# IMMIGRANTS IN LEEDS: AN INVESTIGATION INTO THEIR SOCIO-ECONOMIC CHARACTERISTICS, SPATIAL DISTRIBUTION, FERTILITY TRENDS AND POPULATION GROWTH.

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ABSTRACT

This thesis sets out to examine the socio-economic characteristics, spatial distribution, fertility and demographic development of immigrant populations in Leeds C.B. The immigrant populations derive from the New Commonwealth, Northern Ireland, Eire and other areas of the world and the developments in these aspects of their existence in Leeds is examined over the ten year intercensal period from 1961 to 1971. This is performed using a variety of well tested methods and a number of new developments, both of data handling techniques and conceptual frameworks.

The links between immigrant groups and certain indicators of social deprivation are examined using correlation techniques to show the trends in association over the ten year period.

The developing spatial distribution of the immigrant groups is examined using well tested methods and some indication is derived of the way in which the immigrant populations, and their descendants are likely to develop, spatially, in the future.

The demographic aspects of the study are founded in the organising concept of Spatial Population Analysis. This concept is used to give new relevance to population information deriving from both a variety of official sources and from very simple estimations. It ultimately provides a framework for the projection of immigrant population numbers in the United Kingdom.

For the city of Leeds new evidence is obtained regarding the

levels of fertility of the immigrant groups and this evidence is used in a simple demographic model to project the population numbers, both immigrant and indigenous, up to 1986.

Finally an attempt is made to link these projections to their corresponding spatial distributions at future dates using allocative techniques which examine as a by-product, and albeit very simply, the allocative influence of certain social structures.

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# CHAPTER 1

## INTRODUCTION

### 1.1. The aims and area of interest of the thesis.

This thesis has, as its area of interest, the study of a significant racial minority group in a British city. The city is Leeds and the racial group is the New Commonwealth immigrants of whom there were approximately 13,000 in 1971. The thesis sets out to examine the spatial, social, economic and demographic facts about this population group over a short period of time when the whole immigration situation of Great Britain was in a state of considerable change. The study is set in a city which has a long history of immigration and one in which intra-urban population movement has been of particular significance in shaping the city's character. This process is still ongoing and is eminently observable when the migrant population is as distinguishable as are the New Commonwealth groups.

But within this wider context there is a concern, expressed in the existence of the thesis at all, with the progress of these new immigrant groups in British society. Thus, in one city in Britain, this work sets out to examine the change which has taken place in residence location in the city, the tendency or otherwise towards segregation and the degree to which dispersal to more prestigious areas is taking place. In addition the thesis examines social and economic characteristics of the immigrant population and uses measures of association to make some observations on the progress of coloured immigrants towards the achieving of social and economic equality with the indigenous

population (within the limitations set by the nature[2] of the analysis).

To achieve these aims a variety of analytic techniques have been used. Well-tried techniques of measuring segregation and dissimilarity in residence patterns are used for the spatial analysis and are combined with map analyses and other measures of change for the ten year period 1961 to 1971, over three national censuses. In this way the different settlement patterns of the coloured groups are observed and the change in these patterns for the different birthplace groups which make up the New Commonwealth group are viewed in a way designed to give some indication of the future trends to be expected in the location of New Commonwealth people in the city.

The analysis of the social and economic characteristics of the immigrant groups is based on correlation techniques which associate numbers of immigrants with certain social indicators selected to indicate unacceptable levels of deprivation. The relationship between immigrants and indicators of deprivation cannot be measured definitively at the present time unless data is gathered from house to house surveys. In this thesis we have avoided this technique in order to examine the possibilities of more "remote" analytic techniques and show, with some success, how simple mathematical tools can be used to give a highly effective picture of the social and economic characteristics of immigrants in Leeds. Also closely observed are the changes in levels of association with these indicators over the same ten year period, 1961 to 1971.

Having thus described and analysed these changes over time

in the city the thesis has discharged its responsibility to accurately reflect the circumstances of New Commonwealth immigrant groups in Leeds. White immigrant groups are compared to the coloured groups to give a bench-mark, so to speak, against which the changes observed can be measured and evaluated.

But to describe and analyse static situations and to measure, however closely, changes over time is not enough when urban problems are reaching pressing proportions. To take the contribution of the thesis one stage further, therefore, the central element of the whole urban situation, population, has been selected for further developmental study.

Original data and previously under-utilised official information are used to develop a predictive model which is used to account for population change over the historic period 1961 to 1971 and to project these population figures into the future. The power of a good conceptional framework, that of spatial demographic analysis, developed by Wilson and Rees (1974 ) in assisting the use of rather loosely defined official data is shown. Most of all, however, it is the observation of immigrant fertility levels, defined accurately probably for the first time in Britain, and the use of these in a simple but effective model, showing the detailed evolution of an immigrant population in a British city, which is of most importance.

The model is an answer to the "numbers" game which is played with monotonous, but extremely dangerous regularity but more than that, it is a demonstration of how basic data can be organised into a simple predictive framework which can be used to suggest the future nature of key variables

in the urban framework.

## 1.2 The structure of the thesis and chapter content.

The structure of the thesis follows fairly closely the outline of the main thesis aims given above. Within chapters 3 and 4 are contained the necessary description and analysis of the three "snapshots" in time, 1961, 1966 and 1971, in terms of immigrant distributions in the city and the social and economic characteristics of this population. Also contained in these chapters is a closer look at what changes in spatial distribution and in social and economic circumstances have taken place in this 10 year period, how these have varied between the different immigrant groups and what these changes appear to mean in terms of immigrant settlement in Leeds, in general terms.

Chapter 5 describes the application of a strong conceptional framework to the raw, notoriously inaccurate and often difficult to interpret official data collected on Commonwealth immigrants in the International Passenger Survey, the Commonwealth Immigrant Act (1962) Statistics and the national censuses with the purpose of rationalising this collection of data and organising it in such a way that new information can be derived on immigrant fertility levels and statements made about the future growth of immigrant population numbers in England and Wales.

Much manipulation of data takes place in this chapter to prepare information for use in the spatial demographic context. The manipulations are spelled out in full not only so that the assumptions made may be tested within the reader's own knowledge of the field but in the hope that

official collecting bodies may take heed of the nature of data needed to produce effective analysis of complex situations.

In chapters 6, 7, 8 and 9 this argument is taken one stage further, both in terms of physical space and in terms of the use of extremely limited data availability. In these chapters the area of interest is not England and Wales but Leeds C.B. No information on Commonwealth Immigrants exists at city level apart from small area (enumeration district) population totals in the national censuses and some original information on levels of fertility of the different birthplace groups, gathered and prepared by the author. It is shown how a demographic model can be produced with the aid of a few basic assumptions which are clearly stated. The model is then used to study the future evolution of an ethnic group in a British city. The empirical example of the decade 1961 to 1971 is used to calibrate the model, in effect, and projections for each of the main New Commonwealth immigrant groups are made for five year periods up to 1986.

The implications of this population growth, particularly of the growth in the numbers of young and elderly immigrants, are examined in chapter 10. The same chapter contains some observations on the future levels of concentration of immigrants in certain city areas which derive from the juxtaposition of the information in chapter 3 with the population projection of chapter 8. Finally the chapter contains some more philosophical comment on geography and race relations deriving, not explicitly from the thesis conclusions but from the author's own concern with the situation of coloured immigrants in British cities.

# CHAPTER 2

## A review of work on race relations and geography relevant to the thesis.

### 2.1 Introduction

Geography is, by definition, concerned with the spatial manifestation of man's occupance of the earth in all its forms. Since almost 90% of the population of Britain live in towns or cities it is natural that considerable endeavour is now being put into the formulation of laws and theories concerning man's occupance of urban environments. That this work necessitates several stages, each one dependent on the one before, is clear from work performed not only in Britain but in the United States as well and is highlighted in the development of studies in race relations from a geographical standpoint, as will be described below. It is salient to reflect that the present "state of the art", which will be examined, may require more than simply geographical ability. It is relevant to say, even at this early stage that it is no longer enough to be a geographer, observing from above, cossetted in techniques and statistical analysis. The subject has developed to a point which pushes it into the political arena in a most important way. It is no longer possible to stand aside.

How has geography reached this point? There are, in fact, as many answers to this question as there are facets of human geography, be it the poverty of the third world or the problems of inner city areas in Britain. In general though, it is because the people who seek to examine and explain phenomena are making the assumptions of their

models fully explicit and are prepared to accept that political inputs to the predictive framework are amongst the most vital of all considerations.

Nowhere is this development of political awareness, and the steps leading up to it, more striking than in the development of racial thought in geography in the United States.

## 2.2 Geography and race: the development of a science.

This section attempts to do two things. First, it describes the increasing awareness of race in British cities from a geographical point of view. Second, it attempts to show how the developing academic situation in America is reflected by academic research in Britain and how it is the author's contention that this habit of peering across the Atlantic Ocean has been a retarding factor in the development of race as a strand in geographical thought in this country. It will be shown that in attempting to follow the American Model the British geographers have lost their way and are now failing to identify and analyse the racial situation in the most productive manner.

The American example, it is suggested, has six stages. The extent to which these have been constructive in a British sense is discussed later. These six stages are (1) simple recognition of the existence of a significant minority, (2) the recognition that this is a complex situation, (3) the recognition that a complex range of variables is involved, (4) the recognition that the situation was part of a wider system, (5) the recognition that the system could be influenced in certain ways and (6) the recognition

that this system is capable of being modelled and that these models can be made predictive and prescriptive.

There is probably not a clear chronological order to these stages, indeed there is no reason why there should be, and even less, why there should be correspondence across the Atlantic in Britain. The American situation was obviously quite well established before Britain passed through stages (1) and (2). Indeed the information availability in Britain has ensured that much work must be done in these stages even now before any further development, in an empirical sense, can be carried out. These stages are reflected in Britain in work throughout the sixties. The Milner Holland Report on London's Housing (Ministry of Housing and Local Government, 1965) is probably a worthy entrant in several of the stages mentioned above, as in other ways are the works of Rex and Moore (1967) and Elizabeth Burney (1967). In a sociological context the work of Michael Banton (1967) and David Lockwood (1970) are important in claiming that, in the coloured groups resident in Britain, there was a separate identifiable social group worthy of individual study. Banton suggests that:

> "An approach to Race Relations from the standpoint of Social Science requires that Race be viewed not as a biological category but as a sign by which social category may be identified". (Banton, 1967)

Thus, even in 1970 a publication by the Centre for Urban and Regional Studies at the University of Birmingham on social patterns in Birmingham in 1966 (Edwards, Leigh and Marshall, 1970) could seemingly justifiably use Coloured Immigrants as the <u>first</u> variable in an analysis of 1966

census data, albeit they claim, as an indirect indicator of urban deprivation. They have recourse to the non-committal geographical terms such as "concentrated" (Leech, 1967) and observe the high levels of correlation between this distribution and the distribution of more direct measures of deprivation such as high density housing and low social class, thus only slightly extending the work of Davidson (1963), Collison (1967) and Philip Jones (1967). Davidson attempted, as early as 1963 to compare the ward level distributions of coloured immigrants in London over a census decade, 1951 to 1961 using a simple segregation index. Collison used a simple index of similarity to measure the difference in distribution between individual groups, the difference in levels of association between these groups and certain social indicators such as numbers of skilled people per unit of population and attempted to measure the centrallity of the different groups within the city. Jones (1967) goes a stage further than this. Using a sound basis in the analysis of the spatial distribution of immigrants in Birmingham he begins to ask significant questions, which are begging answers even in 1976. Thus he urges an understanding of the observed clusters of immigrant populations in relation to social policies being formulated and implemented by the city of Birmingham and in relation to the urban morphology of the city.

These developments, in retrospect however, were only reflecting the statements of the Milner Holland Report (Ministry of Housing and Local Government, 1965) made some three years earlier, although, of course, it is always easier to theorise effectively than to back this theory

with suitable practice. Milner Holland attempted to identify the main elements aggravating the shortage of housing in London to which, it was noted, immigrants were relatively greater sufferers than the indigenous population. These were the rapid growth of employment, the creation of relatively more households, greater numbers of old people, demands caused by the progress of slum clearance, the competition for living space and finally the overall demand for higher standards of housing. Thus, although perhaps it wasn't realised at the time, Milner Holland was attempting to lay down a conceptional framework for the analysis of an urban problem which approaches a "model" format. Like a number of British works we find that the development of a particular framework such as this gives relevance to several of the "stages" which have been identified above. In the same way Cullingworth (Ministry of Housing and Local Government, 1969) identified three elements which made immigrants more disadvantaged in terms of housing than the indigenous population. These were that they suffered from rules which applied equally to non-coloured groups, that they suffered from an extra lack of information and finally, they suffered from human prejudice. At the same time, however, Cullingworth admitted that he was unsure of the actual ways in which these elements affected the life and distribution of immigrants and he claimed that our dilemma in Britain was that we had time to act but were unsure of the way to act because of insufficient knowledge. It should have been clear, even at that stage, that not only was hard information lacking but also we had no idea how elements were linked and inter-acted with each other to produce the significant distributional patterns which were being identified.

Jones (1970) claimed for example that the zones of "invasion" (an American terminology which in this case merely reflects increases in the numbers of small areas with immigrant residents) were not simple and that the process of expansion was a complex phenomenon. He identified polarization points and produced evidence to show that the increases in occupance were mostly in the "gaps" left in a concentric ring and within the limits of pre- 1914 housing. John Rex (1970), meanwhile, was concentrating on the sociological aspects of immigrant concentration and was developing his concept of competition through housing classes, a basis of conflict which is blurred in the transition zones of our cities into a system of conflict between "colonies" in this area.

By 1970, therefore, there was a large range of thought available on the subject of immigrant groups in Britain. Development had taken place from, for example, the simple statements of Goodall or Butterworth (1963) to early recognition of the complex situation building up in many British cities.

## 2.3 The American example

In America the list of contributors to this stage of development is almost endless. The U.S. had become earlier much more adept and skillful at measuring the degree to which their negro populations were deprived. The work of Lieberson (1963), the Taeubers (1965) and Zelder (1970) are supreme examples of this aspect of the science of measurement. It is instructive, though, to consider Karl Taeuber when he says the basic need is for, "methods, models and materials suited to disentangle the causal relationships

involved." (Taeuber, 1969). David Harvey has since reflected these sentiments when he says, "We have enough information already..." (Harvey 1973). Taeuber continues his statements by stressing in the U.S. context the requirement of determining how the entire process of the provision of shelter is affected by race and racism, particularly the strategic points at which planned intervention might be particularly feasible or effective.

The measures of segregation which were developed in the United States were used in a far more explanatory way than in the United Kingdom. Thus Ray Zelder's approach (1970) varied from the Taeuber's massive statistical portrait of the incidence of residential segregation in urban areas. He concentrated on economic and demographic characteristics of households to show that 30 to 50% of the observed segregation of certain racial groups could be accounted for by the economic status of the households. It did not seem to occur to Zelder to ask the next question as to the reason for this difference in economic status.

The United States was similarly early to identify the element of choice as a further complicating variable in the developing racial situation. Freid & Levin (1968) for example identified the difference between working class slums and ghettoes as lying basically in the degree of freedom of choice open to the individuals concerned, the ability to choose between the "inner comfort" provided by the slum and the opportunity to select the residential area and housing in which to live. They identified the fact, as did John Rex in the U.K., that the social functions of a slum remain viable despite increasing public committment and social policy directed at their

elimination. The clear distinction possible between a working class slum and a ghetto in the United States context is lost in transference to the United Kingdom. In this context Freid and Gleicher (1961) identified as early as 1961 the strong positive sentiments which identification with the local area can induce (see also Rainwater, 1968) compounded of kinship groups, local friendships and strong spatial identity. It is this "co-ethnicity" which has quite obviously become a major determinant of the spatial patterns of coloured occupance of British cities.

In a post-Watts study in America by John Adams (Adams, 1972) threw even more variables into the pile by recognising explicitly the rise and fall of certain city sectors within the overall migration process in the city. In the processes impinging on poor city residents and blacks in particular he emphasised the Kerner Commission statements concerning the effects of police practices, of under and un-employment and of inadequate housing. Thus, without explicitly recognising the fact Adams, and other significant writers, were identifying not only the facts of segregation but also the processes by which segregation was initiated and maintained as urban deprivation. These processes may be identified as being of two kinds, official and personal. J.F. Kain, for example (Kain, 1968) pointed to the effects of residential segregation and the distribution of negro employment. He attempted an evaluation of three hypotheses concerned with this type of interrelationship and interdependancy; that residential segregation in housing markets affects (1) the distribution of negro employment, (2) reduction in negro job opportunities and that (3) post war suburbanisation of employment has

seriously aggravated the problems. Kain quotes Raymond Hilliard, Director of Public Aid for Cook County, Chicago as saying "...and the real problem is jobs not people. There are thousands of jobs now going begging in the suburbs but the negro can't get there." From these statements we can obtain some idea of the importance of decentralisation in the American context and can see implicit recognition of urban processes at work.

George and EuniceGrier (G. and E. Grier 1965) were concerned with the effects on segregation of the policies of the Federal Housing Agency who offered mortgage loans to "modal" families, young people with good repayment records, thus leaving the negroes to "inherit" the older parts of the cities. It did not seem possible, they observed, that mere non-discrimination could lower levels of segregation but there was a requirement for vigorous action on the part of government to halt the firmly entrenched trends.

Meanwhile Elizabeth Wolf (1968) and Rapkin and Grigsby (1968) could indicate the strength of personal prejudice in the process of segregation and ghetto expansion. Wolf examined the influences on the demand for housing in potential ghetto areas. She recognised that there was a "tipping point" in racially changing neighbourhoods after which the moving out of white residents allowed a greatly speeded-up increase in negro occupancy. The process of ghetto expansion was, she suggested, relatively slow until a point between 20% and 30% negro occupancy was reached after which the area suffered very much increased white out-movement. Other influences she postulated, were the amount and kind of real-estate activity, community

organisation and action, the amount of rented property, any special advantages (or disadvantages) of the area and the proximity to the ghetto proper. Rapkin and Grigsby, enlarged on these processes and stressed the interaction and interrelationship between levels of white and negro demand for housing and the factors affecting each of these. The most important variable, they discovered, was the level of white demand for housing but they also indicated the complicating variables of the demographic characteristics of the resident and in-migrant populations. In their study period and area (Philadelphia) it was found that three-quarters of white purchases were made in blocks where there were no negro purchases whatsoever. By contrast three-quarters of negro purchases were made in blocks where there were no white purchases and only 2 out of 286 house purchases in the period by white families in West Philadelphia were directly adjacent to negro households. Their hypotheses about demographic characteristics of migrant households resulted in the discovery that the "block-breakers" were generally negroes of high or relatively high socio-economic groups, but they recognised that this situation begged many questions. In general, they felt fairly confident that in time ghetto development would be avoided as negroes obtained greater market freedom to buy into more blocks than their numbers could possibly fill. Nevertheless their conclusions are rather more depressing, particularly viewed in conjunction with Kain's hypotheses. While actual segregation in certain areas might fall, congregation in certain areas might not. Factors which would remain important in creating congregation seemed to be largely of a personal nature, for example, the unwillingness of negroes to expose

themselves to personal discrimination by attempting to move away from concentrated areas.

More hopeful suggestions came from Hyman and Sheatsley (1964) who examined the relationship between education achievement and levels of support for integration and found that there was a strong positive relationship. They suggested also that in many places in America it had been found that public sentiment towards desegregation followed rather than preceded official action, a hopeful sign for those involved in public policy formulation. Their contention however that the battle for integration in America was won and that the issues that remained were how soon and in what way the principles were to be implemented seems a little hasty even twelve years further on.

## 2.4 The pace and direction change

Having thus recognised the systemic nature of the negro situation in their cities, the American sociologists and geographers moved the next step. It was a step which was to remove them from a strictly research situation to one which, implicitly at least, recognised the political input to segregation and resulted ultimately in the viewpoint which David Harvey can express openly in his book "Social Justice & the City" (Harvey, 1973).

Probably the most important clear statements of where two decades of race relations research had led were made by Katz and Gurin (Katz & Gurin, 1969). In this paper, an overview of race relations and the social sciences, they arrived at the clear conclusion that much work in the U.S.A. in this field was neither theoretically interesting

nor directly relevant to policy issues. In other words, research which concentrated merely on the observable status quo was no longer adequate, that there needed to be a much clearer focus on factors that influenced the pace and direction of change. This focus however should not be simply to learn more about the factors themselves but was required so that research should be tied much more integrally to social intervention and social policy. They identified a need for regular and systematic gathering of information about a host of socio-psychological, political, economic and demographic variables, a full "social accounting" framework. This work should be directed towards providing accurate indices of inputs and outputs from "the system" to give some idea of the "conversion process". They did not, therefore, deny the importance of descriptive research, in establishing the tools necessary to monitor "change efforts", but they do raise a point which is most salient in the British context, that one should guard against the danger of allowing descriptive studies to substitute for the kinds of analysis which would get at the underlying causes of racial differences in "urban achievement".

The way was clear, therefore, for work which attempted to <u>model</u> ghetto development. This required the attempt to quantify the various elements of the system and to measure the amounts of variation in output, however measured, arising from variation in these various elements. Naturally enough the American examples of this stage in the development of the race relations "science" are concerned in the most easily measured element of the negro occupance of their cities, the development of the ghettoes. The results

of the work of Richard Morrill in this area demonstrated the distance that their American work, even in 1965, had come; he was prevented from publishing the full results. The lack of chronological order in the development which we have been outlining is illustrated by the fact that Morrill published his work on the development of the Seattle Ghetto in 1965 (Morrill, 1965). The importance of certain work arising out of their internal conceptual frameworks is a feature which is most noticeable in the few really notable British works which will be discussed later. Nevertheless the lack of full research and illustration into and of the variables involved led Morrill to develop a simulation model of the way in which the negro populations of the ghetto were permeating the areas around about. He attempted to simulate moves for typical households, thus generating a pattern of expansion which he then tested against reality by a series of visual and statistical tests. Despite the probabilistic nature of the model Morrill attempted to build in control features, natural increase in population numbers and immigration into the negro population, the relationship between moves and proximity to the ghetto proper, land values and population size limits to the blocks involved. A "probability surface" was thus evolved showing "producer" zones and zones of probable "acceptance" of negro households. The purpose of the model was to generate a pattern of expansion which corresponded to the real pattern, empirically observed, to discover and illustrate the nature of the ghetto expansion process. In the context in which it is placed in this taxonomy of race relations work it is probably lacking, as Morrill himself recognised when he said;

"the model attempted merely to identify the process of ghetto expansion and thus helps only indirectly in the evaluation of measures to control the ghetto."

An approach towards relatively more useful planning models has been made by Harold Rose (Rose, H.M., 1969(a), 1969(b), 1970, 1972). Rose attempted to; "provide insights on the spatial dynamics of a single urban subsystem within the metropolitan system", using the negro ghetto as the clearly observable manifestation of the system processes. The "real world" was more a feature of the models which Rose developed than that of Richard Morrill. He attempted to build in the real world elements in a fairly simplistic manner using three components, a producer component, a consumer component and a demographic component. Within this framework, Rose hypothesised that a process of adjustment took place whereby the stability of the negro population was directly related to the ability of individuals to cross critical house rental or house price

At the same time the increasing number of firms pledged to equality of opportunity for negroes was making the whole issue more critical. Rose thought that, on the basis of something very similar to Rex's "housing class" concepts, enclaves would develop in areas of specific types of housing and that those developing enclaves would reflect the spatial clustering of a number of conditions. Within the whole framework there would be a sorting action in which the need for certain types of housing was the main motivating force, influenced inter alia, by income and stage in the life cycle. Thus the demographic component, built around sub-models of population development, was used to obtain reasonable measures of housing demand. Rose included in these sub-models levels of negro fertility

and net immigration as well as a "family formation" factor to control or estimate the formation of new households. The producer component was employed to create housing vacancies, with more than a nod in the direction of recognising the importance of proximity to the ghetto. Finally a consumer component took the form of a residential assignment mechanism based on the propensity of negro households to occupy housing of a certain rental or price category within certain distances of ghetto areas. From this base Rose suggests that an alternative model might be developed which might generate specific levels of "ghetto escapement" on the basis of changing patterns of behaviour growing out of modified economic policies and social relations. A model of this kind would, therefore, become a valid planning tool in the prediction of the location and intensity of certain types of economic and social problems. Even in a situation where planning machinery is not yet geared to the incorporation of models of this nature there are benefits to be gained from a systemic view of urban structure and change. As Anthony Downs declares (Downs, 1968);

> "Strategic thinking about social problems can play a vital role in stimulating social change even where decision making is dominated by disjointed incrementalism."

These latter developments are probably the most important lessons we can learn from the American racial situation and they apply not so much to the racial situation in Britain but to our overall urban planning and modelling. Indeed it is the author's contention that the American development described above has not assisted but limited and diverted our own work in race relations and geography. The next

section attempts to support this statement. The heading is taken from Banfield (1968) and in many ways is a pointed summary of this interrelationship.

## 2.5 The racial problem: thinking may make it so.

We have already discussed the early recognition of the nature of coloured immigrant occupancy of British cities. The story may, therefore, be picked up at the stage of the recognition that the situation was a result of a complex range of variables. In the British situation it is less easy to identify this rough taxonomy. The reason for this, it is suggested, is that there is less work of a theoretical nature deriving from a British situation. The development of thought is much more clearly reflected in a few works which stand out as, on their own, making the major amount of effort in this field. These works, that of Rex and Moore (1967) and Elizabeth Burney (1967) are the most notable examples, contain within them the spark of real insight and contain real strength in their overall conceptional frame-works. Thus at the one time they are descriptions of the complex range of variables involved as well as being detailed analyses of the system components which result in the segregation of coloured immigrants in our cities. They require only the explicit mathematical statements of the model context to bridge the whole range of developments described for the American situation. That they could do this, however, meant that they threw away, because of the lack of data amongst other items, any attempt at general-isation. It became easiest, in the British context, to concentrate on illuminating a particular situation, and this was performed with different degrees of success and relevance.

Valerie Karn, for example, (Karn 1969), looked at the effect on property values amongst Indians and Pakistanis in a Yorkshire town, successfully supporting five hypotheses which showed that these groups paid more for their housing than others, even when buying from people of their own race, and that they paid more, relatively, in order to buy into areas of high occupancy by Indian and Pakistani groups. Probably the most important hypothesis which is proved correct within this work is that there was a drop in house prices before coloureds moved into certain areas or streets. Thus in a small scale, quantified manner she provides support for the statements of Millner-Holland made fully six years earlier. But was there an increase in the real understanding of the interlinking, systemic nature of the whole question of the location of immigrants in our cities?

Direct contrary evidence is provided by Wilkinson and Gulliver (1971). They found that there was no easy or simple correlation between house prices and the numbers of coloured people moving into certain areas. By introducing a factor to account for location of dwellings in relation to the city centre they found that the negative correlation between coloured numbers and house prices was reduced to zero. They concluded, therefore, that there was no evidence to suggest that numbers of non-whites cause house prices to fall. They suggested that it seemed much more likely that there was something approximating to a neighbourhood average price. This would seem to deny, at small scale and for a particular context, the relevance of Lockwood's and Banton's early statements about race as a separate identifiable social category. In fact it was in implicit recognition of the coloured person as one more element within social scales

and values and that in this way, at least, it was not, de facto, of great importance. In this same context of "proof" and "counter-proof", Richmond (1970) sought to test Rex and Moores statements about housing class conflict. Extending this hypothesis suggested that a white person might be more antipathetic towards immigrants the more expensive his house, that is the higher his position in the housing market. Richmond found that his data did not support Rex and Moores hypothesis, but one is forced to ask what the significance of this particular study might be. Like many other works, which it is unfair to criticise, these studies lacked a focal point, lacked a conceptional framework into which they could fit and to which they could contribute in a significant way.

Of these localised, particular studies the work of Christopher Duke (1970) is of much greater significance. Within an organising framework of the "cycle of deprivation", Duke looked at access to housing as the major way in which the life of Britain's coloured population could be improved, and examined the problems of relocation and rehabilitation which face planners in certain city areas. His particular example was the area of Chapeltown in Leeds. Using a range of presentation techniques, Duke looked at the failure of the "System" as expressed in letters to the Housing Department, letters which are expressed in an idiom that might have been amusing if the situation they describe were not so tragic. But the central point of this race and geography context is that Duke emphasised the holistic nature of the situation of immigrants in Leeds. Thus he stated that:

"What is clear is that little can be done about this

(tendency to concentration) given the general political climate and realities and that the fate of many coloured people in Leeds, to judge by this case study and by general impression, is tied up more with the future of Chapeltown than with any simple policy for dispersal." (Duke, 1970)

The importance of the Local Authority is pinpointed in this quotation and merely serves to emphasise the statements of Rex and Moore (1967) and Elizabeth Burney (1967). Rex and Moore describe at length the effect of Birmingham Corporation's housing policy in helping to create and maintain the area of lodging houses and multi-occupation known as Sparkbrook by refusing to give the area development status and by regarding it, in effect, as a "ghetto" within whose boundaries they could effectively "control" the existence and spread of multi-occupation and lodging houses. The Council would have to have taken responsibility, in any other circumstances, for the people of Sparkbrook, clearing the lodging houses and rehousing the population. Rex and Moore saw this as the solution to nearly all the problems facing Sparkbrook residents. But the Council refused to act, and for reasons which were clearly racial. There appears to have been a tremendous difference between the attitude of the Council and the attitude of the Sparkbrook Housing Association who, claim Rex and Moore, declared "racialism to be an illegitimate response", assisted in the channelling of welfare resources into the area, "made it a less deprived area than it otherwise would have been" and "made possible a kind of entry into Birmingham society, <u>not only for the immigrants but also for its lost and isolated residents</u>" (author's

emphasis). In the same vein Elizabeth Burney (1967) could baldly state, using examples from Aldgate and Lambeth, that the essence of a Local Authority housing system is discrimination and that this discriminatory element functions against the Commonwealth immigrants who are in "housing need". There appears to be a great deal of this institutional discrimination operating through the subjective approach of most Local Authorities to this particular problem.

The stage in the development of race and geographical thought which was identified in the American context as "modelling of the system processes", cannot be identified as an explicit stage in the equivalent British development. There are a number of reasons for this and most correspond to the overt differences observable between the British and American situations with regard to race relations in general. There are not as many coloured immigrants as there are Negroes by proportion, they are by nature immigrants, their identity as a group is not unitary but extremely fragmented, and our cities differ in significant ways from their more ordered American counterparts. For these reasons, and possibly for reasons of data availability as well, the more important work in urban modelling and systems work is likely to include coloured immigrants and their social and geographical mobility only as a sub-system within an overall general urban model.

One exception to this is the recent work by R.I. Woods (1975) who attempts to directly extend the work of Harold Rose and Richard Morrill to the location of coloured immigrants in Birmingham. Avoiding the usual diversionary pitfalls, such as the numbers of white Indian immigrants,

the amount of under-enumeration in the censuses or the conversion of place of birth to racial origin, Woods takes three general propositions which would normally be held to influence location patterns of immigrants, the present observed distribution of people of the same ethnic origins, a distance-decay function and the differences in favourability of various city areas, and converts these general concepts to formal rules with the aid of Monte Carlo simulation. This simulation is then used to develop three model situations. The first merely distributed incoming immigrants on a yearly, but incremental, basis according to a probability based on the proportion of the total city immigrant population in any cell. The second model incorporated the "year zero" population into the migrant pool for location by allowing 5% of them to change residence in the subsequent year with respect to a probability field derived from the distance of cells from centres of immigrant concentration. In the third model Woods incorporated the third proposition, that of the favourability of certain city areas by incorporating, into the probability field, the total number of dwellings in multi-occupation in each cell. Each of these models was incremental in the sense that the predicted situation for year zero plus one, became the situation on which the situation for year zero plus two was built. The models were then tested against reality in ways which were probably far too sophisticated given the paucity of data used in the model generation. Woods notes the low level of data availability on what he calls the middle-range studies of immigrant distribution, a view which the present author supports and illustrates figuratively in a later chapter.

The overall aim of this type work would be, as Robson (1975) has expressed it; "To understand, and to make potential contributions to the achievement of greater social justice,... to turn away from a preoccupation with static geographical patterns of urban society and look instead at the processes and mechanisms which perpetuate social divisions in towns."

## 2.6 The relationship of review and thesis content

There is a close relationship between the thesis content and structure and the stages in the development of the geographical study of race as discussed in this chapter. Broadly speaking, the two chapters which follow, 3 and 4, correspond to those stages identified in this chapter and described as the recognition of a developing situation and of the complex nature and range of variables involved in this situation. But in taking a view of the developing spatial and social situation over a ten year period we are also observing the pace and direction of the change which is taking place, with the ultimate aim of extrapolating these change trends into the future.

This extrapolation into the future is explicitly performed in chapters 5, 6, 7 and 8 with one element of the urban equation, the immigrant populations themselves. This work, therefore, attempts to illuminate much more clearly the factors which influence the pace and direction of change, to develop, if only for one key variable, a "social accounting" framework to assist in the development of our knowledge of the "conversion" process.

# CHAPTER 3

## The Social and Economic Situation of Immigrants in Leeds

### 3.1 The Overall Situation

'Colour and Citizenship' (Rose, 1969) is a volume to which there will be repeated reference in this thesis. The obvious reason for this is that it is the single most informative work on the subject of the situation of coloured immigrants in British society, covering not only the information available in the 1966 British Census, but also special tabulations from the basic data of the census, the 1966 Family Expenditure Survey and making comparisons between situations in controlled areas between 1961 and 1966. It is from this volume that it is intended to extract some information to show, briefly, the situation of coloured immigrants at national level, so that in the subsequent sections the Leeds situation will be more relevant. The reader who is not familiar with Chapters 11, 12 and 13 of Rose (1969) should look to them for a fuller exposition.

#### 3.1.1 Population and demographic characteristics

Immigrants into any society tend to have distinctive demographic characteristics. They are generally young, probably male dominated, are likely to be the more intelligent, more energetic examples of their race. The coloured immigrant to the U.K. is no exception. Rose makes the observation that in 1961 "outside the Indian group there is probably not more than 10% of all coloured immigrants over the age of 45 years. This compares with 38% in the total population in the conurbations". Consequently

high proportions of the immigrants must be under 45 years and many of these will be very young children and persons in young adulthood. Rose observes a relative deficiency of persons aged 5 to 14 years in 1961. In the period 1961 to 1966 the immigrant population in general became much younger still but this can be shown to be almost entirely due to the arrival in the U.K. of young West Indians, arriving to complete the family units in this country.

Table 3.1. summarises Rose's conclusions about the age structures of coloured immigrants in the six conurbations in 1961 and 1966.

In the case of the early years of coloured New Commonwealth migrations to the U.K. the sex ratio was dominated by male migrants. In the English population in 1961 there were some 937 men to every 1000 women, this ratio rising to 940 males per 1000 females in 1966. Immigrant society on the other hand was dominated by males. Table 3.2 is drawn from Table 11.1 of Rose (1969) but includes figures on the situation in Leeds for 1966. All the coloured groups may be seen to have many more males than females in these early years except for the Jamaican migrants to London, a feature which Rose attributes to the higher status occupations available in the London conurbation to which a person would be more likely to migrate with a spouse.

Much controversy centres around the fertility of the immigrants to the U.K. and Rose uses a number of surrogates for actual fertility rates in an attempt to measure the relative fertility of these immigrants. As this subject will be dealt with in much greater detail in a later

Table 3.1 A comparison of percentage age structures for the six conurbations 1961 and 1966

| Age | 1961 All coloured groups | 1961 Total population | 1966 All coloured groups | 1966 Total population |
|---|---|---|---|---|
| 15yrs | 29 | 23 | 34 | 23 |
| 15-24 | 16 | 14 | 13 | 14 |
| 25-44 | 45 | 26 | 42 | 25 |
| 45 | 10 | 37 | 11 | 38 |
| Total | 100 | 100 | 100 | 100 |

Source: E.J.B. Rose et al. Colour and Citizenship. Table 11.3

Table 3.2 Male dominance among immigrants in selected areas, males per 1000 females 1961 and 1966

| Area of origin | England and Wales 1961 | England and Wales 1966 | London Conurbation 1966 | West Midlands Conurbation 1966 | West Yorkshire Conurbation 1966 | Leeds C.B. 1966 |
|---|---|---|---|---|---|---|
| India | 1,568 | 1,479 | 1,520 | 1,644 | 1,640 | 1,633 |
| Pakistan | 5,380 | 4,231 | 2,890 | 9,451 | 5,394 | 5,402 |
| Jamaica | 1,258 | 1,066 | 983 | 1,181 | 1,356 | 1,228 |
| Other Caribbean | 1,264 | 1,026 | 1,048 | 1,152 | 1,145 | |
| Ireland | 925 | 912 | 870 | 1,122 | 1,045 | 1,044 |

Source: Rose et al. 'Colour and Citizenship' and own calculations.

chapter suffice it to say here that Rose suggests that the immigrants' fertility may be in excess of that for the British born population by 40 to 65% This excess fertility will, of course, result in more children and it can be shown that in selected areas only 35 to 45% of immigrant households have no children, which compares with a figure of up to 70% for the English households. Further than this the average family size, that is, average number of children per household, may be shown to be greater for immigrants than for the indigenous population. More discussion of this situation is given in a later chapter.

### 3.1.2 Housing

While the nature and type of housing which any population occupies is dictated to a large extent by the type of property available in different areas it can be shown that coloured immigrants to the U.K. tend to live in the relatively poor housing, at relatively high densities, with a relative lack of amenities and in the most insecure of tenure types. Rose shows for example that with regard to density the English born population in the London conurbation in 1966 lived at a density of 0.57 persons per room (Rose, 1969 Table 12.1). The persons living at highest density on average in this conurbation in this year were the West Indians and West Africans at approximately 1.10 persons per room.

This relatively higher density living is compounded by a higher percentage of the immigrant households sharing accommodation. For the same area, that is the London conurbation, Rose demonstrates that the West Indians, West Africans and Pakistanis had well over half of their

households sharing accommodation, at a percentage more than double the average of 31.2% for the English households. Only the Indians and the Cypriots, at 56.8% and 54.9% respectively, were less than double the English percentage.

A third compounding factor is the lack of basic amenities in the housing which the immigrants occupy. It can be shown that in 1966 (Rose, 1969, Table 12.7), in the London conurbation, four times as many (relatively) of the coloured immigrant households as English households were sharing a bath or a w.c. although nearly the same percentage of households (14.1 compared to 14.8) of both groups were without a bath. The last factor is one which the government has recently selected as being of very great importance in the definition of 'Housing Action Areas'.

Finally we can turn our attention to tenure type while remembering that comparisons in this area are probably the most spurious, especially in 1961 and 1966 due mainly to the institutional rules governing entry to council housing. Thus we could expect that the immigrants, being unable to qualify for council housing would be highly over-represented, in comparison to English people, in owner occupation and privately rented accommodation. This is demonstrated later for Leeds C.B. while Rose, speaking of certain inner London boroughs and central Birmingham, says:

"In the inner London boroughs, 22% of immigrant housing is in owner occupancy: in the central Birmingham area 56% of immigrant household heads are owner occupiers. In both

areas this is nearly double the figure for the English."

One may observe, also, that there are differences between the immigrant groups. The Indian group appears to be the one which scores most highly on owner occupation, and in general, lowest in the privately rented market (lowest except for the English). The Jamaicans reflect the coloured average, with small regional variations while the other Caribbeans score relatively poorly on owner occupation and highly in the private rented sector. But above all the West Africans appear to be the worst situated with nearly 70% of their households in furnished rented accommodation in the London conurbation. In general less than 10% of all the immigrant households were in housing provided by the Local Authorities of the selected areas.

Comparisons of the changing situation in housing tenure for 1961 to 1966 are made using information for controlled areas which Davidson surveyed in 1961 (Davidson, 1963, 1966). The results of this comparison are given in Rose (1969), Table 12.12. This Table shows that while the coloured groups in general obtained 6% of local authority housing in 1966, compared with only 2% in 1961, this increase was entirely due to the Indian population moving from 7 to 10% in council housing and the 'other' Caribbeans from 1% to 7%. All other groups lost ground in this respect. Large increases however were experienced in the unfurnished rented sector but lower percentages in the furnished rented housing (except for Pakistanis). Moderate increases in owner occupation are also a feature of the comparison, except once again for Pakistanis whose only increase in any of the

tenure types was in the furnished rented sector.

### 3.1.3 Employment

To round off this brief excursion into the national scale situation we now turn to the employment status of the immigrants. Later in this chapter information is presented which shows that in Leeds the coloured immigrants in particular tend to be found in the low status industries, and in low status socio-economic groups within these industries. Data presented in Rose (1969) shows that this situation is indeed a feature of the lives of coloured immigrants in Britain. It is obvious, of course, that local industrial elements and concentrations will greatly affect the distribution of persons over occupational categories (as defined in O.P.C.S. 1970). The concentration of labour in the woollen textile industries of West Yorkshire is an example. Nevertheless it may be illustrated that immigrants, and coloured immigrants in particular do tend to be concentrated in the lower status occupations at the national and regional level. Table 13.3 in Rose (1969) shows for example that in the West Midlands conurbation in 1966 the percentage of all totally active males working in the Registrar General's Occupational Categories 5, 7, 18 and 19 (furnace, forge, foundry and rolling mill workers, engineering and allied trades workers, labourers n.e.c., and transport and communication workers) was 61.7% for Indians, 75.4% for Pakistanis and 66.3% for the Caribbean born population compared with 46.7% for the total population. Reference to Table 3.12 of this chapter shows that the equivalent percentages for the Leeds C.B. for the sample of the total population derived from the information

gathered by the author concerning births in the city in 1971 were 45.8% for Indians, 44.9% for Pakistanis and 42.5% for West Indians. The equivalent total for the total population of the city for 1966 (the 1971 data was not available at time of writing) was 31.9%. The Greater London conurbation is shown to fare rather better, illustrating the greater diversity of industry, for example in 1966 18.1% of Indian economically active males were in occupational category 25 (professional, technical workers, artists), 7% higher than the figure for the total population. 12.3% of economically active Pakistani males were in this category also. 17.9% of Indian males were clerical workers in the G.L.C. in 1966 along with 12.9% of Pakistani males, both figures being above the average for the total population. However the same table (Rose 1969, Table 13.5) shows that the West Indian population, in general, fell well below the average in these higher status occupations. This was the case for the New Commonwealth immigrant groups generally in the West Midlands conurbation.

Finally reference may be made to the socio-economic groups of the immigrants. This categorisation more accurately reflects the status of the immigrant workers since it is an amalgam of occupation and of status within occupation. Thus a labourer may be classed as S.E.G. 11 (unskilled manual) or S.E.G. 6 in the aggregated version of these groups. A foreman labourer though, would be classified as S.E.G. 8 (S.E.G. 4 in the aggregated version) because of his increased status within the occupational category. Rose (1969) gives data on socio-economic groups of the West Indian population which may be directly compared with the Leeds data presented later in this chapter. Table 13.9 of

'Colour and Citizenship' shows that the immigrant groups represented fall well below the average percentage for England and Wales (for selected London boroughs) for the three top S.E.G.'s and above average for the bottom four groups, the skilled manual, semi-skilled manual, unskilled manual and inadequately described occupations. This is largely the situation for females in these selected London boroughs and for males and females in selected Midland wards. For the situation in Leeds C.B. as indicated by the data on births in 1971, the reader is referred to Table 3.13.

## 3.2 Review of data availability

One of the biggest problems for any social scientist who wishes to investigate the social and economic situation of New Commonwealth immigrants in British cities is data availability. Indeed it is the author's own experience that when theoretical discussion is over and the researcher sits down to try to organise a model's data requirements then practical short cuts, changes and re-arrangements, not to mention a large number of fairly tenuous estimations have to be made. The researcher is then diverted from what should be his aims to being a generator of information, information which really should be available in documented form.

Much of the work over the past decade and a half in race studies in Britain have been of this nature, and of necessity they have been forced to settle at one of two very distinct levels of resolution. On the one hand are the studies of the nature of 'Colour and Citizenship' (Rose, 1969) presenting and interpreting, and to a limited extent manipulating data which is available at a low level

of resolution, England and Wales, the Greater London conurbation, the West Midlands conurbation. The recent book by Sheila Allen (1971) shows that there is still a market for this type of study and no doubt there will be a flood of studies of this kind following the publication of the Commonwealth Immigrant Tables of the 1971 census.

On the other hand are the studies of small areas within cities, dealing with various aspects of the race/immigration situation. These are often incisive and provide useful insights into the motive forces behind certain situations. They are almost countless in number. A few examples will hardly do justice to the width, and often depth, of the field; Rex and Moore (1967), Richmond (1970), Duke (1970), Barnet, Pickvance and Ward (1970). It is almost amazing how often one can cite Rex and Moore's book as being a fine example of this or that type of study. It appears to be almost universal in relevance.

The predominance of these two types of study can be related almost directly to the availability of data concerning immigrants. Simply, at one level, and a relatively useless one for city policy makers one has recourse to the census, or the International Migration Statistics or more recently the Registrar General's Statistical Review of England and Wales. The small scale, community studies are of a size which allows the gathering of data "on the ground" by social survey and participant observation techniques. These are obviously of more use for policy, for example by feeding into E.P.A. or Community Development programmes but are extremely limited in any wider sense.

There are few examples of studies of Commonwealth immigrants at city level, and where these exist, for example Jones'

two papers (1967 and 1970), they concentrate on the spatial manifestation of segregation through the use of the Census small area tables which are available for 1961, 1966 and 1971.

The availability of data at varying scales is summed up in Table 3.3.

## 3.3. Alternative approaches

How, then, in view of this severely limited range of information, can we begin to describe and discuss the social and economic situation of New Commonwealth immigrants at the city level, or more specifically for Leeds C.B ?

Basically we do this using a range of computer based techniques. At one end of the spectrum are the correlative measures which we can compute to show the degree of association between evidence of immigrant concentrations and the existence of other factors in the census which indicate different types of social and economic disadvantages. The aim of these exercises would, therefore, be to show that there was, or was not an association (such as a high or low $r^2$ value) between the immigrants distribution in the city and the distribution of those indicators which are accepted as demonstrating social deprivation.

Of course, this is not a proven case. The level of association only indicates that degree to which the numbers of immigrants and the amount of deprivation (as indicated by a particular variable) are spatially associated. The immigrant family could be living in owner occupied, low density, all amenity splendour next to the white indigenous family in furnished rented, high density, sharing amenity

Table 3.3 Information levels and availability in the 1966 Census.

| Scale | Data Source | Data available |
|---|---|---|
| Leeds C.B. | Ward Library Tabulations | Birthplaces of population by E.D. |
| | Commonwealth Immigrant Tables | Table 1 Commonwealth immigrants by sex |
| West Yorks Conurbation | Commonwealth Immigrant Tables | Table 2 Change of address by country of birth, 1 year and 5 year migrants. |
| | | Table 3 Commonwealth immigrants by sex, age, marital condition |
| | | Table 5 Commonwealth immigrants by country of birth, sex, age, marital condition. |
| | | Table 8 Commonwealth immigrants by employment status, occupation, industry and S.E.G. |
| | County Reports | Table 4 Birthplaces of the whole population. |
| Great Britain | Commonwealth Immigrant Tables | Tables 1-5 Numbers, location, sex, age, marital condition, mobility. |
| | | Tables 6-12 Commonwealth immigrants by occupation, economic status, industry, S.E.G., country of birth, mobility, age, sex. |
| | | Tables 13-16 Commonwealth immigrants by households, age, country of birth, type, size, number of rooms occupied, tenure. |
| | | Tables 17,18 Commonwealth immigrants, households by numbers of children, ages, type of marriage, child's country of birth by descent. |
| | Economic Activity Tables (part iii) | Table 24 Residents born outside G.B. by country of birth, occupation, industrial status, S.E.G. and social class. |

deprivation. However it does not require much generalisation to reject this kind of argument. Besides, the association measures are useful for a comparison over periods of time to show the trends in the developing situation.

More sophisticated techniques can be introduced. Factor analysis allows the major dimensions of a variety of social indicators to be extracted, that is the multi-dimensional distribution which is described by a great number of these social indicators is reduced to a small number of dimensions or factors which are, in effect, groups of highly correlated variables (this correlation may be positive or negative). This technique is a further aid also to more general social area analysis. The factor score for each zone for each factor can be plotted to demonstrate the varying situation in the different areas of the city. This technique is demonstrated later in this chapter.

The major limitations of this type of analysis lie in the associational nature of the variables. No attempt can be made, with these techniques, to identify the actual people involved. The difference may be simply illustrated. To say that there is a high correlation between Pakistani immigrants and privately rented furnished accommodation in a particular area is different from saying that in the same area 50% of the Pakistani population, for the sake of argument say 100 persons, live in this type of accommodation. In a sense, then, this latter statement is a direct link with the small area studies discussed above for it could be a direct lead into the sampling of the area for a social survey where a fully

random survey of such accommodation for example could be expected to yield a certain, calculable number of Pakistani respondents.

This ability derives from the use of a probability model which, of course, can be of varying degrees of sophistication. The estimation of the numbers and proportion of New Commonwealth immigrants in certain social and economic categories is performed later in this chapter, using a doubly constrained conditional probability model based on principles derived in the transport modelling field by Evans (1970) and developed by Wilson (1973) in relation to spatial interaction models. A statement and discussion of the model used is given in Section 3.6.

The techniques used in this chapter, then, may be seen to be a scale of the same type of analysis. The association of immigrant communities in Leeds C.B. with various indicators of social structure are examined using correlation techniques and the information is directly comparable for the years 1966 and 1971. A separate analysis for 1961 is presented but is not quite directly comparable with the later years, for reasons of difficulty with the 1961 census. Secondly a factor analysis of this data is performed and the changing emphasis within the factors is examined for the years 1966 and 1971. The scoring of each zone of the city on these factors is also examined and comments are made on the changing emphasis for these two years. Finally estimations are presented of the numbers and proportions of immigrants in certain demographic, social and economic categories in the city and in particular zones in the city. For example the age structure of immigrants of particular birthplace groups is estimated (even this is not supplied

directly at city level in the censuses), the numbers and proportions in the different tenure categories is estimated for the city and for certain zones within the city, and the socio-economic group distribution, thus estimated, is examined in conjunction with some harder data deriving from birth records in Leeds. There is, in fact, no limit to the amount of data which could be estimated in such a manner. Most of the probabilities required as inputs to the model can be obtained at Great Britain scale. However, ulterior motives have been brought into play in that the amount of data generated has been limited to the more 'evocative' social indicators, and that data which was required as an input to further development of the demographic study of this document. It is hoped that this has led to a reasonable balance between data generation, or at least showing how it can be done, and the more theoretical developments, which then become possible.

## 3.4 The Social and economic situation of immigrants in Leeds

There are a great number of variables available from the censuses which may be used as indicators of social deprivation and there are three main categories into which these indicators fall. These three categories are housing, employment and education, three key markets identified by Pahl (1970) where the poor in general are poorly placed. For the commonwealth immigrants the first two are probably, as yet, the main considerations. This situation will certainly alter within the next ten years when education will become a critical factor as well.

From this great number of variables particularly relevant indicators must be selected and this selection clearly must alter with consideration of the purpose to which the analysis is to be put. A number of recent works have considered this range of variables and almost all have arrived at varying combinations depending upon the purpose to be served.

For our purposes here 13 variables were specified for 1966 and 1971. Eleven of these variables were directly comparable at each census date and thus direct comparison is achieved over this five year period. These variables are:

1. Percentage of households in privately rented accommodation.
2. Percentage of households in council accommodation.
3. Percentage of households in owner occupied accommodation.
4. Percentage of persons living at more than 1.5 persons per room.
5. Percentage of persons living at more than 1 person per room.
6. Percentage of persons born in New Commonwealth countries.
7. Percentage of households in shared dwellings.
8. Percentage of households without all amenities exclusively.
9. Percentage of persons born in India.
10. Percentage of persons born in Pakistan.
11. Percentage of persons born in the West Indies.

The tenure classifications speak for themselves, although it may be argued that, in reality, the distinctions may not mean that much. The two density indicators have been included because the definition of density of living has

been recently re-specified using these two definitions. The higher density of 1.5 persons or more per room is now regarded as critically high. Variables 7 and 8 indicate very well defined deprivation in the housing market while the different birthplace groups have the dual purpose of not only comparing the individual distributions but also of attempting to measure the effect of 'co-enthicity', that is, the obvious desire of the different birthplace groups to live together.

Two other variables were included in the 1966 data. These were:

1. Percentage of households in other accommodation, that is, not one of the three main types.
2. Percentage of persons in socio-economic groups 5 and 6.

   That is, percentage of persons who were semi- and non-skilled.

These two variables were not included in the 1971 data because they were simply not available. Instead two variables were included which attempt to indicate the quality of housing, or living standard achieved in owner occupied and council rented housing. These two variables were:

1. Percentage of households in council housing at more than 1.5 persons per room.
2. Percentage of households in owner occupation at more than 1.5 persons per room.

This information was not available in the 1966 census.

For 1961 ten variables were classified. These were:

1. Percentage of households in owner occupied accommodation.

2. Percentage of households in council accommodation.
3. Percentage of households in furnished rented accommodation.
4. Percentage of households in unfurnished rented accommodation.
5. Percentage of sharing households at more than 1.5 persons per room.
6. Percentage of non-sharing households at more than 1.5 persons per room.
7. Percentage of households occupying part only of a dwelling.
8. Percentage of persons born in Northern or Southern Ireland.
9. Percentage of persons born in India or Pakistan.
10. Percentage of persons born in the West Indies.

These variables were defined for each enumeration district in Leeds C.B. in 1961. The results of the correlations are not, therefore, directly comparable with the results for 1966 and 1971. The correlations are presented in table 3.4.

None of these correlation coefficients are very high. The largest association demonstrated in the Table is that between each of the three main immigrant groups with the Indian/Pakistani (9) group and the West Indian group(10) in particular standing out as the largest single correlation. This grouping is followed by the association between the immigrant groups and the furnished rented accommodation specified by variable 3. On the whole, the Pakistanis may be seen to be 'worst off' in terms of these indicators of social deprivation being more likely than the other immigrant groups to live in furnished rented accommodation, in overcrowding and in only part of a dwelling. There are

small differences in the correlations with owner occupied and council rented accommodation. For both coloured groups there was less likelihood of occupying a council house than owning a house, a situation which will become of more significance when the immigrants are in a position to qualify under present and past allocation systems.

Of course, the point was made earlier that these correlations are most useful in a time series to indicate relative positions with regard to certain social indicators and it is to the directly comparable situations in 1966 and 1971 that we can now turn our attention.

Similar correlations to those performed above were calculated on the 1966 and 1971 census data to give direct comparison on the specified variables. Table 3.5 presents the correlation values for the New Commonwealth birthplace groups for these two dates.

This Table presents a very different picture from that suggested in Table 3.4 and of course part of the reason for the larger correlations will be found in the use in Table 3.5 of the larger 34 zone system. Once again, therefore, it must be pointed out that it is not perhaps the absolute correlation values which really concern us, though of course they are extremely interesting, but the relative movement in the values over the five year period. In 1966, then, as we would suspect the percentage of persons born in New Commonwealth countries correlates highly with with the distribution of households living in shared high density dwellings. This is combined with less significant correlations with the privately rented housing market. The remaining correlations are not of great significance in

Table 3.4 Correlation coefficients of the main birthplace groups in Leeds C.B. in 1961

| Birthplace | Variables | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| Ireland | -0.1562 | -0.1135 | 0.2429 | 0.0442 | 0.0184 | 0.0028 | 0.2915 | 1.0000 | 0.2896 | 0.2842 |
| India/ Pakistan | -0.0433 | -0.1777 | 0.3755 | 0.1448 | 0.1215 | 0.0077 | 0.3748 | 0.2896 | 1.0000 | 0.4827 |
| West Indies | -0.0089 | -0.0714 | 0.3074 | 0.0161 | 0.0371 | 0.0044 | 0.3581 | 0.2842 | 0.4827 | 1.0000 |

*N.B. Definition of the variables is as per Page 44.

Table 3.5 Correlation coefficients with percentage of persons born in New Commonwealth countries as dependent variable. Leeds C.B. 1966 and 1971.

| | Variable | 1966 | 1971 |
|---|---|---|---|
| 1 | % households in private rented accommodation | 0.34268 | 0.38256 |
| 2 | % households in council rented accommodation | -0.25805 | -0.27511 |
| 3 | % households in owner occupation | -0.05114 | -0.00060 |
| 4 | % of persons living at + 1.5 p.p.r. | 0.44907 | 0.86779 |
| 5 | % of persons living at + 1.0 p.p.r. | 0.53601 | 0.79186 |
| 6 | % of households in shared dwellings | 0.77979 | 0.82446 |
| 7 | % of households without all amenities excl. | 0.19588 | 0.34489 |
| 8 | % of persons in council housing at + 1.5 p.p.r. | N.A. | 0.71715 |
| 9 | % of persons in owner occupation at + 1.5 p.p.r. | N.A. | 0.74079 |
| | Multiple correlation coefficient | 0.86851 | 0.96475 |
| | Squared multiple correlation coefficient | 0.75432 | 0.93074 |

themselves but the negative value of -0.25805 with the distribution of households living in council housing is of interest. The multiple correlation value of 0.86851 is high and suggests that these particular social indicators were reasonably well chosen. There is very little of the distribution of New Commonwealth born persons, therefore, which is not 'explained' by these particular variables.

By 1971 the situation, thus illustrated, has undergone significant change. But it has been change for the worse rather than the better in that the association of the immigrant population with those variables which indicate social deprivation has increased quite sharply. The correlations with the indicators of density are the most striking rising from 0.44907 in 1966 to 0.86779 in 1971 for the highest density indicator and 0.53601 to 0.79186 for the second density indicator. So it would appear that the New Commonwealth born population has become more poorly situated with regard to the higher density than the lower, a situation which did not exist in 1966. The association with households in shared dwellings has also increased as has that for households without all amenities exclusively.

Other comment can be made, however. The correlation of the immigrant situation with the different sectors of the housing market bears some examination although the correlations, as one would expect in a British city, are not on their own very decisive. Owner occupation appears to have increased, albeit from a situation of small negative correlation to one where there is almost no correlation at all! But the pattern for the other two tenure types has hardened over the five year period although only very marginally, with increases in the privately rented

sector and decreases in the council rented sector. That the immigrants are not obtaining the best of the owner occupier and council housing markets is indicated by the correlation values of 0.71715 and 0.74079 for percentage distribution of New Commonwealth born persons versus percentage of persons in council housing and owner occupation, respectively, at over 1.5 persons per room.

Of course, it could be that these changes which have affected the New Commonwealth immigrant groups could have affected the city population as a whole. The immigrants may have possibly improved their situation relative to the rest of the population. Table 3.6 shows the average city-wide percentage values for the indicators used in the correlation analysis for the years 1966 and 1971.

Clearly the most remarkable changes have taken place in the housing tenure markets. Both the owner occupied and council rented markets have expanded, the latter considerably, at the expense of the private rented sector. This change is in line with general trends in the country as a whole, a trend which Rose (1969) has estimated will mean the shrinking of the private rented sector to about 9% of the whole housing market in 1981. The situation which we have attempted to illustrate for the immigrants is almost certainly, under the circumstances, one of occupying the poorest tenure type in a market which is constantly shrinking and where they are not receiving or making compensatory movements into the other tenure groups.

New Commonwealth immigrants are more highly correlated in 1971 than in 1966 with another indicator which has declined sharply on average over the period. This is the

Table 3.6 City average percentage values for the indicators of social deprivation

| | Variable | 1966 | 1971 |
|---|---|---|---|
| 1 | % of households in private rented accommodation | 32.7 | 23.6 |
| 2 | % of households in council rented accommodation | 27.8 | 36.9 |
| 3 | % of households in owner occupied accommodation | 35.9 | 38.9 |
| 4 | % of persons living at + 1.5 persons per room | 0.3 | 2.0 |
| * 5 | % of persons living at + 1 person per room | 1.3 | 7.5 |
| 6 | % of persons born in the New Commonwealth | 3.0 | 4.7 |
| 7 | % of households in shared dwellings | 13.9 | 3.9 |
| 8 | % of households without all amenities excl. | 33.2 | 22.5 |

* N.B. That is at greater than 1 and less than 1.5 persons per room.

percentage of households who do not have exclusive use of household amenities, that is, a shower or bath, inside w.c. and piped hot water, and the percentage of households who were sharing a dwelling. In general this is not, therefore, a particularly heartening picture which has been built up. It must be remembered however that the correlations measure spatial association only. The only way in which definitive remarks and evaluations could be made would be to actually know the numbers of immigrants in these certain categories, for direct and absolute comparison.

Until now we have considered the New Commonwealth population as one group. It may, therefore, be rewarding to look at the same associations presented above but for each of the main coloured groups in Leeds C.B., the Indians, the Pakistanis and the West Indians, for it is known that there are different propensities to, for example, owner occupation amongst the different coloured groups. There are also different aspirations on the part of the coloured groups to 'succeed' in British society, a difference which may imply different associations with certain social indicators. It may be expected, for example, that the West Indians, by the nature of their migration, would be the main group to which traditional values of British society might seem of importance. At a simple level the sex ratio amongst this group, being much more evenly balanced between males and females than either the Indian or Pakistani ratios, places initially much greater value on a good house, good job and so on. What may be satisfactory for a group of Pakistani men may not be satisfactory for a West Indian family.

The correlation coefficients for 1966 and 1971 of the three

main coloured groups with the indicators used above are given in Table 3.7.

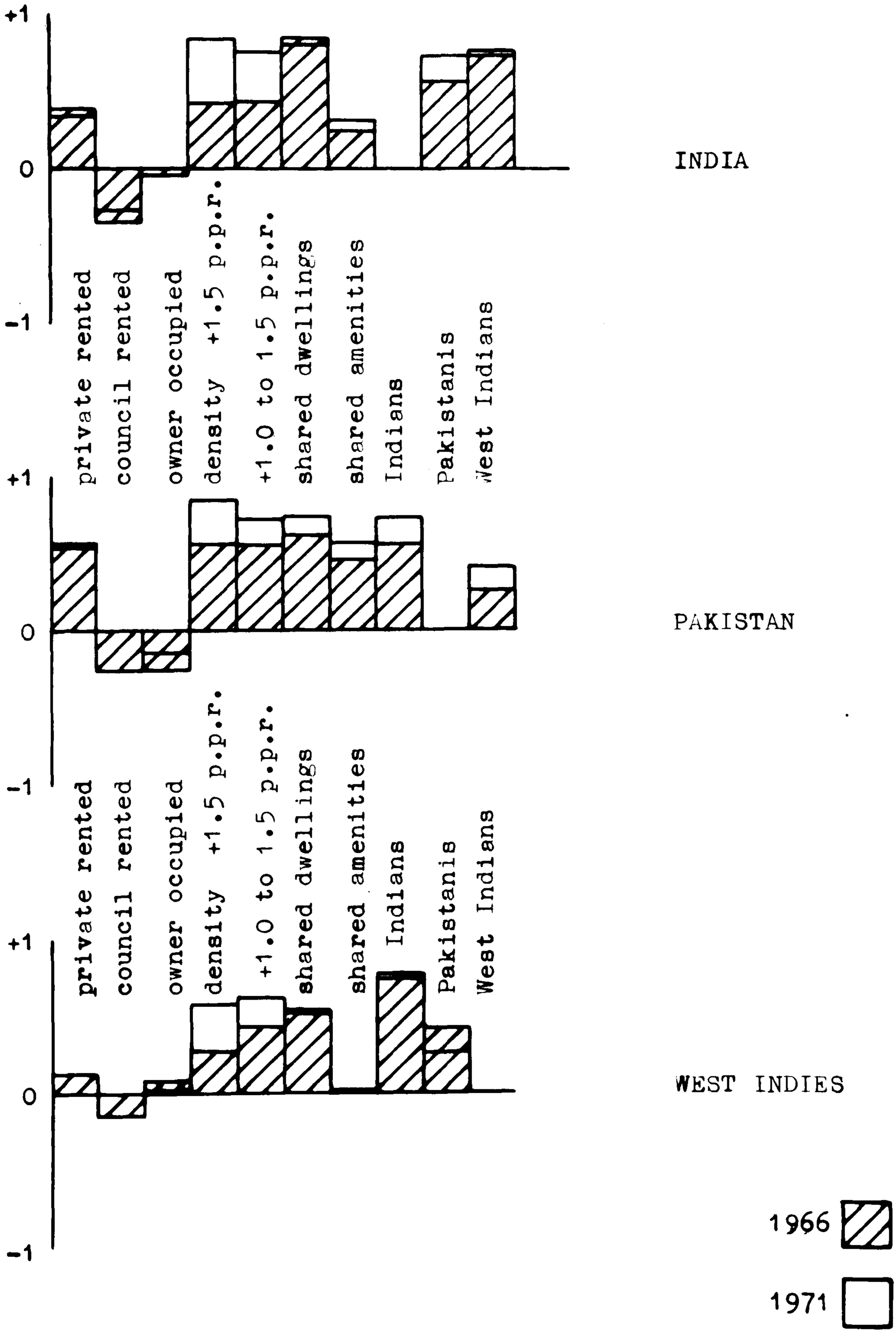
In all cases the multiple and squared multiple correlations are very high and in all cases the computed "F" value was highly significant. This Table shows up some quite remarkable differences between the coloured groups and some very remarkable changes in the five year period. Because the Table is not easy to read the changes are represented in Figure 3.1.

It is immediately apparent that all these groups fared relatively badly, over the period, in terms of the four central housing quality indicators, that is, persons living at over 1.5 persons per room, persons living at 1 to 1.5 persons per room, households sharing dwellings and households without all amenities exclusively. The correlation values for all groups increased over this period but least of all for the West Indian group and most, across the board, for the Pakistanis although the Indians shared heavy increases on the first two indicators and, indeed scored high correlations with these particular variables. There appears to be no clear association for any of the groups with tenure type. The most noticeable feature is the positive association with private rented accommodation and the negative association with the other two tenure types except in the case of the West Indians and owner occupation. The Pakistanis have marginally increased their association with the private rented sector and marginally decreased their association with the owner occupied sector. The correlation of Indians with private and council rental has marginally decreased and the West Indians association with owner occupied housing has increased slightly.

Table 3.7 Correlation coefficients for the three main coloured groups, 1966 and 1971, Leeds C.B.

| | Variable | Birthplace: India | | Pakistan | | W. Indies | |
|---|---|---|---|---|---|---|---|
| | Census Date | 1966 | 1971 | 1966 | 1971 | 1966 | 1971 |
| 1 | % households in private rental | 0.39446 | 0.34835 | 0.53369 | 0.54350 | 0.13275 | 0.06765 |
| 2 | % households in council rental | -0.33014 | -0.28669 | -0.26707 | -0.26681 | -0.13856 | -0.13508 |
| 3 | % households in owner occupation | -0.01858 | 0.04239 | -0.26664 | -0.13848 | 0.03942 | 0.09923 |
| 4 | % persons at + 1.5 p.p.r. | 0.40630 | 0.83955 | 0.57070 | 0.85501 | 0.29675 | 0.59282 |
| 5 | % persons at + 1.0 - 1.5 p.p.r. | 0.41416 | 0.77436 | 0.55935 | 0.71755 | 0.44626 | 0.61835 |
| 6 | % households in shared dwellings | 0.85469 | 0.80069 | 0.61209 | 0.74231 | 0.54472 | 0.51302 |
| 7 | % households without all amenities excl. | 0.24134 | 0.31873 | 0.47208 | 0.57018 | 0.00283 | 0.03547 |
| 8 | % Indians | 1.00000 | 1.00000 | 0.58326 | 0.74876 | 0.74247 | 0.78862 |
| 9 | % Pakistanis | 0.58326 | 0.74876 | 1.00000 | 1.00000 | 0.41558 | 0.28546 |
| 10 | % West Indians | 0.74247 | 0.78862 | 0.41558 | 0.28546 | 1.00000 | 1.00000 |
| 11 | % in S.E.G. 5 and 6 | 0.36567 | N.A. | 0.52065 | N.A. | 0.42610 | N.A. |
| 12 | % in council housing at + 1.5 p.p.r. | N.A. | 0.69842 | N.A. | 0.72375 | N.A. | 0.47629 |
| 13 | % in owner occupied at + 1.5 p.p.r. | N.A. | 0.71107 | N.A. | 0.82194 | N.A. | 0.43988 |
| | Multiple correlation coefficient | 0.97633 | 0.99419 | 0.97406 | 0.98172 | 0.99726 | 0.98749 |
| | Squared multiple correlation coefficient | 0.95322 | 0.98841 | 0.94879 | 0.96377 | 0.99452 | 0.97513 |

**Figure 3.1** Correlation coefficients for the main coloured groups 1966 and 1971



Differences emerge between the groups themselves. The Asian groups appear to have drawn together while the West Indians appear to have drawn away from these other two. This observation is examined more closely in Chapter 4 and the conclusions there substantiate this observation from the correlation coefficients. Examination of the tenure situation of the immigrants in Chapter 9 and the location modelling of the immigrant distribution substantiates the fact that tenure category was even less of a locational influence in 1971 than it was in 1966.

For three of the indicators in Table 3.7 no comparison over the five year period is possible due to lack of comparable information in either 1966 or 1971. These variables are the percentage of population in S.E.G.'s 5 and 6, that is, semi- and un-skilled employment and percentage of households in owner occupation and council accommodation living at over 1.5 persons per room.

The Pakistani group is seen to have the highest association with the first of these variables closely followed by the West Indians. This data was not available for the 1971 census at the time of writing. On the housing density indicators the Pakistanis and the Indians are seen to be most poorly situated. Their association with these tenure types is so low and the association with the density by tenure indicators so high that it would seem to indicate that while these groups are not using (or being allowed to use) these tenures to their full advantage, when they do they obtain (or receive) the poorest end of the market.

## 3.5 Examination of the incidence of the social indicators throughout the city.

In order to extend the correlation analysis a stage further and to develop a means of scoring each zone of the city in terms of the social indicators used above, a principal components analysis was performed on the data which had been used in the correlation analysis. Factor scores could then be calculated for each of the principal factors thrown up by the principal components analysis. This means that, simply, the multiple correlation situation detailed above is reduced to a small number of factors which are groups of highly associated variables while there is as little as possible association between the factors, that is, intra-factor association is maximised, inter-factor association is minimised. The calculations were performed using the Leeds University I.C.L. 1906A Computer.

The three factors which the analysis produced and the variables loading most highly on each factor are listed in Table 3.8. The amounts of variance "explained" by each factor for each year are:

| | 1966 | 1971 |
|---|---|---|
| Factor 1 | 34.9% | 56.3% |
| Factor 2 | 23.5% | 15.1% |
| Factor 3 | 21.3% | 16.5% |
| Total | 79.7% | 87.9% |

The orientation of the factors derived from this analysis may be seen to have changed over the five year period. In 1966 the only strong association which the analysis picked out with the birthplace criteria was that with shared dwellings. In 1971 the associations with the housing

Table 3.8 (Part 1) Variable Loadings 1966 and 1971

1966

| Factor 1 | | Factor 2 | | Factor 3 | |
|---|---|---|---|---|---|
| Variable | Loading | Variable | Loading | Variable | Loading |
| % persons born in the New Commonwealth | 0.9760 | % owner occupied | 0.9299 | % households privately renting | -0.8809 |
| % households in shared dwellings | 0.8449 | % persons living at + 1.5 p.p.r. | -0.6526 | % households in council housing | 0.7997 |
| % persons born in India | 0.9292 | % persons living at 1 and 1.5 p.p.r. | -0.7339 | % households without all amenities excl. | -0.8896 |
| % persons born in Pakistan | 0.6589 | % persons in S.E.G.'s 5 and 6 | -0.8204 | | |
| % persons born in the West Indies | 0.8678 | | | | |

Table 3.8 (Part 2) Variable Loadings 1966 and 1971

1971

| Factor 1 | | Factor 2 | | Factor 3 | |
|---|---|---|---|---|---|
| Variable | Loading | Variable | Loading | Variable | Loading |
| % persons living at + 1.5 p.p.r. | 0.9585 | % households in council housing | 0.8815 | % households in private rented accommodation | -0.8312 |
| % persons living at 1 and 1.5 p.p.r. | 0.9051 | % households in owner occupation | -0.9339 | % households without all amenities excl. | -0.8506 |
| % persons born in the New Commonwealth | 0.9656 | | | | |
| % households in shared dwellings | 0.8148 | | | | |
| % persons in council housing at + 1.5 p.p.r. | 0.8429 | | | | |
| % persons in owner occupation at + 1.5 p.p.r. | 0.8411 | | | | |
| % of Indians | 0.9471 | | | | |
| % of Pakistanis | 0.8202 | | | | |
| % of West Indians | 0.7421 | | | | |

density indicators is much more apparent, but there is still not a high enough association with the amenity aspects or the tenure aspects for these to register in the same factor. In factor 2 the association in 1966 of owner occupation tenure type with the density aspects and the low S.E.G.'s, which was highly negative, has been replaced in 1971 by a straightforward negative association between owner occupied housing and council housing. In factor 3 the council house indicator was negatively associated with private rented housing and lack of exclusive use of amenities within the home. In 1971, this third factor may be largely described as being of private rented accommodation with lack of amenities.

This further analysis, therefore, has been able to show, quite successfully, and in a very simple way, the situation which we attempted to describe with the correlation analysis. This was that the New Commonwealth immigrants, in Leeds C.B., did not progress very far in terms of social and economic "advancement" in this half decade, that while the association with indicators of adverse social conditions were weak in 1966, they had grown much stronger by 1971. The analysis has shown that a very much higher percentage of the variation in the distribution of immigrants could be explained by these adverse social indicators in 1971 than in 1966.

## 3.6 Some theoretical developments

The above sections have attempted to illustrate, as far as possible, the social and economic situation of the main New Commonwealth born groups in Leeds C.B. In this section the next logical step forward in the social analysis of these groups is taken, that is, we attempt to estimate the

the actual numbers of these persons in certain social and economic categories, that is, we move beyond the purely associational aspects of the analysis so far and suggest what amount to "best fit" solutions to questions such as; what is the age structure of the West Indians in Leeds and what is the socio-economic grouping amongst the Pakistanis in Leeds? In other words it is an attempt, however theoretical, to get behind the correlation figures which were presented above and to discover the actual number of a specific birthplace group in certain social situations. In terms of social group analysis this may seem to be an advance. Indeed it is possibly a significant development in a wider context, for example in attempting the estimation of the numbers of persons in need of certain social services. In terms of the present study, however, the author sees this as a response to the poorly developed information system on the situation of immigrants in British society generally. Hence the theoretical development and the results themselves are in this context merely a necessary preliminary to supply inputs to further work, in this case the investigation of the demography of the immigrant groups, for which an age breakdown was specifically required. So, in fact, the trap which has claimed many victims in race research in the past, that is becoming a generator of information, has sprung again. In this case, however, the information thus generated can be presented in this chapter, in the knowledge that part of it at least will be made use of for further study.

It is possible using probability measures to estimate this demographic, social and economic data. In its simplest form we could obtain a sex/age breakdown of the ethnic

populations of Leeds from the probabilities obtained from the nearest possible scale level i.e. West Yorkshire, and making the assumption that the distribution in Leeds is the same as the distribution in West Yorkshire we can obtain:

$$K_{er}^{LE\,X} = K_{e}^{LE\,X}\ P^{WY}(r/e) \qquad (3.1)$$

where $K_{er}^{LE\,X}$ is the ethnic population by age, r, and sex ($X$ = M or F) in Leeds

$K_{e}^{LE\,X}$ is the ethnic populations of Leeds ($X$ = M or F)

and

$P^{WY}(r/e)$ is the conditional probability of being in age group r given ethnic group e.

However this is rather unsatisfactory in that it is both unlikely that Leeds conforms exactly to West Yorkshire in the matter of this age distribution and secondly that, if this is performed for zones <u>within</u> Leeds that all zones in Leeds have the same age structure as the city as a whole and thus conform to West Yorkshire distributions. It is also rather inadequate in generating the sorts of differences which are essential to the urban geographer's work.

Given that these are the only probabilities it is possible to use (no others are obtainable) a model is required which takes into account the different social and economical structures of Leeds, in comparison with West Yorkshire, and the different structures within zones of the city. Basically this is made possible by the use of 2 or more balancing factors which ensure that

1) The estimated row elements add up to the correct row total, available in the census.

2) The estimated column elements add up to the correct column totals, available in the census.

In other words, these may be expressed as two mathematical constraints which can be built into the probability model,

$$\sum_{k} K^{i}_{ek} = K^{i}_{e} \qquad (3.2)$$

$$\sum_{e} K^{i}_{ek} = K^{i}_{k} \qquad (3.3)$$

These constraints can exist for any number of zones, i, where i may be the city or zones within the city but in all cases the constraining information has to be provided in the model. For example one can build into the model balancing factors which satisfy these constraints at Leeds City level by providing two sets of data which are available from official sources:

1) Total persons (males or females) in Leeds in each ethnic group.

2) Total persons (males or females) in Leeds in each of the specified age groups to be used in the model.

Thus, the estimates from the model can be used to obtain balancing factors which modify the estimates in turn so that the results are consistent with the supplied official data. Conversely if the model is used to estimate age groups within different zones of the city then data can still be provided to apply constraints:

1) Total persons (males or females) in zone i in each ethnic group (Ward and Parish Library Tabulations).

2) Total persons (males or females) in zone i in each of the specified age groups to be used in

the model (Ward and Parish Library Tabulations).

In short, what happens within the model using balancing factors, is that externally derived probabilities are used to obtain a first approximation to the age structures either for Leeds or for zones within Leeds. These estimates are then modified by an age balancing factor $(B_k^i)$ or an ethnic group balancing factor $(A_e^i)$ so that the constraints at each level are met in full. Solution to the balancing factors is obtained iteratively. The model, therefore, becomes

$$K_{ek}^i = A_e^i \; B_k^i \; K_e^i \; (P^{wy}(k/e)) \qquad (3.4)$$

$$\text{where } A_e^i = 1 / \sum_k B_k^i \; (P^{wy}(k/e)) \qquad (3.5)$$

$$\text{and } B_k^i = K_k^i / \sum_e A_e^i \; K_e^i \; (P^{wy}(k/e)) \qquad (3.6)$$

Further to the use of this model in the estimation of numbers of persons in certain social groupings in Leeds C.B. it is shown later how the model can be used to estimate numbers at zonal level. Thus for example the probable age distribution or the tenure structure of immigrants in different areas of the city may be examined. In this case, however, these derived data are not used elsewhere in this document, the demographic analysis is based on the Leeds C.B. not the 34 zone system. The situation arises for a significant number of zones that the numbers of immigrants are too small to accommodate, meaningfully, an estimated age breakdown of persons who were <u>born abroad</u>.

Figures 3.2 to 3.6 show the estimated age structures of immigrants to Leeds C.B. who were born in the West Indies, India and Pakistan, other Commonwealth countries, Ireland,

**Figure 3.2** Estimated age/sex pyramids for the West Indian population of Leeds, 1961, 1966, 1971

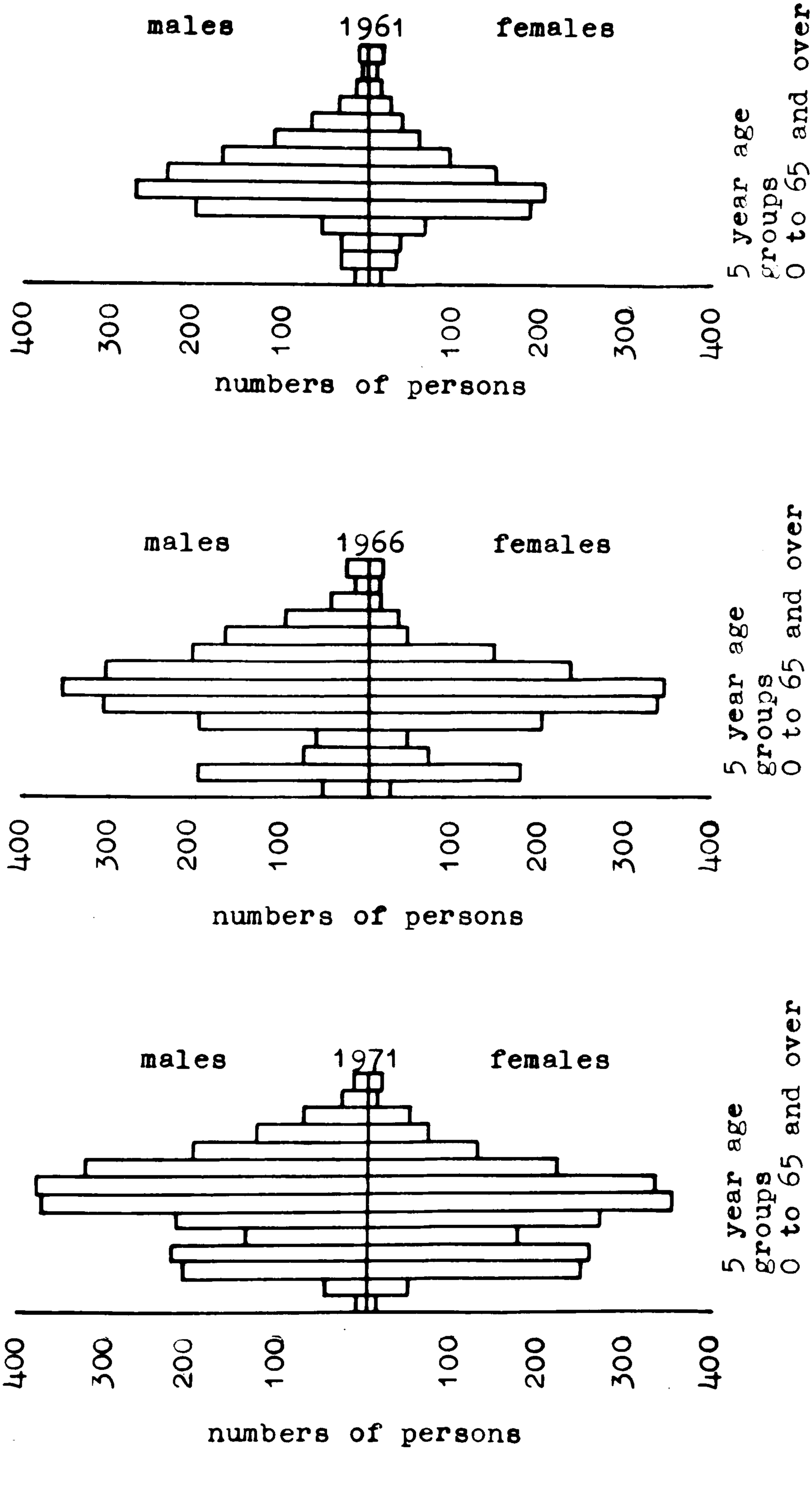


**Figure 3.3** Estimated age/sex pyramids for the Indian and Pakistani populations of Leeds, 1961, 1966, 1971.

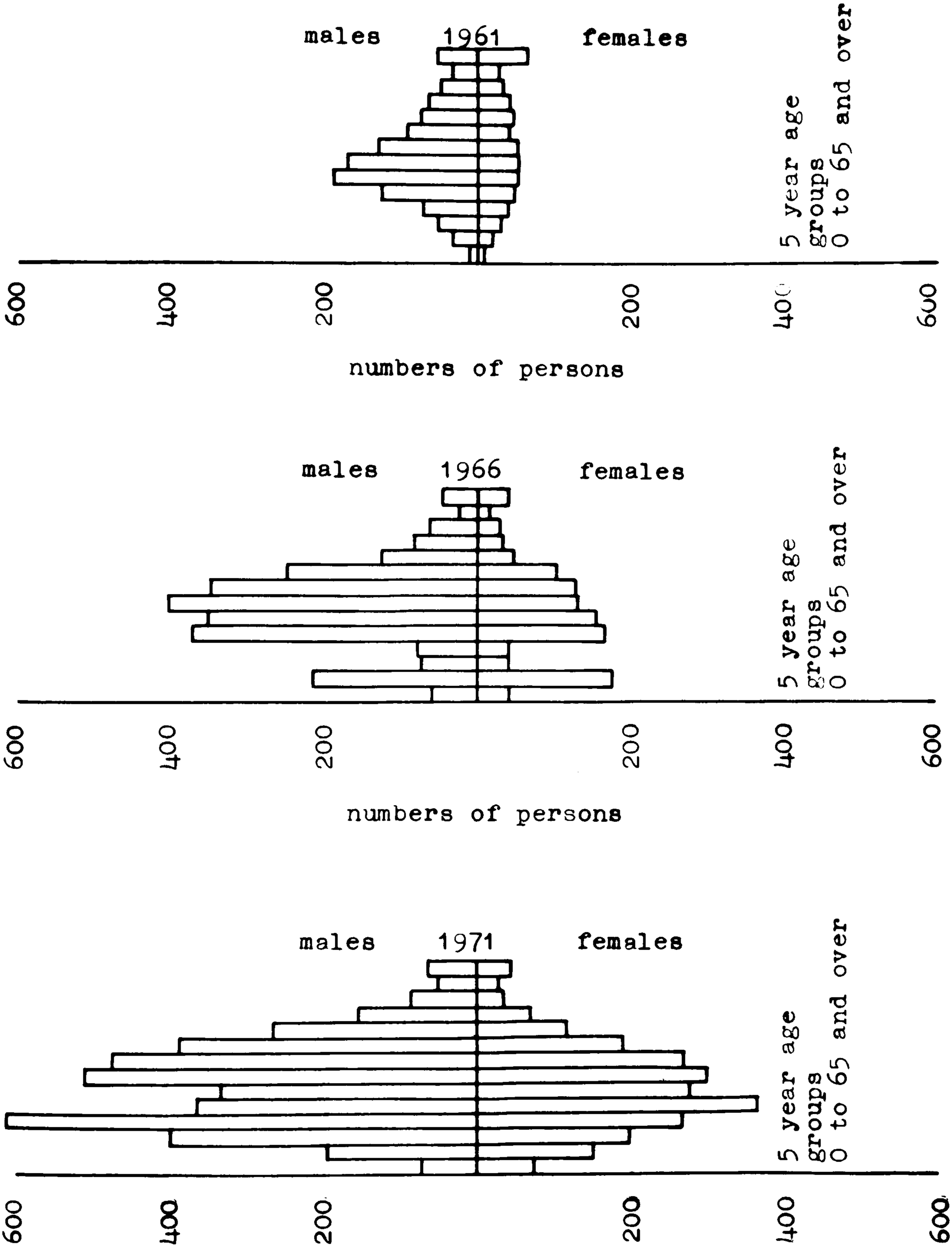


**Figure 3.4** Estimated age/sex pyramids for the Other New Commonwealth population of Leeds, 1961, 1966, 1971.

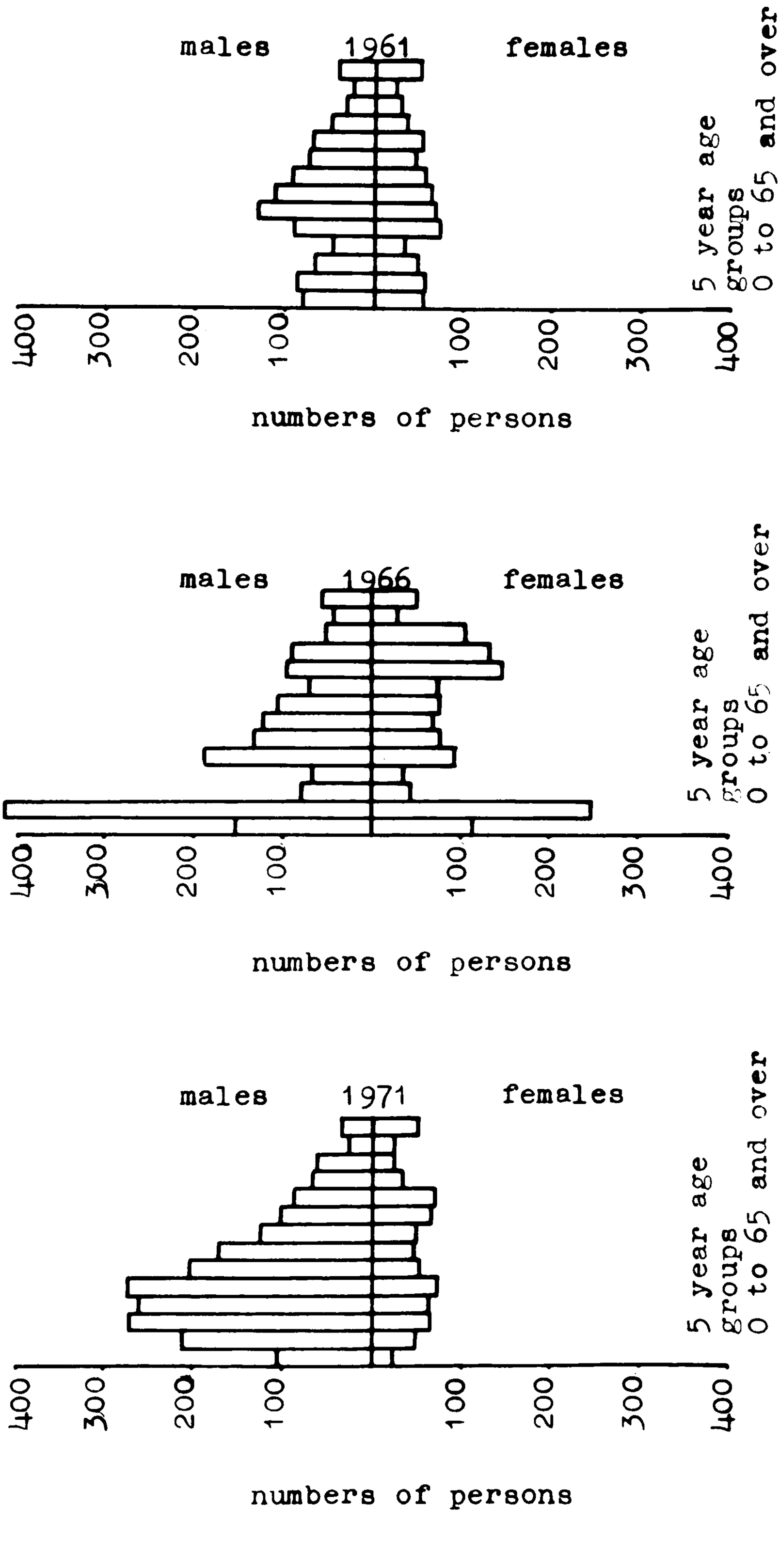
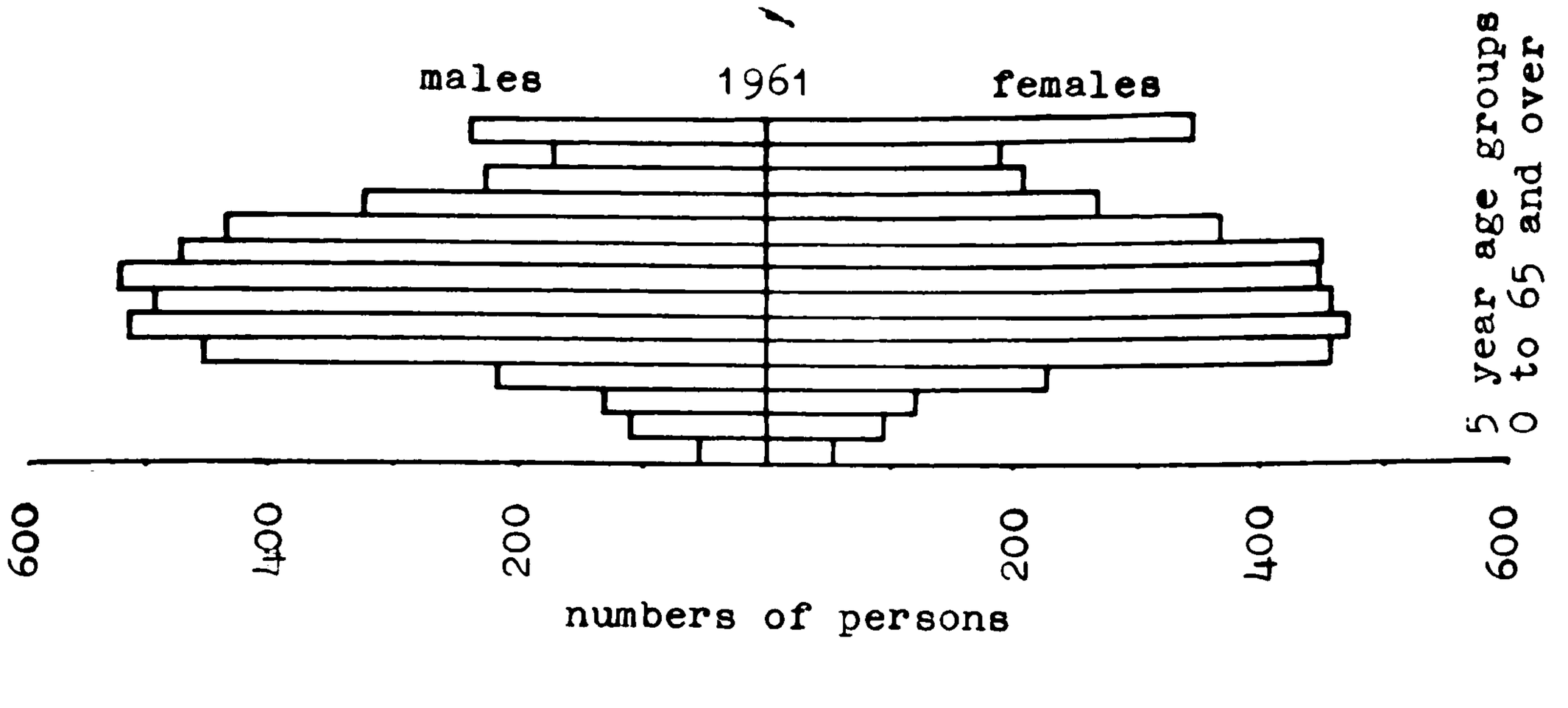
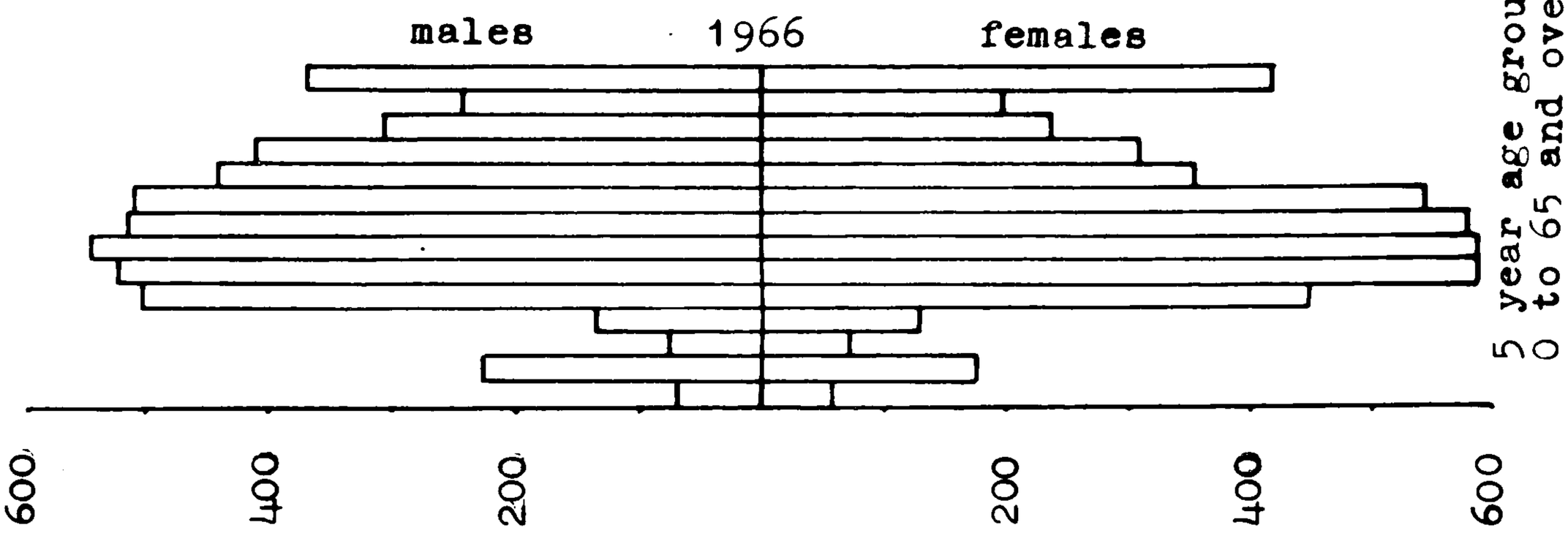


**Figure 3.5** Estimated age/sex pyramids for the Irish born population of Leeds, 1961, 1966, 1971.



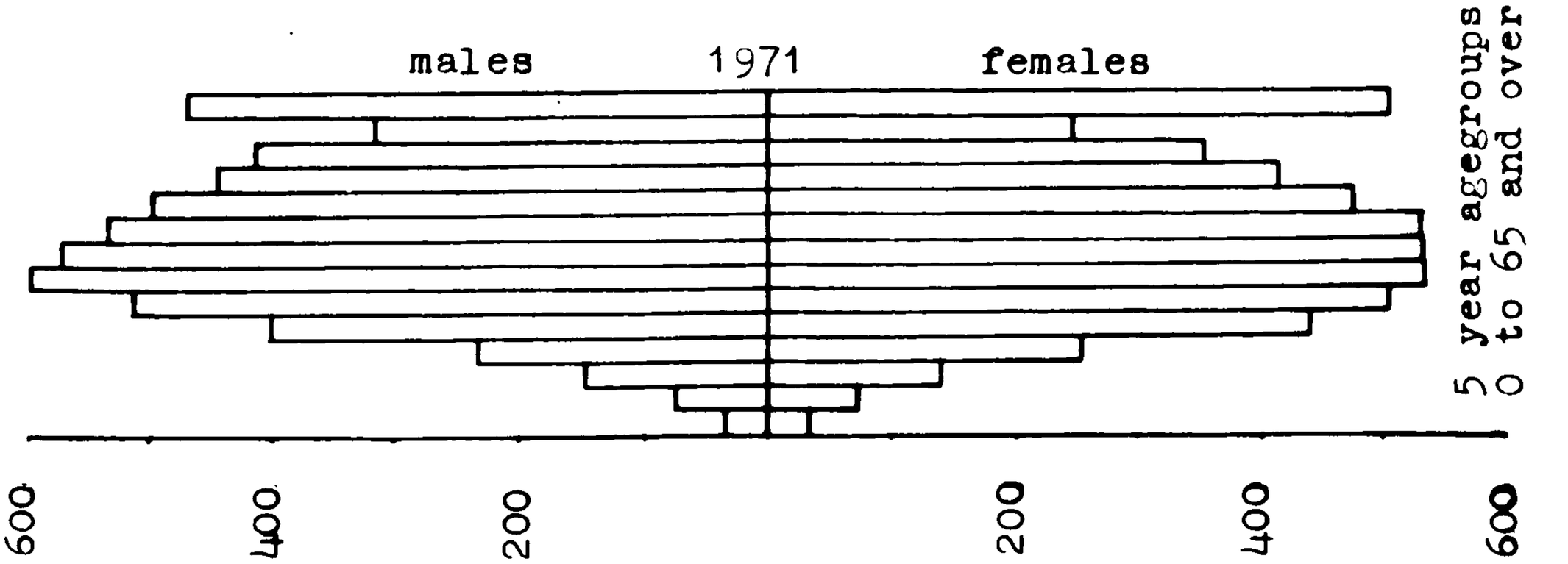
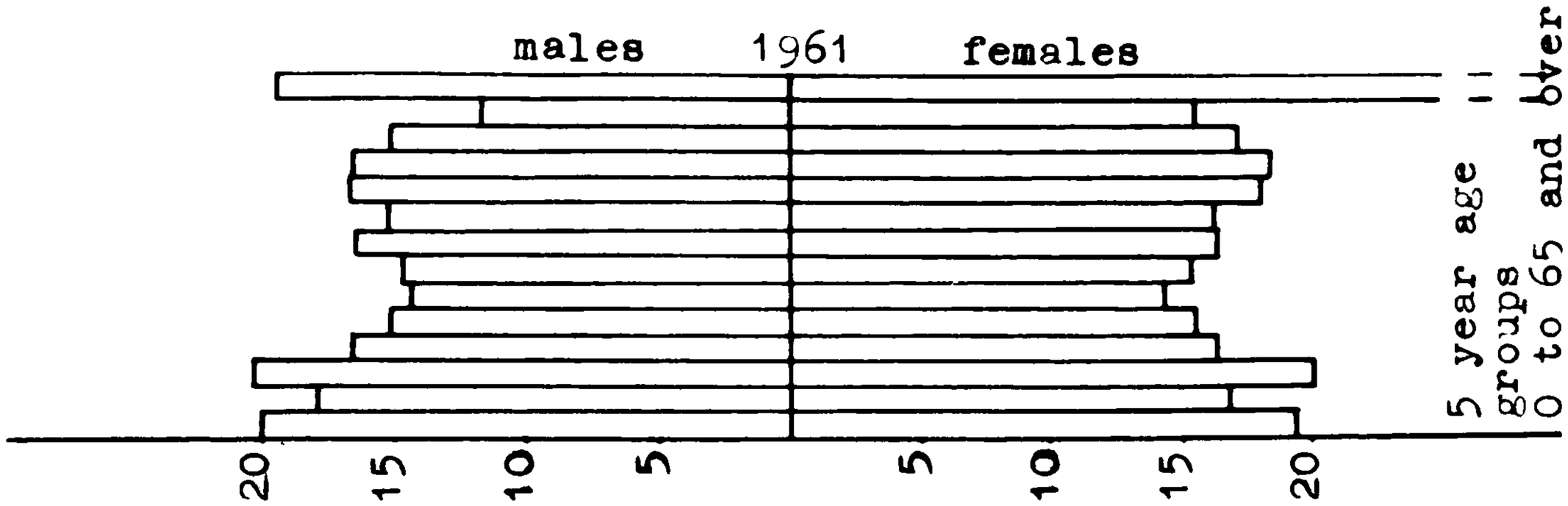



**Figure 3.6** Estimated age/sex pyramids for the U.K. born population of Leeds, 1961, 1971.



and, as a comparison, the U.K. population. This is probably not the best medium to present data on this last group. The shape or form of the Figure is the important point. The data from which these figures were drawn is given in Table 3.9.

