Durham University

Durham E-Theses

Settlement relations in the city and region of Kashan, Iran

Costello, Vincent F.

How to cite:

Costello, Vincent F. (1971) *Settlement relations in the city and region of Kashan, Iran*, Durham theses, Durham University. Available at Durham E-Theses Online: http://etheses.dur.ac.uk/7921/

Use policy

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

- a full bibliographic reference is made to the original source
- a link is made to the metadata record in Durham E-Theses
- the full-text is not changed in any way

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

Please consult the full Durham E-Theses policy for further details.

Academic Support Office, The Palatine Centre, Durham University, Stockton Road, Durham, DH1 3LE
e-mail: e-theses.admin@durham.ac.uk Tel: +44 0191 334 6107
http://etheses.dur.ac.uk

SETTLEMENT RELATIONS IN THE CITY AND REGION OF KASHAN, IRAN.

by

VINCENT F. COSTELLO, B.A.
(University College)

Thesis submitted for examination for the Degree of Doctor of Philosophy in the University of Durham.

March 1971

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

ABSTRACT

SETTLEMENT RELATIONS IN THE CITY AND REGION OF KASHAN, IRAN.

Kashan is one of a number of ancient city regions on the margins of Iran's arid central plateau. The region has a well-defined territorial socio-economic pattern in which an urban upper class has in the past maintained its control over the illiterate mass of the people in the city and its satellite villages through the ownership of land and water rights, carpet-weaving contracts and credit. In recent years, however, Land Reform and the co-operative movement have altered the economic and political balance between town and country, while the growth of a modern textile industry has radically altered urban industrial structure. Rural response to change, through migration or agricultural development, has been governed by an inheritance of land and potential water resources which varies much between upland and lowland.

A multivariate analysis of one hundred Iranian cities is described : the occupational, housing and demographic structures of the cities are shown to be related to their location and to their relations, through migration, with their hinterlands. The need for study of cities with under one hundred thousand population is stressed since size directly affects urban growth. In the present case, though commerce and industry in Kashan City are growing rapidly the pace of regional urbanization has been relatively slow.

Within Kashan City the grafting of new suburbs onto the old pre-industrial quarters is the latest manifestation of an already established social order, but a detailed areal study reveals that the statistical dividing line in population and housing between the suburbs and the old town, and between urban and rural areas is hard to distinguish. The operation of central-place principles in the provision of goods and services in the region and in the land use and land value surfaces of the city is described.

CONTENTS

LIST OF FIGURES

LIST OF TABLES

LIST OF PLATES

Note on Transliteration

Where Persian words have been transliterated the scheme followed as far as possible is a simplified form of that used by J. Mace in Teach Yourself Persian, English University Press, 1962. A major departure is the use of 'q' rather than 'gh' for both the Persian letters ghain (qain) and ghaf (qaf) in the text, but not in the figures.

S T A T E M E N T

None of the material offered here has been previously submitted by the candidate for a degree in this or any other university. The work represents the candidate's own original research except where acknowledged by references.

PREFACE

Research for the present work was carried out by the author between 1967 and 1970. Two field trips were made to Iran, from March to August 1969 and from January to April 1970. Funds were provided by the Department of Education and Science under the Hayter studentship scheme.

The work could not have been accomplished without help given generously from many quarters. In the first place my sincerest thanks are due to many persons in Iran: to Professor Ganji of the Department of Geography, University of Tehran, who smoothed my path on many occasions; to the Director and officials of the Iranian Statistical Centre, who provided so much of the unpublished material used here; to Mr. E. Plaisance and Mr. P. Schwarz for their hospitality in Kashan; and to Mr. D. Stronach, Director of the British Institute of Persian Studies, who was most liberal in allowing me use of the Institute and, in the spring of 1969, the loan of a field vehicle.

In Durham also I have received much assistance, and I wish to acknowledge my debt to Professor W.B. Fisher, for his supervision of the project and on two occasions making available supplementary travel grants; to Mr. M.A. Power and Mr. P. Walker for their comments; and in particular to Mr. B.D. Clark, who has been a constant source of advice and encouragement to me as an undergraduate and during the period of research. Finally I should like to thank my wife for her forebearance while the research was being carried out and the thesis written.

"This readiness in misapprehending one's meaning and reversing what one had said gave rise to one class of difficulty. Another class arose from the extreme simplicity of the people. For instance, after asking them the words for a number of common objects in their language, I asked "And what do you call 'city'?" "Kashan", they replied. "Nonsense!" I said, "Kashan is the name of a particular city : what do you call cities in general?" "No", they said, "it is quite right : in Persian you say '<u>shahr mi-ravam</u>', 'I am going to the city' : we say '<u>Kashan mi-ravam</u>': it is all the same". It was useless to argue, or to point out that there were other cities in the world besides Kashan : to these simple-minded folk Kashan remained "the city" <u>par excellence</u>, and they could not see what one wanted with any other. Finally I had to give up the struggle in despair...."

E.G. Browne, (1926), 204-5.

CHAPTER ONE

INTRODUCTION

I. RATIONALE

The functions and limits of the city and its unifying relations with the surrounding area have been the subject of many studies, most dealing with the city-region in Europe and North America (Dickinson, 1964). Few such studies are available for the Middle East and only a handful are available for Iran. Modern geographical studies in English of Persian cities are confined to D. Darwent's work on Mashad (1965), J.I. Clarke's study of Shiraz (1963), the work of P.W. English on Kerman (1966), J.I. Clarke and B.D. Clark on Kermanshah (1969), and a brief study of the city of Semnan by J. Connell (1970). Of these only P.W. English's admirable study of Kerman deals with relations between the city and its region in any detail. No previous work has been published on Kashan. From these studies it is apparent that Iranian cities have much in common with other cities in the Middle East and in some respects with cities in newly developing countries as a whole. It is proposed, therefore, to examine in the first part of this introductory chapter some of the major distinguishing marks or features of present day urban growth and urbanization in the developing world with particular reference to the Middle East and Iran, and the theories which have been advanced to explain those features.

In the first place urban growth and urbanization in the developing world are not always linked to economic development and industrialization. Until recently the growth of modern cities during the last century in Europe

and North America was regarded, in its details, as the 'normal' pattern of growth. Absolute growth in city size and an increase in the proportion of the total population living in cities were accompanied by technically induced manufacturing scale shifts and an expansion and intensification of the transport net around cities, which in turn encouraged geographical specialization of manufacturing and helped induce cityward migration from the surrounding areas. This cityward migration accounted for much of the urban growth. At the same time the growth of urban population increased demands on the agricultural hinterland and resulted in a more extensive utilization of the hinterland or its spatial extension, sometimes even overseas (Pred, 1962). In the non-western world however, quite apart from the fact that urbanization has been delayed until the present century, the processes accompanying urbanization have been radically different. Local urban population growth occasioned by lower mortality has often played a more substantial part in city growth than it did in the West. There has been in the developing world in general a disappointing lack of industrialization, with consequent unemployment or over expansion of the tertiary industrial sector, and while an increase in agricultrual production preceeded industrialization in the West, the agricultural sector in most newly developing countries has remained underdeveloped, with few per capita increases in production.

The range of theories advanced to explain these observed differences is immense and often conflicting and

confusing (Meier, 1964). Among the more specifically geographical oriented approachs is that of T.G. McGee (1967) who draws a distinction between the 'true urban revolution' in Western Europe and other capitalist societies and the present phase of 'pseudo-urbanization' in the non-Western underdeveloped world. Factors accounting for this present phase are the dependance of 'Third World' economics on the industrial powers and their consequent failure to industrialize, the economic stagnation of rural populations under the effects of rapid population growth and the lack of agricultural reform. In the opinion of some writers this stagnation is largely the result of non-productive city growth. B.F. Hoselitz (1955) has divided cities into two categories of 'generative' and 'parasitic'; cities in the former category are said to stimulate the growth of the wider region in which they are located, while 'parasitic' cities act as a curb rather than a stimulus to economic growth. A key factor in the parasitic city is the dissipation of wealth derived from the surrounding region in non-productive urban consumption. On a national scale parasitism has been regarded as one consequence of urban primacy, (Breese, 1969), where the largest city in a country is very much larger than the second city and consumes a disproportionate amount of the country's wealth. Primacy however is a phenomenum associated with relatively small countries, often with a colonial history; whereas primacy is prevalent in Latin America and Africa in the Asiatic pattern of city size it is less marked, since in Asia as a whole and in particular in the Middle East there has been a longer tradition of urban growth than in the rest of the

developing world.

A detailed attempt to define the relations between the city and its surrounding area in the Middle East has been made by P.W. English in a case study of Kirman in central Iran. English's thesis is that writers have customarily divided Middle Eastern society into city, village and tribe and that this tripartite division is fallacious. City and village - the tribes are ignored - are seen as being interdependant, rather than pristine isolates. Kirman City at the centre of the study area is the administrative, economic and social capital of south-east Iran. Because of the scanty rainfall the city depends on an elaborate and extensive system of qanats (underground irrigation channels). Qanats are expensive to build and maintain and therefore require large amounts of capital and complex regulations about ownership and use. Capital is supplied by the wealthy city dwellers of Kirman City, who then control the water rights and receive a return.

"Most Kirmanis are engaged in collecting and processing raw materials from the hinterland and in distributing goods, materials and services to this wider area..... The city is the focal point of a regional organised settlement pattern... a clear hierarchy of settlements, their ranking in age, size, hinterlands and posture rights is evidence of a rational pattern of settlement developed and maintained by continuous communication among all sectors. The existence of Kirman, then, rests on co-ordination and exploitation of resources in surrounding areas, not on fortuitous location on a trade route".

In Kirman isolated self-subsistent settlements do not exist.

"Furthermore rural settlements in the Kirman Basin are not homogeneous in structure or occupations. They differ in size and complexity from regional subcentres to simple hamlets. Their morphologies vary with site conditions, historical development and regional functions..... This diversity of settlement morphologies is reflected in complex occupational structures. Finally the evidence from Kirman suggests that the impact of modernization in

the Middle East has altered social patterns more deeply than economic organization" (pp 112-113).

One of the principal values of English's work is the detail with which the varying potentialities of the hinterland is described. Variations occur within the immediate hinterland of one city as they occur between countries. As Beaujeau-Garnier has put it "A town is the fruit of a whole natural and human complex. Like a flower growing in a garden it draws its characteristics as much from space and the soil as from climate and the efforts of man; it is born, expands, becomes enormous, often changes and occasionally dies" (1967, p.40). We should therefore expect regional variants in the process of urban growth and urbanization. If that is the case is there a Middle Eastern "regional variant" of the city?

Certainly the pre-industrial Islamic city has been regarded by historians as being distinct in form and function from the West European city (Lapidus, 1967), but the Islamic city as such existed in some sense from the seventh century A.D. to our own times, and was found from Spain to the Indian sub-continent. We cannot expect that urban life should take the same form over such a span of time and space (Hourani and Stern, 1970). A number of distinguishing characteristics of the Middle Eastern city have been pointed out by W.B. Fisher (1966), who gives several reasons why cities are abnormally influential in the area; the variety of geographical environment gave rise to a diversity of economic production and hence a need for exchange and a market centre; the defence role has been significant in cities such as Aleppo, Ankara and Tabriz, while small groups

have often seized power and ruled territories from urban bases, the Mamluks and Ottomans being good examples; all the religions of the Middle East have urban origins and the religious role has been the major function of many cities, Mecca, Jerusalem, Qom, Mashad; wealth has been concentrated in the cities by the presence of absentee landlords, and government has been concerned almost entirely with the urban areas.

In the present century however few non-Western or specifically Middle Eastern cities have remained untouched by western influences. Modern Middle Eastern cities differ considerably in morphology, functional and social organisation from the purely Islamic Middle Eastern city. In many cases a basically western city has been grafted on to a pre-existing indigenous city to give a dual-structured settlement. Studies of Mashad (Darwent, 1965) Shiraz (Clarke, 1963), Kermanshah (Clarke and Clark, 1969), Tehran and Isfahan show this process to be taking place to a greater or lesser extent in the largest cities of Iran.

Explanations for the present form of many Middle Eastern cities and non-Western cities in general can be made on the basis of G. Sjoberg's (1960) analysis of the nature of pre-industrial cities and Boeke's concept of dual societies in colonial countries (see Meier, 1964). Sjoberg's generalizations on pre-industrial cities have been tested against historical cities, present day cities largely untouched by modern development, or to parts of modern cities which still retain their pre-industrial character. Boeke's concept of dual societies may be applied to those cities which have a dual personality and form with, Western

and non-Western parts. It is worth pointing out here that the terms 'pre-industrial' and 'non-Western' are not synonymous, though they are often confused. A number of studies of dual-structered cities are becoming available, for example, Darwent in Mashad (1965), Breese on New Delhi (1966), Mabogunje on Ibadan (1968). Generalizing their conclusions, populations in the old parts of the cities live at high densities, have higher rates of natural increase, lower rates of literacy and a lower proportion of active females than those of the new part of the cities; while social structures in the old quarters remain based primarily on kinship and clan groups rather than income.

It is the opinion of the present author that studies of urban growth and urban-rural relations in the developing world might usefully be supplemented in a number of ways. In the first place, most writers have placed an undue emphasis on the largest urban centres, with populations of over 100,000 persons. In Iran, for example, 23 per cent of the population is in cities with over 100,000 inhabitants and 10 per cent in cities of 20-100,000 inhabitants. Defining an urban place as one with over 20,000 persons, nearly a third of the country's urban population has been studied in any detail in only one major published work. Prevailing attitudes towards smaller cities have been put by Breese (1966) who considered that special interest is always directed towards cities with populations of 100,000 or more as particularly good indicators of 'real' urbanization. The truth of the matter however is that there has been hitherto less data and therefore less interest in settlements above

the village level but below the level of a major agglomeration. Completely different processes might be operating at different size levels in the urban hierarchy.

As a general theory of settlement in the Middle East P. English's study of one Iranian city-region could hardly be adequate, nor was it meant to be, but the questions asked on the nature of settlement and society, as applied to Iran, are valid ones. Kirman however was studied before Land Reform and it has little industrial development. It is arguable that the system described was therefore in many respects a fossil, and that more radical shifts than those observed in the socio-economic organisation of the region might be seen after Reform and in a similar regional system undergoing industrial growth. Also, the lack of a more abstract theoretical approach in the context of central place studies makes comparison of Kirman with other city-regions somewhat difficult.

Lastly, a point arises from the discussion of urban-rural relations. Cities maintain unifying relations with their surrounding regions, but as the focus of change in an area they often differ greatly from their regions in social and economic structure. Social links between city and countryside in the developing world have been studied, especially those maintained by immigrant groups in cities (e.g. Abu-Lughod, 1961), often with the aim of modifying views of the dichotomy between city and village. Indeed the notion of such a dichotomy has been viewed by Hauser (Hauser and Schnore, 1965) as a form of Western ethnocentricism. Whether a socio-economic, quantifiable gradient,

or continuum exists between populations in different parts of a city and those in a rural area has yet to be established; For Iran J. Aubin (1970) has pointed out that there has been a historic tendency not to distinguish between a territory and its principal locality, and that this invites one to place the study of Iranian urban areas within the context of their historic territorial divisions.

The foregoing considerations may now be summarized and formally stated as hypotheses which it is the task of this work to examine further, with reference to a case study of the city and region of Kashan.

(i) While the thesis propounded by P. English on the nature of settlement in the Middle East may hold good in many respects with regard to some of the city-regions of central Iran, it might profitably be tested in a larger and more diverse region than the Kirman Basin and under the conditions of more radical change. Valid comparisons with other systems are best made within the more formal limits of central place studies.

(ii) The phenomena of urban growth and urbanization in newly developing countries are highly complex and world wide. We should expect regional variations; the Persian city may represent such a distinct variant.

(iii) Just as urbanization can take more than one form with both historical and regional variants, so also should we expect variations in the process at different size levels in the urban hierachy.

(iv) Finally, it is apparent that whether we perceive the relations between city and village as dichotomy or continuum

may depend on the scale of the units studied. Division of the city into old and new will inevitably show a dual socio-economic structure, but further subdivision may reveal a plurality of structures merging into a continuum; furthermore, division of a region into urban and rural will also give a dichotomy but it is open to question whether further subdivision of parts may not show a like continuum. We should then expect some correlation of the dual-structured city with the basic rural-urban contrast.

II THE CASE STUDY AREA

The area chosen for study was the city and region of Kashan in central Iran. The criteria for selection were several: a medium-sized city was required below the level of 100,000 population, which could be studied with its region by one person in some detail; the region should have a diversity of physiographic types; Persian should be the language of town and country; it should be relatively close to Tehran where much of the statistical information had to be collected; there should be no additional difficulties to work in the area, such as those provided by religious feeling in Qom.

Kashan is the proper name of both city and province. The term "Kashan City" is used to prevent confusion wherever the context is not explicit. The shahrestan (shahr = city) is the basic unit for administration in Iran and the basic unit for the 1966 Census of Population and Housing. Kashan shahrestan is divided into 9 dehestans (village districts) and contains two urban areas - Kashan City and the twin cities of Aran and Bidgol. The shahrestan

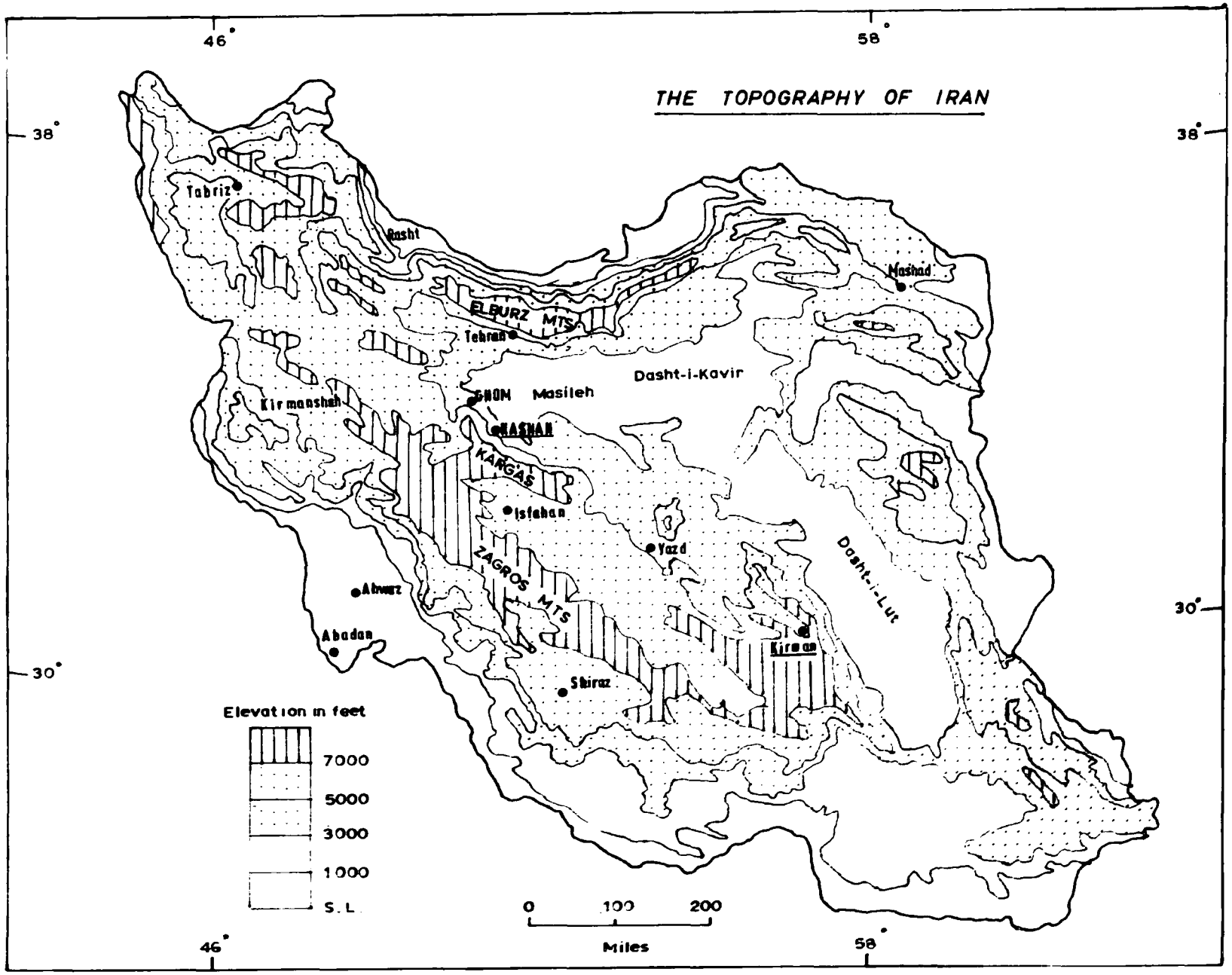

THE TOPOGRAPHY OF IRAN
46°
58°
38°
30°
Tabriz
Rasht
ELBURZ MTS
Tehran
Mashad
Dasht-i-Kavir
QHOM
Masileh
Kirmanshah
KASHAN
KARGAS
Isfahan
Yazd
ZAGROS MTS
Ahwaz
Abadan
Dasht-i-Lut
Kirman
Shiraz
Elevation in feet
7000
5000
3000
1000
S.L
0
100
200
Miles

Figure 1:1

is similar to an English county. How far does this unit correspond to any other geographical criteria for determining a regional system apart from administrative convenience ? The primary indications that Kashan is a functional geographic region centred on Kashan City are the present and historic boundaries of the province and the rank-size distribution of its settlements.

Kashan is one of a number of city-regions located on the margins of Iran's arid central plateau. At times in the past local differences and rivalries between the cities have been considerable, though they have all remained within the common bond of a Persian Islamic culture. These cities and their regions form the heartland of Iran (Fig.1:1). Within this framework of city-provinces Kashan has had an independant existence since the twelfth century A.D. Josheqan - i - Qali dehestan was originally within Kashan but became a separate province under the Qajars. It is now again included in Kashan (Houtum - Schindler, 1898) and the modern provincial boundaries agree closely with those of the old province. Moreover, there is some logic in the present boundary; nowhere does it pass through any densely inhabited area; in the west it follows the edge of the Kargas mountains; it passes through the almost empty lands between Kashan and Qom in the north and Natanz in the south; in the east it passes through the empty and sterile lands of the Dasht - i - Kavir. In the past and at present the inhabitants of this area have looked only to Kashan City as the regional capital (Browne, 1928).

The rank-size distribution of settlements in the

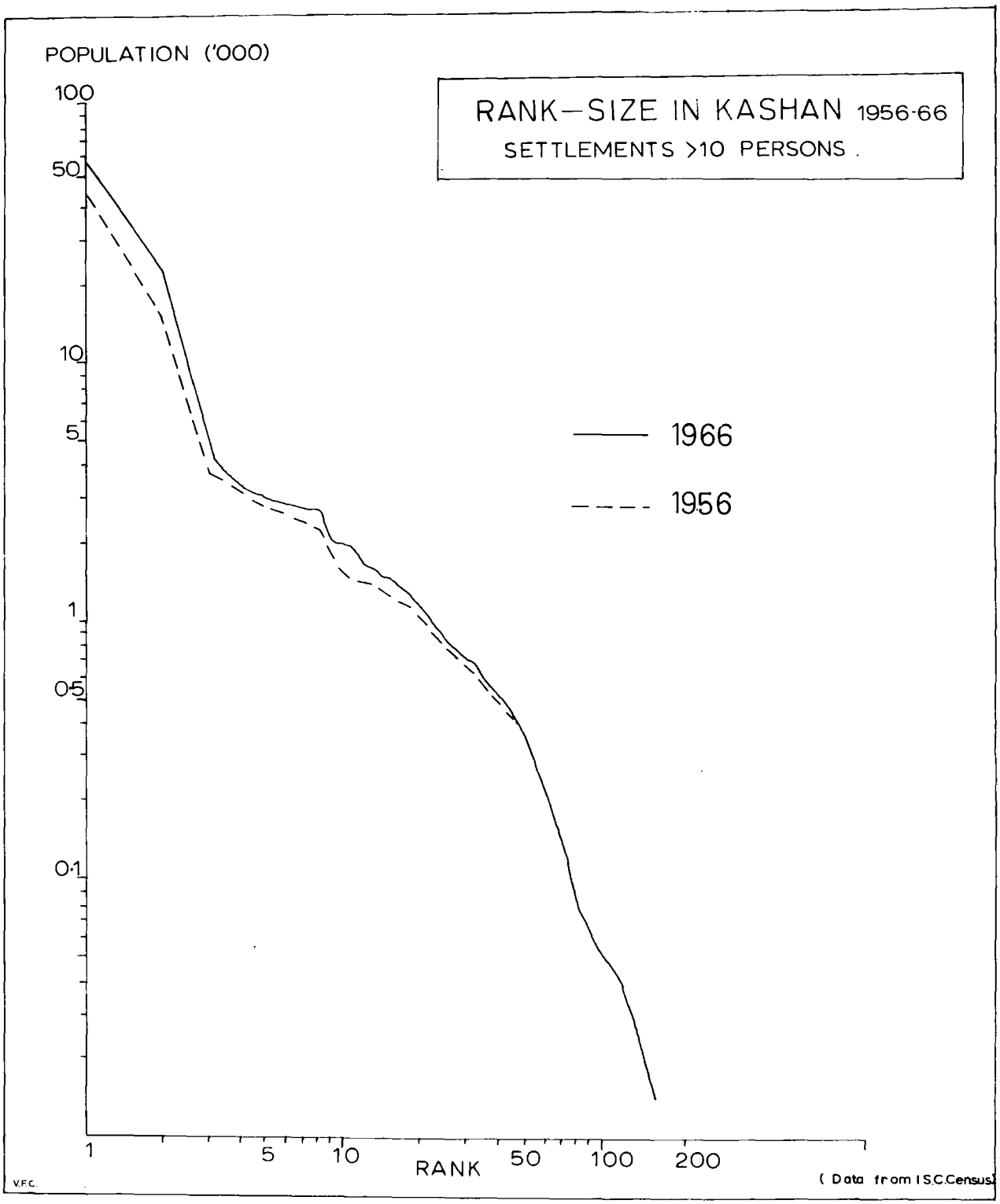

POPULATION ('000)
RANK—SIZE IN KASHAN 1956-66
SETTLEMENTS >10 PERSONS .
100
50
10
5
1
0·5
0·1
1966
1956
1
5
10
RANK
50
100
200
V.F.C.
(Data from I.S.C.Census)

Figure 1:2

shahrestan provides further evidence that they represent parts of a common whole. Kashan City, the focus of the study area, had a recorded population of 58,468 persons in 1966; the twin cities of Aran and Bidgol, taken together for census purposes, had a population in 1966 of 23,265. The total population of the rural area in 1966 was 72,393. It can be seen from Fig. 1:2, showing the ordering of rank and size between settlements in the shahrestan, that although the two urban areas are very much larger than the largest villages the shape of the lower part of the distribution is normal. In the light of Berry's (1966) remarks on size distribution we may conclude that Kashan's settlements form an interacting, interdependant system centred on Kashan City.

Factors Affecting the Pattern of Settlement

Settlement patterns in the shahrestan have been shaped by environmental conditions, by water supply systems, and to an indeterminate amount by evolution over time. Traditional terminology has divided the province into garmsir and sardsir (warm lands and cold lands). This environmental division corresponds to a fundamental division in types of settlement and agrarian economy between the mountains of the western shahrestan and the lowlands of the east (Fig. 1:3). The shahrestan as a whole however suffers from aridity, and beginning with this basic fact much else in the pattern of settlement follows.

(1) Climate: Detailed climatic data on Kashan are lacking, since no synoptic weather station was established until 1967 and figures are not yet available. The data presented

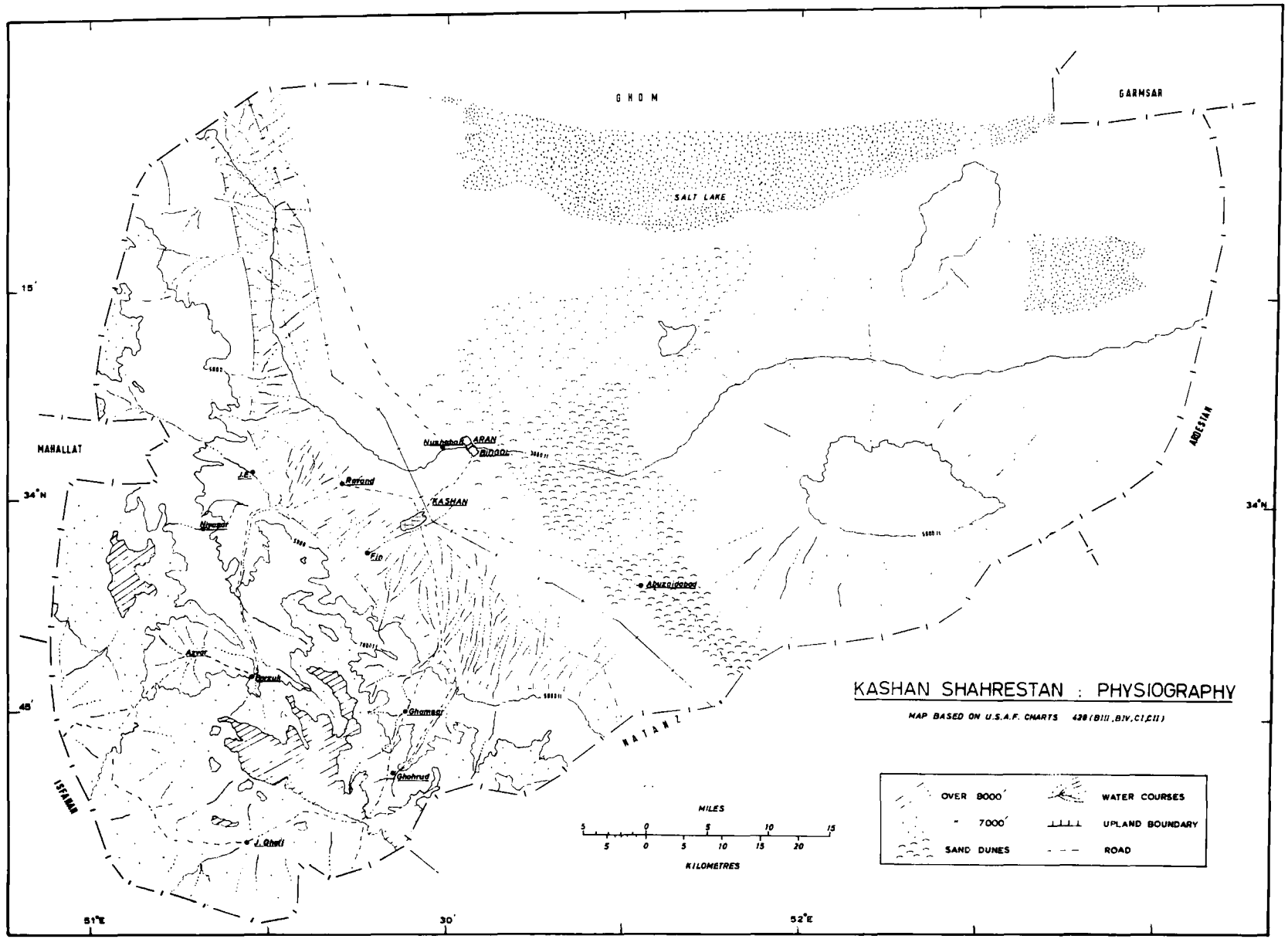

GHOM
GARMSAR
SALT LAKE
MAHALLAT
ARAN
BIDGOL
Nushabad
Barand
KASHAN
Niasar
Fin
Aliabad
Azar
Qamsar
Ghamsar
Ghahrud
J. Ghali
NATANZ
ISFAHAN
ABUZIAN
15'
34°N
45'
51°E
30'
52°E
KASHAN SHAHRESTAN : PHYSIOGRAPHY
MAP BASED ON U.S.A.F. CHARTS 428 (BIII, BIV, CI, CII)
MILES
5 0 5 10 15
KILOMETRES
5 0 5 10 15 20
OVER 8000'
7000'
SAND DUNES
WATER COURSES
UPLAND BOUNDARY
ROAD

Figure 1.3

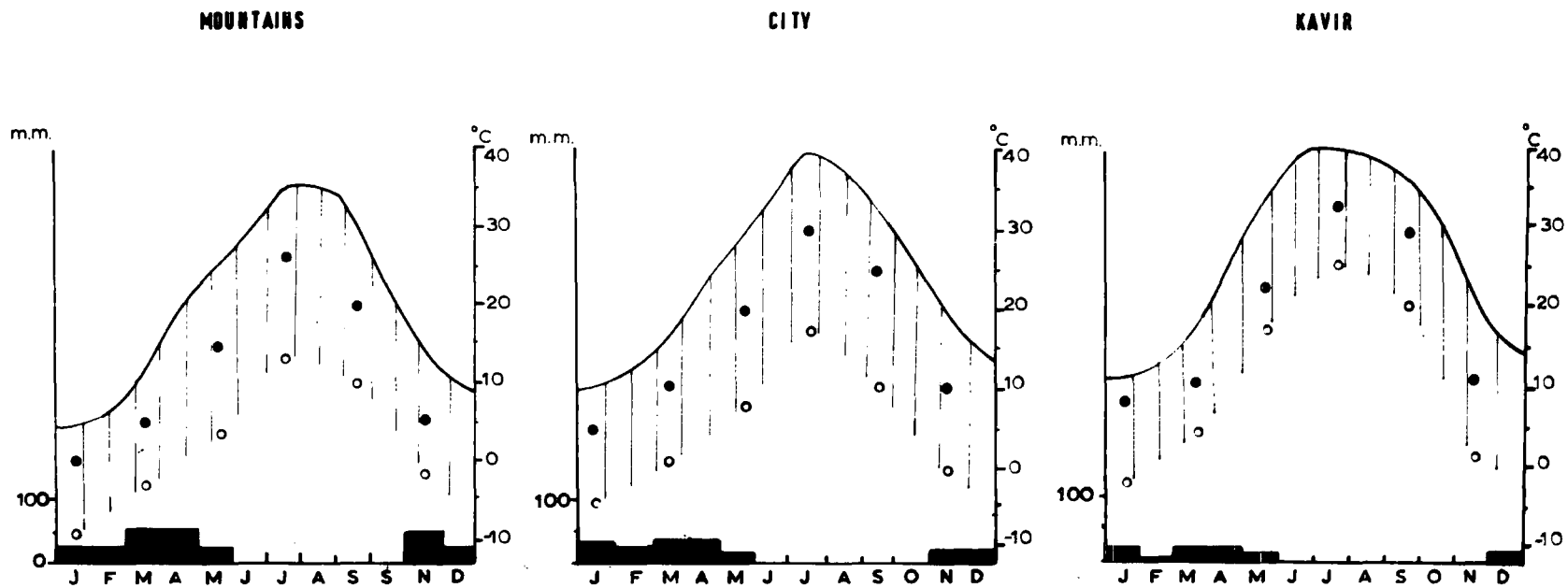
in Figure 1:4 are taken from the climatic Atlas of Iran published in 1969 by the Iranian meteorological service, and they must necessarily be only an approximation. Iran's central plateau is to a considerable extent shut off from the influences of damp maritime air masses by its highland rim. High pressures systems from Central Asia dominate the area in winter and low pressure systems predominate in summer. The plateau experiences only moderate rainfall and considerable extremes of temperature; in consequence it is a region of desert and steppe.

Kashan, located on the plateau and part of its highland rim, falls entirely within the zone of 800 mm water deficit defined by Thornthwaite, Mather and Carter (1962). Precipitation occurs usually in winter and spring, with a complete drought in summer and autumn. Rainfall varies much from year to year, with years of relative plenty interspersed with years of severe agricultural hardship caused by water shortage. When rain does fall it is often fierce and sudden, causing floods, loss of life and damage to property. Much of the precipitation in the mountains falls as snow, and snow-melt in the spring forms an important part of the water budget of both uplands and lowlands.

The altitudinal range of settlement is considerable; from below 900 metres in the lowlands to above 2150 metres in the mountains. As Figure 1:4 shows, there is a great range in the temperatures experienced in the two major environmental zones, though in general the inhabited mountains are 5°C colder than the lowlands. Summers are almost cloudless and temperatures are very high during the day, with a mean daily maximum of 35-40°C; but again because

KASHAN SHAHRESTAN : CLIMATIC REGIMES

(Data from Climatic Atlas of Iran)



	MTNS	CITY	KAVIR
Average day of first freeze	15 Oct	15 Nov	1 Dec
" " " last "	15 Apr	15 Mar	15 Mar
Mean annual number of days with min. $<5^{\circ}C$.	200	120	110
Altitude range of inhabited area ('000m.)	1.5 - 2.15	1 - 1.5	.9 - 1

KEY

- Mean daily temperature
- " " maximum
- " " minimum
- " " range (approximate)

Figure 1.4

of the lack of cloud, the elevation and the dryness of the air there is rapid radiation of heat from the surface at night. The mean daily range in July is 20°C, contrasting with 5°C in winter. Winters are also thermally harsh, having January mean daily temperatures of only 0°C in the mountains and 5-6°C in the lowlands.

(2) Physiography: The predominant physiographic units in central Iran are a number of Tertiary/Quaternary endoreic drainage basins. The basins have been described by H. Bowen-Jones (1969). A schematic plan and cross-section of one is given in Fig. 1:5. Their principal characteristics are described as (a) steep fringing hillsides, (b) wide or narrow pediment shelves covered for the most part by overlapping fans of coarse boulder and peddle detritus; the central basins are filled with finer material ranging from (c) gravel at the edges to (d) silt and clay sediments at the hydrological centre. Kashan shahrestan exhibits a section across such a basin; from west to east there is a mountainous fringe, a zone of alluvial fans, a sandy kavir and a salt lake. Settlement patterns in Kashan have been moulded by the distinctive nature of the first three of these zones.

The mountains occupy the whole of western Kashan. Out of a total of 72,383 persons living in the villages of the shahrestan's rural area 55 per cent live in the uplands. It is an area of steep hillsides and deeply incised vallies, often with alluvium at the bottom. Mechanical and sub-aerial erosion is dominant. The land, which in the absence of cultivation and grazing most probably possessed dry forest or mountain steppe, has been subject to depletion of the

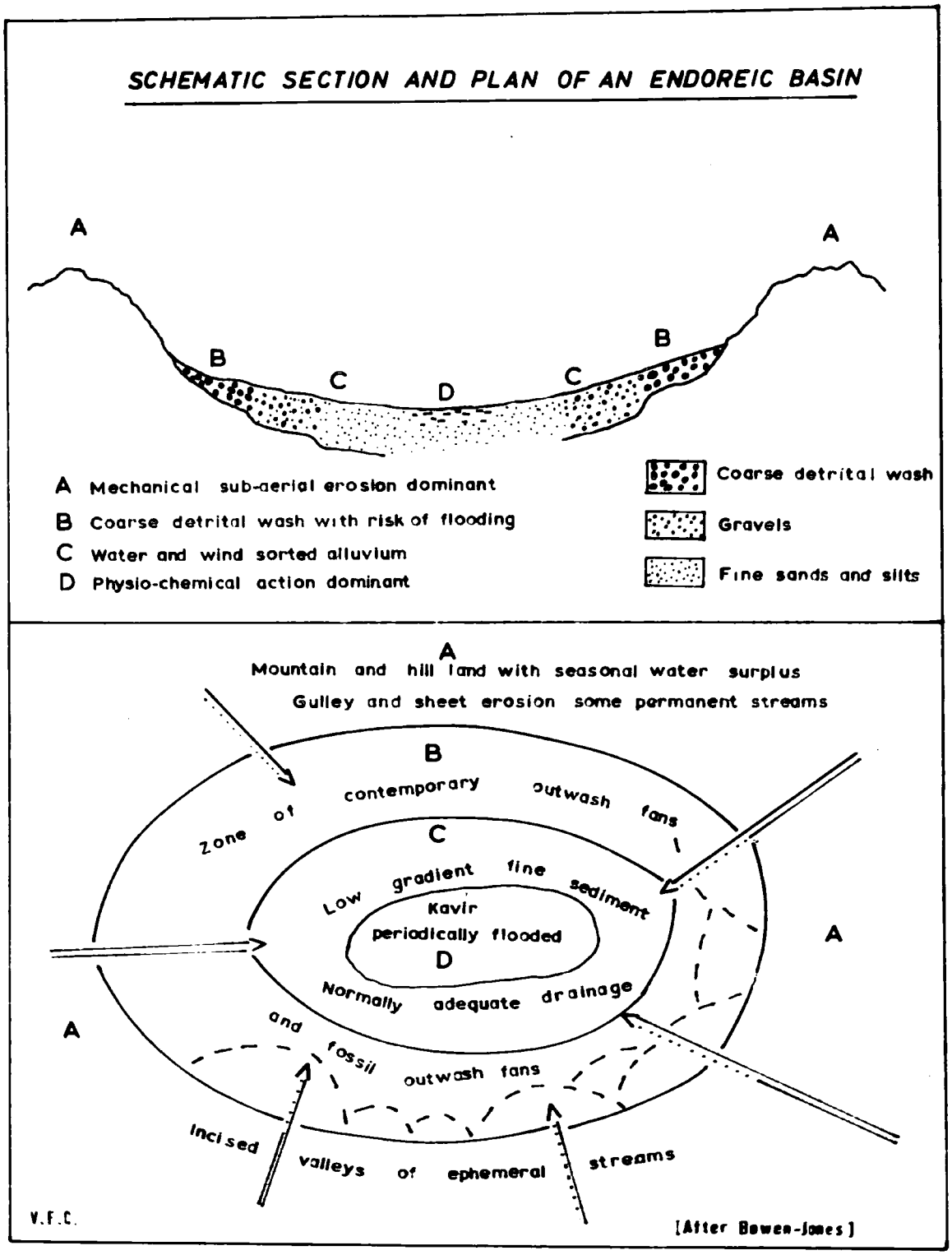

SCHEMATIC SECTION AND PLAN OF AN ENDOREIC BASIN
A
A
B
C
D
C
B
A Mechanical sub-aerial erosion dominant
B Coarse detrital wash with risk of flooding
C Water and wind sorted alluvium
D Physio-chemical action dominant
Coarse detrital wash
Gravels
Fine sands and silts
A
Mountain and hill land with seasonal water surplus
Gulley and sheet erosion some permanent streams
B
Zone of contemporary outwash fans
C
Low gradient fine sediment
Kavir
periodically flooded
D
Normally adequate drainage
A
A
and fossil outwash fans
Incised valleys of ephemeral streams
V.F.C.
[After Bowen-Jones]

Figure 1.5

vegetation cover, soil exhaustion and erosion. The rigorous thermal regime, seasonal water shortage and steep slopes confine farming to irrigation farming in pockets of flat land, such as the Azwar basin, or in narrow alluvial strips along the valley floors. Village settlements are found only where the necessary conditions for water supply and flat land can be fulfilled. Water is conducted to villages and fields through often highly complicated systems of canals and small reservoirs designed to minimise the effects of high runoff rates and the low water holding capacity of the land.

The zone of alluvial fans lies along the eastern flanks of the Kuh-i-Kargas; 24 per cent of Kashan's rural population lives in the area, which also contains Kashan City. Slopes on the fans are gentle. Particle size varies from very large boulders near the mountain front to gravel, sand and silt at the junction of the fans with the kavir. Most of the surface water entering the zone percolates into the fans from the mountains. Salinity in the water table beneath the fans increases markedly as the water percolates downslope. The availability of water determines the agricultural value of land, and water seeping into the pediment must be tapped near the top of the fans while the content of soluble salts is low, yet can be utilized only lower down where coarse detritus is succeeded by cultivable silts (Bowen-Jones, 1969). To effect this an extensive system of water supply by qanat has been developed. The factors which govern the siting of qanats, such as slope and the porosity of the ground, thus directly influence the detailed siting of

settlements. Alluvial-fan settlements were completely dependant on qanats for domestic water supply and for irrigation until very recently.

In the kavir water is available at the surface only in spring. Soils are sandy and often alkaline. All settlements, including the cities of Aran and Bidgol, were dependant on qanats for the whole of their water supply until the 1960's. 21 per cent of the rural population of the province live on the kavir margins in two main clusters of villages. The first is located north-east of Kashan City near Aran and Bidgol, at the junction of the alluvial fans and the kavir. The second group is a series of oasis villages around Abuzaidabad situated among a belt of sand dunes in the trough between the alluvial fans of the Kargas mountains and the Siah mountains. The villages take advantage of seepage from both ranges of mountains. Where the sand-dune belt is wider and on the shallow slopes towards the large salt lake in the north-east of the shahrestan (Fig 1:3) the only settlement is that of a few transhumant shepherds and goatherds. The whole of the kavir proper, 40 per cent of the shahrestan's total area, is devoid of habitation.

(3) Settlement evolution: The role of historical change in influencing the present patters of Kashan's settlements is hard to judge. Evidence for the study of past changes in the pattern is lacking, though considerable possibilities must exist for research along the same lines as those used by R.McAdams (1965) in a study of land behind Baghdad. In the Kirman Basin,* an enclosed area much smaller than Kashan,

*The inhabited area is about 30 km square.

P.W. English (1966) was able to establish a progressive correlation in the age, size, elevation and water rights of settlements. In Kashan only the rudiments of a hierachy of size and water rights can be established. Kashan City is undoubtedly on the oldest settled of the alluvial fans and its qanats appear to take precedence over those of Aran, Bidgol and the north-eastern kavir villages, since these latter make wide detours in almost a half circle to the south of the city.

Only in the case of certain hamlets in the kavir can a clear relationship between age, size and water rights be established. A large number of these inhabited and uninhabited hamlets are found on the desert fringe; often they take the form of walled homesteads or qal'eh. From field work and the study of air photographs at a scale of 1:20,000 taken by the Iranian Cartographic Centre it is possible to deduce the probable outline of settlement evolution in this case, though on what time-scale the processes operated is not known. Each hamlet is attached to a particular village and has its own qanat. The names of both the hamlet and the qanat are derived from the village of origin. Yet while the hamlets are located north-east of the first group of kavir settlements described above, their villages are mostly in the second group around Abuzaidabad, away to the south. Iranian custom and Islamic law govern the construction of and distance between qanats. Once a settlement is established with its qanat or qanats the tendency is for fewer new ones to be established, since to dig a well or qanat which results in loss for another is illegal. In the Abuzaidabad villages at some time in the

past further expansion of the cultivated area necessitated use of land to the north, and qanats had to be dug in a wide loop into the desert away from the established villages and their water supply systems to tap water in the Abuzaidabad trough, where the parent villages had water rights.

CONCLUSION

Kashan is a region of considerable physical diversity, though aridity is one unifying attribute of the entire province. Patterns of settlement have been shaped by the varying demands of the shahrestan's major physiographic zones, by water supply systems and by evolution over time. The broad hierachy in the lowlands of age, size and water rights among the settlements indicates that a rational basis to the pattern does exist. In addition, Kashan's historic identity as a Persian province, its past and present boundaries and the rank-size relations of its settlements indicate that the shahrestan is a recognizable functioning regional system centred on Kashan City. It is this diversity, combined with a functional unity within the region that makes Kashan a stringent testing ground for the hypotheses stated earlier.

In the present work the topic is approached systematically in ten further chapters divided into two major parts. The first part deals mainly with the first two major hypotheses, while the second part deals with the last two. Chapter 2 examines the settlement size continuum in the region, together with demographic trends, particularly those due to migration between settlements. The provision of goods and services in city and village and their organization

in a functional hierachy of central places is dealt with in Chapter 3. In Chapter 4 the pattern of urban dominance in the regional economy and recent changes in the pattern are examined, while Chapter 5 deals with regional land use and settlement morphology and their relevance to population change and the region's future development. Chapter 6 introduces the second part of the thesis by examining the place of Kashan City and Aran/Bidgol in Iran's urban system. Chapter 7 deals with individual aspects of the ecology of Kashan's urban areas, while Chapter 8 presents a detailed study of Kashan's industrial development. Chapter 9 deals with the commercial structure of Kashan and Aran/Bidgol and Chapter 10 examines Kashan's land use and the results of a multivariate analysis of urban ecology, with respect to the projected rural-urban gradient. Finally the various themes are worked together in the Conclusion.

CHAPTER TWO

POPULATION AND SETTLEMENT IN THE SHAHRESTAN

In the previous chapter the physical factors affecting settlement in Kashan and the techniques evolved to cope with the environment were discussed. The aims of the present chapter will be to show how Kashan's settlements relate to established theories of rank and size, and to examine the demographic changes taking place in the region, in particular those due to migration between settlements.

1. Introduction: Data Sources

Material on population in the shahrestan comes from the Censuses published by the Iranian Statistical Centre, but while the First National Census of Iran in 1956 was published in Census District Volumes, the 1966 National Census of Population and Housing was published by Shahrestan volumes. The discrepancy causes some difficulty, since the 1956 Census District of Kashan was not coterminous with the 1966 Shahrestan; the former included areas to the south of the present Shahrestan which now form the separate Shahrestan of Natanz; the 1956 Census also included the dehestan of Meimeh to the west, now in Isfahan Shahrestan. When dealing with most of the data of the 1956 Census District Rural Area it is not possible to break it down into the 1966 regional components, though the demographic and occupational structure of Natanz shahrestan in 1966 was substantially similar to that of Rural Kashan (See Table No.4:1) and general comparisons between the whole of the 1956 Rural Area and that of the 1966 Rural Area may be made. Aran/Bidgol and Kashan City

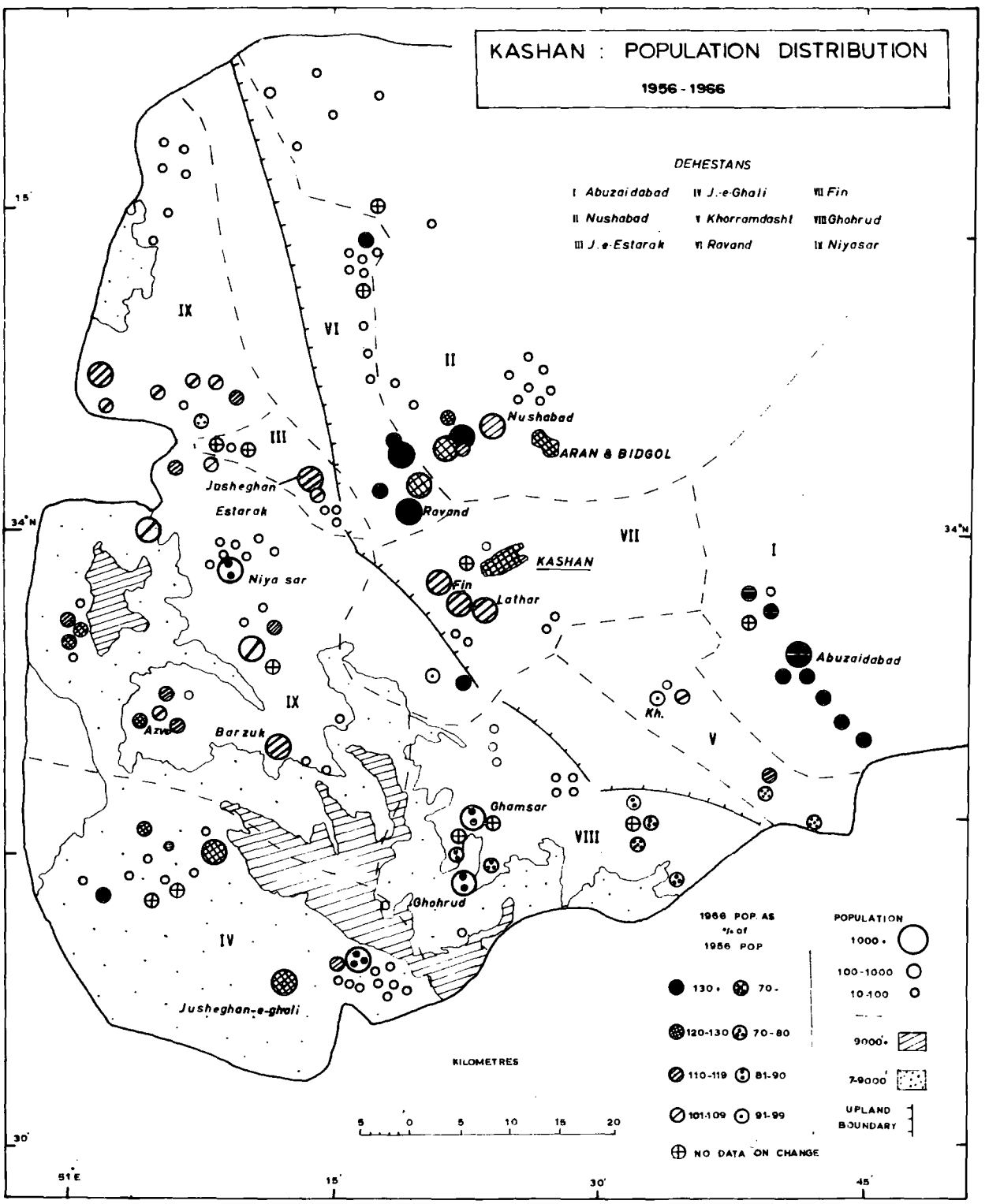

KASHAN : POPULATION DISTRIBUTION
1956 - 1966
DEHESTANS
I Abuzaidabad
II Nushabad
III J.-e-Estarak
IV J.-e-Ghali
V Khorramdasht
VI Ravand
VII Fin
VIII Ghohrud
IX Niyasar
Nushabad
ARAN & BIDGOL
Jasheghan
Estarak
Ravand
KASHAN
Fin
Lathar
Niya sar
Abuzaidabad
Kh.
Barzuk
Ghamsar
Ghohrud
Jusheghan-e-ghali
KILOMETRES
5 0 5 10 15 20
1956 POP. AS % of 1956 POP
130+
120-130
110-119
101-109
70-
70-80
81-90
91-99
NO DATA ON CHANGE
POPULATION
1000+
100-1000
10-100
9000+
7-9000
UPLAND BOUNDARY
34°N
30'
51°E
15'
30'
45'

Figure 2.1

were the subject of separate tables on population in both censuses; hence, their boundaries remaining the same, intercensal changes can accurately be measured. Registration of vital statistics on births and deaths in Iran is unreliable (Clarke, 1969) and the Censuses must remain the major source of information though data from them suffers from defects typical in the developing world; among these are (i) underestimation of children's ages up to 10 years (ii) undereporting of the male age groups eligible for military service (iii) overestimating the ages of the old, but with a marked underestimation in the age group 55-59 years (iv) heaping of age groups at round numbers.

I SETTLEMENT SIZE

2. Population : The Size Continuum

We have seen that Kashan Shahrestan may be regarded as a distinct regional sub-system within the overall Iranian system of settlements since Kashan's settlements conform to the rank-size rule, with the exception of the two largest settlements. In fact, the settlement size distribution in Kashan appears to confirm Zipf's theory that rank-size conforms more closely to a theoretical S - shape than to a linear log-normal distribution and also to confirm Stewart's finding that internal provincial settlement patterns show a strong dominance by large urban centres (Zipf, 1949 : Stewart, 1958).

