THE URBAN DEMOGRAPHY OF INDUSTRIALISATION AND ITS ECONOMIC IMPLICATIONS, WITH PARTICULAR REFERENCE TO A REGION OF INDIA FROM 1951 TO 1971

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ABSTRACT

This thesis is an examination of the demographic characteristics of urban localities that were subject to a planned industrialisation strategy in India beginning in the 1950s. It studies the local age and sex structures that emerged and evolved in these populations over time, down to 1971, using the Censuses as the main sources of data, and focusing on the iron and steel producing region of Eastern India, with comparisons drawn from the West of the country. To aid interpretation a simulation model of urban demographic growth is constructed, and various growth patterns are projected. At the same time, the empirical evidence of migration and fertility differentials in different types of towns is explored. The study addresses the hypothesis that modern technology, in combination with factor proportions typical of a developing country (with relatively abundant labour) gives rise to the formation of local population structures that are unusual if not unique in history - (some comparative historical material from 19th Century England is presented here) -, and that these demographic features, as they emerge over time, carry exceptional implications for the allocation of local welfare expenditure (especially in the field of housing), and for the local labour market, as subsequent generations enter the labour force. The implications are of most interest in the case of the fastest growing localities (related to heavy industry), and the slowest growing localities, and these therefore are discussed the most. The welfare and employment implications are further analysed at the level of the household (using additionally the 1959 Labour Bureau survey data), and the strategies adopted by the households themselves to mitigate the more adverse consequences, especially in single-industry towns, are investigated and assessed. Similarly, strategies that have been adopted by the State are reviewed, and alternatives suggested.

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PREFACE

I would like to think this thesis will be read by various readers with differing interests. I would like its possible significance (besides any intrinsic interest in the detail of the analysis) to be considered on the following scores. Firstly, as the first attempt to write a demographic history of post-Independence industrialisation in India. Secondly, as a didactic exercise throughout: as a simulation of industrial-demographic relationships, where interrelated variables are more or less systematically incorporated from macro to micro in a chain-like formation not previously explored in the literature. (In formal terms, the demographic side alone is modelled, in a rather short-term perspective. But the rest of the scenario is selectively introduced to enable a wide range of socio-economic considerations to be explored without an unwieldy technical model: some rigour may be lost this way, but the results are more easily communicated to others.) Thirdly, as the exploration of a hypothesis (rather than its rigorous testing) linking technology and demography in a fairly innovative way (see Chapter 1). Finally, perhaps as a study that leads to the introduction of an original thesis (that will need sharper tooling) on the vulnerability in the overlapping of sources of transfer payments and sources of direct income (see Chapter 9).

It was C.R.Malaker of I.S.I. Calcutta who first really encouraged me to use the 1961 Census. And an academic interest in unstable populations, plus an interest in migrants, that turned me towards urban demography. It was not apparent at that time that some of the issues would be of such social and economic significance that I now believe they are. And it was M.Bapat of C.D.S.A. in Poona who first stimulated my interest in housing conditions in developing cities, and steered me in the direction of valuable literature in that field, including her own contribution.

I firmly believe that in the 1961 Census there are more data, and probably of no worse quality, than could be got from anything other than numerous survey case studies. In a sense, it is a set of case studies. I would agree (from my own survey work, in a different field, in Poona) that some mistakes are made through an imperfect local experience; but as many mistakes are made through an inadequate perspective arising from an insufficient familiarity with a wide range of data. This the 1961 and 1971 Censuses and the Labour Bureau Industrial Worker Surveys provide; both sources had been underutilised. I have combed through most of the ten volumes of 1961 Census material for each of the five States studied, in addition to the special volumes for four of the Cities. Practically every table I present is a derivation or manipulation of Census data (and I have not troubled to indicate this fact at the foot of each table). The data are still being published for 1971 (as also for 1981). The continuing nature of the data makes it imperative that one stop somewhere and report.

Nearly every Chapter has been subjected to seminar and presentation given before colleagues and students, in India and in England, too numerous to mention by name. Their hospitality is gratefully acknowledged. Their critique has been invaluable.

My Supervisor, T.J.Byres, gave the work a perspective: he sensed what I was after, and encouraged me to draw it out more explicitly.

But what is offered here, for good or bad, remains basically my own.

This thesis is dedicated to my Father and to the memory of my Mother; for they encouraged me more than anyone else to bring the study to fruition.

Goring-by-Sea 26.9.83

PART ONE

Hypotheses and Model

CHAPTER 1

Introduction and Empirical Overview

A Summary of the Argument and Discussion

Here we try to encapsulate within the confines of a single shell what this study is about. We offer a survey of the literature and discussion that has taken place, up to the time of writing, on demographic aspects of industrialisation. It is pointed out that academic economists, on the one hand, have looked at the effects of population growth and dynamics on the aggregate economies of developing countries; but we wish to emphasise here how these effects may be much more dramatic on the economies of localities within those countries, especially when some localities are industrialising rapidly while others stagnate. Practical planners, on the other hand, indeed have focused on sub-national populations, but have usually failed to study the dynamics of local demography as they develop through time. Our study concentrates on the effects of very rapid local urbanisation, accompanied by a huge wave of migration, on the evolving population structure that follows, with its sympathetic waves of future generations of workforce (descendants of the migrants), and on the likely employment and income opportunities, and provision of municipal services, that face individual families caught up in the inexorable repercussions, as it were, of a stirring in the calm of the demographic sea.

The second part describes the economic and demographic development of the region of India that first prompted the author to investigate this problem - the iron and coal belt, sometimes called the Chota Nagpur Crescent. We find that a substantial proportion of the Second Five-Year Plan's investment was concentrated on a small number of localities, especially the integrated iron and steel towns. We also find that huge populations are involved, growing from a few hundred to a hundred thousand in a single township in the space of a decade or less. We also note that this economic momentum was not sustained for a further decade in complementary, or "accelerator"-type industrial investments, since the industrial structure changed towards oil-based manufacturing located in the West of the country.

To help focus this empirical study of economic demography, a hypothesis is suggested. Its most incisive component reads as follows: that modern technology in combination with factor proportions typical of a developing country gives rise to local population structures that are unusual if not unique in history, and that carry with them over time exceptional economic welfare implications for localities and households.

Setting of the Problem in the Context of existing Scholar-Ship and Planning Policy: Neglect of the Demographic Dynamics Implicit in Industrialisation

This thesis is a study in the recent historical demography of an industrialising oriental country. It is about local people caught up in the broad process of industrialisation. It focuses on the growth of the factory manufacturing sector and its implications for local demographic formation; in particular it concerns itself with the spearhead of this industrial advance - on the basic industries that experienced so large a share of India's national investment after Independence, (an experience shared in the development strategies of other countries). The effect of industrial recruitment or attraction of labour, the streams of migration, the demographic characteristics of the migrants, and the resultant demography of the population agglomeration in the vicinity of the industry - these have all been remarked upon by many scholars. Perhaps the earliest comparative study of this nature was done by Adna Weber on the 19th Century industrialisation in Europe and America.[1]

1 A.Weber, The Growth of Cities in the Nineteenth Century, 1899, reprinted 1963, Cornell University Press, Ithaca and New York. The comparative theme has been taken up more recently in E.A.Wrigley, Population and History, Weidenfield and Nicolson, London, 1969.

Many of the more detailed economic-demographic studies have been monographs on individual cities: Bombay, Jakarta, and Shanghai, to name a few from Asia.[1] These studies are essentially exercises in comparative statics (as far as their demography is concerned): they do not explore in any detail the evolution of demographic characteristics that occurs as the towns develop, that is as the industry expands, diversifies, or contracts, and, more crucially in the short run, as the population cohorts drawn in by the first round of industrial investment, marry, reproduce themselves, and grow old.

Turning to consider India more specifically, I find that the comparative approach has not to date fulfilled two descriptive-analytical objectives I set myself. It has not been able to disaggregate to the degree necessary to compare and contrast industrial type within the manufacturing sector - cotton textiles, agro-processing,

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1 See H. and V. Joshi, Surplus Labour and the City: A Study of Bombay, Oxford University Press, Delhi, 1976; S.V.Sethuraman, Jakarta: Urban Development and Employment, International Labour Office, Geneva, 1976; C.Howe (ed.), Shanghai: Revolution and Development in an Asian Metropolis, Cambridge University Press, Cambridge, 1981. A classic study in the social demography of an industrial city in England is R.Glass, The Social Background of a Plan: A Study of Middlesbrough, Routledge and Kegan Paul, London, 1948.

heavy engineering, etc., (in this context consider, for example, the economic-demographic studies of A.Mitra or A.Mamood)[1] ; nor has this approach pursued a dynamics path at the level of the town, or groups of towns, (the comparative statistical work of A.Bose, for instance, is mainly a study in comparative statics)[2]. Equally the few studies made of the evolution of individual towns over time have been less concerned with matters demographic (c.f. the excellent contemporary study of Poona by M.Bapat)[3]. These weaknesses are particularly true of monographs of industrialising towns of the kind that have taken my particular interest: for instance the Indian Labour Bureau studies of industrial worker families (in Jamshedpur and Asansol, among 40 other towns)[4], the Planning Commission and other officially sponsored studies (which include Ranchi, Jamshedpur,

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1 A.Mitra et al., Indian Cities, Their Industrial Structure, In-migration, and Capital Investment, 1961-71, Abhinav Publications, New Delhi, 1980; A Mamood, "Patterns of Migration into Indian Cities and their Socio-Economic Correlates - a Multi-variate Regional Analysis", M.Phil. thesis, Jawaharlal Nehru University, Delhi, 1975.

2 A.Bose, Studies in India's Urbanisation 1901-1971, Tata McGraw-Hill Publishing Co., New Delhi 1974 (2nd. Ed. 1978).

3 M.Bapat, Shanty-town and City: the Case of Poona, Pergamon, Oxford, 1982; (and Ph.D. thesis cited in Chapter 5 below).

4 Government of India, Labour Bureau, Ministry of Labour, Employment and Rehabilitation, Family Living Surveys among Industrial Workers, 1958-59, Delhi, 1968.

Dhanbad, and Nagpur)[1], and other monographs relating to the newly developing urban areas in the North (for instance those of M.Mohsin on Chittaranjan, S.D.Badgaiyan on Bhilai, and the Census monograph on Rourkela)[2] all experience this defect. Most recent of all, the study on New-towns, undertaken by the Secretary of the Calcutta Metropolitan Development Authority, K.C.Sivaramakrishnan, explicitly neglected this aspect.[3]

This approach to case-study or regional material reflects the pre-occupation of theoretical analysis in the regional planning schools. This pre-occupation is with the <u>size</u> of demographic agglomerations (as in the work of B. Berry, for instance, in his world-wide comparative study, or of R.P.Misra or the authors of the Stanford-Delhi-

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1 For a summary analysis of these see J.F.Bulsara, <u>Problems of Rapid Urbanisation in India</u>, Popular Prakashan, Bombay, 1964.

2 M.Mohsin, <u>Chittaranjan: a Study in Urban Sociology</u>, Popular Prakashan, Bombay, 1964; S.D.Badgaiyan, "A Sociological Study of the Effects of Industrialisation of Bhilai on the Surrounding Villages", Ph.D. thesis, Dept. of Sociology, Delhi University, 1974; Government of India, <u>Census of India 1961</u>, Social Processes in the Industrialisation of Rourkela, (Special Monograph), New Delhi.

3 K.C.Sivaramakrishnan, "New Towns in India: A Report on a Study of selected New-Towns in the Eastern Region", Indian Institute of Management, Calcutta, 1976-7. He told me personally that he had no brief to cover demography, and thought that my study and his would be complementary (1976).

Hyderabad studies on India)[1]. That is to say, there has been a neglect of that other essential element in demographic analysis, time. For it has to be remembered that size is achieved through growth, and as is well-known to demographers, many of the interesting features of populations (for example, their age structures and changes in relative cohort sizes) derive largely from growth rates. It is striking that only in 1981 have the early papers of the Indian Census publication contained ranking of cities by growth rates as well as by size. Yet any observation of the link between the new industrialisation, often centred on New-towns, and local demography, would have prompted the observation that the Calcuttas of tomorrow are only medium-sized (but fast growing) towns today: surely they should command our attention.[2] Perhaps the worst example of this

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1 B.Berry, The Human Consequences of Urbanisation: Divergent Paths in the Urban Expansion of the 20th Century, Macmillan, London & Basingstoke, 1973; R.P. Misra (ed.), Regional Planning, Concepts, Techniques, Policies and Case Studies, Prasaranga - University of Mysore, Mysore, 1969; Stanford Research Institute (California), School of Planning & Architecture (New Delhi), Small Industry Extension Training Institute (Hyderabad), Costs of Urban Infrastructure for Industry as related to City Size in Developing Countires (India Case Study), 1968.

2 A point made to me by D.K.Bose of the Indian Statistical Institute, Calcutta, who had himself worked in planning for the Government of West Bengal, and agreed there was a lack of demographic dynamics in the analysis.

static thinking and planning is indicated in the future picture that was officially envisaged for the public sector Steel Towns: that Rourkela, for example, should aim at a population target of 100,000.[1] By when exactly this should be achieved, and what should happen then, were not suggested: in actual fact by 1981 (only 20 years after its inauguration) the town was a third of a million (321326) in population size (despite no expansion in steel capacity).

This thesis, as was stated above, is a study in aspects of India's recent demographic history (from about 1955 to 1975 with emphasis on the years preceding the 1961 Census). But its scope is, hopefully, beyond that. It is a major contention of the author's that the evolution of local urban demography, induced by specific types of industrial growth, has important economic implications. In a broad sense these implications have been adequately recognised by economists working at the level of the national aggregation of economy and population. Pioneers in the field, who incidentally worked on India, were A.J.Coale and E.M.Hoover.[2]

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1 The same target-setting was apparently practised in all the public sector steel New-towns: see V.Prakash, New Towns in India, Duke University Monograph No.8, 1969, (Appendix C).

2 A.J.Coale and E.M.Hoover, Population Growth and Economic Development in Low-Income Countries, Princeton University Press, Princeton, 1958.

Important modifications and refinements to their argument have been incorporated in a contemporary study of India's population and economy as a single conceptual entity, the excellent work of R.H.Cassen.[1] In some ways my own study is an attempt to focus these arguments and empirical discussion on the urban sector (which Cassen left, explicitly, relatively under-researched). The crux of the relevant aspects of the Coale-Cassen theory would be that the highly dependent age-structure that emerges from a rapidly growing population will, or may, restrict the investible funds that are channelled toward high-yielding projects. Schools, housing, medical and health-promoting infrastructural services, whose main component is sometimes viewed as current consumption, enjoyed once and for all, rather than investment for future continuous consumption, and whose investment component is in any case a long time maturing, all make greater claims on the resource allocation if the youth or aged predominate (although, of course, this is only true if those claims are met: as Cassen emphasises, they may be simply ignored). My point is that if this is all true of a national population, how more so must it be true of a local population, as in a town, whose age-structure may change dramatically in a quinquennium or a decade. New-towns may fill rapidly with

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1 R.H.Cassen, India: Population, Economy, Society, Macmillan, London and Basingstoke, 1978.

productive workforce, rapidly acquire a young dependant population, stabilise, then age as growth declines; these are the sequences that I seek to explore in theory and in fact, and their implications for local social expenditure and planning.

But the demographic-economic theory takes us further than this. The more unstable the population structure, the more rapidly the labour force changes in character: the importance of its turnover rate for innovative potential - what has been described as its "metabolic rate" - has been noted by N.B.Ryder, and the implications for job-seekers of their relative cohort sizes have been outlined by R.A.Easterlin.[1] I am particularly interested in addressing the possibilities of a mismatch between the dynamic demand for new entrants to the labour force, and their dynamic supply: the mismatch emerges from the evolution of a town that once grew rapidly, and now stabilises or declines. The sociological implications of this mismatch in terms of alienated youth, and especially the ethnically divisive characteristic of this process in multi-regional societies like India's have been

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1 N.B.Ryder,"The Cohort as a Concept in the Study of Social Change", American Sociological Review, 30:6, Dec. 1965; R.A.Easterlin, "The Conflict between Aspirations and Resources", Population and Development Review, 2:3 & 4, Sept. and Dec. 1976.

suggested by M.Weiner; but the possible demographic determinants of this political atmosphere, due to differential changes in age-structures among the social groups, need exploring (which he did not do).[1]

The empirical scope of this study could easily get out of hand. I wished to avail myself of the opportunity to use data down to 1981 from Independence, and especially the rich Census data from the 1961 Census. I wished also to view India in a comparative context, to pinpoint the distinct contribution made to this demographic process through the current factor proportions being what they are in the economy, and the currently known technologies being what they are (and their use in India, appropriate or otherwise, being taken as it is). To enable the complexity of the analysis to be handled, I concentrate rather on heavy industry, and, as a special case, on the development of the iron and steel industry (often regarded, whether appropriately or not, as a spearhead to industrial development). This has enabled the comparative approach to include an analysis of some regions of England in the industrial revolution, and some of England's "de-industrialising" localities of the 1970s, once again concentrating on

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1 M.Weiner, Sons of the Soil: Migration and Ethnic Conflict in India, Princeton University Press, Princeton, 1978.

Steel Towns.

Now the study of these towns has raised a further theoretical issue, which is the subject of a later Chapter. For a time at least, heavy industrial towns tend to be "mono-industrial".[1] In such a potentially risky environment how far can (and do) the individual families safeguard their source of income by spreading the risk, by having their adult members participate in a wide range of employments? This particular economic implication of demographic formation due to the concentration of a specific industrial type (industrial "monoculture" to coin a phrase) has not been explored before, although the question of family income diversification has been raised in the context of the familial mode of production, in a recent paper by M.Lipton.[2] It is an extreme form of A.Sen's identification of wage-labour vulnerability that emerges during the early development of capitalism.[3] It is also an extreme case of the overall

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1 This term was apparently first coined in the 1930s: see A.Lösch, The Economics of Location, 1939, reprinted by Yale University Press, New Haven, 1954.

2 M.Lipton, "Family, Fungibility, and Formality: Rural Advantages of informal Non-farm Enterprise versus the Urban-formal State", International Economic Association meeting held at Mexico City, August, 1980. Family income composition has been discussed most recently in Y.Ben-Porath, ed., "Income Distribution and the Family", suppl. to Population and Development Review, 8:3, Sept., 1982.

3 A.Sen, Poverty and Famines, Oxford University Press, 1981.

argument that industrialisation determines dynamic demography in a manner that has economic implications, often neglected at the level of the locality. It is further to be noted that there are not only future implications for the towns that grow, but also current implications for those that stagnate or decline.

Of course, "monocultures" are not confined to Steel Towns with their single massive plant sizes. Particular localities may be dominated by textiles for instance, but with numerous small units in simultaneous operation. For comparison and contrast we shall analyse some of these also. Our particular interest in the heavy industrial towns is due to our belief that both the scale and character of the difficulty in providing sustained and secure employment over time are currently unique. A combination of current internationally traded technology and local labour endowments in developing countries of Asia (and elsewhere) renders these socio-economic phenomena particularly interesting (and the potential long-term problems particularly acute).

Essentially, this is intended to be an objective analysis. But it is not without relevance that the industrial demography and resultant social economy of cities are subject to various degrees of planning in most countries of the world. I shall restrict my study and say rather little about the viability of planning for the particular industry under discussion or its specific location in the first place. These objectives I have taken as largely given. But I will consider what may usefully be said about the phasing-in of new industry over time or diversification in a given locality. I will also have some regard for what may be said about demographic planning to meet the problems outlined above, though this is a highly esoteric field into which only the Chinese seem to have ventured to any significant extent. Finally, and more mundanely, the important implications for economic planning to meet the requirements of the evolving populations, the appropriate financing and provision of social infrastructure (particularly housing) for individual cities, be they growing or stagnating (juvenating or aging), will all be reviewed, particularly in the Indian context, albeit under the assumption that the political will is there, at least in part, to meet those needs. To whom these analyses and suggestions are addressed I will not here specifically indicate. Suffice it to say that I believe a wider knowledge of the situation may be of use to parties concerned from local community to central government.

Overview of Growth Patterns, Industrial and Demographic, in Eastern India; and the Introduction of Hypotheses for Exploration and Examination

We will start with an overview of the region of India that will be the main focus of this study - the coal, iron, and steel industrial belt known as the Chota Nagpur Crescent (Figures 1.1 and 1.5). It was a passing familiarity with the characteristics of this region that first induced the author to formulate the demographic hypotheses on which this study hinges. It will perhaps highlight this inductive process if the historical and economic context is first surveyed.

What is striking about the region known as Chota Nagpur is that it was the focus of one of the most ambitious industrial development plans in any largely agricultural developing nation having recently gained independence: about ten years of concentrated investment in heavy industry. At the All-India level net investment rates rose from around 6% to around 13% from 1950 to 1965: the major rise occurred from 1955 to 1960, the Second Plan period.[1] Disaggregation reveals the regional concentration.

1 Economic data in this chapter are culled from one of the most recent secondary sources (unless otherwise stated): P.Chaudhuri, The Indian Economy: Poverty and Development, Crosby Lockwood Staples, London, 1978.

In 1960 11% of industrial production was in basic metals and machinery: over the previous five years the former had doubled and the latter tripled. Over the subsequent quinquennium those growth rates were repeated (Figure 1.3), increasing the contribution to industrial production to around 14%.[1] Most of that growth occurred in the Chota Nagpur Crescent. Additionally, mining, counting for 10% of industrial production, grew by a third in each quinquennium: iron ore and coal are again largely the product of this one region, and hence the rationale behind siting the steel and heavy engineering industries here. In short, Nehru's vision of building up the heavy industry both to maximize the long-term growth rate and (a rather separate point) to ensure self-reliance in the essential ingredients of growth, dictated a regional concentration in the first phase of industrialisation.

We can now disaggregate further, and, to take a specific example, we concentrate on steel. During the decade 1950 - 1960 finished steel output doubled from 1.0 to 2.4 million tonnes, doubling again to 4.5 by 1965.

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1 This is derived from P.Chaudhuri, The Indian Economy.., (cited in note 1 previous page), Table 14 on page 66.

In the Second Plan (1955-60) 11% of the total outlay went towards iron and steel.[1] That level of steel production sufficed for 90% of domestic consumption and exports (which were 2.6 m.t. in 1960 and 4.9 m.t. in 1965).[2,3] The remarkable feature to note is that this level of output, supplying a manufacturing industrial sector that soon became the tenth largest in the world in sheer size[4], was fabricated in just five major plants, with a combined capacity of six million tonnes, four of the five being rated at one million tonnes each. That is to say, this enormous expansion in steel output was focused on five localities; and three of them were villages at the start of the Second Plan. It is immediately apparent that national industrial strategy may have remarkable social implications at the level of the locality, something Nehru's vision may not have quite encompassed.

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1 See W.A.Johnson, <u>The Steel Industry of India</u>, Harvard University Press, Cambridge, Massachusetts, 1966.

2 See S.D.Kshirsagar, "Growth in Consumption of Steel in India", <u>Economic and Political Weekly</u> (Bombay), August 1977 (Review of Management), page M101.

3 By 1974 production stood at 4.9 m.t., 84% of consumption and exports.

4 This is taken from estimates for the late 1970s. In the mid-1970s India was supplying about $\frac{1}{4}$ of Asian steel production; but note that the manufacturing sector is less than $\frac{1}{4}$ of the total Indian economy, see Tata Services Limited, <u>Statistical Outline of India 1976</u>, Bombay, 1976 , Tables 9&11.

How do the social implications come to stem from the size of industrial capacity and investment? This is to be explored in detail through the chapters that follow. But, put graphically, the picture is this. Hindustan Steel (the public sector producer), investing in the three plants on "green-field" sites, employs 13-15,000 men per million tonnes of output, a number sufficient in itself to form a small town.[1] Ancillary and induced manufacturing employs another 10-15,000. With steel output reaching between 1.5 and 2.0 m.t. by 1970, the total population of these New-towns had attained in each case a minimum of 200,000 (taking Durgapur and Bhilai as examples), that is within fifteen years of their birth. Such in outline is the demographic component.

It is difficult to know on what quantitative criteria to judge the demographic importance of Steel Towns. At Independence the urban population of Eastern India, by which I mean the current States of Bihar, Orissa, West Bengal, and the Eastern Divisions of Madhya Pradesh,

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1 See W.A.Johnson, The Steel Industry of India.., cited in note 1 on the previous page.

were dominated by Calcutta "like a colossus".[1,2] Calcutta's aggregate working population engaged in manufacturing was about 850,000 in 1961; the five integrated iron and steel-making localities together employed about one fifth of that number in manufacturing in 1961, and by 1981 the adult male workforces of all the Steel Towns (with the addition of Bokaro, which was built in the 1970s) amounted to 22.5% of Calcutta's workforce in size. We are not talking about trivial numbers of people (but we would agree that India's manufacturing workforce as a whole is numbered in millions at this time, not mere hundreds of thousands: 40 million in 1981 is the Census estimate of male urban workers according to their "main" employment, with 600,000 in the integrated Steel Towns).

Of course the case of industrial location on "green-field" sites is the exception rather than the rule. An urban base was already established in West Bengal by

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1 This was the colourful expression used by Moonis Raza of Jawaharlal Nehru University, Delhi, (1976).

2 For reasons discussed in an Appendix on Homogeneity at the end of this chapter, we restrict much of our analysis to only 26 Districts in the Chota Nagpur region (Figure 1.1). But to put the figures in perspective we refer here to all the Districts in the region.

the time of Independence; Burdwan and Singbhum Districts (in West Bengal and Bihar) were the homes of the original steel and engineering industries of the massive scale. Smaller-scale factory manufacturing and processing was already established in such towns as Cuttack in Orissa, Patna and Gaya in Bihar. But the exceptional demographic result of the First and Second Five-year Plan strategy is illustrated in Figure 1.4 a. The distribution is noticeably skewed to the right of the All-India mean (which is a growth rate in urban population of 34%, close to the modal value of our distribution of urban growth rates in the Eastern region, but well below our mean of 61%). Our distribution displays a notable peak at the very fast growth rates (above 130% per decade).

During the Third and Fourth Plans, including the "inter-regnum", a sea-change was experienced in the Indian economy (from 1960 to 1975 or thereabouts). Not only did the rate of investment level off at around 13%, but the composition of investment changed too. The growth of the heavy industries based on the resources of iron and coal was much reduced (from 10% to 7% annual growth).[1] For

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1 See P.Chaudhuri, The Indian Economy.., (cited above), Table 16. For a graphical presentation of the change in the composition of output see our Figure 1.3 and note the contrasts in slopes of the various industrial growth curves before and after the mid-1960s.

reasons now clear this industrial sea-change will impinge on demographic growth specifically in the Eastern region, (and, to take an example, engineering employment expanded in West Bengal from 236,000 to 303,000 during 1961-5, but was still 295,000 in 1969)[1]. Now let us observe Figure 1.4 a again: the distribution of growth rates in urban populations has shifted leftwards. In fact the modal value is below the All-India mean of 37% decadal growth (as adjusted for redefinitions of "urban").

But during the Third and Fourth Plans the industries that expanded were oil-based (growing at 8%, nearly twice the rate of overall industrial growth), and the growth in consumer durables also prevalent in that period was to some extent enabled by the plastics and chemicals expansion related to that oil base. Indeed the changing base of consumer demand, arguably symptomatic of a changing politico-economic power structure, could be regarded as another facet in the change in the heavy industrial structure, most noticeable after the mid-1960s (Figure 1.3). Oil is found in the Gulf of Cambay (Figure 1.2). And hence if we observe the demographic growth in areas of the Western region we will expect to see a reversal of the picture in the East. To parallel the 26 Districts in our Eastern

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1 Data from Indian Chamber of Commerce, Background Paper for I.C.C. Conference on Calcutta - 2000, "A Demographic and Economic Profile of the Calcutta Metropolitan District", I.C.C., India Exchange, Calcutta, 1976.

sample we record the growth rate of the 26 Districts in Maharashtra. Both aggregate urban populations number about 11 million. First we note from Figure 1.4 b that the distribution shifts rightward not leftward from the first to the second decade in question: the modal value shifts from below to above the All-India mean. Secondly we note the relative absence of "green-field" sites, or, more precisely, of urbanisation in "green-field" Districts. The rapid expansion of the chemical industries indeed gave rise to very fast-growing towns, but on the whole these were in Districts where industry had already been established (and note that the data here presented are for the aggregate urban populations of each District). The grafting of the chemical industry on to the textile industrial base in Bombay, and the chemical industry at Pimpri on to the engineering industrial base at Pune are examples. A fairly straightforward point emerges. If a broad industrial base has been established at the District level, rapid expansion of new industry has a less dramatic local demographic effect: and conversely, as we will argue later, severe contraction in an industry has less dramatic social consequences.[1]

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1 For a politico-economic analysis of the industrial change see S.L.Shetty," Structural Retrogression in the Indian Economy", Economic and Political Weekly, Annual Number, February 1978. For the economic effect on the Eastern region see D.Banerjee," Industrial Stagnation in Eastern India: A statistical Investigation", E.P.W., Feb. 20, 1982.

The forthcoming analysis devotes attention to the area I am describing as the Eastern region of India, or the Chota Nagpur Crescent with the addition of Calcutta (Figures 1.1,1.2,1.5). Its unifying characteristic is that its industrial development is heavily dependent on the rich iron ore resources and more variable coal resources (including some of metallurgical grade). With the exception of the Calcutta Metropolitan region and the pre-Independence Steel Towns of Jamshedpur and Burnpur, the industrial base was not well-established in 1951. As a seat of industrial capital Calcutta was already losing place to Bombay; this process was hastened by, and possibly contributory toward, the local industrial unrest that was to develop especially in the late 1960s. There were thus indigenous reasons for stagnation that must be distinguished, in examining their local demographic implication, from the national economic malaise, and restructuring, referred to above. A further characteristic important to note is that in 1951 the region was prominent in its high incidence of agricultural labour (as recorded in the Census) in what was in any case a largely rural population, an incidence that was apparently to increase faster than the Indian average over the subsequent decades. Finally we note that we are dealing with a population that is ethnically differentiated: much of the region is Hindi-speaking, but industrialisation has resulted in migration of some of these people into the Bengali heartland.

The Districts I have chosen for observation sum to between one half and two-thirds of the population in this region, depending on precisely where you draw the boundaries.[1] We will now describe them in a little more detail (Figures 1.6 and 1.7 a).

A major growth centre in the Chota Nagpur Crescent lies in the Damodar valley amid the rich higher grade coal seams that stretch from Karanpura to Raniganj.(Figure 1.5). It is the closest that India comes to an industrial belt, though by the mid-1970s, when the author travelled through the region by train, it still amounted to no more than an array of smoke-stacks among the palms. Burdwan is the District comprising Burnpur Steel Town, and the Second Plan steel plant at Durgapur and associated engineering works; there is also the town of Asansol of mixed engineering including the production of railway wagons, and Chittaranjan, the new locomotive works. The growth of the urban population reflects these developments clearly, with increases of

1 My "Eastern region" does not coincide with the Eastern Region or Eastern Zone as they are officially defined: these include Assam and exclude any of Madhya Pradesh. The closest official classification to mine would be the South East Resources Development Region drawn up for planning purposes by the Government of India.
The criterion for selection of Districts in our study is discussed in the Appendix to this chapter.

45%, 73%, and 59% in the three post-Independence decades (Figure 1.7 a). The surrounding Districts are largely agricultural-based. Midnapore, Birbhum, and Bankura have old-established rice mills: their urban demographic growth rates are therefore more modest, averaging below 30% per decade, in line with the scale of these scattered processing industries. Their enhanced rates of growth during the 1951-61 decade will be in part due to the derived growth in demand for their consumer products (a multiplier effect), a prosperity not to be sustained through the 1961-71 decade: indeed the aggregate urban populations came close to stagnation, with net out-migration occurring in some of the individual towns.

Travelling Westward up the Damodar valley and on to the plateau between the Hazaribagh and Rajmahal Hills we are in the coal-mining District of Dhanbad whose rapid urban expansion in the 1950s is clearly derived from the demand for coking coal for iron production, as well as being due to the construction and enlargement of the fertiliser plant at Sindri. The demand for coal is also high in the 1970s and beyond, due to the expansion of the existing iron and steel plants, and partly due to the industrial expansion related to the siting of the next steel mill at Bokaro (which was due on stream by the early 1970s). Hence the urban growth in the District remains rapid though much reduced. The machine-tools and heavy engineering equipment required for the steel plants (among other users) were fabricated at Ranchi, though not until the mid-1960s, and despite shortfalls in production this has remained the major centre for such requirements as long as the continued growth of national output (albeit with fluctuations) called forth additional investment in industrial capacity (on the "accelerator" principle); the earlier growth in Ranchi District, however, relates to aluminium and cement manufacture.

Between the Damodar and Ganges valleys are a number of large towns of earlier foundation. The Districts of Gaya, Patna, Monghyr, Bhagalpur and Shahabad are mainly engaged in food and raw materials processing. Patna and Monghyr have additionally produced and repaired transport equipment, and Shahabad is a source of limestone, an essential ingredient in the purification of iron. Urban demographic growth in all these Districts of Bihar has remained fairly constant without fluctuations throughout the three decades, though the largest towns (Patna excepted) have experienced sluggish growth: any regional "multiplier" effects must have been barely felt. At the same time Bihari labour has tended to migrate Eastward within Bihar, and into West Bengal in general and Burdwan

District in particular. Singbhum District, also in Bihar, is the home of Indian steel-making: Jamshedpur was already producing a million tonnes at Independence, but a significant expansion took place in the 1950s, doubling the capacity. The town was also the homeland of heavy industrial and transport equipment, a broad manufacturing base thus having been achieved already by the 1960s. Urban demographic growth was again in this case sustained at at least one third above the rate of natural increase throughout the three decades.

The neighbouring State of Orissa is among the most rural in India. The new steel mill of the Second Plan built with West German collaboration was founded here on an entirely "green-field" site, at Rourkela in Sundargarh, and the demographic growth was explosive (800%). The same District includes other New-towns: cement production created Rajnagar for instance, limestone quarrying created Birmitrapur. The springing up of new settlements in neighbouring Districts is related to the opening of ore mines (Figure 1.5), again in previously undisturbed lands. But in addition Orissa has traditionally had a textile industry. Textiles have been the slowest growing manufacturing sector since Independence (Figure 1.3), with capacity barely expanding between 1956 and 1968 in the industry that is the largest single employer of all Indian industries. Mayurbanj, a small centre of the industry, owed its sudden demographic growth to the establishment of a power station at Baripada. Cuttack, a large centre of textiles, engages more generally in manufacturing, with more steady demographic consequences. Other Districts in Orissa are raw-material based, with rice-milling in the rich green coastal plains South in Ganjam, and saw-milling on the forested slopes of the Eastern Ghats, as in Bolangir. These areas enjoyed little expansion, indeed Bolangir clearly stagnated, untouched by the Second Plan; by contrast both enjoyed the local prosperity of projects in the 1960s. The influence of industrial development in neighbouring Districts can be observed in the fate of Baudh-Khondmals: traditional household manufacturing was unable to retain the local labour force over the first two decades.

Inland of Orissa, high on the central Indian plateau known as the Deccan, in Eastern Madhya Pradesh, lies an area of industrial activity best depicted as something of an outlier from the centre of the iron and steel belt (Figure 1.5). The District of Durg is the home of the integrated iron and steel plant at Bhilai (or Bhilainagar), whose rapid expansion is reflected in a demographic growth rate of 200% over the 1951-61 decade; (below we shall take this Steel Town for a special case study in employment dynamics.) The whole sub-region we take as a control against which to compare the more complex picture in West Bengal, looking more fully at the surrounding Districts to assess their demographic reaction to the rapid growth of this isolated locality; (we shall also make some comparisons with a similarly isolated iron and steel -making town in 19th Century England.) All three of the contiguous Districts were characterised by agricultural product processing, and Bilaspur and Bastar also by the manufacture of local cigarettes (beedis). All three Districts witnessed a growth in their urban populations that was well above the likely natural increase, during the period when the steel works were being developed and to a lesser extent through the subsequent decade, though in the latter period the differential growth between different towns is particularly marked. In Bilaspur District lies the source of the coal that was initially used to fire the furnaces of Bhilai. The failure of this whole sub-region to diversify further (at least until the late 1970s) has provided a good case through which to study the demographic and economic dynamics of rapid growth followed by relative stagnation (taken up in Chapters 6 and 9 below).

This overview should conclude with a reference to the comparative region and selected Districts of Western

India that we refer to in the course of this study (Figures 1.1 and 1.7 b). This is traditionally the home of the textile industry, being also a major area of cotton production. As was mentioned earlier, later developments in oil in the Gulf of Cambay, among other factors, have led to the diversification of the region, with new growth centred on Bombay and its New-town developments in Thana District (with sustained growth rates between 40% and 70% per decade); related industrial expansion has taken place in Poona District (where again an industrial base of a varied nature had already been laid). By contrast, the old inland textile-manufacturing District of Sholapur has continued to decline (without diversifying), with urban demographic growth below the rate of natural increase, whereas, further North, in Gujarat State, the famous textile City of Ahmedabad has modernised its technology (though also without much diversification) and maintains a healthy growth rate throughout the period. (The development of the textile industry in the different socio-demographic setting of 19th Century England is analysed below.)

Four Hypotheses

This completes our overview of the experience of an industrialising region in Eastern India, in comparison with other industrialising regions of rather different character in Western India (and later we make further comparison with industrial localities in England, both contemporary and historical (especially in Chapter 2)). The point of comparison to be developed throughout the work is as follows. Localities are affected demographically and socially by the establishment and fate of specific industries, and by the health of industry generally. The rate of investment levelled off in India during the ten years 1965-75: but that will have affected Western India as well as Eastern India. The more specific switch in the industrial content of what investment did take place will have affected the two regions differently. Thus Western India can be taken as a control against which to observe the demographic effect in the East of the country. The differential impact under different demographic pre-conditions is observed by regarding an industry with identical technology in contemporary Britain; and another differential is observed by regarding somewhat similar demographic conditions under the influence of a very different technology in the same industry in 19th Century England, though of course there remain contrasts within the comparisons, and some of these we shall exploit in our analysis.

From this overview four inferences were drawn, four hypotheses formulated, not for direct rejection or support so much as to bestow a more incisive quality, and to provide an analytic frame in the following economic-demographic history of industrialisation in a region of India since Independence. They are these:

1. Industrial strategy determines demographic structure in terms of age, sex, and migrant characteristics and their development over time.
2. Current technology is responsible for unprecedented demographic features, not experienced in earlier industrial revolutions.
3. The macro-economic-demographic relationships proposed in models founded on the Coale-Hoover tradition are acutely observed, and fundamentally important, at <u>local</u> levels of demographic aggregation, in the town or city.
4. In addition to, and maybe more important than, the issues raised in the models just referred to, there are implications in the urban demographic dynamics that follow from industrialisation for the current and future social and economic health of urban societies, particularly relating to continuing employment opportunities.

These four hypotheses may be summarised in a rather stronger hypothesis quoted in the Abstract: that modern industrial technology in combination with factor proportions typical of a developing country gives rise to local population structures that are unusual if not unique in history and that carry with them over time exceptionally complex economic welfare implications for the localities and households involved.

Figure 1.1

Map of India indicating Districts

Studied in this Thesis

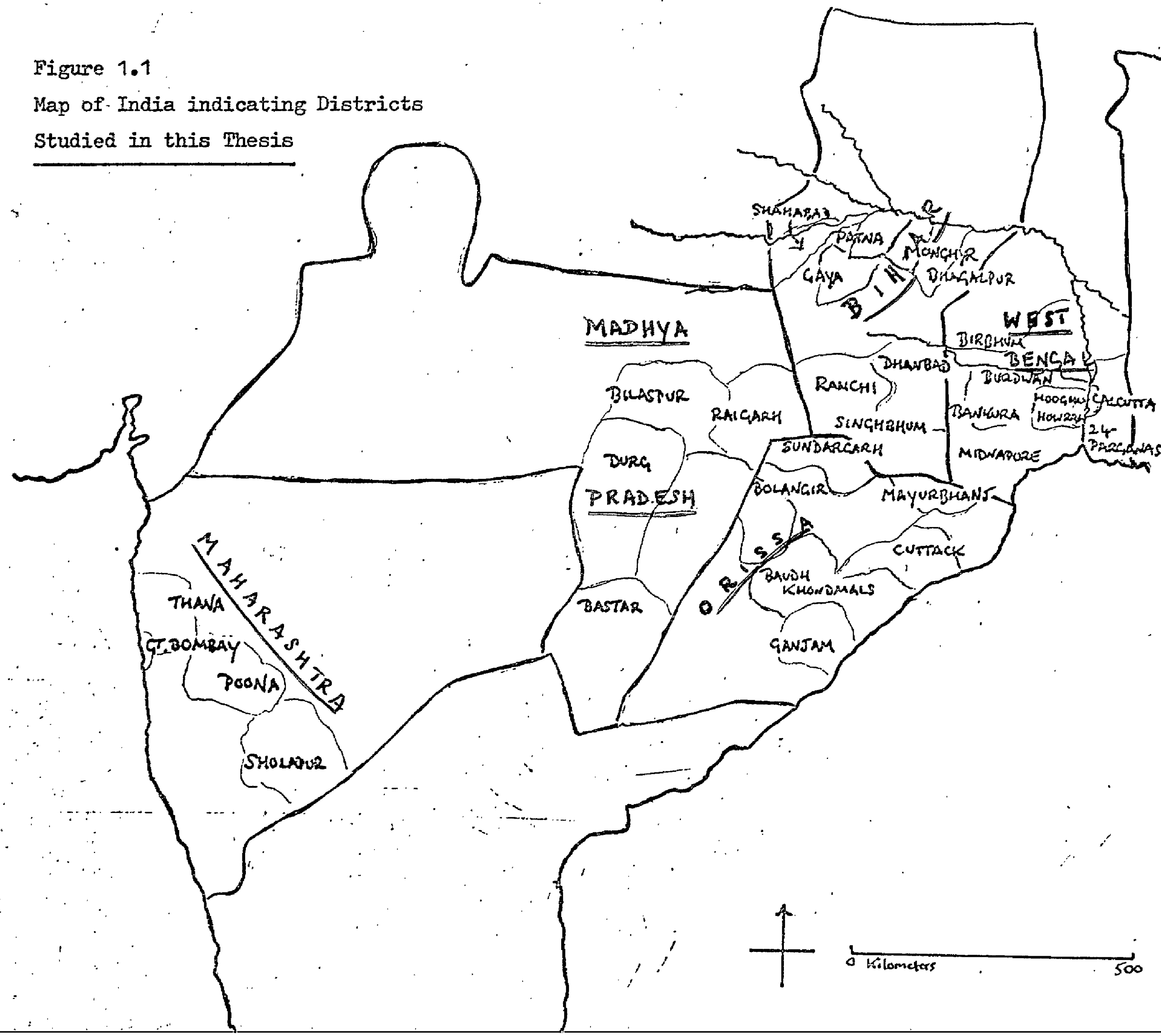


Figure 1.2

Map of India indicating Cities

Studied in this Thesis

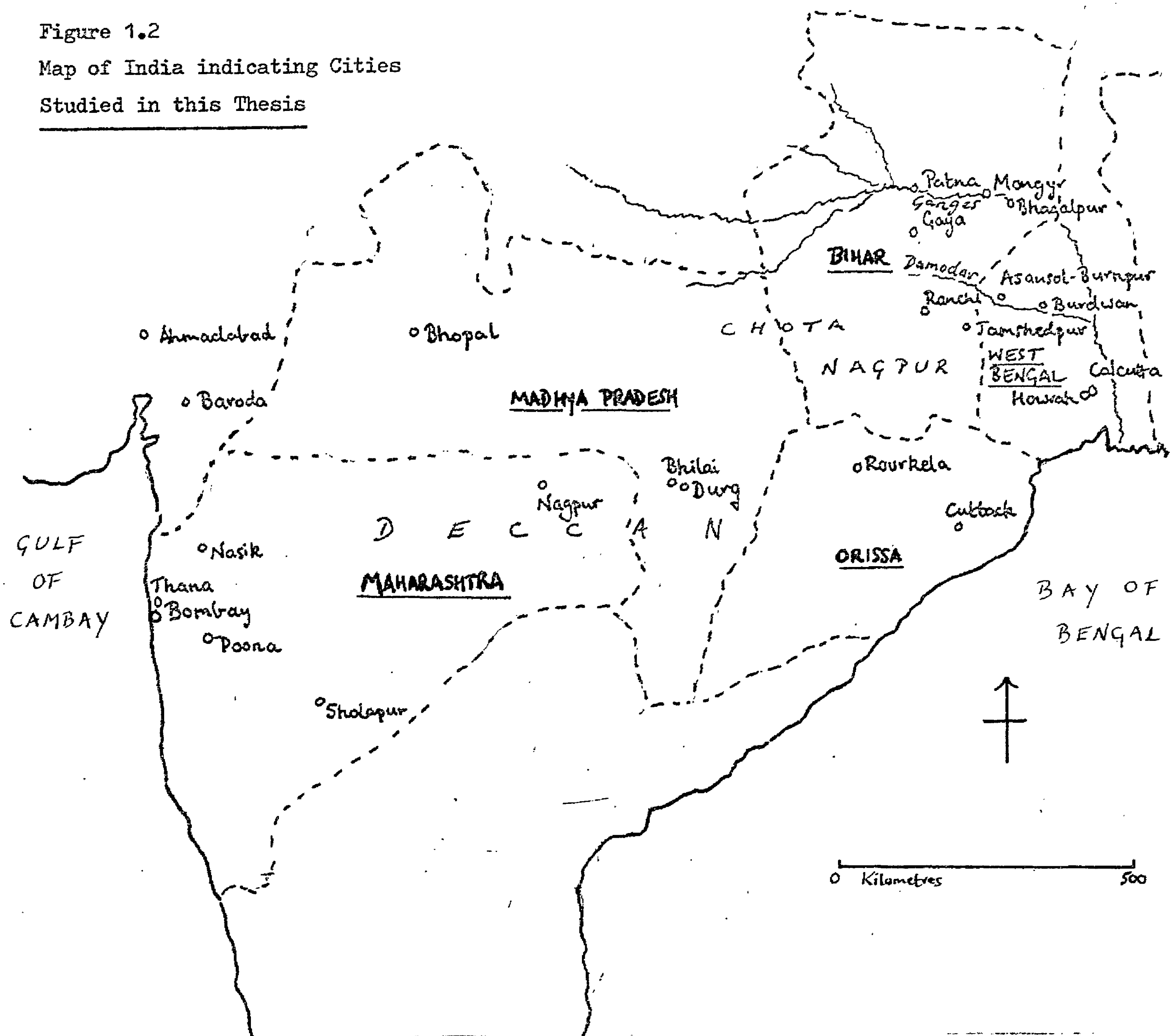
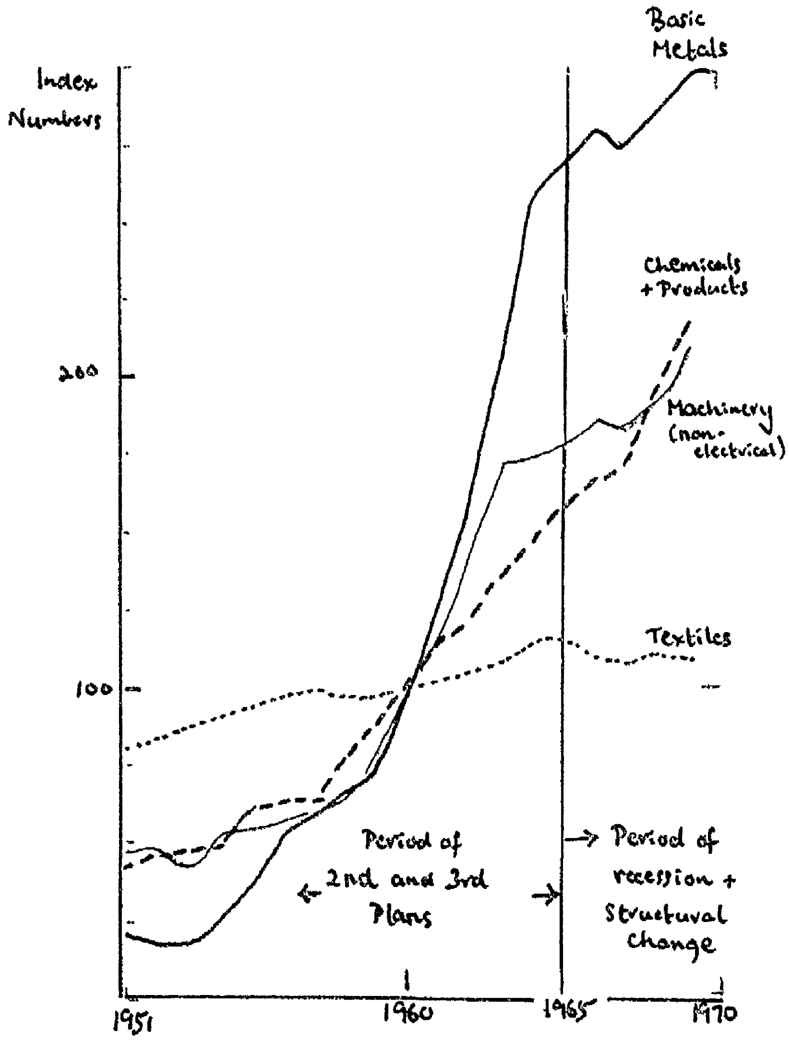


Figure 1.3
Indices of Industrial Production
from 1951 to 1971

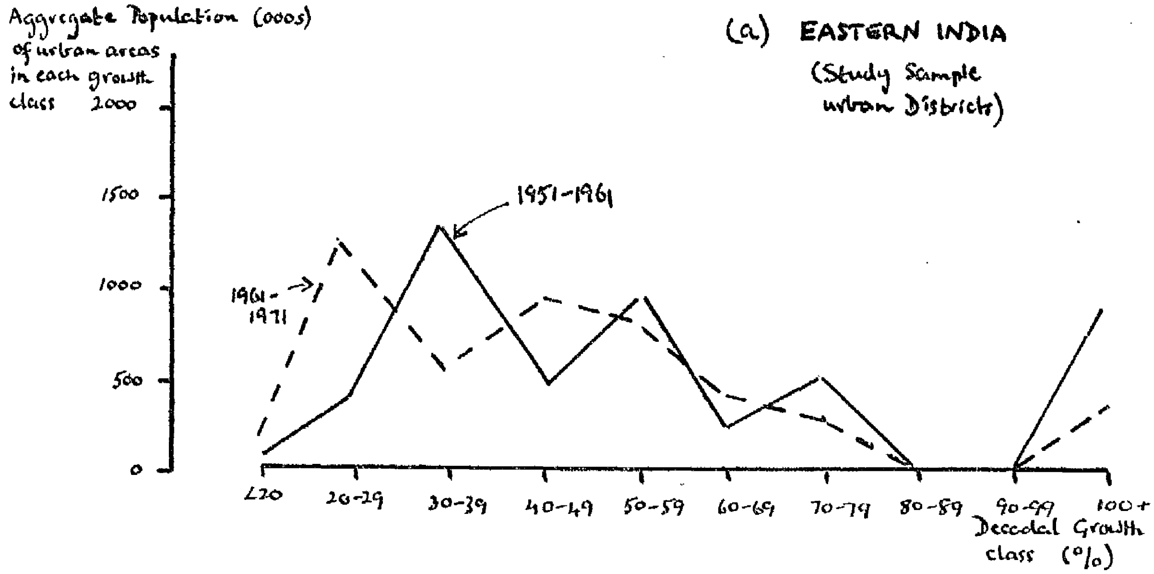


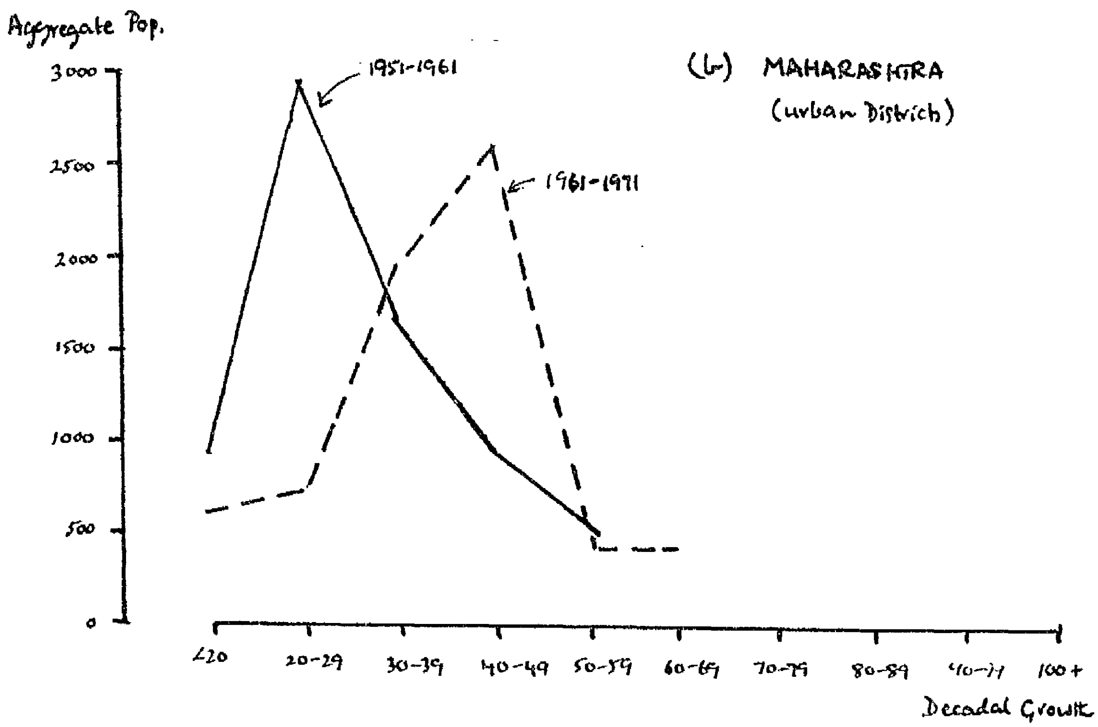
Industrial Production Base year 1960 = 100

Source M.R. Kulkarni, Industrial Development, National Book Trust, New Delhi, 1971, Diagram 12.