Figures 3.2, 3.3, 3.4 and 3.5 show the classic mushroom shape of an immigrant population, few children or elderly persons and a predominance of young adults. The sex imbalance in favour of males is quite marked both in the Asian and Other Commonwealth groups. Between the 1961 and 1971 pyramids is a decade of growth and change, some of which is reflected in the changing, or evolving shape of the pyramids. This is encouraging in that these figures are only "best estimates" yet they fit the wider context of growth and change very well indeed. Thus in Figure 3.6 a minor bulge seen in the 10 to 14 year old population of both males and females in 1961 has become a minor bulge in the 20 to 24 year old male and female population 10 years later.

In the populations which are in much greater relative change, the immigrant population, these similarities in pattern will be less strikingly obvious. Yet they do exist. In Figure 3.2 for example, the 1961 population of West Indians shows the typical predominance of young adults. In 1971 the largest numbers of persons are to be found in the young 'middle' age ranges, between 29 and 44. Suggestions about types of immigration may also be made. For example, between 1961 and 1966 both the young adult (25 to 34) and the 5 to 9 year old population expanded in number. Between 1966 and 1971 the increases are mainly seen to be in the 10 to 19 year old age groups. Could this reflect the family nature of the West Indian immigration in the early sixties,

Table 3.9 Age structure of selected groups 1961, 1966 and 1971

| Age Group | West Indians | | | | | |
|---|---|---|---|---|---|---|
| | Males | | | Females | | |
| | 1961 | 1966 | 1971 | 1961 | 1966 | 1971 |
| 0-4 | 18 | 52 | 10 | 15 | 26 | 13 |
| 5-9 | 33 | 199 | 48 | 29 | 180 | 46 |
| 10-14 | 33 | 77 | 210 | 34 | 70 | 248 |
| 15-19 | 56 | 60 | 221 | 61 | 45 | 257 |
| 20-24 | 202 | 193 | 139 | 186 | 201 | 173 |
| 25-29 | 271 | 303 | 220 | 204 | 337 | 266 |
| 30-34 | 233 | 353 | 373 | 144 | 345 | 351 |
| 35-39 | 170 | 302 | 379 | 91 | 236 | 333 |
| 40-44 | 111 | 203 | 321 | 57 | 143 | 220 |
| 45-49 | 68 | 164 | 198 | 36 | 45 | 128 |
| 50-59 | 15 | 44 | 71 | 12 | 13 | 51 |
| 60-64 | 8 | 17 | 28 | 8 | 13 | 13 |
| ≥65 | 11 | 24 | 13 | 16 | 16 | 17 |
| Total | 1263 | 2088 | 2355 | 914 | 1702 | 2185 |

| Age Group | Indians/Pakistanis | | | | | |
|---|---|---|---|---|---|---|
| | Males | | | Females | | |
| | 1961 | 1966 | 1971 | 1961 | 1966 | 1971 |
| 0-4 | 13 | 61 | 73 | 8 | 40 | 73 |
| 5-9 | 34 | 219 | 195 | 19 | 176 | 149 |
| 10-14 | 53 | 76 | 399 | 28 | 39 | 198 |
| 15-19 | 74 | 80 | 616 | 39 | 39 | 264 |
| 20-24 | 128 | 373 | 366 | 45 | 165 | 363 |
| 25-29 | 190 | 351 | 335 | 49 | 153 | 275 |
| 30-34 | 172 | 401 | 511 | 49 | 149 | 298 |
| 35-39 | 131 | 347 | 474 | 48 | 126 | 268 |
| 40-44 | 93 | 251 | 387 | 40 | 102 | 190 |
| 45-49 | 78 | 127 | 265 | 42 | 46 | 117 |
| 50-54 | 66 | 85 | 156 | 40 | 34 | 69 |
| 55-59 | 50 | 62 | 85 | 32 | 29 | 36 |
| 60-64 | 35 | 27 | 51 | 28 | 17 | 28 |
| ≥65 | 48 | 46 | 62 | 65 | 40 | 42 |
| Total | 1165 | 2503 | 3975 | 532 | 1155 | 2370 |

Table 3.9 (Continued)

| Age Group | Other Commonwealth | | | | | |
|---|---|---|---|---|---|---|
| | Males | | | Females | | |
| | 1961 | 1966 | 1971 | 1961 | 1966 | 1971 |
| 0-4 | 80 | 153 | 105 | 57 | 114 | 22 |
| 5-9 | 85 | 413 | 212 | 58 | 244 | 47 |
| 10-14 | 67 | 80 | 274 | 47 | 41 | 62 |
| 15-19 | 48 | 66 | 261 | 34 | 37 | 61 |
| 20-24 | 111 | 187 | 276 | 76 | 93 | 74 |
| 25-29 | 130 | 135 | 205 | 69 | 73 | 50 |
| 30-34 | 111 | 123 | 175 | 64 | 69 | 46 |
| 35-39 | 91 | 108 | 124 | 57 | 77 | 47 |
| 40-44 | 75 | 72 | 103 | 46 | 74 | 64 |
| 45-49 | 72 | 99 | 87 | 52 | 143 | 66 |
| 50-54 | 49 | 92 | 68 | 38 | 132 | 33 |
| 55-59 | 34 | 53 | 61 | 28 | 105 | 25 |
| 60-64 | 25 | 42 | 29 | 22 | 14 | 22 |
| ≥65 | 40 | 58 | 35 | 51 | 45 | 51 |
| Total | 1018 | 1681 | 2015 | 699 | 1261 | 670 |

| Age Group | Irish (including Northern Ireland) | | | | | |
|---|---|---|---|---|---|---|
| | Males | | | Females | | |
| | 1961 | 1966 | 1971 | 1961 | 1966 | 1971 |
| 0-4 | 59 | 70 | 37 | 52 | 55 | 34 |
| 5-9 | 111 | 214 | 71 | 95 | 177 | 72 |
| 10-14 | 131 | 78 | 142 | 120 | 67 | 140 |
| 15-19 | 220 | 136 | 237 | 227 | 128 | 255 |
| 20-24 | 459 | 505 | 400 | 457 | 466 | 440 |
| 25-29 | 518 | 523 | 513 | 468 | 586 | 509 |
| 30-34 | 497 | 546 | 591 | 451 | 586 | 537 |
| 35-39 | 522 | 518 | 571 | 442 | 578 | 533 |
| 40-44 | 476 | 512 | 537 | 407 | 540 | 535 |
| 45-49 | 438 | 442 | 499 | 365 | 352 | 474 |
| 50-54 | 324 | 411 | 442 | 266 | 309 | 415 |
| 55-59 | 228 | 309 | 416 | 200 | 219 | 354 |
| 60-64 | 174 | 311 | 319 | 187 | 199 | 246 |
| ≥65 | 240 | 374 | 470 | 343 | 409 | 506 |
| Total | 4401 | 4882 | 5245 | 4080 | 4671 | 5050 |

Table 3.9 (Continued)

| Age Group | Great Britain | | | | | |
|---|---|---|---|---|---|---|
| | Males | | | Females | | |
| | 1961 | 1966 | 1971 | 1961 | 1966 | 1971 |
| 0-4 | 20071 | 21506 | 20838 | 19428 | 20558 | 18537 |
| 5-9 | 18014 | 37465 | 20547 | 16972 | 35562 | 19177 |
| 10-14 | 20489 | 9389 | 18071 | 20080 | 9147 | 17630 |
| 15-19 | 16841 | 10409 | 16242 | 16459 | 10614 | 16594 |
| 20-24 | 15317 | 16016 | 17759 | 15616 | 14891 | 19072 |
| 25-29 | 14455 | 13490 | 13966 | 14225 | 13652 | 12264 |
| 30-34 | 14913 | 12832 | 12605 | 15235 | 13140 | 11962 |
| 35-39 | 16665 | 13490 | 12204 | 16486 | 14448 | 12239 |
| 40-44 | 15444 | 15025 | 12917 | 16150 | 15643 | 13726 |
| 45-49 | 16842 | 14328 | 14435 | 18065 | 14920 | 14920 |
| 50-54 | 16824 | 15351 | 13118 | 18471 | 16408 | 14466 |
| 55-59 | 15277 | 14817 | 13743 | 17096 | 16648 | 15689 |
| 60-64 | 11893 | 13284 | 12828 | 15578 | 15983 | 15853 |
| ≥65 | 19661 | 21000 | 23827 | 35692 | 36153 | 41382 |
| Total | 232706 | 228402 | 223100 | 255553 | 247767 | 243871 |

followed by a family consolidation in the later sixties?

In Figure 3.3 the heavy predominance of Asian male immigrants is well illustrated. In this case migration throughout the sixties seems mostly to have been of young adults aged between about 20 and 35 years with, in the late sixties, heavy immigration of older teenagers. There appears to be a slightly anomalous population of 5 to 9 year olds in 1966 but a glance at the 1971 situation will show that this situation has been absorbed into the whole structure. Figure 3.4 shows the evolving structure of Other Commonwealth born persons. The evolution from 1961 to 1971 is almost totally explainable by aging of the 1961 population along with immigration of teenagers and persons in their early twenties. Notice that there are more children aged 0 to 4 years in this population. This could reflect the immigration of "African" Asian families in the later half of the 1960's. In this population there was still a heavy predominance of males in 1971. Part of this may be explained by the presence in the city of a number of West African students. Finally Figure 3.5 shows the age structure of the Irish born population in Leeds C.B. in 1961, 1966 and 1971. In this case the main difference from the coloured immigrant situation is the relatively large number of old persons. The rest of this structure still shows the typical immigrant population age structure if, on the whole, slightly older than the coloured population.

## 3.7 Inter zonal differences in age groups and tenure structure.

Simple modification of the model used to generate city age structure allows the model to estimate the age structures of the birthplace groups in the different zones of the city. Whereas in the former case the constraints used were such that the sum over the age groups equalled the total (given) population in each age group and that the sum over the birthplace groups equalled the total population of the city, for zonal estimates the constraints are the total population in each age group in each zone and the total population of each zone.

Experimentation with the model at this scale, however, is less successful than at the city scale. This is mainly due to the relatively large number of zones with very few immigrants resident in them. Table 3.11 is presented to show the sorts of differences which may be generated. It appears, however, that when the numbers estimated are indeed small the model generates information which is tied much more closely to the characteristics of the zones than to the age or social characteristics of the groups themselves.

Another application of this particular model is offered below. In this case it was wished to produce estimates of the numbers of immigrants in certain tenure categories in the zones of the city and to compare this distribution with that for the white indigenous population. For these purposes the required inputs to the model were:

(1) Total persons in each birthplace group (in this case India, Pakistan, West Indies and

the remainder of the population) in each zone. In mathematical notation $K_i^{*e}$

(2) Total persons in each tenure category in each zone. (In this case Owner Occupation, Rented from Council, Rented Privately, and Other. In mathematical notation $K_i^v$

(3) Probability function, that is, the probability of a person of birthplace group (e) being in tenure type. In mathematical notation P(v/e)

Table 3.10 shows the distribution according to the results of this estimation technique for 1966 and 1971 for the city and Table 3.11 shows the tenure statistics by ethnic group and for selected zones.

Let us consider the city-wide situation as shown in Table 3.10 first. For the majority population, in 1966, the commonest form of housing tenure was that of owner occupation. 43.3% of this population, or 207,187 persons were living in this tenure type at that date. Council rented accommodation accounted for another 35.3% of this population, a total of 168,907 persons. Of the remainder, 90,183 persons, or 18.9% of the total were in privately rented accommodation and 11,727 (2.5%) were in other tenure types. The most remarkable difference between this situation and that for the coloured immigrants is the predominance, among this latter group, of the privately rented tenure type. The difference appears to be largely made up from the very small numbers of immigrants in council accommodation for there are relatively high levels of owner occupation. In the case of persons born in India this latter tenure type accounts for over half of the total

Table 3.10 Estimated tenure structure of the population of Leeds C.B. 1966 and 1971

| Tenure Type | Birthplace 1966 | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | India | | Pakistan | | West Indies | | Rest of World | |
| | No. | % | No. | % | No. | % | No. | % |
| Owner Occupied | 1330 | 51.0 | 432 | 41.1 | 1420 | 37.5 | 207,187 | 43.3 |
| Council Rented | 185 | 7.1 | 34 | 3.2 | 192 | 5.0 | 168,907 | 35.3 |
| Privately Rented | 1086 | 41.7 | 579 | 55.2 | 2170 | 57.3 | 90,183 | 18.9 |
| Other | 6 | 0.2 | 5 | 0.5 | 8 | 0.2 | 11,727 | 2.5 |
| Totals | 2607 | 100.0 | 1050 | 100.0 | 3790 | 100.0 | 477,994 | 100.0 |

| Tenure Type | Birthplace 1971 | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | India | | Pakistan | | West Indies | | Rest of World | |
| | No. | % | No. | % | No. | % | No. | % |
| Owner Occupied | 1963 | 55.9 | 1145 | 47.4 | 1558 | 43.1 | 204,507 | 42.8 |
| Council Rented | 314 | 8.9 | 108 | 4.5 | 273 | 7.5 | 200,174 | 41.9 |
| Privately Rented | 1234 | 35.2 | 1163 | 48.1 | 1785 | 49.4 | 73,592 | 15.3 |
| Other | NS | - | NS | - | NS | - | NS | - |
| Totals | 3511 | 100.0 | 2416 | 100.0 | 3616 | 100.0 | 478,173 | 100.0 |

population (1,330 or 51.0%). For the Pakistanis the level is almost equal to that of the rest of the population at 41.1% and is slightly lower for the West Indians at 37.5%. These last two birthplace groups each appear to have more than half their populations living in the private rented sector of the housing market.

Between 1966 and 1971 the situation estimated here appears to have changed more or less in line with general housing trends for this half decade. For the majority of the population the owner occupied situation appears to have remained fairly static while the council housing sector has expanded from 35% to 42% of the total market, this expansion taking place largely at the expense of the privately rented sector. For the three main immigrant groups, however, the story is somewhat different. Very little change has occurred in the council housing sector and the increases which may be observed in the owner occupied sector have come, once again, from the privately rented tenure type. In respect of owner occupation the Indian group is still in the best position with 56% of their population in this tenure type. The Pakistani group may be seen to be next in line with 47% of their population, and the West Indians third with 43% of their population in this tenure type. The Pakistanis and West Indians are still relatively most poorly situated with regard to privately rented accommodation with nearly half of their populations in this type of tenure (48% and 49% respectively), this statement of course assuming that the privately rented accommodation is the poorest, in terms of general facilities and amenities, of the three types of tenure.

The tenure character of the three areas illustrated in

Table 3.11 Percentage tenure structure of the population of Leeds C.B. in selected zones, 1966 and 1971

| Tenure Type | | Birthplace: India | | Pakistan | | West Indies | | Rest of World | |
|---|---|---|---|---|---|---|---|---|---|
| Owner Occupied | 1966 | 157 | 63.7 | 58 | 64.2 | 364 | 47.3 | 3059 | 47.6 |
| | 1971 | 206 | 70.9 | 21 | 73.8 | 346 | 59.5 | 2135 | 44.8 |
| Council Rented | 1966 | 27 | 11.2 | 6 | 6.2 | 56 | 7.3 | 2232 | 37.7 |
| | 1971 | 42 | 14.3 | 2 | 8.4 | 62 | 10.7 | 2220 | 46.5 |
| Privately Rented | 1966 | 62 | 25.2 | 26 | 29.4 | 348 | 45.2 | 1026 | 16.0 |
| | 1971 | 43 | 14.7 | 5 | 17.7 | 174 | 29.9 | 415 | 8.7 |
| Other | 1966 | 0 | 0.0 | 0 | 0.0 | 2 | 0.2 | 108 | 1.7 |
| | 1971 | - | - | - | - | - | - | - | - |

(i) Zone 17 Potternewton West

| Tenure Type | | Birthplace: India | | Pakistan | | West Indies | | Rest of World | |
|---|---|---|---|---|---|---|---|---|---|
| Owner Occupied | 1966 | 232 | 58.2 | 58 | 57.8 | 611 | 40.5 | 3921 | 44.6 |
| | 1971 | 405 | 60.0 | 189 | 60.1 | 532 | 42.8 | 2487 | 41.9 |
| Council Rented | 1966 | 41 | 10.4 | 6 | 5.9 | 97 | 6.4 | 2963 | 33.7 |
| | 1971 | 73 | 10.8 | 19 | 6.1 | 86 | 6.9 | 2313 | 39.0 |
| Privately Rented | 1966 | 126 | 31.4 | 36 | 36.3 | 800 | 53.0 | 1799 | 20.5 |
| | 1971 | 197 | 29.2 | 106 | 33.8 | 626 | 50.4 | 1134 | 19.0 |
| Other | 1966 | 0 | 0.0 | 0 | 0.0 | 2 | 0.1 | 107 | 1.2 |
| | 1971 | - | - | - | - | - | - | - | - |

(ii) Zone 18 Potternewton East

Table 3.11 (Continued)

| Tenure Type | | Birthplace: India | | Pakistan | | West Indies | | Rest of World | |
|---|---|---|---|---|---|---|---|---|---|
| Owner Occupied | 1966 | 99 | 27.6 | 45 | 24.9 | 39 | 13.8 | 1436 | 28.0 |
| | 1971 | 55 | 31.5 | 83 | 29.0 | 7 | 16.4 | 626 | 28.5 |
| Council Rented | 1966 | 6 | 1.7 | 2 | 0.8 | 2 | 0.7 | 368 | 7.2 |
| | 1971 | 6 | 3.6 | 5 | 1.9 | 1 | 1.7 | 367 | 16.7 |
| Privately Rented | 1966 | 254 | 70.5 | 133 | 73.7 | 239 | 85.3 | 3119 | 60.9 |
| | 1971 | 113 | 64.9 | 197 | 69.1 | 37 | 81.9 | 1207 | 54.9 |
| Other | 1966 | 1 | 0.3 | 1 | 0.5 | 1 | 0.2 | 197 | 3.9 |
| | 1971 | - | - | - | - | - | - | - | - |

(iii) Zone 34 Blenheim West

Table 3.11 may be taken from the structure shown by the majority of the population. In Potternewton West (zone 17) the owner occupied and council rented sectors contained approximately equal proportions of the population of the area for 1971 (45% and 46% respectively). The private rented sector is in a minority in this zone with only 9% of the population. In Potternewton East the 19% of the population in the private rented market is above the city average for 1971 while the other two tenure types are below the average for this year. In zone 17 the owner occupied sector appears to have declined relatively, over the period, and the council sector has gained population relatively, both from owner occupation and private rented accommodation. This situation holds also for Potternewton East (zone 18). In zone 34 (Blenheim West) the increases in the council rented sector has come entirely from the private sector of the market. The question to be answered, therefore, is whether, as part of the population of these areas, the coloured immigrant groups have enjoyed the same sort of changes in their tenure structures, or if not, what have been the trends within these groups? We should, therefore, look for increases in council house occupation given that these are inner city areas of different degrees of urban renewal.

In Potternewton West (zone 17) the percentage of the population not born in the New Commonwealth living in council accommodation rose from 37.7% to 46.5%. In the same period the percentage of Indians in this type of accommodation rose from 11.2% to 14.3%, for Pakistanis from 6.3% to 8.4% and for West Indians from 7.3% to 10.7%. It would seem that in this area of the city, at least, the coloured immigrants did not achieve increases in this type of

accommodation equivalent to those sustained by the rest of the population.

This situation is more severely demonstrated in Potternewton East. In this zone in 1966, 33.7% of the rest of the population lived in council housing. In 1971 this was 39%. Reference to Table 3.11 shows that the equivalent figures for the Indian, Pakistani and West Indian Groups were 10.4% to 10.8%, 5.9% to 6.1% and 6.4% to 6.9%. As in zone 17, with the decline of the private rented market the immigrants have shown much greater tendencies to owner occupation than the rest of the population. Of course it may be the case that the immigrants have a greater desire to own their homes than the rest of the population. On the other hand the owner occupied housing market would provide the only way open to the immigrants faced with a declining private rented market and an inability, for either institutional or personal reasons, to obtain entry to council housing. The resulting situation may be that which is demonstrated in Table 3.11, where the percentage of immigrants in owner occupation has increased even in the face of declining owner occupation amongst the rest of the population. It hardly needs stating, of course, that in these zones where immigrants are living or having to live they are unlikely to be obtaining the better housing even of the owner occupied sector.

## 3.8 Socio-economic group structures and industrial categories of the immigrants.

Estimates of the socio-economic grouping of the immigrants to Leeds C.B. are available from two sources. As in the previous sections attempts were made to estimate the

structures using a conditional probability model. This involved a number of steps. First, from the total population in each birthplace group estimates were made, as related above, of the males in each 5 year age groups up to 65 years and over. From this population those persons who were by census definition "economically active" ,that is, between the ages of 15 and 65 years old, were extracted. This population, so delimited, was then used as an input to a third conditional probability model using the usual constraints and derived probabilities. These were:

(1) Numbers of males, by birthplace, aged 15 to 65 in Leeds C.B.

(2) Numbers of males economically active of all birthplaces, by S.E.G. for Leeds C.B.

(3) The probability of a male economically active being in a particular S.E.G. given birthplace. This probability, as may be seen from Table 3.3, was obtained for the West Yorkshire conurbation.

The second source of these estimates of socio-economic group structures amongst the immigrants is the information obtained by the author on the births of children in Leeds C.B. to parents who were born abroad. This information is available for three years from mid-1969 to mid-1972 and is presented in full in a later chapter and appendix1 . For purposes here the 1971 figures are used and are given as a comparison with those which have been estimated. Before giving the different figures, however, a word of warning may be necessary. In the first estimates, using the model, figures for the whole population of males were obtained and are given in Table 3.12. In the second

Table 3.12 Estimated socio-economic group structure

Selected groups 1966

| S.E.G. | Birthplace Group | | | | | |
|---|---|---|---|---|---|---|
| | West Indies | | India | | Pakistan | |
| | No. | % | No. | % | No. | % |
| 1 | 5 | 0.3 | 48 | 3.9 | 5 | 0.8 |
| 2 | 2 | 0.1 | 16 | 1.3 | 2 | 0.3 |
| 3 | 647 | 38.8 | 444 | 36.8 | 139 | 21.0 |
| 4 | 25 | 1.5 | 84 | 7.0 | 9 | 1.4 |
| 5 | 422 | 25.3 | 320 | 26.5 | 191 | 28.8 |
| 6 | 518 | 31.1 | 250 | 20.7 | 297 | 44.8 |
| 7 | 49 | 2.9 | 46 | 3.8 | 19 | 2.9 |
| Total | 1,668 | 100.0 | 1,208 | 100.0 | 662 | 100.0 |

estimates (they are not, in fact, estimates but actual figures) the population of males is defined rather differently. These figures relate to men who became fathers of a particular child in 1971. They will therefore, tend to be married men, more settled in this country, probably from higher socio-economic groups than the particular population as a whole. We would expect to find, therefore, that these latter figures differ from the estimated ones in fairly significant ways. The information available from this data source will be dealt with first and then comparisons will be made with the estimated data.

Table 3.13 (a and b) demonstrates the differing socio-economic structures of the birthplace groups. It is immediately obvious that the Pakistani group has considerable lower occupational status than any other group with 73% of all fathers being in socio-economic groups 5 and 6, that is, semi-skilled and unskilled manual occupations. No other group is as strongly represented in the unskilled manual category as are the Pakistanis. At the other extreme the Indian group and the Other New Commonwealth group are relatively highly represented in socio-economic group 1 (professional workers). Socio-economic group 4, (skilled manual) accounts for the majority of fathers in the Indian, West Indian, Northern Irish, European, Rest of the World and British (with overseas mother) groups.

Tables 3.14 and 3.15 provide the number and percentages of births by occupation of the fathers (or mothers if alone and stated). Some interesting inter group differences are apparent, reflecting the tendency of different groups to be found in different occupations, within the framework of

Table 3.13 Births by father's place of birth by socio-economic groups in Leeds C.B. 1971. *1

(a) Numbers of births

| SEG | Father's birthplace *2 | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Ind | Pak | Carib | NI | Eire | ONC | OC | Eur | RW | GB[1] |
| 1 | 14 | 1 | 3 | 2 | 5 | 10 | 4 | 2 | 5 | 5 |
| 2 | 4 | 0 | 0 | 2 | 12 | 6 | 0 | 1 | 0 | 7 |
| 3 | 11 | 5 | 10 | 3 | 15 | 10 | 1 | 2 | 5 | 20 |
| 4 | 104 | 37 | 88 | 38 | 116 | 21 | 3 | 19 | 7 | 66 |
| 5 | 46 | 81 | 61 | 17 | 156 | 23 | 0 | 13 | 3 | 43 |
| 6 | 9 | 35 | 4 | 4 | 7 | 2 | 1 | 3 | 0 | 2 |
| 7 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 1 |

*1 Note: The following abbreviations have been used in Tables 3.13, 3.14 and 3.15.

| | | | | | |
|---|---|---|---|---|---|
| Ind | - | India | OC | - | Other Commonwealth |
| Pak | - | Pakistan | Eur | - | Europe |
| Carib | - | Caribbean | RW | - | Rest of the World |
| NI | - | Northern Ireland | GB[1] | - | Great Britain |
| ONC | - | Other New Commonwealth | | | |

*2 Note: Includes mother of an illegitimate child if occupation recorded.

Categories used in table consist as follows:

1: Professional Workers

2: Employers and managers

3: Non-manual workers

4: Skilled manual workers

5: Semi-skilled manual workers

6: Unskilled manual workers

7: Armed Forces and inadequately described

Table 3.13 (Continued)

(b) Percent of births

| SEG | Father's birthplace | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Ind | Pak | Carib | NI | Eire | ONC | OC | Eur | RW | GB[1] |
| 1 | 7.5 | 0.6 | 1.8 | 2.9 | 1.6 | 13.9 | 44.4 | 50.3 | 25.0 | 3.5 |
| 2 | 2.1 | 0.0 | 0.0 | 2.9 | 3.9 | 8.3 | 0.0 | 2.5 | 0.0 | 4.9 |
| 3 | 5.9 | 3.1 | 6.0 | 4.4 | 4.8 | 13.9 | 11.1 | 5.0 | 25.0 | 13.8 |
| 4 | 55.2 | 23.4 | 53.0 | 55.0 | 37.2 | 29.2 | 33.4 | 47.5 | 35.0 | 45.8 |
| 5 | 24.5 | 50.9 | 36.8 | 24.6 | 50.2 | 31.9 | 0.0 | 32.5 | 15.0 | 29.9 |
| 6 | 4.8 | 22.0 | 2.4 | 5.8 | 2.3 | 2.8 | 11.1 | 7.5 | 0.0 | 1.4 |
| 7 | 0.0 | 0.0 | 0.0 | 4.4 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.7 |
| Total | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |

Table 3.14 Births by occupation of economically active in Leeds C.B. 1971.

| Definition | occ. | Birthplace | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | No | Ind | Pak | Carib | NI | Eire | ONC | OC | Eur | RW | GB[1] |
| Farmers, foresters, fishermen | 1 | - | 2 | - | - | 2 | - | - | - | - | 1 |
| Miners and quarrymen | 2 | - | - | 3 | - | 3 | - | - | 1 | - | 3 |
| Gas, coke and chemicals | 3 | 2 | - | - | 2 | 3 | 4 | - | 6 | - | 2 |
| Glass and ceramics | 4 | - | 3 | 3 | - | - | - | - | - | - | 1 |
| Furnace, forge and foundry | 5 | 22 | 12 | 19 | 4 | 4 | 1 | - | 1 | - | 1 |
| Electrical and electronic | 6 | 7 | 3 | 6 | - | 6 | 4 | 1 | - | - | 3 |
| Engineering and allied trades | 7 | 37 | 21 | 42 | 11 | 29 | 11 | 2 | 18 | - | 30 |
| Woodworkers | 8 | 13 | - | 12 | 2 | 16 | - | - | 2 | - | 6 |
| Leather workers | 9 | 1 | 1 | 2 | - | - | - | - | - | - | - |
| Textile workers | 10 | 11 | 28 | 1 | 2 | 3 | 3 | - | 1 | - | 4 |
| Clothing workers | 11 | 7 | 3 | 9 | 2 | 3 | - | - | - | - | 1 |
| Food, drink and tobacco | 12 | 1 | 2 | 3 | - | - | 2 | - | 1 | - | 2 |
| Paper and printing | 13 | 3 | 1 | - | - | 1 | - | 1 | - | 2 | 2 |
| Makers of other products | 14 | 1 | - | 2 | - | 2 | - | - | - | - | - |
| Construction workers | 15 | 8 | 30 | 27 | 14 | 148 | - | - | 3 | 1 | 13 |
| Printers and decorators | 16 | - | 1 | 2 | 1 | 2 | - | - | - | - | 2 |
| Drivers of cranes etc. | 17 | 8 | 7 | 8 | 4 | 28 | - | 1 | - | - | 5 |
| Labourers n.e.c. | 18 | 7 | 34 | 9 | 2 | 5 | 1 | - | - | 1 | 1 |
| Transport and communications | 19 | 20 | 3 | 12 | 12 | 24 | 3 | 1 | 1 | 2 | 20 |

....Contd. overleaf...

Table 3.14 Continued...

| Definition | occ. | Birthplace | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | No | Ind | Pak | Carib | NI | Eire | ONC | OC | Eur | RW | GB[1] |
| ....Contd. | | | | | | | | | | | | |
| Warehousemen, storekeepers | 20 | 2 | - | 3 | - | 4 | 3 | - | - | 1 | 8 |
| Clerical workers | 21 | 1 | 1 | - | - | 2 | 3 | 1 | - | 1 | 5 |
| Sales workers | 22 | 15 | 4 | 4 | 1 | 13 | 5 | - | 6 | - | 10 |
| Service, sport and recreation | 23 | 1 | - | 14 | 4 | 7 | 13 | 2 | 8 | 4 | 8 |
| Administrators | 24 | 4 | - | - | 2 | 7 | 2 | - | 1 | - | 5 |
| Professional technical | 25 | 18 | - | 12 | 3 | 11 | 14 | 9 | 2 | 6 | 16 |
| Armed forces | 26 | - | - | - | 3 | 1 | 1 | - | - | - | 2 |
| Inadequately described | 27 | - | - | - | - | - | - | - | - | - | - |
| Totals | | 189 | 156 | 193 | 70 | 324 | 70 | 18 | 51 | 18 | 151 |

Table 3.15 Percent of births by occupation of economically active in Leeds CB 1971 and percentage distribution of occupation in Leeds CB in 1966.

| Definition | occ No. | Birthplace Ind | Pak | Carib | NI | Eire | ONC | OC | Eur | RW | GB[1] | Leeds 1966 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Farmers, foresters, fishermen | 1 | - | 1.3 | - | - | 0.6 | - | - | - | - | 0.7 | 0.7 |
| Miners, quarrymen | 2 | - | - | 1.6 | - | 0.9 | - | - | 2.0 | - | 2.0 | 0.5 |
| Gas, coke and chemicals | 3 | 1.1 | - | - | 2.9 | 0.9 | 5.7 | - | 11.8 | - | 2.0 | 0.5 |
| Glass and ceramics | 4 | - | 1.9 | 1.6 | - | - | - | - | - | - | 0.7 | 0.3 |
| Furnace, forge and foundry | 5 | 11.6 | 7.7 | 9.8 | 5.7 | 1.2 | 1.4 | - | 2.0 | - | 0.7 | 1.6 |
| Electrical and electronic | 6 | 3.7 | 1.9 | 3.1 | 1.4 | 1.9 | 5.7 | 5.6 | - | - | 2.0 | 3.4 |
| Engineering and allied trades | 7 | 19.6 | 13.5 | 21.8 | 15.7 | 8.9 | 15.7 | 11.1 | 35.3 | - | 9.9 | 15.3 |
| Wood workers | 8 | 6.9 | - | 6.2 | 2.9 | 4.9 | - | - | 3.9 | - | 4.0 | 3.1 |
| Leather workers | 9 | 0.5 | 0.6 | 1.0 | - | - | - | - | - | - | - | 0.7 |
| Textile workers | 10 | 5.8 | 18.0 | 0.5 | 2.9 | 0.9 | 4.3 | - | 2.0 | - | 2.7 | 1.0 |
| Clothing workers | 11 | 3.7 | 1.9 | 4.7 | 2.9 | 0.9 | - | - | - | - | - | 3.6 |
| Food, drink and tobacco | 12 | 0.5 | 1.3 | 1.6 | - | - | 2.9 | - | 2.0 | - | 1.3 | 1.3 |
| Paper and printing | 13 | 1.6 | 0.6 | - | - | 0.3 | - | 5.6 | - | 11.1 | 1.3 | 2.2 |
| Makers of other products | 14 | 0.5 | - | 1.0 | - | 0.6 | - | - | - | - | 1.3 | 2.2 |

....Continued overleaf...

Table 3.15 Continued...

| Definition | occ No. | Birthplace Ind | Pak | Carib | NI | Eire | ONC | OC | Eur | RW | GB[1] | Leeds 1966 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ....Contd. | | | | | | | | | | | | |
| Construction workers | 15 | 4.2 | 19.2 | 14.0 | 20.0 | 45.7 | - | - | 5.9 | 5.6 | 8.6 | 3.4 |
| Printers and decorators | 16 | - | 0.6 | 1.0 | 1.4 | 0.6 | - | - | - | - | 1.3 | 1.9 |
| Drivers of cranes etc. | 17 | 4.2 | 4.5 | 4.2 | 5.7 | 8.6 | - | 5.6 | - | - | 3.3 | 1.9 |
| Labourers n.e.c. | 18 | 3.7 | 21.8 | 4.7 | 2.9 | 1.5 | 1.4 | - | - | 5.6 | 0.7 | 6.5 |
| Transport and communications | 19 | 10.9 | 1.9 | 6.2 | 17.1 | 7.4 | 4.3 | 5.6 | 2.0 | 11.1 | 13.3 | 8.5 |
| Warehousemen, storekeepers | 20 | 1.1 | - | 1.6 | - | 1.2 | 4.3 | - | - | 5.6 | 5.3 | 4.5 |
| Electrical workers | 21 | 0.5 | 0.6 | - | - | 0.6 | 4.3 | 5.6 | - | 5.6 | 3.3 | 8.3 |
| Sales workers | 22 | 7.9 | 2.6 | 2.1 | 1.4 | 4.0 | 7.1 | - | 11.8 | - | 6.6 | 9.7 |
| Service, sport and recreations | 23 | 0.5 | - | 7.3 | 5.7 | 2.2 | 18.6 | 11.1 | 15.7 | 22.2 | 5.3 | 5.4 |
| Administrators | 24 | 2.1 | - | - | 2.9 | 2.2 | 2.9 | - | 2.2 | - | 3.3 | 5.4 |
| Professional tech. | 25 | 9.5 | - | 6.2 | 4.3 | 3.4 | 20.0 | 50.0 | 3.9 | 33.3 | 10.6 | 9.6 |
| Armed forces | 26 | - | - | - | 4.3 | 0.3 | 1.4 | - | - | - | 1.3 | 0.1 |
| Inadequately desc. | 27 | - | - | - | - | - | - | - | - | - | - | 0.2 |
| Totals | | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |

what is offered in Leeds C.B. The common denominator is the engineering and allied trades as one might have expected in Leeds while construction and service, sport and recreation are also fairly well represented by several groups (construction workers notably by the Irish group). The individual distributions, however, have little importance unless they can be compared with the city proportions to account for the industrial and occupational distinctions of different cities. The last column, therefore of Table 3.15 provides the occupational distribution of economically active males in 1966 (G.R.O.1969). It shows that 15% of the total population was employed in Engineering and Allied Trades with Sales and Transport workers next in importance. Comparison of the group percentages with these percentages shows that the different birthplace groups are still over-represented and under-represented in certain occupations. As a whole the New Commonwealth groups are over-represented in the manual occupations - Furnace, Forge and Foundry Workers (particularly Pakistanis), Construction Workers, Labourers n.e.c. and Service Workers. Individually, Indians are particularly strong in the transport field compared to other New Commonwealth Groups but not compared with the Leeds total figures, Pakistanis as Textile and Construction Workers, West Indians as Engineering and Construction Workers and other New Commonwealth Groups as Service Workers.

Both Irish Groups, but particularly the Republic of Ireland are very strongly over-represented in construction, nearly 50% of the latter group, with correspondingly high percentages as drivers of cranes and engines involved in construction work. The Republic of Ireland group, however,

is under-represented in the engineering occupations. The other "white" groups appear to be much more likely to be involved in "white collar" occupations than these above occupations.

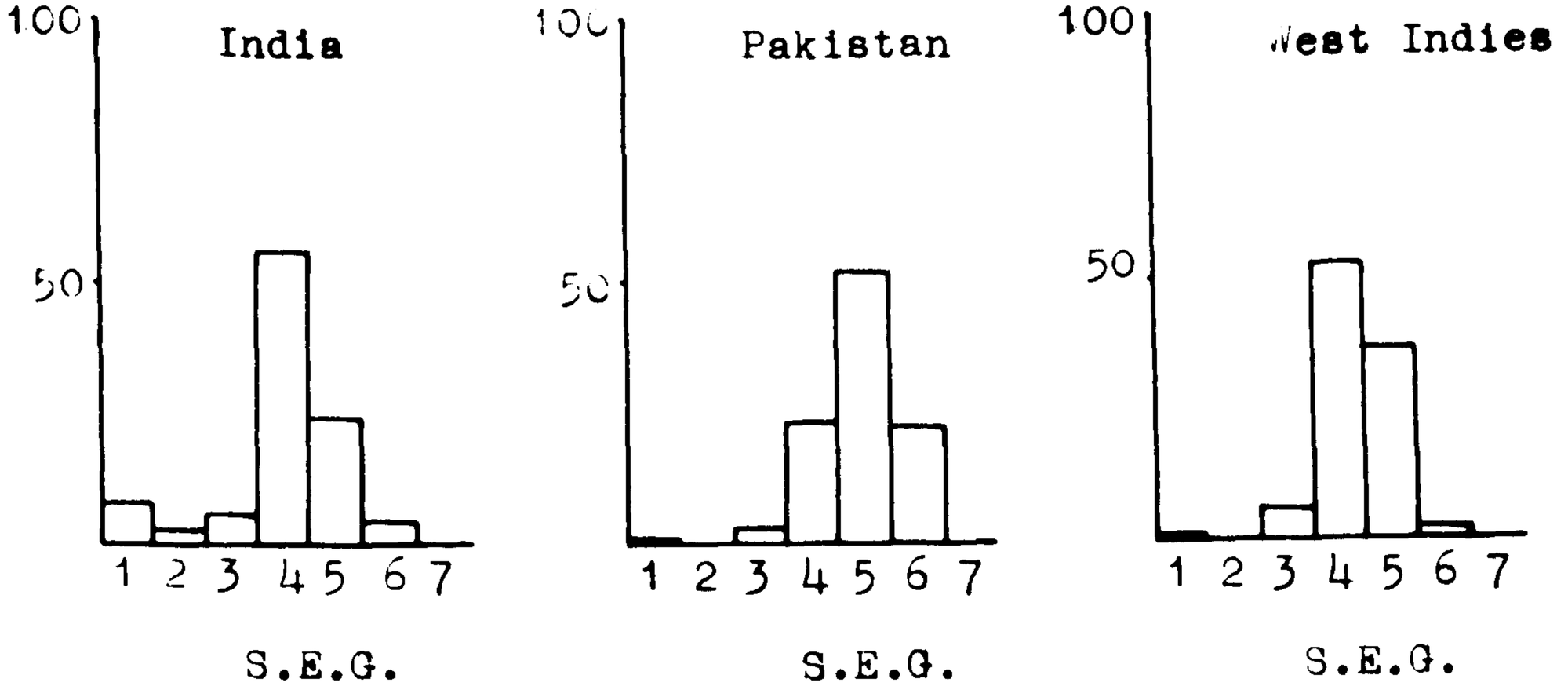
A look at Figure 3.7 and Table 3.12 indicates significant differences in the data from the two sources. The major differences seems to be in the estimates of the numbers of persons in socio-economic group 4 (the skilled manual worker category) and this difference is so large that unless we can attempt to explain the variation satisfactorily it would seem to call into question the whole concept of the conditional probability model estimates.

The basic difference in the data source is that estimates (a) illustrate the structure of socio-economic groups amongst men who became fathers in 1971, (either for the first time or not). Estimates (b) are given for the whole male population of these birthplace groups between the ages of 15 and 65 years. The extra emphasis in these second estimates on the lower socio-economic groups could therefore arise for a number of reasons. Probably the main reason could be the inclusion in (b) but not in (a) of a large number of young males not yet married, or not yet married long enough to have begun a family. This argument may be followed a little further by saying, as mentioned above, that the parents producing children in 1971 are more likely for financial and security reasons, to be in the security of a skilled manual occupation. Both the estimates seem to show that to aspire to S.E.G. 4 is, for a coloured person, quite an achievement!

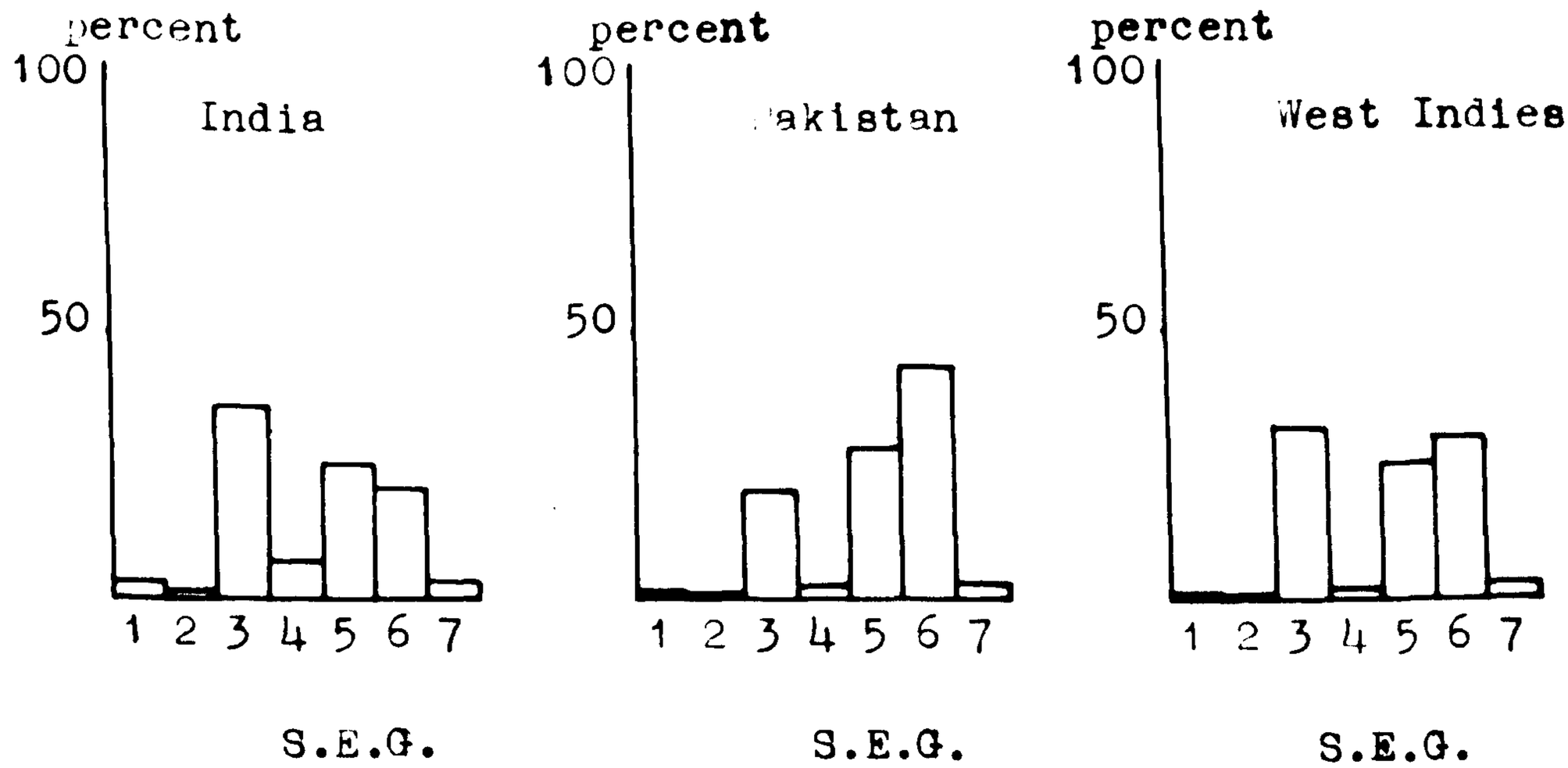
The difference shown in S.E.G. 3 (non-manual workers) for which the model estimates show many more persons of these

**Figure 3.7** Socio-economic group distributions as illustrated by the two sources

(a) Source; 1971 births information




(b) Source; conditional probability model using 1971 census.



birthplace groups than the births information are less convincingly explainable. Following the arguments used above it is possible to put forward an argument for the difference. This would be that the immigrants in non-manual occupations are likely to have responded more quickly than other immigrants to the benefits to be achieved by family limitation (see Chapter 7). The more aspiring Indian population is the group which shows the most difference between estimates for this particular socio-economic group.

On balance these arguments seem to be valid to a certain extent and may explain much of the observed variation. On the other hand some doubt must be cast over the efficacy of the conditional probability model in predicting real and not "best fit" situations. Never the less no excuse is made for using the model in this discussion of the social and economic structures of the coloured immigrant groups in Leeds C.B. It is felt that its use has been illuminating, to the extent that is worth the risk of error involved. After all, its use would not be necessary in this context if the information was available in the first place from official sources.

# CHAPTER 4

## The changing spatial distribution of immigrants in Leeds

### 4.1 Introduction

A number of studies, notably Jones (1967 and 1970), Collison (1967) and Davison (1963), have shown that there is a strong association between the spatial distribution of immigrants and certain ecological areas in British cities. The mechanics of the situation are the continuing movement of population away from central city areas as these areas become increasingly less desirable places of residence either because of age or because of the cumulative lack of care and attention. The movement derives not only from those persons wealthy enough to be able to choose but also from the rehousing of people in new local authority owned housing on the city peripheries. It is into these inner areas that the newcomers to cities arrive. Unable to afford, temporarily, the better housing, they tend to cluster together, finding economic strength, as well as social comfort in the presence of other persons like themselves.

The rate of population change is probably crucial to this process, for certain areas will have acquired, over time, a true transitional nature, while other areas will tend to be more stable thus not presenting the means, that is, housing availability, by which the population can change. For this reason the transition zone as identified as long ago as 1925 (Burgess, 1925) is a by no means continuous area in British cities. In Leeds, for example, the area known as Chapeltown is an area which has acquired a fairly

mobile population over a long period of time. Fifty years ago this area was distinctly middle class with both large detached and semi-detached housing and substantial terraces. In the years before the first World War this area became the focus for the Jewish population moving out from the area of North Street. This build up continued until about 1945 when the movement to the suburbs acquired momentum (Butterworth, 1963) leaving the way clear for the next series of immigrations from Poland and Eastern Europe. Finally in the late 1950's and the decade of the 1960's came the more clearly distinguishable immigrants from the New Commonwealth. But while Chapeltown has clearly developed as an area with a quickly changing population other areas of what may be regarded as the zone of transition in Leeds have more effectively retained their identity, Burmantofts and Hyde Park are examples of these.

Within this context it may be premature to begin to talk about segregation as a racial problem in British cities. This latest and heaviest immigration is still in these terms a fairly new feature of most British cities. Nevertheless it seems worthwhile to examine the spatial distribution of these immigrants and to do so for the decade covered by the two 100% censuses of Great Britain 1961 to 1971. In this was it may be possible to observe the underlying trends in the changing spatial distribution of coloured immigrants, and other new immigrants in Leeds. It must be remembered, however, that observation of the spatial distribution at three points in time, 1961, 1966 and 1971, is merely observation of the result of a great number of individual decisions and value judgements, not only on the part of the new immigrant populations but also by the outgoing original population in the areas of

immigrant expansion. In this chapter no attempt is made to analyse the reasons behind the changing spatial distribution but simply to observe the results of a decade of increase and movement, and to try to identify the basic patterns of development.

## 4.2 The framework for studying the changing spatial distributions

In order to achieve this identification of the patterns of the changing spatial distribution of immigrants in Leeds the city has been divided up into 34 zones. The definition of these zones is based on a subjective observation of the socio-economic structures and physical infra-structures of the city, and while the zones may not be entirely homogeneous they have proved an adequate basis for much of the analytical work both in this chapter and elsewhere. A word of warning must be expressed here, however. As one of the criteria for the identification of the zones was their immigrant content the results of the segregation and dissimilarity indexes (to be explained later) which are presented later are not strictly comparable with equivalent indexes presented in other works (for example, Collison, 1967). Their values could have been increased or decreased according to the prior definition of the zones and their individual immigrant content. For the city itself, however, the indexes are directly comparable over the three periods 1961, 1966 and 1971 since the zonal system was held constant for each of these periods. The basis of the zones is the 1966 enumeration districts aggregated to manageable sizes. The 1961 enumeration districts aggregate directly to these zones. The 1971 districts required certain manipulations to achieve strict comparability. The zoning system is

presented in Appendix 2. The opportunity is taken also to observe the difference in the results of the segregation indexes computed for this zonal scale and for the 1966 enumeration district scale for both 1961 and 1966 since it has been suggested that there is a hierarchy of segregation indexes at different scales within any study area which taken as a whole describe the full extent of segregation. (See for example Poole and Boale (1973)). Individual street level segregation may be important but is beyond the scope of present data sources and could also pose severe problems of manageability. The immigrant groups are defined by country of birth which implicitly assumes, rightly or wrongly that all immigrants born in the 'coloured' countries or colonies were in fact coloured. Allied to this is the error arising from underenumeration in the 1961 and 1966 censuses which has been demonstrated to be fairly high for certain groups (for example Peach, 1966). Like other researchers these errors cannot be taken into consideration here and the data from the censuses is, for the present, accepted at face value.

## 4.3 General outline of the situation for the three census dates.

In 1961 the total population of Leeds who had been born abroad numbered 22,440 persons. This number, representing 4.4% of the total population of Leeds County Borough. The main components of this total of 22,440 persons derived from 8,492 persons born in the Republic of Ireland and Northern Ireland and 8,343 persons born in 'foreign' countries. The remaining 5,605 persons were all born in Commonwealth countries, this total being made up of 1,171 persons born

in the Old Commonwealth countries of Australia, Canada and New Zealand and 4,434 persons born in the New Commonwealth countries. The predominant birth place in this last group was the Caribbean from where there derived 2,186 persons. Of the remainder 1,696 came from India and Pakistan and 552 from all other New Commonwealth countries. The percentage of the city's population who were born in the New Commonwealth was therefore less than 1% in 1961. No disaggregation of the Asian group is possible for 1961 but Butterworth (1963) suggests that the ratio of Indians to Pakistanis could be as great as 3:1 in favour of Indians which would give approximate totals of 1200 Indians and 400 Pakistanis.

By 1966 the total population of Leeds who were born abroad had swelled to 28,380 persons. By this time however, the dominant group had become the Commonwealth immigrants who totalled 10,420 persons. This figure was comprised of 3,790 West Indians, 2,610 Indians, 1,050 Pakistanis and 2,280 persons born in other New Commonwealth countries. Numbers of persons from the Old Commonwealth had fallen to 690. This represented an increase of 86% on the population of five years previously whereas the New Commonwealth population of England and Wales only increased by 65% of the population in 1961 in the same period. The individual groups grew at different rates, however. The West Indian group grew by a mere 73% of the total in 1961. The Asian group more than doubled its original population and the group from the other New Commonwealth countries more than trebled in size. In comparison the other immigrant groups grew very much more slowly. The Irish group increased by only 1,058 to a total of 9,550 persons (11% increase) and

the foreign born increased by only 67 persons to 8,410 persons (0.8% increase).

At the same time the British born population of Leeds was declining. In 1961 these persons totalled 482,495 and in 1966, 477,240. Consequently the proportion of the total population of the city who were born abroad increased to 5.6% and the percentage of persons born in the New Commonwealth increased to 2.1% of the total city population in 1966.

This situation changes markedly over the next five year period, 1966 to 1971. The New Commonwealth group as a whole maintained its increases, growing to 11,953 persons. This total increase of 1,533 persons, 15% of the 1966 total, was predominantly in the Pakistani group which increased in numbers from 1,050 persons in 1966 to 2,395 persons in 1971. The West Indian group actually appears to have declined in number from 3,790 persons in 1966 to 3,593 persons in 1971, while the Indian population grew from 2610 persons in 1966 to 3,477 persons in 1971. A small increase also took place in the other New Commonwealth population, from 2,280 persons to 2,487 persons.

Immigration into the other main birthplace groups slowed yet again for 1966 to 1971. The Irish group increased by just over 200 persons to 9,773, the foreign group increased by 259 persons to a total of 8,669 and numbers in the Old Commonwealth group fell again to 656 persons.

Once again the British born population of Leeds fell in the five year period. From the 477,240 persons in 1966 the numbers declined to 448,586 in 1971. Consequently the proportion of persons born abroad, totalling 31,051 persons,

of the total city population rose to 6.4% and the proportion of persons born in the New Commonwealth, totalling 11,953 persons, increased to 2.5%. These figures are summarised in Table 4.1.

Table 4.1 Numbers of persons by birthplace, resident in Leeds C.B. in 1961, 1966 and 1971.

| Birthplace | 1961 | 1966 | 1971 |
|---|---|---|---|
| N. Ireland | 8,492 | 2,270 | 2,664 |
| Eire | | 7,280 | 7,109 |
| W. Indies | 2,186 | 3,790 | 3,593 |
| India | 1,696 | 2,610 | 3,477 |
| Pakistan | | 1,050 | 2,396 |
| Other New Commonwealth | 552 | 2,280 | 2,487 |
| Old Commonwealth | 1,171 | 690 | 656 |
| Foreign | 8,343 | 8,410 | 8,669 |
| G.B. | 482,495 | 477,240 | 448,586 |
| Totals | 504,953 | 505,620 | 479,637 |
| Total New Commonwealth | 4,434 | 9,730 | 11,953 |

The Table shows that, by 1971, the New Commonwealth group had become the single largest group of persons born abroad and living in Leeds, but that their proportions, on a city wide basis were not by any means large in comparison with certain areas of the Midlands and the Greater London conurbation. The increase between 1966 and 1971 however, had fallen to 23% of the 1966 total, compared with 121% for the period 1961 to 1966. The New Commonwealth born population of England and Wales increased by 33% of the

1966 total in the 1966-1971 period.

## 4.4 Distribution of immigrants within the city.

The concentration of immigrants, especially coloured immigrants, within certain ecological zones of British cities has already been mentioned. The association of the immigrants and the social and economic conditions of these ecological zones has been discussed in Chapter 3. This concentration is the result of a great many factors acting on the new immigrants, economic and social considerations and discrimination which Daniel (1968) suggests is of great importance. In a later chapter the effects of some of these considerations are modelled more explicitly but discrimination, in a study of this nature, is not something which can be addressed directly.

The result of the manifold forces acting on new immigrants to the city, cheap rented, high density accommodation, nearness to co-ethnics, male domination, discrimination in the housing and employment markets and so on, is a spatial pattern developing over time which can be observed and analysed. Although the period 1961 to 1971 may not be very long in terms of the length of time which immigrant groups in the past have taken to "assimilate" and "integrate" there are patterns developing which may illustrate the past and indicate the future progress of the new immigrant groups in their residential location. What levels of concentration exist and are increasing or decreasing? Is this concentration reflected in the actual segregation of the immigrant groups as measurable through the Index of Segregation and is this segregation increasing or decreasing? What levels of segregation exist between the immigrant

groups themselves? Is there a tendency to out-movement away from the inner city areas and are the different groups faring differently in this, perhaps ultimate, aim? Are the immigrant groups a replacement population, replacing white or indigenous losses of population from inner areas or is population density building up in the areas of the city where most deprivation exists? These are the kinds of questions which we seek to elucidate in this chapter.

In 1961, the total New Commonwealth born population, numbering 4,434 persons formed less than 1% of the total population of Leeds C.B. This small percentage at city level was, even then, hiding concentrations of this group within certain areas of the city. While zones in the outer regions of the city displayed less than average immigrant occupancy levels other zones, in the inner city areas showed the beginnings of the concentrations which have come to be expected in the cities and conurbations of England with relatively large numbers of immigrants. Reference to figure 4.1 shows that these zones are to the north and north east of the city centre in the areas known as Potternewton (zones 17 and 18) and Blenheim (zone 34). Concentration in these areas was not high though, being less than 10% of the total zonal population in all three cases, a situation deriving as much from the relatively small numbers of New Commonwealth immigrants in Leeds in 1961 than from any suggestion that concentration was much less active in 1961 than in later years.

The distribution of the different birthplace groups over the 34 zones of Leeds C.B. in 1961 is shown in Table 4.2. The table also includes the British born population of each zone. Of all the immigrant groups it is easily seen from

Table 4.2 Numbers of Persons by Birthplace Group and Zone - Leeds C.B. 1961

| Zone Name | No. | Irish | Indian/ Pakistani | West Indian | Other New Com. | Old Com. | Foreign | British | Total |
|---|---|---|---|---|---|---|---|---|---|
| Far Headingley | 1 | 264 | 54 | 7 | 32 | 87 | 307 | 24,610 | 25,361 |
| Moortown | 2 | 263 | 32 | 7 | 10 | 67 | 728 | 24,204 | 25,311 |
| Stanningley | 3 | 165 | 22 | 6 | 2 | 22 | 157 | 20,341 | 20,715 |
| Wortley | 4 | 143 | 33 | 1 | 7 | 28 | 124 | 16,790 | 17,126 |
| Middleton | 5 | 168 | 16 | 2 | 4 | 15 | 77 | 20,882 | 21,164 |
| East Hunslet | 6 | 182 | 19 | 1 | 10 | 17 | 24 | 14,489 | 14,742 |
| Halton | 7 | 195 | 42 | 7 | 8 | 52 | 136 | 20,548 | 20,988 |
| Cross Gates | 8 | 341 | 47 | 7 | 8 | 44 | 213 | 30,831 | 31,491 |
| Roundhay | 9 | 243 | 25 | 6 | 17 | 68 | 355 | 22,505 | 23,219 |
| Allerton | 10 | 195 | 33 | 13 | 7 | 84 | 622 | 21,341 | 22,295 |
| Bramley | 11 | 158 | 17 | 10 | 5 | 26 | 131 | 18,620 | 18,967 |
| Meanwood | 12 | 292 | 44 | 19 | 12 | 52 | 243 | 17,340 | 18,002 |
| Armley | 13 | 187 | 49 | 17 | 7 | 28 | 124 | 15,236 | 15,648 |
| Kirkstall | 14 | 299 | 39 | 41 | 21 | 64 | 196 | 22,354 | 23,014 |
| Hyde Park | 15 | 462 | 131 | 88 | 38 | 38 | 340 | 10,029 | 11,126 |
| Woodhouse | 16 | 160 | 21 | 31 | 16 | 19 | 142 | 11,641 | 12,030 |
| Potternewton West | 17 | 244 | 44 | 370 | 62 | 28 | 960 | 5,307 | 7,015 |
| Potternewton East | 18 | 604 | 162 | 810 | 42 | 66 | 1,362 | 8,010 | 11,056 |

....Contd. overleaf...

Table 4.2 Continued

| Zone Name | No. | Irish | Indian/ Pakistani | West Indian | Other New Com. | Old Com. | Foreign | British | Total |
|---|---|---|---|---|---|---|---|---|---|
| Contd.... | | | | | | | | | |
| Harehills | 19 | 280 | 36 | 43 | 5 | 32 | 215 | 13,332 | 13,943 |
| Burmantofts | 20 | 230 | 17 | 13 | 3 | 10 | 95 | 13,934 | 14,302 |
| Osmandthorpe | 21 | 193 | 20 | 7 | 2 | 33 | 68 | 18,271 | 18,594 |
| Holbeck | 22 | 342 | 94 | 57 | 9 | 21 | 153 | 17,786 | 18,462 |
| Wellington East | 23 | 173 | 27 | 4 | 9 | 17 | 64 | 9,347 | 9,641 |
| Blenheim East | 24 | 254 | 50 | 65 | 2 | 8 | 153 | 5,760 | 6,292 |
| City South | 25 | 90 | 61 | 0 | 1 | 5 | 42 | 4,327 | 4,526 |
| Beeston | 26 | 135 | 31 | 2 | 7 | 20 | 99 | 15,372 | 15,666 |
| Hunslet Carr | 27 | 245 | 36 | 9 | 6 | 19 | 75 | 14,176 | 14,566 |
| Westfield | 28 | 833 | 155 | 207 | 82 | 55 | 358 | 12,918 | 14,608 |
| Potternewton North | 29 | 130 | 38 | 146 | 12 | 21 | 315 | 4,046 | 4,708 |
| Richmond Hill North | 30 | 148 | 21 | 12 | 7 | 10 | 94 | 6,351 | 6,643 |
| City North | 31 | 201 | 49 | 31 | 11 | 31 | 69 | 3,450 | 3,842 |
| Wellington West | 32 | 74 | 3 | 0 | 1 | 11 | 29 | 5,326 | 5,444 |
| Richmond Hill South | 33 | 124 | 5 | 5 | 2 | 18 | 49 | 7,211 | 7,414 |
| Blenheim West | 34 | 475 | 223 | 142 | 85 | 55 | 224 | 5,810 | 7,014 |
| Totals | | 8,492 | 1,696 | 2,186 | 552 | 1,171 | 8,343 | 482,495 | 504,935 |

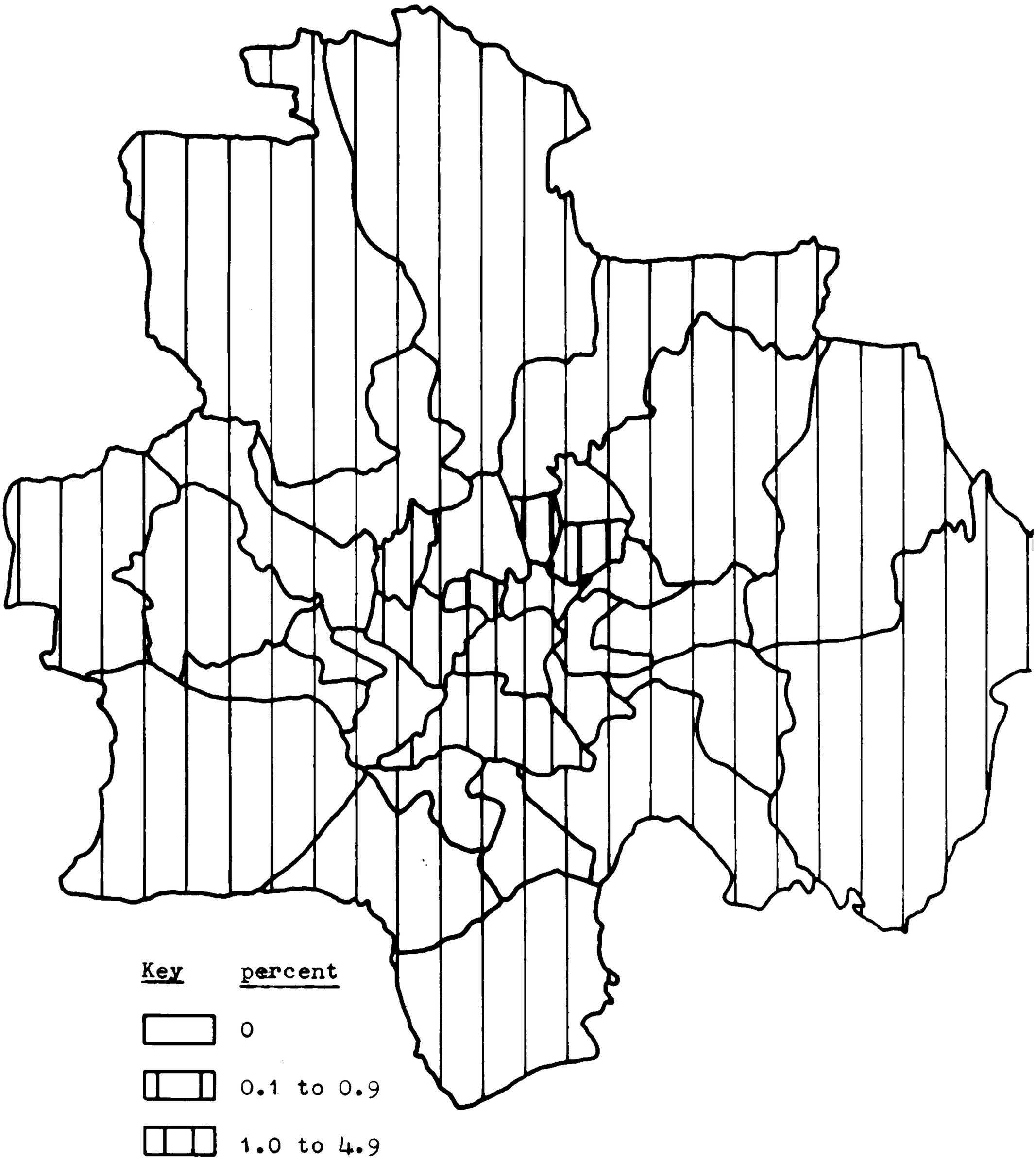
this evidence that the coloured New Commonwealth groups were already, in 1961, becoming concentrated in a few areas. But these areas do not appear to be the same for the different coloured groups. While the areas of Potternewton and Blenheim (zones 17, 18 and 34) account for 1,322 persons born in the West Indies, 61% of the group total, those three zones account for only 25% of the Indian and Pakistani group and 34% of the Other New Commonwealth group. The Asian group, on the other hand, was quite well represented relatively in areas where the West Indian group hardly showed up at all. These include, for example, most noticeably Far Headingley (zone 1) and Halton (zone 7), zones which accounted for only 8 persons born in the West Indies, out of a very much larger total number of persons.

The Other New Commonwealth group appeared, in 1961, to be rather more concentrated than the Asian group but less than the West Indian, with their maximum numbers being found in Blenheim, in a comparable situation to the Asians. So an overall pattern was beginning to emerge for the coloured groups even in 1961. The West Indians concentrating in the Potternewton, Chapeltown area of the city, with much less significant numbers in Westfield (zone 28) and Blenheim (zone 34). The Asian groups, on the other hand were most significantly represented in Blenheim and in one area of Potternewton (zone 18) but not in the other (zone 17). They also showed up in greater numbers than the West Indians in the outer areas of the city, thus appearing much more evenly distributed.

By way of contrast to this situation it is worth comparing the distribution in 1961 of the 'white' immigrants to the city. The situation with regard to these groups is much

Figure 4.1 Persons born in the New Commonwealth as percentage of total population in zones.

1961



less clear cut but there are noticeable concentrations of both Irish and Foreign born in the inner city areas as well. The largest numbers of both groups occur in Potternewton (zone 18). The large number of Foreign born persons in Moortown (zone 2) probably locates the older Jewish and Polish persons who were mentioned earlier in the chapter. The areas which showed the greatest concentration of New Commonwealth immigrants as a whole, Potternewton (zones 17 and 18) and Blenheim (zone 34) account for 31% of Foreign born persons but only 15% of Irish born persons, a situation which demonstrates their relative concentrations. The Irish in particular as the above percentages demonstrate, are fairly well represented in all areas of the city.

Table 4.3 shows the numbers of persons in the immigrant groups and in the British population in 1966. The extent of the reliance to be placed on the figures from this census has been called into question and it is clear that in dealing with relatively small groups of persons on a 10% basis may give fairly large levels of error at this level of resolution. However, while the 1961 to 1971 trends may be regarded as more satisfactorily reflecting the changing spatial distribution of immigrants in Leeds there appears to be no harm in observing a mid-decade situation which thus lies between two constraining patterns. The more detailed birthplace information given in the 1966 census means that for the first time the Asian group may be disaggregated into its component Indian and Pakistani sources and the Irish group into its Northern and Southern (Eire) sources.

Once again the concentration of the coloured New Commonwealth immigrant groups is very apparent from this Table. Of the total of 3,790 West Indian born persons

Table 4.3 Numbers of persons by birthplace group and zone - Leeds C.B. 1966.

| Zone Name | No | Northern Irish | Indian | Pakistani | West Indian | Other New Com. | Old Com. | Foreign | Eire | British | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Far Headingly | 1 | 70 | 30 | 0 | 0 | 130 | 70 | 490 | 180 | 28,320 | 24,290 |
| Moortown | 2 | 100 | 10 | 10 | 0 | 10 | 20 | 950 | 320 | 26,050 | 27,380 |
| Stanningley | 3 | 50 | 100 | 20 | 10 | 70 | 10 | 230 | 160 | 22,810 | 23,460 |
| Wortley | 4 | 40 | 60 | 0 | 0 | 70 | 10 | 160 | 130 | 17,330 | 17,800 |
| Middleton | 5 | 30 | 10 | 0 | 0 | 50 | 30 | 100 | 210 | 25,150 | 25,580 |
| East Hunslet | 6 | 60 | 0 | 0 | 20 | 10 | 0 | 40 | 100 | 9,490 | 9,720 |
| Halton | 7 | 60 | 10 | 10 | 0 | 60 | 30 | 80 | 190 | 23,530 | 23,970 |
| Cross Gates | 8 | 100 | 10 | 0 | 0 | 30 | 30 | 210 | 300 | 35,090 | 35,770 |
| Roundhay | 9 | 150 | 40 | 10 | 120 | 50 | 70 | 340 | 390 | 22,630 | 23,800 |
| Allerton | 10 | 60 | 60 | 20 | 10 | 30 | 40 | 780 | 170 | 21,150 | 22,320 |
| Bramley | 11 | 30 | 0 | 10 | 0 | 20 | 20 | 120 | 190 | 21,020 | 21,410 |
| Meanwood | 12 | 160 | 60 | 0 | 0 | 40 | 40 | 330 | 270 | 20,100 | 21,000 |
| Armley | 13 | 140 | 30 | 0 | 50 | 130 | 40 | 130 | 140 | 15,660 | 16,320 |
| Kirkstall | 14 | 150 | 100 | 50 | 50 | 10 | 50 | 190 | 260 | 21,690 | 22,550 |
| Hyde Park | 15 | 80 | 180 | 70 | 70 | 290 | 20 | 400 | 230 | 9,610 | 10,950 |
| Woodhouse | 16 | 60 | 40 | 60 | 70 | 130 | 10 | 170 | 160 | 10,960 | 11,660 |
| Potternewton West | 17 | 30 | 250 | 90 | 770 | 90 | 10 | 950 | 190 | 5,270 | 7,650 |
| Potternewton East | 18 | 80 | 400 | 100 | 1,510 | 240 | 20 | 1,040 | 510 | 7,470 | 11,370 |

....Continued overleaf...

Table 4.3 Contd.

| Zone Name | No | Northern Irish | Indian | Pakistani | West Indian | Other New Com. | Old Com. | Foreign | Eire | British | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Continued.... | | | | | | | | | | | |
| Harehills | 19 | 60 | 100 | 80 | 150 | 70 | 0 | 160 | 360 | 12,130 | 13,110 |
| Burmantofts | 20 | 80 | 0 | 20 | 40 | 10 | 10 | 50 | 100 | 10,380 | 10,690 |
| Osmandthorpe | 21 | 90 | 50 | 10 | 10 | 0 | 0 | 60 | 180 | 18,020 | 18,420 |
| Holbeck | 22 | 90 | 230 | 20 | 220 | 80 | 30 | 140 | 330 | 16,570 | 17,710 |
| Wellington East | 23 | 0 | 30 | 60 | 50 | 20 | 10 | 60 | 80 | 4,340 | 4,650 |
| Blenheim East | 24 | 50 | 20 | 120 | 50 | 80 | 0 | 60 | 290 | 3,900 | 4,570 |
| City South | 25 | 10 | 50 | 0 | 10 | 10 | 0 | 20 | 30 | 2,810 | 2,940 |
| Beeston | 26 | 60 | 10 | 0 | 10 | 20 | 0 | 160 | 220 | 15,200 | 15,680 |
| Hunslet Carr | 27 | 50 | 60 | 20 | 10 | 10 | 10 | 130 | 110 | 11,920 | 12,320 |
| Westfield | 28 | 90 | 80 | 90 | 80 | 180 | 20 | 140 | 490 | 6,810 | 7,980 |
| Potternewton North | 29 | 50 | 160 | 0 | 160 | 40 | 20 | 350 | 230 | 3,890 | 4,900 |
| Richmond Hill North | 30 | 40 | 20 | 0 | 0 | 60 | 0 | 80 | 240 | 8,250 | 8,690 |
| City North | 31 | 50 | 10 | 0 | 20 | 10 | 20 | 0 | 120 | 1,930 | 2,160 |
| Wellington West | 32 | 30 | 0 | 0 | 10 | 0 | 10 | 80 | 80 | 5,670 | 5,880 |
| Richmond Hill South | 33 | 20 | 40 | 0 | 10 | 10 | 20 | 50 | 120 | 7,050 | 7,320 |
| Blenheim West | 34 | 50 | 360 | 180 | 280 | 220 | 20 | 160 | 290 | 5,040 | 6,600 |
| Totals | | 2,270 | 2,610 | 1,050 | 3,790 | 2,280 | 690 | 8,410 | 7,280 | 477,240 | 505,620 |

living in Leeds in 1966 over 1,500 were resident in one area of Potternewton (East), zone 18, and over 2000 in both Potternewton East and West, zones 17 and 18. In direct comparison with the situation in 1961 when 61% of the West Indian group were resident in Potternewton and Blenheim (zones 17, 18 and 34), some 2,560 persons, or 68%, were resident in these same areas in 1966. This overall increase in concentration, however, masks a doubling of this population in these areas which in turn hides vast differences in this population moving into Potternewton, over 700, compared to just under 140 for Blenheim. This differential growth is something which will be looked at with more refined measures later in the chapter, but even at this point it is worth observing that the outer areas of Leeds (zones 1 to 10) have really not shared this general increase of immigrant population except for Roundhay (zone 9). This zone abuts the zones of concentration at its south-western extremity. Other areas appear to have actually lost population. Some of this loss in the transition zone immediately north of the city centre may be attributed to general clearance programmes, for example Blenheim East (zone 24), Westfield (zone 28) and Richmond Hill North (zone 30). For the first time expansion of the West Indian group into the southern half of the city appears to be of some importance. Holbeck (zone 22) contained 6% of the West Indian population in 1966, compared with less than 3% in 1961.

In 1961 the three main areas of coloured immigrant concentration, Potternewton (zones 17 and 18) and Blenheim (zone 34) accounted for 25% of the Asian birthplace groups. In 1966 the number of Asian born persons in these areas

totalled 1,380 or 38% of the group's total population. Comparison of Tables 4.2 and 4.3 shows that growth had occurred strongly and reasonably evenly, in terms of simple population numbers, in all three areas. Similarly to the West Indian situation a number of zones appear to have significantly decreased their Asian populations. Once again these are the outer areas of the city mainly in the east and certain inner city areas, Richmond Hill North (zone 30), Armley (zone 13) and Wellington West (zone 32). The central city zones (zones 25 and 31) also, understandably, lost population.

In 1966 the spatial distributions of the Indian and Pakistani populations can be observed separately. These birthplace groups numbered 2,610 Indians and a small number of 1,050 Pakistanis. The two main areas of concentration in Potternewton (zones 17 and 18) accounted for 25% of the Indian population. This compared with 60% of the West Indian population in the same year. Even fewer Pakistanis, relatively, lived in these zones, a mere 190 persons or 17% of the total Pakistani population of Leeds in 1966. In Blenheim (zone 34) however the situation described above is reversed. In this zone alone resided 17% of the Pakistani group and 14% of the Indian group, a figure which compares with 7% for the West Indians, who nevertheless, because of their larger numbers, outnumbered the Pakistanis in this part of the city. This distribution therefore, shows that it would be an inaccurate reflection of the spatial distribution of immigrants if they were to be regarded as one group of people. There appears to be developing a clear distinction between the West Indians, living in the main in Potternewton with very few living in

the outer city areas, the Indians who are more highly represented in the outer city areas and are also found in large proportion in Blenheim and Potternewton, the Pakistanis whose largest numbers are found in Blenheim with smaller numbers in Potternewton and very few representatives in most other areas of the city. The Other New Commonwealth group may be seen to be most numerous in the Hyde Park area of the city (zone 15) but are also well represented in Potternewton and Blenheim. These figures are summarised in Table 4.4 and the areas to which they apply are shown in Figure 4.2.

For the purposes of Table 4.4 the city has been divided into three macro-zones representing areas of "high", "moderate" and "low " immigrant occupancy based on the distribution as represented previously for 1961. These macro-zones are shown in Figure 4.3. The Table shows that the New Commonwealth immigrant groups have been increasingly concentrated in those zones which have been losing not only their British born populations but also their white immigrant populations as well. The percentage of the total Leeds indigenous populations in the areas of high immigrant increase fell from 40% to 3.8%. In the zones of moderate occupancy in 1961 the population of all the zones fell absolutely except for the Indian/Pakistani group. The alliance of this trend with increases in suburban zones and an overall fall in the numbers of the white indigenous population of the city as a whole means a considerable loss of persons from inner city areas. The British born population of Potternewton West and East was 5,307 and 8,010 respectively and of Blenheim West, 7,014, in 1961. In 1966 these numbers were 5,270, 7,470 and 5,040 persons

**Figure 4.2** Persons born in the New Commonwealth as percentage of total population in zones. 1966

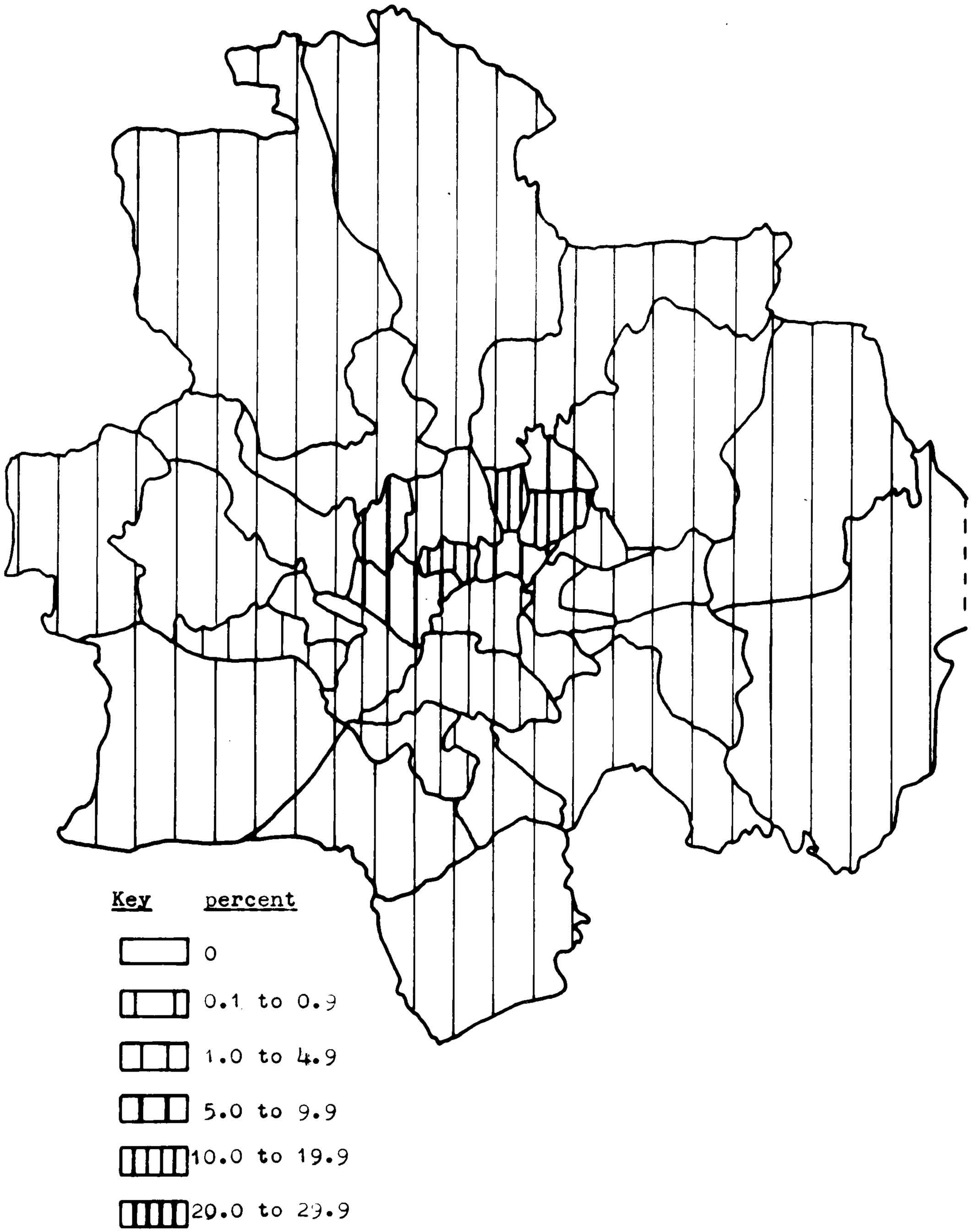


Table 4.4 Percentage of total persons in birthplace groups in certain areas of Leeds C.B. 1961 and 1966

| Zone Name and Number | Birthplace: India* 1961 | India* 1966 | Pakistan* 1961 | Pakistan* 1966 | Caribbean 1961 | Caribbean 1966 | N. Ireland* 1961 | N. Ireland* 1966 | |
|---|---|---|---|---|---|---|---|---|---|
| 17 Potternewton West | 2.6 | 9.6 | 2.6 | 8.6 | 16.9 | 20.3 | 2.9 | 1.3 | "High" Immigrant Occupancy |
| 18 Potternewton East | 9.6 | 15.3 | 9.6 | 9.5 | 37.1 | 39.8 | 7.1 | 3.5 | |
| 34 Blenheim West | 13.1 | 13.8 | 13.1 | 17.4 | 6.5 | 7.4 | 5.6 | 2.2 | |
| Subtotal | 25.3 | 38.7 | 25.3 | 35.5 | 60.5 | 67.8 | 15.6 | 7.0 | |
| 15 Hyde Park | 7.7 | 6.9 | 7.7 | 6.7 | 4.0 | 1.9 | 5.4 | 3.5 | |
| 19 Harehill | 2.1 | 3.8 | 2.1 | 7.6 | 2.6 | 5.8 | 4.0 | 4.0 | |
| 24 Blenheim East | 2.9 | 0.8 | 2.9 | 11.4 | 3.0 | 1.3 | 3.0 | 2.2 | "Moderate" Immigrant Occupancy |
| 28 Westfield | 9.1 | 3.1 | 9.1 | 8.5 | 9.5 | 2.1 | 9.8 | 4.0 | |
| 29 Potternewton North | 2.2 | 6.1 | 2.2 | 0.0 | 6.7 | 4.2 | 1.5 | 2.2 | |
| 31 City North | 2.9 | 0.4 | 2.9 | 0.0 | 1.4 | 0.5 | 2.4 | 2.2 | |
| Subtotal | 26.9 | 21.1 | 26.9 | 34.2 | 27.2 | 15.8 | 26.1 | 18.1 | |
| Remainder of City | 47.8 | 40.2 | 47.8 | 30.3 | 12.3 | 16.4 | 58.3 | 74.9 | "Low" Immigrant Occupancy |
| Total Leeds C.B. | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | |

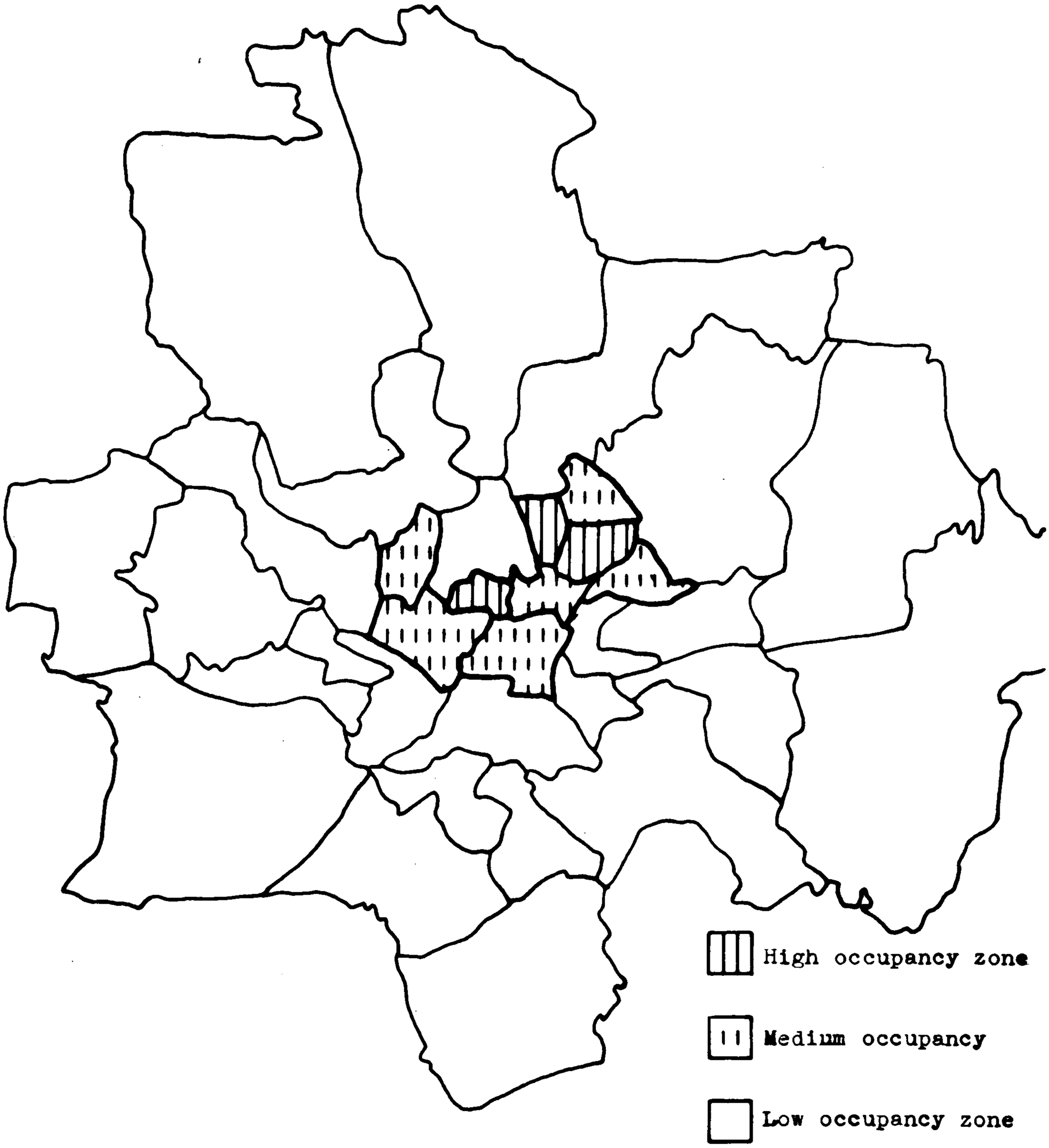
....Continued overleaf...

Table 4.4 Continued..

| Zone Name and Number | Birthplace: Eire* 1961 | Eire* 1966 | Foreign 1961 | Foreign 1966 | G.B. 1961 | G.B. 1966 | |
|---|---|---|---|---|---|---|---|
| 17 Potternewton West | 2.9 | 2.6 | 11.5 | 11.3 | 1.1 | 1.1 | |
| 18 Potternewton East | 7.1 | 7.0 | 16.3 | 12.4 | 1.7 | 1.6 | "High" Immigrant Occupancy |
| 34 Blenheim West | 5.6 | 4.0 | 2.7 | 1.9 | 1.2 | 1.1 | |
| Subtotal | 15.6 | 13.6 | 30.5 | 25.6 | 4.0 | 3.8 | |
| 15 Hyde Park | 5.4 | 3.2 | 4.1 | 4.8 | 2.1 | 2.0 | |
| 19 Harehill | 4.0 | 4.5 | 1.8 | 1.7 | 3.7 | 3.5 | |
| 24 Blenheim East | 3.0 | 4.0 | 1.8 | 0.7 | 1.2 | 0.8 | "Moderate" Immigrant Occupancy |
| 28 Westfield | 9.8 | 6.7 | 4.3 | 1.7 | 2.7 | 1.4 | |
| 29 Potternewton North | 1.5 | 3.2 | 3.8 | 4.2 | 0.8 | 0.8 | |
| 31 City North | 2.4 | 1.6 | 0.8 | 0.0 | 0.7 | 0.4 | |
| Subtotal | 26.1 | 28.6 | 16.6 | 13.1 | 10.7 | 8.9 | |
| Remainder of City | 58.3 | 57.8 | 52.9 | 61.3 | 85.3 | 87.3 | "Low" Immigrant Occupancy |
| Total Leeds C.B. | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | |

*N.B. For 1961 it is impossible to disaggregate the Indian and Pakistani Groups and the Northern Irish and Eire Groups.

**Figure 4.3** Macro-zones for population change 1961 to 1966



respectively, a total loss of 2,551 persons. Similarly the Foreign born population of these areas fell by a total of 396 persons and the Irish born population by 173 persons.

The New Commonwealth immigrant group, therefore, clearly seems at this stage to be a replacement group, replacing the suburbanising white population in the less desirable parts of the city. As a consequence of this falling white population and increasing coloured population situation, the proportion of the population in these particular zones was increasing considerably. Table 4.5 shows the percentage of the total population of particular zones who were born abroad in 1961 and 1966.

Some clear and distinctive trends are visible in Table 4.5. The increasing percentage of coloured persons from India, Pakistan and the Caribbean in the population of the areas of Potternewton West and East (zones 17 and 18) and Blenheim West (zone 34) compare with declining percentages of both white immigrants, the Irish and the Foreign born, and the indigenous British population. In the zones of Hyde Park (zone 15), Holbeck (zone 22) and Harehills (zone 19) smaller growths in the percentage of the population who were from the "coloured" New Commonwealth countries compare with smaller losses from the indigenous population. In these areas, however, the proportions of white immigrant persons from Ireland and other Foreign countries were stable or slightly increasing over the five year period. The zones of very low immigrant occupancy, Far Headingley (zone 1), Middleton (zone 5) and Cross Gates (zone 8) there appeared to be fairly stable or slightly increasing proportions of indigenous British born

Table 4.5 Percentage of the total population of certain zones by birthplace, Leeds C.B. 1961 and 1966

| Zone Number | Birthplace | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | India | | Pakistan | | Caribbean | | N. Ireland | | Eire | | Foreign | | G.B. | |
| | 1961 | 1966 | 1961 | 1966 | 1961 | 1966 | 1961 | 1966 | 1961 | 1966 | 1961 | 1966 | 1961 | 1966 |
| 17 | 0.6 | 3.3 | 0.6 | 1.2 | 5.3 | 10.1 | 3.5 | 0.4 | 3.5 | 2.5 | 13.7 | 12.4 | 75.7 | 68.9 |
| 18 | 1.5 | 3.5 | 1.5 | 0.9 | 7.3 | 13.3 | 5.5 | 0.7 | 5.5 | 4.5 | 12.3 | 9.1 | 72.4 | 65.7 |
| 34 | 3.2 | 5.5 | 3.2 | 2.7 | 2.0 | 4.2 | 6.8 | 0.8 | 6.8 | 4.4 | 3.2 | 2.4 | 82.8 | 76.4 |
| 15 | 1.2 | 1.6 | 1.2 | 0.6 | 0.8 | 0.6 | 4.2 | 0.7 | 4.2 | 2.1 | 3.1 | 3.7 | 90.1 | 87.8 |
| 22 | 0.5 | 1.3 | 0.5 | 0.1 | 0.3 | 1.2 | 1.9 | 0.5 | 1.9 | 1.9 | 0.8 | 0.8 | 96.3 | 93.6 |
| 19 | 0.3 | 1.8 | 0.3 | 0.6 | 0.3 | 1.1 | 2.0 | 0.5 | 2.0 | 2.7 | 1.5 | 1.2 | 95.6 | 92.5 |
| 1 | 0.2 | 0.1 | 0.2 | 0.0 | 0.0 | 0.0 | 1.0 | 0.2 | 1.0 | 0.6 | 1.2 | 1.7 | 97.0 | 96.7 |
| 5 | 0.1 | 0.0 | 0.1 | 0.0 | 0.0 | 0.0 | 0.8 | 0.1 | 0.8 | 0.8 | 0.4 | 0.4 | 98.7 | 98.3 |
| 8 | 0.1 | 0.0 | 0.1 | 0.0 | 0.0 | 0.0 | 1.1 | 0.1 | 1.1 | 0.8 | 0.7 | 0.6 | 97.9 | 98.1 |

* Zone Key :

| | | | | | |
|---|---|---|---|---|---|
| 17 | Potternewton West | 15 | Hyde Park | 1 | Far Headingley |
| 18 | Potternewton East | 22 | Holbeck | 5 | Middleton |
| 34 | Blenheim West | 19 | Harehills | 8 | Crossgates |

N.B. For the Indian and Pakistani, Northern Ireland and Eire birthplace groups the 1961 values are composite figures.

persons combined with falling proportions of New Commonwealth born immigrants and immigrants from Ireland. Foreign born persons slightly increased their proportions in these zones. In this last example the total population living in these three zones (1, 5 and 8) increased over the five year period from 78,016 persons to 90,640. Stable percentages therefore represent absolute increases in the numbers of persons present of a particular birthplace group. Similarly the total population of Potternewton West and East and Blenheim West fell from 39,113 persons in 1961 to 25,620 persons in 1966. The total population of Hyde Park, Holbeck and Harehills fell from 43,531 to 41,770 in the same period. The implication is, therefore, that more subtle measures than simply percentage occupancy rates should be used to identify the underlying trends in the spatial distribution. This is something which is attacked directly later in this chapter.

Table 4.6 shows the numbers of persons by birthplace resident in the 34 zones of Leeds C.B. in 1971. Once again the concentration of the New Commonwealth groups in the areas of the city picked out in the 1961 figures, is apparent. Also apparent, however, is the increased spread of these groups over all zones of the city. It was shown that in 1961 the three zones of Potternewton, West and East, and Blenheim West, accounted for 61% of the total of West Indian born persons in the city (68% in 1966). In 1971, however, these three areas accounted for 52% of the total of West Indians in Leeds. Equivalent figures for the Asian groups were 25% (Indian and Pakistani) in 1961, 38% in 1966, and in 1971 30%. Use of the 1966 figures enables disaggregation of this group. In 1966 39% of Indians and

Table 4.6 Numbers of persons by birthplace group and zone - Leeds C.B. 1971

| Zone Name | No | N. Irish | Indian | Pakistani | West Indian | Other New Com. | Old Com. | Foreign | Eire | British | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Far Headingly | 1 | 111 | 43 | 1 | 12 | 62 | 77 | 383 | 197 | 24,621 | 25,507 |
| Moortown | 2 | 132 | 53 | 11 | 23 | 61 | 54 | 789 | 258 | 25,959 | 27,340 |
| Stanningley | 3 | 93 | 21 | 36 | 8 | 13 | 24 | 244 | 134 | 23,438 | 24,011 |
| Wortley | 4 | 78 | 42 | 9 | 6 | 30 | 22 | 227 | 200 | 19,570 | 20,184 |
| Middleton | 5 | 94 | 22 | 14 | 15 | 25 | 15 | 188 | 204 | 28,574 | 29,151 |
| East Hunslet | 6 | 61 | 17 | 17 | 43 | 62 | 16 | 119 | 144 | 9,630 | 10,109 |
| Halton | 7 | 48 | 34 | 14 | 8 | 39 | 43 | 209 | 215 | 24,282 | 24,892 |
| Cross Gates | 8 | 183 | 55 | 14 | 63 | 77 | 49 | 426 | 433 | 39,850 | 41,150 |
| Roundhay | 9 | 158 | 37 | 13 | 78 | 96 | 56 | 687 | 400 | 24,264 | 25,789 |
| Allerton | 10 | 115 | 135 | 29 | 151 | 149 | 67 | 975 | 288 | 24,603 | 26,512 |
| Bramley | 11 | 93 | 12 | 3 | 24 | 43 | 18 | 217 | 187 | 20,904 | 21,501 |
| Meanwood | 12 | 130 | 89 | 17 | 41 | 65 | 47 | 327 | 363 | 19,016 | 20,095 |
| Armley | 13 | 94 | 80 | 104 | 33 | 53 | 12 | 135 | 162 | 11,633 | 12,306 |
| Kirkstall | 14 | 117 | 81 | 47 | 56 | 62 | 11 | 264 | 326 | 18,161 | 19,125 |
| Hyde Park | 15 | 126 | 581 | 245 | 246 | 397 | 19 | 482 | 396 | 10,788 | 13,280 |
| Woodhouse | 16 | 88 | 81 | 100 | 82 | 85 | 3 | 172 | 175 | 7,165 | 7,951 |
| Potternewton West | 17 | 37 | 291 | 28 | 582 | 171 | 4 | 584 | 167 | 4,034 | 5,898 |
| Potternewton East | 18 | 100 | 676 | 314 | 1,244 | 308 | 13 | 519 | 321 | 5,219 | 8,714 |

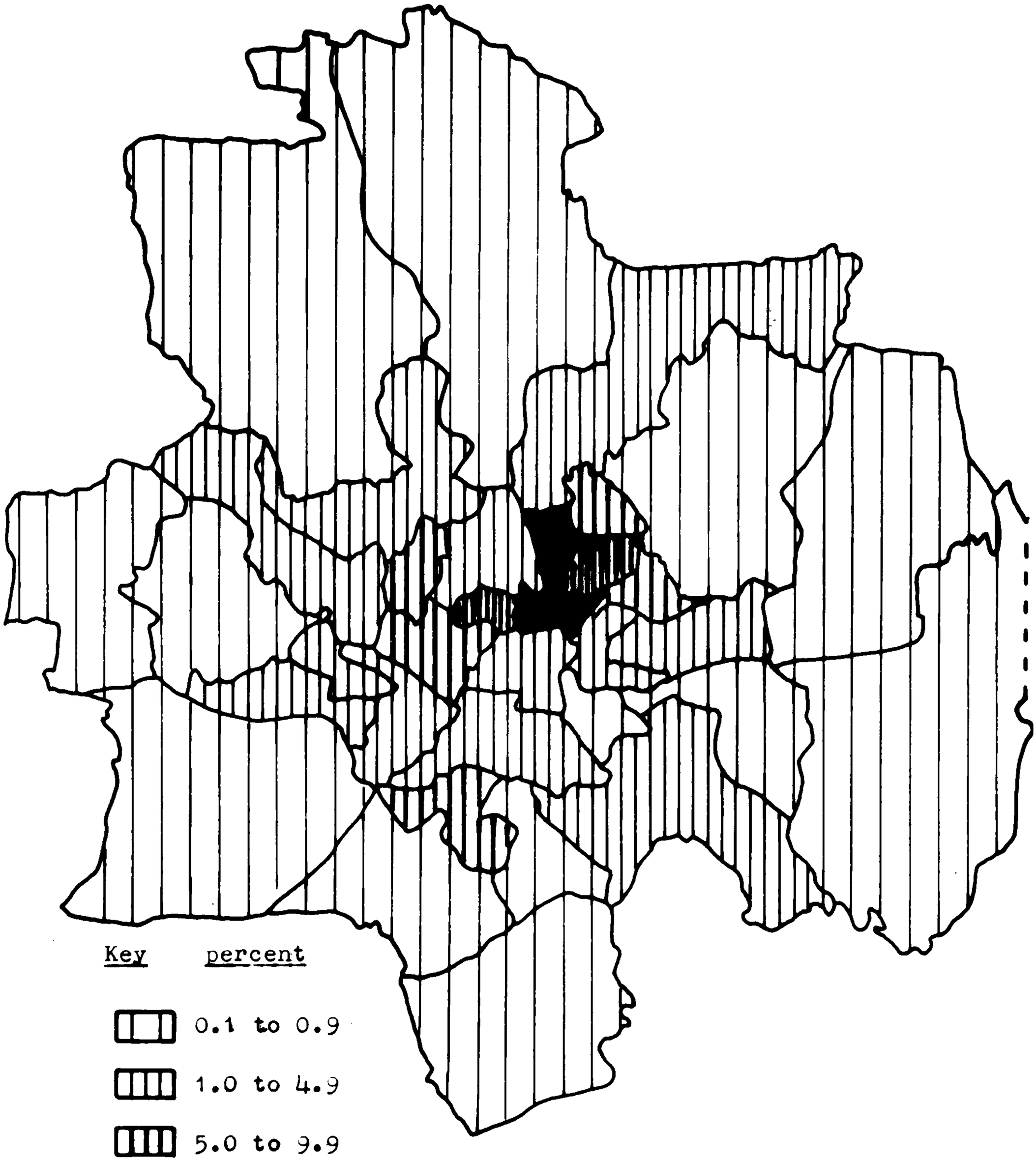
....Continued overleaf...