The size distribution of settlements in Kashan is shown in Figures 2:2,3 where the 212 settlements are plotted by size and number on double log paper. Here it should be noted that

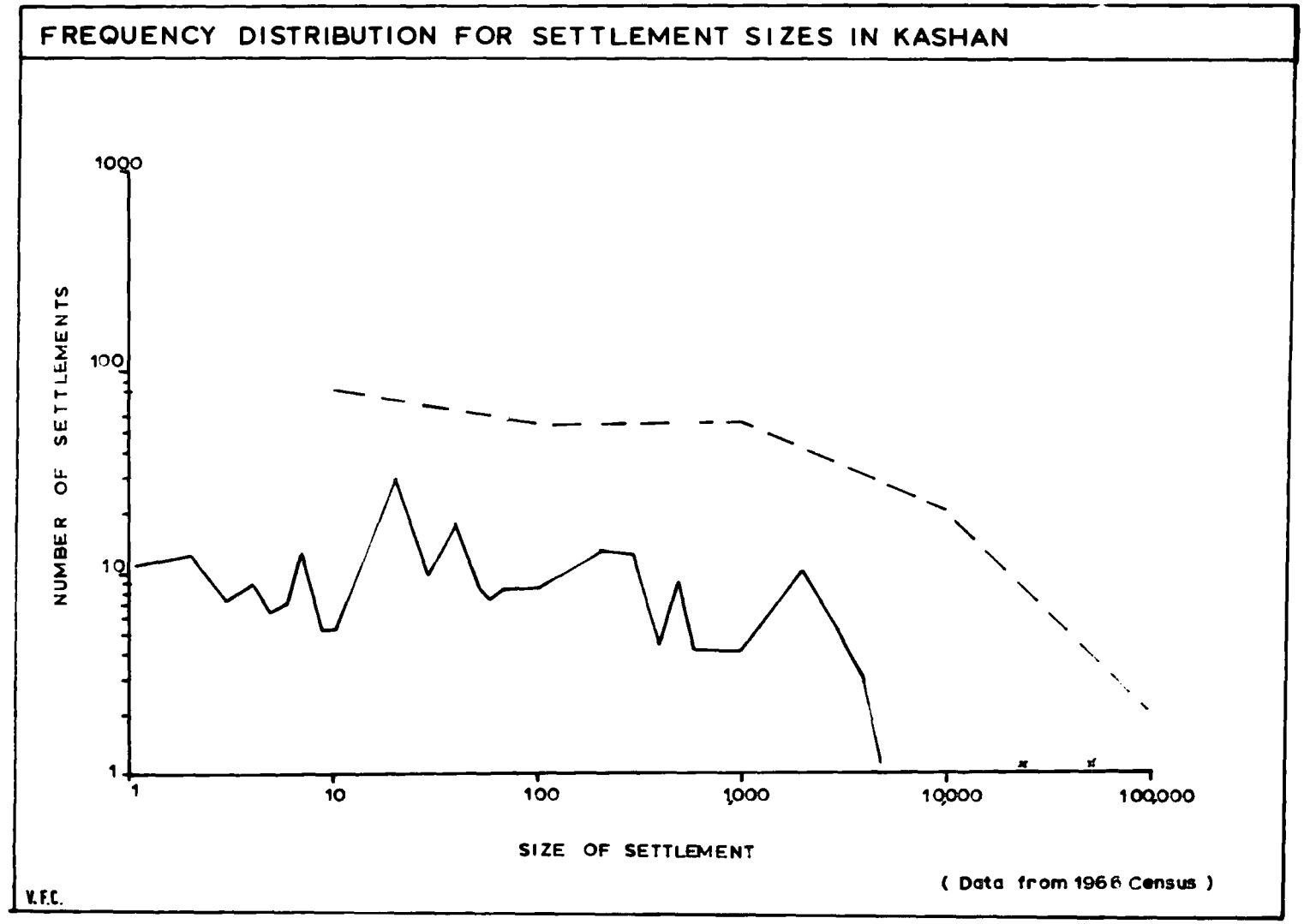

FREQUENCY DISTRIBUTION FOR SETTLEMENT SIZES IN KASHAN
NUMBER OF SETTLEMENTS
1000
100
10
1
1
10
100
1,000
10,000
100,000
SIZE OF SETTLEMENT
(Data from 1966 Census)
V.F.C.

Figure 2.2

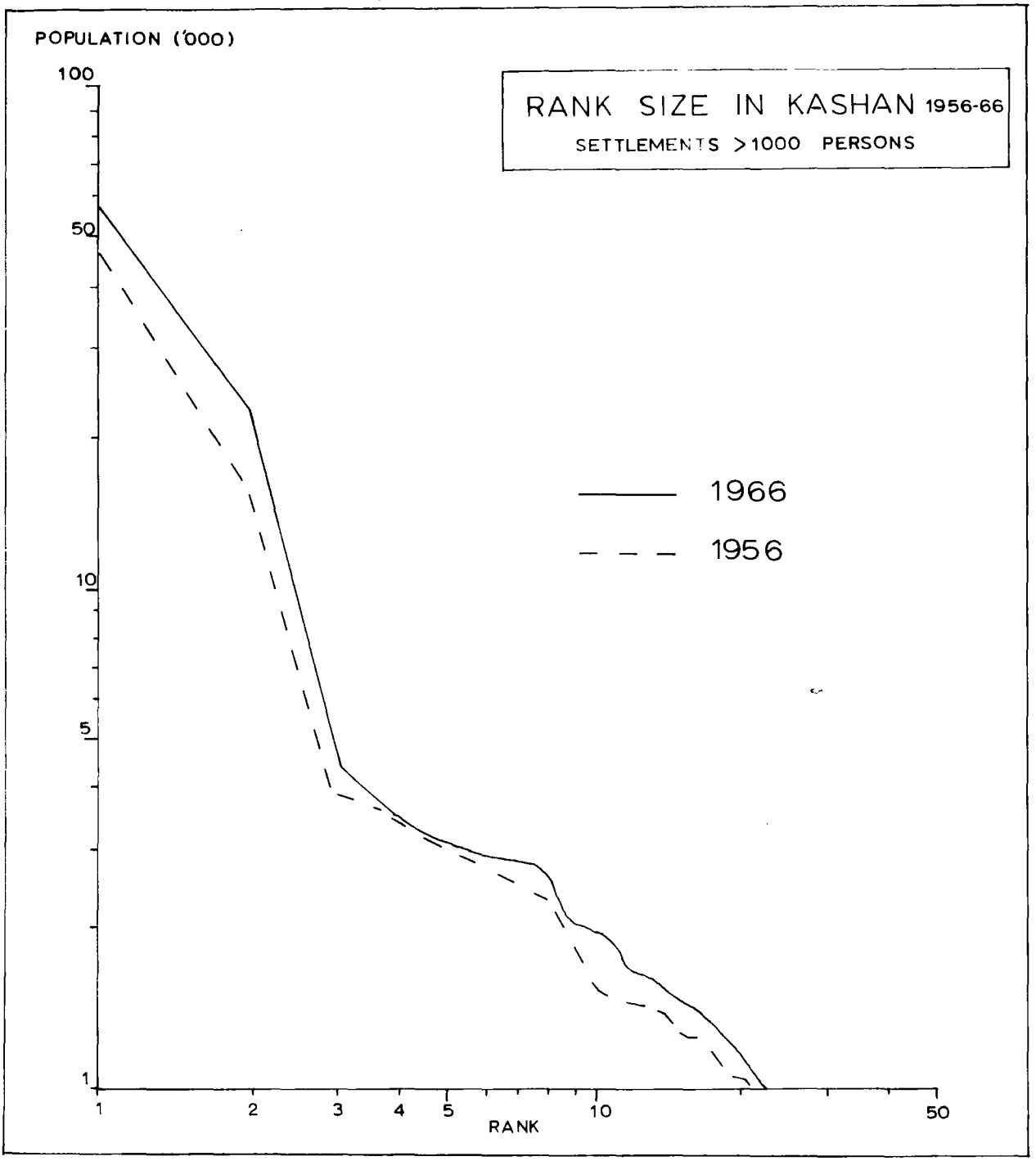

POPULATION ('000)
100
50
10
5
1
RANK SIZE IN KASHAN 1956-66
SETTLEMENTS >1000 PERSONS
1966
1956
1
2
3
4
5
10
50
RANK

Figure 2.3

the interval size of settlement groups has a considerable effect on the shape of the graph : the wider size group limits, the more general is the curve and the more settlements found in the group. Kashan's settlements were therefore plotted in groups of one logarithmic cycle (less than 10, 10-100, 100-1000 etc) and in groups of one tenth of a cycle. Under the rank-size rule and truncated log-normal distribution rule the number of settlements should continue to expand as size decreases and both plottings confirm this for Kashan. Quoting work done by Gunawardena in Ceylon (1964) Haggett claims that the rules fail to apply to the lower ends of the settlement size continuum. (Haggett, 1965). A "sub-village limb" is identified, where the number of settlements decreases as size diminishes. Whether or not Haggett's statement is based on work supporting the claim, and done in other regions, is not revealed, but clearly it does not hold true for Kashan, even allowing for a smaller sample of settlements.

A number of hypotheses and groups of hypotheses have been advanced by Berry (1961) in interpreting the varying forms of settlement size distributions at the city level. After dismissing the degree of urbanisation or economic development of a country as hypotheses unsupported by empirical evidence he goes on to approach the problem from the viewpoint of general systems theory. It is argued that primate rank-size patterns are the product of urbanisation in countries which are (i) smaller than average (ii) have a short history of urbanisation (iii) are economically or politically simple.

Conversely, log-normal distributions are the product of city development in countries (i) larger than average (ii) have a long history of urbanization (iii) are economically or politically complex.

An attempt to apply these arguments to Kashan raises two points, both involving considerations of scale. First, Berry's analyses and most others of a similar kind are of countries, not regions. None of Berry's size distributions continue below the 20,000 population level, yet Kashan has only two settlements above that level. Variations in scale could result in the operation of different processes, though the shape of the size continuum is similar. Second, following partly from the first, the overall shape of the size continuum is dependant on how much of it is examined : the distribution of settlements larger than 1000 population appears entirely different when seen in the context of the entire size range of settlement than on its own. A comparison of Figures 1:3 and 2:3 illustrates the point.

Bearing these points in mind, how far does Kashan conform to Berry's generalizations? Kashan's rank-size sequence is 1.00, 0.40, 0.08, 0.06, 0.05...., and we may regard it as dual-primate. (i) Among Iranian regions Kashan is perhaps smaller than average (ii) In Kashan City alone does the region have a "long history of urbanization", though the other settlements could hardly be described as 'urban', as one takes Berry to understand the term. (iii) Compared to any nation-state the region is economically and politically simple. If, therefore, any comparisons can be made between national and regional settlement systems using

concepts evolved for whole countries, then Kashan does conform closely in all three respects to Berry's hypotheses.

3. Size and Spacing of Settlements

Relations between size and spacing of settlements have been considered by a number of workers (Lösch, 1954; House, 1953). Their general conclusion is that large settlements are more widely spaced and small settlements more closely spaced, which is to be expected from the rank-size rule. The primacy of Kashan City and Aran/Bidgol suggests that their spacing should be considered with other settlements of comparable size by measuring, for example, distance to Qom rather than simply within the region. At the lower levels of Kashan's settlement hierarchy straight-line distances were measured between settlements with less than 100, 100 to 1000, and over 1000 population to test the hypothesis that the larger ones would be more widely spaced. Mean distances between settlements in each group were 3.2, 5.6 and 17.8 kilometres respectively.

Comparability with other studies of size and spacing is again difficult since most deal with larger settlements. Nonetheless patterns of relationships in Kashan between size categories are similar, though on a different scale, to those found by Hartley in Libya (1968) and Lösch in Iowa (1954), with the large settlements more widely spaced. The small difference between means for the first two size categories results from the clustering of settlements around water resources noted in the previous chapter, comparable to the clustering of English settlements on coalfields,

shown by House (1953).

II POPULATION CHANGE

Between 1956 and 1966 Kashan City increased in population from 45955 to 58468, 21.4 percent ; Aran/Bidgol increased in size from 16645 persons to 23265, an increase of 28.5 percent ; the Rural Area of Kashan increased in population from an estimated 63281 to 72393, or 14.4 percent. Kashan City's growth rate was 50 percent higher than the Rural Area, while in Aran/Bidgol it was twice that of the Rural Area.

TABLE 2:1

POPULATION OF KASHAN SHAHRESTAN

	1956	%	1966	%	PERCENT + 1956-66
Kashan City	45955	36.5	58468	37.9	21.4
Aran/Bidgol	16645	13.2	23265	15.1	28.5
Villages	63281*	50.3	72393	47.0	14.4

Data from 1956 Census, 1966 Census

* Estimated.

These differences in growth rate resulted in a 3 percent shift in the balance of the total population of the province between town and country, so that by 1966 over half were living in the urban areas. (Table 2:1). The proportion of the Shahrestan's population (53 percent) in urban areas is a high one for Iran and for the developing world generally.

TABLE 2:2

FERTILITY, SEX RATIOS, DEPENDANCY, MARRIAGE

I EFFECTIVE FERTILITY $\left(\frac{\text{Pop. 5 years}}{\text{Females 15-44}} \times 100\right)$

	1956	1966		1956	1966
Kashan City	76	85	Urban Iran	75	80
Aran / Bidgol	89	108	Rural Iran	92	99
Kashan Villages	79	96			

II DEPENDANCY RATIO $\left(\frac{\text{Pop. 15 + Pop. 65 +}}{\text{Pop. 15 - 64}}\right) \times 100$

Kashan City 99 ; Aran Bidgol 122 ; Rural Areas 105

III SEX RATIOS $\left(\frac{\text{Males}}{\text{Females}} \times 100\right)$

Kashan City 104 ; Aran Bidgol 97 ; Rural Area 101

IV MARRIAGE : (Percent of Age Group Married)

	Males 15-19	Females 15-19	Males 20-24	Females 20-24
Kashan City	1	40	27	88
Aran / Bidgol	3	49	55	93
Rural Area	3	50	81	95

4. Elements in the Age Structure

Age-sex pyramids for Kashan, Aran / Bidgol and the villages appear as Fig. (2:5). Both urban and the rural areas have broad-based, progressive age pyramids, divisible for the purposes of analysis into three sections.

(i) Age groups below 15 years: with between 12 and 20 percent of the population in each 5 year age group these groups are the largest. They are sharply differentiated from the older groups. Over half the 1966 population of

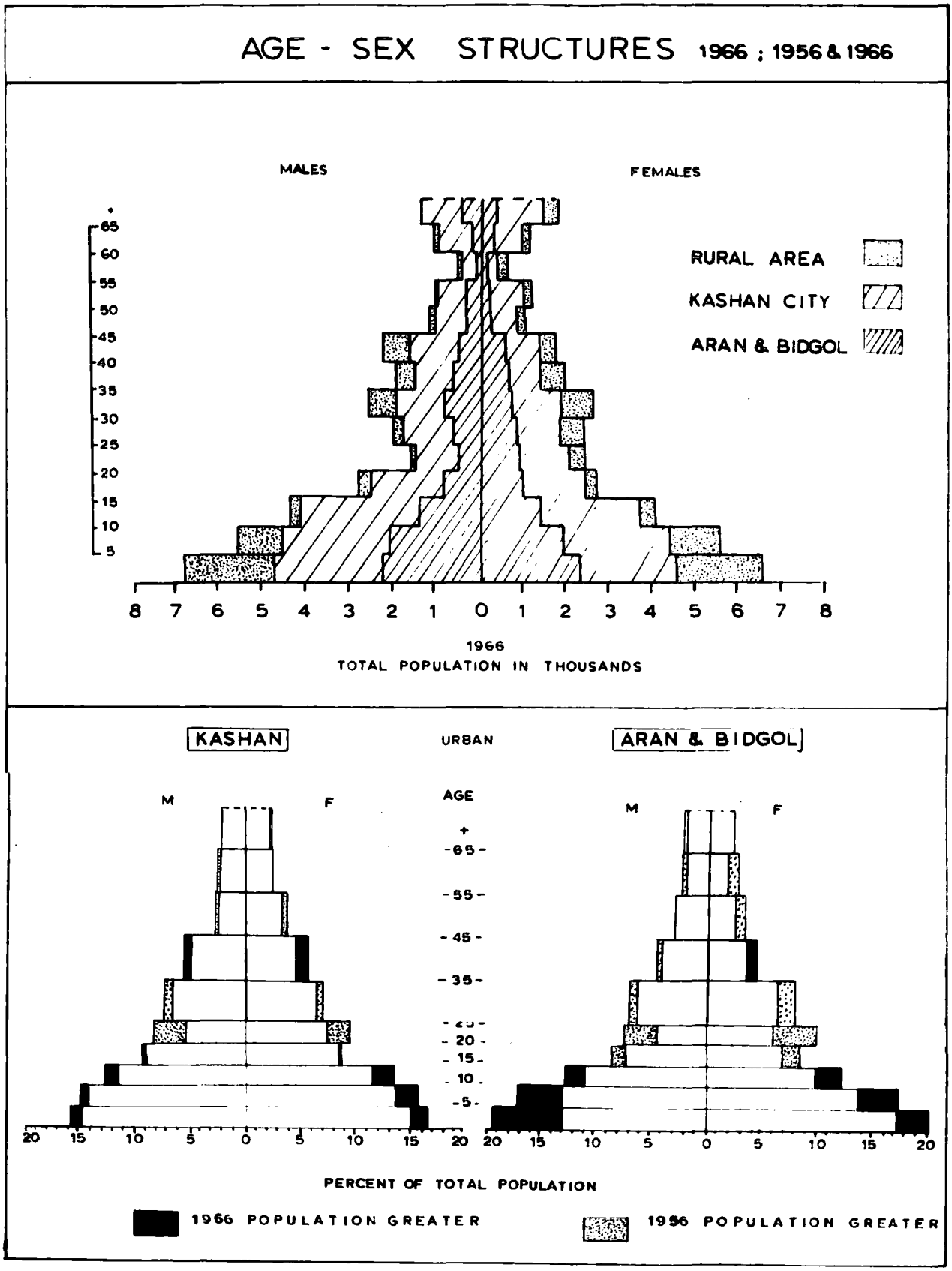

AGE - SEX STRUCTURES 1966 ; 1956 & 1966
MALES
FEMALES
RURAL AREA
KASHAN CITY
ARAN & BIDGOL
65
60
55
50
45
40
35
30
25
20
15
10
5
8 7 6 5 4 3 2 1 0 1 2 3 4 5 6 7 8
1966
TOTAL POPULATION IN THOUSANDS
KASHAN
URBAN
ARAN & BIDGOL
M
F
AGE
+
65
55
45
35
20
15
10
5
20 15 10 5 0 5 10 15 20
PERCENT OF TOTAL POPULATION
1966 POPULATION GREATER
1956 POPULATION GREATER

Figure 2.4

Aran/Bidgol was younger than 15 years, making it the "youngest" population in the shahrestan, followed by Kashan City with 45 percent. However, the villages had a higher proportion of their population under 5 years than Kashan City. Higher child mortality rates partly account for this discrepancy but the main reason is that medical services were only available extensively in the villages in the five years preceding the 1966 Census, whereas they were available in the urban areas some time before 1966. Effective fertility in the villages was also higher than in Kashan City (Table 2:2).

(ii) Age Groups 15-29 years: age-sex pyramids show a marked indentation in these age groups, especially for males. This is more extreme in Aran/Bidgol and the villages than Kashan City ; in fact, there are 330 more males recorded in these groups in Kashan City than in the villages, despite a sizeable difference in their total populations. Expressed as percentages, 21 percent of Kashan City's population is in these groups, 18 percent of Aran / Bidgol's and only 17 percent of the villages'. Urban-rural contrasts in the shahrestan are not as high as the national average ; urban Iran records 25 percent of the population in these age groups, and rural Iran 18 percent.

(iii) 30 years and Above : there is a resumption of the age curve in the older groups, with a sharper fall-off rate for women than for men. Little difference can be observed between the three age pyramids in these older groups.

Changes in age structure in Kashan Shahrestan are

shown in Figures 2:5 and 2:4. Kashan City's shift to a younger population paralleled the shift in urban Iran (Fig. 2:5), while the extreme shift in Aran/Bidgol was similar more to rural than urban Iran. Change in the villages was slight, and unlike the national average, for the proportion under 15 years increased by only 1 percent, whereas the increase in rural Iran was 4 percent. More people also survived over the age of 65 years, so that, with more younger people also, the dependancy ratio increased (Table 2:2).

Similar trends took place in the country as a whole and a number of factors were responsible.

a) During the period of the Second Seven Year Plan (1955-62) the Iranian Government gave high investment priority to improvements in public utilities in urban and rural areas. Effects of government investment were felt in Aran/Bidgol before the villages, while Kashan City benefitted from improvements before 1956. At the same time as the construction of waterworks and sewerage schemes medical facilities were extended and improved using organized teams of workers. D.D.T. spraying, for example, has virtually eradicated malaria from the shahrestan. Further details on these improvements will be given in the next chapter.

b) Social conditions in places such as Aran/Bidgol and the Kashan villages have helped accelerate some changes. Marriage in Iran is nearly always arranged between the two participant families and payment of a dowry is essential. Whereas wealthier folk with greater aspirations spend longer in

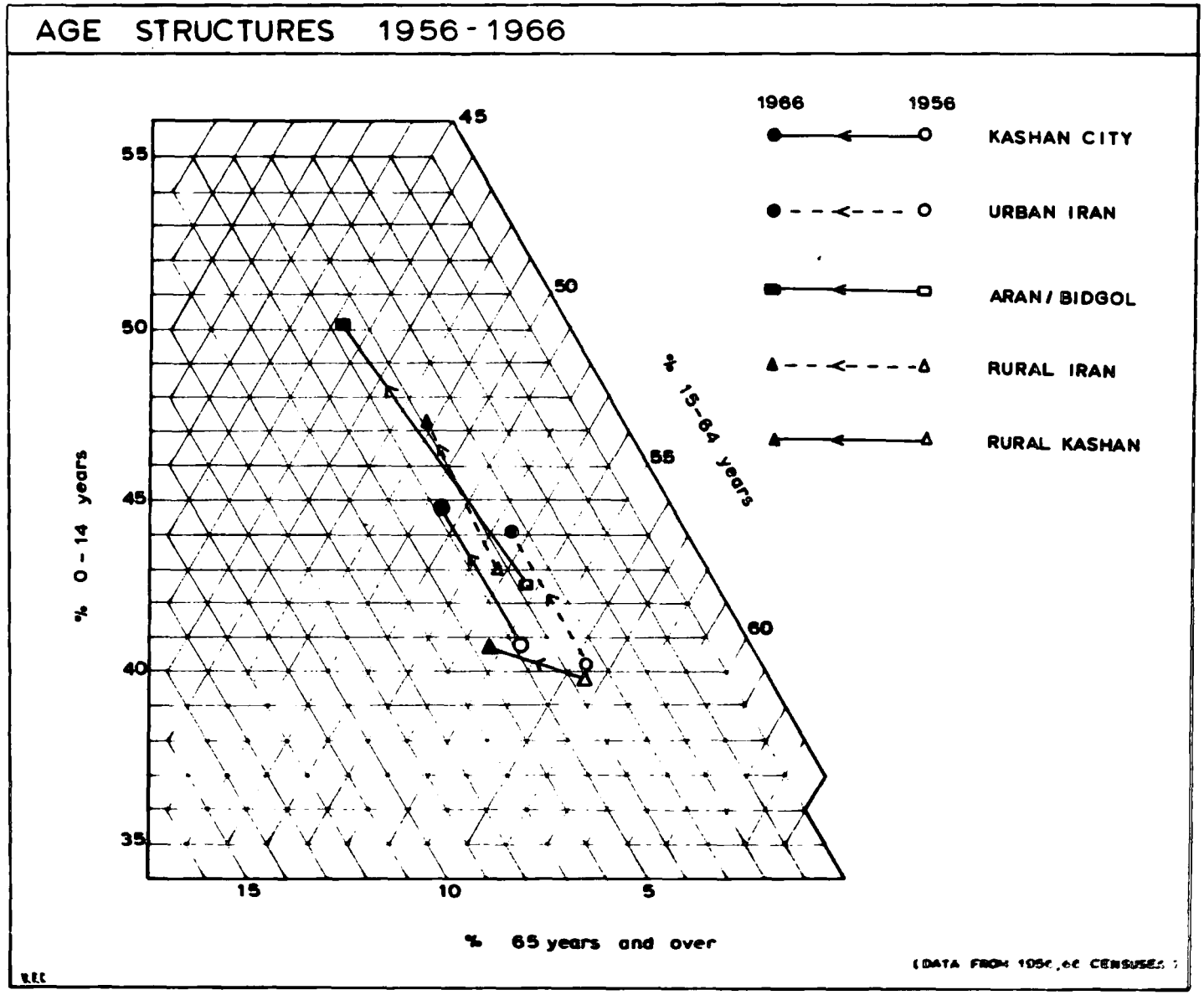

AGE STRUCTURES 1956 - 1966
1966
1956
KASHAN CITY
URBAN IRAN
ARAN / BIDGOL
RURAL IRAN
RURAL KASHAN
% 0 - 14 years
% 15-64 years
% 65 years and over
55
50
45
40
35
45
50
55
60
15
10
5
(DATA FROM 1956,66 CENSUSES)

Figure 2.5

education and usually take longer to save for the dowry, poorer families not only have dowries smaller in proportion to their income, but also on many occasions they are agreed upon but never paid, or paid only in part. Consequently, marriage and child-bearing occur at an earlier age. 40 percent of the females between 15 and 20 years in Kashan City are married and in Aran/Bidgol and the Rural Area the figure is 50 percent.

5. Elements in the Sex Structure

The sex structure of Kashan reflects an anomaly found in Iran as a whole, for in all but the age group 15-29 years there is an excess of males over females (Figure 2:6). In a population unaffected by international migration normally high death rates of females at birth and a subsequent higher male death rate should give a ratio declining from about 105 males per 100 females at birth, and accelerating slowly with increasing age. Iranian sex ratios, however, do not reflect this process; rather, they commence high and continue higher, in a manner similar to other Islamic States. Iran has a high mortality rate among women of child-bearing age, particularly in the age group 45-55 years, occasioned by excessive child bearing. Poor diet, health facilities, and the hard domestic labours they most frequently perform are other factors. More enlightened attitudes to women in the urban areas are responsible for a higher proportion of females surviving. Furthermore, in rural and urban areas reticence about giving information on women - a tendancy found in most Islamic countries - may well

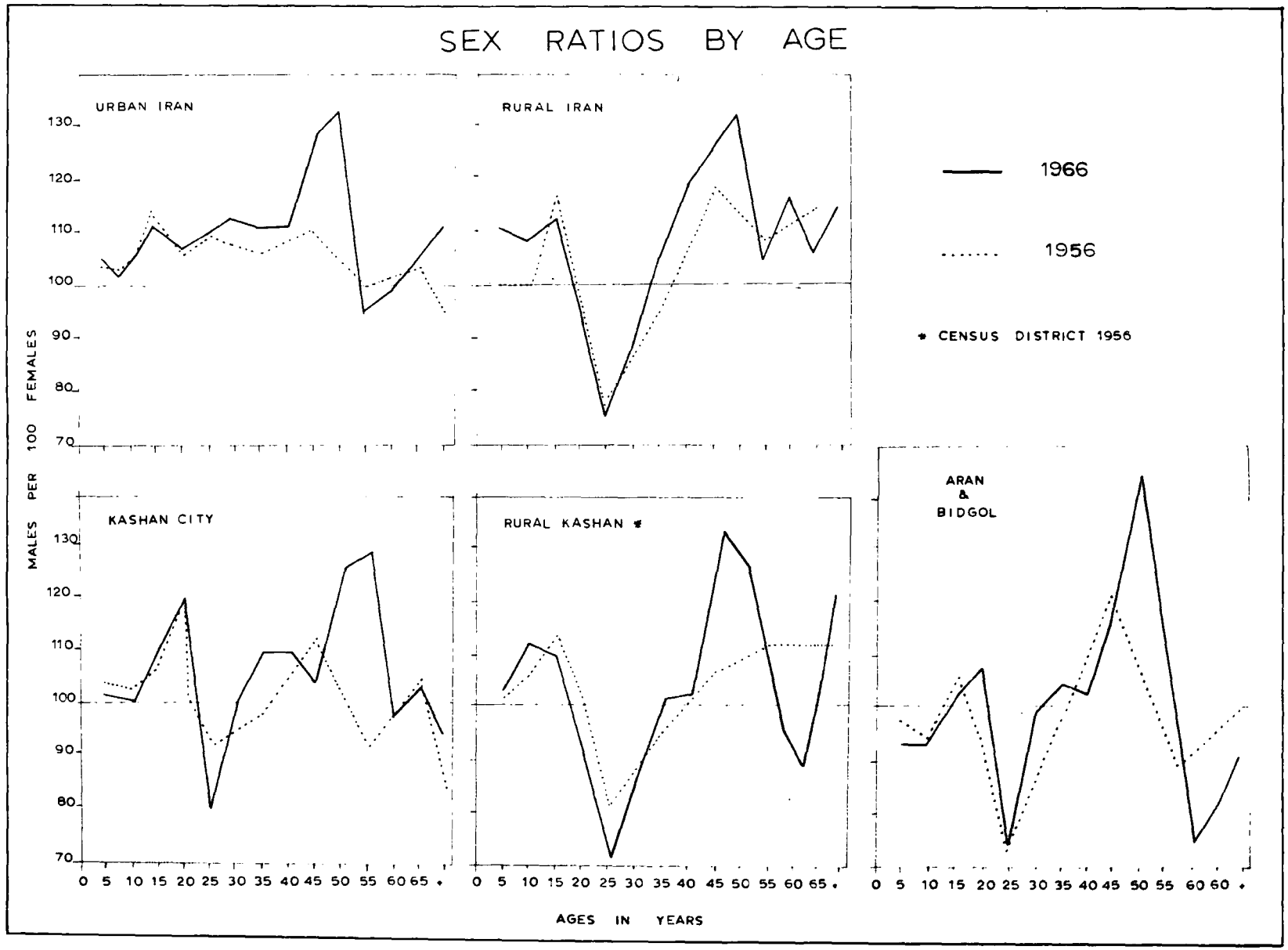

SEX RATIOS BY AGE
URBAN IRAN
RURAL IRAN
KASHAN CITY
RURAL KASHAN *
ARAN & BIDGOL
1966
1956
* CENSUS DISTRICT 1956
MALES PER 100 FEMALES
AGES IN YEARS
130
120
110
100
90
80
70
0 5 10 15 20 25 30 35 40 45 50 55 60 65 +

Figure 2.6

give a degree of undereporting.

But sex ratios in the age groups between 15 and 29 years are the inverse of those found in younger and older age groups. There are two reasons. First, fear of military service in those groups causes consistent undereporting of males. To conceal the existance of persons from enumerators is easier in the villages than the towns, where bureaucratic control is more pervasive - a fact which helps account for the larger number of males recorded in Kashan City. Second, in Iran and most of the Middle East migration is to some extent sex selective. Though there is evidence in some areas of Iran of family migrations, the most mobile section of the population is young adult males.

Kashan City's sex ratios in these 15-29 year five year age groups are 119, 80 and 100; Aran/Bidgol has ratios of 108, 74 and 100 and the villages 92, 72 and 87. From these figures alone it is of course impossible to see how much relative weight should be given to migration or undereporting in explaining the observed deficit of males. However, evidence that much of the contrast in sex ratios in the shahrestan can be explained by migration comes from a more detailed examination of population change.

6. Variations in Population Change

Population distribution and change for each of the settlements in Kashan are shown in Figure 2:1. A generalized map of population density dehestan by dehestan would be virtually meaningless, since settlement in the province is

clustered, with the dehestans containing large areas of uninhabited waste. The primate status of Kashan City and Aran / Bidgol suggests that changes in their population could more profitably be examined apart from settlements lower in the hierarchy ; accordingly they are examined in Chapter 6.

It has been noted that the Shahrestan in 1966 was not coterminous with the 1956 Census District. However, using data in the 1956 Census and the, as yet unpublished, Village Gazeteer of the 1966 Census, it proved possible to plot population change in the intercensal period village by village. Ambiguities and other confusions in the data prevented all the villages from being plotted and the present coverage for each dehestan is given in Table (2:3). 82 villages were plotted, containing 91 percent of the total rural population of the shahrestan.

TABLE 2:3

POPULATION CHANGE IN THE DEHESTANS

Number		Pop 1956	Pop 1966	% Coverage (1956)	Change % 56-66	Sex Ratios '56	Sex Ratios '66
1	Abuzaidabad	3261	4413	94	+35	105.4	101.5
2	Nushabad	7474	9041	87	+21	101.5	119.3
3	J. Estarak	2487	2515	86	+11	105.5	111.2
4	J. Qali	6118	7834	96	+15	103.3	106.3
5	Khorramdasht	1188	923	83	-22	97.7	97.0
6	Ravand	5402	7699	97	+43	102.5	103.8
7	Fin	6834	8335	84	+22	100.1	102.4
8	Qohrud	7345	6449	91	-12	94.4	92.3
9	Niasar	17,617	18,840	90	+ 7	100.0	98.1

Neither Census gives figures for internal migration within the Shahrestan, so precise evidence on movements is not available. Numbers of males and females in each village were given in the 1956 Census and the ratio between the sexes can be calculated, but the 1966 Census gives male and female totals only for the dehestans and villages with over 2,000 persons.

Considerable variations in population growth between the dehestans can be seen in Fig. 2:1; two sets of hypotheses suggest themselves to explain these; one is that the type and degree of change is related in some way to settlement size, the others are that change is related to location. (i) Settlement Size : to test this hypothesis settlement size was correlated with percent change in population between 1956 and 1966. No significant correlation was found between settlement size and population change, for all 82 settlements or for settlements over 2000 persons. The hypothesis was rejected. (ii) Settlement Location: 'Location' of settlement as a determining factor in population change suggests two lines of enquiry; distance to Kashan City might be a major factor, or, there might be a variety of local conditions ("push factors") acting as determinants.

Classical rural - urban migration theory states that short-distance inmigratory moves to cities greatly outnumber long-distance moves. (Hagerstrand, 1957 : Stewart, 1960 : Pred, 1962). Bogue and Thomson qualify this by pointing out that regional differences in population distribution impart distance patterns "which cannot be

exactly duplicated in any region". But classical theories deal in the absolute numbers migrating, and it must be admitted that we have no data on absolute numbers for Kashan, though the material available does allow some conclusions to be drawn on the relative volume of outmigration between different villages. Empirically, a relationship can be established for the Kashan dehestans between intercensal change and total sex ratios in 1956 and 1966; the lower the sex ratio the lower the rate of growth. (Coefficient of correlation, $r = 0.64$). The relation is significant also for villages with over 2000 persons ($r = 0.67$). Thus, dehestans which suffered a loss or slow rise in population in the decennium had already a lower sex ratio in 1956 than those which experienced a higher growth rate. Evidently the processes operating in the ten years were already underway by 1956, were continuing in 1966, and their prime result was outmigration of males. Furthermore the sex ratios of Kashan City and Aran/Bidgol (Table 2:2) imply that Kashan City is the recipient of migrants from Aran/Bidgol and the villages.

From rather scanty data, therefore, it is possible to glean evidence for an outmigration which probably accounts for observed differences in growth rates. Data is summarized in table (2:3). Apart from Khorramdasht, the highest increases were in the kavir and on the alluvial fans, whereas the mountains suffered either a slow rise in population or, in many cases, an actual decline.

Such facts tell us the relative changes within each

community, but they do not tell us where most of the migrants to Kashan City come from : clearly, the em igration of, say, 5 percent of Qohrud's population of 7118 would provide a greater volume of migrants than the movement of 10 percent of the 1113 population of Khorramdasht.

Measurements were made of the distance between each village and Kashan City and the results correlated with population change in the villages. No significant correlation was found between them. Whether or not the volume of migration is related to distance from this City cannot be determined.

Village size, then, in Kashan is unrelated to population growth; change in villages in the upper part of the size hierarchy is related to their sex ratios. There is evidence for outmigration of males being directly related to population change; this migration is chronic and more intense in the mountains than the lowlands, on the whole. Having discovered this contrast in the demographic processes operating in Kashan we must look further for the reasons for it and this will be done in Chapter Five.

CHAPTER THREE

SERVICES AND AMENITIES IN THE SHAHRESTAN

Methods of analysis in research are usually determined by the nature of the material available. In this chapter material from the summary Census Volumes, which treat Kashan/City, Aran/Bidgol and the Rural Area as units, allows comparisons to be drawn between each as a unit. Also, information on type and number of service functions was available from the unpublished Village Gazetteer of 1966 and field work carried out in Spring 1969 gave a certain amount of checking on the Gazetteer. Taken together these data allows one to study the whole spectrum of service availability in the villages. The first part of the chapter, then, looks at the urban/rural contrast in the provision of domestic amenities, health and education in the shahrestan, while the second aims to test the applicability of established theories of service provision to the shahrestan, using the material available.

I Housing and Amenities

Figures for persons per housing unit, households per unit and persons per household in the shahrestan are given in table 3:1. There is some indication that families in Kashan City are larger than in Aran/Bidgol or the villages. Kashan City has a larger average size household and, on average, a higher proportion of relatives who are not in the basic children and parents family unit than elsewhere, which might be evidence for the extended family found in cities by Sjoberg. (1960).

TABLE 3:1

HOUSING IN THE SHAHRESTAN

	Persons per H'hold	Households per Unit	Persons per unit	Age Percent of Housing units L.T. 5 years	5-9	10+years
KASHAN CITY	4.7	1.5	7.2	17	12	71
ARAN/BIDGOL	4.4	2.2	9.8	19	13	68
RURAL AREA	4.2	1.2	5.1	75	15	10

The mean of 2.2 households per unit in Aran/Bidgol is however 50 percent greater than Kashan City and 80 percent greater than the villages. Figures for persons per unit and persons per room show a similar degree of relative crowding in Kashan City and in Aran/Bidgol. Aran/Bidgol thus combines the rural extremes of high effective fertility and earlier marriage with the urban extremes of overcrowding, and it is hard to escape from the conclusion that a high rate of natural increase is largely responsible for the poorer housing conditions there, all this despite a higher proportion of new houses than Kashan or the Villages. As regards tenancy, the City has a lower proportion of owner-occupiers than elsewhere. Many of those who rent rooms are persons living on their own, probably migrants from the villages or government employees sent to Kashan from outside the province.

Water supply in the Shahrestan varies in its source and mode of conveyance to households (Table 3:2). City water is piped to 92 percent of Kashan City's households; it is filtered and chlorinated, and, as one can testify, is considerably more salubrious than that of Tehran. Most of

TABLE 3:2 Domestic Amenities in the Shahrestan 1966.

Percent of all Housing Units

	Owner - Occupied	With Electricity	Using Kerosene as major fuel			Water Supply			
			alone	with wood	with charcoal	spring	qanat	well	Piped municipal
Kashan City	68	91	47	25	26	2	1	4	92
Aran/Bidgol	84	93	41	25	33	3	13	72	12
Rural Area	85	16	8	81	5	24	53	21	-

Source : Census of Population and Housing, 1966.

Aran/Bidgol's water comes from wells or qanats; 13 percent is piped, and the rest is carried home by human porterage, usually the womenfolk. Watersellers, carrying the water in goatskins from door to door, still have some trade in the urban areas, but the piped water system is rapidly being extended in Aran/Bidgol and the traditional water storage tanks - abambars will become as obsolete there as they are now in Kashan. Virtually none of the villages' domestic water supply is piped. Qanats are the most common source of water; they are used by 52 percent of households. Wells and springs supply the rest.

Disposal of effluent is naturally a problem in a region where water is so valuable a commodity. Kashan and Aran/Bidgol do not have the impressive sewerage system detailed by Clark and Clarke in Kermanshah (1969), for there is no river in Kashan to prime such a system. Rubbish is dumped on waste ground or collected by the city authorities and dumped outside the town.* Domestic effluent is disposed of in cess-pits, well buried; when these are clogged, skilled professionals, much like the qanat diggers, are called in to clear them out; the material extracted is dried in the sun and then sold for use on the fields. In the villages, however, there is no organized disposal of rubbish - the scale of the undertaking does not warrant it - but if cess-pits are not used, particularly in the mountains, sewerage is often discharged into water courses, to contaminate the

* The dry air, and, in summer, high temperatures, rapidly dry out animal and vegetable matter, making the practice more hygenic than in a humid climate.

water supply of settlements downstream.

Kerosene is the most common domestic fuel in both the urban areas, (table 3:2), but kerosene and charcoal together make up a large part of consumption. A combination of kerosene and charcoal is the most important fuel type in 82 percent of rural households. Wood in the form of hard timber is hard to come by but brushwood is gathered by hand on the hillsides. (Scouring the land for fuel over a long period has, with other factors, had a severely deleterious effect on the ecological stability of large areas of the shahrestan). Throughout the shahrestan charcoal is used in winter for korsis.* Electricity is laid on to over 90 percent of the urban housing units. The 16 percent of the village households supplied are mostly in places close to the cities. Kashan City has electricity throughout the day, but, until 1969, Aran/Bidgol was supplied for only 5 hours in the evening.

2. Education and Health

Perhaps in provision for education and medical care the rural/urban contrast is greatest. Under the First and Second Seven Year Plans (1955-62, 1962-1968) funds were provided by the Iranian Government for health and education facilities in both town and country to develop the country's infrastructure. Whereas the effect of greater investment in the cities was apparent in the late 1950's it was only

* A means of heating in which the hot smokeless fuel is placed in a metal tray under a low table. Quilts are placed over the table, and the entire family sits round it on cushions, snuggled in under the quilts to keep warm night and day.

towards the end of the Second Plan that the government's efforts in the rural areas began to show fruit. Government policy is as far as possible to encourage peasants to stay on the land and so help contain population pressures in the cities. Policy towards the villages is thus formed partly with the cities in mind. The major instruments of policy in this field apart from Land Reform have been the Health, Education and Development Corps: these are staffed by educated men and women who do the work as an alternative to military service.

The rural area of Kashan had in 1966 one secondary and about 31 elementary schools. In effect, there was no provision for secondary education in all but one village, though a number of boys do travel into Kashan City daily by minibus from Fin and other places. By contrast, Aran/Bidgol has one secondary school and Kashan City has three.

TABLE 3:3

LITERACY IN THE SHAHRESTAN (Persons 10 Yrs +)

	% Pop 10ys +		MALES		FEMALES	
	1966	1956	1966	1956	1966	1956
KASHAN CITY	37	25	54	40	19	10
ARAN/BIDGOL	18	10	31	18	4	3
RURAL AREA	17	9	30	16	3	1

Better school provision over a number of years has resulted in 38 percent of the Kashan City population over 7 years being literate; among males the figure is 55 percent. Aran/Bidgol's literacy rate of 18 percent is the same as that of

the villages, which suggests that literates being produced there are leaving for Kashan. As a direct result of the activities of the Literacy Corps there was an increase from 9 percent literate in 1956 to 18 percent in 1966 in the rural area.

In public health there is again a wide contrast between town and country: Kashan City had 237 persons employed in five hospitals in 1966; Aran/Bidgol had 11 employed in two clinics. Of the 25 persons with doctorates in the shahrestan, 23 of which were medical, one resided in the rural area, four in Aran/Bidgol, and twenty in Kashan City. It is a fair assumption to make, given the disparity in medical serviees between Kashan and the villages, and Kashan's lower effective fertility rate, that Kashan City's higher growth rate is a direct result of a lower death rate and, possibly, immigration.

Under the influence of the various development corps the situation in the villages has continued to improve. Preventive medicine in the countryside has been the responsibility of four mobile health groups, which in cooperation with the Malaria Office travel round the villages. All dwellings are sprayed with D.D.T.. The Development Office has undertaken to improve rural sanitation and a major task has been the conversion of traditional bath houses, where the water in bathing pools was seldom changed, to modern shower baths with individual cubicles. This has been done in a number of villages: Esmaveh, for instance, received a new bath house and a water pipeline, costing 140,000 riyals,

in 1967. In some instances the Office has taken over the capital-supplying functions of money lenders, for the public benefit; the case of Lathar may be cited in this context; here 370,000 riyals was paid towards the cost of repairing a water cistern, a mosque, the village mortuary, and a bridge.

Long term results of these developments may in fact hasten the rural-to-urban migration which, as one part of their motivation, they seek to prevent. Increasing numbers of children survive, and at the same time mental horizons are broadened by education. But without local opportunities at hand the better educated and the more ambitious leave for the towns and in Aran/Bidgol they leave for Kashan City.

II SERVICE FUNCTIONS IN THE VILLAGES

Given the nodal distribution of population in Kashan, the theory of functional central places evolved in the Western world (Berry and Pred, 1965) might lead us to expect that there exist also in Kashan precise mathematical relationships between settlement size, the number, and the variety of service establishments. On the evidence of the size and spacing of settlements, it was predicted therefore that a system of central places could be determined for Kashan, but that there would be local distortions in the system similar in origin to those found in the spacing of settlements.

Material for the study of central places in the shahrestan comes from the 1966 Village Gazetteer and from fieldwork. In the former, data is presented in two forms: (i) social institutions to which a village has "access";

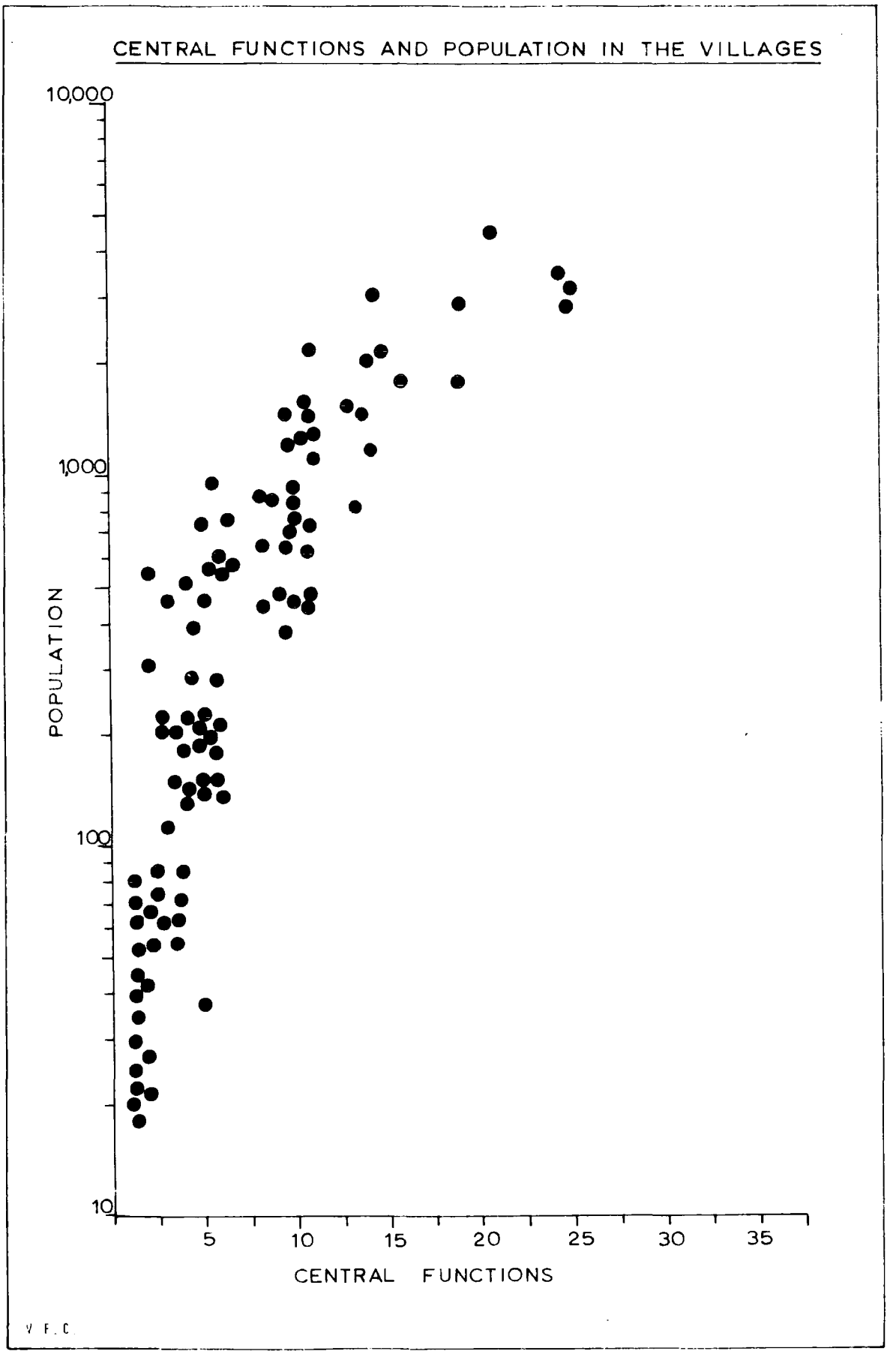

CENTRAL FUNCTIONS AND POPULATION IN THE VILLAGES
10,000
1,000
100
10
POPULATION
5
10
15
20
25
30
35
CENTRAL FUNCTIONS
V F C

Figure 3.1

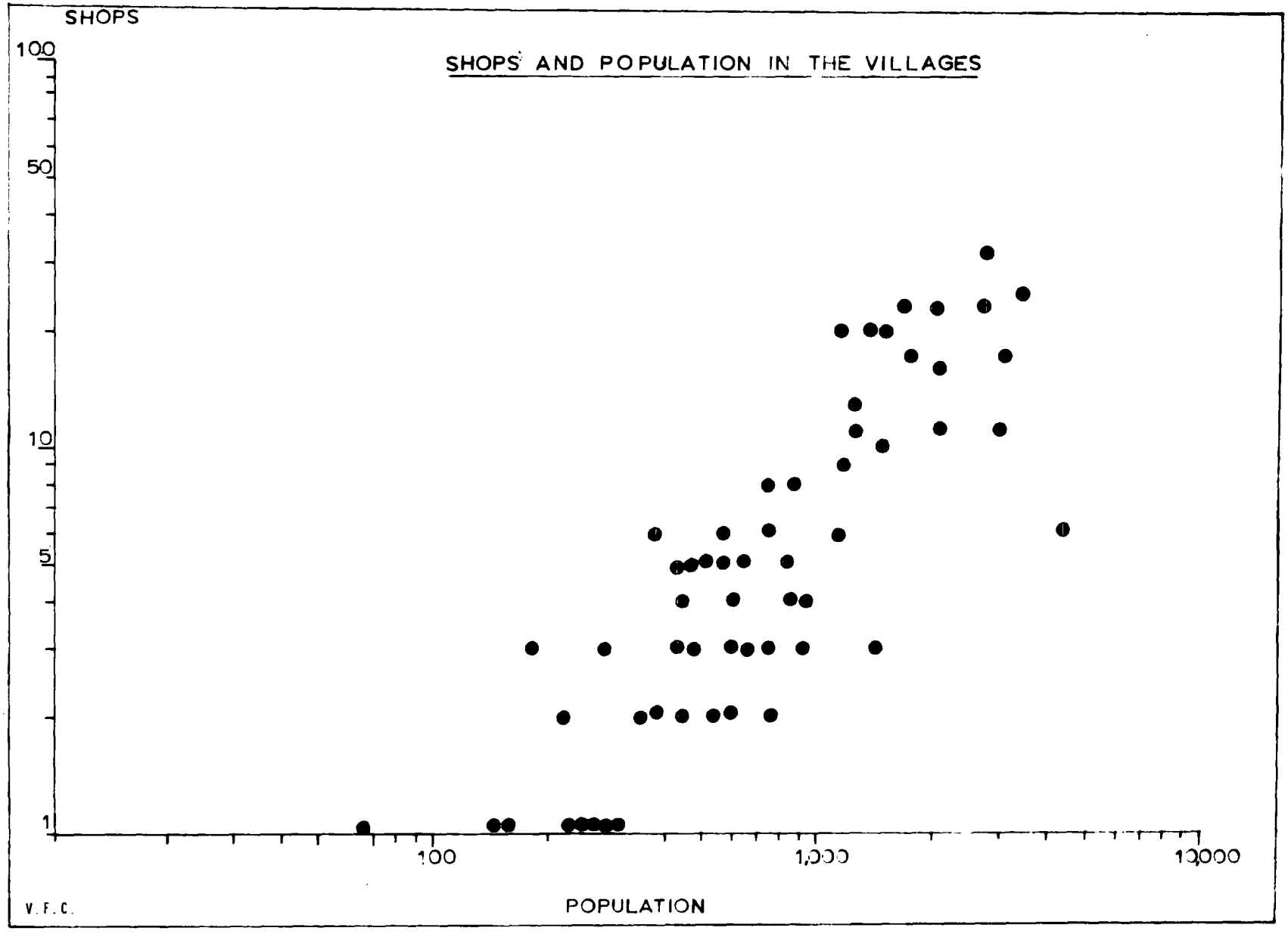

SHOPS
SHOPS AND POPULATION IN THE VILLAGES
100
50
10
5
1
100
1,000
10000
V.F.C.
POPULATION

Figure 3.2

(ii) existing establishments and facilities, giving type and numbers, which are located in the village. A full list of both is given in the Appendix . Mobility between centres could not be measured directly, but all the information available to the author from village interviews indicated that village to village movement for higher order goods was very low. Bus services do not run from one village to another; rather, they run from villages to Kashan City.

3. Village Size and Village Function

If mobility between villages is not important are other correlates of centre size significant? Using statistics on population and service establishments in the dehestan reports the variable of centre size was plotted against the total range of service functions in a village and against the number of individual function types.

Figure (3:1) shows that the numbers of different kinds of business in the villages is dependant on their population size: the graph is semi-logarithmic. The coefficient of correlation between size and functional range is +0.82. It follows from Figure (3:1) that the total number of retail establishments be a function of centre population, for the demand for central functions should increase with population; because the population served is related to numbers of types of business the rate of growth of establishments should be proportional to the growth of population served. In Figure (3:2), therefore, retail establishments and population are plotted on double logarithmic paper, so that a straight line depicts constant rates. A close positive correlation can be

seen (r = +0.83) on the graph. Further, when central functions in Kashan are plotted against functional units on semi-logarithmic paper (Fig. 3:3) the result is markedly similar to that found in western societies (Berry; 1967, p.26-40). Towns (over 1,000), villages (100-1,000) and hamlets (less than 100), as classified by Berry, do form a hierarchy on three levels, though there is some overlap of size categories. The correlation between functional range and the number of units is +0.91.

It is clear from these three graphs, and the correlations given that we have positive confirmation of some western theories of central place in an oriental situation. But in detail there are some disturbing anomalies resulting from the cross-cultural complexities involved.

