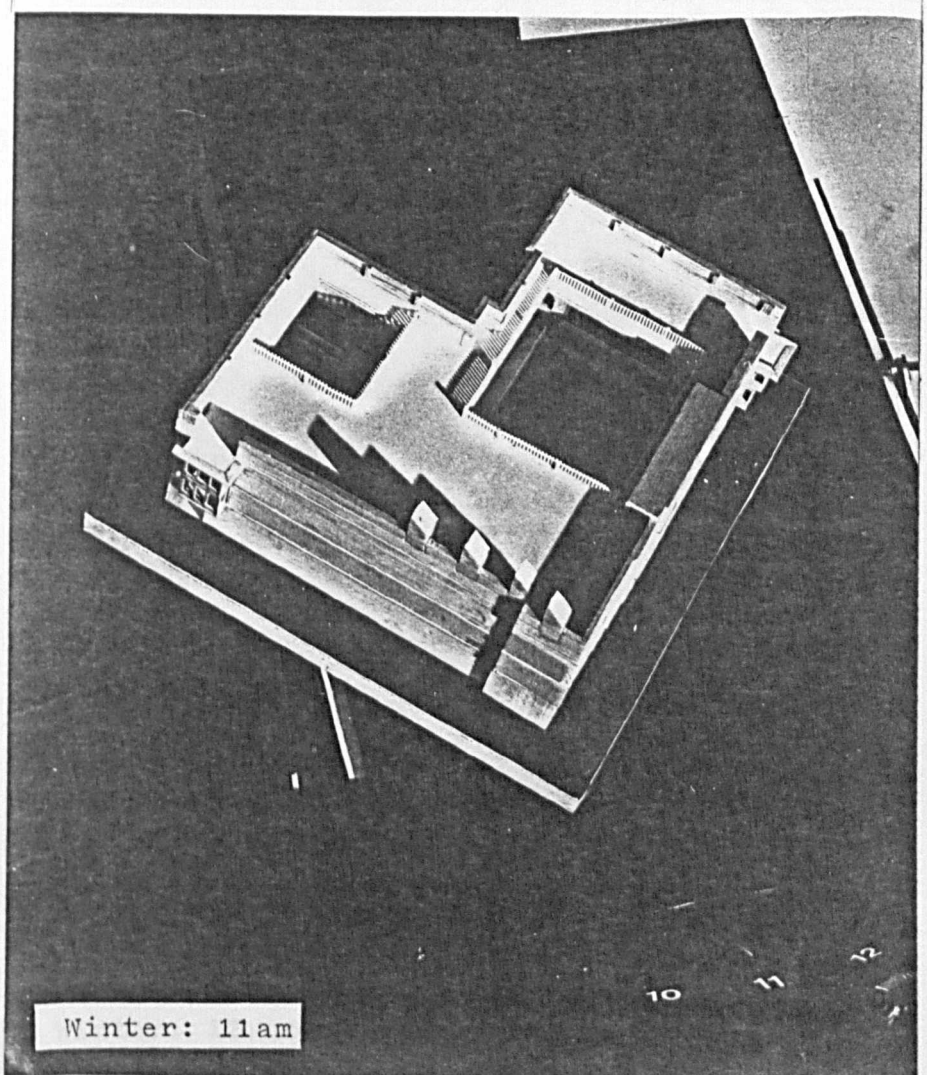


FIGURE: G.32c.



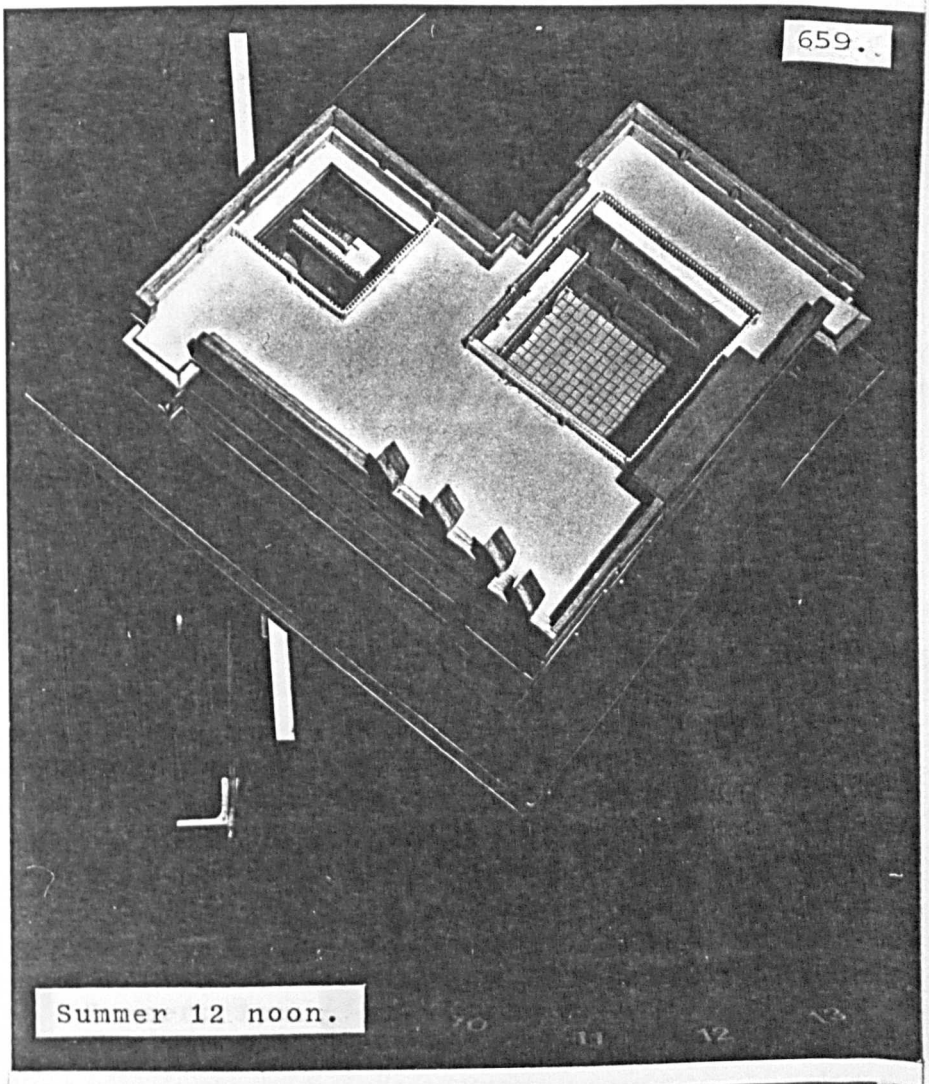
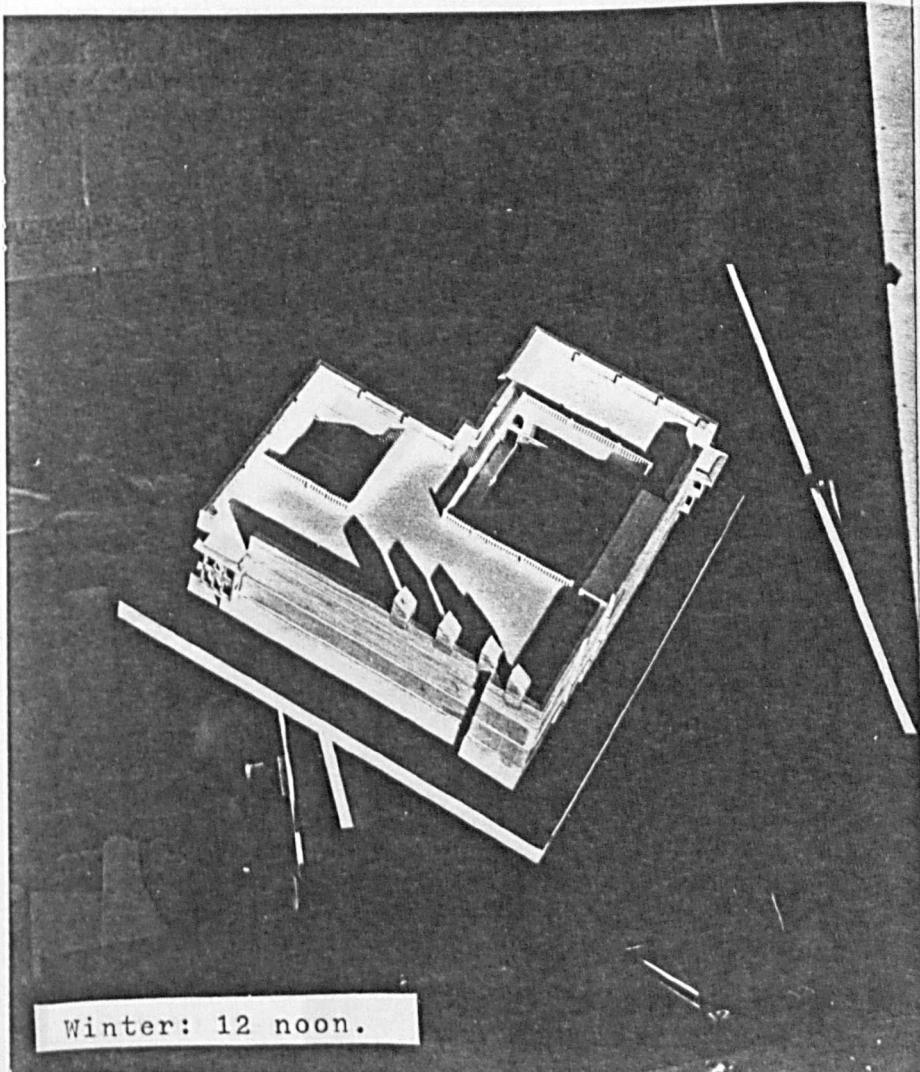


FIGURE: G.32d.



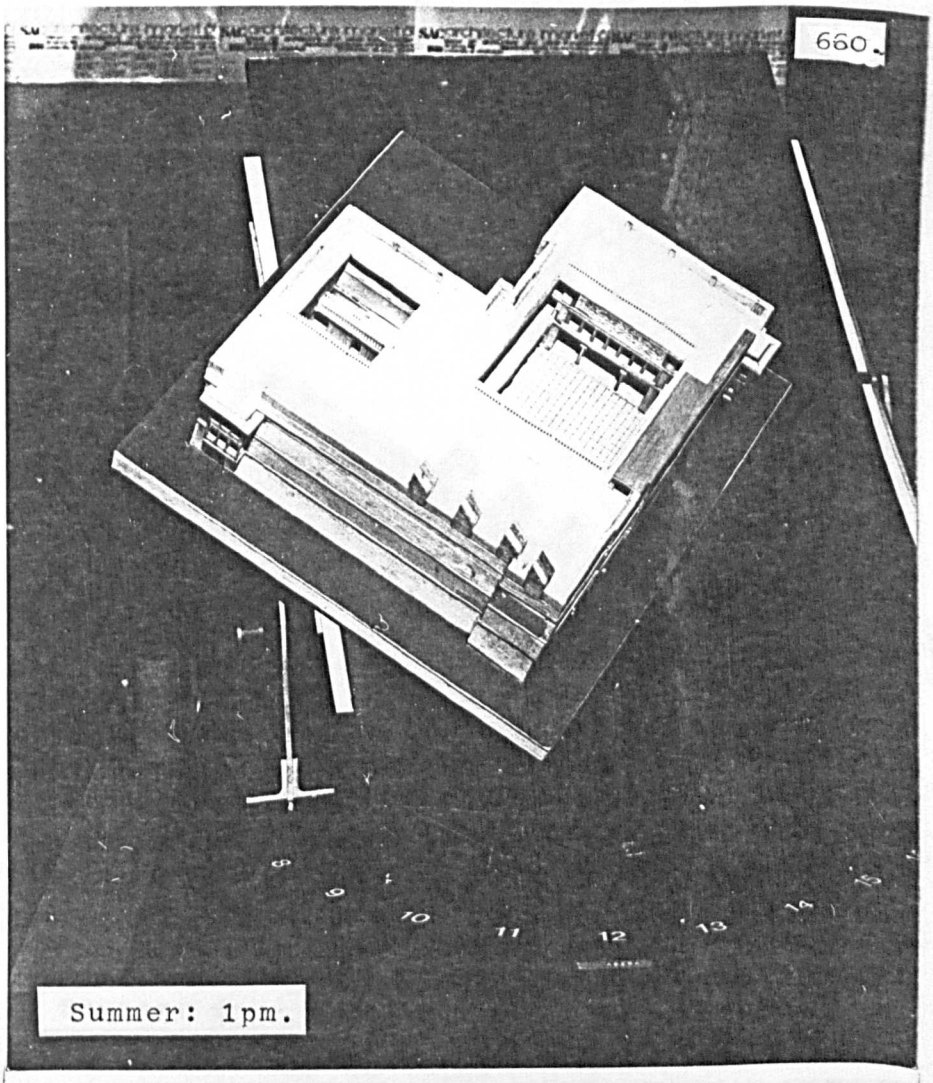
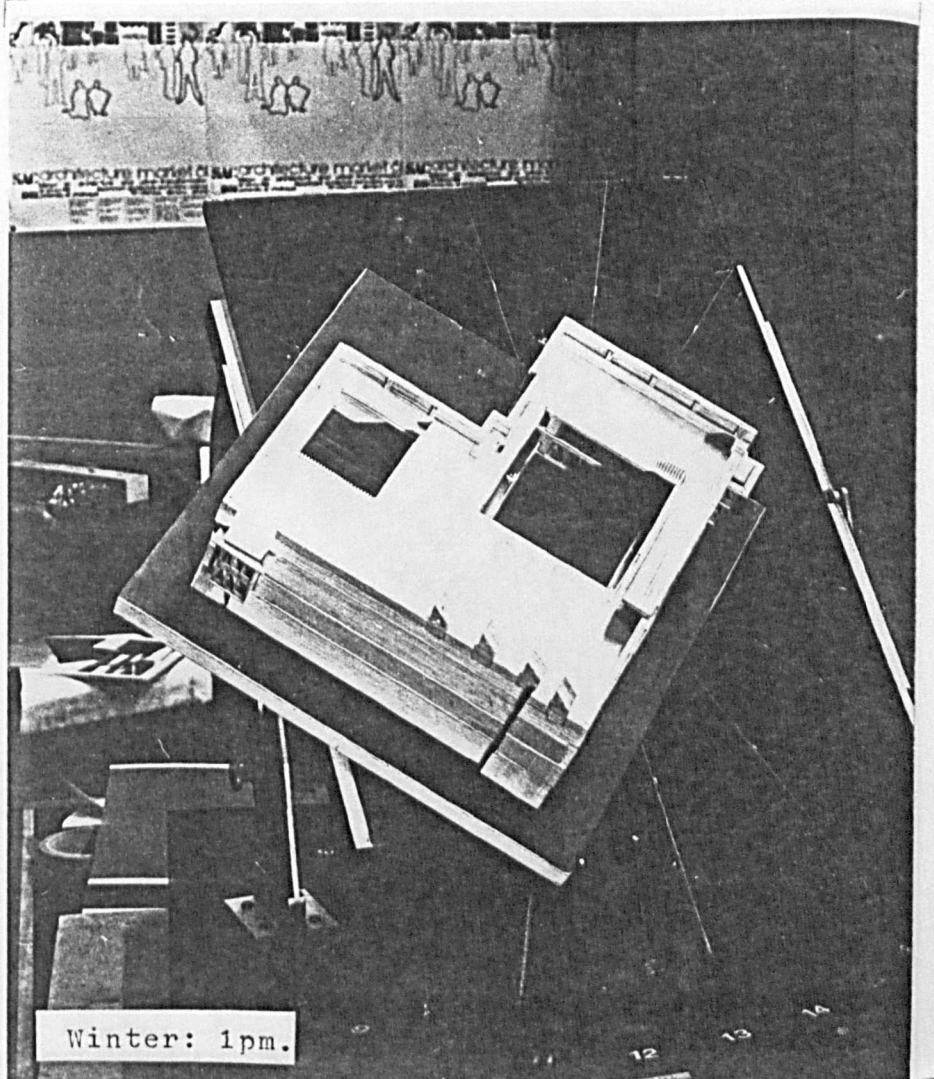


FIGURE: G.32e.



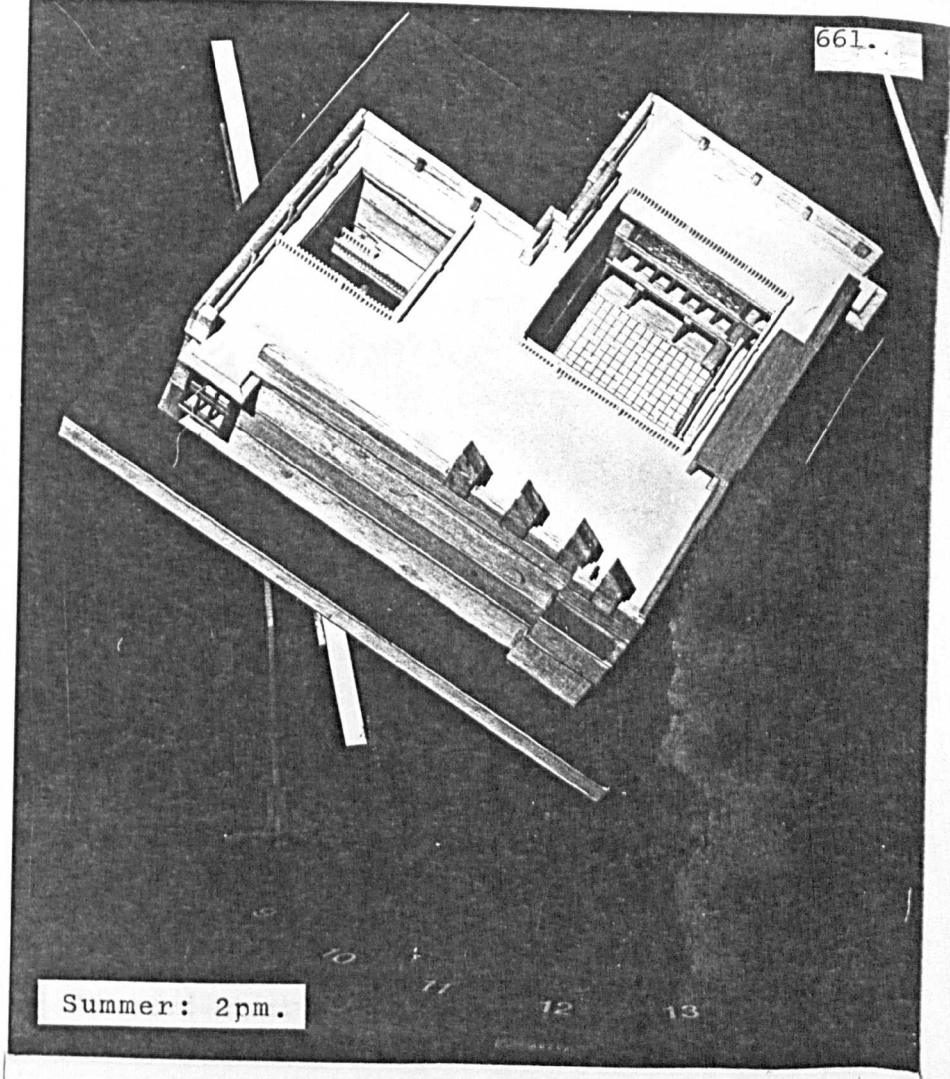
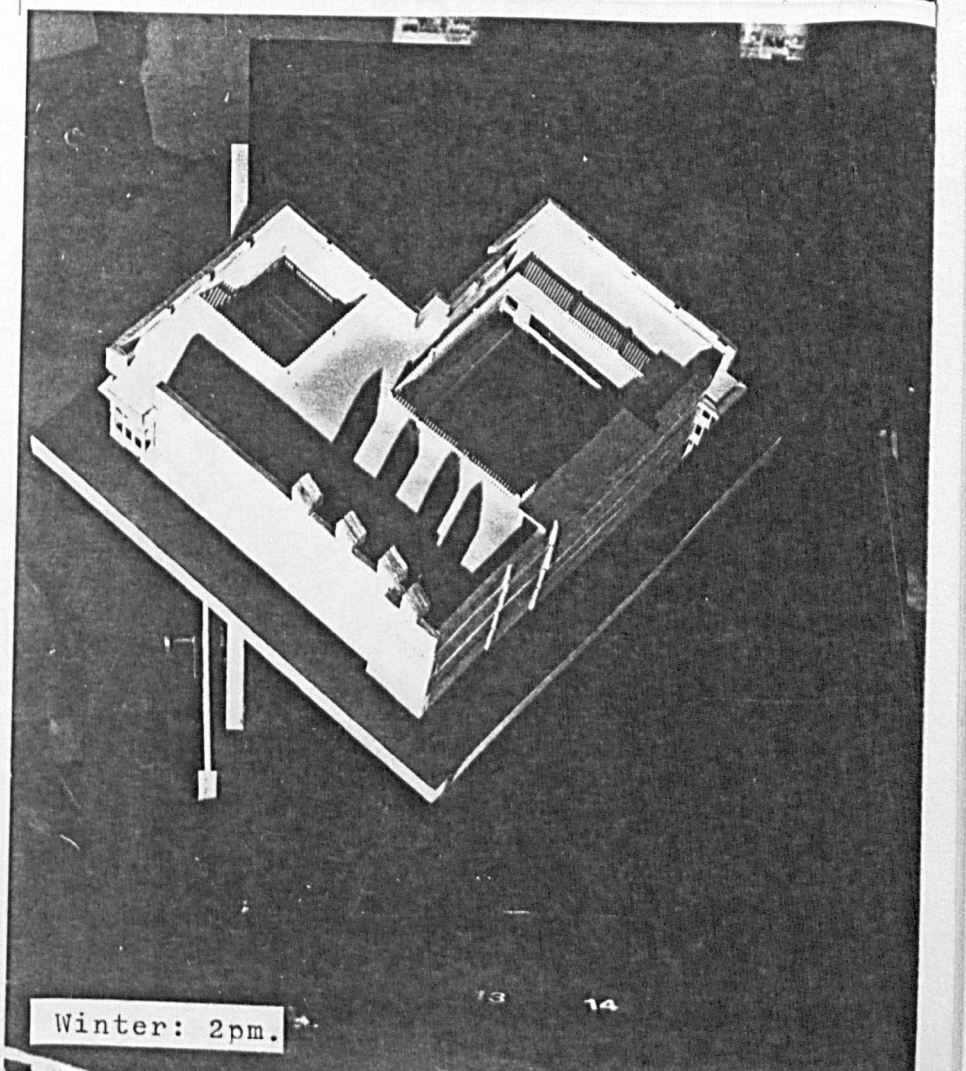


FIGURE: G.32f.



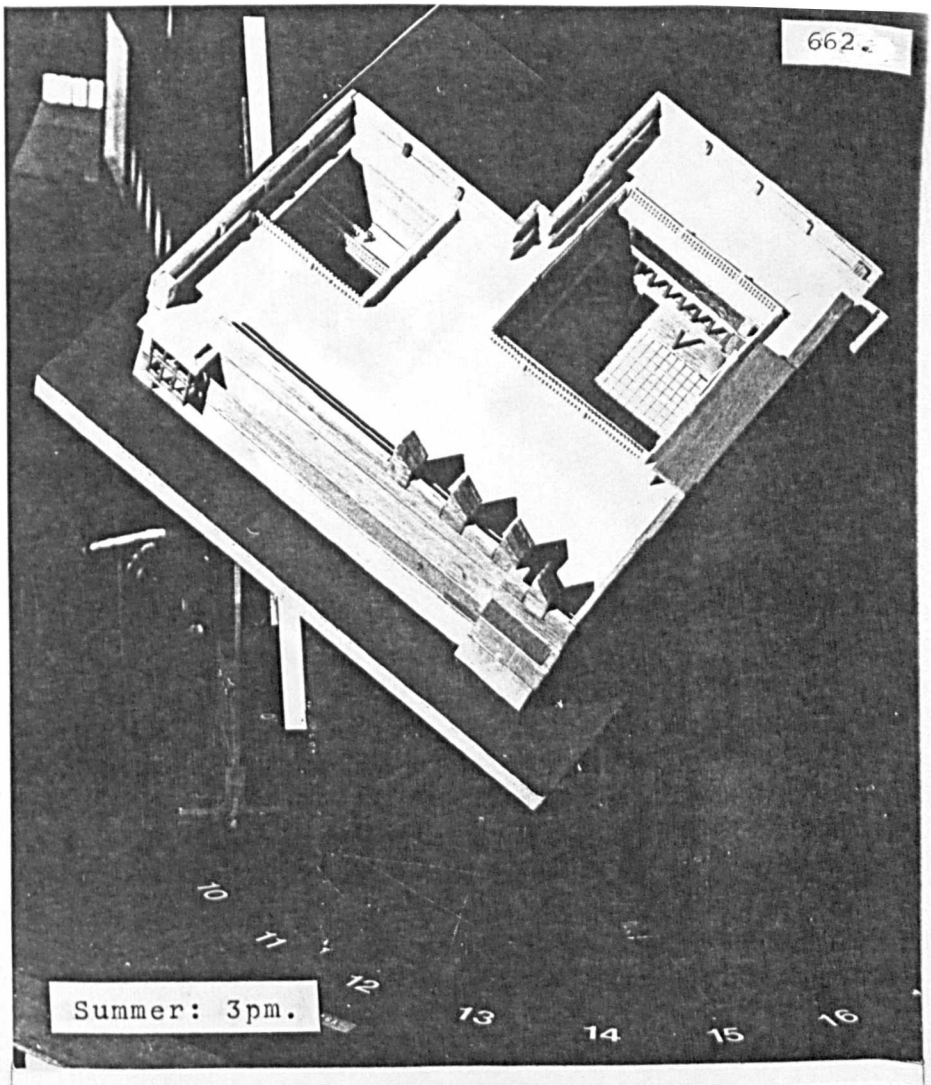
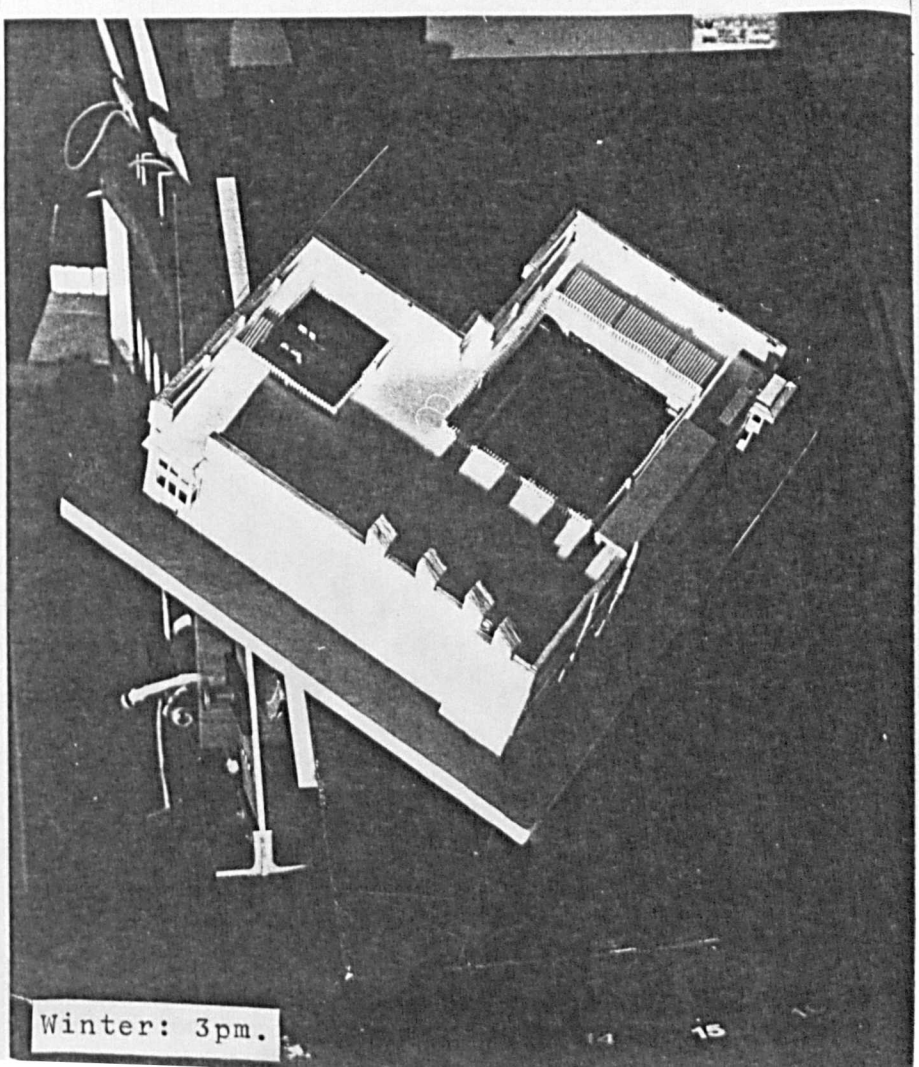


FIGURE: G.32g.



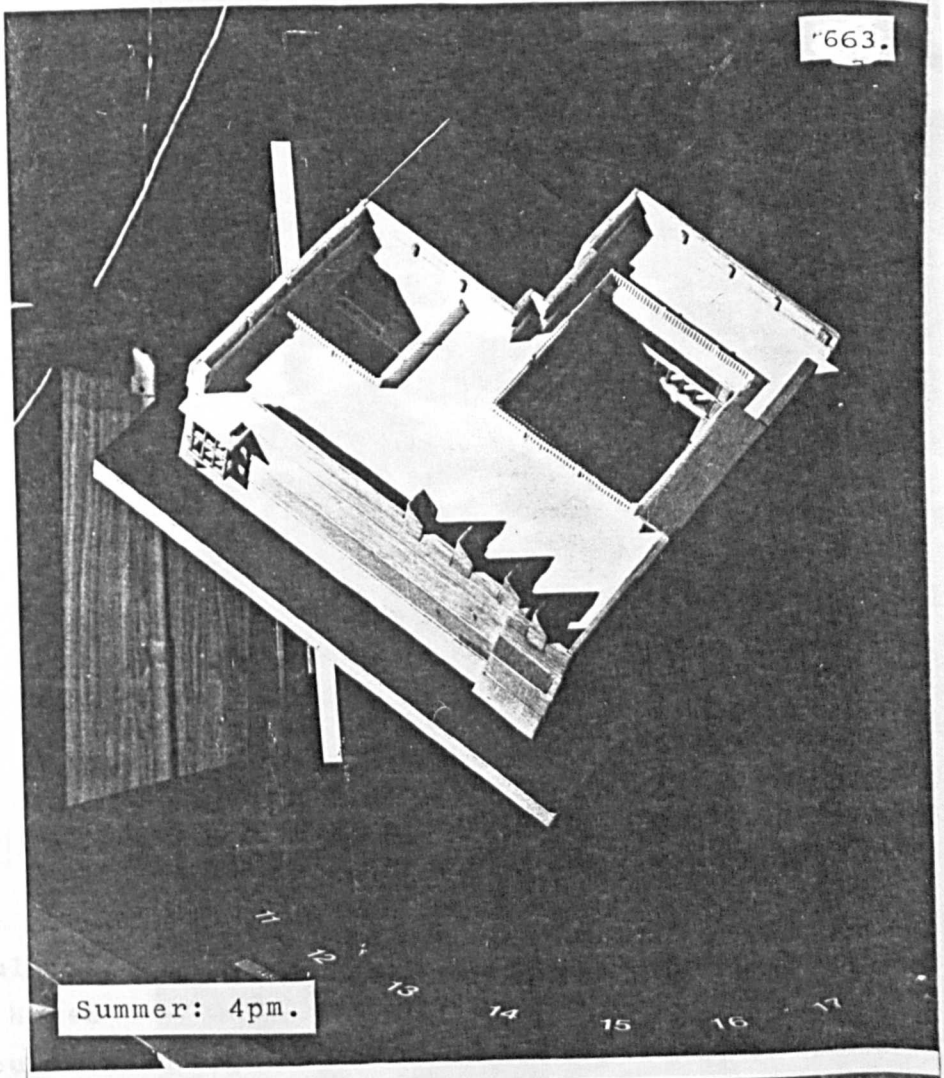
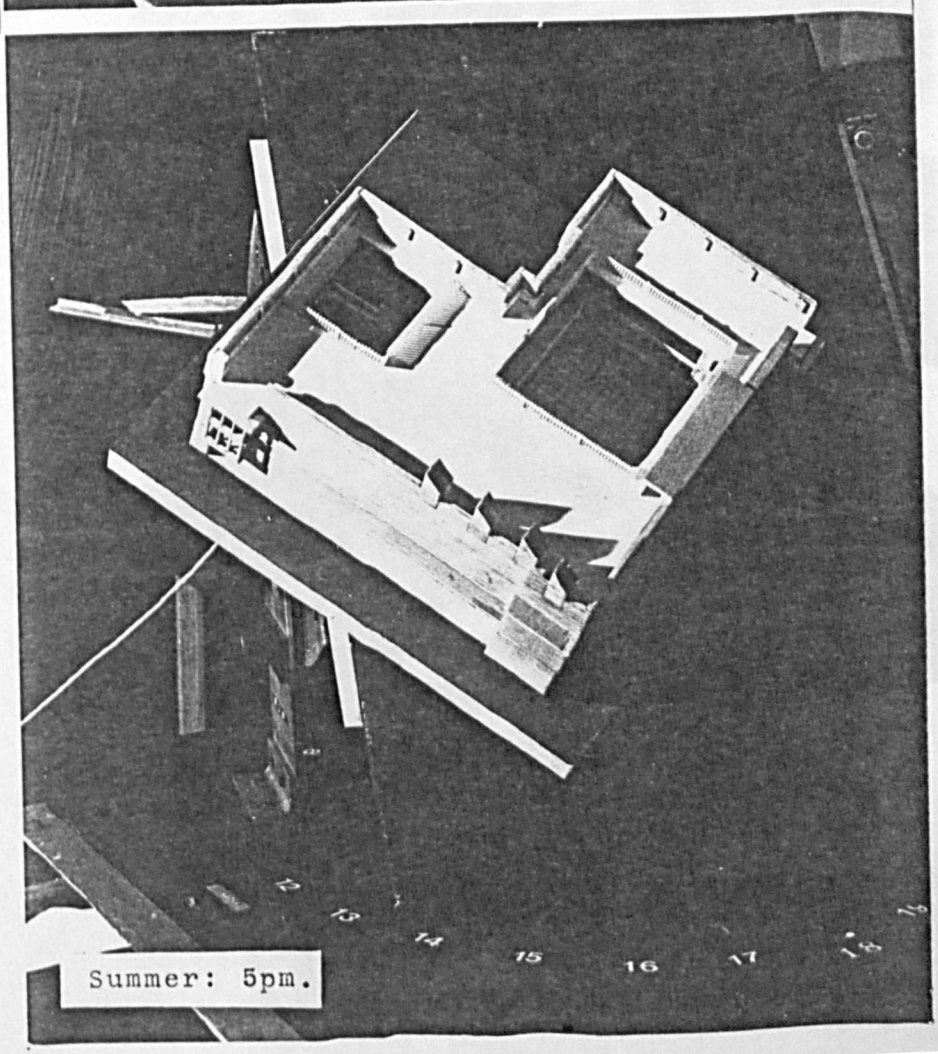


FIGURE: G.32h.



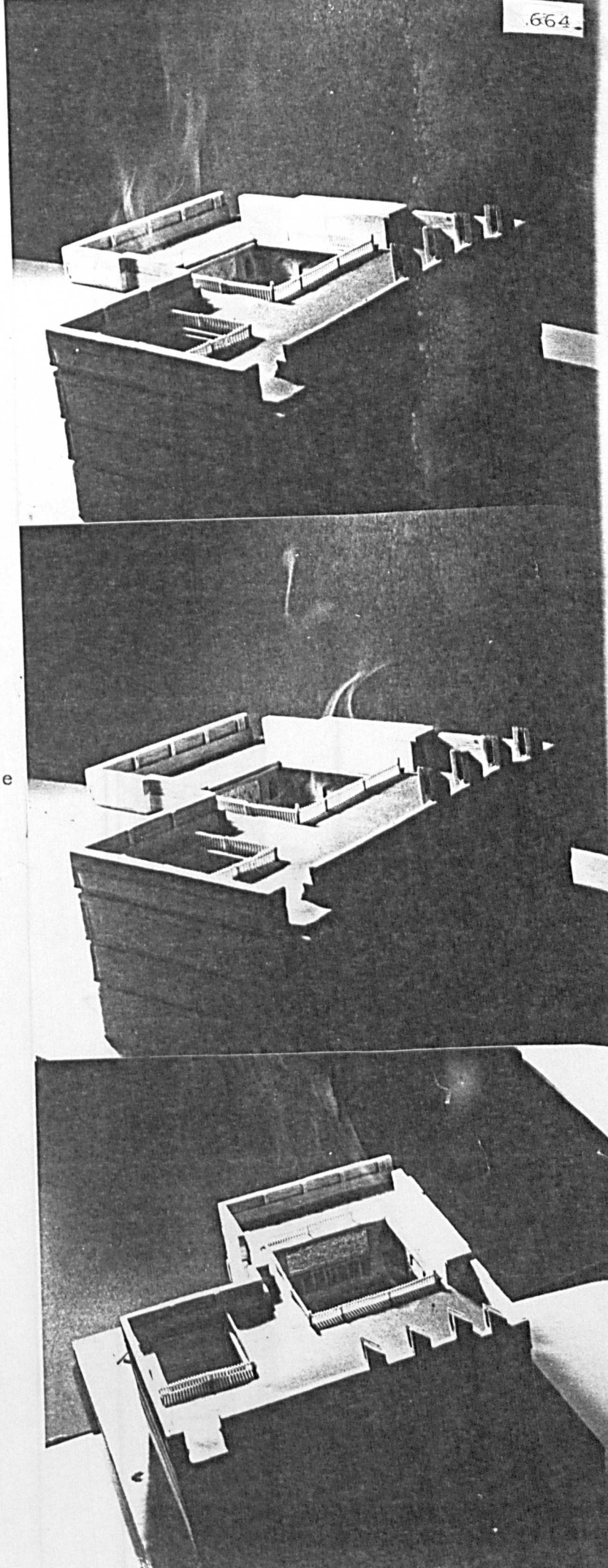
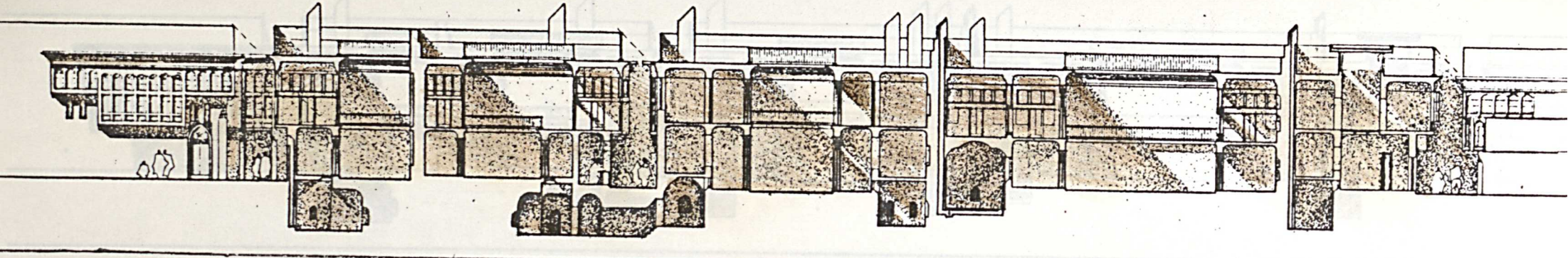
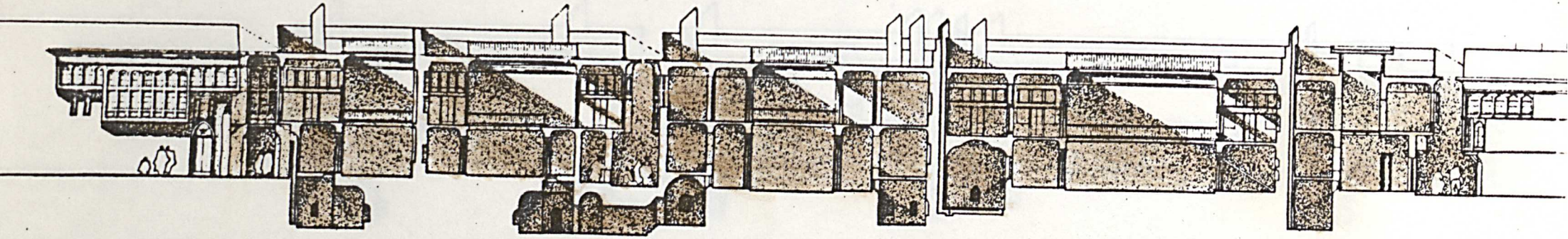


FIGURE: G.32i.

Testing the Air Circulation inside the Courtyard House with Smoke Blown Through the Air Scoop.



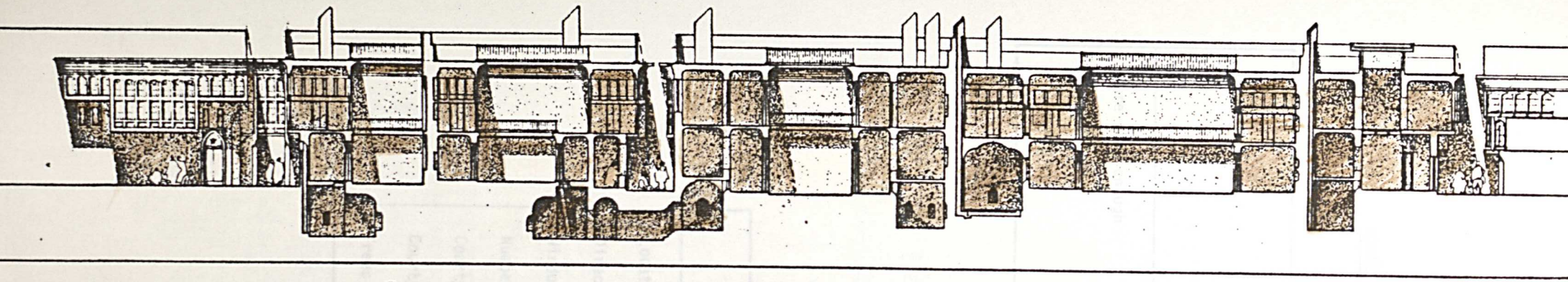
Summer: 9am. Angle: 45°



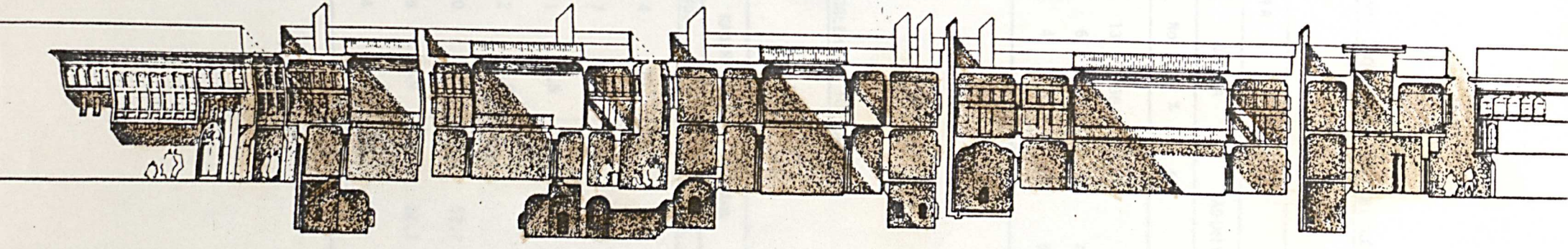
Winter: 9am. Angle: 30°

FIGURE: G.32j.

The Daytime Direction of the Sun through the Courtyard House Urban Fabric in Summer and Winter.



Summer: 12am. Angle: 81°



Winter: 12am. Angle: 49°.

FIGURE: G.32k.

The Daytime Direction of the Sun Through the Courtyard House Urban Fabric in Summer and Winter.

HOUSE GETTING SUNLIGHT VAR 360 WINTER, VAR 361 SUMMER

	SUMMER				WINTER			
	KADIMIYA		KARAMA		KADIMIYA		KARAMA	
	No.	%	No.	%	No.	%	No.	%
More than enough	18	45.0	13	56.5	1	2.5	-	-
Just enough	17	42.5	6	26.1	18	45.0	4	17.4
Not enough	5	12.5	4	17.4	21	52.5	19	82.6

CAUSE OF THE PROBLEM DUE TO SUNLIGHT

	KADIMIYA		KARAMA	
	No.	%	No.	%
Location	4	10		
Direction	7	17.5	5	21.7
Window Size	1	2.5		
Number of Windows	2	5.0		
Courtyard	30	75.0	12	52.2
Courtyard Depth	8	20.0	6	26.1
Trees	4	10.0		

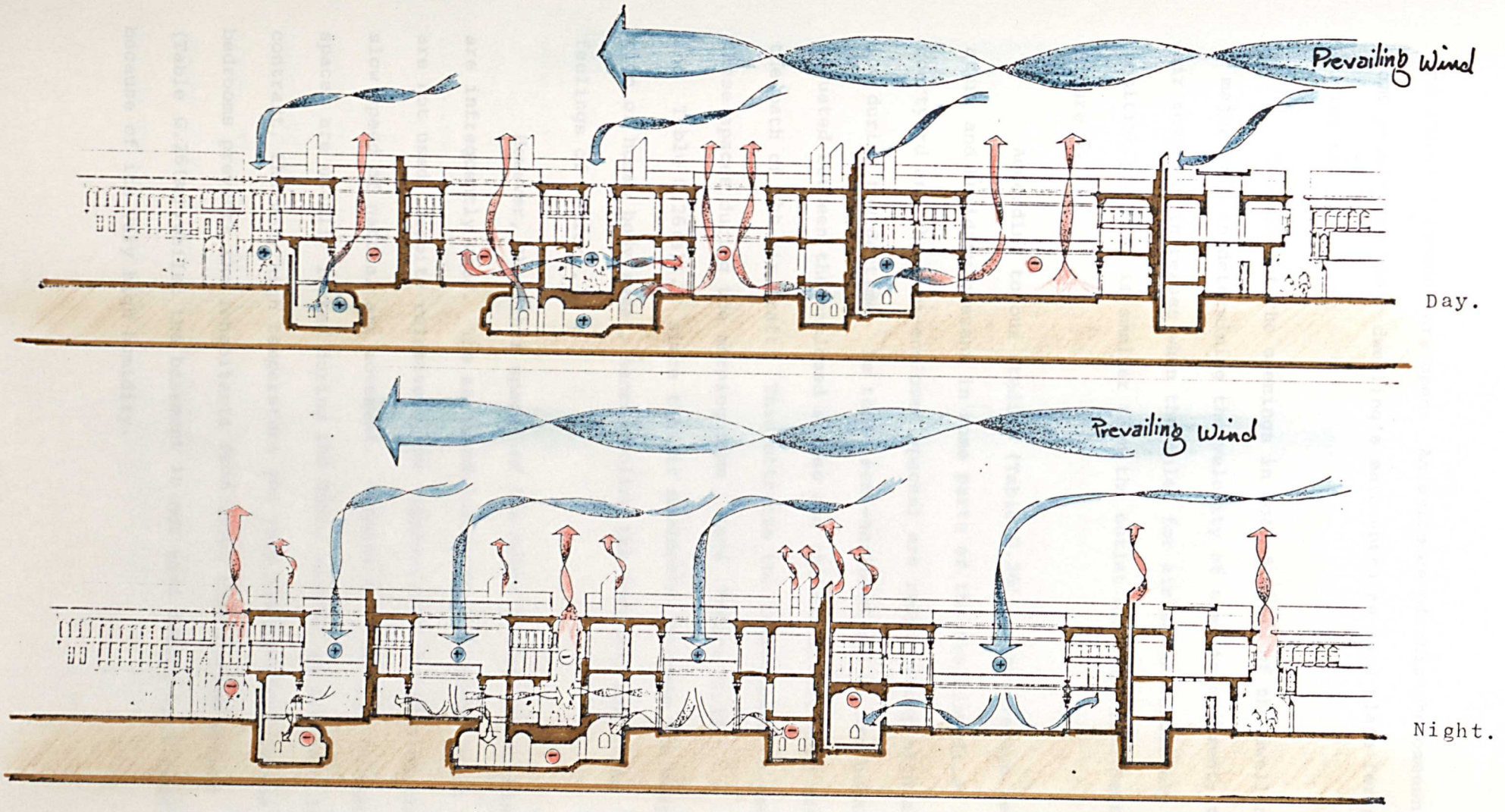


FIGURE: G.33.

Circulation of Air Movement Through Day and Night.

and internal facades are open. As evidence of this phenomenon, some people use their dwelling's main entrance as a place for sitting during the day.

The size of the openings in both facades of the dwelling plays a major role in determining the velocity of the air movement; the air movement increases when the inlet for air under relatively positive pressure is smaller than the outlet openings (see Section Figure G.33).

According to our studies (Table G.26) the average temperature and humidity present in some parts of the dwelling (i.e. the courtyard and the semi-enclosed spaces) are respectively high and low during the daytime. As these semi-enclosed spaces are usually situated between the enclosed spaces and the courtyard, they are in the path of the air draft. This attracts the inhabitants to use these spaces during the morning time (see Figure G.33 and Table G.26(a)). since the air movements increase the evaporation of human body sweat, hence cooling the body and achieving feelings of comfort.

However, the other spaces of the house during the morning time are infrequently used. The enclosed living spaces on the first floor are not used, despite relatively low temperatures, because of the slow speed of natural air movement. Windows and openings to these spaces are usually locked during the dusty weather in summer. In contrast, the very high temperature and very low humidity inside the bedrooms prevents the inhabitants from using them during summer (Table G.26(a)),whilst the basement is not used during this time because of its very high humidity.

During the afternoon the family moves to the basement as the most comfortable place environmentally for the siesta. At this time the basement presents the lowest temperature and the highest humidity compared to the other parts of the house (Table G.26(a)). The family remains in the basement until the conditions there become unacceptable. Humidity increases and the air movement through the air scoop becomes more turgid, as a result of the increases in the temperature of the building construction (i.e. walls and roofs). This helps to increase the temperature of the inflow air, resulting ultimately in an upward flow inside the duct late on a summer's day.

After sunset at night the family usually moves to the court-yard and semi-enclosed space as the temperature and humidity in these spaces more or less returns to the same conditions as existed during the morning after passing through its highest peak during the afternoon (Table G.26(a)). These places are usually sprayed with water before moving back to them, in order to release the heat gained during the day. On some hot days, when the air movement (i.e. prevailing wind) is very slow or changing in its deviation to a sirocco wind the inhabitants use air fans to create air movement, or they move to the roof of the house during the evening, where the prevailing air movement can be felt in the case of slow prevailing wind.

By the movement of the family to the roof of the house at night, the daytime activities of the family come to an end with household members sleeping in the open space where the temperature drops. The heat gain through the day into the structure and different spaces of the house and the outside alleyways makes the conditions inside the dwelling (especially at ground level and also in the

adjacent alleyways) hotter than the open spaces (i.e. on the roof) where solar gain is re-radiated to the night sky.

Accordingly, during the early morning as Table G.26(a) indicates, the hottest parts of the house are the bedrooms, semi-enclosed spaces and the basement, whilst the highest humidites are in the basement and the semi-enclosed places at ground level, whilst relatively low humidities are in the bedrooms and enclosed living spaces on the first floor. This is because the spaces on the ground level and the basement are surrounded by thick massive walls which act as storage for heat and cool (see Figure G.33) which release the heat gain of the day during the night and release cool air gained through the night during the day (see Figure G.33). This phenomenon plays a major role in creating air movements throughout the house spaces and changes the relative humidity.

Whilst the enclosed living spaces on the first floor which are constructed mainly from good insulated materials (i.e. wood, glass) are better than brick, thus the temperature usually drops inside these spaces soon after sunset (Table 26(a)).

Moreover, the table shows that the bedrooms have almost constant temperature and humidity during a 24 hour period. This is as a result of the collected solar energy in the living space during the daytime which heats up the inside air (see Figure G.33). The heated air moves upwards into the double height spaces and is passed to the bedrooms on the second level of the first floor through the bedroom windows which look into the enclosed living spaces (Figure). During the night the heat is reflected into the spaces of the bedrooms from the walls and the ceiling below.

Another factor which helps to make these rooms of constant temperature is their low ceiling height which limits air movement.

These facts can be seen clearly in Figure G.34(a). This figure shows that apart from the bedroom which has constant weather conditions, the temperature inside the different spaces of the house are getting closer at around 30° during the time between 3 and 6 AM. This is due to the construction of the building which at night loses its heat gained throughout the day and its temperature becomes close to the ambient temperature. In contrast, the figure shows big differences in temperature between the various spaces within the house during the time between 15 and 21 PM; this is because of the differences in the orientation of spaces, the surrounding building materials and their location in the building itself.

The humidity data (Figure G.34(b)) shows that the humidity is determined by the variation of the temperature during the hours of day which affect the evaporation, i.e. when the temperature increases the humidity increases accordingly.

Therefore, in the time between 3 to 6 AM the degrees of humidity in different spaces within the house are also getting closer and approach a level of around 30°, as seen before with the temperature curve. This means that at this period of daytime all the micro climate conditions in the traditional house are in common condition and approaching ambient conditions.

In winter the ambient temperature is lower and the sun's radiation angle has changed compared to summer as shown in Figure G.32. The natural conditions of the house will be changed accordingly. It is therefore to be expected that the shape of the temperature and

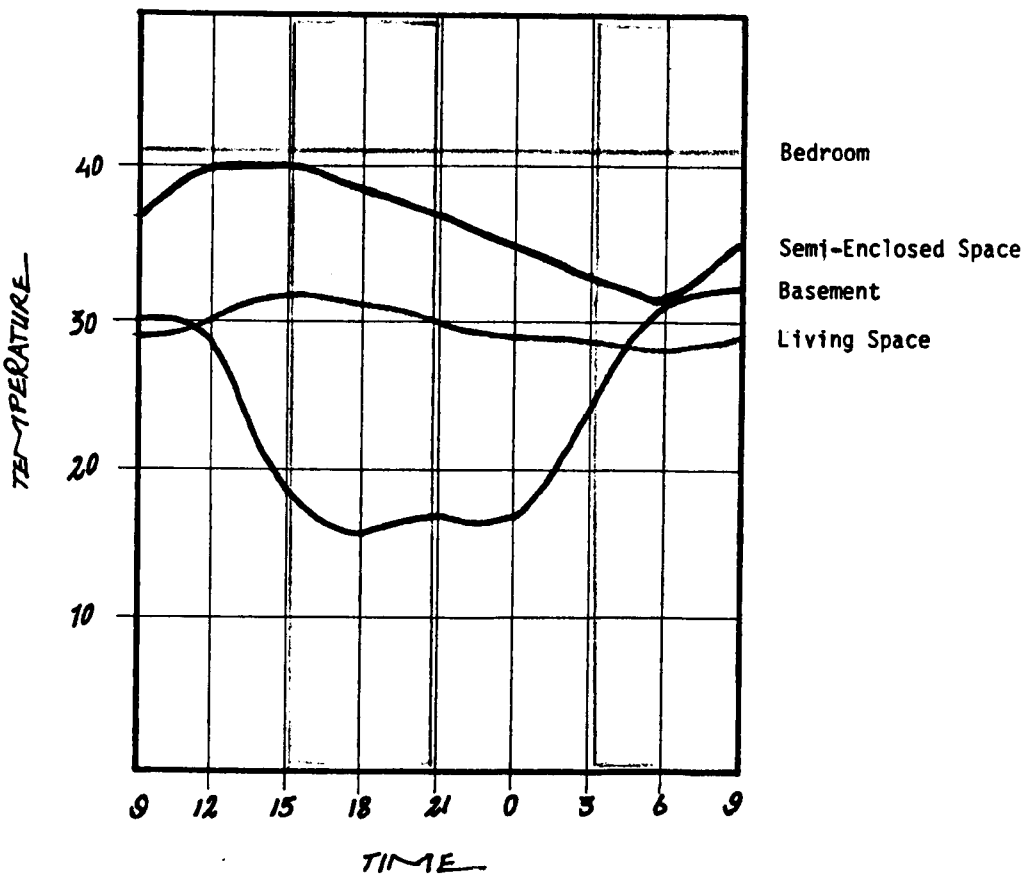


FIGURE: G.34a.
Temperature Levels in Different Parts of the House Throughout the Day.

