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PATTERNS AND PROCESSES
OF TUNISIAN MIGRATION

Thesis submitted in accordance with
the requirements of the University of Durham
for the Degree of Ph D.

by

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Department of Geography

May 1980

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ABSTRACT

Patterns and processes of post-war Tunisian migration are examined in this thesis from a spatial perspective. The concept of 'migration regions' proved particularly interesting in this context, highlighting the orderly character of internal migration. Comparison of different taxonomic procedures for transforming interaction matrices not only illustrated the advantages and disadvantages of different clustering techniques, but also facilitated explanation of contemporary migration patterns.

The hypothesis of the 'mobility transition' provides an interesting yardstick against which trends in internal migration and other mobility characteristics may be measured. Although the development of Tunisian migration resembles in some respects the pattern prescribed by the mobility transition hypothesis, it is shown that it would be wrong to conclude that the evolution of Tunisian migration is a predetermined unilinear process.

International migration grew rapidly in importance to Tunisian job seekers in the late 1960s and early 1970s, becoming more important in some regions of Tunisia than out-migration to Tunis. Calculation of migration quotients for emigration to France and Libya shows that international movement of workers has been a highly selective process, not only with regard to migrant characteristics, but also with regard to regions of origin and destination. An attempt is made to explain the changing pattern of Tunisian emigration, and to identify elements of spatial order within the evolving emigration process.

Migration both at the internal and international scale is closely associated with migrants' aspirations for occupational and social mobility. An understanding of the complex relationships between these different forms of mobility is a prerequisite to meaningful migration planning. The thesis concludes by outlining the relevance to policy formulation of spatial analysis of migration and employment patterns, and by reviewing the possible strategies which the Tunisian government might adopt for migration and manpower planning.

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PREFACE

This thesis documents some research findings concerning the operation of the Tunisian migration system. It does not claim to offer an exhaustive analysis either of the migration process or of Tunisian population geography, but seeks to describe and explain only those aspects of Tunisian migration which were of greatest interest to me during my three years as a research student at the University of Durham (September 1976 - September 1979).

I visited Tunisia on four separate occasions during the preparation of the thesis in order to collect primary and secondary data for analysis in Durham, as well as to extend my personal awareness of the nature of Tunisian society and of the lifestyles of the communities I was studying. Apart from consulting the very wide range of interesting material available at the Centre for Middle East and Islamic Studies at the University of Durham, I was fortunate in also being able to visit the documentation unit of the Centre de Recherche des Economies et Sociétés Méditerranéennes at the University of Aix en Provence

From amongst other Arab and African nations, Tunisia was chosen for study since it encapsulates within one small country of 5.6 million people many of the problems faced by other members of the Third World. Moreover, Tunisia affords many advantages for research which other developing countries do not possess. For example, the Tunisians have a long

record of conducting reasonably reliable population censuses (Clarke, 1972). This gives authority to research findings based on comparative analysis of census records. A further attractive feature of research in Tunisia is the availability of a large number of recent reports and academic studies carried out by Tunisian geographers and social scientists, offering an indigenous view of the country's prospects and problems added to which, the stability of the political regime in Tunisia is of special interest to the student of migration. In the 24 years since independence was gained from the French, voluntary migration has proceeded almost uninterrupted by civil strife or other forms of internal disorder which generate refugee migration and forced population movement. This is a situation experienced by few other Arab or African nations and one which facilitates analysis of migration patterns.

Much of this thesis (Chapters 3 to 6 and Chapter 9) is based on the results of the 1966 and 1975 censuses. Unfortunately, not all the results of the 1975 census had been published at the time of presenting this thesis. Migration matrices were available at the level of Tunisia's 18 gouvernorats (the largest administrative districts), but not at the more detailed level of delegations (sub-divisions of gouvernorats). The publication of a monthly bulletin containing regional statistics for international migration permitted a more precise and more up-to-date investigation to be made of international population movements.

A wide range of secondary data sources has been used in this research and to facilitate point-to-point checking throughout the text, a code has been assigned to each data set. A list of these data codes and the matrices to which they refer is given in Appendix 1. Precision has also been attempted in the terminology used in this thesis. Throughout the text, the terms 'in-migration' and 'out-migration' specifically refer to internal migration, while international moves are described as 'immigration' and 'emigration'. Other terms which the author has endowed with specific meaning are listed in the glossary (p. 393). In order to keep footnotes to a minimum, the Harvard reference system has been adopted and a list of the published work cited is included at the end of the thesis rather than after each chapter.

ACKNOWLEDGEMENTS

My greatest debt is to my parents and to my wife, Anne. My parents were first to arouse my interest in geography by encouraging me to marvel at, to question and to seek to understand the fascinating patterns of the world around. I am also extremely grateful to my wife, since her interest in geography has frequently given me heart at times when my own search for geographical explanation has seemed to be in vain. Her personal support and enthusiasm have sustained me throughout my research.

I have been greatly encouraged during my studies by many individuals. At the University of Aberdeen, Mr Eric Naylor convinced me of the value of adopting scientific method in geographical analysis, while Dr Brian Beeley introduced me to the varied patterns and problems of the Arab world.

In the University of Durham, Professor John Clarke consolidated my interest in population geography, and as my supervisor gave me generous assistance in planning and executing my research. I am particularly grateful to him for his helpful comments on the early drafts of this thesis. Dr Richard Lawless of the Middle East Documentation Centre provided a rich fund of relevant materials for consultation, as well as being a catalyst to thought on many North African topics.

Data collection in Tunisia was greatly facilitated by the efforts of Dr. Jean-Marie Miossec of the University of Tunis, and by Professor Mohammed Fakhfakh of the Centre d'Etudes Economiques et Sociales, Tunis, as well as by the cooperation of many

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SECTION 1

Chapter 1

INTRODUCTION

"The truth of yesterday could be the lie of today. They had come . . . on the assumption that by moving to a new world they would leave their problems behind. When the craving for a better way of life seemed thwarted they had again and again renounced their homes and moved . . . looking once more for a place where their problems would not exist. Man had run out of geographical solutions for his problems and changes of scene as a 'cure' for his restlessness. There was only one thing which could lead to an answer to man's searching and that was to let the sense of journey, expressed for so long in travelling the world without, become a journey within the spirit of man."

(Van der Post, 1976, 401)

Migration in space is only the outward manifestation of the individual's desire for change, whether this be attributed to economic, environmental, religious or social stimuli. Van der Post expresses well the futility of population movement in space if this occurs unaccompanied by other, more radical changes in the lifestyles and perceptions of the migrant community. In the developing countries, spatial inequality in the distribution of opportunities has fuelled an unprecedented movement of population towards the locations where Western influence has brought visible changes in the patterns of life. These changes have involved both



the economic benefits and the social problems that are associated with the emergence of a so-called 'modern' economy. Sadly the majority of migrants in these countries do not find an easy solution to their problems simply through spatial relocation in a large 'modern' city. Given their very limited personal resources, migrants in the Third World could also be said to have "run out of geographical solutions" to their problems. Having achieved only partial assimilation into the urban communities to which they have moved, most are unwilling or unable to return and reintegrate with their societies of origin.

To the geographer, a map of migration flows stimulates a wide range of hypotheses about the evolving welfare of regional populations. In a complex fashion it mirrors the changes in economic and social structures being experienced by people from different strata in society, involved in different sectors in the economy and living in different regions of the country. Study of the migration process is quite unlike analysis of other flow patterns. For example, the movement of merchandise, money or mail reflects primarily the connectivity of places, and leads to the examination of processes functioning in space. By contrast, migration flows involve the conscious movement of human agents who have selected their destinations from amongst a variety of alternative locations (Wolpert, 1965, 161). Most migrants, other than refugees, have chosen to move in response to their

perceptions of the differences in opportunity and lifestyle between their place of origin and intended destination. This leads to the conclusion that the human migration process has a unique spatial significance in contradistinction to the other interactive processes mentioned above.

In spite of this important characteristic of the migration process, explanation of the emerging patterns remains superficial if it does not consider the occupational, social and personal dimensions of population mobility. It is these dimensions which invest the migration act with its greatest significance, rendering it worthy of the most detailed geographical study.

Despite these many dimensions of migration, it is appropriate that geographical study should place special emphasis on the analysis of patterns of population movement. Traditionally, migration research has sought to answer four questions: Who migrates? Why do people move? What are the patterns, volumes and directions of flow? What are the consequences of migration? (Mangalam, 1968, 15). Geographers, while considering all four questions, have tended to give greatest attention to analysing patterns and spatial processes. Consequently most geographical studies have followed a macro-analytic approach leaving social scientists to investigate the behavioural environment of individual decision makers and to tackle the problems of why some persons are more prone than others to migrate (consider for example the range of studies cited in Shaw's (1974) review bibliography of migration).

Fortunately a number of geographical studies have recently sought to correct this imbalance and have adopted a behavioural approach to migration analysis (Lieber, 1978, Morgan, 1978, Schwind, 1971). Not only is there a need for more micro-studies of patterns of migration behaviour, but there is also a need to integrate the results of micro- and macro-scale migration analysis. Pryor (1975, 23) has suggested that this should be a high priority in geographical research if a better understanding is to be achieved of the complex relationships which exist between patterns of 'modernization' in developing countries and the character and form of population mobility in these countries.

Extensive multi-disciplinary reviews of the role of migration in the development process have recently been published by the U S Bureau of Census (1977) and by the International Development Research Centre (1977). These very valuable reviews identify the fact that over the last two decades the contribution of internal migration to population redistribution has reached unprecedented levels, and they highlight the many social and economic crisis associated with the continued concentration of population in Third World cities. Migration is predominantly viewed, however, as a result of differential development between rural and urban economies, rather than as a human response to changing values and aspirations in an evolving society. Migration remains an intensely personal experience for the individuals involved in the trauma of movement to a new locus of employment or a

new place of residence The migration analyst must not lose sight of this perspective on human movements if he wishes his research to be of value to 'people' and not merely to 'populations'

Comprehensive literature reviews have also been compiled by Pryor (1975, 1978a, 1979), Simmons (1976), Sinclair (1978), Swindell (1979) and Todaro (1976), and it would be repetitive to further synthesize the results of the wide range of recent empirical work whose contribution to the study of migration and spatial economic development has been adequately assessed by the authorities mentioned above. Instead, the reader's attention is drawn to the concepts which have been of particular relevance to the author's research into population movements in Tunisia

Migration Regions

One concept to emerge recently from geographical studies is that of the 'migration region', which may be identified from two perspectives The first involves the grouping of areas on the basis of the similarity of the migration flows entering or leaving those areas This approach defines regions which may have little or no internal exchange of migrants yet share common migration destinations (or some other common characteristic of the migration system). The second approach identifies migration regions on the basis of the intensity of migration interaction between the areas under study Interaction regions attempt, on the basis of some

predefined criterion, to maximize intra-regional interaction and to minimize extra-regional movements. This approach is of greater conceptual interest to the geographer and the regional scientist, who are concerned to model regional systems of interaction within the space economy

Migration region analysis as first formally proposed by Ng (1969) has been criticised for its weak methodological basis (Hildenbrandt, 1974). This criticism has not invalidated the basic concept of migration regions, since new and more efficient forms of grouping algorithm are constantly being developed. Some of these will be discussed in Chapter 5 of the thesis. Furthermore, the value of the migration region concept should be judged in terms of its capacity to stimulate new ideas about the nature of regional structures and its ability to explain the operation of certain spatial processes, rather than in terms of the adequacy of the statistical methods employed in regional definition.

One potential avenue of research which remains unexplored is the relationship between migration regions and information systems. In a recent migration study of Uganda in which migration movements were considered as one of the primary processes in defining functional regions, it was hypothesized that "a concomitant circulation of information and increased awareness takes place within the functional region" (Hirst, 1976, 89). If this were proved to be valid then migration systems should not be viewed as dependent on other spatial processes, but rather they should be studied as operationally

interdependent with information and communication systems (Hagerstrand and Kuklinski, 1971). In 'advanced' countries, other opinion-forming media such as telecommunications networks should be considered as defining functional regions, but in the less developed realms, migration matrices alone may prove to be an adequate surrogate variable for this purpose in the foreseeable future. Therefore statements, such as by Berry and Schwind (1969), that migration regions help to explain residual variables after migration flows have been fitted to appropriate distance decay functions, state only one perspective on migration analysis. Migration regions might instead be interpreted as one of the chief constricting forces on movement patterns, and migration systems might be viewed as an active force in the moulding of other spatial structures.

The Hypothesis of the Mobility Transition

As well as treating migration as a dependent variable, most geographical studies also fail to explain the changes which occur in the migration process through time. Statistical explanations are often sought for the spatial variation in the total migration recorded during a fixed time period, but it is less usual to find studies which attempt to explain temporal variations in the migration process through comparison of the character of migration during two or more periods. Why do the volume, character and pattern of

migration differ from one decade to another? Some possible answers to this question are offered by the hypothesis of the mobility transition. This hypothesis was formulated by Wilbur Zelinsky (1971, 222) on the basis of his belief that

"there are definite patterned regularities in the growth of personal mobility through space-time during recent history and these regularities comprise an essential component of the modernisation process "

The hypothesis suggests that the mobility of a population experiences a transition in its character similar to the transitions in the mortality and fertility characteristics of developing societies. Thus, the nature of mobility is modified progressively from an initial phase with low levels of residential migration and highly constrained patterns of circulation, through to an early transitional society in which rural-urban migration has become of very great importance, circulation has accelerated and international migration has begun to emerge. Zelinsky predicts further interesting changes in patterns of population mobility in the late transitional, advanced and superadvanced societies.

A paradoxical aspect of the mobility transition hypothesis is the demarcation of 'stages' within the transition as this feature highlights the discontinuities in mobility characteristics rather than emphasizing the common features of population movements through time (Chapman and Prothero, 1977, 5). In view of the small number of theories propounded in recent years within the field of population studies, it is surprising

that Zelinsky's hypothesis has neither come under more detailed scrutiny, nor been more widely tested Zelinsky (1979) himself has made some cautionary comments concerning the hypothesis in the light of some recent research findings. One reason that the concept of the mobility transition has not been more closely examined by migration analysts has been the practical difficulty of testing a hypothesis which refers to such a wide spectrum of types of population movement ranging from intra-city commuting patterns to international labour migration

Although the hypothesis is open to criticism on a number of grounds (see Chapter 6), it must nevertheless be recognized as a valiant attempt to develop a theory of population mobility in a spatio-temporal context. It is of particular value in identifying and emphasizing the inter-relationships between mobility patterns at various different scales. This feature of the mobility transition hypothesis makes it possible to consider it in relation to the processes of spatial development, in which interdependencies between economic systems at one scale have far-reaching influences on processes operating at quite different levels of resolution

International Migration

The post-independence history of Tunisian migration serves as an excellent example of the inter-relationships of population movement at different scales. The advent of large-scale labour migration to Western Europe and to Libya between

1964 and 1974 substituted to a limited extent for internal population movements when some job seekers who had previously moved to Tunis for employment, found that they could earn far larger incomes by working abroad (Simon, 1977, 58). The desire to emigrate also stimulated certain new patterns of internal migration since it is known that many persons moved within Tunisia to locations where they hoped to receive contracts from foreign employers to work abroad

The study of international migration is a field which received scant attention from geographers during the 1960s and has only recently regained popularity (Clarke, 1979, 262). Investigation of emigration patterns has revealed that many of the regularities observed in internal migration also apply at the international scale despite the larger number of physical, economic and social barriers encountered by migrants moving from one country to another (Courgeau, 1970 Findlay, 1978b). In the case of Tunisian emigration to adjacent countries, the availability of a precise space-time statistical breakdown permits analysis of the spatial evolution of emigration patterns at a much more detailed level than would normally be possible. One feature observed in Tunisian emigration patterns is the tendency for some regions to consistently lead trends in national labour migration while other areas are traditionally laggards in following the national trends. Similar temporal regularities in unemployment patterns have been investigated by Bassett and Haggett (1971), as a result of their hunch that economic interdependence between regions

should also be reflected in lags in employment opportunities between economic core regions and peripheral regions. The diffusion of information concerning migration opportunities from one region to another or from one country to another gives a similar foundation to the hypothesis that emigration from a lag region at a given time may be correlated with labour migration from a lead region at an earlier date. Clearly, if this could be proven, it would give grounds in the first instance for a reasonable degree of migration predictability, secondly, it would suggest that intervention in information dissemination systems might have a significant influence in retarding or encouraging regional emigration.

Employment, Mobility and Planning

While in Sections 2 and 3 of this thesis attention is focussed on patterns of internal and international migration respectively, in the fourth section discussion is broadened to include consideration of the occupational and social dimensions of mobility. Any attempts at government intervention in either internal or international migration must consider not only the spatial relocation of population but also the aspirations of migrants for occupational and social mobility which are integrally associated with most population movements. Although existing manpower policies have undoubtedly exacerbated trends towards population concentration in north-eastern Tunisia, analysis of Tunisian employment trends reveals that migration patterns cannot be explained

simply in terms of rural inhabitants moving to Tunis in order to fulfil their aspirations for non-agricultural employment. The migrant's desire to live in the city extends beyond the wish for a secure, well-paid job, and includes the wish to participate in the urban milieu and to have access to the full range of city services and the kaleidoscope of urban innovations.

Chapter 2.

SPATIAL STRUCTURES in TUNISIA

Introduction

Tunisia, the smallest of the four Maghreb countries both by area and by population (Table 2.1), became an independent republic in 1956 under President Bourguiba. 65 years of French rule left the economy strongly oriented towards the export of agricultural produce, especially olives, and mineral resources such as the phosphates with which the country is so richly endowed. French colonization also brought about a substantial reorganization of the spatial structure of Tunisia, but had much less impact on the Arab culture of Tunisian society. Most characteristics of the contemporary geography of the country may be attributed to one of three different phases in its historical development: the pre-colonial era, the period of French colonization and the phase of reorganization which followed independence.

The Pre-Colonial Era

Poncet (1962, 15) vividly records the obliterating effect of the eighth century Islamic invasions with the trenchant sentence

"elles n'ont pas gardé trace de dix siècles de présence romaine et byzantine, de cinq siècles de propagande chrétienne."

The Arabs transformed not only the economy of the Maghreb, but also its culture base. Islamization was

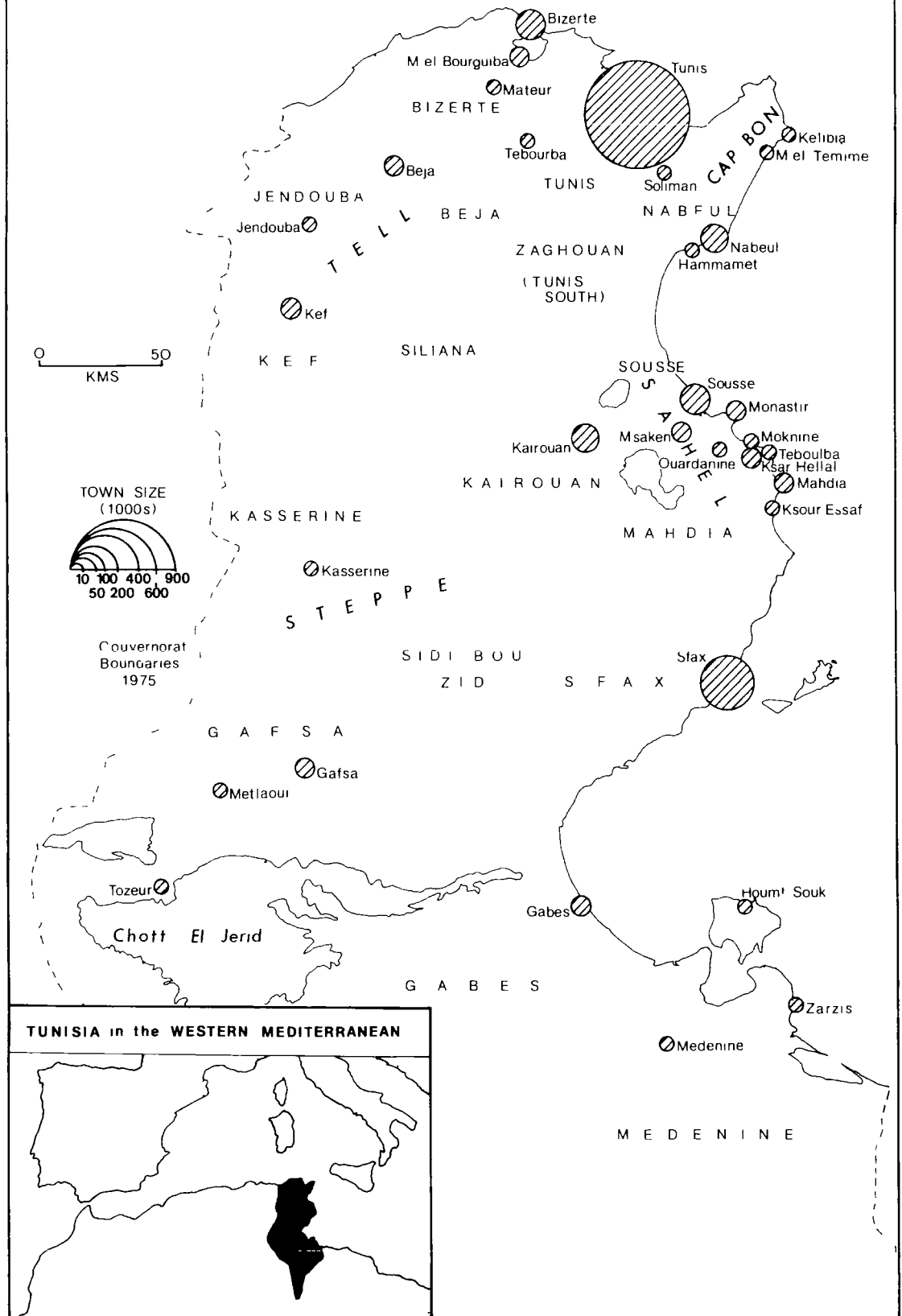
Table 2.1. Comparative Statistics for Tunisia, Algeria, Libya and Morocco

	AREA ¹ (1000 SQUARE KMS)	POPULATION (MILLIONS)		RATE OF NATURAL INCREASE (ANNUAL PERCENT)		PER CAPITA GROSS NATIONAL PRODUCT (U S DOLLARS, 1977) ¹	RATE OF GROWTH IN G.N.P. (ANNUAL PERCENT) ²
		1977	Mid-1979 (est.) ³	1970-1977 ¹	1977 ³		
Tunisia	164	5.9 ¹ 6.1 ²	6.4	2.0	2.6	860	4.3
Algeria	2,382	17.0 ¹ 17.9 ²	19.1	3.5	3.3	1,110	2.1
Libya	1,760	2.6 ¹ No Data ²	2.8	4.1	3.5	6,680	6.6
Morocco	447 ⁴	18.3 ¹ 18.2 ²	19.4	2.8	3.2	570	2.2

Notes and Sources 1. World Bank, 1979, World Development Report, Washington, D.C. World Bank.
 2. United Nations, 1978, Demographic Yearbook, 1977, New York United Nations.
 3. Population Reference Bureau, 1979, 1979 World Population Data Sheet, Washington, D.C. Population Reference Bureau.

4. Excludes the disputed territories of the former Spanish Sahara.

FIG 21 PLACE NAME AND LOCATION MAP



even more complete than Arabization, since the native Berber peoples accepted Islam while retaining their own language.

The environmental impact of the 11th century invasions of the Beni Hillal and Solaim tribes was even greater than that of the first Islamic warriors. They took over much of the cultivated land for pasturage and the coastal towns were deprived to some extent of their functions as agricultural entrepôts. Settled cultivation was pushed back into the Sahel on the eastern coast of Tunisia and shrank to small areas around the largest towns. The Hillal ravaged and occupied the central steppelands of Tunisia and there they maintained a nomadic lifestyle which was to remain virtually unchanged until the end of the nineteenth century.

The towns and settled peoples of Tunisia were ruled by a succession of Arab dynasties followed by periods under Spanish and Ottoman suzerainty. During the seven centuries after the Beni Hillal invasions, the towns of Tunisia passed through cycles of growth and decline according to the fortunes of each dynasty but they never reasserted full control over the hinterland of the country or effectively expanded the cultivated areas. The towns were centres of religious law and Islamic learning. They were also the focus of artisanal industries and termini of trans-Saharan commerce.

On the basis of population size, ethnic diversity, and economic and social functions, Valensi (1977, 17) has suggested that there were at least sixteen Tunisian settlements which could be designated 'urban' by the end of the eighteenth

century. Around the larger towns dense networks of roads had been established to collect produce from villages in the neighbouring countryside in exchange for the artefacts of urban-based craftsmen and merchants. The inter-regional road network was very disjointed, however, and a map of the roads suitable for carriage transport prepared by the Belgian geographer, E. Reclus, shows that as late as the eve of the Protectorate there were few reliable roads penetrating either the Tell or the high steppes.

Throughout the nineteenth century the French viewed Tunisia as a natural extension to their Algerian territories which had been annexed as early as 1830. Using the pretext of frontier clashes and in the face of financial and administrative disorder in Tunisia, the French occupied the country and made it a Protectorate in 1881. They disliked the strong Italian presence which presented a challenge to their authority in north-eastern Tunisia. Consequently the French vigorously encouraged agricultural colonization by French settlers to substantiate their right to govern the country. It was this policy which first caused them to instigate major changes in the spatial structure of the country (Despois, 1961).

The Development of Transport Networks during the Colonial Era

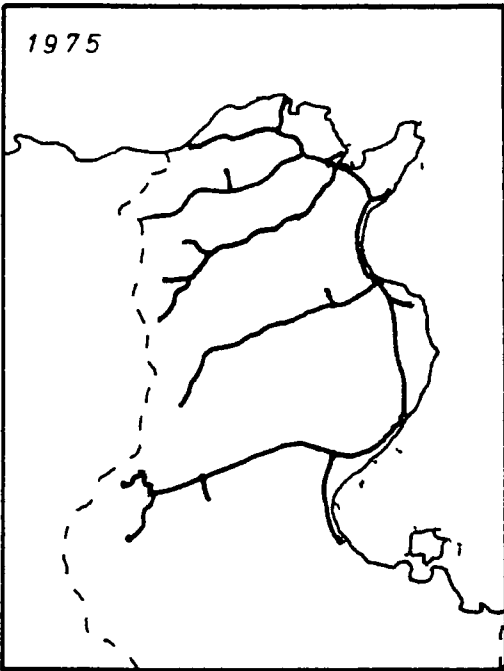
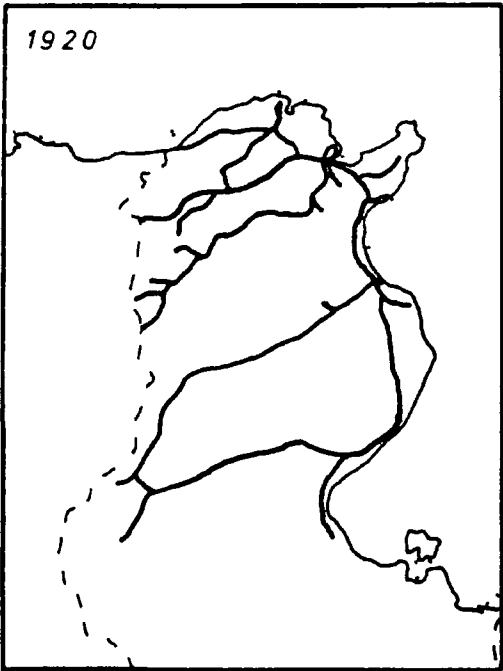
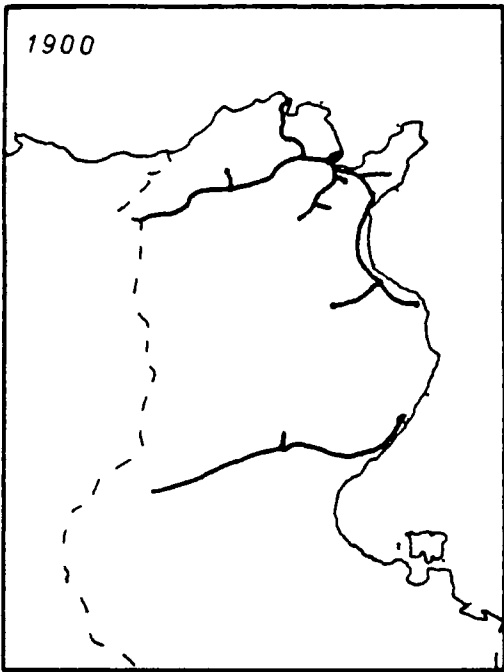
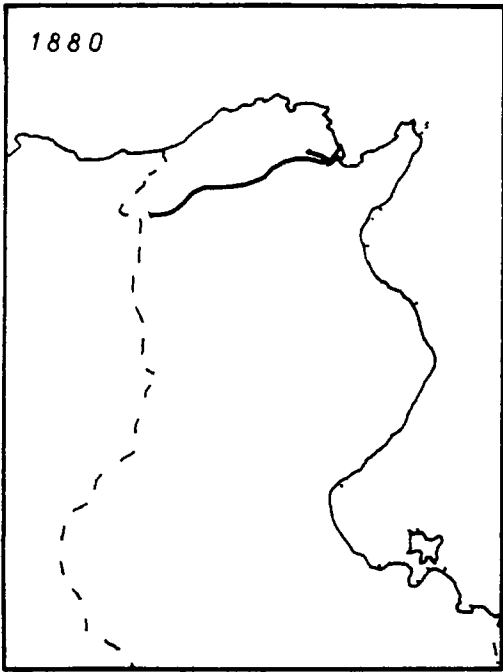
Transport networks are of great importance in channelling and redistributing a nation's human and physical resources in the manner perceived as appropriate by those governing a country. Modifications to Tunisian transport networks

achieved by the French during the colonial era can hardly be overemphasized because the structures which they established or remoulded have remained a major force in influencing patterns of resource redistribution since independence.

The Tunisian railway system is one example of the close association which can be observed between the development of spatial structures and the evolution of colonial interests (Aydalot, 1966). Already by 1888 the French had established a rail link between Tunis and Bône (Annaba) in eastern Algeria. This was followed by the development of several lines in the most promising agricultural areas, built to encourage the settlement of French farmers. The first colonists to settle in rural areas after the establishment of the Protectorate located their farmsteads around the railway stations of the lower Medjerda valley and of the Cap Bon peninsula (Thomas, 1953). This phase of railway construction continued until the turn of the century by which time French rule was firmly established and additional motives had emerged for railway construction.

A new surge in building railways followed the discovery of valuable mineral deposits (phosphates, iron ore, lead, zinc) in the interior of Tunisia. Lines were rapidly constructed to link these inland deposits with the nearest ports. The resulting rail network displayed low levels of connectivity and served dominantly the interests of the colonial power. It was not until 1911 that the major cities of Sousse and Sfax were directly linked by rail, even

FIG 2 2 TUNISIAN RAIL NETWORK



at its zenith the railway system had only one main north-south track compared with four lines running east-west from the interior of the country to the ports (Figure 2 2)

Although connectivity improved slightly following the installation of a rail link between Haidra and Kasserine in 1942 to serve military purposes, the directional bias in the railway system remained fundamentally unaltered during the colonial era. Indeed, following independence some lines in the interior have been allowed to fall into disrepair and the overall connectivity of the system has declined (Table 2 2). Tunis continues to be a focal point of interchange and it is still impossible to move directly from the mountainous north-western region of the country to the steppelands of central Tunisia or to the olive growing region of Sfax without passing through Tunis.

Some of the developments in the Tunisian railway system may be expressed in terms of changes in connectivity as measured by the Beta index. This index relates the number of routes (edges) to the number of connecting points (vertices) in a network (Kansky, 1963, 16-18). In the Tunisian context, all railway junctions and termini were considered as vertices and the railway lines between vertices were counted as edges. Despite the problems associated with any index of this kind (James et al, 1970), the index adequately displays for the purpose of this investigation, the rise and decline of connectivity in the Tunisian rail system. Between 1880 and

Table 2 2 Connectivity of the Tunisian railway system

Date	Edges	Vertices	Connectivity Index (Beta)
1880	4	5	0.80
1900	21	22	0.95
1920	39	37	1.05
1942	44	41	1.07
1975	28	29	0.97

$$\text{Beta} = \frac{\text{Edges}}{\text{Vertices}}$$

Source author's calculations

1942 the number of edges increased faster than the number of vertices, resulting in an overall rise in connectivity. Thereafter damage to some links in the system has resulted in a decline in connectivity, fragmentation in 1975 being almost as severe as in 1900. With index values ranging between zero and three, those which are less than one are usually interpreted as representing poorly connected networks with few circuits (Haggett et al, 1977, 315). It can be seen both from the dendritic character of the rail network (Figure 2.2) and from the low values of the Beta indices that the Tunisian railway system has never developed to a mature state capable of offering all parts of Tunisia similar opportunities of access to the nation's resources. Clearly a citizen of Tunis is much more favoured in this respect than someone from the south or west.

Spatial imbalance could similarly be demonstrated to ensue from the structuring of other aspects of Tunisia's transport system. The geography of the country's ports and roads will however be considered in less detail to prevent the argument from becoming repetitious.

The major ports of Tunis-La Goulette, Sfax, Sousse and Bizerte were all established in the first few years of French occupation. By a law of 1902, the territory of Tunisia was divided among these ports, assigning to each one a specific hinterland (Miossec and Signoles, 1976, 153). These hinterlands were extremely elongated territories and in some instances poorly linked, either by road or rail, to their outlet port. As a result the port of Tunis-La Goulette, which was well placed in relation to the national transport system, grew faster than the other ports and expanded to become the country's only major cargo port. The ports of Bizerte and Sousse were progressively undermined because of their proximity to the larger and better equipped port of Tunis. During the century, the French developed Sfax largely as a node for the export of phosphates, which soon exceeded the tonnage of olives exported. This specialization made Sfax increasingly vulnerable to swings in world demand for phosphates.

In 1975 Tunis-La Goulette handled over half of all shipping entering Tunisian ports (A.P I, 1976a, 70), recording over double the gross tonnage of shipping at Sfax, the country's second largest port. The recent creation (1973) by the

Tunisian government of phosphate exporting facilities at Gabes has to some extent reduced the spatial imbalance in the provision of ports. Nevertheless, international trading links still remain highly concentrated on Tunis-La Goulette. The other ports only survive because of their specialist functions.

The impact of the French on the Tunisian road network was also marked. Unlike the railway system, a road network long predated the arrival of the French. Colonial policy demanded the creation of a new mesh of rural roads along the Medjerda valley, in the Cap Bon peninsula and in the densely colonized zone around the Lac de Bizerte. As a consequence, the road network of the nation was reshaped within 50 years to serve primarily the north and north-east of the country, creating an imbalance which was still obvious in the 1970s.

Territorial Administration

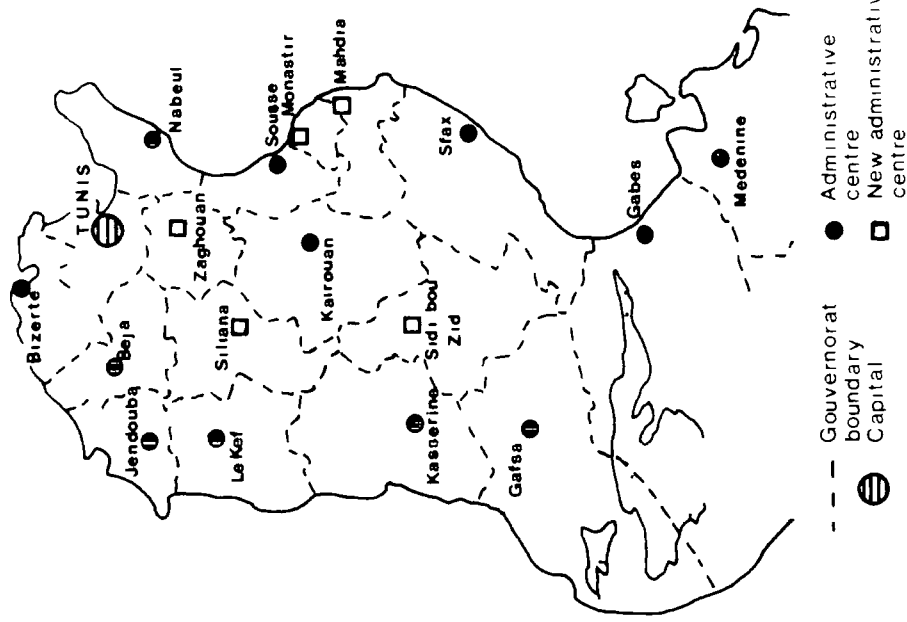
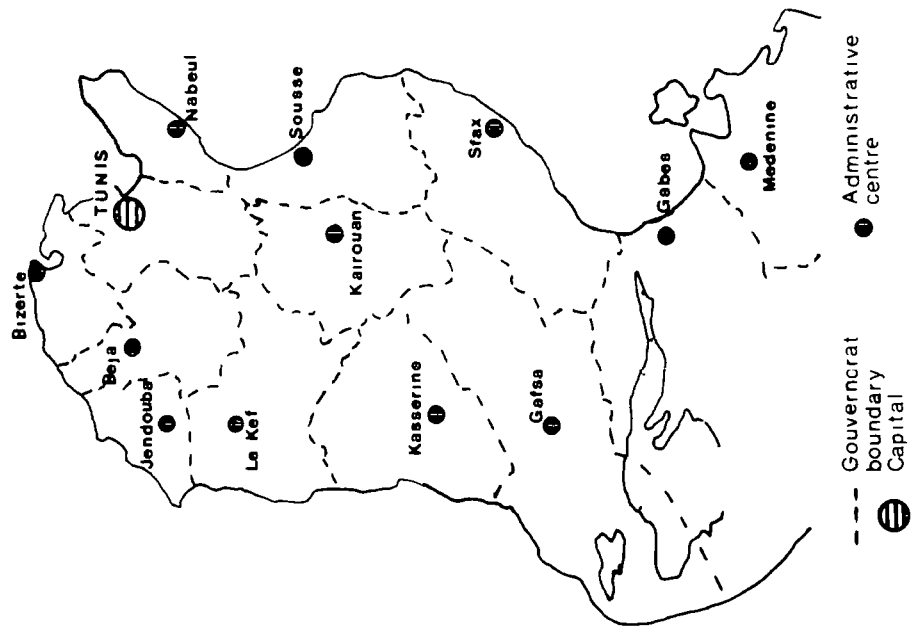
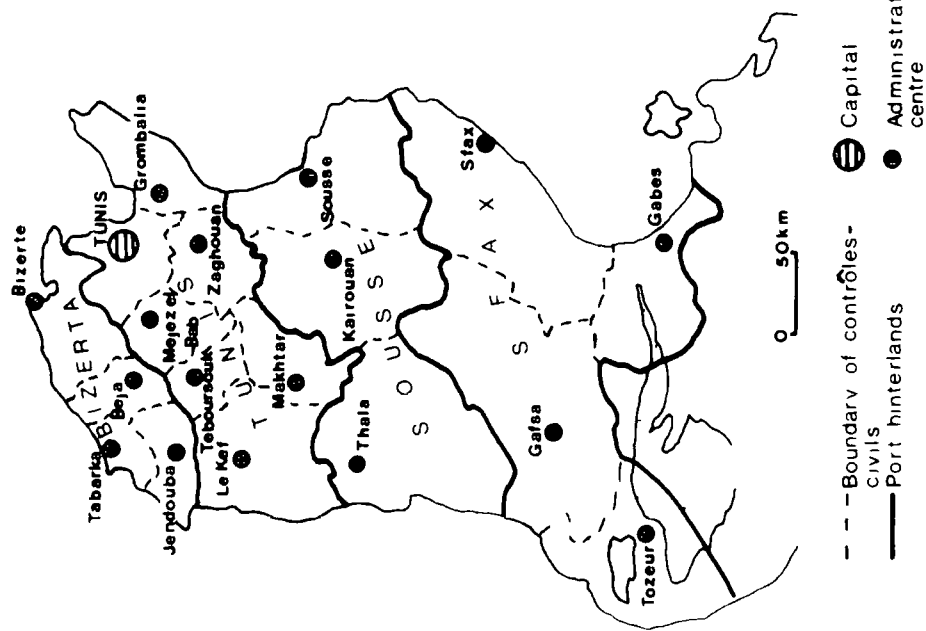
In order to govern their new territories, the French established a hierarchy of administrative centres at key points along their transport networks. Some centres were designed largely to service the rural colonial population, others were involved chiefly in enforcing colonial law and order among the tribes to secure the uninterrupted exploitation and transportation of mineral deposits. A symbiotic relationship therefore arose between the Tunisian transport network and a number of key points in the settlement hierarchy which were selected to organize and control the

FIG 2.3 TUNISIAN ADMINISTRATIVE BOUNDARIES

1 Contrôles-civils 1948

2 Gouvernorats 1966

3 Gouvernorats 1975



Adapted from Miossec and Signoles 1978

movement of human and physical resources along the vital lines of communication. The four port hinterlands already described (Figure 2 3) coincided with macro-administrative units which were subdivided into 'contrôles-civils'. Within each 'contrôle', one settlement was selected to be an administrative headquarters under the authority of a French civil controller. Each 'contrôle' was subdivided into several 'caidats', and the 'caidats' in turn were split up into 'cheikhats'. Local native administration was carried out by 'caids' who were selected from the most important Arab families, and who became the chief links between the French government and the Arab population

The French promoted the development of European institutions such as schools, hospitals and law courts in the larger regional towns and it was these centres which also began to experience more rapid rates of population growth than did neighbouring settlements less affected by colonial influences. Administrative centres and colonial settlements consequently became nodes of considerable demographic importance in the evolution of other spatial structures in Tunisia.

In the north-west and north-east, where colonization was most extensive, a fine territorial division was established to serve the interests of the expatriate population. Following independence, this imbalance was reduced and some of the 'contrôle-civils' of the north were amalgamated into larger

units A total of thirteen 'gouvernorats' was defined and subdivided into smaller districts termed 'delegations'. Former administrative centres such as Tabarka, Teboursouk, Medjez el Bab, Zaghouan and Makhtar lost their privileged status, and in the Cap Bon peninsula the administrative centre was changed from the Italian agricultural settlement of Grombalia to the coastal town of Nabeul (Figure 2.3). The reorganization of boundaries which followed independence can be viewed as a first attempt to give a proportional representation of the population in the administrative restructuring of the country. The gouvernorats which were defined were however in many cases inefficiently delimited. For example, Nabeul and Gafsa gouvernorats were extremely elongated, and their administrative centres were located far from the most distant parts of the territories over which they had jurisdiction. Between 1956 and 1974 the boundaries of Tunis, Beja and Nabeul gouvernorats were redrawn several times in order to achieve a more satisfactory regionalization.

In 1974 and 1975 five new administrative centres were added to those of the existing thirteen gouvernorats. This was part of a policy to increase the number of towns benefitting from the extra public employment and service provisions associated with the recognition of a settlement as a gouvernorat capital. Two of these centres were located in areas of extremely low urbanization (Siliana and Sidi Bou Zid), and the gesture of nominating them as administrative centres

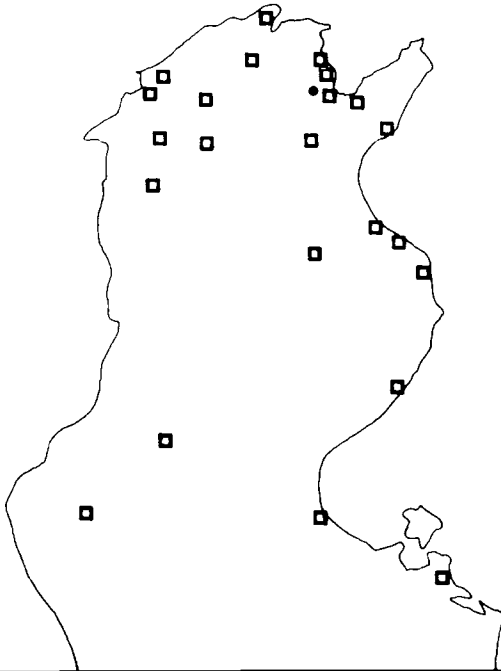
may be viewed as a genuine attempt to introduce new employment opportunities to these underprivileged environments. The creation of new gouvernorat capitals at Monastir and Mahdia reflects the increasing emphasis given to the economic development of this region of the Tunisian littoral by politicians, many of whom are native to this part of the country.

A swing in emphasis from French to Tunisian priorities may also be perceived by analysis of the evolution of the pattern of Tunisian towns with 'commune' status. The French colonists decided to give special decision-making powers to a few of the larger colonial towns. These communes had the right to exercise municipal law. Initially only Tunis (1858)[†], Sousse (1884), Sfax (1884) and Bizerte (1884) - the four major ports - were granted commune status, but other towns with moderate-sized French populations were soon seeking this privileged rank. As a result, a large number of communes were created in the north and north-west at the end of the nineteenth and beginning of the twentieth century (I.N.S. 1966). By contrast, settlements with large Tunisian populations, but few European residents, such as M'saken in the Sahel of Sousse, had to wait until much later to receive commune status. An exception to this north-west/south-east trend in the diffusion of communes was the military zone to the south of the Chott el Djerid which was substantially in

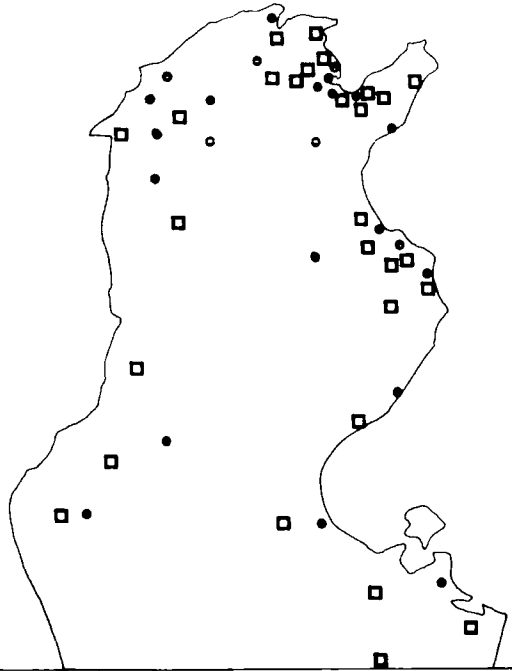
[†] Tunis attained special 'commune' status prior to the French Protectorate, since the Beylical regime recognized that the city had a large foreign population and merited a degree of political autonomy.

FIG 2 4 DATE OF THE CREATION OF COMMUNES

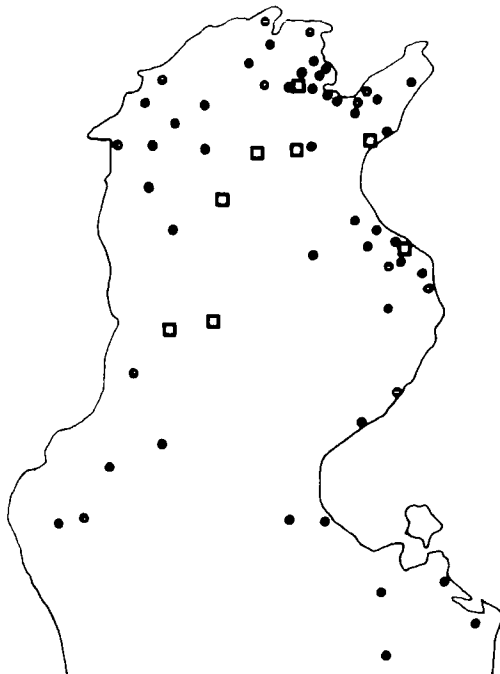
1875 - 99



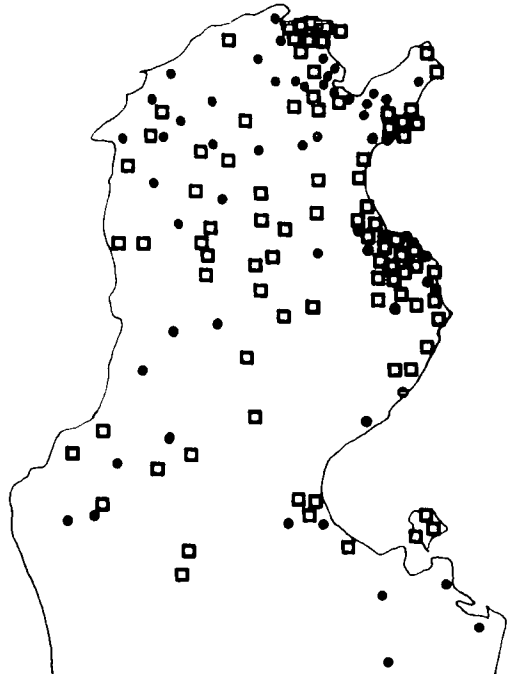
1900 - 24



1925 - 49



1950 - 75



- New commune
- Existing commune

0 50 100
kms

Data source I N S (1966 and 1975b)

advance of the rest of the south in achieving commune rights. The spatial imbalance between the north-west and the remainder of the country is clearly shown in Figure 2.4 which maps the dates of commune creation. It can be seen that in the period (1950-1975) a large number of communes have been established in the Sahel of Sousse, and in central and southern Tunisia. Despite this attempt to redress the balance, large areas of Tunisia remain without urban settlements of any significant size, and consequently have no communes. There are, for example, eight delegations in the hinterland of Sfax which have no communes and a further four in the high steppelands (Miossec and Signoles, 1978, 245).

The directional component in the spread of communes can be easily identified by trend surface analysis (Chorley and Haggett, 1965, Riddell, 1970), using the data presented in Figure 2.4. Taking the date of creation of the first commune in each delegation (1966 boundaries), linear, quadratic and cubic surfaces were fitted. All delegations to the south of a line running due west from Sfax to the Algerian frontier were excluded because of the complications of fitting a surface to this much more sparsely populated region of Tunisia where the delegations are much larger than in the north and where French administrative intervention was on a quite different basis from that of the north.

Trend surface mapping was employed in this instance chiefly in its descriptive capacity as a means of facilitating the identification of dominant trends hidden by a more detailed

FIG 25
DIFFUSION OF COMMUNES

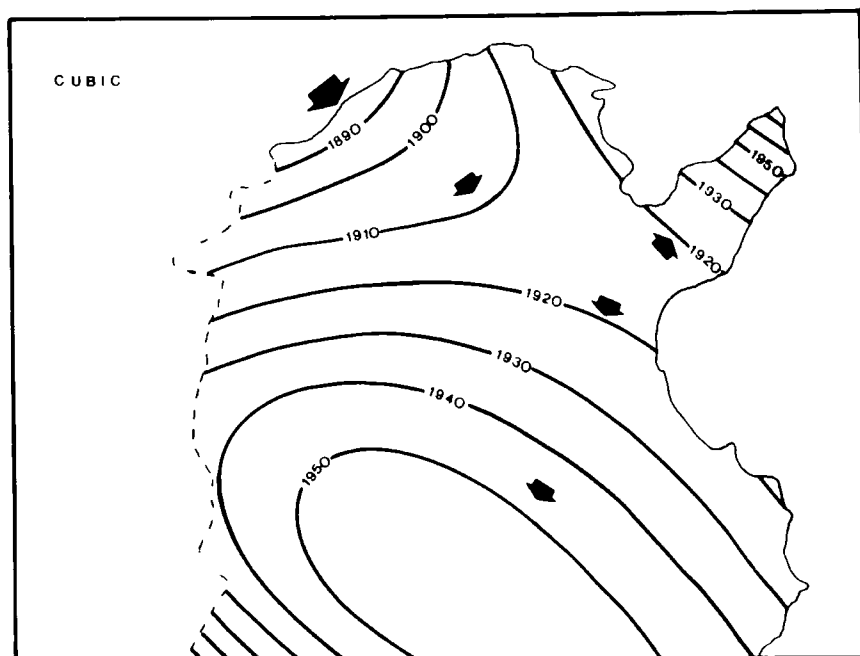
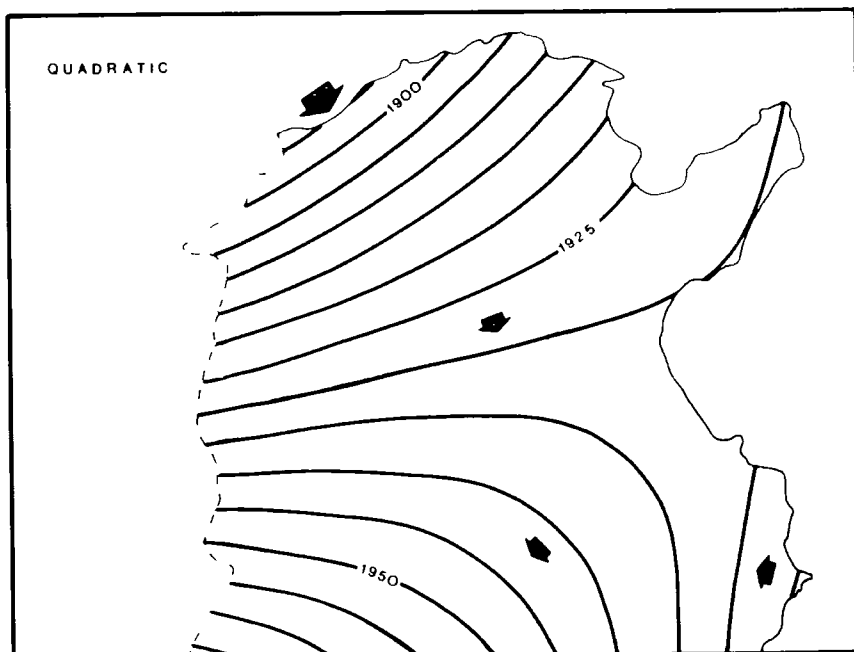
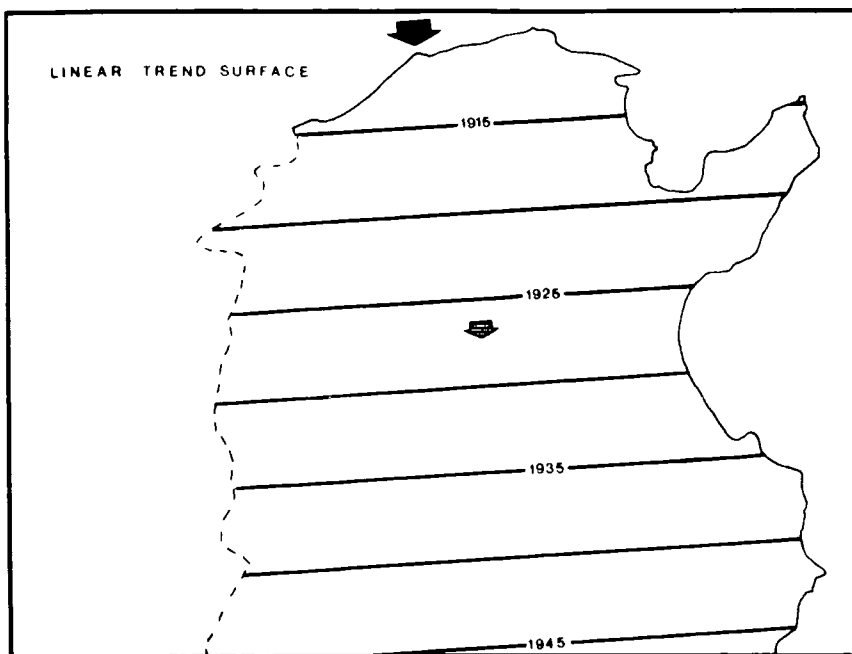
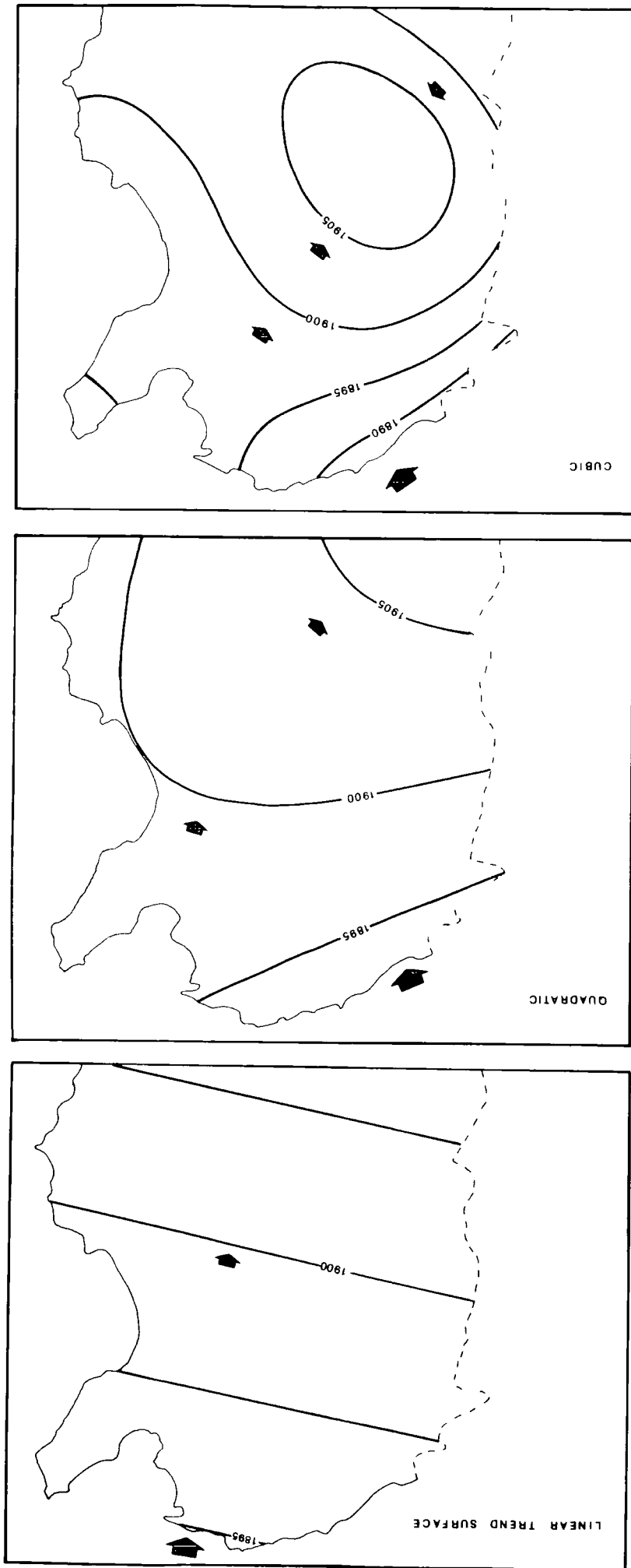


FIG 26
DIFFUSION OF POST OFFICES



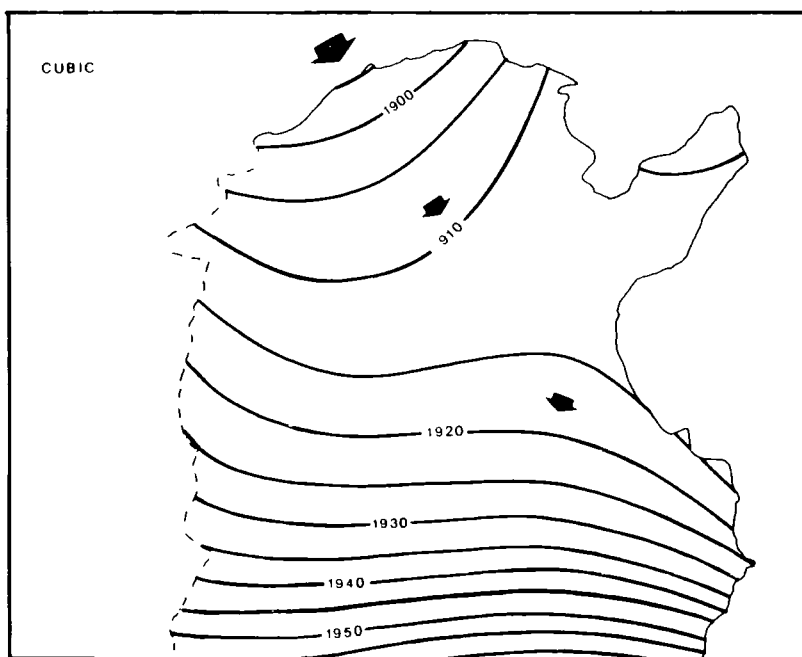
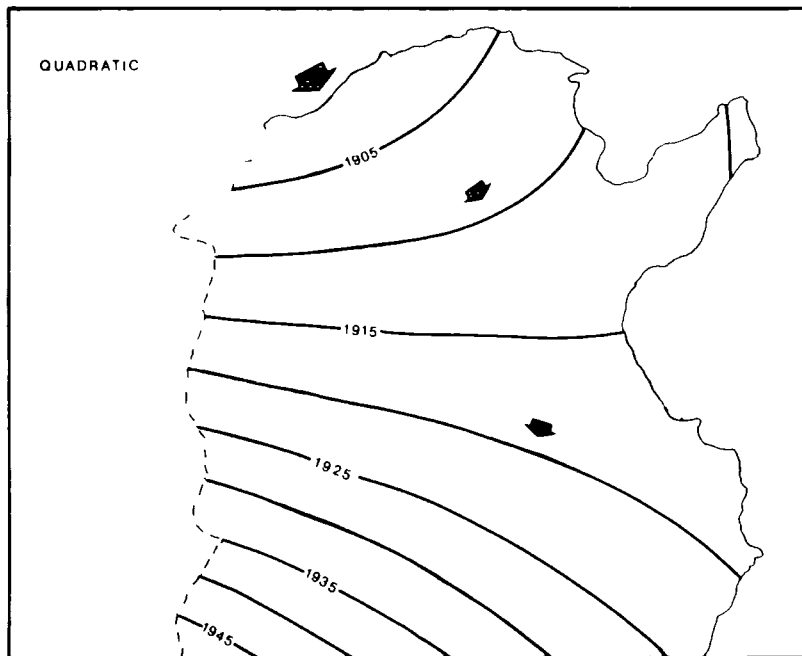
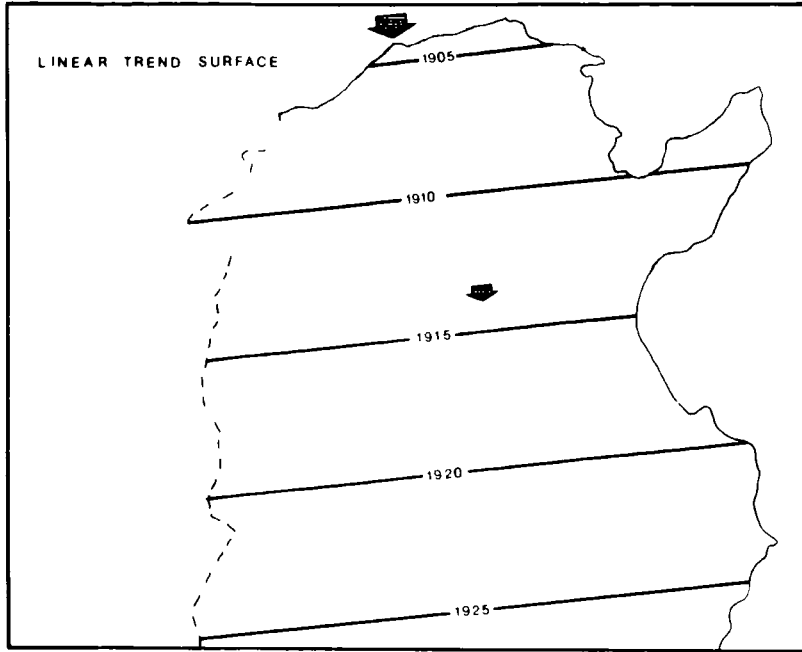
data surface (King, 1969). The first order surface (Figure 2.5) shows that the main thrust in the diffusion of communes came from the north. The second and third order surfaces identify the dome of much later commune creation which occurred in the high and low steppe in the post-war years.

Patterns of Service Provision

French colonial rule not only led to the establishment of a new administrative system, but also to innovations in social and economic services. In the first instance these were introduced for the benefit of the colonial population but soon were extended to native communities. Institutions such as schools, hospitals and banks served as catalysts to change, increasing local awareness of different lifestyles, modifying native aspirations and providing information about opportunities to live and work in other environments

The first French schools were established in Tunis in 1845, 1859 and 1871. By 1883 public primary schools had been opened in Bizerte, Sousse, Sfax and Beja, while a number of private schools had been established for the education of the Jewish community and for the children of Italian colonists (Versini, 1902) By 1889 there were as many as 67 schools scattered across northern and eastern Tunisia (Régence de Tunis, 1931), but there were few schools to be found in the interior of the country where colonists were rare. This area was still perceived as an alien environment occupied by troublesome nomadic tribes.

FIG 27
DIFFUSION OF LIBRARIES



Similar diffusion patterns might be reported for the spread of post offices and libraries. The first order trend surfaces of Figures 2.6 and 2.7 confirm that the dominant direction of diffusion of these facilities was once more from the European influenced north to the regions of the south. The second order surfaces affirm that in regard to the diffusion of libraries and post offices, the village communities of the Sahel of Sousse lagged behind similar agricultural communities in the Cap Bon peninsula in receiving these hallmarks of Europeanization. These new facilities took even longer to reach the steppe gouvernorats. Spatial analysis of the multitude of other European influences on patterns of change in Tunisia would reveal the same directional bias which has been discussed with reference to schools, libraries and post offices.

Structural Changes since Independence

Following independence, Tunisian administrators were quick to encourage the 'modernization' of urban communities in the Sahel of Sousse, but much slower to promote the development of other areas. In national investment policies little interest has been taken in the economy of the north-west and this region has fallen far behind the north-east and the Sahel of Sousse in terms of the quality of its infrastructure.

Since independence the Tunisian government's attempts at spatial development have been less successful than its policies for national growth. As Table 2.1 demonstrates Tunisia

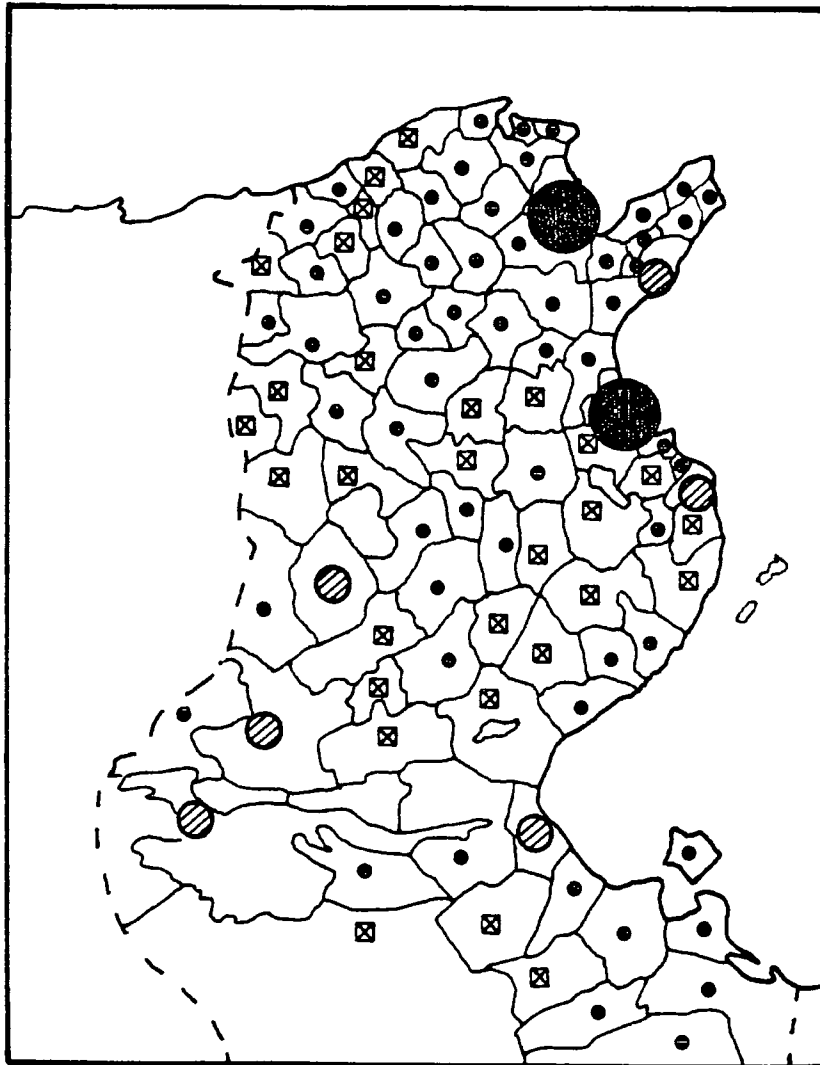
experienced higher levels of growth in its Gross National Product than either Algeria or Morocco during the period 1960-1977. With a G N P. of \$860 per head of population in 1977 (World Bank, 1979), Tunisia was certainly richer than many of the oil 'have-nots' of the Arab world.

Although economic growth has been sustained at moderate levels during the 1970s, the economy has continued to be highly dependent on foreign markets. As recently as 1972 olive oil was the largest earner of foreign income. Phosphates and petroleum products are now the chief exports, but neither offers significant employment opportunities to the Tunisian population. In 1975 there was a slump in the world price for phosphates and as a result the output and export of super-phosphates dropped by 50%. Similar instability has been experienced in other sectors of the economy, such as in the new textiles industries.

Since independence the government has made considerable efforts to increase its investment in the country's social and economic infrastructure. By 1971 public capital expenditure on social services represented 11.4% of the gross domestic product, representing a doubling in outlay on this sector per head of population since 1962 (Min. du Plan, 1971). Investment in social and economic infrastructure has unfortunately been concentrated in north-eastern Tunisia, and has not been shared equitably throughout the country.

The current spatial shortfall in investment in social and economic services, both public and private, may be gauged from an index of regional infrastructure and services prepared

FIG 2 8 Index of Regional Infrastructure and Services per caput



IRIS per caput



9000+ 5000-8999 1000-4999 <1000

very well provisioned poorly provisioned

0 100km

Source see Appendix 2

at the delegation level by the Tunisian physical planning authority, the Direction Aménagement du Territoire (D A T , 1973b). The commercial and service functions included in the index and the weighting given to each function are listed in Appendix 2 (Direction l'Aménagement du Territoire, 1973b, 172). The agglomeration of Tunis was by far the largest city in the early 1970s, having a population nearly four times that of the second city of Sfax (Houdi and Miossec, 1976). It is not surprising therefore that the service index reveals the immense dominance of the capital as a node of high-order service provision within the Tunisian hierarchy. When the index is standardized by dividing its value for each delegation by the respective populations of each area, it becomes apparent that Tunis still has more than its due proportion of economic and social functions. On a per caput basis, residents of Tunis are much more favourably located in relation to patterns of national investment than are other members of the Tunisian population. Citizens of Sousse, third city of Tunisia, are also extremely well served by comparison with rural populations in the north-west of the country or on the steppelands. The investment imbalance is shown clearly in Figure 2.8 which maps the spatial availability per caput of services and infrastructure in each delegation. Many of the delegations in Kairouan gouvernorat, in the Tell and in the steppelands around Sidi Bou Zid had very low indices. A concerted effort in national planning would be required to compensate these regions for the losses they have suffered from being peripheral,

both during the colonial era and through the subsequent period of political independence

To summarize it has been demonstrated from the evolution of the transport system, the administrative hierarchy and other spatial structures that the basic infrastructure imposed on the Tunisian economy by the French, served to accentuate existing regional inequalities. Despite political independence, the imbalance has only been partially corrected. It is within this framework of considerable inequality in the spatial access to economic and social facilities that changes in the patterns of Tunisian population must be viewed. While to suggest that population redistribution has occurred as a direct response to regional inequalities would be a gross over-simplification, it would be true to say that the directions of population migration have been strongly influenced by the spatial structures which Tunisia inherited from the colonial era.

Population Patterns and Urbanization

The most obvious characteristic of the Tunisian population distribution is the contrast which exists between the densely populated coastal zone and the more sparsely populated interior. The greatest concentrations are found in the areas where there has been a continuity of settlement and of urban life (Despois, 1961, Clarke, 1972). The relative importance of each region has however changed markedly during the twentieth century. Even before the establishment of the Protectorate,

Ganiage (1966) records a population drift towards the north-east. Table 2.3 shows that this drift accelerated noticeably in the years 1936-1946, and also between 1966 and 1975.

Table 2.3 Regional Distribution of Population (Percentages)

	1936	1946	1956	1966	1975
North-east	21.9	28.5	29.7	31.6	34.4
Sahel of Sousse	23.0	20.6	20.3	20.9	21.0
Haut Tell	22.2	20.6	21.4	19.6	17.2
Centre	12.2	10.4	10.1	10.9	10.4
South	20.7	18.9	18.5	17.0	16.9
Total	100.0	100.0	100.0	100.0	≈100.0

(Source compiled by the author from Picouet (1971) and I.N.S. (1975b))

North-east Gouvernorats of Bizerte, Tunis, Nabeul, Zaghouan.

Sahel of Sousse Sousse (+ Mahdia, Monastir).

Haut Tell Jendouba, Beja, Kef (+ Siliana).

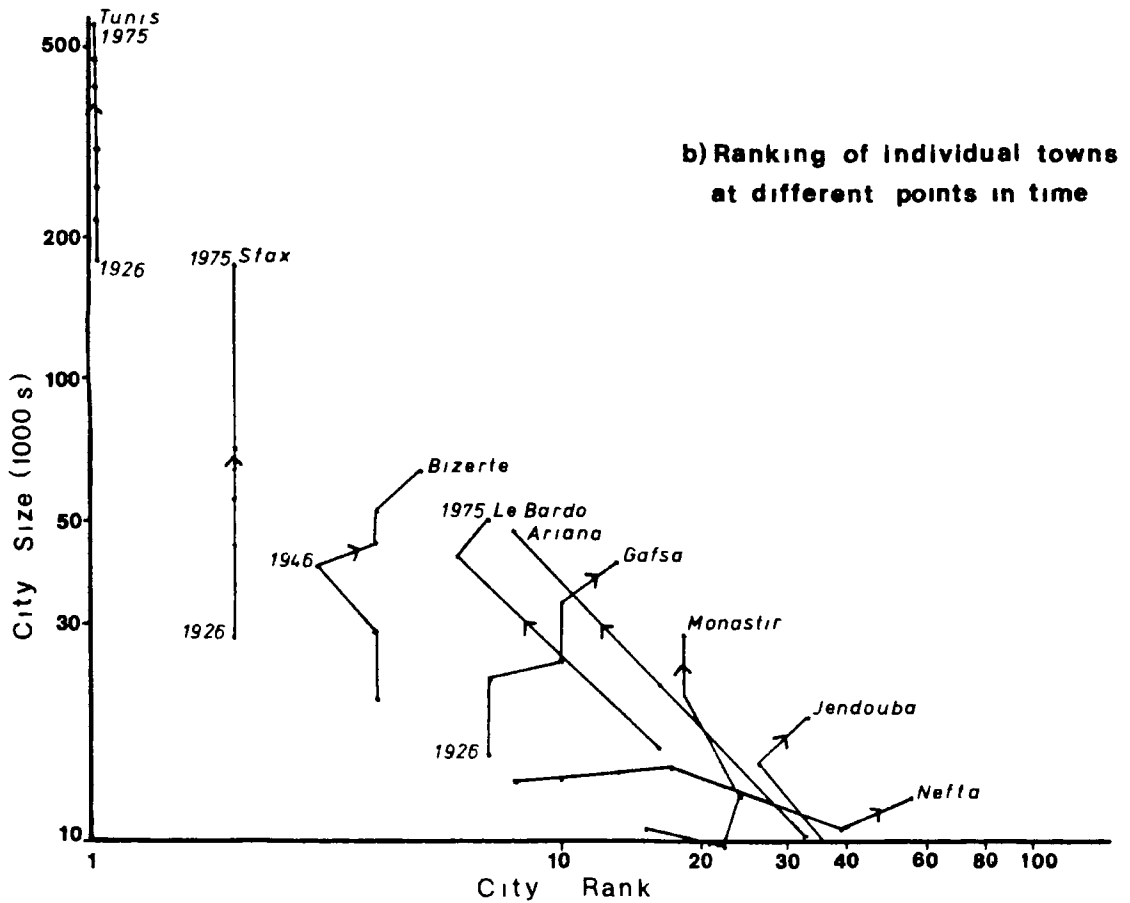
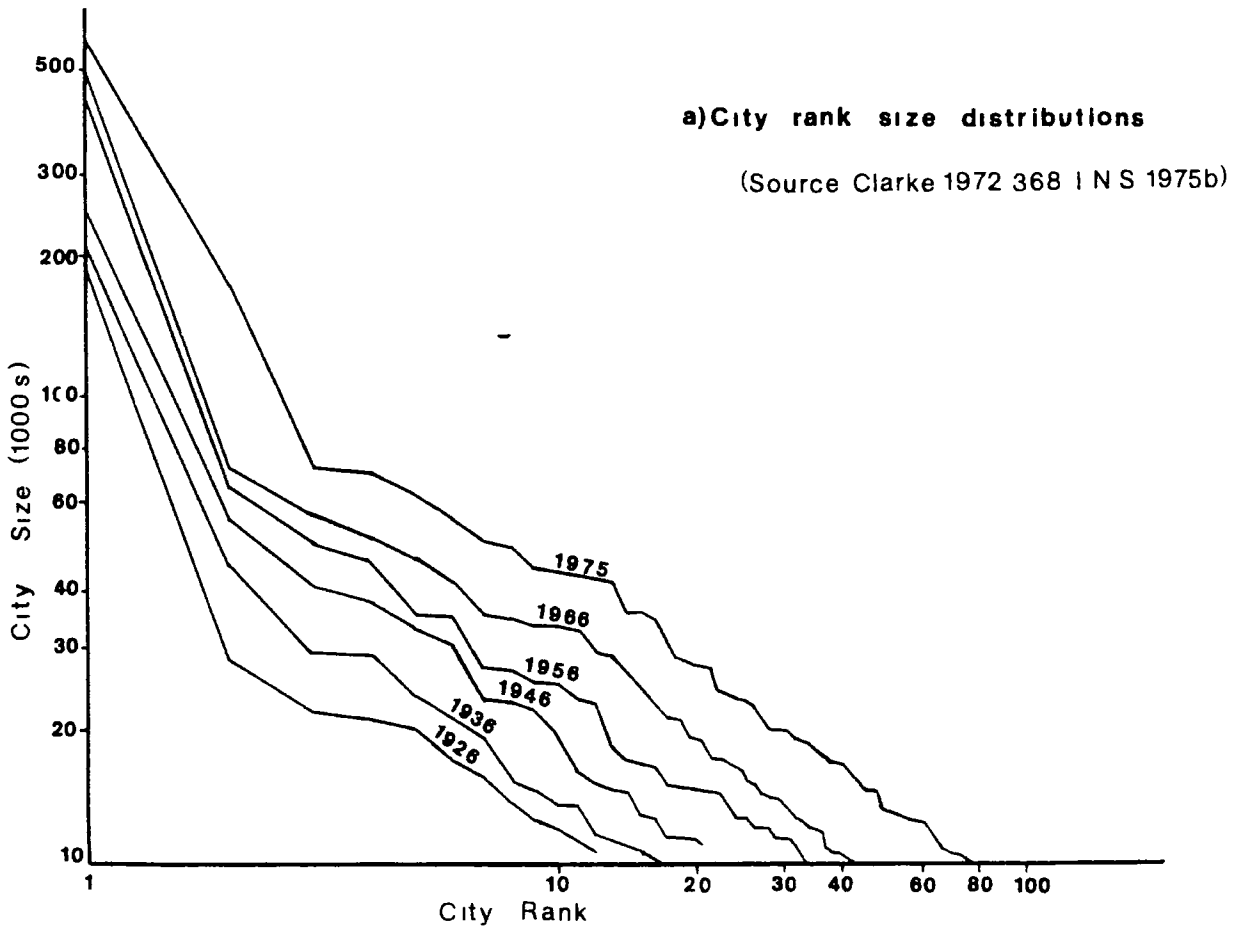
Centre Kasserine, Kairouan, Gafsa (+ Sidi Bou Zid).

South Sfax, Gabes, Medenine

In 1936 Tunisia was divided into five zones with approximately equal populations, by 1975 only the Sahel of Sousse and the central gouvernorats had not significantly changed their share of the national population. In the south and in the Tell populations dwindled in a very serious fashion between 1936 and 1966 relative to other regions. It appears that the drift from the south was reduced to some extent between 1966 and 1975.

One of the major factors accounting for the divergent

FIG 29 CHANGES IN THE TUNISIAN URBAN SYSTEM



trends of the five regions is the different level of urbanization and urban growth experienced in each. Once more the root of these inequalities can be traced to the colonial era. Clarke (1952) has noted a fairly close correlation during the period of the Protectorate between the annual rate of urban growth and the size of the European community present in each settlement. Coastal settlements, particularly in the north-east, increased very fast while 'traditional' Tunisian cities, such as Kairouan, which had only small colonial populations, grew very slowly or stagnated. This pattern of urban growth is not surprising in view of the dichotomy in French investments in social and economic matters which has been discussed earlier in this chapter.

The contrasting fortunes of Tunisian towns may be observed by arranging them in order of size (i.e. in a rank-size curve) for each census year between 1926 and 1975 (Figure 2.9a). The city of Tunis maintained its primate position in the urban hierarchy during this period (Clarke, 1972, 368), although Sfax, the second city of the country, apparently experienced a spurt of growth between 1966 and 1975, thus reducing the strong polarity of the capital. This change was in fact largely illusory, arising mainly because of a redefinition of the city's boundaries. Between 1926 and 1975 urban growth was experienced not only in the largest towns, but also throughout the urban system. In 1926 there were only

12 towns with over 10,000 inhabitants, by 1956 there were 32 and the number continued to grow until by 1975 Tunisia had 62 towns and cities with populations of over 10,000.

Plotting the rank position of a selection of cities against their size at different points in time (Figure 2.9b) helps to illuminate the differences in rates of urban growth between cities on the eastern littoral, and those of other parts of Tunisia. Tunis and Sfax maintained their high positions in the urban hierarchy as well as growing at a rapid pace throughout the period under consideration. 'Popular' suburbs around Tunis, such as Bardo and Ariana, were among the settlements to experience the most astonishing expansion, growing so rapidly that they surpassed regional centres such as Gafsa and Beja, and by 1975 rising to much higher positions in the urban hierarchy than they had held in 1956. By contrast, the oasis towns of south-western Tunisia have faced stagnation throughout the twentieth century. With the loss of their significance as caravan towns for trans-Saharan traders, oases such as Nefza never achieved importance within the colonial economy and suffered a constant drainage of population to the more prosperous regions. The decline in the importance of Nefza is particularly dramatic. Located immediately to the north of the Chott el Djerid, close to the Algerian frontier, it fell from being the eighth largest settlement in 1926 to being the fifty-third in 1975.

Not all settlements have consistently increased in

importance during the period under study. Bizerte, for example, grew rapidly under the stimulus of French colonial policy, but expanded much less quickly than other Tunisian towns after their departure. Conversely, the town of Monastir experienced population decline between 1921 and 1926 and again between 1936 and 1946, but has grown extremely rapidly in the post-independence period, as a result of the enormous investment accorded to the birthplace of the country's president

Only the briefest assessment has been given here of the changes which have occurred in the Tunisian population distribution and in patterns of urbanization. More detailed geographical studies of the problems generated by these patterns of change have recently been completed by Houdi and Miossec (1976), Miossec and Signoles (1978) and Signoles (1978a, 1978b). Rapid urbanization causes immense difficulties in the sphere of housing and service provision for the populations of the ever-expanding cities of Tunis, Sfax and Sousse. Planners must also cope with the difficulties arising in areas of acute out-migration. Attempts to solve the problems associated with population migration must delve beneath surface analysis of the patterns of population redistribution to consider the forces bringing into existence the spatial structures which have made this movement necessary. This point will be discussed in more detail in Chapter 11, but first it is necessary to examine how the aforementioned spatial structures

of the Tunisian economy have channelled migration movements in specific directions at different points in time

Conclusion

This chapter has outlined some of the influences stemming from the policies of French and Tunisian administrators which have moulded the character of Tunisian geography. It has been shown that considerable efforts have been made under both French and Tunisian administrations to reorganize the spatial structures of the economy in order to increase the efficiency of physical resource use. Regrettably, much less effort has been expended in considering the value of human resources, and the criteria which could be used to redeploy the talents of the population. History suggests that the dominant presupposition of persons in authority has been that population distributions will adjust through the mechanism of migration to accommodate changes in the patterns of physical resource use. In recalling that in the final analysis populations are made up of individual people, each with his own abilities and aspirations, feelings and beliefs, is it not perhaps time that the validity of this presupposition be challenged? Migration should not be a necessity, it should be a choice. The greater the levels of spatial inequity in a country, the smaller the opportunities for the inhabitants of less fortunate areas and the greater the urge amongst the young and able members of the population to migrate in order to share fully in the development and enjoyment of the nation's resources.

SECTION 2 INTERNAL MIGRATION

Chapter 3

PATTERNS OF INTERNAL MIGRATION, 1856-1966

Patterns of Migration before and during the Protectorate

In 1856 a census of the adult males of Tunisia was carried out with a view to imposing a headtax called the 'mejba'. This census provides the earliest statistical record on which a systematic analysis of Tunisian migration may be based. It reveals the existence of a number of interesting minority groups such as the Turkish garrison communities in the ports of the regency, or the Trabelsi tribes originating from Tripolitania which by the mid-nineteenth century were to be found mainly in northern Tunisia. Of even greater interest is the record of internal migration offered by the census. Ganiage (1966, 875) has estimated from the 'mejba' returns that one in ten of the population of the island of Djerba were living in other parts of the country in 1856 and as many as one in five Kerkenniens had forsaken their native isle. Ganiage has also shown that most of the Djerban migrant community, composed largely of grocers, was located in the villages of the Sahel of Sousse and in the Cap Bon peninsula. They were noticeably absent from the rival merchant community of Sfax.

The 'mejba' records indicate moderate levels of out-migration from the south of Tunisia towards Sfax, the Sahel of Sousse, Cap Bon and Tunis. This exodus from the villages of

the south has traditionally been attributed to two main factors the collapse of the artisanal activities of these communities and the decline of their commercial functions which once thrived on the trans-Saharan caravan trade.

By contrast, central Tunisia retained its population Valensi (1977, 26) reports that the powerful tribes of the Drid, Djlass, Frachich and Madjer neither accepted strangers into their company nor sent their young men to work in other parts of the country The low levels of migration in the mid-nineteenth century between the settled and the nomadic communities of Tunisia has been summed up by Ganiage (1966, 868)

"Dans la Tunisie de 1860, nous retrouvons l'opposition entre sédentaires et nomades, mais numériquement les premiers ne l'avaient pas encore emporté sur les autres."

Even following the establishment of the Protectorate, low levels of out-migration continued to be recorded from the nomadic pasturelands of the high steppes Ironically, the highest levels of out-migration appeared to be from the best endowed agricultural land such as the middle Medjerda valley It was these richer agricultural areas which were first to be exploited by the European colonists (see Chapter 2). Consequently they were the first areas in which established Tunisian systems of agriculture came into contact with European influences. On the plains of the middle Medjerda large European farms were established for the production of

wheat The local population became labourers on European lands and villages began to spring up around the colonial farms. Viticulture expanded fast under French rule, particularly in the north-east of the country where Cap Bon wines soon gained a reputation. On the eastern littoral, colonial settlement was less dense but Europeans nevertheless acquired large blocks of land or 'domains'. These were rented back to local peasants who then worked the land for their colonial landlords. For example, around the city of Sfax a contract system was established, known as 'mgharsa'. Tunisian managers were allocated land on which to develop olive groves tended by Tunisian labour. The profits were in part shared between the landowners and the Tunisian estate managers (Despois, 1961).

It was in the Tell and on the plains of Kef that the greatest changes occurred. Here rural colonization led to abandonment of many of the traditional agricultural villages, as native cultivation was pushed from the best arable lands on to the higher valley slopes, and to other areas (such as the Kroumerie and the Mogods) less amenable to cereal cultivation. A detailed analysis of these changes has been given by Poncet (1962) in his description of the influence of European colonization on Tunisian agricultural landscapes.

Changes in the economic structures of the north of Tunisia also prompted social upheaval in the rural communities of the region. The authority of local leaders was now challenged by the rival power of the colonial administrators.

As a result it became easier for individuals to leave their communities of origin to seek out new places in which to work and live. Thus large-scale migration to the cities of Tunisia commenced not from the nomadic tribes of the steppes whose social cohesion was still strong, but from the settled and semi-sedentary populations of the north and north-west. Between 1926 and 1936 as many as 94,000 Tunisians moved to the towns - chiefly to Tunis, Sfax, Sousse and Bizerte (N I U., 1945). Significant out-migration was recorded not only from the Tell and the plains of Kef but also from the stagnating villages of the Sahel. Out-migration from the Sahel was particularly acute in years when the olive harvest failed (Attia, 1970, 98).

In the south, the diffusion of the colonial transport system progressively undermined the traditional trading patterns of the oasis settlements, leading to a decline in their economy, and to out-movement of their population. Meanwhile in the Medjerda valley and in the Cap Bon peninsula the introduction of mechanical innovations on colonial farms led to a further change in the demand for labour during the 1940s. Employment for agricultural workers on colonial farms slumped and further out-migration from these areas occurred as a result.

Although initially European colonization did not actively seek to modify the systems of nomadic pastoralism on the steppe-lands, it had an indirect yet very important influence in

changing their character. By expanding the area of land under cultivation in the Tell, the colonists progressively deprived the nomadic tribes of the northern mountain pastures to which they had traditionally retreated in summer to graze their herds during the hottest and driest months of the year. This critical disruptive effect on nomadic patterns has been described in detail by Clarke (1956) in his study of the decline of nomadism in Tunisia

The inability of the nomadic tribes to move freely with their flocks was only the beginning of the decline in their lifestyle. Equally significant were the conditions which permitted individual pastoralists to become socially and economically independent of their tribes (Capot-Rey, 1962, 458). The social acceptance of the nomad in the city and his ability to gain alternative employment (albeit in manual and often demeaning tasks) encouraged detribalization. This process was accelerated within the tribal base by the imposition of laws and regulations of external authorities. No longer was tribal cohesion necessary for the protection of flocks from other tribes. No longer was the authority of the sheiks supreme. National authorities imposed taxes, provided welfare services and enforced certain standards concerning property, land tenure and legal relationships. Into the late 1940s, winter and summer transhumance continued on a very restricted scale involving small family groups rather than whole tribal units. The severe drought years of 1947 and 1948 drove tens of thousands of nomads to the north-east. During

the same period, Clarke (1956) records the attempts of the French to boost a programme of 'fixation au sol'. Some settlement schemes succeeded admirably, but many nomads were unable or unwilling to adjust to the new grazing systems and simply infiltrated into the cities. In other words, the steppelands of the 1930s and 1940s were, on the one hand, the pioneer fringe of sedentarization and on the other, the death zone of nomadism (Clarke, 1956, 91).

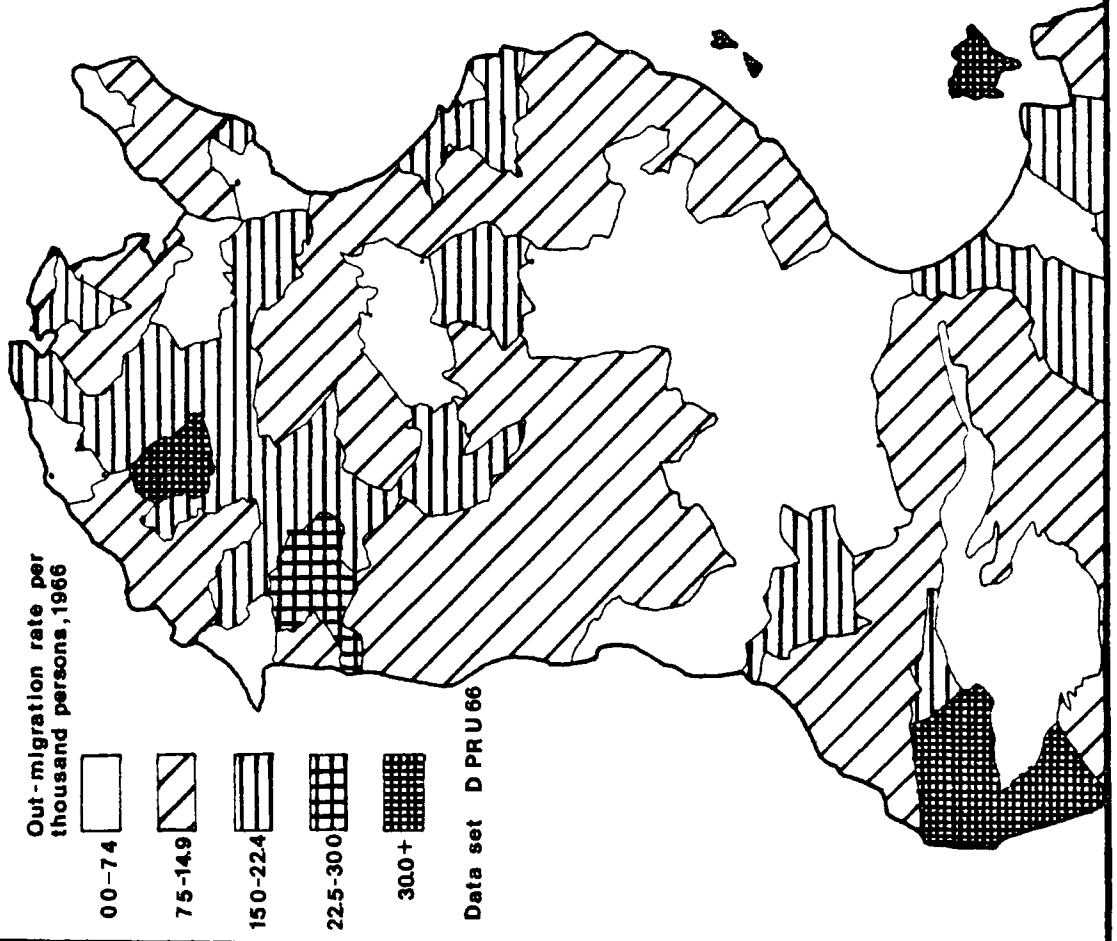
Both too much and too little has been said here about the decline of nomadism. Too much, in the sense that more has been discussed than could ever be inferred from statistical analysis of census documents, too little, in the sense that the social changes associated with the transition from nomadic to settled societies, and the surges of peoples from the land to the cities, are infinitely more complex and more subtle than can be conveyed in a few hundred words.

Evidence will now be sought from statistical analysis of the 1966 census to validate some of the trends in migration which have been described, and to outline the developments which have occurred in Tunisian migration patterns since political independence.