(i) Retailing: (Fig 3:2) The correlate of centre size and retail establishments is itself encouraging, but checks carried out in the field by the author showed, however, that any official definition of 'retail establishment' in a Persian village society must be treated with circumspection. Retail functions and personal services are often carried out in private houses and at irregular intervals. (Plate 3:1). One family might sell paraffin, or another potatoes; a man might offset the expenses of his trip to the city by bringing back goods to sell to his neighbours. The number of shops visible and easily enumerable by the author in a village was invariably lower than the number recorded in the Census.

(ii) Schools: The decision to build and staff an elementary school is a government one, bearing in mind the aim to reach

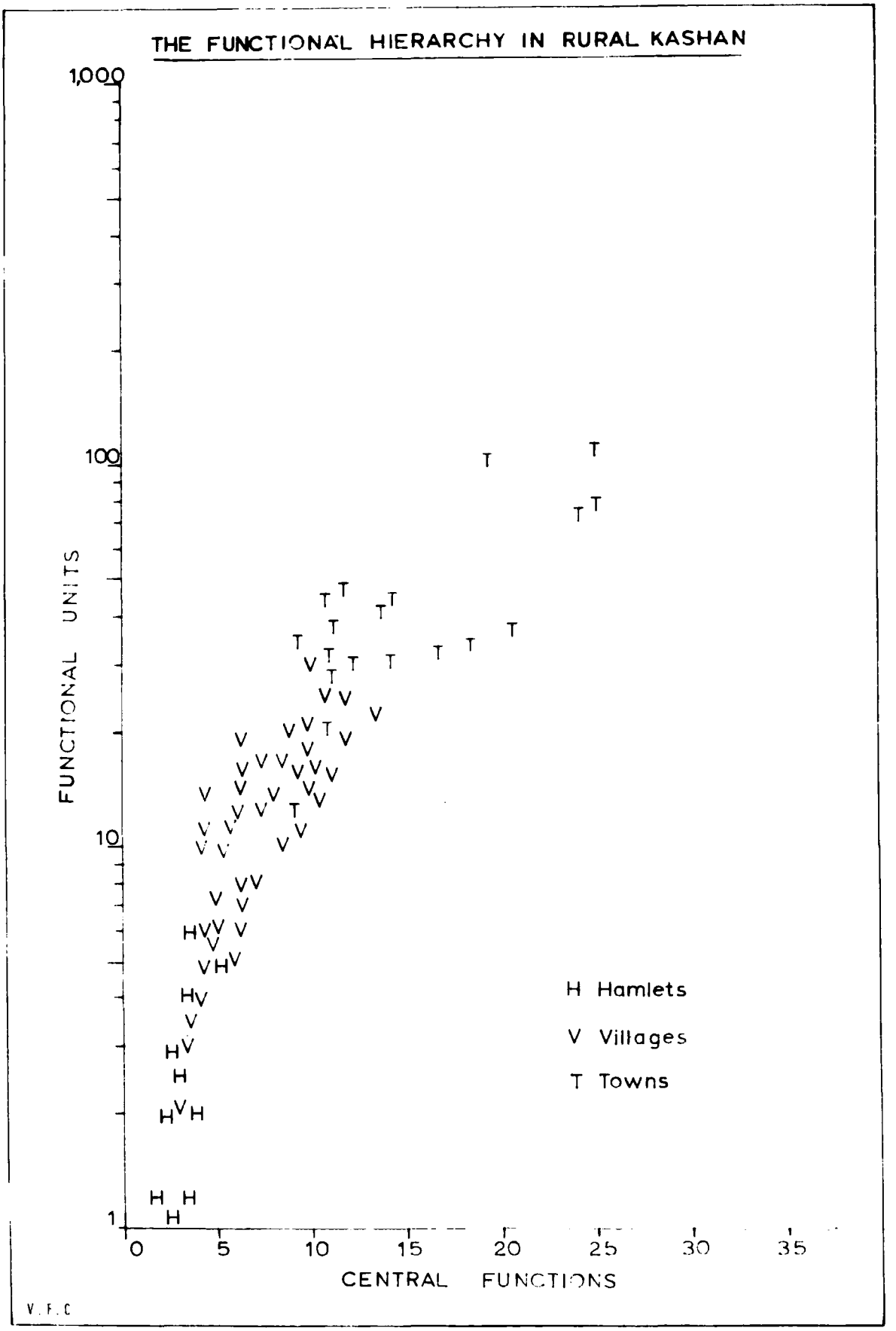

THE FUNCTIONAL HIERARCHY IN RURAL KASHAN
1,000
100
10
1
FUNCTIONAL UNITS
0
5
10
15
20
25
30
35
CENTRAL FUNCTIONS
H Hamlets
V Villages
T Towns
V.F.C

Figure 3.3

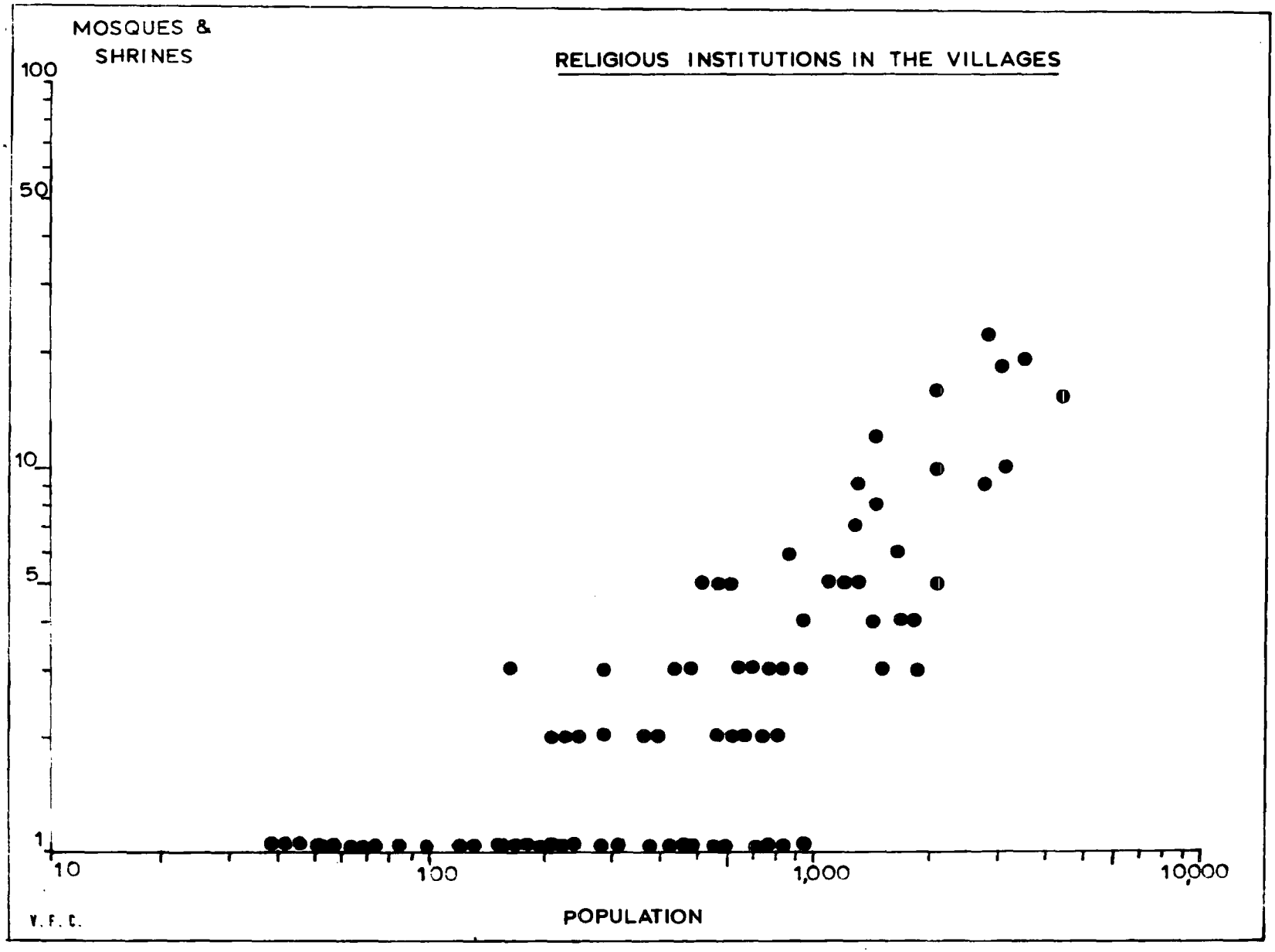

MOSQUES &
SHRINES
RELIGIOUS INSTITUTIONS IN THE VILLAGES
100
50
10
5
1
10
100
1,000
10,000
POPULATION
V. F. C.

Figure 3.4

as many people as possible. Transport is poor and long distance journies to school expensive and impracticable. In 76 villages, regardless of size, there is one school. Large villages simply have larger schools (Plate 3:2).

(iii) Religious Institutions: In Figure (3:4) religious institutions - mosques and shrines - are graphed against population on logarithmic paper. At the lower end of the scale the distribution contrasts with that for shops. One village of 200 persons has three institutions: one of over 900 persons has one institution. The chance fact that a Saint happens to be buried at a certain site will account for the shrine over his grave, and the accompanying services provided, rather than the number of people living nearby. At the higher end of the scale there is a reasonably close correlation between numbers of mosques and shrines and centre size.

(iv) Hammams (public baths) are a necessity in an Islamic Society, so nearly all villages with more than 80 persons have one. Only villages with over 900 persons have more than one. The service provided by a hammam is expensive, requiring plenty of fuel and often a full-time attendent, and only the larger villages need more than one unit.

4. Levels in the Hierarchy

On theoretical grounds (Haggett, 1965) the relationship between settlement size and function might be expected to be recognizably 'stepped' in character rather than continuous. Figure (3:3) suggests that discontinuities do exist. To shed further light on the hypothesis that levels do exist in

Kashan two analyses were carried out. Firstly, it was hypothesized that higher order functions would (a) be present in the region in smaller numbers and (b) be accessible on average in centres with larger populations. Service facilities were ranked according to the number in the region: the lowest number, which was one secondary school, was ranked No. 1; the highest, radios, which were in nearly all villages was ranked No. 11. The average size of villages with the facility was likewise ranked, the highest mean ranking as No. 1.

TABLE 3:4: THE HIERARCHY OF SERVICES "ACCESSIBLE"

SERVICE FUNCTIONS	A Number of Centres	B Mean Size of Centre	Rank A	Rank B	D $(A-B)^2$
SECONDARY SCHOOL	1	1813	1	2	1
BANK	3	2682	2	1	1
EXTENSION CORPS	14	792	3	5	4
CLINIC	20	1606	4	3	1
HEALTH CORPS	26	468	5	11	36
COOPERATIVE	43	756	6	6	0
LITERACY CORPS	60	510	7	9	4
MAIL BOX	62	837	8	4	16
ELEM. SCHOOL	95	733	9	7	4
MOSQUE	103	700	10	8	4
RADIO	132	555	11	10	1

$\Sigma D^2 = 72$

$R = 1 - \frac{6\Sigma d^2}{n^3-n} = 0.67$ Degrees of Freedom: D.F. = N-2, D.F. = 9

Significant Correlation at 5%

The two rankings, shown in table (3:4), were compared using the Spearman rank order correlation coefficient, and a positive correlation of 0.7, significant at the 1 percent level was found. The first hypothesis was thus proven. Secondly, the Reed-Muench (Haggett and Gunawardena, 1969) technique was used to determine the median population threshold for the same facilities. A positive relationship between services accessible and population can be seen in Fig (3:5), and it was predicted that a similar ranking for the 11 major services to that already found could be determined from the median population thresholds. Assaying thresholds for services in fewer villages than co-operatives was not possible, but thresholds for services at a lower level than the Health Corps are given in table (3:5)

TABLE 3:5: MEDIAN THRESHOLDS FOR RANGE OF FUNCTIONS

SERVICE FUNCTIONS	MEDIAN POP. THRESHOLD
RADIO	15
MOSQUE	52
EL. SCHOOL	75
MAIL BOX	150
LITERACY CORPS	195
CO-OPERATIVE	60

For the six functions shown there is a close association with rankings according to mean population and number of settlements. This tends to confirm that discontinuities and the type of threshold hierarchy established for southern

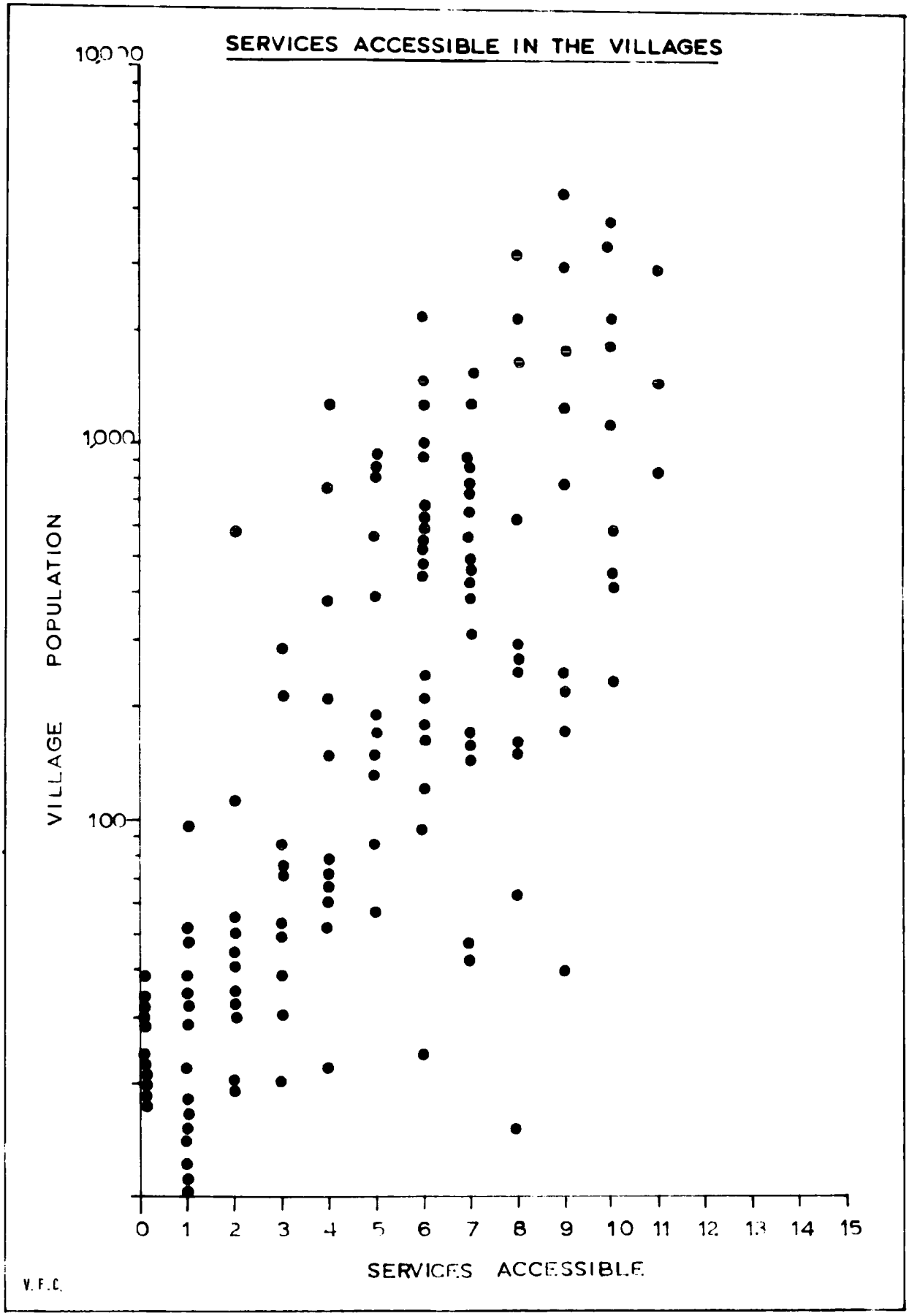

SERVICES ACCESSIBLE IN THE VILLAGES
10,000
1,000
100
VILLAGE POPULATION
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
SERVICES ACCESSIBLE
V.F.C.

Figure 3.5

Ceylon and the United States do exist (Haggett, 1965).

5. Conclusion: Central Places in Rural Kashan

Rural Kashan is an area of low mobility for goods and services. What movement there is for services is to Kashan City. Central place principles provide a complete statement of centre location only when central places are supported exclusively as market centres by the retail and service functions they provide for surrounding regions (Berry, 1967). Wide deviations from the perfect service centre hierarchy may be due to a) specialized centre functions, b) agglomeration, c) resource localization. (Haggett, p.14). In Kashan the first and third of these are responsible for deviations.

1a) The principal function of the villages is agricultural production. This function supports a residential population which in turn supports retail and service activities. B.Berry claims "the retail and service provision so supported is less than in a market center of similar population size because the resident population is not matched by the residents of a corresponding rural region." Comparison of distributions of services in Kashan with those of the U.S. Mid-West shows this to be the case, but 'Fall-off Rates' with size are greater than in the U.S. It should be added that in Iran a much lower income per capita and lower demand might in any case contribute to such a result. (B.Berry, 1967, p.35).

11) Village location is governed by the localization of a major resource-water, and there is no interstitial population between villages. We cannot look to the demand for services

to explain village location.

It has been found in Ceylon that a basic contrast in rainfall between wet and dry zones, with contrasts in the supporting capacity of the land and hence in population densities, gives larger numbers and higher orders of retail or service function per unit area in the wet zone (Balasundarampillai; personal communication). Whether or not Kashan is typical of arid Iran, and similar patterns of centre size and function have been found in Isfahan by M.A. Power, can only be established by work in another, contrasting part of Iran. As far as possible such an area should have similar conditions to Kashan in all but the one point of having very low rainfall. It is to be hoped that further research on these lines will be attempted.

In the previous chapter it was seen, from the size relationships and spacing of village settlements in Kashan, that the villages are organized into a recognizable system. The close positive correlations found between village size, functional range of services and number of functional units confirm the application of some western theories of central place to the settlement system - an oriental, arid area of traditional peasant agriculture with a highly nucleated population. Clearly defined functional relations in goods and services exist between the villages, but also between the villages and the city; and it is the relations between city and village which will be examined further in the following chapter.

Notes:

Plate 3:1. Street Barber in Bidgol.

The Provision of goods and services in the villages and Aran/Bidgol is often undertaken casually. In consequence, it is difficult to enumerate. The barber shown here plies his trade in private houses and in the street, wherever a customer stops him and asks for a shave or haircut.

Plate 3:2. Primary School in Abuzaidabad.

Most village primary schools are run by the Literacy Corps. Three of the large classes are shown. With but a few exceptions secondary education can be obtained only in the urban areas.

Plate 3:3. Vehicle Caravanserai in Kashan.

Village buses spend the day in the city parked in large open serais such as the one shown. Store rooms are found under the arcading. On top of the bus in the immediate foreground is a village-woven carpet which has been brought into Kashan for disposal.

CHAPTER FOUR

TERRITORIAL SOCIOECONOMIC STRUCTURE

1. The Data

The areal non-coincidence of statistics for Kashan on industrial and occupation structure between the 1956 Census and 1966 Census of Population and Housing must be resolved in a manner different to that used in Chapter Two. The Censuses give no detail on economic structure or the size of the active population in individual villages. On one hand the 1966 Census Volume on Natanz Shahrestan, an area formerly one dehestan within the Kashan Census Province of 1956, gives details on economic structure comparable with those available for the Kashan Shahrestan in 1966, and it can therefore be used for comparison over the intercensal period. On the other hand information on Meimeh dehestan, also formerly part of the 1956 Kashan Census District, is lost in the 1966 summary for Isfahan Shahrestan. Furthermore, Aran and Bidgol though accorded 'urban' status in 1956, were summarized, in their economic structure, apart from Kashan City in 1956 and along with the totals for the rest of the Census District, that is, Aran, Bidgol, Meimeh and Natanz dehestans. Direct intercensal comparison is therefore not possible.

It was calculated that Aran/Bidgol and the population of the Kashan dehestans in 1956 together constituted 68 percent of the rural population at that time. The figures for Natanz, given in Table 4:1, are known and their deviance

from the Rural Area of Kashan in 1966 can be assessed and allowed for. Those for Kashan are given in Table 4:2.

TABLE 4:1

Employed Population ten years of age and over by major industry group in Natanz Shahrestan, 1966

INDUSTRY DIVISION	MALE	FEMALE	TOTAL	Percentage MALE	FEMALE	TOTAL
1. Agriculture, Forestry, Hunting & Fishing.	4572	144	4716	65.7	4.3	45.6
2. Mining & Quarrying	78	1	769	-	-	0.1
3. Manufacturing	446	3159	3605	6.4	94.4	34.9
4. Construction	822	2	824	11.8	-	8.0
5. Electricity, gas, water & sanitary services.	27	-	27	-	-	0.2
6. Commerce	263	3	266	3.8	-	2.6
7. Transport, Storage	135	-	135	1.9	-	1.3
8. Services	547	40	587	7.9	-	5.8
9. Activities not adequately described	65	28	93	0.9	0.8	0.9
TOTAL	6955 (67%)	3377 (33%)	10332			

If the Natanz fraction of the 1956 Census population is added to the 68 percent already accounted for the coverage of the 1956 population is raised to 93 percent. In the absence of any alternative means of comparing the social and economic statistics in the two Censuses such a degree of accuracy must be accepted, though in any interpretation of the data it must be allowed for constantly.

TABLE 4:2 EMPLOYED POPULATION TEN YEARS OF AGE AND OVER BY MAJOR INDUSTRY GROUP IN KASHAN, URBAN IRAN AND RURAL IRAN, 1956 and 1966

M A L E S

INDUSTRY DIVISION	1956				1966				
	Urban Iran	Rural Iran	Kashan City	Rural Kashan	Urban Iran	Rural Iran	Kashan City	Aran/ Bigdol	Rural Kashan
1	12.9	80.0	10.6	73.9	8.2	76.2	7.0	26.6	55.3
2	0.7	0.4	-	-	-	0.5	-	-	0.2
3	24.7	3.7	49.7	11.3	25.3	4.8	52.7	49.6	25.0
4	10.9	4.2	6.0	5.5	11.6	6.6	7.7	8.1	8.2
5	0.6	-	0.6	-	2.0	0.1	1.6	1.1	0.3
6	16.0	2.4	13.3	3.1	17.9	3.6	14.3	9.0	2.1
7	8.9	1.6	4.4	41.3	7.3	1.5	4.2	1.6	1.4
8	20.4	4.4	13.6	3.7	25.0	5.1	11.6	3.0	2.0
9	4.8	2.4	0.6	-	2.5	1.6	1.0	1	0.8

F E M A L E S

	1956				1966				
1	4.0	34.9	0.2	1.8	2.9	32.1	0.3	0.1	-
2	-	-	-	-	-	-	-	-	-
3	39.6	52.7	93.9	93.7	45.6	61.1	94.1	98.7	99.0
4	-	-	-	-	-	-	-	-	-
5	-	-	-	-	-	-	-	-	-
6	1.3	-	-	-	2.3	-	-	-	-
7	0.5	-	-	-	0.7	0.5	-	-	-
8	52.5	10.8	5.8	1.4	45.6	5.0	4.9	0.6	-
9	-	0.8	-	-	2.0	1.1	-	0.4	-

I ECONOMIC STRUCTURE

2. Economic Activity

Any division of an Iranian population into economically active and inactive persons is to some extent arbitrary, since the basic economic unit in the traditional sector of the economy is the family. If the family is engaged in some form of household industry nearly all its members may at some time or other work in it. Males usually provide the most reliable measure of economic activity, since females, sometimes working in the home and sometimes not, are more difficult to classify. Table 4:3 gives figures for economic activity in Kashan and in Iran.

DEMOGRAPHIC FACTORS AFFECTING ACTIVITY

(i) Differences by Sex: in Iran, as most countries, males are primarily responsible for economic livelihood: they made up 90 percent of the labour force in 1956 and 87 percent in 1966. Kashan Shahrestan, in both City and Village, had a much lower percent than Iran: in Kashan City 66 percent of the labour force, in the villages 54 percent, and in Aran/Bidgol 50 percent were males. (In fact the figure for Aran/Bidgol was 49.98 percent, making it the only Iranian urban area to have more females than males economically active).

These exceptionally low figures for settlements apart from Kashan City together with a decline from 67 percent in 1966, were partly the result of changes in overall sex ratios. (p. 29). There was a rise in the female activity rate from 42 percent for the 1956 Rural Area to 64 percent in the Kashan dehestans and 77 percent in Aran/Bidgol in 1966.

TABLE 4:3 Activity Rates in Kashan and Iran for Population over ten years
Percent of Population Economically Active

1956

	Kashan City	Aran/Bidgol & Rural Area	Rural Iran	Urban Iran
Males	82.7	87.5	86.6	78.5
Females	41.8	41.6	9.2	9.3
Total	62.3	46.5	48.5	45.2

1966

	Kashan City	Aran/Bidgol	Rural Kashan	Rural Iran	Urban Iran
Males	73.9	80.9	81.4	82.5	68.9
Females	39.0	77.1	67.5	14.2	9.8
Total	57.0	79	74.5	49.2	40.6

TABLE 4:4 Worker Status in Kashan Shahrestan, Urban Iran and Rural Iran of the employed male population ten years and over 1956 and 1966

Percent of the Employed Population 1956

	Employer	Own Account Worker	Government Employee	Private Employee	Unpaid family worker	Others
Urban Iran	2.0	27.9	18.7	44.6	2.4	6.5
Rural Iran	0.8	49.9	3.2	32.7	12.2	13.1
Kashan City	2.4	26.6	9.3	58.6	2.6	0.5
Rural Kashan	0.5	49.1	1.6	36.4	12.1	0.3
1966			1966			
Urban Iran	4.0	25.4	22.5	45.6	1	2
Rural Iran	1.4	51.5	2.4	31.6	12.3	1
Kashan City	3.1	24.0	8.3	62.1	1.5	0.7
Aran/Bidgol	1.1	50.8	2.1	36.4	8.8	0.7
Rural Kashan	1	50.9	1.5	38.8	6.9	0.9

Not only, therefore, were there relatively fewer men in the labour force outside Kashan City, but also a higher proportion of the females took over their economic functions. Contrariwise, in Kashan City there was a slight decline in the female activity rate.

(ii) Differences by Age : A high birth rate and decreasing infant mortality have given Kashan an age structure weighted heavily at the base. The ratio between dependants - classified as those under 15 years and over 65 years old - and the rest of the population is high, 108 per 100 in Aran/Bidgol, 96 in the villages, and 85 in Kashan City. Outside Kashan City the burden of such a high demographic dependancy rate and a relatively small male labour force is offset partly by a higher rate of child employment. It has been shown (Durand, 1953) that economic activity of children aged 10-19 has some correlation with a nation's degree of economic development. The correlation appears to hold true at the regional level in Kashan, where activity rates for these age groups in Kashan City are considerably lower than in Aran/Bidgol and the villages. Too much emphasis should not be laid on the difficulties of Aran/Bidgol and the rural area in this respect, since a certain amount of remuneration is received from Menfolk who have migrated to Kashan City.

3. Worker Status

Changes in the status of workers can be used to measure the erosion of the traditional economic sector by the modern economic sector. Males again provide the most reliable measure for intercensal comparison. (Table 4:4). Employees formed the

largest group in urban Iran, being 46 percent of those employed in 1966. In rural Iran the group expanded from 33 to 46 percent between 1956 and 1966, remaining second in size behind self-employed workers. Unpaid family workers were of little importance in urban Iran, but were 12 percent of the rural workforce. Workers on own account and unpaid family workers, both typical of the traditional sector, declined from 32 to 27 percent of the male labour force, while in rural Iran the percentage rose slightly from 62 to 64. Further, a rise in urban government employees from 19 to 22 percent contrasted with a small fall in rural Iran. In effect, the polarization of the modern and traditional sectors of Iran's economy into urban areas and rural areas was intensified in the intercensal period.

In Kashan the situation was more extreme still. In Kashan City employees were 62 percent of the male labour force; government employees were 8 percent, considerably lower than the national urban average; self-employed workers were in similar proportion to the rest of urban Iran. Proportions to be found in each group in Aran/Bidgol and the villages were similar to the mean for Iranian rural areas. While rural Kashan has a balance between modern and traditional sectors in male employment similar to rural Iran as a whole, the extent and speed of the erosion of the traditional sector in Kashan City is much greater than urban Iran in general.

4. Industrial Structure

(i) Males

Manufacturing, group (3), was the most important

employer in Kashan City in 1966. It employed 53 percent of the male labour force, compared with 25 percent in urban Iran. Such a high percentage in one group reduces the percentages in others. Bearing this in mind the proportions of the male workforce in other groups in Kashan City are still very different from urban Iran as a whole; 14 percent are in commerce (6), and 12 percent in services (8) in Kashan City, compared with 25 and 18 percent respectively in those groups in urban Iran. Much of the labour surplus, where there is one, in cities of the developing world accumulates in the tertiary sectors, where a multitude of jobs - tea boys, messengers and sweepers, for example-performing no real economically productive functions can be created. Kashan City's concentration of the labour force in secondary activities is unusual.

Aran/Bidgol has an even lower proportion in services and commerce than Kashan. Just under 50 percent of the males are employed in craft and manufacturing processes. At 27 percent, the agricultural sector (1) is large for an Iranian urban place, indicating that in employment structure, as in demography and housing, the place has a mixture of 'urban' and 'rural' characteristics. Rural Kashan in 1966 had a lower fraction of the male labour force in agriculture than the mean for urban Iran. The difference was made up by a higher proportion, 25 percent, in manufacturing. Other industrial groups were in broadly the same proportion as the national average.

It is important to distinguish between the traditional

and modern sectors in group (3), manufacturing. The large number of men in the group in Kashan City are mostly working in modern textile factories for wages. Apart from some workers who travel into Kashan from Aran/Bidgol and nearby villages by bus every day, those employed in manufacturing and resident outside Kashan City work in small workshops or in the home at traditional handweaving of textiles.

(ii) Females and Household Industry

Most employed females in the Shahrestan were in group 3 , working at home. The large numbers of women in manufacturing, to the exclusion throughout of agriculture, contrasts with 25 percent in services in urban Iran and 33 percent in agriculture in rural Iran. Kashan Shahrestan is one of Iran's major carpet - producing districts, and cottage industry is of importance in both urban and rural areas, though more so outside Kashan City. (Table 4:4).

(iii) Changes in Industrial Structure 1956-66.

Changes in industrial structure in Kashan and Iran may briefly be summarized as follows:

(i) Between 1956 and 1966 urban Iran maintained approximately the same proportion of its labour force in each major industry group, with the exception of an increase in the service sector. (ii) At the same time Kashan City's labour force increased from 19892 to 22,292, 8 percent, yet the numbers in the service sector declined from 2185 to 2082 and in manufacturing increased from 6506 to 7783. Agriculture decreased from 1392 to 142. (iii) While male employment in agriculture in rural Iran fell from 80 to 76 percent, the figure for the 1956 Kashan Census District rural area was 74 percent : in 1966 for

Aran/Bidgol the figure was 25 percent, 50 percent in the Kashan villages, and 66 percent in Natanz. The actual figures, given in table 4:2, show that allowing for the numbers which must be employed in Meimeh (population 14,086) the total employed in agriculture hardly changed in the ten years.

Thus, the region has a rapidly industrializing urban centre, with concomitant shifts in urban economic structure, while at the same time it has a number of village settlements - here Aran/Bidgol is included - which supply labour to the city and have themselves a stagnant industrial structure.

II SOCIETY AND ECONOMY

5. Communications

Though the settlements of Kashan differ fron one another in size, complexity, economic structure and economic function, strong social and economic bonds have developed between them. In the lowlands topography and mutual proximity have allowed easy intercommunication while in the highlands contacts are confined within individual valleys and groups of valleys where, cut off one from another in winter by snowfalls on the intervening mountains, the easiest routes of access are down valley to the lowlands and the city.

From the city the shahrestan is governed. Appointments to local political and administrative posts, such as kadkhoda (village headman), are made by the Governor in Kashan. The law courts are situated in the city and disputes other than minor, local ones are referred to them there. Each of the Government Ministries is represented in the city and from their offices instructions are issued to government officials

the Literacy Corps, the Health Corps, and the instruments of bureaucratic control in the villages. Economic and social links between city and village are found in agriculture and cottage industry, in the supply and demand of labour, and the provision of goods and services.

Travel between the villages and Kashan City is mostly by bus. Many of the larger villages possess one such vehicle, owned collectively or by one of the wealthier citizens, and the largest villages and those nearest Kashan have more than one. Buses travel to the city in the morning and return in the evening, and the nearer villages such as Niyasar have more than one trip a day. While weekday visits are mostly for shopping and business, on Fridays, when the shops are shut, most visits are social. Numbers of peasants still ride in by donkey and some travel out from Kashan by the same means to work in the fields of the oasis. Many also use bicycles for short trips around the city. City dwellers in their turn visit the villages, particularly during the summer when many travel to the mountains to escape the heat of the lowlands. Women and children often go leaving the menfolk behind in Kashan.

The ten years before 1968 saw considerable improvements in the road system of the province. In particular a motorable road has been constructed through the mountains to the Mahallat district. In Kashan, as in Kerman, "wheeled vehicles expanded and intensified an existing pattern; they did not create a new one". (English : p.66). Comments by nineteenth-century European travellers bear this out and maps given by Curzon (Vol 1, p.2) and Houtum-Schindler show a skeletal routeway pattern in the province the same in outline as that of today. There have been

only two major routeway innovations in modern times - the Tehran - Isfahan railway which now runs through Kashan skirting the foot of the alluvial fans, and a tarmacadam motor road to Qom which has been built along the foot of the Kuhi-Kargas. These routes have affected the external rather than the internal communications of the province.

Despite the spread of the road network, the radio, and the government official, and the growth of western, materialist, cultural values, there are still some local differences in Kashan in language and in dress. A real sense of the barriers of time and distance is often lacking among villagers; America or Britain may be only a bus ride away - a weekend's drive from Tehran. In 1889 Edward G. Browne, when discussing the Qohrudi dialect with a peasant learnt that in Qohrud the phrases "I am going to the city" and "I am going to Kashan" were synonymous (p.205). This is still the case in rural Kashan. Aran and Nushabad no longer speak the "peculiar dialect" noted by Houtum-Schindler (1898) but regional dialects are still spoken in Qohrud and Abuzaidabad. While ordinary Iranian peasant garb is worn in most of the province, in the Kavir men wear black baggy pyjamas; and in the city modern western dress is no longer a monopoly of the educated classes, though considerable social stratification does exist.

6. Occupational Structure

Besides giving some further insight into the economic structure of Kashan the occupational structure may be viewed also as a reflection of the existing social hierarchy. Details are given in Table 4:5.

TABLE 4:5 Major Occupation of Employed Population 10 years old and over. 1966 (in percentages)

OCCUPATION	KASHAN CITY	ARAN/BIDGOL	RURAL AREA
1. Farming, Forestry, Hunting, Fishing	4.7	13.0	30.5
2. Mines, quarries, wells	0.0	0.0	-
3. Production Workers	71.8	79.3	64.3
4. Service Workers	6.3	1.3	1.7
5. Sales Workers	9.3	4.7	2.0
6. Clerical & Religious	3.0	0.5	0.2
7. Admin. & Management	0.3	-	-
8. Professional, technical & related.	3.7	0.6	0.6

Source: Census of Population and Housing 1966.

Administrative, management, professional, technical and related groups (7) and (8), 5 percent of the city's male labour force, constitute the 'upper class' in Kashan. Practically all of them live in the city. As far as the rest of the shahrestan is concerned the most important members of these groups are the bureaucrats and the landowners. These used to control local administration but all major political appointments are now made by the central government. Only under the Pahlavis has the function of Iranian government changed from simply the maintenance of order and collection of taxes to one in which are also provided fundamental services and amenities. Clerical workers, group (6), of whom two thirds have no more than six years' elementary schooling and one in fifteen is unable to read and write, are found mostly in the city. Paralleling the administrative hierarchy from Kashan City down through the bakshs (rural administrative units) to the villages, there is a hierarchy of those employed in sales and service occupations, and in the number of services available. Among the city traders there is a further distinction between the great majority employed in retailing and a small select group of wholesalers, the wealthiest of them dealing in carpets and finance. That group, along with the landowners, exerts an influence throughout the shahrestan.

It has been shown in chapter 3 that the number of shops and service functions in the villages is directly related to settlement size. There is no reason to doubt, therefore, that the numbers employed in these functions are likewise

directly related to settlement size. The increase in the number of types of function available in larger villages is most unlikely to affect the overall occupational structure in each village, since they employ so small a proportion of the total village labour force.

The remaining mass of the people, which we can call the proleteriat, is employed in city and village in unskilled and semi-skilled occupations, the farmer in the fields, the housewife at the loom, the workers in the mill. While there is some difference in income and living standards between Kashan City, Aran/Bidgol and the villages, the level of illiteracy is universally high, at over 90 percent.

7. The Pattern and Means of Urban Economic Control

Control by an urban upper class of the shahrestan has in the past been exerted through the ownership of land and water rights, of carpet contracts and of credit, as well as through political administration.

(i) Land Ownership and Water Rights

Before reform, the pattern of land ownership in Kashan was complex, and in detail it is outside the scope of the present study. As in many parts of Iran there were considerable local differences in the type of ownership; reform has, if anything, further complicated the pattern.

In the immediate neighbourhood of Kashan City the prevailing form of tenure was that of large landed proprietors. In some villages the landlord provided the seed and draught animals and took four fifths of the crop. The landlord, who

usually lived in the city, had control of the basic elements of production - water, land and capital while, without the ownership of these elements, the sharecropper had no security of tenure, being in effect little more than a landless labourer. Qanats were built only by the land-lowners, and it has been argued that only under their regime could there have been the concentration of capital needed to undertake the expensive and prolonged irrigation projects necessary in so arid an area. (English, p.22). There may be some truth in the argument; certainly, around Kashan many of the largest irrigation projects have been carried out by government ministers with financial interests, such as Amin ad Daulat in the early nineteenth century, and one general who built the Qohrud dam in the seventeenth century to sell water to the city.

Away from the houmeh* of Kashan the form of land tenure varied. In some mountain villages the peasant paid a fixed rent in cash or kind, or both, according to the amount of land or water he held. The rent in Barzuk in 1948 was 10-12 manni tabrizi per jarib**: it was considered a high one when compared with villages around Natanz and Isfahan. Water rights also varied; at Khorramdasht, for example, one qanat was owned by two villages, while in most cases a qanat was owned by one. (Lambton, 1953, p.320, p.220).

Ownership in a number of villages was mixed. Qamsar

** In fact manni tabrizi vary from 651b to 131 lb; the jarib measures approximately 478 square yards.

* The area immediately adjacent to the city.

was owned partly by peasant proprietors and partly by Kashanis. Property - gardens and houses - were and still are owned in the mountains by folk from Kashan, for profit and as summer retreats. One such property in Niyasar, situated among streams, waterfalls and vines, overlooks the entire village.**

Josheqan & Qali was held by peasant proprietors. Pressure on irrigated land there is high and holdings small, often too small to provide an adequate income for a family unless supplemented by carpet weaving. But any detailed assessment of differences in peasant income as between areas held by landlords and those held by peasant proprietors is difficult. Peasant ownership is found mainly in the less productive parts of the province and direct comparison is misleading. While in the Kirman basin - a much smaller area than Kashan shahrestan - differences in the terms of crop sharing agreements appear to vary according to the needs of the peasant, relative to crop yield (English p.89) so that in the mountain valleys where yields are lower the peasant's share is correspondingly higher, in Kashan no such simple correlation is to be found.

An official of the National Bank in Kashan estimated in 1968 that a farmer might receive, after payment of rents, 20,000 riyals (circa £100) from summer crops, 10,000 riyals from winter crops, and a further income of 35,000 riyals from household industry.

** Similar to the village of Tezerjan, near Yazd (Sunderland,1968), much of which is owned by Yazdis

(ii) Carpet Contracts

Carpet weaving provides a considerable proportion of rural family income. Of village households 78 percent have some form of household industry; 90 percent of those weave carpets. Whereas in other parts of Iran the province provides the raw material for weaving, in Kashan there is not enough animal herding to meet local requirements and wool is imported. Again, there were local variations in carpet contracts in Kashan, for there has long been a general accordance between landownership and carpet ownership. A man who owned land in a village often controlled weaving contracts. Sometimes a village unprofitable in agriculture was retained in order to maintain control of weaving.

All the villages in the neighbourhood of the city are given over to a greater or lesser extent to home industry. In Aran, Bidgol and Nushabad, a lack of alternatives in agriculture has forced a particular concentration on craft manufacturing. The villages of the houmeh weave carpets equal in quality to those of Kashan City, the centre of the industry. They are controlled from Kashan by owners who through their agents supply the dyed wool, working capital, and designs, besides keeping a close watch on the quality of the product.

In Josheqan-e Qali on the other side of the Kargas mountains, there is an absence of landlord control and the peasants own the carpets they weave. Isolation may partly account for this lack of outside control, for the village is cut off from Kashan during four to five months of the year.

Unlike the rest of the shahrestan wool and dyestuffs come from local sources. The channels for disposing of the finished carpets and the carpet designs used further reflect the village's independence. The carpets are sold in one particular caravanserai - the Josheqan Serai - in Kashan City. Kashan carpets are sold in other serais. In addition, for at least two centuries possibly four Josheqan has been weaving only two closely allied rectilinear designs (Edwards. p.312). A fragment of an eighteenth century Josheqan in the Victoria and Albert museum, in its fabric, design motif and dyestuff is the same as a modern Josheqan. Kashan carpets, have on the other hand, since, their revival in the late nineteenth century, constantly altered their styles as their owners have interpreted the varying stylistic, and fashionable demands of the market.

8. Recent Changes in the Pattern of Urban Control

(i) Changes in Irrigation and Water Rights

Changes in irrigation techniques in Kashan have been greatest in the lowlands. The present century has seen an increase in lowland population, while a number of droughts in recent years have led to a lowering of the water table and the drying of many qanats around Kashan City. Whether or not there is any correlation between these circumstances and the steady encroachment of sand dunes to the east of the kavir settlements is not known, but it seems likely.

Several changes stemmed from this new lack of water in the qanats. In some areas, it was claimed in 1968, landowners were discouraged from retaining their lands, since they were

taxed on the former 'wet' rates for qanats; to avoid that, qanats were rented out for periods of up to twenty years, for such an arrangement reduced tax liability. Another response was to sink deep and semi-deep wells, though in any case the opportunities to dig them would most likely have been taken, with or without the drop in the water table.

Around Kashan City the water table is at 100 to 150 metres and one landowner estimated that the investment cost of a well to that depth, including drilling and the installation of pumps and pipelines was 2,000,000 riyals, or about £12,000. This compares with a sum of £9,000 quoted by Professor Lambton for the cost of a new qanat in the Qazvin area. (p.283). How much water is actually gained from well or qanat, in Kashan and Qazvin, in neither case was stated nor, in Qazvin, how extensive was the qanat.

Running costs of wells around Kashan were estimated at £9 to £12 per day, while a comparable qanat needed only £120 - £180 for cleaning every three years. Qanats however are no longer being built in Kashan despite their cheapness. Existing laws on the harim of qanats, that is the area surrounding them within which certain operations, such as the sinking of wells, are forbidden, were drawn up in the context of a traditional technology, and they are now inadequate to protect the qanat owners' rights. The large number of semi-deep wells dug in the decade before 1967 have themselves had an accelerative effect on the decline in the water table. Realization of the long term dangers of the situation has been

slow in coming. At an interview with the author a manager of one of Kashan's largest textile factories was asked what his company will do when the water table gets even lower. He replied: "We will simply dig more and deeper wells". A similar situation is common in Iranian desert towns. Government reaction has been to declare Kashan a restricted area: a license must now be got to sink a well.

(ii) Land Reform :

The Iranian Land Reform has had a profound influence on the social and political structure of the country. Three points stand out : first, the principal aim of reform was, quite simply, to break the social and political power of the landowning classes; economic benefits such as an increase in agricultural production, without which no reform can succeed in the long term, were relegated to second place; second, the peasants' cooperation was assiduously sought for; and third, following partly from the first and second, the reform was essentially a pragmatic one, adapted to the Persian situation, in which no one theoretical solution was applied in a country so diverse in its social and physical makeup. The provisions of the law of January 1962 for transferring land direct to the peasants and the additional articles of January 1963 , which placed emphasis on tenancy, were carried out as speedily as the limited resources of the Land Reform Office would allow. Transfers were direct; plots were not consolidated or redistributed in the manner a text book reform might dictate (Lambton, 1969).

Information on the scope and results of Reform in

Kashan was, in the spring and summer of 1968, hard to come by. It is known that many of the big landowners round the city who owned unconsolidated land in several villages, were affected only in part by the transfer of land to the peasants. Settling tenancy agreements under the Additional Articles appeared to form the greater part of the Reform Officers' workload. Uncertainty as to the effects of Land Reform however, together with irrigation difficulties previously mentioned, and a reluctance to invest in land when capital could more profitably and securely be used in local industry and commerce was summed up in the rueful remark of one landowner : "There has been no market in land for the past five years".

(iii) Changes in Credit : The Co-operative Movement

Change from the traditional credit system in rural Kashan was initiated by the activities of the Agricultural Credit and Rural Development Bank. Formerly, credit provision by landlord or merchant to the peasant was, as in most of Iran, only for his short term needs, to plant a crop or to tide his family over a difficult period. Foreselling was common ; farmers were often forced by immediate needs to sell their crops in advance, receiving but a fraction of their real value. Profits went to middlemen and farmers were chronically in debt so that innovation and long term planning were impossible.

Iran's Agricultural Credit and Rural Co-operative Bank is the means by which government finance is deployed in agriculture. Funds come from Plan Organization and the Central Bank.

Through the Credit Bank in Kashan two-year short-term loans were made to farmers for buying seeds and implements. Long-term loans for 10 years were given for well digging and other mechanized operations. During 1966 the short-term loan functions of the Bank, which made up 50 percent of the total, were transferred to co-operatives, but in areas without land reform or co-operatives farmers still used the Bank. Altogether, by 1967 some 40 million riyals, £220,000 in credit was available to Kashan's farmers. The role of the landlord as provider of capital had been supplanted.

By 1967 some 37 co-operatives were working in the shahrestan. They had a registered capital of 7¼ million riyals and a membership of nearly 7,000 persons. An unpublished report on Kashan by the Central Bank stressed that the aim of Government aid in the rural areas was through co-operation: to increase production and keep farmers on the land. In Kashan they have three functions. (i) To give short term loans. (ii) To supply basic necessities such as oil, tea, rice, sugar and cloth at a lower price than the middlemen. Goods are bought direct from the wholesalers and sent to the villages. (iii) To buy crop surpluses from the farmers. Prices are determined by the usual daily supply and demand factors in the market or, sometimes, and for some commodities, they are fixed by the Government.

It is in the field of maintaining price stability for goods that that co-operatives have so far been most successful. The needed increase in agricultural production will be a more difficult problem to solve. By 1968, however, the Central

Bank concluded the co-operatives' activities had resulted in a significant rise in the rural standard of living, a conclusion verified by officials of other banks in Kashan.

9. Conclusion

Changes in the regional patterns of economic activity, in worker status and in industrial structure indicate that Kashan City is a rapidly growing industrial centre, while at the same time the economic structure of Aran/Bidgol and the villages has remained relatively unchanged apart from their new function of supplying labour to the city. Nonetheless, viewed in terms of the relationship between society and economy rural Kashan is far from changeless. The present social hierarchy is an inherited one, and it is reflected in occupational patterns throughout the shahrestan; it comprises a small urban-based elite of bureaucrats, landlords, carpet nabobs, and industrialists, along with a small educated urban middle class, both of which are perched atop the poor and illiterate masses of the population living in city and village. Territorial economic patterns in the past reflected this stratification, with close links existing between ownership of land, water rights, carpet contracts and credit.

Recent improvements in communications have begun to extend government influence and western cultural conformity throughout the countryside. At the same time expectations have been raised ; today the peasant wants more than enough to eat; he wants a radio, oil stoves, better pots and pans, education for his children and access to the city. Political awareness has increased and Dr. Arsanjani made plain this point at the

Peasants' Congress of January 1963: "After the holding of this congress the town community will no longer be able to consider itself the embodiment of the Persian people and will have to recognize this great force constituted by the peasants" (A.K.S. Lambton, 1969). In addition technical changes associated with the digging of deep wells have altered the pattern of water rights in the lowlands; Land Reform and the Co-operative movement have begun to supplant the power of landlords and have greatly reduced the invidious power of creditors, though in the long term success in the sphere of agricultural reform will depend on a demonstrable increase in per capita income, and the real effects of these changes cannot be properly assessed for some years to come.

True, rural communities are now a force in the land, but one cannot exercise economic management or political control from a village, and Kashan City has lost none of its pre-eminence; on the contrary, faster economic and population growth rates in the city indicate that a progressive industrialization and urbanization of the entire province is taking place.

CHAPTER FIVE

LAND USE AND SETTLEMENT MORPHOLOGY IN RURAL KASHAN

1. Data Sources

Data concerning land use and settlement morphology in the Kashan region are derived from three primary sources; fieldwork carried out in the summer of 1968 and the spring of 1969; aerial photographs taken by the Iranian Cartographic Centre on a scale of 1:20,000 and dated 1966; and the Village Gazetteer of 1966.

The fieldwork carried out by the author in 1968 involved the use of a bicycle to travel around the villages in the neighbourhood of Kashan City, on the alluvial fans and in the Kavir; also, during several weeks in the spring of 1969 the author, accompanied much of the time by Mr. M.A. Power was able to travel all over the shahrestan using a Land Rover kindly lent by the British Institute of Persian Studies. In both periods detailed information was collected, mostly by observation, but partly by informal interview, on settlement morphology, water supply systems, and at a very general level on the broad patterns of land use in the various physiographic zones. This work was later supplemented in part by study of the aerial photographs mentioned above.

The Village Gazetteer provides two categories of information; each conditions the means of analysis which can be applied. Examples of each are given in Appendix (I,II). The information in the first category is a plain indication as to whether or not one or more of a number of specific crops

is grown in a village, and also what is the village's principal means of water supply. The information is statistically qualitative; it can be used to examine broad irrigation and crop types over the whole province, but is of little use in detail. The second category provides data on numbers and types of livestock and the hectareage under irrigated wheat, irrigated barley, fallow, orchard, and some other types of land use for each village. This information is examined along with settlement morphology later in the Chapter. The figures given were estimated by the village headmen, and a considerable degree of inaccuracy, not to say deliberate distortion, must be present; no complete cadastral survey has yet been carried out in Iran. It was possible to check this data in a general manner by assessing its congruence with data presented in other parts of the Gazetteer under the first category, and collected by the census enumerators and a considerable measure of agreement was found between them.

2. Water Supply and Crop Distributions

(1) Water Supply. Within Kashan the Village Gazetteer provides data on 413 settlements for which the principal form of water supply is recorded, whether this be qanat, semi-deep well or some other source, and this has been summarized in Table 5:1. The main points which emerge are (i) the use of qanats is universal (ii) semi-deep wells are likewise widely used, (iii) finally, apart from the spring at Fin, spring and river supplies are found only in the mountains, and here in Josheqan-i-Qali over 70 percent of settlements use this means. As qanats and semi-deep wells are in such widespread

TABLE 5:1

Water Supply in the Dehestans:

Dehestan			Qanat	Semi-deep Well	Spring	Other
1.	a)	inhabited	13	3		
	b)	uninhabited	11	-		
2.	a)		29	7		3
	b)		7	6		
3.	a)		9	2	1	
	b)					
4.	a)		7		17	3
	b)		13		2	14
5.	a)		12			1
	b)		9			
6.	a)		14	12	1	
	b)		4			
7.	a)		12	7	9	0
	b)		4	1	3	3
8.	a)		25		2	
	b)		19		5	7
9.	a)		59	10	12	3
	b)		21	2	8	5

Source: Village Gazetteer : 1966

use, and are not merely confined to the lowlands it is necessary to re-evaluate statements made in Chapter 1 touching the relationships between settlement and water supply. Accordingly, variation in the number of settlements using qanats was tested using Chi-Square against the null hypothesis that frequency of village qanats is merely proportional to the total number of settlements in each dehestan. The calculations are set out in Table 5:2.

TABLE 5:2

Chi-Squared Analysis of Qanat Distribution in 9 Dehestans.

Total number of settlements = 413

Dehestan no.	1	2	3	4	5	6	7	8	9
Total Villages	27	58	12	56	22	31	39	48	120
Observed with qanats:	24	36	9	21	21	18	16	34	80
Expected	16.9	36.2	7.5	35.0	13.7	19.4	24.4	30	75
$\frac{(O-E)^2}{E}$	(+) 3.018	(-) 0.001	(+) 0.3	(-) 6.4	(+) 3.8	(-) 0.96	(-) 2.9	(+) 0.5	(+) 0.3

$\frac{(O-E)^2}{E} = 17.4$

The percentage probability that use of qanats is distributed in proportion to the frequency of the total settlement distribution between dehestans is very small - 2 percent. Dehestans with less than the expected number of qanat-using settlements were Josheqan-i-Qali, to be explained by the number of rivers and springs there, Nushabad, Ravand and Fin. These latter are lowland dehestans. Abuzaidabad and Khorramdasht, to the south, had greater than expected values. Thus, in the case of the northern lowland dehestans

the analysis gives results at odds with statements made in Chapter 1. If the number of settlements supplied by deep and semi-deep wells is added in each dehestan to those supplied by qanat, and their frequency distribution tested against the same null hypothesis, the probability of the hypothesis being valid is even less than before. The calculations for this are given in table 5:3.

TABLE 5:3

Analysis of Semi-deep Wells and Qanats

Dehestan	1	2	4	5	3	6	7	8	9
Observed : O	27	55	20	21	11	30	26	34	92
	+	+	-	+	+	+	-	-	-
Expected : E	17.2	42.6	41.1	16.1	8.8	22.3	28.6	35.2	88.0
$\frac{(O-E)^2}{E}$	5.6	3.5	0.55	10.8	1.5	6.78	0.24	0.06	0.18

The distribution of positive and negative deviations between expected and observed values in this case is completely different, it confirms that the emphasis in the lowlands is on qanat irrigation, and its modern substitute, the mechanized well. It is technically easier to sink a well in the lowlands; it is also cheaper and more capital is available. That opportunities for greater use of water resources, which have been provided by new methods of extraction, have been greater in the lowlands than the uplands has been an important contributory factor in the observed higher lowland growth rate in the intercensal period.

(ii) Principal Crops

Crop distributions may be summarized under three

headings - staple crops, cash crops, and tree crops.