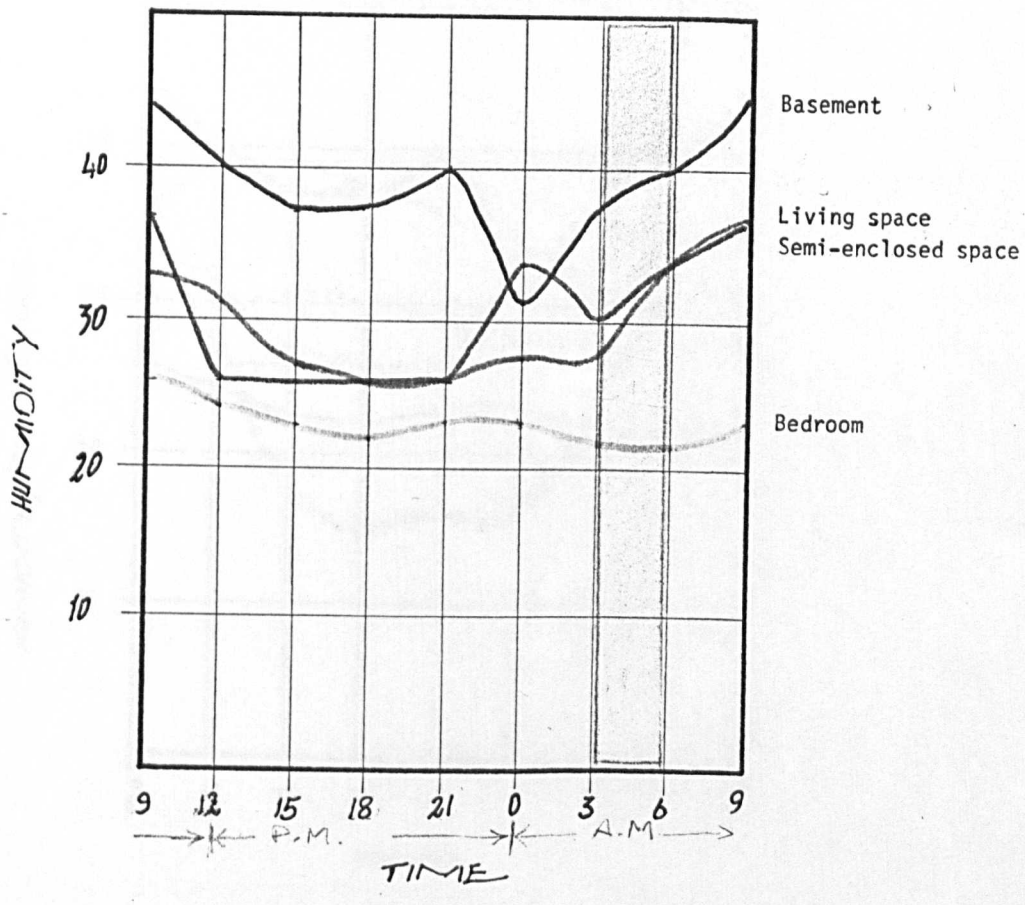
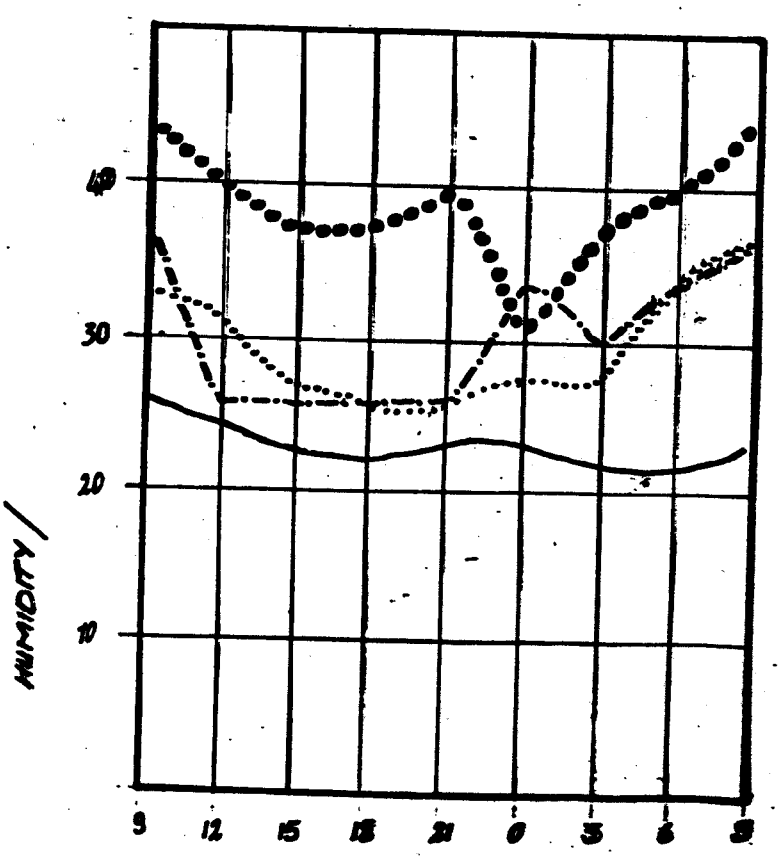
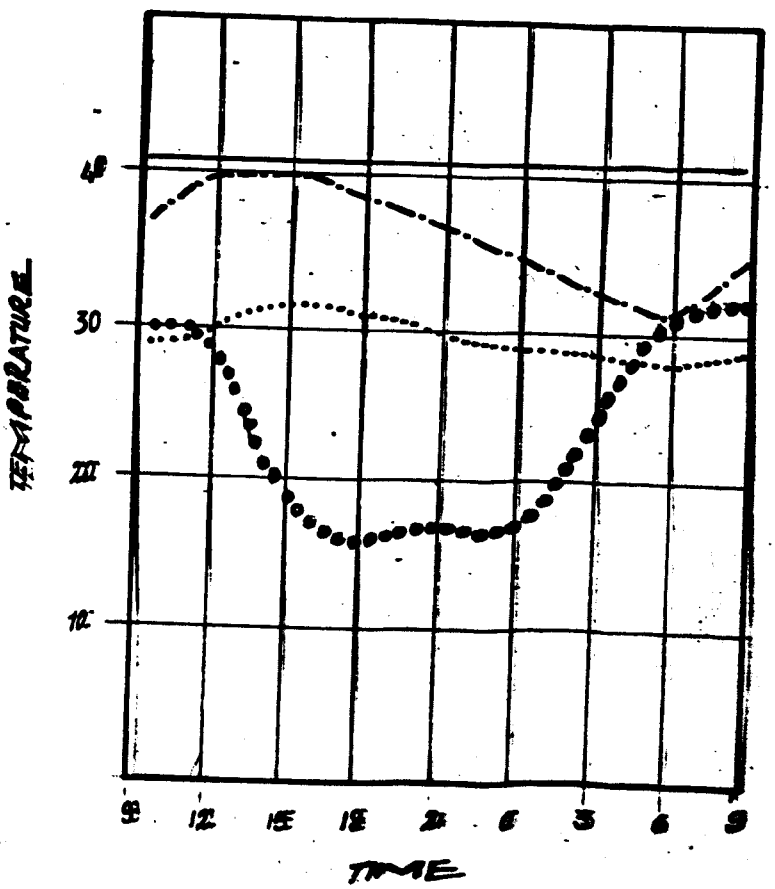
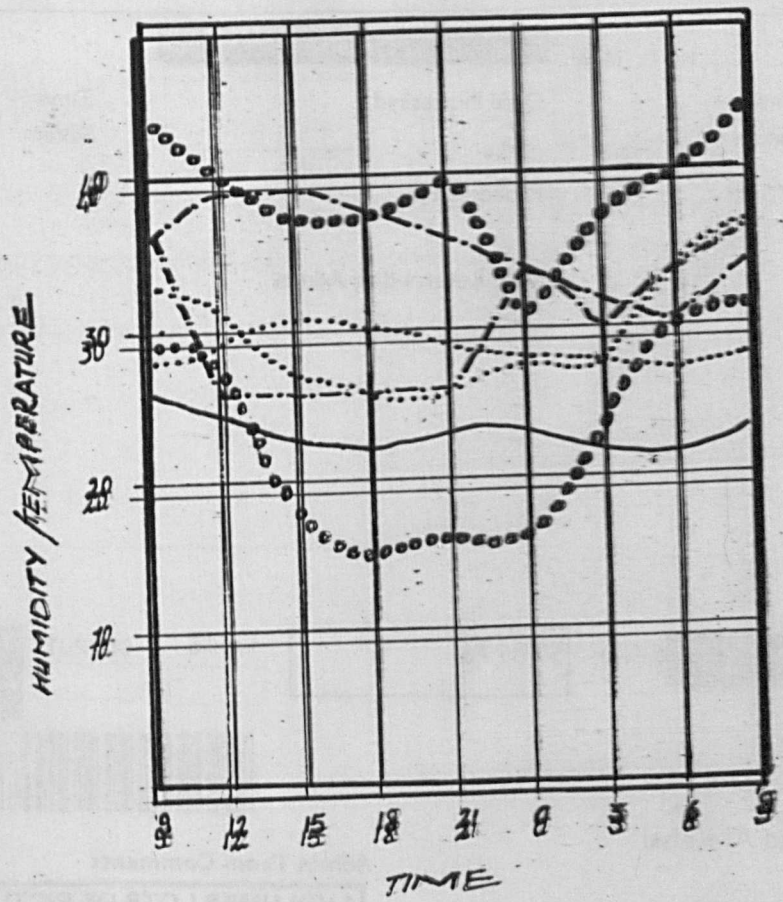


FIGURE: G.34b.

Humidity Levels in Different Parts of the House Throughout the Day.


HUMIDITY
40
30
20
10
9
12
15
18
21
0
3
6
9


TEMPERATURE
40
30
20
10
9
12
15
18
21
6
3
6
9
TIME


HUMIDITY /TEMPERATURE
40
30
20
10
TIME

humidity curves will be altered. For example, it is expected that the semi-enclosed spaces and the courtyard will not receive the same amount of sun radiations during winter when the angle of the sun's rays change from 45° during summer to 30° during winter at 9 AM, whereas the angle of the sun's rays at 12 noon changes from 81° during summer to 49° during winter (Figure G.32).

This means that the alleyways will be almost always in shade during the winter periods and will continue to play a similar role in their localised air circulation system (Figure G.33). Within the dwelling the enclosed living spaces on the first floor during winter are receiving more direct sunlight than in summer (Figure G.32). Accordingly, the expected temperature in the living enclosed spaces will be greater than in the courtyard and in the semi-enclosed spaces.

As a result of the aforementioned analysis, the system of ventilation and temperature adaptation will be heavily affected by designs for urban housing which neglect these principles. Polservice suggested redeveloping residential quarters of Kadimiya which include large areas of open space and detached dwelling areas. Attempts to create public space in such a way within the residential quarter will directly affect the physical function of ventilation and temperature adaption in the traditional system in relation to the surrounding dwellings because such open spaces will create negative pressure during the day, and expose the elements of the urban fabric to more direct sunlight. This outcome will either be to generate horizontal drafts from the dwellings towards the external public open space (which means that the internal open space of the dwellings (courtyard) will act as an inlet shaft for the ambient hot dry air during the

day, which is opposite to the basic principles of the courtyard's physical function), or create a balanced pressure between the internal courtyard and the external open space. This situation will affect the efficiency of the draft movement and the ventilation circulation and so create less acceptable micro climate for living.

The inhabitants' movements and activities within the traditional home are determined by the relationship between the spaces arranged around the courtyard by the building construction and urban spatial arrangements and by the external natural environment. This can be seen clearly in Figure G.35(a) where the relationship between use and activities is measured qualitatively throughout the different main seasons, i.e. summer and winter. Moreover, these relationships are also measured quantitatively (Figure G.35(b)) where it can be seen that the sequence of daily activities in terms of space use in the house are dramatically different at different seasons. Daily activities are directed predominantly upwards (i.e. onto the first floor) towards solar energy sources during winter, whilst on the contrary, directed downwards (i.e. the ground floor and basement) away from solar gain during summer.

Generally, the dominant space for family use within the house during summer is the courtyard, whereas the dominant used space during winter is the sitting room, followed by the bedrooms (as illustrated in Figure G.35(b)). The kitchen is used only for cooking, whatever the season. This is mainly because of its small size and micro climate condition.

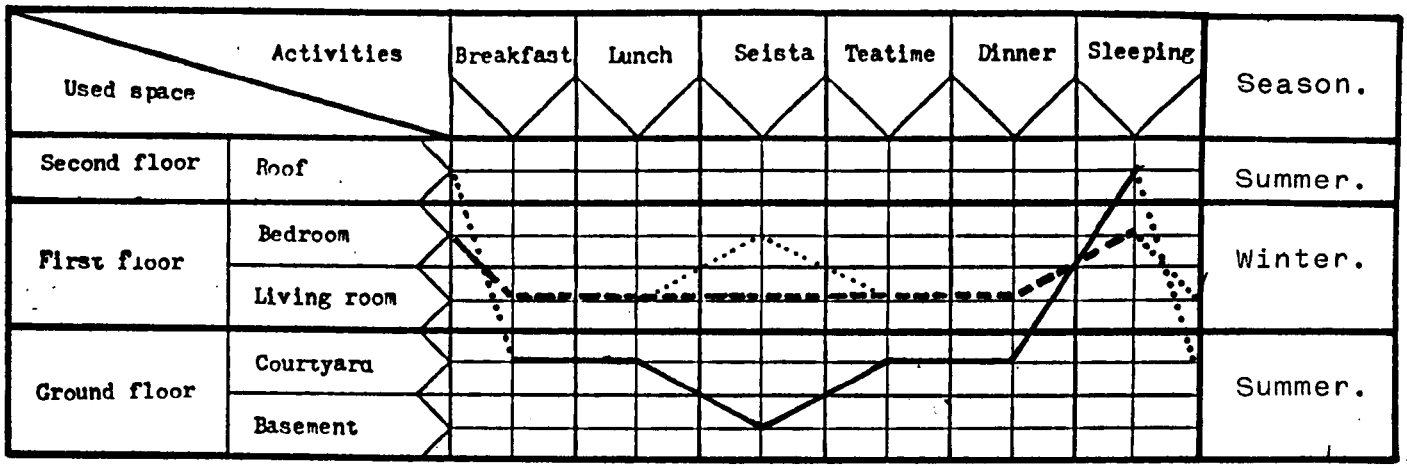


FIGURE: G.35a.

Qualitive.

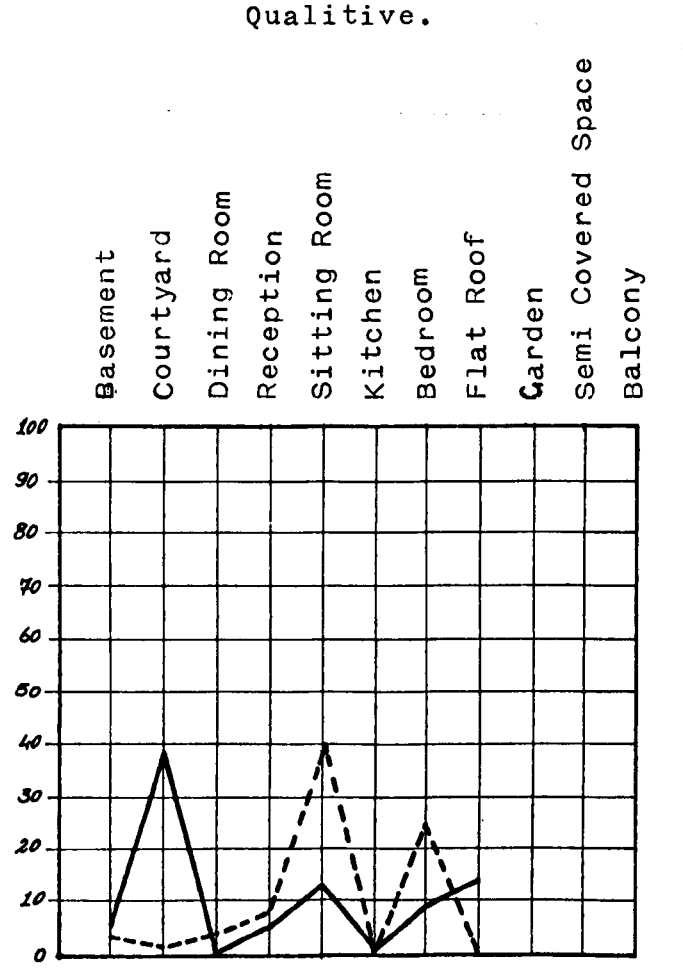
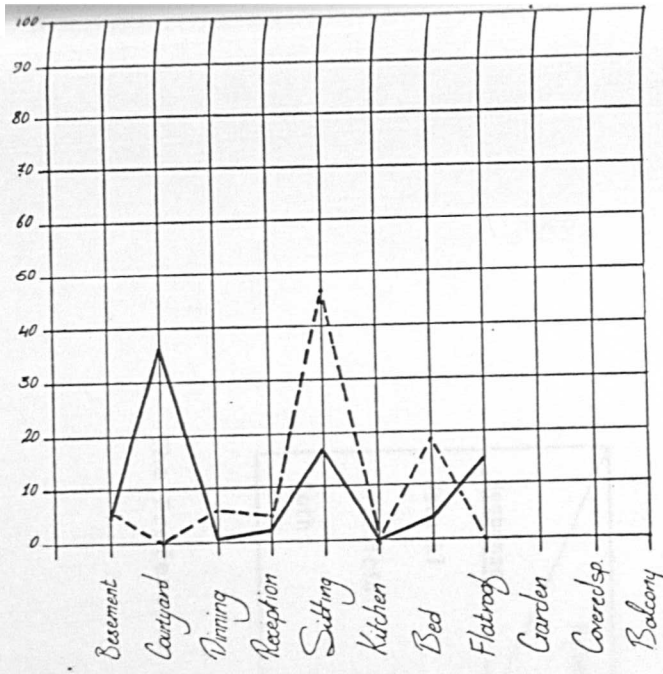


FIGURE: G.35b.

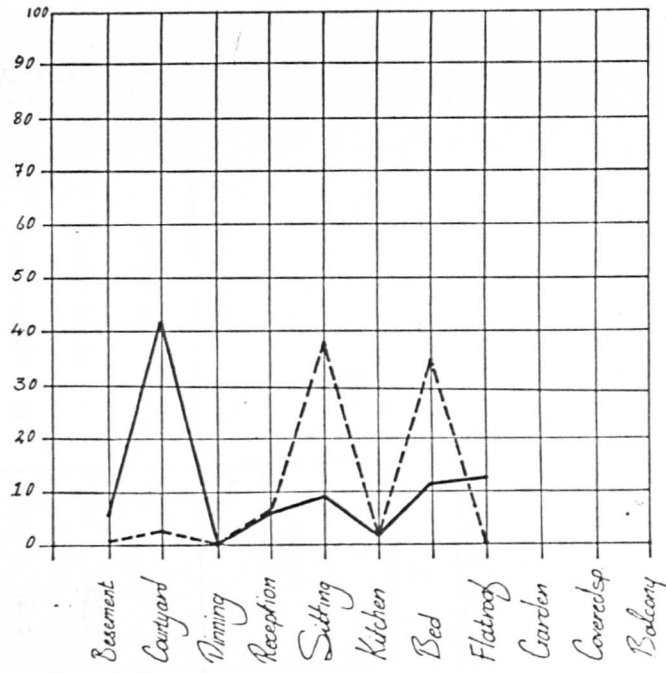
Quantitative.

THE SPATIAL USE OF THE HOUSE AND THE SEASONS.

KARAMA



KADIMIYA



The Function and the Used Space

ACTIVITIES \ SEASONS	THE USED SPACE											
	Basement	Courtyard	Dinning	Reception	Sitting	Kitchen	Bed	Flatroof	Garden	Covered sp	Balcony	
TIME — Breakfast	0 / 2	16 / 0	0 / 2	0 / 1	4 / 14		0 / 3					
Lunch	0 / 2	10 / 0	1 / 2	0 / 1	6 / 15		1 / 2					
Sasla	8 / 0	4 / 0		3 / 1	4 / 3		3 / 2					
Teatime	0 / 2	12 / 0	0 / 2	0 / 1	5 / 15		0 / 2					
Dinner	0 / 2	11 / 0	0 / 2	0 / 1	6 / 15		1 / 2	1 / 0				
Afterdinner	0 / 2	11 / 0	0 / 2	0 / 1	4 / 15		1 / 2	1 / 0				
Sleeping at night	0 / 2	/ 0		0 / 2	0 / 1		/ 20	23 / 0				
TOTAL	8 / 12	64	1 / 10	3 / 8	29 / 78		6 / 33	25 / 0				
%	4.6 / 6.9	36.6	.6 / 5.7	1.7 / 4.6	16.6 / 44.6		3.4 / 18.9	14.3				

ACTIVITIES \ SEASONS	THE USED SPACE											
	Basement	Courtyard	Dinning	Reception	Sitting	Kitchen	Bed	Flatroof	Garden	Covered sp	Balcony	
TIME — Breakfast	/	24 / 2		1 / 3	4 / 21	1 / 1	3 / 13					
Lunch	2 / 0	18 / 0		3 / 3	5 / 20	1 / 1	3 / 11					
Sasla	11 / 0	9 / 0		4 / 0	5 / 0		13 / 1					
Teatime	3 / 0	20 / 2		2 / 3	2 / 21	1 / 1	2 / 13					
Dinner		23 / 2		2 / 3	4 / 21	1 / 1	2 / 13	1 / 0				
Afterdinner		21 / 2		3 / 3	4 / 21		3 / 13	2 / 0				
Sleeping at night	0 / 2	1 / 0		/ 1	1 / 4		5 / 36	32 / 0				
TOTAL	16 / 2	116 / 8		15 / 16	25 / 109	4 / 4	31 / 100	35 / 0				
%	5.7 / .7	41.4 / 2.8		5.3 / 5.1	8.9 / 38.3	1.4 / 1.4	11.1 / 35.7	12.3				

FIGURE: G.35(c)

CLIMATE AND HOUSE: VAR 335 SUMMER, VAR 344 WINTER

Estate / Response	KADIMIYA				KARAMA			
	Summer		Winter		Summer		Winter	
	No.	%	No.	%	No.	%	No.	%
Very Comfortable	10	25	6	15	8	34.8	3	13
Comfortable	17	42.5	19	47.5	9	39.1	4	17.4
Not comfortable	13	32.5	15	37.5	6	26.1	13	69.6

TABLE: G.28

The Surveyed People's Responses With Regard to the Climatic Comfort of the House

TYPE OF VENTILATION USED INSIDE THE HOUSE

Estate / Response	KADIMIYA		KARAMA	
	No.	%	No.	%
Natural	36	90	21	91.3
Artificial	4	10	1	4.3
Both	-	-	1	4.3

TABLE: G.29

The Preference Shown for the Ventilation Used

TABLE 29a

PREFERENCE FOR NATURAL VENTILATION

Response \ Estate	KADIMIYA		KARAMA	
	No.	%	No.	%
Healthy	33	82.5	19	82.6
Economy	8	20	3	13
Less Maintenance	-	-	-	-

TABLE 29b

SUITABILITY OF THE DIFFERENT PARTS OF THE HOUSE DURING THE DAY AND SEASON

Location \ Estate	SUMMER				WINTER			
	KADIMIYA		KARAMA		KADIMIYA		KARAMA	
	No.	%	No.	%	No.	%	No.	%
Sitting Room	12	30	5	21.7	20	50	6	26.1
Reception Room	3	7.5	5	21.7	1	2.5	2	8.7
Dining Room	2	5	-	-	3	7.5	-	-
Bedroom	4	10	4	17.4	16	40	12	52
Kitchen	-	-	-	-	-	-	-	-
Courtyard	21	52.5	15	65	1	2.5	-	-
Entrance	1	2.5	-	-	-	-	-	-
Basement	16	40	9	39.1	-	-	2	8.7
Roof	30	75	1	4.3	-	-	-	-
Room in 2nd Floor	2	5	4	17.4	4	10	-	-

PROBLEMS IN CLEANING THE HOUSE

Response \ Estate	KADIMIYA		KARAMA	
	No.	%	No.	%
No	9	22.5	7	30.4
Yes	31	77.5	16	69.6
Causes of the Problems				
Too many openings	11	27.5	3	13
Existing courtyard	29	72.5	8	34.8
Location of the house	1	2.5	-	-
Window details	7	17.5	5	21.7
Unpaved roads	2	5	-	-

TABLE: G.30

The Surveyed People's Responses in Regard to the Courtyard House Problems

PUBLIC BUS SERVICES

Estate / Response	KADIMIYA		KARAMA	
	No.	%	No.	%
No	11	27.5	13	56.5
Yes	28	70	10	43.5
Distance Between House and Bus Stop (In Minutes)				
0-4	9	22.5	22	95.7
5-9	10	25	1	4.3
10-14	9	22.5	-	-
15+	12	30	-	-

TABLE: G.31

The Surveyed People's Responses in Regard to the Public Bus Services

OPINION ABOUT THE HOUSE IN FUTURE

Response \ Estate		KADIMIYA		KARAMA	
		No.	%	No.	%
No		1	4.3	-	-
Yes		38	95	23	100
Don't Know		1	4.3	-	-
Changing the Whole House					
No		2	5	2	8.7
Yes		36	90	21	91.3
Don't Know		2	5	-	-
Type of House Improvement					
Enlarge	(No)	38	95	21	91.3
	(Yes)	2	5	2	8.7
Add	(No)	39	97.5	23	100
	(Yes)	1	2.5	-	-
Transfer	(No)	40	100	23	100
	(Yes)	-	-	-	-
Remove	(No)	40	100	23	100
	(Yes)	-	-	-	-

TABLE: G.32

The table shows clearly the responses of surveyed people towards the suitability of the courtyard house and also their suggestions for the future.

G.8.4.7 The Articulation of the Traditional Urban Fabric and Its Aesthetic Status

Natural and cultural factors not only create the form of the different elements of urban fabric, but also delineate the overall character of the city, its aesthetic dimensions and visual language.

Despite the expressive elements utilized on the facades of the buildings being often the same, their composition in each building's facade is different, either in the interior or exterior, due to the function of the building and its individual arrangements. As a totality the facades of different buildings located in the same alleyway present a continuous facade of the alleyway. Despite the main function of the alleyways as public space for communication and transportation, they have another function dependent upon the hierarchy of neighbourhood communications. Each alleyway derives some of its own visual character from the scale and function according to the roads hierarchy.

In order to come to grips with the aesthetic elements and the visual language embedded in the different parts of the urban fabric, it is appropriate to utilize a technique which has already been introduced in Section D.4.5. In this technique a comparison can be made of the different situations and of the changes taking place over time in each part of the urban fabric.

In order to concentrate the tour and to study the different main features of the urban fabric within the residential area, as much as possible, a free tour has been suggested through the traditional residential area.

Since the caravansery played the role of marking the arrival in and departure from the city, it can be considered as the starting

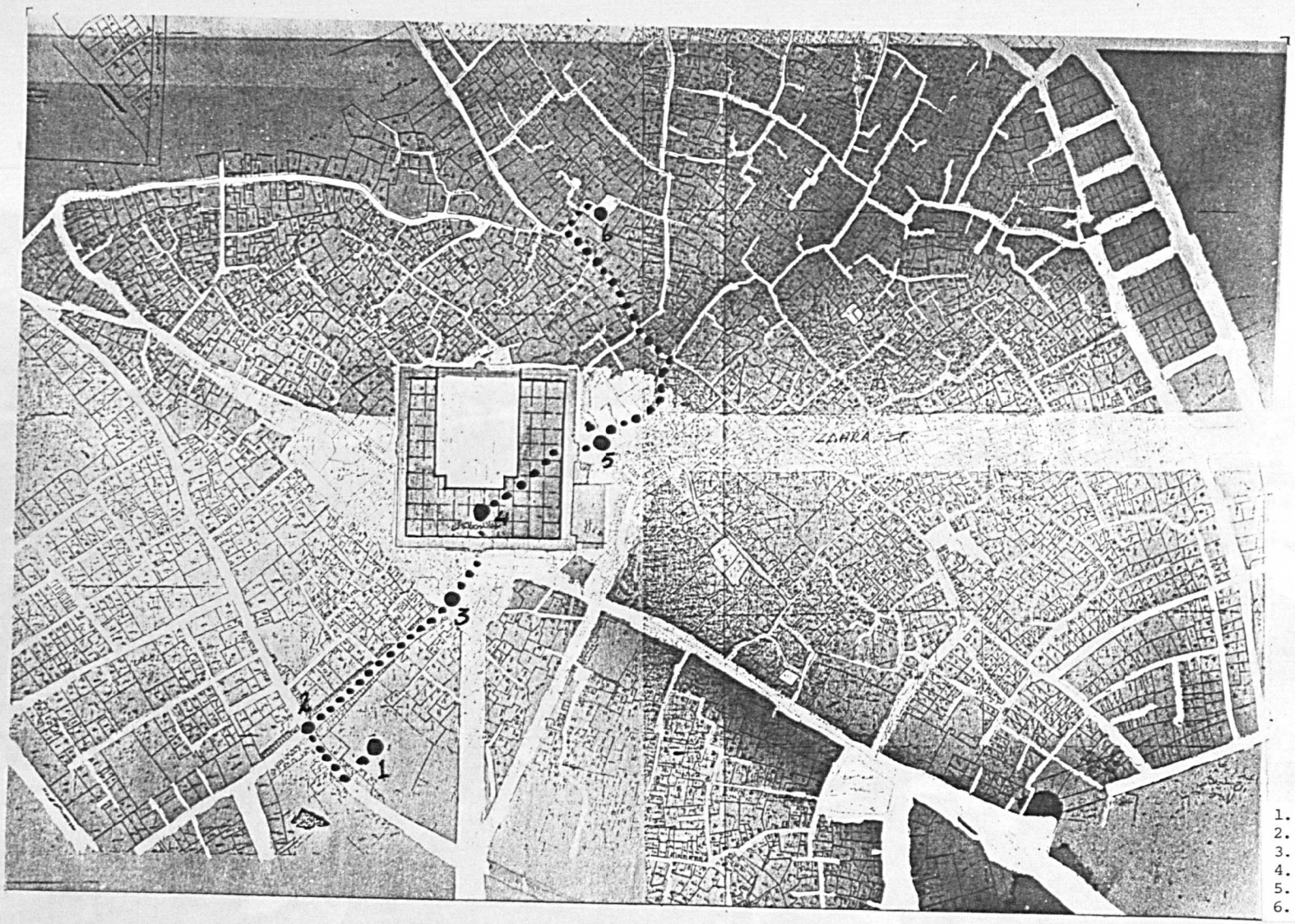


FIGURE: G.36.

Layout of Kadimiya and the Route of the Tour.

FIGURE: G.37.

Top View of Kadimiya and the Entrance to the Khan.

FIGURE: G.38.

The Facade of the Khan.

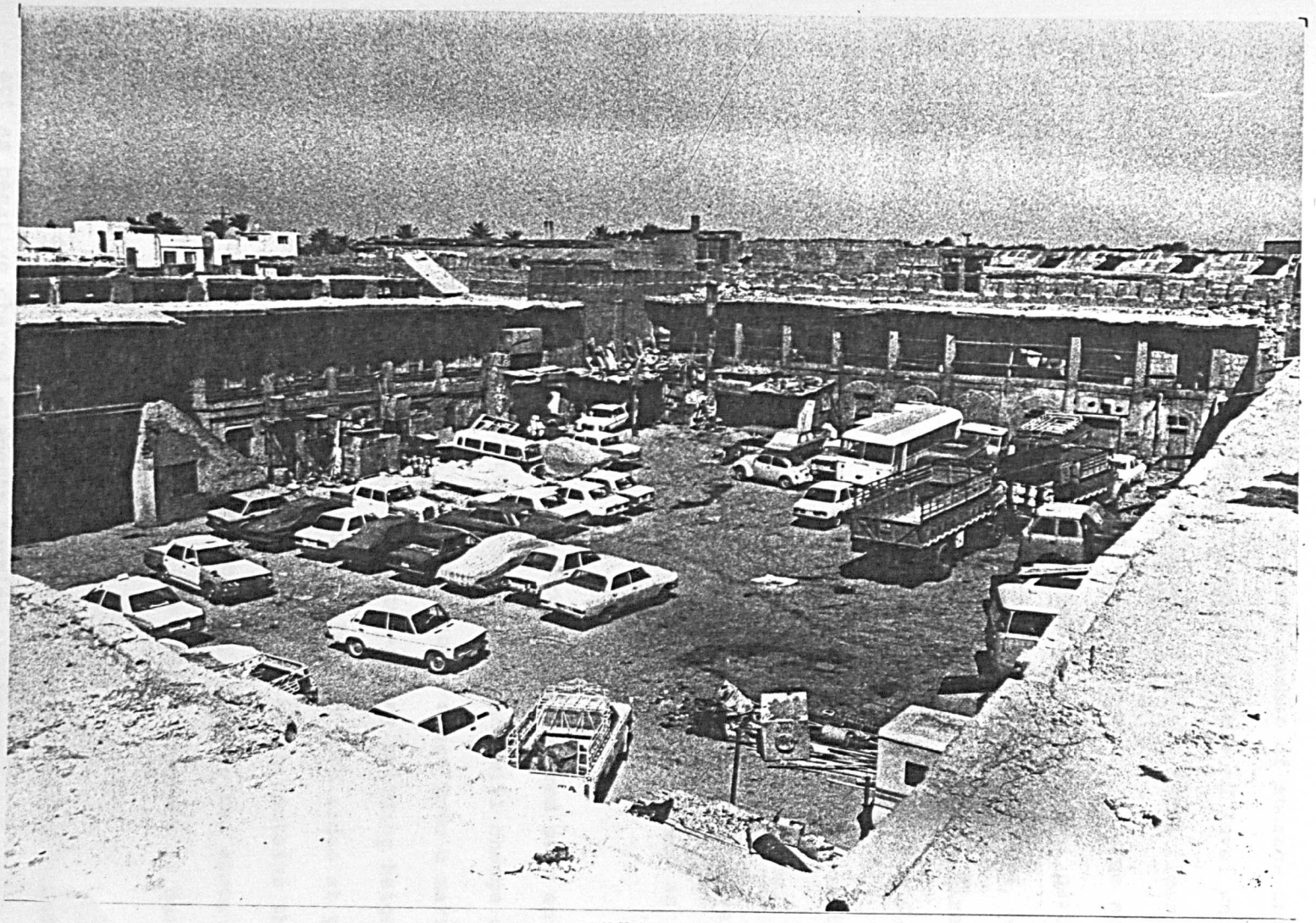


FIGURE: G.39.

The Courtyard of the Khan.

point for urban tourism and commerce. Accordingly, our tour will start from the caravansery in Kadimiya. This two-storey building consists of a main tunnel entrance and a number of storage units grouped around a hugh square courtyard on the ground level which had once been used as a depot for carts. On the first floor there is a gallery surrounding the courtyard, along which a large number of rooms for visitors have been arranged in a symmetrical pattern. These rooms are mainly directed towards the inner courtyard, except the rooms which are located on the front facade which are directed towards the outside. These are arranged in a zig-zag pattern. (Fig G.38)

However, this caravansery is today in a derelict condition, since no maintenance has taken place for a considerable time. In addition some of the rooms on the ground floor have been converted to garages for vehicle repairing and the courtyard is used as a car park. (Fig G.39)

On leaving the caravansery through the covered main entrance, visually, the character and the form of the space will change dramatically from regular brightly-lit private/public open space into a narrow shaded and irregular alleyway, with a two-storey building height, where commercial activities are taking place on both sides at ground level. The plain level of the street facade, which contains the shops, acts as a neutrally charged boundary, forming the space for activities through which can be seen the smooth movement of bustling crowds.

In addition, the recessed elements of the neutral boundary act as negative charged elements forming the interior of the shops. These spaces are linked directly with the main space of the alleyway.

This arrangement allows the public space to extend through the solid element of the facade resulting in a widening of the space and increased depth of vision.

On the first floor level of the commercial alleyway are projected bay windows (shanasheel) in different compositions which have been introduced on both sides of the street. These projections act as extensions of the solid elements of building facade into the space, which can be taken to act as positively charged elements. These bay windows constrict the space, thus creating shade on the ground level and on parts of the facades which are facing the direct sunlight, creating sharp contrasts in the degrees of light and shade seen in this urban scene.

The moulded components of the space and the solid elements through the alleyway are within a single purview of human vision. This creates the relationship between the pedestrians and their surroundings. The irregular projected bay windows and the bend in the street determine the skyline and thus create a continuous change in the perspective of the alleyway restricting the vision of the pedestrians in relation to their movements. This creates a hidden element and therefore encourages the pedestrian to venture forward in search of its mystery. Beyond the bend, the vision opens out to a crossroads created by the street and the linear market place (sūq-Al-Easterabady). By turning to the right the pedestrian will be walking in the sūq-Al-Easterabady. This market consists of two-storey buildings on both sides of a straight narrow alleyway covered by a canopy supported on steel trusses at second floor level in which skylight windows have been provided. The shops are occupied at ground level, whilst on the first floor, rooms are constructed

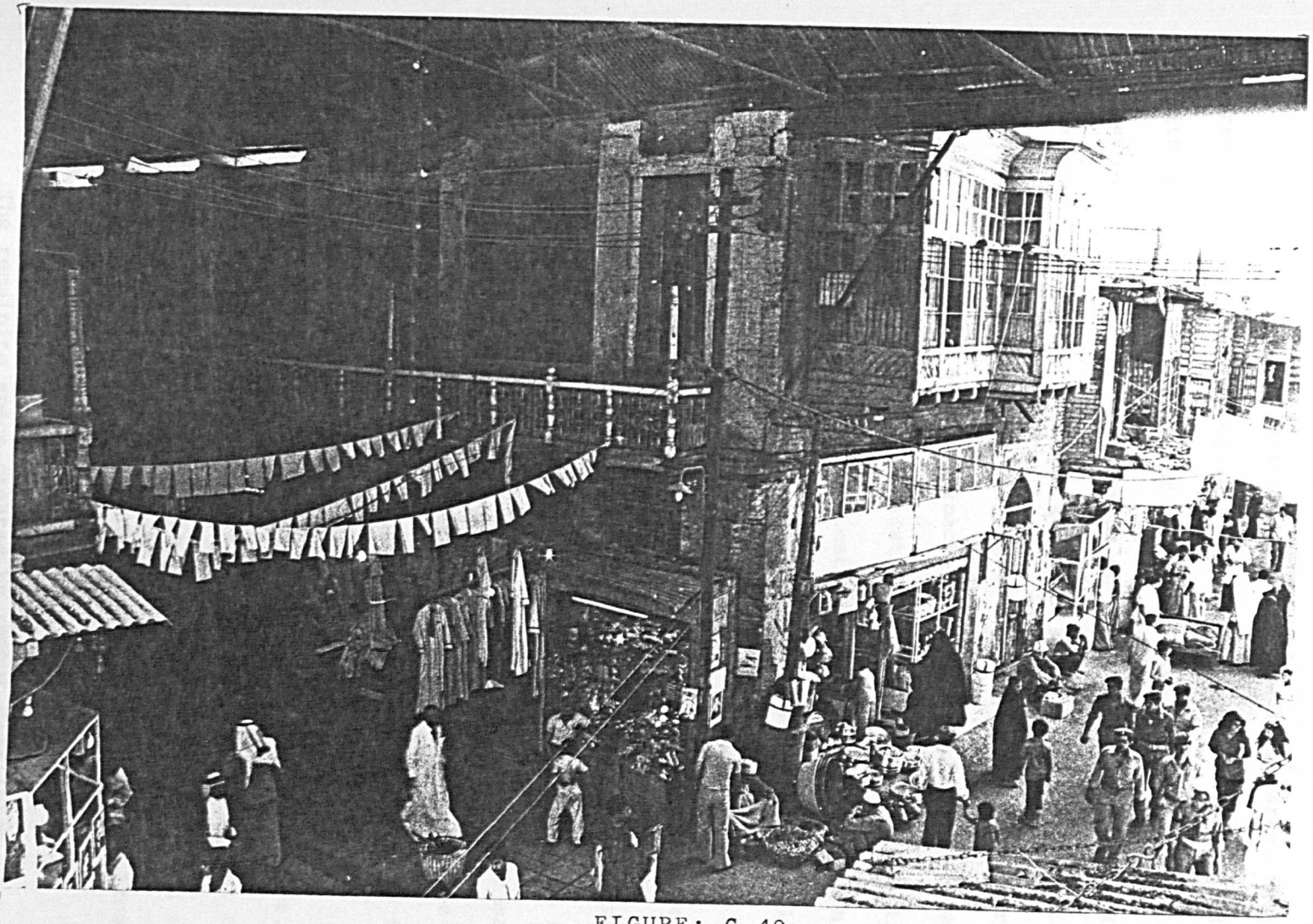


FIGURE: G.40.

The Junction Between the Alleyway and the Market Place.

above the shops which have access from two galleries located along both sides of the market on the first floor.

The space is dramatically changed in this market from the previous freely-shaped, closely-integrated space and solid elements with their sharp contrasts of light and shade to a regularly determined space with relatively homogeneous conditions of shade, except for the shafts of sunlight which penetrate through the roof skylights. Walking towards the mosque the angle of vision of the pedestrian gradually increases as he approaches the end of the covered market. The eyes, conditioned by the relatively subdued lighting of the market, gradually adapt as more natural light filters through the end of the covered area and before reaching the end of sūq-Al-Easterabady he will perceive the mosque framed on both sides by the dark shaded facade of the shops and the pitched roof overhead.

The walk through the covered market ends in a hugh irregularly shaped open space. This space is so huge and irregular that it is difficult for the person to identify with it, and at the same time conflicts exist between pedestrians and vehicles. These conflicts are generated by the new routes penetrating through the area from the north-east focussing on the main entrance of the mosque. This route now acts as one of the main axes into Kadimiya district. Both the huge open space and the radial route are the recent creation of the bulldozer which was used to implement the development of the Kadimiya district in accordance with the short report from Pol-service, the Consulting Engineers.

The remaining space created by recent demolition is surrounded by a hotch-potch of facades built up from the treatment of the remaining buildings and the naked high wall of the mosque with its

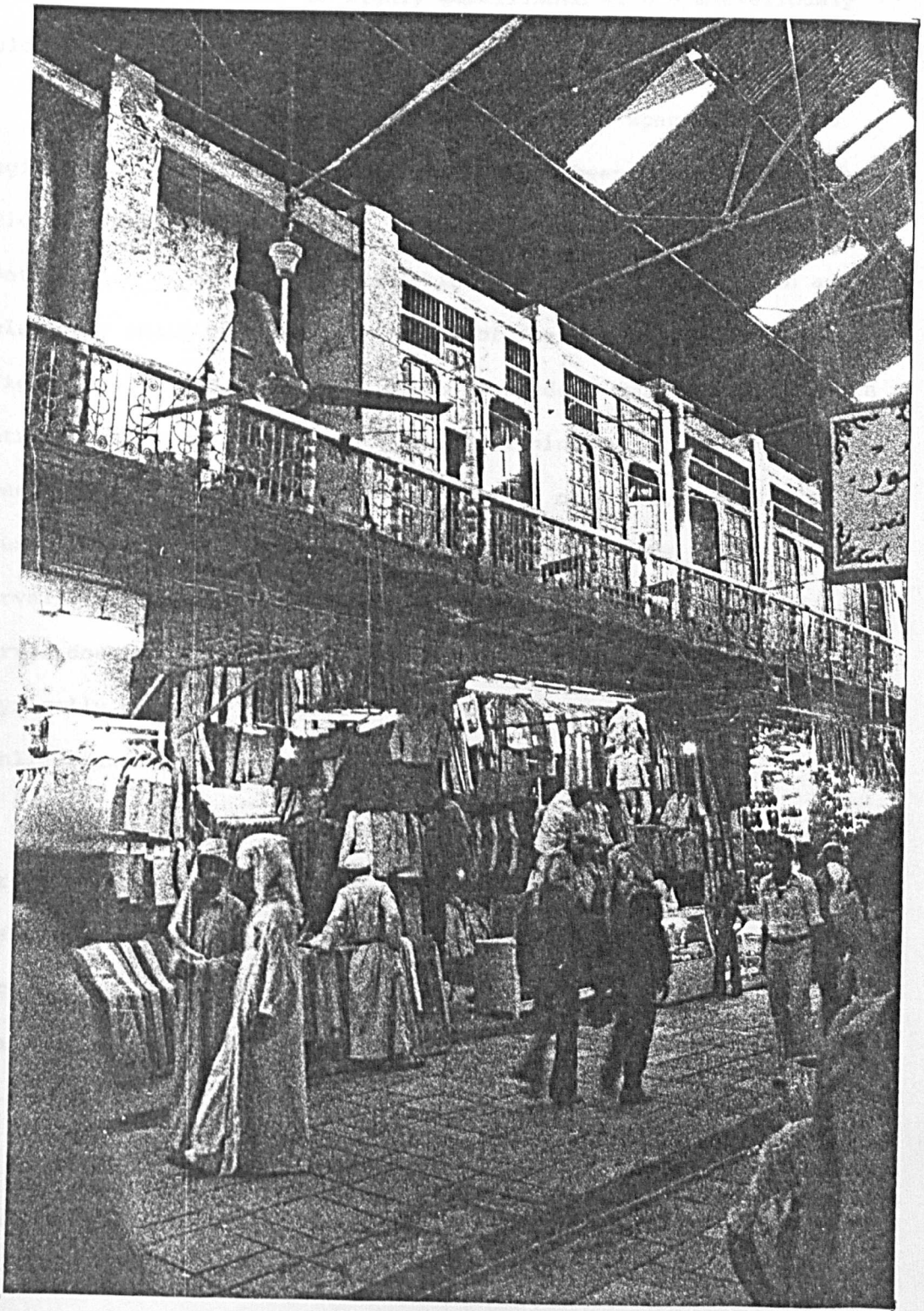


FIGURE: G.41.

The Market Place.

recessed double-storey height pointed arch identifying the main entrance. The entrance is highly embellished with a marvellously colourful decoration of mosaic tiles.

However, the creation of this huge open space spoils the magical spirit of the human scale which had been engendered in the original fabric of this place. This scale was formed by the continuation of the narrow meandering open market ending with a relatively small open space in front of the mosque's main entrance (Figure G.14). Such an open space gave added emphasis to the main entrance as it was a dominant feature within the whole space. The space intensified the powerful perspective of the main entrance thus attracting the attention of pedestrians because of its marvellously colourful embossed details and highly embellished carved double-storey arch. Moreover, the size of the open space physically provided protection for the pedestrian from the direct sunlight and vehicular traffic.

The aesthetic dimensions of such an enclosed open space were the result of the powerful yet balanced integration in the scale of the square and the composition of space and solid elements. Accordingly, emphasis was given to the main entrance (i.e. by the scale of the open space and by the recess of the main entrance as a negative and attracting urban element).

After looking closely at the open space which previously existed in front of the mosque, it is the time to continue the tour through the traditional urban area. The next step in this tour is to visit the Kadimiya mosque, since we are at its main entrance. This mosque is not only a mosque for everyday prayer but a shrine and a religious centre.

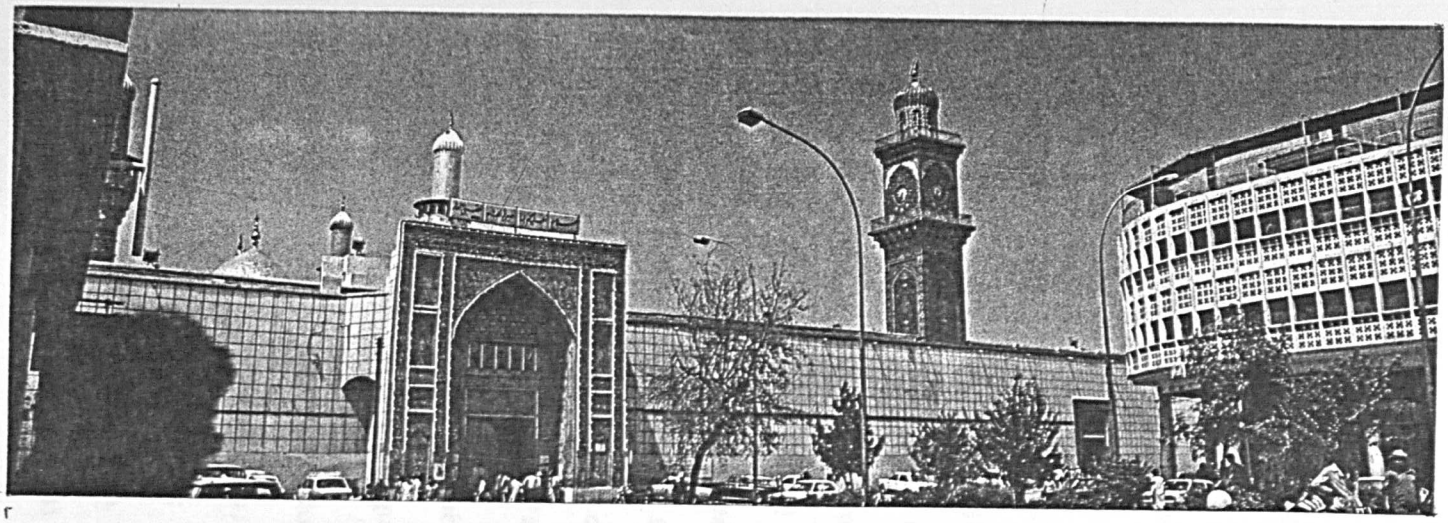


FIGURE: G.42a.
Entrance to the Mosque.

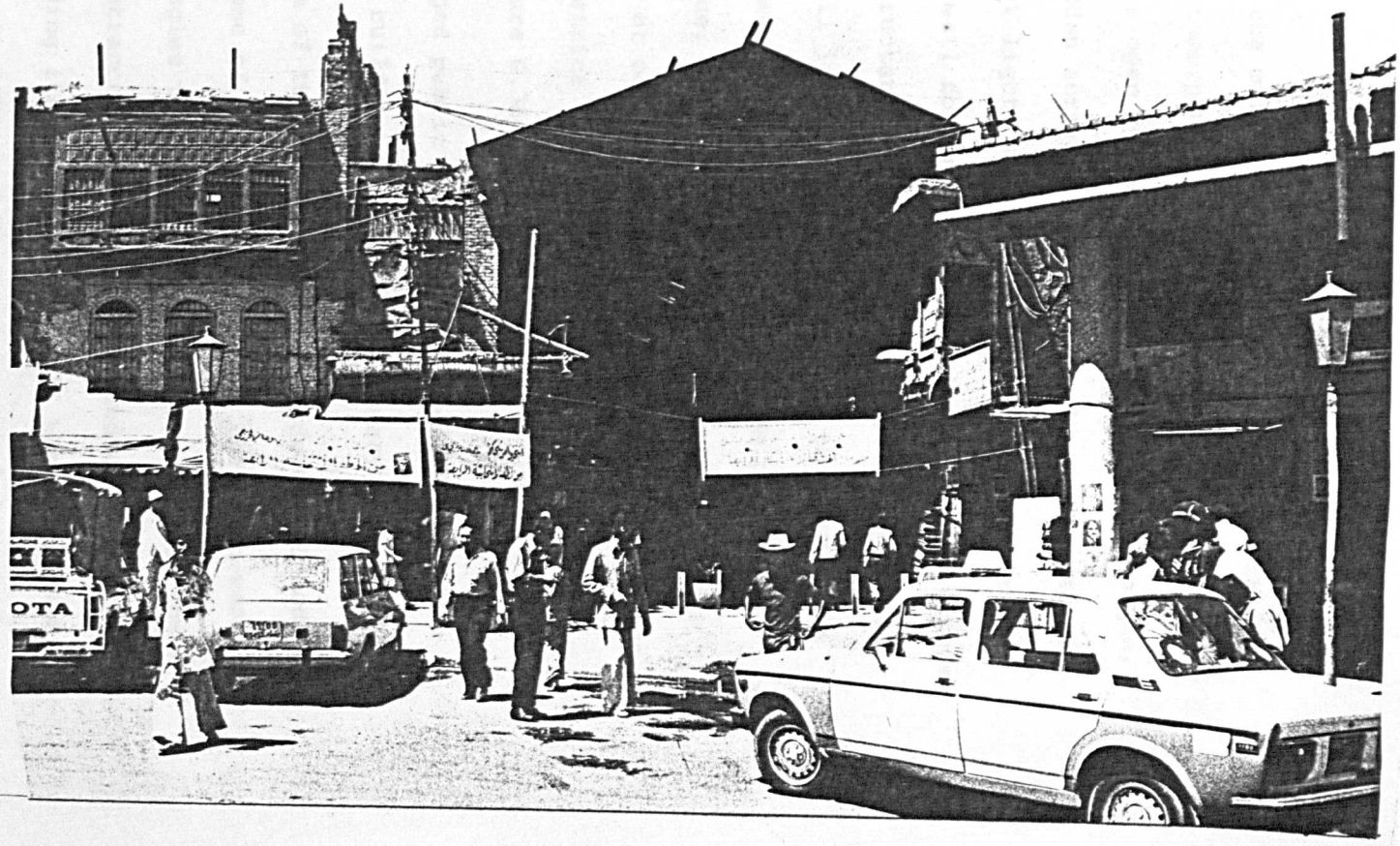
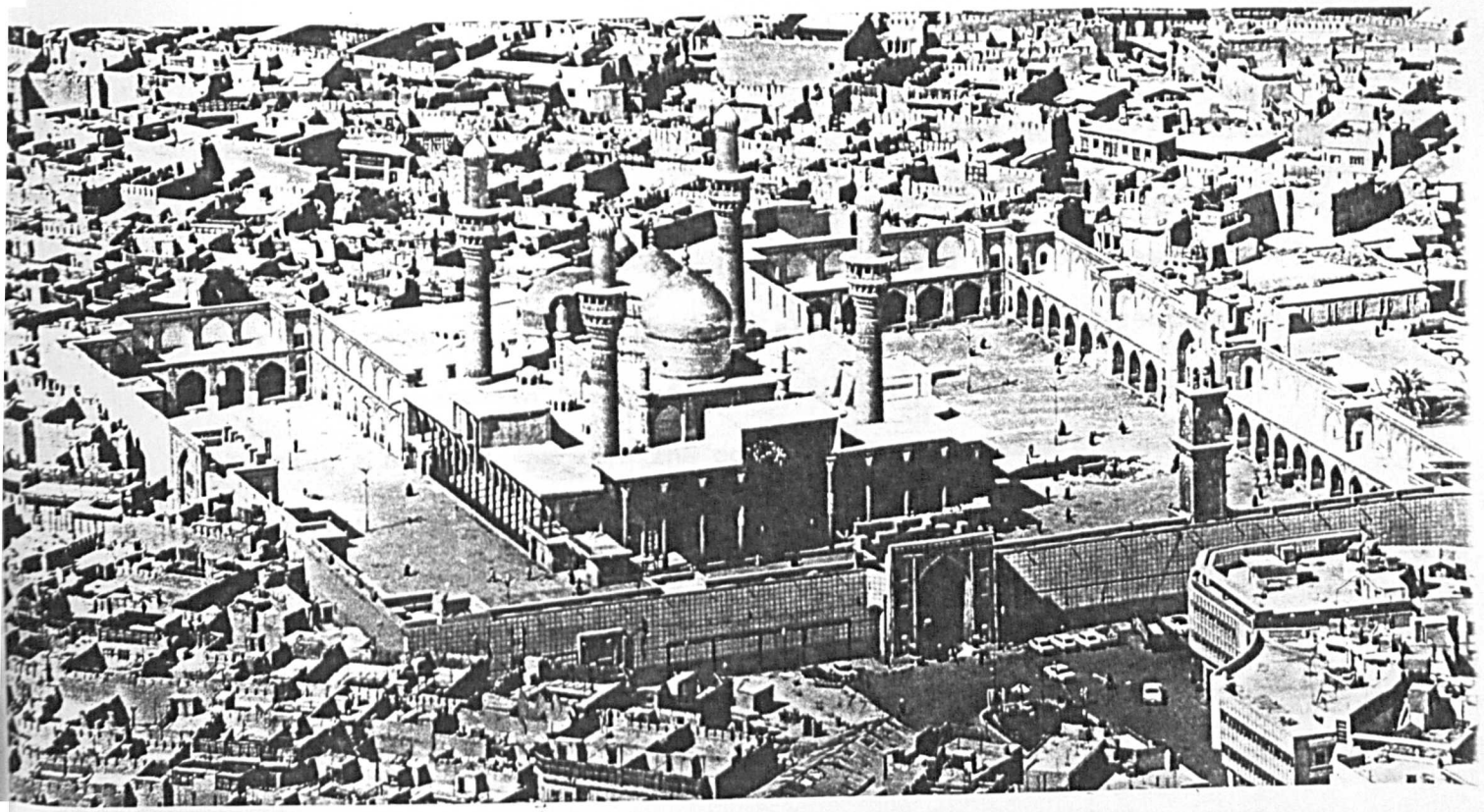


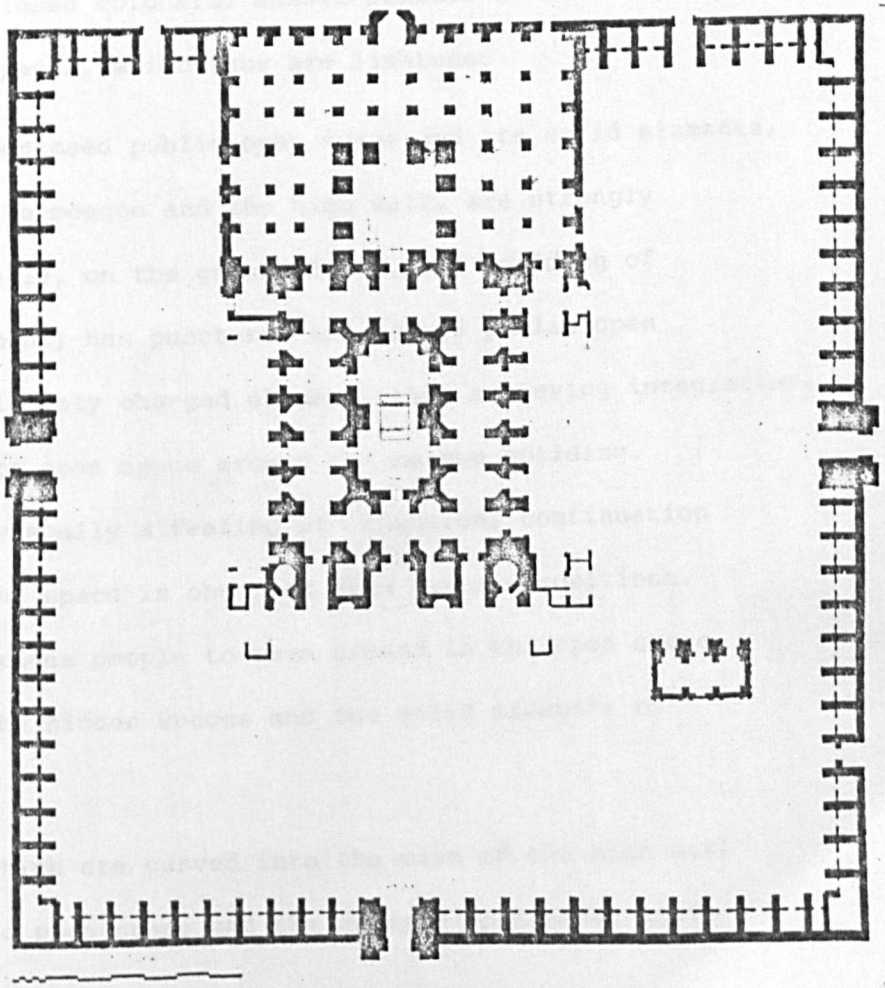
FIGURE: G.42b.
Entrance to the Suq.

Passing through the main entrance of the mosque, which acts as a radical point of metamorphosis between the public space of the street and the public open space within the body of the mosque, one is struck by the sudden surprise created by a large open space filled with strong bright light, embraced by the impervious mass of a double-storey high wall forming the square layout of the mosque. The mosque began as a structure occupying the centre of the space and has been extended until joining the high wall at the south-west side, the direction of Mecca, toward which the Moslem people face during prayer. The mosque, because of its siting in a north-east - south-west direction, is at odds with the general pattern of north-south movement in the district and thus has remained a landmark in the urban fabric (Figure G.36).

However, a U-shaped public space has been left between the solid mass of the mosque building and the high boundary wall.

The building form of the mosque is highly ordered and modelled around twin cross axes, one of them running towards the south-west and the other at right angles towards the north-west. Both of these axes indicate the main entrances through the surrounding high wall and into the mosque building itself. The high wall has three main entrances leading from three different directions at 90° from each other and also is articulated by a number of alcoves on the ground level, each of them leading to a chamber behind, as a place for meditation and study. Nowadays these alcoves are used by people as a meeting place for groups. The whole facade of the high wall is arranged in a symmetrical pattern and decorated by marvellously embellished, highly coloured mosaic tiles.





المشهد الكاظمي — مخطط الطابق الأرضي

FIGURE: G.43.

Plan and Top View of Kadimiya Mosque.

The building of the mosque dominates the space with its four golden minarets and domes, which not only act as powerful elements within the confines of the mosque but also act as landmarks for the whole neighbourhood. Three main entrances have been established for the mosque itself and they are also located in the direction of the two axes. In front of each entrance there is a colonnade forming a covered space. The cover of the colonnade space has been lifted up above the main entrance and along the axes in order to emphasise the entrance and the symmetrical pattern of the colonnade facades. The underside of the covered way is embossed and embellished by highly detailed tiny pieces of mirror, which reflect indirect sunlight radiated from the ground and from them further reflections onto the shaded embellished colourful mosaic facades of the mosque and the other shaded spaces, which thus are lightened.

The mosque's enclosed public open space and its solid elements, i.e. the building of the mosque and the high wall, are strongly integrated; horizontally, on the ground level, the building of the mosque (solid element) has punctured the square public open space to create a positively charged element, thus achieving integration, by creating the U-shape open space around the mosque building. Such a shape creates visually a feeling of expansion, continuation and ambiguity, when the space is observed from certain positions. This phenomenon encourages people to move around in the open space in order to explore the hidden spaces and the solid elements of building.