Figure 1.4

Distribution of Urban Populations by Decadal Growth





(Note: in 1.4b 1961 definition of urban is used throughout due to large number of 'declassifications' in that State)

Figure 1.5

Map showing major Mineral Resources in the Iron and Steel.Region of Eastern India

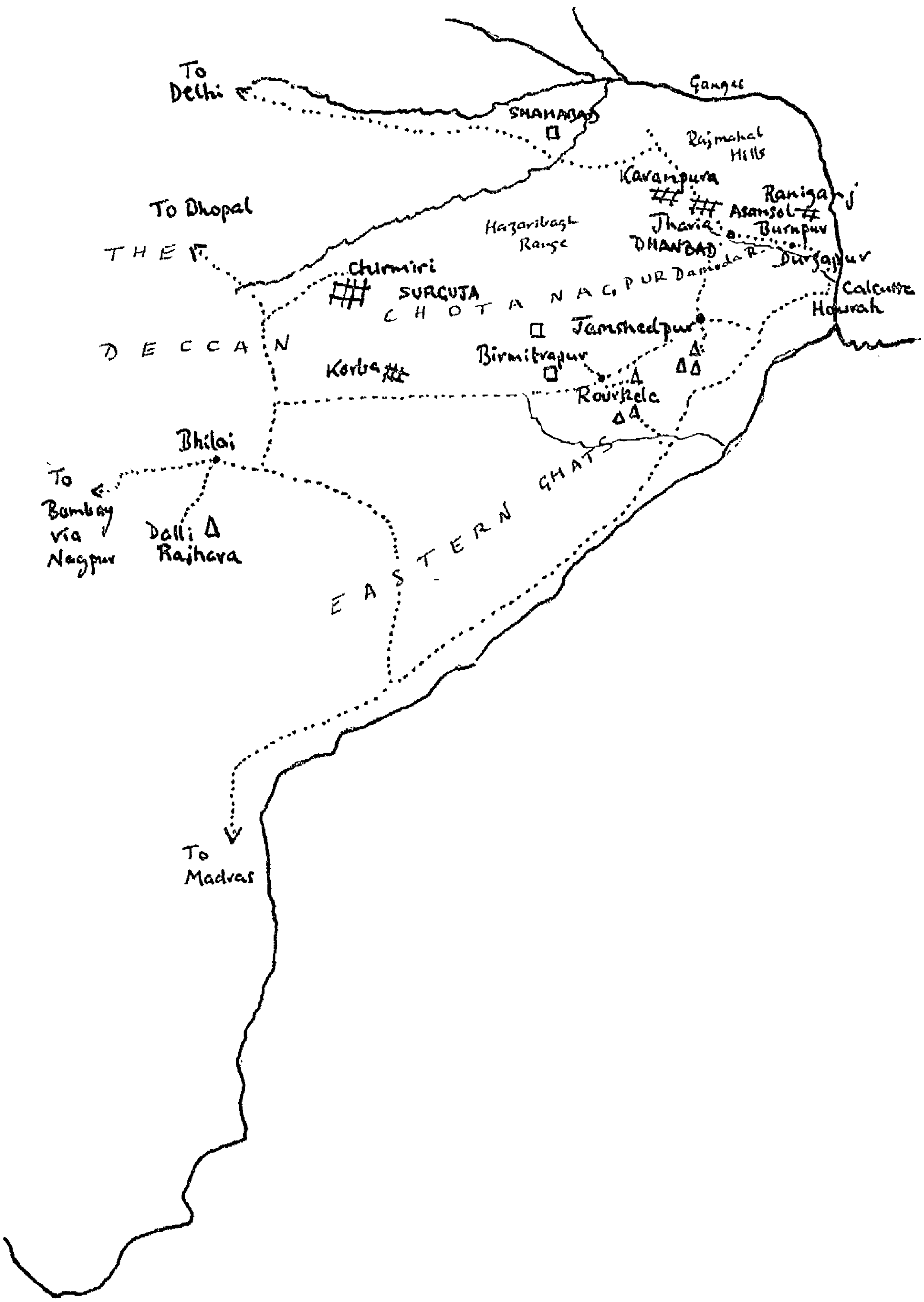


Figure 1.6

Tableau showing major Manufacturing Activities and principal Urban Characteristics in study Region of Eastern India

District (and size of total urban population)[a]	Manufacturing Activity (1951-61)	Characteristics of Urban Population 1941-51 - 1951-61 (see also Fig. 1.7a)
West Bengal		
CALCUTTA (1815791) (1111498)	Jute products	Metropolitan City (stagnation - decline)
HOWRAH (501822) (323270)	Small-scale workshops	Twin City (stagnation - moderate growth)
24-PARGANAS (1150205) (847752)	Jute products Small-scale engineering	City Outgrowth (moderate growth)
HOOGLEY (331287) (247996)	Jute products	City Outgrowth (stagnation - moderate growth)
MIDNAPORE (182687) (151599)	Rice milling	Lakh* City and medium towns (moderate growth/ stagnation)
BURDWAN (330311) (230767)	Heavy industry Iron and Steel Coal mining	Two Lakh Cities and New Towns (moderate - fast growth)

[a]Size in 1961 males and females

* ≧100,000 people

Figure 1.6 continued

BIRBHUM (54647) (46122)	Rice milling	Medium towns (decline - moderate growth)
BANKURA (64133) (58024)	Rice milling	Large town (decline - stagnation)
Bihar		
PATNA (327525) (266371)	Mixed industry - transport equipment, food and drink processing	Lakh City (moderate growth) Medium towns (stagnation - moderate growth)
GAYA (142480) (122618)	Food and raw material processing	Lakh City (stagnation - decline) Medium and New Towns (stagnation - fast growth)
SINGBHUM (245256) (195395)	Iron and Steel Heavy engineering	Lakh City and medium towns (moderate growth)
RANCHI (111447) (91031)	Mixed - minerals and textiles (machine tools later)	Lakh City (fast - moderate growth) New Towns
DHANBAD (176070) (113843)	Coking Coal and mineral-based industry Fertiliser	Lakh Town Group (fast - rapid growth) New Towns

Figure 1.6 continued

MONGHYR (197117) (178082)	Loco - engineering, cigarettes (Oil - Refining later)	Lakh City (stagnant) Large town (stagnant - rapid growth)
SHAHABAD (125538) (106163)	Agro-based - food processing, leather-making Limestone	Medium and small towns (stagnant)
BHAGALPUR (101919) (84800)	Textiles	Lakh City (stagnant) New Towns
Eastern Madhya Pradesh		
RAIGARH (31504) (28383)	Agro-based - cotton, rice milling, forestry	Medium and small towns (moderate growth - stagnation)
DURG (138073) (97481)	Iron and steel Metal Products	Lakh Town Group with New Town (stagnation - rapid growth)
BILASPUR (88581) (79856)	Beedi*-making, textiles. Coal-mining and mineral products	Large and medium towns (stagnation - rapid growth)
BASTAR (14132) (12767)	Beedi-making	Medium and small towns (stagnation - moderate growth)

*local cigarette

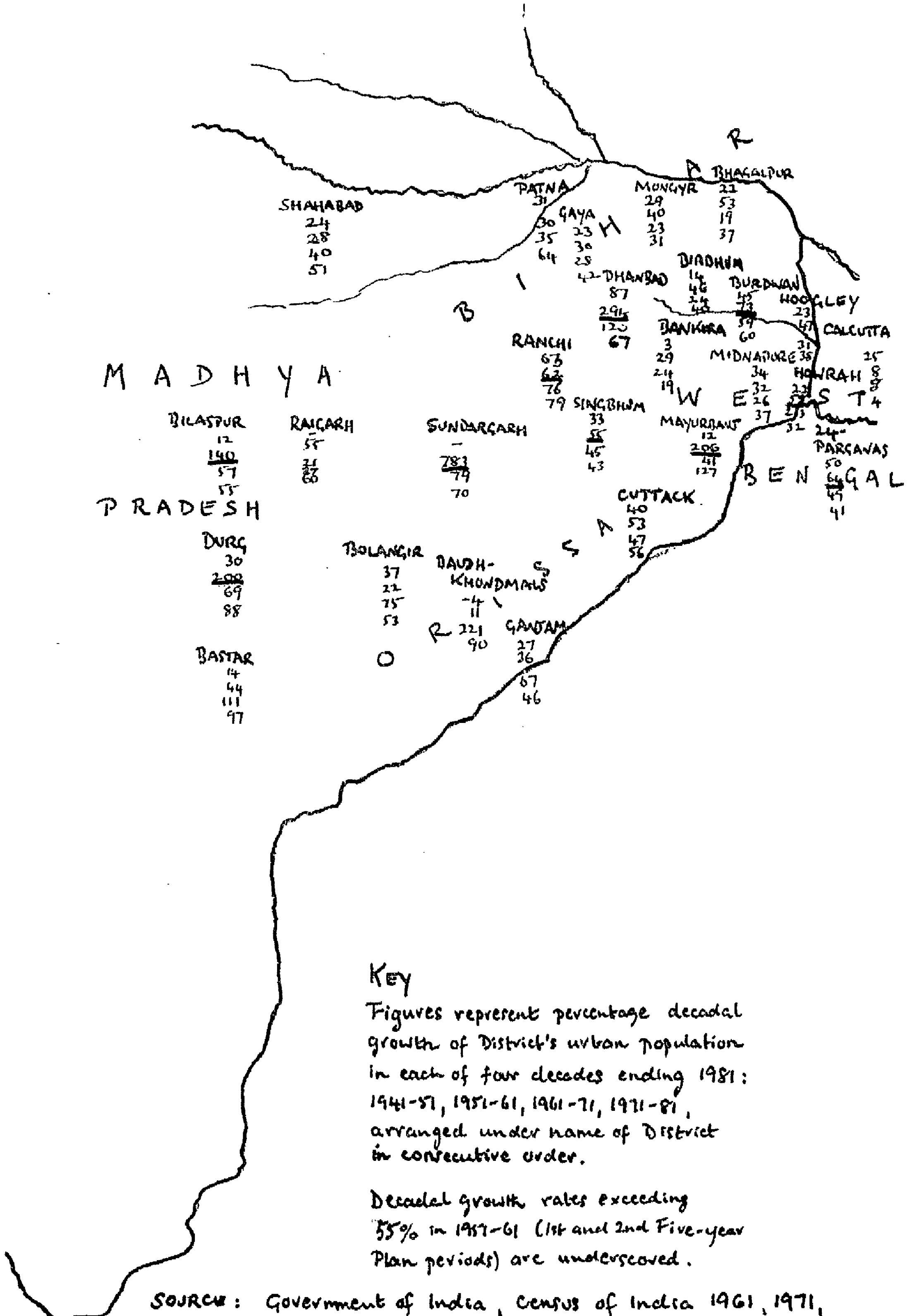
Figure 1.6 continued

Orissa		
MAYURBANJ (15699) (12721)	Household textile industry Power plant	Medium and New Town (decline - rapid growth)
SUNDARGARH (83287) (52473)	Iron and Steel	New Towns (rural - rapid growth)
CUTTACK (119568) (89029)	Mixed manufactures - textiles	Lakh City (moderate growth)
GANJAM (79865) (75979)	Rice milling, saw milling	Large town and small towns and New Town (stagnation - moderate growth)
BOLANGIR (25824) (23835)	Rice milling, saw milling	Small towns (moderate growth - stagnation)
BAUDH-KHONDMALS (3123) (2965)		Small towns (decline)

Source: Government of India, Census of India 1961, General Population Tables, New Delhi.

Figure 1.7 a

Diagrammatic Map indicating Decadal Growth Rates of Urban Populations from 1941 to 1981 in Eastern India



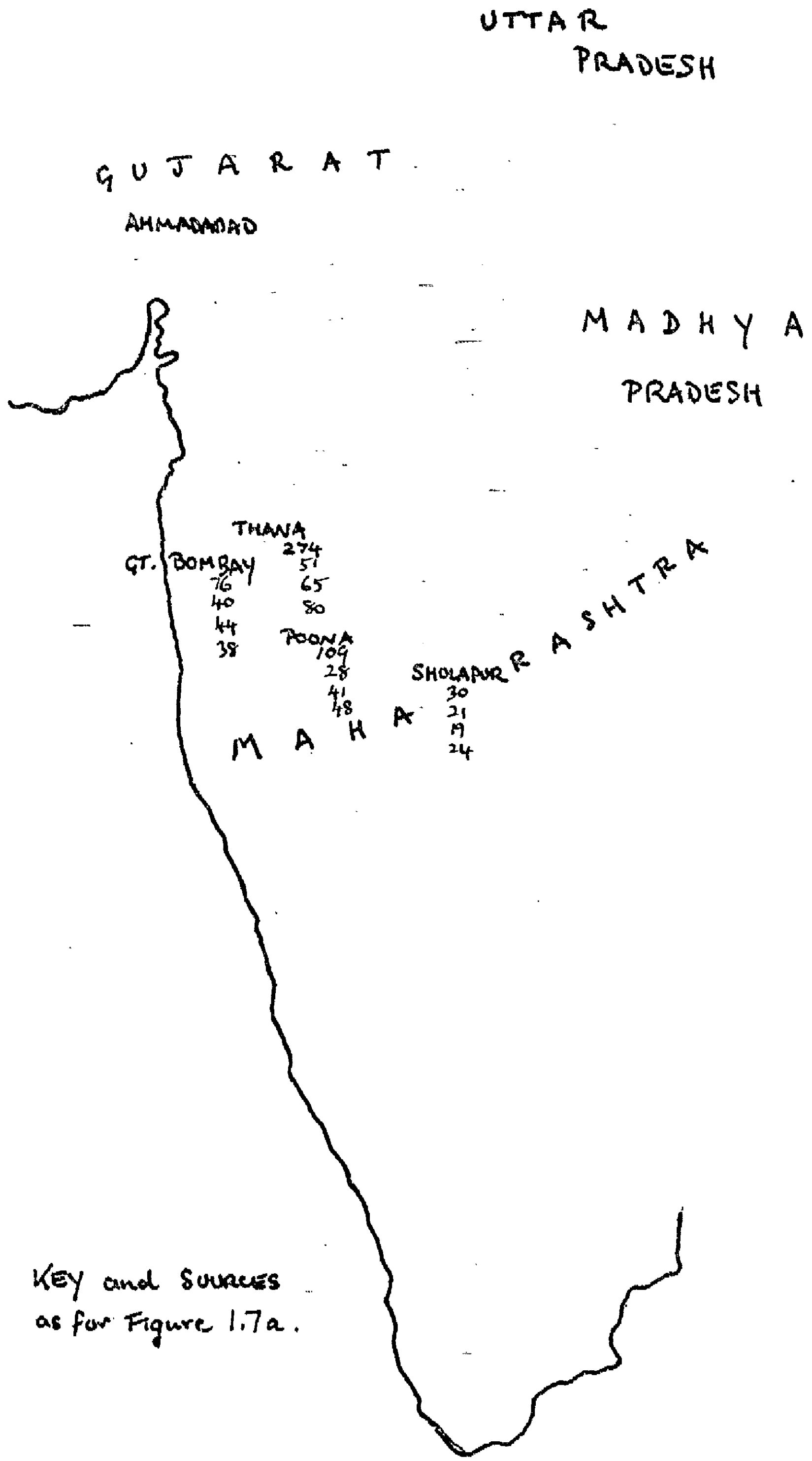
Key

Figures represent percentage decadal growth of District's urban population in each of four decades ending 1981: 1941-51, 1951-61, 1961-71, 1971-81, arranged under name of District in consecutive order.

Decadal growth rates exceeding 55% in 1951-61 (1st and 2nd Five-year Plan periods) are underscored.

SOURCE: Government of India, Census of India 1961, 1971, Vol 2A Population Totals (for the four States), Area and Population Tables (derived from), and Statements on Decadal Growth (where available); Census of India 1981, Paper 3, Provisional Population Totals, Appendix III.

Figure 1.7 b
Diagrammatic Map indicating Decadal Growth Rates of Urban Populations from 1941 to 1971 in selected Districts of Maharashtra



Appendix 1.1 Selection of the Study Sample

The Indian Census data are fullest for the largest cities in 1961: in our region Calcutta is the sole example (though we do make use of some comparative data for other major cities, notably Bombay). A good intermediate category consists in the towns of 100,000 or more (One "lakh") people, of which there are a number in our region (Figure 1.2). Below this size the data for individual towns are rather meagre, the purely demographic data being available on size of male and female population and broad age groups only. There are no 5-year age group data, marital status data, or, worst of all, migration data. These statistics are available, however, for the urban populations of each District taken as a whole (the Urban District). It is possible therefore for a researcher interested, say, in towns of Class Three in population size (20-50,000 people) to select those Districts that are dominated by towns of that size: whose urban population has a majority of ⅔rds, for instance, in towns of that size class. My study relates not to size per se, but to the speed and character of the growth of towns. The "character" of growth stems from migration characteristics, and hence can only be diagnosed at the District level of aggregation. Growth rates alone, however, are to be had for individual towns. I have tried to select those Districts where either there is a city of 100,000 population size (for which we have fairly full separate information), or at least ⅔rds of the towns were growing at approximately similar rates from 1951 to 1961, so that it becomes possible to describe the District as consisting in towns and cities "in stagnation" (0-30% decadal growth), or "of modest growth"(30-55%), or "of fast growth" (over 55%), and so on. An arbitrary cut-off point on the acceptable coefficient of variation of growth rates was taken as follows:[1] if the mean for the District is 40% or below, 1.5 is the maximum tolerable coefficient of variation; if the mean is above 40%, 1.0 is the maximum acceptable. The growth rates of New-towns in 1961 were calculated from their rural constituents in 1951. On this basis 26 Districts from the Eastern part of India (described in the text above) were chosen (Figure 1.1). The sample is therefore systematically biased, it is not a probability sample. For some purposes particular inclusions or exclusions are made (Calcutta is often excluded), and for comparative purposes, for instance in presenting data for Maharashtra, similar procedures are not adopted. In each case the possible bias involved in such comparisons will be indicated.

Generally speaking it should be noted that this sample tends to over-represent the heavy industrial towns within the region, just as the region itself is more heavily industrialised than India as a whole. Hence for example the growth of the urban population in the 26 Districts is 61% over the 1951-61 decade (and 98% if you exclude the

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1 The coefficient of variation is the standard deviation divided by the mean.

Districts incorporated in Calcutta), as against the All-India average of 34%. This high figure is strongly influenced by the inclusion of all three "green-field" Steel Towns.

In the Appendices to chapters that follow we have undertaken statistical regressions to provide a check on the observations we make in the text (and occasionally to estimate parameters). In some cases we use a sample of large cities (described below), in other cases the sample Districts (just described, and sometimes referred to here as the "homogeneous sample" or "study sample"), and at times we use a sub-sample of either of these. We emphasise that the basic requirements of random sampling are not met: our results therefore tell us more about heavily industrialising urban areas than about other types. Our interest has always been to focus on the extreme cases, the large and fast growing New-towns, and the large but stagnating old towns for example.

A brief Overview of Chapter 1

In a review of the literature on demographic-economic relationships we conclude that studies have too often focused on aggregate problems, whereas the more serious implications of too rapid or too slow a population growth occur at local levels; and secondly that studies of urban populations focus mainly on their size, and fail to analyse their growth and changing demographic structure over time (despite the more serious economic implications of the latter). In an overview of Eastern India we highlight how national investments during the Second Plan, being concentrated on heavy industry, and especially iron and steel production, were channelled towards a few localities, with significant and unforseen consequences for local population growth, structure, and migrant composition.

CHAPTER 2

Technology of Scale and its Demographic Correlates

A Summary of the Argument

Here we begin to build a more detailed theory from the foregoing observations: to examine the hypotheses through comparisons and controls. The scale of investment in individual plant is the result of vast economies of scale exploitable in modern technologies. To examine this idea a little more closely we look back in time to the formation of the iron and steel industry in England when the supply of labour was also relatively plentiful as in India today. We find small plant and small townships and lower demographic growth rates by comparison. We also observe the impact of contemporary technology in current England, over a period when labour supply was growing less rapidly than in India, and again the localities are found to be small and growing more slowly. We look at economies of scale in other industries. At the plant level, they are either much smaller (as in textiles) or highly labour-saving (as in chemicals), though in the former case economies of agglomeration are also noticeable (both historically and today). None of these comparisons suggests that the future will necessarily replicate the problem I am outlining in so acute a form,as in heavy engineering, and especially iron and steel making; however, a less dramatic, more secular problem of similar kind can arise in the case of agglomeration economies in closely related industries. All these comparisons indicate that the maximum repercussions will be occurring over the current decades, owing to the current peak in the Indian labour supply.
In these two senses the problem I outline may be historic - it never occurred before and may never occur again on such a scale. But it is currently of considerable significance, and the repercussions will be felt long into the future as industrial restructuring takes place.

The Development of the Iron and Steel Industry in England and India

Although this work is intended to be an historical study of industrial and demographic inter-relationships during the first twenty years of India's Independence, it is written with a number of specific questions in mind, with the intention thereby of sharpening the analysis and increasing its contemporary relevance for understanding the continuing character of that economic-demographic relationship. This was made clear in the first chapter. The object in this chapter is to examine how the industrial demographic relationship might differ under the conditions of changing technologies on the one hand, and varying initial demographic positions on the other. A problem of contemporary interest would be to gauge the future inter-relationships under a number of assumptions regarding the technological and demographic future. To provide guidelines in this approach we pursue an historical review; and to provide some degree of control we adhere at first to a single industry.[1]

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1 The method is still that of selected case studies: in our judgement the detail in which one can pursue such an approach compensates for the lack of wide representation; it is hoped that the contextual awareness which we try to maintain will tend to mitigate the latter defect.

The home of modern iron and steel making was very much the North-East of England in the 19th Century. The important determinant of that location was the presence of the Cleveland ores (Figure 2.3). Although the major centres established from the middle of the century were in the vicinity of Middlesbrough, the site that both typifies our examples of the Indian green-field plants (Bhilai above all), and exemplifies in an extreme way an industrial monoculture perpetuated as such down to the present day, is that of Consett.

High on the Durham moorland, on what was believed to be a rich source of ore, Consett was foisted on the local folk much as Bhilai was planted on the tribals of the Eastern Deccan. Consett was regarded as a huge plant at that time (early 1850s), but its output was only of the order of 100,000 tons. Tracing the size of the associated township over time is not easy, but the population of the Lanchester locality, described in the Durham Chronicle at the time as consisting of people dependant on the iron works[1], numbered 20,000 by the late 1850s[2], considerably less than a quarter of whom will have been employed directly or indirectly in the industry of iron-making. The point to

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1 Durham Chronicle, 9th July 1858, quoted in A.S.Wilson, "The Origin of the Consett Iron Company", Durham University Journal, 1977.

2 British Government, Census of England and Wales 1861, Tables of the Ages....of the People (Northern Counties), London. The total population of Lanchester is given as 22338, males aged 20-60 number 5393. The township of "Conside-cum-Knitsley" numbered 2777 in 1851 (1589 males), and 195 in 1941.

emphasise is this. The technology of industrialising Britain dictated local demographic features of a completely different magnitude; less plentiful labour resources (than India's today) enhanced that difference; so that a local population of a mere 20,000 grew up over a couple of decades as a result of an investment in plant of the largest economic scale then known in the industry concerned (Table 2.1).[1]

The limited size and growth rates of these local populations in iron-making areas - (Lanchester expanded at the fairly modest rates, in comparison with Indian Steel Town Districts, of 103% and 41% respectively over the decades 1841-51, 1851-61) - reduced the planning problems related to green-field sites, and the dynamic population fluctuations that followed were modest, partly due to the relatively balanced sex ratios among the migrants, and partly due to their modest number (by Indian standards) in relation to the total local population (Consett's sex ratio in 1851 was about 750 females to 1000 males; see Table 2.1 for contrasting population age structures that follow from these technological and demographic differences). On this we have more to say below. Furthermore, even modest industrial growth

1 By 1864 the 18 blast furnaces had a capacity of 150,000 tons of pig. By 1875 it was the largest iron plate works in the world. See H.W.Richardson and J.M.Bass, "The Consett Iron and Steel Company", Business History, 7:2, July 1965. In the earlier period Consett is said to have employed 5-6,000 men (50% of whom were Irish). To judge from the size of the working population of Lanchester in 1861 this must have been about 75% of the local workforce (migrants included). The figure is likely to include the Company's service sector.

rates (by modern developing country standards) were more likely to shift the population in proportional terms from rural to urban locations, given a slower rate of rural natural increase (much less than India's 2% per annum, and generally around $1\frac{1}{4}$% in the 19th Century), thus relieving some of the demographic pressure on rural economies, and reducing the relative attraction of urban non-core manufacturing sector employment. Hence the local multiplier effects of the new industry seem much reduced in comparison with those in contemporary India. However, a minority of rural migrants at least would be attracted from more backward regions (no doubt actively encouraged as a source of cheaper labour) and hence a picture of ethnic diversity (similar to that in Indian Steel Towns - see Chapter 6 below on Durgapur) follows: "the influx of many new workers of diverse origin into the infant towns such as Middlesbrough and Barrow created social problems for which there was at first no adequate machinery."[1]

From here we should turn to the origin of the steel industry in modern India. In 1911 the Tata Iron and Steel Company (TISCO) was founded in the District of Singbhum on a site in the jungle close to a vein of singularly pure ore:

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1. J.C.Carr and W.Taplin, History of the British Steel Industry, Oxford University Press, Oxford, 1962; see also the previous note.

the township that emerged was christened Jamshedpur (after the entrepreneur Jamshedji Tata). What is significant from our point of view is the fact that the technology sought was the best currently available in the world, obtained not from England but from the United States. The relative labour and capital factor proportions in the two countries, India and America, seem not to have been a consideration. Technical expertise, the physical equipment embodying the advanced technology, the skilled and semi-skilled labour, were all inevitably to be imported from overseas (Germany was an important source of labour and also manufactured the furnaces). Capital it seems was forthcoming on the Indian market.[1] Despite the costs of importing skills and technology, the plant was exporting steel by 1912. The very high quality of the ore must have rendered India a competitive steel producer in those days, as in more recent times, despite other disadvantages, though how far importation of unmodified Western technology was justifiable is open to question, and indeed in the 1920s the industry needed protection at the rate of 33% in the face of world over-capacity. By 1915 the plant produced 100,000 tons per annum, and by 1921 170,000 tons with a workforce of 26,000.[2] By that date the town had reached 57,000 (which was comparable with only five other towns in Bihar and Orissa at that time, Patna

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1 J.L.Keenan, A Steel Man in India, Duell, Sloan and Pearce, New York, 1943, is a fascinating source of information here.

2 S.K.Sen, The House of Tata(1839-1939), Progressive,Calcutta, 1975.

alone being substantially larger at 120,000).[1] By the time of Independence scale economies in the industry justified a million ton production unit: this was achieved at Jamshedpur with a workforce of 23,000 (less than in 1920) as the result of an expansion programme to be completed in 1955, prior to the erection of the public sector plants of the Second Five-Year Plan. The city's population was now heading for a quarter of a million.

While the giant Indian mills of the Second Plan were being expanded or erected in the late 1950s, a remarkably similar thing was taking place elsewhere: for a comparative case we look again at the United Kingdom. Both at Corby (in Northamptonshire) and at Consett (in Durham) renewal and expansion of iron and steel plant were taking place, to take the capacity to the one million tonne mark.[2] Scale economies were such that unit costs would rise by about one third between output levels of 250,000 and 1,000,000.[3] Essentially the technology was the same as in India, with open-hearth furnaces in the case of both Corby and Durgapur; indeed Britain built Durgapur. What is remarkable is the

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1 Government of India, Census of India 1921, Bihar and Orissa, Patna.

2 From this period the metric tonne becomes the more frequent accounting measure. Fortunately the ton and tonne are similar in size, the latter being 0.984 of the former.

3 See, for example, B.Balassa et al., The Structure of Protection in Developing Countries, The Johns Hopkins University Press, Baltimore and London, 1971.

size of the labour forces. At Corby in the late 1960s about 6,000 men were employed in the integrated iron and steel works by British Steel; at Bhilai about 17,000 were employed by Hindustan Steel, and 20,000 at Durgapur.[1,2]

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1 Data from Master Plan for Corby published in 1975. It is fiendishly difficult to standardise production labour forces across different plants and in different countries. Iron and steel production workers at Corby numbered 4753 (excluding those in the tube plant). We should add to that a section of the general staff in the employment of the British Steel Corporation totalling 3216, who will have been employed at both plants. The figures are for 1971 when capacity was 1 million tonnes.Comparability is further confused by the difference in the final product: data rarely refer to the ingot stage (indeed in continuous casting processes this will become a meaningless cut-off point). But the finished or semi-finished product may be rail, plate or billet, each requiring different processing. I have tried to exclude labour involved in any further processing than this (for instance in tube production), but inevitably some non-comparability remains. For India, data are from Hindustan Steel Limited, Statistics for Iron and Steel Industry in India 1970, Ranchi. They indicate the employment of 17270 process, service and maintenance workers at Bhilai, and 20043 at Durgapur (excluding those in the alloy plant). This is for 1964 when the plants were fully on stream and each rated at 1 million tonnes capacity or so (actually production rose to 1¼ m.t. - 1⅓ m.t. in that year).

2 W.A.Johnson, The Steel Industry of India, Harvard University Press, Cambridge, Massachusetts,1966, suggests that 13,000-15,000 were employed, but that the target labour force at Bhilai was between 6000 and 8000; and a figure of 7500 is given as the standard for the three public sector plants in the Times of India Yearbook for 1959. It cannot be said

The second point to note is that both Corby and Bhilai conspicuously failed to diversify (see further Chapter 9 on Bhilai). Employment in manufacturing was 17,000 in Corby in 1966, with 12,000 in the whole of the British Steel plant (including the tube mill), and an estimated 6-7000 in the integrated iron and steel mill, about 70% and 40% of manufacturing employment respectively. In Bhilai about 70% of the manufacturing workforce (26000) are also in iron and steel. The whole of the manufacturing

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note 2 continued from overleaf

that pure market forces operated in dictating the manning levels in any of the cases under comparison; all were carrying excess labour, owing to political pressures. The figures we quote refer to operatives, maintenance, and service workers permanently on site. Construction workers inflate total labour force figures enormously during initial fabrication, and subsequent expansion phases: 63,000 at Bhilai, 22,000 at Durgapur, 45,000 at Rourkela are the figures given in Iron and Coal Trades Review, <u>A Technical Survey of the Durgapur Works</u>, undated but apparently 1960, page 2. It is difficult to dismiss (also to manage) such large forces, especially when expansion phases are in sight, and it is reported that construction workers get carried on in the overall workforce; (press reports in India in 1981 claimed that the Bokaro plant had held over some 4000 workers in construction between the inauguration and the expansion phases).

and services labour force supports a local population of about 40,000 in Corby (by the mid-1970s) and 39,000 in Consett (at the million tonne stage), whereas at Bhilai the figure is between 86,000 (1961) and 174,000 (1971), that is about 120-150,000, or four times the size of the United Kingdom populations at roughly comparable production levels. Here the factor endowment and demographic contrasts between India and contemporary England are displayed to the full. In a single-industry town the core-manufacturing labour force in India is three times the size of the United Kingdom equivalent, and the total labour force is three to four times the size.[1] The size of the total dependant population depends on how many urban workers were supporting rural families in each case. The Indian dependant population is probably five to six times the size.[2] Strictly open unemployment rates do not differ much in the two towns, but in India the massive labour force is absorbed in commerce, transport and services, like water in a sponge.

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1 It is difficult to make comparisons between towns such that they represent similar degrees of maturity (following investments in a core industry), especially as steel capacity in India is continually being expanded. To compare like with like we should probably exclude the tube mill at Corby and estimate figures for Bhilai as of the early 1960s. The labour forces compared would be 15-20,000 and 60-70,000 respectively.

2 India has about 4 dependants per adult worker, England has about 3. Bhilai's skewed sex ratio (.80 f:m) in 1971 suggests more absent dependants than was the case in Corby.

For reasons to be discussed below an identical technology has been adopted in these two economies. But owing to the different circumstances of labour supply, the demographic implications can be sharply contrasted. In the case where labour is relatively abundant the core industry itself carries more labour per unit of capital, and the industries that grow up to provide the local goods and services carry far more labour than in the case where labour is relatively scarce. Labour-force in-migration rates are therefore far higher. In the labour-abundant country family size is also larger (due to higher fertility without compensating high mortality, which has of course ensured the relative abundance of labour), so that total in-migration rates are also higher. These are reflected in a very sharp acceleration in the growth rates of the towns over a decade, and a very large local population at the end of the decade. The problem of planning social services and continuing full employment in such situations is discussed in detail in later chapters of this study. When the technology was different so that optimal scale of plant was smaller, the acceleration in growth rates was naturally smaller. At a time when Western economies were themselves relatively labour-abundant, in the mid-19th Century, optimal scale of plant was considerably smaller. The net effect of more abundant labour but smaller scale was to result in slower urban demographic growth, and smaller cities at the end of these periods of acceleration.

(It is true that natural growth was slower, since birth-rates were a little lower, and deathrates higher than in contemporary developing countries, but differential natural growth rates are not important components in overall growth rates of these magnitudes - natural growth is swamped by in-migration rates.) These illustrations indicate our grounds for belief that the experience of the 1960s onwards in India is probably unique.

The argument may be pursued relentlessly; the epilogue is as follows. The increasing economies of scale in iron and steel manufacture face no clearly forseeable limit today. Currently the minimum efficient scale of an integrated plant is six million tonnes.[1] The next plant to be established in India will be of 3.2 m.t., destined for Visakhapatnam in Andhra Pradesh. The township, built on a green-field site and given current factor ratios in

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1 See S.V.Char, "Viability of Vizag Steel Plant", Economic and Political Weekly, 10th Nov. 1979. He claims that 6 m.t. ensures that 90-95% of scale-dependent economies are reaped. Eight to nine m.t. seems to be the maximum size before we can be sure diseconomies will set in, (technically they currently set in when blast furnaces head towards 5 m.t. capacity each, owing to cooling and maintenance difficulties). See W.F.Cartwright, "Comparison of the Blast Furnace BOF Route with its Alternatives", in the Iron and Steel Institute , Alternative Routes to Steel, A.G.M. Proceedings 1971; J.Aylen," Plant Size and Efficiency in the Steel Industry: an International Comparison", University of Salford, 1981.

industry and commerce, can expect to absorb something in excess of 250,000 people in a decade (and perhaps well in excess of that for the six million tonne plant ultimately hypothesised). But economies of scale are clearly going to become labour-saving in character; it would be absurd merely to extrapolate in this way. Suffice it to say that growth rates will be larger than experienced before in India (or in Britain), until the day when labour supply tightens significantly, following declines in natural increase, and factor proportions change.

A continuing increase in the economies of scale and improvements in labour productivity are indicated in the more modern U.K. plant. By 1971 Consett was using two blast furnaces and two L.D. converters (not Open Hearth, as at Durgapur and Bhilai) to produce 1.4 m.t. with 3605 operators from a local population that had fallen to 36,015 (from 39,000).[1] Durgapur had reached a capacity of 1.6 m.t. by the late 1970s, employing about 23,000 men in the iron and steel works (excluding the alloy plant) with a local population of around 305000 [2] Returning finally to Cleveland in North East England where we began the comparison, one of the most advanced plants in Europe has now been established. In the whole of the Teesside Division (including Consett before

1 British Steel Corporation, Teesside Division, Steel Times, Technical Survey, Sept. 1979.

2 Government of India, Census of India 1981, Paper 3, New Delhi.

closure in 1980) the iron and steel-producing labour force numbered only 25,000 and made $6\frac{1}{2}$ m.t. of steel ingots (5 m.t. in the Redcar-Cleveland complex after Redcar came on stream). Hence even if India were faced with U.K. long run factor proportions and a growth in labour supply reduced to zero (hardly a picture to be envisaged before the first half of the next century), new local populations based on local industry limited to steel-making would still be likely to number around 150-200,000 with each new investment made. To continue the argument further we would need to estimate whether India is likely to be a world steel producer over the coming decades. What we can say is that the industry has recently been competitive, it seems,[1] (though some doubts have been cast here regarding the capital costs of a plant the size of Bokaro), and given the resource position of a reserve of technically skilled manpower (in the requisite medium-level skills) and the continuing high-grade ore output, this happy situation is likely to continue. How far pressure from the State governments is likely to lead to smaller plants being established in more diverse locations depends on the currently uncertain outlook on the balance of State and Centre power. But certainly

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1 D.Lal, Prices for Planning: toward the Reform of Indian Planning, Heinemann, London, 1980, Statistical Appendix to Chapter 4, Table S.A.1, gives supporting evidence on this point.

plants in the $2\frac{1}{2}$ m.t. range are the smallest likely, and anything less than 1 m.t. would be prohibitively costly in unit cost terms.[1] These new plants are likely to be raised on coastal sites, having regard to export possibilities (to both developed and developing nations).

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1 Until the building of the Redcar complex individual plant size has been small in the U.K. compared to West Germany and the U.S.A. The upper quartile of plant by employment size averaged 4220 men in the 1970s in the U.K., but 8500 in Germany and 12000 in the United States (see Table 2.3).

In the 1960s unit costs fell 30% between $\frac{1}{4}$ and 1 m.t., and a further 10-15% between 1 and 4 m.t. Estimates for Bokaro suggest that a fall of around $\frac{1}{3}$ would be experienced between 1.7 and 4.0 m.t. See F.M.Scherer, The Economies of of Multi-Plant Operation, Harvard U.P., Cambridge (Mass.), 1975, and P.Desai, The Bokaro Steel Plant, North Holland, Amsterdam, 1972, Chapter 7, Table 4, (also B.Balassa cited earlier in this Chapter).

Currently (early 1980s) the best productivity capability in the world is supposed to be 7 manhours per million tonne of output, i.e. about 12,000 men on a 3 m.t. integrated plant (see, for example, a report in Middlesbrough Evening Gazette, 16 January 1981). Indeed the Consett workforce was down to 3600 by date of closure in 1980 (producing partly plate and partly billet), (British Steel, Annual Report and Accounts 1979-81). In India we would expect at least 40,000 men on a 3 m.t. plant (if we maintain the inter-country ratio of 3:1 as up to now). India is not alone among oriental steel producers in using labour so generously: China is reported to employ 30,000 at 2 m.t. capacity (see Financial Times (U.K.) Supplement, 14 December 1981). In fact the economies, given current technology, are

For reasons outlined in a note at the end of this Chapter I, expect a gradual worldwide convergence on the more technically efficient plant sizes despite differing factor price ratios for labour and capital. Clearly there will be leaders and laggards: but that does not imply that India will be a laggard. Indeed in the inter-War period the average size of German plant was three times that of U.K. plant in the upper quartile range: and at that time India was installing German technology at Jamshedpur, to make that complex the largest in the British Empire. But then, as now, and for the decades to come, the demographic implications were far more dramatic for the relatively labour-abundant country.[1]

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most noticeable in the capital, not in the labour, use, though in the case of the blast-furnace the economies are in maintenance and down-time. A rule-of-thumb calculation suggests that capital costs fall by about a third, but labour costs by only a quarter as you move from 1 to 3 m.t. size plant. Jumbo blast-furnaces and huge L.D. converters (in contrast to the O.H. furnace) are already largely mechanised by the time 1 m.t. is reached: this is due to the fact that labour operatives cannot handle the necessary throughput in the confined physical space without mechanisation (see W.Alexander and A.Street, Metals in the Service of Man, Penguin, Harmondsworth, 1980, pp. 155-7). But labour may be used more intensively in the loading and unloading of materials at either end of the process, and in maintenance (and construction).

1 A completely new technology could change the whole picture

footnote continued from previous page

so laboriously presented in the previous note. The Direct Reduction - Electric Arc Furnace route at present exhausts economies of scale at about $\frac{1}{2}$ a million tonnes. A technical breakthrough in the construction of the Reduction kiln could change this. But currently the high cost of electricity in this process makes it unlikely that the mini integrated Direct Reduction plants will become widespread in India before the end of the century, by which time they may well cease to be mini. Direct Reduction seems to pave the way for a more direct and continuous process of iron-making and steel-making, less amenable to dividing up into stages, that can be carried out in different countries according to their differing factor endowments.

Scale, Agglomeration, and Demography in Other Industries

It has already been suggested that increasing economies of plant size are unlikely to be of great significance in India in a number of the processing and manufacturing industries that have more to gain from the intensive use of cheap labour. Hence towns that form on the basis of such enterprises are unlikely to be subject to the same demographic characteristics as those of the Steel Towns described above. But are there other industries that exhibit similar characteristics to the steel industry?

For an answer to this question, we would expect first to look at the heavy engineering industries most closely related to iron and steel: these were an integral part of India's Second Plan, and were also conceived on a "grand scale", a notable case being the Russian-aided plant at Ranchi in Bihar. As the Ranchi complex did not reach capacity production until the mid-1960s, data from the 1971 Census are the major source of information. By that date there are two distinct plants in the field of metal products in the District, with a total it was claimed of 17,648 on the payroll. This means that there must have been a maximum of

8824 at the larger of the two plants.[1] Both are now included in Ranchi Urban Agglomeration (including the New-towns called Doranda and -a premonition? - Jagannathnagar), which numbers 255,000 people, an increase of 82% over 1961. Another important engineering plant in the area, dating from the earlier decade, is the Chittaranjan railway workshop, whose labour force had reached 5000 by 1961, resulting in a local population growth of 79% in the New-town built for the works, attaining a total of 29,000 by 1961.[2] These are select examples from the area of our study. Taking the country as a whole we might consider the average size of factories in the engineering industry in the upper employment size range. In plants employing above 5000 employees in 1971 the average employment per unit (factory) worked out to be 7000 in machine-tools, 8000 in transport equipment,

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1 Government of India, Census of India 1971, Bihar, Establishment Tables, New Delhi, Table E III. These figures are collected from the industrial establishments themselves. Hence they are likely to be minima, not fully accounting for casual labour, (and indeed a cross-check on the steel plants' personnel data from the alternative sources supports this view). Ten thousand would be likely to be a more comprehensive figure in this case.

2 M.Mohsin, Chittaranjan: a Study in Urban Sociology, Popular Prakashan, Bombay, 1964. Here the multiplier effect must have been felt more in nearby Asansol-Burnpur. The male workforce at Chittaranjan numbered 8620 in 1961, with machinists and welders accounting for 5703, (Government of India, Census of India 1961, West Bengal, General Economic Tables, New Delhi).

12,000 in electrical machinery (compared to 11,000 in basic metals, according to the same source).[1] In the U.K., West Germany, and U.S.A. mechanical engineering factories contain on average between 1000 and 2000 employees, and electrical engineering between 2000 and 3000, in the upper quartile range of the employment size distribution (compared with 4000 to 12,000 in iron and steel)[2],(see Table 2.3). The rank order is roughly the same, though the ratios are different. But in Europe and the United States the motor-vehicle, ship-building, and aerospace plants enjoy much more significant economies of scale to judge from the same data, apparently ahead of those experienced in iron and steel. India has yet to penetrate these industries to any significant degree.

During the Third and subsequent Plan periods a switch of emphasis occurred (as we recorded in Chapter 1) towards products based on synthetic manufactures of the chemicals and oil-based industries. Would this new trend have different implications for local demography also? The largest chemical or chemical products plant in the country employed nearly 13,000 men in 1971;[3] the next largest was below the 5000 mark. This scale is still not comparable to that of the

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1 Government of India, Labour Bureau, Ministry of Labour, Statistics of Factories, Chandigarh, 1977.

2 S.J.Prais, Productivity and Industrial Structure (forthcoming).

3 Again allowing for the divergence between official factory statistics and the actual number of daily employees we could expect this figure (12889) to be inflated to 15,000.

steel industry, but the margin of difference is not great. European and American experience is extremely divergent on this point, underlining the operation of local economic and non-economic factors (on which see Scherer[1]), but, of interest to note, West Germany (which may enjoy a young capital age structure, and hence be more representative of minimum efficient scale) produces chemicals in plant larger by a small margin than its steel plant. The largest downstream plant in the chemicals industry in India (that is in rubber, plastics, and petroleum products) was employing only 6000 men in 1971. To complicate the picture, there are far less powerful economic forces attracting the heavy chemicals industry to green-field sites. Industrial or commercial economies of agglomeration (that is economies external to the plant) are likely to be of greater importance. This complication is taken up below in respect to the textile industry. Its immediate demographic implications are indicated in an earlier diagram (Figure 1.4) contrasting speed of growth of urban areas in Maharashtra with those in Eastern India. These large industrial investments affect the local demography rather less if they are attracted to already developed industrial localities, like Bombay or Poona. However, an agglomeration of similar industries renders

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1 F.M.Scherer, The Economics of Multi-Plant Operation, Harvard University Press, Cambridge (Mass.), 1975.

the local population, generation upon generation, more vulnerable should there be a change in the wind.

If we are to predict where the Indian economy is going, insofar as it affects the populations in our sample of Eastern States, we might glean a few seeds of information by examining progress during the only decade for which we have adequate comparable documentation as yet (1961 - 1971). Restricting ourselves to factories employing more than 100 men, let us see what happened to the average plant size in that range. Data availability also forces us to concentrate on West Bengal (Table 2.2).[1] Plants where average size increased were in chemicals, rubber, petroleum and coal production (products), and in basic metals. Large plants in capital and intermediate goods production seem therefore to be moving toward the optimal scale economies (in this State of India at least). The scale effect has dominated any effect of capital for labour substitution. From an earlier analysis of the size structure of the factory sector undertaken by Ishikawa (Figure 2.2) it is clear that in 1956 India was already moving toward a factory size structure comparable to that of the U.S.A. and Japan in the machinery and basic metals sector.[2] I have updated these

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1 Government of India, Census of India 1961, 1971, West Bengal Establishment Tables, New Delhi, Table E III. This is the only State that quotes the number of employees in the upper-size categories in both Censuses. Refer to Table 2.2 for caveats.

2 S.Ishikawa, Economic Development in Asian Perspective, Kinokuniya Bookstore Co., Tokyo, 1967.

comparisons with data from India in 1971 to indicate the continuing trend. A priori there is no reason to expect any difference in the case of heavy electricals or chemicals (which Ishikawa did not compare). By contrast, at that point in time (1956) at least, other South and East Asian countries were lagging behind.

One industry that we expect to grow in the current global economic situation is petroleum refining. Here we have a case, however, where capital substitution seems clearly to dominate the economies of scale. For all the difficulties involved in valuing capital across industries, we can fairly confidently assert that the petroleum refining industry is more capital intensive in India than any industry so far described.[1] In Europe and the U.S.A. the largest plant averages 1500 to 2000 employees, with capacity between 10 and 15 million tonnes.[2] The largest Indian plant, at Trombay (outside Bombay), with a capacity of 5.2 m.t., employs only 1000 men.[3] Expansion here has rather little demographic implication for the locality. At the same time it implies very little transfer of population from rural to urban.

So far we have been looking at the heavy goods industries, particularly those producing investment goods. True, it is

1 See Statistical Abstract of India (various years), published by the Government of India's Central Statistical Office, Delhi.

2 Britain's newest plant, in Kent, has a capacity of 10 m.t.

3 Times of India Yearbook, 1978, section on Petroleum.

here that we expect to find most significant plantwise economies of scale, with few advantages from proximity to consumers, but where most transport economies are secured instead by proximity to sources of raw materials. In consumer goods industries giant plant is generally rare, but units in the 5-7000 employee range are to be found. A similar size relationship seems to hold for consumer compared with investment or intermediate goods in European manufacturing. In the U.K. food-processing is undertaken in some of the largest plants in the consumer goods sector, 1300 being the average employment size in the upper quartile (Table 2.3). Figure 2.2 shows clearly the humped distribution for food factories in contrast to the step-wise distribution for basic metals, with India having a similar distribution to its neighbours in 1956, that is less employment concentrated in plant above 1000 employees. The pattern is not so clear by 1971 (partly because the data are not so complete); the case of West Bengal suggests that food and beverage is something of an exceptional group in that the average factory size (above the 100 employee mark) has grown significantly (66%) over the 1961-71 decade. In most other consumer goods industries, in marked contrast to the heavy industries, there has been a substantial fall in average employment size of the large factory. Although retrenchment in a difficult period is a possible explanation (not to mention statistical inconsistencies in the data source) the substitution of more mechanised processes in the larger plant must have been a compounding factor.

Crucial, however, to the discussion on consumer goods in India is the part played by the textile industry, historically the strength of her industrial development, and still the largest aggregate industrial employer in the nation. In 1971 this was the single industry with the largest number of factories employing more than 5000 workers in the country.[1] In this respect cotton outshadows jute. As far back as the 1950s the employment distribution was skewed markedly towards the large-scale enterprises, in direct contrast to South Korea, and more in line with the U.S.A., Taiwan and Japan taking an intermediate position, (Figure 2.2, and reference to Ishikawa noted there). In 1971 the employment size of plant, however, averaged only 6700 for cotton manufacturing in the largest size range (that is more than 5000 men). The Indian industry is currently based on natural fibres; but there is an increasing investment in the synthetics branch. In synthetics, the core Western technology is capital intensive, with important scale economies, and its adoption in India has meant large-scale plant with larger labour to capital ratios than in the Western economies. The New-town of Ulhasnagar in Maharashtra, for example, has grown on the basis of this industry and the town's manufacturing force was dominated by the 5,500 employees at the plant.[2] Though technically a green-field site,

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1 Government of India, Labour Bureau, Ministry of Labour, Statistics of Factories, Chandigarh, 1977.

2 Government of India, Census of India 1961, 1971, Maharashtra, Establishment Tables, New Delhi. The figure is 5594, and recorded as exactly the same for both 1961 and 1971 (symtomatic of the inherent unreliability of these data).

Ulhasnagar is in close proximity to the major centres of Bombay and Thana, on a corridor of industrial expansion and diversification from the coast to the inland city of Poona. It is less alarming to note therefore that between 25% and 50% of the growing industrial labour force were employed in this single plant.

Much more isolated a town is Sholapur, whose fortunes were also founded on the textile industry, in cotton-growing country, in pre-Independence days. This case brings us to an important development in the main argument of this work. For Sholapur's manufacturing labour force is similarly dominated by the textile workers. However, these are distributed in a large number of factories: 2000 handloom workshops and 18 powerloom. In Sholapur District's urban areas (of which Sholapur City is the largest by far) there are 40 large handloom factories employing more than 100 men each. By contrast Bombay has only 116 handloom workshops altogether, but 59 powerloom factories (at this date, 1961).[1] The demographic

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1 Government of India, Census of India 1961, Maharashtra, Cities of Maharashtra, Establishment Tables, and Special Tables for Bombay, New Delhi. (Note that by a curious oversight Table E III was never published for the Cities, hence we have to use the urban District data).

Ahmedabad City had 155 powerloom and 163 handloom factories in an urban economy that is similarly dominated by the textile industry, (see Chapter 8 for further comparisons between Ahmedabad and Sholapur).

implications are clearly different from those of the massive single steel plant dominating the locality: the growth of a textile town is unlikely to have been so precipitous;[1] and it is likely to have been more balanced in terms of male and female workers, (though this is a very complex matter referred to later). But, once established, the population is equally dependent on the fortunes of a single industry, with severe local social implications if an industry-specific recession sets in. The implications are not, however, compounded by demographic fluctuations of the kind we associated with a heavy industrial monoculture.

What has been the historical experience in regard to technical and demographic relationships in the textile industry? As in the case of iron and steel we propose to investigate this a little more closely, and this takes us initially to the slopes of the Pennines in North West England, where we focus on a pioneer locality in the cotton spinning country, - Oldham in Lancashire (Table 2.4 and Figure 2.3).

Oldham was never a green-field site, strictly speaking. It was an agricultural village with a population estimated in 1714 at 1732.[2] In 1776-78 the first six small cotton mills

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1 No period in Sholapur's growth was as fast as that of the steel towns, as far back as 1921 at least.

2 From the Annals of Oldham, quoted in E.Butterworth, A Statistical Sketch of the County Palatine of Lancaster 1841, Longmans, Manchester, 1841.

were established, 3 water-driven, 3 horse-driven. Thirty spindles were used to employ ten men and two donkeys (in the case of the "horse"-powered technology) and 250 spindles employed 50 men in the case of water-driven machinery.[1] (Note incipient economies of scale, although the scale is still minute). Another population count in 1792 recorded 9480 people. That must have seemed like a population explosion in the wake of an industrial revolution. But clearly its industrial base was an agglomeration of tiny units - "within its area (in 1794) were at most a dozen small mills".[2] - seeking the advantage simply of appropriate environmental features that coincided more or less at that point: that is to say, fast-flowing streams off the Pennines, sufficient humidity on the sheltered West-facing slopes, and proximity to the source of imported raw materials, together with the minimum existing infrastructure, or amenity, of the village. Chapman notes that small-scale was advantageous for jenny-spinning since selection of skilled operatives was important. Tight control over labour supply is crucial if the skill component is high. But the innovation of twist

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1 S.J.Chapman, <u>The Lancashire Cotton Industry</u>, Manchester University Press, Manchester, 1904; Oldham and District Historical and Antiquarian Society, <u>The Cotton Mills of Oldham</u>, Oldham Libraries, 1979.

2 <u>Oldham and Its Industries</u>, Official Handbook of Corporation (undated).

spinning reduced the skill component. Economies of scale were enjoyed up to an employment of 300 operatives per plant (with one large Manchester mill having 600 men), though the average was below 100.[1] By the second half of the 19th Century a textile plant would reap major economies at the level of 100,000 spindles (as compared with 250 in the late 18th Century).[2] Oldham was principally a centre for the spinning of coarse cloth, and on the basis of this modest scale of plant size its population growth rate peaked to a modest 40% per decade (42% between 1801 and 1811). Between 75% and 100% of that growth will have been due to migration, since at that date urban birth rates rarely exceeded urban death rates by more than 10 per thousand. The absolute addition to the population was a mere 5000 during the first decade of the century. This may be contrasted with the initial expansion of Middlesbrough, which was founded upon the iron-making industry, and added 10,000 and 20,000 to its population during two adjacent decades (starting from a population size comparable to Oldham's). At this early date we can safely say that the vast majority of the manufacturing employment in Oldham was in textiles (mainly in spinning), a picture similar to that in Sholapur in India today.

