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INTRA-URBAN MIGRATION AND POPULATION
REDISTRIBUTION IN VICTORIA AND KOWLOON, HONG
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INTRA-URBAN MIGRATION AND POPULATION REDISTRIBUTION IN VICTORIA AND KOWLOON, HONG KONG

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by

Kenneth Leung Kai Miu

Dissertation Committee:

Gary Fuller, Chairman
James A. Palmore
Forrest R. Pitts
Paul Schwind
Chung Tong Wu

Abstract

The main task of the study was to explain the relocation patterns of intra-urban migration which was used as an entry point for analysing population redistribution in the private housing market within the twin cities of Hong Kong. Better understanding of the mechanisms in the relocation of migrants would provide the rationale for predicting the future patterns of population redistribution. A number of variables were used in explaining the relocation patterns of a sample of migrants who moved between 1973 and 1974. The relationship between migration and these variables provided a basis for identifying the locations where population expansion would be fastest by migration. It was suggested that the convergence of people towards these growth centers might create the problems of traffic congestion and overtax the capacity of the existing local facilities and amenities. It was recommended that a sound policy of population distribution be formulated and as a basis for such a policy, the population increase in the growth centers be carefully monitored and more information about the capacity of the infra-structure of these locations be gathered.

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Hong Kong - The Problem and the Setting

Introduction

It has become increasingly true that there is a high price to pay for living in a big city and enjoying its facilities and amenities. The price can be measured in both economic and psychological terms. Fear, anger, frustration, and anguish have become the frequent experiences of an urbanite whose emotional strength is tested to the fullest in his daily encounters. To survive in a big city, adaptation is the key word. To understand how people adapt and survive is to widen the understanding of man himself and his environment. The knowledge gained will help those in the future to structure an environment better suited for human living.

This dissertation is a study of human adaptations in one of the world's metropolises, Hong Kong; it is an attempt to understand some of the ways people in this city respond to the environment during the time when they change their place of residence within the urban area. Residential selection is taken as the point of entry because it is the time when one is required to assess the environment and arrive at a decision. Such a decision is seldom made without due concern for comfort and safety in the new surroundings. A study of these decisions reveals a view of how people perceive and respond to the urban environment.

Our present understanding of residential selection is based largely on studies of Western cities. Little is known of the behavior of Asians in this respect. Yet it seems certain that such behavior is

influenced by cultural factors. Asians' perception of distance, the ways they make use of space, their ideas about neighboring, their concepts of a viable living environment can be quite different from those held by Westerners. Residential selection in Asian cities can therefore be a different process. However, it is a process that must be studied and understood as it is a major driving force in the development of a city. In view of this, the rapid urbanization in Asia calls for systematic analysis of these migratory processes in order to provide a more comprehensive basis for urban policies.

Hong Kong offers an interesting place for a systematic study of site selection. By virtue of its status as a British colony, Hong Kong has an uncertain political future. Its unusually large share of Western influence as a result of the ruling class being Western has caused a rapid erosion of traditional values, leading at times to bewilderment, conflict, and alienation in the younger generation. Its lack of physical space and high population density is a constant source of planning problems. Its fast economic growth in the past twenty years has raised the standard of living and redefined lifestyles. In this complex and changing society, how do people adjust? What are the human prices that were levied?

Some adaptations (responses) to the urban environment can be readily visible. In Hong Kong, physical space is a very costly commodity. As a result, many people have erected "iron cages" outside their windows as extensions of living space. These cages are used for storage, for keeping pots of flowers, or for hanging out the laundry. In response to the rising crime rate, heavy iron gates are often used to guard the safety of the apartment dwellers. One can also find an illegal car

service that has been spawned by an indequate transportation system and for which people pay four or five times the regular bus fare. These responses to the urban environment can tell us a great deal which is useful in improving living conditions. The increasing industrialization of Hong Kong, the creation of new towns through the convertion of farm land into urban concrete, the air pollution that accompanies such development, the construction of the mass transit system, the lowering birth rate and the rising standard of living all alter the urban environment and elicit responses from the residents. It is imperative to study the urban environment systematically and to understand these responses since, increasingly, it is the city that is the home of man.

In the following sections, the origin of the uncertain political future of Hong Kong and the urgency of the need for planning will be described. Provided also is a description of the study area and the research design. A general summary will be given at the conclusion of the chapter.

The Future that is At Stake

On August 29, 1842, by the Treaty of Nanking which brought an end to the First Anglo-Chinese War, the island of Victoria, now part of the present Colony of Hong Kong became part of the British Empire (Figure 1). In 1860, by the Convention of Peking which ended the Second Anglo-Chinese War, the tip of the peninsula on the other side of the natural harbor of Victoria was added to the Colony. Victoria and Kowloon (south of Boundary Street, see Figure 2) now form the core of the Colony of Hong Kong which came to its present size of 399.8 square miles by the lease in 1898 of the New Territories which consists of New

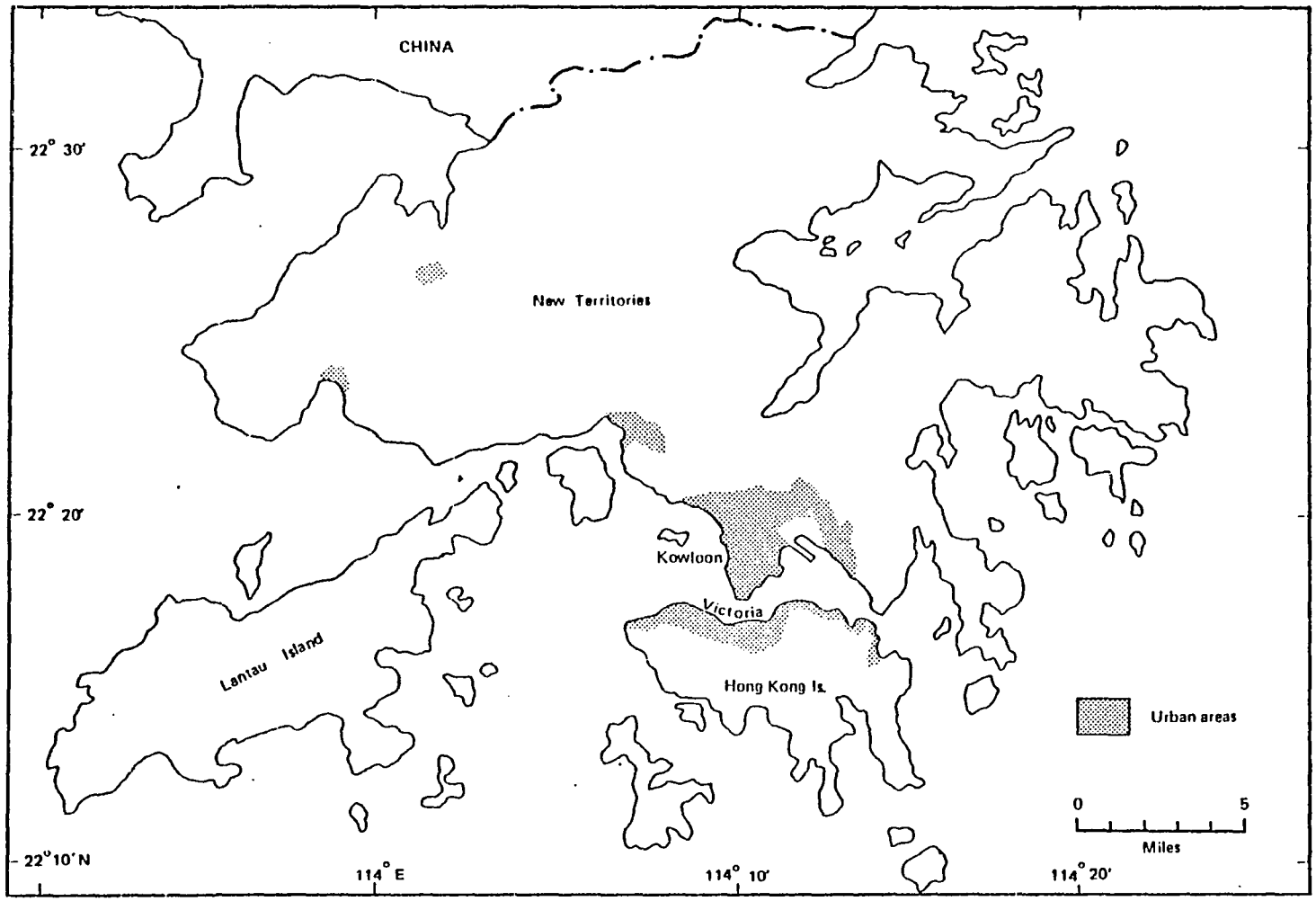

Figure 1 The Colony of Hong Kong

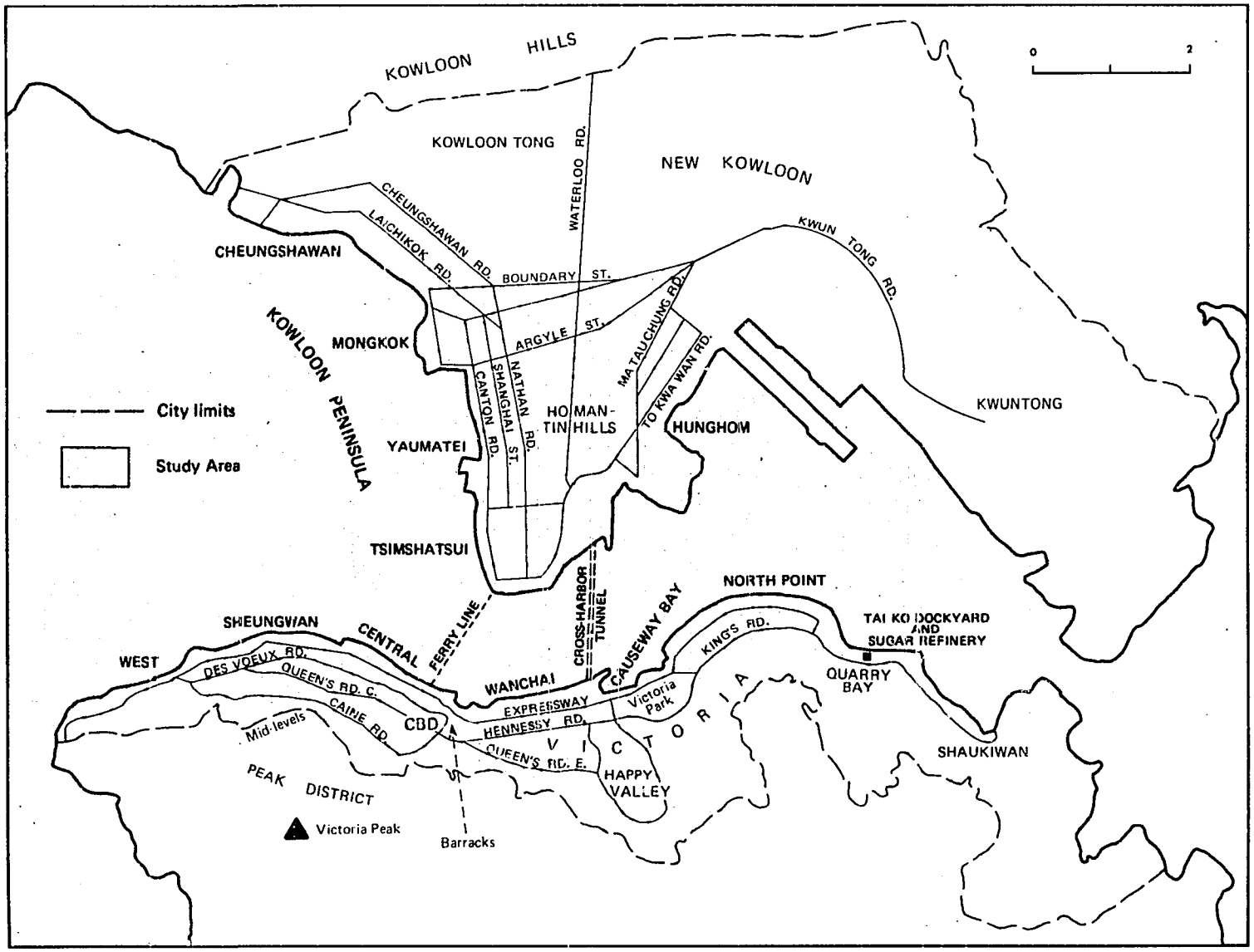

Figure 2 The Twin Cities of Victoria and Kowloon

Kowloon, the farming areas to the north, and 235 islands, most of which are tiny. The lease is for 99 years and will expire in 1997. What will happen to Hong Kong when the lease is up or, at least, to that part of Hong Kong covered by the lease? The question is asked with increasing frequency and greater urgency nowadays by politicians, foreign investors, historians, militant students, local businessmen, the so-called China watchers, journalists, and researchers. This growing concern is understandable because in exactly twenty years, the lease will expire and, one way or another, there will be an answer to the question. In the meantime, speculations or educated guesses regarding what will happen to Hong Kong abound. Some say that since Hong Kong is the main source of foreign exchange for China, some arrangement would be made between the British and Chinese governments to maintain the status quo. Others argue that such an outcome is impossible because China will take Hong Kong back for ideological reasons. A third viewpoint is more novel and subscribes to the possibility that Hong Kong may gain the status of independence through some sort of revolution and become a politically distinct entity, a sort of "third China". Between these distinct views, debate can be heated and proponents of each view can bear on the others with a polished argument. Such a debate is undoubtedly a worthwhile one because its subject should be of great concern to every citizen of Hong Kong. However, the problem is: whatever viewpoint one holds, it will take some twenty years to find out who is right and who is wrong. As it is, the issue will likely remain an academic one for a long while to come and a tantalizing subject for discussion and speculation. The future remains uncertain. Looking at the issue from a different perspective, we may ask how does this uncertainty affect the people of

Hong Kong? Do they care? What do they do in face of this uncertainty? These quesrions seem to have more practical value than the question about the political future. For an answer, we may assume that those who have the resources will be able to go overseas if they want to and leave whatever the future may be to those who stay. The majority will stay for one reason or another, most likely for financial reasons. The whole issue may thus boil down to one simple conclusion for the majority of the population: whatever the future may be, they will have to face it and hopefully, it may turn out to be good. Some people may object to the above argument, claiming it to be too simplistic. The revolutionary minded individuals would exclaim that such an argument provides precisely the rationale for an independence movement: the people cannot wait and accept what may come; they should take it upon themselves to shape the future! This course of action seems most unlikely to happen when one considers the lack of political consciousness in Hong Kong. It has been noted that Chinese tend to be more group (or ethnic) conscious than politically conscious. This, together with the general attitude of leave-me-alone of the people of Hong Kong, do not seem particularly helpful in breeding revolutionaries.

Even though we do not know how the majority of the people might react to this uncertainty about the political future of Hong Kong, we may assume that "I don't know," or "There is nothing I can do about it," are likely to be the most prevalent answers. There has been little discussion of this issue publicity. Most people are not knowledgeable enough to talk about it and we suspect that many find the subject a futile one to argue about. What is illuminating is that this issue gains a much greater audience among Hong Kong students who have gone to

foreign countries for their higher education. Forums and private discussions are held and articles written about the different viewpoints. This greater awareness among these young people is prompted probably by the sudden realization that they may have a choice of staying in the foreign countries or going back to Hong Kong. Their final decision will undoubtedly be influenced by what they think the future of Hong Kong will be. For them, the issue has taken on an immediate urgency and is of more than academic significance. Compare these students with the majority of people in Hong Kong. The latter do not have such a choice to make and to them, the issue has little immediate relevance. To the man in the street, the central issue is to make a living in an increasingly competitive society. The realities of looking for a job and making a livelihood can be very sobering. To these people and to others who are supporting a family, their central concern is making life more pleasant for themselves and their families. Their concern is the rationale behind research and planning: what social scientists and planners can do to identify and solve social problems, to improve the living conditions so that interaction between the people and the environment will take place to the benefits of both. In other words, to the man in the street, it is the immediate future he is faced with that is more relevant than the political fate of Hong Kong over which he has little control. Undoubtedly, most people in the world are faced with the same need of making provisions for the immediate future and improving their living conditions but in Hong Kong such a need has a special urgency and meaning. Whatever improvements are to be made, they have to be made within the time span of twenty years, at least if they are to be made within the current political framework. Those long

range planning efforts that may take more than twenty years to complete should not be dismissed as irrelevant, but it is important to point out how easy it is to use the uncertain political future as an excuse for makeshift, short term remedies or for putting off programs that are needed now. What Hong Kong needs is systematic planning which is made all the more necessary as a result of the uncertain fate of Hong Kong. To most of the residents, the future is now. Actions that make life immediately more pleasant will be all the more appreciated because to them the immediate future is the one that counts most.

Hong Kong and the Study Area

Two of the most frequently asked questions about Hong Kong by foreigners are: what will happen to Hong Kong when the lease is up? Are the refugees still coming over the border from China? These questions represent probably two of the most distinctive features by which Hong Kong is known to the world.

In the previous section, we traced the origin of Hong Kong and in effect have shown the uncertainty surrounding the first question. The second question reflects the demographic composition of the Colony, especially the size of its population in relation to land area. In 1841 when Hong Kong had just become a British colony, it was inhabited by only a few fishermen. Then began a gradual influx of Chinese and the infrastructure developed and expanded in the Colony. The long period of unrest in the last days of the Manchu Dynasty in China which was overthrown in the Chinese Revolution in 1911 and the unstable political conditions that followed saw a steady flow of Chinese across the border, swelling the population of Hong Kong to an estimated 1,600,000 just

before the Second World War. During the war, Hong Kong was occupied by the Japanese, and many Chinese returned to mainland China. At the end of the war, there were an estimated 500,000 to 600,000 persons (Podmore, 1971, p.25). Since then, the population grew rapidly, helped by an influx of refugees between 1945 and 1949 (an estimated 1,285,000 arrived in Hong Kong during that period (Podmore, op. cit.), and subsequently, by a high birth rate (35.0 per thousand in 1961). By the end of 1973, the total population stood at a staggering 4.2 million.

The magnitude of the size of the Hong Kong can only be appreciated if one realizes that the total area of the Colony is only about 400 square miles, with about 80 per cent of the population, that is, over 3 million people crowding into the 20 square miles which constitute the twin cities of Victoria and Kowloon. Victoria is a narrow strip of coastal land on the north shore of Hong Kong Island while across the harbor from Victoria, the city of Kowloon together with New Kowloon[1] to its north occupies the triangular tip of the peninsular. The twin cities are flanked both in the north and south by steep ridges which have effectively prevented any horizontal expansion of the urban areas. As a result, vertical development is encouraged and necessary to provide shelter for the huge urban population, producing a phenomenal average density of 250,000 persons per square mile (1968), ten times the density of New York City in 1960.[2]

The rapid increase of the population after the Second World

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1. Kowloon and New Kowloon will be referred to collectively as Kowloon for sake of convenience unless otherwise stated.

2. The comparison was made by Keith Hopkins (1968, p.275).

War created a housing shortage of staggering proportions. The housing stock was damaged in the war and was in poor conditions. In 1946, as Hopkins has indicated (1968, p.276), "(The housing stock) was 'adequate' to house only three quarters of a million people at the pre-war legal minimum of 35 square feet per person." Tremendous overcrowding thus occurred and many people lived in the streets, on rooftops, and on hillsides surrounding the cities. Faced with housing and feeding thousands of squatters who were suddenly made homeless by a huge fire that broke out on Christmas Eve of 1953 in the Shek Kip Mei squatter area in the western part of New Kowloon, the government began a long term housing program by which thousands of squatter were evicted and rehoused in low cost resettlement estates. The early estates provided only communal bathing and toilet facilities and each individual unit was 120 square feet in size and rented monthly for HK$18.[1] The later models provided private bathroom facilities and 140 square feet for a monthly rent of HK$38. Both types of units are designed for a minimum of three to four persons per unit. By 1974, there were 1,015,500 people housed in these estates. As in the past, the housing policy governing these estates is to give top priority to those people who are made homeless in emergency circumstances and to squatters who are evicted from a site needed for development. Those who are better off financially and who are neither victims of natural causes nor squatters may apply for accommodation in one of the low cost housing estates. The units in these estates are mostly self-contained with private cooking and bathing facilities and their rents in 1974 range from HK$51 a month for a six person flat to

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1. The exchange rate is HK$5.0 (approximately) = US$1.00

HK$249 for a 13 person flat. Density in these units is designed to be 36 square feet per person which is an improvement on the 24 square feet per person in the resettlement estates. The population in these estates stood at 489,700 persons in 1974. Other public housing is provided by the Housing Society which is a government aided voluntary organization which provide housing similar to the low cost estates constructed solely by the government. The total number of people now residing in some type of public housing is approximately 1.7 million, or about 40 per cent of the total population of Hong Kong.

The public housing program has indeed been most impressive in terms of the number of people it has sheltered. The private housing market is equally impressive in its development. It has been estimated by Hopkins (1968) that 89 per cent of the housing units in the city in 1969 were built since 1946 and in his words (op. cit. p.273), "Hong Kong is and looks a new city." Due to the physical restrictions imposed by the ridges that surrounded the city, and by the scarcity of open space within the city, residential development usually involves demolition of an existing building before a new one is constructed in its place. This process of re-development began soon after the Second World War and reached a peak in the early sixties during which time an average of 100,000 persons a year were evicted from old buildings. Redevelopment is encouraged because, firstly, it is easy for the owner of an old tenement building to obtain a court order to evict his tenants (who are given cash compensation), and secondly, a rent control bill passed in 1962 which affected pre-war buildings made redevelopment the only profitable alterative. The vertical growth that resulted from residential redevelopment has changed the face of Hong Kong from one of

low (two-three story) tenement buildings to one of high-rises which often reach twenty or more stories.

These apartment buildings together with the public housing estates provide accommodation for virtually the entire urban population. There are only a few houses in the most exclusive residential areas like Kowloon Tong in New Kowloon and the Prak area in Victoria. A potential migrant who wishes to remain within the private housing sector has only apartments to choose from and does not enjoy the options available in a Western city of living in an apartment near the city center or in a single-family house away from the CBD.

In Hong Kong, there are thus two main types of housing, public or private. To be eligible for public housing, a household must, of course, satisfy the requirements set by the government. Housing in the resettlement estates is designed mainly for families who are victims of natural disasters and is allocated by a system of priorities. The most expensive low cost housing requires an applicant to have a family of at least four and a total income of not more than HK$1400. For larger families, the income ceiling is up to HK$2000. As in other bureaucratic systems, an application takes a long time to process and in most cases, a family has to wait two to three years before space is allocated. Those who do not qualify or who cannot wait will join the competition for housing in the private sector. The choice between public and private housing also means a locational decision because the two types of housing are quite distinct in distribution. Public housing is found mostly on the fringes of the city with a heavy concentration in New Kowloon which, with the exception of the high income district of Kowloon Tong, and a few pockets of private housing areas, is virtually

a public housing territory. Of the 1.7 million people in public housing, 1.1 million are found in New Kolwoon (the proportion in Kowloon is very small), and only .23 million on Hong Kong Island, where their distribution is mainly outside the city. Private housing, on the other hand, occupies the more central locations in the cities. Given the control of public housing by the government, its growth pattern is but a function of governmental policy. On the contrary, the growth pattern of the private housing sector is more a result of market forces and our attention is thus on this sector. As a result, most of the public housing areas in New Kowloon have been excluded from our study. The high income districts of Kowloon Tong and the Peak are also eliminated because they house the very rich and experience little in or out migration. Kwun Tong which is situated at a distance from the Kowloon peninsula proper is included, however, because private housing development there is very active. Our study area thus encompasses almost the entire city of Victoria from Western District to Shaukiwan, the whole of Kowloon and parts of New Kowloon, with Cheungshawan in the west and Kwun Tong in the east (See Figure 2).

Purposes of the Study and the Research Design

In the previous sections, the urgent need for planning in Hong Kong is emphasized. Undoubtedly, such long term plans in raising the standard of living as improving and extending the education system, and strengthening the economy to provide full and adequate employment are required but they call for long term planning and efforts. Resources can also be directed to other channels to improve living conditions immediately. In this connection, the urban environment can be regarded

as an arena of constraints imposing restrictions on the residents. To improve the quality of life will be to identify the nature of these constraints and to control and modify them, if necessary, so that they are as less restrictive as possible. Traffic congestion is a case in point. It not only wastes time and effort but also is a source of irritation with negative repercussions on human interaction. In view of the constant population growth and movements within the city, one difficulty is to identify and explain future traffic generating areas and to recognize where the infra-structure needs to be expanded. To overcome this difficulty, a device is needed to predict the spatial patterns of population growth. In the Western world, three urban growth models have been developed for this purpose. They are the "concentric zone theory" by Burgess and Park (1923), the "sector theory" by Hoyt (1933), and the "multiple nuclei theory" by Harris and Ullman (1945). A brief discussion of these conceptual framework is in order here.

Based on intensive study of the Chicago area, Burgess and Park (1923) proposed that the pattern of growth in the city can be understood in terms of five concentric zones. The first zone is the core, the central business district (CBD), which is the concentration of financial, commercial, and entertainment activities. Surrounding the CBD is the second zone of wholesaling, factories, truck and train depots. The third zone is known as an area in transition with the once wealthy houses being subdivided and occupied by low income families. Slums and rooming houses are widespread in this area, and it is a destination for immigrants (rural and foreign) who are attracted because of low rent and nearness to the CBD. Better housing and higher income

characterize the fourth zone. It is the area into which those who once lived in the zone of transition and have accumulated enough wealth have moved. Beyond this zone is the upper class residential area with single family houses and exclusive restricted districts. One may add a sixth zone of commuters, the suburban areas surrounding the city. In this formulation of the spatial patterns of different socio-economic groups, a distinct process of the movement of immigrants and low income group from near the city center outwards is depicted and is the dynamic element in the model.

Hoyt disagreed with the ring patterns of residential location and argued, on the basis of his analysis of 142 cities in North America, that the different socio-economic groups arrange themselves sectorally with the high income classes along transportation routes and in the most scenic sites. Both Burgess's and Hoyt's models are concerned essentially with where the people are, while Harris and Ullman made a general statement about the location of various types of land uses and suggested that the city is organized around several nuclei each perhaps specializing in one type of activity.

It is recognized that the three models are based on cross-sectional analyses of rent values and land use types. A complementary approach would be to look at the actual movements of the people as they change their residences. In other words, this approach makes use of intra-urban migration as an entry point to examine how the urban area is organized, to identify the constraints in migratory flows, and to investigate those variables which affect the re-distribution of the population. Intra-urban migration is defined here as a temporary or permanent change in residential location within a city. Two major

questions are involved in the study of intra-urban migration: why move? and where do people move to? The main concern of this dissertation is the latter question. It is the study of where people move to that will allow insights into the phenonmenon of population redistribution. In the following, a description of the various approaches to study the relocation aspect of migration will be given.

The literature on intra-urban migration is a scanty one and is particularly so on the relocation aspect of such movements. Few, if any, definitive statements can be made regarding the behavior of site selection. Several reviews of the state of the art have already been done, the most notable of which is by James A. Simmons who offered a systematic summary of the available literature on intra-urban migration in the Western world (Simmons, 1970). In order not to repeat what has already been said, what will be given in this section will not be another literature review but rather a brief synopsis of the various approaches by which the relocation aspect of intra-urban migration can be studied. Provided also will be the rationale behind the one that was used here as well as the research design that was employed in this thesis.

The first approach can be described as micro-behavioral, with the analysis centered on the individual or the family as a decision-making unit. The frame of reference of such analysis is normally sociological or socio-psychological. Peter Rossi's now classic study demonstrates the use of this approach by which sociological, psychological or both types of variables were investigated. Such approach has been applied with some success to the understanding of why people move. It has not been particularly useful, however, in gaining insights into the nebulous area of how and why a new home is chosen (Rossi, 1955).

Recently, geographers have entered the scene and introduced the spatial variables of distance and direction, with the emphasis placed on the search behavior of the migrants (Brown and Holmes, 1970, Moore 1970, Gould 1966, Wolpert 1965). So far, the result of such geographical thinking has been the formulation of several conceptual models which still await empirical verification.

The second approach is macro in character, involving often the use of surrogate variables as indicators of behavior, and administrative divisions as units of analysis. Within this general macro framework, three different but related branches can be identified: 1) simulation of movement patterns, 2) analysis of migration vectors, 3) a macro application of the "place utility" concept.

The simulation approach is best exemplified by Richard Morrill's study of the expansion of the black ghetto in Seattle. In this approach, the attenuating effect of distance on inter-personal interaction and the probabilistic nature of human actions are built-in elements of the heuristic model by which the migration patterns of a given number of migrants are stochastically produced. In the case of a postdiction, the simulated pattern is then compared with the actual one to assess the accuracy of the model. Simulation is a useful approach when little is known about the processes at work, and when only a general pattern is desired of the result.

The second macro approach involves taking a migratory move as a vector that has direction and "magnitude". The latter quantity can be measured in terms of distance of the move. The directions and distances of these vectors are analysed in reference to some significant location in the urban area such as the central business district. The analysis

of these spatial elements can provide insights into the factors responsible for the relocation patterns. Brown and Moore's study (1970) is an example of this approach.