The alcoves which are carved into the mass of the high wall surrounding the public open space and the covered colonnaded semi-

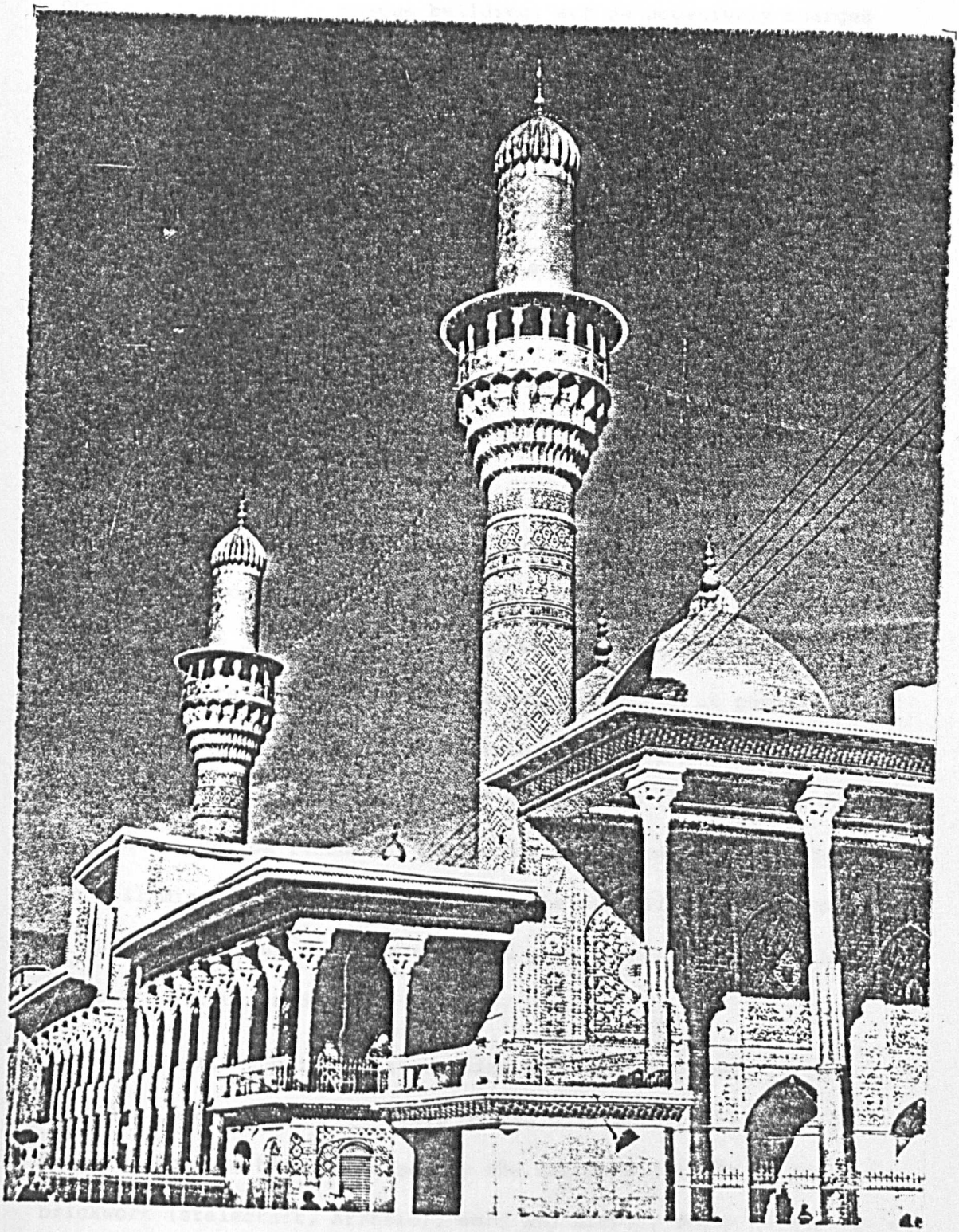


FIGURE: G.44.

The Minaret of Kadimiya Mosque.

open space around the mosque building, act as negatively charged elements. These elements allow the main enclosed open space to extend into them, which creates interpenetration of positive space into the solid elements. This increases the integration and bonding between the open space and the surrounding solid elements, thus the enclosed public open space plays a major role in linking together the surrounding mass of the high wall and the mosque building.

The building of the mosque, the mass of high wall and the public open space between them are also articulated by their vertical integration.

The building of the mosque and its golden domes and minarets act as solid positive elements in the space seen from within the mosque wall as does the mass of high wall itself, whilst the public open space acts as a positively charged element as it penetrates at points through these solid elements. The powerful effect of the vertical pattern of columns and elements on the mosque's facades, i.e. the colonnade facade on the ground level and the domes and the tall minarets above them, enforce the stability, power and order of the solid element into the enclosed open space, and enable it to be a powerful landmark.

Despite the integration which has been achieved between the solid elements and the space on the mass level, the bond between them has been increased by the embossed details of the brickwork (stelectait, Arabsic), wood and mirror, found on the walls, ceilings, alcoves, niches in the recess around the pointed arch to the main entrance's domes and on the minarets.

The size and the form of the alcoves in the mosque wall enable their seated occupiers to feel that they are apart from the whole complex, and yet the limited size of the whole public open space enables those using it to feel the inter-relationships which exist between space and form in the whole complex.

After visiting the main public open space which is represented by the Kadimiya mosque, then in order to continue the tour of the traditional area of Kadimiya the visitor must leave by the main entrance located in the north-east wall. Passing through the entrance one is struck by a further huge open space; bright light results from reflection off the pavements and the road surfaces. This space was also created in order to implement the same urban planning project as described before; accordingly the same problems can be seen in this huge open space. Confusion in the direction of pedestrian and traffic, congestion, indefinable space and hotch-potch architecture. All these factors make for unrelated space in relation to the surroundings and to the human scale.

Furthermore, these huge public open spaces which were created in front of two main entrances in the south-east wall and in the north-east wall, as external open spaces, are destroying one of the main aesthetic features of the traditional urban design, which is small scale and sudden surprise.

However, the original form of this open space outside the mosque was a continuation of the commercial activities which took place in the alleyways round the high wall of the mosque (Figure G.46).

The damage to the traditional urban fabric and its environment, as discussed above, has recently been recognized by the local

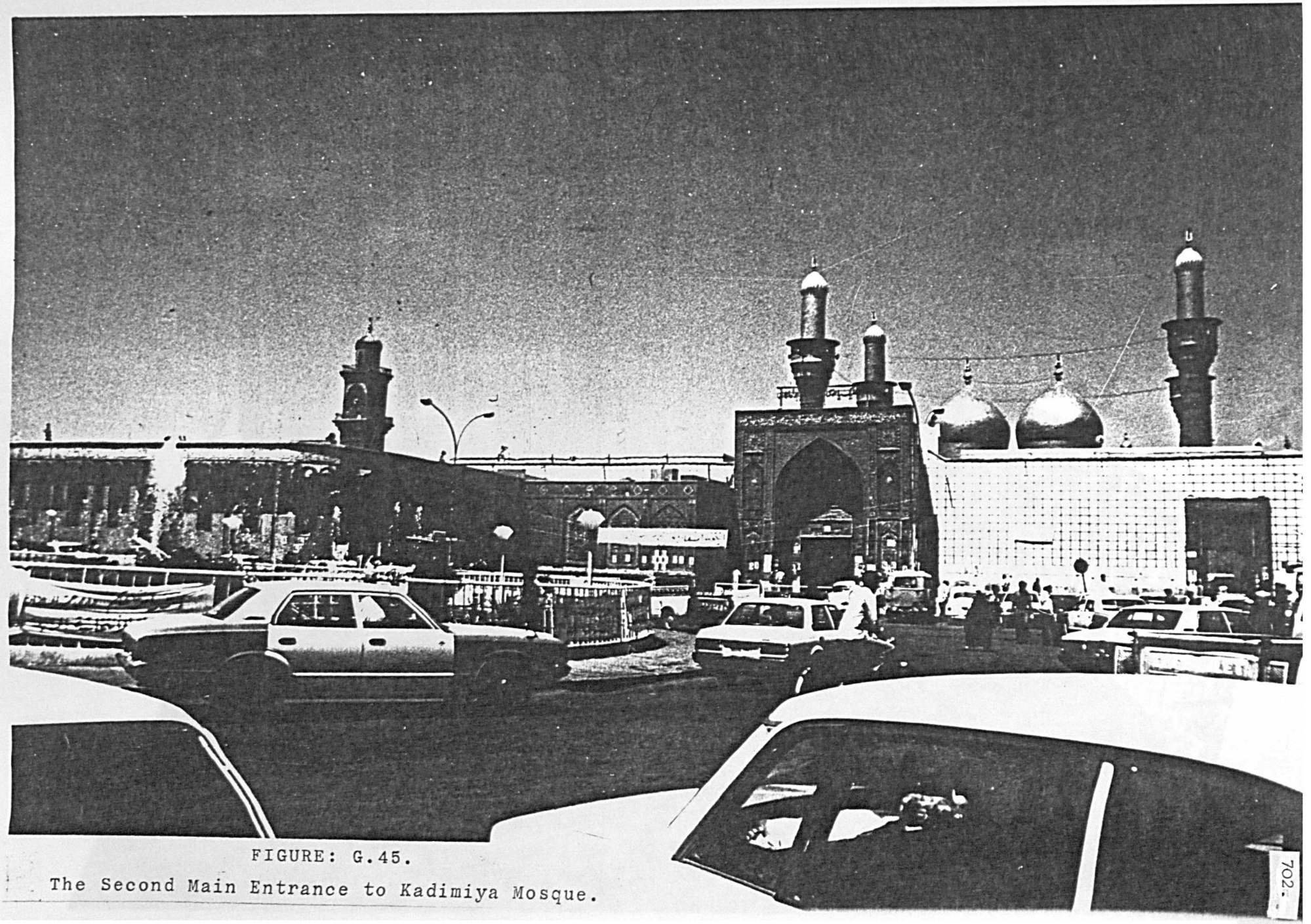


FIGURE: G.45.

The Second Main Entrance to Kadimiya Mosque.

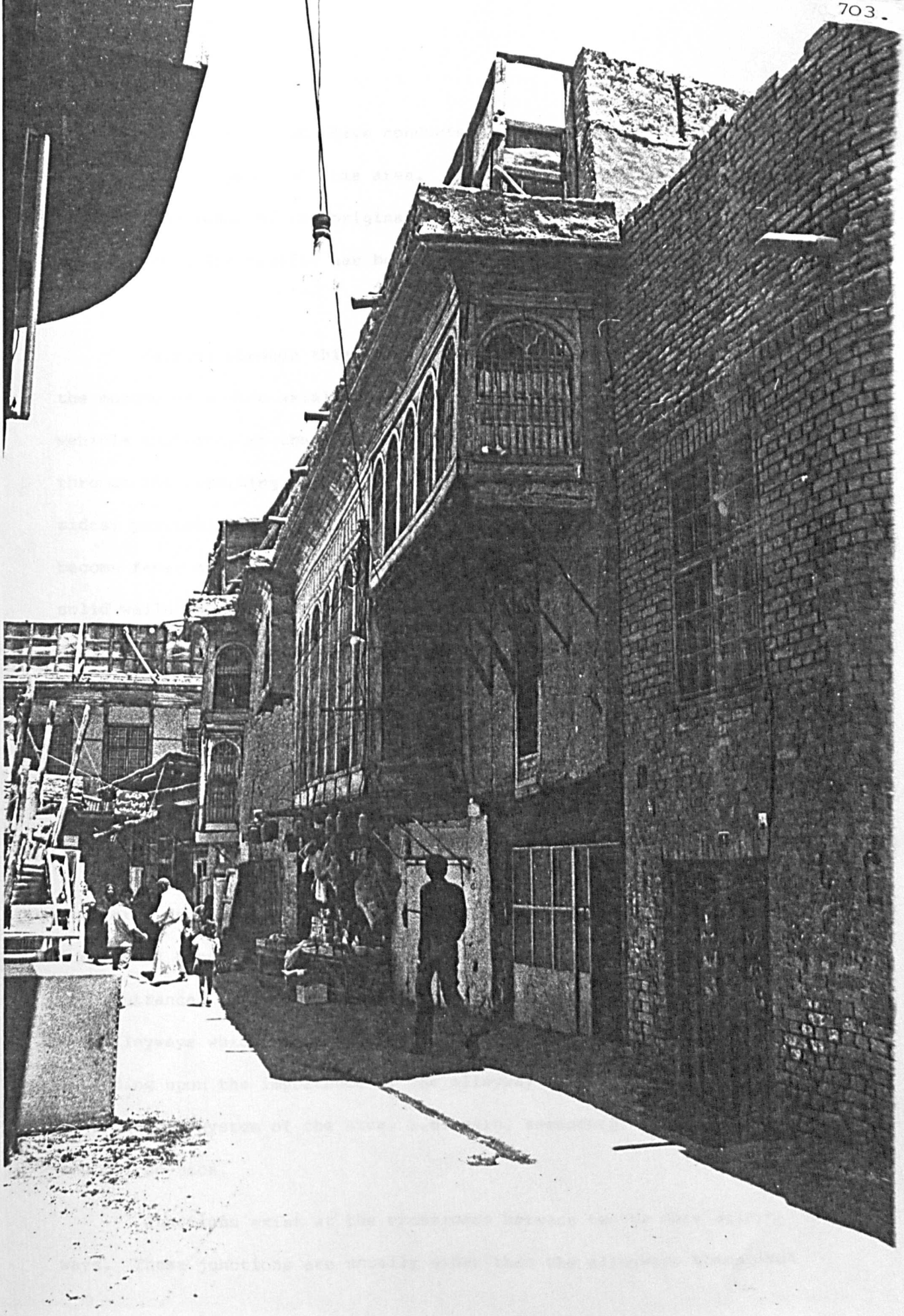


FIGURE: G.46.

The Extension of the Shopping Area.

Planning Authorities, who have conducted a competition for the further redevelopment of this area. The winning design encapsulated the form and scale of the original buildings long since demolished and the vehicular traffic has been re-routed away from the area

Walking through this existing huge open space which linked the mosque by a wide axial road, full of traffic and pedestrian-vehicle conflict, at the south-east corner of the district we pass through the remaining commercial alleyway partly demolished on both sides, particularly to the left. Walking further, the shops gradually become fewer and the doors of the dwellings' entrances and the plain solid walls on both sides of the alleyway begin to represent the dominating urban features at ground level. At the same time, pedestrian movement becomes less and the urban scene becomes relatively quieter as smaller alleyways and cul-de-sacs are distributed along both sides of the main alleyway. These features give the indication of a residential area.

Generally, walking through the alleyways of the residential quarters, despite the same elements being used in the facades of individual houses (i.e. bay windows, solid walls, pointed arches, main entrances etc.) they are utilized in different compositions. The alleyways which are framed by the dwellings differ in size depending upon the importance of the alleyway in relation to the road network system of the area, i.e. main, secondary, thoroughfares and cul-de-sacs.

Junctions exist at the crossroads between two or more alley-ways. These junctions are usually wider than the alleyways themselves

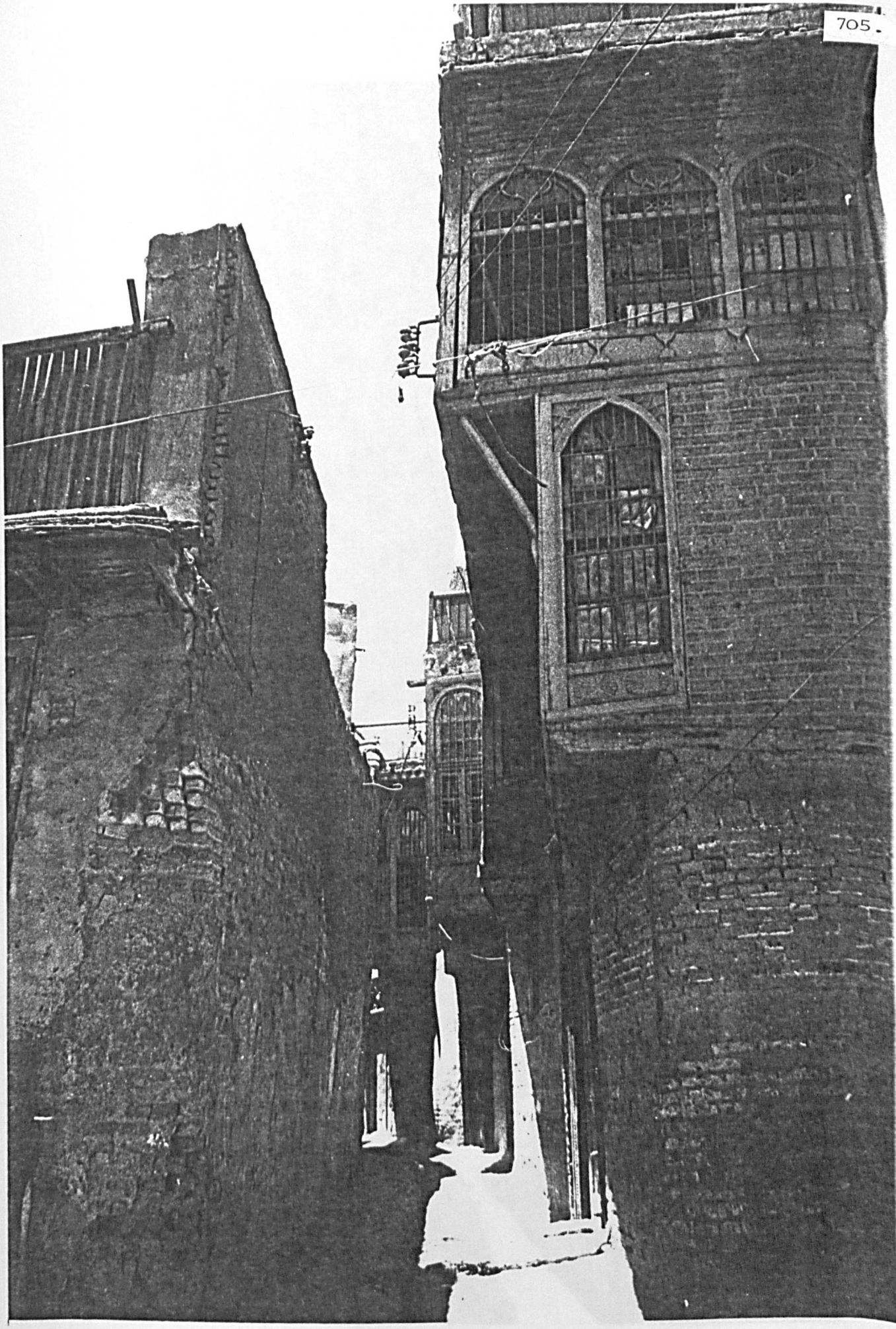


FIGURE: G.47a.

Residential Alleyways.

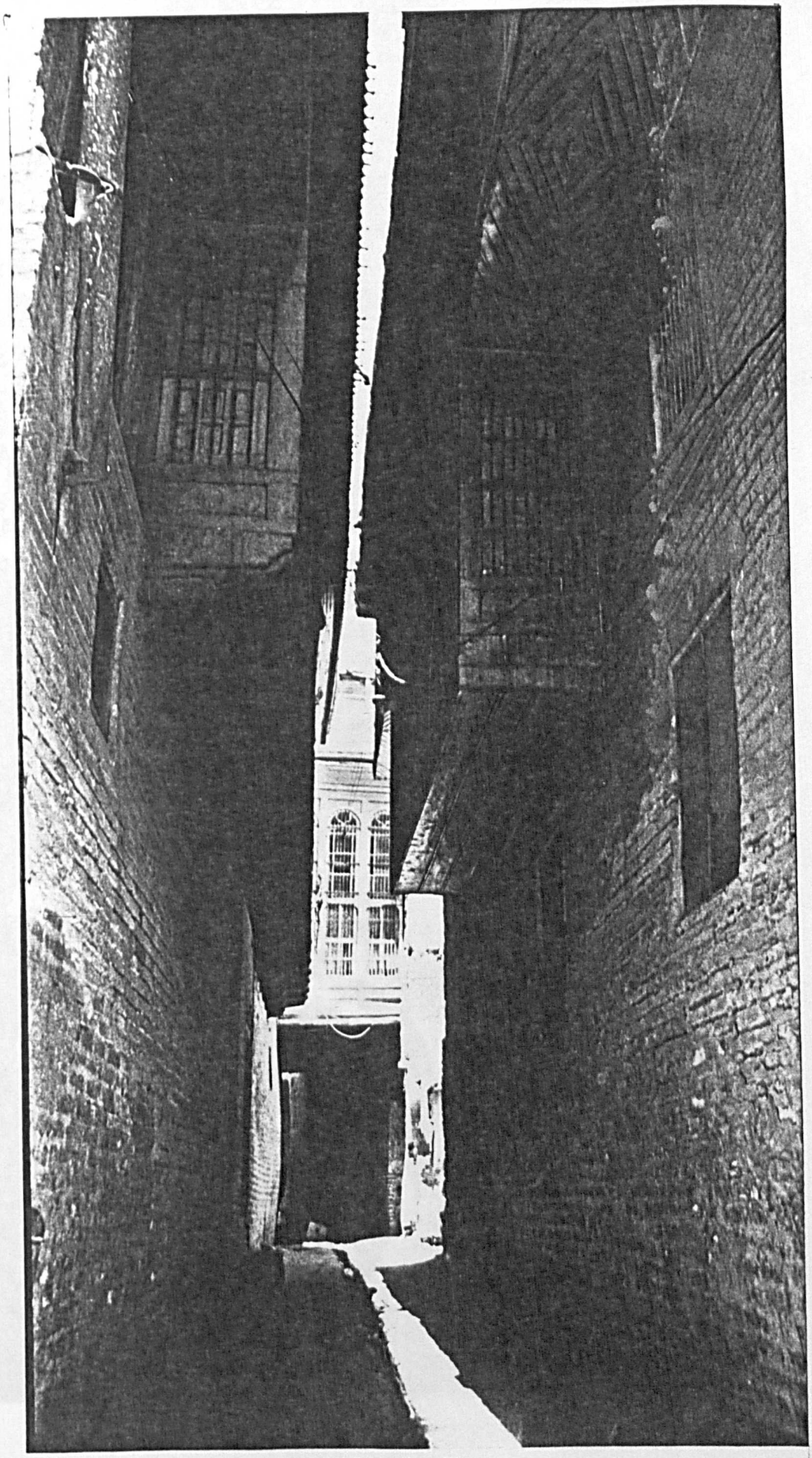


FIGURE: G.47b.

Residential Alleyways.

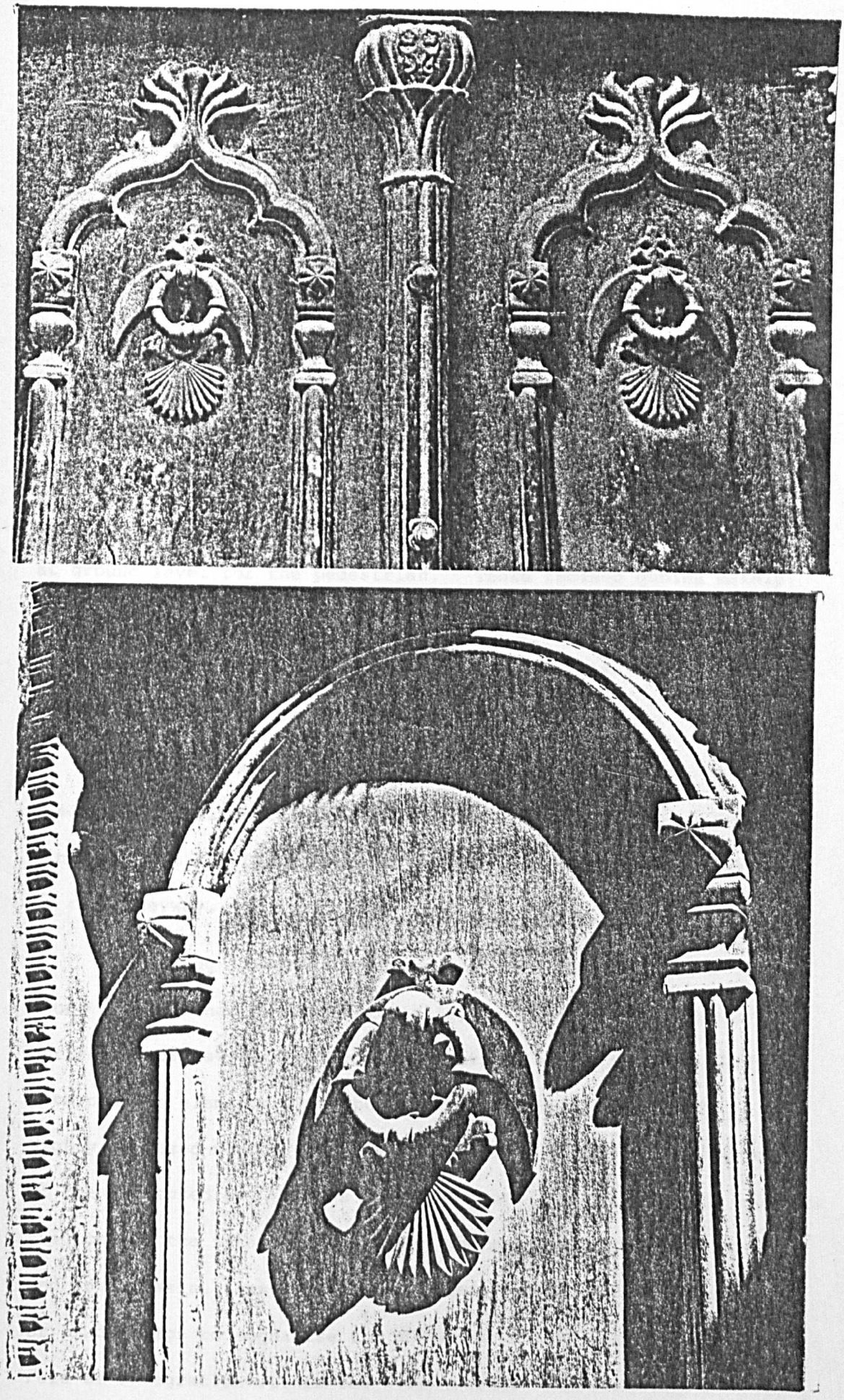


FIGURE: G.48.

Details of Main Doors.

and their form is usually shaped in relation to the flow of the pedestrian movement and the angle of meeting of the alleys. These spaces are mostly used by the children as playing areas, as more space is provided and shafts of direct sunlight penetrate through onto the street.

Incised quoins can also be considered as one of the main features in the traditional urban fabric which form the characteristic of the street. They usually exist on buildings at the corners between two alleys in order to create smooth building edges at ground level for the pedestrian. These incised quoins mainly end with different geometrical embossed brickwork in a stalactite-like treatment before returning back to the original angle above first floor level.

Another physical feature which can be seen within the traditional residential area in Kadimiya is the bridges. They link together the first floor of dwellings situated on both sides of the alleyway.

A strong integration of the solid elements and space is found in these narrow meandering alleyways; both the vertical and horizontal cross-section through the street are highly modelled with charged elements (i.e. positive and negative elements). Highly embossed wooden work has been created as decoration on some of the projected bay windows and main entrances, in order to increase the bond of the integration between the space and the solid elements and to emphasise these features. Moreover, the pattern of light or shade helps to emphasise the solid charged elements and their role of integration within the urban scene. These factors achieve

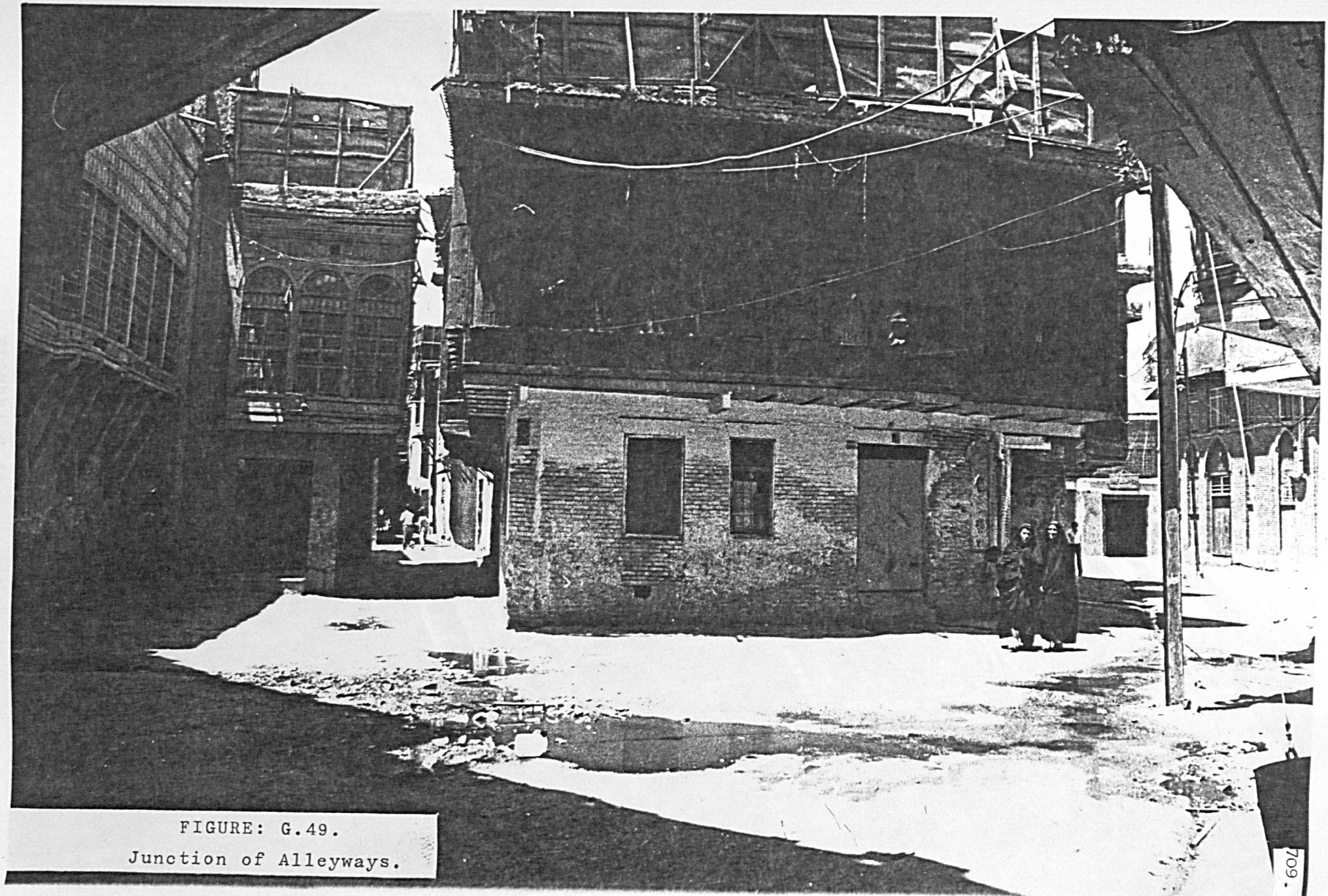


FIGURE: G.49.
Junction of Alleyways.

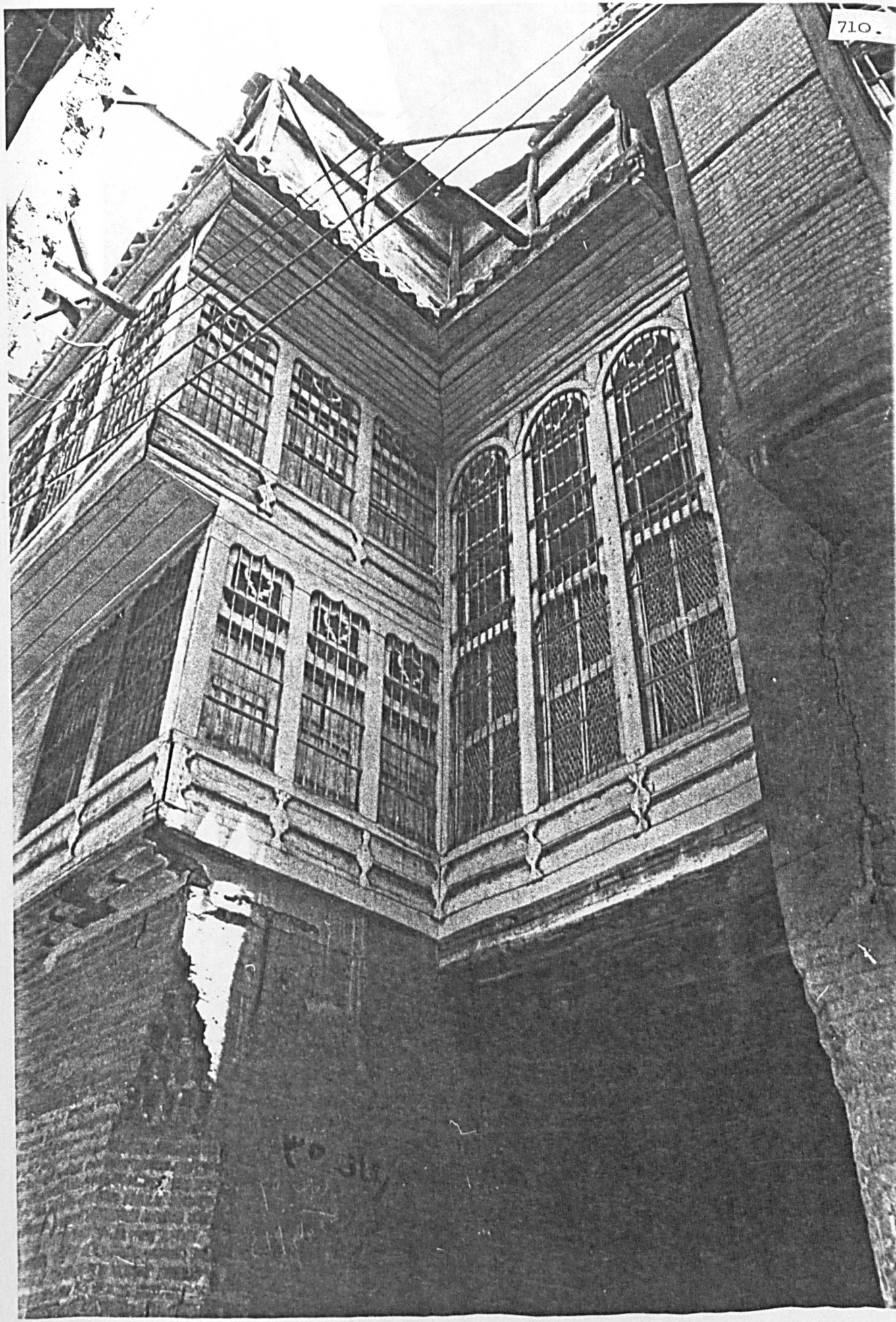


FIGURE: G.50.

Bridge Over an Alleyway.

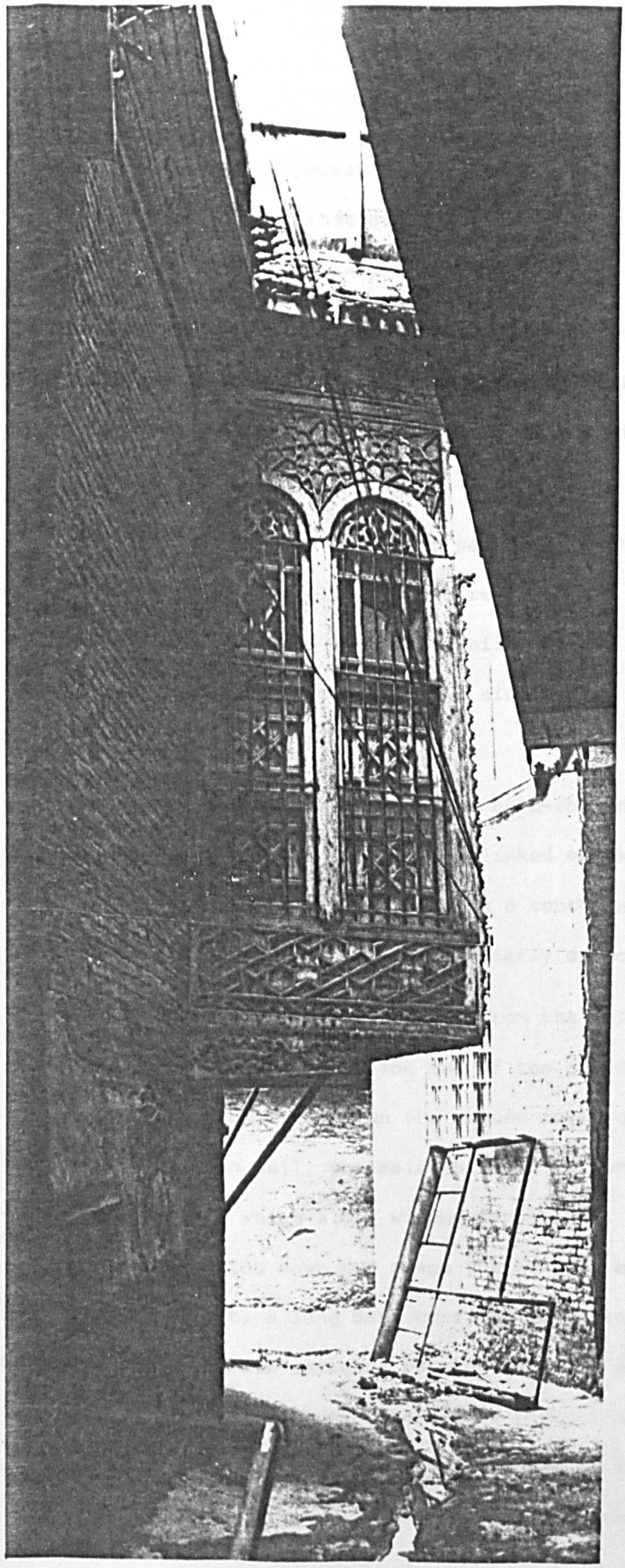


FIGURE: G.51.

The Hidden Element in the Alleyway.

a relationship between the pedestrian and the surroundings. This creates in turn the feeling that every element in the urban fabric can be reached and visualised in detail.

Furthermore, the meandering alleyways create an ambiguity and factor of surprise, which again encourages the walker to continue his perambulation of discovery. A dramatic element is introduced into the traditional urban fabric.

After touring through different parts of the traditional district, i.e. commercial, religious and residential, and studying some of their elements, it is essential whilst in the residential area to look at one of the dwellings as a single cell in this urban fabric.

The house which has been chosen is an L-shaped house with two inside courtyards. This dwelling is linked on two sides with the street, one entrance is a cul-de-sac in a south-easterly direction and the other a thoroughfare in a south-westerly direction (Figure G.52).

We make our way towards the house from the cul-de-sac. The facade of the house stands at the end of the cul-de-sac with a width of not more than 2.50m. On the ground level of this facade and flush with its main wall, the main entrance is located, with its wooden door, above which a bay window projects at the first floor level. By stepping down two steps through the main gate and turning 90° to the left, a long dark corridor leads to the inside of the house. In the main entrance passage there is a door in the middle of the right hand wall leading to the reception room. The entrance corridor ends by turning at right angles to the right, when a strong bright light strikes the eyes. After the eyes have

adapted to the light, a large rectangular courtyard can be identified. This private open space is surrounded by a two-storey building and is crossed by the main longitudinal axis of the house. The reception room is located in a north-westerly direction, whereas the covered semi-open space is located on the opposite site, its' roof supported by two wooden columns. On the remaining sides of the courtyard are utility rooms (bath, storages, toilets etc.). Below the ground level and behind the covered semi-open space is situated the basement which can be reached by stairs from the courtyard.

By using one of the two staircases which are located within the utility rooms on both sides of the courtyard, the first floor can be reached. This floor consists of two galleries situated above the utility rooms. To the north-west these galleries lead to living quarters which are located above the reception room on the ground level, whilst in the opposite direction the gallery ends with a covered open space above the ground level. Behind it is a living quarter which is situated above the basement. Each of these, on the first level, leads to a living space and on the second level through an internal staircase leads to a bedroom located above the entrance, the bedrooms looking down onto the living space itself.

All the aforementioned courtyard and the building complex round it are linked to another square courtyard complex by a wide bridge at first floor level and it is covered by the bedrooms on the second floor level, whilst on the ground level the linkage is achieved by a broken tunnel, which is located below the bridge.

The main outside access to the square courtyard is from the alleyway located on the north-west side, where the facade

of the house is not more than two metres in width. This facade consists of a wooden door of the main entrance similar to the main entrance door on the other facade. Above the entrance there is a wooden bay window (shanasheel) on the first floor. The main entrance hall is located behind the door after taking two steps through the door and below the alleyway ground level. This entrance leads to a reception room on the right hand wall, whereas to the front a passage leads to a bright lit square courtyard which can be considered as private open space, surrounded by a two-storey building. On the ground level and on the east wall the broken tunnel is located which leads to the triangular private family courtyard. Moreover, access has also been provided to the basement from the right hand wall of the tunnel. This can be used by visitors without interference with private open space for the family, whilst on the north-east wall a group of utility rooms and staircase are located.

The first floor gallery can be reached up a staircase which leads to different parts of the house, i.e. living quarters, the wide bridge which links both courtyards and staircase to the second level (bedroom) in addition to the internal staircases of the individual entrances.

Living rooms on this level are connected together through internal wooden doors which can be opened if an extension for the space is needed. Moreover, extension for the enclosed living space can also be achieved by use of the adjacent semi-enclosed space after lifting up the sliding windows to the courtyard. The enclosed living room can be divided into two parts by light partitions, since each living room has two means of access located on opposite sides and each access leads to separate entrances, which acts as an individual

private circulation zone, above which a bedroom is usually located. By this modification two independent flats can be created. Accordingly, this flexibility in the house enables the occupiers to modify the house to offer a number of separate flats, or to arrange the space in relation to their needs and demands.

However, the internal facades round the regular courtyards as a mass and details, have been arranged in a symmetrical pattern, in particular the facades surrounding the big triangular courtyard. This type of design and arrangement whether on the physical to meet the function and the social needs, or visually, to meet the aesthetic function, is an indication of individual experience for order and power within their ownership.

The articulation and integration between the space and the solid elements within the interior of the Abaida house has been magnificently handled, to achieve a high degree of balance. This has been created by using symmetry in treating the different facades by the use of different materials, i.e. the facades along both sides of the longitudinal axis have been treated mainly by carved brickwork and recessed pointed arches, whilst the opposite facades are treated mainly by highly detailed straight line patterns of wooden work filled with coloured glass and mirror. Both types of treatment increase the bonds of integration by creating negative and positive charge elements. This arrangement of the facades is in contrast to the external free composition and irregular alleyway's facades. This phenomenon creates sudden surprise and a dimension of beauty.

At the detailed level, windows (see Figure G.54), also play a major role in visual terms by articulating and inte-

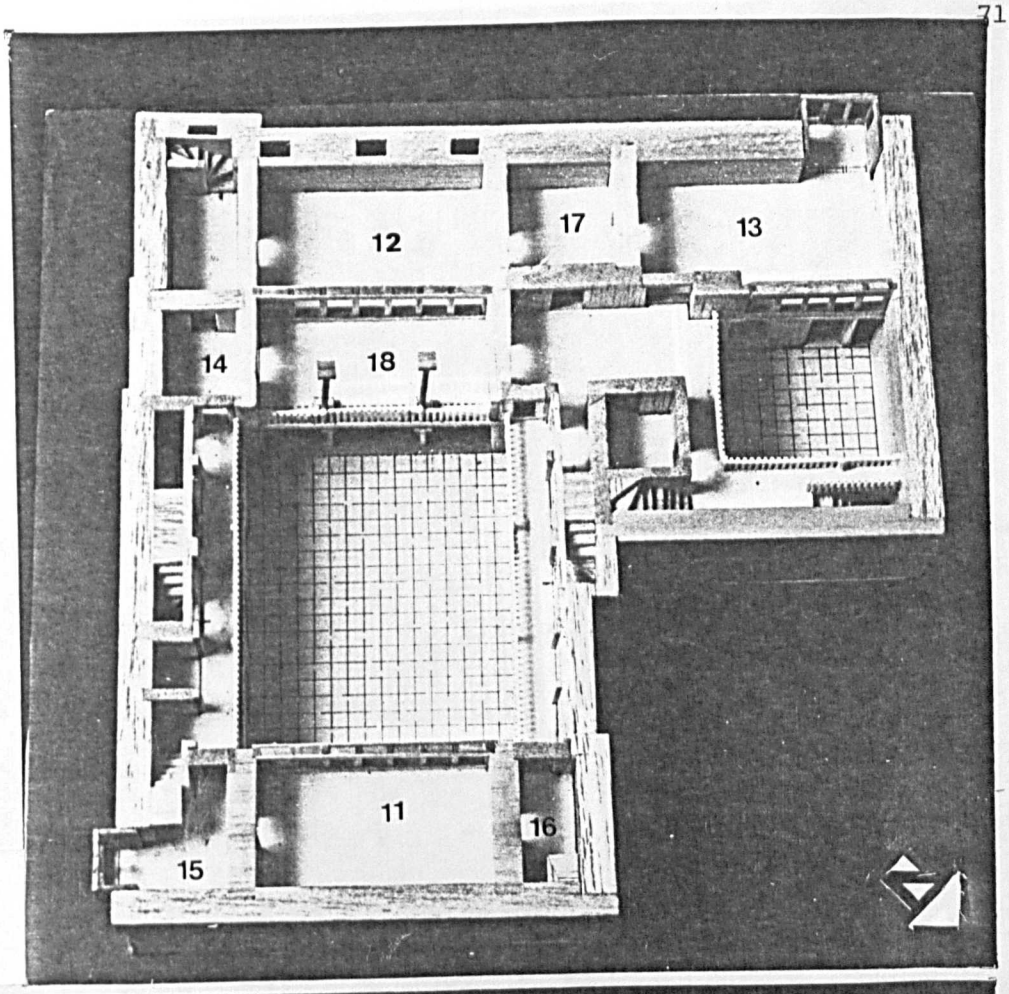
grating solid and spatial elements of the built form through the transmission of beamed rays into the spaces of the courtyard.

The integration of and the transition between solid elements and space are not only introduced between the building and the external open space surrounding them, but this technique has been adopted within the internal enclosed and semi-enclosed space, by using highly carved internal wooden windows and doors, recessed niches in the walls and highly geometrical stalactite-like carved plastering on the ceiling.

The details of the windows, i.e. the raised wooden work and coloured glass and mirrors fitted into them have been arranged in a repetitive pattern (Figure G.54). This pattern has a hidden image as a result of the transition in the visual movement. The composition of geometrical wooden details in each window panel consists of multiple patterns embedded and interconnected and filled with coloured glass which gives a magical image, with its visual ambiguity. Visually, in following one of its patterns, the others will be as the background. This arrangement creates a mobile visual movement, waxing and waning, by which the eyes can be attracted for a long time to follow and discover some of the infinite patterns within the frame of window.

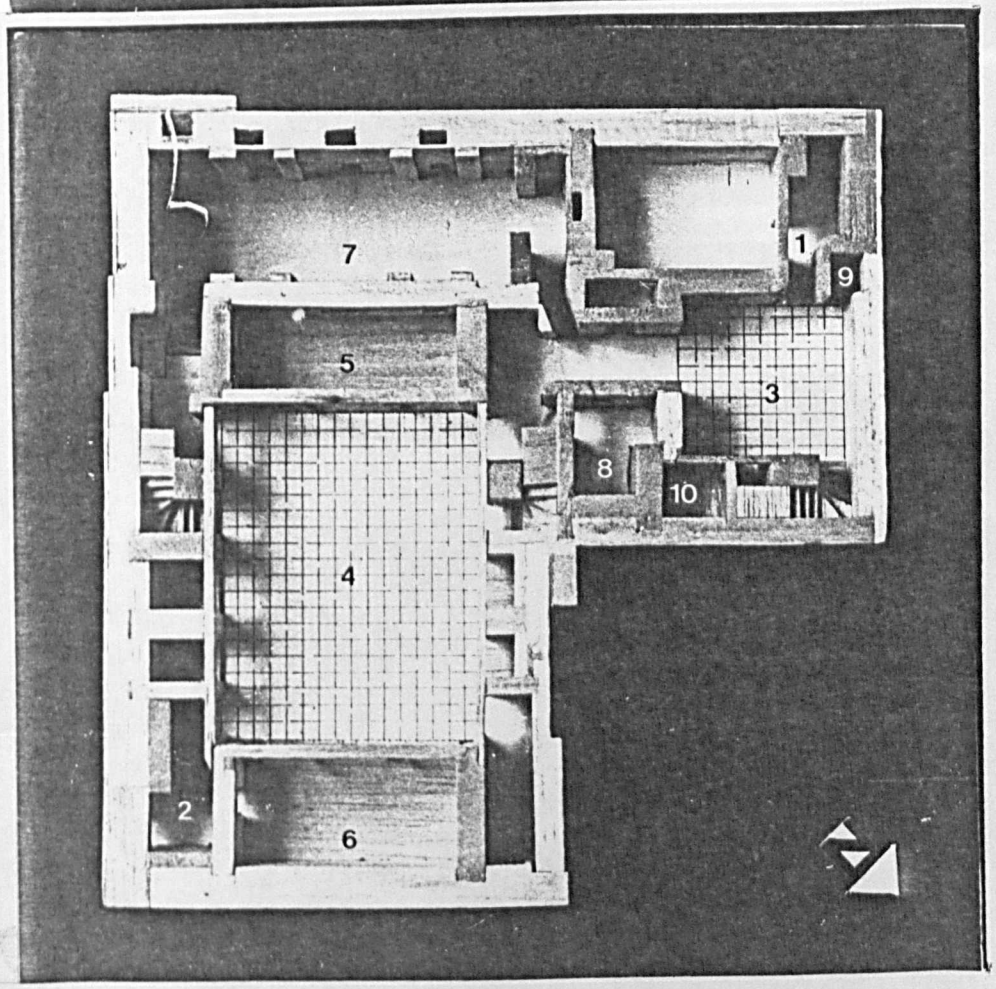
These geometrical patterns with their colourful glass can be considered as an abstract representation of still life, water, sky, red colour of the sunset, leaves and dense foliage. This particular feeling can be experienced from the interior against the external natural bright light. These patterns of decoration have been used in the buildings as a substitute for plants to give colour and free form within a geometric urban environment.

On the mass level, the integration and articulation between the different solid parts of the house on the one hand and the solid elements and the space on the other hand, has been created by moulding them into each other. This is achieved by the transition of the open space through the tunnel on the ground floor and the covered bridge on the first floor which link together the solid parts of the house, whereas the transition space links together both courtyards which each act as the core for the separate parts of the house. Accordingly, a unified unity has been created for the house, despite it being made up of separate zones and elements.



First Level

11.12.13. Living room
14.15.16.17. Quarter entrance
18. Balcony

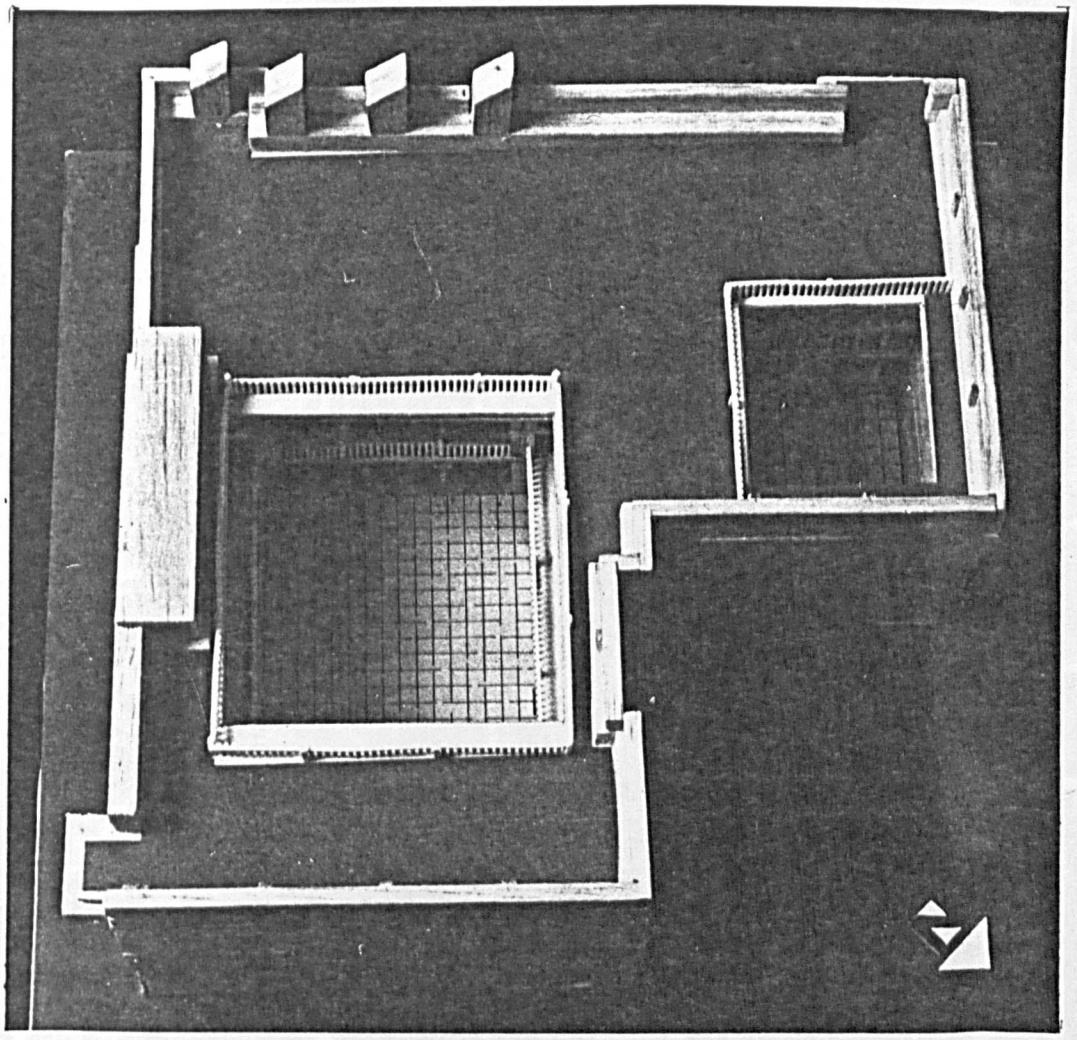


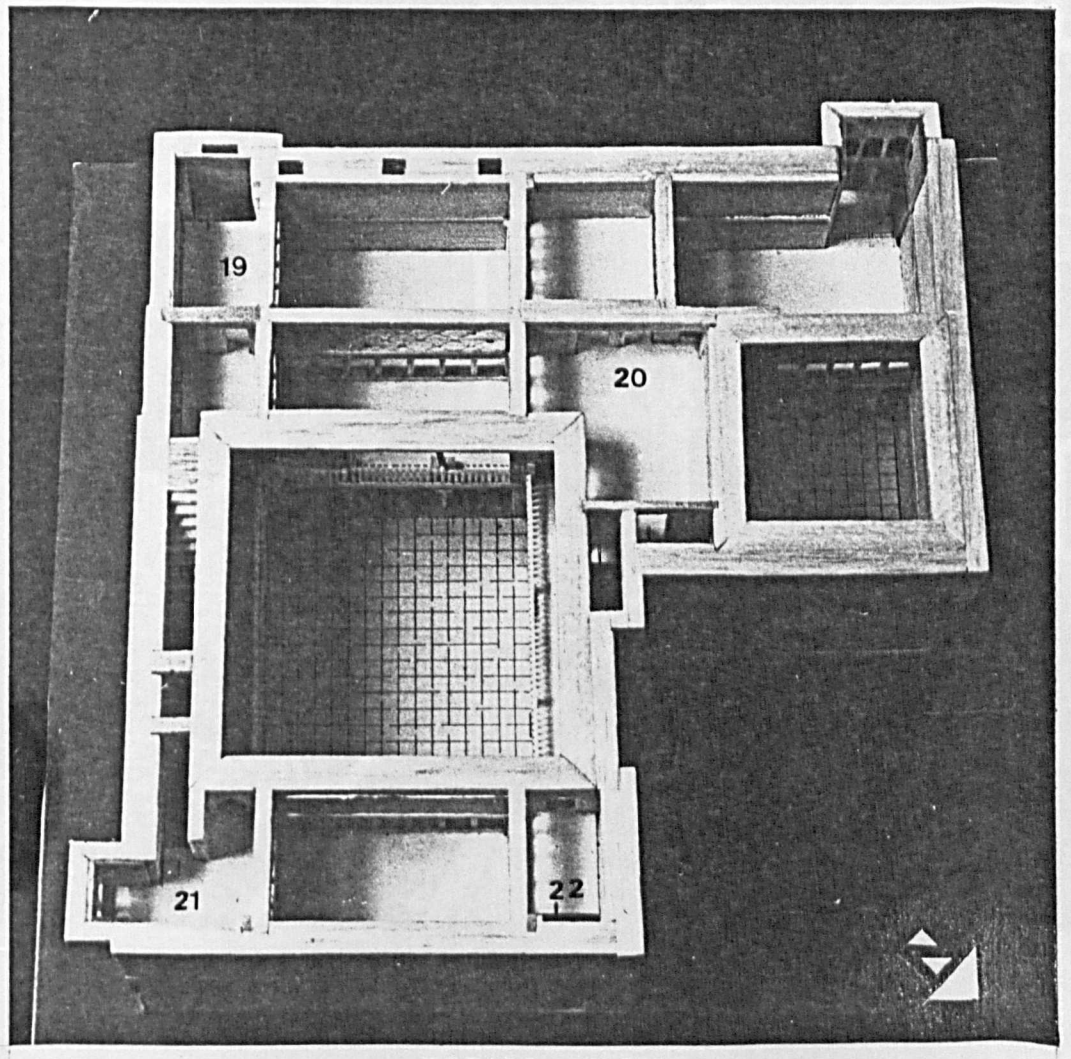
Ground Level

1.2. Entrance
3.4. Courtyard
5.6. Semi-enclosed space
7. Basement
8. Kitchen
9. Toilet
10. Bath

FIGURE: G.52a.

The Viewed Courtyard House.





Second Level

19.20.21.22. Bedroom

FIGURE: G.52b.

The Viewed Courtyard House.

FIGURE: G.53.
Interior Courtyard.