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1 S.J.Chapman, cited in note 1, previous page.

2 R.Smith, "An Oldham Limited Liability Company 1875-1896", <u>Business History</u>, 4:1, Dec. 1961.

If we take spinning and weaving together as a single integrated industry for the moment, it is clear that the economies of scale have not taken employment levels per plant very much higher over the subsequent 150 years. The median plant size in terms of employment was only 290 in England in the 1970s (430 in the United States), and the upper quartile median only 530 (880 in the U.S.A.), (Table 2.3). We have already commented on the only modest size of the large textile plant in India in comparison with basic metals (6700 employees compared with 11,300 in the 5000+ class). These economies of scale in textiles furthermore are relatively labour-using. But the change of technology has induced investments in newer vintage capital that already does exploit large and capital-using economies of scale, that is the technology involved in the spinning and weaving of synthetic fibres. In England the median plant size in these man-made fibre industries was 2460 in the 1970s, with the upper quartile median reaching 3730 (or 6000 in the United States). But as these economies are relatively capital-using, permitting little labour-capital substitution, the plant-wise employment levels in the labour-abundant countries will not grow significantly larger (as is witnessed in the case of Ulhasnagar near Bombay, referred to above).

The case of Oldham is worth pursuing further. For it soon ceased to be solely a textile manufacturing town. And yet, in a sense, it remained monocultural. The town proved to be fairly and squarely sited on a steam-coal outcrop. With the innovation of steam-powered machinery (first used in Oldham in 1798) the exploitation of the seam began. By 1846 there were 62 collieries and 1300 miners. The fast growth rates of the town in the 1820s and 1830s (between 35% and 45% a decade) were partly due to mining development. It was the siting of these collieries that gave Oldham so dreadful a reputation for a polluted environment. Taking the social-environmental evidence into account it is unlikely that the death rate fell below that of Manchester during the 19th Century, which means that the growth rate continues to be predominantly due to in-migration, not natural increase.

More significantly perhaps, Oldham began to develop (in the 1830s) what became the largest textile-machinery manufacturing enterprise in the world, with 20,000 employees by 1900. Now this is clearly a diversification, for whereas coal-mining could only be undertaken profitably on a limited scale (and was very much tied to the local demand for coal), textile machinery manufacture was an export industry (exporting 75% of production in 1900)[1], and could remain wholly independent of the local demand. The engineering plant was evidently employing over one third of the

1 Oldham at Work, Exhibition and Booklet produced by Centre of Local Interest, Oldham, 1981.

workforce in 1881.[1] This was a welcome diversification, and was subsequently to lead to a wide range of small engineering production, when, in the 1920s, the bottom fell out of the cotton market. The particular vulnerability of Oldham lay in its continued production of coarse cloth, a speciality most readily adopted for manufacture in India and elsewhere. Between 1931 and 1951 the labour force in engineering began to outnumber that in textiles. By 1971 less than ten per cent (9.0) of the economically active were employed in the latter, over twenty per cent (21.1) of the male workforce being employed in engineering.[2] Despite this, the rundown of so major an industrial employer as textile manufacture has rendered Oldham a depressed town, like Consett and Corby actively promoting itself as a new growth centre, and with a high rate of unemployment (though without so sudden an increase as in the former towns, this being the social advantage of an economy operating on a multiple plant basis, as well as the fruit of some degree

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1 From these few quantitative reports, I estimate that by 1881 not much more than 50% of the male working force could be engaged in cotton cloth manufacture: for there would be 12,500 working males, with about 2000 in mining, and 4000 in machinery manufacturing. The Census does not categorise the population by occupation at the urban sanitary district level at this date.

2 British Government, Census of England and Wales, relevant years, North West Counties, Occupation Tables, London.

of diversification.).

These overall employment figures hide a crucial feature of the change we have described. The textile industry was an employer of women - 140 to every 100 men among the operatives in the late 19th Century, according to Chapman[1];(this was actually lower than for other towns in the North West). By 1881 the region was on average employing 130 women per 100 men in the industry; by 1971 the ratio had become 107 per 100, which was still high by industrial standards. In contrast, engineering now employs about 600 men to every 100 women (568). Given the relative decline in the textile industry the loss of female jobs has been enormous. [2]

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1 S.J.Chapman, The Lancashire Cotton Industry, Manchester University Press, Manchester, 1904.

2 The demographic implications of this are discussed in Chapter 4 below.

A Note on Industrial Technology:
Theory and Practice (Figure 2.1)

Why is the technology adopted in the case of Indian heavy industry, and particularly in the steel industry, identical to that in the already industrialised nations? Can we predict a convergence, that is to say, can we predict that the demographic features we analyse will become more widespread, and unbalanced or unstable populations more typical, with contrasts between localities more frequent (and more intensive), and social implications of industrialisation and de-industrialisation more severe throughout the developing world?

There are a limited number of conditions that will induce a labour-abundant country to invest in massive scale of plant. It is rare for internal economies of scale, i.e. at the level of the plant, to be reaped in labour-intensive manufacturing, so the usual inference would be that we are considering capital-intensive industry when we refer to internal economies of scale. The first obvious sufficient condition for this capital use is that factor prices are distorted. There is evidence of this in India.[1] I know

1 See for example D.Lal, Appraising Foreign Investment in Developing Countries, Heinemann, London, 1975, Part 3.

of no reason why this situation should worsen (or indeed improve). Not a dissimilar argument relates to the "effective" prices of factors as perceived by the industrialist (be he public or private). For though labour may be nominally cheap, it may be regarded by him as unreliable and hence not actually so cheap (whether or not this is in fact the case).[1] The larger the labour contingent on any one plant, the less reliable it may be (the more likely it is to unionise, for example). The more sophisticated is the plant, or the more continuous the production process (as in modern steel manufacture where only a minimum cooling is allowed between the stages of production) the more crucial the reliability of the labour force becomes. Thus the supply price may be low, but the potential price, allowing for costs of possible disruption, may be high. Hence the factor market may look not dissimilar to the industrialist in Britain and in India, and the adoption of the most capital-intensive plant, which carries with it enormous economies of scale, becomes economically rational. (This choice is made of course in the knowledge that political pressure may well require the employment of a minimum labour force in excess of what would be required for profit maximisation for any given technology).

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1 On this we elaborate in Chapter 5 below.

This leads to a second set of conditions for large-scale plant adoption. For it is not suggested here that such an industry must be competitive on the world market. Labour may be unreliable the world over, and more so in some nations than in others, but capital is still generally cheaper in industrialised nations. What then would be the motive for investing in (and hence protecting) an uncompetitive industry? There is always evident a nationalist fervour for owning your own basic industrial capacity, coupled with a fear of being vulnerable to international sanctions and leverage if you do not.[1] This self-sufficiency argument taken as a universal objective implies that only the largest industrial economies (like India and Brazil) will adopt the largest plant. Steel, for example, would have initially to be produced in smaller than 4-million tonne plant in the emerging African nations. Given that a nation intends to make steel anyway, it then views the alternative techniques. This, ceteris paribus, would lead a labour-abundant nation to utilise labour intensely, which in turn would allow investment in several small-scale plants. However, we assume in that argument that a continuous production function exists, with labour and capital being substitutable throughout the range of scale available to the industrialist

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1 See for example the Government of India's Third Five-Year Plan pronouncements.

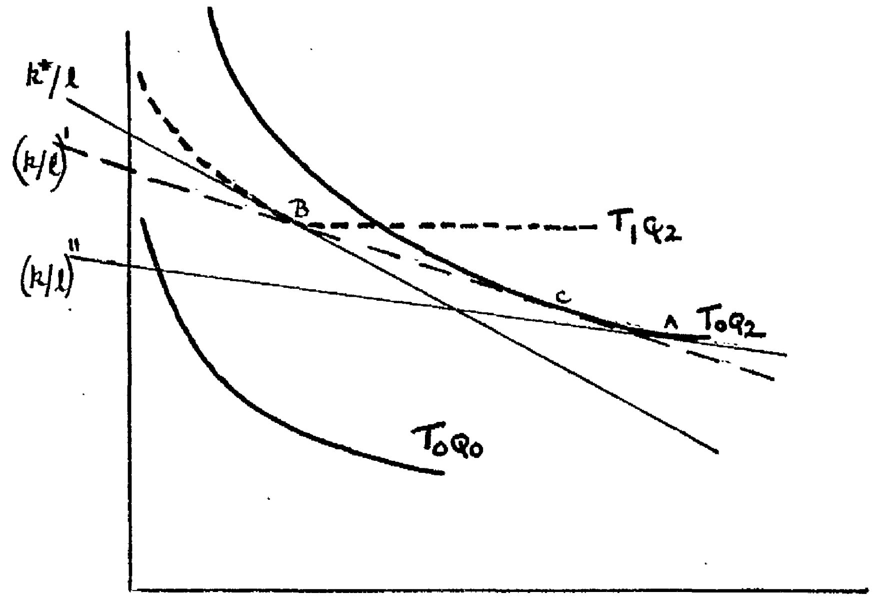
(for any given quality of output). In practice a number of modern basic industries may show their highest productivity and profit rates (in a closed economy) at levels of output for which only a limited range of technical possibilities has been developed. The core process in oil-refining for instance can only be efficiently carried out within a very narrow range of factor ratios, so that whatever the factor prices (within a wide range), the core process has to be capital intensive. In summary then, self-sufficiency and technical discontinuity form a second set of conditions.

This leads us to the third set. Granted that in the real world there are more than two distinguishable factors of production, an industry may be competitively located in a developing country even though the core process may be capital intensive (whether to embody the latest innovations or to reap the available economies of scale). Complementary factors - semi-skilled labour, or raw materials, for example (like high-grade iron ore in the case of the Indian steel industry) may be relatively abundant, but only intensively exploitable in conjunction with a particular capital-using technology; while at the same time certain ancillary activities can be made more intensive in the use of unskilled labour with very little complementary capital. In which case the non-labour factors, taken together, may be relatively cheap, and raw labour relatively costly, even in a developing country.

In some industries of course it may be possible to divide the production process into stages and to carry out the different stages in different countries. But if the newly developing technology makes this less easy (as with continuous steel casting for instance) or transport costs are high (as with the transport of iron ore) it may be more profitable to export the finished product (rather than any intermediate product) despite the fact that a country's factor endowments would not favour the carrying out of some of the intermediate processes in that country (could they be isolated in this way). If the country is particularly well-endowed with one out of the many factors of production, that fact alone may dominate the international location decision.

Figure 2.1

Production Possibilities in an Industry



General Note: Individual plants are aggregated to give the industry's output (Q) under different technological regimes (T); Labour is measured horizontally, Capital vertically; For illustration we take the iron and steel industry.

Interpretation:

1. Earlier Technologies (T_O) enable the production of iron and steel with various combinations of capital and labour. Increased production levels would be achieved with equi-proportional increases in the two factors (no scale economies). The nation produces its optimal output on T_OQ_O for instance, say 2 m.t., in plants of $\frac{1}{2}$ m.t. each. Limited technological know-how prevents the use of larger plant.

2. New Technologies (T_1) enable increased output to be produced over a range (limited) of factor combinations at lower unit cost: the new technologies relate to plant scale (i.e. they are internal to the unit of production) so that fewer plants can produce the same output as before. (Each plant is limited by know-how to, say, 4 m.t.).

The nation decides to increase its output to Q_2 , say 4 m.t.

A labour-abundant economy might adopt the old technology T_0Q_2, (and produce at A, given its factor-price ratio of (k/l)", in $\frac{1}{2}$ m.t. plants with heavy use of ancillary labour).

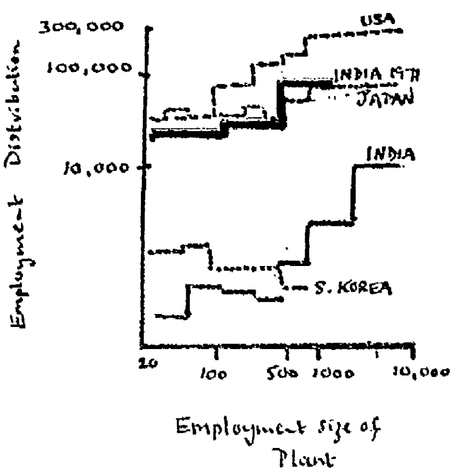
The same economy, if factor prices are distorted, may adopt the new technology, producing at B say, in a single 4 m.t. plant, with rather less use of ancillary labour (and much less use of production labour). Indeed if wages are higher than (k/l)' there will be a shift to the new technology with B preferred to C.

The 2 X 2 diagram fails to capture the case of the complementary inputs: but here is an approximation: If K (capital) and R (a raw material) are absolutely complementary, and R is relatively abundant to K, i.e. its true price is low, we can collapse R and K into a new variable K*, price k*. In this case production takes place at B say. (This is an extreme case and the reader can readily consider the implications of relaxing the rigidity of complete complementarity).

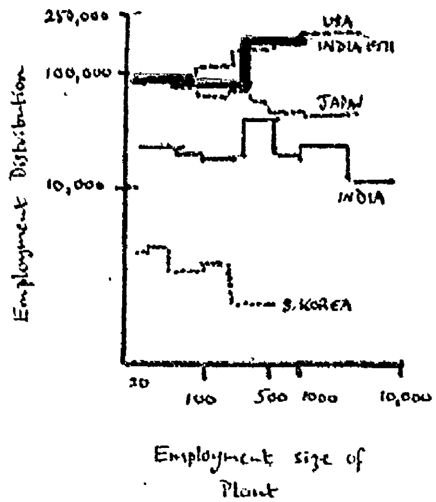
Figure 2.2

Employment Size Distribution of Factories in Selected Industries: Comparative Data, Cross National and Inter-temporal

Basic Metals



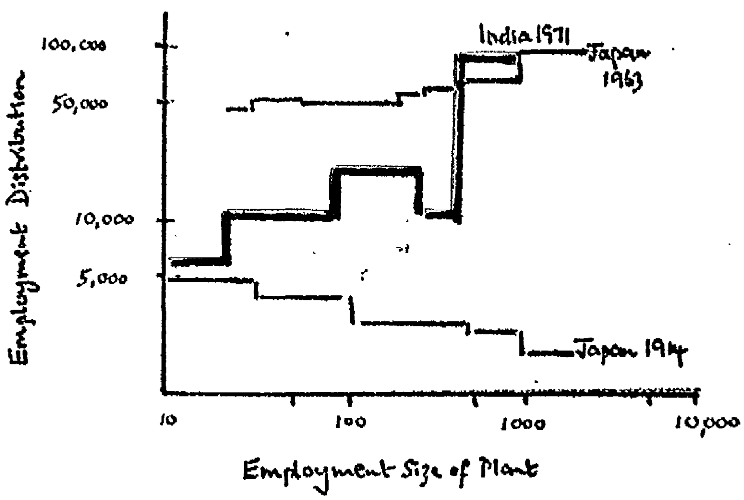
Machinery



Notes to Tables

India 1971 figures are for 3 size classes only: 20-100, 100-500, 500+

Basic Metals



Notes to Table

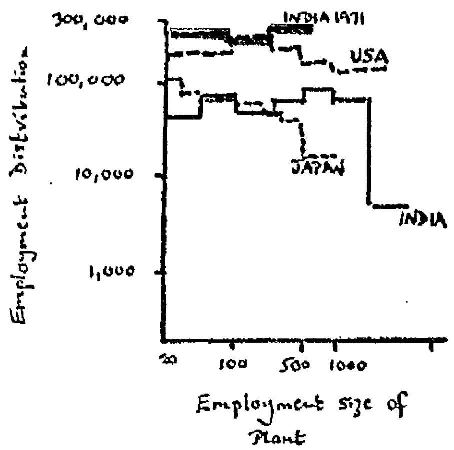
India 1971 figures are for size classes 10-20, 20-50, 50-100, 100-300, 300-500, 500+

Sources

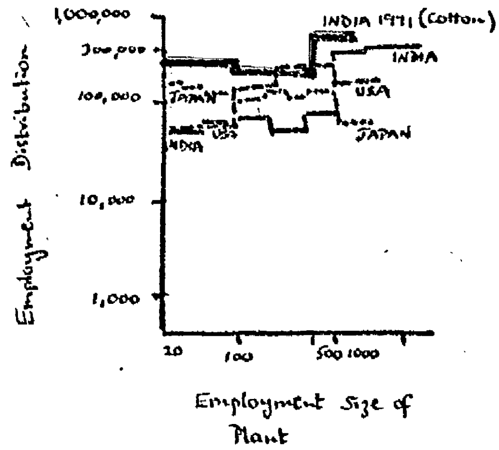
S. Ishikawa, Economic Development in Asian Perspective, Kinokuniya Bookstore Co., Tokyo, 1967: Charts 5:10 and 5:11, with additions from

Census of India 1971, Establishment Tables EIII, New Delhi

Food



Textiles



Notes to Tables

India 1971 figures are for three size classes only 20-100, 100-500, 500+

Sources

S. Ishikawa, Economic Development in Asian Perspective, Kinokuniya Bookstore Co., Tokyo 1967:
Chart 5-10, with additions from
Census of India 1971, Establishment Tables EIII, New Delhi.

Figure 2.3
Map of England indicating places referred to in the Comparative Analyses

Table 2.1

Growth Rates and Age Structures in 19th Century Steel Towns in England (with a contemporary Indian comparison)

Decadal Growth given as Percentage
(Selected Population Totals in brackets)

	1841		1851		1861		1871		1881
Lanchester (incl. Consett)	(7783)	103	(15814)	41	(22338)				
Consett 1831 (130) est.							(5961)[a]	20	(7165)
Conside-cum-Knitsley			(2777)	78	(4953)				
Middlesbrough		33		138		111	(39563)	38	

Proportion of Population in each age group by sex

--At Initial Investment Phase--

	LANCHESTER 1851 (15814)		MIDDLESBROUGH 1871 (39563)		BHILAI 1961 (86116)	
Age	male	female				
0-14	.20	.19	.19	.20	.13	.12
15-34	.21	.16	.22	.16	.42	.16
35-59	.11	.09	.12	.09	.11	.04
60+	.02	.02	.01	.01	.01	.01
	(Total 1.00)					

--During Consolidation Phase--

	CONSETT 1881 (7165)		BHILAI 1971 (174370)[b]	
	.19	.20	.22	.20
	.21	.15	.19	.17
	.12	.09	.13	.06
	.02	.02	.02	.01

Notes: [a]1871 is the first date when the town is given a separate identity in the Census. [b]Growth from 1961 to 1971: 102%.

Sources for Table 2.1: British Government, Census of England and Wales (relevant dates), tables on Ages and Civil Condition of the population, London, (tabulated under Northern Counties); B.R.Mitchell with P.Deane, Abstract of British Historical Statistics, Cambridge University Press, Cambridge, 1962; Government of India, Census of India, Madhya Pradesh, (relevant dates), General Economic Tables, Table B II, New Delhi; for other estimates see text and references cited therein.

Table 2.2

Change in Average Employment Size of Large Plant in West Bengal 1961 - 1971

Industrial Sector	Average Plant* Size (Employment) 1961	1971	Decadal Change (Per Cent)
Food	180	299	66.1
Beverages and	556	365	.
Tobacco products	290		
Cotton textiles	957	801	-16.3
Jute textiles	2646	2439	-7.8
Wool and	588		
Silk and	273	282	.
Misc. textiles	141		
Wood	200	163	-18.5
Paper and	869	463	.
Printing	322		
Leather	3031	2010	-33.7
Rubber, petroleum and coal	493	580	17.6
Chemicals	336	405	20.5
Non-metal minerals	438	244	-44.3
Basic metals	537	620	15.5
Machinery and	624	716	
Electrical mach.		540	.
Transport equip.	1137	642	.
Misc.	191	237	.
Repair		571	.

*of plants employing more than 100 employees

Notes: Calculations not performed on non-comparable data; Failure to include repair sector separately in 1961 is source of bias throughout.

Sources for Table 2.2: Government of India, _Census of India 1961_, West Bengal, Establishment Tables, E III, New Delhi; Government of India, _Census of India 1971_, West Bengal, Establishment Tables, E II, New Delhi.

Table 2.3

Scale of Manufacturing Plant in Contemporary India with Comparisons from the United Kingdom and the United States

India Industrial Sector	Average number of employees at Plant employing at least 5000 (1971)	
Basic metals	11307*	*calculated from upper 25% in size distribution
Chemicals and products	12889	
Machinery and Machine tools	7225[a]	[a]calculated from upper 10% in size distribution
Electrical machinery	12537[a]	
Cotton	6716[a]	
Jute	6034[a]	
Textile products	7050	
Transport equipment	8452*	

United Kingdom Industrial Sector	Median number of employees	Average number of employees in upper quartile (1970s)
Ferrous metals	1120	7200
Chemicals	680	1540
Machine Tools	190	550
Electrical engineering	970	2310
Textiles	290	530
Manmade fibres	2460	3730
Motor vehicles	2290	7200

Table 2.3. continued

United States Industrial Sector	Median number of employees	Average number of employees in upper quartile (1970s)
Ferrous metals	1650	12000
Chemicals	420	1270
Machine Tools	120	470
Electrical engineering	970	3200
Textiles	430	880
Manmade fibres	2900	6000
Motor vehicles	4000	12000

Sources: (for U.K. and U.S.) from S.J.Prais, Productivity and Industrial Structure (forthcoming);
(for India) Government of India, Ministry of Labour, Labour Bureau, Statistics of Factories, New Delhi, 1977.

Table 2.4

Growth Rates and Age Structures in 19th Century Textile Towns in England (with a contemporary Indian comparison)

Decadal Growth given as Percentage
(Selective population totals to nearest thousand)

	1801	1811	1821	1831	1841	1851	1861	1871	1881	1891
Oldham		42	29	45	34	23	36	15	34	18
	(1801: 12000)							(1891 : 131000)		
Manchester		19	42	44	29	29	12	4	32	9
	(1801: 75000)							(1891 : 505000)		

Proportion of Population
in each age group by sex

OLDHAM 1881 (111343)			MANCHESTER 1881 (341414)		AHMEDABAD 1961 (1206001)[a]	
Age	male	female				
0-14	.17	.18	.17	.18	.20	.18
15-34	.17	.19	.18	.19	.20	.16
35-59	.11	.13	.11	.13	.13	.08
60+	.02	.03	.02	.03	.02	.02
	(Total 1.00)[b]					

Notes: [a]Growth between 1951 and 1961 was 38%. [b]before rounding.

Sources: As for Table 2.1 above (with British Census data tabulated under North-Western Counties, and Indian Census data for the State of Gujarat).

Table 2.5

Population Size and Age Structure of 20th Century Steel Towns in England (with an Indian comparison)

	Population 1951	1961	1971	Steel Capacity[a] (1960s)	Core[a] Workforce
Consett	39480		36015	1 m.t.	4000- 5000
Corby	16735		47990	1 m.t. - 1.4 m.t.	
Bhilai		86116	174370	1 m.t. - 2 m.t.	17000- 25000

Proportion of Population in each age group by sex

CONSETT 1971			BHILAI 1971	
Age	male	female		
0-14	.12	.11	.22	.20
15-34	.13	.12	.19	.17
35-59	.16	.16	.13	.06
60+	.08	.11	.02	.01
	(Total 1.00)[b]			

CORBY 1971		
	.16	.16
	.15	.15
	.17	.14
	.04	.05

Notes: [a]For definition see text and footnote.

[b]Owing to rounding, proportions will not always sum to 1.00.

Sources: As for Table 2.1 above (with British Census data tabulated under County Reports for Durham and Northamptonshire).

A brief Overview of Chapter 2

Here it becomes clear that economies of scale are a major consideration in modern industry, and especially in important sectors of heavy industry; this, in conjunction with a relatively abundant labour supply, results in the rapid demographic growth of local centres, which is the object of our analysis, and which can be held responsible for the problems of labour market equilibria, and provision of welfare infrastructure associated with declining areas as well (especially when they too were the result of earlier growth of large-scale heavy industry). At no other point in time did technology and demography conspire to such an extent to this effect, and there are reasons for suggesting they will not combine again in such a way in the foreseeable future.

CHAPTER 3

The Model

A Summary of the Main Indications of the Model

The preceding demographic observations prompted the construction of a simple simulation model of local population structures and their development over time. This incorporates various contrasting patterns of migration to aid our understanding of how urban populations do develop as time goes on, and what underlies the changes we observe, and how changes in the periodic phasing of labour demand might modify the pattern described earlier. We find that the peculiar de-stabilising effect of migration to a "green-field" site is due to the adverse adult sex ratio being rapidly equalised in conjunction with a fertility-promoting age-structure. The resultant severe fluctuations in the aggregate number of labour force entrants can be seen over time. Equilibrium is not improved by further migration during the troughs in the supply of entrants to the labour force: future disequilibrium is made worse. But simply spreading the labour demand over a longer period irons out fluctuations. The proportion of children builds up rapidly if demand for female labour equalises sex ratios earlier. (And we go on to show, with an illustration in Chapter 9 below, that more rapid growth in that dependency occurs in the town itself, if, as in the Steel Towns, the young male migrants are already married and subsequently bring their wives and children to the town.) Conversely, declining towns, having sex ratios, but not age structures, favourable to fertility, have both high young and old age dependencies.

By keeping the initial populations and new migrants cohorts separate, we can trace the relative sizes of the two groups: apart from the obvious sensitivity to differential fertility, the growth-promoting effects of the migrants' young age, or favourable sex structure are also significant here.

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The aim in constructing and operating a simulation model at this stage in the investigation is severalfold. But one feature combines all the objectives: the need to understand the real world more clearly. Without that feature the simulation becomes a mere toy. Furthermore, the costly temptation to elaborate a model to beyond the point where valuable insights can be seen to be forthcoming from it has been resisted. The risk of irrelevance becomes too great. It was hoped that in simulation some of the processes and implications of human population formation would become clearer than they are apt to be in the eyes of an observer of the empirical data. Some of the questions a simulation might help answer are as follows. Why are birth rates so low in rapidly industrialising areas? And how long can you expect that experience to last in the absense of fertility change? Are changes in the growth rates of particular age cohorts, or changes in their proportionate size in the total population, the more important of the effects of different migration rates? And how do these depend on the age and sex structures of the migrants? How are they affected by different fertility and mortality levels? These models are not supposed to be used for long-term population projections: rather they have a didactic purpose, for they show the kind of population disequilibria that can occur (beyond, I think, those that are intuitively obvious). Hence the focus here is on the intermediate time span, up to the next twenty-five years at the outside, and particularly on the next ten to fifteen years, from the initiation of a project and onset of major inmigration.

To maintain the sense of relevance, insights obtained specifically from the model and not from the data will be indicated as such in addition to those that confirm the more readily intuitive observations from the data. More importantly, allusions will be made to the empirical importance of some of the observations, allusions travelling back to our fore-going analysis on technology, and forward to our discussions of the social implications of industrial strategy.

To help fix the basic patterns in our mind, first we outline the models. We can thence compare them more easily as a group.[1] The basic model represents the demography of the average Indian town, in that it adopts approximately the recorded aggregate urban growth rate in the 1950s (in the region of 30% per decade): one of the lessons of this whole thesis is that such towns represent only one among a whole range of experience in urban demographic formation or dissolution, a fact easily

1 These are presented in detail in Table 3.1. But three representative major types are presented, with the indices essential to our dynamics argument, in Table 3.2, and Figure 3.1 is a graphical illustration.

disguised in the aggregate figures (or, to put it another way, these towns represent the modal experience of our 1951-71 growth distributions for the region illustrated in Figure 1.4). In this basic model inmigration is 1% per annum, and natural increase 1½ to 2% (depending on the fertility and mortality parameters used). For our various comparisons we take the version with natural increase of 1½% (or 15 per thousand) implying an urban mortality and fertility close to rural levels (though with fertility on the lower side), with a birth rate of around 38 per thousand and death rate of around 23 per thousand of the population. This reflects the correct parameters as far as we can judge for the mid-1950s, (see Chapter 4 for further discussion). We call this the "Base" migration model (Table 3.1),(or the "Balanced Growth" example in Table 3.2).

Then we have the models labelled "1" (Table 3.1, or "Concentrated heavy industry" in Table 3.2). These represent decadal growth of 55% and upwards. The heavy engineering towns fall into this category. Model "1 c" is an extreme case, typical of New-town growth - with a fivefold increase over a decade. An immediate implication here is that the migrant population quickly dominates the local population, an important and neglected consideration in demographic analysis (neglected because at the national urban level aggregate internal migration is never significant enough in Asia for this domination to occur in so short a space of time, nor indeed does it do so in the major cities). Model "1 b" describes a fairly heavy growth of around 70% over the decade. The "primed" model ("1 b'") introduces a more heavily bunched migration age structure - fewer children, more workers - a characteristic more apparent in the less local migration streams. Model "1 a" has 50% more women than is typical (see further discussion below). All the Type "1" models have heavy net inmigration concentrated in just five years: 1,500 males per annum in the cases "1 a", "1 b", "1 b'", 15,000 males in "1 c", migrating into an urban area of 10,000 males. Female migration, consisting of spontaneous (occupational) and induced (marriage) migration is derived from regressions relating female to male migration streams (see further Chapter 5 below), and the initial female population in the urban area numbers 8410. This sex ratio and the initial urban age structure are identical to the all-India figures for the urban areas in 1961 (but we test some of the migration models on stable age and sex structures also).

Next we have the models labelled "2". These have urban population growth rates of around 50% per decade.

The principal didactic purpose here is to show what happens if the same number of migrants as in model "1" are spread out over ten years instead of five, with 750 males migrating per annum instead of 1,500. This would imply that the component plants in an engineering project came on stream over a longer period, or that blast furnaces in an iron works were phased in gradually. But the model is also useful in describing the effects of a more mixed industrial development, both less "lumpy" and more diversified in its investments. The "2 a" version again (like "1 a") increases the number of women migrating, this time by 30%; (the need to introduce these "a" variants only became apparent when we tried to explain the empirical evidence of high female to male sex ratios in some fairly fast growing towns in Eastern India).

Finally the models labelled "3" are representative of the more depressing case of the towns that have become net losers of population, or outmigrating towns (described as "Lightly industrialised localities" in Table 3.2. As with the above-described models, a graphical presentation in Figure 3.1 highlights the migration dynamics in Panel A.

For comparative purposes the underlying fertility and mortality were kept the same and constant over time for all these cases. Then, in order to examine the relative sizes of migrant versus non-migrant population, these parameters were systematically varied in line with what probably took place, in a few alternative models.

Observe first in Table 3.1 how the age compositional effects of migration influence the birth and death rates. There is virtually no difference in the birth and death rates projected between the "Base" population model (decadal growth of 29%) and a stable population closed to migration (decadal growth 16%, outlined in Table 3.1 alongside the "Base") with the same parameters;[1] i.e. taken in aggregate, urban growth in India is so slow that the age structure effects on fertility and mortality can be ignored. But take now the extreme case of "1 c" (decadal growth of 527%) and we can see that the birth and death rates are markedly reduced (the former from 39 to 30 per thousand). This was not quite expected, since migrants are bunched in the reproductive ages (Table 5.1 below). However, the enormous deficit in the sex ratio, resulting from lagging the female migration behind the male migration (as further detailed in Chapter 5 below), is responsible for this, and the model is approximately in line with observed sex ratios observed in some of the rapid growth towns of India (Table 6.1 below). Only in the more mixed industrial towns, which are growing more steadily,

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1 A "stable" population is simply that which emerges if mortality and fertility have been unchanging for a reasonable length of time (50 years or so); (economists have a parallel in "steady-state" growth that emerges from an unchanging savings rate).

is the deficit reduced (as illustrated in model "2"). The cases of "1 b" and "1 b'" (with decadal growth rates in the region of 70%) again show rather small age-structural effects on birth and death rates (a few percentage points). This is quite simply because, first, the migrant flow per annum is less than 10% of the initial population, and second, the age composition of migrants, though concentrated on the working ages, is not wholly "unnatural", that is to say it includes children and old people. Clearly an extreme case of all migrants being aged 25 to 35, like an extreme case of a 1:1 sex ratio among migrants (no lag between male and female streams), will <u>raise</u> the birth rate, as we had expected, but the cases are rare in Eastern India (though we isolate an example of very balanced sex ratios in Chapter 6 below).[1] We shall have more to say about dynamics shortly, but observe for the moment that birth rates recover from immediate shortfall within five to ten years (as the women follow the men). A <u>sustained</u> migration, (like any other sustained demographic phenomenon) results in a permanent displacement of the age structure and hence transformed birth and death rates;

1 In an advanced "Western" type population with a far older age structure the same migration composition will go much further toward reducing the death rate.

as Lotka taught us to realise, the population will recover from a shock:[1] but over the initial years (or quinquennia) of recovery the dynamics behaviour of particular cohorts may be quite dramatic, and it is here, as I am eager to stress, that social and economic implications are crucial.

The cases of "2 b" and "2 a" (with decadal growth rates of around 50%) of course show very little age-structure effects. Note also that in spite of a 30% increase in female migration the birth rate is only one per thousand higher as a short term result (it was 2 to 3 per thousand higher in the "1 a" variant over "1 b"). The empirical evidence we have that points to quite heavily distorted birth rates (discussed below) must result from significantly increased female migration streams (which prompted our creation of the "1 a" variant), or much higher fertility among migrants than among the pre-existing urban population.

Cases of declining or stagnant populations subject to outmigration, as in model "3", register rather high crude birth rates, since the pre-existing skewed sex ratio in favour of males is equalised by male-selective outmigration.[2] Death rates are slightly higher (25 per thousand after 15 years compared with 23 per thousand in the populations

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1 A.J.Lotka, "A Contribution to the Theory of Self-Renewing Aggregates, with Special Reference to Industrial Replacement," Annals of Mathematical Statistics, 10:1, 1939.

2 Regardless of migration, a skewed sex ratio is expected due to differential mortality in Northern India.

subject to inmigration) mainly due to the ageing of the population, but also, in a high mortality population, due to the presence of infants (increased with the higher birth rates). In a society where local consumption, of the poor at least, is largely determined by local production and employment, the age-structural effects on welfare may be quite severe.: the incidence of the elderly population's dependence on the active population increases, and the active labour force declines absolutely (at over 2% per annum in model"3" while outmigration continues, despite a positive natural increase: see additionally part C of Table 3.2). This is a fairly extreme case, where net outmigration rates are of the same magnitude as the inmigration rates assumed in model "2 b" (leading to an overall decline in decadal population of -16%). The "Zero Base" model illustrates the effect of stagnation (with decadal growth of 13% resulting from no migration in conjunction with the pre-existing Indian urban age structure - indicative of net inmigration in the past).[1]

The age structure phenomenon, as we have discussed it above, is only significant for the provision of social

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1 Here the subsequent developments of the age structure will depend purely upon the initial age structure (plus any subsequent change in fertility or mortality). The low percentage under 5 may denote a previous fall in fertility, and the adverse effects on the labour force structure can be seen in year 10 (when the 15-19 cohort declines).

services specific to the young and old. Our interest in the birth rate is that it tells us something about the size of the very young cohort (as well as the services required at birth). The birth rate in the female population alone, which is indicative of the future proportions of infants to mothers, has additional implications for child care. It is of interest that in the sex-skewed populations the female birth rate is higher than the male (not illustrated in the tables): that is to say, although inmigration may reduce birth rates, it may do less to reduce child-to-women ratios, (indeed if female migration is sufficiently bunched in the peak reproductive ages it will raise them). Similarly, old-age dependency ratios have family care implications. Initially inmigrant flows improve (i.e. decrease) the young and old dependency burdens taken together. Later they lead to an increase (Figure 3.1, panel B).

We have shown that only in fairly extreme cases would Indian towns and cities be radically affected by distorted age structures. Greater distortions occur in populations whose migrant age-structures are more in contrast to their resident local population structures, which is typically truer as modern (i.e. older) age structures develop, while the migrants continue to be concentrated in younger age groups. The distortions are enhanced if sex structures, on the other hand, are more alike in both resident and migrant populations; again this is more likely to be true in more developed societies where autonomous migration is less sex selective (in favour of males).

The feature that deserves more investigation is a more truly dynamic one (illustrated in Figure 3.1, panel C). If the age structures of immigrant populations were very close to that of the resident population, all age cohorts would expand at a similar rate, say 10% per annum while migration continued. If, however, the sex ratio of the adult migrants is skewed in favour of males, this picture will be modified in that the birth cohorts will grow initially at somewhat less than 10%, and then subsequently, after the cessation of male migration, at somewhat more than the rate of natural increase, assuming that female migration continues and the adult sex ratio improves.[1] However, if there is a hollow in the migrant age distribution in the age groups 5-9 and 10-14 for example, there will come a time when the sensitive 15-19 age cohort (the age of labour force entry) grows less rapidly, subsequently to pick up strength when the birth cohorts of the initial wave of migrants reach that age. This effect is clearly observable in the "1 c" ,

1 It is a well-known characteristic of "stable" populations (subject that is to unchanging mortality and fertility and with no migration) that each age cohort grows at the rate of natural increase.

or "New-town" model; (note especially the result of using a stable population base, where declines of 7.1 and 1.6% are followed by increases of 1.7% per annum, and declines of 3.3% by increases of 7.1% per annum).[1] What is perhaps of more social significance can be seen if we relate the size of the immigrant 15-19 cohort to that of the native-born cohort, and if we continue to observe the relationship over time, as we will below. It should be noted that the power of this sudden growth of the age group about to enter the labour force depends on how few children arrive with the original migrants: the more children aged 5-14 they bring, the more gradual the growth over the quinquennia, which is a crucial factor in the stabilising of the labour market. If the delayed arrival of female migrants results in a sudden growth of births, a further spurt will occur in the growth of the 15-19 cohort up to 20 years after a project's initiation (as we have illustrated for the case of "1 c" above). The major social problem attributed to the sons of the migrants can thus be delayed by up to 20 years, or it can occur at once (if the migrants bring a large number of 15-19 year olds with them). In the case of "1 b" the de-stabilising effect of migration is more successfully damped by the steady growth of the base population. Generally speaking if a lower rate of

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1 The simulation built on the actual urban age structure of India as reported in the 1961 Census over-emphasises this effect, since there is a considerable hollow, or

migration is sustained over a longer period of time the fluctuations in the age composition are swamped by the stability of the natural growth. This can be clearly seen in Figure 3.1 where the "Balanced growth" industrial investment option results in more stable dependency ratios and more stable growth in labour force entry cohorts. The implications for the labour market, for investment policy, and for social welfare are discussed in Chapters 6 to 9 below. Examination of static age structures, or indeed vital rates, did not clearly reveal this phenomenon. We could view it further in the light of how fast the labour force is being quitted via old age, but remembering that old and young workers are by no means simple substitutes. We do this by observing the rates of male labour force growth. Ironically the more concentrated migration cases ("1 b" rather than "2 b") can mitigate the effect of rapid labour force entry rates since very large cohorts also age out of the labour force in later quinquennia (the older members of the original migrant stream), so that the labour force growth rate is subdued. It should be emphasised that such an observation

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footnote continued from previous page

undercutting of the base age distribution, in the 0-4 age group. This underlines how other changes (which would result in the 0-4 age group suddenly declining in proportion to the rest of the population) can enhance the effect of in-migration by reducing the native-born 15-19 cohort preceding that of the migrant-born 15-19 cohort. To see this compare the effect on the "1 b" model of using both stable and actual initial age distributions.

depends crucially on the age structure of migrants and the length of working life: for again the workforce could delay shedding its largest cohorts until five years after the entry of the largest cohorts in the 15-19 age group. In all these cases, how easily a society can accomodate such changes without precipitating changes in its own organisation (administrative or political) is likely, inter alia, to be a function of the instability and the size of the 15-19 cohorts, and both instability and size generally decline as one proceeds through the models from "1 c" to "2 b" and "Base". The other ingredient in the dynamic social implications, the relative size of migrant and non-migrant cohorts (in the same age groups), we will now go on to discuss.[1]

Whereas societies may well react to changes in age and size of their total populations, the differential changes among the different groups or classes is likely to be of more significance. In the present context, let us consider migrants in comparison with the native or locally born population. This is a first approximation to a more

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1 The relative importance of differential mortality and differential fertility is indicated in an appendix to Chapter 4. In summary, a 50% decrease in fertility reduces the size of the labour force entry cohort by 50%, but increasing life expectancy by 43% increases that same cohort by between 29 and 36% only, depending upon the mortality pattern assumed within plausible limits.

subtle disaggregation, but given that different migrant streams are representative of different social and economic groups (see further Chapter 5), the approximation will do: for example, the initial heavy inmigrant stream we describe is largely wage labour, skilled and unskilled, whereas the following or continuing undercurrent of migrants is more generally non-wage labour. In considering the political dynamism of the 15-19 age group, it is particularly important to focus on the migrants and non-migrants separately. Aspirations have to some extent been formed by occupations secured by peers and elders in the same population groups, and prospects are determined by the size of the competing population groups. Clearly the fluctuations in the size of the cohort become more intense when we exclude the stabilising demographic effect of the native-born (of more than one generation). Let us focus attention on the "1 b" population. For ten years after the initial inmigration the 15-19 cohort declines absolutely. In the third quinquennium a dramatic reversal takes place. This is partly the pure "second generation migrants" effect. For these are the sons of the initial migrants, born before they arrived and migrating with them, and their cohort grows at rates in excess of the natural increase owing to the fact that the earlier cohorts were so much smaller than they would be in a stable population (for the initial migrants aged 5-14 were few in number), and there was no supplementation of their numbers by continuing migration on the same scale beyond the first quinquennium. As we have noted, a further reversal takes place between 20 and 25 years later when the sons of the migrants actually born in the city reach labour force entry age. By contrast in model "2 b" there is the supplement of continuing migration for a second quinquennium: hence the absolute decline in the 15-19 age group is delayed and the later increases are more gradual, (those in the sixth quinquennium, though for reasons discussed above those in the forth are not). The extreme sensitivity of these effects to the age pattern of migration is illustrated in model "1 b'": the age bunching of women (into the high fertility ages) in the quinquennium both contemporary with and following the initial male migration induces a baby boom that reaches the labour market in quinquennia starting year 20, as well as year 25. A similar result occurs if female migration is increased by 50% (compare "1 a " with "1 b"). It would be an ironical response to these fluctuations if a second wave of young migrants were encouraged in the quinquennia starting years 5 and 10 to fill the hollow that is causing a slack in the labour supply, and thus exacerbate the excess supply that will occur in the subsequent quinquennia. Labour market signals may be quite deceptive unless accompanied by a knowledge of demographic dynamics!

The overall social effects of these and similar observations must presumably depend on how large is the migrant population in relation to the native-born, and how this ratio changes over time. We investigate this in Table 3.3 (Figure 3.2), counting the descendants of the main migration stream (recorded in the first quinquennium) as migrants, and counting the continuing undercurrent of migration as local and therefore equivalent to native-born. Starting from a migrant to native ratio of 0.5:1.0 in the "1 b" model, the subdued rate of natural increase in the migrant population (due to its initial sex structure) tends to reduce this ratio (and age the migrant population faster). In 20 years the ratio has fallen to 0.4:1.0.[1] A slightly less substantial decline is sustained in the migrant population if fertility is enhanced by the sex structure of the migrants (as in "1 a"). A more evenly

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1 If fertility is enhanced by the age structure within the migrant population, as in "1 b'" (not illustrated) the proportion of migrants will start and finish larger (i.e. starting in quinquennium 5-10 when migrant children are first born in the town).

distributed migration (not illustrated) will obviously start with a lower proportion migrant, and at the same terminal date have a substantially lower proportion migrant (including descendants) due to the shorter period of natural increase among the migrant families in the town (compared with "1 b" , where all the migrants arrived together at the start). In the extremely unbalanced case of New-town development ("1 c"), where the initial migrant population is five times the native-born, the decline reaches 3.7 times the native-born over the 20 year period. As before it has to be pointed out that if age-specific fertility were higher among migrants the ratio would have a tendency to rise rather than fall, at least until migrant fertility began to decline. Small (but probably typical) differentials in fertility do little to offset the effect of population sex differentials (Table 3.3). Conversely, if the native population grows faster owing to lower mortality offsetting lower fertility, the migrant population falls even faster in relative size. In all these cases of unsustained migration the ratio of migrant to native population falls rather than rises (which we show below in Chapter 6 is a fair reflection of what has happened in the areas of rapid migrant inflows associated with industrial expansion in the Second Plan period).

Figure 3.1
Demographic Effects on a Locality
of Three Contrasting Migration Patterns

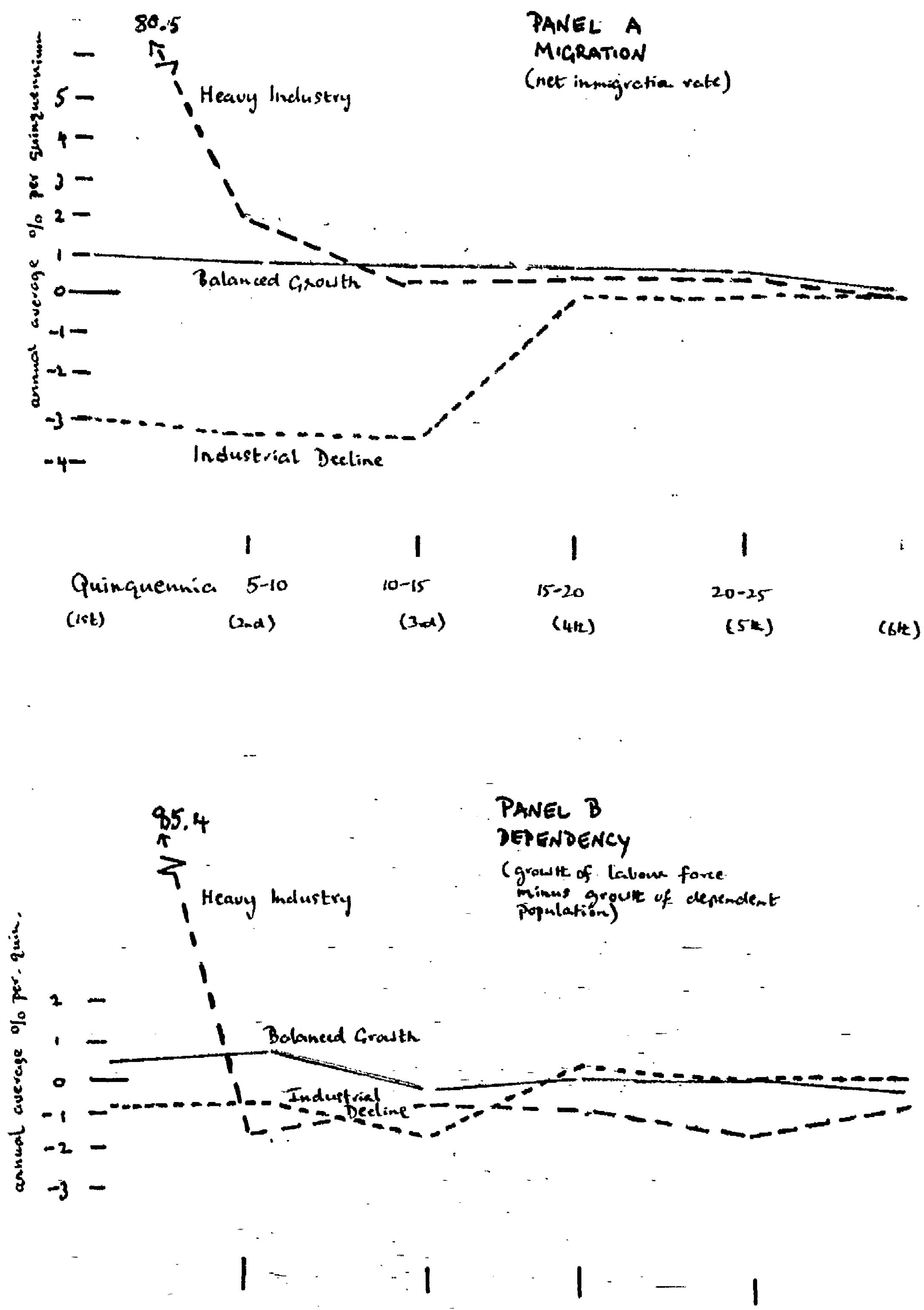
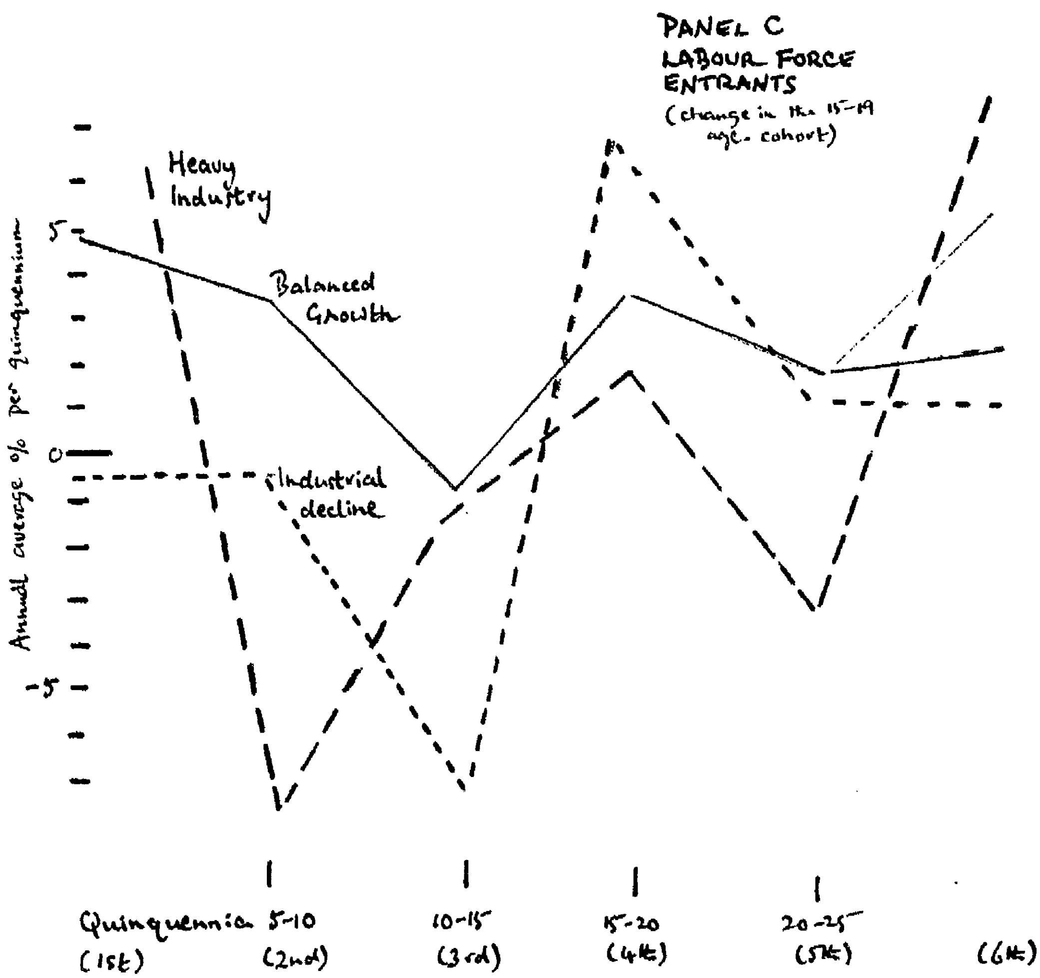


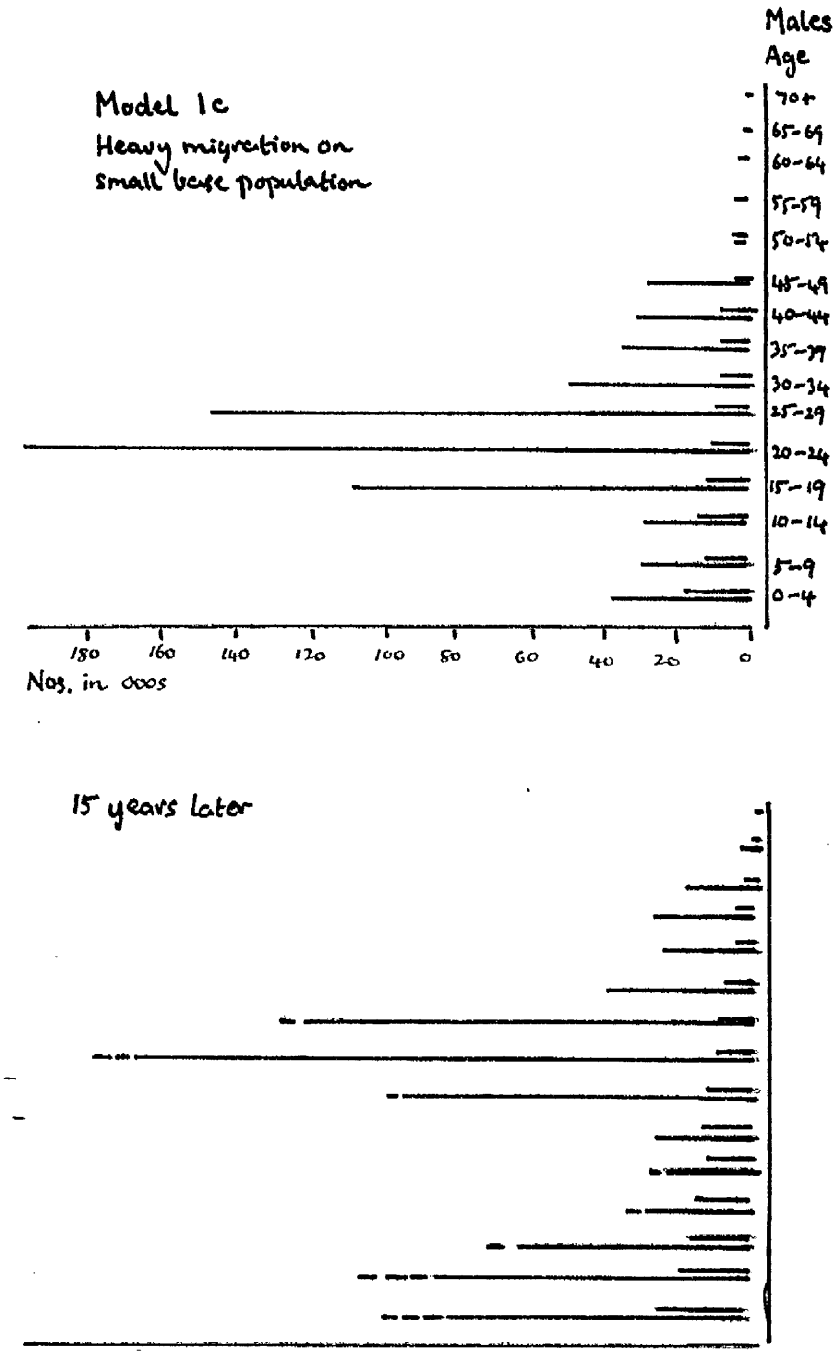
Figure 3.1 continued



Source: Simulation Model (see Table 3.2)

Figure 3.2

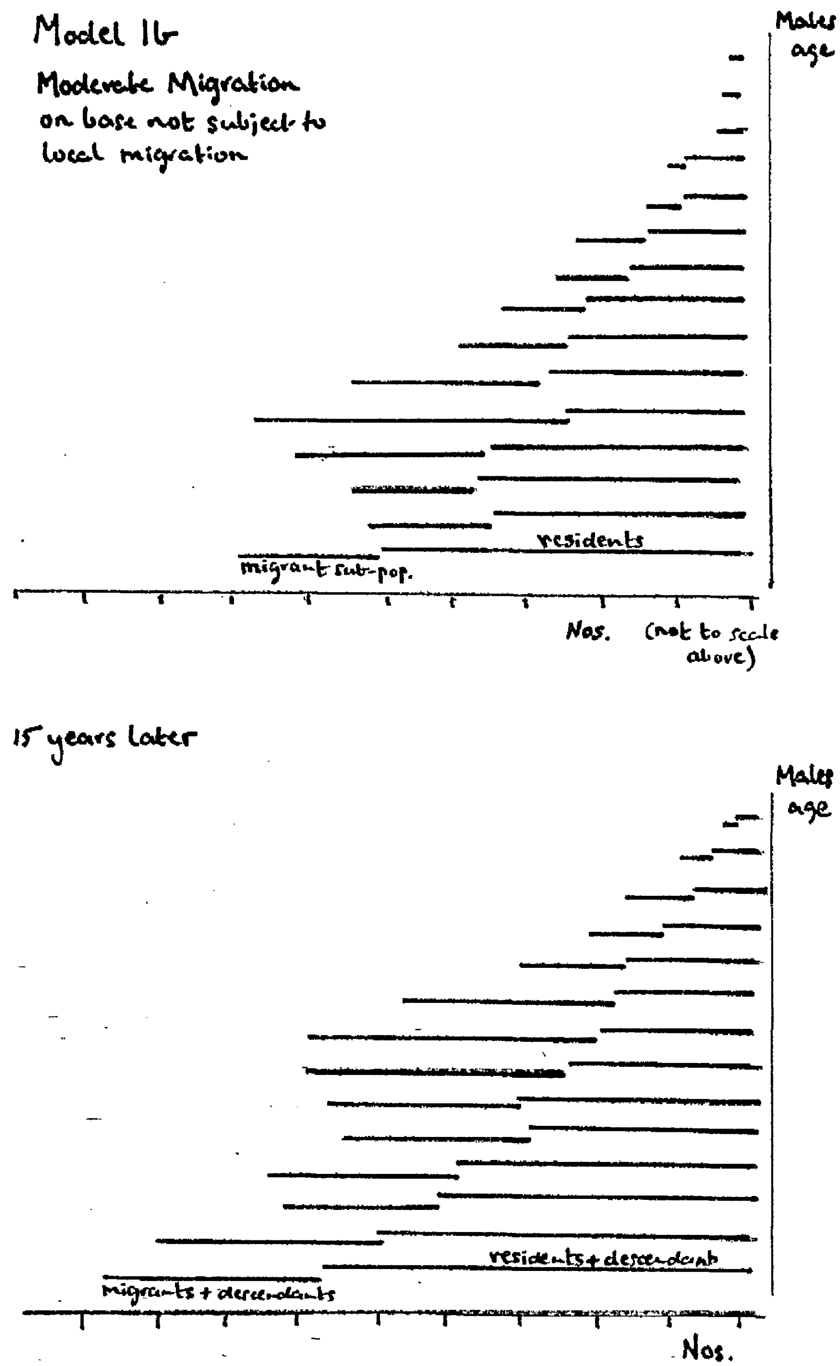
Age Structures and Proportions of Migrant and Local Populations: Inter-Temporal Comparisons



Key: Top bar is residents + local migrants
Bottom bar is major migrants and descendants

Broken line shows effect of increased life-expectancy among migrants

Figure 3.2 cont'd



Source: derived from Simulation Models

Table 3.1

The Models of Urban Demographic Growth and Structure: Populations subject to various Patterns of Migration

Notes and Overview of Parameters

Initial Age Structure: All-India urban average as recorded in 1961 Census (unless otherwise stated).