Table 4.6 Continued

| Zone Name | No | N. Irish | Indian | Pakistani | West Indian | Other New Com. | Old Com. | Foreign | Eire | British | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Continued..... | | | | | | | | | | | |
| Harehills | 19 | 90 | 296 | 310 | 157 | 180 | 17 | 210 | 478 | 10,786 | 12,524 |
| Burmantofts | 20 | 84 | 43 | 9 | 62 | 30 | 6 | 137 | 199 | 11,884 | 12,454 |
| Osmandthorpe | 21 | 70 | 20 | 1 | 32 | 16 | 11 | 149 | 218 | 15,501 | 16,018 |
| Holbeck | 22 | 100 | 212 | 278 | 60 | 84 | 11 | 110 | 203 | 11,552 | 12,610 |
| Wellington East | 23 | 50 | 14 | 32 | 19 | 11 | 2 | 50 | 101 | 4,303 | 4,582 |
| Blenheim East | 24 | 29 | 131 | 198 | 73 | 74 | 0 | 92 | 92 | 1,851 | 2,540 |
| City South | 25 | 8 | 3 | 0 | 10 | 20 | 0 | 20 | 55 | 1,159 | 1,275 |
| Beeston | 26 | 48 | 26 | 12 | 12 | 32 | 8 | 126 | 223 | 14,998 | 15,485 |
| Hunslet Carr | 27 | 28 | 13 | 17 | 3 | 3 | 4 | 47 | 74 | 5,955 | 6,144 |
| Westfield | 28 | 59 | 69 | 134 | 108 | 62 | 8 | 203 | 215 | 5,097 | 5,955 |
| Potternewton North | 29 | 29 | 73 | 26 | 216 | 67 | 12 | 297 | 117 | 3,163 | 4,000 |
| Richmond Hill North | 30 | 49 | 22 | 8 | 55 | 31 | 8 | 69 | 139 | 6,665 | 7,045 |
| City North | 31 | 15 | 4 | 43 | 8 | 8 | 0 | 38 | 43 | 1,882 | 2,041 |
| Wellington West | 32 | 23 | 19 | 23 | 4 | 5 | 5 | 26 | 65 | 3,703 | 3,873 |
| Richmond Hill South | 33 | 70 | 8 | 4 | 14 | 8 | 10 | 66 | 167 | 6,265 | 6,612 |
| Blenheim West | 34 | 54 | 174 | 285 | 45 | 58 | 4 | 82 | 150 | 2,111 | 2,963 |
| Totals | | 2,664 | 3,477 | 2,396 | 3,593 | 2,487 | 656 | 8,669 | 7,109 | 448,586 | 479,637 |

**Figure 4.4** Persons born in the New Commonwealth as percentage of total population in zones.

1971



35% of Pakistanis were resident in these three areas. The equivalent 1971 figures were 33% and 26% respectively. Concentration of these NC groups would, therefore, seem to have been less in 1971 than in 1961. The numbers of persons born in the Other New Commonwealth countries had increased, by 1971, to form a sizeable proportion of the total number of persons born in the New Commonwealth. Of the coloured groups, their levels of concentration seem to be lowest. In 1961 34% of these persons were to be found in Potternewton West and East and Blenheim West (zones 17, 18 and 34). In 1966 this had fallen to 24% and in 1971 was a mere 22%.

These figures, and the percentages of other birthplace groups are represented in Table 4.7 using the macro zone system of Figure 4.3.

The continued loss of the indigenous population from the inner city areas depicted by the zones of "high" and "moderate" immigrant occupancy (Table 4.7) is still apparent over the ten year period. These areas contained 14.3% of the white indigenous population in 1961 but only 10% in 1971. These percentages represent a total indigenous population loss of 23,731 persons, 7,763 persons from the "high" zones 17, 18 and 34 and 15,968 persons from the "moderate" zones 15, 19, 24, 28, 29 and 31. In comparative terms the New Commonwealth population of these areas increased in the ten year period from 2,441 persons or 55.1% of the total New Commonwealth born population, to 7,222 persons or 60.4% of the total New Commonwealth born population. These figures comprise total increases of 2,236 persons in Potternewton East and West and Blenheim West ("high" zones 17, 18 and 34), and in the "moderate" zones. So it seems that contrary to the situation in the

Table 4.7 Percentage of total persons in groups in certain areas of Leeds C.B. by birthplace, 1961 and 1971

| Zone Name and Number | Birthplace: India | | Pakistan | | Caribbean | | N.Ireland | | Eire | | Foreign | | G.B. | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1961 | 1971 | 1961 | 1971 | 1961 | 1971 | 1961 | 1971 | 1961 | 1971 | 1961 | 1971 | 1961 | 1971 |
| 17 Potternewton West | 2.6 | 8.3 | 2.6 | 1.2 | 16.9 | 16.1 | 2.9 | 1.4 | 2.9 | 2.3 | 11.5 | 6.7 | 1.1 | 0.9 |
| 18 Potternewton East | 9.6 | 19.3 | 9.6 | 13.0 | 37.1 | 34.4 | 7.1 | 3.7 | 7.1 | 4.5 | 16.3 | 6.0 | 1.7 | 1.2 |
| 34 Blenheim West | 13.2 | 5.0 | 13. | 11.8 | 6.5 | 1.2 | 5.6 | 2.0 | 5.6 | 2.1 | 2.7 | 0.9 | 1.2 | 0.5 |
| Subtotal | 25.4 | 32.6 | 25.4 | 26.0 | 60.5 | 51.7 | 15.6 | 7.1 | 1 .6 | 8.9 | 30.5 | 13.6 | 4.0 | 2.6 |
| 15 Hyde Park | 7.7 | 16.5 | 7.7 | 10.1 | 4.0 | 6.8 | 5.4 | 4.7 | 5.4 | 5.6 | 4.1 | 5.6 | 2.1 | 2.4 |
| 19 Harehills | 2.1 | 8.4 | 2.1 | 12.8 | 2.0 | 4.3 | 3.3 | 3.4 | 3.3 | 6.7 | 2.6 | 2.4 | 2.8 | 2.4 |
| 24 Blenheim East | 2.9 | 3.8 | 2.9 | 11.4 | 3.0 | 2.0 | 3.0 | 1.1 | 3.0 | 1.3 | 1.8 | 1.1 | 1.2 | 0.4 |
| 28 Westfield | 9.1 | 2.0 | 9.1 | 8.5 | 9.5 | 3.0 | 9.8 | 2.2 | 9.8 | 3.0 | 4.3 | 2.3 | 2.7 | 1.1 |
| 29 Potternewton North | 2.2 | 2.1 | 2.2 | 0.0 | 6.7 | 6.0 | 1.5 | 1.1 | 1.5 | 1.6 | 3.8 | 3.4 | 0.8 | 0.7 |
| 31 City North | 2.9 | 0.1 | 2.9 | 0.0 | 1.4 | 0.2 | 2.4 | 0.6 | 2.4 | 0.6 | 0.8 | 0.4 | 0.7 | 0.4 |
| ubtotal | 26.9 | 32.9 | 26.9 | 42.8 | 26.6 | 22.3 | 75.4 | 13.1 | 25.4 | 18.8 | 17.4 | 15.2 | 10.3 | 7.4 |
| emainder of City | 47.7 | 34.5 | 47.7 | 31.2 | 12.9 | 26.0 | 59.0 | 79.8 | 59.0 | 72.3 | 51.1 | 71.2 | 85.7 | 90.0 |
| ttal Leeds C.B. | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |

period 1961 to 1966 the greatest increases of New Commonwealth born persons in the period 1966 to 1971 came in the areas which could be described as less concentrated, "intermediate" settlement areas. But as Table 4.7 shows this masks differences for the individual ethnic groups. In 1961 the joint percentage of Indians and Pakistanis in zones 17, 18 and 34 was 25% but in 1971 the average or joint percentage was 29.3%. The Caribbean group, however, diminished in concentration in these areas from 60.5% of the group in 1961 to 51.7% in 1971. The zones which have been used in Table 4.7 to represent "intermediate" settlement areas, zones 15, 19, 24, 28, 29 and 31, markedly increase their concentrations of Indians and Pakistanis from a joint 27% in 1961 to a joint 37% (a figure which does not, however, take into account the different weightings of the groups). Similar figures for the Caribbean population are 27% and 22%. The Caribbean group, however, increased in percentage in the macro-zone of low immigrant occupancy, the rest of the city, from 12.9 of the group total in 1961 to 26% of the group total in 1971. These areas fell in terms of Indian and Pakistani occupancy from a joint 47.7% to a joint 33% in the same period. But what of the "white" immigrant groups, the Northern Irish, Southern Irish and Foreign born? Like the Indians and Pakistanis no distinction was made in the 1961 census between the Northern and Southern Irish born persons. In 1961 15.6% of these Irish persons were to be found in zones 17, 18 and 34. Like the Caribbeans, their concentration in these areas fell in the period to a joint 8% and decreased also from 25.4% to 15% in the zones of intermediate occupancy. Consequently there was an increase from 59% to a joint 75% in the rest of the city. This

pattern is duplicated by the Foreign born whose concentrations fell from 30.5% to 13.6% in zones 17, 18 and 34, and fell again from 17.4% to 15.2% in the "intermediate" zones. Consequently their numbers too increased in the rest of the city from 51% to 71% of the group's total population.

## 4.5 The evolving spatial distribution

The evolving spatial distribution may be further illustrated very simply. Table 4.8 shows the percentage increase in the Total Commonwealth population for each zone for the period 1961 to 1971. This percentage figure is derived from the increase in population in the period and is expressed as a proportion of the 1961 population figure for each zone. The mathematical statement of this is as follows:

$$Z_e^i = 100\left\{ \frac{K_e^i\,(1971\text{c.d.}) - K_e^i(1961\text{c.d.})}{K_e^i\,(1961\text{c.d.})} \right\} \qquad 4.1.$$

where $Z_e^i$ is the proportion increase

$K_e^i$ is the population of zone i, of ethnic group e at 1961 and 1971 census dates

In the Table a score of 1.00 represents a completely static situation, a score of less than 1.00 represents a real population loss and conversely a score of more than 1.00 represents a real population increase.

A distinctive pattern emerges, as reference to the figure will show. The most central city areas have lost

**Figure 4.5** Total Commonwealth group increases 1961 to 1971

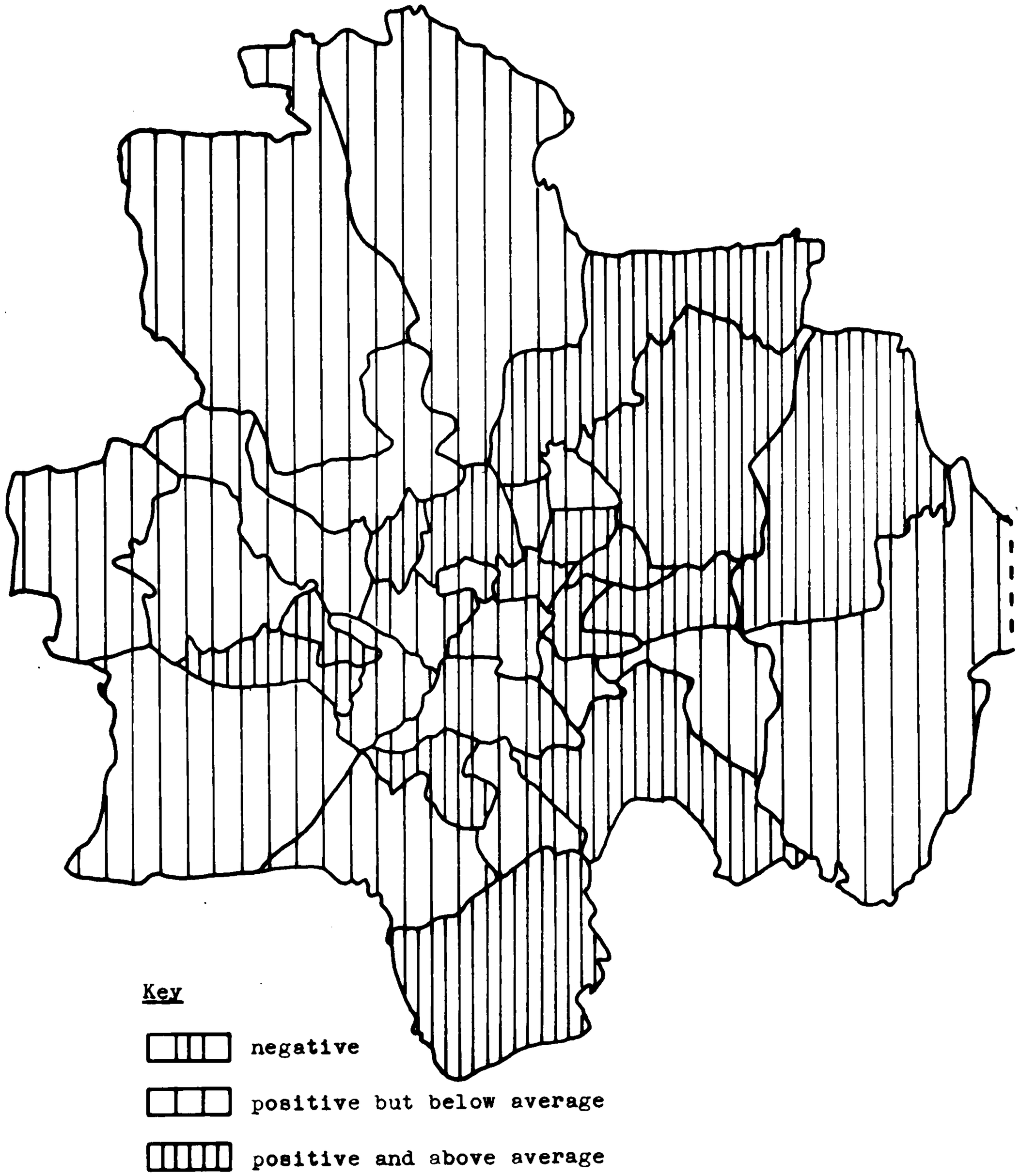


Table 4.8 Increases by zone for the Commonwealth Immigrants 1961 to 1971

| Zone Name | Zone No | Increase | Zone Name | Zone No | Increase |
|---|---|---|---|---|---|
| Far Headingly | 1 | 1.08 | Potternewton E. | 18 | 2.37 |
| Moortown | 2 | 1.74 | Harehills | 19 | 5.96 |
| Stanningley | 3 | 1.96 | Burmantofts | 20 | 3.49 |
| Wortley | 4 | 1.58 | Osmandthorpe | 21 | 1.29 |
| Middleton | 5 | 2.46 | Holbeck | 22 | 3.56 |
| East Hunslet | 6 | 3.30 | Wellington E. | 23 | 1.37 |
| Halton | 7 | 1.27 | Blenheim E. | 24 | 3.81 |
| Cross Gates | 8 | 2.43 | City South | 25 | 0.49 |
| Roundhay | 9 | 2.41 | Beeston | 26 | 1.50 |
| Allerton | 10 | 3.88 | Hunslet Carr | 27 | 0.57 |
| Bramley | 11 | 1.72 | Westfield | 28 | 0.76 |
| Meanwood | 12 | 2.04 | Potternewton N. | 29 | 1.82 |
| Armley | 13 | 2.84 | Richmond Hill N. | 30 | 2.48 |
| Kirkstall | 14 | 1.56 | City North | 31 | 0.52 |
| Hyde Park | 15 | 5.04 | Wellington W. | 32 | 3.73 |
| Woodhouse | 16 | 4.03 | Richmond Hill S. | 33 | 1.47 |
| Potternewton W. | 17 | 2.13 | Blenheim West | 34 | 1.12 |
| | | | City Average | | 2.25 |

population along with Hunslet Carr and Westfield (zones 27 and 28), both of which have been extensively cleared of older housing. Almost all the areas immediately surrounding this central core have gained Commonwealth immigrants at more than the city average. In the south, Middleton (zone 5) shows up as a city fringe area in which the increase of immigrants closely matched that of the city as a whole. In the west, Armley and Wellington West (zones 13 and 32) show increases well above the city average. Holbeck (zone 22) is also in this classic transition zone situation having increases above the city average and situated between the loss areas of the city centre and the relatively low gain areas of the outer city zones. Most expansion of the Commonwealth immigrant groups has clearly taken place to the north and north east of the city centre and here Hyde Park and Harehills stand out as having increases of Commonwealth born population of more than double the average city increase. Of the traditional immigrant core areas Potternewton West, East and Blenheim West (zones 17, 18 and 34) only zone 18, Potternewton East, stands out with an increase above this average. Of course this does not imply that the numbers of persons born in the Commonwealth moving into this area were small. This is the disadvantage of this technique of representation. All that this in fact means is that <u>considering the area's population in 1961</u> there were relatively few immigrants to the area over the decade 1961 to 1971, although there were, in absolute terms, very many more persons moving in than to Far Headingley for example. These two areas which had a less than city average increase in Commonwealth born persons are the only areas to have this distinction for the whole of the north-east

sector of the city. Cross Gates and Allerton (zones 8 and 9) increased their Commonwealth populations at very much the same rate as the city but Roundhay (zone 10) underwent a considerably greater change. The shape of this zone and its abutment with Potternewton probably account for this fact. Expansion of the Commonwealth group in Burmantofts and Richmond Hill North (zones 20 and 30) and in Halton in the south-east complete the picture of inner ring expansion, with the notable exceptions of Cross Gates, Allerton and Middleton as outer areas with more than the city average increase of Commonwealth persons.

Figure 4.6 and Table 4.9 show the same analysis performed for the British born population. In this case, however, the city average change was not an increase but an overall decrease. The Figure shows up the areas where the greatest decreases in the British born population occured. The city appears to divide into three zones. The most northerly of these is a zone of increase of British born persons, stretching from the north west to the south east. In this area the percentage difference in population above the city average figure is sufficiently large to show that this area gained, in absolute terms, indigenous population. This northerly zone is matched by a southerly zone stretching from Wortley in the east to Middleton in the south where again, the percentage difference in population is sufficiently high enough above the city average to show absolute gains of British born population. Between these zones is a belt of loss areas. From Kirkstall (zone 14) in the north west this area expands to encompass the whole inner city and the transition zone areas and terminates in Halton (zone 6) in the south east. Comparison of this figure (4.6) with the previous figure (4.5) shows that only

**Figure 4.6** British born population increases 1961 to 1971

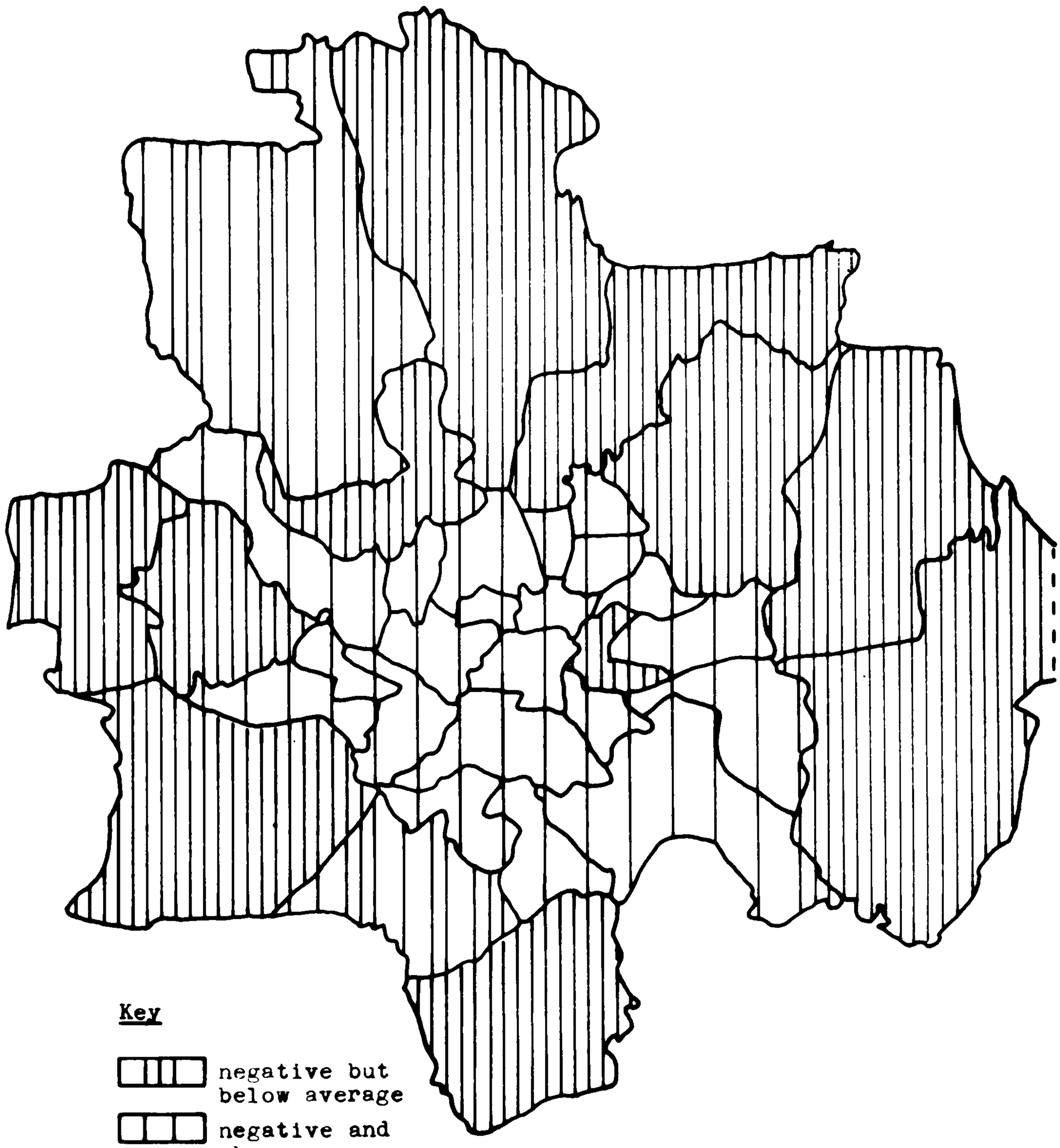


Table 4.9 Change in the zonal populations born in Britain 1961 to 1971.

| Zone Name | Zone No | Change | Zone Name | Zone No | Change |
|---|---|---|---|---|---|
| Far Headingley | 1 | 0.98 | Potternewton E. | 18 | 0.63 |
| Moortown | 2 | 1.06 | Harehills | 19 | 0.80 |
| Stanningley | 3 | 1.14 | Burmantofts | 20 | 0.84 |
| Wortley | 4 | 1.15 | Osmandthorpe | 21 | 0.84 |
| Middleton | 5 | 1.36 | Holbeck | 22 | 0.65 |
| East Hunslet | 6 | 0.65 | Wellington E. | 23 | 0.45 |
| Halton | 7 | 1.17 | Blenheim E. | 24 | 0.31 |
| Cross Gates | 8 | 1.31 | City South | 25 | 0.21 |
| Roundhay | 9 | 1.06 | Beeston | 26 | 0.97 |
| Allerton | 10 | 1.13 | Hunslet Carr | 27 | 0.42 |
| Bramley | 11 | 1.11 | Westfield | 28 | 0.32 |
| Meanwood | 12 | 1.05 | Potternewton N. | 29 | 0.76 |
| Armley | 13 | 0.81 | Richmond Hill N. | 30 | 1.04 |
| Kirkstall | 14 | 0.80 | City North | 31 | 0.54 |
| Hyde Park | 15 | 0.88 | Wellington West | 32 | 0.69 |
| Woodhouse | 16 | 0.58 | Richmond Hill S. | 33 | 0.86 |
| Potternewton W. | 17 | 0.75 | Blenheim W. | 34 | 0.32 |
| | | | City Average | 0.94 | |

four areas of increase of Commonwealth born persons were outside the areas of decrease of British born persons, these being the fringe areas of Middleton, Cross Gates, Allerton and Roundhay (zones 5, 8, 9 and 10). One zone, Richmond Hill North, stands out as an area where both the British and Commonwealth born populations increased over the ten year period.

The differences displayed above may be contrasted more directly by the simple expedient of forming a matrix from the two distributions given in Tables 4.8 and 4.9. Figure 4.7 shows this matrix, supplying the numbers of the zones which fall into each one of the nine sub-divisions. On the vertical axis are represented the three categories of change for the Commonwealth born population, positive and above city average, positive but below city average and negative. These apply to the three rows. The three columns represent the change situations for the British born population, negative but below the city average, negative and above city average and positive. In ten zones, therefore, high Commonwealth gains were associated with above average negative change in the British population. In four suburban zones above average Commonwealth change was associated with positive change in the British population. The bottom left hand element shows these zones where urban renewal has made considerable inroads into populations of all ethnic groups. The middle ground of Commonwealth population change may be seen, finally to be mainly associated with negative change in the British population. This analysis, therefore, seems to indicate that the Commonwealth population of Leeds C.B. <u>is</u> a "replacement" population. It also indicates, however, that

the traditional population out-movement from areas of decay in the inner city is affecting this population, but to a very much smaller degree than the indigenous residents of these areas.

Figure 4.7 Change Matrix for Commonwealth and British born populations of each zone 1961 to 1971.

| Commonwealth \ Zone Numbers | Negative but below average | Negative but above average. | Positive |
|---|---|---|---|
| Positive above average | 6, 13, 15, 16, 18, 19, 20,22,24,32 | | 5, 8, 9, 10, 30 |
| Positive below average | 14, 17, 21, 23, 29, 33, 34 | 1, 26 | 2, 3, 4, 7, 11, 12 |
| Negative | 25, 27, 28, 31 | | |

British

## 4.6 Analysis of the evolving spatial distribution using standard scores

The above analysis has indicated certain trends in the changing spatial distribution of immigrants in Leeds C.B. However, as was mentioned in the text, the observation of increases and decreases using simple percentage values may be improved upon by the use of more sophisticated techniques. In this situation where a large number of zones have a very small given population then very small increases in these zones represent high percentage increases. For example in a zone with 50 coloured immigrants an increase of 25 persons represents a percentage increase of 50%. However in a zone with 500 coloured immigrants resident such an increase of 25 persons represents an increase of only 5%.

The standard scores technique used below to further illustrate ethnic group expansion does not directly counter this problem of the relationship between a zonal population and zonal increments. What it does achieve is an expression of increases and decreases of population groups in zones as proportions of a standard deviation for the city as a whole. In other words the abnormally distributed increases in population are normalised to a higher degree than is achieved by a simple percentaging of the figures. This latter method, while adequate for the larger populations of Commonwealth persons is not adequate for the smaller numbers in the separate ethnic groups. Its use here is, therefore, defended if only for this reason.

The formula for achieving a standard score for each zone

is given as:

$$Z_i^e = (X_i^e - \bar{X}^e)^2/\sigma^e \quad \ldots.4.2$$

where $$\sigma^e = \sqrt{\sum_i (X_i^e - \bar{X}^e)^2 / n - 1} \quad \ldots.4.3$$

The variables are defined as follows:

$Z_i^e$ = Standard score for zone (i)

$X_i^e$ = Increase of persons of a given ethnic group over a given time period

$\bar{X}^e$ = Mean or average growth per zone of a given ethnic group over a given time period.

$\sigma^e$ = Standard deviation

n = Number of cases, i.e.number of zones.

In order to examine the different growth trends these calculations were performed for the Indian/Pakistani, the West Indian and the Irish birthplace groups for the period 1961 to 1971 for Leeds C.B. The Indian and Pakistan group values are given as a joint figure since their groups are indistinguishable in the 1961 census. The results of the calculations are given in Table 4.10 and are mapped in Figures 4.8 to 4.10. These results clearly show the differentiation between the "coloured" and "white" immigrant groups. But there are interesting differences between the New Commonwealth groups themselves. The Caribbean population show the greatest tendency to out-movement represented in the figure and table by quite strong positive values in zones 8, 9 and 10, Cross Gates, Roundhay and Allerton. This group also expanded in zones 29 and 30, Potternewton North and Richmond Hill North, areas with fairly high negative scores for the other New Commonwealth

**Figure 4.8** Standard scores for Indian/Pakistani group 1961 to 1971

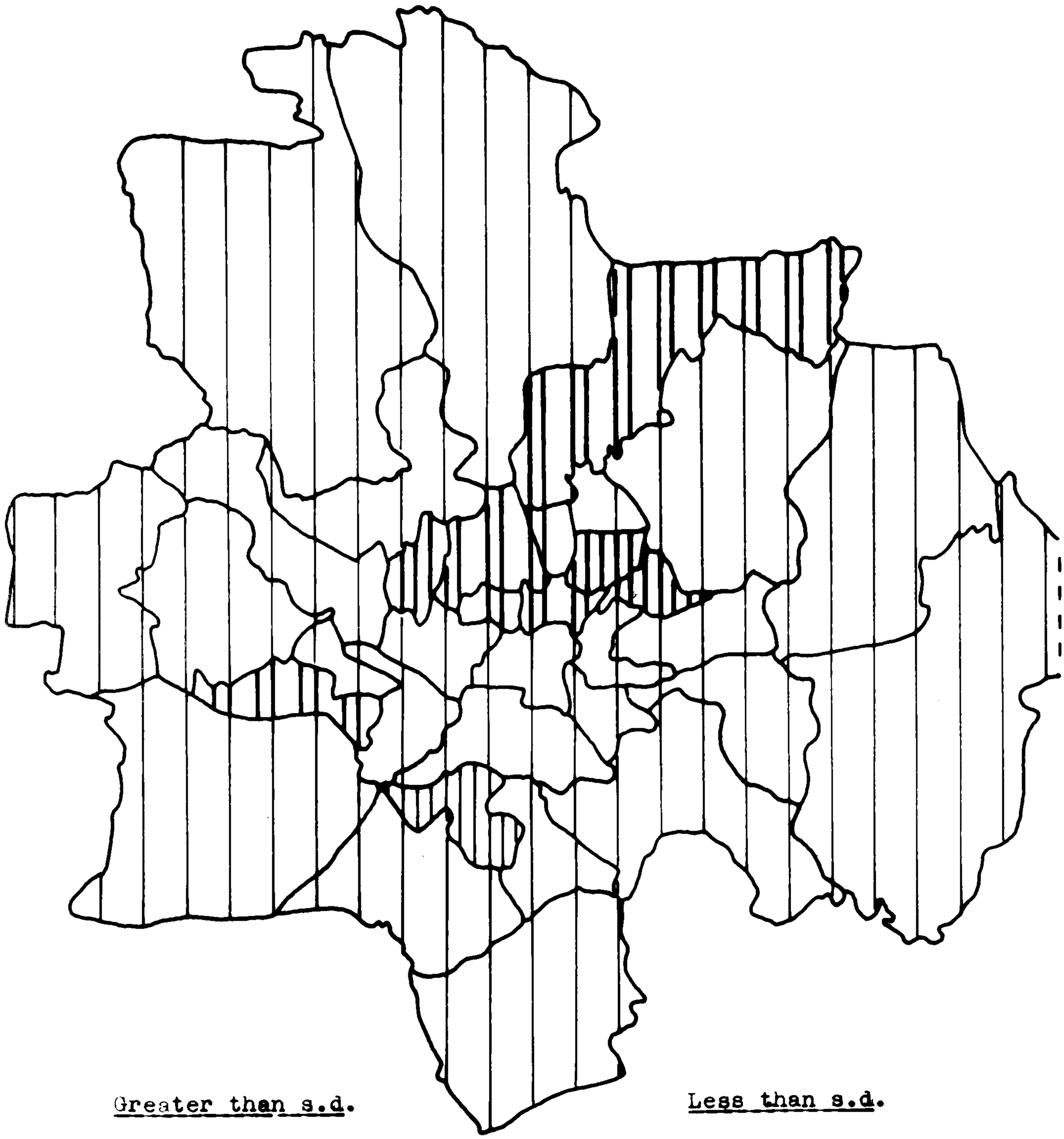


**Figure 4.9** Standard scores for the West Indian group 1961 to 1971

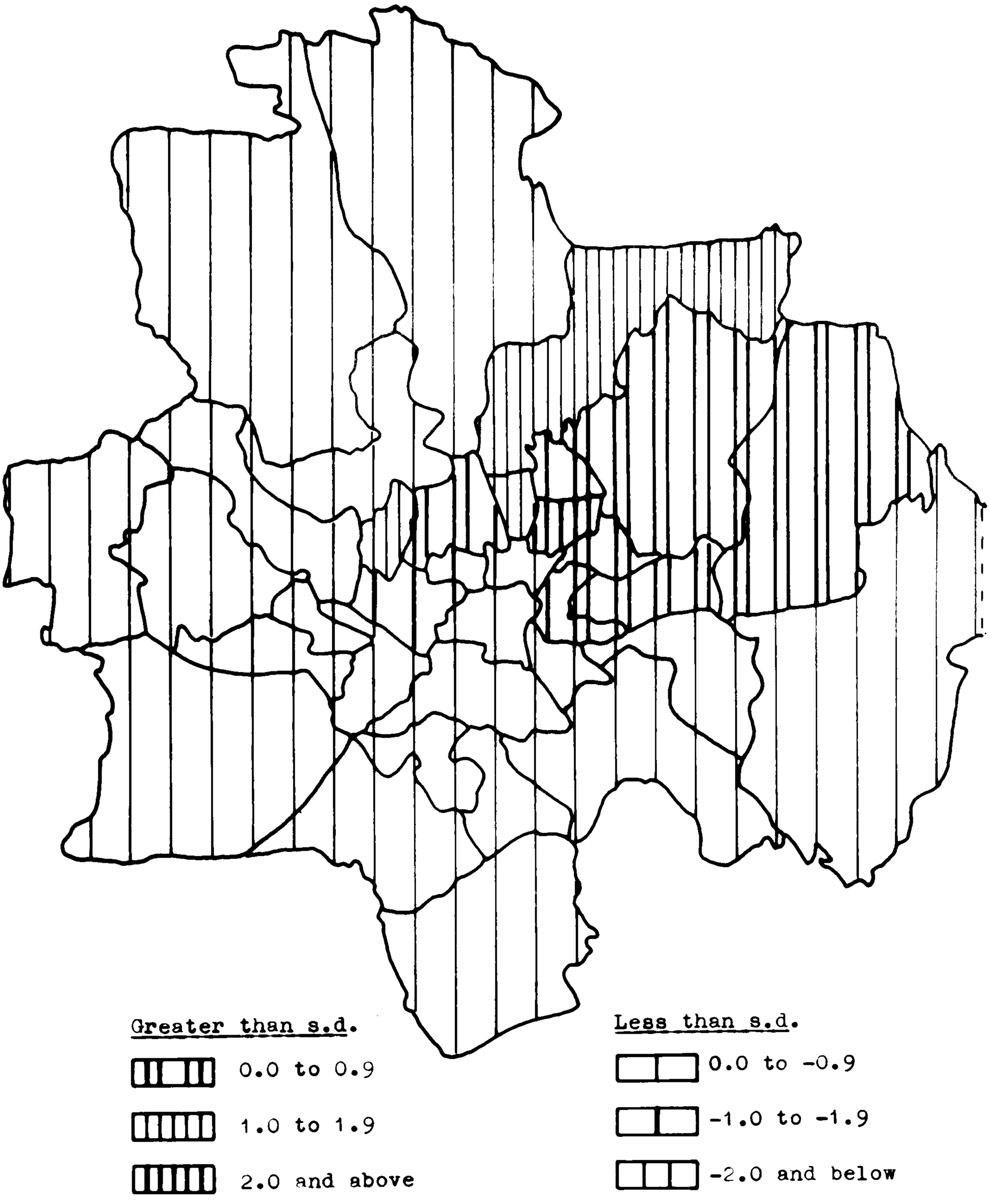


**Figure 4.10** Standard scores for the Irish group 1961 to 1971

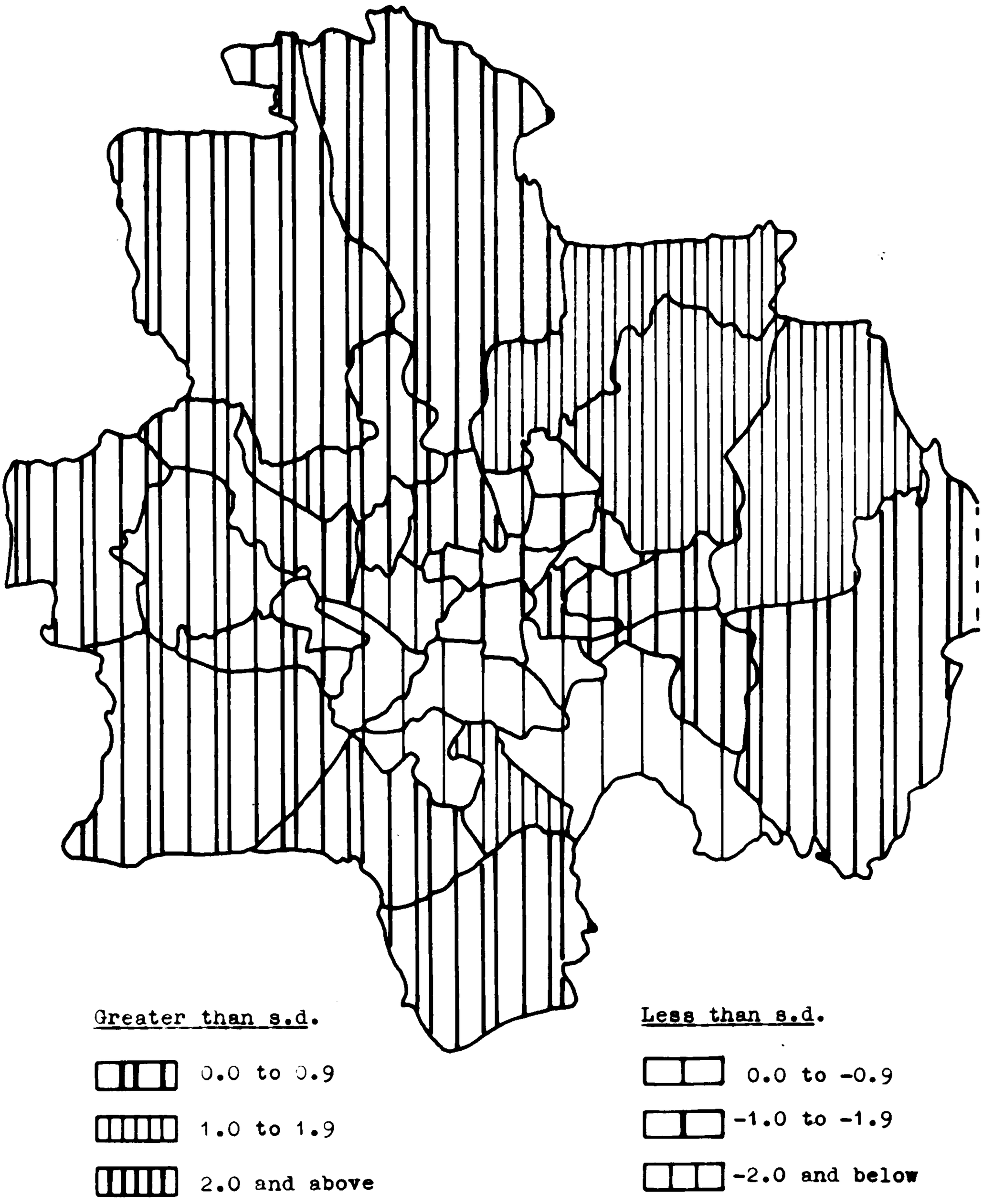


Table 4.10 Standard scores for each birthplace group for the period 1961 to 1971 in Leeds C.B.

| Zone Name | Zone No | West Indian | Indian/ Pakistani | Irish | Zone Name | Zone No | West Indian | Indian/ Pakistani | Irish |
|---|---|---|---|---|---|---|---|---|---|
| Far Headingley | 1 | -0.40 | -0.62 | +0.05 | Potternewton E. | 18 | +4.26 | +3.42 | -1.30 |
| Moortown | 2 | -0.36 | -0.43 | +0.54 | Harehills | 19 | +0.78 | +2.17 | -1.50 |
| Stanningley | 3 | -0.43 | -0.41 | +0.15 | Burmantofts | 20 | +0.08 | -0.41 | +0.10 |
| Wortley | 4 | -0.40 | -0.49 | +0.59 | Osmandthorpe | 21 | -0.18 | -0.57 | +0.35 |
| Middleton | 5 | -0.32 | -0.48 | +0.56 | Holbeck | 22 | -0.42 | +1.33 | -0.45 |
| East Hunslet | 6 | 0 | -0.51 | -0.08 | Wellington E. | 23 | -0.29 | -0.49 | -0.35 |
| Halton | 7 | -0.45 | -0.55 | +0.19 | Blenheim E. | 24 | -0.37 | +0.29 | -1.35 |
| Cross Gates | 8 | +0.15 | -0.47 | +1.42 | City South | 25 | -0.35 | -0.86 | -0.05 |
| Roundhay | 9 | +0.33 | -0.46 | +1.66 | Beeston | 26 | -0.35 | -0.55 | +0.59 |
| Allerton | 10 | +1.04 | +0.05 | +1.02 | Hunslet Carr | 27 | -0.52 | -0.55 | +1.07 |
| Bramley | 11 | -0.30 | -0.59 | +0.51 | Westfield | 28 | -1.53 | -0.35 | -3.54 |
| Meanwood | 12 | -0.22 | -0.28 | +0.39 | Potternewton N. | 29 | +0.03 | -0.29 | -0.12 |
| Armley | 13 | -0.28 | +0.07 | +0.20 | Richmond Hill N. | 30 | +0.01 | -0.54 | +0.02 |
| Kirkstall | 14 | -0.29 | -0.15 | +0.64 | City N. | 31 | -0.71 | -0.59 | -1.07 |
| Hyde Park | 15 | +1.26 | +2.80 | +0.14 | Wellington W. | 32 | -0.41 | -0.39 | -0.13 |
| Woodhouse | 16 | +0.10 | +0.19 | +0.39 | Richmond Hill S. | 33 | -0.36 | -0.55 | -0.46 |
| Potternewton W. | 17 | +1.85 | +0.75 | -0.45 | Blenheim West | 34 | -1.51 | +0.56 | -1.83 |

groups. The Indians and Pakistanis show a pattern which, although tending towards the sectoral development of the Caribbeans, is much weaker in this respect. Their main increases appear to have been in the inner city, in Hyde Park, Potternewton East and Harehills (zones 15, 18 and 19) with weaker development in the sector extending from Blenheim West (zone 34) to Allerton (zone 10). This group also show a positive score south of the river in Armley (zone 13) and a strong increase in Holbeck (zone 22) for which the Caribbean population show negative standard score value.

The outer ring of growth is positively defined for the Irish group, the strongest growth being to the North East of the city. These "positive" increases extend into the centre of the city but the area of greatest coloured immigrant growth stands out as scoring negative values for the Irish group. Their lowest scoring zone, more than -2 standard deviations, is Westfield (28).

This analysis has shown that the coloured immigrant groups in Leeds have been "suburbanising" to varying degrees. The tendency to favour the north eastern sector of the city in all three examples shows that the old movement patterns established by the early "white" immigrants to the city may still be useful channels for the new immigrants trying to move away from the inner city areas. This tendency is most marked for what are probably the most aspiring groups, the West Indians and the Other New Commonwealth groups, many of the latter being Asians from the African continent (see Chapter 6) and "white" New Commonwealth immigrants from Gibraltar, Malta and Cyprus. On the other hand the main Asian group only shows tentative steps in that direction.

Much more than the other two groups, their increases are concentrated strongly on the inner city to the north-west and north-east of the city centre and to the south of the river in Holbeck and Armley. In all three cases growth into the outer suburban ring is very severely limited, into the owner occupier belts of the north and south west, and into the council house belts of the east and south. It is probably no surprise, therefore, that the expansion which has taken place to the north east has been through the housing and servicing of an area which has previous experience of other foreign people.

## 4.7 Measurement of residential segregation using dissimilarity indexes.

The extent to which certain population groups differ from the city-wide average and from each other can be demonstrated using the Index of Segregation and the Index of Dissimilarity. Duncan and Duncan (1955) showed that all the various indexes of segregation were related through the"segregation curve". This curve was obtained by the plotting of the cumulative percentage of the population of a distinct group for a number of zones, in order of magnitude from the largest percentage to the smallest against the corresponding percentage, for each zone, of the rest of the population. In this way the residential dissimilarity could be demonstrated visually and represented in precise mathematical terms. At that time, however, there appeared to be much discussion as to the correlative and predictive nature of the segregation index. Discussion now lies dormant as the index is accepted for what it is, an expression of the percentage of any given population

which would have to move residence if the proportion of residents in particular birthplace groups in each zone was to be made equal to the city wide proportion. That is, the situation where if 10% of a city's population was coloured then each zone would also be 10% coloured. Thus, the higher the score of one ethnic group on the segregation index then the greater the difference in residence pattern between that group and the group with which it is being compared, since more of a particular group would have to move home to even out the zonal situation to equal the city-wide situation.

The index of segregation and the index of dissimilarity are linked, as Duncan and Duncan (1955) and the following formulae show. The index of dissimilarity measures the difference in residential patterns between two specifically identified groups, in this case groups identified by birthplace, although a social class identification, for example, would serve a similar purpose. The index of segregation measures the amount of residential dissimilarity between one specifically identified group and the remainder of the population.

The index of dissimilarity, $D^{ef}$ in residential patterns of group e and group f is defined as follows:

$$D^{ef} = (100)(\tfrac{1}{2}) \sum_{i=1}^{n} \left| \left( \frac{K_i^e}{K_*^e} - \frac{K_i^f}{K_*^f} \right) \right| \qquad \ldots.(4.4)$$

where $K_i^e$ is the number of persons of ethnic group e in zone i

$K_*^e = \sum_{i=1}^{n} K_i^e$ is the sum over zones 1 to n of the numbers of persons in ethnic group e. There are n zones in the city so that this is the city total of persons in ethnic group e.

$K_i^f$ is the number of persons of ethnic group f in zone i

$K_*^f = \sum_{i=1}^{n} K_i^f$ is the city total of persons in ethnic group f.

$|\quad|$ is the absolute value function

The maximum value that the expression $\sum_{i=1}^{n} \left| \left(\frac{K_i^e}{K_*^e}\right) - \left(\frac{K_i^f}{K_*^f}\right) \right|$ can take is 2.00 and the minimum is 0.00. So we multiply by a $\frac{1}{2}$ to scale the index values between 1.00 and 0.00 and we multiply by 100 to make this scale 100 to 0. The value of 100 on the index of dissimilarity scale indicates that the two groups are maximally dissimilar in their residential distributions and a score of 0 indicates that they are minimally dissimilar in their residential patterns, in so far as the index measures differences in residential pattern between two groups. There is no one-to-one correspondence, of course, between a dissimilarity index value and a set of two residential distributions.

When the index of dissimilarity is computed between one ethnic group and all the others (the rest of the population) then it is conventionally called the index of segregation and is defined as follows:

$$D^{e\bar{e}} = (100)(\tfrac{1}{2}) \sum_{i=1}^{n} \left| \left(\frac{K_i^e}{K_*^e}\right) - \left(\frac{K_i^{\bar{e}}}{K_*^{\bar{e}}}\right) \right| \qquad \ldots(4.5)$$

where $\bar{e}$ defines the rest of the population apart from ethnic group e.

The values for the index of segregation for the city of Leeds in 1961, 1966 and 1971 are given in Table 4.11. It should be noted, in consulting these figures, that it is possible for the size of a group to affect the indexes. Very small groups such as the Old Commonwealth group may

be too small to stretch to one family per zone, for example, and may, therefore, give a falsely high index value.

Table 4.11 Index of segregation for Leeds C.B. 1961, 1966 and 1971.

| Birthplace Group | 1961 | 1966 | 1971 |
|---|---|---|---|
| Northern Ireland | 26.8 | 23.7 | 16.6 |
| Eire | | 27.6 | 21.5 |
| Caribbean | 72.4 | 71.4 | 63.8 |
| India | 41.9 | 53.5 | 58.6 |
| Pakistan | | 65.9 | 66.3 |
| Other New Commonwealth | 49.7 | 46.8 | 44.7 |
| Old Commonwealth | 22.6 | 30.0 | 22.6 |
| Foreign | 39.7 | 37.8 | 29.6 |
| Great Britain | 34.6 | 35.8 | 34.0 |

The values for the Northern Ireland/Eire group and the India/Pakistan group in 1961 are joint. The index shows that the West Indian immigrants were most segregated in 1961 with an index value of 72.4 implying that over 70% of their number would have to move residence to eliminate segregation. The Indian and Pakistani group were relatively unsegregated with an index value of 41.9. The only remaining group with an index value of over 40 in 1961 was the immigrants from the Other New Commonwealth countries. Both the "white" immigrant groups from Ireland and the old Commonwealth were fairly unsegregated with index values of 26.8 and 22.6 respectively, whilst the relative newness, in 1961, of much of the Foreign immigration shows up with a relatively high 39.7.

The 1966 results show up well within the trend of the decade despite the inadequacies of the 10% sample census.

These figures show the different degrees of segregation for the two Irish groups and for the Indian and Pakistani groups separately. The Southern Irish appear more segregated than the Northern Irish and the Pakistani group appears more segregated than the Indian. The segregation index of both these groups would seem to have risen in the five year period whilst that of the West Indian group fell marginally from 72.4 to 71.4. The index for the Other New Commonwealth group fell from 49.7 to 46.8 as did the Foreign born index values, from 39.7 to 37.8. Only the index for the Old Commonwealth group appears anomalous rising 8 points above its 1961 and 1971 values.

In 1971 the index is again calculated on the basis of a 100% population census. All the values fell in the decade apart from those for the Indians and the Pakistanis, which rose, and for the Old Commonwealth group which stayed at the same value as in 1961. The Caribbean group index fell from 72.4 to 63.8 indicating that in 1971 only 63% of this population group would have to move residence to eliminate segregation.

So while the general picture of the decade is one of generally falling indexes, except for the Indians and Pakistanis, the situation is far from one which holds a lot of promise for actual "integration" as opposed to segregation. The numbers of immigrants in the city rose sharply over the decade 1961 to 1971. So in numerical terms the problem or aim of achieving a situation of little or no segregation in the city became quite markedly worse. For example, in 1961 72% of the West Indian group would have had to move physically in certain specific directions to achieve an unsegregated situation. In numerical terms

this amounted to 1,574 persons. In 1971 the index of segregation for this group had fallen to 63.8 implying that 64% of the group's population would have to move residence to achieve an unsegregated situation. In numerical terms this amounts to a total of 2,298 persons, not including the substantial numbers of children born to this group in Britain and Leeds in the period. In other words the achievement of an unsegregated situation for the Caribbean group was over 700 persons further away in 1971 than it was in 1961. If this reasoning is carried through for all the New Commonwealth immigrant groups then it emerges that while, in 1961, 2,552 persons of this group would have to have moved to achieve an unsegregated situation, in 1971 this number is 7,049.

This sharply changing situation, which contrasts so sharply with the complacency engendered by the index is reflected also in the changing situation of the white immigrant groups. In 1961 2,293 Irish persons would have to have moved, just like the coloured groups, to achieve an unsegregated residential pattern. In 1971 despite increased numbers this was 2,017 persons. For the Foreign born 3,337 persons would have had to move residence in 1961, in 1971 this was 2,601.

Table 4.12 shows the index of dissimilarity for each birthplace group for the three census dates 1961, 1966 and 1971. This table compares the amounts of segregation between each individual birthplace group and all other groups individually. It allows an "inter coloured" group comparison which was not available from the segregation index.

These figures show the pattern of segregation as it

Table 4.12 Index of dissimilarity for all birthplace groups in Leeds C.B. 1961, 1966 and 1971

| 1961 | N. Ireland | Eire | West Indian | Ind/ Pak | Other New Com. | Old Com. | Foreign | British |
|---|---|---|---|---|---|---|---|---|
| N.Ireland) Eire ) | | | 19.0 | 50.8 | 29.9 | 22.5 | 32.8 | 27.8 |
| W. Indian | | | | 46.8 | 24.8 | 33.2 | 35.9 | 43.3 |
| Ind/Pak. | | | | | 44.3 | 61.3 | 40.5 | 73.6 |
| Other New Com. | | | | | | 37.9 | 34.8 | 51.1 |
| Old Com. | | | | | | | 27.8 | 23.7 |
| Foreign | | | | | | | | 40.6 |
| British | | | | | | | | |

| 1966 | N. Ireland | Eire | W. Ind. | Ind. | Pak. | Other New Com. | Old Com. | For. | Brit. |
|---|---|---|---|---|---|---|---|---|---|
| N.Ireland | | 21.6 | 66.9 | 50.5 | 58.9 | 42.4 | 26.9 | 39.8 | 24.9 |
| Eire | | | 56.5 | 40.8 | 47.4 | 34.0 | 32.6 | 35.9 | 29.0 |
| W. Indian | | | | 40.2 | 55.8 | 54.9 | 70.1 | 50.9 | 72.7 |
| Indian | | | | | 36.9 | 37.3 | 57.1 | 37.9 | 55.1 |
| Pakistani | | | | | | 39.5 | 67.3 | 53.8 | 67.4 |
| Other New Com. | | | | | | | 50.2 | 42.3 | 48.5 |
| Old Com. | | | | | | | | 43.6 | 31.3 |
| Foreign | | | | | | | | | 38.9 |
| British | | | | | | | | | |

| 1971 | N. Ireland | Eire | W. Ind. | Ind. | Pak. | Other New Com. | Old Com. | For. | Brit. |
|---|---|---|---|---|---|---|---|---|---|
| N.Ireland | | 11.9 | 55.6 | 48.9 | 55.2 | 35.4 | 28.2 | 25.1 | 18.2 |
| Eire | | | 50.5 | 42.9 | 51.0 | 29.5 | 31.7 | 25.0 | 23.0 |
| W.Indian | | | | 32.8 | 52.8 | 36.8 | 66.2 | 47.5 | 65.4 |
| Indian | | | | | 32.9 | 17.9 | 61.4 | 44.3 | 60.3 |
| Pakistani | | | | | | 39.0 | 70.7 | 60.8 | 68.0 |
| Other New Com. | | | | | | | 47.4 | 31.2 | 46.6 |
| Old Com | | | | | | | | 23.5 | 30.9 |
| Foreign | | | | | | | | | 18.2 |
| British | | | | | | | | | |

developed between the groups over the decade. The 1966 figures show more acutely the deficiencies of the 10% sample census in picking up relatively small populations and hence these particular figures should be judged within the constraints offered by the 1961 and 1971 index figures. Set against the generally falling levels of segregation shown by the segregation index these figures show up marked differences in the individual patterns. Thus while segregation levels for the West Indian group fell over the decade, Table 4.12 shows that in fact this was mainly the result of increased similarity in the distribution of the West Indians with other coloured immigrant groups and the Irish groups. In fact, there was increasing segregation between the West Indians and the British population, the Foreign born population, the Old Commonwealth group, the Other New Commonwealth group and the Pakistani group. For the Indians and Pakistanis the situation is less easy to read due to the joint 1961 figure which, simply because of the relative numbers of the groups must be weighted heavily towards the Indian population. At first sight increasing segregation between the West Indian population and the Pakistani population and decreasing segregation between the West Indian and Indian populations might be suggested. In effect, however, the situation has probably remained fairly stable for the West Indians and Indians but some increased segregation between the Pakistanis and West Indians may be suggested. Of all the coloured groups only the West Indians feature as having increased dissimilarity against the British population. Clearly, then, one of the main drawbacks of using such an index is that it does not begin from a common base level. Reference to the standard score maps (Figures 4.8 to 4.10) shows that the West Indians

had positive scores in zones 8 and 10 which also showed positive for the British born population. On the other hand the Indians and Pakistanis only showed a positive score in zone 10. Clearly this "advance" is of much greater significance from the point of view of the Indians and Pakistanis than it was for the West Indians. In other words the expansion of the Asian group into this North Eastern sector of the city is of much greater importance than that for the West Indians when the base from which the situation developed is considered. Therefore it may be suggested that, while in general terms the West Indians are less segregated than the Asian groups, these latter groups have made relatively greater strides towards desegregation in the decade. It may be further suggested that this has been the result, in the main, of the location decisions of the Indian group.

Of the "white" immigrant groups, the Foreign born have decreased their segregation vis-a-vis the British population. The Irish groups also have decreased this aspect of their segregation pattern in accordance with the weak decentralisation shown in the standard score maps.

The index figures given here are not absolute measures of the amount of segregation which exists in the city. They are measures only of the amount of segregation defined for the 34 zone system. This system is an aggregation of Enumeration Districts chosen partly for their immigrant content. It may, therefore, be instructive to examine the segregation indexes for this enumeration district scale to see to what extent selection of a set of predefined zones has affected the segregation levels suggested and to observe the segregation which exists at the level of approximately

1000 to 1,500 households which was the average size of the enumeration districts in 1966. To this end, and for comparison over a given time period, the 1961 enumeration districts were aggregated to the equivalent 1966 sizes to give a precisely comparable zoning system at the two dates 1961 and 1966. The index was, therefore, computed over 234 zones. (In fact there were 237 e.d.'s in the 1966 census, and four e.d.'s were consolidated in the actual Ward Library. This convention was followed in defining the e.d. level data for the city.) The 1961 and 1966 indexes of segregation for this zone system are given in Table 4.13.

Table 4.13 Indexes of segregation over 234 zones 1961 and 1966

| Birthplace | 1961 | 1966 |
|---|---|---|
| Northern Ireland | 31.6 | 55.7 |
| Eire | | 41.3 |
| West Indies | 74.4 | 81.7 |
| India | 50.6 | 71.5 |
| Pakistan | | 87.4 |
| Other New Com. | 42.2 | 70.2 |
| Old Commonwealth | | 75.2 |
| Foreign | 43.8 | 47.5 |
| Great Britain | 40.2 | 42.5 |

The figures in this Table should be directly compared with those in Table 4.11. It may be seen that all the indexes are higher at the enumeration district level than at the 34 zone level, some, like the Old Commonwealth index, markedly so. What does this imply? Firstly it implies simply that greater segregation of the different ethnic or birthplace groups exists at this scale as opposed to the larger areal units. It implies that the ethnic

composition of certain areas of the city comprising approximately 1000 households are rather more different from the overall city composition than the zones chosen partly for their ethnic homogeneity. This is probably not surprising in view of the relatively small numbers of immigrant groups in Leeds. But there are further conclusions. Immigrants tend to live close together, their expansion in the city has been shown to take place not in long distance moves but in short moves, filtering into areas close by the main centres of occupation. The 34 zone system was made up of aggregations of the 234 enumeration districts and it may be suggested, therefore, that while the segregation levels fall if the larger zones are considered it will require much larger scale residential movement of population to reduce them a lot further in the future. Indeed the future levels of physical segregation as shown by an index, using such a zone system as the 34 zone system used here, may increase as more enumeration districts in close proximity to those in which the segregation is shown to be strongly active undergo the slow change in racial composition as the immigrants slowly filter away from the ethnic centres. Probably still more sensitive measures are required by which to measure the real segregation which exists in the urban framework.

## 4.8 Conclusions

It has been the concern of this chapter to describe the spatial distribution of Leeds' immigrant population, not only in the static manifestations of the national population censuses but in terms of the dynamics between

the different population groups. Thus it was shown that those areas of the city which were identifiable in 1961 as areas of relative immigrant concentration formed the basis for immigrant settlement over the ten years from 1961 to 1971. In particular the New Commonwealth immigrant population, in growing from nearly 4,500 persons in 1961 to very nearly 12,000 persons in 1971, remained "concentrated" in these more central areas at almost the same level in 1971 as in 1961. Consequently the central city areas have experienced a large increase in New Commonwealth immigrants. This trend has been counterbalanced by the fairly rapid suburbanisation of the white indigenous population to the north-east and south-west of the city in particular. The only areas of the city's inner ring which have experienced relative "losses" of coloured population are those which have undergone extensive clearance of old housing.

It was shown in Figure 4.7 that, in the main, immigrant gain areas (that is, at more than the city average for the period 1961 to 1971) are white indigenous population loss areas (that is, once again at more than the city average for this period). It was shown, also, that the immigrant populations vary amongst themselves in terms of the degree to which they are moving away from city centre areas. The white immigrant groups, the Irish and the Old Commonwealth populations possibly demonstrate the extent to which colour and culture "encourage" New Commonwealth immigrants not to seek residence in the city's outer areas. It was demonstrated that the white immigrants had tended to follow the indigenous population trends to a markedly higher level than the coloured groups, while never achieving the amount of suburbanisation of the indigenous group. The West Indians were shown to be moving in the main towards the

north-east of the city while the Asian groups showed a tendency to move towards the older housing in the inner areas to the south-west of the city centre. Possibly the continued existence here of older, cheaper housing has been an influence in this. As far as the West Indians are concerned there still seems to exist, in Leeds, the old pathways to suburban existence carved by successive European and Jewish immigrations.

Finally it was shown, by means of segregation and dissimilarity indexes that overall levels of segregation have been falling, that is, in general the different birthplace groups show increasing similarity in terms of residence distribution. However, this reasonably promising prospect evaporates when total population figures are concerned and it is on this rather depressing note that it is wished to end this chapter. In 1961 the dissimilarity in residence location could have been eliminated, not withstanding what this implies, by the movement of 2,500 persons. In 1971 7,049 people would have to have changed their residence location to achieve an even spatial distribution. Thus the sheer volume of people affected by association with the adverse social indicators used in Chapter 3 has almost tripled, and this takes no account of the children born to these people in Britain who do not register as born overseas in the population censuses.

# CHAPTER 5

## Accounts for the New Commonwealth population in England and Wales, 1961 to 1966 and projections

### 5.1 Introduction

#### 5.1.1 Problems of measurement and concept

Much controversy surrounds the numbers of New Commonwealth immigrants in the United Kingdom. Yet our knowledge of these numbers is very imperfect. Some of the measurement instruments have been established only fairly recently, and are subject to change in definition, such as the International Passenger Statistics, and there are many gaps in the recording of persons moving in and out of the country. But probably the most serious problem that prevents us from using the information we have at hand to increase our knowledge of immigrant numbers and characteristics, present and future, is the lack of an adequate conceptual framework for the analysis of a population undergoing rapid change due to migration and natural increase. In demographic analyses of the past, for example, re-emigration has not been explicitly recognised (Thomas, 1970); in others it has been assumed that all migrants stay to reside in the country entered.

#### 5.1.2 Aims of the present study

This present work is an attempt to construct a model of the New Commonwealth immigrant population in England and Wales. This is done by applying the recently developed techniques of spatial demographic analysis (Rees and Wilson, 1973; Wilson and Rees, 1974) to the problem of measuring population change between the years 1961 and 1966. This necessitates the

development of population accounts tables which require the close specification of population stocks, migration flows, death counts, birth counts and flows involving combinations of all these elements. These are then put together into an historical accounts matrix and used as the basis of simple projection techniques which are developed more fully, and explained conceptually, in a later chapter.

It must be stated, at an early stage, that some of the estimation techniques used in this chapter are a good deal more rudimentary than these which are used by Rees and Wilson, and are a good deal cruder than the author might have wished. It is only possible to operationalise theory to a certain level, however, if the input data is extremely limited and unrefined in the first place.

The structure of population accounts and of the models derived from them have been fully explained in Wilson and Rees (1974) and Rees and Wilson (1977 )and, therefore, do not require reiteration here. However, some statement is necessary of the methods used here and the organisation of the steps used to construct the accounts.

Figure 5.1 represents a very simple demographic accounts matrix for four regions, England and Wales (1), Scotland (2), Northern Ireland (3) and the Rest of the World (4) (this table explicitly excludes births within the transition period). The population of interest is the stock of persons at time (t) on the right of the figure, residing in England and Wales. Certain events can now overtake this population as they move forward through the transition period (t) to (t+T), for example,

between
1961 to 1966. They may:

(1) die in England and Wales (box 1)

(2) survive in England and Wales (box 2)

(3) move to Scotland and survive (box 3) or die (box 4)

(4) move to Northern Ireland and survive (box 5) or die (box 6)

(5) move to the Rest of the World and survive (box 7) or die (box 8)

all flows, except (2) represent deletions from the stock at time (t) and summed, therefore, the row should add up to the time (t) stock.

But the population may increase in the period due to certain flows:

(1) immigration and survival to (t+T) from Scotland (box 9)

(2) immigration and survival to (t+T) from Northern Ireland (box 10)

(3) immigration and survival from the Rest of the World (box 11)

Therefore, summing this column, plus survivors from the original stock population, should give the t+T population stock (except, of course, for those persons born in the period).

Figure 5.1 A simple accounts matrix

| | (t+T) | Region of survival | | | | Region of death | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| (t) | | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | |
| Source region of migration flow | 1 | 2 | 3 | 5 | 7 | 1 | 4 | 6 | 8 | (t) |
| | 2 | 9 | | | | 12 | | | | |
| | 3 | 10 | | | | 13 | | | | |
| | 4 | 11 | | | | 14 | | | | |
| stocks | | t+T | | | | 15 | | | | |

### 5.1.3 Variable Definition

The first step, then, having outlined the framework, is to develop and specify a variable which will adequately cater for all alternative flows. Let K be the population number which is then disaggregated by a series of sub-and-super scripts as follows. The full variable may be stated as

$$ {}^{i}_{e}K_{T}^{ij\,x}{}_{s}(t,t+T) $$

and the subscripts and superscripts have the following meaning:

- i - before variable K refers to region of birth,
- e - an ethnic group label,
- i - after variable K refers to regional location at start of period under consideration or if preceded by $\mathcal{A}$, denotes region of birth in the period,
- j - after the variable K refers to regional location at time t+T, the end of the period, or if preceded by a $\delta$, denotes region of death in the period,
- x - label for sex, male or female,
- r - age group of person at time (t), or if the starting state is $\mathcal{B}(1)$, then r stands for age group of mother, at time of the birth,
- s - age group of person at time (t+T) or at time of death,
- t - the starting point of the period,
- T - the length of the period under consideration,
- t+T - ending point of the period.

In the context of this work the labels have to be given a specific meaning. Four main regions are recognised. These

| | | |
|---|---|---|
| are: | England and Wales | Region 1 |
| | Scotland | Region 2 |
| | Northern Ireland | Region 3 |
| | Rest of the World | Region 4 |

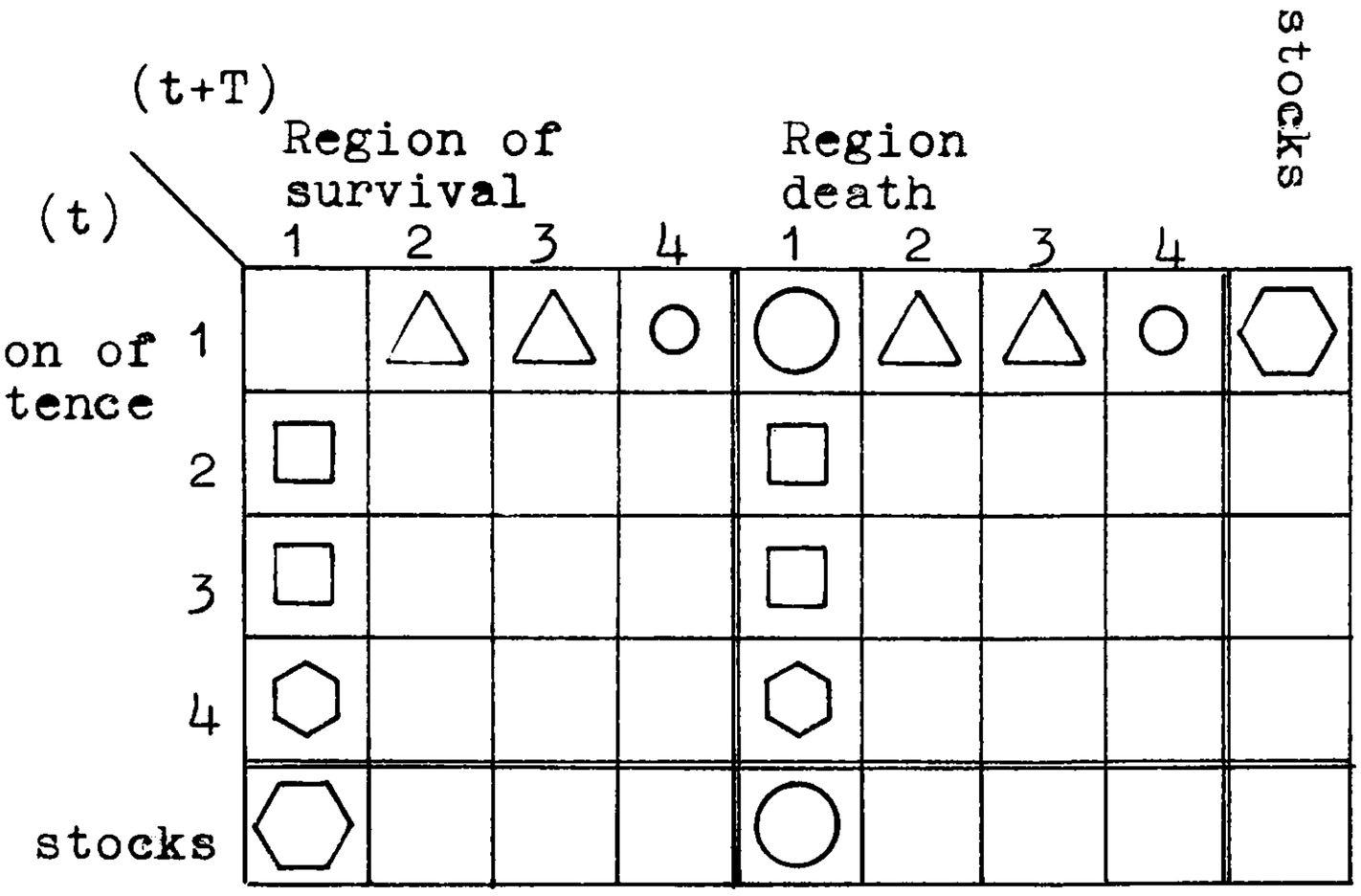
The ethnic group of interest consists of persons born into the New Commonwealth ethnic group. Thus persons born outside of the New Commonwealth countries but to parents of New Commonwealth birthplace are included in the analysis. The New Commonwealth is defined in official documents to be the Commonwealth of Nations less Britain and the three dominions that make up the Old Commonwealth, namely, Australia, New Zealand and Canada. In this chapter the New Commonwealth group is held to be one body of people. In fact there are probably as great differences within this group demographically as between this group and the British population. These demographic differences are examined in greater depth in the context of the City of Leeds.

The age groups used in the analysis are five years in length and it will therefore be necessary to disaggregate certain official information which are not recorded in this fashion.

### 5.1.4 Organisation of the account building procedure

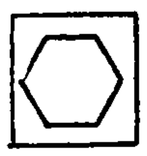
Figure 5.2 shows the means and order by which the accounting framework will be carried through. The building procedure for the accounts, excluding births in the period which are dealt with in a separate section, is a series of six steps, which are illustrated in the figure.

Figure 5.2 The accounts matrix building steps




The region labels refer to the regions specified previously. The matrix, as illustrated, is specific to region 1 (England and Wales). We are not concerned with, for example, survival of New Commonwealth persons in Scotland or Northern Ireland. These populations are of interest only when flows from or to them affect the New Commonwealth population of England and Wales.

Step 1 of the accounts building procedure then is illustrated by the shading thus:

Step 1 

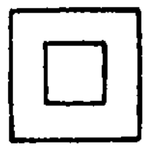
and involves the close specification of the start and end of period populations for the historical period 1961 and 1966, in the five year age groups and disaggregated by sex, males and females.

Step 2 is illustrated by the shading:

Step 2 

and involves the specification of an initial immigrating population to England and Wales, from the New Commonwealth, although technically this region is the Rest of the World. This involves the specification of total immigrants, the survivors of those immigrants in England and Wales in the period to the end of the period, and the numbers of persons who immigrated to and died in England and Wales in the period.

Step 3 is illustrated by the shading:

Step 3 

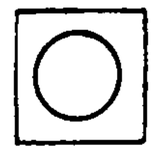
and involves the specification of the numbers of migrants, by age, belonging to the New Commonwealth group, from Scotland and Northern Ireland to England and Wales. Once again these migrants are divided up into those who survive in England and Wales to the end of the period and those who die in England and Wales before the end of the period.

Step 4 is illustrated by the shading:

Step 4 

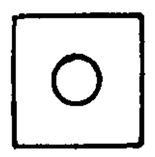
and involves the specification of migrants, of the New Commonwealth group, by age, between England and Wales and Scotland and Northern Ireland. Again migration and survival and migration and death are estimated for those migrants who will obviously be fairly few in number.

Step 5 is illustrated by the shading:

Step 5 

and involves initially an estimation of deaths to the New Commonwealth stock population of 1961 using an age specific death rate. This completes the column of deaths in England and Wales and allows the calculation of total deaths to this group in this region.

Finally, step 6, is illustrated by the shading:

Step 6 

and involves the calculation of the migrants from England and Wales to the Rest of the World of the original stock population of 1961. This total is then disaggregated into migration and survival, and migration and death.

Very simple iterative procedures are then used to balance the table from which rates may then be derived for the use with the projection model discussed in a later chapter.

The following sections of this chapter are concerned, therefore, with the completion of the accounts table through the six step procedure which has been described. This fairly lengthy data preparation exercise is justified in the final section where the accounts table, so derived, is used as a platform on which to "launch" the population projections which are the ultimate aim of the exercise.

## 5.2 Population stocks, 1961, 1966 and 1971: counts and adjustments

### 5.2.1 The 1961 New Commonwealth immigrant population

The net results of the population flows, which have been spelled out above, are reflected in the population stocks counted at certain points in time. Since so little is definitely known about the demographic features of the New Commonwealth population of England and Wales these population stocks for 1961, 1966 and 1971 assume vital importance. There are, however, considerable problems associated with their use.

There are two sources from which we may derive the 1961 stock population figures. These are Tables 2 and 5 of the Birthplace and Nationality Tables (G.R.O. 1964) Table 2 presents the numbers of persons, males and females, resident in England and Wales and born in New Commonwealth countries by nationality and citizenship. Table 5 presents the numbers of persons, males and females who were Commonwealth citizens resident in but born outside England and Wales by country of birth. None of these figures, for individual countries proves to be compatible with comparative figures from Table 2. The difference between the two population estimates for New Commonwealth countries is largely the numbers of persons who were born in each country but have assumed or obtained U.K. nationality. As would be expected the differences are fairly high for these countries which have recently obtained independence. These numbers include the "white" Indians and Pakistanis who have been the cause of much discussion in the past.

It would, of course, be desirable to exclude such elements from the measures of population stocks to be used here. This would overcome, at least in part, the problem of these "white" New Commonwealth immigrants. However, whilst the nationality and citizenship categorisation is probably effective for New Commonwealth countries it will be less so for the U.K. colonies and protectorates. The problem cannot be solved in an "across the board" basis such as is undertaken here.

We, therefore, propose to take as base population stock for 1961 the figures presented in Table 5 of the 1961 Birthplace and Nationality Tables. Table 5 supplies the numbers of persons, males and females, by 5 year age groups, born in New Commonwealth countries, colonies and protectorates, who were commonwealth citizens. While this has the disadvantage of excluding from our calculations persons with United Kingdom citizenship who have not yet acquired this by birth or descent, as well as those who have, it has two major advantages. These advantages are:

1. provides compatible information to the Commonwealth Immigrants Act (1962) Statistics
2. provides a rational basis for classification for both Commonwealth countries and Commonwealth colonies and protectorates.

The figures are presented in Table 5.1.

For similar arguments the same classification and definition is used for Scotland (Table 5.2). In both cases the full age breakdown is supplied.

TABLE 5.1 Persons of New Commonwealth citizenship resident in but born outside England and Wales 1961 Census date

| Age Group | A | | | B | | | C | | |
|---|---|---|---|---|---|---|---|---|---|
| | P | M | F | P | M | F | P | M | F |
| 0-4 | 11,215 | 5,735 | 5,480 | 8,893 | 4,546 | 4,347 | 20,108 | 10,281 | 9,827 |
| 5-9 | 15,541 | 8,102 | 7,434 | 11,267 | 5,745 | 5,522 | 26,808 | 13,847 | 12,961 |
| 10-14 | 16,438 | 8,785 | 7,653 | 9,369 | 4,635 | 4,734 | 25,807 | 13,420 | 12,387 |
| 15-19 | 19,567 | 10,428 | 9,139 | 12,106 | 5,880 | 6,226 | 31,673 | 16,308 | 15,365 |
| 20-24 | 32,525 | 19,261 | 13,264 | 34,041 | 17,685 | 16,356 | 66,566 | 34,946 | 29,620 |
| 25-29 | 40,074 | 27,014 | 13,060 | 41,373 | 23,281 | 18,092 | 81,447 | 50,295 | 31,152 |
| 30-34 | 34,519 | 23,017 | 11,502 | 32,715 | 19,750 | 12,965 | 67,234 | 42,767 | 24,467 |
| 35-39 | 27,173 | 16,439 | 10,734 | 23,044 | 14,144 | 8,900 | 50,217 | 30,583 | 19,634 |
| 40-44 | 20,269 | 11,762 | 8,507 | 15,112 | 9,415 | 5,697 | 35,381 | 21,177 | 14,204 |
| 45-49 | 18,803 | 10,204 | 8,599 | 10,078 | 6,080 | 3,998 | 28,881 | 16,284 | 12,547 |
| 50-54 | 16,964 | 8,881 | 8,083 | 6,492 | 3,713 | 2,779 | 23,456 | 12,594 | 10,862 |
| 55-59 | 12,898 | 6,463 | 6,435 | 4,051 | 2,140 | 1,911 | 16,949 | 8,603 | 8,346 |
| 60-64 | 9,422 | 4,388 | 5,034 | 2,891 | 1,401 | 1,490 | 12,313 | 5,789 | 6.524 |
| ⩾ 65 | 18,153 | 6,494 | 11,659 | 4,937 | 2,008 | 2,929 | 23,090 | 8,502 | 19,588 |
| Totals | 293,561 | 166,973 | 126,588 | 216,369 | 120,423 | 95,946 | 509,930 | 287,396 | 222,534 |

Source: Birthplace and Nationalities Tables, General Register Office, 1964

NOTE: The following abbreviations were used in Tables 5.1, 5.2 and 5.3

1. A - Persons born in New Commonwealth countries B - Persons born in New Commonwealth colonies and protector
   C - Persons born in New Commonwealth countries, colonies and protectorates
2. P - Persons M - Males F - Females

TABLE 5.2 Persons of New Commonwealth citizenship resident in but born outside Scotland 1961 census date

| Age Groups | A | | | B | | | C | | |
|---|---|---|---|---|---|---|---|---|---|
| | P | M | F | P | M | F | P | M | F |
| 0-4 | 854 | 446 | 408 | 635 | 313 | 322 | 1,489 | 759 | 730 |
| 5-9 | 1,209 | 655 | 554 | 624 | 317 | 307 | 1,833 | 972 | 861 |
| 10-14 | 1,194 | 629 | 565 | 324 | 187 | 137 | 1,518 | 816 | 702 |
| 15-19 | 1,101 | 593 | 508 | 256 | 146 | 110 | 1,357 | 739 | 618 |
| 20-24 | 1,649 | 1,002 | 647 | 518 | 275 | 243 | 2,167 | 1,277 | 890 |
| 25-29 | 1,781 | 1,228 | 553 | 406 | 207 | 199 | 2,187 | 1,435 | 752 |
| 30-34 | 1,449 | 903 | 546 | 295 | 147 | 148 | 1,744 | 1,050 | 694 |
| 35-39 | 1,231 | 664 | 567 | 262 | 132 | 130 | 1,493 | 796 | 697 |
| 40-44 | 1,057 | 483 | 574 | 172 | 94 | 78 | 1,229 | 577 | 652 |
| 45-49 | 1,016 | 490 | 526 | 163 | 80 | 83 | 1,179 | 570 | 609 |
| 50-54 | 992 | 511 | 481 | 135 | 71 | 64 | 1,127 | 582 | 545 |
| 55-59 | 869 | 405 | 464 | 144 | 67 | 77 | 1,013 | 472 | 541 |
| 60-64 | 495 | 233 | 262 | 128 | 60 | 68 | 623 | 293 | 330 |
| ≥ 65 | 1,044 | 366 | 678 | 315 | 128 | 187 | 1,359 | 494 | 865 |
| Totals | 15,941 | 8,608 | 7,333 | 4,377 | 2,224 | 2,153 | 20,318 | 10,832 | 9,486 |

Source: Birthplace and Nationality Tables, General Register Office, 1964

No allowance is made for under-enumeration in the 1961 census. While much argument has taken place both in Britain and the United States about the categories of poeple who form the main bulk of those who are not enumerated in censuses, the young, single, disadvantaged, there is no rational basis by which this can be allowed for in the 1961 census of Great Britain.

Finally, with reference to the 1961 base population data which are adopted here, it must be recognised that figures which refer to persons born in New Commonwealth countries, colonies or protectorates do not, by their very nature, include the children of these persons born in England and Wales prior to the census date. No estimation of these numbers is possible so we are forced to specifically ignore their existence. The problem of the numbers and ethnicity of coloured persons born in England and Wales is something which must receive greater attention in the future (Rees, 1972). In other words, the 1961 base population has been selected on the grounds of most simplicity of form and definition and in terms of the best possible coverage of the countries, colonies and protectorates involved.

### 5.2.2 The 1966 New Commonwealth immigrant population

As in 1961, two census estimates of the 1966 New Commonwealth born population of England and Wales and Scotland are available. These are the Birthplaces of the whole population from Table 6 of the G.B. Summary Tables (G.R.O.1967) and the Commonwealth Immigrant Tables (G.R.O. 1969a) in particular Table 5. Unfortunately, the citizenship and nationality classification of the 1961 census was dropped in 1966 in favour of a

birthplace classification only. This cuts down on complexity in the tables but it does mean that the 1961 and 1966 population stocks are not exactly comparable. However, it is felt that the differentials can be reduced as far as possible.

The two population estimates for 1966 differ by only 660 persons. This figure is well within the possible allowance made for rectification of the estimates between different volume publishing dates of these two estimates, therefore, the Commonwealth Immigrant Tables, being the most recent, are accepted as being correct.

It was said with reference to the 1961 census estimates that under-enumeration could not be taken into consideration. However, in 1966 not only can under-enumeration be allowed for but such were the levels of sample coverage that this becomes a necessity. It has been suggested that under-enumeration amongst several immigrant groups was fairly heavy (Rose, 1969) and that, for example as much as 35% of all Pakistani's living in England and Wales were missed by the census. Definite quantification is impossible but for general use the census itself supplies an overall estimation of the under-enumeration in England and Wales and Scotland, from which Table 5.3 for England and Wales derives. The census is much more vague concerning under-enumeration in Scotland but suggests that it may have been as little as 0.5%.

The first parts of Tables 5.4 and 5.6 supply the numbers of persons born in New Commonwealth countries resident in England and Wales and Scotland as they are presented in the

Table 5.3 Under-numeration in 1966 Sample Census

England and Wales

| Cause of Error | Approx pop. omitted from sample census | % proportion of population omitted |
|---|---|---|
| Due to deficiences in the Sample frame | 36,000 | 0.75 |
| New property not on valuation list - March, 1966 | 17,000 | 0.35 |
| Isolated Caravans, Vagrants, etc | 4,000 | 0.08 |
| Due to errors made during the 1966 Enumeration | | |
| Under-enumeration of people at addresses described as vacant, occupier-absent etc<br>Net under enumeration of people at other addresses | 10,000 | 0.20 |
| TOTAL | 67,000 | 1.38 |

Source: 1966 10% Sample Census Commonwealth Immigrant Tables

Table 5.4 Persons born in the New Commonwealth and resident in England Wales, 1966 census date

| | Persons born* in New Commonwealth countries resident in E. & W. 1966. Under enumeration not allowed for. | | | Persons born in New Commonwealth countries resident in E. & W. in 1966. Under-enumeration allowed for. | | |
|---|---|---|---|---|---|---|
| | Persons | Males | Females | Persons | Males | Females |
| 0-4 | 30,340 | 15,160 | 15,180 | 30,758 | 15,369 | 15,389 |
| 5-9 | 55,760 | 28,610 | 27,150 | 56,529 | 29,005 | 27,525 |
| 10-14 | 63,320 | 33,110 | 30,210 | 64,194 | 33,567 | 30,627 |
| 15-19 | 59,180 | 32,360 | 26,820 | 59,997 | 32,807 | 27,190 |
| 20-24 | 88,320 | 44,610 | 43,710 | 89,539 | 45,226 | 44,313 |
| 25-44 | 392,020 | 239,850 | 152,170 | 397,430 | 243,160 | 154,270 |
| 45-59 | 98,230 | 56,440 | 41,790 | 99,586 | 57,219 | 42,367 |
| 60-64 | 16,170 | 7,850 | 8,320 | 16,393 | 7,958 | 8,435 |
| 65 & over | 27,070 | 10,060 | 17,010 | 27,444 | 10,199 | 17,245 |
| Total | 830,410 | 468,050 | 362,360 | 841,870 | 474,510 | 367,361 |

Table 5.5 Persons born in the New Commonwealth and resident in Scotland, 1966 census date

| | Persons born* in New Commonwealth countries resident in Scotland 1966 Under-enumeration not allowed for | | | Persons born in New Commonwealth countries resident in Scotland 1966 Under-enumeration allowed for | | |
|---|---|---|---|---|---|---|
| | Persons | Males | Females | Persons | Males | Females |
| 0-4 | 1,900 | 860 | 1,040 | 1,910 | 864 | 1,046 |
| 5-9 | 2,730 | 1,360 | 1,370 | 2,744 | 1,367 | 1,377 |
| 10-14 | 2,390 | 1,160 | 1,230 | 2,402 | 1,166 | 1,236 |
| 15-19 | 1,930 | 1,060 | 870 | 1,940 | 1,065 | 874 |
| 20-24 | 2,170 | 1,140 | 1,030 | 2,180 | 1,146 | 1,035 |
| 25-44 | 7,830 | 4,740 | 3,090 | 7,869 | 4,764 | 3,105 |
| 45-59 | 2,520 | 1,320 | 1,200 | 2,533 | 1,327 | 1,206 |
| 60-64 | 640 | 210 | 430 | 643 | 211 | 432 |
| 65 & over | 1,220 | 480 | 740 | 1,226 | 482 | 744 |
| Total | 23,330 | 12,330 | 11,000 | 23,447 | 12,392 | 11,055 |

Note: *No citizenship or nationality is supplied in the 1966 census information - Source: Commonwealth Immigrant Tables Table 5 1966 10% Sample census and estimation

Commonwealth Immigrant Tables. The second parts of the Tables give the estimated numbers of these persons after under-enumeration has been taken into consideration. The figures supplied in the second parts of the tables have been taken as the 1966 population stocks in nine age groups.

Compatability with the 1961 and 1971 stock populations which are supplied by the census in (at least) 14 five year age groups, now has to be achieved. Consider the 1961 stock population. Any one of the five year age groups will have a large element of survival through to 1971 and in doing so will have survived through two additional five year periods. So any one five year age group (r) in 1966 will have had its origins in the (r-1) age group in 1961 and its destination in the (r+1) age group in 1971. So now consider the 25-44 year old age group of the 1966 stock population. This population group will have its origins in the 20-39 year group in 1961 and its destination in the 30-49 year group in 1971. By simply calculating the probabilities of a person being in any one of the four, 5 year groups comprising the aggregate 20-39 and 30-49 groups in 1961 and 1971 respectively we can achieve a full 14 age group breakdown for the 1966 stock population by the process of averaging out the two probabilities. The same method can be used for the 45-59 year old age group. So a full 14 age group breakdown of the 1966 stock population thus produced is given for England and Wales in Table 5.6, and for Scotland in Table 5.7.

Table 5.6 Persons born in New Commonwealth countries, colonies and protectorates resident in England and Wales in 1966 in 14 age groups

| Age Group | Males | Females | Persons |
|---|---|---|---|
| 0-4 | 15,369 | 15,389 | 30,758 |
| 5-9 | 29,005 | 27,525 | 56,530 |
| 10-14 | 33,567 | 30,627 | 64,194 |
| 15-19 | 32,807 | 27,190 | 59,997 |
| 20-24 | 45,226 | 44,313 | 89,539 |
| 25-29 | 67,550 | 48,441 | 115,991 |
| 30-34 | 73,215 | 44,738 | 117,953 |
| 35-39 | 59,866 | 34,865 | 94,731 |
| 40-44 | 42,529 | 26,226 | 68,755 |
| 45-49 | 25,469 | 17,413 | 42,882 |
| 50-54 | 18,516 | 13,981 | 32,497 |
| 55-59 | 13,234 | 10,973 | 24,207 |
| 60-64 | 7,958 | 8,435 | 16,393 |
| 65-71 | 10,199 | 17,245 | 27,444 |
| Totals | 474,510 | 367,361 | 841,871 |

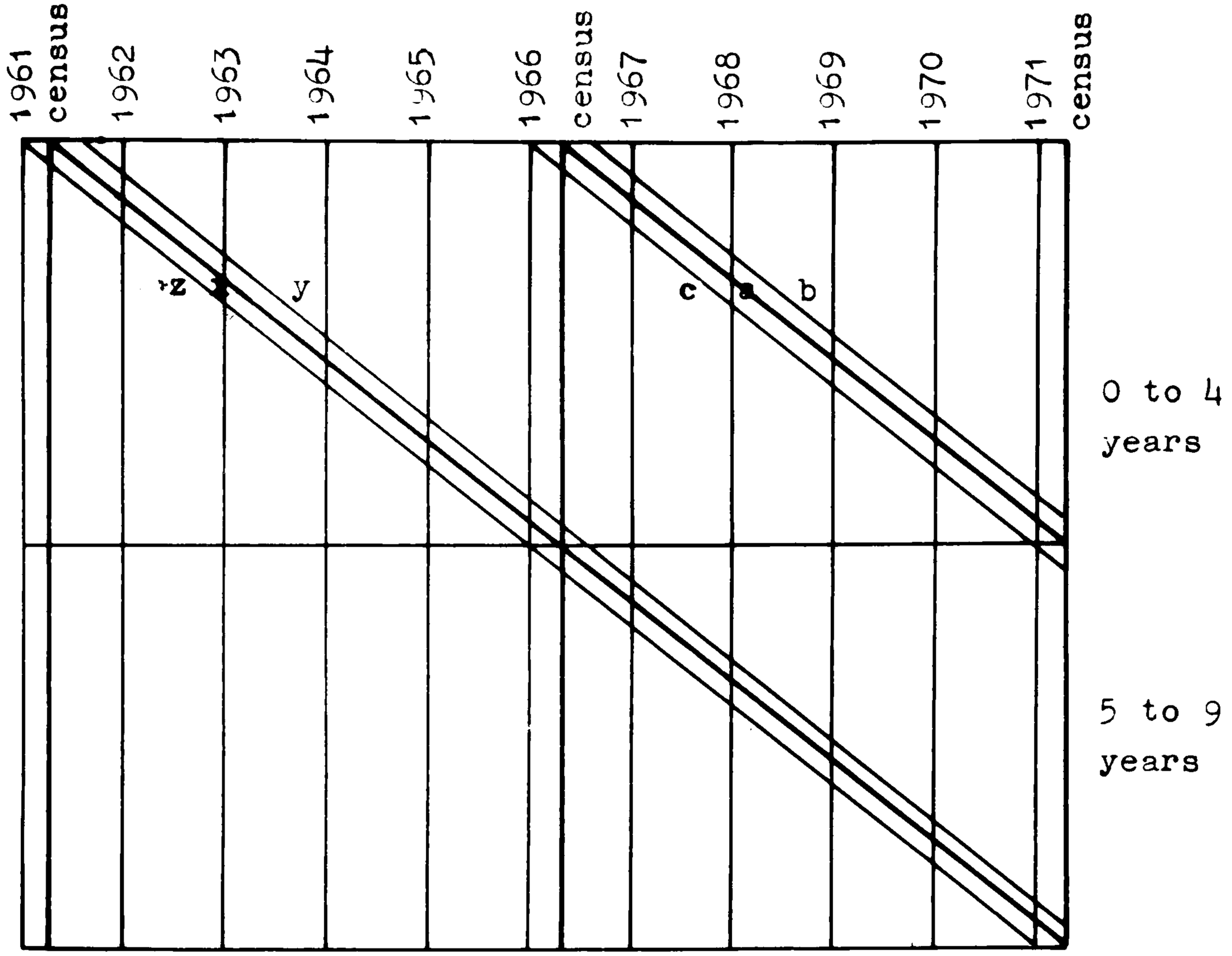
Table 5.7 Persons born in New Commonwealth countries, colonies or protectorates resident in Scotland in 1966 in 14 age groups

| Age Group | Males | Females | Persons |
|---|---|---|---|
| 0-4 | 864 | 1,046 | 1,910 |
| 5-9 | 1,307 | 1,377 | 2,744 |
| 10-14 | 1,166 | 1,236 | 2,402 |
| 15-19 | 1,065 | 874 | 1,939 |
| 20-24 | 1,146 | 1,035 | 2,181 |
| 25-29 | 1,529 | 971 | 2,500 |
| 30-34 | 1,403 | 766 | 2,169 |
| 35-39 | 1,028 | 695 | 1,723 |
| 40-44 | 804 | 673 | 1,477 |
| 45-49 | 486 | 436 | 922 |
| 50-54 | 434 | 411 | 845 |
| 55-59 | 407 | 359 | 766 |
| 65+ | 211 | 432 | 643 |
| Totals | 12,392 | 11,055 | 23,447 |

## 5.2.3 The 1971 New Commonwealth Immigration Population

At the time of analysis only the Advance Analysis of the 1971 census (O.P.C.S., 1972) is available. However, this volume does supply a birthplace categorisation along with a sex breakdown and year of birth classification. The figures in the census are rounded to the nearest five persons. In order to obtain the age/sex structure comparable with 1961 and 1966 three modifications to these figures have to be undertaken. The year of birth categorisation cannot be used directly to obtain age groups for the reason that there is not a one-to-one correspondence between calender years of age. The reason for this is that the census was taken at an intermediate point in the calender year. At subsequent censuses persons born before the census date in calender years will be in one annual age group and persons born after the April date will be in another. Figure 5.3 is a Lexis diagram which demonstrates this fact for the 1961 and 1966 birth cohorts. Lines A and X represent the birth and life line of two children, born on census date 1966 and census date 1961 respectively. They will, therefore, celebrate their fifth birthdays on the respective census dates five years in the future. Lines B and Y represent the birth and life lines of children born after census dates 1966 and 1961 respectively but still in these years. It may be noted that their lifelines end, in 1971 above the lines A and X and therefore they are still in the 0-4 years category in 1966 and the 5-9 years category in 1971. Similarly, the lines C and Z represent the birth and lifelines of children born

**Figure 5.3** A Lexis diagram to show the non-correspondance between year of birth and age groups.



before census dates 1966 and 1961. Note that their lifelines end below lines A and X and therefore they find themselves in the 5-9 years and 10-14 years categories respectively. Allowance for this effect is done by making two simple assumptions:

1. that births are evenly spread over the five years
2. in the census year births are evenly spread over the year.

The births in each census year, then, are modified to show births before the census and births after the census, therefore, taking into account the effect of birth date shown above.

To these figures for males and females are added the estimated numbers of males and females whose sex was "not known", a peculiar classification due presumably to the incorrect completion of the census form. These are added in proportion to the size of each age group. Finally we distribute the numbers of males and females whose birth year was not known between the age groups, using only pre-1961 age groups. It is assumed here that there is much less likelihood of a person not knowing his birth date after 1961 than before 1961.

From these adjustments the 1971 stock populations of England and Wales and Scotland are obtained. (Tables 5.8 and 5.9)

Table 5.8 Persons born in New Commonwealth countries resident in England and Wales in 1971

| Age Group | Females | Males | Persons |
|---|---|---|---|
| 0-4 | 13,718 | 14,366 | 28,084 |
| 5-9 | 29,997 | 32,561 | 62,558 |
| 10-14 | 47,569 | 56,450 | 104,019 |
| 15-19 | 53,459 | 69,144 | 122,603 |
| 20-24 | 62,387 | 58,551 | 120,938 |
| 25-29 | 60,887 | 62,681 | 123,568 |
| 30-34 | 59,680 | 83,882 | 143,562 |
| 35-39 | 48,799 | 73,047 | 121,846 |
| 40-44 | 37,840 | 57,168 | 95,008 |
| 45-49 | 26,952 | 40,308 | 67,260 |
| 50-54 | 18,413 | 26,522 | 44,935 |
| 55-59 | 14,568 | 18,273 | 32,841 |
| 60-64 | 11,161 | 11,981 | 23,142 |
| 65+ | 20,932 | 14,874 | 35,806 |
| Totals | 506,362 | 619,808 | 1,126,170 |

Table 5.9 Persons born in New Commonwealth countries resident in Scotland in 1971

| Age Group | Males | Females | Persons |
|---|---|---|---|
| 0-4 | 803 | 765 | 1,568 |
| 5-9 | 1,533 | 1,479 | 3,012 |
| 10-14 | 1,846 | 1,587 | 3,433 |
| 15-19 | 1,702 | 1,457 | 3,159 |
| 20-24 | 1,847 | 1,510 | 3,357 |
| 25-29 | 1,711 | 1,314 | 3,025 |
| 30-34 | 1,844 | 1,146 | 2,990 |
| 35-39 | 1,397 | 847 | 2,244 |
| 40-44 | 1,025 | 755 | 1,780 |
| 45-49 | 831 | 705 | 1,536 |
| 50-54 | 617 | 550 | 1,167 |
| 55-59 | 502 | 521 | 1,023 |
| 60-64 | 426 | 444 | 870 |
| 65+ | 655 | 951 | 1,606 |
| Totals | 16,739 | 14,031 | 30,770 |

**Figure 5.4** Age/sex pyramids for the New Commonwealth population stock of England and Wales and Scotland, 1961, 1966 and 1971.