TABLE 5:4

Settlements with Tree Crops and Others in Dehestans

Dehestan	1	2	3	4	5	6	7	8	9
Grapes	8	4	0	12		7	1	4	2
Figs	5	4	6		5	13	3	1	7
Pomegranates	10	12	8		11	20	13	13	19
Almonds				12			2	10	38
Apricots			3			4	4	10	
'Dried' Apricots			3			1	2	12	43
Apples						2	2		3
Walnuts				3			1	23	5
Plums						3	3	10	28
Quinces							1	17	2
Peaches								5	
NON TREE CROPS									
Wheat	26	49	8	34	14	22	25	35	86
Barley	25	47	8	30	16	21	25	31	81
Cotton	7	41	3		1	15	12	1	2
Tobacco	7					10	2		

Source: Village Gazetteer, 1966.

a) Staple Crops: wheat and barley are the shahrestan's staple crops; they are grown throughout the province, in nearly all the inhabited and most of the uninhabited settlements. So widespread was their frequency that when it was tested against the null hypothesis that it was proportional merely to the number of settlements in each dehestan, the null hypothesis proved to be correct. In fact the probability level was 95 percent. We can therefore say with confidence that wherever there is settlement in Kashan these crops are grown.

b) Cash Crops : non-orchard cash crops are grown for the most part in the lowlands. Cotton is grown around Kashan City where it is ginned locally and then used in the home textile industry. Tobacco - a government monopoly - is grown around Ravand and around Abuzaidabad, where there is a large, well-built government warehouse. Through a local office in Kashan a bounty is paid by the Government for improvements to land in connection with the crop. The entire crop is sent to Isfahan and prices paid during the buying season, which runs from late November to late February, have an important effect on business in the Kashan bazaar.

Melon, watermelon and cucumber are grown throughout Kashan, but with a significant concentration in the lowlands. Squashes which are not eaten locally are sold in the city, though in the uplands the difficulty of transporting so delicate a commodity over poor roads precludes growing them for sale outside the village. Occasionally, in wet years farmers are able to speculate in the spring by growing

melons without irrigation on the soft, sandy land at the junction of the alluvial fans and the kavir and since they pay for seeds but not water, large sums can be made.

c) Tree Crops: the mountain districts of Qamsar and Niyasar have the largest number of settlements growing tree crops, and the greatest variety of crop. Grapes, figs, and pomegranates are grown in all dehestans, but Nushabad and Abuzaidabad in the kavir and Khorramdasht on the alluvial fans grow no others. On the alluvial fans, nearer the city market, the variety is greater. The lack of tree crops in Josheqan -i- Qali, which certainly has the necessary climate for them, may be a result of the dehestan's isolation from the urban market.

3. Village Morphology and Land Use

In Chapter 1 a tripartite division of Kashan was implied by the zonation into Kavir, Alluvial Fans and Mountains; in each case relative uniformity of the physical background has encouraged similar types of settlement morphology and patterns of land use.

(i) The Kavir : Villages in the Kavir are all oasis-type clustered settlements, compact and walled. They are located along a line running north to south which follows the junction of the alluvial fans and the sandy kavir. This significant line of contact was followed by the Kashan - to - Yazd caravan route in the south, while to the north it was followed by the road to Qom. Typically, the Kavir village is composed of a cluster of conjoined household compounds, the whole of which is surrounded by a wall; in the centre of the

village is an open square where cattle could be driven in more unsettled times. The houses are built on several levels, usually of sun-dried brick and with domed roofs; there are few household gardens and it is almost impossible to tell from observation in the field the class of resident in any one locality in the village. From the air, the conjunction of numerous household compounds, each with its courtyard in the middle, gives the settlement a cellular structure similar to that of the residential districts of many Islamic towns. Cemetaries are located close to, but outside, the village walls. In this zone of relatively mild, snowless, winters animal shelters are simple, unroofed structures built of mud and brick.

The agricultural lands associated with villages are often located quite separate from them at points where local physiography and the presence of previously-built qanats permit. Cultivated lands, like the settlements to which they belong, are discrete from one another, with areas of treeless waste in between. Across these wastes the farmers, often old men, can be seen with spade on shoulder riding out to their fields by donkey every morning, and back to their villages at night. Field patterns in each village are similar : nearest the point where the qanat emerges are walled orchards and double-cropped vegetable lands; below these are lands growing wheat or barley on a rotation of up to seven years. The whole of the inhabited Kavir suffers from encroachment by sand dunes; to combat this most villages have built retaining walls against the sand and where possible

TABLE 5:5

Land Utilization (Data in the second form)

I LIVESTOCK	DEHESTAN								
	1	2	3	4	5	6	7	8	9
Cows & Calves	265	864	377	1176	190	1486	3219	1821	1533
Sheep & Goats	4567	5939	1923	13534	1110	5930	8785	9379	22440
Horses &	851	1848	228	1446	186	898	1158	680	1096

II CROPS (Ha.)	DEHESTAN								
	1	2	3	4	5	6	7	8	9
Irrigated wheat	163	1003	325	268	31	459	265	146	1006
Irrigated barley	101	459	42	139	34	162	507	61	334
'Fallow'	14	1016	327	961	0	523	402	85	342
'Other'	38	643	84	81	7	193	146	39	56
Orchards & Nursuries	17	47	191	263	9	216	254	742	811

Source: Village Gazetteer, 1966. (Headmen's estimates)

S/A Figures 5:2-5:5 .

TABLE 5:6

Ratios Between Crops and Livestock and Population

	1	2	3	4	5	6	7	8	9
Population	4720	10341	2934	8177	1113	7905	9887	7118	21051
Ratio x To:									
Cows and Calves	6	8	13	14	17	19	33	26	7
Sheep and Goats	97	58	66	165	98	75	89	132	107
Horses and Donkeys									
Irrig. wheat	4	10	12	5	6	8	8	3	7
Irrig. barley	2	5	1	2	3	2	5	1	2
'Fallow'	0.3	9.8	11.1	11.8	0	6.6	1.	1.2	1.6
'Other'	1	6	3	1	0	2	2	1	0
Orchards & Nursuries	4	5	7	3	1	3	3	10	4

Source: Village Gazetteer. 1966

some have tried to fix the dunes with grasses; under these circumstances the camel is still in widespread use.

The agricultural economy of the two Kavir dehestans varies. In Abuzaidabad, where nearly all the settlement is confined to a belt of sand dunes between the alluvial fans of the Kuhi Kargas, there are only small numbers of cattle and little irrigated barley and wheat, for here the concentration of natural salts in the soil is particularly high. The ratio between fallow land and population is particularly low, and semi-deep wells in the dehestan have been used only for land growing cotton or tobacco.

Kushabad dehestan is less affected by sand dunes than Abuzaidabad, and has more flat land. Here again the number of cattle is small; but the area under grain crops is extensive, and the ratio between fallow land and rural population is high, though partly because the drop in water table has left hundreds of hectares still classified as fallow uncultivable by qanat; such areas are now wasteland. Semi-deep wells are in widespread use; and from a comparison of the National Cartographic Centre map of 1956 at a scale of 1:50,000 with the National Cartographic Centre aerial photos taken of the same area at a scale of 1:200.00 and fieldwork undertaken in 1968 and 1969 it is possible to observe the growth of lands irrigated by these means; some good examples may be observed between the villages of Taherabad and Mohammedabad, where the fields, laid out in a regular grid pattern, are used exclusively for growing cash crops to gain a maximum return on capital.

Other recent changes in the landscape of the Kavir can be seen: a new motorable road to Qom has been built nearer the mountains; this, along with the relatively recent suppression of banditry has led to the abandonment of the caravanserais and forts along the old caravan route; [illegible] the villages are no longer closed in upon themselves, each presenting an almost unbroken blank wall to the outside world, for those same walls are now pierced in numerous places, and allow the free flow of traffic and ideas. But the most noticeable features of the Kavir are the dozens of ruinous forts and serais which litter the sand; the Kavir is for the most part an empty, dessicated, landscape, rendered even more desolate by these reminders of a once prosperous past.

(ii) The Alluvial Fans : By contrast with the Kavir, village and fields on the alluvial fans are more closely integrated, for both in the village itself and in the fields land use is organized according to a clear system of priorities in the use of water. Typically, qanat or spring-supplied water courses run down the fans parallel to the axis of the slope; in some cases dry valleys incised into the slope are the main village thoroughfares. Like the alluvial fan settlements of the Kirman Basin (P. English, 1966, p.49), but unlike the Kashan Kavir settlements, household compounds follow the line of the watercourse; and there is a distinct social gradient down the fan. At the point where the qanat surfaces and where the quantity and quality of water are greatest live the wealthiest inhabitants of the village. They dwell in

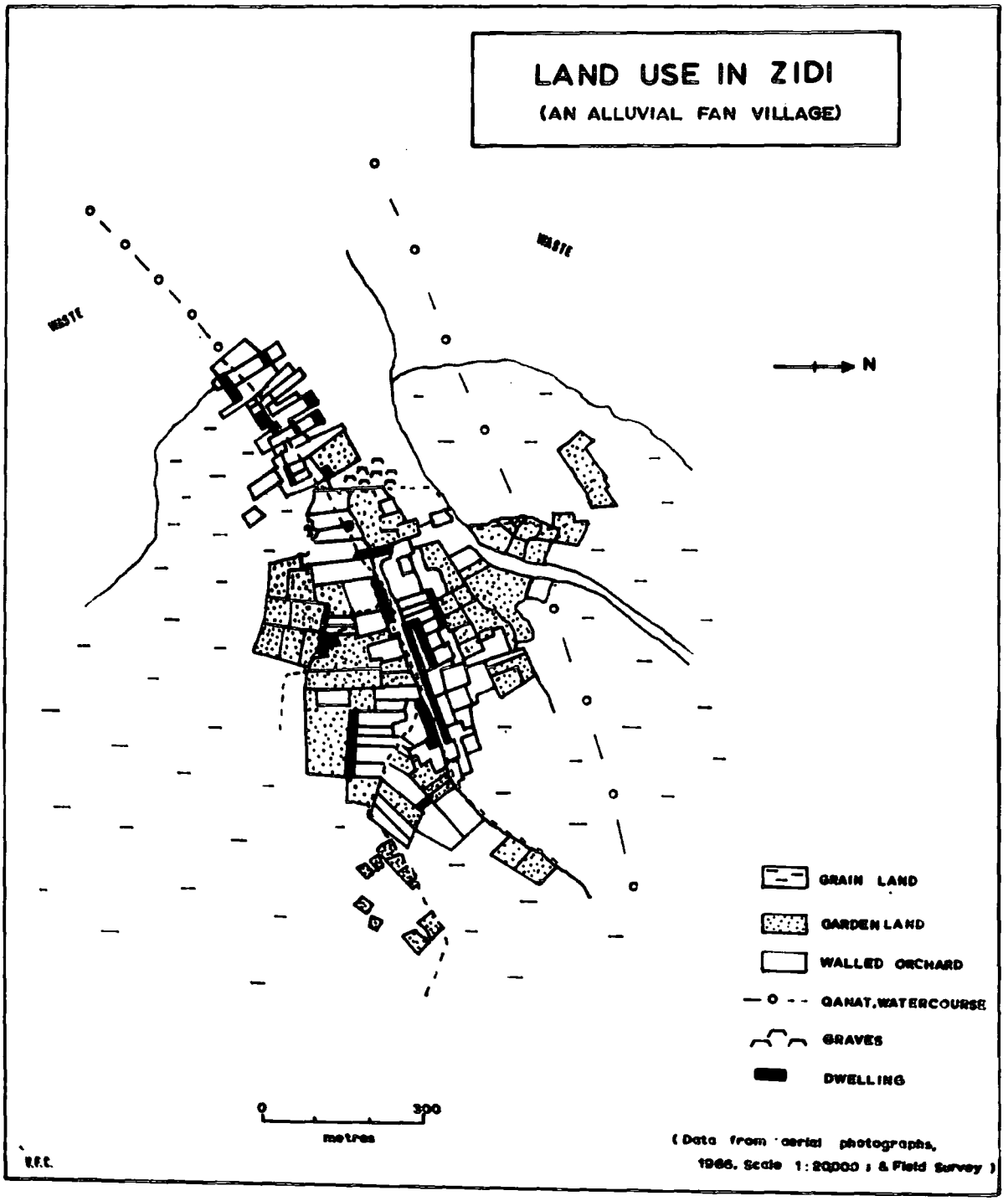

LAND USE IN ZIDI
(AN ALLUVIAL FAN VILLAGE)
WASTE
WASTE
N
GRAIN LAND
GARDEN LAND
WALLED ORCHARD
QANAT, WATERCOURSE
GRAVES
DWELLING
0
300
metres
R.F.E.
(Data from aerial photographs, 1966, Scale 1:20000 ; & Field Survey)

Figure 5.1

large walled mud-brick household compounds with walled gardens attached. The houses are built to a U-shaped plan around a square, enclosed courtyard. The main central section of the building has a veranda with steps down to the yard, or garden, and to the basement below; the other sections contain the store rooms and sometimes the kitchen. Further down the gradient, it can be observed that as the stream divides house and gardens are smaller, less pretentious, with lower, less massive walls. Finally, come delapidated household compounds lacking gardens and dependant upon polluted water; here, often in squalid conditions live the poorest folk.

The size of such settlements is dependant on the amount of water flowing through them; this, too, determines the degree of social differentiation. At one end of the scale are smaller settlements such as Zidi and Qazzaq which do not exhibit the full extent of the social gradient, and judging from their morphology, they are not inhabited by the wealthier classes, though urbanites from Kashan do own property in them. At the other extreme is Fin, on the largest of the alluvial fans, situated above Kashan City at a point where a powerful spring gives an unfailing water supply. Here, in the seventeenth century A.D. Shah Suleiman built a garden palace around the spring. The place was later frequented by the Safavid Shahs and in the nineteenth century A.D. Fath Ali Shah improved it by planting cyprusses and lining the garden's canals with marble. At present it is a tourist attraction.

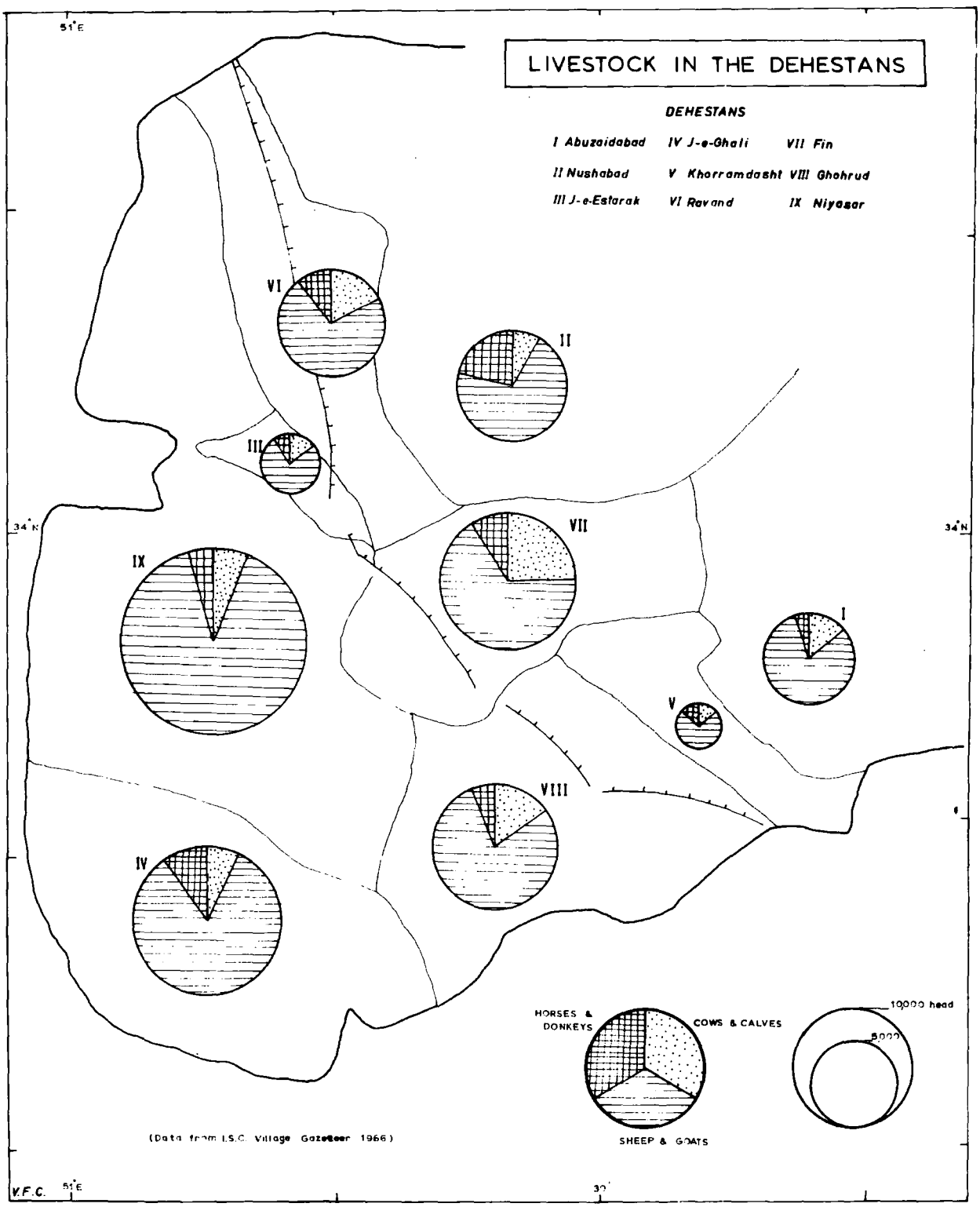

LIVESTOCK IN THE DEHESTANS
DEHESTANS
I Abuzaidabad
II Nushabad
III J-e-Estarak
IV J-e-Ghali
V Khorramdasht
VI Ravand
VII Fin
VIII Ghohrud
IX Niyasar
51°E
34°N
HORSES & DONKEYS
COWS & CALVES
SHEEP & GOATS
10000 head
5000
(Data from I.S.C. Village Gazetteer 1966)
V.F.C.

Figure 5.2

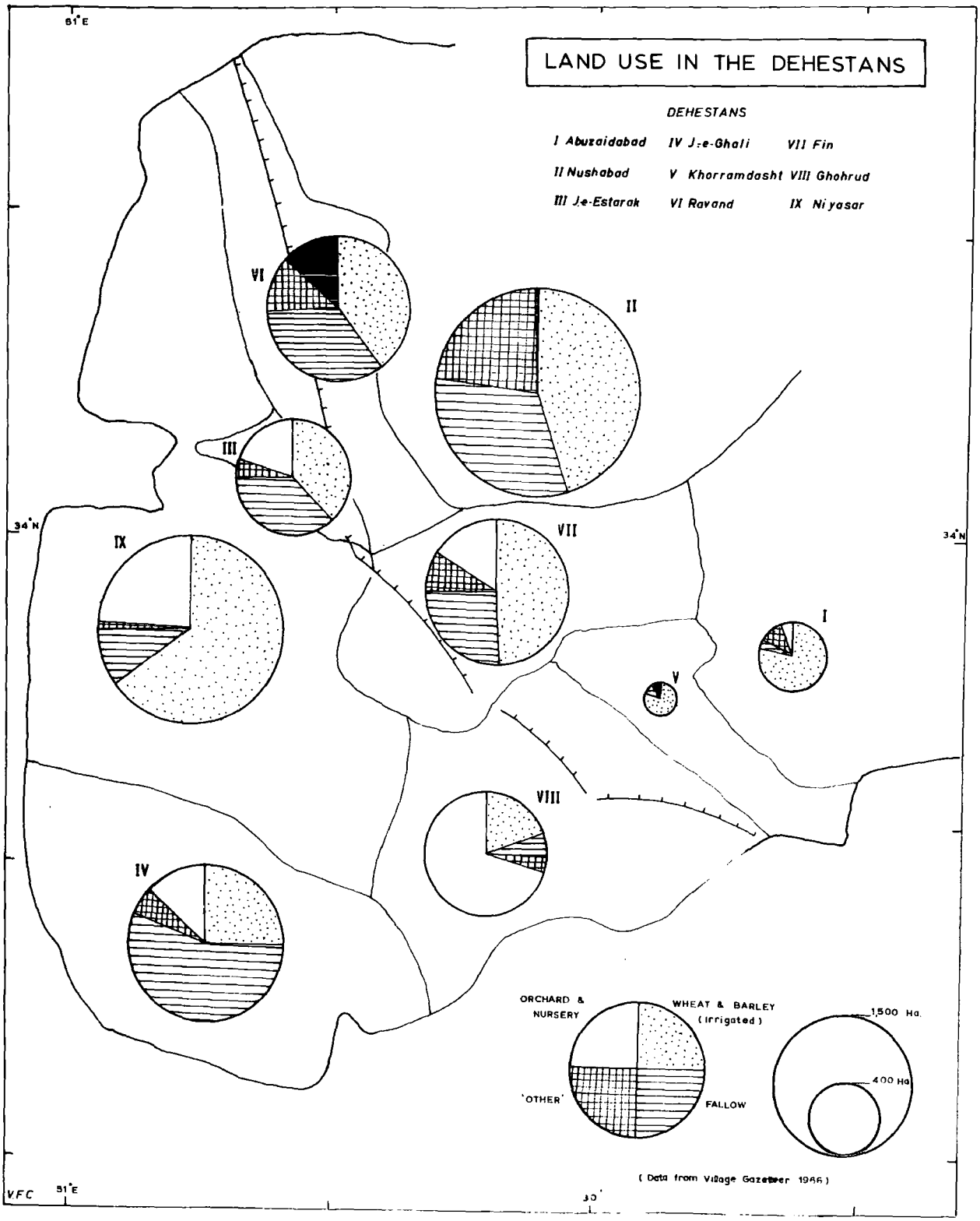

LAND USE IN THE DEHESTANS
DEHESTANS
I Abuzaidabad
II Nushabad
III Je-Estarak
IV Je-Ghali
V Khorramdasht
VI Ravand
VII Fin
VIII Ghohrud
IX Niyasar
51°E
34°N
ORCHARD & NURSERY
WHEAT & BARLEY (Irrigated)
'OTHER'
FALLOW
1,500 Ha.
400 Ha.
(Data from Village Gazetteer 1966)
VFC

Figure 5.3

While Fin does have a royal palace at the upper end of the village, the squalor to be found at the lower end of the settlement equals that of anywhere else.

Village fields on the alluvial fans are organized in a similar manner to those of the Kavir, but surrounding rather than isolated from the village. At the top of the village, around the richer houses are walled orchards, downslope where the stream branches are double cropped lands, and below the village are small, fragmented grain fields subject to only occasional irrigation and to a rotation of two, three or more years; these fields are much fragmented. The system of priorities in water use thus results in the village having a triangular shape, with fields spread out over the fan and with the buildings forming a line from the apex to the base. The village cemetary is located near the village but outside the irrigated area. Zidi, which is illustrated in Figure 5.1 , provides a good example of such a village.

The Kashan City market is of greater importance in the agricultural economy of the alluvial fans than elsewhere in the shahrestan. Approximately 5,000 cows, stall-fed all the year, are kept in these dehestans, and about 16,000 sheep and goats. Fin and Ravand have large areas under grain and a high ratio of fallow land to population though the area under orchards and nurseries is small. But while Fin and Ravand have 0.04 and 0.07 hectares of fallow land, respectively, per head of the rural population Khorramdasht has no recorded fallow land whatsoever, only tiny amounts of cultivated land

and no deep or semi-deep wells in operation. (Table 5:5; Table 5:6)

(iii) The Mountains

Kashan's uplands have a greater diversity of settlement morphology than either of the other two major physiographic units. In the uplands there is a need for both water supply and flat land for cultivation and land use must be organized according to the limited availability of both. The patterns of land use which result in village and field are not therefore necessarily related solely to priorities of water use, and few elements of a hierarchy of land use can be seen, though one exception is the Azvar basin, which has ample flat land, is irrigated by irrigation qanat and crop rotations and patterns of land use are similar to the Kavir.

Villages in the wider, lower, mountain valleys, such as Estarak, are located on the valley floor. They are as compact as the width of the floodplain and the size of the settlement allow. The villages are walled, composed of household compounds built of wood and mud brick, some houses having roofs of domed brick others flat roofs of timber and stamped earth. Domestic water comes from qanats and springs, but the qanats are generally shorter and less reliable than those of the lowlands. There is no social gradient traceable to the physical gradient of the villages. In Josheqan-e Estarak, for example, the headman lives in a converted fort in the lowest section of the village, while some of the poorest folk live in the highest part of the settlement.

Village fields are found on the flood terraces above and below the villages, but outside the floodplain cultivation is rare, and the land is given over to herding. Cemetaries are located up off the plain, where they do not occupy potentially irrigable flat land.

Higher up in the mountains valleys are narrower, gradients steeper, and the pressure on land greater. The larger villages are often located like Barzuk, at the confluence of two streams. Isolation has bred security and the villages are unwalled. They are built usually on the valley sides to save flat land and avoid the violent floods of spring. Dwellings, sometimes stepped one above the other, are built of field stone cemented with mud, with flat wood and mud roofs and without courtyards. The highest and most isolated settlements have only a few resident families, living underground during winter in caves dug into the hillside. Animal shelters are also underground. In the spring they are cleaned out and the sheep and goat droppings used for fertilizer, while the cow dung is used for fuel. Cemetaries in these highland villages are in some cases composed of a series of tombs cut into the hillside. The exigencies of space and slope in the uplands demand that fields be located wherever land can be terraced. Water is supplied from above the villages by tanks, from which it is allowed to flow in a series of channels running along the hillsides at a lesser gradient than the valley floor. Under these circumstances there is no simple pattern of agricultural land use, except that orchards are usually closer to the village than vegetable

land or grain land.

It can be seen from tables 5:5 and 5:6 that apart from Josheqan-e-Qali - always the exception - wheat and barley are of less importance in the mountains than the lowlands. Rotations for wheat and barley in the uplands have a shorter cycle of every two years compared with three or more years on the alluvial fans. There is much double cropping of vegetable land, with also a heavy emphasis on tree crops. The terraces necessary for such intensive agriculture in an area with steep slopes are only built and maintained with a massive input of human labour, and in Niyasar and Qamsar dehestans ratios between fallow land and rural population are among the lowest in the province, though the area under orchards and nurseries and the variety of fruits grown are the greatest. Overall, the mountain dehestans have the largest number of sheep and goats and the highest ratios between them and the population; but though herding is a major economic function in the uplands the shahrestan cannot supply its own needs for the carpet industry.

4. Conclusion:

The morphology of village settlements and the varied organization of village field patterns, water systems, and landuse are sensitive indicators of the nature of the man-land balance in the three major physiographic zones in the province: in the Kavir and the Alluvial Fans, which together constitute the garmsir, or warm lands, and in the Mountains, which have been traditionally termed the sardsir, or cold lands.

Agricultural systems in the lowlands have in the past been based on qanat irrigation and the use of much fallow on a long rotation; nowadays, modern semi-deep wells and proximity to the Kashan City market have encouraged cash cropping and, most probably, have been important contributory factors in permitting local population growth.

It is quite otherwise in the mountains. Every detail of settlement morphology, of field patterns and landuse shows evidence of a progressively more restrictive physical environment, with steep slopes, thin soils, and a harsh climate. The paradox of the upland valleys - and this has been shown by Professor H. Bowen-Jones to occur throughout the Middle East - is that to the eye, in summer at any rate, they are the richest and most luxuriant of Kashan's landscapes; all the delights of a Persian garden are there, with the shade of fruit trees, vines, and gushing rivulets; yet intensive double cropping and the short rotations on grain land, the large flocks stripping the hillsides bare, are all signs of a too dense rural population and a poverty more wretched than that of the lowlands.

Comparison of generalised population change in the shahrestan (Figure 5.4) with the ratio between fallow land and rural population (Figure 5.5) goes far to explain the chronic emigration from the uplands described in Chapter 2. This connection between population pressures and the colonization or more intensive use of land reserves is a familiar theme in the study of agrarian peasant societies. For large areas in the uplands of Kashan the opportunities

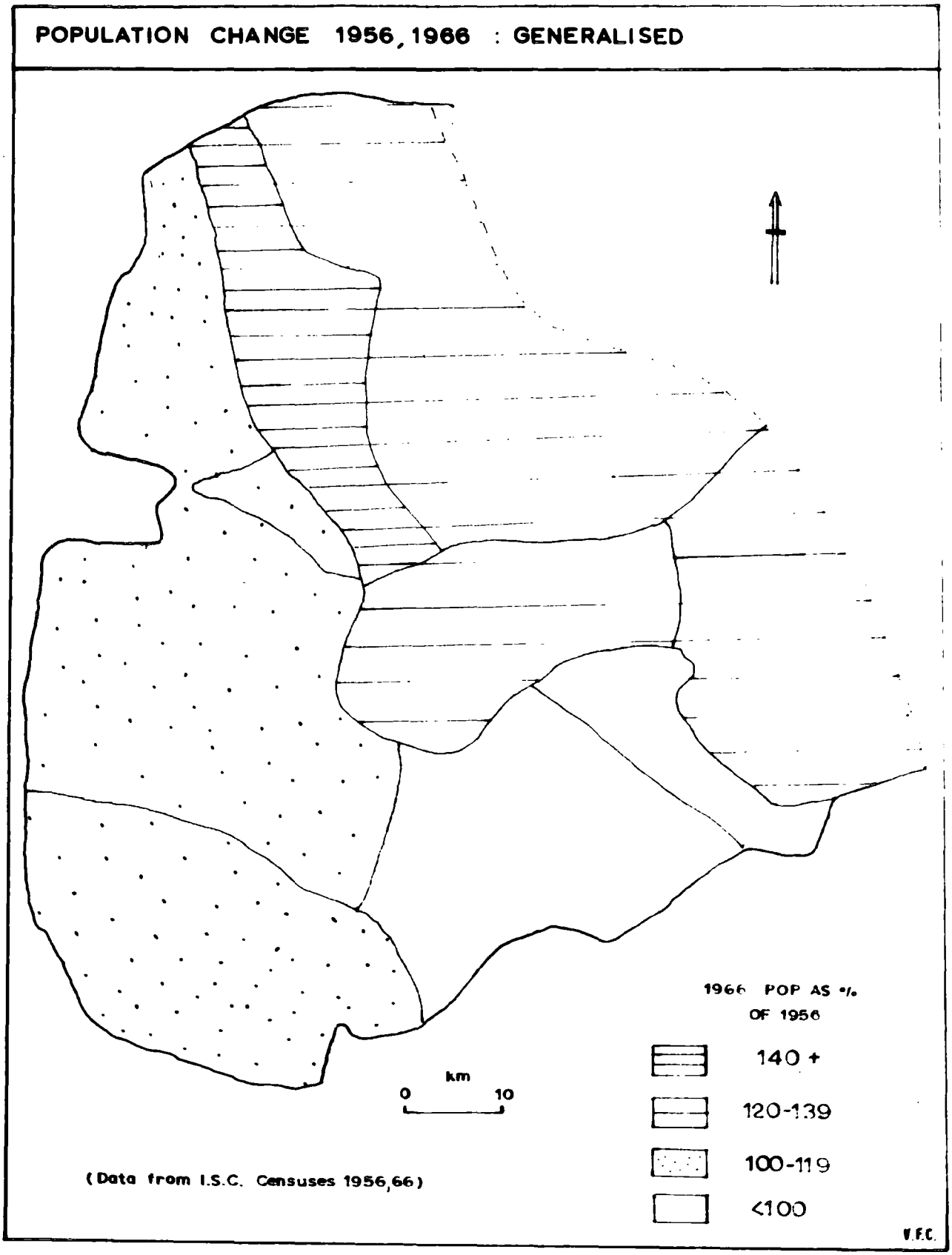

POPULATION CHANGE 1956, 1966 : GENERALISED
1966 POP AS % OF 1956
140 +
120-139
100-119
<100
km
0
10
(Data from I.S.C. Censuses 1956,66)
V.F.C.

Figure 5.4

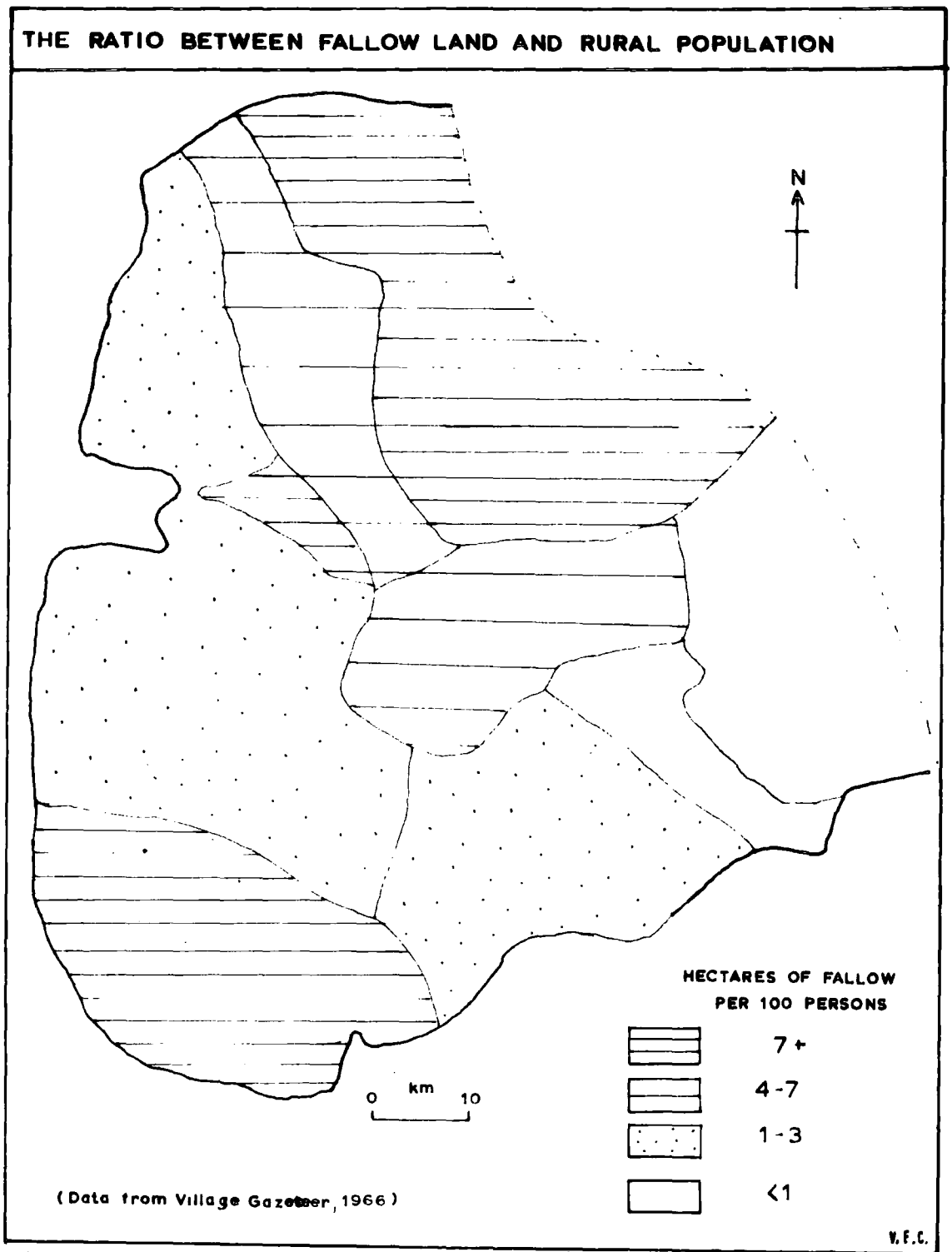

THE RATIO BETWEEN FALLOW LAND AND RURAL POPULATION
N
HECTARES OF FALLOW
PER 100 PERSONS
7 +
4 - 7
1 - 3
<1
0 km 10
(Data from Village Gazetteer, 1966)
V.F.C.

Figure 5.5

for new techniques of water extraction and cash crop production, or for more intensive use of fallow land, have been limited. In the years immediately preceding the 1956 Census a slight decline in mortality may well have increased population pressures on the land and perhaps promoted even further ecological instability and soil exhaustion through overgrazing and overcropping; in consequence numbers of peasants, especially young males have been forced to leave for Kashan or Tehran. The detailed study of this process would be a most useful project for future research, in particular the relative importance of household industry and the role it plays in village economy.

It appears, then, that local 'push' factors have been the main determinants of permanent or semi-permanent migration in Kashan, rather than the positive attractions offered by the city's industries. The importance of these factors to most Iranian cities will be examined in the following chapter.

Notes

Plate 5:1. Camel Train outside Abuzaidabad.

The plate illustrates the almost total barrenness of the unwatered Kavir. These garden walls on the outskirts of the village serve both to keep out thieves and to protect the gardens from sand dunes, some of which can be seen in the distance. Jeep tracks can be seen in the sand. Transport is also by camel and donkey. This camel train, led by an old man, is laden with bales of straw.

Plate 5:2. View of Josheqan Estarak

The village is situated in one of the broad, lower valleys of the uplands. The houses are of mud brick and the whole settlement is walled. Note that higher up the valley beyond the village orchard trees are grown, while below the village are terraced fields growing vegetables. In the left foreground are a number of fallow plots.

Plate 5:3 View in Qazaan

This is a typical mountain village, built on steep rocky slopes. The houses are constructed of mud brick, wood, and stone and are crowded one on top of the other. Note the pedlar's wares spread for sale; coloured cloth and aluminium pots and pans from Kashan.

CHAPTER SIX

KASHAN AND ARAN/BIDGOL IN IRAN'S URBAN SYSTEM

1. Introduction

Before continuuing with the study of the urban areas of Kashan and Aran/Bidgol it is necessary to examine more closely how they compare with other cities in Iran. Up to this point comparisons have frequently been made with the mean population, housing and employment statistics for urban Iran, and in many cases conditions in Kashan and Aran/Bidgol appear to be widely at variance with urban Iran as a whole. It is arguable from this that Kashan and Aran/Bidgol cannot be valid examples from which may be drawn general conclusions about the urban system.

On the other hand, the mean figures for urban Iran obscure the fact that Iranian Cities form an interacting, interdependant system, of which Kashan and Aran/Bidgol themselves form a part. (Figure 6.1). It was therefore postulated that these two urban areas were similar to other members of the urban system rather than statistical aberrations from it.

To examine where Kashan and Aran/Bidgol lie in relation to other cities it was necessary to determine the basic differences among Iranian cities, using a large number of variables. Accordingly, 45 variables for each of the 100 largest cities were examined in their simultaneous co-variation, using a principal component factor analysis technique. Such a technique has been used by a number of authors to solve similar problems, in which comparatively

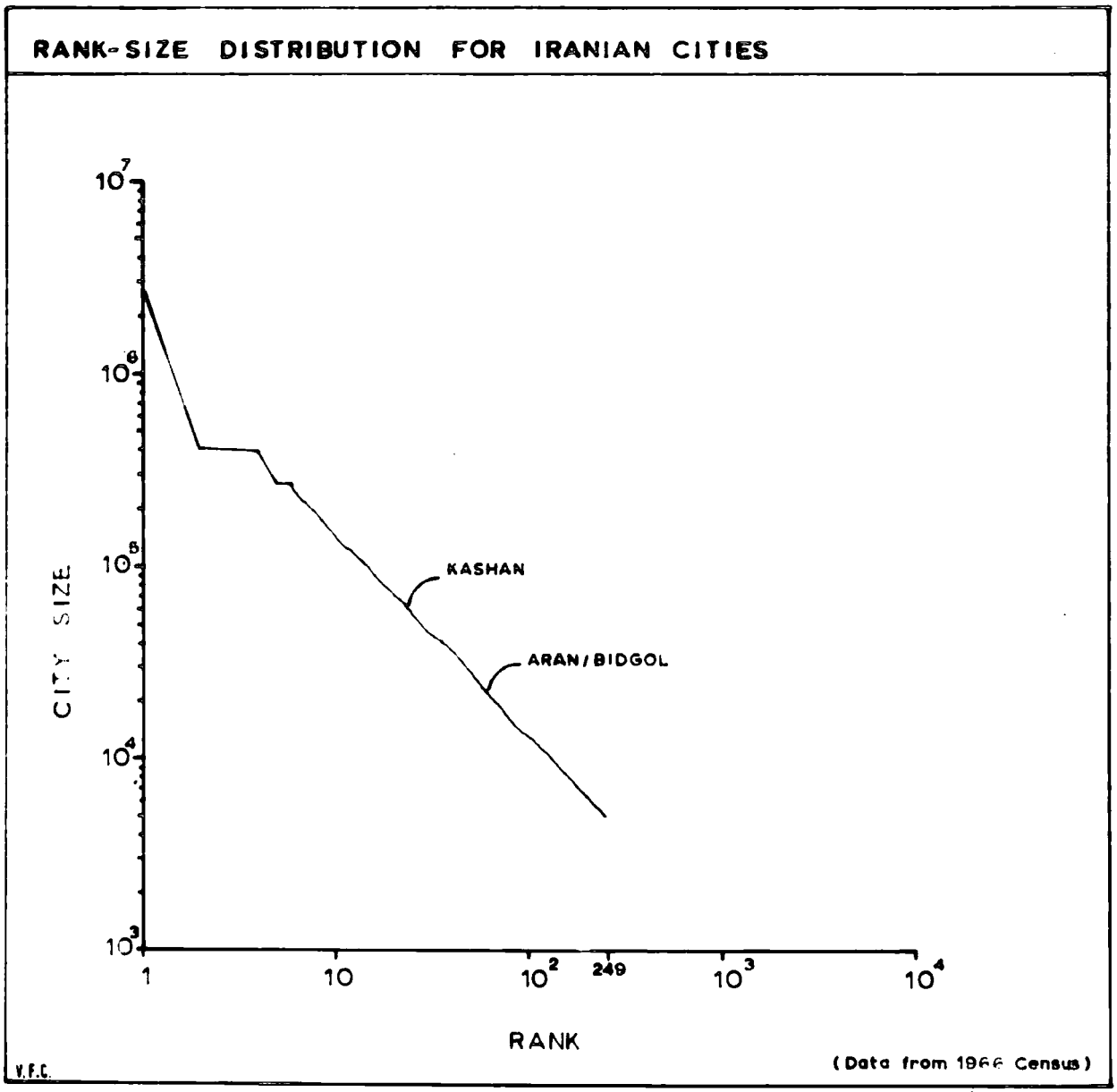

RANK-SIZE DISTRIBUTION FOR IRANIAN CITIES
10^7
10^6
10^5
10^4
10^3
CITY SIZE
KASHAN
ARAN/BIDGOL
1
10
10^2
249
10^3
10^4
RANK
V.F.C.
(Data from 1966 Census)

Figure 6.1

few meaningful relationships are separated from a mass of data. (Moser and Scott, 1961 : Ahmed, 1965 : Harman, 1961)

2. Computation

Computation of the principal component factors involved several stages, all of which were undertaken on the NUMAC IBM 360 computer.

1) Stage One : Variables were selected for the 100 largest cities. The cities ranged in size from over 2 million to just over 13 thousand inhabitants: Kashan and Aran/Bidgol lie roughly one-third and two-thirds of the way along their rank order distribution. As many worthwhile indices as possible were extracted for the cities from the 1966 Census of Population and Housing, and 55 variables computed from these using simple data handling programmes written by the author.

2) Stage Two : The variables were tested for statistical linearity and normality employing a programme written for the purpose by the present author. A large number of distributions were found to be neither linear nor normal and to satisfy these statistical assumptions the data were transformed to their logarithmic equivalents.

3) Stage Three : The transformed data were reduced to a 55 x 55 correlation matrix. Where two indices were highly correlated one was eliminated and indices with very low coefficients of correlation with all the others were also removed. (For an explanation of this procedure see E. Gittus, 1964). Some 45 variables were left; they are listed in Table 6:1.

4) Stage Four : The transformed data were subjected to a principal components factor analysis using a programme written by J. Klovan (Klovan, 1966).

Many of the set of 45 variables being related, the components analysis eliminates redundancies by developing an orthogonal basis for the statistical space in which the 100 cities are distributed. The correlation matrix is therefore subjected to a principal axis solution, yielding 10 latent vectors : the vectors are then rotated to a normal varimax position. It is these varimax factors which summarize the basic differences in the original data. The factor matrix is given in Tab. 6:I. The score of or weighting of each city on the factors is then computed and the resulting factor score matrix shows the relative amount of each city in each factor (Tab.6:2).

3. Composition of the Major Varimax Factors

Only the first four varimax factors will be considered here since together they explain 88 percent of the variance, while the last six factors account for only 10 percent.

(i) The first component, which accounts for 72% of the total variance is by far the most important. It comprises a variety of elements, but is identified predominantly with high sex ratios, high rates of effective fertility, and a high proportion of households of one room and one person. A large percentage of the workforce in production and tertiary economic activities are also found. In general, these variables are associated with urban immigration.

(ii) Accounting for 33 percent of the variance, the second

le 6.1
CTOR ANALYSIS OF 100 IRANIAN CITIES USING 45 VARIABLES

RIMAX FACTOR MATRIX

		COMM.	1	2	3	4
1	POPULATION 1956	0.9912	-0.3604	-0.0576	0.9128	-0.0017
2	PUPULATION 1966	0.9796	-0.4124	-0.0677	0.8936	0.0061
3	INCREASE 1956/66	0.9455	0.8584	0.0891	-0.2568	-0.0979
4	SEX RATIO	0.9976	0.9346	0.0983	-0.2639	-0.1098
5	EFFECTIVE FERTILITY	0.9978	0.9251	0.1082	-0.2874	-0.1098
6	MARRIED MALES 20-25	0.9909	0.9197	0.1302	-0.2841	-0.1066
7	BORN IN OSTAN	0.9749	0.7043	-0.1996	-0.1543	0.0085
8	BORN OUTSIDE OSTAN	0.9533	0.8590	-0.0810	-0.2401	-0.0060
9	PERCENT LITERATE	0.9975	0.9335	0.0748	-0.2508	-0.1069
10	'' AT SCHOOL	0.9976	0.9325	0.0697	-0.2545	-0.1085
11	'' 6YRS SEC EDUC	0.9366	0.9180	0.0149	-0.1244	-0.0808
12	PERSONS PER H'HOLD	0.9985	0.9310	0.1081	-0.2662	-0.1123
13	H'HOLDS 1 PERSON	0.9626	0.9016	0.1154	-0.2635	-0.1126
14	'' 6 PERSONS	0.9972	0.9300	0.1053	-0.2669	-0.1151
15	'' 6 ROOMS	0.9979	0.3121	0.1402	-0.0299	-0.0625
16	'' 1 ROOM	0.9917	0.9427	0.0636	-0.2489	-0.1088
17	H'HOLDS WITH IND.	0.9954	0.1773	0.9563	-0.1076	-0.1032
18	PERCENT CARPETS	0.9862	0.7376	0.1987	-0.2111	-0.0566
19	H'HOLDS PER UNIT	0.9978	0.9267	0.1020	-0.2775	-0.1086
20	LAND & BLG. OWNED	0.9873	0.9110	0.1642	-0.2659	-0.1127
21	UNITS ≥ 10 YEARS	0.9961	0.9293	0.1105	-0.2751	-0.1161
22	PERCENT KILN BRICK	0.9341	0.9242	-0.0130	-0.0864	-0.0861
23	'' PIPED WATER	0.9634	0.8319	0.0094	-0.1024	-0.0927
24	'' ELECTRICITY	0.9924	0.9283	0.0990	-0.2257	-0.1088
25	ACTIVITY RATE	0.9822	0.9145	0.1130	-0.2992	-0.0813
26	EMPLOYMENT RATE	0.9990	0.9316	0.1025	-0.2674	-0.1103
27	FEMALE ACTIVITY RATE	0.9663	0.8795	0.2790	-0.2167	-0.1364
28	PERCENT GOVT EMPL	0.9687	0.9022	0.0124	-0.3132	-0.0471
29	'' OWN ACCOUNT	0.9875	0.9119	0.1445	-0.3135	-0.1029
30	'' PRIVATE WAGE	0.9840	0.9295	0.0705	-0.1811	-0.1249
31	EMPL. UNCLASSIFIED	0.9970	0.7594	-0.1689	-0.0308	-0.0157
32	'' PRODUCTION	0.9971	0.9269	0.1351	-0.2630	-0.1186
33	'' AGRICULTURE	0.9739	0.8423	0.1613	-0.4353	-0.1203
34	'' PROF.& TECH	0.9762	0.9184	-0.0107	-0.2075	-0.0822
35	'' SERVICES	0.9773	0.9104	-0.0044	-0.2693	-0.0955
36	'' SALES	0.9867	0.9348	0.0757	-0.2544	-0.0916
37	'' CLERICAL ETC	0.9733	0.9013	-0.0976	-0.1936	-0.0512
38	INDUSTRY. PRIMARY	0.9569	0.8365	0.1345	-0.4479	-0.1222
39	'' MANUFACTURE	0.9899	0.9247	0.1807	-0.2322	-0.1410
40	'' CONSTRUCTION	0.9782	0.9087	0.0835	-0.3011	-0.0840
41	'' ELECTRICITY	0.9968	0.6237	-0.2319	-0.1403	-0.0292
42	'' SERVICE	0.9932	0.9316	0.0073	-0.2279	-0.0708
43	'' TRANSPORT	0.9627	0.9074	-0.0049	-0.1788	-0.0840
44	'' COMMERCE	0.9874	0.9343	0.0707	-0.2521	-0.0914
45	DISTANCE	0.9997	-0.2540	-0.0987	0.0164	0.9595
	VARIANCE		71.967	3.392	9.345	2.920
	CUM.VAR		71.967	75.358	84.704	87.624

Table 6.2
VARIMAX FACTOR SCORE MATRIX

FACTOR		1	2	3	4			1	2	3	4
1	TEHRAN	1.678	-0.767	3.713	-2.777	51	TORBAT E HDARIEH	0.741	0.380	-0.423	-0.609
2	ISFAHAN	1.675	0.741	2.034	0.594	52	QUCHAN	1.043	-0.644	-0.526	-0.206
3	MASHAD	1.847	0.351	2.072	1.718	53	MAHABAD	1.089	-0.160	-0.467	-0.276
4	TABRIZ	1.517	1.591	2.192	0.755	54	MIANEH	1.013	-1.140	-0.599	-0.210
5	ABADAN	1.799	-1.082	1.748	-0.394	55	MALAYER	0.642	0.042	-0.518	-0.895
6	SHIRAZ	1.563	0.017	1.679	1.219	56	BEHSHAHR	0.807	-0.698	-0.731	-1.191
7	AHVAZ	1.170	-0.213	1.317	-0.328	57	BIRJAND	0.404	0.127	-0.698	0.117
8	KERMANSHAH	1.021	0.234	1.227	-2.839	58	LAHIJAN	1.138	-0.318	-0.508	0.898
9	SHEMIRAN	1.365	-1.464	1.104	0.716	59	MARVDASHT	0.327	1.221	-1.078	-1.449
10	RASHT	1.250	-0.172	1.203	-0.105	60	ARASBARAN	0.792	1.090	-0.497	-1.327
11	QOM	1.173	1.880	1.169	0.339	61	NAHAVAND	0.931	-0.202	-0.634	0.140
12	HAMADAN	1.513	0.425	1.113	0.666	62	MARAND	0.972	0.773	-0.733	-0.131
13	REY	1.061	-0.959	0.571	-2.637	63	SHAHR E KO	0.764	1.772	-0.582	0.724
14	REZAIYEH	1.181	-0.313	0.168	0.553	64	BUSHAHR	0.672	-0.916	-0.687	-0.532
15	YAZD	0.739	0.960	0.568	-2.118	65	ARAN / BIDGOL	0.620	2.906	-0.897	-0.394
16	KHORRAMSHAHR	0.997	-0.847	0.356	-0.223	66	SHUSHTAR	1.125	-1.991	-0.906	-0.656
17	QAZVIN	1.476	-0.354	0.684	1.508	67	BAM	0.350	-0.968	-1.060	-3.058
18	KERMAN	0.761	0.958	0.652	-0.056	68	SHAHPUR	0.910	-1.073	-0.924	0.261
19	DEZFUL	0.718	1.446	0.460	0.447	69	LAR	0.216	-0.342	-0.889	0.011
20	ARDEBIL	1.354	0.781	0.677	0.243	70	RAFSANJAN	0.319	0.977	-1.108	-0.691
21	ARAK	1.069	1.408	0.670	-0.047	71	LANGARUD	0.987	0.885	-0.668	1.758
22	BORUJERD	1.403	0.315	0.379	-0.144	72	GOLPAYGAN	0.746	0.433	-1.017	-0.374
23	MASJED E SULEIMAN	1.321	-1.625	0.164	-0.552	73	BORAZJAN	0.707	0.285	-1.132	0.678
24	KHORRAMABAD	1.061	0.322	0.228	-0.110	74	SIRJAN	0.574	0.909	-0.886	1.370
25	ZANJAN	1.297	0.426	0.366	0.764	75	FASA	0.450	0.074	-1.033	-0.928
26	KASHAN	0.896	2.172	0.368	0.069	76	BONAB	1.364	-0.364	-0.850	-0.072
27	SANANDAJ	0.908	0.720	0.311	-0.431	77	ZABOL	0.715	-1.182	-1.002	0.178
28	MARAGHEH	1.183	-0.946	0.010	-0.303	78	MIYANDOAB	1.211	0.047	-0.802	1.616
29	GORGAN	1.227	-0.959	-0.015	0.771	79	ESTAHBANAT	0.757	1.483	-0.877	-0.003
30	BABOL	1.237	-0.537	0.071	0.219	80	SAQQEZ	1.048	-0.745	-0.956	-0.341
31	KHOY	1.180	0.223	-0.065	-0.217	81	SAVEH	1.027	-0.410	-0.911	1.769
32	SEDEH	0.916	1.040	-0.374	-3.000	82	KASHMAR	0.355	1.027	-0.961	0.129
33	SARI	1.006	-0.930	-0.104	-0.194	83	SAREB	0.678	-0.812	-0.915	-0.031
34	KARAJ	0.689	-1.359	-0.564	-1.548	84	MAHSHAHR	0.791	-1.304	-0.934	0.336
35	NAJAFABAD	0.750	1.928	-0.084	-1.858	85	ANDIMESHK	0.009	-0.998	-1.171	-0.496
36	SABZEVAR	0.818	0.777	-0.059	0.031	86	NEYRIZ	0.681	-0.179	-1.175	-0.011
37	BANDAR PAHLAVI	0.566	1.126	-0.123	-1.525	87	QASR E SHIN	1.173	0.163	-0.668	-0.320
38	GONBAD	0.611	1.106	-0.697	1.138	88	ABADEH	0.200	1.349	-1.215	-0.299
39	AMOL	1.117	-1.266	-0.376	-0.074	89	ILAM	0.746	0.349	-1.249	-0.032
40	BEHBEHAN	1.104	-0.440	-0.274	0.263	90	BORUJEN	0.749	1.431	-1.008	0.247
41	KAZERUN	0.878	0.256	-0.263	-0.446	91	SONQOR	0.822	0.822	-1.032	0.053
42	ZAHEDAN	1.102	-1.312	-0.367	1.950	92	AZARSHAHR	0.979	0.092	-1.144	0.286
43	SHAHI	1.390	-1.483	-0.274	0.121	93	CHALUS	1.100	-0.842	-1.204	0.013
44	JAHROM	0.943	0.278	-0.300	0.167	94	ARDAKAN	0.440	2.008	-1.423	-0.117
45	BANDAR ABBAS	1.262	0.424	-0.362	1.265	95	EQLID	0.464	1.823	-1.239	-0.273
46	SHAHREZA	0.707	1.630	-0.228	-0.657	96	DORUD	0.537	-0.542	-1.348	-1.315
47	NEYSHABUR	0.758	-0.284	-0.331	-0.983	97	TORBAT E JAM	0.535	-0.389	-1.451	0.021
48	BOJNURD	0.907	-0.610	-0.522	0.436	98	ALIGUDARZ	0.769	-0.351	-1.229	0.405
49	SEMNAN	1.226	-0.652	-0.294	0.815	99	TAKESTAN	1.120	-0.840	-1.544	0.132
50	SHAHRUD	0.881	-0.343	-0.559	0.884	100	DOGONBADAN	0.261	0.343	-2.492	-0.079

component is identified very strongly with high female activity rates, a large proportion of urban households having some form of household industry, and a very low proportion of the labour force employed in electricity, gas, water and sanitation.