Wolpert defined place utility as "... the net composite of utilities which are derived from the individual's integration at some position in space ... expressing respectively the individual's satisfaction or dissatisfaction with respect to that place." The concept is conceived as a behavioral model to analyse migration. But, this concept can be used to mean just the "attractiveness" of a place in a macro approach towards understanding the relocation pattern of a sample of migrants. "Attractiveness" can, of course, be measured in various ways. The choice of surrogate variables can be made on the basis of the available literature on migration but is likely to be limited by the availability of data. The correlation between the degree of "attractiveness" of a place and its amount of in-migration allows inferences to be made with regards to the relocation patterns.

It should be mentioned also that other than the various approaches just mentioned, an analysis of the relocation aspect of migration can also be made in terms of housing economics. Undoubtedly, a migrant's housing choice is determined partly by his income and the search for an explanation of a migration pattern can be taken along the line of economics.

The approach that is used in this thesis is a macro one which includes both the analysis of migration vectors as well as the application of the place-utility concept. The adoption of such an approach reflects the author's basic philosophy in social studies. It is well known that the dichotomous frameworks in the study of human behavior via the micro

or the macro route are complementary, one not being the better of the other, but both contributing towards the understanding of human actions. The micro-behavioral framework is still at an early stage of development and little is known yet of the causes of many different types of behavior. Given the state of the art in the micro-behavioral approach, the macro framework offers an attractive alternative in which the focus of attention is shifted from the psychological components of behavior to the external factors to which the response of people produces a distinct set of actions.

In the study of the relocation aspect of intra-urban migration, intuition suggests that migrants will usually go about locating possible alternatives and evaluate them by a set of criteria that is dependent on the migrant's financial status, size of his family, taste, preferences and needs. A micro approach would call for an analysis of these criteria, the relative importance of each, and the evaluation and decision-making processes of which very little is known. In the face of formidable gaps in the knowledge of such migratory behavior, it is useful to borrow Herbert Simon's ideas and adopt a macro approach. In observing the movements of ants among the sand grains on a beach, Simon (1969) made the assumption that the intricate movements exhibited by the ants are due not to their complicated behavior (that is, their reasoning for taking certain routes) but to the complexity of the environment (the arrangement of the sand grains). The focus is therefore shifted from the analysis of the ants' decision-making processes to the examination of the environment in which the ants move. The environment is viewed as a constraining factor which dictates the turns and the paths of the routes. Similarly, we may assume that the

process of searching and evaluating housing alternatives is a constant and the variation in where occupants move to is a function of the variations in the environmental factors as perceived by the occupants. This approach therefore calls for an examination of what these environmental factors are and how they might affect the relocation of migrants. As noted in the introduction, the main purpose of this study is to gain some understanding of the urban environment as it affects the distribution of the urban population. This approach towards the study of the urban areas is analogous to the geologist's method of learning about the internal structure of the earth through the analysis of seismic waves. From their paths of transmission and their speed of travel, the kinds of materials that make up the various layers of the crust, the mantle and the core may be inferred. Similarly, the migratory movements of the people within the city may show us how the urban area influences migration, allowing thus better understanding of the urban structure as well as better prediction of future patterns of population distribution. A secondary purpose of the study is to compare some of the aspects of migration in Hong Kong with those in the West. Such dimensions as causes of migration, length of moves, and types of market information migrants employed have been documented in countries like the United States and New Zealand. A cross cultural comparison would contribute towards ascertaining the universality of these migratory elements. The employment of Western models would also allow insights into the applicability of Western concepts in an Asian setting.

In an attempt to identify the environmental factors which direct the path of the migrant in his search of a new home, the scanty literature developed in the West can be used as a guideline. Rossi's

now classic work on migration (1955) indicates that market information is a significant variable. Obviously, even given an abundant supply of housing, not the entire housing supply market is relevant to any single migrant. The imperfections of the migrant's information leaves him unaware of many housing opportunities which may have been suitable. Knowledge therefore is a direct and important link in the process of housing search. Rossi (1955) has identified several information sources the most effective of which is what he defined as "windfall" (op. cit. p.160). It is the information about the housing market provided by friends, relatives, storekeepers and so forth without their being asked. But he recognized that the definition is rather vague because if a person has made it known among his friends and acquaintances that he is looking for a new place, information about housing opportunities that is subsequently received from these sources cannot really be called "unsolicited" and, thus, is not "windfall", even though the information was not asked for at the time it was given. In our study, we would attempt to determine the important sources of housing information and how such sources may affect the relocation patterns of migration.

The locational bias in a migrant's housing search and in his final decision is caused not only by his imperfect knowledge of the housing market and of the urban area but probably by his perception of various aspects of different locations in the city as well. Such aspects as accessibility and social conditions seem to be important considerations that would affect the migrant's choice. One of the long time beliefs that the author has and is shared by many in Hong Kong is the alleged attenuating effect of distance on movement and interaction. One often hears people expressing reluctance to travel "long" distances even

within the city. It is postulated that such attitude towards distance would be reflected in migration. It is to be noted that when a person buys or rents a place, he has acquired not only a home but he has also chosen a location in relation to other locations of interest such as the residence of friends and relatives, schools, places of work, shops, markets, entertainment facilities, etc. The choice of the home location would reflect to an extent the migrant's response to the constraint of accessibility, the significance of which would be revealed in the relocation pattern of a sample of migrants.

Undoubtedly, there are other "environmental" factors which affect the migration patterns to various extents. The main purpose of this study is to identify these factors and their relative significance. Such factors would provide one way of understanding the urban structure and the basis for the formulation of an urban growth model by which future patterns of population distribution can be predicted.

Methodology

To determine where people move to and from, and how they obtain information about the housing supply, an interviewing survey is required. Since the survey would require the migrants to recall the process of their housing search, we decided that only recent migrants would be interviewed. Thus, by our definition, whoever had moved within the past twelve months prior to the date of the interview would be eligible. This institutes an approximate time frame of June 1973 to June 1974. To locate these recent migrants proved to be one of the most difficult problems in the research. Inquiries with several possible sources were made in an attempt to identify people who had just moved but the effort

proved to be fruitless. The Department of Registration of Persons where such data are supposed to be available is the first place that was contacted but the Department could offer no help because of the confidential nature of their records. We next contacted the Hong Kong Telephone Company and discovered that they did not keep a record of those who reported a change of address. Our inquiry at the Department of Census and Statistics was equally fruitless. Finally, a sample of migrants was sought through the school system. The procedure involved was as follows: seventy-seven schools were selected randomly from the telephone directory (about 25% of all the schools listed) and the principals of these schools were solicited by mail for cooperation. They were requested to compile from their school records a list of names and addresses of those students in their schools who reported a change of address since June 1973 and provide us with the list. The purpose was to contact the parents of these students by mail and then interview them. Of the seventy-seven schools selected, only seven turned out to be primary schools while the rest were secondary schools. The result of this survey of schools seems to be fairly satisfactory (Table 1), given the fact that a positive response would demand a good deal of effort on the part of the school principal.

Table 1

Results of the Survey of Schools

Positive Response	Negative Response	No Response	Total Number of Schools Contacted
15 (19.5%)	5 (6.5%)	57 (74.0%)	77 (100%)

From the fifteen positive responses, the names and addresses of 309 students were obtained. It turned out during the beginning of the interviewing survey that the list provided by one school which alone gave 115 names, was made up of a large number of households which had moved more than twelve months before the survey began and were thus not eligible for interviewing. This inclusion of non-eligible households was found to be a clerical mistake by that particular school. The total number of eligible households eventually came to be 197.

A letter of introduction was sent to the head of each of the eligible households before he was visited by an interviewer who was instructed to visit in the evening. The non-response rate was found to be 19.3 per cent with a refusal rate of 10.1 per cent. These rates do not seem to be particularly high. In one survey done in 1963 in Hong Kong, a non-response rate of 23 per cent was reported (Maunder, p.13, 1969), and in another study in 1972, a non-response rate of 10.56 per cent was obtained (Chung and Kwok, p.50, 1974). Barnett, the former commissioner of the Department of Census and Statistics in Hong Kong, stated that "... in any survey conducted without statutory powers a non-response rate in excess of 20 per cent should not be regarded as unusual." (Maunder, 1969, p.3). We definitely share his feelings when he expressed skepticism over the non-response rate of 4 per cent obtained in a 1957 housing survey in Hong Kong, which he simply regarded as an "unreal result".

Of the 159 questionnaires completed in the interviewing, 18 were eliminated from the analysis because of grossly incomplete information. It is realized that the remaining 141 cases constitute a very small sample but given the resources and time constraint, and

particularly the great difficulty of identifying recent migrants, we consider ourselves rather fortunate to have obtained even that number. However, given the unusual procedure in securing the sample of recent migrants, an analysis of the representativeness of the sample was carried out. For lack of knowledge of the statistical population of recent migrants, the sample was compared to the 1971 population of Hong Kong (the most up-to-date figures available), and was found to be quite representative of the general population. The method of comparison was provided in Appendix 1. Even though it was encouraging to find such representativeness, the comparison was done on the basis of two profile questions only. Furthermore, it is not known how representative the sample is of the statistical population. Therefore, the small size of the sample should be borne in mind in reading the remainder of the dissertation.

The questionnaire is worded in Cantonese which is spoken by 89.4 per cent of the total population (1971).[1] The main questions are designed to ascertain, firstly, the address of the former residence of the household (the present address is already available from the lists provided by the schools), secondly, the reasons for moving, thirdly, the sources of information used by the households to locate housing vacancies, fourthly, the locations of those vacancies that the migrants inspected, and lastly, the socio-economic status of the head of the household. The last item was measured by only two profile questions, the present occupation of the head of the household and his (or her) level of educational attainment. We did not attempt to obtain the

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1. Hong Kong Population and Housing Census, 1971 Main Report.

income figures because of their sensitive nature. We did ask whether the household is renting or owning the apartment and what the cost is. Most of the questions are open ended because it is felt that so little is known about the way people in Hong Kong go about in their housing search that structured questions would constrain the amount of information gathered. Due to the small sample size, the unstructured nature of the questionnaire did not pose too difficult a problem of postcoding. The questionnaire in Cantonese can be found in Appendix 2 and the English version of it in Appendix 3.

Summary

In this chapter, it is argued that the uncertain face of Hong Kong makes physical and social planning all the more urgent. Our purpose is to turn the attention of those who are too engrossed with the question of the political future of Hong Kong to the reality of the immediate future and to point out also that it is all too easy for us to use the uncertainty of the political future as our excuse for doing nothing. Hong Kong needs not only long range plans but perhaps more importantly planning programs that can make life immediately more pleasant. One may also say perhaps that improvements in the quality of life may give the government and the people a greater incentive when the time comes for the government to bargain for a future for Hong Kong.

Our study aims at satisfying, to a certain extent at least, a fundamental need of urban planning, that is, to gain some understanding of the urban structure. To do so, intra-urban migration is used as an entry point. Through the movements of migrants within the city, the constraining features of the urban environment may be

revealed. The relocation patterns of migrants may help to develop an inductive model to predict future patterns of population distribution which will have significant policy implications for planning. Our research involves mainly an interviewing survey of a sample of households who experienced a change of address within twelve months of the time of the study. The problems encountered during data collection are discussed and in Appendix 1, the representativeness of the sample analyzed. It seems that the sample is generally quite representative of the total urban population of Hong Kong.

CHAPTER 2

The Intra-urban Migration Matrix - an Initial Exploration by Multi-Dimensional Scaling and Distance Decay Functions

The Origin-Destination Matrix

A question of overriding importance in the study of intra-urban migration and, in fact, migration at any scale, is how and why do migrants select their destinations. As a first step towards answering that question within the scope of this study, a straight line connecting the origin and the destination of each move in the sample was plotted. These migration vectors in their aggregate (Figure 3) do not, however, offer any easy picture to decipher. They cross the urban area in all directions and converge at a few locations to form discernable clusters. To unravel this migration labyrinth and to gain some insight into underlying influences, order has to be cast on this web to make it less complex and less confusing to comprehend. This imposed order is an arbitrary geographical regionalization scheme which divides the urban area into smaller units. Such a scheme is readily available in the government census report and is made use of in this study for the obvious reason that secondary data, which might be needed, are organized mostly on this spatial basis.

The regionalization scheme adopted by the government breaks the urban area into "census districts" (Appendix 4). Within the study area, there are 9 districts in Victoria and 7 in Kowloon. (Their names can be found in Appendix 4). Within each district, three types of moves are identified: 1) Those whose origins and destinations are found within the district (within-district moves), 2) those that originated

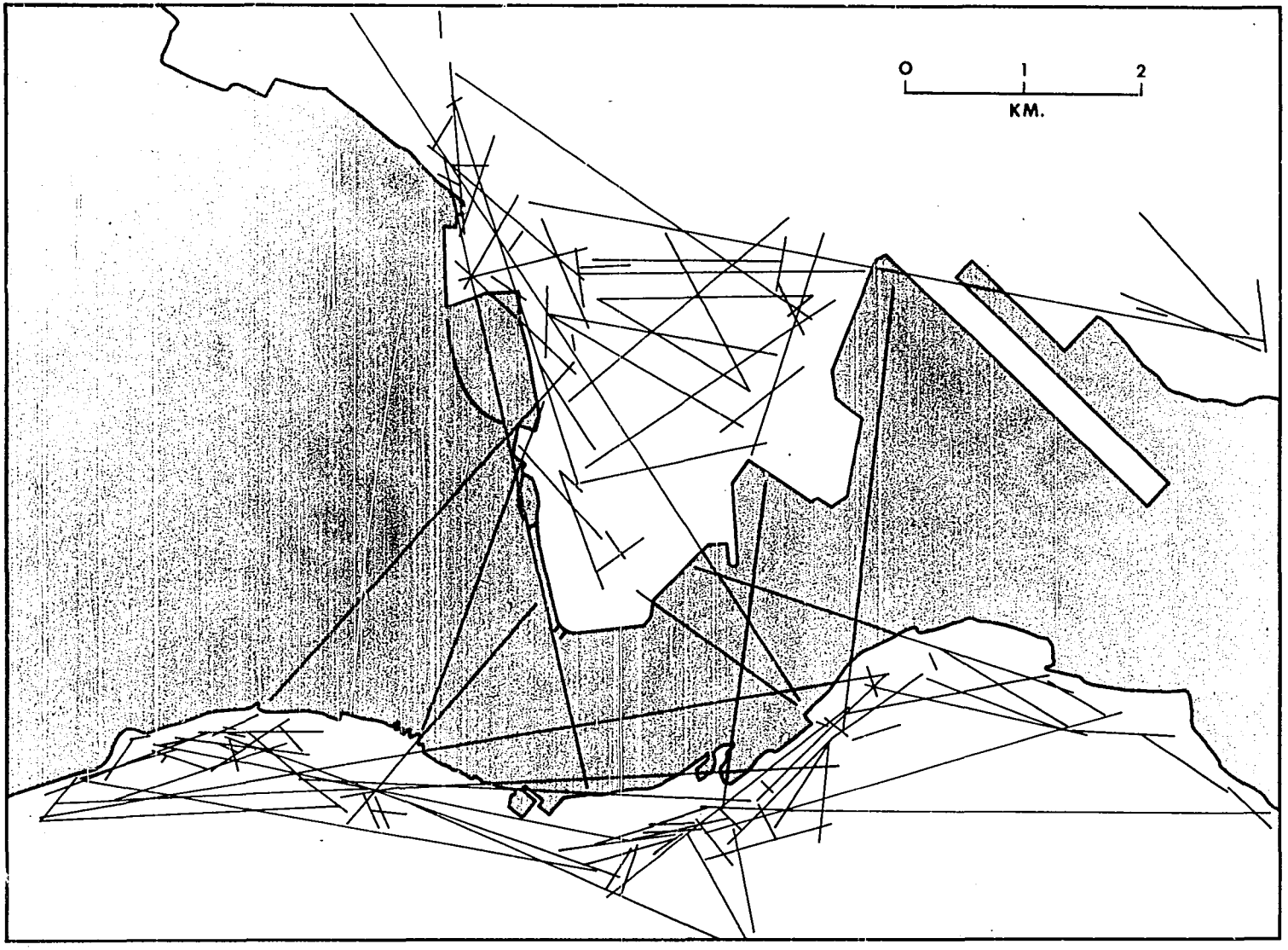

Figure 3 The Migration Vectors

in the district but terminated in another (out-migration), 3) those that are originated in other districts (in-migration). The latter two types of moves are, in other words, inter-districts moves. The number of each of these three types of moves in each district can easily be counted and entered into a matrix (Figure 4). The count of within-district moves is entered in the diagonal cells, and the amount of in- and out-migrations in each district is represented by the numbers in the row and column cells off the main diagonal. There are, for example, in district West, 13 within-districts moves, 7 out-migrations and 5 in-migrations to and from districts against which the numbers are entered correspondingly. It should be mentioned in passing that the total number of out-migrations equals the total number of in-migrations, giving thus the same grand total for the rows and the columns. The laying of the sixteen district boundaries onto the migration map is to group the origins and destinations of the intra-urban moves by districts, which is, in effect, a reduction of the original matrix of 148 moves each with its own origin and destination to a square asymmetric matrix of 16 common origins by 16 common destinations. In this smaller matrix, the within-district moves are reduced to dimensionless points thus simplifying the migration patterns furthur.

Since the within-district moves are dimensionless and are positioned along the main diagonal of the matrix, they are the easiest to read and provide a convenient starting point in studying the matrix. As the matrix reveals, the districts of West, Wanchai, and North Point in Victoria have conspiciously more within-district moves than the other districts. This is expected to a certain extent as these districts are also the ones where a greater number of moves originated;

		VICTORIA									KOWLOON							
	From \ To	West	Sheung Wan	Central	Mid-Levels	Wanchai	Tai Hang	North Point	Quarry Bay	Shaukiwan	Tsimshatsui	Yaumatei	Mong Kok	Cheungshawan	Hung Hom	Ho Man Tin	Kwun Tong	Excluding Cross Harbor Moves	Including Cross Harbor Moves
VICTORIA	West		3		5	2		2										12	12
	Sheungwan				1		1					Cross		Harbor		Moves		2	2
	Central				4													4	4
	Mid-Levels					1	1					2			1			2	5
	Wanchai						7	2	1	1				1	1			11	13
	Tai Hang							3										3	3
	North Point								4		1			1			1	4	7
	Quarry Bay									2	1							2	3
	Shaukiwan																	0	0
KOWLOON	Tsimshatsui											1		1	1			3	3
	Yaumatei												4	1	5			10	10
	Mong Kok													2	2	1	1	6	6
	Cheungshawan														1			1	1
	Hung Hom															1		1	1
	Ho Man Tin																	0	0
	Kwun Tong																	0	0
	Excluding Cross Harbor Moves	0	3	0	10	3	9	7	5	3	0	1	4	4	9	2	1		
	Including Cross Harbor Moves	0	3	0	10	3	9	7	5	3	2	3	4	6	11	2	2		

Figure 4
Origin-Destination Matrix

if one assumes, on the basis of past research on intra-urban migration in North America, that most moves are short, then it is not very surprising that those districts where more origins of migration are found should also have more destinations. However, on the Kowloon side, the distribution of within-district moves is not as clear. There is no obvious direct correspondence between origins of moves and within-district moves by districts. Yaumatei, for example, which is the origin of 13 moves, the largest number in Kowloon, retains only 4 of them, producing 9 out-migrations. This immediately raises the suspicion that the spatial structure of the migration matrix in Kowloon may be quite different from that in Victoria. The next logical step is to find some way of exposing the spatial structures that are imbedded in the migration matrixes.

The matrix of inter-district moves can logically be regarded as a set of relationships between the districts, each move being the outcome of interaction involving the origin and the destination districts. We can assume in this study an inverse correspondence between the distance separating two districts and the amount of interaction, measured in terms of number of moves, between them.[1] Thus two districts related by ten moves irrespective of direction are seen to be physically closer together in the migration space than a pair connected by only two moves. Given this assumption we want to recreate a configuration of the districts as points in which the distances between

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1. See Gunnar Olsson, "Distance and Human Interaction: A Review and Bibliography," Regional Science Research Institute Bibliography Series Number 2, Philadelphia, 1965.

the points reflect the amount of inter-point migration. In effect, we are taking the map of inter-district moves as if it were a rubber sheet, stretching those parts where inter-migration is slight and compressing those where interaction is intense. To obtain such a configuration, it is necessary to use a technique called multidimensional scaling to do the stretching and compressing.

Multidimensional Scaling

The basic notion of multidimensional scaling is quite simple. As Gould has put it, "We wish to illustrate graphically the similarities and dissimilarities between things by showing them as points in a space, with the distances between the points matching our measures of similarity or dissimilarity as closely as possible."[1] To illustrate his point, Gould used the example of a series of historical events that are located as points on a time scale represented as a straight line with the intervals along the scale being proportional to the number of years between the events (Figure 5). It is noticed that these events can also be represented by the rows and columns of a matrix whose elements are the number of years between each pair of events. From this matrix of similarities between events (measured in years), the exact configuration of the events along a straight line can be reconstructed. Given a matrix of distances between cities on a map, we could also use multidimensional scaling methods to reconstruct almost the exact configuration

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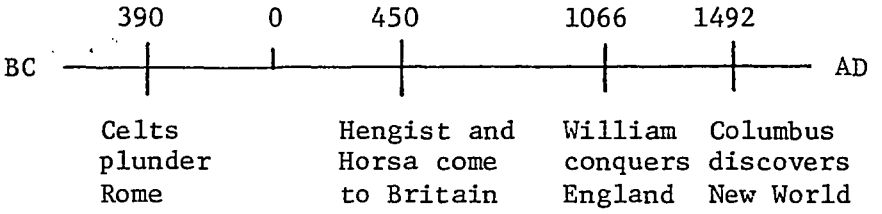
1. Gould, P.R., "The Creation and Transformation of Spaces by Multidimensional Scaling," Prepared for the First Lund Conference in Sweden in 1973. The article was obtained through personal communication.

Figure 5

Reconstructing a one-dimensional point configuration from a matrix of distances (times) between historical events

Time Diagram



Measurement, or arithmetic

One kind of seriation

Time Interval

	Columbus	H & H	William	Celts
Columbus	0	1042	426	1882
H & H	1042	0	616	840
William	426	616	0	1456
Celts	1882	840	1456	0

Source: See Footnote on page 34.

of the cities. The exact configuration cannot be retrieved because the distances between the points in the reconstructed map would not match exactly the true distances between the cities that are measured over the curved surface of the earth. This, as Gould pointed out, is precisely the cartographer's problem of map transformation. However, multidimensional scaling might well give us a transformation that is best in the sense that there is a closest match between the inter-point distances in the reconstructed map and the given distances (or measures of similarities).

Romney *et al.*[1] set forth the various examples of the use of multidimensional scaling techniques. These techniques can be applied to a wide range of phenomena and the similarity measure can be any relevant variable. The *stress*, that is, the difference between the reconstructed distances and the measure of similarity or dissimilarity, may be quite high but it can always be reduced by adding more dimensions to the configuration. In this case, we will be faced with the problem of judging the size of the stress against the number of dimensions of the space, since an addition of each dimension will make interpretation more difficult. We may also be able to reduce the size of the stress by switching from the usually employed Euclidean metric of Pythagorus's theorem to the more general Minkowskian metric:

$$d_{ij}(p) = \sum_{x=2}^{r} \left| \quad {}_{ik} \quad - X_{jk} \right|^{P} \quad ; \quad p = 1$$

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1. Romney, A.K., R.N. Shepard, and S.B. Nerlove, *Multidimensional Scaling: Theory and Applications in the Behavioral Sciences*, Vol. 1 Theory, Vol. 2 Applications, (New York Seminar Press 1972).

when p = 2, we have the familiar Euclidean metric; when p = 1, we would have the so-called Manhattan, or city block metric.

The measure of similarity in reconstructing the configuration of the sixteen districts in this study is the number of moves between each pair of districts. The greater the number of moves between two districts, the more "similar" they will be, and thus closer in the migration space. To obtain this measure of similarity, the upper and lower halves of our original a symmetric matrix of inter-district moves are combined to produce a symmetry matrix so that each half is a mirror image of the other with the numbers in the cells indicating the total number of moves between each pair of districts regardless of the directions of moves (Figure 6). Either half of the matrix can now be used as input in the multidimensional scaling technique[1] to find a configuration of points to represent the sixteen districts so that the inter-point distances will match the number of inter-district moves as closely as possible. In this case, the Euclidean metric of p = 2 is used to calculate the inter-point distances for ease of interpretation.

The Migration Space of Victoria and Kowloon

The Guttman-Lingoes computer program recovered a configuration of sixteen points in a two dimensional space with minimum stress. The two dimensions recovered can be regarded as the longitude and latitude of the space in which migration has occurred. With these

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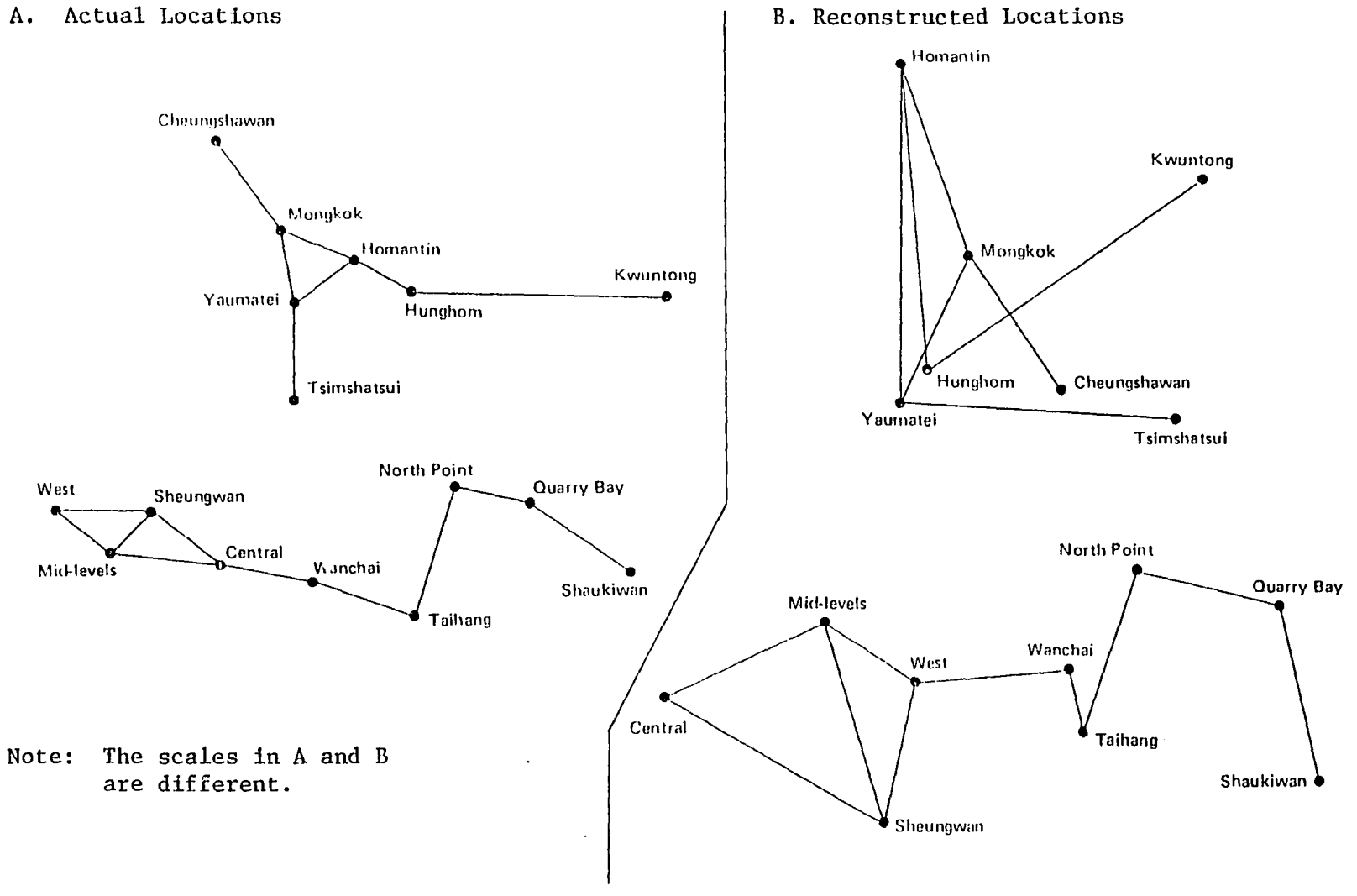
1. The specific multidimensional scaling technique used is known as the smallest space analysis and the computer program employed is part of the package of non-metric programs designed by Guttman and Lingoes, which is available at the Computing Center of the University of Hawaii.

			VICTORIA								KOWLOON									
	From \ To	West	Sheung Wan	Central	Mid-Levels	Wanchai	Tai Hang	North Point	Quarry Bay	Shaukiwan	Tsimshatsui	Yaumatei	Mong Kok	Cheungshawan	Hung Hom	Ho Man Tin	Kwun Tong	No. of Origins	No. of Within District Moves	No. of Out-Migration
VICTORIA	West	13	2		4			1										20	13	7
	Sheungwan	1	3		1		1						Cross Harbor Moves					6	3	3
	Central			0	3													3	0	3
	Mid-Levels	1		1	4										1			7	4	3
	Wanchai	2			1	12	5	2	1						1			24	12	12
	Tai Hang				1	2	3	3										9	3	6
	North Point	1						9	3								1	14	9	5
	Quarry Bay							1	0		1							2	0	2
	Shaukiwan					1			2	3								6	3	3
KOWLOON	Tsimshatsui		Cross Harbor Moves					1			5	1		1	1			9	5	4
	Yaumatei				2							4	2		5			13	4	9
	Mong Kok											2	3		2	1	1	9	3	6
	Cheungshawan					1		1				1	2	5	1			11	5	6
	Hung Hom														8			8	8	0
	Ho Man Tin														1	1		2	1	1
	Kwun Tong																5	5	5	0
	No. of Destinations	18	5	1	16	16	9	18	6	3	6	8	7	6	20	2	7	148	78	70
	No. of In-Migration	5	2	1	12	4	6	9	6	0	1	4	4	1	12	1	2	70	148	

Figure 6
Symmetric Origin-Destination Matrix

co-ordinates, the configuration of the points can be mapped. The points are joined in an arbitrary fashion to facilitate visual inspection (Figure 7).