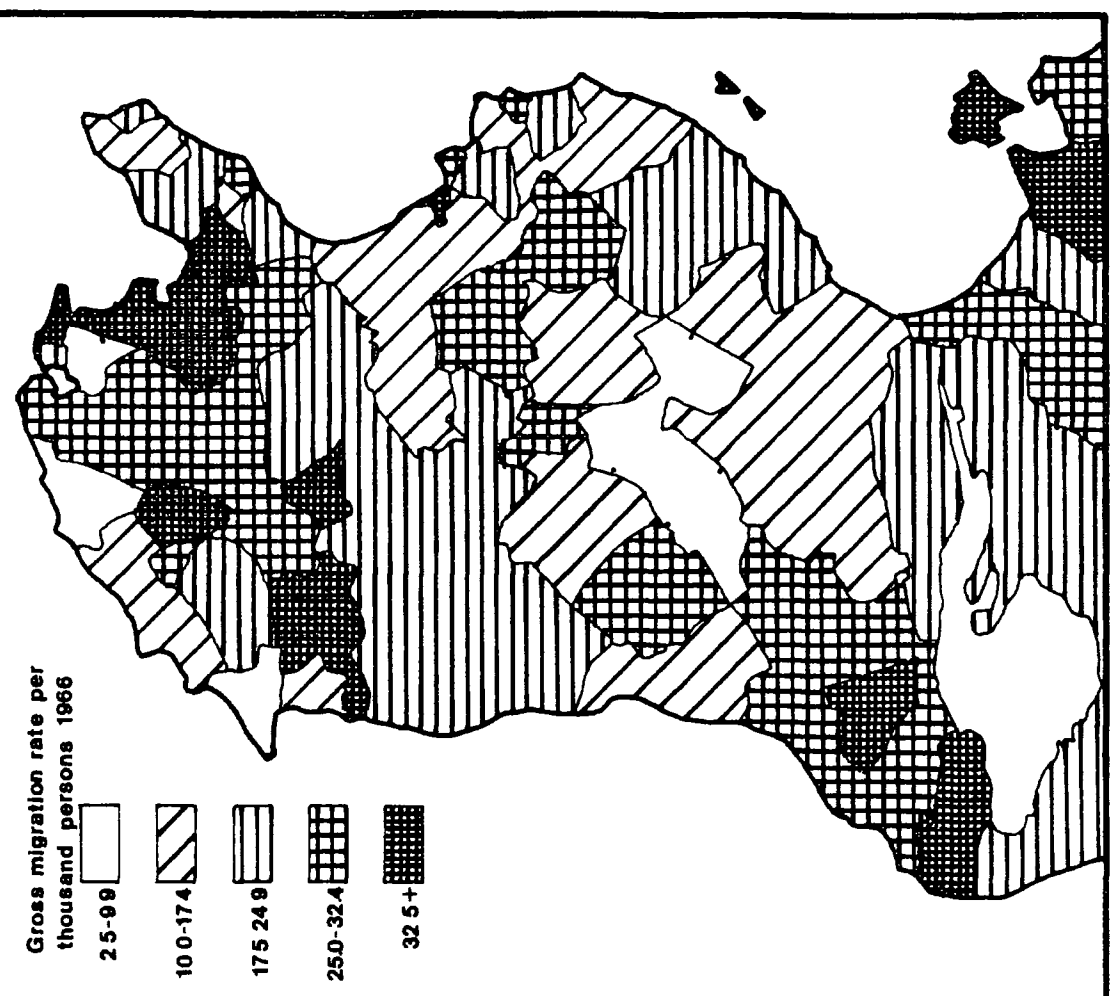
Inter-delegation Migration, 1966

Information concerning migration is available in the 1966 census at both the delegation and gouvernorat scale. Regrettably it is impossible to study inter-delegation movements during specific time periods, the census giving no

FIG 31 A) OUT-MIGRATION RATES 1966



B) GROSS MIGRATION RATES 1966



information about the date of migration. This is unfortunate, since it is at the detailed level of the delegations that mobility rates can be most meaningfully related to spatial developments in regional, social and economic structures

At the delegation level it becomes clear from observation of a map of rates of out-migration from place of last residence that rural areas experienced the greatest population exodus (Figure 3 la). This phenomenon was not universal, but was certainly true for the rural delegations of the Tell, the majority of which had out-migration rates of 15 per 1000 or higher. Heavy out-migration was also recorded from the oases of Tozeur, Nefta and Degueche, as well as from the villages of southern Tunisia. Figure 3 la shows that not all urban areas were able to retain their population. Regional administrative centres such as Beja, Le Kef, Kairouan and Gafsa had high out-migration rates reflecting their dual role, both as zones of out-migration for local people and also as springboards for more widespread regional out-migration (Signoles, 1972). Migrants to these centres, finding no suitable employment, appear to have moved on to larger cities where they believed their opportunities for self-advancement to be greater. A final zone of out-migration worthy of note is the Sahel of Sousse. Many of the village populations there appear to have lost a high percentage of their population in the years prior to 1966. Some of this migration was highly localized involving population redistribution from the

surrounding villages to the rapidly growing city of Sousse. In contrast with these zones of departure, the delegations of central Tunisia had uniformly low levels of out-migration.

Summing flows of in-migrants and out-migrants, a measure of total or gross movement may be achieved. This can be standardized between delegations, by calculating the ratio of gross migration to total population. Figure 3.1b showing gross migration rates, may at first appear a little confusing. Distinctly higher mobility is observable in the north-east and in other highly urbanized coastal delegations. It is notable once more that gouvernorat capitals have higher mobility rates than surrounding delegations, because of their local and regional significance to the migration system. Among the lowest levels of gross migration are recorded in those areas which were most remote from European influence during the Protectorate, and which were last to be integrated into the economic and social structures of 'modern' Tunisia - namely the delegations of the steppelands such as Regueb, Sidi Bou Zid and Ben Aoun.

Patterns of net migration are, naturally, closely associated with the patterns of out-migration and gross migration which have already been described. Few centres outside Tunis made large net gains from migration other than the mining towns of Gafsa, the industrial pole of Menzel Bourgiba and the tourist town of Hammamet. At the regional level, population equilibrium could be said to exist in central Tunisia and in the Cap Bon peninsula (D A T , 1973b, 376). The areas of

heavy net population loss equate with the rural delegations whose high out-migration rates were noted above. The net loss of population from the Sahel of Sousse is particularly interesting since it has been shown by Attia to have accelerated in post-independence years (Attia, 1970, 110)

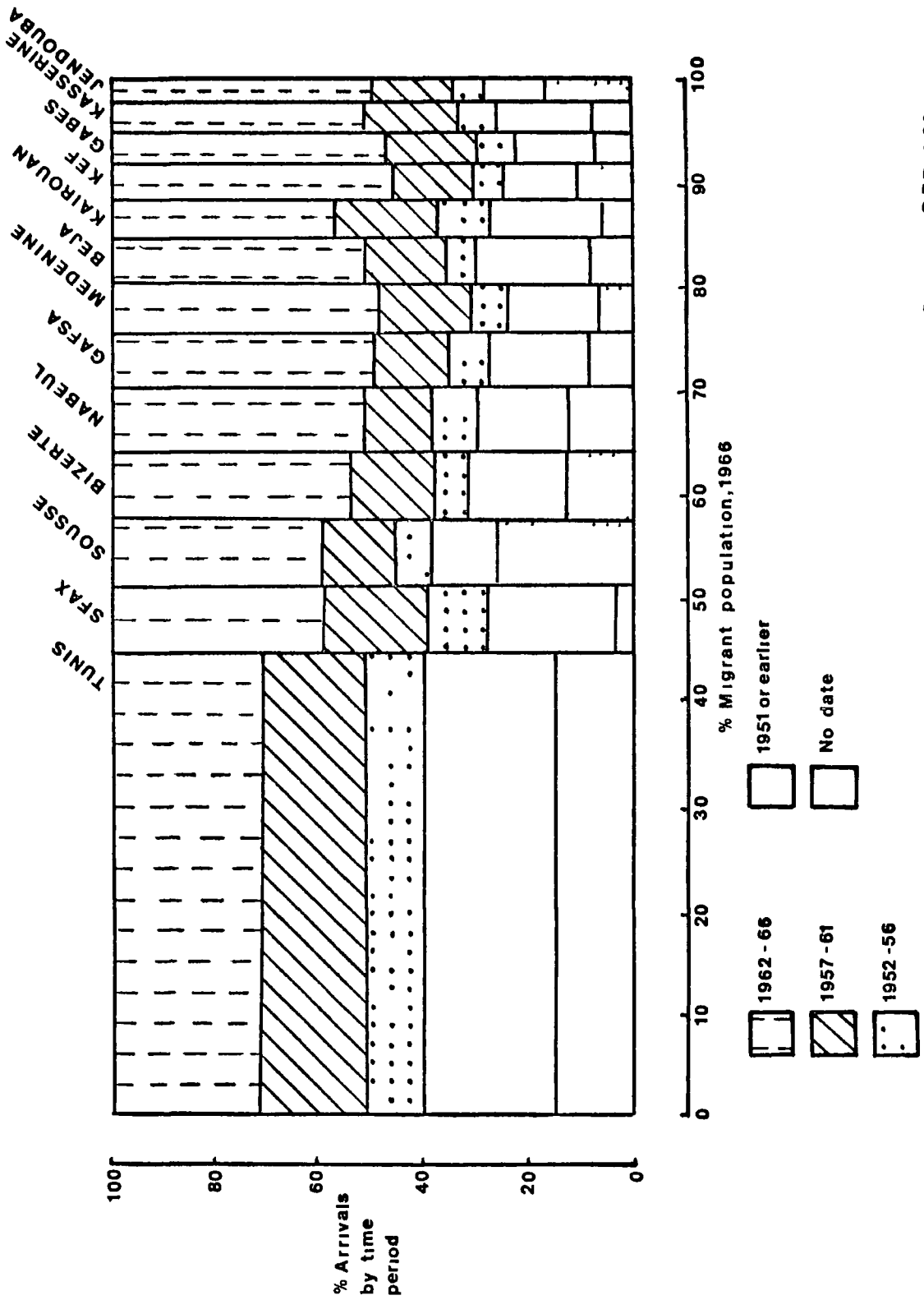
"Cette accélération de l'émigration sahélienne est conséquente à l'indépendance et à tunisification de l'administration "

Large numbers of Sahelians moved to administrative posts in Tunis in response to the special interest of the president in the people of his home region. Even more significant than the time of the acceleration of out-migration is the fact that this transfer of population from the Sahel "corresponde surtout à une mobilité sociale". And like spatial mobility, opportunities for social mobility have been extremely unevenly distributed in Tunisia.

Migration in Tunisia as Recorded by the Census of 3.5.66 A Retrospective Study

Research on internal migration in Tunisia, using census records published by the Institut National de la Statistique (I.N.S., 1966), has been undertaken by a surprising number of anthropologists, demographers, economists, geographers and sociologists (Abdellatif, 1976, André, 1972a, Picouet, 1970a and 1971, Seklani et al, 1970, Seklani, 1974 and Signoles, 1972 and 1973). Many of the migration measures calculated by these specialists are of value in describing the social and economic processes which have generated population

FIG 3 2 TIME DISTRIBUTION OF MIGRANTS



redistribution. Most of these researchers considered migration patterns in the period 1956-66 (G PR 10.66) or concentrated on movements from the last place of residence [(G PR U 66) see Appendix 17], giving no heed to temporal changes in migration characteristics. This leaves the reader with the misleading impression that migration patterns prior to independence were insignificant. Although census information concerning the evolution of Tunisian migration is difficult to interpret, it is worthy of examination since it offers some insights into the volume and orientation of migration during the colonial era.

The percentage of all Tunisian migrants living in each gouvernorat in 1966 and the percentage of movers arriving in these gouvernorats in each of the four time periods are graphed in Figure 3.2. It is evident from the diagram that Tunis, the destination for 44.6% of all migrants in 1966, has been for many decades the chief zone of in-migration. By contrast, other gouvernorats have each had only a small share of the country's migrant population, and most of their in-migrants arrived in the decade preceding the 1966 census.

It should be noted that the probability of a migration movement being recorded in the 1966 census is less for moves occurring a long time before the census than for more recent movements. This bias results from the rising probability of a migrant dying or making a second move with the passage of time from the date of his first migration. Consequently it is not surprising that the census records fewer migrants for

the time-period 1952-56 than for the years 1957-61 or 1962-66. The statistics make it clear, however, that very substantial migration movements occurred in Tunisia in the first post-war decade. Migration on a large scale continued (rather than commenced) after political independence, as an increasing percentage of the population sought to take advantage of the new opportunities for social and occupational mobility available in the country's largest cities. The departure of large numbers of the European population created these opportunities as French administrators, managers, bankers, teachers and shopkeepers were progressively replaced by Tunisians. This process was mirrored in the physical environment when the former European quarters of Tunis city were occupied by the more enterprising members of the Tunisian population. In turn the fine old houses of the 'medina' were no sooner relinquished by the richer Arab families moving to former European houses, than they were subdivided and occupied by in-migrants transferring from the squatter suburbs or arriving fresh from the countryside (Micaud, 1976, 145). In-migration and urban growth also occurred on a dramatic scale in Sousse and Sfax, although in the latter case migrants settled mainly in the peripheral 'gourbivilles' (squatter towns) and did not enter the 'medina' (Lawless, 1980).

The volume of migration in the decade immediately following independence was unprecedented. Some 363,080 persons - or 8% of the entire Tunisian population - changed their delegation of residence between 1956 and 1966. Since

this accounts for 64.7% of all migrants recorded by the 1966 census, it is natural that this is the group that has received the greatest attention by research workers. Less attention has been given to the 9.6% of the migrant population who moved between 1952 and 1956, or to the 25.7% who changed their delegation of residence before 1952.

It is possible to estimate the approximate level of migration in the 1940s and 1950s from an examination of the parameters which have subsequently modified the size of the original population. Applying a regressive age-specific death rate to the surviving migrant population of the 1952-56 period it can be estimated that the migrant population had declined at the time of the 1966 census by some 8,000 persons due to deaths in the intervening period. Further corrections can be estimated from the known probabilities of occurrence of multiple migration movements. From a study of the general relationship between first and subsequent migrations (Wendel, 1957) and from examination of a number of micro-scale studies in Tunisia (Auerbach, 1975, Behr, 1971, Brown, 1976, Hay, 1974 and Picouet, 1975), it is possible to make an informed estimate of the likelihood of multiple and return migration in Tunisia between 1952 and 1956. It is reasonable to suggest that 30% of migrants in this period would have moved again by the time of the 1966 census. As a result they would be registered as migrants in the later period, and their earlier movements would be ignored by the census.

Taking all these factors into account, one arrives at a rough estimate of 100,000 inter-gouvernorat migrants for the five year period preceding independence. It therefore becomes apparent that the migration process was a highly significant mechanism of population redistribution, not only in the decade after independence, but also in the closing years of the colonial era.

Migration from Birthplace, 1966

It is particularly interesting to compare the distribution of the 1966 population by place of residence and by place of birth. This comparison permits the researcher to identify the net redistribution of population which has occurred during the lifetime of the population under study. In 1966, the Tunisian gouvernorats which had lost the largest number of their native population through out-migration were Beja and Le Kef, while the greatest gains were made by Tunis. Indeed Tunis gouvernorat was the only one to make a net gain in population through the redistribution of population by migration from birthplace.

Expressing out-migration as a percentage of the population born in each gouvernorat (Table 3.1), it appears that the zones of heaviest out-migration prior to 1966 were the Tell and southern Tunisia. Some reasons for the differentials in out-migration patterns have already been discussed. The pattern of in-migration rates (Table 3.1) reflects the attractiveness of Tunis to migrants relative to all other gouvernorats. In

1966, 33.8% of the resident population of Tunis were native to other gouvernorats. Bizerte proved to be the next most attractive location, but it had only 76 in-migrants per 1,000 residents. A second feature of in-migration rates worthy of comment is that they decline with increasing distance from Tunis, creating a centre-periphery pattern within the country in terms of the attractiveness of each place to in-migrants. The lowest in-migration rates were recorded in Medenine gouvernorat in the extreme south with 26 in-migrants per 1,000 residents and in the north-west (Jendouba) where only 27 of every 1,000 persons had been born outside the gouvernorat. Deviations from the general core-periphery pattern of in-migration included the gouvernorat of Sousse which proved much less attractive than might have been expected and Gabes gouvernorat which had a surprisingly high level of in-migration (43 per 1,000).

Care must be exercised in at least three respects when interpreting Table 3 1. A first difficulty arises from the difference in area and shape of the administrative districts of Tunisia. Clearly in and out-migration is more probable from small areas than from large, since the probability of a migrant crossing an administrative boundary increases as the size of that area decreases (Taylor, 1971). A second important point to note is that Table 3 1 refers only to inter-gouvernorat migration ignoring the volume of intra-gouvernorat migration. A third reason for caution in interpreting Table 3 1 arises from the fact that it considers only migrants

entering a gouvernorat other than that of their birth No
account is therefore taken of return migration. Each of

Table 3.1. Rates of In and Out-migration from Place of Birth,
1966.

Gouvernorat	Out- migrants from place of birth	Out- migration rate (per 1000)	In- migration of persons born in other gouver- norats	In- migration rate (per 1000)
Tunis	22730	43	260436	338
Gafsa	17757	54	11075	35
Sfax	32290	73	12611	30
Nabeul	25019	77	23587	73
Kasserine	18154	82	7821	37
Bizerte	28469	86	24991	76
Kairouan	25782	87	8703	31
Jendouba	26359	96	6764	27
Sousse	54622	98	15183	29
Gabes	27887	125	8814	43
Le Kef	45652	133	13792	44
Beja	51098	144	16196	51
Medenine	40451	147	6307	26

(Source author's calculations from data set G.PB.66)

these three qualifications to Table 3.1 will now be discussed
in more detail.

It is difficult to establish the precise relationship
between gouvernorat area and the volume of migration In

Tunisia the largest gouvernorat, Medenine, is also the most sparsely populated, large areas having no habitation at all. It would clearly be unreasonable to suggest that solely on account of its size, Medenine should have a lower level of in and out-migration than other gouvernorats. It was therefore decided to regress migration rates on gouvernorat size but to exclude Medenine in view of its atypical character. No statistically significant correlation was obtained between the size of Tunisia's 12 other gouvernorats and their respective levels of inter and intra-gouvernorat migration. It was concluded that in the Tunisian case the areal extent of administrative districts was not in itself an important determinant of the levels of inter-gouvernorat migration and that the distribution of population within administrative areas was probably more significant than the size of these areas in influencing the volume of migration across administrative boundaries (Coleman, 1977).

To supplement the information supplied in Table 3.1 it was decided to subdivide the population of each gouvernorat into three mobility categories

- 1) Non-migrants from birthplace,
- 2) Migrants who had left their delegation of birth at some period of their lives but either had not left their gouvernorat of birth or had returned to it by the time of the census in 1966,
- 3) Persons living in a gouvernorat other than that of their birth

FIG 33 MOBILITY OF POPULATION BY GOUVERNORAT OF BIRTH

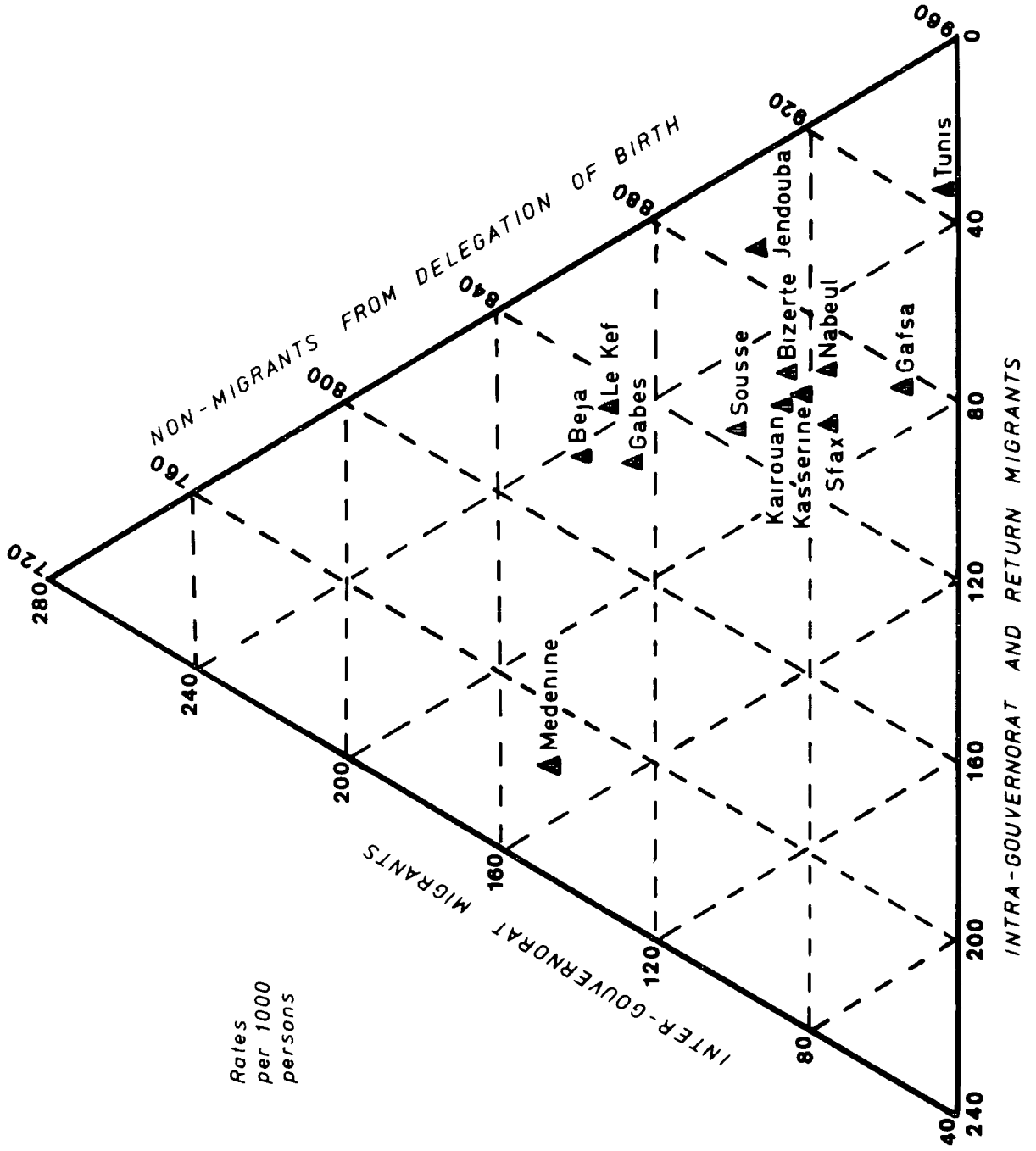


Figure 3 3 shows that Medenine has uniquely high mobility both in terms of its out-migration rate to other gouvernorats and in terms of the number of intra-gouvernorat migrants and return migrants (107 persons in every 1,000 born in Medenine) which it has. By contrast, it is interesting that members of the Tunis population not only had a very low probability of moving to places of residence outwith their delegation of birth but also that those who did migrate were as likely to resettle within the gouvernorat of Tunis as to move to a location in the other 12 gouvernorats. Three of the gouvernorats of the Tell (Beja, Jendouba and Le Kef) had low rates of intra-gouvernorat and return migration, partly caused by lack of urban employment opportunities and partly because of the paucity of modern services. As explained in Chapter 2, another cause is the long history of exploitation which the peoples of the densely settled areas of the upper and middle Medjerda Valley have experienced.

In 1966 Sfax and Gafsa might be said to represent the inverse situation, where labourers leaving the land appeared to be seeking and finding alternative employment within their gouvernorat of birth. In Gafsa gouvernorat the presence of four large phosphate mining centres responsible for the total production of Tunisia's phosphate has also acted as a major magnet to migrant workers. The mines have attracted rural labour from the oases settlements around the north of the Chott el Djerid, surplus labour from the Kasserine steppelands

and workers from even further afield. At one time many migrants came from Tripolitania, but this flow declined, and indeed reversed, subsequent to the discovery of oil in Libya (Clarke, 1958, Damette, 1970).

Sfax, second city of Tunisia, offered secondary and tertiary employment to the large number of out-migrants from the fishing communities of the Kerkennah Isles as well as to landless labourers from the rest of the *gouvernorat* of Sfax. The prosperity of Sfax relative to other parts of the country prior to independence was sufficient to discourage out-migration to Tunis. Fakhfakh (1971, 178) notes that for this period

"l'émigration des Sfaxians (ville) vers le nord de la Dorsale était presque nulle, seules les basses et les hautes steppes les ont attirés et fixés pour des activités de commerce et de service dans les souks et les agglomérations rurales."

This was no longer the case in the decade after independence.

From Figure 3.3 it can be seen that the nearer a *gouvernorat* is in its co-ordinate plot to the bottom right-hand corner of the tri-graph, the more capable it is of retaining its native population. By inference, either it must be capable of meeting the economic and social needs of its native population within the delegation of their birth or else it must have a population with low mobility aspirations. The further away that a plot occurs from this corner, the greater the structural adjustment that will be required to balance human and physical resource distributions.

The third characteristic worthy of investigation in relation to Table 3 1 is the phenomenon of return migration. Estimates of R (Table 3 2) suggest that return migration is particularly common amongst out-migrants from central Tunisia. For every three migrants native to Kairouan or Kasserine still living in other gouvernorats, at least one other migrant has already returned home. In Sfax the proportion of return migrants to out-migrants is even higher (54 per 100 migrants still living outwith their gouvernorat of birth). Medenine also displays high return migration, while the gouvernorats of the Tell appear to be incapable of attracting many migrants to return home.

Table 3 2		Return Migration, 1966
Gouvernorat	Known Returnees † 1966	Returnees as percentage of migrants still living in gouvernorats other than that of their birth
Tunis	2892	13
Bizerte	3001	11
Beja	2373	5
Jendouba	1041	4
Le Kef	1490	3
Kasserine	7215	40
Gafsa	4855	27
Medenine	11987	30
Gabes	4724	17
Sfax	17449	54
Kairouar	8434	33
Sousse	8502	16
Nabeul	6128	24

(Source author's calculations)

† Return migration was estimated as follows

$R = P_b - N_d - O_b - I$, where R = known number of
returnees to gouvernorat of birth;

P_b = Population of gouvernorat by birth (I N.S , 1966,
I, 175),

N_d = Non-movers from delegation of birth (I N.S., 1966,
II, 12);

O_b = Out-migrants from gouvernorat of birth (I N.S , 1966,
I, 175),

I = Intra-gouvernorat migrants (I.N.S , 1966, II, 15).

Following the evidence of Bchar (1971) and Picouet (1975), it
may be assumed that the majority of migrations occurring within
each gouvernorat involve the indigenous population, and that

only about 5% of intra-gouvernorat moves may be attributed to persons born in other gouvernorats. The figure for R (known returnees) is therefore a slight under-estimate of the true number of return migrants. R states the minimum level of known return migration.

Migration Effectiveness, 1966

Many studies of migration consider only patterns of net population redistribution. Net migration is, however, only a small part of the total volume of movement in a migration system, and the significance of net migration relative to gross migration merits examination. The relationship can be studied by the calculation of an index of migration effectiveness, which is the ratio of net migration to gross migration (Shryock, 1959).

The effectiveness of migration flows can be derived from the formula

$$E = \frac{I_{j1} - O_{1j}}{I_{j1} + O_{1j}} \times \frac{100}{1}$$

where E = migration effectiveness

I_{j1} = in-migrants to area 1 from area j

O_{1j} = out-migrants from area 1 to area j.

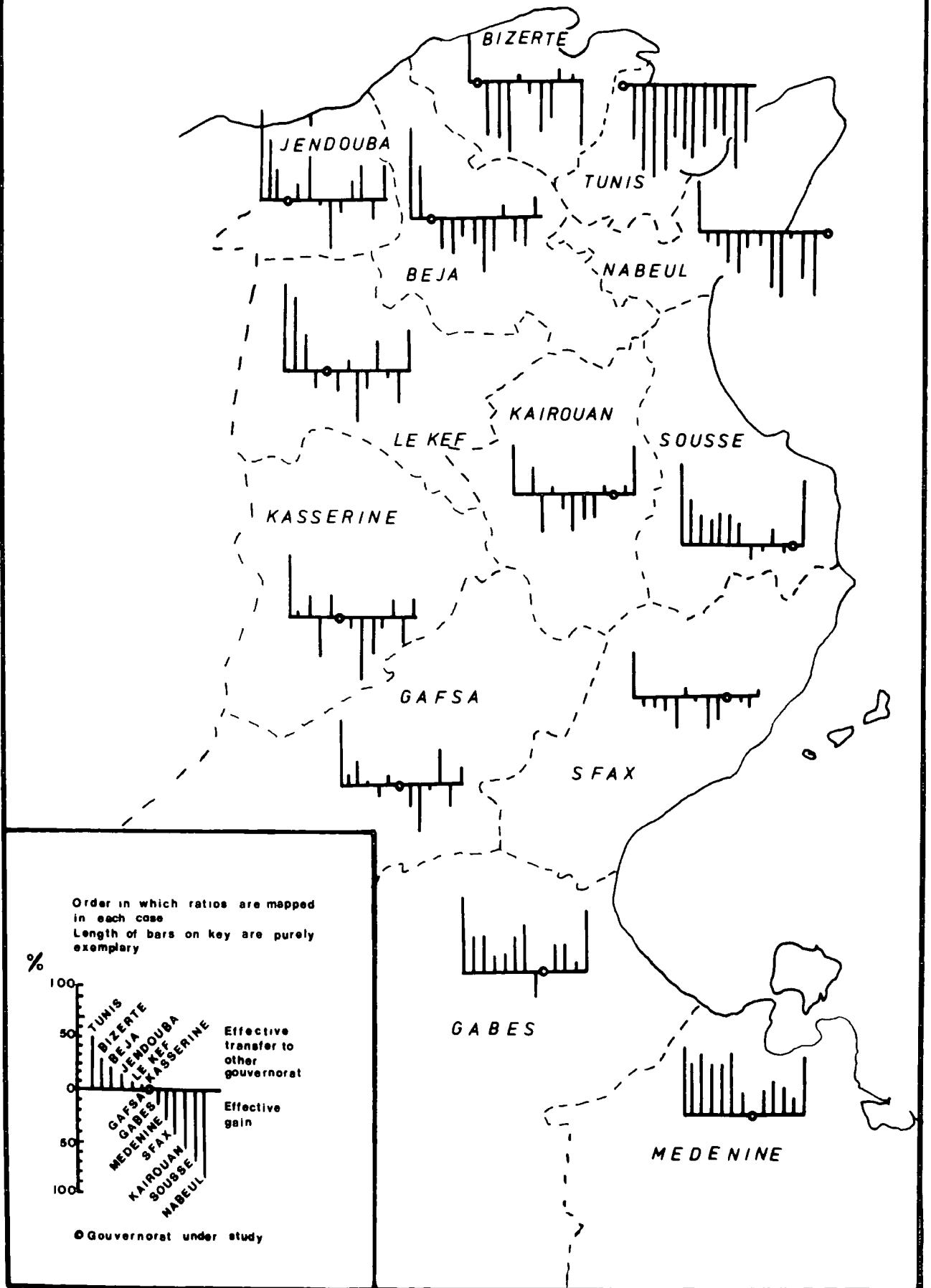
By standardizing the magnitude of migration flows, so that the index of effectiveness is independent of absolute numbers, the index permits comparison of the balance (or imbalance) of flows between places experiencing very different levels of interaction. The measure has most often been applied to migration streams consisting of entirely heterogeneous populations (Borejko, 1968, Shryock and Siegel, 1973,

Table 3.3 Migration Effectiveness Migration from last place of residence, 1966.

Gouvernorat of Residence, 1966	Gouvernorat of Origin												
	Tunis	Bizerte	Beja	Jendouba	Le Kef	Kasserine	Gafsa	Medenine	Gabes	Sfax	Kairouan	Sousse	Nabeul
Tunis	-	55.29	86.63	87.58	87.18	53.15	62.90	63.37	76.03	44.18	49.82	78.39	52.71
Bizerte	-55.28	-	48.08	62.64	69.79	.91	10.54	50.80	33.59	-10.46	- .08	51.75	-11.35
Beja	-86.64	-48.08	-	29.24	34.88	18.79	26.76	56.66	33.76	- 8.01	25.53	30.55	-15.24
Jendouba	-87.58	-62.64	-29.24	-	-15.23	-41.50	2.13	49.70	17.29	-17.32	-34.87	17.95	-32.00
Le Kef	-87.18	-69.79	-34.88	15.23	-	20.85	-11.09	50.92	13.18	-28.63	2.95	29.76	-41.10
Kasserine	-53.15	- 0.91	-18.79	41.50	-20.85	-	10.23	61.13	36.90	7.78	-14.68	27.77	-13.90
Gafsa	-62.90	-10.54	-26.76	- 2.13	11.09	-18.23	-	21.78	44.38	- 1.17	-33.33	19.38	-16.05
Medenine	-63.37	-50.80	-56.66	-49.70	-50.92	-61.13	-21.78	-	-23.86	-27.89	-26.86	-16.48	-55.51
Gabes	-76.03	-33.59	-33.76	-17.29	-13.18	-36.90	-44.38	23.54	-	-26.14	-23.84	- 5.68	-58.74
Sfax	-44.18	10.46	8.01	17.32	28.63	- 7.78	1.17	27.89	26.18	-	7.16	9.09	- 7.03
Kairouan	-49.82	0.08	-25.53	34.87	- 2.95	13.18	33.33	26.86	23.84	- 7.16	-	- 4.33	-44.56
Sousse	-78.39	-62.37	-30.55	-17.95	-29.76	-27.72	-19.38	16.48	5.68	- 9.09	4.33	-	-62.65
Nabeul	-52.71	11.35	15.24	32.00	41.10	13.90	16.05	55.51	58.74	7.03	44.79	62.65	-

(Author's calculations)

FIG 3 4 COMPOSITE MAP OF MIGRATION EFFECTIVENESS, 1966



Staveley, 1973), although Wolpert (1965, 169) has employed the measure to describe the differences between sub-groups in a migrant population. Sternstein (1979) has recently argued that the measure (sometimes termed 'migration efficiency') should only be applied with respect to migrant flows where some degree of homogeneity exists within the migrant population. Regrettably this is seldom the case, and census records do not usually permit the detailed disaggregation of the heterogeneous populations making up individual migrant flows.

Indices of migration effectiveness were calculated for each of the 156 inter-gouvernorat linkages in the 1966 migration system. The indices were calculated from the matrices of the inter-gouvernorat movements from last place of residence (G PR.U66) and are listed in Table 3.3 and mapped in Figure 3.4. For each gouvernorat the effectiveness of migration to the twelve other gouvernorats of the country is represented by twelve vertical bars. The length of the bars is proportional to the effectiveness of each migration link. The order in which linkages are considered is held constant in the form indicated by the key.

As with other statistical measures describing the Tunisian migration system, the most dominant feature of this map of migration effectiveness is the extremely effective transfer of population towards the capital. This is shown by the consistency of the bar chart for Tunis which displays twelve links, all of which not only record net gains by migration to

Tunis, but also indicate a high ratio of net to gross migration in each of the linkages with the capital. Effectiveness of transfer was particularly great from the governorats of Beja, Jendouba, Le Kef, Medenine and Sousse. Over 85% of all population interchange ($E \geq 75$) between Tunis and these governorats was directed towards the capital.

The southernmost governorat of Medenine experienced the inverse fortune to Tunis, with its population being effectively redistributed to other governorats. Highly effective migration links ($E \geq 50$) existed between Medenine and seven of the governorats of northern Tunisia. Redistributive links to Gabes, Sfax, Gafsa and Kairouan were weaker ($E \geq 20$), but still accounted for 60% of inter-governorat migrant exchange with these governorats. Only the Sahel of Sousse can be said to have had a relatively ineffective exchange with Medenine.

Examination of Figure 3.4 reveals that Tunis is not the only governorat to have a large number of effective migration links associated with it. Beja, for example, has effective ($E \geq 20$) and favourable linkages with eight other governorats. Strong net transfers of population occur from Sousse, Kairouan, Gabes and Medenine to the governorat of Nabeul ($E \geq 40$). The three extremely different governorats of Jendouba, Sousse and Gabes all have strong and dominant out-movements to the north-east of the country ($E \geq 25$). Surprisingly they also have effective redistributive flows to the governorat of Kasserine. It is difficult to explain this redistributive trend ($E \geq 25$), since it emerges from net out-migration from very disparate

origins and focuses on a gouvernorat with very little industrial employment and a predominantly rural population (86% rural in 1966).

The gouvernorats of central Tunisia have generally low levels of mobility but population movements associated with these gouvernorats are also rather ineffective. Migration within the low and high steppe and between this region and Sfax was particularly ineffective. In terms of Zelinsky's (1971) mobility transition this region might be considered to be still in the early transitional phase (see Chapter 6, Table 6 1). Rising mobility levels, and in particular redistributive migration movements, are likely to be increasingly important. Ratios of net to gross migration emphasize the most unusual position of Sfax in the Tunisian migration system. After the trio of Tunis, Nabeul and Bizerte, the gouvernorat of Sfax has the largest number of in-migrants of any of the Tunisian regions. Despite making net gains from nine of the gouvernorats, in no case does a really effective population exchange occur. Ironically for the capital of the south, the strongest redistribution of migrants in its favour came in 1966 from Le Kef, in north-western Tunisia. Even Kasserine made more effective exchanges with Gabes and Medenine than did Sfax.

Beja is an example of a gouvernorat with only small net gains from other regions but in relation to levels of gross migration, these gains were moderately effective ($E \geq 20$). Although Nabeul made gains from every gouvernorat except Tunis, the redistribution of population from Kairouan, Kasserine and

Gafsa was ineffective ($E \leq 15$).

Underlying the regional differences between the flows and counterflows of migrants are contrasts not only in the geographical distribution of human and physical resources, but also differences in the role of migration relative to the structure of local economies of each gouvernorat. For example, out-migration of large numbers of young men from Medenine gouvernorat to the north of Tunisia had, by the beginning of the twentieth century, become so common that Stephenson (1972, 7) was prompted to suggest that a 'migration ethic' had come into existence. Young men were expected to return home after a few years of migrant employment and to resume their traditional village lifestyles. In other areas, such as the Medjerda valley, large-scale out-migration had assumed quite a different character. It was not accompanied by the development of specialist migrant skills, nor did an 'ethic' emerge involving the expectation that migrants would return after a period of urban employment to their villages of origin. These differences in the significance of migration account in part for the regional variations which exist in migration effectiveness.

Effectiveness of Migration from Birthplace

The birthplace statistics given in the 1966 census (G PB 66) provide an opportunity to study the effectiveness of migration over a longer time span, by merit of the fact that the one-step migration tables used so far in this analysis

ignore all but the last migration made by an individual Hagerstrand (1969) has shown that the average person, in addition to migrations undertaken for economic or social reasons, moves two or three times during his lifetime solely in response to changing positions in his life cycle. Lifetime migration statistics reflect therefore population displacements resulting from several different migration movements

It was expected that effectiveness ratios calculated on a lifetime migration basis would yield a lesser range of values than migration from last place of residence since it was supposed that the result of migration from birthplace would involve a smaller net displacement of population. In fact, effectiveness was found to be greater for lifetime migration than for migration moves from last place of residence. Only 14.1% of all linkages had lower values of E for lifetime migration (Table 3 4) than for one-step moves (Table 3 3) and the majority of these flows were those which had also changed their direction of net population transfer. In no instance was migration to Tunis by single step movement more effective than by lifetime migration.

The trend toward greater redistribution on a lifetime basis is truly surprising since it suggests that second and subsequent population moves have a greater tendency towards more effective redistribution than towards return migration. This may be taken as tentative evidence of the operation of step migration at a significant level within Tunisia (Signoles, 1972, Picouet, 1975). A detailed analysis of the magnitude

Table 3.4 Migration Effectiveness: Migration from place of birth, 1966.

Gouvernorat of Residence, 1966	Gouvernorat of Birth												
	Bizerte	Beja	Jendouba	Le Kef	Kasserine	Gafsa	Medenine	Gabes	Sfax	Karrouan	Sousse	Nabeul	
Tunis	-	62.43	90.06	89.87	91.62	87.34	82.50	91.19	90.61	82.10	82.93	86.37	66.93
Bizerte	-62.43	-	52.69	65.60	69.99	68.96	35.92	80.34	64.18	68.20	58.38	69.33	26.57
Beja	-90.06	-52.69	-	28.83	34.54	55.95	42.42	79.39	57.89	42.03	52.31	45.81	-19.63
Jendouba	-89.87	-65.60	-28.83	-	-10.33	17.92	13.44	79.12	56.35	38.42	10.61	35.21	-30.54
Le Kef	-91.62	-70.11	-34.54	10.33	-	48.72	26.59	78.04	51.22	11.38	26.90	47.55	-44.67
Kasserine	-87.34	-68.96	-55.95	-17.92	-48.72	-	19.33	79.14	63.27	46.44	0.99	27.44	-52.35
Gafsa	-82.50	-35.92	-42.42	-13.44	-26.59	-19.33	-	39.37	56.02	17.33	-42.96	17.90	-41.52
Medenine	-91.19	-80.34	-79.39	-79.12	-78.04	-79.14	-39.37	-	-27.95	-35.47	-40.85	-33.72	-76.47
Gabes	-90.61	-64.18	-57.89	-56.35	-51.22	-63.27	-56.02	27.95	-	-22.87	-17.79	-0.43	-74.17
Sfax	-82.10	-68.20	-42.03	-38.42	-11.38	-46.44	-17.33	35.47	22.87	-	10.73	-16.30	-65.35
Karrouan	-82.93	-58.38	-52.31	-10.61	-26.90	-0.99	42.96	40.85	17.79	-10.73	-	-19.93	-75.52
Sousse	-86.37	-69.33	-45.81	-35.21	-47.55	-27.44	-17.90	33.72	0.43	16.30	19.93	-	-73.09
Nabeul	-66.93	-26.57	19.63	30.54	44.67	52.35	41.52	76.47	74.17	65.35	75.52	73.09	-

(Author's calculations)

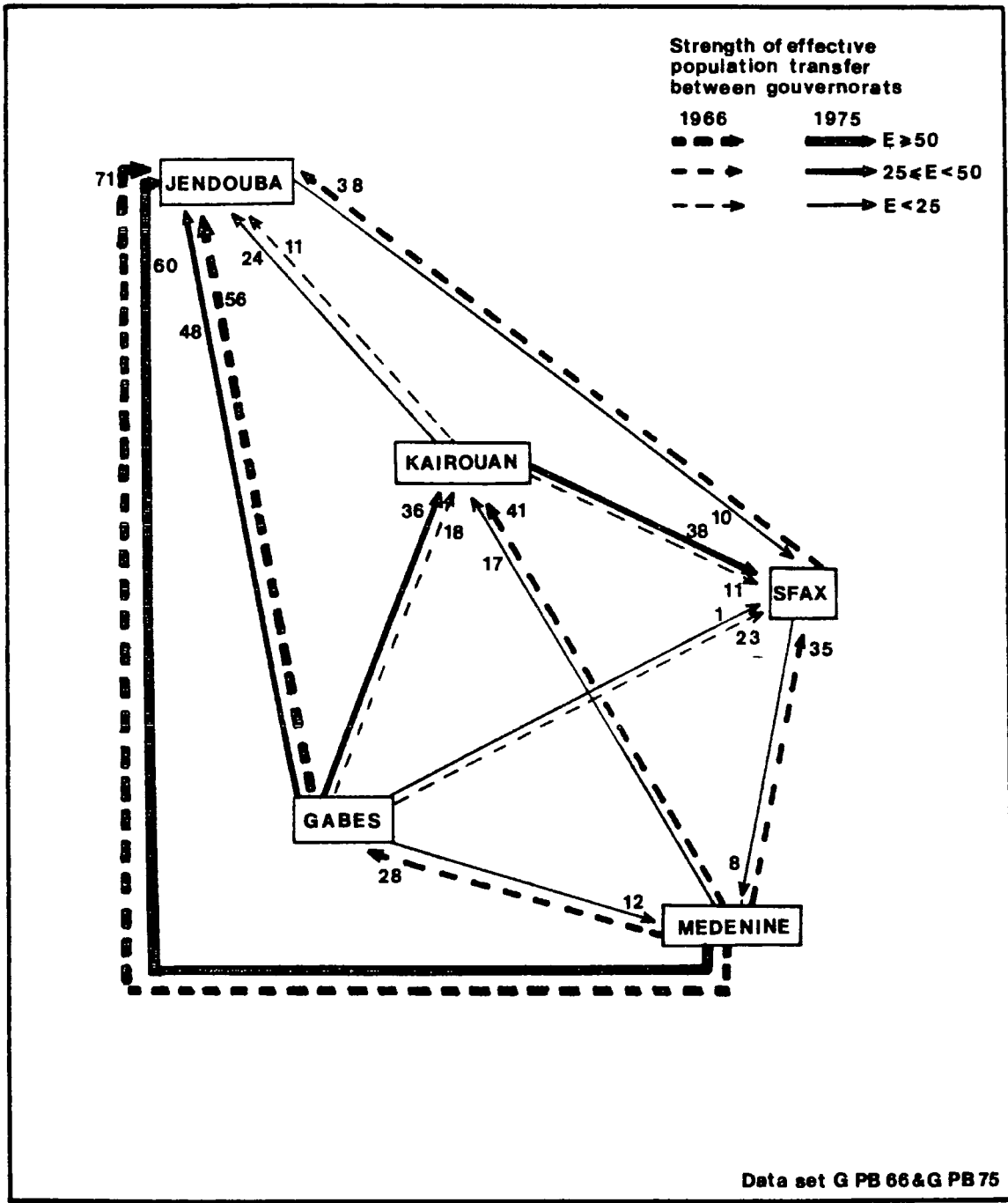
of migration effectiveness from birthplace is not pursued here, but it should be noted that the increase of effectiveness of 'lifetime' over 'migration from last place of residence' was much greater for some gouvernorats than for others. Medenine and Gabes had even greater effective losses for migration from birthplace statistics, while Beja made much more impressive net gains on a limited number of linkages using this migration matrix. In two gouvernorats - Jendouba and Sfax - the significance of the migration interchange modified considerably. Patterns of movement from place of last residence in 1966 seem to suggest that Jendouba was a reservoir of potential migrants ready to be redistributed to other gouvernorats, particularly to Tunis. Migration from birthplace data revealed that Jendouba has also gained population from many sources including Kasserine, Kairouan and Gafsa. On a lifetime basis net migration has been especially effective from Gabes, Medenine, Sfax and Sousse ($E \geq 30$).

Movement from last place of residence prior to the 1966 census gave an impression of Sfax having a relatively balanced migration pattern. Analysis of lifetime migration shows that a slightly more effective redistribution of population occurred from the south in the past, but net transfer of migrants to the north was also much more effective. A highly significant transfer of native Sfaxians has occurred to Nabeul, Tunis and Bizerte ($E \geq 60$) and to Beja, Jendouba and Kasserine ($E \geq 35$).

The deviations from the general trend of reduced effectiveness for moves from last residence were not evenly scattered throughout the system, but also tended to concentrate in those gouvernorats whose attractiveness to migrants had changed greatly through time.

Effectiveness ratios were calculated for migration patterns for the 1, 2, 3, 5 and 10 years previous to the 1966 census. Effectiveness of migration was found to be less for the short time periods immediately prior to the census. This result is difficult to interpret. It could be taken to imply that net redistribution was becoming a less important component of population movement with the passage of time. This trend might be explained in the Tunisian case in terms of the rising levels of population mobility which emerged in the first decade after independence. At first these movements proved relatively effective in redistributing population towards Tunis, but gradually return migration from the capital and migration to other centres became more important and the overall 'effectiveness' of the system declined. Alternatively, declining effectiveness ratios in the 1956-1966 period might be attributed solely to the tendency of the migration system to be less effective over short time periods than over larger time spans (as was noted in relation to the comparison of birthplace and migration from place of last residence statistics).

FIG 3 5 COMPARISON OF MIGRATION EFFECTIVENESS



1975 Census Data on Migration from Birthplace

It is extremely difficult to compare the migration flows recorded by the 1966 and 1975 censuses, due to the changes which occurred in the intervening period in the country's administrative boundaries (see Figure 2.2). At the governorat scale only Medenine and Kairouan experienced no frontier reorganization. Gabes, Sfax and Jendouba had only minor boundary changes. Thus only 10 of the 78 two-way linkages considered for the 1966 census can readily be compared with data from the 1975 census. In comparing the flows between these five governorats it is clear that substantial changes occurred in the migration system between 1966 and 1975. From Figure 3.5 it can be seen that without exception out-migration from Medenine to the other four governorats became less effective by 1975. That is to say, the net transfer of population was smaller in relation to the level of gross migration. Interchanges between Medenine and Gabes, and Medenine and Sfax, altered in character such that Medenine became an area of net in-migration with respect to these two governorats, reversing all previous trends.

Table 3.5 represents the values of E that were calculated for the entire 1975 matrix of inter-governorat migration from birthplace. It appears that the increased attraction of Medenine noted above was not an isolated feature, but was shared by all the southern governorats. Sfax made net gains from Jendouba, and redistribution of population from Kairouan to Sfax became more effective (1966 E = 11, 1975 E = 35)

Table 3.5 Migration Effectiveness Migration from place of birth 1975

Gouvernorat of Birth

Gouvernorat of Residence 1975	Tunis	Tunis Sud	Sousse	Jendouba	Kef	Silliana	Kasserine	Sidi Bou Zaid	Medenine	Gafsa	Gabes	Kairouan	Kahira	Monastir	Sousse	Tunis	
Tunis	-63 35	6 35	66 54	91 50	91 64	93 31	94 2	85 07	48 48	72 98	76 35	79 65	81 25	75 19	76 77	61 75	19 10
Tunis Sud	-66 54	-52 43	52 43	67 23	91 30	79 44	54 89	84 1	100 00	41 18	82 05	82 35	72 31	56 25	58 20	10 67	-33 30
Sousse	-91 30	-07 23	-34 43	34 43	45 10	50 67	76 92	52 21	87 50	23 60	68 04	37 93	80 65	41 67	36 90	11 96	3 34
Jendouba	-01 64	-91 30	-45 10	-7 65	-	- 3 22	-30 61	0 03	30 00	13 33	25 00	0	17 07	17 95	10 45	-34 21	-62 39
Kef	-93 31	-79 44	-55 67	-0 85	-3 22	-	-73 1	59 01	9 09	22 38	60 00	48 39	24 14	30 77	-60 47	- 21	-60 0
Silliana	-94 3	-54 89	-70 92	65 80	30 61	73 51	-	22 8	-12 0	-4 26	66 04	0	-20 45	30 00	17 86	- 7 3	-18 76
Kasserine	-80 07	-84 31	-52 21	16 28	-3 03	-58 01	-22 58	-	-52 82	7 59	47 17	47 62	15 56	70 37	-2 78	-4 01	-70 93
Sidi Bou Zaid	-48 48	-100 00	-87 50	-50 00	-9 09	31 03	12 50	52 82	-	-18 01	-39 46	-56 96	-12 73	100 00	35 84	-62 10	-15 79
Gafsa	-72 98	-41 18	-23 60	-13 33	-22 58	4 26	-61 90	-7 59	38 01	-	-46 67	-8 94	31 71	30 94	30 90	-14 29	-11 11
Medenine	-76 35	-82 05	-68 84	-25 00	-60 00	-66 04	-72 00	-47 17	39 46	46 67	-	12 38	-16 98	42 80	30 00	-45 88	-16 59
Gabes	-79 65	-82 35	-37 93	0	-48 39	0	-80 00	-47 62	56 06	8 94	-12 38	-	-36 36	21 43	0	- 5 00	-50 36
Sfax	-73 88	-57 38	-47 76	12 82	9 52	25 00	-6 25	-17 24	29 16	8 64	-8 15	0 98	38 27	11 43	-30 61	-42 27	-61 13
Kairouan	-81 25	-72 31	-80 65	-17 07	-24 14	20 45	23 61	-15 56	12 73	-1 71	16 98	36 36	-	4 55	-17 28	-52 66	-74 03
Kahira	-70 49	-56 25	-41 67	-17 95	-30 77	-30 00	-4 45	-70 37	-100 00	-22 94	-42 86	-21 43	-4 55	-	-43 42	-60 21	-73 72
Monastir	-76 77	-58 26	-56 92	-10 45	60 47	-17 86	31 15	2 78	-36 84	-20 93	-20 00	0	17 28	43 42	-	-21 35	-31 25
Sousse	-61 75	-16 67	-11 96	34 21	38 89	7 32	45 21	12 15	62 16	14 29	45 88	5 00	52 66	64 21	24 35	-	-27 61
Nteul	-49 10	-33 33	-3 94	62 39	75 84	48 76	70 83	52 06	15 79	11 11	56 59	56 86	74 03	73 72	31 22	27 61	-

(Author's calculations)

T O T A L

The greatest net gains in population through migration, and the most effective redistribution of population continued to be towards north-eastern Tunisia

Comparing the status of the Tunisian gouvernorats in terms of the effectiveness and net direction of the migration flows associated with each one, it becomes clear that the gouvernorats of Tunis, Nabeul and Bizerte were still the main focus of effective net in-migration in 1975. The newly created gouvernorat of Silliana and the redefined gouvernorat of Sousse also had relatively effective and favourable linkages with the rest of the country in 1975 (excepting the linkages of these two gouvernorats with those of the north-east) Sfax was the only gouvernorat at the time of the census to attract more net in-flows of population than out-flows. Nevertheless by aggregating these flows it becomes clear that the region made an overall loss of population by migration. Although Beja, Monastir and Gafsa had net losses of migrants to the majority of gouvernorats, the effectiveness of flows was low ($E \leq 25$), except for those to the north-east.

The gouvernorats of the interior of Tunisia (Kairouan, Kasserine, Sidi Bou Zid and Le Kef) and of isolated regions such as Jendouba, tended to experience much more imbalanced migration exchanges, with population being redistributed towards the coastal zones. Within this category a distinction remained however between the high mobility levels of the north-west and the lower migration rates of the central region of Tunisia.

In 1975 the contrast within the Sahel of Sousse, between the pattern of net out-migration from the new gouvernorat of Mahdia and the net in-migration to the gouvernorat of Sousse was remarkable. This contrast was hidden in the 1966 census due to the areal aggregation of the two gouvernorats. Patterns of population interaction between Mahdia and the rest of Tunisia were almost the inverse of those of Sousse in 1975. Net migrant losses were recorded by migration to all gouvernorats and the effectiveness of redistribution was high in all cases except for links with Kairouan and Sfax.

Examination of the differences between male and female migration streams using the E ratio supported Shryock's (1964) contention that sex was not a major discriminant in the effectiveness of migration flows. Differences were greatest (between the effectiveness of male migration and the effectiveness of all migration) for linkages between the south of Tunisia and the gouvernorats of the interior where male migration greatly exceeded female in volume and effectiveness.

Migration Trends in the 1970s

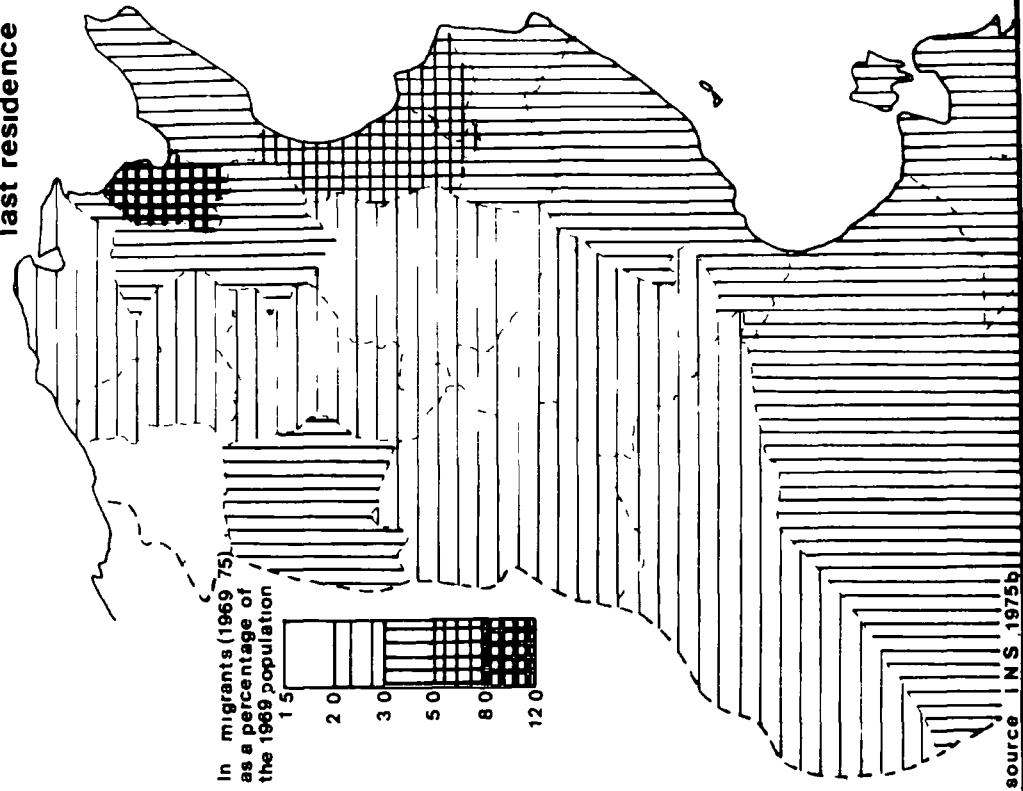
The trends in Tunisian migration from birthplace which have been discussed with regard to the changing effectiveness of migration have been validated elsewhere by a more traditional analysis of patterns of in and out-migration (Findlay, 1980). As in 1966 in-migration rates calculated from place of birth data indicate a core-periphery pattern with the highest levels of in-migration in the areas proximate

FIG 3 6

A) Rates of in-migration 1975 (Place of birth statistics)



B) Rates of in-migration 1969-75 from place of last residence



Data source : I.N.S. 1975b

to the capital city (Figure 3.6a). This pattern is different in a number of respects from the pattern of migration from last place of residence calculable for the period 1969-1975 (Figure 3.6b). During these six years Tunis continued to be a very attractive destination for migrants from all over Tunisia with an in-migration rate of 87 per 1,000 inhabitants, but unlike the patterns of lifetime movement, other poles of attraction are apparent. For example, Monastir and Sousse gouvernorats appear to have experienced considerable levels of in-migration during the early 1970s with migration rates of 61 and 51 per 1,000 respectively. Even Mahdia gouvernorat had moderate levels of in-migration and made net gains by migration. Although over a longer time span (lifetime migration data) the area has lost population, recent developments throughout the Sahel, such as the establishment of numerous textile factories in the area, have reversed these trends completely making the area highly attractive to migrants.

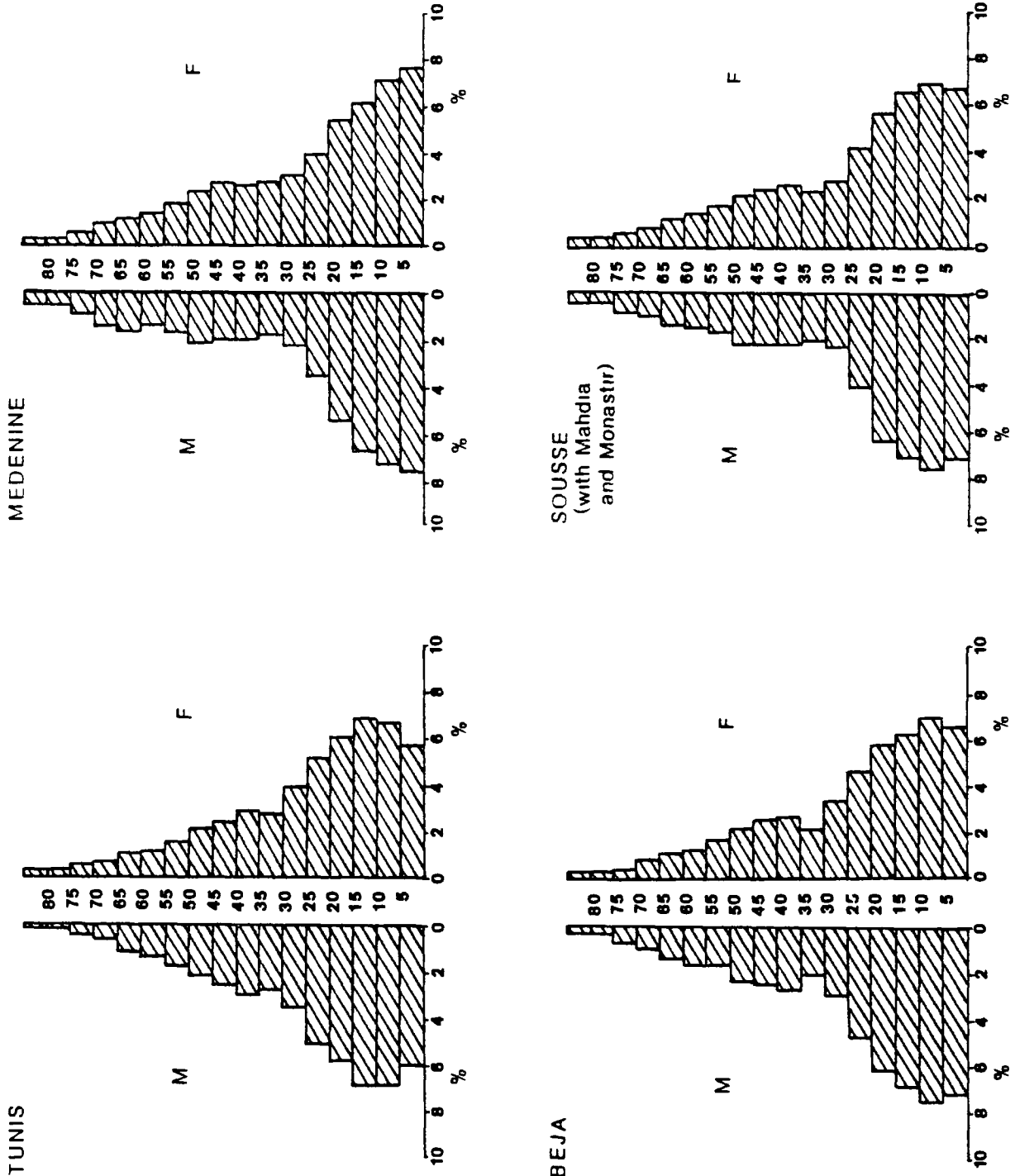
Meanwhile at the opposite extreme Jendouba and Kairouan gouvernorats remained extremely unattractive to migrants in the 1969-1975 period having in-migration rates of only 15 and 20 per 1,000 inhabitants. Table 3.6 shows that although in-migration rates to Beja, Le Kef and Siliana were higher than to these other two gouvernorats, levels of out-migration between 1969 and 1975 were exceptionally high resulting in even higher net population losses than from Jendouba and Kairouan. In the period 1969-1975 the pattern of net migration might be considered still to contain elements of a

Table 3.6 Rates of In and Out-migration, 1969-1975

Gouvernorat	In- Migration Rate ‰	Out- Migration Rate ‰	Net Migration Rate ‰
Tunis	87	44	+43
Monastir	61	35	+26
Mahdia	46	36	+10
Medenine	42	33	+ 9
Sidi Bou Zid	26	19	+ 7
Nabeul	34	32	+ 2
Sousse	51	50	+ 1
Gabes	36	39	- 3
Sfax	30	35	- 5
Kasserine	33	39	- 6
Kairouan	20	30	-10
Gafsa	27	38	-11
Zaghouan	46	59	-13
Bizerte	24	46	-22
Jendouba	15	40	-25
Siliana	23	51	-28
Le Kef	32	62	-30
Beja	26	66	-40

Source author's adaption from I.N.S.,
1975b and Tarifa, 1977. Data
Set G.PR.6 75.

FIG 37 AGE-SEX PYRAMIDS FOR TUNIS, BEJA, MEDENINE AND SOUSSE, 1975

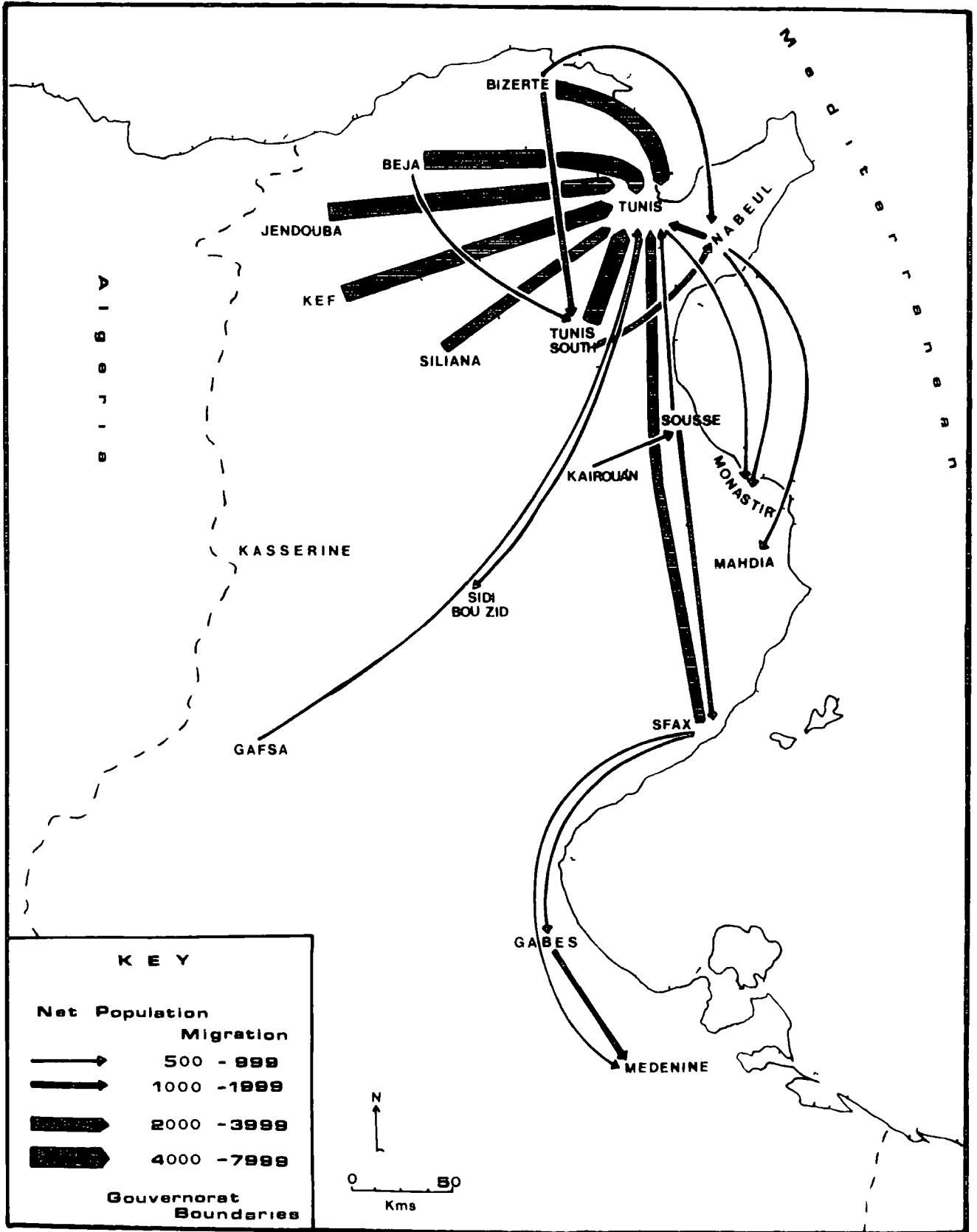


Source data from INS 1975b

core-periphery model with heavy population redistribution occurring from the north-west of the country towards Tunis. The southern half of the country was not involved in this trend to the same extent, instead a pattern of population movement from the interior to the coastal gouvernorats was detected. A third significant element in migration patterns of the early 1970s was the rising level of migration between the more urbanized regions of the country (i.e. between Sfax, the settlements of the Sahel of Sousse and the towns of the north-east). The causes underlying the emergence of these trends will be examined in fuller detail in Chapter 6.

One of the direct consequences of the acceleration of out-migration from the Tell has been an increased imbalance in the age-sex structure of the residual population. Consider, for example, the age-sex pyramid for Beja which has fewer men in the cohort 30-34 years than in either the older or younger cohorts (Figure 3.7). This indentation is almost certainly due to the heavy levels of out-migration which Beja has experienced. These departures have been supplemented by the considerable international emigration of workers from all the gouvernorats of the Tell. Study of the age-sex pyramids of the gouvernorats of southern Tunisia has shown that the populations of these areas have also got many fewer men in the age cohort 25-35 years than might be expected, reflecting the demographic impact of internal and international migration.

FIG 38 NET MIGRATION of TUNISIANS (1969 - 1975)



on these areas. Interestingly, areas of net in-migration such as Tunis do not display a significant bulge in their age-sex pyramids in the active echelons (Figure 3 7). This is because the zones of internal in-migration have also been areas of departure for international migration. At times the levels of international emigration have equalled or exceeded the volume of internal in-migration in these areas.

Figure 3 8 maps all net migration flows exceeding five hundred persons in size. It re-emphasizes that Tunis was the only centre to make major net gains in population between 1969 and 1975. Small net out-flows of population from Tunis were recorded, however, to the favoured gouvernorats of Monastir and Mahdia, and also to Sidi Bou Zid. A further interesting feature of migration in this period is the redistribution recorded from Sfax to Gabes and Medenine.

Between May 1969 and the census of May 1975, 81,030 new arrivals were recorded in Tunis or approximately 13,500 persons per annum. It should be noted that this remarkable level of in-migration represented a very slight slowing down of in-movement by comparison with the early 1960s. In the period 1962-1966 (the most comparable time period for which data is available) 68,984 people moved to Tunis or approximately 13,800 per annum.

"Ce ralentissement de l'immigration s'explique par les efforts de stabilisation de la population rurale mais surtout par l'ampleur de l'émigration de ces

populations vers l'étranger et plus particulièrement par les difficultés croissantes d'accès à la ville." (Attia, 1976, 4)

Two further explanations are offered by Attia for the slight slowing down of in-migration to Tunis. While in the first decade after independence a considerable amount of urban employment became vacant through the departure of Europeans from administrative and commercial posts, there were no equivalent sources of new urban employment in Tunis in the second decade after independence. The problems of declining opportunities for occupational mobility in the urban environment are discussed in greater detail in Chapter 9.

The increased demand for labour in Western Europe which occurred in the late 1960s was a second factor bringing major changes in Tunisian migration patterns. Many potential migrants who a decade earlier would have moved to Tunis in search of a better future, found instead that they could emigrate to the much more lucrative European market. The development of international migration (Chapter 7) itself influenced patterns of internal migration, because many would-be emigrants moved in the first instance within Tunisia to zones where they would be most likely to obtain foreign work contracts. Tunis in the period 1969-1975 became a staging post for emigration to France, while Medenine gained recognition as the point of departure for Libya. As a result Medenine 'benefitted' from this southward movement of job seekers hoping to find work in Libya.

More precise quantitative analysis of trends in migration patterns in the 1970s is reported in Chapter 6 in the context of Zelinsky's (1971) hypothesis of the mobility transition. This offers a theoretical structure within which the causes of change in the Tunisian migration system may be considered. Prior to this analysis, a number of methods will be examined for defining the regional groupings within which migration flows tend to be arranged.

Chapter 4

ZONATION of MIGRATION PATTERNS on the BASIS
of SIMILARITY CRITERIAIntroduction

Classification is fundamental to scientific method. By means of classification, order is imposed on the immense range of events that are observed in the 'real' world. By grouping events into classes, information is more easily understood and manipulated. Geographers have traditionally taken a special interest in the classification of space in order to describe and better comprehend the organization of the multifarious features on the earth's surface.

The form of classification chosen by a taxonomist often moulds the questions which he subsequently asks about his data (Harvey, 1969, 348). Consequently, an understanding of taxonomic procedures is itself a prerequisite to effective scientific inquiry. If data analysis is to extend beyond merely answering the questions forced upon the investigator by the method he has used to classify his data, then taxonomic procedures must be chosen at the outset which serve the investigator's specific purpose. Purpose-specific classifications tend as a result to be more valuable than general taxonomies.

Events or places in the 'real' world are classified by reference to their attributes. Most commonly, events or places with similar attributes are grouped together, but classification

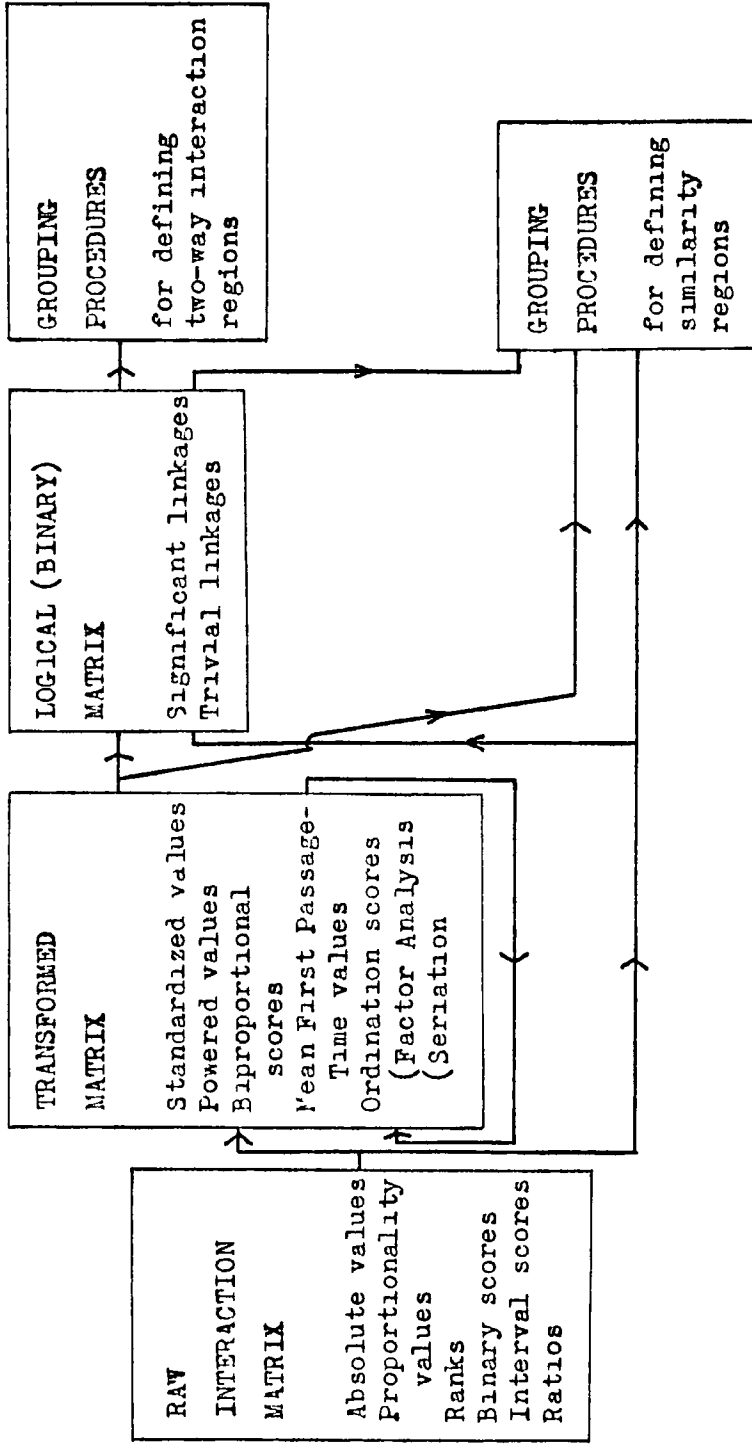


FIGURE 4.1 Steps toward regionalization of an interaction matrix (substantially adapted from Holmes, 1978, 2).

may also be attempted on the basis of the relationships between places or events. Both these approaches will be applied with reference to the classification of the Tunisian migration system.

Census records of migration movements introduce an initial grouping of data for publication purposes. Migrant origins and destinations are grouped within enumeration districts and are frequently classified by the time period in which they occurred. Migration matrices, in the form published by statistical offices, remain extremely difficult to comprehend and analyse. Superficial examination of the entries in these matrices often confirms only the analyst's preconceptions of the character of the migration system. A number of recent taxonomic procedures have enabled the geographer to elicit much more useful and interesting information from data-rich migration matrices. A number of these procedures will be reviewed in the chapters which follow.

Two critical steps in matrix analysis present themselves to all students of taxonomy. The first involves the choice of transformation which may be applied to the raw data matrix (see Figure 4.1). The second critical step concerns the choice of the level of information abstraction which should occur prior to the application of grouping procedures or other analytic techniques. Many studies of migration consider only the dominant migration flows within an interaction matrix, ignoring all other entries. Other approaches define significant flows on the basis of different criteria, such as network structure. Yet others consider all entries in the original matrix, yielding analyses which are dependent on the entire origin-destination matrix.

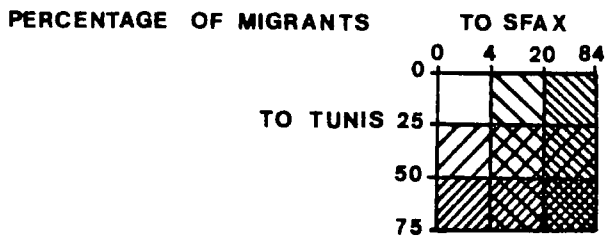
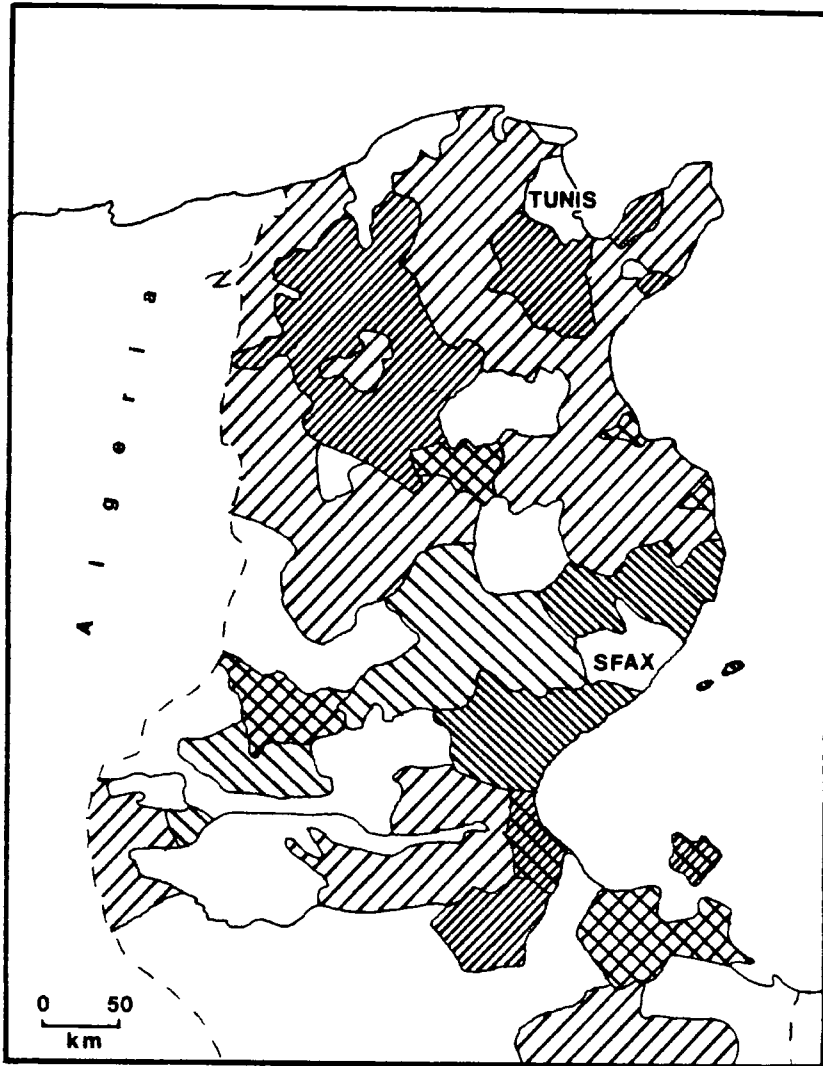
rather than on a subset of flows within the matrix

In the remainder of this chapter a range of approaches to the regionalization of migration systems on the basis of similarity characteristics will be examined, while in the next chapter methods for the identification of two-way interaction regions will be discussed. Throughout these chapters discussion will initially be restricted to inter-gouvernorat migration as recorded by the 1966 census (G.PR U 66). The techniques introduced and systematically reviewed using this data set have also been applied selectively to the larger 98 x 98 inter-delegation migration matrix (D PR U 66) and to other time specific matrices (G PR.4.66 and G PB.66). The reader is once more referred to Appendix 1 for a description of the different data matrices used in this thesis and of the codes by which they are labelled throughout the text.

During analysis of migration at the level of inter-delegation movements no attempt is made to introduce new analytic techniques, but merely to give greater insights into the Tunisian migration system. Significantly, it was often the attempt to extend analysis to the more detailed level of inter-delegation migration which uncovered fundamental weaknesses in the techniques employed

A further dimension is added to the study of Tunisian migration systems in Chapter 6, in the examination of temporal changes in migration using a variety of migration matrices from the 1966 and 1975 censuses. Several of the more efficient techniques introduced in Chapters 4 and 5 will be employed in Chapter 6 to describe the changes which have occurred in the

Fig 4 2 Migration Fields of Tunis and Sfax 1966



Source D P R U 66

Tunisian migration system with the passage of time

Migration Field Zonation

Inter-gouvernorat migration

A migration field may be identified by the dichotomization of an interaction matrix into one set of entries directly linked by migration flows to the centre of the field and another set of entries, discrete and unconnected to this centre. In simpler terms, a migration field is the geographical distribution of migrants as seen from an area under study (Hagerstrand, 1957, 29). Within a migration field further zonation may occur with areas being grouped together that have similar levels of interaction with the centre of the field. This elementary approach to zoning a migration system has been widely adopted by geographers. For example, in the case of Tunisia, Simon (1977, 58) has recently analysed internal migration to Tunis in this fashion.

A more complex migration zonation may be derived by mapping the contribution of enumeration areas to two or more migration fields. For example, superimposition of the Sfaxian migration field over that of Tunis permits cross classification of gouvernorats by their relative importance within each field (Table 4.1). It becomes obvious from examination of this Table that Sfax, as the second city of Tunisia, has little attraction for migrants relative to the capital city of Tunis.

Comparison of Tables 4.1 and 4.2 highlights the problem of imposing a multi-variable classification on data sets with highly

different frequency distributions (Evans, 1977) Arithmetic intervals appear to classify relatively satisfactorily the spread of values of Tunis bound migration. By contrast, the heavy skew of values in the Sfaxian migration field is ineffectively identified when arithmetic intervals are employed, and the use of geometric intervals is more satisfactory (Table 4 2)

Inter-delegation migration

Extending the cross-tabulation and zonation of migration fields to the level of inter-delegation movements it can be seen that the pattern of interaction between the Tunis and Sfaxian fields remains fundamentally unchanged (Figure 4 2). Migration zonation was relatively easily achieved since Tunis and Sfax are competitive rather than complementary destinations. The Sfaxian field is only strong in the delegations around the city itself. The attraction of Sfax declines steeply with increasing distance from the city. The influence of Tunis on out-migration from the country's delegations is less closely associated with distance. Not only do the surrounding delegations of Zaghuan and Mornag send over 50% of their migrants to the capital but so also do more distant delegations in the Tell such as Beja, Bou Salem and Le Kef. The strength of the Tunis field is such that even to the south of the main Sfax migration field, Tunis is able to draw over 50% of migrants from the oasis delegation of El Hamma and the island community of Jerba.

Further complexity might be introduced to migration field analysis by studying the interaction of three or more fields

 Table 4.1 Percentage of Migrant Departures to Tunis and Sfax

Gouvernorat of Origin	% To Tunis	% To Sfax	% To other Gouvernorats
Beja	61.8	0.6	37.6
Kef	61.1	0.8	38.1
Jendouba	59.5	0.9	39.4
Bizerte	51.3	2.8	47.9
Gabes	49.6	6.5	44.9
Nabeul	47.9	4.0	48.1
Medenine	43.8	3.6	52.6
Kasserine	41.7	2.4	55.9
Sousse	39.9	10.7	49.4
Kairouan	34.4	3.2	62.4
Gafsa	20.8	7.3	71.9

Data set G PR U 66

Table 4 2 Cross-tabulation of Migration to Sfax and Tunis

Departures to Sfax (%)

		0	1	3	7	15
Departures to Tunis (%)	20					Gafsa
	30			Kairouan		Sousse
	40		Kasserine	Gabes Medenine Nabeul		
	50	Jendouba	Bizerte			
	60	Beja Kef				
	70					

Data set G PR.U 66

This has been attempted by the D A T (1973b). In practice the mapping and interpretation of zones becomes extremely difficult when a large number of fields are overlaid. On theoretical grounds the approach remains weak because it classifies migration enumeration areas on the basis of similarity of migrant destinations and gives no consideration to the wide variety of different causes for migration to any given destination (Staveley, 1973, Hyman and Gleave, 1978). Furthermore the approach depends entirely on the researcher's ability to identify significant migration fields for subsequent zonation. The technique may be used most effectively when the migration analyst has already achieved a considerable understanding of the migration system from other sources.

Zonation using the Spearman Rank Correlation Coefficient

Inter-gouvernorat migration

As an increasing number of origins (or destinations) is introduced to a classificatory system, it becomes desirable to find a technique which can offer a summary measure of similarity between out-migration (or in-migration) areas. One such measure is the Spearman rank correlation coefficient. Applied to a migration matrix, this coefficient describes the strength of the relationship between migration flows from any two origins to their surrounding migration fields. Where the ranking of flows by destination (or origin) is highly similar between two migration fields, a positive coefficient approaching 1.0 will be generated. Low correlation between paired migration flows will be represented

by coefficients near 0.0 while strong inverse relationships (as for example between the Tunis and Sfaxian fields described in Table 4 2) will approach the value -1 0

The derivation of Spearman rho is adequately reviewed elsewhere (Yeomans, 1968, 302, Nie et al., 1975, 288-289), and is not repeated here. It has only 91% power efficiency compared with the often used Pearson product moment coefficient of correlation. It is, however, more robust than Pearson's r, and being a non-parametric statistic is more suitable for handling migration data which seldom conforms to the properties of a normal distribution. The entries in most migration matrices form highly skewed distributions, one or two destinations receiving many migrants from a large number of origins, while most origin-destination linkages involve only very small flows.

Spearman rho is defined formally as

$$r_s = 1 - \frac{6 \sum d^2}{n(n^2-1)}$$

where r_s is the Spearman correlation coefficient

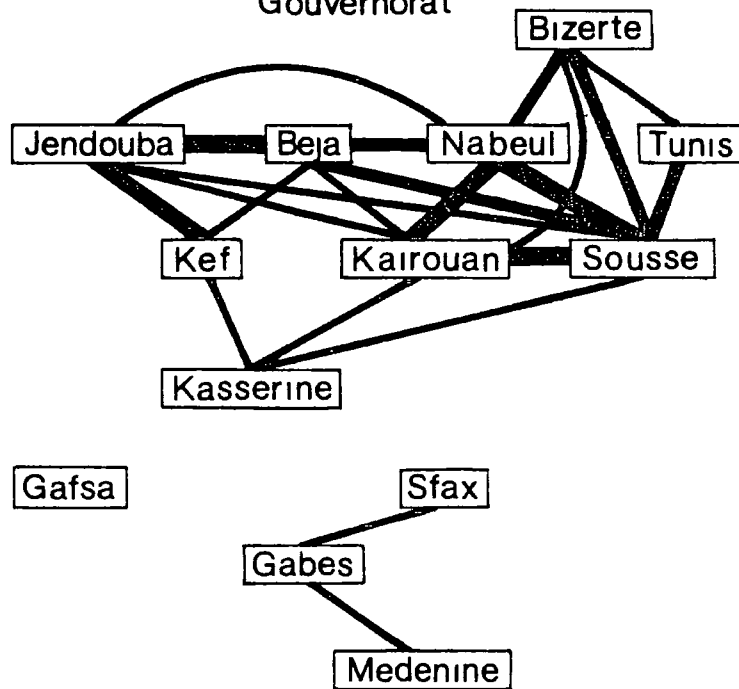
$\sum d^2$ is the sum of the squared differences of paired ranks for two variables over all cases, and

n is the number of cases

In this instance variables and cases both refer to enumeration areas, these being labelled as zones of origin and destination as appropriate.

In applying the test to the inter-gouvernorat migration matrix for 1966 (G PR U 66) it should be recalled that intra-gouvernorat

FIG 43 Significance of Rank Correlations between the Out-migration Fields of each Gouvernorat



Data set	G	PR	U	66	Significance level
					0.05
					0.01
					0.001

movements have been excluded from the analysis. Consequently pairwise deletion of variables involving intra-gouvernorat migration is necessary prior to assigning rankings. For out-migration flows from each pair of gouvernorats rank correlation coefficients were calculated for 11 common destinations.

Statistically significant values of r_s at 0.001, 0.01 and 0.05 probability levels are mapped in Figure 4.3. Several gouvernorats are shown to have closely correlated emigration patterns. It can be seen that at the 0.001 level two groupings exist. The first is in the Tell where Le Kef, Jendouba and Beja show strong similarity in their out-migration patterns. All three gouvernorats share the same problems of a degraded agricultural economy, high population densities, rapid rates of natural population increase, low rates of employment expansion in all sectors of the regional economy and peripheral locations relative to the national growth zones of the eastern littoral. The high correlation between the migration fields of these gouvernorats confirms intuitive expectations derived from migration studies in the area (see Chapter 10). The second grouping lies in the Sahel and low steppe where Kairouan, Sousse and Nabeul form a trio of gouvernorats bonded together by the similarity of their out-migration fields. While it is not surprising that Nabeul and Sousse, with their similar physical environments and common history of settled agricultural village societies, are closely correlated, it is interesting that Kairouan gouvernorat with its more arid environment and its affinities with the pastoral economy of the steppelands should be grouped with the migration fields of

its eastern neighbours

At the lower 0.01 level similarity may be observed in the patterns of out-migration from Gabes and Sfax. The out-migration fields of Tunis and Bizerte may also be described as similar to those of Sousse and Nabeul at this level. Out-migrations from Medenine, Gafsa and Kasserine remain distinctly different from all other gouvernorats and do not appear to reflect the unique migration histories associated with each of these semi-desert areas.

Inter-delegation migration

Empirical results of rank correlation at the delegation level are not reported here since the regional bondings which were observed were repetitive of those already discussed at the gouvernorat level. This is to say, the strongest bondings occurred in north-west Tunisia, in the Sahel of Sousse and in the Cap Bon peninsula, the weakest bondings occurred in southern Tunisia.

Two problems with the Spearman r_s were encountered in extending the analysis to the level of inter-delegation migration. Firstly the 98 x 98 migration matrix with its considerable number of zero entries generated a considerable number of tied ranks. This reduced the efficiency of Spearman's r_s . Kendall's Tau correlation coefficient (τ), because of differences in its method of calculation, might have offered a more rigorous analysis of the inter-delegation migration matrix. A second problem common both to Kendall's τ and Spearman's r_s is that they attribute the same weight to each rank in calculating correlation coefficients.

In handling large matrices they therefore assign undue significance to small migration flows

Zonation using Principal Components Analysis

Inter-gouvernorat migration

Principal components analysis (P C A) is frequently applied in the social sciences (along with other factor analytic techniques), because of its data-reducing capabilities P C A. enables the researcher to detect underlying relationships in a data matrix, such that the data may be reordered around a smaller set of principal components These components should account for the major variations in the observed data

In applying P C A to migration matrices, the researcher hopes to identify the major dimensions of the migration system The approach has been adopted by a number of academics interested in interaction matrices (Berry, 1969; Goddard, 1970). Winchester (1977) has recently applied P C A to the study of internal migration movements in France. P C A. is usually based on the analysis of an input matrix of Pearson correlation coefficients This is regrettable since Pearson's r is a parametric statistic assuming normality in the distribution of the data being analysed. It does not therefore offer a very satisfactory description of the relationships existing within a migration system. As previously stated, the majority of trip distributions are highly skewed and break the normality assumption. This might readily be demonstrated by examining scattergrams for the distribution of paired migrant flows from any two delegations to all other

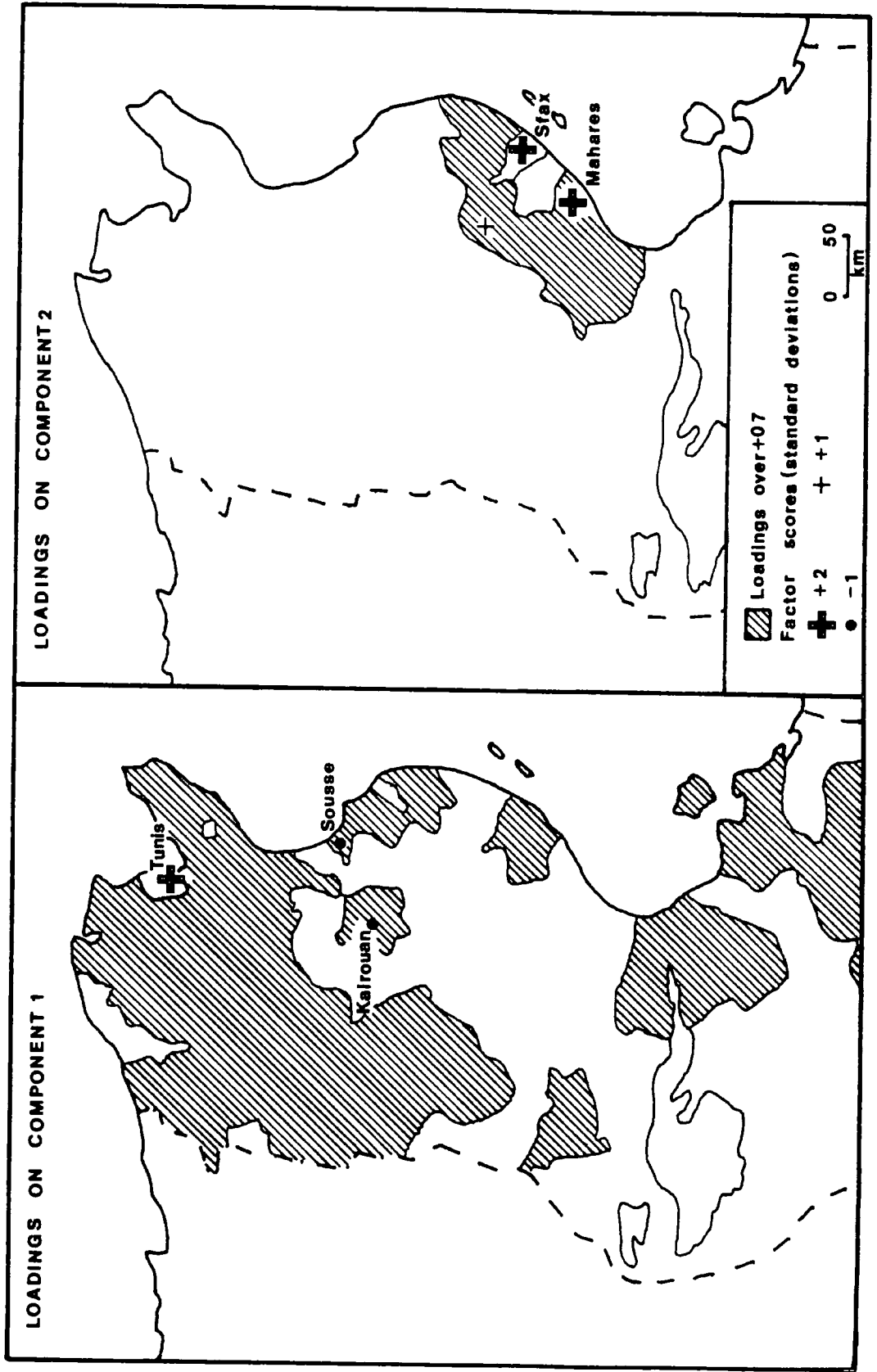
possible destinations This was done for the Tunisian migration matrix, and confirmed that the data set was highly skewed The problems in using Pearson's r could be circumvented by employing a non-parametric correlation coefficient. This, however, increases the difficulty in interpreting the final results of P C.A , as well as introducing new problems specific to the use of rank correlation coefficients For this reason, Pearson's r , despite the aforementioned limitations, was taken as the initial statistical measure of the relationships between the migration fields of Tunisia's gouvernorats, for subsequent treatment using P C A.

A review of the statistical strengths and weaknesses of P C A is not undertaken here, since a voluminous literature already exists on this topic The reader should refer to Mather (1976), Daultry (1976) and Goddard and Kirby (1976) for a description of the merits and problems of P C.A A working knowledge of P C A is assumed in the comments which follow.

Interpretation of P C A. is in some respects easier when it has been applied to interaction matrices than to other forms of data matrix since both cases and variables relate to the same characteristic location in space In the application of P C A to the Tunisian migration system, migrant destinations were treated as cases and migrant origins as variables.

The first component of the 1966 inter-gouvernorat migration matrix (G PR U.66) accounted for 89.5% of the variation in the data set Examination of component loadings and scores on a varimax rotation of the factor matrix revealed, not surprisingly,

FIG 44 PRINCIPAL COMPONENTS ANALYSIS



that the principal dimension of the system was migration to Tunis. The factor score of Tunis on this component was 3.47. All other gouvernorats were heavily loaded on this component (loadings were all greater than 0.9) These results confirm the immense importance of migration to Tunis already revealed by other techniques.

The second component was hard to interpret, being associated with migration to Bizerte, Sfax and Nabeul (factor scores of 1.22, 1.14 and 1.01 respectively). Loadings on this component were low with the exception of Tunis gouvernorat Of the other gouvernorats the highest loading on the second component came from Sousse (0.47) All other components identified by the P C A. had eigen-values less than 1.0 and were consequently suppressed

The results of P C A. of the 1966 inter-gouvernorat migration matrix appear to add little to the understanding of the migration system already achieved by simpler techniques.

Inter-delegation migration

The spatial dimensions of the migration system identified by P C A at the delegation level are of greater interest and correspond to facets of the migration system revealed by other techniques and by microstudies in the field (see Chapter 10). Delegations with high component loadings on the first component form a broad contiguous zone across northern, north-western and central Tunisia. There are also some delegations with high loadings scattered in eastern and southern Tunisia (Figure 4.4).

All have exceptionally high levels of out-migration to Tunis city. The high positive component score of Tunis delegation identifies this node very closely with the orientation of the axis. Kairouan and Sousse delegations have high negative component scores and are apparently antipodal to the Tunis migration field.

Component two consists of a number of delegations in the hinterland of Sfax all of which send a very high proportion of their migrants to the city of Sfax (Figure 4.4). The town of Mahares, 34 kilometres south of Sfax, also appears to play an important role in defining the migration patterns of this area. Component three appears to identify the importance of the city of Kairouan as a destination point for migrants from surrounding delegations, while components four and five focussed on the oases of Gafsa and the city of Sousse respectively. In total 13 components were identified with eigen-values greater than 1.0. In each instance one common destination accounted for a very large proportion of migration from the delegations with high loadings on the component.