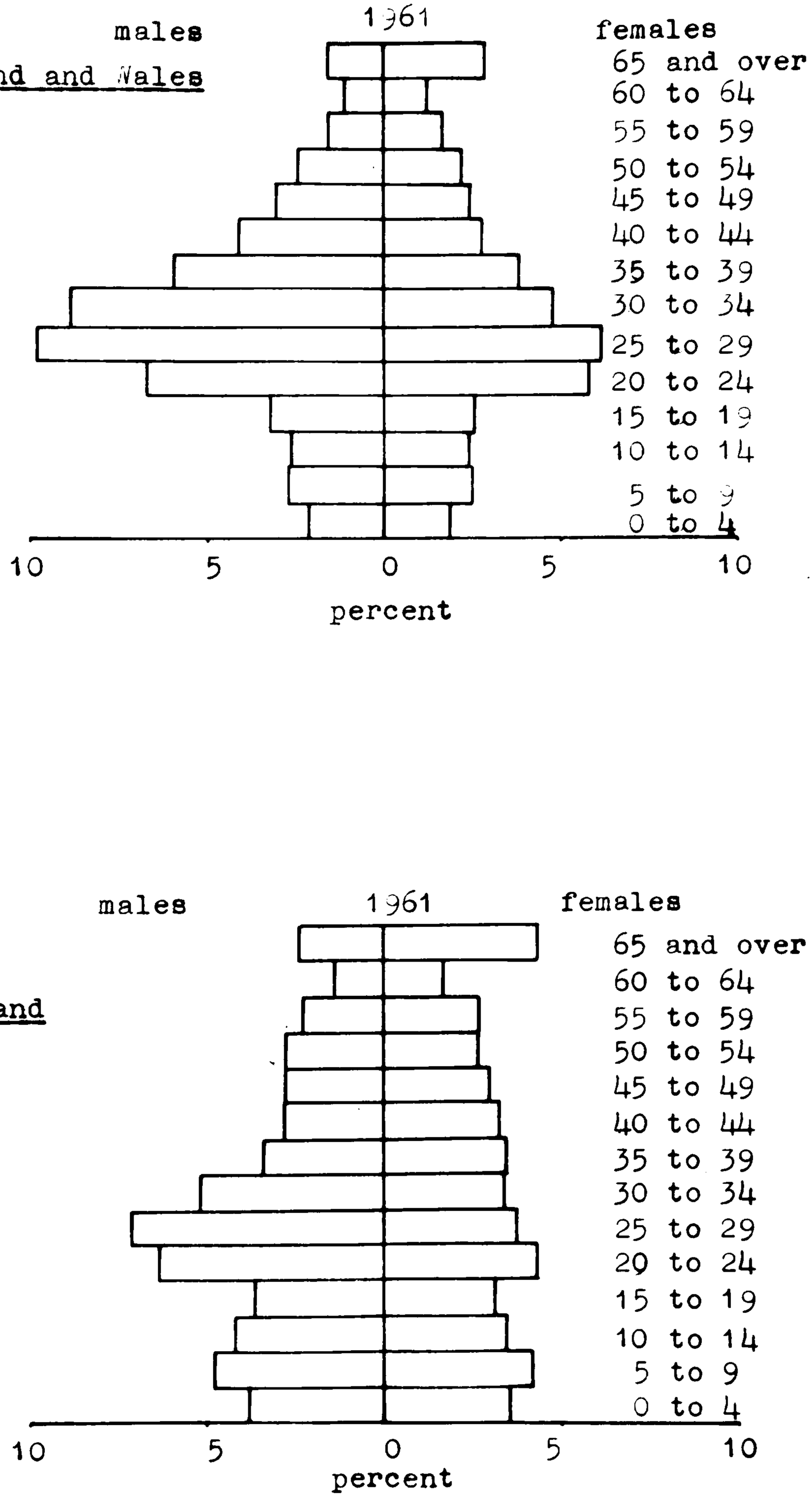


**Figure 5.4 (continued)**

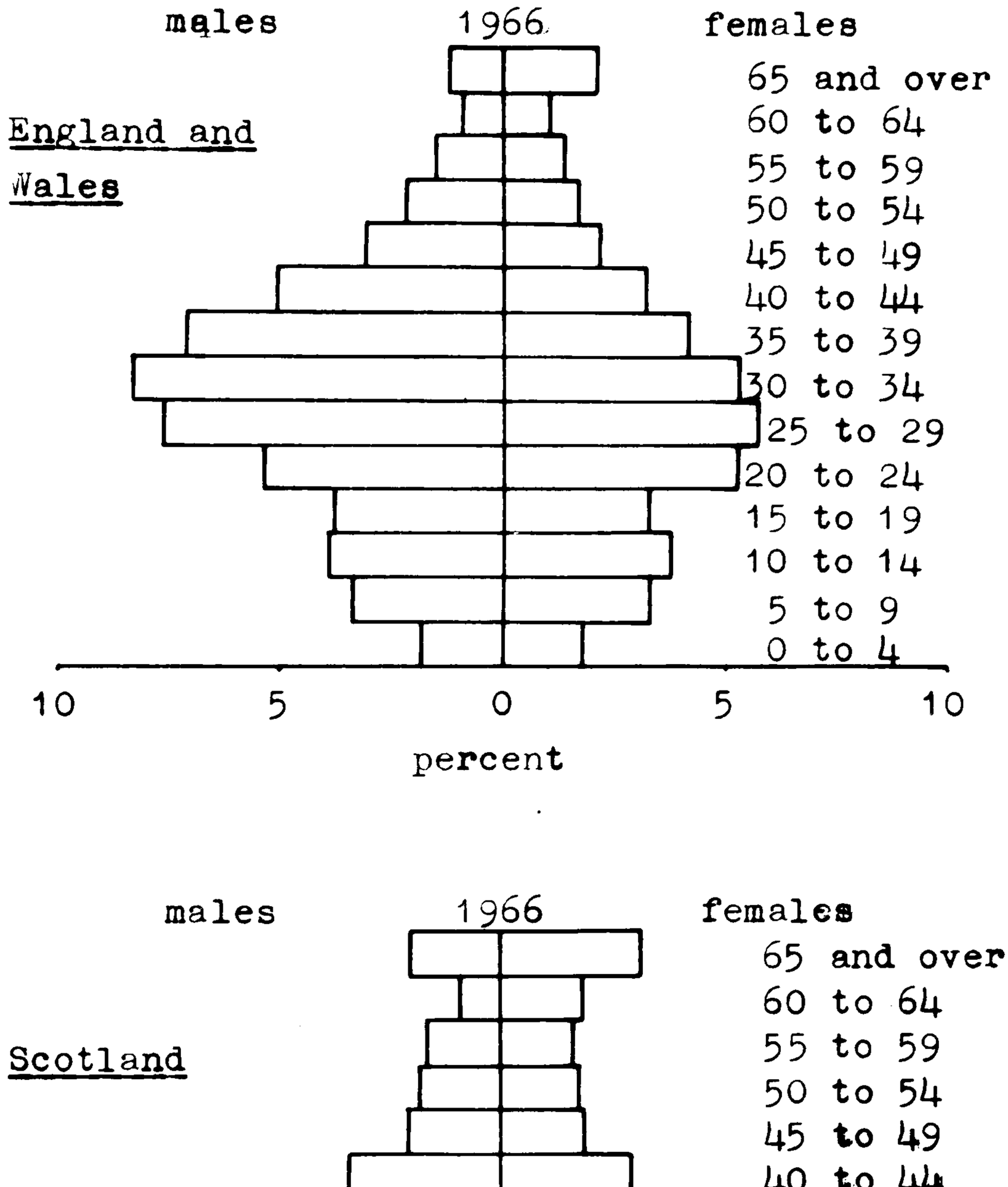
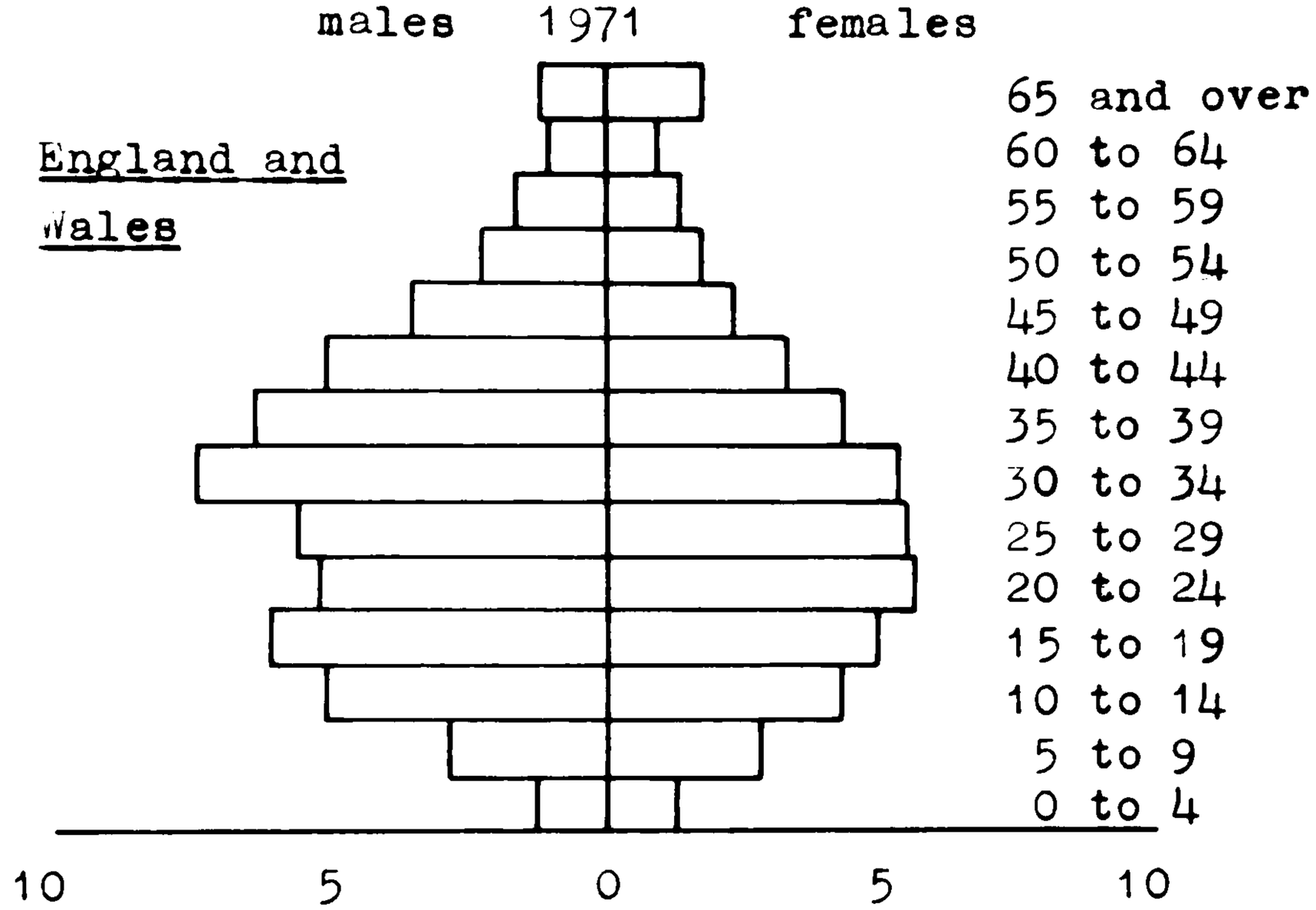
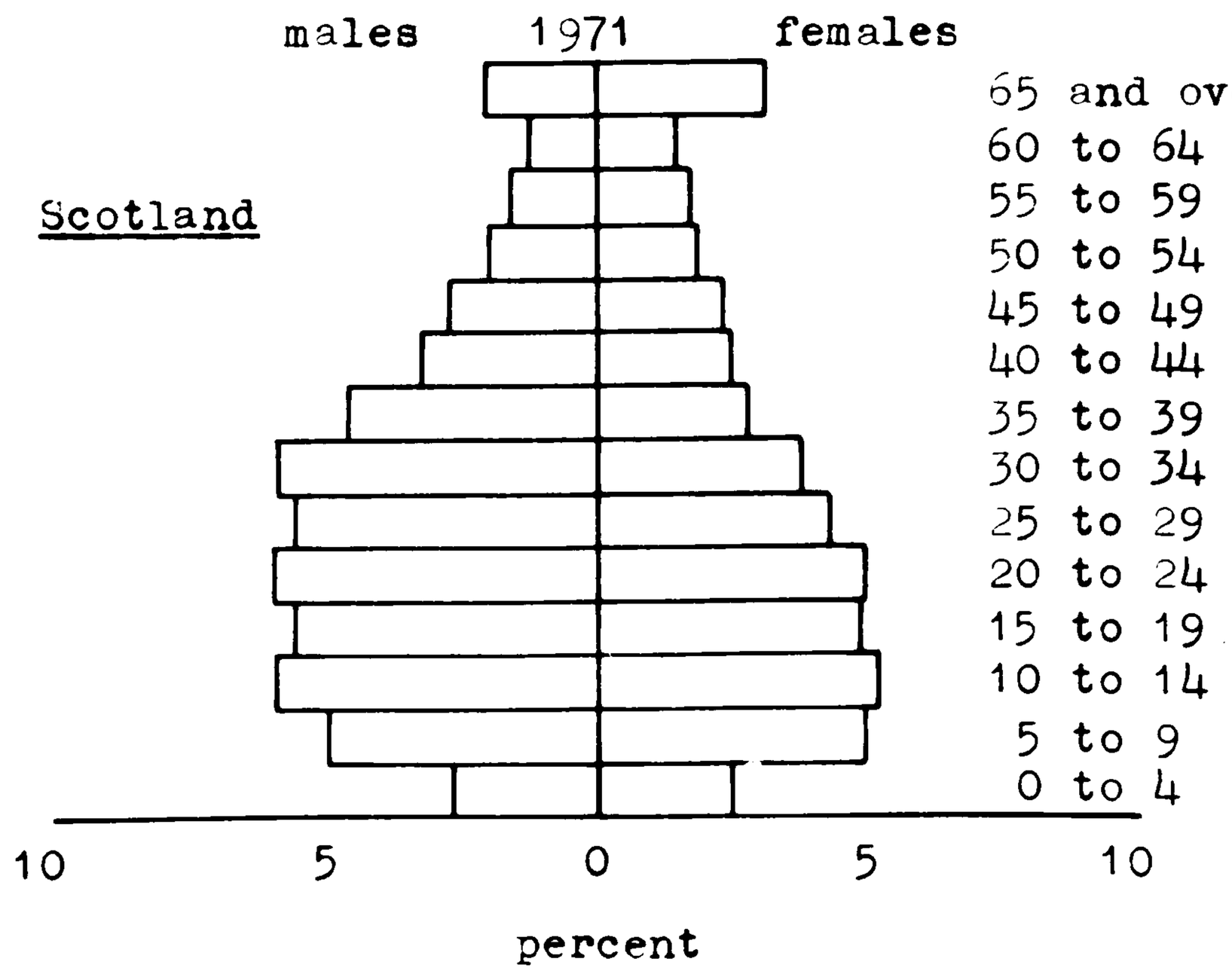


**Figure 5.4 (continued)**



## 5.3 Migration estimates

### 5.3.1 Data sources

Within the context of the population and migration accounts system the increase in the numbers of persons born in New Commonwealth countries and resident in England and Wales in the ten years under consideration is a result of a number of interacting flows. Increases occur through the numbers of persons in certain ethnic categories entering the country, numbers which are decreased slightly by the death of these persons after entering the country and deaths of the stock population. Decreases occur through the out-migration or re-migration of these persons and by the out-migration between the census dates of persons recorded as being resident in England and Wales at a former census date. For example, a person entering the country between 1961 and 1966 census dates may re-migrate before 1966 census date and, therefore, will not have been recorded in any census. However, if this person survived in England and Wales until 1966 census date and out-migrated after that date then he or she will have become part of the 1966 stock population who out-migrated. Two types of migration data can be distinguished, therefore. The 1966 census of England and Wales recorded one year and five year migrants by country of birth (G.R.O. 1968 ), that is, it recorded persons who migrated into Great Britain over the year at five years prior to the 1966 census date and who survived in Great Britain to be recorded in the census. The 1971 Census of Great Britain Migration Tables are not yet available. However, the 1971 1% sample Summary Tables (O.P.C.S. 1974) do record persons by place of birth by year

of entry to Great Britain which can be made analogous to the 1966 Migration Tables. These data supply estimates of migration and survival to the 1971 census date of migrants entering the country in single years from 1955.

This data, therefore, forms a migration and survival stock population with which we can compare the other kind of migration data available for these ten intercensal years. This second sort of migration data consists of "flow" information, that is, it is a record of the events of "crossing the border" and as such forms a migration flow rather than a migration and survival stock. This data is available from two main sources, the Commonwealth Immigrant Act (1962) Statistics and the Registrar General's Statistical Review of England and Wales, migration tables ( O.P.C.S. annual) These latter data are available only from 1964 onwards and only classified by country of last residence. In 1966 a citizenship classification was added which allows persons of Commonwealth citizenship to be distinguished. The former data series is essentially a more useful set if only because of the earlier commencement of the record. A country of birth criterion is not available from either source. The Commonwealth Immigrant Act (1962) Statistics distinguish persons on a "country issuing passport" basis which is not strictly comparable with either country of birth or citizenship. Basically, then, one is faced with a considerable amount of data which is not compatible. The migration stock populations are expressed according to a country of birth criterion while the migration flow data can be expressed either according to a citizenship or country issuing passport basis but not

country of birth. The initial task, then, is the selection of a set of migration flow data which approximates, as nearly as possible, the migration stock definition and which most closely reflects the intention of permanent migration.

Table 5.10 presents the data on migration flows available from these two sources. The Commonwealth Immigrant Act (1962) Statistics have been pruned to provide as closely as possible for persons who were likely to survive in the United Kingdom until the census dates. From the ten available categories have been excluded:

1. Visitors for three months or less
2. Visitors for more than three months
3. Diplomats and officials (and their dependants)
4. Passengers in transit
5. Persons joining crews of ships or aircraft
6. Persons returning to the U.K. from temporary absence abroad

The four remaining categories for permanent settlement, therefore, are:

1. Students
2. Holders of employment vouchers
3. Dependants accompanying or coming to join the head of the household
4. Persons coming for settlement not included elsewhere

Students have been specifically included since the length of courses and the occurence of the censuses in the middle of academic years means that the vast majority of these persons,

Table 5.10 In-migration to the United Kingdom between the years 1962 and 1971

| Year of Entry | A | B | C | D |
|---|---|---|---|---|
| 1962 | 55,808 | NA | NA | NA |
| 1963 | 72,441 | NA | NA | NA |
| 1964 | 70,884 | 84,200 | NA | 73,100 |
| 1965 | 66,032 | 82,300 | NA | 72,600 |
| 1966 | 54,016 | 76,100 | 50,800 | 64,600 |
| 1967 | 67,193 | 86,100 | 58,500 | 74,100 |
| 1968 | 67,762 | 88,400 | 57,900 | 71,800 |
| 1969 | 53,070 | 72,900 | 49,500 | 63,900 |
| 1970 | 48,329 | 70,400 | 41,700 | 60,100 |
| 1971 | 17,138 | | | |

Notes: Column A : Commonwealth Immigrant Act (1962) Statistics. New Commonwealth countries only issuing passports

Column B : Registrar General's Statistical Review, migration tables. All citizenships, last place of residence.

Column C : Registrar General's Statistical Review, migration tables. Commonwealth Citizenship only and last place of residence. New Commonwealth countries.

Column D : Registrar General's Statistical Review, migration tables. Commonwealth Citizenship, No country of last residence.

even entering the country in 1962, will have been present in 1966. Full explanation of the criteria on which the other series are based is given in the notes.

There exist, therefore, a variety of estimates of the migration flows, but it is not in fact impossible to reconcile them. For example, the difference between the estimates of Column B and Column C is clearly attributable to the fact that not all persons entering the United Kingdom from New Commonwealth countries held Commonwealth citizenship. This situation also applies to the difference in estimates between Column D and Column C of Table 5.10.

Similarly the relatively smaller differences between the estimates of Column A and Column B reflects the fact that relatively small numbers of New Commonwealth citizens will have entered the United Kingdom from countries other than those in which they were born. The whole situation really calls for a rationalisation on the part of official information collection and the recording of country of birth and citizenship together. One of the few implicitly acknowledgeable facts with which one can approach the Registrar General's figures is that there will have been no "coloured" immigration from Old Commonwealth countries. Being forced to accept one of these sources, then, lays one open to a variety of criticism. However, we believe that by selecting the Commonwealth Immigrant Act (1962) Statistics, that is, the four categories stated above and excluding persons holding passports issued by Old Commonwealth countries, we are obtaining the closest possible estimate of persons from the New Commonwealth who came to the United Kingdom for permanent settlement or settlement over a five year census period. The figures

in full for the flow categories are given in Table 5,11.

### 5.3.2 Conversion of the Commonwealth Immigrant Act (1962) Statistics to a usable data series

For the requirements of the present analysis it is necessary for the migration flow information to be rationalised to account for males and females entering the United Kingdom and later England and Wales. It is also required that some estimates be obtained of the age structure of the migrants. The first step in achieving this structure is the dividing of the "children" category into male and female categories. The major difficulty to be avoided here is the structuring of this children category in the manner in which the rest of the migration data is structured. There is clearly a large sexual imbalance in the figures presented in Table 5.11. There is not however, any reason why the children categories should be structured in a similar manner since the sex balance clearly depends on the nature of each migration category, a matter which affects adult selection rather than children. In effect, then, we must look outside the migration flow data for some indication of how to disaggregate the "children" (under 16) category. The migration stock data available from the 1966 and 1971 censuses is not particularly useful since no age-disaggregation is available and this would tend to perpetuate the sex imbalance nature of the migration flow. Instead the proportions of males and females in the 1966 and 1971 stock populations are used aggregated for the age groups 0 to 4 years, 5 to 9 years, 10 to 14 years and 15 to 19 years. In other words the "children" flow is disaggregated to males and

Table 5.11 In-migration to the United Kingdom of persons holding New Commonwealth passports between 1962 and 1971

| Year of Entry | Students | | | Voucher Holders | | | Dependants | | | Others | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Males | Females | Children | Males | Females | Children | Males | Females | Children | Males | Females | Children |
| 1962 | 15,220 | 5,726 | 1,456 | 7,092 | 1,342 | - | 466 | 7,398 | 8,572 | 1,272 | 3,880 | 2,884 |
| 1963 | 10,742 | 4,567 | 1,061 | 26,603 | 2,075 | - | 773 | 10,516 | 13,170 | 586 | 1,314 | 1,034 |
| 1964 | 11,718 | 5,377 | 949 | 11,355 | 2,533 | - | 1,186 | 12,681 | 21,871 | 776 | 1,489 | 949 |
| 1965 | 7,591 | 4,107 | 684 | 9,326 | 2,799 | - | 1,419 | 13,965 | 23,844 | 803 | 1,071 | 423 |
| 1966 | 7,686 | 4,249 | 472 | 4,164 | 1,004 | - | 1,327 | 12,109 | 25,694 | 858 | 756 | 697 |
| 1967 | 5,896 | 3,210 | 439 | 3,807 | 909 | - | 2,098 | 13,216 | 34,769 | 1,084 | 917 | 848 |
| 1968 | 7,264 | 3,880 | 415 | 3,581 | 772 | - | 1,010 | 14,253 | 31,544 | 3,231 | 1,812 | - |
| 1969 | 7,779 | 4,691 | 409 | 2,777 | 746 | - | 587 | 10,962 | 20,801 | 2,412 | 1,906 | - |
| 1970 | 8,852 | 5,644 | 432 | 2,413 | 754 | - | 582 | 8,976 | 16,245 | 2,697 | 1,734 | - |
| 1971 | 3,148 | 2,099 | 165 | 644 | 204 | - | 261 | 3,102 | 5,452 | 1,361 | 702 | - |
| Total 1962 to census date 1966 | 47,833 | 21,193 | 4,307 | 56,755 | 9,084 | - | 4,286 | 48,596 | 76,022 | 3,723 | 8,006 | 5,529 |
| Total 1966 to census date 1971 | 38,063 | 22,357 | 2,175 | 16,007 | 4,054 | - | 5,423 | 58,582 | 125,940 | 11,357 | 7,575 | - |
| Total 1962 to census date 1971 | 85,896 | 43,550 | 6,482 | 71,762 | 13,138 | - | 9,709 | 107,178 | 201,962 | 15,080 | 15,581 | 6,835 |

| | |
|---|---|
| Overall Total 1962 to 1971 census date | 577,173 |
| Overall Total 1962 to 1966 census date | 284,334 |
| Overall Total 1966 census date to 1971 census | 292,839 |

females according to the proportions shown in the population to which they have added in each census period. Table 5.12 supplies these stock population proportions.

Table 5.12 Males and females aged 0 years to 19 years in 1966 and 1971 in England and Wales

| Age Group | 1966 Males | 1966 Females | 1971 Males | 1971 Females |
|---|---|---|---|---|
| 0-4 | 15,160 | 15,180 | 14,366 | 13,718 |
| 5-9 | 28,610 | 27,150 | 32,561 | 29,997 |
| 10-14 | 33,110 | 30,210 | 56,450 | 47,569 |
| 15-19 | 32,360 | 26,820 | 69,144 | 53,459 |
| Total | 109,240 | 49,360 | 172,521 | 144,743 |
| Proportions Male/Female | 0.5236 | 0.4764 | 0.5437 | 0.4563 |

Sources: Sample Census 1966, Great Britain, Commonwealth Immigrant Tables, London, HMSO

Census of Great Britain, 1971. Advance Analysis. (O.P.C.S. 1972)

Those proportions can now be multiplied into the migration flow figures for children for each year, using the proportions from the 1966 census for the years 1962 to census date 1966 and the proportions from the 1971 census for the years census date 1966 to census date 1971, in order to obtain males and females under the age of 16 years entering the United Kingdom between 1962 and census date 1971 for permanent settlement.

These figures are given in Table 5.13.

Table 5.13 Estimates of males and females under 16 years entering the U.K. between 1962 and 1971

| Year of Entry | Students | | Dependants | | Others | |
|---|---|---|---|---|---|---|
| | Males | Females | Males | Females | Males | Females |
| 1962 | 763 | 693 | 4489 | 4083 | 1510 | 1374 |
| 1963 | 556 | 505 | 6892 | 6273 | 542 | 492 |
| 1964 | 497 | 462 | 11454 | 10417 | 497 | 452 |
| 1965 | 358 | 326 | 12487 | 11357 | 222 | 201 |
| 1966 | 247 | 225 | 13453 | 12241 | 364 | 333 |
| 1967 | 239 | 200 | 18880 | 15889 | 461 | 387 |
| 1968 | 226 | 189 | 17128 | 14416 | - | - |
| 1969 | 222 | 187 | 11295 | 9506 | - | - |
| 1970 | 235 | 197 | 8821 | 7424 | - | - |
| 1971 | 90 | 75 | 2964 | 2488 | - | - |
| Total 1962 to census date 1966 | 2,256 | 2,051 | 39812 | 36210 | 2896 | 2633 |
| Total census date 1966 to census date 1971 | 1,177 | 998 | 68056 | 57884 | 700 | 606 |
| Overall Totals | 3,433 | 3,049 | 107868 | 94094 | 3596 | 3239 |

Consequently the 1962 to census date 1971 Commonwealth Immigrant Act (1962) Statistics become:

Table 5.14 Persons holding passports issued by New Commonwealth countries entering the United Kingdom between 1962 and census date 1971.

| Year of Entry | Persons | Males | Females |
|---|---|---|---|
| 1962 | 55,308 | 30,812 | 24,496 |
| 1963 | 72,441 | 46,699 | 25,742 |
| 1964 | 70,884 | 37,483 | 33,401 |
| 1965 | 66,032 | 32,206 | 33,826 |
| 1966 | 59,016 | 28,099 | 30,917 |
| 1967 | 67,193 | 32,465 | 34,728 |
| 1968 | 67,762 | 32,440 | 35,322 |
| 1969 | 53,070 | 25,070 | 27,998 |
| 1970 | 48,329 | 23,600 | 24,729 |
| 1971 | 17,138 | 8,468 | 8,670 |
| Total 1962 to Census date 1966 | 284,334 | 156,561 | 127,773 |
| Total census date 1966 to census date 1971 | 292,839 | 140,783 | 152,056 |
| Total 1962 to Census date 1971 | 577,173 | 297,344 | 279,829 |

As a final adjustment to this data series some estimate has to be obtained of the in-migration of persons for permanent settlement in 1961. No official data of the quality of that after 1962 is available so we are forced to accept an estimate from the Registrar General's Statistical Review (Commentary) 1965, (G.R.O. 1968[a]) of 130,000 persons. This is in broad agreement withe estimate in Eversley and Sukdeo (1969) of 136,400 "commonwealth coloured immigrants" arriving in that year. Unfortunately this figure has to be accepted at face

value. There is no way of checking it against the definitions used to define permanent migration for the rest of the data series. Male/female disaggregation of this figure is achieved simply by using the proportions of males and females entering the United Kingdom between the years 1962 and census date 1966. These proportions are obtained from Table 5.14 to give:

Males = 0.5506

Females = 0.4494

The aggregate total of 130,000 persons in-migrating in 1961 now becomes:

Males = 130,000 x 0.5506 = 71,630

Females = 130,000 x 0.4494 = 58,370

The final modification to these figures is the exclusion of persons entering before the 1961 census date on the 23/24th of April that is only the persons entering in the last 252 days of 1961. The assumption is made that migration took place evenly over the year so that these estimations can be obtained from the sums:

Males = 71,630 x 252/365 = 49,454

Females = 58,370 x 252/365 = 40,299

A full series of data for the two census periods is now available and is presented in Table 5.15.

Table 5.15 In-migration of persons holding New Commonwealth passports to the United Kingdom during the census periods 1961 to 1966 and 1966 to 1971

| Year of Entry | Persons | Males | Females |
|---|---|---|---|
| 1961 | 89,753 | 49,454 | 40,299 |
| 1962 | 55,308 | 30,812 | 24,496 |
| 1963 | 72,441 | 46,699 | 25,742 |
| 1964 | 70,441 | 37,483 | 33,401 |
| 1965 | 66,032 | 32,206 | 33,826 |
| 1966 | 59,016 | 28,099 | 30,917 |
| 1967 | 67,193 | 32,465 | 34,728 |
| 1968 | 67,762 | 32,440 | 35,322 |
| 1969 | 53,070 | 25,072 | 27,998 |
| 1970 | 48,329 | 23,600 | 24,729 |
| 1971 | 17,138 | 8,468 | 8,670 |
| Total census date 1961 to census date 1966 | 374,087 | 206,015 | 168,072 |
| Total census date 1966 to census date 1971 | 292,839 | 140,783 | 152,056 |
| Total census date 1961 to census date 1971 | 666,926 | 346,798 | 320,128 |

5.3.3 Estimation of in-migration to England and Wales, Scotland and Northern Ireland

The statistics finally derived above (Table 5.15) are supplied for the United Kingdom, thus comprising the countries of England and Wales, Scotland and Northern Ireland. A means

now has to be devised to obtain estimates of the persons who migrated to each of these individual countries within the aggregate total. In most cases this sort of disaggregation would be achieved based simply on the numbers of persons born in particular categories resident in each country in 1961. This approach is not very satisfactory in this case and another hypothesis may be developed. Migration has taken place to the United Kingdom. Some of these migrants will have died in the United Kingdom, some will have re-migrated. If we assume that these deaths and out-migration rates are the same over England and Wales, Scotland and Northern Ireland then we can, with reasonable confidence, disaggregate the flow data of Table 5.15 in similar proportion to the number of five year migrants born in New Commonwealth countries recorded in each of the constituent countries of England and Wales in 1966. The migration and survival figures, and the proportions of the total migration and survival for each individual country are given in Table 5.16 for the first census period.

Table 5.16 Migration and survival of New Commonwealth born migrants to England and Wales between census dates 1961 and 1966

| Country of Residence | Persons | | Males | | Females | |
|---|---|---|---|---|---|---|
| | No | Proportion of Total | No | Proportion of Total | No | Proportion of Total |
| England & Wales | 284,919 | 0.9725 | 164,672 | 0.9713 | 120,247 | 0.9739 |
| Scotland | 6,965 | 0.0238 | 4,151 | 0.0245 | 2,814 | 0.0229 |
| Northern Ireland | N.A. | 0.0037 | N.A. | 0.0042 | N.A. | 0.0032 |
| | 291,884 | 1.0000 | 168,823 | 1.0000 | 123,061 | 1.0000 |

Note: The figures for Northern Ireland were not available to the author at time of writing. Consequently migration to Northern Ireland is estimated through the 1961 census figures using the relationship between the estimate by this method and the estimate by the above method for Scotland to modify the Northern Ireland estimate.

In other words, the numbers of migrants from the Rest of the World zone in the first period is disaggregated according to the number of persons who were recorded as being five year migrants to each country comprising the United Kingdom in 1966.

These figures are given in Table 5.17.

Table 5.17 Persons holding New Commonwealth passports entering England and Wales, Scotland and Northern Ireland between 1961 and 1966 census dates.

| Country of Destination | In-migration | | |
|---|---|---|---|
| | Persons | Males | Females |
| England and Wales | 363,788 | 200,102 | 163,685 |
| Scotland | 8,896 | 5,047 | 3,849 |
| Northern Ireland | 1,403 | 865 | 538 |
| Totals | 374,087 | 206,015 | 168,072 |

### 5.3.4 Age-disaggregated case

For the age-disaggregated case it is further required that both types of migration data, that is, the census migration and survival stock data and the Commonwealth Immigrant Act

(1962) Statistics, be disaggregated into 14 five year age groups, compatible with the stock populations of the two census years 1961 and 1966. This really requires two estimation techniques, one for the migration flow data, ideally derived from the flow records themselves and one for the census migration and survival data, ideally derived from the census. However, data availability does not allow this luxury.

Instead one technique is used deriving from the 1966 Migration Summary Tables Part I, Table 3.B. This table supplies five year migrants from New Commonwealth countries in nine age groups. The proportions obtained are then multiplied into the 1961 to 1966 migration and the migration and survival data. The resulting nine age groups can then be disaggregated further to 14 five year age groups. This disaggregation is performed in the same way that the census figures for the 1966 stock population were disaggregated in Section 5.2.2. The proportions and the resulting age structures are given in Table 5.18 for 1966.

Although implicitly this disaggregation does not allow us to observe differences in the age structure between persons who in-migrated and persons who in-migrated and survived this is, in fact, still possible by use of the following method.

### 5.3.5 The Migration Sub-System

To more clearly explain the next stages in constructing a migration system for New Commonwealth groups it may be useful to study Figure 5.5.

Table 5.18 Migration and survival to England and Wales in 14 age groups

| Age Groups | Proportions (a) Males | Proportions (b) Females | Migration and Survival (c) Males | Migration and Survival (d) Females | Migration Proportions (e) Males | Migration Proportions (f) Females | Migration 1961-1966, terminal age (g) Males | Migration 1961-1966, terminal age (h) Females |
|---|---|---|---|---|---|---|---|---|
| 0-4 | - | - | 15,369* | 15,389* | 0.0854 | 0.1135 | 17,089 | 18,578 |
| 5-9 | - | - | 14,914 | 12,976 | 0.0828 | 0.0957 | 16,568 | 15,665 |
| 10-14 | 0.1954 | 0.2280 | 17,263 | 14,440 | 0.0959 | 0.1065 | 19,190 | 17,432 |
| 15-19 | 0.0849 | 0.0956 | 13,981 | 11,496 | 0.0777 | 0.0848 | 15,548 | 13,880 |
| 20-24 | 0.1171 | 0.1967 | 19,283 | 17,640 | 0.1070 | 0.1300 | 21,411 | 21,279 |
| 25-29 | - | - | 22,410 | 15,635 | 0.1245 | 0.1152 | 24,933 | 18,857 |
| 30-34 | 0.4899 | 0.4141 | 24,291 | 14,440 | 0.1348 | 0.1064 | 26,973 | 17,416 |
| 35-39 | - | - | 19,562 | 11,253 | 0.1103 | 0.0830 | 22,071 | 13,586 |
| 40-44 | - | - | 14,110 | 8,465 | 0.0784 | 0.0624 | 15,688 | 10,214 |
| 45-49 | - | - | 7,073 | 4,522 | 0.0393 | 0.0333 | 7,864 | 5,451 |
| 50-54 | 0.0965 | 0.0915 | 5,142 | 3,631 | 0.0286 | 0.0268 | 5,723 | 4,387 |
| 55-59 | - | - | 3,676 | 2,850 | 0.0204 | 0.0210 | 4,082 | 3,437 |
| 60-64 | 0.0098 | 0.0106 | 1,614 | 1,275 | 0.0090 | 0.0094 | 1,801 | 1,439 |
| ⩾65 | 0.0064 | 0.0135 | 1,053 | 1,623 | 0.0058 | 0.0120 | 1,161 | 1,964 |
| Totals | 1.0000 | 1.0000 | 180,041 | 135,636 | 1.0000 | 1,0000 | 200,102 | 163,685 |

Notes: * These first age groups are given directly in the census, Commonwealth Immigrant Tables (G.R.O. 1969[a]) Table 5.

Figure 5.5 A migration system for the New Commonwealth groups.

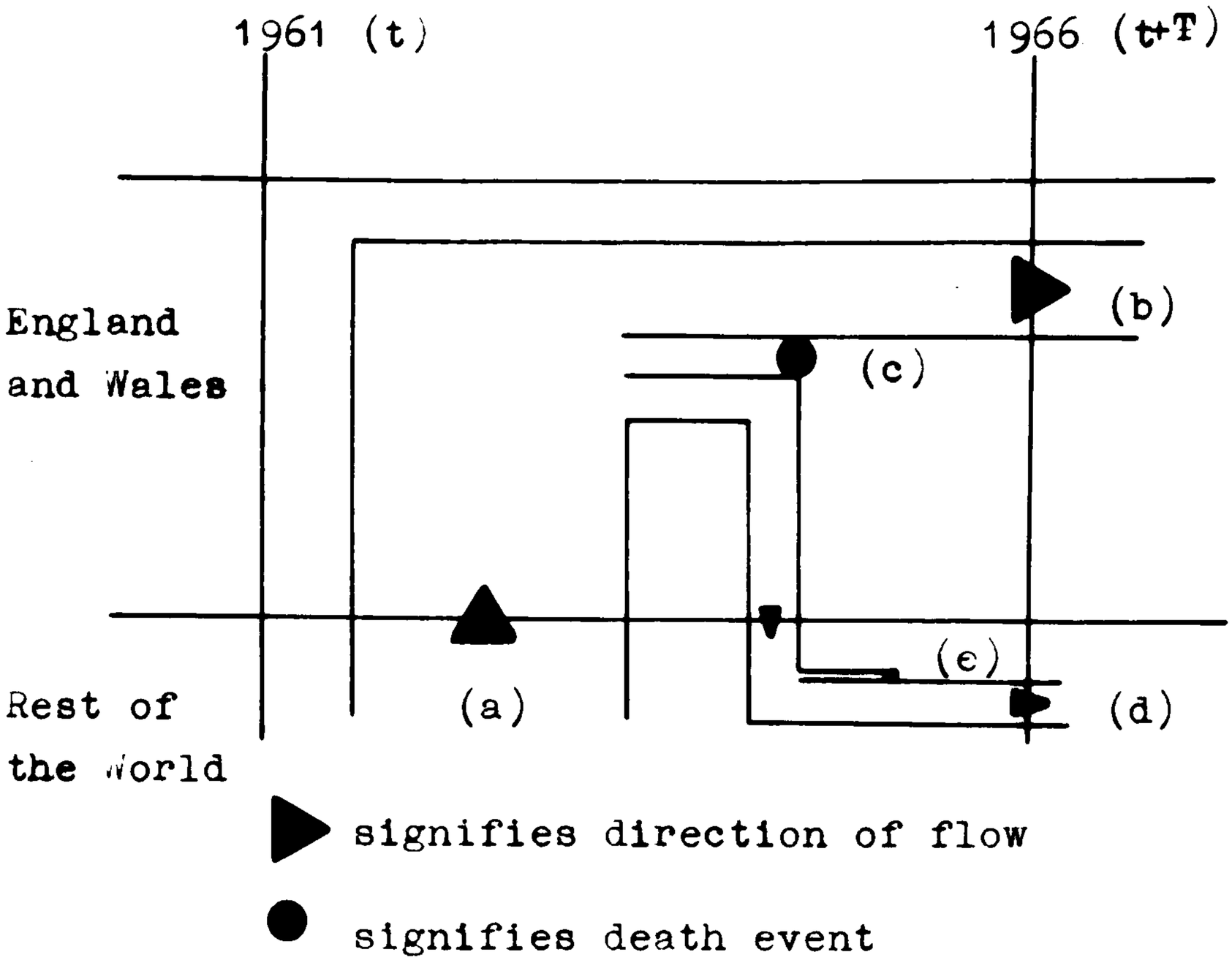
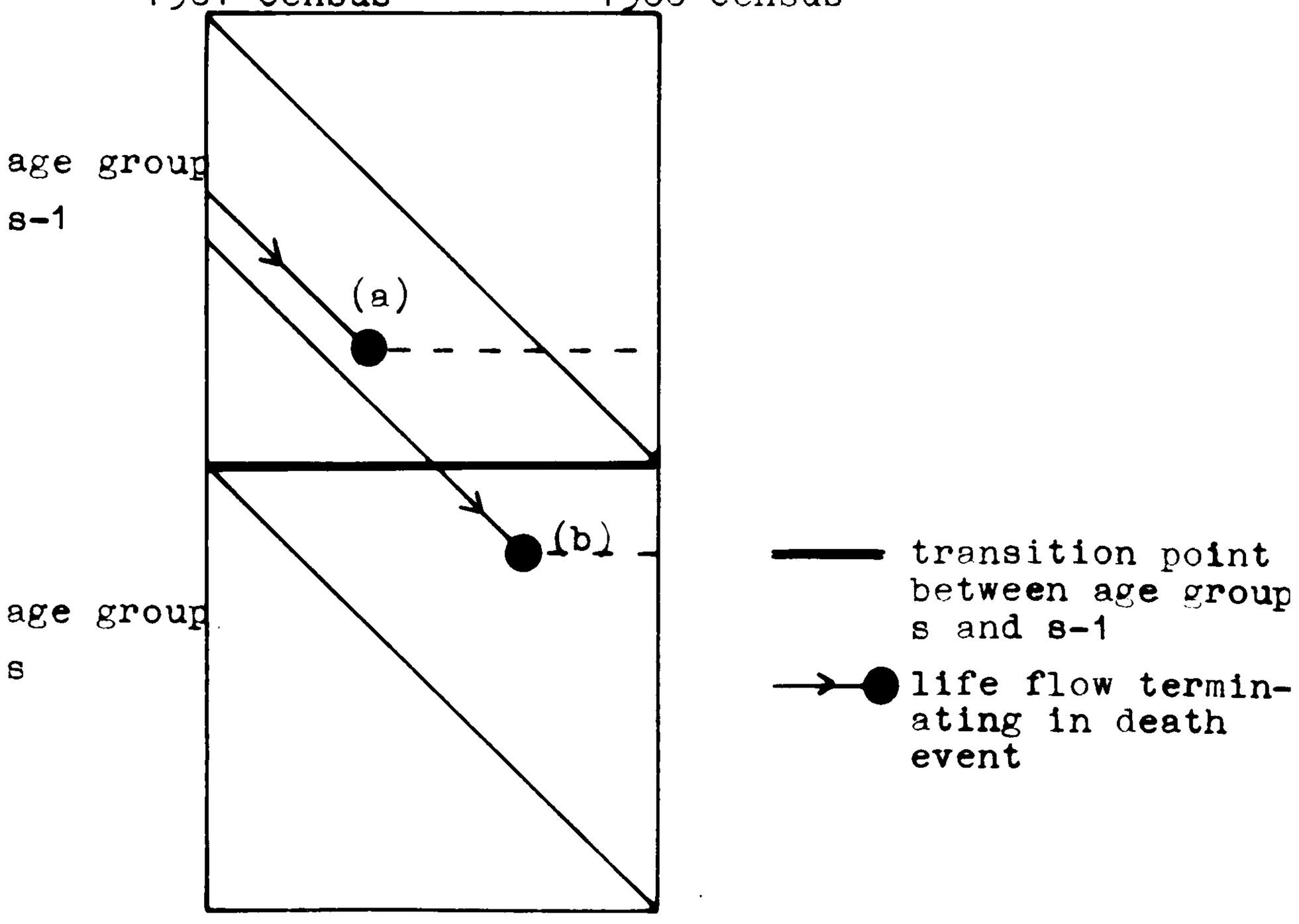



Figure 5.6 A Lexis diagram to show the difference between age at death and age at census.



This figure represents a two-zone migration system, England and Wales and the Rest of the World. Flow (a) represents in-migration to England and Wales in the period 1961 to 1966 (Commonwealth Immigrant Act (1962) Statistics). These migrants have a variety of possible futures after their entry to this country [flow (a)].

They can:
1. survive in England and Wales and be recorded in the next (1966) census [flow (b)],
2. die in England and Wales before the next census [flow (c)],
3. out-migrate before the next census [flow (d)],

or
4. out-migrate and die before the next (1966) census [flow (e)].

We may regard flows (d) and (e) as being, to all intents and purposes, non-quantifiable from present data sources in the United Kingdom. But there is already available a data source for flow (b), that is, migration and survival to the 1966 census. Figures for this in 14 age groups were presented in Table 5.18 [columns (c) and (d)], while similar figures for flow (a) have been given in the same table [columns (g) and (h)].

So in order to calculate the relative sizes of flows (d) and (e) together all that is needed is a reliable estimate of the numbers of immigrants who died in England and Wales before census date (1966). Then in terms of our notation the sum can be formed so that for each age group (k)

$$N_{K_k}^{EW\ R\ X}{}_{(t,t+T)} = N_{K_k}^{R\ EW\ X}{}_{(t,t+T)} - N_{K_k}^{N\ R\ EW\ X}{}_{(t+T)} - N_{K_k}\, R\delta(EW)\, X_{(t,t+T)} \qquad (5.1)$$

where: $N_{K_k}^{EW\ R\ X}(t, t+T)$ = New Commonwealth persons of sex X migrating between England and Wales and the Rest of the World in the period (t ,t+T) and in age group k in 1966

$N_{K_k}^{R\ EW\ X}(t,t+T)$ = New Commonwealth persons of sex X migrating between Rest of the World and England and Wales in the period (t,t+T) in age group k in 1966

$N_{K}^{R\ EW\ X}_{k}(t+T)$ = New Commonwealth persons of sex X migrating between Rest of the World and England and Wales and surviving to 1966 in age group k in 1966.

$N_{K_k}^{R\ \delta(EW)X}(t, t+T)$ = New Commonwealth persons of sex X migrating betwen Rest of the World and England and Wales and dying before 1966 in England and Wales.

That is, the outmigration of persons entering England and Wales (EW) from the Rest of the World (R) in the period 1961 to 1966 (t,t+T) is equal to the total number of entrants less those who in-migrated and survived to 1966 and less those who died in England and Wales (EW) in the period. The different re-migration rates for the 14 age groups can then be calculated.

This operation is performed in Table 5.20. Deaths to in-migrants are presented in Table 5.19.

5.3.5 Deaths estimated for in-migrants

A full exposition of the methods used to estimate the total deaths to in-migrants from the New Commonwealth is given in Section 5.4.1. Basically the method consists of identifying yearly flows of migrants between 1961 and 1966 and the use of a five yearly death rate for each age group in each year 1961 to 1966. A qualification is used, also, which measures the length of time that the individual yearly flows could have been exposed to the death rate. The death rates used

are for England and Wales, thus we assume that the in-migrants die at the same rates as the equivalent English and Welsh populations for each given age group. Since death rates vary less than other essential demographic rates, such as fertility rates, this is not an unreasonable assumption.

Table 5.19 presents the estimated deaths to each age group obtained by this method. But these figures require some modification since we wish to estimate the deaths to each age group in 1966 and 1971. The Lexis diagram (Figure 5.6) shows that it is possible for a person to die in the age group prior to the one in which his or her contemporaries are recorded at the next census. In Figure 5.6 flow (a) represents the life-line of a person in age group S-1 in 1961 at census date, flow (b) represents the life-line of a person also in the age group S-1 in 1961 at census date. But as the marking of the death event shows although both these persons were in the same age group in 1961 they did, in fact, die in different age groups. Flow (b) terminated in age group S while flow (a) terminates in age group S-1. Coefficients can be devised by which the total deaths which have been estimated and given in Table 5.19 can be split up into deaths at age S for each age group S in 1966. The coefficients used here are derived from Rees and Wilson (1977a) for the total population of England and Wales for the years 1961 to 1966.

Table 5.20 gives the re-migration calculations for 1961 to 1966, each equation for each age group being derived from the migration model shown in Figure 5.5.

Table 5.20 Calculation of re-migrant numbers

| Age Group | Total Entrants Males | Total Entrants and Survivors | Total In-migrations x deaths | Re-migration to all zones | Rate |
|---|---|---|---|---|---|
| 0-4 | 17,089 | 15,369 | 642 | 1,078 | 0.0630 |
| 5-9 | 16,568 | 14,914 | 36 | 1,618 | 0.0976 |
| 10-14 | 19,190 | 17,263 | 48 | 1,879 | 0.0979 |
| 15-19 | 15,548 | 13,981 | 48 | 1,519 | 0.0976 |
| 20-24 | 21,411 | 19,283 | 78 | 2,050 | 0.0957 |
| 25-29 | 24,933 | 22,410 | 111 | 2,412 | 0.0967 |
| 30-34 | 26,973 | 24,291 | 138 | 2,544 | 0.0943 |
| 35-39 | 22,071 | 19,862 | 162 | 2,047 | 0.0927 |
| 40-44 | 15,688 | 14,110 | 143 | 1,435 | 0.0914 |
| 45-49 | 7,864 | 7,073 | 171 | 620 | 0.0788 |
| 50-54 | 5,723 | 5,142 | 196 | 385 | 0.0672 |
| 55-59 | 4,082 | 3,676 | 166 | 240 | 0.0587 |
| 60-64 | 1,801 | 1,614 | 187 | - | - |
| ⩾65 | 1,161 | 1,053 | 45 | 63 | 0.0542 |
| Totals | 200,102 | 180,041 | 2,270 | 17,791 | |

| Age Group | Total Entrants Females | Total Entrants and Survivors | Total migrations x death | Re-migrations to all zones | Rate |
|---|---|---|---|---|---|
| 0-4 | 18,578 | 15,389 | 634 | 2,555 | 0.1375 |
| 5-9 | 15,665 | 12,976 | 20 | 2,669 | 0.1703 |
| 10-14 | 17,432 | 14,440 | 27 | 2,965 | 0.1700 |
| 15-19 | 13,880 | 11,496 | 26 | 2,358 | 0.1698 |
| 20-24 | 21,229 | 17,640 | 35 | 3,554 | 0.1674 |
| 24-29 | 18,857 | 15,635 | 46 | 3,176 | 0.1684 |
| 30-34 | 17,416 | 14,440 | 59 | 2,917 | 0.1674 |
| 35-39 | 13,586 | 11,253 | 68 | 2,265 | 0.1667 |
| 40-44 | 10,214 | 8,405 | 63 | 1,686 | 0.1650 |
| 45-49 | 5,451 | 4,522 | 72 | 857 | 0.1572 |
| 50-54 | 4,387 | 3,631 | 78 | 678 | 0.1545 |
| 55-59 | 3,437 | 2,850 | 70 | 517 | 0.1500 |
| 60-64 | 1,539 | 1,275 | 264 | - | - |
| ⩾65 | 1,964 | 1,623 | 25 | 316 | 0.1608 |
| Totals | 163,685 | 135,636 | 1,531 | 26,518 | |

## 5.3. Estimation of the minor migrating flows

As well as the in-migration to England and Wales of persons from the New Commonwealth countries there will also be small flows of such persons to this country from Scotland and Northern Ireland and from England and Wales to Scotland and Northern Ireland. These flows have their origin in the stock populations of Scotland and Northern Ireland and the increases to these populations through in-migration from the Rest of the World zone in the two periods. These numbers will be fairly small so the simple device is used of obtaining a migration rate for the total populations of these countries moving to England and Wales over the five years 1961 to 1966. The male and female rates are thus derived from:

To England and Wales

from Scotland:
$$m^{Sc,EW*}_{(t,t+T)} = {}^{*}K^{Sc,EW*}_{(t,t+T)} / {}^{*}K^{Sc*}_{(t)} \quad ..(5.2)$$

from Northern Ireland:
$$m^{NI,EW*}_{(t,t+T)} = K^{NI,EW*}_{(t,t+T)} / {}^{*}K^{NI*}_{(t)}$$

where: ..(5.3)

${}^{*}m^{Sc,EW*}_{(t,t+T)}$ rate of migration between Scotland and England and Wales

${}^{*}K^{Sc,EW*}_{(t,t+T)}$ persons of all ethnic groups migrating between Scotland and England and Wales in the period

${}^{*}K^{Sc*}_{(t)}$ persons recorded as being resident in Scotland in 1961

${}^{*NI,EW*}_{m\ (t,t+T)}$ migration rate for persons between Northern Ireland and England and Wales

$*K^{NI,EW*}(t, t+T)$ persons migrating between Northern Ireland and England and Wales in the period

$*K^{NI*}(t)$ persons recorded as being resident in Northern Ireland in 1961

These rates are applied to the estimated mid-period New Commonwealth populations of Scotland and Northern Ireland and are disaggregated by age in the same manner as the populations from which the rates derive. (Table 13B, Sample Census 1966 Migration Tables, Part 2, G.R.O. 1969b). The figures are given in Table 5.21.

Table 5.21 Estimated in-migration of persons of New Commonwealth birthplace, to England and Wales 1961 to 1966 from Scotland and Northern Ireland

| Age Group | Scotland | | Northern Ireland | |
|---|---|---|---|---|
| | Males | Females | Males | Females |
| 0-4 | 32 | 24 | 4 | 3 |
| 5-9 | 32 | 23 | 3 | 2 |
| 10-14 | 34 | 27 | 3 | 2 |
| 15-19 | 28 | 21 | 3 | 2 |
| 20-24 | 47 | 36 | 8 | 6 |
| 25-29 | 43 | 35 | 5 | 4 |
| 30-34 | 47 | 33 | 5 | 4 |
| 35-39 | 29 | 22 | 2 | 2 |
| 40-44 | 21 | 16 | 2 | 1 |
| 45-49 | 16 | 11 | 1 | 1 |
| 50-54 | 12 | 9 | 1 | 1 |
| 55-59 | 8 | 7 | 1 | 0 |
| 60-64 | 6 | 5 | 0 | 0 |
| ⩾65 | 13 | 10 | 1 | 1 |
| Total | 368 | 279 | 39 | 29 |

Migration of New Commonwealth born persons to Northern Ireland and Scotland is done on the same basis using the rate of migration for the total population of England and Wales (Table 5.22).

Table 5.22 Estimated minor migration and survival flows from England and Wales in 14 age groups 1961 to 1966

| Age Group | Scotland | | Northern Ireland | |
|---|---|---|---|---|
| | Males | Females | Males | Females |
| 0-4 | 57 | 43 | 17 | 12 |
| 5-9 | 46 | 34 | 14 | 10 |
| 10-14 | 49 | 38 | 15 | 10 |
| 15-19 | 27 | 20 | 8 | 6 |
| 20-24 | 48 | 37 | 15 | 10 |
| 25-29 | 67 | 55 | 21 | 16 |
| 30-34 | 72 | 51 | 20 | 14 |
| 35-39 | 44 | 33 | 13 | 9 |
| 40-44 | 31 | 24 | 10 | 6 |
| 45-49 | 26 | 18 | 8 | 5 |
| 50-54 | 19 | 15 | 6 | 4 |
| 55-59 | 13 | 11 | 3 | 3 |
| 60-64 | 14 | 11 | 4 | 3 |
| ⩾65 | 32 | 24 | 10 | 7 |
| Totals | 545 | 414 | 165 | 116 |

## 5.4 Deaths Estimates

### 5.4.1 Population "at risk" of death

Of much greater numerical importance are the deaths which will have occurred to the New Commonwealth born population of England and Wales. We can identify two different sets of population "at risk" of dying. The 1961 stock population of England and Wales, is, barring those persons who out-migrated in the period, at risk of dying over the whole five years. However, persons entering the country between 1961 and 1966 are

not actually "at risk" of dying in England and Wales until the date of their arrival. Therefore, while it is valid to apply a five year age standardised death rate to the 1961 stock population this technique would greatly overestimate deaths to the migrant population. The rate must, therefore, be modified to allow this year of entry effect to be taken into consideration, allowing a greater risk of dying for persons whose year of entry to England and Wales was early in the period than for those whose year of entry was later in the period.

5.4.2 Deaths in the 1961 stock population

An age standardised death rate may be obtained for the 14 age groups of the 1966 stock population from the Registrar General's Statistical Review, Medical Tables. These are given in Table 5.23 for males and females in the total population of England and Wales.

Table 5.23 Death rates for England and Wales total population for 1961 to 1966 in 14 age groups.

| Age Group | Males | Females |
|---|---|---|
| 0-4 | 0.0668 | 0.0520 |
| 5-9 | 0.0027 | 0.0018 |
| 10-14 | 0.0026 | 0.0016 |
| 15-19 | 0.0056 | 0.0022 |
| 20-24 | 0.0062 | 0.0027 |
| 25-29 | 0.0062 | 0.0036 |
| 30-34 | 0.0075 | 0.0053 |
| 35-39 | 0.0115 | 0.0083 |
| 40-44 | 0.0185 | 0.0132 |
| 45-49 | 0.0308 | 0.0210 |
| 50-54 | 0.0560 | 0.0321 |
| 55-59 | 0.0943 | 0.0472 |
| 60-64 | 0.1514 | 0.0758 |
| ⩾65 | 0.3904 | 0.2905 |

Estimates of the deaths in each age group of the New Commonwealth born 1961 stock population are obtained by straight forward application of the death rate, thus assuming that the immigrants die at the same rate as the indigenuous population of England Wales.
These estimates are given in Table 5.24.

Table 5.24 Estimated deaths in 1961 to 1966 of the 1961 stock population.

| Age Transition | Age Group 1961 | 1961 Males | Estimated Deaths | 1961 Females | Estimated Deaths |
|---|---|---|---|---|---|
| 0-4, 5-9 | 0-4 | 10,281 | 687 | 9,827 | 511 |
| 5-9,10-14 | 5-9 | 13,847 | 37 | 12,961 | 23 |
| 10-14,15-19 | 10-14 | 13,420 | 35 | 12,387 | 20 |
| 15-19,20-24 | 15-19 | 16,308 | 91 | 15,365 | 34 |
| 20-24,25-29 | 20-24 | 36,946 | 229 | 29,620 | 80 |
| 25-29,30-34 | 25-29 | 50,285 | 312 | 31,152 | 112 |
| 30-34,35-39 | 30-34 | 42,767 | 321 | 24,467 | 130 |
| 35-39,40-44 | 35-39 | 30,583 | 352 | 19,634 | 163 |
| 40-44,45-49 | 40-44 | 21,177 | 392 | 14,204 | 187 |
| 45-49,50-54 | 45-49 | 16,284 | 502 | 12,597 | 265 |
| 50-54,55-59 | 50-54 | 12,594 | 705 | 10,862 | 349 |
| 55-59,60-64 | 55-59 | 8,603 | 811 | 8,346 | 394 |
| 60-64, ≥ 65 | 60-64 | 5,789 | 876 | 6,524 | 495 |
| ≥65 ≥65 | ≥65 | 8,502 | 3,319 | 14,588 | 4,325 |
| Totals | | 287,396 | 8,669 | 222,534 | 7,088 |

5.4.3 Estimation of deaths to in-migrants

The Commonwealth Immigrant Act (1962) Statistics do not provide an age breakdown for in-migrating persons born in New Commonwealth countries. Only persons under the age of 16 years are distinguished. Estimation of this age breakdown is therefore required. The numbers of migrants for each year of the migration period 1961 to 1966 can be split proportionately

between England and Wales, Scotland and Northern Ireland in accordance with the procedure followed in Section 5.3.3 to supply the numbers of male adults and female adults and the numbers of male children and female children for each year of the five year period (except 1961 when only adults can be distinguished). The problem now is to attempt to obtain individual yearly migrations in 14 five year age groups. In Section 5.3.4, Table 5.18 estimates of the proportions of persons in-migrating to England and Wales in five year age groups was obtained. By using yearly figures as constraining totals and making a small adjustment to each yearly set to allow for the children aged 15 years we can obtain the required 14 age group breakdown. Note that the fact that the nature of the migrations changed in the five years, from Voucher Holders to dependants, is allowed implicitly in these calculations. For example, we do not alter the estimate that in 1962 23,364 male adults in-migrated compared with 6,560 male children or that in 1966, 4,535 male adults in-migrated compared with 4,559 male children. The proportions are calculated within each group rather than over the whole years male and female migration. It is now quite a simple procedure to apply the five yearly death rate to each of these yearly migration flows. However, before doing this some element must be calculated to account for the length of time each migrant is exposed to risk of death in England and Wales. For example, persons entering England and Wales in 1961 are exposed to risk of death over the whole period. Persons entering England and Wales in 1965 are exposed to risk of death in England and Wales for only approximately 1/5th of the period.

This may be refined by considering the number of days a migrant has spent in England and Wales prior to 1966 Census date compared with the total number of days in the census period, 1961 to 1966. It is also assumed that migration takes place on average at the mid-period of each year so that under-and over-estimations will tend to even out. A factor which reduces death rates in relation to length of time spent in England and Wales is therefore included in each deaths estimation equation. The results of all these estimations are the figures given in Table 5.19 and their subsequent disaggregation into age at death subtotals.

### 5.4.4 Estimation of the minor migration and death flows

To complete the migration system there remains to estimate the minor migration and death flows of persons born in New Commonwealth countries migrating from Scotland and Northern Ireland. In comparison with the migration and death flows from the Rest of the World these particular flows will be very small since the migration flows themselves are relatively small. These have already been estimated as (Section 5.3.6 Table 5.21).

In aggregate from Scotland to England and Wales

$$N_K^{ScEWM}_{(t,t+T)} = 368$$

$$N_K^{ScEWF}_{(t,t+T)} = 279$$

In aggregate from Northern Ireland to England and Wales

$$N_K^{NIEWM}_{(t,t+T)} = 39$$

$$N_K^{NIEWF}_{(t,t+T)} = 29$$

This migration has taken place over the whole five years and there is no easy way of obtaining a yearly breakdown. Deaths to these migrants are estimated by the application of the England and Wales standardised death rate to half of the five year total migration figures in each age group. Basically this assumes that the migrations took place evenly over the five year period so that, in effect, over-estimation incurred by assuming that all migrants were "at risk" of death over five years is countered by the under-estimation incurred by assuming that the migrations occurred at the end of the five year period.

The migration and deaths estimation is for each age group:

For Scotland and Wales:

$$N_K S \int(EW)^*_{(t,t+T)} = {}_xEW \int(EW)^*_{(t,t+T)} . N_K SEW^*_{(t,t+T)}/2 \qquad (5.4)$$

and for Nothern Ireland to England and Wales:

$$N_K NI \int(EW)^*_{(t,t+T)} = {}_xEW \int(EW)_{(t,t+T)} . N_K NIEW_{(t,t+T)}/2 \qquad (5.5)$$

Similarly some estimate is needed of deaths to persons migrating from England and Wales to Scotland and Northern Ireland in the period 1961 to 1966. Estimates of these migration flows have been obtained already (Section 5.3.7 Table 5.22)

In aggregate from England and Wales in Scotland:

$$N_K EW\ SH_{(t,t+T)} = 545$$

$$N_K EW\ SF_{(t,t+T)} = 414$$

In aggregate from England and Wales to Northern Ireland:

$$N_K^{EW\ NI\ M}(t,t+T) = 165$$

$$N_K^{EW\ NI\ F}(t,t+T) = 116$$

Table 5.25 Migration and death flows of persons born in New Commonwealth countries between Scotland and England and Wales and Northern Ireland and England and Wales in the period 1961 to 1966

| Age Group | to Scotland | | to Northern Ireland | |
|---|---|---|---|---|
| | Males | Females | Males | Females |
| 0-4 | 2 | 1 | 1 | - |
| 5-9 | - | - | - | - |
| 10-14 | - | - | - | - |
| 15-19 | - | - | - | - |
| 20-24 | - | - | - | - |
| 25-29 | - | - | - | - |
| 30-34 | - | - | - | - |
| 35-39 | - | - | - | - |
| 40-44 | - | - | - | - |
| 45-49 | - | - | - | - |
| 50-54 | 1 | - | - | - |
| 55-59 | 1 | - | - | - |
| 60-64 | 1 | - | - | - |
| ⩾65 | 6 | 4 | 2 | 1 |
| Totals | 11 | 5 | 3 | 1 |

Deaths to these migrants are estimated from the five year death rates for each period but correction for age at death is not made since the numbers are very small. The estimates are given in Tables 5.25 and 5.26.

Table 5.26 Estimation of deaths to migrants from Scotland and Northern Ireland in the periods 1961 to 1966

| Age Group | Scotland 1961-66 | | Northern Ireland 1961-66 | |
|---|---|---|---|---|
| | Males | Females | Males | Females |
| 0-4 | 4 | 2 | 1 | 1 |
| 5-9 | - | - | - | - |
| 10-14 | - | - | - | - |
| 15-19 | - | - | - | - |
| 20-24 | - | - | - | - |
| 25-29 | - | - | - | - |
| 30-34 | 1 | - | - | - |
| 35-39 | 1 | - | - | - |
| 40-44 | 1 | - | - | - |
| 45-49 | 1 | - | - | - |
| 50-54 | 1 | - | - | - |
| 55-59 | 1 | 1 | - | - |
| 60-64 | 2 | 1 | - | - |
| ≥ 65 | 10 | 7 | 2 | 2 |
| Totals | 22 | 11 | 3 | 3 |

## 5.5 Completion of the Accounts matrix

### 5.5.1 Out-migrations from the 1961 stock population

The final step in the building of the accounts matrix involves the specification of a first estimate of the numbers of persons who left England and Wales in the five year period 1961 to 1966 who had been resident in the countries at the 1961 census. The calculation of this flow of people means that a first estimate of the survivors in England and Wales of the

original 1961 stock population may be obtained from the row sum of the matrix and hence compared with the estimate already obtainable at this point from the column sum.

There is no official source from which these migrants from England and Wales to the Rest of the World can be estimated. Therefore, as usual, an assumption is required which will allow this estimation to be made. The assumption here is that the 1961 stock population will out-migrate at the same rate as the population which in-migrated in the period 1961 to 1966, a rate, disaggregated for age groups which was shown calculated in Table 5.20. Obviously arguments may be advanced against the use of this particular rate derived from a different population. The lack of any viable alternative outweighs these arguments. In any case the rate is used to achieve a first approximation only and some balancing of the completed matrix will alter the actual numbers estimated. The base population to which the rate is applied is the 1961 stock population of males and females born in New Commonwealth countries, colonies or protectorates. Error may arise again from the consideration of this whole population as "at risk" of migrating when, in fact, some may have died, or migrated from England and Wales to Scotland or Northern Ireland in the period. This will be a fairly minor margin of error, however.

Table 5.27 shows the calculation of these out-migrants. The event of migration need not, of course, be the sum total of events occurring to this migrating population in the period,

Table 5.27 Calculation of migration from England and Wales to the Rest of the World of the 1961 stock population of New Commonwealth born persons

| Age Group 1961 | Males | Females | Out-migration rate (males) | Out-migration rate (females) | Out-migration males | Out-migration females |
|---|---|---|---|---|---|---|
| 0-4 | 10,281 | 9,827 | 0.0630 | 0.1375 | 648 | 1,351 |
| 5-9 | 13,847 | 12,961 | 0.0976 | 0.1703 | 1,351 | 2,207 |
| 10-14 | 13,420 | 12,387 | 0.0979 | 0.1700 | 1,314 | 2,106 |
| 15-19 | 16,308 | 15,365 | 0.0976 | 0.1698 | 1,592 | 2,609 |
| 20-24 | 36,946 | 29,620 | 0.0957 | 0.1674 | 3,536 | 4,959 |
| 25-29 | 50,295 | 31,152 | 0.0967 | 0.1684 | 4,863 | 5,246 |
| 30-34 | 42,767 | 24,467 | 0.0943 | 0.1674 | 4,033 | 4,096 |
| 35-39 | 30,583 | 19,634 | 0.0927 | 0.1667 | 2,835 | 3,273 |
| 40-44 | 21,177 | 14,204 | 0.0914 | 0.1650 | 1,936 | 2,344 |
| 45-49 | 16,284 | 12,597 | 0.0788 | 0.1572 | 1,283 | 1,980 |
| 50-54 | 12,594 | 10,862 | 0.0672 | 0.1545 | 846 | 1,678 |
| 55-59 | 8,603 | 8,346 | 0.0587 | 0.1500 | 505 | 1,252 |
| 60-64 | 5,789 | 6,524 | - | - | - | - |
| ≥65 | 8,502 | 14,588 | 0.0542 | 0.1608 | 461 | 2,346 |

some may die, some may even in-migrate over again. An estimate of deaths to these persons may be obtained for the sake of argument from the application of an England and Wales age specific death rate for the five year period. But this will not change the fact of out-migration from which total figure the deaths would be derived. The event of repeated in-migration does not affect the situation either, these being completely within our previous definitions of in-migrants to the United Kingdom and England and Wales.

### 5.5.2 Completion of the accounts matrix for age groups other than the first (0-4 years)

#### (1) The Row Terms and Equation

We have now completed the six steps used to calculate the inputs to the accounts matrix and can specify the accounting equations in full. The row term is a means of estimating survivors from the 1961 population. The 1961 stock would have lost people in a variety of ways and these can now be spelled out and a first estimate of survivors obtained. For the sake of simplicity this calculation is performed out of its matrix context. Basically the equation states that the survivors of the 1961 stock population to 1966 will be equal to the 1961 stock population minus:

1. migrants from this stock to Scotland whether they survive there or not,

2. migrants to Northern Ireland from this stock whether they survive there or not,

3. migrants to the Rest of the World from this stock whether they survive there or not,

Table 5.28 The accounts matrix in tabular form (1)

(1) The Row Equation for Males

| Age Group Transition | 1961 Population | Migrants to Scotland | Migrants to N. Ireland | Migrants to Rest of World | Deaths to 1961 Stock | Survivors 1961 to 1966 | Age 1966 |
|---|---|---|---|---|---|---|---|
| 0-4 5-9 | 10,281 | 57 | 17 | 648 | 687 | 8,872 | 5-9 |
| 5-9 10-14 | 13,847 | 46 | 14 | 1,351 | 37 | 12,399 | 10-14 |
| 10-14 15-19 | 13,420 | 49 | 15 | 1,314 | 35 | 12,007 | 15-19 |
| 15-19 20-24 | 16,308 | 27 | 8 | 1,592 | 91 | 14,590 | 20-24 |
| 20-24 25-29 | 36,946 | 48 | 15 | 3,536 | 229 | 33,118 | 25-29 |
| 25-29 30-34 | 50,295 | 67 | 21 | 4,863 | 312 | 45,032 | 30-34 |
| 30-34 35-39 | 42,767 | 72 | 20 | 4,033 | 321 | 38,321 | 35-39 |
| 35-39 40-44 | 30,583 | 44 | 13 | 2,835 | 352 | 27,339 | 40-44 |
| 40-45 45-49 | 21,177 | 31 | 10 | 1,936 | 392 | 18,808 | 45-49 |
| 45-49 50-54 | 16,284 | 26 | 8 | 1,283 | 502 | 14,465 | 50-54 |
| 50-54 55-59 | 12,594 | 19 | 6 | 846 | 705 | 11,018 | 55-59 |
| 55-59 60-64 | 8,603 | 13 | 3 | 505 | 811 | 7,271 | 60-64 |
| 60-64 ≥65 | 5,789 | 14 | 4 | - | 876 | 9,575 | ≥65 |
| ≥65 ≥65 | 8,502 | 32 | 10 | 461 | 3,319 | | ≥65 |
| Source | Table 5.1 | Table 5.22 | Table 5.22 | Table 5.27 | Table 5.24 | - | |

(2) The Row Equation for Females

| Age Group Transition | | 1961 Population | Migrants to Scotland | Migrants to N. Ireland | Migrants to Rest of World | Deaths to 1961 Stock | Survivors 1961 to 1966 | Age 1966 |
|---|---|---|---|---|---|---|---|---|
| 0-4 | 5-9 | 9,827 | 43 | 12 | 1,351 | 511 | 7,910 | 5-9 |
| 5-9 | 10-14 | 12,961 | 34 | 10 | 2,207 | 23 | 10,687 | 10-14 |
| 10-14 | 15-19 | 12,387 | 38 | 10 | 2,106 | 20 | 10,213 | 15-19 |
| 15-19 | 20-24 | 15,365 | 20 | 6 | 2,609 | 34 | 12,696 | 20-24 |
| 20-24 | 25-29 | 29,620 | 37 | 10 | 4,959 | 80 | 24,534 | 25-29 |
| 25-29 | 30-34 | 31,152 | 55 | 16 | 5,246 | 112 | 25,723 | 30-34 |
| 35-39 | 40-44 | 19,634 | 33 | 9 | 4,096 | 163 | 15,333 | 40-44 |
| 40-44 | 45-49 | 14,204 | 24 | 6 | 2,344 | 187 | 11,643 | 45-49 |
| 45-49 | 50-54 | 12,597 | 18 | 5 | 1,980 | 265 | 10,329 | 50-54 |
| 50-54 | 55-59 | 10,862 | 15 | 4 | 1,678 | 349 | 8,816 | 55-59 |
| 55-59 | 60-64 | 8,346 | 11 | 3 | 1,252 | 394 | 6,686 | 60-64 |
| 60-64 | ≥65 | 6,524 | 11 | 3 | - | 495 | 13,901 | ≥65 |
| ≥65 | ≥65 | 14,588 | 24 | 7 | 2,346 | 4,325 | | ≥65 |
| Source | | Table 5.1 | Table 5.22 | Table 5.22 | Table 5.27 | Table 5.24 | - | |

4. deaths to this stock population over the period.

This equation can now be spelled out numerically. Below each column of figures is the number of the table in the preceding text from which they derive. Note that, again for simplicity, the migrations and survival and migration and death flows are presented as single flows. These migration and death flows do not, of course, feature in the column equation at all as reference to Figure 5.1 will show.

The column equation takes, as its base, the 1966 population of persons born in the New Commonwealth countries. The constituent elements of this population have been estimated in the previous text and the column equation may now be specified. The survivor element of the 1961 population is calculated from the following:

the 1966 population stock minus:

1. migrants and survivors from Scotland to England and Wales,

2. migrants and survivors from Northern Ireland to England and Wales,

3. migrants and survivors from the Rest of the World to England and Wales.

This may now be specified numerically in tabular rather than matrix form, again for simplicity of presentation.

Table 5.29 The accounts matrix in tabular form (2)

(1) The column equation for males

| 1966 population stock | Migrants from Scotland | Migrants from Northern Ireland | Migrants from the Rest of the World | Survivors 1961 to 1966 | Age Group 1966 |
|---|---|---|---|---|---|
| 15,369 | | | 15,369 | | 0-4 |
| 29,005 | 32 | 4 | 14,914 | 14,055 | 5-9 |
| 33,567 | 32 | 3 | 17,263 | 16,269 | 10-14 |
| 32,807 | 34 | 3 | 13,981 | 18,789 | 15-19 |
| 45,226 | 28 | 3 | 19,283 | 25,912 | 20-24 |
| 67,550 | 47 | 8 | 22,410 | 45,085 | 25-29 |
| 73,215 | 43 | 5 | 24,291 | 48,876 | 30-34 |
| 59,866 | 47 | 5 | 19,862 | 39,952 | 35-39 |
| 42,529 | 29 | 2 | 14,110 | 28,388 | 40-44 |
| 25,469 | 21 | 2 | 7,073 | 18,373 | 45-49 |
| 18,516 | 16 | 1 | 5,143 | 13,356 | 50-54 |
| 13,234 | 12 | 1 | 3,676 | 9,545 | 55-59 |
| 7,958 | 8 | 1 | 1,614 | 6,335 | 60-64 |
| 10,199 | 19 | 1 | 1,053 | 9,126 | ⩾65 |

(2) The column equation for females

| 1966 population stock | Migrants from Scotland | Migrants from Northern Ireland | Migrants from the Rest of the World | Survivors 1961 to 1966 | Age Group 1966 |
|---|---|---|---|---|---|
| 15,389 | - | - | 15,389 | - | 0-4 |
| 27,525 | 24 | 3 | 12,976 | 14,522 | 5-9 |
| 30,627 | 23 | 2 | 14,440 | 16,162 | 10-14 |
| 27,190 | 27 | 2 | 11,496 | 15,666 | 15-19 |
| 44,313 | 21 | 2 | 17,640 | 26,650 | 20-24 |
| 48,441 | 36 | 6 | 15,635 | 32,764 | 25-29 |
| 44,738 | 35 | 4 | 14,440 | 30,259 | 30-34 |
| 34,865 | 33 | 4 | 11,253 | 23,575 | 35-39 |
| 26,226 | 22 | 2 | 8,465 | 17,737 | 40-44 |
| 17,413 | 16 | 1 | 4,522 | 12,874 | 45-49 |
| 13,981 | 11 | 1 | 3,631 | 10,338 | 50-54 |
| 10,973 | 9 | 1 | 2,850 | 8,113 | 55-59 |
| 8,435 | 7 | 0 | 1,275 | 7,153 | 60-64 |
| 17,245 | 15 | 1 | 1,623 | 15,606 | ⩾65 |

The two estimates of survivors may now be compared. In total, the two estimates differ by 93,195 persons, 41,246 males and 51,949 females. The row estimate suggests that, given reasonable estimates of death and migration, a total of 252,815 males born in the New Commonwealth and present in England and Wales in 1961 survived to 1966 in that region, the total losses from that 1961 population numbering 34,581. Similarly, the row estimate suggests that, of the total of 222,534 females of New Commonwealth birth resident in England and Wales in 1961, 179,470 survived in England and Wales to 1966, a loss to that population of 43,064 females, a rather higher figure than for the males but understandable within the context of the New Commonwealth migrations.

On the other hand, the column estimates involve population numbers of a higher order altogether. Not only are the numbers involved larger but the sources from which they largely derive, that is, the 1966 10% Sample Census and the Commonwealth Immigrant (1962) Act Statistics, are of a relatively more doubtful nature. Thus, the main elements of the column equations involve male and female increments from the Rest of the World of 200,102 and 163,685 respectively and the figures, corrected for under-enumeration as far as possible, for the 1966 stock male and female populations. In a situation where we are forced to accept a degree of error or misfit in the matrix it seems reasonable and logical to assign the error to the area of largest doubt, that is the in-migration data, particularly as we may well have excluded a significant number of other persons who would be

recorded as resident in England and Wales in 1966 while not having entered the country within one of our pre-determined "permanent settlement" categories. For example the Commonwealth Immigrant Act (1962) Statistics for 1966 reveal that 61,958 persons entered the United Kingdom from New Commonwealth countries as "visitors for less than 3 months" and 59,527 persons "returning to the United Kingdom from temporary absence abroad". It is thus a weakness, not of the conceptual framework used, but of the level at which it has been possible to operate this analysis that flows such as these have not been directly considered. It would require a very sophisticated set of estimation techniques, which it would be possible to obtain, to calculate the likelihood of any of these "temporary" migrants being recorded in England and Wales in 1966. In view of these considerations we feel it is reasonable to accept a mis-fit between the two survivors estimates of 14% for males (252,815 from row and 294,061 from column) and 27% (179,470 from row and 231,419 from column) for females. Thus the difference between the two estimates is loaded, according to this reasoning, onto the in-migration and survival from the Rest of the World flow and the new estimates, so derived, are given in Table 5.30.

Table 5.30 **In-migration and survival calculated within the matrix.**

| Age in 1966 | Males | Females |
|---|---|---|
| 0-4 | - | - |
| 5-9 | 20,097 | 19,588 |
| 10-14 | 21,133 | 19,915 |
| 15-19 | 20,763 | 16,948 |
| 20-24 | 30,605 | 31,594 |
| 25-29 | 34,377 | 23,865 |
| 30-34 | 28,135 | 18,976 |
| 35-39 | 21,493 | 14,652 |
| 40-44 | 15,159 | 10,046 |
| 45-49 | 6,638 | 5,753 |
| 50-54 | 4,034 | 3,640 |
| 55-59 | 2,203 | 2,147 |
| 60-64 | 678 | 1,742 |
| ⩾65 | 604 | 3,328 |
| Totals | 205,919 | 172,194 |

Acceptance of this new in-migration and survival flow requires that the persons who in-migrated and died must also be calculated. Since we have accepted the numbers of survivors these deaths may be calculated by calculating total in-migrants, that is in-migrations and survivals and in-migrations and deaths using the reciprocal of the death rate and subtracting the estimated survivals from this total. The in-migration and death flows are given in Table 5.31.

Table 5.31 In-migration and death flows from the Rest of the World

| Age at Death | Males | Females |
|---|---|---|
| 5-9 | 34 | 22 |
| 10-14 | 34 | 20 |
| 15-19 | 71 | 44 |
| 20-24 | 116 | 54 |
| 25-29 | 134 | 55 |
| 30-34 | 132 | 65 |
| 35-39 | 155 | 79 |
| 40-44 | 174 | 85 |
| 45-49 | 127 | 78 |
| 50-54 | 140 | 75 |
| 55-59 | 130 | 64 |
| 60-64 | 64 | 85 |
| ≥65 | 155 | 634 |
| Totals | 1,466 | 1,360 |

This final estimation completes the accounts table for the second age group and above. The accounts matrices for males and females are given in Figure 5.7a and Figure 5.7 b.

It may be seen that this accounts table differs in significant ways from the accounts matrices developed by Rees and Wilson (Rees, P. H., Smith, A. P. and King, J. R. 1974). Primarily, of course, the above matrix explicitly excludes persons born in the period. We consider these persons in the next section. The flows presented above are

Figure 5.7(a) Population accounts table for England and Wales, 1961 to 1966, stocks and flows, MALES

| Existence, 1961, England & Wales | Survival in England and Wales to 1966 | | | | | | | | | | | | | Migration & survival, migration and death in Rest of World | Deaths in England & Wales | Totals 1961 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| t \ t+T | 5- 9 | 10-14 | 15-19 | 20-24 | 25-29 | 30-34 | 35-39 | 40-44 | 45-49 | 50-54 | 55-59 | 60-64 | 65 | | | |
| 0- 4 | 8,872 | | | | | | | | | | | | | 722 | 687 | 10,281 |
| 5- 9 | | 12,399 | | | | | | | | | | | | 1,411 | 37 | 13,847 |
| 10-14 | | | 12,007 | | | | | | | | | | | 1,378 | 35 | 13,420 |
| 15-19 | | | | 14,590 | | | | | | | | | | 1,627 | 91 | 16,308 |
| 20-24 | | | | | 33,118 | | | | | | | | | 3,799 | 229 | 36,946 |
| 25-29 | | | | | | 45,032 | | | | | | | | 4,951 | 312 | 50,295 |
| 30-34 | | | | | | | 38,321 | | | | | | | 4,125 | 321 | 42,767 |
| 35-39 | | | | | | | | 27,339 | | | | | | 2,892 | 352 | 30,583 |
| 40-44 | | | | | | | | | 18,808 | | | | | 1,977 | 392 | 21,177 |
| 45-49 | | | | | | | | | | 14,465 | | | | 1,317 | 502 | 16,284 |
| 50-54 | | | | | | | | | | | 11,018 | | | 871 | 705 | 12,594 |
| 55-59 | | | | | | | | | | | | 7,271 | | 621 | 811 | 8,603 |
| 60-64 | | | | | | | | | | | | | 9,575 | 521 | 4,195 | 5,789 |
| 65 | | | | | | | | | | | | | | | | 8,502 |
| 0- 4 | 20,133 | | | | | | | | | | | | | | 34 | |
| 5- 9 | | 21,168 | | | | | | | | | | | | | 34 | |
| 10-14 | | | 20,800 | | | | | | | | | | | | 71 | |
| 15-19 | | | | 30,636 | | | | | | | | | | | 116 | |
| 20-24 | | | | | 34,432 | | | | | | | | | | 134 | |
| 25-29 | | | | | | 28,183 | | | | | | | | | 132 | |
| 30-34 | | | | | | | 21,545 | | | | | | | | 155 | |
| 35-39 | | | | | | | | 15,190 | | | | | | | 174 | |
| 40-44 | | | | | | | | | 6,661 | | | | | | 127 | |
| 45-49 | | | | | | | | | | 4,051 | | | | | 140 | |
| 50-54 | | | | | | | | | | | 2,216 | | | | 130 | |
| 55-59 | | | | | | | | | | | | 687 | | | 64 | |
| 60-64 | | | | | | | | | | | | | 624 | | 155 | |
| 65 | | | | | | | | | | | | | | | | |
| Totals 1966 | 29,005 | 33,567 | 32,807 | 45,226 | 67,550 | 73,215 | 59,866 | 42,529 | 25,469 | 18,516 | 13,234 | 7,958 | 10,199 | | 10,135 | |

Figure 5.7(b) Population accounts table for England and Wales, 1961 to 1966, stocks and flows, FEMALES

| Existence, 1961, England & Wales: t \ t+T | Survival in England and Wales to 1966: 5-9 | 10-14 | 15-19 | 20-24 | 25-29 | 30-34 | 35-39 | 40-44 | 45-49 | 50-54 | 55-59 | 60-64 | ≥65 | Migration & survival, migration and death in Rest of World | Deaths in England & Wales | Totals 1961 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0- 4 | 7,910 | | | | | | | | | | | | | 1,406 | 511 | 9,827 |
| 5- 9 | | 10,687 | | | | | | | | | | | | 2,251 | 23 | 12,961 |
| 10-14 | | | 10,213 | | | | | | | | | | | 2,154 | 20 | 12,387 |
| 15-19 | | | | 12,696 | | | | | | | | | | 2,635 | 34 | 15,365 |
| 20-24 | | | | | 24,534 | | | | | | | | | 5,006 | 80 | 29,620 |
| 25-29 | | | | | | 25,723 | | | | | | | | 5,317 | 112 | 31,152 |
| 30-34 | | | | | | | 20,176 | | | | | | | 4,161 | 130 | 24,467 |
| 35-39 | | | | | | | | 16,156 | | | | | | 3,315 | 163 | 19,634 |
| 40-44 | | | | | | | | | 11,643 | | | | | 2,378 | 187 | 14,204 |
| 45-49 | | | | | | | | | | 10,329 | | | | 2,003 | 265 | 12,597 |
| 50-54 | | | | | | | | | | | 8,816 | | | 1,697 | 349 | 10,862 |
| 55-59 | | | | | | | | | | | | 6,686 | | 1,266 | 394 | 8,346 |
| 60-64 | | | | | | | | | | | | | 13,901 | 2,391 | 4,820 | 6,524 14,588 |
| ≥65 | | | | | | | | | | | | | | | | |
| 0- 4 | 19,615 | | | | | | | | | | | | | | 22 | |
| 5- 9 | | 19,940 | | | | | | | | | | | | | 20 | |
| 10-14 | | | 16,977 | | | | | | | | | | | | 44 | |
| 15-19 | | | | 31,617 | | | | | | | | | | | 54 | |
| 20-24 | | | | | 23,907 | | | | | | | | | | 55 | |
| 25-29 | | | | | | 19,015 | | | | | | | | | 65 | |
| 30-34 | | | | | | | 14,689 | | | | | | | | 79 | |
| 35-39 | | | | | | | | 10,070 | | | | | | | 85 | |
| 40-44 | | | | | | | | | 5,770 | | | | | | 78 | |
| 45-49 | | | | | | | | | | 3,652 | | | | | 75 | |
| 50-54 | | | | | | | | | | | 2,157 | | | | 64 | |
| 55-59 | | | | | | | | | | | | 1,749 | | | 85 | |
| 60-64 | | | | | | | | | | | | | 3,344 | | 634 | |
| ≥65 | | | | | | | | | | | | | | | | |
| Totals 1966 | 27,525 | 30,627 | 27,190 | 44,313 | 48,441 | 44,738 | 34,865 | 26,226 | 17,413 | 13,981 | 10,973 | 8,435 | 17,245 | | 8,448 | |

all related to a particular age transition for the period 1961 to 1966. Thus, whereas Rees and Wilson present deaths by age at death using coefficients to break down the aggregate death flows into their S-1, S components, we simply present the estimates within their transition age group. Thus a person aged 41 in 1961 who dies in the period will be found recorded in the 40-44/45-49 cohort of deaths even though the person in fact died in the 40-44 age group. As a consequence of lacking a disaggregation of this nature the matrix above has only one figure for survival to age over 65 years, for the 1961 stock population and in-migrants from the Rest of the World. Note also that the minor flows into and out from England and Wales, the migration and survival and migration and death flows, have been added into the corresponding flows for the Rest of the World simply for the sake of convenience in the presentation of the accounts table.

In the final section of this chapter a demographic model is used to project the population of "New Commonwealth" identification up to 1986 using firstly the rates derived from the above accounts table and secondly rates derived from Rees and Smith, the derivation of which are given in Chapter 8. Prior to this however we must now turn to the first age group and the estimation of flows and stocks of persons aged 0-4 years. The specification of an accounts matrix for these persons allows the calculation of a fertility rate for New Commonwealth women, a clear indication of the benefit of a well designed conceptual framework when data is very limited.

## 5.6 Births Estimates

### 5.6.1 Accounts Table

The first age group, 0-4 year old males and females, have been separated from the main accounts table because of the nature of the population under study. The main population and migration accountstable recognises only persons born in New Commonwealth countries and therefore explicitly excludes from consideration those persons of New Commonwealth parentage who were born in England and Wales, Scotland and Northern Ireland, and to a lesser extent those persons born in the Rest of the World zone. Probably little can be discovered about this category apart from recognising its existence.

Some notational difficulty is therefore incurred. Superscript N has been used so far to imply region of birth being New Commonwealth countries. To use this superscript for this particular population in this section would be erroneous since birthplace is no longer the criterion upon which their ethnicity is judged. The N superscript is thus dropped in favour of an N subscript denoting the fact that at least one parent was born in a New Commonwealth country. A place of birth superscript is, therefore, also required, adhering to the four zone case used in the population and migration accounts. The use of only one parental designation for the whole of this particular population group avoids, for the time, the question of cross-ethnicity. More specific note is taken of this later in the paper.

The following place of birth superscripts are used:

| | |
|---|---|
| Birth in England and Wales | EW |
| Birth in Scotland | S |
| Birth in Northern Ireland | NI |
| Birth in Rest of World/Commonwealth | N |

These superscripts are used in conjunction with the $\beta$ (or births) zone used as superscript after the K population term.

The Births Accounts Matrix is given in full for the four zone case in Figure 5.8.

The following equations, which allow the calculation of a birth rate for New Commonwealth persons in England and Wales, derive directly from the accounts table.

From the row sum:

$$
\begin{aligned}
{}_{N}^{EW}{}_{K}\beta_{01}^{(EW)*}\,X \;=\;& {}_{N}^{EW}{}_{K}\beta_{01}^{(EW)}\,EW\,x \;+\; {}_{N}^{EW}{}_{K}\beta_{01}^{(EW)}S\,x \\
&+\; {}_{N}^{EW}{}_{K}\beta_{01}^{(EW)}NI\,x \;+\; {}_{N}^{EW}{}_{K}\beta_{01}^{(EW)}RW\,x \\
&+\; {}_{N}^{EW}{}_{K}\beta_{01}^{(EW)}\delta(EW)x \;+\; {}_{N}^{EW}{}_{K}\beta_{01}^{(EW)}\delta(S)\,x \\
&+\; {}_{N}^{EW}{}_{K}\beta_{01}^{(EW)}\delta(NI)\,x \;+\; {}_{N}^{EW}{}_{K}\beta_{01}^{(EW)}\delta(RW)\,x
\end{aligned}
\qquad \ldots(5.6)
$$

and the column sum:

$$
{}_{N}^{*}{}_{K}\beta_{01}^{(*)EW}\,x \;=\; {}_{N}^{EW}{}_{K}\beta_{01}^{(EW)EW}\,x \;+\; {}_{N}^{SC}{}_{K}\beta_{01}^{(S)EW}\,x \;+\; {}_{N}^{NI}{}_{K}\beta_{01}^{(NI)EW}\,x \;+\; {}_{N}^{RW}{}_{K}\beta_{01}^{(RW)EW}\,x \qquad \ldots(5.7)
$$

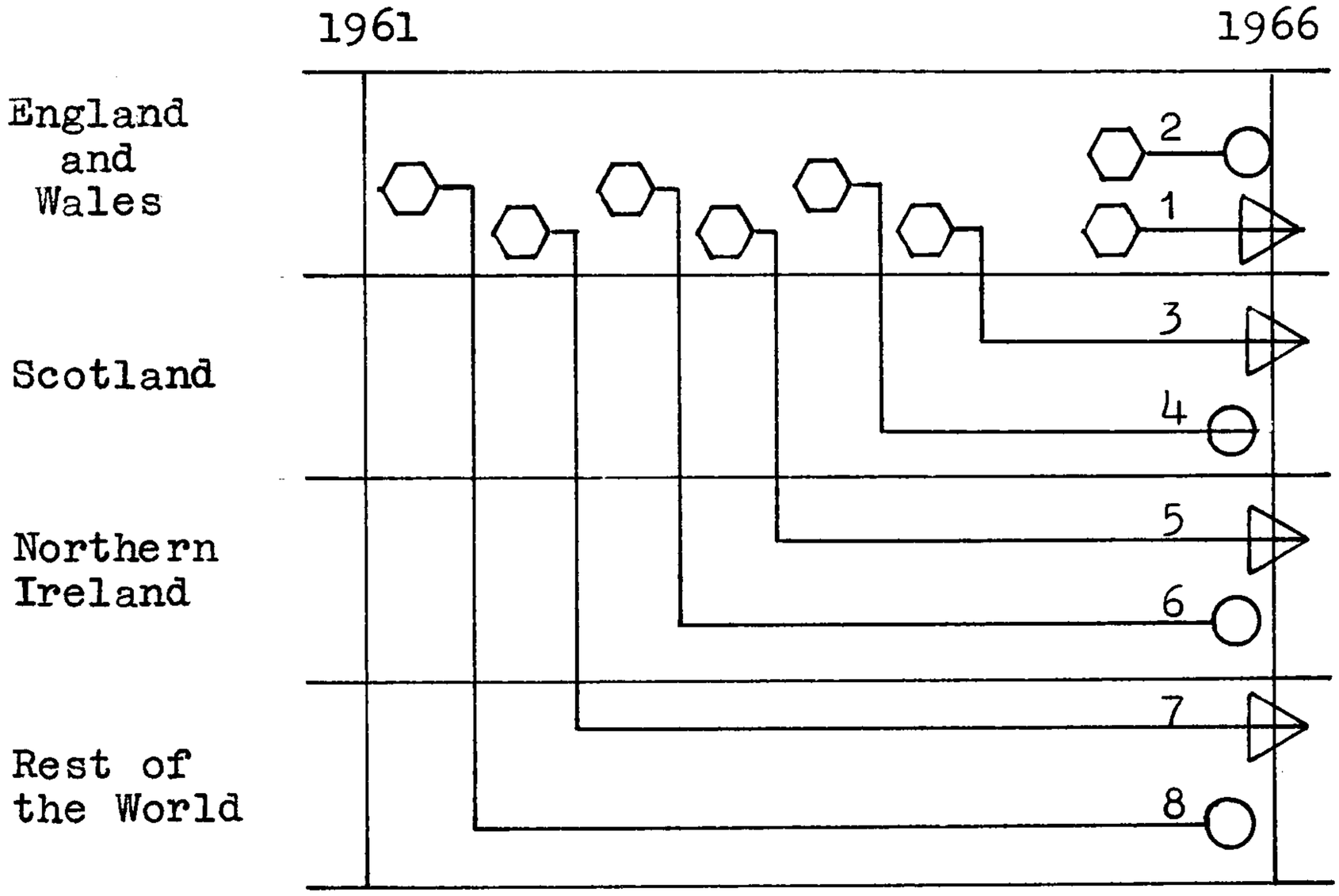
The term ${}_{N}^{EW}{}_{K}\beta_{01}^{(EW)*}\,x$ in equation 5.6 represents total births in England and Wales to persons at least one of whom was born in New Commonwealth countries over the period 1961 to 1966. This equation assigns these persons of 0-4 years to a "destination" in 1966, all possible variations in which are

Figure 5.8 General matrix for births, relevant flows only are shown.

| Region of birth 1961 to 1966 | Region of survival to 1966 | | | | Region of death between 1961 and 1966 | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | England and Wales | Scotland | Northern Ireland | Rest of the World | England and Wales | Scotland | Northern Ireland | Rest of the World | Totals |
| England and Wales | $EW_{N}{}^{K}{}^{P}EW$ EW | $EW_{N}{}^{K}{}^{P}EW$ Sc | $EW_{N}{}^{K}{}^{P}EW$ NI | $EW_{N}{}^{K}{}^{P}EW$ RW | $EW_{N}{}^{K}{}^{P}EW\delta EW$ | $EW_{N}{}^{K}{}^{P}EW\delta Sc$ | $EW_{N}{}^{K}{}^{P}EW\delta NI$ | $EW_{N}{}^{K}{}^{P}EW\delta RW$ | $EW_{N}{}^{K}{}^{P}EW$ |
| Scotland | $Sc_{N}{}^{K}{}^{P}Sc$ EW | | | | $Sc_{N}{}^{K}{}^{P}Sc\delta EW$ | | | | |
| Northern Ireland | $NI_{N}{}^{K}{}^{P}NI$ EW | | | | $NI_{N}{}^{K}{}^{P}NI\delta EW$ | | | | |
| Rest of the World | $RW_{N}{}^{K}{}^{P}RW$ EW | | | | $RW_{N}{}^{K}{}^{P}RW\delta EW$ | | | | |
| Totals | $\bullet_{N}{}^{K}{}^{P}\bullet$ EW | | | | $\bullet_{N}{}^{K}{}^{P}\bullet\ \delta EW$ | | | | |

spelled out in the right hand side of the equation. These possible "destinations" or "states" in 1966 are shown in Figure 5.9 .

Figure 5.9 Possible states in 1966, of births in England and Wales to New Commonwealth born persons between 1961 and 1966.




The flow arrows represent the following flows in the period 1961 to 1966:

1. Birth in England and Wales and survival to 1966
2. Birth in England and Wales and death in England and Wales before 1966
3. Birth in England and Wales and migration to Scotland
4. Birth in England and Wales and migration to Scotland and death in Scotland
5. Birth in England and Wales and migration to Northern Ireland
6. Birth in England and Wales, migration to Northern Ireland and death in Northern Ireland

7. Birth in England and Wales and migration to the Rest of the World
8. Birth in England and Wales, migration to the Rest of the World and death in the Rest of the World

The term in equation $\overset{5.7}{\backslash}{}^{*}_{N} K^{\beta}{}^{*}_{01}(EW) x$ represents the total number of persons who were born between 1961 and 1966 in all states and survived to be counted as residents in England and Wales in 1966. Since this implies recording in the 1966 census this term can form a basis towards which to work.

5.6.2 Information from the census

The 1966 Commonwealth Immigrant Tables directly record the number of persons, males and females born in New Commonwealth countries aged under five years on census night resident in England and Wales in 1966. These persons are, by definition, migrants to England and Wales in the period and survivors to 1966 but were born in New Commonwealth countries. This supplies directly the matrix term:

$$ {}^{RW}_{N} K^{3}{}^{(RW)EW}_{01} \; x \quad = \quad 30,758 \text{ persons} - $$

15,369 males, 15,389 females

From the 1966 census it is also possible to derive an estimate of the total numbers of persons aged 0-4 years in 1966 who were not necessarily born in New Commonwealth countries but have the ethnic distinction of having at least one parent born in these countries. Table 17 in the Commonwealth Immigrant Tables provides this information for the major sources of the New Commonwealth migrations, India, Pakistan, British Caribbean, Cyprus, Africa, Malta and other New

Commonwealth countries. These figures are given in Table 5.33.

Table 5.33 Children aged 0-4 years in 1966 with at least one parent born in a New Commonwealth country resident in England and Wales in 1966

| Place of birth of head or spouse | Number of children 0-4 |
|---|---|
| India | 49,119 |
| Pakistan | 8,871 |
| British Caribbean | 90,867 |
| Africa | 11,263 |
| Cyprus | 12,591 |
| Malta | 5,860 |
| Other New Commonwealth | 10,858 |
| Totals | 189,429 |

The total derived in Table 5.33 is in fact the second directly derivable term in the accounts matrix, being the 1966 total of all persons aged 0-4 years in 1966 who had at least one parent born in a New Commonwealth country.

That is:

$$ {}^{*}_{N}K^{\beta}_{01}(*)EW\ x \quad = \quad 189,429 $$

It should now be possible to work back through the matrix accounts to obtain a direct estimate of ${}^{EW}_{N}K^{\beta}_{01}(EW)*\ x$ which

is the total number of persons born between 1961 and 1966 in England and Wales at least one of whose parents was born in a New Commonwealth country.

To do this it is required that some assumptions are made, on a rational basis, regarding the migration, infant mortality and initial birth rates for the New Commonwealth group. The hypothesis is that once reasonable estimates have been obtained for migration and infant mortality then iteration through the matrix will eventually produce a birth rate which, when applied to the population at risk, will supply the required numbers of children recorded in 1966.

5.6.3 Assumptions made, migration, child mortality and birth rates assumed

The assumptions concerning the rates of migration and child mortality are held constant throughout the analysis. These two assumptions are:

1. the 0-4 year population with New Commonwealth parents will migrate at the same rate as the total population so that:

$$ {}^{*}_{N}K^{\beta(*)EW}_{01}\,x = {}^{*}_{N}K^{\beta(*)*}_{01}\,x_{(t,t+T)} \cdot \left[ {}^{*}_{*}K^{*EW}_{(t,t+T)}\,x \Big/ {}^{*}_{*}K^{**}_{(t,t+T)}\,x \right] \quad \ldots(5.8) $$

where only Scotland and Northern Ireland are concerned.