When the recovered configuration of the districts represented as points in the migration space is compared with the actual distribution on the ground, the results are revealing. Since there are only nine cross harbor moves in a total of seventy inter-district moves, Victoria and Kowloon will be considered separately for the time being. Smallest space analysis has recovered the actual geographical location of the districts in Victoria remarkably well, especially in the eastern half of the area where the districts are arrayed in a stretch from Wanchai eastwards to Shaukiwan (Figure 7). In the western half, the districts, taking on a somewhat rhomboid pattern in true geographical space, have their locations reversed. Central has switched position with West to occupy a peripheral location in the same migration space as Shaukiwan. Mid-Levels is now closer to Kowloon than Sheungwan. However, after transformation, these four districts still maintain a roughly rhomboid arrangement. The close resemblance between the two configurations before and after transformation indicates that the flow of intra-urban migration follows the geographical frame of reference well, with most of the moves occurring between neighboring districts or near neighbors. This pattern implies a strong bias towards short moves thus reflecting the influence of friction of distance in migration. But, we should take note also of the difference between the eastern and western portions of Victoria in the degree of approximation between the recovered and the actual configurations of the districts.



Note: The scales in A and B are different.

Figure 7 Comparison of the Actual Locations of the 16 Districts of Hong Kong with Their Recovered Locations in the First Run of the Smallest Space Analysis

Crossing the harbor, we find that multidimensional scaling has stretched and compressed the geographical space beyond recognition. Yaumatei and Hung Hom come together to form a close pair. Kwun Tong and Ho Man Tin take up positions on the periphery of the migration space and are in fact little involved with the other districts in the migration field. Distortion of the actual pattern of the locations of the districts is created by the removal of Ho Man Tin from a central location from a peripheral to a more central position, and by the pairing of Yaumatei and Hung Hom which before transformation were on opposite flanks of the peninsula. Neighboring districts no longer have the largest share of migration. This apparent free interaction between districts in the migration field presents a striking contrast to the situation observed in Victoria. It seems that the attenuating effect of distance in Kowloon is much less pronounced than in Victoria. Is this contrast between the two urban areas a result of some intrinsic differences between the migrants from each side of the harbor or is it due to some external influences? An answer to this question would bring light not only to the migration processes but also to the structure of the environment in which migration takes place. Later on in this chapter, we will consider this question further.

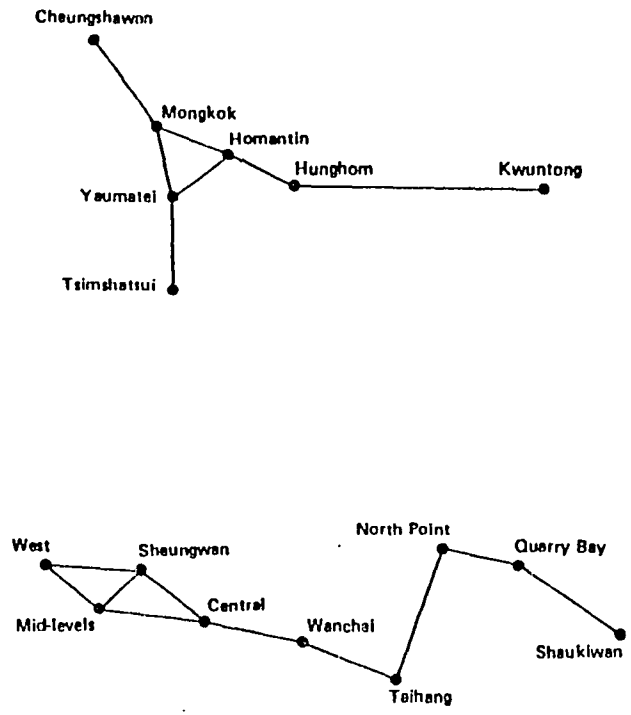
A cautionary note is in order here about the smallest space analysis results. Admittedly, the use of districts as a spatial basis for analysis is quite arbitary and the inter-district moves are consequently defined on this basis. If smaller areal units are used, the number of inter-unit moves will increase and the subsequent analysis may produce a different result. This is, of course, the classic geographic problem of determining the size of the areal unit to

be used. For this preliminary analysis of the migration patterns, smaller spatial units are not employed because in the original matrix of 16 X 16 districts, the proportion of cells with zero moves is already quite high. If smaller units are used, the matrix would greatly increase in size and the proportion of zeroes would expand very rapidly, rendering the results of smallest space analysis meaningless.

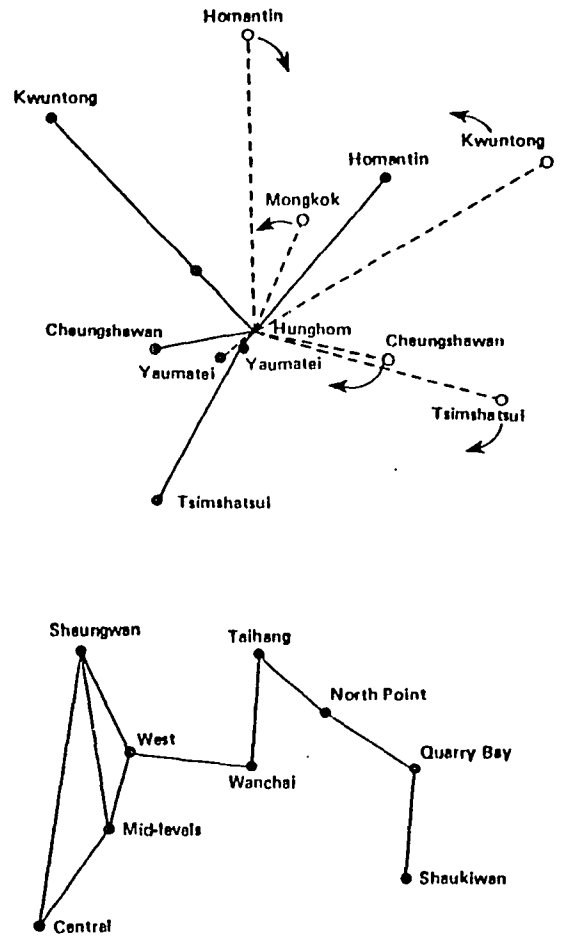
One may recall that we ignored the cross harbor moves in our previous interpretation of the results. If these moves are considered, one can see that the east-west alignment of Yaumatei, Hung Hom, Cheungshawan and Tsimshatsui in the recovered configuration is due partly to their involvement in cross harbor migration with North Point, Wanchai, and Mid-Levels. The amount of migration between these districts can be seen from the matrix. Thus, one may suspect that the distortion of the recovered pattern in Kowloon may be due in part to this alignment caused partly by the cross harbor moves. Therefore a second smallest space analysis was performed. This time the cross harbor moves were deleted and the original matrix divided into its Victoria and Kowloon components. From each component matrix, the same Guttman-Lingoes program was used to recover a configuration of points in a two dimensional space.

The Victoria and Kowlooon configurations from this second run (Figure 8) are basically the same as that from the first run. In Victoria, the eastern portion exhibits a similar pattern as before, with Wanchai and Tai Hang in reversed positions. The western portions, however, is flattened along the north-south axis with the actual locations of Sheungwan and Mid-Levels recovered, though West and Central have switched their positions as in the first run. The

A. Actual Locations



B. Reconstructed Locations



Note: The scales of A and B are different.

Figure 8 Comparison of the Actual Locations of the 16 Districts of Hong Kong with Their Recovered Locations in the Second Run of the Smallest Space Analysis

resemblance of the recovered configuration to the actual one in the second run is definitely discernable, though not quite as strong as that in the first run. In Kowloon, the pattern seems to be very different from the one in the first run, but in fact the basic relationships are all there. The closest pair is still made up of Yaumatei and Hung Hom with Mong Kok and Cheungshawan close by and Ho Man Tin, Kwun Tong and Tsimshatsui in the periphery. This configuration is obtained simply by taking Hung Hom and Yaumatei in the previous run as in Figure 7 as the pivot around which the other districts are rotated by various degrees to reach their present positions in Figure 8, (the dotted lines in Figure 8 indicate the positions of the districts as in Figure 7 in relation to Hung Hom, and the arrows indicate the directions of rotation). Kwun Tong and Ho Man Tin are in positions that are opposite to those in the first run. This reversal stems from the fact that they are poorly involved in the migration field and are thus located in the periphery of the migration space where their exact positions are of little significance. The important point to notice in this second run is that Victoria and Kowloon still maintain their marked constrast which was observed in the first run. This persistent difference between the two urban areas suggests they they should be treated separately in subsequent analysis. A more important point that arises from this initial analysis of the migration patterns is the indication that the friction of distance in migration seems to be greater in Victoria than in Kowloon. In the next section, we will look at this particularly aspect of migration in Hong Kong in greater detail.

Distance Patterns in Migration

The smallest space analysis has indicated that the migration patterns in Victoria and Kowloon may be quite different. Of these patterns, the one that seems most obvious from the analysis and that has been given much consideration in geographical studies on migration is the distance bias. It has been demonstrated in Western society that most intra-urban moves are short (Rossi, 1955). Given a set of moves, their generalized distance pattern can be measured and described by an index called the distance decay function which indicates the degree to which the moves as a whole are affected by the friction of distance. The purpose of this section is to calculate such functions for the moves in Victoria and Kowloon. A comparison of these functions may indicate how different the migration patterns in the two urban areas are. The following describes the standard procedure by which we can obtain the distance decay functions as it was first calculated by Hagerstrand[1] in his pioneering work on migration and diffusion. It should be remembered that the same procedure is carried out separately for Victoria and Kowloon.

The straight line distance between the origin (the former residence of the migrant) and the destination (the present residence) of each move is measured in miles and the distances are grouped into half mile categories (Table 2). The number of moves per square mile for each half-mile ring is then determined so that the ring areas are

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1. Hagerstrand, Torsten. "A Monte Carlo Approach to Diffusion," European Journal of Sociology VI (1965), 43-67.

Table 2

Distance Patterns of Migration
in Half-Mile Area Bands in Victoria and Kowloon

Distance in Miles	Number of Migrating Households		Ring Area	Number of Moves Per Square Mile	
	Victoria	Kowloon		Victoria	Kowloon
0.0 - 0.5	52	26	0.79	65.82	32.91
0.5 - 1.0	20	13	2.35	8.51	5.53
1.0 - 1.5	3	7	3.93	0.76	1.78
1.5 - 2.0	3	2	5.50	0.54	0.36
2.0 - 2.5	5	2	7.06	0.71	0.28
2.5 - 3.0	1	0	8.64	0.11	0.00
3.0 - 3.5	1	1	10.21	0.10	0.10
3.5 - 4.0	0	1	11.78	0.00	0.08
4.0 - 4.5	1	0	13.36	0.07	0.00
4.5 - 5.0	1	1	14.91	0.07	0.07
5.0 - 5.5	0	0	16.50	0.00	0.00
5.5 - 6.0	0	1	18.07	0.00	0.05
	N = 87	N = 54			

standardized.[1] As in other studies[2], a Pareto curve of the general form $Y = aD^{-b}$ is fitted to the distribution. Y is the expected number of moves per square mile and D is the distance in miles. The equation is transformed into a linear form by the use of logarithm so that the "curve" fitting can be handled by linear regression:

$$\text{Log } Y = \log a - b \log D$$

The regression analysis produces the following equations for Victoria and Kowloon respectively:

<u>Victoria</u>: $\log \nabla Y = \log 0.77580 - 3.33 \log D$

or $\nabla Y = 5.9675\ D^{-3.33}$

<u>Kowloon</u>: $\log \nabla Y = \log 0.63771 - 2.74 \log D$

or $\nabla Y = 4.3422\ D^{-2.74}$

The exponent of D, that is the b coefficient, is the slope of the straight line and it measures the frictional effect of distance on migration; the greater the exponent, the more severe is the frictional effect. It can be seen that Victoria does indeed have a higher exponent than Kowloon but the difference is only 0.59 which is hardly large enough to produce the kind of contrast we have seen in the smallest

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1. The area of each ring is obtained by subtracting the area of the inner circle from the outer one. The areas of the circles are given by the formula, πr^2, where r is the radius of the circle and π being a constant of the value 22/7.

2. Such line fitting in migration has been done by Hagerstrand, W.A.V. Clark, Richard L. Morrill and F.R. Pitts.

space analysis results. Moreover, we observed that these coefficients were derived from fitting distributions of moves to half mile distance categories. Considering the size of Hong Kong where the longer axis of Victoria is only seven to eight miles and that of Kowloon no more than four miles, the use of half miles in the distance scale might have created a sizable measurement bias and its use is justified only for the purpose of comparison with other studies. However, when the distance categories are changed to quarter miles (Table 3), the coefficients of the two curves become -2.68 for Victoria and -2.23 for Kowloon. The difference between the two coefficients is now 0.45 which is smaller than before. To test if the two distributions of moves by quarter-mile categories are statistically different, a two-tailed Kolomogorov-Smirnov test was performed and it was found that there was no significant difference between them at the 0.01 level of confidence. Our expectation that the attenuating effect of distance on migration is much more effective in Victoria than in Kowloon seems completely overturned by the comparison of the distance decay functions. It appears that migrants in Kowloon as a whole moved no greater distances than those in Victoria. The question thus remains: what leads to the difference in the smallest space analysis results that we have observed?

If we reconsider the two distance decay functions within the context of their respective geographical backgrounds, their unexpected similarity will take on a new meaning. It is noticed that Victoria and Kowloon are quite different in size and particularly so in shape. The areas of the two places (as defined in our study area) are 6.01 (Victoria) and 4.82 (Kowloon) square miles. Much more significant is the sharp contrast between the thin and long urban area of Victoria

Table 3

Distance Patterns of Migration
in Quarter-Mile Area Bands in Victoria and Kowloon

Distance in Miles	Number of Migrating Households		Ring Area	Number of Moves Per Square Mile	
	Victoria	Kowloon		Victoria	Kowloon
0.0 - 0.25	35	18	0.20	175	90
0.25 - 0.50	17	8	0.53	29.3	13.8
0.50 - 0.75	12	7	0.99	12.1	7.1
0.75 - 1.00	8	6	1.37	5.8	4.4
1.00 - 1.25	3	6	1.77	1.7	3.4
1.25 - 1.50	0	1	2.16	0.0	0.5
1.50 - 1.75	2	2	2.55	0.8	0.8
1.75 - 2.00	1	0	2.95	0.3	0.0
2.00 - 2.25	4	1	3.33	1.2	0.3
2.25 - 2.50	1	1	3.73	0.3	0.3
2.50 - 2.75	1	0	4.12	0.2	0.0
2.75 - 3.00	0	0	4.51	0.0	0.0
3.00 - 3.25 [a]	3	4	4.91	0.6	0.8
	N = 87	N = 54			

a. To avoid zeroes in the categories beyong 3.25 miles, all the moves that are longer than 3.00 miles are grouped together. In view of the small number of moves in this category, the bias thus created in the distance decay functions is minimal. Besides, the functions in this case are for comparison only and since the bias is introduced into both functions, it will not affect the comparison.

with the triangular shape of Kowloon. Here lies the key to the difference between them in the smallest space analysis. If one stands at the geographical center of Victoria, either end of the urban area of its long axis is three and a half to four miles away but in the case of Kowloon, the distance is only one and a half to two miles. Given the distance decay function we observed in Victoria, the spatial pattern there is one of migration mostly between near or next door neighboring districts and only infrequently between districts that are far apart. But in a situation where the districts are arranged in closer proximity to one another as in the case of Kowloon, the same distance decay function will produce a different spatial pattern of migration in which there is a much freer exchange between most districts. What we have in equivalence is a "constant" which is the distance decay function, and a "variable" which is the geographic dimension of scale and shape. The interaction between the "constant" and the two different values of the same "variable" produces two different spatial patterns. Here is, perhaps, one of the most important differences between Victoria and Kowloon as far as migration is concerned. Even though the migrants from both places exhibit a similar distance decay function, the physical milieu of Kowloon being smaller and less extended permits a wider choice of "opportunities" (in terms of districts) to the migrants as a whole within the restriction as defined by the distance decay function. In Victoria, however, to have a choice similar in scope to that in Kowloon, greater distances will have to be overcome. In other words, given the range that is defined by the distance decay function, the Kowloon migrants are better off than their counterparts in Victoria because they have most of the urban area within this range, an advantage that

is not enjoyed by the Victoria migrants. But, the point is that an advantage is not always taken because as in the present case of overcoming distance, it requires an effort to be made. This effort may be in terms of money, time or energy. Wolpert (1964) has demonstrated clearly that man is more often a "satisficer" than an "optimizer" so that "most human decision-making, whether individual or organizational, is concerned with the discovery and selection of satisfactory alternatives; only in exceptional cases is it concerned with the discovery and selection of optimal alternatives." (March and Simon, 1957, p.140). That is not to say that Kowloon migrants have made optimal choices in their process of looking for a new home but since the migrants in Victoria did do without any advantage, we might ask why the Kowloon migrants might not have moved shorter distances than they have done and have thus saved some energy in the process. In other words, given the physical environment of Kowloon, we might expect a steeper distance decay function than the one we have observed. To attempt answering the above question, we may take two approaches: one is to find out what the migrants did during the process of relocating and what they did may give us insights into how they have come to exhibit the generalized distance patterns (that is, the distance decay functions). This approach will be taken in the following section. An alternative approach is to look at some of the attributes of the physical environment, especially the distribution of housing opportunities, so that we may gain some understanding of why people have moved over various distances to their new homes.

An important question that grew out of this analysis is concerned with the differences found in various distance decay functions and especially the cross-cultural differences. What is not known is the reasons for such observed differences. Our findings in Hong Kong pose the same question. For sake of comparison, the first set of coefficients of the distance decay functions obtained in Hong Kong using the conventional half mile categories was employed. Clark (1970) in his study of intra-urban migration in Christchurch, New Zealand, reported a coefficient of -2.57. The value of -2.49 is observed in the 1933-1936 migration data for Cleveland, Ohio, as quoted by Marble and Nystuen (1963). It is recalled that for Hong Kong, the coefficients are -3.33 (Victoria) and -2.74 (Kowloon). It does seem that the frictional effect of distance is greater in Hong Kong than in those Western cities cited. In fact, the mean migration distance in Hong Kong is 0.76 mile which is three to four times shorter than that noted by Clark in Christchurch (2.44 miles). What is responsible for this observed difference in the distance decay rates between Hong Kong and the West? Obvicusly, the steeper rates observed in Hong Kong are related partly to the small size of the urban areas. The question then becomes: would the distance decay function in a Western city of comparable size be similar to those in Hong Kong? There is, however, no available statistics for comparison but it seems likely that the distance patterns of migration in Hong Kong would still reflect a greater frictional effect of distance than that in a Western city of equal size because of the Colony's distinctive features, some of which are briefly described in the following.

According to official figures[1], only 10% of the households in Hong Kong own a private car (1974). It is inevitable that most of the residents depend on public transport for moving about in the city, especially for their daily trips to and from work and schools, a situation which is very different from that in most North American cities. Even though no location in the urban area is very far away from a bus route, there is much less freedom in commuting by public transport than by one's own vehicle. Through time, one comes to know the rhythm of the transport system in one's neighborhood and the knowledge helps to minimize the frustration that comes with using a public transport system that provides no official time schedule. When the need to move arises, the preference for moving within the same neighborhood is great, and would seem to be greater than that in Western cities where people are more mobile and less dependent on public transportation. The difference in mobility is probably an important factor in explaining the observed steeper distance decay rate in Hong Kong. In the questionnaire, the respondents were asked if there were any locations (in terms of districts) that they preferred to move to before they began the search for the new home and, if so, why did they choose those districts. The reasons given by those who did have such predisposed locational preferences can be grouped into four categories; their frequencies are as follows:

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1. Hong Kong Annual Report, 1974, Appendix 35.

Table 4

Reasons Given for Location Preferences

Reasons	Frequency	Percent
Proximity	85	64.39
Familiarity with the district	38	28.78
Good Environment	4	3.03
Lower Rent	5	3.78
Total	132	99.98

In the category "proximity", most of the replies stress nearness to work or school but also include a general accessibility term. The terms in Chinese are, chiao (交), t'ung (通), fang (方), pien (便), which mean, respectively: exchange, connectivity, directions, and expedient. The distance factor was clearly foremost in the respondents' minds as they assessed the various parts of the city in their search for a new home.

To explain differences in distance decay rates, Marble and Nystuen found the results of a series of studies conducted by Berry on central places (1969) illuminating in this respect. These studies demonstrate that a steeper rate can be expected in areas of higher gross population density. Given this relationship, one certainly expects a very steep rate in Hong Kong which undoubtedly leads the world in urban population density. How does density affect the slope of the distance decay curves? High urban population density is made possible by tall buildings which, as in the case of Hong Kong, limit

vision and effectively block out the horizon. May it not be this visual barrier that accounts for a more severe distance barrier in a high rise area than in a low rise area?

Explanation of the Distance Patterns

It has been shown that the distance patterns in Victoria and Kowloon are statistically the same. They are the spatial expressions of underlying processes that occurred as people moved from one place to another. The purpose of this section is to see if these processes can be inferred from the independent variables available for the respondents.

We have focused on three groups of independent variables: the socio-economic status of the household, the reasons for moving, and the relocation process. These variables are described in detail in Table 5. Due to the fact that most of the variables are measured on a nominal scale, the chi-square test was used in the analysis. In cross tabulating distance with the independent variables, the original half or quarter mile categorization of distance can no longer be used because of the small sample size. In Kowloon especially where there are only 54 cases, the cross tabulation of ten or more distance categories (as would be the case if distance is in half or quarter mile groupings) with any of the independent variables would result in an unacceptable number of zeroes in the contingency tables. The distances of migration are therefore regrouped into three categories on the basis of an intuitive scheme: those that are under a quarter of a mile are the within neighborhood moves, those moves of an intermediate length between a quarter and three quarters of a mile long can be regarded as within-district

moves, and those that move beyond three quarters of a mile from the originating apartment are the long moves. The last type may not seem very long in a Western context but in Hong Kong moving more than three quarters of a mile is in most cases far enough to end up in another district distinguishable from the originating one at least by their commonly known names.[1]

The results of the chi-square tests of association between distance and the three groups of independent variables for Victoria and Kowloon are given in Table 5. With one exception, none of the chi-square results was significant at or above the 0.05 level of confidence. Taking the three groups of independent variables one by one, the results of these tests will be evaluated. It seems that knowing about the migrant's socio-economic status does not tell us how far he will move from the origin. Adams (1970, p.311) suggested that, ".... while change intimidates all people, strange places and strange people intimidate lower-income and poorly educated groups more than others." If a long distance move can be assumed to be a move into relatively unfamiliar territory in Hong Kong, then it does not seem that people of lower socio-economic status are any more reluctant than anyone else to move to strange places. On the other hand, the relatively small size of Hong Kong might mean that there is no place in Hong Kong that is strange enough to anyone to be intimidating. However, a more plausible hypothesis is that given the high cost and the limited supply of housing

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1. The distances were grouped also in four and five categories and each time the distance categories were tested for association with the independent variables. No significant association was found except for the one that we have already discovered and discussed in the following paragraphs.

Table 5

Results of the Chi-Square Tests of Association between Distance of Migration and a Number of Independent Variables

	Independent Variables:	Victoria	Kowloon
		Level of Significance	
DISTANCE:	Socio-Economic Status:		
	Occupation of Head of Household	0.5931	0.5885
	Education Attainment of Head of Household	0.6852	0.9029
	Occupancy Status (owner or renter)	0.9750	0.6923
	Rental per Month	0.2422	0.9383
	Price of the Apartment	0.4125	0.2027
	Reasons For Moving	0.3208	0.8147
	1. Home too Small		
	2. Access to Work or School		
	3. Eviction due to Demolition of Former Residence		
	4. Eviction due to Reclaim of Property by Owner		
	5. Rent Increase		
	6. Poor Environment		
	7. Desire to Own		
	8. Others		
	Relocation Process:		
	Length of Residence at Former Residence	0.1734	0.5743
	Had or had no Preference for Any Location Before Search (Yes or No)	0.9158	0.0305
	Number of Housing Vacancies Inspected	0.1037	0.1771
	Source of Information about The New Home	0.1463	0.8759

in Hong Kong, this socio-psychological factor of familiarity might well be low in the list of criteria migrants consider in their evaluation of housing alternatives. In other words, the housing choice for most people, especially for the poor, in Hong Kong is limited. Their location is determined more by what is available and accessible to them. Our results reinforce Clark's (1970, p.54) remark that, "it does not seem that gathering information of the status of individuals will yield useful additional information on the distances or reasons for household relocation."

Simmons in his review of the literature on intra-urban mobility (1968) observed that knowing why people move tells us little about where they would relocate. The chi-square test of association between distance and the reasons the sampled households gave for moving lends furthur support to Simmons's observation. Intuitively, it seems that people who move not because of dissatisfaction with their present home or environment (social and/or physical) but because they were evicted, would be reluctant to leave their familiar neighborhoods and thus account for the short moves. On the basis of this reasoning, a correlation between short moves and eviction in Hong Kong was expected. Since eviction is the major cause of relocation (49.4% and 30.2% of all the moves in Victoria and Kowloon respectively), such a correlation would explain to a large extent the steep distance decay rate. As we have seen, the expected association did not occur.

The last group of independent variables are concerned generally with the way people usually go about their search for a new home. This process of search is neglected in most migration research. It is also a most difficult aspect of migration to gain information

about because researchers have to rely, in most cases, on the respondents' memory to recall what they did when they were looking for alternative accommodations. Memory can be and is faulty. To bypass this method of gaining information, one has to follow the sampled households very closely during the time when they were actually searching for a new home. The difficulty of finding people who would consent to such close scrutiny is obvious. In this study, there was difficulty in finding those who had already moved, let alone the people who were in the process of moving. Thus, it was necessary to depend on the respondents' recall of what they did. The selection of the variables regarding the search process was based largely on what I think is important in the context of Hong Kong, guided partly by the existing literature on migration in the West and restricted in number by the length of the questionnaire which was kept deliberately short. These variables will be discussed in turn.

Contrary to expectation, long time residents seem no more reluctant to leave their old neighborhood than others. The sentiments and social ties that people are thought to cultivate in their communities did not hinder them from moving to other districts. This finding is particularly surprising when one considers the social network that the residents, especially the housewives, must have built up in their neighborhoods in the course of their daily visits to the open markets for food, and their reliance on the neighborhood stores for other daily necessities. Equally unexpected was the lack of correlation between distance of migration and the kinds of housing information that migrants utilized in their search of a new home. The distance bias observed apparently is not due to any spatial bias in the information

channels that link the migrants with the housing market. The third variable is the number of places migrants inspected (including the final choice) in their housing search. Again, this variable bore no strong relationship with the distance patterns of migration. Of the four variables, only one was statistically related with the distance patterns (at the 0.05 level of confidence), and this relationship was found only for Kowloon. This variable is converned with whether or not migrants indicated any preference for any location prior to the housing search. 79% of the respondents in Victoria did have a preference but their distance patterns were no different from the rest who did not have such a preference. In Kowloon, however, the sample was split almost equally by their answers. Most of those who moved within a quarter mile of their former homes had a locational preference while those who made longer moves tended not to have such a preference. This contrast between Victoria and Kowloon poses a very perplexing puzzle that does not seem to have an easy solution. It is possible, however, to venture a few speculative remarks. First of all, the areal unit used in the questionnaire in this particular question is the district. The respondents were asked if they had any preference for any district or districts. It is plausible that the lack of locational preference observed in the Kowloon sample might in fact reflect an absence of a mental image of the urban area in terms of distinct districts. The locational units used in their mental maps may be of a different form and, for example, may well be streets instead of districts. If one looks at an aerial photo or a large scale map of Kowloon, one would find that on both flanks of the peninsula where most of the population of Kowloon is concentrated, several main streets run parallel to the

coast. Nathan Road on the western flank is the major artery and parallel to it are such well known roads as Shanghai Street, Shantung Street, and Canton Road. As one moves from Tsimshatsui in the south of the peninsula northwards along one of these roads, one passess from one district to another without any sign of physical breaks between them, even though the districts are known by different names. The same continuity is true also on the eastern side of the peninsular. Victoria, however, is different. The elongated urban area is well punctuated by open space, a military barrack, the Central Business District, a park, or warehouses. In most cases, one district is clearly separated from its neighbors. The physical separatedness of the districts in Victoria probably influences the residents to develop a clear image of the urban area in these spatial terms. The Kowloon residents, however, do not have the same spatial cues and, other than their immediate neighborhood, might have found it difficult to respond to a question which employs a set of spatial units that are different from those in their mental maps. This "explanation" is suggested only as a hypothesis for future testing and as food for more thought.