(iii) The third component accounts for 9.3 percent of the variance, and is identified with city size and a low percentage of the labour force in agriculture. Agricultural employment is the only economic variable to be directly related to city size.

(iv) Explaining 2.9 percent of the variance, the fourth component is identified solely with the last variable - a measure of the road distance of each city to the nearest city with over 100,000 inhabitants.

4. The Weighting of City Scores

Having established the character of the principal factors the relative amount of each city in each factor must be assessed. The scores are given in Table 6.2. They are pseudostandardized and can be used in a qualitative way only. City scores on the third and fourth factors are self-explanatory and need not be examined further : scores on the first and second factors however require some detailed consideration.

1) Scores on Factor One:

The 100 cities may be grouped into five. The grouping is shown in Table 6.3 and the cities mapped in Figure 6.2.

(i) The first group is composed of cities with scores of over 1.3. These are experiencing the highest rates of

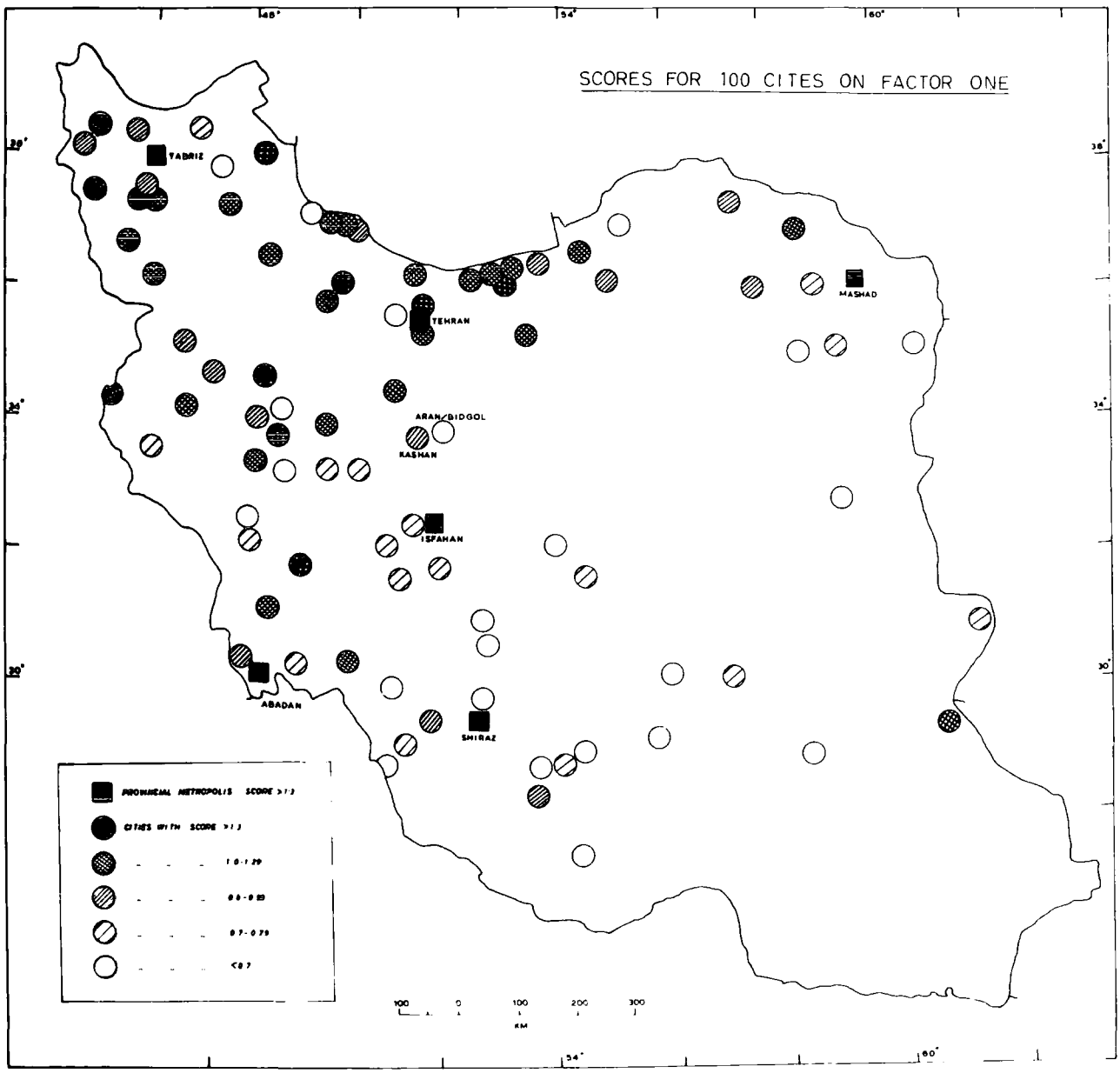

SCORES FOR 100 CITES ON FACTOR ONE
TABRIZ
TEHRAN
MASHAD
ARAK/BIDGOL
KASHAN
ISFAHAN
ABADAN
SHIRAZ
48°
54°
60°
100 0 100 200 300
KM

Figure 6.2

immigration in Iran. Included in the group are the six largest urban areas, together with some others. Size is the single most important factor accounting for the high immigration rates in the six largest cities; but the low size ranking of some of the others indicates that size is not the only possible cause.

(ii) Cities with scores between 1.0 and 1.29 comprise the second group. They fall with but a few exceptions into four well-defined geographic areas : (a) the Caspian lowlands, (b) East Azerbaijan, (c) the Western Zagros (d) the Southern Elburz. Furthermore, each of the smaller cities in the first group of scores, over 1.3, is also located in one of these areas.

(iii) In the third group of cities, having a score of between 0.8 and 0.99, there is no geographic concentration. They are scattered throughout Iran. Kashan is included in the group.

(iv) Most of the cities in the fourth group - Scores between 0.7 and 0.79 - are found around the central deserts. In the group are Kirman, Yazd, and many of the cities near Isfahan.

(v) Cities with a score of less than 0.7, of which Aran/Bidgol is one, are small, and located in the south and east of the country, particularly in Eastern Fars and in Kerman Ostan.

We have on this factor what appears to be a basic contrast between cities in the first two groups, which are located near the mountain areas of Iran's pluviose fringe, with dense rural populations about them, and cities in groups 4 and 5, which are located in the south and east of Iran, with

TABLE 6:3 GROUPING OF CITY SCORES ON FACTOR ONE

(City rank is shown in brackets)

Score 1.3+	Score 1 - 1.29		0.8 - 0.99
Tehran (1)	Khoy (31)	Rasht (10)	Kashan (26)
Isfahan (2)	Rezaiyeh (14)	Gorgan (29)	Khorramshah (16)
Mashad (3)	Maragheh (28)	Amol (39)	Sanandaj (27)
Tabriz (4)	Miyandoab (78)	Babol (30)	Jahrom (44)
Abadan (5)	Miyaneh (54)	Lahijan (58)	Bojnurd (48)
Shiraz (6)	Saqqaz (80)	Takestan (99)	Nahavand (61)
Shemiran (9)	Mahabad (53)	Sari (33)	Marand (62)
Hamadan (12)	Kermanshah (8)	Chalus (93)	Shahpur (68)
Qazvin (17)	Khorramadad (24)		Langarud (71)
Ardebil (20)	Arak (21)	Zanjan (25)	Azarshahr (92
Borujerd (22)	Qom (11)	Behbehan (40)	Sedeh (32)
M.I.S. (23)	Qasr Shirin (87)	Zahedan (42)	
Shahi (43)		Rey (13)	Sabzevar (36)
Bonab (76)		Ahvaz (7)	Kazerun (41)
			Shahrud (50)
			Behshahr (56)
			Souqor (91)

0.7 - 0.79		L.T. 0.7	
Yazd (15)	Borazjan (73)	Karaj (34)	Bir jand (57)
Kirman (18)	Zabol (77)	Gonbad (38)	Fasa (75)
Dezfol (19)	Estahbanat (79)	Malayer (55)	Ardekan (94)
Najafabad (35)	Mahrshahr (84)	Bushahr (64)	Eqlid (95)
Shahreza (46)	Ilam (89)	AIB (65)	Marvdasht (59
Neyshabur (47)	Borujen (90)	Sarab (33)	Bam (67)
Torbat (51)	Aligurdaz (98)	Neyriz (86)	Rafsanjan (70

Continued...

TABLE 6:3 (continued) GROUPING OF CITY SCORES ON FACTOR ONE

0.7 - 0.79	L.T. 0.7	
Arasbaran (6)	B. Pahlavi (37?	Kashmar (82)
Shahre Kord (63)	Sirjan (74)	Lar (69)
Golpaygan (72)	Darub (96)	Abadeh (88)
	T. e Jam (97)	Dogonbadan (100)

thinner local rural populations. Those in the third group including Kashan are not easily classifiable, having some of the characteristics of groups with high and low factor scores. Aran/Bidgol has a demographic and housing structure typical of many other small urban aread in the more arid parts of Iran.

2) City Scores on Factor Two

This factor is identified with a high proportion of urban households engaged in household industry and a concomitant high rate of female economic activity. (Table 6.4). Cities may be divided into three groups on the factor.

(i) First are those with scores of over 0.7. They are the traditional weaving centres of the country. Many are located near the older provincial metropolises of Tabriz, Mashad, Isfahan and Shiraz, though Shiraz is the only one of these not to be in the group. Others in the group are cities with a long history of urbanization, located on the desert fringes, of which Kashan and Aran/Bidgol, with the highest scores in the whole group, are part.

(ii) Second are cities with scores between 0.7 and -0.7 including the most Iranian cities.

(iii) Cities with scores of less than -0.7 are a) associated with recent large scale industrial growth, Tehran, Abadan and Karaj, for example; or, b) located on the Caspian lowlands or c) isolated in the far south-east.

5. General Considerations

Some general observations can be made pertinent to the component analysis.

TABLE 6:4 CITY SCORES ON FACTOR TWO.

High Scores G.T. 0.7		Low Scores L.T. -0.7	
Tabriz	Na jafabad	Shemiran	Zahedan
Qom	Marvdasht	M.I.S.	Shahi
Yazd	Arasbaran	Maragheh	Miyaneh
Khorramshahr	Shahre Kord	Gorgan	Zabol
Kerman	A/Bidgol	Sari	Mahshahr
Dezful	Shushtar	Karaj	
Arak	Shahpur		
Sedah	Ardekan		
Kashan	Eglid		

First, the factors are independant of each other, that is, they are uncorrelated. This property might appear to be contradicted by the first group of city scores on Factor One, for the size of the six largest cities is an important differentiator and yet size is the primary concern of the quite uncorrelated Factor Three. An explanation for this anomaly may lie in the fact that judging from the rank size continuum (Fig. 6.1) these cities play a unique role in the urban system.

Second, the factors are additive; each explains only part of the total variance. They are "weighted averages of the primary variables, the latter contributing in very different degrees to the different components" (Moser and Scott, 1961, p.75). The primary variables in the first component, or factor, carry a greater weight and are more strongly associated than those in the second component, and so on.

By comparison with Ahmed's (1965) analysis of 112 Indian cities using 62 variables the analysis of Iranian cities yielded a much higher concentration of the variance in one component; the first component in the Indian study yielded 15.2 percent of the variance, whereas the first in the present analysis yielded 72 percent. Reasons for such a contrast are twofold: (i) the Indian City system is very much larger and more complex than the Iranian. The size range for 112 cities was 100 thousand to 4.1 million. (ii) The Indian analysis was based on a larger and more heterogeneous set of data than the Iranian. In fact, a component analysis by Ahmed of 113

Indian town groups and 12 variables yielded only four variables, which together accounted for 99.9 percent of the variance. (Ahmed, 1965, p.45).

Third, related to the above points, is the significance of the input-output relationship. In the words of Moser and Scott "Up to a point 'what comes out' depends on 'what goes in' ". The selection of variables for this analysis was dictated by the data available, and the results obtained apply only to the particular set of data used.

6. Conclusion

The major social and economic differences between Iranian Cities have been considered in the foregoing chapter. These are the degree and type of migration, the amount of local concentration on household industry, city size, and city isolation. Of great significance is the contrast between the northern and western cities, with relatively dense local rural population and high rates of urban immigration, and the southern and eastern cities, in the more arid areas of Iran, with low local rural population densities and low rates of urban immigration or even some emigration. Kashan City is shown to be a member of a group with medium to low immigration rates while Aran/Bidgol is shown as typical of many small towns on the desert fringes, with excessive outmigration. In addition, Kashan's urban areas are shown as part of a group of traditional Iranian weaving centres.

From this, we may conclude that the placings of Kashan and Aran/Bidgol on the major dimensions which shape the urban system are clearly identifiable; and, that the postulate at

the beginning of the chapter that Kashan and Aran/Bidgol are not aberrations in their population, housing and employment structure, is proved.

CHAPTER SEVEN

POPULATION AND MORPHOLOGY OF THE URBAN AREAS

I Urban Morphology

1. Before Modern Expansion

Evidence on Kashan City's morphology before modern expansion comes from a variety of sources : from travellers' accounts; from aerial photographs; and from intensive study in the field by the author. Physical change in Kashan's townscape has been limited in the past fifty years, and most of it has occured through the growth of modern suburbs. The old part of Kashan within the walls possessed and still does possess many of the characteristics of a typical Islamic Persian city. It was a city which had evolved over centuries. The importance of family and kinship group, tolerance of religious minorities, the high status given to craftsmen and merchants, the centrality of the mosque and the vagueness of the law on encroachment of the public way all arose out of the precepts of Islam.

Prior to the development of the new suburbs the built-up area was confined entirely within the walls; it was compact and built parallel to the axis of the alluvial fan on which it stands. At the time of the construction of the present wall (probably early nineteenth century, Lockhart: 1960) the city was an elegant oval shape. Outside the wall, to the east, was the Mausoleum of Habib Ibn Musa. A number of houses grew up around the mausoleum and the district which they formed and which became known as Poshte Mashad (Trans : "Behind the Tomb") was later walled in. The distinctive nature of the district provides several illustrations of the segregation of quarters, clans and family groups within the City. At the quarter's eastern extremity were two large caravanserais for

travellers on the Qom-Yazd road. They provided an additional attraction for the quarter's development. The quarter is District No. 3 in Figure 7:1.

Our information on Kashan in the last century is supplemented by travellers' accounts. Descriptions of most Persian towns by European travellers were usually highly impressionistic and in most the ruination and decay of cities was emphasised frequently and there was a tendency to exagerate both the good and the bad. In Kashan these most superior persons stayed not in the caravanserais but in the Telegraph House - now the Post Office - outside the walls. Of the half-dozen or so descriptions left by them in English Curzon's account of the city is the most objective, though it is hardly complementary.

"The bazaars and busy part of the town are in the southern quarter ..... In 1870 Colonel Evan Smith reported the city to contain twenty-four caravanserais for the sale of goods, thirty-five for the accomodation of strangers, thirty-four public baths, eighteen larger mosques and ninety smaller shrines. He returned its population as 90,000 an altogether exorbitant estimate, although General Gesteiger Khan's calculation of 5,000 is scarcely less inaccurate at the opposite extreme. In 1885 Schindler reckoned it at 30,000, though where these people are stowed away one is at a loss to imagine after inspecting what is outwardly one of the most delapidated cities in Persia. A more funereal place I have not yet seen. Scarcely a building was in repair, barely a wall intact. Both the cobbled roadway and the houses that

lined it were in an equal state of decay, and it was as melancholy to see the one as it was to ride over the other" (Curzon, Vol II p.14). And as recently as the 1950's a British Ambassador described Kashan as "the most depressed small town in Persia" (Stevens, 1962).

The city walls were pierced by five large gates. In the south-west was a large double walled fort with a ditch. Outside the walls were a number of yakh chals - large pyramidic structures covering an underground pit in which ice was stored for the hot months. As in most Persian cities, three institutions were foci of corporate life in Kashan - the government, religion and commerce. The seat of government was in a suite of buildings near the northern gate, and this separation of fortress and administrative centre may be regarded as an unusual feature. Kashan was not the centre of a Governor Generalship (Ostan) and government functions were confined to the city and the shahrestan. The main religious focus was the Masjed-i-Jamai located just to the north of the bazaar. Mosques (Masjedha) are found with associated baths all over the city. Shrines (ziarat), usually with a blue conical roof, are numerous and are often grouped together with mosques in certain quarters of the city. One of the greatest concentration of baths, mosques and shrines was to be found in and around the bazaar. Here was the main commercial district of Kashan running the length of the city from the Aran gate to the Fin gate. The main passage of covered section, built of domed mud brick, ran unbroken for over 1,000 metres. The bazaar fulfilled a variety of functions;

besides religious and personal services, and retailing and wholesaleing, a large proportion of the city's manufacturing was carried out there. At its centre was a complex of caravanserais, used for trading and warehousing, together with a mosque, a seminary and several bath houses.

Residential quarters in Kashan were a confusion of twisting alleyways, arches, and dead ends. Although the city enjoyed the favour of the Safavid Shahs in the sixteenth and seventeenth centuries they built no major thoroughfares as they did in Mashad and Isfahan. Alleyways in the city are usually just wide enough to allow two laden donkeys to pass. Alleys used as water distributaries were cobbled over, with flat stones every few metres covering openings to the conduits below. Water from the conduits was stored in cisterns (ab anbar) - large domed constructions, mostly below ground, with wind towers to keep the water cool. The basic unit of the residential quarter was the traditional Persian dwelling house built around a central courtyard, and clusters of dwellings were often occupied by members of the same family. The most notable of these clusters is the rambling household of the Borujerdis, in the south western quarter, of the city, where several houses, some of them quite palatial, are built up against the interior wall of the city fort. From the air Kashan looks like most old Islamic cities, with numerous cell-like structures crowded together and a maze of irregular streets between. This irregularity resulted from the spontaneous nature of urban growth. The routeway system grew and developed with no direction from

planning, for Islamic law was vague on the subject of right-of-way and there was no corporate civic body, or even a sense of communal civic awareness. Each owner had rights which extended in all directions from his dwelling, much like the laws governing the digging of qanats. As a result, newly constructed walls often tended to move farther into the lane, and progressively to narrow the public way.

Kashan's Jewish Quarter is near the bazaar. Small by comparison with others in Persian cities, it nonetheless had its own baths, schools and synogogues. The Jews gained their livelihood trading in the bazaar, where numbers of them still own cloth shops. Juxtaposition of the residential quarter and the bazaar made it possible, for reasons of security, to work and to find all the necessities for a Jewish community life within a narrow compass.

At present Kashan's Jewish population is fast diminishing. Many have migrated to larger communities in Isfahan and Tehran; while 509 Jews were recorded in the 1956 Census only 70 were recorded in 1966. In contrast to the Jews Zoroastrians in Kashan have never been numerous and it is difficult to identify a separate Zoroastrian Quarter. At the turn of the century Jackson estimated there were forty-five Zoroastrians doing business in the city, but by 1966 only 17 were recorded as resident in the whole shahrestan.

2. Modern Urban Expansion

Considerable changes have taken place in the physical morphology of Kashan City during the present century; to a certain degree these reflect the trends towards social grouping

by class and income rather than race, family, or religion, visible in Iranian society as a whole. In the city increased wealth and a larger population have resulted in new suburbs, built mainly of kiln-fired brick in the 1950's and 1960's. The extent and direction of this physical expansion outside the walls has been influenced by the operation of a number of restraining and permissive factors and by an increasing amount of government direction and influence; these will be dealt with below.

(i) General Influences on Growth : Kashan's walls and the cemetaries which were located outside each of the major gates have been a major restriction on new building. In the poorer quarters the need for security which the walls provided has kept urban development within the city bounds. Where recent development has taken place it has had to avoid the cemetaries, since under Islamic law they may not be built on. In the north, building had to avoid one large cemetary, which now forms an enclave within the built-up area. (Fig. 7:1). In the east, however, the government has defied religious opinion and built a school in the middle of one large cemetary. Similar conflicts between religious and government authorities have taken place in other Persian cities. (Darwent : p.70, English : p.45).

Gardens traditionally form an integral part of the Persian townscape; but they are a private pleasure, and to the casual eye most are hidden by the high brick walls surrounding the household compounds. Urban gardens were most commonly located in the southern and western residential

quarters, where qanats enter the city; towards the city centre and downhill to the east there are fewer, while none are to be found in Poshte Mashad. In this arrangement Kashan City shows some features similar to those occasioned by the hierarchy of land use in the alluvial fan villages. Many gardens in the city have been sold for building. The garden of a former newspaper proprietor, who lived between the bazaar and the Perfume Gate in the south wall, was divided up into over half a dozen building plots. Also, one ancient garden, known as the Chahar Bagh, which was originally layed out as the grounds of a Safavid palace near the Government Gate, was built over by the local authorities; a school, the Mayor's office, and a hospital, all set in spacious surrounds, now occupy the site. Irregularity of development in the old city, the growth and decay of family and city fortunes, left a large number of small parcels of land derelict and waste. Some of these, like the gardens, have been built on and it is possible to come across a modern-style house occupying such a site in the middle of a delapidated quarter of the old town.

Water : while the residential quarters of the old city received their water from qanats or itinerant water sellers, such means of supply and distribution were neither desirable nor available in the new quarters. Although piped municipal water is now available throughout the city, the early development of new suburbs depended on new sources of water. Land to the south of the city is underlain by several qanats and is itself of high agricultural value while land to the

north had fewer qanats and greater opportunities for well digging. Consequently much of the new building in Kashan took place to the north.

Government Planning : As part of the drive to modernize Iranian cities under the present Shah and his predecessor a number of broad straight tree-lined boulevards were driven through the old town and along its northern boundary. This planning by 'pencil and ruler' was made without reference to the social or economic structure of the city. Houses were torn down and the inhabitants resettled, sometimes in the suburbs; and the covered bazaar was pierced in two places, though mercifully both places were near the bazaar's extremities and the main section remained untouched. Continued development of the urban infrastructure has been mainly in the provision of domestic ammenities and local services by the municipal authorities : (i) Water Supply: four water towers, supplied from deep wells, store the city's water. Funds have been available from the Ministry of Housing and Development for installing a 57 kilometre mains water system and 111 public pumps. As a result piped city water is available to 90 percent of the city's housing units. In the southern districts qanats still supply a number of households. Unlike Kermanshah, for example, few differences can be detected between water availability in the better suburbs and the poor quarters. Maldistribution of supply was a feature only in the early days of the public water system. (ii) Sewerage: although plans exist for a sewerage system in Kashan a major difficulty, encountered in many arid areas, is the problem of finding

adequate water to flush the system. At present individual housing units throughout Kashan use cess-pits. Industrial sewage is an increasing problem as the city's textile mills discharge effluent into an open sewer running along the northern city boundary and out into the desert. One enterprising individual has acquired the right to use the fluid and irrigates his fields with it. As a result, vegetables which are sold in Kashan are grown in fields dyed a deep blue by successive applications of industrial filth.

(iii) Electricity: some 91 percent of Kashan's households are supplied with electricity, available twenty-four hours a day. An oil-fired generating station run by the Ministry of Water and Power took over from the Kashan Spinning Company's generators in 1968, a further example of the spread of government interest in urban development.

3. Aran and Bidgol : Many features of Kashan's townscape are seen in other Persian cities of comparable size, but for Aran and Bidgol it is hard to find comparisons, partly because of the almost complete lack of data on similar settlements. They were and still are composed of a maze of twisting alleyways and household compounds, like the residential quarters of Kashan. Each city had a small discontinuous bazaar and a scattering of mosques and shrines. In itself neither Aran nor Bidgol would be extra-ordinary, but these two completely circumvallated towns stared at one another across only 100 metres of bare ground.*

---

* How such a situation came about must pose an interesting question in historical geography.

Figure 7:1

Places mentioned in the text:

a. Mine Chal

b. Khiaban Afzal

c. Khiaban Pahlavi

d. Maidan Fez (See Plate 9:1)

e. Khiaban Mir Amad

f. Isfahan Gate

g. Perfume Gate (Natanz Gate)

h. Fin Gate

i. Kashan Spinning Co.

j. Kashan Velvet Co.

k. Khiaban Amir Kabir

l. Maidan Daulat

m. Poshte Mashad

n. Chahar Bagh (site of)

p. Jewish Quarter (former)

q. House of the Borujerdis

r. Masjed-i-Jomei

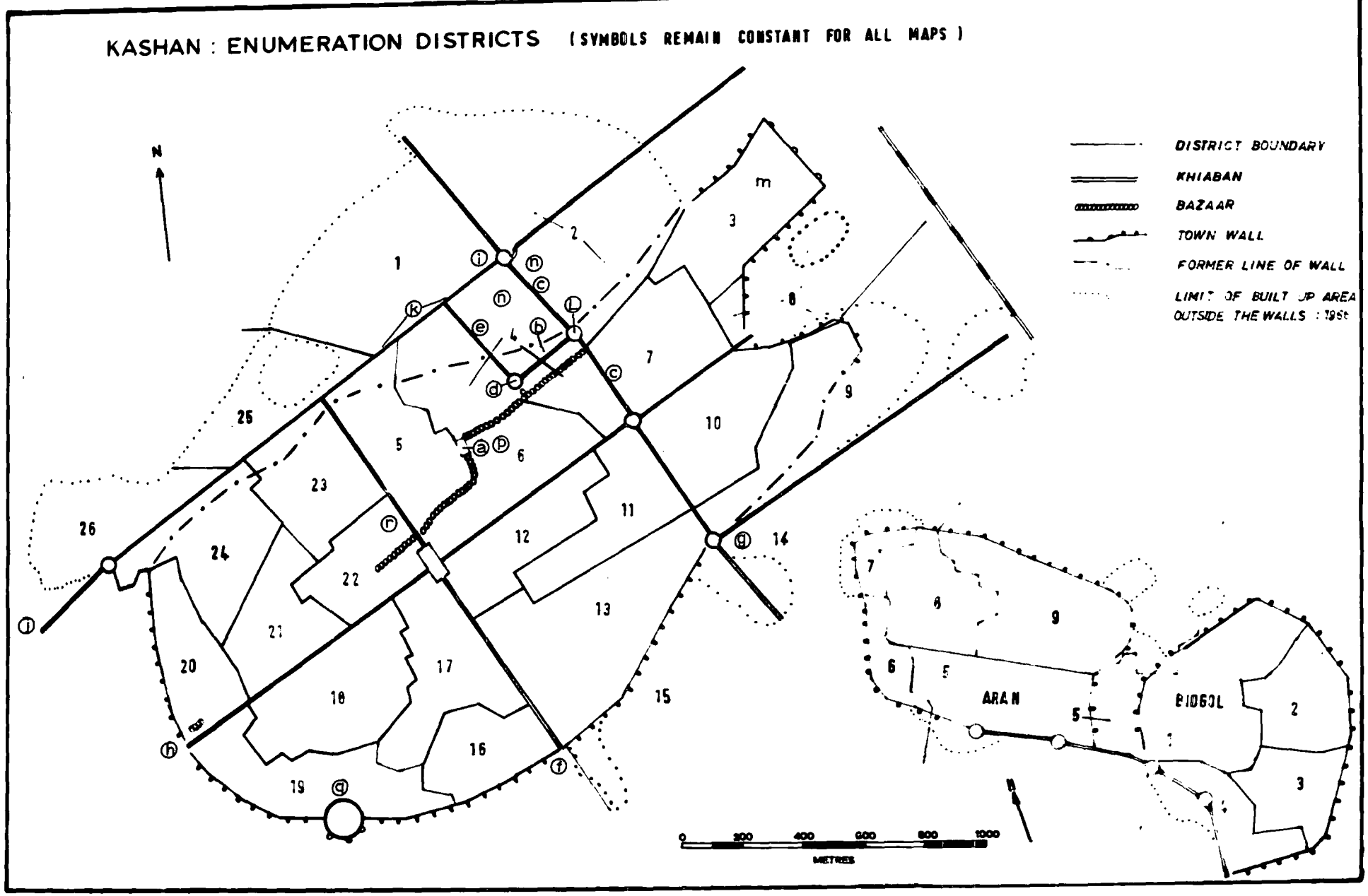

KASHAN : ENUMERATION DISTRICTS (SYMBOLS REMAIN CONSTANT FOR ALL MAPS)
N
DISTRICT BOUNDARY
KHIABAN
BAZAAR
TOWN WALL
FORMER LINE OF WALL
LIMIT OF BUILT UP AREA OUTSIDE THE WALLS : 195
ARAN
BIDGOL
0 200 400 600 800 1000
METRES

Figure 7.1

Poverty and the expense of water have kept the number and size of gardens in Aran and Bidgol to a minimum. Though there are extensive areas of ruined and run down dwellings within the walls, some small amount of new housing development has taken place outside the walls. Modern road construction has been limited to one unsurfaced boulevard running outside the southern walls.

Water in districts part of Aran comes from the new municipal supply; progressively fewer housing units use this source to the south-east, where greater use is made of qanats.

II Population and Housing

A large proportion of the data used in this and subsequent chapters was collected in the Census of Population and Housing conducted by the Iranian Statistical Centre in November 1966. Up to this point extensive use of material from the summary volumes published for each shahrestan has been used, but detailed statistics on the internal structure of Iranian urban areas remain unpublished. The author was able nonetheless to obtain unpublished 1966 Census data for the 26 enumeration districts of Kashan City and the 9 enumeration districts of Aran and Bidgol through the generosity of officials in the Iranian Statistical Centre. A list of the data headings calculable is given in Tabs. 7:1, 7:2. It should be noted that this information refers only to aspects of population and housing and excludes occupational, industrial and household industry data by place of residence. A map of the enumeration districts of Kashan and Aran/Bidgol is given in Fig. 7:1.

TABLE 7.1. POPULATION STRUCTURE IN KASHAN CITY AND ARAN/BIDGOL.

Enumeration Districts — $S.R. = \frac{M}{F} \times 1000$

Districts Kashan City	Total Pop.	Sex Ratio	Effective Fertility	% L.T. 5 yrs	Dependancy Ratio	% Born Outside Shah'n
1	1897	1091	849	17.2	92	6.5
2	3337	1114	1031	19.1	112	3.6
3	3639	997	947	17.5	102	1.5
4	2141	982	648	12.8	90	9.9
5	2281	1031	709	13.4	84	2.6
6	2070	1035	719	14.0	97	0.6
7	3055	1005	894	16.0	98	3.7
8	2537	996	983	18.4	107	3.4
9	2796	1058	910	17.0	103	2.2
10	2969	1098	917	15.9	101	3.1
11	1942	1079	730	14.7	94	2.5
12	2192	1025	768	14.6	100	3.7
13	2287	1082	877	15.6	93	1.2
14	1302	1086	1007	19.6	115	16.2
15	2447	1045	1078	20.6	113	5.2
16	2385	1001	915	16.6	107	0.1
17	2149	1022	727	14.3	94	0.7
18	2118	1043	778	14.9	93	1.0
19	2211	980	910	16.8	102	1.1
20	2288	1110	759	14.7	97	1.0
21	2039	949	816	15.4	102	0.2
22	2109	1065	761	14.8	91	1.2
23	1923	1078	662	12.9	90	3.1
24	1075	982	802	14.7	98	2.5
25	745	990	867	17.1	100	15.0
26	1787	1173	866	15.9	107	6.4
Districts Aran & Bidgol						
1	2401	995	1120	20.6	115	0.3
2	2693	975	1109	19.7	112	0.5
3	2287	902	987	19.2	114	0.4
4	1991	1000	1120	21.1	118	0.1

Contd...

TABLE 7.1 (continued)

Districts Aran & Bidgol	Total Pop.	Sex Ratio	Effective Fertility	% L.T. 5 yrs	Dependancy Ratio	% Born outside Shah'n
5	2529	980	992	18.7	123	0.5
6	2566	910	1010	19.4	121	0.1
7	3085	972	1109	19.1	132	0.1
8	2640	1016	1020	19.2	127	0.3
9	3073	952	1202	21.3	135	0.5
RURAL AREA	72393	1019	961	18.5	105	0.8

Data Unpublished from 1966 Census of Population & Housing.

TABLE 7.2 HOUSING IN KASHAN CITY AND ARAN/BIDGOL

KASHAN CITY

Enumeration District No.	Distance to City Centre	Persons per Acre	Persons per Room	Households per Housing Unit	% with Piped Water	% Houses over 10 years	% Houses Mud & Brick
1	0.7 km.	21.3	1.6	1.2	88	39	85
2	0.8	22.0	1.5	1.2	66	35	92
3	1.2	86.3	2.1	2.3	65	88	98
4	0.5	35.7	1.6	1.5	87	86	87
5	0.2	50.7	1.1	1.2	87	95	97
6	0.2	51.8	1.6	1.4	83	91	75
7	0.8	39.1	1.7	2.3	76	91	95
8	1.3	65.9	2.4	1.7	70	43	96
9	1.3	52.0	2.4	1.7	80	77	82
10	0.9	80.0	2.3	2.0	90	90	95
11	0.6	41.7	1.2	1.2	77	87	96
12	0.5	62.6	1.7	1.5	85	94	95
13	0.8	38.5	1.5	1.4	23	90	77
14	1.2	86.0	2.0	1.2	44	34	85
15	1.5	22.7	2.3	1.2	65	12	96
16	1.0	37.9	1.8	1.6	10	82	98
17	0.8	49.3	1.7	1.5	67	91	97
18	0.9	47.5	2.4	2.4	85	96	97
19	1.2	41.6	2.0	1.7	68	77	96
20	1.2	46.3	1.7	1.6	52	74	88

Continued...

TABLE 7.2 (Continued)

Enumeration District No.	Distance to City Centre	Persons per Acre	Persons per Room	Households per Housing Unit	% with Piped Water	% Houses over 10 years	% Houses Mud & Brick
KASHAN CITY							
21	0.9	50.8	2.2	1.6	78	100	92
22	0.5	55.6	2.1	2.0	79	80	93
23	0.5	43.2	1.7	1.6	87	99	97
24	0.9	31.9	1.6	1.3	76	86	86
25	0.7	12.4	1.0	1.3	73	53	30
26	1.3	16.2	1.3	1.0	65	13	15
ARAN/BIDGOL							
1	-	66.9	2.6	2.5	3.9	73	99
2	-	58.0	2.4	2.2	-	83	98
3	-	44.0	2.2	2.0	2.8	66	95
4	-	41.8	2.4	2.3	4.0	74	97
5	-	59.6	2.2	2.0	3.4	60	96
6	-	53.0	2.4	2.3	6.5	59	99
7	-	65.8	2.1	2.0	2.7	71	100
8	-	79.5	2.4	2.6	9.2	83	98
9	-	51.2	2.7	2.0	0.6	49	96
RURAL AREA	-	-	-	1.2	0.2	75	58

Data Unpublished from 1966 Census of Population and Housing.

In many ways the enumeration districts are not ideal areal units since, being delimited with an eye to administrative convenience rather than internal homogeneity, some of them include different types of area; in particular, some include areas within the walls and areas without. This problem affects a number of areas and attention is drawn to it in the cases where it affects the subsequent analyses. The small size of the 'sample' available is a further disadvantage, with only 26 districts in Kashan City and 9 districts in Aran/Bidgol; but the limitations imposed must, with the absence of any alternative, be accepted. All linear correlations which are referred to hereafter between variables distributed throughout the enumeration districts are statistically significant at least at the 5 percent level, and most have a much higher level of statistical significance.

5. Population Density

A number of measurements of density are available to the geographer in addition to densities per acre. J.I. Clarke has pointed out that "Even more significant than the man/land ratio in urban conditions are such ratios as dwellings per hectare, persons per dwelling and persons per room" (Clarke, 1960). For Kashan a measurement of persons per dwelling unit is of little significance since the area and size of dwellings varies considerably between the new districts and the old. Houses in the new suburbs are spacious, modern adaptations of the traditional Persian desert town house. There was little building in the time of Reza Shah and therefore there are few Pahlavi-type dwellings. In the old quarters houses are

usually a jumble of structures, often built on several levels. A densely crowded housing unit may stand beside an unused ruin.

In favour of using a measurement of densities per acre, however, are its close associations with other indices of housing density and type (Table 7:2). Densities per acre in Kashan City are significantly correlated with persons per room ($r = 0.59$), and the percent of dwellings built of mud and brick ($r = 0.69$). This last measurement is a particularly useful indicator of housing type and age, since figures for housing age are unreliable. Figures 7:2 and 7:3 map densities for Kashan and Aran/Bidgol. On the maps a clear distinction may be seen between the old town within the walls and the new suburbs without.

1) The old Town: This is the area where lives the greater part of the population. Most buildings are of sun-dried brick. Densities are highest in Poshte Mashad (E.D.3), which is a distinct morphological area, sandwiched between two cemetaries and the ruins of the two travellers' caravanserais. Poshte Mashad is also a distinct social quarter, where kinship ties are particularly close, and the people even have a distinctive accent. For these reasons, with the physical limitations imposed by walls and cemetaries, few Mashadis have moved out of the quarter, despite a high rate of population increase and already overcrowded conditions. Similar circumstances account for high densities in the other eastern districts of the city.

Man/land ratios in the rest of the old town are highest around the congested central bazaar, while in the western and

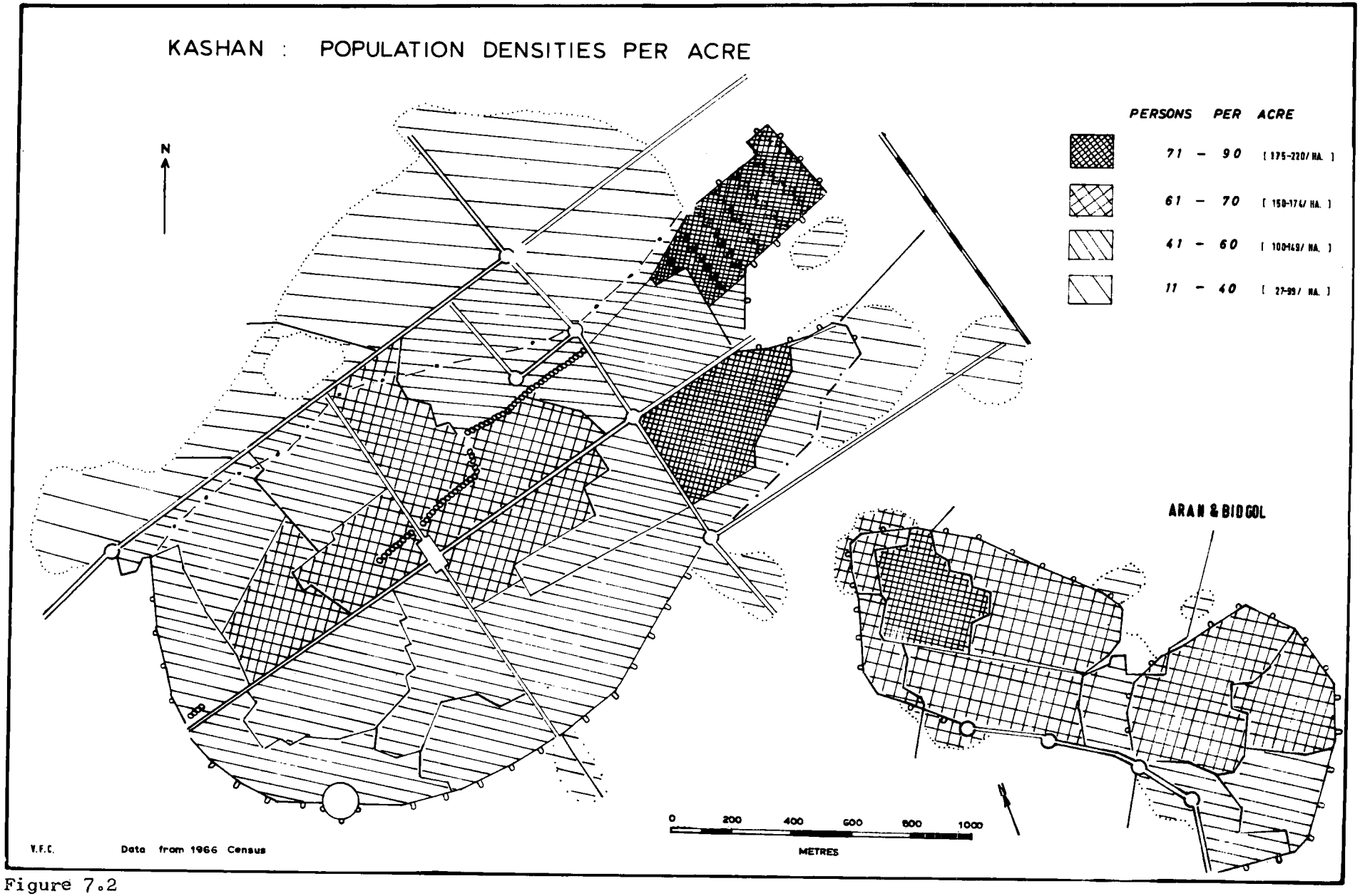

KASHAN : POPULATION DENSITIES PER ACRE
N
PERSONS PER ACRE
71 - 90 [175-220/ HA.]
61 - 70 [150-174/ HA.]
41 - 60 [100-149/ HA.]
11 - 40 [27-99/ HA.]
ARAN & BIDGOL
0 200 400 600 800 1000
METRES
Y.F.C.
Data from 1966 Census

Figure 7.2

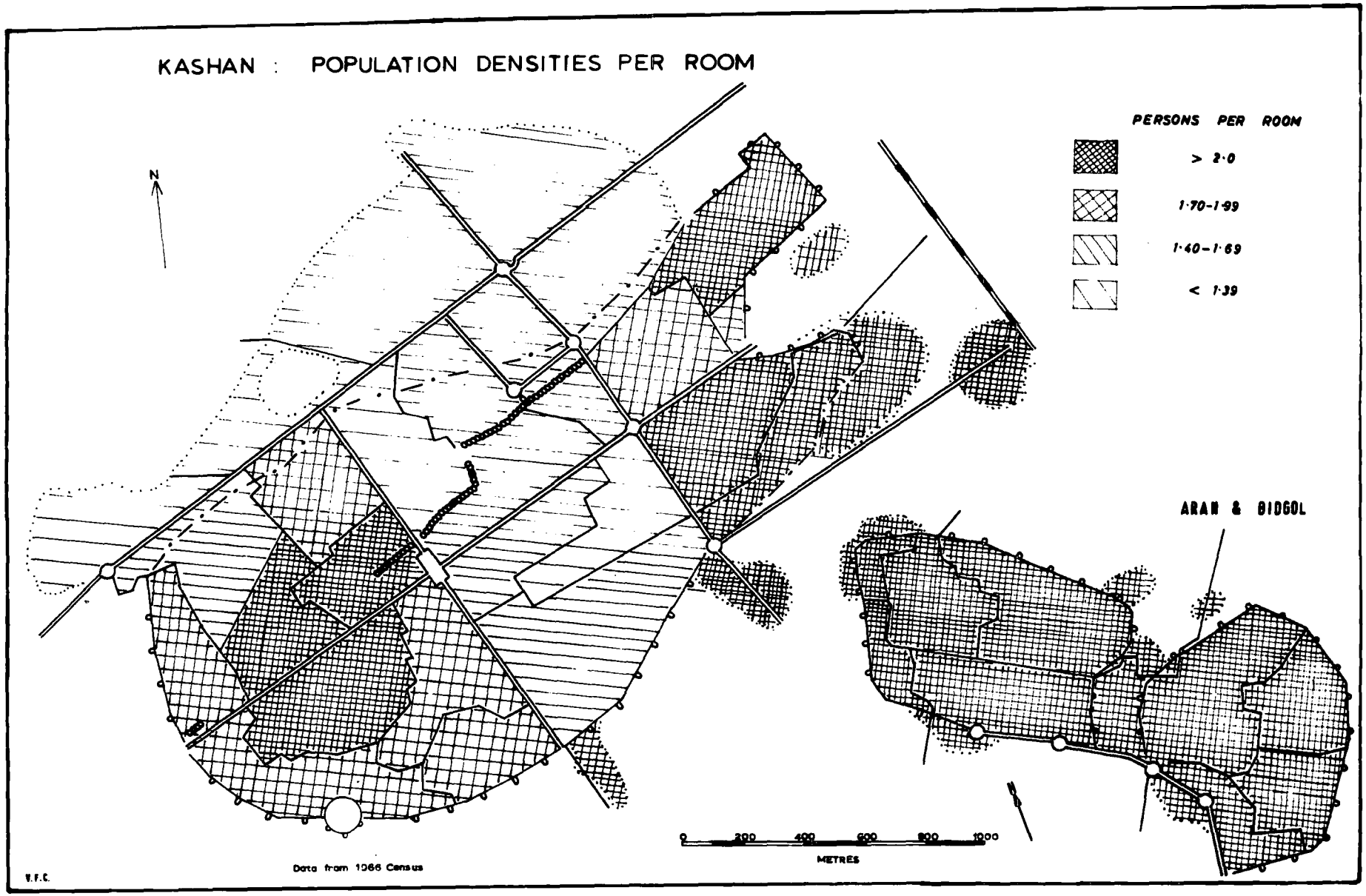

KASHAN : POPULATION DENSITIES PER ROOM
PERSONS PER ROOM
> 2·0
1·70–1·99
1·40–1·69
< 1·39
N
ARAN & BIDGOL
0 200 400 600 800 1000
METRES
Data from 1966 Census
V.F.C.

Figure 7.3

southern sections the higher incidence of gardens reduces the ratio. As regards persons per room, however, densities in the west are much higher than in the bazaar districts, where dwellings are more often built on several levels with a large number of rooms.

2) The new suburbs: Densities per acre outside the walls are lower. Buildings are of kiln brick, mostly erected after the mid nineteen-fifties. Though densities per acre in districts 14 and 15 are low with plenty of land between dwellings these suburbs have a high population growth rate, and quite possibly are inhabited by immigrants from Khorramdasht and Qamsar. Densities of persons per room in the southern suburbs are high.

In the northern districts (Nos. 1,2, 25 and 26) live most of Kashan's monied class, at the lowest densities to be found in the city.. At the western end of Khiaban Amir Kabir, which takes its nickname of "The Takhte Jamshid of Kashan" after Tehran's equivalent of Park Lane, are found the most opulent houses in the city occuppied by leading city bureaucrats, industrialists and carpet nabobs.

Aran and Bidgol: the contrast between districts wholly inside and districts outside or straddling the walls is again seen in Aran and Bidgol. There is a significantly high negative correlation ($r = -0.69$) between persons per acre and new houses, and a high positive correlation ($r = 0.70$) between persons per acre and the percent of dwellings in a district built of mud and brick. By comparison with Kashan City densities per room are uniformly high; but this is a less useful indicator of conditions than in Kashan, for a considerable number of rooms recorded in Aran and Bidgol were

recorded as occupied, but which in fact were probably derelict. Comparison of the ratios between highest and lowest densities, using both indices, in Kashan and Aran/Bidgol shows that Kashan has a greater density range than the smaller settlement (Table 7:1) while Kashan had a ratio of 1 to 4.1 for persons per acre, Aran/Bidgol had a ratio of 1 to 1.1. The ratio for Mashad in 1956 was 1 to 7 (Darwent, p. 103). It seems probable therefore that in Persian, as with other cities, the larger the settlement the greater is the range of densities.

6. Densities in Theory

Attempts to define mathematically the relations between population densities and distance from the city centre have been made by Clark (1951) and Berry, Simons and Tennant (1963). Analysing thirty-six samples from the western world Clark showed that densities declined at a constant rate from the city centre. Berry provided further empirical evidence for non-western cities to show that "in every place so far studied a statistically significant negative exponential relationship between density and distance appears to exist"; that gradients appear to decline over time in western cities, while remaining constant in non-western cities; and that whereas the rich live on the periphery and the poor in the centre in western cities, the reverse is true in non-western cities.

Kashan and Density Distribution Theory :

Population densities in Kashan City were plotted in Figure 7:4 against distance from the city centre[1]. to the

---

1. Taken as the point Mine Chal in the centre of the bazaar with the city's highest land values.

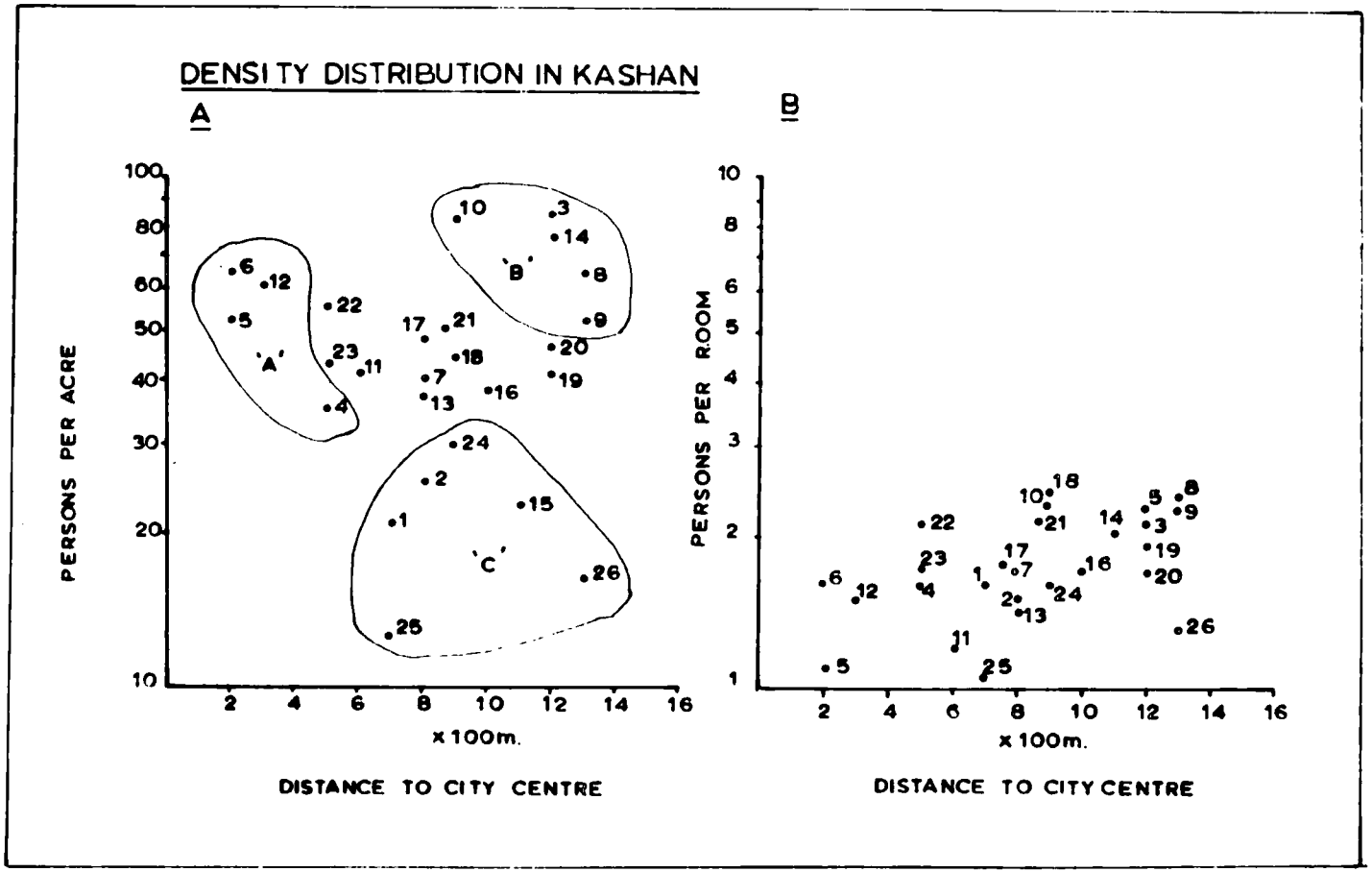

DENSITY DISTRIBUTION IN KASHAN
A
B
PERSONS PER ACRE
PERSONS PER ROOM
'A'
'B'
'C'
x 100m.
DISTANCE TO CITY CENTRE
x 100m.
DISTANCE TO CITY CENTRE

Figure 7.4

central point of each enumeration district. Clearly, there is no progressive decline of densities away from the city centre; on the contrary, Fig. 7:4 suggests that there is a positive exponential relationship between densities per room and distance. In fact there is a statistically significant positive correlation ($r = 0.50$ at the 1% confidence level) and no correlation ($r = 0.02$) between density per acre and distance.

Enumeration districts have been grouped in Fig A, with the bazaar area 'A', the eastern quarters 'B' and the new suburbs 'C' standing out. It should be noted that the suburban building line in Kashan is clearly defined on the ground, for dwellings tend to remain close to a water source, with less scattering of building plots than might be found in a more pluviose zone.

Further explanation of the apparently anomalous position of Kashan with regard to density distribution theory may come from observing flaws in the theory as it applies to non-western cities. For Mashad, Darwent came to the conclusion that density distribution coincided with theoretical predictions only because the theory was vague in definition and the data on which it was based was inaccurate. From the postulate that the rich inhabit the centre of non-western cities it follows that the rich are living at very much higher densities per acre than the poor on the periphery. That is unlikely. The shanty towns found on the fringe of many non-western cities often have very high densities. Berry's rationale to explain the

negative exponential law is based on income and competition for land, yet in the pre-industrial Middle Eastern city residential land use was divided according to ethnic occupational and family ties, rather than income group. As Darwent has pointed out, in using Indian cities Berry chose exceptional examples, where caste and income were in a direct relationship so that family ties were associated with income groups. Lastly, though Sjoberg's generalisations on rich and poor in pre-industrial cities referred to cities of less than 100,000 inhabitants all Berry's examples of 'non-Western cities' are of over 100,000 persons. There is often a tendancy in geographic and other literature to equate the terms, 'non-Western' with 'pre-industrial', whereas in fact they are by no means synonymous.