Distortions introduced in the calculation of Pearson's product moment correlation coefficient appear to have, in many instances, dichotomized the set of migration origins. On the first component this occurred on the basis of whether or not delegations sent a large number of migrants to Tunis. Similar dichotomization occurred with reference to other important destinations. Unfortunately the nature of the data set precludes more rigorous statistical interpretation of the values of component loadings and scores (although some of the migration

analysts seem to be less wary - e g Winchester, 1977)

Graph Theoretic Approaches Dominant Flow Zonation

Inter-gouvernorat migration

Rather than attempting to identify the salient characteristics of Tunisian migration from composite indices derived from all the migration movements recorded by the 1966 census, it is possible to define significant flows within each system which represents specific facets of the total migration system. Graph theoretic approaches select such flows using a number of different criteria and represent them as linkages in a binary matrix. Matrix structure is sometimes defined on the basis of flow frequency, but the procedures examined here use the criterion of directionality or orientation of flows incident to each node (origin or destination points) or pair of nodes

Dominant (or primary) flow analysis identifies migration zones by the orientation of the largest flow from each node (or enumeration area). The remainder of the data-rich interaction matrix is not analysed. Nodes sharing a common destination for their largest out-migration flow may be grouped to form a migration region. Nystuen and Dacey's (1961) graph-theoretic approach to the identification of nodal regions follows similar procedures to those stated above.

The dominant out-migration flows from each Tunisian gouvernorat are underscored in Table 4.3. In every instance but one, the largest flow is directed to Tunis, the largest outflow from Tunis is to Bizerte. The resultant dominant flow zonation of

Table 4 3

Inter-gouvernorat Migration, 1966

(Largest out-flow of migrants from each gouvernorat are underlined)

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Gouvernorat of origin	Tunis	Bizerte	Beja	Jendouba	Le Kef	Kasserine	Gafsa	Medenine	Gabes	Sfax	Kairouan	Sousse	Nabeul	Total	Total
Gouvernorat of residence	1	2	3	4	5	6	7	8	9	10	11	12	13	(1)	(2)
Tunis	16 201	<u>23 903</u>	<u>38 751</u>	<u>17 543</u>	<u>33 352</u>	<u>9 337</u>	<u>7 600</u>	<u>23 877</u>	<u>16 298</u>	<u>16 923</u>	<u>11 121</u>	<u>29 777</u>	<u>18 810</u>	247 292	263 493
Bizerte	6883	14 603	4 104	1 650	1 793	776	498	1 888	519	1 049	600	2 689	902	23 351	37 954
Beja	2 776	1 439	13 192	2 634	2 680	490	315	947	208	310	954	1 158	1 076	14 987	28 179
Jendouba	1 162	379	1 442	4 189	971	172	168	506	156	179	99	460	255	5 949	10 138
Le Kef	2 285	319	1 294	1 320	9 379	2 600	822	778	219	243	1 327	931	432	12 570	21 949
Kasserine	2 856	762	335	416	1 703	4 951	1 967	543	345	630	494	956	319	11 326	16 277
Gafsa	1 731	403	182	161	1 027	1 602	19 433	576	2 375	2 614	442	727	238	12 078	31 511
Medenine	5 354	616	262	170	253	131	370	17 423	2 657	1 099	177	436	216	11 741	29 164
Gabes	2 219	258	103	110	168	159	915	4 322	6 841	1 242	123	365	131	10 115	16 956
Sfax	6 552	1 294	364	254	438	539	2 676	1 949	2 121	16 339	1 025	3 440	1 554	22 206	38 545
Kairouan	3 725	601	566	205	1 251	664	884	507	200	888	9 532	2 953	1 215	13 459	22 991
Sousse	3 608	855	616	320	504	541	491	608	409	2 867	3 220	23 929	1 563	15 602	39 531
Nabeul	5 825	1 133	1 463	495	1 035	422	329	755	504	1 789	3 168	6 807	12 534	23 725	36 259
Total (1)	44 976	31 962	49 482	25 278	45 175	17 433	17 035	37 056	26 011	29 833	22 750	50 699	26 711	424 401	
Total (2)	61 177	46 565	62 674	29 467	54 554	22 384	36 168	54 479	32 852	46 172	32 282	74 628	39 245	592 947	

Total (1) Inter-gouvernorat migrants

Total (2) Inter-gouvernorat and intra-gouvernorat migrants

(Data set G PR U 66)

FIG 45a Destinations of the Largest Out-Migration Flow from each Delegation

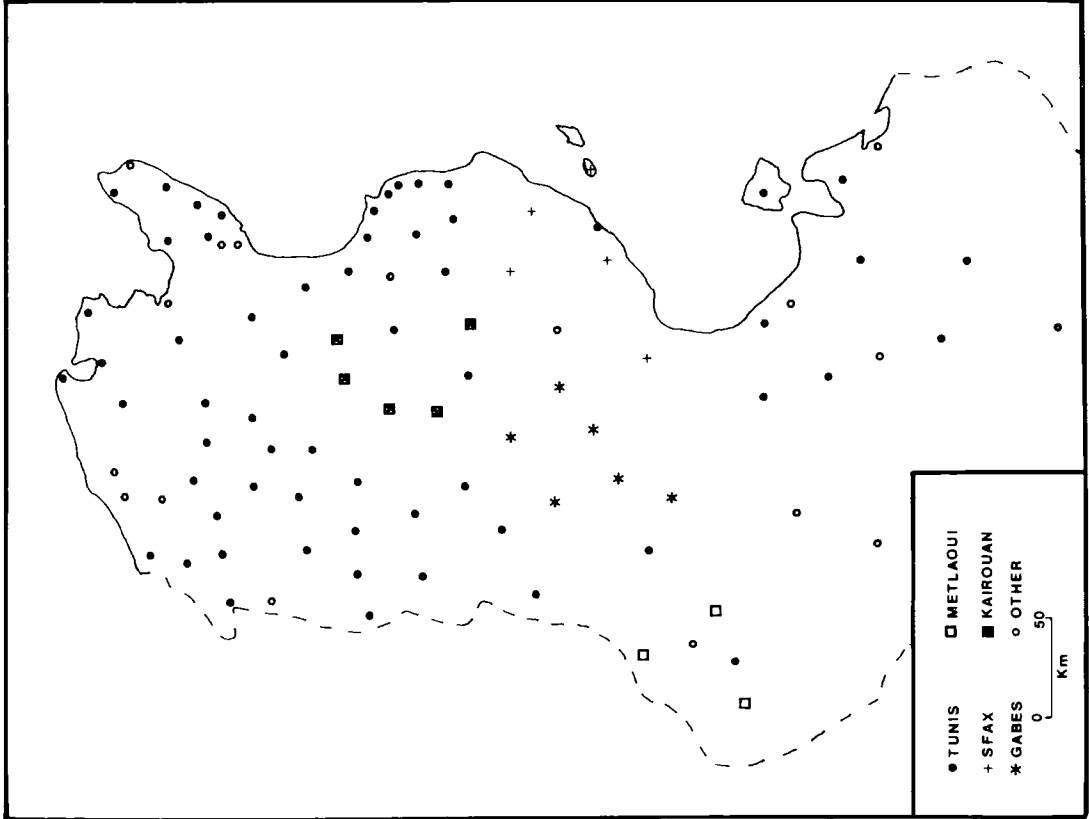
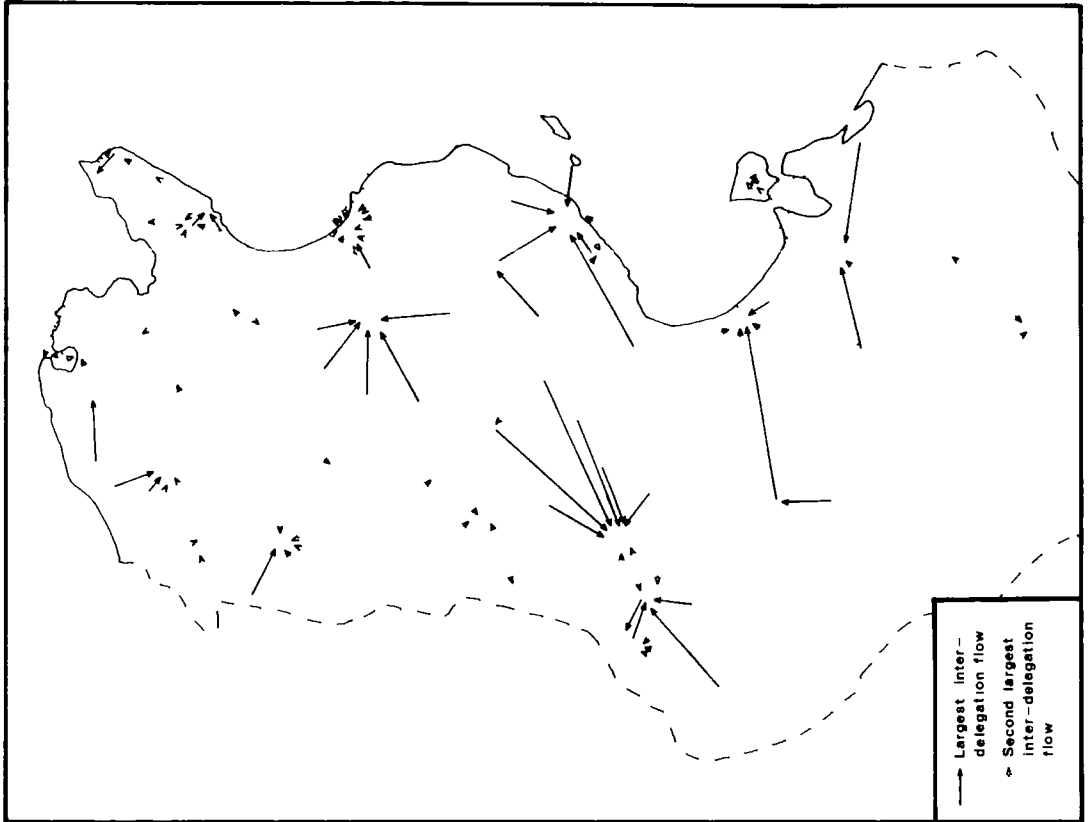


Fig 45b Destinations of the Largest and Second Largest Out-Migration Flows (Excluding flows to Tunis Gouvernorat)



the country divides Tunisia into only two areas the capital, and all other gouvernorats. The exodus of large numbers of persons from each gouvernorat to Tunis has been identified at the expense of all other information. The dominant position of Tunis as a destination in the national migration system will almost certainly be emphasized by most techniques as it is the prime characteristic of the Tunisian migration process. Internal migration to Tunis accounted for 58.3% of inter-gouvernorat movements according to the 1966 census.

Although an extremely important feature, it should not be considered the only characteristic of the Tunisian migration system worthy of mention.

Inter-delegation migration

In considering migration at the level of the delegations the role of Tunis is less important. Tunis gained 37.3% of all inter-delegation migrants (D-PR U.66). Figure 4.5a classifies all delegations by the destination of their dominant flows. It can readily be seen that Tunis is by far the most important node identified by this technique. Indeed its importance is over-emphasized by dominant flow analysis, being the destination for 62% of the significant links. Delegations with Tunis as the destination point of their largest out-migration flow are arranged in two belts. A northern zone consists of most of the delegations of the Tell, Cap Bon and the Sahel, while a second zone exists to the south of the Chott el Jerid. There is considerable coincidence between this distribution (Figure 4.5a) and that

plotted for delegations with high loadings on the Tunis component of the P C A (Figure 4.4a). Isolated delegations also dominated by Tunis include administrative centres in the low and high steppe such as Kairouan and Gafsa. Tunis is also the most important destination for migrants from the city of Sfax. Each of these administrative centres forms the destination for a number of other significant flows. For example, the delegations of Sidi Bou Zid, Maknassy, Ben Aoun, Sened, Guettar and Regueb all focus on Gafsa. To the north there is a migration zone centred on Kairouan, while to the east Sfax gathers many migrants from its immediate hinterland. The mining settlement of Metlaoui forms a fifth destination attracting large flows of worker migrants from neighbouring delegations. Several other migration zones exist such as that focussing on Beja.

It becomes apparent in examining the original migration matrix that the technique has failed to identify certain significant migration flows, because of its arbitrary consideration of only the primary flow departing from each delegation. For example, the third largest city, Sousse, was a significant pole of in-migration (Attia, 1970) yet it is not identified from Figure 4.5a.

Consideration of the two highest ranking migrant flows, as in Figure 4.5b reduces the likelihood of serious omissions, but the arbitrary nature of the threshold remains. In Figure 4.5b the southern oasis of Gabes emerges as an in-migration node. Minor migration zones also appear around Kasserine, Le Kef, Beja and Menzel Bourgiba, while a complex circulation movement seems

to operate in the agricultural delegations of Cap Bon

In summary it is concluded that the technique used to construct Figures 4 5a and 4 5b, although offering considerable insight into Tunisian migration patterns, remains uncomfortably dependent on the arbitrary definition of a cut off point below which migration flows are ignored. As Haggett has commented, this type of procedure "suffers from too great a dependence on dominant rather than complete flows" (Haggett, 1965, 253). A second constraint is its inability to analyse in-migration flows as effectively as out-migration flows. This is because of the lower degree of directionality in primary in-migration flows. The scatter of migrant origins tends to be greater than that of destinations. Consequently, examination of the highest ranking in-migration flows to each node in a system does not usually effectively identify important nodes of out-migration. The zonations which result are trivial and hard to interpret.

Graph Theoretic Approaches Sources and Sinks in the Migration System

The impact of in-migration is highly selective. In 1966 69% of Tunisian migrants were destined for only 16 of the country's 98 delegations (Table 4 4). Since in-migration flows are highly concentrated, it is reasonable to expect migration flows to exhibit a nodal structure with flows from many sources focussing upon a small number of destinations. It is useful to identify these nodes of acute in-migration, not only by the absolute numbers of migrants entering them (Table 4.4), but by comparison of nodal in-migration with patterns of in-migration to surrounding zones.

Table 4.4. Delegations with the Highest Levels of In-migration

Delegation	Percentage of all Tunisian in-migrants	Cumulative %
Tunis	37.3	37.3
Manouba	7.0	44.3
Sfax	4.1	48.4
Sousse	3.1	51.5
Bizerte	2.4	53.9
Kairouan	1.9	55.8
Menzel Bourgiba	1.7	57.5
Beja	1.7	59.2
Gabes	1.4	60.6
Jerba	1.4	62.0
Metlaoui	1.3	63.3
Medenine	1.2	64.5
Redeyef	1.2	65.7
Gafsa	1.2	66.9
Kef	1.2	68.1
Monastir	1.0	69.1

Data set D PR U.66

Methodology

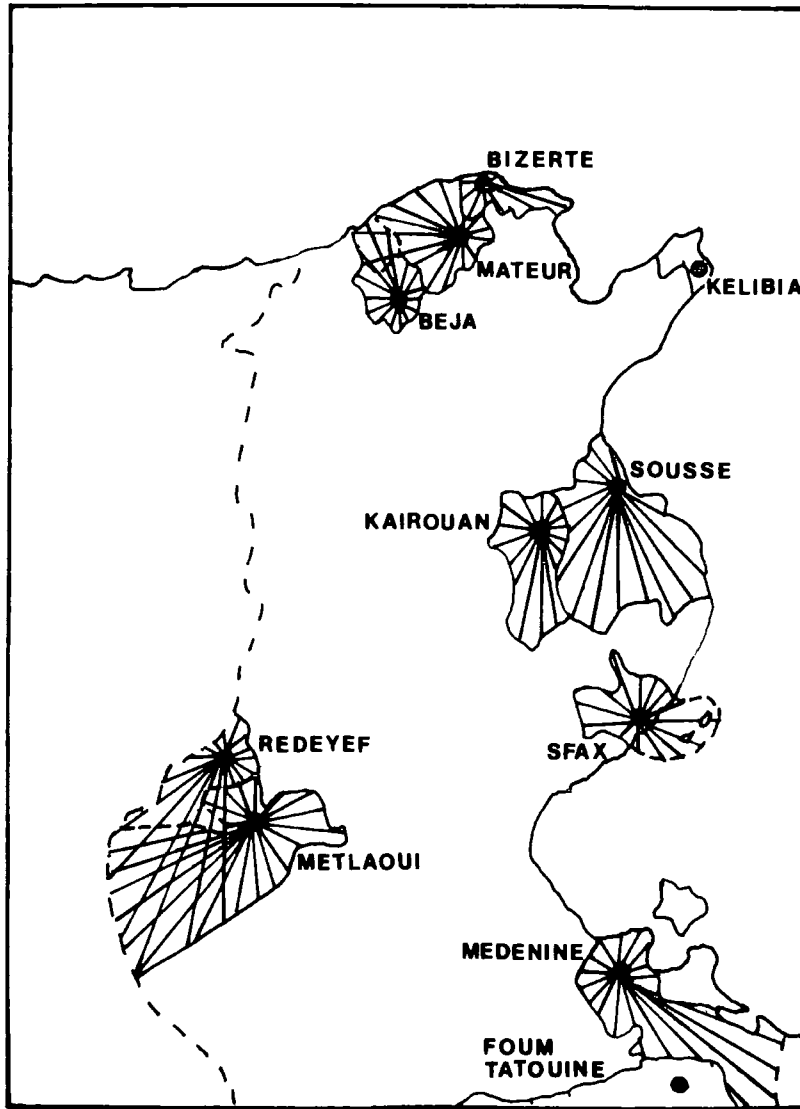
A combinatorial algorithm solving the familiar maximum-flow minimum-cut problem (Ford and Fulkerson, 1962) has been adopted by Nijenhuis and Wilf (1975) to identify nodal regions. These regions possess the interesting property of having fewer flows

into (or out of) them as a whole, than into (or out of) one distinguished part of the region (Slater, 1976b). The node defining this special part of the region is termed a 'sink' node (in the case of in-migration regions) and a 'source' node (in the case of out-migration regions). By definition, the nodal regions identified by application of Nijenhuis and Wilf's algorithm are relatively self-contained

Calculation of the maximal flow through a network does not in itself yield a statistic which may be directly interpreted in the migration context, although the statistic has a specific meaning in the context of other interaction matrices such as telephone networks (Hirst, unpublished) and transportation systems (Gauthier, 1968). Associated with each maximum flow is a minimum cut. Removal of links in the matrix which effect this cut result in division of the migration matrix into two sub graphs (or regions).

The algorithm as developed using multi-terminal analysis (Frank and Frisch, 1971, ch 5) and as adapted by Nijenhuis and Wilf (1975), only considers non-trivial cuts, that is cuts defining subsets with more than one member. Of the two sets of nodes identified by the cut, the one with the fewer members is termed the source (or sink) region. Since the algorithm identifies nodal regions which are minor subsets of the total system, the role of Tunis as in-migration node for virtually the whole of Tunisia is not described by this technique. The sink region centring on Tunis forms a major and not a minor set of nodes and hence is not identified as a sink zone. This is not considered

FIG 46 SINK AND SOURCE REGIONS



Sink zone



Source zone



0 100
km

● Sink or source node

Author's calculations

a major defect of the technique since many other approaches have already been examined which identify the prime influence of Tunis, but which have been unable to describe the other characteristics of the Tunisian migration matrix because of their over-emphasis of dominant flows. A similar point has been made by Hirst (unpublished) in comparing the results of the algorithm with other techniques applied to Tanzanian interaction matrices.

Only trivial results were achieved in applying the maximum-flow minimum-cut algorithm at the level of inter-gouvernorat migration. Inversely, very interesting results were detected at the level of inter-delegation migration.

Inter-delegation migration

Of the 9506 possible flows in the Tunisian inter-delegation migration matrix $[(98 \times 98) - 98]$ only 6901 had non-zero entries (72.6%). Most cuts involved the separation of one Tunisian delegation from all others, but a number of non-trivial migration regions emerged. These are listed in Table 4.5.

Although no contiguity constraint was incorporated in the grouping algorithm it should be noted that all nodal regions display adjacency properties between member-nodes (Figure 4.6). Comparison of the sinks identified by the algorithm (Table 4.5) with the list of delegations recording the largest in-migration flows (Table 4.4), shows that the maximum flow minimum-cut approach has successfully identified the major in-migration nodes in the migration system. Because of the greater level of concentration amongst flow destinations than origins, it is not

Table 4 5 Sink and Source Migration Zones¹

Source Zones			
Component Nodes	Out-migration from region (Or)	Out-migration from source (On)	Or/On
Kelibia ² , El Haouria	3898	3948	0.987
Foum Tatouine ² , Remada	10321	11555	0.893
Sink Zones			
Component Nodes	In-migration to region (Ir)	In-migration to sink node (In)	Ir/In
Redeyef ² , Nefta, Tozeur, ³ Degueche	6994	7003	0.999
Bizerte ² , Ras Jebel	14165	14429	0.982
Kairouan ² , Sidi Bou Hajla	10788	11131	0.969
Metlaoui ² , Nefta, Tozeur, Degueche	6973	7502	0.929
Mateur ² , Sejnane, Jebel Labiodh	4430	5160	0.859
Medenine ² , Ben Gardane	5997	7015	0.855
Sousse ² , Kalaa Kebira, Msaken, Jemmal, Souassi, El Jem, Ksour Essaf, Mahdia, Moknine, Ksar Hellal, Monastir ⁴	15540	18309	0.849
Sfax ² , Kerkennah	19335	24283	0.796
Beja ² , Amdoun, Jebel Labiodh	6201	9792	0.633
Data set D PR U 66		Author's calculations	

Footnotes to Table 4 5

- 1 Where sinks or sources were central to more than one migration zone they were assigned to the zone with the higher level of regional identity. Regional identity was defined by the ratio of the volume of in-migration to a sink region to the volume of in-migration to the central node of the sink region.
- 2 This delegation was a sink or source node of a migration zone.
- 3 The delegation of Redeyef includes two mining centres. These towns, Moulares and Redeyef, both receive large numbers of worker migrants from the nearby oases.
- 4 This total includes 411 migrants whose origins and destinations lie within the nodal region, but who did not state their delegation of origin in the census. They all came from within the gouvernorat of Sousse.

surprising that the majority of nodal regions relate to in-migration rather than out-migration movements

Nodal source regions have highly peripheral locations, suggesting that structural constraints within the migration system may be a critical factor in channelling migration movements in the form identified as a nodal source region. This fact does not in itself reduce the validity of the two nodal source regions identified by the algorithm both of which exhibit high levels of out-migration. On the other hand, it does suggest that the reason for identification of these zones lies in the network structure of the linkage system (in this case, the territorial configuration of Tunisia) rather than in repellent characteristics specific to the zones of out-movement.

In examining the regional identity of sink zones, it can readily be seen that the smallest ratio of in-migration to the sink region to in-migration to the sink node (I_r/I_n) emerges where considerable population transfer has occurred from the members of the sink region towards the sink node. For example in the Sfax-Kerkennah region, with its sink node at Sfax, there is a very high level of internal population transfer. According to the 1966 census, 5431 persons had migrated from the over-populated fishing communities of the Kerkennah Isles to the city of Sfax. Kerkennah migrants accounted for one fifth of all the incomers to the city. Only 196 persons were recorded as migrating to Kerkennah from outside the Sfax-Kerkennah sink region, while 479 persons had moved from Sfax to Kerkennah (mostly return migrants). In-migration to the region as a ratio of in-migration



to Sfax was therefore extremely low.

Other in-migration nodes include administrative centres such as Beja, Mateur, Kairouan and Medenine, all of which share the common characteristic of being service and market centres located in rural areas of heavy out-migration. These nodes may be classed as 'centres de relais' (Karoui, 1970, Trabelsi, 1976), for they themselves are sources of heavy out-migration to the larger industrial cities of north-eastern Tunisia. That the algorithm has identified these out-migration nodes, nested within the much greater migration zone centred on Tunis, indicates the value of the approach when studying migration systems at this scale.

The two mining centres of Redeyef and Metlaoui are, not surprisingly, identified as migration sinks, while the industrial, urban nodes of Bizerte and Sousse also appear to be strongly attractive destinations to the populations of their immediate hinterland. The size of the Sousse nodal in-migration zone is remarkable and reflects the strong influence of Sousse on the villages of the Sahel.

It can be seen from Table 4.5 that the regional identity of the Beja region is very high. Moderately high identity exists for the Mateur, Medenine, Sousse and Sfax regions.

Amongst in-migration nodes, as amongst out-migration nodes, it is hypothesized that constraints introduced by territorial structure play an important role in channelling migration. In-migration nodes in most instances control the chief routes of access to their hinterlands. It is not therefore surprising

that they also dominate local migration patterns. The only significant access route to Amdoun (a delegation in the Beja sink region) departs from the town of Beja. Amdoun is the terminal village on this road. Similarly the sole ferry service from the Kerkennah Isles (in the Sfax sink region) to the mainland operates from Sfax harbour. All bus services to Ras Jebel (a member of the Bizerte sink region) depart from or pass through Bizerte.

In the case of the Sousse node, no such channelling of communications is obvious. In-migration to this node is more independently associated with the attractive properties of the town itself. The same is true of Redeyef which far from being located at a significant point of interchange on the route network, is itself the terminus to the railway line from Sfax. In-migration in this instance is undoubtedly a function of employment opportunities at the node.

It is interesting that a nodal sink was not defined for the oasis town of Gabes. This settlement is located at the significant junction of several branches of the road network and is also administrative capital of a gouvernorat. In 1966 it appears that Gabes was part of a circulatory migration region, rather than being a sink point in the southern migration system.

Graph Theoretic Approaches The Holmes-Haggett Typology of Significant Linkages

Definition of significant links in a migration system need not rest on entirely arbitrary thresholds such as those examined in the analysis of dominant flows. Significant flows may be

defined in relation to the thresholds derived from model distributions. Enumeration areas may then be cross-classified according to the number of significant flows entering and departing from each area. This typology as proposed by Holmes and Haggett (1977) is adopted here, although entirely different criteria for identifying significant links are employed from those which they recommended

The $\frac{1}{n}$ criterion

Calculation was made of the theoretical distribution of migrants which would have occurred between Tunisian governorats had migration flows been evenly dispersed between all possible destinations. This distribution assumes, in a system of n nodes, that $\frac{1}{n-1}$ % of migrants from each origin depart for each of the $n-1$ possible destinations. Inversely, each destination expects to receive $\frac{1}{n-1}$ % of its in-migrants from each source.

In the Tunisian case, the in-flows and out-flows to each governorat which were estimated on this basis are shown in Table 4.6. In most instances observed, inter-governorat migration flows were considerably smaller than expected. Compare Table 4.3 with Table 4.6. Flows greater than the threshold defined by the $\frac{1}{n}$ criterion were treated as significant in further analysis of inter-governorat migration. They are represented in the binary linkage matrix of Table 4.7.

It can be seen that Tunis has the most dispersed pattern of flows reflecting its unique position as capital and point of economic, social and political interchange for all other parts of Tunisia. Sfax and Gafsa are the only other governorats with

Table 4 6 Expected In-flows and Out-flows Predicted
by the $\frac{1}{n}$ Criterion

Node	In-flows	Out-flows
Tunis	20608	3748
Bizerte	1946	2664
Beja	1249	4124
Jendouba	496	2106
Kef	1047	3765
Kasserine	944	1453
Gafsa	1006	1420
Medenine	978	3088
Gabes	843	2168
Sfax	1850	2411
Kairouan	1122	1896
Sousse	1300	4225
Nabeul	1977	2226

(Author's calculations)

Table 4 7 Binary Linkage Matrix of Significant Flows ($\frac{1}{n}$ Criterion)

Matrix A Divergent Arcs

From / To	Tunis	Bizerte	Beja	Jendouba	Kef	Kasserine	Gafsa	Medenine	Gabes	Sfax	Kairouan	Sousse	Nabeul
Tunis	1	0	0	0	0	0	0	1	0	1	0	0	1
Bizerte	1	-	0	0	0	0	0	0	0	0	0	0	0
Beja	1	0	-	0	0	0	0	0	0	0	0	0	0
Jendouba	1	0	1	-	0	0	0	0	0	0	0	0	0
Kef	1	0	0	0	-	0	0	0	0	0	0	0	0
Kasserine	1	0	0	0	1	-	1	0	0	0	0	0	0
Gafsa	1	0	0	0	0	0	-	0	1	0	0	0	0
Medenine	1	0	0	0	0	0	0	-	1	0	0	0	0
Gabes	1	0	0	0	0	0	1	1	-	0	0	0	0
Sfax	1	0	0	0	0	0	1	0	0	-	0	1	0
Kairouan	1	0	0	0	0	0	0	0	0	0	-	1	1
Sousse	1	0	0	0	0	0	0	0	0	0	0	-	1
Nabeul	1	0	0	0	0	0	0	0	0	0	0	0	-

Matrix B Convergent Arcs

From / To	Tunis	Bizerte	Beja	Jendouba	Kef	Kasserine	Gafsa	Medenine	Gabes	Sfax	Kairouan	Sousse	Nabeul
Tunis	-	1	1	1	1	1	1	1	1	1	1	1	1
Bizerte	1	-	1	0	0	0	0	0	0	0	0	0	0
Beja	1	1	-	1	1	0	0	0	0	0	0	0	0
Jendouba	0	0	1	-	1	0	0	0	0	0	1	0	0
Kef	1	0	1	1	-	1	1	0	0	0	0	0	0
Kasserine	0	0	0	0	1	-	1	0	0	0	0	0	0
Gafsa	0	0	0	0	0	1	-	0	1	1	0	0	0
Medenine	1	0	0	1	0	0	0	-	1	1	0	0	0
Gabes	0	0	0	0	0	0	1	1	-	1	0	0	0
Sfax	0	0	0	0	0	0	1	1	1	-	0	1	0
Kairouan	0	0	0	0	0	0	0	0	0	0	-	1	1
Sousse	1	1	0	0	0	1	0	0	0	1	1	-	1
Nabeul	0	0	0	0	0	0	0	0	0	0	1	1	-

significant in-flows coming from a diffuse hinterland. Unlike Tunis these convergent arcs are not balanced by a dispersed pattern of significant divergent arcs. The divergent arcs from Bizerte, Beja, Kef and Nabeul are oriented solely towards Tunis, reflecting the dominant influence of the capital on out-migration flows from these gouvernorats. Cross-tabulation of significant in-flows and out-flows from each gouvernorat helps to summarize the role of each gouvernorat in the national migration system. The dispersion and concentration of significant linkages associated with each gouvernorat are classified in Table 4.8. It should be noted that this classification is derived from two separate matrices and may not as a result be subjected to further analysis by graph theory.

Most gouvernorats of central and southern Tunisia (Gabes, Gafsa, Kairouan, Kasserine and Sfax) have a highly dispersed pattern of significant links. By contrast the gouvernorats of the Tell and north-eastern Tunisia (particularly Beja, Bizerte, Kef and Nabeul) have only a few significant convergent flows and a small number of divergent flows, suggesting that important migrant links occur with only a few origins and destinations.

Holmes and Haggett (1977, 395) suggest that the $\frac{1}{n}$ criterion for threshold definition, although "a useful discriminant measure in a highly dispersed flow system", has low discriminatory value in a highly directional flow system. This criterion appears to be only partly justified since the $\frac{1}{n}$ criterion was the only measure capable of distinguishing zero from non-zero flows in their test example. In analysing small matrices the $\frac{1}{n}$ criterion

Table 4.8. Typology of Significant Links Defined
by the $\frac{1}{n}$ Criterion

Out-Flows	0	1	2	3	4	5
In-Flows						
0						
1				Bizerte Nabeul	Beja Kef	
2				Medenine	Jendouba Sousse	
3					Gabes Kairouan Kasserine	Gafsa Sfax
4						Tunis

Author's calculations.
Data set G PR U 66

Table 4.9
Binary Linkage Matrix of Significant Flows
(Population Weighted Expectations)

Matrix A Divergent Arcs													
From / To	Tunis	Bizerte	Beja	Jendouba	Kef	Kasserine	Gafsa	Medenine	Gabes	Sfax	Kairouan	Sousse	Nabeul
Tunis	1	0	0	1	0	1	0	1	1	1	1	1	1
Bizerte	1	1	1	0	0	0	0	0	0	0	0	0	0
Beja	1	1	1	1	1	0	0	0	0	0	0	0	0
Jendouba	1	1	1	1	1	1	1	0	0	0	1	0	0
Kef	1	1	1	1	1	1	1	0	0	0	0	0	0
Kasserine	0	0	0	0	1	1	0	0	0	0	0	0	0
Gafsa	0	0	0	0	0	1	1	1	1	1	0	0	0
Medenine	1	1	1	1	1	0	1	1	1	1	0	0	0
Gabes	1	0	0	0	0	0	1	1	1	1	0	0	0
Sfax	0	0	0	0	0	0	1	1	1	1	0	1	0
Kairouan	0	0	0	0	1	0	0	0	0	0	1	1	0
Sousse	0	0	0	0	1	0	0	0	0	1	1	1	0
Nabeul	0	0	0	0	0	0	0	0	0	0	1	1	1

Matrix B Convergent Arcs													
From / To	Tunis	Bizerte	Beja	Jendouba	Kef	Kasserine	Gafsa	Medenine	Gabes	Sfax	Kairouan	Sousse	Nabeul
Tunis	1	0	0	0	0	1	0	1	0	1	1	0	1
Bizerte	1	1	1	0	0	0	0	0	0	0	0	0	0
Beja	1	1	1	0	0	0	0	0	0	0	0	0	0
Jendouba	1	1	1	1	1	0	0	0	0	0	0	0	0
Kef	1	1	1	1	1	1	1	0	0	0	0	0	0
Kasserine	1	1	1	1	1	1	1	1	1	1	0	0	0
Gafsa	0	0	0	0	0	0	1	1	1	1	0	0	0
Medenine	1	1	1	1	1	0	1	1	1	1	0	0	0
Gabes	1	1	1	1	1	0	1	1	1	1	0	0	0
Sfax	1	1	1	1	1	0	1	1	1	1	0	1	0
Kairouan	1	1	1	1	1	0	0	0	0	0	1	1	1
Sousse	1	1	1	1	1	0	0	0	0	1	1	1	1
Nabeul	1	1	1	1	1	0	0	0	0	0	1	1	1

certainly appears superior to the maximization procedure adopted by Holmes and Haggett, which, because of distortions arising from the application of a parametric statistic to a highly skewed data set, identified spurious thresholds of significance (see Holmes and Haggett, 1977, 396).

Two further points should be noted concerning the results generated by the $\frac{1}{n}$ criterion of threshold definition. With the exception of in-flows and out-flows from Tunis, the majority of significant linkages charted in Table 4.7 occur between contiguous gouvernorats. This phenomenon has frequently been analysed by geographers who have noted the strong inverse relationship between numbers of migrants and distance from their point of origin.

Secondly, it should be noted that the $\frac{1}{n}$ criterion does not express accurately the state of flows in an evenly dispersed system. Differences in population size between gouvernorats severely affect the size of the inter-gouvernorat migration flows which can be expected, other things being equal. The probability of migration occurring between places with large populations is higher than between less populous areas. In failing to consider this fact (as Holmes and Haggett do) there is the danger that any criterion of linkage significance will identify only the flows associated with the most populous zones. By developing expectations of migration flow magnitude which are proportional to population size, the influence of this source of directionality in migration systems may be reduced.

Population-weighted migration expectations

In-migration flows to each gouverrorat were predicted on the basis of the distribution of the 1966 population for all possible destinations for migration from each source. The expected distribution of migration flows from each source to all possible destinations was estimated from the proportional distribution of the total population. Expectations of in-migration flows were derived on the same basis

Binary matrices of significant divergent and convergent linkages were once more prepared (Table 4.9), and gouvernorats classed by a cross-tabulation of in-flows and out-flows (Table 4.10). By this classification Tunis remains in a dominant position with the largest number of significant in-flows and out-flows. This affirms that the dominance of the capital city is not merely a function of the size of its population. Again, it appears that most of the central and southern gouvernorats (Gabes, Gafsa, Kairouan and Kasserine) have more dispersed linkage patterns than the gouvernorats of the north-west and eastern littoral. Threshold definition of flows on the basis of population size has apparently led to an increase in the number of significant divergent flows from Kef and in the number of convergent flows to Beja and Gafsa. Inversely, the populous gouvernorats of Sousse and Sfax, and the gouvernorats of Medenine and Nabeul, appear to be dominated by a smaller number of significant links than under the $\frac{1}{n}$ criterion for threshold definition.

Further analysis of the migration system is possible by

Table 4.10. Typology of Significant Links Defined
by a Population Weighted Threshold

Out-Flows	0	1	2	3	4	5	6
In-Flows							
0							
1				Nabeul	Sousse	Bizerte	Kef
2			Medenine		Beja Jendouba	Sfax	
3				Kasserine	Kairouan		
4				Gafsa	Gabes		
5							
6							Tunis

Author's calculations.
Data set G I R U.66.

summation of the matrix of significant convergent flows and the transposed matrix of divergent flows (Table 4.11) Holmes and Haggett (1977, 398) suggest that the marginal totals of this summed matrix may be interpreted as follows

"The row sums indicate the individual or 'local' flow characteristics, the column sums reflect the role of general or 'regional' influence of any node in relation to all others "

In the case of Table 4.11 this influence cannot be attributed to the differences in size of regional populations, but only to the economic, social and spatial characteristics of each node in the migration system

From Table 4.11 it may readily be seen that Tunis, even having accounted for its large population, has a very strong influence on the flow characteristics of the other nodes. Of much less influence, but nevertheless of importance in significantly affecting in-flows and out-flows from other migration nodes, are the gouvernorats of Medenine, Kef, Gabes, Gafsa and Kairouan. Least significant is the gouvernorat of Kasserine which only exerted a minor influence on Tunis, Kef and Gafsa.

Local dispersion of linkages was greatest for Tunis but a considerable number of significant links were also charted for Gabes, Sfax, Kairouan and Jendouba

While the population-weighted model of migration remains insensitive to the high degree of directionality in the Tunisian migration system, it has the advantage of being developed from established relationships incorporated in most migration theories. It is not dependent on predefined numerical distributions such

Table 4.11.

Local and Regional Linkage Scores

Summation of Matrix A and B

From / To	Tunis	Bizerte	Beja	Jendouba	Kef	Kasserine	Gafsa	Medenine	Gabes	Sfax	Kairouan	Sousse	Nabeul	LOCAL LINKAGE SCORE
Tunis	-	2	1	1	1	1	0	2	1	1	1	0	1	12
Bizerte	2	-	1	1	1	0	0	1	0	0	0	0	0	6
Beja	1	2	-	1	1	0	0	1	0	0	0	0	0	6
Jendouba	2	0	2	-	1	0	0	1	0	0	0	0	0	6
Le Kef	1	0	1	1	-	1	0	1	0	0	1	1	0	7
Kasserine	2	0	0	0	2	-	2	0	0	0	0	0	0	6
Gafsa	1	0	0	0	0	1	-	0	2	2	0	0	0	6
Medenine	2	0	0	0	0	0	0	-	2	0	0	0	0	4
Gabes	2	0	0	0	0	0	2	2	-	1	1	0	0	8
Sfax	2	0	0	0	0	0	2	1	1	-	1	0	0	7
Kairouan	2	0	0	0	1	0	0	0	0	0	-	2	2	7
Sousse	2	0	0	0	0	0	0	0	0	1	1	-	1	5
Nabeul	2	0	0	0	0	0	0	0	0	0	1	1	-	4
REGIONAL LINKAGE SCORE	21	4	5	4	7	3	6	9	6	5	6	4	4	84

as those employed by Holmes and Haggett (1977, 389) The approach remains weak, however, in depending purely upon comparison of observed flows with one model of expected migration flows From a theoretical understanding of the migration process further research might hope to derive a wide range of matrices to represent the variety of migration patterns which could arise, given different constraints on the migration system These model distributions could then be systematically compared with observed flows to find out which was the 'best fit'.

Summary

A number of methods for eliciting information from migration matrices have been examined The study has highlighted the strengths and weaknesses of different techniques, as well as illuminating the different characteristics of the Tunisian migration system.

Techniques for data reduction which consider every entry in a migration matrix appear to consistently encounter difficulties in handling skewed distributions Since sparse matrices are characteristic of migration systems as recorded at detailed levels of resolution, these techniques should be restricted in their application to small interaction matrices in which most entries have non-zero values.

Graph theoretic approaches to migration studies offer a wide range of useful techniques by which the salient characteristics of data rich interaction matrices may be identified and analysed Although transformation of matrices to binary format assists in defining the significant dimensions of flow structure, great care

should be taken in identifying appropriate criteria by which migration flows are to be selected for inclusion in a binary matrix. This step of the analysis is as critical as the choice of clustering algorithm in influencing the final results of a study.

Holmes and Haggett's interpretation of the marginal totals of a summary matrix derived from the addition of two binary matrices of significant in-flows and out-flows from each node in a system, offers a rapid method of assessing the role of different regions in a multi-regional migration system.

Ultimately, methods for analysing the characteristics of a migration system must be judged not only in terms of their efficiency in describing statistical distributions, but also in terms of their ability to provoke new ideas and hypotheses concerning the migration process.

Chapter 5

MIGRATION REGION ANALYSIS

Introduction

Only a small proportion of all migration movements result in the net redistribution of population. In Tunisia it has been shown that most migration flows are closely balanced by counter flows (see Chapter 3). Yet most migration studies, both in Tunisia and elsewhere, consider the pattern of net population redistribution to the exclusion of the overall pattern of movement. One reason for this imbalance in migration analysis has been the difficulty in identifying the salient characteristics of gross migration patterns. This chapter highlights the need to develop clustering algorithms which can define efficiently the highly ordered spatial dimensions of gross migration.

Ajo (1954), in an analysis of Finnish migration statistics, noted that migration patterns were self-reinforcing resulting in the development of population basins or regions. It was a further fifteen years before Ng (1969) formalized the concept of migration regions following a study of the Scottish migration system. He defined each region as

"an areal unit having maximum mutual interchange of migrants with the minimum inter-regional flow of population" (Ng, 1969, 140)

Similar definitions have subsequently been adopted by a number of other researchers who have found the migration region concept

of value in their analyses of interaction patterns (Hollingsworth, 1970, Staveley, 1973, Slater, 1976). Although the definitions of migration regions changed little during the 1970s, the statistical techniques employed by researchers became increasingly sophisticated. Some of these techniques will now be compared using the migration data from the Tunisian census.

Ng's Index of Migration Intensity

Ng (1969) calculated an index of interaction intensity as a first step in the regionalization of his migration matrix. He attributed a weight to the direct migration linkages between two enumeration districts on the basis of the formula

$$W_{1j} = \frac{2 (M_{1j} + M_{j1})}{M_1 + M_j} \times \frac{100}{1}$$

where M_{1j} is the number of migrants from (1) to (j)

M_{j1} is the number of migrants from (j) to (1)

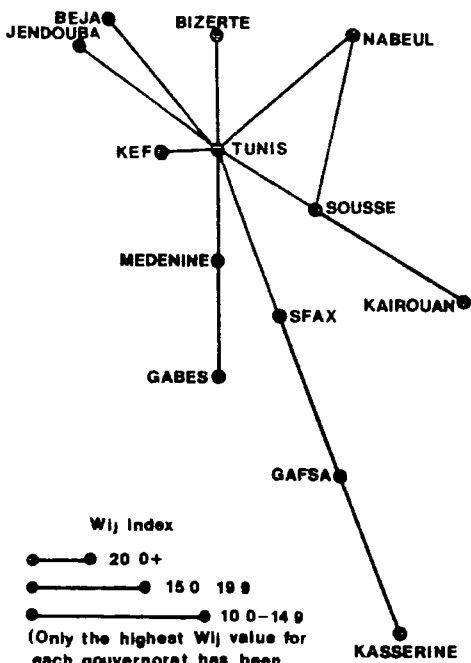
M_1 and M_j are the total number of migrants of (1)

and (j) respectively

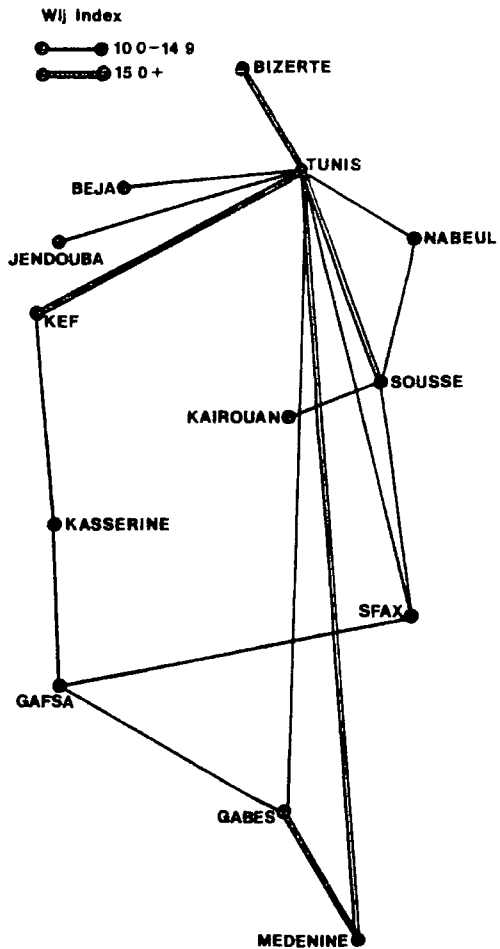
Ng then arranged the W_{ij} values in a matrix, re-ordering the rows and columns successively until the dominant values were distributed in the squares along the diagonal. Migration regions were subsequently identified from the clusters of linkages along and close to the diagonal. This procedure was followed for the Tunisian migration data. W_{ij} values were grouped within arithmetic classes and mapped in matrix format (Figure 5.1). Since Ng did not make explicit his method of maximizing internal migration within regions of interaction, two separate approaches were taken in identifying migration regions from Figure 5.1.

FIGURE 5 2

A) ROOTED TREE DIAGRAM



B) NETWORK of LINKAGES with Wij VALUES GREATER THAN 10 0



Firstly a rooted tree diagram was prepared in which each gouvernorat was linked to the area with which it shared the highest W_{ij} index. Fusions were permitted to continue until all gouvernorats were linked to the tree (Figure 5 2a). The four highest W_{ij} indices linked the gouvernorat of Tunis to Le Kef, then to Bizerte, Sousse and Medenine. At a lower level, linkages were also established between Tunis and Gabes, Sfax, Nabeul, Beja and Jendouba. These linkages reflect the overall dominance of the capital in the Tunisian migration system. From the agricultural problem areas of the lowland High Tell, from the traditional urban centres and villages of the Sahel of Sousse, and from the oases towns of the south, migrants have departed in post-war years in ever increasing numbers to Tunis, in the belief that life there would be more rewarding. Moving in the opposite direction have been a very heterogeneous group of return migrants - some bearing tales of their success and encouraging their kinsfolk to sample city life, others returning with hopes for a secure urban existence dashed and seeking to reintegrate with their communities of origin.

A number of other linkages are evident on Figure 5 2a. For example the link between Gabes and Medenine identifies the continued exchange of population between the settlements of the Saharan fringe. Other links include those between Nabeul and Sousse, Kasserine and Gafsa, Gafsa and Sfax and Kairouan and Sousse. Each of these four links occur between contiguous gouvernorats the large and permanent migrations which they represent stem from earlier temporary movements of tribal groups and

members of village societies of fishermen and traders along the coast from the Sahel to the Cap Bon peninsula of pastoralists and harvesters moving seasonally from the steppe to the Tell of people going to work in the olive harvests of the Sahels of Sousse and Sfax and of displaced and under-employed pastoralists from the interior tribes seeking new employment in the textile industries of the Sahel

If the network is extended to include all connections with migration intensities of 10 0 or over on the W_{ij} index (Figure 5 2b) the number of links is considerably increased. A W_{ij} value of 10 0 was chosen to facilitate comparison with the indices calculated and presented by Ng (1969) and Staveley (1973). Although the absolute dominance of Tunis remains the most obvious feature of the system (nine of the twelve gouvernorats link directly to Tunis) a number of significant secondary nodes emerge within the network. The Sousse region interacts with Nabeul, Kairouan and Sfax as well as with the capital, while in the south, Gafsa develops as an independent centre with links to Kasserine, Sfax and Gabes. Sfax and Gabes, while linking to three other gouvernorats, are more closely integrated into the national network than Gafsa. It becomes clear that the linkage system described above does not readily lead to the identification of discrete migration regions for Tunisia such as those suggested by Ng in Scotland. Rather, in the Tunisian case, migration regions as defined by this approach appear to be more accurately described as a number of overlapping interaction zones.

In place of the linkage procedure outlined above, a complete

linkage constraint was introduced to the clustering algorithm. That is, as threshold values of the W_{ij} index were lowered, a governorat was only linked to other governorats if the W_{ij} values of all links to these other governorats exceeded the threshold. This procedure resulted in a rather different hierarchical structure of linkages. Initially five distinct migration zones were established. These were later merged to give a more stable grouping of three zones. These exhibited one of the necessary conditions specified by Ng for the demarcation of a robust migration region. Namely, that intra-regional migration exceeds inter-regional migration (63.5% and 36.5% respectively). Table 5.1 lists the governorats of each zone and the levels of internal migration.

Examination of the matrix of index values suggests that several different combinations of governorats could achieve the same property. Clearly the fewer the number of migration regions delineated, the greater the ratio of internal to external migrations.

Examination of the inter-regional flows between the three macro migration regions shows that although 50.8% of moves were intra-regional, there was still a considerable transfer of population between different parts of the country. It is interesting that the net loss of population from the south to Tunis and the Tell is very similar to that from the north-east to the capital. When expressed as a percentage of all migrations originating in these regions, flows from the south to Tunis accounted for only 31% of migrations while 33% of moves

Table 5.1. Migration Regions by the Complete Linkage Method

Region	A	B	C	$\frac{A \times 100}{A + B}$	$\frac{A \times 100}{A + C}$
	Number of intra-regional moves	Out-migrants to other regions	In-migrants from other regions		
North-east ¹	64921	146155	98781	30.6	39.7
Tunis & Tell	228642	48179	149348	82.6	60.5
South	82952	169971	116176	32.8	41.1
All regions	376515	364305	364305	50.8	50.8

(Source author's calculations)

- ¹ North-east Nabeul, Kairouan, Sousse
 Tunis and Tell Tunis, Bizerte, Beja, Jendouba, Le Kef, Kasserine
 Southern Tunisia Medenine, Gabes, Gafsa, Sfax

Table 5.2 Highest Ranking Flows between Gouvernorats

Rank	Unstandardized Matrix	Doubly Standardized Matrix
1	Beja - Tunis	Medenine - Gabes
2	Sousse - Tunis	Gabes - Medenine
3	Bizerte - Tunis	Kasserine - Kef
4	Medenine - Tunis	Jendouba - Beja
5	Nabeul - Tunis	Beja - Jendouba
6	Jendouba - Tunis	Kairouan - Sousse
7	Sfax - Tunis	Gafsa - Kasserine
8	Gabes - Tunis	Sousse - Nabeul

originating in the north-east went to the capital.

In contrast to the first classification procedure, the complete linkage method gives the impression of distinct migration zones within which discrete interaction systems can be identified

Standardization of Interaction Matrices

There are two aspects on which Ng's approach can be faulted. Firstly, it makes the unjustified assumption that variations in the total number of out-migrants or in-migrants in any one zone does not significantly influence the linkage pattern. It has been shown by Rybakovskiy (1975) and Hirst (1977) that simple ratio measures of mutual association such as Ng's W_{ij} index do not eliminate size effects. In the Tunisian case, such a bias is very serious since concentration of migration destinations in a few zones is extremely intense.

Size effects are even more serious when iterative processes are employed such as in Hollingworth's (1970) approach to the recalculation of mobility ratios at several stages in the regionalization procedure. Cumulative errors are increased at each iteration. Large populations with large absolute migration flows are likely to be linked up more rapidly to other zones than small migrant populations which represent exactly the same migration rates, but are drawn from a smaller population base. The greater the degree of aggregation, the greater the likelihood of migration intensity indices being biased by this size effect. Tyree (1973), in the context of occupational mobility, has demonstrated that ratios permit neither the comparison of the

relative sizes of different entries in a mobility matrix nor the contrast of mobility patterns at two points in time of the same population

A standardization procedure which scales all columns of an interaction matrix to the same marginal totals and then sets all row totals to the same value, was applied to the Tunisian data. The process was repeated by an iterative proportional fitting procedure (I.P.F.P.) until the values of all marginal totals in the matrix converged. This bi-proportional method (Bacharach, 1970) generates a doubly standardized matrix which gives estimates of the interactions that would occur if each area under study had the same number of in-migrants and out-migrants. In the migration context a doubly standardized matrix eliminates the confounding effects of variations in size of migration streams, at the cost of some information loss on the effectiveness of migration streams (Shryock, 1959). For Tunisia, marginal totals were set to 1,000 in every case.

The doubly standardized matrix for the 1966 inter-gouvernorat migration matrix revealed some interesting differences from the raw data matrix. Table 5.2 lists the eight highest ranking linkages for both the standardized and unstandardized matrices. Standardization led to a reduction in the emphasis placed on migration to Tunis and highlighted the intensity of regional interaction in other areas. For example, the standardized values for migration between Gabes and Medenine were particularly high

FIG 5 3 Dendrogram Migration from last place of residence,1966
 (Intra-gouvernorat moves excluded)

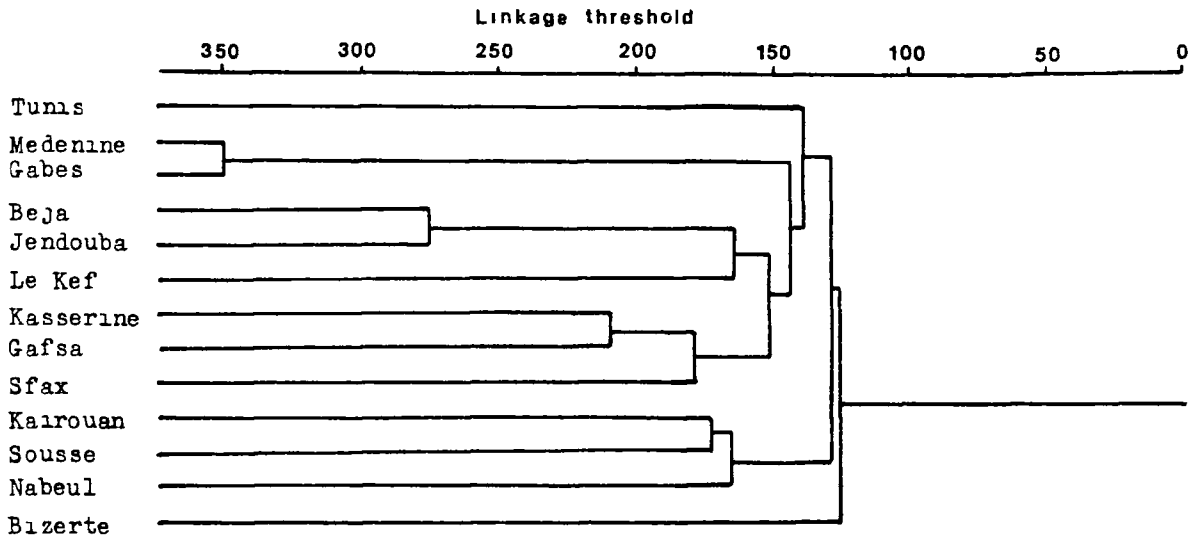
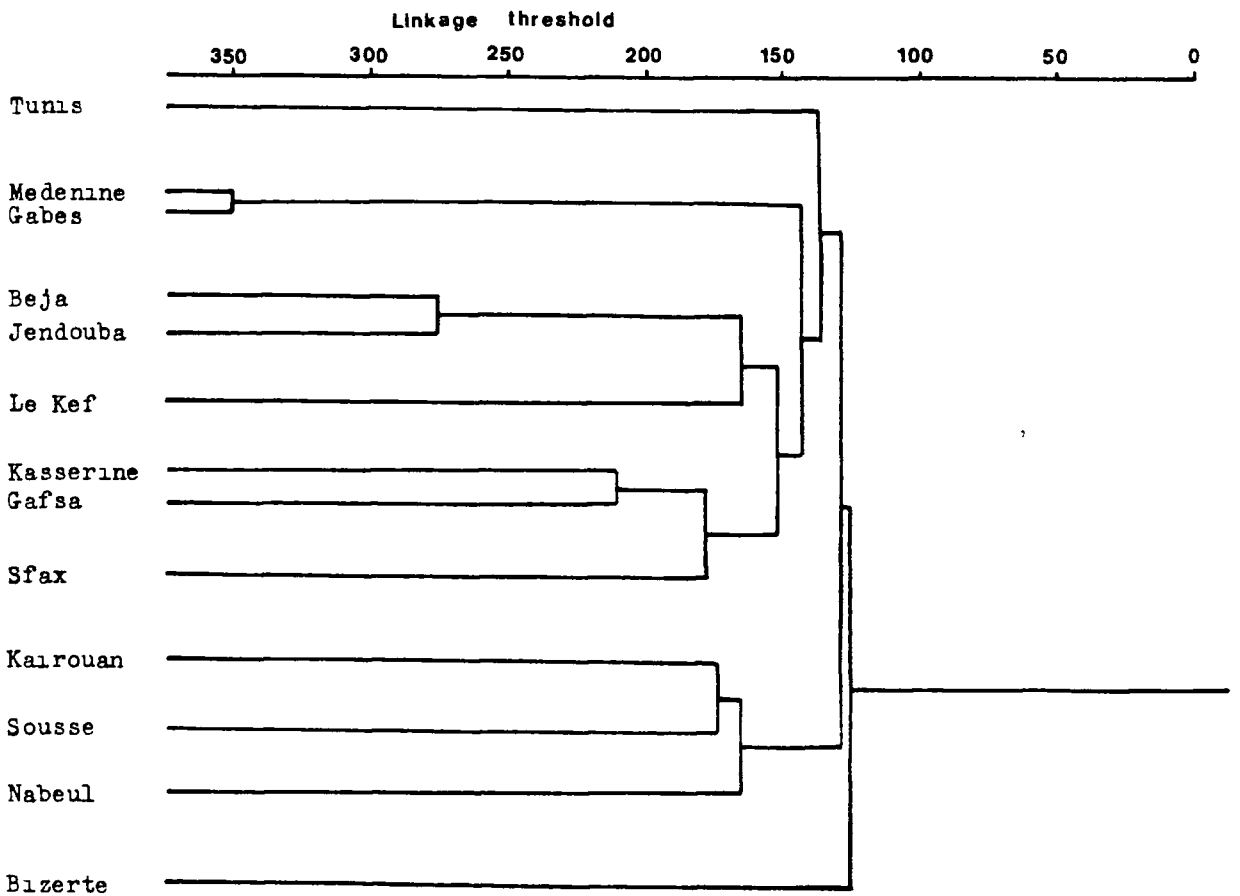


FIG 5 4 Dendrograph Migration regions (Data as fig 5 3)



Clustering in an Asymmetric Matrix

A further shortcoming of Ng's (1969) approach is that it ignores the asymmetric nature of migration flows between most of the Tunisian gouvernorats. A min-max hierarchical clustering procedure which takes account of asymmetric values has been outlined by Hubert (1973). For a given threshold level, a directed migrant flow is recognised between region i and region j , only if the adjusted matrix value is greater than the threshold. When interaction occurs mutually between two regions (either directly or indirectly), then a 'strong component' is formed. These strong components can consist of any number of the original interaction zones identified. As threshold values are reduced an increasing number of salient linkages occur and the number of strong components is reduced, until finally all units merge into one strong component. Leusmann and Slater (1977) have devised an excellent Fortran computer programme for applying just such an agglomerative hierarchic clustering algorithm to migration matrices. This programme has been run on a number of different data sets pertaining to interaction patterns in Tunisia.

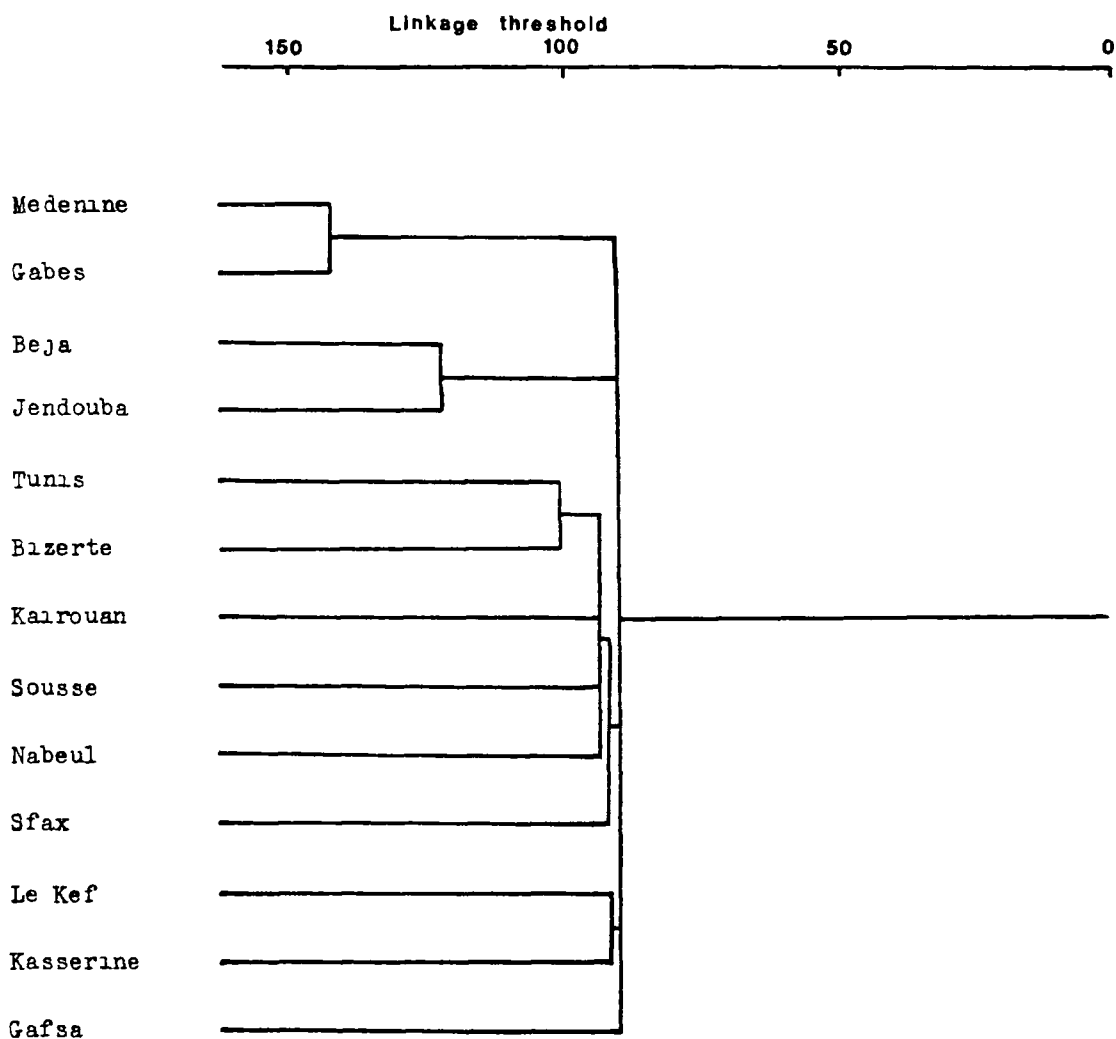
Interpretation of Dendrograms

Figure 5.3 presents in graphic form the results of linkage analysis of the 1966 inter-gouvernorat migration flows. The dendrogram affords a much quicker and more general analysis of the grouping of gouvernorats that results from application of Leusmann and Slater's clustering algorithm than does tabular listing of the thresholds of linkage of strong components. Since

dendrograms are used extensively in presenting the Tunisian data, a short note on dendrogram interpretation may be of assistance to the reader

A dendrogram or linkage tree arranges items (in this case regions) in such a way that stems do not cross when items are grouped. Fusion between items occurs at various hierarchic levels as indicated by the decrease in the number of stems as thresholds are lowered. Fusion between items is indicated by linkage of stems by a vertical crossbar. This is located at the minimum threshold of association, where the threshold is pre-defined by the clustering algorithm. The items may be arranged in the order of linkage, but in the Tunisian case the items (regions) are rearranged to keep spatially proximate zones as close together as possible in the initial listing. The general format for dendrogram construction places all stems equidistant from their neighbours. This arrangement is followed in the majority of dendrograms presented for Tunisia. Figure 5.4 experiments with a graphical variation recommended by McCammon (1968), which spaces the stems proportional to the distance from the tip to the first crossbar. The reader can judge for himself whether this 'dendrograph' gives a clearer impression of clustering than the more conventional dendrogram by comparing Figures 5.3 and 5.4.

FIG 5 5Dendrogram Migration from last place of residence,1966
 (Intra-gouvernorat moves included)



Cophenetic coefficient = 0.9574

Regionalization of Patterns of Migration from Place of Last Residence Using a Directed Linkage Constraint

One of the most striking features of Figure 5.3 is that all links occur between contiguous gouvernorats, unlike the classification which resulted from analysis of W_{ij} indices. In that analysis, Tunis was initially linked to Le Kef (Figure 5.1). High levels of interaction between Medenine and Gabes are once more identified, while the hypothesized existence of a Kairouan-Sousse-Nabeul migration region, suggested by the complete linkage algorithm, seems to be further validated by the early linkage of these three gouvernorats and by their stability as a cluster over a relatively large threshold range. In a number of other aspects the aggregative hierarchy of Figure 5.3 and the earlier clustering systems seem to be different. A Sfax-Gafsa-Kasserine migration region develops linkages with the gouvernorats of north-west Tunisia (Beja, Jendouba and Le Kef) and not with the southern gouvernorats as had been expected. Of particular interest is the linkage of Tunis gouvernorat to the graph at the threshold value of 140, leaving Bizerte as the last unconnected gouvernorat. This suggests that Bizerte has a more equitable representation of persons from all the other Tunisian gouvernorats among its in-migrants, while also being more evenly connected to the rest of Tunisia by its out-migrant flows, than any other region.

The same clustering algorithm was applied a second time to a slightly different version of the migration matrix. The dendrogram of Figure 5.5 arranges into a hierarchy estimates of

the number of persons who would have migrated between gouvernorats if the sum of all migrants both intra and inter-gouvernorat had been the same. Medenine and Gabes do not link at such an early stage in the hierarchy as in Figure 5.3, while the relatively small regions (in spatial terms) of Bizerte and Tunis become the third pair of gouvernorats to link at a threshold of 100.0

The re-adjusted matrix results in this instance in a set of relatively weak and poorly defined regions. All but three of the inter-gouvernorat linkages occur over the narrow threshold range of 95.0-92.0. This result accords with Slater's (1975c) analysis of Turkish interaction patterns, where inclusion of intra-regional movements resulted in the identification of fewer well defined regions than when the matrix diagonal was set to zero. In both the Tunisian and Turkish instances, the clustering algorithms with the diagonal included in the data matrix, suffered from chaining effects which undermined the validity of the classification. These results might either imply that retention of intra-zonal interaction data in an analysis induces a less satisfactory classification, or that the assumptions underpinning double standardization of a migration matrix where the diagonal is not set to zero are unsatisfactory.

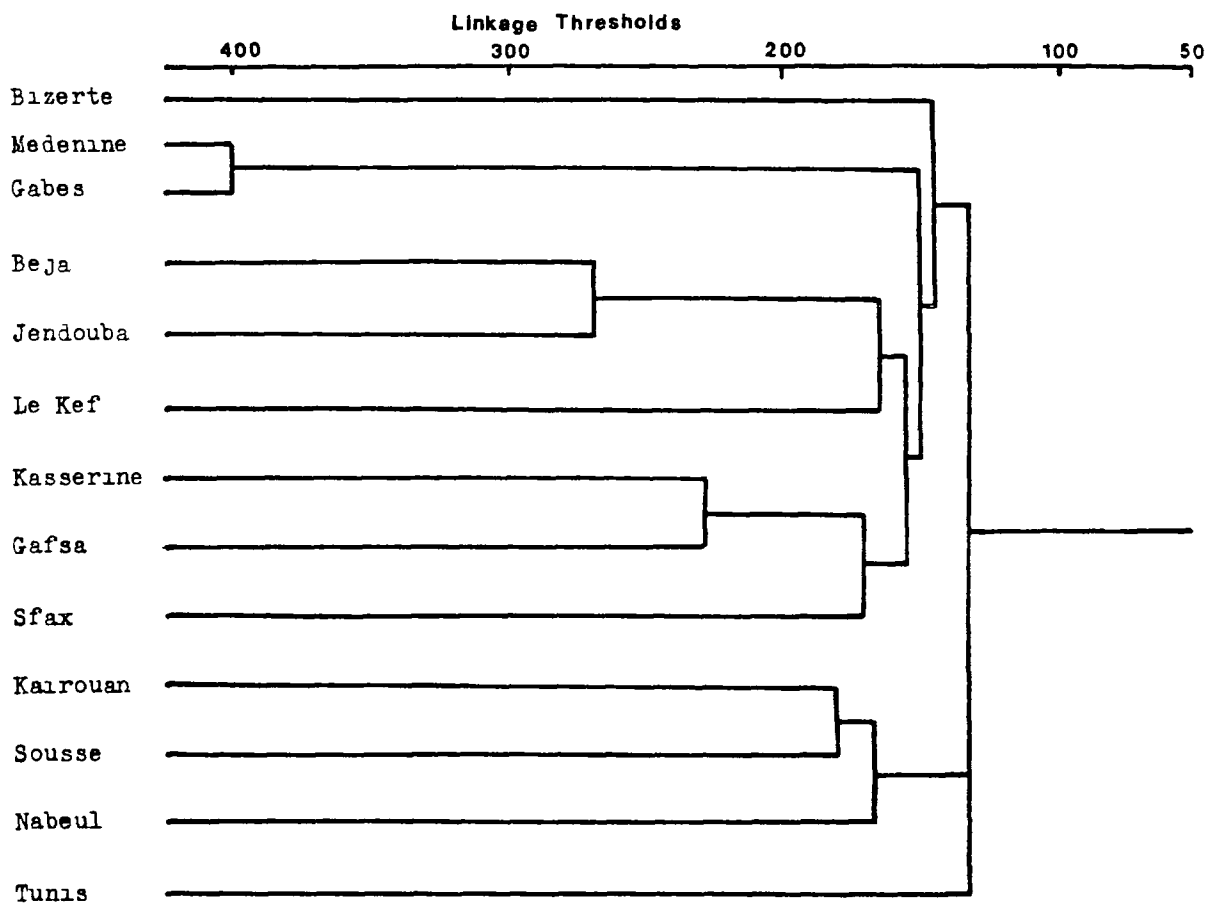
This discussion verges on the major problem of comparison and evaluation of classifications. Many different attempts have been made to measure the optimality of clustering procedures, and to compare the groupings developed by an algorithm with the character of the original data from which they were derived. Sokal and Sneath (1973, 276) suggest that measurement of

optimality is "the most fundamental question of taxonomy", yet make clear that there is no single criterion on which a classification can be judged

While it is possible to search for criteria inherent in a data set by which to judge the optimality of any particular grouping procedure, it is more usual to compare the raw elements of the original input matrix with a matrix of association values generated by the classification. The correlation between the elements of the two matrices is measured by a cophenetic coefficient (Sokal and Rohlf, 1962). Usually this takes the form of a product moment coefficient of correlation whose values lie in the range zero to one. Hence, the closer that the coefficient approaches one, the greater the resemblance between the imposed classification and the original data. It should be noted that since the fitted hierarchy is a symmetrical matrix of association values, and since the original migration matrix is extremely asymmetric, the cophenetic coefficient derived cannot be expected to be very high.

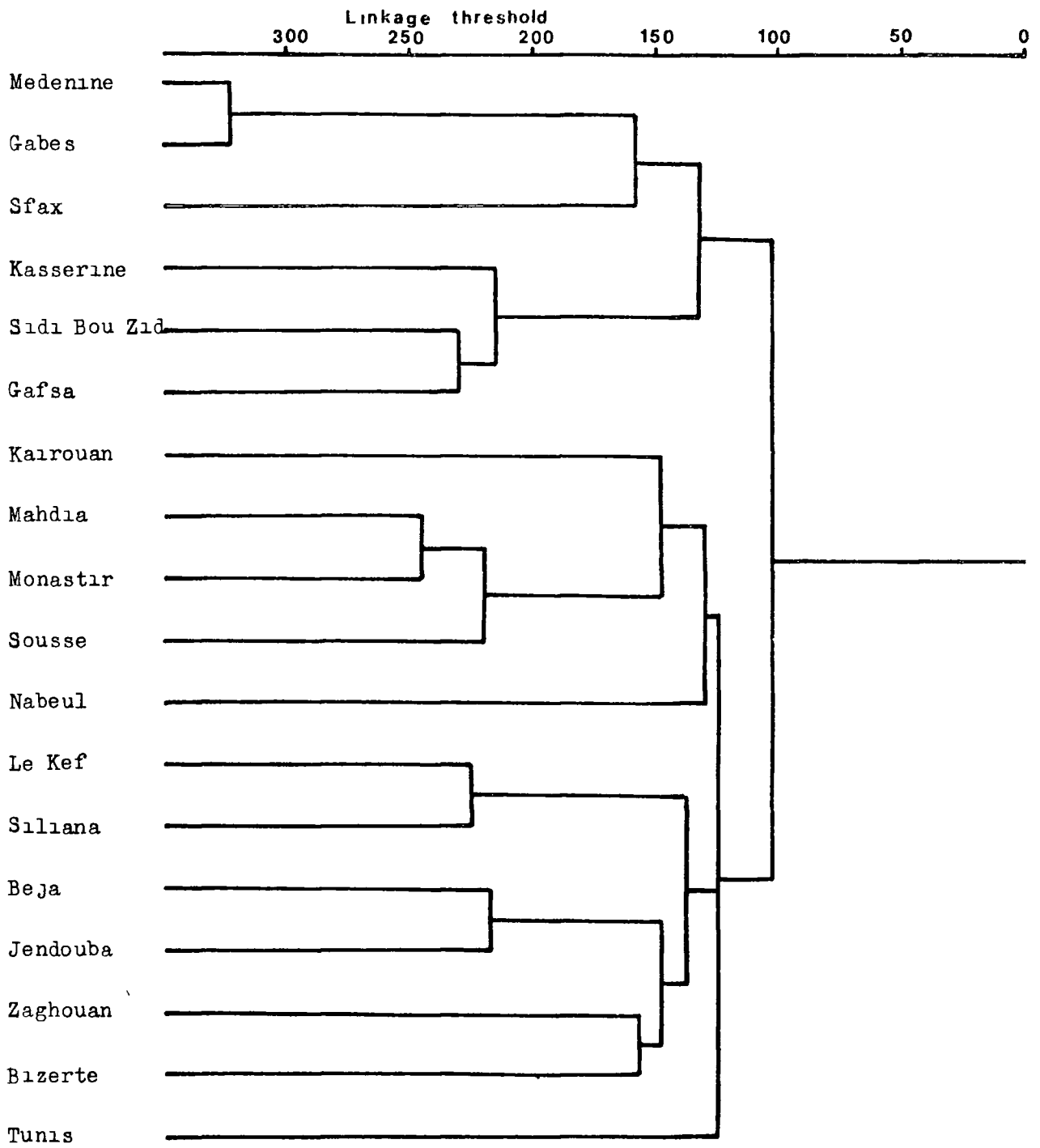
The classification of inter-gouvernorat migration (Figure 5.3) achieved a cophenetic coefficient of 0.654, while the attempt to define clusters in the same matrix with the intra-gouvernorat migrations included, yielded a correlation of 0.957. Both these coefficients lie above the minimum threshold of 0.6 set by Mather (1976, 325) and Sokal and Sneath (1973, 278) for reliable classifications. It is ironic that the retention of the matrix diagonal gave a more satisfactory cophenetic correlation, yet also generated unstable regional groupings. Clearly the

FIG 5 6 Migration regions for migration flows from birthplace 1966
 (Intra gouvernorat moves excluded)



Cophenetic coefficient = 0.66946

FIG 57 Dendrogram Migration from birthplace,1975 (Slater s method)



Cophenetic Coefficient = 0.688

cophenetic coefficient is not itself an adequate measure of the optimality of a classification, though it can warn against acceptance of unreliable classifications. As Mather has commented,

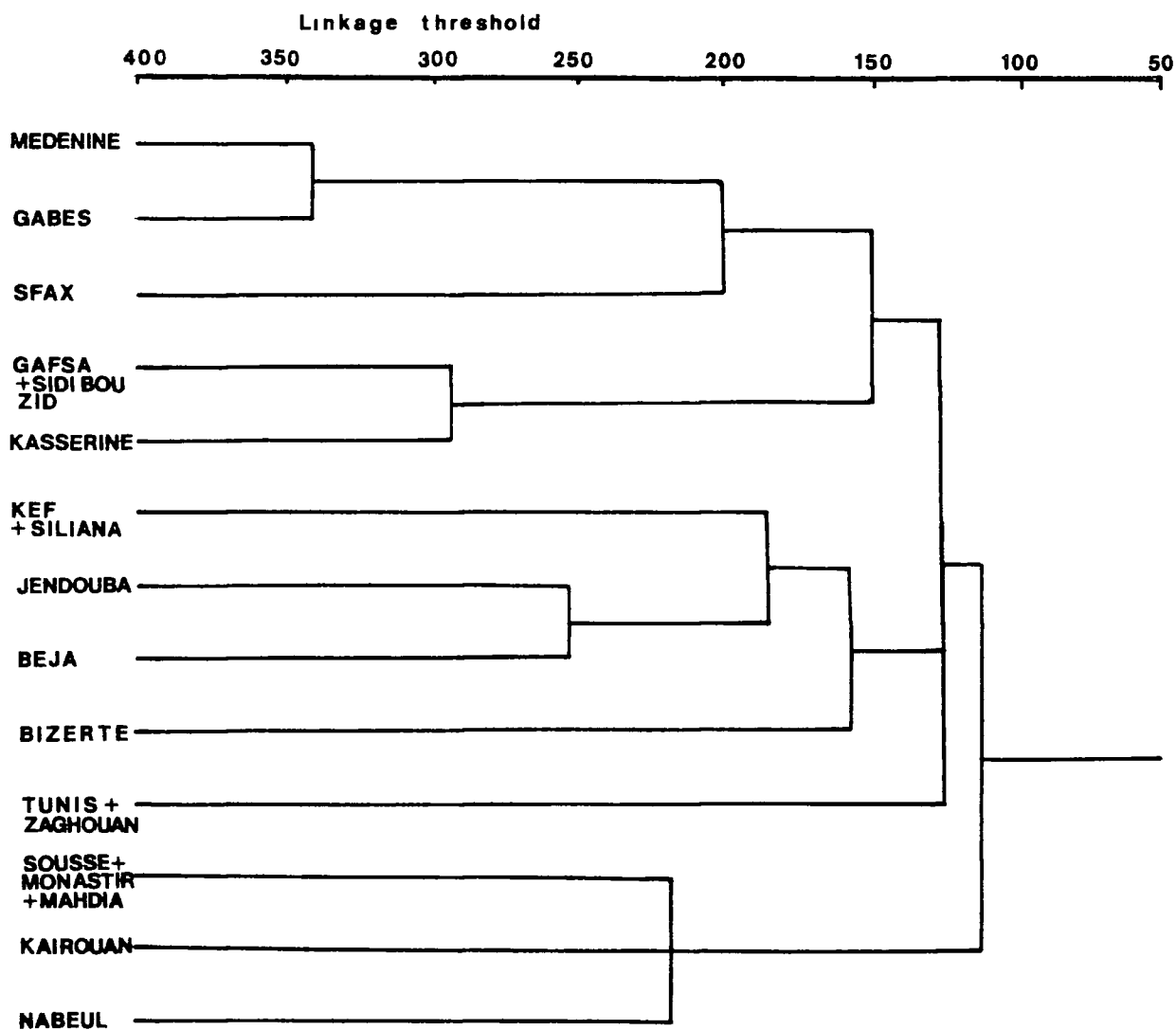
"Common sense and a knowledge of the phenomena under investigation are most important (in assessing whether a classification is satisfactory), servile reliance on the result of an arbitrary optimality measure is not likely to reveal anything of fundamental importance."
 (Mather, 1976, 327)

Regionalization of Patterns of Migration from Birthplace

Figure 5.6 represents the classification of migration flows from birthplace given in the 1966 census. The rank order of linkages is strikingly similar to that of Figure 5.3 for migrations from last place of residence. The chief differences are that firstly, linkage thresholds are universally lower, and secondly that Bizerte fuses with the southern and interior governorats prior to their linkage to the north-east region.

Figure 5.7 shows the classification of migration flows from birthplace as recorded by the 1975 census. It employs the new administrative boundaries. The stable interaction zone south of Chott Djerid survives into the 1970s as one of the most closely integrated sections of the migration system. Another feature to reappear is the zone of high interaction intensity between Beja and Jendouba. The new administrative units suggest that a strong interior migration region can be identified in the governorats of Gafsa, Sidi Bou Zid and Kasserine.

FIG 5 8 Dendrogram Migration from Birthplace, 1975 (Slater's Method), using only 13 areas for comparison with Fig 5 6



Cophenetic coefficient = 0.779

Interestingly, the three newly defined governorats of Mahdia, Monastir and Sousse, link up to form a coherent interaction zone which exists from threshold 220 through to threshold 147. This grouping seems to validate the earlier usage of the territorial unit of Sousse governorat, as defined by the 1966 census, as an interaction zone as well as a decision making unit

The migration movements of north-west Tunisia generate links between contiguous governorats, but the diads of Kef-Siliana, Beja-Jendouba, and Bizerte-Zaghuan, do not join to form a Tell migration region until threshold 137. Shortly after they are absorbed into the main trunk of the dendrogram. It is interesting that the three main migration zones defined by a cut off on this dendrogram at threshold 125, correspond closely to the three zones identified using Ng's W_{ij} index for the 1966 migration data. This suggests that even applying totally different taxonomic measures, and even employing different indices of migration intensity, there emerges some aspects of common zonation which must be inherent in the established movement patterns of the Tunisian population

Slater's clustering algorithm was also run on the 1975 data using the 13 areal units which were considered to approximate most closely to the governorats as defined by the 1966 census. The resultant dendrogram (Figure 5.8) permits more precise comparison of migration at these two dates

It appears from comparison of Figures 5.6 and 5.8 that the dominance of Tunis had been reduced by 1975 and that the north-eastern governorats of Nabeul, Sousse and Kairouan had become more widely linked with all the other governorats. On the basis

of this analysis, it appears that a limited degree of decentralization may have occurred within the Tunisian migration system. A second general trend which may be tentatively proposed, is the tendency for the southern gouvernorats to become more tightly interrelated. Sfax now fuses with the two southernmost gouvernorats prior to being linked to the steppe gouvernorats.

Problems Associated with Double Standardization

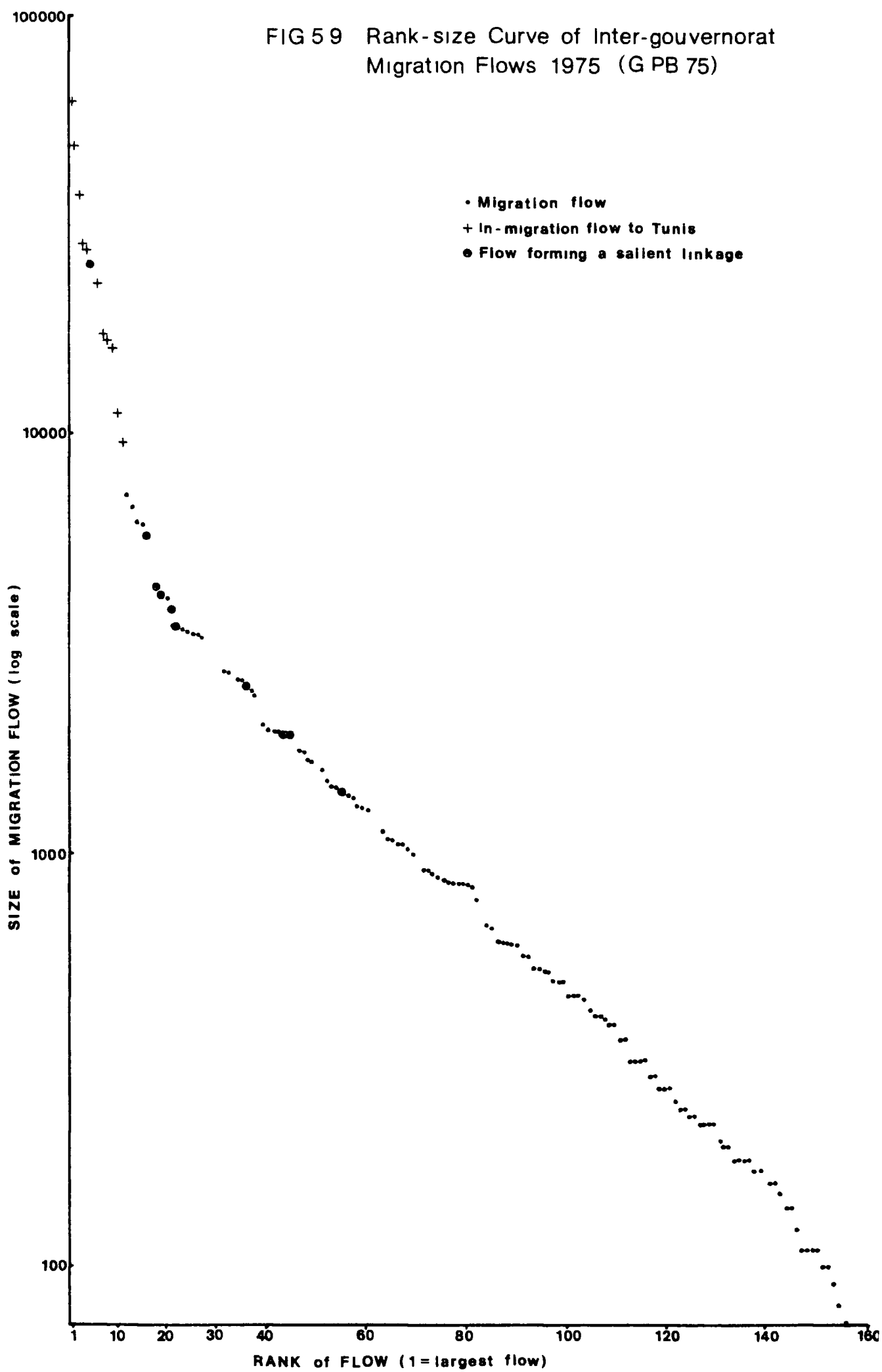
Double standardization has been criticised on the grounds that

"the ratio of one I P F P score to another may not closely resemble the ratio of raw scores" (Slater, 1978, 332)

This minor problem is a limitation which most migration researchers would be willing to accept in order to reduce the severe skew introduced into migration trends by differences in population size between the units analysed. It should be noted that some aspects of the structure of the original interaction matrix are preserved despite double standardization (Masser and Scheurwater, 1978a, 152) and that the technique has been widely tested and found to yield meaningful results in the context of migration region analysis (Slater, 1975, Hirst and Slater, 1976, Masser and Scheurwater, 1978a, Slater and Winchester, 1978).

In the case of Tunisia the method appears to identify efficiently significant regions of population interchange. The approach places less emphasis on the largest redistributive flows, which are atypical of the 156 non-zero entries in the Tunisian 13 x 13 inter-gouvernorat migration matrix (see Figure 5.9), than do matrix adjustment and clustering procedures such

FIG 59 Rank-size Curve of Inter-gouvernorat Migration Flows 1975 (G PB 75)



as those proposed by Nystuen and Dacey (1961). The latter approach also fails to consider the two-way movement of migration between regions, linking areas into functional regions on the basis of the largest uni-directional flows between areas.

In Figure 5 9 Tunisian migration flows for inter-gouvernorat migration from place of birth as recorded by the 1975 census are ranked by size on a log-linear plot in order of decreasing magnitude. It can be seen that the 17 highest scores from the standardized migration matrix (many of which involve flows to Tunis) do not conform to the general and well-defined log-linear relationship between the rank and size of migration flows. The salient linkages forming the migration regions shown on the dendrogram for 1975 (Figure 5 8) all lie in the upper range of the main leg of the rank-size curve. Similar relationships might be established from examination of the location of salient linkages in rank-size curves for migration flows recorded in 1966. In the Tunisian case there is no evidence that this unduly inflates the importance of small flows associated with minor nodes. Indeed Holmes' (1978) criticism that Slater's method awards undue significance to a limited group of trivial flows seems totally unfounded in this instance. The migration flows critical to the definition of the Tunisian migration regions are significant not only in relative terms, but also in terms of the absolute numbers of migrants involved.

Despite the aforementioned problems associated with double standardization Leusmann and Slater's clustering algorithm

remains of great interest to the migration analyst. It is distinctive from other approaches, firstly in its ability to eliminate the effects of population size on the volume of inter-zonal movement. Secondly it is of value because it employs a directed linkage method in clustering, which facilitates identification of functional regions of population interchange as opposed to formal regions of population redistribution. Before discussing the valuable results which were achieved through applying this algorithm to a number of other Tunisian data matrices, an alternative approach to standardization and clustering will be examined.

A Multi-level Standardization Approach

An alternative method to Slater's functional regionalization has been proposed by Masser and Scheurwater (1978a and b). Their approach is different from other regionalizations because it seeks to standardize the adjusted interaction matrix at each stage in the grouping procedure.

Standardization is achieved by dividing observed interaction, T_{ij} , between locations i and j , by the product of the sum of outflows from i , $\sum O_i$, and the sum of the inflows to j , $\sum I_j$. Observed flows are therefore divided by a statistic generated on the basis of the flows which might have been expected from the volume of total in- and out-migration in each zone. This form of standardization avoids some of the difficulties associated with methods of analysis which attempt double standardization from bi-proportional matrices (Holmes, 1978). Masser and

Scheurwater's approach derives a mobility index of two-way interaction using the standardized entries in the adjusted matrix. Consequently it foregoes the possibility of a directed linkage clustering procedure. Hierarchical aggregation of data similar to the method proposed by Ward (1963) is then employed to define migration regions. The grouping algorithm bonds the interaction units which share the highest mobility index X ,

$$\text{where } X = \frac{T_{1j} - (\sum O_1 \sum I_j)}{(\sum O_1 \sum I_j)} + \frac{T_{j1} - (\sum O_j \sum I_1)}{(\sum O_j \sum I_1)}$$

A modification of this index proposed by Masser (personal communication) which yields fundamentally similar results was employed by the author

$$X = \frac{T_{1j}}{(\sum O_1 \sum I_j)} + \frac{T_{j1}}{(\sum O_j \sum I_1)}$$

Following bonding of two interaction units on the basis of the mobility indices, the interaction matrix is standardized once more and the indices recalculated. As in Leusmann and Slater's (1977) procedure aggregation is agglomerative and continues until all units are linked in one large interaction system.

The clustering algorithm adopted by Masser and Scheurwater's (1978a) approach is fundamentally different from that employed by Slater (1975), since it groups units on the basis of the overall strength of interaction between migration regions, rather than on the intensity of interaction which exists between individual interaction units (which may already be members of large migration regions). As a consequence Masser and Brown's (1977) method in its most recent format (see Hirst, 1977) can claim to

avoid the chaining problems encountered in some of Slater's work. This advantage is only achieved by forfeiting Slater's more interesting clustering procedure, which permitted indirect linkage of units. In short, Masser and Scheurwater's mobility indices ignore the asymmetric nature of migration matrices.

As with Slater's approach, the application of multi-level standardization and Masser and Scheurwater's grouping procedure, does not guarantee an optimal solution at any particular level of aggregation, nor does it indicate in a definitive manner the number of migration regions into which an interaction system should be divided.