2. the 0-4 year population with New Commonwealth parents will die at the same rate as the total 0-4 year population of England and Wales in the period 1961 to 1966.

This rate has already been calculated in a previous section (section 5.4.2) and are taken as 0.0668 for males and 0.0520 for females. (see Table 5.23)

The rates of migration between zones in the U.K. are obtained from the 1966 Census Migration Tables and are shown in Table 5.34.

Further to this an out-migration rate is required for migration between England and Wales and the Rest of the World. This is not directly available from the census so the migration rate derivable from the population and migration accounts table is utilised.

This is obtained by:

$$\underset{N^{K}ol}{EW_{K}}{}^{\beta}(EW)\ RWX = {}^{N}_{K}\ EW\ RWX_{(t,t+T)} \ /\ {}^{N}_{K}EWX_{(t)} \qquad \ldots(5.9)$$

thus maintaining the assumption that children migrate at the same rate as their parents / total population.

This rate for males and females is:

0.05834 for males and, 0.10964 for females.

It is worth noting that since the death rates are calculated for deaths to all births in England and Wales over the five year period, the rate itself automatically accounts for any "at risk" concept which may be introduced. There is no need to consider time of exposure to the risk of death as in the migration system. The deaths obtained by estimation, though, may be marginally overestimated since the numbers of births to persons born in the New Commonwealth must have increased towards 1966 as the numbers of these persons themselves resident in the country increased.

The birth rates used initially is obtained for four female

Table 5.34 Migration rates for the total population of each zone between other zones in the U.K.

| From England and Wales | Migration Rate |
|---|---|
| To Scotland | |
| Males | 0.001896 |
| Females | 0.001859 |
| To Northern Ireland | |
| Males | 0.0005735 |
| Females | 0.0005211 |
| To England and Wales | |
| From Scotland | |
| Males | 0.03398 |
| Females | 0.02995 |
| From N. Ireland | |
| Males | 0.02318 |
| Females | 0.02106 |

Table 5.35 First iteration birth rates for the 4 fertile age groups.

| Age Group | Rate obtained from | Birth rate Males |
|---|---|---|
| 10-19 | 534,550.5/3,396,559 | 0.1574 |
| 20-24 | 681,670/1,443,389 | 0.4723 |
| 25-44 | 971,443/6,051,310 | 0.1605 |
| 45-59 | 164,855/4,810,566 | 0.0343 |

| Age Group | Rate obtained from | Birth rate Females |
|---|---|---|
| 10-19 | 503,904.5/3,396,559 | 0.1484 |
| 20-24 | 643,389.5/1,443,389 | 0.4457 |
| 25-44 | 919,776.5/6,051,310 | 0.1520 |
| 45-59 | 16,149.5/4,810,566 | 0.0336 |

childbearing age groups. The rate is obtained using the 1961 total female population but is applied to the mid-period New Commonwealth female population to allow for the great increase in this population over the period.

The rates for the four fertile age groups are obtained from Table 5.35.

These birth rates are essentially fertility rates in that they apply only to females and not the whole population. However, it is clear that a fairly high proportion of births, where one parent is born in the New Commonwealth, will be to couples of whom the father, and not the mother, was born in this group. These births will not be considered using simply a fertility rate. Some compensation, therefore, is needed to allow for this effect. Use of the Commonwealth Immigrant Tables allows this to be done. Table 18 of the Commonwealth Immigrant Tables provides the numbers of children aged under 16 years resident in England and Wales by place of birth of mother and father where at least one of the parents was born in a New Commonwealth country. Proportions in each "cross-ethnic" group can be obtained from this table as shown in Table 5.36.

Use of a fertility rate only would suggest that only 71.8% of the births of interest were being considered, that is, only these births of which the mother was born in the New Commonwealth, the shaded aress of Table 5.36. These figures include, unfortunately, children between the ages of 5-15 years. As such they could be expected to overestimate the numbers of births where <u>both</u> parents were born in the New Commonwealth since unions outside a single group might be expected to increase since the 1950's. More accurate estimation will be available for the 1966 to 1971 census

period due to the Registrar General's Statistical Review Appendix C3 . For example, the following table (Table 5.37) has been derived from the Registrar General's Statistical Review Population Tables for 1969 to 1970. Table 5.37 shows that in this year 19.4% of births to New Commonwealth born persons were of mixed ethnicity with the father in the New Commonwealth group. Similarly 10.4% of these births were of mixed ethnicity with the mother born in the New Commonwealth group. Some 76.6% of births to mothers born in the New Commonwealth were also to fathers from these countries, while some 89.6% of births where the father was recorded as being born in the New Commonwealth were also to mothers born in these countries. The point is that the effect of births to fathers cannot be ignored and the estimates of births to mothers born in New Commonwealth countries must be adjusted upward to allow for this effect.

## 5.6.4. Obtaining an estimate of total births, first birth rate estimate.

It is assumed, initially, that women born in the New Commonwealth and resident in England and Wales between 1961 and 1966 give birth at the same rate as the total female population of England and Wales in the same period. To allow for growth in the female New Commonwealth born population the male and female birth rates are applied using the estimated mid-period female population in the relevant age group. The birth rate is used simply according to:

$$\overset{EW}{N}\overset{\beta}{K}\overset{(EW)}{ol}_{*x} = \overset{N\ EWF}{K}_{(t+T/2)} \cdot \overset{EW}{b}_{EW} \overset{(EW)}{}_{*x} \qquad \ldots(5.10)$$

Table 5.36 Country of birth of both parents of children aged under 10 years resident in England and Wales in 1966.

| Place of birth of head | Place of birth of Spouse | Number of Children | Proportion of total |
|---|---|---|---|
| New Commonwealth | New Commonwealth | 218,280 | 0.5279 |
| New Commonwealth | G. B. | 80,600 | 0.1949 |
| New Commonwealth | Elsewhere | 23,880 | 0.0578 |
| G. B. | New Commonwealth | 50,930 | 0.1232 |
| Elsewhere | New Commonwealth | 6,270 | 0.0152 |
| Lone father | - | 12,050 | 0.0291 |
| - | Lone mother | 21,440 | 0.0519 |
| Total | | 413,500 | 1.0000 |

Table 5.37 Ethnicity of children born in England and Wales 1969-1970.

| Ethnic group of Father | Ethnic group of Mother | | | |
|---|---|---|---|---|
| | Other | | New Com. | |
| Other | 671,078 | 0.993 | 4,548 | 0.007 |
| | 0.986 | 0.927 | 0.104 | 0.006 |
| New Commonwealth | 9,356 | 0.194 | 39,042 | 0.766 |
| | 0.014 | 0.012 | 0.896 | 0.041 |
| | 680,434 | | 43,590 | |
| | 1.000 | | 1.000 | |

Estimates of male and female births are obtained from:

| Males | Age group | | | | | |
|---|---|---|---|---|---|---|
| | 10-19 | 42,784.5 | x | 0.1574 | = | 6,734 |
| | 20-24 | 36,966.5 | x | 0.4723 | = | 17,459 |
| | 25-44 | 121,863.5 | x | 0.1605 | = | 19,559 |
| | 45-59 | 37,086 | x | 0.0343 | = | 1,272 |
| | Totals | 238,700.5 | | | | 45,024 |

| Females | Age group | | | | | |
|---|---|---|---|---|---|---|
| | 10-19 | 42,784.5 | x | 0.1484 | = | 6,349 |
| | 20-24 | 36,966.5 | x | 0.4457 | = | 16,476 |
| | 25-44 | 121,863.5 | x | 0.1520 | = | 18,523 |
| | 45-59 | 37,086 | x | 0.0336 | = | 1,246 |
| | Totals | 238,700.5 | | | | 42,594 |

Under the initial assumption about the birth rate the total births to New Commonwealth born women in the period 1961 to 1966 is only 87,618. In terms of table 5.36 this 87,618 births is approximately 72% of the total births in England and Wales associated with a person born in New Commonwealth countries. This estimate therefore can be increased to fill in the, as yet unaccounted, births. Table 5.36 can therefore be re-stated in terms of our present estimate of births to obtain this required total.

In other words, it has been estimated that at England and Wales birth rate, 62,814 births between 1961 and 1966 were to parents both of whom were born in the New Commonwealth, 23,191 births were to a New Commonwealth father and British mother, 14,659 births were to New Commonwealth mothers and British fathers. The smaller numbers for the remaining pairings provide a total of 118,989 births, at this birth rate, 61,148 males and 57,841 females.

Table 5.38 Estimated births between 1961 and 1966 at England and Wales birth rate associated with persons born in New Commonwealth countries.

| Place of birth of head | Place of birth of spouse | Number of Children | Proportion of total |
|---|---|---|---|
| New Commonwealth | New Commonwealth | 62,814 | 0.5279 |
| New Commonwealth | G. B. | 23,191 | 0.1949 |
| New Commonwealth | Elsewhere | 6,878 | 0.0578 |
| G. B. | New Commonwealth | 14,659 | 0.1232 |
| Elsewhere | New Commonwealth | 1,809 | 0.0152 |
| Lone father | - | 3,463 | 0.0291 |
| - | Lone Mother | 6,175 | 0.0519 |
| Total | | 118,989 | 1.0000 |

## 5.6.5 Estimation of deaths to children born 1961-1966

These 118,989 children born between 1961 and 1966 represent the accounts term

$$\frac{EW \; {}^{\beta}(EW)x}{K \quad N \; 01}$$

which is the now total of equation.

From this total the various "states" of equation and Figure 5.9 must now be calculated.

We begin by estimating child deaths, on the assumption that this is most likely in the first few months of life as opposed to a migration event.

In the previous section on migration of the over five years age groups a five year death rate was derived for the England and Wales total population. Consistency demands that the rate thus derived for the 0-4 year age group be utilised here. Death rates do not vary as much as birth rates and so this age related death rate is used throughout

the iterations although there is reason to believe that there is some variation in the death rates of children born to New Commonwealth parents (King, 1973).

| | | | |
|---|---|---|---|
| Males | 0-4 years old | : | 0.0668 |
| Females | 0-4 years old | : | 0.0520 |

The total numbers of male and female children born and dying in England and Wales in the period is estimated from

$$EW\ \beta(EW)\ \delta(EW)x_{K,N,01} = EW\ \beta(EW)*x_{K,N,01} * \beta(EW)\ \delta(EW)x_{K,*,01}\ /2 \quad \ldots(5.11)$$

for each sex, so that:

$$EW\ \beta(EW)\ \delta(EW)M_{K,N,01} = 1953$$

and

$$EW\ \beta(EW)\ \delta(EW)F_{K,N,01} = 1,440$$

so that

$$EW\ \beta(EW)\ \delta(EW)x_{K,N,01} = 3,393$$

## 5.6.6 Estimation of the migration flows in the accounts table from England and Wales.

Subtraction of these deaths from the total births supplies a total of the 0-4 years population born in England and Wales which still has a variety of destinations for 1966. In this section we attempt estimation of the migration flows out of England and Wales to Scotland, Northern Ireland and the Rest of the World.

The relevant population is obtained from:

$$\underset{N\ O1}{\overset{EW\ K}{\beta(EW)_{*}x}} - \underset{N\ O1}{\overset{EW\ K}{\beta(EW)\ \delta(EW)}} = \underset{N\ O1}{\overset{EW\ K}{\beta^{3}(EW)_{*}}} - \delta(EW)_{*} \qquad ..(5.12)$$

which is, for males:

$$61,148 - 1,953 = 59,195 \qquad ..(5.13)$$

and for females:

$$57,841 - 1,440 = 56,401 \qquad ..(5.14)$$

The rates of migration from England and Wales to Scotland Northern Ireland, and the Rest of the World have already been obtained (Section 5.3.7). It remains to apply the rates for each zone to the population aged 0-4 years obtained above to obtain the remaining deductions from the birth population.

For Scotland:

Males : $59,243 \times 0.001896 = \underline{112}$ ..(5.15)

Females: $56,401 \times 0.001859 = \underline{105}$ ..(5.16)

For Northern Ireland:

Males : $659,243 \times 0.0005735 = \underline{40}$ ..(5.17)

Females: $56,401 \times 0.0005211 = \underline{29}$ ..(5.18)

For Rest of the World:

Males : $59,243 \times 0.05834 = \underline{3,456}$ ..(5.19)

Females: $56,401 \times 0.10964 = \underline{6,184}$ ..(5.20)

### 5.6.7 Estimation of the migration flows in the accounts table to England and Wales.

To be able to estimate the numbers of children aged 0-4 who increase the 0-4 year old population of England and Wales over the period but were not born in England and Wales a similar procedure is followed to that used to estimate migration from England and Wales to Scotland and Northern Ireland. That is, a birth rate is used and allowance is

made for the fact that it may have been the father rather than the mother who was born in a New Commonwealth country.

So for Scotland we obtain (using England and Wales birth rate)

| Persons | Males | Females |
|---|---|---|
| 3,840 | 1,972 | 1,868 |

and for Northern Ireland (using England and Wales birth rate)

| Persons | Males | Females |
|---|---|---|
| 583 | 299 | 284 |

Subsequently birth and migration to England and Wales is obtained. It must be noted that since the migration rates, unlike the birth rates, are obtained from the census of 1966 then they are migration and survival rates. In practical terms this means that what is estimated is in fact the birth and migration flow minus the birth, migration and death flow.

Birth and Migration from Scotland to England and Wales is obtained from:

$$\underset{N\ 01}{\overset{S}{K}}\ \rho(S)EWM = 1972 \times 0.03398 = \underline{67} \qquad ..(5.21)$$

$$\underset{N\ 01}{\overset{S}{K}}\ \rho(S)EWF = 1868 \times 0.02995 = \underline{56} \qquad ..(5.22)$$

so that $\underset{N\ 01}{\overset{S}{K}}\ \rho(S)EW^{*} = \underline{123}$

Birth and Migration from Northern Ireland to England and Wales is obtained from:

$$\underset{N\ 01}{\overset{NI}{K}}\ \rho(NI)EWM = 299 \times 0.02318 = \underline{7} \qquad ..(5.23)$$

$$\underset{N\ 01}{\overset{NI}{K}}\ \rho(NI)EWF = 284 \times 0.02105 = \underline{6} \qquad ..(5.24)$$

so that $\underset{N\ 01}{\overset{NI}{K}}\ \rho(NI)EW^{*} = \underline{13}$

In-flow of children from the Rest of the World is obtained directly from the 1966 Commonwealth Immigrant Tables. If the Rest of the World zone is, in this case, considered to be the New Commonwealth, that is, we ignore for example children born to New Commonwealth officials in New York then this inflow becomes:

| Persons | Males | Females |
|---|---|---|
| 30,758 | 15,369 | 15,389 |

Since these are derived from the census they are birth, migration and survival terms.

We have now obtained in-flows and out-flows of children aged 0-4 years of age for England and Wales. Only the minor birth, migration and death flows remain to be calculated, while recognising that these will be very small in most cases.

## 5.6.8 Estimation of deaths to migrant children.

The figures obtained in section 5.6.7 are migration and survival terms so deaths to these children cannot be obtained simply by multiplication through a death rate. Instead the migration and survival figures are divided by the reciprocal of the death rate to obtain a migration total from which the migration and survival figures may be subtracted to supply migration and deaths.

So for each zone:

Scotland to England and Wales

Males: $67 \times 1/(1 - 0.03115) = 69$ ...(5.25)

Females: $56 \times 1/(1 - 0.02428) = 57$ ...(5.26)

Northern Ireland to England and Wales

Males: $7 \times 1/(1 - 0.03115) = 7$ ..(5.28)

Females: $6 \times 1/(1 - 0.03115) = 6$ ..(5.29)

Rest of the World to England and Wales

Males: $15,369 \times 1/(1 - 0.03115) = 15,862$ ..(5.30)

Females: $15,389 \times 1/(1 - 0.02428) = 15,771$ ..(5.31)

So that:

$$S_{N^K O1}\beta(S)\,\delta(EW)M = 2$$

$$S_{N\ O1}^{K}\beta(S)\,\delta(EW)F = 1$$

$$NI_{N^K O1}\beta(NI)\,\delta(EW)M = 0$$

$$NI_{N^K O1}\beta(NI)\,\delta(EW)F = 0$$

$$N_{N^K O1}\beta(RW)\,\delta(RW)M = 493$$

$$N_{N^K O1}\beta(RW)\,\delta(RW)F = 382$$

Similarly deaths are estimated to out-migrant children from England and Wales.

From England and Wales to Scotland

Males: $112 \times 1/(1 - 0.03115) = \underline{116}$ ..(5.32)

Females: $105 \times 1/(1 - 0.02428) = \underline{108}$ ..(5.33)

From England and Wales to Northern Ireland

Males: $40 \times 1/(1 - 0.03115) = \underline{41}$ ..(5.34)

Females: $29 \times 1/(1 - 0.02428) = \underline{30}$ ..(5.35)

From England and Wales to Rest of the World

Males: $3,456 \times 0.03115 = 111$ ..(5.36)

Females: $6,188 \times 0.02428 = 154$ ..(5.37)

This last equation needs no reformulation since the rate was obtained at "source" rather than at "destination". It is the number of migrations rather than of migrations and

migrations and deaths.

So that:

$$EW_{N^K O1}\ \beta(EW)\ \delta(S)M = 4$$

$$EW_{N^K O1}\ \beta(EW)\ \delta(S)F = 3$$

$$EW_{N^K O1}\ \beta(EW)\ \delta(NI)M = 1$$

$$EW_{N^K O1}\ \beta(EW)\ \delta(NI)F = 1$$

$$EW_{N^K O1}\ \beta(EW)\ \delta(RW)M = 111$$

$$EW_{N^K O1}\ \beta(EW)\ \delta(RW)F = 154$$

The accounts matrix can now be filled in and the iteration equation stated.

## 5.6.9 Birth Accounts, first iteration

The $EW_{N^K O1}\ \beta(EW)\ EW\ M$ and the $EW_{N^K O1}\ \beta(EW) EW\ F$ terms are obtained from row equation where;

$$EW_{N^K O1}\ \beta(EW)\ EW\ M = 61,148-111-1-4-1953-3,456-40-112 = 55,471 \quad (5.38)$$

and

$$EW_{N^K O1}\ \beta(EW)\ EW\ F = 57,841-154-1-3-1440-6,188-29-105 = 49,917 \quad (5.39)$$

and the column sum where;

$$EW_{N^K O1}\ \beta(EW)\ EW\ M = 94,658-15,369-7-67 = 79,215 \quad (5.40)$$

and

$$EW_{N^K O1}\ \beta(EW)\ EW\ F = 94,771-15,389-6-56 = 79,320 \quad (5.41)$$

By comparing the two estimates we can obtain a factor by which we can increase the birth rates used initially. This will enable a better approximation to the actual numbers of children aged 0-4 years old in England and Wales in 1966.

So for the second iteration birth rate in each age group becomes for males:

Table 5.38 Births Accounts Table : first iteration

Males

| Region of birth | | State at (t,t+T) EW | S | NI | RW | Region of death (t,t+T) ∫(EW) | ∫(S) | ∫(NI) | ∫(RW) | Totals |
|---|---|---|---|---|---|---|---|---|---|---|
| | (EW) | 55,471 / 79,215 | 112 | 40 | 3456 | 1953 | 4 | 1 | 111 | 61,148 |
| | (S) | 67 | | | | 2 | | | | |
| | (NI) | 7 | | | | 0 | | | | |
| | (RW) | 15,369 | | | | 493 | | | | |
| | Total | 94,658 | | | | 2446 | | | | |

Table 5.39 Births Acounts Table : first iteration

Females

| Region of birth | | State at (t,t+T) EW | S | NI | RW | Region of death (t,t+T) ∫(EW) | ∫(S) | ∫(NI) | ∫(RW) | Totals |
|---|---|---|---|---|---|---|---|---|---|---|
| | (EW) | 49,922 / 79,320 | 105 | 29 | 6188 | 1440 | 3 | 1 | 154 | 57,841 |
| | (S) | 56 | | | | 1 | | | | |
| | (NI) | 6 | | | | 0 | | | | |
| | (RW) | 15,389 | | | | 382 | | | | |
| | Total | 94,771 | | | | 1823 | | | | |

79,215 / 55,471 = 1.4282

and for females:

79,320 / 49,921 = 1.5890

The birth rates for the second iteration become:

| Age Group | Birth rate (Males) 1st Iteration | New Rate | Birth rate (Females) 1st Iteration | New Rate |
|---|---|---|---|---|
| 10-19 | 0.1574 | 0.2248 | 0.1484 | 0.2358 |
| 20-24 | 0.4723 | 0.6745 | 0.4457 | 0.7082 |
| 25-44 | 0.1605 | 0.2292 | 0.1520 | 0.2415 |
| 45-59 | 0.0343 | 0.0490 | 0.0336 | 0.0534 |

Iteration is achieved through recycling through the equations of section 5.6 (equations 5.10 to 5.37) The sequence is as follows.

1) Estimate births in England and Wales
2) Estimate births and deaths in England and Wales
3) Estimate migrations <u>from</u> England and Wales
   <u>to</u> (a) Scotland
   (b) Northern Ireland
   (c) Rest of the World
4) Estimate births in Scotland and Northern Ireland
5) Estimate migrations <u>to</u> England and Wales
   <u>from</u> (a) Scotland
   (b) Northern Ireland
6) Estimate deaths <u>to</u> migrants to England and Wales
   <u>from</u> (a) Scotland
   (b) Northern Ireland
   (c) Rest of the World
7) Estimate deaths to migrants <u>from</u> England and Wales
   <u>to</u> (a) Scotland
   (b) Northern Ireland
   (c) Rest of the World
8) Use equations 5.38, 5.39, 5.40, 5.41 to check on the "fit" of the two estimates
9) Calculate new birth rate and recycle.

## 5.6.10 Birth accounts, converged form.

Subsequent iterations enable convergence of row and column estimates to be obtained. Final iteration values are given in Table 5.40.

The birth rates which produce these final values in the matrix are given in Table 5.41.

The Births Matrix shows that in 1966 there were an estimated 94,658 Male children under 5 years of age residing in England and Wales of whom at least one parent was born in a New Commonwealth Country or Colony. Of these an estimated 79,186 male children had been born in England and Wales and 15,472 had in-migrated to England and Wales from the other 3 zones. It is also estimated that 4,767 male children were born in England and Wales but migrated to the Rest of the World zone in the period. Similar values for female children are obtainable from the second matrix in the table.

The most important conclusion from the Matrix is that, given certain numbers of persons who could be involved in the birth of a child over the period, the birth rates at England and Wales level cannot possibly account for the total number of births which have occurred in the period. The migration and migration and death rates do not substantially effect the situation and one arrives at the conclusion that the New Commonwealth birth rates are considerably larger than the rates for the England and Wales total population. This is a conclusion which has been reached elsewhere but here it can be said that to satisfy the 1966 census totals for persons under the age of 5 years it is necessary for the male birth rate level for the New Commonwealth groups to be 1.39

Table 5.40 Birth accounts, converged form

Males

| Region of Birth | State at 1966 | EW | S | NI | RW | Death state ∫(EW) | ∫(S) | ∫(NI) | ∫(RW) | Totals |
|---|---|---|---|---|---|---|---|---|---|---|
| | (EW) | 79,186 | 160 | 48 | 4767 | 2712 | 5 | 2 | 153 | 87,033 |
| | (S) | 93 | | | | 3 | | | | |
| | (NI) | 10 | | | | 0 | | | | |
| | (RW) | 15,369 | | | | 493 | | | | |
| | Total | 94,658 | | | | 3208 | | | | |

Females

| Region of Birth | State at 1966 | EW | S | NI | RW | Region of death ∫(EW) | ∫(S) | ∫(NI) | ∫(RW) | Totals |
|---|---|---|---|---|---|---|---|---|---|---|
| | (EW) | 79,287 | 170 | 47 | 9554 | 2222 | 4 | 1 | 238 | 91,523 |
| | (S) | 86 | | | | 2 | | | | |
| | (NI) | 9 | | | | 0 | | | | |
| | (RW) | 15,389 | | | | 382 | | | | |
| | Total | 94,771 | | | | 2606 | | | | |

Table 5.41 Birth rates, final form

| Age group | Male | Female |
|---|---|---|
| 10-19 | 0.2185 | 0.2290 |
| 20-24 | 0.6557 | 0.6876 |
| 25-44 | 0.2228 | 0.2346 |
| 45-59 | 0.0477 | 0.0519 |

times the level of the England and Wales total population, and for females, 1.54 times the level of the England and Wales total population. These figures are obtained from averaging over the 4 age groups for the England and Wales (1st Iteration) rates and comparing with the similarly averaged last iteration values.

In simple terms the conclusion is drawn that the level of fertility of the New Commonwealth Groups is, for males approximately $\frac{1}{3}$ greater than the England and Wales total population, and for females this figure is approximately 50% greater than the England and Wales population. To satisfy the census control totals for 1966 the birth rate for males born to parents one of whom was born in a New Commonwealth country or colony in the period 1961 to 1966 was 0.2862 and for females 0.3008 compared with England and Wales total population values of 0.2061 and 0.1949 respectively for the five year census period 1961 - 1966 It has thus been possible, using a new methodology - the accounts based demographic model - to derive precise statements on the level of fertility of New Commonwealth groups in England and Wales, which directly account for the numbers of children under the age of five years in the group of interest in 1966, and which are not grossly affected by the other rates used in the accounts building.

It remains in this section to recognise the fact of mixed ethnicity in children born in this period. Table 18 of the Commonwealth Immigrant Tables enabled us previously to estimate total births where not only the mother, but also the father, could be "responsible" for a child. It was estimated that 71.82% of all births were to parents who were both born in New Commonwealth countries (see Table 5.36).

Table 5.42 England and Wales birth rate and New Commonwealth birth rate compared

| Age Group | Males 1st Iteration | 2nd Iteration | | Females 1st Iteration | 2nd Iteration |
|---|---|---|---|---|---|
| 10-19 | 0.1574 | 0.2185 | 1 | 0.1484 | 0.2290 |
| 20-24 | 0.4723 | 0.6557 | 2 | 0.4457 | 0.6876 |
| 25-44 | 0.1605 | 0.2228 | 3 | 0.1520 | 0.2346 |
| 45-59 | 0.0343 | 0.0477 | 4 | 0.0336 | 0.0519 |
| Average | A 0.2061 | B 0.2862 | Ave Br. | C 0.1949 | D 0.3008 |

B/A = 1.39 D/C = 1.54

Table 5.43 Cross-ethnicity of children born in period 1961 to 1966 resident in England and Wales in 1966

| Place of Birth of Head | Place of Birth of Spouse | Number of Male children | Number of Female children | Total | Total% |
|---|---|---|---|---|---|
| N.C. | N.C. | 45,945 | 48,315 | 94,260 | 52.79 |
| N.C. | G.B. | 16,963 | 17,838 | 34,801 | 19.49 |
| N.C. | Elsewhere | 5,031 | 5,290 | 10,321 | 5.78 |
| G.B. | N.C. | 10,722 | 11,276 | 21,998 | 12.32 |
| Elsewhere | N.C. | 1,323 | 1,391 | 2,714 | 1.52 |
| Lone Father | - | 2,532 | 2,663 | 5,195 | 2.91 |
| - | Lone Mother | 4,517 | 4,750 | 9,267 | 5.19 |
| Totals | | 87,033 | 91,523 | 178,556 | 100.00 |

It is valid, therefore, since these proportions are for the period preceding the 1966 census to break down the birth totals obtained from the matrices in the proportions calculated here. The children are divided up into 7 cross-ethnic categories depending on the ethnicity of each of their parents.

The conclusion is that as little as 52% of all the children in the group of study were born to parents both of whom were born in the New Commonwealth. Inter-group differences are worth mentioning here. 72% of all children born to parents at least one of whom was born in the British Caribbean had parents who were both born there, while this was true of only 40% of Indian children and 47% of Pakistani children.

## 5.7 The accounts matrix : all age groups

### 5.7.1 The status of the estimated population

The calculation and piecing together of the accounts was performed in two stages because we recognise that the two populations analysed may be of a different nature. In the main body of the accounts only persons who had been born in New Commonwealth countries, colonies or protectorates were recognised and we did not admit, for practical and developmental reasons only, the existence of persons born in England and Wales of New Commonwealth parents prior to 1961 census date. Hence the population in 1966 so analysed was aged 5 years or over.

In the second part of the estimation and building procedures we recognised the existence of persons aged 0-4 years in 1966 born of New Commonwealth parent or parents but born

in England and Wales. They are therefore not definable in as precise a manner as the age groups of 5 years and over. Therefore, in the final procedure, that is, the assembling of the two estimates in one accounts framework the reader should be aware that we are, in part, dealing with slightly differently defined populations.

## 5.7.2 Accounts table : final version

The Table below gives the final version of the accounts table towards which we have been working. It is presented in full again and the reader may if he wishes match the relevant variables against their correct situation in the accounts matrix given previously, for age groups 5 to 9 and above.

Figure 5.10(a) Population accounts table for England and Wales, 1961 to 1966, stocks and flows, MALES

| | t \ t+T | Survival in England and Wales to 1966 | | | | | | | | | | | | | | Migration & survival, migration and death in Rest of World | Deaths in England & Wales | Totals 1961 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 0- 4 | 5- 9 | 10-14 | 15-19 | 20-24 | 25-29 | 30-34 | 35-39 | 40-44 | 45-49 | 50-54 | 55-59 | 60-64 | ⩾ 65 | | | |
| Existence, 1961, England & Wales | 0- 4 | | 8,872 | | | | | | | | | | | | | 722 | .687 | 10,281 |
| | 5- 9 | | | 12,399 | | | | | | | | | | | | 1,411 | 37 | 13,847 |
| | 10-14 | | | | 12,007 | | | | | | | | | | | 1,378 | 35 | 13,420 |
| | 15-19 | | | | | 14,590 | | | | | | | | | | 1,627 | 91 | 16,308 |
| | 20-24 | | | | | | 33,118 | | | | | | | | | 3,799 | 229 | 36,946 |
| | 25-29 | | | | | | | 45,032 | | | | | | | | 4,951 | 312 | 50,295 |
| | 30-34 | | | | | | | | 38,321 | | | | | | | 4,125 | 321 | 42,767 |
| | 35-39 | | | | | | | | | 27,339 | | | | | | 2,892 | 352 | 30,583 |
| | 40-44 | | | | | | | | | | 18,808 | | | | | 1,977 | 392 | 21,177 |
| | 45-49 | | | | | | | | | | | 14,465 | | | | 1,317 | 502 | 16,284 |
| | 50-54 | | | | | | | | | | | | 11,018 | | | 871 | 705 | 12,594 |
| | 55-59 | | | | | | | | | | | | | 7,271 | | 521 | 811 | 8,603 |
| | 60-64 | | | | | | | | | | | | | | 9,575 | 521 | 4,195 | 5,789 |
| | 65 | | | | | | | | | | | | | | | | | 8,502 |
| Existence, 1961, in Rest of World | 0- 4 | | 20,133 | | | | | | | | | | | | | | 34 | |
| | 5- 9 | | | 21,168 | | | | | | | | | | | | | 34 | |
| | 10-14 | | | | 20,800 | | | | | | | | | | | | 71 | |
| | 15-19 | | | | | 30,636 | | | | | | | | | | | 116 | |
| | 20-24 | | | | | | 34,432 | | | | | | | | | | 134 | |
| | 25-29 | | | | | | | 28,183 | | | | | | | | | 132 | |
| | 30-34 | | | | | | | | 21,545 | | | | | | | | 155 | |
| | 35-39 | | | | | | | | | 15,190 | | | | | | | 174 | |
| | 40-44 | | | | | | | | | | 6,661 | | | | | | 127 | |
| | 45-49 | | | | | | | | | | | 4,051 | | | | | 140 | |
| | 50-54 | | | | | | | | | | | | 2,216 | | | | 130 | |
| | 55-59 | | | | | | | | | | | | | 687 | | | 64 | |
| | 60-64 | | | | | | | | | | | | | | 624 | | 155 | |
| | 65 | | | | | | | | | | | | | | | | | |
| Region of birth 1961-1966 | England and Wales | 79,186 | | | | | | | | | | | | | | 5,135 | 2,712 | |
| | Scotland | 93 | | | | | | | | | | | | | | | 3 | |
| | Northern Ireland | 10 | | | | | | | | | | | | | | | 0 | |
| | Rest of World | 15,369 | | | | | | | | | | | | | | | 493 | |
| Totals 1966 | | 94,658 | 29,005 | 33,567 | 32,807 | 45,226 | 67,550 | 73,215 | 59,866 | 42,529 | 25,469 | 18,516 | 13,234 | 7,958 | 10,199 | | 13,343 | |

Figure 5.10(b) Population accounts table for England and Wales, 1961 to 1966, stocks and flows, FEMALES

| | t \ t+T | Survival in England and Wales to 1966 | | | | | | | | | | | | | Migration & survival, migration and death in Rest of World | Deaths in England & Wales | Totals 1961 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 0- 4 | 5- 9 | 10-14 | 15-19 | 20-24 | 25-29 | 30-34 | 35-39 | 40-44 | 45-49 | 50-54 | 55-59 | 60-64 | ⩾65 | | |
| Existence, 1961, England & Wales | 0- 4 | | 7,910 | | | | | | | | | | | | | 1,406 | 511 | 9,827 |
| | 5- 9 | | | 10,687 | | | | | | | | | | | | 2,251 | 23 | 12,961 |
| | 10-14 | | | | 10,213 | | | | | | | | | | | 2,154 | 20 | 12,387 |
| | 15-19 | | | | | 12,696 | | | | | | | | | | 2,635 | 34 | 15,365 |
| | 20-24 | | | | | | 24,534 | | | | | | | | | 5,006 | 80 | 29,620 |
| | 25-29 | | | | | | | 25,723 | | | | | | | | 5,317 | 112 | 31,152 |
| | 30-34 | | | | | | | | 20,176 | | | | | | | 4,161 | 130 | 24,467 |
| | 35-39 | | | | | | | | | 16,156 | | | | | | 3,315 | 163 | 19,634 |
| | 40-44 | | | | | | | | | | 11,643 | | | | | 2,374 | 187 | 14,204 |
| | 45-49 | | | | | | | | | | | 10,329 | | | | 2,003 | 265 | 12,597 |
| | 50-54 | | | | | | | | | | | | 8,816 | | | 1,697 | 349 | 10,862 |
| | 55-59 | | | | | | | | | | | | | 6,686 | | 1,266 | 394 | 8,346 |
| | 60-64 | | | | | | | | | | | | | | 13,901 | 2,391 | 4,820 | 6,524 |
| | ⩾65 | | | | | | | | | | | | | | | | | 14,588 |
| Existence, 1961, In Rest of World | 0- 4 | | 19,615 | | | | | | | | | | | | | | 22 | |
| | 5- 9 | | | 19,940 | | | | | | | | | | | | | 20 | |
| | 10-14 | | | | 16,977 | | | | | | | | | | | | 44 | |
| | 15-19 | | | | | 31,617 | | | | | | | | | | | 54 | |
| | 20-24 | | | | | | 23,907 | | | | | | | | | | 55 | |
| | 25-29 | | | | | | | 19,015 | | | | | | | | | 65 | |
| | 30-34 | | | | | | | | 14,689 | | | | | | | | 79 | |
| | 35-39 | | | | | | | | | 10,070 | | | | | | | 85 | |
| | 40-44 | | | | | | | | | | 5,770 | | | | | | 78 | |
| | 45-49 | | | | | | | | | | | 3,652 | | | | | 75 | |
| | 50-54 | | | | | | | | | | | | 2,157 | | | | 64 | |
| | 55-59 | | | | | | | | | | | | | 1,749 | | | 85 | |
| | 60-64 | | | | | | | | | | | | | | 3,344 | | 634 | |
| | ⩾65 | | | | | | | | | | | | | | | | | |
| Region of birth 1961-1966 | England and Wales | 79,287 | | | | | | | | | | | | | | 10,014 | 2,222 | |
| | Scotland | 86 | | | | | | | | | | | | | | | 2 | |
| | Northern Ireland | 9 | | | | | | | | | | | | | | | 0 | |
| | Rest of World | 15,389 | | | | | | | | | | | | | | | 382 | |
| | Totals 1966 | 94,771 | 27,525 | 30,627 | 27,190 | 44,313 | 48,441 | 44,738 | 34,865 | 26,226 | 17,413 | 13,981 | 10,973 | 8,435 | 17,245 | | 11,054 | |

## 5.8 Projections of the New Commonwealth population of England and Wales.

### 5.8.1 The means of projection

In the previous section we have shown how to derive the population matrix of flows from which key rates of population change may be derived. It follows that the next step is to use these rates in projecting the future New Commonwealth populations of England and Wales. Although this is the logical step with respect to this chapter, this requires the introduction of the reader to the means of projection to the model which will supply population numbers at given future dates. Full exposition of this model is given in a later chapter. For the present it will suffice to introduce the reader to the principles upon which the model works rather than its actual mathematical form since the principles are all that are required in order to visualise the points at which the data, which we have gone to such lengths to establish, fit into the model.

Basically the model takes a given population disaggregated by age and sex, for example the 1961 or 1966 population totals in five year age groups, and applies the survival rate, calculated through the matrix to obtain the probable numbers of people in five year age groups five years later. To this population is added the persons in-migrating and surviving in the period, again in five year age groups. The calculation of this series of population vectors is given in the chapter dealing with the model and the Leeds C.B. projections. From this aggregate population is calculated the women at risk of giving birth, which we assume, is the average number of women in existence, in the fertile age

groups, in the five year period. This population is assumed to give birth at the rate for New Commonwealth women in Leeds in 1971. This may seem to be a large assumption. In fact the average rate of fertility, the general fertility rate, calculated for Leeds varies very little from that average calculated in the births matrix and it has the advantage of being disaggregated by five year age group of women in the fertile age range. No apology, therefore, is made for this inclusion.

This calculation supplies the total number of children under five years old born in this country in the particular five year period under consideration. To these persons must be added the young, under five, immigrants who both in-migrate and survive in this country in the period. From this final rate calculation the new vector of population in the five year age groups at the end of the period is achieved. The whole process is explained more rigorously in the later chapter (8) and the reader is requested to refer to this if more clarification is required at this time.

## 5.8.2 The projected population

There are problems in the definition of the population which is being projected. Quite clearly, the children born to New Commonwealth population in England and Wales are British by birth just as their parents were "New Commonwealth" by birth. Mixed ethnicity, over one, two or more generations makes this whole situation a very complex one. The Registrar General now presents a table in the Annual Statistical Review which, in the long run will make it possible to formulate prevalences and so forth. At the present time we accept that the persons, within the model

are identifiable by their connection with persons, either one or more, who were born in the New Commonwealth countries without regard to the length of the generational gap from the identity of birth in the New Commonwealth which may exist.

## 5.8.3 The results of the model runs

The results of the model predictions given below are true if the following assumptions hold. We do not attempt to foresee the future with these predictions we simply show what will be the case if our assumptions are correct. Should the reader have any quibble with the assumptions then he may modify the predicted figures in accordance.

The assumptions are:

(1) That the survival in England and Wales rates for the New Commonwealth population remain the same as those which are calculated for the period 1961 to 1966. The survival rates used are not, in this specific instance derived from the accounts table because of the difficulties which have been thrown up surrounding the calculation of these rates. Instead the survival rates deriving from the work of Rees et al (1974) for West Yorkshire are used. The derivation of these survival probabilities (since they sum to a total of 1.00) is given in Chapter 8 and the values themselves for each age transition in Table 8.1.

(2) That in-migration takes place as shown in Table 8.3 of Chapter 8.

(3) That the fertility of the New Commonwealth women remains at the level calculated for Leeds, in 1971, until 1976 whereafter they fall to a level equal to that of British women in 1971.

Table 5.44 Projected New Commonwealth population of England and Wales, 1976, 1981 and 1986.

| Age Group | 1976 | | 1981 | | 1986 | |
|---|---|---|---|---|---|---|
| | Males | Females | Males | Females | Males | Females |
| 0-4 | 128,228 | 124,604 | 63,996 | 62,192 | 69,659 | 67,602 |
| 5-9 | 105,087 | 88,316 | 114,690 | 93,279 | 60,833 | 49,716 |
| 10-14 | 96,379 | 75,677 | 102,326 | 78,760 | 109,435 | 81,613 |
| 15-19 | 38,394 | 33,426 | 92,628 | 65,554 | 97,173 | 66,910 |
| 20-24 | 46,067 | 42,483 | 48,936 | 41,202 | 96,973 | 66,795 |
| 25-29 | 51,231 | 45,441 | 59,898 | 48,673 | 61,744 | 46,237 |
| 30-34 | 63,478 | 51,359 | 66,520 | 51,191 | 73,790 | 52,857 |
| 35-39 | 81,164 | 55,345 | 73,927 | 53,108 | 76,013 | 52,014 |
| 40-44 | 85,070 | 49,849 | 85,191 | 54,600 | 78,006 | 51,934 |
| 45-49 | 64,488 | 36,055 | 82,844 | 46,537 | 82,690 | 50,274 |
| 50-54 | 44,330 | 27,637 | 63,751 | 35,425 | 80,611 | 44,640 |
| 55-59 | 28,446 | 19,736 | 43,150 | 27,072 | 60,714 | 33,868 |
| 60-64 | 19,674 | 15,772 | 26,117 | 18,524 | 38,937 | 24,953 |
| 65 + | 21,741 | 27,870 | 30,185 | 34,751 | 40,568 | 41,883 |
| Totals | 873,877 | 693,970 | 954,159 | 710,086 | 1,027,146 | 731,296 |

Under these assumptions the model predicts the following male and female population vectors for 1976, 1981 and 1986.

The Table shows

the development of a population structure from that of a distinctively migrant population with the attendant bulges in numbers, in the case of the 1976 structure in the 35 to 45 year age groups reflecting the glut of in-migration of young adults in the early sixties. The 30-34 year old age group in 1976 is the highest age group for males to continue increasing in numbers through to 1986 (2529 for females). Thereafter all the age groups above this group decline in number but have the effect of "piling up" in the over 65 year age group.

At the same time as the "piling up" in the oldest age group, it may be seen that the children born during the period of high fertility predicted during the late sixties and early seventies are becoming of school age. The model predicts that between 1976 and 1981 a total of 114,690 male and 93,279 female children of New Commonwealth "origin" will enter the education system. In 1976 an estimated 365,000 children will be between the ages of 5 and 14 years. For 1981 this will have increased to approximately 389,000 but will decline sharply to 1986 to 301,000, when the effects of the lowered birth rates will be making themselves felt. Further declines could then be predicted to a situation where, at a very loose approximation we might expect about 225,000 children of ethnic origin to be in the education system at any one time, although this situation is beyond the time span of the present model runs. As time goes on, of course, these children will present less of an educational problem, in the sense of being especially difficult to teach because of language or behavioural/ cultural characteristics.

At the same time we may see from the table that persons of New Commonwealth origin in the national labour force will be increasing fairly steadily. It is here that tensions may arise. Society is geared to expect to support children and elderly people, how far society's institutions may be expected to stretch under the strains of increased unemployment for long periods as our economic depression deepens, particularly as many, disproportionately many, of these unemployed are likely to be coloured, New Commonwealth people is another matter. By the last half of the 1970's Britain's New Commonwealth population are likely to be reaching out, rightly, for, if not "middle class" status, at least "middle class" job security, reaching areas of our society which have learned to react and defend themselves. It will be a challenge for these British "institutions" on no smaller scale than that of the bleaker periods of the 1960's to resist the temptation once more to make the immigrant population (and particularly the coloured migrant population c.f. lack of comment about Irish immigration in the 1960's) a scapegoat for economic and social malaise.

# CHAPTER 6

## Information about births in Leeds to the immigrant population.

### 6.1 Introduction

In June, 1969, the Department of Health began the recording of mother's and father's place of birth on a birth registration form. This paper is a presentation of the ethnic, social and economic characteristics revealed by the association of information normally recorded on the birth registration form with this new information on the birth place group of mother and father for one year of recorded births to mothers and fathers residing within Leeds C.B. in 1971. Because of the nature of the search of birth records, kindly allowed by the Department of Child Health in Leeds, it was possible to extract only figures for mothers and fathers born outside Great Britain, that is, England and Wales and Scotland, and not for mothers and fathers born in Great Britain. The information is supplied as part of a sequence covering the three years from June, 1969, to June, 1972. It must be stressed at the outset that while the sampling of the births was 100%, the analysis by birth place of mother and father is, in effect, a sampling of the total ethnic populations of Leeds C.B. in 1971, i.e. it covers only these members of each population grouping who were involved, as parents, in the birth of a child in 1971.

### 6.2 Aims of this chapter

Because of the special nature of problems associated with

the collection of data which make specific note of a person's ethnicity, the presentation of a data set such as this has specific value in itself. While the initial reaction, when it became apparent in the Mid-Sixties that ethnicity of a birth needed recording, was a fear of what this might show up, the more recent commitment to the recording of such information has resulted in very little published work dealing directly with the results. In this respect the endeavours of the Birmingham Health Authorities (e.g. Corporation Statistician 1967-1968) over recent years, are to be greatly admired. Similarly if the Birmingham Papers, or even this chapter, stimulate any more interest in what must by now be a most vital information system in national terms then so much the better.

The paper also has behind it a number of less grandiose but equally imperative reasons mostly concerned with the author's present work on ethnic demography in Leeds C.B. Donald Bogue (1969) has stressed that birth statistics are not only biological data but also social and economic data as well. The birth statistics provide the occurrence information necessary for measurement and analysis of the fertility levels characteristic of different groups. Later in the thesis the 1971 census results are used in the calculation of birth and fertility rates for different birthplace groups within the city. The information presented here also allows analysis of the birth occurrences by other social and economic phenomena such as mother's age and number of previous live-born children, mother's location within zones in the city and father's occupation category and socio-economic group. Further, while this information applies to the birth occurrences, the social

and economic data also refer to the parents involved and provide, therefore, a cross-sectional picture of a part of the overseas born population of Leeds C.B. This data is normally only obtainable at intra-city level by the use of probabilistic estimation methods. Therefore, part of this chapter must be concerned with comparing and contrasting the social and economic structures of the populations concerned in the birth occurrence of a child in 1971.

Finally, the collection of this data is an attempt to place the demography of coloured and other immigrant persons in Leeds C.B. within the wider framework of spatial demographic analysis, developed by Rees and Wilson (1973). The natality data described here and the fertility rates derivable from them are one essential ingredient needed for projecting the future immigrant population of Leeds C.B. and residential areas within it.

## 6.3 The organisation of the data.

The data used in this chapter was collected directly from the birth registration forms held by the Department of Child Health in Leeds. Complete anonymity of the births has been ensured by the assignment of each birth occurrence to its 1966 enumeration district and from this to one of 34 zones which cover the city. The zone system and definition of each zone in terms of enumeration districts and the name by which the area is recognised within the city may be found in Appendix 1. No names were recorded, but recognition of an Anglo-Saxon name along with an Indian birthplace recording was noted, and the cases are included in the analysis. The list of variables which were recorded from the forms are as follows:

1) Father's Place of Birth
2) Mother's Place of Birth
3) Father's occupation
4) Child's date of birth
5) Previous births to mother
6) Previous still births to Mother
7) Previous abortions to Mother
8) Mother's date of birth
9) Sex of child
10) Live or still birth
11) Legitimacy
12) A location code for mother's residence

The total number of countries of birth which occurred as the data was collected and the nine major groups into which these have been organised to allow for easier data handling are shown below. The only remaining data to require comment are the occupation and socio-economic group coding which were obtained from the Classification of Occupations (O.P.C.S. 1970).

Birthplaces recorded and grouped for analysis

| Actual Birthplace | Analysis Group |
|---|---|
| India | India |
| Pakistan | Pakistan |
| West Indies, Grenada, Jamaica, Barbados, St. Kitts, Guyana, St. Lucia, Dominica, Trinidad | West Indies |
| Cyprus, Malta, Hong Kong, Kenya Bahamas, Mauritius, Rhodesia, Commonwealth countries of Africa, Singapore | Other New Commonwealth |
| Australia, New Zealand, Canada | Old Commonwealth |
| Northern Ireland | Northern Ireland |
| Republic of Ireland | Republic of Ireland |
| Italy, Greece, Poland, Spain | Europe |
| Egypt, China, Palestine, Peru, Hungary Iran, Zanzibar, Antilles, Argentina, Lithuania | Rest of World |

Clearly there is a problem when presenting data of this nature since the mothers and fathers may be, in significant numbers, born in different birthplace groups. Except where stated, the tables are presented by birthplace of mother. Information on the mother is both more reliable and more useful in the planned generation of fertility rates than information on the father. Also birthplace of the parents is taken as a valid surrogate for other factors, unknown from this data source, which combine to provide the classification of "ethnic group", that is, language, customs, colour, religion, racial type and so on.

## 6.4 Ethnicity of births in Leeds.

In 1971, there were 7,842 births in Leeds C.B. to residents of the city (Office of Population Censuses and Surveys, 1973[b]), made up of 4,080 male births and 3,762 female births. Of these 7,842 births, 1,318 were to parents at least one of whom had been born in an overseas country, including Northern Ireland and the Irish Republic. Table 6.1 supplies the number of births in each of the eleven major parental birthplace groups and their corresponding percentages of the total "ethnic" and total Leeds births. These figures, which are births to mothers in particular birthplace groups show that of the New Commonwealth countries, the Caribbean is most strongly represented followed by the Indian and then Pakistani groups with 2.3%, 2.1% and 2.0% respectively of the total births in Leeds. A total of 7.6% of all births in Leeds in 1971 were to mothers who had been born in New Commonwealth countries. Mothers from the Irish Republic produced the most births of all the ten major overseas groups, the largest single group percentage of 3.8% of total Leeds births and 22.4% of the specified

Table 6.1 Births by mother's place of birth, Leeds C.B. 1971

| Mother's Birthplace | Birth occurrences | | | % of Ethnic Births | % of Leeds Total Births |
|---|---|---|---|---|---|
| | Persons | Males | Females | | |
| India | 167 | 81 | 86 | 12.7 | 2.1 |
| Pakistan | 155 | 86 | 69 | 11.8 | 2.0 |
| Caribbean | 184 | 90 | 94 | 14.0 | 2.3 |
| Northern Ireland | 62 | 38 | 24 | 4.7 | 0.8 |
| Irish Republic (Eire) | 296 | 146 | 150 | 22.0 | 3.8 |
| Other New Commonwealth | 90 | 43 | 47 | 6.8 | 1.2 |
| Old Commonwealth | 16 | 10 | 6 | 1.3 | 0.2 |
| Europe | 41 | 22 | 19 | 3.1 | 0.5 |
| Rest of World | 13 | 5 | 8 | 1.0 | 0.2 |
| Great Britain (Overseas father) | 294 | 159 | 135 | 22.2 | 3.7 |
| Great Britain (British father) | 6,524 | 3,400 | 3,124 | - | 83.2 |
| Total | 7,842 | 4,080 | 3,762 | 100.0 | 100.0 |

"ethnic" births respectively. Northern Ireland, the Old Commonwealth Countries of Australia, New Zealand and Canada, Europe, and the Rest of the World are the minor contributors supplying 0.8%, 0.2%, 0.5% and 0.2% of the total Leeds births respectively. Therefore of the 1,318 births to parents at least one of whom was born overseas nearly half (596 births, 45.3% of total "ethnic" births) were to women who may be regarded as coloured New Commonwealth immigrants, since the number of births to mothers from "white" New Commonwealth countries (Gibraltar, Malta) were very small. Mothers born in the Irish Republic produced over one fifth of the "ethnic" births and almost the same number of births were to mothers born in Great Britain with an overseas father.

Table 6.2 which gives total births in Leeds by mother's and father's place of birth, enables the details concerning the 294 births to mothers born in Great Britain to be filled in. Table 6.3(a) and (b) supply the percentage values derived from Table 6.2, with the exclusion of the births to mothers and fathers both born in Great Britain. Table 6.3(a) supplies the range of values for mother's birthplace, for each father's birthplace, Table 6.3(b) supplies the range of values for father's birthplace, for each mother's birthplace. It can be seen from Table 6.2 that of the 294 births to mothers born in Great Britain with an overseas father nearly half (49.0% - Table 6.3(b)) had a father who was born in the Republic of Ireland. There were only 38 births to British mothers and a Caribbean father (12.9%), 18 births (6.1%) to British mothers and an Indian father and the relatively very small number of British mother/Pakistani father unions is indicated by the 10 births (3.4%) of this

Table 6.2 Births by place of birth of mother and father, Leeds C.B. 1971.

| Father's Birth-place | Mother's Birthplace | | | | | | | | | | Totals |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Ind | Pak | Carib | N.I. | Eire | O.N.C. | O.C. | Eur | R.W. | G.B. | |
| Ind | 144 | 11 | 1 | 1 | 0 | 18 | 0 | 0 | 2 | 18 | 195 |
| Pak | 4 | 142 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 10 | 157 |
| Carib | 0 | 0 | 136 | 0 | 1 | 0 | 0 | 0 | 0 | 38 | 175 |
| N.I. | 0 | 0 | 0 | 29 | 8 | 0 | 0 | 0 | 0 | 32 | 69 |
| Eire | 2 | 0 | 1 | 5 | 159 | 0 | 0 | 1 | 0 | 144 | 312 |
| O.N.C. | 7 | 1 | 3 | 0 | 1 | 57 | 0 | 1 | 0 | 14 | 84 |
| O.C. | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 8 | 10 |
| Eur | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 23 | 1 | 22 | 49 |
| R.W. | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 8 | 7 | 8 | 26 |
| G.B. | 9 | 1 | 3 | 14 | 95 | 9 | 10 | 8 | 3 | 5520 | 5672 |
| Illeg | 1 | 0 | 40 | 13 | 29 | 4 | 2 | 0 | 0 | 1004 | 1093 |
| Totals | 167 | 155 | 184 | 62 | 296 | 90 | 16 | 41 | 13 | 6818 | 7842 |

Notes 1. The following abbreviations are used in Tables 6.2 and 6.3.

| | | |
|---|---|---|
| Ind | - | India |
| Pak | - | Pakistan |
| Carib | - | Caribbean |
| N.I. | - | Northern Ireland |
| Eire | - | Republic of Ireland |
| O.N.C. | - | Other New Commonwealth |
| O.C. | - | Old Commonwealth |
| Eur | - | Europe |
| R.W. | - | Rest of the World |
| G.B. | - | Great Britain |
| Illeg | - | Illegitimate |

Table 6.3 Percent of births to mothers and fathers of particular birthplace groups, Leeds C.B. 1971.

(a) Percent of births to fathers of a particular birthplace group and to mothers of all other birthplace groups.

| Father's Birthplace | Mother's Birthplace | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Ind | Pak | Carib | N.I. | Eire | O.N.C. | O.C. | Eur | R.W. | G.B. | Total |
| Ind | 73.9 | 5.6 | 0.5 | 0.5 | 0.0 | 9.2 | 0.0 | 0.0 | 1.0 | 9.2 | 100.0 |
| Pak | 2.6 | 90.5 | 0.0 | 0.0 | 0.6 | 0.0 | 0.0 | 0.0 | 0.0 | 6.4 | 100.0 |
| Carib | 0.0 | 0.0 | 77.7 | 0.0 | 0.6 | 0.0 | 0.0 | 0.0 | 0.0 | 21.7 | 100.0 |
| N.I. | 0.0 | 0.0 | 0.0 | 42.0 | 11.6 | 0.0 | 0.0 | 0.0 | 0.0 | 46.4 | 100.0 |
| Eire | 0.6 | 0.0 | 0.3 | 1.6 | 51.0 | 0.0 | 0.0 | 0.3 | 0.0 | 46.2 | 100.0 |
| O.N.C. | 8.3 | 1.2 | 3.6 | 0.0 | 1.2 | 67.9 | 0.0 | 1.2 | 0.0 | 16.7 | 100.0 |
| O.C. | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 20.0 | 0.0 | 0.0 | 80.0 | 100.0 |
| Eur | 0.0 | 0.0 | 0.0 | 0.0 | 2.0 | 2.0 | 2.0 | 46.9 | 2.0 | 44.9 | 100.0 |
| R.W. | 0.0 | 0.0 | 0.0 | 0.0 | 3.9 | 3.9 | 3.9 | 30.8 | 26.9 | 30.8 | 100.0 |
| G.B. | 5.9 | 0.7 | 2.0 | 9.2 | 62.5 | 5.9 | 6.6 | 5.3 | 2.0 | - | 100.0 |
| Total | 2.1 | 2.0 | 2.3 | 0.8 | 3.8 | 1.1 | 0.2 | 0.6 | 0.2 | 86.9 | 100.0 |

Table 6.3

(b) Percent of births to mothers of a particular birthplace group and to fathers of all other birthplace groups.

| Father's Birthplace | Mother's birthplace | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Ind | Pak | Carib | N.I. | Eire | O.N.C. | O.C. | Eur | R.W. | G.B.[1] | Total |
| Ind | 86.2 | 7.1 | 0.5 | 1.6 | 0.0 | 20.0 | 0.0 | 0.0 | 15.4 | 6.1 | 2.5 |
| Pak | 2.4 | 91.6 | 0.0 | 0.3 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 3.4 | 2.0 |
| Carib | 0.0 | 0.0 | 73.9 | 0.0 | 0.3 | 0.0 | 0.0 | 0.0 | 0.0 | 12.9 | 2.2 |
| N.I. | 0.0 | 0.0 | 0.5 | 46.8 | 2.7 | 0.0 | 0.0 | 0.0 | 0.0 | 10.9 | 0.9 |
| Eire | 1.2 | 0.0 | 1.6 | 8.1 | 53.7 | 0.0 | 0.0 | 2.4 | 0.0 | 49.0 | 4.1 |
| O.N.C. | 4.2 | 0.7 | 0.0 | 0.0 | 0.3 | 63.3 | 0.0 | 2.4 | 0.0 | 4.8 | 1.1 |
| O.C. | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 12.5 | 0.0 | 0.0 | 2.7 | 0.1 |
| Eur | 0.0 | 0.0 | 0.0 | 0.0 | 0.3 | 1.1 | 6.3 | 56.2 | 7.7 | 7.5 | 0.6 |
| R.W. | 0.0 | 0.0 | 0.0 | 0.0 | 0.3 | 1.1 | 6.3 | 19.5 | 53.9 | 2.7 | 0.3 |
| G.B. | 5.4 | 0.7 | 1.6 | 22.6 | 32.1 | 10.0 | 62.5 | 19.5 | 23.1 | - | 72.3 |
| Illeg. | 0.6 | 0.0 | 21.7 | 21.0 | 9.8 | 4.5 | 12.5 | 0.0 | 0.0 | - | 13.9 |
| Totals | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |

Note: See notes with Table 6.2 for definition of birthplace groups.

Table 6.3 Percent of births to mothers and fathers of particular birthplace groups. England and Wales 1970.

(c) Percent of births to fathers of a particular birthplace group and to mothers of all other birthplace groups in England and Wales, 1970.

| Father's Birth-place | Mother's Birthplace | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Ind/ Pak | Carib | Eire | O.N.C. | O.C. | FOR | U.K. | N.S. | Total |
| Ind/Pak | 80.3 | 0.2 | 0.8 | 4.3 | 0.1 | 2.0 | 12.2 | 0.2 | 100.0 |
| Carib | 0.2 | 80.8 | 1.2 | 0.6 | 0.1 | 1.4 | 15.6 | 0.1 | 100.0 |
| Eire | 0.2 | 0.1 | 52.4 | 0.3 | 0.2 | 1.1 | 45.5 | 0.2 | 100.0 |
| O.N.C. | 6.0 | 2.2 | 1.8 | 61.9 | 0.3 | 5.2 | 22.4 | 0.2 | 100.0 |
| O.C. | 0.7 | 0.2 | 1.5 | 0.5 | 29.0 | 7.0 | 60.7 | 0.4 | 100.0 |
| FOR | 0.9 | 0.6 | 1.8 | 1.3 | 0.6 | 47.2 | 47.2 | 0.4 | 100.0 |
| U.K. | 0.3 | 0.1 | 1.4 | 0.3 | 0.2 | 1.3 | 95.2 | 1.2 | 100.0 |
| N.S.leg | 0.4 | 0.1 | 1.1 | 0.4 | 0.2 | 1.4 | 90.3 | 6.1 | 100.0 |
| N.S. illeg | 0.3 | 5.7 | 4.2 | 0.8 | 0.4 | 1.7 | 86.2 | 0.7 | 100.0 |
| Totals | 2.7 | 1.8 | 3.0 | 1.3 | 0.3 | 2.5 | 87.3 | 1.1 | 100.0 |

(d) Percent of births to mothers of a particular birthplace group and to fathers of all other birthplace groups in England and Wales, 1970.

| Father's Birth-place | Mother's Birthplace | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Ind/ Pak | Carib | Eire | O.N.C. | O.C. | FOR | U.K. | N.S. | Total |
| Ind/Pak | 87.0 | 0.3 | 0.8 | 9.3 | 1.2 | 2.3 | 0.4 | 0.4 | 2.9 |
| Carib | 0.1 | 78.5 | 0.7 | 0.8 | 0.5 | 0.9 | 0.3 | 0.1 | 1.7 |
| Eire | 0.2 | 0.1 | 50.2 | 0.6 | 1.7 | 1.3 | 1.5 | 0.6 | 2.9 |
| O.N.C. | 3.3 | 1.8 | 0.9 | 67.2 | 1.6 | 3.0 | 0.4 | 0.3 | 1.5 |
| O.C. | 0.1 | 0.0 | 0.1 | 0.1 | 21.9 | 0.6 | 0.2 | 0.1 | 0.2 |
| FOR | 0.8 | 0.7 | 1.4 | 2.3 | 5.4 | 44.8 | 1.3 | 0.8 | 2.4 |
| U.K. | 7.8 | 3.7 | 39.0 | 16.7 | 59.8 | 43.1 | 90.1 | 87.9 | 82.5 |
| N.S.leg | 0.2 | 0.1 | 0.4 | 0.3 | 0.8 | 0.7 | 1.2 | 6.7 | 1.2 |
| N.S. illeg | 0.5 | 14.8 | 6.5 | 2.7 | 7.1 | 3.3 | 4.6 | 3.1 | 4.7 |
| Totals | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |

(See overleaf)

Source Registrar General's statistical Review of England and Wales (1970)

Note The following abbreviations are used in Table 6.3 (c) and (d).

| | | |
|---|---|---|
| Ind/Pak | - | combined figures for India and Pakistan |
| U.K. | - | United Kingdom, England and Wales, Scotland and Northern Ireland |
| N.S. | - | birthplace not stated |
| Leg | - | legitimate birth |
| Illeg | - | Illegitimate birth |

combination parentage. Conversely, considering the small number of births where European and other New Commonwealth fathers were involved there are relatively high percentages of 7.48% and 4.76% respectively of births to British mothers with fathers in these birthplace groups.

The diagonal of Table 6.2 gives births where the ethnic group of both parents was the same. This may be interpreted in two ways as Table 6.3(a) and 6.3(b) shows, as a percentage of births to fathers of a particular ethnic group, the figures and their complements (100 minus percent in diagonal) then supplying some idea of the amount of intra- and inter ethnic marriage (at least those resulting in children), and which sex is doing the mixing! For example of the total births to Indian fathers (Table 6.3(a)) only 73.9% were to women born in India also. Equal numbers were to women born in Great Britain (18, 9.2%) and other New Commonwealth Countries (18, 9.2%) and a smaller number (11, 5.6%) to women born in Pakistan. On the other hand of the total births to Indian Women (Table 6.3(b)) 86.2% were to Indian fathers, followed by British fathers (9, 5.4%) and other New Commonwealth fathers (7, 4.19%). Indian men, rather than the Indian women, are mainly responsible for the ethnic mixing which takes place. As may be expected the Pakistani mothers and fathers both have a very low tendency to intermixture, 90.5% of birth to Pakistani fathers being also to Pakistani mothers and 91.6% of births to Pakistani mothers being to Pakistani fathers, most of the remaining births being to mothers or fathers born in the other Asian country, India. For the Caribbean group intermixture is higher but for Caribbean males is almost solely with British women. The figures for Caribbean women are masked by the high illegitimacy rate, of which

more will be said later. On the other hand union of Caribbean women with British men appears to be fairly rare accounting for only 1.6 of births to Caribbean mothers. The other New Commonwealth countries also show a fairly high level of marital segregation. 63.3% of these births were to mothers who were from these other New Commonwealth countries and fathers from the same countries while the equivalent figure for fathers was 67.9%. The males, however, demonstrated less tendency to be associated with Indians, Pakistanis and West Indians than the women in overall terms though they were associated with all three groups, the women being associated only with Indian males.

The remaining groups all demonstrate much higher intermixture with a definite preference for other white groups and the British men and women in particular. Almost half of all the births to men and women born in the Republic of Ireland were from partners born in Britain, 32.1% for women and 46.2% for men. Males born overseas have proportionately more successful procreational unions with females born in Great Britain than do females born overseas with males born in Great Britain.

Table 6.3 (c) and (d) provide the comparable values of Table 6.3 (a) and (b) for England and Wales in 1970. In general comparison shows that intermixture levels for Leeds C.B. are higher than for England and Wales as a whole for the coloured New Commonwealth groups and lower for the "white" groups. The only exception to this is Other New Commonwealth females who have a lower intermixture level at Leeds C.B. scale than at England and Wales scale. It would seem, however, that illegitimate births are relatively more frequent in Leeds C.B. for all groups than in England

and Wales. The women born in the Caribbean, at 7% more than the national average appear to be worst off in this respect.

To sum up there appears to be a marked difference in inter-ethnic mixing between the coloured immigrant groups - the major New Commonwealth countries - and those areas of origin which may be regarded as white. Some 70 to 90 per-cent of births to New Commonwealth born mothers are to fathers with the same birthplace, whereas only 20 to 70 per-cent of births to mothers born overseas in "white" countries are to fathers with the same birthplace. Of all groups the Pakistanis are notably the most separate and in six out of nine cases the men have a higher probability of being associated with a female of a different ethnic group than have the women with a man of a different ethnic group. Mixing with British men and women is important in varying degrees but appears to be most important for men with British women. Table 6.4 may make this more clear.

The large difference between the values for Caribbean males and females must be treated carefully because of the number of illegitimate births in this group, a number of which births were to a recorded British father. However, even under the extreme assumption that all illegitimate births were fathered by British men there would still be an appreciable difference in the number of mixed births involving either British men or British women. Births involving British women number 294, births involving British men number 152 and there were 89 recorded illegitimate births in total.

Table 6.4 Percent of births in Leeds C.B. in 1971 where a British mother or father was involved.

| Father's Birthplace | Percent of births in fathers group to British mother | Mother's Birthplace | Percent of births in mothers group to British father |
|---|---|---|---|
| India | 9.2 | India | 5.4 |
| Pakistan | 6.4 | Pakistan | 0.7 |
| Caribbean | 21.7 | Caribbean | 1.6 |
| Northern Ireland | 46.4 | Northern Ireland | 22.6 |
| Eire | 46.2 | Eire | 32.1 |
| Other New Commonwealth | 16.7 | Other New Commonwealth | 10.0 |
| Old Commonwealth | 80.0 | Old Commonwealth | 62.5 |
| Europe | 44.9 | Europe | 19.5 |
| Rest of World | 30.8 | Rest of World | 23.1 |

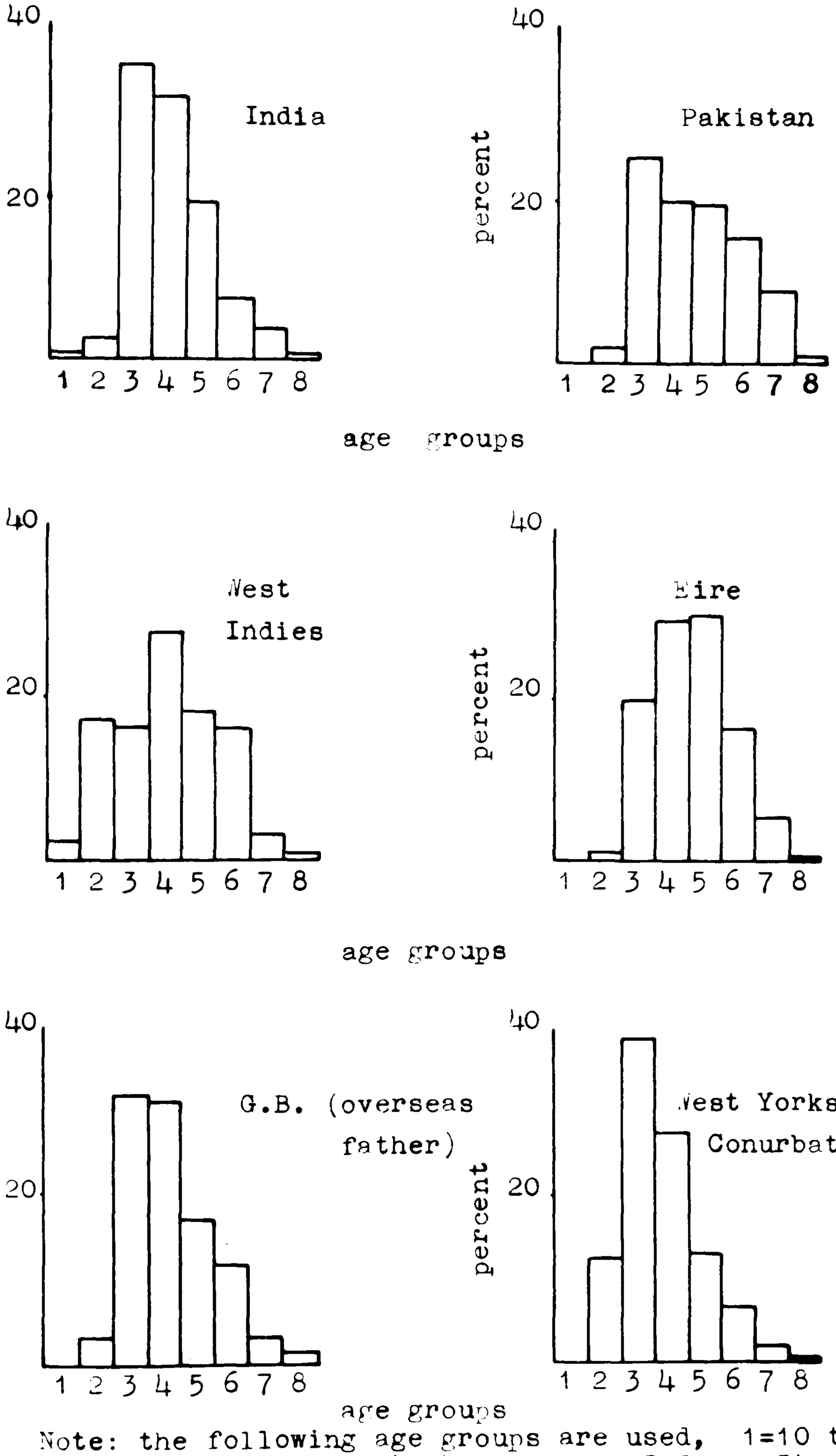
## 6.5 Births by social characteristics of mother

### 6.5.1 Births by age of mother

Age of mother at the birth of the child is a most important social characteristic and may be one of the main reasons why the fertility of immigrant women appears to be larger, for any aggregate populations, than that of the indigenous population of Great Britain. It is suggested here that the age structures of women giving birth is significantly different from that of the indigenous women due to a number of factors which tend to spread the birth occurrences to immigrant groups, including both white and coloured, out over the whole age range. For example, one may expect the number of children being born to English women to be greatest between the ages of 20 to 29 years while for immigrant groups one may expect more births to occur at a later stage when settlement in British society is more complete. The Birmingham Central Statistical office Report on the ethnic origins of children born in Birmingham in 1967 notes this, stating that only about a quarter of the births to non-immigrant women were to women aged 30 or over while for Indian women this proportion was 29.4%, for Irish women 38.2% and for West Indian Women 44.9%. However, the other side of the bias is, of course, that the age structure of the whole immigrant population is skewed towards the younger age groups which would therefore tend to give sharp peaks in birth occurrences in the younger age ranges.

Figure 6.1 demonstrates that both these major effects appear to exist in Leeds. The percentage of the total birth occurrences for each group occurring in each age group - for 6 major ethnic groups given in Table 6.5 may be

**Figure 6.1** Distribution of births by mother's age and mother's place of birth, Leeds 1971




Note: the following age groups are used, 1=10 to 14, 2=15 to 19, 3=20 to 24, 4=25 to 29, 5=30 to 34, 6=35 to 39, 7=40 to 44, 8=45 to 49.

plotted for comparative purposes on graphs (Figure 6.1). It may be seen from both the table and the figure, mothers from the Caribbean appear to begin their families markedly earlier than any other of the sample birthplace groups, 16.8% of births occurring to mothers in the second child bearing age group, 15-19 years. This group also has the second largest percentage of births occurring to mothers of the oldest child-bearing age group, 11% of all recorded births to this group for 1971 i.e. mothers aged 45 to 49 years. Consequently the plot of these birth percentages show a longer spread than for any other of the selected groups. 33% of births to Caribbean born mothers occurred to women over the median child bearing age of 30 years (Table 6.6). Conversely for Indian mothers nearly 70% of all the birth occurrences were to women aged under 30 years and 65% were to women aged between 20 and 30 years. Some 29% of births were to women aged 30 years and over. The Pakistani women, however, appeared to sustain fertility the longest of any of the New Commonwealth groups with 8% of the births being to women aged between 40 and 44 years. The most fertile age group for Pakistani women appeared to be, as for Indians, in the 20-24 years age group which is younger than the Caribbean women's most fertile group and fully 10 years on average younger than the most fertile age group for women from the Republic of Ireland.

In comparison one may look at the births by age of mother for the West Yorkshire conurbation for 1970 which is the latest date available, supplied in Table 6.5. This demonstrates the differences which do exist in the distribution of births by mothers age in the immigrant and indigenous populations. 77.6% of all births to mothers in 1970 in the West Yorkshire conurbation were to women aged under 30

Table 6.5 Births by age of mother by place of birth of mother in Leeds, 1971.

Selected groups

| Mothers Age | Mothers place of birth: India No. | India % | Pakistan No. | Pakistan % | Caribbean No. | Caribbean % | Eire No. | Eire % | G.B.-1 No. | G.B.-1 % | G.B.-2 % |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 10-14 | 1 | 0.6 | 0 | 0.0 | 4 | 2.2 | 0 | 0.0 | 0 | 0.0 | 0.0 |
| 15-19 | 4 | 2.4 | 3 | 1.9 | 31 | 16.8 | 4 | 1.4 | 10 | 3.4 | 12.1 |
| 20-24 | 58 | 34.7 | 38 | 24.5 | 29 | 15.8 | 57 | 19.3 | 94 | 32.0 | 38.3 |
| 25-29 | 52 | 31.1 | 30 | 19.4 | 50 | 27.2 | 85 | 28.6 | 93 | 31.6 | 27.2 |
| 30-34 | 31 | 18.6 | 29 | 18.7 | 33 | 17.8 | 87 | 29.4 | 50 | 17.0 | 13.8 |
| 35-39 | 11 | 6.6 | 23 | 14.8 | 29 | 15.8 | 44 | 14.9 | 32 | 10.9 | 6.5 |
| 40-44 | 6 | 3.6 | 13 | 8.4 | 6 | 3.3 | 16 | 5.4 | 9 | 3.1 | 2.0 |
| 45.49 | 1 | 0.6 | 1 | 0.7 | 2 | 1.1 | 1 | 0.3 | 4 | 1.4 | 0.1 |
| Unknown | 3 | 1.8 | 18 | 11.6 | - | - | 2 | 0.7 | 2 | 0.6 | - |
| Totals | 167 | 100.0 | 155 | 100.0 | 184 | 100.0 | 296 | 100.0 | 294 | 100.0 | 100.0 |

Table 6.6 Percent of births to mothers in certain age groups in Leeds 1971 and West Yorkshire, 1970.

Selected groups

| Mothers age group | Mothers place of birth | | | | | |
|---|---|---|---|---|---|---|
| | Indian | Pakistan | Caribbean | Eire | G.B.[1] | G.B.[2] |
| less than 30 years | 68.8 | 45.8 | 62.0 | 49.3 | 67.0 | 77.6 |
| 30 - 39 years | 25.2 | 33.5 | 33.6 | 44.3 | 27.9 | 20.3 |
| 40 years or more | 6.0 | 20.7 | 4.4 | 6.4 | 5.1 | 2.1 |

Note: The following abbreviations are used in Tables 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16 and 17 of Chapter 6.

G.B.[1] - births in Leeds in 1971 to mothers born in Great Britain with overseas father

G.B.[2] - births in West Yorkshire in 1970 to total population

Source Registrar Generals Statistical Review of England and Wales for 1970. Table GG.

years and only 22.4% were to women aged over 30 years. One is left, therefore, to ask why the distribution of births by age of mother for Indian women is demonstrated to be most similar to the West Yorkshire conurbation average, along with parents of whom the mother was born in Great Britain and the father overseas, and why the distribution of births by age of mother for the Caribbean and Irish Republic groups are most dissimilar. It may be that there exists a difference in the sequence of events for Asians and West Indians. For the former, family formation is more likely to precede migration whereas this tends not to be the case for West Indians, to whom migration is more likely to be an event which comes before family formation. The West Indian females attitude to temporary associations with males is certainly likely to be much freer than for their Asian counterparts and is consequently likely to result in the fairly high proportion of births in the 15-19 years age group. In fact of the 184 births to West Indian women, 52 were recorded as being illegitimate, whether or not the father was named, 44% of these were to women aged between 10 and 20 years. Illegitimate births to West Indian women accounted for 23 out of 35 births to women aged between 10 and 20 years.

A re-examination of the distribution by age of mother of births to Caribbean mothers suggests the hypothesis that, where illegitimate births are a fairly regular occurrence for a particular group one might expect that there will be two peaks in the births by age of mother structure. In the case of the Caribbean women a second peak occurs at 25-29 years which may be defined as the most probable age at which a married West Indian woman may give birth. In simple terms one can say that a child born to a West Indian

woman between the ages of 10 and 20 is most likely to be illegitimate and that one born to a woman aged 25-29 is likely to be legitimate. Figures for Northern Irish women, who also have a high illegitimacy rate also show this double peak effect. Of the births to women in this group aged between 10 and 24 which represent half the total births to this group, over one third were illegitimate.

To sum up, then, it seems that of the ethnic populations excluding British born women, Indians are the most likely to have children before the age of 30 years, and the Pakistanis most unlikely. For Irish women on the other hand, the likelihood of giving birth is roughly similar for the under 30's and the over 30's. There is a very marked tendency for Caribbean women to begin families at a very early age, usually illegitimately but with most births occurring between the ages of 25 and 29 years for the mother.

In considering the information supplied above it must be remembered that to speak of the fertility and the productivity of certain age groups of mothers is not strictly accurate. What is presented here are the numbers of live births occurrences by age of mother for the specified birthplace groups in Leeds C.B. in 1971. So a certain age group of women may appear to be the most fertile by producing the most children. This may not be correct since no account has yet been taken of the relative number of women "at risk" of giving birth, in these age groups. This information, and hence the ability to derive fertility rates is given in a later chapter. (7)

## 6.5.2 Births by parity of mother

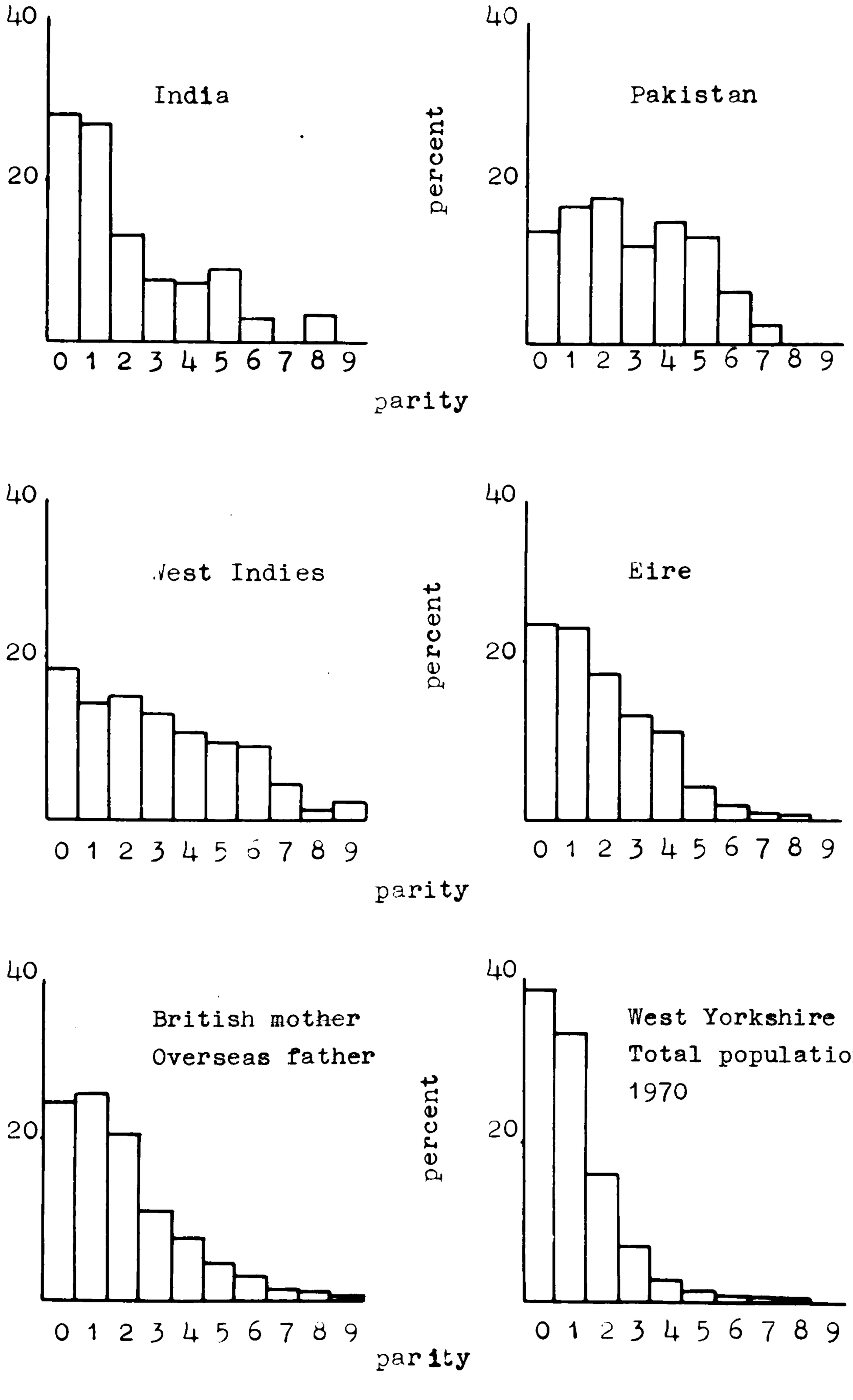
Parity is the number of previous children live-born to a mother before the birth of the child at which parity is recorded. The recording of parity on the birth registration form along with mother's and father's place of birth provides the opportunity of examining the family structure of each ethnic group. The proviso still remains however, as was expressed in the first section, that as a means of examining and comparing any structures the birth record is only a sample of the total persons in families in Leeds. For example, the mothers who have one, two or more children, but did not give birth to another in 1971, are not recorded. There is no means as yet of obtaining these numbers which are not recorded from the birth forms. This must be borne in mind when all the figures presented in this chapter are considered.

Table 6.7 provides the 1971 births to mothers and fathers born overseas by the parity rating of the mother, and their corresponding percentages. Figure 6.2 plots these percentages on a graph. The implications to be drawn from this table is that of all the ethnic groups it is the Indian children who were most likely to be born into a small family, 28% were first born children. On the other hand the Pakistani children appeared most likely to be born into a family of 4 children or more. The percentage of all births to Pakistani mothers being in this category was 39% compared with 25% for the Indian group, and only 14% of Pakistani children were first-born. The women from Britain and the Republic of Ireland displayed roughly similar structures there being relatively more births to the families of 2 and 3 children. Caribbean mothers

Table 6.7 Births by parity and mothers place of birth in Leeds C.B. 1971.

| Parity | Mothers place of birth | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | India | | Pakistan | | Caribbean | | Eire | | G.B.[1] | | G.B.[2] |
| | No. | % | No. | % | No. | % | No. | % | No. | % | % |
| 0 | 47 | 28.1 | 22 | 14.2 | 35 | 19.0 | 73 | 24.7 | 72 | 24.5 | 39.2 |
| 1 | 45 | 27.0 | 27 | 17.4 | 27 | 14.7 | 72 | 24.3 | 76 | 25.9 | 33.4 |
| 2 | 22 | 13.1 | 28 | 18.1 | 28 | 15.3 | 55 | 18.6 | 60 | 20.4 | 15.8 |
| 3 | 13 | 7.7 | 19 | 12.2 | 25 | 13.6 | 39 | 13.1 | 32 | 10.9 | 6.5 |
| 4 | 12 | 7.1 | 24 | 15.4 | 20 | 10.8 | 33 | 11.2 | 22 | 7.5 | 2.8 |
| 5 | 15 | 9.0 | 21 | 13.6 | 18 | 9.8 | 13 | 4.4 | 14 | 4.7 | 1.3 |
| 6 | 5 | 3.0 | 10 | 6.5 | 17 | 9.2 | 6 | 2.0 | 9 | 3.1 | 0.6 |
| 7 | 4 | 2.4 | 4 | 2.6 | 8 | 4.4 | 3 | 1.0 | 4 | 1.4 | 0.3 |
| 8 | 6 | 3.6 | 0 | 0.0 | 2 | 1.1 | 2 | 0.7 | 3 | 1.0 | 0.1 |
| 9 | 0 | 0.0 | 0 | 0.0 | 2 | 1.1 | 0 | 0.0 | 0 | 0.0 | 0.0 |
| 10 | 0 | 0.0 | 0 | 0.0 | 1 | 0.5 | 0 | 0.0 | 0 | 0.0 | 0.0 |
| 11 | 0 | 0.0 | 0 | 0.0 | 1 | 0.5 | 0 | 0.0 | 1 | 0.3 | 0.0 |
| 12 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 1 | 0.3 | 0.0 |
| Totals | 167 | 100.0 | 155 | 100.0 | 184 | 100.0 | 296 | 100.0 | 294 | 100.0 | 100.0 |

Figure 6.2 Percent of births by parity and mother's place of birth.



appeared in a middle position between the parity structure of the Indian and Pakistani women. It is worth noting that the similar figures presented by the Birmingham C.S.O. for 1967 and 1969 are in very close agreement with the figures produced here for births to women with more than 4 children at time of the birth of the recorded child. In Leeds these figures are for Indians, 25%, West Indians - 37%, Irish Republican women - 19%. In Birmingham, the equivalent values are 24.9% and 23.8% for Indians, 37.6% and 38.0% for West Indians and 18.2% and 19.0% for the Irish group. Pakistanis are not directly considered but in Leeds at 39% they have the largest value of all the groups.

There are, however, very remarkable differences between the distributions exhibited here and those which are exhibited for England and Wales as a whole. Figure 6.2 shows that 39% of births during 1970 in the conurbation as a whole were the first children to be born to mothers and that only 5% of births were to mothers with 4 or more children. The only similarity between the groups is that, except for British women married to an overseas born male and Pakistani mothers, the greatest number of births were in the first born category.

### 6.5.3 Parity and age

The parity figures (Table 6.7 and Fig. 6.2) showed that the children born to Pakistani mothers in Leeds in 1971 were most likely to be born into a large family, West Indian children less likely, Indian children less likely still, followed by Irish Republic children, children born to British mothers and overseas born fathers and children

born to British parents with only a 0.05 probability of being born into a family of 6 people. The age of mother figures (Table 6.5 and Table 6.6) showed that the Pakistani women gave birth in relatively later age groups than any other group except the Irish Republic. Caribbean born mothers also produced children at relatively older age groups but less so than the Irish and Pakistanis, and the Indian mothers largely gave birth in the younger, under 30, age groups. The suggestion then is that since parity and age are not unrelated i.e. it is nearing the bounds of what is physically possible to expect a 20 year old woman to have four or five children, a clearer picture can be formed of the family situation by considering both parity and age simultaneously.

It would seem that the Pakistani women in Leeds tend to have the largest families, the children are on the whole born to older women with already larger families, whereas children born to Indian women could expect to be born to a relatively young mother with a relatively small family. The Caribbean group appears to be between these two extremes. An English child, by the same reasoning, could expect on average to be born to a relatively young mother and probably be the first or second born. The child would be considerably less likely to be born into a family of 4 or even 3 children than any of the specified ethnic groups. Table 6.7 suggests that family building for English parents largely finishes at the third child having accounted for 88% of all births by this stage. Conversely the ethnic groups are much more likely to keep on having children to a relatively later stage, particularly in the case of West Indian parents.

Table 6.8 shows a technique of calculating the average family size of the different groups which has been utilised by Birmingham C.S.O. The single character columns present the total births by parity of mother for the six population groups. The double character columns (for example, AxB, AxC) present the relevant single character column multiplied by the parity group, that is they are a measure of the number of children already existing to the mothers giving birth in 1971 in Leeds and in 1970 for England and Wales. Thus, dividing by the number of births, effectively the number of mothers, one obtains a measure of average family size in each group. A clear distinction is obtained between the 'coloured' and 'white' groups. Caribbean, Pakistani and Indian families all average more than 3 children. Caribbean mothers, in fact have an average of nearly 4 children. Irish Republican women and British women married to an overseas born father are roughly similar with 2.97 and 2.92 children respectively while the England and Wales (1970) average size is much lower, at 2.11. A word of caution must be added though, for these averages are only for the families which were increased by a birth in 1971 and 1970.

## 6.5.4 Incidence of illegitimacy by mothers place of birth

Table 6.9 shows the number of births which were illegitimate in Leeds C.B. in 1969, 1971 and 1972 and as a percentage of the births to each group. The other years have been included in this table because of the very low occurrences of illegitimacy to some of the groups. Never-the-less there is considerable regularity displayed throughout the table and considerable divergence is visible from the city

Table 6.8 Refined parity and average family size for selected groups

| Parity | Mothers place of birth | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | India | | Pakistan | | Caribbean | | Eire | | G.B.[1] | | G.B. | |
| A | A | AxB | C | AxC | D | AxD | E | AxE | F | AxF | G | AxG |
| 0 | 47 | - | 22 | - | 35 | - | 73 | - | 72 | - | 274,252 | - |
| 1 | 45 | 45 | 27 | 27 | 27 | 27 | 72 | 72 | 76 | 76 | 233,089 | 233,089 |
| 2 | 22 | 44 | 28 | 56 | 28 | 56 | 110 | 110 | 60 | 120 | 110,332 | 220,664 |
| 3 | 13 | 39 | 19 | 57 | 25 | 75 | 39 | 117 | 32 | 96 | 45,757 | 137,271 |
| 4 | 12 | 48 | 24 | 96 | 20 | 80 | 33 | 132 | 22 | 88 | 19,554 | 78,216 |
| 5 | 15 | 75 | 21 | 105 | 18 | 90 | 13 | 65 | 14 | 70 | 9,337 | 46,685 |
| 6 | 5 | 30 | 10 | 60 | 17 | 102 | 6 | 36 | 9 | 54 | 4,329 | 25,974 |
| 7 | 4 | 28 | 4 | 28 | 8 | 56 | 3 | 21 | 4 | 28 | 2,145 | 15,015 |
| 8 | 6 | 48 | - | - | 2 | 16 | 2 | 16 | 3 | 24 | 1,032 | 8,256 |
| 9 | - | - | - | - | 2 | 18 | - | - | - | - | 538 | 4,842 |
| 10 | - | - | - | - | 1 | 10 | - | - | - | - | 279 | 2,790 |
| 11 | - | - | - | - | 1 | 11 | - | - | 1 | 11 | 146 | 1,606 |
| 12 | - | - | - | - | - | - | - | - | 1 | 12 | 147 | 1,764 |
| Total | 167 | 357 | 155 | 429 | 184 | 541 | 296 | 569 | 294 | 574 | 700,937 | 776,172 |

India: Average family size = 167+357/167 = 3.14
Pakistan: Average family size = 155+429/155 = 3.77
Caribbean: Average family size = 184+541/184 = 3.94
Eire: Average family size = 296+569/296 = 2.92
G.B.[1] Average family size = 294+579/294 = 2.97
G.B.[2] Average family size = 776,172+700,937/700,937 = 2.11

Table 6.9 Incidence of illegitimacy by mothers place of birth

| | | Mother's Birthplace | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Ind | Pak | Carib | NI | Eire | ONC | OC | Eur | RW | GB[1] | GB[2] | City Total |
| Total births: | 1969 | 88 | 93 | 126 | 30 | 164 | 45 | 6 | 22 | 13 | 203 | | |
| | 1970 | 180 | 153 | 200 | 63 | 306 | 66 | 12 | 44 | 12 | 300 | | |
| | 1971 | 167 | 155 | 184 | 62 | 296 | 90 | 16 | 41 | 13 | 294 | 6,524 | 7,842 |
| | 1972 | 76 | 74 | 77 | 33 | 136 | 35 | 9 | 20 | 19 | 138 | | |
| Total births illegitimate: | 1969 | - | - | 27 | 7 | 19 | 1 | 2 | 1 | 1 | 16 | | |
| | 1970 | 2 | - | 57 | 7 | 33 | 5 | 1 | 5 | 1 | 24 | | |
| | 1971 | 2 | 1 | 51 | 16 | 36 | 4 | 2 | 4 | - | 16 | 961 | 1,093 |
| | 1972 | 1 | 1 | 26 | 14 | 22 | 3 | 1 | - | 3 | 23 | | |
| % of births illegitimate: | 1969 | - | - | 21.4 | 23.3 | 11.6 | 2.2 | 33.3 | 4.5 | 7.7 | 7.9 | | |
| | 1970 | 1.1 | - | 28.5 | 11.1 | 10.8 | 7.6 | 8.3 | 11.4 | 8.3 | 8.0 | | |
| | 1971 | 1.2 | 0.6 | 27.7 | 25.8 | 12.7 | 4.3 | 12.5 | 9.8 | 0.0 | 5.4 | 14.7 | 13.9 |
| | 1972 | 1.3 | 1.4 | 33.8 | 42.4 | 16.2 | 8.6 | 11.1 | - | 15.8 | 16.7 | | |

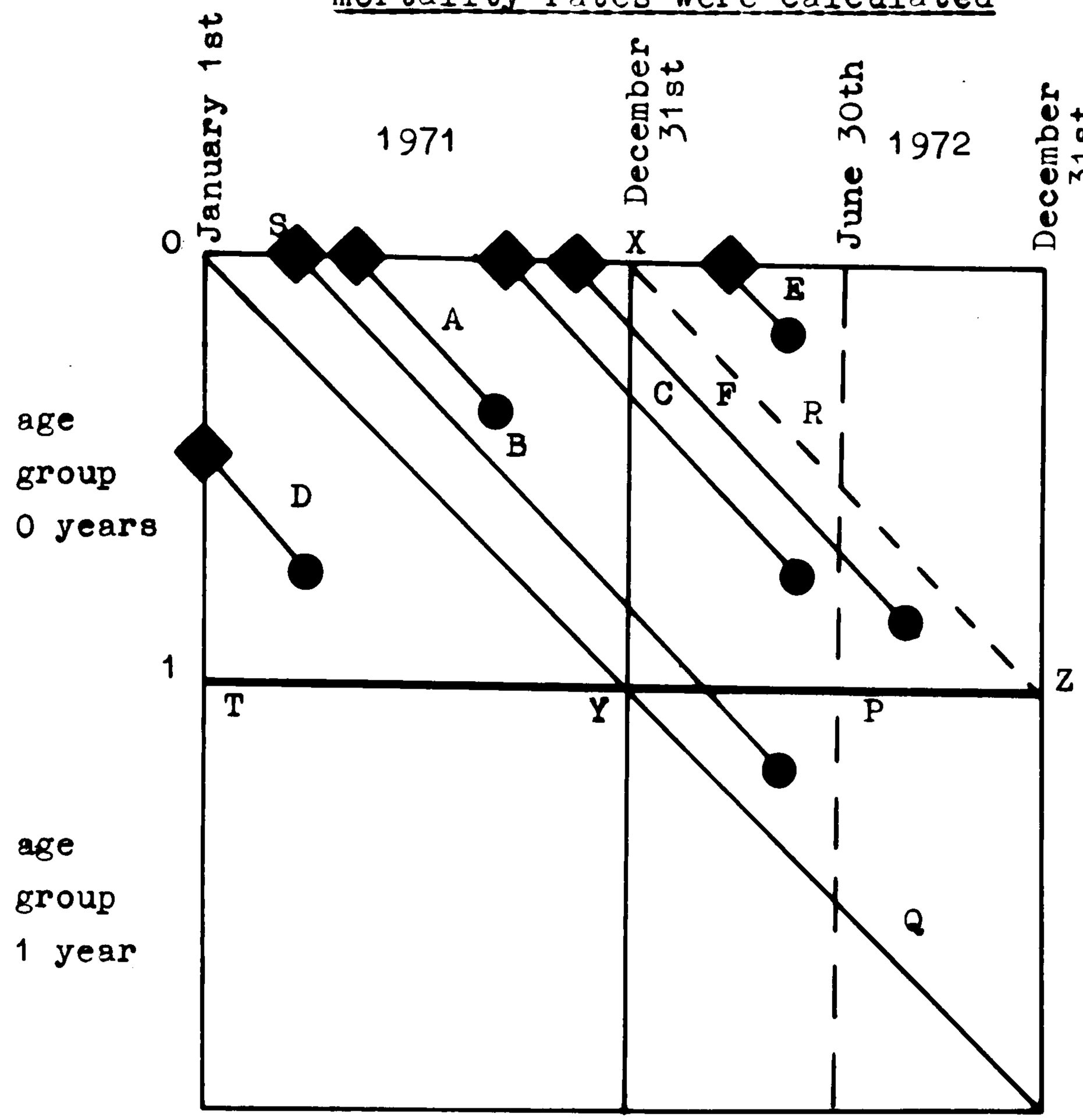
average for 1971 of 13.9 illegitimate births per 100 total births. The Caribbean women stand out as being the most likely to give birth to an illegitimate child over the four year period, and only eleven of the 51 illegitimacies in 1971 were to what may be described as a "Common Law" marriage. The majority of the births were, therefore, "full" illegitimacies.

Women from Northern Ireland were, almost surprisingly, the next largest group in terms of illegitimacies in 1971 with 26% of all their births being illegitimate. Their numbers were relatively much smaller than the Caribbean numbers and the occurrences rather more irregular. The remarkably low rates of illegitimacy for Indian and Pakistani women must be assigned to cultural values which do not allow free mixing of unescorted females and males. They must reflect also the interpretation of the migration purpose which still remains as a temporary economic endeavour for Pakistanis in particular.

### 6.5.5 Infant mortality

Infant mortality rates are normally calculated on the basis of total deaths in any one year of children under one year of age. Reference to the Lexis diagram normally shows this rate in 1971 to be flows A plus D divided by births in 1971. Flow A represents children born in 1971 and dying in 1971, flow D represents children born in 1970 and dying in 1971 still under one year of age. However because of the nature of data storage system the information available here concerning infant deaths is rather differently derived. As the data was collected in June, 1972, the deaths recorded are comprised of 3 flows:

**Figure 6.3** A Lexis diagram to show how the infant mortality rates were calculated




The symbol ◆ represents a birth event

The symbol ● represents a death event

The line ——— represents a childs first birthday

flow A : children born in 1971 and dying in 1971

flow B : children born in 1971 and dying in 1972 aged over one year

flow C : children born in 1971 and dying in 1972 aged under one year

The mortality rate, therefore, is derived from the division of flows A + B + C by total births in 1971. The assumption is implicitly made that flows C + B equal flow D, thus making the rate comparable with the conventional infant mortality rate. This is not an unreasonable assumption since, as reference to the diagram will show triangles PQY and PRZ are congruent as are triangles XYZ and STY. The flow which is represented by triangle PQY is directly substituted for triangle and flow PRZ.

Table 6.10 presents deaths to children born in Leeds C.B. in 1971 by mother's place of birth. A total of 169 deaths gives an average infant mortality rate of 21.5 deaths per 1000 births for children born in Leeds C.B. in 1971.

The rates for all the New Commonwealth groups were higher than this average, particularly, and remarkably, the Pakistani group with the very high level of 9 deaths out of the total of 164 births.