A full explanation for the failure of density theories stated by Clark and Berry to account for densities in Kashan awaits further examination of the internal structure and function of the city. One clue is the close and significant association between densities per acre and manufacturing workers ($r = 0.46$); little distinction can be drawn between residential and manufacturing zones in Kashan, though Clark's law refers only to residential districts. Just as Winsborough (quoted in Haggett, p.155) found that the total population density of cities was positively and significantly associated with age (as measured by the proportion of old dwellings), the size of the city, and the proportion of the population in manufacturing, it may be postulated at this stage that the same or similar relationships hold true for Kashan's enumeration districts.

districts.

7. Population Growth and Fertility:

Past estimates of Kashan City's population are unreliable; the city probably experienced wide fluctuations in total population at different times, depending on the state of trade or economic conditions in the hinterland; the first census of any accuracy was taken as late as in June 1939, when the recorded population was 44,944. The First National Census of Iran, in 1956, gave the population as 45588; this represents a recorded increase of only about 600 in 15 years, thus confirming most reports that the city was one of the most depressed in Iran. The increase of 21 percent between 1956 and 1966, though not dramatic by the standards of some Iranian cities, is firm evidence of a sudden change in the dynamics of Kashan's population. As far as we may judge a decline in infantile death rates and an increase in effective fertility were the most important contributors to the city's growth.

Effective fertility in Kashan is mapped as Figure 7:5. Fertility is highest in some of the new suburbs - districts 2, 14 and 15, and in the poorer eastern and south-western districts of the old city. Intermediate levels are found in the wealthier northern suburbs, and the lowest levels in the central bazaar area. In the complex of relations which make up the social geography of the city fertility occupies a central position; it is correlated significantly with low levels of literacy ($r = -0.67$) (Figure 7:6), partly because schooling must be paid for and larger families can less afford

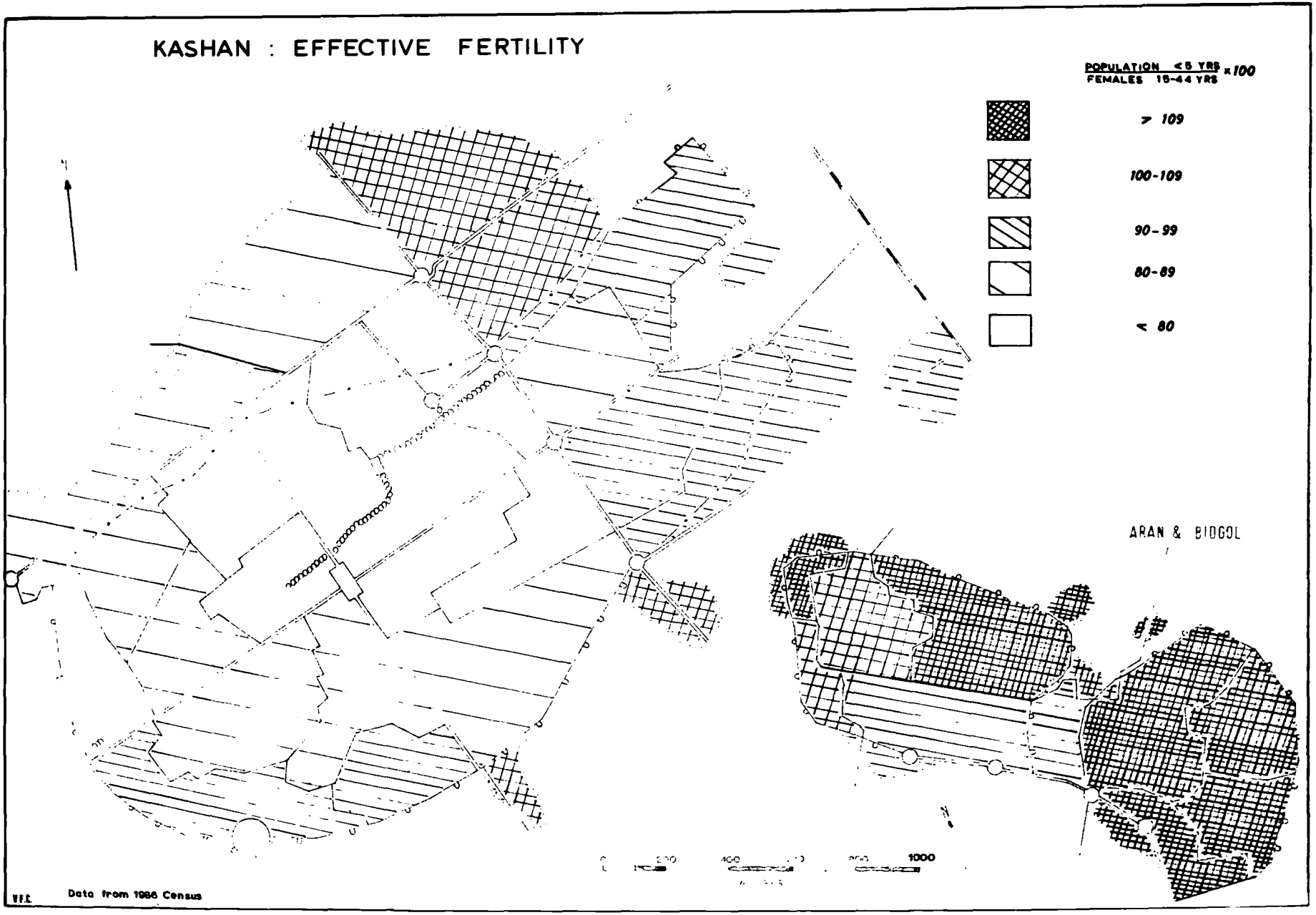

KASHAN : EFFECTIVE FERTILITY
POPULATION <5 YRS / FEMALES 15-44 YRS x100
> 109
100-109
90-99
80-89
< 80
ARAN & BIDGOL
400
1000
Data from 1986 Census

Figure 7.5

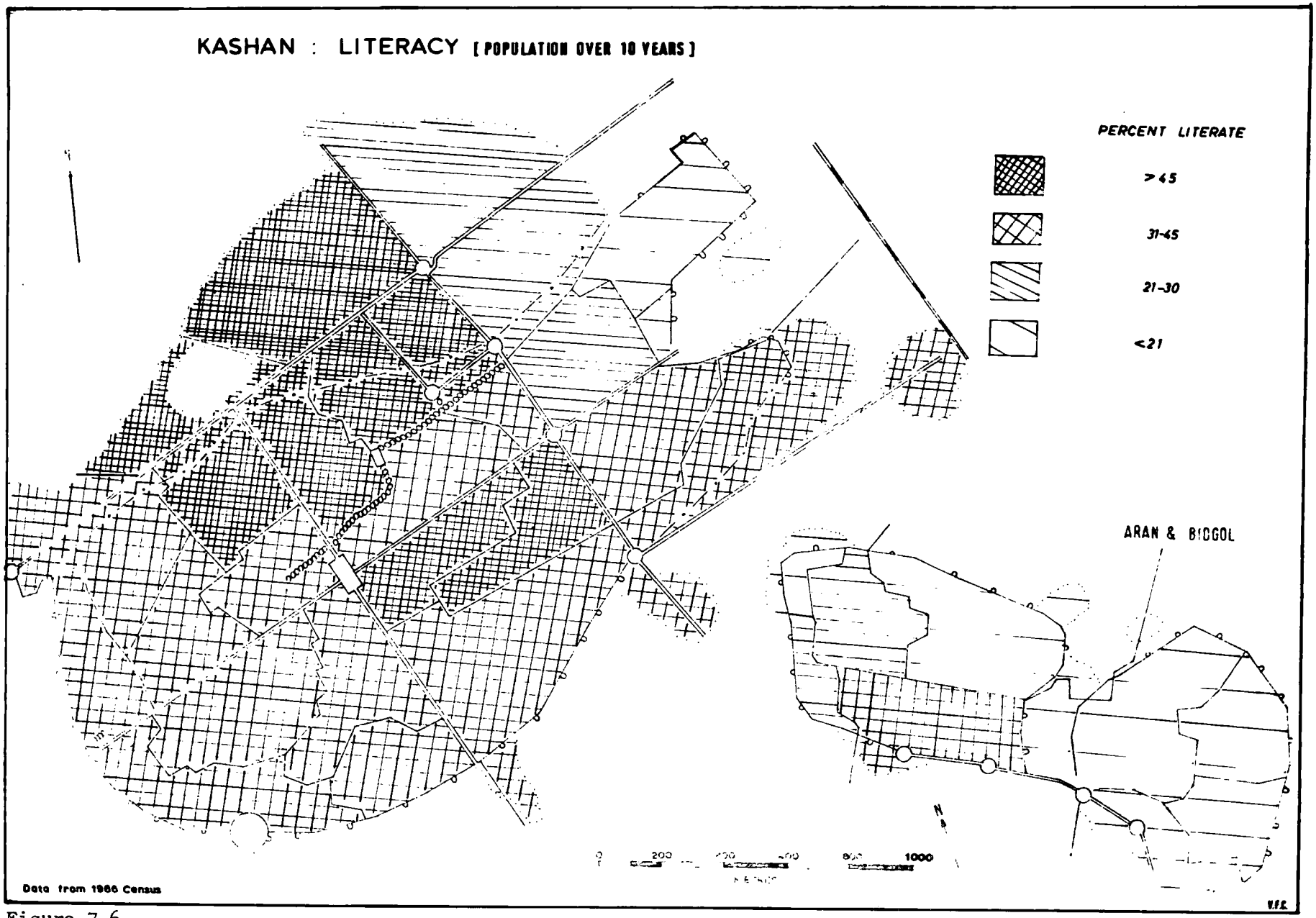

KASHAN : LITERACY [POPULATION OVER 10 YEARS]
PERCENT LITERATE
> 45
31-45
21-30
< 21
ARAN & BIDGOL
0
200
1000
Data from 1966 Census

Figure 7.6

school fees and it is also positively correlated, at a significant level, with densities of persons per room ($r = 0.37$), for obvious reasons, and with owner occupiers ($r = 0.44$) of households, since most houses in the central area and the suburbs are leased. The significant correlations between a high incidence of marriage in males 15-24 years ($r = 0.45$) and the demographic dependancy ratio ($r = 0.85$) would be expected. But fertility also increases with distance from the city centre ($r = 0.69$).

The relation between fertility and lack of living space is closer in Aran/Bidgol. The significant correlation there between the percent of the population under five years and persons per room is higher than Kashan ($r = 0.84$), despite the much smaller sample of enumeration districts (9) in Aran/Bidgol than Kashan (26). The Overall Level of fertility is higher in Aran/Bidgol than in Kashan, but, as Fig 7:5 shows, while the highest levels are higher than any in Kashan the lowest overlap with some districts in the larger city. Apart from lower fertility in District 5, which has some 'modern' suburbs, we are unable to interprete the pattern of fertility within the twin cities.

8. Age-Sex Structures

On the basis of Figure 7:5 and age-sex pyramids for all 35 urban enumeration districts the age-sex structures of the urban areas were divided into three main types; six pyramids, given as Figure 7:7, were selected as illustrations.

(i) Older Areas with High Fertility: Areas, such as Kashan District 3 (Poshte Mashad) and Bidgol District 1 have

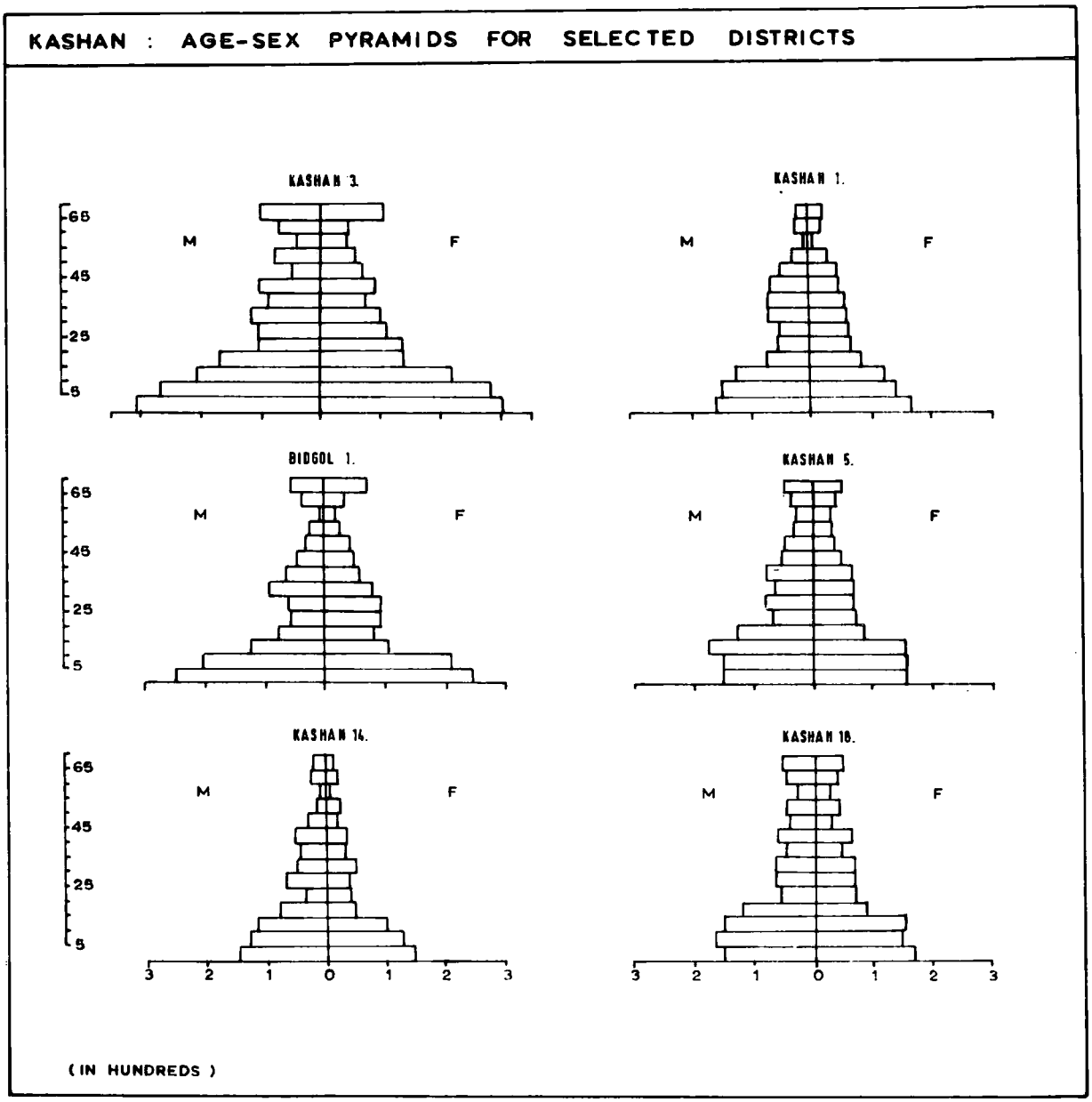

KASHAN : AGE-SEX PYRAMIDS FOR SELECTED DISTRICTS
KASHAN 3.
KASHAN 1.
BIDGOL 1.
KASHAN 5.
KASHAN 14.
KASHAN 18.
M
F
65
45
25
5
3
2
1
0
1
2
3
(IN HUNDREDS)

Figure 7.7

broad-based pyramids with a high proportion of the population under 10 years resulting from high effective fertility. The Kashan district has but a slight indentation in the cohort 20-29 years, whereas the Bidgol district has a pronounced lack of males in that age group, indicating, quite probably, a degree of outmigration to Kashan City.

(ii) New Suburbs may be divided into the wealthy northern suburbs and the poorer ones in the south. District 14 is a fast expanding area, with a broad-based pyramid having an excess of males at all age groups. This is arguably an immigrant area, though field interviews in the district gave no confirmation. The higher-class District 1 has a more balanced sex structure, lower fertility, and a higher proportion of persons in the older age groups.

(iii) Older Areas with Low Fertility: District 18 is representative of most purely residential areas in the western and southern quarters of Kashan. Fertility is comparatively low and aside from the 20-24 years age group sex ratios are fairly constant. The pyramid's narrow base and large numbers in the older age groups indicate an ageing population. District 5 is a commercial and residential area, with much small scale manufacturing. There are few persons in the lowest age groups, but the pyramid expands at the adolescent age groups for large numbers of boys are employed in the bazaar.

9. Sex Ratios and Immigration

Data for sex ratios are given in table 7:1. It appears that total sex ratios in the enumeration districts of Kashan

City or Aran/Bidgol are unrelated to any of the variables discussed so far, though in the villages of the shahrestan they are associated with population change. But ratios in the adolescent age groups of 15-19 years are associated in a statistically significant manner with some variables; they are correlated with household size ($r = -0.40$), households per housing unit ($r = 0.45$) and persons per room ($r = 0.37$); we know, then, that there are concentrations of boys and young men living most probably apart from their families at high densities in the west and central and eastern districts of Kashan City. This would suggest these people are immigrants, but whether from outside the city or from other parts of the city we do not know. The older age group of 20-24 years shows none of these correlations, though these are the groups where distortions are caused by gross under-reporting. Ratios for the age groups 15-29, however, show a relative concentration of males in the suburban districts 2, 14 and 26 and in district 20, suggesting possibly that the migrants we do know are leaving the villages move to Kashan's suburbs. But the evidence here is indecisive.

Long-distance immigration is recorded in the enumeration district data, and figures for such immigration are given in table 7:2. Though the numbers born outside the Shahrestan of Kashan and inside the Central Ostan are small and in themselves do not affect the age-sex pyramids they do have a distinctive distribution pattern. Nearly all are resident in the suburbs. Those living in the northern suburbs are

literates, often teachers from other parts of the Ostan while those in the southern suburbs are more often illiterate, many of them from Meimeh in Isfahan Ostan, which borders Kashan Shahrestan in the south.

Long-distance migrants in Kashan - mostly government officials, teachers and technicians at the textile factories - are also mostly resident in the newly-built sections of the city.

10. Conclusion

The morphology of the cities of Kashan before modern expansion was similar to other Islamic/Persian cities: Kashan and Aran/Bidgol were composed of a maze of alleyways between household compounds; ethnic and religious groups were segregated, while the main institutional foci of the cities were the bazaar, the mosque, and in Kashan City the government offices. In the fifteen or so years preceding the Census of 1966 new suburbs were grafted on to the old cities. Urban growth has been at the expense of gardens and cemetaries and in the direction of newly available water resources. Government activities are progressively more important to urban development.

The demographic characteristics of the new suburbs and old districts within the walls contrast; in the latter lives over 80 percent of Kashan City's population at relatively high densities per acre, with generally lower rates of literacy and higher effective fertility than the newly-built areas. Although outmigration from Kashan's villages has occurred we are unsure, apart from the southern suburb, to where in

Kashan City the migrants have moved: high rates of out-migration in Aran/Bidgol correspond with the most crowded districts, having high rates of effective fertility and low rates of literacy (Fig 7;6).

Possibly more fundamental than the old town / new town contrast however is a social gradient within the old town from the south and west to the east. Put at its simplest, the most spacious and desirable districts, with more gardens and qanat-supplied water systems, were uphill in the southern and western parts of Kashan City, while downhill to the east were districts less well endowed, with fewer gardens and higher densities of persons per acre; the extreme downward end of the gradient is seen in the overcrowding, poverty and lack of amenity in Aran and Bidgol and quite probably in villages such as Nushabad; Kashan may thus exhibit the residual elements of a former social gradient similar to that of the alluvial fan villages, or at another scale, to Tehran, where the demand also is for summer coolness. In that context Kashan's extra-mural suburbs may be seen as a recent evolution from an already existing situation.

A disturbing element in the pattern however is the distinctive character of the central districts of Kashan City around the bazaar. Indices such as literacy, effective fertility and density of persons per room, bear a close relationship to distance to the city centre, albeit a relationship inverse to that predicted by classic western models, so that there appears also to be a centrality gradient

in Kashan City. The interaction of those two hypothesised gradients will be examined further in the next chapter on industry in Kashan.

Notes

Plate 7:1. Aran.

The photograph was taken from the municipal water-tower looking north. Note the contrast between modern urban development by government agencies and the old town; in the foreground is a wide, empty avenue leading to a square around which there are no signs of retail development; to the left are the grounds of a secondary school; the donkeys are using the sidewalks and not the road; in the background is the dense jumble of walls, houses and alleyways which make up the old town.

Plate 7:2. Poshte Mashad, Kashan

Poshte Mashad is an old quarter of the city. Houses are built of sun-dried brick daubed with mud. Many of the roofs are domed. Note the entrance to a stairway leading up to the roof, which is where most people sleep in summer. Note also the massive tower in the city wall, with a small gateway inside which are shops. Electricity power lines, and skeins of wool drying on the roofs can be seen.

Plate 7:3 Kashan City

This photograph was taken looking west towards the centre of the bazaar, where the domes of mosques and carpet caravanserais can be seen. Some impression of the complexity of the bazaar's morphology can be gained from the view. The bazaar is built on several levels, and to some extent there is a correlation between the height of buildings, the number of levels or stories within them, and the value of sites in the area where they are located. The courtyard of an open bazaar caravanserai can be seen in the bottom left corner. Behind the city are the Kargas Mountains, still capped with snow in the late spring.

CHAPTER EIGHT

URBAN INDUSTRIAL STRUCTURE

1. Early Industrial and Commercial Development

'Early' industrial and commercial development is taken here to include only those changes, beginning in the late nineteenth century, which had a direct effect on Kashan's present economic structure. True, Kashan has a long noble history of trade and manufacture, but the fluctuation of the city's fortunes before the last decades of the nineteenth century, though of great interest in themselves, bear little relevance to the economic forces operating today. Nonetheless it is necessary first briefly to consider some aspects of pre-industrial society, since vestiges of that society are still to be found in the city.

(i) Pre-industrial organization:

Unhappily, information in European languages on Persian pre-industrial social and economic organization is scarce; much has been inferred from analogies with Sjoberg's examples from other societies (G. Sjoberg, 1960). Society was, in general, organized along horizontal lines, with the extended family as the basic social unit. Loyalties were directed towards the family rather than the corporation or state. The often diverse ethnic backgrounds of social groups in Middle Eastern cities found spatial expression in division of the city into quarters and P. English has shown how Jews and Zoroastrians were segregated from Muslims in Kerman (p.42). For Kashan the Jewish quarter, Poshte Mashad, and as will be

seen later, other quarters were distinguished one from another. Economic organisation was by product, rather than process specialization. Economic activity was located in bazaars and caravanserais in which were all types of function, retailing, wholesaleing, production etc. The various processes dealing with one product were under the control and direction of product guilds.

(ii) Economic History before Modern Development:

The period of 'industrial revolution' in a country or region is usually precipitated by the events of a preceding period. There was no sudden step in Kashan from small scale guild-controlled production to modern large scale factories. For Goteberg in the 1850's and 1860's A. Pred has listed a number of events and developments helping towards industrial growth: (i) A tremendous increase in timber production and exports, which in turn provided (ii) significant sums of investment capital for other industrial sectors (iii) the gradual abolition of legislation which had previously restricted the growth of trade and manufacturing (iv) increased agricultural productivity (v) important technical innovations (vi) the incipient beginnings of new industries (vii) the creation and expansion of such commercial institutions as banks and joint stock companies, and (viii) the appearance of new and augmented markets (Pred, p.73). While it is recognized that 'industrial revolution' is an arbitrarily defined period abstracted from a continuum of basically evolutionary growth, the events and changes preceding this period in Goteborg and other western cities closely resemble those in Kashan.

The bulk of the reliable economic material on Kashan in the late nineteenth century is comprised of passing comments in travellers' accounts and the commercial reports of British Consuls in other Iranian cities. The consular reports are limited in their coverage of the city for two reasons: first, consulates were established in cities where Britain had direct trade interests, such as Mashad, Tabriz, Isfahan and Kerman, and their reports refer only to Kashan indirectly; second, the prime concern of the consulates was the trade war involving the sale of Manchester cotton goods in competition with ever increasing imports from Russia. Kashan was not a strategic point and was as a result largely ignored.

From the reports we know that by the 1890's at least Kashan province was not self-sufficient in grain; in 1894 the Isfahan Consul reported : "the amount of grain cultivation in the districts belonging to Isfahan is very great. As previously shown., Yezd is supplied from here, also Kashan and some other smaller districts" , (House of Commons Sessional Papers: 1894 Vol. 87 p. 1316). Other writers confirm this. At that time therefore the province did not produce enough staple foodstuffs for local needs, and it seems that such a situation, in which population had outgrown local agricultural resources,must have occurred many times in the past. Kashan City maintained itself by manufacture: "From a very remote period Kashan appears to have been famous for five things : the industrial aptitude of its inhabitants, its silk manufactures, its brass and copper utensils, its earthenware or faience and

its scorpions"., , (Curzon, Vol. 2. p.13).

Some of the difficulties in trade at the time were detailed in the reports. Communications were poor, and this was fully realised: "the question of roads in this country is of the very greatest importance, not only to us but to the Persians. Roads are essential now to enable us to meet Russian commercial competition"., (1899 Vol. 101 p.12). Neither weights and measures nor coinage were uniform, and there were often wild fluctuations in local exchange rates; in 1899, for example, an influx into Isfahan of copper coins from Kashan, Hamadan and Kermanshah upset local rates for copper and silver, and was declared to be ruinous to Isfahani commerce (1899 Vol 101 (2260) p.7). In addition the times were often turbulent: the report from Isfahan for 1897 described the chaos after the assassination of the Shah; Manchester piece goods were stolen and sold to nomads well below their bazaar value, glassware and tea were wantonly destroyed; Her Brittanic Majesty's Consul was most incensed over one particularly dastardly outrage, when, "a large consignment of Austrian matches was set on fire for the fun of the thing, or to use the Persian expression, as a tamasha (i.e. sight or exhibition)"., (1897, Vol. 92 (1953) p.2) .

Despite the difficulties Kashan goods were distributed throughout Iran. Textile weaving was the major industry of city and province: velvets, brocades, satins, sarsenet as well as plain silk and silk mixed with cotton were woven. "Of modern fabrics that I saw ... I admired the velvets of Kashan the most .... silk carpets are still made to order in

Kashan and Sultanabad, and as magnificent and costly as heretofore" (Curzon : Vol. 1. p.369). Much of the silk came from the Caspian provinces or from outside Iran. The Consul at Resht reported in 1894 "The usual quantity of spun silk was exported to different provinces in Persia". The provinces are listed below:

Name	Quantity in Bales	Value in Sterling
Tabriz	140	184,080
Baghdad	864	16,588
Hamadan	172	3,302
Kashan	790	15,168
Isfahan	185	2,886

The list reveals that the value of silk exported from Rasht to Kashan was comparable to that of the largest cities in Iran.

Imports to Gilan from Kashan were reported in 1907 as drugs, opium, tambaku, rose water and coppers for export to Russia; exports to Kashan were "silk, rice, sugar, naptha, iron and Russian cotton goods".[*] The last item in the list is significant; local textiles, apart from carpets, had been under severe competition from foreign markets, and much of Kashan's former trade had been lost by the 1890's, which perhaps accounts for the emphasis on local ruin and delapidation given by European travellers.

But the expansion of trade contacts with overseas markets, while allowing cheap foreign machine-woven goods into Iran,

[*] Such a list reads like Strabo's account of exports from Roman Britain. It tells us about as much.

also provided opportunities for export. In the same decade which saw the ruin of much of the Persian cloth trade, the manufacture of woollen carpets for export was revived in Tabriz. The possibilities were recognized in other parts of Iran; Mashad began weaving carpets, and foreign capital and control, in the form of the British Carpet Manufacturing Co. in Arak (Sultanabad) made its influence felt. Cotton twist was exported from Kashan to Arak; wool was procured from Gulpaigan.

Carpet making spread to Kashan, and it is worth quoting Edwards' account of its inception there.

"... The good merchant counted among his activities the sale of merino yarn from Manchester, for use in the textile industries of his native town. But the trade had fallen off and the Hajji found himself in possession of a fine quantity of merino which was unsaleable. He remembered then that his young wife had been a skilled weaver in Arak, and he suggested to her that she should weave a rug with the yarn in his store. A suitable design was chosen; the yarn was given to be dyed; and in due course the first modern Kashan rug was born."

"Its workmanship was of the best; its surface as soft as velvet; its colouring rich and clear. It was examined with critical eyes by the textile experts of Kashan; and it was approved. For, indeed, a rug had never before been woven in Persia with Australian merino."

"A second rug was soon started in the house of Burujirdi and a third in the house of Tabatabai - both prominent merchants of Kashan whose sons are still producing carpets there. All three rugs were quickly sold. The movement was set in train and began rapidly to expand; for the women workers of the moribund textile industries took up carpet weaving with alacrity.

"Thus was revived - after two centuries of quiescence - the carpet - weaving industry of Kashan." (Edwards (1953), p.334.)

Two points stand out from Edwards' narrative: Kashan had already a long tradition of weaving and an international, if somewhat faded, reputation which helped establish a place in the export market; also, the use of imported merino, entirely

novel, made the revival possible.

Kashan was drawn into the pattern of Persian and international trade. Demand for Kashan carpets was considerable and local entrepreneurs from the city established revived or intensified their contacts with neighbouring settlements, such as Nushabad, Aran and Bidgol, which had formerly been producing cloth. Although there have been fluctuations in the carpet trade this century, there has been a steady accumulation of capital by those who control carpet manufacture and distribution. Capital accumulation, the expansion of export markets outside the region and the beginnings of technical innovation, together with increased political stability were major developments preceding the growth of large-scale industry in Kashan in the present century.

2. Industrial Structure

The aim of this section is to analyse types of industry and changes in manufacturing, in particular technically - induced manufacturing scale shifts, using modern material from Government reports and censuses supplemented by interviews in the field.

1) The Data: Among the published censuses available since 1956 the 1963 industrial census gave more detailed information than either the 1956 or 1966 population censuses, but comparisons are complicated by the different aims, methods and industrial classifications adapted in the three sources. The same problem was encountered by Clark and Clarke for Kermanshah: "For example, in the 1956 and 1966 Censuses

information of a socio-economic nature was collected as part of a broad assessment of the demographic characteristics of the country, whereas in the 1963 industrial census an attempt was made to evaluate the contribution of the industrial sector to the national income and provide a basis for a 'study and analysis of the country's industrial development'" (p.53). The industrial census referred only to cities, ignoring the rural areas.

For Kashan, however the author was fortunate to obtain not only the published 1956 and 1966 Census Volumes and the 1961 and 1963 industrial censuses, but also the results of an unpublished industrial census conducted at the same time as the 1966 census of Population and Housing by the Iranian Statistical Centre. The census recorded every industrial establishment in Kashan City and Aran/Bidgol, its precise location, six-figure industrial classification, and the numbers employed within. Extensive use of this data will be made in this and subsequent chapters.

Again, comparison of the 1966 industrial censuses with the other censuses is beset by problems.

(1) The 1956 population census gives the number employed in major industrial categories in Kashan City, but not Aran/Bidgol and does not include information on the number of workplaces, whereas the unpublished 1966 industrial data gives numbers employed in each industrial category in great detail, together with the number of workplaces, but does not distinguish between the sexes. It is possible, then, to examine changes in numbers employed in detailed categories, but not in the number of

TABLE 8:1 EMPLOYED POPULATION OVER 10 YEARS OF AGE BY MAJOR INDUSTRY GROUP KASHAN CITY

	KASHAN CITY 1956				KASHAN CITY 1966			
	MALES	FEMALES	TOTAL	%	MALES	FEMALES	TOTAL	%
1. Agriculture, Forestry, Hunting, Fishing.	1392	14	1406	7.1	1028	20	1048	4.6
2. Mining and Quarrying	1	-	-	-	-	-	-	-
3. Manufacturing	6506	6387	12893	64.8	7783	7086	14869	66.6
4. Construction	911	2	913	4.6	1135	1	1136	5.1
5. Elec., Gas, Water and San. Serv.	81	-	81	0.4	238	1	239	1.1
6. Commerce	1745	5	1750	8.8	2108	11	2119	9.5
7. Transport, Storage and Communication	577	1	578	2.9	613	4	617	2.8
8. Services	1793	394	2186	11	1716	366	2082	9.3
9. Activities not adequately described	82	2	84	0.4	143	40	182	1
	13087	6805	19892	100	14763	7529	22292	100

Data from First National Census of Iran, November 1956, 22, 37; and National Census of Population and Housing, November 1966, 12, 53.

TABLE 8:2 MANUFACTURING INDUSTRY IN THE URBAN AREAS: 1956, 1961, 1963, 1966.

Type of Industry	KASHAN CITY 1956(1) No. Empl.	1961(2) Empl.	1961(2) Estabs.	1963(3) Empl.	1963(3) Estabs.	1966(4) Empl.	1966(4) Estabs.	ARAN 1963(3) Empl.	ARAN 1963(3) Estabs.	BIDGOL 1963(3) Empl.	BIDGOL 1963(3) Estabs.	ARAN/BIDGOL 1966(4) Empl.	ARAN/BIDGOL 1966(4) Estabs.
1. Food Manufacture	572	303	120	435	157	530	171	82	22	38	15	119	37
2. Beverages	1	-	-										
3. Tobacco	19	-	-										
4. Textiles	M4500 F6062	4844	1727	4669	869	5572	624	48	28	120	70	275	144
5. Footwear & Clothes	439	373	193	390	218	363	208	17	12	2	2	22	19
6. Wood and Cork	171	131	86	22	15	219	121	23	14	12	6	20	18
7. Furniture and Fixtures	-	114	73	138	93								
8. Paper & Products	-	5	3	6	4	7	3						
9. Printing	3												
10. Leather	41	4	4			11	9						
11. Rubber	-	2	2										
12. Chemicals	178			160	32	43	4	17	8	20	4		
13. Petrol & Coal	18											21	9
14. Non-metallic mineral products	92					94	18						
15. Basic metal	2	103	67	188	111			18	9			27	16
16. Metal products	381	144	87			246	135						
17. Machinery	3			3	2								
18. Electric Machinery	6			12	8								
19. Transport Equipment	61	81	15	106	58	98	57	9	6			10	10
20. Miscellaneous													

Data from (1) First National Census of Iran, November 1956, 22, 31-32.

(2) Work Premises and Workers - City of Kashan, 1961, 2-3.

(3) Report on the Industrial Census of Iran, August 1963, series 2, Central Ostan, 11-25.

(4) Unpublished I.S.C. industrial Census, 1966.

workshops.

While none of the industrial censuses distinguish between male and female employees or mentions household industries, the population censuses include a large number of females in industrial groups, who are in fact employed in household industries. Many of the discrepancies between the two types of data arise from that fact. (II) Modifications have been made to industrial classifications in some cases. (III) The accuracy of the censuses varies. Detailed study of the 1961 and 1963 industrial surveys leads one to suspect that their coverage, was not so thorough as the 1966 census, which was conducted on a house to house basis, though it is impossible to give a precise mathematical assessment in the matter.

3. Changes in Industrial Structure

Turning first to the overall picture of industrial change, Table 8:1 reiterates the point made in chapter four that the greatest increases in the decade 1956 to 1966 were in manufacturing industry, where the number of male workers in Kashan City rose by 1277 and female workers by 699. The proportion of the total workforce employed in the group rose from 65 to 67 percent. The number employed in agriculture and services declined during the period.

Types of Manufacturing industry are shown in Table 8:2 which gives a detailed analysis of employment and numbers of establishments from the four main statistical sources. Under the headings given in the tables textiles account for a very high percent of employment in manufacturing. If the number of women employed in manufacturing is subtracted from the 1966

and 1966 population census group totals a higher degree of comparability is possible with the 1961 and 1963 survey, since most females in manufacturing are in fact employed in households. Textiles will be dealt with further later in this chapter but it should be noted here that the evidence of the four censuses suggests that the total number of establishments is declining, while the numbers employed are increasing, which indicates a scale-shift to larger production units in the industry. The uncertain information on Aran and Bidgol points to an increase there in numbers employed and in the number of establishments.

Manufacture of food products is the next most important group after textiles, though in Kashan City the numbers employed decreased from 573 in 1956 to 530 in 1966. A breakdown of the group into minimum list headings showed that 103 of the 171 industrial establishments were ordinary bread bakers and 26 were confectioners. Kashan has only 3 small flour mills for nearly all of the city's flour is imported.

Employment in the manufacture of footwear and clothing declined in the intercensal period as the industries came under increasing competition from goods mass-produced in Tehran and elsewhere. Woodworking and furniture construction are declining for similar reasons. During the intercensal period there was but a slight increase in the numbers employed in "non-metallic mineral products". The stability of the labour force size in the group, which is mainly comprised of the brick-making trade, masks the fact that

there has been a large increase in production, mainly for new houses in the suburbs.*

4. Size and Location of Manufacturing Establishments

A further indication of the slow shift in scale from a large number of small establishments to a smaller number of large establishments can be gained from Table 8.3 comparing 1963 and 1966. In textiles, and footware and clothing - the two largest groups - there was a decrease in workshop numbers mostly in the size range 1 - 4 employees, but an increase in overall employment. In food manufacture and transport equipment manufacture there was also a decline in the number of workshops in the smallest size category and an increase in the large size categories, accompanied in food manufacture by a recorded increase in employees of nearly 25 percent. Admittedly, even allowing for the differing criteria used for classifying industrial groups in the two censuses, the three years between 1963 and 1966 is not a long enough period for really valid comparisons to be made.

The overall size distribution of workshops in 1966 is however significant. It can be seen from the table that only in textiles are there any establishments with more than ten employees. In fact over half the employees in manufacturing - 3557 out of 6949 - were employed in large textile factories - defined as having more than ten employees. Within the textile industry 3158 persons were employed in the four largest establishments. There is then, in textiles, a fundamental split between the large number of small, unmechanised workshops

* Furniture is increasingly being made of wholly unattractive tubular metal rather than wood.

TABLE 8:3 CHANGES IN ESTABLISHMENT SIZE IN SELECTED INDUSTRIES IN KASHAN CITY 1963-1966

Type of Industry	Total Establishments 1963(1)	Total Establishments 1966(2)	Number Employed 1963 1-4	Number Employed 1966 (1) 1-4	(2) 5-9	(1) 5-9	(2) 10-50	(1) 10-50	(2) >50	(1) >50	(1) Employed	(2) Employed
1. Food	157	171	139	131	17	40	1				435	530
2. Beverages												
3. Tobacco												
4. Textiles	869	624	813	498	45	100	11	21		5	4669	5171
5. Footwear & Clothing	218	208	212	199	6	7	1		1		390	464
6. Wood & Cork 7. Furniture & Fixtures	108	121	107	111	1	10					160	219
8. Paper												
9. Printing												
10. Leather												
11. Rubber												
12. Chemicals	43	4	32	4	10	1					160	8
13. Petrol & Coal												
14. Non-Metallic Mineral Products												
15. Basic Metal												

Continued.

TABLE 8:3 (Continued) CHANGES IN ESTABLISHMENT SIZE IN SELECTED INDUSTRIES IN KASHAN CITY, 1963-1966

Type of Industry	Total Establishments 1963(1)	Total Establishments 1966(2)	Number Employed 1963 1-4	Number Employed 1966 1-4	1 5-9	2 5-9	(1) 10-50	(2) 10-50	(1) 50	(2) 50	(1) Employed	(2) Employed
16. Metal Products	111	133	107	129	44						188	246
17. Machinery												
18. Electrical Machinery												
19. Transport Equipment	58	42	52	42	6						106	98
20. Miscellaneous												

Data from (1) Report on the Industrial Census of Iran, August 1963, Series 2, Central Ostan, 11-25

(11) Unpublished I.S.C. Industrial Census, November, 1966.

and the mechanised factories which employed two thirds of those working in factories or workshops. The progressive trend towards smaller numbers of larger units is clearly the technically induced manufacturing scale shift that one would expect in a place undergoing a genuine 'industrial revolution'.

Workshop location in Kashan and Aran/Bidgol is plotted on Figure 8:1. As might be expected, nearly all the smaller workshops are found in the old city of Kashan and of Aran/Bidgol with a heavy concentration in the Kashan bazaar, where many of them are producer-retailers, while the larger modern factories are located in the northern suburbs of Kashan, where there has been cheap land available for building. In Kashan City the number of workshops and manufacturing workers, excluding those employed in units with over 10 persons, correlates significantly with a number of demographic indices - with high population densities per acre ($r = 0.34$), with a low fertility rate ($r = 0.59$), low female activity rates ($r = -0.48$), and a high sex ratio in the age group 15 - 19 years ($r = 0.44$); of great significance is the association between manufacturing premises and distance to the city centre ($r = -0.60$), which indicates that the total number of industrial workshops found in any district is in direct proportion to the centrality of the district. Most workshops are found in and around the bazaar, where survive relic features of specialisation by product, rather than function.

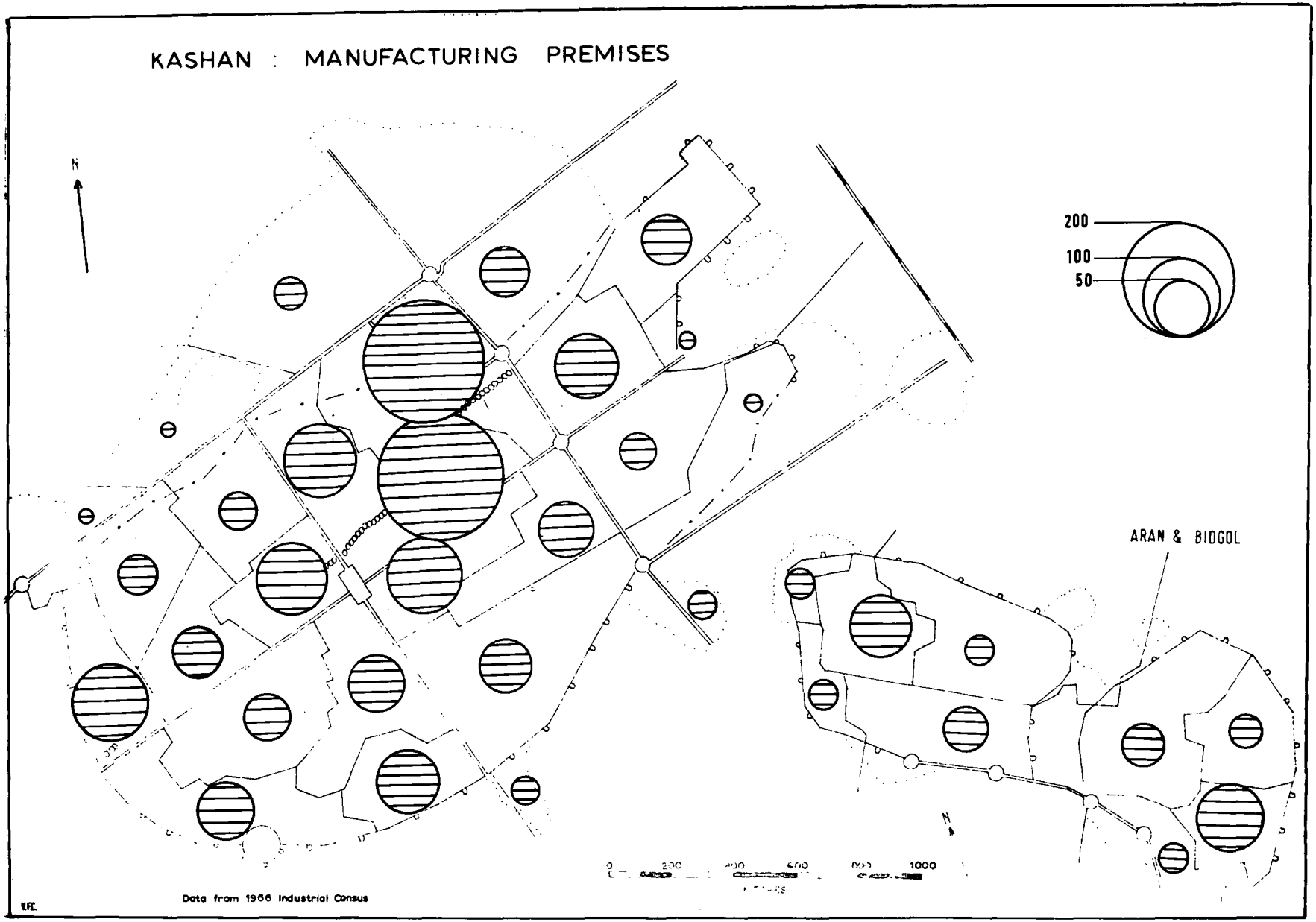

KASHAN : MANUFACTURING PREMISES
N
200
100
50
ARAN & BIDGOL
N
0
200
400
600
800
1000
Data from 1966 Industrial Census

Figure 8.1

5. Activity Rates

Economic activity in Kashan and Aran/Bidgol is affected by the demographic structure of the population discussed earlier. Female activity rates in particular are associated with the character of populations in the various districts, there being a statistically significant correlation between female economic activity and effective fertility ($r = 0.54$), female activity and the proportion of the population less than five years of age ($r = 0.54$).

Total and female economic activity rates for the urban districts are given in Table 8:4. A gradient can be discerned in total activity rates from west to east in Kashan, with the bazaar standing out as an area of "low" residential rates, the southern suburbs as districts of high activity, and a continuation of this in Aran/Bidgol. Activity rates range from 45 to 55 percent in western Kashan up to 80 and 90 percent in Aran/Bidgol. Female activity rates, illustrated in Fig. 8:2, show the same gradient, though with a greater range, from 20 to 30 percent in western Kashan to over 90 percent in one district of Aran. Taking Kashan City as a whole, between 1956 and 1966 there was a decline in the total activity from 62 to 57 percent, for although the population increased by 27 percent the number of employed persons rose by only 13 percent. At the same time there were shifts in the age structure of the employed population.

An analysis of the age composition of the employed population in Kashan is given in Table 8:5. Education occupied a considerably higher proportion of persons in the

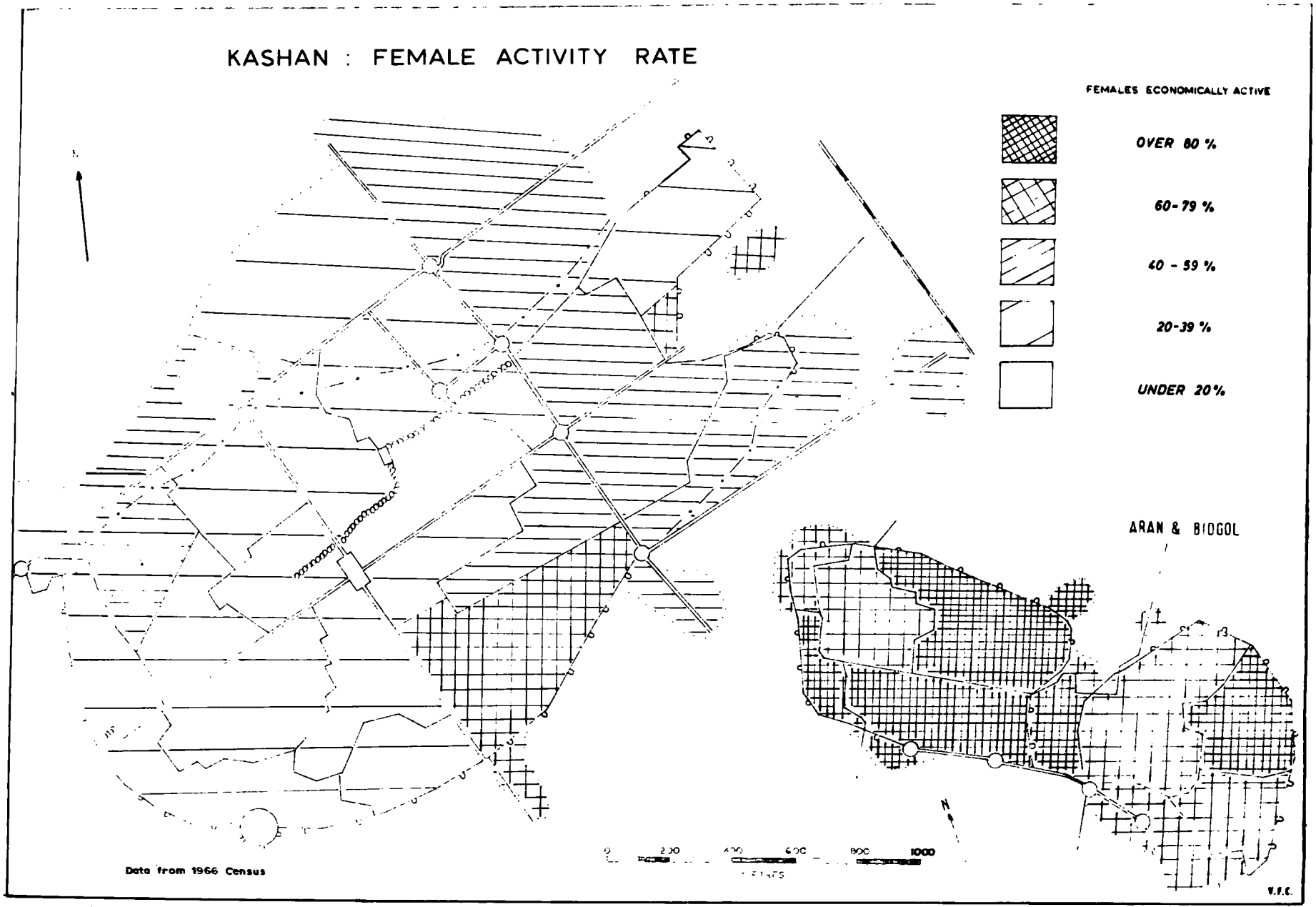

KASHAN : FEMALE ACTIVITY RATE
FEMALES ECONOMICALLY ACTIVE
OVER 80 %
60-79 %
40 - 59 %
20-39 %
UNDER 20%
ARAN & BIDGOL
Data from 1966 Census
200
400
600
800
1000
METRES
V.F.C.

Figure 8.2

TABLE 8:4 ECONOMIC ACTIVITY RATES IN THE URBAN AREAS 1966

Percent of Population over Ten Years of Age economically active

DISTRICT	TOTAL	FEMALES	DISTRICT	TOTAL	FEMALES	DISTRICT	TOTAL	FEMALES
KASHAN			KASHAN			KASHAN		
1	38	25	13	64	45	25	40	27
2	42	26	14	59	34	26	20	13
						ARAN/BIDGOL		
3	35	23	15	67	40	1	64	40
4	26	18	16	25	17	2	87	55
5	33	24	17	37	26	3	76	48
6	13	9	18	31	25	4	69	43
7	54	36	19	37	25	5	80	51
8	71	46	20	33	23	6	87	53
9	45	30	21	35	24	7	63	43
10	47	31	22	23	16	8	66	42
11	40	29	23	22	16	9	93	55
12	26	18	24	40	28	RURAL AREA	75	67

Data Unpublished from I.S.C. Industrial Census, November 1966.

TABLE 8:5 AGE STRUCTURE OF THE ECONOMICALLY ACTIVE POPULATION 1956-1966

KASHAN CITY	10-14 YRS	15-19 YRS	20-24 YRS	25-44 YRS	45-64 YRS	OVER 65 YRS	
TOTAL 1956	2481	2678	2806	7243	4032	1004	20242
PERCENT	12.3	13.2	13.9	35.8	19.9	4.9	100
TOTAL 1966(2)	2696	3132	2429	9777	4042	758	22834
PERCENT	11.8	13.7	10.6	42.8	17.7	3.3	100
PERCENT CHANGE	+ 8.7	+ 17	- 13	+ 35	0.2	-25	+ 12.7
ARAN/ BIDGOL(2)							
TOTAL 1966	1832	1431	1218	4650	1798	592	11521
PERCENT	15.9	12.4	10.6	40.4	15.6	5.1	100

Data from (1) First National Census of Iran, November 1956, 22, 21.

(2) National Census of Population and Housing, November 1966, 30-31.

10-14 age group than it had done in 1956 and the numbers employed at that age rose only slightly. In the older age group of 20 - 24 years numbers decreased, due to military service and, probably, misreporting. The major increase in the workforce was in the 25-44 years age groups; employers are using the better educated, younger and more active persons in the modern industries, and there has been no increase in the numbers employed in older age groups. These changes, associated with the erosion of the traditional sectors of the city's economy, are further shown in worker status : some 40 percent of those self-employed are over 40 years, while less than a quarter of private wage earners are over that age.

By comparison with Kashan, Aran/Bidgol had very high activity rates in all age groups. Like Kashan, the self-employed are distinctly more aged. Private wage earners are mostly in two groups - those 15-19 years who work in local small textile manufacturies, and those over 25 years, many of whom commute to Kashan.

6. Occupations

Changes in the composition of occupation groups are shown in Table 4:5. Comparison is made difficult by the regrouping of occupations between the two censuses. Primary occupations had 339 fewer men in 1966 than 1956, a decline of nearly a quarter. Amongst the factors accounting for the decline are the incorporation of land once used for agriculture into the urban land market and the alternative attractions to younger men of wages and fixed working hours in the factories.

Service occupations were the only other group to show a decrease in the intercensal period. Unlike Kermanshah and other Iranian cities, where apparant decreases in service occupations are due to census regrouping and where, in fact, the tertiary sector is expanding its share of the labour market, comparison with figures for industrial employment reveals that Kashan has had a genuine, if small, decline in the number employed in services and tertiary activities in general.

Employment in all occupation groups rose in the intercensal period. Large rises in the number of males in production occupations, groups (7,3,5) are of particular importance; the 24 percent increase here, however, is partly inflated by the inclusion of transport and mining workers in 1966, and the true figure is 21 percent. Such expansion, at nearly twice the average rate for occupation groups in Kashan, in an occupation group already accounting for 55 percent of male employment in 1956 indicates that Kashan's 'industrial revolution', under way by 1956, continued to accelerate in the decennium. Numbers in professional, technical, administrative and clerical posts all rose, but by far the greatest increase was among professional and technical workers - a fact largely accounted for by increased governmental employment of those with vocational training. Aran and Bidgol are distinguished by high employment of males in production - 60 percent, and agriculture - 25 percent, with very poorly developed tertiary employment.

7. The Modern Textile Industry

The establishment of the Kashan Spinning Company in 1932

saw the beginnings of the modern textile industry in Kashan. At first the company's activities were confined to the machine spinning of cotton yarn, to be sold for the weft and warp of hand-woven carpets. Capital for the enterprise came initially from bazaar merchants (bazaari), most of whom had acquired their wealth in the carpet trade. Under the management of a certain Mr. Tafazoli the factory expanded and diversified its interests into cloth production - in competition with failing foreign producers. A number of engineers were brought in from western Europe to provide the technical expertise lacking in Iran at that time. During the 1950's and early 1960's home market potential increased under the stimulus of oil revenues and foreign aid and the company, raising capital through floating stock on the Iranian market, expanded its enterprises rapidly.