Fertility: Total Fertility Rate of 5.1.

Average fertility for each five-year age group as follows, from 10-14 to 45-49: (.0069,.1361,.2590, .2445,.1871,.1252,.0542,.0070) from Coale-Trussell models (see Chapter 4 below and Figure 4.2). (Variations noted where they are made.)

Mortality: Female Life Expectation at Birth of 40 years. Survivorship pattern as in Princeton Model Life Tables, West Level 9 , paired with male level and pattern as therein (see Chapter 4 below and Figure 4.1). (Variations noted as appropriate.)

The reader may care to note that Table 3.2 offers a summary of three major variants (illustrated in Figure 3.1); Figures 4.3 and 5.1 illustrate age distributions and migration schedules respectively.

BASE

	Year 0		5		10	Stable Model for Comparison
	Project Initiated Migration starts					
In-Migration Rate[a] (MMR)		1.0		0.9		0.0
Natural Increase	1.6		1.5		1.5	1.5
Decadal Growth					$\boxed{28.5}$	
B.R.[b]	39.3		38.7		38.5	38.3
D.R.[b]	23.1		23.3		23.2	23.3
Male Labour Growth (ages 15-59)[a]	3.1		3.2		2.2	
Male Age Group (15-19) Growth[a]	4.9		3.3		-0.9	
Dependency Burden (Males<15 or >59 ÷ Labour Force)	68.5		67.4		62.9	

		15		20		25
MMR	0.9		0.9		0.8	
NI		1.5		1.4		1.4
BR		38.0		37.8		37.9
DR		23.4		23.4		23.7
MLG		2.4		2.2		1.0
15-19G		3.1		1.4		1.6
DB		64.9		64.2		64.2

Notes: a Simple annual average per cent for the quinquennium. In projection the net in-migration streams were cumulated into 5-year totals, which became part of the urban population for the next 5 years on. Both sexes.

b Birth and Death Rates are expressed traditionally per thousand.

1 b

	Year 0		5		10
		Project Initiated			
MMR		8.1[a]		1.0	
NI	1.6		1.4		1.5
Decadal Growth					71.6
BR	39.3		35.6		37.0
DR	23.1		22.2		22.3
MLG	15.8 [a]		2.5		1.7
15-19G	21.7 [a]		-1.4		-1.3

		15		20		25
MMR	0.7		0.6		0.6	
NI		1.4		1.3		1.3
BR		36.4		36.2		36.5
DR		22.7		23.0		23.5
MLG		1.8		1.4		0.7
15-19G		3.3		0.4		1.8

Note: a As stated above, these are simple (arithmetic) annual average rates for the quinquennium 0 - 5, and so on.

1 b'

Year	0	5	10
15-19G	21.7	-4.0	-1.1

	15	20	25
15-19G	3.4	5.0	1.5

Note: This is as 1 b but with the male migration more heavily concentrated in the young adult ages.

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1 b STABLE

Year	0		5		10
MMR		8.7		1.1	
NI	1.6		1.4		1.5
Decadal Growth					$\boxed{75.3}$
BR	38.6		35.8		37.6
DR	23.2		21.6		22.3
MLG	19.2		2.7		2.3
15-19G	19.7		-1.8		1.4

	15		20		25
MMR 0.7		0.7		0.7	
NI	1.5		1.4		1.4
BR	37.4		36.9		36.8
DR	22.7		23.0		23.3
MLG	1.9		1.6		0.8
15-19G	0.4		0.7		2.0

Note: This is a projection from an initial stable, not Indian urban, age-structure, - see Figure 4.3.

1 a

	Year 0		5		10
MMR		9.1		1.3	
NI	1.6		1.6		1.7
Decadal Growth					81.6
BR	39.3		37.9		39.6
DR	23.1		22.2		22.8
MLG	15.8		2.5		1.7
15-19G	21.7		-1.4		-1.3

		15		20		25
MMR	0.6		0.6		0.6	
NI		1.5		1.5		1.4
BR		38.4		37.7		37.8
DR		23.0		23.1		23.4
MLG		1.8		1.7		1.0
15-19G		3.3		2.3		2.5

Note: Female migration is raised by 50% in 1 a over 1 b. In-Migration Rate (MMR) is for both sexes.

1 c

	Year 0	Project Initiated	5		10
MMR		80.6		1.8	
NI	1.6		1.1		1.5
Decadal Growth					527.1
BR	39.3		29.7		35.6
DR	23.1		18.8		20.8
MLG	144.3		1.5		0.8
15-19G	191.6		-7.0		-2.3

		15		20		25
MMR	0.2		0.2		0.2	
NI		1.3		1.2		1.1
BR		34.5		33.8		34.3
DR		21.6		22.2		23.1
MLG		0.7		-0.1		0.2
15-19G		2.6		-3.4		7.0

1 c STABLE

	Year 0	5	10
15-19G	186.8	-7.1	-1.6
	15	20	25
15-19G	1.7	-3.3	7.1

Note: This is a projection from an initial stable, not Indian urban, age-structure, see Figure 4.3.

$\boxed{\text{2 b}}$

	Year 0		5		10
		Projects ..... Initiated			
		Migration .... Continues			
MMR		2.9		2.4	
NI	1.6		1.6		1.5
Decadal Growth					$\boxed{50.2}$
BR	39.3		38.4		38.0
DR	23.1		23.0		22.7
MLG	6.3		5.3		2.0
15-19G	9.1		4.4		-1.9

		15		20		25
MMR	0.9		0.7		0.7	
NI		1.5		1.4		1.4
BR		37.8		37.1		37.2
DR		23.0		23.1		23.4
MLG		2.2		2.0		1.0
15-19G		4.1		2.1		0.4

$\boxed{\text{2 a}}$

	Year 0		5		10
MMR		3.1		2.6	
NI	1.6		1.6		1.6
Decadal Growth					$\boxed{53.4}$
BR	39.3		39.0		39.0
DR	23.1		23.0		22.9
15-19G	9.1		4.4		-1.9

		15		20		25
MMR	0.9		0.7		0.7	
NI		1.6		1.5		1.4
BR		38.7		38.9		37.7
DR		23.2		23.2		23.5
15-19G		4.3		2.5		0.8

Note: Female migration is raised by 30% in 2 a over 2 b.

ZERO BASE

	Year 0		5		10
MMR		0.0		0.0	
NI	1.6		1.6		1.6
BR	39.5		39.1		39.2
DR	23.3		23.6		23.7
MLG	1.5		1.8		0.9
15-19G	4.1		2.7		-2.2
Decadal Growth					13.2

	15		20		25
MMR		0.0		0.0	
NI	1.5		1.5		1.5
BR	38.9		38.9		39.2
DR	23.9		24.1		24.3
MLG	1.3		1.2		1.2
15-19G	3.1		1.4		1.6

Note: This is a projection without migration, from the Indian urban age-structure.

3

	Year 0		5		10
MMR		-2.9		-3.2	
NI	1.6		1.5		1.4
Decadal Growth (Decline)					$\boxed{-16.0}$
BR	39.5		38.6		38.2
DR	23.3		24.1		24.6
MLG	-2.2		-2.3		-4.0
15-19G	-0.4		-0.5		-6.9
DB	69.6		72.2		68.5

		15		20		25
MMR	-3.5		0.0		0.0	
NI		1.2		1.3		1.5
BR		37.8		39.0		40.4
DR		25.5		25.5		25.6
MLG		1.3		1.3		1.5
15-19G		6.5		1.1		1.1
DB		75.0		72.6		72.6

Table 3.2

Three Cases of Contrasting Urban Models

Examples: a. Concentrated Heavy Industry on new site

b. Balanced Industrial Growth at existing centre

c. Decline of Lightly Industrialised locality

A Net-Inmigration Rate (annual average % per quinquennium)

Quinquennium	1st (e.g 1955-60)	2nd	3rd	4th	5th	6th (e.g. 1980-85)
a.	86.5	1.8	0.2	0.2	0.2	0.0
b.	1.0	0.9	0.9	0.9	0.8	0.0
c.	-2.9	-3.2	-3.5	0.0	0.0	0.0

B Difference between Growth of Male Labour-force and Growth of Total Population (annual average %)

a.	85.4	-1.4	-0.8	-0.8	-1.4	-0.8
b.	0.5	0.8	-0.2	0.0	0.0	-0.4
c.	-0.9	-0.6	-1.9	0.1	0.0	0.0

C Growth of Labour-force Entrants (males 15-19, annual av. %)

a.	186.8	-7.1	-1.6	1.7	-3.3	7.1
b.	4.9	3.3	-0.9	3.1	1.4	1.6
c.	-0.4	-0.5	-6.9	6.5	1.1	1.1

Source: Simulation Model (Table 3.1);

a. = 1 c Stable, b. = Base, c. = 3.

This table is graphed in Figure 3.1

Table 3.3

Ratios of Migrant to Original (or Local) Population

Model	Migrant males divided by males locally born[a] Year 0	5	10	15	20
1c	5.20	4.67	4.34	4.01	3.69
1b	0.47	0.42	0.38	0.35	0.32
1b low fertility and mortality among migrants and locals[b]	0.46	0.41	0.38	0.34	0.31
1a	0.47	0.44	0.42	0.40	0.38
1b with high fertility among migrants only[b]	0.47	0.42	0.40	0.37	0.35

Notes: a A continuing modest migration stream from local areas is assumed as in the "Base" model and this is counted in with the native-born to form a group called "locals". Sons of the main migrants are counted as migrants, wherever born.

b Low fertility: T.F.R.=4.7; Low mortality: e_0°(fem)=45. High fertility: T.F.R.=5.7.

Source: Simulation model derivations (Table 3.1).

A brief Overview of Chapter 3

From this analysis we can say that demographic characteristics of new fast-growth towns will exacerbate the future labour market's ability to equilibrate supply and demand (other things being equal). This is predominantly due to the large population size accumulating over a very short period, and the rapid equalising of the adult sex ratios. The age-structure of migrants has a secondary effect. The demographic character of slow (or negative) growth towns will exacerbate their ability to find resources for maintaining local welfare, owing to their loss of adult men but retention of women and dependants (both young and old). The determination of the (short-run) relative sizes of competing migrants and local sub-populations is outlined.

PART TWO

Exploring the Empirical Evidence

CHAPTER 4

Discussion of the Parameters used in the Model and Exploration of the Fertility Factor

A Summary of the Main Empirical Points

The speed at which a second generation population (the future, locally-generated, workforce) is created, depends in part on the fertility of the first generation migrants. Similarly the subsequent size of various population groups, of different origins, with their individual aspirations towards achieving specific types of employment, depends on earlier and current fertility levels. There are three components here affecting the urban populations: marital fertility, proportions of population married (by age), and the presence of spouses. It is found that lighter manufacturing towns (e.g. textile towns) sustain higher and unchanging proportions of children in their populations, whereas heavy industrial towns experience rapid increases in the proportions of children (as existing families join the initial male migrants), but exhibit the socio-economic potential for a subsequent rapid fertility decline through later marriage or marital fertility control. This contrasts with experience in other societies (e.g. historical England), where we find light industry attracts single female labour, so that despite more balanced sex ratios overall, the proportions married and the proportions of children are lower than in India. Hence we infer that increased opportunities for female labour will currently enhance the birth rate in Indian cities, but need not continue to do so if the age at marriage rises (as it is clearly doing in all categories of towns). Finally we show that some migrant groups remain as split families (as we observe in Bombay, but find less in the heavy industrial towns), and hence will not necessarily retain their relative strength over time in the urban population.

Overview of Parameters

Although it is hoped that the model just discussed will have wide application and usefulness in interpreting the changing structure of urban populations in other economies and at other periods of time, the fact that we intended to use it here in the analysis of data from contemporary India prompted the choice of parameters we used. Initially our ambition was to use mortality and fertility schedules that were particularly appropriate to the Eastern region of India under discussion. This ambition was abandoned for a number of reasons. First the value of the mortality tables prepared by the Registrar General for the decade 1951 to 1961 has been seriously questioned:[1] for although the Registrar General did not indicate his method of calculation, it is clear that regional life-tables can only be prepared from censuses after adjustments have been made for migration between the regions. Estimation of the latter, however, cannot accurately be made on the basis of place of birth data collected in the 1961 Census since, among other things, we need additional information on the place of last residence, and we need to allow for

1 Notably by Professor K. Dandekar, of the Gokhale Institute of Politics and Economics at Poona, in a personal interview.

misreporting of duration of stay, though it is true that for some regions at least a reasonable approximation might be made. The alternative then is to use census-survival methods to estimate the migration, but that of course requires using regional life-tables, which is what we are trying to construct in the first place.[1] In the light of this argument it seemed pointless to indulge in the

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1 K.E.Vaidyanathan, "Population Redistribution and Economic Change in India 1951-1961", University of Pennsylvania, 1967 (mimeograph), reported a similar problem in trying to construct estimates of urbanward migration by census-survival methodology. Briefly described, census survival methods entail observing an age-cohort, 20-25 say, in the first census, and following it through to the second decennial census, when it will be aged 30-35. If we have age-specific survival rates (obtained from Life-tables) appropriate to the area of the country (in default of complete deaths registration) we can <u>estimate</u> the number of people who will have died in the 10-year interval and subtract them from the original 20-25 age-cohort, thus reducing the expected number aged 30-35 at the end of the interval. Any excess over that expected number is then to be attributed to net inmigration. The method is very sensitive to the survival rates we use.

sophistication of using local mortality data for model-building purposes.[1] Recourse was had accordingly to the Princeton Model life-tables.[2] The "West" variant was used (following the argument of Professor A. Coale that

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1 For the 1961-1971 decade the introduction of the Sample Registration System of birth and death recording enables a more valid reconstruction of State-wise life-tables; but see also T.Dyson's attempt (and commentary) using census-survival techniques: "Mortality Estimates for the States of India", Centre for Population Studies, London School of Hygiene and Tropical Medicine, 1980 (mimeo).

2 If there is a reasonably complete registration of deaths, and age reporting is fairly accurate, it is possible to convert these mortality data into the probabilities of dying between the ages of 20 and 30 for example, and hence obtain the probabilities of survival. When such data do not exist (as in the case of India) the probabilities of survival obtaining in other countries (e.g. Western Europe in the 19th Century) can be used instead. Sets of these have been grouped together and averaged (by Coale and Demeny, at Princeton University), the result being labelled the "West" model life-tables. These are graded for overall expectation of life at birth - 40years, 50 years, 60 years etc. Knowing which level to take to apply to India is not easy, but techniques have been developed to check the accuracy of one's choice against the population age structure (in broad terms) and decennial growth rates that would be implied by particular levels, (so long as the national population is closed to migration and is subject to unchanging mortality and fertility over time, - all roughly true of India in the 1950s). A.J.Coale and P.Demeny, Regional Model Life Tables and Stable Populations, Princeton University Press, Princeton, 1968.

we know insufficient about Indian mortality((in the 1950s) to justify using anything other than this admittedly "residual" table),[1] and the level chosen was "9", giving an expectation of life at birth close to what is thought to be the case for India in the late 1950s, namely about 40 years for women. I have illustrated the Eastern Regional table (of the Registrar General) and the Princeton West model in Fig. 4.1. A priori the sharp decline in survivial of women in the Registrar General's table (and to a lesser extent of men) around the ages 25-35 could be regarded as suspect, though in the case of women it could derive from exceptional adverse nutrition in the child-bearing ages, and in the case of men the high incidence of tuberculosis and other respiratory diseases may make adult survival worse than it was in Europe in the 19th Century.[2] A possible error in the Registrar General's tables could be that too many net in-migrants were adjusted for in the earlier ages (for, as we shall see more closely later, it is not accurate to take the age distribution of migrants to be the same as that in the general population); but a more general error may be that age misreporting (shifting numbers into the older age groups specifically) has not been sufficiently allowed for. In that context note the better survival beyond the

1 Personal communication with Professor Coale at Princeton University (1975).

2 See N.R.Crook, "The Changing Character of Mortality in the City of Poona"(manuscript), School of Oriental & African Studies, 1983.

age of 65. A second reason for not using the Eastern Region (or Zone) mortality table of the Registrar General is that the region itself is heterogeneous. Registration data for the 1960s are hopelessly unreliable, but if we have regard for the rather more satisfactory Sample Registration System (SRS) data for the late 1960s and early 1970s we see a notable variance in crude death rates for the different States in the region (a picture confirmed by life tables constructed from the two Censuses 1961 and 1971).[1] For instance, the urban death rate for Orissa is 11.4 as against 6.3 in West Bengal. Rural death rates are about 50% higher, though, as we shall discuss below, this is not the case uniformly throughout the age groups. Presumably such variances held in the 1960s (early) and late 1950s; indeed they might be expected to be larger in a period when fairly rapid falls in the death rate were still being experienced.[2] It seemed therefore useful to

1 Government of India, Sample Registration System Bulletin, Office of the Registrar General, various years, New Delhi.

2 A major drawback with non-Indian models is that the male to female mortality differential is inappropriate. In India, at most ages female mortality exceeds the male. But the regional contrasts are quite large and our region is heterogeneous; nor do we know much about urban mortality sex differentials. The bias resulting from using the "West" model sex differential is that we have probably projected too large a female population at most ages.

take a single model of fairly broad application (i.e. "West" level 9) and to indicate, as the investigation proceeds, the effects of using slightly different levels, or different models (including some differentiation between migrant and non-migrant sub-populations in these respects), as we have done in Chapter 3.

There was never any question of using regional fertility schedules for 1961, although vital statistics surveys including fertility information were carried out during the 1961 Census: the data would need considerable manipulation. Again, the Sample Registration System data suggest inter- State variations within the Eastern region. Again therefore recourse was had to models, though this time they are arguably a little more Indian in character. The Coale-Trussell Princeton fertility model was fitted to the National Sample Survey age-specific fertility schedule for 1958 (All-India).[1] Following estimates made by Veena Soni a total fertility rate of 5.50 was assumed to be approximately correct; but even as early as 1961 a rural to urban fertility differential is likely to have existed, and perhaps a differential between migrant and non-migrant populations (discussed further below), the effects of which are borne in mind in Chapter 3, so that for most of our simulation

1 As with mortality, the under-reporting of vital events, and the inaccurate recording of people's ages, make it desirable to use a model schedule of fertility by age, derived from populations with better data.

model a level of 5.1 was taken, which is close to the National Sample Survey figure for urban India in 1964, 4.88.[1] The result of the fit is illustrated in Figure 4.2.

As it was by now apparent that All-India rather than specific regional parameters would best be used, with some qualitative observations on local differences, an All-Indian urban base population was also adopted, using the age distribution as reported at the 1961 Census, without adjustments (as these are only readily carried out on fairly stable populations not subject to migration). Particular problems arising from the use of unadjusted data are discussed below, and (as was seen in Chapter 3 above) we use stable age distributions in alternative projections by way of control. The sex ratio adopted was 8 to 10 , females to males (which is close to the average urban sex ratio in India).[2]

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1 The actual fitting was done for me by Basia Zaba at the Centre for Population Studies, London School of Hygiene and Tropical Medicine. The method is such that certain parameters characteristic of the Indian population are observed. The earliest age of marriage and survey estimates of the level of total fertility per woman are the principal parameters used.

2 At the State level these are given in 1961 as follows: Bihar 811 women per 1000 men, Madhya Pradesh 856, Orissa 808, West Bengal 701, (all for urban areas). Government of India, Census of India 1961, General Population Tables, Delhi.

A Note on the Age Distribution

The urban age distribution revealed in the 1961 Census was used in some, but not all, of the simulations. It was felt that the attempt to simulate the peculiar effect of welding migration on to an already distorted population was worth making. But at the same time it is well-known that age misreporting and under-counting (especially in the 0-4 age group) would artificially distort the figures revealed in the Census: the problem with all unstable populations is to distinguish the artificial from the real. The shortfall in the All-India (rural plus urban) 0-4 group has been well discussed by Tim Dyson, who believes that, of the 12% or so omitted from that group, about $\frac{1}{3}$ has been shifted into the 5-9 group, and about $\frac{2}{3}$ omitted from the population altogether.[1] This phenomenon may affect the female population more than the male. When we look at the urban population separately we find the 0-4 male cohort is particularly small, 12.8% of the male population (whereas females 0-4 are 14.7% of their own population), but this is due to the large number of adult males in a population subject to sex selective, age selective, inmigration (Figure 4.3). Both are of course significantly below

1 T.Dyson, "Analysis and Adjustment of the 1971 Indian Age Distribution", Demography India, 5:1 & 2, 1976.

what we would expect in a stable population (of appropriate mortality level and with fertility characteristics that coincide with All-India demographic experience over the decade; Figure 4.3). This is confirmed by observing the sex ratio by single years of age: throughout 0-9 the urban areas have excess males, (and a greater excess at each age than in the rural areas), but with the excess worsening further in the 5-9 age group, (though to a smaller degree than in rural areas, so that the rural-urban difference begins to narrow). The male urban age distribution is actually undercut in the 0-4 age group (there are more males aged 5-9 than 0-4). How has this come about? It is unlikely that age displacement or pure omission are worse in urban areas than in rural. We do not know of cultural reasons why survival rates for boys would be better in urban areas vis-a-vis those for girls than they are in rural areas; on the contrary, we might expect the more educated population to be less likely to neglect girls. The National Sample Survey Migration Survey (and the 1961 Census data on migrants migrating within the last twelve months to Bombay, which are cross-classified by age) suggest that boys outnumber girls in the age groups 1-4.

The NSS suggests that girls outnumber boys among infant migrants (under 1 year old) but the 0-4 age group as a whole turns out to be slightly male-dominant (f:m sex ratio of .954 versus .992 in the All-India population). This probably indicates that boys are a little more likely to accompany their fathers (or elder brothers) if the latter are migrating alone, than are girls: they will stay with their mothers in the rural areas. Declining fertility in urban areas (with their higher socio-economic class composition), if not in rural areas, is likely to have taken place during the 1950s, and hence the small size of the 0-4 cohort. All the States in our region have aggregate urban populations with the 0-4 cohort smaller than the 5-9 (for both sexes) with the exception of Madhya Pradesh.

Fertility Differentials: Evidence From Bombay

It is well-known that fertility rather than mortality differentials are by far the more important determinants of natural growth rate differences in contemporary populations (and particularly of national sub-populations), and hence also of their relative sizes. Mortality differentials would modify, but always be dominated by the fertility effect in populations of our experience, (see below Appendix to Chapter 4). Furthermore, differential age structures are largely determined by fertility, not mortality.[1] In our initial model-building we assumed for clarity a single fertility schedule, derived from the data collected as representative of All-India. In actual fact our urban populations are significantly more complex. Not only may migrants have different fertility behaviour from non-migrants, but migrants of different regional background may have different fertility (and in India those differences, even if we hold constant socio-economic characteristics, turn out to be considerable).[2,3] Similarly, migrants of different socio-economic status would be expected to have different fertility, given that, by the 1960s at least, family limitation was clearly being practised, especially in urban populations. In theory we need to distinguish migrant types, and also the two major social components in overall fertility per woman: the pace and ultimate extent of entry of the female population into marital union, and the control of fertility within marriage.

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1 See A.J.Coale, The Growth and Structure of Human Populations, Princeton University Press, Princeton, 1972.

2 T.Dyson,"India's Regional Demography", London School of Economics and Political Science, 1981 (mimeo).

3 S.J.Jejeebhoy, "Status of Women and Fertility: a Socio-Cultural Analysis of Regional Variations in Fertility in India", in K.Srinivasan and S.Mukerji (eds.), Dynamics of Population and Family Welfare 1981, Himalaya, Bombay, 1981.

However, City-wise or District-wise data on marital fertlity are non-existant, though we do have Census data on marital status. As an index of total fertility we have of course child-to-woman ratios (but unfortunately these are confounded, as is well-known, by differential child mortality, a not insignificant problem (see Appendix to Chapter 4)).[1] As for differentials between migrants and non-migrants, further conceptual problems arise, discussed below, and we have to rely on evidence from two major Cities for which special tabulations were done in 1961: Bombay and Ahmedabad. Despite these limitations, it seemed worthwhile to investigate this evidence directly, in order perhaps to provide further insight into the shortfall in the number of children recorded as aged 0-4 in the 1961 Census (just discussed). In particular we may discover how far such a shortfall, insofar as it is real and not a mere undercount, could relate to differences in the marital status of the migrants (as compared with the rural or urban non-migrant

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1 The 0-4 death rates differ more noticeably than do those at adult ages. However their effect on the Child-Woman Ratio differentials between the States of India should not be exaggerated. For example, male rural death rates in the age group 0-4 are 41.6 and 72.6 per thousand for Maharashtra and Gujarat respectively (SRS data), implying, cet. par., only 3% in CWR due to child mortality differences. The Maharashtrian rural-urban difference in child mortality is only 1% of the child population. Note that in some of the analysis we have to make do with 0-9 in the numerator of the CWR.

population).

We can see from Table 4.1 that for males there is really very little difference in the singulate mean age of marriage (SMAM)[1] I have calculated between migrants and native-born. For males it is difficult to detect a consistent trend, though it is universally observed that urban-urban migrants marry later; this reflects that they are more likely to be of middle-class status, in managerial occupations,(though not all will fit this description). Our interest, however, must focus on women, since, in the simplified demographer's approach, only women are responsible for the birth of children (so that only the absense of women is a limitation on the birth rate). The SMAM of females rises slightly with duration of residence, but, more significantly, is highest of all for the non-migrant population: that is to say, there is no evidence that those currently migrating (or with less than one year's duration of residence in the City) are more likely to be single than their urban peers.

This latter is a very important point. It would seem from detailed examination of case studies (see further below) that migrants to green-field Steel Town sites

1 This is the average age at which first marriages take place.

are very heavily male-dominated for the first two to three years. But it also becomes clear from the rapidity of family formation subsequent to those three years or so that a majority of migrants are already married on migration (this is confirmed by some detective work on Bhilai in Chapter 9), and simply brought their fertility history with them (as it were), thereby rapidly pushing up the child-adult dependency rates in the city. The evidence from Bombay seems to confirm this. There is however a notable difference between the urban and rural migrants (according to origin). It appears that female migrants whose move is urban to urban, and who are more likely to be joining husbands (or rather subsequently marrying men) of managerial or professional status will have lower fertility (by virtue of a later age of marriage); and they, as we shall see, are a more important demographic component in the industrial sectors of heavy industrial towns (around 20% of factory sector employment) than in other towns, thus offsetting some of the boost to the numbers of children in these cities given by the influx of young married migrants, but enhancing the significance of the class differentials in fertility in the city. Some qualifications have to be added in extrapolating from the Bombay data in this way, which we will do shortly.

A more drastic simplification we made in model-building was to assume that the same fertility behaviour would characterise migrants moving to join husbands (the "marriage-response" migrants as those moving in search of employment (the "autonomous" migrants), the argument being that even the latter were generally speaking migrating as part of a household (and often as a marriage partner) and not as individuals, even though the actual decision, or timing of that decision, to come to the town was influenced by work opportunities. Some light is shed here from the useful tabulations on marital status and labour force participation: again the evidence is for Bombay. There are nearly 6 years between the ages of marriage (SMAM) of working and non-working women of urban origin (and the working women marry nearly 4 years later than those in the general city population including native-born; again note the qualifications on interpretation that follow). These will be the relatively skilled working women in the non manual trades. The rural working migrants marry nearly 3 years later than the non-working, and 3 years later than rural women generally, but 1 year younger than the general population in Bombay, (Table 4.1).

These observations should not be extended too readily to imply differential marital, and hence differential fertility, status of subpopulations in <u>any</u> town or city. Working women migrating to Bombay are heavily represented among migrants from Kerala, Tamil Nadu, and the Southern States in general. And we know that the <u>average</u> mean age of female first marriages for all social classes together is higher in these particular States, viz. 20 years in Kerala, in contrast to 15 years of age in Bihar. Cultural components cut across the purely economic, (a point more clearly demonstrated when we consider contrasts between English, Japanese, and Indian textile labour below).[1]

An additional source of information on differential fertility is the child-woman ratio (CWR), available for Bombay for migrants of different origins. Let us first clarify the nature of the evidence. What is recorded is simply the migrant children present in the City. Assuming we have constant mortality, very low CWRs could imply two things: first they might imply the existence of absent sons and daughters (who may migrate later), and not necessarily low fertility; second, assuming we can control separately for duration of residence and hence isolate migrants who have been in the city a long time, we might infer from low CWRs a divided and hence impermanent family

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1 Cultural characteristics may also determine the speed of any fertility change, given a change in economic circumstances takes place: N.R.Crook, "On Social Norms and Fertility Decline", <u>Journal of Development Studies</u>, July, 1978.

(with migrants likely eventually to return to family of origin) and hence not one to contribute to the long-run differential growth and size of regional groups within the City. On the other hand, very high CWRs might imply (in addition to the opposite of the two possibilities just mentioned) the presence of young children with lone fathers, (whose wives may be back in the rural home). Finally, and most important, in a migrant population we cannot actually relate children to their mothers from the Census data: children born in the city should be, and often are, recorded as native population, a bias in comparative work that can only be partly mitigated by restricting the analysis to recent migrants only (those arriving within the last year), and children up to 5 years old, most of whom must have been born before arrival and hence classified as migrants.

The picture is as follows, (Table 4.2). Migrants of between of between 1 and 4 years duration, from other towns and cities within Maharashtra, have higher CWRs than the general Bombay population. We have already noted the earlier age at marriage for those non-working migrants from urban areas (and might additionally note their high f:m sex ratios). The picture is one of permanent and fertility-enhancing local migration. On the other hand, migrants from rural areas of Maharashtra have lower CWRs than the general population. This is also true of rural migrants from every major State, despite their younger age at marriage. Why is this? It would seem unlikely that the whole of the differential is due to lower marital fertility. Taking Maharashtra alone we note a 10% CWR differential between rural and urban. But birth rates, in the late 1960s at least, were higher, not lower, in rural compared with urban Maharashtra. The perverse reverse differential could be partly attributed to a longer inter-birth interval during the period of migration when spouses may be separated (except for infrequent visits) for up to three years before finally settling in the City (and note that Bombay has about 10% of its households consisting of single males). A further part of the differential could be due to higher child mortality: over a third of the difference could be explained by a difference of five years in life expectancy at birth, a plausible rural-urban differential at the low average levels of life expectancy experienced in the late 1950s. We should also allow for the fact that of the migrants of

1 - 4 years duration of residence a proportion will have had one, and a smaller proportion two, children since arrival in Bombay - and these children will have been classified as non-migrants. Quantitatively this can easily account for low CWRs, but it cannot easily explain differentials. The other expanations therefore remain interesting. And when we observe in Table 4.2 the very skewed female male sex ratios among the migrants (even for those from rural Maharashtra we have .62, among the adults .52, and taking the rural and urban together .70 as against .82 in Bombay) the clear indication that families are split makes it plausible that not only adults, but also children, are being left behind. Correlation of low sex ratios (especially low adult sex ratios) and low CWRs favours this interpretation.

There might appear to be some evidence of women bringing their age-specific fertility with them, as it were. CWRs among both rural and urban migrants are lower in Karnataka than in Gujarat. This might be thought to reflect the fertility differentials later observable in the two States.[1] But again the migrating adults have very different sex ratios, so what may differ is the degree of

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1 By 1970-72 the birth rates are as follows; (SRS): Karnataka rural 33.9, urban 27.0; Gujarat rural 42.1; urban 35.6.

divided families (children included). From the point of view of the local labour market the demographic distinctions are less important; it is the children alive and present in Bombay that count. Interestingly the political conflict in this multi-ethnic city has been largely between Maharashtrians and migrants from the South (especially Tamil Nadu (Madras)). But in fact the Gujaratis are the most likely to increase their share in the Bombay population insofar as natural increase (rather than migration) is concerned.

There is a distinct characteristic among migrants from the North, mainly Bihar and Uttar Pradesh, which is of particular interest in as much as these migrants feature significantly in our Eastern region studies. There are very few women (Table 4.2). Thus despite the higher fertility that we would have expected among migrants from Uttar Pradesh for example (to judge from later SRS data), albeit partly offset by higher childhood mortality, yet the dominant factor here in determining the birth rate in Bombay is bound to be the adult sex ratio.[1] In fact, in the case of the rural migrants the CWR is very low also. These migrants are distinctly impermanent. There are barely two adult women to every ten men among migrants

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1 Conventionally the birth rate is measured as births to the <u>total</u> male and female population (which will be very low if the sex ratio is very male dominant); whereas child-woman ratios refer to surviving children and female adults only.

of under five years' duration, and the ratio does not improve with duration of stay: the overall adult sex ratio among these rural migrants is as low as .127. The possible social causes, and some implications for economic security, of this experience, are to be discussed in Chapters 5 and 8 below. We will note here, however, that without a continuing migration, the Bombay sub-population tracing its origin from these Northern States would rapidly decline in proportion to the rest.

These findings are tempting to use in model-building and projection for analysing the demography of other cities. However, our analysis in Chapter 5 below shows that a construction worker migrating to Bombay or Sholapur may be a very different person in a social and economic sense from a steel operative migrating to Durgapur or Jamshedpur, even though in both cases he may come from Bihar or Uttar Pradesh. The character of the wage labour demand, and whether a provision of housing or other amenities is included in the implicit wage, is bound to affect fertility through the intermediate processes just described. Economy modifies, if it does not create, culture.

But with these reservations in mind, we may still hazard a reconstruction of migrant and non-migrant fertility behaviour from the much less detailed data we have for the other urban areas in the study.

Fertility Differentials in the Region under Study

A glance at Table 4.3 will reveal that the heavy engineering towns of the Chota Nagpur region have low child to population ratios (which we take, ceteris paribus, as being indicative of low birth rates).[1] We can explain this phenomenon largely through the low female to male sex ratios observed in those towns, and we also show below that this distortion is only temporary. But what can we say about the women who are already in (or subsequently will migrate to) these towns, as far as their marital status and fertility are concerned?

The broad picture is as follows. In 1961 the recently industrialising areas, especially those involved in heavy industry, had relatively low CWRs vis-a-vis the urban areas in their respective States (thus re-inforcing the effect of the adverse sex ratios, or at least adult sex ratios, on the birth rate, i.e. depressing it further still); note especially in Table 4.3 the cases of Durg, Sundargarh, and Dhanbad, (Burdwan's CWR being on the high side, a case we discuss in more detail below).

1 Child to Population ratios, like Birth Rates, are particularly influenced by age and sex structure. They have the additional disadvantage of incorporating child mortality: the 0-4 age group are the survivals of the previous five years' births. The bias becomes severe when we are forced, owing to data availability, to take 0-9 as the age group proxy for accumulated births.

There is evidence that these low birth rates are a transitory phenomenon. Detailed study of particular towns has suggested that the rapid uniting of families (already formed) in these urban areas leads to the equalising of the sex ratios, <u>and</u> to an increase in CWRs, (see further below, and the case study of Bhilai in Chapters 6 and 9). Why these two change together we cannot know for sure, but our study of Bombay above has cast doubt on all the hypotheses save that of split families: in those urban environments where few men have been accompanied by women, those few women are less likely to be accompanied by their children. Table 4.10 shows how in Burdwan, where fertility seems hardly to decline between the Censuses, despite the trend in the rest of the State, the major contrast with neighbouring Districts lies in the improvement of the sex ratio among adults. There is also evidence that engineering towns whose major expansion was <u>prior</u> to the Second Five-Year Plan period of 1955/6 - 60/61 had high CWRs once they too had passed the phase of initial rapid expansion: hence pre-Independence Jamshedpur has higher CWR than average for cities in Bihar (Table 4.5) and Asansol-Burnpur has higher CWR than average for towns in Burdwan District by 1961 (Table 4.4).

As we have said, if we are right in supposing that these heavy engineering towns start with low CWRs and evolve into towns with higher CWRs (even higher than average), the fact warrants some explanation. Despite the Bombay evidence, we will advance a hypothesis that may be more relevant to the unique experience of these rapidly industrialising areas. On the establishment of a heavy engineering centre or Steel Town the workforce contains a large component of construction workers (not all recorded as resident in the urban area,-see below), and of white-collar technical and managerial staff (the project designers and supervisors). The latter form a link over time between the departure of the construction workers and the arrival of the plant operatives (insofar as they are entirely separate, for in practice construction workers often stay on). The white-collar workers have a higher age at marriage and hence lower CWRs (if not also lower marital fertility). The subsequent influx of blue-collar workers, the majority already married, is dominated by young adults. Their wives, who follow later, are also young (probably younger than the average population, see Chapter 5 below for the age-structure of males in various occupations). Thus the age-structure alone could raise the CWR (and it may be this that can raise it above that of surrounding towns, where age-specific marriage and fertility rates may be similar). It is also possible that these migrants have lower child mortality, being a self-selected, and hence possibly atypically healthy group, moving into an environment that also offers some protection from disease; (compare the lower adult mortality rates implied by the low widowhood rates observed in these heavy industrial areas, and see our evidence on amenities supplied by employers in heavy industrial townships).[1] Whether fertility or mortality is the cause, the effect is the same: larger cohorts leaving childhood and approaching labour participation and childbearing ages.

By contrast, the urban areas of light industry, and the stagnating Districts seem to have high fertility in 1961, as well as high sex ratios and hence high birth rates (inferred from Child-population ratios); we refer to places like Midnapore, Bankura, Ganjam, and Bastar, in Table 4.3, but the picture is certainly not clear-cut. Despite the fact that some of these areas provide employment for women more extensively than do heavy engineering areas, the age-specific marital status data reveal that women in these areas are generally speaking married, not single. The scenario seems to be as follows: married women are more likely to join their husbands if there are jobs for them, and the married women who are more likely to offer themselves

1 N.R.Crook, "The Economy of Mortality Decline", paper read at SSRC Development Group Seminar, held at London School of Oriental and African Studies, January, 1979, (mimeo); relevant table reproduced here as Table 4.9.

for work (as for example from the Southern States of India) are more likely to migrate with their husbands and place themselves on the labour market in these circumstances. We find continuing high fertility, often particularly high fertility, in these towns over time. For instance, in 1931 Sholapur was a high fertility City in the Bombay Presidency, and in 1961 it was still a high fertility City with high proportions married in the 15-24 age group in comparison with other Maharashtrán Cities, (Table 4.7).

In summary, the demographic types become hard to distinguish over time. But there are striking differences in their evolution. In the short run the heavy industrial towns are subject to sharper fluctuations in these fertility-related variables, thereby further enhancing the de-stabilising effects of distorted age structures. In the long run their higher social and economic status may promote more rapid fertility decline. The clear evidence of differential birth rates in the short run between sub-populations in these cities indicates the potential for ethnic conflict, due, for example, to competition for jobs as the second generation of migrants and locals, Bengalis and Biharis, enters the labour market. The contrasts and comparisons with other cultures in these respects are followed up below in a review of the engineering and textile towns of 19th Century England.

Alternative Cultural Traditions; Similar Industry, similar factor endowments

The experience of England in the last Century was remarkably different for reasons wholly unrelated to industrial technology (which indeed was different) or the abundance of labour or the behaviour of capitalists, but purely due to the cultural character of that labour supply. Controlling therefore somewhat for the industry and for the factor endowments, we may consider the cultural effect alone.[1] As in the case of Japan it was socially acceptable for women to offer themselves for employment in the textile (and other light manufacturing) industry. In that sense the process of sexual liberation had progressed far further than in India, even than in India today. In the early decades of this century Japan was employing nearly four women to every man in the textile industry, India four men to every woman.[2] And there was a second crucial

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1 I am not wishing to enter a debate here on whether culture determines economy or vice-versa. But the major cultural characteristics to which I refer were, if not exogenous, formed at this date by the pre-existing agricultural economy.

2 G.Saxonhouse and Y.Kiyokawa, "The Supply and Demand for Quality Workers in the Cotton Textile Industries in Japan and India", Papers and Proceedings of the Conference on Japan's Historical Development Experience and the Contemporary Developing Countries, International Development Centre of Japan, Tokyo , October 1978.

difference in the labour supply. The women in England were single. Hence if we look at figures for a region of textile manufacture, Lancashire in North West England, in 1861 (prior to the major fertility decline), we find high sex ratios (female:male) combined with low Child-Woman ratios, and low Child-Population ratios, indicative of low Birth Rates, (Table 4.8). Compare that with mining and iron manufacturing areas across the Pennines. County Durham has low sex ratios, but high Child-Woman ratios, and very few of the women present are single. Such broad regions are rather heterogeneous, but town-wise data are not available for the towns of our interest until 1891, by which time fertility has begun to decline throughout the country. Nevertheless analysis of some data from that latter date is instructive, (Table 4.8). Taking Middlesbrough as representative of heavy engineering and iron and steel making par excellence, we find higher fertility than is observed in the County of North Riding generally. The cause of such low fertility can be clearly related to the low proportion of single women, (only 29.5% by ages 25-29). The sex ratio is only slightly depressed in favour of men, so the net effect is to <u>raise</u> the Child-Population ratio (13.8%). In the textile town of Oldham, where female employment is far more dominant, sex ratios are over one to one in favour of females, and as many as half (54.3%) of women aged 25-29 are single. The differences in CWRs are clearly therefore not only due to a differential fall in marital fertility between the two areas, though this may have added to the result; all these effects (and others) are compounded in the Child-Population ratio (11.4%). there can be no doubt that cultural differences cut across economic ones, in the short run at least, in the determination of urban demography.

In a nutshell, in England heavy industrial towns, after their initial expansion, apparently stabilised with higher fertility than light industrial towns, mainly due to the larger number of single female employees in these latter towns, in marked contrast to the case in India; (and there were more gradual fluctuations on the road to stability than in India, due to the more modest scale of migration).

Case Study: Burdwan District

We will now look at the Chota Nagpur region in a little more detail, focussing on the District of Burdwan. Our index of fertility, the CWR, has in this case to be restricted to the 0-9 child age group. The highest CWRs are to be found in Asansol and Hirapur, where the workers in the Indian Iron and Steel Company foundries live (CWRs of 1.5 and 1.4 respectively, Table 4.4).

The other mining and industrial townships in the area have high ratios. The exceptions are Durgapur (and Kulti) with CWR of 1.2. The large City of light processing and manufacturing, and administrative centre, Burdwan Municipality, also has a low ratio (1.2). In this City, 57% of women aged 15-19 and 81% aged 20-24 are reported as married, compared with 60% and 90% respectively in Asansol, a generally lower pace of entry into marriage; in both cases virtually all females are married by age 50. The socio-economic class structure of these towns may be responsible for these differences, and Table 4.6 gives an indicator here, using education as the measure of status. Unfortunately for our analytical purposes, Burdwan is a heterogeneous City: we cannot tease out separately any information on the females employed in the light industry for instance, for comparison with those whose husbands are employed in the administrative occupations. But it does not appear to be the case that Burdwan is a City of low socio-economic status.

The engineering town of Chittaranjan, the site of the locomotive factory established in 1948, has a high proportion of married women aged 20 and over, but large proportions single below that age. Our reconstruction would be that these women are the daughters of the original migrants, well-endowed with high levels of education (Table 4.6). If this is so, the implication for the future will be a fall in fertility in Chittaranjan. By contrast Durgapur, a more recent New-town has already a large proportion of its 15-19 population married, and judging from the skewed adult sex ratio a large addition to the adult female cohorts is still to arrive (in the most prolific child-bearing ages), accompanied by their existing children. This will have the effect of both raising fertility (or offsetting any decline), as well as raising the child-population ratios. The family composition tables (Chapter 8 below) point to a contrast between towns in nearby Birbhum District and those here in Burdwan, confirming the picture outlined above. Currently (1961) there are smaller households, and fewer married daughters and other relations in Burdwan, but more married sons. Table 4.10 indicates that Burdwan was not the highest fertility District in 1961; ten years later, however, it was. This is despite the fact that in 1961 the socio-economic status of the area (the increase in high-level manpower) might have suggested it was ripe for a fertility fall of substantial size.

To check the components in this quite mild decline in CWR (and new status at the top of the CWR league) we examine the differences between Burdwan and other Districts in West Bengal, (Table 4.10). Burdwan has become increasingly a heavy industrial area by 1971, with Burdwan Municipality itself taking diminishing demographic importance, whereas Birbhum and Midnapore retained their characteristics of being primarily rice-milling Districts. Given that fertility decline apparently takes place throughout the State, why is it least in the most rapidly industrialising District? Burdwan's Singulate Mean Age at Marriage rose less than the average for the other Districts in the State, from 18.1 to 18.6, less than a year compared to the average of 3 years. The District's proportion of single women rose in the 15-19 age group (from below that in neighbouring Birbhum to 20% above). This may well indicate the potential for fertility decline in the future. But for the purposes of explaining fertility in the 1961-71 decade, the following age group (regarded generally as a higher contributor to the fertility rate per woman) is of more interest. In this (20-24) age group the proportion single increased <u>less</u> than in Birbhum (or Bankura), though by 25-29 roughly the same proportions were still single in all the Districts under study. But what did change dramatically were the age-specific sex ratios, improving in favour of females by about one third in the higher fertility age groups in Burdwan, but by less than a quarter in Birbhum (where they were already at a high, i.e. well-balanced level); the improvement is from 0.61 to 0.87 in the 20-24 age group. If as we argue female migrants bring children with them, increased proportions of <u>female</u> migrants (during the early 1960s) must have raised, or countered any fall in, the child to population ratios in the towns of this District (which of course is all that concerns us in our analysis of future growth of the labour force, or of dependency ratios); it may also have increased the CWRs (or retarded the fall) if migrant women are younger (or have higher age-specific fertility than the already resident population). The contribution of a differential improvement in child mortality was probably slight: it is true that adult mortality (as far as can be indicated by widowhood) did reduce faster in Burdwan than in Birbhum, but at the same rate (though from lower levels) as in Midnapore. But it is hazardous to infer child from adult mortality. What unequivocally distinguishes Burdwan is the improvement in adult sex ratios. Altogether the evidence is suggestive that continuing female migration to heavy industrial areas may raise fertility as well as raising the birth rate, at least in the short run, with the likelihood of a decline in the longer run; but the precise mechanism is complex.[1]

Finally it is of interest to note from Table 4.4 that the mining towns have only moderate CWRs but high proportions married in all age groups. High child mortality

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1 A further attempt to tease out the factors involved is made, using theoretical models, in the Appendix. Note that an improvement of 5 years life expectancy could result in a CWR falling from 0.66 to only 0.63, rather than 0.58, when Total Fertility falls from 5.0 to 4.4.

among miners' children is a likely explanation for subdued CWRs. But the hypothesis of split families is also plausible: children would remain to be looked after in rural areas in those cases where their mothers have migrated to be employed as surface workers in the mining towns. In Chapter 8 below we find that second earners in mining families are rare, but usually wives, not children as in other towns.

Comparative Study of Selected Districts in Maharashtra

For a comparison with the more detailed study of Burdwan District, we take a look at the State of Maharashtra with particular reference to the Cities we discuss elsewhere in this study (and for which special tabulations were made in the Census of 1961). Maharashtra is a State with not dissimilar, though somewhat higher, levels of fertility than those obtaining in West Bengal, and with not dissimilar changes over the decade, though they are somewhat larger. Notably the older interior urban localities of the Deccan plateau have higher CWRs than the new industrialising coastal regions in proximity to Greater Bombay. These interior localities are small marketing towns, and their high fertility (apparent at the District level) reflects that of surrounding rural areas. The contrast also exists, however, between the long-established textile City of Sholapur, with a CWR of 0.697, and the New-towns of Thana, Ulhasnagar, and Nasik (0.592, 0.652, and 0.675), and, at the other end of the social spectrum, the more cosmopolitan and administrative Cities of Poona (0.608) and Bombay (0.552), (selected examples in Table4.7).[1] What are the components? Sholapur has few single women aged 15-29 (34.8% in the 15-19 age-group, 11.4% of age 20-24). This contrasts with the New-towns of Thana and Ulhasnagar (60.4% and 19.0% respectively in Thana, and 57.5% and 45.9% respectively in Ulhasnagar). Ulhasnagar is a City engaged in manufacturing the new synthetic textiles. There is high female literacy, but only modest participation by women in industrial (blue-collar) occupations.[2] It would appear that the large single female cohorts aged 20-25 and above are the sisters and daughters of the earlier male migrants (compare the case of Chittaranjan described above). The employment of women as industrial labour is far higher in Sholapur City (mainly in cotton textiles). This has not affected their marital status (nor apparently their marital

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1 As data on the larger Cities suggests lower than average urban mortality among infants, we can be reasonably sure the figures largely reflect genuine fertility differentials.

2 It is also largely a refugee New-town, as was Chittaranjan. The data are derived from Government of India, Census of India 1961, Cities of Maharashtra, Delhi, Tables B V and C II for the relevant Cities.

fertility). The large component of local migrants has evidently ensured that local (i.e. rural) fertility conditions prevail (as occurred in 19th Century England, with precisely the opposite effect). Industrialisation as a mechanism of social change is irrelevant in the traditional (and stagnating) textile towns.