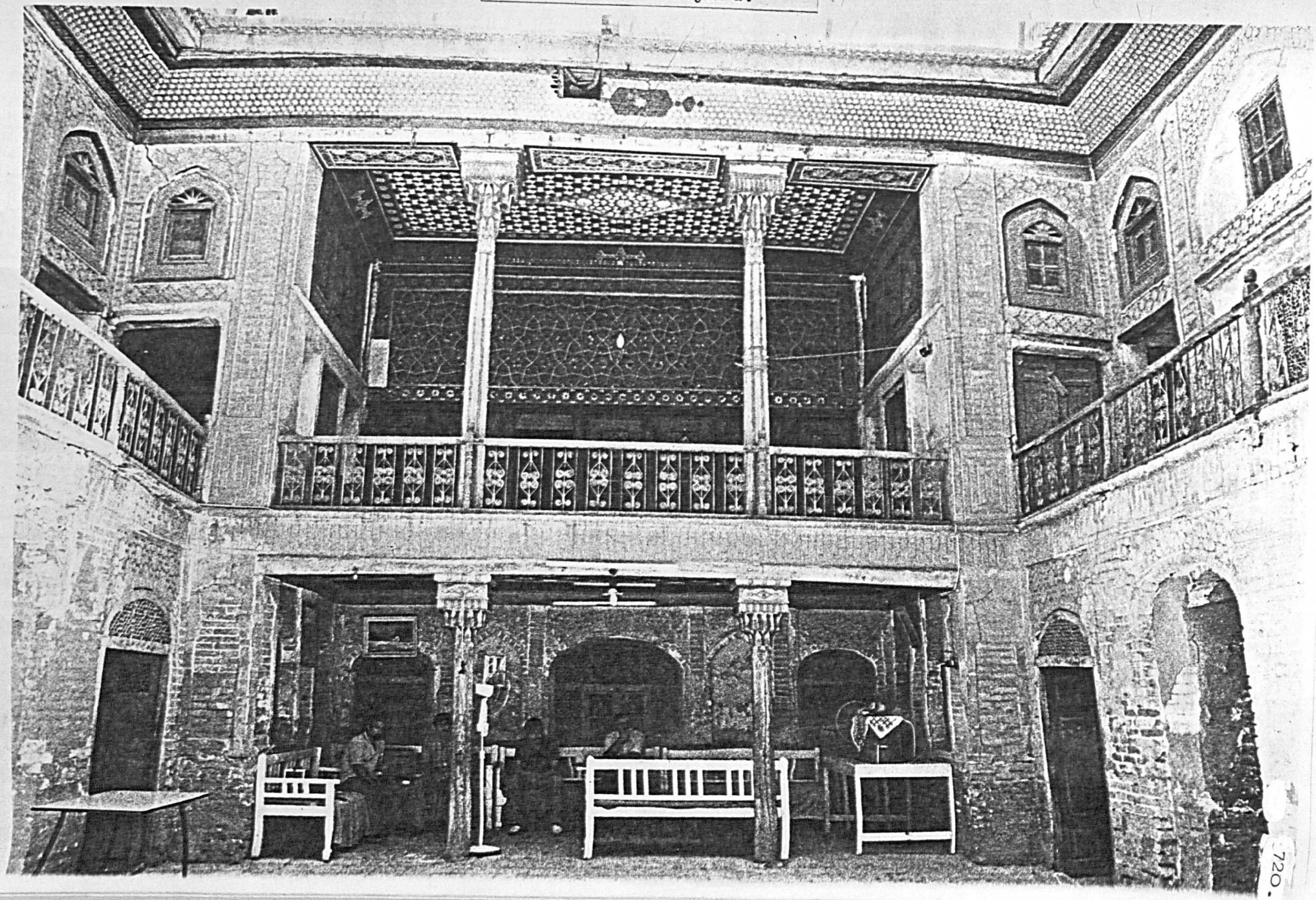
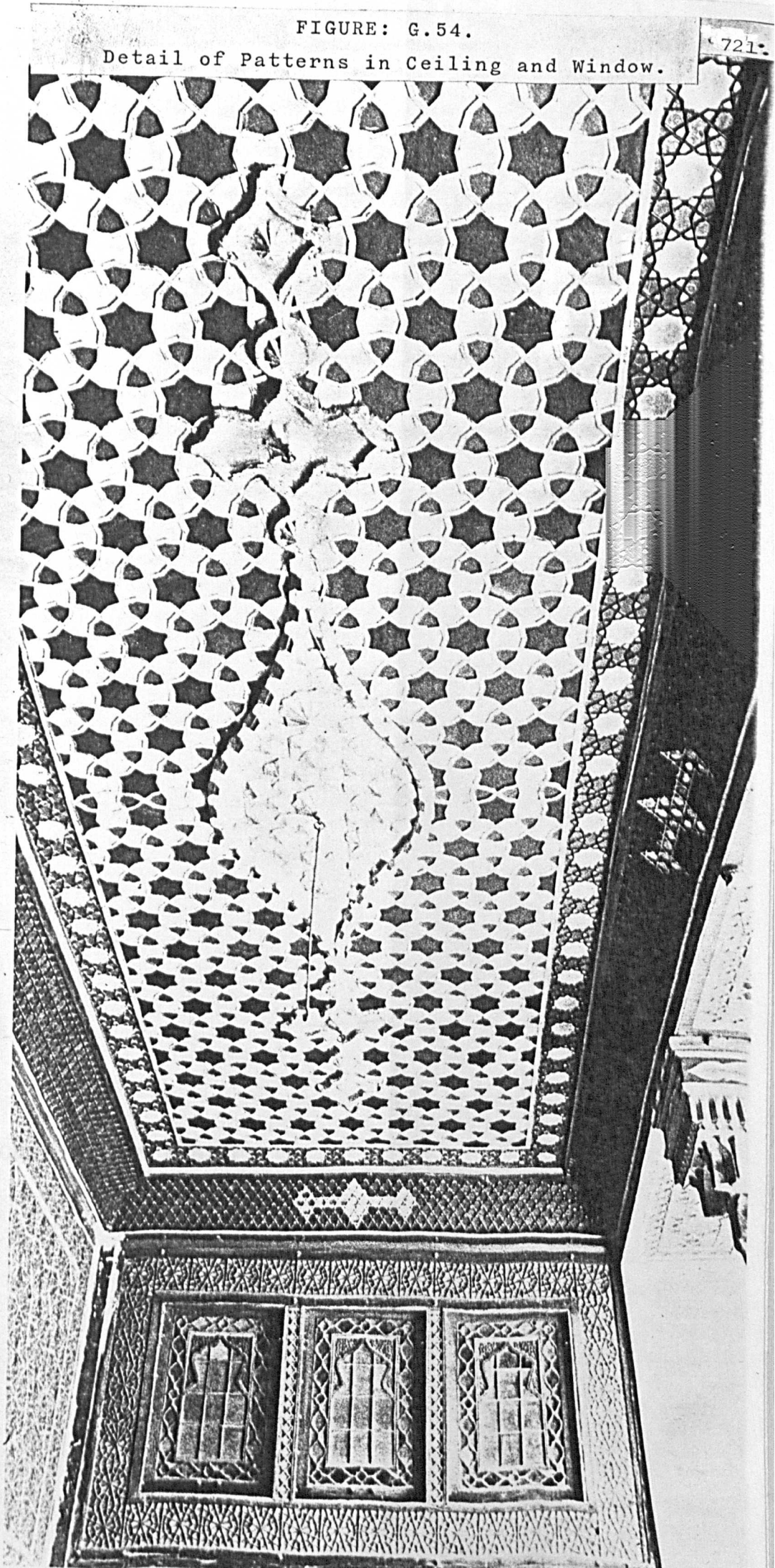


FIGURE: G.54.
Detail of Patterns in Ceiling and Window.



H

THE MODERN URBAN FABRIC

[H] THE MODERN AREA STUDIES

[H.1] INTRODUCTION

Technology acts as one of the main factors affecting the design criteria of urban form and this directly influences in turn people's activities and social relationships.

The new technology which was the result of the industrial revolution in Europe, is still vital and dynamic and keeps providing the world with new inventions in different fields of life. In the sphere of transportation this has created the bicycle, car, train, aeroplane, mechanical ship and rocket, whilst communications have given books, newspapers, radio, recorders, television, video and computers. New sources of energy have also been developed such as electricity, nuclear power and solar radiation. In addition to building science together with new materials and artificial materials, new means of construction and infrastructure have been introduced.

This technology, which is mainly based on the use of the machine, and the new resources of energy has affected the design of the city and its urban fabric not merely in Europe but throughout other parts of the world, among them Iraq. The new technology penetrated in the 1920s when Britain received a mandate for Iraq. Since that time the people's education and the city's face, their characteristics and development have dramatically changed, mainly in a Western direction, particularly Baghdad city (i.e. the case study) because it is the nation's capital.

Two main factors can be considered as playing the major role in creating the twentieth century modern urban fabric and its urban design in Iraq; the new ideas and technology of the Western civilization were widely used, thus taking the different elements of the nation's life and among them the city, its elements and growth on the one hand and development control which consists mainly of planning controls at both the regional and local levels on the other hand, which were introduced in 1936 (see Section F.4.3).

The above two factors have brought in the compact buildings within a loose layout, particularly in the new parts of the cities and around their traditional cores.

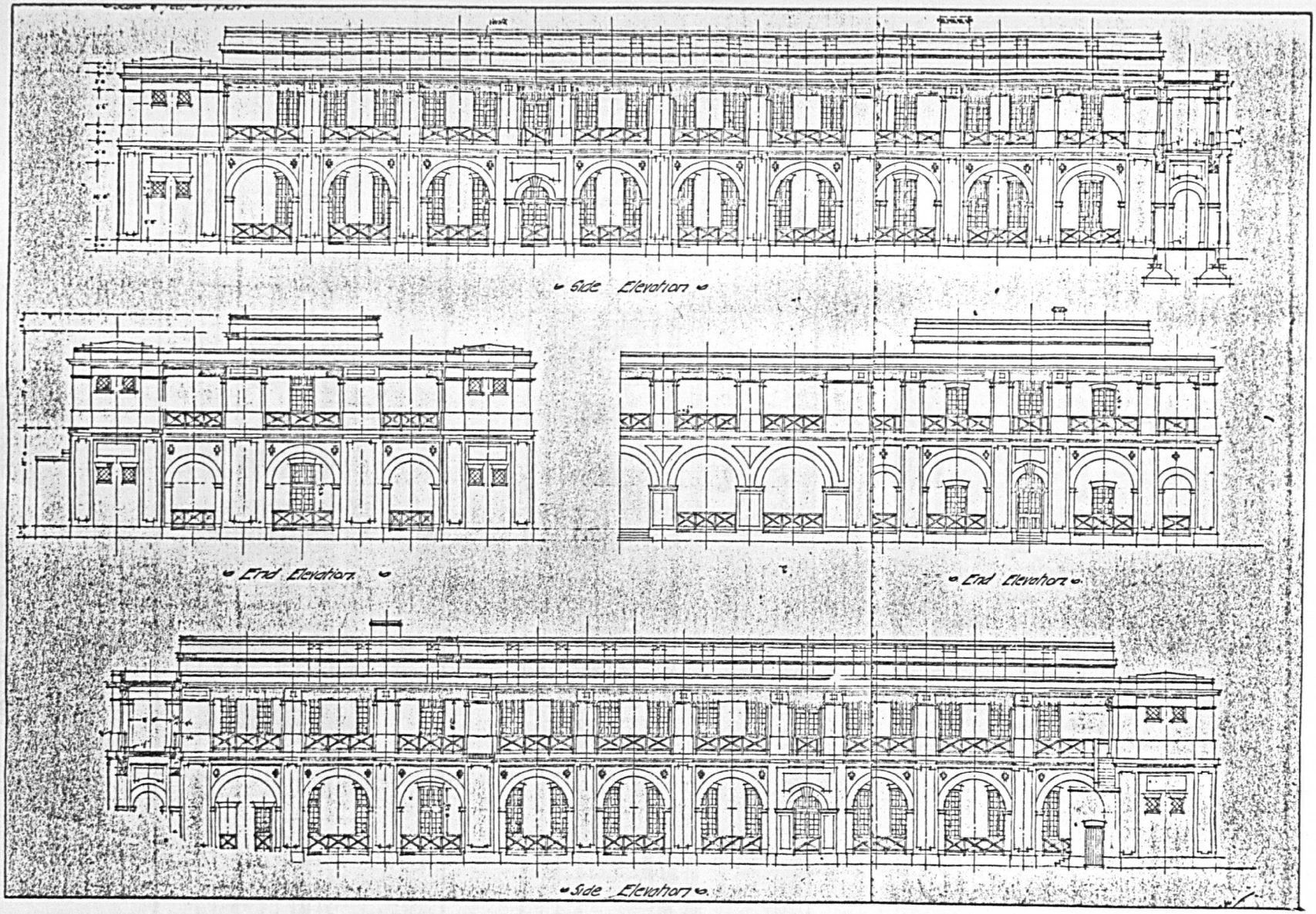
The new road network systems and their hierarchical scale have been designed to accommodate the pedestrian and the new modes of transportation, 'the car' and its movement. Thus the motor vehicle becomes the main mode of transportation for both the inhabitants and the city's daily services. Accordingly, wide roads have been created to form the skeleton of the city. As vehicle speeds shorten the time taken to cover distances, cities expand peripherally.

For a better distribution of the new system of supplementary services, such as electricity, pure water and sanitation, the grid-iron pattern road system has been adapted in new planned areas.

In order to improve the environment within the new urban fabric and to bring nature to the inside of the urban fabric, open spaces and gardens have been added to the subdivision, publicly within the road system network and privately within each plot. This has resulted in the creation of wide open spaces between the

FIGURE: H.1

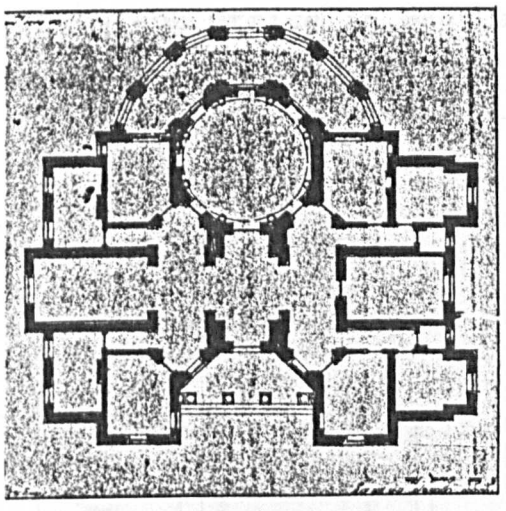
Basra Hospital, 1921

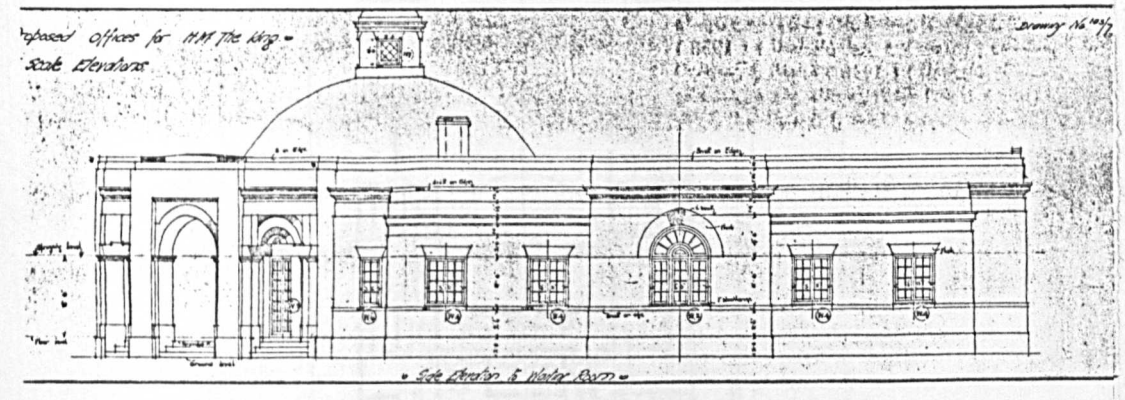


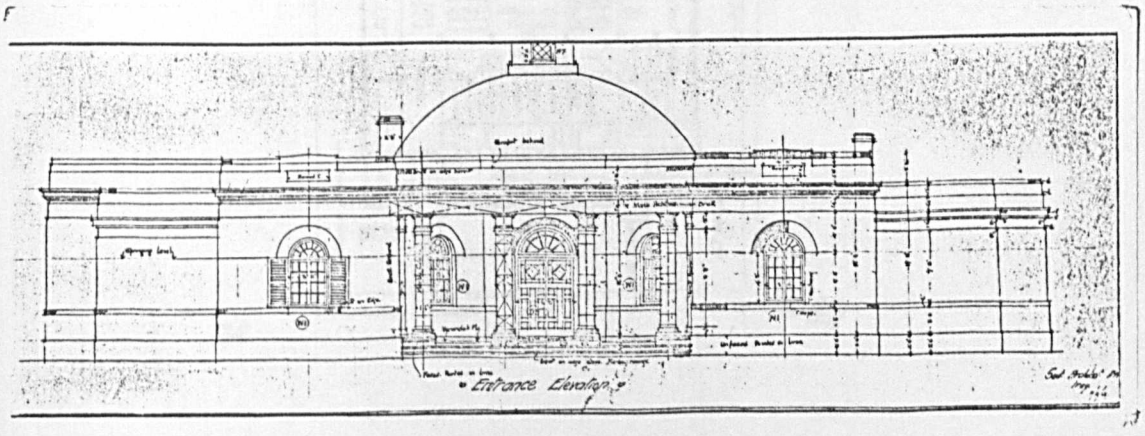
Architects: Willson-Mason (British)

FIGURE: H.2

The King's Head Office, 1923



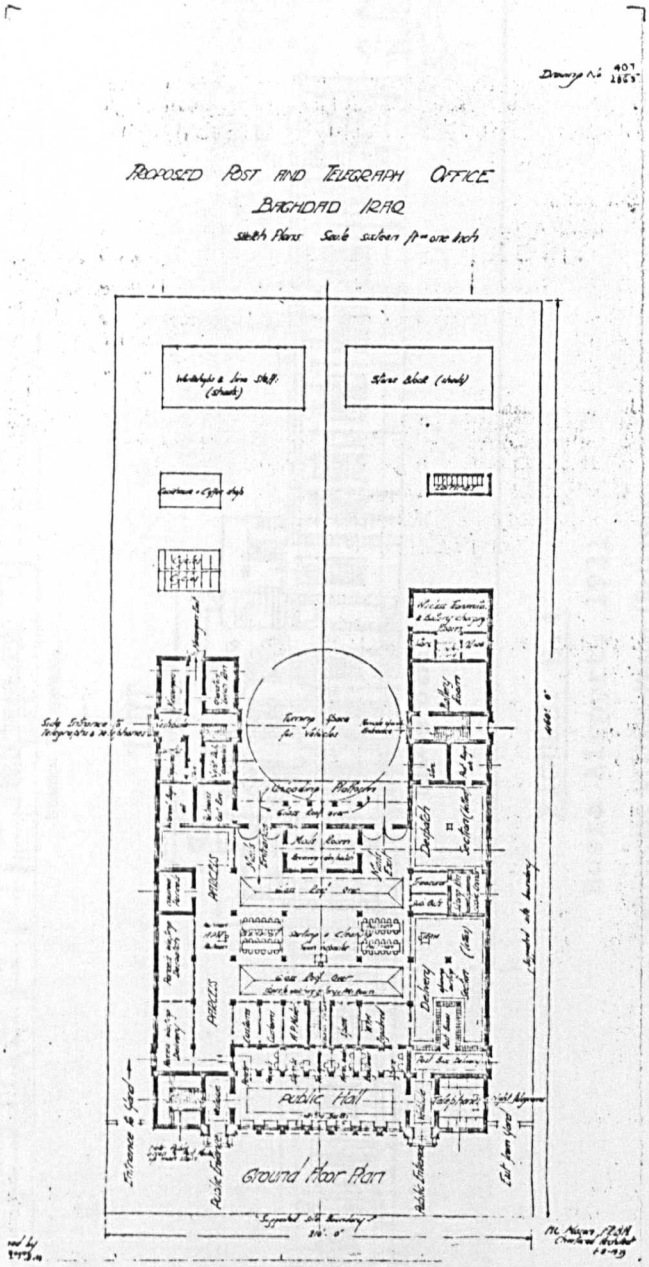




Architects: Willson-Mason (British)

FIGURE: H.3

Post and Telegraph Office in Baghdad, 1929



Architect: H.C. Mason (British)

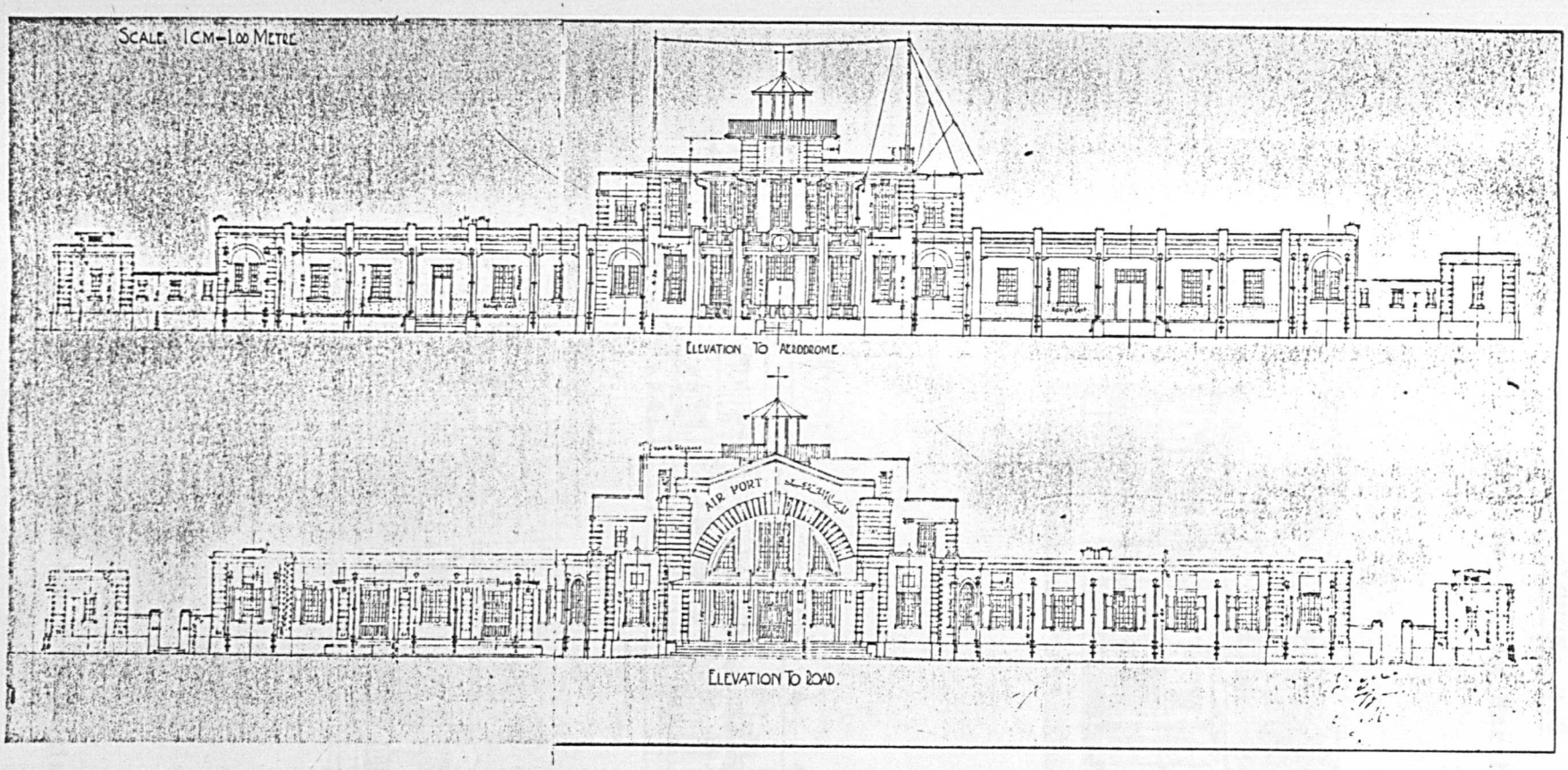


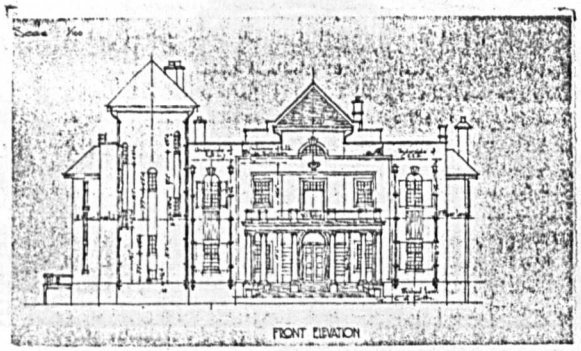
FIGURE: H.4

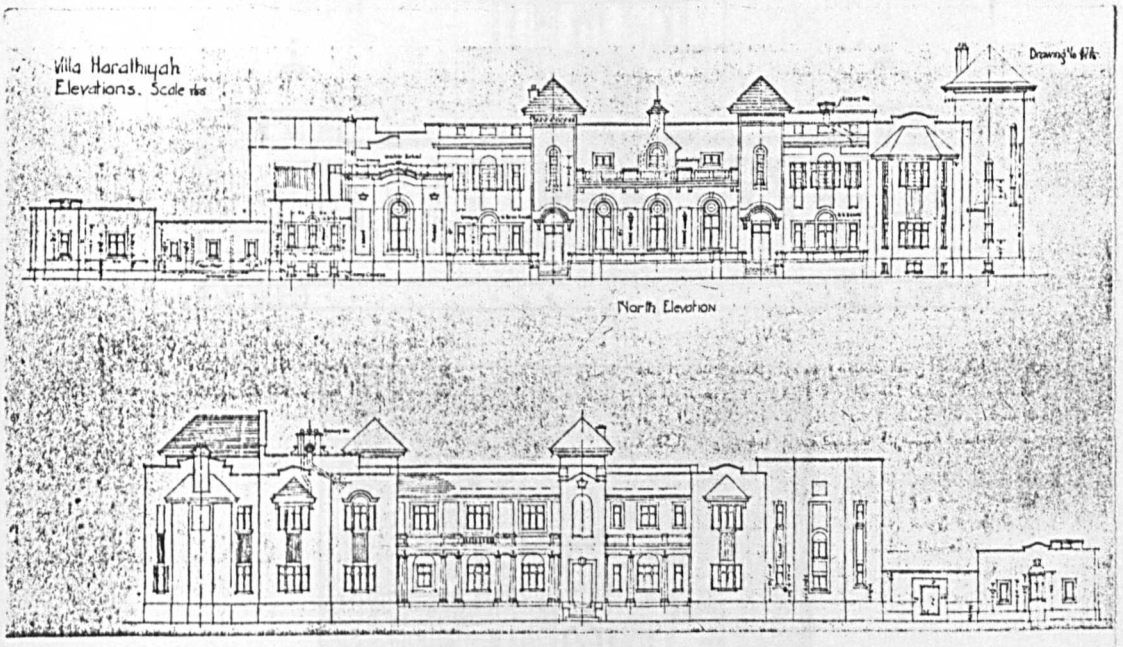
Basra Airport, 1931

Architects: Willson-Mason (British)

FIGURE: H.5

Zohar Palace (Villa Harthyah) 1933

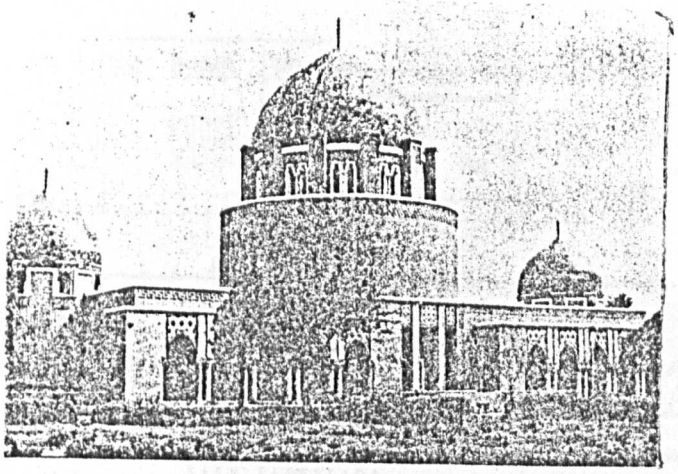


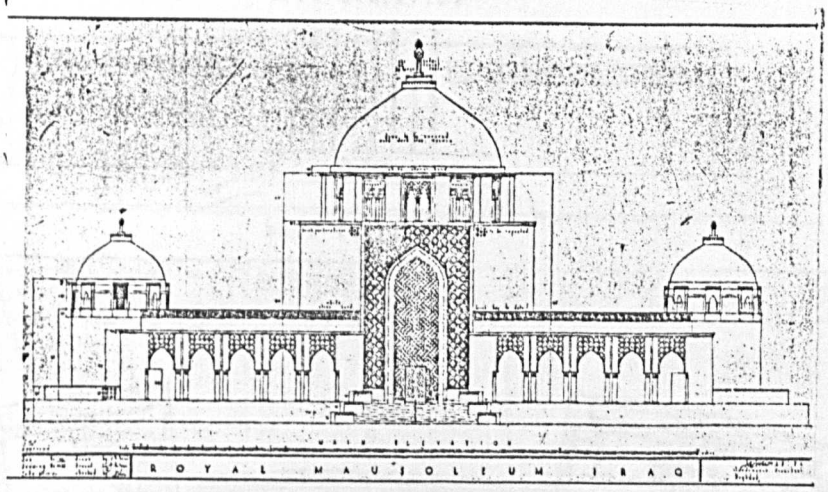


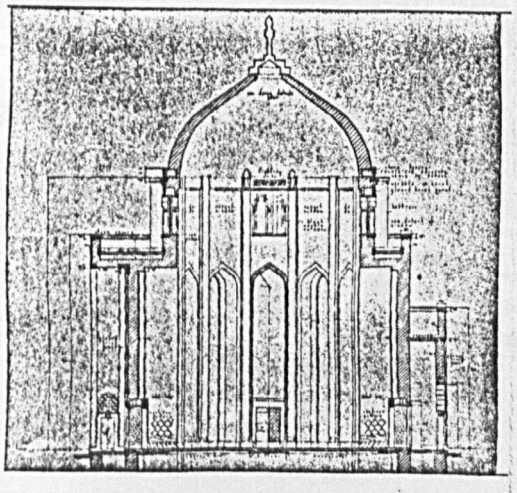
Architect: H.C. Mason (British)

FIGURE: H.6

Royal Mausoleum



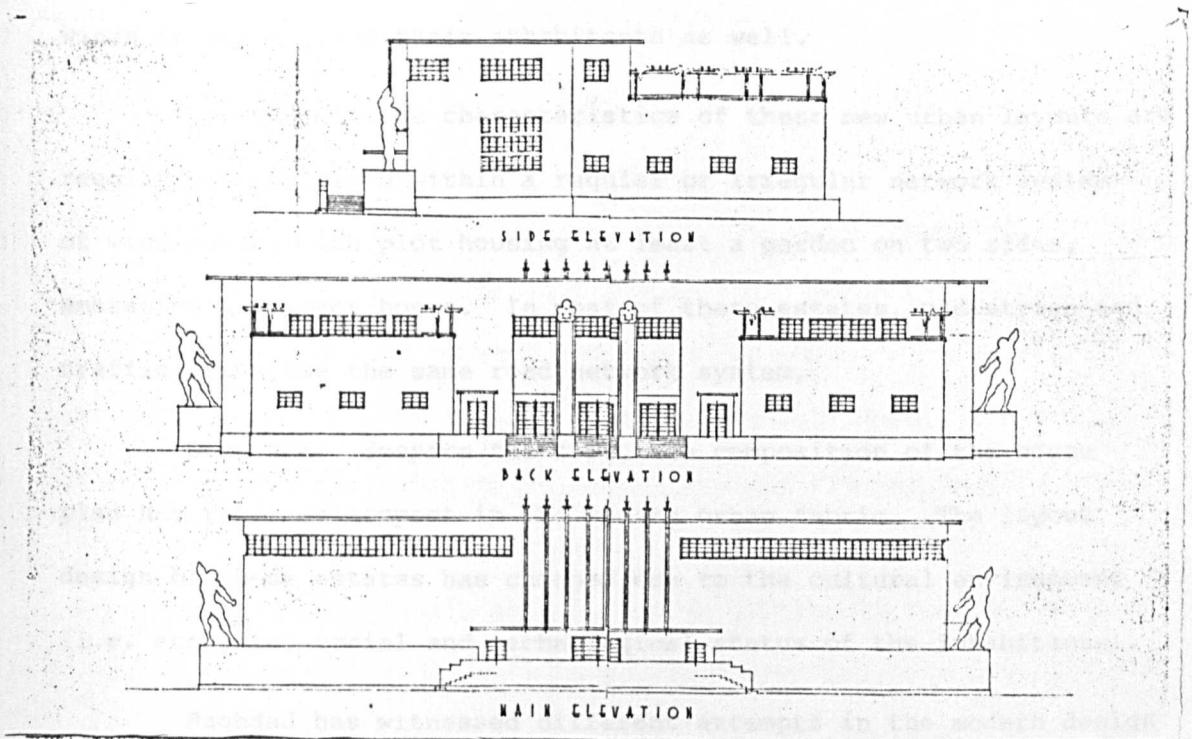


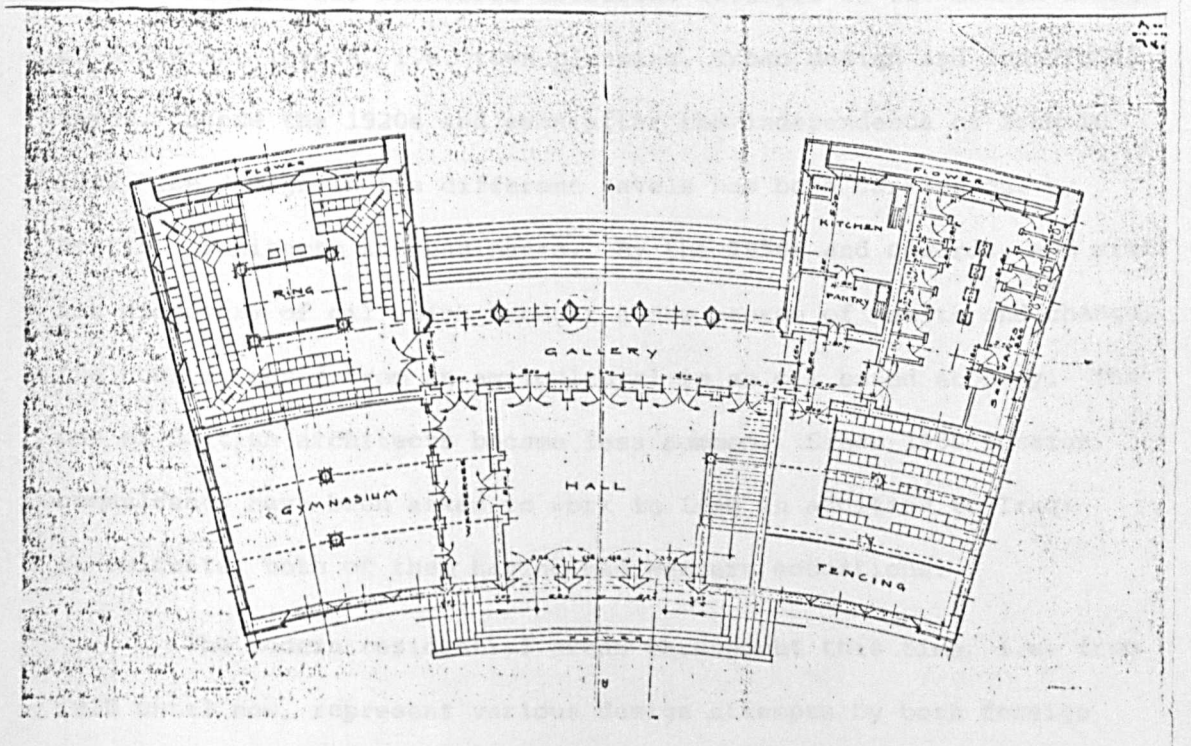


Architect: Cobar (British)

FIGURE: H.7

Sports Club in Baghdad, 1940





Architect: Ahemed Mokhtar (Iraqi)

dwellings which exposes not only large areas of the buildings' elements to the direct sunlight in summer and rain plus cold winds in winter, but their inhabitants as well.

In general, the characteristics of these new urban layouts are regular housing plots within a regular or irregular network system of wide roads, each plot housing at least a garden on two sides, embracing a compact house. In most of these estates, pedestrian and traffic modes use the same road network system.

Over time, despite the size, the composition of the house plan has remained compact in the modern urban fabric. The layout design of these estates has changed due to the cultural environment (i.e. economic, social and technological status of the inhabitants).

Baghdad has witnessed different attempts in the modern design on different levels, i.e. town planning, urban design and individual units. Since the 1920s and even after the independence of Iraq in 1932, the design in its different levels has been carried out by British architects and engineers. By the 1950s and onwards, and after the discovery of oil which brought a new source of wealth and change, the country moved from an agricultural to an oil based economy. The use of British architects became less common. Since 1950 foreign consultants have been asked to work in Iraq in addition to Iraqi consultants, both of them having had Western educations.

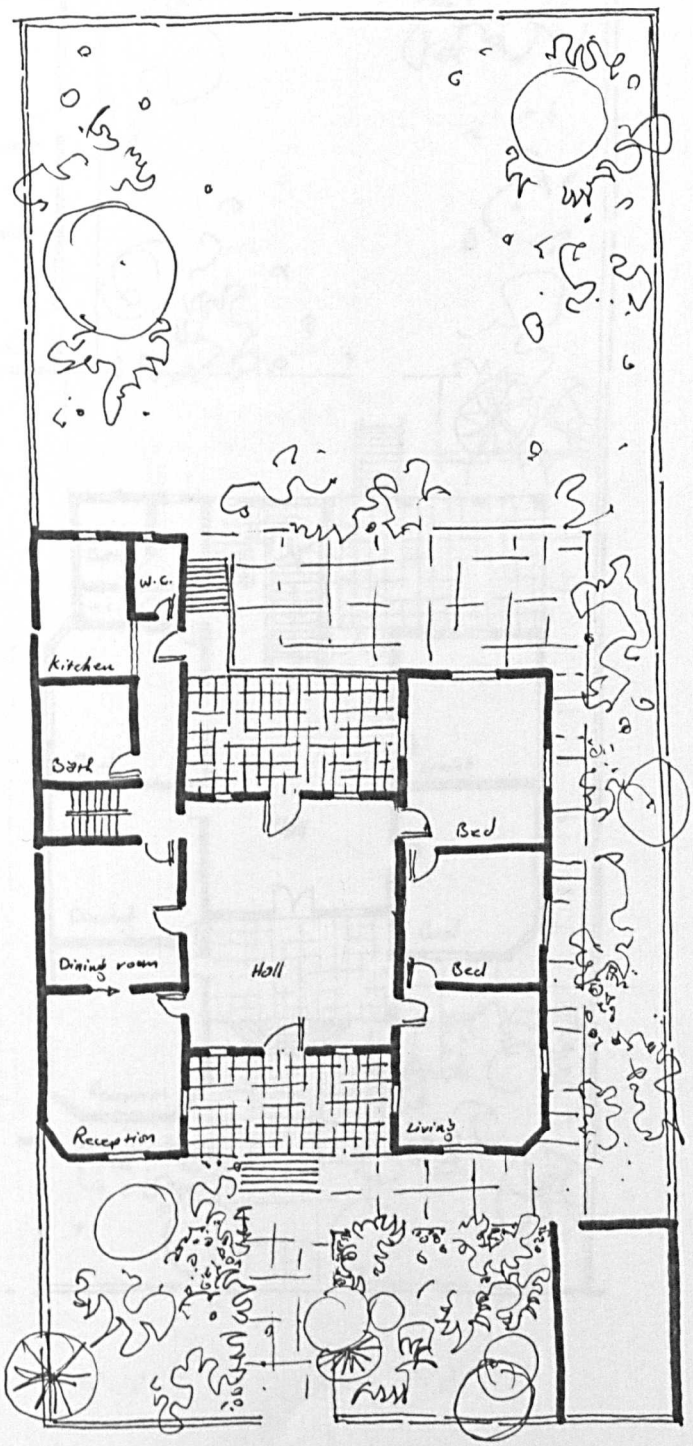
The modern residential areas throughout this time, i.e. from 1920 until now, represent various design attempts by both foreign and Iraqi planners and architects.

The first period from the 1920s to 1950s was influenced mainly by the British who introduced the suburban compact house within a loose layout. This type of housing has similarity in the composition of the plan to the traditional house, being based on a central core for circulation, a basement and the use of some traditional features in the decoration. But it differs completely from traditional housing in a physical and cultural sense as the central core of circulation is covered and visual orientation is directed principally towards the outside open space and gardens. The houses of this period can be characterised by heavily planned gardens and construction mainly by shallow brick vaults running between r.s.j.s (built without centering), used for second floor and roof construction. Western classical lines have been superimposed on a traditional building approach, with houses usually built as single dwellings off tree-lined avenues.

These buildings in general are fine and very simple in design and not sophisticated as in the traditional type. During this period electricity and fan cooling begins to supplant careful orientation and climatic control. Choice of materials and layout are in conflict with climatic conditions.

However, this type of house represents the transition from the traditional to the recent modern type which appears after 1950. These early modern houses are no longer replicated due to their large size, as they were erected originally for high income groups and they are lacking in internal privacy, as all rooms open onto a central hall. Thus the main hall acts as a node of circulation which affects its privacy and function as a sitting room. Moreover, some of these

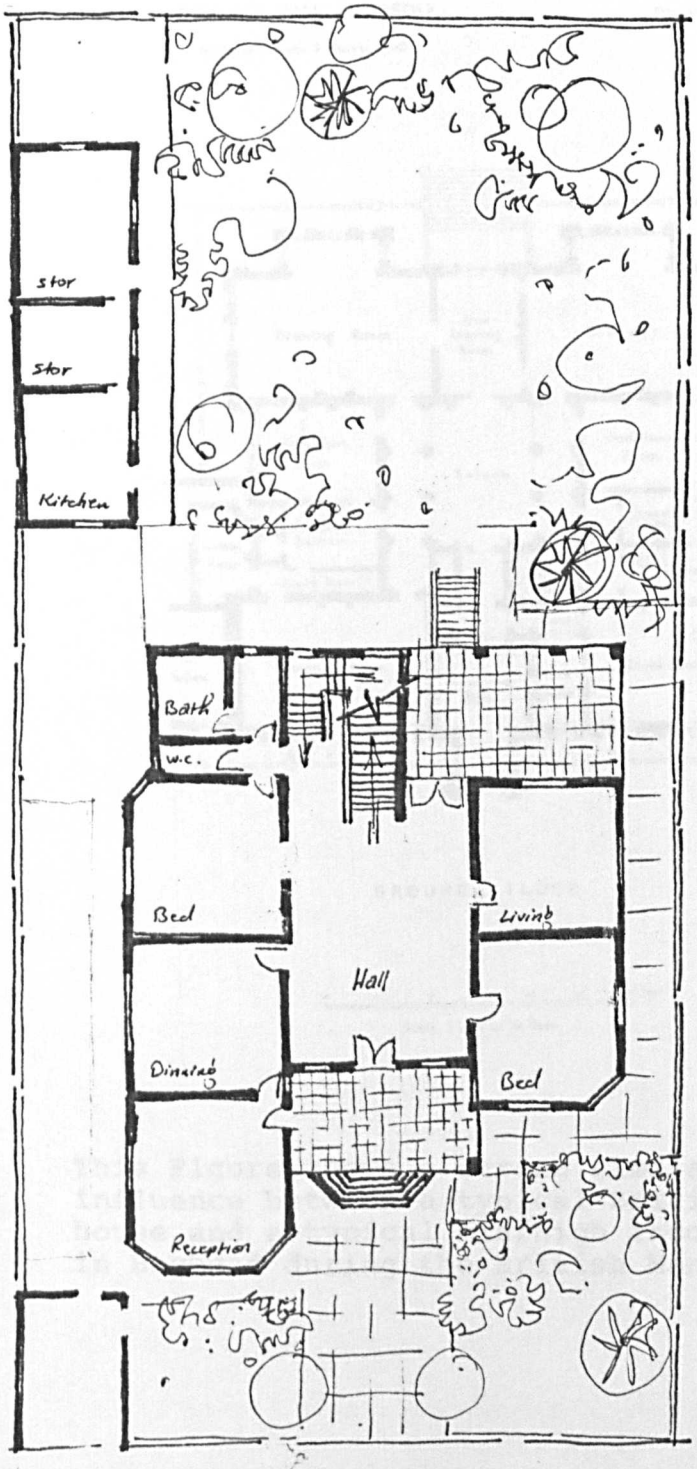
FIGURE: H.8(a)



A Typical Mid/High Income House in Baghdad
During the British Mandate Period

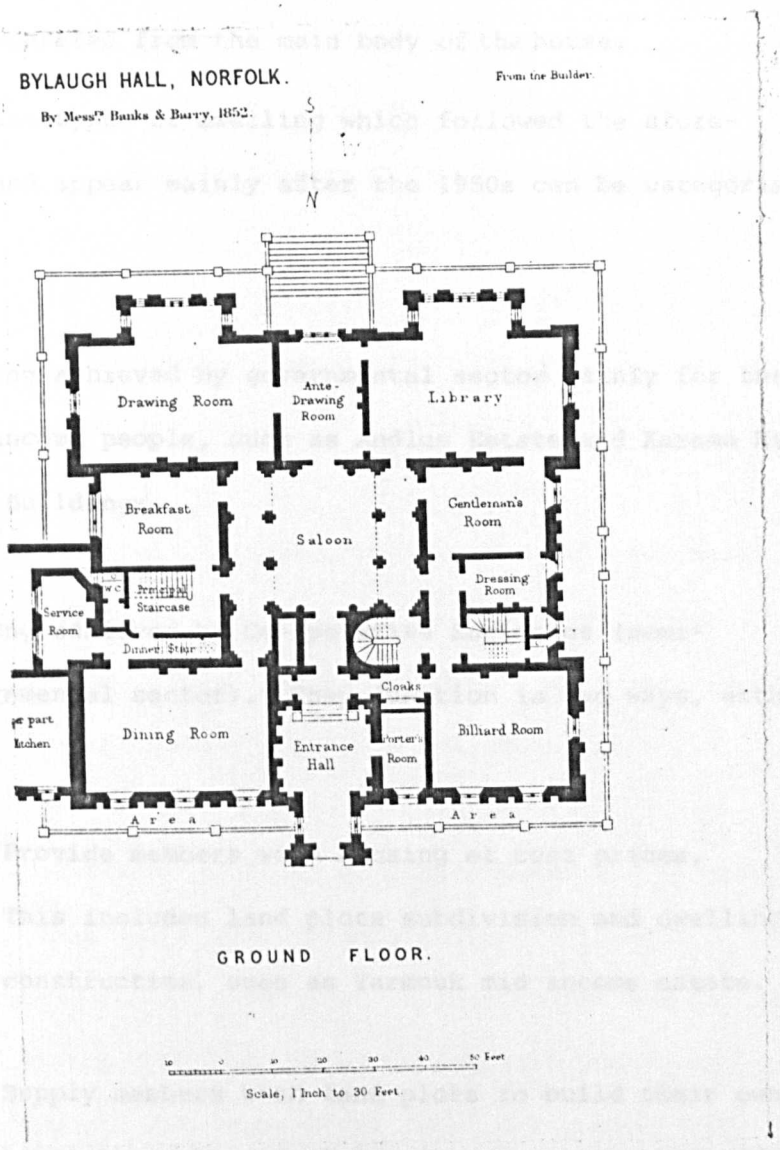
1/200

FIGURE: H.8(b)



A Typical Mid/High Income House in Baghdad

FIGURE: H.8(c)



This Figure shows a strong similarity and influence between a typical British country house and a typical mid/high income house in Baghdad during the British Mandate period.

From: Robert Kerr, F.R.I.B.A.
The Gentleman's House, London, 1864, Plate 32

houses have their services and utilities, i.e. kitchen, stores within the back garden separated from the main body of the house.

However, the types of dwelling which followed the aforementioned period and appear mainly after the 1950s can be categorised as follows:

- Housing achieved by governmental sector mainly for the low income people, such as Andlus Estate and Karama High Rise Buildings.

- Housing achieved by Co-operative Societies (semi-governmental sector). They function in two ways, either to:

  (a) Provide members with housing at cost prices. This includes land plots subdivision and dwelling construction, such as Yarmouk mid income estate.

or

  (b) Supply members with land plots to build their own housing, such as Umal low income estates and Qadisya mid income estate.

- Housing built by the private sector. After legal subdivision of the estate, plots of land in various sizes are offered for sale to the public in order to erect their own dwellings. These estates, such as Tamim (mid and low income) and Mansur (high income) estates represent good examples of post-1950 housing in the private sector.

In order to measure the inhabitants' responses to the natural and cultural adequacy and inadequacy of the estates and of individual dwellings on both types of estates, a survey was carried out. The case study in the modern estates will be separated into two groups:

- Housing estates designed in line with cultural factors. They are: Mansur (high income), Yarmouk (mid income) and Andlus (low income).

- Housing estates arranged in relation to the framework of the legislation and building regulations. They are Qadisya (mid income), Firdaws (mid income), Tamin (mid and low income) and Umal (low income).

In the case of Kārama's blocks of flats, these are treated as a special case. This is because these blocks were erected on a part of the traditional Kārama estate on the site of the demolished houses. The flats of the new block were given to the people who had been living in the old demolished buildings as substitute housing. Thus, it cannot be considered as falling within the category of the other two groups. It is considered separately.

The analysis and comparison throughout the following sections will be considered in relation to natural and cultural environments, and on two levels.

First: on the estate level, between the estates of each group. In this level the study will follow two stages, a macro-level stage, which will detail the population characteristics of the sample survey carried out by the author (i.e. population age-sex structure, education, etc.), the layout of the estate, design criteria and aesthetic criteria, whilst on the second micro-level stage (i.e. dwelling scale), the study will deal with the design criteria in relation to social status and function of space and house arrangements.

Second level: the analysis and comparison will be between the different groups of estates (i.e. traditional and the modern.) as on the groups level. The study will be in two stages: Macro-level between the design criteria on the layout level. Micro-level between the design criteria on the individual unit.

[H.2] MANSUR: HIGH INCOME ESTATE

H.2.1 Population Characteristics

The population characteristics, the age-sex structure, educational status and occupational performance are given in Table H.1 and Figure H.9.

The age structure of this area indicates that 46.8 per cent of its population are males and 53.1 per cent are females, with an average age of 31.4 years and 29.5 years for males and females, respectively, which gives a total average age of 30.5 years. This average shows a not very young population, a phenomenon which can be clearly seen in the reverse population pyramid of the estate. This pyramid is standing on a relatively small base of population age group between 1-19 years, which indicates the characteristics of the old nuclear families. Above the base a high proportion of people aged 20-29 years forms the main feature of the population pyramid profile. This age group consists mainly of students in their final stages of education and people in the early stages of their careers. Following this age group a sudden shrinkage in the population pyramid occurs, resulting mainly from marriage and work circumstances, which tend to separate the population in the age group between 30-39 years from their original families to places where they can establish new young nuclear families.

The pyramid also indicates a sudden increase in the female population in the age group between 40-49 years. This is brought about by unmarried females who usually live with their parents, or the wives of the elderly rich male residents on the estate, which can

be seen clearly in the population increase of the male population pyramid in the age group between 50-59 years.

Table H.1 shows the educational and occupational status of people on Mansur estate, which indicates that 50 per cent of the population have a university education and 25 per cent have secondary school education, whilst the population who are illiterate, merely read and write or enjoy education only to primary school level, form about 15 per cent of the population.

The dominant occupations of people in this area are educational, with students forming 42 per cent of its population and the civil service which forms 30.9 per cent, whilst other occupations such as manual workers and businessmen represent only a very small proportion of the total.

In general, the histogram shows also that about 35 per cent of the population are productive manpower, whereas the rest of the population i.e. students, housewives and unemployed people forming about 65 per cent, are economically dependent.

H.2.2 Design Criteria on the Estate Level

Mansur private housing estate was subdivided on the base of the seventh class of the 1936 building control regulations. The scheme was carried out by a private company, Al-Mansur, in 1945.

The layout of Mansur, that of plots, subdivision and road system have been clustered around a horse racing track as a focal point. The traffic network in this area is distributed from the main arteries surrounding the racing track which form a wide triangular traffic island with sharp crossroads at the corners. The secondary

arteries which are distributed from the main arteries are arranged in an irregular pattern (i.e. mainly loops and crescents) (Figure H.10); this can improve the visual and the aesthetic condition of the estate as well as slow down traffic movements and so increase the safety of these roads.

According to this road network pattern the divisions of plots surrounding them becomes irregular too, in size and shape. The houses on these plots are mostly two-storey buildings and are set back from the street within large gardens, usually shielding them from the eyes of the passer-by. Each plot is bounded by a continuous high wall, the front of which is located on the street, with a large gateway, forming the boundaries of the road itself.

The houses are usually built of brick and concrete, with very large areas of glass windows on the facades. Most of these houses have balconies on the first floor and semi-enclosed space (Tarma) on the ground level, often placed to create an aesthetic composition rather than as a response to environmental and cultural needs.

The size of the plots in this area vary between 200-approximately 1,000m². Table H.2(b) shows that 84 per cent of the sample house plots are more than 600m², 8 per cent of them 300-399m² and 4 per cent are between 200-299m². Most of the plots which are between 200-300m² within this estate were created later by dividing the original plots, as a result of the building control regulation amendment 1970 which allowed the owners to divide their properties to give areas of not less than 120m².

Table H.2(a) shows that 60 per cent of the dwelling area on the ground level are between 200-249m², and 20 per cent between 250-299m². In the same table the range of dwelling areas on the first floor show 36 per cent of the sample houses having between 50-99m² and 20 per cent of them having less than 49m². This results in an average dwelling area on the ground floor of 235m² and 98m² in the first floor. This is because most of the houses' facilities are built within the ground floor. In addition, these houses are without basements.

By comparing these results with the whole plot areas of the dwellings shown in Table H.2(b) the majority of the houses' plot areas varied between 600-1,000m², representing 84 per cent of the total sample and only 4 per cent of the houses fall into the range of 500-599m². This implies an average plot area of 732m² in Mansur, i.e. the average external open space (garden) which is left between the boundaries of the plot wall and the dwelling area of the house averaged 497m². Due to this considerable open space 84 per cent of the inhabitants did not complain about any source of noise such as children playing, services or traffic, as illustrated in Table H.3.

The large plot areas combined with the majority of single families in the sample resulted in 80 per cent of the people feeling that the density of this area is just right, as shown in Table H.4 whilst Table H.4 shows people's response.

On the other hand, the large open spaces within the individual plots and the wide streets exposed the residents in Mansur area to the natural constraints of sun and extreme weather, i.e. the climate. This is clearly shown in Table H.5 in which approximately half of the

inhabitants suffer from walking in the estate's streets, mainly from the climatic conditions. As indicated in Table H.5 44 per cent of the inhabitants suffer from walking in the streets of the estates as a result of climatic conditions.

Table H.6 shows the relationship between the individual household and the services and utilities within the estate catchment area. Figure H.10 shows the location of the different services and utilities within the layout of the whole estate. The responses of the people indicate that 60 per cent of inhabitants feel that the primary schools are near and 36 per cent of them feel that secondary schools are near, and 28 per cent of them feel they are within walking distance. 40 per cent of the inhabitants feel that the shops are near, and 32 per cent of them feel they are within a walking distance, whereas services like health clinic and religious centre in this area need to be easily reached on foot, and as indicated in the table 84 per cent of the residents need transportation to go to the health centre.

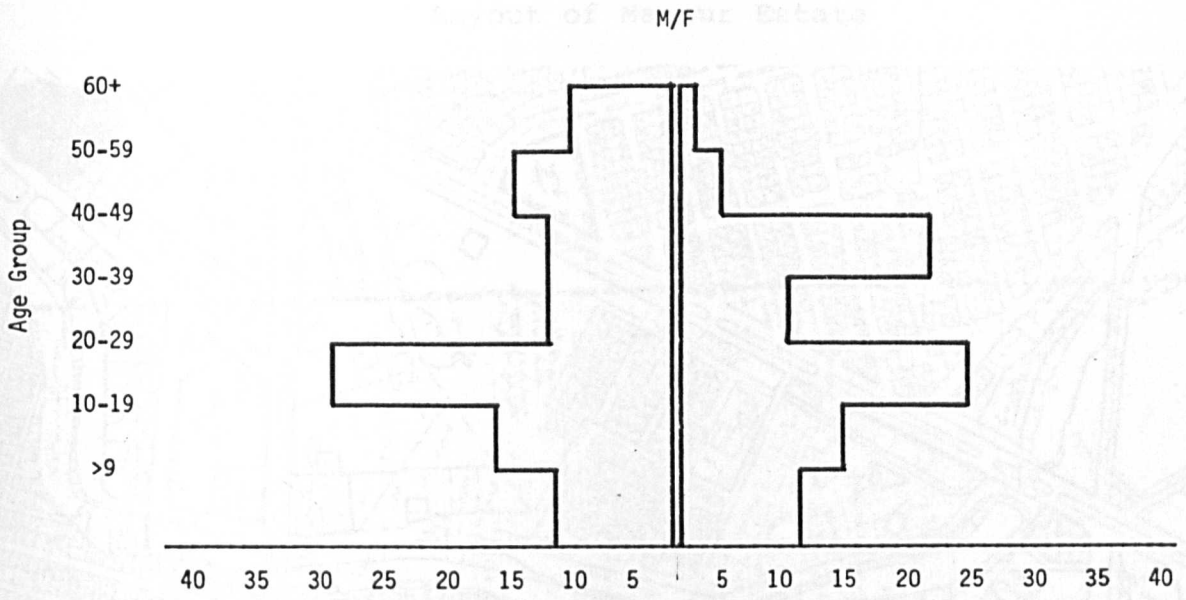
The houses of this estate are occupied mainly by high income people with a high standard of living. This fact is reflected in the quality of their houses, car ownership etc. Therefore, 96 per cent of the sample population have their own car and own inside garage. Accordingly, no problem of car parking has arisen in this area (Table H.7).

H.2.3 Function of Space and Family Activities

With artificial cooling and heating it is possible to use the rooms of these houses even when the external or natural conditions would render them uncomfortable so that a characteristic finding from the survey is that the pattern of daily use in modern houses

varies very little from season to season. The area of the rooms, their location within the layout, micro-climatic conditions and the degree of privacy appear to be the principal factors influencing use of internal space in the modern houses (Figure H.11(a)).

Figure H.12 shows that the living room is the room in dominant use followed by the kitchen, since it is used for daily meals. The bedroom is next in frequency of use. Only a small proportion of people on this estate use the flat roof for sleeping at night. This is because the people on the estate prefer sleeping indoors, using artificial sources of cooling. Moreover, only a small proportion of people use the garden in summer.