By 1968 the Kashan Spinning Company was the second largest spinning and weaving company in Iran. It occupied two sites; the older factory was sited on Khiaban Pahlevi - the road to Tehran -, the newer factory, completed in 1963 was on a site about half a mile beyond the built-up area to the north, again on the Tehran road. At this new "Rayon Factory" was concentrated production of artifical fibres. The recorded number of employees in 1966 was 859 in the new factory and 999* in the old. Capital expenditure continued at a high rate in the 1960's, with over £1 million spent from 1968 to 1969 on expansion of spinning and weaving activities.

The other major employer of labour in Kashan is the

* No doubt a bogus figure. The real figure was probably something over 1,000 persons.

Kashan Velvet Company. Originally the company was a small family business concerned with irrigation. In the 1940's a Kashani merchant moved his own capital into the business and began to manage it, turning from irrigation to mechnized textile production, and building up a thriving trade in lines not directly in competition with the Spinning Company. Not that this was entirely accidental; the same person is President of the Board of Directors for both companies. The two major units owned by the company are on the road to Fin, the larger unit employed 658 persons and the smaller unit 612 persons in 1966. Further to illustrate the importance of family connections and personal influence on the development of industry we may refer to the Kamvaye Iran Company - a smaller unit, but expanding employment and production. A share company based in Tehran, it produces knitting wools and wool fibre threads. The principal raw material is natural wool imported from Australia, though artificial fibres are imported from Germany, Austria and Japan. In its second year of production, 1968, the factory employed about 200 workers. The President of Kashan Spinning and Kashan Velvet is also honorary Chairman of the Kamvaye Iran board of directors.

Raw materials for Kashan's major textile factories came from a variety of sources. Artificial chemicals are imported from the Tehran industrial complex and in some cases from Europe and Japan. Cotton comes from the districts of Mashad, Gireh and Qom in Iran, while water, essential to mechanized production comes from deep wells, usually within the factory premises. Water hardness, it is claimed, is more of a problem

than water shortage.

Without entering into a detailed economic analysis, it is possible to cite a number of reasons for the success of the modern textile industry in Kashan. Probably the single most important reason for success has been the quality of management: during interviews conducted in 1968 in the factories and local banks several businessmen agreed on this point; with a scarcity of good management in Iran as a whole the expertise of Kashan's leading industrial family has itself been an attraction for companys like Kamvaye Iran. Capital for industry came at first from carpets and trade, but in the Iranian context it was unusual to continue to invest in long term production, rather than the quick profit. Recently government investment in the industry has helped development and Kashan Velvet and Rayon received a direct investment loan of 250 million riyals. Transport has been no problem. Kashan City is on the Tehran - Ardestan railway, but since the road to Qom and Tehran was surfaced imports and exports are shipped by lorry. Freight charges to and from Tehran in 1968 were 300 riyals (£1.62) a ton, while a ton of cotton might be worth 50,000 riyals (£270.33) and a ton of finished cloth 300,000 riyals (£1,622). The high value to weight ratio therefore completely outweighs transport costs. Kashan Shahrestan has, as we have seen, a ready supply of labour, though unused to modern industry, and the expanding Iranian market provides ready outlets for the finished product.

8. The Traditional Textile Industry

Manufacture of textiles by small unmechanised units has been a significant feature of Kashan's economy for centuries, and at present approximately 7,000 persons, mostly women, in nearly 5,000 of the city's households are occupied in the industry. Apart from the great number of units the most striking aspect of the industry is its complexity of organization. From raw material to finished product the processes are in the hands of a number of different operators, often in different parts of the city. Fine degrees of specialization in production are accompanied by a high degree of mutual interdependance among operators. There are also significant conclusions to be drawn from the industry on the relations between social and economic patterns in Kashan City and the villages.

Carpet weaving is the most important of the traditional textiles, in terms of numbers employed, individual value of the product, and overall value to Kashan's economy. The

stages in carpet production will therefore be examined first, after which, other textiles and the spatial distribution of workships in the urban areas, and finally the household industries of Kashan and Aran/Bidgol.

(1) Carpets:

The stages in the manufacture of a Kashan carpet are much the same as those for most Iranian non-tribal carpets. For convenience the stages may be divided into four:

(i) Wool is the principal raw material used for the carpet pile ; cotton is used for the weft and warp. The wool and silk come from Gulpaigan in the north ; no wool now comes from Australia. Carded cotton comes from Isfahan and the kavir villages. The raw material is sold by importing agents to the spinning factories. A few, such as the Saba Co. are mechanised, but there are numerous small workships with a labour force of boys manually operating simple spinning devices.

(ii) After spinning the cotton, wool or silk it is sold to a dealer in yarn (nakh). Most such dealers have premises in the bazaar, where, in their turn, they sell to the carpet maker.

The carpet maker, who may control up to 100 looms, and in some cases even more, is the central figure in the production process. He contracts with a dyer to dye the wool. The dyers' workshops are heavily concentrated in one part of the bazaar. They are closely interdependant; if, for example, a dyer receives an order for blue and has only red in his vats at the time he will pass the order on. Concentration of dyers gives a contractor maximum choice on what is available.*

* Vegetable ingredients are still the bases for many dyes: use of artificial dyes, often cheaper and more brilliant in hue than vegetable ones, is actively discouraged since it reduces the carpets' value.

After dyeing, the skeins of wool are hung out to dry on the rooftops, where their bright colours are a most attractive scenic element in the townscape.

(iii) Carpet designs are purchased by the owner from shops in the bazaar; in each, perhaps 5 or 6 highly skilled professional designers are employed. Design prices vary considerably with quality and the designer's reputation : they might range from £10 to well over £100 for a carpet. Patterns for Josheqan carpets are memorized by the weavers.

(iv) Carpets are woven by households under contract to the owner, who supplies both wool and design, while the weavers provide the loom. The previous stages of spinning, dyeing and design are carried out in Kashan City, but, as we have seen, Kashan carpets are woven throughout the shahrestan. Kashan City has only about 25 percent of the carpet looms; a further 20 percent are in Aran/Bidgol and the rest in the villages. Carpet owners undertake to deliver the wool to villages and collect the finished items; a stockpile of materials to last the winter must be built up during summer and autumn in settlements difficult of access. In addition to materials the owner advances financial credit to families while the carpet is being woven. There are numerous ways in which an unscrupulous merchant may benefit from the weavers' ignorance and constant need of working capital.*

(v) Once finished, the carpet is clipped, washed and sent to

* One of the most notorious is that while carpets are woven by the zar, which is 104 cm square, the dealer sells by the square metre. In some instances the 0.8 percent difference goes as fee to the agent selling the carpet for the owner.

the bazaar, where it is sold through carpet agents. Throughout the process of carpet making, when breaks in function occur, materials are moved from one part of the city to another by porters and donkeys, causing congestion of traffic in the bazaar and the more-frequented alleyways.

(2) Other Textiles

Most Iranian town producing traditional textiles can show a diversity of product types: the difference between some types is not always easy for the uninitiated to discern. Gelims are a kind of short-knapped coarse tapestry woven on a horizontal loom with a flying shuttle: zilu is a kind of pileless carpet from four to fifteen or more feet wide, of wool or cotton, woven on a vertical roller-beam loom in which the weft is passed through the warp by hand.

Up to the point of weaving the stages of production for these textiles and tailoring cloth are little different from carpet production, though the range of dyes is more limited and designs are crude. Carpet weaving, however, takes much longer than weaving cheaper products. Each carpet has an individual design and colour scheme, and requires skilled application over a period of months. The only labour force willing and able to undertake such labour are womenfolk, very poorly paid, who work in the home. By constrast spinning yarn, or weaving cloth, zilus or gelims are faster processes with a much higher turnover of lower-value goods and which are more easily organised into larger workshop units. The average workforce in 'large' gelim workshops is 16, in cotton spinning workshops it is 2.6 persons: the city had only 132 industrial

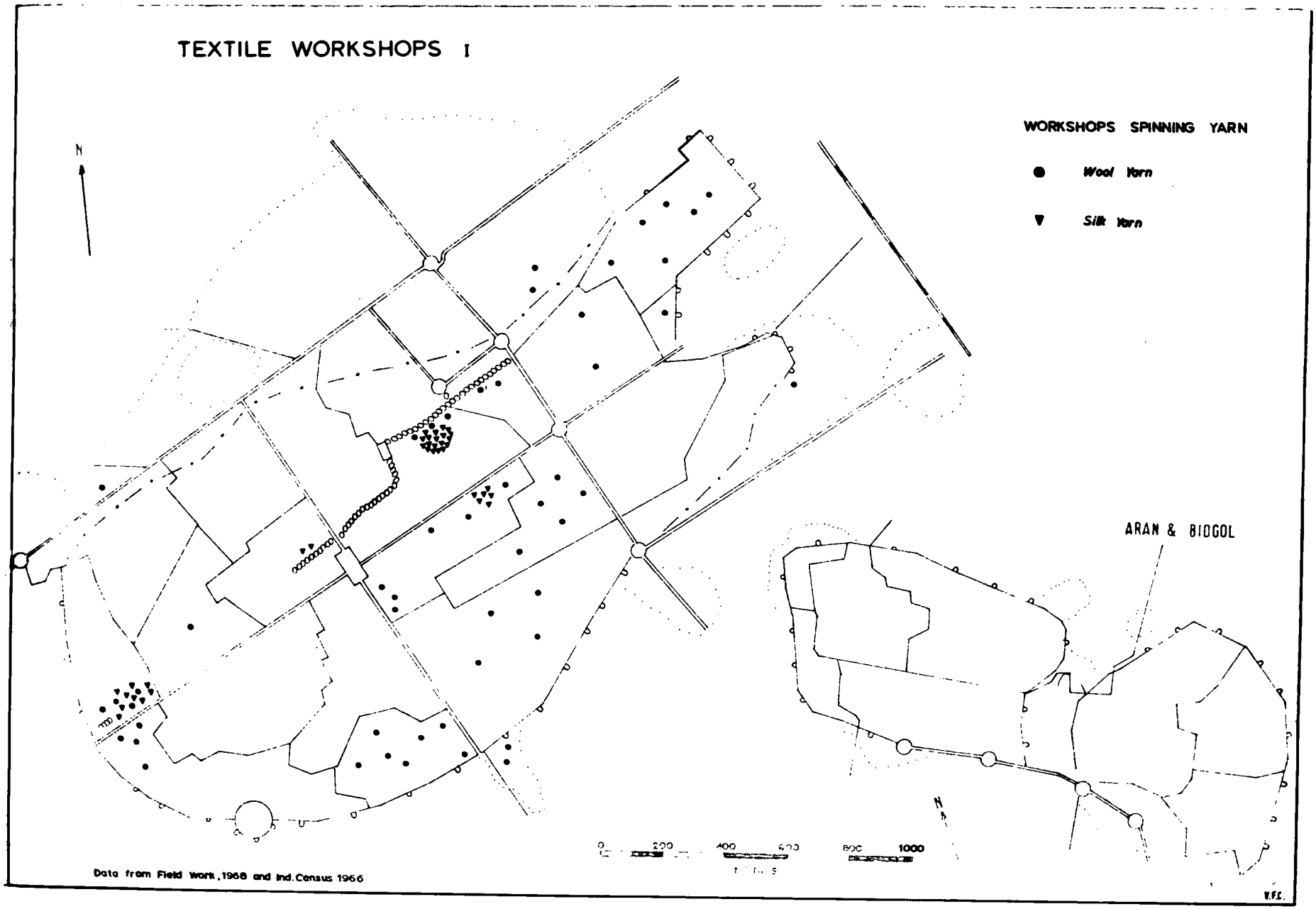

TEXTILE WORKSHOPS I
N
WORKSHOPS SPINNING YARN
Wool Yarn
Silk Yarn
ARAN & BIDGOL
N
0
200
400
600
800
1000
Data from Field Work, 1968 and Ind. Census 1966
V.F.I.

Figure 8.3

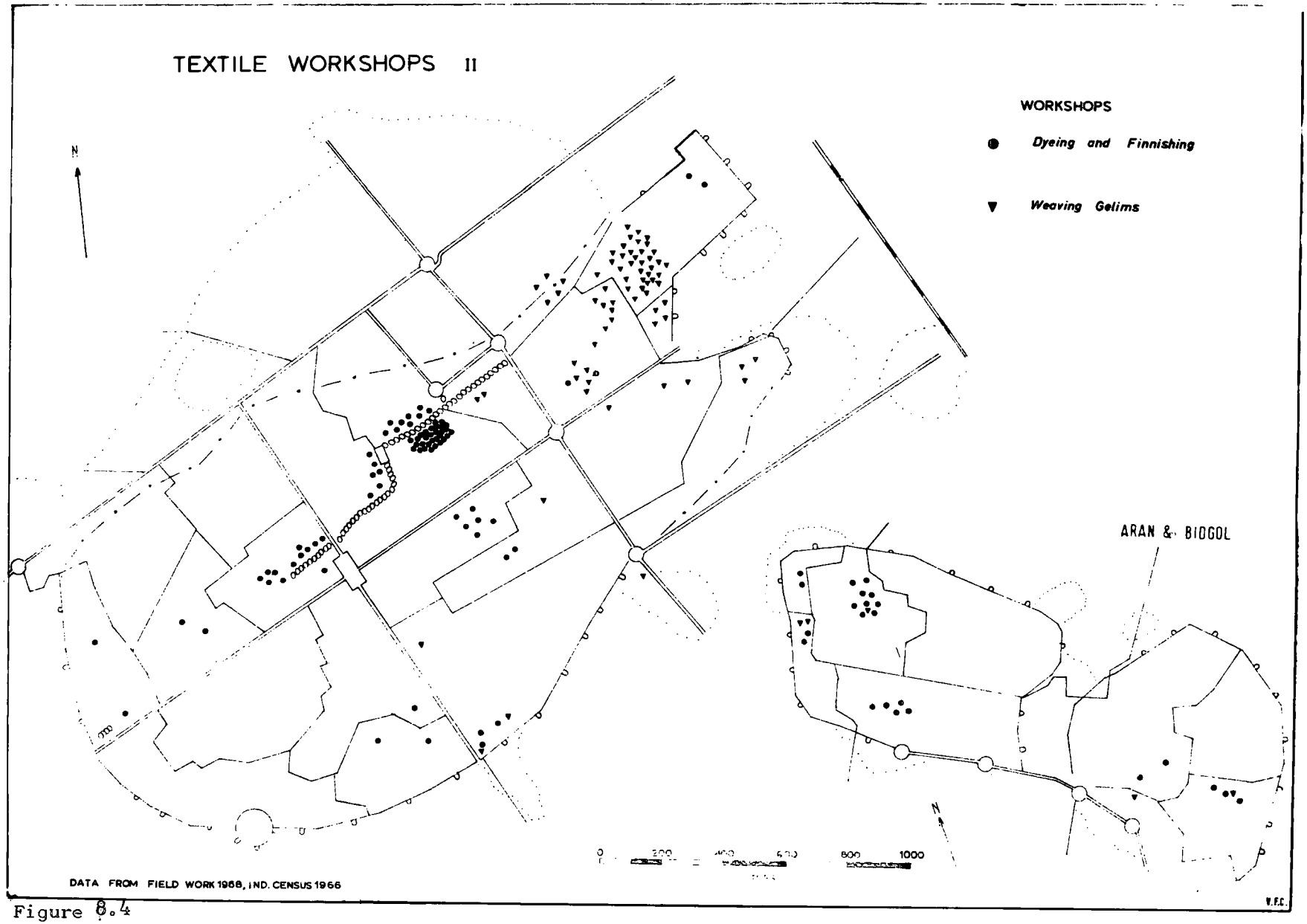

TEXTILE WORKSHOPS II
WORKSHOPS
Dyeing and Finnishing
Weaving Gelims
N
ARAN & BIDGOL
0
200
800
1000
DATA FROM FIELD WORK 1968, IND. CENSUS 1966

Figure 8.4

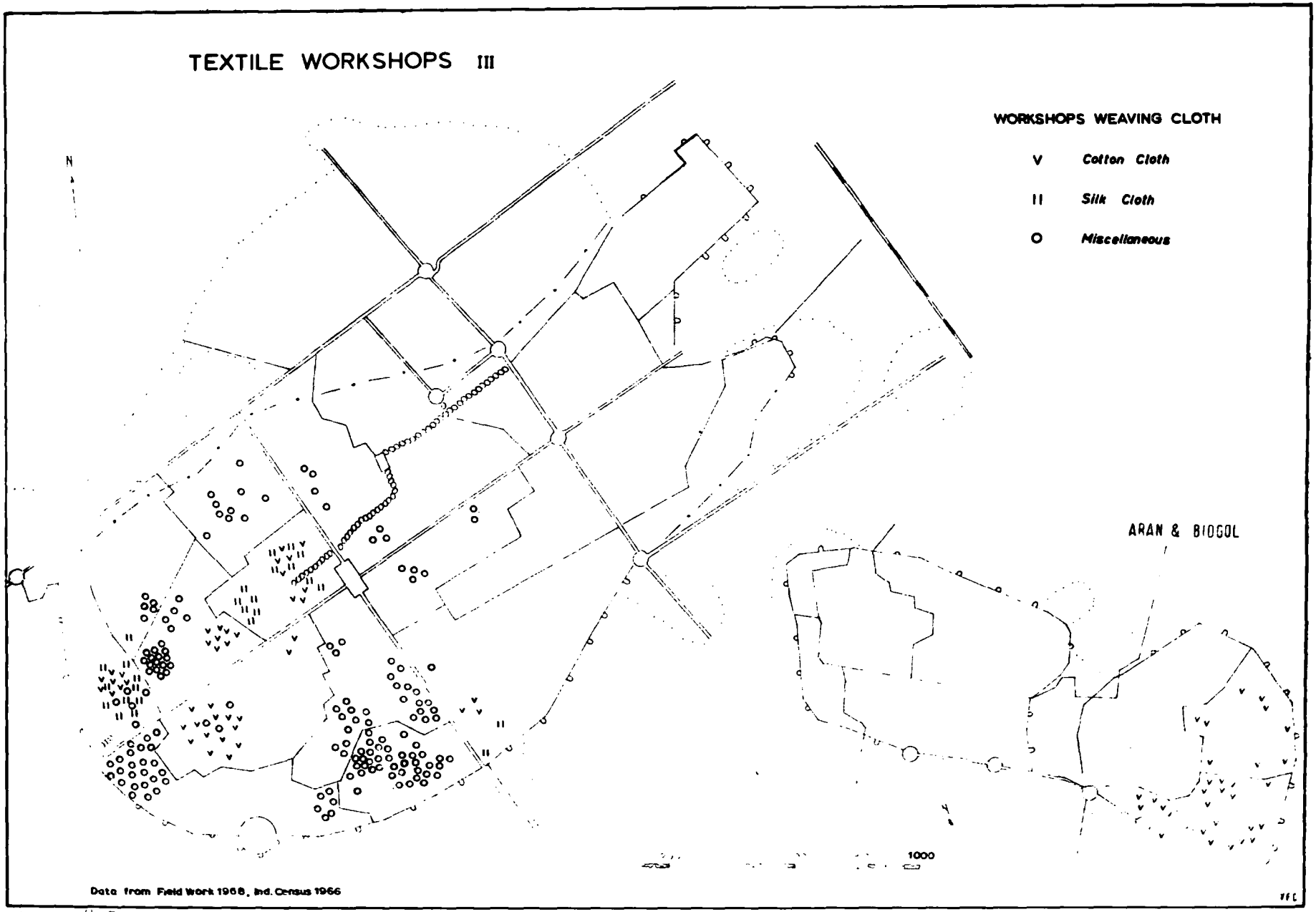

TEXTILE WORKSHOPS III
WORKSHOPS WEAVING CLOTH
V Cotton Cloth
II Silk Cloth
O Miscellaneous
N
ARAN & BIDGOL
1000
Data from Field Work 1968, Ind. Census 1966

Figure 8.5

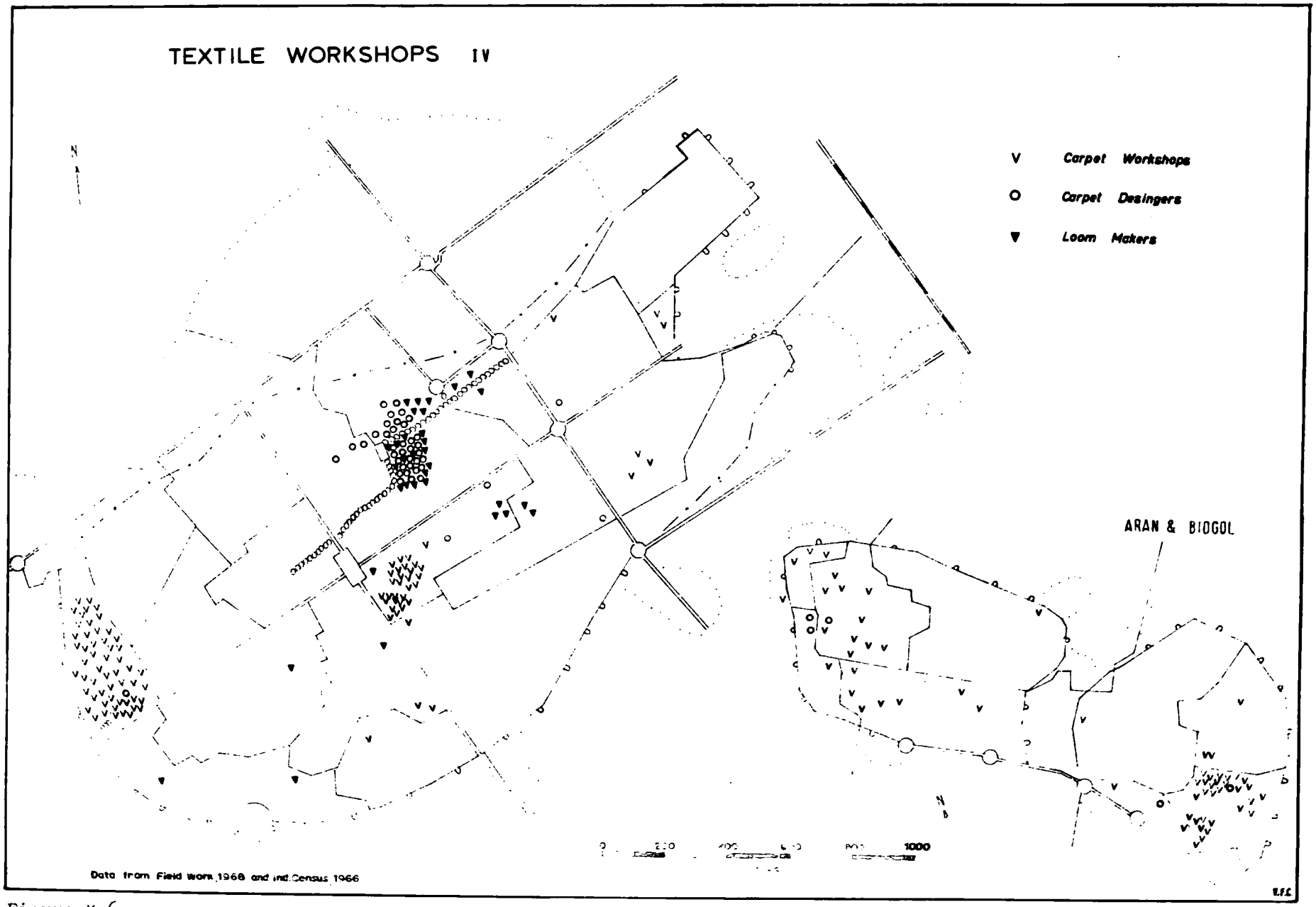

TEXTILE WORKSHOPS IV
N
V Carpet Workshops
O Carpet Designers
▼ Loom Makers
ARAN & BIDGOL
N
1000
Data from Field work 1968 and ind.Census 1966

Figure 8.6

workshops weaving carpets, the average size of workforce being 1.3 persons.

(3) Workshop Distribution

Distribution of workshops by type was mapped in Figs. 8:3 - 8:6. It can be seen that the traditional textile workshops are confined to the old city, and they may be divided into four categories.

(i) Workshops spinning yarn : those workships which spin wool or silk yarn are shown in Figure 8:3. Silk yarn workshops are located in one large cluster in the southern part of the main bazaar, and another at the other end of the bazaar near the Fin Gate. Wool spinning, which requires less skill and produces a product with comparatively low value added, is more widespread and is found in residential areas, where land values are lower than the bazaar. No spinning sheds were recorded for Aran/Bidgol.

(ii) Dyeing and finishing : (Fig 8:4) dyers of wool, cotton and silk and finishers of textiles - cleaners, repairers and others - are mostly found in the bazaar, for mutual inter-dependance between dyers encourages concentration, which also facilitates comparison buying. Aran has a similar clustering of dyers around Maidan Bozorg in enumeration district No. 8.

(iii) Weaving: it can be seen in Figures 8:4 to 8:6 that while the weaving workshops are distributed throughout the old city there is some clustering of product types. Poshte Mashad and the eastern districts have a near monopoly of workshops weaving gelimsin Kashan City but cloth weaving is found almost entirely at the western end of the city. Silk

cloth is woven near the bazaar and cotton-weaving establishments are found in districts 20, 21, 22, and in eastern Bidgol. Workshops weaving miscellaneous types of cloth are in two groups, one near the Fin Gate, the other just west of the Isfahan Gate in the South.

(iv) Carpets: workshops directly connected with carpet weaving are shown in Figure 8:6. Carpet design workshops are producer - retailer establishments : their's is a high quality low bulk product, and the shops can readily stand the high rents or key money of the central bazaar. Most are found in a group just to the southwest of the dyers, where again comparison buying is easy. Carpet weaving in workshops, as opposed to households is entirely confined to Districts 12 and 20 in Kashan, to eastern Bidgol and western Aran and in these cases a high proportion of the workshops in a group are probably owned by one man.

After analysing the distribution of workshops in the industry it was hypothesised that the location of different stages in production and distribution was related primarily to the differential price of land within Kashan City and Aran/Bidgol. Workshops, such as those spinning and weaving, with low value - added are located in the residential areas of the old town and many of these production workshops also require much land.[*] Workshops with a high value - added product, such as designers, or premises where materials are sold and the product changes hands, are located in the bazaar, where they can withstand the high land value rates and be in

[*] A spinning shed is usually at least 15 metres long by 3 metres wide.

a position of maximum availability to customers. Evidence for the differential price of land in the city is given in Chapter Nine.

Fine degrees of specialization in the industry are unaccompanied by mechanization, and the units of production remain small so that the mutual interdependance between units at some stages of production accounts for the clustering of some workshop types. But an explanation of why one textile type is often woven in one district but seldom elsewhere cannot be purely economic. The weaving of gelims or carpets does not require mutual interdependance between units. It was therefore hypothesised that the reasons for such clustering lay in social differences within Kashan and Aran/Bidgol, similar in some respects to the craft structure of the Yoruba town described by Bray (Bray, 1969). A more detailed knowledge of patterns of ownership in the industry in Kashan, and how they relate to family and "clan" groupings would throw more light on the factors behind the observed distributions.

It can be seen from the maps (Fig 8:2 - 8:6) that the east-west contrast in the social geography of Kashan City appears to be reflected in differences in types of traditional textile industry in workshops. Study of traditional industries in households elucidates the contrast.

9. Household Industry

(i) Numbers and types of household industry in the urban areas are given in Table 8:6. Kashan and Aran/Bidgol are, as the factor analysis in Chapter Six revealed, unusual among

TABLE 8:6

TYPES OF HOUSEHOLD INDUSTRY 1956 - 1966

KASHAN CITY 1956(1)	Number	Percent	KASHAN CITY 1966(2)	Number		Percent	ARAN/BIDGOL(2) 1966 Number		Percent
1. Rugs, Gelims, Zilus, etc.	4084	42.6	1. Carpets	4169	4278	83.7	3804	3811	85.2
2. Weaving Spun Yarns	1560	16.3	2. Gelims	109			7		
3. Cleaning Cotton	2	-	3. Weaving	53		1	25		0.6
4. Clothing	188	2	4. Spinning	302	675	13.2	508	596	13.3
5. Food, Oils etc.	117	1.1	5. Sewing & Knitting	355			88		
6. "Others"	3642	38	6. Cleaning Cotton	9		0.1	5		0.1
TOTAL	9591	100	7. Food Processing*	58		1.1	23		0.5
			8. Others	51		0.9	14		0.3
			TOTAL	5106		100	4474		100

*Not Comparable 1956-66.

Data from (1) First National Census of Iran, November 1956, 22, 48

(II) National Census of Population and Housing, November, 1966, 12, 80.

Iranian cities in the proportion of households with industry and the concentration of the home industry on carpets. The unpublished 1966 industrial census refers only to workshops and not to households, but we have seen over the entire spectrum of Iranian cities that household industry is strongly correlated with high female activity rates. Also, most carpet weaving, which makes up 84 percent of household industries, is done by women. Those facts, supported by field interviews, indicate that the map of female activity rates (Fig. 8:2) shows to a large extent the pattern of household industry in Kashan and Aran/Bidgol.

Following from this, it may it is reasonable to speculate that household industry is associated with low rates of literacy, high fertility and quite probably low family incomes.

A distinction must however be drawn between household and workshop textile industries, since household industry has a female labour force and its distribution is associated with the broad east-west social gradient in Kashan and Aran/Bidgol, while the workshop industries have a labour force of men and boys, and a distribution of product types associated with ownership / kinship groups in different quarters.[*] Stages in the production of textiles are the same for both workshop and household.

(ii) Changes in the number and type of household industry between 1956 and 1966 were considerable. Some 3642 miscellaneous household industries disappeared in the period,

[*] There is a statistically significant correlation between high sex ratios in the age group 15-19 and (i) manufacturing premises (r = 0.48) (ii) the proportion of premises in the textile business (r = 0.54).

but what most of these industries were is impossible to say, though it is unlikely that they had been a significant section in total household production. Carpet and gelim making together were the largest recorded category in 1956. The later census shows the proportion of carpets to gelims, with 4169 households producing carpets and 109 producing gelims. Together they made up 82 percent of household industry, increasing by 194 in the intercensal period, indicating the general stability in the carpet trade which results from continued demand both in Iran and abroad. Individuality and beauty are an essential part of the Kashan carpet, which does not lend itself to a subdivision of labour and mass production. Gelims also are individually made, for the customer decides on colour and pattern. They remain economic because labour costs for the 10-15 year old boys used are a small proportion of total production cost and because raw materials, which vary little in cost for machine-made or hand-made goods, are the most expensive input. A further indication of the relative value of raw material and labour is that gelims are sold by weight rather than width or the quality of workmanship. Competition from machine-made goods has not therefore forced a decline in the gelim or carpet industries. During the intercensal period, however, competition from machine-spun yarns reduced the number of household industries "spinning and weaving" from 1560 to 657.

(iii) The Structure of household industry in Aran and Bidgol in 1966 was similar to Kashan, though the proportion of households with industry was greater. Further evidence for

the greater relative importance of household industry in Aran/Bidgol is the number of hours worked by females in the two settlements. Whereas the recorded mean number of hours worked by females in manufacturing in Kashan during the week before the census was 29.3 hours, in Aran/Bidgol the mean was 38.7 hours.*

Household industry in both Kashan and Aran/Bidgol plays an important part in the urban economy. In interviews conducted by the author a number of carpet owners and weavers agreed that there are two major trends in the carpet industry. First, the high wages paid in the local large-scale factories were increasing the price of labour and owners in many cases were taking a master weaver, who directs the work of others, to other parts of Iran, such as Gulpaygan, Yazd or Najafabad and producing 'Kashan' carpets there. As yet the quality of these carpets did not match home-produced ones, but they were improving. Second, where the menfolk were earning high wages in the factories the women were less inclined to work all day for a pittance, and some families were abandoning carpet weaving. At the same time, some factory workers had saved enough capital to set up as a carpet owner and maker in their own right : carpets produced by them lack the skill or taste of the best weavers; also, having comparatively less capital than a large-scale operator they cannot afford good designs or to buy all the wool at one time, so that the carpets are irregular in dye-colour and texture.

* A figure of 31.4 hours was recorded for the rural area.

10. Conclusion

During the decade of the 1950's and during the early part of the 1960's Kashan City experienced what can only be described as an industrial revolution. The main feature of this most significant change was a shift in emphasis from a large number of small production - retailing works in the bazaar and textile workshops in the residential quarters of the old town to a small number of relatively large modern textile factories located in the new suburbs. Industrial growth during these years was precipitated by the events of a preceding period in which markets outside the region were expanded, capital was accumulated, and technical innovations were introduced. Recent industrial success has been due to a combination of good local management, with good fortune, in the production and marketing of a product which has a high value and low bulk. Yet there has not been a massive inflow of permanent residential labour, as might be expected in such a situation. Among the factors responsible for this are the availability of commuting labour from Aran/ Bidgol and neighbouring villages, and - as previous chapters have indicated - the volume of inmigratory labour is largely dependant on rural population densities and agricultural conditions and partly dependant on city size. The opportunities for expansion of the service sectors in Kashan have been no less than elsewhere, but it has not occurred.

We have seen that the traditional textile industry still plays an important part in the economy of urban and rural Kashan; it provides a vital proportion of poorer families'

income and it provides a means of capital accumulation for the merchant class. The areal distribution of the total number of small industrial workshops shows a concentration in the bazaar and the old city; but various stages in the manufacture of textiles other than carpets are located in different parts of the city; in the bazaar or in the residential quarters according to the size of workshop needed and the value added by the process; and in consequence their areal distribution is related to land values and competition for central locations within the urban area. The type of textile woven in any one district is quite probably related to patterns of ownership and family ties, and it is suggested that further research in this particular field would be highly rewarding with regard to our knowledge of socio-economic patterns in the pre-industrial Persian city.

Carpet weaving in Kashan City and Aran/Bidgol is a household industry operating under a system of contracts much the same as those in the villages. The unremitting hard work involved and the poor return for labour spent ensure that this is an occupation associated with the poorer classes. Carpet weaving is thus associated with poverty, overcrowding, poor housing, high fertility and illiteracy and its distribution closely follows the east-west social gradient in the urban areas from the better districts of Kashan City down to the slums of the eastern quarters and Aran/Bidgol.

Notes

Plate 8:1. Coppersmiths in the Kashan Bazaar

A typical producer - retailer establishment, with a small workshop, a few shelves, and a small storeroom at the back. Two men work in this smithy. Note the wooden shutters.

Plate 8:2. A Camel Mill in the Bazaar.

Sources of power in pre-industrial societies are limited. In the case of the smiths shown above human labour is used; in this mill just off the main bazaar three camels are in use. The one shown is grinding an abrasive used for washing.

Plate 8:3. An Ironmonger's in the Kashan Bazaar.

It can be seen that a great variety of goods may be hand-wrought by one craftsman. Without a division of labour individuals produce a small but diverse number of goods. Note inside the door of the serai to the right the bales of stuff awaiting collection.

CHAPTER NINE

COMMERCE

1. The Data

Data concerning commercial structure and the provision of services and ammentiies in Kashan and Aran/Bidgol are derived from three primary sources: the unpublished Industrial Census carried out by the Iranian Statistical Centre in 1966; two surveys carried out in the field by the author alone in 1968 and with the help of Mr. M.A. Power in 1969; and interviews conducted by the author with bankers and merchants in Kashan City. The first of the field surveys, carried out in the spring and summer of 1968, was aimed at establishing the type and location of every retail and producer-retail establishment in the urban areas. A classification for commercial types was evolved in which types of establishment were identified and these are listed in Table 9:1, but the natural obtuseness of the Persian shopkeeper prevented any accurate assessment of the numbers employed in each case. In the spring of 1969, however, the author was fortunate enough to acquire the results of the 1966 Industrial Census and with the active help of Mr. M.A. Power the opportunity was taken to check the Census against the author's field survey of the previous year. While the field survey identified some 1569 establishments, the Census listed only 1342 wholesalers and retailers. This discrepancy results from the differing criteria used, for the field survey included retailers and producer-retailers, while the Census listed the latter as

TABLE 9:1 MAJOR SERVICE FUNCTIONS IN KASHAN

Producer-Retailers	KASHAN CITY Estabs.	Persons	Mean	ARAN/BIDGOL Estabs.	Persons
1. Bakers	104	372	3.6	32	101
2. Confect-ioners	37	65	2.4	2	3
3.	31				
4. Shoes	83	130	1.3	6	6
5. Tailoring	91	188	2.0	9	13
6. Blanket & Quilt Sewing	26	37	1.4	3	4
7. Carpenter	113	151	1.3	17	19
8. Coppersmith	46	92	2.0		
9. Samovars	18	24	1.3		
10. Tinsmith	21	24	1.1		
11. Blacksmith	52	80	1.5		
12. Scourer	12	19	1.5		
13. Jeweller	18	36	2.0		
14. Repair Motor Cars	15	37	2.5		
15. Repair Bicyc-les	43	78	1.8		
WHOLESALE					
16. Agricult-ural Prod.	24	38	1.5		
17. Silk,Cotton fibres	21	36	1.7		
18. Foods	24	38	1.5	7	8
19. Clothing	6	6	1		
20. Carpets & Gelims	110	192	1.7		

Continued...

TABLE 9:1 (Continued)

	KASHAN CITY			ARAN/BIDGOL	
Producer-Retailers	Estabs.	Persons	Mean	Estabs.	Persons
RETAIL					
21. Forage	18	23	1.3		
22. Gen.Grocers	428	555	1.3	173	179
23. Dairy produce	8	13	1.6	1	1
24. Butchers	86	113	1.3	49	47
25. Sweets	10	19	1.9		
26. Greens	16	30	1.9	1	1
27. Fruit	44	60	1.4	8	9
28. Nuts, dried fruit	10	17	1.7		
29. Wood & timber	33	39	1.2	7	7
30. Spices etc.	23	32	1.4	9	9
31. Tools etc.	10	33	3.3	2	5
32. Heavy Cloth	67	97	1.5	3	3
33. Clothing	56	67	1.2	4	5
34. Yarn	56	75	1.3	3	3
35. Shoes (leather plastic)	10	14	1.4		
36. Shoes (traditional)	7	7	1		
37. Rosewater	7	11	1.6		
38. Paint & Varnish	18	31	1.7	1	1
39. Books	10	14	1.4		
40. Carpets & Gelims	57	96	1.7		
41. Electrical Goods	21	30	1.4	1	1
42. Hardware	25	37	1.5		
43. Glassware	18	29	1.6		
44. Photographic	20	N/A	N/A		

Continued...

TABLE 9:1 (Continued)

Producer-Retailers	KASHAN CITY Estabs.	Persons	Mean	ARAN/BIDGOL Estabs.	Persons
45. Transport	33	67	2.0	5	4
46. Storage	378	2		19	3
47. Traditional restaurants	72	136	9	10	
48. Hotels and Guest houses	7	34			
49. Launderies	11	27			
50. Barbers	75	112			
51. Baths		-	-	1	
52. Mosques	204	-	-		
53. Banks	7	-	-	-	-
54. Cinema	1	8	8	-	-
55. Other Recreation	4	2	-	-	-
56. Legal and Insurance	9	31	3.4	-	-
57. Schools	29	-	-	-	-
58. Baths	24	-	-	-	-
59. Hospitals	4	237	-	-	-
60. Doctors' Surgeries & Clinics	21	-	-	-	-
61. Hotels	2	7	3.5	-	-
62. Guest Houses	4	17	4.25	-	-

Data from (1) Field Survey by the Author; Summer 1968.

(11) Unpublished I.S.C. Industrial Census, November, 1966.

manufacturing units, or retailing units according to their 'dominant' function. Statistically then, the Census and the first field survey are not directly comparably, but it was possible after the second field survey to place a number of units classified in the Census as producers into a seperate producer - retailer category. While the group classification in Table 9:1 are based on field survey, figures for numbers employed in each category come from the industrial census. Allowing for the two-year difference between the surveys, and the checks made, they show a close accordance, and its is possible to place confidence in the results.

2. The Bazaar

The bazaar's role as a functional and morphological unit in the geography of Iranian cities has been examined by a number of writers from varying points of view. For Mashad Darwent has argued that early writers saw the bazaar as a purely morphological element, but that it is a mistake to differentiate between shops in the bazaar and shops on the avenues and he goes on to say:"whilst in functional terms there were probably differences between shops in either location, in effect "bazaar" is merely an area of more intensive commercial activity differing only superficially in kind from elsewhere". Quoting the same passage from Darwent, Clarke and Clarke likewise concluded that the only distinction to be drawn was a morphological one. Such a view, overlooks both the social and institutional and the functional complexity of the

bazaar system. The maps presented in Chapter Seven show that the residential population of the bazaar districts is characterised by a unique combination of high densities per acre, and low densities per room, together with high rates of literacy and low rates of effective fertility and female activity. Also, the sex ratios in the age group 15 to 19 years indicate that there is a relatively high proportion of young men living in the area; most of them in fact work in craft manufacturing establishments. Such characteristics may imply that a number of literate migrants from outside Kashan City are resident in the central districts. How closely the residential population corresponds to the working population of the bazaar is, however, unknown.*

But it is the morphology of the bazaar which most obviously sets it apart from other areas of the City. It has been little changed physically in the present century, apart from the widespread adoption of fluorescent lights, and it should be possible to describe with some accuracy how the bazaar looked, sounded and smelled, before the advent of the "planned" avenues with the new retailing areas and motor transport that came with them. Kashan's bazaar, like most Persian bazaars, is linear and therefore did not have the concentric zonation of product types found in many bazaars of the Middle East. Product types are grouped in sections along the bazaar, each section being known by the name of the

* In fact the study of journey to work in Kashan, and cities like it, with a large home cottage industry, modern industry, and a main commercial quarter accessible only on foot would no doubt reveal some interesting patterns. Any such of this nature was beyond the author's capacity, working alone.

dominant product sold there. The main thoroughfare runs at present over 800 metres from east to west. It is vaulted throughout its length, and at its centre is a complex of mosques, baths, and roofed caravanseraies. The fabric of the bazaar has been maintained in the past by continued reinvestment from bazaar merchants, and since the 1930's Kashan has been fortunate in that only a limited amount of physical destruction has been caused by the driving of modern avenues through the old commercial centre;[*] at the western end a new avenue cut the Bazaar of the Copper Scourers in two, leaving a stump on the other side of the new road, while at the eastern end a very small part of the Coppersmiths' Bazaar was demolished by another new road.

The bazaar's caravanserais are located to the east of the bazaar's centre. There are both roofed and unroofed serais. The unroofed caravanserais are built in two or three stories around a central courtyard, often with a pool in the middle. Ground floor rooms are used for storage, while the upper floors are used for commercial offices and accomodation. Serais tend to specialize in a limited range of goods; in the upper floor offices, which are often subdivided, wholesale transactions are carried out in the goods stored below, where Khiaban Afzal parallels the bazaar, access to the caravanserais by vehicular traffic is directly to the back of the serais; but on the south side of the bazaar goods are transported to the

[*] Future plans for the bazaar made by the Mayor's Office in Kashan and the Ministry of the Interior, do not envisage any further dismemberment of the main thoroughfare.

caravanserais by donkeys, which enter through an underground passage or gateway in the back of each serai. Roofed caravanserais differ little from the unroofed ones except they are more ornate, and deal mostly in carpets. Little retailing is conducted in the caravanserais. Most retailing and producer-retailing establishments are located along the line of the main thoroughfare, with the width of shop frontages frequently corresponding to the width of the succession of individual vaults which go together to make up the continuous covered way.

The importance of the bazaar as a commercial institution rested in the past on the credit system which operated within it and the guild system which ordered the production and retailing of goods. Credit was provided through the financial instrument known as the softeh; this is a short term discounted signature bill* for which credit is given by full time money lenders or by merchants with other interests operating from the tiny offices in the caravanserais. The guild system which operated in the bazaar, and still does operate to some extent, was intimately linked with economic organization by product rather than function. Prior to industrialization in Kashan, and Iran, much of the production and retailing of goods was carried out by units which did both these functions.

* Softeh : A man's credit, and the interest rates he must pay, rest on his ability to secure reputable signatures for the discount bill; first class credit at low interest rates is given for a bill with one good signature, but persons with less creditability must secure more signatures and pay more interest - sometimes over 30 per cent per month, though if refused credit a man can try again in the guise of his brother or a cousin, limited only by the number of his relatives. Knowledge of the market is everything, and credit information is bought and sold like any other service.

Agricultural and imported luxury goods, together with products, such as textiles, which required relatively large amounts of production space were sold through purely retail establishments, but much else was made and sold on the spot by the producer - retailer.

Specialization in economic activity was by product rather than process, so that from raw material to finished product goods were in the hands of one man. Without a division of labour production units remained small and had a low turnover of goods. Under such precarious circumstances economic protection was provided by the guilds, which trained apprentices, maintained control over standards, regulated disputes and acted as a corporate unit for tax purposes. Every trade had its guild, and the guilds were part of the general social - religious milieu in which the tradesman lived. An overall picture of how guilds operated in medieval Islamic Persia has been given by A.K.S. Lambton (1954)[*], but to extrapolate from this general medieval view to one particular Iranian town in the early twentieth century is hardly possible. The guilds' influence in the present century has undoubtedly diminished; the government no longer treats them as a unit for tax purposes and trade disputes are now referred to the local courts. The guilds' economic influence has declined as competition from goods mass - produced in the factories of Tehran, Isfahan, or even Kashan, has increased. Direct competition has been hardest on the luxury trades; the guilds for gold embroiderers, workers in figured calico, and brocade weavers are now extinct and gold smithing is declining.

[*] Islamic Society in Persia. S.O.A.S., London.

In locational terms the significance of these changes is that sections of the bazaar which were formerly the preserve of one of the handicraft guilds are now being colonised by retail outlets, selling goods produced outside the City. Trades which have been able to adjust to changing circumstances have survived; many blacksmiths, for instance, have abandoned a bazaar location, where they sold scores of different types of hand-wrought implement, and have moved to the new avenues, where they use oxy-acetelene equipment to build iron frames for the building trade. Guilds connected with the carpet trade have survived and even flourished; the dyers and designers, along with the carpet cleaners and repairers are in the strangest position. This varied response by the producer-retailers is best illustrated by reference to specific examples, three of which are given below.

(1) Coppersmiths: Kashan has long been known for the quantity and quality of the copperware produced there; Curzon (1892, Vol. 2 p.14) and most travellers in the last century remarked on the size of the Coppersmiths' Bazaar and the defeaning row made by the smiths. By 1968 there were only 45 establishments, all of them located in the bazaar between Khiaban Pahlevi and Maidan Fez. The average size of unit, according to the 1966 Census, was 2.0 persons. The wares produced are domestic vessels, jugs, trays, pans and spoons. The wares are worked from sheet copper to finished product by one smith, and for most items the difficulty of separating processes means that copper smithing remains a skilled handicraft industry. Plastic and galvanised iron goods are steadily taking the place of

copper in the Iranian household, though the tradition in Kashan that part of a bride's dowry be in copperware has helped maintain some production. Division of labour and mechanization are difficult, and the cost of the raw material is high compared with plastic or iron. Kashan has few immediate prospects in the tourist trade and the possibilities for producing fancy copper goods are limited. Under these circumstances many coppersmiths have gone out of business; the low value of the product and declining production have encouraged smiths to sell up their site or to go into other business. Whereas formerly coppersmiths alone were found in their bazaar - no one else could stand the frenetic hammering - premises have been sold to blacksmiths, who produce iron spades and other agricultural tools, and used for selling gelims and zilus; being in a high land value section, also with high rates for key money, it is profitable to sell up or change a premise's function.

(2) Goldsmiths and Jewellers: the Bazaar of the Goldsmiths is found just to the south of the bazaar's centre - Mine Chal. By 1966 there were 18 jewellers recorded, employing 36 persons in the bazaar, but two years later the number of units had been reduced to a dozen. The articles produced in Kashan are not of high quality, and to some extent the jewellers must rely on imports from other cities. Adequate substitutes for gold and jewelled articles are not readily produced by mass production, since individuality and beauty are part of the product. As the value added by manufacture is high, the goldsmiths can afford to maintain their small workshops at

the back of the booths where the goods are sold, despite incentives offered by other retailers for the space. This comparative lack of incentive to move probably accounts for the inertia of Kashan's goldsmiths; it contrasts with the situation in Mashad, where offers in key money for sites in the bazaar are so high that many jewellers have sold up and moved to the new avenues (Darwent, 1965).

(3) Tailors and Cloth Merchants: of the 88 tailors and cloth sellers in Kashan 45 have their premises in the bazaar, and most of these are found in the central section, next to the carpet caravanserais. While the average size of cloth selling establishments is only 1.1 persons, the average size of unit among the tailors is 3.2 persons. Both are found in the same area since they are mutually dependant; a man may choose his cloth at one place and take it next door to be made up into a suit or coat. To some extent the tailoring processes can be subdivided, with one person cutting and another sewing the cloth, hence the comparatively large size of establishments. Craft production of cloth in Kashan is declining, and shops in the bazaar are increasingly stocked with goods from outside Kashan or from the Kashan factories, but the personal nature of the tailor's service and the need for close contact with customers together with the high value added have kept many tailors in the bazaar, though the concentration is less than it has been in the past, and more shops are being established on the avenues.

The position of the producer - retailer is, then, a difficult one. As retailers they had to be located in the

bazaar, where customers had access to them, and as producers they were geared to small-scale craft manufacture with little division of labour, yet they face competition in both these functions; as producers they cannot produce either the quantity or the quality and range of goods manufactured in mechanised establishments, while as retailers the sites they occupy in the main bazaar are coveted by higher order retail units, usually selling modern goods. The guild system to which the producer - retailer was tied is thus becoming economically as well as institutionally moribund.

Changes in the credit and finance system operating in Kashan's commercial life at first sight appear to have been as dramatic as changes in the guild system. From the 1930's onwards, when the bazaar began to supply capital to the modern factories, there were alterations. Unlike many Iranian provincial cities, where credit appears to have been extended most readily for comparatively short-term projects in building, real estate and trade (Benedick, 1964) credit in Kashan has been given first to the factories and the carpet trade, secondly for commercial enterprises and lastly for building and agriculture. This ordering of priorities goes some way to explaining the past profitability of carpets and the modern textile industry. Also, during the 1950's and 1960's a number of banks, both public and private, were set up in Kashan, and all of these were located on the road leading to the main entrance of the bazaar.[*] Government banks, such as

[*] Benedick is of the opinion that Iranian banks are not a radical departure from the old financial system, claiming that they grew out of bazaar moneylending activities, and even today the basic philosophy and type of credit extended are practically identical. "Iranians have observed that the main distinction between the bazaar and modern commercial banks is the impressive buildings housing the latter". (R.E. Benedick, 1964, p.65).

the Agricultural Credit Bank and the National Bank, have been the channels through which Government money has flowed into the City and the region. But the shift in emphasis from the caravanserais to the new banks on Khiaban Mir Amad - known popularly as "Khiaban e Bank" - has not been full or permanent; a development of major importance has been the appearance of branches of the major banks in the bazaar itself; the National Bank established a branch in the main section of the bazaar in premises formerly occupied by a chelokebab restaurant[*] in 1969, and in the same year the newly - built Bank of Iran and Japan, with its main premises in Khiaban Mir Amad set up a branch in one of the carpet caravanserais. That the same person who is managing director of the Kashan Velvet Company and others is also a director of the Bank of Iran and Japan and head of the family which owns the serai illustrates the power of personal connection in the Kashan's economic development.

3. The Distributive System

(1) Garages and Warehouses

Since the traditional role of the bazaar as a centre for production - retailing and retailing has changed, with production and retailing becoming progressively divorced, a larger and more complex distributive system for goods and services has developed, the main collecting and distribution points for which are the new garages and caravanserais.

[*] The key money value of the site was certainly well in excess of 50,000 tomans (£6,000); with some of the profit from his sale the former chelokebab restauranteur set up further along the bazaar a smaller shop selling plastic footwear and staffed by his numerous family.

These garages are located in one major group near the Maidan Dawlat and in Khiabans Pahlavi and Afzal, where the main road from Tehran enters the old city. In the same area, along Khiaban Pahlavi, are most of Kashan's motor vehicle and spare part shops. Passenger buses depart from this district for Tehran; on most days there are about twenty services a day to choose from among the different companies and at different times.* Freight truck services are equally frequent, for the Tehran-to-Yazd railway operates very few trains through Kashan and provides no sort of competition. Lodgings and restaurants catering for travellers are situated near the garages. In plan the garages are similar to open caravanserais, with courtyards in the centre of a square of buildings, and some in fact are converted serais; but the main dissimilarity in the new garages is the much greater size of their yards, which permit access and parking facilities to a number of lorries at the same time. There is some specialization; a number of garages concentrate on bus traffic to Tehran, others in a limited range of merchandise, while the largest garage, on the Maidan Dawlat, is used by buses and lorries from the shahrestan villages. From near here buses leave for Aran and Bidgol whenever sufficient passengers have been collected to justify

* It was calculated that nearly 500 people left Kashan and 500 arrived in Kashan by bus every day; a quarter of these were travelling between Kashan and Qom. The fare for the 100 km trip to Qom was 3 tomans, while the fare for the 250 km trip to Tehran was only 5 tomans, so that there were economies in distance travel. With a number equal to 2 percent of Kashan's population travelling to and from other major Iranian Cities, the degree of personal communication outside Kashan is considerable.

the trip. Garages are a recent element in Kashan's urban structure; many were built or converted from caravanserais in the 1940's and 1950's, in an area where there was cheap agricultural land available outside the Dawlat Gate; it was convenient as regards access from outside Kashan and as a break of bulk point, since it is here that the bazaar came closest to the city walls. Apart from Khiaban Afzal, where lorries unload directly to bazaar caravanserais, goods are transported from the garages to warehouses in the bazaar by donkey and human porterage. Warehouses and wholesalers in Kashan are concentrated almost entirely in the bazaar area; they are to be found behind the retailers fronting onto the main thoroughfare, in the caravanserais, and in numerous side and back alleys, where goods can be distributed to retailers with the minimum of effort.