Now let us consider the components in the change over time.[1] The crude changes in CWR are roughly speaking inversely related to the level in 1961, the largest fall occurring in Sholapur District, the smallest in Bombay (Table 4.11).[2] The fertility reduction in Sholapur, and to a lesser extent in Poona, is attributable to rising proportions remaining single in the 20-29 age-groups (and indeed in the 15-19 age group, where the proportions rose from 35 to 52% in Sholapur), as well as to possible declines in marital fertility. These contrast notably with Thana District (containing the modern towns of Thana and Ulhasnagar) where the 20-24 cohort (which, due to migration, is large in relative size) undergoes virtually no change in the

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1 Here we have to compare the urban areas of each District taken together, since data for the Cities themselves are not published for 1971. It was a curious idiosyncracy for them to be published for the State of Maharashtra alone in 1961. See Government of India, Census of India 1961, 1971, Maharashtra, Social and Cultural Tables, Delhi, Table C II.

2 Again we assume no offsetting differences in the rate of improvement of child mortality; indeed we would expect a higher level and rate in Sholapur.

already high proportions still single (22%). To judge from the rather modest fall in CWR there was little change in marital fertility either, despite the modern industry that was introduced into the area; and seeing that there is no perceptible change in sex ratios there is no reason to suppose there have been arrivals of migrant women with their high fertility, or young age structure, offsetting any tendency for the pre-existing female population to experience fertility decline.

It remains true that much of the fertility change in industrialising regions has come about (in the 1960s at least) through increased age at marriage, and that some of these changes are most noticeable in the moderately industrialised well-established towns (not the New-towns), where the age of marriage was especially low. It might be argued that the potential for further change (e.g in marital fertility) now lies, however, more in the more sophisticated industrial cities (often New-towns) with their proportionally higher skilled labour forces, more literate, aspiring towards middle-class values, and with less to gain from their children's participation in the informal labour force from an early age (or less economic compulsion to encourage such participation). Particularly low proportions married in the 15-19 age group may be an indicator of this incipient trend: we have to follow those cohorts through time to be sure. The New-towns in particular are experiencing a fertility evolution. This reflects the changing social composition of their people. During the 1960s their informal non-wage sectors began to develop. These sub-groups are more likely to retain rural fertility characteristics. Equally, particular migrant streams may continue to reflect fertility levels in their region of origin, though the evidence suggests that the socio-economic background is at least of equal importance. These short or medium term fluctuations, reflecting structural changes in population composition, are the most interesting features of such towns from the point of view of this study.

Figure 4.1
Life-tables for use in the
Simulation Model

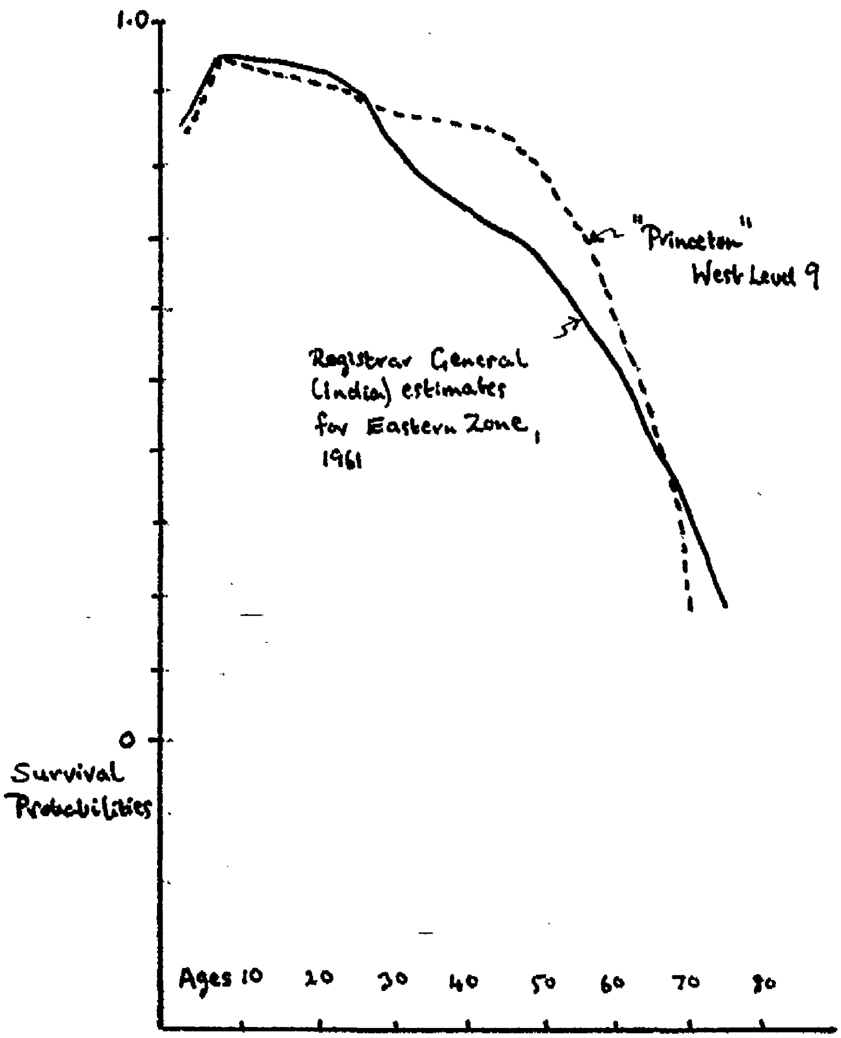


Figure 4.2
Fertility Schedules for use in the
Simulation Model

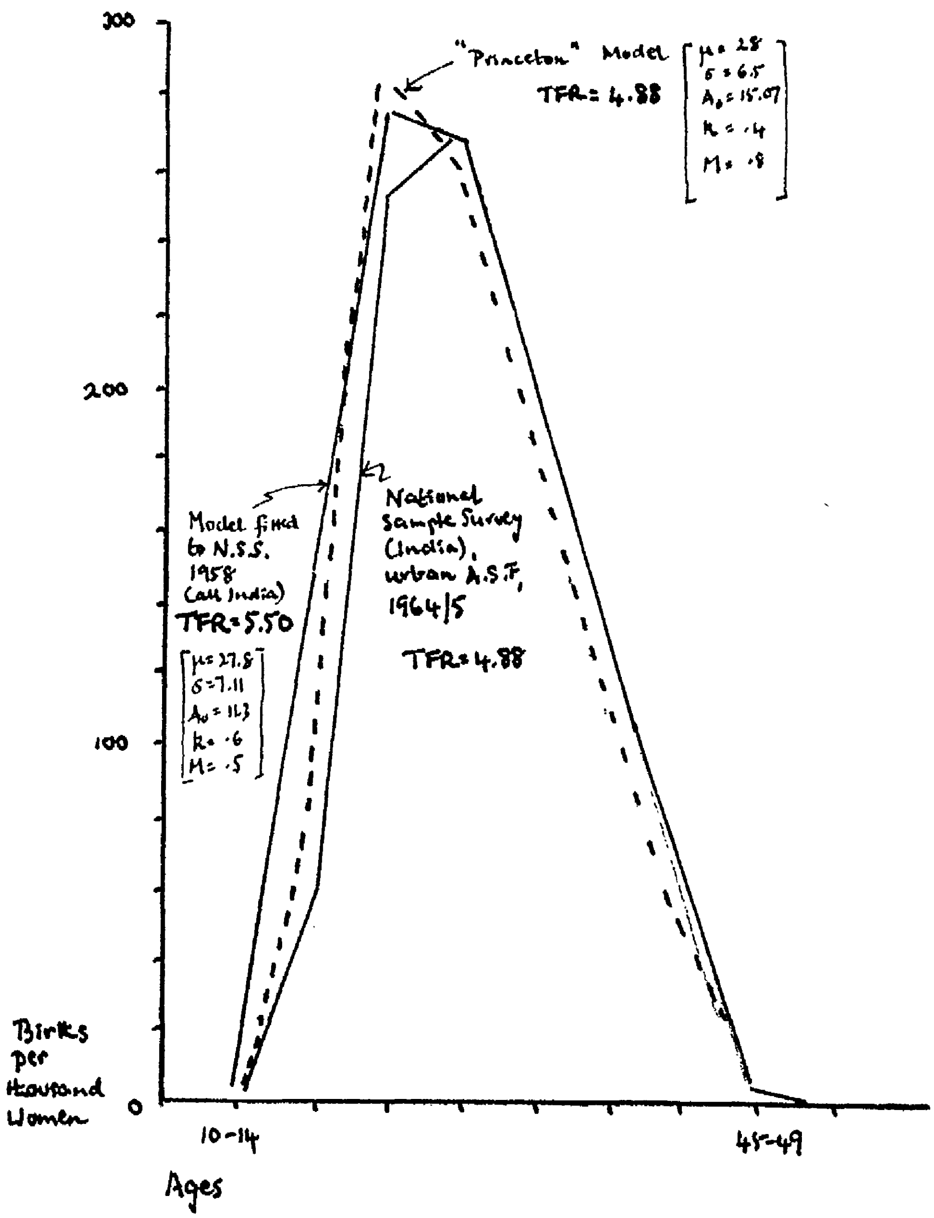
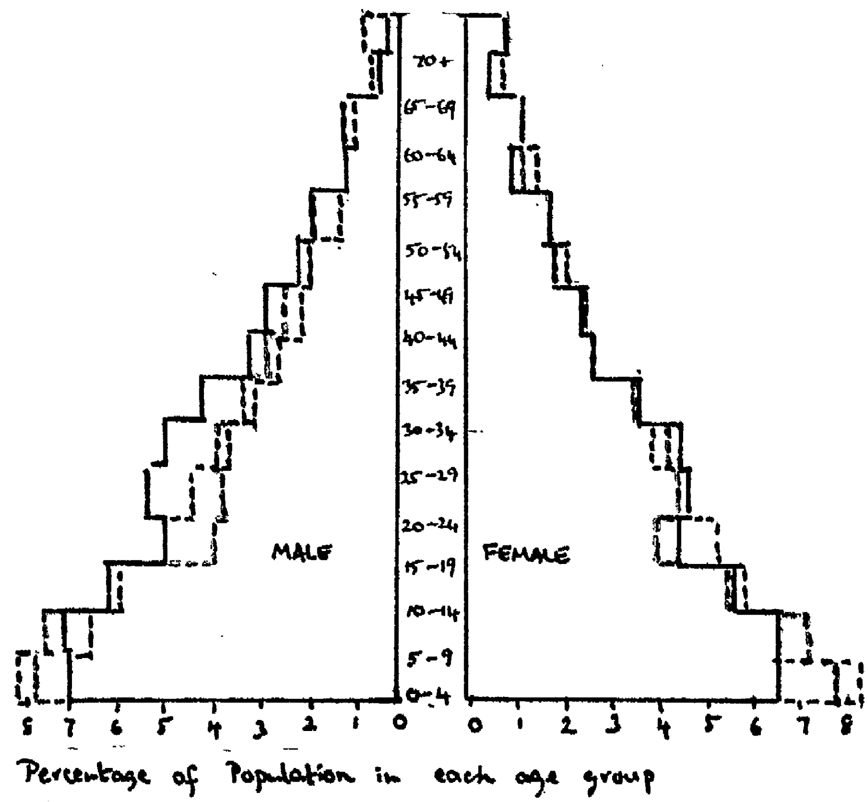


Figure 4.3

Comparison between Indian and Stable Age Structures used in the Simulation Model



Key: Continuous line : India, urban population age structure, 1961 (unsmoothed).

Broken line : "Princeton" Model Life Table, West Level 9 ($e_0^\circ = 45$), (stable) population age structure, growth rate 2.0%.

Red line : India, rural population age structure, 1961 (unsmoothed), indicated where significantly different from Model structure.

Table 4.1

Marital Status of Migrants in Bombay

Mean Age at Marriage among the Single ("SMAM"), 1961

	Migrants of 1-4 years Duration		Migrant and Non-Migrant Population ("General P.")
	Rural Origin	Urban O.	
Female:	15.8	17.5	19.4
Male:	23.6	25.6	24.8

Proportion of Female Migrants single, by Age

	Working Women		Non-working Women	
	Rural Origin	Urban O.	Rural Origin	Urban O.
10-14	.88	.96	.90	.89
15-19	.41	.73	.19	.36
20-24	.30	.58	.02	.07
25-29	.07	.26	.02	.10
30-34	.04	.15	.01	.03
35-44	.02	.07	.01	.02
45-59	.02	.05	.01	.01
(Number of Women)	(9645)	(6303)	(103333)	(67441)
SMAM	18.2	23.0	15.5	17.2

Source: Derived from Government of India, Census of India 1961, Maharashtra State, Bombay: Special Migration Tables, Table VI.

Control: SMAM for the rural female population of Maharashtra is 14.8

Table 4.2

Child-Women Ratios among Migrants to Bombay

(and other Indices)

State of Origin (by birth) (Number of Migrants of 1-4 yrs. Duration in brackets)	C.W.R.[a] Migrants of 1-4 years Duration	C.W.R.[a] < 1 years Duration	Sex[b] Ratio Migrants 1-4 yrs. Duration	Sex[b] Ratio Child[a] Migrants 1-4 yrs. Duration
MAHARASHTRA				
Rural (134226)	.508	.734	.619	.919
Urban (89306)	.666		.821	
GUJARAT				
Rural (39228)	.708	.912	.721	.952
Urban (30675)	.881		.858	
UTTAR PRADESH and BIHAR				
Rural (63138)	.336	.466	.202	.973
Urban (14902)	.590		.333	
KARNATAKA				
Rural (22935)	.530	.735	.577	.983
Urban (15358)	.549		.759	
TAMIL NADU				
Rural (14791)	.462	.827	.518	.987
Urban (8489)	.603		.644	
KERALA				
Rural (16323)	.533	.734	.316	.885
Urban (6156)	.532		.449	

Notes: [a]Children aged 0-4, Women aged 15-44; [b] f : m.

Source: As for Table 4.1 above, derived from Table II.

Control: CWR for Bombay = .553

Table 4.3

Indicators of Birth Rates in Sample Districts

	Per Cent of Male Population under 5 (1961)	Child-Women Ratio	
WEST BENGAL			
Calcutta	7.2	.488	
Howrah	9.6	.627	
24-Parganas	10.5	.649	
Hoogley	10.5	.625	
Burdwan	10.3	.631	See Table 4.4
Midnapore	12.5	.611	
Bankura	13.6	.682	
Birbhum	13.1	.693	
BIHAR			
Patna	12.8	.700	
Gaya	13.5	.719	
Shahabad	13.0	.689	
Bhagalpur	12.7	.712	
Monghyr	14.2	.737	
Dhanbad	10.2	.689	Rapid Growth - Heavy Industry
Ranchi	13.1	.732	
Singbhum	12.9	.700	
ORISSA			
Mayurbanj	12.6	.711	
Sundargarh	9.3	.556	Rapid Growth - Heavy Industry
Cuttack	11.0	.661	
Baudh-Kh.	9.3	.509	
Bolangir	14.2	.637	
MADHYA PRADESH			
Raigarh	13.7	.620	
Bilaspur	13.5	.529	
Durg	11.2	.614	Rapid Growth - Heavy Industry
Bastar	13.6	.623	

Table 4.3 continued

RAPID GROWTH - HEAVY INDUSTRIAL areas (and State averages)

	% Males under 5	C.W.R.	% Young[a] Females Single	Sex Ratio[b]
Dhanbad	10.2	.689	3.4	.646
All Urban Bihar	12.7	.708	3.9	.811
Sundargarh	9.3	.556	7.5	.630
All Urban Orissa	11.2	.603	4.7	.807
Durg	11.2	.614	7.5	.706
All Urban M.P.	14.5	.739	3.8	.856

Notes: [a]Per Cent Single in age group 20-29; [b] f : m.

Sources: Government of India, Census of India 1961, Social and Cultural Tables, Tables C II, C III, (for relevant States), New Delhi.

Table 4.4

Indicators of Fertility in Burdwan District Towns

Town[b] (1961 population female)	C.W.R.[a]	Industry	%Females married by Age 15-19	20-24	25-29
ASANSOL (41254)	1.47	Mixed Heavy	60	90	96
HIRAPUR (25790)	1.37	Includes BURNPUR Steel	50	89	98
DURGAPUR (10522)	1.21	Steel New-town	59	91	94
CHITTARANJAN (12442)	1.70	Loco Manufacture	46	92	97
KULTI (30181)	1.21	Coal Mining	77	94	92
RANIGANJ (13126)	1.38	Coal Mining	71	92	96
ONDAL (10621)	1.51	Coal Mining	73	93	95
BURDWAN (47746)	1.23	Mixed Light	57	81	89

Notes: [a]C.W.R. here calculated as Children aged 0-9 as ratio of Women aged 15-44.
[b]Urban sector of "Police Station" areas.

Sources: Derived from Government of West Bengal, Census 1961, Burdwan District Census Handbook Volume II, Table C II, Calcutta.

Table 4.5

Pre-Independence Child-Women Ratios in Cities of Bihar

	PATNA	GAYA	JAMSHEDPUR
C.W.R.[a] 1931	.515	.494	.532

Note: [a] Children 0-4, Women 15-49.

Source: Government of India, Census of India 1931, Bihar & Orissa, Age, Sex, and Civil Condition Tables, Patna.

Table 4.6

Educational Differentials among Burdwan District Urban Populations

	Per Cent Literate Only (All ages, M + F, 1961)	Per Cent Educated to Primary Level	Per Cent Educated to Secondary L.	Per Cent Educated to Any L.
Burdwan City	29.0	15.8	3.9	51.8
Raniganj	28.1	13.7	2.3	43.9
Burnpur	18.5	28.1	7.4	58.7
Outer Burnpur	21.0	15.5	3.7	41.7
Asansol	42.9	4.3	4.8	55.3
Chittaranjan	32.8	17.6	8.0	61.9
Durgapur Steel Town	27.0	16.4	10.3	63.9
Coke Oven T.	37.4	7.5	11.5	64.9
Districts of Light Industry for Comparison				
MIDNAPORE	22.7	15.8	4.4	46.6
BANKURA	19.0	17.4	3.5	42.4

Sources: Government of West Bengal, Census 1961, District Census Handbook Volume II, Table B III, Calcutta.
Government of India, Census of India 1961, State of West Bengal, Social and Cultural Tables, Table C III, New Delhi.

Table 4.7

Marital Status in Selected Contrasting Urban Localities

	Per Cent of women single by age group, 1961				C.W.R.
	15-19	20-24	25-29		
Burdwan District					
ASANSOL (Police Station)	27.7	5.6	1.0	(City)	.685
BURDWAN (P.S.)	42.5	17.6	6.8	(City)	.551
DURGAPUR	40.6	8.8	4.2		n.a.
CHITTARANJAN	54.0	8.1	2.0		n.a.
				West Bengal (rural+urban)	.753
East Madhya Pradesh					
DURG (Urban District)	15.6	12.8	1.0		.614
BILASPUR (U.D.)	24.6	4.6	1.0		.634
				Mad. Prad. (rural+urban)	.769
Maharashtra					
POONA (City)	54.6	19.1	5.5		.608
THANA (City)	60.4	19.0	6.1		.592
SHOLAPUR (City)	34.8	11.4	1.5		.697
				Maharashtra (rural+urban)	.710

Sources: Government of West Bengal, Census 1961, District Census Handbook (Burdwan), Vol II, Calcutta; Government of India, Census of India 1961, Maharashtra, Cities of Maharashtra, New Delhi; Madhya Pradesh, Social and Cultural Tables, New Delhi; Tables CII and CIII in all cases.

Table 4.8

Marital Status and Fertility Indicators in Contrasting Urban Localities in 19th Century England

	C.W.R.[a]	Sex Ratio[a]	% Women Single by age group 20-24	25-29	Child[a] Population Ratio
1861					
North-West Counties (Mainly Textiles)					
LANCASHIRE	.599	1.07	64.6	35.9	12.6
CHESHIRE	.501	1.06	67.9	39.8	13.4
North-East Counties (Coal, iron, and steel)					
N.RIDING	.579	1.01	68.5	38.8	13.6
DURHAM	.641	0.96	53.4	24.1	14.1
1891					
OLDHAM (Textile town)	.430	1.09	67.9	54.3	11.4
Rural Lancs.	.453				
MIDDLESBROUGH (Steel town)	.576	0.92	53.5	29.5	13.8
Rural N.Rid.	.518				

Notes: [a] Child-Women Ratio comprises age groups 0-4, 15-49; Sex Ratio is f:m; Child-Population Ratio= %under 5.

Sources: British Government, Census of England and Wales, (relevant dates), Tables of the Ages and Civil Condition of the People, London.

Table 4.9

Indicators of Mortality in Contrasting Urban Areas

Predominant Industry in Urban areas of District (Number of Districts)	Percentage of Ever-married women widowed in age groups 35-39,40-44,45-49 : arithmetic average % Widowed
Light (12)	22.1
Mixed (9)	20.2
Heavy (5)	19.3

Source: Government of India, Census of India 1961, Bihar, Orissa, West Bengal, Madhya Pradesh, Social and Cultural Tables, Table CII. (Sample consists of the 26 study Districts.)

Table 4.10

Changes in Fertility Indicators between 1961 and 1971 in Urban Areas of West Bengal

	C.W.R 1961	C.W.R. 1971	% Change
Howrah	.627	.521	-16.9
Hoogley	.625	.514	-17.8
Calcutta	.488	.413	-15.4
24-P	.649	.512	-21.1
Burdwan	.631	.610	-3.3
Birbhum	.693	.597	-13.9
Midnapore	.611	.566	-7.4
Bankura	.682	.512	-24.9

	Per Cent women Single by age group			
	20-24		25-29	
	1961	1971	1961	1971
	(Sex ratios f:m bracketed)			
Burdwan	10.8 (.611)	14.5 (.868)	3.9 (.599)	3.5 (.755)
Birbhum	13.1 (.813)	19.1 (.916)	2.7 (.807)	4.0 (.969)
Midnapore	16.7 (.869)	17.8 (.855)	4.6 (.790)	5.0 (.900)
Bankura	5.3 (.885)	19.3 (.893)	2.2 (.847)	4.1 (.989)

Source: Government of India, Census of India 1961,1971, West Bengal, Social and Cultural Tables, Tables CII and CIII.

Table 4.11

Changes in Fertility Indicators between 1961 and 1971 In Urban Areas of Maharashtra

	C.W.R. 1961	C.W.R. 1971	% Change
Gt. Bombay	.554	.539	-2.7
Thana	.640	.607	-5.2
Poona	.644	.597	-7.3
Sholapur	.701	.630	-10.1

	Per Cent women Single by age group			
	20-24		25-29	
	1961	1971	1961	1971
	(Sex ratios f:m bracketed)			
Gt. Bombay	22.1	29.6	8.2	8.0
	(.591)	(.621)	(.574)	(.638)
Thana	22.5	21.7	4.4	5.2
	(.807)	(.792)	(.777)	(.749)
Poona	16.5	20.0	4.6	5.4
	(.829)	(.820)	(.989)	(.796)
Sholapur	10.0	13.8	1.7	3.3
	(.994)	(.855)	(1.003)	(.973)

Source: Government of India, Census of India 1961,1971, Maharashtra, Social and Cultural Tables, Tables CII and CIII.

Appendix 4.1

Sensitivity to Changes in Demographic Parameters

(i) Effect on Cohort Size of Changes in Fertility and Mortality by age 20:

	Size of Cohort GRR=3.0			Size of Cohort GRR=1.5
	At Birth			At Birth
	100,000			50,000
	At Age 20			At Age 20
Life Expectation At Birth				
"South" 35 years	56,754	"West" 35 years	59,661	"S"35 28,376
	(+30.4%)	(+35.6%)		(-50.0%)
"South" 50 years	74,104	"W"50	76,990	"S"50 37,052

survival increase by 15 years → fertility decrease by half

●○

(ii) Effect on proportional Cohort Size of Changes as above

		Cohort 15-19 as % of Stable Populations	
		GRR = 3.2	GRR = 1.4
Life Expectation At Birth			
"South"	35	10.1	7.0
		(+0.2)	(-3.1)
	50	10.3	7.5

●○

Note: GRR = Gross Rate of Reproduction

(iii) Sensitivity of Child-Women Ratios to Mortality and Fertility Changes in Stable Populations:

At e_o^o = 40		28.6		.446
("West")[a]	a Birth Rate of	43.3	implies a CWR of	.745
		48.6		.844

....

GRR = 2.15, e_o^o = 40 CWR = .579 GRR = 2.15, e_o^o = 45 CWR = .625 $\boxed{\text{reduction in fertility}}$

[+ 5 years in e_o^o; + .05 in CWR]

[+2/3 of a birth + .08 in CWR]

GRR = 2.45, e_o^o = 40 CWR = .657 GRR = 2.45, e_o^o = 45 CWR = .709

[+ 5 years in e_o^o; + .05 in CWR] $\boxed{\text{improvement in survival}}$

....

Note: a in part (iii) the "west" model is used throughout.

Source: calculated from A.J.Coale and P.Demeny, Regional Model Life Tables and Stable Populations, Princeton University Press, Princeton, 1966.

A brief Overview of Chapter 4

Fertility can only modify the effects of migration gains or losses of the scale described in local populations. But differential fertility may have a substantial effect on the relative future size of population groups (with implications for social tensions) and of cohorts of the same age but from different regional background (with implications for the future competition for the most prized industrial jobs). Empirically there are clear indications of such differential fertility and differential fertility change.

CHAPTER 5
The Migration Component Explored

A Summary of the Main Empirical Points

The characteristics of the migrants to towns and cities of differing industrial structure are examined as an indicator of the effect of labour demand (and especially wage-labour demand) on the demography of the urban areas. There is some evidence of particularly young (adaptable) labour forces being favoured in industries with new technology; and of female labour being favoured in certain processing household-based industries. It is overwhelmingly clear that heavy industrialisation has promoted long-distance migration, and hence towns of mixed linguistic composition: but the rather high average component of urban-origin labour among migrants in our area (retarding effectively an overall rural to urban population transfer), is less easy to relate to industrial composition. It seems that heavy industrialisation is not the major cause. Nor do heavy industrial town areas draw disproportionately from stagnating urban areas (though, being large, merely to take their proportionate share is to make a non-trivial impact). We argue, as a working hypothesis, that wage-labour migrants are a fairly distinct social category (likely to have possessed small land-holdings, and, a small proportion having retained divided families - especially those employed in more traditional industries), in contrast with the local "multiplier"-type migrants, less often working as wage labourers, (and likely to be landless, and, in part, forced into migration, and moving usually as a family whole).

The Migration Schedules

Central to the thesis are the age-specific migration schedules, and to these we now turn. The level of male migration is a variable in the model. It is this that we seek to change over a wide range in order to indicate the demographic result of decisions on industrial strategy, the size, and the time-phasing of projects. But the age distribution of the schedule is taken to be rather more of a parameter. Our basic source for this is the National Sample Survey (NSS) of 1964 on Internal Migration (Table 5.1). Initially we can concentrate on the rural to urban male migrants' age profile, as from the 1961 Census it is clear that at least ⅔rds of male migrants in our region are of this kind (Table 5.10). The Survey of course records gross in-migration (there being separate tables on gross outmigration). The Census also tells us that, on average, the place of origin of migrants is fairly evenly divided between the "same District", "another District" and "another State" (West Bengal being an exception at the State level of aggregation). So the schedules used for the model were made to be an arithmetic average of the age profiles of these three streams. We then had to re-arrange the data into age groups appropriate to population projection, i.e. 5-year cohorts (from the idiosyncratic grouping adopted in the NSS report), and this re-allocation was done "by eye" to obtain the reults illustrated in Figure 5.1.

Now it was our initial assumption that most female migrationwas due to male migration: what required estimation, we believed, was the appropriate lag structure. To obtain this, female migrants of less than one year's duration were related to male migrants of less than one year's duration, one to five years duration, six to ten years duration, in a linear regression. The data used were from the sample Districts in the Eastern region. Interestingly, only 2/5ths of the squared variation (R^2) in female migration on a District-wise basis could be explained by male migration. Low though this explained variation may be, it should be noted that the National Sample Survey of female migrants conducted in 1964 found that only 12% migrated for marriage purposes and 50% to join family members (including husbands presumably) so that altogether only 62% of female migration could be linked directly with male migration. Appendix 5 presents the statistics of our regression. As a check on this a similar regression was done for all the Districts of Maharashtra, with similar results. The male migration of 6-10 years previous was not significant in determining female migration flows. The other two variables (less than one year, and 1-5 years) were highly significant. They indicate that the coefficient of response (as we may call it) is about 0.32 (unlagged) and about 0.17 (for a lag of between 1 and 5 years): that is to say, an increase of 1000 in male migrants to a town would elicit a response of 320 female migrants in the same year, and a further 170 over the next five years. The response function, then, would be of a declining exponential kind (not unimodal, or lagged in the strict sense, for in that case the response would have been <u>greater</u> in the following five years, not less). Again a check using the data for Maharashtra substantiates the order of magnitude of these coefficients. For the purposes of the model <u>autonomous</u> female migration, like the male migration, is regarded as a variable, that is we can change it at will in different models, or model variants. However, there is reason to believe that a proportion of this female migration must relate to the demographic structure of the non-migrant population: perhaps a proportion that are reported as migrating for domestic purposes (in the NSS) are joining or marrying the native-born. These would not be explained by our female migration "response" equations.

A further explanation for the apparent "autonomous" migration of females may lie in the large variation in male migration. If the latter relates specifically to the variation in impermanent (or "turnover", or seasonal) migration, that would not precipitate a female response, then the female migration may be more fully explained by the permanent male migration alone, of men whose jobs are pre-arranged, or at least of men who have come to stay. Unfortunately there is no accurate method of estimating the proportion of male migrants who are of the latter category, nor of knowing how far they were included in the Census count in urban areas. We can make estimates of the long-term split-family migrants, but they are very much in a minority (see the discussion on Bombay in Chapter 4 above).[1] But we do not have estimates of different degrees of "marriage response" (as we shall call it) according to the occupation or class of migrant: in the course of this study we follow through the argument that factory-employed

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1 It is also universally observed that the sex ratios among recent migrants are higher (more women to men) in migration streams from urban to urban areas. Split families are less likely to be maintained for more than a brief interval in these cases (partly because of the high cost of maintaining two urban dwellings (Table 5.13).

migrants, who are typically from small-farm owning backgrounds, bring their wives into the town after a short time period once their position is secured (or in a minority of cases remain as a split family), whereas other migrant workers, especially those in the non-wage sector, who are more likely to be landless, migrate with their wives in the first instance.[1] It follows that the sex ratio among migrants will, over the short run of five years at least, be variable, dependant upon the predominant characteristics of the migrant streams: we try to predict this from the industrial composition of different urban areas, though clearly the condition in the rural areas (especially of the same

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1 This is supported by a survey recently undertaken in Bombay that indicates that 79% of females who joined other family members (largely husbands) in the factory sector did so once they had secured employment, and only 11% came before a job was secure, whereas in the case of casual workers 60% joined joined husbands with jobs, and 33% came with them in speculation. See L.K.Deshpande, "The Bombay Labour Market" (unpublished), Department of Economics, University of Bombay, 1979.

District) is an important determinant here too.[1] The differences in sex ratio that persist in the long-run among migrants are of more demographic significance in the eventual population composition of the town, once some degree of stability is achieved (and these were discussed above in Chapter 4).

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1 A survey with which the author is familiar, carried out in Poona, throws some light on the economic backgrounds of migrants in different urban industrial employments or occupations: a slum settlement in which over 2/3rds of the household heads surveyed were in formal industry, municipal service, or working as skilled labour, contained 44% of migrants who still had land, one half of them, however, owning less than two acres. In a contrasting slum settlement where over 2/3rds of household heads were in petty trade or casual service only 12% had land (though 87% had previously been employed in agriculture). This was despite the fact that a higher proportion of the latter migrants were local. See M.Bapat, "Occupational and Spatial Mobility among Shanty Dwellers in Poona," Ph.D. Thesis, University College London, 1979.

Similar findings come from the survey carried out in Bombay (referred to in the previous Note) by L.K.Deshpande. The population was divided into factory workers, casual workers, and those in small establishments. Of the factory workers, 72% owned land in rural areas, with an average holding of 2.7 acres, whereas of the casual workers, at the other end of the scale, 51% owned land with an average holding of 2.1 acres. These surveys are at least consistent with what we have inferred from demographic indicators: that factory manufacturing workers are more likely to own land than other (non-white collar) workers.

We have devoted some time to explaining the variance in female migration when related to male migration. For all this, there will be a small proportion of women who migrate alone for jobs or further education, as revealed in the Sample Survey (where about 15% were so categorised).[1] Initially, for the purposes of model-building, these women will be ignored; their inclusion is one of the more important variations we make in the model (see Chapter 3). The "turnover" and seasonal male migrants are also ignored. And the women who join the native-born are also left out; they would be partly balanced by an outmigration of women who join rural husbands, in any case. Hence the response coefficient will be taken to suggest the absolute size of the female in-migrant flow. To repeat, 1,000 males will be followed by 320 females in the same time period, and 170 in the following quinquennium; in some variants up to 250 additional females are allowed to migrate.

From this starting point a more elaborate hypothesis will be adopted. The age distribution of these migrants has to be heavily reconstructed. Insofar as female migration is a response, its age distribution is related to the past male migration history: i.e. the NSS female age profiles are only appropriately related to a combination of the male migration streams that preceded, and those that took place during, the NSS reference period (one year).

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1 Some areas of the country, especially in South India, experience net female outmigration to urban areas.

Given the age differential at marriage (about 5 years in 1961)[1], a five-year lag would be needed to give a similar male and female age distribution (cet. par.) among migrants. These phenomena are compounded in the NSS data. First I will offer an explanation of these data, and hence I hope to justify the age-specific female response migration schedules I have constructed (Figure 5.1). To anticipate, the effect of reconstruction is to make the current female migration profile that relates to current male migrants alone rather younger than the NSS age profile.

Restricting ourselves still to rural-urban movements we see first a higher proportion of female infants among female migrants (than male infants among male migrants), though the absolute number of males is a little higher than females in this age group (as is the case in the national population also) due to superior survival. The next age group has a distortion of the same kind. The 5-17 age groups are roughly similar in the "Same District" category but the female percentages are higher for the other categories. Male "turnover" migration will be concentrated in the earlier years of age and also is likely to be predominantly local, hence females fail to dominate this first category significantly. The female proportions in this age group among the non-local female migrants are high, and this illustrates the incidence of marriage migration, either to join residential males, or of females migrating

1 C.R.Malaker, personal communication on material from his Ph.D. thesis on Nuptiality in India, still in progress when this Chapter was prepared, Demographic Unit, Indian Statistical Institute, Calcutta.

contemporaneously with migrant males: in both cases the age differential at marriage accounts for the dominance of females in this age group. The 18-24 group of females is also proportionally quite high, combining those reponding to male migrants migrating when in the 25-34 age group (and recorded in the NSS male stream), together with those joining male migrants who migrated a few years earlier (not recorded in the NSS). Disentangling these sub-groups in order to construct a female response migration schedule is not possible on a rigorous basis. The schedules we present are the result of first re-grouping the NSS data into 5-year age groups and smoothing the result; then taking the mode of the new female schedule that we construct to be 20-24 years of age for those in the 1-5 year lagged response group,(who will have been 15-19 when they married), and 15-19 years of age for the unlagged response. (By applying the weights suggested by the regression coefficients to these two groups we can reproduce the NSS female migrant age profile again as a broad check on the validity of the method). Clearly there is a crudity here: the regressions were not age-specific, and there must in fact be a lagged and unlagged "response" of pre-marriage migrant females to male migration; and additionally the pre-marriage male migration is itself a response to the migration of married males and females.[1] But further sophistication would be

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1 Some degree of autocorrelation in the error term will have resulted.

pure guesswork without age-specific Census data on current migration flows. Proceeding now to the tail-end of the schedules, the migration of the 45+ group is insignificant quantitatively, and I have adopted a fairly arbitrary smoothing procedure. But interestingly these elder migrants are a not insignificant proportion of the elder total population (native and migrant), particularly in the case of females. I suspect they are female widows, and aged couples whose young folk have migrated, leaving an unviable family farm as the parents age.[1]

Age and Education in the Structure of the Industrial Workforce

In the economics of production, age is only significant in respect of the command it implies over the means of production. If an economy is expanding rapidly into new industries, or adopting radically new technology in the old ones, and if this implies an increasing need for new skills and new learning for which a secondary education is a sine-qua-non, then only the younger age groups in an economy are employable. It is a paradox that, in this sense, the stock of labour in India (as also in England today) is too old, not too

1 More information on age and marital status of migrants has now been published in the 1971 Census, and is consistent with this particular hypothesis. See M.K.Premi, "Aspects of Female Migration in India", Economic and Political Weekly, April 12, 1980.

young, since it has a disproportionate number of people over fifteen years of age who are illiterate, and a disproportionate number over twenty-five who are without a secondary education.[1] These people will be more costly to train than the younger cohorts. A steady supply of pre-school children plus 100% primary education is necessary to provide the required future labour force in a technically modernising economy.

It is conceivable that a modern industrial estate or New-town would actually seek (i.e. demand, in the economist's sense) a younger local age structure than the national. The neo-classical economist imbued with comparative statics will argue that this is irrational. If the skills are so scarce, then industrial specialisation should not proceed in those industries that are skill-intensive. This argument fails to address the question of the next generation, and fails to provide guidance on the question of how natural resource endowments change over time (whence would follow a change in comparative advantage). Indeed it relegates all education to the rank of consumption goods.

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1 Data on literacy are available from the Indian Census down to 1981. Restricting ourselves to males only, even as late as 1981 crude literacy in Bihar is only 38%. In 1961 it was only 30%, and 43.5% in the 20-24 age group (compared with 49.8% for All-India). In 1971 crude literacy rates were still generally below 50%: Bihar 31%, Orissa 38%, M.P. 33%, West Bengal 43% and Maharashtra 51%. Government of India, Census of India 1961, 1971, Social and Cultural Tables, Delhi.

It is possible, though not easy, to see how far particular industries select young labour forces deliberately, since the age structure of the occupations is recorded for a particular sample in the 1961 Census: the sample consists of large towns (above one lakh, i.e. 100,000 in population size, conventionally referred to as Cities), where these statistics are available for migrants only. I have selected about 20 cases comprising virtually all those from the Districts under study in Eastern India supplemented with a number from Gujarat and Maharashtra (and one from Western Madhya Pradesh). The idiosyncracies of the Census-taking and publication mean that not all the Cities are equally well documented.

Interpretation of the data must proceed warily. Older industries, if they fail to expand at the rate of supply of the labour force, will develop an older age structure than the average.[1] The only way to check this is to examine the data in the special migration tables for Bombay, Ahmedabad, Jamshedpur and Dhanbad, where duration of residence is cross-classified by age in particular occupations, and by levels of education. For the purpose of this analysis we need to exclude those occupations whose age structure is dependant on promotion through seniority; the administrative and managerial classes

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1 In a detailed survey of factory labour in Poona, R.D.Lambert came to the conclusion (too hasty in the view of the author of this thesis) that differential age structure was solely due to this cause. See R.D.Lambert, Workers, Factories and Social Change in India, Princeton University Press, Princeton, 1963.

are likely to be both more educated and older. In fact we will restrict ourselves to concentrate on the manual employee groups, workers in transport and communications, production workers, and service workers (to use the National Occupation Classifications). Miners will be referred to later. From Table 5.3 it can be seen that production workers are more heavily represented in the younger age group, i.e. 15-34, than are other workers. This remains true when we standardise (as we can only in the case of the special sample mentioned above) for recency of arrival. This is broadly consistent with our hypothesis that in the new or modernising industries (which are all well represented in many of these Cities) young recruits are preferred.

It would be better, however, to have information for particular occupations within that large industrial category of production or manufacturing workers. Unfortunately this limits us to one City, Ahmedabad (Table 5.2). Of the six production occupations we have, two are characterised by higher literacy rates (and a higher incidence of secondary education): tailors and tool-makers (and makers of precision instruments), and indeed these two groups are characterised by a younger age structure at both durations of residence recorded, including current migrants (Tables 5.2 and 5.3).[1] Of course these data are only broadly

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1 Textile workers generally are in large part factory workers. Tailors are more likely to be self-employed small businessmen. Hence presumably the importance of literacy.

in line with our expectations, and anyway Ahmedabad could be a special case.[1]

1 A regression on this small sample attempts to attribute the age structure quantitatively to both forces, recency of recruitment and educational attainment. All occupations reported, except the administrative and professional, are included. We find that the two factors between them explain only 45% of the squared variation in age structure (R^2). Education is wholly insignificant. This indicates a number of things in regard to the sample. First, although we set it up as though it were a demand schedule, clearly it is not, since the measured characteristics are those that cleared the market (supply and demand interacting). We have come across this phenomenon in other cities where a high local supply of educated labour resulted in high levels of education appearing in the residual (largely casual) worker categories. Secondly, and more substantially, the relationship can be expected to be discontinuous. There are a limited number of occupations where the demand for young labour is determined by educational requirements (in theory); these may be restricted to the spearhead of modern industry.

The other variable, duration of residence, is highly significant. A 10% addition to the proportion of recent (1-5 years) migrants raises the proportion aged 15-34 by 7%. This underlines the importance of duration as an over-riding determinant of age structure, taking all occupations together, and hence also of the speed of expansion or contraction of the industry in question. Lambert's contention would seem to be vindicated (see note above). But we (and he) are concerned principally with the manufacturing industry (and the sample was too small to confine the test to those occupations alone). Table 5.2 (and Table 5.3) would suggest that duration alone loses its explanatory <u>dominance</u> in the analysis of age structures <u>within</u> the manufacturing industry.

With the caveat of a likely bias introduced through recency of recruitment kept in mind, let us look now at the recorded occupational age structure in the City sample (Table 5.3). I have selected for illustration occupations that are representative of the industries under study. In particular this means that tool - makers and other metal - workers feature predominantly in the Eastern States, whereas textile - workers predominate in the Western States. The average age of the former two occupations is below that of the latter, and the education level is higher, but clearly this relates partly to the age of the industrial capital stock. Less ambiguously the occupational group of electricians is significantly younger in all areas (and their educational level higher). It is particularly instructive, however, to look down the columns in Table 5.3 under particular occupations. It is noticed for example that a particularly young age structure is found among the textile workers in Ulhasnagar near Bombay: this new industrial development incorporates the latest technology (and the largest scale of plant, as noted in Chapter 2 above). Consistent with this, the proportion of secondary school matriculates in that age group is far higher than in the rest of Maharashtra's textile workforce (and illiteracy lower). The other newly developing industry of the Western States is the chemicals industry, which was still at a very early stage of development in 1961: here again Thana and Baroda have a highly qualified workforce in that occupation to judge from age-specific education rates, and a very young age structure. The high qualifications of tool-makers and their young age structure is clear in the new industry at Ranchi, and the metal-making industry will be discussed in more detail below in the case of the only modern integrated steel plant in our City sample, at Bhilai (Durg-Bhilainagar Town Group).

It is also worth discussing the exceptions, and this leads us to look along the rows in Table 5.3 rather than down the columns. One City that seems to be a consistent exception to any hypothesis is Jamshedpur, the private sector Company Steel Town. Here the educational qualifications are particularly notable, yet the age structure is curiously old. The latter can be related to the paucity of migrants during the 1951-1961 decade, in comparison with some of the other heavy industrial Cities. The foundation of the industry here pre-dates the Second Plan. Exceptionally (in their day) the Tatas recruited a migrant labour force for work in their mills and then trained it on the spot to a high level of skill. Subsequent capital expansions were carried out with less further labour recruitment (and, more recently, no doubt with the sons of the labour force already there and educated in the local schools.)[1] With the establishment of public-sector training centres, near emerging industrial localities, this phenomenon is likely to be repeated, and in this repsect we refer to the City of Ranchi again below. We deliberately included Bhopal (in Madhya Pradesh) in the City sample to discover whether a centre with a newly developed modern electrical or engineering industry would also put a premium on education. In fact it illustrates one of the best-educated cohorts in the Table, and almost all the electricians are in the younger age group; in a State with a low education record (noted above) this is clearly not the result simply of a supply of youthful migrants, but a feature of demand requirements. We cite specific example in the section that follows to indicate the care with which

1 Daily employment at the Tata Iron and Steel Company was on average 22,662 in 1918-23 (with output at 200,000 tons). From 1935-39 employment was reduced to 19,309 (while output rose to 700,000). By the time of the 1961 Census the mill was rated at 2 million tons, double pre-war capacity, but its labour force was only 30,000. By then its ever-migrant labour force of 25,000 was no larger than in 1926-7. What had changed was the white-collar contingent in the work-force: its increase had perhaps contributed towards the ageing of the employees (i.e. with capital-using expansion there was relatively more labour recruitment (or less retrenchment) at the senior end of the scale. See S.K.Sen, The House of Tata (1839-1939), Calcutta Progressive Publishers, Calcutta, 1975; and Government of India, Census of India 1921, 1951, 1961, State of Bihar (& Orissa in 1921), Delhi (Patna in 1921), (Special Tables for Jamshedpur in 1961).

the post-Independence heavy industries selected their labour forces.

To point up the contrast I have illustrated the thesis with a very traditional occupational group, millers, bakers, and brewers. Here, on average, only 55% of the workers are in the 15-34 age group (as against 68% in the case of electricians). Needless to say, secondary school matriculates (data not provided here) are uniformly a very low proportion, illiterates (Table 5.3) a uniformly high one. Of course this reflects the fact that bakeries have always existed in the towns even before the impact of modern industrialisation. However, there will have been a local multiplier effect, or at least an increased local demand for manufactured food and drink, and yet the resultant migration or absorption of resident labour has not selected noticeably the younger cohorts. This can be seen strikingly in the New-town area of Durg (containing Bhilai Steel Town) where the proportion of young millers, though above average (61%) is still below the proportion of young electricians (72%).

Finally it is instructive to look at the residual column, that is those labourers "not elsewhere classified" (in the Standard Occupational Classification); this will probably consist predominantly of casual labour whose occupational "mix" defied the Census investigators. It is a large category. It tends to have an older age structure, but this also relates quite closely to the rate of growth of the town in question. In a few exceptional cases it has a notable proportion of matriculates (i.e. 5% rather than 1% or less), as in Gaya, Asansol, and Jamshedpur in particular (Table 5.8). These latter two are Cities that acquired their modern industry at an earlier date: steel at Jamshedpur and also at Asansol's twin town of Burnpur, and hence built up an educated labour force. The Second Plan period of expansion of these existing plants failed to absorb this stock of qualified labour, and hence follows its comparatively high representation in the residual occupational categories. How far this story may be repeated for the new engineering towns when their well-educated cohorts come on to the labour market in the 1970s and 1980s remains to be seen, but some indications of this emerging problem are illustrated below.

The overall age distribution of the work-force in a town will clearly be dictated, in most cases, by its duration of residence. The declining industries, and the tertiary sector (a labour absorbing sector) will have the older structures. The new industries will have young structures, though quickly ageing if subsequent expansion is accompanied by substitution of capital for labour. On the green-field, or greenish, industrial sites local industrial workforces are likely therefore to be younger in all economic sectors initially, but especially so if the industry is of high technology. Skill-specific demand is likely to turn out to be age-specific (given the increasing illiteracy with age in the Indian population). We would probably be right to "bunch" our migrants specifically into the younger working age groups when illustrating the effects of migration to newly industrialising sites (as in our Model "1 b'" in Chapter 3) (which exacerbates future instabilities in the labour market). As we have argued in Chapter 2, only in the case of iron and steel and heavy engineering is this phenomenon likely to coincide with very large local work-forces. In other modern plant capital substitution tends to outweigh the effects of scale alone as far as the individual plant is concerned, though it still may be the case that economies of agglomeration are significant.[1]

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1 Attributes of the work-force in a single industry are by no means standard across societies. We have noted this in Chapter 4 above principally in regard to the employment of women. In a very careful comparative study of the textile industry, Saxonhouse and Kiyokawa show how Indian and Japanese mills differed in this respect over a similar period (and despite crude technical and demographic similarities). It is worth quoting their conclusion in full: "The high productivity, high turnover, high absentee.,closely supervised, largely female Japanese labour force can be contrasted with the low productivity, lower turnover, also high absentee and loosely supervised, mostly male Indian labour force. It is evident that the

A Case Study from
Eastern Madhya Pradesh

We discuss here the sub-region of the new Steel Town development at Bhilai. As we noted above, older industries, if they fail to expand at the rate of supply of the labour force, will be inclined to have an older age structure than the average. For that reason alone, workers in transport, trades and communications, are often older than their industrial colleagues in the newly developed industries for there were passenger buses before the steel workers arrived. The age structure of an occupation represents an interaction of demand and supply, whereas our current interest is to focus on demand. If we confine our observations to a single industry we tend to overcome that bias. The iron and steel industry at Bhilai employs both furnacemen and electricians, the latter on average being

footnote continues

acquisition of a mature, stable labour force does not necessarily result in industrial success." G.Saxonhouse and Y. Kiyokawa,"The Supply and Demand for Quality Workers in the Cotton Textile Industries in Japan and India", (Paper from a Conference on Japan's Historical Development Experience and the Contemporary Developing Countries, Feb. 1978), International Development Centre of Japan, 1978.

The Japanese textile worker was also more highly educated (they note): 95% being literate in 1933 and 30% having post-primary education.

more skilled (and less illiterate): we see from Table 5.4 (derived from the 1961 Census) that the age structure among migrants is slightly younger among the latter.[1] The contrast with the age structure of the construction workers, whose skills are much less specific to the plant, is clear; yet they were recruited at approximately the same time - only three years earlier.

The future implications of this are important. The young work-force cohorts in modernising industries will tend to remain with those industries over time: their chances of recruitment into another industry elsewhere will diminish as they grow older. If a steel or engineering plant becomes outmoded it will cease to recruit new labour. Its labour force will age. If it faces closure its labour force will seek employment in industries whose demand for labour is not specifically toward the young. Thus the older the population age structure the more serious are the effects of an industrial monoculture when it goes into decline.

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1 What is interesting is that this remains true if we consider the illiterates alone. They are slightly younger in the case of electricians than furnacemen, and in both cases clearly younger than illiterate construction workers. This is consistent with the argument that the potential for training can best be found in the younger groups. It is not simply a question of having to recruit young men if literacy is required as a qualification. Furnacemen, for example, are being recruited young so that they are trainable in the operation of the most modern equipment. Construction workers, on the other hand, need little specific knowledge of the technology of the plant, (a point brought out strongly in the context of Jamshedpur steel plant in the next section).

On a recent visit to Corby (United Kingdom) the author found it reported in the local press that the steel workers now made redundant, on the closure of most of the integrated iron and steel works, were unlikely to find employment in the county of Northampton (Figure 2.3). There is industrial growth in this County, but the new industries, light manufacturing and electronics, favour a younger work-force. The <u>sons</u> of the steel-workers will have the opportunity in nearby Kettering and elsewhere to find employment in these expanding industries. Similar opportunities do not exist in the case of the Steel Town of Consett, also recently closed down, where the locality, in the generally more depressed North East of England, has no neighbouring growth centres.[1] In a country like India with a younger age structure, these particular problems are less severe for the present: if layoffs must occur during stagnation, they will be of a less aged, more redeployable, work-force. But in the young age structure we have a more serious problem regarding the second-generation workforce: the sons of the migrants will not only be more in number than in the United Kingdom, but may be fired with stronger aspirations, given the novelty and promise of industrialisation.

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1 The comparative case-studies were pursued in some detail in Chapter 2 above.

This requires more rapid expansion of new industries, failing which, cet. par. the potential frustration will be stronger.

We turn here to look briefly at sex structure in employment in the same region of Madhya Pradesh. Again it can be argued that we have an interaction of demand and supply, in the sense that since the supply of women through migration to an urban locality is not wholly, or even mainly, called forth by the demand for their labour, the actual employment of women is not a simple case of a specific industrial demand. A significant feature will be that women are absorbed in the non-factory sector simply because they are aleady in the urban locality and will be seeking additional household income even for a considerable amount of effort expended or loss of leisure.

The District-wise sex ratios for workers, available from the Census, are thus difficult to interpret. More enlightening is their disaggregation. For this purpose we look at contrasts in Durg and Bilaspur Districts. Both are subject to high rates of inmigration (from 1951-61): the former depends largely on the steel industry, the latter is more diversified. In the case of Durg, men preceded the women. The demand for labour could, a priori, be regarded as male biased; furnacemen and other steel workers will be recruited for their physical strength potential.

We note from Table 5.5 that the sex ratio (f:m) in metal goods production is 0.023, which is very low. By contrast, tobacco manufacture or textile manufacture can more easily be done by women, which induces industrialists to select women specifically: for the level of training is low, so that instability in the work-force can be tolerated, and this facilitates the payment of low wages; but more importantly, with the possibility of a "putting-out" system, manufacturing work is not incompatible with household occupations, which facilitates piece-rating and even lower remuneration. The very elastic supply of female labour makes it easy to adopt a differential pay policy, effectively, albeit not explicitly, awarding women lower wages. We observe that the sex ratio in textiles is around 1.1 (f:m) in household industry; in tobacco manufacturing, the making of "bidis" (a local cigarette) is mainly household-based , and the sex ratio is around 1.5. In the non-household sector it is of course lower (more men are employed). One quarter of the household-sector female work-force in Bilaspur is employed in tobacco manufacture, and ⅔rds in textiles; and the household sector is far larger than the non-household sector as an employer of women in Bilaspur. It is true that both sectors may attract female labourers from outside the towns, or encourage their earlier migration (than would otherwise have occurred) to join husbands in factory employment. But it is also apparent that whatever the attraction, once the pool of female labour is present, there is some evidence here that the female labour available but not absorbed in the female-intensive industries is taken up in the less-specifically female intensive industries: hence in the household sector of manufacturing the female labour coefficient (f:m sex ratio) is higher in nearly every branch of manufacturing in Bilaspur than in Durg. Similarly in services the female labour coefficient is again higher in Bilaspur than in Durg. Unfortunately a re-definition of what constitutes economic activity plays havoc with the recorded female participation, and in household industry especially, so that we cannot pursue this analysis forward over time to the 1971 Census.