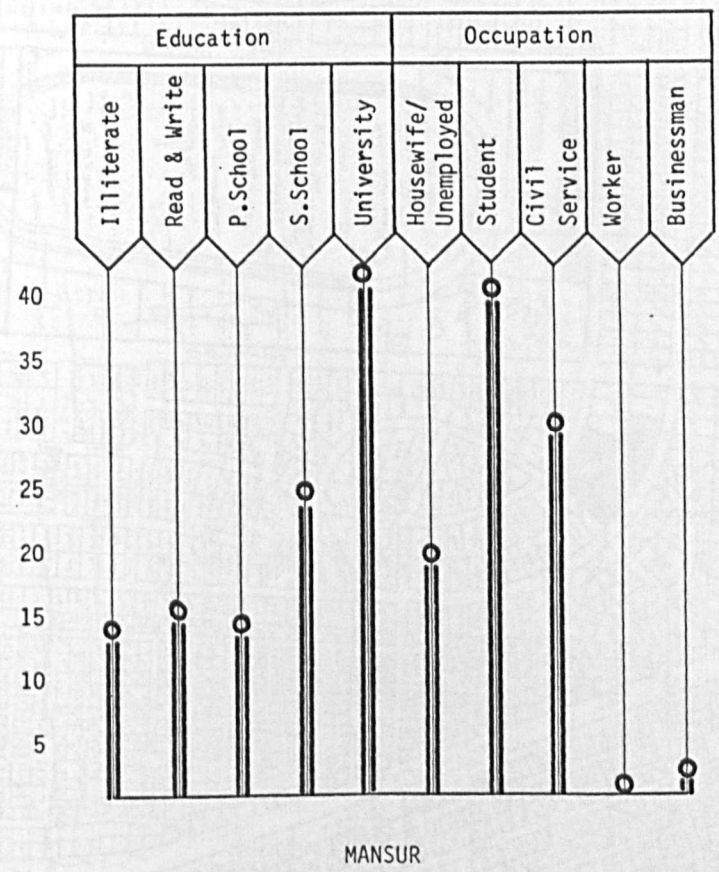


FIGURE: H.9

Population Pyramid, Education Occupation Status

FIGURE: H.10

Layout of Mansur Estate

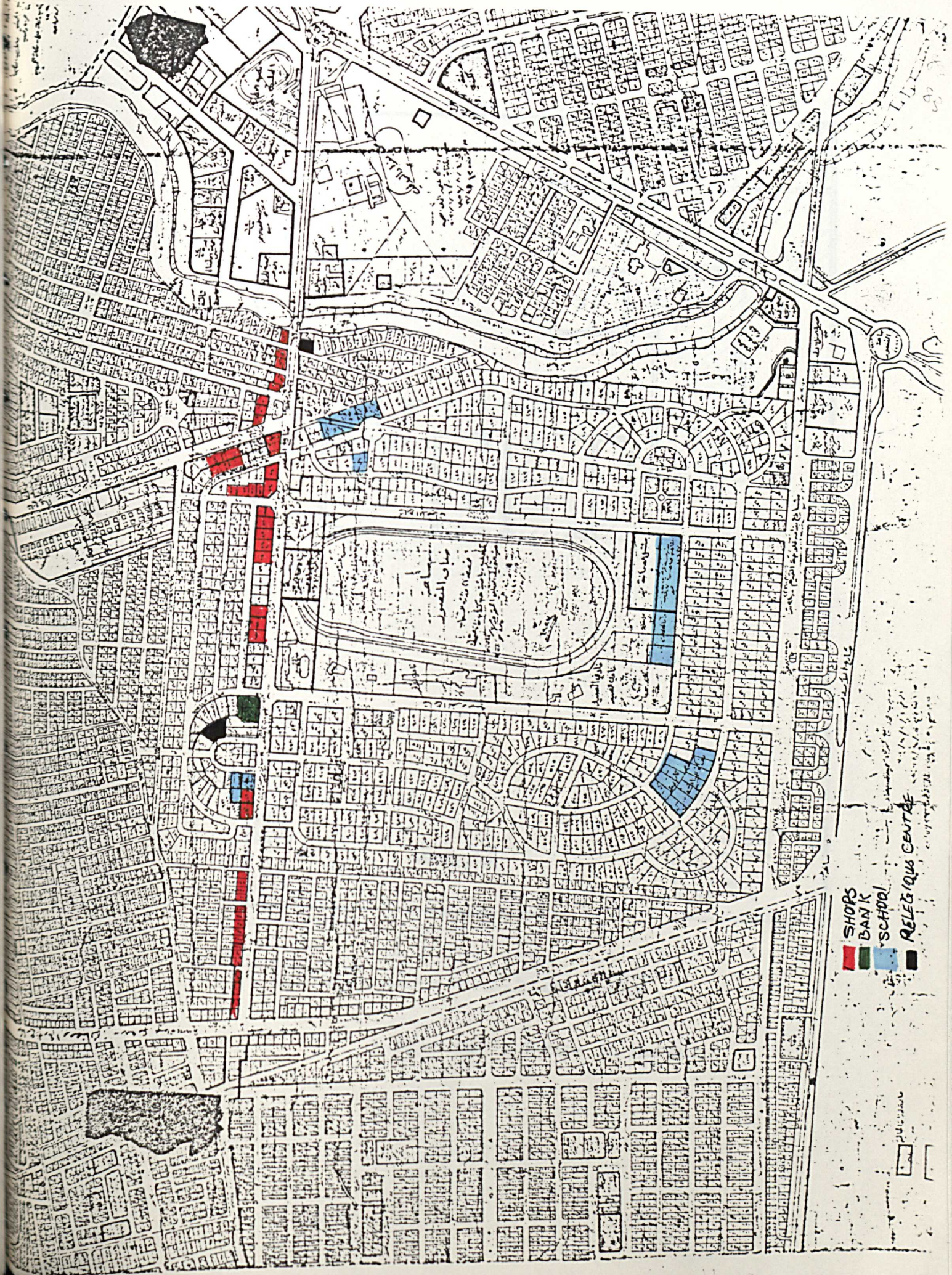
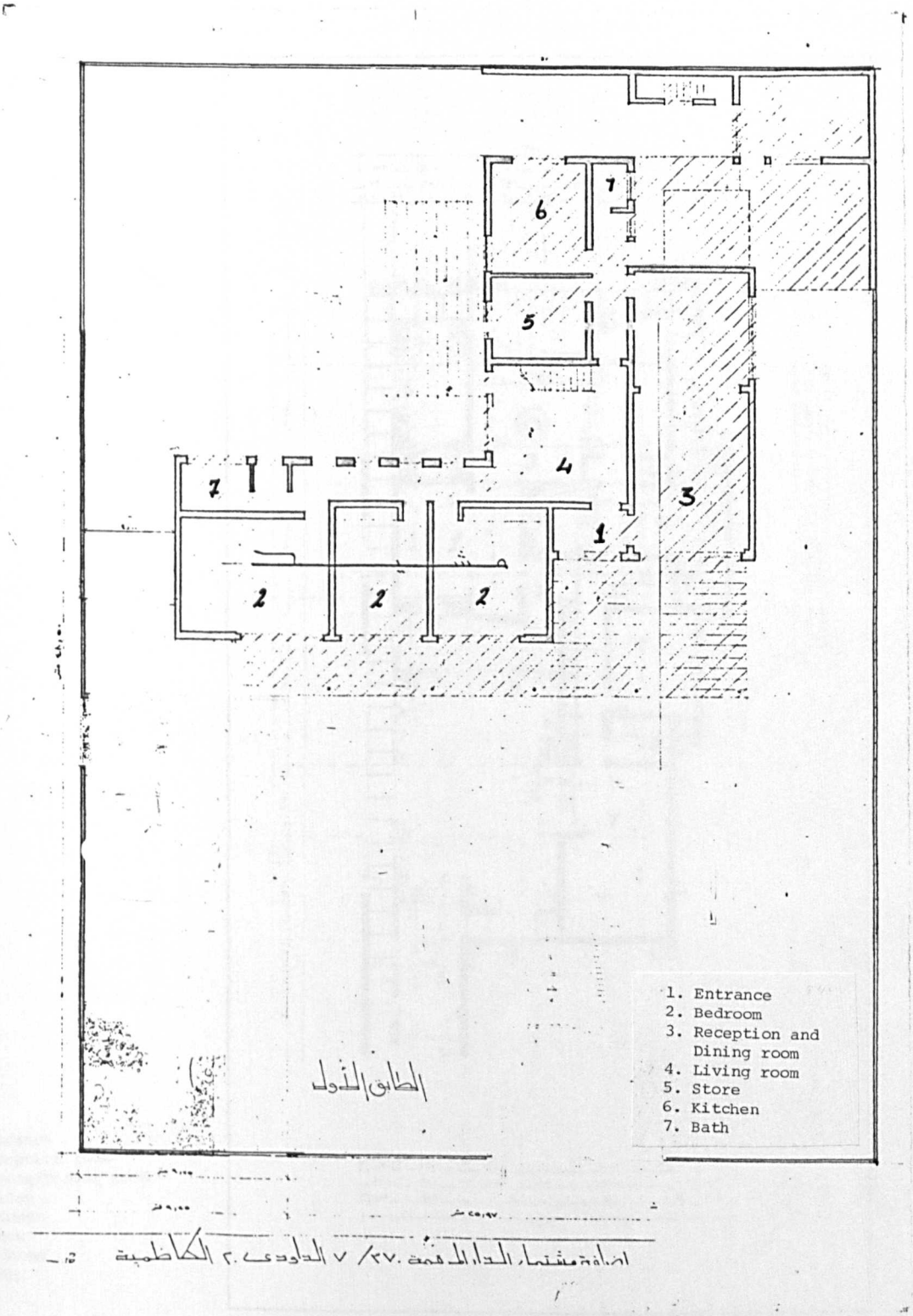
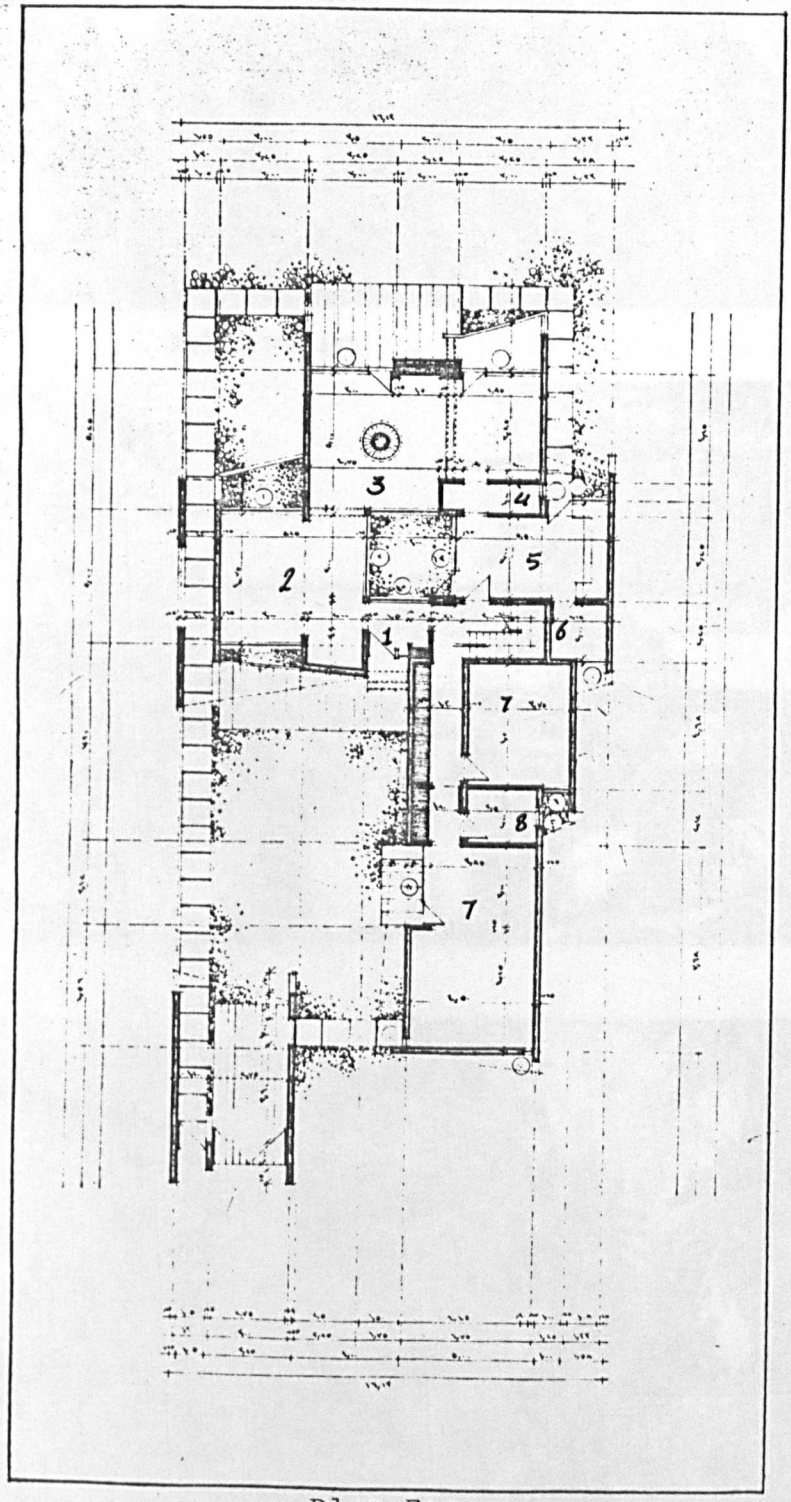


FIGURE: H.11(a)



A Plan for a House in Mansur

FIGURE: H.11(b)



1. Entrance
2. Reception room
3. Living/Dining room
4. Toilet
5. Kitchen
6. Store
7. Bedroom
8. Bath

Plan For
A House in Mansur

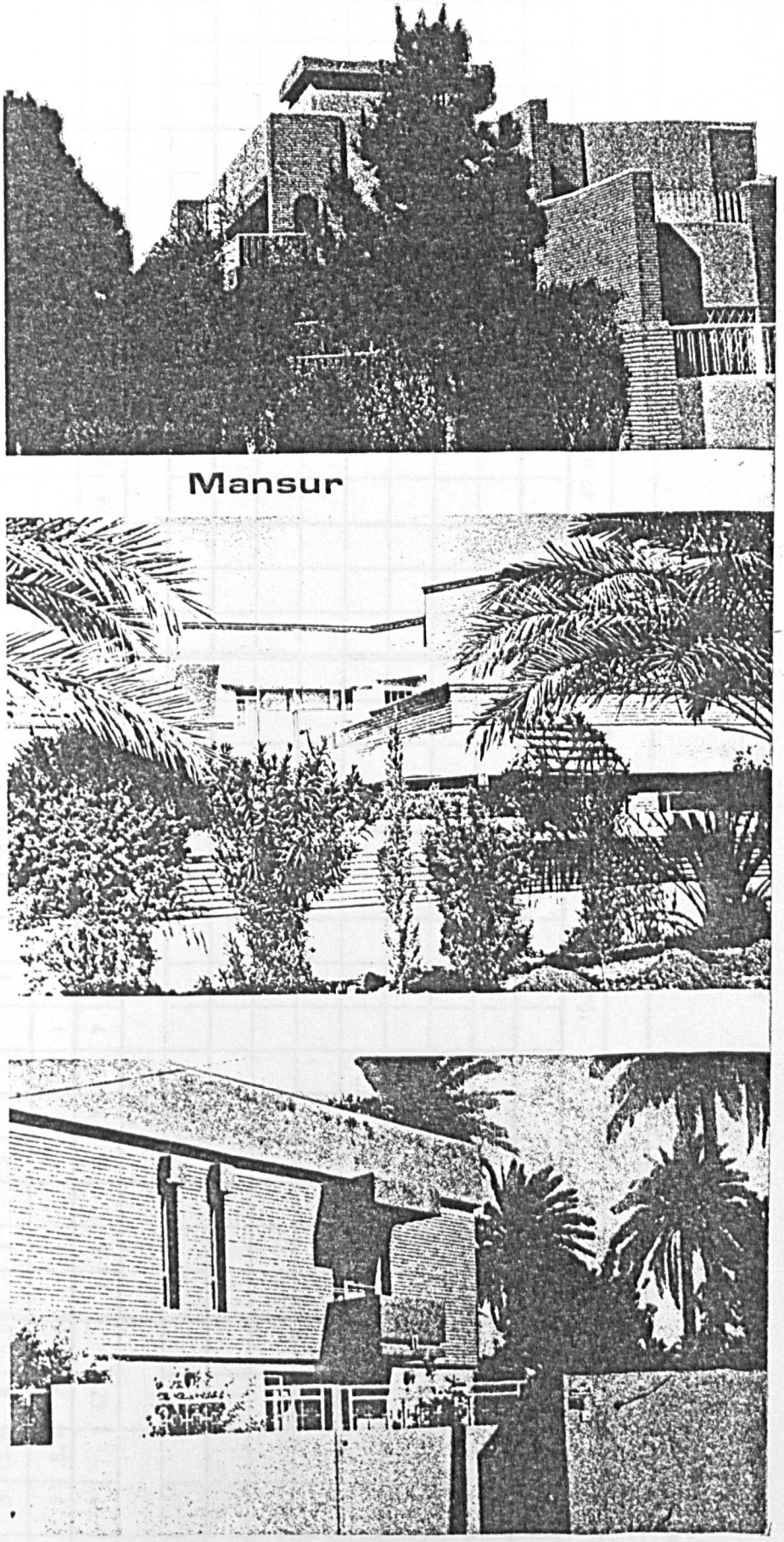


FIGURE: H.11(c)

Different Types of Housing in Mansur

STATUS / NO.	AGE GROUPS				EDUCATION														OCCUPATION													
	MALE		FEMALE		ILLITERATE			LITERATE			P.SCHOOL			S.SCHOOL			UNIVERSITY			HOUSEWIFE/ UNEMPLOYED			STUDENT			CIVIL SERVICE			WORKER			BUSINESSMAN		
	No.	%	No.	%	M	F	%	M	F	%	M	F	%	M	F	%	M	F	%	M	F	%	M	F	%	M	F	%	M	F	%	M	F	%
>9	7	11.9	9	13.4	1	6		-			5	3		1						1	6		7	3									
10-19	10	16.9	11	16.4	-			-			1	6		8	3		1	2					10	10			1						
20-29	17	28.8	17	25.4								2		1	3		16	11			1		11	11		6	5						
30-39	6	10.2	9	13.4											3		6	6			5			1		4	3				2		
40-49	6	10.2	15	22.4					1			1		2	5		4	8		2	6					3	9				1		
50-59	8	13.6	4	6.0		1		2				1			2		6				2					5	2						
60+	5	8.4	2	3.0		1					1			1	1		3			2	2					1							
TOTAL	59		67		1	8		2	1		7	13		13	18		36	27		5	22		28	25		19	20				3		
RELATIVES																																	
>9																																	
10-19																																	
20-29																																	
30-39																																	
40-49																																	
50-59																																	
60+																																	
TOTAL																																	
% within the whole sample	46.8		53.1		14.28			16.6			15.8			24.6			50			21			42.0			30.9						2.3		
Average Age	31.4		29.5																														

Total average age = 30.5 years

TABLE H.1

MANSUR: POPULATION, EDUCATION OCCUPATION STATUS

TABLE H.2(a)

APPROXIMATE DWELLING AREA

Level / Area m²	MANSUR			
	Ground Floor		First Floor	
	No.	%	No.	%
>49			5	20
50-99			9	36
100-149	1	4.0	2	8
150-199	2	8.0	2	8
200-249	15	60	2	8
250-299	5	20	1	4
300-349	2	8.0	1	4
Average	25	235	25	98

TABLE H.2(b)

AREA OF THE WHOLE PLOT

Estate / Area m²	MANSUR	
	No.	%
>99		
100-199		
200-299	1	4
300-399	2	8
400-499	-	-
500-599	1	4
600-1,000	21	84
Average	25	732

TABLE H.3

DISTURBANCE FROM NOISE

Estate / Noise	MANSUR	
	No.	%
No	21	84
Yes	4	16
Cause of Noise		
Crowdedness	-	-
Children	2	8
Services	3	12
Source of Noise		
Inside the House	-	-
Outside the House	4	16
No Noise	21	84

TABLE H.4

FEELINGS ABOUT ESTATE DENSITY

Response \ Estate		MANSUR No.	MANSUR %
Too crowded		1	8
Crowded		4	16
Just right		20	80
Don't know		-	-
Reasons			
Near to Services	(No)	24	96
	(Yes)	1	4
Family Size	(No)	8	32
	(Yes)	17	68
Multi-Family	(No)	24	96
	(Yes)	1	4
Children	(No)	24	96
	(Yes)	1	4

TABLE H.5

FEELINGS OF DISCOMFORT WHEN WALKING ON THE ESTATE'S ROADS

Response \ Estate		MANSUR	
		No.	%
No		12	48
Yes		12	48
Don't know		1	4
Reasons for Discomfort			
Long distance	(No)	21	84
	(Yes)	4	16
Unpaved	(No)	17	68
	(Yes)	8	32
Climatic Factors	(No)	14	56
	(Yes)	11	44
Children playing	(No)	25	100
	(Yes)	-	-
Traffic	(No)	20	80
	(Yes)	5	20
Odour	(No)	23	92
	(Yes)	2	8

TABLE H.6

SERVICES AND UTILITIES

Distance Between House and Services

Estate / Services	MANSUR					
	Near		By Walking		By Car	
	No.	%	No.	%	No.	%
Primary School	15	60	2	8	7	28
Secondary School	9	36	7	28	8	32
Clinic	-	-	3	12	21	84
Public Bath	-	-	-	-	-	-
Shops	10	40	8	32	7	21
Cafe	6	24	11	44	8	32
Religious Centre	1	4	7	28	9	36

Services and Utilities Needed on the Estate

Services / Estate		MANSUR	
		No.	%
Education	(No)	23	92
	(Yes)	2	8
Social Services	(No)	25	100
	(Yes)	-	-
Environmental Services	(No)	25	100
	(Yes)	-	-
Health Services	(No)	21	84
	(Yes)	4	16
Public Services	(No)	15	60
	(Yes)	10	40

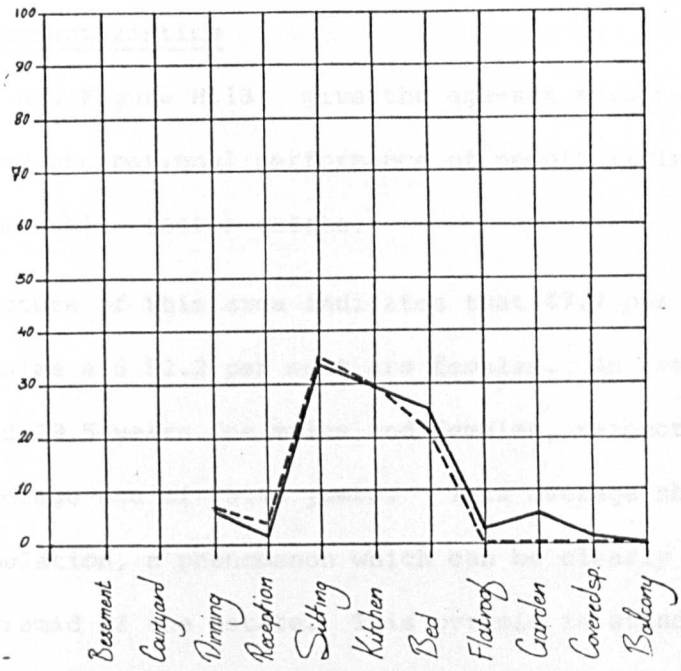
TABLE H.7

CAR AND TRANSPORTATION

Response \ Estate	MANSUR	
	No.	%
Having a Car		
No	1	4
Yes	24	96
Don't Know	-	-
Problems of Car Parking		
No	24	96
Yes	1	4
Parking Space in Relation to the House		
Inside	24	96
Outside	-	-
Preference for Car Space in Relation to the House		
Private	18	72
Public	-	-
Don't Know	7	28

FIGURE: H.12

MANSUR



The Function and Use of Space

ACTIVITIES \ SEASONS	THE USED SPACE: Basement	Courtyard	Dining	Reception	Sitting	Kitchen	Bed	Flatroof	Garden	Coveredsp.	Balcony	
TIME — Breakfast	SUMMER / WINTER	SUMMER / WINTER	2 / 3	SUMMER / WINTER	4 / 3	18 / 19	SUMMER / WINTER	SUMMER / WINTER	SUMMER / WINTER	1 / 0	SUMMER / WINTER	
Lunch			5 / 5		4 / 2	16 / 18						
Snack				1 / 1	0 /		24 / 19					
Teatime			1 / 1		21 / 21	3 / 3			2 / 0			
Dinner			3 / 3		8 / 9	13 / 12			3 / 0	1 / 0		
After dinner				1 / 1	22 / 24	1 / 0			5 / 0	1 / 0		
Sleeping at night				0 / 6	0 / 1		20 / 17	5 / 0				
TOTAL			11 / 12	2 / 7	59 / 61	51 / 52	44 / 37	5 / 0	10 / 0	3 / 0		
%			6.3 / 6.8	1.1 / 4	33.7 / 34.8	29.1 / 29.7	5.1 / 21.1	2.8	5.7	1.7		

TABLE H.8

[H.3] YARMOUK: MID INCOME ESTATE

H.3.1 Population Characteristics

Table H.9 and Figure H.13 give the age-sex structure, educational status and occupational performance of people living on Yarmouk mid income public sector estate.

The age structure of this area indicates that 47.7 per cent of its population are males and 52.2 per cent are females. An average age of 29.4 years and 29.5 years for males and females, respectively is given and a total average age of 29.45 years. This average shows not a very young population, a phenomenon which can be clearly seen in the population pyramid of the estate. This pyramid is standing on a very small base of population age group between 1-9 years which indicates the characteristics of older nuclear families without small children. Above the base a high proportion of people aged between 10-29 years form the main feature of the estate population pyramid profile. This age group consists mainly of students in their secondary school and university stages and also people in the early stages of their careers. Following this age group a sudden shrinkage in the population pyramid occurs, resulting mainly from the tendency for people seeking work and getting married to separate the population in the age group between 30-39 years from their original families to places where they can themselves establish new young nuclear families.

The pyramid also indicates a high proportion in the female population age group between 40-59 years. This is brought about mainly by the unmarried females who usually live with their parents or relatives (8.9 per cent of this estate population is formed by

extended families). The proportion of males aged 60 years and over indicates the head of extended families wives represented by a younger age group, usually in between 50-59 years.

The Histogram (H.13) shows the educational and occupational status of Yarmouk estate. This shows that 46.6 per cent of its population have university education and 14.04 per cent have secondary school education, whilst the population who have other educational levels are very small in proportion, i.e. able to read and write 2.2 per cent, primary school 11.7 per cent, with an illiterate population of 6.7 per cent.

The dominant occupational response from the people of this area is education, with students forming 40.4 per cent of its population, and the civil service forming 26.9 per cent, whilst other occupations such as manual workers and businessmen represent only a very small proportion of the total.

In general, the occupational status of the estate shows that about 30 per cent of the population are productive manpower, whereas the rest of the population, i.e. students, housewives and unemployed people form about 70 per cent and are economically dependent.

H.3.2 Design Criteria on the Estate Level

Yarmouk, a semi-governmental sector residential area was designed by foreign consultants as a fourth class residential area, to accommodate some of the government civil service. The development was implemented by a co-operative society and the dwelling units were then sold to its members at cost price.

In broad terms the design of the estate accommodates a number of general cultural factors (i.e. pedestrian-vehicular segregation, hierarchy of roads etc.) in order to improve the safety and social life of the inhabitants.

However, the design of the layout is based on a rigid grid-iron plan with loops and cul-de-sacs forming elements in the hierarchy of the road network system which results in geometrical, triangular shaped divisions of plots. Each of these plots is bounded by a continuous wall or fence, with one access from the front located on the edge of the street. Most of these plot areas are not less than 600m². (Figure H.14).

Two types of house design have been implemented on this estate, both types based on the principles of the two-storey compact house. They were constructed from brick and concrete with large glass and steel windows. Both house types have in the front and back facades a semi-enclosed space on the ground floor and balconies on the first floor. The houses on this estate are generally joined with one of the side walls (fences) and detached on the other three sides (i.e. semi-detached). (Figure H.15).

The built up area in Yarmouk estate shows that 66.7 per cent of the surveyed sample are between 150-199m² and 33.3 per cent are between 100-199m² on the ground floor, whereas on the first floor 88.9 per cent of the dwelling areas are between 50-99m², 7.2 per cent are between 150-199m² and 3.7 per cent are between 100-149m². Accordingly, the average built up area on the ground floor is 158.33m² and on the first floor is 84.26m². (Table H.10).

The open space left between the house and plot boundaries as external paths and gardens is on average 441.67m². A large proportion of this open space is located in the front and in the back of the house rather than to the side.

The density in Yarmouk estate has been estimated as as 77.68 P/H. This density seems 'just right' as 96.3 per cent of the inhabitants responded in this way (Table H.11). This is because the houses are occupied by a majority of single families as shown in Table H.11. This table shows that 88.9 per cent of the inhabitants feel that the density of their estate is just right.

59.3 per cent of the sample did not suffer from walking in the streets of the estate (Table H.12). The 40.7 per cent of the inhabitants who complained had different complaints (Table H.12). Mostly the problems focussed on the traffic (22.2 per cent of the residents suffered from traffic) as the district is cut through by roads and bounded by highways with heavy traffic. These peripheral highways link Baghdad with the northern and middle regions of the country. 14.8 per cent of the people who are negative about access within the estate complain about the climate when they are walking in the streets of the estate.

About half the population of the surveyed sample in Yarmouk estate are not disturbed by any source of noise, whether from inside or outside the area as illustrated in Table H.13. 51.9 per cent of the inhabitants are disturbed by noise, 35 per cent of them complaining about the services noise which forms 44.4 per cent of the total sample population and only 11 per cent of the total population

complaining about noise from children, as shown in Table H.13 As given in Table H.13 44.4 per cent of the population indicate that the main source of noise is from outside the house.

85.2 per cent of Yarmouk residents possess cars. 81.5 per cent of them have no problem with car parking since they all have garages inside the house, as illustrated in Tables H.14.

On access to facilities, Table H.15 shows that most of the services need transportation in order to reach them, since the majority of them are located on the boundaries of the estate. The exceptions are the primary and secondary schools because these are distributed within the estate.

H.3.3 Design Criteria Within the Domestic Level

In general two types of dwelling are present in Yarmouk. In each type attempts have been made to achieve the inhabitants' needs and demands mainly in relation to privacy and security.

The first house type (Figure H.16), provides a semi-public - private zone; an open space (garden) acts as the intermediary zone between the public areas, semi-public and private circulation which protects the private status of the family from the surrounding dwellings and roads. This zone is followed by the family public-private circulation zone which acts as the main entrance for the house. This zone leads to the public-private zone(*) (reception and dining room) and to the family private zone (family sitting room), in addition to the other private family facilities (i.e. kitchen, bath and toilet). Also the same circulation zone leads through the

(*) Public-private zone: the space usually used by the family and visitors (reception room).

staircase to the first floor family private circulation zone, from which access is provided to the individual private zone (i.e. bedrooms and baths). Another access has been provided on the ground level through the car park as a family private circulation zone. This secondary entrance leads to a family private internal open space (i.e. service courtyard) from which access has been provided to the kitchen and surrounding service zones. Thus, the kitchen in this situation acts as a circulation zone (i.e. by-pass) between the private circulation zone (i.e. the secondary entrance) and the main entrance to the family public-private circulation zone.

The second type of Yarmouk dwelling also has a semi-public - private family open space (garden) as a hinge between the compact body of the house and its surroundings (i.e. the roads, neighbours). From this zone access is provided from the front to a family private-public circulation zone which acts as the main entrance to the house. This zone leads to a private-public zone (reception and dining room) or to a private family zone (sitting room). From this zone access has been provided to the public-private zone (reception and dining) from the side, whilst another one leads to a family private circulation zone on the opposite side. In this case the family's living space becomes the main cross-circulation area within the house which directly affects the family's privacy and the use of other space. This space is connected to the private circulation zone for the family which offers access to the family's private zones (i.e. kitchen, bath and stores) and to the individual private zone, the bedrooms. Also from this zone access is given through a staircase to the first floor family private circulation zone from which access is then provided to the different family and individual private zones. (Figure H.17).

However, a secondary main entrance for the house is provided on the ground level from one of its sides as a family private entrance.

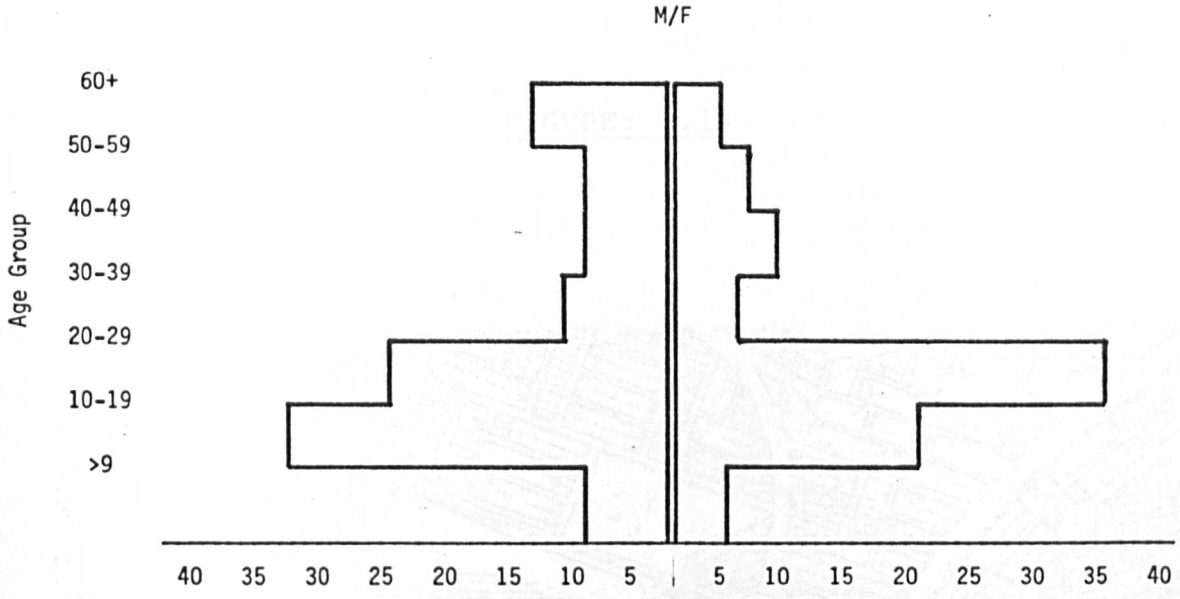
H.3.4 Function of Space and Family Activities

The study of Yarmouk estate shows that there is no indication of any consideration being given to natural environment factors either on the macro level (i.e. the estate layout) or micro level (i.e. the individual unit). The design and the orientation of the road network system and the plot subdivisions are fitted to the surrounding estates and their network system. Thus the plot subdivisions were all orientated differently and in relation to the road network system and not to natural factors (i.e. wind and sun direction) on the macro level nor is the arrangement between the dwelling area and the open space on the plot designed to create suitable internal micro climates.

However, the two types of dwelling in Yarmouk estate are designed in broad terms to meet the inhabitants' cultural expectations as rational requirements (i.e. privacy, security, social activities, etc.) which seem therefore to have played the major role in forming the dwelling shape, the arrangement of the inside different spaces and therefore, the inhabitants' use and movement.

Nevertheless, the purchasers of these units have no opportunity to participate in modelling their house in relation to their individual needs and demands or social status. Accordingly, some of these houses have been altered by their owners in order to fit their personal requirements.

Functionally, Figure H.18 shows that all the house elements are used during the different seasons except those elements which are directly exposed to the natural environment (i.e. flat roof, garden, covered spaces and balconies which are usually not used during winter). Also the same data indicates the most frequently used space within the house is the sitting room, both in summer and winter. Differences can be recognized in the use of other elements such as in the kitchen and bedrooms during the different seasons. There is increased use of the kitchen and bedrooms during winter and also a decrease in use of the dining room, since this room is inadequately warmed during this season.



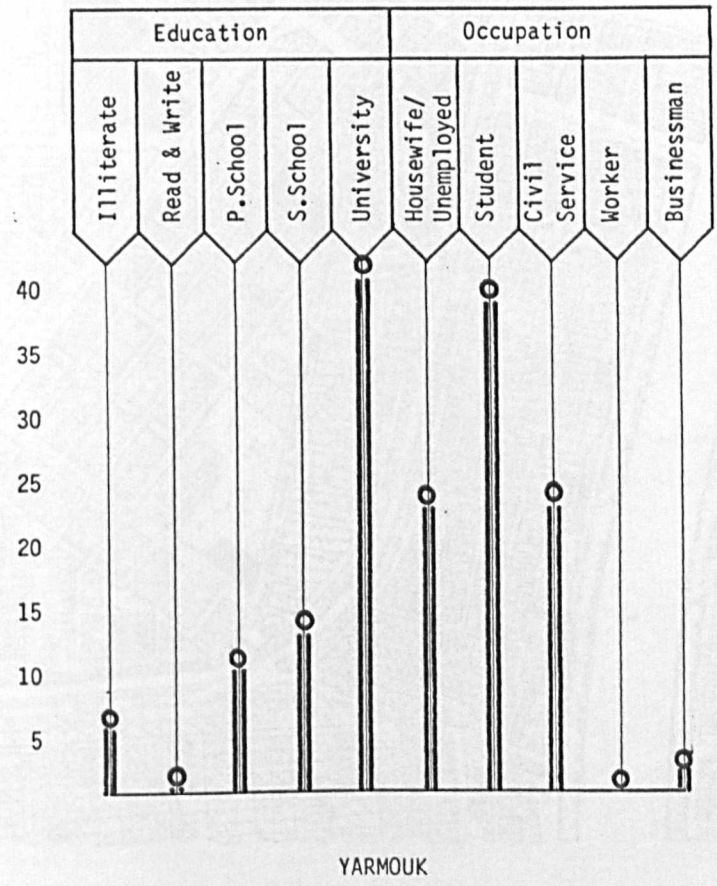


FIGURE: H.13

Population Pyramid, Education Occupation Status

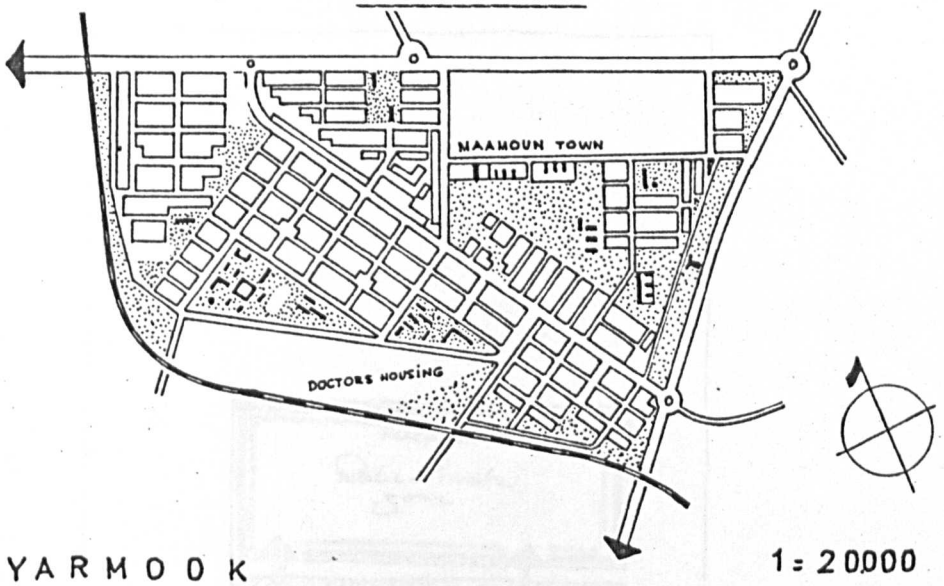
Yarmouk M.

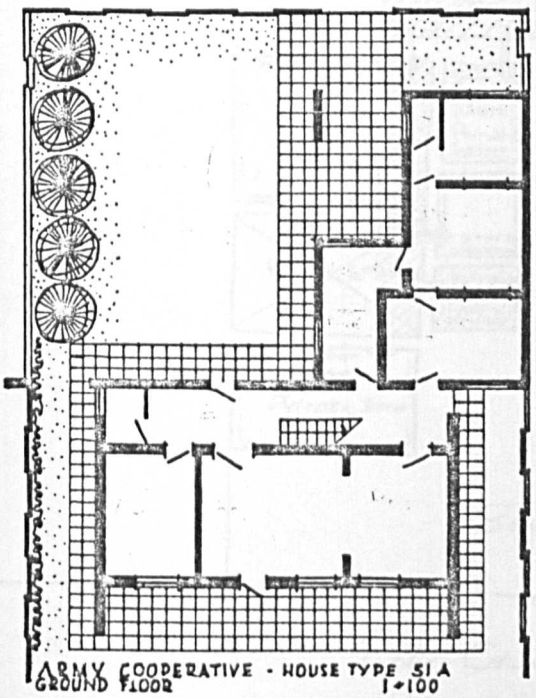
fig H.14

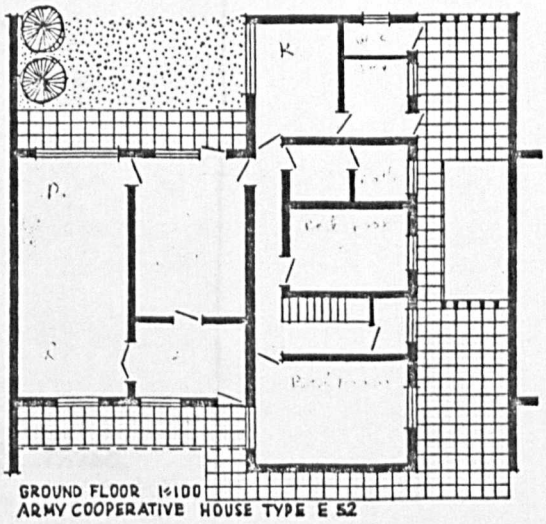
FIGURE: H.14

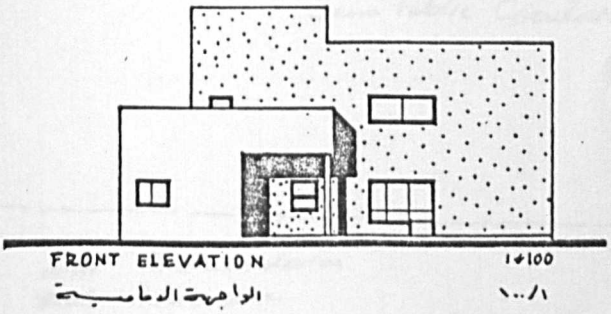
Layout for Yarmouk

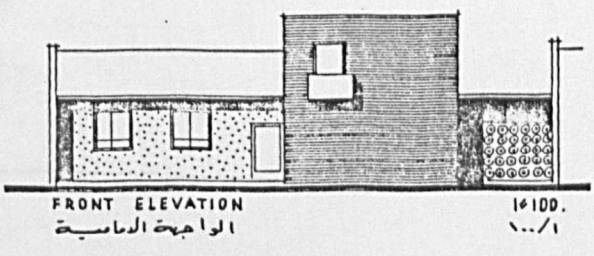
FIGURE: H.15





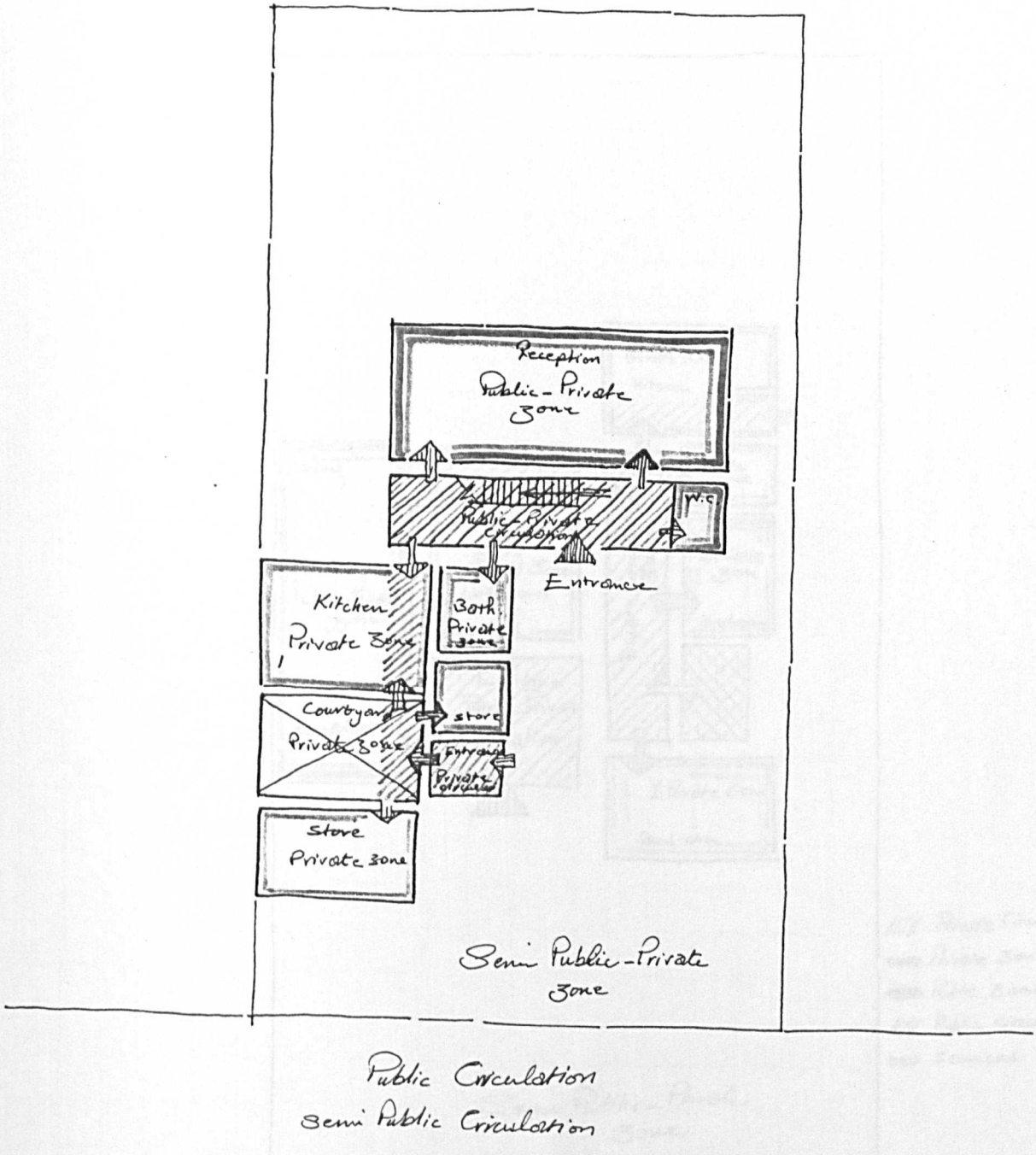






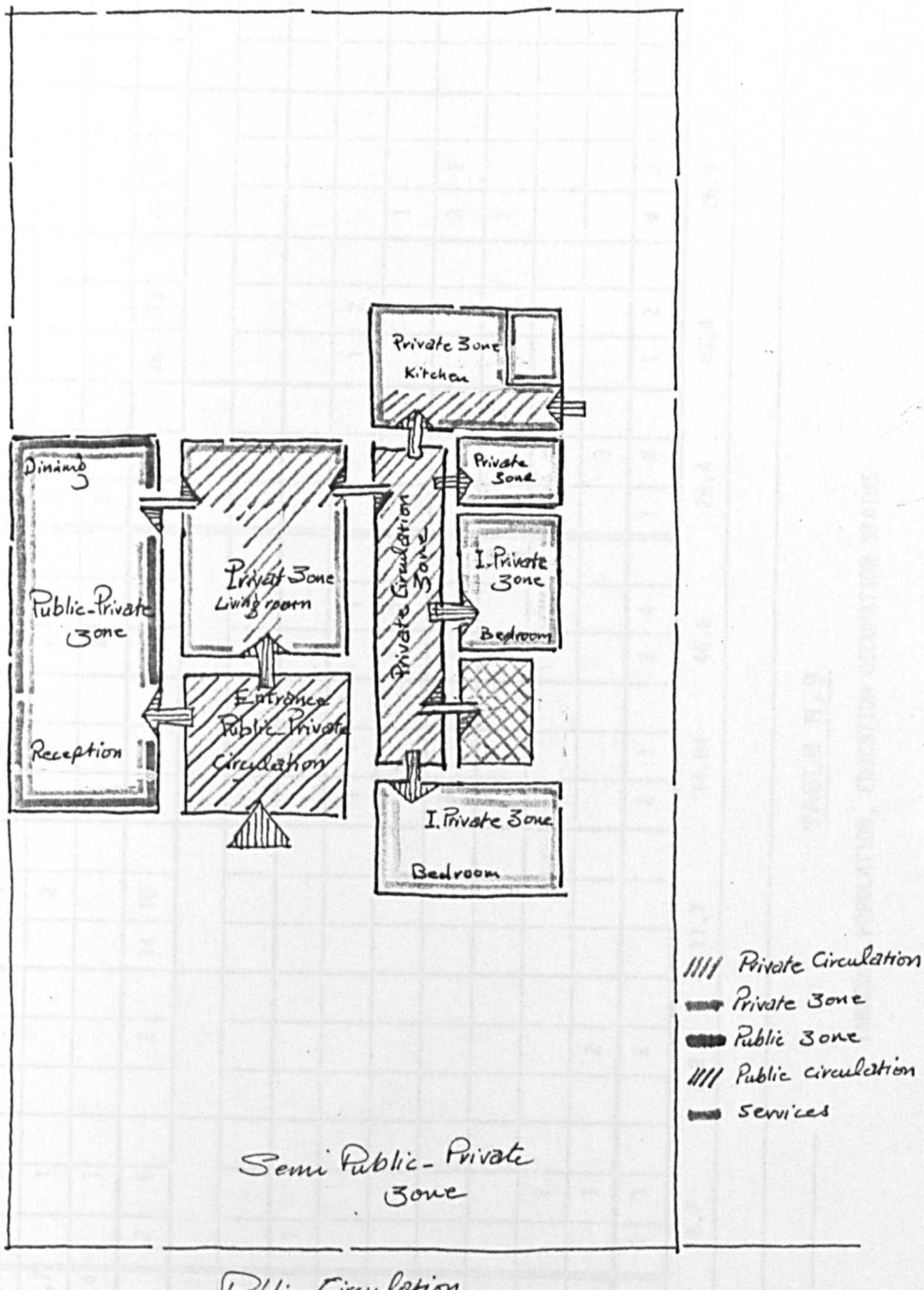
Yarmouk: Layout and Detail of House Types

FIGURE: H.16



Zones of Privacy

FIGURE: H.17



Zones of Privacy

STATUS / NO.	AGE GROUPS				EDUCATION														OCCUPATION														
	MALE		FEMALE		ILLITERATE			LITERATE			P.SCHOOL			S.SCHOOL			UNIVERSITY			HOUSEWIFE/ UNEMPLOYED			STUDENT			CIVIL SERVICE			WORKER			BUSINESSMAN		
	No.	%	No.	%	M	F	%	M	F	%	M	F	%	M	F	%	M	F	%	M	F	%	M	F	%	M	F	%	M	F	%	M	F	%
>9	6	8.2	5	5.4	2	3					4	2		16						2	3		4	2										
10-19	26	31.7	20	23.7							7	4		3	14		3	2			1		25	19		1							
20-29	20	24.7	34	37.6								1		1	8		17	25			6		6	11		13	17					1		
30-39	6	9.4	5	7.5											2		5	3			2		1	1		4	2					1		
40-49	5	7.1	10	10.7		1			2			1			4		5	2		2	8					2	2					1		
50-59	6	7.1	7	9.7		1						2			4		6			4	7					1						1		
60+	10	11.8	2	5.4		1								2	1		8			9	2											1		
TOTAL	79		83		2	6			2		11	10		22			44	32		17	23		36	33		21	21					5		
RELATIVES																																		
>9	1				1															1														
10-19	1		2											1	1			1					1	2										
20-29	1		1														1	1			1					1								
30-39	2		2											1			2	2								2	2							
40-49	1																									1								
50-59			2			2															2													
60+			3			1			2												3													
TOTAL	6		10		1	3			2					2	1		3	4		1	6		1	2		4	2							
% within the whole sample	47.7		52.2		6.7			2.2			11.7			14.04			46.6			26.4			40.4			26.9						2.8		
Average Age	29.4		29.5																															

Total Average Age = 29.45

TABLE H.9

YARMOUK: POPULATION, EDUCATION OCCUPATION STATUS

TABLE H.10

APPROXIMATE DWELLING AREA

Level / Area m²	YARMOUK			
	Ground Floor		First Floor	
	No.	%	No.	%
>49	-	-	-	-
50-99	-	-	24	88.9
100-149	9	33.3	1	3.7
150-199	18	66.7	2	7.2
200-249	-	-	-	-
250-299	-	-	-	-
300-349	-	-	-	-
Average	27	158.33	27	84.26

AREA OF THE WHOLE PLOT

Estate / Area m²	YARMOUK	
	No.	%
>99	-	-
100-199	-	-
200-299	-	-
300-399	-	-
400-499	-	-
600 +	27	100
Average	27	600

TABLE H.11

FEELINGS ABOUT ESTATE DENSITY

Response \ Estate		YARMOUK	
		No.	%
Too crowded		-	-
Crowded		1	3.1
Just right		26	96.3
Don't know		-	-
Reasons			
Near to Services	(No)	27	100
	(Yes)	-	-
Family Size	(No)	3	11.1
	(Yes)	24	88.9
Multi-Family	(No)	24	100
	(Yes)	-	-
Children	(No)	26	96.3
	(Yes)	1	3.7

TABLE H.12

FEELINGS OF DISCOMFORT WHEN WALKING ON THE ESTATE'S ROADS

Response \ Estate	YARMOUK	
	No.	%
No	16	59.3
Yes	11	40.7
Don't know	-	-
Reasons for discomfort		
Long distance	2	7.4
Unpaved	2	7.4
Climatic Factors	4	14.8
Children playing	2	7.4
Traffic	6	22.2
Odour	4	14.8

TABLE H.13

DISTURBANCE FROM NOISE

Estate / Noise	YARMOUK	
	No.	%
No	13	48.1
Yes	14	51.9
Cause of Noise		
Crowdedness	1	3.7
Children	3	11.1
Services	12	44.4
Source of Noise		
Inside the House	1	3.7
Outside the House	12	44.4
No Noise	-	-

TABLE H.14

CAR AND TRANSPORTATION

Response \ Estate	YARMOUK	
	No.	%
Having A Car		
No	3	11.1
Yes	23	85.2
Don't Know	-	-
Problems of Car Parking		
No	22	81.5
Yes	1	3.7
Don't know	4	14.8
Parking Space in Relation to House		
Inside	22	81.5
Outside	1	3.7
Don't know	4	14.8
Preference for Car Space in Relation to House		
Private	23	85.2
Public	-	-
Don't Know	4	14.8

TABLE H.15

SERVICES AND UTILITIES

Distance Between House and Services

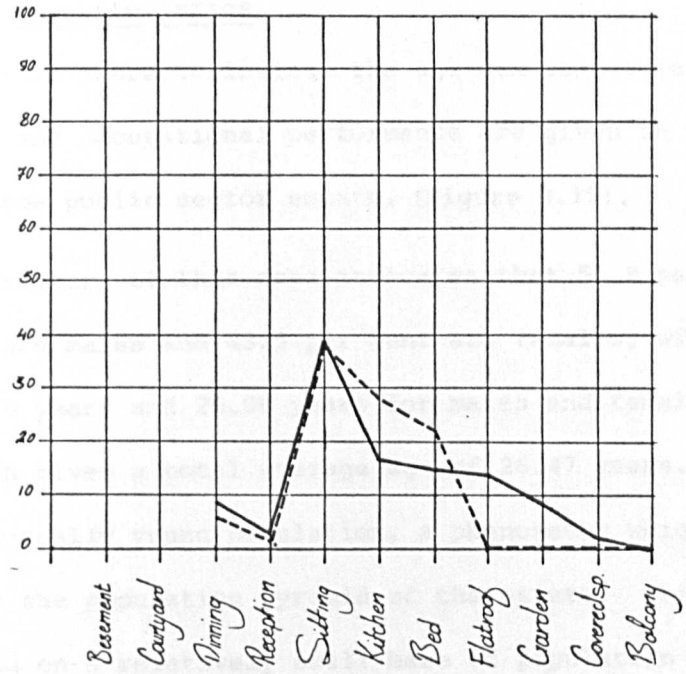
Services \ Estate	YARMOUK					
	Near		By Walking		By Car	
	No.	%	No.	%	No.	%
Primary School	19	70.4	7	25.9	1	3.7
Secondary School	7	25.9	13	48.1	7	25.9
Clinic	-	-	1	3.7	26	96.3
Public Bath	-	-	-	-	27	100
Shops	9	33.3	15	55.6	3	11.1
Cafe	8	29.6	13	48.1	5	18.5
Religious Centre	10	37.0	14	51.9	3	11.1

Services and Utilities Needed on the Estate

Services \ Estate		YARMOUK	
		No.	%
Education	(No)	24	100
	(Yes)	-	-
Social Services	(No)	24	100
	(Yes)	-	-
Environmental Services	(No)	22	81.5
	(Yes)	5	18.5
Health Services	(No)	24	88.9
	(Yes)	3	11.1
Public Services	(No)	17	63.0
	(Yes)	10	37.0

FIGURE: H.18

YARMOUK



The Function and the Used Space

		THE USED SPACE												
		Basement	Courtyard	Dining	Reception	Sitting	Kitchen	Bed	Flatroof	Garden	Coveredsp.	Balcony		
SEASONS / ACTIVITIES		SUMMER / WINTER												
TIME	Breakfast			5 / 4		4 / 2	18 / 21	0 / 1		1 / 0				
	Lunch			5 / 6		9 / 6	13 / 16							
	Siesta			1 / 0	3 / 1	16 / 3		14 / 16						
	Teatime			1 / 1		16 / 21	6 /			8 / 0				
	Dinner			3 /		8 / 13	10 /	9 / 0			1 / 0			
	Afterdinner				2 / 1	19 / 26			1 / 0	8 / 0				
	Sleepingatnight			1 / 1	0 / 1	1 / 0		5 / 26	24 / 0					
TOTAL				16 / 10	5 / 3	73 / 71	31 / 53	29 / 43	25 / 0	17 / 0	2 / 0			
%				8.5 / 5.3	2.6 / 1.6	38.6 / 37.6	16.4 / 28.0	14.8 / 22.8	13.2 /	8.9 /	1.1 /			

TABLE H.16

[H.4] ANDLUS: LOW INCOME ESTATE

H.4.1 Population Characteristics

The population characteristics, the age-sex structure, educational status and occupational performance are given in Table H.17 for Andlus low income public sector estate. (Figure H.19).

The age structure of this area indicates that 56.8 per cent of its population are males and 43.5 per cent are females, with an average age of 25.9 years and 26.96 years for males and females, respectively, which gives a total average age of 26.47 years. This average shows a generally young population, a phenomenon which can be clearly seen in the population pyramid of the estate. This pyramid is standing on a relatively small base of population falling in the age group between 1-9 years which indicates the characteristics of the older nuclear families. Above the base a very high proportion of the population aged 10-29 years forms the main feature of the population pyramid. This age group consists mainly of students in their secondary school and university stages, also people in the early stages of their careers. The low proportion of people above 30 years of age is the result of marriage and work circumstances for older offspring which tends to separate the population in the age group between 30-39 years from their original families as they migrate to places where they can establish new young nuclear families.

The pyramid also indicates a small proportion of males in the age group between 40-49 years, whilst the females in the same age group are more heavily represented. This is because the males in this age group are mainly the fathers of the children in the age group between

1-9 years and the unmarried men, whereas the females in the same age group mainly represent the wives of older males in the age group between 50-59 years who as can be seen are heavily represented, plus the unmarried females either from the original family or living with other relatives. The phenomenon of the sudden increase in the males in the age group 50-59 years which was mentioned earlier is because this age group represents mainly the fathers of the large proportion of the total estate population, i.e. the population age group between 10-29 years.

One of the main features which can be recognized in the age-sex structure of this estate is the large proportion of the age group from 10-29 years and this is because of the large number of the extended families on the estate which form 20.1 per cent of its population.

Table H.17 shows the edcuational and the occupational status of people on the Andlus estate, which indicates that 37.7 per cent of the population have secondary school education and 24.9 per cent have primary school education whilst the population who can merely read and write or who received university level education form 11.2 per cent and 10.5 per cent, respectively. The illiterates form 15.5 per cent of the population.

Students form 40.7 per cent of the population, the civil service forms 19.8 per cent of those with jobs, followed by manual workers forming 10.5 per cent and businessmen, who represent only a very small proportion of the total, i.e. 0.7 per cent.

In general, the histogram shows that about 31 per cent of the population are productive manpower, whereas the rest of the population, i.e. students, housewives and unemployed people, form about 69 per cent, and are economically dependent.

H.4.2 Design Criteria on the Estate Level

Andlus is a low income governmental housing project carried out in 1956, in order to accommodate the low income workers in government service. The project has been designed by a foreign consultant, Doxiadis. The design is based on the second class of the building control regulations 1936 and its amendment.

The layout of Andlus is a grid-iron plan with cul-de-sacs. In this project attempts were made to segregate pedestrian and vehicular traffic. The straight lines of the road pattern resulted in triangular shaped plot divisions, these plots being bounded by a continuous wall with a main access from the front facade location usually to the pedestrian pathway (Figures H.20 and H.21)[21] with approximate area plot between >49-150m² (Table H.18).

The houses constructed on these plots are of two types; one and two-storey buildings, the former mostly abutting the fence of the plot from three sides, leaving a garden in front of the house and a courtyard in the rear surrounded on two sides by the services and the living room. Thus an L-shaped semi-compact open courtyard house is formed. In contrast the two-storey dwellings abut the fence of the plot usually only on non-adjacent two sides leaving a garden at both the front and the rear of the house, the mass of the house forming a triangular shape. Both types of house are built mainly of blocks of concrete and prefabricated lintels and roofing. The steel framed windows which are used in these houses are medium sized compared with the traditional and the high and middle income housing. Windows on the modern estates appear to have been provided solely to provide direct light and give views out of the house and do not have the co-ordinated function of controlling the internal environment with

precision which was noted in traditional housing. The two-storey house type has balconies on the first floor. (Figure H.21).

The small area of plots and the built up area within a compact layout on the one hand and the relatively large number of residents in each house plays the major role in the inhabitants' response to noise disturbance. Table H.19 shows that 46.7 per cent of the surveyed sample feel that the estate is too crowded, 33.3 per cent of them feel it is crowded and only 20 per cent of the population feel that the density is acceptable at 'just the right size'. These feelings about the estate density are said to be due to family size 53.3 per cent, too many children 30 per cent and due to multi-family occupation 26.7 per cent, as illustrated in Table H.20. Accordingly, the estate in general is considered noisy, as shown in Table H.19, with 90 per cent of the inhabitants disturbed by noise. The main source of noise is the children (as indicated in Table H.19), with 73.3 per cent of the inhabitants disturbed by noise from children, mostly created by the children playing outside the house. Table H.19 shows that 83.3 per cent of the inhabitants suffer from outside noise.