Aside from the perception perspective, there seems to be a less speculative explanation for the pattern found in the answers to the question of locational preference. Most of those who had a locational preference gave proximity as the most important reason for such a preference, and 64% of all the reasons in the entire sample are in this category (Table 4). Migrants in Hong Kong seem to employ a search strategy which begins with a selection of those locations where accessibility is thought to be good. Familiarity as a factor is of secondary importance. We can perhaps argue that if accessibility is

not an importance criterion in a migrant's housing choice, then he is more likely to show less particular locational preference than one who considers accessibility as important, or, if accessibility is not a significant differentiating factor of the locations in the urban area, then there would be a less need for a migrant to pre-select any district for housing search. The latter condition might be the case in Kowloon which, as we have seen, is smaller in size, and, more important, is less extended in territory than Victoria. Due to these two basic geographic dimensions, none of the locations in Kowloon is hampered by severe inaccessibility, a situation which might have accounted for the absence of locational preference in 50% of the sample. Indeed, the following table shows that even for those in Kowloon who did have a locational preference, the importance of proximity is not as overwhelming as that in Victoria, and familiarity with the neighborhood is given more consideration.

Table 6

Reasons Given for the Locational Preferences in Victoria and Kowloon

Reasons	Victoria	Kowloon
Proximity	67.70%	55.55%
Familiarity	27.08%	33.33%
Good Environment	3.12%	2.77%
Lower Rent	2.08%	8.31%
	99.98%	99.96%

There seems to be some validity in our reasoning that the difference in the replies to the question of locational preference between Victoria and Kowloon may stem from their basic geographic differences of shape and size, thus reinforcing the notion that the two urban areas are different and, more importantly, providing some evidence that their differences affect the behavior of the residents.

Kowloon Peninsula, is, in fact, bigger than Victoria, a fact that seems to contradict what we have been saying about the size of Kowloon. It is true that the built up area of the Peninsula is more extensive than that of Victoria but as far as migration within the private housing sector is concerned, New Kowloon which is the northern part of the peninsula, seems to drop completely out of the picture. It seems that when migrants are considering alternative accommodations in their search of a new home, their usual mental image of the peninsula shrinks in size, with New Kowloon shifting out of focus. The study area in Kowloon has been defined accordingly. This image reduction is encouraged by the distribution of the private housing supply which is limited mostly to Kowloon, almost to the exclusion of New Kowloon where public housing predominates. The narrow focus helps to make the housing search more manageable and efficient.

The variables have failed to explain the distance patterns in migration, which show, in a generalized form, the distances migrants travelled as they changed their residential locations. There have not been many attempts at explaining the distance patterns in intra-urban migration in North America and the few that have been made have not been particularly successful. Apparently, those migrants who moved very short distances are no different from those who made longer moves in

terms of their socio-economic status, in their reasons for moving, in the kinds of housing information they used, or in the ways they went about looking for a new home.

Summary and Conclusion

This chapter is an initial attempt to explain the migration patterns in Hong Kong. The exploratory probe with the use of smallest space analysis method yields certain clues which are followed up with an examination of the distance patterns by fitting the distance decay functions. Association between the distance patterns and a number of variables about the migrants and the way they went about in search of a new home was then tested statistically and the results discussed.

This first attempt in explaining the relocation patterns of the migrants has not been very fruitful. We were, however, more successful in gaining information about the urban structure of the twin cities. It is commonly known among the residents that their knowledge of the cities is usually restricted to that side of the harbor where they reside and the other side is generally reduced to a number of district and street names. What is not common knowledge is that the basic geographic differences between Victoria and Kowloon provide clues to the understanding of the urban structure of the cities and these differences may have significant bearings on the residents' behavior in space. Behavioralists distinguish spatial behavior from behavior in space,[1] the former being the rules behind the actions that have a

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1. A good discussion of these two types of behavior can be found in Problems of Spatial Behavior: A Symposium, edited by K. Cox and R.G. Golledge, Evanston, Ill., Department of Geography, Northwestern University, 1969.

spatial expression, while the latter is a description of the actions. Spatial behavior remains the same irrespective of the environment because the rules governing such behavior do not vary. Behavior in space, however, changes as the environment in which it occurs changes. The geographic dimensions of shape and size in Hong Kong, albeit simple, might have influenced the distances migrants travelled. In other words, we have an example here of how the differences in one structural element between two spatial systems may have produced two different behaviors in space.

CHAPTER 3

A Place-Characteristic Approach in Explaining Migration

Introduction - Population Size and Relative Location

The attempt to explain the distance patterns in migration in the previous chapter has not been successful, thus throwing doubt on the approach used. In the study of intra-urban migration, one of the difficulties is to identify the dependent variable, or variables. It is especially so in the case of the question of how people select among alternative destinations. Geographers' preoccupation with distance inevitably leads them to adopt the distance between the originating home of the migrant and his new residence as the variable to be explained, and it is a legitimate variable to use. Not only in migration but also in diffusion, the distance decay effect is observed, that is, we usually find an inverse relationship between the distance connecting two places and the amount of interaction or migration between them. Distance is an obstacle to migration and interaction and is recognized as such by Ravenstein (1889), Lee (1966), Olsson (1965), and others. It is a surrogate measure of a number of things: it may represent the cost of moving; it may influence the amount of information migrants have of destinations, and long distance moves may mean leaving one's familiar environment and friends. The distance patterns found in migration can thus be regarded as an expression of the varying degrees in which migrants are able to overcome these obstacles. To explain these distance patterns is to gain an understanding of how the migrants differ in this ability. There are,

therefore, a number of studies employing the approach of using distances as the dependent variable. The lack of success of this approach in this study has already been noted in the previous chapter.

In this section, a different approach towards understanding the migration processes will be employed. In this approach, we ignore the migration distances and focus on the characteristics of the destinations. To begin, we are again faced with the old problem of scale, that is, the perpetual question of what areal units of observation should be used. The 1971 census uses areal units smaller than the districts (which were used in the previous chapter) by dividing the twin cities into Tertiary Planning Units (TPU) which are equivalent to census tracts in the United States. In the study area, there are 53 TPUs. Of these, 25 are in Victoria and 28 in Kowloon (Appendix 5). They formed the geographical basis for subsequent analysis. Each TPU was regarded as a destination area and the number of moves that terminate there were counted. Obviously, of this number of destinations, there were some that originated from outside the TPU and some from within, but it is the total number that we are concerned with for the time being. What we have, therefore, is a distribution of destinations by TPUs, and our objective is to find an explanation of this distribution, or put simply, to explain why some TPUs are more popular destination areas than others. To do so, one could perhaps match the socio-economic characteristics of the TPUs with those of the migrants but this is unsatisfactory for the simple reason that Hong Kong is, even to the casual eye, very heterogeneous in character, much more so than most Western cities. Within the same street block, old, run-down tenement buildings stand in sharp contrast to the new and

costly apartments for the well-to-do; residential density may increase two to three times from one side of the street to the other. Multiple land use is found almost everywhere in the twin cities and each district has its share of commercial, residential, and even industrial activities. Such variations underscore the mixture of people from different socio-economic groups within a small area. This heterogeneity challenges the validity of such summary indices as median income, median rent, average size of the dwelling unit, mean number of cars owned, and others. Obviously, there are some locations which we could label as relatively upper-middle class or lower class but in a low income neighborhood, it is not unlikely for a migrant household of middle income to find an acceptable apartment. For most locations, therefore, the summary socio-economic indices are likely to be misleading. However, the use of socio-economic variables has not been ruled out but postponed until there is definite indications that they would help to explain migration. Also, a more reliable measurement than averages would be necessary. At this point, however, attention is focused on two prominent features of a TPU that are not affected by its heterogeneous nature: its population size and its relative location in the urban area.

Population size is of course a surrogate measure of a number of things that are considered to be related to the search and choice of a new home. Foremost in this list of things is probably the information factor, that is, the means by which people obtain housing information. From survey data, the major information sources used by migrants were: newspaper, personal contacts (i.e. from friends or relatives), personal search, street notices and brokers. The last two require some

explanation. In Hong Kong, a common way to advertise a vacancy is to write the information on a piece of red paper (a color symbol used in the Chinese culture for almost anything except death). The piece of paper is then posted at a prominent place in the street. Such red notices are found often by the entrance of a building, or on a utility pole. The temporary wooden sidewalk at a construction site is a haven for such notices. This kind of advertisement costs next to nothing and is most often employed by people of lower income and in most cases, the vacancy advertised is a single room or an apartment to share with the owner or main tenant. Bed spaces are advertised in this fashion also. Sometimes, a neighborhood general store provides a central location for these vacancy notices. The store keeper is entrusted with the duty of letting any enquirer inspect the property and he receives a commission on any successful deal. Such a store-keeper would be classified as a broker. There are also a few brokers who collect information from people who have a housing unit to rent out or sell and display the information at a small stall by the road side. The commission they earn allows them a meager livelihood. Of the kind of real estate agencies in the Western world, there are very few in Hong Kong and they deal with property that is within the top price ranges and cater mostly to the needs of expatriate business executives.[1]

The five sources of information were used by migrants to various extents (Table 7). In the table, "coverage" denotes that

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1. Information about the "street notices" and the lack of real estate agencies in Hong Kong is obtained respectively from a field survey conducted by the author, and from conversations with the employees of several large land developers.

Table 7

Types of Information Sources Used by Migrants

	Coverage: Percentage of Migrants using the information source		Impact: Percentage of Migrants using the source effectively				
	VICTORIA	KOWLOON	VICTORIA		KOWLOON		
NEWSPAPER	42.86%	46.67%	30.95%		17.78%		
FRIENDS & RELATIVES	52.38%	68.89%	38.09%		53.33%		
STREET NOTICES	16.67%	42.22%	8.33%		26.67%		
WALKING AROUND	28.57%	4.44%	20.24%	30.95%	2.22%	31.11%	
BROKERS	8.33%	6.67%	2.38%		2.22%		

information source which leads a migrant to inspect a housing vacancy. "Impact" is that information source that leads a migrant to his new home. Of the five sources, it should be noted that the last three require searching in the streets for housing vacancies. Rossi (1955) found that "windfall"[1] is the most effective channel of information in finding a new home and next in importance is personal contact. In Hong Kong, the situation is quite different. Personal contact is the most important source and the migrants in Hong Kongseem to be more active in soliciting housing vacancies than those in the West, as evident in the fact that the last three information channels given in the table require, as we have noted, looking around in the streets and may in effect be grouped as one. Given the importance of personal contact and "walking around", the population size of a TPU is probably a good approximation of the amount of personal contact there is between the people of that unit and the rest of the urban area. It is thus assumed that the larger the population of a social unit, the greater is the amount of inter-personal information flow in and out of that unit. Population size of a unit might also reflect the likelihood of migrants going to that unit to check out the street notices and to search for vacancies. Finally, population size could also be a surrogate measure of the availability of housing vacancies.

The variable of relative location is to be used in this analysis because, as we have seen in the last chapter, proximity is

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1. "Windfall" is defined as unsolicited information about housing vacancies brought to the migrant's attention. Discussion of the definition was already made in Chapter 1, page .

regarded as the most important factor in locational preferences. Proximity includes nearness to place of work, schools, friends, relatives, and to amenities. As these places of interest may be widely distributed in the urban area, a residence that is centrally located will be more attractive to a migrant. One way to measure this centrality or relative location of a place is to find its aggregate distance to all the other places in the area. In the next section, the means of calculating this aggregate measure will be described in detail.

The Potential Model

A concept that makes use of the variables of population size and relative location in migration analysis is the potential model. The basic idea of this model is borrowed from Newtonian physics. In the same way as we observe that the gravitational force between any two physical objects varies directly with the product of the masses of the two objects and inversely with the square of the distance between them, we might expect a similar relationship between social units. In a region with a number of towns, for example, the towns are the social units. The interaction potential at each town can be thought of as the sum of the attractive forces exerted on that town by each of the towns. The attractive force thus created by each of these towns varies directly with its population size and inversely with its distance from the one it attracts. Given N points in a bounded region, the total potential, P, created at point, i, by each of the other points, j, is equal to the sum of the mass at, j, divided by its distance from, i. In symbols:

$$P_i = \frac{M_1}{d_{i1}} + \frac{M_2}{d_{i2}} + \quad \ldots\ldots \quad + \frac{M_j}{d_{ij}} + \frac{M_i}{d_{ii}} \qquad (1)$$

In brief:

$$P_i = \sum_{j=1}^{n} \frac{M_j}{d_{ij}}$$

where P_i = total population at place i.

M_j = the population size of a place in the region

d_{ij} = the distance between i and j.

It should be noted that the effect of i upon itself is included in the total potential but clearly d_{ii} cannot be taken as zero or else P_i would be driven to infinity. As a result, d_{ii} is sometimes taken as half the distance between i and its nearest neighbor. Here, because there are several cases where such a measure of d_{ii} would produce distances less than unity and thereby exaggerate the term M_i, d_{ii} is taken as unity throughout.

In this study, the potential concept is used slightly differently. Instead of determining the potential exerted on each unit by the rest of the units, we want to find out the attractive force exerted by each unit on the others. What we have thus is a reversal in the direction of the aggregate attractive force of the original potential model. The equation becomes:

$$A_i = \frac{M_i}{d_{i1}} + \frac{M_i}{d_{i2}} + \quad \ldots\ldots \quad + \frac{M_i}{d_{ii}}$$

In brief:

$$A_i = \sum_{j=1}^{n} \frac{M_i}{d_{ij}} \quad \ldots\ldots (2)$$

where A_i = total potential at place i

M_i = population size of place i

d_{ij} = distance between place i and place j

It should be noted that equation (2) can be written as:

$$A_i = (M_i) \left(\sum_{j=1}^{n} \frac{1}{d_{ij}} \right)$$

M_i is, of course, the population size of place i and the term $\left(\sum_{j=1}^{n} \frac{1}{d_{ij}} \right)$ is precisely the measure of the aggregate accessibility of place i, that is, its relative location in the urban area. The term gives the aggregate of place i's inverted distances to all the other places. Thus, the larger its value, the more central its relative location. In this equation, we therefore have the two attributes of a location that we need for the analysis.

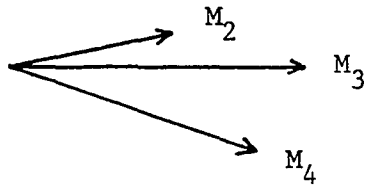
The difference between the two versions of the potential model can be illustrated further with the use of a matrix (Figure 9). Given four towns in a bounded region, the potential force exerted on each town as calculated according to equation (1) is simply a row total while the potential attractive force of each town (as in equation 2) is a column total. The rationale of using the second version of determining the interaction potential in our case, besides the fact that it provides a measure of relative location, is because the question is how a TUP has drawn or attracted migrants from other TPUs and created enough attraction to keep others within its own borders from moving out. Those moves made by the latter migrants may perhaps be

Figure 9

Diagrammetric and Matrix Representation
of the Differences between Two Versions of Potential Forces

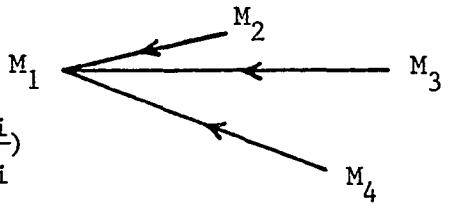
Potential Force
Exerted on Town
1 by Towns 2, 3 & 4

$$(P_1 = \sum_{j=1}^{4} \frac{M_j}{d_{ij}})$$



Attractive Force
Exerted on Town 2,
3 & 4 by Town 1

$$(A_1 = \sum_{j=1}^{4} \frac{M_i}{d_{ji}})$$



TOWNS

TOWNS	1	2	3	4	
1	$\frac{M_1}{d_{11}}$	$\frac{M_2}{d_{12}}$	$\frac{M_3}{d_{13}}$	$\frac{M_4}{d_{14}}$	$P_1 = \sum_{j=1}^{4} \frac{M_j}{d_{1j}}$
2	$\frac{M_1}{d_{21}}$	$\frac{M_2}{d_{22}}$	$\frac{M_3}{d_{23}}$	$\frac{M_4}{d_{24}}$	$P_2 = \sum_{j=1}^{4} \frac{M_j}{d_{2j}}$
3	$\frac{M_1}{d_{31}}$	$\frac{M_2}{d_{32}}$	$\frac{M_3}{d_{33}}$	$\frac{M_4}{d_{34}}$	$P_3 = \sum_{j=1}^{4} \frac{M_j}{d_{3j}}$
4	$\frac{M_1}{d_{41}}$	$\frac{M_2}{d_{42}}$	$\frac{M_3}{d_{43}}$	$\frac{M_4}{d_{44}}$	$P_4 = \sum_{j=1}^{4} \frac{M_j}{d_{4j}}$
	$A_1 = \sum_{j=1}^{4} \frac{M_1}{d_{j1}}$	$A_2 = \sum_{j=1}^{4} \frac{M_2}{d_{j2}}$	$A_3 = \sum_{j=1}^{4} \frac{M_3}{d_{j3}}$	$A_4 = \sum_{j=1}^{4} \frac{M_4}{d_{j4}}$	

Where:

P_i = Potential exerted on place i by others

M_j = Population of town j

d_{ij} = Distance between i and j

Where: A_i = Attraction potential created by place i on the others

M_i = Population of place i

d_{ij} = Distance between place j and i

accounted for by the attractive potential each TPU has upon itself as measured by the diagonal elements in the matrix.

In calculating the attractive potentials, the values for M_i are the population figures from the 1971 census,[1] and the distances between each pair of TPUs are the Euclidean distances between the arbitrarily determined geographic centroids of the units. Equation (2) is then used to calcualte the potential of each TPU. What we have now is a distribution of potential figures with which we can compare the distribution of destinations by TPU that was obtained earlier. The comparison was made for Victoria and Kowloon separately, and the Spearman rank correlation was used for this purpose. In Victoria, a coefficient of +0.73 was obtained and in Kowloon, +0.45. There is thus a definite relationship between the "magnetic" potential of a TPU and the number of migrants it has attracted and this relationship is seen to be much stronger in Victoria than in Kowloon.

Analysis of "Residuals"

To gain further insights into the relocation process, a more detailed comparison of the potential values and the total destination figures was made. The method of comparison, adapted from the work by Abler, et al. (1971, p.228), is a simple one. Each TPU was expected to draw its own share of migrants from the total number in the sample (either from outside its boundary, that is, the in-migration, or keeping those within its boundaries from moving out, that is, the within TPU

L. The figures are obtain from the Social Statistics Unit of the Department of Census and Statistics, Government of Hong Kong, in 1974.

migrations), and the size of its share was assumed to be a linear function of its potential or attractive force in terms of its population size and relative location. The expected size of each TPU's share is therefore the same as its proportion of the total potential created by all the TPUs, as in the following:

$$\text{TPU i's expected share of migrants (in percentages)} = \frac{\text{TPU i's Potential Force}}{\text{Total Potential Force generated by all TPUs}} \times 100$$

For each TPU, the expected value is then subtracted from the observed (expressed also in percentage of the total) to produce the difference which will be called the "residual". A positive "residual" is the result of an excess of the observed share of migrants over the expected number and the reverse is a negative "residual". Both the positive and negative "residuals" were then mapped by TPUs. The map (Figure 10) reveals an interesting pattern from which we might draw some inferences about the migration processes and about the urban spatial structure.

To a long time resident, an evident explanation of the residual pattern of Victoria is the perceived differences of the TPUs in terms of socio-economic status. Immediately, he would point out that TPU 142 whose positive residual is one of the largest in Victoria enjoys a higher status than most of the localities in the city. It is located on the slopes of Victoria Peak. As in most cities, the hill side locations are the choice sites for residences because of the elevated position which provides an unobstructed view of whatever is worth looking at, a relatively pollution-free environment, and perhaps a psychological exuberance of being above the masses. The area further

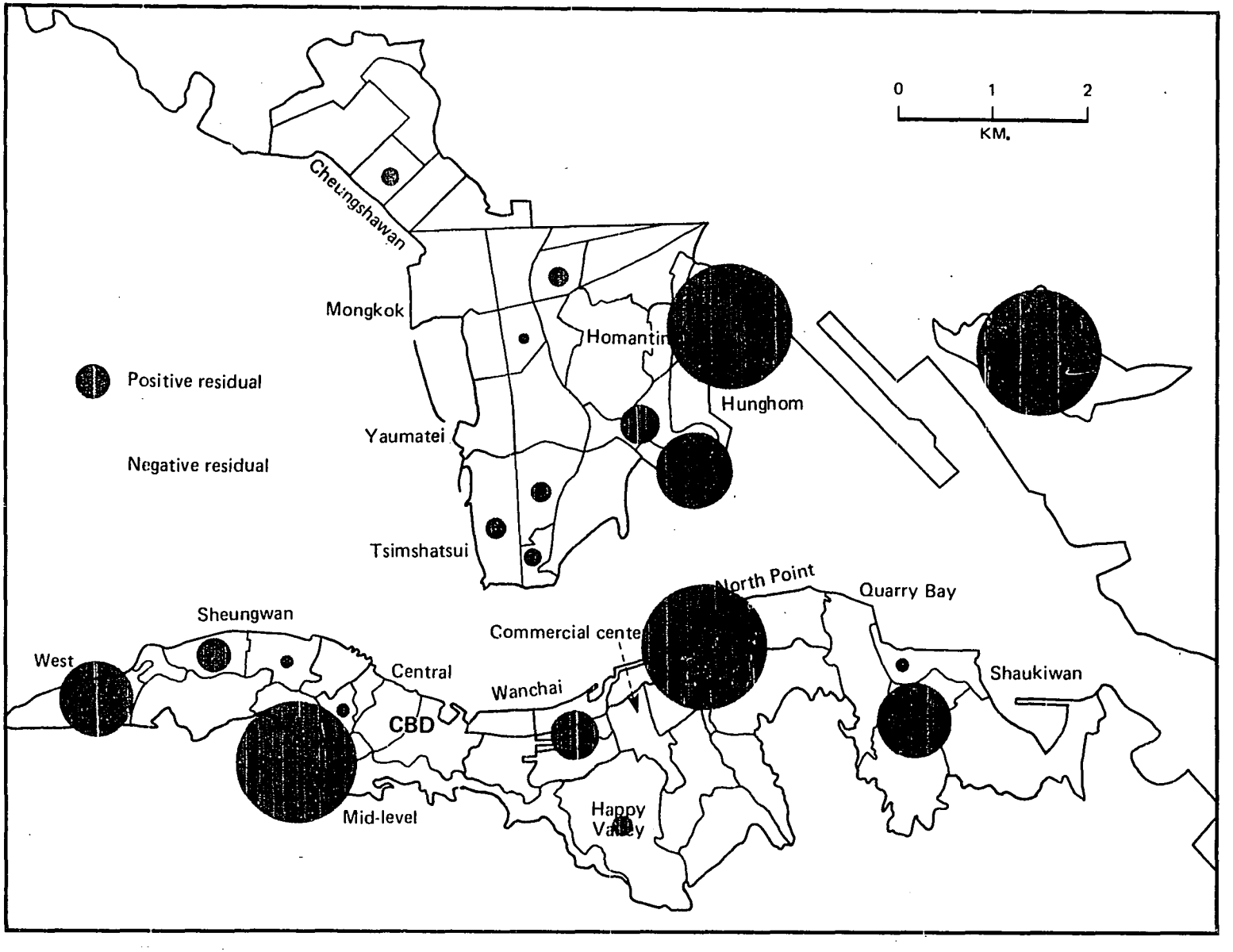


Figure 10 Residuals - When the Amount of Total Destination Points in Each TPU is compared to the Unit's Potential Value

up the slopes beyond the Mid-Levels is known as the Peak, and here all the locational advantages just mentioned are maximized. The Peak has indeed been a heaven for the wealthy and the powerful whose presence bestows further prestige to the locality. The Mid-Levels, as the name implies, enjoys a status somewhere between that of the Peak and the city below. Within the Mid-Levels itself, however, there are differences. As one climbs the steep slopes, the quality of the buildings improves and so does the wealth of the occupants. In the lower stretches, the prices and rental rates are within the reach of the middle class. The lower costs, together with prestige of the area and its proximity to the Central Business District (CBD), have made the Mid-Levels very popular.

This perceived status of the Mid-Level is generally substantiated by more objective evidence. On the basis of the 1971 census figures, Travers (p.139, 1976) has derived standardized scores of average monthly household income for 57 districts in the urban area of Hong Kong. According to these scores, the Peak is ranked second and the Mid-Levels ranked third.[1]

The other major positive "residuals" in Victoria fell in those locations which also appear to be of a higher social status than their neighborhoods, even though, unlike the Mid-Levels, these locations do not possess a clear cut social prestige that is way above others. A

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1. Ranked first is the district of Repulse Bay, a well known resort area in the southern part of Victoria. It should be noted that the district of Mid-Levels in Travers' table encompassess TPUs 141, 142 and 143 all of which are locations on the slopes. Unfortunately, Travers's districts are often aggregates of the units employed in this chapter. The scores he derived therefore cannot be freely used here.

cantonese word known as "gzarb" (雜) is often used to describe the general conditions of a place. It means literally "mixing", implying a lack of order, both physical and social, and an unpleasant situation. TPUs 156, 151, 133 and 111 all appear to be less "gzarb" than their next door neighborhoods especially TPUs 131, and 161. It is noted that TPU 131 is a notorious red light district where bars and dancing halls are packed four to five a block. Drunken sailors, prostitution and crime seem to be associated in the minds of the residents with this place. TPU 161 has generally been regarded as a poorer and less developed area which still retains a village-like environment in some parts. On its shore is also found a densely packed boat population with its stench and filth due to lack of sanitary measures. It is interesting to note the pairing of a positive with a negative "residual" in eastern Victoria. If the description of the socio-economic conditions of the localities is accurate, this pairing of the "residuals" would seem to indicate a mental process by which a general area is decided upon and then a "better" neighborhood in this area is picked out and chosen as a destination by the migrants.

There seems to be another factor that contributes to the "residual" pattern in eastern Victoria where the pairing of the positive and negative "residuals" occurs with the positive one invariably on the left (western) side of the negative one. This consistent pattern may be a reflection of the migrants' desire to be closer to the commercial center at Causeway Bay. This commercial center has the second largest concentration of retailing activities in Victoria with a blend of traditional Chinese shops and modern department stores. It is also an entertainment center with an agglomeration of restaurants,

nightclubs, modern hotels, and theatres within a few blocks of one another. Compared with the Central Business District which grows dark and empty after office hours, Causeway Bay bursts into life at night, with people overflowing into the streets from the sidewalks, with crowds of customers at the brightly lit restaurants and shops, and movie goers gathering at the theatres where movies are shown up to the small hours in the morning. Business offices and government departments have also found their way into this area. A large convention center was built here to cater to international conferences. The convergence of migrants towards Causeway Bay is likely a consequence of the attraction of this commercial center. As a retailing and entertainment focal point, the CBD is certainly being usurped by Causeway Bay. If one has lived in Hong Kong for a relatively long time, one would notice a locational shift in the popularity of the Chinese restaurants in the city. Twenty-five years ago, the most popular restaurants were in the Western districts with such big names as Lung Fung (龍鳳), Gum Sing (金城), and Luk Yue (陸羽). Then the wind of fortune blew eastward to the CBD where Tai Wah (大華), Winter Garden (皇都) and Savoy (夏蕙) took over the reign. Now, the biggest crowds are found in the restaurants in Causeway Bay and to a lesser extent in North Point (in TPU 153). This eastward shift in restaurant patronage is indicative of the growing prosperity of the eastern part of Victoria and thus its increasing attractiveness to migrants. However, one finds only a small positive "residual" in TPU 146 where the commercial center is located. One may infer that most migrants desire to be near such commercial and entertaining activities but not right in the middle of them. This is similar to the situation in which people would like to live near an

airport but not close to it. In close proximity, the undesirable aspects of the airport would become intolerable.

To the west of the Central Business District, the "residual" pattern is less complex. As pointed out earlier, the Mid-Levels are the desirable locations and their positive "residuals" have been noted. The attractiveness of these locations is probably a result also of their proximity to the CBD. However, below the slopes, nearness to the CBD does not seem to matter as the positive "residuals" increase in size away from the CBD. This pattern is likely due to the fact that the entire western district from TPU 123 to TUP 112 has been earmarked for urban renewal. The uncertainty of what might happen and the prospect of large scale construction in this area may have made these locations less attractive than those farther to the west. In addition, housing opportunities in these places have been reduced drastically because some buildings have already been torn down for renewal. Of all the TPUs in this western part of Victoria, the greatest amount of construction activity has been in TPUs 111 and 142 in the last two to three years (Figure 13).

In Victoria, therefore, the "residual" patterns indicate that the general social standing of a neighborhood and its location relative to commercial and entertainment facilities may have played a significant part in the migrants' choice of a new home.

The pattern of residuals in Kowloon is much less complicated. Tsimshatsui has barely made it into the positive "residual" category, reflecting its locational advantage of being the Western commercial and retailing center of Kowloon with its many restaurants, theatres, and

hotels, and its proximity to the CBD in Victoria.[1] Beyond Tsimshatsui, the pattern is clear: positive residuals on the eastern side of the peninsula and negative residuals on the western flank. It appears that the eastern districts have gained migrants at the expense of the western ones, a situation that would be quite surprising because Mong Kok (TPU 221) which is on the western side has a commercial and retailing center similar to the one in Causeway Bay though smaller in size. Apparently, this commercial center is not as attractive as its counterpart across the harbor. Ho Man Tin in the center of the peninsula is also an area where there are fewer migrants who have made their homes there than is expected, but in this case the pattern is easily explainable: Ho Man Tin is at a slightly higher elevation (50 to 100 feet) than the rest of Kowloon (not counting New Kowloon) and is not completely built upon. A few pockets of expensive apartment complexes are found there, and there is little commercial activities.