Sources of Migration and Recruitment

It has been emphasised from the outset that there is no simple model of the industrial migrants' demographic characteristics. These are determined by an interaction between demand for and supply of labour; perhaps too much academic analysis has concentrated on the supply side, on migrants looking for jobs, rather than on jobs (or jobbers) looking for migrants.[1] Different types of jobs seek different types of migrants, but it is not equally true to say that different types of migrants seek different types of jobs. The landless labourer or small-scale farmer would be eager for employment at the right wage (on his criterion) whether in bakery, textiles, or engineering industry: but the three industries would select their labour, sometimes quite carefully, each on rather different criteria.[2] These points have been made and the practice

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1 The most recent and readable exposition of this thesis is by M.P.Todaro, "Rural Urban Migration, Unemployment, and Job Probabilities in recent Theoretical and Empirical Research", in A.J.Coale (ed.) Economic Factors in Population Growth, Macmillan, London & Basingstoke, 1976. My main criticism of this approach is that it ignores rigidities and constraints that were and still are the very essence of the Indian labour market. The probability of getting an industrial job is very slight indeed for a villager with no urban contacts. It is very high for a villager whose area is visited by an agency recruiting for TISCO (see further below). Hence the urban unemployment rate is likely to be a very weak indicator of job prospects in industry (especially in unstable populations).

2 The work-force for one of the first post Independence industrial enterprises, the Chittaranjan locomotive works, was decribed as being a "large contingent specially recruited from various parts of the country", by M.Mohsin, Chittaranjan: a Study in Urban Sociology, Popular Prakashan, Bombay, 1964. Only 8% of the work-force was local, from within Burdwan District. Similarly in the Bihar coal-fields there was a "long tradition of systematic recruitment of individual workers from outside Dhanbad region ", (mainly from Uttar Pradesh): Rothermund D., et al. (eds), Urban Growth and Rural Stagnation: Studies in the Economy of an Indian Coalfield and its Rural Hinterland, Manohar, Delhi, 1980.

documented in some detail by M.D.Morris,[1] and the whole issue of labour commitment has been surveyed and debated critically in this light.[2]

Morris pointed to the distinction between the advantage to employers of a floating labour force in the textile industry (where the industrial work ethic was relatively unimportant, and commitment could be a positive problem by encouraging unionisation) and the advantages of a more permanent work-force in iron and steel(where skills acquired on the job were crucial to the smooth functioning of the production process). At this point it should be noted that commitment is equally important a disadvantage in the iron and steel industry, as the early strikes at Jamshedpur surely indicate. Although documentation is difficult, it would seem that management might seek to obviate this problem in rather different ways therefore in the steel and engineering industries, and, to extend the argument further, especially in the more continuous-process industries, like oil and chemicals production in the current era. Labour's disruptive power becomes acute: one break in the chain and the whole process halts - it is not even easy to accumulate stock further down the line. Worse still, stoppage may cause damage (as in iron-ore refining if furnaces are allowed to cool rapidly), or danger

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1 M.D.Morris, The Emergence of an Industrial Labour Force in India: A Study of the Bombay Cotton Mills 1854-1947, Oxford University Press, Bombay, 1965.

2 S. Munshi,"Industrial Labour in Developing Economies", Economic & Political Weekly, (Review of Management), August, 1977.

even.[1] One natural response to all this is to reduce the work-force per unit of capital. That is to say, even in a poor country, the full cost of labour (including these risks of disruption) may be sufficiently high in some industries to be an inducement to capital substitution (despite the monetary cost).[2] A second possible response is deliberately to recruit a work-force that is more likely to be "tame". Recruitment of labour from afar may suit this purpose: hopefully the unemployed local people, "sons of the soil", will fight it out with the in-migrants in the streets, not on the shop floor. If economies of scale exist at the plant level, and if large plant labour forces are especially risky (on which point some European evidence seems to be emerging), then the inducement to

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1 The effect of a stoppage by the blast-furnace crane operators at Jamshedpur (a small group of specialised, but technically unsophisticated, workers) is documented in J.L.Keenan, A Steel Man in India, Duell, Sloan, and Pearce, New York, 1943. Substitute crane-operators from elsewhere on the site were recruited and productivity fell about five-fold.

2 The argument is by now familiar to analysts in the field of Indian agriculture; the parallel was first suggested to me on reading T.J.Byres, "The New Technology, Class Formation and Class Action in the Indian Countryside", Journal of Peasant Studies, 8:4, July, 1981.

substitute is strengthened.[1] Written documentation of such a conscious policy is, for perhaps rather obvious reasons, hard to find. Selective reading between the lines is risky, but part of the hue and cry on the conflict between locals and migrants (the "sons of the soil" issue) can surely be seen in that light. Management clearly resented being told whom to notify of jobs (despite not being told whom to recruit): witness the Chairman of the Indian Iron and Steel Company (who own the Burnpur works in Burdwan District) deploring the new legislation regarding local employment exchanges on the grounds that it was "fostering the evils of provincialism" instead of promoting the "mobility of industrial labour....of benefit both to workers and to their employers." [2]

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1 See S.J.Prais, Productivity and Industrial Structure, (forthcoming). As far as India is concerned some recent surveys have supported the suggestion that the increasing ancillarisation of Indian industry (farming out engineering jobs to small-scale factories, for example) is prompted by the desire to avoid the accumulation of large plant-based labour forces. See for example J.Harriss, "Two Theses on Small Industry: Notes from a Study in Coimbatore, South India" (Proceedings of 7th European Conference on Modern South Asian Studies held in London, July, 1981, forthcoming in edited collection, eds. D.Taylor and K. Ballhatchet). Harriss notes "the most commonly stated reason for starting new small-scale units rather than building up one unit is, broadly, this factor of labour control".

2 Economic & Political Weekly, "From the Chair: Chairman of IISCO", 26 Nov., 1960.

Whatever the motives or compulsions facing the management, the rapidly growing heavy industrial towns of Eastern India have always recruited labour from outside the District. In the early days, the Tata Iron and Steel Company (TISCO) at Jamshedpur used new local firms as contractors to recruit labour directly from Mayurbanj and Sambalpur Districts of Orissa, as well as from Manbhum and Singbhum Districts in Bihar, thus establishing the precedent of multi-ethnicity in the Steel Town.[1] Forty years later the Orissan steel plant at Rourkela (in Sundargarh District, neighbouring Sambalpur) was to recruit or attract labour from urban Bihar (Table 5.6). Jamshedpur would take labour from rural Bengal. Durgapur, Chittaranjan, and Burnpur in West Bengal would take labour from rural Bihar. Durg, the site of the steel industry in Madhya Pradesh, acquires labour from rural Andhra. These practices of inter-State migration become fuel to the fires of the "sons of the soil".[2]

Naturally shortages of educated or skilled labour may require searching far afield. This was clearly the case in the early days at Jamshedpur, where special construction skills needed in the erection of the furnaces,

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1 S.K.Sen, The House of Tata(1839-1931), Calcutta Progressive Publishers, Calcutta, 1975.

2 M. Weiner, Sons of the Soil: Migration and Ethnic Conflict in India, Princeton University Press, Princeton, 1978.

were obtained from among the ship-builders of Bombay Presidency. In addition, white-collar workers came from Bengal, Bombay (Parsees), and Madras. Skilled and semi-skilled labour in the production process came from the United States, Germany, and South Wales. The pattern was to repeat itself with the new generation of steel plants built post-Independence, scarce skills being provided by the Russian work-force at Bhilai, the West Germans at Rourkela, and so on. Unfortunately the Census data do not allow detailed investigation of skills in particular occupations according to the origin of migrants. But we can make some headway by restricting the analysis to the larger Cities in our area. Jamshedpur is particularly well-documented (with special tabulations in the 1961 Census). The integrated steel plant had been expanded in output to two million tonnes by 1960. The stock of migrants as of 1961 represents a history of labour migration (18% claiming to have arrived during the period of expansion). Of all manufacturing workers, 85% are migrant (Table 5.6) and 48% came from beyond the boundaries of Bihar, 36% from rural origins beyond the State.[1] It would not be apparent in this case that recruitment from afar has by now much to

1 For all worker categories urban labour tended to come from West Bengal. It is reasonable to link this with skill requirements: Bengalis are generally more highly educated than their neighbours in Eastern India. The manufacturing and commercial sectors used the most long-distance rural migrants. Their origins were chiefly Orissa and Uttar Pradesh.

do with searching out skilled labour. In fact Jamshedpur had come to acquire its skills by technical training in a captive Institute, established in 1921, (which can be viewed as part of the tactic of ensuring good labour relations by training the unskilled in the Company Town). Looking at those long-distance migrants employed in manufacturing industry, we can see (Table 5.7) that 62% of those rural migrants were employed in iron and steel making, and 55% of the urban migrants in the same, making an average of 61%. This compares with only 52% of all manufacturing migrants, that is including migrants from shorter distances. West Bengal, Uttar Pradesh, Punjab and Orissa are the major sources of supply. Even in the case of West Bengal, three times as many migrants were rural as urban in origin. There seems to have been little selection specifically for migrants from urban localities. There is a caveat, however. These data are for place of birth, not place of last residence. The only control we have over this obvious defect is by observation on the 1971 Census, only partly published, and the picture that emerges is not one of rural to urban to urban movements ("stepwise migration") in India. That is to say, it seems on balance that the large majority of rural migrants (by place of birth) are rural migrants by place of last residence also, but verification on such a level of disaggregation as industrial group within a City would have to await further information.[1]

We cannot analyse the other Steel Towns in quite the same detail (Table 5.6). But working from the District level urban figures we can say that between 2/3rds and 4/5ths of the manufacturing populations were drawn from outside the locality with 35% or more of both the working and the specifically manufacturing population coming from other States. In the case of Durg (the home of the Bhilai steel plant) the proportion of the male population from another State reaches 58%. Bhilai is in the heart of Madhya Pradesh, a region of Scheduled Tribes and Castes (the lowest socio-economic group in the community). Its labour force was obtained from the South (Andhra Pradesh)

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1 See Table 5.16, drawn from Government of India, Census of India 1971, Special Monograph No. 1, "Birthplace Migration", New Delhi. Outmigration from urban localities is increased by only 8.5% if last residence is the criterion for migration status, rather than birthplace, in the case of intra-District migrants; for those crossing State boundaries the difference falls to only 3.0%, i.e. on average our estimate of the proportion of inter-State migrants from urban areas should increase by only 3% to account for "stepwise migration", provided that (i) the 1961 differences would be similar to those of 1971, and (ii) the heavy engineering towns (in this case) are not exceptional in this respect.

and the West (Maharashtra) predominantly from rural backgrounds. A similar picture holds for all the Steel Town areas (Table 5.6), in marked contrast to our control, Burdwan City, a mixed manufacturing and administrative centre: inter State migration is dominant. But the urban areas of Sundargarh District, where Rourkela steel plant is located, are exceptional in having obtained the majority of long-distance migrants from urban areas, especially from urban Bihar and West Bengal. This phenomenon (not apparently a statistical error) may be related to the West German management of the plant. It was reported that little effort was made to seek out the necessary skills (not even those of carpenters, who were reported to be unobtainable in India!)[1], migrants from West Germany being readily resorted to. With such an attitude of mind would go the tendency to recruit in urban areas (where necessary skills might be thought to lie). Whatever the motivation in this case, the point is thereby underlined that demand characteristics are quite important in explaining the origins of these huge work-forces. For there can be no reason to explain a greater supply of urban Biharis to one steel plant, and of rural Biharis to another, both in neighbouring States to Bihar.

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1 This anecdote is reported in a column in Economic and Political Weekly, Special Number, June 1960.

In fact whether supply or demand features the more powerfully in explaining the distant (and usually rural) origins of these labour forces is of little concern to the basic argument: the point I am demonstrating is that large industrial complexes promote the emergence of a multi-regional or multi-ethnic urban locality, with its potential for conflict in the future labour market (depending in part on differential proportions of children in the populations). But idiosyncracies of demand may accentuate these effects.[1]

1 It should be noted of course that the designation of "Other State" in the Census need not imply a particularly distant origin. Both Singbhum District (Jamshedpur) and Durg District (Bhilai) border on neighbouring States. But what it does imply in the Indian context in many cases is a foreign origin in linguistic and cultural terms.

A stable labour force was clearly required for these public-sector steel plants. For a considerable investment was made in the men themselves. The target labour force had been 7,500 per plant. About 1/7th were engineers, given preliminary training at Jamshedpur, then overseas. The skilled workers and operatives were also given training, at existing steel or engineering works. In these circumstances a fairly careful recruitment scheme is to be expected. In other public sectors of heavy industry captive training schools were established in the late 1950s; the heavy electricals at Bhopal and heavy engineering at Ranchi are examples. About 10% of investment in the heavy sector is for these training schools.

In contemporary Europe there is evidence that rural labour is favoured for new manufacturing plant owing to its relative docility. This is made explicit in replies to a survey (late 1960s): see F.M.Scherer et al., The Economics of Multi-Plant Operation, Harvard U.P., Massachusetts, 1975.

The time-honoured textile Cities of the Western States, Ahmedabad, Bombay, and Sholapur (to take three notable examples) have not been drawing their labour from so far afield. This is what we might expect from the detailed historical work of Morris on the Bombay textile industry.[1] But those fewer migrants who have travelled from afar are, as in the cases documented above, from rural backgrounds. The remaining Cities, in the sample we took, experienced even less long distance migration. The reasons for this, however, are by no means uniform, and it is certainly not the case that they are all towns requiring only unskilled labour (available locally). Asansol for instance is a modern manufacturing town, producing chemicals, glass, and bicycles; Poona has a mixed tradition of modern and less modern manufacturing, brass metal working and small-scale engineering.

It might be argued that an indicator of the demand for educated labour would be the proportion of migrant manufacturing labour coming from any urban area (more local, and distant). This we have graphed against a measure of education, basic literacy (Figure 5.2, and Appendix 5 B).[2]

1 M.D.Morris, The Emergence of an Industrial Labour Force: A Study of the Bombay Cotton Mills 1854-1947, OUP, Bombay, 1965.

2 The City Sample is not random (as we indicated above). Hence I have refrained from discussing statistical analysis in the body of this text. The pre-conditions for such work are simply not fulfilled. A major concern of this whole study is to focus on those cases that are at the spearhead of development, the crucial exceptional rather than the unimportant average experience. However, in the Appendix we do present the major statistical results.

The relationship is not a close one (the simple correlation between literacy and urban origins is 0.3). At this date, 1961, the weakness of the relationship is unlikely to be so much due to characteristics on the supply side (as it may become later), namely that literates would be offering themselves for jobs not requiring literacy, having been brought up in a town and gained the qualification of literacy simply because there were more schools there. We shall see below that the picture is different by 1971, and certainly so by 1981. We would conclude that recruitment of migrants from urban origins is necessary largely because of the skills required, or basis on which to create those skills, namely literacy; but that this is only a component in explaining urban to urban migration flows.

Since our interest is to develop an understanding of the overall demographic effect of industrialisation, we should ask what if any is the relationship between manufacturing workers and the urban work-force in general, including the trades and service workers. Are the former a typical group? Here some interesting observations arise. First (Figure 5.3), generally speaking workers in manufacturing are no more likely to be migrant than are non-manufacturing workers. Furthermore, this relationship extends to the question of the source of labour supply in that manufacturing and non-manufacturing migrants from other States of origin also correlate, across the Districts and the Cities under study (Figure 5.4; and for both these observations, Figures in Appendix 5B,1 and 2).

It seems clear that the larger the manufacturing content of the work-force in a given city, the larger its migrant content is, and, as we have just seen, the larger is the migrant component in both broad sectors of the work-force (manufacturing and non-manufacturing). It seems that the desire and the need to search further afield are promoted by the onset of industrialisation, and especially heavy industrialisation, and in the process a source of labour supply is mobilised for all work-force sectors. This is the strongest conclusion to arise from our regression analysis (Appendix 5B). An externality of industrialisation, one might argue, is the development, if not the creation, of a labour market.[1] To summarise then, the increased likelihood of multi-ethnicity (implied by distant origins) is promoted by rapid, and particularly by heavy, industrialisation.

Now beneath these generalisations is revealed a more disturbing feature from some points of view. The Indian population has remained approximately 20% urban throughout the twenty post-Independence years of our study.[2]

1 And hence the relevance of the Todaro model referred to critically above may be enhanced the more industrialised an economy becomes: better information ensures a freer flow of labour.

2 In 1951 17.6% urban, 1961 18.3%, 1971 20.2% ; (in 1981 a clearer shift occurred: 23.7%).

But its labour force in our industrialising region at least, when drawn from beyond the locality itself, has been drawn disproportionately from urban areas (according to birth), the mean values being 35.6% for the urban Districts in our study (and 28.5% for the City sample). This readily illustrates how India managed to remain close on 20% urban for two decades. Broadly speaking, industrialisation did not promote a transfer of labour from rural to urban areas in proportional terms, despite a rural natural increase that was only modest by traditional population growth standards, at between 2 and 2½% annually). However, if we take the newly industrialising towns separately, the tendency is for the workforce to be more predominantly rural in origin, and especially so in the case of heavy industrialisation. This is because rapid growth on nearly green-field sites reduces dramatically the proportion of local urban self-recruitment that is possible in the labour force. But it is certainly not clear that the migrants to these engineering towns are substantially less than average (less than 20%) from urban origins, as Table 5.6 on Steel Towns indicated. There are two counter forces, to recap the argument. The requirement for skills (or at least for literacy) and the substitution of capital for labour both encourage less re-allocation from rural to urban areas, whereas the desire for a captive and potentially passive labour enclave may favour a continuing transfer. The substitution will continue as long as the price of capital is kept, or is perceived to be, relatively low (or so long as the value of its product, shielded from world markets, is kept artificially high).[1]

As we have shown, the age structure of current migrants is not uniform. The generalisation that the majority are aged 20-34 hides variation. We have already discussed to what degree those variations are determined by differing occupational requirements. In the late 1950s a modern industry favoured the younger end of the age-group. Seen in conjunction with policies on recruitment outlined above, the influence of distance alone on age-structure is a combination of factors. According to the National Sample Survey (Table 5.1) adult migrants from far afield turn out to be younger than those who travel a shorter distance. The same is true of adult migrants from urban origins of afar (though urban migrants are generally older than rural migrants). This is all to be expected if the more local migrants are attracted in by the developing opportunities, to work in the non-wage

1 M. Weiner has suggested that the potential for ethnic conflict may worsen as the rapid urbanisation increases the volume of migrants. If however the rate of urbanisation stagnates, the proportion of native-born rises. But the sons of the migrants are typically regarded as migrants still, (in which case differential fertility, sex, and age structure are what matter). M.Weiner, <u>Sons of the Soil</u>, Princeton, 1978, (noted above).

sector, often from the poorest backgrounds, and without land; they will be young and old alike. But all these would be insecure grounds on which to predict the demographic effects of any particular industrial investment.[1] There can be no substitute for a knowledge of recruitment policy and local labour market conditions.

The seeds of change were sown in the 1960 to 1970 decade. The disproportionate advance in secondary education affected the supply of labour significantly. The graduates of "captive" training institutions began to multiply, reducing the need to search beyond the locality for literate labour. This, if no other reason, might account for the fall in migrant manufacturing workers (see below); given that supply does not readily respond to changing demand conditions, the fall may be less in other worker categories. Aggregate All-India data indicate a dramatic increase in registered non-manufacturing employment in urban areas during the decade, especially in the public sector. Manufacturing employment on the other hand only crept up, and in the private sector did not register any change at all. Whereas the urban population increased by 37.9% over the decade, the number of urban-dwellers

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1 Rather bold inferences on the migrant composition of an industrial project are drawn by D.Lal on the basis of aggregate regressions: D.Lal, Prices for Planning, Heinemann, London, 1980.

claiming to have been born elsewhere increased by only 30.8%, and those from rural areas alone by only 28.3%. Although misreporting of place of birth, and differential fertility and mortality, make direct comparison difficult, this evidence strongly suggests that the rural to urban transfer was stagnating (Table 5.9). Furthermore, the State of West Bengal (and to a lesser extent Madhya Pradesh) seems to have born the brunt of stagnation as far as the region of our study is concerned. Orissa, Bihar, and in Western India Maharashtra, have continued to experience tangible transfers of population from rural to urban areas (Table 5.10). More detailed figures now available for Maharashtra indicate the decreased migrant component most clearly in the category of manufacturing (data also available for Gujarat), even in some of the cases where the manufacturing work-force was increasing proportionally to the rest (as in the Cities of new industry, like Baroda, Thana, Ulhasnagar, and Poona). To aggravate the excess supply there are always periods of severe agricultural conditions. The droughts in Maharashtra of the late 1960s help account for the increase in migrants among the workforce in the cases of Poona and Sholapur, despite their conspicuous absence in manufacturing industry (Table 5.3). Only very gradually do these people succeed in competing with the rest for jobs in the latter, generally favoured, sector.[1] Such

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1 See further in Chapter 8 below an analysis of inter-sectoral mobility. The case of the drought refugees is documented in M.M.Bapat, "Occupational and Spatial Mobility among Shanty Dwellers in Poona", Ph.D. thesis, University College, London, 1979.

migrants are by necessity predominantly local, and generally of all ages (i.e. representative of the rural age structure) except that the weakest, be they young or old, do not survive to reach the haven of the City.

The problem of adjustment to a greater supply of not always appropriate education was already being faced locally in the late 1950s. Above we have commented on the high proportion of secondary school matriculates employed in the residual manufacturing categories, or in non-skill intensive activities (like milling and baking), who are resident in centres of higher education and training (geared to the expansion of heavy industry) like Ranchi in Bihar. By 1970 the sons and brothers of the migrants are beginning to matriculate (though it is not until the late 1970s that the full effects of the migrant cohorts will begin to become apparent). A glance at the proportions of matriculates in the various occupations in the case of Bihar (Table 5.14), or in the various industries in the case of Madhya Pradesh (Table 5.15), indicates the extent to which the process has gone. Ranchi District still stands out. The production workers have quadrupled their educational achievement over the decade. But at the same time the residual workers increased theirs too in contrast to other Districts in the State. Furthermore the Service occupations witnessed a doubling in the proportion of matriculates. From first-hand experience Weiner comments on this phenomenon in Ranchi City: "An afternoon walk around the movie houses in Ranchi ....reveals where most of the unemployed matriculates hang out. They constitute not just a reserve labour pool, but a reserve political pool as well."[1] He is thinking of the disturbances in Calcutta in the late 1960s. His own study in the Chota Nagpur region indicates clearly how the migration process ends up in potential ethnic conflict.[2] In the mid1970s the Chief Mechanical Engineer of Chittaranjan Locomotive works told me how that town too was suffering from an over-expansion of education among the young. We might add here that the pent-up energy could more usefully be channelled elsewhere than in the direction of ethnic conflict. In the 1920s at Jamshedpur Sikhs and Biharis joined hands versus the management; many of their demands were constructive: the new civil township was built following the disturbances (though the connection between the two would require careful investigation). But the overall effect was to render labour more costly

1 M.Weiner, Sons of the Soil, Princeton, 1978, cited in note above; page 184.

2 Note my qualification on that judgement in note on M.Weiner above.

in the eyes of the management. The crucial test of the long-term constructiveness of such frustration would be if it led to the promotion of increased real investment in the regions concerned. The short-term effect is unfortunately the opposite, as the case of stagnation in West Bengal eloquently testifies. The District of Singbhum in Bihar, however, seems to have used its matriculated labour more efficiently, in that it has reduced the proportions of matriculates in the residual category. Turning finally to Madhya Pradesh, all the industrial sectors expanded their use of matriculate labour at least as much as did the manufacturing sector; and the residual sector nearly doubled its percentage of these secondary school graduates. In an atmosphere such as this the new migrant sees his prospect of employment diminish. And the older migrant becomes less likely to see his sons follow in their father's footsteps at the spearhead of the industrial labour force. The prospects of migrating out, with a special skill to offer, from Bihar to Gujarat (for instance) are as remote as are the days when the Gujarati shipbuilders built the furnaces of Jamshedpur.

A Note on the Relationship between the Fastest and the Slowest Growing Areas

It would be of interest to know whether, other things like accessability being equal, the fastest growing urban localities tend to draw a disproportionate amount of their population from the slowest growing urban localities. In Chapters 7 and 8 we point to the problem of maintaining urban infrastructure in towns that lose their potentially most productive members (typically young males in the Indian culture). If these outmigrants tend to go to the new growth areas, and to form their families there, they incur the costs of new dwellings, and this may reduce their ability to support the urban family of origin (typically the older members). They also incur the risks of an uncertain future in a town that has yet to establish itself on a secure diversified base. For a time this family nexus between new towns and declining towns would be especially insecure in that neither side could easily assist the other.

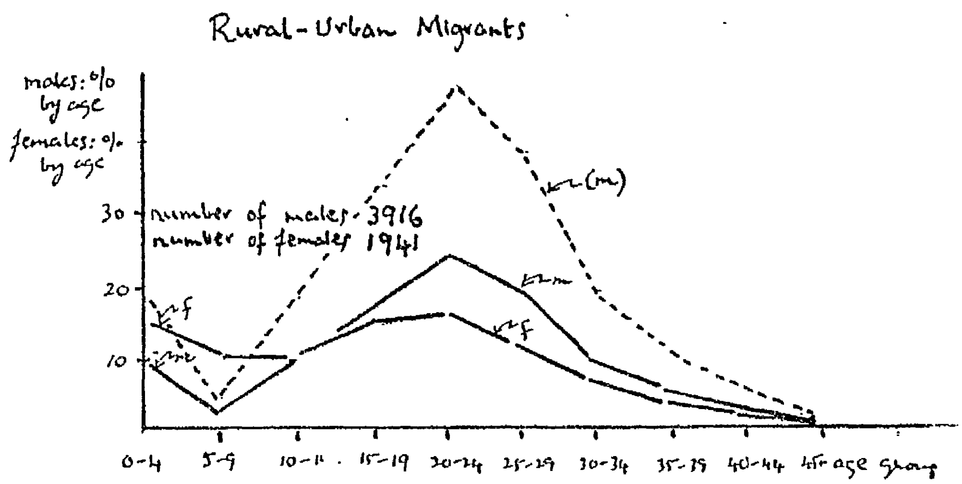
It is not possible to trace migration flows between towns. But the Census does enable us to construct migration flows between the aggregate urban areas of Districts where the State Census authorities have undertaken these tabulations. So far this restricts us to Bihar in 1961, and Orissa in 1971, which we study (Tables 5.11 and 5.12; data are also published for Maharashtra in 1971). There is no question of an extreme concentration of migrants from slow-growth areas making their presence in fast-growth areas. For example (Table 5.11, and refer to Figure 1.7) Dhanbad has taken 2,500 of its migrants from Patna and Gaya together, 1000 from Monghyr, and 600 from distant Shahabad (all urban Districts): over time this has amounted to less than 1% of Gaya's 1961 population, or 17% of its life-time outflow, and about ½% of Shahabad's and ½% of Monghyr's, or 11% and 18% of their outflows respectively. Only Patna in our sample has attracted percentages as large as these (taking 23% of Gaya's outflow and 34% of nearby Shahabad's; Patna is of course the State capital, is well diversified in economic activity, and until the 1951-61 decade its District's urban population was far larger than Dhanbad's. Ranchi and Singbhum, the other fast-growing Districts take a similarly small percentage of Gaya's urban population as does Dhanbad.

For Orissa the data date from 1971, by which time the Districts have lost their homogeneous qualities, for which they were originally selected for study; also by this date there are no slow-growing Districts as such. The best we can do with the material is to express the in-migration flows as a percentage of out-migration flow from a District. We note that Cuttack, Bolangir and Ganjam lost most population. Cuttack contains the State capital and has always had a large urban population. But the other two localities were based on agro-industry and were fairly slow-growing in the 1951-61 decade. Sundargarh (the District of Rourkela Steel Town) takes a substantial proportion (13.7%) of Bolangir's outflow (but not surprisingly in view of its proximity), and 14.5% of Mayurbanj's. But Cuttack takes proportionally more (despite its less precipitous development than the Steel Town area) with 24% of Mayurbanj's and 20% of Ganjam's out-migration heading there.

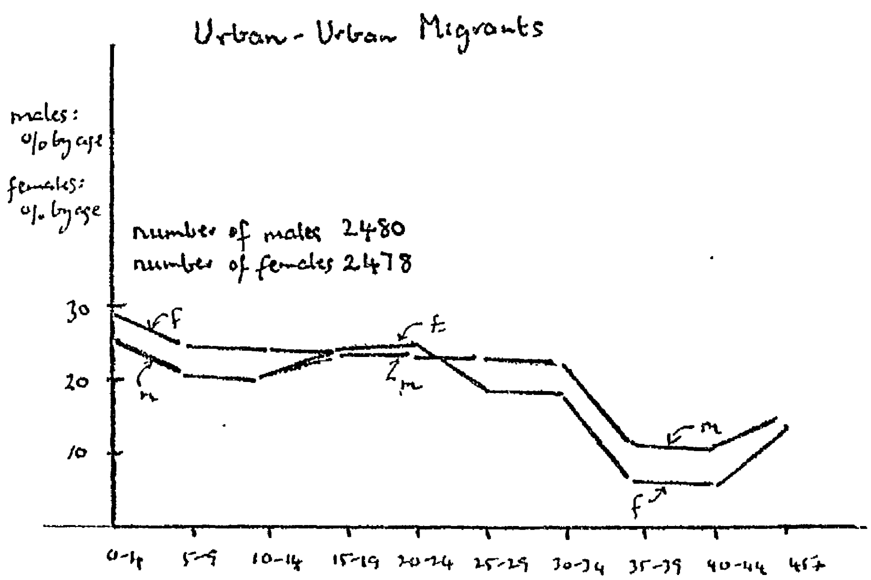
To reiterate, there is not an extreme concentration of migrants from any one District of origin in the heavy industrial Districts. They do tend to attract slightly higher proportions of the outflows of the declining Districts than do other areas generally with the exception of the State capital Districts, which contain large diversified towns. And there is a lack of concentration around the diagonal in Figure 5.11 that would occur if pure proximity were a dominant determinant of inter-District migration. The question that we cannot answer is whether 15% of a District's urban outflow is indicative of high degrees of concentration at the level of the town: is 50% of a single town's out-migration concentrated on a single destination like Rourkela for example? Only more detailed disaggregation than the Census allows would reveal whether there is a network of vulnerability stretching back from the monocultural centres of production and spreading out to the weakest towns, without the moderate-growth and more diversified towns playing a mediating role.

Figure 5.1

Age Profile of Current Migrants



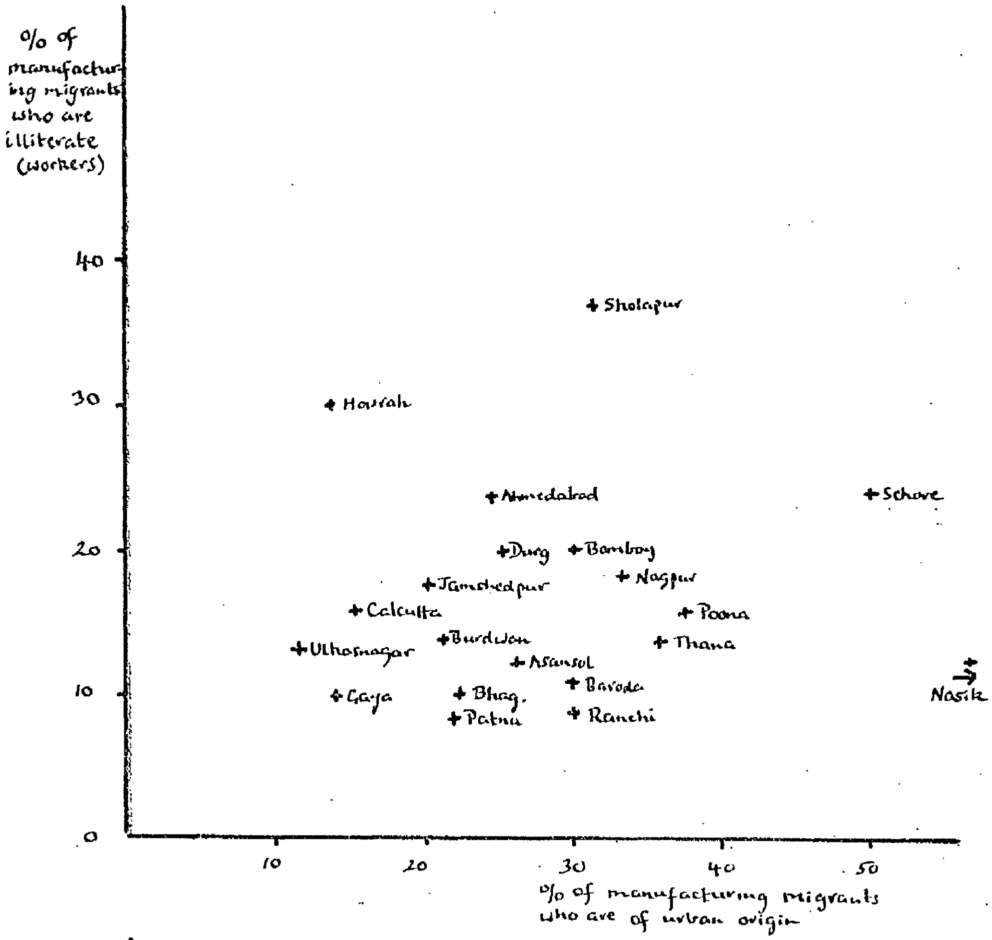
Dotted line (m) preserves the male: female ratio at each age
i.e. = 3916 ÷ 1941 ≃ 2 × m.



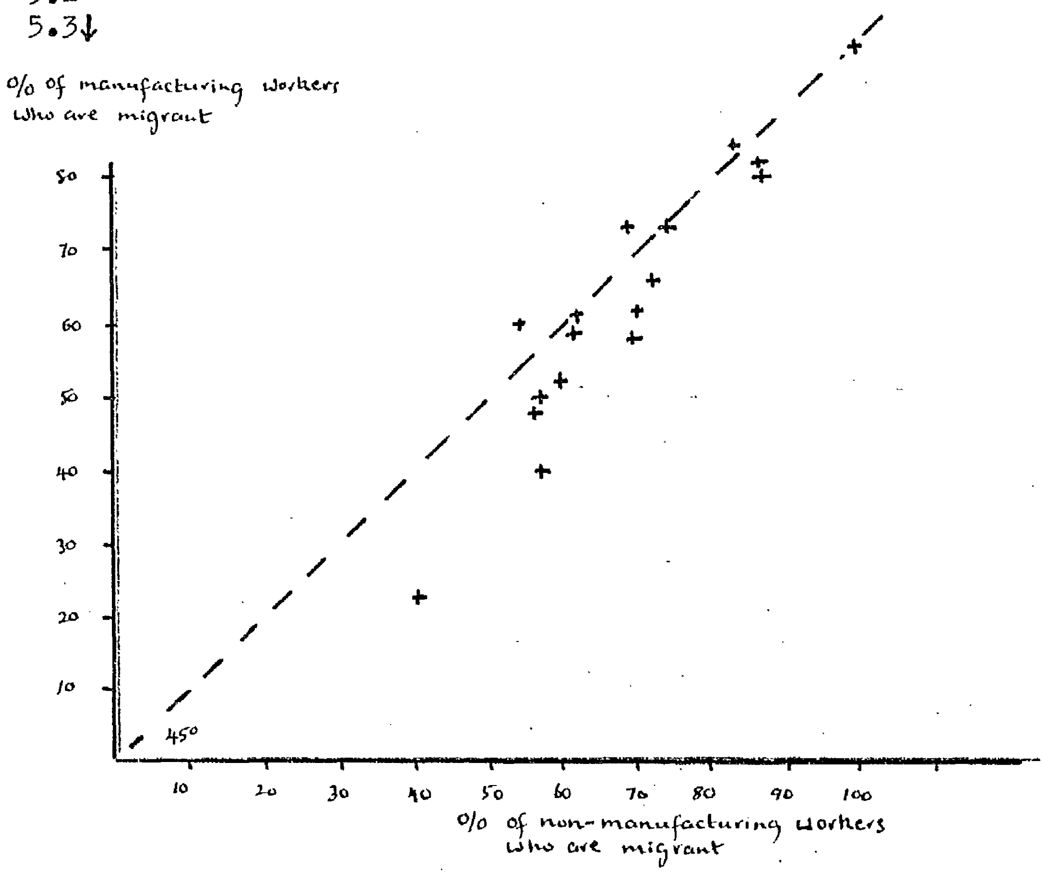
Source: Government of India, Ministry of Finance, National Sample Survey No. 182, Tables with Notes on Internal Migration, New Delhi, Re-grouped in 5-yr age groups by author

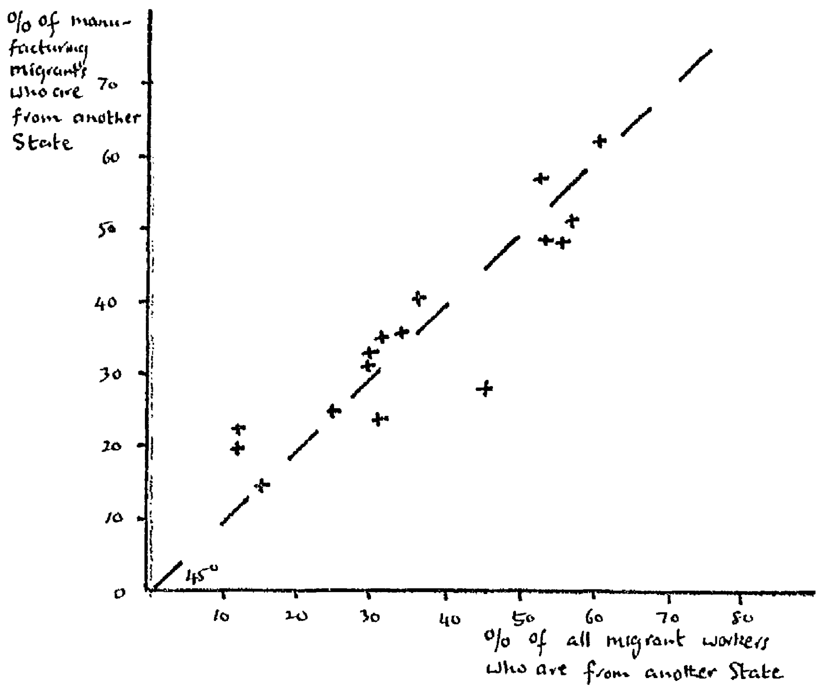
Figures 5.2 to 5.5

The Relationships between Migrant Workers, their Origins, Literacy, and Manufacturing: evidence from the Cities

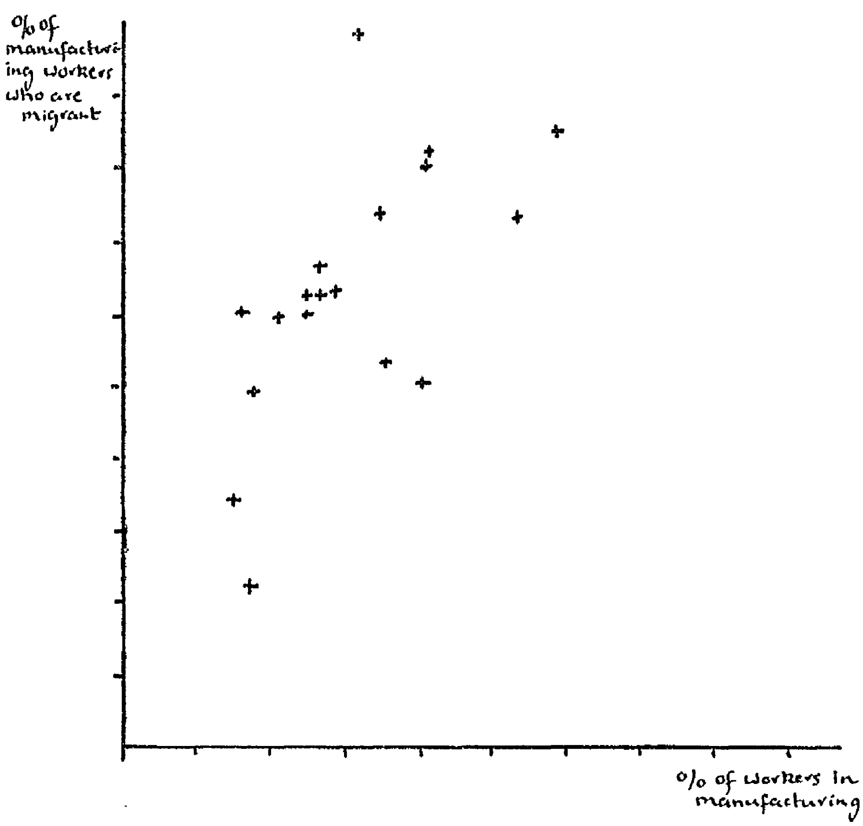


5.2↑
5.3↓





Figures 5.4↑
5.5↓



(Source: see Appendix 5B)

Table 5.1

Age Profile of Current Migrants to Urban Areas

Male migrants from rural origins (Number in brackets, with % of all male migrants to urban areas) From	Age Distribution (%*) 1	1-4	5-17	18-24	25-34	35-44	45+
Same District (2127 33.0%)	3.13	8.17	33.28	18.74	20.04	9.18	7.36
Another District (1134 17.6%)	3.27	7.70	18.56	37.37	18.42	9.77	4.91
Another State (655 10.2%)	1.66	5.43	17.72	33.26	23.16	11.45	7.32
The same repeated for females in selected age groups for comparison							
Same District			34.30	20.27	14.38		
Another District			28.92	23.05	16.81		
Another State			27.81	23.69	18.22		
Male migrants from urban origins From							
Same District (850 13.2%)	4.07	13.03	26.93	13.34	23.22	11.93	7.48
Another District (1063 16.5%)	1.46	8.81	22.92	23.25	22.55	12.13	8.88
Another State (567 8.8%)	2.30	9.99	24.34	22.53	22.40	10.79	7.65
All male migrants to urban areas (in sample) (6450 100.0%)							

* Rows sum 100%

Source: Government of India, Ministry of Finance, Dept. of Economic Affairs, National Sample Survey No. 182 (1964), Tables with Notes on Internal Migration, New Delhi, 1972.

Table 5.2

Age Distribution of male migrants by Occupation

in Ahmedabad City (1961)

Age Distributions recorded for two age-groups (by occupation) only: 15-34, 35-59. Percentages for all age groups would sum to 100. Recorded for one age group (by industry).

Occupation		Duration of Residence 1 year	1-5 years
All Production Workers	15-34	76	80
	35-59	21	19
(Tot. ages		100	100)
(Number		5525	22615)
Spinners & Weavers	15-34	72	79
	35-59	25	20
Tailors	15-34	86	81
	35-59	12	16
Metal Workers	15-34	81	82
	35-59	18	16
Tool Makers	15-34	84	82
	35-59	15	17
Carpenters	15-34	76	79
	35-59	21	20
Bricklayers	15-34	79	77
	35-59	17	20
Other	15-34	79	78
	35-59	17	20

Industry		Duration of Res. 1 year	1-5 yrs
All Manufacturing	15-34	74	79
(Tot. ages		100	100)
(Number		4320	20070)
Textiles	15-34	72	78
Metal Products	15-34	86	85
Wood Products	15-34	78	78
Construction	15-34	76	72
Retail Trade	15-34	68	72
Not Described	15-34	69	75

Sources: Derived from Government of India, Census of India 1961, Gujarat, Special Migration Tables for Ahmedabad City, Delhi, Tables 4 and 5.

Table 5.3

Age Structure and Literacy by Occupational Groups among Migrants to Cities

City[a] (1961 population)	% of Male Working Migrants: i aged 15-34	ii 3 years since arrival	iii as production workers (numbers)	Male migrants in Production work: % of textile workers: aged 15-34	(illiterate)	% of tailors aged 15-34	(illit.)
CALCUTTA (2927289)	50	11	26 (273170)	63	(27)	57	(29)
HOWRAH (512598)	51	17	41 (74611)	57	(55)	72	(63)
ASANSOL (103405)	49	13	23 (8093)			52	(27)
BURDWAN (108224)	35	13	15 (4524)			58	(32)
GAYA (151105)	45	31	14 (3722)	62	(40)	61	(57)
PATNA (363700)	54	31	14 (12201)			52	(23)
JAMSHEDPUR (291791)	44	18	42 (42467)				
RANCHI (122416)	54	43	14 (4069)	49	(23)		

Table 5.3 continued

	% of Male Working Migrants:			Male Migrants in Production work			
	i aged 15-34	ii 3 years since arrival	iii as production workers (numbers)	% of textile workers: aged 15-34	(illiterate)	% of tailors aged 15-34	(illit.)
DURG T.G. (133230)	62	51	43 (30967)				
BHOPAL T.G. (222948)	53	44	31 (21472)	59	(32)		
BARODA (295144)	49	27	22 (15850)	53	(30)	54	(11)
AHMEDABAD (1149918)	45	18	41 (137110)	46	(39)	58	(19)
GT BOMBAY (4152056)	53	17	36 (624625)	57	(38)	62	(19)
THANA (101107)	51	34	27 (10642)	69	(28)	63	(13)
ULHASNAGAR (107760)	52	10	26 (10473)	83	(20)	74	(58)

Table 5.3 continued

	% of Male Working Migrants: i aged 15-34	ii 3 years since arrival	iii as production workers (numbers)	Male Migrants in Production work: % of textile workers: aged 15-34	(illiterate)	% of tailors, aged 15-34	(illit.)
NASIK (131103)	42	24	22 (7168)			51	(3)
NAGPUR (643659)	45	22	28 (43440)	39	(39)	56	(8)
POONA (597562)	44	21	23 (37434)	45	(38)	51	(17)
SHOLAPUR (337583)	39	21	42 (28588)	45	(59)	55	(19)

Notes: a-Municipality, unless otherwise stated. Figures for 1961. Small cells left blank.

Sources: Derived from Government of India, Census of India 1961, 1971, All-India General Population Tables, Table A IV; Relevant States, Migration Tables, Delhi, Table D IV.

Table 5.3 continued

	% of toolmakers:		% of electricians:		% of metal-workers:		% of chemical workers:		% of millers:		% of other labourers	
	15-34	(illit.)	15-34	(illit.)	15-34	(illit.)	15-34	(illit.)	15-34	(illit.)	15-34	(illit.)
CALCUTTA	61	(28)	64	(31)							55	(55)
HOWRAH	58	(41)			66	(58)					61	(69)
ASANSOL	73	(17)	76	(13)					49	(38)	63	(50)
BURDWAN	65	(32)							59	(59)	51	(58)
GAYA	62	(30)	64	(6)					56	(52)	54	(41)
PATNA	65	(15)	71	(10)					54	(28)	63	(69)
JAMSHEDPUR	48	(8)	45	(6)	37	(13)					54	(46)
RANCHI	68	(13)	73	(8)							60	(60)
DURG	83	(10)	86	(13)	84	(26)					72	(70)
BHOPAL	70	(12)									64	(81)

Table 5.3 continued

	% of toolmakers: 15-34	(illit.)	% of electricians: 15-34	(illit.)	% of metal-workers: 15-34	(illit.)	% of chemical workers: 15-34	(illit.)	% of millers: 15-34	(illit.)	% of other labourers: 15-34	(illit.)
BARODA	70	(12)			66	(38)	75	(13)			53	(47)
AHMEDABAD	62	(25)			66	(36)					62	(68)
GT BOMBAY	65	(19)	69	(9)	59	(34)	61	(29)	63	(49)	61	(55)
THANA	75	(11)	72	(5)	68	(28)	78	(33)	61	(42)	62	(55)
ULHASNAGAR	75	(15)	83	(3)	77	(44)			51	(31)	62	(24)
NASIK	57	(16)							54	(35)	46	(51)
NAGPUR	51	(14)	59	(10)	49	(34)	61	(18)	51	(31)	48	(57)
POONA	61	(17)	60	(7)	55	(46)	54	(28)	58	(28)	47	(59)
SHOLAPUR	50	(21)	54	(9)	48	(40)			42	(35)	47	(56)

Table 5.3 continued

	All Migrant Male Production workers: % aged 15-34	All Male Manufacturing workers: % migrant 1961	All Male Manufacturing workers: % migrant 1971		All Migrant (m) Production workers: % aged 15-34	All male Manufacturing workers: % migrant 1961	All male Manufacturing workers: % migrant 1971
CALCUTTA	58	67		BARODA	58	53	51
HOWRAH	59	74		AHMEDABAD	50	74	66
ASANSOL	68	59		GT BOMBAY	61	82	82
BURDWAN	56	60		THANA	66	83	87
GAYA	57	23		ULHASNAGAR	68	99	89
PATNA	60	35		NASIK	53	62	61
JAMSHEDPUR	49	85		NAGPUR	47	60	50
RANCHI	59	48		POONA	51	63	55
DURG	78	n/a		SHOLAPUR	46	50	30
BHOPAL	69	n/a					

Table 5.4

Age, Education, and Occupation among Migrants to the Durg Steel Town Area

Age Distributions (%) (male migrants 1961)
all durations

Furnacemen

		illiterates	literate but uneducated
0-14	00	00	00
15-34	84	77	83
35-59	15	22	17
60+	00	00	00
number 5090	100%*	100%*	100%*
		%illiterate 27.3	

*subject to rounding

Construction Workers

0-14	01	02	00
15-34	72	69	72
35-59	25	27	26
60+	03	02	00
number 2339	100	100	100
		%illiterate 51.4	

Electricians

0-14	00	00	00
15-34	86	79	84
35-59	14	20	16
60+	00	00	00
number 3069	100	100	100
		%illiterate 13.7	

Source: Derived from Government of India, Census of India 1961 Madhya Pradesh, Migration Tables, New Delhi, Table D IV.

Table 5.5

Sex Ratios in Industries in Bilaspur and Durg

Industry	Bilaspur District (urban) Sex ratio (f:m) of workers		Durg District (urban) Sex ratio of workers	
	Household	Non-household	House.	Non-house.
All workers (number in brackets)				
	0.795	0.257	0.595	0.193
	(m5010 f3984;	m37295 f9573	m3374 f2008;	m85138 f16454)
Tobacco	1.476	0.581	1.647	1.418
Construction	-	0.218	-	0.270
Cotton Textile	1.098	-	-	0.161
Misc. Textile	0.327	0.047	0.138	0.051
Leather Goods	0.336	0.260	0.281	0.221
Metal Goods	0.236	0.020	0.131	0.023

Source: Derived from Government of India, Census of India 1961, Madhya Pradesh, General Economic Tables, New Delhi, Table B IV C.

Table 5.6

Areas of Origin among Migrants to Steel Towns

	SUNDARGARH District Towns (Rourkela)	DURG TOWN Group (Bhilai)	BURDWAN District Towns[a] (Durgapur)	JAMSHEDPUR City	City of Burdwan (CONTROL)
TOTAL MALE WORKFORCE Numbers	59342	83566[b]	122185	88624	29326
Proportion Migrant	0.71	0.86	0.74	0.84	0.65
From within the District:					
Urban areas	0.06	0.01	0.03	0.02	0.03
Rural areas	0.08	0.11	0.13	0.09	0.10
From another State:					
Urban areas	0.20	0.17	0.08	0.11	0.04
Rural areas	0.18	0.41[c]	0.27	0.33	0.13
(the rest	0.19	0.16	0.23	0.29	0.35)

Notes to this section:

a excludes Asansol and Burdwan Cities; includes Burnpur Steel Town area.

b Total Male Population, and proportions thereof, throughout this column, (due to data limitations).

c Principal States of origin:
Andhra Pradesh
Maharashtra

Table continues......

Table 5.6 continued

	SUNDARGARH	DURG T.G.	BURDWAN	JAMSHEDPUR	Burdwan
MALE WORKERS in MANUFACTURING Numbers	19298	a	55655	51250	4760
Proportion Migrant	0.68		0.77	0.85	0.60
From within the District: Urban areas	0.07		0.03	0.02	0.03
Rural areas	0.04		0.13	0.07	0.08
From another State: Urban areas	0.37 Bihar West Bengal		0.08	0.12	0.04
Rural areas	0.08		0.30 Bihar	0.36 West Bengal Orissa	0.17
Total Proportion From Rural areas[b]	0.14	0.57[a]	0.50	0.59	0.31

Notes to this section: a workforce data n/a, only male population data.

b including intra-State migrants, not recorded above.

Source: Government of India, Census of India 1961, relevant States, Migration Tables, New Delhi, Table D VI for Orissa, Bihar, and West Bengal, Table D V for Madhya Pradesh.

Table 5.7

Areas of Origin among Steel-working Migrants to Jamshedpur

<table>
<tr><td></td><td colspan="2">Migrants from Outside the State of Bihar:</td><td>All Migrants</td></tr>
<tr><td></td><td>Rural Origin</td><td>Urban Origin</td><td></td></tr>
<tr><td>Number in Manufacturing</td><td>19815</td><td>5924</td><td>46225</td></tr>
<tr><td>Number in Iron & Steel</td><td>12383</td><td>3284</td><td>24473</td></tr>
<tr><td>Iron & Steel Migrant workers as % of Manufacturing Migrant workers</td><td>62%</td><td>55%</td><td>52%</td></tr>
<tr><td></td><td colspan="2">61%</td><td></td></tr>
<tr><td>States of Origin (order of importance)</td><td colspan="2">West Bengal
Uttar Prad.
Punjab
Orissa</td><td></td></tr>
<tr><td>Iron & Steel Migrant workers as % of all Migrant workers</td><td colspan="2">37%</td><td>31%</td></tr>
</table>

Source: Government of India, Census of India 1961, Bihar, Special Migration Tables for Jamshedpur, New Delhi.

Table 5.8

Secondary Education among Unclassified Labourers in Industrialising Cities (Migrants)

West Bengal	Proportion Matriculate	Maharashtra	
Burdwan	0.01	Thana	0.01
Asansol	0.05	Ulhasnagar	0.04
Howrah	0.01	Nasik	0.01
Calcutta	0.00	Sholapur	0.03
Bihar		Nagpur	0.01
		Poona	0.01
Gaya	0.06	Bombay	0.01
Patna	0.00	Gujarat	
Jamshedpur	0.05		
Ranchi	0.01	Baroda	0.00
Madhya Pradesh		Ahmedabad	0.01
Durg	0.01		
Bhopal	0.00		

Source: Government of India, Census of India 1961, Migration Tables, Delhi, Table D IV.