The procedure was applied to the inter-gouvernorat migration matrices available for the 1975 Tunisian population statistics. The 18 x 18 trip matrix recording migration from place of birth was used in the first instance. The diagonal of the matrix was set to zero so that prior to aggregation there was considered to be no intra-regional migration. A dendrogram was drawn to indicate the proportion of all migration movements occurring within migration regions at each stage in the clustering procedure. The most intensely linked interaction units fuse towards the left of the diagram, while interaction zones with more diffuse associations join the main tree of the dendrogram further to the right. The horizontal scale does not however reflect a linear decline in interaction intensity, but merely the increasing proportion of migration flows lying within the migration regions which have been defined. It was therefore impossible to prepare dendrograms on the same basis as Slater

FIG 5 10a Grouping of migration flows from birthplace,1975
 (Masser's method without contiguity constraints)

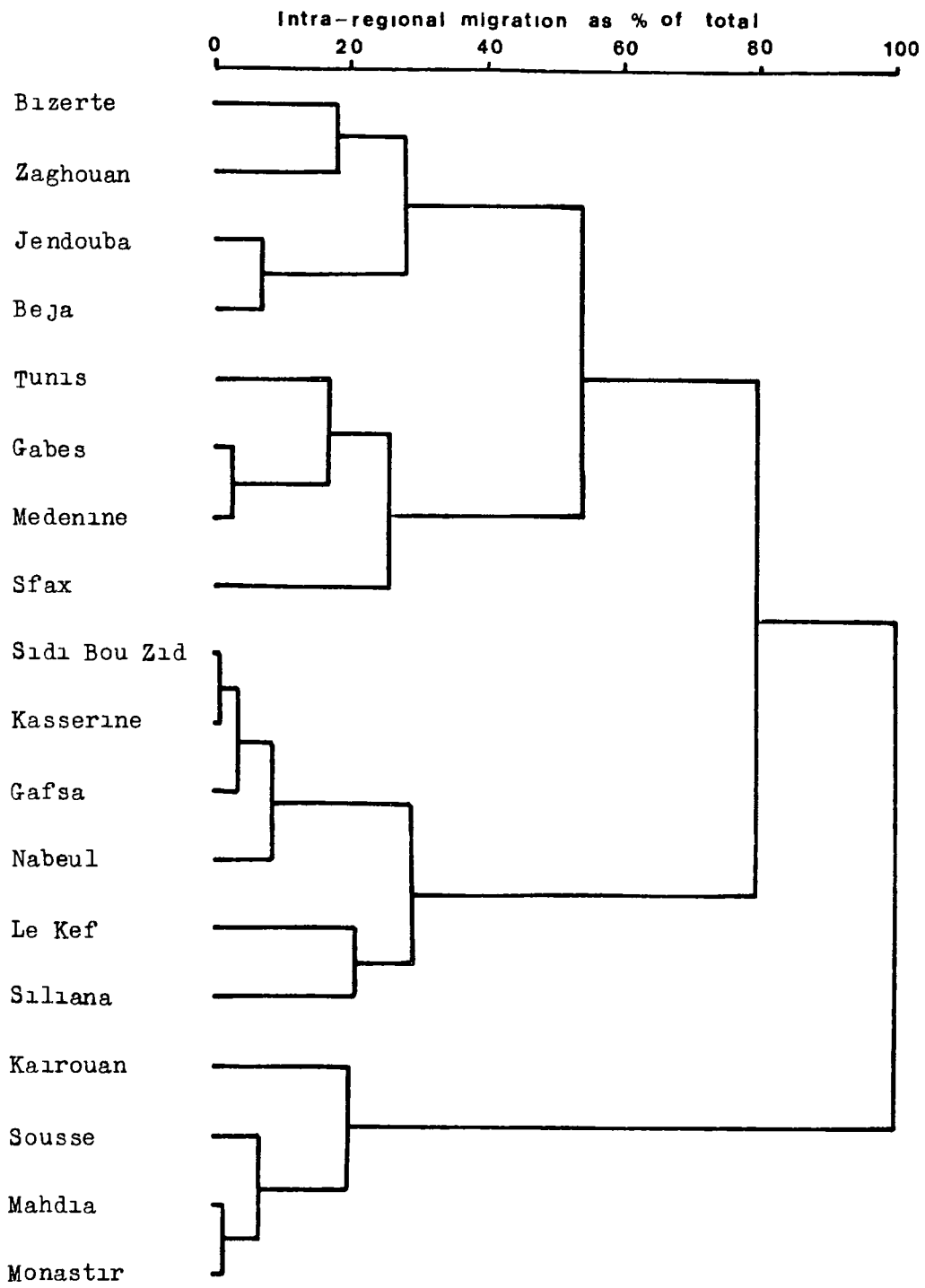
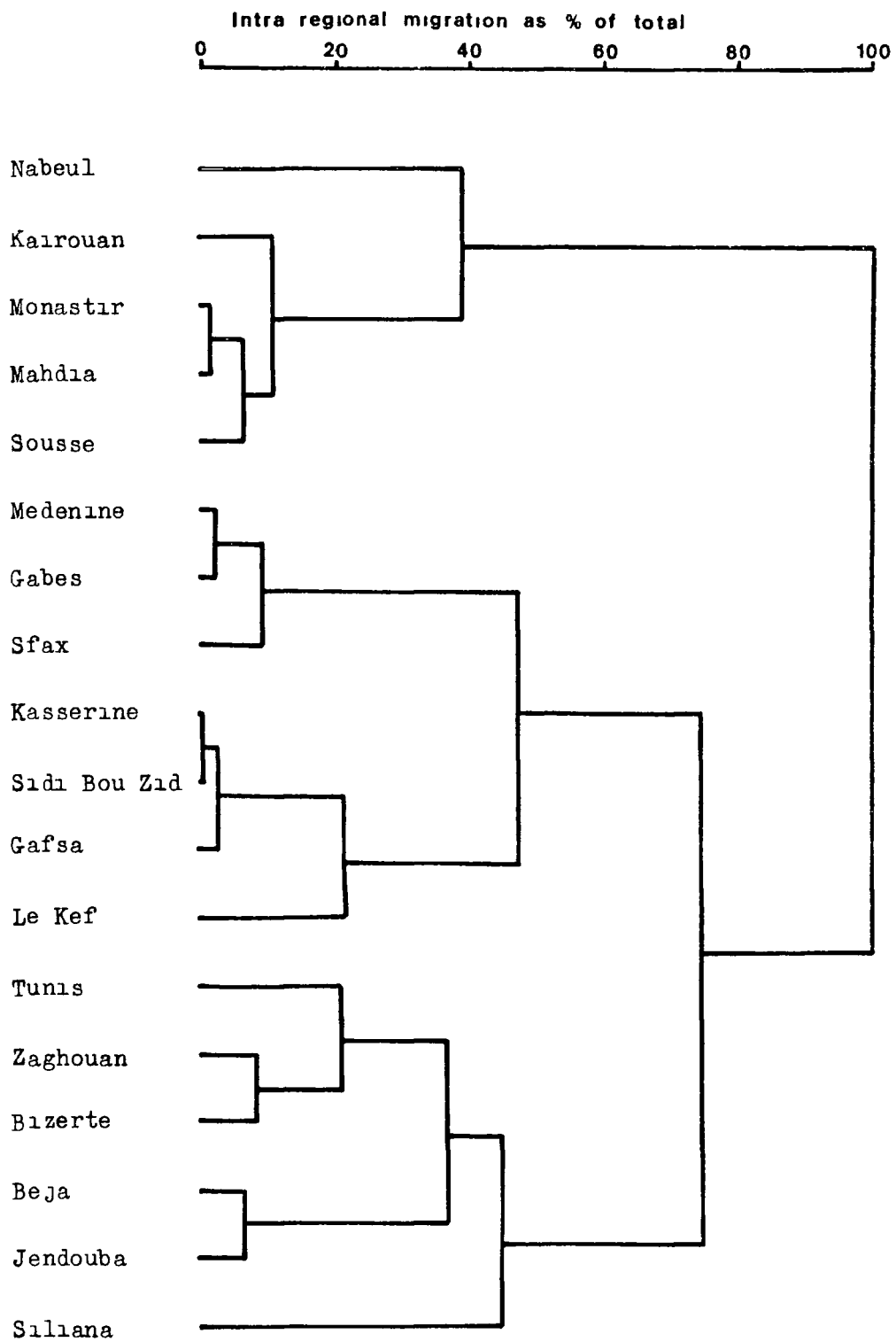


FIG 510b Grouping of migration flows from birthplace, 1975
 (Masser's method, with contiguity constraints)



since thresholds of interaction intensity were rescaled at each stage of the aggregation procedure following standardization of the adjusted matrix. Masser and Scheurwater (1978a, 233) are therefore incorrect in comparing the structure of dendrograms constructed by their method with those representing fusion following Slater's regionalization. The well developed structure of Masser and Scheurwater's approach arises in part because the interaction units which fuse in the later stages of the aggregation procedure are associated with larger numbers of inter-regional flows than the units which fuse at an earlier stage. Figure 5.10a shows the grouping of the Tunisian migration system which was achieved following application of the multi-level standardization procedure. The first link to be established was between Kasserine and Sidi Bou Zid, followed by the fusion of Mahdia and Monastir governorats, and then the linkage of Medenine and Gabes. Similar linkages were also elicited by Slater's method at an early stage in the clustering procedure. The first major difference emerged in the multi-level standardization procedure when Nabeul governorat joined the Kasserine-Gafsa-Sidi Bou Zid cluster. This non-contiguous linkage reflects the existence of a previously undetected level of interaction between these two areas. Significant migration streams linking the steppe governorats with the Cap Bon peninsula have not previously been identified. A further non-contiguous linkage was observed between Tunis city and the two southernmost governorats of Medenine and Gabes, suggesting that an unusual relationship exists between the economies of southern Tunisia and the capital. The south has been dependent for many decades on worker out-

migration to Tunis, the movement being treated almost as if it were an international labour transfer. Separation of origin and destination have precluded the possibility of frequent return visits and has encouraged some occupational and spatial segregation of migrants from the south within Tunis. The final gouvernorat to fuse with other interaction zones was Sfax, which finally linked to the Tunis-Gabes-Medenine cluster. At this level of aggregation a quarter of migration flows lie within the six migration regions which have been defined.

In the final stages of the grouping procedure it is interesting to note that the Kef-Siliana region fused with the steppe-Nabeul cluster rather than with the other gouvernorats of the Tell. The most basic dichotomy in the Tunisian migration system as defined by this approach exists between the Sousse cluster (Sousse-Monastir-Mahdia-Kairouan) and the rest of the country. This migration region was also shown to have diffuse links with the rest of the country when Slater's method was used.

Comparison of Slater's Method with Masser and Scheurwater's Approach

Although Masser and Scheurwater (1978a, 231) suggest that no single solution to the regionalization problem is indicated in their approach, it is apparent from examination of the dendrogram that the fundamental migration units of the country have been established by the 30% threshold. Analysis of the changes in the percentage of intra-regional flows involved at each stage of the procedure also reveals that a discontinuity occurs at this level. The interaction zones delineated at the four region level

FIG 511 Migration from birthplace,1975 -
four region threshold

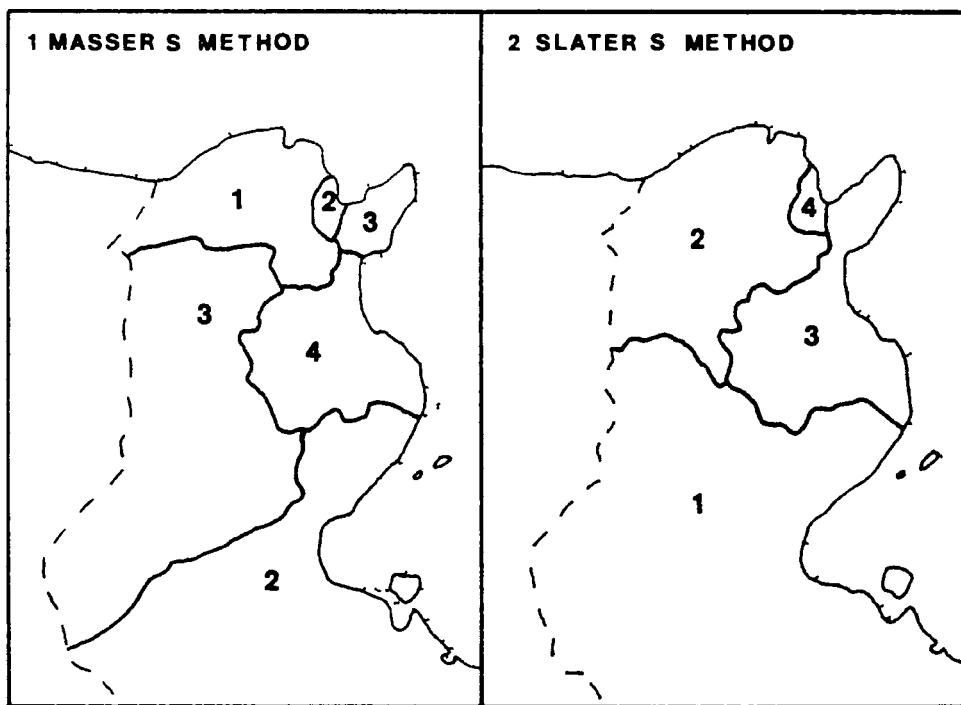
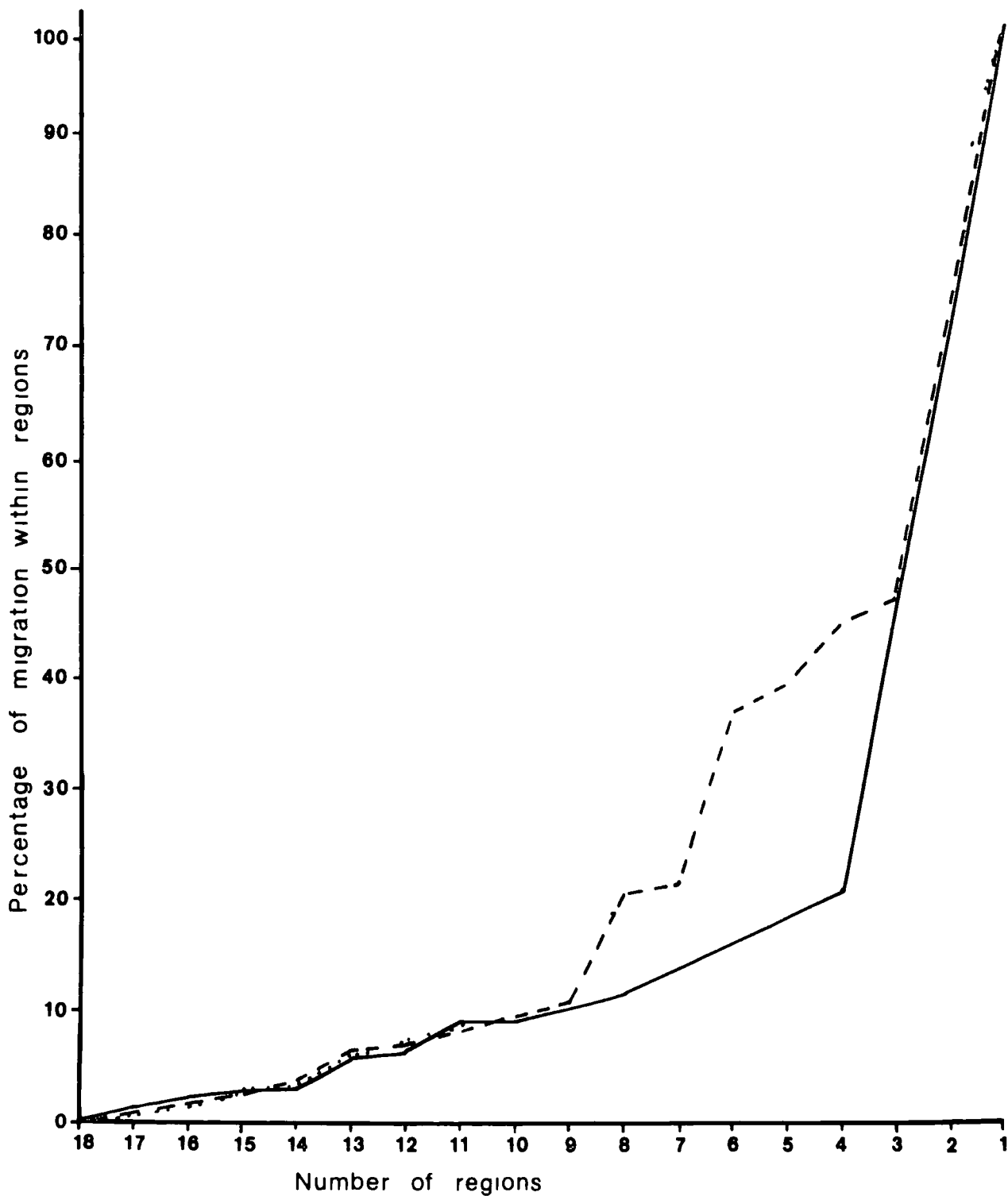


FIG 5 12 MIGRATION FROM BIRTHPLACE,1975,PERCENTAGE OF INTRA-REGIONAL MIGRANTS AT DIFFERENT LEVELS OF AGGREGATION

- Slater's method
- - - Masser's method with contiguity constraints
- Masser's method without contiguity constraints



are shown in Figure 5.11. They are different in some respects from those defined by Slater's method, which, at this level, left Tunis city isolated from the rest of the country and included Nabeul in the Sousse-Monastir-Mahdia-Kairouan cluster. At the four region level Slater's method succeeded in placing only 21.0% of flows within migration regions while the multi-level standardization defined 29.6% of flows as intra-regional. Slater's approach did, however, preserve contiguity between the zones within a cluster while this property was violated by Masser and Scheurwater's technique.

Imposing a contiguity constraint on the multi-level standardization procedure resulted in a grouping of governorats which actually increased the percentage of intra-regional movements at the four region level to 45.1%. The remarkable divergence in the percentage of flows incorporated in the migration regions defined by the different methods and involving different constraints prompted further investigation of the degree to which each method maximized flows within regions while minimizing flows between regions. The percentages of flows within the migration regions defined at each stage of the grouping procedure are graphed in Figure 5.12. It can be seen that the different approaches defined regions with similar levels of intra-regional migration in the early stages of aggregation. Between the eleven region and the three region level considerable divergence occurs, with Slater's method consistently achieving a smaller percentage of intra-regional flows. Neither of the versions of the multi-level approach was clearly superior to the other in

the entitiation of the migration system, the trial involving no constraints emerging with higher levels of intra-regional migration at the two, three, nine and ten region levels, and the constrained version of the clustering programme having higher levels at the four, five, six, seven and eight region levels

It is noticeable that the primary point of divergence between the two versions occurs where Tunis is fused with other gouvernorats in the aggregation process. This takes place at an earlier stage in the unconstrained version. It appears that the same event may be significant in differentiating Slater's method from Masser and Scheurwater's. The main upsurge in the level of intra-regional migration bounded by the regionalization devised by Slater, occurs after the four region level when Tunis fuses with other regions

It may be concluded on the basis of the level of intra-regional migration achieved by the two methods that the multi-level standardization procedure is marginally more efficient in defining migration regions in terms of the magnitude of flows listed in the original interaction matrix. It should be added that this occurred largely because of the differences in the forms of standardization employed by the two methods and that a technique which did not involve any standardization procedures at all might yield still higher levels of intra-regional migration. It has already been demonstrated, however, that standardization is a critical and desirable phase in defining migration regions and should be attempted even although it may involve some lowering in the level of intra-regional migration. Unfortunately there is no evidence by which to determine in a rational fashion whether

Leusmann and Slater's (1977) methods or Masser and Scheurwater's (1978a) method of standardization offers the more appropriate form of matrix adjustment to allow for differences in population size between the original interaction units

It is proposed that the criterion of 'percentage intra-regional migration at different levels of aggregation' (Figure 5 12) is a dubious one on which to discriminate between the two methods which have been examined. With respect to other characteristics of the two procedures, it would appear that Leusmann and Slater's method is superior firstly, since it achieves spatially contiguous regions without the use of a contiguity constraint, and secondly, since it permits analysis of the asymmetric nature of migration matrices by an indirect linkage grouping algorithm. Neither of these properties hold for Masser and Scheurwater's multi-level standardization approach. Further applications of Leusmann and Slater's method will now be explored.

Analysis of Migration Regions Identified at the Delegation Level

For a classification to be of value both as a descriptive device and also as a trigger to hypothesis formulation, clusters need to form which are statistically significant and which retain their identity through a wide range of thresholds. There appear to be two obvious and independent means of verifying a classification. The first is to seek a theoretical justification for adopting a given classification or clustering procedure which stems from an a priori acquaintance with the structural relationships within the data. The second is to analyse the same data

using different clustering algorithms to perceive whether similar groupings emerge (i.e. are inherent in the data rather than a function of the classification procedure), and to use the same clustering algorithm on data presented in various formats (e.g. at different scales)

In the Tunisian case the validity of the migration hierarchies which have been evolved can be tested by regrouping the same information, but starting from the delegation level. This permits consideration of whether the gouvernorats are internally homogeneous migration units, or whether migration between administrative units is merely a consequence of randomly directed movements which chance to cross political boundary lines.

Figure 5.13 plots a dendrogram for the 98 Tunisian delegations. A marked spatial contrast emerges between the interaction patterns of the peripheral areas of the country (those most distant from Tunis), which form distinctive migration regions, and the delegations of central and north-eastern Tunisia which form only trivial clusters (linking to only one or two other delegations) prior to being joined to the main trunk of the dendrogram.

A procedure for gauging the significance of clusters has been developed by Hubert (1974), which establishes whether a particular grouping is the consequence of 'noise' or of strong linkages inherent in the data. A simple measure of internal homogeneity of clusters may be calculated from the formula

$$\text{Hom} = \frac{d - n}{n(n - 1) - n}$$

FIG 5 13 DENDROGRAM of
 MIGRATION FROM LAST DELEGATION OF RESIDENCE
 (INTRA DELEGATION MOVES
 EXCLUDED)

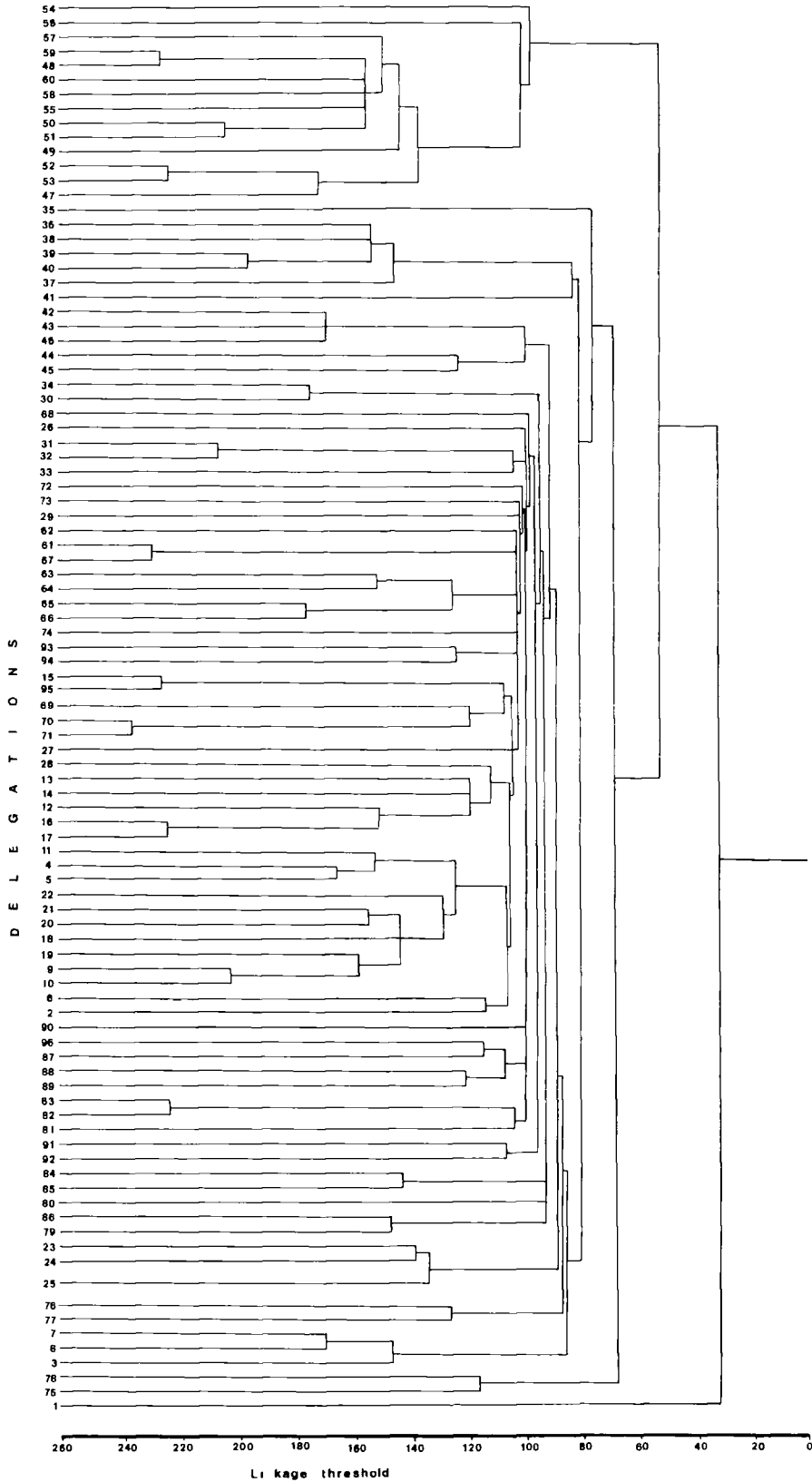


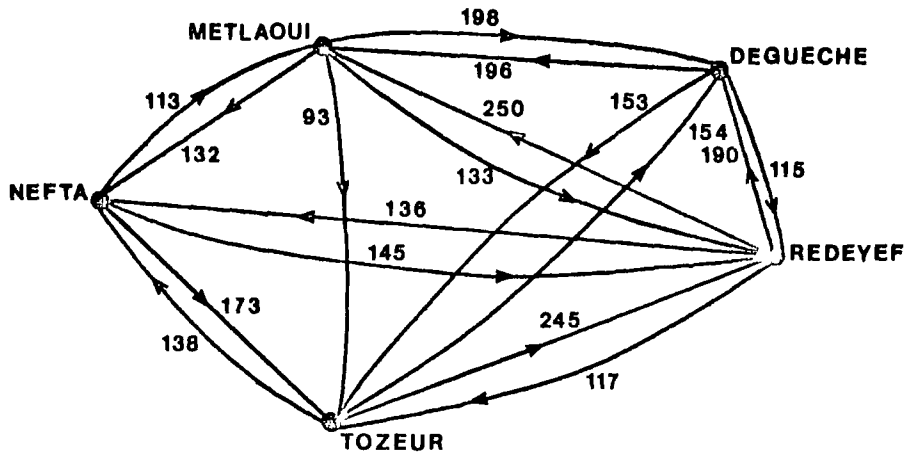
Figure 5.13. List of Tunisian Delegations

- | | | |
|------------------------------------|-------------------------|-----------------------------|
| 1. Tunis | 33. Tala | 65. Mezzouna |
| 2. Manouba | 34. Feriana | 66. Mahres |
| 3. Bizerte | 35. Gafsa | 67. Kerkennah |
| 4. Sejnane | 36. Redeyef | 68. Kairouan |
| 5. Mateur | 37. Nefta | 69. Sbikha |
| 6. Tebourba | 38. Tozeur | 70. Oueslatia |
| 7. Menzel Bourguiba | 39. Degueche | 71. Haffouz |
| 8. Ras Djebel | 40. Metlaoui | 72. Hajeb El Aouin |
| 9. Beja | 41. Guetar | 73. Sidi Ali Ben Nasrallah |
| 10. Amdoun | 42. Sened | 74. Sidi Amar Ben Hajla |
| 11. Djebel Labiodh | 43. Maknassy | 75. Sousse |
| 12. Teboursouk | 44. Regueb | 76. Kalaa Kebira |
| 13. Gafour | 45. Sidi Bou Zid | 77. Enfida |
| 14. Bou Arada | 46. Ben Aoun | 78. M'Saken |
| 15. Fahs | 47. Medenine | 79. Jemmal |
| 16. Medjez El Bab | 48. Beni Khedache | 80. Souassi |
| 17. Testour | 49. Ghomrassen | 81. El Jem |
| 18. Jendouba | 50. Remada | 82. Ksour Essaf |
| 19. Bou Salem | 51. Tataouine | 83. Mahdia |
| 20. Tabarka | 52. Ben Gardane | 84. Moknine |
| 21. Ain Draham | 53. Zarzis | 85. Ksar Hellal |
| 22. Gardimaou | 54. Jerba | 86. Monastir |
| 23. Le Kef | 55. Gabes | 87. Nabeul |
| 24. Sakiet Sidi Youssef | 56. El Hamma | 88. Korba |
| 25.*Tajerouine and
Kalaat Senan | 57. Kebili | 89. Menzel Temime |
| 26. Ebba Ksour | 58. Douz | 90.*Kelibia and El Haouaria |
| 27. Maktar | 59. Matmata | 91. Menzel Bouzelfa |
| 28. Siliana | 60. Mareth | 92. Soliman |
| 29. Sers | 61. Sfax | 93. Grombalia |
| 30. Kasserine | 62. Jebiniana | 94. Bou Argoub |
| 31. Sbeitla | 63. Menzel H. Chaker | 95. Zaghouan |
| 32. Sbiba | 64. Bir Ali Ben Khalifa | 96. Hammamet |

* These delegations fused at thresholds above 260, and are therefore represented by a single line on Figure 5.13.

FIG 514 WELL DEFINED MIGRATION REGIONS

a) South West Gafsa

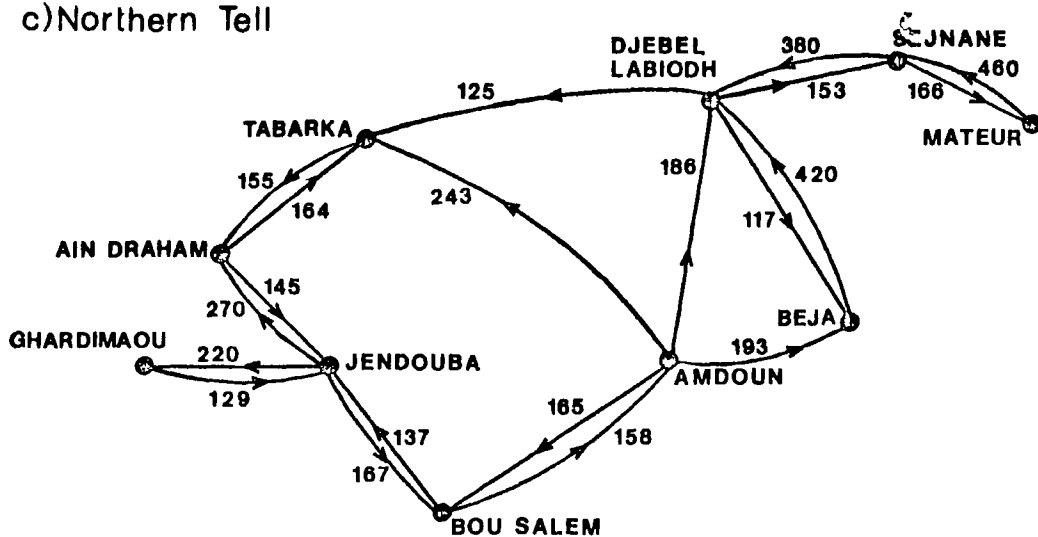


RANGE=145-83
 NUMBER OF NODES=5
 HOM INDEX=0.80

b) Gabes - Medenine

RANGE=99-53
 NUMBER OF NODES=14
 HOM INDEX=0.62

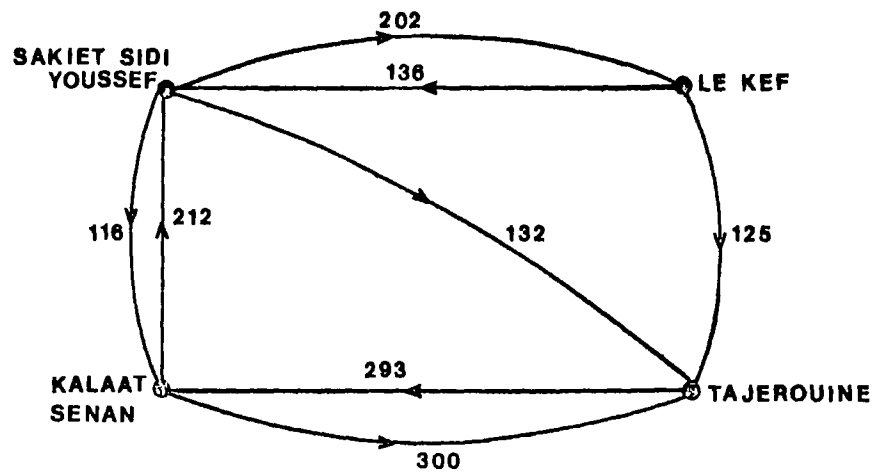
c) Northern Tell



RANGE=126-107
 NUMBER OF NODES=10
 HOM INDEX=0.15

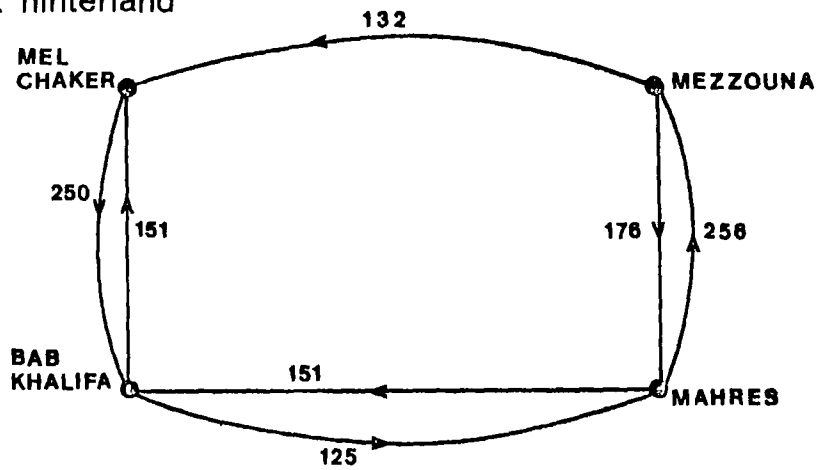
FIG 514 contd

d) Le Kef



RANGE=132-89
NUMBER OF NODES=4
HOM INDEX=0.50

e) Sfax hinterland



RANGE=125-102
NUMBER OF NODES=4
HOM INDEX=0.375

where n is the number of spatial units in a cluster, and d is the number of salient linkages between the units. The index value, H_{om} , ranges between zero and one, where clusters with indices close to one are extremely homogeneous. 'Chaining' of units results in heterogeneous clusters with index values near to zero.

Applying the index to the clusters of Figure 5 13, it was found that the most coherent interaction region existed in the south-west of Gafsa gouvernorat incorporating the oasis towns of Nefta and Tozeur, and the mining centres of Metlaoui, Degueche and Redeyef. The migration region forms at a threshold of 145 and survives to a threshold of 083 at which point a new salient linkage emerges between Metlaoui and the delegation of Guetar, which lies on the northern shores of the Chott el Djerid.

Rouissi (1969) shows that current migration from Tozeur and Nefta to the mines is only the last in a long history of out-movement from the oasis towns by persons in search of alternative sources of subsistence. Unlike migrants in other parts of Tunisia, the Djerid migrants have been able to find some of the social services which they desire, as well as jobs in the centres established by the phosphate mining companies, in relative proximity to their home towns. This has the obvious advantage that migrants need not be absent for long periods from their homes and families. Many labourers travel home to Tozeur and Nefta for the weekends.

Figure 5 14 shows that directed flows from the oases to the mines unexpectedly occur at a lower threshold than the flows

from the mines to the oases. This in part reflects the nature of the standardization procedure. Although migration flows to the mines exceed return flows, the adjusted matrix values reflect the much greater significance of return migration to the oases than to other parts of Tunisia.

It should also be noted that there is a considerable interaction between the mining centres themselves. Damette (1970) has noted the existence of marked differences in the provision of services and shelter for workers in the various centres. This may be one reason for worker movements between the mining towns, as migrants seek out more desirable situations. Swings in the international price of phosphate also result in fluctuations in the demand for phosphates, and consequently in the size of the labour force employed.

The strength of intra-regional migration represented by this interaction region explains in part the late linkage of the governorat of Gafsa to the national migration system. The second most stable cluster of Figure 5 14 is also found in pre-Saharan southern Tunisia and includes all the delegations of the governorats of Medenine and Gabes. The grouping of the 14 delegations survives through a range from 099 to 053, and has considerable internal coherence as reflected by the homogeneity index of 0.62. With the exception of Jerba and El Hamma, the delegations of the south establish themselves as a migration region as early as a threshold of 139.

The governorat capital of Medenine and the delegation of Mareth seem to be particularly closely linked to all other

parts of the migration region. The physical constraint of the Chott el Djerid provides a natural barrier to the northward migration of the southern population and helps provide this region with its internal coherence. The fact that a strong migration region occurs at the delegation level of analysis substantiates the findings of the inter-gouvernorat linkages of Figures 5.5 and 5.6, where Gabes and Medenine consistently linked at an early stage relative to other gouvernorats. That linkages at the delegation level should be strong is interesting in view of the extremely high out-migration to Tunis from all parts of the area, and in view of the slight social antagonism which is generally believed to exist both between different tribal groupings and between the Arab and Berber settlements of the south. The total lack of interaction between this region (with the exception of Jerba) and most other delegations of Tunisia results in this region surviving as an independent unit until the penultimate linkage of the digraph (Figure 5.13).

In locational and structural contrast to the homogeneous southern migration region ($hom = 0.62$), is the poorly integrated zone of the Northern Tell ($hom = 0.15$). This region forms by the chaining of ten of the delegations of the Upper Medjeida valley and the coastal mountain ranges of north-west Tunisia. Within this region, it is the most peripheral delegations of Ain Drahem, Jendouba, Bou Salem and Djebel Labiodh which form the core of the interaction system. Like the Medenine-Gabes migration region, the constituent delegations of this zone have extremely high out-migration rates to Tunis, but extremely low interaction rates with the rest of Tunisia. Also, like the

southern migration regions, features in the physical environment form a barrier to the free movement of persons. The ridges of the north-eastern arms of the Atlas mountains run in a south west - north east direction isolating the region from central Tunisia. Inter-delegation linkages exhibit an east-west directional bias.

At threshold 132, a migration region forms in the High Tell between the delegations of Le Kef, Kalaat Senan, Tazerouine and Sakiet Sidi Youssef. It is curious that the latter, a predominantly rural delegation on the western border of Tunisia, proves to be more nodal than Le Kef delegation with its larger urban population and better agricultural land (Bouman, 1977). Movement of landless peasantry to the few towns can therefore provide only a partial explanation of the migration system in this region. The region's marginality and isolation relative to the economic core of the nation is reflected in the continued independence of the Kef subgraph from that of the main migration system of central Tunisia until a threshold of 089, when Kalaat Senan forms a salient linkage and chains the region to the delegations of the steppe.

In Sfax gouvernorat, four of the hinterland delegations (M'el Chaker, B A B Khalifa, Mahares and Mezzouna) link to create a region which has low homogeneity (only 0.375), but which survives over the range 125-102. It consists of three chained interaction systems, with M'el Chaker and B A B Khalifa, Mezzouna and Mahares being closely linked at relatively high thresholds, and B A B Khalifa and Mahares being linked at the

lower threshold of 125, at which point the region comes into existence. No further linkages occur to strengthen the region before it is aggregated into a larger Sfaxian zone, which in turn is linked to the steppe delegations after only a short range of existence.

It is interesting that both Sfax and Sousse link to a neighbouring unit (the Kerkennah Isles and M'Saken, respectively) at relatively high thresholds, and then, because of their pull on a wide migration field, do not integrate with any other zone till they reach extremely low thresholds. The lowest critical link occurs between Tunis and Gafour. In one sense, Tunis is shown by the dendrogram to be the most accessible place in Tunisia, since it has substantial ties not only to the migration regions discussed above, but also to the delegations of the steppe and sahel, which do not fuse to form readily identifiable migration regions. Tunis, in being last to join the national hierarchy, is comparable to Istanbul in relation to the Turkish migration system (Slater, 1975c) and Paris in relation to the French system (Slater, 1976a). Slater has demonstrated that the same phenomenon occurs in other highly centralized nations. National capitals tend to have ties which are dispersed and hierarchical in nature rather than highly localised as is the case with most migration fields.

Other delegations, not so far discussed, which join the Tunisian hierarchy at low threshold values (below 100) include Jerba, the island of the lotus eaters in the Gulf of Gabes, which is also famed for its merchants and traders. The Jerbians have

established grocer's businesses throughout Tunisia. Other delegations which join the hierarchy below the threshold include Gafsa oasis, administrative capital of its gouvernorat and cross-roads of the southern steppe, Kairouan delegation, again administrative capital of its gouvernorat, and prime centre of religious pilgrimage in the Maghreb, and Souassi, a delegation south of Sebkhah en Noual, which has experienced considerable out-migration of Souassi tribesmen to take up weaving jobs in the villages of the Sahel of Sousse

In review, this analysis has identified on the one hand five distinct migration regions and on the other a small number of delegations which have very diffuse migration fields and have no clear functional linkage with a particular migration region. The majority of delegations do not fall into these two categories, being neither independent of other delegations, nor being part of a coherent and stable migration system. Most link to their neighbours and exist as sub-units in these diadic interaction systems for a short period, before being merged with the main trunk of the dendrogram.

Manouba and Tebourba emerge as a strong component, for example, at a threshold of 112. They then link at a threshold of 106.9 to the Jendouba-Beja migration region, weakening its homogeneity (index of 0.120), and at a threshold of 106.4 are linked further to six delegations of the Low and Middle Tell (Silliana, Gafour, Bou Arada, Teboursouk, Medjez el Bab and Testour), giving a massive heterogeneous cluster (Hom = 0.076) which collapses again at threshold 105.0, after yet another chain linkage.

The low homogeneity of the clusters formed in central Tunisia, as well as the short range over which they exist, indicates the lack of any clear divides in interaction patterns. Chaining results in large clusters, many of whose constituent delegations have no directed migration linkages between them. If one considers the interaction patterns of each delegation as a symmetrical migration field (Hagerstrand, 1957) and if linkages between fields are only recorded because of 'noise' introduced by the administrative boundaries across which the interactions are measured, the resultant linkages will be totally misleading and after several steps in the clustering procedure totally disparate delegations may be unified within one zone, while proximate areas with a considerable, but insufficient, level of interaction, remain as separate units. Just such a random element in the agglomerative procedure seems to occur in the linkage of the delegations of the steppe and sahel. As a consequence of the largely local nature of the migration fields of the delegations, the chaining of these fields results in a poor hierarchical fit with large residuals between the elements of the original matrix and the matrix of linkage values from the clustering algorithm.

A cophenetic coefficient of correlation of only 0.41 was achieved for the dendrogram of inter-delegation linkages. Applying a cube root transformation to the input matrix, to reduce the gap between the large migration values to proximate zones and the zero entries for migrations between distant places, actually lowered the correlation. It was shown in a separate

test that application of the same clustering algorithm to the unstandardized interaction matrix generated a much less satisfactory classification (cophenetic coefficient of 0.327) A further test was carried out examining the linkages which would emerge when Tunis was omitted from the interaction matrix Migration regions become a little more distinct but chaining continues to occur among the delegations of the east coast and the steppe A final refinement of the clustering algorithm involves standardizing delegation entries not merely for the number of migrants, but also for the population of non-movers. The resulting classification considerably improved the cophenetic coefficient of correlation, but the regions which were defined following this modification of the matrix were difficult to interpret.

Location of Migration Regions Some Hypotheses Concerning Distances and Shapes

In comparing the migration regions which have been defined by Slater's method at different scales and using different data sets it becomes clear that certain common features emerge. In most cases the south of Tunisia and the north-western area of the country form distinct migration regions while the remainder of the country's migration system does not lend itself readily to a clear-cut classification The differences in cophenetic coefficients between the two scales of analysis, result because of the increased size of residuals between data and classification structure which emerges at the delegation level

While tentative suggestions have been made concerning the

economic and social reasons for the development of the five distinct migration regions of Figure 5 14, the possibility of these groupings emerging for purely structural reasons has not been entertained. Taylor (1971), from a study of the frequency distributions of distances within shapes, has suggested that up to 70% of all recorded moves can be explained by a simple understanding of the shapes of administrative units. It is therefore worth considering how important shape and distance constraints are in moulding the spatial character of the Tunisian migration system, and in explaining the distribution of migration regions.

It seems remarkable that two of the first four inter-delegation linkages occur between zones whose locations considerably constrain the possible directions in which migrants can move. Consider the peninsular location of the Menzel Temime-Kelibia linkage, and the interaction system which operates between the Kerkennah Isles and Sfax. At a different scale the peripheral locations of the Beja-Jendouba migration region and Kef-Sakiet Sidi Youssef regions, reduce the possible destinations which can be reached at any given distance by out-migrants from these zones. Most severely constrained are the delegations of Gabes and Medenine governorats which in addition to frontier constraints on the directions of possible movement, also are examples of what Taylor (1971, 43) describes as 'punctured shapes'. The Chott Rharsa, Chott el Jerid and Chott Fejej function not merely as barriers to movement, but also constitute large areas to which no movement can occur. Thus they reduce the potential number of destinations at certain

crucial distances within the migration fields of the southern delegations. Frequency diagrams could be constructed to show the effect of such shapes on the distribution of possible distances available to migrants.

To suggest that the constraints of distances within shapes influence entries in a migration matrix and affect the identification of migration regions, is not to deny the concept of migration regions. On the contrary, it underlines the significance of spatial structures as opposed to non-spatial forces in influencing the development of strong components in an interaction matrix.

Migration Regions and Planning Regions

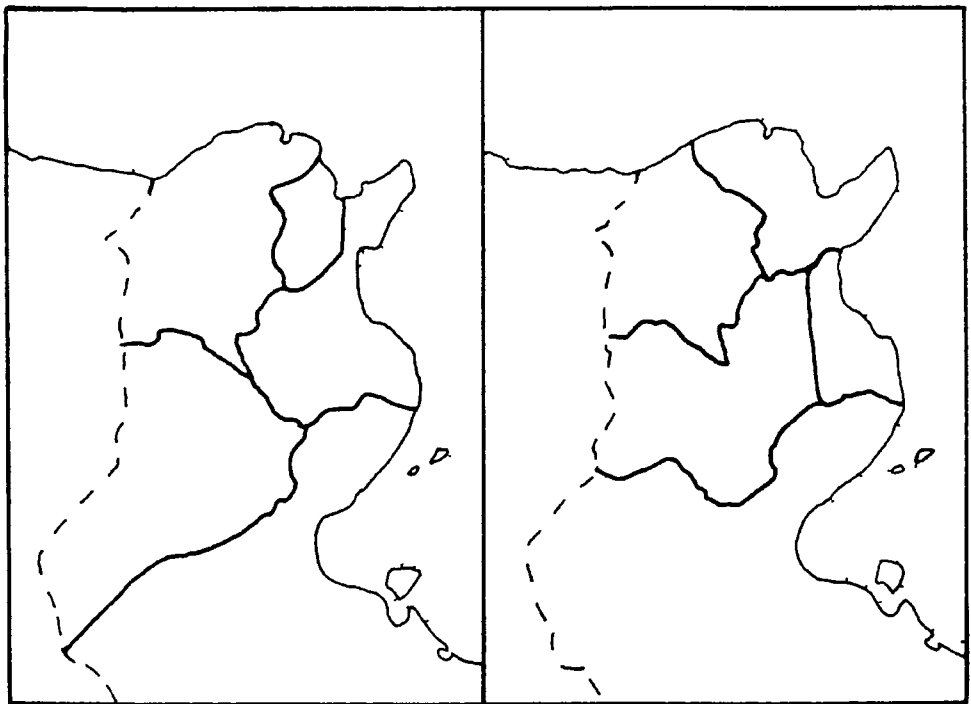
The value of migration region analysis should not be assessed purely in terms of the level of sophistication (or otherwise) of the statistical techniques which have been involved. It must stimulate hypotheses and theories such as those stated above concerning the processes which introduce spatial order into migration behaviour. Migration involves an overtly spatial decision to move to one destination rather than to any other. Migration regions therefore exhibit patterns which reflect formative spatial behaviour. It is possible that migration regions structure the space within which other processes such as innovation diffusion may operate.

If migration is accepted as an appropriate surrogate for some other forms of human interaction, it is also valuable to compare the functional units defined by migration region analysis

FIG 5 15 Regional delimitation

**MIGRATION REGIONS, 1975 -
FIVE REGION SOLUTION**

**PROPOSED PLANNING REGIONS
(MINISTERE DE L'INTERIEUR)**



with those adopted for planning purposes. In the Tunisian context it can be seen that the five planning regions recently proposed by the Ministry of the Interior differ to some extent from the five regions which might have been established on the basis of migration region analysis (Figure 5.15). Clearly, a number of different forms of interaction data would require to be analysed before functional regions of value for planning purposes could be satisfactorily defined. On the basis of comparison of the two regionalizations presented in Figure 5.15, one might only speculate that the proposed planning regions bound zones with similar geographical characteristics, rather than delimiting units which exhibit functional integrity. Further research would be required either to justify or refute this speculation.

Summary and Conclusions

There is a Chinese proverb

"The more one doubts, the more one understands "

It is believed that critical analysis of many different taxonomic procedures leads towards a deeper understanding of migration processes. No single clustering algorithm should ever be accepted as the ideal approach to the classification of interaction data. Only examination of many different techniques can hope to reveal the multiplicity of subtle processes hidden in data-rich interaction matrices. By means of the different approaches employed in this chapter, and despite many technical and conceptual difficulties which have been encountered, it is

believed that light has been shed on the complex character of
the Tunisian migration system

Chapter 6

THE TUNISIAN MIGRATION SYSTEM in TRANSITION

Patterns of population redistribution at any point in time may be explained in terms of the economic, social or political organization of space. Only a minority of studies have considered the evolution of migration patterns through time. Such an approach demands a wider view of population mobility which investigates causal factors relating not only to the spatial differentiation of migration destinations, but also to the temporal oscillations in the mobility status of the population. Zelinsky's (1971) hypothesis of the mobility transition, which has already been briefly discussed in Chapter 1, offers a theoretical structure within which both spatial and temporal changes in population mobility may be examined. In the remainder of this chapter it is hoped to compare the Tunisian migration system of the 1960s with that of the early 1970s, in the light of the trends which might be expected if Zelinsky's claims were justified.

Propositions Derived from the Mobility Transition Hypothesis

Zelinsky has defined five phases in the development of personal mobility, which may be taken to encapsulate his hypothesis of the mobility transition. The characteristics of each phase are listed in Table 6.1. It can be seen that as society progresses from the Pre-Modern Traditional Phase (Phase I) towards an Advanced State (Phase IV), the volume of population

movement increases, although the importance of different forms of mobility fluctuates. For example, residential mobility begins to drop as journey to work patterns become more extended and more complicated. In the long run, daily circulation of workers declines as telecommunications improve reducing the need for personal movement.

Analysis of the mobility of the Tunisian population after the results of the 1966 census suggests that it is characteristic of a society in the second phase of the transition. It was demonstrated in Chapters 3 and 4 that there was "massive movement from countryside to cities, old and new", and significant growth in various kinds of inter and intra-urban circulation. International migration of Tunisians remained low in the early 1960s, but after 1964 soared rapidly in response to new demands for cheap labour in the Western European economies.

Condition 2 of the Late Transitional Society seems inappropriate to the Tunisian case, since by the 1960s there was very little land available for new settlement without heavy investment in new irrigation projects. The one exception to this was the resettlement of farmlands left by the French colonists who returned to France in the early part of the decade. Finally, it should be noted that the heritage of a community of skilled and semi-skilled workers residual from the colonial era, obviated the need for any major inflow of foreign professional workers to Tunisia (Condition 4).

Zelinsky (1971, 249) hypothesized that Tunisia might enter Phase III during the 1970s. If this prediction was fulfilled,

Table 6.1 Characteristics of the Mobility Transition

PHASE I - The Pre-Modern Traditional Society

(1) Little genuine residential migration and only such limited circulation as is sanctioned by customary practice in land utilization, social visits, commerce, warfare, or religious observances.

PHASE II - The Early Transitional Society

- (1) Massive movement from countryside to cities, old and new
- (2) Significant movement of rural folk to colonization frontiers, if land suitable for pioneering is available within country
- (3) Major outflows of emigrants to available and attractive foreign destinations
- (4) Under certain circumstances, a small, but significant, immigration of skilled workers, technicians and professionals from more advanced parts of the world
- (5) Significant growth in various kinds of circulation

PHASE III - The Late Transitional Society

- (1) Slackening, but still major, movement from countryside to city
- (2) Lessening flow of migrants to colonization frontiers
- (3) Emigration on the decline or may have ceased altogether
- (4) Further increases in circulation, with growth in structural complexity.

Table 6 1 (continued)

PHASE IV - The Advanced Society

- (1) Residential mobility has levelled off and oscillates at a high level
- (2) Movement from countryside to city continues but is further reduced in absolute and relative terms
- (3) Vigorous movement of migrants from city to city and within individual urban agglomerations
- (4) If a settlement frontier has persisted, it is now stagnant or actually retreating
- (5) Significant net immigration of unskilled and semi-skilled workers from relatively underdeveloped lands
- (6) There may be a significant international migration or circulation of skilled and professional persons, but direction and volume of flow depend on specific conditions
- (7) Vigorous accelerating circulation, particularly the economic and pleasure-oriented, but other varieties as well.

PHASE V - A Future Super-Advanced Society

- (1) There may be a decline in level of residential migration and a deceleration in some forms of circulation as better communication and delivery systems are instituted
- (2) Nearly all residential migration may be of the inter-urban and intra-urban variety
- (3) Some further immigration of relatively unskilled labour from less developed areas is possible
- (4) Further acceleration in some current forms of circulation and perhaps the inception of new forms
- (5) Strict political control of internal as well as international movements may be imposed.

certain changes in the migration system might be expected to appear in the records of the 1975 census. Four propositions derived directly from the mobility transition hypothesis will be employed to test whether Zelinsky's prediction proved to be accurate. These are

1) that there would be a slight deceleration of residential mobility (Zelinsky, 1971, 243)

2) that there would be a decrease in the volume and significance of rural-urban migration,

3) that there would be a concomitant increase in the significance of inter-urban migration

4) that there would be a decline in the effectiveness of migration movements, migration tending to result in a circulation of persons, rather than in a net redistribution of population.

These conditions all relate to the volume, and to the crude rural-urban dichotomization of flows. Although Zelinsky (1971, 249) stresses that the mobility transition as a spatio-temporal process "is essential to the understanding of the modernization phenomenon", he does not elucidate how the process is linked to the spatial dimensions of development.

Pryor (1975, 28) has attempted to amplify the applicability of the transition hypothesis by developing a theoretical model of migration in Phases II and III. He argues that the net direction of migration moves will be reciprocal to the direction of diffusion of 'modernization'. He therefore postulates a flow from the spatio-economic periphery of a nation towards its core. He also shows that traditional and modern sectors of an economy

may be spatially intermeshed, such that migration from rural to urban areas does not guarantee an individual entry to the modern economy, while intra-urban movement might have this effect. Fusion of the core-periphery model with the hypothesis of the mobility transition is an important step, since it leads to a further proposition concerning the spatio-temporal behaviour of the migration process.

Following the work of Friedman (1972), one may expect core-periphery relationships to be self-reinforcing. The effect of the dominance of the core over the periphery will be

"the steady weakening of the peripheral economy by net transfers of natural, human and capital resources to the core." (Brookfield, 1975, 120)

Thus in the Tunisian case, migration can be expected to occur from the peripheral regions (whether rural or urban) towards the 'modern' economic core. Clearly during the colonial era this core lay in the north-east of the country centring on the capital city, Tunis.

Provincial towns will be influenced by the spread of the modern economic system before villages and rural areas. Extension of the 'modern' economy during Phases II and III of the mobility transition may therefore result in the development of a nationwide network of less dominant cores. The hierarchical diffusion of 'modernity' through the urban system may be mirrored in the reorientation of migration flows from the capital to other important nodes in the urban hierarchy. Simultaneously, small towns in peripheral locations may lose population to these larger centres. This theory is in contra-distinction to

Hirschman's (1958) hypothesis of the 'trickling down' of 'modernization' to zones spatially contiguous to the national core.

A fifth proposition may be derived from the concept of hierarchical diffusion of 'modernization' through the urban system (Hermansen, 1972). That is

5) there will be an increase in in-migration to highly urbanized regions outwith the central core of the economy with the passage of time

In the remainder of this chapter the Tunisian migration system, as revealed by the 1966 census, will be contrasted with the system identified in the 1975 census. Although there are a number of problems in data handling (discussed in Appendix 3) it is possible to draw firm conclusions from the analysis concerning the validity of the five propositions.

Volume of Inter-regional Migration

One of the most remarkable changes in the migration system emerging from comparison of the 1966 and 1975 census results is the overall decline in the volume of inter-regional migration. Between 1962 and 1966, 3.48% of the Tunisian population changed their governorat of residence while in the longer period from 1969 to 1975, 3.23% of the population were recorded as inter-regional migrants. Both the overall and the yearly level of migration declined between the first and second period, a finding substantiated by analysis of lifetime migration statistics. By 1975 it appears that Tunisia had passed its peak level of

population redistribution. Examination of the mobility status of individual gouvernorats indicates that there is considerable diversity within the national trend. Table 6.2 shows that the level of gross migration declined in the north-east (Tunis, Bizerte and Nabeul), in Kairouan gouvernorat and in the south (Gafsa, Gabes and Medenine). The most dramatic declines were recorded in the Tunis region, largely due to a drop in the level of in-migration to the city and in Medenine, caused by a reduction in the rate of population departures to other regions of the country. There was a striking similarity in the trends of Bizerte and Nabeul, whose out-migration rates declined from 68 and 67 per 1,000 to 58 and 57 per 1,000 respectively.

Contrary to the national trend, there was an increase in gross mobility in the gouvernorats of the Tell, while in the regions around Sfax and Sousse there was little change in the overall level of movement. In Sfax there was hardly any modification in the rate of population departures, and a small increase in in-migration. By contrast, Sousse experienced a large drop in the level of departures concurrent with an increase in the in-migration rate from 12 to 38 per 1,000.

In most regions, gross migration appears to follow parallel trends to those of departure and in-migration rates. Exceptions to the rule, such as Sousse, indicate regions whose significance in the national migration system has changed. Only in the cases of Sousse and Bizerte did these modifications in the patterns of movement precipitate a total change in the direction of net migration. While Sousse became an area of net in-

Table 6 2

Measures of Mobility 1962-66 and 1969-1975

Gouvernorats	Number of out-migrants		Number of in-migrants		Departure rate (1)		In-migration rate (2)		Gross Migration	
	1962-66	1969-75	1962-66	1969-75	1962-66	1969-75	1962-66	1969-75	1962-66	1969-75
Tunis										
(and Zaghouan)	24389	35740	68984	71650	0 0327	0 0314	0 0873	0 0745	0 1182	0 0916
Bizerte	10780	13600	11530	6650	0 0328	0 0385	0 0350	0 0238	0 0677	0 0585
Beja	15271	15090	7515	5220	0 0465	0 0594	0 0234	0 0255	0 0711	0 0833
Jendouba	8165	11450	3314	4080	0 0314	0 0386	0 0130	0 0165	0 0450	0 0537
Kef										
(and Silliana)	12360	20380	6927	9100	0 0390	0 0481	0 0223	0 0258	0 0620	0 0715
Kasserine	5927	7710	5612	6360	0 0280	0 0325	0 0265	0 0340	0 0545	0 0596
Gafsa										
(and Sidi	6584	8870	7655	8010	0 0206	0 0196	0 0238	0 0222	0 0443	0 0374
Pou Zid)	13994	8300	6925	10030	0 0561	0 0288	0 0286	0 0427	0 0863	0 0632
Medenine	8776	8730	5654	8050	0 0425	0 0344	0 0278	0 0381	0 0709	0 0663
Gabes	13130	14420	9717	12160	0 0306	0 0304	0 0229	0 0301	0 0537	0 0562
Sfax	7757	9240	5974	5820	0 0277	0 0275	0 0215	0 0213	0 0493	0 0453
Karouan										
Sousse	21055	16030	6447	21680	0 0393	0 0230	0 0124	0 0383	0 0528	0 0537
(and Mahdia	9693	10270	11627	11020	0 0301	0 0277	0 0359	0 0356	0 0668	0 0573
and Monastir)										
Nabeul	157881	179830	157881	179830	0 0348	0 0323	0 0348	0 0323	-	-
Total										

Sources Author's calculations columns 5, 6, 7, 8, 9, 10

Columns 1, 2, 3, 4 derived from the 1966 population census and the 1975 population census

(1) Defined as the ratio of departures from an area in a given period to the population of the area minus the volume of net migration This measure was employed to permit comparison with Tarifa's work (1978)

(2) In-migrants/Total Population in 1966 (and 1975)

migration, Bizerte experienced the inverse situation and became a zone of net out-migration.

The declining levels of out-migration and the rising levels of in-migration in southern governorats appears anomolous on first examination. The sharp increase in in-migration to Gabes and Medenine between 1969 and 1975 is disproportional to the rate of expansion of the southern labour market. It may in part reflect the return migration of some workers from Tunis and north-eastern Tunisia, but in large part the change in migration patterns must be related to the development of international migration. The selective impact that international emigration had on the Tunisian labour market is shown clearly in Table 6.3.

With only 8.9% of the total Tunisian population, the governorats of Gabes and Medenine were the regions of origin for 17.7% of all emigrants in the period 1969-1975. A high proportion of emigrants from the south departed to Libya to find new employment opportunities. It is hypothesized that by the early 1970s the Libyan cities had become competitive migration destinations to Tunis, not only for potential migrants from the southern governorats, but from all over the country. The emergence of significant foreign employment opportunities may indeed be a major factor in explaining the changing patterns of Tunisian internal migration. While it may have reduced internal migration movements from some regions, this external magnet may have drawn forth new inter-regional movements in others, as persons from peripheral regions gravitated towards the cities to obtain foreign work permits, or switched to more favoured coastal agri-

Table 6.3. International Emigration, 1969-1975

Gouvernorat	(1) Number of Emigrants	(2) Percentage of all Emigrants	(3) Departure Rate per 1000 Population	(4) Percentage of the Tunisian Population, 1975
Tunis (+ Zaghouan)	19449	22.9	17	20.6
Bizerte	5929	7.0	17	6.1
Beja	3425	4.0	14	4.4
Jendouba	6220	7.3	21	5.4
Kef (+ Siliana)	3741	4.4	9	7.6
Kasserine	2603	3.1	11	4.3
Gafsa (+ Sidi Bou Zid)	2027	2.4	4	8.1
Medenine	8499	10.0	30	5.2
Gabes	6552	7.7	26	4.6
Sfax	7101	8.4	15	8.5
Kairouan	3149	3.7	9	6.1
Sousse (+ Mahdia + Monastir)	11403	13.4	16	12.5
Nabeul	4840	5.7	13	6.6
Total	84938	100.0	15	100.0

Source 1 Taamallah (1977, 5)
2 + 3 Author's calculations
4 I.N.S., 1975b

cultural zones to take up employment in the jobs left vacant by international migrants (Sethom, 1978). While the emergence of high levels of emigration to foreign labour markets can be taken as a primary factor in accounting for the decline of internal migration from southern Tunisia, it must be concluded that the opposite was true for many other regions, international migration acting as a catalyst to further internal migration. Further details concerning the inter-relationship of internal and international migration are given in Chapters 7 and 8.

The Decline of Rural-Urban Migration

Zelinsky (1971) and Pryor (1975) stress that it is not simply the volume of internal migration which characterizes the phases of the mobility transition, but also the direction and destinations of migrant flows. A particularly significant distinction may be made between flows destined for urban areas originating in rural areas and those occurring between urban zones.

Tarifa (1978) arbitrarily defines urban areas as those delegations with 50% or more of their population living in communes. Investigation of the distribution of the Tunisian population in 1966 and 1975 as classed within the 1975 administrative boundaries (Houdi and Miossec, 1976) reveals that the 50% threshold is remarkably stable. Between 1966 and 1975 only one delegation (Korba in Nabeul governorat) experienced sufficient levels of urbanization to require reclassification in the 'urban' category of delegations.

To avoid misunderstandings due to such reclassification it

was decided that all delegations containing communes which accounted for over 50% of the 1975 delegation population should also be considered urban in 1966. On this basis Table 6.4 groups all inter-delegation migration flows into four categories urban → urban, urban → rural, rural → urban and rural → rural. It is clear that prior to 1966 the most important was rural → urban movement accounting for 36% of all moves. Of all flows entering urban delegations 57% came from rural areas and a surprising 43% came from other urban delegations. The level of circulation between rural delegations was also higher than might have been expected, accounting for one in five migrants.

Calculations by Tarifa (1978, 22) show a remarkable shift in the orientation and direction of flows by the period 1969-1975 (Table 6.5). Over 50% of all flows were between urban areas compared with 27% of all flows prior to 1966. Only one in four of the migrants arriving in cities between 1969 and 1975 came from delegations which were predominantly rural. Comparison of Tables 6.4 and 6.5 therefore reveals the marked diminution of rural-urban migration which has occurred. By 1975 the level of circulation between rural areas had also dropped substantially.

These results strongly confirm the suggestion that the character of Tunisian mobility has changed during the last decade. The rapid increase in inter-urban migration combined with a reduction in relative and absolute terms of rural → urban flows are characteristic of a nation moving from the second through the third and towards the fourth phase of the mobility transition.

Table 6.4. Migration Streams from Rural and Urban
Delegations, 1966

Residence in 1966	Previous place of residence			%		
	Urban	Rural	Total	Urban	Rural	Total
Urban	157588	210834	368422	26.7	35.7	62.4
Rural	93831	127819	221650	15.9	21.7	37.6
Total	251419	338653	590072	42.6	57.4	100.0

Source Author's calculations.
Data set G PR U 66

Table 6.5. Migration Streams from Rural and Urban
Delegations, 1969-1975.

Residence in 1975	Residence in 1969			%		
	Urban	Rural	Total	Urban	Rural	Total
Urban	194060	72300	266360	50.3	18.7	69.0
Rural	63070	56650	199720	16.3	14.7	31.0
Total	257130	128950	386080	66.6	33.4	100.0

Source Tarifa, 1978, 22.

FIG 61 Migration Regions, 1962-1966 (Slater's method)

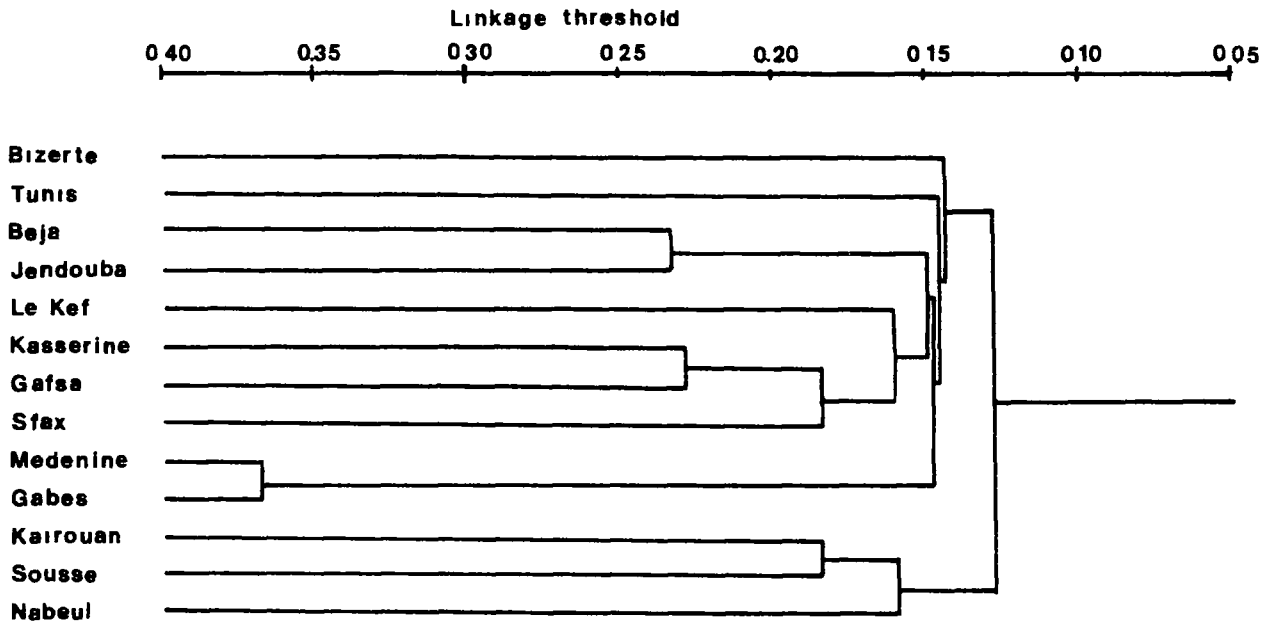
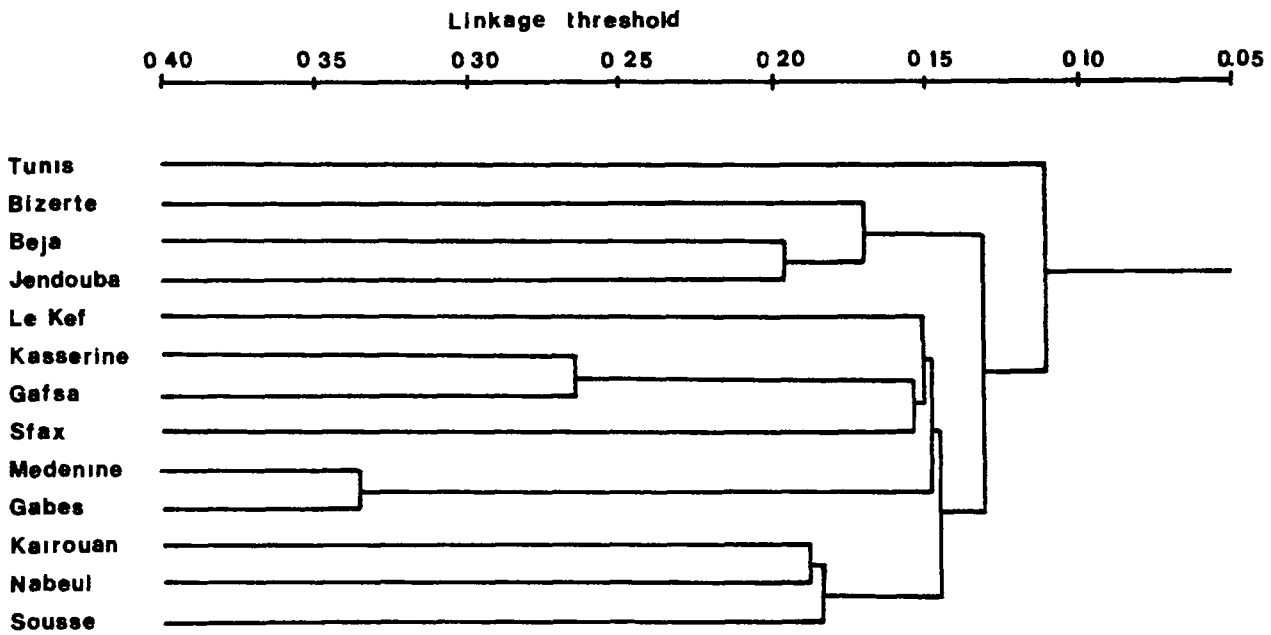


FIG 62 Migration Regions, 1969-1975 (Slater's method)



Circulation versus Redistribution

Since emphasis appeared to shift from rural → urban movements towards urban → urban movements in the late 1960s and early 1970s, it is interesting to examine whether this change was accompanied by the development of an increasingly complex and less effective migration system. If effectiveness may be defined as the ratio of net migration to total migration, it appears that the Tunisian system did become much less effective by the period 1969-1975 (Table 6.6). Net migration (redistributive flows) accounted for 30.6% of all inter-gouvernorat moves between 1962 and 1966, but for only 24.5% of moves between 1969 and 1975. Inversely, circulatory movements became more important.

The growth of population circulation relative to redistribution is evident in the strengthening of intra-regional migration patterns. Leusmann and Slater's (1977) regionalization procedure was once more applied to the matrices for Tunisian migration. In the 1962-1966 period a very distinctive migration region was defined in the southern governorats of Medenine and Gabes, and a weaker interaction region also emerged in the Tell (Beja and Jendouba governorats). Bizerte and Tunis have diffuse links with a large number of other governorats, rather than intense interaction with just one or two other regions, and they join the dendrogram independently after threshold 0.150 (Figure 6.1). Interestingly, the final fusion is not between Tunis and the rest of the nation but between the Kairouan-Sousse-Nabeul cluster and the main stream of the Tunisian migration system. This grouping is distinct from those obtained

in Chapter 5 from analysis of different data sets. It should also be noted that the algorithm appears to force fusion between gouvernorats in the lower reaches of the dendrogram. The 'regions' which emerge do not survive over any significant span in the later stages of the dendrogram fusion.

The dendrogram describing migration regions in the period 1969-1975 (Figure 6.2) has many points in common with the migration regions defined from analysis of lifetime migration (Chapter 5). Once more, the Medenine-Gabes migration region is the strongest, although it appears to be less important than it was between 1962 and 1966. In contrast, the Kasserine-Gafsa region is more distinct than it was a decade earlier. The Beja-Jendouba region collapses to incorporate Bizerte at an earlier stage, but this may in part reflect the boundary changes since the 1966 census. Kairouan, Sousse and Nabeul appear to become more closely interrelated by the 1969-1975 period. At a threshold of about 0.150 there is a chaining of regions with each strong component surviving over only very short spans. The final linkages occur between the distinct migration region of the Tell and the rest of the country, and between the capital and the rest of Tunisia. Although in-migration and out-migration rates to Tunis were lower in the five years prior to 1975 than in the early 1960s, the results of hierarchical regionalization suggest that migration links were less concentrated than previously, and that links were more widely dispersed than between 1962 and 1966. That this should have occurred at the same time as certain migration regions became more distinctly defined, affirms the fundamental change in the role of the capital city in the

national migration system Tunis appears to have become much less important as a terminal point in patterns of Tunisian population redistribution. This trend may be demonstrated by comparing the absolute values for net in-migration to Tunis in 1962-1966 with those for 1969-1975. It can be seen (Table 6.7) that net migration accounted for almost one half of moves in the early 1960s, but for only one third by the 1970s. Between 1969 and 1975 a large part of the flows associated with the city were outward moves away from Tunis towards other gouvernorats.

Dominant Flows and Primacy Ratios

Dominant flow analysis (Chapter 4) was unable to detect the reorientation of migrant flows which has occurred during the last decade. Examination of the out-migrant flows from each of the regions of Tunisia reveals that for both periods under consideration Tunis was the most important destination for migrants from other regions reflecting the continuing importance of its key location within the economy and its on-going nodal significance in the spatial organization of the country.

Tunis may have remained the most important single migrant destination throughout the period, but the primacy of the conurbation within the national migration system was weakened. This is clearly demonstrated from changes in the ratio of migrant flows to Tunis to the sum of the four largest out-flows from each gouvernorat. Primacy ratios (Table 6.8) suggest that only the gouvernorats of the Tell, Kairouan and Medenine had their out-migrant flows more concentrated on Tunis in the

Table 6.6. Net Migration and Circulation between Regions¹

	1962-66	%	1969-75	%
Net migration	48350	30.6	44040	24.5
Circulation	109531	69.4	135790	75.5
Total migration	157881	100.0	179830	100.0

¹ 'Circulation' is defined in this context as gross migration minus net migration

Author's calculations

Table 6.7. Migration Exchange with Tunis

	1962-66	1969-75
Net migration	+ 44595	+ 35910
Circulation	48778	71480
Total migration	93373	107390

Author's calculations

Table 6.8. Primacy Ratio of Migrant Flows to Tunis

From	Bizerte	Nabeul	Sfax	Gabes	Kasserine	Gafsa
1962-66	0.802	0.772	0.653	0.506	0.355	0.411
1969-75	0.713	0.551	0.606	0.408	0.331	0.325
Change	-	-	-	-	-	-

From	Sousse	Kairouan	Medenine	Jendouba	Kef	Beja
1962-66	0.591	0.458	0.641	0.692	0.748	0.772
1969-75	0.591	0.481	0.661	0.734	0.774	0.814
Change	0	+	+	+	+	+

Author's calculations

$$\text{Primacy ratio} = \frac{m_1}{m_1 + m_2 + m_3 + m_4}$$

where m_1 = largest migration flow and m_2 = second largest migration flow

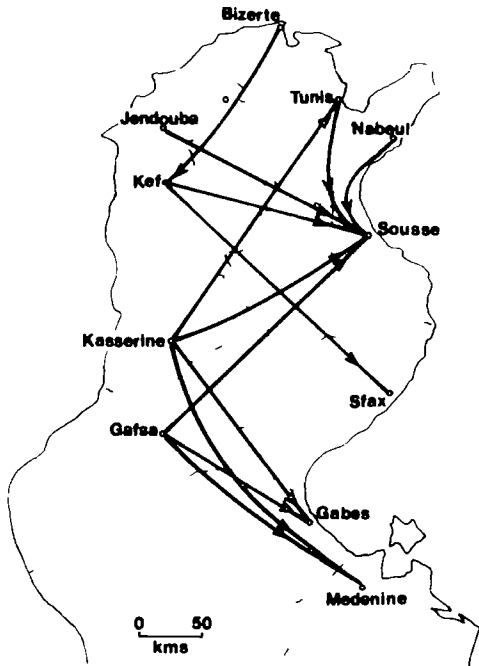
1969-1975 period than previously. The rising importance of Tunis as a destination for migrants from the Tell is remarkable in view of the already high levels of migration to the capital recorded by the 1966 census. This may in part be interpreted as a consequence of the decline in migration opportunities in Europe after 1973, when migrants from the Tell sought employment in Tunis instead. More important, the rising primacy ratios emphasize the structural constraints on the migration system introduced by the channelling of most route networks and information networks from the Tell towards Tunis. It also reveals the failure of the Tunisian government to implement any major projects for economic development within the Tell or to reorient rural migrants towards local growth points.

The reduction of the importance of out-migration from Bizerte, Kasserine, Gabes, Gafsa and Sfax to Tunis relative to out-migration to other major destinations suggests that the population of these regions found the attraction of the national core to be waning with the passage of time. This may have been due to the growing structural, spatial, and economic congestion found in the capital. Alternatively, it may have been a function of the diffusion of modern sector employment to other cities of the eastern littoral and of the consequent increase in the attractiveness of such destinations. The diffusion of certain social and infrastructural characteristics to large cities other than the capital, may also have been critical in modifying migrants' perceptions of these alternative destinations.

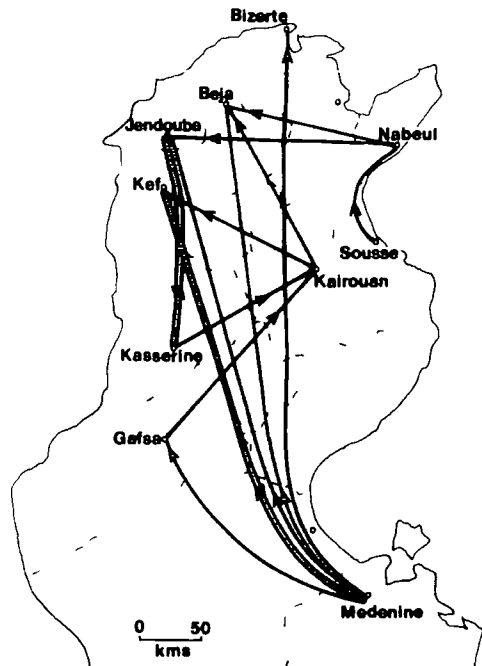
This same trend is identified from analysis of the rank

FIG 6 3 COMPARISON of MIGRATION FLOWS 1962-66 and 1969-75

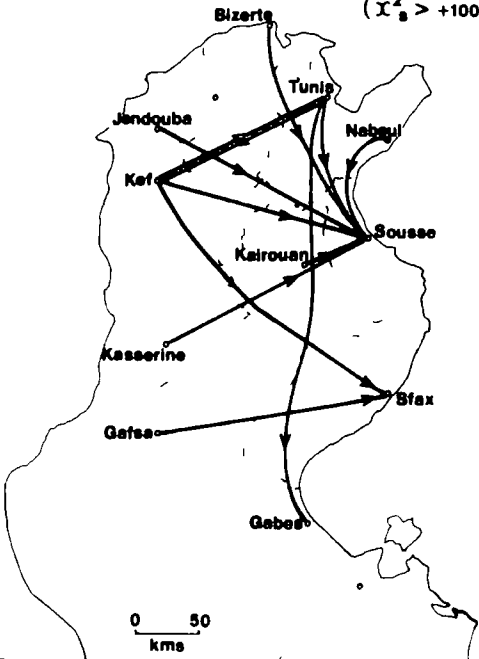
a) Flows increasing by over 200%



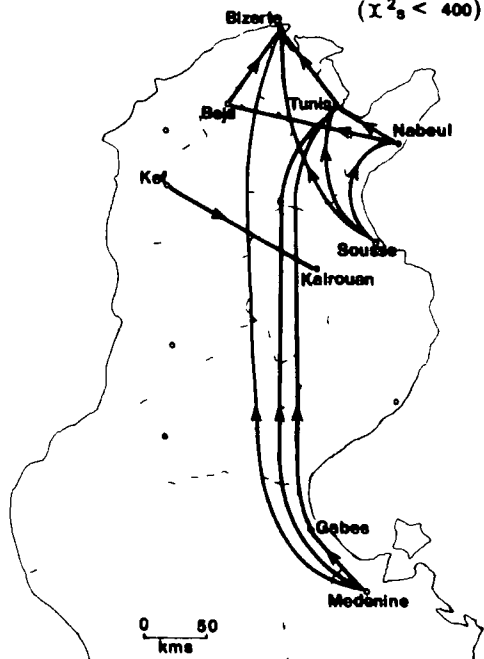
b) Flows declining by over 50%



c) Very significant increase in flow size
($\chi^2_s > +1000$)



d) Very significant decrease in flow size
($\chi^2_s < 400$)



importance of the Tunisian regions in the national migration systems at the two different time periods. Table 6.9 and Table 6.10 display the rank frequency of each destination in the system. For example, the important position of Tunis as the rank 1 destination for 12 of the inter-regional flows can be easily distinguished from the matrices. No single destination assumed national significance as the rank 2 destination during the period 1962-1966, Nabeul, Beja and Medenine all asserting only a restricted regional influence. Between 1966 and 1975 the pattern changed considerably, as the Sousse area emerged as a distinctive and important second destination for the migration system. To a lesser extent the significance of the Sfax region in the national migration system also increased. By contrast, Bizerte fell to a mean rank of only 7.0 (from 5.1) while Beja slipped to a mean rank of 8.5 (from 5.8). This exploratory analysis of the reorientation of the migration system suggests that the regions immediately surrounding Tunis became less important as migrant destinations compared with those areas in other parts of Tunisia which contained large urban areas.

Reorientation of Migrant Flows Ratio and Chi-square Measures

Thus far, modification in the migration system has been assessed only in terms of the growth or decline in importance of points of origin or destination. Another approach to the study of changes in the pattern of flows is to map individual flows which were either greatly reduced or considerably amplified between 1966 and 1975. Figure 6.3a distinguishes the 14 flows which more than trebled in volume during this period, while Figure

Table 6 9. Out-migration Flows Rank Frequency, 1962-66

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Destinations	Destination rank												Mean rank ¹	
	1	2	3	4	5	6	7	8	9	10	11	12		
Tunis	12												1.0	
Bizerte	1	1	2		4		1	2	1					5.1
Nabeul		2	3		2		3		1	1				5.2
Sfax		1	1	5	2				1	2				5.3
Beja		3	1		1	3		1	1	1	1			5.8
Sousse		1	2		2	2	1	1	1	1	1			6.2
Kef		1		2	1	1	2	2	1			2		6.8
Gafsa		1	2	1		1	1	1	2	1	2			6.9
Kasserine			2			2	2	3	3					6.9
Kairouan				2	1	2	2	1		1	1	2		7.7
Medenine		2				2	1		1	2	3	1		8.1
Gabes		1		2						1	1	7		9.6
Jendouba				1				2	1	3	1	4		9.8

Source Author's calculations

¹ The mean rank is calculated by summing the product of rank \times frequency for each rank and by dividing by the total frequency of flows to each destination, which in this case is 12.

Table 6 10 Out-migration Flows Rank Frequency, 1969-75

Destinations	Destination rank												Mean rank	
	1	2	3	4	5	6	7	8	9	10	11	12		
Tunis	12												1.0	
Sousse	1	5	2	1	2	1								3.1
Sfax		2	2	3	1	2	1		1					4.6
Kef		1	1	1	5	1	1	1	1					5.3
Nabeul		1	2	2	1	2		2			2			5.9
Medenine		1	1		2	2		1	2	2		1		6.7
Bizerte			1			3	4	2	1	1				7.0
Gafsa		1	1	1			1	5	1	1	1			7.2
Kasserine			1	1		1	4			1	3	1		8.0
Gabes		2		1		1		2	1		2	3		8.1
Kairouan			1	2				2	1	3		3		8.5
Beja			1		2				4	3	1	1		8.5
Jendouba				1		1				3	3	4		10.1

Source Author's calculations

6.3b charts the 15 flows which had shrunk to 50% or less of their former size by the 1969-1975 period. It is hoped by choosing these high, if somewhat arbitrary thresholds, that fluctuations in migration flows introduced by differences in enumeration practices will have been excluded from the analysis, and that the most significant alterations in the migration system arising from real changes in migration opportunities at the points of origin and destination, might be distinguished from other flows in the data matrix.

Figure 6.3a shows that there was a very important increase in the volume of in-migration to Sousse. The southern governorats of Gabes and Medenine also became substantially more attractive to migrants from the steppelands. Between 1969 and 1975 Gabes appears to have also drawn much larger migrant flows from the north-east of Tunisia, doubling its number of in-migrants from Tunis and Nabeul over the number for the 1962-1966 period.

Figure 6.3b, mapping flow reductions of over 50%, suggests that a great decline of out-migration occurred from Medenine to the western and north-western governorats of Tunisia. Secondary tendencies include reduced movement from Kasserine and Gafsa to Kairouan, and from Kairouan to Le Kef and Beja. Flows from Beja and Jendouba were also reduced.

While Figures 6.3a and 6.3b display two most interesting indicators of change in the Tunisian migration system, the ratios from which they are constructed can be shown to be somewhat unstable. Consistent use of ratio cut-offs hides quite important

differences in absolute increases and decreases in the volume of migration from zones of existing high out-migration. Inversely, a greater proportional difference in migration levels can be expected in zones with low levels of mobility. The problem can in part be circumvented by comparing regional out-migration as a proportion of all migration within the Tunisian migration system at one period, with its relative importance at another.

Visvalingam (1976), facing similar problems in establishing the significance of sex ratios in populations of very different sizes, has advocated the use of the X^2_s statistic. This statistic has the advantage that although it

"expects larger numerical differences in larger populations, unlike ratios it does not expect the magnitude of difference to be a linear function of population size." (Visvalingam, 1976, 11)

$$X^2_s = \text{sgn}(O - E) X^2$$

where 'sgn ()' is the sign, + or -, of the expression in parenthesis. As applied to the case of Tunisian migration X^2 itself may be defined as

$$X^2 = \frac{(O_{1j} - E_{1j})^2}{E_{1j}}$$

where O_{1j} = Observed migration between origin 1 and destination j in the period 1969 to 1975

E_{1j} = Expected migration between origin 1 and destination j in the period 1969-1975. E_{1j} was calculated on the assumption that migrants from 1 to j would form the same proportion of all Tunisian migrants in the period 1969-1975 as in the period 1962-1966.

The X^2_s statistic therefore compares observed and expected values of specific migrant flows and assesses the significance of the magnitude and direction of departure of observed values from those expected. The significance of the departure might be established from summation of the absolute value of X^2_s for each individual link ij with the value of X^2_s for all other flows in the Tunisian migration system. Due to the large numbers involved many of the X^2_s values which might be derived by summation would appear statistically significant not only with 99% confidence limits but with 99.99% confidence limits. It was therefore decided to rank X^2_s values for individual linkages and map only the largest positive and negative values (i.e. those values representing the most significant positive and negative changes in flow size as established by the X^2_s statistic).

Examination of the frequency distribution of X^2_s values which were calculated for the 156 inter-regional linkages revealed an approximately normal distribution of values about zero. It was decided to map the twelve highest values (i.e. those which represented links which had experienced much larger flows in the period 1969-1975 than might have been expected from their relative importance between 1962 and 1966). These were readily distinguished as extreme values lying in the positive tail of the distribution. From Figure 6.3c it can be seen that many of these links focus on the Sousse region. It will also be recalled that Sousse was identified as a new pole for in-migration from origins spread across northern and central

Tunisia by the ratio method of Figure 6.3a. Indubitably, the growing significance of Sousse in the Tunisian migration system is the most important characteristic of regional change to emerge from the analysis. Two migration flows to Sfax were also identified as being much larger than might have been expected. Interaction between Kef and Tunis also grew in relative significance in the 1970s. From comparison of Figures 6.3a and 6.3c, it is clear that the rapid increases revealed by the ratio map in in-migration to the southern governorats were not numerically of the greatest significance. Similarly the increase in out-migration from Kasserine only involved the movement of a few thousand people, even although individual flows were increasing at very rapid rates.

The twelve largest negative χ^2_s statistics also indicate a structured change in emphasis in inter-regional linkages. Both Tunis and Bizerte had many markedly lower in-migration flows, reflecting a decline in importance relative to their dominant position in the early 1960s. It is interesting that a decline in out-migration from Medenine is mapped both in Figures 6.3b and 6.3d but that the destinations involved appear to be different. Figure 6.3b shows that the most rapid rates of declines were in the small flows to the regions of the north-west and central Tunisia, while Figure 6.3d suggests that the absolute decline in migration to Tunis and Gabes (as well as to Bizerte) was of greater significance. Changes in small flows between the governorats of the steppe and the Tell were not deemed to be very significant by the χ^2_s statistic.

The results of the ratio and the χ^2_s statistic maps are not contradictory, but emphasize different aspects of the reorientation of the Tunisian migration system. To summarize, it is clear that in-migration to Sousse rose both in absolute and relative terms. The change in importance of urban areas was not however uniform, both the capital and the northern city of Bizerte waning in attractiveness. While the rates of change of flows between the largely rural regions of western and central Tunisia were sometimes considerable, they were not significant by comparison with the absolute changes in volume of flow to, from and between the more urbanized coastal regions.

Conclusions and Implications of the Propositions Considered

From the evidence examined concerning the evolution of the Tunisian migration system, it is possible to reconsider the validity of the hypothesis of the mobility transition. The expected shift in emphasis from rural → urban to urban → urban migration occurred (Propositions 2 and 3), and there was an overall decline in the effectiveness of migration movements coupled with an increase in the complexity of Tunisian migration (as predicted by Proposition 4). Of particular importance is the fact that flows to and from Tunis became less effective in redistributing population, Tunis coming to assume the role of an inter-change node in the national migration system.

Propositions 1 and 5 proved harder to verify. Migration statistics, both for lifetime migration and for migration from place of previous residence, suggest that the overall volume of

Tunisian migration has declined marginally over the last decade, but it is difficult to ascertain the cause of this trend. It may have been due to the rapid advance of the mobility transition in Tunisia from the Early Transitional Phase in the years preceding the 1966 census towards the Advanced Phase by the 1970s. Support for this viewpoint might be drawn from the rapid increase in inter-urban migration which occurred during the same period and which also serves as a portent of progress towards Phase IV of Zelinsky's mobility transition.

Alternatively the change in the level of internal migration might be attributed to the rapid pace of development of international migration. This explanation would infer that internal and international migration are competitive systems. It should be noted, although no proposition was established to this effect, that observed patterns in international movements between 1966 and 1975 were contrary to the expectations formulated by Zelinsky for Phase III of the mobility transition (Zelinsky, 1971, 243). Ironically it appears that divergence of observed and expected trends in international migration may be the major factor leading to the fulfilment of Proposition 1 concerning internal migration. That is to say, increased levels of international migration (to be discussed in Chapter 7) may have resulted in lower levels of internal migration, as persons migrating traditionally to work in Tunis, found opportunities for employment abroad more attractive.

The fifth proposition, concerning the reorientation of certain migration flows, was only partially justified. Not all

major urban areas became recipients of larger migrant flows. Analysis showed that the Sousse region as well as the governorats of the south gained disproportionately over the rest of the country. Holding other factors constant, it is surprising that Sfax and Bizerte governorats did not also grow rapidly since they contain large urban units

To a certain extent the selective decentralization of the migration system mirrors the discriminatory national investment policies of the Tunisian government. The Sahel of Sousse has tended to be favoured over and above other regions. By comparison the competing urban nodes of the Tunisian settlement hierarchy have received a much smaller share of recent investment in, for example, manufacturing industry

It has been shown that most of the propositions derived from the mobility transition hypothesis fit the Tunisian experience moderately well. It is therefore worth considering, first how these results relate to evidence from other societies concerning the existence of a mobility transition, and second what implications must be drawn from these findings concerning the future of Tunisian migration patterns

Fuchs and Demko (1978) have suggested that Zelinsky's hypothesis is an inadequate description of migration trends in Eastern Europe. They found no significant increase in inter-urban or inter-regional migration to counterbalance the decline of rural→urban movements in Eastern Europe. They explain the development of mobility in this region in terms of "deliberate government interventions" rather than in terms of "inexorable

and universal processes" (Fuchs and Demko, 1978, 171) This specific case does not seem to invalidate Zelinsky's hypothesis, but rather shows that government intervention can result in temporary deviations from the general pattern In the Tunisian case, government schemes to return unemployed migrants to the countryside (Trabelsi, 1976, Hill, 1978) have had negligible impact in reducing the desire of the rural population to migrate With reference to international migration, it is clear that the French government's decision to halt immigration of foreign workers after 1973 led to a temporary decline in Tunisian emigration, but the ongoing pressure in the Tunisian labour market to seek foreign employment resulted in the re-emergence of massive emigration of workers to Libya as soon as political relations proved favourable Government policies which attempt to alter migration patterns by redirection or inhibition of population movements, may modify the short-term mobility characteristics of a society but are unlikely to have any long-term impact on trends in population mobility.

Another criticism of the mobility transition hypothesis has been made by Chapman and Prothero (1977, 5) Analysis of a wide range of case studies of population movements in less developed countries led them to claim that

"circulation, rather than being transitional or ephemeral, is a time honoured and enduring mode of behaviour, deeply rooted in a great variety of cultures and found at all stages of socio-economic change "

They assert that externally generated changes in the economy may 'modify', 'amplify' or 'maintain' existing patterns of movement

but they do not initiate them. It is certainly true that Tunisia has a long history of population movement, and that colonial influence led largely to a reinforcement of the existing urban nodes. The development of migration patterns in the period under study does however, indicate the emergence of certain important new patterns of interaction, such as that between the Tell and the Sahel. While the evolution of Tunisian migration has reinforced certain traditional patterns of movement, as identified by migration regional analysis, it has also involved the development of some new migration flows. These new directions have resulted from the diffusion of 'modernization' in Tunisia and from the associated changes which have occurred in the mobility status of the Tunisian population.

Zelinsky himself has outlined the greatest problem arising from acceptance of the mobility transition hypothesis. This is the implicit suggestion that the historical changes in the mobility characteristics of a society are a "unilinear repetitive process" (Zelinsky, 1979). He points out that this is an unrealistic assumption in a world economy where changes in the structure and organization of one region or nation can fundamentally modify the characteristics of other economies and societies. In the case of Tunisia, ample evidence has been presented in this thesis to show that changes in the migration patterns of the population have been stimulated by external influences and have not followed an independent course. Since the forces of change in the mobility status of the Tunisian population have differed from the factors which influenced the mobility transition in more advanced nations, there is no reason

to believe that in the future trends in Tunisian movement patterns will follow the same course as that of Western European societies.

It appears therefore that Zelinsky's mobility transition hypothesis can provide only a limited description and explanation of trends in Tunisian migration. Nevertheless his initial proposition, that population mobility alters through time in an orderly sequence, remains a valuable contribution to migration theory. It induces the researcher to investigate the common rather than the unique characteristics of migration systems in different countries. It also leads him to hypothesize about the future state of population mobility.

Although inaccurate in some respects, Zelinsky's (1971, 249) prediction of trends in Tunisian mobility has resembled observed trends to a sufficient degree to warrant further comment. Already, some characteristics of Phase IV of his evolutionary model are present in Tunis. There has been for example an acceleration of inter-urban migration. Undoubtedly, even more intense interaction between Tunisian cities can be expected in the future. If other characteristics of Zelinsky's Phase IV are accepted as providing a possible scenario of future internal migration, then Tunisian planners should carefully consider the implications of increased intra-urban residential mobility, of increasingly complex migration systems and of greatly expanded commuting sheds. Barring innovative government intervention in the reorganization of the space economy, it can also be expected that population circulation, rather than redistribution will be the predominant characteristic of Tunisian migration in the future.

SECTION 3 INTERNATIONAL MIGRATION

Chapter 7

THE SELECTIVITY of INTERNATIONAL MIGRATION

Introduction

Approximately 250,000 Tunisians left their homeland in the twenty years following independence. This is a remarkable exodus when it is remembered that the total Tunisian population was only five and a half million in 1975 and that during the same period 200,000 French and Italian colonists quit the country. With this volume of emigration it is clear that analysis of international labour migration is essential to an understanding of recent patterns of spatial mobility in Tunisia.

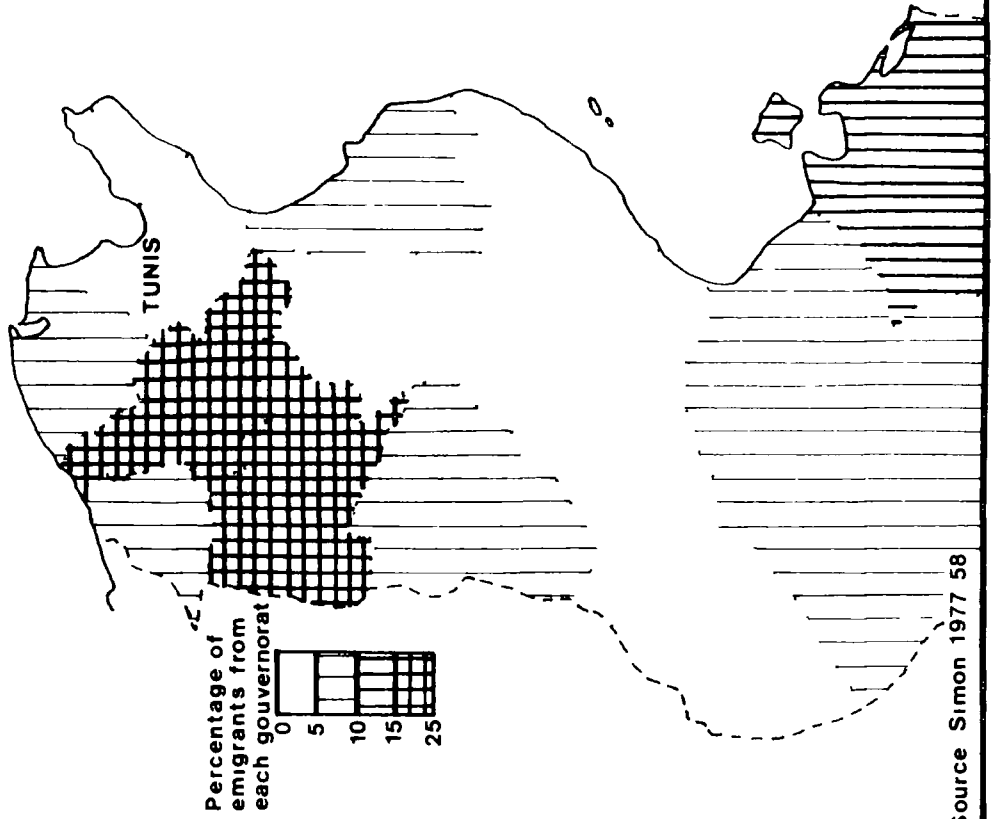
Increasingly the problems of demographic and resource imbalance, epitomised by the juxtaposition of Libya with its large oil reserves and Tunisia with its abundance of manpower, are finding their solution through international migration. Despite the manifest significance of spatial processes in the formation of international migration flows, there has been only limited study of the geographical dimensions of international labour migration. In many instances it is possible, however, to apply laws formulated in the context of internal migration to the case of international migration. For example, the role of distance, which is well recognized in the explanation of patterns of internal migration, has also been examined at the international level by Courgeau (1970) in a study of immigration to France. Similarly, the hypothesis of stepwise migration in the

international migration process has been investigated for emigration from Turkey to Western Europe by Abadan-Unat (1974) Nelson (1976) has suggested that the characteristics of rural-urban migration within a nation, change through time, a trend which has been recognized to apply also to international migration (Amersfoort, 1978). Indeed, mobility cannot be neatly subdivided into international and internal movements. Social and spatial mobility at one scale act as catalysts to movement at another. This inter-relationship has been noted in a number of studies of migration in the countries of the Western Mediterranean (Findlay, 1978c, King, 1976 Simon, 1974, 1979). Further understanding of the function of international migration in the mobility nexus is a prerequisite to the planning of future manpower policies and the space economy, both in sending countries (see Chapter 11) and in receiving countries.