On the basis of our observations, the factor of "social orderliness" seems to operate in Kowloon also. Mong Kok is reputed to by very "gzarb". South of Mong Kok, Yaumatei has been designated for urban renewal. One respondent did indicate that he and his family moved because of the uncertainty created by the imminence of urban redevelopment. On the otherhand, Hung Hom appears to be less "gzarb" and is the first stop for buses coming out of the cross harbor tunnel on the newly installed route. Thus it seems that socio-economic status, urban

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1. It is a seven minutes ferry ride between Tsimshatsui and the CBD in Victoria. The ferry crossing at this point is the busiest and fastest of all the lines in Hong Kong, with an average of 139,726 passengers using this line per day in 1973 (Hong Kong Annual Report, 1974).

renewal, and relative location or connectivity have contributed in varying amounts to the cross peninsula movements of the migrants.

In those TPUs within New Kowloon, negative "residuals" prevail except in one major location, Kwun Tong. Kwun Tong is one of the major industrial centers of Hong Kong and thus one of the important employment centers also. Its large positive "residual" is due probably to the migrants' desire to be near their places of work. The rest of the locations in our study area in New Kowloon are too peripherally situated to produce any positive "residual".

The above discussion is based on the "residuals" obtained from a comparison of the two sets of figures, the potential or attractive force of a TPU and the observed number of destination points of migration in that unit. The observed value includes both within TPU moves and in-migration. To gain more insight into the movement patterns of migration, only in-migration was used for comparison with the derived potential values. The same method as before was used and the resulting Spearman rank coefficient for Victoria was +0.71 and that for Kowloon, +0.42. The "residuals" were again derived and mapped (Figure 11). In this case, a positive "residual" indicates a greater amount of in-migration into the TPU than is expected and a "negative" residual is obtained where the reverse is true. The resemblance between the "residual" maps is striking, implying that where a district is "attractive" enough to keep most people from moving out, it is also likely to be "appealing" enough to draw people from outside its borders. This attraction is of course a function of the factors discussed before, the most important of which is the information about the housing market and about the destination.

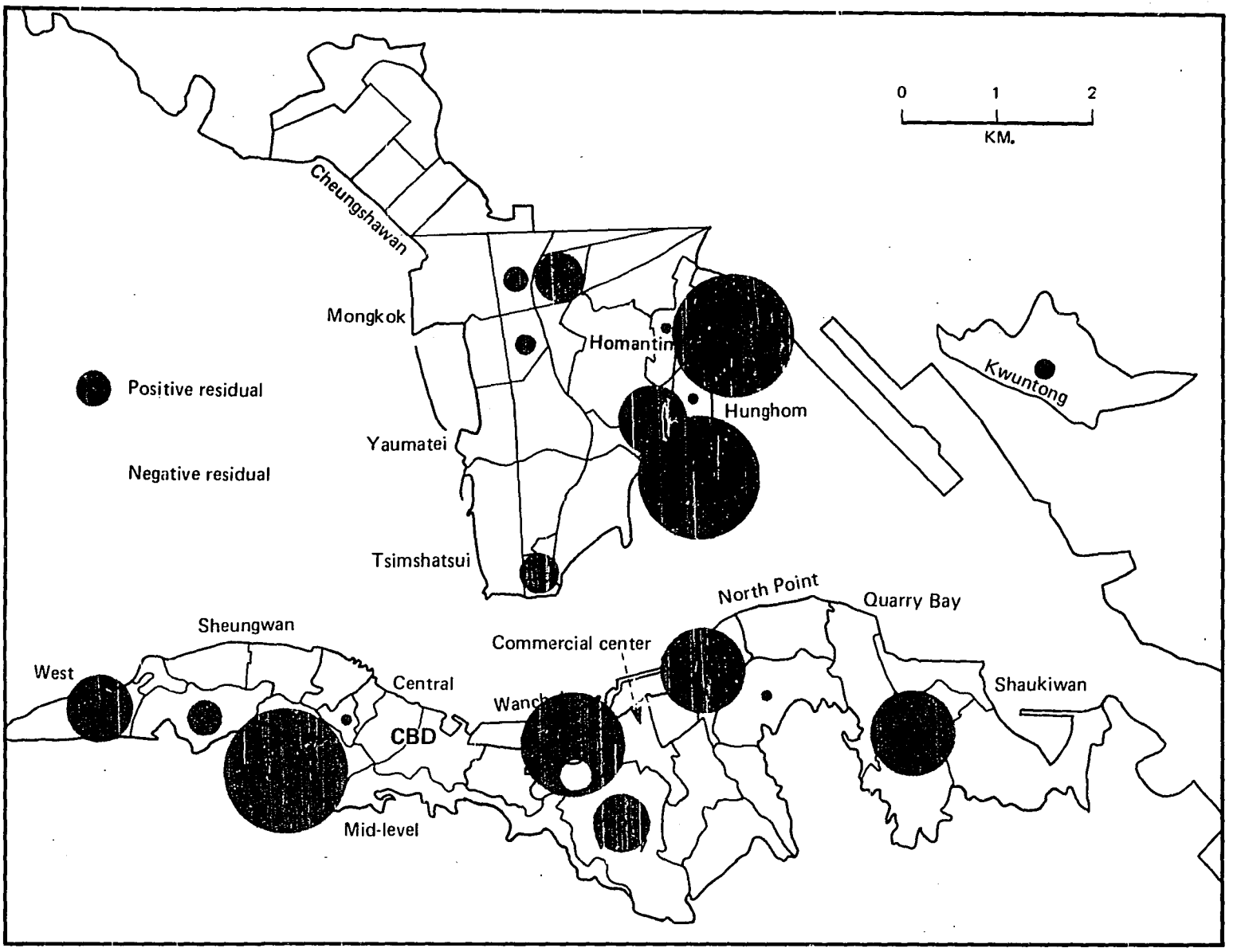

Figure 11 Residuals - When the Amount of In-Migration in Each TPU is Compared to the Unit's Potential Value

Across the harbor, the west to east movements across the peninsula are again evident. Since Ho Man Tin is hardly involved in the migration field as we have seen from the smallest space analysis in the previous chapter, most of the migrants who moved into Hung Hom must then be from the western flank of Kowloon. The small pocket of positive "residuals" at the meeting point between the three districts, Mong Kok, Ho Man Tin and Yaumatei reflects the pull of the commercial center at Mong Kok. The dramatic reduction in size of the positive "residual" at Kwun Tong betrays the district's poor location and the fact that the original "residual" value is due to the movements within the district rather than to in-migration.

In this section, it has been inferred from the "residual" patterns that relative location and the socio-economic character of a locality may have contributed to the shaping of the migration patterns in Hong Kong. Relative location has in fact been used earlier in this chapter as a component of the potential model to generate an "attraction" or "potential" index. However, on the basis of the foregoing discussion, it is felt that this component should be extracted from the potential model for a closer look. We will do just that in the following section and leave the socio-economic factor which needs a more detailed treatment to the next chapter.

A Hierarchical Order of Location in Victoria

To take a further look at the relationship between the relocation of migrants (i.e. each TPU's share of migrants) and the unit's relative location (i.e. the $\sum_{j=1}^{n} \frac{1}{d_{ij}}$ term in the potential model), a scattergram of these two variables was drawn (Figure 12). The pattern

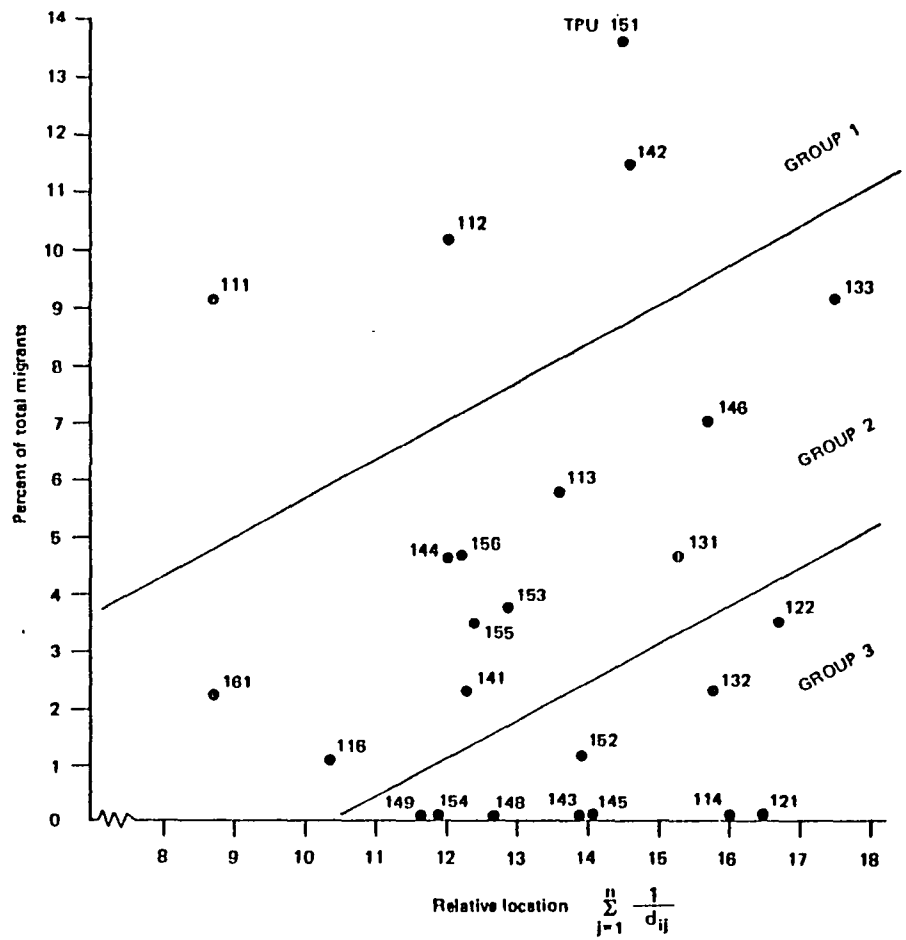

Figure 12 Relationship Between Migration and Relative Location in Victoria

so derived appears random, contrary to the earlier findings and discussion. However, a more careful examination of the diagram reveals a certain stratification and grouping of the points. The TPUs decrease in population size rather consistently in a northwest-southeast direction in the scattergram. Our knowledge of the area indicates also that the amount of housing supply (to be given a more exact definition later) in these locations also seem to decline in a similar direction. In other words, those at the top of the graph (i.e. TPUs 151, 142, 112 and 111) appear to be the population and housing supply centers, forming a distinct group. The rest can be partitioned into two separate groups. If one uses the nearest neighbor concept in determining the grouping, with the exceptions of TPU 131 and 161, two groups would be formed as indicated in the diagram. Before embarking on an analysis of these groups, the housing supply factor needs to be given a quantitative value.

Housing supply is defined as the total number of apartment units (irrespective of size) that were constructed in 1972, 1973 and the first five months of 1974.[1] The reason for using housing figures dating back to 1972 is obvious when it is realized that the housing market consists of both used and new housing. However, statistics on the size of the used housing market are not available. To determine

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1. Figures for the month of May 1974 were the latest available at the time of data collection. Besides, none of the migrants in the sample moved after this month, thus making the housing supply figures later than that date irrelevant. The 1972-73 figures were compiled from the records kept by the Rating and Valuation Department. The 1974 figures were not available at this department at the time and were obtained from the files of the Public Works Department.

the age of the buildings the migrants moved into, a cross check of the present addresses of the migrants was attempted with the files kept by the Department of Public Works, and the Department of Rating and Valuation in which the addresses of the buildings constructed each year are recorded. This process of cross-checking is not only painstaking but very often frustrating because the street numbers of the buildings' addresses may have changed after the buildings were constructed and occupied because the new buildings are usually bigger than those replaced and thus require a larger set of street numbers. A case in point is a building of eighty apartment units in North Point (Victoria) which had the street numbers of 314-316 in its address for six months after construction but the street numbers of that building later became 310 for unknown reasons. In other words, the stated addresses of the migrants may not match those in the government files even though they may refer to the same buildings. It seems that approximately forty per cent of the migrants in Victoria moved into buildings constructed in 1973 and in Kowloon the figure is about twenty per cent. It was therefore decided to use the housing figures dating to the beginning of 1972 as a measure of the supply that is relevant to the study. In this connection, the Rating and Valuation Department publishes a table in their annual report which lists the total domestic vacancies by districts. In the table, the vacancy situations in terms of number of vacant units at the beginning of the year and that of the previous year are given but the figures provide a picture of what is available at only one point in time. A district might have a large housing supply during the year but by the end of the year, most of the supply might have been occupied. Since we are

concerned with availability through the year, the official vacancy reports are not adequate. Further, they have the disadvantage of being aggregated by districts and not by the smaller units that are used in this analysis.

The total number of apartment units per TPU in the period between January 1972 and May 1974 inclusively was determined and the figures were mapped (Figure 13). In Victoria, the distribution of supply is quite even throughout the urban area with slightly heavier concentrations in the western districts (including Mid-Levels), North Point, and just outside Shaukiwan. Wanchai has lagged behind in providing housing in the last two and half years. In Kowloon, the distribution of housing supply assumes a very clearcut pattern, with most of it concentrated in two locations, Mong Kok and Hung Hom. At the extreme corner of Kowloon, Kwun Tong has had a fair amount of housing supply too. Excluding this isolated locations, however, the bi-nodal distribution of housing supply in Kowloon is unmistakable.

Taking both the population size and size of the housing supply, the first group of TPUs in the scattergram had a mean population size of 49,973 persons and an average housing supply of 1,178 units. The second group's figures were 40,502 persons and 867.82 units, while the third group averaged 13,008 persons and 248.40 units. Since the figures given are the averages for each group, an index to indentify the membership of each individual TPU is clearly desirable. This index was derived by multiplying the two variables, population size and housing supply, and dividing the product by a constant. The result is an index of population weighted by supply. By this index, the three groups have the following ranges: those in group one at the top of

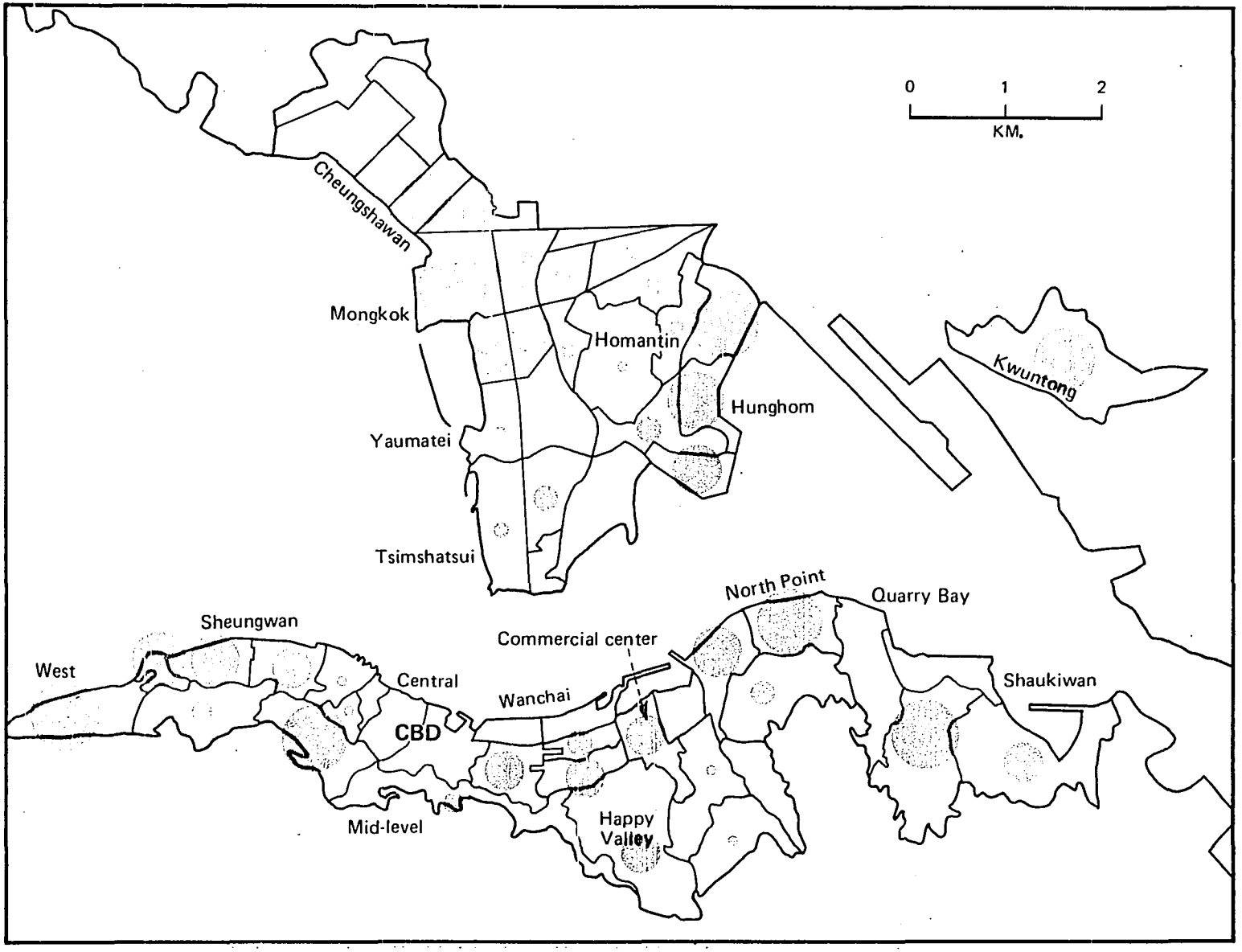


Figure 13 The Distribution of Housing Supply in Hong Kong

the graph have an index of above 40, with one exception; those in group two range from 5 to 40, with five exceptions, and those in group three are below 5, with one exception. The exceptional cases, as marked in the graph (Figure 14) will be dealt with more explicitly later.

When the TPUs in the scattergram are stratified into three groups, a linear relationship between migration and relative location can be discerned in each group, especially in the top two groups. What is being done is to hold the variables of population and housing supply constant in order to observe the effect of relative location on relocation. To measure the strength of the relationship and to determine the predictive power of relative location, a linear regression within each group was performed. The results of the regression runs are shown in table 8.

The coefficients of determination in the first two groups (0.72 and 0.75) indicate a strong relationship between relocation and relative location. The relationship in the third group is much weaker, with a coefficient of determination of only 0.29 but since only 6.9 per cent of all the moves have ended in these TPUs, we may safely assume that this group of locations is at best marginally important as far as migration is concerned. We may infer from the relationships that, given several locations of similar population size and containing similar housing supply, migrants would tend to choose the one that is best situated in the urban area.

As mentioned earlier, there are seven cases which do not fit within the three groups of locations in the hierarchy. These cases possess a weighted population index outside the groups' ranges. In the previous regression analysis, it was assumed that the exceptional cases

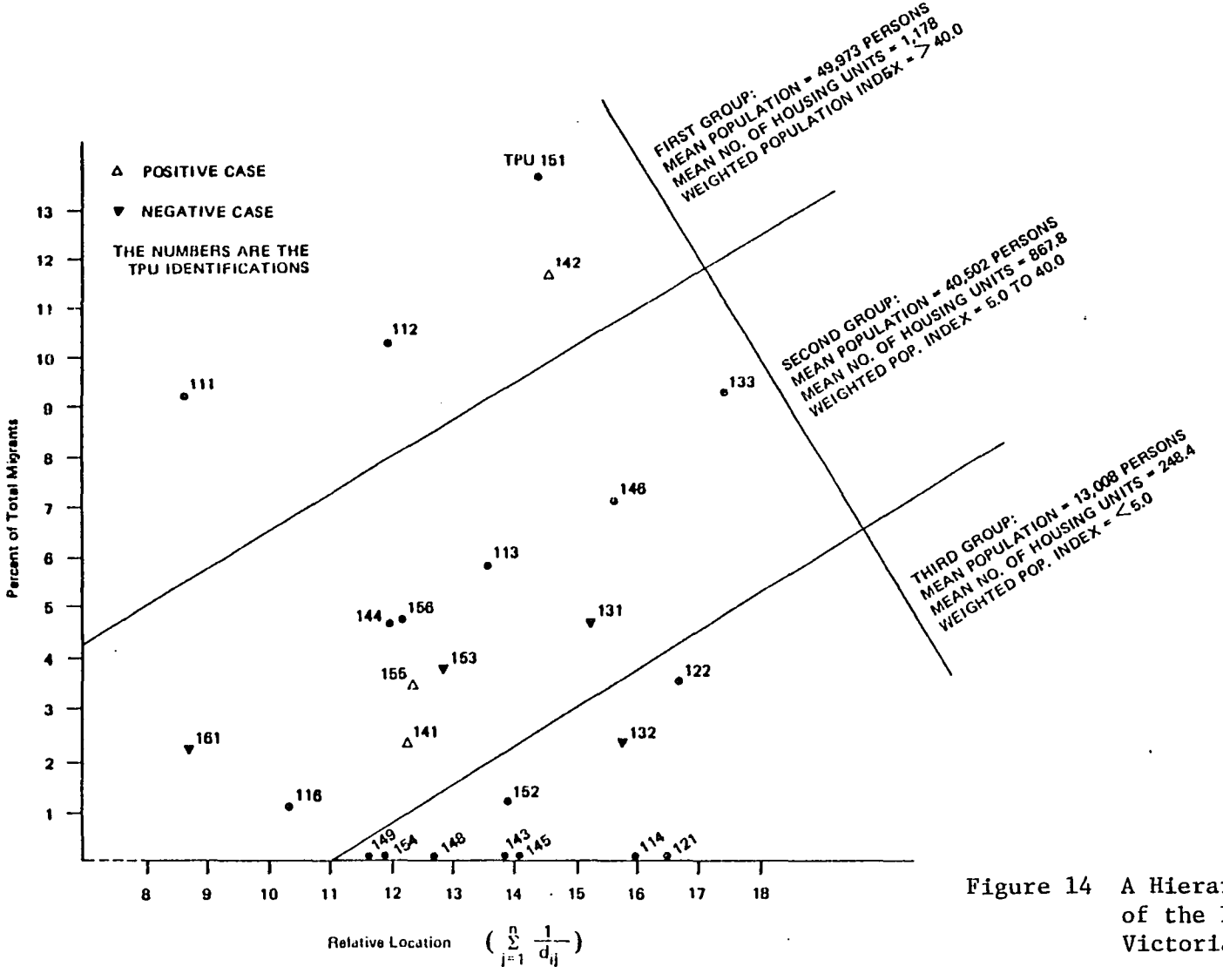


Figure 14 A Hierarchical Structure of the Locations in Victoria

Table 8

Results of the First Regression Run

Group	Number of Cases	Coefficient of Determination	Standardized B Coefficient
1	4	0.72	0.85
2	11	0.75	0.86
3	10	0.29	0.54

Table 9

Results of the Second Regression Run

Group	Number of Cases	Coefficient of Determination	Standardized B Coefficient
1	3	0.87	0.93
2	6	0.93	0.96
3	9	1.23	0.48

were legitimate components of the groups and were included in the analysis. Here, they are excluded and the regressions rerun. The results are given in Table 9.

Except for the last group, the coefficients of determination have increased substantially, indicating an improvement in the predictive power of the relative location factor. Clearly, the cases of exception have introduced into the previous regression analysis an influence not included in the independent variable and have, therefore, depressed the variance explained. Closer inspection of these cases may reveal what this influence is.

These cases may be divided into two types: the positive cases, that is, those that should have been at a lower level in the hierarchy but are found in an upper level, and the negative cases, that is, those that should have been in an upper level but are found in a lower level. The three positive cases are TPUs 142, 141 and 155. The four negative cases are TPUs 131, 132, 153 and 161. These exceptional cases agree quite well with the "residuals" in the previous section, with the positive cases matching closely the positive "residuals", and the negative corresponding to the negative "residuals". Such matching is expected to a certain extent because with the exception of the housing supply factor, the variables used in this graphical-regression model are the same as in the previous analysis from which the "residuals" are derived. However, in the present analysis, the potential model was disaggregated to isolate and observe the effect of the relative location component. The matching of the "residual" patterns and the cases of exception indicates again the need to examine the socio-economic factor as an additional explanatory variable of migration.

Given the three-level hierarchical ordering of the locations in Victoria, it seems that given equal availability of housing opportunities, and equal amount of information about such opportunities and about the neighborhoods, the migrants would choose the one with the locational advantage. This hierarchical model offers, therefore, a framework for understanding the urban structure of Victoria. One may conceptualize Victoria as cast in a three-level hierarchy with those locations at the top level growing faster in population through migration than those in the lower levels. Within each level, those that are better located grow at the expense of the less well situated. If such a framework is accepted, it can be used as a growth model for Victoria by which the spatial distribution of population in the future may be predicted. However, one may notice that the presence of exceptional cases in the framework gives this model a rather untidy appearance in spite of the near perfect coefficients of determination that were obtained. Therefore, in the next chapter, another model will be formulated that will include the variables discussed previously.

A Bi-Nodal Structure of Kowloon

A scattergram similar to the one for Victoria was drawn for Kowloon (Figure 15). Again, the points appear to be randomly distributed, implying little association between migration and relative location. However, the kind of hierarchical structure observed in Victoria is not found here. This finding agrees with the analysis in Chapter 2 which indicates that migration in Kowloon is not affected sufficiently by distance. On the other hand, figure 16 has shown that housing supply in Kowloon assumes a bi-nodal distribution that is

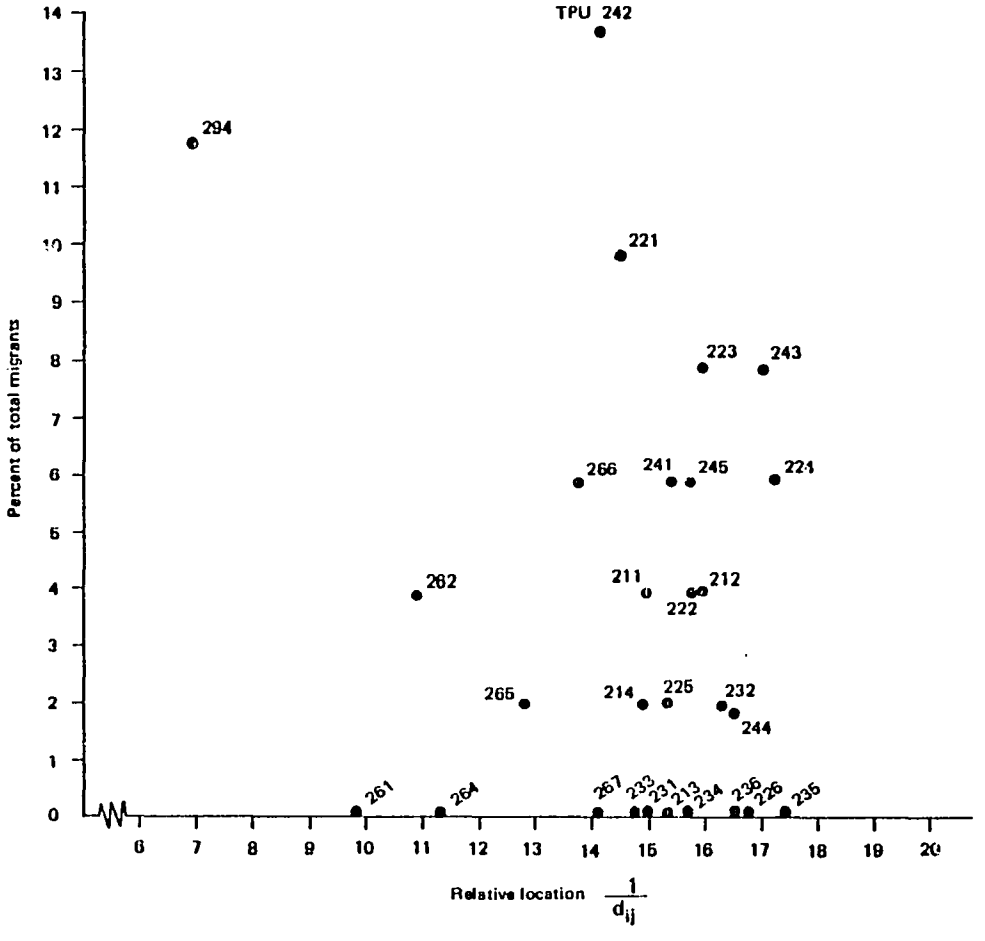


Figure 15 Relationship Between Migration and Relative Location in Kowloon

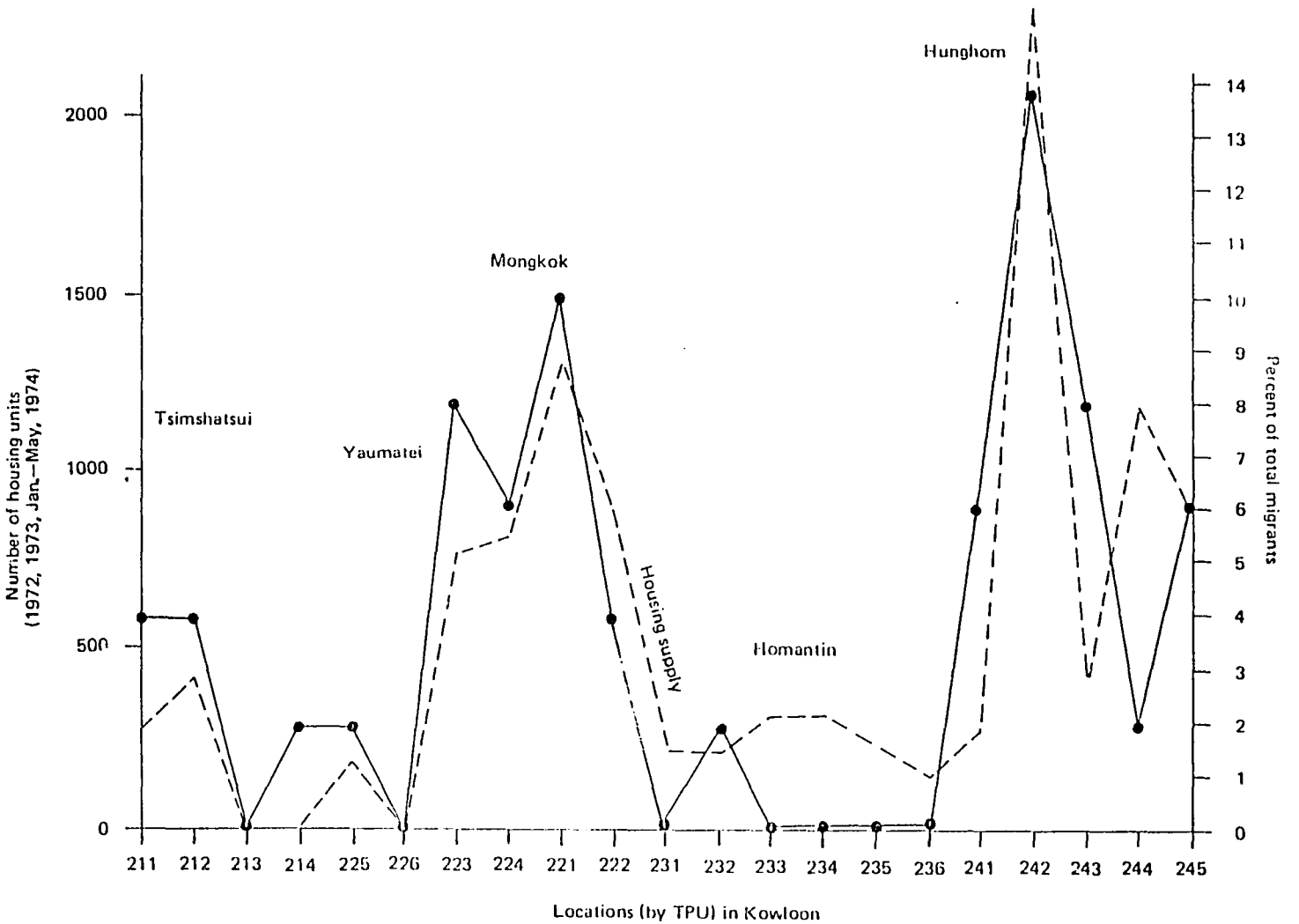


Figure 16 Housing Supply and Migration in Kowloon

similar to the observed pattern of migration. A Pearson r (Product-Moment) correlation between the two distribution yields a coefficient of +0.83 which is highly significant. In Victoria, the coefficient is only +0.59. In any city, one expects a certain association between where the housing supply is and where people would move to, but the strong correlation found in Kowloon is likely an indication of a special phenomenon. Indeed, compared with Victoria where the supply was 44.8 housing units constructed per 1,000 persons in the period 1972 to May 1974, the figure in Kowloon was only half as much (22.2 units per 1,000 persons). In addition, 59.5 % of this supply in Kowloon was concentrated in Mong Kok (25%) and Hung Hom (34.5%). In other words, the migrants in Kowloon had fewer choices both in quantity and in location. Since most of the housing opportunities were in Mong Kok or in Hung Hom, it was expected that a large proportion of migrants' choices would be in these two areas also.