Table 5.9

Urbanward Migration in India: Comparison of two Censuses

Lifetime migration according to place of birth; numbers in millions, % decadal change in brackets

	Male 1961	Male 1971		Female 1961	Female 1971	
Rural to Urban	10.3	13.0	(26.2)	9.1	11.9	(30.8)
Urban to Urban	5.3	7.1	(34.0)	5.5	7.5	(36.4)
(Urban to Rural	1.8	3.0	(66.7)	3.0	5.1	(70.0))

Source: Government of India, Census of India 1971, Special Monograph No. 1, Birth-Place Migration, Delhi.

Table 5.10

Migration and Areas of Origin in Five States under Study: Contrasts between the Censuses

MAHARASHTRA	Urban Population Place of Birth (males) 1961	1971	
% born:			
In Same urban Area	45.4	51.1	
In Same District	10.3	9.4	
In Another District	20.2	18.6	
In Another State	21.4	19.2	
	100.0	100.0	

Distribution of Migration Streams (males)[b]	1961	1971
R-R	72	68
R-U	17	19
U-R	6	7
U-U	5	5
	100	100
Number:	6.5[a]	8.0
State Population Total Male:	20.4	26.1

a- millions

b-"ever-migrant"

Table 5.10 continued

	Urban Population Place of Birth (males)		Distribution of Migration Streams (males)		
	1961	1971		1961	1971
BIHAR					
% born:			R-R	80	77
In Same Urban Area	59.0	65.9	R-U	15	17
In Same District	14.2	10.2	U-R	2	2
			U-U	3	3
				100	100
In Another District	15.4	15.0	N.	2.9	3.1
In Another State	9.2	7.5	TP.	23.3	28.8
	100.0	100.0			
ORISSA					
% born:			R-R	84	83
In Same Urban Area	56.5	53.7	R-U	10	13
			U-R	2	2
In Same District	17.8	17.3	U-U	4	2
				100	100
In Another District	12.4	15.6	N.	1.3	1.9
In Another State	12.0	12.2	TP.	8.8	11.0
	100.0	100.0			
WEST BENGAL					
% born:			R-R	76	78
In Same Urban Area	43.3	62.7	R-U	15	11
			U-R	2	4
In Same District	6.1	3.5	U-U	7	5
				100	100
In Another District	9.3	6.7	N.	5.5	5.1
In Another State	23.0	15.1	TP.	18.6	23.5
	100.0	100.0			

Table 5.10 continued

	Urban Population Place of Birth (males)			Distribution of Migration Streams (males)	
	1961	1971		1961	1971
MADHYA PRADESH					
% born:			R-R	83	81
In Same Urban Area	55.6	61.0	R-U	11	12
			U-R	3	4
In Same District	11.9	10.7	U-U	3	3
				100	100
In Another District	12.3	11.9	N.	3.8	4.7
In Another State	16.6	14.1	TP.	16.6	21.4
	100.0	100.0			

Notes: [a] millions, and similarly for all rows N. and TP.

R = rural, U = urban

N. = Absolute number of male migrants

TP. = Total male population of the State

Source: Government of India, Census of India 1971, Special Monograph No. 1, "Birth-Place Migration", Delhi.

Table 5.11

Migration Flows between Growing and Stagnating Urban Areas in Bihar

Inter-District Urban-Urban Male Migration (cumulated to 1961)

Urban Origin	Urban Growth 1951-61 (%)	Gross Outflow (intra-State)	Urban Destination: PATN	GAYA	SHAH	MONG	BHAG	RANC	DHAN	SING
PATNA	30	11891	——	1427 (12.0)	828	1375 (11.6)	556	1086 (9.1)	1316 (11.1)	1285 (10.8)
GAYA	30	7365	1691 (23.0)	——	573	351	118	894 (12.1)	1229 (16.7)	939 (12.7)
SHAHABAD	28	5398	1858 (34.4)	364	——	215	140	414	604 (11.2)	552 (10.2)
MONGHYR	40	5799	1195 (20.6)	334	89	——	122	209	1019 (17.6)	621 (10.7)
BHAGALPUR	53	4509	662 (14.7)	163	86	799 (17.7)	——	178	288	266
RANCHI	62	3862	766 (19.8)	85	58	63	57	——	354	1451 (37.6)
DHANBAD	294	1465	127	44	45	74	10	248	——	292
SINGHBHUM	55	1455	228 (15.7)	11	30	65	30	403 (27.7)	367 (25.2)	——

Notes and Interpretation: Only those Districts in the Study Sample are included, but Gross Outflow Totals refer to all Districts in the State. As Districts are arranged according to approximate geographical proximity, if distance were the main determinant of migration, the largest outflows could be expected to lie close to the diagonal (which they do not). Outflows representing 10% or more of a total District outflow are indicated with % in brackets.

Source: Government of India, Census of India 1961, Bihar, Migration Tables, Delhi, (Appendix to D II with derivations).

Table 5.12

Migration Flows between Urban Areas in Orissa

Inter District Urban-Urban Male Migration (cumulated to 1971)

Urban Origin	Urban Growth 1961-71 (%)	Gross Outflow (intra-State)	Urban Destination: MAY	SUND	CUTT	BOL	BK	GANJ
MAYURBHANJ	41	1305	----	190 (14.5)	315 (24.1)	15	5	50
SUNDARGARH	70	990	30	----	110 (11.1)	65	10	80
CUTTACK	47	9720	195	1180 (12.1)	----	250	145	940 (9.7)
BOLANGIR	75*	2560	10	350 (13.7)	90	----	100	75
BAUDH-KH	221*	805	10	60	75	150 (18.6)	----	120 (14.9)
GANJAM	67*	12814	70	1215	2465 (19.2)	325	664	----

Notes and Interpretation: see Table 5.11

* These Districts had slow growth rates over the 1951-61 decade.

Source: Government of India, Census of India 1971, Orissa, Migration Tables, Delhi, Appendix.

Table 5.13

Sex Ratios among Recent Migrants

	Census 1961 (f:m) Duration 1 year	1-5 years	NSS (f:m) Current
Rural-Urban	0.622	0.721	0.496
(number of males)	(1506)[a]	(3322)	(3916)
Urban-Urban	0.816	0.911	0.999
	(792)	(1791)	(2480)

Note: [a] Census figures in thousands

Sources: NSS - National Sample Survey (see Table 5.1)

Census - Government of India, Census of India 1961, Migration Tables, Delhi, Table D II.

Table 5.14

Secondary Education by Occupation: Developments between the Censuses, Bihar

		Urban Males - Occupational Groups: proportion with Secondary education only								All workers: Proportion Literate
		Profess-ional	Admin-istrative	Clerical	Sales	Service	Farmer	Product-ion*	Residual	
PATNA	1961	0.24	0.25	0.43	0.08	0.04	0.02	0.04	0.20	0.68
	1971	0.32	0.28	0.47	0.17	0.07	0.04	0.08	0.15	0.71
GAYA	1961	0.20	0.25	0.40	0.05	0.03	0.02	0.04	0.19	0.64
	1971	0.34	0.38	0.52	0.13	0.06	0.01	0.07	0.06	0.63
RANCHI	1961	0.28	0.32	0.47	0.12	0.05	0.08	0.04	0.15	0.72
	1971	0.25	0.30	0.46	0.19	0.09	0.08	0.18	0.20	0.78
DHANBAD	1961	0.30	0.26	0.50	0.08	0.03	0.01	0.06	0.17	0.55
	1971	0.32	0.37	0.53	0.17	0.06	0.03	0.09	0.11	0.56
SINGHHUM	1961	0.31	0.26	0.56	0.09	0.03	0.03	0.12	0.17	0.70
	1971	0.30	0.28	0.58	0.17	0.07	0.06	0.22	0.11	0.74

* see continuation for further breakdown of production workers

Table 5.14 continued

		Production Workers: Miners	Transport workers	Rest
PATNA	1961	-	0.09	0.03
	1971	-	0.06	0.09
GAYA	1961	-	0.12	0.02
	1971	-	0.08	0.06
RANCHI	1961	0.05	0.08	0.04
	1971	0.14	0.07	0.20
DHANBAD	1961	0.01	0.18	0.07
	1971	0.04	0.12	0.15
SINGHBHUM	1961	0.04	0.16	0.12
	1971	0.13	0.14	0.27

Notes to this section: Occupational Codes as follows:

	1961	1971
Miners	5	71
Transp	6	86 & 98
Rest	7 & 8	rest of 7,8 & 9

Notes: Occupational categories were changed between the Censuses: compatible re-grouping has been attempted.

Source: Government of India, Census of India 1961, 1971, Bihar, General Economic Tables, Delhi, Table B VI.

Total Male Population: Prop. Literate in State

1961	0.30
1971	0.31
1981	0.38

Additional Source: Census of India 1981, Paper - 3.

Table 5.15

Secondary Education according to Industrial Employment:

Developments between the Censuses, Madhya Pradesh

Urban Males - Industrial Divisions: proportions with Secondary Education only

		Household Industry	Factory Industry	Trade & Commerce	Transport & Communications	Other Services	All workers: Proportion literate
DURG (contains BHILAI)	1961	0.01	0.19	0.09	0.13	0.13	0.66
	1971	0.08	0.27	0.19	0.20	0.23	0.72
BILASPUR	1961	0.00	0.04	0.08	0.22	0.15	0.72
	1971	0.06	0.14	0.18	0.34	0.26	0.73
SEHORE (contains BHOPAL)	1961	0.01	0.13	0.07	0.13	0.20	0.61
	1971	0.04	0.28	0.17	0.24	0.27	0.71
BASTAR	1961	-	0.03	0.12	0.13	0.19	0.72
	1971	0.01	0.06	0.13	0.15	0.23	0.65

Notes: In 1971 part-time workers were omitted, hence students are likely to be omitted from all categories, but especially Other Services.

Sources: Government of India, Census of India 1961, 1971, Madhya Pradesh, General Economic Tables, Delhi, Table B III A ; Census of India 1981, Paper - 3.

Total Male Population: prop. Literate in the State

1961	0.27
1971	0.33
1981	0.39

Table 5.16

Migrant Origin According to Place of Birth and Place of Last Residence

1971 Number of outmigrants from Urban Areas (in millions)

		Males	% difference between PB & LR	Females	% difference between PB & LR
To rural or urban areas in:					
Same District	PB	5.9	8.5	7.5	8.0
	LR	6.4		8.1	
Another District	PB	7.2	2.8	6.9	2.9
	LR	7.4		7.1	
Another State	PB	6.4	3.0	4.5	2.2
	LR	6.6		4.6	

Notes: PB - place of birth

LR - place of last residence

Source: Government of India, Census of India 1971, Special Monograph No. 1, "Birth-place Migration", Delhi, (and derivations).

Appendix 5.1

Statistical Analyses

Appendix 5A. The Regression to Explain Female Migration

The following was obtained from 29 observations of the Study Sample of Urban District areas in Eastern India:

Female migrants of less than one year's duration = -96* + 0.32*male migrants of less than one year's duration

+ 0.17*male migrants of 1-5 years duration

- 0.062 male migrants of 6-10 years duration.

$R^2 = 0.32$

- 0.062 male migrants of 6-10 years duration.

$R^2 = 0.32$

* sign. 0.05

Average unweighted data from the

male migration rate (current) 6.74% sex ratio current migrants — 0.644 (f:m)

sex ratio population (urban) 0.802

average male migration rate over previous 5 years (1-5 duration) 3.12% sex ratio of migrants (1-5) 0.747

Note: see Figure 1.1 for sample.

Appendix 5.B Statistical Analysis of Male Migration Patterns. Discussion on Methodology

Strict random sampling has not been undertaken for either the City sample or the Homogeneous District sample. Hence the validity of variance analysis and significance testing is open to question. The City sample was chosen in such a way as to maximise the contrasts in the industrial and occupational characteristics of the populations. The District sample on the other hand is distorted only in the sense that only those Districts were included that fulfilled our requirements of homogeneity, or contained a City of 100,000 people or more (as explained in the Appendix to Chapter 1). This distortion is not so serious. But in addition it must be remembered that our study region focuses on an area of heavy industrialisation, and hence is not representative of All-India.

The employment patterns we observe are a product of both supply of and the demand for labour. A simple supply function would be such as is illustrated in Figure 5B.4(a). In any particular District the demand for non-agricultural labour would shift rightward depending in particular, we would postulate, on the size of the manufacturing sector in general and the size of the heavy industrial sector in particular (for these together have spearheaded the non-agricultural growth in our region and our period, whereas expansion in commercial activities has tended to follow rather than lead that growth). Demand on this scale would soon exhaust the supply of local labour at low wage levels, so that the same analysis extends to other Districts in the same State, and to other States (Figure 5B.4(b)). If we disaggregate further, we postulate that the demand for labour of specifically urban origin would also shift rightward (Figure 5B.4(c)), depending on factors related to the character of the industry in the District(i); we have postulated that a rightward shift occurs if high levels of education are required in manufacturing industry, and, in the extreme, that no shift occurs if they are not, or if the potential malleability or docility of a rural workforce is actually preferred, (this consideration also might determine the shift to other States of origin, in addition to insufficient supply). It is postulated that the latter considerations will tend to dominate more in the case of heavy industry (in basic metals production and engineering) than in manufacturing generally: there will be more rural labour and it will be from further afield.

We throw some light on these hypotheses by observing the size of the correlation coefficient (Spearman's "r") and the significance (and value) of regression coefficients qualifying variables that can be derived from the Census data. These variables amount to: the male labour force engaged in manufacturing, and, of that, the component in heavy engineering; the proportion of the labour force that is migrant, and those from other States by birth, and the component that comes from urban areas (again by birth); for the City sample we have data on the literacy of migrants.[1] How shifts in labour demand just described will affect the expected correlations between these variables is illustrated in Figure 5B.4(d). It is hypothesised that there will be more migration if there is more manufacturing industry in the urban economy, and there will be more migration from far afield in this case, and especially if there is heavy industry; there will be more migration from urban areas if there is manufacturing industry, but heavy industry may promote the use of rural labour; and urban migration will be associated with literacy.

The greatest risk with this methodology is that the assumption of identical supply functions in each District or each State may not hold good. For within these aggregate supply functions there will be different components of

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1 It has been necessary to exclude Madhya Pradesh from some of the tests due to a peculiar data deficiency in the publication of the 1961 Census volumes on migration for this State.

labour from different backgrounds, more Backward Classes in some local areas than in others for instance, and perhaps more developed information networks in some areas. If these supply schedules are not similar, then our observations on changing composition of the labour actually employed are not based on the changing composition of demand alone, but also on the changing composition of supply. Estimation of coefficients becomes impossible. Worse still, the supply schedules, if not similar, may not be independent of demand, in that better information networks, for instance, may exist in areas of heavy industry, in which case the coefficients in the equations we estimate will be biased. The root of these difficulties is the identification problem (and the possible bias is illustrated in the model in Figure 5B.4).

The other problem of interpretation is that of the "ecological fallacy". Just because manufacturing towns are associated with long distance migrants does not mean that manufacturing migrants themselves come from long distances, or, if they do, that they alone do so. Where possible the actual industrial employment of the migrants themselves is considered in the tests; the possibility that manufacturing and non-manufacturing migrants come from similar origins arose in the course of analysis, giving rise to further tests also reported below.

Finally we should not wish to attach too great a significance to the predictive value of the intercept in the regression. We have too few observations close to the origin (i.e. in the range of 10% of workers in manufacturing for instance) to be confident how any relationship may behave in this region: the assumption of linearity may simply break down. We cannot confidently say, therefore, if the intercept suggests that 20% of workers are migrant (when there is no manufacturing), that this represents exogenous supply, that is those subject to rural push factors or urban natural increase alone.

Analysis: the following correlations can be reported:

	Correlation Coefficient
The proportion of workers[a] in manufacturing by the proportion of workers of urban origin	-.635 (D) -.572 (C)
The proportion of manufacturing workers in heavy industry[b] by the proportion of workers of urban origin	-.445 (D)
The proportion of workers in manufacturing by the proportion of migrants of urban origin	+.379 (D') (Figure 5B.3)
The proportion of manufacturing workers in heavy industry by the proportion of migrants of urban origin	+.176 (D') (Fig. 5B.3)
The proportion of migrants in manufacturing by the proportion of migrants of urban origin	+.030 (C)
The proportion of migrants who are illiterate by the proportion of migrants of urban origin	-.310 (C) (Fig. 5.2)
Mean value of urban origin of migrants 35.6% (D) 28.5% (C)	

The growth rate of the urban population (male and female) by the proportion of workers in manufacturing	+.124 (D) +.148 (D')
The growth rate of the urban population by the proportion of manufacturing workers in heavy industry	+.579 (D) +.527 (D')
The growth of the urban population by the proportion of workers in heavy manufacturing industry	+.405 (D)

The proportion of manufacturing migrants from another State by the proportion of non-manufacturing migrants from another State	+.924 (D) (Figure 5B.2)
The proportion of manufacturing workers who are migrant by the proportion of non-manufacturing workers who are migrant	+.832 (D) (Figure 5B.1)

Notes: a The male population is referred to throughout unless otherwise specified. "Migrants"="Working men".

D This is the "Homogeneous District" sample (Chapter 1 Appendix); Figure 1.1.

D' As D, but omitting Madhya Pradesh (see text above).

C This is the "City" sample (see Chapter 5 above): Figure 1.2.

b Manufacturing Industry excludes Household Manufacturing, and Heavy Manufacturing Industry includes rubber, petroleum, & coal products, chemicals and products, structural clay products & cement, basic metals & products, machinery, & transport equip.

A Summary

The new, largely manufacturing, areas derive their workforce from a predominantly rural background due above all to the small existing urban base in these manufacturing areas, making it impossible to recruit from the urban natural increase alone: this is especially true of heavy industry.

There is little clear determination of the origin, whether rural or urban, of the migrants themselves, but, by All-India standards, they are generally over-represented in the category of urban origin (i.e. more than 20% are from such origins). But although manufacturing areas have large proportions of migrants from urban areas, the migrants themselves in those cases are not particularly likely to be employed in manufacturing. And in the case of heavy manufacturing areas, there is virtually no association between the large numbers of heavy industrial workers in those areas and the urban origins of the migrants. Furthermore, manufacturing and non-manufacturing workers are highly correlated both in respect of migrancy and in the distance of that migrancy (i.e. proportion from another State). This suggests that migrants who are responding to a direct demand for manufacturing labour (that is neither met by natural increase in the towns, nor from within the same State) encourage the migration of others from the same origins to find employment in the trades and services sectors. An information network is thus established; (and this throws into doubt the true independence of the demand and supply schedules).

Analysis: the following regressions were undertaken:

% workers of urban birth = 71.2** -62.3** % workers in manufacturing (D) R^2.40

" = 70.6** -64.4* " (C) R^2.33

" = 66.0** -25.4* % manufacturing workers in heavy industry (D) R^2.20

% migrants of urban birth = 29.2** +66.8(*) % workers in manufacturing -4.3 % manufacturing workers in heavy industry (D) R^2.16

% migrants of urban birth = 48.6** -120.5(*) % migrants who are illiterate +38.5 % migrants in manufacturing (C) R^2.16

Mean value of urban origin of all workers: 57% (D)
Mean value of urban origin of all migrants: 36% (D)

% workers who are migrants from other States = 40.1 +77.4** % workers in manufacturing (C) R^2.66

% migrants who are from other States = 84.0(*) +59.6* % workers in manufacturing +18.2(*) % manufacturing workers in heavy industry (D') R^2.55

% migrants who are from other States = 18.5** +102.2** % workers in heavy manufacturing (D') R^2.49

Notes: as for correlations above, and
** significant at level .01
* significant at level .05
(*) significant at level .10

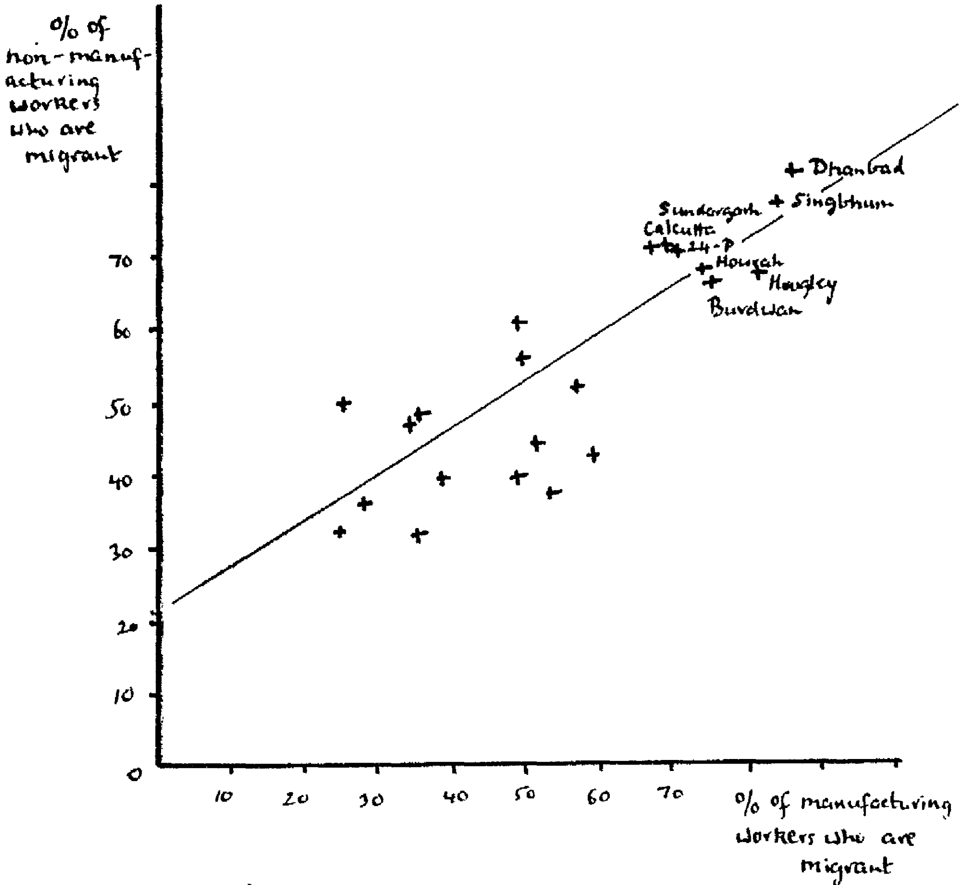
Summary

The significance of manufacturing industry as a determinant of rural migration to urban areas in our region is confirmed, with a suggestion that it is chiefly heavy manufacturing that accounts for this, and that other manufacturing would be as likely to acquire recruits from urban centres, particularly if literacy were required. Manufacturing is also significant in promoting long-distance migration, and again this is probably more likely if the manufacturing is heavy. The reliable coefficients have values (indicating elasticites) of between $\frac{2}{3}$ and 1: for example, if one doubled the proportion of heavy industry in employment in a town, one would double the proportion of migrants from other States, and if one doubled the proportion of manufacturing in general, one would reduce the urban-born proportion of the workforce by about two-thirds (through vastly increasing migration generally, not through selecting rural migrants specifically, except perhaps in the case of heavy industry). If there was little manufacturing, and hence little migration, it seems that over two-thirds of the work-force would be urban-born (mainly within the same town) but that a small proportion would still be migrant from rural areas (as one would expect in poor agricultural areas like parts of Bihar): but we argued above that the constant terms are not quantitatively reliable. Finally it must be remembered that our interest is on the demographic effects of industrialisation: we do not wish to argue that all demographic effects are due to this cause, and indeed in our regressions only between $\frac{1}{3}$ and $\frac{2}{3}$ of the dependent (demographic) variable's squared variation is explained by the manufacturing component in the Districts' urban areas. The strongest single conclusion is that heavy industry has promoted inter-State migration.

It should be clear from elsewhere in this study that migration is regarded as an important social phenomenon in itself. It is the uprooting of a way of life, whether temporarily or permanently, and, with the ageing of the migrants, often irrevocably. But migration is also symptomatic of other social phenomena: it has been suggested that migrants from urban origins, migrants from distant origins, and migrants from local origins, may fall into three fairly distinct social groups in terms of education and other assets. A completely new data set would need to be created in the field, to examine the relationship between industrialisation and these more definitive categories. Hopefully we have at least pointed interested researchers and census takers in that direction.

Figures 5B.1 to 5B.3

The Relationships between Migrants, their Origins, and Manufacturing Industry: evidence from the urban Districts



5B.1↑
5B.2↓

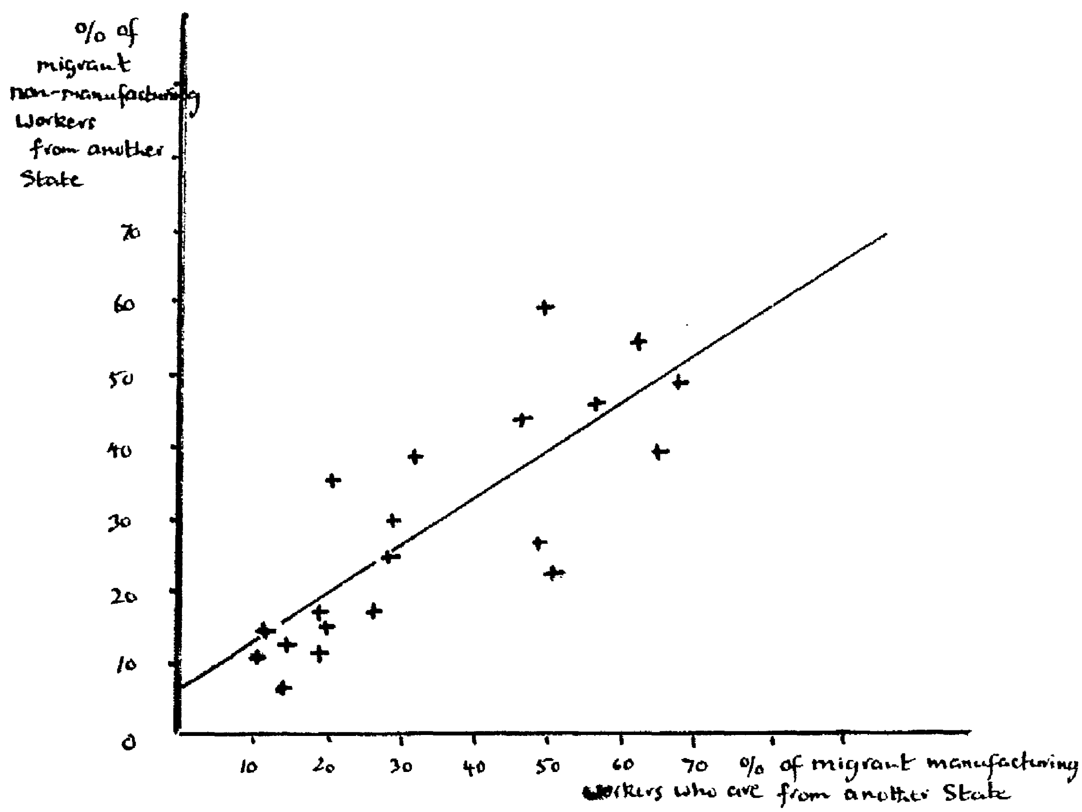
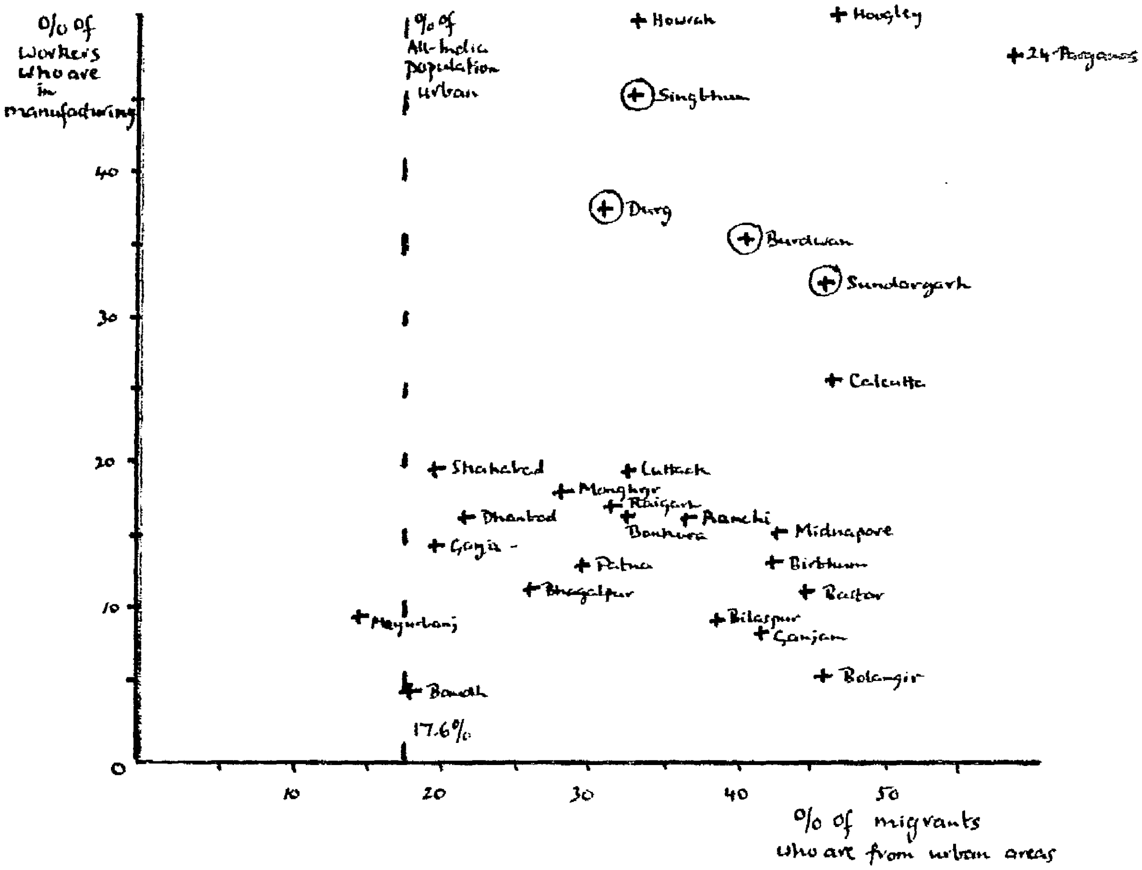


Fig. 5B.3

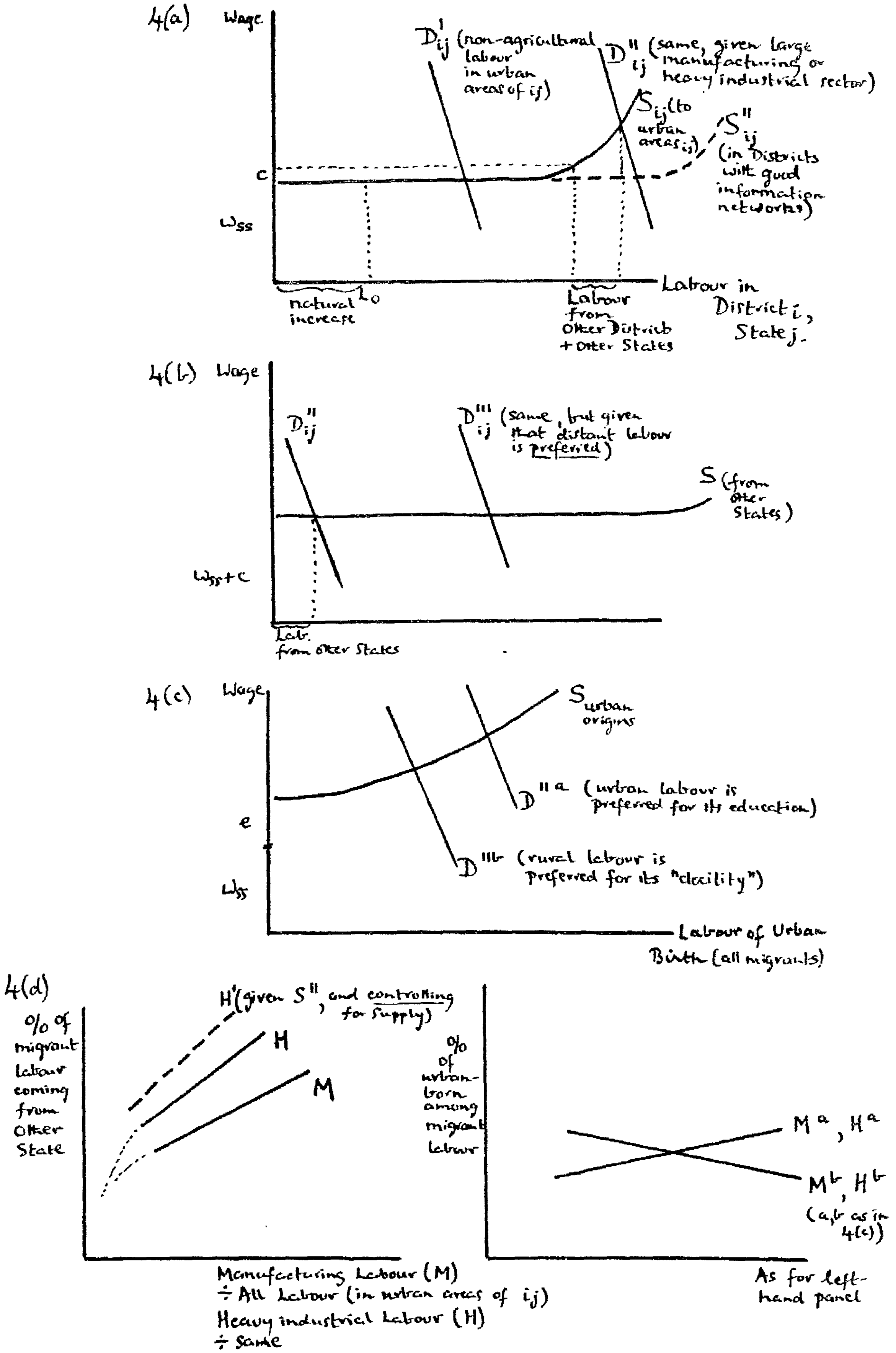


(note: Steel-town areas encircled)

Source: refer to Appendix; see also Tables 5B 1 and 2 following.

Figure 5B.4

The Migrant Labour Model



Key to undefined parameters: w_{ss} = subsistence income. c = costs of migration, c = 0 within ij, c = constant for all other origins. e = educational premium + c.

Table 5B.1

Origins of the Migrant Men to Urban Areas of Eastern India, 1961

Column A: Proportion from each origin, Same District, Other District, Other State; column sums to 1.00

Column B: Proportion from Urban origin in each row; weighted average given at foot of column

WEST BENGAL		A	B
Calcutta	SD	-	-
	OD	0.27	0.25
	OS	0.73	0.41
			0.37
Howrah	SD	0.18	0.33
	OD	0.20	0.35
	OS	0.62	0.12
			0.20
24-Parganas	SD	0.25	0.42
	OD	0.24	0.43
	OS	0.52	0.23
			0.33
Hoogley	SD	0.15	0.38
	OD	0.27	0.45
	OS	0.58	0.18
			0.28

Burdwan*	SD	0.30	0.21
	OD	0.20	0.62
	OS	0.49	0.25
			0.31
Birbhum	SD	0.41	0.17
	OD	0.34	0.36
	OS	0.25	0.20
			0.24
Bankura	SD	0.56	0.11
	OD	0.27	0.43
	OS	0.17	0.35
			0.24
Midnapore	SD	0.51	0.32
	OD	0.22	0.35
	OS	0.27	0.31
			0.32

E.MADHYA PRADESH		A	B
Durg*	SD	0.27	0.11
	OD	0.13	0.44
	OS	0.61	0.31
			0.28
Bilaspur	SD	0.44	0.12
	OD	0.21	0.45
	OS	0.35	0.53
			0.33
Raigarh	SD	0.33	0.11
	OD	0.30	0.29
	OS	0.37	0.41
			0.27
Bastar	SD	0.31	0.14
	OD	0.23	0.58
	OS	0.46	0.46
			0.39

* For within-District details see Table 6.5

Table 5B.1 continued

BIHAR		A	B			A	B
Patna	SD	0.39	0.26				
	OD	0.49	0.20				
	OS	0.12	0.56				
			0.27				
Gaya	SD	0.62	0.08				
	OD	0.29	0.25				
	OS	0.09	0.47				
			0.17				
Singbhum: Jamshedpur				Other urban areas in Singbhum			
	SD	0.16	0.15		SD	0.31	0.37
	OD	0.27	0.20		OD	0.25	0.28
	OS	0.57	0.15		OS	0.43	0.33
			0.16				0.33
Ranchi City				Other urban areas in Ranchi			
	SD	0.28	0.16		SD	0.46	0.20
	OD	0.43	0.35		OD	0.35	0.28
	OS	0.28	0.52		OS	0.19	0.47
			0.34				0.28
Dhanbad							
	SD	0.11	0.31				
	OD	0.54	0.11				
	OS	0.30	0.25				
			0.17				
Monghyr							
	SD	0.50	0.19				
	OD	0.35	0.25				
	OS	0.12	0.48				
			0.28				
Shahabad							
	SD	0.56	0.13				
	OD	0.25	0.24				
	OS	0.17	0.33				
			0.19				

Table 5B.1 continued

		A	B
ORISSA			
Cuttack	SD	0.55	0.29
	OD	0.30	0.29
	OS	0.13	0.50
			0.31
Mayurbanj			
	SD	0.49	0.05
	OD	0.28	0.20
	OS	0.20	0.23
			0.13
Bolangir	SD	0.54	0.38
	OD	0.31	0.49
	OS	0.14	0.68
			0.45
Ganjam	SD	0.46	0.35
	OD	0.23	0.43
	OS	0.30	0.50
			0.41
Baudh Khondmals			
	SD	0.39	0.00
	OD	0.55	0.26
	OS	0.05*	0.52*
			(0.17)
Sundargarh			
	SD	0.27	0.34
	OD	0.18	0.39
	OS	0.55	0.51
			0.44

*small numbers

Source: Government of India, Census of India 1961, (relevant States), Migration Tables, Delhi.

Table 5B.2

The Urban Origins of the Urban Workforce

	% of Total Male Workers who were born in an Urban Area	% of Total Male Workers who were born in another State	Ratio of Urban to Rural among Male Workers born in another State
WEST BENGAL			
24-Parganas*	42.4	26.0	0.26
Calcutta	40.1	31.1	0.23
Howrah*	39.6	41.2	0.12
Hoogley	39.5	39.8	0.20
Burdwan*	44.5	30.9	0.31
Birbhum	51.8	15.3	0.24
Bankura	67.5	6.7	0.45
Midnapore	65.2	11.5	0.33
BIHAR			
Patna	64.3	5.3	0.91
Gaya	71.1	3.4	0.72
Shahabad	66.1	7.8	0.38
Bhagalpur	73.8	3.8	0.70
Ranchi*	61.4	13.7	0.81
Dhanbad*	27.2	24.4	0.25
Singbhum*	36.5	40.7	0.36
Monghyr	74.0	4.1	0.70
ORISSA			
Ganjam	71.9	17.2	0.90
Sundargarh*	61.9	38.3	1.08
Cuttack*	71.2	55.5	1.00
Majurbanj*	48.0	15.0	0.26
Bolangir	70.7	7.0	2.48
B-K	62.9	2.9	0.78

Note:* 1951-1961 decadal increase in urban population over 50%
Source: Government of India, Census of India, 1961, (relevant States), Migration Tables, Delhi

A brief Overview of Chapter 5

From this Chapter we can say that migrant origins, near or afar, rural or urban, and migrant age and sex composition, are all in part the result of recruitment strategy; these factors reduce further the ability of future labour markets to equilibrate supply and demand in rapidly growing towns of the present, due to the resultant inflexibility (barring major outmigrations) in future labour supply. Indirectly at least the new growth areas contribute to the loss of urban population in the stagnating areas.

CHAPTER 6

The Region of Eastern India's Industrial Belt: Demographic Structure and its Development over Time

Empirical Overview

The short-run evolution of our Eastern Region of India is looked at in dynamic demographic terms over the 1961 - 1971 decade: comparisons and contrasts with the predictions of the models are noted. Two or three points of some importance emerge: first the rapidity with which females become attached to the initial male migrants in the rapidly growing New-town areas (like the Steel Towns); secondly the large proportion of migrants that have arrived within the last twelve months (preceding 1961), especially in the more slowly growing mature towns, suggesting high rates of "turnover" migration; thirdly, even in a population like India's of moderate natural increase, the age structure developing in the most stagnant urban centres, with some of the characteristics of depressed localities (e.g. an increasingly old age structure), as currently experienced in England.

We also note how the lowest caste groups among migrants (probably of local origin) have failed to penetrate the manufacturing sector in the newly industrialising areas, and are well represented in the stagnating towns and in mining areas. Finally we note that the rise in the proportions of, for example, migrant Biharis in developing areas of West Bengal is largely attributable to family formation, not to continuing male migration in response to industrial demand, and is unlikely therefore to become a significant phenomenon.

Interpretation of the Demographic Structure and its Development

In Chapter 1 we gave an account of the 1951-71 period of industrialisation and subsequent stagnation, and of its demographic manifestation, in an overview of urbanisation in the Eastern region of India characterised as the Chota Nagpur Crescent. We now proceed to fill in some of the demographic detail. To anticipate slightly, we will find some guide to an interpretation of that detail by looking back at the simulation models, though that of course must not prevent us from challenging the sacrosanctity of the model; rather, a dialectic should occur: let the model help us interpret the facts, and the facts help us question the model.

To start in the East of the Study region, the Districts of West Bengal are dominated by the urban agglomeration of Calcutta, and Calcutta is in some ways unique. The central District, Calcutta City, grew very slowly down to 1951, and almost stopped growing at all after that date. Yet the rate of gross inmigration, recorded as 3.0% in the last year before the 1961 Census, was about 4 times higher than the overall population growth rate, an annual average of less than 0.8%, (Table 6.2). Calcutta's growth fits between our "Zero Base" Model and our Model "3", and in the former the net migration (that is gross in-migration minus gross out-migration) was 0% while in the latter it was -3% per annum. Since the (arithmetic) average recorded gross in-migation for the previous five years was also around 3% (net of mortality) the implication would, at first sight, seem to be that there have been fairly heavy rates of out-migration.[1] Furthermore, the gross

1 The data I have recorded from the Census rely upon correct recall of time of entry. They are also deficient as an estimate of annual gross in-migration in that those who have entered the city and subsequently died before the Census are excluded: this error clearly compounds the further back in time the entry occurred. In-migrants who stay less than the reference period used in recall (whether 1 year or 6 years) are similarly unrecorded. In Table 6.2 I have computed the recorded gross migrations as proportions of the Census population (expressed as annual averages). Where the gross in-migration is an annual average of the recorded migration from 1 - 5 years prior to the Census, the correct population to use as a denominator would be that estimated 3 years prior to the Census. The bias in not doing so is only acute if rapid rates of growth are experienced per annum. We can illustrate with an example: suppose the urban population is 100 thousand in 1951, 200 thousand in 1956, and 400 thousand in 1961, i.e. doubling every five years.

in-migrant stream is more heavily dominated by males than was the case in our Model (see Tables 6.2 and 6.1a), and this must have been equally true in the past, since the overall sex ratio (f:m) is at most $\frac{2}{3}$rds what it would be in a steady migration model at this low level of growth.

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footnote continued

Decadal growth is 300%, average annual (compound) growth is 15%, 2% of which we assume to be natural increase. Then the 1961 population would have reached 220 thousand due to natural increase alone since 1956, and the rest of the quinquennial growth (200 - 20 = 180) would have been due to net in-migration. Ignoring mortality and out-migration and assuming accurate reporting, 180 of the 1961 population would claim to have migrated over the last 5 years, an arithmetic average of 180 ÷ 5 = 36 thousand per annum. Expressed as a percentage of the 1961 population this gives a gross migration rate of 9%. Expressed as a percentage of the 1956 population it gives a growth rate of 18%. And we know the real rate is 15% - 2% = 13%. In the text I assume a natural increase of about 2%. Hence, in this illustration, if the last year's reported migration rate was 13% and decadal growth was 300% we would argue there was approximately 0 gross out-migration. If the reported rate had been 15% (and the past five years average 11%) we would have surmised an approximate rate of outmigration of 2%, and so on. This methodology serves perfectly adequately for the kind of qualitative comments we wish to make.

But this characteristic gives the City's central District very few children, well below the replacement of the labour force (7.2% of the male population is aged below 5, in contrast with 14.9% in the moderate growth Model "2" for instance, Table 6.4).[1] Such a low birth rate, as implied by such a low child-population ratio, indicates that net migration may be higher than we thought, gross migration being less. For instance, in the extreme, natural increase could be 0, gross in-migration $3\frac{1}{2}$%, and gross out-migration about 3% per annum. The continuing stagnation in demographic growth of the following decade (an annual average of less than 0.8%) implies continuing large outward flows, unless there has been a sharp decrease in inward flows, or alternatively ageing population and increasing death rate, (see Table 6.4 for the potential future ageing of Calcutta's population). The problem of economic support for this dependent population in a very poor economy will be discussed later. An inner City demographic problem of this nature and on this scale is virtually unique in India, though it may well be the writing on the wall for other great Cities still in their

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1 We always have to assume that child mortality is not dramatically worse than in the Model.

prime. Bombay may be a case in point.

Taking the Calcutta Metropolitan area as a whole (included in the Districts of Hoogley, Howrah, and 24-Parganas), the City flourished, then declined, in our period. Howrah, similarly, had low sex ratios, but in contrast, there is clear evidence of higher net in-migration here (the growth rate of 4.7% per annum is twice the likely rate of natural increase of between 2.2 and 2.5%). High in-migration with moderately skewed sex ratios would explain the low birth rate implied by the relative size of the 0 - 4 cohort, as indeed in the Model (Tables 6.1 and 6.2). This could be predicted to improve marginally, given a slow-down in migration and equalisation of the sex ratios, though, as we have argued above in Chapter 5, we do not know with much precision what determines the sex ratio of migrants, and the relatively favourable ratio of the latter experienced in Howrah in 1961, in marked contrast with the District of Calcutta, would seem at odds with its overall sex ratio (and its somewhat depressed implied birth rate).

By contrast again, 24-Parganas and Hoogley Districts had high female in-migration rates and population sex ratios (as compared with our Models) with 24-Parganas, however, heading in the reverse direction by 1971: the latter development would be consistent with increasing "turnover" migration, that is in-migration of less than one year's duration (for in "turnover" migration male migrants always tend to predominate, as families are only formed with settlement). It might be added that of the three non-central Districts of the City, Hoogley seems to provide most female employment, which may be an added attraction to female migrants (Table 6.3). A further interpretation of these high female to male sex ratios might follow from the consideration that the largest City is a refuge in times of decreasing prosperity, and the outskirts are entered first if you come by road. During the 1961-71 decade the general slow-down in economic growth and crop failures in the late 1960s may have driven complete families (men and women) into the City. But Hoogley District does not share equally with 24-Parganas in that characteristic. Both start from a position in 1961 where 10% of the male population is under five, equally low for both. But the implications for the two areas from there on are divergent. Hoogley with increasing sex ratios in 1971 is destined to add to its burden of youthful dependency (and, ceteris paribus, to overfulfil its labour requirements in the future), and 24-Parganas with decreasing sex ratios in 1971 faces the reverse consequences. The disbalance could induce intra-City migration, though labour markets do not necessarily equilibrate in this simple fashion.

From the unique City of Eastern India we should proceed to a more representative view of the empirical evidence of the types that are underlying this analysis. We have grouped the Districts according to their similarity with the various simulations (Table 6.1b): Model "1" heavy immigration, "2" modest in-migration, "Base" or "3" stagnation or net out-migration, (Table 3.1 for further details). Focussing still on West Bengal, we see that the iron and steel producing and engineering District of Burdwan approximates the sex ratios we would expect (for Model "1") though still we notice too many women and too few children. We will comment on this later. The migration rates (gross in-migration of 4.5% and overall growth of 5.6% and average in-migration of 2.9% over the previous 5 years suggests little "turnover" migration)[1] imply little out-migration of any kind;

1 An estimate of "turnover" migration is obtained by comparing the migration rates recorded over the last 12 months with the annual average recorded over the previous 5 years. If the former exceeds the latter by a long way, out-migration of migrants who spend less than 5 years in the city areas is suspected.

the migrants are, we know (Chapter 5) more long-distant, less speculative, and rather more certain of jobs, (and this may also account for the high sex ratio among the recent migrants, despite the continuing growth of the area, in that they feel it safe to bring their wives sooner, reducing the lag between the male and female migration streams). The other heavy engineering towns are mainly in Bihar, in the Districts of Singbhum, Ranchi, and Dhanbad. The latter two are fast growing (Model "1") types (though in the case of Dhanbad the recorded migration rate over the previous 5 years is too low)[1]. In Ranchi, females were also migrating at a high rate, a fact not unrelated to the presence of the textile and pottery industries. The high level of youth dependency that will occur particularly rapidly in that District as a result during a period of rapid overall demographic growth may have serious implications for labour market competition and hence social harmony (issues discussed further in Part III of this study). Singbhum District falls only marginally into the Model "1" category, its continued more balanced growth, really characteristic of Model "2", being ..

1 In-migration rate over the previous year is given as 8.8%, and the average over the previous 5 years as 4.2%, taking the 1961 population as the denominator, whereas the growth rate of 294% over the decade would imply migration rates of 13.8% and 8.2% (with 1961 denominator), assuming a natural increase of 2%.

due to the more diversified structure of industry within Jamshedpur having prevailed over a longer period of time than in the new Steel Town areas. The high sex ratio of recent migrants may be evidence of low "turnover" or simply of the fact that the expansion in the Steel Town took place rather earlier than elsewhere, so that the peak male migration will have occurred earlier in the decade. Outside of Bihar and West Bengal the heavy industry is confined to Sundargarh in Orissa and Durg in Madhya Pradesh. The former qualifies as a case of "1 c", but again with more than the expected number of females present. This tendency is confirmed by the rapidly improving sex ratio over the decade. In Durg District the improvement in the overall population sex ratio is also faster than predicted, and the initial level of the ratio is again too high. The migrant sex ratio is lower than in Sundargarh, which is unexpected if male migration is slowing down, but Sundargarh is exceptional in the proportion of migrants coming from urban areas (see Chapter 5 above) and this will account for the higher proportion of women, since urban to urban migration streams always have high sex ratios. This concludes analysis of the heavy engineering areas in the sample; but it does not exhaust the instances of rapid urban growth, for Bilaspur District fits the "1 a" Model quite well and a well-established household industry in cigarette manufacture accounts for the presence of a large proportion of women and high sex ratios among migrants, in contrast to neighbouring Durg (see also Table 6.3). Mayurbanj is a peculiar case also of rapid growth, related to the installation of a power-generating plant in an almost "green" District.

Already by 1961 a number of urban localities had achieved the balanced demographic growth associated with a structure of mixed industry, or industry not so clearly subject to vast economies of scale (agro-processing industries being a typical case where fewer scale economies prevail). These resemble our "Base" or Model "2" type. Gaya and Patna Districts are typical of mixed industrial urbanisation. Their current in-migration rates are about ½ to ¾ too high (i.e. above the trend net rate implied by decadal growth), pointing to out-migration of fairly high proportions: annual growth is 2.7%, net migration will be between 0.5 and 0.7%, but gross in-migration is recorded as 4-5%, so that gross outmigration may be as high as 5% per annum. Heavy outmigration is to be expected, though it has not been quantitatively documented in the literature, in the diversified, but only moderately expanding , municipal localities, (and intra-State outmigration was documented here in Table 5.11 above); aspirations of in-migrants are simply not fulfilled. The samee feature of disappointment may yet become the norm in the currently fast-growing towns. Gaya has more women than might be expected: but it also has more employment opportunities for women, being without a heavy engineering industry, whereas Patna produces transport equipment among its manufactures. The implied birth rate is appropriately higher in Gaya, and that will be maintained into the 1970s given the relative stagnation of that locality. Cuttack in Orissa is of similar industrial structure, though textiles are a predominant sector here, and the demographic growth is rather faster. The contrast here lies in the high rate of recent migration (7.4%); given that the growth rate falls slightly and sex ratio rises slightly by 1971, it appears that very considerable "turnover" migration is being experienced (in support of which we may note the very low sex ratio among the current migrants, 440 to a thousand (women to men). The effect of this is to depress the numbers of children in the population, about 12% below age 5, as against the 13% to 15% expected, a proportion that will probably rise over time. Cuttack is on the borderline between our Model "1" and "2".

The more balanced towns whose basis of industry is the processing of agricultural materials are typically populated by more women (as in our "2 a" rather than "2 b" Model: Ganjam District, the rice-milling area in Orissa, similarly Birbhum and Bankura in West Bengal, and Monghyr District, the bidi manufacturing area in Bihar, all clearly have a higher female migration component than other areas of similar growth (Table 6.2), related to, if not determined by, their higher female employment ratios as compared to other Districts in the State (Table 6.3). This partly determines a higher overall sex ratio, which in turn determines the higher child-population ratios recorded for these areas (Table 4.3). This does not exhaust all the examples in our sample, but is sufficient to indicate the empirical patterns (and the relevance of our Model) in these particular growth categories.