(2) Retailing: Retail establishments, the final stage in the distributive system, are plotted for Kashan and Aran / Bidgol in Figure 9:1. It can be seen that the bazaar remains the most important retailing district in Kashan; away from it the number of retail units on the avenues decreases, with local concentrations at squares, and with very little retailing in the residential districts off the avenues. Aran and Bidgol have only weak concentrations of retailing facilities and but a poor range of low-order goods is available; in fact, they provide no good or service which cannot be obtained in one or other of the villages. Retailing in Kashan and other Iranian cities is distinguished by a number of traits not found in Western Cities (i) units are smaller than European equivalents, few retailing types having more than an average

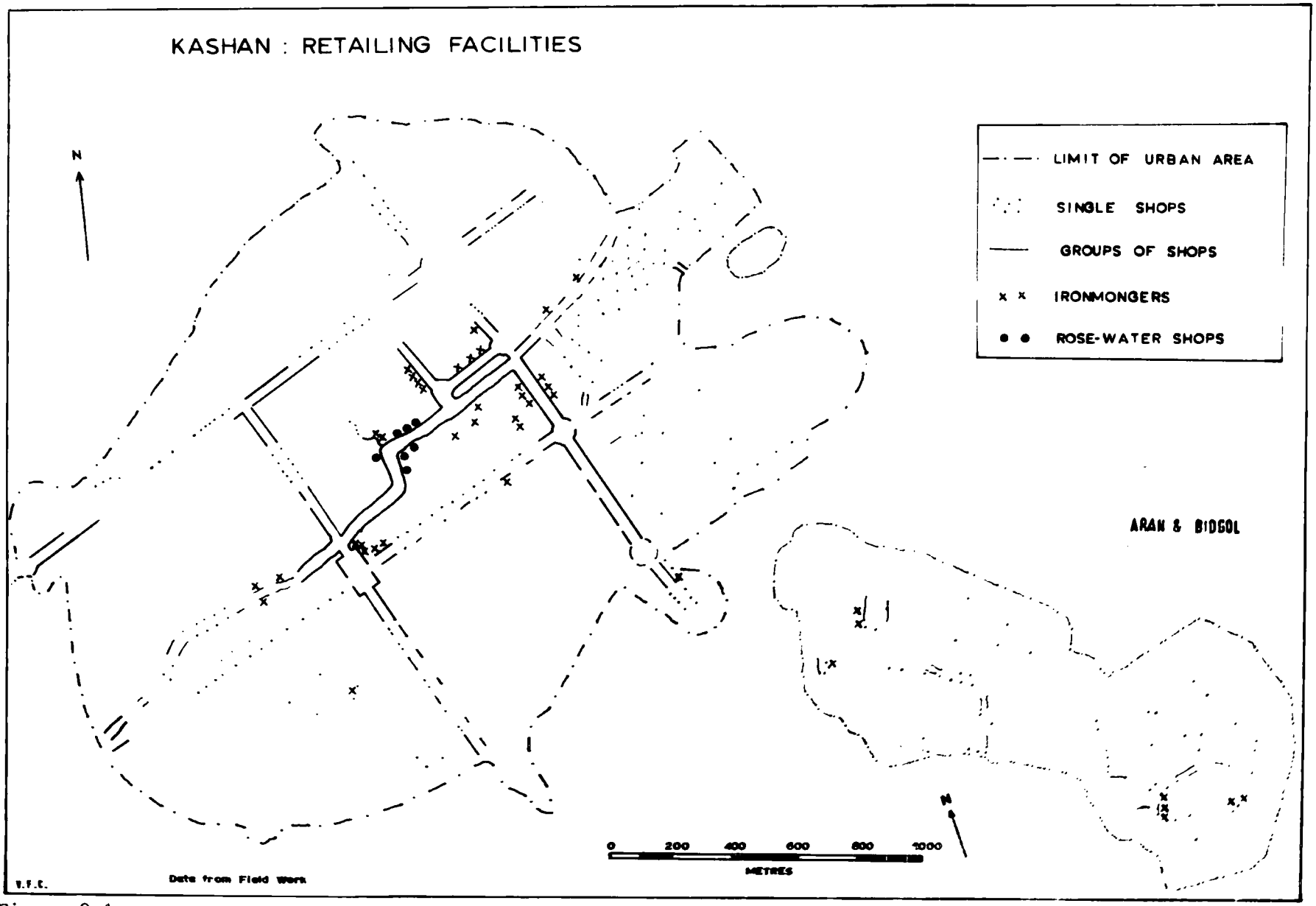

KASHAN : RETAILING FACILITIES
N
LIMIT OF URBAN AREA
SINGLE SHOPS
GROUPS OF SHOPS
IRONMONGERS
ROSE-WATER SHOPS
ARAN & BIDGOL
0 200 400 600 800 1000
METRES
Data from Field Work
U.F.C.

Figure 9.1

of 1.5 persons per unit (ii) frontages on the avenues are seldom over 3 metres, while in the bazaar they are as little as 2 metres, (iii) a significant number of producer-retailers still survive, (iv) shops are often grouped by the type of product sold, (v) prices are seldom fixed, and the cost of an item is usually arrived at through bargaining, (vi) the range of stock is limited in any one establishment, so that, for example, vegetables are seldom sold in a general grocery store.

We have seen in Chapter Three that a hierarchy in the provision of goods and services can be established for rural Kashan; we would expect, therefore, that Kashan and Aran - Bidgol should also have a hierarchy of service types and service centres, and that within their central business districts there is structure and pattern, with the different kinds of business sorting themselves out according to the amounts they are willing to pay for the most central location; also within each central business district there should be a cone of high value land which is highest at the main interaction and declines away from it. The most numerous service types together with retailers with a low value product have the lowest proportion of their number located in the bazaar. To illustrate different levels in the hierarchy of service types, the distribution of general grocers, ironworkers, and shops selling books or rosewater are shown in Figure 9:1, indorsing the view that local need shops (grocers) are more numerous and widely scattered than more specialized, higher-order shops. The pattern of land values and key money payments observable in Kashan also confirms that business types have sorted

themselves out according to the amount they are willing to pay for a given location.

4.3 Land Values and Key Money: the sale of land in Iranian cities is subject to a tax by the Central Treasury Department, and from the Department's assessment of the tax it is possible to plot the varying land values within Kashan City (Fig. 9.2) though information of this kind was not available for Aran and Bidgol. The Kashan data gives the price of land on the first 30 metres of avenues, but unlike other cities tax assessments for the interior of building blocks in Kashan was uniform throughout and in consequence it was considered not worth further attention. The high land values on the main avenues in northern Kashan City are shown in Figure 9:2, with the values decreasing away from the main commercial quarter, and local peaks appearing at intersections, where they show a close correlation with the distribution of retailing. Corroborative evidence for the Department's tax assessment from a study of pedestrian densities in the city was unavailable; it proved impossible for the author alone to conduct a satisfactorably controlled count of pedestrians, though, as might be expected the impression gained was that densities were highest at intersections and in the bazaar. While the tax assessment gives no figures for the bazaar area another measurement of value which allows comparisons between bazaar and avenue frontages is available in estimates of key money.

(Sarghofli)

Key money is a sum of money paid by an incoming rentier

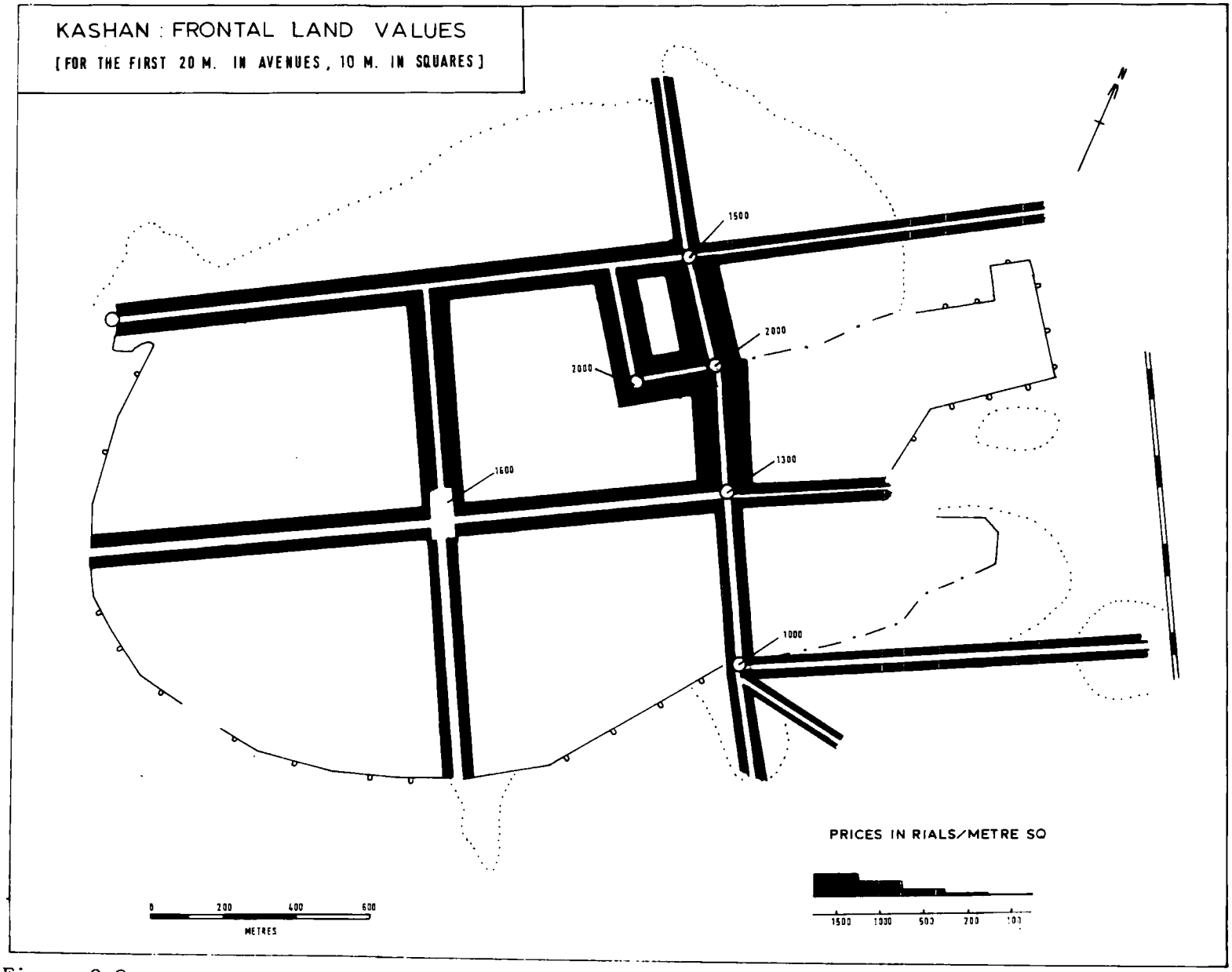

KASHAN : FRONTAL LAND VALUES
[FOR THE FIRST 20 M. IN AVENUES, 10 M. IN SQUARES]
N
1500
2000
2000
1600
1300
1000
PRICES IN RIALS/METRE SQ
1500
1000
500
200
100
0
200
400
600
METRES

Figure 9.2

for the site value of a shop; the amount paid depends mainly on the site value and only secondarily on other factors such as the shop's fittings, the product dealt in, or the value of the previous holder's custom. It is thus in Iranian cities a sensitive measure of the commercial potential of a given site, though it can only be directly measured when a property changes hands, and very small variations in site location or the state of the market make measurement difficult. Nonetheless it proved possible with the invaluable help of the detailed personal knowledge of an official in the National Bank in Kashan to piece together a broad picture of the sums being paid, together with the approximate range of amounts, in the city's central business district. (Fig. 9.3). It was estimated that during the 1950's and early 1960's the sums paid in Kashan rarely rose above 10,000 tomans, but with the increase in the value of the market associated with industrial growth prices rose rapidly to their 1968 - 1969 level, and rivalled those paid in much larger cities such as Kermanshah. Values are highest at the bazaar's centre, Mine Chal, where are the carpet caravanserais and the cloth merchants' bazaar. The sharp fall off in value from this area emphasise its centrality and the sensitivity of key money as a value measurement. The relation between these values and retail types in parts of the bazaar is complicated by the continued presence of relict trades from the producer - retailer system, but as time progresses modern market forces increasingly dominate the location of service types, and low - order types such as bakers have now almost all moved out

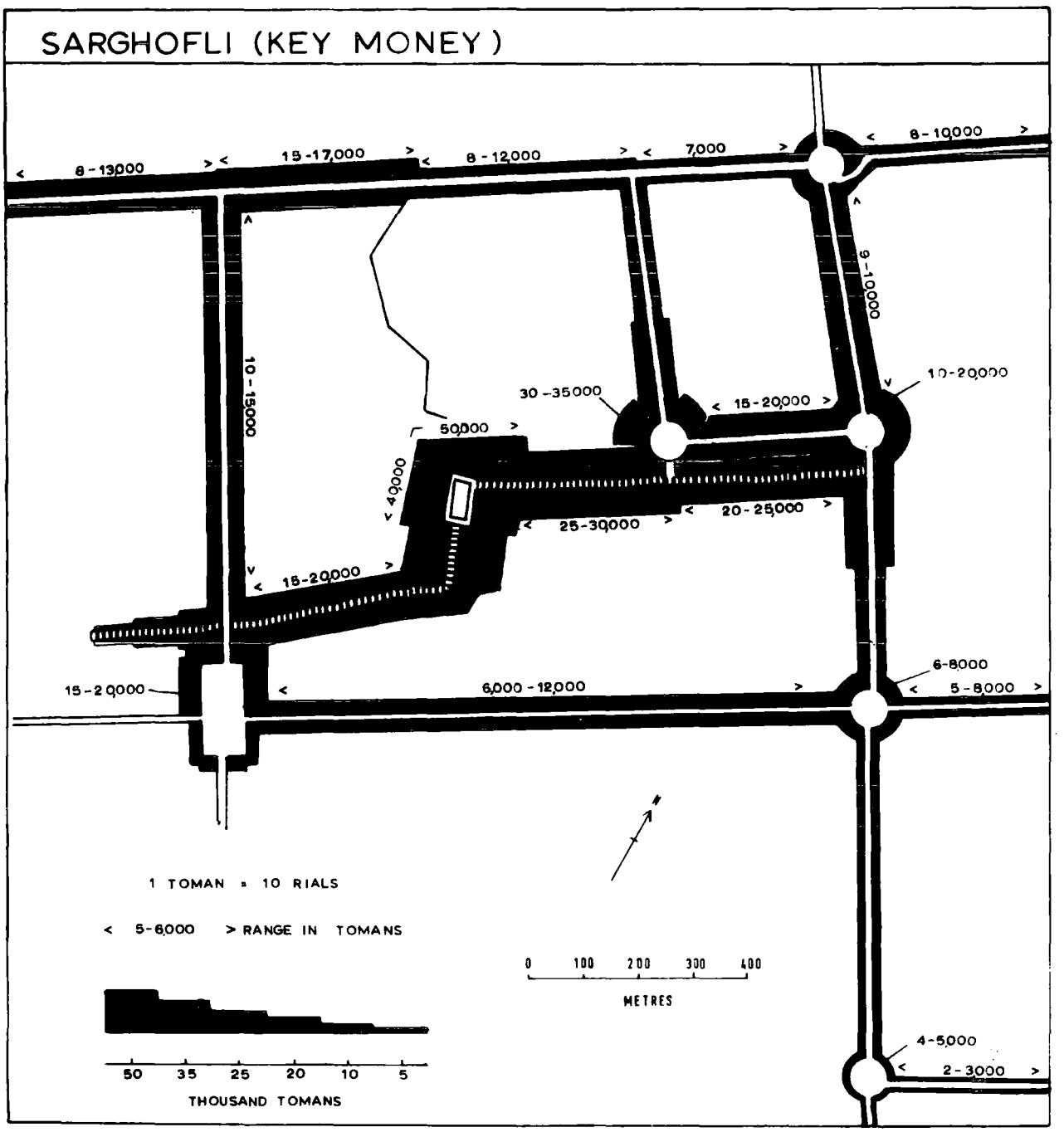

SARGHOFLI (KEY MONEY)
8-13000
15-17,000
8-12,000
7,000
8-10000
9-10000
10-15000
10-20,000
30-35000
15-20,000
50,000
40,000
25-30,000
20-25,000
15-20,000
15-20,000
6,000-12,000
6-8000
5-8,000
4-5,000
2-3000
1 TOMAN = 10 RIALS
< 5-6,000 > RANGE IN TOMANS
50 35 25 20 10 5
THOUSAND TOMANS
0 100 200 300 400
METRES

Figure 9.3

of the bazaar. The north-eastern sector of the bazaar, with easy access from Maidan Fez and Khiaban Pahlavi has higher key money values than the south-eastern limb. Outside the bazaar sites on Maidan Fez command the highest values, and competition here, next to the main bazaar entrance, is forcing prices up rapidly as retailers of modern imported and expensive household goods such as refrigerators, televisions[*] and gas cookers are becoming established and the older teahouses and fruit stalls move away.

5. Conclusion

Thus Kashan has a hierarchy of service types with a Central business district focussed on the bazaar; patterns of retailing, land values and key money indicate that the point of maximum access lies close to the carpet caravanserais from where so much of the commercial and industrial life of the city and the shahrestan is directed. The development of retailing by the movement of lower-order service types to the avenues is similar to developments seen in other Iranian cities such as Qom or Kirman; but in larger urban areas a major evolution has been the growth in number and diversity of new retail outlets for modern housing districts. In Isfahan, Mashad, Kermanshah, Shiraz and Tehran for example, a separate centre has grown up providing high-order functions for the new areas; these centres emphasise the duality in socio-economic structure and morphology between the old parts of the city and the new. On the other hand Aran and Bidgol at a lower level

[*] Kashan is just within range of the Tehran transmitter.

in the urban hierarchy have poorly developed service centres within the old towns and no trace of a separate centre in newly built districts. A new and separate central business district has not evolved in Kashan for a number of reasons. First, population increase in the two decades before 1956 was negligible and since that date the expansion of Kashan's extra-mural population has not been so great as to provide an incentive for large scale retail developments. The shopping facilities on the avenues are merely an extension of the bazaar retailing system and they rival it only around Maidan Fez by the main bazaar entrance and no place else. Second, and of equal importance, the bazaar was not dismembered by early attempts at town planning, in contrast to elsewhere, the avenues' layout, helped by an efficient taxi service, tends to ease access to the bazaar without encroaching on it. Third, the continuing vigour of the carpet trade - central to Kashan's commercial structure - has helped maintain the bazaar's pre-eminence when faced by competition from the new retailing facilities on the avenues.

Notes

Plate 9:1. Maidan Afzal, Kashan.

A planned square with gardens and a fountain. Transport of goods is by lorry and motorcar. The shops are glass fronted and spacious, and protected by sun-awnings. Note the flight of steps which leads up to the main entrance of the bazaar.

Plate 9:2 A Carpet Caravanserai

Note the heaps of carpets awaiting inspection by prospective buyers. Within the bazaar much of the transport is by human porterage, and a man is here seen unloading his burden. Around the side of the serai are the offices of carpet merchants; the offices are shuttered above and windowed below. The office so brightly lit is a sub-branch of the Bank of Iran and Japan.

Plate 9:3. View in the Bazaar.

Note the modern roller blinds which have replaced the wooden shutters in this section, also the vaulting overhead with openings for light, and the steps at ground level. The bazaar is built on several levels; on the ground is a grocer's with sacks of food displayed, while in the decorated gallery above two carpet designers are at work.

C H A P T E R T E N

LAND USE AND URBAN ECOLOGY

1. The Analysis of Land Use

The land use map of Kashan and Aran/Bidgol given as Fig. 10.1. is an attempt at a spatial representation of the various elements, residential, industrial, and commercial, which make up urban society. Whereas land use patterns in cities of developed countries usually show a degree of functional specialization by area, such specialization is little in evidence in Kashan or in many other cities in developing countries. In the Western city progressive functional segregation by area tends towards a state at which the patterning of land uses perfectly reflects land users' ability to pay the different rentals at different sites and at which the friction caused to the system by the internal movements of men and materials has been reduced to a minimum. (B.T. Robson, 1969, p.102). In reality this state is never reached, for continuing technological and social change and the effects of 'friction' operate on the urban system and modify it. The land use map of urban Kashan shows that there has been little tendancy towards such a state in the past, though the beginnings of functional segregation are increasingly evident.

(i) Extra-Mural Land Use: Outside the city walls land use may conveniently be classified into a number of categories, though there has been little zonal planning around the urban areas and a variety of land uses are often intermixed. Kashan City has expanded mostly to the north, but with two small suburbs, one outside the former Isfahan gate, district No. 15,

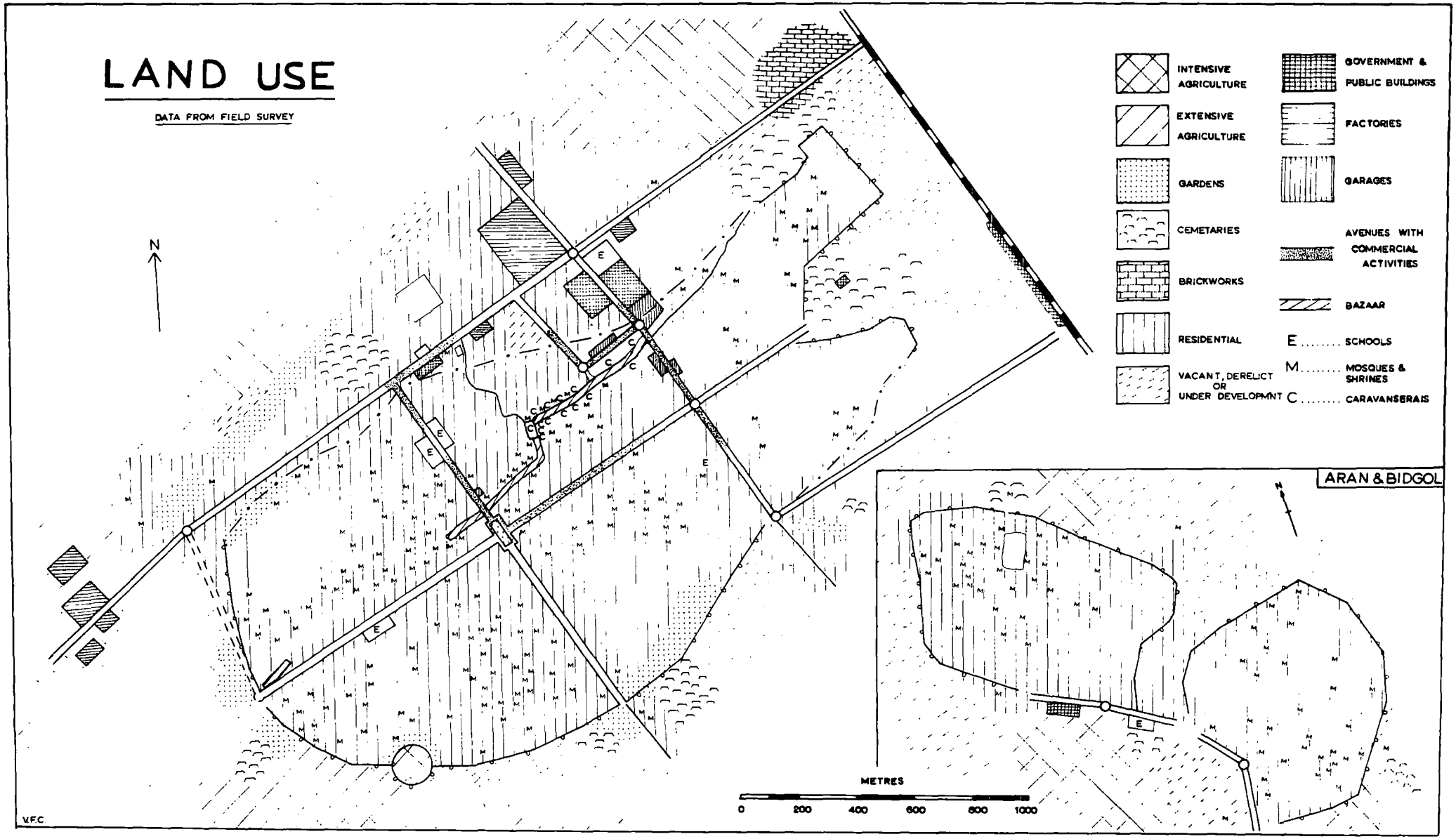

LAND USE
DATA FROM FIELD SURVEY
N
INTENSIVE AGRICULTURE
EXTENSIVE AGRICULTURE
GARDENS
CEMETARIES
BRICKWORKS
RESIDENTIAL
VACANT, DERELICT OR UNDER DEVELOPMNT
GOVERNMENT & PUBLIC BUILDINGS
FACTORIES
GARAGES
AVENUES WITH COMMERCIAL ACTIVITIES
BAZAAR
E ..... SCHOOLS
M ..... MOSQUES & SHRINES
C ..... CARAVANSERAIS
ARAN & BIDGOL
METRES
0 200 400 600 800 1000
V.F.C

Figure 10.1

the other outside the Natanz gate, district No. 14.
(a) Agriculture: agricultural land use is found only to the west of Kashan City where qanats are still operating. The qanats which supplied fields to the north and east of Kashan have dried and the land has fallen out of cultivation. Pressure to sell land in these areas is considerable. There is some qanat agriculture south of Aran and Bidgol and in addition there are three deep wells, close to the walls, which supply households in the city and some intensively cropped market gardens. (b) Cemetaries: various cemetaries on the outskirts of Kashan and Aran / Bidgol have impeded urban expansion; they are now in the process of incorporation within the urban areas. (c) Brickworks: brickworks shown in Fig. 10.1 are of two types. Some make traditional sun-dried bricks, others have kilns to fire the bricks. On the western side of the railway line the two are intermixed, though the need for more space has forced some modern producers to set up beyond the line, on the road to Bidgol and Aran. Numerous abandoned pits, used formerly for excavating brick-earth may be found around the peripheries of the urban areas. (d) Land Vacant or Under Development: vacant land in Kashan occurs for the same variety of reasons given by Clark and Clarke for Kermanshah (p.114). Where there has been a delay to building through lack of money or constructional difficulties; where ownership is disputed; where ownership is municipal and earmarked for public use; where ownership is private and is being retained until land prices rise; or where land is religiously endowed and available for certain types of development only. The

failure of some qanats to the north of Kashan City has left much land, with a potential for housing development and within easy access of public services. Most land under development in Kashan is in the north. Such land is found in some spots around Aran and Bidgol. (f) Industrial Land: Kashan's large textile factories occupy much space in the north. Close up against the walls or the original wall-line are a number of older, smaller mechanized factories, submerged in the residential suburbs. The newest large factory units of the Kashan Spinning Company and the Kashan Velvet Company have been built well away from the old city, on the Fin road and the road to Tehran. These units are too far out to be shown on Fig. 10.1.

(ii) Intra-Mural Land Use: Land use within the limits of the walls of Kashan, Aran and Bidgol is highly complex and details of land function and distinctions between one function or another are difficult to show on a large-scale map; indeed, both the small scale of industrial and commercial units, and the possible multiplicity of function of any one site - where a person may live, produce and sell his goods all in the same building - make Fig 10.1 little more than a general statement on the use of urban land.

In general, the greater part of land use is residential, but with an intermingling of small textile workshops in most quarters. Commercial and public service land use is more clearly divided from residential use, for the need for a central location has concentrated retailing in the bazaar and on the avenue frontages, but again in the bazaar the

persistance of the producer-retailer makes differentiation between commercial and industrial functions difficult. Only on the fronts of the new avenues is there clear segregation of commerce from residence and production.

In sum, land use within the walls of Kashan, Aran and Bidgol is typical of land use in pre-industrial cities, with no clear segregation of function. The new avenues and the details of commercial change in the bazaar indicate that competition for land is altering the existing pattern though some sort of segregation appears already to have existed within Kashan before the growth of the suburbs. Outside the walls, the beginnings of modern functional segregation are more clearly seen. Modern factories' demand for extensive areas of cheap land requires them to be established at some remove from suburban residential areas where prices are comparatively high. The residents of these new quarters are likely to demand such segregation even more in the future, on the grounds of ammenity. Such pressures are little in evidence in Aran/Bidgol.

Thus, the analysis of urban land use shows a major contrast between the old and new quarters; the patterns of land use which now exist are very largely the result of historical legacy, though contemporary forces for segregation of residential, commercial and industrial functions and continued centralisation of the commercial, retailing, function are actively modifying this pattern.

(iii) Land Use in Theory: While the details of the internal structure of any city make it unique, some degree of order, based on the land value surface, has been observed to underlie

the land use pattern of Western cities. Accounts of the nature of this order have been given in a number of urban growth models; Burgess concentric-zone model, Hoyt's sector model and the multiple-nuclei model of Harris and Ullman, being the most prominent. These models are not mutually exclusive, and as Haggett points out it is expected that zone development would show traces of all of them. Apart from references to the central business district general models of urban structure say little about the nature of the urban business complex; yet, as we have seen, Kashan's business complex appears to be closely related to a number of social and industrial variables distributed through the city. Kashan's land use pattern would appear to conform to none of the three major Western urban growth models; instead the pattern shows the beginnings of a old-new contrast - a dual social structuring of the city, but with competition for a central location in the old city operating in the provision of goods and services and in the location of small-scale manufacturing workshops. And even at the very low urban size level of Aran/Bidgol districts wholly within the walls and districts straddling the walls have some socially distinguishing features.

2. Socio-Economic Multivariate Analysis

Up to this juncture the study of a number of individual social and economic variables in Kashan City points to the urban scene being more complex than any one variable much suggest. Female activity rates, for instance, vary more in the old city than between the old city and the new suburbs.

It was therefore decided to examine a large and heterogeneous set of variables at the same time and compare the results with the land use pattern outlined above. The principal component factor analysis technique described in Chapter Six was used, following the same stages in computation. It was predicted that all the variables analysed together would show the same broad pattern of urban ecology as that shown in the land use map.

The statistics used in the analysis of the twenty-six enumeration districts of Kashan City may be divided into five groups; (1) Distance to centre (2) Demographic structure (3) Housing and Literacy (4) Small scale manufacturing (5) Services. After testing and, where appropriate, transforming the data they were reduced to a 46 by 46 correlation matrix. Where two indices were very highly correlated one was removed. Indices with very low correlations with the others were also eliminated. The twenty-seven indices which were left are listed in Table 10.1. The principal component factor analysis was then applied to the data and the resulting nine varimax factor components and the scores of the 26 enumeration districts on each component are given in tables 10.1 and 10.2.

(i) Composition of the Varimax Factors: Only the first three varimax factors will be considered here, since together they explain 85 percent of the variance, while the last five factors account for only 15 percent (1) The first component which accounts for 70 percent of the variance is by far the most important. It comprises a variety of elements, among

TABLE 10:1 VARIMAX FACTOR MATRIX FOR KASHAN CITY

		1	2	3
1	Distance to Centre	0.9643	0.0131	0.1084
2	% born outside Ostan	-0.0823	0.4667	0.3202
3	Sex ratio	0.5184	0.2436	0.1244
4	Sex ratio 15-29 yrs.	0.9831	0.0465	0.0991
5	Effective fertility	0.9827	0.0427	0.1070
6	% under 5 years	0.9813	0.0418	0.1196
7	Dependancy ratio	-0.1155	-0.1132	0.1413
8	Married 15-25 yrs.	0.9766	0.0368	0.1580
9	Persons per acre	0.9865	0.0488	0.0460
10	Persons per household	0.9799	0.0427	0.1159
11	Households per unit	0.9270	0.674	-0.0963
12	Persons per room	-0.9461	-0.0117	0.0541
13	Percent units leased	0.9710	-0.0141	0.1165
14	Percent new houses	0.6768	0.4794	0.2993
15	Percent mud and brick	0.9873	0.0461	0.0802
16	Percent literate	0.9738	-0.0130	0.0431
17	Total activity rate	0.9477	0.2002	0.1126
18	Female activity rate	0.9390	0.0628	0.0803
19	Percent Employed	0.9827	0.0434	0.1036
20	Workshops	0.6753	0.1509	-0.2239
21	Workers	0.9641	0.0757	-0.0013
22	Manufacturing prems	0.9501	0.0877	-0.0423
23	Manufacturing workers	0.9634	0.0844	-0.0231
24	Percent small textiles	0.8646	0.0482	-0.4114
25	Retail workers	-0.0215	0.9903	0.0103
26	Retail premises	0.1117	-0.9790	-0.0331
27	Mosques and Shrines	-0.3929	-0.0105	-0.8400
	Variance	70.018	9.516	4.844
	Cum. Var.	70.018	79.534	84.378

TABLE 10:2. VARIMAX FACTOR SCORE MATRIX FOR KASHAN CITY

Enumeration District	Factor 1	2	3
1	0.5403	-0.1552	3.0527
2	0.8009	0.0751	-0.5363
3	1.2379	0.4238	-0.5474
4	1.0365	0.5736	-0.2275
5	0.9016	0.2461	-0.2098
6	0.8267	0.7693	0.4442
7	1.1487	0.3943	-0.7188
8	1.2294	0.0883	-0.4723
9	1.0376	0.1798	-0.3840
10	0.9091	0.2151	0.1040
11	0.8633	0.1514	-0.6386
12	1.0366	0.1375	-0.6840
13	0.9875	0.2200	-0.7253
14	0.8519	-0.1202	1.5329
15	0.9259	0.3648	2.0162
16	1.0910	0.5794	0.0746
17	1.0747	0.3413	-0.3098
18	1.1321	0.2719	0.1494
19	1.2314	0.4389	-0.5891
20	0.8896	0.3140	-0.4768
21	1.2974	-4.8051	-0.3476
22	0.9712	0.4804	0.0666
23	0.9536	0.0198	-0.3049
24	1.1833	0.1073	0.0975
25	0.7777	-0.1842	2.4435
26	0.6211	-0.429	-0.1675

the most prominant of which are high rates of effective fertility, a high density of persons per acre and of persons per room, with a large proportion of dwellings built of mud brick, early marriage, low rates of literacy and a large number of small manufacturing establishments. Taken together these are associated with the 'pre-industrial' residential districts of the city.

(2) The second component accounts for 10 percent of the variance. It is associated with retailers and numbers of retail premises.

(3) The Third Component, which explains 5 percent of the variance is associated with new housing, a relatively large number of long distance migrants and a small number of mosques and shrines.

(ii) The Weighting of District Scores: (Tab. 10.2).

(1) As predicted, the scores of enumeration districts on the first component - the primary dimension of variation within the city - are related to location in the old or new quarters. It is possible to divide Kashan's 26 districts quite simply into those with scores of 0.95 or above and those with less than 0.95. Districts with the higher scores are all inside the walls. Districts with the lower scores are all outside or partly outside the walls.

(2) There appears to be some polarization of district scores on the second, retailing, component. At one end are districts No. 4 and 6 - the bazaar - , with high scores, where most of Kashan's retail outlets are to be found, while at the other end are the new suburbs and district No. 21 with very few

retailing facilities.

(3) Scores on the third factor may also be divided into two groups. On the one hand are the few districts with high positive scores of over 1.0, that is, with a high proportion of new housing and a relatively large number of long distance migrants; and on the other hand are districts with negative or low positive scores which are, with the exception of District 26, the enumeration districts of the old town.

3. The Urban - Rural Continuum

Taking Kashan City and the shahrestan's rural area each as a single unit, the social, economic and political dichotamy between them has been demonstrated in Part One of the present work. We have seen that they contrast in population growth, structure and dynamics, in the provision of goods and services for each and in the nature of their economic and political relations. We have seen also that the ecology of Kashan City is itself by no means uniform, and that there are measurable differences between its constituent parts. Throughout Part Two summary figures for population and housing in the villages have been given where the figures are comparable with data for the urban enumeration districts. What information is available on population change, on economy, land use and settlement morphology in the villages indicates that there is as much variety between them as between parts of the city. When summarized, however, averages for the rural area are in many cases markedly similar to those for some residential districts at the lower, eastern end of the city.

The literacy rate and the proportion of long distance

migrants in the villages are close to the figures for Aran/Bidgol. By contrast, total sex ratios, effective fertility, and female activity rates in the villages are closest in every case to those in enumeration districts No. 8 and No. 9 in Kashan City. (Tables 7.1,8.4). The number of persons per room and per housing unit are considerably lower in the villages than in the cities, though the recorded age of the housing stock and, most important, female activity rates in the villages were very similar to those in enumeration district No. 9 in Kashan City. These similarities of the rural area to districts No. 8 and No. 9, rather than to Aran, Bidgol or to other districts in Kashan City, indicates that the east - west social gradient in Kashan City, which has been complicated and obscured by modern developments outside the walls and by centripedal tendancies within them, may be regarded as one part of a social continuum from the more desirable residential districts in the city down through the poorer districts at the east end and on to the villages.

The anomalous position of the 'city' of Aran/Bidgol here requires some explanation. Up to a few years before the First National Census in 1956 Aran and Bidgol could fairly be characterised as large agricultural and weaving villages. Aran with a population in 1956 of 9,461 and Bidgol with a population of 7,185; apart from their size they had little to distinguish them from other Kavir villages; they were similar in function, population composition, land use and morphology and had the same lack of tendancy towards the

central location of retailing facilities. But these two villages were officially recognized as 'urban' settlements and they were comparatively close to Kashan. Medical services were much improved during the intercensal period, and in consequence there was a sharp increase in population, which has resulted in relatively poorer housing conditions and higher rates of outmigration than is to be found in the villages. Aran/Bidgol has thus an official urban status, with no specifically urban function; quite probably Iran has many such settlements.

In conclusion, the case for a quantifiable urban-rural continuum cannot, as it stands on the present evidence, be regarded as proved; but it does suggest that it is hard to draw the line with many social variables. The major contrast between city and villages must be in the scale and organization of modern industry and in the availability of goods and services in the city.

CHAPTER ELEVEN

C O N C L U S I O N

The city-regions of central Iran represent one regional variant within an urban Islamic world which stretches from Hausaland in West Africa to the Indian sub-continent. These ancient Iranian cities, forming part of a common cultural ecumene, have long-established social and economic links with their hinterlands : the case in point, the city-region of Kashan, is one of a number of such regions on the margins of Iran's arid central plateau. The present study confirms for this comparatively large and diverse region many earlier statements on the nature of settlement in central Iran, notably those of P.W. English, but under conditions of more radical social and economic change. The present boundaries of Kashan Shahrestan, the rank-size distribution of its settlements and a roughly defined hierarchy of age, size and water rights are the primary indications that the shahrestan is a functional geographic region centred on Kashan City. The region exhibits sharp contrasts in demography, housing and social and economic structure between the urban centre and its satellite villages. The region's social hierarchy has an urban-based upper class of officials, carpet- and landowners, merchants and creditors which maintains its economic and social dominance over the illiterate mass of the people through the control of land, water and credit and through the exercise of political power. The whole is maintained by continuous communication

between city and village. Some aspects of these hierarchical relationships are paralleled by a quantifiable hierarchy in the provision of goods and services in the region; and the use of some techniques of central place analysis has allowed comparison with other western and non-western regions.

Numerous forces of modernisation are changing this pattern: recent developments in Land Reform and the co-operative movement have altered the economic balance between town and country, while the democratisation of some institutions has given the rural sector some voice in public affairs. The most rapid recent changes, however, have been in Kashan City, where the growth of a modern textile industry has radically altered urban industrial structure, leaving the rural economic sector comparatively unaltered. As in most regions the city has been the main focus of change, though just as the villages vary in location, size and function, change in them has not affected all equally. The division of Kashan into Kavir, Alluvial Fans and Mountains delimits three broad zones of past development and future opportunity; in each, village morphology, land use, and field patterns are sensitive indicators of the balance between people and their land, within the overall limitations imposed by aridity. Broadly, in the lowlands, traditionally termed the garmsir, or warm lands, the availability of land and the opportunities for technical progress in water extraction, together with proximity to the market and employment opportunities of the

city, have allowed continued rural development. By contrast, in the uplands, traditionally termed the sardsir, or cold lands, pressures on land and water have been greater and opportunities less, resulting in chronic outmigration of males and slow population growth or even decline.

The significance of these local variations for Kashan City is that what affects the extremities of the system also affects the nucleus. An analysis of 100 Iranian cities has shown that apart from the largest of them the occupational, housing and demographic characteristics of the cities are related to their absolute location within the country and to the amount of immigration or outmigration each is experiencing. Migration is directly affected by conditions in surrounding rural areas and by the size of urban centres. The possibilities here for comparable studies in other developing countries are considerable. Many aspects of the present analysis are similar to those described by A. Mabogunje in his multivariate study of urbanization in Nigeria (Mabogunje, 1968), though a major block against which such studies often stumble is a lack of accurate statistical data.

It is inside Kashan City that the most obvious signs of change in the shahrestan can be detected: at first sight the clearest of these is the gulf between the old town, where live four-fifths of the inhabitants, and the new town - a gulf as wide as that separating the city from

the villages. Inside the walls live four-fifths of the inhabitants at high densities, with few amenities, in poor housing interspersed with small primitive industrial workshops; outside the walls live a privileged few, and functional segregation of industry, residence and commerce proceeds apace. Kashan's suburbs, however, are the latest and most vigorous ramification of a social structure already existing before the local 'industrial revolution'; it is the range of government influence on every aspect of the region's socio-economic geography that is entirely new.

The absolute size of an urban settlement affects its patterns of growth: Aran/Bidgol, at a very humble level, has some of the distinctive marks of larger urban areas, with some incipient differentiation between districts wholly within and districts straddling the walls; Kashan City, at a higher level, has an old town and a new town, but partly because of the city's size, partly because of the continued vigour of the bazaar, and partly through fortuitous circumstances, no separate commercial centre has grown up; studies of Kermanshah, Shiraz, Isfahan and other large cities in Iran point to a new and separate commercial centre being an essential element in urban structure once the new part of the town has passed a certain as yet undefined threshold size.

It was hypothesised that division of the region into urban and rural and division of the city into old and new would show a pair of dichotamies, and this has been demonstrated as being the case. Nonetheless, a more detailed areal analysis has indicated that with regard to housing and demographic structure the one merges with the other; the

statistical dividing line between urban and rural areas is as difficult to draw as that between the old town and the new town. Similarities in traditional,urban and rural economic structures and social structures may account for this. The carpet owner, the textile manager and the money lender operated alike in city and village; the poorest citizens of Kashan City have always been as much in economic bondage as their country cousins. The 'urbanized' characteristics of many Persian villagers has been remarked on by some authors, and the close contacts between city and village make a similar impression on the observer in Kashan. By the same token the 'ruralised' characteristics of many Kashan city dwellers should be noted; until recently many still worked in agriculture, and most still have relatives in the villages. We must conclude therefore that the scale and nature of modern industrial development is the principal distinguishing mark of the city, rather than a specifically 'urban' social structure.

Finally, we are left with the problem of the reciprocal effects of urban growth and urbanization on the villages. While nearly all migratory moves in the developed world are now for reasons of less than absolute necessity, in the developing world a man leaves his home only because he must. A mass exodus from the rural areas of Kashan has not materialised, despite the fact that on the face of it Kashan City, with its modern industry, flourishing commerce and close ties with the hinterland, provides an ideal attraction for migrants. The phenomenon of rural to urban migration without real economic growth has become familiar in the developing world; we are here faced with real economic growth with comparatively little migration and relatively slow urbanization. It follows that

a knowledge of the economic and cultural restraints operating on the rural population, and which were operating before government intervention through reform and education in the limitation of births, is essential to the further understanding of settlement relations in such an area. Future prospects for Kashan and city-regions like it will be determined by the balance of these restraints and progressively more urgent local pressures to quit the land.

A P P E N D I X

Headings of Unpublished Data on Population and Housing and in the Village Gazetteer

1. Unpublished census information on population and housing in Kashan City and Aran/Bidgol was made available from the 1966 Census by the Iranian Statistical Centre.

(i) Data on population were given by five-year age groups for males and females under the following headings: total population; numbers married; numbers literate; numbers attending school; economically active; employed; born inside the ostan; born outside the ostan.

(ii) Data on housing were given under the following headings: number of private households; collective households; housing units under five years old, five to nine years old, and over ten years old; housing units built of mud and brick, kiln brick and iron, stone and iron; number of units owner-occupied; number of rooms occupied; number of housing units with city water piped inside or outside the unit; number of units supplied by well, qanat, river or spring; number of units with electricity; number of households burning kerosene or charcoal.

2. The Village Gazetteer of 1966 presents data on all of the villages in the shahrestan in two forms, or categories. In the first form it is indicated by means of an asterisk whether or not a certain attribute is present in a village. In the second form data are given in figures on numbers and types of crop and livestock, on various institutions and industrial establishments in the village, and the total population and number of households.

Category One Data:

(i) Principal road:

railroad, asphalt; paved; dirt (veh.) rd.; jeep rd.; trail.

(ii) Availability of Social Institutions and Facilities:

mosques; old type school; elementary school; secondary school; literacy corps; health corps; extension corps; home extension agent; clinic; village council; co-operative society; house of equity; village headman; electricity; radio; mailbox; post office; tractor.

(iii) Principal Sources of Water:

Qanat; spring; river, no pump; river 1 pump; deep well; semi-deep well; well; cistern; other and not reported.

(iv) Principal Annual Crops:

Sainfon; eggplant; beans; rice; linseed flax; cotton; onion; tobacco; barley; beet; melon; cucumber; millet-sorghum; potato; clover; canteloup (talebi); lentils; oilplant; seasame; jute; gum tragacanth; canteloup (garmak); wheat; tomato; kidney bean; wild rocket seed; peas; sugar-cane; cocoon; water melon; alfalfa.

(v) Principal Permanent Crops:

Black cherry; brown plum; prune; grapes; figs; pomegranate; almond; quince; orange; pistachio; tea; dates; persimmon; apricot (zardaloo); barberry; olive; apple; other citrus fruits; dried apricot; walnut; pear; plum (gojeh); cherry; lime; citron; sweet lemon; banana; orange(2); mandarin; peach; other crops.

Category Two Data:

(i) General description:

village name; village code; total population; number of households.

(ii) Livestock:

cows; calves; oxen; sheep and goats; horses, donkeys.

(iii) Land Utilization (in hectares):

irrigated wheat; unirrigated wheat; irrigated barley; unirrigated barley; rice; fallow land; other annual crops; natural pasture; forests; orchards, nurseries; cultivable land; non-cultivable land.

(iv) Existing Establishments and Facilities:

animal hus. and battery; cotton, wool cleaning; mining and quarrying; slaughterhouse; dairy prod.; dried fruits and jams; mill; bakery, confectionary; manuf. of sugar candy; miscell. foodstuffs; ice-making; spinning, weaving; carpet making; gelim, zilu making; shoe making and repair; tailors; manuf. of wood; basketry, straw prod.; carpentry furniture; manuf. of leather; manuf. of leather prod.; manuf. repair of rubber prod.,; oil manuf.; manuf. of soap; manuf. of clay-ware; manuf. of pottery, china; manuf. of lime, plaster, cement; manuf. of metal prods.; copper smiths; making, repair cooking stove; tin smithy; farriers; motor-vehicle repair; motor cycle, bicycle repair; manuf. of wooden transport equipment; miscell. industries; stone cutting (construct.); power supply; water supply distribution; wholesale trade; retail trade; butcher's; co-operative society; real estate agency; trans. of passengers, goods; transport services; store-house; post, teleg. telephone;

government organisations; secondary school; elementary school; old type school; medical, veterinary service; clinics; religious institutions; charity foundations; legal serv. (notary); recreational serv.; hotels, cafes, restaurants; tea shop; barber shop; public baths; mortuary; other activities, activities not adequately described.

B I B L I O G R A P H Y

The bibliography is divided into two parts: the first lists the major sources of primary information used; the second lists secondary sources.

I PRIMARY SOURCES

Statistical Unpublished:

a) Data on population and housing, by enumeration districts for the cities of Kashan and Aran/Bidgol, from the 1966 Census conducted by the Iranian Statistical Centre. Details are given in the Appendix.

b) Information on villages gathered by the Iranian Statistical Centre in 1966 and compiled into a Village Gazetteer. Details are given in the Appendix.

c) An Industrial Census conducted by the Iranian Statistical Centre in 1966 at the same time as the Census of Population and Housing. Complete information on industrial premises, by 6-figure classification of type, by location and numbers employed is given for the urban areas of Kashan.

d) Survey of all retail establishments in Kashan and Aran/Bidgol by type, location and approximate numbers employed, conducted by the author 1968-9.

e) 'Report on the Economic Situation in Kashan'. Unpublished Central Bank Report (in Persian), dated 1967.

Statistical Published:

(f) First National Census of Iran, November 1956, 22, Kashan Census District. Ministry of Interior, Public Statistics, Teheran.

(g) National Census of Population and Housing, November 1966, 12, Kashan Shahrestan. Iranian Statistical Centre.

(h) Survey of Work Premises and Workers - City of Kashan, 1961.

(i) Report on the Industrial Census of Iran, August 1963, Series 2.

Maps and aerial photographs:

(j) City of Kashan : Scale 1:2,500. Dated 1966. Published by the Iranian Cartographic Centre.

(k) Kashan and Environs : Scale 1:50,000. Dated 1956. Published by the Iranian Cartographic Centre.

(l) Aerial Photographs : Kashan, Aran/Bidgol and Immediate Environs. Scale 1:20,000. Dated 1966. Unpublished, Iranian Cartographic Centre.

(m) U.S.A.F. Aeronautical Approach Charts. 428 (BIII, BIV, CI, CII). Scale 1:250,000.

BIBLIOGRAPHY II

Abu-Lughod, J. (1960) "Migrant adjustment to city life - the Egyptian villager in Cairo", in New Metropolis in the Arab World. Cairo.

Aubin, J. (1970) "Elements pour l'étude des agglomerations dans l'Iran medieval", in The Islamic City. ed. A.H. Hourani and S.M. Stern, Oxford.

Ahmed, Q. (1965) Indian Cities : Characteristics and Correlates Department of Geography. Research Paper No. 102, Chicago.

Beaujeau-Garnier, J. and G. Chabot (1967) Urban Geography Longmans.

Benedick, R.E. (1964) Industrial Finance in Iran. Boston, Mass.

Berry, B.J.L. (1961) City Size Distributions and Economic Development, Department of Geography, Research Paper No. 62, Chicago.

Berry, B.J.L. (1967) Geography of Market Centres and Retail Distribution. Prentice-Hall, N.J.

Berry, B.J.L., J.W. Simmons, and R.J. Tennant, (1963) "Urban population densities : structure and change". Geogr. Rev., 53, 389-405.

Berry, B.J.L. and A. Pred (1961) Central Place Studies : A Bibliography of Theory and Applications, Regional Science Research Institute, Bibliographic Series I.

Bogue, D.J., and W. Thompson (1949) "Migration and distance", American Sociological Review, 14, 239-244.

Bowen-Jones, H. (1968) "Agriculture"in The Cambridge History of Iran, Vol. I.

Bray, J. (1969) "The craft structure of a Yoruba Town", Transactions of the Institute of British Geographers, 46, March, 179-93.

Breese, G. (1966) Urbanization in Newly Developing Countries. Prentice-Hall, N.J.

Breese, G. (1969) The City in Newly Developing Countries, Readings on Urbanism and Urbanization. Prenctice-Hall, N.J.

Continued

Browne, E.G. (1926) A Year Amongst the Persians. C.U.P.

Clarke, J.I. (1960) "Persons per room - an index of population density", Tidjschrift voor Economische en Sociale Geographie, Vol. 51.

Clarke, J.I. (1963) The Iranian City of Shiraz. Department of Geography Research Paper Series No. 7, University of Durham.

Clarke, J.I. and B.D. Clark (1969) Kermanshah : An Iranian Provincial City. University of Durham Centre for Middle Eastern and Islamic Studies. Publication No. I, Department of Geography Research Paper Series No. 10.

Connell, J. (1970) Semnan : Persian City and Region. University College, London.

Curzon, Hon. G. (1892) Persia and the Persian Question. London.

Darwent, D. (1965) Urban Growth in Relation to Socio-Economic Development and Westernization - A case study of the City of Mashad, Iran. Ph.D. thesis, University of Durham.

Durand, J.D. (1953) "Population structure as a factor in manpower and dependancy problems of under-developed countries" in U.N. Population Bulletin of the United Nations, 3, 1-16. N.Y.

Edwards, A.C. (1938) The Persian Carpet. London.

English, P.W. (1966) City and Village in Iran : Settlement and Economy in the Kirman Basin. University of Wisconsin Press.

Fisher, W.B. (1966) The Middle East and North Africa. Europa Publications.

Friedman, J. (1966) Regional Development Policy : A case study of Venezuela. Mass. Institute of Technology.

Gittus, E. (1965) 'An experiment in the identification of urban sub-areas', Transactions of the Bartlett Society, 2, 1963-4. London.

Hagerstrand, T. (1957) 'Migration and area', Lund Studies in Geography Series B, 13, 27-158.

Haggett, P. (1965) Locational Analysis in Human Geography, London.

Continued...

Haggett, P., and K.A. Gunawardena (1964), 'Determination of population thresholds for settlement functions by the Reed-Meuench method'. Professional Geographer, 16, 6-9.

Harman, H.H. (1961) Modern Factor Analysis. Chicago.

Hartley, R. (1968) Recent Population Changes in Libya : Economic Relationships and Geographic Patterns. Ph.D. thesis, University of Durham.

Hauser, P.M., and L.F. Schnore (1965) The Study of Urbanization, John Willey and Sons Inc., N.Y.

Hill, A.G. (1969) Aspects of the Urban Development of Kuwait, Ph.D. thesis, University of Durham.

Hoselitz, B.F. (1955) "Generative and parasitic cities", Economic Development and Cultural Change, 3, 278-294.

House of Commons (1894) Sessional Papers , Vol. 87.

Houtum-Schindler, A. (1898) East Persian Irak. (Special Publication of the R.G.S.).

Mabogunje, A.L. (1968) Urbanization in Nigeria, University of London Press.

McAdams, R. (1965) Land Behind Baghdad, Chicago.

McGee, T.G. (1966) The Southeast Asian City, London.

Meier, G.M. (1964) Leading Issues in Development Economics, New York.

Moser, C.A., and Scott, W. (1961) British Towns : A Statistical Study of their Social and Economic Differences, Centre for Urban Studies, Report No. 2, Edinburgh.

Klovan, J.E. (1966) Q - Mode Factor Analysis in Fortran IV for Small Computers. Department of Geology, University of Calgary.

Lambton, A.K.S. (1953) Landlord and Peasant in Persia, O.U.P.

Lambton, A.K.S. (1969) The Persian Land Reform : 1962-66, O.U.P.

Lapidus, I.M. (1967) Muslim Cities in the Later Middle Ages, Cambridge, Mass.

Losch, A. (1954) The Economics of Location. New Haven.

Pred, A. (1962) The External Relations of Cities during 'Industrial Revolution'. Department of Geography, Research Paper No. 14, Chicago.

Robson, B.T. (1969) Urban Analysis, C.U.P.

Continued...

Stewart, C.T. Jr. (1958) 'The size and spacing of cities', Geographical Review, 48, 228.

Stewart, C.T. Jr. (1960) 'Migration as a function of population and distance'. American Sociological Review, 25, 347-356.

Sjoberg, G. (1960) The Preindustrial City Past and Present, The Free Press of Glencoe.

Sunderland, E. (1968) 'Pastoralism, nomadism and the social anthropology of Iran'. The Cambridge Modern History of Iran, Vol. 1 p.618.

Stevens, R. (1962) The Land of the Great Sophy, London.

Thornthwaite, C.W., Mather, J.R., and Carter, D.B. (1962) Three Water Balance Maps of S.W. Asia. Drexel Institute of Technology Publications in Climatology, 11, No. 1.