An examination will be undertaken in Chapters 7 and 8 of the geographical aspects of Tunisian labour migration. The Tunisian case is a microcosm of the wider experience of labour migration in the Arab world. In the last decade, Tunisia has experienced a total reorientation of emigration flows with Libya replacing France as the major destination. Labour migration has now extended to the even more distant Arab labour markets such as Saudi Arabia.

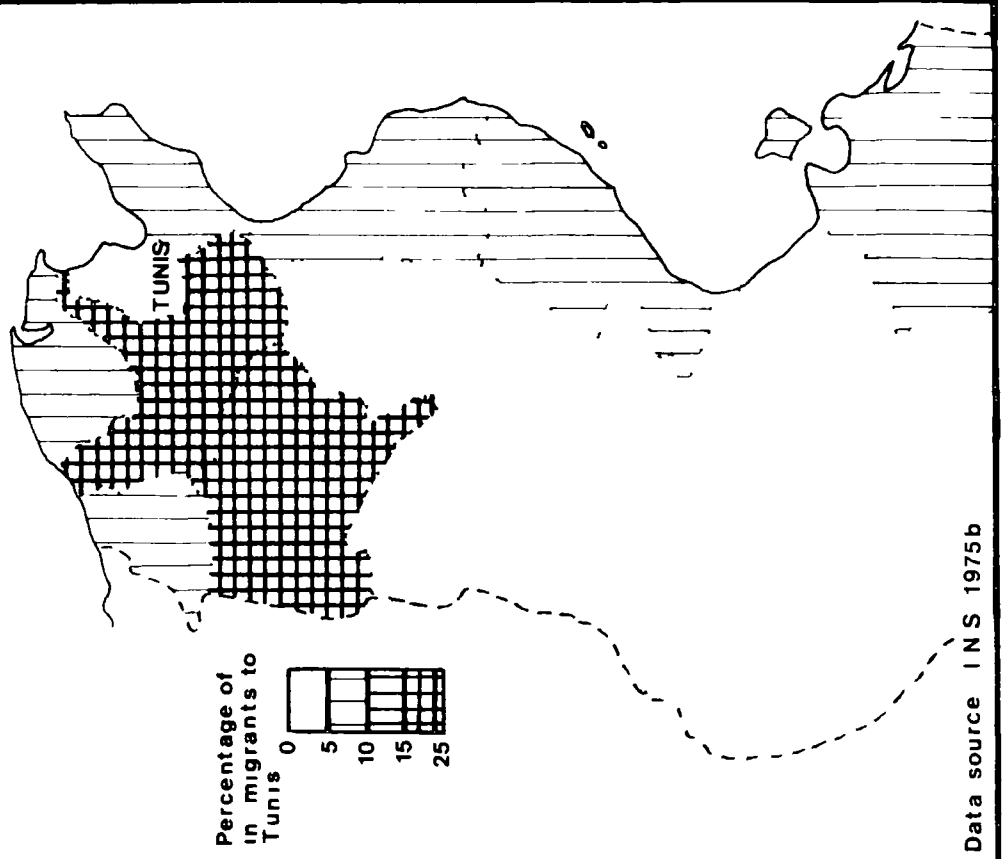
This chapter is concerned with three interrelated themes. Firstly, the connections between internal and international migration will be explored. Secondly, trends in Tunisian emigration will be examined paying particular attention to the

FIG 71a Birthplace of emigrants from
Tunis 1972



Source Simon 1977 58

FIG 71b In-migration to Tunis 1969-75



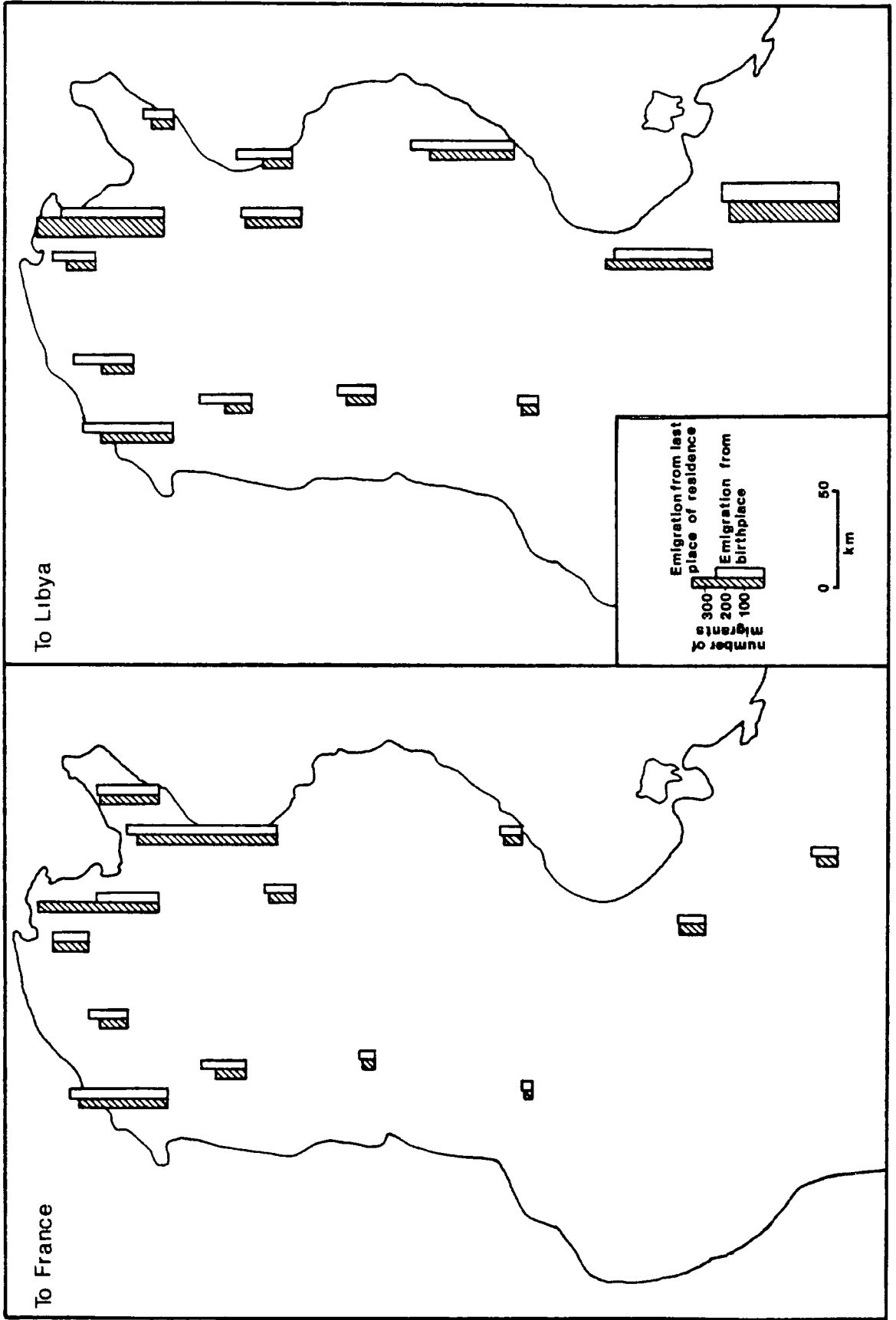
Data source I N S 1975b

spatial and temporal selectivity of the migration process. Finally, an assessment will be undertaken of the extent to which migration to Libya could be said to have become a substitute for migration to France.

Internal and International Migration

Regions of exodus for internal and international migration have frequently coincided. While this relationship has previously been studied in the case of Tunisian emigration to France (Simon, 1976, 20), it is important to re-examine the relationship between these two scales of population movement and to assess whether they are complementary or competitive. Figure 7.1a, reproduced from Simon's work (1977, 58), shows the distribution by birthplace of migrants who left from Tunis in 1972, but who were not native to that city. These movements bear considerable resemblance to the patterns of internal migration to Tunis recorded by the 1975 census (Figure 7.1b). The region of the Tell in particular exemplifies this coincidence of patterns for it is an important region of out-migration both to Tunis and to Europe. Seklam (1970, 12) has discussed one cause which might explain the existence of a close correlation between patterns of internal and international migration. He suggests that pressures on the urban employment market increased considerably in the 1960s. Tunis was no longer able to cope with the massive demand for employment created by the influx of migrants. Consequently, a large part of the migrant community who had in the immediate post-war years sought jobs in Tunis and its conurbation went instead in the years after 1964 to France.

FIG 72 Distribution of Migrants by Birthplace and Gouvernorat of Last Place of Residence 1974



He therefore infers that internal and international migration to a certain extent became alternative options open to mobile job seekers

The degree to which the two scales of population movement are interrelated can in part be assessed from the records of l'Office des Travailleurs Tunisiens à l'Etranger, de l'Emploi et de la Formation Professionnelle (O T T E E F P.), the organization which arranges foreign work contracts on behalf of Tunisian job seekers. Their records cross-classify emigrants by place of birth and also by place of residence at the time of departure. The two definitions result in very different distributions of migrant origins as shown in Figure 7.2. For example, there were 222 persons born in the gouvernorat of Le Kef who migrated to France in 1974, but in the same year only 162 persons resident in the gouvernorat departed directly to France. By inference there were at least 60 persons born in Le Kef who had been residing in other gouvernorats prior to emigration.

Inversely, Tunis experienced 616 departures to France but only 321 of these migrants were native Tunisois. The balance of 295 persons must have consisted of individuals who had previously migrated to the capital from other parts of Tunisia. The existence of these internal migrant flows prior to international migration explains in part the correlation between rates of internal and international migration.

Distinguishing flows both by destination and origin, it becomes apparent that international migration to Libya is a very different process from labour transfer to Europe. The patterns

as plotted for migration to France substantiate Simon's claim (1974, 78) that

"les migrants gagnent l'étranger, sans travailler préalablement dans une ville tunisienne. Mais parfois, l'itinéraire se déroule en deux étapes en passant par un relais urbain qui est généralement Tunis "

Concerning emigration to Libya, it appears that step migration is a much more frequent and widespread occurrence than it is in emigration to France. To take again the extreme cases of Le Kef and Tunis, only about 52% of migrants born in Le Kef departed directly to Libya, whereas in Tunis there were 136 persons not born in the capital departing to Libya for every 100 native migrants. The importance of Gabes as a relay point for Libya should also be noted (Figure 7.2). Very similar patterns were observed in 1973 but by 1975 direct migration to Libya had become more common.

Although migration flows from Tunis to France might have been initiated by the same regionally specific socio-economic conditions as those encouraging internal migration, it should not be thought that migrants perceive France and Tunis as offering similar opportunities. If they were considered similar in character, one might expect migrants on the principle of 'least effort' (Zipf, 1949) to search first for employment in Tunis, and only when unsuccessful to proceed to France. The hypothesis that potential migrants view opportunities in Tunis and France as rather different is substantiated by the findings of a case study of emigration from Medjez el Bab (Hanning, 1973). In this study it is suggested that potential migrants would prefer

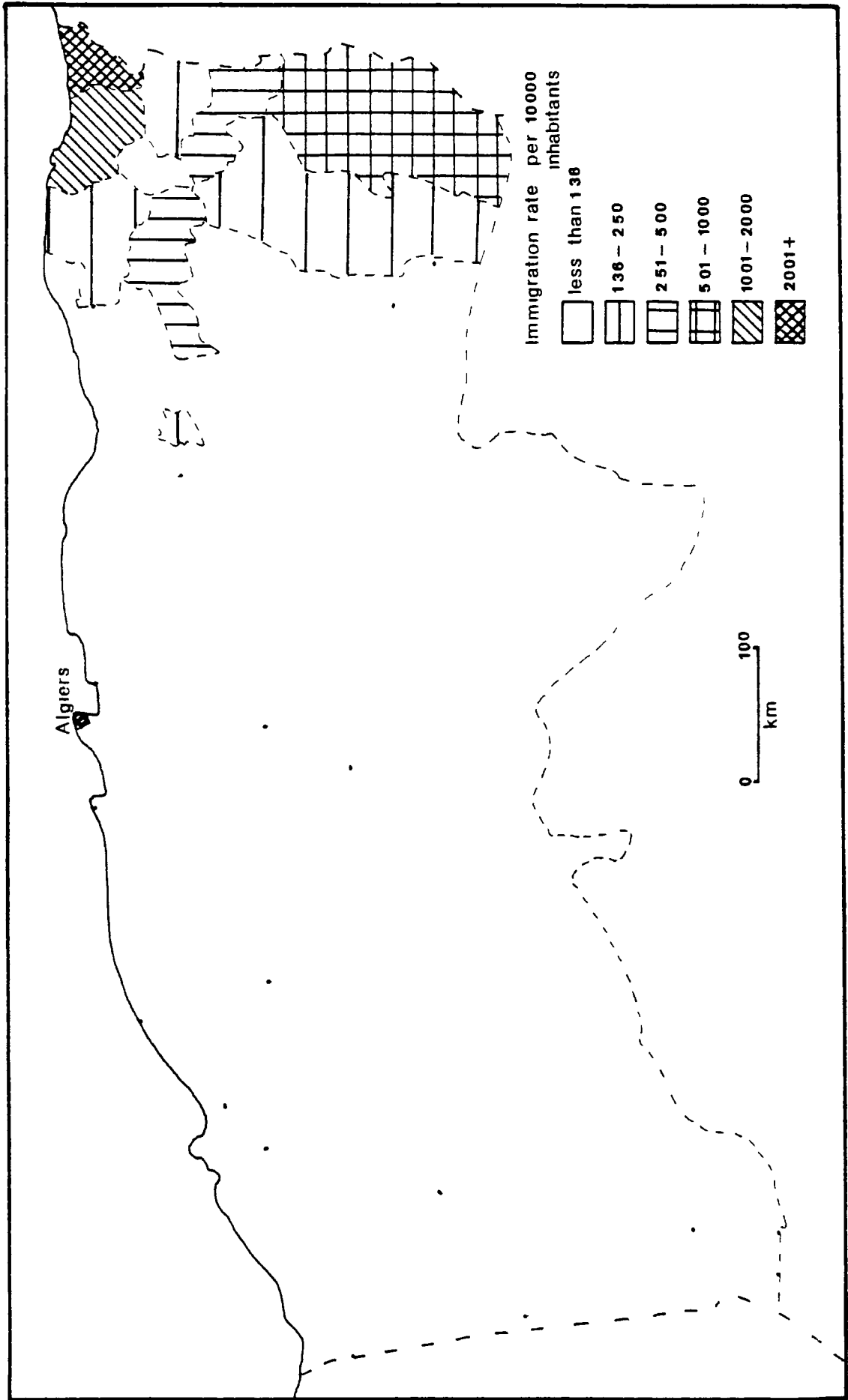
to work in France, but if constrained by economic or family circumstances would accept a 'second best solution by seeking modern sector employment in Tunis. On this basis it might be concluded that the forces encouraging regional emigration to France are similar to those stimulating internal out-migration, but that the attractive forces of the alternative destinations are somewhat different.

It is not surprising to discover that emigration to Libya is also perceived differently from emigration to France. It appears in some respects to offer opportunities which are superior but nevertheless comparable with employment in Tunisian cities. Fakhfakh (1974, 5) describes the characteristics of migrants to Libya as follows:

"Les partants vers la Libye sont pour la plupart des provinciaux, anciens ruraux mal intégrés à la ville (de Tunis), et non des natifs."

O T T E R F P statistics show that there were at least some 1,100 such migrants in 1973, 700 in 1974, but only 100 in 1975. Fakhfakh (1974, 3) also suggests from her survey of Zaghuan governorat that most return migrants from Libya intended to depart abroad a second time, on this occasion to France. It is suggested from this brief analysis that the nature of employment opportunities desired by migrants and the constraints on their capabilities to achieve these goals, determine whether internal migrants are merely a residual category of international migrants or whether internal migration is a preparatory stage for international migration. It may permit individuals to adapt their lifestyle and their attitudes to those required in the urban

FIG 73 TUNISIAN IMMIGRATION TO ALGERIA (1966)



milieu, thus facilitating subsequent movement to foreign culture areas such as Western Europe

The complex inter-relationships between internal and international migration have been reviewed. A more detailed analysis of the evolution of Tunisian emigration will now be undertaken paying particular attention to the spatially selective character of the migration process at the international scale

Traditions of Tunisian Migration

Before the advent of large-scale migration to Western Europe a moderate level of spatial mobility existed within the Maghreb countries. Some Tunisians had migrated to Algeria and many Algerians and Moroccans were to be found in Tunisia. There was also a substantial migrant flow from Libya to southern Tunisia (Clarke, 1958), a movement which came to an abrupt end following the discovery and exploitation of oil resources in Libya.

The Tunisian population recorded as resident in Algeria in 1966 was only a fraction of the former migrant community. Examination of this residual population is nevertheless of interest since it is representative of the distribution of Tunisian migrants in Algeria during the colonial era. Figure 7.3 indicates that Tunisians were to be found mainly in the eastern part of Algeria. An inverse relationship appears to exist between distance from the Tunisian frontier and the level of immigration to Algeria. That is to say, the ratio of Tunisian migrants to the total population resident in each 'daïra' or province in 1966 declined with increasing distance from the Tunisian frontier.

The only significant exception to this trend was the conurbation of Algiers where immigration rates were considerably above those of other dairas equidistant from Tunisia. In 1966, 19.4% of Tunisian migrants were resident in Algiers.

The nature of the distance decay function was examined in greater detail by re-ordering the possible destination zones of Tunisian migrants. This was accomplished in a fashion similar to that used by Courgeau (1970) in his analysis of worker movements from Spain and Italy to France. A series of broad zones was spaced at 40 kilometre intervals across Algeria. These zones were oriented to run parallel to a base line located on the Algerian-Tunisian frontier. Dairas were allocated to these zones on the basis of the location of their principal administrative town. Migration rates were then recalculated for each 40 kilometre zone. A precise description of the relationship between migration rates and distance was sought by use of linear regression. The 'best fit' relationship was found by regressing the logarithm of migration rates (the dependent variable) against distance (the independent variable). A coefficient of determination (r^2) of 0.57 was achieved, suggesting in this instance a moderately strong inverse relationship between migration and distance.

The distance decay function was also examined for migration to eastern Algeria (defined as the area lying within 400 kilometres of the Tunisian frontier). An r^2 value of 0.80 was achieved. The differential between this value and the lower level of 'explanation' of the earlier correlation may in part be

a consequence of the inclusion of the district of Algiers in the former correlation analysis. The district had a much higher migrant presence than was predicted by the regression equation. By contrast, Constantine and Amiaba did not diverge significantly from the predicted pattern, and did not appear to constitute intervening opportunities for migrants to more distant destinations. Analysis of this particular example of migration from Tunisia to Algeria serves to illustrate that distance may be of importance in explaining patterns of interaction even at the international level.

Post-War Evolution of Tunisian Migration

Tunisia, unlike Algeria and Morocco, had no major tradition of migration either to Europe, or indeed to Libya. The departure of Europeans during the 1950s released many jobs within the Tunisian labour market, particularly in the service sector of the economy, which were subsequently filled by Tunisian nationals. The significance of the departure of the foreign community was twofold. Firstly, the repatriation of the colonists stimulated mobility amongst the native population and increased local awareness of migration opportunities within Tunisian society. This was a critical step in preparing for the main period of international labour migration that was to follow. Secondly, the return of those foreigners to their homelands established new information links between regional labour markets in Tunisia and those in Europe. These information links were to act as catalysts to the emigration of Tunisian workers.

Tunisian emigration can conveniently be divided into four

phases Many of the earliest moves occurred in the years 1956-1963 immediately after independence as a result of Tunisian employees accompanying or following their former colonial employers to Europe Jobs were to be found amidst some of the repatriated French communities and with Jewish businesses which had moved from Tunis to France during the post-independence wave of emigration of Tunisian Jews (Simon, 1977, 7).

After 1964 there was an immense surge in worker emigration This second phase saw the Tunisian presence in France rise from 47,000 in 1964 to 149,000 in 1973 (Table 7.1) with the most rapid increases occurring in 1968-69 and 1972-73 By the end of 1973 4% of the total population of Tunisia was living abroad Over half of these persons were estimated to be members of the active population, reflecting the high activity rate amongst the emigrant community This immense exodus of workers undoubtedly relieved the Tunisian economy of surplus labour in the short term. For the migrants themselves there were also obvious pecuniary and social advantages Although experiencing a drop in social and often occupational status during their stay in France, the economic benefits were considerable and migrants found that on their return relatives and friends held them in high esteem As Sassi (1967, 47) has remarked, such was the respect for returning migrants that if "on dirait un Hadj de la Mecque, on l'appelle 'Monsieur' de la France"

Contemporaneous with the escalation of migration to France was a diversification of migrant destinations, Tunisians also finding employment in Germany, Belgium, the Netherlands, Austria,

Table 7.1. Tunisian Population Resident in France

	1965	1966	1967	1968	1969	1970	1971	1972	1973 *	1974	1975
Numbers	52,159	62,905	70,274	73,261	89,181	96,821	106,845	119,546	148,805	162,479	174,000
% increase per annum	20.6	11.7	4.2	21.7	8.6	10.3	11.9	24.5	9.2	7.1	

* The rapid increase in 1973 was largely due to the regularisation of many clandestine migrants in this year.

(Source Office National d'Immigration, 1976)

Switzerland, Italy and Libya During the period 1969-75 44.3% of all migrants went to France, 36.1% to Libya, 16.4% to Germany and only 3.2% to other countries (Table 7.2) The distribution of Tunisians resident abroad in 1975 is shown in Table 7.3 The movement of Tunisians to Libya in search of employment commenced in the late 1960s By the early 1970s it had grown to account for a large percentage of all departures from Tunisia. This represented a reversal of earlier migration currents between the two countries. The expansion of employment opportunities in Libya not only led to the return of most expatriate Libyans, but also to the departure of large numbers of Tunisians seeking their fortune in Tripolitania.

One indication of the pressure to emigrate from Tunisia to Libya has been the high incidence of clandestine migration For the 2,984 Tunisians who migrated under regular contracts in 1971, 40,665 others tried unsuccessfully to cross the frontier without work permits or any official form of authorisation. Forced repatriation of clandestine migrants involved 4,635 persons in a single month in 1972 (Table 7.4)

Tightened border controls and the fostering of Tunisian-Libyan employment contracts may have reduced the level of illegal movement, but it nevertheless remains difficult to estimate the total number of Tunisians in Libya OECD sources suggest that there were 45,000 Tunisians in Libya at the end of 1973 (OECD, 1975, 55) while other sources (Mitar, 1975, 155) estimate as many as 71,500 Tunisian workers and families in Libya in 1974. Whichever estimate is accepted, it is clear that Libya by 1973-74 had come close to and perhaps surpassed France

Table 7.2.

Migration of Tunisian workers by year and by country of destination

	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977
France (1)	5,800	6,600	6,500	6,100	14,925	11,070	9,971	9,890	20,857	4,190	820	883	370
Libya (2)	126	1,286	4,664	1,647	1,373	575	2,984	5,858	11,519	5,004	3,359	492	27,313
Germany (2)	29	326	173	481	2,093	4,990	2,769	1,524	2,566	15			
The Netherlands (2)	-	10	-	-	-	47	383	127	419	37			
Austria (2)	-	-	-	-	-	-	295	107	23	20			
Belgium (2)	-	-	-	-	27	100	19	14	47	129	36	336	134
Switzerland (2)	174	246	217	217	192	156	127	120	72	51			
Others (2)	267	136	25	18	-	32	73	21	51	31			

Source: (1) O.N.I., 1977, 12.

(2) O.T.T.E.E.F.P., 1975a, 50.
 O.T.T.E.E.F.P., 1977d, 7.
 O.T.T.E.E.F.P., 1978b, 7.

Table 7.3. Total number of Tunisians resident abroad, 1975

France	174,000
Libya	50,000
West Germany	14,000
Algeria	12,000
Belgium	3,000
Netherlands	1,000
Others	7,500

Source Findlay, 1978a, 9.

Table 7.4 Attempted Clandestine Migration to Libya

	Illegal migrants intercepted by the Tunisian army	Clandestine migrants returned by Libya
1969	29,356	5,382
1970	32,939	5,049
1971	40,665	6,353
1972 (Jan.-Sept)	43,251	10,405

Source Findlay, 1978a, 12.

as the dominant destination of worker migration

A third phase, in the form of a lull (1974-1976), in Tunisian emigration followed the end of the era of mass migration. On 3rd July 1974 the French government decided, because of economic and social problems, to suspend all further immigration. The background to this decision has been documented in detail elsewhere (Adler, 1977, Findlay, 1978a, 58-60). Assistance was offered by a French law of 25th December 1974 to aid the repatriation of migrants. Subsequently a number of other schemes were implemented to accelerate return migration. Political estrangement between Tunisia and Libya also occurred in 1974, leading to a decline in the number of work contracts offered to Tunisians. The impact of these changes in international relations with France and Libya not only involved the decline of emigration from Tunisia but also resulted in the repatriation of some migrants from abroad.

Migration to Libya was temporarily halved. Migration to Europe was cut to approximately one-sixth the level of the previous year. Unlike migration to Libya, which soared again in 1977 to the 1973 levels, migration to Europe has remained extremely low with little or no prospect of resurgence. In 1976 Tunisia experienced net immigration for the first time since independence, reflecting the severe application of European anti-immigration legislation, and the de facto return of several thousand workers from France and Germany.

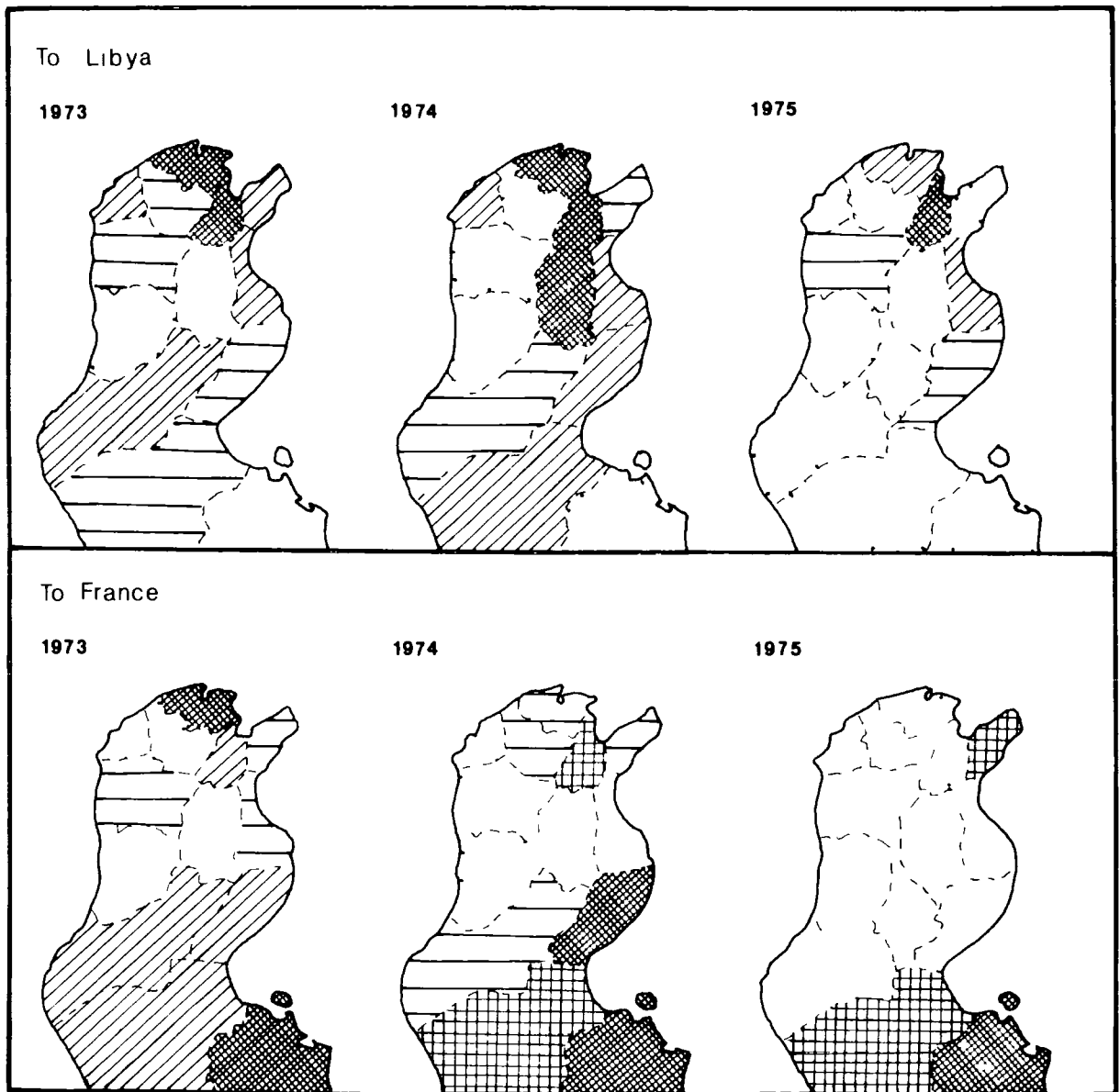
Political tensions between Tunisia and Libya over a number of issues, such as oil exploration and drilling rights in the

Gulf of Gabes, have impinged directly on labour relations between the two countries. By imposing restrictions on border movements and by reducing the number of work contracts offered to Tunisians, Libya has tried to use migration dependence as a political tool. For example, the Libyan attitude towards Tunisian migrants is known to have been substantially modified following the collapse of discussions aimed at the economic and political integration of the two countries.

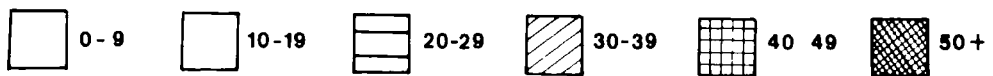
In March 1976 the Tunisian-Libyan frontier was closed to all further migration and Libya expelled 13,700 clandestine migrants. Many others returned 'voluntarily'. The massive return of migrants created considerable problems for Tunisian manpower planners. The official response was to create temporary work projects in those areas of southern Tunisia most severely affected by the return of these migrant workers.

The lull in international migration lasted only three years. The re-opening of the frontier early in 1977 and the expulsion by Libya of many Egyptian migrant workers created a new demand for Tunisian labour. In this fourth phase of Tunisian emigration history (1977 to the present), the number of Tunisians departing yearly to Libya reached unprecedented levels. In 1977 no less than 27,300 persons left for Libya with permanent work contracts, and many others departed on tourist visas. A further 18,000 proceeded under contract during the first six months of 1978, mainly to work in the Tripolitanian region of Libya.

FIG 74 QUALIFICATION OF EMIGRANTS TO LIBYA AND FRANCE



Percentage of qualified workers amongst emigrants (by gouvernorat)



Spatial Selectivity of Migrant Characteristics

Whereas the problems of immigrant groups in host countries have been the focus of a number of geographical studies (Courgeau, 1970, De Lannoy, 1975, Jones, 1970, Rosenberg, 1974), less attention has been paid to the spatial dimensions of emigration, and to the characteristics of migrants prior to departure from their region of origin. This imbalance has arisen in part from the fact that many of the research workers interested in migration problems are natives of the host countries and consequently have adopted the same perspectives on migration matters as the host nations. Spatial, social and economic factors associated with emigration have been given insufficient emphasis and on occasion have been virtually ignored (e.g. Griffin, 1976). It is to these problems that the reader's attention is now directed.

A regional analysis of the qualification levels of migrants in 1973 shows that departures to France and Libya were spatially differentiated. Qualified workers for France seemed to come primarily from two zones: firstly from the Bizerte-Tunis region of north-eastern Tunisia, and secondly from the southern governorates of Gafsa, Gabes and Medenine. The latter group were largely qualified in hotel and service skills.

By contrast, Medenine offered a lower percentage of qualified workers than any other governorate contributing to the Libyan migration field. The northern coastal governorates led in their contribution to qualified labour migration as is made obvious by Figure 7.4. The map showing qualifications of

FIG 75a Age Pyramids of Emigrants to Libya, 1975

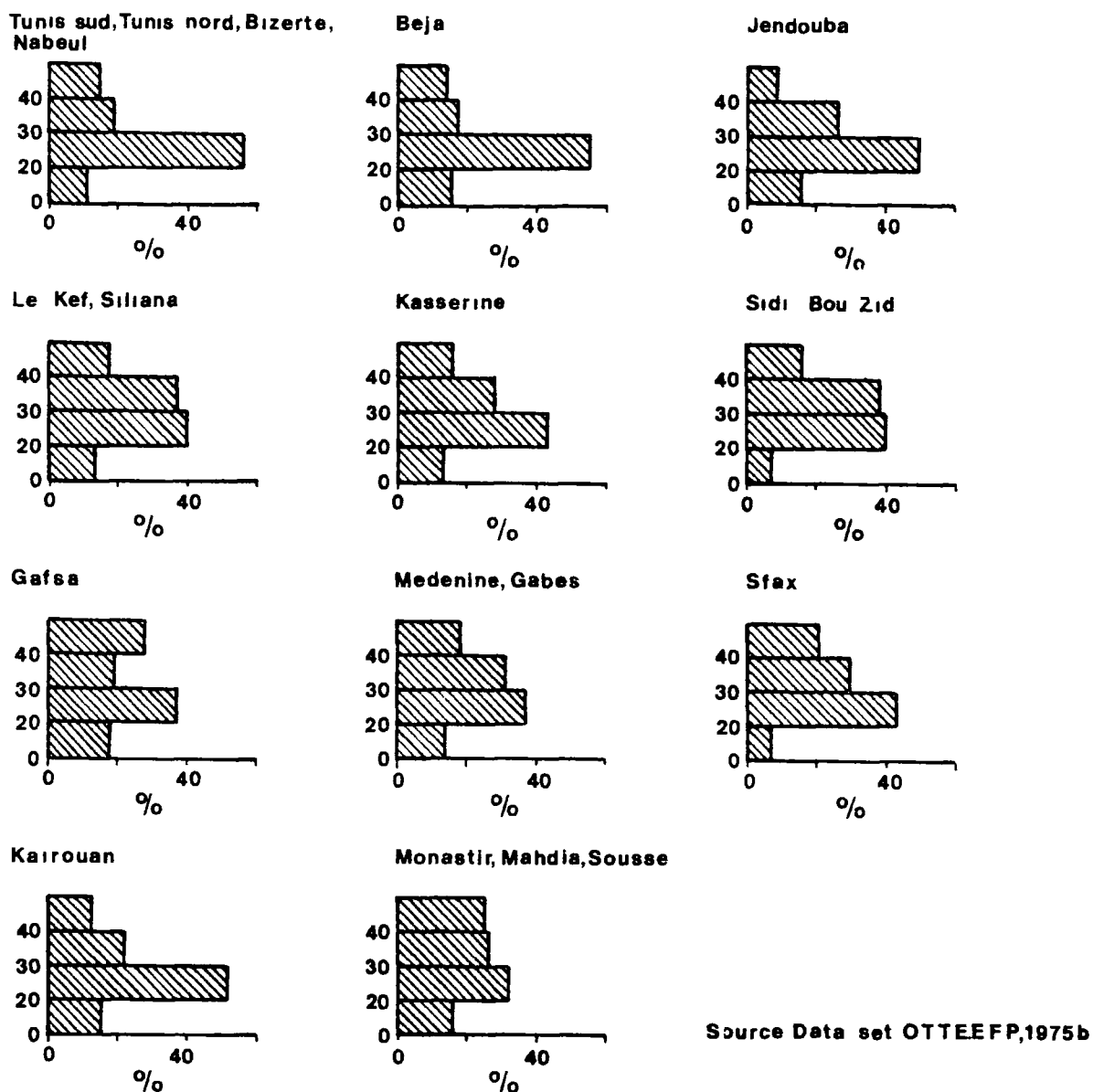
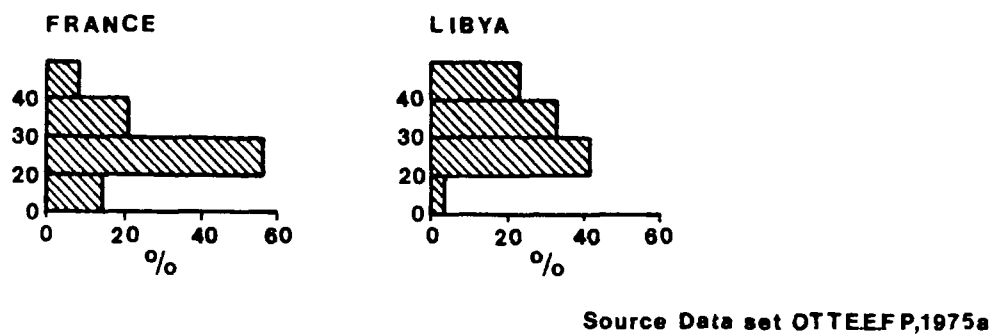


FIG 75b Age Pyramids of Emigrants to France and Libya, 1971-74

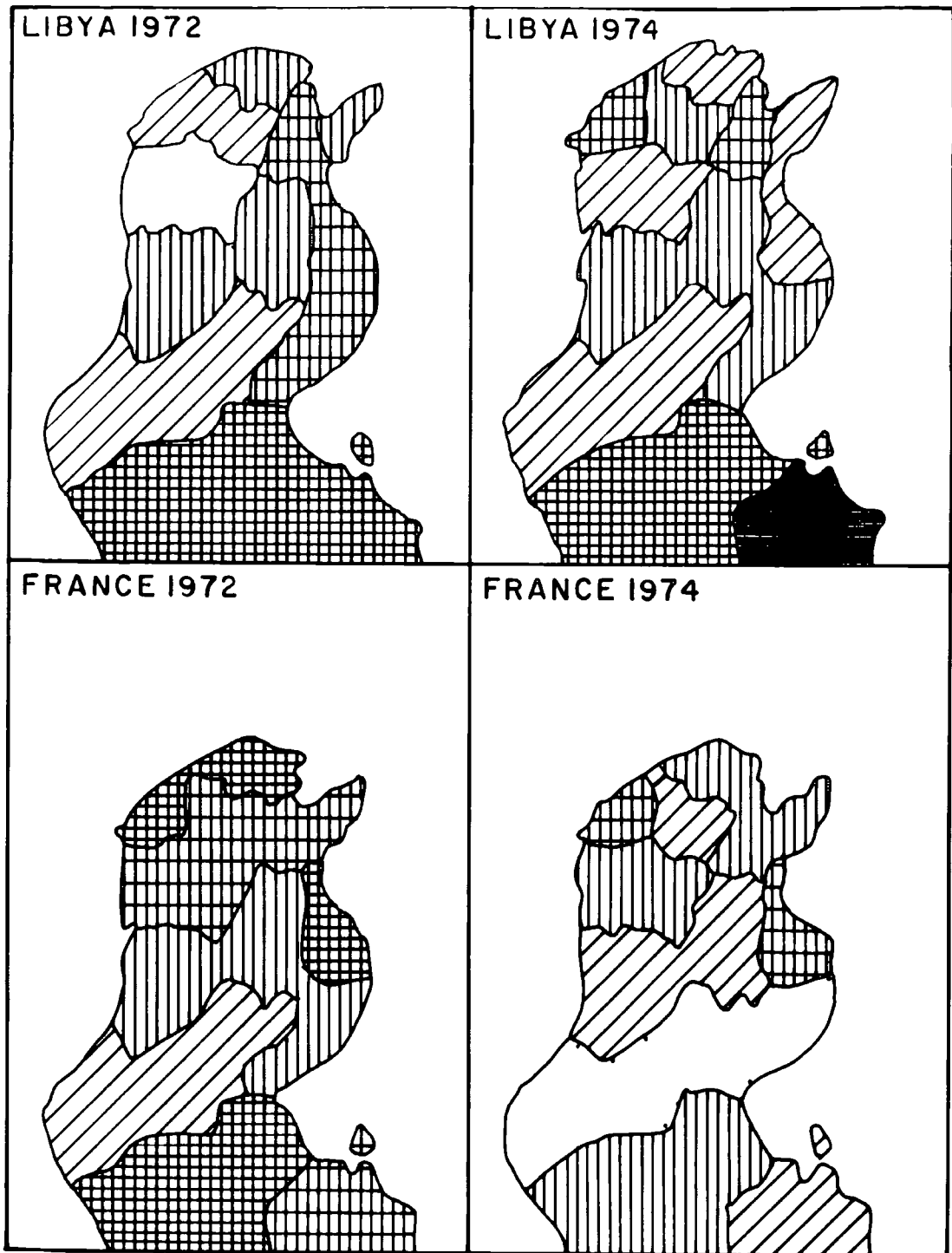


migrants to Libya would seem to support the theory that the selectivity of labour migration increases with distance between the place of migrant origin and destination

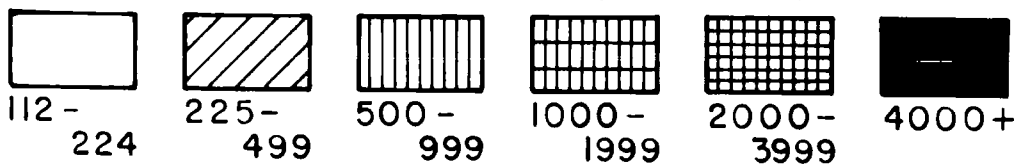
In 1974 the percentage of qualified migrants going to Libya rose from 29.5% to 37.3% of the total, while the qualification level of migrants to France dropped. While the national pattern changed, the regional disparities remained very similar to 1973, with the southern governorats sending higher percentages of qualified workers to France than the northern governorats, and the latter continuing to send a higher percentage of qualified workers to Libya than the southern governorats.

Age characteristics of migrants also show a pattern of spatial selectivity. There is, for example, a contrast between the age pyramids for migrants from the governorats of the south and those of the north (Figure 7.5a). The governorats of Funis Sud, Tunis Nord, Bizerte, Nabeul, Beja and Jendouba have a much higher percentage of migrants in the age cohort 20-25 years, while the governorats of Medenine and Gabes, Mahdia, Monastir, Sousse and, to a certain extent, Sfax send a higher percentage of migrants who are 35 years of age or older. Again there would appear to be a relationship between distance and migrant selectivity. Migrants from further away tend to be younger than migrants from the governorats closer to Libya. Figure 7.5b also illustrates that the age characteristics of migrants to France and Libya during the early 1970s were somewhat different in their composition, migrants to Libya having a higher average age than migrants to France.

Fig 76 MIGRATION TO FRANCE AND LIBYA, 1972 & 1974



Migration rate per annum per 1,000,000

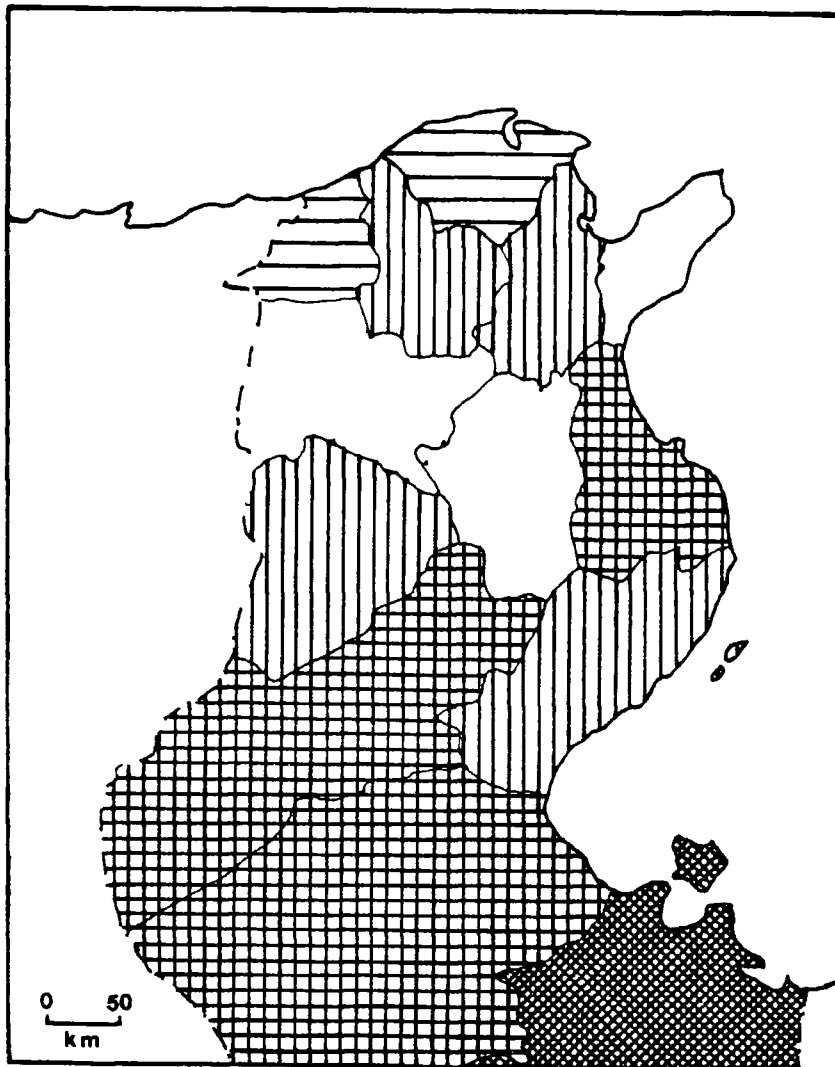


Spatial Selectivity of Migrant Origins

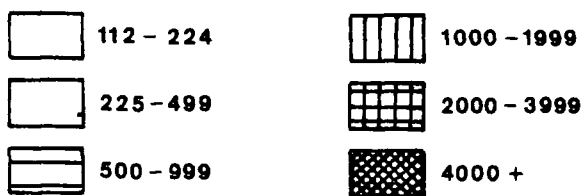
Analysis of the selectivity of a number of migrant characteristics has already indicated that the pattern of emigration to France differs from that to Libya. This section hopes to show that the opening up of migration to Libya has not proved to be a direct substitute for migration to France either in terms of the origins of migrants or in terms of migrant characteristics.

O T T E E F P statistics permit analysis of migrant origins within Tunisia. Migrant origins by regions of departure to France and Libya are shown in Figure 7.6 for 1972 and 1974. It is immediately clear that migrant origins for France and Libya differ considerably. The French migration field is concentrated in the north of the country while in the case of Libya the highest rates of emigration are recorded for the gouvernorats of Medenine, Gabes and Sfax. It is particularly noticeable that a north-south dichotomy exists. In 1972, migration to France occurred from the northern Tell, the Sousse region and the southern gouvernorats. In the same year, emigration to Libya affected mainly the southerly and coastal areas. By 1974 migration to France from the southern provinces had declined but it remained important in the provinces of Jendouba and Sousse. The migration rates to Libya for 1974 were highest in the provinces of Gabes and Medenine. It appears that Libya-oriented migration had come to replace, to a large extent, migration to France from these provinces. On the other hand, it had not proved to be a substitute for migration to France from many of

Fig 77 Tunisian Emigration to Libya, 1977



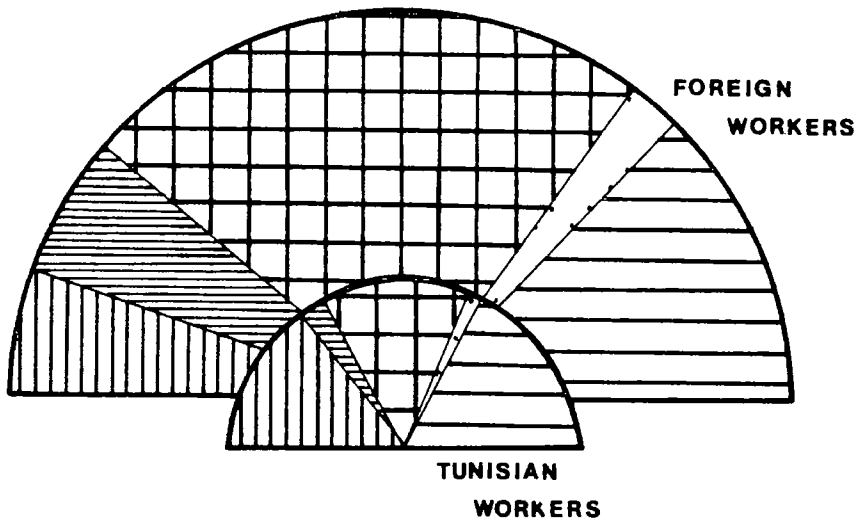
Migration rate per 1,000,000



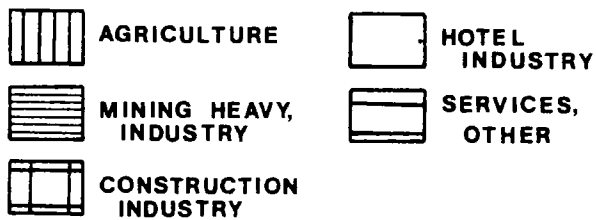
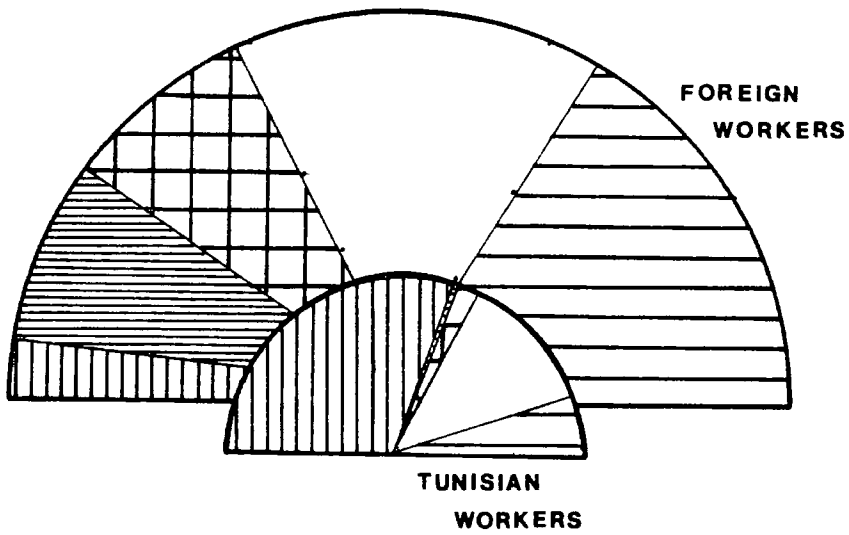
Source Author's calculations

Fig 78 Migrant Employment Structure

Libya(1975)



France(1976)



Source Birks, J, Sinclair, C, 1978, 41, ONI, 1976 OTTEFP, 1976c

the northern provinces such as Bizerte, Le Kef and Sousse. The above examination of the patterns of migration to France and to Libya has demonstrated the specifically regional dimension of both migration fields. Since these fields do not coincide, the closure of the French labour market to Tunisian workers is likely to have particularly severe spatial repercussions in the regions of north-western Tunisia which have not been incorporated in the Libyan migration field. Examination of the pattern of emigration to Libya in 1977 (Figure 7.7) indicates that substantial areas of northern Tunisia which formerly sent many migrants to Europe are not involved to any extent in emigration to Libya.

Differentials in Migrant Employment

Figure 7.8 shows the occupational structure of Tunisian workers in France and Libya and the relationship between the occupational structure among Tunisian workers and other migrant groups. The occupational structure of Tunisian migrants in Libya in 1975 showed a concentration into three categories: agriculture, construction work and other services. Compared with the entire foreign population in Libya, Tunisians were under-represented in the construction sector and over-represented in the agriculture sector. This is not surprising since the agricultural environment and the types of agricultural system operating in the two countries are quite similar. In the case of the small number of Tunisians to migrate to France in 1976 a high percentage found employment in the agricultural sector, Tunisians being over-represented in this category compared with

other migrant workers. On the other hand, Tunisians were under-represented in construction work. The hotel industry employed 28% of Tunisians entering France, a percentage which closely resembles that for all foreign workers. Comparing Tunisian migrants in Libya with those in France, it becomes clear that the occupational structures of the two migrant groups are quite dissimilar. In both cases a large proportion of migrants were employed in the agricultural sector in relation to other foreign workers, but a much higher proportion of migrants to France than migrants to Libya found employment in this sector. By contrast, the construction industry absorbed a much higher proportion of Tunisian migrants going to Libya than going to France. The hotel industry was of minor significance in the case of migration to Libya, although it was a major employer in France. In terms of occupational structure, it may therefore be concluded that migration to Libya was far from an exact replacement for migration to France. This is also reflected in the occupational structure of the migrant flows to the two destinations at the *gouvernorat* level (Table 7.5).

In the *gouvernorats* dominated by migration to France, such as Sousse (71% of all migrants left for France in 1974), agricultural employment absorbed a high percentage of migrants in Sousse 61% and in Nabeul 63% of migrants found agricultural employment in France. Many fewer people went to Libya, but 55% of those migrants from Nabeul who did leave for Libya also took up agricultural employment - a higher percentage than from any other *gouvernorat*. By contrast, in the provinces of Jendouba

Table 7 5. Migrant Occupational Structure by Gouvernorat and Country of Destination (%), 1974

	Gouvernorat	Construction	Metallurgy	Agriculture	Hotel	Other
To Libya	Tunis	49.5	18.4	6.1	3 0	22.7
	Bizerte	37.7	14 6	18 2	3 4	25 8
	Beja	27.2	0 5	40 8	-	31 3
	Jendouba	43 6	4 5	20 9	-	30 9
	Le Kef	52 7	6.9	16.6	-	23 6
	Kasserine	32.2	0 6	8.7	1 3	57 0
	Gafsa	36.2	6 0	15 0	-	43 8
	Medenine	36 1	3.1	41 2	0.2	19 2
	Gabes	33 5	3 4	8.6	2.2	52 2
	Sfax	20 9	12.1	20 3	0 6	46 0
	Kairouan	53 9	11 7	5 3	0.4	28 7
	Sousse	28 4	9 3	13 9	3.3	45 0
	Nabeul	27 6	4 7	55 2	4 7	7 8
To France	Tunis	28 7	12.0	28 5	5 7	25 0
	Bizerte	24 8	32.5	27 9	2.0	12 7
	Beja	19 4	6 8	62.1	-	11.6
	Jendouba	5.8	6.5	79 6	0.7	7 2
	Le Kef	15 6	6.8	64.6	-	6 1
	Kasserine	22.3	4.5	61 2	1.4	10.4
	Gafsa	39.4	27.2	12.1	-	21 2
	Medenine	10.4	3.8	9.5	59.0	25.7
	Gabes	22.5	4 5	18 9	31.5	22 5
	Sfax	39.2	19.0	22.8	5.1	13 9
	Kairouan	15 6	6 7	70.1	0 7	6.7
	Sousse	15 9	5.9	61.5	3 7	12 7
	Nabeul	15 2	2 8	63 2	5 3	13 4

Source O T T E E F P., 1975a, 121

and Kairouan, where more than 70% of migrants to France were employed in agriculture, most migrants to Libya found employment in the construction industry. In gouvernorats where migration occurred to both Libya and France in approximately equal proportions, it was found that each flow involved quite different occupational groupings. For example, of all migrants from Medenine 89.1% left for Libya in 1974, but of these 36% were employed in construction and 41% in agriculture, while of the workers migrating from Medenine to France only 9.5% were employed in agriculture but 59% found employment in hotels. Migrants to Libya from the gouvernorats of Sousse, Sfax and Gabes were concentrated in the service sector. Relating the patterns of age selectivity discussed earlier, to the occupational structure of migration from the gouvernorats it is possible to isolate the regionally specific nature of emigration to Libya and France. For example, from Sousse there appear to have been two rather different migrant flows, younger people seeking work in France, and the older generation seeking work in Libya. While in 1974 71% of workers from Sousse migrated to France, mainly to work in the agricultural sector, hardly any of the migrants from Sousse to Libya found employment in this sector. The majority found work either in the construction industry or in service employment.

In conclusion, it may be suggested that in gouvernorats dominated in 1974 by migration either to France or Libya, the occupational structure of the two migrant groups was rather different, the construction industry assuming greater importance

in the case of Libya and agriculture in the case of France. In these gouvernorats, subsidiary flows to either Libya or France differed in their occupational structure from the dominant flows. These patterns again underline the complementary rather than competitive nature of migration to France and Libya.

Changes in Migration Characteristics through Time

Migration characteristics vary not only through space but also through time. Nelson (1976) and Amersfoort (1978) have noted a progressive change in the characteristics of migrants in any given migration flow with the passage of time. They have suggested that early links between two places will involve 'short-term' or 'temporary' migration, but that with the passage of time migration will become more 'permanent' or 'long-term' in character. Some of the changes in the nature of migration associated with this trend towards 'long-term' migration are summarized in Table 7.6. In some respects at least, the changes in migration characteristics hypothesized in Table 7.6 can be shown to have occurred in the history of Tunisian emigration to France.

The average age of migrants appears to have decreased between 1968 and 1976 (see Table 7.7), the percentage of young migrants (defined as those below 25 years of age) rising from 34% of all migrants in 1968 to 51% in 1976. The marital status of migrants has also changed, the number of unmarried workers leaving for France increased from 51% in 1967 to 72% in 1975. By contrast, migrants to Libya (see Figure 7.5b) have been concentrated in the older age groups in the early 1970s, and their

Table 7 6. Temporal Changes in Migration Characteristics

Short-Term Migration	Long-Term Migration
1. Income from remittances supplement traditional sources of income. Existing agriculture is maintained	1. Income from remittances become a main source of household income Agricultural productivity declines
2. Foreign employment is easy to obtain.	2. Foreign employment becomes more restricted
3. Migrants remain abroad over short periods of time and return frequently	3. Migrants remain abroad for longer periods and return only for vacations
4. Migrants depart from the economically most productive age cohorts	4. Migrants leave, not only from the economically most productive cohorts, but also at younger ages, and are often unmarried.
5. Migrant families remain in the country of origin	5. Families migrate to join workers

Source Author.

Table 7.7. Age Structure of Tunisian Migrants to France (%)

	1968-70	1971-73	1974-76
Less than 25 years	33.7	49.7	50.9
25-39 years	43.4	41.3	39.2
40 years and older	12.9	9.0	9.9
Total	100.0	100.0	100.0

Source: Calculated from O.N.I., 1977, 99.

Table 7.8. Family Migration as a Percentage of Total Migration

Year	Family Members	Migrant workers	Family members % of total migrants
1966	1737	6631	20.7
1967	2012	6534	23.5
1968	2665	6109	30.3
1969	2944	14925	19.7
1970	3731	11070	25.2
1971	3962	9971	28.4
1972	4223	9890	29.9
1973	4763	20857	18.5
1974	4347	4190	50.9
1975	3871	820	82.5
1976	4194	883	82.6
1977	4101	370	91.7

Source: O.N.I., 1976, 119, 136;
O.N.I., 1977, 138, 141.

marital status resembled that of migrants to France a decade earlier. The ratio of married to unmarried migrants to Libya was 1.63 in 1972 compared with 0.41 for migrants to France. By 1974 the ratio had changed to 1.48 and 0.60 for Libya and France respectively (O T T E E F P, 1975a), confirming that the migration stream to Libya included a much higher proportion of married men. By the early 1970s there were more unmarried migrants seeking permanent employment in France than ever before.

In the case of migration to France, since 1964 there has been a significant rise in the proportion of family members joining migrant workers (Table 7.8), although controls on the entry of migrant workers have been tightened, family migration has escalated reaching 82.5% of all immigration in 1975. Migrant remittances have come to represent a high proportion of family income reducing the importance of subsistence agricultural holdings to the livelihood of households in the regions of heavy emigration. Simon (1977, 110) has estimated that in the mid 1970s the average Tunisian family required 40/50 dinars per month for living expenses. He has also shown that 51% of migrant workers regularly transferred this amount of money per month, indicating that in many instances remittances represented a large proportion of a family's income. Comparison of wage levels for Libya and France suggests that the average migrant monthly income in France in 1975 was 200 dinars, whereas in Libya it was approximately 150 dinars (Findlay, 1978a, 28). Income from remittances from migrant workers in Libya had not at this date superseded other sources of household income.

It would appear that since the mid 1960s migration to France on a short-term basis has developed to become a more permanent

movement, employment in France representing a first choice rather than last resort and the income therefrom becoming the mainstay of the household rather than a supplement

One of the few micro-studies investigating the effects of emigration to Libya (De Graafe, 1976) has suggested that the movement of workers to Libya is still primarily on a short-term basis. Many migrants leave for Libya on tourist visas, staying there for an average of three months or less. Very few remain for a year or more in Libya. Traders seem to migrate to Libya on an even more temporary basis, often for periods of less than a month (De Graafe, 1976, 6). This study has also highlighted a further contrast between the length of stay and the age of the migrant. Younger migrants stayed for longer periods than the older men who were supplementing their family incomes by short-term employment abroad (De Graafe, 1976, 13). Many of those migrating to Libya were actively employed prior to their departure. Temporary migration for brief periods of time thus appeared to be the norm. Again, this contrasts with the much more restricted job opportunities now available in France which have forced migrants to seek more permanent forms of employment in order to be permitted to continue to work in France.

Analysis has shown that in the case of migration to France a transition has taken place in migrant characteristics of the form predicted in Table 7.6 and that migration has become a long-term phenomenon. In the case of Libya this change has not occurred and migration remains primarily short-term.

Conclusions

Emigration to Libya, although seemingly a fortuitous and timely alternative to migration to France, has not provided a new source of employment for those regions formerly sending many workers to Europe. The Libyan labour market has captured a few echelons of traditional out-migration to Tunis, particularly in southern Tunisia in the governorates of Gabes and Medenine. It has not, however, attracted migrants from the Tell, perhaps the region of Tunisia where communities had come to depend to the greatest extent on emigration to Europe as a source of income and outlet for surplus labour. In the form in which it had developed by 1976 migration to Libya was also a rather different process from migration to France. Migrants to the two countries have had rather different relationships with their communities of origin and have perceived emigration from contrasting perspectives. Consequently it is not surprising that the characteristics of migrants to these two destinations have differed. Finally it may be restated that migration to Libya has not emerged as a direct substitute for migration to France. The two foreign labour markets have not been in direct competition because they draw on Tunisian workers with quite different socio-economic characteristics and encourage emigration from entirely different regions of the country.

Chapter 8

SPATIAL ANALYSIS of TUNISIAN EMIGRATION

The development of emigration to Libya and France has a distinctive spatial as well as historical sequence. Two forces contribute to fluctuations in regional emigration rates (emigration per annum per 1000 inhabitants). Firstly, national trends in emigration, although shaped by the vagaries of international politics as well as by cycles in labour demand and supply in the domestic employment market, affect the magnitude of regional departures. Secondly, temporal variations occur in the importance of emigration as an element of each regional labour economy. While it is easy to describe the changing contribution made by each gouvernorat to the aggregate level of national migration, it is more difficult to determine the specific causes of variations in regional emigration.

Migration Quotients and the Coefficient of Concentration

Regional trends in migration were identified using quotients. By standardizing levels of national migration through time, migration quotients permit attention to be focussed on changes in the regional component of migration. Migration quotients were calculated for each of the 13 Tunisian gouvernorats by dividing gouvernorat migration rates (Table 8 1) by national migration rates (Table 8 2). As a consequence, quotient values higher than one indicate that the regional migration rate exceeds the national rate. Figure 8 1 shows the sequential development of migration to France and Libya as measured by quotients.

Table 8 1 Migration Rates (per million population) to Libya
from each Gouvernorat ^{1,2}

Year	1969	1970	1971	1972	1973	1974	1975	1976	1977
Gouvernorat									
Tunis	26	41	226	1124	1819	1115	286	4	1938
Bizerte	3	19	176	661	1472	459	274	75	800
Beja	84	0	220	465	1214	565	483	37	1160
Jendouba	4	7	283	380	1839	1304	803	169	671
Kef	6	-	303	192	950	446	397	148	296
Kasserine	-	-	702	670	1495	679	1221	51	1755
Gafsa	-	-	344	424	565	237	737	33	3315
Medenine	1404	924	1935	3874	11291	4751	1352	321	4082
Gabes	2915	149	349	3459	5621	2483	2413	467	2472
Sfax	649	364	1070	1483	3512	978	641	13	1868
Kairouan	6	19	111	970	1494	894	578	30	193
Sousse	12	35	271	1349	1433	249	325	34	2126
Nabeul	96	195	534	876	1342	381	229	27	177

Table 8.2. National Migration Rates to France and Libya ^{1,2} (per
million population)

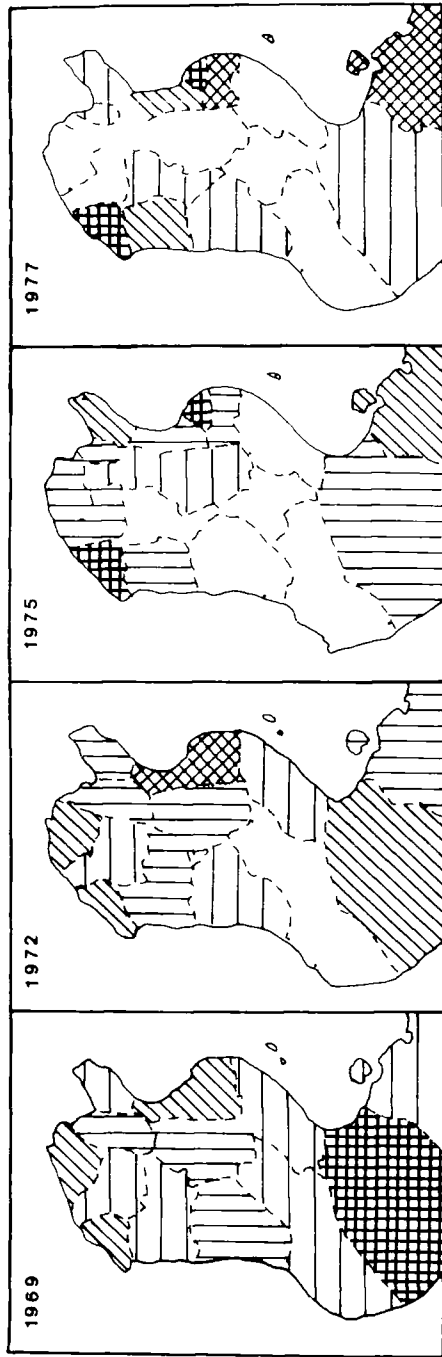
Year	1969	1970	1971	1972	1973	1974	1975	1976	1977
France	818	1556	1576	1682	761	596	241	274	250
Libya	270	113	587	1153	2061	895	522	88	1679

1 Rates for 1969-1972 were calculated using the 1971 population estimate of 5,081,590 persons, 1973-1977 rates were calculated using the 1975 census records. Extrapolation of the 1977 rate was based on the O T T E E F P statistics for the first ten months of the year. Emigration rates have been calculated for the last place of migrant residence.

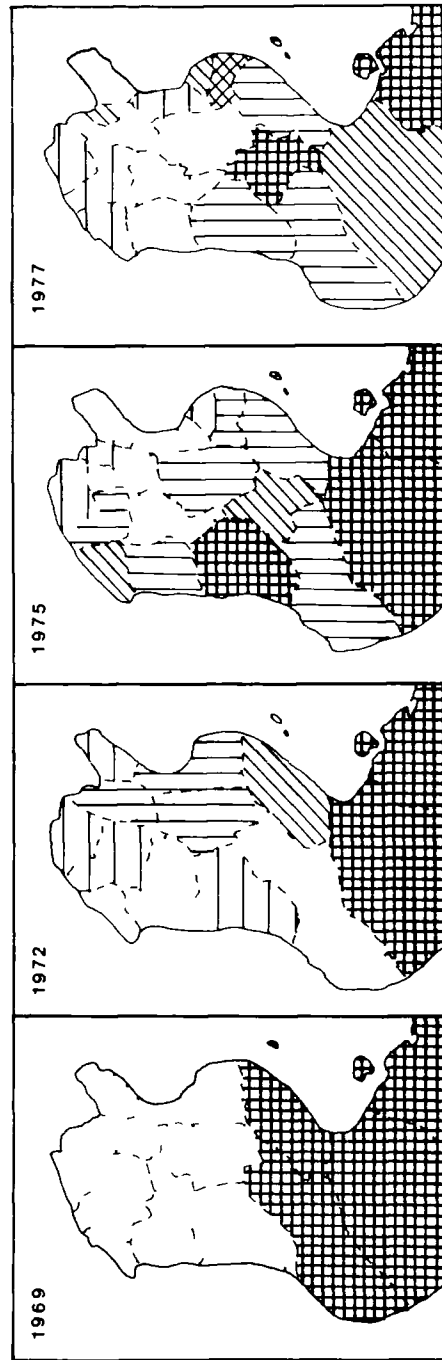
2 Calculated from O T T E E F P , 1975a, 54-56
O T T E E F P , 1976c
O.T T E E F P , 1977d.

FIG 81

(a) TUNISIAN - FRENCH MIGRATION QUOTIENT



(b) TUNISIAN - LIBYAN MIGRATION QUOTIENT



$$\text{Quotient} = \frac{\text{provincial migration rate}}{\text{national migration rate}}$$

To the geographer concerned with the analysis of migration patterns, the development of emigration to Libya is of greater interest than emigration to France, since the former pattern reflects more accurately the spatial behaviour of individual migrants. The system of work contracts issued to migrants to France is in many cases controlled by French employers who often specify the name and geographic origin of the migrant workers whom they are willing to employ. These contracts are termed 'contrats nominatifs'. By contrast, migration to Libya is not organized on the same restrictive basis and patterns of Tunisian emigration directly reflect spatial variations in the propensity of Tunisians to migrate. For this reason more attention has been given in this chapter to analysis of patterns of emigration to Libya. A second reason for focussing on this pattern is that it has received scant attention from migration analysts by comparison with the pattern of emigration to France.

Migration to France

Simon and Noin (1972) have suggested that three migration hearths exist in Tunisia which are responsible for the majority of migrant movements to France

1) the communities of the south where migration has been a tradition for many decades,

2) the village societies of the Sahel of Sousse and

3) the urban populations of the agglomeration of Tunis

This classification fits adequately the pattern of emigration, if only the absolute numbers of migrants are considered. Migration quotients, by contrast, reveal a fourth hearth in the north-west of

Tunisia Through time this hearth has grown in importance relative to other areas of Tunisia (Figure 8 1). In 1977 the two north-western Gouvernorats of Jendouba and Le Kef were responsible for 32% of all migrants departing for France, while accounting for only 9% of the total Tunisian population.

Another interesting feature emerging from comparison of the migration quotients for emigration to France in the years 1972, 1975 and 1977 is the decline in importance of emigration from north-eastern Tunisia, and most particularly from Tunis As overall migrant numbers have declined, so has the relative importance of emigration from the capital

A concentration index was calculated for the patterns of emigration in the same four years as is mapped on Figure 8 1 The index represents extreme polarization as values approach one, while an equal spread of events is represented by an index of zero The index suggests that migrant origins for persons going to France become increasingly concentrated through time (Table 8.3). Interestingly, the pattern of emigration to Libya during the same period followed almost the inverse trend

Migration to Libya

In 1969, in the early period of emigration to Libya, the majority of departures (93 1%) came from the three southern gouvernorats of Medenine, Gabes and Sfax, resulting in a marked dichotomy between the north and the south of Tunisia By 1972 there were still large areas of the interior and north-western Tunisia that were unaffected by emigration to Libya, but the east

Table 8.3. Concentration Index Applied to Patterns of Migrant Origins ¹

	Year	1969	1972	1975	1977
Country					
Libya		0.714	0.413	0.267	0.354
France		0.339	0.431	0.507	0.665

¹ Details of the concentration index and a worked example are provided by Hammond and McCullagh (1974).

The index is calculated as follows

- i. the percentage contributions of each area to national migration are arranged in rank order for each year
- ii. the cumulative percentages are then calculated (as for a Lorenz curve).
- iii. cumulative totals are summed for observed data (O), for the maximum possible concentration that could occur (M_a), and for the minimum possible concentration (of an even distribution) (E).
- iv. the index is calculated from the formula
$$\frac{O - E}{M_a - E}$$

coast governorats and the capital, Tunis, had increased in significance as sources of emigration, while there was a reduction in the contribution from the southern governorats (now only 40.8% of the total number of migrants)

By 1975 the pattern had entirely changed. No longer was it the urbanized east-coast governorats that dominated the pattern. Now it was in the more rural interior governorats that migration rates were above the national average. However, even in 1975 one or two traditional rural areas such as Siliana and Zaghouan had not become significantly involved in the migration system (see Figure 8.1).

Calculation of the concentration index for the pattern of Libyan emigration indicates a trend towards increased diffuseness

between 1969 and 1975. There was a slight reconcentration of migration in the southern gouvernorats of Tunisia in 1977 due to the specific circumstances associated with the re-opening of the Tunisian-Libyan frontier in that year.

From the evidence of Table 8.3 it may tentatively be hypothesized that in the Tunisian case, patterns of migrant origins become more diffuse as a migration wave approaches its peak level, and then becomes more concentrated again with the ebb of the migration wave.

Migration Patterns Some Hypotheses concerning their Evolution

Migration rates, distance and urbanization

Having established the sequence in which the Libyan migration field appears to have evolved, it becomes pertinent to demand some form of explanation for these trends. It has been suggested that distance from the Libyan border has to some extent affected the availability of migration opportunities. It is apparent from Figure 8.1 that the importance of distance decreased considerably between 1969 and 1977. Similarly, some correlation is implied between the regional level of urbanization and the migration rate. 'Urbanization' in this context is considered as a surrogate variable representing the forces for modernization and change not experienced in the rural environment.¹ In 1972 it appears that

¹It is clearly somewhat unsatisfactory to use 'urbanization' as a surrogate for 'modernity' since there are some relatively modern sectors as well as 'traditional' ones within the rural environment. Offsetting this disadvantage is the ease of application of the surrogate. Urban populations are those defined by the Institut National de la Statistique as lying within 'communes' or boroughs. The properties and rights of a commune are defined in the 1975 census (I N S, 1975b, 13).

'urbanization' favours migration whereas in 1975 the converse is the case. These two hypotheses have been tested for each year between 1971 and 1977. The hypotheses could not be tested using parametric statistics for 1969 and 1970 due to the abnormal distribution (bimodal) of the values of migration rates. It was considered that deviation from normality was too great to apply the Pearson product moment to the data set. Of various power exponents applied to distance measurements it was found that transformations of the data with $e = 0.5$ gave the highest correlations of distance against migration rates for the years 1971 to 1977.

If the qualitative descriptions of Figure 8.1 are accurate, the tests should indicate that distance is of declining importance in explaining migration patterns through time. The results of Table 8.4 substantiate this generalization at the governorat level of analysis.

Table 8.4. Inverse Association between Distance from Tripoli and Migration Rates

	1971	1972	1973	1974	1975	1976	1977
r^2	0.513	0.726	0.639	0.548	0.545	0.395	0.426
Level of Significance (D.f. = 11)	0.01	0.001	0.001	0.01	0.01	0.05	0.05

Table 8.5. Migration Rate, Distance, Urbanization

	1971	1972	1973	1974	1975	1976	1977
Multiple step regression r^2	0.526	0.740	0.645	0.567	0.611	0.464	0.427
Level of Significance (D.f. = 9)	0.05	0.005	0.01	0.05	0.01	0.05	0.1
Simple regression r^2 M. on U/d^e	0.519	0.910	0.843	0.757	0.252	0.497	0.271

(Source: Author's calculations)

As distance becomes less important in constraining opportunities, one expects other variables to become more important in influencing pattern formation. The results reported in Table 8.5 indicate that when both level of urbanization and distance are analysed in a multiple step regression, high correlation coefficients are achieved, most notably in 1972. Fluctuations in the migration rates through space suggest that their relationship to distance from Tripoli and to the level of urbanization is extremely unlikely to be a chance association.

In some studies (e.g. Thomas, 1968) migration numbers are regressed on population size at place of origin. This seems to offer little explanatory power to the analysis since it is obvious that large populations are likely to send larger numbers of migrants than small populations. This step is therefore omitted in the Tunisian-Libyan analysis, and population sizes are standardized by taking migration rates rather than migrant numbers as the dependent variable.

An alternative formulation in which migration rates were correlated with a single index of urbanization and distance achieved even higher levels of explanation for 1971, 1972 and 1973 (Table 8.5). The index was calculated as U/d^e ,

where U is the level of urbanization in a delegation

d is the distance from Tripoli

e is a power function, empirically derived

In this regression $e = 3.0$ gave the best fit. Unfortunately the index is harder to interpret than the simple variables considered in the multiple regression. In 1972, 91% of the spatial variation

in gouvernorat migration rates could be 'explained' in terms of the U/d^e index

Both the multiple regression and the simple regression of migration rates on U/d^e achieved lower levels of 'explanation' in 1976 and 1977, indicating the increasing importance of other variables (not considered in the statistical analysis) in explaining migration patterns. Having established that a statistical association exists between emigration, distance from Tripoli and the level of urbanization, it is now worth investigating the theoretical basis for this relationship and the reasons why it has changed through time.

Information constraints on migration

One possible hypothesis which can be evoked to explain the time-space series of Figure 8.1 lies in the field of information diffusion theory (Hagerstrand, 1952, 1966 and 1967). According to Hagerstrand's theory of diffusion, spatial inequalities in the availability of information concerning new ideas account for the temporal lags in the adoption sequence of innovations. The theory as applied in the migration context would suggest that information concerning migration opportunities, because it is diffused by interpersonal communication, is highly constrained by distance. Places and populations near to an information source have therefore the opportunity to adopt an idea prior to places and populations at a greater distance from the source. In the context of emigration to Libya, one would therefore hypothesize that the populations of southern Tunisia, because they live in physical proximity to the Libyan labour market, would be first to become aware of opportunities

of employment in Libya and consequently the first to adopt the decision to emigrate

On first examination this intuitively attractive explanatory model apparently matches the Tunisian experience rather well. The populations of Medenine, Gabes and Sfax were indeed the first to be involved in emigration to Libya. The logical extension of the theory suggests that an outward diffusion of the decision to migrate should occur from the source point to the periphery. One might therefore expect central Tunisia and then northern Tunisia to become involved in emigration to Libya.

As has been shown, the number of gouvernorats involved in emigration did continue to rise, but the pattern of departures by 1972 had become biased towards the east coast regions. Why should the information field be biased towards the towns of the eastern littoral and not be spread evenly across the country? In terms of information diffusion theory one might suggest that the spatial bias is a consequence of inequality in the structure of communications channels. More intense patterns of inter-personal contact are indeed possible in the urban zones of the east coast than in the rural environments of the interior of Tunisia. Irrespective of the mode of spatial interaction chosen (telephone, bus, rail etc), the Tunisian network of communication channels may be shown to favour the eastern littoral (Signoles, 1973. Miossec and Signoles, 1976). Each contact pattern is arranged in nodal regions centering on the urban areas of the country and more specifically on the towns of the Sahel of Sousse and of north-eastern Tunisia. In summary there is evidence to suggest that there is an unevenness in contact structures which is coincident

with the unevenness observed above in the development of patterns of emigration. Whether this is a causal factor influencing migration patterns, or merely a coincident pattern resulting from an independent process is hard to determine.

It seems improbable that diffusion of the awareness of migration opportunities would take several years. Information diffusion in the order of weeks or months seems more likely. The theory seems to be most applicable in the opening phases of the migration wave, but other hypotheses need to be sought to offer a more credible explanation for the subsequent development of the pattern.

Social and economic constraints on migration

Since migrant flows of Tunisians to Libya consist predominantly of persons seeking better employment, it seems logical to search for a relationship between areas with restricted employment opportunities and areas with high levels of emigration. The O T T E E F P will not offer a work contract abroad unless an applicant has previously been registered over a period of two months as 'unemployed'. The concept of 'unemployment' is difficult to operationalize in view of the high level of hidden unemployment in the agricultural sector. Official unemployment statistics (e.g. D A T , 1973b, 114-15) mirror only one aspect of unemployment. Table 8.6 attempts to represent the broader concept of 'underemployment'. On the basis of these statistics one might expect that international labour 'export' to Libya would have been greatest in the early 1970s from the rural north-west, and least from the south. The low levels of underemployment in the south

Table 8.6 Underemployment in Tunisia, 1971

Region	Active population	Underemployment	(Underemployed/ Active) x 100
Tunis	488,100	165,800	34.0%
North-west	202,000	118,600	58.7%
Sahel	130,000	58,600	45.1%
Centre	140,500	61,400	43.7%
South	269,500	67,500	25.0%

(Source derived from D A T
1973b, 122-23)

may seem surprising in view of the long tradition of emigration from this region, but Seklan's analysis (1976) of the economy of the south substantiates the results of Table 8.6 by establishing that the south has significantly better employment opportunities than the interior and the north-west of Tunisia. He also suggests that there is little labour surplus on the southern employment market.

The distribution of underemployment has changed little over the last decade, and therefore cannot offer any ready explanation for the changing emphasis of migration patterns through time. The distribution of underemployment relates more closely to the rates of Libyan migration in 1975 and 1976 than to the earlier pattern. Underemployment may well be an important influence on migration, once a flow has developed, but it is not a force encouraging search behaviour in the innovative period. It is concluded that this particular 'non-information' factor does not assist in explaining the sequential pattern of development of

Libyan migration A variety of other economic variables were also considered by the author, but they too failed to account for trends in migration behaviour

An alternative explanation of the variation in migration rates might be sought in anthropological terms There are extremely strong cultural and ethnic links between some of the tribes of Tunisia and the Libyan population of Tripolitania Clarke (1958) has discussed in detail the distribution of the Trabelsi (Tripolitanian) tribes in Tunisia and the complex history which underlies their dual status as Tunisian nationals of Libyan origin and descent It is unquestionably true that Libyan workers in Tunisia who had not adopted Tunisian nationality, were the first persons to leave for Libya following the beginning of oil production in 1961 with its subsequent expansion of the labour market Table 8.7 shows the decline in the numbers of Libyans in Tunisia between 1960 and 1975 Presently the Libyan community in Tunisia is extremely small.

Table 8 7

The Libyan Community in Tunisia

	1956	1960	1965	1970	1975
Number resident	18,900	14,500	9,800	5,500	1,700
Net decline over previous 5 years		4,400	4,700	4,300	3,800

(Source Marcoux, 1971, 130 I N S , 1975b)

The majority of persons belonging to the 57 Tripolitanian tribes identified in Tunisia, by a study at the turn of the century (cited by Clarke, 1958, 90), are considered by the authorities as

Tunisian nationals and are therefore not counted in Table 8 7

It is difficult to establish whether this sub-population has responded to the increased demand for labour in Libya, in a similar manner to the expatriate Libyan community. There would be grounds to support the theory that ethnic links encourage emigration, if emigration rates were higher in those areas where the Trabelsi tribes settled. North of the Chott el Djerid the Trabelsi are found predominantly in the north-east of the country and in the lower Tell (Clarke, 1958, 90). This indeed is an area which contributed a large number of migrants in the earlier stages of the migration wave. Many other variables could have been equally important in prompting early migration from this area (such as higher literacy rates, the higher levels of urbanization etc.) If the tribal affinity of the northern Trabelsi was a significant factor in stimulating migration, this would be rather surprising since

"most of these particular Trabelsi have lost contact with their former homelands and have been more or less absorbed by the peoples of Tunisia " (Clarke, 1958, 90)

The links between the tribes of southern Tunisia and Tripolitania appear to be stronger. A general disregard for national authority concerning frontier control is reflected in the statistics for clandestine migration which show that very large numbers of illegal migrants originate in the south of Tunisia. It seems likely that cultural affinity between this area and Tripolitania may account in part for the large number of clandestine migrants departing from the south.

Tenuous as such a relationship may be (between tribal

distributions and patterns of migration), it is worth considering whether its existence would negate Hagerstrand's theory. It would suggest that the characteristics of a population, which affect information awareness (namely location relative to information sources) were less important than factors affecting information evaluation (such as kinship ties).

Information evaluation

If cultural affinity is temporarily accepted as an element assisting in the evaluation procedures of potential migrants in southern Tunisia, and encouraging the earlier and more widespread departure of persons to Libya from this area, what forces can be invoked to explain the patterns of emigration observed in the rest of Tunisia?

It is likely that decision makers in the urban environment receive information more frequently, a factor stressed by Hagerstrand as important in the decision making process. Furthermore, it might be argued that with higher literacy rates than in rural areas, they are better able to evaluate rapidly the prospects of migration. Substituting literacy for levels of urbanization in the multiple regression of Table 8.5, yielded largely similar levels of explanation. A second and more important factor in the evaluation procedure is the relationship between perceived risks and returns from adopting a decision. With regard to migration to Libya, the financial benefits of migration seem clear. M'tar (1978, 144) reports that Tunisians trained in the building trade could, in 1973, earn three times their monthly Tunisian wage (42 T Dinars) by migrating to Libya (average migrant builder's

monthly salary 120 T.Dinars) Painters could earn 100 T Dinars in Libya compared with only 33 T Dinars at home, while welders could gain more than four times their Tunisian salary (24 T Dinars against 112 T Dinars in Libya) A survey by the author of migrant earnings for the year 1976 at selected O T T E E F P. offices (see Chapter 10) revealed that by then an unskilled worker could gain 75 T Dinars per month on average and a skilled worker 150 T Dinars.¹ By contrast, in Tunisia the same workers could only have earned 28 and 70 T.Dinars respectively

The risks of emigration are harder to quantify. It seems logical that town dwellers with their looser kinship ties and their lack of commitment to an agricultural economy are more willing to migrate on an experimental basis If migration should prove unsuccessful their re-integration into their city of origin involves the restructuring of fewer social and economic relationships Persons in rural areas, particularly those living in the more traditional societies of the low and high steppe of Tunisia, have closer kinship ties, as well as more immobile assets Emigration may involve the forfeiture of the right to cultivate the land and the transfer of responsibility for the land to another member of the family. Hay (1974) has shown that in the district of Testour only persons with little or no land were willing to emigrate

Even if return were easy, few rural migrants, once accustomed to the higher standards of living and greater individual freedom which accompany employment in the modern sector of the economy, wish to step back into the old lifestyles This is where

¹At the time of the survey (October, 1977) £1 sterling = 0 74 T.Dinars

international migration involves a greater risk than internal movement, for the assurance of continued employment in a foreign labour market is extremely low, and the urban migrant has a better chance of returning to modern sector employment after his spell abroad than has a rural migrant. It is not surprising that information evaluation concerning migration opportunities is initially a more lengthy process in the rural environment, even if the availability of perfect information was ubiquitous.

Once a destination has been proven a reliable employment market, the situation changes and migration becomes even more desirable to rural than to urban persons. With the passage of time the benefits of migration become increasingly apparent to persons in the rural community.

The return of migrant remittances to both urban and rural bred families undoubtedly results in an improvement of their standards of living. The impact is subdued in the urban environment since social inequalities in the standard of living, and particularly in purchasing power, already exist in the city. By contrast, remittances from migration often initiate inconsistencies in social status in the rural environment. The availability of cash from migrant remittances distinguishes a rural family from their surrounding milieu, and the expenditure of the surplus cash on improved housing and on consumer goods such as radios, televisions, bicycles and sewing machines creates a visible duality within village society.

By 1975 it therefore appears that emigration to Libya had become the accepted norm for many men from the rural environments of western Tunisia, and levels of emigration from this region had grown to outweigh in significance

worker emigration from the coastal gouvernorats From the preceding discussion it appears quite logical that the populations of the rural areas of western Tunisia should be more conservative in their behaviour and that they should lag behind populations of the more 'modern' regions of the eastern littoral in their response to migration opportunities This hypothesis seems to fit the experience of Tunisian emigration The indices of migration presented in Tables 8 1 and 8 3 might therefore be interpreted as follows. In the early years of high labour demand in Libya, emigration occurred first from southern Tunisia where awareness of migration opportunities was greatest (and where the local population was well accustomed to the concept of short-term labour migration) The eastern littoral became the second source of migrants, contributing increasingly large numbers as the demand for foreign workers rose This phase may be associated with the initiation of Libya's three-year plan (1973-1975). The less innovative populations from the more traditional societies of western and north-western Tunisia were the last to embark on the emigration wave, but on recognition of the benefits of migration, came to participate in the Libyan labour market as vigorously as any other region of Tunisia

Explanation of Regional Migration Rates

A number of unsubstantiated hypotheses have been stated in the preceding section suggesting that the more urbanized areas of eastern Tunisia are more innovative in adopting migration opportunities than the more traditional rural areas of western and north-western Tunisia It is necessary now to seek corroborating evidence, firstly so that this hypothesis may be accepted or rejected, and

secondly in order to improve the predictive capacity of the model with regard to rates of Tunisian emigration to Libya. Three tests are possible, which enable more detailed analysis and prediction of regional migration rates.

Firstly, the general hypothesis will be examined independently of the absolute migration rates observed. The synchronism of adoption curves of migration opportunities will be studied.

Secondly, taking 'urban' and 'rural' populations as surrogates for 'innovative' and 'conservative' populations, the hypothesis will be tested afresh at the more detailed scale of the Tunisian delegations.

Thirdly, the theory must be tested against the most recent patterns of Tunisian emigration (i.e. those which developed during 1977 following the re-opening of the Tunisian-Libyan frontier).

Leads and lags a preliminary discussion

One method of verifying the existence of the lead and lag areas, implied by the above hypothesis, is to consider the relative rather than the absolute variations in the size of gouvernorat emigration flows. These standardized flows may be compared with the national trend. In migration quotient analysis (Figure 8.1) national trends were removed by dividing regional migration rates by national rates. Now the difference between regions is removed by assigning the value 100 to the emigration flow departing from each gouvernorat in the year of peak out-movement. Indices of migration for other years were then calculated as a percentage of emigration in the peak year. For all 13 Tunisian gouvernorats migration rates peaked in 1973. Table 8.8 presents the migration

Table 8 8 Migration Indices for Tunisian Emigration to Libya

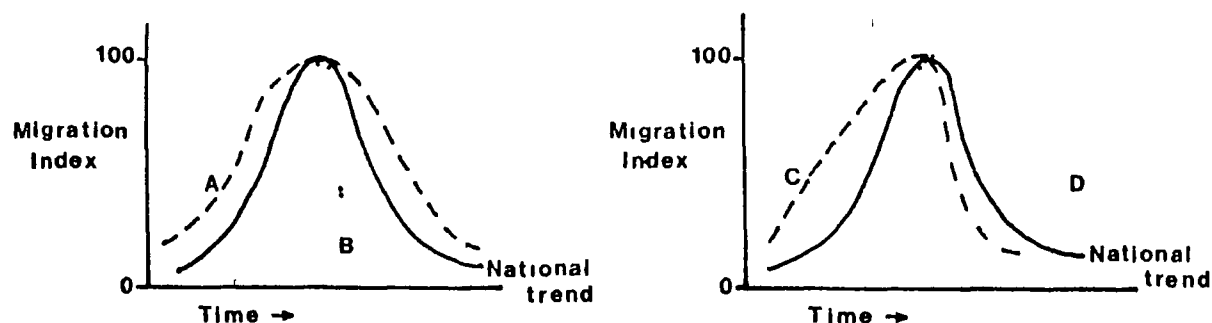
Gouvernorat	1970	1971	1972	1973	1974	1975	1976
National trend	5 5	28 5	55 9	100.0	43 4	25 3	4 3
Tunis	2 3	12 4	<u>61 8</u>	100 0	25 2	15 7	0 2
Bizerte	1 3	12.0	44.9	100 0	31.2	18.6	0 5
Beja	0.0	18.1	38 3	100.0	<u>46.5</u>	<u>39 8</u>	3 0
Jendouba	0.4	15 4	20 7	100 0	<u>70.9</u>	<u>43 7</u>	<u>9 2</u>
Kef	0 0	<u>31 9</u>	20 2	100.0	<u>46.9</u>	<u>41 8</u>	<u>15.6</u>
Kasserine	0.0	<u>47.0</u>	44 8	100.0	<u>45 4</u>	<u>81 7</u>	3 4
Gafsa	0 0	<u>60 9</u>	<u>75 0</u>	100 0	41.9	<u>130.4</u>	<u>5.8</u>
Medenine	<u>8 2</u>	17 1	34 3	100.0	42 1	12 0	2.8
Gabes	<u>16 4</u>	<u>34 4</u>	<u>61 5</u>	100.0	<u>44 2</u>	<u>42.9</u>	<u>8 3</u>
Sfax	<u>10 4</u>	<u>30.5</u>	42 2	100.0	27.8	18.2	3.7
Kairouan	1.3	7 0	<u>64 9</u>	100 0	<u>59 8</u>	<u>38.7</u>	2 0
Sousse	2 4	18 9	<u>94.1</u>	100.0	17.4	22 6	2.3
Nabeul	<u>14.5</u>	<u>39 8</u>	<u>65.3</u>	100.0	28 4	17.1	2 0

Indices above the national trend are underlined

Source Author's calculations¹

¹The technique used in Table 8.7 for distinguishing 'lead' and 'lag' regions is effective because of the coincidence of peak emigration flows from each gouvernorat in one year. Where this does not occur and where smaller numbers of migrants are involved the technique has a slight "squashing effect" on the data

FIG 8 2 MODEL MIGRATION WAVES

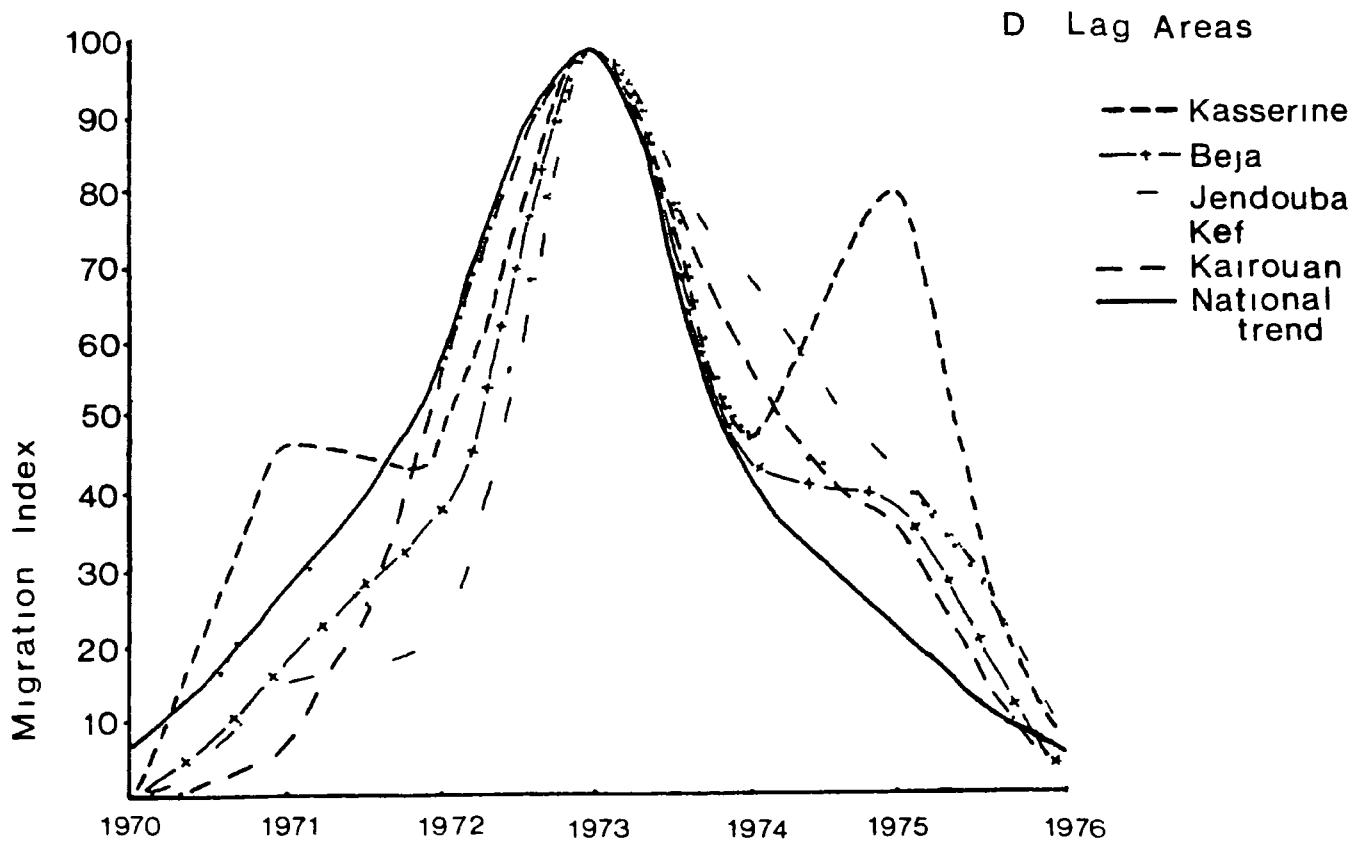
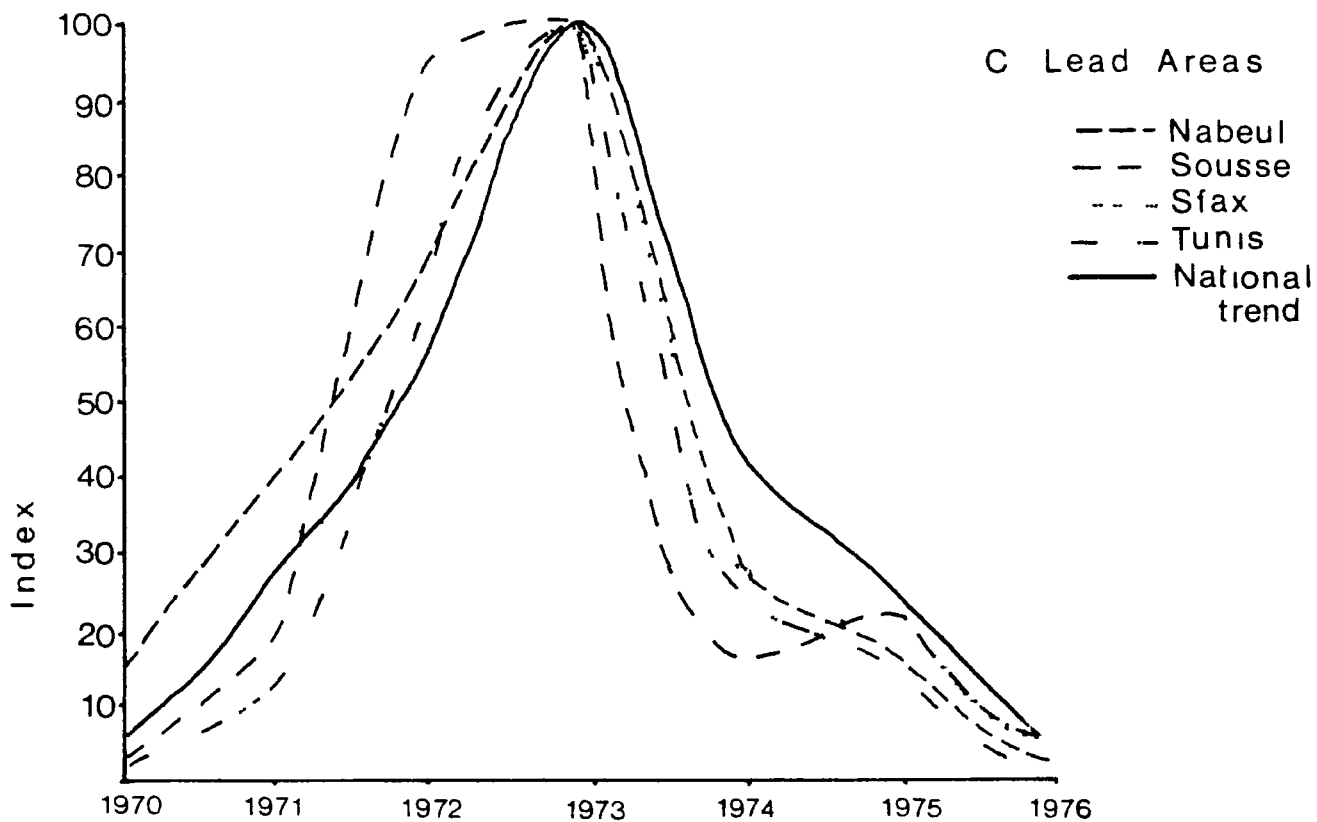


indices for the period 1970 to 1975. Four conditions may be identified in comparing trends of individual governorats with that of the nation as a whole. These are represented diagrammatically in Figure 8. 2.