## 6.6 Location of births under consideration

### 6.6.1 Location by mothers place of residence

Previous analysis both here and elsewhere (e.g. Jones, 1967, 1970) has already made it clear that in any British city with an overseas born population, one would expect to find significant differences in the residential location

Table 6.10 Deaths to children born in Leeds C.B. in 1971 by mothers place of birth

| | Mothers place of birth | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Ind | Pak | Carib | NI | Eire | ONC | OC | Eur | RW | GB[1] | GB[2] |
| Total births | 172 | 164 | 190 | 64 | 301 | 93 | 16 | 42 | 13 | 304 | 6,483 |
| Total deaths | 5 | 9 | 5 | 2 | 5 | 3 | 0 | 1 | 0 | 10 | 129 |
| Percent of Total births Estimated | 2.9 | 5.5 | 2.6 | 3.1 | 1.7 | 3.2 | 0.0 | 2.4 | 0 | 3.3 | 2.0 |
| Deaths per 1000 births | 29 | 55 | 26 | 31 | 17 | 32 | 0 | 24 | 0 | 33 | 20 |

patterns of overseas and indigenous groups. The "immigrant populations" of cities (that is, the "new" immigrant populations) are found generally in inner city areas. The areas are often occupied by poor quality housing, housing which has been through several stages from single to multi-occupation and which is now showing signs of lack of attention over the years. Often this zone of occupation extends in a not necessarily continuous ring around the central city and occasionally extending in segments into residential areas farther out. This has been shown to be true for Leeds for 1961, 1966 and 1971 and consequently one could expect that a similar pattern will exist in 1971 for the location of births to overseas parents.

### 6.6.2 Estimation of births in each zone

Given the total births in Leeds C.B. to residents of the city in 1971 as 7,842, it is possible, using a simple model, to estimate the numbers of births in each of the 34 zones in Leeds C.B. This data obviously exists in recorded form at the Department of Child Health in Leeds but the difficulties of hand processing of 7,842 Registration forms precluded the actual collection of this data. The model simply attempts to assign to each zone the numbers of births which could be expected given that the age structure of females in each zone in 1971 approximates to the age structure in 1966. Using the Yorkshire and Humberside age specific fertility rates an estimate of 8,901 births in Leeds in 1966 is obtained which can be compared with the actual 9,102 births in Leeds C.B. that year. Each zone total is then reduced by the relationship the 1966 estimated births and the 1971 known births.

The model, therefore, becomes

$$K^{\beta(i)}(1971) = A^{L} \sum_{r=3}^{8} b_r^{YH}(1966).\ K_r^{iF}(1966) \qquad \ldots\ 6.1$$

where

$$A^{L} = K^{\beta(L)}(1971) \ / \sum_{r=3}^{8} \sum_{i=1}^{34} b_r^{YH}(1966).K_r^{iF}(1966) \ldots 6.2$$

where

$K^{\beta(i)}(1971)$ = total estimated births in each zone

$b_r^{YH}(1966)$ = age specific fertility rate for Yorkshire and Humberside, 1966

$K_r^{iF}(1966)$ = total females in fertile age groups in each zone in Leeds C.B. 1966.

$A^{L}$ = balancing factor

$K^{\beta(L)}(1971)$ = total births in Leeds C.B. in 1971

First results from this model are given in Table 6.11 (column (c)). It may be seen from comparison with Table 6.11(d) that the estimated births in Potternewton West and East (zones 17 and 18) are less than the actual recorded births in 1971 to overseas parents. Table 6.11(e) therefore is a revised estimate where the lack of births in Potternewton West and East has been accounted for. The births needed to make up the difference are provided from all other zones in relation to the estimated number of births in these zones. The estimates, therefore, in Table 11 (column (f)), of the percentage of births in each zone being to an overseas born parent for Potternewton West and East are 100%. This is not necessarily an accurate figure but it does reflect the concentration of New Commonwealth immigrants and the high proportion of coloured children in schools such as Primrose Hill C.S., and Cowper St J.M. (Redmayne, 1972). Only four other zones, Harehills (19), Hyde Park (15), Potternewton North (29), and Blenheim West (34), had percentages approaching this level with 55%,

Table 6.11 Estimated total births and recorded ethnic births in Leeds C.B. in 1971

| Zone Name | Zone No | Estimated births in zones | Recorded ethnic births in zones | Revised estimate of births in zones | Percent of births in zones | Percent of total ethnic births |
|---|---|---|---|---|---|---|
| (a) | (b) | (c) | (d) | (e) | (f) | (g) |
| Far Headingley | 1 | 441 | 20 | 439 | 5 | 1.5 |
| Moortown | 2 | 404 | 22 | 403 | 5 | 1.7 |
| Stanningley | 3 | 396 | 21 | 394 | 5 | 1.6 |
| Wortley | 4 | 283 | 24 | 281 | 9 | 1.8 |
| Middleton | 5 | 373 | 20 | 371 | 5 | 1.5 |
| East Hunslet | 6 | 149 | 21 | 148 | 14 | 1.6 |
| Halton | 7 | 396 | 28 | 394 | 7 | 2.1 |
| Cross Gates | 8 | 507 | 40 | 504 | 8 | 3.0 |
| Roundhay | 9 | 373 | 43 | 371 | 12 | 3.3 |
| Allerton | 10 | 327 | 31 | 325 | 10 | 2.4 |
| Bramley | 11 | 348 | 26 | 346 | 8 | 2.0 |
| Meanwood | 12 | 345 | 33 | 342 | 10 | 2.5 |
| Armley | 13 | 254 | 21 | 253 | 8 | 1.6 |
| Kirkstall | 14 | 339 | 40 | 336 | 12 | 3.0 |
| Hyde Park | 15 | 202 | 96 | 201 | 48 | 7.3 |
| Woodhouse | 16 | 375 | 28 | 372 | 8 | 2.1 |

(Continued overleaf....)

Table 6.11 Continued

| (a) | (b) | (c) | (d) | (e) | (f) | (g) |
|---|---|---|---|---|---|---|
| ....Contd | | | | | | |
| Potternewton W. | 17 | 115 | 142 | 142 | 100 | 10.8 |
| Potternewton E. | 18 | 188 | 204 | 204 | 100 | 15.5 |
| Harehills | 19 | 191 | 105 | 190 | 55 | 8.0 |
| Burmantofts | 20 | 147 | 25 | 146 | 17 | 1.9 |
| Osmandthorpe | 21 | 213 | 22 | 212 | 10 | 1.7 |
| Holbeck | 22 | 247 | 68 | 246 | 28 | 5.2 |
| Wellington E. | 23 | 46 | 7 | 46 | 15 | 0.5 |
| Blenheim E. | 24 | 84 | 6 | 84 | 7 | 0.5 |
| City South | 25 | 41 | 6 | 41 | 15 | 0.5 |
| Beeston | 26 | 215 | 7 | 214 | 3 | 0.5 |
| Hunslet Carr | 27 | 100 | 23 | 99 | 23 | 1.7 |
| Westfield | 28 | 152 | 36 | 151 | 24 | 2.7 |
| Potternewton N. | 29 | 96 | 35 | 95 | 37 | 2.7 |
| Richmond Hill N. | 30 | 118 | 7 | 117 | 6 | 0.5 |
| City North | 31 | 28 | 6 | 28 | 21 | 0.5 |
| Wellington W. | 32 | 86 | 12 | 86 | 14 | 0.9 |
| Richmond Hill S. | 33 | 111 | 19 | 110 | 17 | 1.4 |
| Blenheim W. | 34 | 152 | 74 | 151 | 49 | 5.6 |
| Total | | 7,842 | 1,318 | 7,842 | 17 | 100.0 |

48%, 37% and 49% respectively of all births being to "ethnic" groups. Table 6.11 (column (g)) shows that these 5 zones together accounted for 47.2% of all births in Leeds C.B. in 1971 where one parent was born overseas.

Table 6.12 however, shows that the ethnic characteristics of these areas differ considerably. This table expresses each zone's specific ethnic births as a percentage of the total births to each group. Zones 17, 18 and 19 stand out as having the greatest percentage of "ethnic" births 56.2% of all Indian births, 32.8% of Pakistani births, 62% of West Indian births and 41% of all other New Commonwealth births. The zone with the greatest percentage of Pakistani births however was zone 34 which had relatively small percentages of other New Commonwealth births while zone 15 showed a fairly high percentage of Indian births. Figure 6.4 recaps on the location and identification of analysis zones and Figures 6.5, 6.6, 6.7, 6.8, 6.9 and 6.10 show the percentage of the births in each of these zones to mothers of particular ethnic groups.

Table 6.12 also shows the computed segregation indexes for the groups using the births in 1971 and the total population in 1961 and 1971. The 1966 values must be looked at with some suspicion due to the inadequacies of the 1966 Sample Census. The indexes show the births to be less segregated than the population in general. The Northern Ireland group is not directly considered in the 1961 figures and the Indian and Pakistani groups are supplied together in this year. The most clearly segregated group was the West Indian group whose percentages only exceeded 4% in the two zones 17 and 18. The "white" groups demonstrate rather less concentration.

Figure 6.4 Location of analysis zones Leeds C.B.

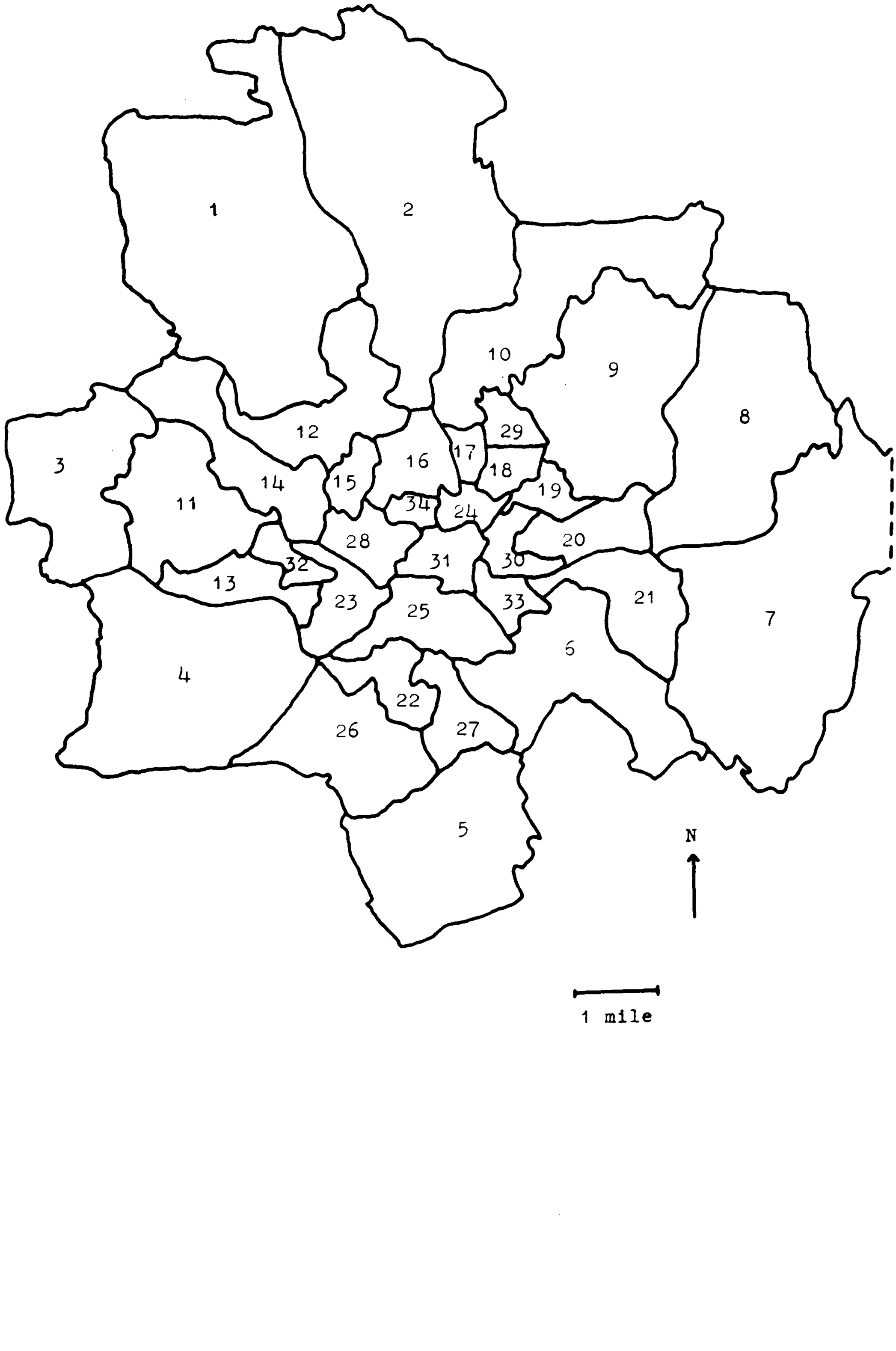


Figure 6.5 Percent of total births in each zone to mothers born overseas. Leeds 1971

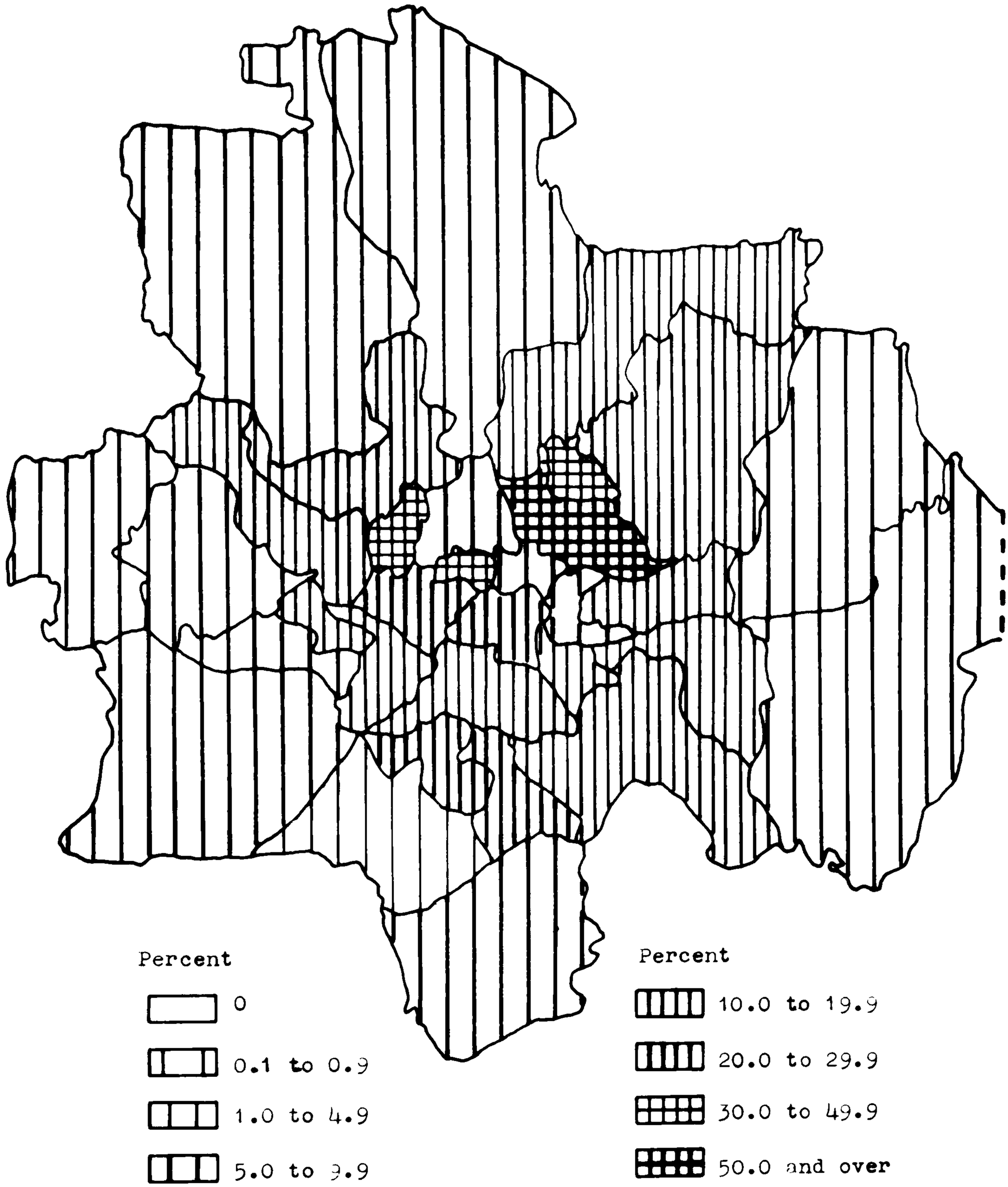


**Figure 6.6** Percent of total births in zones to mothers born in India. Leeds 1971

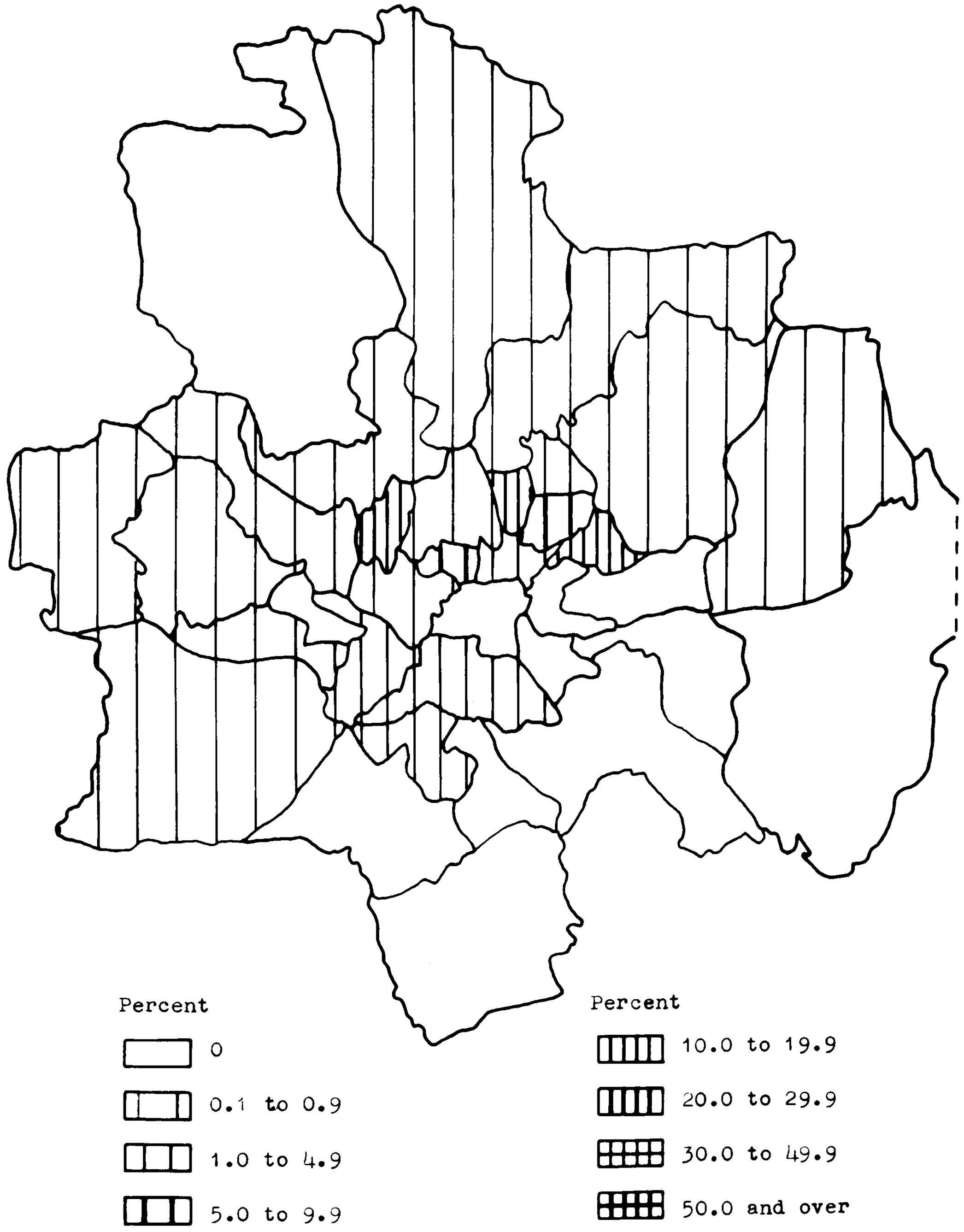


Figure 6.7 Percent of births in each zone to mothers born in Pakistan. Leeds 1971

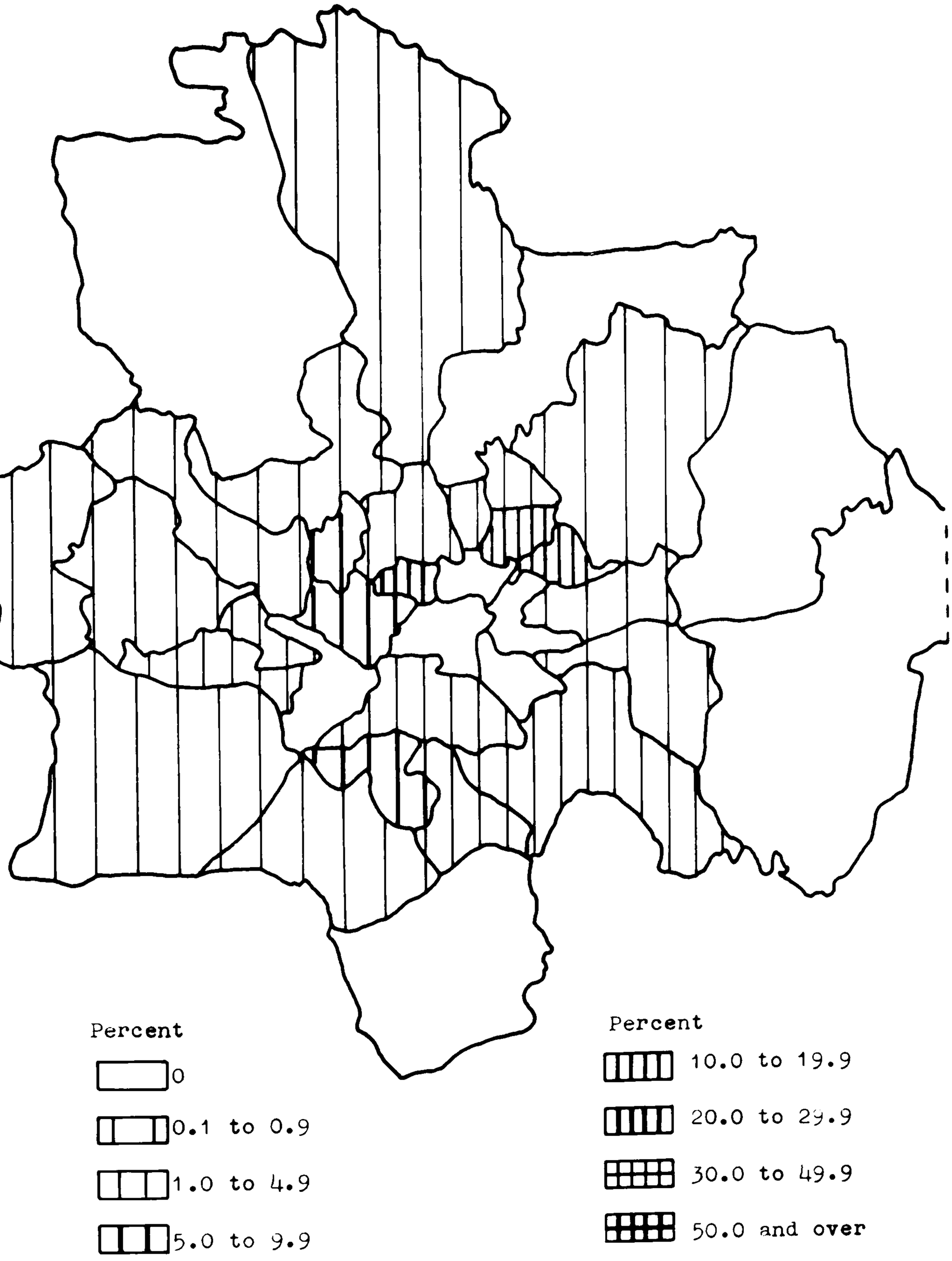


**Figure 6.8** Percent of births in each zone to mothers born in the West Indies, Leeds 1971

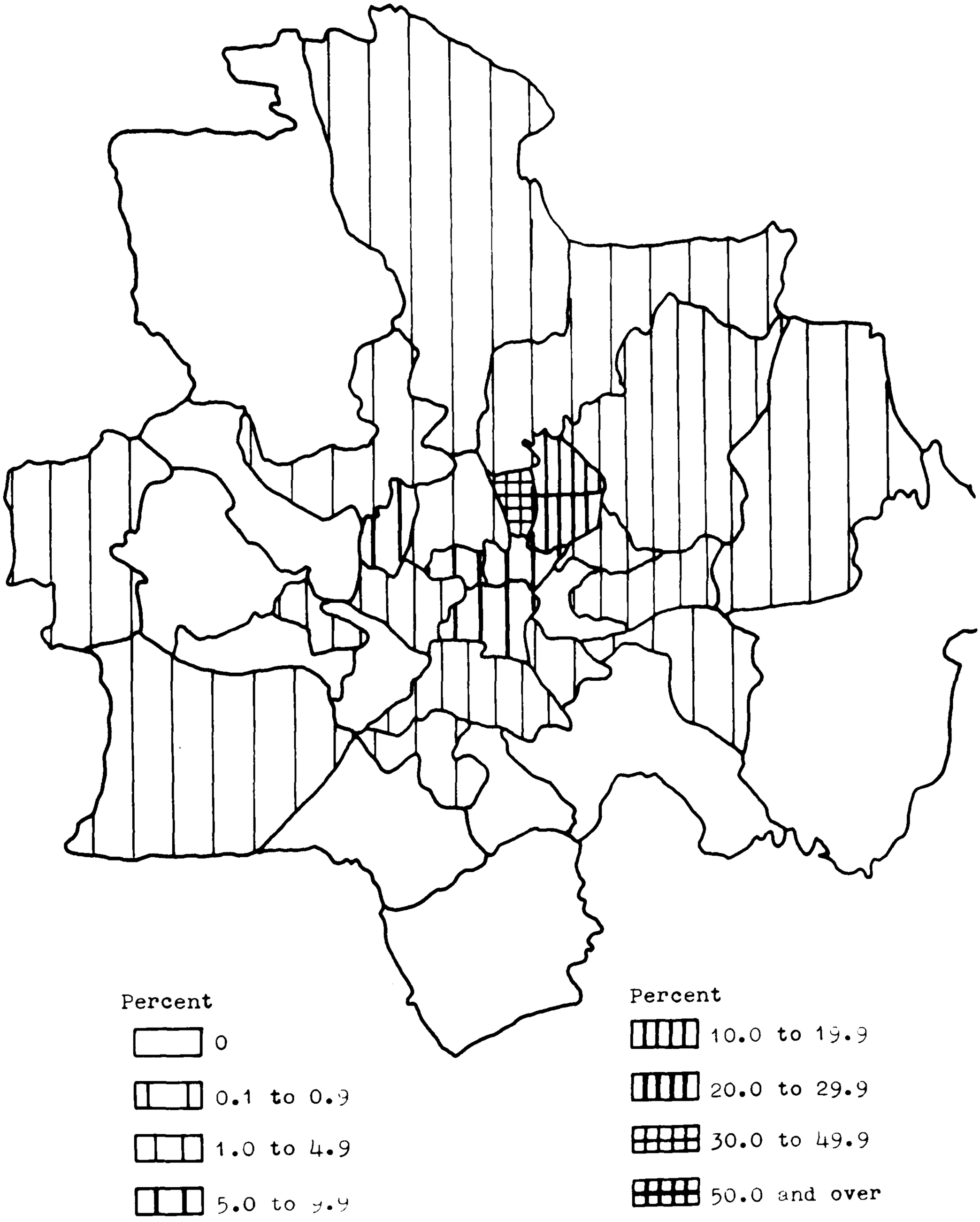


Figure 5.9 Percent of births in zones to mothers born in Eire, Leeds 1971

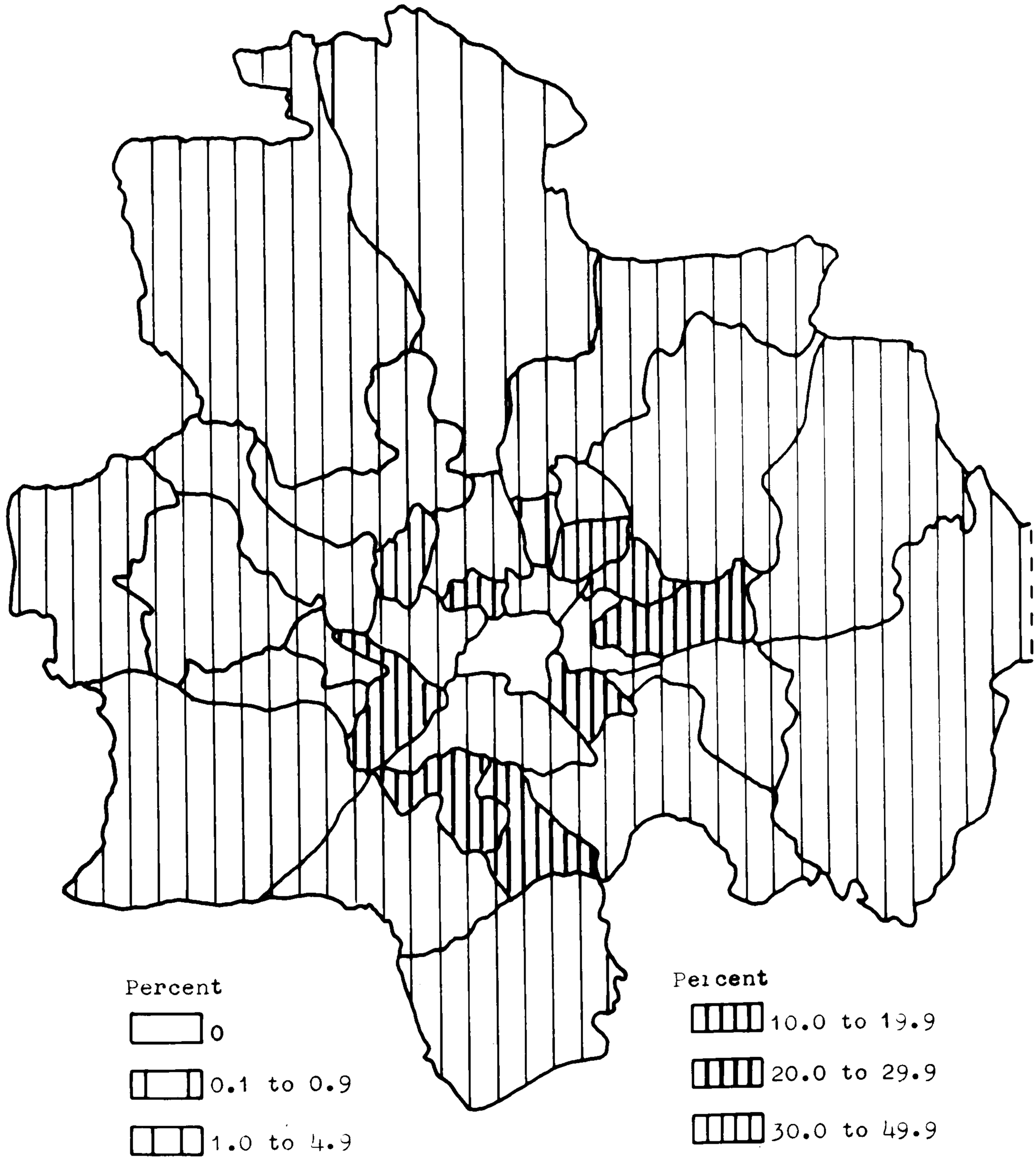
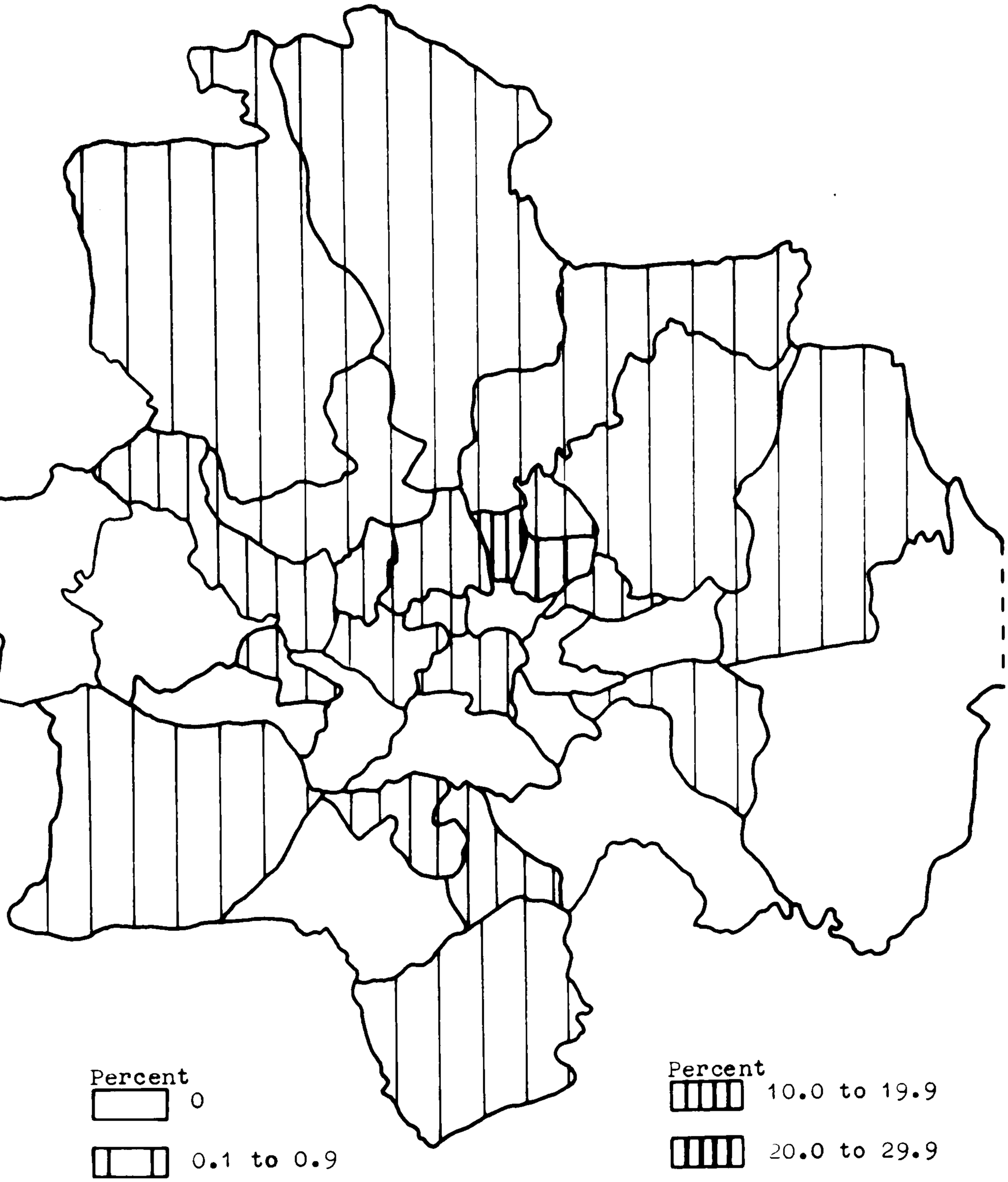


**Figure 6.10** Percent of births in zones to mothers born in Other New Commonwealth countries Leeds 1971



The ethnic structure of the births in each zone is shown in Table 6.13 where percentages of births in each zone to different birthplace groups are shown. Potternewton West (17) and East (18) may be seen as mainly West Indian and Indian while Harehills (19) and Blenheim West (34) may be seen as mainly Pakistani. Figure 6.11 is a series of histograms which illustrate the differing ethnic compositions of the births for selected zones. Far Headingley (1), Middleton (5), and Cross Gates (8) are representative of the low "ethnic" zones on the city limits, Potternewton West(17), East (18), and Harehills (19) being representative of high "ethnic" zones and Hyde Park (15), Holbeck (22) and Blenheim West (34) being representative of the medium "ethnic" zones. The main implication to be drawn from Table 6.13 and Figure 6.11 is that in Potternewton West (17) and East (18) over half of the total births were to parents at least one of whom was born in a New Commonwealth country (in the case of Potternewton West, nearly 70%) while in all but one or two other zones these births are a more or less insignificant part of the total.

Table 6.14 shows the number and percentage of births in each birthplace group in the highest scoring zones of each group. The coloured New Commonwealth groups for India, Pakistan and the West Indies all have over 50% of their births in these first three zones, Northern Ireland and Republic of Ireland groups are similar, scoring 24.4% and 27.0% respectively. At least one of the Potternewton zones are represented in all groups except the Old Commonwealth group. The Pakistani group is unfortunate in being strongly represented in what is, perhaps, subjectively the worst zone in the city, Blenheim West (34), the Blackman Lane,

Table 6.12 Births and segregation index by mothers place of birth by residence zone at birth of child in Leeds C.B. 1971.

8 major groups

| Zone Name | Zone No. | Mothers place of birth: Ind | Pak | Carib | N.I. | Eire | O.N.C. | Eur | G.B. |
|---|---|---|---|---|---|---|---|---|---|
| Far Headingley | 1 | 0.0 | 0.0 | 0.0 | 6.5 | 2.7 | 1.1 | 2.4 | 1.7 |
| Moortown | 2 | 1.2 | 1.3 | 0.5 | 6.5 | 1.4 | 1.1 | 0.0 | 2.0 |
| Stanningley | 3 | 1.2 | 1.3 | 0.5 | 0.0 | 1.7 | 0.0 | 2.4 | 2.4 |
| Wortley | 4 | 0.6 | 0.6 | 1.1 | 0.0 | 2.4 | 1.1 | 2.4 | 3.4 |
| Middleton | 5 | 0.0 | 0.0 | 2.2 | 0.0 | 2.4 | 1.1 | 0.0 | 2.4 |
| East Hunslet | 6 | 0.0 | 1.3 | 0.0 | 6.5 | 2.0 | 0.0 | 4.9 | 2.0 |
| Halton | 7 | 0.0 | 0.0 | 0.0 | 0.0 | 3.7 | 0.0 | 0.0 | 5.4 |
| Cross Gates | 8 | 1.8 | 0.0 | 0.5 | 1.6 | 4.4 | 2.2 | 0.0 | 6.1 |
| Roundhay | 9 | 0.6 | 1.3 | 3.9 | 6.5 | 3.7 | 2.2 | 7.3 | 4.1 |
| Allerton | 10 | 1.2 | 0.0 | 1.6 | 3.2 | 1.7 | 3.3 | 9.8 | 3.1 |
| Bramley | 11 | 0.6 | 0.6 | 0.0 | 8.1 | 2.0 | 0.0 | 2.4 | 4.1 |
| Meanwood | 12 | 0.6 | 0.6 | 0.5 | 1.6 | 4.4 | 2.2 | 2.4 | 4.4 |
| Armley | 13 | 1.2 | 1.9 | 0.0 | 6.5 | 1.0 | 2.2 | 0.0 | 2.4 |
| Kirkstall | 14 | 1.2 | 0.6 | 0.0 | 3.2 | 4.7 | 5.6 | 0.0 | 5.4 |
| Hyde Park | 15 | 14.4 | 9.0 | 6.5 | 3.2 | 7.1 | 10.0 | 7.3 | 3.1 |
| Woodhouse | 16 | 1.8 | 1.3 | 0.5 | 3.2 | 3.0 | 5.6 | 2.4 | 1.7 |
| Potternewton W. | 17 | 15.6 | 2.6 | 26.2 | 9.7 | 3.7 | 20.1 | 19.6 | 7.1 |
| Potternewton E. | 18 | 28.6 | 13.6 | 33.4 | 6.5 | 9.8 | 14.5 | 4.9 | 7.6 |

Continued overleaf.....

Table 6.12 Contd.

| Zone Name | Zone No. | Mothers place of birth: Ind | Pak | Carib | N.I. | Eire | O.N.C. | Eur | G.B. |
|---|---|---|---|---|---|---|---|---|---|
| Harehills | 19 | 12.0 | 16.9 | 2.7 | 4.8 | 10.1 | 6.7 | 0.0 | 5.1 |
| Burmantofts | 20 | 0.0 | 0.6 | 2.2 | 3.2 | 2.7 | 0.0 | 4.9 | 2.7 |
| Osmandthorpe | 21 | 0.6 | 0.6 | 1.1 | 1.6 | 2.4 | 1.1 | 0.0 | 2.7 |
| Holbeck | 22 | 5.4 | 11.1 | 0.5 | 3.2 | 7.1 | 3.3 | 4.9 | 4.4 |
| Wellington East | 23 | 0.6 | 0.0 | 0.0 | 0.0 | 1.0 | 0.0 | 0.0 | 1.0 |
| Blenheim East | 24 | 0.6 | 0.0 | 1.6 | 0.0 | 0.3 | 0.0 | 0.0 | 0.3 |
| City South | 25 | 0.6 | 1.3 | 0.5 | 0.0 | 0.7 | 0.0 | 0.0 | 0.0 |
| Beeston | 26 | 0.0 | 1.3 | 0.0 | 0.0 | 1.7 | 0.0 | 0.0 | 0.0 |
| Hunslet Carr | 27 | 1.2 | 0.6 | 0.0 | 1.6 | 2.4 | 2.2 | 0.0 | 3.1 |
| Westfield | 28 | 0.6 | 7.8 | 2.7 | 1.6 | 2.4 | 1.1 | 0.0 | 3.1 |
| Potternewton N. | 29 | 1.8 | 0.6 | 6.5 | 3.2 | 1.4 | 4.4 | 12.2 | 1.0 |
| Richmond Hill N. | 30 | 0.0 | 0.0 | 0.0 | 3.2 | 0.3 | 0.0 | 0.0 | 1.4 |
| City North | 31 | 0.0 | 0.0 | 0.5 | 1.6 | 0.0 | 1.1 | 4.9 | 0.0 |
| Wellington West | 32 | 0.0 | 1.9 | 0.5 | 0.0 | 0.0 | 2.2 | 0.0 | 1.4 |
| Richmond Hill S. | 33 | 0.0 | 0.6 | 0.5 | 3.2 | 2.0 | 2.0 | 0.0 | 2.7 |
| Blenheim West | 34 | 6.0 | 20.7 | 3.3 | 0.0 | 3.7 | 5.6 | 4.9 | 2.7 |
| Totals | | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| Segregation index of births, 1971 | | 34.6 | 44.6 | 46.2 | 40.2 | 24.4 | 25.4 | 44.9 | 33.4 |
| Segregation index of population, 1961 | | 41.9 | | 72.4 | 26.8 | | 49.7 | 39. 7 | 34.6 |
| Segregation index of population, 1971 | | 58.6 | 66.3 | 63.8 | 16.6 | 21.5 | 44.7 | 29.6 | 34.0 |

Table 6.13 Percent of births in each zone in each mothers birthplace group in Leeds C.B. 1971

| Zone Name | Zone No. | Mothers place of birth | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Ind | Pak | Carib | N.I. | Eire | O.N.C. | O.C. | Eur | R.W. | G.B.[1] | G.B.[2] |
| Far Headingley | 1 | 0.0 | 0.0 | 0.0 | 0.9 | 1.8 | 0.2 | 0.2 | 0.2 | 0.0 | 1.1 | 95.6 |
| Moortown | 2 | 0.5 | 0.5 | 0.2 | 0.9 | 0.9 | 0.2 | 0.5 | 0.0 | 0.0 | 1.5 | 94.8 |
| Stanningley | 3 | 0.5 | 0.5 | 0.3 | 0.0 | 1.3 | 0.0 | 0.5 | 0.3 | 0.3 | 1.8 | 94.5 |
| Wortley | 4 | 0.4 | 0.4 | 0.7 | 0.0 | 2.5 | 0.4 | 0.4 | 0.4 | 0.0 | 3.6 | 91.2 |
| Middleton | 5 | 0.0 | 0.0 | 1.1 | 0.0 | 1.9 | 0.3 | 0.3 | 0.0 | 0.0 | 1.9 | 94.5 |
| East Hunslet | 6 | 0.0 | 1.4 | 0.0 | 2.7 | 4.1 | 0.0 | 0.0 | 1.4 | 0.7 | 4.1 | 85.6 |
| Halton | 7 | 0.0 | 0.0 | 0.0 | 0.0 | 2.8 | 0.0 | 0.0 | 0.0 | 0.3 | 4.1 | 92.8 |
| Cross Gates | 8 | 0.6 | 0.0 | 0.2 | 0.2 | 2.6 | 0.4 | 0.0 | 0.0 | 0.4 | 3.6 | 91.5 |
| Roundhay | 9 | 0.3 | 0.5 | 1.9 | 1.1 | 3.0 | 0.5 | 0.3 | 0.8 | 0.0 | 3.2 | 88.4 |
| Allerton | 10 | 0.6 | 0.0 | 0.9 | 0.6 | 1.5 | 0.9 | 0.6 | 1.2 | 0.3 | 2.8 | 90.6 |
| Bramley | 11 | 0.3 | 0.3 | 0.0 | 1.4 | 1.7 | 0.0 | 0.0 | 0.3 | 0.0 | 3.5 | 92.5 |
| Meanwood | 12 | 0.3 | 0.3 | 0.3 | 0.3 | 3.2 | 0.6 | 0.6 | 0.3 | 0.0 | 3.8 | 90.3 |
| Armley | 13 | 0.8 | 1.2 | 0.0 | 1.6 | 1.2 | 0.8 | 0.0 | 0.0 | 0.0 | 2.8 | 91.6 |
| Kirkstall | 14 | 0.6 | 0.3 | 0.0 | 0.6 | 4.2 | 1.5 | 0.0 | 0.0 | 0.0 | 4.8 | 88.0 |
| Hyde Park | 15 | 11.9 | 7.0 | 6.0 | 1.0 | 10.4 | 4.5 | 0.5 | 1.5 | 0.5 | 4.5 | 52.2 |
| Woodhouse | 16 | 0.8 | 0.5 | 0.3 | 0.5 | 2.4 | 1.3 | 0.0 | 0.3 | 0.3 | 1.3 | 92.3 |
| Potternewton W. | 17 | 18.3 | 2.8 | 33.8 | 4.2 | 7.7 | 12.7 | 0.0 | 5.6 | 0.0 | 14.8 | 0.1 |
| Potternewton E. | 18 | 23.5 | 10.3 | 29.9 | 2.0 | 14.2 | 6.4 | 0.0 | 1.0 | 1.5 | 10.8 | 0.4 |
| Harehills | 19 | 10.5 | 13.7 | 2.6 | 1.6 | 15.8 | 3.2 | 0.0 | 0.0 | 0.0 | 7.9 | 44.7 |
| Burmantofts | 20 | 0.0 | 0.7 | 2.7 | 1.4 | 5.5 | 0.0 | 0.0 | 1.4 | 0.0 | 5.5 | 82.8 |

Continued overleaf.....

Table 6.13 Contd.

| Zone Name | Zone No. | Mothers place of birth | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Ind | Pak | Carib | N.I. | Eire | O.N.C. | O.C. | Eur | R.W. | G.B.[1] | G.B.[2] |
| Osmondthorpe | 21 | 0.5 | 0.5 | 0.9 | 0.5 | 3.3 | 0.5 | 0.5 | 0.0 | 0.0 | 3.8 | 89.8 |
| Holbeck | 22 | 3.7 | 6.9 | 0.4 | 0.8 | 8.5 | 1.2 | 0.0 | 0.8 | 0.0 | 5.3 | 72.4 |
| Wellington East | 23 | 2.2 | 0.0 | 0.0 | 0.0 | 6.5 | 0.0 | 0.0 | 0.0 | 0.0 | 6.5 | 84.8 |
| Blenheim West | 24 | 1.2 | 0.0 | 3.6 | 0.0 | 1.2 | 0.0 | 0.0 | 0.0 | 0.0 | 1.2 | 92.8 |
| City South | 25 | 2.4 | 4.9 | 2.4 | 0.0 | 4.9 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 85.4 |
| Beeston | 26 | 0.0 | 0.9 | 0.0 | 0.0 | 2.3 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 96.8 |
| Hunslet Carr | 27 | 2.0 | 1.0 | 0.0 | 1.0 | 7.1 | 2.0 | 0.0 | 0.0 | 1.0 | 9.1 | 76.8 |
| Westfield | 28 | 0.7 | 7.9 | 3.3 | 0.7 | 4.6 | 0.7 | 0.0 | 0.0 | 0.0 | 6.0 | 76.1 |
| Potternewton N. | 29 | 3.2 | 1.1 | 12.6 | 2.1 | 4.2 | 4.2 | 0.0 | 5.3 | 1.1 | 3.2 | 63.0 |
| Richmond Hill N. | 30 | 0.0 | 0.0 | 0.0 | 1.7 | 0.9 | 0.0 | 0.0 | 0.0 | 0.0 | 3.4 | 94.0 |
| City North | 31 | 0.0 | 0.0 | 3.6 | 3.6 | 0.0 | 3.6 | 3.6 | 7.1 | 0.0 | 0.0 | 78.5 |
| Wellington West | 32 | 0.0 | 3.5 | 1.2 | 0.0 | 2.3 | 2.3 | 0.0 | 0.0 | 0.0 | 4.7 | 86.0 |
| Richmond Hill S. | 33 | 0.0 | 0.9 | 0.9 | 1.8 | 5.5 | 0.0 | 0.9 | 0.0 | 0.0 | 7.3 | 82.7 |
| Blenheim West | 34 | 6.6 | 21.2 | 4.0 | 0.0 | 7.3 | 3.3 | 0.0 | 1.3 | 0.0 | 5.3 | 51.0 |

Figure 6.11 Percent of births in selected zones by mother's place of birth.

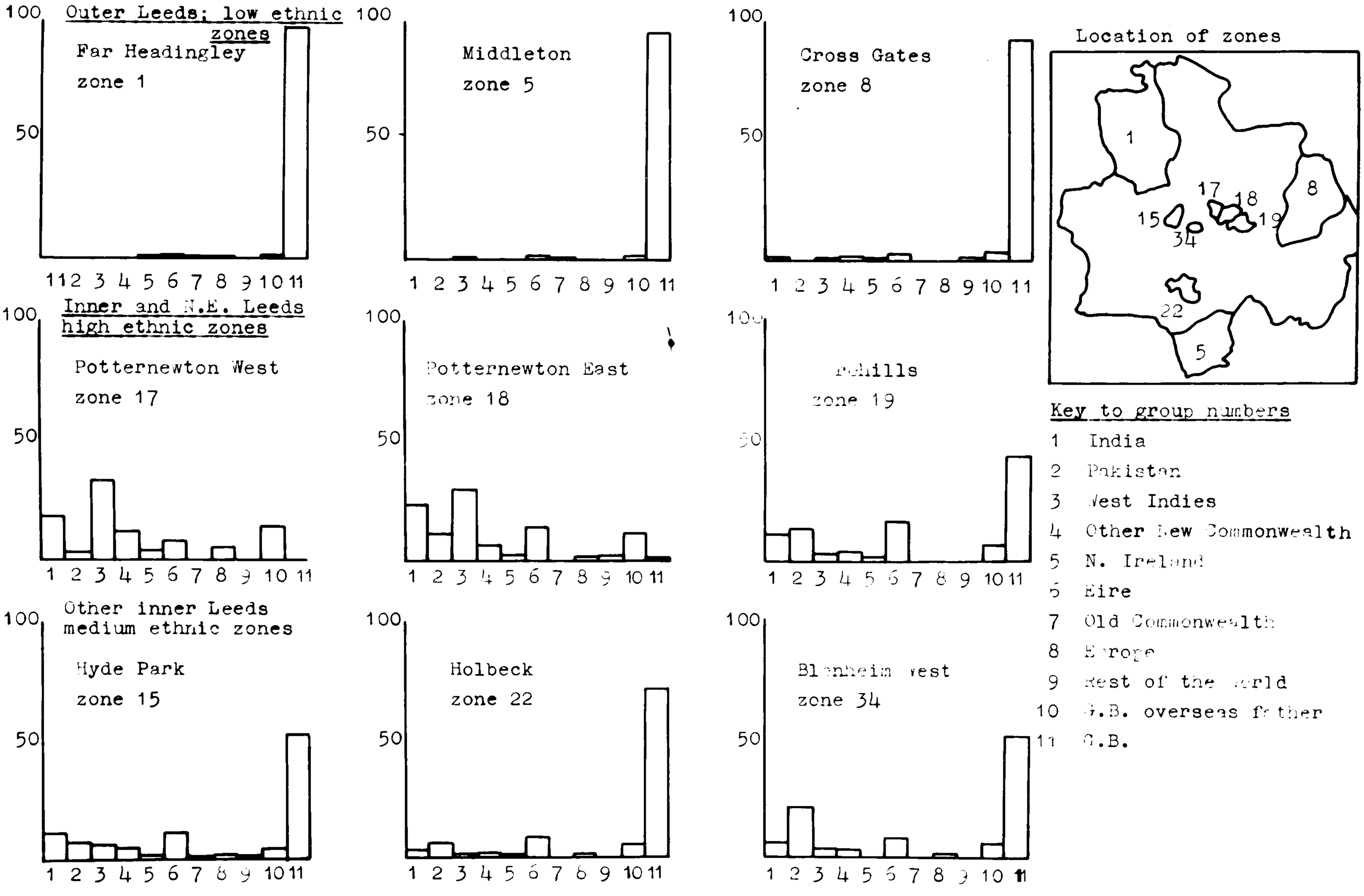


Table 6.14 Number and percentage of total births accounted for by the three highest scoring zones in each birthplace group in Leeds C.B. 1971

| Birthplace | India | Pakistan | Caribbean | O.N.C. | N.Ireland |
|---|---|---|---|---|---|
| Zone Numbers | 15, 17, 18 | 18, 19, 34 | 17, 18, 15 | 15, 17, 18 | 17, 11, 1 |
| Zone Names | Hyde Park<br>Potternewton W.<br>Potternewton E. | Potternewton E.<br>Harehills<br>Blenheim W. | Potternewton W.<br>Potternewton E.<br>Hyde Park | Hyde Park<br>Potternewton W.<br>Potternewton E. | Potternewton W.<br>Bramley<br>Far Headingley |
| No. of births | 98 | 79 | 121 | 40 | 15 |
| Percent | 58.7 | 50.9 | 65.8 | 44.4 | 24.4 |

| Birthplace | Eire | O.C. | Rest of World | Europe | G.B.[1] |
|---|---|---|---|---|---|
| Zone Numbers | 19, 18, 15 | 2, 3, 10 | 8, 18, 3 | 17, 29, 10 | 17, 18, 8 |
| Zone Names | Harehills<br>Potternewton E.<br>Hyde Park | Moortown<br>Stanningley<br>Meanwood | Cross Gates<br>Potternewton E<br>Stanningley | Potternewton W.<br>Potternewton N.<br>Allerton | Potternewton W.<br>Potternewton E.<br>Cross Gates |
| No. of births | 80 | 8 | 6 | 17 | 61 |
| Percent | 27.0 | 37.5 | 46.2 | 41.4 | 20.0 |

Servia Hill and Wellclose Terrace area to the east of the university.

6.6.3

The ultimate purpose of the collection of this information on birth events to immigrants to Leeds was to enable the calculation of the vital rates concerning the fertility of these persons for use in a population projection model. This aspect of the population geography of immigrants in Britain has been considerably under examined in the past because of the dearth of information about these relevant births. No excuse, therefore, is needed for the next chapter which seeks to examine the results of the juxtaposition of the births examined in this chapter with the 1971 census populations for the city. The rates derived are used in an explicit model for population projection in Chapter 8.

# CHAPTER 7

## Fertility rates and trends for the immigrant population.

### 7.1 Introduction.

#### 7.1.1 Rates in demography.

Any given population will change in numbers over a period of time. The losses which a population suffers through death or out-migration of some of its members are replenished by births to its female members and by in-migration. The difference between births and deaths, that is, the change due to differences in the numbers of births and the numbers of deaths is known as "reproductive change" or "natural increase". The difference between in-migration and out-migration is called "net-migration".

In most demographic study these changes are described by rates generally expressed as events occurring over time per 1,000 persons at the mid-point of the time period. Thus birth, death and migration rates can be specified for any population given data concerning the events themselves and the population to which these events are occurring. These are the basic rates on which demographic study has depended for so long, and are the basis for population projections. They can be shown to be very powerful tools of analysis provided that the individual populations involved in the numerators and denominators of the rate equations are specified correctly. (Rees & Wilson, 1973). Despite warnings about the shortcomings of the demographic rates expressed by some authors, notably Pressat (1972), Donald Bogue says about them:-

"they are a very important medium of exchange of demographic information around the world. They are easy to compute; their meaning is widely understood by those who have little demographic training; and despite their simplicity, they are amazingly efficient in detecting and measuring fairly accurately differences and changes in population growth. Often they can be calculated or estimated in situations where other more refined measures have not been established." (Bogue, 1969).

Of all the rates which are necessary to demographic study the areas to which most importance is generally assigned are those concerning the birth of children into a population. These rates are usually termed fertility rates in that they refer to the actual event of the bearing of a child. This terminology is used in this thesis, to refer to rates which are calculated using the female population only as a denominator. The term birth rate is used to refer to rates calculated using the total population as denominator of the rate calculation equations. While the calculation of fertility rates is relatively easy, fertility is probably the most complex subject in demographic study. The factors involved in establishing a set of fertility rates for any population are wide and varied, drawing from a great number of different disciplines.

As Bogue says:-

> "the major shortcoming in fertility study at the present time is a comparative scarcity of basic explanation of fertility changes and differentials. Much of our model-building is no more than curve-fitting to parameters which we do not yet understand and whose variations remain largely unexplained". (Bogue, 1959).

Yet this does not detract from the basic importance of investigation into the rates at which populations are being renewed through births. The fertility rates may be regarded

as a social fact, reflecting the varying social, economic, and ethnic situation of particular populations. In most cases they are the only rates which can be calculated given present data systems.

There have been two main trends in fertility analysis. The first is the study of fertility trends over time. The second is the study of the differences in fertility patterns at one point in time between separate population groups. Both these types of study directly concern us here.

### 7.1.2 Aims of the chapter

This chapter is an attempt to specify the fertility patterns displayed by a distinct population group in Leeds C.B. the New Commonwealth immigrant population. It is a study of the differential fertility of the main national groups which make up this population group, Indians, Pakistanis, West Indians and persons born in Other New Commonwealth countries. The fertility rates of these groups are calculated using birth totals for 1971 and the population totals derived from the 1971 census. The preparation of this data is explained below in Section 7.2.

In order to examine the trends in fertility rates for the four years for which birth information is available, estimates are made of the numbers of women in the fertile age ranges in each ethnic group for the years 1969, 1970 and 1972. The results of these calculations are given in section 7.8 of this chapter.

Differential fertility is studied using the five major measures of the rates at which populations give birth: the crude birth rate, general fertility rate, age specific

fertility rates, total fertility rate and cumulative fertility rate. The meaning and derivation of these rates are discussed briefly in section 7.3. The rates for the four national groups of Leeds City in 1971 are presented in section 7.4, and are compared with two other population groups, the Irish in Leeds, another immigrant group, and the total population of England and Wales. Conclusions are drawn as to the absolute and relative differences in the fertility patterns of the immigrant and indigenous groups.

In section 7.5 we attempt to calculate the total expected births in Leeds over the calendar year period 1961 to 1971 to the New Commonwealth immigrant population and compare these with the total expected births to the women aged 15 to 49 years old whatever their location over the period. Estimates can then be made of the numbers of children born abroad and residing in Leeds C.B. in 1971.

A check on the calculated fertility rates is made in section 7.6, using four other data sources, details of the fertility levels in the origin countries (Bogue, 1969, Keyfitz and Flieger, 1968), the census data for 1971 (O.P.C.S. 1973a) and the estimates in Rose et al (1969).

### 7.1.3 The fertility of coloured immigrants

In general, there is very little that is definitely known about the fertility levels of coloured immigrants in England and Wales. We know something about these fertility levels from past censuses. For example, Thompson (1969) says:

> "The fullest information on this subject is that contained in the 1961 Census of Population, and this is the material on which this paper mainly draws".

The population censuses can really only supply suggestions rather than concrete facts about fertility and difficulties are always incurred such as comparability between censuses and the definition of nationality.

Researchers who have approached this problem have previously been forced, through the lack of basic demographic information, either to work with surrogates for fertility rates such as the ratio of children under five to women in the child bearing ages or such as the different social grouping of the immigrants or the differing rates of marriage of the different birthplace groups. The work of Jackson in Rose (1969) and Thompson (1969) are examples of this type. Or instead researchers make simple assumptions about the relative levels of fertility on a mostly subjective basis (Thomas, 1970). Work of the former type is to be admired in that the basic components of fertility are recognised and their probable effects on fertility levels are analysed. However, we still lack the basic fertility data with which to analyse fertility trends among immigrant groups in the U.K.

In all work to the present time the coloured immigrant groups have been analysed collectively. Yet it is recognised that there are significant differences in cultural background and attitude to family building which are likely to make each individual immigrant group behave differently in terms of its fertility. No attempt has ever been made to compare the differential fertility of groups in these terms. This is by no means an indictment of work performed in this field. It is simply an inevitable result of the scarcity of information. In 1964 Waterhouse and Brabban made a study of the fertility of immigrant groups in Sparkbrook,

Birmingham (Waterhouse & Brabban, 1964). This was apparently the first time that survey information had been linked with census data for these purposes. The paper does not enlighten us overmuch, however, since it attempts to analyse essentially the fecundity, that is, the ability to bear children, rather than the fertility, of the immigrants. Nevertheless they do recognise that there are likely to be considerable differences between the immigrant groups as well as between the immigrant groups and the indigenous population. Despite the fact that in 1964 they could claim:

> "...the pattern of fertility they (immigrants) exhibit becomes a matter both of intrisic interest from a sociological point of view and of importance in the future provision of services of all kinds..."
> (Waterhouse & Brabban, 1964)

the recording of information on births to immigrants did not begin until 1969 when the Department of Health included a question on mother's and father's place of birth on the birth registration form.

## 7.2 The data available

### 7.2.1 The births

The analyses in subsequent sections of this thesis are based on two basic data sources. The first is the information on births which has been obtained from the Department of Child Health in Leeds C.B. The incidence of these births and the sociological information associated with them have been examined in the previous chapter.

### 7.2.2 The population

The second data source supplied the denominators of the

rate equations, that is, the numbers of persons, males and females, in each ethnic group in Leeds in 1971. These data are also required broken down by age groups. The 1971 census however does not supply this information directly. At city level the numbers in each birthplace group only are supplied. Information on the distribution of the different birthplace groups by year of birth is supplied, at its lowest scale level, for the West Yorkshire conurbation. Data from these two sources are used to obtain the correct form for the denominators of the rate equations.

The first stage is to recognise that the census classification by year of birth for five year groups does not correspond directly to age groups. This situation arises out of the non-conformity of the five year census period with the five year of birth classification. For example a person born in 1961 before the census date would be classified at the census of 1966 in the 5-9 years old age group. Conversely a person born in 1961 after census date would be classified, at the census of 1966 as being in the 0-4 years old group. Yet the year of their births was the same. A process is used which allocates the births in each census year to each of the age groups to which these persons could belong. This has already been explained in Chapter 5. The final result is the ethnic population of the West Yorkshire conurbation broken down into 14 five year age groups. From this data we can derive the conditional probabilities which are used in the first iteration of an estimation of the numbers of persons in each ethnic group in each age group for Leeds C.B. Clearly the probabilities derived for the West Yorkshire conurbation need not necessarily "fit" the situation as it exists in reality in

Leeds. So adjustments are made using balancing factors to force the estimates of numbers of immigrants in the various age groups to add up to the correct totals for the immigrant groups and to the numbers in each age group in the Leeds total population.

Estimation of the numbers in each age group is made using a doubly constrained conditional probability model which is given as follows:-

$$K^i_{ek}\,(\text{est}) = A^i_e\, B^i_k\, K^i_e\, (P^{wy}(k/e)) \qquad \ldots 7.1$$

where $$A^i_e = K^i_e \,/ \sum_k B^i_k\, K^i_e\, (P^{wy}(k/e)) \qquad \ldots 7.2$$

and $$B^i_k = K^i_k \,/ \sum_e A^i_e\, K^i_e\, (P^{wy}(k/e)) \qquad \ldots 7.3$$

where $K^i_e$ = Persons in zone i, ethnic group e

$K^i_k$ = Persons in zone i, age group k

$A^i_e$ = Balancing factor specific to ethnic group e in zone i

$B^i_k$ = Balancing factor specific to age group k in zone i

$P^{wy}(k/e)$ = Probability of being in age group k given ethnic group e

$K^i_{ek}$ = Persons in zone i in ethnic group e and in age group k.

Basically the model adjusts the supplied probabilities through the balancing factors $A^i_e$ and $B^i_k$ specified in equations (2) and (3) until the conditions are satisfied such that:

$$\sum_k K^i_{ek}\,(\text{est}) = K^i_e\,(\text{observed}) \qquad \ldots 7.4$$

$$\sum_e K^i_{ek}\,(\text{est}) = K^i_k\,(\text{observed}) \qquad \ldots 7.5$$

that is, such that the sum over the age groups k of the

estimated number in an age group in an ethnic group gives the total for each ethnic group e (equation 7.4) and the sum over the ethnic groups in each age group gives the total in each age group k (equation 7.5). The results of this model specifying the age structure of male and female immigrants in Leeds C.B. in 1971 at census date are given in Tables 7.1 and 7.2. These results are essentially "best estimates" of the age structure of the ethnic groups in Leeds C.B. in 1971.

Notes

The following abbreviations are used in Tables 7.1 and 7.2

NI - Northern Ireland

ONC - Other New Commonwealth, i.e. New Commonwealth minus India, Pakistan, Caribbean

OC - Old Commonwealth, comprising Australia, New Zealand and Canada.

GB - Great Britain

The information supplied in Tables 7.1 and 7.2 becomes the basic population data necessary to the calculation of the birth and fertility rates which are described briefly in section 7.3. In reality this information should be given for the mid-year period, but we accept the small error involved in assuming that the census recording approximates the mid-year population. This will lead to a very slight overestimate of the various fertility rates.

## 7.3 The birth and fertility rates defined.

The specification of the birth and fertility rates follows the accepted practice accorded to such rates. The rates calculated, therefore, are directly comparable with rates for other populations derived in the same way. This is

Table 7.1 Females in Leeds C.B. in 1971 by age and birthplace group

| Age Group | Birthplace | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | India | Pakistan | Caribbean | NI | Eire | ONC | OC | Foreign | GB |
| 0-4 | 25 | 49 | 13 | 9 | 25 | 15 | 7 | 385 | 18,537 |
| 5-9 | 94 | 55 | 46 | 14 | 58 | 37 | 10 | 373 | 19,177 |
| 10-14 | 133 | 65 | 248 | 35 | 105 | 53 | 9 | 307 | 17,630 |
| 15-19 | 205 | 59 | 257 | 64 | 191 | 49 | 12 | 328 | 16,594 |
| 20-24 | 261 | 100 | 173 | 110 | 330 | 50 | 24 | 404 | 19,072 |
| 25-29 | 206 | 67 | 266 | 128 | 381 | 31 | 19 | 217 | 12,264 |
| 30-34 | 207 | 91 | 351 | 135 | 402 | 20 | 26 | 147 | 11,962 |
| 35-39 | 183 | 86 | 333 | 134 | 399 | 14 | 33 | 180 | 12,239 |
| 40-44 | 143 | 47 | 220 | 135 | 400 | 9 | 55 | 360 | 13,726 |
| 45-49 | 99 | 18 | 128 | 119 | 355 | 8 | 58 | 344 | 14,920 |
| 50-54 | 64 | 5 | 69 | 104 | 311 | 5 | 28 | 307 | 14,466 |
| 55-59 | 36 | 2 | 51 | 89 | 265 | 4 | 21 | 369 | 15,689 |
| 60-64 | 26 | 2 | 13 | 62 | 184 | 3 | 19 | 115 | 15,853 |
| ⩾65 | 38 | 4 | 17 | 127 | 379 | 5 | 46 | 254 | 41,382 |
| Totals | 1,720 | 650 | 2,185 | 1,265 | 3,785 | 305 | 365 | 4,090 | 243,505 |

Table 7.2 Males in Leeds C.B. in 1971 by age and birthplace group

| Age Group | Birthplace | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | India | Pakistan | Caribbean | NI | Eire | ONC | OC | Foreign | GB |
| 0-4 | 39 | 34 | 10 | 10 | 27 | 85 | 20 | 73 | 20,838 |
| 5-9 | 103 | 92 | 48 | 20 | 51 | 171 | 41 | 107 | 20,547 |
| 10-14 | 211 | 188 | 210 | 39 | 103 | 221 | 53 | 90 | 18,071 |
| 15-19 | 325 | 291 | 221 | 66 | 171 | 210 | 51 | 122 | 16,242 |
| 20-24 | 193 | 173 | 139 | 111 | 289 | 223 | 53 | 234 | 17,759 |
| 25-29 | 177 | 158 | 220 | 142 | 371 | 165 | 40 | 208 | 13,966 |
| 30-34 | 270 | 241 | 373 | 163 | 428 | 141 | 34 | 218 | 12,605 |
| 35-39 | 250 | 224 | 379 | 158 | 413 | 100 | 24 | 187 | 12,204 |
| 40-44 | 204 | 183 | 221 | 148 | 389 | 83 | 20 | 405 | 12,917 |
| 45-49 | 140 | 125 | 198 | 138 | 361 | 70 | 17 | 846 | 14,435 |
| 50-54 | 81 | 75 | 124 | 122 | 320 | 55 | 13 | 494 | 13,118 |
| 55-59 | 49 | 36 | 71 | 115 | 301 | 51 | 10 | 431 | 13,743 |
| 60-64 | 26 | 25 | 28 | 88 | 231 | 23 | 6 | 307 | 12,824 |
| ⩾65 | 32 | 30 | 13 | 130 | 340 | 27 | 8 | 443 | 23,827 |
| Total | 2,100 | 1,875 | 2,355 | 1,450 | 3,795 | 1,625 | 390 | 4,165 | 223,106 |

part of the value of maintaining the simple form of rate calculation and ensures that comparisons are valid later. The rates which are defined and calculated here are specific to a period and an age group. It is also possible to calculate cohort rates for a period (Pressat, 1972, pp 195 ff) and accounts based rates (Rees and Wilson, 1977a) which are of greater utility in population projection. Here we restrict attention to the conventional rates.

There are five different rates which can be calculated and their specification is the same as that given in Bogue (1959). Formal mathematical statements of the rate equations are made using the notation developed for spatial demographic analysis by Rees (1973). A fully explicit treatment of all the concepts attached to this notation is given there.

(a) Crude Birth Rate

This is the total number of births in a given period (usually a year) per 1,000 total population. It is not an especially useful measure when, as reference to Tables 7.1, 7.2, and 7.4 shows, there is a fairly large inbalance in the sex ratio. Formally it can be expressed as:

$$b_e^i = (1000)\left(K_e^{\beta}(i)^* / \hat{K}_e^{B*i}\right) \qquad \ldots 7.6$$

where $b_e^i$ is the birth rate in region i to mothers in ethnic group e

$K_e^{\beta}(i)^*$ are the birth in region i to mothers in ethnic group e

$\hat{K}_e^{B*i}$ is the population of ethnic group e at risk of giving birth in region i

We assume that:

$$\hat{K}_e^{B*i}(1971) \simeq K_e^i \quad \text{(census date, 1971)} \qquad \ldots 7.7$$

although conventionally:

$$K_e^{B*i}(1971) \simeq K_e^i(\text{start of 1971}) + (K_e^i(\text{end of 1971}) - K_e^i(\text{start of 1971}))/2 \qquad \ldots 7.8$$

$$\text{or} \qquad \simeq K_e^i(\text{mid-year, 1971}) \qquad \ldots 7.9$$

(b) General Fertility Rate

This is the total number of births in a period per 1,000 women in the fertile age groups, that is, between the ages 15-49 years. This is an improvement on the crude birth rate in that it excludes from the calculations males in total and females too old and too young to bear children. Formally it may be expressed as:

$$g_e^i = (1000)\left\{K_e^{\beta(i)*} \Big/ \sum_{k=\lambda}^{\mu} \hat{K}_{e*k}^{B*i}\right\} \qquad \ldots 7.10$$

$$\text{where} \sum_{k=\lambda}^{\mu} \hat{K}_{e*k}^{B*i} \simeq \sum_{k=\lambda}^{\mu} K_{ek}^{iF} \quad \text{(census date, 1971)} \qquad \ldots 7.11$$

and $k = \lambda \ \mu$ specifies the range of childbearing ages, in this case with five year age groups $\lambda = 3$ (15 to 19 years) and $\mu = 9$ (45 to 49 years).

(c) Age Specific Fertility Rate

This is the number of births in a period per 1,000 women in a specific age group. There are considerable advantages in using this rate. It specifies the rate of childbearing through all ages, reflecting as this does marriage patterns and other social influences and allows the probable fertility history of a cohort of women to be traced over a period of time (see section 7.5) through the total fertility rate. Formally this may be expressed as:

$$f^{i}_{ek} = 1000 \left\{ K^{\beta(i)*}_{e**} (K^{*m(i)}_{e*k}) \,/\, \hat{K}^{B*i}_{e*k} \right\} \qquad ..7.12$$

where

$$\hat{K}^{B*i}_{e*k} \simeq K^{iF}_{ek} \text{ (census date, 1971)} \qquad ..7.13$$

and the term $K^{\beta(i)*}_{e*k}$ $(K^{*m(i)}_{e*k})$ refers to the number of children born in regions i to mothers in ethnic group e who were in age group k at the time of birth.

(d) Total Fertility Rate

This is calculated by summing the age specific fertility rates and multiplying by the extent of the age group interval, in most cases five years. In effect this specifies the probable terminal family size of the population of interest. For example, if the total fertility rate is 3,000, this implies that the cohort of 1,000 women would, if the rates remained constant, and the mother survived, produce 3,000 children, an average family size of 3. Formally this may be expressed as:

$$t^{i}_{e} = \sum_{k} f^{i}_{ek} \triangle k \qquad ..7.14$$

where $\triangle k$ is the age group interval.

(e) Cumulative Fertility rate

This is calculated by multiplying each age specific fertility rate by the age group interval and summing these products cumulatively. It is a statement of the total number of children a woman would bear up to and including a given age in living through the fertile age groups. It can be halted at any specific age but over the whole fertile age range will equal the total fertility rate. Formally it can be expressed as:

$$c^{i}_{ek^{1}} = \sum_{k=\lambda}^{k^{1}} f^{i}_{ek} \triangle k \qquad ..7.15$$

where $\lambda \leqslant k \leqslant \mu$

and $k^{1}$ refers to the particular age group to which products are summed.

Two particular refinements to these fertility rates must be mentioned more because they would be noticeable by their absence in any study of fertility rather than because they are useful here. The first is the definition of the rates for married women to give nuptial-specific rates, that is, the rates are specified for married women or women ever-married rather than the women in the fertile age groups. This is an obvious improvement in specifying women at risk at giving birth since in most populations the birth of children within marriage is the rule rather than the exception.

The second refinement is strongly advanced by Pressat (1972). He urges that it is important to distinguish, in different populations, between groups commonly using birth control and those who don't. To such an end he distinguishes Neo-Malthusian populations as those who have knowledge of, and regularly practice, birth control, and Malthusian populations as those who either do not have knowledge of and/or do not practice birth control.

Both these refinements would aid in the analysis of the fertility levels of immigrant groups in the United Kingdom but are beyond the scope of the present work.

## 7.4 The birth and fertility rates of the New Commonwealth population of Leeds in 1971.

### 7.4.1 Crude birth rates

The crude birth rates for the nine birthplace groups in Leeds for 1971 are given in Table 7.3

It can be seen from the Table that the New Commonwealth groups have considerably higher crude birth rates than the indigenous population and are higher than the white immigrant groups. An almost as noticeable feature of this table is the very low crude birth rate to persons born in foreign countries. We should not perhaps place too much dependence on the accuracy of the results for the small population groups, the other New Commonwealth and the Old Commonwealth. This proviso holds for the more closely specified rates, in particular the age-specific rates and this should be borne in mind when consulting the results.

Table 7.3 shows that the crude birth rate in Leeds tends to be greater for the immigrant groups than in the country as a whole, but lower for the indigenous population. Reference to Table 7.4 which shows the sex ratio for Leeds and England and Wales in 1971, that is the number of women to every 100 males suggests that the differentials displayed here will be even more marked when only the female populations are used in rate calculation. There are fewer females per 100 males in Leeds than in England and Wales as a whole. The high birth rate of 64.9 for the Pakistani group is being held artificially low by the very low number of women in relation to males in this birthplace group! In total the crude birth rates given here suggest that the fertility of immigrants and the coloured immigrants in particular,

Table 7.3 Crude birth rates for nine birthplace groups in Leeds C.B. in 1971.

| Birthplace | Total Births | Total Population | Rate per 1000 total population | Rate per 1000 total pop. in England & Wales |
|---|---|---|---|---|
| India | 172 | 3,820 | 45.0 | 48.1 |
| Pakistan | 164 | 2,525 | 64.9 | |
| Caribbean | 189 | 4,540 | 41.6 | 41.6 |
| Northern Ireland | 64 | 2,715 | 23.5 | N/A |
| Eire | 301 | 7,580 | 39.7 | 31.5 |
| Other New Commonwealth | 93 | 1,930 | 48.1 | 29.3 |
| Old Commonwealth | 16 | 755 | 21.1 | N/A |
| Foreign | 55 | 8,255 | 6.6 | 19.2 |
| Great Britain | 6,788 | 466,605 | 14.5 | 15.2 |

Notes:

The figures for the crude birth rates for England and Wales are derived from the Registrar General's Statistical Review for 1971 (OPCS 1973[b]) Appendix C.

Table 7.4

Sex Ratio for birthplace groups in Leeds and England and Wales in 1971.

| Birthplace | Sex Ratio Leeds Females per 1000 Males | Sex Ratio E. W. Females per 100 males |
|---|---|---|
| India | 81.6 | 83.8 |
| Pakistan | 34.7 | 38.3 |
| Caribbean | 92.8 | 99.6 |
| Other New Commonwealth | 80.3 | 87.6 |
| Old Commonwealth | 93.6 | 116.2 |
| Foreign | 98.2 | 105.9 |
| Northern Ireland | 87.2 | N/A |
| Eire | 99.7 | 106.3 |
| Great Britain | 101.1 | 106.2 |

a

Source: OPCS (1972)

OPCS (1973 (b) )

is very high. The initial conclusion is borne out in the other fertility rates.

## 7.4.2 General Fertility Rate

The general fertility rate, as mentioned above, removes from the fertility calculations those persons in the total population who could not possibly give birth to a child, that is, the males and the old and young females. This rate states the numbers of births occurring to every 1000 females in each particular population group. Values of this rate for Leeds in 1971 are given in Table 7.5. This table shows that there are indeed very large differences in the rates at which children are born to particular populations differentiated by birthplace. Women born in Pakistan and Other New Commonwealth countries appeared to give birth, in Leeds particularly, at a very high rate. The rate is so large in the case of the Other New Commonwealth women that the safest thing which can be said about it is that this was the rate for one English city in one year. There is evidence to show, however, from information supplied by the Department of Child Health in Leeds on births over a three year period in Leeds C.B. that this rate was far from a "flash in the pan". Much the same proportions were reached in 1969, 1970 and 1972. The table suggests that Indian women give birth at approximately twice the rate of the indigenous women, Pakistanis at approximately five times and Other New Commonwealth women at approximately seven times the rate for the indigenous population. Thus on average, women born in the New Commonwealth gave birth at four times the rate for the indigenous population. Comparison with the rates derived for England and Wales suggests that on

Table 7.5 General fertility rate for nine birthplace groups in Leeds C.B. in 1971 and for England and Wales 1971

| Birthplace | Total Births | Total females aged 15-49 | General fertility rate | GFR 1971 England & Wales |
|---|---|---|---|---|
| Indian | 172 | 1,303 | 132.0 | 177.3 |
| Pakistan | 164 | 468 | 350.0 | |
| Caribbean | 189 | 1,728 | 109.3 | 105.2 |
| N. Ireland | 64 | 825 | 77.5 | N/A |
| Eire | 301 | 2,458 | 122.4 | 96.6 |
| Other New Commonwealth | 93 | 181 | 513.8 | 102.1 |
| Old Commonwealth | 16 | 408 | 39.2 | N/A |
| Foreign | 55 | 1,980 | 27.7 | 19.2 |
| Great Britain | 6,788 | 100,777 | 67.3 | 72.2 |

Notes:

The general fertility rate at England and Wales level for Indians and Pakistanis is a joint figure. The presentation of the figures in the Registrar General's Statistical Review makes this necessary.

the whole those figures for Leeds are a reasonably accurate reflection of those at national level. There are more Pakistani women per 100 males at national level than at Leeds level (Table 7.3), which suggests that this rate of 350.0 births per 1000 Pakistani women in Leeds could be reduced slightly at national level.

As a final word concerning the very high rate for Other New Commonwealth women, it may be said that the age specific fertility rates are tested later in the paper against census and other estimates and are not found to be excessively high in relation to the "finished product", that is, the number of children recorded in this birthplace group. But it must be recognised as a remarkable situation when half of the total number of women in the fertile age groups give birth in one year!

### 7.4.3 Age specific fertility rates

Information to derive the age specific fertility rates is obtained from Tables 6.5 and 6.10 of Chapter 6. This means that all births are included, children who survived and children who died for each five year age group of women. Table 7.6 gives the total number of births in each age group for each of the major birthplace groups.

The age-specific fertility patterns displayed by each birth-place group are quite distinctive as Table 7.8 and Figure 7.1 show. The Other New Commonwealth group has been explicitly excluded from Figure 7.1. The rates show that of all coloured groups the Indian women begin at the lowest rate in the first age group, attain their greatest fertility in the 25-29 years age group and decline sharply after this point. Women born in the Caribbean have a fairly high

Table 7.6 Births by age of mothers for five major birthplace groups and for England and Wales total population in 1971

| Age Group | India | Pakistan | Caribbean | Other New Comm. | Eire | Births to the total pop. of England & Wales 1971 |
|---|---|---|---|---|---|---|
| 15-19 | 5 | 3 | 35 | 9 | 4 | 82,641 |
| 20-24 | 61 | 47 | 30 | 38 | 57 | 285,703 |
| 25-29 | 57 | 36 | 51 | 26 | 87 | 247,239 |
| 30-34 | 31 | 34 | 35 | 11 | 91 | 109,616 |
| 35-39 | 11 | 28 | 30 | 4 | 45 | 45,224 |
| 40-44 | 6 | 15 | 6 | 2 | 16 | 11,915 |
| 45-49 | 1 | 1 | 2 | - | 1 | 817 |
| Totals | 172 | 164 | 189 | 93 | 301 | 783,155 |

The female population by age group to which these births relate are given in Table 7.7.

Table 7.7 Females by age and birthplace group in Leeds and in England and Wales in 1971

| Age Group | India | Pakistan | Caribbean | Other New Comm. | Eire | England & Wales Females |
|---|---|---|---|---|---|---|
| 15-19 | 205 | 59 | 257 | 49 | 191 | 1,625,852 |
| 20-24 | 261 | 100 | 173 | 40 | 330 | 1,830,026 |
| 25-29 | 206 | 67 | 266 | 31 | 381 | 1,568,238 |
| 30-34 | 207 | 91 | 351 | 20 | 402 | 1,416,151 |
| 35-39 | 183 | 86 | 333 | 14 | 399 | 1,373,766 |
| 40-44 | 143 | 47 | 220 | 9 | 400 | 1,456,043 |
| 45-49 | 99 | 18 | 128 | 8 | 355 | 1,575,717 |
| Totals | 1,304 | 468 | 1,728 | 181 | 2,458 | 10,845,523 |

The age specific fertility rates are obtained by expressing those births in each age group and birthplace group as births per 1,000 women in each age group. These rates are given in Table 7.8.

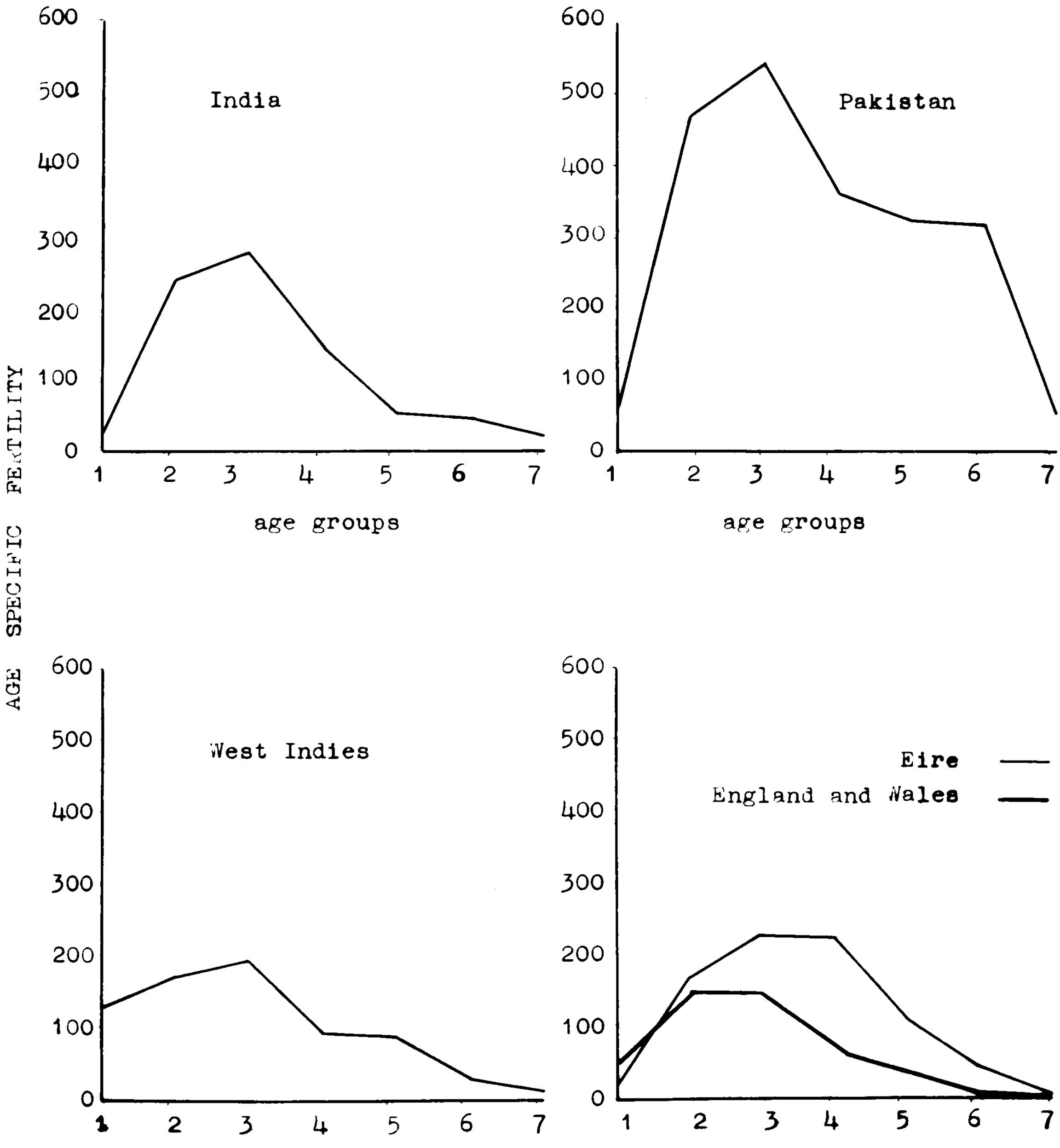
Table 7.8 Age-specific fertility rates for selected birthplace groups in Leeds and for the female population of England and Wales in 1971

| Age Group | Birthplace | | | | | |
|---|---|---|---|---|---|---|
| | India | Pakistan | Caribbean | ONC | Eire | England & Wales |
| 15-19 | 24.3 | 50.8 | 136.1 | 183.6 | 20.9 | 50.8 |
| 20-24 | 233.7 | 470.0 | 173.4 | 760.0 | 172.7 | 156.1 |
| 25-29 | 276.7 | 537.3 | 191.7 | 838.7 | 228.3 | 157.6 |
| 30-34 | 149.7 | 373.6 | 99.7 | 550.0 | 226.3 | 77.4 |
| 35-39 | 60.1 | 325.5 | 90.0 | 285.7 | 112.7 | 32.9 |
| 40-44 | 41.9 | 319.1 | 27.2 | 222.2 | 40.0 | 8.1 |
| 45-49 | 10.1 | 55.5 | 15.6 | - | 2.8 | 0.5 |

Table 7.9 Total fertility rates for the major birthplace groups in Leeds C.B. in 1971 and in England and Wales for the total population in 1971

| Age Group | Birthplace | | | | | |
|---|---|---|---|---|---|---|
| | India | Pakistan | Caribbean | Eire | ONC | England & Wales |
| 15-19 | 24.3 | 50.8 | 136.1 | 20.9 | 183.6 | 50.8 |
| 20-24 | 233.7 | 470.0 | 173.4 | 172.7 | 760.0 | 156.1 |
| 25-29 | 276.6 | 537.3 | 191.7 | 228.3 | 838.7 | 157.6 |
| 30-34 | 149.7 | 373.6 | 99.7 | 226.3 | 550.0 | 77.4 |
| 35-39 | 60.1 | 325.5 | 90.0 | 112.7 | 285.7 | 32.9 |
| 40-44 | 41.9 | 319.1 | 27.2 | 40.0 | 222.2 | 8.1 |
| 45-49 | 10.1 | 55.5 | 15.6 | 2.8 | 0.0 | 0.5 |
| Total | 796.4 | 2,131.8 | 733.7 | 803.7 | 2,840.2 | 483.4 |
| Total x 5 | 3,982.0 | 10,659.0 | 3,668.5 | 4,018.5 | 14,201.0 | 2,417.0 |
| ÷ 1000 | 3.98 | 10.66 | 3.67 | 4.02 | 14.2 | 2.42 |

**Figure 7.1** Age specific fertility rates for selected groups in Leeds 1971




Note: In figures 7.1, 7.2 and 7.6 the numbers 1 to 7 represent the seven five year age groups between 15 years and 49 years.

rate of fertility in the first age group but never reach the peaks that the other coloured groups achieve. They maintain a fairly high fertility rate into the oldest child-bearing age group. The Pakistani women demonstrate the highest rates (except for the Other New Commonwealth). In the first age group they appear to give birth at a fairly usual rate, equal to that in England and Wales as a whole, but this rises rapidly to a peak in the 25-29 age group. It is also most noticeable that they maintain a high rate of fertility throughout the childbearing age group. This is a feature which may be most easily attributable to the nature of the migration process. The greatest increases of Pakistani women into Leeds came in the years 1966 to 1971. Most, if not all, of these women would be entering the country to join males and the high incidence of births may represent vigorous stages of family building. In this sense these women have not had a standard fertility history. Nevertheless these are the rates demonstrated in one particular year in one city and therefore are, de facto, the rates at which this population was giving birth in that year. More is said about this later in relation to the cumulative fertility rate. Despite these sorts of considerations, it would seem that the Pakistanis have high fertility rates.

In general the age-specific fertility rates of the New Commonwealth immigrant women vary least from the England and Wales average in the earlier age groups and most in the older age groups. Of all the groups the rates for Caribbean women vary least from the England and Wales average.

## 7.4.4 Total fertility rates and cumulative fertility rates

These two rates are coupled together because they illustrate much the same effect. The total fertility rate measures the numbers of children any particular cohort of 1,000 women would produce if they were exposed, so to speak, to the age-fertility rates holding for that cohort at a particular time. In other words it is a measure of completed fertility whereas the cumulative fertility rate measures the same process essentially but enables us to comment on the actual process of family building in each of the fertile age groups. For the years 45-49 the cumulative fertility rate refers to completed family size. Hence the cumulative fertility rate for the last age group equals the total fertility rate.

The total fertility rate is shown in Table 7.9. It is calculated simply by summing the age specific rates and multiplying by the age group interval, in this case five years. Division of these products by 1,000 expresses the expected number of children who would be born on average to each woman exposed to these rates of fertility.

This total fertility rate, therefore, suggests that when family building has had its chance to run a full course for the immigrant groups then average family sizes will be somewhat larger than for the total female population of England and Wales. For Indians and West Indians this amounts to considerably less than double the England and Wales average. Indeed the "white" immigrant group from the Republic of Ireland will on average have a larger family size than these coloured groups. The Pakistani women, however, appear to be likely to have much larger families.

As has been said before, these estimates of the fertility rates are for one year at a time when family building for all immigrant groups is likely to be fairly vigorous. As a result the figures for completed family size are likely to be over-estimated. If this is the case then the conclusion is that the Indian and West Indian groups have achieved a greater level of adjustment to British norms, in terms of their family structure than the other groups. Whether or not this indicates increasing integration is not a matter for discussion here, but it could be postulated that the Indians and West Indians appear more ready to grasp and appreciate the benefits which accrue, economically and socially, from family limitation.

Table 7.10 presents the figures calculated for cumulative fertility rates for the major birthplace groups. Figure 7.2 shows these figures graphically for comparative purposes.

Table 7.10 and Figure 7.2 show that the pace of family building and the age at which, to all intents and purposes, family building ceases differs for the different groups. In England and Wales as a whole, family building ceases most commonly between the ages of 30 and 34. For women born in the Republic of Ireland and in India this age is between 35 and 39 years, while for women from the Caribbean and Pakistan this age is between 40 and 44. We can obtain estimates of the average number of children per family in Leeds in 1971 for each age group of women and test these against the total number of children generated for each mother through the cumulative fertility rate. This will allow conclusions to be drawn as to the level of the rates over the past few years. If the average number of children

Table 7.10 Cumulative fertility rates for the major birth-place groups in Leeds C.B. in 1971 and in England and Wales for the total population in 1971

| Age Group | India | Pakistan | Caribbean | Eire | ONC | England & Wales |
|---|---|---|---|---|---|---|
| 15-19 | 121.5 | 254.0 | 680.5 | 104.5 | 918.0 | 254.0 |
| 20-24 | 1290.0 | 2,604.0 | 1,547.5 | 968.0 | 4,718.0 | 1034.5 |
| 25-29 | 2673.0 | 5,290.5 | 2,506.0 | 2109.5 | 8,911.5 | 1822.0 |
| 30-34 | 3421.5 | 7,158.5 | 3,004.5 | 3251.0 | 11,661.5 | 2209.0 |
| 35-39 | 3722.0 | 8,786.0 | 3,454.5 | 3814.5 | 13,090.0 | 2373.5 |
| 40-44 | 3931.5 | 10,381.5 | 3,590.5 | 4014.5 | 14,201.0 | 2414.0 |
| 45-49 | 3982.0 | 10,659.0 | 3,668.5 | 4028.5 | 14,201.0 | 2416.5 |

per family exceeds the number of children estimated through the cumulative fertility rate then the suggestion is that the fertility rates have fallen. If the average number of children per family is less than the number of children estimated through the cumulative fertility rate then the suggestion is that the fertility rates have risen. The average number of children per family is calculated, for each of the fertile age groups by cross-classifying the 1971 births by age group of mother and the parity value. For each age group of mother the births in each parity group are multiplied by their parity values, summed, and divided by the total number of births. The calculation is shown in Table 7.11 for the Republic of Ireland group. We are, of course, making the assumption that the average numbers of children per family displayed by the families which increased by a birth in 1971 were the same as the average numbers of children per family of those families which were not added to in 1971.

**Figure 7.2** Cumulative fertility rates for selected groups in Leeds 1971.

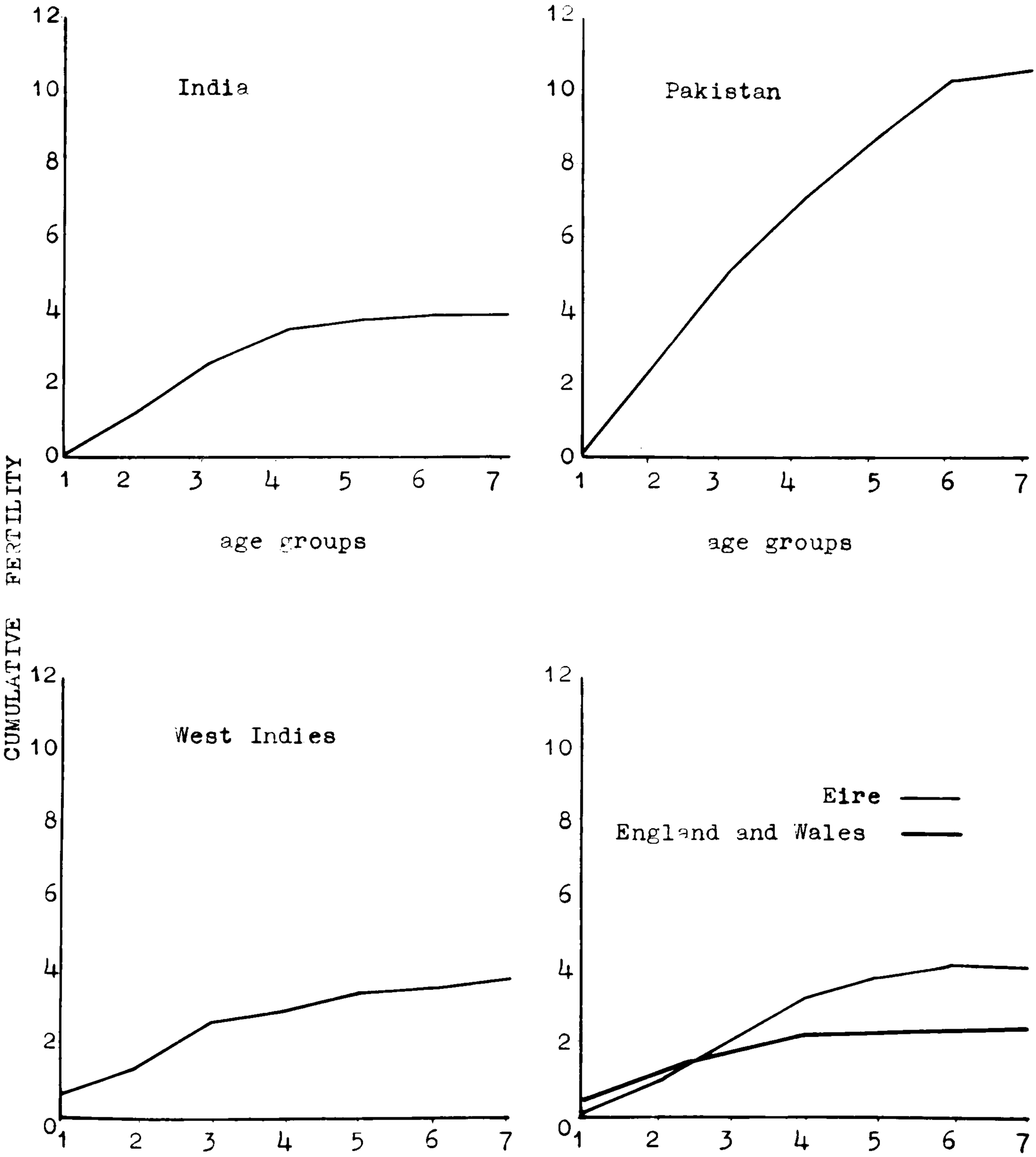


Table 7.11 Estimation of average number of children in families for each age group of mother in Leeds C.B. in 1971 - Republic of Ireland Group

| | Age of Mother | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Parity | 15-19 | BxP | 20-24 | BxP | 25-29 | BxP | 30-34 | BxP | 35-39 | BxP | 40-44 | BxP | 45-49 | BxP |
| 0 | 4 | 0 | 22 | o | 28 | 0 | 14 | 0 | 4 | 0 | 1 | 0 | - | - |
| 1 | - | - | 22 | 22 | 23 | 23 | 22 | 22 | 5 | 5 | - | 0 | - | - |
| 2 | - | - | 11 | 22 | 19 | 38 | 14 | 28 | 8 | 16 | 3 | 6 | - | - |
| 3 | - | - | 2 | 6 | 6 | 18 | 20 | 60 | 7 | 21 | 4 | 12 | - | - |
| 4 | - | - | - | - | 7 | 28 | 13 | 52 | 10 | 40 | 3 | 12 | - | - |
| 5 | - | - | - | - | 4 | 20 | 4 | 20 | 10 | 50 | 5 | 25 | 1 | 5 |
| Tl | 4 | 0 | 57 | 50 | 87 | 127 | 87 | 182 | 44 | 132 | 16 | 55 | 1 | 5 |
| Avg No of chldn | | 0 | 0. | 0.9 | | 1.5 | | 2.1 | | 3.0 | | 3.4 | | 5.0 |

Abbreviation BxP = Birth x Parity

The values obtained through this method are shown plotted against the equivalent age group values of the cumulative fertility rate for each group in Figure 7.3. The diagonals of Figure 7.3 represent a situation where the fertility rates have been stable, when the average number of children per family equals the cumulative fertility rate for each age group of mother. Of all the groups it seems that the rates for the Indian women and the Caribbean women have been the most steady. The Caribbean women show a small excess in the younger age groups which suggests that the fertility rates for the younger women have risen recently. The women from the Republic of Ireland show small excesses in the middle age ranges and a small deficit in the oldest age group suggesting that the fertility rates for the middle age ranges have risen and the rate for the oldest age group have fallen. Indian women demonstrate the most stable rates of all the groups while the Pakistani women show the most unstable. The plot for the Pakistani group supports the hypothesis that the fertility rates of this group have risen fairly recently in response to the completion of the family building unit, that is, the mother and father, in this country and Leeds, only fairly recently. The fact that the divergence from the diagonal is greater in the older age groups suggests that the more recent arrivals have been relatively older women from family units begun probably in the earlier 1960's.