Given the strong correlation between migration and housing supply, it would be desirable to be able to explain the observed distribution of the housing opportunities, especially the bi-nodal pattern of concentration. One plausible explanation of the supply pattern is suggested here. Of the two supply concentrations, Hung Hom is ten per cent larger than Mong Kok's (Figure 16). An examination of the spatial patterns of land values in Kowloon (Figure 17) indicated that the cost of land in Hung Hom was much lower than in Mong Kok and the rest of the western flank of the peninsula. Most of the land in Tsimshatsui and northwards from Yaumatei to Mong Kok was at least twice as expensive as that in Hung Hom. Such high land value results in residential use being outbid by commercial use in these locations, the

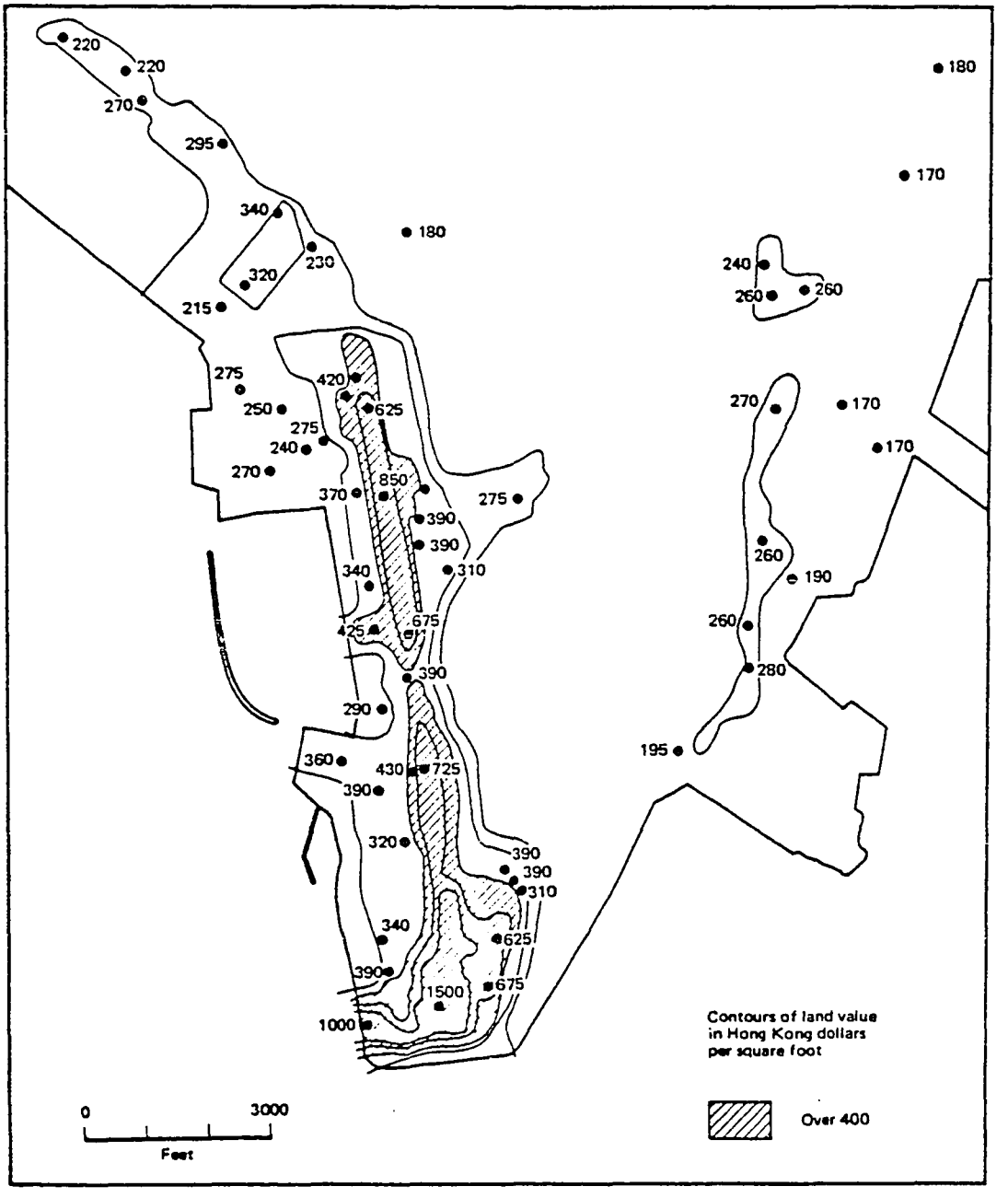


Figure 17 Distribution of Land Values in Kowloon
Source: Liang, C. A., Urban Land Use Analysis; a Case Study of Hong Kong, Ernest Pubns., 1973, p. 101.

lower land cost in Hung Hom tends to increase the profit margin and thus encourages residential development there. Coupled with the availability of more housing opportunities was probably a more viable neighborhood in Hung Hom which, as postulated in the section on "residuals", could be labelled as generally less "gzarb" or "disorderly".

Summary

An adapted version of the potential model was employed in this chapter to explain the observed patterns of intra-urban migration. On the basis of the "residual" analysis, the potential model was disaggregated so that the component of relative location could be examined more closely. A conceptual framework for understanding the urban structure of Victoria was then developed and an explanation of the migration patterns in Kowloon was suggested.

Chapter 4

The Potential Model Revisited and a Multi-Variate Analysis of Migration

Introduction

To gain further understanding of the migration patterns in Victoria and Kowloon, it was suggested in the last chapter that the socio-economic character of a neighborhood should be examined as an additional independent variable. There were indications that an improved measure of relative location would increase the exploratory power of the potential model in Victoria. The search for a suitable variable that may adequately describe the socio-economic nature of a place presents a problem and will be discussed later. At this point, effort is made to improve the measure of the relative location component of the potential model.

The Potential Model Revisited

In Chapter Two (p.36), it was mentioned that distances in multi-dimensional scaling can be measured by the use of the general Minkowskian metric of the form:

$$d_{ij}(P) = (\sum_{x=1}^{n} |X_{ik} - X_{jk}|^{P})^{P}$$

When P=2, we have the familiar Euclidean metric which is used most frequently in geographical studies (in those cases when the gravity or potential model is employed). When P=1, the distances are measured in the Manhattan or city block metric. The Euclidean metric is employed most often because it measures the straight line distance between two

points and is thus conceptually simple. On the other hand, the Manhattan metric is less straight forward. Figure 18 illustrates the differences between the metrics. When P=2, all the points that are of the same distance away from the central reference point would lie on a circle. When P=1, such points would lie on a square. When P=2/3, we would no longer be in a metric space. The distances between points would thus change as one switches from one metric to the other. The effect of allowing the Minkowskian metric to range from zero to infinity is illustrated in Figure 19.

It can be seen from the diagram that distances between points are greatest when P=1. If this metric is applied to the calculation of our index of relative location, the marginal positions of those TPUs that are located in the periphery of the urban areas will be accentuated. In other words, the Manhattan metric portrays a greater attenuating effect of distance and therefore was used to calculate the component of relative location in our potential model. The potential indices so derived are thus based on the following formula:

$$A_i = (M_i) \left(\sum_{j=1}^{n} \frac{1}{d_{ij}} \right)$$

where A_i = potential index at place i

M_i = population size in number of persons at place i

d_{ij} = Manhattan distance between places i and j

As an experiment, the population density of place i (i.e. number of persons per acre) was taken as a variant of M_i and the potential index of place i was generated.

Figure 18

Iso-Similarity Contours
for Selected Minkowski P-Metrics

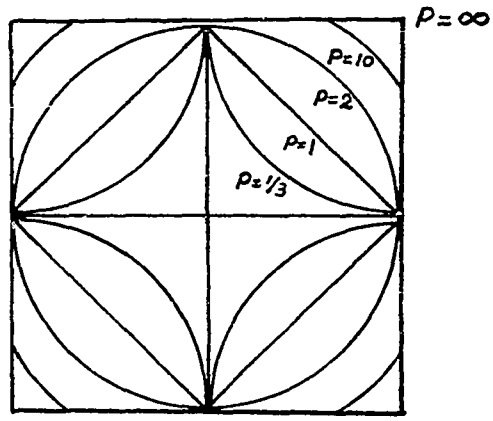
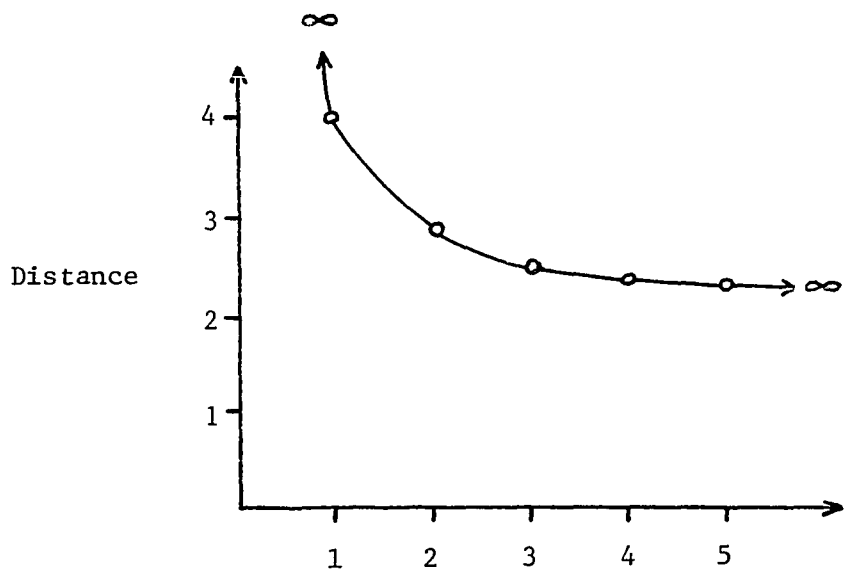


Figure 19

Effect on Distance as Minkowskian
P-Metric ranges from Zero to Infinity



Source: Calculated by the author

Thus, there are four variations of the potential index:

Potential Index 1:- M_i = population size of place i

d_{ij} = Euclidean distance between places i and j

Potential Index 2:- M_i = population size of place i

d_{ij} = Manhattan distance between places i and j

Potential Index 3:- M_i = population density of place i

d_{ij} = Euclidean distance between places i and j

Potential Index 4:- M_i = population density of place i

d_{ij} = Manhattan distance between places i and j

The purpose of using population density is to see if the population figures would be a better surrogate measure of the information factor after having neutralized the effect of variations of the TPUs in area. The patterns of in-migration and total migration (that is, including the within TPU moves) were regressed on each of the potential indices to determine which index had a better predictive power of migration. The linear regression was done separately for both Victoria and Kowloon. The coefficient of determination in each case is given in Table 10.

The results of these regression runs indicate that population size is a better predictor of migration than population density. Apparently, population size is a better surrogate measure of the information factor than population density. In other words, it seems

Table 10

Coefficients of Determination of the Linear Regressions of Migration on Potential Indices

Dependent Variable	Independent Variable	Coefficient of Determination	
		Victoria	Kowloon
In-Migration	Potential Index 1	20.9%	24.4%
	Potential Index 2	21.8%	27.9%
	Potential Index 3	17.2%	20.0%
	Potential Index 4	9.8%	23.1%
Total Migration	Potential Index 1	27.0%	30.3%
	Potential Index 2	27.5%	28.7%
	Potential Index 3	18.4%	18.6%
	Potential Index 4	9.5%	19.0%

that inter-personal communication depends on the actual number of people in a place rather than on the ratio of the number of people to the size of the place, which is of course the usual measure of population density. This explans why the gravity model has been so successful in traffic studies. The model measures the actual number of people in a place, and in the generation of traffic, it is the number of people that is most important. The size of the area has no influence. Thus potential indices 3 and 4 can be ignored.

The second point about the regression results is that in Victoria there seems to be a slight improvement in the amount of variance explained with the use of the potential model employing the Manhattan metric but in Kowloon, such improvement occurred only in the prediction of in-migration.

In these linear regression runs, the residual sums of square are sizable enough to warrant abandoning the linearity assumption of the relationship between migration and potential indices. A Pareto curve of the form $Y = aX^b$ was fitted to the data through the use of linear regression after the formula is converted into the linear form through the use of logarithm: $\log Y = \log A + b \log X$. The Pareto curve was used because of its simplicity and ease of application. The results of the second regression runs are shown in Table 11. In this second run, only potential indices 1 and 2 were used. Indices 3 and 4 were discarded because, as evident in the previous runs, they were not as powerful as the other two indices in explaining migration. It is clear from the results that the establishment of a curvilinear relationship between migration and the potential indices in Victoria substantially improves the predictive power of the latter. It can be seen also that the

Table 11

Regression Analysis of the Non-Linear Relationship between Migration and Potential Indices

Dependent Variable	Independent Variable	Coefficient of Determination	
		Victoria	Kowloon
In-Migration	Potential Index 1	42.8%	20.9%
	Potential Index 2	44.2%	20.1%
Total Migration	Potential Index 1	41.9%	20.5%
	Potential Index 2	42.2%	19.4%

Manhattan metric is superior to the Euclidean metric in explaining migration. In Kowloon, however, a linear relationship seems to be a better fit. The Euclidean metric seems to work better also in Kowloon. This finding again agrees with the conclusions reached earlier that relative location in Kowloon is not as important a factor in migration as it is in Victoria.

Having established the predictive power of the modified potential model, detailed analysis of the socio-economic variable will now be undertaken.

The Search for a Socio-Economic Variable

Analysis in the last chapter pointed out the need for a socio-economic variable to increase understanding of the migration patterns in Hong Kong. This section describes the attempt to identify and quantify this variable and to correlate it with the migration patterns.

There are two problems one should be aware of when looking for a reliable variable that can accurately describe the socio-economic conditions of a neighborhood in Hong Kong. The first problem is that it is generally believed that the income figures collected in the 1971 census in Hong Kong are grossly under-reported (Wong, 1975). The median gross monthly income of a household is reported to be HK$708 in the census (US$141.6, using an exchange rate of HK$5 to US$1).

The second problem, which has already been discussed in the beginning of Chapter Two, is the heterogeneous nature of the neighborhoods in Hong Kong, and has prompted the use of population size and relative location as independent variables because they are not affected by such heterogeneity. At this point, the need for a quantitative

description of the socio-economic nature of a place requires us to go beyond these two basic geographical dimensions.

In view of these two problems, it is felt that a multi-variate approach in describing the socio-economic conditions of the locations in Hong Kong would be more reliable. In the 1971 census, a number of household and population characteristics was tabulated for each street block (Table 12). For each characteristic, there are usually several categories. For example, there are eleven categories for the item, "household income per month". A full tabulation of all the categories of these eighteen characteristics aggregated from the street blocks to the level of the tertiary planning units and converted to percentages was obtained.[1] Each category was treated as a distinct variable and the total number of variables came to 83 (a full listing of these variables can be found in Appendix 6). Since many of these variables are but classes of the same item, there is a great deal of redundancy in them. To reduce the redundancy, a factor analytical technique is needed. By this technique, several components that will account for the interrelations of the original variables will be extracted. The character of each component is dependent on what variables are "loaded" or correlated highly with it. From these components, a set of factor scores can be calculated. These factor scores can be regarded as composite variables derived from the combination of the original variables. Therefore, the main purpose of using the factor analytical

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1. The author is grateful to Dr C.P. Lo of the Department of Geography and Geology, University of Hong Kong, for making the data available. The assistance of Mr Luke S.K. Wong, the assistant dean of students of the University of Hong Kong in this matter is also greatly appreciated.

Table 12

Household & Population Characteristics in the 1971 Census Block Data

Household	1.	Type
	2.	Number of Persons
	3.	Tenure
	4.	Type of Accommodations
	5.	Rent per Month
	6.	Income per Month
	7.	Own Cars
Persons	1.	Marital Status
	2.	Sex
	3.	Age
	4.	Place of Origin
	5.	Place of Birth
	6.	Usual Language
	7.	Educational Attainment
	8.	Ability to Speak English
	9.	Activity Status
	10.	Occupation
	11.	Industry

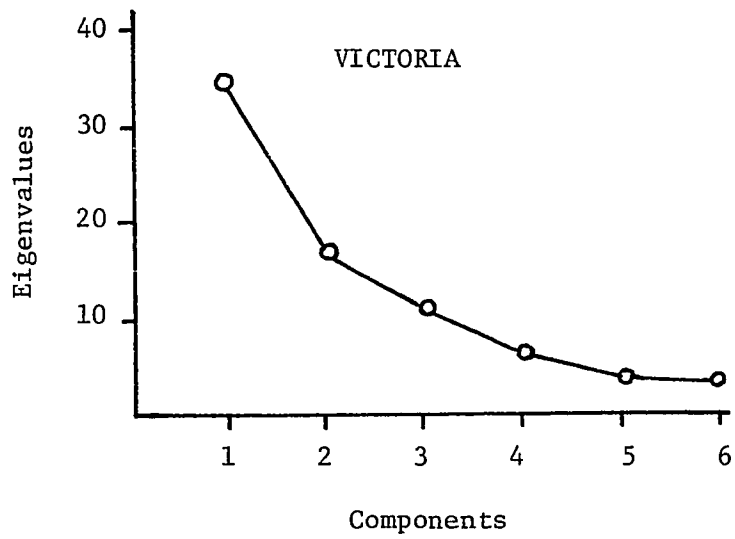
technique here is to make use of its data-reduction capability and to build composite indices out of the original variables.

Ten components were extracted from the 83 variables by the use of principal-component analysis for Victoria and Kowloon separately. Varimax rotation was performed to simplify the factor structure to facilitate interpretation of the factors. A comparison of the loadings between the unrotated and the rotated factors does indicate that the varimax rotation makes it easier to label the factors. One of the problems in factor analysis is to determine the number of factors that are significant. There is no fast and hard rule to help one to solve this problem. One way is to plot the eigenvalues by the factors or components and to see if there is any natural break in the sequence. Figure 20 shows such plots for Victoria and Kowloon.

In Victoria, the eigenvalues tend to level off after the third factor while in Kowloon, the levelling off begins after only two factors. The break is particularly prominent in Kowloon. It was decided therefore that the first three factors for Victoria and the first two for Kowloon would be considered as significant. The three Victoria factors account for 73.1% of the variance while in Kowloon, the two factors have explained 63.6% of the variance. Tables 13 and 14 list these factors, their respective eigenvalues, and the variables that load highly on them. Due to the large number of variables and for ease of labelling, only those variables with loadings of + or - 0.60 are considered and listed.

Figure 20

Eigenvalues for the First Six
Components in Victoria and Kowloon



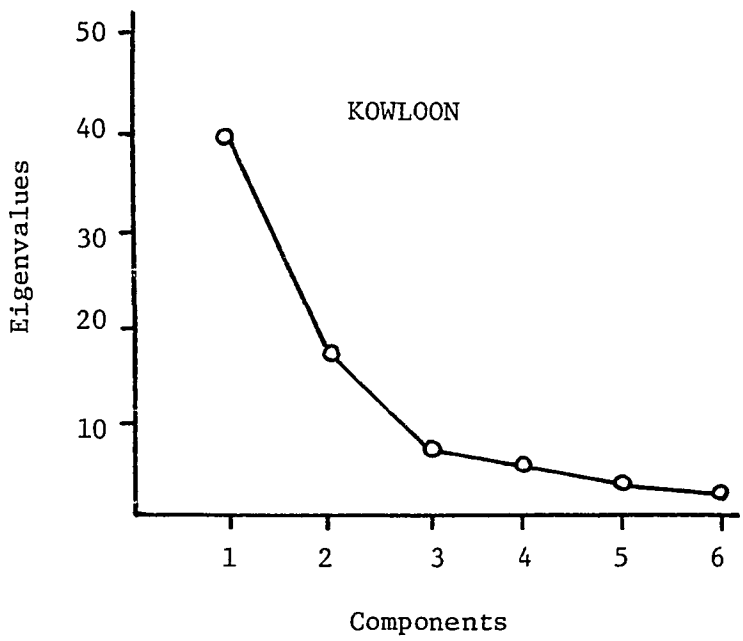


Table 13

Factor Loadings for the First Three Components in Victoria

Number	Variable Name	Component 1	Component 2	Component 3
28	Monthly income $600-$799	-0.67709		
29	Monthly income $800-$999	-0.68248		
30	Monthly income $1000-$1199	-0.77249		
33	Monthly income $2000-$2499	0.71430		
34	Monthly income $2500-$4499	0.86849		
35	Monthly income $4500 or more	0.86228		
41	Monthly rent $600-$799	0.81376		
42	Monthly rent $800-$999	0.91778		
43	Monthly rent $1000 or more	0.89748		
44	Own one car	0.84548		
45	Never married	-0.89895		
46	Married	0.86681		
47	% males	-0.65102		
49	% aged 10-19	-0.83975		
52	% aged 40-49	0.77441		
53	% aged 50-59	0.85442		
55	% Hong Kong born	-0.84384		
58	% foreign born	0.91734		
60	% with primary education	-0.88490		
62	% with post-secondary education	0.88749		
63	% with university education	0.93844		
64	% speak English	0.87094		
66	% employers	0.94687		
72	% professional workers	0.79798		
73	% technicians	0.64473		
74	% administrators/executives	0.97678		
76	% service/sports workers	0.74781		
78	% craftsmen/laborers	-0.79687		
79	% transport workers	-0.79488		
83	% in service industry	0.92961		
25	Monthly income less than $200		0.72351	
36	Monthly rent less than $50		0.64870	
1	% of collective households		0.93911	
10	% of households in institutions		0.93911	
19	% in tenement flats		0.89925	
22	% in verandah, cockloft or basement		0.92215	
23	% in storeroom, shop etc.		0.92309	
5	% of single-person households		0.72645	
7	% of five-persons households		-0.69093	
48	% aged 0-9		-0.76078	
54	% aged 60 and over		0.75811	
56	% born in Canton, Macao etc.		0.77514	
65	% self-employed		0.76361	
68	% family workers		0.93844	
81	% in manufacturing (textiles)		0.74551	
82	% in commerce		0.67023	
16	% paying no rent			-0.50194
24	% in temporary structure			-0.51340
32	Monthly income $1500-1999			0.93572
33	Monthly income $2000-$2499			0.56901
50	% aged 20-29			0.56081
59	% with no schooling or kindergarten			-0.77879
61	% with secondary education			0.90714
70	% retired or homemakers			0.72879
73	% technicians			0.64893

Table 14

Factor Loadings for the First Two Components in Kowloon

Number	Variable Name	Component 1	Component 2
11	% owner occupiers	0.78313	
16	% households paying no	0.80127	
18	% in self-contained flats	0.72176	
20	% in a room or cubicle	-0.72799	
27	Monthly income $400-$599	-0.87309	
28	Monthly income $600-$799	-0.94018	
29	Monthly income $800-$999	-0.81411	
32	Monthly income $1500-$1999	0.82195	
33	Monthly income $2000-$2499	0.94185	
34	Monthly income $2500-$4499	0.92193	
35	Monthly income $4500 or more	0.75361	
36	Monthly rent less than $50	-0.63985	
37	Monthly rent $50-$99	-0.79820	
41	Monthly rent $600-$799	0.77661	
42	Monthly rent $800-$999	0.85122	
43	Monthly rent $1000 or more	0.68502	
44	% own one car	0.77780	
45	% never married	-0.73477	
46	% married	0.71450	
47	% males	-0.72466	
48	% aged 0-9	-0.61038	
53	% aged 50-59	0.78453	
54	% aged 60-69	0.69766	
57	% born in Shanghai, Taiwan etc.	0.63990	
58	% foreign born	0.85437	
59	% with no schooling or kindergarten education	-0.69842	
60	% with primary education	-0.97422	
61	% with secondary education	0.91137	
62	% with post-secondary education	0.93837	
63	% with university education	0.95019	
64	% can speak English	0.94686	
66	% employers	0.89366	
72	% professional workers	0.87609	
73	% technicians	0.90061	
74	% administrators/executives	0.93536	
76	% service/sports workers	0.72644	
78	% craftsmen/laborers	-0.86087	
82	% in commerce	0.78523	
83	% in service industry	0.92677	
2	% households occupying whole of a living quarter		-0.84779
3	% households sharing a quarter		0.84598
5	% single-person households		0.82403
6	% three-persons households		0.82524
7	% five-persons households		-0.78669
8	% seven-persons households		-0.95627
9	% ten-persons households		-0.63216
12	% sole tenants		-0.93173
13	% main tenants		0.83266
14	% sub-tenants		0.82555
25	Monthly income less than $200		0.54369
26	Monthly income $200-$399		0.56890
39	Monthly rent $200-$399		0.79801
46	% married		0.60099
49	% aged 10-19		-0.84915
50	% aged 20-29		0.76683
51	% aged 30-39		0.75872
56	% born in Canton, Macao etc.		0.63609
65	% self employed		0.61881
71	% students		-0.95927

Factor Labelling

The first factor in Victoria is characterized by high household income, high monthly rent, well educated individuals who are most likely married, well established in their careers and are holding white collar prestigious jobs. A large number of people in the age groups 40 - 59 are associated with this factor. Many of these people also own one car and can speak English and among them are the expatriates who normally hold high positions in the government and business firms. This factor can be labelled as high affluence dimension.

The second factor is almost the polar opposite of the first. It is characterised by low household income (less than HK$200 per month), low monthly rent, and individuals residing in poor accommodations such as cocklofts and verandahs. People who are in the age group 60 and over, or those born in Canton or its adjoining areas, are associated with this factor which apparently describes those places which are poor and where poor refugees from China are found in relatively large numbers. This factor is therefore labelled as a "gzarb" dimension.