The residents also suffer from walking in the estate streets to reach facilities as illustrated in Table H.21. 60 per cent of the inhabitants suffer from walking in the streets because the children use them as playing fields. 46.7 per cent of the inhabitants also suffer from traffic, particularly because there are not enough places for car parking. Accordingly the cars occupy the pavements of the streets and the side roads. In addition the area is surrounded by highways. 43.3 per cent of the surveyed people suffered discomfort when walking around the estate.

40 per cent of the inhabitants do not possess cars, 22 per cent of them have cars and 36 per cent answered 'Don't know' to this question. This throws some doubt on the question. One explanation for this ambiguous response may be because most of the inhabitants drove through the narrow alleyways which are allocated for the use of pedestrians only and an observation made during the survey is that most of the houses which are located on either side of the pedestrian alleyways had their main gates' entrances enlarged in order to give access for a car. In addition many cars were parked all over the estate on the pedestrian pavements and on both sides of the road. These illegal uses of the estate road system may have explained the inhibition by residents to give answers about their car ownership and their parking space as indicated in Table H.22.

Due to the location of the services and utilities within the middle of the district, the information on distance to facilities in Table H.23 shows that most of the population felt services and utilities to be nearby.

H.4.3 Design Criteria Within the Domestic Level in Andlus

In Andlus low income estate, the dwelling designs are based on two types. The first, as in Figure H.23(1) provides relatively small open spaces and gardens surrounding a two-storey house. These spaces act as family semi-public-private zones. The main entrance area has been provided in the front facade and represents the family public-private circulation zone. This zone leads to a reception room which acts as a family public-private zone, and to the family private zone, i.e. the family sitting room from which access is provided to the family private circulation zone where access is offered to the different

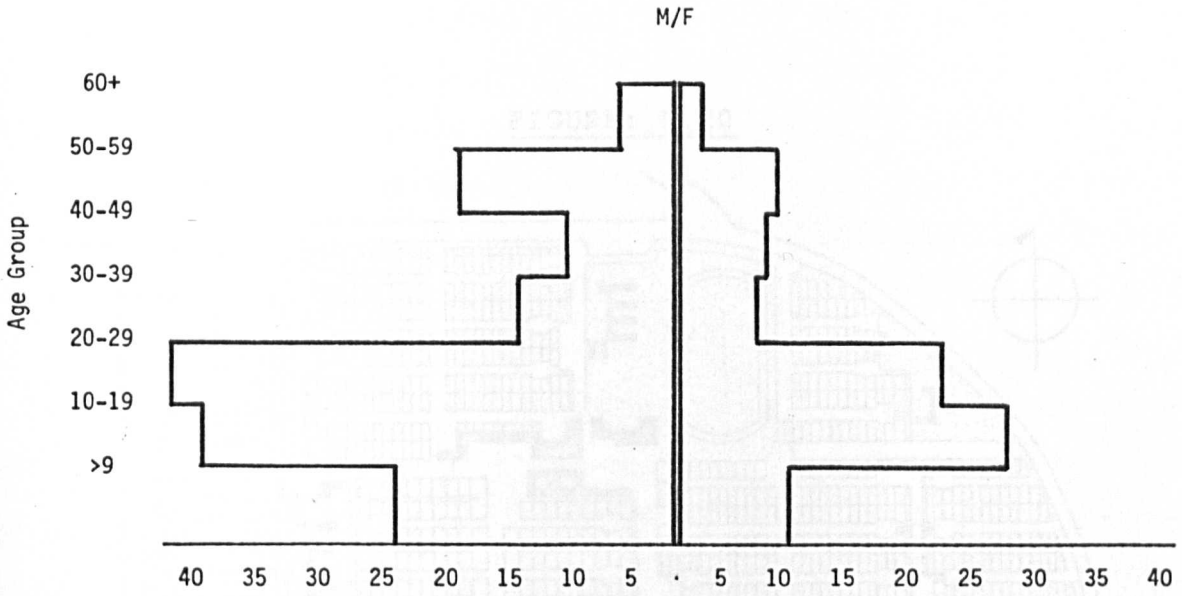
family and individual private zones on both the ground and the first floors. The arrangement of connecting both circulation zones (i.e. public-private and family private circulation) has improved the privacy and increased the use of some parts of the house which are usually affected by cross circulation. Moreover, this arrangement enables the different use zones to retain their clean and temperate conditions away from disturbances.

The second type which is the one-storey building (Figure H.23(2)) treats the used space differently in relation to family privacy and security. This type, like the first type, offers an open garden in front of the house as a family semi-public-private zone in relation to the surrounding roads and neighbours and to the body of the house itself. This zone leads to the main entrance of the house which acts as a family public private circulation zone. From this zone two axes have been provided, one of them leading to the reception room (i.e. public-private zone) and the other leading to the family private zone (i.e. the living room). From this zone access has been given in different directions, to both the individual private zone i.e. bedrooms and also to the family private open space zone (courtyard). Accordingly this family room loses in terms of its privacy and physical qualities due to the excessive cross circulation. The family private open space which follows this zone gives access to the family private zone, kitchen and services.

H.4.4 Function of Space and Family Activities

Similar to the other modern housing types, natural constraints were not taken into consideration when these types of housing were designed. Their design focussed mainly on the cultural factors and

the daily family activities (Figure H.24). Despite the differences in the proportional use of rooms between the main season, summer and winter, the sitting room is the dominantly used space during the different seasons. The second dominantly used space are the bedrooms, despite clear differences in their use between summer and winter. The transfer of family activities to the other indoor spaces at different times of the year results in increasing the use of the bedrooms and the sitting room, whilst not affecting the proportional use of the kitchen throughout the year. This is because the kitchen has a relatively small area which does not allow its use for other than cooking.



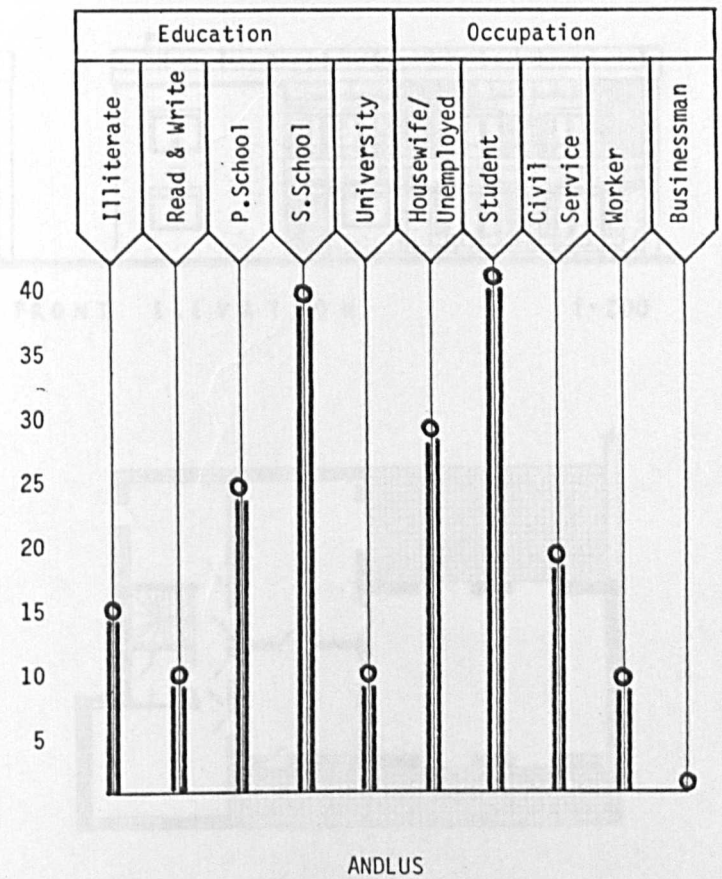
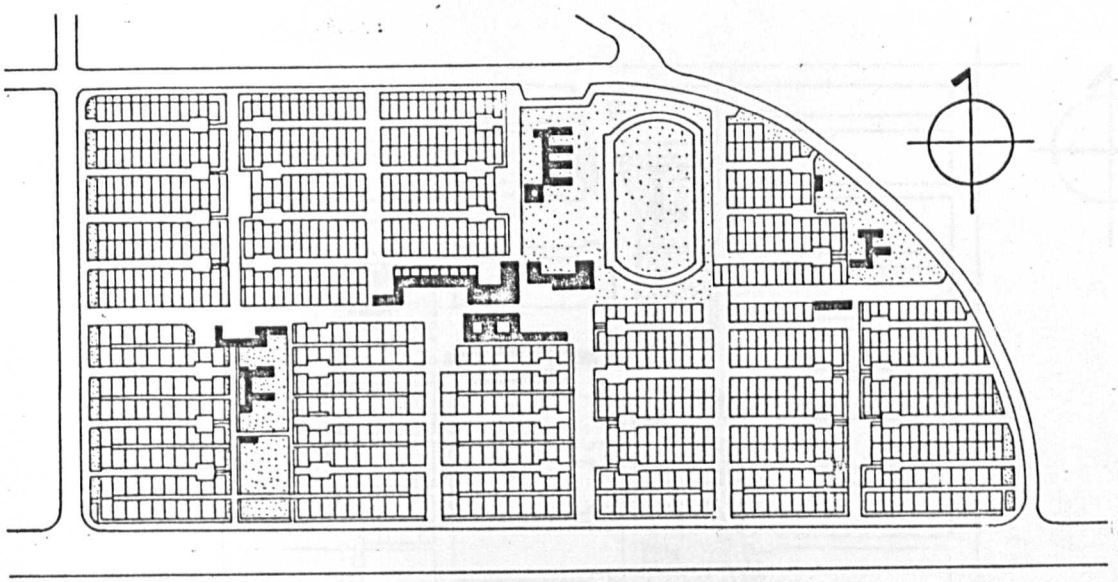


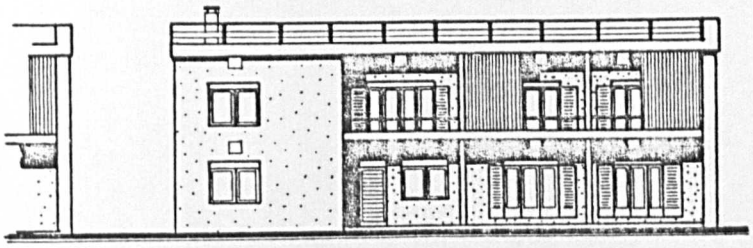
FIGURE: H.19

Population Pyramid, Education Occupation Status

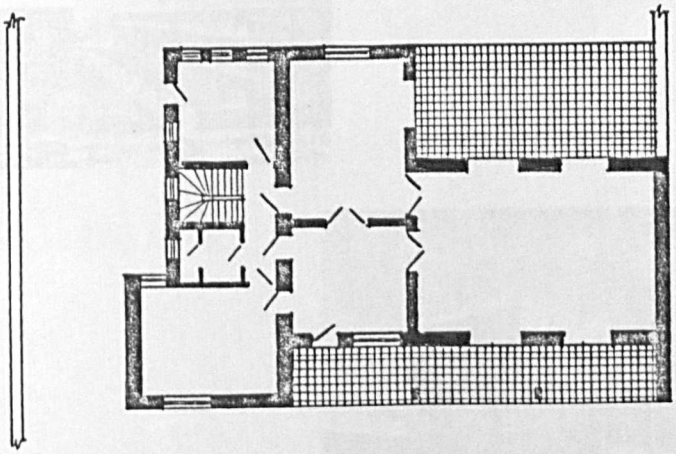
FIGURE: H.20



WESTERN BAGHDAD



FRONT ELEVATION 1·200

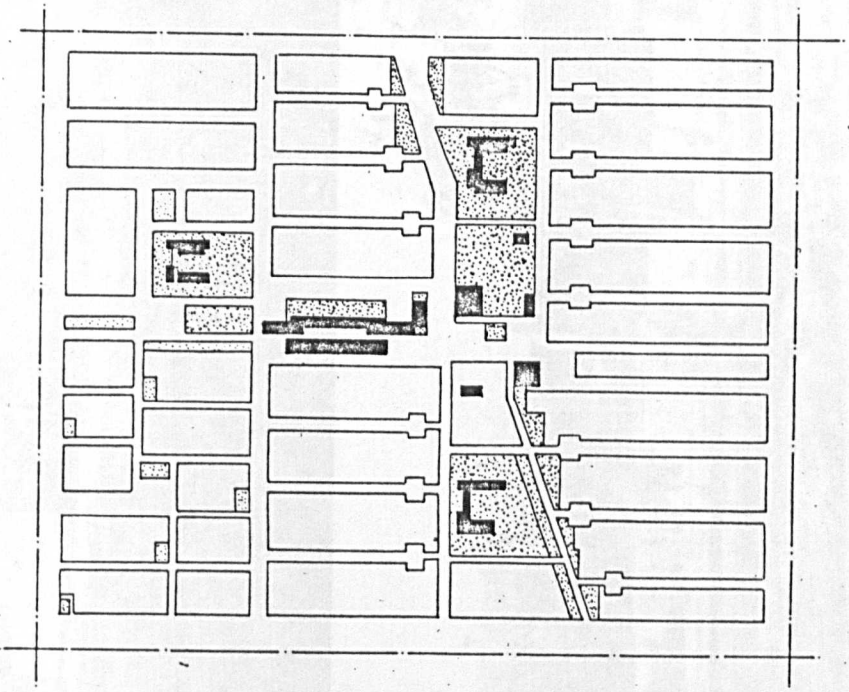


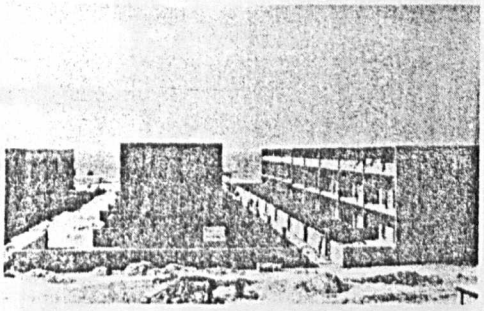
HOUSE TYPE A 601

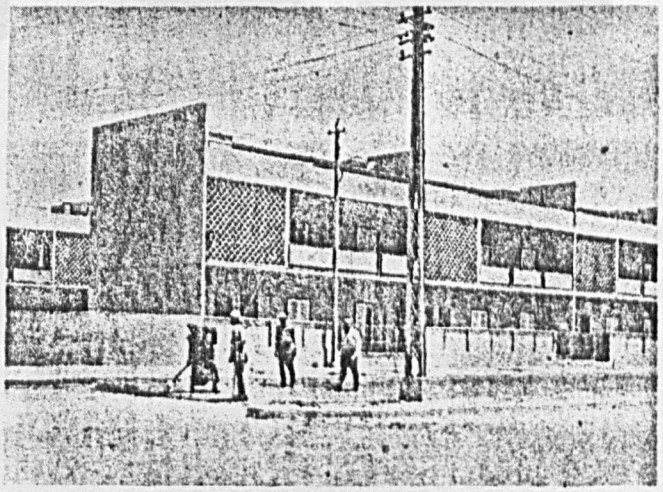
GROUND FLOOR

Andlus Layout and House Detail

FIGURE: H.21

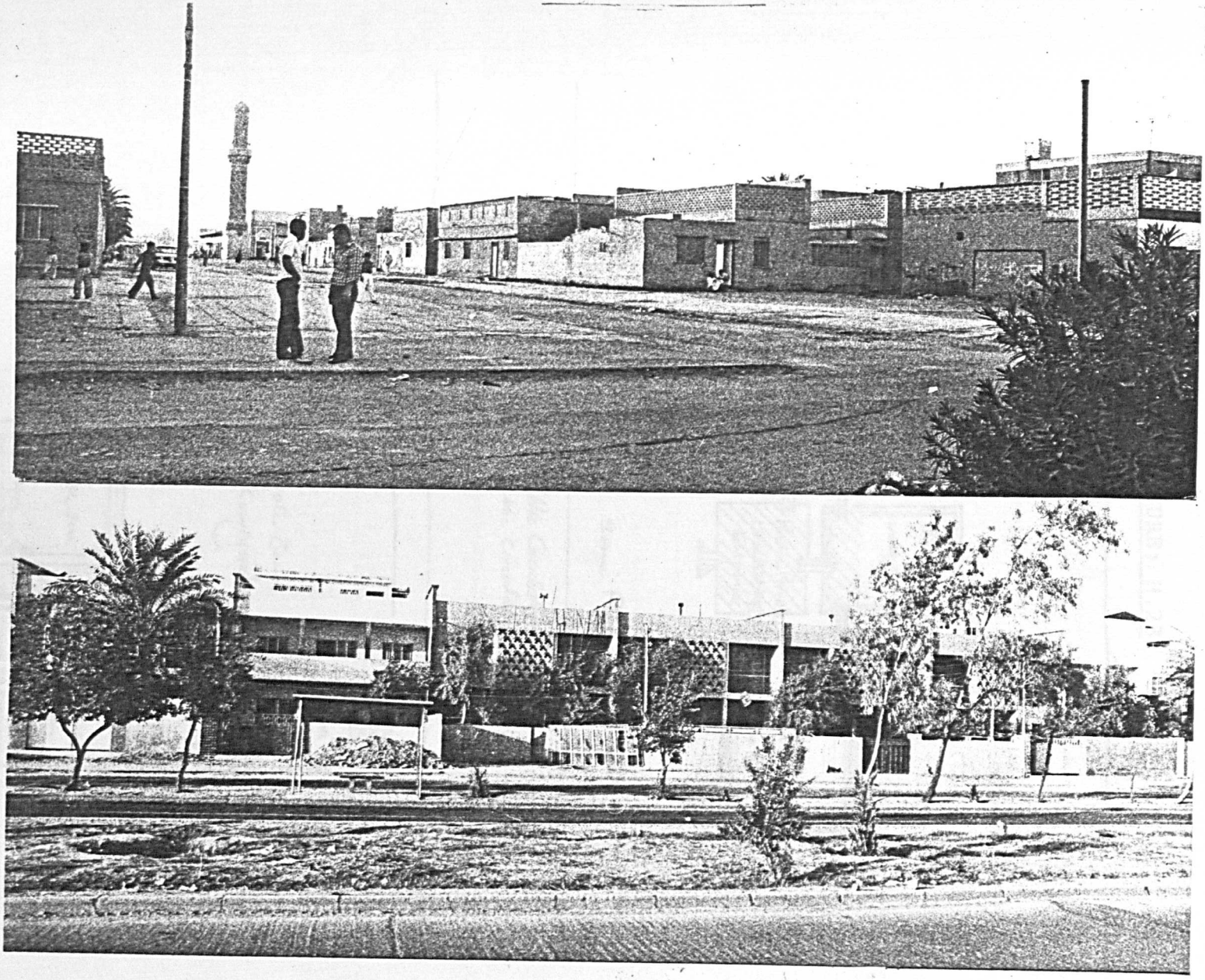






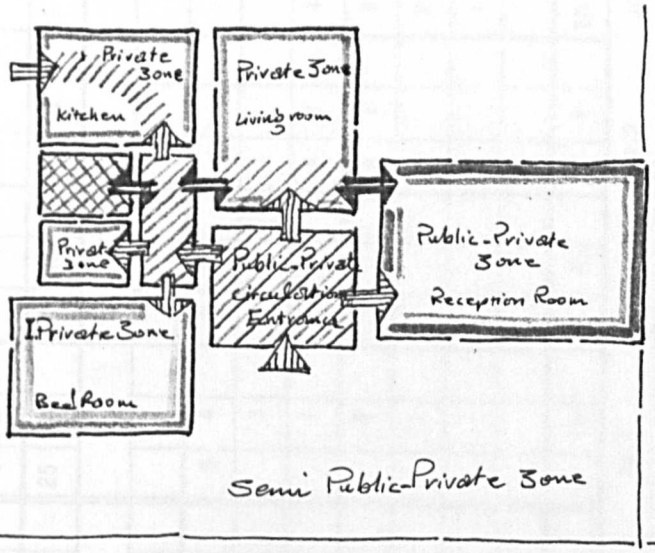
A View of Houses in Andlus

FIGURE: H.22



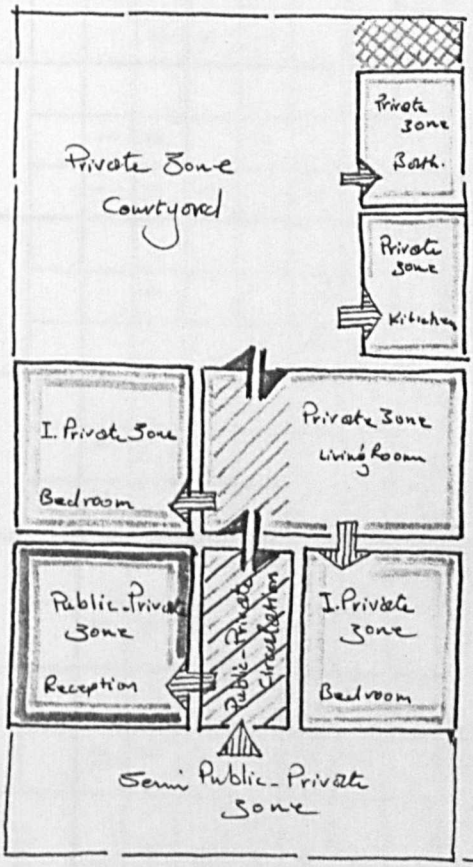
A View of Houses in Andlus

FIGURE; H.23



(1)

Public Circulation
Semi Public circulation



(2)

Public Circulation
Semi Public Circulation.

Zones of Privacy

STATUS / NO.	AGE GROUPS				EDUCATION														OCCUPATION													
	MALE		FEMALE		ILLITERATE			LITERATE			P.SCHOOL			S.SCHOOL			UNIVERSITY			HOUSEWIFE/ UNEMPLOYED			STUDENT			CIVIL SERVICE			WORKER			BUSINESSMAN		
	No.	%	No.	%	M	F	%	M	F	%	M	F	%	M	F	%	M	F	%	M	F	%	M	F	%	M	F	%	M	F	%	M	F	%
>9	10	24	8	12.5	5	4					5	4								5			5										
10-19	37	39	28	29.5							17	9		20	18			1		3			27	33					3	1			
20-29	32	42	26	25.8		1		2	1		1	3		16	14		13	7		1	2		10	11		15	10		8	3			
30-39	8	13	7	8.0		1			4					5	1		4	2			5			1		8	1		2				
40-49	6	8	9	9.0		6		1	1		1			4	1					2	8			1		2	1						
50-59	15	17	13	12.5	2	5		4	5		5			4	1					10	11					4							
60+	4	4	3	2.7	2	3		1	1											4	4										2		
TOTAL	112		94		9	20		8	12		29	16		49	35		17	10		25	31		42	46		30	12		13	4		2		
RELATIVES																																	
>9	12		6		5	4					7	3								5	4		7	2									
10-19	2		5						3		1	2		2							3		2	2									
20-29	10		3								3			6	1						1		2			4	1		4				
30-39	5		2					1				2		3	1						2					1	1		3				
40-49	3		1					2	1		1										1					1			2				
50-59	2		1			2		2													2					1			1				
60+																																	
TOTAL	34		18		5	6		5	4		12	7		11	2					5	13		11	4		7	2		10				
% within whole sample	56.8		43.5		15.5			11.2			24.9			37.7			10.5			28.7			40.7			19.8			10.5			0.77		
Average Age	25.97		26.96																														

Total Average Age = 26.47

TABLE H.17

ANDLUS: POPULATION, EDUCATION OCCUPATION STATUS

TABLE H.18

APPROXIMATE DWELLING AREA

Estate / Area m²	ANDLUS			
	Ground Floor		First Floor	
	No.	%	No.	%
>49	11	36.7	12	40
50-99	16	53.3	18	60.0
100-149	3			
150-199				
200-249				
250-299				
300-349				
Average				

Estate / Area m²	ANDLUS	
	No.	%
>99	27	86.7
100-199	3	6.7
200-299		
300-399		
400-499		
Average	160	

TABLE H.19

DISTURBANCE FROM NOISE

Noise \ Estate	ANDLUS	
	No.	%
No	3	10
Yes	27	90
Cause of Noise		
Crowdedness	-	-
Children	22	73.3
Services	18	60
Source of Noise		
Inside the House	4	13.3
Outside the House	25	83.3
No Noise	1	3.3

TABLE H.20

FEELINGS ABOUT ESTATE DENSITY

Response \ Estate		ANDLUS	
		No.	%
Too crowded		14	46.7
Crowded		10	33.3
Just right		6	20
Don't know		-	-
Reasons			
Near to Services	(No)	-	-
	(Yes)	-	-
Family Size	(No)	14	46.7
	(Yes)	16	53.3
Multi-Family	(No)	22	73.3
	(Yes)	8	26.7
Children	(No)	21	70
	(Yes)	9	30

TABLE H.21

FEELINGS OF DISCOMFORT WHEN WALKING ON THE ESTATE'S ROADS

Response \ Estate	ANDLUS	
	No.	%
No	9	30
Yes	21	70
Don't know	-	-
Reasons for Discomfort		
Long distance	4	13.3
Unpaved	-	-
Climatic Factors	13	43.3
Children playing	18	60
Traffic	14	46.7
Odour	5	16.7

TABLE H.22

CAR AND TRANSPORTATION

Response \ Estate	ANDLUS	
	No.	%
Having a Car		
No	12	40
Yes	7	23
Don't Know	11	36
Problems of Car Parking		
No	5	16.7
Yes	2	6.7
Don't know	23	76.7
Parking Space in Relation to the House		
Inside	2	6.7
Outside	5	16.7
Don't know	23	76.7
Preference for Car Space in Relation to the House		
Private	5	16.7
Public	1	3.3
Don't Know	24	80

TABLE H.23

SERVICES AND UTILITIES

Distance Between House and Services

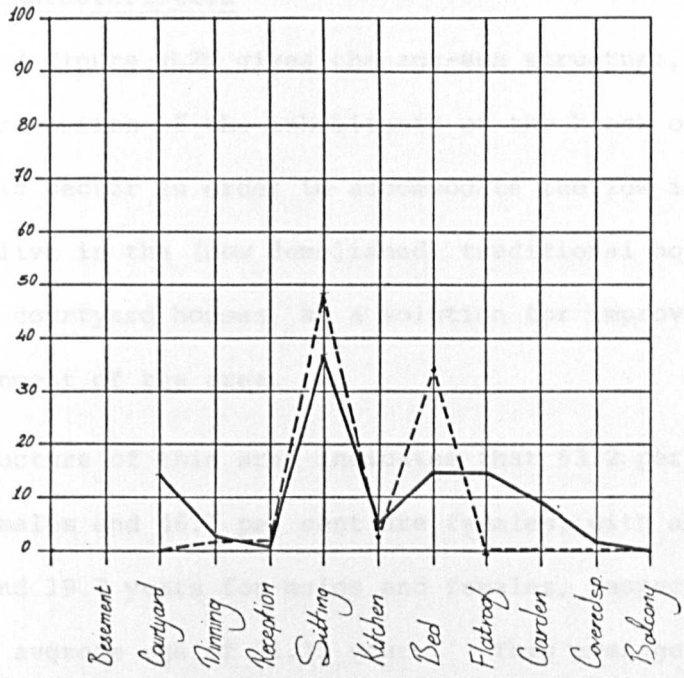
Estate / Services	ANDLUS					
	Near		By Walking		By Car	
	No.	%	No.	%	No.	%
Primary School	22	73.3	7	23.3	1	3.3
Secondary School	13	43.3	11	36.7	5	16.7
Clinic	6	20	11	36.7	13	43.3
Public Bath	1	3.3	1	3.3	28	93.3
Shops	20	66.7	7	23.3	3	10.0
Cafe	20	66.7	9	30	1	3.3
Religious Centre	18	60	11	36.7	1	3.3

Services and Utilities Needed on the Estate

Services / Estate		ANDLUS	
		No.	%
Education	(No)	25	85.3
	(Yes)	5	16.7
Social Services	(No)	28	93.3
	(Yes)	2	6.7
Environmental Services	(No)	24	80
	(Yes)	6	20
Health Services	(No)	21	70
	(Yes)	9	30
Public Services	(No)	10	33.3
	(Yes)	20	66.7

FIGURE: H.24

ANDLUS



The Function and the Used Space

	THE USED SPACE																			
	Basement		Courtyard		Dining		Reception		Sitting		Kitchen		Bed		Flatroof		Garden		Covered sp	
SEASONS / ACTIVITIES	SUMMER	WINTER	SUMMER	WINTER	SUMMER	WINTER	SUMMER	WINTER	SUMMER	WINTER	SUMMER	WINTER	SUMMER	WINTER	SUMMER	WINTER	SUMMER	WINTER	SUMMER	WINTER
TIME — Breakfast			9 / 0		2 / 0				12 / 2		1 / 3		3 / 7				2 / 0		1 / 0	
Lunch					3 / 2				1 / 21		6 / 0		0 / 7							
Siesta									19 / 8				15 / 13							
Teatime			6 / 0						13 / 23		2 / 1		3 / 6		1 / 0		5 / 0		2 / 0	
Dinner			6 / 0		1 / 1				13 / 22		2 / 1		4 / 6				5		1 / 0	
After dinner			3 / 0				1		17 / 25				4 / 5				6 / 0			
Sleeping at night							4		1 / 0				2 / 26		29 / 0		1 / 0			
TOTAL			24 / 0		6 / 3		1 / 4		76 / 101		11 / 5		31 / 70		30 / 0		19 / 0		4 / 0	
%			11.4 / 0		2.8 / 1.4		.9 / 1.9		36.1 / 48.1		5.2 / 2.4		14.1 / 33.3		14.2 / 0		9.0 / 0		1.9 /	

TABLE H.24

[H.5] KARAMA HIGH RISE BUILDING: LOW INCOME ESTATE

H.5.1 Population Characteristics

Table H.25 and Figure H.25 gives the age-sex structure, educational status and occupation of the inhabitants of the block of flats erected by the public sector in order to accommodate the low income people who used to live in the (now demolished) traditional houses of Karama estate, i.e. courtyard houses, as a solution for improving the physical environment of the area.

The age structure of this area indicates that 53.2 per cent of its population are males and 46.7 per cent are females, with an average age of 22.6 years and 19.7 years for males and females, respectively, which gives a total average age of 21.15 years. This average shows a very young population, a phenomenon which can be clearly seen in the population pyramid of the estate. This pyramid is standing on a large base of population age group between 1-9 years which forms the main feature of the population pyramid which in turn indicates the dominant characteristics of the young nuclear families on the estate. The population age group between 10-19 is much smaller in size. Above this base the very small proportion of males in the age group between 20-39 years is due to marriage and work circumstances which tend to separate them from their original families, whilst the high proportion of female population group aged between 20-29 years may be brought about by a large number of unmarried females in these low income families. These unmarried females usually live with their parents or relatives. Only a small proportion of families were found above 30 years of age. The population pyramid also shows a high percentage in the male population

age group between 40-49 years, representing the fathers of the largest proportion of population, i.e. people aged between 1-19 years. Following this age group is a gap in the population aged between 50-59 years, then another increase in the age group over 60 years of age.

The unbalanced age-sex structure which is indicated in the population pyramid is mainly as a result of the extended families which form 18.7 per cent of the estate population.

Table H.25 shows the educational and occupational status of the people who occupied the block of flats, with most of them originally being the inhabitants of the traditional residential area of Karama. 27.9 per cent of the population have primary school education and 19.2 per cent have secondary school education, whereas the population who are merely able to read and write and in the university form a very small proportion, i.e. 8.12 per cent and 4 per cent of the population respectively, whilst the illiterate people form a large proportion from the total population, i.e. 40.6 per cent.

The dominant group in this area are the unemployed, housewives and students, forming 48.7 per cent and 27.9 per cent of the population, respectively. These groups are economically unproductive, whilst the productive occupations of the population on this estate are dominated by the manual workers forming 14.2 per cent of the total population, whilst other occupations such as civil service and businessmen represent only a small proportion of the total, i.e. 9.1 per cent are civil service and 0.5 per cent are businessmen.

In general, the histogram shows also that about 23.8 per cent of the population are productive manpower, whereas the rest of the population, i.e. students, housewives and unemployed people forming 76.2 per cent are economically dependent.

The high rise building as a solution to solving urban housing problems has been tried in many contexts, particularly in western countries. The same approach was adopted in Iraq in 1970 whereby high rise buildings were constructed as a remedy for the housing problems of the cities. One reason given for their construction was in order to improve the physical environment conditions of the old areas within the cities. Some of these blocks were built on Karama estate as a redevelopment area after clearing away part of the traditional courtyard housing.

These blocks of flats are four storeys in height. They consist of several flats in each floor, each of these flats representing a living cell to accommodate people. Accordingly, the block of flats represents a very compact setting for housing. (Figure H.26).

All the blocks of flats in Karama district are located close to the main highway which links Baghdad city centre with the Baghdad suburbs. Due to their location small open spaces were left between the blocks. These open spaces had been left mainly in front of the blocks in order to be used as gardens, whilst the open spaces in the back were arranged for use as car parking.

These blocks of flats are mainly constructed of reinforced concrete as a skeleton structure and filled with bricks as partitions in order to create the living spaces. Each flat has large steel framed windows and balconies, these windows and balconies forming the

facades of the whole blocks.

The occupiers of these blocks are mainly people whose houses were cleared in the same area. These residents in general have only a short experience of the flats since they were moved into them within months of the survey.

The areas of the flats fall in the range between 50-99m² as shown in Table H.26; this area includes a flat with living room, kitchen, other utilities and two or three bedrooms.

The multi-family household with a large number of children can be considered as a phenomenon in the traditional housing; this phenomenon becomes one of the features of the population in the blocks of flats in Karama when the inhabitants of the traditional houses transfer into these flats as the result is overcrowding. Table H.27 shows the feeling of the inahabitants: 44.4 per cent of them feel it is too crowded, 22.2 per cent of them feel it is crowded and only 33.3 per cent of them feel their flat is the right size.

The residents diagnose the causes of the crowdedness in Table H.27 with 59.6 per cent saying it is because of the large number of families, 55.6 per cent because of the multi-families and in both of the above cases, a large number of children can be expected, as shown in the same table.

The location of these blocks of flats within the traditional housing areas of the city allows their inhabitants to use the facilities and the narrow alleyways of the traditional areas, particularly by walking. As a result Table H.28 shows that 66.7 per cent of the inhabitants do not suffer discomfort from walking in the streets of

the estate. In general, Table H.28 shows that 33.3 per cent of the residents suffer from traffic, since all the blocks are located alongside the main highway, whilst 25.9 per cent of the inhabitants suffer from the noise of children playing.

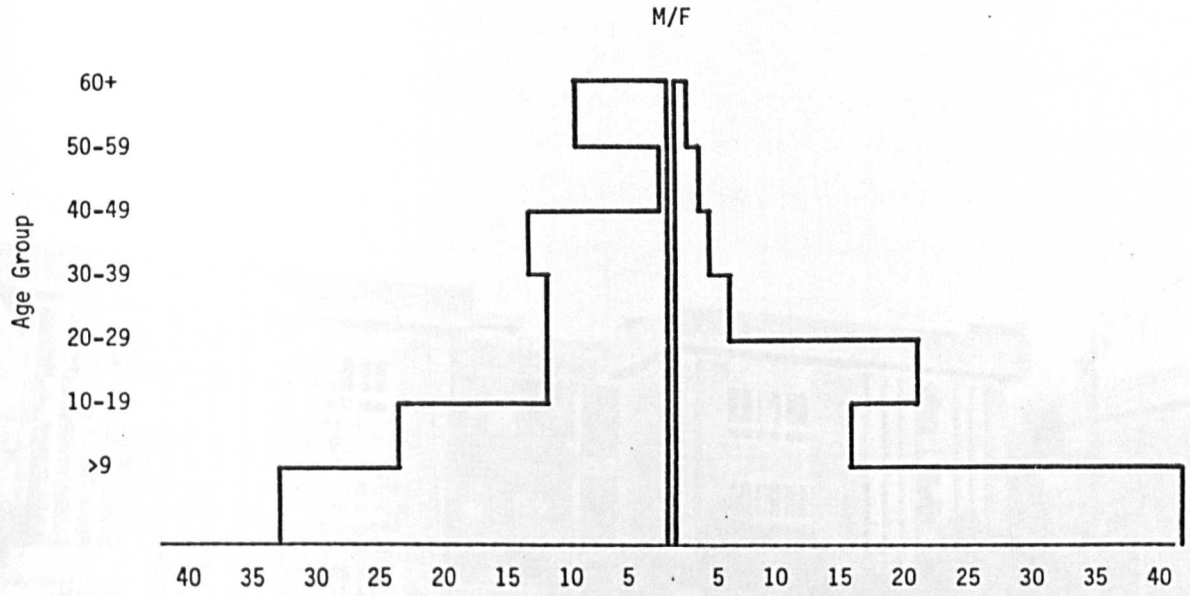
In addition, the location of the blocks enables the residents to use the same traditional area services and utilities which resulted in services and utilities being nearby for the occupiers as seen in Table H.30.

However, the location of the blocks of flats within the traditional area and adjacent to the highway causes disturbance from noise for the inhabitants. Table H.29 shows that 85.2 per cent of the inhabitants were disturbed by noise and that the source of noise is mainly from the children and services (the traffic etc.) as shown in Table H.29. This table shows that 77.8 per cent of the residents are disturbed by noise from children and 25.9 per cent of the inhabitants are disturbed by other sources of noise from outside the flats. Table H.29 shows that of all noise sources 66.7 per cent are from outside, 7.4 per cent from inside the flats whilst 11.1 per cent is from both inside and outside.

As these blocks of flats are occupied by low income people, car ownership is very low. Table H.31 shows that only 14.8 per cent of inhabitants possess cars and they do not face any problem of car parking since they park their cars in the provided car park as indicated in Table H.31.

H.5.2 Function of Space and Family Activities

Despite each flat within the block of flats having most of the ordinary house elements (i.e. living room, bedrooms, kitchen, balconies and flat roof) they are not used as fully as intended, mainly because of the lack of privacy. The close location of the blocks to each other allows overlooking from one flat to another which does not encourage the people to use their balconies. For a similar reason most of the inhabitants do not use the flat roof for sleeping as all of them share the same staircase and same roof (i.e. the flat roof of the block of flats). Despite the roof being divided into areas by partitions according to the number of flats in each block there is little use of the roof. Accordingly the daily activities of the sample families have been limited to three major areas during the different seasons of the year. Figure H.32 shows in general that the most used space is the living room, followed by the bedroom and then the kitchen, but on the detailed level differences in the use of space can be seen in the living room and the kitchen during the year. This is due to the internal thermal condition of the spaces, as the living room is usually the coolest place in summer because of the use of air coolers and the kitchen the hottest place in winter. The figure shows an increase in the use of the living room during summer and a decrease in the use of the kitchen in winter. The use of the kitchen increases and decreases in an opposite way to the use of the sitting room. The change in the use of the bedrooms occurs over the year.



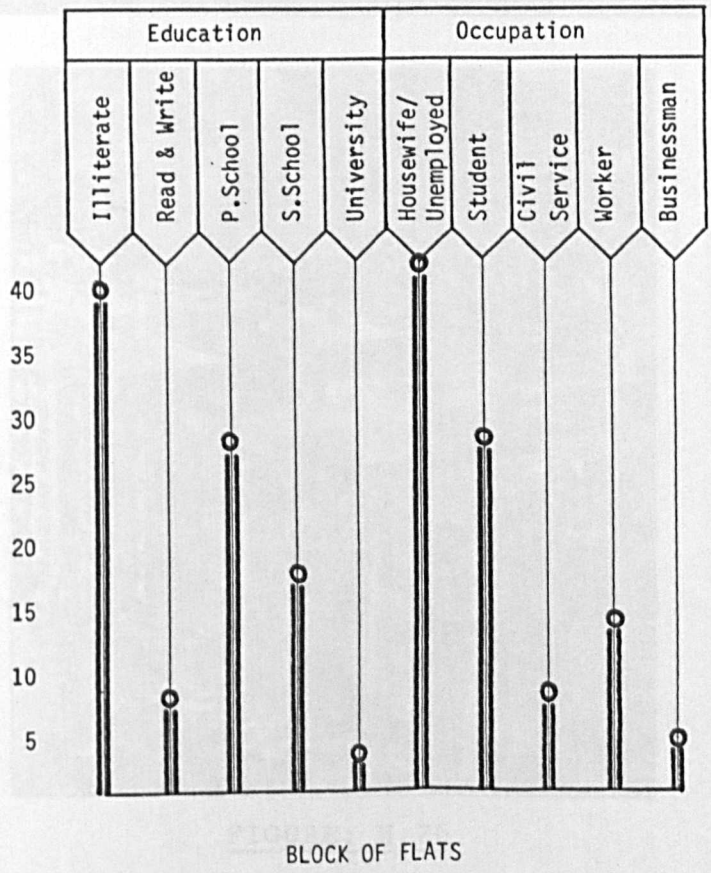


FIGURE: H.25

Population Pyramid, Education Occupation Status

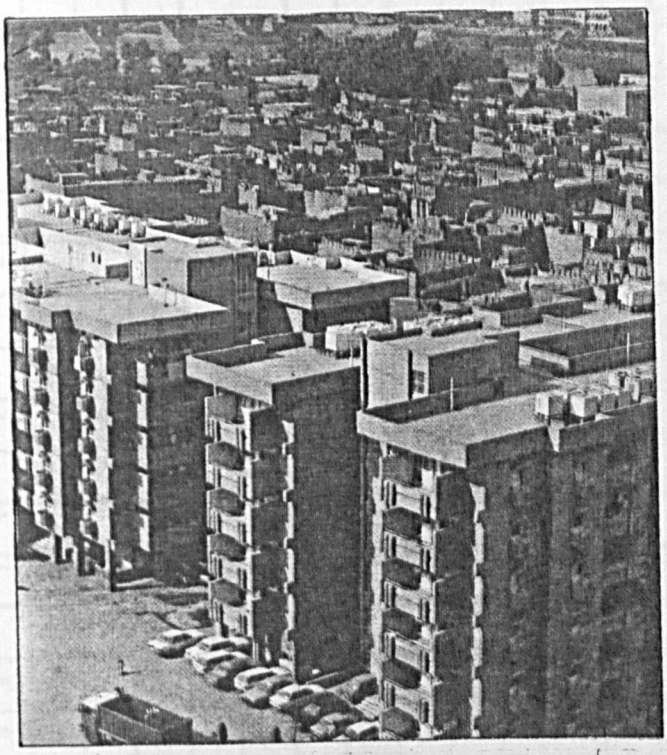


FIGURE: H.26

Karama Block of Flats

STATUS / NO.	AGE GROUPS				EDUCATION														OCCUPATION													
	MALE		FEMALE		ILLITERATE			LITERATE			P.SCHOOL			S.SCHOOL			UNIVERSITY			HOUSEWIFE/ UNEMPLOYED			STUDENT			CIVIL SERVICE			WORKER			BUSINESSMAN		
	No.	%	No.	%	M	F	%	M	F	%	M	F	%	M	F	%	M	F	%	M	F	%	M	F	%	M	F	%	M	F	%	M	F	%
>9	29	33.4	28	40.2	21	16		1			7	12								22	18		7	10										
10-19	24	23.8	15	17.4	1						7	10		16	5					1	1		19	14		2			2					
20-29	8	11.4	13	21.7		1		1	4		3	1		3	5		1	2			7		1	3		3	3		4					
30-39	9	11.4	6	7.6	1	3		1			4	2		1	1		2				6					2			7					
40-49	12	12.4	5	5.4	3	4		1	1		2			3			3			1	5					6			4			1		
50-59			4	4.4		3			1												4													
60+	7	7.6		3.3	3			2			2									3									4					
TOTAL	89		71		29	27		6	6		25	25		23	11		6	2		27	41		27	27		13	3		21			1		
RELATIVES																																		
>9	6		9		6	8						1								6	8			1									
10-19	1		1			1								1							1								1					
20-29	4		7			3		1	2		1	2		2							6					1			3	1				
30-39	3		1		1				1		1			1							1					1			2					
40-49	1				1															1														
50-59																																		
60+	1		3		1	3														1	3												
TOTAL	16		21		9	15		1	3		2	3		4						8	20			1		2			6	1				
% within whole sample	53.2		46.7		40.6			8.12			27.9			19.2			4			48.7				27.9		9.1			14.2			0.5		
Average Age	22.6		19.7																															

Total Average Age = 21.15

TABLE H.25

BLOCK OF FLATS: POPULATION, EDUCATION OCCUPATION STATUS

TABLE H.26

APPROXIMATE DWELLING AREA

	BLOCK OF FLATS			
Level / Area m²	Ground Floor		First Floor	
	No.	%	No.	%
>49	-	-		
50-99	27	100		
100-149	-	-		
150-199	-	-		
200-249	-	-		
250-299	-	-		
300-349	-	-		
Average	76.35			

TABLE H.27

FEELINGS ABOUT ESTATE DENSITY

Response \ Estate		BLOCK OF FLATS	
		No.	%
Too crowded		12	44.4
Crowded		6	22.2
Just right		9	33.3
Don't know		-	-
Reasons			
Near to Services	(No)	27	100
	(Yes)	-	-
Family Size	(No)	11	40.7
	(Yes)	16	59.3
Multi-Family	(No)	12	44.4
	(Yes)	15	55.6
Children	(No)	26	96.3
	(Yes)	1	3.7

TABLE H.28

FEELINGS OF DISCOMFORT WHEN WALKING ON THE ESTATE'S ROADS

Response \ Estate	BLOCK OF FLATS	
	No.	%
No	18	66.7
Yes	9	33.3
Don't know	-	-
Reasons for Discomfort		
Long distance	-	-
Unpaved	-	-
Climatic Factors	5	18.5
Children playing	7	25.9
Traffic	9	33.3
Odour	1	3.7

TABLE H.29

DISTURBANCE FROM NOISE

Estate / Noise	BLOCK OF FLATS	
	No.	%
No	4	14.8
Yes	23	85.2
Cause of Noise		
Crowdedness	-	-
Children	21	77.8
Services	7	25.9
Source of Noise		
Inside the House	2	7.4
Outside the House	18	66.7
No Noise	3	11.1

TABLE H.30

SERVICES AND UTILITIES

Distance Between House and Services

Estate / Services	BLOCK OF FLATS					
	Near		By Walking		By Car	
	No.	%	No.	%	No.	%
Primary School	23	85.2	4	14.8	-	-
Secondary School	22	81.5	3	11.1	2	7.4
Clinic	17	63	5	18.5	4	14.8
Public Bath	9	33.3	4	14.8	14	51.9
Shops	26	96.5	1	3.7	-	-
Cafe	27	100	1	3.7	-	-
Religious Centre	27	100	-	-	-	-

Services and Utilities Needed on the Estate

Services / Estate		BLOCK OF FLATS	
		No.	%
Education	(No)	27	100
	(Yes)	0	-
Social Services	(No)	25	92.6
	(Yes)	2	7.4
Environmental Services	(No)	23	85.2
	(Yes)	4	14.8
Health Services	(No)	27	100
	(Yes)	-	-
Public Services	(No)	15	55.6
	(Yes)	12	44.4

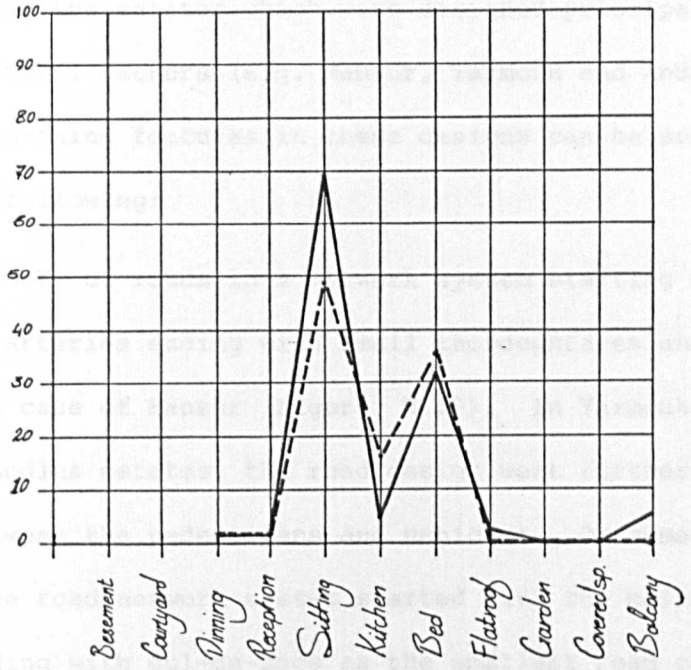
TABLE H.31

CAR AND TRANSPORTATION

Response \ Estate	BLOCK OF FLATS	
	No.	%
Having a Car		
No	23	85.2
Yes	4	14.8
Don't Know	-	-
Problems of Car Parking		
No	2	7.4
Yes	2	7.4
Don't know	23	85.2
Parking Space in Relation to the House		
Inside	-	-
Outside	4	14.8
Don't know	23	85.2
Preference for Car Space in Relation to the House		
Private	4	14.8
Public	23	85.2
Don't Know		

FIGURE: H.27(a)

BLOCK OF FLATS



The Function and the Used Space

	THE USED SPACE											
	Basement	Courtyard	Dining	Reception	Sitting	Kitchen	Bed	Flatroof	Garden	Coveredsp.	Balcony	
SEASONS / ACTIVITIES	SUMMER / WINTER											
TIME — Breakfast			1 / 1		20 / 74	5 / 11	3 / 3					
Lunch			1 / 1		23 / 17	2 / 8	2 / 2					
Snack					15 / 4		18 / 22					
Tea time				1 / 1	23 / 18		6 / 4					
Dinner			1 / 1	1 / 1	25 / 17	1 / 5	4 / 4					
Afterdinner				1 / 1	24 / 21	1 / 2	4 / 4					
Sleeping at night					5 / 1		25 / 26	4 / 0			1 / 0	
TOTAL			3 / 3	3 / 3	131 / 92	9 / 31	60 / 65	4 / 0			1 / 0	
%			1.6 / 1.6	1.6 / 1.6	69.3 / 48.6	4.8 / 16.4	31.7 / 34.3	2.1			.3	

TABLE H.32

[H.6] COMPARISON AND ANALYSIS

Comparing the estates which were designed principally to accommodate cultural factors (e.g. Mansur, Yarmouk and Andlus) certain distinguishing features in these designs can be seen clearly in the following:

A hierarchy of roads in a network system starting mainly from wide main arteries ending with small thoroughfares and road loops as in the case of Mansur (Figure H.10). In Yarmouk and especially in Andlus estates, the road design went further with spatial segregation between the pedestrians and vehicles. On some estates the hierarchy of the road network system started with the main arteries and usually ending with cul-de-sacs as the smallest road connections, (Figure H.19(a)). This design arrangement has a marked effect on the inhabitants' social relationships and their physical functions. Thus, for example, Figure H.27(b) shows that a high proportion of the inhabitants have good social relationships with their neighbours and a very small proportion of them feel lonely.

The criteria used in the design of each estate layout was linked to the inhabitants' income status as can be seen in Andlus low income estate, in which the layout has been subdivided into relatively small plots and outside open spaces. In Mansur high income estate the layout has been subdivided into large plots and outside open spaces.

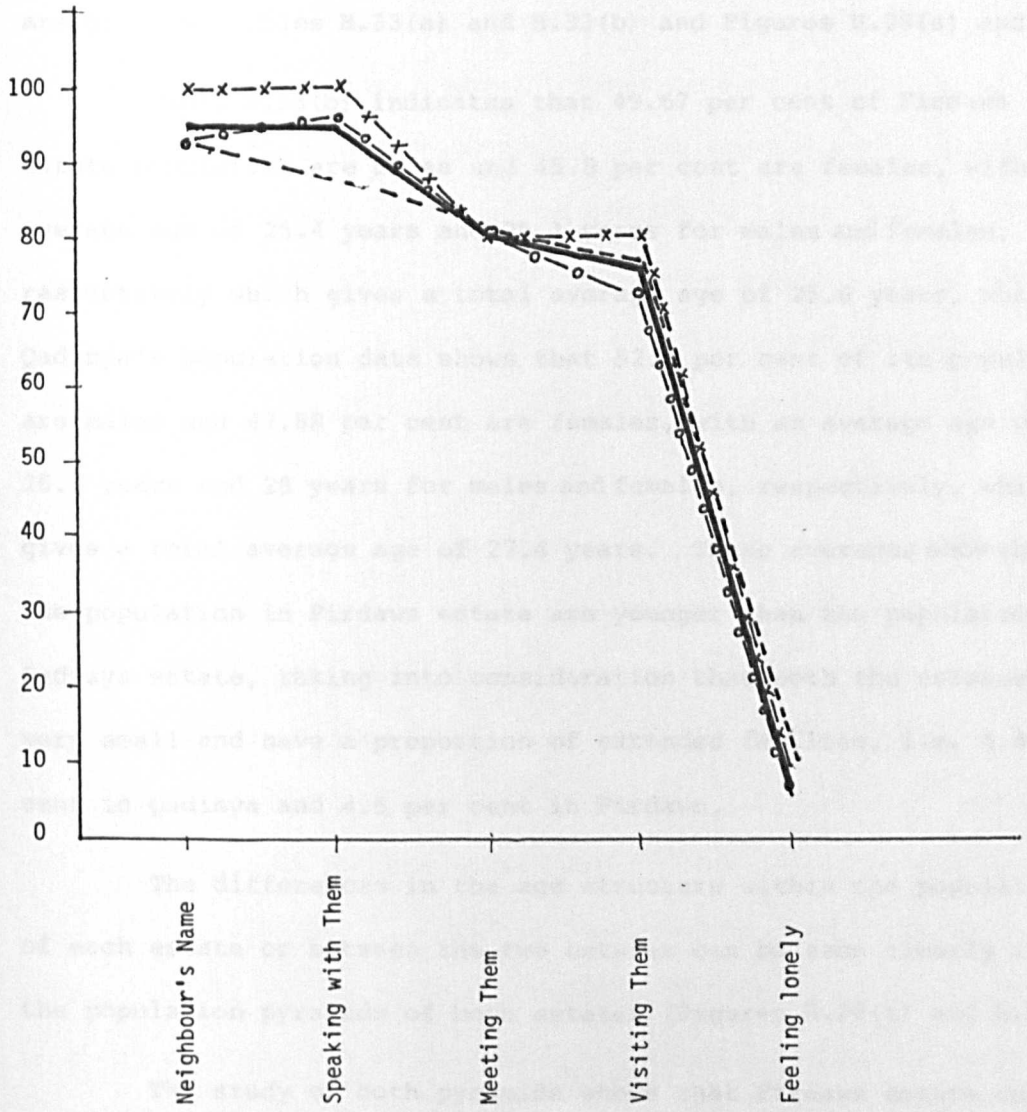
The main design principles used in these estates were based on the inhabitants' modes of transportation within the estate. This fact can be seen in Figure H.10 where in Mansur the location of the

main services and utilities are placed on the edge of the estate. This type of distribution is mainly based on assumptions of car ownership, which is also reflected therefore, in the inhabitants' responses in Table H.6. This table suggests 33 per cent of the people use their cars and 23.8 per cent walk to reach local services. In Andlus estate the location of the services and utilities were designed to be within the pedestrian catchment areas (Figure H.19(a)). Inhabitants' responses in Table H.23 show that 47.6 per cent of the inhabitants of Andlus feel that the services and utilities are near whereas only 24 per cent of them feel they need a car. But with Yarmouk it seems that the distribution of services and utilities within the estate were based on both a car and a pedestrian scale as shown in Figure H.14. These design features are reflected in the inhabitants' responses (Table H.15) which suggests a balance between the people who use the car and those on foot.

As for the social relationships which have developed within each estate (i.e. Mansur, Yarmouk and Andlus) Figure H.27(b) indicates that these estates enjoy a high degree of social relationship between their inhabitants, at the same time there is only a very small proportion of the inhabitants who feel lonely.

FIGURE: H.27(b)

Social Relationship Activities Between the Estates Designed in Relation to the Cultural Factors



Key:

Mansur -o-o-

Yarmouk -----

Andlus -x-x-

Average ———

[H.7] QADISYA AND FIRDAWS: MID INCOME ESTATES

H.7.1 Population Characteristics

The age-sex structure, educational status and occupation which indicate the population characteristics of Qadisya and Firdaws estates are given in Tables H.33(a) and H.33(b) and Figures H.28(a) and H.28(b).

Table H.33(b) indicates that 49.67 per cent of Firdaws estate population are males and 45.8 per cent are females, with an average age of 25.4 years and 25.1 years for males and females, respectively which gives a total average age of 25.6 years, whilst Qadisya's population data shows that 52.6 per cent of its population are males and 47.88 per cent are females, with an average age of 26.8 years and 28 years for males and females, respectively, which gives a total average age of 27.4 years. These averages show that the population in Firdaws estate are younger than the population in Qadisya estate, taking into consideration that both the estates are very small and have a proportion of extended families, i.e. 4.4 per cent in Qadisya and 4.5 per cent in Firdaws.

The differences in the age structure within the population of each estate or between the two estates can be seen clearly in the population pyramids of both estates (Figures H.28(a) and H.28(b)).

The study of both pyramids shows that Firdaws estate consists of a large base of population aged between 1-19 years. This indicates that the population of this area is compared mainly by newly formed nuclear families. This conclusion is confirmed by the small proportion in the age group between 20-29 years and a high proportion of people in the age group between 30-39 years which is the normal age of parents for children aged between 1-19 years.

On the other hand the population pyramid for Qadisya estate stands on a very small base which shows the characteristics of an area of older nuclear families. A large proportion of population aged between 10-29 years marks the main feature of the pyramid profile. This age group consists mainly of students in the secondary school followed by the students in the university. The population pyramid shows a small proportion into age groups of between 30-39 years. The population pyramid also shows a small proportion of males aged between 40-49 years, followed by a sudden jump in the age group between 50-59 years. This phenomenon emphasises the dominance of the nuclear families in this area and also shows the normal age of the parents for the majority of the estate's population of age between 10-29 years.

The histogram (Figure H.28(a) and H.28(b) shows the status of education and occupation in Qadisya and Firdaws estates. This indicates that 41.6 per cent of the population in Qadisya have secondary school education and 23.6 per cent of them have university education level, whereas the rest of the population, who are illiterate or merely read and write, enjoyed primary school level education and form about 10 per cent of the population. This is because Qadisya represents an old nuclear family estate. This situation of educational status can be compared with the majority of the population whose age is between 1-19 years with a proportion of those between 20-29 years who are students, indicating that students form a group on the estate (i.e. 44 per cent). Housewives and the unemployed are also heavily represented (26.9 per cent of the population) and the civil service forms 24.8 per cent of the population. Productive manpower on the estate represents only a quarter of the population with three-quarters being economically dependant.

Educational and occupational status in Firdaws are different from Qadisya estate since Firdaws estate is made up of younger families, i.e. consisting of a large proportion of children and teenagers in ages between 1-19 years. A relatively undulating distribution of educational level reflects the different educational stages according to age and as indicated in Table , 29.6 per cent of the population are only able to read and write, 18.7 per cent are within or achieved only primary school level education, whereas 29.6 per cent of the population are within or achieved secondary school level and 27 per cent obtained university education. Educational level is reflected directly in the occupational status and the economic conditions of the population indicated clearly in the histogram (Figure H.28(b)).This shows that the dominant activity of the population in this area is education, with students forming 34.8 per cent of its population. Unemployed people form 30.9 per cent of the population. The dominant occupation on this estate is the civil service, with 27.7 per cent of the population working for the government, representing the main productive economical manpower for the population whilst other occupations such as manual workers and businessmen, represent only a very small proportion of the total.

H.7.2 Design Criteria on the Estate Level

Qadisya and Firdaws are two quasi-governmental schemes subdivided on the basis of the fifth class of the 1936 building control regulations and its subsequent amendments in favour of workers in the government (mid income civil service) through the agency of co-operative societies.