Conditions A and B represent respectively extreme stability and extreme peaking of migration rates. Bizerte and Medenine are examples of the latter situation, indicating a tendency towards extremely high migration in the peak year relative to all other years. Gabes exemplifies condition A in which migration is only a little higher in the peak year than in other years. This reflects a higher level of continuity in the volume of migration.

Conditions C and D are of greater interest since they suggest that some governorats consistently lead or lag in relation to the mean trend. In case C a governorat reacts more slowly than the nation as a whole before and after the peak adoption period. It might therefore be considered to be a lag area. Case D represents an innovative population which is faster to accept migration opportunities before the peak and is more rapid to abandon them thereafter. Such an area would be termed a 'lead' area. Governorats with below average indices in two of the three years before 1973 and above average indices in both of the following years were defined as

FIG 83 LEAD AND LAG MIGRATION AREAS



lag areas, while those displaying above average adoption in one of the two years prior to the peak and below average behaviour in the two years after were defined as lead communities (Figure 8.3)

By these definitions Tunis, Nabeul, Sousse and Sfax are 'lead' areas and Beja, Jendouba, Kef, Kasserine and Kairouan 'lag' districts. Only Gafsa governorat is anomalous in failing to belong to any of the four classes, A, B, C or D. Differential levels of clandestine migration may be the causal factor resulting in this deviant behaviour.

The 'lead-lag' definitions given above split the country most markedly between the innovative urbanized coastal zone and the conservative and almost exclusively rural interior of Tunisia (Table 8.9)

The existence of these 'lead-lag' relationships appears to partially substantiate the hypothesis that the evolution of migration patterns is intimately linked to the societal values

Table 8 9 Level of Urbanization (1975) in Lead and Lag Areas

% of population living in urban areas, 1975					
Lead areas		Lag areas		Undefined	
Tunis	81	Beja	27	Bizerte	58
Sousse	62	Kef	25	Gabes	38
Sfax	58	Kairouan	23	Gafsa	34
Nabeul	49	Kasserine	22	Medenine	23
		Jendouba	16		
Average	74	Average	22		

(Source Author's calculations)

prevailing in zones of emigration. If 'lead-lag' relationships could be proven to be consistent through time, then this form of analysis would prove extremely valuable for planning purposes.

Migration analysis at the levels of the delegations

Unfortunately it is not possible to study emigration from each delegation in each year. Statistics are only available for 1971, 1976 and 1977. Statistics for 1971 were derived from a detailed map constructed by Simon (1974). The nature of this data source precluded the possibility of rigorous statistical analysis for emigration in 1971. For this year a simple classification was devised relating the size of migration flows to the level of urbanization (Table 8.10). It should be recalled that in 1971 the main surge of migration to Libya had still to occur, and that in the same year the migration field was still relatively concentrated in southern Tunisia (Table 8.1). Compared with 1972 (Figure 8.1), the urbanized north-east was still not fully involved and had migration rates that were much lower than the southern gouvernorats. Table 8.10 confirms that there is a tendency for delegations with low levels of urbanization to send few migrants but the inverse relationship is less clear. The larger migration flows are often related to higher levels of urbanization, but as the variance of the results about this trend increases, no simple linear relationship can be verified. Some of the deviation from the general trend is accounted for by three of the mining delegations of Gafsa gouvernorat, which despite urbanization rates of over 80%, sent only very small migration flows to Libya (5-24 persons category). Conversely, high migration rates were experienced in delegations such as Ben Gardane and Medenine because of their proximity to the

Libyan frontier, despite low levels of urbanization

It is unfortunate that data is unavailable at the delegation level for 1972 and 1975, the years which have been mapped in Figure 8.1 and which typify urban and rural migration respectively. It is impossible to establish whether in 1975 migrants were truly rural in origin, or whether they were merely coming from the urban delegations of the rural governorates. The distinction is an important one.

In 1977 national migration rates to Libya were much higher than in 1971 (Table 8.11), and the migration field was more diffuse. In 1971 38% of delegations sent less than five migrants to Libya but by 1977 the percentage had dropped to only 22%. In the same year, 32% of delegations sent over 50 persons. For the sake of comparison with Table 8.10, migration flows and urbanization rates were also cross-classified for 1977 (Table 8.11).

In 1977 there is once more a tendency for small migrant flows to be associated with the delegations of little or no urban settlement. Larger flows came not only from the more urbanized delegations, but also from those delegations which in absolute terms had large numbers of town dwellers living in one or two large settlements. While predominantly rural areas sent only small flows, highly urbanized areas were more variable in their behaviour. Once more the mining settlements of Gafsa sent very few migrants to Libya.

It should be noted that the marginal totals of Table 8.11, which represent the frequency distribution of migration flows and of levels of urbanization, are once more positively skewed, but the skew is less strong than in Table 8.10.

Transformations of these distributions approach normality and

Table 8 10. Migration Flows and Level of Urbanization, 1971

		Size of Migration Flows						Total
		500+	100-499	50-99	25-49	5-24	0-4	
Percentage of Population living in urban Areas	80-100	1	1	2	1	4	0	9
	60- 79	0	0	1	2	3	2	8
	40- 59	0	1	2	1	4	2	10
	20- 39	0	2	1	3	9	6	21
	0- 19	0	0	2	2	13	14	31
	Total		1	4	8	9	33	24

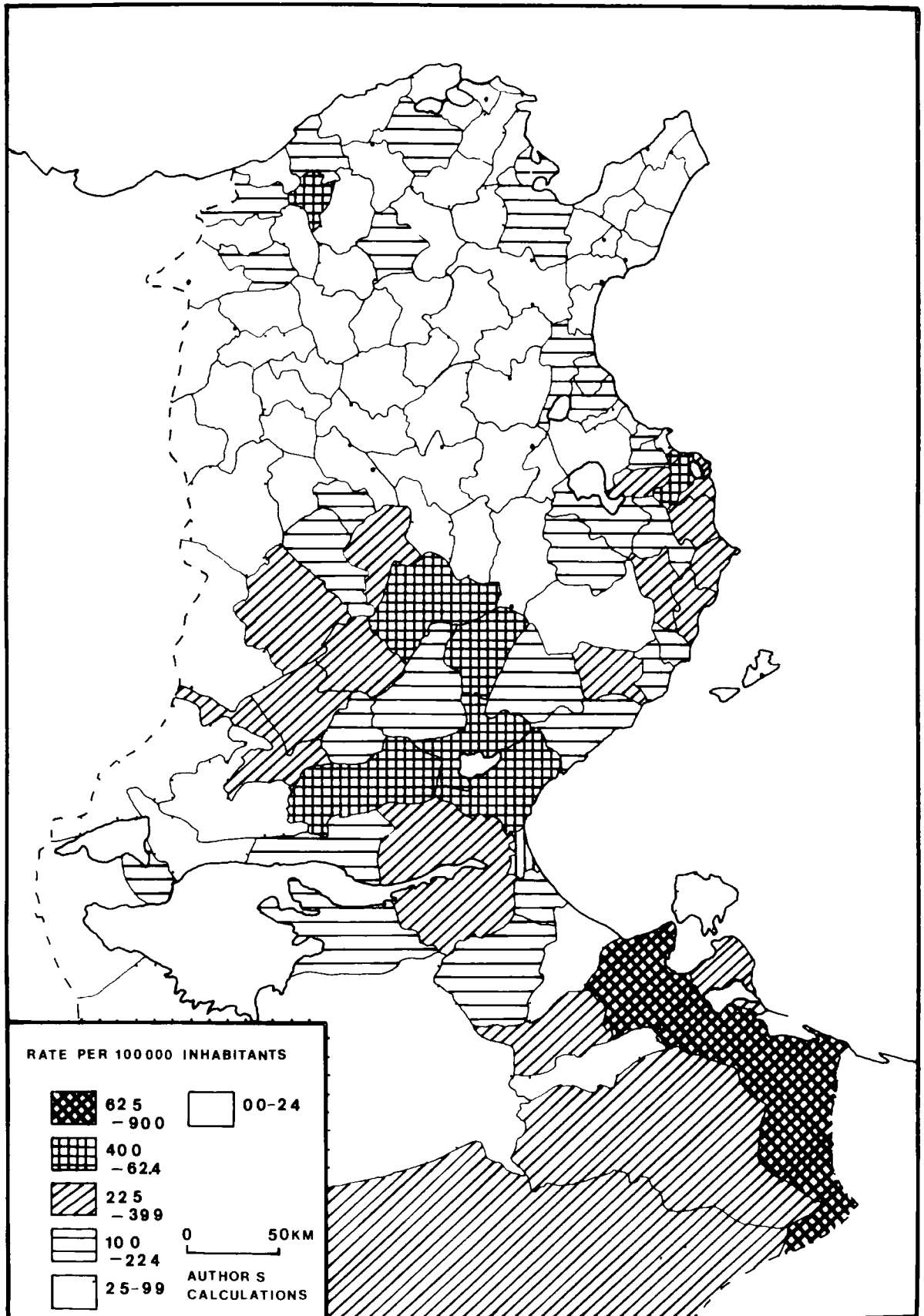
(Calculated from statistics in D A T , 1973b, and Simon, 1974, map 2
No data was presented by Simon for some delegations These have been
omitted from the analysis.)

Table 8 11. Migration Flows and Level of Urbanization, 1977

		Size of Migration Flows						Total
		500+	100-499	50-99	25-49	5-24	0-4	
Percentage of Population living in urban Areas	80-100	1	3	2	3	3	0	12
	60- 79	0	4	2	2	2	1	11
	40- 59	0	2	2	1	8	3	16
	20- 39	0	8	2	7	7	6	30
	0- 19	0	2	12	8	15	17	54
	Total		1	19	20	21	35	27

(Calculated from author's survey of O T T E E F P. records.)

FIG 84 RATES OF EMIGRATION TO LIBYA, 1977



permit application of parametric statistical tests in analysing these data sets

Libyan migration in the first ten months of 1977

The ordered distribution of delegations with high migration rates (Figure 8.4) suggests that distance effects were important in 1977. Dichotomizing the country for convenience into northern and southern areas along a line from Monastir to Kasserine, establishes a northern region in which only one delegation experienced a migration rate of over 225 persons (calculated for the first ten months of 1977). To the north there are also a large number of delegations with little or no migration. 32 delegations fall into the lowest classes (rates less than 24 per million) compared with only three such delegations south of the line. In the north, the majority of delegations with higher migration rates (in the 25-224 range) cluster around urban areas such as Bizerte, Tunis, Sousse and Menzel Bourgiba, or in delegations which contain administrative capitals, such as Jendouba, Le Kef and Silliana. To generalize, it can be said that in the north migration occurs predominantly from urban areas. Even in gouvernorats where the population is largely rural, it is the urban or administrative centres which are the chief migrant sources. Recalling that 1977 marked the initiation of a totally new migration wave, it can be said that once more urban populations appear to be more innovative than rural populations.

In the south, interpretation is more complex since distance effects are stronger. Furthermore, the gradient seems to decline from the coast to the interior, and within this pattern there are other major regional deviations such as the exceptionally high

FIG 85 RESIDUALS ABOUT REGRESSION OF MIGRATION RATE
ON DISTANCE FROM TRIPOLI

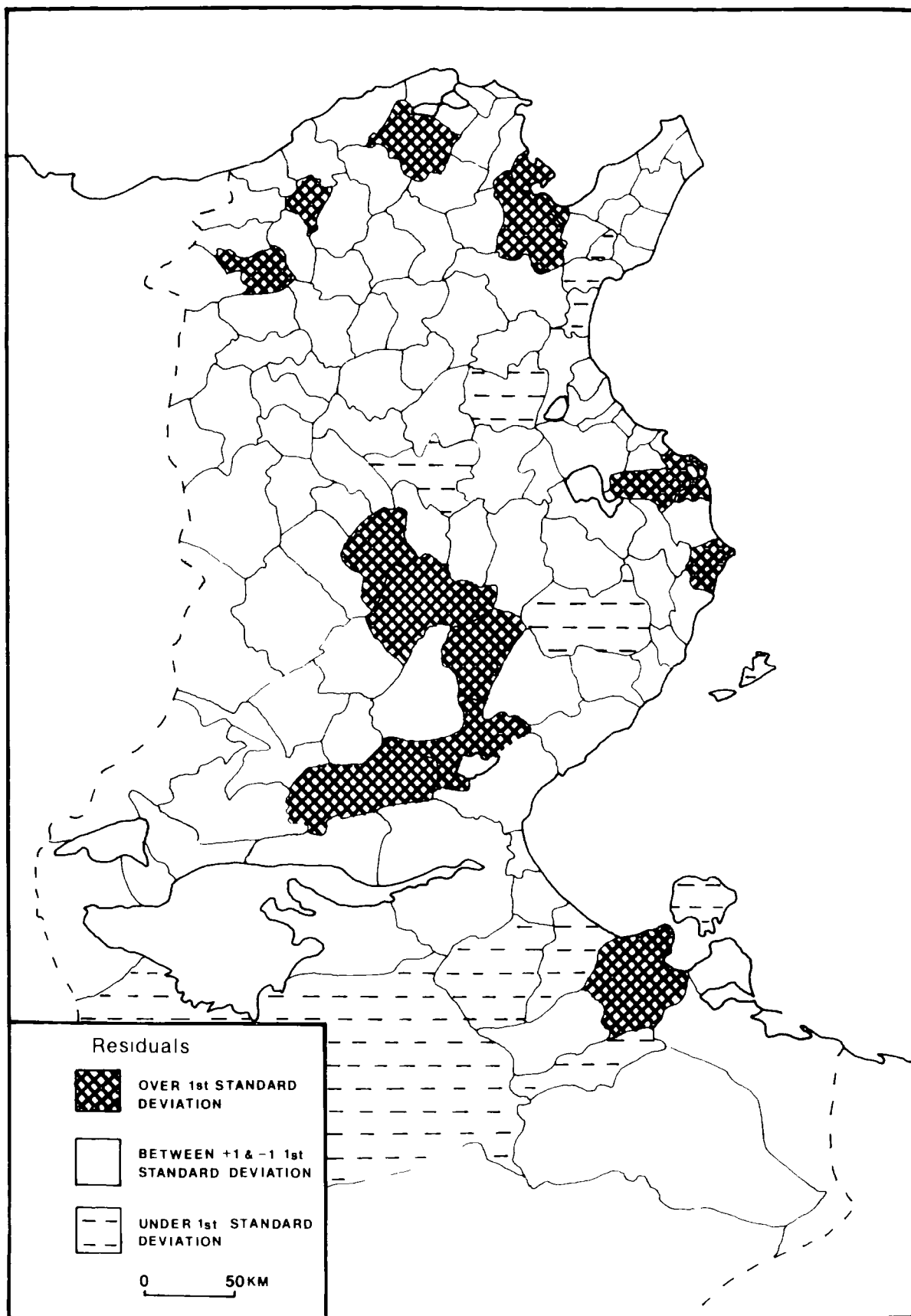


FIG 86 ANNUAL RATE OF POPULATION GROWTH 1966-75

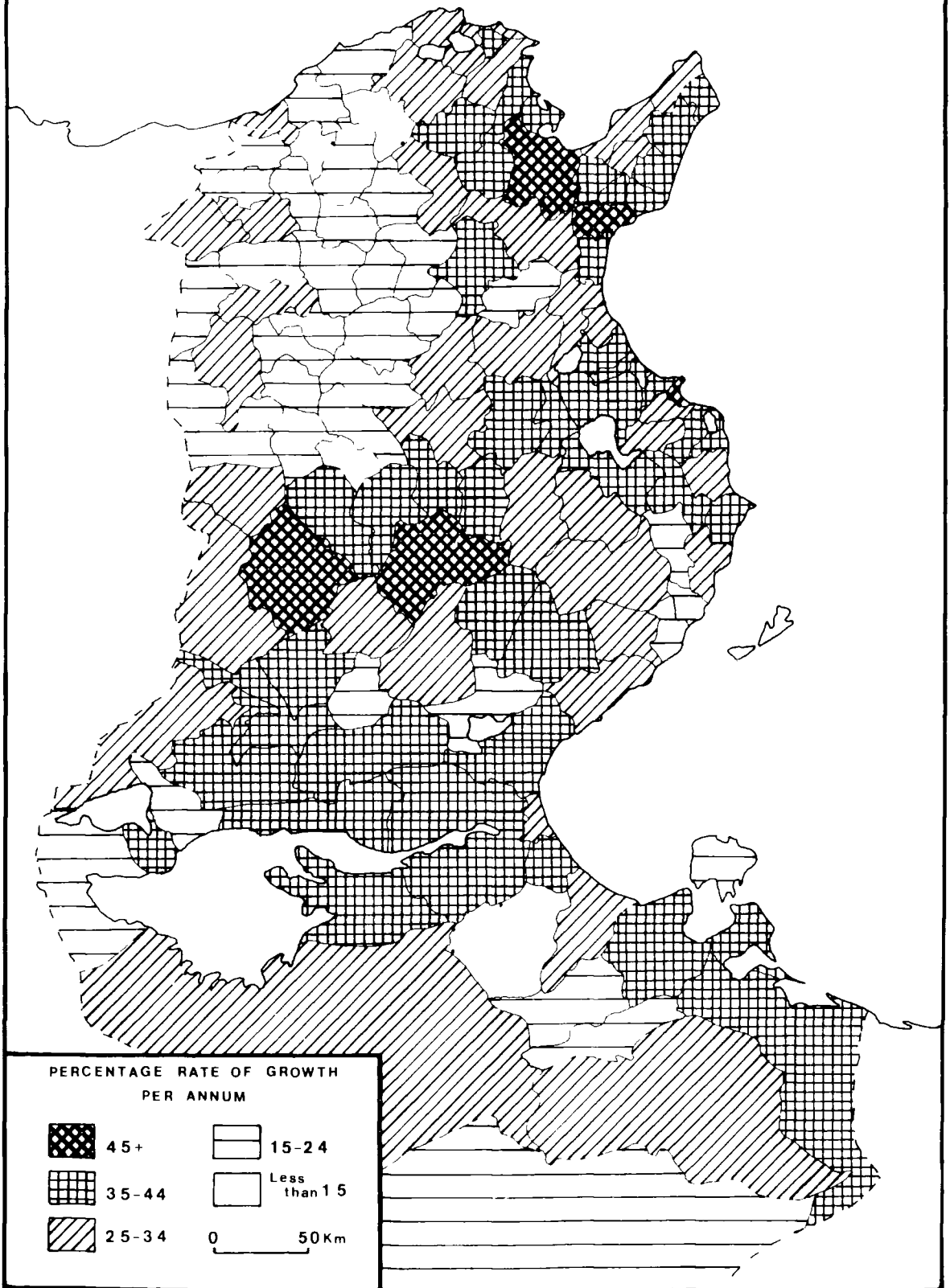
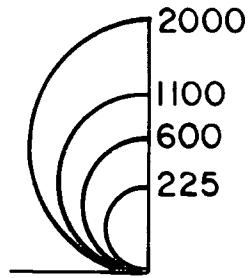


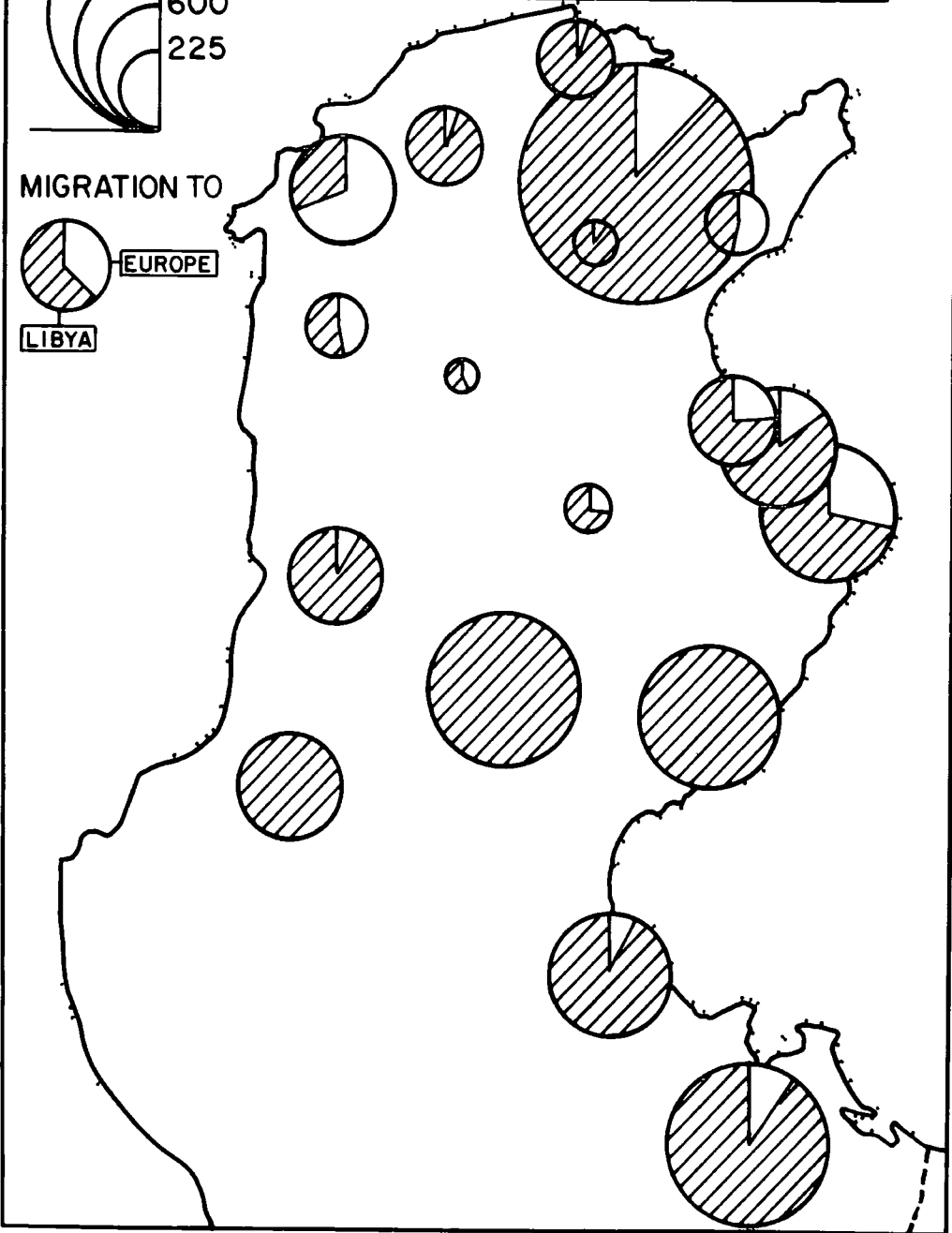
Fig 87 INTERNATIONAL MIGRATION
1977 (First 10 months Distribution
by origin)



MIGRATION TO

EUROPE

LIBYA



migration rates from Sidi Bou Zid and Regueb. The efficacy of predicting migration from levels of urbanization in this area is extremely low. Regression analysis was once more employed to identify the importance of various predictor variables for migration.

As at the governorat level, so also at the level of the 123 delegations, the migration rate was regressed against road distance to Tripoli. A square root transformation of migration rates was calculated to normalize the frequency distribution. The square root was also taken of all distance measurements. A correlation coefficient of -0.59 and a coefficient of determination of 0.35 were achieved, confirming the findings of the correlation analysis at the governorat level.

From the regression of migration rates on road distance through Tripoli it was possible to examine the pattern of residuals emerging around the stated relationship. Residuals with standard deviation scores greater than 1.0 on either side of the predicted relationship were plotted on a map (Figure 8.5). Examination of the pattern of residuals reveals that high deviations from the predicted relationship seem to fall in spatial clusters, suggesting that some common regional variations about the general trend may exist. It was discovered that four of the regions of high positive residuals (Tunis, Mahdia - Moknine, Sidi Bou Zid - Regueb and Medenine) could be related to areas of rapid population growth (over 2.5% per annum between 1966 and 1975). By contrast, three of the high negative residual zones (Matmata - Ghoumrassem, Jerba and Mateur) lay in areas with low rates of population growth (less than 2.0% per annum). Comparing Figures 8.4 and 8.6 it can

be seen that the correlation extends to other delegations. Statistical analysis indicated that the hypothesized relationship between population pressure (as measured by the rate of population growth) and the level of emigration was justified. Although a correlation coefficient of only +0.26 was achieved, the relationship was nevertheless significant in statistical terms at the 0.01 significance level.

Several other variables were introduced in an attempt to increase the level of explanation, but none led to any major improvement in the value of the coefficient of determination. Table 8.12 shows the correlations that were achieved between the migration rate (square root of), distance (square root of), the level of urbanization, the annual rate of population growth and the percentage of men in non-agricultural employment. It was both interesting and significant that opportunities for non-agricultural employment apparently had very little influence on emigration patterns, and resulted in only a small increase in the level of 'explanation' achieved by statistical analysis. Unfortunately, data constraints made it impossible to test whether a relationship existed at the delegation level between emigration rates, and levels of employment expansion in non-agricultural activities. This latter measure might have proved a more appropriate predictor of migration.

The multiple regression of Table 8.13 managed to 'explain' only 38.9% of the statistical variation in emigration rates ($r = 0.624$). While it is clear that only a partial understanding of the spatial variations in emigration has been achieved by the analysis, the result remains highly significant in statistical

Table 8 12 Correlation Coefficient Matrix

	(1)	(2)	(3)	(4)	(5)
	Emigration Rate	Urbanization	Rate of Population Growth	Distance to Tripoli	Non-Agri- cultural Employment
(1) Emigration Rate	1.00	0 08	0 26	-0.59	-0.01
(2) Urban- ization	0.08	1.00	0.46	0.05	0.57
(3) Rate of Population Growth	0.26	0.46	1.00	-0 23	0.35
(4) Distance to Tripoli	-0.59	0.05	-0.23	1.00	-0 08
(5) Non-Agri- cultural Employment	-0.01	0.57	0.35	-0 08	1.00

Notes

- 1) A square root transformation was found to yield the highest level of correlation
- 2) Urbanization measured by the percentage of the population living in urban areas in 1975.
- 3) Average annual rate of population growth, 1966-1975.
- 4) A square root transformation was employed
- 5) Percentage of all male employment in non-agricultural activities in 1977

Table 8 13. Multiple Regression of the Rate of Emigration to Libya on Distance, Population Growth, Non-Agricultural Employment and Urbanization ¹

Variable	Multiple R	R Square	R Square Change	Simple R
Distance	0.589	0.347	0.347	-0.589
Population Growth	0.602	0.363	0.016	0.260
Non-Agricultural Employment	0.612	0.374	0.011	-0.011
Urbanization	0.624	0.389	0.015	0.076

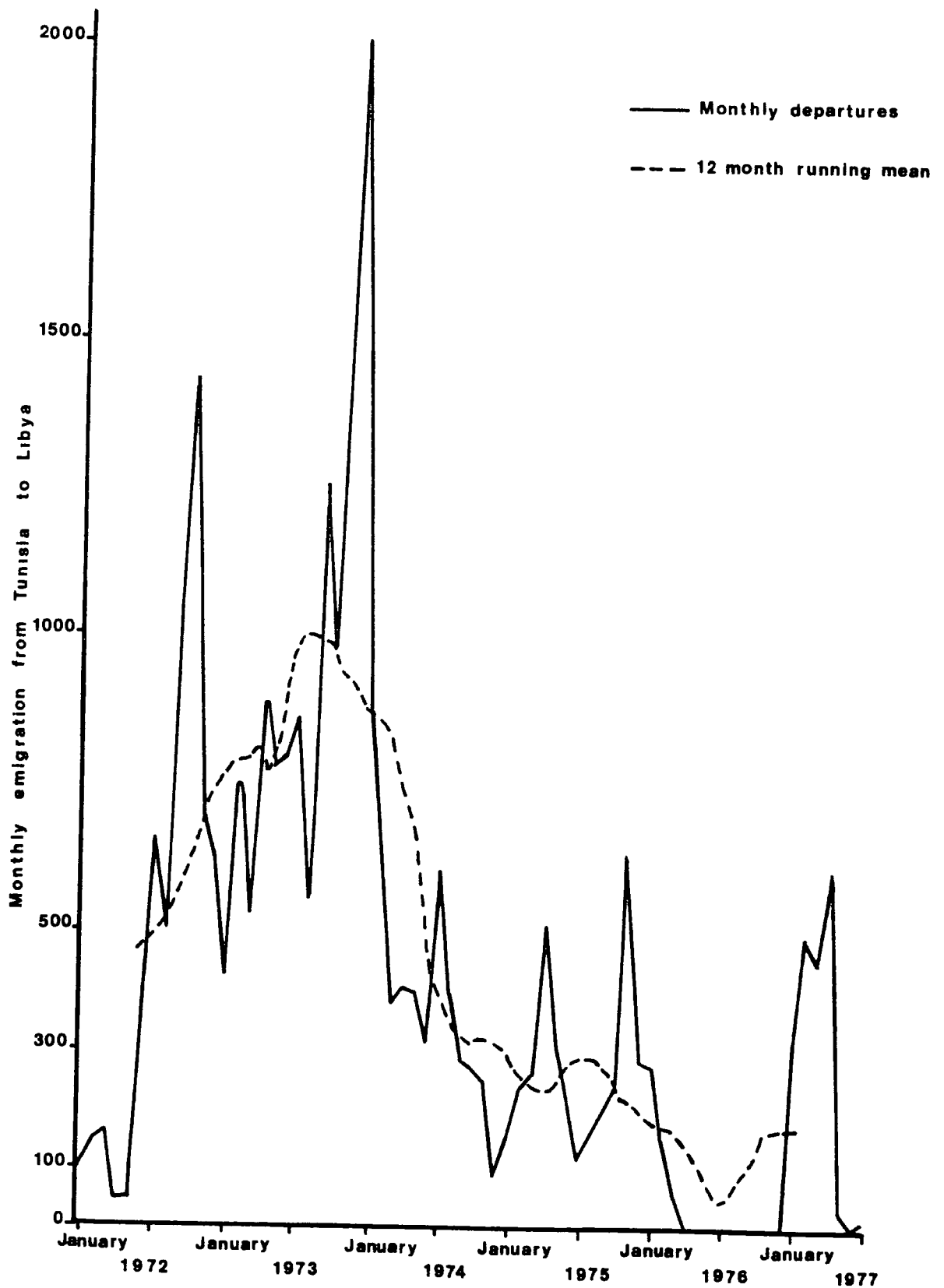
¹ Variables as defined in Table 8 12

terms (significant at the 0.001 level). It should also be recalled that variations in migration due to regional differences in population density have already been standardized, and that it is this variable which in many regression analyses is shown to account for a high percentage of the spatial variation in the volume of migration.

Summary of the Analysis of the Evolution of Tunisian Emigration

Different tools and data sources have been investigated to describe and explain the nature of Tunisian emigration to Libya over the last decade. Rather than denying the importance of information evaluation procedures in the decision to migrate, analysis of the changing patterns of emigration emphasizes the need for a dynamic explanatory model, and seems to demonstrate the inadequacy of invoking any single monolithic variable as the explanation of all patterns in space and time. It is concluded

FIG 88 TUNISIAN EMIGRATION TO LIBYA, 1972-77



DATA SET OTTEFP, 1976c & 1977d

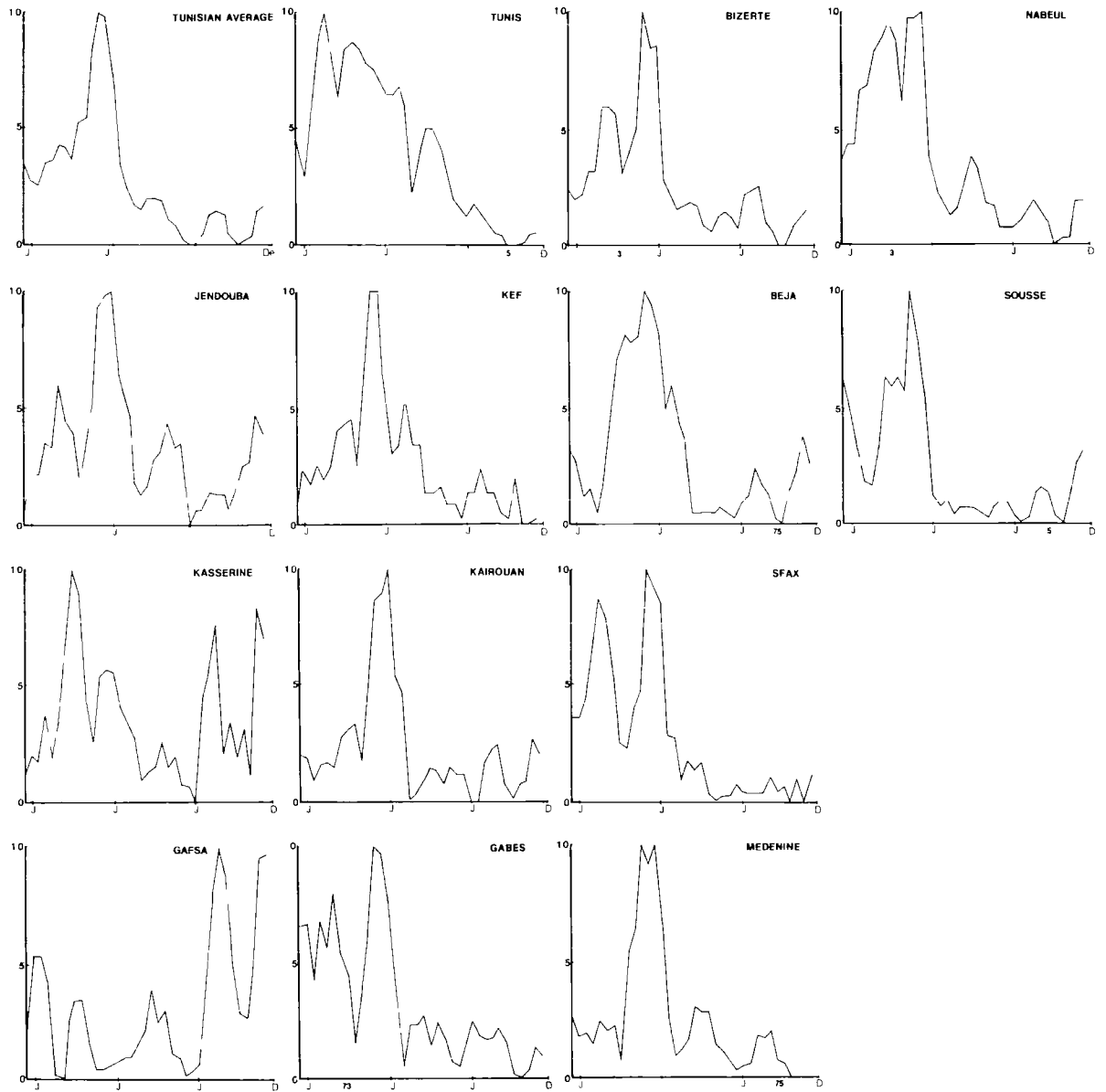
that factors influencing information evaluation rather than information awareness are critical in moulding migration rates during the initial diffusion of opportunities to move to a new destination. The subsequent development of patterns of migration is conditioned by alternative opportunities available to the population of potential migrants and by the wide range of physical, economic and social constraints which impinge on migration behaviour.

Leads and Lags in Migration

The concept of leads and lags in migration has already been introduced earlier in this chapter. Techniques for predicting migration and explaining the interdependence of migration in space and time will now be explored in greater depth.

Variations in the number of migrants departing from Tunisia to Libya between January 1972 and July 1977 are shown in Figure 8.8. Three elements may be identified from this graph. Firstly there appears to be a long-term decline in the number of migrants between 1972 and 1977. This trend is represented most clearly by the curve for a 12 month unweighted running mean. The 12 month interval was chosen to eliminate from Figure 8.8 any seasonal fluctuations in emigration, which form the second element of the sequence. In most years migration peaks twice: first in the period April to June and again during the months October to December. Troughs in emigration occur during the hot summer months and also during the first quarter of the year. Thirdly there are apparently random fluctuations in migration. For example, between September and November 1973 the seasonal upswing in

FIG 89 MIGRATION INDICES FOR TUNISIAN GOUVERNORATS 1973 75



migration was interrupted by a temporary and unpredictable drop in numbers during the month of October

It was decided that seasonal and longer term trends might be more readily identified if short-term fluctuations in migration were smoothed out. Consequently a three month unweighted running mean was calculated. The migration series was further transformed to give migration indices in order to permit comparison between gouvernorats on a standardized scale (as in Table 8.8). The peak departure month was set to the value 1.0 and the month of lowest emigration to 0.0, and indices for all other months calculated relative to their position between the minimum and maximum months of emigration. Figure 8.9 offers a quick visual impression of the amplitude, phase and frequency of emigration waves for the 13 Tunisian gouvernorats between 1973 and 1975. The majority of gouvernorats had one major peak (index of 0.8 or over) in 1973 and a number of smaller peaks in 1974 and 1975. Four gouvernorats (Tunis, Nabeul, Sfax and Gabes), all defined as 'lead' areas in Table 8.9, had two major peaks in 1973, while Kasserine and Gafsa were atypical in displaying major peaks in 1975, a year in which emigration was minimal from other gouvernorats.

In order to compare more precisely the rise and fall of migration a concise description of a 'peak month' was adopted. A 'peak month' in the migration series was defined as 'any month in which the level of migration was greater than in the two preceding and two following months'. By this definition most gouvernorats experienced either four or five peaks. The timing of these peaks is indicated in Table 8.14. Comparison of the peaks permits identification of specific emigration waves. These can be seen

Table 8 14. Peaks in Tunisian Emigration, 1973-1976

Gouvernorat	Date of Migration Peaks Gouvernorats defined as lead zones in Table 8 9	1st	2nd	2b/3a?	3rd	4th	5th
TUNIS	✓	April '73	August '73	March '74	July '74	-	February '75
MFENINE	-	April '73	October '73	-	July '74	-	May '75
SFAX	✓	April '73	November '73	-	-	December '74	May '75
GABES	✓	May '73	November '73	-	June '74	January '75	May '75
BIZERTE	-	May '73	November '73	-	June '74	November '74	April '75
SOUSSE	✓	July '73	October '73	-	June '74	November '74	May '75
NABEUL	✓	July '73	December '73	-	July '74	-	April '75
JENDOUBA	x	May '73	January '74	-	September '74	-	March '75
BEJA	x	August '73	November '73	-	? October '74	-	March '75
KEF	x	-	November '73	April '74	September '74	-	March '75
KAIROUAN	x	-	January '74	-	July '74	October '74	May '75
KASSERINE ¹	x	July '73	December '73	-	August '74	-	April '75
GAFSA ²	-	July '73	-	June '74	-	-	April '75
NATIONAL TOTAL	-	May '73	November '73	-	June/July '74	-	April '75

¹Kasserine also experienced a peak in March '73

²Gafsa also experienced a peak in February '73

Source derived from Figure 8 9

to have affected different gouvernorats at slightly different times Kasserine and Gafsa proved extremely difficult to classify, since the timing of the peaks in their migration series did not readily relate to the national sequence of peaks and troughs. In a number of instances it was difficult to decide whether to allocate a gouvernorat peak to a national wave which had already passed or to one which was still approaching. Distinction between the third and fourth waves was particularly difficult.

The peaks of emigration from Tunis appear to be cyclical in occurrence. The time lapses between the five peaks are four months, seven months, four months and seven months consecutively. In other gouvernorats lapses are less regular. For example in Medenine the peaks occur after seven, seven and nine months successively, in Beja lapses of three, eleven and five months occur between peaks.

Emigration from Sfax and Medenine peaked initially in the same month as Tunis (April 1973), but thereafter they appear to fall progressively behind. After two years they both lag Tunis by approximately three months. One might have expected the lags of other gouvernorats behind Tunis to be large initially and subsequently to decrease. The inverse trend observed above is unexpected and brings into question the efficacy of the classification. There is a need to compare all stages in wave development and not merely the peaks and troughs.

From the subjective classification of Table 8 14, it appears that Tunis leads other regions of Tunisia in rising to the peaks of successive migration waves. The next zones to adopt migration opportunities after Tunis are those lying in the south and south-east

Somewhat slower are the gouvernorats of the north-west and north-east which lag two to three months behind the rest of the country in their migration behaviour

In order to be able to make more definitive statements concerning the relationships between migration patterns in one gouvernorat and those in another, it was decided to calculate the serial correlation (autocorrelation) functions of each migration sequence, and then to seek for cross-correlations between the migration series of different gouvernorats

Autocorrelation of Time Series

The migration indices discussed above were unsuitable as a data base for testing for autocorrelation because of temporal interdependence introduced by the calculation of three month running means. The unaltered monthly migration statistics as presented by the O T T E E F P. were therefore taken as the basis for studying autocorrelation effects. Before the data could be usefully tested, it had to be 'detrended' by least squares regression to remove the general trend towards decline in migration numbers between 1973 and 1976. Where a linear relationship of statistical significance was detected the trend was removed and subsequent analysis was applied to the distribution of residual terms about the general trend.

Autocorrelation compares a data sequence with itself at successive space or time lags. It helps identify points of maximum correspondence between the segments of the sequence. The efficiency of different statistics measuring spatial autocorrelation has been analysed by Cliff and Ord (1973, 131-53). The measure of autocorrelation applied to the Tunisian data set is one of a

number of statistics suitable for describing interdependency in time series. It is defined and described by Davis (1973, 232) as

$$r_L = \frac{[(n-L)(\sum Y_1 Y_{1+L}) - \sum Y_1 \sum Y_{1+L}] / (n-L)(n-L-1)}{[\sum_{i=1}^n Y_1^2 - (\sum_{i=1}^n Y_1)^2] / n(n-1)}$$

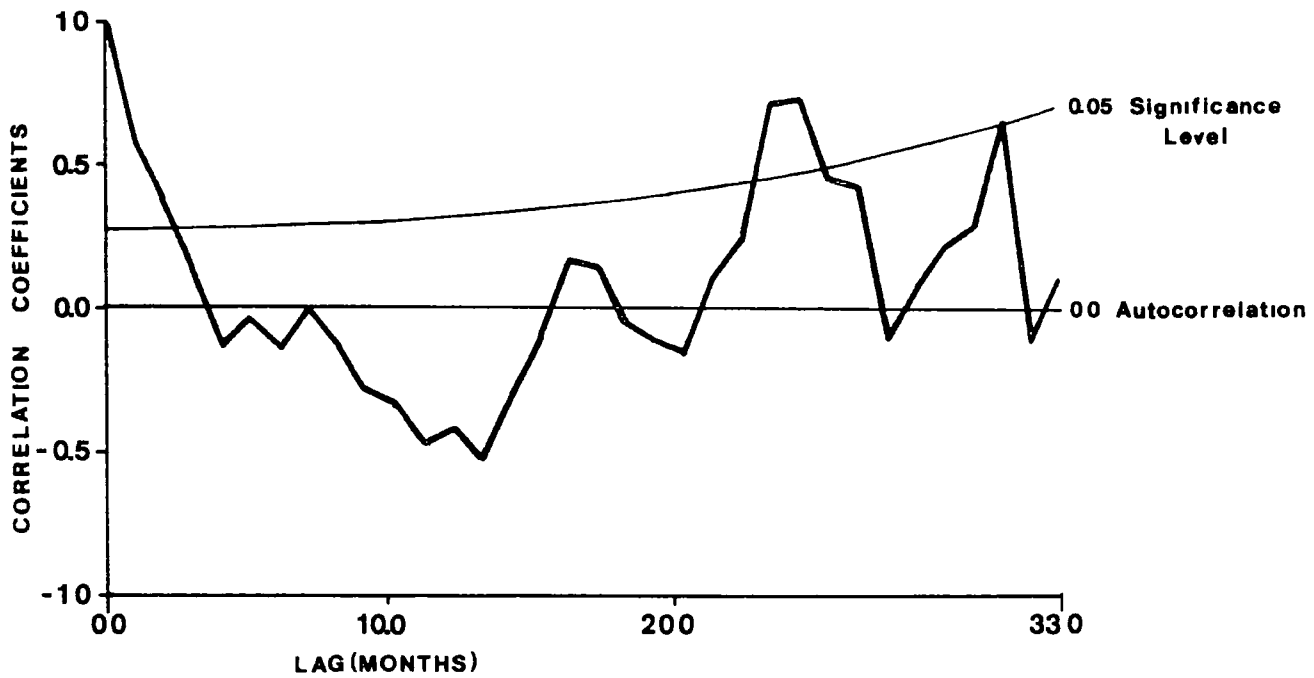
where r_L is the autocorrelation coefficient for a series of n elements (Y_1) at lag L . As with the ordinary correlation coefficient the covariance of paired variables is divided by the total variance of the data series. Since the correlation of lagged observations rather than independent variables is being measured it is called an autocorrelation coefficient. The coefficient was calculated using Tunisian migration data for the 40 months between January 1973 (labelled month one) and March 1976 (month 40). The changing values of r_L were plotted for increasing lag values, L . A number of analysts suggest that no great significance should be attached to values of r_L calculated for lags greater than $n/4$ (Box and Jenkins, 1970, Chatfield, 1975, 25-26, Davis, 1973, 236). The $n/4$ recommendation has been waived however by Haggett, Cliff and Frey (1977, 368). In their study of the interdependence in time of the occurrence of measles epidemics they make statistical inferences from a minimum sample size of ten paired observations.

Autocorrelation coefficients for the detrended Tunisian emigration statistics were calculated for each of the Tunisian gouvernorats for lags between 0 and 33 months and the results plotted in the form of correlograms. A correlogram indicates the distribution of r_L values against lag values. In the analysis which follows attention will be focussed on the portion of the correlograms plotting autocorrelation values for lags of between zero and ten

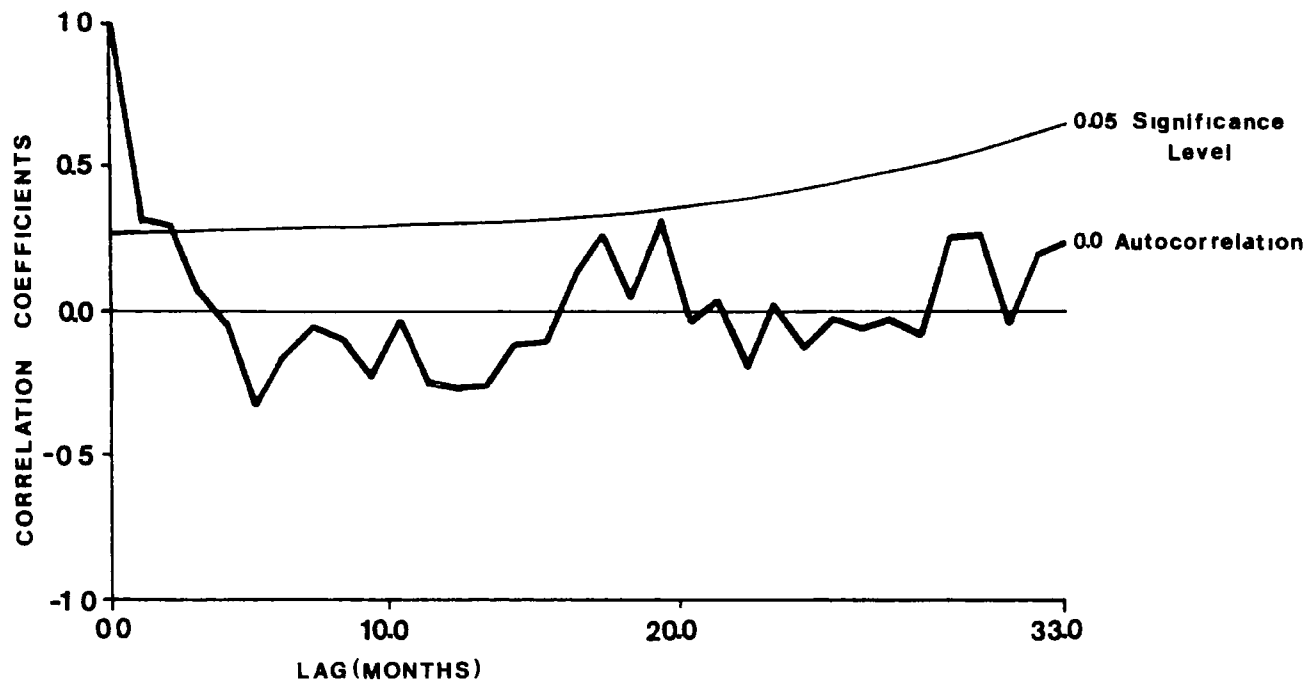
FIG 810

CORRELOGRAM

a) Tunisian Emigration to Libya



b) Emigration from Medenine



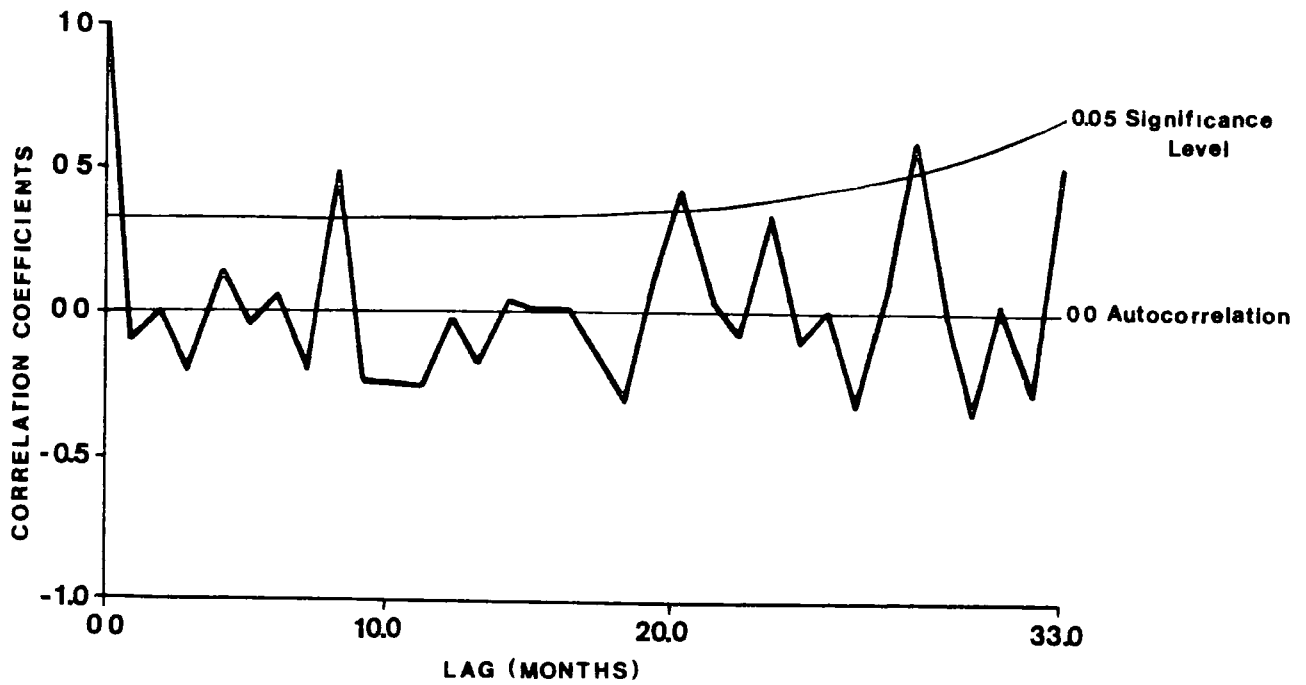
months (i.e. that portion where lags are less than $n/4$) Figure 8 10a shows the distribution of r_L values for the summation of all Tunisian emigration to Libya. It can be seen that for short lags of between one and three months, positive though rapidly declining autocorrelation coefficients are achieved, suggesting that migration levels are more similar in successive months and over short time lags than over longer time lags. Between four and eight months coefficients are low revealing no obvious temporal interdependence, and thereafter coefficients suggest rising negative correlations up to a lag of 13 months. Applying Davis' recommended test of significance at the 0.05 probability level indicates that only three of the first ten values vary significantly from zero (Davis, 1973, 236). The autocorrelation function suggests that in the short term an autoregressive structure may exist but that successive migration waves at lags of six to nine months are insufficiently regular to generate significant positive autocorrelation coefficients.

Interpretation of the correlograms for each individual governorat was based on Chatfield's description (1975, 26-30) of the properties of autocorrelation functions. The majority of Tunisian correlograms displayed no significant positive autocorrelation ($1 \leq L \leq 11$), but rather they tended towards weak negative autocorrelation at lags greater than three months. Davis (1973, 239) suggests that autocorrelation coefficients seldom are significant in a statistical sense, even where true cyclicity exists in data series, in the earth or social sciences. Usually there is at least one segment of a sequence which is stretched relative to another. This appeared to be the case with the Tunisian migration waves. It was seldom possible to move all equivalent parts of a series

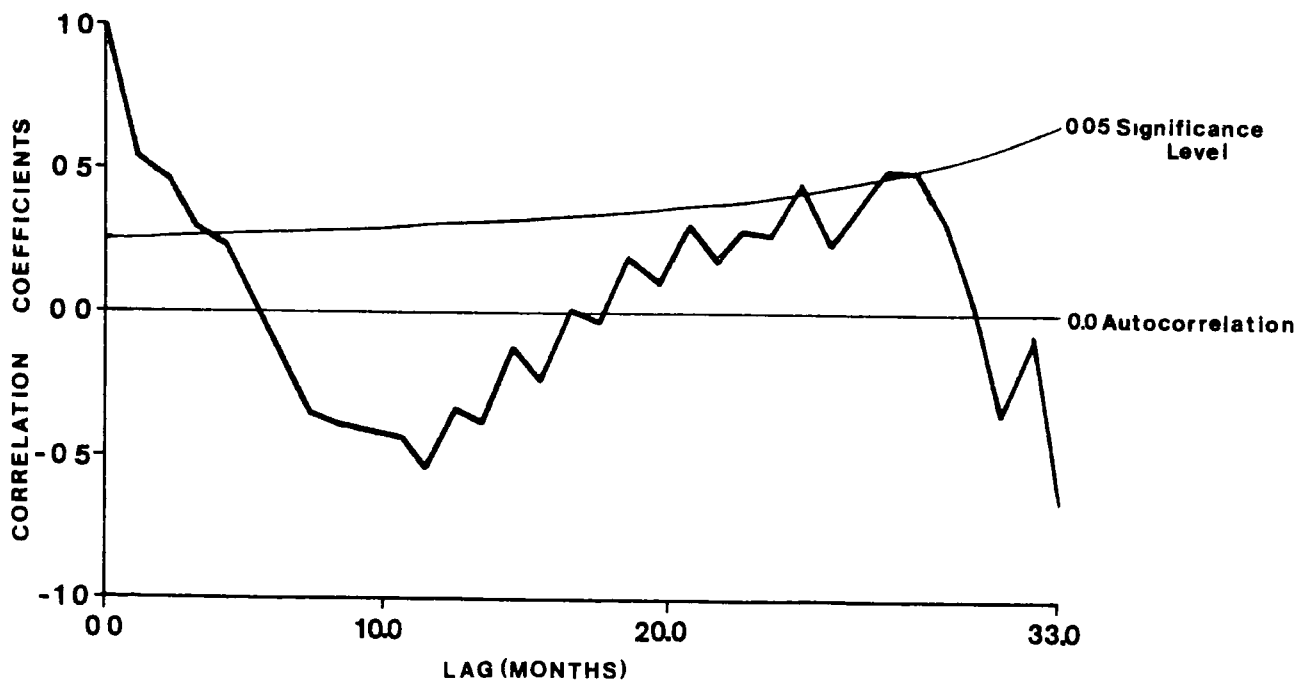
FIG 8 11

CORRELOGRAM

a) Emigration from Kasserine



b) Emigration from Beja



into correspondence at the same lag. For example, there were four distinct peaks in emigration from Medenine at months 6, 10, 20 and 29 of the series, but since the peaks were irregular in occurrence, variable in amplitude and short in duration, they did not generate any significant autocorrelation coefficients as demonstrated by the correlogram of Figure 8.10b. An exceptional case was that of Kasserine (Figure 8.11a) where a lag of eight months displaced troughs and peaks in the series to corresponding troughs and peaks at a later point in the sequence. At a lag of eight months the trough of month two was correlated with that of month ten, the peak of month eight with the minor peak of month 16, the trough at month ten was paired with the trough at month 18, and so on. The most notable correspondence occurred between the two peaks of months 29 and 37 which became paired at an eight month lag. The resultant r_L value of +0.48 was significant at the 0.01 level.

The Tunisian correlograms reveal that over the short term significant negative autocorrelation is more usual than positive autocorrelation. In Medenine significant negative autocorrelation occurs at a lag of five months, and in Beja lags of seven to eleven months all generate significant negative autocorrelation. Beja is an especially interesting case (Figure 8.11b), since the correlogram shows highly significant autocorrelation over short lags of one and two months, declining but still positive coefficients up to five months' lag and progressively higher negative autocorrelation coefficients between lags of six and eleven months. The correlogram suggests that regular cyclical variation in migration occurs and the form of the correlogram approximates to the model plot of autocorrelation coefficients generated by a sine function as

described by Davis (1973, 235). With six of the first ten lag coefficients (both positive and negative) significant at the 0.05 level the trend of the migration series certainly differs from a random pattern. Although little significance can be attached to the correlogram beyond lag ten, it should be noted that the autocorrelation coefficients do increase again to peak with positive values at lags of 24 and 27 months. Examination of the original migration series shows that migration waves do recur at approximately two yearly intervals. The correlograms of other governorats also suggested the presence of regular cyclical elements in their migration series, but these effects are insufficiently strong to be significant in a statistical sense. For example, Gabes displayed progressive decline to a high negative autocorrelation at a lag of five months, and then returned to a notable positive autocorrelation at a lag of six months. Likewise Sfax generated a positive coefficient at a lag of seven months which just failed to reach the 0.05 significance level. With Tunis negative autocorrelation troughed at lags of 10, 15 and 20 months.

The rate of decay of autocorrelation with increasing time lags varied considerably between governorats. In most governorats autocorrelation remained marginally positive for lags of three to four months, but the contiguous governorats of Nabeul, Beja and Tunis showed more powerful interdependence of data over short lags and displayed positive autocorrelation for lags of four, five and six months respectively. In these governorats the magnitude of migration flows in one month was more likely to resemble that in the preceding and following months than was the case for the migration series of the other governorats.

Kasserine exemplifies the case of an alternating autoregressive series. There is negative autocorrelation even at a lag of one month, a zero coefficient at lag two, a negative coefficient at lag three, a positive coefficient at lag four, a negative coefficient at lag five, and so on up to lag ten. This alternating series underscores the aforementioned difference between Kasserine and the other governorats. Rapid fluctuation in the migration series may result from unofficial aggregation of information for every second month by the original recording office. This is likely in the case of the governorats of the high steppe which record only small numbers of departures by controlled migration. Data collection and publication for these governorats may well give an inaccurate view of the true levels of emigration.

It is unfortunate that disagreements between the Tunisian and Libyan governments led to a total disruption of migration flows in 1976. This prevented extension of the data series. In nearly every governorat high positive autocorrelation coefficients were achieved for lags of 22 to 27 months, but in the absence of a longer time series it is impossible to infer more than that there is some close similarity between fluctuations in the migration patterns in 1973 and those experienced two years later.

In summary, the tests for autocorrelation suggest that interdependence does exist in the migration series over short time lags. The extremely short time span of peak migration flows interspersed by the longer periods of little or no migration reduce the likelihood of achieving significant positive autocorrelation coefficients over the longer term. This facet of the statistical series emphasizes the tendency for migration waves to develop and dissipate themselves

with great rapidity. The apparent temporal irregularity of occurrence of migration waves increases the difficulty of making accurate predictions of their timing when only time series data is being taken into consideration.

Cross-correlation of Migration Series

Several econometricians (e.g. Malmquist, 1978) have recently succeeded in relating migration trends to time series data for a variety of other variables such as wage levels. It is logical to also expect some degree of interdependence between the migration trends of different regions. 'Lag' areas in a nation may follow a similar migration trend to 'lead' areas, but may simply be two or three months behind. Discovery of a cross-correlation between migration trends in 'lead' and 'lag' areas would provide an interesting tool for predicting migration patterns from those areas of Tunisia, already established in Table 8.9 to be conservative in adopting migration opportunities.

Cross-correlation between migration trends were sought for the period January 1973 until December 1974, by calculating the Pearson product moment correlation coefficients for paired series of observations of governorat emigration rates. Lags of zero, one, two, three and four months were investigated.

The emigration rates for the two governorats of Bizerte and Nabeul were calculated jointly. It was found that trends in migration in these governorats of north-eastern Tunisia were closely associated with those in the capital city of Tunis. With no lag, a coefficient of determination of 0.600 ($r = 0.775$) was achieved. This highly significant association (significant at

the 0.001 level) between emigration from Tunis and emigration from its neighbouring gouvernorats is not surprising in view of very close economic and social links which exist between Tunis and its immediate hinterland. Interestingly the unlagged correlation between emigration from Tunis and emigration from Sousse was low ($r = 0.232$) and statistically insignificant. Lagging Sousse by three months on Tunis yielded a higher correlation ($r = 0.589$), a value which just failed to be significant at the 0.01 level. With 16 degrees of freedom (d.f.) the critical value of r at the 0.01 significance level is 0.590.

An attempt was made to correlate the migration trends of the region identified in Table 8.9 by the 'lag' areas with the migration trends of other regions. Emigration rates were calculated for the 'lag' area defined by the gouvernorats of Jendouba, Beja, Kef, Kairouan and Kasserine. A statistically significant correlation at the 0.05 level was achieved between the emigration rates from this area when lagged by three months on emigration from Tunis. A higher correlation was achieved when emigration from these same gouvernorats of the interior and north-west were lagged by only two months on the emigration from Gabes and Medenine. This time a coefficient of determination of 0.399 was achieved ($r = 0.632$, d.f. = 18, significant at the 0.01 level). A slightly higher correlation was uncovered between the emigration rates of the two steppeland gouvernorats of Kairouan and Kasserine and the two southern gouvernorats of Gabes and Medenine. With a lag of two months a coefficient of determination of 0.418 was achieved ($r = 0.647$, d.f. = 18, significant at the 0.01 level).

The analysis of leads and lags in migration trends which has been reported above indicates that a certain level of predictability exists within the emigration data set, because of the existence of spatial interdependence between the migration trends of different regions. Several statistically significant correlations have been discovered, which substantiate the hypotheses proposed earlier in the chapter concerning the evolution of migration patterns, and which in turn might justify further study in the form of regression analysis. It should be noted that the level of statistical 'explanation' achieved, as reflected in the coefficients of determination, has not been very high. Further research might hope to increase the predictive power of this kind of analysis by attempting more advanced forms of data manipulation (for example, assessment of alternative data transformations) prior to seeking to establish cross-correlations between the migration trends of different regions.

In concluding it is worth making the observation that the spatial interdependence of Tunisian emigration data has proven in many instances to be stronger than the temporal interdependence of the data. It is difficult to determine definitively whether this observation is only a function of the specific statistical procedures which have been performed, or whether it offers substantive proof of the orderly character of migration in space.

Clearly there is need to refine and improve the predictive techniques discussed in this chapter. In particular the durability of the relationships which have been identified needs to be tested. That even low levels of predictability have been achieved from examination of Tunisian time and space migration series is surprising.

in view of the dearth of previous research in the field of migration prediction. Some analysts may shudder at the very thought of attempting to predict as complex a phenomenon as migration, but as Popper (1959, 280) has said

"Bold ideas, unjustified anticipations and speculative thoughts are our only means of interpreting nature. Those among us who are unwilling to expose their ideas to refutation do not take part in the scientific game."

SECTION 4 SPATIAL, OCCUPATIONAL and SOCIAL MOBILITY

Chapter 9

LABOUR MOBILITY and the TUNISIAN LABOUR MARKET

Introduction

The Tunisian labour market is characterized by an extreme spatial imbalance between patterns of labour supply and patterns of employment growth. Labour transfer from areas of gross labour surplus to areas of rapid employment expansion is one of the chief components of the Tunisian migration system. It is extremely difficult to isolate individual motives for migration. Population transfer occurs not only because of the desire of many migrants to find better paid employment, but also because of the more intangible social aspirations cherished by most migrants.

Within Tunisia, participation in the modern urban milieu is only possible in a restricted number of locations in Tunis, in Sousse and to a lesser extent in Sfax. Other cities certainly draw migrants (Chapter 3), but they have a less cosmopolitan atmosphere. Resultant patterns of internal labour migration from the urban void of central and western Tunisia (Miossec and Signoles, 1978) to the economic foci of the eastern littoral accentuate rather than diminish problems for the planner. Continued population redistribution would appear to add further congestion to the housing and employment markets in zones of in-migration and to accelerate economic depression and social disruption in the hearths of out-migration.

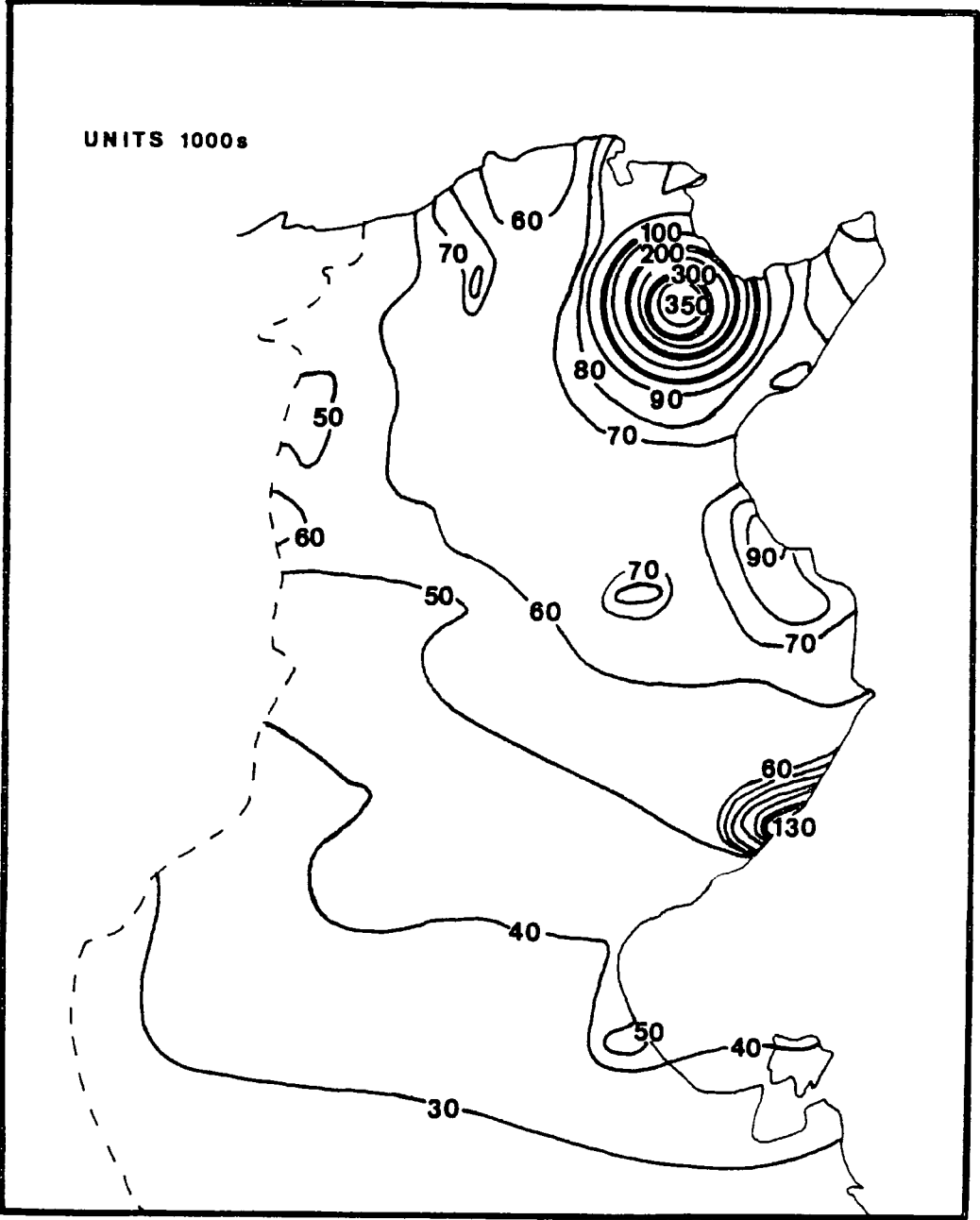
Since independence in 1956, the Tunisian government has had moderate success in achieving economic growth, the highest rates of

growth in G N P being recorded between 1970 and 1974, when an average annual rate of 9.7% was maintained. Preoccupation with rapid expansion has been at the expense of providing alternative spatial strategies for development, to the highly polarized pattern of activities inherited from the French colonial period (Chapter 2) Attempts at decentralization in the 1960s were limited to the encouragement of capital intensive projects such as the chemical processing industries located at Gabes. Despite government awareness of the spatial imbalance in employment prospects and the selective depopulation of the less developed regions of Tunisia, no effective policy emerged to distribute the labour absorptive textile factories which were established in Tunisia during the late 1960s and early 1970s. While no development strategy concerning the regional provision of new jobs was enforced, the promotion of a nationwide educational system added to the numbers of school leavers seeking office and service jobs in every region of Tunisia. Education and a receptiveness to the mass media have accentuated the desire among the younger cohorts of the rural population, not merely for non-agricultural employment, but also for participation in city life. Patterns of labour migration in Tunisia suggest that aspirations for social advancement associated with becoming an 'urbanite' transcend desires for the limited improvement in occupational status accorded to factory employment.

Spatial Dimensions of the Labour Market

Labour migration is necessary for two reasons. Firstly, patterns of job creation and labour supply are ill-matched in Tunisia. Secondly, opportunities for social and occupational

Fig.91 Population Potential



mobility are neither equivalent nor ubiquitous

Labour supply

Analysis of patterns of labour supply and job creation helps towards an understanding of the first of these two problems. Population distribution (already described in Chapter 2) forms the base map for considering patterns both of labour supply and consumer demand, whether it be for shelter, sustenance, manufactured goods or welfare services. The pattern of Tunisian population represented in Figure 9.1 by a map of population potential for the year 1975¹ does not correspond precisely with patterns of labour supply, but is modified by at least two constraints. Firstly, a large percentage of the population is debarred by age or sex from active employment. Secondly, the productive capacity of members of the labour force is highly disparate, some workers having much higher skill levels and superior training to others. Both activity rates and skill levels are spatially selective.

The male activity rate for the Tunisian population aged 15-59 years was 85.5% in 1975, but many members of this 'active' labour force were in fact recorded by the latest census as unemployed (Table 9.1), and many more were seriously underemployed. National male activity rates and levels of overt unemployment are arranged by age cohorts in Table 9.1. For most age groups, male activity rates were higher in 1975 than in 1966, reflecting changing definitions in employment classification between the two dates.

¹In the calculation of population potential, distances in kilometres were not transformed, and the self potential of a point was calculated at a radius of 3.00 kilometres for urban places and 19.01 kilometres for rural places. These radii were empirically derived from measurement of the size of Tunisian rural and urban administrative areas.

rather than any real increase in male absorption into the labour force. Of greater significance is the consistent trend in both censuses for the activity rate of 20-24 year olds to be lower than amongst more senior cohorts. It is hypothesized that this is due to the higher percentage of persons in younger age groups undergoing educational or professional training, and consequently excluded from the labour force. Spatial variation in male activity rates appears to be small and may largely be accounted for by variations in the level of involvement of younger cohorts in the labour force. Thus Tunis, Sfax, Monastir and Sousse, the centres of higher education and professional training, have lower male activity rates than the rest of the country. Exceptionally low rates are also recorded in Kairouan gouvernorat.

Table 9.1 Characteristics of the Male Labour Force, 1966 and 1975

Age	Activity rate		Unemployment rate amongst active persons	
	1966	1975	1966	1975
20-24	91.0	80.9	16.3	24.3
25-29	96.4	95.9	13.2	10.4
30-34	96.8	98.2	11.8	7.3
35-39	96.7	98.4	10.9	7.2
40-44	96.3	98.1	10.7	7.1
45-49	95.1	97.1	11.1	7.6
50-54	92.5	94.0	12.2	8.0
55-59	86.6	85.8	13.6	8.1

(Author's calculations from various sources)

FIG9.2a Female Activity Rates

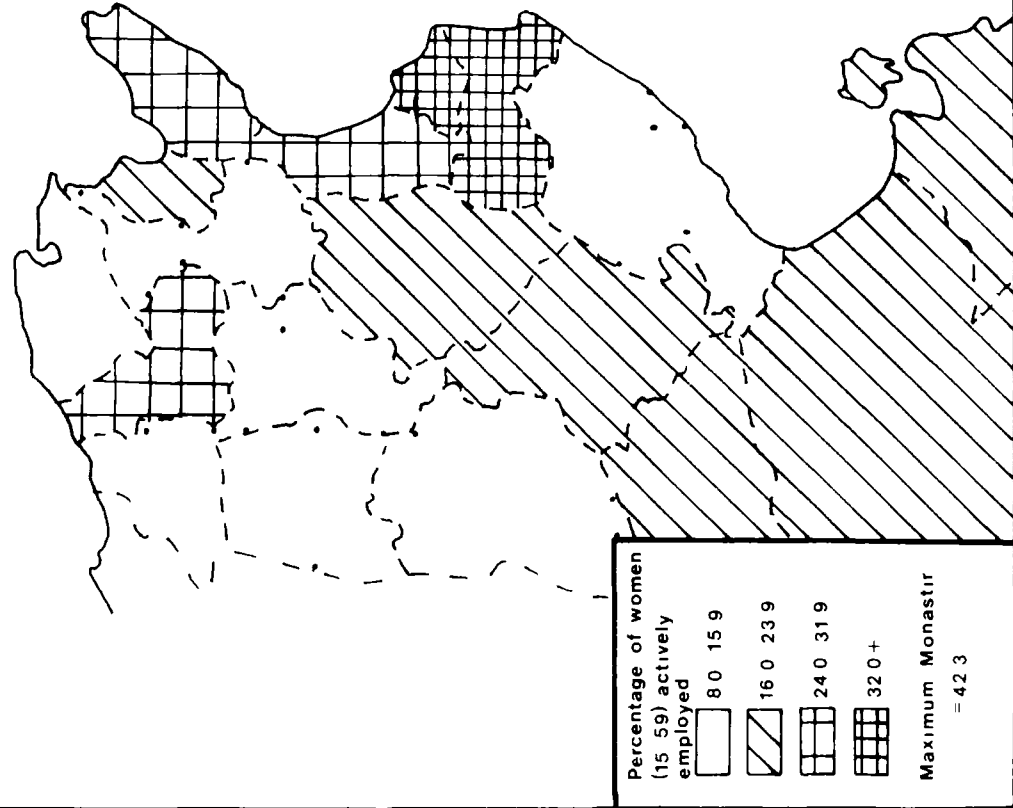
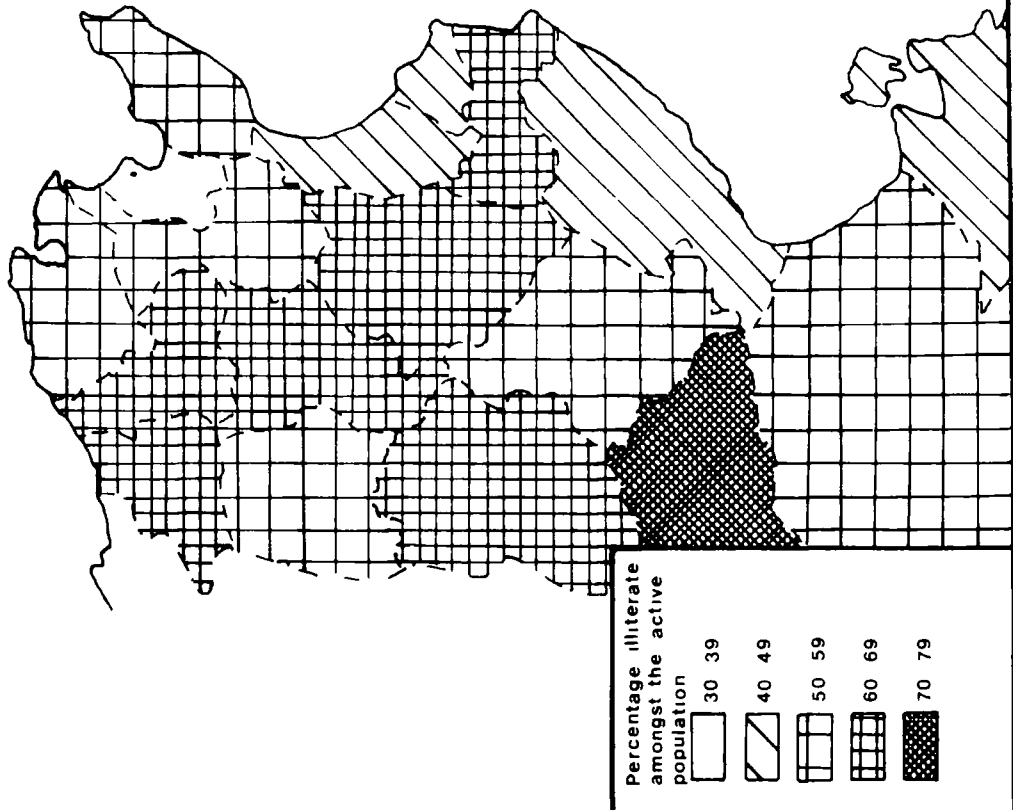


FIG9.2b Illiteracy



For religious and cultural reasons, female participation in the labour market was much lower than that of the male population in 1975. Female emancipation has been one of the key objectives of the post-independence political regime (Durrani, 1975), yet only in the Sahel, and most notably in the *gouvernorat* of Monastir, have significant employment opportunities become available for women (Figure 9.2a) in textile and shoe factories.

Female activity rates were calculated by dividing the number of women in the labour force by the female population of ages 15-59. This gives only an approximation to the female activity rates since some women of over 60 years of age may have been enumerated by the 1975 census as members of the labour force. It is not considered that this is a source of significant distortion in the analysis. It can be seen from Figure 9.2a that less than 16% of women in the active age groups were involved in the labour market in the *gouvernorats* of north-western Tunisia, the lowest level of 9.3% participation being found in the rural *gouvernorat* of Siliiana.

Labour qualifications act as a second form of spatial bias. Workers in the interior *gouvernorats* have received less professional training than in the Sahel and in the north-east, and this has resulted in considerable spatial variation in the skill levels of the labour force. Similarly Figure 9.2b indicates that levels of adult illiteracy are also lower on the eastern littoral where the colonial educational system was most influential. Members of the labour force in the *gouvernorat* of Tunis were more than four times as likely to have received secondary or higher education as workers in Kasserine *gouvernorat*. The same dichotomy between the north-east zone and the interior *gouvernorats* is to be found if primary

education is considered (Table 9 2). Apart from Tunis, only Sfax and Monastir could boast that over 50% of the workforce had received at least some level of primary schooling in 1975. Not all persons failing to receive formal education at primary school were totally illiterate, some 3 4% of the workforce having attended a 'kouttab' or koranic school. The census was unable to ascertain the educational status of 1 3% of the population.

It is not surprising that the professional status of the population, an attribute closely linked with educational status, also mirrors the considerable regional disparities which exist within the labour force. A surrogate measure of the professional status of the population has been derived by calculating the percentage of the labour force classed as scientists, technicians, directors and administrators by the 1975 census. This measure of the importance of 'highly skilled' persons in the workforce is listed by governorats in Table 9.3. The distribution of these highly skilled persons is skewed, Tunis being excessively over-represented in relation to other governorats. Sousse and Monastir also had more highly skilled workforces than the national average. This surrogate measure is to some extent unreliable due to the difficulty in ascertaining the professional status of different agricultural workers. It is also clear that there are greater opportunities for employment of skilled persons in the larger urban centres of the eastern littoral than elsewhere in Tunisia.

In spite of the apparently lower quality of labour supply in the interior and north-western region, labour productivity in manufacturing activities is only marginally below the national average. This indicates that given training and time for adaptation

Table 9.2 Educational Status of the Labour Force

GOUVERNORAT	Percentage Illiterate	Percentage having received Primary Education or above	Percentage having received Secondary or Higher Education
Tunis	35.9	60.6	27.1
Tunis South	58.9	36.3	10.2
Bizerte	54.8	42.5	12.7
Beja	65.0	30.1	8.3
Jendouba	65.1	31.2	7.9
Kef	55.3	36.4	10.0
Siliana	61.3	31.7	8.2
Kasserine	65.0	22.9	6.4
Sidi Bou Zid	55.4	27.9	7.7
Gafsa	74.1	39.8	11.9
Medenine	48.6	35.3	10.7
Gabes	54.0	41.4	11.8
Sfax	41.5	53.6	16.3
Kairouan	68.3	29.7	9.2
Mahdia	64.2	32.6	7.7
Monastir	45.9	51.9	16.8
Sousse	47.4	48.9	16.8
Nabeul	55.5	43.6	11.3
Tunisian average	53.1	42.2	14.0

(Author's calculations from unpublished results of the 1975 census)

Table 9 3 Professional Status of the Active Population, 1975

Percentage of the active population aged 15 years and over

GOUVERNORAT	HIGHLY SKILLED	IN COMMERCE
Tunis	10.0	8.9
Tunis South	3.3	3.5
Bizerte	5.0	4.4
Beja	3.2	4.6
Jendouba	2.8	3.6
Kef	3.0	4.0
Siliana	2.7	2.5
Kasserine	4.2	3.2
Sidi Bou Zid	3.2	2.7
Gafsa	3.8	4.6
Medenine	4.2	7.9
Gabes	4.3	4.4
Sfax	5.1	6.9
Kairouan	4.5	4.1
Mahdia	3.8	5.5
Monastir	6.6	6.9
Sousse	7.9	6.0
Nabeul	5.0	4.6
Tunisian average	5.4	5.5

(Source Author's calculations from provisional copy of the 1975 Tunisian census.)

to non-agricultural routines, the labour force of the less developed gouvernorats can be tapped for employment in manufacturing industries. Value added per employee in the small number of food processing units, such as the Beja sugar factory, is moderately high (1834 dinars per annum), comparing favourably with the productivity of industrial employees in the Sahel (1698 dinars per annum). Chemical industries in Gabes and around Tunis assist in giving these gouvernorats the highest levels of productivity, with 3102 dinars and 2830 dinars added in value per employee per annum (D A T., 1976). Value added per employee is also high in light engineering and metal industries throughout the north-east (1349 dinars per annum).

Patterns of employment

Patterns of contemporary labour demand mirror the distribution of economic activities established by the French. Tunisia was the least industrialized country in the Maghreb during the colonial era. As Lawless (1976a, 6) has commented

"no attempt was made to set up industries which might compete adversely with those of the Metropolitan power "

The Tunisian economy, once based almost exclusively on the export of olives and phosphates, continues to be highly dependent on exports. Although diversification has occurred in the range of commodities now earning foreign exchange, 64% of the value of these exports can be accounted for by the sale of petrol and phosphate products (Table 9.4). Exports from capital intensive activities have become more, rather than less important since independence. Diversification has also occurred in commodity export markets, France dropping from being the destination for 31% of exports in

Table 9.4 Value of Principal Exports as a Percentage of Total Exports

Commodity	1965	1970	1975
Phosphates, and phosphoric acid	33.6	20.3	22.8
Olive oil	21.6	8.8	9.0
Iron ore	4.9	2.0	0.5
Wine	4.4	5.0	2.0
Vegetables	4.1	2.1	0.4
Lead	3.9	3.4	1.1
Alfa and Paper	3.2	2.4	0.4
Petroleum	-	24.5	41.8

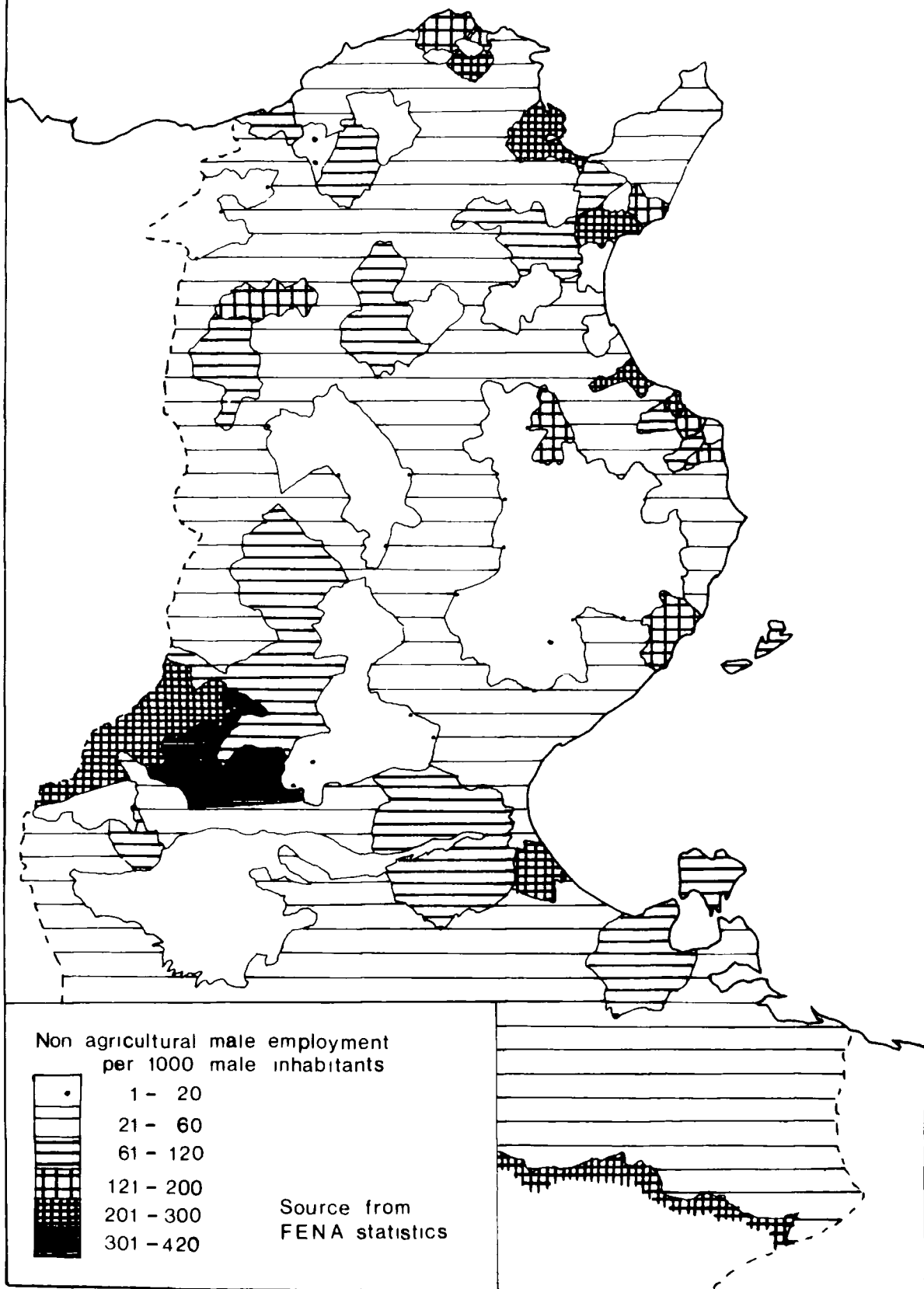
(Author's calculations from Banque Centrale de Tunisie, 1978, 58)

Table 9.5 Percentage of Exports to Principal Destinations

Destination	1965	1970	1975
France	31.2	24.4	19.1
Italy	12.1	20.7	17.0
United Kingdom	5.2	2.6	0.6
Yugoslavia	4.3	1.5	1.2
Algeria	3.7	4.2	4.2
F R of Germany	3.3	9.7	7.6
Libya	2.5	9.3	5.4
U S A	0.0	0.0	10.3

(Author's calculation from Banque Centrale de Tunisie, 1978, 60)

FIG 93 NON-AGRICULTURAL EMPLOYMENT, 1977



1965 (in terms of commodity values) to 19% in 1975 (Table 9.5). Nevertheless France remained the single most important trading partner as well as the chief labour market for Tunisians working abroad. Susceptibility to swings in the French economy has not only affected the Tunisian labour market through a reduction in demand for export commodities (often via prohibitive E E C tariff barriers, as in the case of textiles), but also indirectly through reduced demand for migrant workers. Along with other Maghreb states, Tunisia might justly claim that French restrictions on immigration, following the economic recession of 1973, virtually amounted to the export of French unemployment.

Employment in non-agricultural activities is almost entirely confined to the largest coastal cities. This is most strikingly demonstrated when employment structures are examined at the delegation level. Figure 9.3 expresses permanent male employment in certain non-agricultural activities as a percentage of the male population.

Figure 9.3 has been constructed from "Fiches d'Emploi Non-Agricole" (F E N A) collated by the O T T E E F P. It is not yet a comprehensive record of non-agricultural employment, although by 1976 it had been extended to cover occupations such as café owners and small shop owners. It is suspected that a considerable shortfall in enumeration occurs in the so-called 'informal' sector which may be taken to include many self-employed persons.

F E N A records tend to boost non-agricultural employment in some rural areas such as Beja, where peasants growing sugar beet for the local factory are registered as industrial workers because of the nature of their work contract with a commercial organization.

Despite these shortcomings F E N A records provide an interesting and detailed source of information concerning employment patterns. The ratio of permanent non-agricultural male employees (as of 21/7/77) to the total resident male population may at first appear low. It should be remembered, however, that 46.7% of Tunisian males are excluded from the active workforce because of age and other constraints.

From Figure 9.3 it can be seen that non-agricultural employment assumes importance in the cities of Tunis, Sfax, Sousse, Bizerte, Gabes and Monastir, where both secondary and tertiary activities have developed extremely rapidly during the last twenty years. Other major centres of non-agricultural employment include the tourist town of Hammamet, the mining delegations of Metlaoui and Redeyef, the industrial pole of Menzel Bourgiba, the fishing port of Mahdia and the regional administrative centres of Le Kef and Kairouan. Remada delegation in southern Tunisia also has a high percentage of the male population in non-agricultural activities, due both to the presence of an oil drilling community on the El Borma oilfield and to the absence of any significant agricultural activity.

The most remarkable feature of the employment distribution is the extreme localisation of the non-agricultural labour market. There is no region which can truly be described as industrial in nature, and there is but limited evidence from Figure 9.3 that there has been any 'spread effect' (Myrdal, 1957) in terms of industrial investment and employment expansion away from the main growth nodes.

In order to analyse the regional employment structure in more detail economic activities were divided into five classes

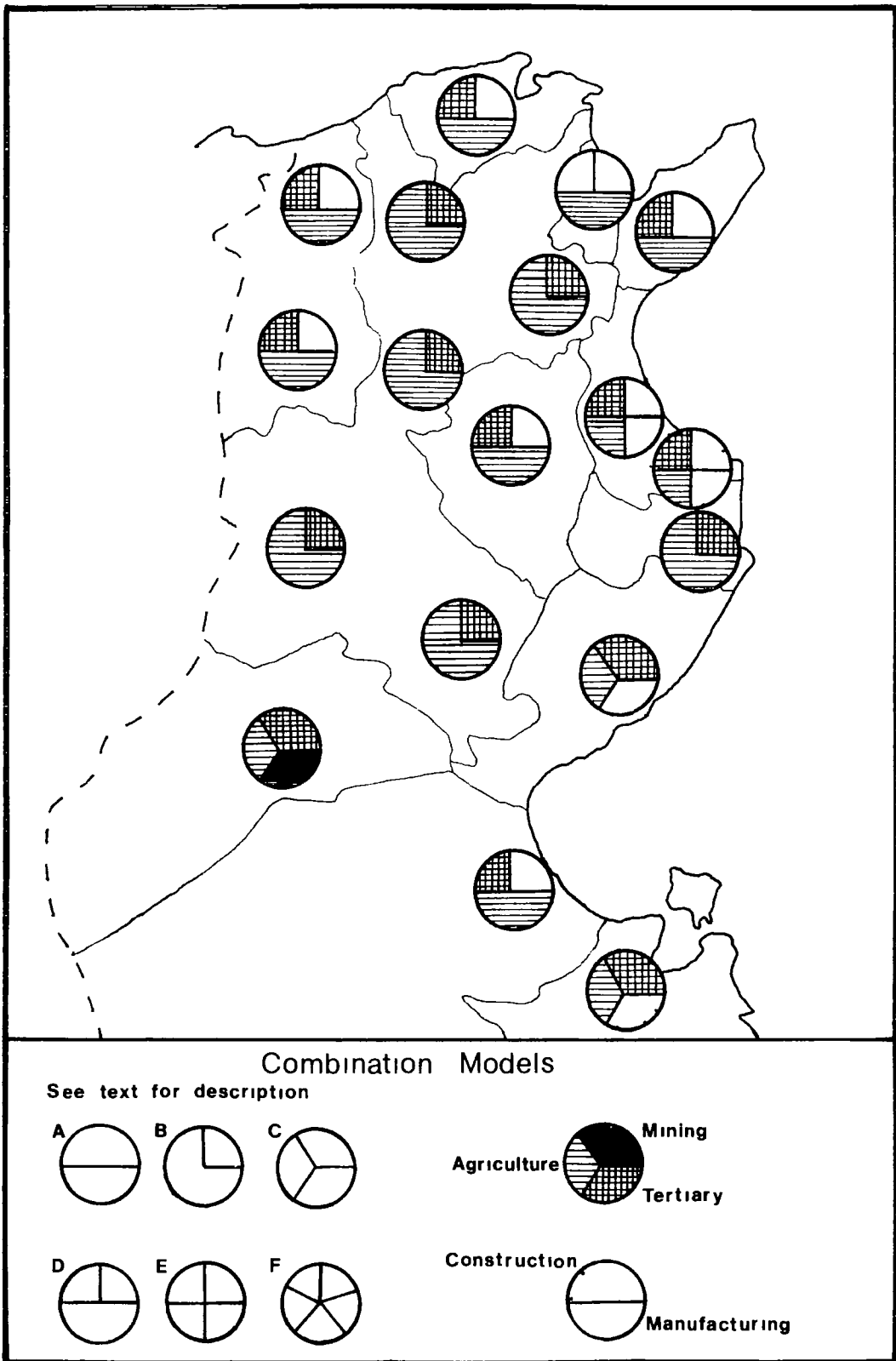
Table 9.6. Employment Distribution of the Male Population
(15 years and over)

GOUVERNORAT	Percentages					Total <u>±</u>
	Agriculture	Mines	Manu- facturing	Con- struction	Tertiary Sector	
Tunis	6.2	0.8	23.6	12.7	56.7	100.0
Tunis South	62.1	2.0	4.2	7.7	24.0	100.0
Bizerte	49.6	2.2	12.1	8.2	28.0	100.0
Beja	61.0	1.7	5.7	10.9	20.6	100.0
Jendouba	45.6	3.1	8.3	16.1	27.1	100.0
Kef	50.9	6.6	5.1	12.5	24.8	100.0
Siliana	67.3	2.1	3.7	8.6	18.3	100.0
Kasserine	65.3	1.5	4.9	11.0	17.3	100.0
Sidi Bou Zid	73.5	0.5	1.4	9.0	15.6	100.0
Gafsa	36.7	24.4	4.3	10.0	24.7	100.0
Medenine	38.3	1.0	6.7	21.4	32.8	100.0
Gabes	43.4	1.9	10.1	16.4	28.2	100.0
Sfax	36.2	1.3	17.4	11.9	33.2	100.0
Kairouan	62.4	0.6	7.9	10.1	21.3	100.0
Mahdia	65.2	1.3	4.5	1.1	18.4	100.0
Monastir	23.6	1.3	26.0	14.1	35.0	100.0
Sousse	31.7	1.1	14.4	15.0	37.9	100.0
Nabeul	53.7	1.2	8.4	10.3	26.4	100.0

(Source: author's calculations from unpublished results of the 1975 Tunisian Census.)