The third factor presents a less clear-cut picture. To facilitate interpretation, those variables with loadings of more than + or - 0.50 are used in this particular case. This factor seems to describe those locations where people with a secondary school education are just starting out in their careers and are making a reasonably good income. On the other hand, there are retired people and homemakers among this group whose income is likely to be that of a middle class. This dimension seems to reflect a middle class social status and is labelled as the well-to-do factor.

The first factor for Kowloon is almost identical to the first factor for Victoria, and is accordingly labelled. The second factor in Kowloon differs somewhat from the second factor for Victoria. It is more of a lower middle to low status dimension. This factor is associated with people in the young adult and middle age groups, who tend to be single or have small families and are sharing accommodation with others. Unlike the second factor in Victoria, fewer of these people are living in very poor physical conditions and many are paying a relatively high rent. Apparently, this is a group of young working people who are not particularly well educated but are getting by.

These components describe the locations in the urban areas of Hong Kong on the basis of many variables. From these components, factor scores are derived. These factor scores inform us how highly each location (TPU) "loads" on each component. For Victoria, the factor scores of each TPU in the study area is obtained for the first three components and for Kowloon, those for the first two components. To find out how well these composite variables of socio-economic status, together with the modifed potential indices discussed earlier in the chapter can predict migration, a multiple regression analysis is performed. A stepwise model is employed in order to identify the relative significance of the variables. The results are given in Table 15.

The results of the regression analysis do not seem to be very encouraging. The socio-economic components did not improve substantially the prediction of the total migration patterns, implying that the socio-economic status of a neighborhood does not play an

Table 15

Regression of Migration on Potential Index and the Socio-Economic Components

	Dependent Variable	Independent Variables	Coefficient of Determination	Beta
Victoria:	Total Migration (in logarithm)	Potential Index 2 (in logarithm)	42.2%	0.629
		Low Socio-Economic Status (2nd component)	9.2%	-0.305
		High Socio-Economic Status (1st component)	0.2%	-0.047
		Middle Socio-Economic Status (3rd component)	0.2%	0.040
			51.8%	
Kowloon:	Total Migration	Potential Index 1	30.3%	0.424
		Middle to low Socio-Economic Status (2nd component)	3.5%	0.195
		High Socio-Economic Status (1st component)	2.7%	-0.188
			36.5%	

important part in the migrants' relocation considerations. However, the patterns of the coefficients of determination and the signs of the standardized regression coefficients seem to match the tentative conclusions reached in the last chapter in the section on the analysis of "residuals". According to the analysis, it appears that the migrants searched out those places that might be labelled as less "disorderly" and of a higher affluence. In the case of Victoria, the signs of the regression coefficients indicate that migration has a negative relationship with places of a "gzarb" nature, and with places of high affluence, but a positive relationship with those well-to-do locations. The negative relationship with the high affluence component would seem to mitigate our earlier tentative conclusions but an examination of the factor scores reveal that of the eight locations that "loaded" positively on the high affluence component (TPUs 141, 142, 143, 144, 145, 146, 149 and 152), five of them are the mid-level locations (TPUs 141, 142, 143, 149, and 152). TPU 144, Happy Valley, is a reputed wealthy neighborhood while the other two have very low positive scores (TPU 145: 0.23, TPU 146: 0.14). This component in fact picks out those locations that are expensive and out of most people's financial reach. TPUs 141 and 143 are such locations in particular (their factor scores on this component are the highest, +1.59 and +3.47 respectively). It is therefore suggested that the negative relationship between migration and the high socio-economic component does not imply that migrants did not desire to live in locations of high social status but rather the fact that the migrants could not afford them. Of the three components, the one that holds the strongest relationship with migration is the "gzarb" component, and it is in the direction that is expected, thus

providing some evidence that the migrants were avoiding poor neighborhoods. On the other hand, the positive sign of the bets of the third component lends support to the contention that these migrants sought out those neighborhoods that were of a higher social status and within their budgets. It seems that the general pattern of the regression analysis is in accordance with the conclusions reached in Chapter Three. In Kowloon, the same explanation seems to hold for the regression results. All the positive scores (those above 1.0) on the high affluence factor belong to those locations in Ho Man Tin and to two in Tsimshatsui (TPU 231: +2.08, TPU 232: +2.11, TPU 233: 2.02, TPU 235: 1.44, TPU 212: 1.18, TPU 214: 1.56). It has already been noted that Ho Man Tin is a high income area and Tsimshatsui is a generally high rent area (Chapter Three). Again, the component has picked out those locations that are too expensive for the migrants, thereby accounting for the negative regression coefficient.

In spite of the foregoing argument, the question remains regarding the rather low predictive power of the components. To this question, we would offer a speculative answer. It is suspected that the migrants might not preceive the conditions of the neighborhoods multi-dimensionally. It seems, rather, that they may have developed general impressions of the various locations of the city and such impressions can be best described by one or two variables. The next step is, therefore, to search for those particular variables that may reflect the socio-economic conditions of a location as perceived by the migrants.

A Pearson correlation analysis is performed between total migration and each of the 83 variables used in the previous factor analysis. Those with a coefficient of more than + or - 0.40 are listed in Table 16.

Stepwise regression is used again to pick out those variables that could predict total migration to a significant extent. Again, the modified potential indices discussed earlier are added to the list of independent variables. The results of the regression runs indicate that in Victoria, three of the independent variables have a regression coefficient with a F ratio of over 5% level of significance, while in Kowloon, the number of such variables is two. The results of the regression analysis are given in Table 17.

In Victoria, the potential index derived from the variables of population size and relative location (on Manhattan metric) explained 42.2% of the variance, while the second variable which describes the proportion of households in a location paying a monthly rent of less than HK$50 explained 16.7%. This socio-economic variable is a definite improvement over the components used earlier in predicting migration, thus lending support to our speculation that the migrants' perception of the social conditions of the neighborhoods does not correspond with the dimensions derived from factor analysis. The negative regression coefficient of this variable provides further evidence that the migrants avoided locations of low socio-economic status. The third variable, that is, percentage of people aged 40-49, is one of the variables that loaded highly on the high affluence component and it is likely a reflection of those locations of well-established and well-off households. It has already been argued that such locations are not

Table 16

Pearson Correlation Coefficients
between Migration and Selected Socio-Economic Variables

Victoria		Kowloon	
Variable	Coefficient	Variable	Coefficient
% of households paying a monthly rent less than HK$50	-0.40	% of households of monthly income HK$800-$999	0.44
% of households paying a monthly rent of HK$200-$399	0.41	% of households of monthly income HK$2500-$4499	-0.42
% of households who are main tenants	0.45	% of households paying a monthly rent of HK$200-$399	0.41
% of households who pay no rent	-0.41	% of households who are co-tenants	0.49
% of households with monthly income of HK$1000 to $1199	0.43	% of households who are living in room/cubicle	0.41
% of people aged 40-49	-0.48	% of people aged 40-49	-0.42
% of people in service and sports occupations	-0.55	% of people with none/ kindergarten education	0.48
% of people who are farmers or fisherfold	-0.42	% of people with secondary education	-0.41
% of people who are in agriculture	-0.49	% of people who can speak English	-0.42
		% of people who are professional workers	-0.41
		% of people who are technicians	-0.42
		% of people who are craftsmen/laborers	0.42
		% of people who are in the service industry	-0.45

Table 17

Stepwise Regression of Total Migration
on Potential Index and Socio-Economic Variables

	Dependent Variable	Independent Variable	Coefficient of Determination	
Victoria	Total Migration (in logarithm)	Potential Index 2 (in logarithm)	42.2%	+0.72276
		% of households paying monthly rent less than HK$50	16.7%	-0.38791
		% of people aged 40-49	7.4%	-0.24328
			66.3%	
Kowloon	Total Migration	Potential Index 1	30.3%	+0.54818
		% of households paying monthly rent of HK$200-$399	8.3%	+0.19832
			38.6%	

avoided by the migrants but are out of their financial reach, thus accounting for the negative sign. In Victoria, the relationship between these variables and migration is a curvilinear one and has accounted for a total of 66.3% of the variance in migration. The relationship between migration and the potential index is particularly interesting, and indicates that the attraction of a neighborhood as migration destination increases gradually at first and then quickly as its relative location and population size (that is, migrants' knowledge of the place) improve. This Pareto relationship points out that the population in those locations of large population and better situation will increase fastest through intra-urban migration. The socio-economic variables indicate that such growth would even be greater if the locations are of a higher social status. By these critieria, those places in Causeway Bay (TPUs 133, 146), North Point (TPUs 151, 153), and part of Mid-Levels (TPU 142) would experience the greatest amount of in-migration.

In Kowloon, almost 40% of the variance in total migration is accounted for by the potential index and the socio-economic variable. The latter describes the middle to lower middle class areas and corresponds with the second component in the factor analysis. This variable, however, is twice as powerful as the derived component in predicting migration in Kowloon. The regression results indicate that the information factor and the social status of a neighborhood are important considerations in a migrant's choice of a relocation site. However, the explantory power of the regression model in this case is not as good as that in Victoria. It is suspected that the smaller housing supply in Kowloon (only half of that in Victoria, Page 99

Chapter Three) might have accounted for the relatively low predictive power of the variables used in the regression model. Since housing choice is more restricted both in quantity and location, the migrants might have been more concerned with finding a place that is available and in the process might have paid less attention to other factors in the housing choice.

Summary

An attempt was made in this chapter to modify the potential model by the use of two variants of the numerator and the denominator. In Victoria, the modified model with the variable of relative location measured on a Manhattan metric is a slight improvement over the usual version. In Kowloon, the unmodified model works better. Effort was also made to find a variable that describes the socio-economic character of a location well. Factor analysis was used to create such a variable but it was found that other than the potential indices, such composite variables have rather weak predictive power of migration. Postulating that migrants' perception of the social conditions of the urban places is uni-dimensional or less than multi-dimensional, "simple" socio-economic variables were used. The subsequent regression analysis resulted in 66.3% of the variance in migration in Victoria accounted for by the potential model and two socio-economic variables, while in Kowloon, the potential model and one socio-economic variable explained 38.6% of the variance. The regression models provide a way to predict future patterns of population redistribution and thus to

identify locations where population growth through intra-urban migrantion will be most rapid. In the concluding chapter, the policy implications of these findings will be discussed.

CHAPTER 5

Summary and Conclusions

Summary of the Findings

In this study, residential selection was used as a means of gaining understanding about the human responses to the urban environment in Hong Kong. The urban environment was seen as a multi-dimensional space of constraints, and residential choice was regarded as a direct consequence of the migrants response to such constraints. The purpose of the study was to document and analyse the interaction between the migrants and their environment, and ultimately to draw inferences about human behavior in the city.

Both survey and secondary intra-urban migration data were collected in Hong Kong in 1974. In the analysis of the data, macro models were used. As discussed in the first chapter, implicit in these macro models was the assumption that the decision-making processes of choosing a new home were the same for all the migrants. The focus of these models was therefore shifted to the "environmental" and socio-psychological factors. With these models, three different methods of analysis were conducted in this study.

The first method aimed at measuring the "friction of distance" in migration. The analytical models used were the distance decay function and the smallest space analysis. The former model provided a uni-dimensional summary index of the frictional effect of migration distance while the latter analysed such effect on a two dimensional scale. It was found that migration distance was as much an intervening

obstacle in migration in Hong Kong as it was in the Western world. The observed distance coefficient indicated that migrants in Hong Kong might be more sensitive towards migration distance as an intervening obstacle than their western counter-parts. A comparison of Victoria and Kowloon migrants revealed that migrants in the former location appeared to be more constrained by migration distance than those in the latter. It was suggested that this difference was due to the basic contrast between Victoria and Kowloon in terms of size and shape.

The second method of analysis was concerned with the aggregated patterns of migration distances, and the possible explanation of such patterns. The association between these distance patterns and the variables made available from the questionnaire survey were explored. Such variables as reasons for moving, the socio-economic status of the migrants, the length of residence in the previous home, and types of information used in the housing search, were used in the analysis, but most of the associations were found to be not significant.

In the third method of analysis, the relocation patterns of migration constituted the dependent variable in two separate but related analysis, using a modified potential model in the first instance and a multi-variate model subsequently. In these approaches, the macro surrogates of the factors of inter-personal communication, accessibility, and the general social character of a neighborhood were the independent variables. The results explained 66% of the variance in the relocation pattern in Victoria and 39% in the case of Kowloon.

What Sensitivity towards Distance Means?

One of the purposes of calibrating the distance decay function in Hong Kong was to compare it with published findings in the West. The question was: are the Chinese migrants in Hong Kong more sensitive to distance than Western migrants? As the distance coefficient in the distance decay function increased in direct proportion to the frictional effect of distance, the data did yield a slightly larger coefficient than those cited in Western studies but the difference was not prominent enough to allow one to say with confidence that distance exerted greater friction on migration in Hong Kong. This discussion raises the question of what determines the size of the distance coefficient. The physical determinant created by geographical scale seems obvious since one would expect people to travel shorter distances in a smaller place. Hong Kong was a smaller city than those cited in the literature, a comparable, if not larger, coefficient would thus be expected.

What other factors determined and influenced the size of the distance coefficient? Other than the constraining effect of geographical scale, it seems futile to look for other determinants of the distance decay function. It appears that people do not respond to migrantion distance per se but to what it represents. In other words, migration distance is a surrogate of other factors and it is these other factors that must be considered explicitly in any attempt to explain migration distances.

Migration distance can be used as a surrogate measure of the cost (money, energy and time) in overcoming the intervening distance between the "origin" and the "destination" of migration. The greater

the distance, the greater the expenditure. In most cases, a linear relationship between distance and cost is assumed.

Western studies (Adams, 1969; Wolpert, 1965) have indicated that a migrant's familiarity with the "destination" is an important factor in it being chosen as the location for the new home. Migration distance is used therefore as a surrogate measure of a migrant's relative familiarity with the "destination". It is assumed that the shorter the migration distance is, the more familiar the migrant is with the chosen location prior to migration.

A third factor that migration distance may represent is how far away a migrant is removed from his social ties at the "origin" after migration. The assumption is that such social ties exist and are valued by the migrant. A great distance between the "origin" and the "destination" is taken to indicate a near or complete severance of the migrant's tie with the social netowrk at the former home location.

A migrant's positive response to these factors of cost, familiarity, and social ties will yield a shorter move, and vice versa, thus contributing to the varying size of a distance coefficient. However, the attempt to explain the distance patterns of migration in Hong Kong with explicit consideration of these factors in Chapter Two yielded negative results. Several inferences are made on the basis of this finding.

Should Migration Distance be used as a Dependent Variable?

The first inference is concerned with the intra-urban scale by which migration distances were measured. It may be argued that cost differentials of migration distances on the urban scale are much less

pronounced than those on a regional or international scale. In other words, the relationship between cost and migration distance may assume a straight line with a rather flat slope. A similar problem arises when migration distance is used to approximate spatial differences in a migrant's familiarity with a city. While a person's activities may take him to different locations within an urban area, his knowledge of the city does not necessarily decrease uniformly with distance from his home location. Finally, the representation of the strength of social ties at "origin" by migration distance may easily break down if housing choice is made on the basis of social ties at the destination. Undoubtedly, such "deviations" that would lend to weak linkages between migration distance and the factors of cost, familiarity and social ties may occur also in migration on a regional scale. However, their occurrence may be more frequent in a smaller area such as Hong Kong, and renders migration distance a poor candidate as a dependent variable in the urban context.

The Unusual Housing Market Conditions in Hong Kong

Our second inference is made with regards to the housing market conditions in Hong Kong. Some scholars, notably Hopkins (1973), have pointed out the peculiar housing situation in the Colony where housing choices for the middle class are limited. The vigorous public housing program caters mainly to the low income families who can exercise little housing choice, while those in the upper echelons of the social hierarchy have less of a problem in finding accommodation than the rest of the population. This leaves the middle income people in a private housing market that is overpriced. Some of them enter the

public housing program because they fail to compete successfully in the private sector. Others spend a large proportion of their incomes to live in housing of their choice. This unusual housing situation may be one of the reasons for the lack of significant association between migration distance and the socio-psychological variables. What was found in our study might have been a situation in which the cost of housing was perceived by the migrants to be of such an overriding importance that other factors could explain only a very small proportion of the variance in migration distances. Such a housing situation differs from that in the Western society where housing opportunities for the middle class are more plentiful. Simmons (1971) has indicated that the various housing sub-markets in terms of location and type of housing imposed little restriction on housing choice in the West. It seems that in Hong Kong, housing supply constitutes an important factor to be reckoned with.

Direcrions for Future Migration Studies in Hong Kong

The failure to account for migration distances prompted the use of the relocation pattern as the dependent variable in the third chapter. Here, the ecological variables of accessibility, interpersonal communication and the general social character of a neighborhood explained 66% and 39% of the variances in relocation in Victoria and Kowloon respectively. The fact that better explanation was not achieved, especially in the case of Kowloon, may perhaps be attributed to two factors. Firstly, our earlier inference about the overriding importance of cost in the migrants' search for new accommodation may again apply. The limited housing choice imposed by what the migrants

could afford suppressed the importance of socio-psychological factors, depressing thus the proportion of variance that could be explained by these factors.

Secondly, the analysis made use of several independent variables that were measured on a macro scale. One may raise the question that a more micro behavioral approach in the measurement of these variables may be needed to arrive at a better explanation of the relocation patterns. In this study, accessibility and inter-personal communication were measured in terms of a modified potential model which made use of aggregated distances and population sizes as its components. Undoubtedly, accessibility can be determined for each individual migrant in terms of his expressed locations of interest such as the place of work and the places he visits often. Similarly, a refined measure of inter-communication will take into account the spatial distribution of social ties such as relatives and friends, with the distribution weighted by the relative strength of the relationships. The determination of the social character of a neighborhood poses perhaps the most difficult problem since the unusual urban environment of Hong Kong makes the definition of neighborhood more difficult than it already is in the West. As described in the earlier chapter, "neighborhoods" in Hong Kong seem to be more heterogenous in character than those in Western societies. The prevalence of the co-existence of residential and commercial activities and of the rich and the poor within a small area makes it difficult to find a realistic index of the social character of a "neighborhood". One may perhaps resort to a subjective ranking of small areas in terms of their social character by a sample of residents to derive a reasonable index. However, one

is still left with the problem of defining these "small areas". As a first step in solving this problem, a study of popular place names in the urban area may shed some light on this thorny issue.

The improvements suggested are clearly in the direction of using a micro model of analysis. In a situation where little is known of the processes of relocation in migration, it seems that micro-behavioral models may generate more information than macro ones. In the light of this discussion, can we say also that micro models are more appropriate for understanding processes while macro models are better suited for broad generalizations and predictions.

Some Policy Implications

In veiw of the earlier inference of the unusual housing conditions in Hong Kong, and the observed importance of accessibility in migration, some planning implications may be drawn.

As described in Chapter One, there are two main types of public housing, the resettlement and the low cost housing estates. The latter are designed for families with a higher income than those who are given resettlement housing. However, the stigma of living in government housing and the availability of only basic facilities in such accommodation make it much less desirable than private housing to the middle income families who are able to afford more than what public housing charges and offers. A change in government policy seems necessary. Included in the public housing program should be the construction of more attractive apartments with improved facilities for which higher rents can be charged. However, such policy change must take into account also the locational factor of future public

housing. The ten-year housing program well publicized by the government consists mainly of developing the so-called new towns in the New Territories to a projected total population of more than 1.7 million, an almost four-fold increase from the current population size. The site of such public housing that are far removed from the main urban areas creates a locational disadvantage which may well offset any other planned upgrading of the apartments.

At present, another major public program that is in progress is the mass transit system which will serve only the urban areas of Victoria and Kowloon. This system will have a maximum capacity of 1 million passengers a day, and will undoubtedly improve the traffic situation in the city. It is, however, disconcerting to note that an original plan to extend the system into the New Territories was dropped. Such a plan would have enhanced the attractiveness of the public housing to be constructed in the new towns and will help ease the housing situation in Hong Kong. Given the future construction of thousands of new housing units at such distance from the major urban areas, the question arises as to who the government intends to accommodate and how it proposes to attract tenants. At present, the housing and the transportation programs seem out of touch with each other.

Concluding Remarks

The application of various analytical methods in this study has not resulted in a satisfactory explanation of the relocation patterns of migration in Hong Kong. This chapter has pointed out some of the possible reasons for the negative findings. Three major points arise from this discussion and appear to have implications for future

migration studies in Hong Kong as well as for planning.

One of the difficulties in migration studies is the selection of an appropriate dependent variable. Migration distance has been used in such capacity in various Western studies. This chapter pointed out that in an intra-urban migration context, migration distance may not make an appropriate dependent variable. On the basis that most moves are short, migration distance still allows a good general prediction of where people move to, but explaining such distances is a different matter. This latter endeavour involves making assumptions about the surrogate nature of the distance variable that may not be true at all. It seems that migration distance can be used for broad predictive purposes but efforts can be better spent on finding a more appropriate dependent variable when explaining migration is called for.

A second major point is the application of Western migration models to the rather unique housing and cultural conditions in Hong Kong. Familiarity and inter-personal communication in a Chinese society may not lend themselves well to valid measurement by macro models and may require a refined behavioral treatment. In this connection, it is suggested that in future migration studies in Hong Kong the research design should include at least a small sample of migrants who have moved within a very short time prior to the survey, or better still, who are still in the process of moving. These migrants should be then contacted for in-depth interviewing. The purpose is to obtain detailed information on the processes of migration. Such information can be used as guidelines for subsequent surveys.

The third point is concerned with the special conditions in Hong Kong that require attention in a migration study. These conditions are the unusual housing market and the heterogeneity of neighborhoods. In neglecting these factors, we may be ignoring a large portion of the variance in migration in Hong Kong. Outside the migration context, these factors should also call for attention. Since shelter is one of the basic necessities in life, a tight housing market together with unattractive public housing is a source of frustration and hardship. Planners should also look into the social and economic implications of the heterogeneity of neighborhoods. In this study, the local concept of "gzarb" was made use of in making inferences of residents' perception of the urban environment. Is "gzarb" equated with the heterogeneity of neighborhoods in the minds of the residents? If so, does it mean that development of communities should be more in the direction of the Western concept of homogeneity? These questions are highly relevant not only in the constant redevelopment of the old urban areas but also in the proposed creation of new towns in the rural part of the Colony.

Appendix 1

Representativeness of the Sample

Given the unusual procedure in securing the sample of recent migrants, an analysis of the representativeness of the sample was called for. For lack of knowledge of the statistical population of recent migrants, the sample was compared to the 1971 population of Hong Kong (the most up-to-date figures available) to determine if the sample was representative of the population. The two profile questions in the questionnaire, one on the educational attainment of the respondent (head of the household) and the other on his occupation, were used in the comparison which can be seen in Table 18 and graphically in Figure 21.

In the case of educational attainment, the sample approximates the 1971 population very closely and the chi-square test indicates that the difference between the sample and the population is significant only at $\alpha = .30$. Graph A in Figure 21 clearly shows how similar the sample is to the population. On the other hand, the difference between the two in occupation distribution is much greater and is significant by chi-square test at $\alpha = .001$. This bigger difference is expected because of the unavoidable bias in assigning the occupations of the sample to the various categories in the census and especially when this bias is compounded by the often less than exact descriptions given by the respondents of their occupations. Graph B in Figure 21 does show however that the sample generally approximates the population in this characteristic.

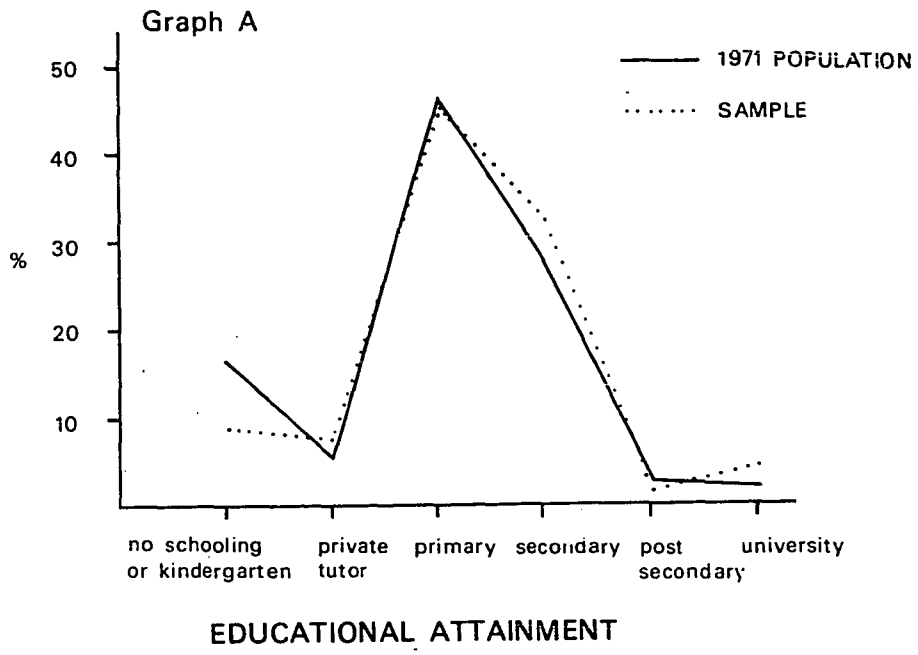
To obtain a more representative sample than the one discussed, two logical modifications of the sampling method described earlier can

Table 18

Comparison of the Sample and the 1971
Population on Educational Attainment and Occupations

Educational Attainment:	Sample	1971* Pop	Percent Point Difference between Sample and Pop
University (Graduates)	4.20%	2.50%	-1.70%
Post Secondary	1.68	2.36	+0.68
Secondary	32.77	27.55	-5.22
Primary	45.39	45.92	+0.53
Private Tutor	7.56	5.41	-2.15
No Schooling	8.40	16.26	+7.86
	100.00%	100.00%	=7.00
Occupations:			
Professional, Technological and Managerial	8.49%	10.41%	+1.92%
Clerical and Sales	20.75	17.57	-3.18
Transport and Communication	13.21	6.24	-6.97
Craftsmen, Production Workers and Laborers	54.72	49.68	-5.04
Service, Sport and Recreation	2.83	16.10	+13.27
	100.00%	100.00%	=20.16

* Figures are for the economically active members of the population defined by the census as "all persons aged 10 and over who were engaged in productive work for at least 15 hours during the seven days before enumeration..." (Hong Kong Population and Housing Census, 1971 Main Report, p.87)



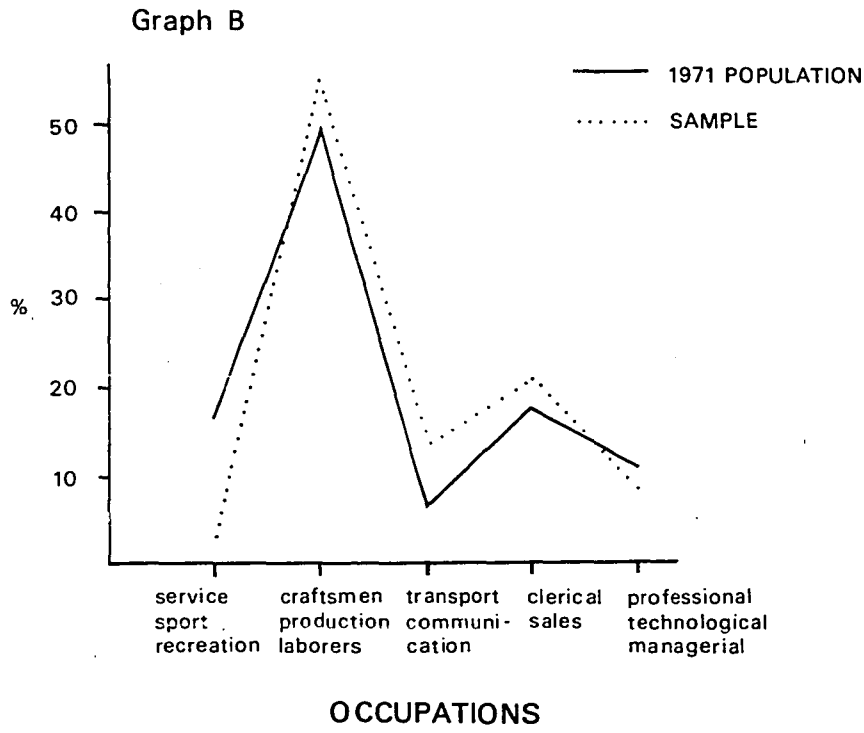
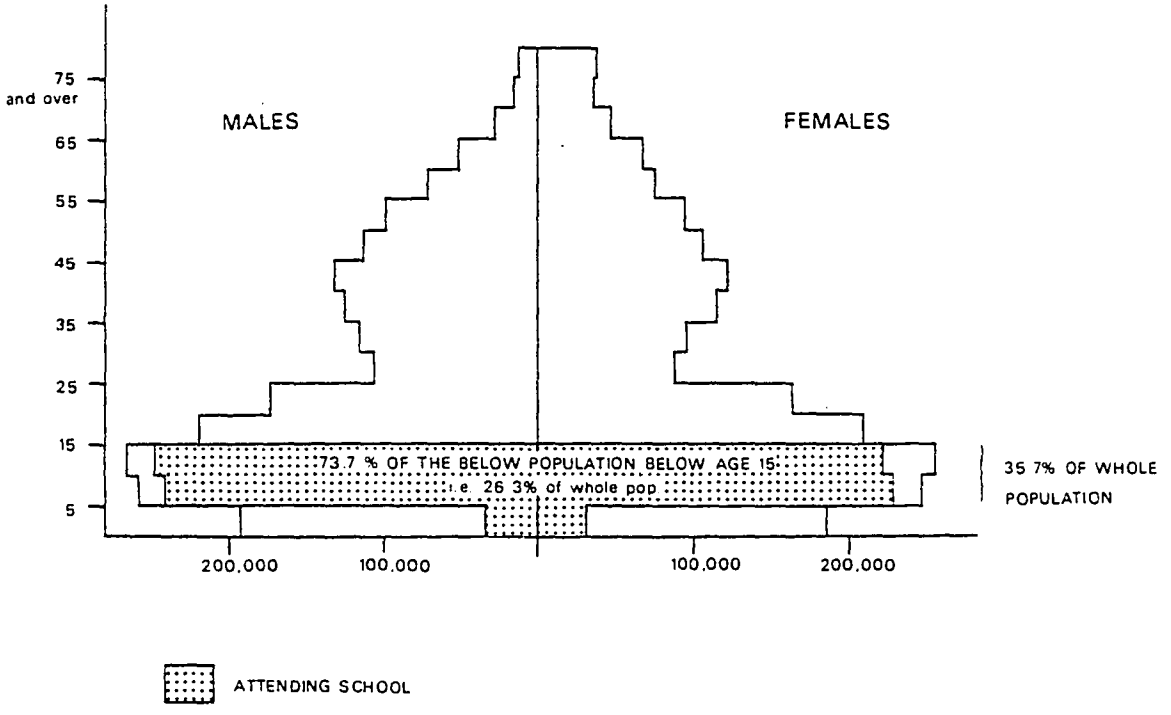


Figure 21 Comparison of the Sample and the 1971 Population on Educational Attainment and Occupations



Source: Hong Kong Population and Housing Census, 1971 Main Report

Figure 22 Population Pyramid, 1971 and Number of Persons Attending School

be attempted. The first one is to obtain a systematic sample of schools to ensure a good geographical coverage of the study area by the sample. If local service areas are assumed to be typical of the schools in Hong Kong, then the systematic sample of schools will probably give a more representative sample of households. This systematic sample of schools should also preferably cover a wider range of schools than in this study. With these improvements, the sampling method by school units would seem to be a commendable way by which a representative sample can be obtained easily and inexpensively.