The design of the layout of both estates is based on a rigid grid-iron plan pattern without any distinguishing characteristics except the subdivisions were arranged in such a way as to achieve as many plots as possible. Thus the design has been developed in relation to government legislation and regulations with little attention to overall planning or to other cultural and environmental factors. Accordingly the layouts of the estates are arranged in a rigid regular arrangement with equal geometrical plot division. Each of these plots is bounded by a continuous wall with a main access from the street front. (Figure H.29).

Most of the houses which have been constructed on both these estates are two-storey buildings, built of brick and concrete. They are usually set back from the street to achieve a long garden in front.

As a result of the building regulations the houses in these estates are either detached or semi-detached. As a general rule, they enjoy semi-enclosed space on the ground level and balconies on the first floor with wide glass windows on both floors as the main features of the facades. (Figure H.30).

The plot areas in both Al-Qadisya and Al-Firdaws are in the range of 300 to 600m² (Table H.34). This table shows that 90 per cent of Al-Qadisya and 96.7 per cent of Al-Firdaws plot areas are

600m². 6.7 per cent of the plots in Al-Qadisya are between 300-399m² and 3.3 per cent of them are between 400-499m², whereas only 3.3 per cent of Al-Firdaws plots are greater than 99m². All the plots of less than 600m² have been divided from the original plots of 600m² due to changes in the building regulations.

The dwelling areas within each plot of Qadisya and Firdaws are given in Table H.34, which indicates that 70 per cent of Qadisya and 56 per cent of Firdaws have a dwelling area on the ground level of between 200-249m² and 13.3 per cent of dwellings are between 150-199m² and 13.3 per cent are between 250-299m² in area in Qadisya whereas 26 per cent of dwelling areas on the ground floor are between 150-199m² and 10 per cent are between 250-299m² on Firdaws. This yields an average dwelling area on the ground floor of 221.67m² in Qadisya and 208.33m² in Firdaws, whereas the average dwelling area on the first floor in Qadisya is 85.83m² and in Firdaws is 40m². The differences in the dwelling on both the ground level and the first floor between Qadisya and Firdaws may be due to the increases in the building materials prices as Firdaws was built five years after Qadisya.

Surrounding the house the large proportion of the open space is mainly in front of the house. The average area of this open space in Qadisya is 356.66m² and 380m² in Firdaws. Due to the existence of this open space between the dwellings 90 per cent of the inhabitants in Firdaws are not disturbed by any source of noise but 70 per cent of Qadisya inhabitants are disturbed by noise. This is because Qadisya forms a linear development along the main highway which links Baghdad with the southern region. These indicators can be seen clearly in Table H.35.

The density in Qadisya and Firdaws have been separately estimated as 109.48 P/H and 75.43 P/H respectively. These densities seem acceptable as 100 per cent of the sample feel that these areas are not crowded. Satisfaction follows from size of plots because the majority of households are single families in the sample (i.e. 97 per cent single families). (Table H.36).

Despite the aforementioned positive factors due to open space within the individual plot or the whole layout of the areas, these open spaces also cause a negative response. This is by exposing the inhabitants to the direct effects of sun and heat in summer and colder weather in winter.

The effects of climate encourages the use of the car which increases the estate traffic. This is clearly shown in Table H.37, where 67 per cent of the Firdaws residents suffer from walking in the streets, 53 per cent of them feel dissatisfied due to climatic conditions and the long distances to facilities, and 47 per cent of them feel discomfort from traffic. Nearly half of the population in Qadisya suffer discomfort due to walking in the estate streets, 20 per cent are discomfited because of the climatic conditions and 43 per cent of them due to traffic, as illustrated in Table H.37. The traffic in Qadisya estate not only creates problems for the pedestrian but causes an unacceptable noise level for the residents as shown in Table H.35, whereas 90 per cent of the Firdaws estate inhabitants are not disturbed by noise, with only 10 per cent of the inhabitants suffering disturbance principally from the children playing outside as indicated in Table H.35.

More than half of the population in both Qadisya and Firdaws possess cars as shown in Table H.38 and in both estates, car owners have no problem in parking their cars, since all of them have garages inside their dwellings (Table H.38).

Due to the large open spaces which exist within the confines of the individual dwellings and the distribution of services and utilities throughout each estate, the houses in each estate have different accessibility to services (Table H.39). The distribution of the services and utilities in each estate are considered to be within walking distance.

Table H.39 shows that both Qadisya and Firdaws estates have sufficient services and utilities.

STATUS / NO.	AGE GROUPS				EDUCATION														OCCUPATION													
	MALE		FEMALE		ILLITERATE			LITERATE			P.SCHOOL			S.SCHOOL			UNIVERSITY			HOUSEWIFE/ UNEMPLOYED			STUDENT			CIVIL SERVICE			WORKER			BUSINESSMAN		
	No.	%	No.	%	M	F	%	M	F	%	M	F	%	M	F	%	M	F	%	M	F	%	M	F	%	M	F	%	M	F	%	M	F	%
>9	13	11.9	6	6.4	7	2					6									7	11		6	4									
10-19	41	30.4	30	28.2		2			1		11			30	20						3		41	26			1						
20-29	40	30.4	34	33.7	1				3		3			14	7		22	20		1	6		19	13		19	13					1		
30-39	9	8.1	10	9.1					3					4	4		5	3			5					8	6					1		
40-49	3	2.2	12	11.8		5			3						2		3				11					3	1							
50-59	12	8.9	10	9.1	1	5		1	2					8	1		2	1		5	9					3	2					4		
60+	11	8.1	3	2.7	1	2		1	1					8			1			7	3					1						3		
TOTAL	129		105		10	16		2	13		20			64	34		33	24		20	39		66	43		34	23					9		
RELATIVES																																		
>9	3		1		3	1														3	1												
10-19			1												1						1													
20-29	1		2									1		1	1						1					1	1							
30-39	2													1			1									2								
40-49			1			1															1													
50-59																																		
60+																																		
TOTAL	6		5		3	2						1		2	2		1			3	4					3	1							
% within the whole sample	52.6		47.88		12.65			6.1			8.57			41.6			23.67			26.9			44			24.8						3.6		
Average Age	26.8		28.0																															

Total Average Age = 27.4

TABLE H.33(a)

QADISYA: POPULATION, EDUCATION OCCUPATION STATUS

STATUS / NO.	AGE GROUPS				EDUCATION														OCCUPATION													
	MALE		FEMALE		ILLITERATE			LITERATE			P.SCHOOL			S.SCHOOL			UNIVERSITY			HOUSEWIFE/ UNEMPLOYED			STUDENT			CIVIL SERVICE			WORKER			BUSINESSMAN		
	No.	%	No.	%	M	F	%	M	F	%	M	F	%	M	F	%	M	F	%	M	F	%	M	F	%	M	F	%	M	F	%	M	F	%
>9	18	22.5	14	17.5	13	7					5	7								14	7		4	7									
10-19	17	21.2	18	23.75							3	6		13	12								17	17			1						
20-29	9	12.5	11	15							1	1		4	4		4	6			2		3	6		5	4				1		
30-39	17	22.5	15	20		1			1			1		3	5		14	7			7					15	8				2		
40-49	9	11.2	9	11.25	1	2		2	3			1					6	3			7					5	1		1		3		
50-59	6	7.5	2	2.5				1	2		1			2			2			2	2					2					2		
60+	1	1.2	2	3.75		2		1												1	2												
TOTAL	77		71		14	12		4	6		11	16		22	21		26	16		17	27		24	30		27	14		1			8		
RELATIVES																																		
>9	1				1															1													
10-19			1												1						1												
20-29	1		1								1	1									1							1					
30-39	1		1											1	1												1	1					
40-49																																		
50-59																																		
60 60+			1			1															1												
TOTAL	3		4		1	1					1	1		1	2					1	3						1	1	1				
% within whole sample	49.67		45.8		18.0			29.6			18.7			29.6			27			30.9			34.8			27.7			1.29			5.16		
Average Age	25.4		25.7																														

Total Average Age = 25.6

TABLE H.33(b)

FIRDAWS: POPULATION, EDUCATION OCCUPATION STATUS

TABLE H.34

APPROXIMATE DWELLING AREA

Estate / Area m²	QADISYA				FIRDAWS			
	Ground Floor		First Floor		Ground Floor		First Floor	
	No.	%	No.	%	No.	%	No.	%
>49	-	-	2	6.7	-	-	22	73.3
50-99	-	-	8	26.7	1	3.3	7	23.3
100-149	1	3.3	4	13.3	1	3.3	1	3.3
150-199	4	13.3	3	10	8	26.7	-	-
200-249	21	70	4	13	17	56.7	-	-
250-299	4	13.3	-	-	3	10.0	-	-
300-349	-	-	-	-	-	-	-	-
Average	30	221.67		85.83	30	208.33	30	40

AREA OF THE WHOLE PLOT

Estate / Area m²	QADISYA		FIRDAWS	
	No.	%	No.	%
>99				
100-199				
200-299			1	3.3
300-399	2	6.7	-	-
400-499	1	3.3	-	-
500-599	-	-	-	-
600+	27	90	29	96.7
Average	30	578.33		588.33

TABLE H.35

DISTURBANCE FROM NOISE

Noise \ Estate	QADISYA		FIRDAWS	
	No.	%	No.	%
No	9	30	27	90
Yes	21	70	3	10
Cause of Noise				
Crowdedness	-	-	-	-
Children	8	26	3	10
Services	19	63.3	1	3.3
Source of Noise				
Inside the House	1	3.3	1	3.3
Outside the House	20	66.7	3	10
Don't know	-	-	26	86.7

TABLE H.36

FEELINGS ABOUT ESTATE DENSITY

Response \ Estate		QADISYA		FIRDAWS	
		No.	%	No.	%
Too crowded		-	-	-	-
Crowded		-	-	-	-
Just right		30	100	30	100
Don't know		-	-	-	-
Reasons					
Near to Services	(No)				
	(Yes)				
Family Size	(No)				
	(Yes)	29	96.7	27	90
Multi-Family	(No)				
	(Yes)				
Children	(No)				
	(Yes)				

TABLE H.37

FEELINGS OF DISCOMFORT WHEN WALKING ON THE ESTATE'S ROADS

Response \ Estate	QADISYA		FIRDAWS	
	No.	%	No.	%
No	16	53.3	10	33.7
Yes	13	43.3	20	66.7
Don't know	1	3.3	-	-
Reasons for Discomfort				
Long distance	7	23.3	16	53.3
Unpaved	1	3.3	7	23.3
Climatic Factors	20	66.7	16	53.3
Children playing	8	26.7	2	6.7
Traffic	13	43.3	14	46.7
Odour	-	-	2	6.7

TABLE H.38

CAR AND TRANSPORTATION

Response \ Estate	QADISYA		FIRDAWS	
	No.	%	No.	%
Having a Car				
No	13	43.3	6	20
Yes	17	56.7	24	80
Don't Know	-	-	-	-
Problems of Car Parking				
No	13	43.3	24	80
Yes	-	-	-	-
Don't know	-	-	6	20
Parking Space in Relation to the House				
Inside	15	50	24	80
Outside	2	6.7	-	-
Don't know	13	43.3	6	20
Preference for Car space in Relation to the House				
Private	11	36.7	17	56.7
Public	1	3.3	-	-
Don't Know	18	60	13	43.3

TABLE H.39

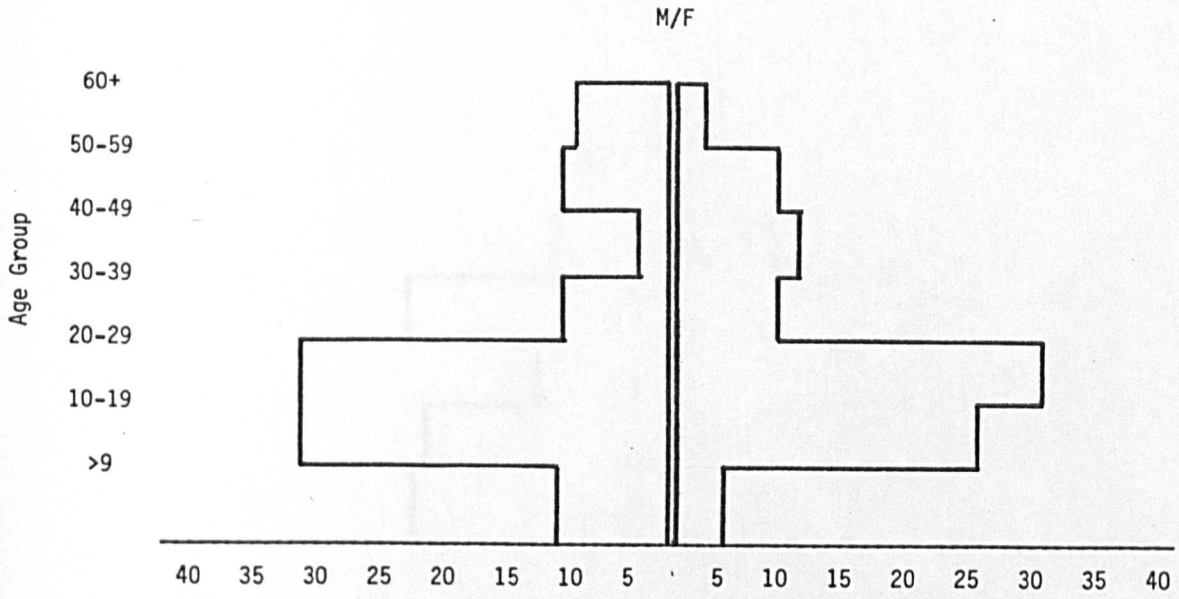
SERVICES AND UTILITIES

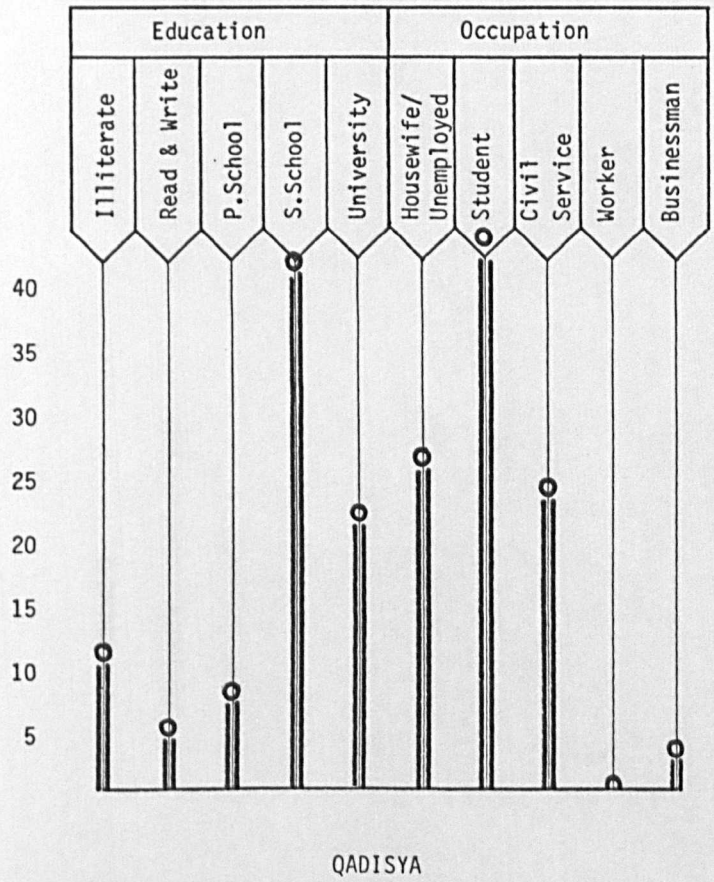
Distance Between House and Services

Services \ Estate	QADISYA						FIRDAWS					
	Near		By Walking		By Car		Near		By Walking		By Car	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Primary School	28	93.3	1	3.3	1	3.3	10	33.3	10	33.3	5	16.7
Secondary School	-	-	16	53.3	14	46.7	8	26.7	14	46.7	8	26.7
Clinic	-	-	20	66.7	10	33.3	11	36.7	15	50	4	13.3
Public Bath	-	-	-	-	-	-	-	-	-	-	-	-
Shops	26	86.7	3	10	1	3.3	4	13.3	20	66.7	6	20
Cafe	-	-	9	30	21	70	6	20	15	50	7	23.3
Religious Centre	2	6.7	21	70	7	23.3	4	13	18	60	8	26.7
Averages		26.5		33.3		25.7		20.4		46.2		18.1

Services and Utilities Needed on the Estate

Services	Estate	QADISYA		FIRDAWS	
		No.	%	No.	%
Education	(No)	29	96.7	14	46.7
	(Yes)	1	3.3	16	53.3
Social Services	(No)	29	96.7	30	100
	(Yes)	1	3.3	-	-
Environmental Services	(No)	29	96.7	29	96.7
	(Yes)	1	3.3	1	3.3
Health Services	(No)	30	100	24	80
	(Yes)	-	-	6	20
Public Services	(No)	6	20	4	13.3
	(Yes)	24	80	26	86.7

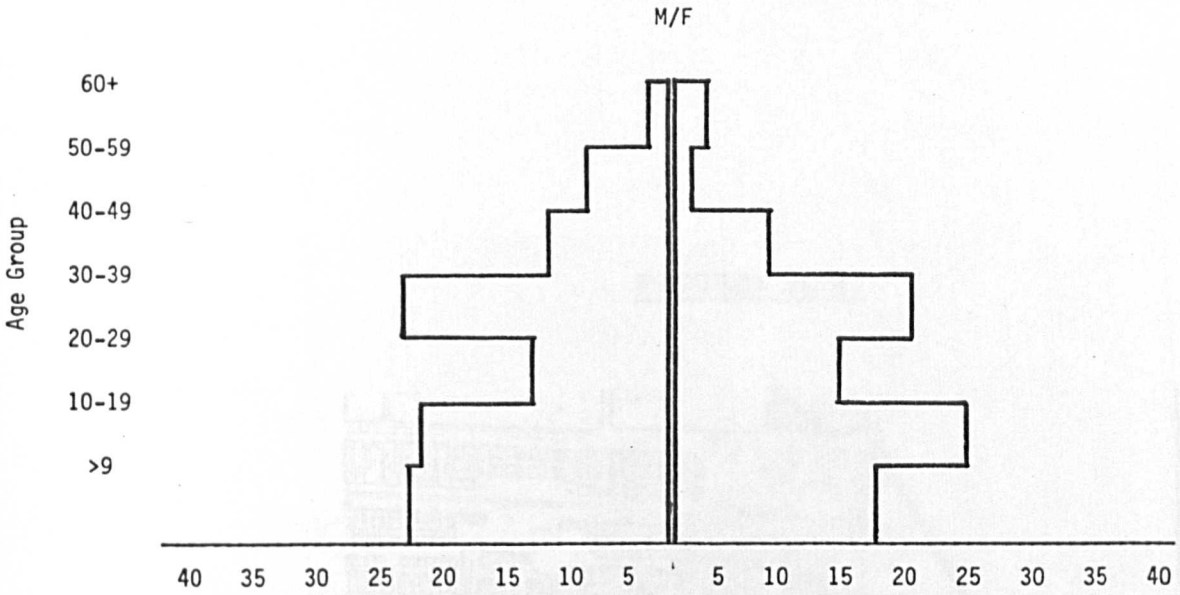




QADISYA

FIGURE: H.28(a)

Population Pyramid, Education Occupation Status



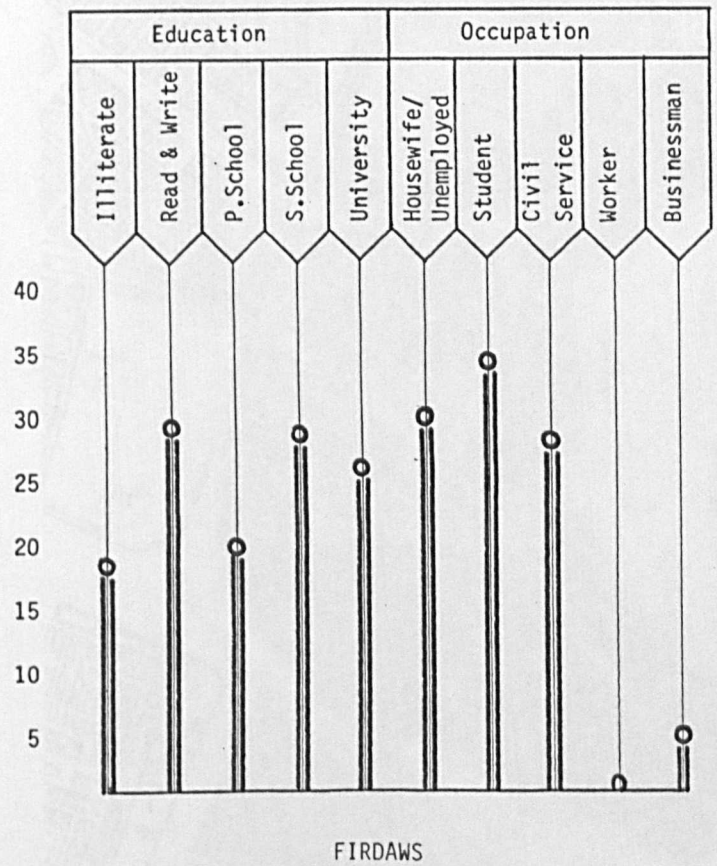


FIGURE: H.28(b)

Population Pyramid, Education Occupation Status

FIGURE: H.29

Qadisya Layout

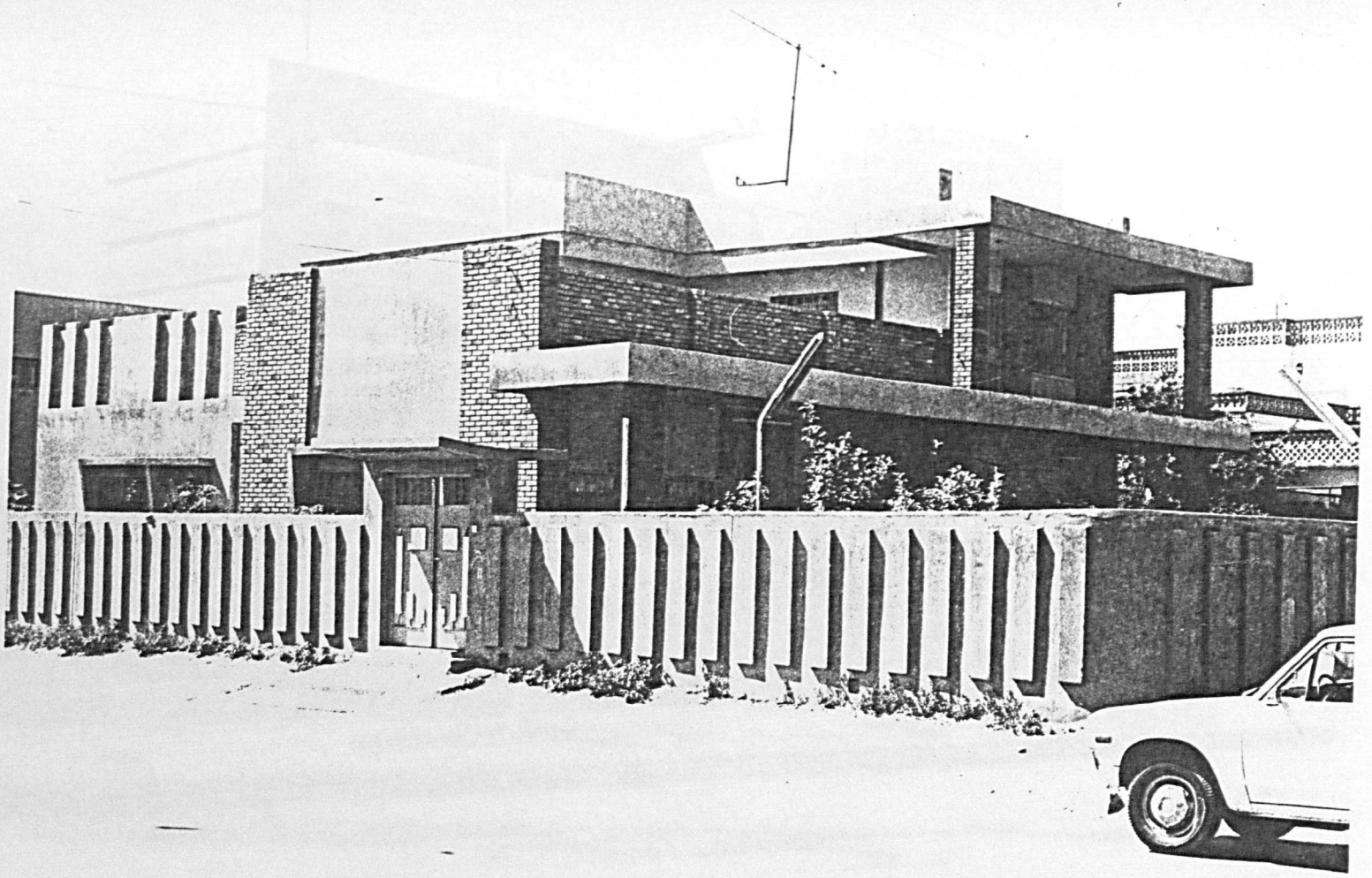


FIGURE: H.30(a)

Typical Mid Income House

FIGURE: H.30(b)

Typical Mid Income House

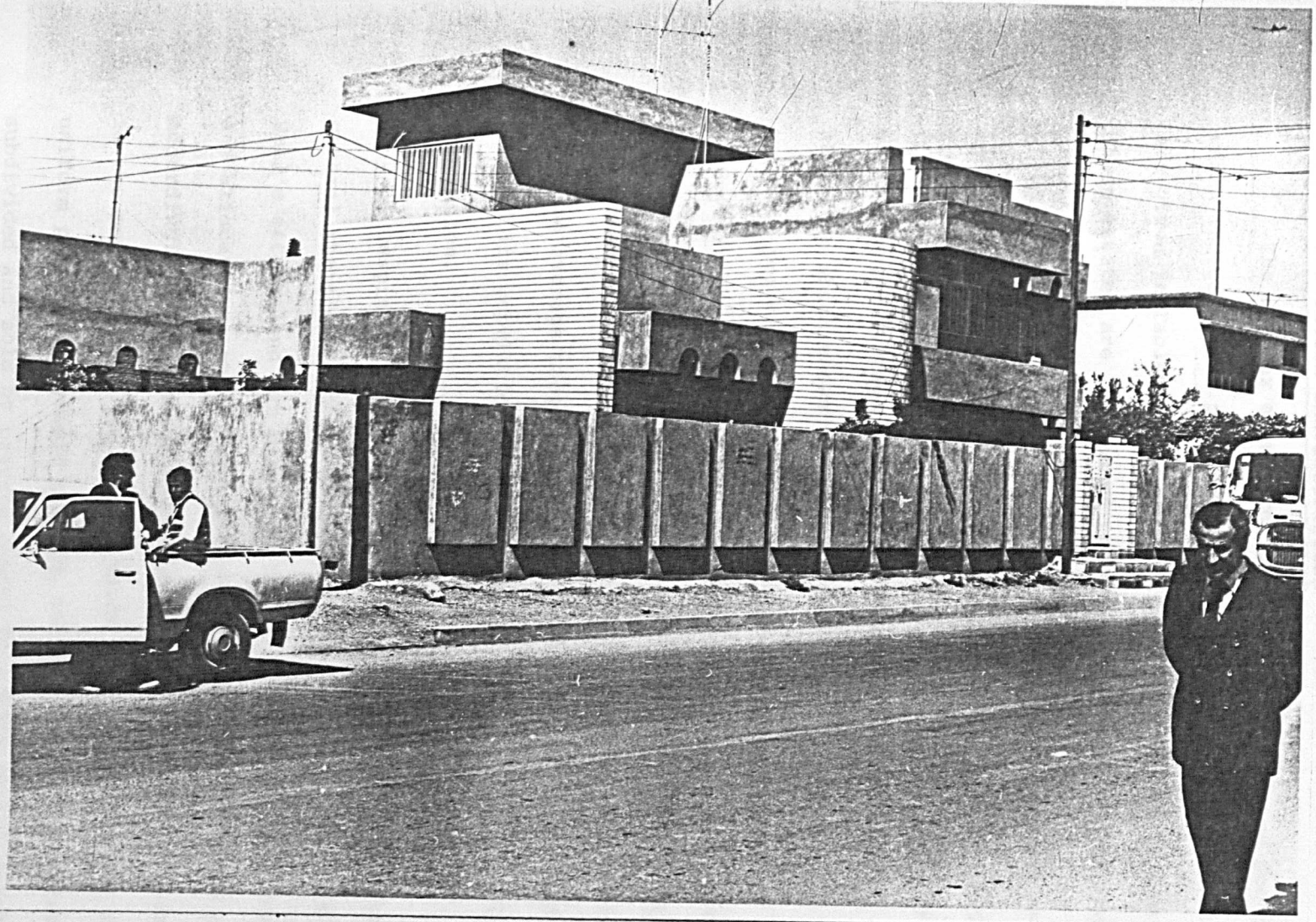


FIGURE: H.30(c)

Typical Mid Income House

[H.8] TAMIM AND UMAL: LOW INCOME ESTATES

H.8.1 Population Characteristics

The age-sex structure, educational status and occupation which indicates the population characteristics of Umal and Tamim estates are given in Tables H.40(a) and (b) and Figures H.31(a) and (b). These estates are low income private sector residential areas.

The above tables show that 56.6 per cent of Umal estate population are males and 43.3 per cent are females with an average age of 23.5 years and 22.7 years for males and females, respectively, which gives a total average age of 23.1 years. Tamim estate has an age structure which shows that 42.6 per cent of its population are males and 46.1 per cent are females, with an average age of 25.6 years and 21.8 years for males and females, respectively. This gives a total average age of 23.7 years. These averages indicate that the population in both Umal and Tamim estates are young and both of them have nearly the same average proportion of extended families, i.e. Umal has 16.1 per cent of its population and Tamim has 18.8 per cent of its total population.

Despite both estates being occupied by low income groups, in general their age and sex structure are different. This is because Umal's estate land was purchased by the workers' union's association and allocated to their members after being subdivided into plots. Accordingly a homogeneous and balanced age-sex structure has emerged in the population of the estate, which can be seen clearly in the uniform population pyramid profile, whereas Tamim estate land was subdivided and sold by private owners to a more varied population,

i.e. varied age-sex groups. This background affected directly the population structure of the estate which can be seen clearly in the disturbed and unbalanced population pyramid profile of the estate.

The detailed study of each pyramid shows that Umal estate stands on a large base of population age group between 1-9 years; above this age group an even larger proportion of population between 10-19 years and the age group between 20-29 years is not highly represented. These phenomena, with the gradual decrease in the population in the age between 30-60+ years, indicate that the estate is composed principally of old nuclear families with a large number of extended families.

The age structure of Umal also reflects on the educational and occupational status of people on the estate which can be seen clearly in the Histogram (Figure H.31(a)). This shows that a large proportion of the population are within or achieved education to primary school level (i.e. 38.2 per cent), followed by 27.6 per cent of the population who are in or have completed their education at secondary school and a small proportion of the population who have a university education (i.e. 5.5 per cent). 17.5 per cent of the population can only read and write and 23.5 per cent are illiterate.

Students form the dominant population group on the estate (i.e. 40 per cent). The unemployed form 32.2 per cent of the population, followed by the civil service and workers forming 14.2 per cent and 11.5 per cent, respectively. A very small proportion of the population work as private businessmen (i.e. 2.2 per cent). This phenomenon shows that 27.2 per cent of the population are productive manpower, whereas 72.1 per cent of the population are economically dependant.

Due to the differences in the age-sex structure and in the educational and occupational status between Umal and Tamim estates, the histogram of educational and occupational status of Tamim estate are different, which shows very close averages relatively undulant for the overall different educational stages indicating that 26.9 per cent of the population in Tamim are within secondary school level, 25.14 per cent are in the primary school level and 19.8 per cent are at the university stage, whereas 7.6 per cent of the population are merely able to read and write and 19.2 per cent are illiterate.

Education and age distribution has a strong relationship with the occupational status of people on the estate and is given in the histogram, which shows that close average figures with the dominant activity of the population in this area are education, with students forming 32.1 per cent of its population, 29.8 per cent of the population are in the civil service, whilst 28 per cent of the population are unemployed and housewives. The other occupations, such as worker and businessman in the population form small proportions, i.e. 3.5 per cent are workers and 4 per cent are businessmen.

However, the productive manpower in this area forms about 37.3 per cent of the population, whilst 62.7 per cent of the remaining total population are economically dependant.

H.8.2 Design Criteria on the Estate Level

Tamim and Umal residential areas in Baghdad are both low income estates. Tamim layout was arranged and subdivided by builders/developers in the private sector and sold directly to the people, whereas Umal's layout was arranged by organisations in the semi-governmental sectors (unions) and the plots were sold to their members.

The layout of Umal estate is based on a rigid grid-iron pattern, in order to achieve as many units as possible, whilst the Tamim layout is based on a loop system. Accordingly, the general characteristics of the roads and the plots are regular straight lines and geometrically rational layout. Each plot is bounded by a continuous wall with a main gate for the house from the front. (Figure H.32).

The majority of the houses in both Tamim and Umal estates are two-storey buildings, constructed mainly of brick with the use of I beams for roofing. In accordance with the third class of the building control regulations the house facades are set back from the edge of the street by a distance of not less than 25m, with either detached building or semi-detached housing adjoining on one of the sides only. As a general characteristic of the developed plot, a semi-enclosed space usually forms the main feature, within which the main entrance of the house is located. Large glass windows are also dominant in the different facades.

The plot areas in both Tamim and Umal are mainly in the range of 99-400m² (Table H.41). This table shows that 44 per cent of Tamim and 100 per cent of Umal plots are between 200-299m². 28 per cent of Tamim plots are 300-399m² with just one plot in the same estate with an area of 400m².

The dwelling table (Table H.41) indicates that 52 per cent of Tamim and 60.7 per cent of Umal dwelling areas on the ground level are between 150-199m², and 24 per cent of Tamim and 28 per cent of Umal are between 100-149m², whereas 4 per cent of Tamim dwellings are between 200-249m² nd 250-299m². In Umal 10.7 per cent of the dwellings are between 200-249m². This yields an average dwelling area on the ground floor of 153m² in Tamim and 186m² in Umal, whereas the average dwelling area on the first floor in Tamim is 42.3 per cent and 51.78 per cent in Umal.

Consequently similarities in areas can be clearly seen between both estates, despite the different arrangements.

The open space within the individual plot - laid out as gardens or as paths surrounding the dwellings - are an average of 97m² in Tamim and in Umal are 64m².

Accordingly, due to the small size of the external open space between the houses, the houses on these estates are close to each other. This factor, coupled with the large families occupying the houses, creates high densities and high noise levels around the dwellings. This can be seen from the response of the people in both estates. Table H.42 shows that 72 per cent of Tamim and 67.9 per cent of Umal people are disturbed by noise, which is caused mainly by children on the estate as indicated in Table H.42. This table shows that 67.9 per cent of Umal and 68 per cent of Tamim estates' inhabitants are disturbed by noise caused by children. 35.7 per cent of Umal and 16 per cent of Tamim feel that the noise is from the roads and services.

The density in Tamim and Umal estates has been estimated as 176 P/H and 215 P/H respectively. This density seems too high as 44 per cent of the inhabitants in Tamim feel that the density on the estate is particularly crowded and 44 per cent feel crowded, whereas 50 per cent of the inhabitants in Umal feel the density on the estate is too crowded and 25 per cent of them feel it is crowded, whereas 25 per cent feel the density is 'just right' (Table H.43). These responses are due to the type of families occupying the houses (i.e. multi-families),

In general, both Tamim and Umal estates' inhabitants suffer from walking in the streets in environmental terms as illustrated in Table H.44.

Despite the discomfort found by walking in the streets being due to somewhat different causes, the climatic condition remains a crucial factor, since it presents a permanent problem, whereas the other factors present a temporary condition (such as the unpaved streets due to the sanitary works in the streets when this survey was carried out. Paving these streets will not only improve walking conditions but will help solve their traffic problems).

Car ownership is low on both estates as indicated in Table H.45. Only 32 per cent of Tamim and 21.4 per cent of Umal residents have cars. Due to the existing situation at the time of the survey of the unpaved streets and traffic problems, some of the inhabitants suffered from car parking difficulties, as shown in Table H.45.

As for the services and utilities in both Tamim and Umal estates, the inhabitants responses are in contrast.

Because of the small size of the plots in Tamim and the distribution of services and utilities within the estate, most facilities are nearby, whereas services and utilities within Umal are very few and most of them are outside the estate. Residents felt that a car was required to gain access to most facilities, as indicated in the previous table and Table H.46.

H.8.3. Design on the Domestic Level

Despite the differences in the plot sizes and the scale and quality of the built up area between the mid and low income estates and although the individual owners have the opportunity to choose their own house designs, most of these houses can be categorised under one type, since the design principles and the design criteria are largely the same (Figures H.33(a), (b) and 8c)). This type provides a fairly semi-public private zone (garden) as an intermediate zone between the dwellings and the public circulation zone (i.e. usually the main road). As there is no clear hierarchy of roads within the layout of these estates, the access for the houses is directly from the main road or the thoroughfare to the house. From this intermediate zone (i.e. the family semi-public-private zone) access is to the main entrance of the house in the front facade which acts as a family public-private circulation zone. From this entrance area two points of access have been provided, one of them to the reception and dining rooms, the public-private zone, and the second access to the family private zone of the living room. Both the family private and family public-private zones are linked together, usually by a wide access and they are also linked to the family's private circulation area. Accordingly, both the aforementioned zones are affected by cross circulation movement

which affects the physical setting and the quality of the used space. The family private circulation zone (Figure H.34) which is linked to the private and the public-private zone provides access points to the family and individual private zones. At the first floor level access from the circulation zone is afforded to different family and individual zones, whilst on the ground level access is given to the bedrooms and kitchen. However, the secondary main entrance opens into this area. This situation creates through circulation within the kitchen to reach the private area which affects the space and physical condition of the kitchen.

H.8.4 Function of Space and Family Activities

Due to the similarity in the general design principles between Qadisya and Firdaws estates on the one hand and Tamim and Umal on the other, and despite the differences in the dwelling area and the construction and decoration detail and axiality, in order to avoid repetition, the discussion of this section will be based on what has been written earlier.

The design orientation of the houses in these estates is mainly to meet cultural criteria with very little consideration being given to natural environmental factors. Accordingly, the sitting room in this type of housing represents the dominant space, despite extreme differences in temperature in this room between summer and winter, as can be seen clearly in Figures H.35(a), (b), (c) and (d). It is difficult to generalise further because the second most heavily used space after the sitting room is the bedrooms in the Tamim estate followed by the kitchen, whereas in Firdaws estate houses, the second

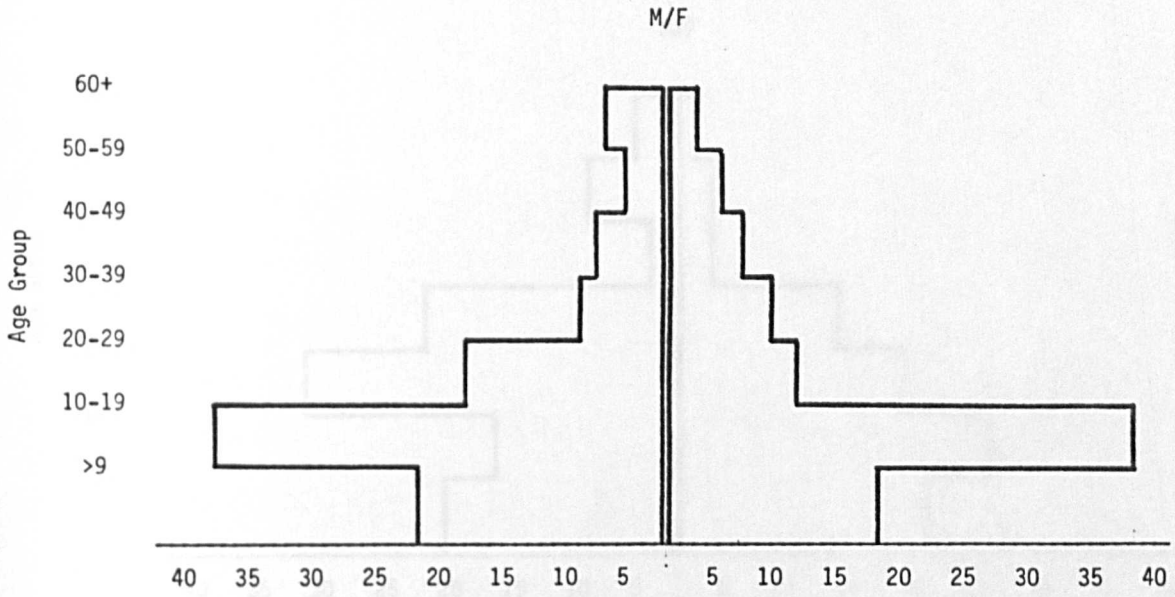
most heavily used space is the kitchen, followed by the bedrooms. This is because the area of the kitchen in Umal houses is larger than in Tamim. As the Umal estate was erected after the Tamim estate the people's attitudes have changed as a result of experience, preferring a large rather than a small kitchen in order to use it in the family's daily activities.

These differences in the used space due to a change in people's requirements can be seen in Figures H.35(a), (b), (c) and(d).

Moreover, as the number of the family activities are relatively constant and some of the spaces in the houses are not used due to poor natural environment circumstances, some of these activities will be transferred to the remaining used spaces in the house. This fact is indicated clearly in the figure, which shows that some of the family activities, which usually take place outdoors in summer (i.e. garden, flat roof and covered space) will transfer indoors during winter. This transformation will increase the use of the indoor spaces, in particular the kitchen and the bedrooms depending upon their areas. In addition, the continuous use of the internal space will create monotony.

[H.9] DESIGN - SOCIAL CRITERIA (GENERAL)

In general the estates which are designed principally in relation to meeting the criteria found in the legislation and building controls, both for the mid and low income, private or quasi-governmental sectors, such as Qadisya, Firdaws, Tamim, Umal, show that good social relationships exist between their inhabitants. On a detailed level the survey results from these estates indicate that a high proportion of the inhabitants know their neighbours' names and speak with each other when they meet in the street. When we consider deeper forms of social interaction such as visiting neighbours, the level of contact is lower than is the case for knowing neighbours' names or speaking with them in the street. Information from these estates also indicates that only a small proportion of the inhabitants feel lonely. (Figure H.36).



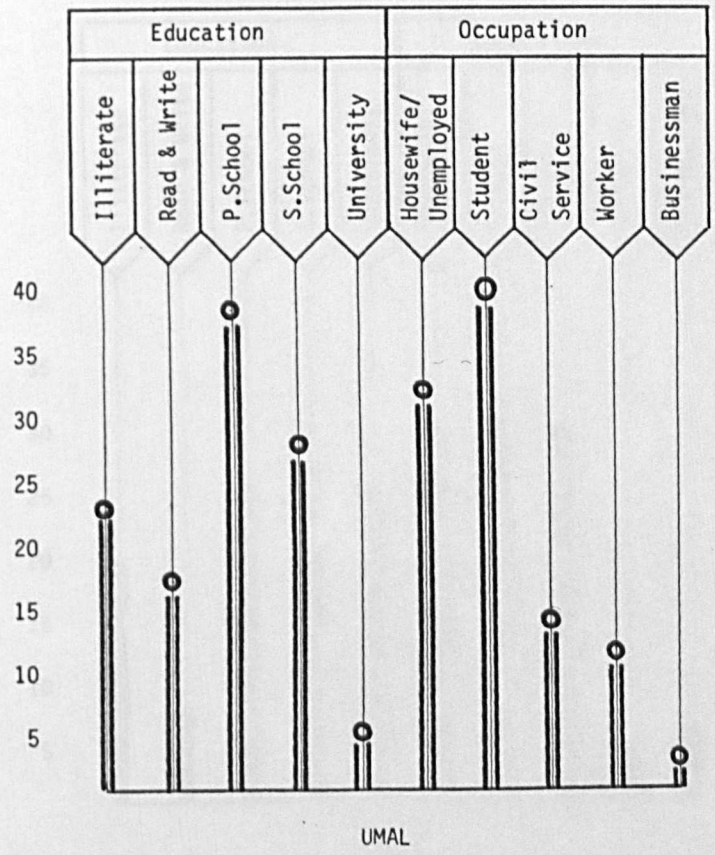
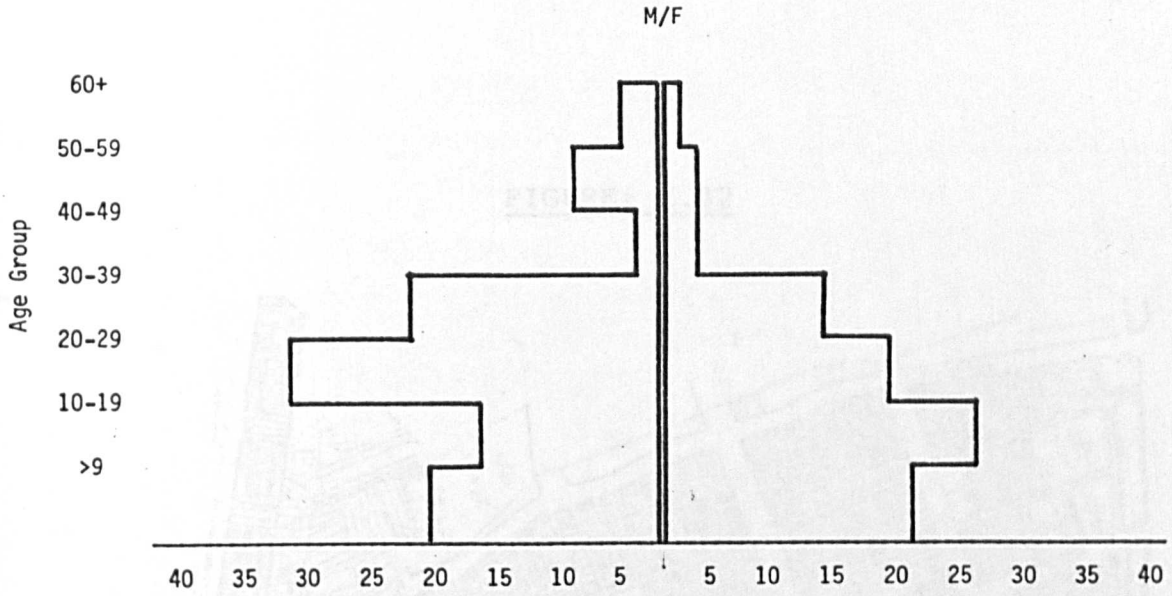


FIGURE: H.31(a)

Population Pyramid, Education Occupation Status



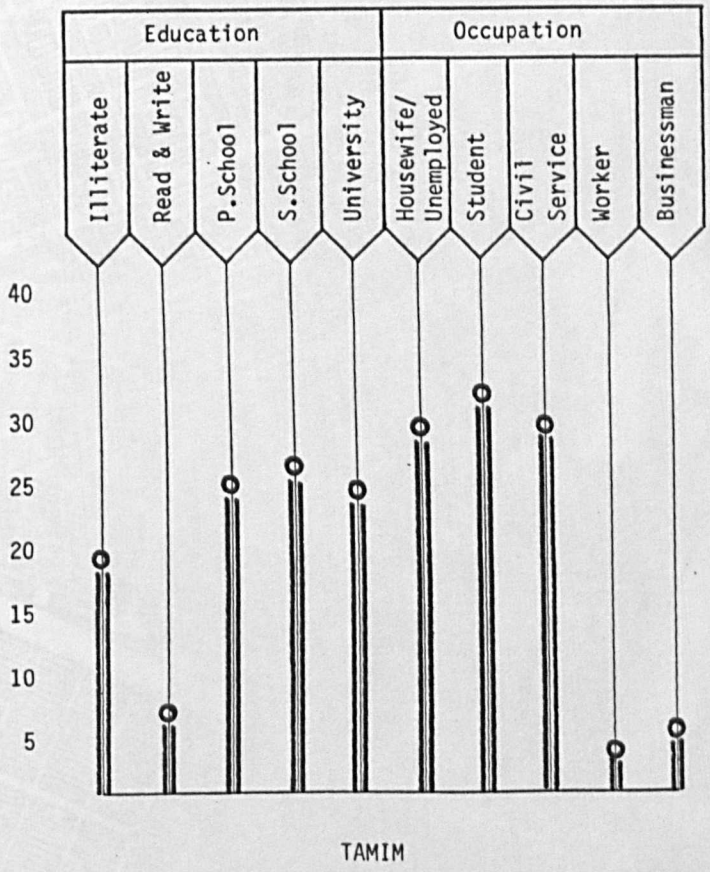


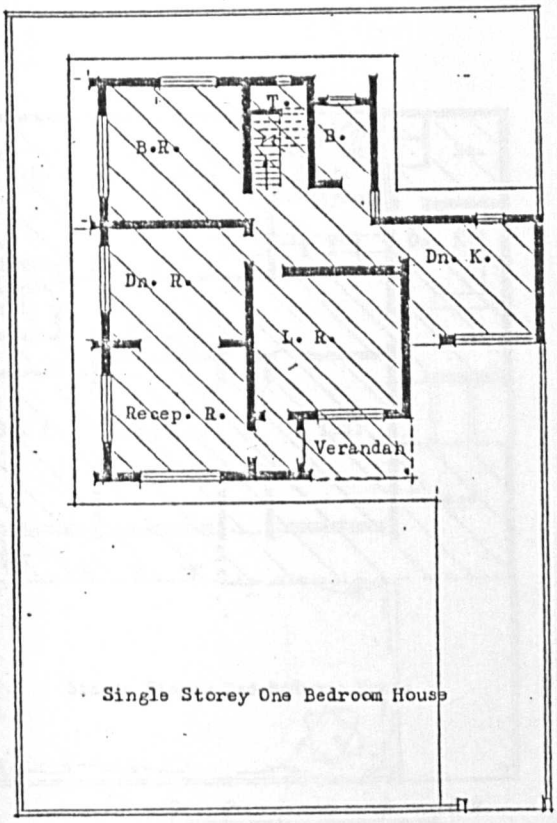
FIGURE: H.31(b)

Population Pyramid, Education Occupation Status

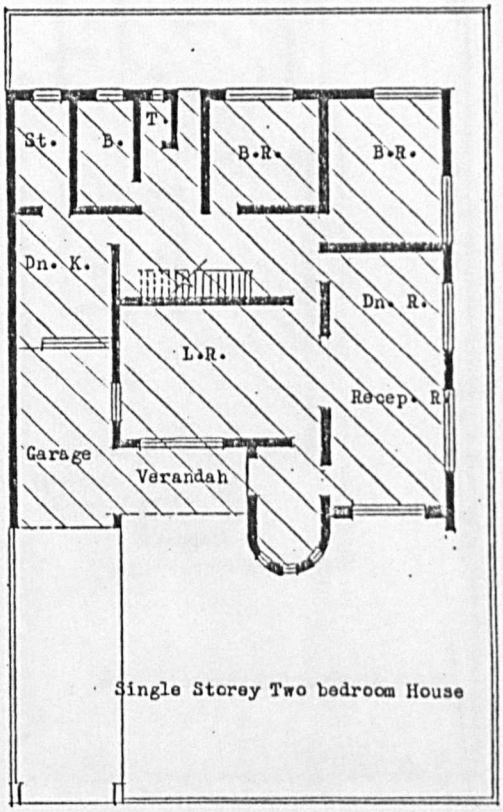
FIGURE: H.32

Layout for Tamim and Umal

FIGURE: H.33(a)

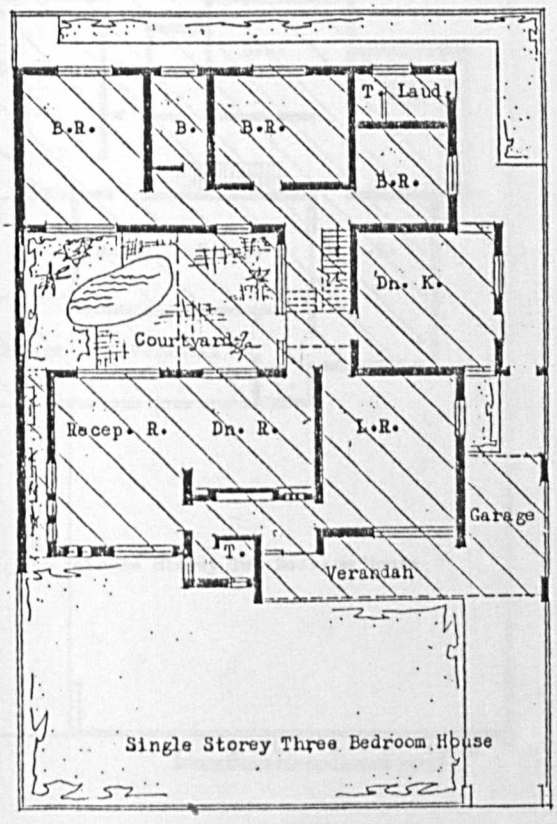


Single Storey One Bedroom House

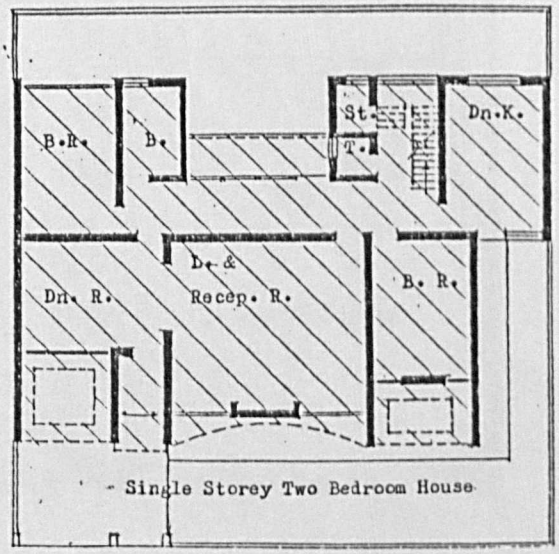


Single Storey Two bedroom House

Mid Income Housing Types



Single Storey Three Bedroom House



Single Storey Two Bedroom House

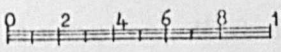
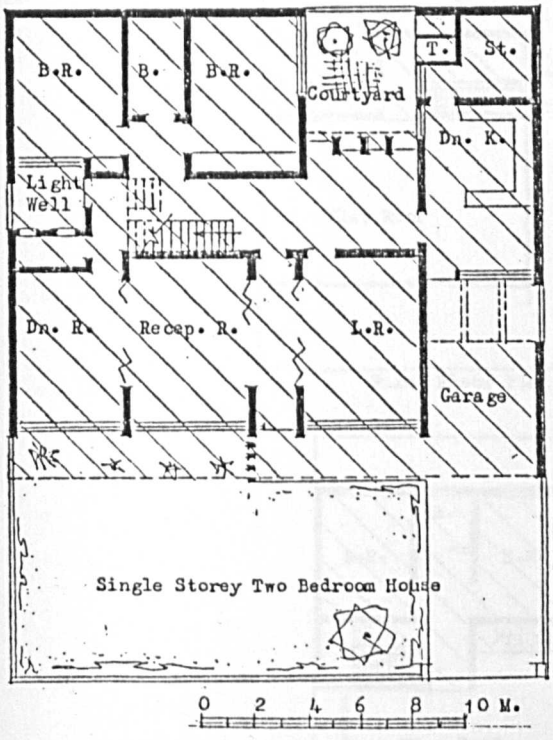
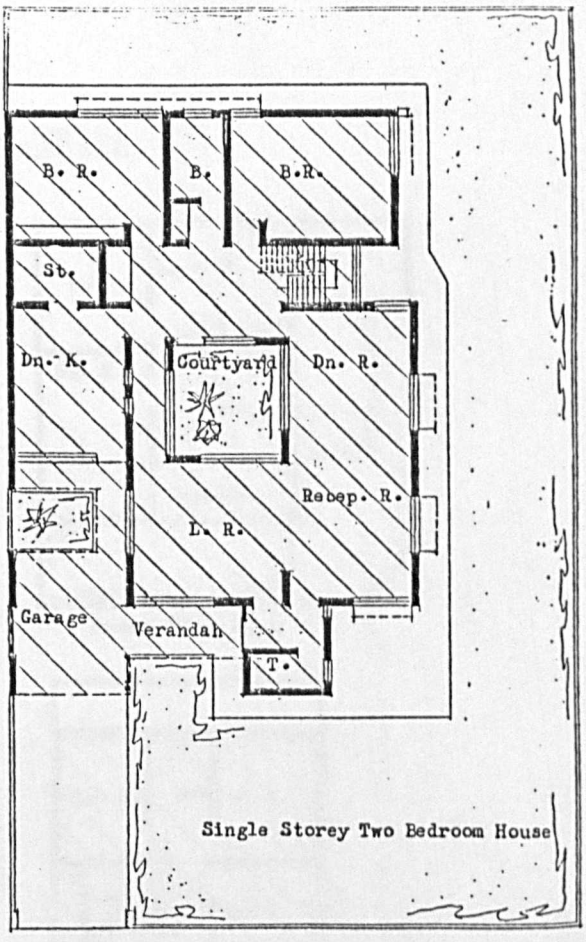
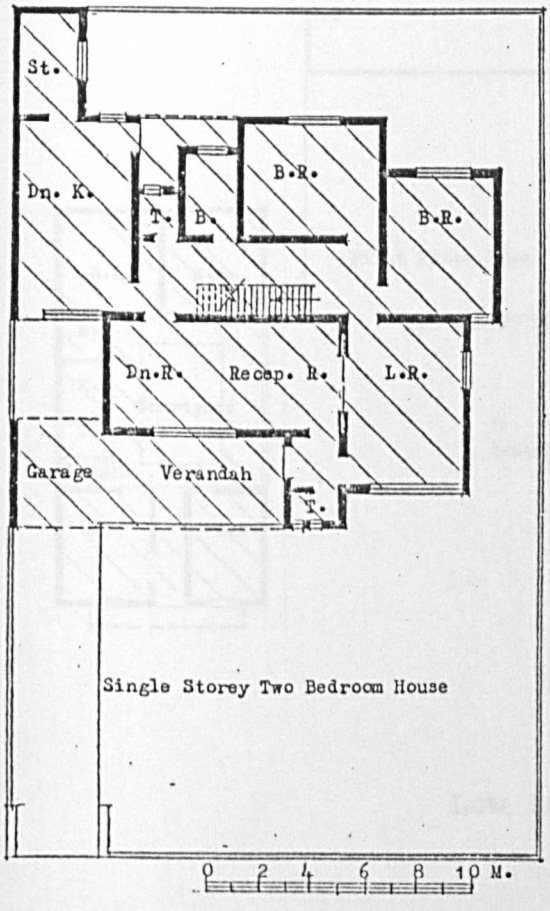
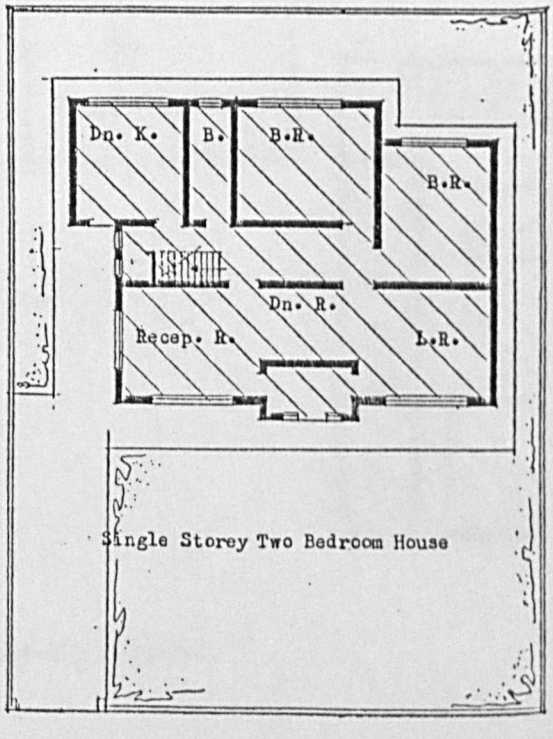