Unemployed persons in each of the five sectors have been excluded from the calculations, as have those with no specific occupation, and those in undefined activities

Fig 94 ACTIVITY COMBINATIONS, 1975



agriculture, mining, manufacturing, construction and tertiary activities. Unemployed persons and those in occupations undefined by the census were omitted from the analysis. Table 9.6 arrays the percentage distribution of employment for each gouvernorat in each of the five classes.

Comparison between the employment structures of different gouvernorats was facilitated by application of a variant of Weaver's crop combination methodology (Weaver, 1954a and b, Coppock, 1964). Tunisian gouvernorat employment structures were fitted to the following theoretical distributions

- a) a two activity region with 50% employment in each sector
- b) a two activity region with a 75% 25% split
- c) a three activity region with 33 3% in each sector
- d) a three activity region with a 50% 25% · 25% split
- e) a four activity region with 25% in each sector
- f) a five activity region with 20% in each sector.

Each gouvernorat was assigned to the model which offered the least difference of squares from its own percentage distribution of employment (Figure 9.4).

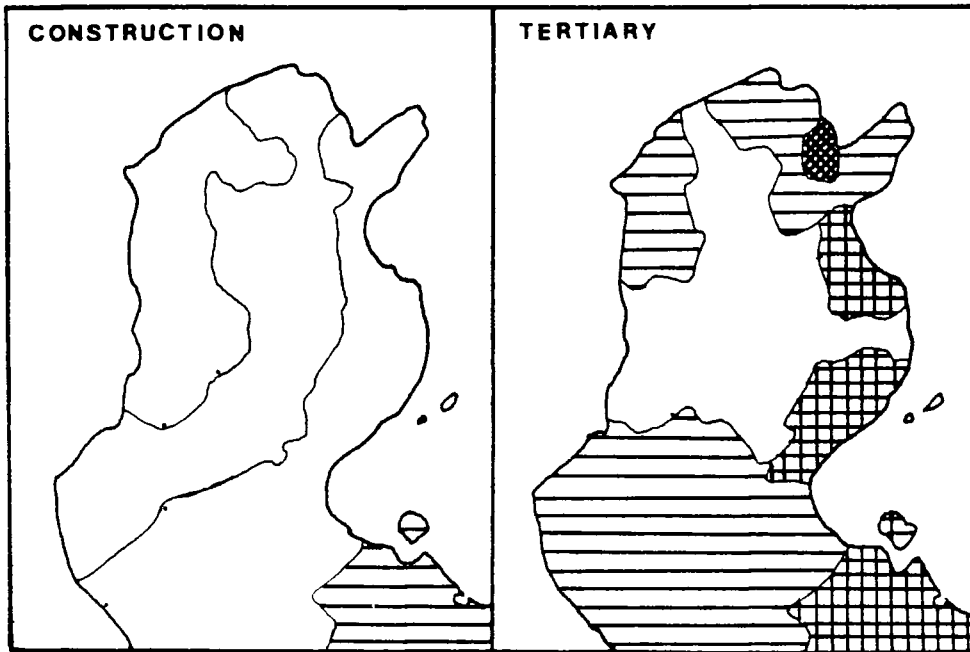
Ranking the structures in order of decreasing specialization and of increasing employment diversity, one arrives at the sequence b) a) d) c) e) f). It can be seen from Figure 9.4 that Sousse and Monastir have the most diverse employment structures. The tertiary sector, agriculture, manufacturing and construction all contribute approximately one quarter of the jobs available. Even distributions between three activities were achieved for the areas of Gafsa, Medenine and Sfax. Gafsa gouvernorat was the only one in which mining played a significant part in the regional employment

structure (24.4%) In Medenine a three-way split emerged because of the exceptionally large size of the construction sector (21.4% of total employment) The modal distribution (six gouvernorats) proved to be a three activity region with 50% of employment in agriculture, 25% in tertiary activities and 25% in either construction or manufacturing Tunis also had a three-way split belonging to class d), but the dominant employment sector was in tertiary activities (56.7 of the total) A surprisingly large number of gouvernorats had 75% of employment concentrated in one sector - that of agriculture and other primary activities The map (Figure 9.4) shows that the distribution of gouvernorats with the most restricted employment opportunities lies in central and north-western Tunisia Mahdia also has a very high proportion of workers in primary activities, but unlike other gouvernorats, many of these are involved in fishing activities

The above analysis, while suffering from the over-generalization which follows from model fitting, seems to show that many Tunisian gouvernorats have very similar employment structures, 13 of the 18 regions fitting into two of the model distributions and within these models having a similar ranking of activities The lack of diversity in employment opportunities which has been illuminated is one of the chief problems which Tunisian manpower planners must strive to overcome

Since independence, most new labour demands have come from construction activities, from manufacturing and from the expansion of employment in the service industries Mining, although of great economic significance, has not provided many new jobs, while agriculture has continued to provide work for a disproportionate percentage of

FIG 95 MALE EMPLOYMENT, 1975

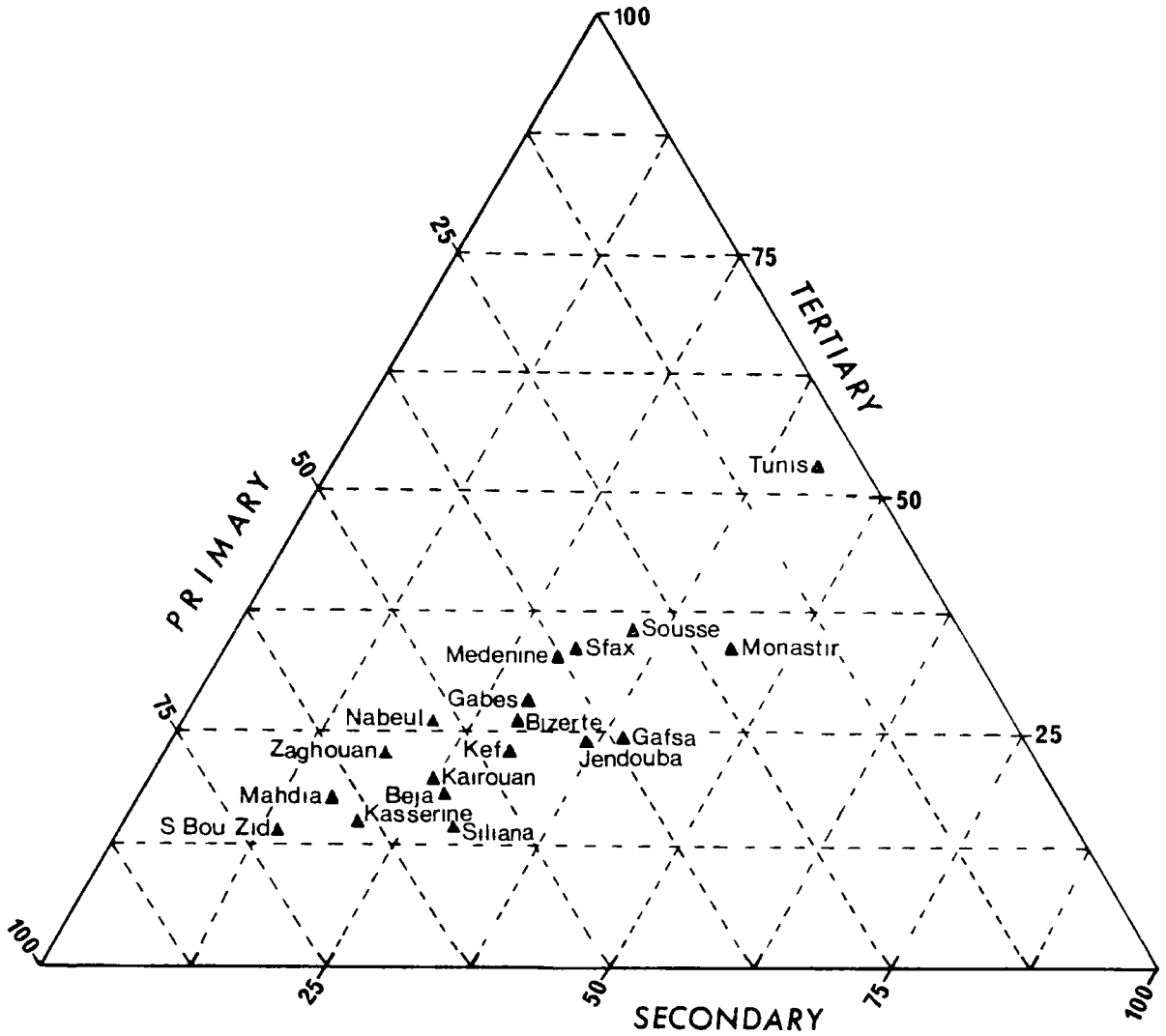


PERCENTAGE OF MALE EMPLOYMENT

Source LNS 1975b

FIG 9 6 REGIONAL EMPLOYMENT STRUCTURE

PERCENTAGE OF ACTIVELY EMPLOYED MALE POPULATION BY SECTOR



the labour force relative to its contribution to the Gross National Product

In 1975 56.2% of all male employment in manufacturing industry was concentrated in the governorat of Tunis. By contrast the governorats of central and north-western Tunisia accounted for less than 7.7% of all industrial employment. The small numbers employed in secondary activities throughout most of the rural governorats can be closely equated with employment in the construction industry (Figure 9.5a). Investment of migrant remittances in new or improved housing has been one of the major forces stimulating building activities in these areas. The vicissitudes of international migration policies have substantially influenced the availability of employment opportunities in the construction sector, especially in the governorats of Medenine and Jendouba.

Figure 9.5b shows the coastal concentration of employment in tertiary activities. Throughout Tunisia there is an interesting correlation between the size of the secondary and tertiary sectors, reflecting the interdependent nature of development in manufacturing and service employment. It can be seen from Figure 9.6 that a 'development spectrum' exists, with Sidi Bou Zid, Mahdia and Kasserine at one extreme having little secondary or tertiary employment, and Tunis at the opposite extreme with scarcely any agricultural employment. Tunis, as has been noted above, has the highest level of involvement in the tertiary sector, resulting from its dominant role as administrative and commercial capital. Rapid growth of manufacturing opportunities, as well as the proliferation of office jobs in the headquarters of national organizations, has encouraged the expansion of the 'dependent informal' sector.

Increasing numbers of street merchants, pedlars and bootblacks subsist by providing a wide variety of cheap and convenient services to the more fortunate populace involved in modern sector activities. Growth of the 'dependent informal' sector has stimulated further expansion in the capacity of the city to employ migrants. Each migrant family contributes additional demands for city services.

Recent Trends in Employment

Agriculture

Recent trends in agricultural, industrial and service employment have augmented, rather than reduced regional disequilibrium. The apparently intractable problems of rural development have neither been overcome by socialist cooperatives initiated chiefly in the period 1964-1969 (Grissa, 1973), nor resolved by the subsequent return to economic liberalism. Although indices of agricultural productivity improved substantially between 1970 and 1975, this largely reflected continued mechanization and technical advance in already prosperous agricultural zones such as Cap Bon. Land reform and amelioration of rural infrastructure has been extremely slow in the Tell and steppelands. Government programmes of widespread village electrification, sewage disposal and piped water supply were only started in 1974 (Lawless, 1976b, 10). Opportunities for further employment in agriculture have remained poor both within the traditional systems of the interior, and in the increasingly mechanized modern sector. In some areas the outflow of labour from agriculture has exceeded the surplus supply of potential employees, suggesting that the desire to migrate has outpaced the

necessity to find alternative employment.

The short-term policy of the Tunisian government towards rural unemployment has been to create workgangs to repair roads and improve agricultural structures Attia (1966) considers that this form of temporary wage employment has done no more than transform the peasantry into a mass of day labourers By accentuating local consciousness of underemployment and unemployment, new values, and in particular a new perception of the utility of time, have emerged (Bourdieu, 1962). This in turn has stimulated further migration

Lawless (1976b) has made the interesting suggestion that rural problems might be reduced if surplus labour resources in overpopulated mountainous regions, such as the Tell, were transferred to areas where intensive farming systems could support higher populations To a limited extent in Tunisia, migration has occurred voluntarily from some of the less fortunate rural areas to the rich horticultural region near Nabeul Population redistribution between agricultural regions cannot be viewed as an easily attainable solution to labour management problems in rural Tunisia, since most rural migrants seek urban rather than rural employment For the majority of migrants, alternative agricultural employment is not perceived to yield either an improved occupational or social position from that of their origins Unlike the process of rural-urban migration, manpower planners would need to offer incentives to potential rural-rural migrants, if they wished to institute a policy of significant dimensions to redistribute population from one agricultural region to another.

Government policies on industrial investment

While the solution of problems in the rural environment must not be underemphasized, the long-term welfare of the Tunisian economy lies in the emergence of a sound manpower policy based on integrated development of urban infrastructure linked to secondary and tertiary employment opportunities. The pattern of job creation in the past decade in non-agricultural activities can best be understood in the light of government policies influencing industrial growth. Unfortunately the government has been unable to find an effective spatial programme to link their hopes for industrial growth with those for regional development.

Policies concerning imbalance in industrial locations date from 1968 when law 68-3 was established to encourage investment in the governorates of Gafsa, Gabes, Medenine and later the Kerkennah Islands. This was to be achieved by removing licensing costs, local taxes and duties on industrial stocks and shares, during the first five years of operation of new industrial units (D A T., 1976, 64). It is interesting to note that this law was introduced during the socialist era of Tunisian politics, and prior to the re-emergence of economic liberalism.

The reversal of socialist policies in 1969 was accompanied by a new investment plan (law 69-35) which remained the mainstay of national industrial development until 1972. The new initiative did not discriminate between Tunisian and foreign investors, and gave tax concessions to new projects in proportion to the magnitude of the investment involved, and is usually viewed as the catalyst to the new phase of rapid industrialization. Although it ended a period of economic stagnation and helped the Tunisian economy to

develop some of the activities which had been totally ignored or discouraged during the colonial era, it did nothing to rectify the spatio-economic disequilibrium of the country

A further law (law 72-38) was introduced in 1972 which also encouraged export-oriented manufacturing enterprises. Projects once approved by the Min de l'Economie Nationale received a wide range of tax concessions (A P I , 1976a, 44). For example, foreign firms were totally exempted from corporate income tax during the first ten years of operation. Amongst other benefits (Lawless, 1976a, 8), foreign firms were permitted to repatriate profits free of tax. Decree 73-19 set up an agency to publicise these new investment opportunities (Agence de Promotion des Investissements). Judging by the number of new projects which have registered for initiation under the new regime, the work of the A P I has been highly effective.

Legislation passed in 1974 refined government policy with regard to manufacturing industry and introduced additional investment incentives, with three particular goals in view. It sought to encourage firstly the growth of labour intensive industries, secondly the location of industries in predefined sites, and thirdly increased investment in certain needy sectors of the economy (A.P I., 1976a, 45). It reduced import taxes on raw materials for re-export. Industries exporting more than 10% of their goods were to receive tax concessions during the first five years of operation. Costs of industrial licences were also reduced proportional to the number of jobs created.

The goal of increasing the rate of expansion of labour intensive industries was admirable in view of the large numbers of persons

wishing to find modern sector employment, but the lack of a strong directive controlling the location of the 1600 enterprises, which by the end of 1975 had taken advantage of the government's incentives, was disappointing. The sites designated by the government under the auspices of the Agence Foncière Industrielle (A F I) were without exception located on the eastern littoral (A P I, 1976a, 75). With the exception of the large site at Ghannouch adjacent to the phosphate processing factory (Gouvernorat of Gabes), and a 310 hectare allocation for industrial development in Sfax, the remaining 1630 hectares of land identified by the government as suitable for rapid industrialization were all located in a narrow axis stretching from Bizerte to Sousse. The government, by developing in north-east Tunisia a pattern of sites provided with industrial land, infrastructure and in some instances ready-built factories, have apparently encouraged the acceleration of natural trends towards industrial polarization.

Restrictions imposed by the shortcomings of the Tunisian port system, as well as by the structure of the road and rail networks of the country (Chapter 2), add further disincentives to industrial location away from the existing growth points. Since independence, the government has neither made any significant changes in the structure of the internal communications network (Miossec and Signoles, 1976), nor have they offered selective freight subsidies to cover the cost of moving raw materials to processing sites in peripheral regions. It is hardly surprising therefore that most industrial activities cluster around the major ports to minimize overland transport costs.

Legislation passed in 1973 to create the 'Fonds de promotion et décentralization industrielle' (F O P R O D I) is the government's sole concession to the less favoured regions. Decentralization is only one of fifteen measures encouraged by F O P R O D I , whose primary aim appears to be the encouragement of small and medium sized industries. Grants from F O P R O D I have only been offered to Tunisian nationals, and the contributions which have been made by the fund account for only 3.2% of all industrial investment (D A T , 1976, 69). The limited impact of F O P R O D I investment is summed up by the following comment

"En supposant que la moitié soit consacrée à la décentralisation, le moins que l'on puisse dire c'est que ce poids est bien faible par rapport à la mesure du problème et à l'effort à fournir " (D A T , 1976, 69)

Not only is it disturbing that so little attention has been given to industrial decentralization in the light of the gross spatial imbalance which exists in the Tunisian labour market, but it is also worrying that the result of the government's investment policy has been to give greater encouragement to foreign investors than to domestic enterprises. Average employment costs for Tunisian businesses are seven times as high as for foreign projects (D A T , 1976, 78).

In summary, government policies have shown initiative in encouraging labour intensive industries, but by ignoring the spatial dimension of manpower planning they have failed to tackle the fundamental problem of regional disequilibrium between labour supply and demand.

Table 9.7. Employment Created Under Law 72-38 and Law 74-74 during 1973, 1974 and 1975

	A	B	C	D	E
Tunis	13787	40.0	36 0	6697	18 1
Tunis South	383	1 1	24.1	180	3 5
Bizerte	2810	8 1	45.3	1037	6 0
Beja	482	1.4	52 1	194	4.9
Jendouba	802	2.3	67.8	86	5 0
Kef	97	0 3	11.1	56	4 0
Siliana	17	-	30 4	8	3.3
Kasserine	279	0.8	31.7	60	4.3
Sidi Bou Zid	57	0.2	12.2	13	3.7
Gafsa	358	1 0	60.7	244	3 8
Medenine	566	1.6	74 9	148	4.9
Gabes	761	2.2	46.1	3463	4 2
Sfax	3674	10 6	48.0	1943	7.9
Kairouan	225	0.6	34 0	91	6 0
Mahdia	299	0.9	45 8	1109	4.1
Monastir	3075	8.8	44.8	1244	4 4
Sousse	4457	12.8	44 8	1567	4.6
Nabeul	2694	7.7	38.6	644	7.2
TOTAL	34824	≈100 0	40 4	17780	≈100 0
	A	B	C	D	E

A Employment created under law 72-38 and law 74-74 in 1973, 1974 and 1975

B Percentage of all employment created by gouvernorat

C New employment as a percentage of the employment originally planned

D Investment (1000 Tunisian Dinars)

E Gouvernorat population in active age groups as a percentage of the national total (1975)

(Source A P I , 1976b, 103
I N S., 1975a and 1975b.)

Table 9.8. Employment Growth and Contraction (1973-1975)
by Industrial Sector¹

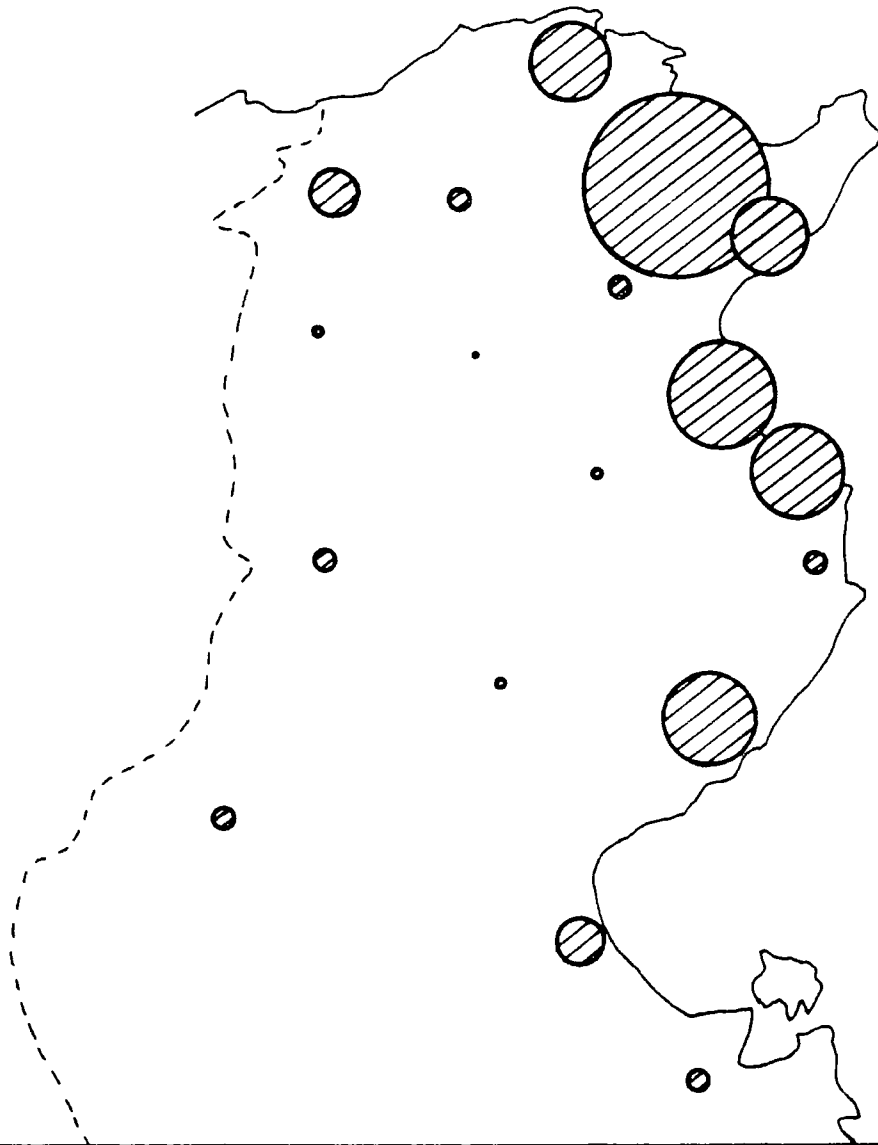
GOUVERNORAT	Mines & Energy	Metal Work	Construction	Chemicals	Food	Textiles	Wood/ Paper
Tunis	989	2262	8564	429	452	2343	1216
Tunis South	-84	168	*	57	-56	269	*
Bizerte	-152	192	311	61	100	1085	82
Beja	-136	-45	394	*	73	11	0
Jendouba	-94	60	24	*	7	-45	68
Kef	-388	-5	85	-7	48	129	-9
Siliana	*	59	216	*	14	*	*
Kasserine	47	*	239	*	79	*	-69
Sidi Bou Zid	*	71	*	*	*	*	11
Gafsa	264	-64	-11	-3	-73	*	-4
Medenine	91	6	-34	-15	23	57	30
Gabes	*	35	559	203	46	*	-9
Sfax	-33	160	-259	476	2	112	223
Kairouan	-38	*	3	-1	17	87	-45
Mahdia	*	*	98	36	31	*	*
Monastir	*	*	-138	11	106	797	149
Sousse	*	121	1246	80	339	-97	234
Nabeul	*	100	69	5	311	451	48
TOTAL	465	3120	11366	1332	1487	5199	1925

* no activity in this sector in this gouvernorat.

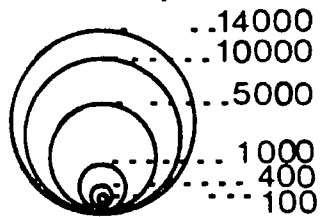
¹ Seasonal employment has been transformed to permanent job equivalents, on a basis of a 250 day working year

(Source calculated by the author from I N S , 1973 and
I N S., 1975a)

FIG 97 Jobs created under lois 72-38 and 74-74, 1972-75



Number of jobs



Source calculated from
A P I statistics

Patterns of job creation

Patterns of job creation testify to the fact that government policies have not only failed to redistribute employment opportunities in the modern sector of the economy, but on the contrary have served to reinforce existing patterns of non-agricultural employment. 40% of the new jobs resulting from the laws of 1972 and 1974 in the period 1973 to 1975, were located in Tunis, and a further 22% in the gouvernorats of Sousse and Monastir (A P I , 1976b, 103). Figure 9.7 and Table 9.7 show that over the first three years of operation, the A P I failed to direct industry away from the coastal cities towards the interior.

A particular problem in operationalizing industrial development policies has been the tendency for new establishments to overstate the number of jobs which they hope to create, in order to gain greater benefits from the government tax concessions. The number of new jobs realized in manufacturing has tended to be considerably lower than the number initially agreed in contracts between the A P I and foreign firms. By the end of 1975 only 40% of the expected jobs had been realized from established projects (Table 9.7). Ironically the gouvernorats of Le Kef and Sidi Bou Zid, amongst the regions most requiring new employment opportunities, have had the lowest levels of project realization. Table 9.7 also shows that Tunis, Sousse, Monastir and Sfax gained a totally disproportionate percentage of new jobs relative to their share of the national population in active age groups.

Table 9.8 shows the distribution of industrial jobs created between 1973 and 1975, by gouvernorat and economic sector. Investment patterns have favoured rapid employment expansion in the

Table 9.9. Industrial Structure and Growth, 1973 and 1975

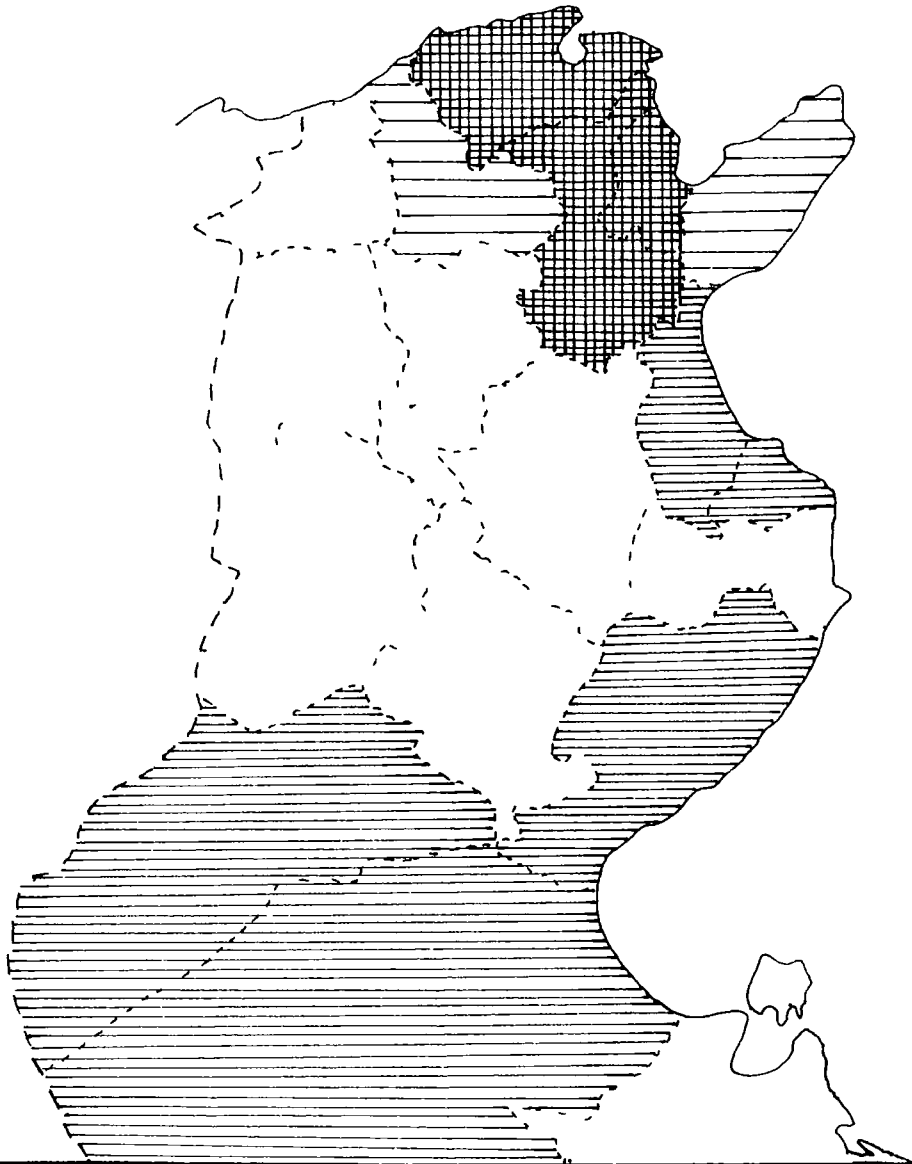
	Percentage of Industrial Employees		Index of Employment Growth, 1973-1975 (1973 = 100)
	1973	1975	
Mines	23.4	19.2	102
Metal Work	13.8	13.9	121
Construction	20.5	25.3	154
Chemicals	5.9	5.7	122
Food Industries	10.5	9.5	114
Textiles	17.4	18.0	129
Wood/Paper	8.5	8.3	122
Total	≈ 100.0	≈ 100.0	124

(Source Author's calculations from I N S., 1973 and 1975a)


construction industry, metal working and textiles such that their overall contribution to total employment has grown relative to mining, food industries or wood processing activities (Table 9.9). It has therefore been the industries of the 'core' regions of Tunisia which have grown fastest, whilst industrial activities in other regions have been in the more slowly expanding sectors. Net decline in employment has been recorded in most governorats in the mining and energy industries. Employment decline in many sectors has been noted in Kef, Gafsa and Kairouan, contrary to national trends in employment.


Rather than considering individual measures of recent industrial growth in further detail, a matrix has been drawn up summarizing the


FIG 98 Index of Industrial Structure



Index

 14 - 17

 10 - 13

 7 - 9

 4 - 6

 1 - 3

Index = Average Matrix Rank
of Table 9 11

Source Authors calculations

strengths of gouvernorat employment structures as indicated by different indices (Table 9 10). Following the analytical methods of Bouthier et al (1976) the Tunisian gouvernorats were ranked on each of the eight indices given in Table 9 10. The ordered matrix of rank frequencies, charted in Table 9 11, reveals that many gouvernorats had very similar rankings on a number of the indices. As a result there is a clustering of rank frequencies along the diagonal of the ordered matrix. Exceptional to this pattern are the rank distributions of Kasserine, Gafsa, Gabes, Monastir and Nabeul. Gafsa maintained a large number of industrial employees in 1975, but had experienced very low employment expansion in the period 1973-1975. Inversely Gabes and Monastir had rapid increases in their industrial employment structure in the same period, having commenced from a very low base level of employment.

Average ranks have been calculated from Table 9 11 and plotted in Figure 9 8. Since a considerable number of the indices incorporated in the matrix (three of the eight indices) reflect recent trends in industrial growth, Figure 9.8 may be interpreted as a map of present structures and contemporary trends in industrialization. Clearly, the eastern littoral once more dominates the national pattern, and offers the greatest potential for future growth. Gafsa and Gabes because of their links with phosphates and phosphate processing have a moderately good outlook for future industrial employment, while the gouvernorats of Sidi Bou Zid, Siliana and Kairouan occupy the lowest rankings on nearly all measures of industrial development. The matrices of Tables 9.10 and 9.11 and Figure 9.8 indicate that, when recent patterns of

Table 9 10 A Data Matrix of Industrial Activities and Industrial Growth

	Indices															
	A		B		C		D		E		F		G		H	
	Vol	Rank	Vol	Rank	Vol	Rank	Rank	Rank	Vol	Rank	Vol	Rank	Vol	Rank	Vol	Rank
Tunis	89 1	1	851	1	259582	1	1	1	14 2	1	66 0	2	12 1	3		
Bizerte	33 8	5	309	3	50084	2	2	3	4 8	3	5 6	9	8 1	4		
Beja	13 2	10	86	10	10498	7	11	9	1 2	10	8 0	8	8 0	5		
Jendouba	10 2	13	66	11	3785	12	10	13	0 0	16	3 0	12	2 8	9		
Kef	16 9	9	141	7	6304	11	9	11	0 6	12	2.5	15	0 1	16		
Silliana	2 1	16	9	16	77	16	16	16	1 6	7	0 0	17	0 0	17		
Kasserine	9 9	14	114	9	7907	8	6	12	1 3	9	2 6	14	1 2	13		
Sidi Bou Zid	0 4	17	2	17	0	17	17	17	0 4	14	0 6	16	0 3	15		
Gafsa	47 5	2	588	2	17265	5	4	2	0 5	13	10 3	7	1 5	11		
Medenine	35 3	4	59	12	371	15	15	15	0 3	15	5 1	11	2 0	10		
Gabes	12 2	11	120	8	7069	9	5	5	3 3	5	13 7	1	3 0	8		
Sfax	31 4	6	260	4	34372	3	3	4	1 4	8	41 1	5	7 8	6		
Kairouan	27 8	7	19	14	2056	13	14	14	0 0	16	2 7	13	0 7	14		
Mahdia	2 9	15	17	15	1241	14	13	8	0 8	11	5 2	10	1 4	12		
Monastir	25 5	8	175	6	14177	6	8	7	4 1	4	55 5	4	13 7	2		
Sousse	39 7	3	256	5	23722	4	7	6	7 3	2	59 4	3	16 9	1		
Nabeul	10 6	12	53	13	6585	10	12	10	2 6	6	17 3	6	7 2	7		

Indices -

- A Industrial employment (permanent and seasonal) / per 1000 inhabitants, 1975
 B Value added (Tunisian Dinars) in industry / per 1000 inhabitants, 1975.
 C Industrial turnover (1000s of Tunisian Dinars)
 D Rank of energy consumption (S T E G), Electricity, 1972-74
 E Rank of energy consumption (S T I R), Gas, 1972-74
 F Growth in industrial employment / per 1000 inhabitants, 1973-75
 G Investment (Tunisian Dinars) in industry under the codes and laws of the A P I / per 1000 inhabitants, 1973-75
 H Employment created ('réalisé') by the A P I / per 1000 inhabitants, 1973-75

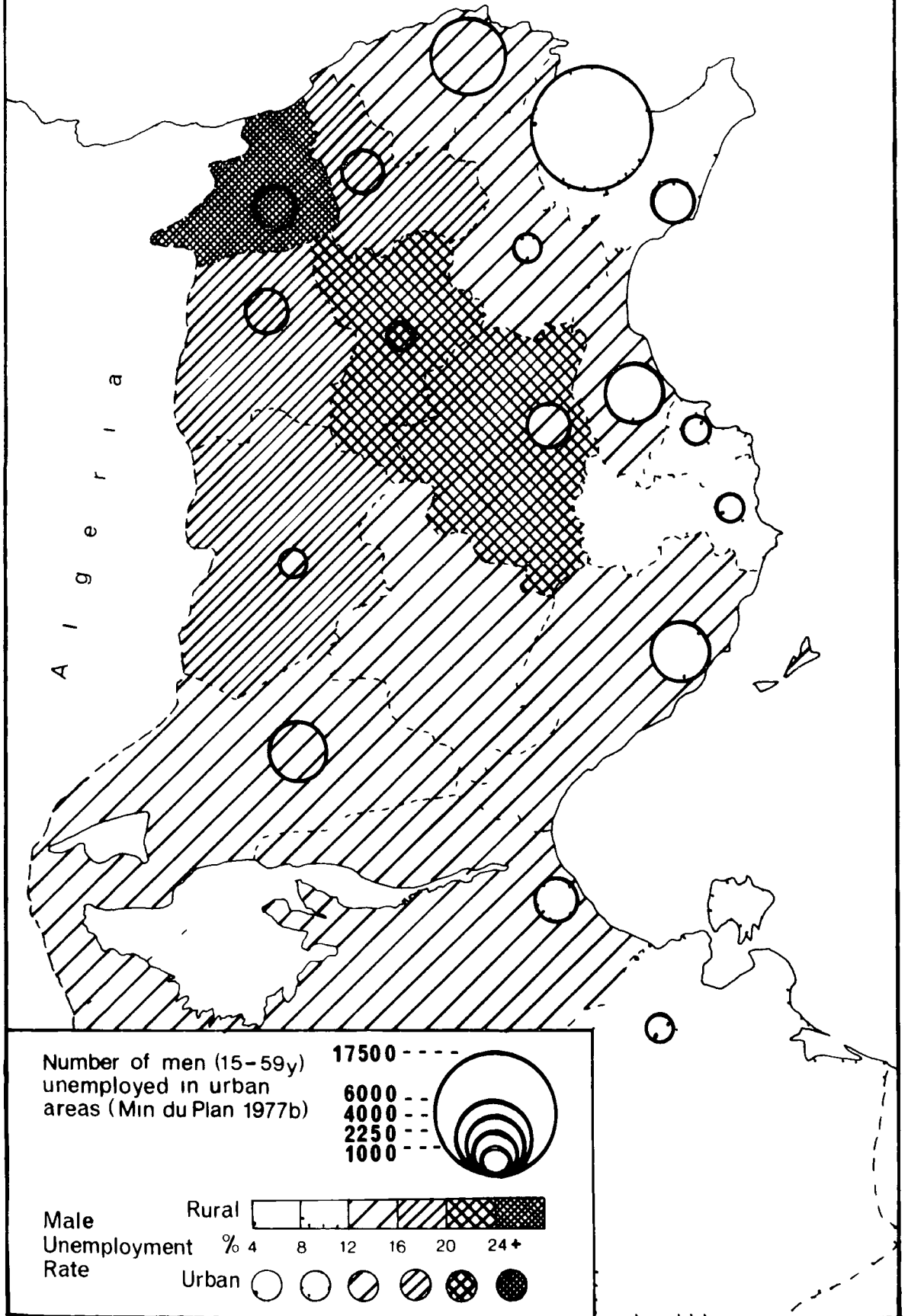
(Sources - A and B I N S (1975a, 213), C, D and E Bouthier et al (1976)
 F I N S (1973 and 1975a), G and H A P I (1976b))

Table 9 11 Ordered Matrix of Frequency of Rank Scores in Table 9 10

	Rank on Indices in Table 9 10																	Average Rank
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	
Tunis	6	1	1															1 4
Bizerte		1	3	1	1				1									2 5
Sousse	1	1	2	1	1	1	1											3 9
Sfax			2	2	1	2		1										4 9
Monastir		1		2		2	1	2										5 6
Gafsa		3		1	1		1				1		1					5 8
Gabes	1				3			2	1		1							6 5
Beja					1		1	1	1	3	1							8 8
Nabeul						2	1			2		2	1					9 5
Kef							1		1		2	1			1	1		10 1
Kasserine						1		1	2			1	1	2				10.6
Jendouba									1	1	1	2	2			1		12.0
Medenine				1						1	1	1			4			12 1
Mahdia								1		1	1	1	1	1	2			12 2
Kairouan						1							2	4		1		13 1
Siliana							1									5	2	14.9
Sidi Bou Zid														1	1	1	5	16 2

(Source Author's calculations)

FIG 99 TUNISIAN UNEMPLOYMENT, 1975



industrial growth which have been strongly influenced by government investment policies are given a high weighting in the overall pattern of Tunisian industry, the imbalance in employment opportunities remains unaltered. Both past influences and current processes have operated to maintain a highly concentrated pattern of industrial employment.

Responses to Imbalance

Unemployment

Having assessed patterns of labour supply and patterns of employment, it now becomes pertinent to delineate regions of net labour surplus. Quantitative and qualitative disparity between labour supply and demand is partially reflected in the high levels of Tunisian unemployment. Table 9.12 and Figure 9.9 show that in 1975 unemployment rates were higher in rural areas than in urban zones. Unemployment rates were highest in central and north-western Tunisia rising to a peak 33% in the governorat of Jendouba. By contrast, the largest number of urban unemployed was to be found in Tunis.

It appears from Figure 9.9 that most of Tunisia must be considered a labour surplus area. Only the towns of some east coast governorats - Nabeul, Monastir, Mahdia, Sfax and Medenine - can be said to have no significant labour surplus. These are the nodes where labour supply and demand are most closely matched. Numbers of unemployed are low in Medenine, but only because of the high level of out-migration and emigration.

High levels of underemployment reinforce congestion on the job market in areas of labour surplus. A survey of in-migration

Table 9.12. Rate of Rural and Urban Unemployment, 1975

GOUVERNORAT	Men (15-59)		
	Rural	Urban	Total
Tunis	9.57	8.88	8.91
Tunis South	12.82	10.68	12.28
Bizerte	14.07	15.75	14.95
Beja	16.89	16.20	16.69
Jendouba	32.51	24.59	31.20
Kef	19.00	17.39	18.53
Siliana	22.16	20.17	21.82
Kasserine	17.47	14.47	16.87
Sidi Bou Zid	14.19	7.69	13.78
Gafsa	14.81	13.57	14.01
Medenine	10.92	7.38	9.93
Gabes	14.57	10.77	12.70
Sfax	13.74	5.86	9.03
Kairouan	20.88	13.18	19.26
Mahdia	9.88	7.62	9.05
Monastir	9.88	7.62	9.08
Sousse	14.65	9.68	10.96
Nabeul	7.46	6.94	7.21
Tunisian average	16.62	10.17	13.36

(Source Min du Plan, 1977b, 6)

and employment carried out within the conurbation of Tunis in 1972/73 suggested that 17.8% of immigrants were seriously under-employed (working 4 days or less per week). A high percentage of workers hoped to find a better position, reflecting a sense of thwarted occupational mobility amongst the active population (I.N.S., 1974, 34 and 42). Although moderate occupational mobility existed in the immediate post-independence years as a result of the restructuring of the employment market, by the 1970s a more inflexible occupational hierarchy was already evident. Studies by Allman (1976) of intergenerational mobility suggest that downward mobility is more probable than upward movement amongst boys of 16-19 years, when their occupations are compared with those of their fathers at the same age. 20-22 year olds have equal chances of achieving upward or downward mobility. Ben Salem (1969, 116), in attempting to assess differentials in social mobility, has calculated that children of workers in higher management are 77 times more likely to reach university than those of day labourers.

Internal and international migration and unemployment patterns

The trend towards lower occupational mobility has not reduced levels of spatial mobility, as demonstrated by the sustained flows of rural-urban migrants, already discussed in Chapters 3 and 4. The internal and international redistribution of human resources has raised problems of social disruption in areas of departure and of reintegration in areas of immigration.

In rural areas, the migration process has left a residual population of unskilled agricultural workers, and of elderly, disabled or dependent persons. Ironically one of the chief forces

encouraging increased female employment in peripheral areas has been the out-migration of the male workforce. Migrants have left their wives at home to maintain their agricultural holdings.

Despite a decade of heavy internal and international migration from the mountainous north-west, rates of unemployment amongst first-time job seekers remain the highest in Tunisia, and news of the success of migrant workers has only increased local dissatisfaction with the limited employment opportunities of the regional labour market. In other areas of departure, such as Medenine gouvernorat, although estimated levels of emigration and out-migration are much lower, migration has persisted since the native population find job opportunities in Tunis, France and Libya preferable to local employment.

Migration, because it does not rectify the root causes of imbalance in the labour market, increases rather than redresses regional disparities.

Development and/or Migration?

The development of new employment opportunities and the encouragement of worker migration are not dichotomous options in manpower planning. Unsatisfactory job creation schemes may accelerate migration. Inversely, the viability of new economic projects may only be assured by intra-regional labour redistribution.

The few experiments in longer term development undertaken in the interior of Tunisia have proven that industrial decentralization is no simple panacea to rural employment problems. Trabelsi (1975) has studied two infant industries - a tannery and a woollen mill - implanted in the steppe village of Hajeb el Aloun. In

addition to other problems such as adjustment to factory routines, Trabelsi discovered that not all the factory workers were content with the recent upward occupational mobility which they had achieved. Furnished with their newly acquired skills, many of them wished to migrate to still better jobs in Tunis, and 28% wanted to eventually find foreign employment. A survey carried out by the author in the same village (see Chapter 10) also identified the importance of the desire for occupational and spatial mobility shared by most jobseekers.

The high turnover of employees and the constant need for training new workers adds to the costs of rural manufacturing. Not all projects succeed in utilizing local labour. For example, a factory set up at Kasserine was only able to draw 37% of its workers from the locality (Boukraa, 1968). Even in the industrial pole of Gabes a new chemical plant has had to bring 12% of its workers from the more favoured governorat of Sfax (see Table 10.10).

The change of work routine from the seasonal rhythm of agriculture to the strictures of factory or office employment cannot be achieved rapidly. Even in the progressive village societies of the Sahel, such as Ksar Hellal, the introduction of factories has disrupted family life and heralded a revision of social values (Auerbach, 1975). In summary, rural and village developments are faced with one of two problems: either the local labour force is insufficiently skilled or lacks motivation to enter new factory employment, or else the workforce, in being capable of attaining the necessary skills, equips itself for levels of occupational and social mobility exceeding those available in the rural environment.

Migrants employed in even the most menial manual occupations find themselves held in high esteem when they return to rural areas from Tunis or foreign cities. In short, there is a 'status inconsistency' between village and city (Abadan Unat, 1974). Absence of urban lifestyle rather than lack of non-agricultural employment is a critical factor in determining propensities to migrate from rural Tunisia. The absence of urban infrastructure on a scale comparable and competitive with that of the cities of the north-east and eastern littoral throughout the rest of Tunisia (D A T., 1973b) is an important factor maintaining high levels of spatial mobility. As long as migration to Tunis continues to be the easiest mode of achieving social advancement, the exodus of population from large rural areas is likely to continue even in the face of adequate local employment opportunities.

Labour mobility involves more than the spatial movement of workers from areas of labour surplus to zones of rapid employment growth. Migration from the less favoured peripheral regions to Tunis and to other urban cores has permitted social but not necessarily occupational mobility. Conversely, the development of rural industries in isolation from an urban environment has provided opportunities for occupational advancement, but has not offered an acceptable level of social mobility. Paradoxically, attempts at decentralization undertaken independently from strategies for urban expansion have facilitated rather than halted rural-urban migration. Examination of the threefold nature of labour mobility - spatial, occupational and social - has offered some resolution of this paradox, and of associated problems of Tunisian manpower planning.

Chapter 10

REGIONAL STUDIES of EMPLOYMENT and MIGRATION

Introduction

Employment is usually ascribed an important role in the shaping of migration patterns. The precise relationship between migration and employment is however often blurred because of the macro-analytic approach of many researchers. Little attention has been given to comparing local labour markets and to assessing their function within the larger national labour market. This is a task which the geographer, with his interest in different scales of analysis, is well qualified to tackle. A host of questions arise from the study of regional labour markets, the answers to which are critical for effective regional planning, and essential also to the formulation of a coordinated national and regional migration strategy. For example, why do substantial differences exist between towns in the size and orientation of the in-migration fields of job seekers? Do the skill levels, family status, social aspirations and other characteristics of migrants vary from those of job seekers in the community of out-migration? How does the arrival of migrants influence the quality of the labour force in zones of in-migration?

The broader problem of explaining the propensity to migrate in terms of variations in employment opportunities has been tackled by a number of researchers. Lowry (1966, 22), in a seminal study of labour migration in the U S A, concluded that

FIG 101 LOCATION OF SURVEY AREAS

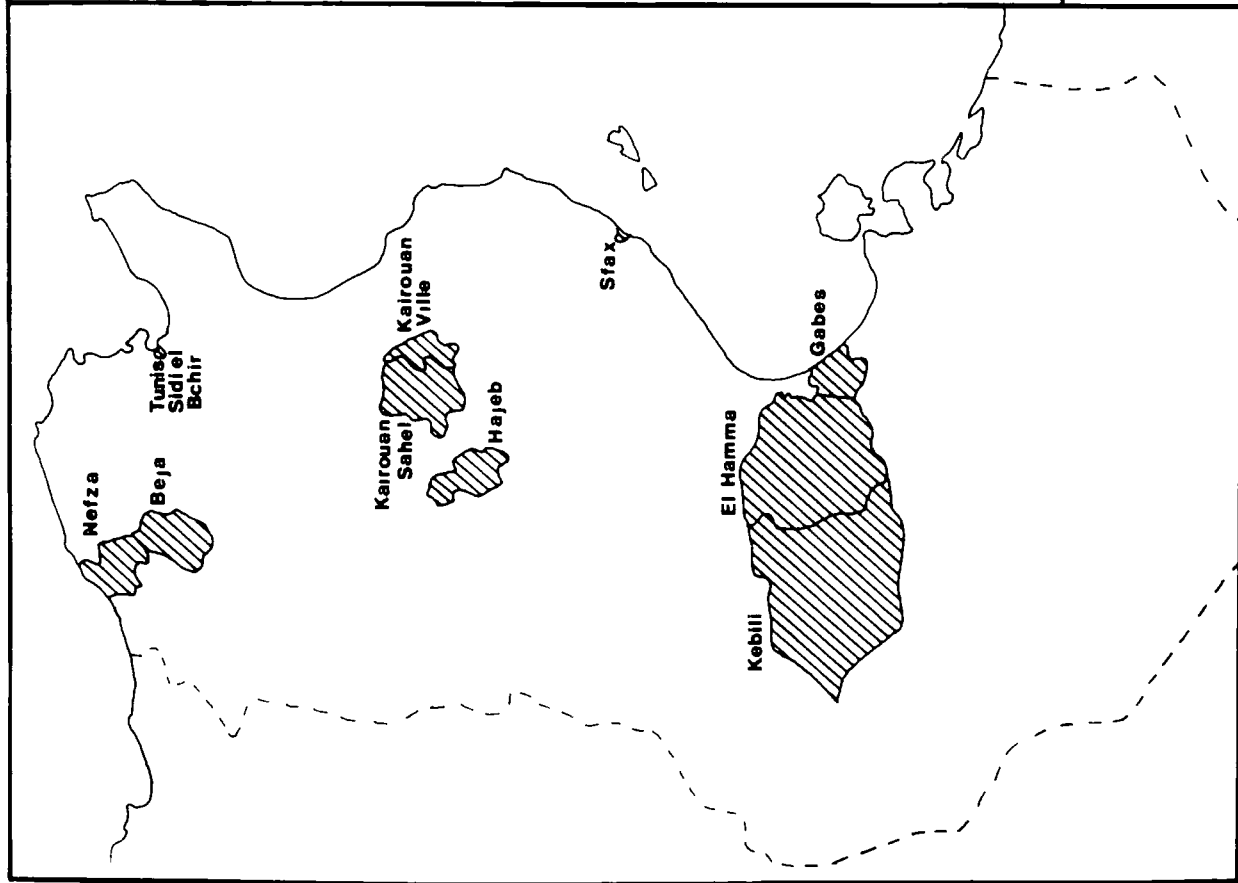
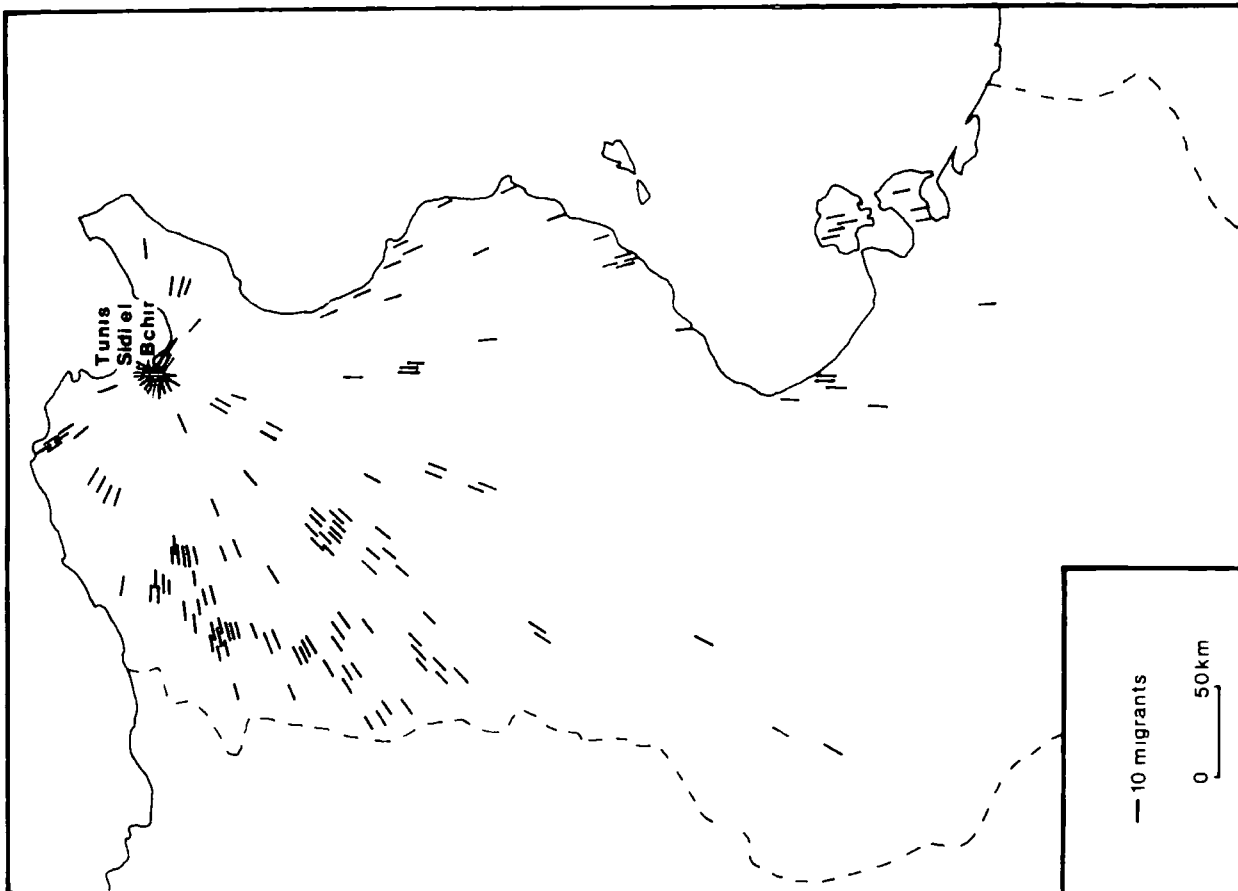


FIG 102 MIGRATION FIELD OF JOBSEEKERS TO TUNIS



the volume of out-migration from a region was not a function of local labour market conditions, but that the choice of destination was related to a migrant's awareness of employment opportunities there. Similar results have been reported by Newell (1977, 6) who in a review of migration literature claims that

"the lack of influence of conditions at origin is not an isolated phenomenon, but has been observed at various scales, at various times, using a wide range of sources and techniques "

Lansing and Mueller (1967, 122) describe the phenomenon in graphic terms

"the carrot is a more important force than the stick . unfavourable local economic conditions have at most an uneven impact on migration."

It is interesting to examine whether or not these relationships are the same in the context of the Tunisian migration system. If conditions on the local labour market have little influence on out-migration, then the efforts of manpower planners would seem to be more effectively deployed in providing 'carrots' in the locations to which labour migration is required rather than in trying to reduce the impact of the 'stick' of unemployment and underemployment in rural areas

Information concerning the migration of job seekers was gathered by the author in a number of delegations throughout Tunisia during November 1977. Sample surveys of registrants at employment offices and job centres were undertaken in Tunis, Beja, Nefza, Kairouan Ville, Kairouan Sahel, Hajeh, Sfax, Gabes, El Hamma and Kebili (Figure 10.1). It is hoped that from the analysis of these selected regional surveys insight may be gained

into patterns of migration and employment in Tunisia

Before comparing the migration fields of the registrands at each location, it is necessary to discuss the nature of the survey. Access was granted in the aforementioned delegations to the "Fiches Signalétiques" of the O T T E E F P. These forms contain key information relating to persons registering at each employment bureau, and seeking to find a job or some new form of employment within the delegation. A high percentage of registrands were without employment at the time of registration, others were dissatisfied with their present work or were self-employed and wished to obtain new salaried employment.

It should be noted that not all unemployed persons are required to register at official bureaux. Consequently, the survey should not necessarily be considered to represent the characteristics of all job seekers. There is, however, no reason to assume a spatial bias in the comparison of the characteristics of registrands at different bureaux. Differences which emerge between one region and another can be taken to represent spatial variations in the labour market rather than being solely attributed to the sampling design.

The results of the survey when assessed in the light of other regionally specific information appear to portray faithfully the problems and prospects relative to the labour markets which were studied. It should be noted that no other comparable source of information about Tunisian job seekers exists (Sethom, 1978), and that O T T E E F P sources provide a valuable opportunity to examine the characteristics of individual migrants and of regional

labour markets, as well as to make broad generalizations concerning regional patterns of employment and migration.

A 10% systematic sample of registration forms, arranged by age, was undertaken at each bureau, and examination of certain characteristics of job seekers was attempted for all registrants at Gabes and Kairouan. All registrations during the period January 1976 to November 1977 were sampled. Each registration form contained information concerning the job seeker's age, place of birth, current residence, family status, education, former occupation, skill level and social and occupational aspirations.

Migration Fields of Job Seekers

Information concerning the place of birth of job seekers made comparison possible between the different Tunisian delegations. Rural areas appeared to attract few migrants, even from other rural delegations. The attraction of delegations containing towns and cities was much greater, migration fields varying in extent with the size and importance of the settlement. Regional cities such as Beja and Kairouan proved to be centres of in-migration from neighbouring delegations and from other parts of their own gouvernorat, while Tunis attracted many inter-gouvernorat migrants from all over the country. Centres of both regional and national significance have therefore been important in shaping the Tunisian migration system. Substantial numbers of job seekers may be willing to travel short distances to a local town, while being daunted by the prospect of migrating to a distant and unknown city, whereas for job seekers with specialized skills, the large city is often the only location

FIG 10 4 MIGRATION FIELD OF JOBSEEKERS TO KAIROUAN AND GABES

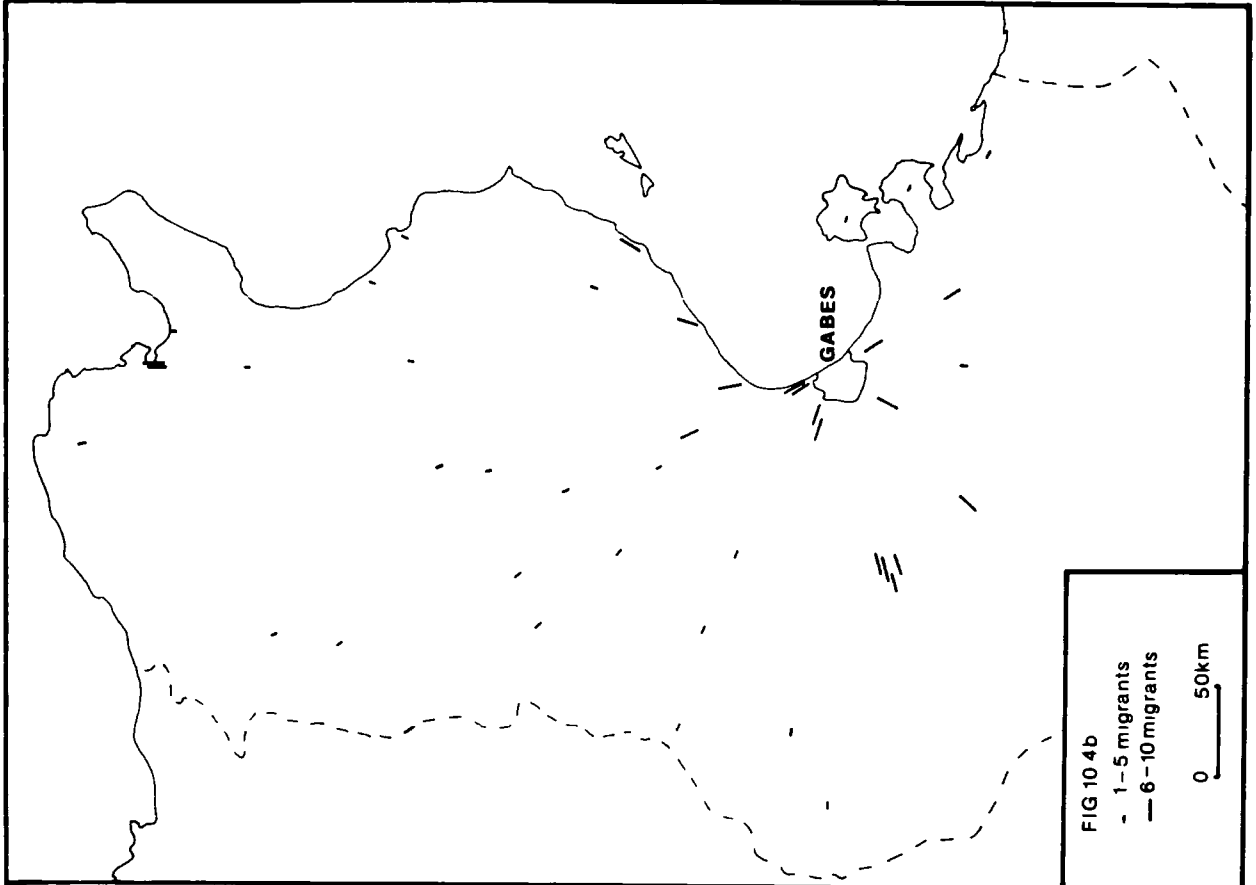
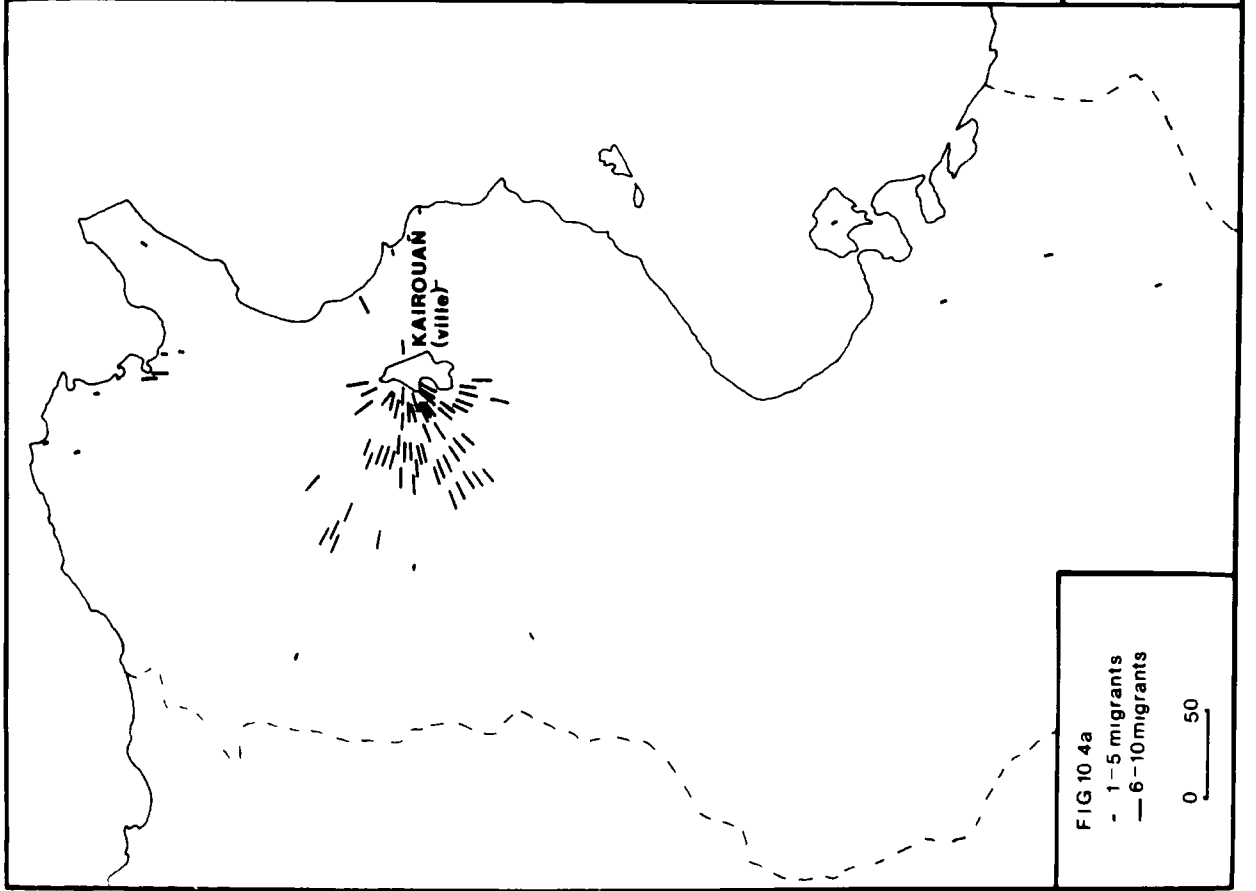
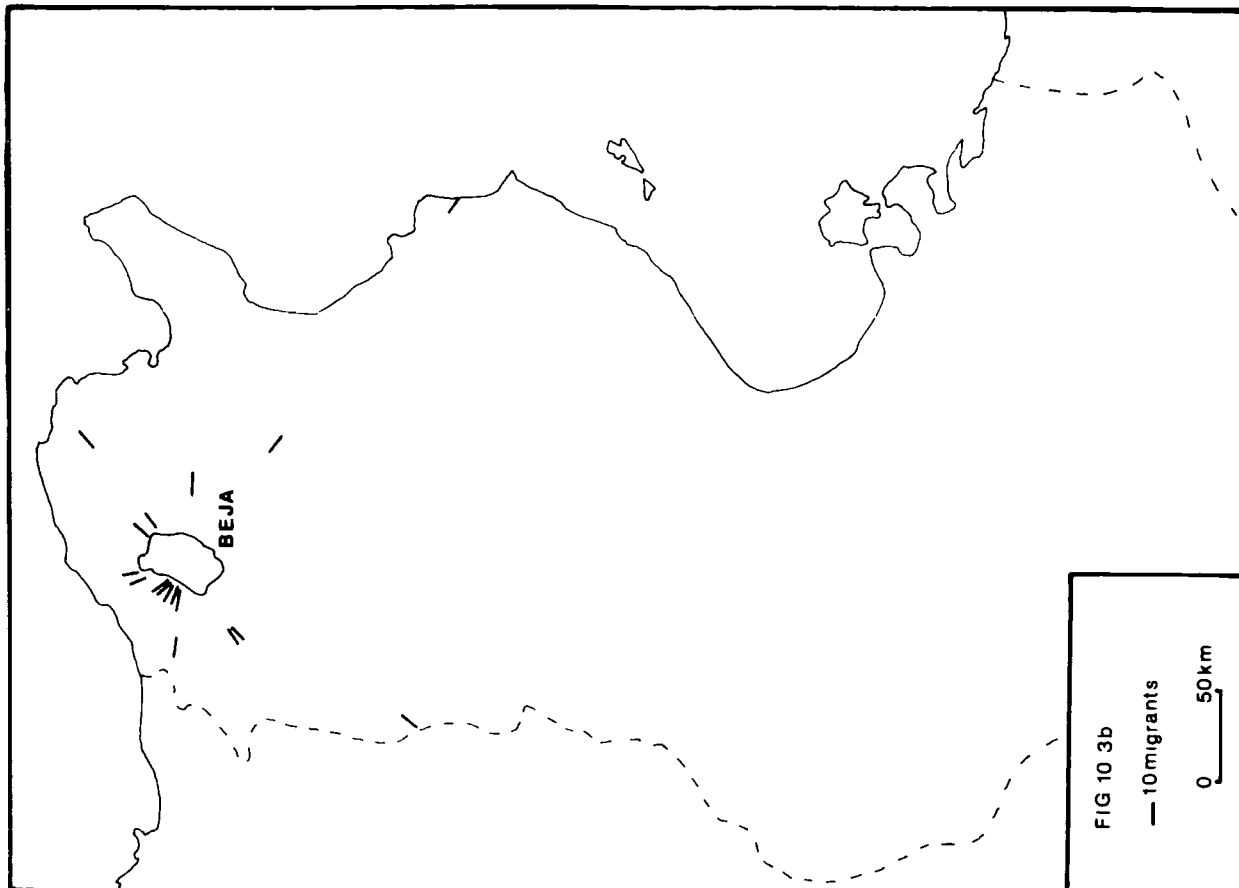


FIG 10 3 MIGRATION FIELD OF JOBSEEKERS TO SFAX AND BEJA



where work exists to match their capacities

The migration fields of Figures 10 2 to 10 4 have two important dimensions - their strength and their orientation. The strength of a migration field may be defined by the proportion of job seekers coming from non-contiguous delegations. From Table 10 1 it can be seen that Tunis, Kairouan Ville, Gabes and Sfax had the strongest fields amongst the delegations which were sampled. The orientation of a migration field may be described as multi-directional or sectoral, depending on whether migrants come from all directions or from one dominant direction. The weak migration field around Beja might be considered to be multi-directional, while that of Kairouan Ville is distinctly sectoral, extending dominantly to the west of the town.

The absolute attraction of Tunis relative to other centres cannot be precisely determined from the data, because only two of the seven Tunis-based employment bureaux were sampled. The bureaux sampled were the two largest offices in Tunis. Both were located in the Sidi El Bchir zone of central Tunis. No survey was attempted at the smaller suburban bureaux of El Menzah, Le Bardo, La Goulette, Rades and Hammam Lif. The sample survey of job seekers in the centre of the city revealed the strong attraction of Tunis to migrants. Of all job seekers, 59 1% were born in non-contiguous delegations. Migrants came largely from the gouvernorats of the Tell, the main body of the migration field extending in this direction (Figure 10 2). Most distinct concentrations of migrants came from those delegations which had administrative centres such as Siliana, Beja

and Jendouba, suggesting the inability of these smaller centres to satisfy the demands of all indigenous job seekers. Outwith the Tell, subsidiary but nevertheless significant migrant origins included the cities of Bizerte and Kairouan as well as the delegations of the Sahel of Sousse. Outliers of the main field were to be found in the city of Sfax, the Gabes region and the delegations of Djerba and Zarzis. No migrants were recorded in the sample survey from very large areas of central and southern Tunisia. This reflects firstly, the low levels of inter-gouvernorat migration from these regions (discussed in Chapter 6), and secondly, the tendency of persons from these regions to search for work in places other than Tunis. A substantial proportion of such people have recently found work in Libya.

Sfax, second city of Tunisia, had a surprisingly weak migration field by comparison with Tunis. It extended thinly across central Tunisia. The results of the survey seemed to suggest that Sfax did not attract many job seekers from the south, a finding which negates the supposed role of the city as capital of the south (Seklani, 1976). It may be an important commercial and administrative centre with a large hinterland, but it appears to serve as an urban labour market for only the populations of the delegations immediately surrounding the city. Large numbers of registrands had come from the densely populated Kerkennah Islands, which lie 20 miles offshore from Sfax.

The lower than average growth rate of the city's population during the last decade also reflects a lack of dynamism. While it has maintained its position as second city of Tunisia, the population has grown at only 2.3% per annum between 1966 and 1975,

compared with 3.2% in Tunis and a national annual average rate of growth of 3.6%.

Beja, the chief town of the central Medjerda valley, had a very weak migration field. Only 6.9% of registrands originated from non-contiguous delegations. Although 85.3% of registrands were local people, it should be noted that in-migration of job seekers from contiguous delegations was still considerably more common than if Beja had been a rural delegation. Its size and administrative role have assured that Beja is perceived as an urban place by at least some of the job seekers in the governorat. The most significant origins of job seekers are the delegations of Amdoun and Nefza.

The in-migration field of Kairouan city, unlike that of Beja, was relatively strong, 24% of registrands came from the non-contiguous delegations such as Haffouz, Hajeb and Ouesslatia. Out-migration from Siliana was also of importance. It would appear that most job seekers came from the west of the city. By contrast, Kairouan has exercised little pull on the populations of the delegations lying to the east, including even the poor districts of the Souassi tribes south of the Sebkhâ Sidi el Mani. The directional component of the migration field may in part be related to the administrative division of the region. Kairouan city lies on the eastern fringe of the governorat which it administers, while to the east of Kairouan city the territory is divided between the governorats of Sousse, Monastir and Mahdia. Routes radiate from Kairouan city to the west, making it the natural urban focus for the rural communities of the governorat,

but the city is poorly linked with the lands to the east, except for one major artery to Sousse. To the west the nearest towns of any size are Kasserine, 135 kilometres by road from Kairouan, and Kef which is 165 kilometres distant. By comparison, the dynamic urban labour markets of Sousse and Monastir lie respectively only 56 and 66 kilometres to the east. It is not surprising, therefore, that Kairouan draws many more job seekers from the west than from the east, where it competes with other major centres.

The town of Gabes had the fourth strongest migration field. This was in part due to the presence of large numbers of migrants from Kebili and Douz in the oasis. These two delegations lie south of the great Chott el Jerid depression, and provide only limited urban employment opportunities. They look to Gabes town as an outlet for their surplus labour. The oasis of Gabes has recently acquired several modern industrial functions which have attracted job seekers not only from within the *gouvernorat*, but also from a wide range of origins across central and southern Tunisia. The diffuse scatter of origins shown on Figure 10 4b has no strong orientation.

None of the other delegations studied contained any major settlements. In-migration of job seekers was negligible, even although minor industries had been established in some villages, such as the leather tannery at Hajeb and the date packing factory at Kebili. The community of Nefza on the north coast of Tunisia represented the extreme instance of a rural area which had not attracted any job seekers from other parts of the country.

In summary, analysis of the migration fields of Tunisian job seekers indicates that a distinct dichotomy exists between the

attraction of delegations containing major urban settlements and those consisting dominantly of rural communities. The former delegations, although in some instances lacking any industrial base, attract job seekers because of their commercial and administrative functions as well as the urban services which they provide, while the latter experience little or no in-migration in most instances. Beja was the only town in which less than 20% of job seekers were migrants, while in rural communities the largest migrant presence was at Hadjeb where 10.5% of job seekers had been born elsewhere. Examination of the strength of migration fields also leads to the tentative conclusion that job seekers travel over greater distances to centres with diversified employment opportunities such as Gabes, rather than to nodes of more restricted non-agricultural employment opportunities.

Regional Studies

Detailed studies were undertaken in the governorats of Beja, Kairouan and Gabes. These permitted analysis and comparison of the mobility and socio-economic characteristics of job seekers in three contrasted parts of Tunisia - the Tell, the low steppe, and the southern oases. Prior to presenting these results, it is useful briefly to review the geographic background of each of these governorats considering the migration characteristics of their populations.

Beja

Population and economy

Beja is the largest town of the central Medjerda valley

The Arab geographer El-Bekri, writing in the eleventh century, described it as "the granary of Ifrikyia", and today it still remains the largest market town in the fertile cereal growing lands of the Medjerda. In 1962 the Tunisian government decided to locate the nation's sugar refining industry in Beja, and this remains the town's chief industrial activity.

In 1975 the town had a population of 41,000, having grown at 3.2% per annum in the intercensal period. The delegation of Beja grew at only 0.1% per annum during the same period, suggesting that massive population redistribution was occurring from rural areas towards the urban settlement of Beja, as well as out-migration from rural areas to other parts of Tunisia. The population of the gouvernorat of Beja increased at only 0.8% per annum between 1966 and 1975, and the growth of the three other communes within the gouvernorat was much slower than that of the township of Beja. Beja accounted for 63.2% of the urban population present in the gouvernorat in 1975.

There were 79,670 persons in the active labour force of the gouvernorat in 1975. Discounting those persons officially classified by the census as unemployed, 51.6% of the workforce may be considered as agriculturalists. A further 14% worked in artisanal trades or in industry and 10.2% were employed in the service sector.

Analysis of employment characteristics reveals that all delegations had at least 50% of their population working in agriculture in 1973, while some delegations such as Nefza and Medjez el Bab had considerably higher proportions in agriculture (64.6% and 66.8% respectively). Beja delegation had the highest

Table 10.1. Birthplace of Job Seekers Recorded in the Sample Surveys

	TUNIS	KAIROUAN VILLE	SFAX	GABES	BEJA	HAJEB	MEHLA	KEBILI	KAIROUAN SAHEL	NEFLA
Percentage of job seekers born....	39.6 *	58.8	67.3	77.9	85.3	89.6	93.1	93.6	93.9	100.0
I. within the delegation of the survey	1.3	17.3	18.5	5.5	7.8	4.2	3.4	2.6	3.7	0.0
II. in contiguous delegations	59.1	23.9	14.1	16.6	6.9	6.3	3.4	3.8	2.4	0.0
III. in non- contiguous delegations	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
TOTAL	235	1609	502	1042	118	48	58	73	82	30
Sample size	10% Systematic	100%	10% Systematic	100%	10% Systematic			20% Systematic		

* This statistic has been calculated for persons born within the city of Tunis, rather than for the sub-district of the city in which the survey was taken.

Data source: Author's survey.

percentage of employees in secondary activities (12.9%) and by far the largest number in tertiary occupations (18.6%). Under-employment and unemployment were estimated to be highest in the mountainous delegation of Amdoun, where almost one third of the workforce was out of work or underemployed (D A T, 1973b, 103)

Growth of modern sector employment in Beja gouvernorat has been extremely limited (see Chapter 9, Table 9.10) and in the period 1973 to 1975, the region gained only 1.4% of all the jobs resulting from the new investment laws, although it had 4.4% of the country's population. Two foreign firms in the textile and clothing industry established themselves at Medjez el Bab providing 269 new jobs, and another small firm located itself at Teboursouk creating 60 new jobs (Signoles, 1978c: 29). In 1976 the Beja sugar factory had 495 employees, but further expansion of the industry at Beja seems improbable. Unfortunately the location of the sugar refinery is now an anachronism for only a small fraction of current production is based on locally grown sugar beet. The rest of the industry depends on imported raw sugar which has to be transported from Tunis to Beja for refining. Labaied (1977) has recently suggested that the sugar industry should be rationalized and relocated at Sfax or Sousse. This would leave the town of Beja with no significant industrial function and would increase the dependence of the local labour market on administrative and service activities. Labaied's analysis, while highly critical of the unnecessary costs incurred in the transportation of raw materials to an inland location, ignores the hidden deficit of the wasted talents of the thousands who

cannot find any work in these remote inland towns. Lack of modern sector employment in the larger towns of the interior is one of the prime causes of out-migration of young workers to the already congested and overcrowded cities of north-eastern Tunisia.

A survey of employment in the delegation of Beja in July 1977 showed that even amongst those involved in non-agricultural activities, 15.1% had only temporary jobs. Seasonal employment was even more prevalent in the rural delegation of Nefza, where 38% of those engaged in non-agricultural work were found to be only temporary employees (O T T E E F P , 1977b).

The instability of employment both in the agricultural and non-agricultural sectors is a major force encouraging population mobility amongst the peoples of the Tell. In recent years extremely heavy out-migration to Tunis has been recorded from Beja and other governorates of the north-west. It has already been shown that the town of Beja is a critical node in the Tunisian migration system (Chapter 4) gathering job seekers from the surrounding rural delegations, as well as being a source of out-migration to Tunis. The development of a wider range of non-agricultural activities in Beja, as well as investment in more adequate local social and economic facilities could reduce the flow of population from Beja and help to make it a terminus to the local migration system, rather than a springboard for inter-regional population movements.

Socio-economic characteristics of job seekers

A survey by the author of job seekers registering at the O T T E E F P. office in Beja in 1976 and during the first ten

months of 1977 revealed the severe pressure of demand which exists among young persons for urban based employment. Amongst persons native to Beja who registered at the O T T F E F P office, 65.7% had been born after 1950 and 49.5% after 1955. The majority of local job seekers were therefore extremely young. Migrants seeking employment in Beja were slightly older than local job seekers (Table 10.2). The majority of registrands had no qualifications at all. Migrants had a marginally higher level of skill attainment than non-migrants (Table 10.3). Likewise only 29% of migrant job seekers were illiterate compared with 47% of native job seekers. Although the 10% sample of O T T F E F P registrands was small, including only 101 native persons and 17 migrants, a significant difference was detectable between the educational attainment of migrants and non-migrants. Of job seekers who had been born in other delegations, 40% had attended secondary school or commercial college, compared with only 12% of job seekers born in Beja. It seems probable that many of the better educated members of the Beja population had not even attempted to seek local employment but had immediately departed for Tunis where wider employment opportunities were open to them.

Of those sampled, 73.6% had not previously been in salaried employment in the town of Beja or elsewhere. Most of them had been smallholders or agricultural labourers from the surrounding region. Only 7.9% of those born in Beja had worked anywhere outside the delegation, and of those that had, nearly all had been employed temporarily as building labourers in Tunis.

Table 10.2 Age of Job Seekers (Percentages)

Place of Survey	Place of Birth	Date of Birth	
		Before 1950	1950, or later
Beja	Beja	34.3	65.7
	Elsewhere	41.2	58.8
Kairouan Ville	Kairouan Ville	40.1	59.9
	Delegations contiguous to Kairouan Ville	52.1	47.9
	Elsewhere	50.9	49.1
Gabes	Gabes	22.3	77.7
	Delegations contiguous to Gabes	36.2	63.8
	Elsewhere	22.7	77.3

Source author's survey

Table 10.3.

Qualification of Job Seekers (Percentages)

Place of Survey	Place of Birth	Skill level						No Data
		No Skill	Apprentice	Semi-Skilled	Skilled	Highly Skilled	Professional and Technical	
Beja	Beja	69.6	-	12.1	15.2	2.0	1.0	-
	Elsewhere	17.1	-	29.4	23.5	-	-	-
Karruan Ville	Karruan Ville	50.5	10.5	21.9	7.6	-	9.5	-
	Delegations contiguous to Karruan Ville	50.0	7.7	23.1	7.7	-	11.5	-
	Elsewhere	65.9	6.8	20.5	4.5	-	2.3	-
Gabes	Gabes	19.3	9.1	9.1	48.0	-	12.5	1.1
	Elsewhere	28.6	4.8	14.3	28.6	-	9.5	14.3

Source author's survey.

Table 10.4. Educational attainment of Job Seekers (Percentages)

Place of Survey	Place of Birth	Illiterate	Primary	Middle School	Higher Secondary	Professional or Commercial College	Higher Education	Other	No Data
Beja	Beja	47.5	37.4	2.0	9.1	3.0	-	1.0	-
	Elsewhere	29.4	17.6	11.8	29.4	11.8	-	-	-
Kairouan Ville	Kairouan Ville	41.0	28.6	4.8	20.0	3.8	1.9	-	-
	Delegations contiguous to Kairouan Ville	65.4	15.4	-	15.4	3.8	-	-	-
	Elsewhere	59.1	27.3	-	9.1	4.5	-	-	-
Gabes	Gabes	13.6	43.2	3.4	27.3	8.0	2.3	-	2.3
	Elsewhere	19.0	28.6	9.5	33.3	-	-	-	4.8

Source: author's survey.

Aspirations of job seekers

The aspirations of native and migrant job seekers were low compared with those recorded in other parts of Tunisia. Most had no specific income to which they aspired, and were willing to accept the legal minimum wage (36 Dinars per month in 1977). Only 2% of job seekers born in Beja were willing to accept professional training in order to improve their qualifications, and only two people in the whole sample were interested in the prospect of establishing themselves in small independent businesses. 66.3% were willing however to migrate in order to find employment, while only 60% of those who had already migrated were willing to do so again.

Job seekers at Nefza

A comparative study of job seekers was undertaken at Nefza where 20% of the 150 registered job seekers were sampled. Nefza delegation has no settlement with the status of an urban commune. The central village (1,700 persons) has a school, a mosque, a cafe, a petrol station, several small shops and a variety of administrative offices, but it has no manufacturing or processing industries. A small shoe factory is planned for the village in the near future. Some villagers earn a cash income by the sale of tobacco to the national cigarette and tobacco company.

Job seekers were much older than at Beja, many of the younger members of the community being worker migrants earning an income for a few months by labouring in Tunis or Sousse before returning home again (Den Held, 1976). Of the 30 persons in the sample, 17

were born before 1950. Qualifications were slightly poorer than amongst job seekers at Beja, 22 of the 30 registrands having no skills at all, and almost half of them being totally illiterate.

Of the registrands, 25 said they would be willing to move to another part of the gouvernorat of Beja to find employment, but only 18 were willing to move to another part of Tunisia. Many of those willing to move only within the gouvernorat hoped to get short-term work contracts as forest labourers. Some temporary employment of this nature was available at the time of the survey.

A high percentage of the labour force at Nefza (23%) already had experience as migrant workers. This confirmed the findings of Den Held's (1976) research which suggested that 24% of the active male labour force had been involved in temporary migration. In the author's O T T E E F P survey, the duration of employment of persons who had worked previously in other parts of Tunisia was very short, averaging only 6.4 months. Most of the temporary migrants had accepted manual work in Tunis, earning no more than the legal minimum wage.

Whether or not the development of a shoe factory at Nefza will effectively curb migration remains to be seen. There is the danger that those workers who acquire some skills through this new source of employment will be more able to secure permanent, more lucrative work thereafter in the cities of Tunisia. It is also possible that those who are unable to find employment in the new factory will be more eager than before to migrate and to find modern sector employment elsewhere. The strong desire to participate in the urban economy and the cosmopolitan milieu of

the larger cities is a major force with which rural industrialization cannot hope to compete

Concentration of both services and employment functions in larger regional towns such as Beja might prove to be a more effective policy for maintaining a stable regional distribution of population than the scattering of a few modern sector activities in small units throughout village communities. It seems surprising that more attention has not been given by the Tunisian government to encouraging labour intensive industries in regional centres, such as Beja, which because of their urban status have the capacity to attract migrants from the surrounding villages despite their dearth of modern sector employment. The trend for foreign investors to locate firms near Tunis and in the Sahel of Sousse seems very unfortunate since it has accelerated existing patterns of in-migration to these regions from the Tell. Government intervention might have influenced a greater number of foreign investors to locate new plant in the Tell where labour surpluses are critically high, and where certain natural resources, such as water and timber, are more plentiful than in any other part of the country.

Kairouan

Population and economy

Kairouan city, with 56,400 inhabitants in 1975, is the only major settlement of the low steppes. Formerly Aghlabid, capital of Tunisia, it remains today of great importance as an Islamic centre, but has progressively declined in significance as an

urban node relative to the coastal cities of Tunisia. It functions as an administrative centre and market town for the peoples of the low steppe, but has gained few other modern sector activities. The 1975 census showed that 74.1% of the urban population of Kairouan governorat lived within the city itself, the population of other communes comprising fewer than 5,000 persons. The level of urbanization of the governorat as a whole remained extremely low, only 21.6% of the population living in communes. Between 1966 and 1975 Kairouan city itself grew at only 2.2% per annum, a relatively slow growth rate by comparison with other Tunisian cities. The slower growth of Kairouan city over the last decade may be attributed firstly, to the effects of the 1969 floods which isolated Kairouan from the rest of Tunisia for many weeks, and secondly, to the establishment of so-called 'growth centres' in the neighbouring governorat capitals of Siliana and Sidi Bou Zid (O T T E E F P , 1976b).

In 1975 there were 97,160 persons defined by the census as members of the active labour force in the governorat. Unemployment was officially estimated at 20,690 persons, or 21.3% of the labour force (I N S , 1975b). Of those persons who were in employment, 51% were in the agricultural sector, 10% in services, 13.7% in industrial activities (chiefly artisanal industries such as traditional textiles and leather working activities) and 8% in building. A similar distribution of employment was suggested by an O T T E E F P survey. Not surprisingly rural/urban contrasts in employment were very marked, non-agricultural work accounting for only 27% of the labour force in rural areas compared with 96% in communes.

An assessment of the labour market at the level of the delegation was undertaken in 1973 by the Direction d'Aménagement Territoire. This suggested that unemployment was greatest in the districts of Ouesslatia in the foothills of the southern Dorsale and in Nasrallah to the south-west of Kairouan. Kairouan and Hajeb delegations were the only areas in the gouvernorat to have a significant level of industrial employment, while in Sbikha and S 4 Bou Hajla, agriculture accounted for approximately three quarters of all actively employed persons (D A T , 1973b)

Labour demand

Growth of modern sector employment has been extremely slow. Between 1973 and 1975 there was no significant expansion in industrial activity anywhere in Kairouan gouvernorat (Chapter 9, Table 9 10). In the same period only 0.6% of all jobs created under the special investment laws (loi 72-38 and loi 74-74) were located in Kairouan gouvernorat. Most of the job seekers who did find work in 1976 via the O T T E E F P received only temporary employment reflecting the unstable nature of labour demand in the region. Impermanent employment was offered chiefly in the building sector, and to a lesser extent in agriculture and in public works undertaken by the municipality of Kairouan (O T T E E F P , 1976b, 31).

A survey by the author of modern sector activities¹ in

¹ The survey was accomplished using 'fiches F E N A ' (Fiches d'emploi non-agricole) collated by the O T T E E F P. F E N A surveys were claimed to account for over 80% of all modern sector enterprises in April 1977 (O T T E E F P , 1977a). The sector which was most poorly represented by F E N A was retailing, because of the difficulties involved in locating and registering small merchants

Table 10.5. Distribution by Size of Establishments Offering
Employment in Non-agricultural Activities,
November 1977

Employees	Kairouan		Gabes	
	No.	%	No.	%
0-9	52	42.3	106	46.5
10-20	29	23.6	42	18.4
21-50	23	18.7	40	17.5
51-100	11	8.9	21	9.2
101-150	2	1.6	7	3.1
151-300	5	4.1	9	3.9
301-500	1	0.8	1	0.4
500 +	-	-	2	0.9
Total	123	100.0	228	100.0

Source Author's survey.

Table 10.6. Date of Creation of Establishments Offering
Non-agricultural Employment.

	% Before 1946	1946-50	1951-55	1956-60	1961-65	1966-70	1971-75	1976/7	No data
Kairouan	6.5	3.3	2.4	13.0	12.2	24.4	22.8	4.1	11.3
Gabes	4.4	1.3	1.3	7.7	11.4	16.6	30.1	12.2	15.3

Source Author's survey.

Table 10 7 Growth of Labour Supply in Kairouan

Population of Kairouan governorat, 1976 (1)	340,462
Estimated growth of population, 1976-1981 (2)	45,110
Estimated growth of population seeking active employment, 1976-1981 (3)	13,165
Estimated growth of population seeking active employment during the Fifth Plan (4)	10,532

Sources (1) O T T E E F P , 1976b

(2) Calculated from the 1976 population using national cohort survival ratios.

(3) Calculated from an estimate of entrants to the active age cohorts using current activity rates for the male and female population.

(4) Calculated as a proportion of growth over 5 years.

Kairouan city indicated that almost 45% of establishments were government offices or were related to public services such as health and education. The number of building enterprises was small - only 5% of the total. In comparison with other establishments, building companies employed large numbers of men both on temporary and permanent contracts. Only six establishments were engaged in manufacturing in Kairouan and most of these were small food processing plants.

The size of existing non-agricultural establishments was relatively small, the only major employer being a building company established in 1976, which had over 400 employees (Table 10.5). Unlike more dynamic provincial centres such as Gabes, the number of establishments being created in the city has declined slightly in recent years. Only 22.8% of existing non-agricultural establishments were created between 1971 and 1975, while 24.4% were created between 1966 and 1970 (Table 10.6).

If the projects proposed by the Fifth Plan are completed, then the range of employment opportunities in Kairouan should increase. Proposed schemes include a new brick works, several food processing factories, a thread factory, a tobacco factory and the extension of some existing plants. The implementation of these proposals will cost 15.6 million dinars and will provide only 1,500 new jobs by 1981 (Min du Plan, 1977a), during a period when a further 10,500 jobs will be required to meet the employment needs of new entrants to the labour market (Table 10.7). The supply of labour will inevitably outpace demand.

Socio-economic characteristics of job seekers

With low levels of urbanization and restricted non-agricultural employment opportunities throughout most of the gouvernorat, the city of Kairouan has tended to become a focus for in-migration from other parts of the gouvernorat. A demographic survey of the city carried out in 1970 confirmed that 11,275 migrants were living in the city (over 20% of all citizens). Both the author's O T T E E F P survey of job seekers (Figure 10 4a), and a sample survey by Trabelsi (1976) agree that many of the migrants to the city came from the delegations of Haffouz and Hajeb, and that few came from outside the gouvernorat of Kairouan.

The O T T E E F P survey revealed that the age of job seekers was lower amongst persons native to Kairouan than amongst persons born in other delegations. Of registrands from Kairouan city, 60% were born after 1950 compared with only 48% amongst migrant job seekers (Table 10 2). Similarly, a differential was identified between the skill levels of job seekers from non-contiguous delegations and the rest of the sample, long distance migrants having lower skill levels. Of job seekers from non-contiguous delegations, 60% had no skills at all compared with only 50% of those born in Kairouan or surrounding delegations (Table 10.3). A similar dichotomy emerged from analysis of the educational attainment of job seekers. Only 41% of Kairouan born job seekers were illiterate compared with 65% of those from neighbouring delegations. Inversely, 20% of those native to Kairouan had received some secondary schooling compared with only

9% of those from distant delegations (Table 10 4).

It seems clear that the socio-economic characteristics of job seekers vary with their migration status. Migrants to Kairouan were older, less well qualified and more poorly educated than other job seekers. In view of the relatively restricted employment opportunities in the city, and also in view of the poor chances which migrants had in competing with urban-bred job seekers for employment, it seems remarkable that so many migrants were found in the Kairouan labour market. This situation reflects the critical level of labour surpluses in rural areas, and the belief which exists among rural job seekers that employment is more likely to be available in the big cities, even in regions such as Kairouan gouvernorat where the rate of urban employment growth is very low.

Aspirations of job seekers

Virtually all job seekers stated that they wished to find permanent employment, but surprisingly few (6.3%) were willing to take any training in order to achieve this end. This presents a severe structural difficulty for manpower planners in Kairouan. Nearly all permanent employment available there in 1976 demanded some level of worker qualification (O T T E E F P , 1976b), yet the vast majority of job seekers had extremely low skill levels and appeared unwilling to enrol in training schemes. Most would-be workers stated that they were willing to migrate to other delegations, even to other gouvernorats if this could enable them to find employment (Table 10 8). Amongst job seekers from Kairouan, 83% were willing to migrate, a higher level than elsewhere

Those from contiguous delegations who were willing to migrate again numbered 73%. This finding was contrary to the expectation that previous migrants who had no work would be more willing to move again than non-migrants. It underscores the conservative nature of the persons who have migrated to Kairouan from the rural delegations of the western part of Kairouan gouvernorat.

The distinctive aspirations of those job seekers who had previously been employed in France or Libya were also of interest. Only 53% of those persons were willing to contemplate employment elsewhere in Tunisia, reflecting their hope either of obtaining work in Kairouan itself, or of departing once again to work abroad. Migrants returning from foreign employment were also more demanding than other job seekers, in terms of the salaries which they hoped to earn. Of those stating the level of income to which they aspired, only 29% were willing to accept the minimum legal wage, compared with 87% of the sample as a whole. Amongst job seekers who had been abroad 35% expected to earn over 60 dinars per month in Kairouan, an income level substantially higher than that looked for by other job seekers. These high aspirations were nevertheless lower than the level of income which migrant workers would have earned during their time abroad. The average income of those registrands who had worked abroad, and were willing to declare their former income, was 82 dinars per month, a staggering 2 25 times more than the minimum guaranteed wage in Tunisia.