Several researchers in Hong Kong expressed concern that using schools as sampling units would result in a very biased sample. We have seen that the sample drawn by the author did not seem to be particularly biased. Certainly it is true that the sample would represent only that portion of the population with children at school but the whole idea of the sampling method is to take advantage of the fact that this portion in Hong Kong is very large. In other words, the success of the method depends on two characteristics of the population: first, a young age structure and thus a large proportion of the population found in households with children and, second, a large school enrollment. Undoubtedly, the population of Hong Kong has a very young age structure as the population pyramid in Figure 22 shows. According to the 1971 census, 35.7% of the population were below the age of 15. In other words, more than one in every three persons is under 15 years old. In the United States, only 28.5% of the population were within this age span and in Sweden, the proportion is down to 20.8%. In the absence of statistics in Hong Kong on the proportion of families who have children of the school attending age, the statement (Hong Kong Population and Housing

Census, 1971 Main Report, p.168) that "... about half of the persons in households were children of the heads and 1,282,121 or 66% of these were under 15" is illuminating. The young age structure in Hong Kong is accompanied by a large enrollment in schools. By 1971 figures, 26.3% of the population were below 15 years of age and were attending school (Fig. 22), that is, one in every four persons fits this description. If we assume that the single person and two-persons households have no children, then each of the 609,926 land (i.e. excluding the people who live on boats) domestic households of three persons or more, which make up 91.1% of the total land population, has on the average 1.6 school-attending children under the age of 15. In other words, a large portion of the population (91.1%) is made up of households which are very likely to have at least one child in each household who is attending school. This is exactly the condition under which the school sampling method works well.

The Advantages of the School Sample Method

The biggest advantage of sampling by school units is of course not its ability to produce a representative sample but its low cost and ease of execution. This advantage is not to be overlooked when one's resources in terms of money and time are limited. Given a large proportion of the population made up of households with children and a large percentage of these children enrolled in schools, the school sampling method makes use of the fact that the school children are "members" of both the households and of the schools and so the larger population of households can be reached by the smaller population of school children through the "double membership" provided by these

children. With Hong Kong as an example in Figure 23, the majority of population, 91.1%, is organized in households of three persons or more. The younger members of these households are also organized by groups in schools. The households are thus entirely represented in the schools by their children (assuming here of course that all of these households of three persons or more have at least one child at school). If the normal probability sampling method is used instead of the one recommended here, what is needed is to take a sample of households (if households are to be the sampling elements) from all the households on the lower surface of the funnel in the diagram. Unless the Census and Statistics Department of the government is willing to do the sampling, to take such a sample is a real task since an address list of households does not exist. One should note that in the city of Hong Kong, the majority of the population is housed in high rise domestic buildings. If the whole city is taken as the study area, the normal sampling procedure is to compile an address list of all the buildings from various government records. The next step is to establish the number of floors in each building and then the required number of floors is selected randomly or systematically. An interviewer is then instructed to visit any one of the units in each of the floors selected (in almost every case, more than one unit or flat can be found on each floor). In this case, it is only necessary to know the addresses of those buildings where the chosen floors are found. This is a good deal of compiling work already. Nowadays, to ensure a high response rate in Hong Kong, it is almost mandatory to send out a letter of introduction to the chosen respondents before they are interviewed. This means the additional work of finding out the addresses of all the chosen respondents

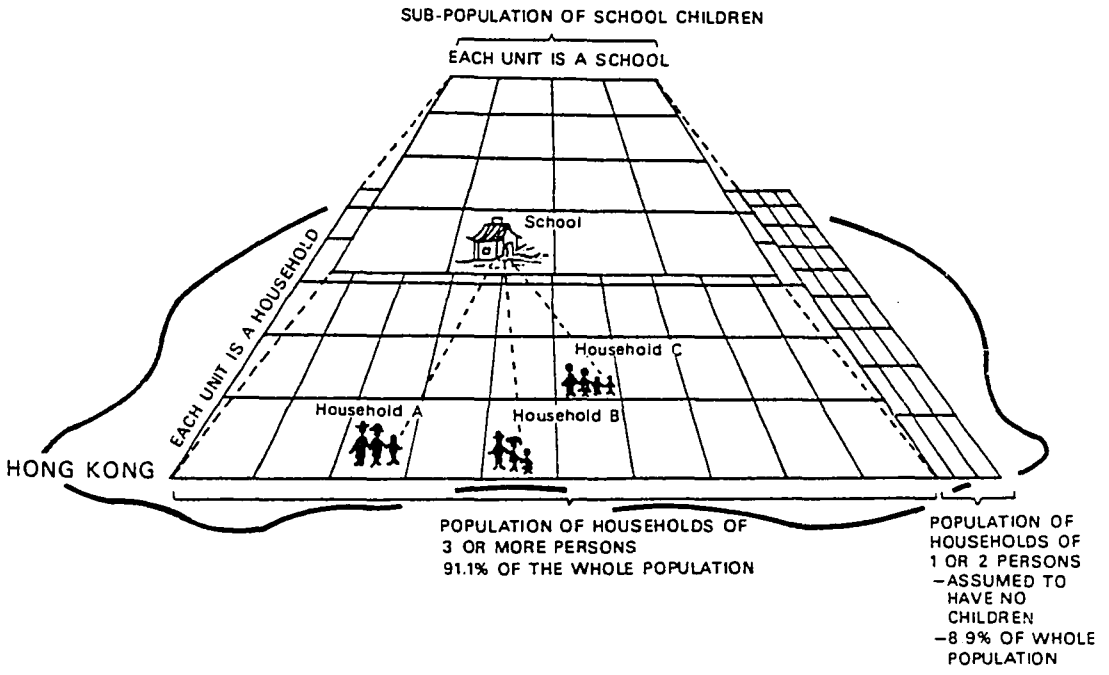


Figure 23 The Population of Households Being Represented in the Schools by the Sub-Population of School Children

before interviewing is carried out. To find out these addresses requires extensive field work which not only is time consuming but also expensive. If the school sampling method is used, the work of sampling is very much simplified. The economy of the school sampling method lies mainly in the fact that the sub-population of school children which can lead us to the larger population of households is readily accessible in school records. To reduce the problem further, we do not sample from the entire population of school children but rather we deal with an initial sampling frame of schools. With the cooperation of the school principals, we can take a sample of the school children from the school records and in so doing we are in fact taking a sample of the households to which the school children belong. The simplicity of the school sampling method is at once evident when we realize that there are a thousand times fewer schools to sample from than the number of buildings or households in our initial sampling frame and the addresses of the schools with its student population are easily available, unlike those of the buildings or, worse still, those of the households.

The economy of the school sampling method is best appreciated when the respondents are required to possess certain characteristics, such as the sub-tenants of specific income groups, households of female heads or, in my own research, households which have moved recently. With the normal sampling procedure as just described, a general survey by interviewers is needed first to find out who are eligible and who are not for inclusion in the final interviewing survey, unless one does not mind a lot of wastage if he goes ahead with the interviewing without a first stage general survey. Obviously, a two-stage interviewing survey is costly. On the other hand, if the school sampling method is

used, a general survey can quite easily be carried out through the selected schools. A one-page questionnaire soliciting the required information can easily and inexpensively be printed and distributed through the authority of the school principal to a chosen number of students in each school selected. The students would take home the questionnaires for their parents to fill out. At a later date, the questionnaires can be collected from the students again by the schools. A sample can then be taken from the list of eligible respondents compiled from the questionnaires. The response rate of such a general survey is normally very high because the parents in Hong Kong tend to have a high respect for the school authority and the school principals tend to be more cooperative in distributing questionnaires than if they are required to do any enquiry themselves or digging into records which may not have the information asked for. Such a general first-stage survey in a two-stage sampling design by school units is definitely more effective than a similar one by mail and much less expensive than one by interviewing. The most obvious disadvantage of this school sampling method is its dependence on the cooperation of the school principals and such cooperation is, of course, not an absolute certainty.

The school sampling method offers an economic way of obtaining a sample which has a high probability of being representative of the population. It is a method worth noting especially for those researchers who have limited financial resources. Given the basic fact that one's working sample is in most cases a trade off between the resources available and the theoretical ideal, the school sampling method definitely has its appeal especially in an area like Hong Kong where the population is young and school attendance is relatively high.

In most developing countries where the population pyramid is similar to that of Hong Kong, where census records are incomplete for sampling purpose, and where social research is urgently needed, the applicability of sampling by schools is certainly worth looking into. As far as Hong Kong itself is concerned, before the lowering birth rates have decreased appreciably the proportion of young people at school and before the population has aged considerably, the school system remains to be a fruitful source of information about the population.

Appendix 2

訪問表

號數：_____

訪問日期及時間：_____

被訪者的地址：_____

( ) one of the following:

1. School Sample _____
2. Newspaper Ad. Sample _____
3. PWD List Sample _____

Interviewer's Name:

_____

(一) 你哋未搬離呢度住之前係喺邊度住嫁？

(二) 你哋喺個度住左幾多年呀？

(三) 你哋幾時搬入離呢度住嘅呢？

年　　月　　日

(四) 請問你哋最近呢次搬屋最緊要係因為乜野理由呢？

(五) (如係迫迁)
你哋係幾時正式知道話要搬嘅呢？

年　　月

(六) (如非迫迁)
你哋係幾時決定搬走上次住個度呢？

年　　月

(七) 你哋搬屋之前有冇諗、住話想、搬去邊區(或邊幾區)度住呢？

有　　冇

(如答案係〔冇〕的話，下一題不用問)

(八)

係邊區呢？(區名)	點解想搬去個度住呢？(理由)
1.	
2.	
3.	
4.	

(九) 當你哋搵屋嘅時候，請問你哋總共去睇過幾多度地方呢？

_____

(十) (下面係問有關呢啲睇過嘅地方嘅資料)：

(1) 請問第一(二,三...)間你哋去睇過嘅地方係,係邊度呢？(地址愈詳細愈好)	(2) 你哋係點搵度呢間地方嘅呢？	(3) 喺點解唔搬去嗰度呢？
1.	1. (如係,由報紙睇度嘅) 請問係邊張報紙呢？ 2. (如係,從朋友度得知嘅) 呢個朋友係,邊度住呢？ 3. (如係,從親戚度得知嘅) 呢個親戚係,邊度住呢？ 4. (如係,睇街招睇度嘅) 呢個街招係,點樣,邊度呢？ 5. (如果以上都唔係,嘅話) 請解釋你哋係,點搵度呢個地方.	
2.		
3.		
4.		

(1) 請問第一趟你哋去睇過嘅地方係、係、边度呢？	(2) 你、哋係、點搵度呢 搵地方嘅呢？	(3) 喺點解咗搬去嗰度呢？
5.		
6.		
7.		
8.		
9.		
10.		
11.		
12.		

(十一) 除左呢啲你哋去睇過嘅地方之外，有冇地方你哋淨係用電話問過佢哋有去睇過嘅呢？

有	冇

(如答案係「冇」嘅話，第十二及十三題不用問)

(十二) 總共問過幾多間地方呢？

_____

(十三) (下面係問有關呢啲淨係用電話問過嘅地方嘅資料)：

(1) 請問第一(二,三...)間你哋淨係用電話問過嘅地方係點樣度呢？(地址愈詳細愈好)	(2) 你哋係點知道呢間地方嘅呢？ 1. (如係由報紙睇到嘅) 請問係邊張報紙呢？ 2. (如係朋友度得知嘅) 呢個朋友係邊度住呢？ 3. (如係親戚度得知嘅) 呢個親戚係邊度住呢？ 4. (如係睇街招睇到嘅) 呢個街招係點樣度呢？ 5. (如果以上都唔係，嘅話) 請解釋你哋點知道呢個地方嘅。	(3) 歡迎解唔去睇下呢個地方呢？
1.		
2.		
3.		
4.		

(十四) 你,舊年四月到而就多數睇邊份(邊幾份)報紙呢?

1. _____
2. _____
3. _____
4. _____

(十五) 除左呢啲報紙,你平時又有冇喺哋中睇下其他嘅報紙呢?

有____ 冇____ (如果係有嘅話):即係邊啲呢?

1. _____
2. _____
3. _____

(十六) 你,哋而就住呢度係,租嘅抑係係買嘅?

租____ 買____

(十七) (如係租的)
請問你,哋哩度幾錢租呀?

_____

(十八) (如係買的)
請問你,哋哩度買幾多錢呀?

_____

(十九) 請問你係做邊行嘅(詳細說明)?

_____

(二十) 請問你讀書讀到邊一班呢?

_____

Appendix 3

The English Version of the Questionnaire

THE INTERVIEWING SCHEDULE

(1) Questionnaire's Number: _____

(2) Date and Time of Interviewing: _____

(3) Respondent's Address:

_____

NOTE: Instructions for interviewers are in parentheses

1. What is the address of your previous home before you moved into the present residence?

_____

2. How many years did you live at the previous address?

_____

3. When did you move into the present address?

Year Month Day

4. What are the main reasons for the recent move?

_____

5. (If evicted),
When were you notified formally that you were required to move?

Year Month

6. (If not evicted),
When did you decide to move out of the previous home?

Year Month

7. Before you began looking for a new home, did you have in mind any specific district (or districts) where you would like to move to?

Yes No

(If answer is "no", skip the next question)

8. (If answer to above question is "yes"),

Which district(s)? (Name of district)	Why did you want to move there? (Reasons for the locational preference)
1.	
2.	
3.	

9. How many housing units did you inspect when you were searching for alternative accommodation?

_____

10. (The following is concerned with information about those places inspected by the respondent):

(1)	(2)	(3)
Where is the 1st (2nd 3rd ...) housing unit that you inspected? (Address as exact as possible)	How did you learn about this housing unit? 1.(if from the newspaper), Which newspaper? 2.(if from a friend), Where did this friend live? 3.(if from a relative), Where did this relative live? 4.(if from a street notice), Where was this notice posted? 5.(if none of the above), Please explain how you found out about this place.	Why did you reject this unit?
1.		
2.		
3.		
4.		
5.		
6.		
7.		
8.		
9.		
10.		

11. Other than those housing units which you inspected, are there others that you enquired by phone but did not visit?

Yes No

(If answer is "no", skip questions 12 and 13)

12. How many units did you enquire by phone but did not inspect?

_____

13. (The following is concerned with information about those units that the respondent enquired by phone but did not visit):

Where is the 1st (2nd 3rd ...) housing unit that you enquired by phone? (Address as exact as possible)	How did you learn about this housing unit? 1.(if from the newspaper), Which newspaper? 2.(if from a friend), Where did this friend live? 3.(if from a relative), Where did this relative live? 4.(if from a street notice), Where was this notice posted? 5.(if none of the above), Please explain how you found out about this unit.	Why did you not go and take a look at this unit?
1.		
2.		
3.		
4.		
5.		
6.		
7.		
8.		

14. Which newspaper(s) did you regularly read between last April and present?

_____

_____

_____

_____

15. Other than these newspapers, did you read other newspapers once in a while?

Yes No If "yes", which newspapers?

_____

_____

_____

16. Are you renting the present residence or are you the owner?

Renter Owner

17. (If Renting),
How much are you paying per month?

_____

18. (If Owner),
How much did you pay for it?

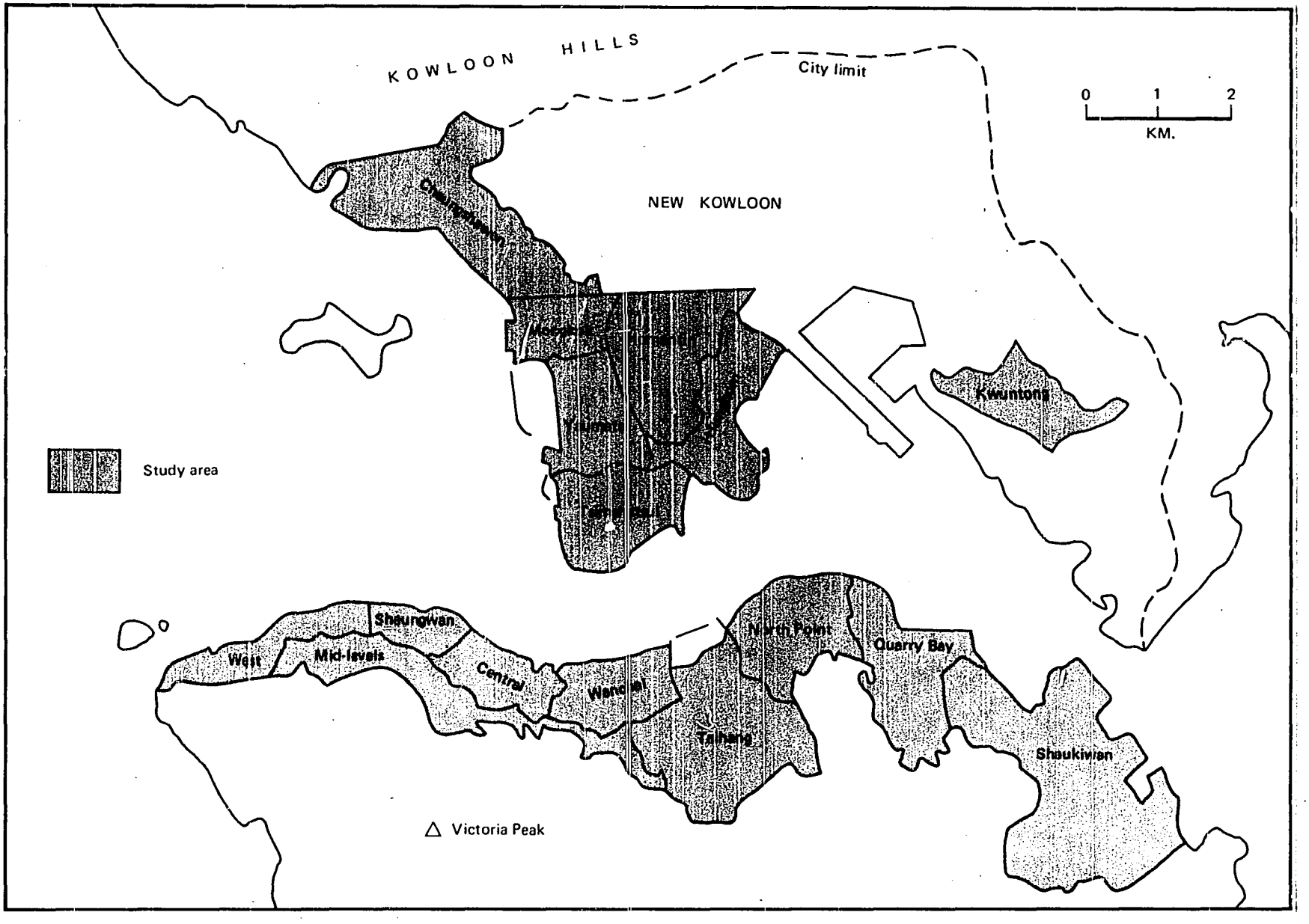
_____

19. What do you do for a living (detailed description necessary)?

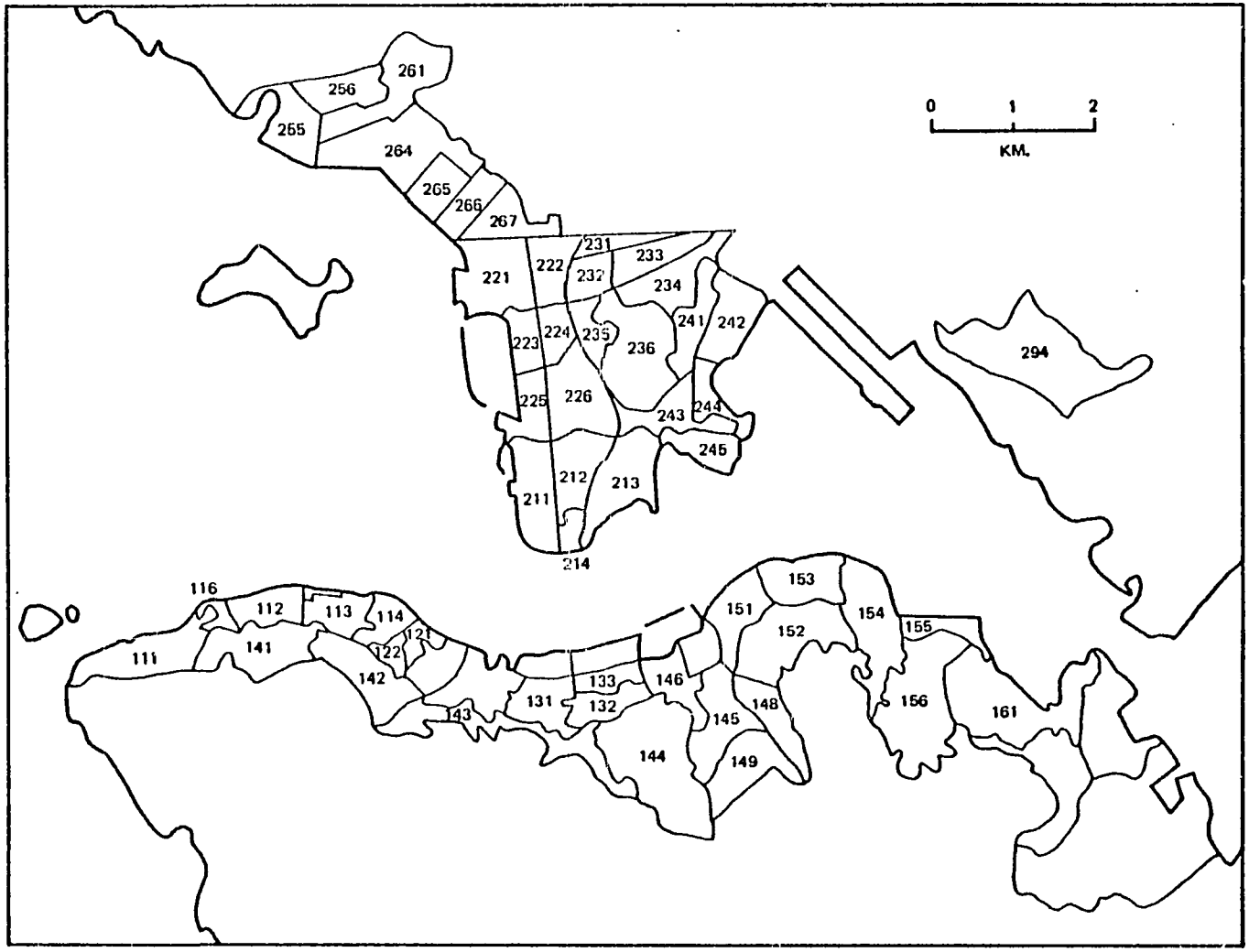
_____

20. At what level or class did you leave school?

_____



Appendix 4 Census Districts in the Study Area



Appendix 5 Tertiary Planning Units in the Study Area

Appendix 6

List of the Variables Used in Factor Analysis

1. Number of collective households (in %)
2. Number of domestic households occupying the whole of a living quarter (in %)
3. Number of domestic households sharing a living quarter with one or more other households (in %)
4. Number of domestic households within an institution (in %)
5. Number of single person households (in %)
6. Number of households with 3 persons (in %)
7. Number of households with 5 persons (in %)
8. Number of households with 7 persons (in %)
9. Number of households with 10 persons or more (in %)
10. Number of households living in an institution (in %)
11. Number of households that are owner-occupiers (in %)
12. Number of households that are the sole tenants (in %)
13. Number of households that are the main tenants (in %)
14. Number of households that are the sub-tenants (in %)
15. Number of households that are the co-tenants (in %)
16. Number of households that pay no rent (in %)
17. Number of households living in a house or stone structure (in %)
18. Number of households living in a whole self-contained flat (in %)
19. Number of households living in a whole tenement flat (in %)
20. Number of households living in a room or cubicle (in %)
21. Number of households living in bed-spaces (in %)
22. Number of households living in verandah, cockloft or basement (in %)

23. Number of households living in storeroom, shop, workshop, other working premises, corridor, hallway, lobby, landing and staircase (in %)

24. Number of households living in temporary structure such as roof-top and squatter huts, un-boat and thatched shop, etc. (in %)

25. Number of households with monthly household income of less than HK$200 (in %)

26. Number of households with monthly household income of HK$200 to HK$399 (in %)

27. Number of households with monthly household income of HK$400 to HK$599 (in %)

28. Number of households with monthly household income of HK$600 to HK$799 (in %)

29. Number of households with monthly household income of HK$800 to HK$999 (in %)

30. Number of households with monthly household income of HK$1000 to HK$1199 (in %)

31. Number of households with monthly household income of HK$1200 to HK$1499 (in %)

32. Number of households with monthly household income of HK$1500 to HK$1999 (in %)

33. Number of households with monthly household income of HK$2000 to HK$2499 (in %)

34. Number of households with monthly household income of HK$2500 to HK$4499 (in %)

35. Number of households with monthly household income of HK$4500 or more (in %)

36. Number of households paying a monthly rent of less than HK$50 (in %)

37. Number of households paying a monthly rent of HK$50 to HK$99 (in %)

38. Number of households paying a monthly rent of HK$100 to HK$199 (in %)

39. Number of households paying a monthly rent of HK$200 to HK$399 (in %)

40. Number of households paying a monthly rent of HK$400 to HK$599 (in %)

41. Number of households paying a monthly rent of HK$600 to HK$799 (in %)

42. Number of households paying a monthly rent of HK$800 to HK$999 (in %)

43. Number of households paying a monthly rent of HK$1000 or more (in %)

44. Number of households who own one car (in %)

45. Percentages of persons who are never married

46. Percentages of persons who are married

47. Percentages of males

48. Percentages of persons aged 0-9

49. Percentages of persons aged 10-19

50. Percentages of persons aged 20-29

51. Percentages of persons aged 30-39

52. Percentages of persons aged 40-49

53. Percentages of persons aged 50-59

54. Percentages of persons aged 60 and over

55. Percentages of persons born in Hong Kong, Kowloon and New Territories

56. Percentages of persons born in Canton, Macao and places adjoining Hong Kong, Canton and Macao

57. Percentages of persons born in Shaighai,Taiwan and Central Coastal Provinces

58. Percentages of persons born in places other than Hong Kong and China

59. Percentages of persons with no schooling or with a kindergarten education

60. Percentages of persons with primary education

61. Percentages of persons with secondary education

62. Percentages of persons with post-secondary education

63. Percentages of persons with university education

64. Percentages of persons who can speak English

65. Percentages of persons who are self-employed

66. Percentages of persons who are employers

67. Percentages of persons who are part-time workers

68. Percentages of persons who are unpaid family workers

69. Percentages of persons who are unemployed

70. Percentages of persons who are retied or home-makers

71. Percentages of persons who are students with no part-time work

72. Percentages of persons who are professional workers

73. Percentages of persons who are technicians

74. Percentages of persons who are administrators or executives

75. Percentages of persons who are clerical and sales workers

76. Percentages of persons who are workers in service, sport and recreation occupations

77. Percentages of persons who are farmers, fisherflok and related workers

78. Percentages of persons who are craftsmen and laborers

79. Percentages of persons who are transport and communication workers

80. Percentages of persons employed in agriculture, forestry and hunting

81. Percentages of persons employed in manufacturing (textiles)

82. Percentages of persons employed in commerce

83. Percentages of persons employed in services industry

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