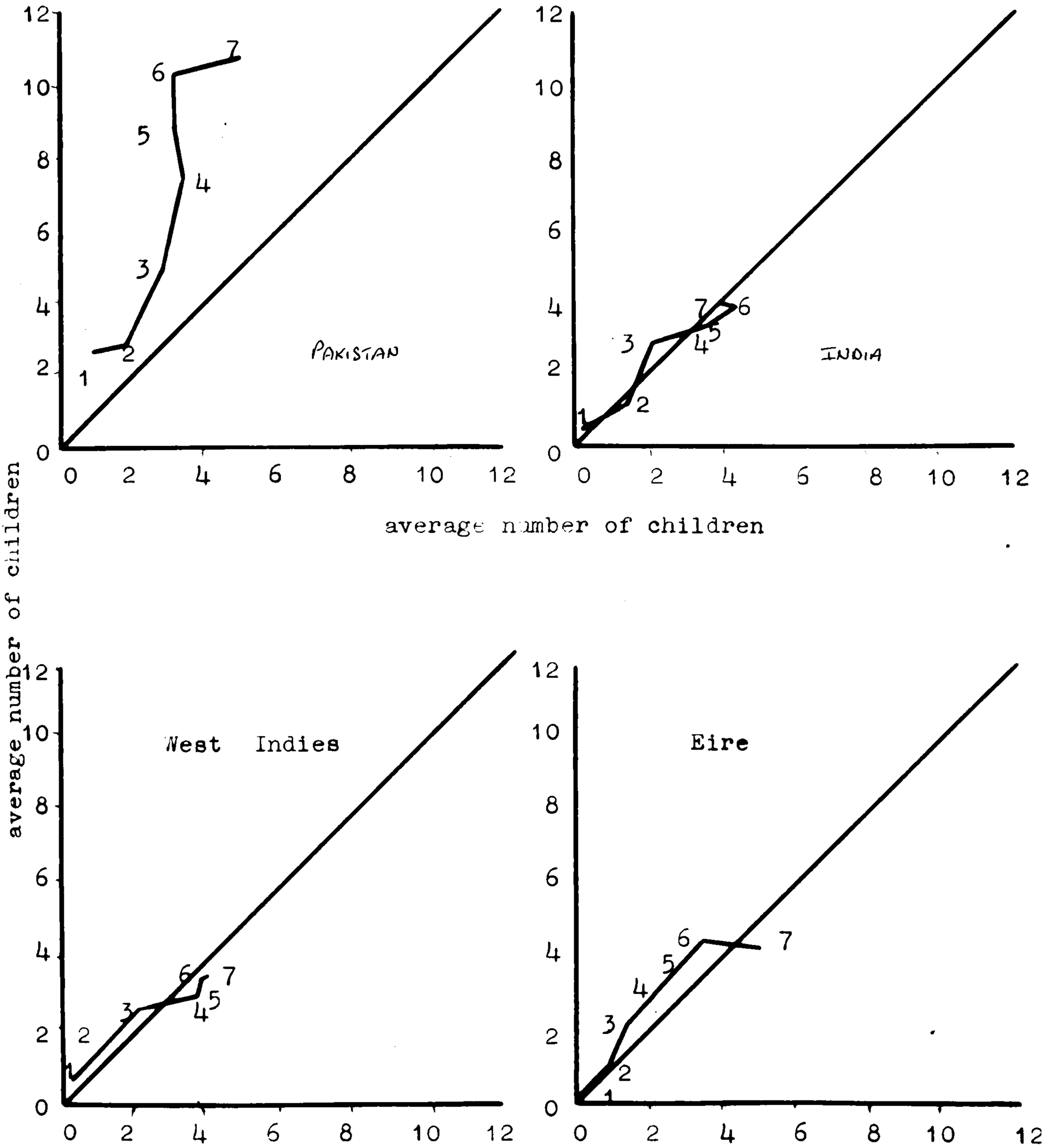
## 7.5 Estimation of children born between 1961 and 1971

### 7.5.1 Total births to the 1971 fertile cohort of women

The women who were aged 15 to 49 years in 1971 have a fertility history stretching back in total to the point at

**Figure 7.3** Cumulative fertility and average family size

Leeds 1971

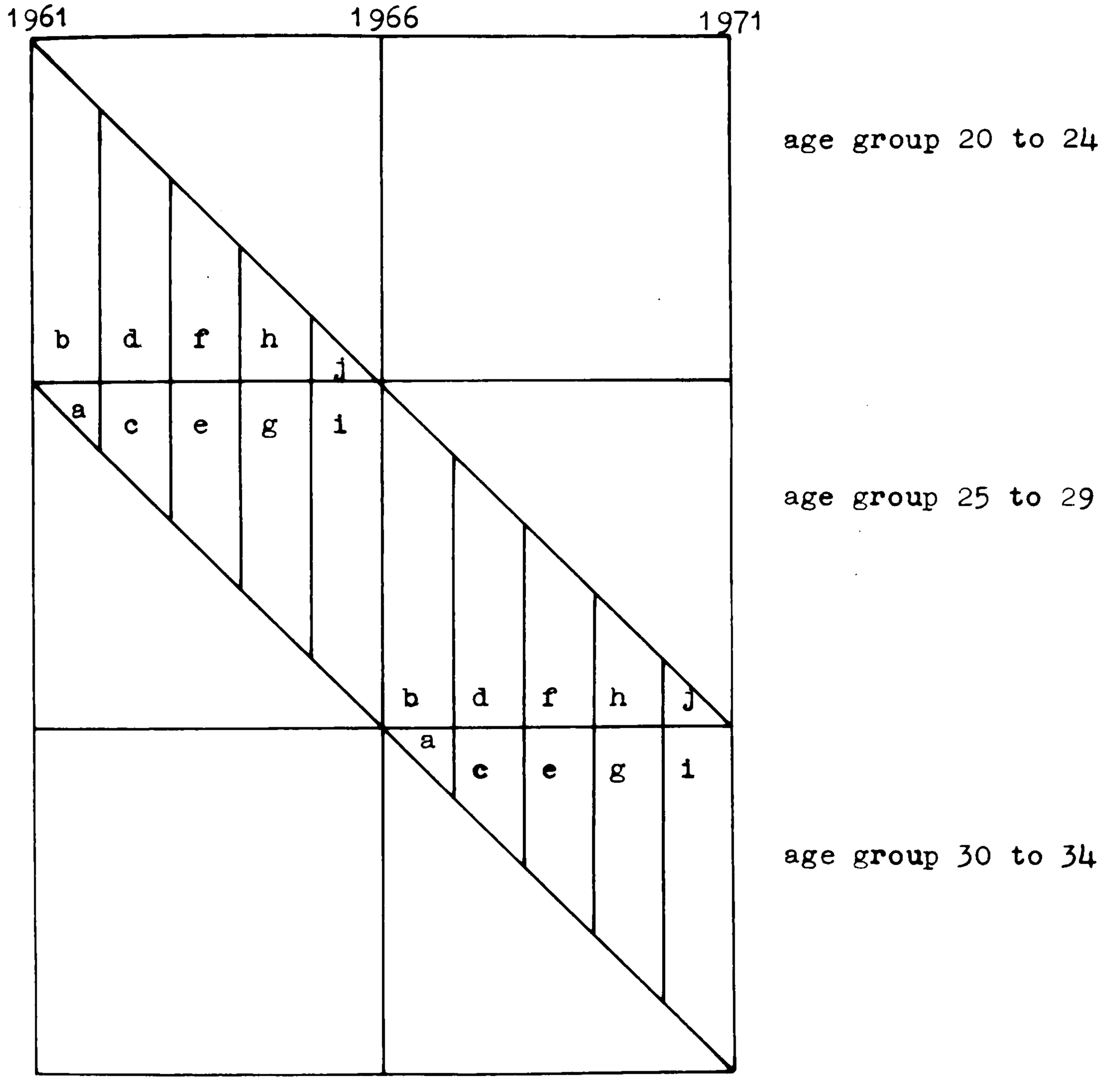


which the women in the last age group, 45-49, entered the first fertile age group, 15-19. The total births to which the women aged 15-49 years in Leeds C.B. in 1971 gave birth can be computed using the age-specific fertility rates. For example, taking the cohort of women aged 30 to 34 years in 1971, we can estimate progressively the births for which they should have been responsible through three age-specific fertility rates, the 20 to 24 years fertility rate, from 1961 to 1966, the 25-29 fertility rate from 1961 to 1971 and the 30-34 years fertility rate from 1966 to 1971. This population is moving constantly, and we assume evenly, between these three age groups for a ten year period. So the numbers of women at risk of giving birth at a particular rate can be calculated for the mid-periods of successive years. Figure 7.4 and a specific example may make this clearer.

In 1971 there were 207 Indian women resident in Leeds, aged 30 to 34 years. In 1961, if the present rates hold, these women were giving birth at the rate for the 20 to 24 year age group. In 1966 they were giving birth at the rate for the 25-29 year age group, and in 1971 they were giving birth at the rate for the 30 to 34 year age group. But Figure 7.4 suggests that in 1962 not all these women were in the 20 to 24 year age group. A certain proportion of the total (area under trapezium b) still remained in the 20 to 24 year age group, but a smaller proportion (area under trapezium a) were aged 25-29 years. The progress of this single cohort through the age groups from 1961 to 1971 can be followed on this Figure (7.4).

It is a simple matter to estimate the number of children to which these women could have given birth given that the

Figure 7.4 Estimation of births to a cohort of Indian women during the period 1961 to 1971.



proportions obtained from Figure 7.4 can be used to estimate the numbers of women at risk of giving birth at each specific fertility rate. For example, In 1971, there were 207 Indian women aged 30 to 34 years. At mid-1961 some of these women were at risk of giving birth at the rate for Indian women aged 20 to 24 years. This number is calculated simply by multiplying the total of 207 women by the proportion (b). Similarly a number of these women were giving birth at the rate for the 25 to 29 year age group. This number is calculated by multiplying the total of 207 by proportion (a). This process is carried to its completion using the proportions (a) to (j) given in Figure 7.4. The numbers of women and the rates to which they are subject are given in Figure 7.5. The births calculation equation can be specified for this population group as:

$$K_{I**}^{\beta(i)*}\left(K_{I*k}^{*m(i)}\right) = K_{I*k-2}^{*m(i)}\left\{f_{I\ k-2}^{leeds}\ (b+d+f+h+j)\right\}$$

$$+\ K_{I*k-1}^{*m(i)}\left(f_{I\ k-1}^{leeds}\ (a+c+e+g+i+b+d+f+h+j)\right\}$$

$$+\ K_{I*k}^{*m(i)}\left(f_{Ik}^{leeds}\ (b+d+f+h+j)\right) \qquad \ldots 7.16$$

which simplifies to:

$$K_{I**}^{\beta(i)*}\left(K_{I*k}^{*m(i)}\right) = K_{I*k-2}^{*m(i)}\left(2.5f_{I\ k-2}^{Leeds}\right)$$

$$+\ K_{I*k-1}^{*m(i)}\left(5f_{I\ k-1}^{Leeds}\right)$$

$$+\ K_{I*k}^{*m(i)}\left(2.5f_{I\ k}^{Leeds}\right) \qquad \ldots 7.17$$

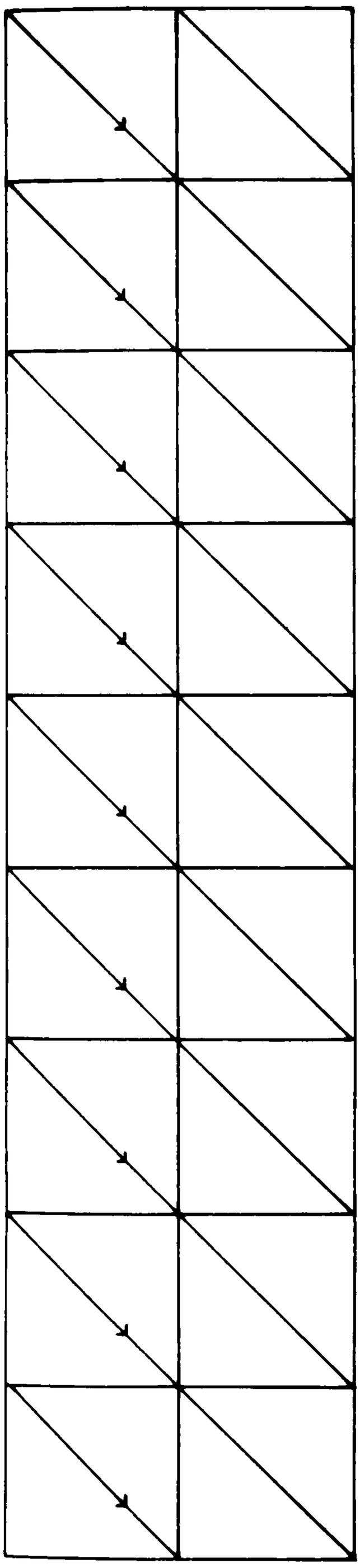
where

$K_{I**}^{\beta(i)*}\left(K_{I*k}^{*m(i)}\right)$ is the total births to mothers born in India in age group k in 1971

and

$f_{I\ k-2}^{Leeds}$ }

**Figure 7.5** Estimation of births to each 1971 fertile cohort for each birthplace group




| | India | Pakistan | West Indies | O.N.C. |
|---|---|---|---|---|
| 15 to 19 | 205 | 24.3 | 59 | 50.8 | 257 | 136.1 | 49 | 183.0 |
| 20 to 24 | 261 | 233.7 | 100 | 170.0 | 173 | 173.4 | 50 | 760.0 |
| 25 to 29 | 206 | 276.6 | 67 | 537.3 | 266 | 191.7 | 31 | 838.7 |
| 30 to 34 | 207 | 149.7 | 91 | 373.6 | 351 | 99.7 | 20 | 550.0 |
| 35 to 39 | 183 | 60.1 | 86 | 325.5 | 333 | 90.0 | 14 | 285.7 |
| 40 to 44 | 143 | 41.9 | 47 | 319.1 | 220 | 27.2 | 9 | 222.2 |
| 45 to 49 | 99 | 10.1 | 18 | 55.5 | 128 | 15.6 | 8 | 0.0 |
| 50 to 54 | 64 | | 5 | | 69 | | 5 | |
| 55 to 59 | 36 | | 2 | | 51 | | 4 | |

$f^{Leeds}_{I\ k-1}$ and $f^{Leeds}_{I\ k}$ are the age specific fertility rates relating to the age group of women

of each age group through the ten year period. The estimates of births obtained by this method are given in Table 7.12.

## 7.5.2 Births of children in Leeds to New Commonwealth born mothers between 1961 and 1971

The totals derived in section 7.5.1 are the total births to the 1971 fertile cohort of women in Leeds irrespective of place of birth of the child. They are, therefore, as close an estimate as it is possible to obtain of the total number of immigrant children who could be expected to be residing in Leeds in 1971. Not all of these children, however, could expect to be recorded as being born in the New Commonwealth in the 1971 census. It is worthwhile, therefore, to attempt to estimate the numbers of children who were born in Leeds to mothers born in New Commonwealth countries over this period. This can be accomplished by simple interpolation between the totals of women in each age group between the census years 1961, 1966 and 1971. This provides yearly averages for the numbers of women in each age group over the whole period 1961 to 1971 who were in Leeds, to which the yearly age-specific fertility rates can be applied. The same procedure is used for the other coloured groups. This estimation supplies the mid-year population totals to be used with the yearly age-specific fertility rates. The numbers of children born in Leeds to New Commonwealth born mothers is given in Table 7.13.

Table 7.12 Births to the 1971 fertile cohort of women born in New Commonwealth countries over the period 1961 to 1971.

| Total Births | Birthplace of mother | | | | |
|---|---|---|---|---|---|
| | India | Pakistan | Caribbean | O.N.C. | Total |
| | 1,505 | 1,397 | 2,134 | 640 | 5,676 |

Table 7.13 Children born in Leeds to New Commonwealth born mothers by 1971.

| Birthplace of Mother | | | |
|---|---|---|---|
| India and Pakistan | Caribbean | O.N.C. | Total |
| 2,589 | 1,711 | 1,192 | 5,492 |

Table 7.14 Crude birth rates for the New Commonwealth immigrant groups in Leeds C.B. 1971.

| Birthplace | Total Births | Total Population | Rate per 1000 total population |
|---|---|---|---|
| India | 172 | 8,934 | 37.6 |
| Pakistan | 164 | | |
| Caribbean | 189 | 6,251 | 30.2 |
| O.N.C. | 93 | 2,490 | 37.3 |
| Total New Commonwealth | 618 | 17,675 | 34.3 |

Clearly the total for children born to Other New Commonwealth women cannot be as high as shown here since the children born in Leeds appears to be greater than the children who could have been born in total over the period. So some estimate of how much higher the calculated birth rate and fertility rates for 1971 are above the rates necessary to produce these children can now be made. The simple assumption is made that birth and in-migration has taken place for Other New Commonwealth children at the average rate for the other New Commonwealth groups. For the Indian and Pakistani group we have estimated total births to the 1971 fertile cohort of women as 2,902, births to these women in Leeds has been estimated as 2,589, the implied birth and in-migration rate then becomes 0.8921 of the total born. The same figures for the Caribbean women are, total born 2,134, total born in Leeds 1,711, therefore the implied birth and in-migration rate becomes 0.8017. The average value of the implied birth and in-migration rate, therefore, is 0.8469. If it is assumed that this is a reasonable rate at which birth and in-migration took place, expressed as a proportion of total children in Leeds in 1971 born between 1961 and 1971, then it may be calculated that out of the 640 Other New Commonwealth children estimated to be in Leeds in 1971, some 100 were born outside Leeds and 540 were born in Leeds. This suggests that the estimations of fertility for this group were as much as double, in 1971, the rates necessary to generate this lower estimate of children born to this group of women over the period. With a group as small as 181 women in the fertile age groups this level of error is probably easy to obtain.

### 7.5.3 Recalculation of the Crude Birth Rates

We are now in a position to be able to calculate the crude birth rate more accurately than in Section 7.4.1. In that section crude birth rates were calculated using total births as the numerators of the rate equations and total persons born in the individual New Commonwealth countries as the denominators. For more accurate specification of the crude birth rates, however, the persons born in Leeds and who identified through colour of skin, religion, or other distinguishing criteria, with the original birthplace groups should be included in the denominators. In other words the crude birth rates were calculated in section 7.4.1 using persons born in the New Commonwealth countries. But the real denominator of the rate equations is this population plus the children born in Leeds. The crude birth rates are shown recalculated in Table 7.14.

Comparison with Table 7.3 shows that this more accurate method considerably reduces the crude birth rates. However, it must be pointed out that this extra consideration applies only to the crude birth rate not to the other fertility rates since it is only in the crude birth rate that the total population is used in the rate calculation. These new values should not be compared with the values for England and Wales as a whole given in Table 7.3. The comparable values of the rates for England and Wales remain the rates for each birthplace group given in that table.

## 7.6 Assessment of the accuracy of the calculated birth and fertility rates.

### 7.6.1 The need for comparisons

It is necessary, both to the reader and to the immigrant

groups themselves since some remarkable facts have emerged, that these rates are checked against other data to attempt to draw conclusions about the validity over the past few years. In this way we may be able to comment on the overall trends in the birth and fertility rates.

There are three means by which these rates can be tested. The first is by calculating the number of children in the first two age groups in 1971 and comparing these with the 1971 census returns for these two age groups. The second is by comparing the age-specific fertility rates for the origin countries given in Bogue (1969) and Keyfitz and Flieger (1968) with the rates calculated for the birthplace groups in this paper. The third method is more tenuous. The number of children under five years per 1,000 women in each birthplace group is calculated and comparisons are made with similar information given in Rose (1969).

### 7.6.2 The 1971 Census estimates

In section 7.5.2 the implicit assumption was made that children born to the 1971 fertile cohort of women in Leeds were the source from which the birth and in-migration flows were derived and that all births outside England and Wales to these women eventually resided in England and Wales in 1971. This is a fairly large assumption but one that it is reasonable to make in the circumstances. This assumption is maintained in this section and total expected birth and in-migration can be calculated simply by the subtraction of the estimated births in Leeds from the estimated total births to women from the New Commonwealth in the period 1961 to 1971. These figures are given in Table 7.15.

Table 7.15 Births and in-migration totals for the period 1961 to 1971

| | Birthplace | | | | |
|---|---|---|---|---|---|
| | India | Pakistan | Caribbean | Other New Comm. | Total |
| Born in Leeds | 2,589 | | 1,711 | 540 | 4,840 |
| Born in total | 2,902 | | 2,134 | 640 | 5,676 |
| Birth and In-mig. | 313 | | 423 | 100 | 836 |

The 1971 census does not supply data by age and year of birth for Leeds C.B. This is given at the West Yorkshire conurbation scale only. However, if the assumption is made that the proportion of children born between 1961 and 1971 in the New Commonwealth and residing in Leeds in 1971 is the same as the proportion of females in each birthplace group in Leeds compared to West Yorkshire in 1971 then estimates of the children born in these years residing in Leeds in 1971 can be made. Table 7.16 shows how these estimates are obtained.

There are several conclusions which can be drawn from the Table 7.16. The relatively few children in the Caribbean group suggests that there are a considerable number of children who yet remain to be brought into England and Wales from the New Commonwealth countries. The extended kinship system utilised in the Caribbean, to where children are often sent back from this country to live with grandparents, (Rose, 1969) suggests that this group should be the most

Table 7.16 Estimation of children born in New Commonwealth countries between 1961 and 1971 residing in Leeds in 1971.

| | Birthplace | | | |
|---|---|---|---|---|
| | India | Pakistan | Caribbean | O.N.C. |
| Total Female population in West Yorks. (a) | 6,885 | 5,780 | 4,840 | 3,270 |
| Total Female population in Leeds. (b) | 1,720 | 650 | 2,185 | 1,305 |
| Proportion (b) / (a) | 0.2498 | 0.1124 | 0.4514 | 0.3990 |
| Children born between 1961 & 1971 residing in the West Yorkshire conurbation. | 1,075 | 2,200 | 270 | 1,215 |
| Children born between 1961 & 1971 residing in Leeds. | 269 | 247 (516) | 122 | 485 |
| Own estimates | | 313 | 423 | 140 |

Table 7.17 Children under 5 per 1,000 Women aged 15 to 44 years in Leeds in 1971 and in England and Wales in 1961 and 1966.

| Birthplace of Women | Leeds C.B. 1971 (a) | England & Wales 1961 (b) | England & Wales 1966 (c) | England & Wales 1971 |
|---|---|---|---|---|
| India | 693 | 830 | 771 | N.A. |
| Pakistan | 1,662 | 1,338 | 979 | N.A. |
| Caribbean | 598 | 576 | 821 | N.A. |
| Other New Comm. | 1,591 | 656* | 557* | N.A. |
| All birthplaces | 354 | 341 | 376 | 420.8 |

Notes:

* indicates New Commonwealth countries of former British West Africa and Cyprus only.

overestimated, as indeed it is. This situation holds, though to a lesser extent, for the India and Pakistan groups. The second part of the hypothesis, under the assumption that the calculated birth and fertility rates are reasonably accurate is that we were too hasty in questioning the very high fertility rates of the Other New Commonwealth group.

Under this same assumption of the accuracy of the calculated birth and fertility rates other reasons can be advanced for the relative over-estimation that these have caused. It is known that during the sixties and the early sixties in particular, the males and females of individual families were parted for periods of time while an economic base was established in this country. This represents, or should represent, a halting in the fertility process. This element has not been directly considered in the estimates of total births over this period. For the women from the Caribbean for example, this difference of 308 children in the estimates amounts to a "non exposure to risk" of bearing a child of only 2.8 woman-years for the total number of West Indian females in Leeds in 1971 ever being able to give birth over this ten year period.

### 7.6.3 Comparison with national data from the origin countries

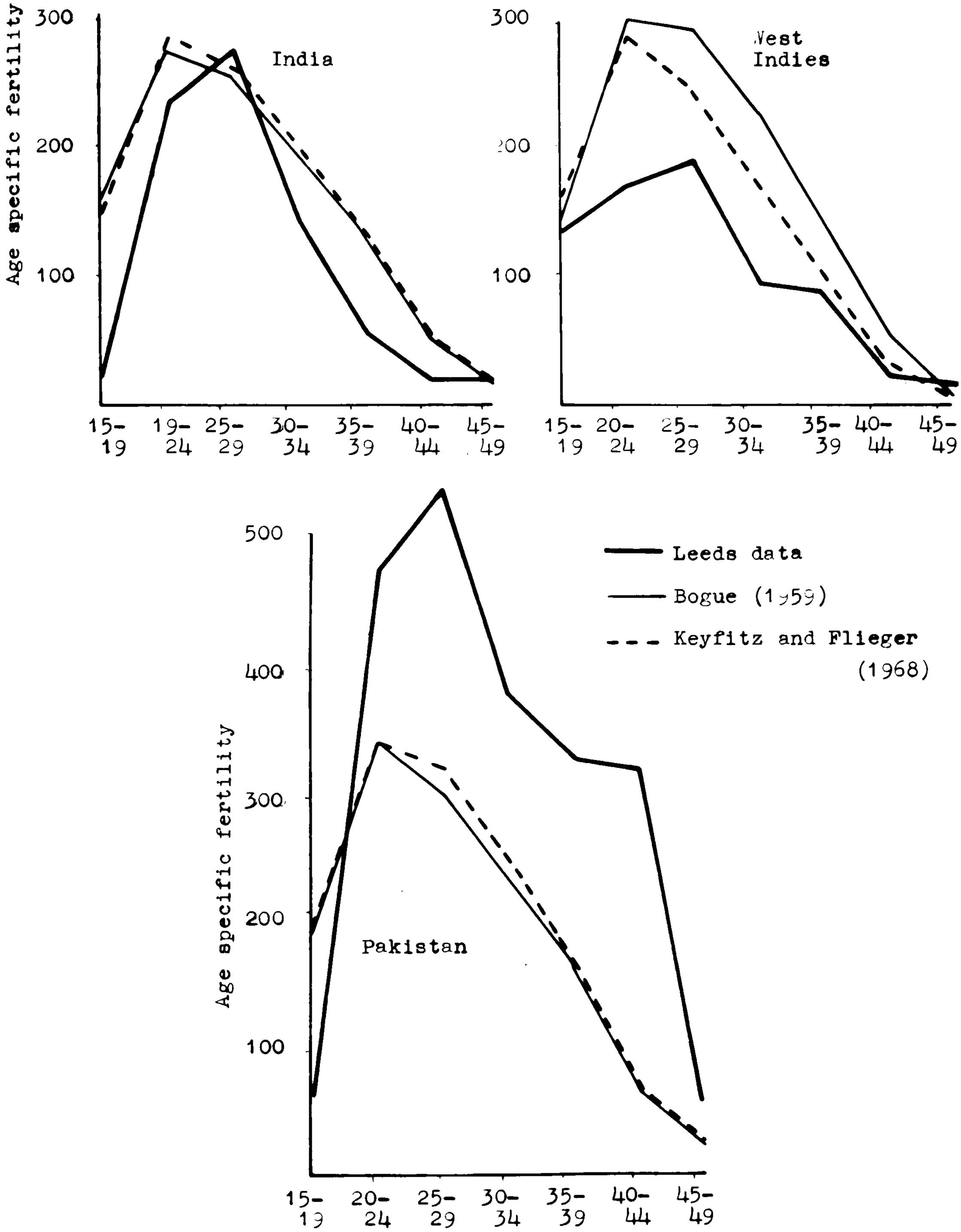
One can, of course, arrive at the conclusion that the rates of fertility generated in this chapter are inaccurate and that these are not the rates at which the New Commonwealth group have been reproducing over the period under consideration. Under this assumption one would be forced to accept that the rates have risen in the last few years to this observed level. Conversely one would have to accept

that the very high rates for the Other New Commonwealth group in 1971 had been higher still in the past. But essentially the birth and fertility rates for the major New Commonwealth immigrant groups are far from unreasonable and are not markedly higher than the rates which could be expected in the actual countries themselves. Figure 7.6 shows the difference between the age specific fertility rates estimated in this chapter and the computed age specific fertility rates for India, Pakistan and the West Indies given in Bogue (1969) and in Keyfitz and Flieger (1968) for the years 1955 to 1960. The rates experienced by the Indian and West Indian women in Leeds in 1971 in general fall below the rates experienced in the origin countries. In the case of the Pakistan women the rates experienced in Leeds are much higher than those for the origin country except for the first age group. This result strengthens the hypotheses that the inequality of the sex ratio and the nature of the migration has meant a delaying of family formation until the later age groups. It may also be mentioned that the majority of the Pakistan immigrants to this country have come from rural areas, the hill country of Mirpur in the West and Sylhet in the East (Rose, 1969). The urban-educated middle class forms only a small percentage of the migrants to Britain. We are, therefore, comparing essentially urbanised fertility rates for this country with what virtually amounts to rural fertility rates for the Pakistan group.

### 7.6.4 Children under 5 per 1,000 women in each birthplace group.

As a final test of the birth and fertility rates we express the births estimated to the Leeds 1971 cohort of women in

**Figure 7.6** Age specific fertility rates compared



the fertile age groups in the way that Jackson expresses them in Rose et al. (1969), that is, as the number of children aged under five years per 1,000 women aged between 15 and 44 years at census date in 1971. To obtain this data each individual year's total of births for the years 1966 to 1971 for each major birthplace group are summed and allowance is made for the births which took place prior to census date 1966 and after census date 1971. The totals derived are divided by the number of women aged 15-44 and the result in each case is multiplied by 1,000. The numbers of women aged 15 - 44 years are derived directly from Table 7.1. The results of this calculation are shown in Table 7.17. Column (a) supplies the children 0 - 4 per 1,000 women aged 15 - 44 years for Leeds. The columns (b) and (c) supply the equivalent date for the birthplace groups in 1961 and 1966 for England and Wales derived from Rose et al (1969 , Table 11.4).

The estimates thus derived compare very well with the estimates given in Rose (1969). The high fertility rates which these numbers of children suggest must be the case then findsimplicit acceptance in this the most accepted work on race relations yet to be produced. Once again strength is added to the hypotheses that the present time represented a period of vigorous family building for Pakistan women and we could, therefore, expect that the rates generated for this group, and for the Other New Commonwealth group in all probability, would settle down in the relatively near future to result in smaller family sizes.

## 7.7 Summary of the 1971 evidence

In general, then, it can be said that the fertility rates

for the New Commonwealth women in Leeds in 1971 are just over double the rates calculated for the indigenous population. This average, however, hides considerable variation between the groups which make up the New Commonwealth group. The Indian women display rates which are about two times, West Indian women one and a half times and Pakistan women about five times, the rates for the indigenous population. These rates appear reasonable estimates given the variety of different situations of the immigrant groups. The recent arrival of the Pakistan women seems to have pushed up, temporarily, the fertility rates to levels which would not be sustained in the longer run by this group. This statement probably also applied to women from Other New Commonwealth countries but the lack of numbers in Leeds itself means that conclusions drawn here would be less than solidly based. For this latter group we can claim only that the situation represented here was the situation in Leeds C.B. in 1971.

Sufficient evidence has been presented to suggest that these rates have been sustained in the past few years. Two groups, the Indians and the West Indians, would appear to be likely to begin a lowering of their fertility rates since the evidence suggests that a full cycle, at these rates, has nearly been completed for these groups. The Pakistanis however, seem more likely to remain at these high rates for some time yet but one could expect that the completed family size for this group will finish below the estimated 10 children. The evidence suggests that a reformulation of hypotheses on the trends in fertility rates of immigrant groups is necessary. Lowered fertility is suggested in the early stages of migration because of the nature of the migration and the migrating population. The women are

without their men for varying periods which effectively cuts these years out of the fertility cycle. This delay appears to be reflected in much increased fertility levels as the females enter the country to complete family units. The Pakistan women have been the latest to enter Leeds, mostly during the 1967 to 1969 period. On the other hand it would seem that after this time the fertility levels are quick to fall under those experienced in the origin countries as is demonstrated now by the Indian and West Indian women. In the near future, therefore one could expect that these latter groups will be much more stable in terms of their fertility levels than the Pakistan women. It would seem likely that this group will experience fairly sharp falls in their fertility rates in the future.

## 7.8 Fertility trends

### 7.8.1 Trends in the fertility of immigrants

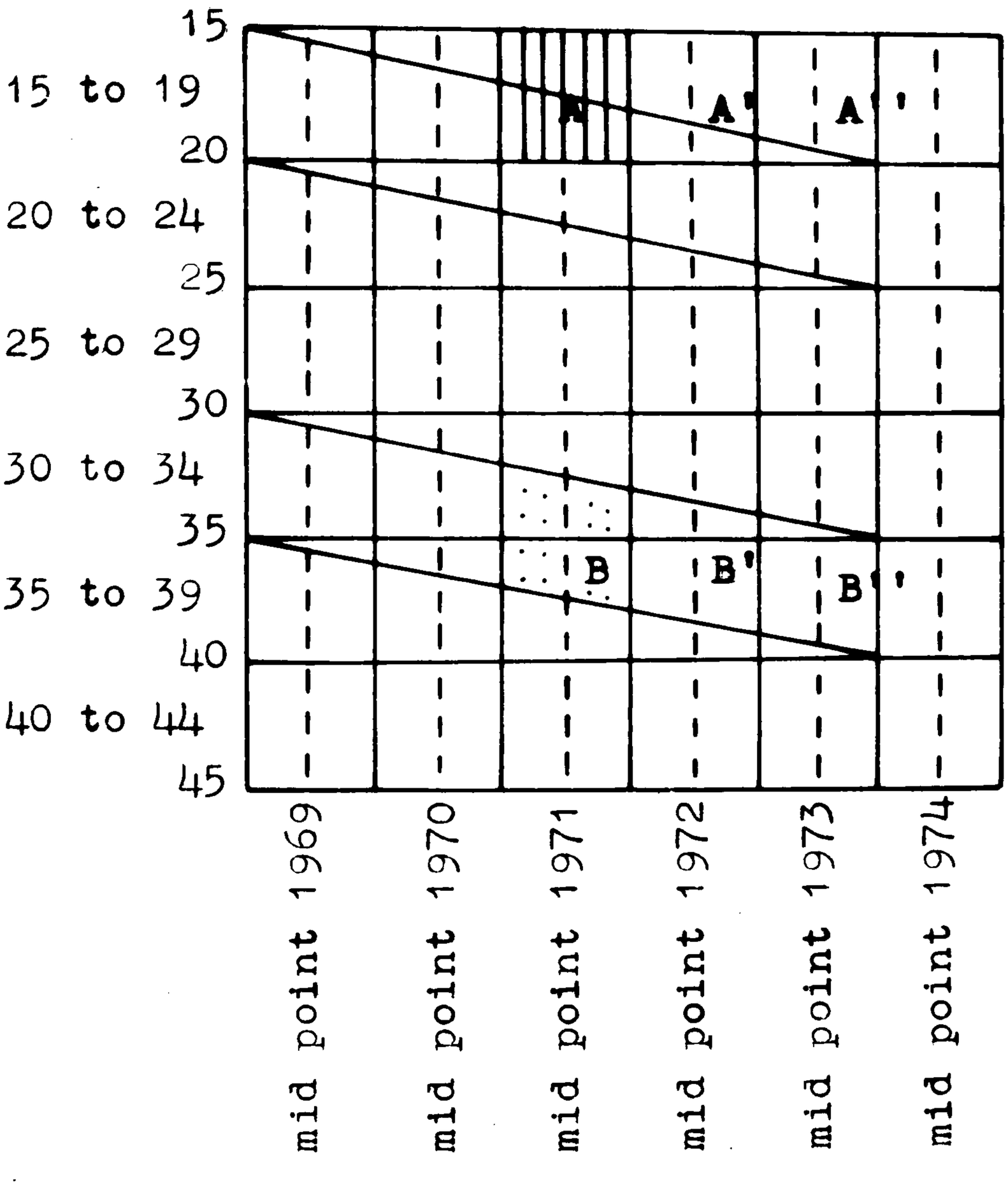
The availability of three years of information on births for Leeds C.B., from mid 1969 to mid 1972, allows the analysis of fertility rates in the manner of the previous section over a four-year period. From this analysis the trends in the fertility rates of the main immigrant groups can be observed. The only new data manipulation required is the simple interpolation of the numbers of women in each of the fertile age groups in 1969 and 1970, and the extrapolation of these numbers for 1972, from the 1966 and 1971 census population structures. Thus we can, for the sake of continuity, proceed to examine trends in the general fertility rates and the age-specific rates for the main birthplace groups, the Indians, Pakistanis, and West Indians, with the Irish as a white immigrant comparison group. However, for

the purposes of the demographic model, the fertility rates input may be refined by using cohort-specific fertility rates. The purpose in choosing to use these rates is that it is much easier to define properly the population to which the cohort fertility rates correctly apply, than to do this for specific age groups of women.

The difference between the two rates is that, in considering age-specific fertility, we are considering births to a group of women which changes in each consecutive year. In Figure 7.7 the age-specific fertility rates are calculated in each year, using the total births by age group of mother divided by the number of women in each age group. In 1971 for example, the age-specific fertility rates already calculated for women aged 15 to 19 years were obtained from the births to this age group (striped area) divided by the midpoint number of women aged 15 - 19 in the population in this year (A). The equivalent rate for 1972 would be the total births in 1972 to this age group divided by the number of women aged 15 - 19 years in 1972 (A').

These two rates are, therefore, really unrelated except that some regularity may be expected in the rate at which women give birth in certain age groups. The cohort fertility rates are obtained rather differently, both in terms of the numerators of the rate equations (the births) and the denominators (the population). Consider the group of women aged 30 to 34 years in 1969 (Figure 7.7). By 1974 none of these women will exist in this age group and, indeed, all the women will progressively have left this age group over the previous five years. So, putting aside age groups, these women form a cohort 'advancing' through time, over which period they are responsible for a number

**Figure 7.7** Age specific and cohort specific rates



of children being born (stippled area). By manipulation of the data concerning births by age of mother these births B, B', and B'' can be specified, as by simple geometry can the female population responsible for producing them. Thus this cohort can be followed through time indefinitely, given sufficient information. In the case of the immigrant population of Leeds C.B., there will be in-migration not into an age group specifically, but into a cohort group. In this way a much more direct link is obtained between the consecutive fertility rates, since there is essentially the same population in each consecutive year. So in fact we are specifying a much more correct form of fertility trend and, as such, this is much more valuable for rate projection. Unfortunately no such classification is available for the total population of England and Wales for comparison purposes. This fact is important when we come to consider the expected fall in fertility rates for future periods.

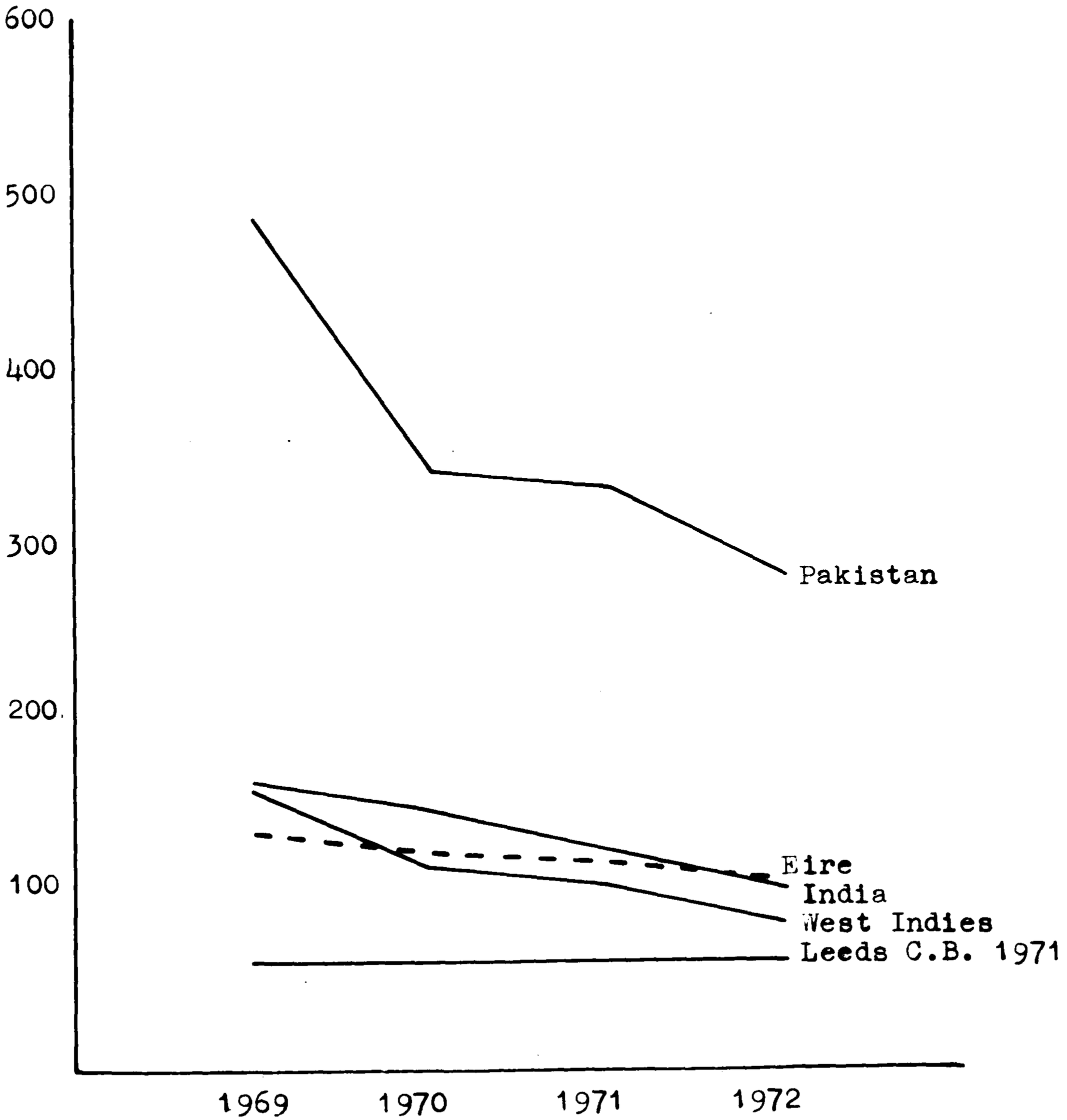
Figure 7.8 and Table 7.18 show that the general fertility rates for the four main immigrant groups fell steadily over the four-year period with the Pakistani and Caribbean rates falling most quickly.

Since the general fertility rate for the total population of Leeds C.B. was 67.3 in 1971, it can be seen that the Indian rate has fallen from 2.4 times that of the level in 1969 to 1.5 times that level in 1972. The Caribbean rate has fallen from 2.3 times the total population level in 1969 to 1.3 times that level in 1972. The Pakistani rate, however, has fallen dramatically from 7.2 times the level for the total population in 1969 to 4.2 times the level in 1972. In terms of the groups there are percentage drops of 37% for Indians, 48% for Caribbeans, and 42% for Pakistanis.

Table 7.18 General fertility rate for four main groups for the four-year period. The figures for England and Wales were obtained from OPCS (1972b).

| Births in | Birthplace | 1969 | 1970 | 1971 | 1972 |
|---|---|---|---|---|---|
| Leeds | India | 163.4 | 149.1 | 128.0 | 103.8 |
| | Caribbean | 160.8 | 117.6 | 106.4 | 84.4 |
| | Pakistan | 484.1 | 340.6 | 331.1 | 281.4 |
| | Eire | 134.0 | 124.8 | 122.4 | 110.2 |
| England and Wales | | 70.5 | 70.9 | 71.5 | - |

Figure 7.8 General fertility rate



Both the Indian and Caribbean rates were less in 1972 than the equivalent rate for the Irish group.

These falls in the general fertility rates are reflected in the falls in the age-specific fertility rates over the period. Table 7.19 and Figure 7.9 show these rates for the four-year period.

In the case of the New Commonwealth immigrant groups the rates may be seen to decline every year, with one or two exceptions. For the Irish group this statement is less obviously true than one would expect for an immigrant group with a very similar culture to that of the receiving society. For the Indian and Caribbean groups the age-specific fertility rates tend to remain relatively higher in the older age ranges and conversely the large falls occur in the younger age group. The Pakistani group shows fairly large falls in all ages except the first. The England and Wales age-specific fertility rates show the more even trends that are associated with a larger more stable population group. Even these rates have been falling in recent years, although the falls are by no means as dramatic as those for the other groups.

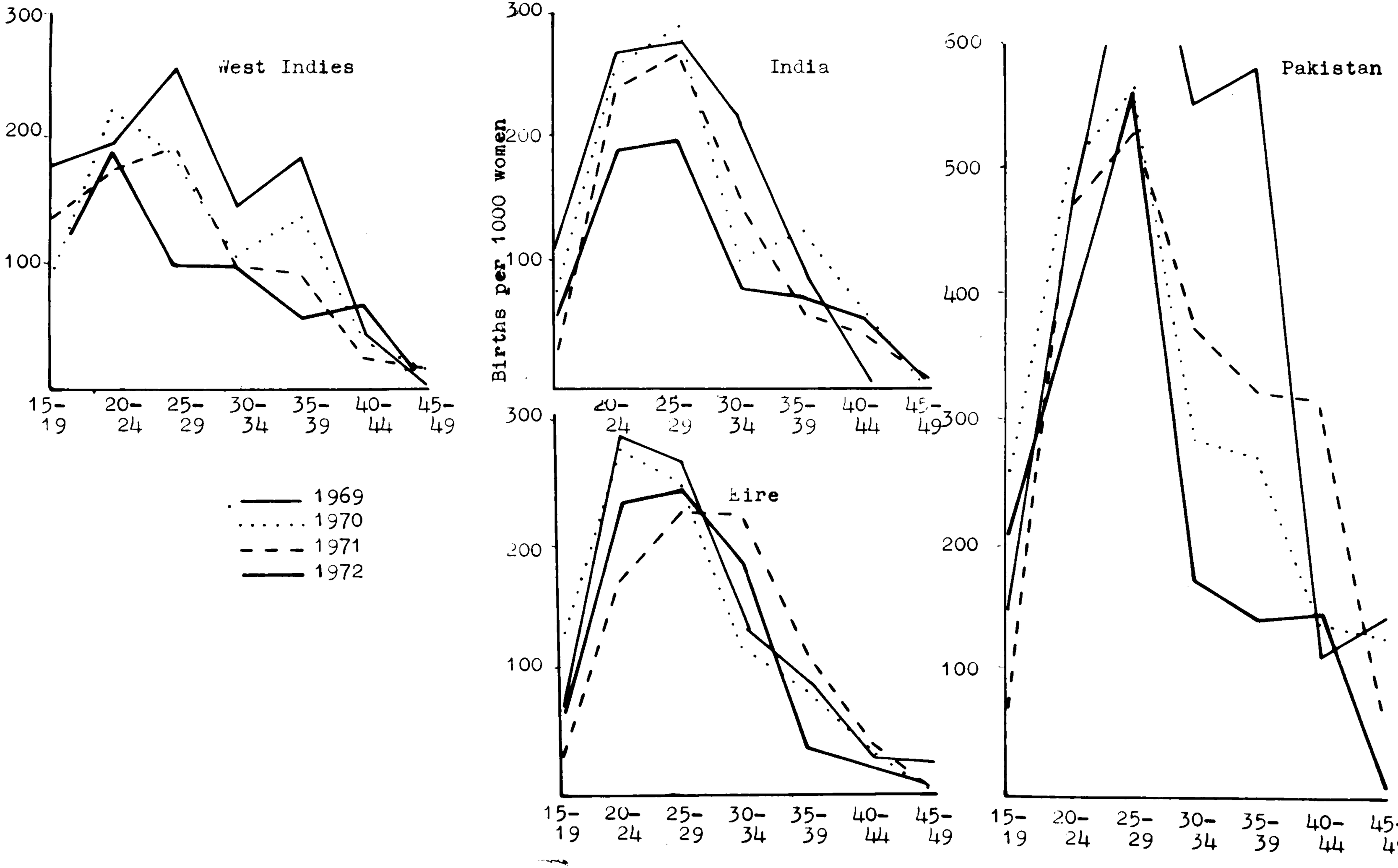
The falls in the age-specific rates are strongly enough defined to imply that all the rates, except some of those for the Pakistan group, should have fallen to (or below) the 1971 England and Wales level by 1980. Some of the rates were below this level even in 1972 and others will have reached it before 1976 if the observed rates of fall are continued.

The overall trends in the fertility of immigrants therefore suggests that, by the middle and late 1970's, there will be

Table 7.19 Age-specific fertility rates for four main groups for the four-year period.

| Age Group | Birthplace | 1969 | 1970 | 1971 | 1972 |
|---|---|---|---|---|---|
| 15-19 | India | 106.0 | 65.0 | 24.3 | 49.3 |
| 20-24 | | 266.6 | 255.3 | 233.7 | 189.4 |
| 25-29 | | 274.2 | 289.4 | 276.6 | 197.3 |
| 30-34 | | 214.2 | 101.0 | 149.7 | 79.2 |
| 35-39 | | 93.9 | 126.5 | 60.1 | 70.0 |
| 40-44 | | 0.0 | 60.6 | 41.9 | 51.5 |
| 45-49 | | 0.0 | 0.0 | 10.1 | 0.0 |
| 15-19 | Pakistan | 139.5 | 235.2 | 50.8 | 205.8 |
| 20-24 | | 472.2 | 500.0 | 470.0 | 469.5 |
| 25-29 | | 941.1 | 568.9 | 537.3 | 560.0 |
| 30-34 | | 550.7 | 287.5 | 373.6 | 174.7 |
| 35-39 | | 580.6 | 270.2 | 325.5 | 142.8 |
| 40-44 | | 111.1 | 139.5 | 319.1 | 148.1 |
| 45-49 | | 142.8 | 125.0 | 55.5 | 0.0 |
| 15-19 | Caribbean | 176.4 | 79.0 | 136.1 | 86.6 |
| 20-24 | | 194.5 | 222.2 | 173.4 | 189.3 |
| 25-29 | | 257.6 | 182.1 | 191.7 | 96.0 |
| 30-34 | | 142.8 | 108.5 | 99.7 | 96.5 |
| 35-39 | | 183.0 | 123.0 | 90.0 | 56.8 |
| 40-44 | | 42.0 | 39.0 | 27.2 | 68.0 |
| 45-49 | | 0.0 | 18.0 | 15.6 | 0.0 |
| 15-19 | Eire | 65.3 | 116.2 | 20.9 | 56.5 |
| 20-24 | | 289.9 | 278.4 | 172.7 | 232.4 |
| 25-29 | | 266.6 | 250.0 | 228.3 | 243.2 |
| 30-34 | | 134.2 | 119.5 | 226.3 | 181.8 |
| 35-39 | | 87.3 | 81.4 | 112.7 | 35.8 |
| 40-44 | | 29.8 | 32.4 | 40.0 | 20.0 |
| 45-49 | | 25.0 | 0.0 | 2.8 | 0.0 |
| 15-19 | England and Wales | 49.4 | 49.7 | 50.4 | 48.0 |
| 20-24 | (total population) | 154.6 | 153.4 | 154.1 | 144.0 |
| 25-29 | | 155.5 | 151.2 | 153.0 | 145.0 |
| 30-34 | | 83.4 | 78.7 | 77.5 | 70.0 |
| 35-39 | | 37.1 | 34.2 | 32.8 | 28.5 |
| 40-44 | | 9.5 | 8.7 | 8.1 | 6.5 |
| 45-49 | | 0.6 | | | 0.5 |

Figure 7.9 Age specific fertility rates



very little difference between the fertility rates for immigrants and the fertility rates for the population as a whole. This statement will be true in the main for the general fertility rates, while there may remain individual differences in the age-specific fertility rates for certain birthplace groups. Since this matter is often brought up in the context of colour rather than migration, it may be seen from Figure 7.8 that the Irish birthplace group had, in 1971, a general fertility rate greater than either the Indians or the Caribbeans and that it was falling much less quickly than the rate for these other two groups. Even the Pakistanis, whose fertility appears to be so high at the present time, show significant falls in the rates at which they are giving birth. Extrapolation of the curve for Pakistanis in Figure 7.8 suggests that their general fertility rate should be no greater than the English rate, if present falls continue, by 1976, although Table 7.19 shows that there may be significant differences for the individual age groups of women.

# CHAPTER 8

## Projected immigrant population growth in Leeds

### 8.1 Introduction

This chapter makes use of the information derived in the previous chapter to investigate further the demography of Commonwealth immigrants in Leeds through a simple projection model. The assumptions employed are clearly spelled out. It is, therefore, in its racial context an attempt to escape from the traditional trappings of Commonwealth demography in the U.K., to end the 'numbers game' in one city by straightforward presentation of assumptions and results. However, I would wish to point out most strongly at the beginning that, while this is obviously a 'racial' study, the Commonwealth immigrants are not treated as a 'problem group' in any way. This work will be most fruitful if it is regarded as the modelling of the demography of one particular social group in our cities, and accepting that it is an example of the way in which complicated demographic processes, always at work in a population, can be spelled out and incorporated into a model which is very simple in operation but, nonetheless, effective. (For an example of how the model may be used for other groups in cities, see Rees and King, 1974.)

Section 8.2 deals with the model in its algebraic formulation, explains the function of each part and the cyclical nature of the calculations. Also dealt with in this section are the assumptions made about survival and in-migration. Fertility rates for the Commonwealth immigrants are examined in some depth in section 8.3 in their projection context.

Finally the results of the model runs are given for census dates up to 1986, and some attempt is made to examine the consequences of high fertility compared with low fertility model projections.

## 8.2 Demographic model

### 8.2.1 The basic processes at work in a population

For any population there are a variety of events which can change its structure over a period of time. Some of these events (such as death and out-migration) delete members from the population; others (such as births) add new members to it. For a population which is increasing markedly through in-migration, such as the New Commonwealth population of Leeds C.B., we can identify more than these simple events. Not only is there increase through births, at rates about which we as yet know little, but also through immigration and births to the immigrant mothers. Further, we cannot simply consider deaths to the original population but must also consider deaths to in-migrating persons, deaths to those people born into the original population, and deaths to those children born to immigrant mothers.

### 8.2.2 The four equation model : the algebraic representation

These processes are best explained in terms of the individual equations which make up the model to be used to predict future numbers of persons belonging to the Commonwealth group in Leeds C.B. The model equations were developed in collaboration with P.H. Rees, and are described in more detail in Rees and King (1974). The notation takes certain

features from that of spatial demographic analysis (Rees, 1973; Wilson and Rees, 1974) and certain features from Rogers' multiregional models (Rogers, 1968). The point at which the model commences for each period is given as time (t), and the point at which the model terminates for each period is given as time (t + T), where (T) is the length of the period (in this case equal to the five year census period). The population is disaggregated by sex and by five year age groups, for example, 0 to 4 years, 5 to 9 years, and so on to 65 years and over. Survival in the region over the five year period (t, t + T) is therefore from time (t) to time (t + T) and from age group s - 1 to s, except for the last age group (R) ( $\geq$ 65 years), where survival within the age group is possible. The model terms refer to persons in a particular immigrant group.

For age groups $1 < s < R$

$$W_s^x(t+T) = S_{s-1s}^x W_{s-1}(t) + I_{s-1s}^x(t,\ t+T) \qquad ....(8.1)$$

For age group $s = R$

$$W_R^x(t+T) = S_{R-1R}^x W_{R-1}^x(t) + I_{R-1R}^x(t,\ t+T) + S_{RR}^x W_R^x(t) + I_{RR}^x(t,\ t+T). \qquad ....(8.2)$$

For age group fertility rates, women at risk are calculated from

$$\hat{W}_s^F(t,\ t+T) = \left\{(W_s^F(t+T) - W_s^F(t))0.5\right\} + W_s^F(t) \qquad ....(8.3)$$

For cohort-specific fertility rates, women at risk are calculated from

$$\hat{W}_s^F(t,\ t+T) = \left\{(W_{s+1}^F(t+T) - W_s^F(t))0.5\right\} + W_s^F(t) \qquad ....(8.4)$$

For the first age group (s=1), population is calculated from (using age-specific fertility rates)

$$W_1^x(t+T) = S_{o1}^x\ \theta^x \left\{ \sum_{s=\alpha}^{\beta} f_s W_s^F(t,\ t+T) \right\} + I_{o1}^x(t,\ t+T); \quad ...(8.5)$$

(using cohort-specific rates)

$$W_1^X(t,\ t+T) = S_{o1}^X\ \theta^X \left( \sum_{s=\alpha-1}^{\beta} f_s W_s^F(t,\ t+T) \right) + I_{o1}^X(t,\ t+T) \qquad \ldots.(8.6)$$

The variables are defined as follows:

$W_s^X(t+T)$ is the number of persons of sex X, where X is male (M) or female (F), and age group s at time (t+T);

$W_{s-1}^X(t)$ is the number of persons of sex X, and age group s-1 at time (t);

$S_{s-1s}^X$ is the probability of a person of sex X and age s-1 at time (t) in the region surviving in the region into age group s at time (t+T);

$I_{s-1s}^X(t,\ t+T)$ is the in-migration into the region in the period (t, t+T) of persons of sex X. These persons must have been alive at time (t) outside the region and aged s-1 in order to be in age group s at time (t+T);

$\hat{W}_s^F(t,\ t+T)$ is the number of women in age group s, or cohort groups s-1 to s, at the mid-point between the starting and ending populations - that is the average population of the period. This is the population of females at risk of giving birth;

$W_s^F(t+T)$ is the number of women in age group s at time (t+T);

$W_s^F(t)$ is the number of women in age group s at time (t);

$W_{s+1}^F(t+T)$ is the number of women in age group s+1 at time (t+T);

$W_1^X(t+T)$ is the number of persons of sex X in the first age group (0-4 years) at time (t+T);

$S_{01}^X$ is the probability of a person of sex X born in a region in a time period (t, t+T) surviving to the end of the period in the region. This is the probability equivalent to the term $S_{s-1s}^X$ for persons in the first age group at (t+T);

$\theta^X$ is the probability of a birth in the period (t, t+T) in the region being of sex X;

$f_s$ is the age-specific or cohort-specific fertility rate for women in the region during the time period (t, t+T). Normally these rates are specified for the fertile age groups only, that is ages 15 to 49 years;

$I_{01}^X(t,\ t+T)$ is the in-migration into the first age groups of persons of sex X. The 0 subscript denotes nonexistence at the start of the period (t, t+T).

Although six equations have been presented, only four of these comprise the actual model. Equations(8.3) and (8.4) are used to estimate, under two different circumstances, the women at risk of giving birth. Equation (8.3) is employed when the fertility rates to be used are specific to an age group. We therefore calculate the mid-period number of females in any given age group s. Equation (8.4) is employed when the fertility rates to be used are specific to a cohort. We therefore calculate the mid-period number of females, in each cohort, moving between age groups s-1 and s in the period (t,t+T).

Equations (8.5) and (8.6) correspond to this distinction. Equation (8.5) utilises age-specific fertility rates in conjunction with the at-risk population calculated in equation (8.3). Equation (8.6) utilises cohort-specific fertility rates in conjunction with the at-risk population calculated in equation (8.4). The actual demographic model therefore comprises either equations (8.1), (8.2), (8.3) and (8.5), or equations (8.1), (8.2), (8.4) and (8.6), depending on the nature of the fertility rates to be used. In the example later in the paper, cohort-specific rates are used - hence the latter definition of the model is employed in actual computation.

We begin with a population disaggregated by sex and age - that is, divided into fourteen five-year age groups, closing these at 65 years and over at time (t) which, for the first run, is the 1961 census date. Since the projection period is five census years in length it is physically impossible for any member of this base population to be in the same group at the beginning and the end of the period, that is at times (t) and (t+T), with the exception of the last age

group, where survival is in the 65 years and older category. But not all of the members of the base population at time (t) will reach time (t+T) in the region; some will have died, and some will have migrated out from the region. Thus there is a certain probability that a person in age group (s-1) at time (t) will reach age group (s) at time (t+T), and we use these probabilities, disaggregated for each age group, to estimate the survivors in the region at time (t+T) from the original population in the region at time (t). These survival probabilities are calculated from the demographic accounts tables for a study approximating the West Yorkshire conurbation (Rees et al., 1974) and are modified by a suitable factor to account for variation in migration rates between the city of Leeds and the remainder of the West Yorkshire conurbation region. They account for all of the losses, by whatever means, from the original population. We are not directly concerned as to whether these losses occur through death or out-migration, but are merely calculating the probable number of the original population who are nonexistent in Leeds C.B. at the 1966 census date, and conversely the numbers of persons who do survive in the region from one census date to the next and from one age group to the next. It is the function of equation (8.1) to calculate these survivors simply by applying the relevant survival rate to the relevant population, and to add on the numbers of persons who in-migrated and survived during the period, and who were aged 5 years and over at (t+T). The variable $W_s^x(t+T)$ therefore clearly excludes a number of people: those who were born abroad in the period and migrated in during the period, thus being in the first age group (0-4 years) at (t+T), and those persons who were born in the region during the period

(t,t+T). The numbers are calculated using equations (8.3) and (8.5), or (8.4) and (8.6).

In a situation where the number of women who could give birth is rapidly increasing, the use of the population numbers at either time (t) or at (t+T) in conjunction with a fertility rate would lead to either under- or overestimation of the real number of births to a particular group. In cases like this it is sensible to use an estimated female population at the midpoint in the time period (t,t+T). Equations (8.3) and (8.4) do this for the New Commonwealth-born females in Leeds C.B. Thus while we may slightly overestimate births early in the five year period, we underestimate slightly births in the latter half of the period. If we assume that immigration is reasonably constant over the period, these overestimations cancel out the underestimations. Having obtained an estimate of the number of women at risk of giving birth in the time period (t, t+T), we then use a set of fertility rates to obtain an estimate of the actual number of children born to these women. These fertility rates will generally be age-specific rates, that is, there will be a fertility rate specific to each fertile age group of women. However, for reasons which are given later (see section 4) we choose to use fertility rates specific to individual fertile cohorts of women. Suffice it to say here that this means following individual groups of women through their fertility history, from their first possibility of conception at approximately 15 years old to their final possibility of conception at age 49 years. Thus for example in 1961 to 1966, the group of women aged 15 to 49 years give birth at the rate of cohort 1; between 1966 and 1971 this group of women will have given birth at the rate of cohort 2, and so on until the end of their

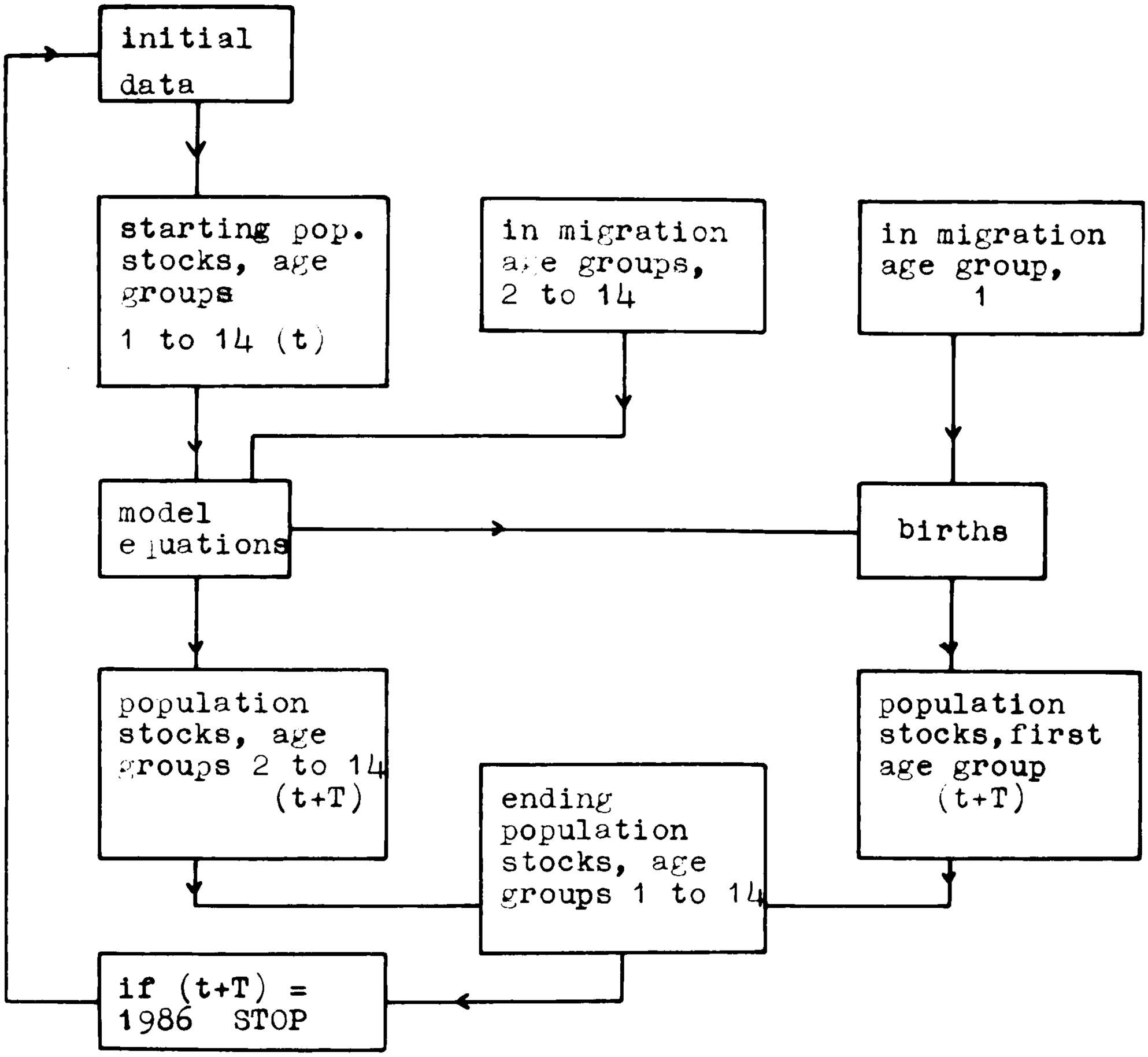
fertile lives. Embodied in equations (8.4) and (8.6) as well is the concept of infant mortality or, to be more precise, the probability of a child born at any time in the period (t,t+T) being alive in the region at (t+T), this rate being given by the variable ($S^{x}_{01}$). The results of this estimation form the number of persons who were born in the region in the period (t,t+T) and survived to the end of it at (t+T). Thus they form part of the first age group, that is the 0-4 year olds at the end of the period. The remainder which make up the variable $W^{x}_{1}(t+T)$ are derived from those persons who were born outside the region, in this case in the New Commonwealth countries, and who migrated into Leeds C.B. all in the period (t,t+T).

The problem of migration followed by re-migration or death resulting in nonrecording at the census of (t+T) is overcome by calculating in-migration and survival directly. This again is explained more fully later.

It remains, therefore, to sum the two estimates or to add the first to the subsequent age groups to obtain an estimate of the population at time (t+T) disaggregated by sex and age. The whole process is then repeated using the estimated population by sex and age at (t+T) to form the base population for the next projection period in equation (8.1). Figure 8.1 may make this clearer.

Briefly then, the model computes survivors from the base population, and adds immigrants in the second age group and above. From this data it computes women at risk of giving birth, calculates expected births through a fertility rate and adds any immigrants into the first age group. Finally it puts these two estimates together to provide a projected total, disaggregated by sex and age, five years hence.

Figure 8.1 The cyclical nature of the model



The model's simple form and function result not from any particular simplification of the concepts involved, but from the consideration directly of only one region, the calculation externally of the in-migration variables $I^x_{s-1s}$ and $I^x_{01}$, and the use of a previously calculated series of survival probabilities. The model is, in fact, ideally suited for use with a population about which there is relatively little information available, since its format requires careful explicit statements about the assumptions made concerning in-migration, survival, and fertility. These latter aspects are the ones which we must now look at more closely.

### 8.2.3 Survival

Any statements about the various rates affecting a population, about which relatively very little is known, are open to question. Obviously we like to think that we have been as accurate as possible in making the necessary assumptions. However, since we cannot be certain, the only means available to us have been stated fully and explicitly so that they may be duly criticised and assessed by the reader in the light of his or her own knowledge of the subject matter. This is the situation particularly with regard to survival rates and in-migration vectors assumed in this particular model, since there is now more detailed information available concerning the fertility of Commonwealth born persons in Leeds. The in situ survival rates used in the model are taken initially from Rees et al. (1974) and as such are calculated for the total population of the West Yorkshire study area for the period 1961 to 1966. They do, however, require some modification for use here.

There is reason to believe the rate of out-migration from Leeds C.B. is somewhat larger than for the West Yorkshire study area simply because Leeds C.B. is so much smaller and is an 'inner city-region area'; the survival rates must therefore be modified accordingly. We are not strictly correct in speaking of survival rates. These variables are more correctly called survival probabilities, since they measure the probability of a person or persons present in the region at the beginning of the period surviving in the region to the end of the period. Essentially this is a definitional distinction - a survival rate would be more accurately the rate at which persons survive to the end of the period from the 'population at risk of surviving' over the whole of the period. This is a different denominator from that for the calculation of the survival probabilities. Some persons will die over the period, thus lowering the survival probability; other people will out-migrate and die; others will survive in the region and some will survive outside the region. Thus if the probability of survival in West Yorkshire study area is added to the rate at which people out-migrate and survive, we obtain what is in effect a survival 'anywhere' probability. This is assumed to be the same for Leeds as for the West Yorkshire study area. The out-migration rates for West Yorkshire are then modified by a factor which allows for the greater out-migration rate from Leeds. This factor is obtained by comparing the total out-migration rate from the West Yorkshire conurbation with the total out-migration rate from Leeds C.B.

The final step is to subtract the out-migration rate for Leeds C.B. from the West Yorkshire study area survival-

anywhere probability. In mathematical notation the procedure is as follows. The rates and their values are given in Table 8.1.

$$S^{LL}_{s\text{-}1s} = S^{WYWY}_{s\text{-}1s} + M^{WY*}_{s\text{-}1s} - M^{L*}_{s\text{-}1s} \qquad \ldots.(8.7)$$

where

$S^{LL}_{s\text{-}1s}$ is the survival rate in situ for Leeds C.B. for age group transition s-1 to s.

For $1 < s < R$,

$S^{WYWY}_{s\text{-}1s}$ is the survival rate in situ for the West Yorkshire study area for age-group transition s-1 to s;

$M^{WY*}_{s\text{-}1s}$ is the migration and survival rate for persons from the West Yorkshire study area to the rest of the World for age-group transition s-1 to s;

$M^{L*}_{s\text{-}1s}$ is the migration and survival rate for persons from Leeds to the Rest of the World for age-group transition s-1 to s.

For $s = 1$,

$$S^{LL}_{01} = S^{WYWY}_{01} + M^{WY*}_{01} - M^{L*}_{01} \qquad \ldots.(8.8)$$

For $s = R$,

$$S^{LL}_{R\text{-}1R} = S^{WYWY}_{R\text{-}1R} + M^{WYWY}_{R\text{-}1R} - M^{L*}_{R\text{-}1R}; \qquad \ldots.(8.9)$$

and where R is the last age group,

$$S^{LL}_{RR} = S^{WYWY}_{RR} + M^{WY*}_{RR} - M^{L*}_{RR}. \qquad \ldots.(8.10)$$

## 8.2.4 In-migration

The second main input to the demographic model is the increase of persons occurring from the events of in-migration up to the date at which we wish to predict population numbers. Since the demographic model uses the five-year census period as its time base, this immigration data must be organised on the same basis and, as we wish to predict population numbers at the end of each census period up

Table 8.1 Calculation of the in situ survival rates for Leeds C.B.

| Transition Group | Terminal Age Group | West Yorkshire rates | | Leeds rates | |
|---|---|---|---|---|---|
| | | Survival | Out-migration | Survival | Out-migration |
| **Males** | | | | | |
| 0-1 | 0-4 | 0.94011 | 0.03330 | 0.90260 | 0.07081 |
| 1-2 | 5-9 | 0.93036 | 0.06304 | 0.85935 | 0.13405 |
| 2-3 | 10-14 | 0.93472 | 0.06304 | 0.86371 | 0.13405 |
| 3-4 | 15-19 | 0.93283 | 0.06370 | 0.86108 | 0.13545 |
| 4-5 | 20-24 | 0.89205 | 0.10223 | 0.77690 | 0.21738 |
| 5-6 | 25-29 | 0.86927 | 0.12510 | 0.72836 | 0.26601 |
| 6-7 | 30-34 | 0.86912 | 0.12494 | 0.72839 | 0.26567 |
| 7-8 | 35-39 | 0.92349 | 0.06829 | 0.84657 | 0.14521 |
| 8-9 | 40-44 | 0.91843 | 0.06828 | 0.84152 | 0.14519 |
| 9-10 | 45-49 | 0.94413 | 0.03370 | 0.90617 | 0.07166 |
| 10-11 | 50-54 | 0.92772 | 0.03372 | 0.88974 | 0.07170 |
| 11-12 | 55-59 | 0.89997 | 0.03368 | 0.86203 | 0.07162 |
| 12-13 | 60-54 | 0.86466 | 0.02082 | 0.84121 | 0.04427 |
| 13-14 | ⩾65 | 0.79436 | 0.02568 | 0.76544 | 0.05460 |
| 14-14 | ⩾65 | 0.77818 | 0.05532 | 0.71587 | 0.11763 |
| **Females** | | | | | |
| 0-1 | (Continued overleaf...) | | | | |

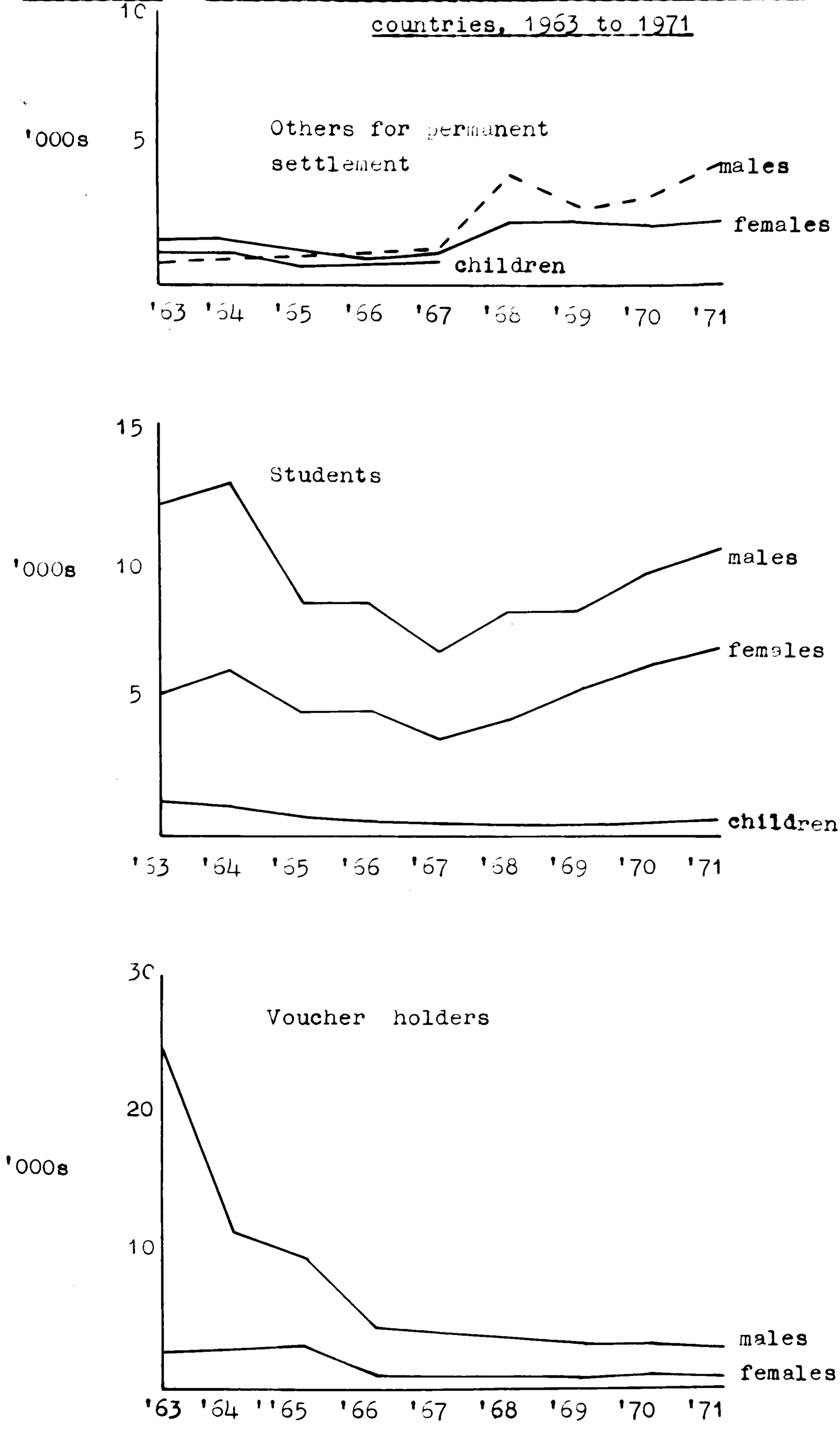
Table 8.1 (Continued..)

| Transition Group | Terminal Age Group | West Yorkshire rates | | Leeds rates | |
|---|---|---|---|---|---|
| | | Survival | Out-migration | Survival | Out-migration |
| Females | | | | | |
| 0-1 | 0-4 | 0.94584 | 0.03399 | 0.90709 | 0.07184 |
| 1-2 | 5-9 | 0.93137 | 0.06362 | 0.86053 | 0.13446 |
| 2-3 | 10-14 | 0.93498 | 0.06361 | 0.86415 | 0.13444 |
| 3-4 | 15-19 | 0.91897 | 0.07957 | 0.83019 | 0.16817 |
| 4-5 | 20-24 | 0.85483 | 0.14289 | 0.69573 | 0.30199 |
| 5-6 | 25-29 | 0.88387 | 0.11325 | 0.75777 | 0.23935 |
| 6-7 | 30-34 | 0.88292 | 0.11312 | 0.75697 | 0.23907 |
| 7-8 | 35-39 | 0.93020 | 0.06400 | 0.85894 | 0.13526 |
| 8-9 | 40-44 | 0.92685 | 0.06397 | 0.85562 | 0.13520 |
| 9-10 | 45-49 | 0.95283 | 0.03246 | 0.91669 | 0.06860 |
| 10-11 | 50-54 | 0.94431 | 0.03243 | 0.90820 | 0.06854 |
| 11-12 | 55-59 | 0.93246 | 0.03245 | 0.89633 | 0.06858 |
| 12-13 | 60-64 | 0.91149 | 0.03292 | 0.87484 | 0.06957 |
| 13-14 | ≥ 65 | 0.88098 | 0.02687 | 0.85106 | 0.05679 |
| 14-14 | ≥ 65 | 0.74688 | 0.05276 | 0.68814 | 0.11150 |

until 1986 census date, we require, as input material, estimates of the in-migration to Leeds C.B. for five periods: 1961 to 1966, 1966 to 1971, 1971 to 1976, 1976 to 1981, and 1981 to 1986. The end of each period at the census date therefore coincides with the beginning of the next period and no double-counting takes place. This organisation means there is a considerable amount of manipulation of basic material required and therefore simple assumptions are made upon which this can be done. All the manipulations however, are performed within constraining totals so that no information is lost in any of the procedures. The example which is used here is for immigration from the whole Commonwealth, that is, both the Old and the New, but the procedure is exactly the same as that used to estimate numbers arriving from particular countries of the New Commonwealth, the West Indies, India, and former Pakistan.

The basic source of information is the Commonwealth Immigrant Act (1962) statistics which have, since that year, provided a yearly sequence of data concerning the nature and source countries of migration to the United Kingdom. Information is supplied in these statistics of the numbers of persons, males, females, and children entering the United Kingdom in each year since June, 1962, by country issuing passport, which may or may not be analogous to country of birth, and by the nature of the migration - dependants, voucher holders, long term visitors, and others. From these classifications are chosen four migration types which are permanent or semipermanent; voucher holders, dependents, students, and others for permanent settlement. Figure 8.2 shows that there is a reasonable amount of regularity in three of these migration types. The number of voucher holders falls from high

Figure 8.2 Persons entering the U.K. from Commonwealth countries, 1963 to 1971



levels for males in 1963 but settles down in the late 1960's at about 2,500 males and 1,000 females per annum. Student numbers fall in the mid-1960's but rise steadily towards the end of the decade. Others for permanent settlement have been relatively few in number over the whole period. This last category recorded males, females, and children until 1967, after which date the relevant children were included in the male or female classification.

It is relatively easy, therefore, to extrapolate the trends shown in Figure 8.2 and Table 8.2 to obtain estimates of numbers of migrants in these categories entering the United Kingdom from Commonwealth countries for the three projection periods 1971 to 1976, 1976 to 1981, and 1981 to 1986 or, more precisely, at the moment in each year until 1986. In the case of voucher holders and others for permanent settlement the yearly entry is held to be equal to the 1971 level. For students the strong upward surge at the end of the 1960's is continued through 1971 and 1972. Extrapolation of this trend suggests an upward tendency until about 1978, after which we allow the trend to fall steadily to reach the 1971 level again in 1986.

Estimation of the number of dependants entering the United Kingdom is rather more difficult. Clearly the number of dependants depends on the numbers of voucher holders arriving in the United Kingdom. Eversley and Sukdeo (1969) suggested that when the glut of entrants during the 1960's decade settled down then we might expect about 2.7 dependants to every voucher holder entering the country. They suggested, however, that during the 1960's a large backlog of dependants had been built up and that most of these, a total of 236,000 females and children (Eversley

Table 8.2 Numbers of persons entering the U.K. from Commonwealth countries, 1963 - 1971.

| Year of Entry | Voucher Holders | | Students | | | Others | | | Dependants | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | M | F | M | F | C | M | F | C | M | F | C |
| 1963 | 27,371 | 2,754 | 12,043 | 5,140 | 1,301 | 763 | 1,513 | 1,171 | 833 | 11,331 | 14,070 |
| 1964 | 11,784 | 2,921 | 12,982 | 6,001 | 1,134 | 948 | 1,676 | 1,111 | 1,239 | 13,437 | 22,784 |
| 1965 | 9,710 | 3,170 | 8,643 | 4,540 | 834 | 1,092 | 1,316 | 560 | 1,485 | 14,992 | 24,737 |
| 1966 | 4,365 | 1,096 | 8,591 | 4,645 | 595 | 1,162 | 973 | 843 | 1,450 | 13,592 | 26,984 |
| 1967 | 4,000 | 978 | 6,849 | 3,595 | 544 | 1,406 | 1,206 | 974 | 2,221 | 14,637 | 35,955 |
| 1968 | 3,828 | 863 | 8,334 | 4,374 | 488 | 3,599 | 2,172 | - | 1,112 | 15,060 | 32,478 |
| 1969 | 3,144 | 877 | 8,789 | 5,260 | 474 | 2,742 | 2,223 | - | 661 | 11,639 | 21,520 |
| 1970 | 3,095 | 1,003 | 9,898 | 6,213 | 528 | 3,140 | 2,080 | - | 647 | 9,736 | 17,024 |
| 1971 | 2,631 | 846 | 10,571 | 6,938 | 603 | 4,358 | 2,372 | - | 869 | 10,082 | 17,063 |

M: male, F: female, C: children

and Sukdeo, 1969, table 43), could be expected to arrive in the United Kingdom between 1967 and 1977 after which an even flow of dependants could be expected at their rate of 2.7 dependants per voucher holder. The benefit of hind-sight now allows us the knowledge that between 1967, which was the commencing date of their estimates, and 1971 a total of 46,517 women and 88,085 children entered the United Kingdom as dependants. Thus according to the Eversley and Sukdeo estimates there should still be, in 1971, some 101,398 females and children to enter the country as dependants by 1977. In 1971 the Commonwealth Immigrant Act (1962) statistics stated that 10,082 females and 17,063 children entered from all Commonwealth countries as dependants. Continuation of this level of in-migration will result in 60,000 women and 102,000 children entering as dependants by 1977, which is some 60,000 more persons by 1977 than Eversley and Sukdeo estimated.

We have now achieved a basis on which to suggest the future levels of in-migration of dependants into the United Kingdom. We know that a continuation of in-migration at the 1971 level for dependants cannot take place since there do not appear to be that many dependants. However, if the 1971 levels are reduced cumulatively by equal amounts for each year 1972 to 1977, we can achieve a close approximation to the estimates made by Eversley and Sukdeo of total arrivals up to and including that year. These estimates are, of course, in excess of the 2.7 dependants per voucher holder who it is assumed, are still regularly entering the United Kingdom (Figure 8.3). All the estimates are now put together and are presented in Table 8.3. The assumptions made are shown graphically in Figure 8.4.

**Figure 8.3** Numbers of dependants (in thousands) entering the U.K. 1963 to 1971.

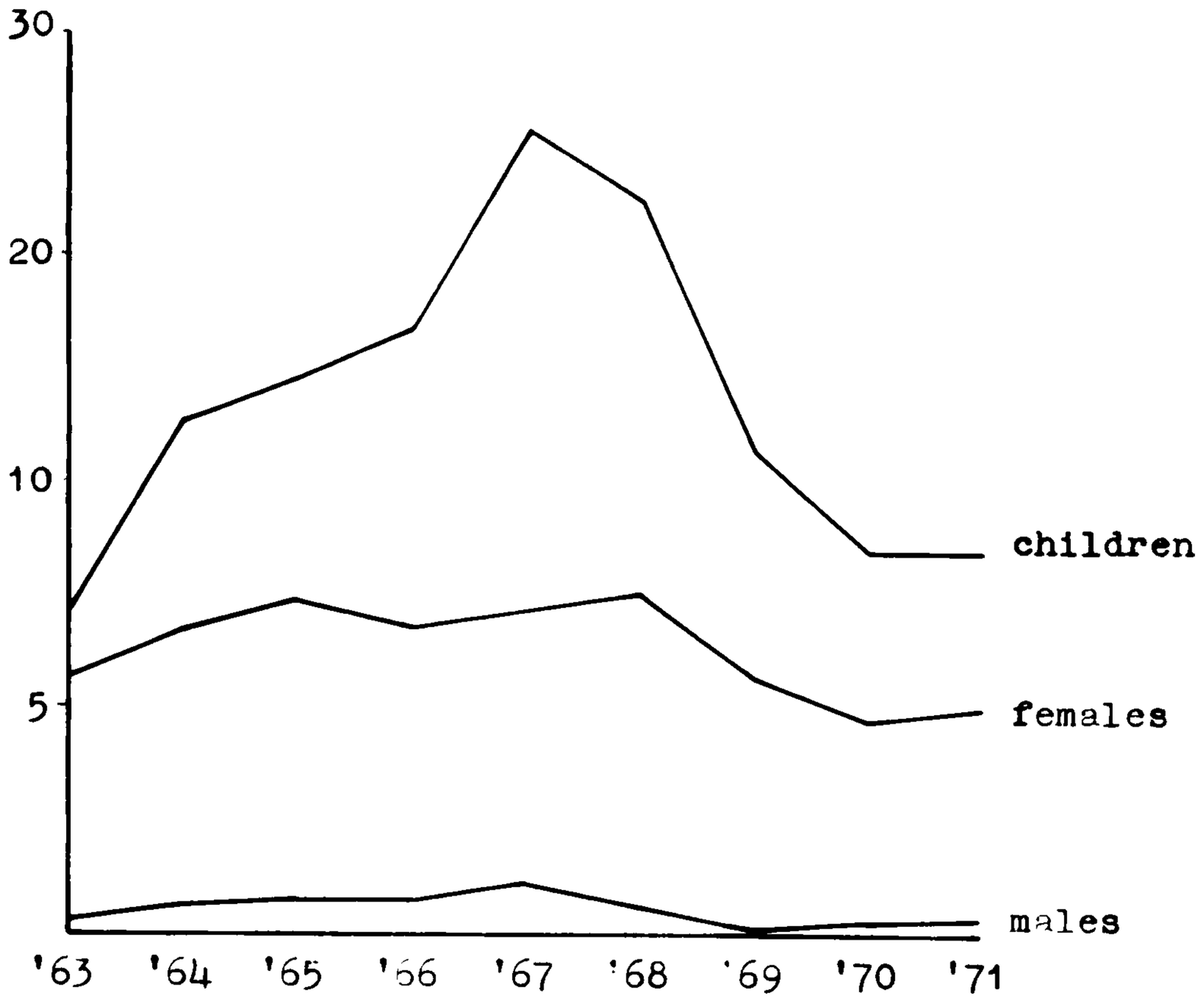
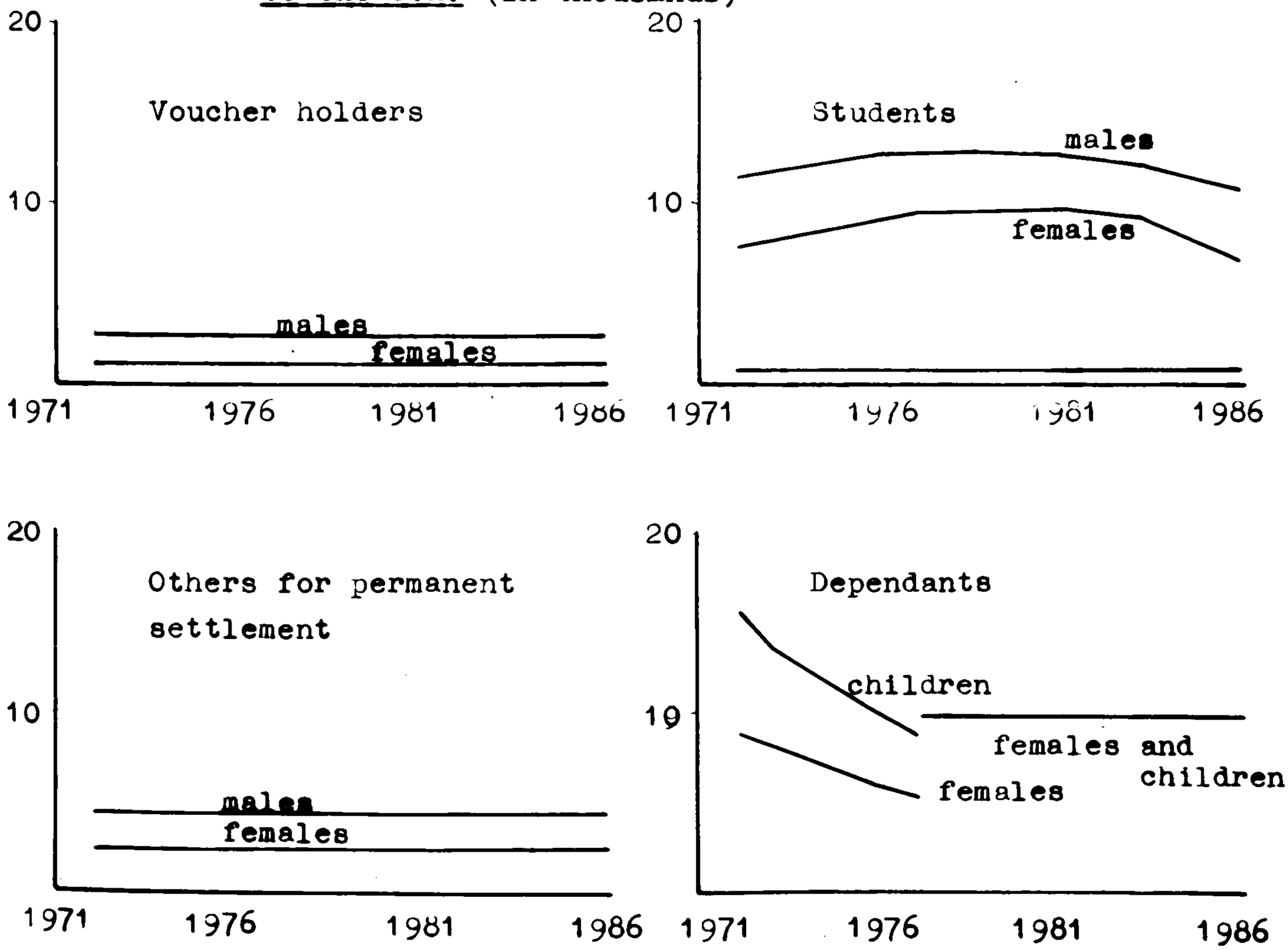



**Figure 8.4** Assumptions about the future levels of immigration to the U.K. (in thousands)



If the assumption is now made that in each census year, that is, in 1976, 1981, and 1986, the in-migrants occur evenly over the year, then each yearly total can be broken down into before-census and after-census events. This is done simply by assuming that approximately one third of the total yearly migration occurs before the census date in the relevant year and that approximately two thirds occurs after the census date in the relevant year. In-migration totals for the three projection periods 1971 to 1976, 1976 to 1981, and 1981 to 1986 are set out in Table 8.4.

The next step is to recognise the essential difference between the above estimates of immigrants and the nature of the data on immigration which are required for the demographic model. The information above, derived from the Commonwealth Immigrant Act statistics, is flow information, that is, it is a record of the numbers of persons entering the United Kingdom. It does not provide details of how many of these migrants remained in the United Kingdom to be recorded at the next census, the immigration and survival information that is required for the model. We thus have to attempt the estimation of the numbers of persons in-migrating to the United Kingdom in a census period and who survive to the end-of-period census date.

The 1966 10% sample census of Great Britain Commonwealth Immigrant Tables provided details of the numbers of persons who were born in Commonwealth countries and who were five year migrants, that is, who had entered Great Britain in the preceding census period. Juxtaposition of these migration and survival data with the estimated in-migration total for the period 1961 to 1966 provides a migration and survival rate of 0.89975 for males, and 0.82864 for

Table 8.3 Estimated immigration from Commonwealth countries to the United Kingdom, 1972 to 1986.

| Year | Males | Females | Children |
|---|---|---|---|
| 1972 | 19,000 | 19,900 | 25,250 |
| 1973 | 19,400 | 19,400 | 23,550 |
| 1974 | 19,800 | 19,100 | 22,250 |
| 1975 | 20,000 | 18,200 | 21,050 |
| 1976 | 20,200 | 18,100 | 19,850 |
| 1977 | 20,300 | 17,600 | 18,850 |
| 1978 | 19,600 | 12,750 | 10,050 |
| 1979 | 19,600 | 12,900 | 10,050 |
| 1980 | 19,490 | 13,000 | 10,050 |
| 1981 | 19,450 | 12,900 | 10,050 |
| 1982 | 19,250 | 12,750 | 10,050 |
| 1983 | 19,000 | 12,500 | 10,050 |
| 1984 | 18,600 | 12,000 | 10,050 |
| 1985 | 18,200 | 11,250 | 10,050 |
| 1986 | 17,500 | 10,250 | 10,050 |
| Total | 289,390 | 222,600 | 221,250 |

Table 8.4 Total Commonwealth immigration to the U.K. for the three projection periods.

| | | Males | Females | Children | Total |
|---|---|---|---|---|---|
| From census date | 1971 | 17,987 | 20,656 | 21,101 | 59,744 |
| | 1972 | 19,000 | 19,900 | 23,550 | 62,450 |
| | 1973 | 19,400 | 19,400 | 22,250 | 61,050 |
| | 1974 | 18,800 | 19,100 | 21,050 | 59,950 |
| | 1975 | 20,000 | 18,200 | 19,850 | 58,050 |
| To census date | 1976 | 5,050 | 4,525 | 4,713 | 14,288 |
| Totals | | 101,237 | 101,781 | 112,514 | 315,532 |
| From census date | 1976 | 15,150 | 13,575 | 14,137 | 42,862 |
| | 1977 | 20,300 | 13,100 | 10,050 | 43,450 |
| | 1978 | 19,600 | 12,750 | 10,050 | 42,400 |
| | 1979 | 19,600 | 12,900 | 10,050 | 42,550 |
| | 1980 | 19,490 | 13,000 | 10,050 | 42,540 |
| To census date | 1981 | 4,870 | 3,225 | 2,513 | 10,608 |
| Totals | | 99,010 | 68,550 | 56,850 | 224,410 |
| From census date | 1981 | 14,610 | 9,675 | 7,537 | 31,822 |
| | 1982 | 19,250 | 12,750 | 10,050 | 42,050 |
| | 1983 | 19,000 | 12,500 | 10,050 | 41,550 |
| | 1984 | 18,600 | 12,000 | 10,050 | 40,650 |
| | 1985 | 18,200 | 11,250 | 10,050 | 39,500 |
| | 1986 | 4,375 | 2,563 | 2,513 | 9,451 |
| Totals | | 94,035 | 60,738 | 50,250 | 205,023 |

females.

These rates attempt to account for the number of persons who appear in the Commonwealth Immigrant (1962) Act statistics as entering the country but who subsequently do not survive to be enumerated at the next census, either because they die or out-migrate within the one period. Once these persons have been enumerated at a census, they become part of the next period's stock population and are assumed to survive at the rates for the stock population.

To prepare the data of Table 8.4 for use with these survival rates all that now needs to be done is to disaggregate the children category into male and female children by using the proportions of males and females aged 0-14 years in 1966 born in the Commonwealth countries. Table 8.5 presents these figures and the estimated migrations and survivals resulting from the total in the three projection periods.

Having obtained estimates of immigration and survival for the United Kingdom, though Northern Ireland can be virtually discounted, we must now assign some of these persons to residence in Leeds C.B. To do this the first equation of the demographic model is used for the two periods for which there is information: 1961 to 1966, 1966 to 1971. Equation (8.1) can be rearranged to give

$$I^{x}_{*R}=I^{x}_{R-1R}+I^{x}_{RR} = W^{x}_{R}(t+T)-S^{x}_{R-1R}W^{x}_{R-1}(t)-S_{RR}W^{x}_{R}(t). \quad ...(8.11)$$

In other words, in-migration and survival to Leeds for the two periods 1961 to 1966, and 1966 to 1971, can be estimated directly by the subtraction from the 1966 and 1971 population stock totals $W^{x}_{s}(t+T)$ (for each age group) of the estimated survivors $S^{x}_{s-1s}W^{x}_{s-1}(t)$. This equation

Table 8.5 Migrations, and migrations and survivals, for the three projection periods 1971 to 1976, 1976 to 1981, and 1981 to 1986.

| Migrations | Projection period | | |
|---|---|---|---|
| | 1971 to 1976 | 1976 to 1981 | 1981 to1986 |
| Males | 101,327 | 99,010 | 94,035 |
| Females | 101,781 | 68,550 | 60,738 |
| Male Children | 58,912 | 29,767 | 26,311 |
| Female Children | 53,602 | 27,083 | 23,939 |
| Total | 315,532 | 234,410 | 205,023 |
| Migration and survival | | | |
| Males | 91,088 | 89,084 | 84,608 |
| Females | 77,628 | 56,803 | 50,330 |
| Male Children | 53,006 | 26,783 | 23,673 |
| Female Children | 44,417 | 22,442 | 19,837 |
| Total | 266,139 | 195,112 | 178,448 |

serves two purposes. It allows us first to obtain the proportion of the migration and survival flow to the United Kingdom which was taken by Leeds C.B., and secondly to observe the age structure of these migrations and survivals at time (t+T); that is, not the age structure when migration took place but the age structure of the migration flow at the end of the period in which it took place.

In-migrations and survivals to Leeds C.B. by this method are given in Table 8.6. It should be noted that the persons in the first age group are available directly from the censuses of 1966 and 1971.

For the same periods Great Britain accepted about 169,000 and 164,000 male, and about 123,000 and 160,000 female migrants. So it seems that the Leeds C.B. proportion of

the total migration to this country has been about 2% of male immigrants and about 1.5% of female immigrants. So by maintaining these assumptions and disaggregating the estimates by the age proportions obtained for the two periods 1961 to 1966, and 1966 to 1971, using the children totals as constraints on the first three age groups, we obtain Table 8.7, which are the estimates, disaggregated by age, of males and females entering Leeds and surviving in the three projection periods 1971 to 1976, 1976 to 1981, and 1981 to 1986.