A further group of registrands with highly disparate characteristics from those of the population as a whole, was the category of female job seekers. This group had an extremely low

mobility status, only 4% being either willing or able to accept employment at another location. The low level of female wages and the restricted local labour market is reflected in the fact that 45% of those who gave an indication of acceptable income, were willing to work for less than the legal minimum wage.

Job seekers in rural delegations

Having shown that both the socio-economic characteristics and the aspirations of migrant job seekers are different from those of persons born and bred in Kairouan, it is interesting to discover whether a distinction also exists between migrants seeking work in Kairouan and others seeking work in the rural delegations from which those migrants departed. It was obviously impossible to sample the entire population of the Kairouan migration field, but micro-surveys were possible in one contiguous delegation (Kairouan Sahel) and one non-contiguous delegation (Hajeb). Only persons native to and residing in these delegations at the time of the survey are considered in this study.

The problems arising from the implantation of infant industries in Hajeb have already been discussed in Chapter 9 (p 292), where it was shown that even amongst the fortunate minority who had obtained employment in the new factories, many still wished to migrate to larger towns and cities. This pressure to migrate was apparent in the O T T E E F P survey which revealed that all persons without employment in Hajeb were willing if necessary to migrate in order to increase their job prospects. In Kairouan Sahel there was no form of permanent employment available locally in the secondary sector with the exception of a small stone quarry

Table 10.8. Percentage of Registrands Willing to Migrate
in order to Find Employment

Men born in Kairouan Ville	83
Men from contiguous delegations	78
Men from non-contiguous delegations	73
Women	4
Persons who had previously been employed abroad	53

Source author's survey

Table 10.9 Age of Migrants to Kairouan Ville from Hajeb
and Kairouan Sahel

	Migrants from		Non-migrants born in	
	Hajeb	Kairouan Sahel	Hajeb	Kairouan Sahel
% Born before 1950	63.5	53.7	41.9	53.2
% Born 1950 and after	36.5	46.3	58.1	46.8

Source author's survey

Table 10.10 Place of Birth of Employees of I C M (5th October 1976)

Gouvernement	Percentage of total	Number
Gabes	79	370
Sfax	12	54
Medenine	3	15
Gafsa	1	7
Others	<u>5</u>	<u>22</u>
	100	468

Source Author's survey of the I C M employment register

A food canning plant provides seasonal employment for 200 workers and 15 olive mills claimed to employ 130 persons in the period after the olive harvest. Both in Hajeb and Kairouan Sahel, projects were under way to build new houses for the rural population. In the latter in particular, vigorous efforts were being made to provide electricity for village communities and to improve rural roads and water supplies.

The age of job seekers who had moved from Kairouan Sahel to Kairouan Ville was very similar to that of registrands at the O T T E F F P bureau in Kairouan Sahel. By contrast, in Hajeb native job seekers were younger than out-migrants to Kairouan Ville. It was also found that migrants from Hajeb to Kairouan Ville were older than from Kairouan Sahel (Table 10 9). In Hajeb, the pressure to migrate for work and participation in the urban economy appears to be strong not merely among the youngest members but also among the older echelons of the population. In both Kairouan Sahel and Hajeb the level of qualifications of native job seekers was much lower than amongst migrants to Kairouan city. Of registrands at Kairouan Sahel 82% were totally unqualified, and the percentage was even higher at Hajeb (86%). It seems ironic that while migrants were less well qualified than other job seekers on the urban labour market of Kairouan city, their departure from rural areas meant a further reduction in the already low level of qualification of the local labour pool. Other aspects of the surveys in Hajeb and Kairouan Sahel revealed no consistent relationships between the characteristics of migrants and non-migrants.

Migration in place of development

It is clear that job opportunities are extremely limited in the Kairouan region. Some job seekers may find work, however, by moving to other areas of Tunisia. The O T T E E F P claim that job opportunities elsewhere in Tunisia are provided for 150 Kairouanese every year. Many more job seekers also depart independently for Tunis and Sousse in search of work. In addition, 2,500-3,000 families continue to migrate seasonally to the Sahel of Sousse for the olive harvest. Most of these (58%) come from the delegation of Sidi Amor Bou Hajla. Intra-gouvernorat migration of workers is also important. Every year 1,000-1,500 families move from Haffouz to Ouesslatia at harvest time, and there is even some seasonal in-movement from the southern steppe lands (Min. du Plan, 1973b, 16). Temporary employment therefore continues to be an important component of the Kairouan labour market.

An interesting feature of the author's sample survey was that 6.7% of the persons born in Kairouan had worked in other parts of Tunisia before returning to Kairouan city to seek employment there once more. Many of these people had earned a living through the tourist industry, working for a few years in the hotels of Sousse or Jerba. That these persons had returned to Kairouan in spite of the limited labour market, reflects the strong attraction which migrants feel towards their birthplace. This return migration reinforces the circulatory nature of many migratory movements (Chopman and Prothero, 1977). The redistributive effect of migration could be greatly reduced if

migrant workers could be induced on their return to take up employment once more at their place of origin. The absence of a dynamic labour economy in cities like Kairouan discourages the re-integration of return migrants.

Amongst the job seekers in the Kairouan survey who had worked abroad, over 70% had been born in Kairouan city. The high income aspirations of this group greatly reduced the likelihood of their finding suitable employment in the city. Many of them would probably emigrate again to foreign labour markets as soon as the opportunity arose. The pressure to migrate to Libya was also considerable among job seekers with no migration experience. It was estimated by one O T T E E F P official that over 50% of those seeking employment in the building sector would have migrated to Libya in 1977 if the O T T E E F P had been able to arrange jobs for them. This estimate reflects the fact that it is the genuine desire of many workers to find more lucrative employment than is available in the Kairouan region.

Ambitious and costly projects (such as the Sidi Saad barrage scheme which hopes to increase the irrigable area in Kairouan gouvernorat by 7,000 hectares by 1983 and to provide 12,000 new jobs) may help to reduce the poverty of rural workers and to increase the stability of agricultural production on the steppe-lands, but they cannot hope to absorb the long-term labour surpluses of the region, given the ecological constraints imposed by the steppe environment on further intensification of agricultural production. Nor can they hope to modify the desires of most young people in rural areas to adopt urban lifestyles.

The introduction of urban innovations such as electricity may improve living standards in rural areas such as Kairouan Sahel, but it is also likely to confirm in the minds of young villagers the belief that urban places are the source of innovation and modernity, and that the fastest means of benefitting from the technological changes which accompany economic development is to move to the city rather than to wait for innovations to filter down to rural communities (Sidile, 1978)

Improvements in the infrastructure, urban facilities and employment opportunities of large regional centres such as Kairouan city may dissuade the youthful population from migrating to the metropolis of Tunis, in favour of settling contentedly in their regional capital. Currently, rates of employment growth in Kairouan city are inadequate to assure the integration of migrant workers into the city's economy. If small secondary and tertiary activities do not develop more rapidly in the city of Kairouan, it seems likely that out-migration of workers from the steppe region will accelerate, causing rapid depopulation as has occurred in recent years in the Tell.

Gabes

Population and economy

The oasis of Gabes lies on the narrow strip of land which runs between the easternmost extension of the Chott el Fedjadj and the gulf of Gabes on the Mediterranean. In 1975 the town of Gabes had a population of 43,100, or 45% of the town dwellers of the gouvernorat. Between 1966 and 1975 the rate of growth of

the town's population was 3.3% per annum, a level considerably higher than that for the population of the *gouvernorat* as a whole (2.5% per annum). The level of urbanization in the *gouvernorat* (36.6%) was higher than in either of the other *gouvernorats* studied, but the level of centralization of the urban population in one settlement was lower than in either Beja or Kairouan. For example, the oases of El Hamma and Douz both had populations of over 10,000 persons in 1975, and other oases were growing fast. Between 1966 and 1975, Kebili showed remarkable growth, its population expanding on average by 6.3% per annum (Houidi and Miossec, 1976). Ironically, the industrial centre of Ghamouche (7,900 persons) grew much more slowly in the same period (only 2% per annum) despite the considerable financial investments which were made in the delegation during the course of the Fourth National Plan to develop chemical industries there.

The census suggests that in the *gouvernorat* of Gabes there were 68,900 persons of 15 years of age and over in the active labour force in 1975. Of these persons officially in active employment (i.e. not registered as unemployed), only 37% were classified as participating in agricultural activities while 17% were involved in production of either traditional or modern goods. Artisanal activities are important in the *gouvernorat* involving an estimated 1,700 persons (O T T E E F P., 1976a, 10), but they represent a much smaller proportion of the 'industrial' labour force than in Kairouan. Of the active population 14% were absorbed in service activities.

A detailed sectoral and spatial analysis of the labour

market was attempted in 1973 by the Direction d'Aménagement Territoire (1973a). Gabes delegation had the largest share of secondary and tertiary employment, while in the cases of El Hamma and Mareth agricultural activities remained extremely important. Surprisingly low levels of unemployment were recorded in El Hamma and Matmata (12% and 14.5% respectively). This was due to the extremely heavy out-migration of surplus labour which has occurred from these areas (Bchir and Djemai, 1977).

Labour demand

With regard to employment expansion in the industrial sector, it has already been shown (Chapter 9, Table 9.10) that Gabes fared better in the period 1973-1975 than either Beja or Kairouan. Nevertheless the rate of employment growth has been low in comparison with that experienced in Tunis or Sousse (El Manoubi, 1977). The gouvernorat has failed to attract foreign investors, the only notable exception being a firm producing aluminium window frames and doors for export to Algeria, Libya and Italy.

Job seekers in Gabes appear to be more successful than in Beja or Kairouan in finding permanent employment. In 1976 only 11% of applicants for jobs at O T T E F F.P offices had to accept seasonal employment. Amongst those receiving more permanent work, the majority (3,688 of 5,056 job seekers) found work in the building sector. Although this sector is expanding rapidly at the moment in response to the large industrial projects being undertaken in the gouvernorat, the long-term

stability of the building sector as a source of employment for Gabesian workers is not guaranteed. Labour demands in industrial activities were quite high in 1976 giving work to 13.6% of job seekers, while the service industries took on 5.2% of the governorat's job seekers. Of the 311 persons entering employment for the first time, approximately half (152) received work in industrial manufacturing (O T T E E F P, 1976a, 24).

The author's survey of the 228 non-agricultural establishments (F E N A) in Gabes delegation confirmed the dominant role of administrative and service jobs in the Gabesian labour market. There was a much wider range of activities in Gabes than in Kairouan including 54 building firms and enterprises undertaking public construction projects. Small businesses and commercial establishments were more numerous and more important than in Kairouan, accounting for almost 20% of the establishments surveyed, while the role of Gabes as a communications centre was also apparent. Of the 228 establishments in the survey, 20 were associated with transport facilities in some form.

Although the number of non-agricultural establishments recorded in Gabes was much greater than in Kairouan, the size distribution of firms was similar. Nearly half of the units studied employed less than ten persons. The three largest employers were the phosphate treatment plants owned by I C M (Industries Chimiques Maghébines), a very large building company called BRFDERO, and the state-owned regional bus company S O R T GABES, each of which had over 450 permanent employees. The employment register at I C M revealed that 79% of the 468

employees of the firm were native Gabesians, reflecting the company's policy of hiring local labour wherever possible. A further 12% of employees were Sfaxians, some of whom had previously worked in the phosphate factories in the city of Sfax (Table 10.10)

The survey of the non-agricultural establishments of Gabes showed that a large number of new employment functions had developed between 1971 and 1975. Indeed, in the year preceding the survey, 26 establishments (12.2%) had been founded. In view of the relatively dynamic labour market, it is not surprising that the O.T.T.E.E.F.P. survey of job seekers, reported earlier in this chapter, indicated that Gabes had a relatively strong migration field attracting job seekers from all over the country.

Socio-economic characteristics of job seekers

A detailed survey of Gabes in 1973 (D.A.T., 1973a) revealed that the town was a 'centre de relais' in the Tunisian migration system. Gabes lost some of its population to the cities of north-eastern Tunisia, at the same time as receiving immigrants from other parts of the country, most notably from the settlements of the surrounding governorat. The in-migrants recorded in the survey were largely recent arrivals, 55% having reached Gabes since the time of the 1966 census. An interesting distinction was observed by the D.A.T. between intra-governorat migrants, who had found accommodation in the villages around the oasis and in the port quarter of the town, and the inter-governorat migrants who had settled mainly in the new suburbs on the periphery of the town. As in the author's survey (Figure 10.4) most inter-

gouvernorat migrants came from Sfax, Medenine and Gafsa, and to a lesser extent, from Tunis (D A T., 1973a, 34).

The age of migrant registrands in the author's survey was once more higher than amongst native job seekers. The age differential was greatest between job seekers migrating to Gabes from contiguous delegations and native Gabesians (Table 10 2). The age of registrands, both migrant and non-migrant, was much lower in Gabes than in either of the other micro-studies.

Migrant job seekers proved to be less well qualified than other persons (Table 10 3). Of the former, 28.6% had no skill at all and 14.3% were only semi-skilled compared with 19.3% and 9.1% in the same categories of the native population. The general skill level amongst both migrants and non-migrants was substantially higher in Gabes than in Kairouan or Beja.

The educational attainment of O T T E E F P registrands was also higher in Gabes than elsewhere, but as in the other samples, illiteracy was higher amongst migrants than amongst the native population. Over 10% of those born in Gabes had received post-secondary training, while no migrants claimed to have attended either commercial college or institutes of higher education. Of job seekers at Gabes 40% had received some secondary education, whereas only 33% of migrant job seekers had achieved similar standards. One of the hardest tasks facing manpower planners in the region is to find suitable outlets for well educated school leavers, many of whom aspire to professional posts. They are too well qualified to accept manual or semi-skilled work and, on failing to find local employment, are prone to migrate to Tunis,

Sfax or Sousse in order to obtain appropriate salaried employment

Aspirations of job seekers

Virtually all job seekers wished to find permanent employment and the majority declared that they were willing to migrate in order to secure it. Gabesians were slightly less inclined to migrate than other job seekers, a contrary finding to the Kairouan and Beja surveys where non-migrants were more mobile in their declared intentions. Differences in the level of aspirations were greater between towns than they were between migrants and non-migrants, in any one urban labour market. In Gabes the vast majority of both migrant and non-migrant job seekers were willing to migrate to find work (Table 10 11)

Opportunities for female employment were very limited and approximately one third of female applicants were willing to work for less than the minimum legal wage. The modal income expected by those male Gabesians willing to specify a desired wage (70.6% of the sample) was 50 dinars per month. This high level of expectation amongst job seekers may be attributed to their knowledge of the relatively lucrative wages paid to the fortunate minority who are employed by I C M. Of all job seekers 39% did not specify the occupation which they hoped to enter, but 15% aspired to work for I C M, a far higher proportion than can possibly be absorbed into the labour force of the current chemical industries. Approximately one third wanted jobs in building, while a substantial minority (8%) were seeking work with a transport company.

Job seekers in rural delegations

Comparative studies were undertaken in the delegations of El Hamma and Kebili. Job seekers registering in these delegations were older than job seekers in Gabes. Migrants from El Hamma to Gabes were virtually the same age as job seekers remaining in El Hamma, but migrants to Gabes from Kebili were substantially younger than native job seekers. It should be recalled from the Kairouan study that migration of job seekers between contiguous zones was not age-selective, substantiating the result achieved for migration between El Hamma and Gabes.

The oasis of Kebili was losing workers via migration who were on average younger than job seekers staying in the oasis. In 1977, the oasis had only a small date packing factory employing 120 workers during the winter date harvest. Inadequate modern sector employment may have stimulated out-migration of the youngest elements of the labour force, although a long tradition of worker out-migration and international emigration has also been of importance in encouraging contemporary labour movements.

The qualifications of registrands at El Hamma and Kebili were very low. Of those born and seeking work in El Hamma and Kebili 65% and 64% respectively had no skills at all. The skill levels of these labour markets were substantially lower than those of native Gabesians, as well as of migrants to Gabes.

Educational attainment was similar in both El Hamma and Kebili. Of job seekers at El Hamma 37% were illiterate and at Kebili 36%. Only 30% of job seekers had been educated beyond primary level at El Hamma, and in Kebili only 17% had proceeded to secondary education. Once more this indicates the

qualitative difference between labour supply in the inland oases and in the town of Gabes. Out-migration has tended to deprive these already poorly endowed labour markets of the better educated and more skilled members of the workforce.

International migration

Of registrands at Gabes and Kebili 14% had worked in other parts of Tunisia or abroad. Many had worked in France and Libya as labourers. Although those who had been abroad had earned substantial incomes by Tunisian standards, their experience of foreign labour conditions had only minimally increased their skill levels. One enterprising migrant had returned to establish a chicken hatchery with the money he had earned abroad, but the majority of the returned migrants were no better qualified to earn a living than when they had first left Gabes and Kebili.

The role of migration in the shaping of El Hamma was even more marked. Of the 54 persons in the sample survey who had been born in El Hamma, 14 had worked in other parts of Tunisia and 11 had worked abroad. A further 15 persons were first time job seekers, leaving only 14 registrands who had actually been in previous employment in El Hamma. The contrast in earnings between migrants to other parts of Tunisia and those who had worked abroad was clearly evident (Table 10.13). Few of those who had worked elsewhere in Tunisia had gained more than the legal minimum wage, while cash earned by those who had been in France and Libya ranged between 60 and 160 dinars per month. It was not therefore surprising that the sample revealed many persons in El Hamma who hoped that they could once more work abroad.

Table 10.11. Percentage of registrands willing to migrate in order to find employment

Men born in Gabes	73 5
Men born elsewhere	78 9
Women	13 0

Source author's survey

Table 10.12. Age of Migrants to Gabes from El Hamma and Kebili

	Migrants from		Non-migrants born in	
	El Hamma	Kebili	El Hamma	Kebili
% born before 1950	35 3	37.1	35.2	36 1
% born 1950 and after	64.7	62.9	64.8	63.9

Source author's survey

Table 10.13 Earnings of El Hamma Job Seekers by Location of Previous Employment

Dinars	Elsewhere in Tunisia	Abroad
Legal Minimum (36D)	11	.
40-59D	3	.
60-79D	.	3
80-99D	.	1
100-119D	.	1
120-139D	.	.
140-159D	.	2
160-179D	.	1
No Data	.	2

Source author's survey

The economy of El Hamma was severely threatened in 1976, when the Libyan frontier was closed to migrant workers and when Tunisians were expelled in large numbers. Of the 743 workers forcibly returned to Gabes governorat 50% were natives of El Hamma (O T T E E F P , 1976a, 21). Many other workers returned 'voluntarily'. In order to absorb the sudden return of so many labourers the government set up temporary employment schemes, initiating a project to build a cement works on the El Hamma-Gabes highway. This project has now been completed and many of the labourers are once more without work and seeking to return to Libya.

The desire to migrate either within Tunisia or abroad was very strong at the time of the O T T E E F P survey. All registrands declared their willingness to leave El Hamma for other locations and 87% of those at Kebili were likewise willing to move.

Prospects and summary of the Gabes survey

While the labour market in Gabes has been relatively buoyant by comparison with the governorats of Beja and Kairouan, employment expansion has been largely dependent on the development of the building sector. This in turn has been closely allied to the expansion of capital-intensive industries in the region. Employment prospects in the longer term are consequently uncertain. Existing studies suggest that the so-called 'trickling down' effect from the industrial growth pole at Ghannouche has been very limited (Aydalet, 1966, El Manoubi, 1977). The effect of recent investments in new chemical processing units may even

have been negatived if the detrimental influences of these developments on the water-table level and on the purity of water supplies are to be taken into consideration.

Industrial investment schemes in the Fifth Plan may be subdivided between those seeking to foster rapid economic growth and those wishing to reduce labour surpluses in the economy. Further extension of the chemical industry at Gabes via the development of a nitric fertilizer plant may help the balance of payments of Tunisia, but its impact on the Gabesian labour market will be small. Simultaneously the government hopes that labour surpluses will be absorbed in a number of small and unrelated labour intensive industries, such as a lemonade factory at Gabes and a tile factory at Methouia (O T T E E F P , 1976a)

This study of Gabes labour market has demonstrated clearly the difficult trade-off which planners often have to make between encouraging investment in the costly but essential exploitation of valuable physical resources and investment in the long-term development of human resources. It has also shown that 'quality' as well as 'quantity' must be considered in manpower planning. Work must be provided for people of all types of ability, if the full capacity of a local labour force is to be realized. Schemes encouraging the long-term integration of moderate numbers of workers into the economy must be favoured over more ambitious projects to provide temporary employment for all job seekers.

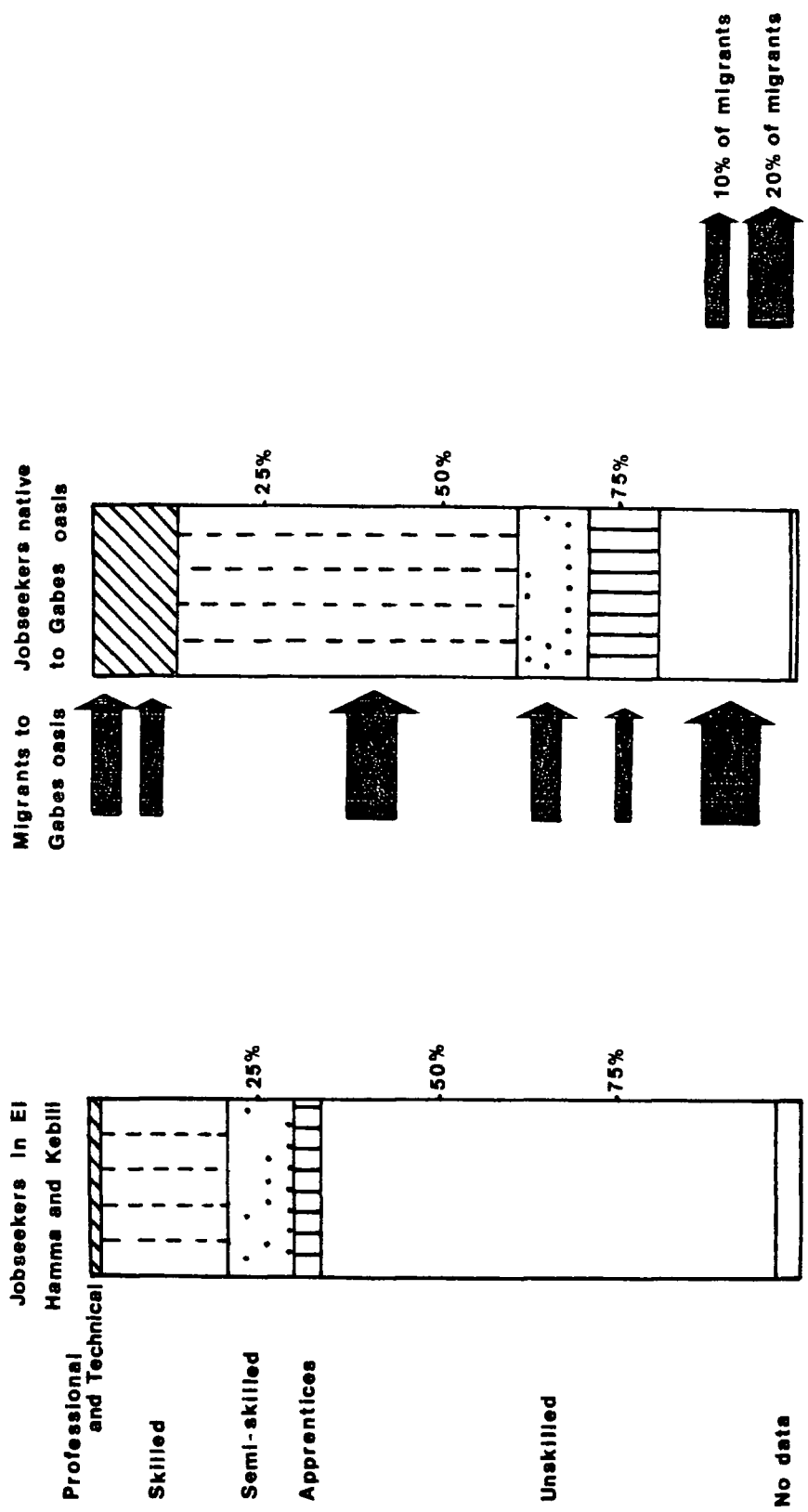
Migration Patterns and Employment Planning

Study of the social and economic characteristics of migrant job seekers has provided further insights into the nature of

migration fields. The movement of workers involves more than population redistribution in space. It alters the character of the labour markets from which migrants depart, and it alters the composition of the workforce at the point of their arrival. Considerable regional variations have been identified between the local labour markets studied, underscoring the danger of seeking to make broad generalizations on the basis of isolated micro-studies undertaken in only one region. Extrapolation of the results in any one of the three regions studied by the author would have led to a quite false picture of relationships between rural and urban job seekers in the national labour market. The three case studies of Beja, Kairouan and Gabes stress the need for regionally specific manpower policies, tailored to meet the problems of local economies and to develop the highly specific human resources with which each region is endowed.

Comparison of the results of the micro-studies undertaken in those different regions of Tunisia permits three generalizations to be made which are of broader policy relevance. The most obvious and yet the most fundamental of these is that large numbers of persons born in rural areas of Tunisia were found to be determined to seek employment in urban centres, while in rural labour markets very few in-migrants were encountered. In general, it may be said that the larger the urban community, and the more diverse its employment opportunities, the higher will be the percentage of migrant job seekers in the labour force. This may be demonstrated by ranking the settlements studied by the size of their populations. Hence, in Tunis, 60.4% were migrants, in Sfax 32.7%, in Kairouan 41.2%, in Gabes 22.1% and in Beja 14.7%

FIG 10 5 QUALIFICATIONS OF JOBSEEKERS



The villages of El Hamma and Kebili, Hajeb and Kairouan Sahel had 7.9%, 7.4%, 10.4% and 6.1% respectively. Nefza, with no urban commune, recorded no in-migrants amongst the job seekers surveyed. It can therefore be seen that only Kairouan and Hajeb deviate from the hypothesized 'town size'/'migrant presence' relationship. The boundary definition of Kairouan city is probably the chief reason for the presence of many more migrants in the city than would otherwise have been expected, while Hajeb's new industries may have attracted more in-migrants than would have been predicted on the basis of the town size alone.

A second generalization which may be ventured is that migration is tending towards an even greater spatial polarization in the distribution of labour resources than exists at present. For example, the qualifications of job seekers born in the urban areas of Beja, Kairouan and Gabes were much higher than job seekers in the respective hinterlands of each of these towns (Table 10.14). Very notable regional differences in the level of qualifications of workers may also be detected from Table 10.14. Migrant job seekers from rural areas were much better qualified than persons in the rural labour markets from which they originated. Worker migration has therefore tended to drain the already poorly endowed rural areas of their more skilled workers, further widening the gap between rural and urban labour markets. This impoverishment of rural labour markets may be graphically demonstrated in the case of Gabes. Figure 10.5 shows the differential in skill levels which exists between Gabes oasis and the rural delegations of El Hamma and Kebili, and the

Table 10 14 Percentage of Job Seekers with no Qualifications

Gouvernorat	Non-migrant job seekers in gouvernorat capital	Non-migrant job seekers in rural delegations	Migrant job seekers in gouvernorat capital
Beja	69.6	73.3	47.1
Kairouan	50.5	82.3	60.0
Gabes	19.3	64.6	28.6

Source author's survey

Table 10 15. Illiteracy amongst Non-migrant Job Seekers (%)

Gouvernorat	Non-migrants in gouvernorat capital	Non-migrants in rural delegations
Beja	47.5	50.0
Kairouan	41.0	55.7
Gabes	13.6	36.2

Source author's survey

selective transfer of skills which has been occurring towards Gabes through worker migration

The educational status of migrants also suggested a transfer of skills from the countryside to the town (except in Kairouan governorat). In all cases, levels of illiteracy were lower amongst job seekers native to urban centres than those seeking work in rural delegations (Table 10.15). In Beja migrants were both better qualified and better educated than the persons born in Beja town and seeking employment there. Migration was therefore not only having the effect of impoverishing rural areas by depriving them of their best workers, but also of raising the skill pool of the urban labour market. An even more serious polarization of labour skills is probably occurring at the national level, with the Tunis labour market benefitting at the expense of peripheral regions.

Since it has been shown that labour migration in most instances leads to stronger spatial contrasts in labour quality and quantity, it can be concluded that a policy designed to encourage the concentration of employment growth in regional centres rather than over a wide number of locations, will increase intra-regional contrasts. Nevertheless such a policy may be highly desirable if it encourages the settlement of job seekers within the region of origin and discourages inter-regional population redistribution. A policy fostering employment growth in the larger regional cities such as Kairouan might well prove to be the most effective method of preventing accentuation of existing disparities between regions in human resource development.

A third observation which must be made concerning the survey results is negative in nature, but nevertheless of significance. No distinct relationships could be observed between the desire of job seekers to migrate and the known local conditions of the labour market. For example, people were more willing to leave Hajeb with its relatively dynamic labour market than Beja with its very restricted employment opportunities. Similarly all job seekers at Hajeb declared their willingness to migrate in search of employment despite the recent establishment of small industrial units in their village, while in Kairouan Sahel with its very limited employment prospects only 62% of job seekers were willing to migrate if local employment was not available. It appeared that the former migration experience of a community was an important determinant of the willingness of job seekers to migrate. Persons from El Hamma and Nefza, both with a tradition of out-migration, seemed more likely to favour employment at another location, than job seekers in other rural delegations who had only limited migration experience.

In summary, the survey of job seekers undertaken by the author suggests that in-migration of job seekers is related to the size of settlement and to the diversity of employment opportunities available at the point of destination. Out-migration is not directly correlated with labour market conditions in regions of departure. It therefore appears that Lansing and Mueller's (1967) contention holds true for Tunisian labour migration. The 'carrot' of job creation is more important than the 'stick' of unemployment in understanding patterns of migration.

Since employment conditions do play some part in attracting migrants, it follows that careful manpower planning at the regional level can play a vital role in moulding population distributions by directing migration streams away from the largest metropolis towards regional cities. In order to avoid increased imbalances between regions in labour skills and qualifications, planners should attempt to direct migrant workers to chosen destinations within regions, rather than permitting further inter-regional labour transfer of the kind discussed in Chapters 3 and 4. Labour strategies should seek to encourage migration to specific centres such as the regional capitals of Gabes, Kairouan and Beja, rather than trying vainly to halt rural out-migration. The three regional centres which have been considered all appear to attract migrants despite their limited range of employment opportunities. By strengthening, diversifying and broadening these urban labour markets, regional out-migration and emigration of rural workers to Tunis, Sousse and Libya might be significantly reduced.

Chapter 11

MIGRATION POLICIES

Introduction

The planning of national resource use is of considerable importance to the wellbeing of any nation. Human resource planning, including migration planning, is even more critical to the welfare of national and regional populations. Of the three demographic processes influencing population distributions - fertility, mortality and mobility - the last is by far the most effective in changing regional patterns in the short term. Migration, as the process whereby labour is transferred through space either voluntarily or involuntarily, should therefore receive considerable attention in the formulation of manpower plans.

Spatial and sectoral deployment of human resources represents a key element in the development nexus. Having reviewed Tunisian manpower problems, this chapter hopes to outline beneficial strategies which could assist in the development of the country's human resources. From the analysis of the patterns and processes of Tunisian migration which has already been reported (Chapters 2-8), it is possible to make several specific policy recommendations concerning both international and internal migration.

Migration and Manpower

The potential for migration in the 1980s has already been determined to some extent during the 1970s by the demographic

trends which emerged in Tunisia, and by the decisions of the Tunisian government, both concerning the education and training of the youthful population and also concerning the development of the labour market. The Fourth and Fifth Tunisian National Plans estimated the population structure for the 1980s on the assumption of a continued decline in age specific fertility rates, an assumption which appears justified in view of the continuous decline in fertility which the country has experienced over the last decade (Table 11.1). The Fifth Plan expected that gross reproduction rates would fall to 2.40 by 1981 and 1.15 by the year 2001. On this basis short and long term population projections were made. Table 11.2 shows the expected age distributions of the Tunisian population in 1981 and 1986, as calculated in 1976. It can be seen that the number of persons in the 15-24 age cohort will continue to expand during the 1980s, creating a need for sustained growth in job opportunities within the Tunisian labour market.

From the demographic projections of Table 11.2 it is possible to predict an increase of 567,000 persons in the active age groups (15-64 years) between 1976 and 1981. Assuming constancy of activity rates, which according to the 1975 census were 82.2% for men and 31.0% for women, the new additions to the active population would result in a demand for a further 303,000 jobs between 1977 and 1981. Extending the projections to 1986, another 372,000 new jobs would need to be created to meet the additional demands in the period 1982-1986.

If fertility rates remained constant rather than declining in the future, the Tunisian population would rise to 6.52 million by 1981 and 7.54 million by 1986. Job demands would be further

Table 11.1 Age Specific Fertility Rates (‰)

Age	(1) 1965	(2) 1970	(3) 1975	(4) 1981 (estimate)
15-19	88	56	39	34
20-24	279	261	206	175
25-29	333	327	302	258
30-34	297	294	293	231
35-39	225	207	199	149
40-44	105	103	101	69
45-49	30	28	28	15

Source (1) Marcoux, 1971,
(2, 3, 4) I N S , 1977, 24

Table 11.2 Projection of the Tunisian Population to 1981 and 1986 (1,000s)

Age	1976	1981	1986
0-4	898.1	903.3	942.9
5-14	1584.0	1679.5	1723.5
15-24	1167.6	1400.0	1564.5
25-64	1884.3	2218.7	2675.7
65 +	203.0	235.0	270.7
Total	5737.0	6436.5	7177.3
15-24 age cohort as % of total	20.3	21.8	21.8

(Adapted from I N S., 1977, 34)

inflated due to the larger numbers of persons entering the labour force in the late 1980s and early 1990s

The implications of these demographic trends for Tunisian manpower planners are manifold. They will need to accelerate the rate of job creation if they are to match the new levels of labour supply which will emerge. Furthermore they must plan to distribute new jobs between the regions of Tunisia in proportion to the regional growth of the active population. Failure to do this will lead to mounting pressure from regions of high labour surplus for opportunities to migrate to other parts of Tunisia and abroad.

Current plans for employment creation appear to be achieving neither the number nor the type of jobs necessary to absorb the youthful labour force. Clemenceau and Hadjadj (1976, 111) have estimated that there will be a shortfall of 71,000 jobs during the course of the Fifth Plan (1977-1981), adding to the already high levels of unemployment. The existing spatial distribution of labour surpluses has already been considered (Chapter 9), and trends in employment creation seem likely to accentuate rather than to diminish these regional differences in employment opportunities. Probably the only major outlets for the surplus labour supplies of the interior governorates and of the north-west will continue to be the cities of the eastern littoral of Tunisia, and foreign labour markets.

It is striking that it is from the interior of Tunisia that the heaviest emigration rates to Libya have been recorded since the re-opening of the frontier in January 1977 (Chapter 7). Much of the labour surplus which will emerge during the Fifth Plan is

likely to be located in these same regions. Inadequate employment opportunities in the steppelands and in the Tell could result in a doubling of labour migration to Libya by 1981 (involving 80-100,000 persons)

Official sources not only acknowledge a large gap between labour supply and demand, but also reveal an inconsistency between the skill levels of school leavers and those of the current labour force. Tunisia faces a growing problem of providing sufficient employment in semi-skilled and skilled occupations to meet the rising aspirations of the young labour force. Comparison of Tables 11.3 and 11.4 shows that the percentage of persons having completed some form of secondary education equates approximately with the percentage of persons in professional or sub-professional occupations. Likewise the percentage of the active population with no special education or training was largely the same as that in unskilled occupations. By contrast, there is a great disparity between the distribution of the labour force by occupational category and the output from the present education system. The notable increase in the number of persons receiving at least primary education will stimulate a greatly increased demand for employment in skilled and semi-skilled occupations. To meet the burgeoning labour supply, manpower planners must therefore seek to create not only a large number of jobs, but also employment of a suitable type to fulfil the rising aspirations of the youthful cohorts of the workforce.

It seems improbable that Tunisian planners will in the early 1980s be able to provide adequately for the employment needs of the

Table 11.3 Educational Attainment Categories (Percentages)

	Present Active Population (1975)	Present Education System
A General Secondary School (Science) at least	2 9	4 0
B General Secondary (Arts) or Commercial School	11 1	12 1
C Six years of Primary Edu- cation or Functional Literacy	28 2	74 9
D No special Education	57.8	9 0
Total	100 0	100 0

Source Findley, 1978a, 41

Table 11 4 Classification of Tunisian Labour by
Occupational Category, 1975

	Number	Percentage
A. Professional and Highly Skilled Technical Occupations	24,620	1 5
B Sub-professional and Technical	137,960	8.6
C Skilled and semi-skilled workers	573,570	35.8
D Unskilled occupations	863,350	54 0
Total	1,599,500	≈ 100 0

Source Findley, 1978a, 53

growing population. Consequently, pressures to migrate, both within Tunisia and abroad, are likely to remain high as certain sectors of the population seek to improve their access to remunerative employment opportunities and to centres of modern service provision. It is therefore highly appropriate to evaluate in the remainder of this chapter a range of possible migration strategies which Tunisia could adopt.

International Migration: Past Experience and Future Prospects

The migration hiatus on the West European labour market now appears to be more than a temporary episode in the history of international emigration from Tunisia. Unemployment figures of 12 million have been predicted for Western Europe by 1990 (Guardian, 1978b), an ominous forecast for the immigrant communities with their impermanent residence status. Assistance was offered by a French law of 25th December 1974 to aid the repatriation of migrants; subsequently a number of other schemes have been proposed to accelerate return migration (Dijoul, 1977), and it has been estimated that the migrant population of France could be halved by 1985 (Guardian, 1978a). If this target was attained it would involve the repatriation of nearly 90,000 Tunisians, thus adding to the problems of the Tunisian labour economy.

Recent experience of migration to the Arab world has suggested that this labour market is unlikely to be any more secure than most of Western Europe. The use by Libya of migration as a tool in political disputes with both Egypt and Tunisia has emphasized this instability (Chapter 7).

In spite of the problems which have been experienced in

relation to emigration of workers to France and Libya, the pressure to migrate from Tunisia has remained very high, because of the large numbers of workers who are poorly integrated in the Tunisian labour market and who perceive that they can earn more by seeking foreign employment. In 1978 Tunisia appeared to be on the crest of a new emigration wave to Libya and other Arab countries. Lamentably Tunisia has not formulated distinct migration policies to increase the benefits which could accrue from short-term labour export, or to reduce the disruptive effects of massive migrant departures on the regional economies and societies most affected by emigration.

Short-term and Long-term Migration

Distinction has already been made between short and long-term migration (Chapter 7). A review of the literature indicates that there may be some benefits to be experienced from the export of labour in the short term, but that in the longer term emigration may have detrimental effects on the exporting country (Amersfoort, 1978, Böhning, 1978, Saasen-Koob, 1978, Wilson, 1976). In the short term Tunisia might therefore gain through its labour exports because of the temporary relief which this offers to the domestic labour market, because of the income derived from migrant remittances and because of the possibility that some migrants may acquire useful skills during their stay abroad. In the longer term the departure of labour involves the loss of a factor of production and may result in increasing dependence by Tunisia on foreign labour markets as a source of employment for part of its labour force and as the dominant employer and source of income for the regions of

heaviest emigration

Certain of the characteristics of migration which change through time have already been analysed (Chapter 7). For example, it has been shown that family migration has grown more important relative to worker migration, reflecting the increasing permanence of migrant insertion in France (Table 7.8). Simon (1977, 78) has also shown that the number of children born to Tunisian migrants resident in France has increased steadily during the 1970s.

Despite the increasing permanence of installation of many migrants in France, the overall level of remittances has continued to rise (Table 11.5). The per capita returns to Tunisia have however only risen sufficiently to keep pace with inflation (Table 11.6), and it seems probable that the per capita level of remittances may fall in the future because of the larger number of Tunisian families now settled in France and the declining activity rates of the migrant community. Some of the probable advantages and disadvantages of short and long-term migration are summarized in Figure 11.1. It can be seen that a dual transition occurs. Longer term migration results in fewer benefits for the exporting country and greater dependence on foreign employment opportunities as a source of revenue. For the host nation more permanent settlement of migrants adds to the costs of housing, servicing and educating the migrant population.

In view of the unfortunate experience of emigration to Europe, it is surprising that Tunisia has not formulated a distinct migration strategy to discourage all tendencies for the new migration wave to Arab countries from becoming a long-term development. Short-term migration, although not entirely desirable,

has a less disruptive effect on the fabric of the exporting economy and involves less serious political and economic dependence of the labour exporting country on the host nation. Short-term migration strategies necessitate that very active programmes be undertaken to promote employment provision within the domestic labour market, to discourage the emergence of trends towards longer term population export, and to offer viable opportunities for migrant re-insertion in attractive forms of remunerative employment.

Short-term Policy Measures for International Migration

Whilst the more developed countries have evolved highly complex immigration policies, labour exporting countries have seldom formulated emigration strategies. This imbalance reflects the tendency for human resources to be undervalued by the less developed countries. A number of strategies could be followed to augment the benefits of short-term migration to labour 'sellers' in international labour markets. These include policies increasing the value and productivity of migrant remittances, policies promoting the cartelization of labour suppliers, schemes for the payment of compensation by immigrant receiving countries, and methods of organizing workers into production units prior to their departure for foreign employment.

Tunisia should explore methods of increasing the value of migrant remittances. Experience of other African nations might usefully be considered in this context. Several of the countries exporting labour to South Africa have required their workers to return a fixed portion of their income. In Malawi, for example,

Table 11 5. Remittances from Tunisian Migrants

	Total earnings (Million Dinars)	Remittances as % of Tunisian Balance of Payments Current Account
1972	29.6	9 46
1973	41.3	11 66
1974	51 7	8 34
1975	58.2	9.45
1976	61 4	9 66
1977	72 3	9.47

Source calculated from

- a) Banque Centrale de Tunisie (1977, 64)
- b) Banque Centrale de Tunisie (1978, 111)

Table 11 6 Index of Growth of Remittances per Caput
from Migrants in France

	1972	1973	1974	1975
Remittances per caput	100 0	109.1	106.3	120.7
Cost of living index, Tunis	100 0	104 7	109.0	119.4

Calculated from statistics provided
by Simon (1977, 103) and Banque
Centrale de Tunisie (1977, 45)

migrant workers have been forced to send home 60% of their income as deferred pay, and a further portion as family remittances (Wilson, 1976, 40) In 1973 Morocco introduced special banking services for its workers in France, a measure which increased both the net income from remittances and the amount returned per capita (Findlay et al , 1979b) In 1978 Morocco further encouraged migrants to remit their income by offering preferential exchange rates to their workers abroad (Anon , 1979) Similar schemes could be implemented by Tunisia

More important than the net contribution to the national balance of payments derived from remittances, are the economic benefits which might accrue from the injection of this capital into the economy Regrettably remittances have become notorious as a means of increasing consumer expenditure, rather than as a catalyst to productive investment The beneficial impact of remittances could be greatly increased by the establishment of a system of investment incentives In Tunisia elements of such a scheme have already taken shape Workers importing capital equipment for the establishment of private enterprises, receive import duty concessions The A P I (Agence de Promotion des Investissements) has instituted a special department to promote investment in small firms by return migrants As a result of this programme a workers' company to produce cement sacks was set up in Gabes This type of industrial scheme has unfortunately proved to be the exception rather than the rule The Gabes scheme remains an indicator of the potential which could be realized from migrant remittances if a comprehensive investment scheme was encouraged Machinery

import might be actively encouraged rather than passively permitted and cooperation between government departments might be increased to facilitate access to investment assistance for migrant projects (Koelstra and Tieleman, 1977, 168). Perhaps the greatest difficulty encountered by return migrants is to coordinate their highly specific experience of employment in Western Europe with that of other migrants who have complementary skills, in such a way as to be able to productively use the limited skills which they have acquired. Investment schemes linked to projects which could draw complementary migrant skills into new firms would yield highly beneficial results both for the individuals involved and for the nation as a whole.

The idea of a supplier cartel has been discussed by several migration researchers, but never implemented by a labour-exporting country (Economic Commission for Africa, 1978; Bohning, 1978). To be effective a cartel would need to contribute a sufficiently high percentage of the migrant workers to an importing country for the threat of migrant withdrawal to carry weight and for the demands of the cartel to receive serious consideration. In Europe, Tunisians, even when considered in association with other Maghreb workers, were never a dominant migrant group, and it is doubtful whether they could ever have operated effectively as a cartel. In the Arab world Maghreb workers also remain a tiny minority in the countries of the Arabian Peninsula, although they could in the future combine to form a cartel with other labour exporters such as the Yemen Arab Republic, Jordan and Egypt (Birks and Sinclair, 1977). The unfortunate experiences of Tunisia and Egypt with respect to

the Libyan labour market, would suggest that the formation of a cartel could prove advantageous, introducing greater economic stability to the market and also extorting higher economic returns for labour export to Libya. Although Libya recruits other foreign workers and plans to import a substantial contingent from Turkey, Tunisians and Egyptians still constituted 81.9% of the foreign labour force at the end of 1975 (Birks and Sinclair, 1979). To a large extent Tunisia and Egypt share common interests as regards manpower policies and their workers have complementary rather than competitive skills. Egyptians and Tunisians are particularly well qualified for employment in Libya from their experience of working in similar environments and because of their common language characteristics. Libya would therefore find it difficult to substitute either the quantity or quality of the Egyptian and Tunisian immigrants.

A modified version of the supplier cartel would be the establishment of a commonly agreed policy by all labour exporting countries, concerning wage levels, trade union rights and migrant working and living conditions. The concept of a joint policy would eliminate differential treatment of workers from different nations, and the undercutting of one country by another in the signing of bilateral treaties.

At the World Employment Conference in 1976 the Jordanian government raised the issue of compensation payments for migrant labour. This call arises from the recognition of the value of human resources as a factor of production, and the consequent loss of production opportunities foregone by a labour exporting nation. Some labour exporting countries have already adopted a system of

recruitment fees, whereby the country seeking extra workers reimburses the source nation for every worker recruited (Wilson, 1976)

A system of annual compensation payments has also been proposed. Formulae for assessing the appropriate level of repayment remain tentative (Bohning, 1977). Compensation could be paid on a per capita basis or according to the skill levels of the immigrant workers. Alternatively repayment could be made as a percentage of the total income of the migrant group. For example, a 2% levy on the wages of migrants in Libya would have raised approximately 1.8 million Dinars in 1975. This estimate is based on the assumption that there were 50,000 Tunisians working in Libya at this date, earning on average 150 Tunisian Dinars per month.

Whilst it is easy to hypothesize about policy formulations which might prove advantageous to labour exporting countries, the applicability of these policies remains a function of the efficacy of state control over emigration. Policies which result in the growth of clandestine migration must be avoided, since illegal migrants are open to considerable exploitation by employers in foreign countries, and because of their status they are unable to remit their earnings through official channels.

A positive rather than prohibitive approach to controlled migration is required. Greater care in the selection of migrants by region of origin and skill level would be possible in Tunisia via the services of the O T T F E F P. The lag of rural areas of western Tunisia behind the urban areas of the eastern littoral in the adoption of migration opportunities (Chapter 8) could be

compensated by an intentional bias in the spatial allocation of migration contracts. The O T T E E F P could encourage a more even dispersion of emigration opportunities during the advance and ebb of each migration wave. Likewise the O T T E E F P could monitor in greater detail the occupational status of candidates for emigration from each region, insuring that the operation of key services and professions is not threatened by the departure of too many personnel from any particular sector. Bohning (1978, 13) has suggested that great care should be taken where more than 4% of the actively employed workers in any one of the eight major I S C O (International Standard Classification of Occupations) groups desire to migrate (I L O , 1968). This rule of thumb might as readily be applied at the regional as at the national level.

Perhaps one of the most positive approaches to the organization of the migrant labour force would be to establish firms of workers within the exporting nation which could undertake limited term contract work abroad. This would increase the returns to the labour exporting nation rather than internalize entrepreneurial profits in foreign firms. Already South Korea and Pakistan have organized firms of this type often using advanced technology which have undertaken construction projects and port clearance in Saudi Arabia. A similar strategy could be followed by the Tunisian government to glean higher returns from the work carried out by some of the skilled and semi-skilled workers from the country.

Since substantial labour surpluses seem inevitable during the next decade, Tunisia has the choice in the short term of permitting continued labour export to unreliable foreign markets, or of vainly

attempting to restrict emigration to foreign countries. The former option seems politically more tenable but might, in the absence of distinct migration policies, involve subjugating the country to the whims of its richer Arab neighbours. A strategy should be developed by the Tunisian government to maximize the benefits which might accrue from continued involvement in foreign labour markets.

Internal Migration: Some Policy Problems

It might initially seem surprising that the formulation of a strategy for internal migration should be more difficult than policy making concerning international movements, in view of the fact that legislation for control of internal movement is the prerogative of only one nation, rather than of several. Experience, however, attests that both the goals and policy tools associated with internal migration strategies are harder to define, than in the case of international migration policies.

Policies relating to the internal movement of human resources have not only to resolve whether factor relocation via labour migration is beneficial to the nation, but also to whom the costs and benefits of the movement should accrue. There is the danger

even in circumstances where policies consider the interests of individual migrants, rather than merely the desires of the politically powerful, that they ignore the plight of the less mobile members of society. While the migrant community may gain from their action by relocating themselves in regions of greater opportunity, the immobile may have to bear the costs of social and economic disruption in the society of departure.

The motivation underlying internal migration policies must be examined, prior to recommending policy tools appropriate to the Tunisian experience. Frequently spatial imbalances have been shown to be maintained in the interests of the national core over the periphery (Chenery et al., 1974, 48). Only in times of social unrest have some governments become concerned about the 'regional problem', and in particular its manifestation in the core cities by the presence of large numbers of rural migrants. Migration measures introduced during times of unrest have tended to be restrictive and have been framed in such a way as to protect the governing powers from the physical and political threat of large minority groups. Consider, for example, recent statements on internal migration made by political leaders in Algeria and Iran (Boumedienne, 1978, Guardian, 1979). While some migration policies, like other forms of government legislation, undoubtedly serve the interests of the politically powerful, it would be incorrect to assert, as do Lewis and Melville (1978), that this is the only motivation underlying policy formulation.

In a different light, those concerned to reduce regional inequalities view migration, not as a threat to the core, but as a critical loss of manpower to the regions of out-migration. Migration may therefore be viewed as an unfortunate response to the denial of opportunities in peripheral regions. From this view arise a number of different policy tools. The contention that

"discrimination can no more be accepted on a regional basis than it can on a social, racial or religious basis"

(McCrone, 1969, 13)

gives a clear basis for developing regional policies which

incorporate measures explicitly dealing with the migration phenomenon

Pryor (1975, 1978b) and Findley (1977) have shown from a wide range of case studies that out-migration is generally inconducive to regional economic growth, while in-migration may be a major stimulant of development. Lang Li (1976), for example, has suggested that a policy encouraging in-migration played a major role in the development of certain 'backward' regions of Taiwan, while Todaro (1969) has correlated out-migration with the declining output of rural areas. The counter-argument that out-migration should be encouraged from the less favoured rural areas since it

"enables the peasantry to overcome the imperfections of the rural credit market by creating opportunities to amass finance capital in the cities for subsequent investment in agriculture" (Griffin, 1976, 359)

has little or no empirical backing. On the contrary, Odumuko and Piddell (1979), from a rigorous analysis of the effects of remittances on rural households in south-eastern Nigeria, indicate that migrant earnings have a "perverse effect" on rural society, encouraging further out-migration in the long term.

Griffin's argument does point, however, to the futility of discouraging out-migration from a region in the absence of a positive strategy to integrate labour surpluses within the local economy. To quote Klaasen and Drewe (1973, 114),

"there can be no specific migration policy target independent of the objectives of a much more general labour market policy "

In summary, the fundamental argument justifying state intervention arises from the belief that central government is better placed than the individual to protect the national interests of both present and future generations, and that to do this effectively a national migration strategy should be embedded within a broader policy for balanced regional development. Migration should be discouraged where its continuance presents a significant threat to the long-term economic and social welfare of peripheral and core regions. The legitimization of intervention should be tempered by the principle that the first goal of migration policy should always be to help 'people', and only through them to help the 'regions' in which they live (Klaassen and Dreese, 1973, 19). People matter more than regions.

Tunisian Government Policies on Internal Migration

Tunisian government intervention in internal migration has emerged in a number of formats and with disparate motivations. Methods of implementing policies intended to directly influence migration have largely been restrictive in character, apparently pursuing the goal of preserving political stability. In contrast, a few strategies have been formulated to reduce regional inequalities, which, in word at least, should have led to a certain decentralization of employment opportunities. These, and a number of other policies, have indirectly, and probably unconsciously, affected migration patterns.

The Tunisian government has long been aware of the urban problems arising from in-migration to Tunis. During the colonial era, the French army was known to establish two defence rings round

the city to prevent displaced nomads from the steppelands from entering the capital and attempting to settle there (Clarke, 1956) More recently 'Centres d'Accueil et d'Orientation' (Centres for the redirection of migrants) were established, whose explicit function was to redirect the less successful migrants away from the cities and back to their regions of origin. Centres were set up in other cities such as the one in Kairouan, which handled between one fifth and one quarter of the rural migrants entering the holy city between 1968 and 1973 (Trabelsi, 1976)

Further forceful intervention in the Tunisian migration system followed the riots of January 1978. Politicians openly admitted that unemployed persons who had moved to the cities from rural areas would be sent back home. The creation of an army of compulsory labourers to be employed temporarily in regional development projects, was seen as a

"means of removing the jobless from the city streets, thus depriving militants of an opportunity to stir further unrest"
(Hill, 1978)

In spite of these examples, it should be noted that Tunisia has had very few restrictive policies concerning migration in comparison with Tanzania or the countries of Eastern Europe (Riddell, 1978, Fuchs and Demko, 1977). All existing evidence suggests that forceful intervention in the internal migration process is extremely difficult and costly to implement. It is impractical to enforce such policies and interference in patterns of personal mobility may also have undesirable political repercussions.

Unplanned Intervention

It is valuable to consider the incidental impact on migration of other Tunisian legislation and planning policies. Strategies such as the encouragement of tourist complexes along the eastern littoral have not been instituted with reference to specific migration goals, yet their impact on migration has been considerable.

The probable influences of a number of government initiated programmes are proposed in Table 11.7. The likely impact of measures influencing patterns of job creation in the non-agricultural sectors of the economy have already been discussed in Chapter 10. The current investment programme of the Fifth Plan indicates that the government intends to promote the non-agricultural sectors of the economy, and in particular the manufacturing sector (Table 11.8). Although agriculture was the dominant sector of employment throughout most of Tunisia in 1975, being the source of livelihood for 43.1% of the actively employed, it was allocated only 500 million Dinars by the Fifth Plan. By contrast, official statistics suggest that manufacturing industry employed 16.7% of the active population in 1975, yet it received 950 million Dinars. The encouragement of the industrial sector relative to the agricultural does not in itself necessitate massive spatial relocation of population, provided investments are equitably distributed between regions. Past experience has shown, however, that this seldom happens, despite policy statements to the contrary (Min du Plan, 1977a, 35). It seems highly probable that the north and east of Tunisia will continue to receive a disproportionate share of national investment in industry. The emphasis given to industrial growth in the current plan, via its

Table 11 7 Policies and Programmes indirectly influencing Migration

Policies (and related institutions)	Impact
1 Improvement of Urban Fabric (Société Immobilière de Tunisie Fonds National d'Aménagement de l'Habitat)	Encourages migration to the largest cities
2. Improvement of Urban Services (Office National d'Assainisse- ment, and others)	Encourages migration to the largest cities
3 Improvement of National Infrastructure (Min. de Travaux Publics)	Encourages migration mainly towards north-eastern Tunisia
4 'Open Door' Industrial Investment (Agence de Promotion des Investissements)	Encourages migration mainly towards north-eastern Tunisia
5 Tourist Developments (Office National de Tourisme)	Encourages migration to the eastern littoral
6 Manpower Training and Employment Agencies (Office des Travailleurs Tunisiens à l'Etranger, de l'Emploi et de la Formation Professionnelle)	Encourages migration to foreign labour markets, and facilitates migration towards the north-east
7 Centralization of Decision Making	Encourages migration to Tunis
8 Placement of Government Employees	Encourages migration to peripheral regions
9. Industrial Decentralisation (Fonds de Promotion et de Décentralisation Industrielle)	Attempts to discourage out- migration
10 Re-afforestation	Encourages short distance moves to new settlements
11 Extension of Irrigation	Discourages out-migration
12 Rural Development Programmes (Programme de Développement Rural)	Attempts to discourage out- migration

Table 11.8. Sectoral Investments of the Fifth Plan (1977-1981)

Sector	Million Dinars	%
Agriculture	500 0	12 0
Mines	130 0	3.0
Energy	732 0	17 4
Water	173 0	4 1
Manufacturing Industries	950 0	22 6
Building and public works	50 0	1.2
Transport	570 0	13.6
Housing	600 0	14 3
Tourism	95 0	2.3
Services	24 0	0.5
Infrastructure	376.0	9 0
Total	4200 0	100.0

(Source Min du Plan, 1977a, 79)

direct implications for regional investment, is consequently expected to encourage still further migration from the interior of the country towards Tunis and Sousse

Spatial imbalance in national investment in service and infrastructure provision also favours migration to the cities of Tunis and Sousse over all other destinations including the majority of provincial cities. In Chapter 2 it has already been demonstrated that the interior governorates and the north-west of Tunisia are poorly provisioned in terms both of public services such as education and health as well as in socio-economic facilities such as banks, hotels and cinemas. The investment imbalance was shown clearly in Figure 2.8 which attempted to map the spatial availability per caput of services and infrastructure.

The effect of rural development programmes on population mobility is extremely hard to assess. The current Tunisian rural development projects were launched at the beginning of the Fourth Plan (1973-76) with the aim of undertaking "toute une gamme d'activités susceptibles de mettre fin à l'exode rural vers la ville" (Koelstra and Tieleman, 1977, 221). Unfortunately there has been little effort made to coordinate the different branches of the rural projects. For example, labour training schemes have not been linked with the plans for employment creation in rural areas. Thus, many workers have found it difficult under the scheme to use their skills at the local or even regional level, and have departed to find employment in the larger cities. Programmes such as the construction of new houses in rural areas, introduction of piped water, electrification schemes and improved communications have undoubtedly raised the standard of living of many agricultural

communities, but they have not provided the security of income necessary for the population to enjoy the long-term benefits of these changes. Raising rural incomes and providing more stable means of earning a living would appear to be a prerequisite to the long-term success of any further attempts to stem the rural exodus of population. Some researchers (Koelstra, 1978, 56) believe that this may be achieved by encouraging small private enterprises in rural areas.

It is impossible to assess the precise quantitative impact on migration of all government projects and policies. On balance it appears that the influence of current Tunisian policies has been to accentuate rather than to moderate trends towards further population concentration in the north-east of the country. A strategy which could resolve at least some of the conflicting influences on migration of government legislation would be a major step towards migration planning and might in some instances obviate the need for further state intervention in the migration system.

Towards a Spatial Policy for Migration Planning

The planning policies employed by the Tunisian government at the present time are inadequate and inappropriate to deal with the problems created by migration. They are inconsistent in their effect on migration and do not have the correct spatial bias, increasing rather than reducing the problems of spatial imbalance. It becomes pertinent to demand what type of policy would be appropriate to the Tunisian case and whether this type of approach would contain more general applications. It is suggested that a spatial policy for migration planning should be employed.

Three types of mobility are involved - spatial mobility, social mobility, occupational mobility (see Chapter 9). Any attempt to influence spatial mobility must equally consider the other two aspects of mobility. Two approaches to changing patterns of spatial mobility may be considered. Firstly there are short-term policies aimed at reducing the hardships caused by population redistribution. Ameliorative policies treat the symptoms arising from migration rather than adopting measures to encourage new and more satisfactory migration patterns. Secondly there are policies which may take a longer time to implement, but which would by their innovative nature have a more lasting effect.

Slowing population drift

Since one of the major factors influencing population redistribution is regional inequality in income, any policy measures reducing these inequalities will also tend to reduce the incentive to migrate. Table 11.9 indicates that the regional distribution of income and expenditures was highly uneven in Tunisia in 1975. The median expenditure of Tunis households was almost three times that of households in the north-west. 38% of households in the north-west and 26% of those in the south spent less than 60 dinars per year while only 2.1% claimed to be as poor as this in Tunisia.

Riddell (1978) has suggested that regional inequalities could be reduced by adopting a regionally differentiated taxation system. In Tunisia, the north-west, the steppelands and the south could be taxed less heavily than the rest of the country. Given the current bias in government expenditure (Figure 2.8) in favour of the north-east and Sahel of Sousse, it would appear quite

Table 11.9. Distribution of Expenditure by Regions (Dinars)

Per Annum	Households					Per capita			
	Tunis	North West	North East	Centre	South	Tunis	North West	Centre	South
Average annual Expenditure	1458	816	599	865	697	260	136	143	117
Median Expenditure	225	117	77	119	96	180	104	109	92
Local Expenditure	80-100	60-80	30-60	60-80	60-80	80-100	60-80	60-80	60-80
Percentage with expenditure less than 60 Dinars per year	2.1	15.3	33.0	18.5	26.0	2.5	18.7	21.3	27.3

Regions
 Tunis Tunis north.
 North West Zaghouan, Mabeul, Bizerte
 North West Beja, Jendouba, Le Kef, Siliana.
 Centre Sousse, Monastir, Mahdia, Kairouan and Kasserine.
 South Sfax, Gafsa, Medenine, Gabes and Sidi Bou Zid.

(Source I.M.S., 1978, 130)

legitimate that these regions should pay higher taxes than the rest of the country

A second approach to reducing regional inequalities would be to boost rural standards of living. The potential of rural development projects for slowing out-migration would be considerable if they could effectively raise rural incomes and reduce the instability of systems of agricultural production. Rural employment programmes, if intended to have the maximum impact on reducing out-migration, should be geared specifically to the needs of the most mobile members of society, rather than to all inhabitants of rural areas. Development schemes in peripheral areas should therefore be oriented towards the male population in the age band 15-25 years. This group is not only the most likely to migrate (Tarifa, 1978, 29), but also is the section of the population most critical to the future welfare of regional economies and societies. Their out-migration will cause the greatest disruption in the area of departure, and will probably be followed by the out-movement of their dependents (wives, children, parents and aged relatives)

In Tunisia the P D R (Programme de développement et d'animation rurale) has recently adopted incentives to induce the integration of young people into the rural economy. These measures have only involved a very small grant allocation to encourage apprentices in different semi-skilled jobs to establish themselves in local businesses. As Koelstra (1978, 80) has wryly remarked with reference to this problem of establishing youth in small enterprises in the peripheral regions of Tunisia

"ce n'est pas une boîte à outils qui puisse assurer à elle seule l'insertion (des jeunes) dans les activités de production "

The chief problem remains the aspirations of young persons to work in the large cities rather than in their village of origin. While the per capita value of P D R grants (currently set at a maximum of 250 dinars) should be greatly increased, of greater importance in increasing the attractiveness of rural environments to young persons would be the continued improvement of rural infrastructure and socio-economic facilities, as well as the broadening of personal incentives to remain in the rural environment, such as the provision of improved housing.

A third approach to controlling the rate of migration to the metropolis would be the regulation of job recruitment in the large scale 'modern' sector of the economy (Gugler, 1976). At present a 'queuing system' appears to operate whereby migrants move to the largest cities, work in the so-called 'informal' or small scale sector, while looking for more permanent employment in the regulated sector. Migration to the city has become the first step in the job search procedure. In short, spatial mobility has become the key to occupational and social mobility in the eyes of many migrants. Hay's (1974) survey of migrants in Tunis revealed that 17% did not find any employment in the first month, while 50% had to accept employment initially in the small scale sector. A policy which made jobs available to persons still resident in the towns and villages of north-western Tunisia would discriminate against speculative migration and might reduce the number of unsuccessful migrants forced to subsist for long periods in the small scale sector. The policy of allocating city jobs to potential migrants still living in zones of out-migration seems practical in the Tunisian context because of the well established network of

government employment bureaux across the country. It represents an interesting form of intervention capable of modifying some aspects of the Tunisian migration system.

Two other policies should be mentioned which could have a long-term impact on the rate of population drift in Tunisia. The first is birth control policy. Family planning has been encouraged by the Tunisian authorities for almost two decades, and the fourth national plan specifically charged the Office of Family Planning with the task of reducing births by some 95,000 between 1973 and 1976. The bureau had the remarkable success of increasing the number of married women protected by different contraceptive measures from 8.5% of the total in 1973 to 17.5% in 1976 (Anon, 1978, 32). However acceptance of birth control measures has been regionally imbalanced, urban zones being more receptive to family planning measures than rural areas (Taamallah, 1978). Diffusion of birth control measures to the populations of north-western and central Tunisia could serve to reduce the future supply of labour in these areas, and consequently reduce in the long term the imbalance between regional labour supply and demand.

The second realm of policy making which may be identified as having long-term significance is education. It is ironic that not only are peripheral regions of Tunisia poorly provisioned with secondary school establishments (Tarifa, 1971), but that the correction of this imbalance might also stimulate further out-migration. The character of the current education system, especially at more advanced grades, tends to raise the aspirations of the youthful population to live and participate in the urban economy. A recent survey of first time job seekers has shown

that only 3% of those interviewed would choose agriculture as a profession (La Presse, 1977), reflecting the widespread desire of the young to leave the land, and to become involved in the urban milieu. Schools need to inculcate the essential values of rural society and to teach skills appropriate to labour market requirements, as well as fulfilling the wider objectives set by most education systems. At present few potential migrants would perceive new employment opportunities in the agricultural sector as a sufficient incentive to move. There is, however, good reason to believe that rural-rural migration might facilitate the improvement of individual opportunities within the agricultural environment, just as inter-urban migration might be expected to hold advantages for some people with urban skills. Lavless (1976) has suggested that migration from over-populated mountainous zones such as the Tell, to more favoured regions of intensive agriculture, might provide a viable alternative to rural-urban drift. This interesting strategy remains inoperable as long as the aspirations of potential migrants are urban inspired.

Spatial reorientation of migration flows

Modification of migration processes must be based on detailed analysis of regional migration movements (Chapters 4 and 5) since the causes of population redistribution lie deeply embedded in the spatio-economic development of the Tunisian regions. The policies proposed so far have only indicated measures which might slow rates of out-movement from rural areas rather than attempting to re-organize the spatial dimensions of the migration system.

Given that a large part of the Tunisian population desire to

live in cities, and trends worldwide suggest that this is the likely fate of most of mankind (Abu Lughod, 1973), it would appear that one strategy which could realistically be adopted to modify patterns of migration, would be to seek to increase the attraction of some urban nodes at the expense of others with the intention of drawing migrants away from the cities already overburdened with new arrivals

Imbalance in the spatial distribution of large centres is one of the fundamental causes of inter-regional population redistribution in Tunisia. It is proposed that the policies most likely to achieve success are those which accept existing trends towards increased population concentration in the higher levels of the Tunisian settlement hierarchy, and which attempt the very major task of changing the hierarchy itself, rather than merely modifying the migration system in isolation from other factors. Effective intervention in the settlement system could occur at two levels in the hierarchy. Firstly, the largest regional centres in the north-west, the steppelands and the south could be strengthened. By increasing the intervening opportunities accessible to potential migrants, some out-migration to Tunis from these regions might be redirected to urban nodes at a lower level in the hierarchy. Secondly, a policy might be pursued to modify the nature of growth of the primate settlement of the system.

The development of provincial towns in north-western and central Tunisia has been stunted, largely because their potential functions as industrial nodes and centres of decision making have never had the opportunity to grow. Under colonial rule and even following independence the only major role given to these towns

was as market centres. For example, Beja, which had a population of 41,000 in 1975, was the largest town in the north-west, yet its only significant manufacturing employment was provided by a small sugar factory. As a consequence of the very limited interest taken in the potential of regional centres as nodes of non-agricultural employment and as centres offering high order services to surrounding villages, provincial towns have become a springboard to regional out-migration, instead of acting as catalysts to regional development.

Out-migration from rural areas and from small and medium sized towns could be channelled towards pre-selected regional cities. Within each region of out-migration, the growth of no more than one or two cities should be encouraged in order that sufficient resources may be invested in these nodes to raise their urban status to the high levels aspired to by most migrants. As has already been demonstrated from analysis of census material (Chapter 6), it is increasingly the residents of small towns who are departing to live in Tunis. It is these persons, as well as rural migrants, who must be attracted to settle in regional cities rather than migrating to Tunis.

Selective intervention in the Tunisian settlement system is most urgently required in the north-western region. By raising the status of one of the towns of the Tell to that of a city, through the concentration of new employment opportunities and service functions, the scale of population movements might be modified from inter-regional to intra-regional migration. Choice of such a town should of course be based on analysis of existing migration trends in order that the maximum impact may be achieved.

through intervention in the migration system. For example, sink-source analysis (Chapter 4) has shown in the Tunisian context that the regional centre of Beja would be the most appropriate node within the settlement system of the Mell at which to encourage spatial intervention. Both rural-urban and urban-urban migration would persist at the intra-regional level towards a centre such as Beja, but imbalances in the distribution of human resources between regions would be reduced.

The costs of establishing viable urban centres in the interior of Tunisia, which could act as counter-attractions to Tunis to local migrants, are extremely great, and the success of such a project would depend entirely on the determination of the Tunisian government to enforce a settlement strategy which involved not only the deconcentration of population from the north-east, but more important the active decentralization of employment and decision making. The costs might be great, but the rewards of such a policy would also be considerable if they achieved a more equitable spatial distribution of the benefits of development.

An alternative strategy which might be adopted, would be to encourage linear urbanization within the existing zone of attraction in the north-east (Abu Lug'od, 1973). This policy would attempt to reduce the congestion of both physical and human resources caused by continued in-migration to the Tunis metropolis. Linear urbanization on the axis between Tunis and Bizerte would serve as an intervening opportunity to migrants from the north-west originally destined for Tunis or the settlements of the eastern littoral.

The absence of a coordinated migration policy in Tunisia is a

policy in itself, and one which in the future may be shown to have had very unfortunate results. Intervention in the spatial organization of the Tunisian settlement system at either or both of the levels proposed would constitute a positive long-term migration strategy and would help to reduce the wide regional inequalities which currently exist in the country.

Summary

A number of the social and economic problems of international and internal migration have been studied. In both instances difficulties in policy formulation arise, because of differences between the interests of individual migrants and those of regional populations or the nation as a whole.

While it is doubtful whether international emigration from Tunisia is either possible or desirable in the long term, the redistribution of population within Tunisia seems virtually inevitable. Different solutions to migration issues are consequently required for the different scales at which mobility occurs, despite the similarities in the processes involved.

Short-term strategies to optimize the returns from international migration should be adopted. Simultaneously Tunisia should continue to pursue a longer term manpower policy which aspires to fruitfully deploy the nation's labour resources within the domestic labour market.

The absence of a clearly specified target for the internal distribution of population is a major shortcoming of Tunisian national planning. Not surprisingly, existing development programmes have had conflicting influences on patterns of internal

migration. A number of ameliorative measures have been discussed which might reduce the volume of internal population redistribution. Failure of such measures in other countries has often occurred because they have been applied unselectively, not being designed specifically to influence the persons most prone to migrate. The fundamental difficulty in slowing out-migration from towns and villages in peripheral areas remains the aspirations of many of the populace to live and work in large cities and to participate in the urban milieu. It is proposed that no minor fiscal incentives or regulatory mechanisms can make a lasting effect on the value systems of the population of potential migrants, and that the pressure to migrate towards the cosmopolitan environments of large cities will continue to escalate. Whether governments in Tunisia and in other developing countries consider onerous tasks such as the restructuring of their settlement systems to be problems worthy of their attention is a decision which only they can take. Measures of lesser magnitude cannot be expected to have any serious long-term influence on the spatial organization of a nation's ultimate resource - its population. Only measures capable of modifying either migrant aspirations or the spatial availability of opportunities for occupational and social mobility can hope to have any lasting impact on migration trends.

SECTION 5

Chapter 12

SUMMARY and CONCLUSIONS

Introduction

"As for knowledge, it will pass away For our knowledge is imperfect Now I know in part, then I shall understand fully, even as I have been fully understood "

I Corinthians 13, v 8, 9, 12

One of the curious consequences of academic labour is that by attempting to extend the boundaries of the island of human knowledge the research worker increases not only the area in which potential understanding has been achieved by the human mind, but he also increases human awareness of the length of the boundaries of man's ignorance New understanding leads to new questions which remind the research worker that his knowledge is still imperfect and only partial The end-product of research must therefore be two-fold firstly the deeper understanding of previously recognized problems, and secondly the identification of unanswered questions which merit further attention In this concluding chapter it is therefore appropriate to synthesize a few of the results and important themes to emerge from the author's research, and briefly to identify the questions which remain unanswered by this study of Tunisian migration patterns.

Trends in Internal Migration

Patterns of spatial organization during the colonial era, and policies for development since political independence have accentuated rather than reduced spatial inequalities in Tunisia. Migration movements have responded to these regional differences, resulting in the net redistribution of population from the interior regions of the country towards the coasts, and from the south and west towards the north and east (Chapter 3)

Inter-regional migration reached a peak in the first decade after independence and has declined slightly since then (Chapter 6). At the same time the character of population movements has become more complex. Migration between urban areas has grown to exceed the volume of rural-urban migration, and the dominance of Tunis within the Tunisian migration system has been reduced, while other urban centres such as Sousse and Monastir have grown in importance as nodes of in-migration.

Analysis of the Tunisian censuses of 1966 and 1975 has shown that high levels of out-migration have not been experienced from all the rural areas of western and southern Tunisia, nor has in-migration been significant in all the urban settlements of the eastern littoral. To generalize about patterns of Tunisian migration in terms of rural-urban population drift would, therefore, be to misconstrue the true nature of the migration system, and would be to simplify significant spatial variations in migration in an inappropriate and non-spatial framework.

Analysis of the spatial linkages in the Tunisian migration system has indicated that changes have occurred in the intensity

of population movements in space. For example, interaction between the governorates of Sousse, Nabeul and Kairouan grew in importance between 1966 and 1975. While the spatial dimensions of migration between these three governorates became more structured through time, the intensity of migration linkages between the governorates of Beja and Jendouba became weaker indicating a decline in the significance of migration as one of the spatial linkages contributing to the inter-meshing of the regional economic systems of the Tell.

Geographical analysis of Tunisian migration exemplifies the need to conceptualize population movements within a spatial system of migration linkages, and not merely to confine migration analysis to the more limited and aspatial form of rural-urban system such as that proposed by Mabogunje (1970). Study of Tunisian migration as a spatial system has necessitated the identification of appropriate techniques for the description of the spatial organization of population movements (Chapters 4 and 5). Similarly, explanation of Tunisian migration has been sought through the examination of relationships between the migration system and other spatial systems such as the distribution of towns and cities and the inter-linked system of regional labour markets (Chapters 9 and 10). The dynamics of the internal migration system have also been found to be closely inter-connected with patterns of international migration.

International Migration

It seems probable that one of the reasons for the decline in internal migration during the last intercensal period was the

availability of opportunities for foreign emigration, notably to France and Libya. The inter-relationship between the two scales of migration appears to have been important not only at the national level, but also at the regional level. Emigration grew very rapidly between 1964 and 1973, so that by the end of 1973 there were 149,000 Tunisians in France and an estimated 45,000 in Libya (Chapter 7). The recession experienced by the West European economies after 1973 led to the introduction of strict controls on the immigration of Tunisians and other North Africans to France. Subsequently, migration to France has been greatly reduced and many migrants have been persuaded to return home.

France and Libya have consistently attracted very different types of Tunisian migrants in terms of their origin, age, marital status, qualifications and skills. Consequently Libya has failed to provide a substitute for employment on the French labour market following the cessation of large-scale emigration to France. It is interesting to speculate that at the present time internal migration may once again grow in importance in those regions most affected by the closure of the French labour market.

Techniques for Identifying Migration Regions

Migration is a relatively ineffective process in redistributing population (Chapter 3). Net migration is only a small fraction of gross migration. Techniques need to be developed which are appropriate to the description and explanation of the entire range of population movements in a migration system, and not merely of net population movement.

One approach to the analysis of all the spatial linkages in a migration system is by the definition of migration regions. In the case of Tunisia it was found that the intensity of migration interaction in certain peripheral areas of the country led to the identification of migration systems which were distinct from those of other parts of the country (Chapter 5). The existence of individual migration regions was explained in terms of variations in local topography, economy and society. Changes in the forces influencing migration between the 1966 and 1975 censuses resulted in slight modifications in the migration regions defined in those years. One of the most interesting questions remaining unanswered is whether with the passage of time Tunisian migration regions will remain distinct or whether the forces which currently mould and channel migration will gradually diminish in importance, until migration patterns cannot be meaningfully disaggregated into regional components.

A number of different approaches to migration region definition were attempted in Chapter 5. Since similar groupings were identified by using entirely different clustering algorithms and by adopting various standardization procedures, it was concluded that the groupings which emerged were inherent in the data sets under study and were not a by-product of the statistical methods being employed. From amongst the range of clustering procedures which were examined, it was demonstrated that the most appropriate techniques for defining migration regions were those which took into account the asymmetric nature of migration matrices. No similar criterion was identified to judge the efficiency of the different approaches to the standardization of migration matrices.

This remains an unsolved problem which the individual migration analyst must resolve in the context of his own research objectives

The Search for an Explanation of Migration Patterns and Processes

Explanation and scale

The search for an explanation of Tunisian migration patterns has formed a major part of this thesis. Meaningful explanation of migration patterns has confronted population geographers with an almost intractable problem involving spatial, historical, economic and social variables. No single monolithic principle can be expected to explain the character of all migration processes in space and time. It was shown in the case of Tunisian migration that the forms of explanation necessary to offer satisfactory insight into the causes of population movements at the micro-scale of analysis (Chapter 10) were different from those deemed appropriate at meso and macro-scales (Chapters 6, 7 and 8). The scale-linkage problem has been ignored by migration analysts in most disciplines other than geography.

The hypothesis of the mobility transition

Zelinsky (1971) has proposed an ambitious model of the evolution of population mobility which attempts to integrate existing understanding of migration at many different scales. His conceptualization of the 'mobility transition' focuses on the processes of change in migration patterns through time and space. If proven valid the hypothesis would provide an explanatory framework within which migration processes could be analysed and

compared

On first examination Zelinsky's hypothesis appears to be an admirable yardstick against which to measure the evolution of Tunisian migration (Chapter 6). Many of the trends in mobility predicted by the hypothesis apparently held true in Tunisia during the intercensal period 1966-75. It was only at the level of international migration that the unilinear and repetitive view of mobility trends taken by Zelinsky was found to offer an entirely inaccurate description of the country's experience. This was not surprising since it is at this level that the interdependence between national economies and between patterns of human and physical resource development was most likely to be apparent. External influences have, however, intervened at many different scales in the Tunisian economy (Chapters 2 and 9), resulting in modification of the mobility status of the population and precluding the possibility of trends in Tunisian migration repeating the same sequence as those followed earlier by West European nations.

In spite of these criticisms, Zelinsky's model remains useful in stimulating thought concerning the processes which introduce order to the development of mobility characteristics. Population geographers should urgently seek to find a more adequate hypothesis concerning the forces governing temporal and spatial change in population mobility. Until they do, Zelinsky's hypothesis is likely to remain of importance as one of a very small number of theoretical models to which the population geographer may make reference in attempting to explain trends in population movements.

Interdependence of spatial, occupational and social mobility

From examination of the forces governing Tunisian migration, it has been suggested that meaningful interpretation of migration patterns can only be achieved by relating spatial population mobility to migrant aspirations for occupational and social mobility (Chapters 9 and 10). Movement to the cities of north-eastern Tunisia, and emigration to Western Europe have permitted migrants to share to a limited extent in the 'modern' urban milieu. Regrettably urban employment opportunities have remained severely limited and have not offered the upward occupational mobility desired by the majority of migrants. Inversely, Tunisian rural development schemes have experienced only partial success in halting out-migration and emigration, since policies to provide industrial employment in the rural environment have in many instances been implemented in isolation from the projects for the provision of 'modern' services and infrastructure.

Explanation of migration patterns cannot therefore be achieved simply in terms of explanatory variables such as 'migration distance', which serve to 'describe' only the spatial manifestation of population mobility. The desire of most migrants for spatial mobility is inseparably connected with their much more deep-rooted desire for the occupational and social mobility which they believe they can achieve by moving to live and work in the largest metropolis of Tunisia.

In the introduction to this thesis it was noted that the geographer's primary contribution to migration studies lay in the description and explanation of migration patterns. In pursuing

this goal in the context of Tunisian migration, the theme of spatial interdependence within the migration system and between migration and other phenomena has been recurrent, highlighting the danger of undertaking analysis of any part of the migration system in total isolation from the broader context of the spatial systems to which it is related. The geographer's experience in investigating the nature of interlocking systems in a spatial context makes him particularly well equipped, therefore, to make a valuable contribution to migration studies.

Migration Planning

The results of geographical analysis of internal and international migration lead directly to specific recommendations for migration planning (Chapter 11). It is perhaps in the realm of migration planning that the culmination of the geographer's skills can best be demonstrated, since in this field it is critical to comprehend not only the direct, but also the indirect consequences of intervention in the migration system. Policy tools must be selected whose influence on the orientation and character of the entire migration system is understood.

Sink-source analysis (Chapter 4) is one example of a technique which may assist in identifying the most critical nodes in a migration system. Spatial intervention at these nodes, in terms of investment and employment, might be expected to achieve the greatest impact not only in altering local migration trends, but also in modifying the character of the associated regional migration system. A variety of possible strategies for planning internal migration have been reviewed in Chapter 11.

From spatial analysis of international migration it is also possible to make important contributions to policy formulation. The regional implications of over-dependence on foreign employment opportunities are even more grave in times of crisis than national reliance on emigration as a solution to problems of labour surplus. It has been shown that during the decade 1965-75 emigration to France became increasingly permanent in character, a trend which was detrimental to the interests of the Tunisian economy, and most particularly to those regions experiencing high levels of emigration to France. Migration policies need to be prepared, which will firstly discourage the repetition of this trend with respect to emigration to Libya and other Arab nations, and which will secondly increase the benefits accruing to the Tunisian economy from the export of its labour resources in the short term.

For too long migration strategies have tended to be purely a product of the personal predilections of manpower planners. This need no longer be so, since it has been shown that detailed spatial analysis of the character of internal and international migration leads directly to the selection of specific policy measures. It is not suggested that any blueprint solutions exist which may be applied to all migration problems, but only that certain principles exist which can guide policy formulation. Analysis of migration patterns and processes must be undertaken within a specific geographic context if appropriate policy tools for spatial intervention in the migration system are to be chosen.

GLOSSARY

- CAIDAT The basic territorial unit employed during the colonial era The caidat was the level at which native administrative decisions were taken concerning local affairs
- CHEIKAT An administrative sub-division of a caidat
- CHOTT Salt lake or marsh.
- CLANDESTINE MIGRATION Migration occurring outwith the official channels laid down by the governments of two countries for the international exchange of population
- COMMUNE Nucleated settlement with the right to enforce Tunisian municipal law
- CONTROLE CIVIL Regional administrative unit defined by the French consisting of several 'caidats'
- DELEGATION The basic territorial unit used for administrative purposes in Tunisia after independence
- DJEBEL Mountain.
- EMIGRATION Departure of population from one country to another on a permanent or semi-permanent basis Defined by the Tunisian authorities as referring to persons departing from Tunisia for a period exceeding three months.
- FORCED MIGRATION Involuntary movement of population on a permanent or semi-permanent basis
- GOURBI Arab hut or temporary dwelling. Commonly used to refer to squatter housing.
- GOURBIVILLE Squatter settlement

- GOUVERNORAT** Administrative unit consisting of several delegations
- GROSS MIGRATION** The total number of in-migrants to and out-migrants from an area
- IMMIGRATION** Population entering one country from another on a permanent or semi-permanent basis
- IN-MIGRATION** Population migration into a predefined area from another area within the same country
- INTERNAL MIGRATION** Permanent change of residence of persons within a country
- INTERNATIONAL MIGRATION** Permanent change of residence of persons moving from one country to another
- MEDINA** Arab word for 'city' Commonly used to refer to the old Arab quarters of present day towns and cities
- MIGRANT** Defined by the Tunisian censuses of 1966 and 1975 as a person whose change of residence had endured at least six months, and who had previously lived in a different delegation or gouvernorat.
- MIGRATION EFFECTIVENESS** Ratio of net migration to gross migration.
- MIGRATION FIELD** Source/destination zone of migrants to/from a given point or area
- MIGRATION FLOW (sometimes STREAM)** A group of migrants with a common origin and destination
- MIGRATION REGION** An area which maximizes intra-regional migration and which minimizes inter-regional migration.
- MIGRATION SYSTEM** A set of interconnected migration flows together with their points of origin and destination.
- MIGRATION ZONE** An area displaying some degree of internal homogeneity with regard to its migration characteristics.

- NET MIGRATION The volume of in-migration to an area minus the volume of out-migration.
- OCCUPATIONAL MOBILITY Movement from one occupation to another.
- OUED River, stream, dry watercourse
- OUT-MIGRATION Population migration out of a predefined area to another area within the same country.
- POPULATION MOBILITY Movement, both temporary and permanent, over an unspecified distance.
- RETURN MIGRATION Migration resulting in the return of migrants to their place of origin
- SAHEL Coast
- SEBKHA Enclosed basin with salt lake
- SOCIAL MOBILITY Movement from one position in society to another.
- SOUK Market, market place.

Appendix 1

LABELLING CONVENTIONS

A number of migration matrices have been published in the Tunisian censuses of 1966 and 1975. Since a variety of these matrices are referred to in the text it is important that the reader is able to check precisely which data set is being discussed. To avoid a lengthy description of each matrix in the text, descriptive labels have been devised by which data sets may be easily identified. Each label defines the scale of analysis of the matrix, the place of migrant origin, the migration interval being considered and the date of the census.

The most frequently used data sets in the thesis are labelled G.PR.U.66, G PR 6.75 and G PB.75. These labels convey the following information

- | | |
|-----------|--|
| G PR U 66 | Inter-gouvernorat migration excluding intra-gouvernorat movements, from the place of previous residence, at an unspecified date, as recorded by the 1966 census. |
| G PR 6.75 | Inter-gouvernorat migration excluding intra-gouvernorat movements, from the place of previous residence, during the six years previous to the 1975 census. |
| G PB.75 | Inter-gouvernorat migration excluding intra-gouvernorat movements, from the migrant's place of birth, as recorded by the 1975 census |

The interpretation of the labels for other data sets may be deduced from the following letter codes

- G Inter-gouvernorat migration excluding intra-gouvernorat movements
- GI Inter-gouvernorat migration including intra-gouvernorat movements.
- D Inter-delegation migration excluding intra-gouvernorat movements.
- PR Movements from place of previous residence.
- PB Movements from place of birth.
- 4 Migration during the four years prior to the census
- n Migration during the 'n' years prior to the census, where the value of 'n' is specified in the label and lies in the range 1 to 10.
- U Migration during an unspecified period prior to the census
- 66 The Tunisian population census of 1966 (I N.S., 1966).
- 75 The Tunisian population census of 1975 (I N.S , 1975b).

The sequence of letter and number codes in the data matrix labels is consistent with the ordering of the codes listed above. The definition of 'migrant' adopted by the Tunisian census is given in the glossary to this thesis.

Appendix 2

INDEX OF REGIONAL INFRASTRUCTURE AND SERVICES

The index of regional infrastructure and services (I R I S) was calculated for each delegation from the formula

$$\text{I R. I S} = \frac{(\text{Ipr} + \text{Ipu}) \times 10^6}{\text{Pop. '71}}$$

where Ipr = privately owned services or infrastructure (1971), including private health, entertainment, accommodation, legal bank wholesaling and insurance services (D A T , 1973b, 174)

Ipu = public infrastructure and service provision in 1971 including health, education, administration, electricity, water and postal services (D A T. , 1973b, 172)

Pop. '71 = delegation population in 1971.

Neither Ipr nor Ipu include a measure of general commercial retailing activity Ipr and Ipu have been calculated by weighting the importance of different services and infrastructure provision For example, a secondary school was weighted with 18 points, an agricultural college with 16 points and a professional training centre with 11 points. A complete listing of the weightings given to each function is listed at the end of this appendix The value of the weightings and the distribution of service functions have been derived from spatial data matrices prepared by the Direction l'Aménagement du Territoire (D A T , 1973b, 172 and 174) The total values of Ipr and Ipu for each delegation were calculated by summing the number of points attributed to each area on the basis

of its provision of services and infrastructure. Scores were divided by the population size of each delegation to obtain an approximate measure of service provision per caput. Values of I R I S are plotted on Figure 2.8, which displays the spatial imbalance which exists in investment in regional infrastructure and services.

Weighting Given to Public Services and Infrastructure

<u>Health</u>	<u>Points</u>	<u>Administration (continued)</u>	<u>Points</u>
National hospitals	100	Gouvernorat capital	15
Specialist centres	60	Delegation offices	5
Regional hospitals	40	Central tax offices	11 (5 5)
Village hospitals	12	Local tax offices	2
Dispensaries	5	Offices of the D A T	5
Specialist dispensaries	6	Health inspector	4
Other medical centres	8 (5)	Regional education inspector	8
		Local education inspector	3
		Agricultural development agency	11
<u>Education</u>		Local agricultural advisory bureau	3
Establishments of higher education	100	Regional office of the O T T E E F P.	4
High schools	18	Local office of the O T T E E F P	1.5
Technical colleges	16		
'Ecoles normales'	15	<u>Technical Services</u>	
Agricultural colleges	16	National level	100
Specialist centres	11	S T E G (electricity and gas) regional bureau	12
		S T E G local bureau	7
<u>Administration</u>		Regional water authority	12
National court functions	*	Local water authority	7
Courts of appeal	20	Post office	2 (3)
Regional tribunals	7		
Local tribunals	3		
Mobile tribunals	1		

* The weighting given to this function by the D A T (1973b, 172) was obscure

Points for service functions are bracketed where the values varied with the character of the service provided

Weighting Given to Private Services

<u>Medical</u>	<u>Points</u>	<u>Finance</u>	<u>Points</u>
Specialists	6	Branch of the Central Bank	20
General practitioner	4	Central Bank	*
Dentist	5	Branch of a commercial bank	4
Pharmacist	3	Credit agency	2
Local chemist	1	Insurance office	7
		Financial consultants	3
<u>Entertainments and Legal Services</u>			
Cinema	5 (10)	<u>Other Activities</u>	
Theatres	8	Offices of Commercial Groups	*
Restaurants	0 5	Import-export agencies	10
Hotels	2	Large wholesalers	10
Advocates/barristers	2	Small wholesalers	2
Sheriff's office	2	Outlets for luxury goods	2
Architects	3	Travel agencies	2
General consultancy services	7		

* The weighting given to these functions by the D A T (1973b, 174) was obscure

Appendix 3

DATA HANDLING PROBLEMS

To achieve meaningful comparison of the migration data provided by the 1966 and 1975 censuses it is necessary to consider carefully the differences in census definitions which emerged between these two dates. There are four specific inconsistencies which require to be considered

- 1) The 1975 census compared the location of residence of persons at the time of the great autumn floods of 1969 and at the time of the census. All persons born after the floods are therefore automatically excluded from the analysis.
- 2) The 1966 census in recording the date of a migrant's installation from his previous place of residence precludes precise comparison with time specific movements recorded by the 1975 census over the period 1969-1975, since one or more move might have occurred during the latter period, yet only the net movement would be recorded by the census
- 3) A further inconsistency is introduced by the administrative boundary changes which occurred between 1966 and 1975. In Chapter 6 the 1975 areal units have been aggregated to minimize differences in areal and population size between censuses, and to facilitate regional comparisons.
- 4) A final inconsistency is introduced by the differences in temporal aggregation of migration statistics in both censuses. From the May 1966 census it is possible to class all migrants arriving from their last place of residence after January 1962 as one group (a time span of four years and four months), but it is

impossible to make precise comparisons with the 1975 census data which records migration for a period of five years and eight months.

Comparison of matrices of migration movements from birthplace to place of current residence, as published in the 1966 and 1975 censuses, does not encounter inconsistencies one, two and four but because of the greater generality of such matrices they remain less useful in studying the evolution of migration patterns.

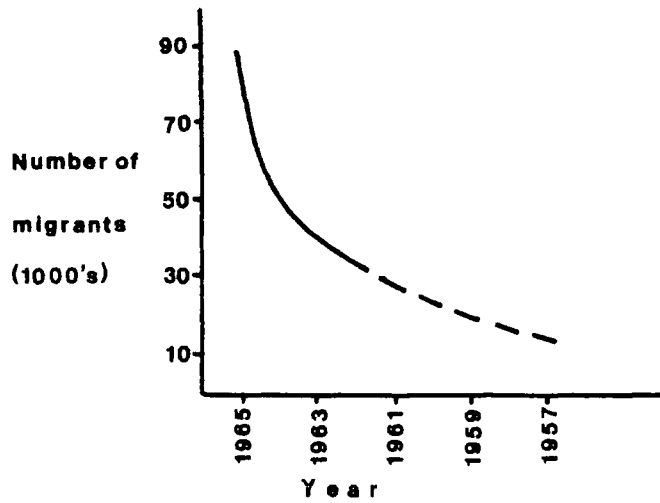
Inconsistencies one to four do not invalidate comparison of migration between 1962 and 1966 with movements between 1969 and 1975, but they do call for caution in the interpretation of differences in the migration patterns. There is a constant need to consider whether alteration in the volume and direction of flows reflects modification in enumeration procedures or whether it indicates real changes in the migration system.

It is consequently important to estimate the effect of the inconsistencies on migration enumeration. The first might be expected to reduce the volume of flows recorded from 1969 to 1975 relative to those in the 1962-1966 period. Tarifa (1978) has estimated that if infants were included in the 1969-1975 matrix, this would augment the migrant population by 31,720 persons, or a 15.8% increase. If Tunisia is subdivided into 13 regions comparison between the 1966 and 1975 census data is facilitated and only minor random increases and decreases in migrant flows between gouvernorats would be expected to occur. Under these definitions only 27,970 infants would have been recorded as inter-regional migrants in 1975, or a 15.5% increase to the total migration system.

The differentials in migration flows between 1962-1966 and 1969-1975 created by the first inconsistency listed above are

FIG App 31

Date of installation of migrants



— Plot from census statistics(yearly)

-- Interpolation from migration numbers over 5 years

1961	30,500
1960	26,000
1959	21,000
1958	18,500
1957	15,000
	<hr/>
	112,000 (~)

largely offset by the longer period of study involved in the 1975 migration enumeration - see inconsistency four. From examination of the temporal decay function of migration for the years prior to the 1966 census, it can be estimated that 30,500 persons migrated in 1961 and a further 8,700 in the last four months of 1960 (Figure A3.1). Thus, if migration had been recorded for the five years and eight months preceding the 1966 census as it was prior to the 1975 census, then the volume of migration might be expected to be 13.5% greater than the level recorded in the years from 1962-1966. The relative significance of this difference between the two censuses is counterbalanced by the differences in population definition between the two dates, resulting in the omission of migrant infants from registration during the 1975 census. In terms of migration flow volume it is concluded that inconsistencies one and four cancel each other out. It remains unfortunate that the characteristics of migrants recorded by the two censuses are disparate.

It is difficult to assess the net effect of the second inconsistency on the levels of population movement. Lifetime migration statistics which do not encounter this problem suggest that there was a slight decline in internal migration during the intercensal period. This decline was not reported by Tarifa (1978, 10), who ignored the effect that administrative reorganization had in increasing the number of governorats between 1966 and 1975. This increased the likelihood of migration enumeration in the 1975 census. In fact, 89% of the Tunisian population in 1975 had been born in a region other than that in which they were enumerated, compared with 92.5% in 1966. This marginal decline is mirrored

in the records of time specific migration which suggests that 3.48% of the population moved between 1962 and 1966, and only 3.23% during the longer period 1969-1975. It is therefore concluded that comparisons from the time specific migration statistics record relatively faithfully the trends also established by the more general and also more reliable lifetime migration statistics. If any bias does exist, it will operate to marginally inflate the volume of 1975 flows relative to their significance under 1966 enumeration definitions

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E D C C Economic Development and Cultural Change
Econ. Geog. Economic Geography
Geog Ann. Geografiska Annaler
Geog. Rev Geographical Review
J. of Developing Areas Journal of Developing Areas
Rev Tun Sci Soc. Revue Tunisienne de Sciences Sociales
T E S G Tijdschrift voor Economische en Sociale Geografie.

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