FIGURE: H.33(b)



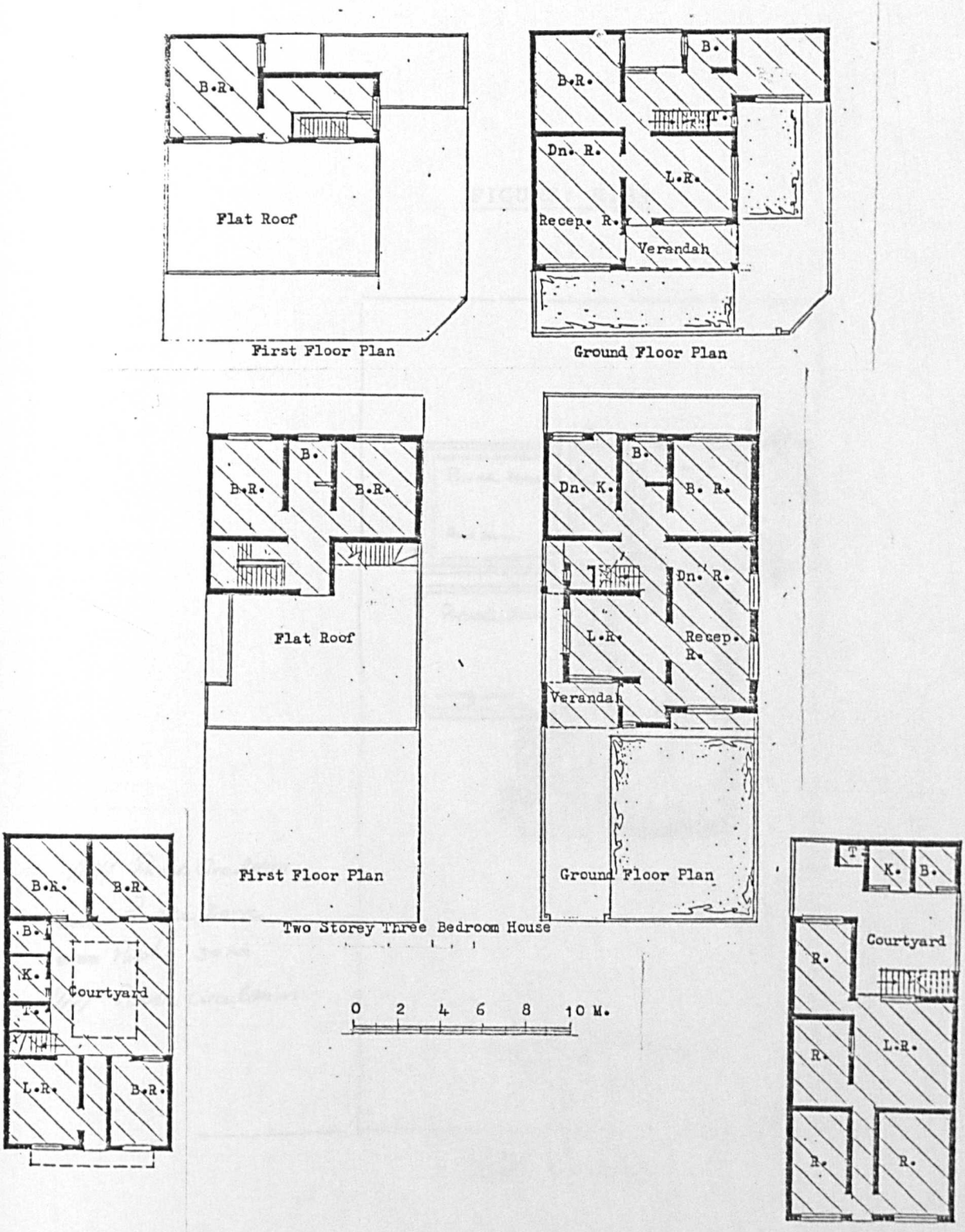






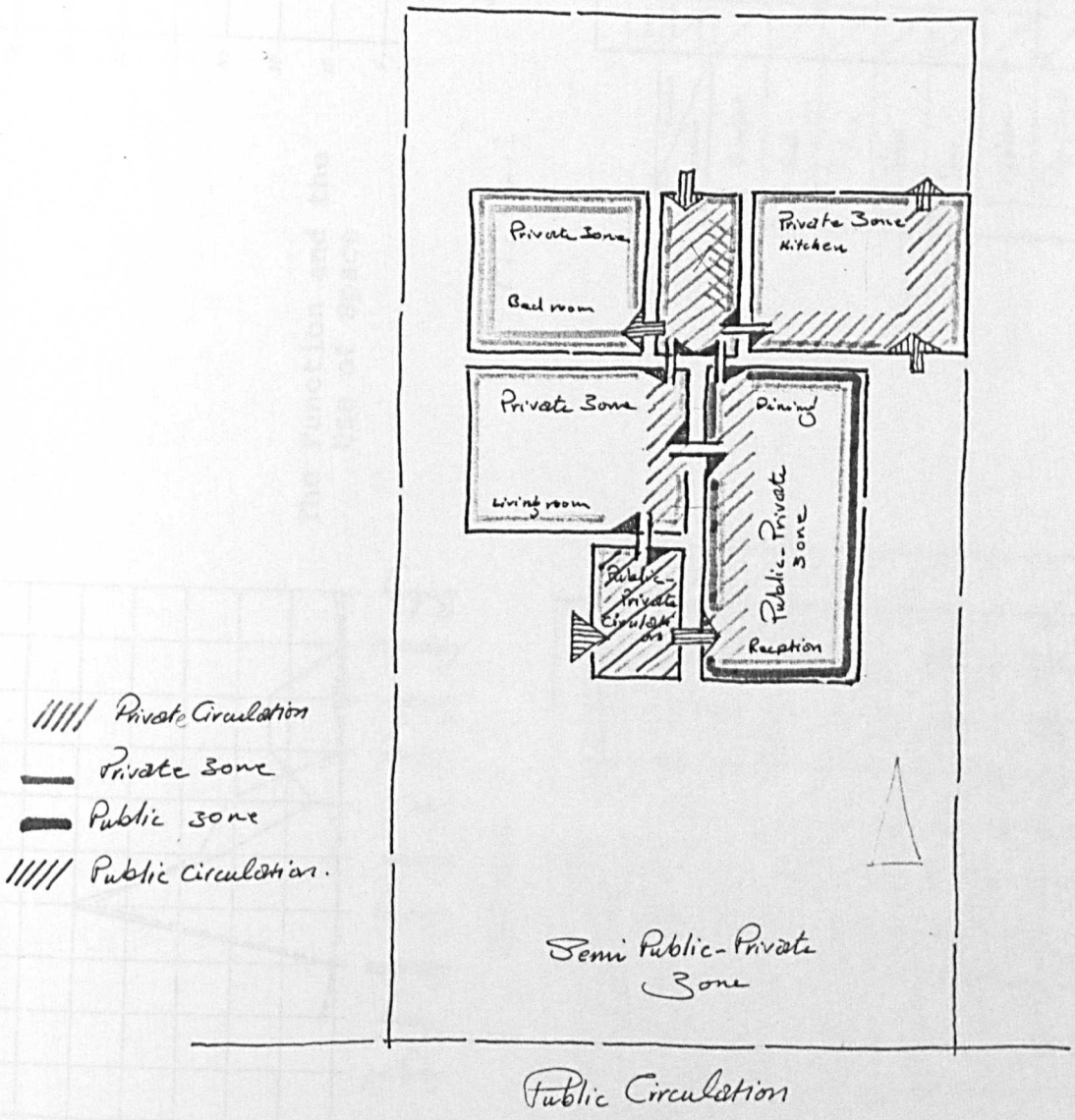
Mid Income Housing Types

FIGURE: H.33(c)

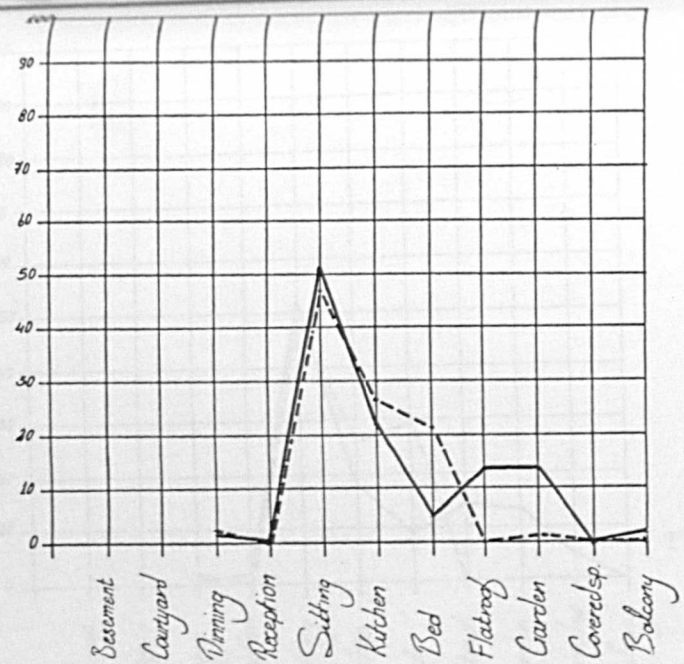


Low Income Housing Types

FIGURE: H.34

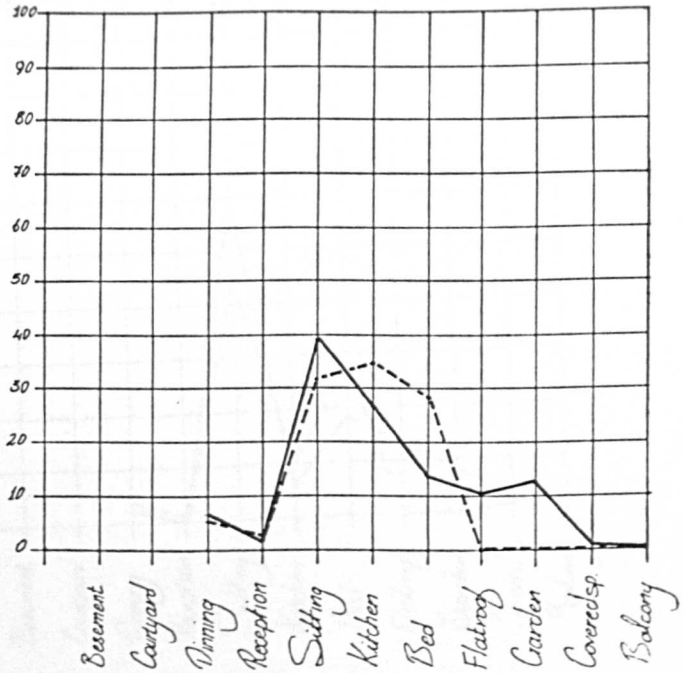


Zones of Privacy



QADISYA

The Function and the Use of Space



Firdaws

FIRDAWS

ACTIVITIES \ SEASONS	THE USED SPACE: Basement	Courtyard	Dinning	Reception	Sitting	Kitchen	Bed	Flatroof	Garden	Coveredsp.	Balcony	
	Summer / winter											
Breakfast			1 / 2		9 / 8	21 / 20			0 / 1			
Lunch			1 / 1		15 / 11	15 / 18			1 / 0			
Snacks				1 /	24 / 7		7 / 16					
Teatime				1 /	23 / 23	4 / 6	0 / 1		6 / 0			
Dinner			1 / 1		15 / 19	5 / 9	0 / 1		8 / 0		1 / 0	
Afterdinner					20 / 29	1 / 0	0 / 1		14 / 0		2 / 0	
Sleepingatnight					1 / 1	0 / 2	3 / 27	28 / 0			0	
TOTAL			3 / 4	2 / 0	107 / 98	46 / 55	10 / 46	28 / 0	29 / 1		3 / 0	
%			1.4 / 1.9	.9 / 0	50.9 / 46.4	21.9 / 26.1	4.76 / 21.9	13.3	13.8 / .5		1.4	

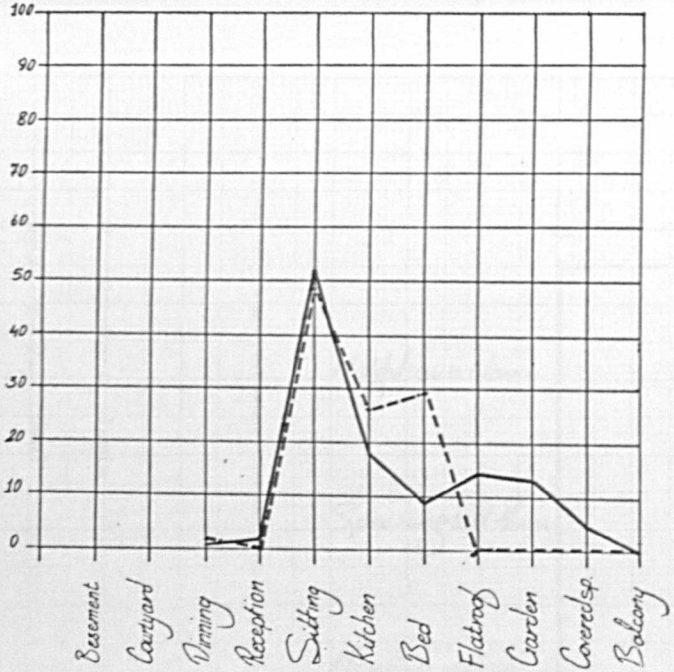
TIME

FIGURE: H.35(a)

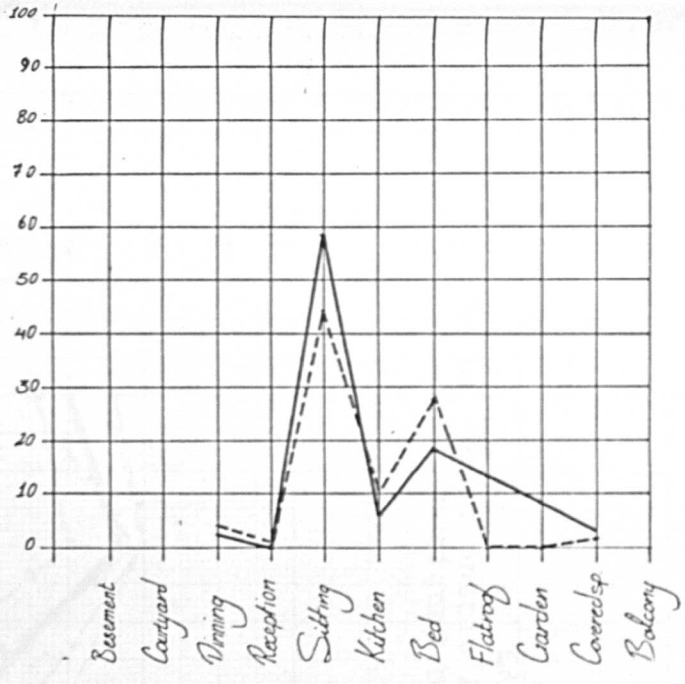
ACTIVITIES \ SEASONS	THE USED SPACE: Basement	Courtyard	Dinning	Reception	Sitting	Kitchen	Bed	Flatroof	Garden	Coveredsp.	Balcony	
	Summer / winter											
Breakfast			2 / 3	0 / 1	5 / 5	26 / 22	1 / 1		1 / 0	1 / 0		
Lunch			3 / 3		9 / 7	17 / 20	1 / 0					
Snacks			1 / 1	1 / 0	13 / 1	0 / 1	18 / 25			1 / 0		
Teatime			1 / 1	1 / 1	20 / 16	6 / 12	1 / 1		6 / 0			
Dinner			3 / 2		14 / 14	6 / 16	0 / 1		10 / 0		1 / 0	
Afterdinner			1 / 1	1 / 2	20 / 23	1 / 2	2 / 2		10 / 0			
Sleepingatnight			2 / 0		2 / 0		6 / 30	22 / 0				
TOTAL			13 / 11	3 / 4	83 / 66	56 / 73	29 / 60	22 / 0	27 / 0	2 / 0	1 / 0	
%			6.2 / 5.8	1.4 / 1.9	39.5 / 31.4	24.4 / 34.8	13.8 / 28.6	10.5	12.8	.9	.5	

TIME

FIGURE: H.35(b)



UMAL



TAMIM

ACTIVITIES \ SEASONS	THE USED SPACE: Basement	Courtyard	Dining	Reception	Sitting	Kitchen	Bed	Flatroof	Garden	Covered sp.	Balcony	
	SUMMER / WINTER											
Breakfast			1		9	18	2	0	0	0		
					8	15	2	1	4	2		
Lunch			1		16	13	2					
			1		18	9	3					
Siesta			0		11	1	18					
				1	24	0	8					
Teatime					16	8	3		0	0		
					14	3	4		7	4		
Dinner			0	2	18	9	3		0	0		
				13	7	3	0		6	3		
After dinner			1	0	24	1	3	0	0			
					21	2	0	1	10			
Sleeping at night					1	1	27	0				
					2	0	1	26				
TOTAL			3	3	95	51	58	0	0	0		
			3	0	100	36	18	28	27	9		
%			1.5	1.5	49.5	26.0	29.6	4.3	13.8	4.6		
			1.5		51.0	18.4	9.2					

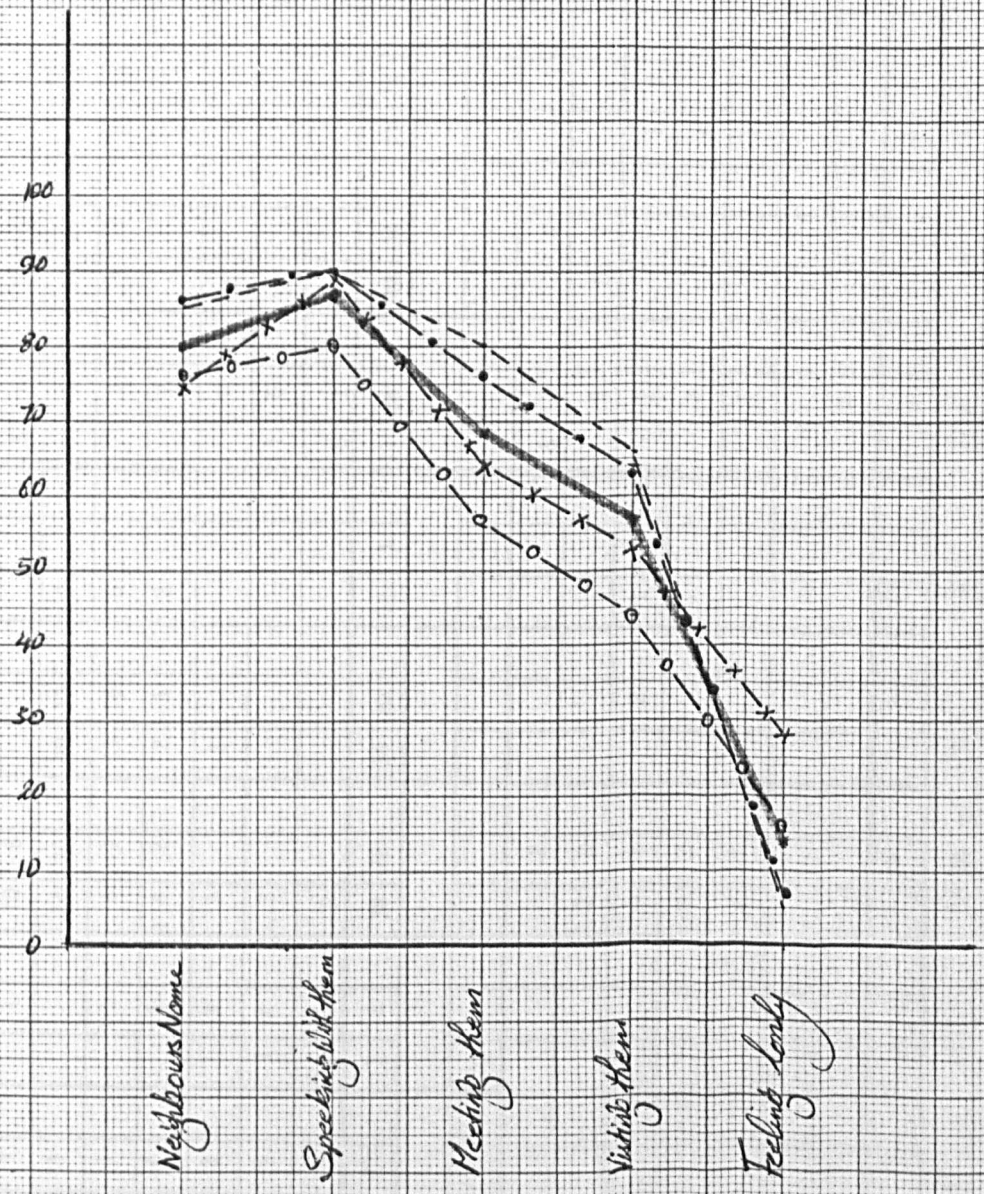
FIGURE: H.35(c)

ACTIVITIES \ SEASONS	THE USED SPACE: Basement	Courtyard	Dining	Reception	Sitting	Kitchen	Bed	Flatroof	Garden	Covered sp.	Balcony	
	SUMMER / WINTER											
Breakfast			2	1	12	7	3			1		
			1		15	4	2			2		
Lunch			3	2	14	4	4					
					20	1	2					
Siesta					6		17					
					18		16					
Teatime					17	5	3		0	3		
					14	5	3			3		
Dinner			2		18	2	3		0	5		
					18	1	3					
After dinner					20	1	3		0	1		
					17	0	3			6		
Sleeping at night				2	1		23	0	0			
				0			3	23	1			
TOTAL			7	2	88	19	56	0	0	2		
			7	0	102	11	32	23	15	6		
%			4	1.1	44.9	10.9	28.6			1.1		
			2.9		58.3	6.3	18.3	13.1	8.6	3.4		

FIGURE: H.35(d)

FIGURE: H.36

Social Relationship Activities Between the Estate Designed by Local Consultant



STATUS / NO.	AGE GROUPS				EDUCATION														OCCUPATION													
	MALE		FEMALE		ILLITERATE			LITERATE			P.SCHOOL			S.SCHOOL			UNIVERSITY			HOUSEWIFE/ UNEMPLOYED			STUDENT			CIVIL SERVICE			WORKER			BUSINESSMAN		
	No.	%	No.	%	M	F	%	M	F	%	M	F	%	M	F	%	M	F	%	M	F	%	M	F	%	M	F	%	M	F	%	M	F	%
>9	18	21.1	13	19.2	8	7			1		10	5								5	8		13	5								
10-19	38	33.3	34	39.4	2	1					14	20		20	13		2				6		32	27		2	1		4				
20-29	21	18.7	10	13.8		1			1		4	1		11	6		6	1			4		3	2		13	4		3			2	
30-39	9	9.8	8	11.7	1	4			1		4	2		2	1		2				7					4	1		4			1	
40-49	7	7.3	6	7.4	2	3			3		2			3							6					2			5				
50-59	4	3.3	6	6.4	1	4		1	2		2									1	6								2			1	
60+	7	6.5	1	2.1	3	1		2			2									5	1								2				
TOTAL	104		78		17	21		3	8		38	28		36	20		10	1		11	38		48	34		21	6		20			4	
RELATIVES																																	
>9	8		5		8	3						2								8	3			2								
10-19	3		3								2	3		1							2		2	1					1				
20-29	2		3								1	1			2		1				2					1	1		1				
30-39	3		3								2	3		1							3					1			2				
40-49	2		1								2	1									1					1			1				
50-59																																	
60+	1		1		1	1														1	1											
TOTAL	19		16		9	4					7	10		2	2		1			9	12		2	3		3	1		5				
% within the whole sample	56.6		43.3		23.5			17.5			38.24			27.6			5.5			32.2			40			14.2			11.5			2.19	
Average age	23.5		22.7																													

Total Average Age = 23.1

TABLE H.40(a)

UMAL: POPULATION, EDUCATION OCCUPATION STATUS

STATUS / NO.	AGE GROUPS				EDUCATION														OCCUPATION														
	MALE		FEMALE		ILLITERATE			LITERATE			P.SCHOOL			S.SCHOOL			UNIVERSITY			HOUSEWIFE/ UNEMPLOYED			STUDENT			CIVIL SERVICE			WORKER			BUSINESSMAN		
	No.	%	No.	%	M	F	%	M	F	%	M	F	%	M	F	%	M	F	%	M	F	%	M	F	%	M	F	%	M	F	%	M	F	%
>9	15	19.5	16	23.8	8	9					7	7								8	8		7	7										
10-19	14	16.8	24	27.2							7	13		6	10		1	1			1		14	22			1							
20-29	19	30.1	18	22.7				1	2		2	1		6	9		10	6			4		3	2		13	12		1			2		
30-39	14	20.4	13	15.9				1	3		2	2		3	3		8	5			6					13	7					1		
40-49	2	2.4	4	4.5		3		1	1					1							4					1			1					
50-59	6	7.2	4	4.5	1	3		2						2			1	1		1	4					1			2			2		
60+	3	3.6		1.1	2			1												1									1			1		
TOTAL	73		79		11	15		6	6		18	23		17	22		19	13		10	28		24	31		28	20		5			8		
RELATIVES																																		
>9	1		5		1	5														1	5												
10-19																																		
20-29	6		2					1			1			4	1		1			1	2		1			2			1			1		
30-39	3		1								1			1	1		1										1							
40-49																																		
50-59																																		
60+			1			1															1													
TOTAL	10		9		1	6		1			2			5	2		2			2	8					2	1		1			1		
% within the whole sample	42.6		46.1		19.2			7.6			25.14			26.9			19.8			28.0			32.1			29.8			3.5			4.0		
Average age	25.8		21.8																															

Total average age = 23.7

TABLE H.40(b)

TAMIM: POPULATION, EDUCATION OCCUPATION STATUS

TABLE H.41

APPROXIMATE DWELLING AREA

Level / Area m²	TAMIM				UMAL			
	Ground Floor		First Floor		Ground Floor		First Floor	
	No.	%	No.	%	No.	%	No.	%
>49	-	-	16	64	-	-	13	46.4
50-99	4	16	6	24	-	-	15	53.6
100-149	6	24	1	4	8	28.6	-	-
150-199	13	52	-	-	17	60.7	-	-
200-249	1	4	-	-	3	10.7	-	-
250-299	1	4	-	-	-	-	-	-
300-349	-	-	-	-	-	-	-	-
Average	25	153	23	42.3	28	186	28	51.18

AREA OF THE WHOLE PLOT

Estate / Area m²	TAMIM		UMAL	
	No.	%	No.	%
>99	3	12	-	-
100-199	3	12	-	-
200-299	11	4	28	100
300-399	7	28	-	-
400-499	1	44	-	-
Average	25	250	28	250

TABLE H.42

DISTURBANCE FROM NOISE

Noise \ Estate	TAMIM		UMAL	
	No.	%	No.	%
No	7	28	9	32.1
Yes	18	72	19	67.9
Cause of Noise				
Crowdedness	-	-	1	3.6
Children	17	68	19	67.9
Services	4	16	10	35.7
Source of Noise				
Inside the House	-	-	1	3.6
Outside the House	17	68	16	57.1
Both	2	8	1	3.6
Don't know	6	24	10	35.7

TABLE H.43

FEELINGS ABOUT ESTATE DENSITY

Response \ Estate		TAMIM		UMAL	
		No.	%	No.	%
Too crowded		11	44	14	50
Crowded		11	44	7	25
Just right		3	12	7	25
Don't know		-	-	-	-
Reasons					
Near to Services	(No)	23	92	28	100
	(Yes)	2	8	-	-
Family Size	(No)	4	16	10	35.7
	(Yes)	21	84	18	64.3
Multi-Family	(No)	15	60	17	60.7
	(Yes)	10	40	11	39.3
Children	(No)	22	88	28	100
	(Yes)	3	12	-	-

TABLE H.44

FEELINGS OF DISCOMFORT WHEN WALKING ON THE ESTATE'S ROADS

Response \ Estate	TAMIM		UMAL	
	No.	%	No.	%
No	5	20	3	10.7
Yes	20	80	25	89.3
Don't know	-	-	-	-
Reasons for Discomfort				
Long distance	5	20	18	64.3
Unpaved	11	44	23	82.1
Climatic Factors	17	68	21	75
Children playing	11	44	18	64.3
Traffic	11	44	21	75
Odour	6	24	4	14.3

TABLE H.45

CAR AND TRANSPORTATION

Response \ Estate	TAMIM		UMAL	
	No.	%	No.	%
Having a Car				
No	17	68	22	78.6
Yes	8	32	6	21.4
Don't Know	-	-	-	-
Problems of Car Parking				
No	4	10	3	10.7
Yes	5	20	3	10.7
Don't know	16	64	22	78.6
Parking Space in Relation to the House				
Inside	7	28	3	10.7
Outside	2	8	3	10.7
Don't know	16	64	22	78.6
Preference for Car space in Relation to the House				
Private	6	24	4	14.3
Public	-	-	2	7.1
Don't Know	19	76	22	78.6

TABLE H.46

SERVICES AND UTILITIES

Distance Between House and Services

Services \ Estate	TAMIM						UMAL					
	Near		By Walking		By Car		Near		By Walking		By Car	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Primary School	22	88	2	8	1	4	17	60.7	9	32.1	2	7.1
Secondary School	13	52	9	36	3	12	9	32.1	10	35.7	7	25
Clinic	12	48	9	36	4	16	1	3.6	5	17.9	22	78.6
Public Bath	-	-	1	4	-	-	-	-	-	-	-	-
Shops	16	64	7	28	2	8	1	36	7	25	20	71.4
Cafe	18	72	7	28	-	-	3	10.7	12	42.9	12	42.9
Religious Centre	20	80	4	16	1	4	17	60.7	6	21.4	5	17.9

Services and Utilities Needed on the Estate

Services \ Estate		TAMIM		UMAL	
		No.	%	No.	%
Education	(No)	23	92	25	89.3
	(Yes)	2	8	3	10.7
Social Services	(No)	24	96	28	100
	(Yes)	1	4	-	-
Environmental Services	(No)	23	92	27	96.4
	(Yes)	2	8	1	3.6
Health Services	(No)	21	84	13	46.4
	(Yes)	4	16	15	53.6
Public Services	(No)	9	36	9	32.1
	(Yes)	16	64	19	67.9

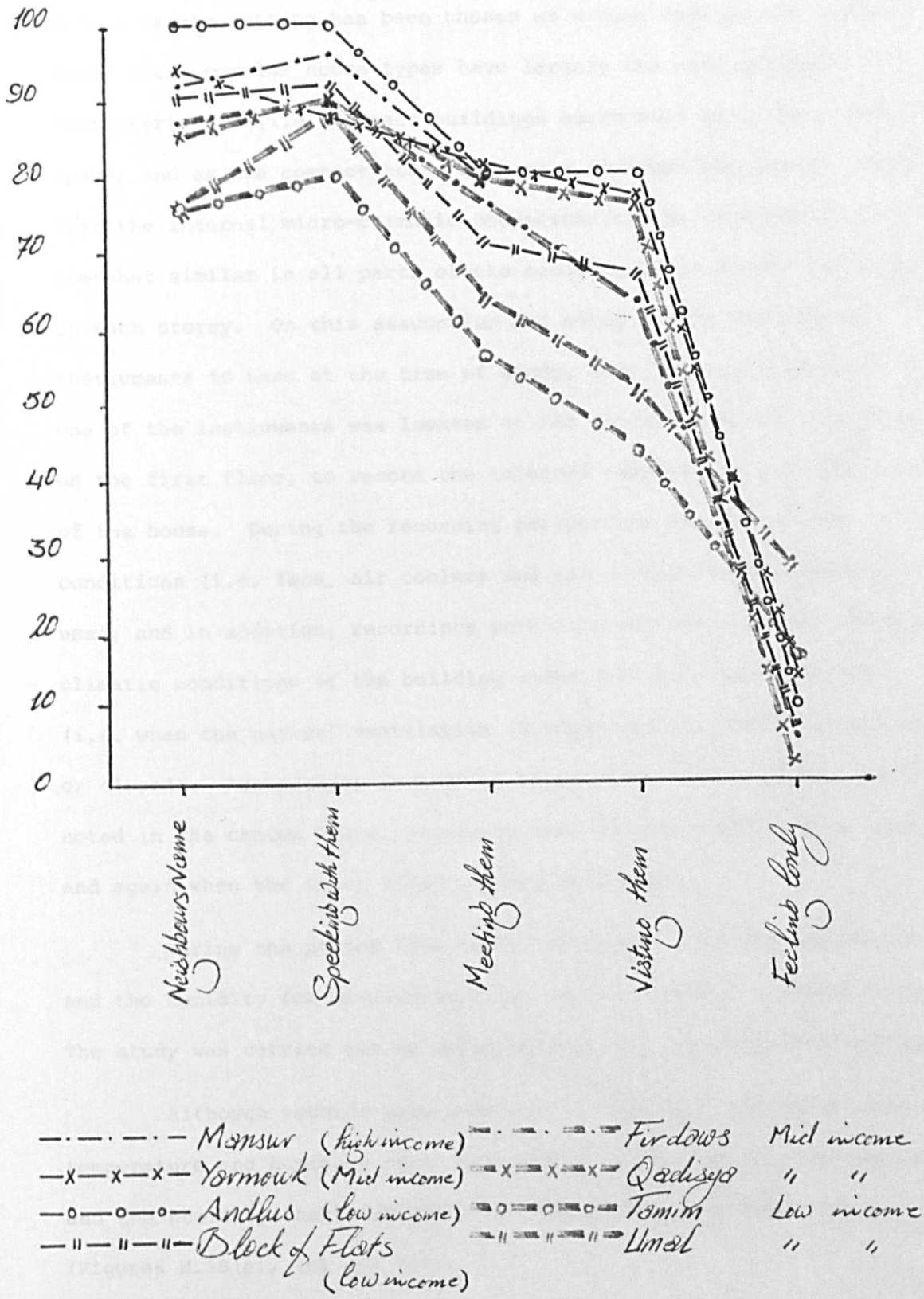
[H.10] DESIGN AND SOCIAL CRITERIA ON THE ESTATE LEVEL

H.10.1 Social Criteria

It seems that the estate design arrangement, i.e. the roads network and its hierarchy, the open spaces, location of services and utilities, play a major role in determining the social activities of the inhabitants. These facts can be seen clearly in Figure H.37 They indicate that the responses of inhabitants in these estates which have been designed principally in relation to cultural factors (Figure H.27(b)) (low income Andlus, mid income Yarmouk and high income Mansur) have a relatively higher degree of positive social relationships than the estates which have been designed principally to meet legislative and building regulation criteria, i.e. Qadisya, Firdaws, (mid income, semi-governmental sector), Umal (low income, semi-governmental sector) and Tamim (mid/low income, private sector) (Figure H.36). This is because the estates designed in relation to cultural factors have maintained a sharp differentiation in the estates' layout between areas for pedestrians and motor traffic within a hierarchy of roads and the location of services and utilities within the estates is intended to facilitate pedestrian use which can be seen clearly in the diagrams of the layouts (Figure H.19(a)).
whereas the grid-iron pattern evolved in a mechanical way dominates the estates designed primarily in order to satisfy the legislation (Figure H.32).

FIGURE: H.37

Social Relationship



H.10.2 Orientation - Function of the House Space Arrangement

In order to study the effect of the natural environment on the modern urban fabric one of the popular types of housing within the modern estate setting has been chosen as a case example for analysis. Since these popular house types have largely the same physical characteristics (i.e. compact buildings surrounded by a loose open space) and as the compact house acts as a detached autonomous living unit the internal micro-climatic conditions can be expected to be somewhat similar in all parts of the house at least within the rooms on each storey. On this assumption and owing to the shortage of instruments to hand at the time of study, only two have been used. One of the instruments was located on the ground floor and the other on the first floor, to record the internal temperature and humidity of the house. During the recording periods the artificial air conditions (i.e. fans, air coolers and air conditioning) were not used, and in addition, recordings were made for the internal physical climatic conditions of the building under different circumstances (i.e. when the natural ventilation (windows) of the building were open or closed). Accordingly records of temperature and humidity have been noted in the chosen house, initially when all the windows were closed and again when the first floor windows were open.

During the period from 14th-18th August 1980 the temperature and the humidity for Al-Jawardi house were recorded on special charts. The study was carried out by using the Casella hygrographic instruments.

Although records were made for several days the variations in temperature and humidity were very small. Consequently, the temperature and the humidity charts of the 17th August 1980 have been chosen (Figures H.38(a), (b) and (c)).

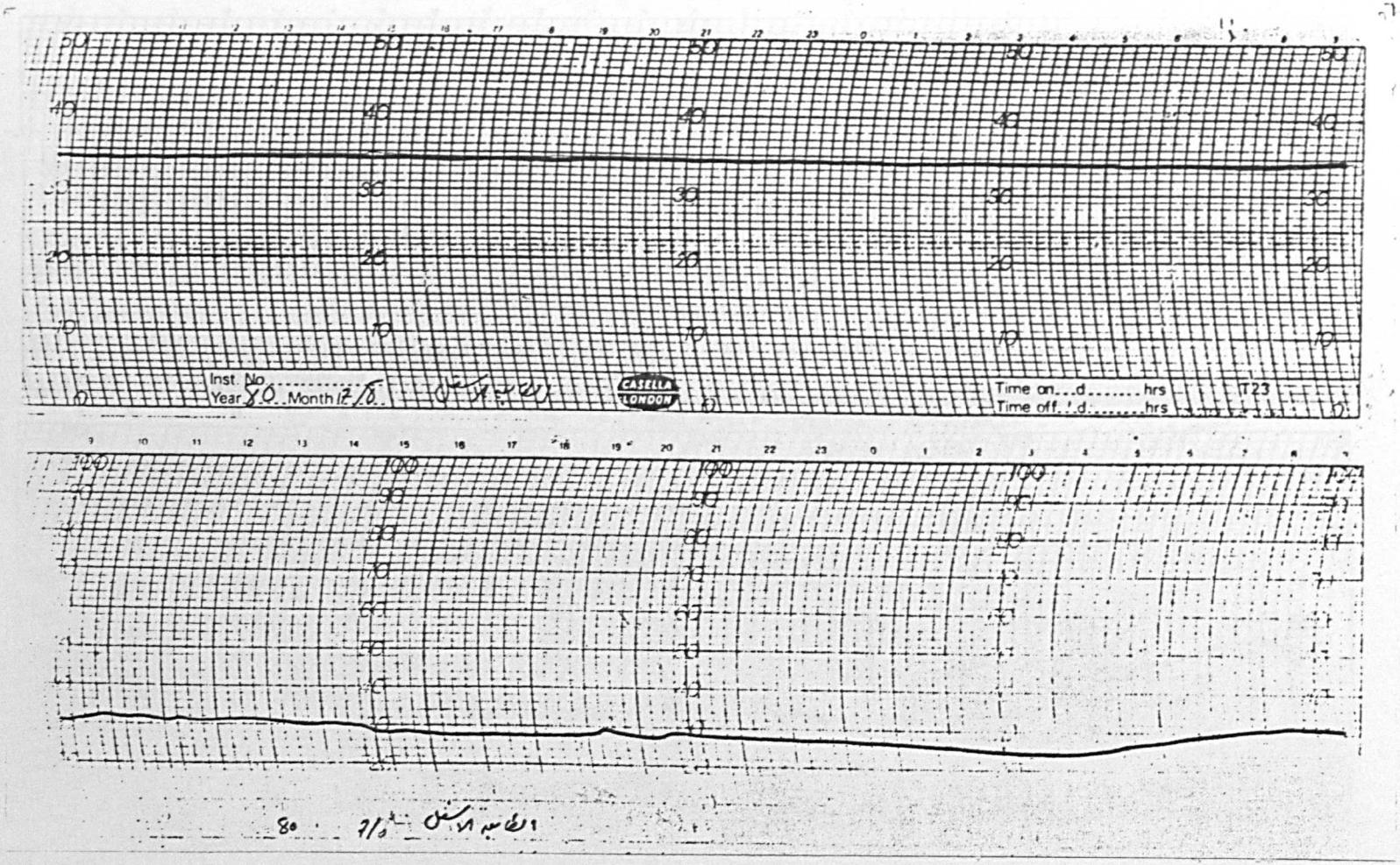
randomly to analyse the relationship between the daily activities of the family and the micro climate of the house.

Accordingly Table H.47 has been constructed. In this table the time during the 24 hours has been grouped as AM and PM. The AM time includes the house 9 to 12 noon on 17th August and 0 to 9 AM for the next day, 18th August, whilst the PM time included 12 noon to midnight on the 17th August. This classification may simplify the required analysis.

The records illustrate that the recorded temperatures during the 24 hours show little variance. The maximum recorded differences on the ground floor when the windows were closed was between 34.8°C at 15:00 hours and 33°C at 06:00 hours, whilst the maximum recorded differences in the humidity during the same hours are between 34.5°C at 12 noon and 27°C at 03:00 hours. On the first floor when the windows were opened the maximum differences in temperature recorded were between 38.5°C at 15:00 hours and 1°C at 06:00 hours, whereas the maximum humidity differences recorded during the same period were between 62 at 09:00 hours on the 18th and 27 at 15:00 hours and 03:00 hours. This greater range of difference in the latter case is due to the direct exchange in temperature and humidity between the internal climatic condition of the building and the external ambient surrounding atmosphere.

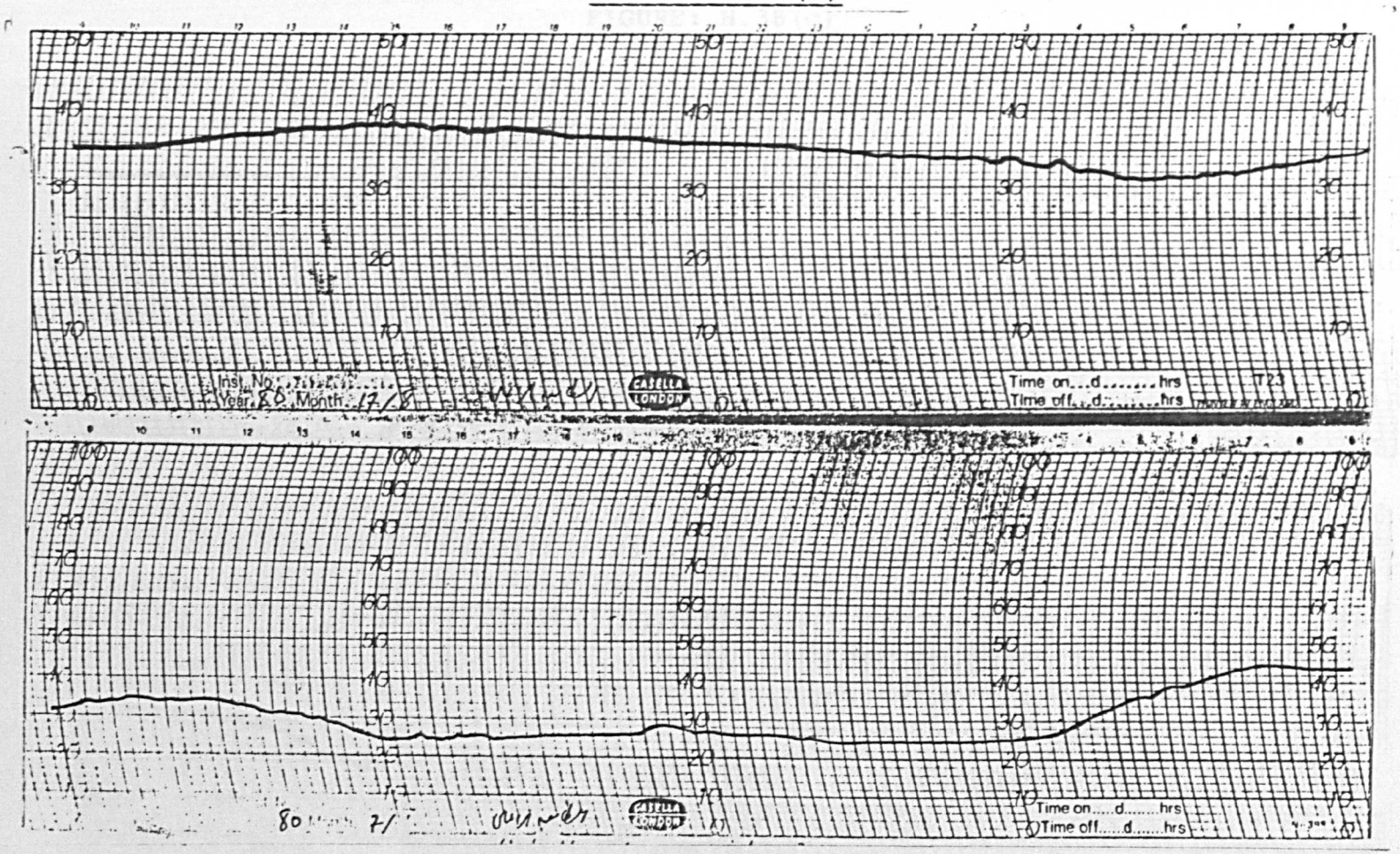
The differences between the external ambient atmosphere (i.e. large sunny open spaces with a negative pressure) and the internal building conditions (i.e. shaded enclosed spaces with a positive pressure) together with direct contact between internal and external environment and the large temperature differences will speed

FIGURE: H.38(a)



Ground Floor (Closed Windows)

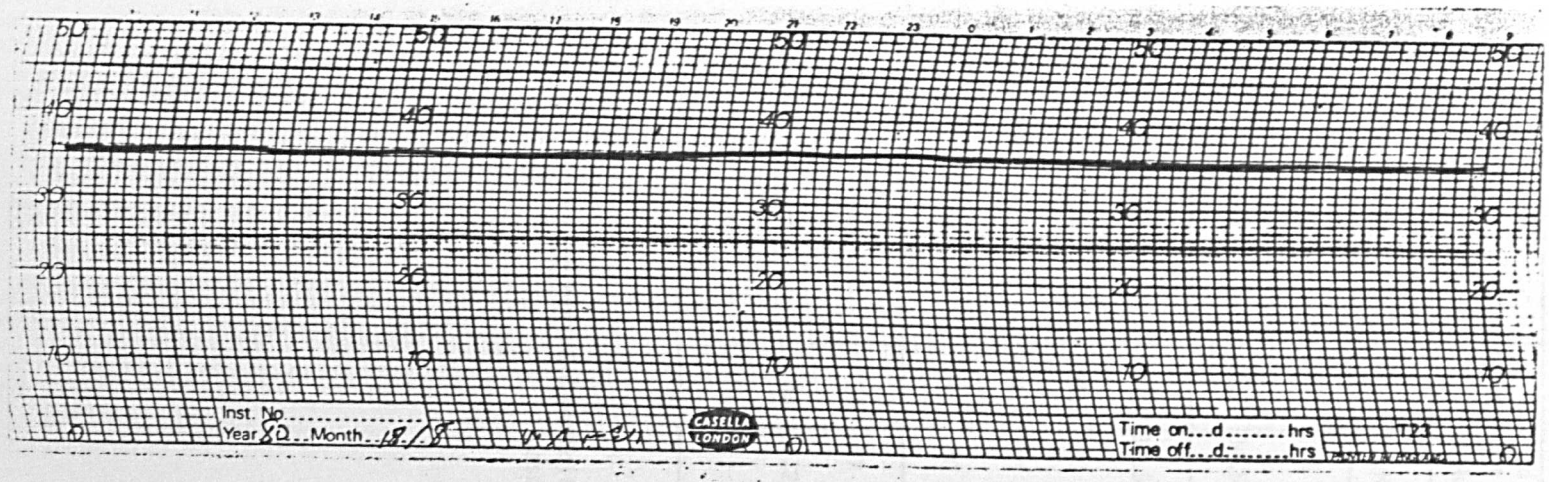
FIGURE: H.38(b)



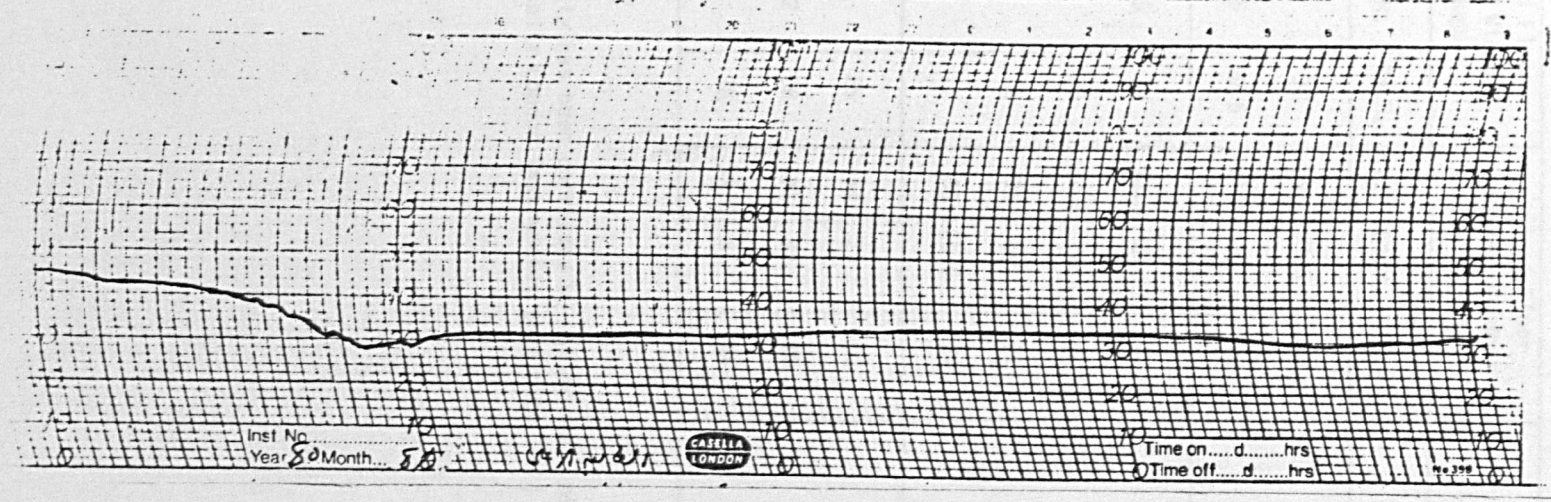
First Floor (Open Windows)

FIGURE: H.38(c)

Temperature



Humidity



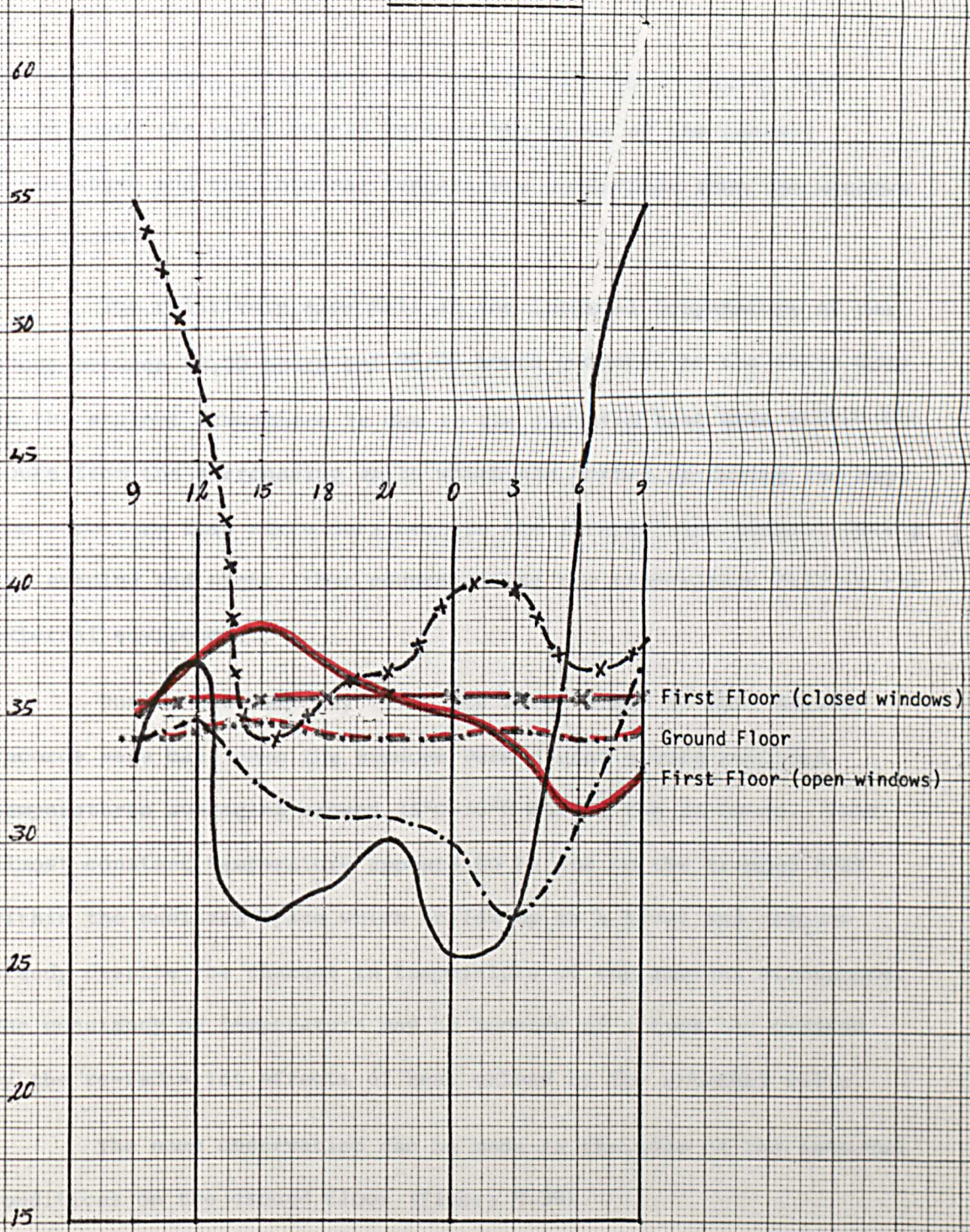
First Floor (Closed Windows)

TABLE H.47

Time			Ground Floor Closed Windows 17 August			First Floor Opened Windows 17 August				First Floor Closed Windows 18 August		
			T.	Co.H.	Re.H.	T.	Co.H.	Re.H.		T.	Co.H.	Re.H.
A.M.	9		34	34	30	35	33.5	31		35	55	45
	12		34.2	34.5	30.5	31	37	32		35	42	40
P.M.	15		34.8	32.5	29	38.5	27	25		35	34	30
	18		34.3	31	28	37.5	28	26		35	35.5	31
	21		34.5	31	28	36	30	27		35	37	32
	0		34.1	30	27	35	25.5	24		35	40	34
A.M.	3		34	27	25	34	27	25		35	40	34
	6		33	31.2	28	31	45	38		35	37	32
	9		34	37	38	33.5	55	44		35	38.5	33

* The recorded humidity has been corrected by use of the correction table of Casella London Instruments (see page 747)

FIGURE: H.39



Temperature and Humidity in the Compact House

Temperature

Humidity

up heat exchange. This fact can be seen clearly in Figure H.39 which shows the relationship between the curve of the ambient temperature and the internal temperature conditions when the windows were opened.

The relatively slow fall in the internal temperature of the house between 18:00 hours and 06:00 hours compared to the sharp drop in the ambient atmosphere is due to the radiated heat gain within the house from the surrounding walls which are heated up during the day. The structure then surrenders heat to the internal environment during the evening and night, thus counteracting the temperature fall in the external environment.

During the next day (i.e. the first floor on 18th August) records were made when the windows were closed giving recorded temperatures averaging around 35°C-36°C during the 24 hours. This almost constant temperature appears to be due to the trapped heat within the enclosed space which builds up to a level and remains steady despite the changes in temperature of the ambient atmosphere. The constancy of temperature may be because of a time lag created by the re-radiation effects of heat gained by the external walls.

The same observation can be made in the case of the internal conditions on the ground floor (Figure H.39).

However, whatever the internal physical condition of the compact house, the preliminary studies show small variations in the temperature conditions during the 24 hours in each floor on one hand and between the first and the ground floor on the other hand. In particular we should note that the temperatures recorded are above the human comfort zone. This means that these houses are incapable

of providing shelter from the natural environment. Accordingly, the daily activities of the family are only able to take place by use of artificial sources of air conditioning (i.e. cooling) by the use of fans, air coolers and air conditioning.

We have no records of temperature and humidity during the winter period but some of our evidence suggests that users found some rooms too cold for use in the winter, indicating that these modern structures are not capable neither of naturally maintaining cool internal conditions in hot weather or providing warm internal conditions in winter.

H.10.3 The Modern Urban Fabric and Its Aesthetic Status

Due to dramatic changes in the design criteria in the modern residential areas on both the estate level (i.e. the layout) and the domestic level (i.e. the individual buildings) visual perceptions and aesthetic status have changed accordingly.

All the modern residential areas within the different sectors and income status followed in their design almost the same principles and control regulations. Therefore, general main visual and aesthetic characteristics can be drawn from them by utilizing the urban form technique which has been introduced in Section D.4.5.1. These characteristics will be illustrated as follows:

The huge open spaces created by car penetration throughout the modern residential areas, in addition to the open spaces which have been left in front and around the dwellings as gardens. In particular the estates in classes three to seven (see Sections H.2, H.3 and H.7) badly affect the balance between the solid mass of the buildings (i.e. positive charge elements) and the surrounding open space.

The imbalance created between the space and the buildings is due to the large gaps of open space in relation to the size and proportion of the building (i.e. bungalows, mainly one - one and a half stories). This phenomenon visually emphasizes individuality and weakens the linkages between the dwellings. Thus the unity, totality and articulation between the solid mass of the dwelling and the open space are not clear within the estate level.

Throughout the different routes of the estates a conflict will arise between different observers' time scales and the desired visual aesthetics of the buildings at the detailed level and in relation to

the surroundings.

As the observers' time scales are different, depending whether on foot or motorized, then their requirements in terms of visual stimulation and aesthetic design will also be quite distinct (i.e. signs and street furniture, shape of the roads, form and details of the buildings and the materials used in relation to the surrounding space. Clearly the pedestrian will require finer detail and variety of space to hold his attention than the motorist seeing only the broad outline of the buildings and demanding smooth and rapid movement.

Visually one of the main dominant features, especially within the estate which has been implemented by the semi-governmental sector (i.e. Yarmouk and Andlus) is the monotony.

Despite each estate having two different types of housing this is not enough to attain the required aesthetic variety, especially when each type is erected along both sides of the street, with highly similar order, thus creating a repetitive stereotype, in addition to the use of the same building materials and colours.

All the modern residential areas can be characterised by a lack of a focal point throughout their layout which does not encourage the inhabitants to walk around and appreciate the aesthetic features of the place. This is mainly due to the centralization criteria which followed in the design based on the separation between the public buildings from the residential areas (i.e. the public buildings are mainly located on a separate island). In other words the public buildings (i.e. mosques, schools, shops and social centres, etc.) are not distributed throughout the residential area

in an urban design manner in order to generate visually strong linkages between the different parts of the residential areas and also to encourage people to walk through.

There is no sign of the hidden surprise elements throughout the residential estates to stimulate the walker to venture forward in search of its mystery. Generally, all the main elements of the residential area can be discovered straightforwardly and from a distance along the main arteries, due to the open vista of the streets and the crossroads of the grid-iron pattern.

Visually there are no differences in the treatment of buildings (i.e. its setting, form and facades) in relation to the hierarchical degree of the road network system or to its function, which can give to each part of the residential area its identity and character. This is due to the rational approach to design and plot subdivisions. A common visual feature within the different sizes of the roads in the modern residential areas is that the roads are determined visually by dwellings, external fences and the setting back of the dwelling with almost always a garden in between.

The green features, trees and plants, which have been used both indoors and outdoors within the modern residential areas not only add a new aesthetic dimension to the residential estate but improve the climatic conditions by increasing the shaded areas.