The persons in age groups 5 to 9 years and above in Table 8.7 form the input information in equation (8.1) of the demographic model, given by variable $I^{x}_{s-1s}$ for the third, fourth, and fifth runs of the model, that is, in predicting population numbers in 1976, 1981, and 1986. The equivalent persons in Table 8.6 form the input information for the first and second runs of the model, essentially replicating the situation which we know to be the case in 1966 and 1971. The data for persons in the first age group in both Table 8.6 and Table 8.7 given by variable $I^{x}_{01}$, form the input information which is used in equations (8.5) and (8.6) of the model, that is, in predicting the number of persons in the first age group at each census date.

It is to the other variables in this equation, namely those concerning the fertility of the Commonwealth immigrants in Leeds, that we can now turn our attention.

Table 8.6 Immigration and survival to Leeds of persons born in Commonwealth countries between 1961 and 1966, and 1966 and 1971.

| Age group at t+T | 1961-1966 | | 1966-1971 | |
|---|---|---|---|---|
| | Males | Females | Males | Females |
| 0-4 | 266 | 180 | 188 | 108 |
| 5-9 | 736 | 531 | 226 | 87 |
| 10-14 | 102 | 58 | 165 | - |
| 15-19 | 74 | 31 | 897 | 457 |
| 20-24 | 615 | 366 | 621 | 526 |
| 25-29 | 468 | 330 | 212 | 243 |
| 30-34 | 447 | 319 | 484 | 269 |
| 35-39 | 320 | 218 | 235 | 164 |
| 40-44 | 196 | 151 | 174 | 98 |
| 45-49 | 137 | 103 | 73 | 19 |
| 50-54 | 80 | 80 | 1 | - |
| 55-59 | 30 | 58 | - | - |
| 60-64 | 3 | - | - | - |
| ≥65 | 5 | - | - | - |
| Total | 3,476 | 2,425 | 3,276 | 1,971 |

Table 8,7 In-migration and survival to Leeds C.B. by age for the periods 1971 to 1976, 1976 to 1981, and 1981 to 1986.

| Age Group | Projection Period | | | | | |
|---|---|---|---|---|---|---|
| | 1971 to 1976 | | 1976 to 1981 | | 1981 to 1986 | |
| | Males | Females | Males | Females | Males | Females |
| 0-4 | 319 | 282 | 161 | 142 | 143 | 126 |
| 5-9 | 611 | 549 | 309 | 277 | 272 | 245 |
| 10-14 | 170 | 51 | 86 | 26 | 76 | 23 |
| 15-19 | 362 | 219 | 354 | 160 | 336 | 142 |
| 20-24 | 461 | 401 | 451 | 294 | 429 | 260 |
| 25-29 | 254 | 257 | 248 | 188 | 235 | 167 |
| 30-34 | 347 | 264 | 339 | 193 | 322 | 171 |
| 35-39 | 207 | 172 | 202 | 126 | 192 | 111 |
| 40-44 | 138 | 112 | 135 | 82 | 128 | 73 |
| 45-49 | 78 | 55 | 77 | 40 | 73 | 35 |
| 50-54 | 30 | 36 | 30 | 26 | 28 | 23 |
| 55-59 | 11 | 25 | 10 | 19 | 10 | 17 |
| 60-64 | 1 | - | 1 | - | 1 | - |
| ≥65 | 2 | - | 2 | - | 2 | - |
| Totals | 2,991 | 2,423 | 2,405 | 1,573 | 2,247 | 1,393 |
| Persons | 5,414 | | 3,978 | | 3,640 | |

## 8.3 Interpretation of cohort fertility in terms of the demographic model.

The demographic model uses population vectors of males and females in fourteen five-year groups. Each five-year age group forms a cohort of persons because, since the projection period is five years in length, no person can survive within one age group over the period (t,t+T) (except for the last age group). This structure is precisely in accordance with the population specification required for predicting births through cohort-specific fertility rates. Consider Figure 8.5, in 1961 a number, x, of women in a particular birthplace group are aged 15 to 19 years. The stippled diagonal of the figure represents their passage through time until, in 1986, they are aged 40 to 45 years.

Estimation of the numbers of women at risk of giving birth is made using the midperiod population or arithmetic mean population in that cohort. In this case age groups can be used because the projection period is equal in length to the age-group interval. The calculation would be more complex if this were not the case.

Having thus derived the population at risk of giving birth, we must now decide upon the fertility rates, both for the past period, 1961 to 1971, and for the future period, 1971 to 1986, The specification of the female population at risk of giving birth suggests that for the greatest accuracy the cohort-specific fertility rates for the different birthplace groups should be used. For the historical period 1961 to 1971 the simple assumption is made that the cohort fertility rates were, throughout, at the level observed in 1971. For a continued high fertility

**Figure 8.5** Identification of individual cohorts of women

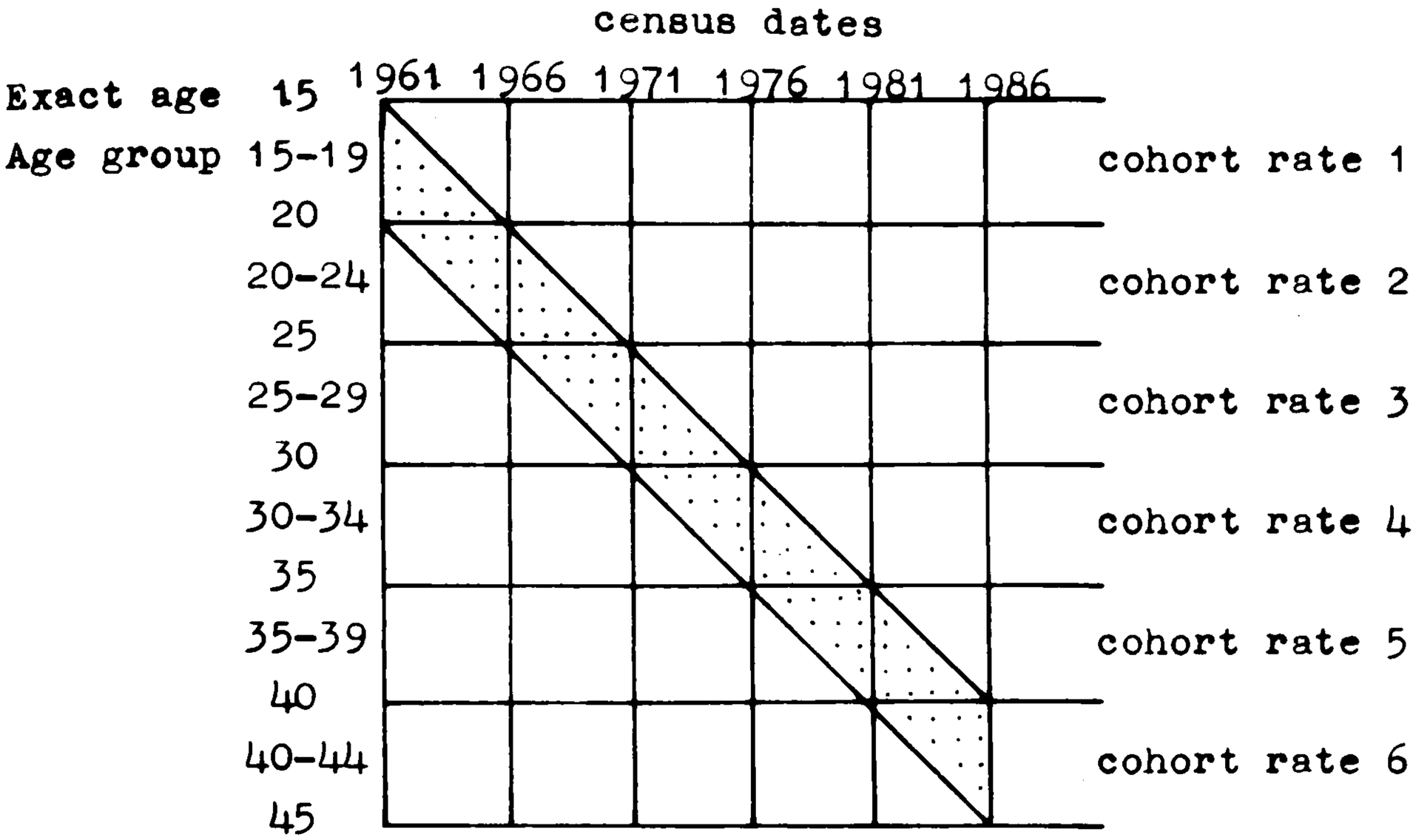
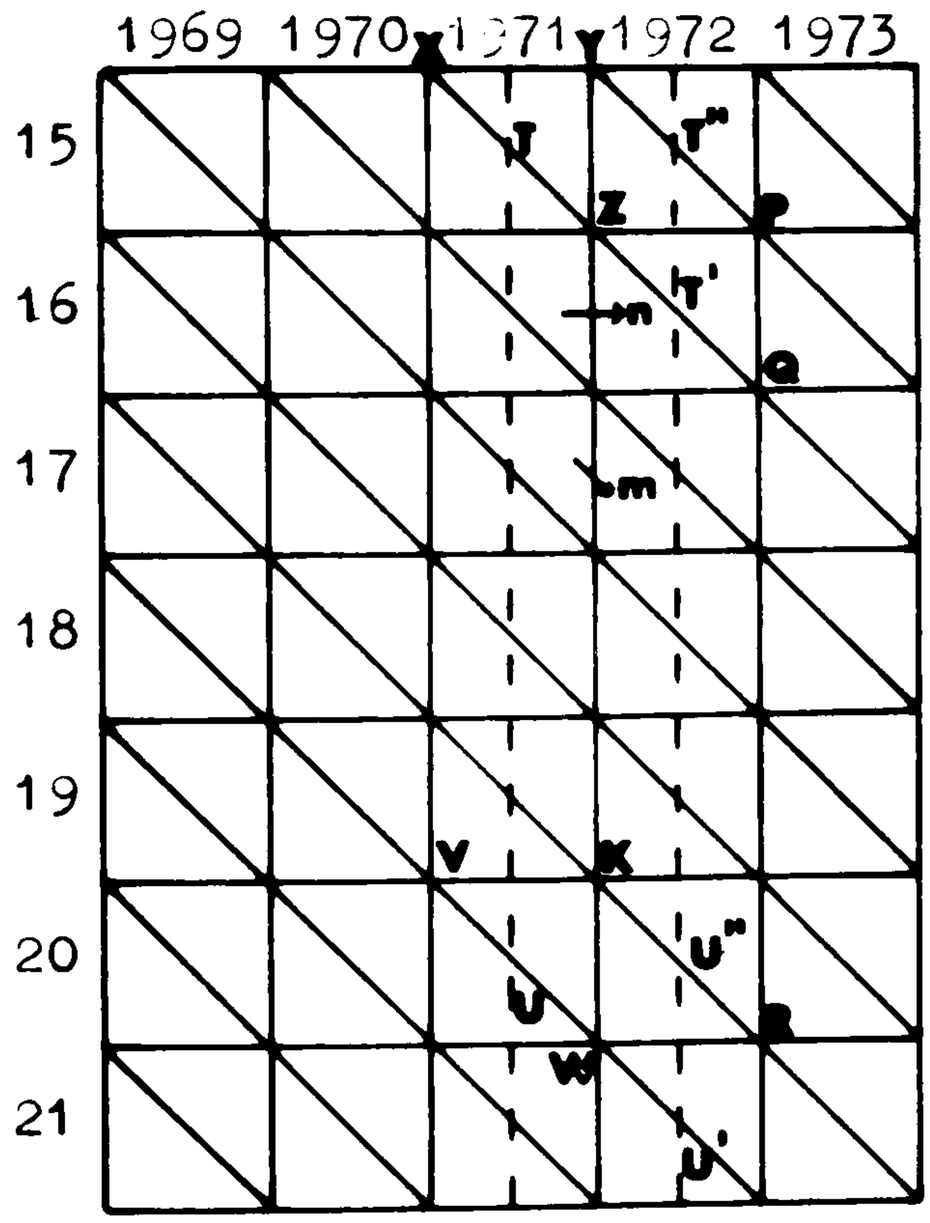



**Figure 8.6** Trends in the cohort specific fertility rates, five year age groups, one year period case.



projection the assumption is made that the cohort fertility rates remain at the 1971 level.

Clearly, though, there must be great doubt about this continued high level of fertility. Figure 8.7 shows that these are strong downward trends in immigrant fertility. The figure shows that, by extrapolating these trends of the general fertility rates, we can suggest that by 1976 the rates for the Commonwealth groups will have declined to or below the general fertility rate level of the indigenous population of Leeds C.B. in 1971. To rationalise this decline for a low fertility estimate it is therefore assumed that the general fertility rates for the Commonwealth group decline at a rate which will bring them into line with the rate for the total population in 1976. This means that to use cohort rates some measure of the amount of decline must be obtained by which to reduce the 1971 levels of these rates for each group.

Calculation of the fertility rate for a cohort of women born between mid-1951 and mid-1956, aged 15 to 19 years at the midperiod of 1971, for example, is done by considering the births in total that occur in parallelogram XVWZ (Figure 8.6), and the women at risk, that is, the life lines crossing line TU. The next rate for this cohort is that in 1972, derived from the births which occur in parellelogram ZWSQ, and the women at risk, line T'U'. But the cohort rates needed for extrapolation of the trends in cohort fertility, in this one-year period/five-year age group case, are the rates derived, for the first point in time from the births occurring in parellelogram XVWZ, and the women at risk, line TU, and for the second point in time from parellelogram YKRP, and the women at risk, line

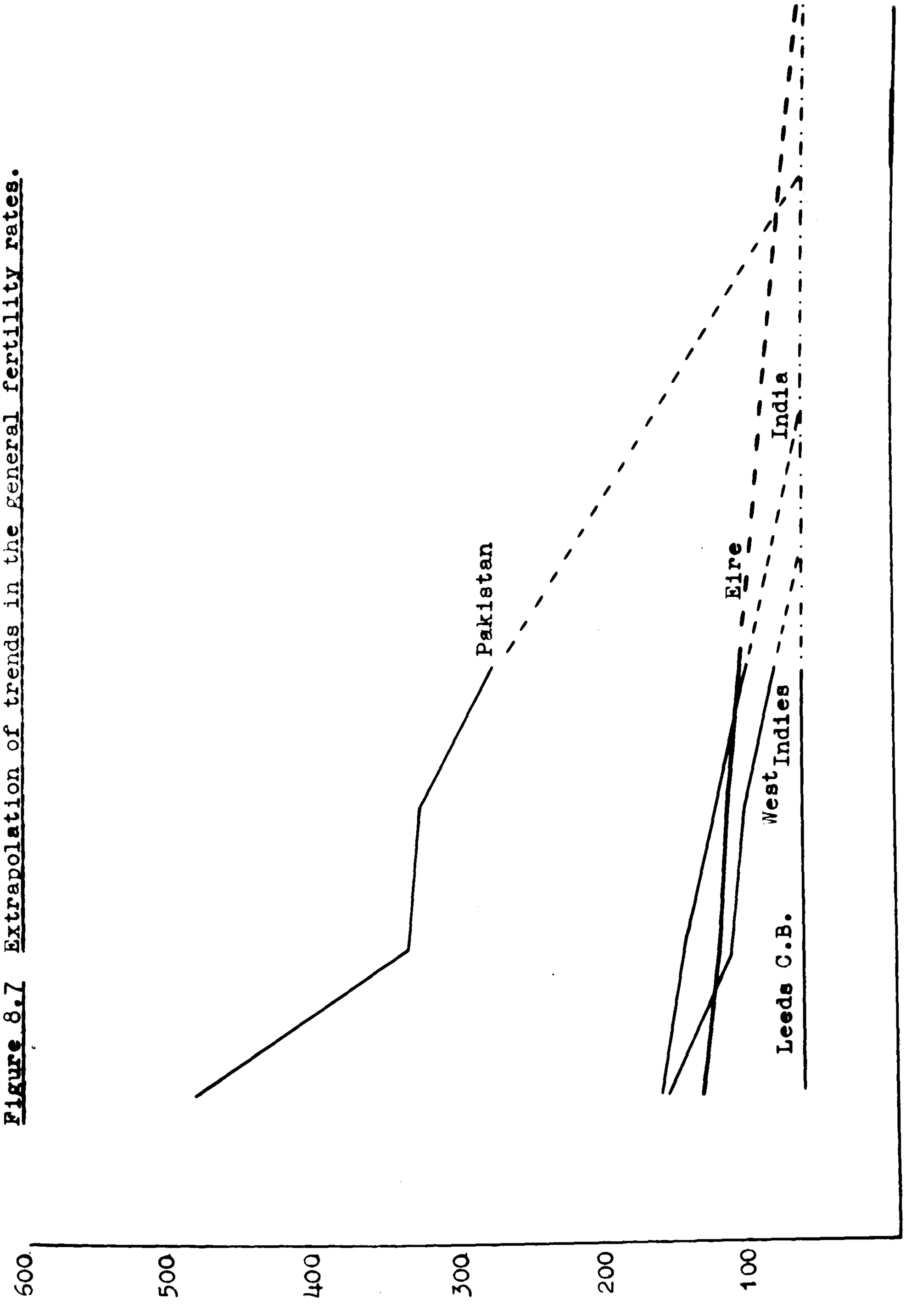



**Figure 8.7** Extrapolation of trends in the general fertility rates.

**Figure 8.8** Trends in the cohort fertility rates, five year age groups, five year period case.

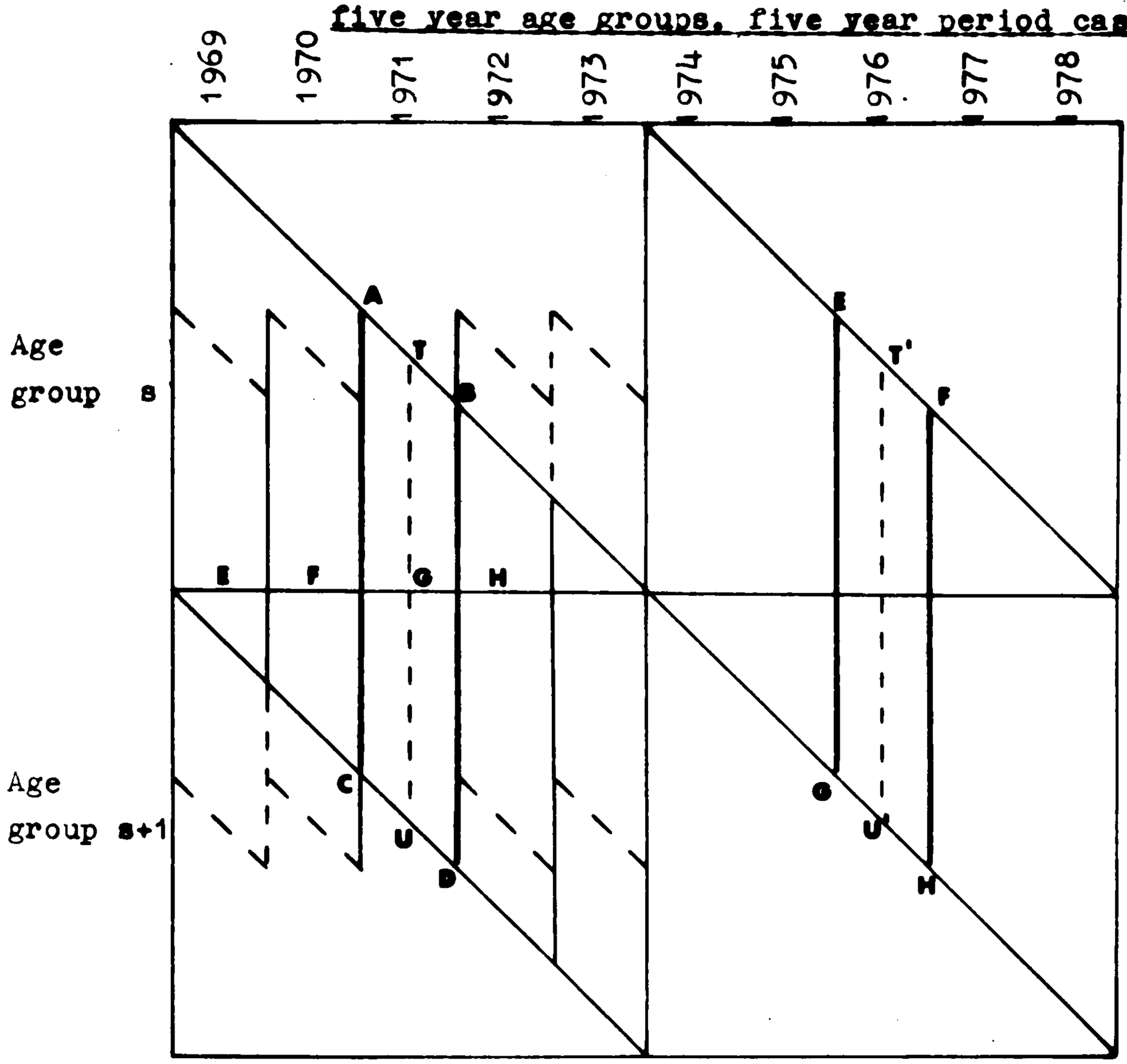
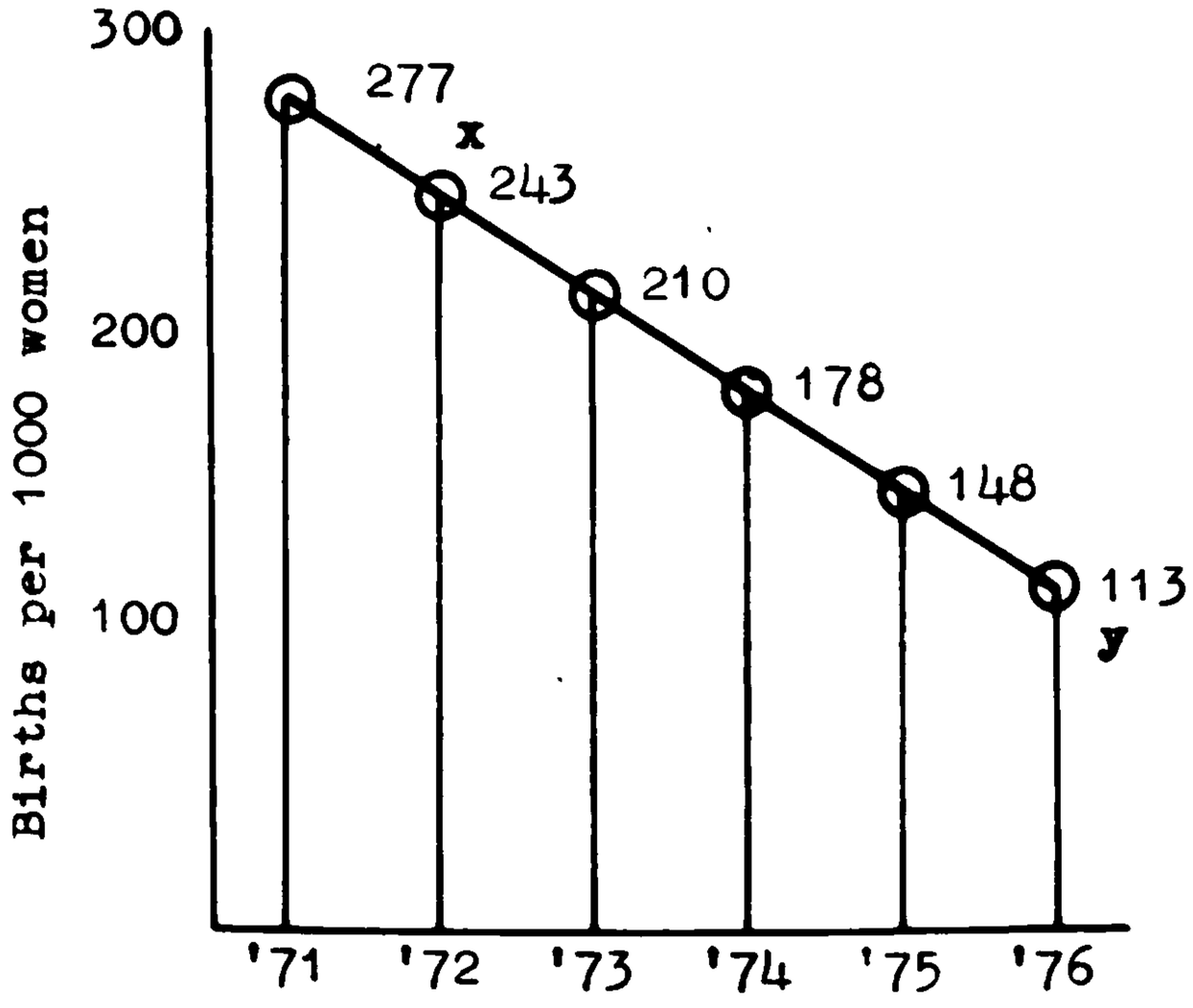



**Figure 8.9** Calculation of an average rate of fertility.




| estimated births to 1000 women | |
|---|---|
| 1971 | 184.660 |
| 1972 | 243.000 |
| 1973 | 210.000 |
| 1974 | 178.000 |
| 1975 | 148.000 |
| 1976 | 37.667 |
| | 1001.327 |

average rate = 1001.3 per 1000 women

implied average rate per annum = 200.26

T"U". That is, the rates which are along the trend given by arrows 'n' rather than along the trend given by arrows 'm'.

Figure 8.8 illustrates the situation in the five-year period/ five-year age group case. The real trends in the cohort rates, which should be used in the model, should be observed by looking at the rate for age-group transition (s,s+1) for 1969 to 1973, and for age-group transition (s,s+1) for 1974 to 1978 (ACDB ÷ TU, EGHF ÷ T'U'), and so on (if the starting date for the cohorts is in 1969). For the second case, we should observe the rates over the whole period for cohort s, s+1 from 1969 to 1973 as a total, with the rates for cohort s,s+1 from 1974 to 1978 as a total.

The trends which are available are those of the age-specific rates for the four years and the overall situation demonstrated in Figure 8.6. The age-specific fertility rates are virtually the same as the rates derivable for areas E, F, G, and H (Figure 8.8), so these rates are measured against the age-specific fertility rates for the total population of Leeds C.B. to obtain reduction factors specific to each age group and each birthplace group. These reduction factors are applied to the cohort rates for each group for 1971 since this year is the middle of the period 1969 to 1973. This technique supplied fertility rates for a low fertility projection. Under these assumptions the fertility rates used in the model are taken to be no higher than the rates for the indigenous population after 1976. There is, therefore, no difficulty in transferring from a one-year rate to a five-year rate over the periods 1961 to 1986 for the high fertility estimate, or over periods 1961 to 1971, and 1976 to 1986

Table 8.8 Cohort-specific average fertility rates for women from different birthplaces. Values are births per 1,000 women.

| Cohort | Years of Birth | Birthplace | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | India | | | Caribbean | | | Pakistan | | |
| | | '61-'66 '66-'71 | '71-'76 | '76-'81 | '61-'66 '66-'71 | '71-'76 | '76-'81 | '61-'66 '66-'71 | '71-'76 | '76-'81 |
| 1 | '21-'26 | 600.5 | 903.7 | 1255.0 | 679.5 | 488.0 | 260.0 | 1375.0 | 1375.0 | 1375.0 |
| 2 | '26-'31 | 1388.5 | 1001.3 | 968.5 | 818.0 | 777.3 | 736.0 | 2321.0 | 1593.7 | 770.5 |
| 3 | '31-'36 | 990.0 | 787.7 | 563.5 | 809.0 | 776.3 | 741.5 | 1708.5 | 1142.3 | 501.0 |
| 4 | '36-'41 | 307.5 | 244.9 | 158.5 | 526.0 | 471.3 | 408.0 | 1460.5 | 915.9 | 302.5 |
| 5 | '41-'46 | 337.0 | 265.9 | 184.0 | 397.0 | 274.3 | 145.0 | 1343.0 | 764.7 | 135.5 |
| 6 | '46-'51 | 82.5 | 51.7 | 915.5 | 172.0 | 116.0 | 51.0 | 454.5 | 266.3 | 11.5 |
| 7 | '51-'56 | 0.0 | 0.0 | 0.0 | 78.0 | 46.8 | 2.5 | 714.0 | 374.9 | 6.0 |

for the low fertility rate. The single-year rates are simply multiplied by five. The transition period 1971 to 1976 provides rather more difficulty. Figure 8.9 shows for one age group that the cohort fertility rates may be reduced cumulatively between 1971 to 1976. A fertility rate for this period can be obtained in two ways - as an average of the five-yearly rates through summing the rates and dividing by five, or by summing the estimated births and dividing by the women at risk over the period. Figure 8.9 gives the example of the 20 to 24 year age group of Indian women.

In 1972 the cohort-specific fertility rate for this group was 243 births per 1,000 women for one year. In 1976 these women are assumed to give birth at the reduced rate of 113 births per 1,000 women. By interpolation of the rates along the line XY an average cohort fertility rate for the period 1971 to 1976 can be obtained. This is performed for every age group, and for every birthplace of women to give the cohort-specific fertility rates for use in the model. Table 8.8 gives these rates in full.

Our assumptions about the future fertility rates assumed in the model may now be stated in full. First, it is assumed for a high fertility projection that the cohort-specific fertility rates remain throughout the period 1961 to 1986 at the 1971 level. Second, it is assumed for a low fertility projection that the cohort fertility rates fall, by 1976, by an amount equivalent to the reduction required to bring the age-specific fertility rates for each group into line with their indigenous equivalents. Under this assumption the high rates of fertility, which are assumed for the 1961 to 1971 period, decline over the

period 1971 to 1976 to give an intermediate rate for this period. Low rates are used after 1976.

## 8.4 Projections of the Commonwealth immigrant population of Leeds.

### 8.4.1 Results of the model runs

The model provides estimates of the population, disaggregated by sex, in 14 five-year age groups from 0 to 4 years old to greater than or equal to 65 years old. The predictions are supplied for the end of each five year projection period, that is, for 1966, 1971, 1976, 1981, and 1986. The model has been used for four groups, and each group has been projected using the high cohort fertility rates and the low cohort fertility rates. The groups used are; total Commonwealth, namely both the Old and the New Commonwealth groups; Indians, Caribbeans, and Pakistanis. The base year of the projection was 1961 except in the case of the Indians and the Pakistanis since these groups are indistinguishable in the 1961 census of Great Britain for Leeds C.B. and therefore the 1966 population of these groups in Leeds C.B. had to be used as the base number. As well as the final population vectors, the model supplies the predicted numbers for each significant step in its procedure, for example the women at risk of giving birth are specified and the births to these women are stated for each period. It is therefore possible to identify the numbers of each group who were born into the group socially although they were born into British nationality in fact.

Since the 1961 to 1966, and 1966 to 1971, periods were

used empirically to derive in-migration, the totals in each birthplace group in 1966 and 1971 are equal to the census recording for these years. The projected populations, using both high and low fertility estimates are given in Tables 8.9, 8.10, 8.11, and 8.12.

Our population projections therefore suggest that the Total Commonwealth population of Leeds will rise by 1986 to 28,600 persons using a high fertility estimate, or 25,414 persons using a low fertility estimate. As suggested, these may be viewed as approximate maximum and approximate minimum population numbers. If the population of Leeds by that time is approximately the same as at present, that is, in round numbers about 500,000 then these Commonwealth persons will account for only 6% of the total population in 1986, a percentage which is by no means large in overall terms compared with the present percentages in some other British cities. Of this 28,600 persons, that is in the high fertility projection, it is estimated that 6,978 will belong to the Indian group, 5,832 will belong to the Pakistani ethnic group and 7,873 will belong to the Caribbean ethnic group. As in 1971, when the Caribbean persons were the dominant coloured ethnic group, so will they be in 1986. The equivalent low fertility estimates are 6,728 Indians, 4,326 Pakistanis and 7,139 Caribbeans who on that assumption remain as the single most numerous coloured group in the city.

The model does suggest, however, that by 1986 the situation will not have stabilised itself. The large growth rates of the 1960's have passed. At census date 1966,

the Indian and Pakistani population of Leeds was more than double their number in 1961. This large growth will have fallen, it is predicted using the high fertility estimates, to only 26% between 1971 and 1976, 17% between 1976 and 1981, and 13% between 1981 and 1986. With the low fertility estimates these growths will be 21%, 9%, and 9% respectively. For the Caribbean group, growth under the high fertility assumption will be 11% between 1971 and 1976, 9% between 1976 and 1981, and 7% between 1981 and 1986. With low fertility estimates, these growths will be 8%, 2%, and 4% respectively. This suggests that the Caribbean group will be relatively stable by 1986. The Indian and Pakistani groups will probably take a little longer to reach a stable position with regard to their numbers. In general the Total Commonwealth group will be growing at approximately 1 to 2% per annum by 1986 while about 5% per annum and 3% per annum growth can be expected for 1971-1976, and 1976-1981, respectively.

### 8.4.2 Concluding remarks on the population projection

The presentation of these results, with an explicit statement of methods and assumptions were the main aims of this chapter. Over the three projection periods, the model predicts remarkable differences in the numbers of children born to the coloured groups under the two fertility assumptions. If the high fertility assumptions hold, which seems very unlikely, then a total of 3,355 extra children will be born into the Indian, Pakistani and Caribbean groups, 289 to Indians, 821 to Caribbeans, and 1,763 to Pakistanis. These differences will be reflected in the numbers of children of primary school age in 1986. On this

assumption there will be 773 Indian children aged 5 to 14 years, 795 Pakistani children and 747 Caribbean children. The low fertility assumption gives estimates of 639, 353 and 550 children respectively, a total difference of 773 children in this year, a difference which is reflected of course, in each of the other projection periods. These differences in births and in the numbers to be expected in primary education imply heavy extra costs both to the families with large numbers of children and to the Authorities who will have to provide extra facilities, often in areas where these are poor anyway, to cater for the extra children.

Although the total of Commonwealth persons will only amount, at maximum, to about 6% of the population of Leeds C.B. by 1986, there is, as in other cities in Britain, marked concentration of immigrants into certain areas. This concentration appears to have been increasing in Leeds C.B. over the last 12 years (Chapter 4) although overall segregation appears to have been falling. Thus, unless much more marked dispersal occurs in the future than has occurred between 1961 to 1971, certain areas of the city are likely to have a substantial proportion of their population in the Commonwealth group. Under either of our fertility assumptions, this implies fairly heavy concentration of children of school age in certain schools, concentrations above the 30% recommended as the upper limit by the Department of Education and Science.

It is felt that these, and other implications of the population projections presented in the chapter need both further research and also careful consideration by both educational and city planners.

Table 8.9 The projected Total Commonwealth population of Leeds C.B.

| Age Group | Males | | | | Females | | | |
|---|---|---|---|---|---|---|---|---|
| | 1971 | 1976 | 1981 | 1986 | 1971 | 1976 | 1981 | 1986 |
| High Fertility Estimate | | | | | | | | |
| 0-4 | 1,279 | 1,754 | 1,791 | 1,908 | 1,161 | 1,666 | 1,714 | 1,829 |
| 5-9 | 1,105 | 1,711 | 1,816 | 1,811 | 870 | 1,548 | 1,711 | 1,720 |
| 10-14 | 833 | 1,124 | 1,563 | 1,645 | 518 | 803 | 1,364 | 1,501 |
| 15-19 | 1,098 | 1,122 | 1,322 | 1,682 | 581 | 649 | 826 | 1,274 |
| 20-24 | 781 | 1,314 | 1,323 | 1,456 | 611 | 805 | 746 | 835 |
| 25-29 | 761 | 823 | 1,205 | 1,199 | 591 | 720 | 798 | 732 |
| 30-34 | 1,059 | 901 | 938 | 1,200 | 695 | 711 | 738 | 775 |
| 35-39 | 978 | 1,103 | 965 | 986 | 647 | 769 | 737 | 745 |
| 40-44 | 811 | 961 | 1,164 | 940 | 473 | 666 | 740 | 704 |
| 45-49 | 550 | 813 | 948 | 1,037 | 311 | 489 | 650 | 713 |
| 50-54 | 348 | 519 | 753 | 871 | 213 | 319 | 470 | 614 |
| 55-59 | 236 | 311 | 457 | 659 | 178 | 216 | 305 | 438 |
| 60-64 | 134 | 200 | 262 | 386 | 103 | 155 | 189 | 267 |
| ⩾65 | 158 | 217 | 310 | 425 | 153 | 193 | 265 | 343 |
| Total | 10,131 | 12,873 | 14,745 | 16,205 | 7,105 | 9,709 | 11,253 | 12,490 |

(Continued overleaf...)

Table 8.9 Continued..

| Age Group | Males | | | | Females | | | |
|---|---|---|---|---|---|---|---|---|
| | 1971 | 1976 | 1981 | 1986 | 1971 | 1976 | 1981 | 1986 |
| Low Fertility Estimate | | | | | | | | |
| 0-4 | 1,279 | 1,754 | 1,043 | 1,106 | 1,161 | 1,666 | 993 | 1,055 |
| 5-9 | 1,105 | 1,711 | 1,816 | 1,168 | 870 | 1,548 | 1,711 | 1,099 |
| 10-14 | 833 | 1,124 | 1,563 | 1,645 | 518 | 803 | 1,364 | 1,501 |
| 15-19 | 1,098 | 1,122 | 1,322 | 1,682 | 581 | 649 | 826 | 1,274 |
| 20-24 | 781 | 1,314 | 1,323 | 1,456 | 611 | 805 | 746 | 835 |
| 25-29 | 761 | 823 | 1,205 | 1,199 | 591 | 720 | 798 | 732 |
| 30-34 | 1,059 | 901 | 938 | 1,200 | 695 | 711 | 738 | 775 |
| 35-39 | 978 | 1,103 | 965 | 986 | 647 | 769 | 737 | 745 |
| 40-44 | 811 | 961 | 1,164 | 940 | 473 | 666 | 740 | 704 |
| 45-49 | 550 | 813 | 948 | 1,037 | 311 | 489 | 650 | 713 |
| 50-54 | 348 | 519 | 753 | 871 | 213 | 319 | 470 | 614 |
| 55-59 | 236 | 311 | 457 | 659 | 178 | 216 | 305 | 438 |
| 60-64 | 134 | 200 | 262 | 386 | 103 | 155 | 189 | 267 |
| ⩾65 | 158 | 217 | 310 | 425 | 153 | 193 | 265 | 343 |
| Total | 10,131 | 12,873 | 14,069 | 14,760 | 7,105 | 9,709 | 10,532 | 11,095 |

Table 8.10 The projected Indian population of Leeds C.B.

| Age Group | Males | | | | Females | | | |
|---|---|---|---|---|---|---|---|---|
| | 1971 | 1976 | 1981 | 1986 | 1971 | 1976 | 1981 | 1986 |
| High Fertility Estimate | | | | | | | | |
| 0-4 | 335 | 437 | 445 | 446 | 309 | 422 | 428 | 429 |
| 5-9 | 103 | 336 | 425 | 431 | 94 | 312 | 410 | 415 |
| 10-14 | 211 | 102 | 304 | 381 | 133 | 85 | 274 | 358 |
| 15-19 | 325 | 225 | 162 | 336 | 205 | 165 | 126 | 282 |
| 20-24 | 193 | 307 | 269 | 219 | 261 | 244 | 215 | 187 |
| 25-29 | 177 | 171 | 275 | 248 | 206 | 263 | 249 | 227 |
| 30-34 | 270 | 170 | 195 | 272 | 207 | 223 | 265 | 254 |
| 35-39 | 250 | 253 | 186 | 207 | 183 | 221 | 234 | 271 |
| 40-44 | 204 | 227 | 241 | 184 | 143 | 185 | 217 | 228 |
| 45-49 | 140 | 193 | 221 | 234 | 99 | 145 | 183 | 213 |
| 50-54 | 107 | 129 | 178 | 203 | 91 | 99 | 140 | 175 |
| 55-69 | 69 | 93 | 113 | 156 | 66 | 88 | 95 | 133 |
| 60-54 | 50 | 59 | 80 | 97 | 55 | 58 | 77 | 84 |
| ⩾65 | 81 | 96 | 114 | 143 | 133 | 139 | 145 | 165 |
| Total | 2,515 | 2,798 | 3,208 | 3,557 | 2,185 | 2,649 | 3,058 | 3,421 |

(Continued overleaf...)

Table 8.10 Continued...

| Age Group | Males | | | | Females | | | |
|---|---|---|---|---|---|---|---|---|
| | 1971 | 1976 | 1981 | 1986 | 1971 | 1976 | 1981 | 1986 |
| **Low Fertility Estimate** | | | | | | | | |
| 0-4 | 335 | 398 | 381 | 402 | 309 | 384 | 367 | 386 |
| 5-9 | 103 | 336 | 391 | 377 | 94 | 312 | 377 | 363 |
| 10-14 | 211 | 102 | 304 | 352 | 133 | 85 | 274 | 330 |
| 15-19 | 325 | 225 | 162 | 336 | 205 | 165 | 126 | 282 |
| 20-24 | 193 | 307 | 269 | 219 | 261 | 244 | 215 | 187 |
| 25-29 | 177 | 171 | 275 | 248 | 206 | 263 | 249 | 227 |
| 30-34 | 270 | 170 | 195 | 272 | 207 | 223 | 265 | 254 |
| 35-39 | 250 | 253 | 186 | 207 | 183 | 221 | 234 | 271 |
| 40-44 | 204 | 227 | 241 | 184 | 143 | 185 | 217 | 228 |
| 45-49 | 140 | 193 | 221 | 234 | 99 | 145 | 183 | 213 |
| 50-54 | 107 | 129 | 178 | 203 | 91 | 99 | 140 | 175 |
| 55-59 | 69 | 93 | 113 | 156 | 66 | 88 | 95 | 133 |
| 60-64 | 50 | 59 | 80 | 97 | 55 | 58 | 77 | 84 |
| ⩾65 | 81 | 96 | 114 | 143 | 133 | 139 | 145 | 165 |
| Total | 2,515 | 2,759 | 3,110 | 3,430 | 2,185 | 2,611 | 2,964 | 3,298 |

Table 8.11 The projected Pakistani population of Leeds C.B.

| Age Group | Males | | | | Females | | | |
|---|---|---|---|---|---|---|---|---|
| | 1971 | 1976 | 1981 | 1986 | 1971 | 1976 | 1981 | 1986 |
| **High fertility estimate** | | | | | | | | |
| 0-4 | 236 | 417 | 499 | 505 | 246 | 404 | 482 | 488 |
| 5-9 | 92 | 261 | 403 | 474 | 55 | 268 | 389 | 456 |
| 10-14 | 188 | 96 | 236 | 358 | 65 | 52 | 234 | 339 |
| 15-19 | 291 | 239 | 150 | 270 | 59 | 96 | 71 | 222 |
| 20-24 | 173 | 324 | 272 | 202 | 99 | 117 | 118 | 102 |
| 25-29 | 158 | 179 | 283 | 245 | 67 | 133 | 121 | 104 |
| 30-34 | 241 | 189 | 196 | 271 | 91 | 101 | 135 | 126 |
| 35-39 | 224 | 248 | 199 | 205 | 86 | 111 | 109 | 138 |
| 40-44 | 183 | 218 | 235 | 194 | 47 | 95 | 110 | 109 |
| 45-49 | 125 | 183 | 212 | 228 | 18 | 53 | 94 | 90 |
| 50-54 | 75 | 117 | 169 | 195 | 7 | 23 | 53 | 51 |
| 55-59 | 36 | 67 | 103 | 148 | 5 | 11 | 24 | 21 |
| 60-64 | 25 | 32 | 58 | 89 | 3 | 4 | 6 | 11 |
| ⩾65 | 30 | 41 | 54 | 83 | 9 | 9 | 9 | |
| Total | 2,077 | 2,611 | 3,069 | 3,467 | 857 | 1,477 | 1,955 | 2,365 |

Continued overleaf.....

Table 8.11 Continued

| Age Group | Males 1971 | 1976 | 1981 | 1986 | Females 1971 | 1976 | 1981 | 1986 |
|---|---|---|---|---|---|---|---|---|
| Low fertility estimate | | | | | | | | |
| 0-4 | 236 | 167 | 187 | 173 | 246 | 161 | 178 | 166 |
| 5-9 | 92 | 261 | 239 | 205 | 55 | 268 | 180 | 195 |
| 10-14 | 188 | 96 | 236 | 217 | 65 | 52 | 234 | 158 |
| 15-19 | 291 | 239 | 150 | 270 | 59 | 96 | 71 | 222 |
| 20-24 | 173 | 324 | 272 | 202 | 99 | 117 | 118 | 102 |
| 25-29 | 158 | 179 | 283 | 245 | 67 | 133 | 121 | 104 |
| 30-34 | 241 | 189 | 196 | 271 | 91 | 101 | 135 | 126 |
| 35-39 | 224 | 248 | 199 | 205 | 86 | 111 | 109 | 138 |
| 40-44 | 183 | 218 | 235 | 194 | 47 | 95 | 110 | 109 |
| 45-49 | 125 | 183 | 212 | 228 | 18 | 53 | 94 | 108 |
| 50-54 | 75 | 117 | 169 | 195 | 7 | 23 | 53 | 90 |
| 55-59 | 36 | 67 | 103 | 148 | 5 | 11 | 24 | 51 |
| 60-64 | 25 | 32 | 58 | 89 | 3 | 4 | 6 | 21 |
| ≥ 65 | 30 | 41 | 54 | 83 | 9 | 9 | 9 | 11 |
| Total | 2,077 | 2,361 | 2,593 | 2,725 | 857 | 1,234 | 1,442 | 1,601 |

Table 8.12 The projected Caribbean population of Leeds C.B.

| Age Group | Males | | | | Females | | | |
|---|---|---|---|---|---|---|---|---|
| | 1971 | 1976 | 1981 | 1986 | 1971 | 1976 | 1981 | 1986 |
| High Fertility Estimate | | | | | | | | |
| 0-4 | 424 | 465 | 463 | 469 | 412 | 448 | 447 | 453 |
| 5-9 | 324 | 380 | 415 | 414 | 314 | 370 | 401 | 400 |
| 10-14 | 210 | 285 | 333 | 364 | 247 | 272 | 320 | 347 |
| 15-19 | 221 | 263 | 325 | 365 | 257 | 257 | 273 | 313 |
| 20-24 | 139 | 277 | 303 | 350 | 173 | 274 | 265 | 267 |
| 25-29 | 219 | 159 | 256 | 276 | 267 | 192 | 263 | 256 |
| 30-34 | 373 | 239 | 191 | 262 | 351 | 265 | 203 | 256 |
| 35-39 | 422 | 363 | 247 | 207 | 334 | 343 | 264 | 211 |
| 40-44 | 321 | 386 | 335 | 238 | 220 | 313 | 317 | 250 |
| 45-49 | 198 | 309 | 367 | 321 | 131 | 214 | 298 | 303 |
| 50-54 | 146 | 183 | 282 | 334 | 75 | 128 | 203 | 279 |
| 55-59 | 83 | 128 | 160 | 245 | 63 | 74 | 121 | 188 |
| 60-64 | 37 | 73 | 110 | 137 | 20 | 55 | 64 | 106 |
| ≥65 | 30 | 50 | 92 | 150 | 24 | 34 | 70 | 103 |
| Total | 3,147 | 3,560 | 3,878 | 4,132 | 2,888 | 3,239 | 3,509 | 3,741 |

Continued overleaf.....

Table 8.12 Continued...

| Age Group | Males 1971 | 1976 | 1981 | 1986 | Females 1971 | 1976 | 1981 | 1986 |
|---|---|---|---|---|---|---|---|---|
| Low Fertility Estimate | | | | | | | | |
| 0-4 | 424 | 386 | 293 | 300 | 412 | 372 | 283 | 290 |
| 5-9 | 324 | 380 | 348 | 268 | 314 | 370 | 335 | 259 |
| 10-14 | 210 | 285 | 333 | 305 | 247 | 272 | 320 | 291 |
| 15-19 | 221 | 263 | 325 | 365 | 257 | 257 | 273 | 313 |
| 20-24 | 139 | 277 | 303 | 350 | 173 | 274 | 265 | 267 |
| 25-29 | 219 | 159 | 256 | 276 | 267 | 192 | 263 | 256 |
| 30-34 | 373 | 239 | 191 | 262 | 351 | 265 | 203 | 256 |
| 35-39 | 422 | 363 | 247 | 207 | 334 | 343 | 264 | 211 |
| 40-44 | 321 | 386 | 335 | 238 | 220 | 313 | 317 | 250 |
| 45-49 | 198 | 309 | 367 | 321 | 131 | 214 | 298 | 303 |
| 50-54 | 146 | 183 | 282 | 334 | 75 | 128 | 203 | 279 |
| 55-59 | 83 | 128 | 160 | 245 | 63 | 74 | 121 | 188 |
| 60-64 | 37 | 73 | 110 | 137 | 20 | 55 | 64 | 106 |
| ⩾ 65 | 30 | 50 | 92 | 150 | 24 | 34 | 70 | 103 |
| Total | 3,147 | 3,481 | 3,641 | 3,758 | 2,888 | 3,163 | 3,279 | 3,381 |

# CHAPTER 9

## The modelling of the location behaviour of immigrant groups.

### 9.1 Introduction

In chapter 3 we attempted to demonstrate the amount of association, spatially, between the individual immigrant groups and certain indicators of social deprivation. Implicit in this chapter was the suggestion that the immigrants, because of certain social and economic characteristics, would be drawn residentially towards these areas of Leeds which were, often still are, characterised by multiple deprivation. It was shown in the chapter that this spatial association has increased for certain indicators over the ten year period between 1961 and 1971.

In this chapter we attempt to be more explicit in this measurement. Using the tendency of immigrants to occupy certain tenure types of housing we attempt to measure the extent to which this tendency could have resulted in the distributions which we have observed in chapter 4. Reference to chapter 3 will show that the choice of tenure type, as an influential variable in what is, in effect, a very complex modelling situation, is by no means the only one which could have been made. Other authors have used the same variable in analytical studies in the past and have been less than completely satisfied with the results, and this in the United States where one might expect that access of coloured people to certain types of housing, and certain residential zones is much more tightly restricted either institutionally or as a result of personal

discrimination. Nevertheless it is hoped that the analysis presented in this chapter may add, if only in small part, to the understanding of the motivations of people and the dynamics of the urban system as they affect the coloured occupants of one British city. In this sense the chapter will probably pose more questions than it will answer. If the author could continue this work in any direction this is an aspect which it is felt could be most lucratively pursued.

The models presented in this chapter are fairly simple for reasons which derive from the limitation of time in the preparation of a thesis and from the fact that the data generation processes which are required prior to model building have, in this work, been orientated towards the demographic study of immigrants not their spatial development. Nevertheless, despite their simplicity the models derived here do relate to the more sophisticated modelling processes demonstrated by Rose, (1969a, 1969b, 1970, 1972), Morrill, (1965) and Woods, (1975). These models and their place in the development of geography and race studies have been discussed in chapter 2, and in this chapter reference need only be made to the ways in which their methodologies relate to the present work.

Richard Morrill, postulated that the spread of the ghetto areas of Seattle took place from a core area with the negro as active agent facing a difficulty of movement based on a distance function. The source of the spread was the increased population in core areas through fertility and in-migration. Allocation of the immigrating population was based on the pre-existing distribution with the addition of certain random elements. Re-allocation and spread of population

was made on the basis of distance and the number of times a particular zone had been "contacted" by a negro mover.

In contrast, Rose made more explicit attempts to model the negro population increases using fertility and death sub-models and saw the process of expansion of the ghetto as a process not of negro advance but of white retreat leaving spaces into which negroes could move. To attempt to define the demand aspect more fully Rose used family formation rates of negro households. This latter approach clearly required much larger data inputs than Morrill's model. It is an approach which would be most difficult to replicate in Britain because of data deficiencies. Woods' models, and those used later in this chapter although less sophisticated, lie closer to Morrill's framework than to Rose's. Certainly all three approaches rely quite heavily on the locative influence of the pre-existing population distribution. The concept of a "mover pool" of persons or households likely to migrate within the city is also present in all three constructs. Both Morrill and Woods however introduce random assignment mechanisms into their models which influence, to varying degrees, the affects of the distance constraints on movement. In this chapter the effects of controlling movement and growth of populations in zones through property tenure characteristics of the New Commonwealth group is examined and no specific use of a distance function is incorporated.

## 9.2 The models

Three types of "residential allocation" model are presented in this chapter. In the first the tenure effect on location patterns is explicitly ignored in favour of a simple

allocation system based on the previous existence in zones of certain numbers of coloured people. In this model the proportions of the total New Commonwealth population of Leeds in each zone at the beginning of each census period, that is 1961 and 1966, are used to disaggregate the end of period population totals. The model therefore may be stated as:

$$K_e^i(t+T) = \left(K_e^i(t) / K_e^*(t)\right)_* K_e^*(t) \quad \ldots.(9.1)$$

where, $K_e^i(t+T)$ is the population by zone (i) and ethnic group (e) at the end of the period

$K_e^i(t)$ is the population by zone (i) and ethnic group (e) at the beginning of the period

$K_e^*(t)$ is the aggregate population by ethnic group (e) at the beginning of the period

$K_e^*(t+T)$ is the aggregate population by ethnic group at the end of the period.

In effect, this model assumes that the distribution of the coloured population as perceived by the immigrant population is the prime motivating factor in their residence choice and that no other factors intervene to alter this choice. The more coloured persons who exist in a zone, then the more will immigrants be attracted to that zone.

The second model recognises first that tenure type of housing and its relative availability may be an important influence on the location decisions of the immigrant population. Second, the model attempts to redefine the population who are, so to speak, to be located. A "mover pool" is created which is the number of people who are to be allocated to residential zones. It is made up of all new immigrants to Leeds C.B. in each period for which the

model is tested, that is 1961 to 1966 and 1966 to 1971, and a number of existing residents from each zone who are, in effect, "freed" to locate elsewhere. These people are estimated fairly crudely by using the 5 year migration rate for each zone. This is defined for the total population of each zone and is calculated by dividing the total numbers of persons who had moved into each zone (and since this is available in the census it is "migration and survival") by the total population at the beginning of each period in the zone. As a result of these calculations a number of people are available to be assigned to zones in consideration of the tenure structure of each zone. This latter estimation is brought about by calculation of the probable numbers of "housing places" becoming available in each tenure type in each zone and then the assignment of the persons in the mover pool to each tenure type in each zone according to the distribution of the New Commonwealth population across the tenure types for the city as a whole.

The concept of "housing places" is one which has arisen as a means of skirting the problem of the conversion of population into households. A housing place may be defined, therefore, as a place of residence in a house for a single person. In a way, therefore, this is a way of solving another problem which this type of analysis throws up, that is, the different occupancy rates of different types of housing tenures. It might be expected that the occupancy rate of privately rented housing would be higher than for owner occupied housing. Persons in private rented furnished accommodation might be expected, on the whole, to be living at higher density than persons in unfurnished accommodation.

One problem which this concept does not help to solve is that of changing densities of occupation, particularly in inner city areas. However, there are so many issues and variables which are not addressed or included in this model that no excuse is made for disregarding this aspect. Nevertheless, should it ever be possible to extend this modelling work then this is an aspect which would have to be built in. The model may, therefore, be specified as follows,

$$Me^{L}(t,t+T) = \sum_{i=1}^{n} (K_e^i(t).\ m_*^i(t,t+T)) + \sum_{j\neq 1} K_e^L(t,t+T) \qquad .....(9.2)$$

$$M_{ev}^{L}(t,t+T) = M_e^L.(p(v/e)) \qquad .....(9.3)$$

$$M_{ev}^{L}.\ (p(i/v)) = K_{ev}^{i}(t,t+T) \qquad .....(9.4)$$

$$K_e^i(t+T) = K_{ev}^i(t+T) + K_e^{ii}(t,t+T) \qquad .....(9.5)$$

The variables may be defined as follows:

| | |
|---|---|
| $M_e^L(t,t+T)$ | is the mover pool into all zones of Leeds C.B. of ethnic group e in time period $(t,t+T)$. |
| $K_e^i(t)$ | is the total population of Leeds C.B. at time $(t)$, of ethnic group e; i runs from 1 to n & constitute L or Leeds |
| $m_*^i(t,t+T)$ | is the rate at which people move into any zone i from all origins, of all ethnic groups, in time period $(t,t+T)$. |
| $K_e^{jL}(t,t+T)$ | is the total in-migrant population, to Leeds C.B. from anywhere, of ethnic group e. |
| $K_{ev}^i(t+T)$ | is the estimate of the numbers of persons of ethnic group e, in tenure type V, in zone i at time $(t+T)$. |
| $p(i/v)$ | is the probability of a housing place of tenure type (v) being available in zone i. |
| $K_e^i(t+T)$ | is the estimated number of people of ethnic group e living in zone i at time $(t+T)$. |
| $K_e^{ii}(t,t+T)$ | is the number of people of ethnic group e, staying in zone i over the period $(t,t+T)$. |

The third model attempts to extend the hypotheses developed in the second model. As before a "mover pool" of people is estimated from the numbers of in-migrants and survivors in the period under consideration and from the population resident in each zone at the beginning of the period. The estimates derived for the second model of "housing places" by tenure type becoming available in each zone are also used. For example in zone 1 (Far Headingley) between 1961 and 1966, 9,410 person housing places are estimated to become available for re-occupance. These 9,410 places are disaggregated by tenure type, using the proportions of housing in each tenure type in that zone, to give 5,309 places in owner occupied housing, 3,286 places in council owned housing, 392 places in private rented housing and 423 places in "other" tenure types.

The New Commonwealth "mover pool" is distributed across and within zones by using the proportion of each tenure type in each zone which is in New Commonwealth occupancy. For example, in Far Headingley in 1961 0.8% of the owner occupied housing was in New Commonwealth hands. It is estimated that, in the next five years 5,309 owner occupied housing places became available. It is, therefore, assumed that 0.8% of these housing places are occupied by New Commonwealth persons.

Clearly, if this procedure is performed for every tenure type and every zone and summed we will arrive at an estimate of New Commonwealth settlers which is in no way related to the actual total in the mover pool. A balancing factor is, therefore, required which is group, rather than zone, specific and which modifies each estimate in turn so that, in the end, the estimated inflow will equal the known

inflow of migrants.

The model may therefore be specified as:

$$Me^{L}(t,t+T) = \sum_{i=1}^{N} (K_e^i(t) \cdot m_*^i(t,t+T) + \sum_{j \neq L} K_e^{jL}(t,t+T) \quad \ldots.(9.6)$$

$$H_V^i(t,t+T) = M_*^i(p(V/i)) \quad \ldots.(9.7)$$

$$H_{ev}^i(t,t+T) = H_v^i(t,t+T).(K_{ev}^i(t)/K_{e_*}^i(t)) \quad \ldots.(9.8)$$

$$H_{ev}^i(t,t+T) = H_{ev}^i(t,t+T) \cdot A_e^* \quad \ldots.(9.9)$$

where

$$A_e^* = M_e^L(t,t+T)/\sum\sum_{iv} H_{ev}^i(t,t+T) \quad \ldots(9.10)$$

$H_v^i(t,t+T)$ is the numbers of housing places becoming available in zone i, of tenure group (v)

$M_*^i(t,t+T)$ is the total number of persons of all ethnic groups moving into zone i in the period $(t,t+T)$

$p(v/i)$ is the probability of a person being in tenure type V in zone i

$H_{ev}^i(t,t+T)$ is the 1st estimate of the numbers of persons of ethnic group e occupying housing places of tenure type v in zone i in the period $(t,t+T)$

$K_{ev}^i(t)$ is the number of persons of ethnic group e, occupying tenure type v housing places in zone i at time (t).

$K_{e*}^i(t)$ is the number of persons of ethnic group e, occupying all tenure types in zone i at time (t).

$H_{ev}^i(t,t+T)$ is the 2nd estimate of the numbers of persons of ethnic group e, occupying housing places of tenure type (t) in zone i in the period $(t,t+T)$.

$A_e^*$ is a balancing factor specific to ethnic group e for all zones.

Throughout these allocation models a number of assumptions have been made. It is felt that at this stage in the development of these models a clear statement of these assumptions is necessary. The laying out of these assumptions clearly so that they may be questioned is as

important as the clear specification of the models themselves and their results. In the next section, therefore, the assumptions are stated. In section 9.4 the results of each model are stated for the periods 1961 to 1966 and 1966 to 1971. The results in each case are tested against reality in the shape of the 1966 and 1971 zonal distributions using correlation techniques.

## 9.3 The assumptions

The assumptions of the first model are easily stated. All the multiplicity of forces which impinge on the location decisions of the immigrants are explicitly ignored and it is assumed that the proportional distribution over the 34 analysis zones remains constant over time. The distribution of population in 1961 is replicated in the distribution of the population in 1966 and 1971 but with larger basic population figures. In effect, therefore, the model assumes that the proportion or percentage of the total New Commonwealth population at the beginning of each period in each zone, attracts a like proportion or percentage of the incoming population, so that the proportion in each zone remains the same over time. The model, therefore, implicitly assumes that the population in each zone at the beginning of the period remains in each zone throughout the period.

In a very limited sense then this model or hypothesis attempts to define and measure the possible effect, on the location decisions of the new immigrants, of the existence in certain zones of large numbers of fellow migrants.

The basic assumptions surrounding the second and third

allocation models are a little more complicated, and come at several stages in the model building. One of the prime assumptions is that the proportion of housing in each zone and in each tenure type remains constant across the time period under consideration. This does not, however, apply to the stock of housing, or more correctly "housing places" since the total of these, for all tenures, is calculated from figures supplied for the end of the period and therefore is based on historical fact. The models further assume that the resident New Commonwealth population move at the same rate as the total population of the city. This assumption may be challenged in the knowledge that is obtained in chapter 3 which shows that the indigenous population of Leeds is "suburbanising" at a higher rate than the New Commonwealth population. Hence the "mobility" rates for the whole population of the outer zones of the city may be rather too high to accurately describe the situation of the New Commonwealth population.

The above assumptions are common to both the second and third models since they involve the generation of a "mover pool" of people to be located. The initial assumptions regarding the definition of housing places by tenure are also common to both models, and involve the simple allocation of the housing places to their tenure categories in proportion to the numbers of persons living in each tenure category in each particular zone. Clearly, however, this assumption may be called into question in several ways, the most obvious being that there will be greater stability of population in certain tenure types than in others. In Leeds, for example, there is relatively little unfurnished private rented accommodation available at any one time,

not because there is a lack of this type of accommodation in the city as a whole, but because there is very little turnover of the people living in this tenure type. Further, the zones in the inner city areas of Leeds are predominantly those in which the students attending the University reside. Consequently we might expect that not only the "mobility rates" of these zones would be higher than for zones further away from the city centre but also that the rate at which furnished rented accommodation is released onto the market would be much greater for example than for owner occupied housing in these areas. This is particularly so as one tends to find older people in owner occupied housing living alongside young and coloured people in furnished flats.

The second model differs from the third, in terms of the assumptions behind it, in the way the New Commonwealth "mover pool" is allocated to residence zones. In the second model the distributive element is rather similar to that of the first model in that the proportion of immigrants in each zone is used. In the second model, however, we have disaggregated the proportions in zones into tenure types and use the distribution of the immigrants in each tenure type over the city as the locative element.

This assumption simply attempts to add tenure type as a second influence on location in a very crude way. Nevertheless it has the benefit of deriving from the tenure situation at the end of the period in question and therefore implicitly takes into account the changing situation over the period in a way that a projection built on a "beginning of the period" tenure situation would not.

In the third model the allocation method differs from the

basic method used in models one and two. In this model a "mover pool" is generated as before. But instead of using previously generated totals of migrants into tenure types the assumption is made that the same proportion of the housing stock which is released onto the market in the period is occupied by the "mover pool" as is owned or rented at the beginning of the period by the same population. Thus instead of a "vertical" allocation over zones, a "horizontal" allocation is made within each zone in a way which crudely measures the level of access to housing tenure types of the immigrant group. Because the allocation procedure is unrelated to the previously measured totals of New Commonwealth people in tenure types, a balancing factor is used at the end of the model to assure the correct totals are derived.

## 9.4 The results

The test of the assumptions spelled out above is the ability of each of these models to predict the location patterns of the New Commonwealth immigrant groups in Leeds. This does not mean that, if the hypothetical distribution does actually closely approximate reality then the influence of the assumptions has been proved. This would be rather like saying that Stonehenge could be built with modern earth-moving machinery, therefore, pre-historic man must have had earth-moving modern machinery. What it does mean is that we have achieved a means, mathematically, of replicating a very complex situation, of simplifying into handleable terms a multi-variate system and achieving a certain amount of predictive ability. Rather than present the distributions, once again, of immigrants over zones,

Table 9.1 shows the correlation coefficients and the squared correlation coefficients for each of the predicted distributions against the actual distributions for 1966 and 1971. The third model was operable only for the period 1966 to 1971 because of the more complex information inputs to the calculations.

It is apparent from Table 9.1 that the model which best replicates the situation for both census dates is the simple procedure by which immigrants are allocated to zones according to the proportion of the total number of immigrants living in each zone at the beginning of the allocation period. The fact that both the first and second models replicate the situation less accurately for the second period 1966 to 1971 and that the third model scores poorest of all in this respect would seem in the circumstances to indicate only one thing and that is that the location decisions leading to the spatial distributions displayed in 1971 were of a more complicate nature than those which lead to the spatial distribution in 1966. Complicated is probably the wrong word in this sense. What we have measured or, in effect, what we have failed to measure with the models for the 1966 to 1971 period are the more complex motivations deriving from family completion in this country, rising expectations in employment and income terms, less dependence on inner city housing and facilities and, the corollary, access to wider housing markets.

What is also clear is that there will be no simple answer to the question of building a predictive model of immigrant group location behaviour in British cities. But what we would like to ask at this stage is not whether such

Table 9.1 Correlation values for each model for the periods 1961 to 1966 and 1966 to 1971.

| Period | Model 1 Simple Allocation | | Model 2 Allocation across zones | | Model 3 Allocation within zones | |
|---|---|---|---|---|---|---|
| | r | $r^2$ | r | $r^2$ | r | $r^2$ |
| 1961 to 1966 | 0.9685 | 0.9380 | 0.9575 | 0.9168 | - | - |
| 1966 to 1971 | 0.8509 | 0.7240 | 0.7872 | 0.6197 | 0.7443 | 0.5540 |

model building is feasible but whether is is purposeful. To extend this argument, encompasses much more than the present chapter and hence we turn to a consideration of some of the ethical and social policy issues which arise out of the whole thesis.

# CHAPTER 10

## Policy implications

### 10.1 Two trends

Two types of conclusion seem to be relevant at this stage of this thesis. The first relates, as any research in any aspect of social policy or social science must at this time, to aspects of policy implications, suggestions as to the direction which policy must take to begin to solve some of the pressing urban problems which confront us. While the problem field of this piece of work is fairly limited in view of the immense problems of inner city areas in general it does go some way towards showing how information may be used for urban management by the development of strong conceptional frameworks within which information can be given strength for the making of planning decisions.

More will be said of this later since, prior to this it is wished to show how results of the thesis, of a more personal nature, eventually impinge on this framework as well. Thus the second trend of results of this thesis concerns the development of a train of thought over the period of the practical research involved in the analysis of the spatial distribution of immigrants in Leeds and their demographic characteristics.

Cullingworth (1970) recognised this duality of research results and quotes Price (1954) in support of his hypothesis:

> "At some point in the process of studying and deciding on any social problem the boundaries of expert know-ledge end, and the realm of responsible judgement

> begins. But all too often the scientist fails to recognise that he has gone beyond the boundaries of what can be proved by research and is speaking 'ex cathedra' on matters on which his own judgement is just as personal, and perhaps nearly as prejudiced as any layman's."

If social scientists are forced, as this statement suggests, into making personal statements on, obviously, problems of a social nature then this suggests certain situations exist. On the one hand this suggests that the modelling and analysis of present social scientists is not answering the questions, even some of a very basic nature, of the policy makers. It is forcing the social scientist into areas which he is not qualified to enter, as Cullingworth again states (1970) quoting Silvert (1967) this is a "denial of the statesman's art and a burdening of the social scientist with what he is incompetent to handle."

On the other hand it might be argued that social scientists have not been directing their attention to the most relevant problems and hence have essentially been breaking their contract with governments and other institutions dealing, on the ground, with the manifestations of social deprivation. Not that this situation is the responsibility of the social scientist alone. It is also a question of urban managers being advised enough to ask the right questions of researchers, what questions can and cannot be solved in a research context. These questions raise the final most important point in this context and that concerns the definition of problems in an urban (geographical/ planning) context. This issue has been raised by Wilson (1972) who suggests that some idea of the <u>importance</u> of problems must be defined. Answers are required to

questions concerning which are the most important questions which require answering in the urban situation. In a geographical context Wilson suggests that we might achieve this concept of importance if we succeed in relating geographical problems to planning problems. In geography and race relations it is suggested that this idea of importance of problems is one which has proved most difficult to achieve and which has, unrecognised, effectively nullified much work in the disciplines in this country, unlike the U.S. where the issues are so much clearer.

It is therefore felt that a new conceptional framework requires development and that in beginning to suggest it here, we first have to question some of the underlying motives behind this thesis. Nevertheless, in doing this, it is felt that a stronger framework can be developed which can not only give a stronger meaning to this work but may also contribute in a small way towards movements towards effective urban management.

## 10.2 Redefining racial problems

The environment we live in is perceived by ourselves in a variety of ways and this perception may alter given certain physical differences, for example, area of residence in the city, and certain socio-psychological differences, for example by social class and occupational training. It has long been a fact of planning life that middle class planners attempt to fashion cities for working class people, that cities are designed to be middle class institutions! The problems of cities therefore and the solutions which are attempted are circumscribed by the class attitudes, amongst others, of the policy makers. How much more severe

then, and possibly erroneous are the attempts to plan or regulate coloured occupancy of British cities, for these people are different not only by class, in the main, but by cultural background as well. It is, therefore, the contention here that there are two types of problems at least concerning this spatial distribution of immigrants in cities. The first type of problem in this admittedly crude typology is the "perceived" problem. This may be defined as the problems of coloured immigrants as they are <u>perceived</u> by academics, planners and decision makers who are of different cultural and class backgrounds to those people which the problems affect. The second type of problem may be defined as 'real' problems of coloured immigrant occupation of British cities, problems of an interpersonal nature based on the incidence of personal and institutional discrimination against such persons.

It is small wonder that, given this definition of problems, race relations research in geography has become bogged down in what are seen as irrelevant issues, such as the long-standing dispersal versus concentration debate. We have not adequately developed ideas concerning the spatial aspects of the access of immigrants to adequate housing, employment and education within the framework of realising that the different groups may have different motivations in making their choices but ultimately deserve to have those choices in the first place.

The second type of problems arise in practise out of the first but differ in a very significant way. However much social science may influence the way in which institutions, in the widest sense of the word, act to cut down the choices of immigrant (or poor) people in cities these problems are

essentially rooted in ignorance and fear and are personal and private to individual persons. This does not mean that society should condone the freedom of the individual to discriminate since the welfare of all the people should be our concern. However much a government may legislate against these problems they will not be solved, indeed, if the argument is followed to its logical conclusion, will even be inflamed by such things as positive discrimination in favour of coloured groups, "guided mobility" (Gans, 1969), or legislation for the bussing of school children to attempt to obtain some semblance of racial balance in schools. The answers to problems of this description will be found in patience and tolerance and at the end of it all in education where research and practice are making large strides in improving the outlook of young persons to their classmates. The incidence of this latter type of problem concerning coloured groups has not yet, it is suggested, reached its height.

The reason for the final statement of the above paragraph probably lies in the area of social science which lies beyond pure research and which was alluded to earlier (Cullingworth, 1970). The original reasons which "pulled" immigrants from the New Commonwealth to the United Kingdom in the late 1950's and early 1960's lay in the requirements of an economy which was expanding rapidly and to which an adequate supply of labour was a vital requisite. (Rose, 1969). It is well known that the immigrants accepted lower paid, less skilled employment, on average, than white persons of equivalent qualification. As a result even without discrimination against them the immigrants would have found the degree of choice which they could exercise limited. But the vital point is that this pattern of

migration has brought the coloured immigrants into competition only with some sectors of society, the working class, other immigrants, the elderly and other people who characterise inner city areas. It has not brought coloured immigrants into competition with any group which has any semblance of political power, the middle and upper classes who might be expected to form much more serious opposition to coloured people obtaining economic equality. This may be particularly prevalent in the present economic climate when, for perhaps the first time, white collar workers are facing the traditionally working class experience of unemployment and job insecurity.

How does geographical research fit into this typology. The basis, it is believed, lies in the ability to exercise choice which was alluded to above. Geographical research must seek to increase the amounts of choice which people in deprived areas can exercise. It need no longer concern itself with the <u>fact</u> of deprivation for in this sense, as Harvey (1973) notes, enough information is probably already available in one way or another. What the research must be concerned with are the links between the elements which have been measured. In other words it is not the fact of high density housing, that this form of residential accommodation exists in 1975, but that there are forces still existing which not only can force people into this type of accommodation <u>and</u> also can effectively form ghettoes in that for some people escape is impossible. The social indicators movement, ably described for example by Knox (1975) should not be taken too seriously in geographical research. The concept has existed for a long time in geography but should now be interpreted in terms of

monitoring change brought about by certain policies not simply measuring the breadth and depth of a certain deprivation. If this requires, ultimately, explicit statements concerning these forces such as that contained in Harvey (1973) then so much the better. If it also requires political commitment on the part of geographical (and other) researchers then also this is not something which should form too great a hurdle. For if there is to be any progress made in urban rehabilitation it will not come from a continuation of the cosmetic planning of the sixties but from the presentation of policies which have been worked through, however radical, which have been shown to be a valid alternative to the policies or non-policies, as the case may be, of the present time. We are forced to the conclusion that researchers and planners must work together to seek power. This would not be power in a totalitarian sense but at several levels. In the first place an analytic power, rapidly developing, to define societies requirements, the power to be politically committed, and finally the power to put these new policies into action, to carry them through in the face of opposition from an establishment which will not let go the reins of its own power easily.

Where does this begin? It begins in the realisation that urban systems are managed very poorly at the present time. Decisions are taken by elected representatives who are ill-informed at best and often ignorant at worst. Their decisions are taken on the basis of little or no information and worse, on the basis of little in the way of choices between valid policy alternatives. It is the researchers job, in the end, to present this information and eventually to present evaluations of alternatives to achieve given goals in social welfare. But as a researcher, I argue that we do

not know what information to interpret or present and do not receive, in the main, sufficient stimulus to begin to consider the presentation of policies and their ramifications. Urban management is at a very crude stage as yet and until the people who take decisions can effectively state their requirements, can actually say that <u>this</u> information is of use and <u>that</u> information is not of use then researchers might as well retreat to the infamous ivory towers of the university. But it is not all the decision makers' fault. We can experiment and in the end must develop a dialogue with policy makers to arrive at definitive ideas on what constitutes management information on which valid decisions can be made. What requirements exist for decision making, what information is required, how can it be used effectively, what requirements exist for monitoring of the way the system is working? Ultimately this will open up new research possibilities in terms of longitudinal studies, and studies in depth of particular issues. I believe it is essential that research of a sociological or geographical nature concerned with urban management is given this conceptional framework to which it can relate.

Within this framework, the author finds it difficult to justify the study of racial problems in a geographical manner unless there is a major orientation within individual projects to examine the wider implications, for society as a whole, of the restrictions placed upon coloured people. Unlike Leach (1973) who feels it impossible to consider the "use" of coloured groups in this way it is felt that any "device" which can be used to highlight the ways that society has devised to discriminate against certain <u>social groups</u> should be capitalised upon. But it is a matter of social justice, not of colour consciousness, that the

coloured immigrant groups do not receive the large amounts of positive discrimination, which some suggest are required to redress the imbalance apparent since the mid 1950's, in any fuller measure than should the poorer groups in society generally receive this discrimination.

It is a fact that coloured immigrants have been dealt with poorly by institutional discrimination in housing, in education and employment since attracted by the "economic opportunity"of the 1950's and early 1960's. But it is also true that they and other groups as well have not received effective compensation for their work over long periods. The poor, the elderly, the unemployed, the single parent family, the drifters and the down and outs are all inhabitants, in general, of inner city areas and all, as such, have at least as effective a claim upon society as the coloured immigrant. No situation arises in isolation and as such it must be re-emphasised that, in a geographical or planning context, the wider urban situation must be considered also. Otherwise we could talk of offering assistance to a coloured family while ignoring the white families living either side. Such a situation could only fuel anger and resentment against the coloured population of this country and would in the long run do nothing to assist in the rehabilitation of inner city areas which must be one of the main objectives of any urban social policy.

## 10.3 Some conclusions from the thesis

Because of the considerations above which, as was stated, do not arise out of the numerical, analytical work of the thesis, it is possible to question some of the implications which may be drawn from this work. To do this does not,

in any real sense, compromise the standpoint of the author since he makes no apology for a modification of ideas over 3 years of time. It is also possible to justify conclusions concerning the specific facts of coloured occupancy of British cities within the framework outlined above if these conclusions in any way add weight to this framework. Doubt is cast on two specific areas of concern in this context by the preceding analysis. The first area is that of future population growth of coloured groups. The second is in the spatial distribution of immigrants in cities, in particular in the reasoning behind dispersal policies of all kinds.

## 10.3.1 Population growth

The population analysis of Chapter 8 indicated that the fast growth of the sixties in the numbers of young adult immigrants arriving in Britain (and Leeds) was faltering in the early seventies. But the analysis also indicated that while this growth rate was slowing down, it was being replaced by high levels of fertility as the main element of population increase for this group of people.

Concern for population numbers, therefore, does not arise out of the total coloured population in Britain or Leeds but of selected elements within that population. Sufficient evidence has been presented to show that it is unlikely that the proportion of coloured "immigrants" in Leeds will ever rise above about 6% of the total population of the city, and perhaps a little less for the country as a whole. So we do not face an American situation, for example, where the potential for a majority coloured population in many cities is, even now, being realised.

Our problems are parochial by comparison and must lead to different solutions.

One concern to arise out of the population analysis is linked to the question not only of "how many" but "where" and is a problem which will be returned to later. At the present time we are concerned with the elements of the population construction and, although it may sound facile, each overall element of the population structure has its own problems, the young, the young adult and middle aged and the elderly. Most of the problems associated with these groups are areas outside the remit of geographical research but nevertheless are alluded to as possible areas for future non-geographical research since we by no means reject the existence of peculiarly racial problems in these contexts. "Racial" is probably the wrong word for problems of certain coloured groups in non-geographical contexts because of its discriminatory overtones.

The problems facing the young adult and middle aged coloured person in employment and their possible future development have already been mentioned and require no re-statement.

Despite the claims of a notable educationalist the author maintains the view that has been expanded before in this conclusion; that the difficulties facing coloured children in schools are largely only those of low income families in general, poor, overcrowded housing, low pay and high rent and fuel costs. In addition, however it has been suggested that West Indian mothers may experience additional difficulties in the depression caused by separation from children who remain abroad and by the difficulty of finding suitable day-care facilities for their children should the mothers wish to go out to work.

Research by Hood et al (Hood, Oppe, Pless and Apte, 1970) shows that in many aspects of social condition West Indian families are at a disadvantage compared to the general population. In marital status West Indian parental relationships are found to be less stable (by definition), families are more likely to be of lower class, have more children, more likely to be housed in flats, have working mothers, have more frequent periods of illness and in general have a generally lower environmental quality. At the same time 94% of a sample of West Indian children was adjudged to be within normal ranges of education development or above.

The present popular remedy to low family income of the mother having to work appears further to disadvantage these children in a physical sense. The children are more likely, at pre-school ages, to be left with neighbours or unregistered childminders whose overcrowded housing situations would disqualify them from registration and, therefore, Local Authority support. It is by no means a proven case that attendance at pre-school facilities increases a child's possibilities of educational success in later schooling (Tizard1974) nevertheless the provision of supervised centres for young children is one of the simplest ways for a Local Authority to supply a small extra degree of "choice" even if that necessity arises out of a crippling lack of income on the part of the family itself. These remarks, of course, are extended to the lower classes in British society generally and are recognised in the Finer Report on One Parent Families (Finer, 1974).

In a practical planning situation what is required is a review of policy in day care facilities throughout the

country, the redefining of objectives to consider the financial situation in the country as a whole and a review of policies which could most effectively counter the financial situation for individual families. This must be linked to not only analysis in the social indicators field which may identify the areas of our cities which are experiencing multiple deprivation but also to research in Local Authority Departments which could attempt to more accurately specify the real need for whichever facility meets the requirements of individual situations.

The final area of concern arises out of the most visible piling up of people in the final age group of the model projections, the 65 years and over age group. Corporate care of elderly people is probably one of the deepest rooted of Local Authority tenets. Probably too much attention is given to them within the overall framework of services and client groups and only recently has the concept of care in and by the community become expressed with any reasonable conviction. The case of elderly coloured people is one which could most successfully be solved within this framework where the family care of the elderly is part of a cultural heritage. One does not, hopefully, foresee the need for homes for elderly coloured people only, as some suggest (Age Concern, 1974), although perhaps an Asian meals-on-wheels is an interesting concept!

Nevertheless there are going to be more elderly coloured people in this country and therefore there will be an increase in requirements for service provision of a specifically ethnic nature. Fortunately, since care of elderly people is such a deeply held tenet of society, these services will be supplied and specific training may even be

given to those who deal with the coloured elderly people. This is probably the most hopeful of the three areas of concern which we have been discussing if only because the decisions involved are strictly non-policical and may therefore be taken without political commitment on the part of the Assistant Directors, Directors and Councillors involved.

## 10.3.2 Population and space

In the introduction to this thesis it was suggested that the heyday of cosmetic planning of a physical nature was reflected also in the way in which social problems were to be dealt with. With the recognition of multiple deprivation we arrive at the realisation that in areas of our cities there existed families with multiple problems and who lived in inner city areas because of a variety of forces both economic and socio-cultural. We began to recognise also that the wholesale clearance of inner city areas not only did nothing to solve the problems but actually increased them through the effects of planning blight (Broadbent, 1975).

In Race Relations it was suggested in the introduction that this cosmetic physical planning was reflected in a concern to make coloured groups in cities as inconspicuous as possible and, having thus salved our consciences for a very clearly distinguishable social group we could pretend that they did not exist. The problems which they highlighted in inner city areas would be highlighted no longer if dispersal to the suburbs could be achieved. Despite the obvious American influence in this thinking a few writers did manage to transcend these limiting ideas as was explained in Chapter 2.

The subsequent virtual refusal to decentralise of some coloured groups with the means to do so and the increasing incidence of racially orientated violence in working class housing estates in suburban or semi-suburban areas has made a reconsideration of the motives of both planners and planned a necessity while at the same time forcing researchers to turn their attention not to the facts of deprivation but to the means whereby it is "achieved". In America it was suggested that decentralisation should be a major aim of policy and that this trend of thought was typified by Gans (1969) concept of "guided mobility". In 1970 Raymond Zelder felt it was fitting to proclaim that;

> "..the basic requirement, then, is for directed population movement."

and that government policies directed towards this end could be romantically described as a "Homesteading Act" of the 20th Century.

Thus the implication is, and this is suggested once more by Richard Morrill(1965), that by selected mobility policies a racial balance could be achieved at something like 75% to 90% of white occupancy to 25% to 10% coloured occupancy. The alternative was seen to be a knife-edge on the other side of which lay white flight, the self-fulfilling prophesy and yet another area lost to the ever expanding negro ghetto.

Thus, led on by our keenness to be "americanised" it was suggested that British Race Research lost its way in the American analogy, with a few notable exceptions where individual conceptial frameworks for their work were strong enough to resist the tempting pull from across the Atlantic. Not that the Americans were to blame for this, it was merely

a feature of the weakness of the tools which were being used in Britain to carry on the research.

It has already been demonstrated that fears over an ever expanding coloured population in Britain are groundless. It can also be demonstrated however that for fairly small areas in our cities a majority coloured population is a distinct probability. The analysis of Chapter 3 shows that while overall segregation levels are falling small areas of just a few enumeration districts are experiencing rising proportions of coloured people to the total population, a proportion which will be higher for the younger generation, given the generally larger family sizes of the coloured population. Should we, therefore, be seeking to break up these concentrations by dispersal policies and if so what is the size of the relocation problem and is there any guarantee that the problems which the families in these areas face will be countered by such a relocation?

In the first place there is the example of other groups of people who have taken their problems with them wherever they have been moved by well-meaning councils to find their original problems compounded by higher journey to work costs, higher rate charges and higher fuel costs in modern all-electric housing, the alienation and facelessness of many Local Authority housing schemes and the lack of many of the social networks of their old housing areas. Is there any reason to suppose that coloured groups will be any different and will not be even more alienated by being placed in positions where discrimination of a personal nature is much more likely (Daniel 1967)?

Let us consider first of all the size of the relocation problem. It was demonstrated in Chapter 4, Section 1.8 that the complete desegregation of the coloured population of Leeds C.B. could be achieved by the "guided relocation" of just over 7,000 people. This would mean an achievement of an index of segregation of zero when in fact scores of 15 may arise from purely random factors. Consequently the figure of 7,000 is an absolute maximum number of relocations and although this represents a large proportion of the coloured population it has its reciprocal in the white indigenous population of 448,000. Consequently it may be postulated that complete desegregation may be achieved if as little as 1.5% of the indigenous population can be persuaded to move residence. This figure may be put into perspective by the fact that as much as a third of the population of Leeds moves residence in any five year period, mostly in a suburban direction. Is this the major breakthrough in race relations which it at first appears to be?

Zelder points out (1970) that the segregation index is, in fact, a very biased index. Not only does it measure the difference in location of coloured faces and white faces but it measures other factors as well, such as income, wealth, character of the housing stock, place of employment and family composition.

> "To the extent that housing is displaced from a random distribution by "other factors", the index of segregation measures a compound of influences with the relative contributions of segregation and other influences to the overall segregation score unspecified." (Zelder 1970)

Is it to be assumed that the relocation of a handful of people (in the citywide context) will remove from the urban

scene, those deprivations which are not mobile in this way and is this not a measure of positive discrimination in favour of one section of a city's deprived populations which would do more harm than good to race relations.

There are a number of corollaries to a policy of vigorous forced dispersal of coloured people. Society, as we mentioned earlier, must learn to live with racially mixed populations, a matter which largely depends on education, shared experiences and familiarity. No amount of government legislation will smooth away the individual prejudices of a white, or a coloured, society but at the same time the present situation encourages the popular vision of coloured people as different in culture and behaviour and also the association between colour and deprivation. We are, therefore, trapped in the cleft stick of having to encourage movement away from inner city areas in order to break down those associations, and equally, face the problems which ensue from direct racial contact on suburban housing estates, a situation which has led to (literally) conflagration in Leeds fairly recently.

Further, there is the matter of community development to be considered. This area is very much more beset by political attitudes than the foregoing discussion. Typically inner city areas are characterised by ageing white populations and young coloured populations. The white populations are often long standing residents of the areas, who have seen successive Local Administrations and Departments turn a blind eye to the problems of increasing deterioration in all aspects of their environment which they face. On top of this, in their eyes at least, the coloured population are another aspect of this deterioration. But need this

in fact be the case. Is it possible that these immigrants can bring benefit to areas such as these. The demographic analysis of the previous chapters shows the increasingly middle aged nature of coloured populations. If amenity becomes something which matters more as populations age then might it not happen that the coloured populations of inner city areas may form the heart of community action groups? Do they still have sufficient vigour left to take action on behalf of their neighbourhoods and carry along with them the older, white populations who no longer, because of continuous neglect, have their own motivation? The areas have much to gain from the activities of immigrants just as Local Authorities have much to gain from the dispersal of people who are noticeably disadvantages and who are prepared to make a noise about it.

In the last paragraph of his book "People and Plans" Gans (1968) states:

> "Still, the future is not easily predicted. If the present college student demand for more equality and democracy in American Society spreads, and if enough students continue to voice this demand when they become bread-winners and parents, the pace of social change may speed up, and could even generate a more thorough transformation of the dominant economic and political institutions."

## 10.4 Conclusion (or "Whatever happened to the revolution" L. Cohen 1972)

So far we have discussed the main conclusions from the thesis concerning population numbers and structure and the distribution of these people within the city. We have concluded that the worries expressed about the growth of the "New Commonwealth" population in England and Wales, and

in Leeds itself, are unfounded. It is also felt that concern about the concentration of immigrants in certain city areas is not as important at the present time as a feature in itself, but is part of a wider social and economic spectrum of deprivation which will only be solved when society decides that certain social groups require large portions of positive discrimination in terms of all manner of resources. The aim of the positive discrimination should be, not to dictate ways of life to these social groups, but in the final analysis to give them the degrees of choice which the majority of society has come to expect.

This achievement will not be realised by revolution but a process of evolution if it will ever be realised at all. This process of evolution has already, I believe, begun. It is possible to see the process beginning in many areas: in the development of increased awareness of social deprivation by those people who are responsible for dealing with it on the ground; in the realisation of the often political nature of deprivation by the urban managers, councillors and directors of Local Authority Departments. The process can also be seen in the increased interplay between managers at this level and those people who feel that their contribution can be most effective at a more academic level, part of a two way process where university researchers may be brought into the forefront of policy making through their own disatisfaction with "pure" research and a realisation by managers of all sorts that researchers can, given the opportunity, contribute not only to objective evaluation of problems but are also prepared to accept the political repercussions of their work.

## APPENDIX 1 Additional information deriving from the birth records, 1969, 1970 and 1971.

### Table A1. Births by mother's place of birth

| Mother's birthplace | Births | | | Percent of ethnic births | | |
|---|---|---|---|---|---|---|
| | 1969 | 1970 | 1972 | 1969 | 1970 | 1972 |
| India | 88 | 180 | 76 | 11.1 | 13.2 | 12.3 |
| Pakistan | 93 | 153 | 74 | 11.7 | 11.2 | 12.0 |
| West Indies | 126 | 200 | 77 | 15.8 | 14.7 | 12.5 |
| N. Ireland | 30 | 63 | 33 | 3.8 | 4.6 | 5.3 |
| Eire | 164 | 3.6 | 136 | 20.6 | 22.5 | 22.0 |
| O.N.C. | 45 | 66 | 35 | 5.7 | 4.8 | 5.7 |
| O.C. | 6 | 12 | 9 | 0.8 | 0.9 | 1.5 |
| Eurore | 22 | 44 | 20 | 2.8 | 3.2 | 3.2 |
| Rest of the World | 13 | 37 | 19 | 1.6 | 2.7 | 3.1 |
| Great Britain | 203 | 300 | 138 | 25.5 | 22.0 | 22.4 |
| Unknown | 5 | - | - | 0.6 | - | - |
| totals | 795 | 1361 | 617 | 100.0 | 100.0 | 100.0 |

Table A2 Births by age of mother and mother's place of birth.

| Mother's age | India Numbers | | | Percentage | | |
|---|---|---|---|---|---|---|
| | 1969 | 1970 | 1972 | 1969 | 1970 | 1972 |
| 15-19 | 7 | 6 | 5 | 8.0 | 3.3 | 6.6 |
| 20-24 | 31 | 69 | 29 | 35.2 | 38.3 | 38.2 |
| 25-29 | 24 | 50 | 20 | 27.3 | 27.8 | 26.3 |
| 30-34 | 16 | 20 | 9 | 18.2 | 11.1 | 11.8 |
| 35-39 | 6 | 21 | 7 | 6.8 | 11.7 | 9.2 |
| 40-44 | - | 8 | 5 | - | 4.4 | 6.6 |
| 45-49 | - | - | - | - | - | - |
| Unknown | 4 | 6 | - | 4.5 | 3.3 | - |
| Totals | 88 | 180 | 76 | 100.0 | 100.0 | 100.0 |

| Mother's age | Pakistan Numbers | | | | | |
|---|---|---|---|---|---|---|
| | 1969 | 1970 | 1972 | 1969 | 1970 | 1972 |
| 15-19 | 4 | 10 | 4 | 4.3 | 6.5 | 5.4 |
| 20-24 | 22 | 45 | 21 | 23.7 | 29.4 | 28.4 |
| 25-29 | 21 | 36 | 11 | 22.6 | 23.5 | 14.9 |
| 30-34 | 18 | 20 | 17 | 19.4 | 13.1 | 23.0 |
| 35-39 | 15 | 19 | 9 | 16.1 | 12.4 | 12.2 |
| 40-44 | 3 | 7 | 4 | 3.2 | 4.6 | 5.4 |
| 45-49 | 1 | 2 | 1 | 1.1 | 1.3 | 1.4 |
| Unknown | 9 | 14 | - | 9.7 | 9.2 | - |
| Totals | 93 | 153 | 74 | 100.0 | 100.0 | 100.0 |

Table A2 continued

| Mother's age | West Indies Numbers | | | Percentage | | |
|---|---|---|---|---|---|---|
| | 1969 | 1970 | 1972 | 1969 | 1970 | 1972 |
| 15–19 | 13 | 24 | 11 | 10.3 | 1200 | 14.3 |
| 20–24 | 21 | 34 | 18 | 16.7 | 17.0 | 23.4 |
| 25–29 | 39 | 53 | 11 | 31.0 | 26.5 | 14.3 |
| 30–34 | 26 | 36 | 16 | 20.6 | 18.0 | 20.8 |
| 35–39 | 22 | 39 | 14 | 17.5 | 19.5 | 18.2 |
| 40–44 | 5 | 9 | 6 | 4.0 | 4.5 | 7.8 |
| 45–49 | - | 2 | - | - | 1.0 | - |
| Unknown | - | 3 | 1 | - | 1.5 | 1.4 |
| Totals | 126 | 200 | 77 | 100.0 | 100.0 | 100.0 |

| Mother's age | Eire Numbers | | | Percentage | | |
|---|---|---|---|---|---|---|
| | 1969 | 1970 | 1972 | 1969 | 1970 | 1972 |
| 15–19 | 5 | 19 | 4 | 3.0 | 6.2 | 2.9 |
| 20–24 | 53 | 91 | 31 | 32.3 | 29.7 | 22.8 |
| 25–29 | 54 | 97 | 46 | 32.9 | 31.7 | 33.8 |
| 30–34 | 27 | 50 | 41 | 16.5 | 16.3 | 30.1 |
| 35–39 | 16 | 36 | 9 | 9.8 | 11.8 | 6.6 |
| 40–44 | 7 | 12 | 5 | 4.3 | 3.9 | 3.7 |
| 45–49 | 2 | - | - | 1.2 | - | - |
| Unknown | - | 1 | - | - | 0.3 | - |
| Totals | 164 | 306 | 136 | 100.0 | 100.0 | 100.0 |

Table A3 Births by parity and mother s place of birth.

| Parity | India | | | | | |
|---|---|---|---|---|---|---|
| | Numbers | | | Percentage | | |
| | 1969 | 1970 | 1972 | 1969 | 1970 | 1972 |
| 0 | 25 | 52 | 26 | 28.4 | 28.9 | 34.2 |
| 1 | 21 | 38 | 16 | 23.9 | 21.1 | 21.1 |
| 2 | 17 | 24 | 12 | 19.3 | 13.3 | 15.8 |
| 3 | 10 | 19 | 11 | 11.4 | 10.6 | 14.5 |
| 4 | 5 | 23 | 4 | 5.7 | 12.8 | 5.3 |
| 5 | 4 | 12 | 3 | 4.5 | 6.7 | 3.0 |
| 6 | 3 | 8 | 2 | 3.4 | 4.4 | 2.6 |
| 7 | 2 | 2 | - | 2.3 | 1.1 | - |
| 8 | 1 | - | - | 1.1 | - | - |
| 9+ | - | 2 | 2 | - | 1.1 | 2.6 |
| Totals | 88 | 180 | 76 | 100.0 | 100.0 | 100.0 |

| Parity | Pakistan | | | | | |
|---|---|---|---|---|---|---|
| | Numbers | | | Percentage | | |
| | 1969 | 1970 | 1972 | 1969 | 1970 | 1972 |
| 0 | 17 | 34 | 16 | 18.3 | 22.2 | 21.6 |
| 1 | 24 | 34 | 11 | 25.8 | 22.2 | 14.9 |
| 2 | 16 | 24 | 13 | 17.2 | 15.7 | 17.6 |
| 3 | 7 | 17 | 15 | 7.5 | 11.1 | 20.3 |
| 4 | 9 | 15 | 6 | 9.7 | 9.8 | 8.1 |
| 5 | 10 | 15 | 5 | 10.8 | 9.8 | 6.8 |
| 6 | 5 | 9 | 7 | 5.4 | 5.9 | 9.5 |
| 7 | 5 | 3 | 1 | 5.4 | 2.0 | 1.4 |
| 8 | - | 1 | - | - | 0.7 | - |
| 9+ | - | 1 | - | - | 0.7 | - |
| Totals | 93 | 153 | 74 | 100.0 | 100.0 | 100.0 |

Table A3 continued

| Parity | West Indies | | | | | |
|---|---|---|---|---|---|---|
| | Numbers | | | Percentage | | |
| | 1969 | 1970 | 1972 | 1969 | 1970 | 1972 |
| 0 | 18 | 41 | 18 | 14.3 | 20.5 | 23.4 |
| 1 | 20 | 34 | 14 | 15.9 | 17.0 | 18.2 |
| 2 | 22 | 21 | 11 | 17.5 | 10.5 | 14.3 |
| 3 | 12 | 25 | 6 | 9.5 | 12.5 | 7.8 |
| 4 | 24 | 15 | 6 | 19.0 | 7.5 | 7.8 |
| 5 | 9 | 22 | 10 | 7.1 | 11.0 | 13.0 |
| 6 | 9 | 15 | 6 | 7.1 | 7.5 | 7.8 |
| 7 | 5 | 9 | 3 | 4.0 | 4.5 | 3.9 |
| 8 | 6 | 8 | 2 | 4.8 | 4.0 | 2.6 |
| 9+ | 1 | 10 | - | 0.8 | 5.0 | - |
| Totals | 126 | 200 | 77 | 100.0 | 100.0 | 100.0 |

| Parity | Eire | | | | | |
|---|---|---|---|---|---|---|
| | Numbers | | | Percentage | | |
| | 1969 | 1970 | 1972 | 1969 | 1970 | 1972 |
| 0 | 37 | 92 | 44 | 22.6 | 30.1 | 32.4 |
| 11 | 44 | 78 | 33 | 26.8 | 25.5 | 24.3 |
| 2 | 38 | 61 | 21 | 23.2 | 19.9 | 15.4 |
| 3 | 20 | 36 | 19 | 12.2 | 11.8 | 14.0 |
| 4 | 8 | 19 | 11 | 4.9 | 6.2 | 8.1 |
| 5 | 9 | 11 | 4 | 5.5 | 3.6 | 2.9 |
| 6 | 2 | 3 | 2 | 1.2 | 1.0 | 1.5 |
| 7 | 3 | 3 | 2 | 1.8 | 1.0 | 1.5 |
| 8 | 3 | 1 | - | 1.8 | 0.3 | - |
| 9+ | - | 2 | - | - | 0.6 | - |
| Totals | 164 | 306 | 136 | 100.0 | 100.0 | 100.0 |

## APPENDIX 2 Zone definition

| Zone Number | 1966 E.D.s | Zone Name |
|---|---|---|
| 1 | 429-440 | Far Headingley |
| 2 | 508-519 | Moortown |
| 3 | 555-563 | Stanningley |
| 4 | 583-592 | Wortley |
| 5 | 497-507 | Middleton |
| 6 | 423-428 | East Hunslet |
| 7 | 441-450 | Halton |
| 8 | 408-422 | Cross Gates |
| 9 | 544-554 | Roundhay |
| 10 | 356-364,366 | Allerton |
| 11 | 390-398 | Bramley |
| 12 | 488-496 | Meanwood |
| 13 | 367-374 | Armley |
| 14 | 473,474,480-487 | Kirkstall |
| 15 | 475-479 | Hyde Park |
| 16 | 575,579-582 | Woodhouse |
| 17 | 365,576-578 | Potternewton West |
| 18 | 530-535 | Potternewton East |
| 19 | 451-457 | Harehills |
| 20 | 399-405 | Burmantofts |
| 21 | 520-527 | Osmondthorpe |
| 22 | 381,458-465 | Holbeck |
| 23 | 567-570 | Wellington East |
| 24 | 387-389 | Blenheim East |
| 25 | 404,405 | City South |
| 26 | 375-380,382-383 | Beeston |
| 27 | 466-472 | Hunslet Carr |
| 28 | 571-574 | Westfield |
| 29 | 528,529 | Potternewton North |
| 30 | 536-539 | Richmond Hill North |
| 31 | 406-407 | City North |
| 32 | 564,566 | Wellington West |
| 33 | 540-543 | Richmond Hill South |
| 34 | 384-386 | Blenheim West |

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