To consider now the Model "3" or "Base" type urban areas, i.e. those that show signs of net out-migration (or at least lack of net in-migration), it is difficult to attribute demographic stagnation directly to industrial composition. With the obvious exception of Calcutta, those localities that failed to attract investment, or to enjoy the multiplier effect of investment elsewhere, were in the economic sectors of the processing and handicrafts industries (similar to those found in the more steadily growing urban areas of the Model "2" type). The lack of in-migration accounts for the high sex ratios. But the lack of the usual urban age-structural bias towar young men and women, associated with in-migration, should result in fewer children than would otherwise be expected; or so predicts the Model. Shahabad District in Bihar and Baudh-Khondmals in Orissa are among the examples; the latter is an extreme case of an out-migrating area, with overall growth under half what would be given, cet. par. by natural increase, (an annual growth of only 1%). The skewed age structure typical of an out-migrating area counteracts the sex ratio favourable to fertility, and births are therefore very depressed, (see Table 6.4 for the "hollow" in the adult male age distribution). The reported gross in-migration rate of nearly 2% indicates a balancing gross out-migration rate of 3.0% (if natural increase is 2.0%, or of 2.0% if natural increase is only 1.0%). The social implications of severely out-migrating localities (with no growth areas in proximity) are acute, especially in a country with few material welfare services provided from resources raised outside of the declining community itself. In the case of Baudh, the rapid change in prospects during the following decade will jack up the young population dramatically. The poor representation of complete Districts subject to urban out-migration in our sample should not blind us to the reality of this problem within the stagnating Districts (of which there are several, like Bankura, Bolangir, and Gaya), where smaller towns will be in decline (see Chapter 7 below), not to mention the problem outside the Chota Nagpur Crescent altogether: we will comment on Sholapur District in Maharashtra in Chapter 8 below.[1]

Observations on the Relationship between the Empirical Evidence and the Simulation Model

The Model was based on empirically estimated parameters. But the process of estimation often itself involved some modelling: there is clearly room for error here. There was also the construction of migration schedules to render them suitable for replication, and again the procedure may have been inadequate or the

1 A selection of these District's towns have been singled out for visual illustration: age and sex structures are plotted as familiar "pyramids" in the four broad age groups for which there are comparable data, in Figure 6.1.

simplifications too cavalier. Some of the parameters were estimated on an All-India basis, whereas our sample is of a region in Eastern India only. We tried to simulate some variance on the basic assumptions, and hence for instance we jacked up the sex ratio of the migrants by an arbitrary 30 or 50 per cent in "a" variants on the Model. We would hope that the real variables observed empirically would be distributed reasonably evenly around the mean values we predict for each Model type.[1] There is of course a possible source of error in the observed variables: the Census data themselves have been imperfectly collected (and we have commented upon the likely undercount of women in 1971 in Chapter 4, and on deficiencies in recall of migration duration earlier in the current Chapter). But with this by way of general introduction, can we make some general observations on the relationship between the simulated and the observed ? And do these observations help us to refine the Model or re-interpret the data?

The first point to make here is that the sex ratios in the urban populations, though generally in line with the Model, tend to be on the high side (females to males).

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1 By this we mean that, having categorised the empirical (as types "1", "2", "3" etc.) on the basis of decadal growth rates, we would hope that the other empirical variables, like child-population ratios, or overall population sex ratios, would cluster around the values predicted in our Models.

As we have seen, young female cohorts are particularly under-reported in the empirical data, so the cause of the discrepancy lies not in our taking too low a fertility rate in the Model, or too male-selective a survival rate at the young ages (indeed quite the reverse).[1] It could be then that our idea of a typical migration schedule contains insufficient female migration (our "b" and "c" variants are wrong). Is it that autonomous migration, or response migration, of females is higher than we estimated? The most clear indication of an error comes from the sex ratios of current, and recent, migrants: these are persistently higher than in the Model types, but especially so in the fast-growing towns. If our regressions were estimated correctly, then the source of the error lies in the "unexplained" variation in female migration (amounting to over 60% of total R^2). We chose to ignore those female migrants because we could not predict them properly, but of course they do exist. It is also possible that the male recent and current migration rate is understated in the Census (thus biasing up the sex ratio) owing to

1 Higher fertility rates would mean, cet. par., more children in the population, and as children have more balanced sex ratios in an urban population (subject to sex-selective adult in-migration), the tendency is for the overall sex ratio to improve, the higher fertility is.

temporary migrants overstating the duration of their stay.

Our Model net-inmigration sex ratios were derived from data on gross rural-urban in-migration flows. But only $\frac{2}{3}$rds of gross in-migration is from rural areas. Both NSS and Census data indicate (Table 5.13) that urban to urban migration streams have higher sex ratios: urban to urban migrants migrate as a family, or form their families quicker. It is this feature of the Model that is least satisfactory, and the "a" variants are more appropriate more often than would be predicted from the sex ratio of occupations. But as we argued in the previous Chapter, it is the urban to urban component in migration that is the least easy to predict, and at times (if we remember the contrast between Rourkela and Bhilai) utterly capricious.

A fairly persistent disparity also observed is between the proportion of children of under five years of age in the Census and that indicated by simulation. For reasons discussed in Chapter 4 above we can fairly safely argue that the data are deficient here. This makes it all the more striking when the data do give a proportion near to that of the Model (take the case of Bankura District in West Bengal for example): in such cases we should probably explain why the Census proportion is so high in comparison with the Model, and higher fertility seems a likely explanation.

Finally we should note that in a few cases the reported in-migration rates of current migrants are too low, especially in the fast-growing towns. So too are the annual rates averaged from the 1-5 years duration data in those cases, (though mortality will have added a slight downward bias here). The fast growth may have been concentrated at the beginning of the decade, but in the case of most of the Steel and heavy engineering towns we know that it was not; quite the contrary in fact. Both current and recent migration may be under-reported: there could be deliberate falsification if security is felt to depend upon stating to the authorities (whoever they may be) that you have been resident longer than you actually have. Illegal squatters thus feel they have a stronger claim to legality. Selectively that might be more true of men. After all, women are expected to be migrants (and not to stay in their place of birth) for purposes of marriage, in India.

But the raw data disguise another important phenomenon in the case of the fastest growing urban areas: enlargement of the physical area of the towns. In this case contiguous villages are incorporated in the expansion, and the incremental population is neither in-migrant nor native-born in the town as it was. They will be most likely to state themselves as native-born, however, so that the migration statistics and the plausible natural increase will together be insufficient to explain the experienced rate of aggregate growth. Furthermore, the sex ratio of such incorporated villages will be balanced, pulling up the overall sex ratio (though not the sex ratio of current migrants).

On the other hand, the reported gross in-migration rates of the slower growing areas are too high (to account for their only modest decadal growth rates). This, as we have shown, points to the important phenomenon of out-migration (and simultaneously high rates of both in and out-migration, probably of the same people, who came and went, equipped with inadequate knowledge of the labour market in cities now past their prime).

Neither out-migration, nor incorporation, were immediately apparent, on the scale experienced, without the exploratory device of model-building. Inconsistencies were then made apparent. Our attention has been drawn to deficiencies in our understanding of the demographic process of urbanisation, as well as some deficiencies in the data recorded for urban areas. Interesting as this is, it is also rather sad. It reduces the value of a model for supplying the missing details to supplement meagre raw data. In particular it lowers their predictive value. We have to compromise. It may be that the didactic and interpretative qualities of simulation exercises outweigh their more grandiose aims.

Eastern Madhya Pradesh
Analysis of a Sub-region

The reason for looking at the development that occurred around the installation of the massive steel works with Russian collaboration at Bhilai, in the District of Durg, is that this is one of the most controlled "green-field" developments that we can find. For although Rourkela is clearly also a green-field site, yet not far North from there we find the industrial development in Singbhum District (at Jamshedpur), in Dhanbad, and later Ranchi, which obviously muddies the clarity of sub-regional demography. But Bhilai is truly isolated.

Over the 1941-1951 decade, Durg District experienced an urban population growth that only modestly exceeded the rate of natural increase, 30% over the decade, (Table 6.2, and Figure 6.2 for a map of the area). The surrounding Districts in Madhya Pradesh had a similar experience, with Bastar and Bilaspur being notably low in the growth of urban population (whether due to de-classification, out-migration, or low natural increase in a time of high mortality). The Second Plan steel investment began to take shape in 1957; by 1958 the first coke oven was lit, and by 1959 the first blast furnace came on stream.[1] During that decade the growth of urban population in Durg District was 200% (15% per annum). In the Steel Town Group it was over 550%, and obviously the growth was tightly bunched into the last three years of the decade. For reasons already explained, this was an unprecedented demographic expansion, even if we allow for the re-drawing of urban boundaries to include once-rural populations.[2] The New-town itself (within the Town Group) was called Bhilainagar (or Bhilai for short), and reached 86,000 in just 4 years,

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1 Madhya Pradesh, Directorate of Economics and Statistics, <u>Socio-economic Survey of Bhilai Region</u>, Part 2, 1967.

2 Survey data (quoted in previous reference) suggested that 75% of the population was migrant, and the 1961 Census records that 67% of males (56% females) had migrated within the last 10 years. These are probably under-estimates since only 7,100 of the 86,000 population can be traced to the New-town's constituent villages.

(up to 1961, by which time the plant was producing 736,000 tonnes of pig-iron).[1]

Where did the migrants come from? Being iron and steel and heavy construction workers they were predominantly men (see also Table 6.3); the sex ratio in Durg District's towns fell from 1.017 to 0.706, and in Bhilainagar Steel Town proper it was 0.486, about two men to every woman. Most of them (72% of those to Durg Town Group) came from outside the State, and very few (15%) from within the District, and, being largely unskilled labour, nearly ¾ (72%) were of rural origin (Table 6.5).

We move on to observe the demographic effect of a backward linkage in the industrial complex, that is a New-town whose investment was also necessary to sustain the future intended expansion of the steel plant in the next decade, and for that reason referred to here as an "accelerator" town: the Jaran Dalli Rajahara Ore Mining Colony (to give it its full multi-lingual name). This is a town of 23,000 people and its more balanced sex ratio (0.650) reflects the relatively high employment of women in the ore-mining industry, presumably as surface workers.[2]

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1 Hindustan Steel Corporation Ltd., Iron and Steel:Statistics for Iron and Steel Industry in India, 1970, Ranchi.

2 We have more to say about the (often depressed) social background of miners that may account for the supply of female labour, below. The sex ratio in the industry as a whole is 0.547. See further, Government of India, Labour Bureau, Women in Industry, Simla, 1975, Chapter 2.

We now turn to assess how other towns in the District were reacting to these dramatic changes in the economy. The other large town is Rajnandgaon. Its principal exports are cloth, size-wood, and pulses (additionally it manufactures cement piping and curtains), but its growth of 92% during the decade clearly indicates its dependence on the growth of Bhilai. Its manufacturing sector was well established (it was $\frac{1}{3}$ of the male work-force), and it was evidently not a mere dormitory town, but had reacted to the rapid increase in demand for consumables in the locality. We shall call it a "multiplier" town (Table 6.6). Elsewhere in the District the towns stagnated or declined, providing their labour to the growth centres. Again from the Census we can infer that most of the labour employed in the towns apart from the Steel Town was local in origin (Table 6.5); 50% of the migrants were from within the same District. There was no question of searching for appropriate labour from further afield either to obtain the type or size of work-force required.

The object of carrying out this detailed study of a sub-region is to ascertain the indirect effects of a new industry on the surrounding work-force and population structure. A glance at the map (Fig. 1.7a) shows the spread of urban population growth in neighbouring Districts in the same decade. The most outstanding District from this point of view is Bilaspur. This contains the ill-fated Korba coal field; the New-town of Korba grew to 12,000 in response to the required input to the iron and steel industry of coking coal. But the District capital, Bilaspur City, also flourished, growing to a town of 87,000 by 1961. Its manufactures, consisting of bidi, soap, bronze and brass utensils demark it as a "multiplier" town, with a modest manufacturing sector established by 1961 (Table 6.6). As in other Districts of this type, male migrants are mainly local (Table 6.5), 65% from within the State, 44% from within the District, and mainly from rural areas in the case of the locals, but not in the case of those from afar. But Bilaspur town (as it was in 1961) is worth studying for different reasons: by Indian standards it is a notable employer of women. This is due to the establishment of household-based bidi manufacture and cotton spinning, partly in operation before the industrial boom in the area, but expanding in its response, and continuing to attract a female work-force (Table 6.3). The immediate effect is more rapid family formation, illustrated in the high sex ratio maintained despite the rapid growth of male migrants. The origin of the female migrants is more local than in the case of the heavy industrial town (51% in Bilaspur District as against 28% in Durg District coming from within the District, figures not dissimilar from those for males - see Table 6.5). It was argued above (in Chapter 5) that these migrants are not wholly attracted by job prospects but are more likely to follow their husbands (or other family members) if job prospects exist, and hence their presence in larger numbers in Bilaspur than in other rapidly growing towns.

The other mining locality in the area is Surguja District, which is strictly speaking outside the study sample (being heterogeneous). The fate of the collieries has been very unstable as prospecting has shifted from one place to another. The general economic problem is that the region does not produce quality coking coal for iron manufacture, but the intention was to blend it with better grade coal from the Burdwan coal fields for use at Bhilai. In Surguja District both Chirmiri and North JK Colliery were revived in 1961. The slightly larger towns of Manandragarh and Ambikapur flourished but purely as trading or commercial centres, in the former case prosperity being closely related to the output of coal.

Two further "multiplier" towns were selected for observation (in the 15-20,000 population size range): Champa in Bilaspur, and Jagdalpur the principal town in Bastar District. Both grew by about 40% over the decade, produced cloth and metal-ware, and traded in agricultural products. The towns of Bastar District follow the path outlined above: 30% of their migrants are local, and those that are less local are more urban. In both repects they contrast with those to the heavy industrial towns.

We now want totrace what happened to these towns during the crucial decade of the 1960s, when the steel mill was fully on stream, at its first-phase rated capacity, against a background of economic depression setting in from around 1965 (when the plant had been expanded toward the $2\frac{1}{2}$ m.t. capacity stage, but with production of pig iron levelling off at around 2 m.t. It should first be noted that Bhilai was affected less by industrial problems than were its sister mills, being as it was very much a pace-setter. Its output was simpler to fabricate (heavy sections), and apparently easily disposed of, at least until the onset of the depression (perhaps by resorting to dumping)[1]; but it is clear that the severe decline in consumption of non-flat products after 1965 set back the plant.[2] Similarly the decline in demand for other locally-produced industrial items (like the cement piping) or raw materials (like timber) afflicted these towns.

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1 See W.A.Johnson, The Steel Industry of India, Cambridge, Massachusets, 1966.

2 See S.D.Kshersagar, "Growth in Consumption of Steel in India," Economic and Political Weekly, 27th August, 1977.

Finally there were specific problems in coal production, requiring prospecting for more suitable grades in the Korba region.

Thus we may distinguish three economic features that determine the stagnation of the local industry in Eastern Madhya Pradesh. One, a twist in the industrial structure away from heavy industry; two, an overall recession; three, technical-economic set-back in the plant itself. It is not always easy to distinguish the effect of each on the sub-region. But some attempt to so do has been made here by investigating a sub-region with a different industrial base (compare Poona District in Maharashtra, in Chapters 1 and 9), and a sub-region with different technical problems (compare Burdwan District in West Bengal, later in this Chapter). The major thrust of the investigation, however, is to compare the effects of modern technology (specifically large-scale plant) per se in such a crisis following upon the period of prosperity just described.

How did this era of economic change (and lack of it) manifest itself in demographic terms? The fuller social implications we leave until later in this Chapter. Here we focus simply on the economic structure of the incremental population and migratory movements of the male labour force.

Bhilainagar grew rapidly, doubling over the decade, with male growth at 67% and female growth - implying family formation - at 175% (Table 6.6). But the manufacturing male labour force grew at only 22%.[1] This differential raised the question of future employment prospects as the younger cohorts enter the working ages. A fall in the ratio of manufacturing males to the total male population need give no cause for alarm, but the size of the fall in so short a space of time might well do so (43% to 31% in 10 years). In this context it would be important to observe neighbouring urban areas. Durg Municipality is a town that could be expected to diversify and expand in manufacturing activity, combining multiplier and accelerator effects, in response to the steel industry growth pole. But the story is a sad one. The growth in manufacturing population was negative over the decade. Taken together, the Durg-Bhilai agglomeration experienced a growth of only 15.6% in its manufacturing force. Rajnandgaon, the other multiplier town of the 1950s stagnated too, the urban agglomeration (retaining comparable boundaries) grew at only 25%; the incremental population contributed only 5% to the manufacturing labour force, that is less than ½% per year. Here we see the seriousness of the check in terms of production-labour growth, <u>in the wake of a dramatic expansion</u>. It is the quality and enormity of the change

1 Later we show that workers in the iron and steel industry increased by about one third with the increase in capacity (i.e. well above the average for manufacuring generally).

that carry seriously and arguably unique demographic and hence social implications. A glance at Table 6.6 reveals a similar picture throughout most of the sub-region. At Bilaspur the actual size of the manufacturing labour force hardly changed (and that from an only modest base of 11% of the work-force). However, the coal town of Korba grew more rapidly (coal-based manufacturing included) though from a very small base of 12,000 so that there was no question of this compensating, on a sub-regional basis, for the overall stagnation. Its mining labour force increased by only 21%. Similarly Ambikapur and Manendragarh in the coal-producing District of Surguja expanded their manufacturing sectors (albeit from minute bases). Ironically the prosperity was probably built on the over-production of coal, in the sense that the Bhilai plant was being fuelled with inferior grades in much higher proportions than was technically desirable, leading to further increases in down-time.

In summary, there was an enormous injection of capital into the area during the Second Plan; its physical manifestation were the steel mill and iron works at Bhilainagar. To sustain an expansion of output from the mill required further investment in the industries supplying the raw materials, in coal mining and ore mining in the sub-region (with other inputs coming from outside). To sustain output elsewhere in the economy (for instance in the steel-using industries) required further investment also: however, little or none of this seems to have occurred in the subregion. "Accelerator" towns then are limited to Bhilainagar itself and to the raw-material producing localities. They are so closely related to the steel industry that their fate is decided by that of the industry. The second part of the decade saw a major stagnation in India's industrial development, but especially in the heavy industries. Steel is a barometer in recession. Thus the state of the macro-economy can be held to be reflected in the fate of these townships. However, had they been diversified, so that accelerator effects were related to the progress of the economy as a whole, their fate would not have been so grim: the chemical and oil-based industries and luxury goods producers did not suffer so seriously in the stagnation, and their market remained relatively boyant u during the slow-down in aggregate growth. The incomes created by the Second Plan investment sought consumer goods, and hence most of the towns that had expanded in the late 1950s were multiplier towns. Stagnation in the late 1960s affected them also. Locally what we see is a crystalisation of the effects of the failure in the macro-economy.

The initial investment and the accelerator effects that followed from increased industrial growth filled the industrialising towns with able-bodied men. They were followed by (if not accompanied by) women, and families were created. The young now dominate their age structure.[1] The other towns attracted migrants also, and their families, but they additionally attracted hopeful young men who would have seen their incomes grow had the multiplier effect been sustained by

1 See Figure 6.1 for Bhilai (and compare Durgapur) where the developing age structure is strikingly portrayed, and Table 6.7 where the increase in the under-15 age cohort is noticeable not only in the core Steel Town (where its proportion in the total population increases from 25% to 42% over the decade), but also for instance in the Korba mining and industrial manufacturing and processing agglomeration (an increase from 30% to 39%). This Table also illustrates how respectable demographic growth rates can mask the fact that more than 50% of the growth is accounted for by the growth of the female population, relating to the earlier in-migration of men.

continued growth in the sub-region. They were disappointed. Some of these towns expanded in the trades and services sector, but not in manufacturing. The young migrants' incomes must have fallen short of expectations. Still other towns failed to expand in economic terms at all in the second decade, after an initial boost in the Second Plan period. People left them, some to go on and try their fortunes in another town, and probably some returned whence they came. Families were not formed. As a whole, the industrial region was nipped in the bud. Yet, here and there, the sap is still rising, for the youngest cohorts are maturing. The 1980s, for better or worse, will witness the result.[1]

Burdwan in West Bengal
Analysis of a District

The North of the Chota Nagpur Crescent is the industrial heartland of India, among the palms and dark waters of West Bengal. In the District of Burdwan India's second large private-sector steel works was erected, at Burnpur, in 1936, and expanded from a million tonnes from about half a million over the course of the Second Plan period (1955-60). The work-force was partly established in the adjacent town of Outer Burnpur.

1 This scenario is investigated, in some detail, in the form of a projection model, in Chapter 9 below.

During the same period the adjacent City of Asansol undertook a range of manufacturing and servicing activities related to the heavy industry: liquid oxygen, glass, and locomotive manufacture, locomotive repairs and motor vehicle servicing. Additionally, both Burnpur and Asansol (together called Asansol Town Group or Urban Agglomeration) produced lighter manufactures, textile garments, and liquor, and processed rice and flour, while Outer Burnpur was a centre of sweetmeat manufacture (Table 6.8). Asansol Town Group was therefore a combination of a diversified accelerator and multiplier town, with a modest proportion of its labour force engaged in manufacturing. Its growth was rapid, 78% during the decade (to reach 169,000 by 1961): the migrant component, amounting to nearly ⅔rds of that growth was notably from outside the State (54%), a pattern we have observed alsewhere in heavy industrial areas;[1] and the disturbed sex ratio (0.664) is indicative of selective male migration of the kind we are used to also. Indicative of the migration, 30% of the population was recorded as Hindi-speaking (and as high as 61% were non-Bengali speakers) in a Bengali District; 10% were Muslims,

1 Unfortunately, the Census classification for migration purposes distinguished Asansol Municipality separately, and combined Burnpur with the other smaller towns in the District and with Durgapur. This makes Table 6.5 a little difficult to read in this respect.

the refugees from East Bengal.[1]

The major investment in the District, also in the Second Plan period, was a brand new integrated iron and steel works (built with British collaboration), the second of the million tonne trio. This was at Durgapur, something of a contrast with the plant at Bhilai in being grafted on to an already industrialising area, but, like Bhilai, actually constructed on a greenfield site. The first output of steel was in 1960-61, 420,000 tonnes of pig iron,[2] by which date the new township had grown to 42,000 people. The migrants initially were men, and to judge from the only migration data that include Durgapur as a major component, around 50% came from other States, mainly from rural origins (Table 6.5); 43% of the population was non-Bengali speaking. At this time nearly half the male work-force was engaged in manufacturing, most of it in the massive steel plant. The other town that sprang up in this decade on a greenfield site was Chittaranjan, the centre of railway locomotive manufacture (to which, of course, steel is the major material input). This was much earlier than Durgapur, and its male population was also

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1 Government of India, Census of India 1961, West Bengal, District Census Handbook, Burdwan, Volume II, Calcutta, Tables C V and C VII.

2 M.R.Chaudhuri, Indian Industries, Development and and Location, Oxford University Press, Calcutta, 1966; Hindustan Steel Corporation Ltd., Iron and Steel, cited in note above.

43% non-Bengali speaking (a similar proportion to that in Hirapur locality where Burnpur Steel Town is situated).

This is the centre of India's coking coal region, and the other towns in the North-West of the District are mainly coal-mining towns; they displayed the same erratic growth that we witnessed in Madhya Pradesh, in response to two factors - dramatic change in the demand for coal, and the working of new seams. Ondal declined, then grew very rapidly, doubling in the decade, Jamuria and Kulti lost population despite earlier growth, Raniganj continued to stagnate (see Figure 6.3 for locations). Their populations were also heavily dependent on migration from Bihar.

Further down the Damodar valley we find a contrasting town of the type characterised by our Model "2": the old administratice centre of Burdwan City itself. The town enjoyed the prosperity of the District that occurred with the expansion of steel and engineering, and its growth rate increased to a modest 44% over the 1951-61 decade. But functionally, as far as its industry was concerned, it remained a multiplier town, producing flour, rice, sweetmeats, textiles, jewelry, and silverware in response to the local increase in demand; and, in any case, manufacturing was only a minor activity, involving less than 10% of the labour force. Migrants were mainly local (only 36% from outside West Bengal) with the population predominantly Bengali speaking (80%), and, in line with its administrative function (and white collar labour force) over $\frac{1}{3}$ of its migrants came from other urban areas (Table 6.5).

The following decade witnessed, as in Madhya Pradesh, first a sustained, then a decreased demand for heavy industrial products. Durgapur began as a success story. Not only did it reach the million tonne target by the middle of the decade, but industry diversified, and the prospects of avoiding a brittle industrial "monoculture" seemed promising. An alloy steel plant was established, also a mining machinery plant, and other engineering concerns. A major fertiliser plant was set up. This activity manifested itself in a rapid population growth in Durgapur. The male population nearly quadrupled (276% growth) and the manufacturing population more than doubled(127% growth), with the male work-force growing rather faster (141%)[1]; the female

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1 There is a problem in that the urban boundaries were much extended to incorporate what had been previously described as a rural population. If we take the whole locality of Durgapur (urban and rural) at both Censuses, the figures become: male population growth 98.4%, male working population 43.4%, and male manufacturing labour 65.3% growth.

population multiplied five-fold. This implies a slight fall in the proportion of the working population employed in factory manufacturing (from 60% to 56%). Stagnation in this proportion, given its high initial level, need not cause alarm. The very rapid increase in the non-adult male population is quite anotherm matter, and poses the question as to whether economic activity, and particularly manufacturing, can be sustained at a level high enough over the following decades to employ this future work-force locally. In actual fact, by the end of the decade Durgapur had become something of a disaster.[1] Inter alia, the growth in manufacturing labour force figures disguise the under-utilisation of that labour. By 1971 the plant was expanded to produce 1.6 m.t. of steel, and actually produced 0.6 million; its output of pig iron had fallen since the mid-1960s to less than 1 m.t. A significant part of the reason for this failure was due to circumstances at Durgapur itself, and not the general stagnation in investment demand. In this respect it serves as a contrast with the fate of Bhilai earlier described. Severe bottlenecks in production arose, stemming from erratic coal supplies and inappropriate design of coal-loading equipment, and technical complaints of this kind quickly interrelated with labour unrest to escalate

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1 B.Tulpule, "Managing Durgapur: experience of a Trade Unionist", Economic and Political Weekly, 25th Dec. 1976; Hindustan Steel Corporation Ltd., Iron and Steel, cited in note above.

towards a crisis. The coal towns during this period continued their erratic development: Raniganj expanded both its mining and manufacturing activities in line with its fast population growth. Ondal declined severely, as did Kulti.

The older engineering towns grew modestly but lost their manufacturing growth, a sign of the overall depression, and Burnpur itself, the older Steel Town, stagnated for the same reason. What is particularly telling is the fate of the multiplier town Burdwan. Here again the effect of falling productivity elsewhere in the District was sufficient to reduce the demand for manufactures and (as will be seen later) to drive manufacturing labour into the small-scale and household sectors, which grew in proportional terms while the factory manufacturing work-force fell. It was fortunate enough that this District, where local conditions compounded the effect of national recession, had acquired more diversified urban centres (and that Durg District in Madhya Pradesh, where less diversification had occurred, was subjected only to the national recession). We return later to these economic aspects of industrial demographic formation.

Cultural Differentiation over time: Bengalis and non-Bengalis in Burdwan

The diversity of regional origins of these large newly formed local populations has serious implications for the harmonious operation of the future labour market. It has already been suggested that much recruitment in India is done through personal contacts, rather than through competitive advertising. Contacts are made on a regional-linguistic basis, as well as through the more concentrated networks of caste and family. Labour market rigidities are further strengthened by the continuing association of caste (determined at birth) and occupation. All this means that equilibrium is more likely to be achieved if the supply of labour for specific industries or occupations grows at approximately the same rate as does the specific demand. On the demand side, changing industrial composition and changing technologies make this very unlikely. The unlikelihood is enhanced further by differential demographic growth in local supply. It has already been mentioned that high sex ratios, implying the pursuit of family formation in urban areas, presage the more rapid growth of the future labour force in particular societal sub-groups. Social disharmony often follows on two accounts: first, the sub-group, outgrowing its employment opportunities, resents the labour market rigidites that it sees discriminating against it; secondly, the rest of the population resents the growth of the sub-group which it fears will compete for diminishing jobs with increasing success (and reacts by tightening the rigidities of the labour market). We cannot usually pursue these populations through time empirically, though the problem was simulated in Chapter 3. But in West Bengal the fairly clear linguistic differences between locals and migrants enable us to make some headway.

The Bengali-speakers in the Burdwan District towns and cities have high (f:m) sex ratios relative to the rest (Table 6.12), though perhaps lower fertility. Projecting differential birth and death rates over time and distinguishing the consequent natural increase from net in-migration is hazardous. In the case of Burdwan District this can be gauged approximately from noting that the Hindi-speaking male population, once established through the massive migration of the late 1950s, grew <u>slower</u> than the male Bengali-speaking population down to 1971 (even despite net in-migration of male Hindi-speakers). In fact a growth of only 25.6% (Table 6.12) suggests that, if there was any net in-migration at all (which there clearly was into Durgapur for instance), natural increase was subdued. The case can be made even more strongly for the non-Bengali speakers generally. This reflects the underlying bias against natural growth that is created, as illustrated in the simulations, by the adverse sex ratios among the migrants. Nonetheless, during the 1960s, family formation was proceeding rapidly, so that the female Hindi-speaking population increased much faster than the female Bengalis in Burdwan. But this process will only continue until the sex ratios are approximately equalised; (if male migration ceased in 1971, the female Hindi-speaking migrant population would continue to grow, on this assumption, until the ratio between the Hindi and Bengali populations reached only 0.13:1.0).

Taking Durgapur alone (Table 6.12) we consider separately Bengali and all non-Bengali speakers (of whom Hindi-speakers are a substantial proportion). Again the native Bengali male population grew far faster than did the non-Bengali speakers between 1961 and 1971, reflecting increasing in-migration from <u>within</u> Bengal (East or West), relative to that from other Indian States. In this case we cannot make any quantitative judgements on relative rates of natural increase (though we do note that in 1961 and in 1971 the sex ratios of the non-Bengalis were well below those of the Bengalis. Over the decade the growth of the non-Bengalis was primarily due to the influx of women (but even that was lower than the rate of growth of the Bengali female population). By 1971 the sex ratio of the non-Bengalis was 0.608: though there are no clear precedents upon which to base a sure judgement, it would seem likely that a ratio of 0.800 would be more likelynto remain stable (this is the sex ratio among the non-Bengalis in Burnpur Steel Town in 1961)[1]. If that is the case, the female migrant population in Durgapur will continue to grow both absolutely and proportionately. This should not be mistaken for a long-term expansion of the migrant population: it is simply a

1 We have already seen empirically, in the case of Bombay, that some migrant sub-groups remain as split families, retaining very low adult sex ratios with no potential for growth: this is especially true of migrants from North India, from Uttar Pradesh, and in some cases, Bihar. These are the longer-term, longer-distance migrants who are employed in factory manufacturing and almost certainly have small amounts of land (but less than 2 acres, see Chapter 5 above), but who are nevertheless compelled (or feel it wise) to keep all adult members of the family at work to survive. At the other end of the spectrum the locally poor (usually landless) migrate as complete families and have little hope of employment in factories. Between these two groups are the long-distance migrants who gain factory employment and form families rapidly in the towns, and are able to leave the rest of their extended family to work the land, and still survive. Their sons will be born in the city. S.N.Sen in his study of Calcutta also found that the Hindi-speaking migrants were far more often single than were the Bengali-speakers (sex ratio of 0.253 versus 0.742, in the late 1950s). S.N.Sen, The City of Calcutta: A Socio-Economic Survey, Bookland Private Ltd., Calcutta, 1960.

traverse towards a new stable state, in which there is no good reason to suppose that one community will grow faster than another. Indeed between 1961 and 1971 the proportion of non-Bengalis in Burdwan's population remained constant at around 17.5 per cent. The short run fluctuations and instabilities in the labour market due to sudden increases in particular age cohorts of particular regional origin are quite another matter. These are the products of the highly unstable initial migration patterns plus differential patterns of family formation. The Bengalis' second generation will enter the labour market rather earlier, and the peak in the non-Bengali labour supply will follow. The disequilibria and tension that this configuration may cause are more fully worked out for the case of Bhilainagar in Chapter 9 below. But there is no evidence to suppose that the longer run growth patters will differ substantially, once the new stable state has been approximately achieved. The likely range in fertility between the two groups has been illustrated in the simulation Model, where 5.1 for local total fertility and 5.7 for migrant total fertility were taken: the ratios of migrant to local population ranged from 0.32:1.0 (with same fertility) to 0.35:1.0 (with the higher migrant fertility) (Table 3.3), within twenty years. In Durgapur differential migration patterns caused that ratio to fall from 0.38:1.0 to 0.25:1 within a decade. Problems in short-run dynamics are far more striking than long term trends.

Class Structure in the Development of Urban Demography: A Study of the Newly Industrialising Areas

It is unfortunately not possible from the available materials to analyse the class composition of the urban areas of different character, nor to document how these areas might be changing in respect of class structure over time. Most of this thesis has had to be restricted to the demography of the aggregate urban population, with some extra detail being incorporated in the case of the migrant populations; most of this has had to relate to locational rather than economic background of the migrant, though some attempt has been made to deduce the latter from the former. In the Chapters that follow in Part III we shall make further attempts to reconstruct something of the areas' socio-economic structure, when we focus more strongly on occupational and income differentiation. Limited demographic information is available to us, however, relating to the Scheduled Castes and Scheduled Tribes (known together as the Backward Classes); as these are predominantly the lowest socio-economic group, we can at least take their recorded experience as an indicator of the inter-play between demographic and social class factors (to put it no stronger than that).

The Backward Classes participate considerably less than their higher caste brethren in the industrial expansion of the heavy industrial areas developed in the Second Plan. This is perpetuated over time. In 1971 there were still no Backward Classes reported as employed in factory-sector industry in the Bhilai-Durg urban agglomeration (Table 6.9). This is despite there being 10,000 people of the Backward Clases in Bhilainagar town itself (and 35,000 in the urban locaities of Durg District). It is to be noted that in this District the participation of this social group in manufacturing is mainly in towns like Rajnandgaon and Dongargarh, where prosperity was least sustained.

Of further interest are their more balanced sex ratios, than those of the general population (Table 6.10). This may reflect in part simply a higher fertility (on which there is no evidence however), and insofar as the sex ratio is also higher in the adult population, it will clearly promote a higher fertility (cet. par.). The sex ratios are also higher among the workers, who will be predominantly adult. This was the case in 1961 when it may have reflected a lack of migrants among the Backward Classes, for by 1971, in the case of Bhilainagar, the sex ratio of the Backward Classes did not differ much from that of the general population (being skewed towards males in both cases), and in this case we know that both Backward and general populations must have been migrant since Bhilai did not exist prior to 1955 (Table 6.9).[1]

The picture is very similar in Durgapur with its 25,000 Backward Class people; only 2.8% of the working Backward Class population participated in the factory sector manufacturing industry (Table 6.9), as against 56.3% of the general population. Again the well balanced sex ratios suggest that these people are just as committed to an urban life, through forming families in urban areas, as are their higher caste brethren. We should note how their participation in the cities has changed over the decades, enhancing the effect of a duality emerging in these industrial towns. The Backward Classes have either congregated around Durgapur, or else the re-drawing of the urban boundary has encompassed them,(or both), as they have grown from 5.8 to 12.3 per cent of the total population; but their participation in the factory sector remained small (2.8%) in 1971. In Bhilai there has been much less congregation recorded over the decade, indeed a slight proportional fall (from 7.1 to 6.1 per cent of the total population) ,(Table 6.9). To take a comparison from Western India during the same period, the New-town

1 The Census did not record details of S.C. and S.T. at the level of the town itself in 1961.

areas of Maharashtra also have the lowest proportions of the Backward Classes: half as many in Pimpri-Chinchwad New-town as in Indapur, an old town in the same District (Poona), or as in Sholapur (Table 6.11).

Case studies that show large numbers of Scheduled Caste migrants in cities have been able to point to worsening rural conditions, rather than expanding opportunities in urban areas, as the cause. In the City of Poona in Maharashtra, for instance, the slum settlements most peopled by migrants from drought-stricken areas contain a high percentage of Scheduled Castes (often over 50% compared with the average of 7% in the City).[1] These migrants come as complete families, from other Districts not far inland, and once located there, having no rural land, they are effectively locked in the city. If the latter fails to prosper, they are the least likely to be able to return to a rural livelihood, and the last to emigrate to other cities. It is interesting to observe that this most depressed class group is characterised by a high sex ratio (and fairly mature family structure) from the start, just as are the higher class migrants from other urban areas. In between fall the industrial wage labour groups, who tend to migrate as single males, but many of whom form families rapidly afterwards.

1 See M.M.Bapat, "Occupational and Spatial Mobility among Shanty Dwellers in Poona", Ph.D. thesis, University College London, 1979.

In the mining localities, where the Backward Classes are more dominant, their population's sex ratios are higher than those of their colleagues, though this is not specifically the case among the actual workers in the mining industry (Table 6.10). Clearly they are more likely to be of local birth, and to have their families stay with them, than are other caste groups. The employment of women among the Backward Classes is generally more likely than is the case in the general population, partly because the Backward Classes only participate in branches of manufacturing that happen to be more suitable to female employment anyway (not so much in iron and steel production for instance), but partly, and more importantly, because women from the lower castes are permitted, and indeed forced through economic compulsion (the two are not unrelated) to work, when other women would not be. Note the contrasting sex ratios in the construction industry (0.65 for the Backward Classes versus 0.27 for the general population), (Table 6.10).

It is the Backward Classes who remain when the mines close down or fail to expand (note the case of Chirmiri in Madhya Pradesh, Tables 6.9 and 6.7). In a later Chapter we discover how migrants generally manage gradually to work their way out of employment in mining and into employment in manufacturing industry over time. The older the mine the more local its workforce and the greater its component of lower caste groups ; there is a concentration of a class of people who are already the most vulnerable in the rural areas (to losing employment as agricultural labour, for instance, in the case of harvest failure). But equally, the older the mine, the more likely it is to be closed, which is the industrial equivalent to a harvest failure in an urban monoculture with a clearly differentiated class of wage labourers. At the community level the problem is exacerbated by the older age structure of a declining population, which we have seen characterises older stagnating economies. At a family level the lack of social mobility among the lowest class means that sons will be of little help in diversifying the family income, for they too will be miners.

The failure of the Backward Classes to be represented in the developing localities can be observed to be long-standing. In the heavy industrial City of Jamshedpur (founded in the first decade of the Century) there was only 12.8% of the population recorded as Scheduled Caste or Tribe as late as 1971, and that is in a District where the Scheduled Tribes alone number 58.6% of the rural population. This is of course an extreme case: tribals are predominant in this region of Bihar. But the observation strengthens the argument (consistent with our inference in Chapter 5) that recruitment managed, consciously or unwittingly, to miss the local labour; for it would be hard to argue that the Backward Classes were exceptional in being more fully employed than their fellows in agriculture, and hence less eager to participate in the alternative urban economy. But a further observation points in the reverse direction. Of those small numbers in Jamshedpur, a very high proportion was employed in manufacturing industry, 54%, almost the same proportion as the general population in manufacturing. Without field research one has to remain agnostic. What remains striking however is the small number of tribals in this longstanding industrial city in the heart of a tribal area.

We have presented separately some contrasting data for other localities in Bihar (Table 6.11). The failure to employ tribals in the developing areas, in preference to migrants (who are mainly from West Bengal), has been a highly contentious issue in the 1960s. As mentioned above, depite the high proportion of tribals in the rural Districts of Ranchi and Singbhum, their urban representation is small. In the newly industrialising locality of Bokaro Steel Town the representation of the Backward classes is low but not negligible, and indeed their presence in the town is higher than the rural average, but they are underrepresented in manufacturing, with only 11% in that sector.[1] In the New-town of Jagannathnagar (part of Ranchi urban agglomeration) they are also well represented. But in Dhanbad urban agglomeration the familiar picture re-appears, with a small proportion of the Backward Classes there, and those predominantly engaged in mining. Developing Bihar is an area undergoing social change. But the overall picture conforms to that presented before, and analysed by others elsewhere in India:[2] the Backward Classes are under-represented in urban areas because the occupations into which they are locked are under-represented. The exceptions are the mining and the declining towns, from where the more socially mobile have moved out, leaving the

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1 N.Sengupta noted how Hindustan Steel employed local Bauri tribals in compensation for their loss of land, but only as temporary unskilled workers: the terms of contractual employment required literacy, thus effectively disqualifying the tribals. Since 1968, of the qualified, locals have to be found employment first. N.Sengupta, Destitutes and Development: a Study of the Bauri Community in the Bokaro Region, Concept, New Delhi, 1978.

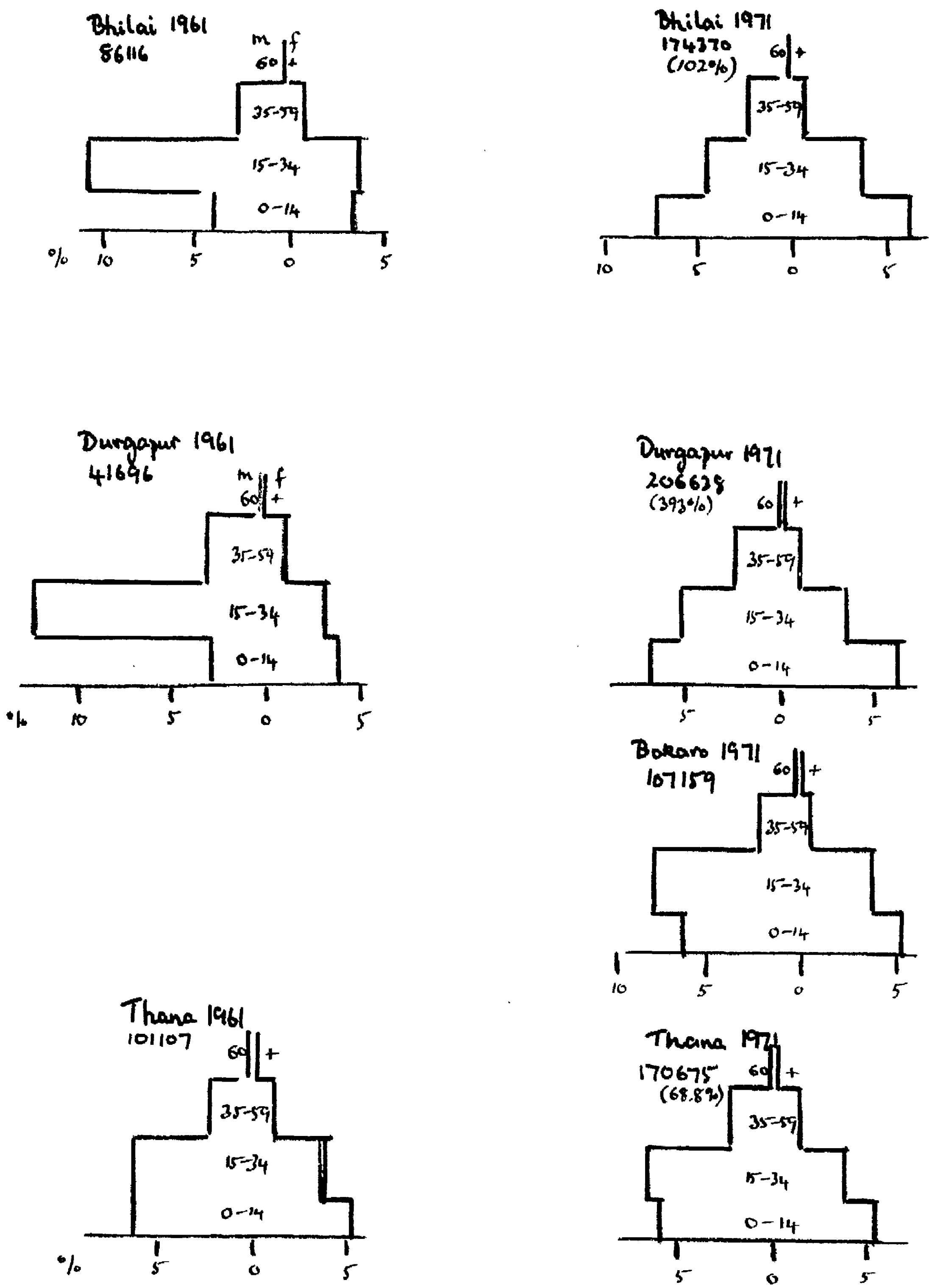
2 See for example V.S.D'Souza, "Scheduled Castes and Urbanisation In Punjab: an Explanation", Sociological Bulletin, March, 1975.

Backward Classes over-represented. This may not, however, be the only reason for an increase in the proportional size of the Backward Classes: their more favourable sex ratios are indicative of less disrupted family formation, and unless high mortality compensates, their growth rates and hence relative future population size will indeed increase. If the caste system exacerbates the disabilities of being born into a Backward Class by further restricting mobility there will be an increasing supply of labour to compete for non-expanding occupations in stagnating towns. Whatever the cause, more Backward Classes sharing a fixed resource means increased inequality between them and the rest of the population.

Figure 6.1

Examples of Contrasting Urban Age Structures

Rapid Growth Towns:

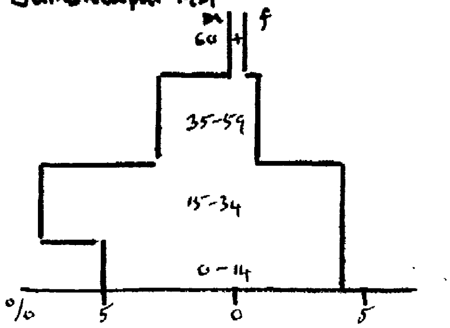


Note: Population size is given with decadal growth below.

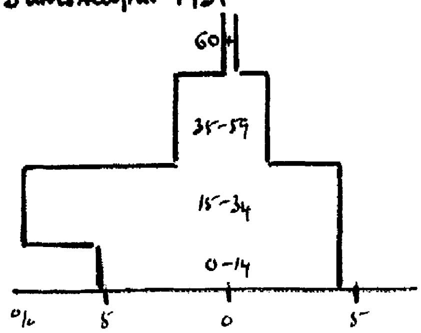
Fig. 6.1 cont'd

Historical Growth of a Steel Town:

Jamshedpur 1921



Jamshedpur 1931



Jamshedpur 1961

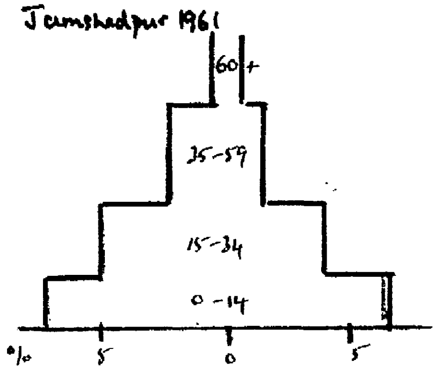
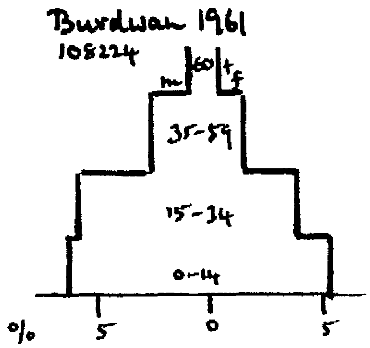
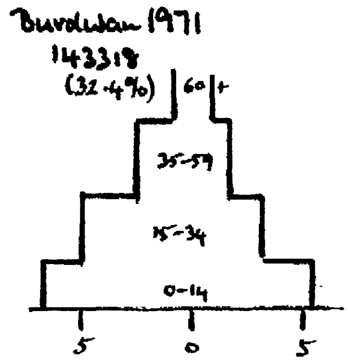
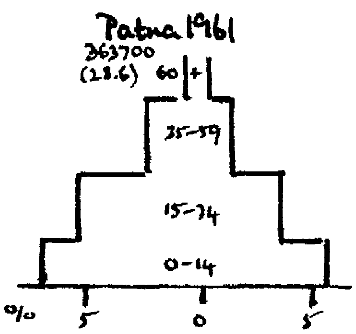


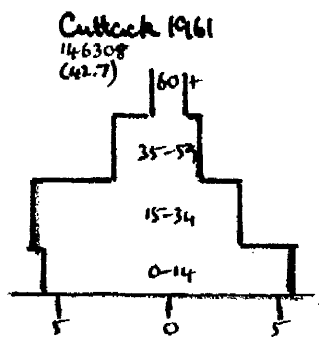
Fig. 6.1 cont'd

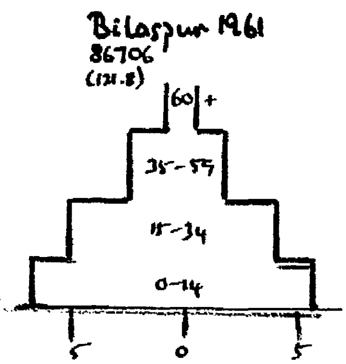
Fast to Moderate Growth Towns:











Control:

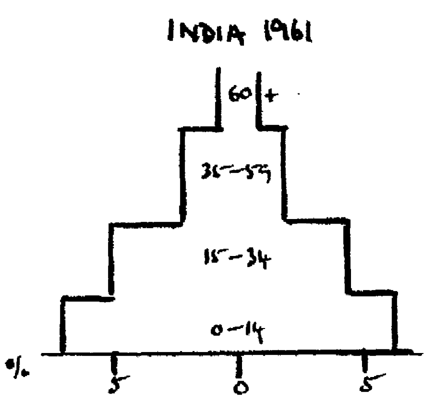
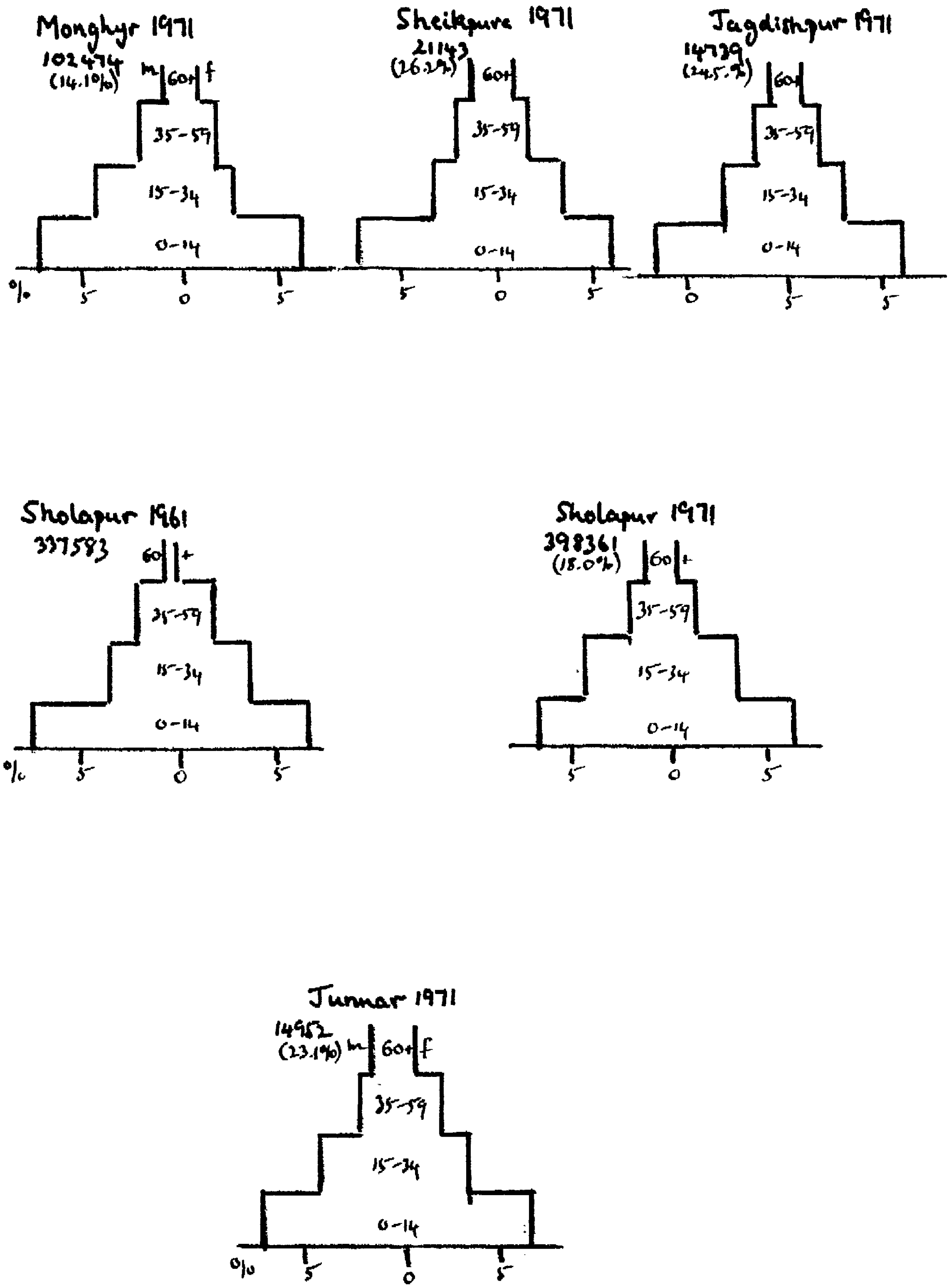


Fig. 6.1 cont'd

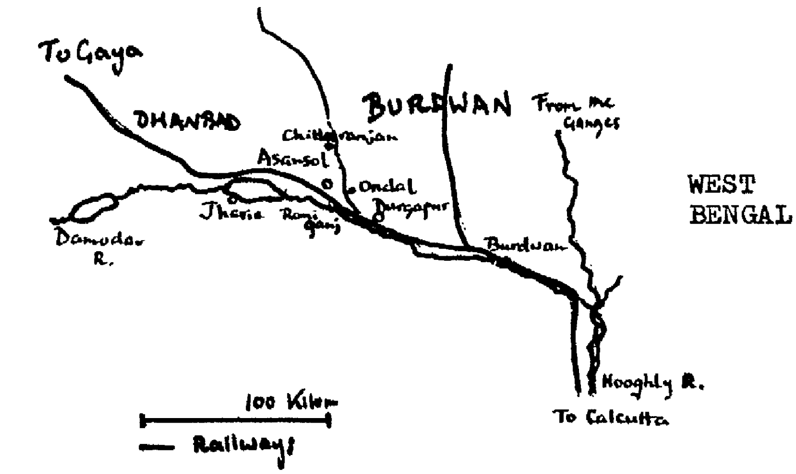
Slow Growth Towns:



Note: Sheikpura and Jagdishpur are in Bihar.
Junnar is in Maharashtra.

Figures 6.2 to 6.3

Maps of Sub-region of Eastern Madhya Pradesh and District of Burdwan in West Bengal



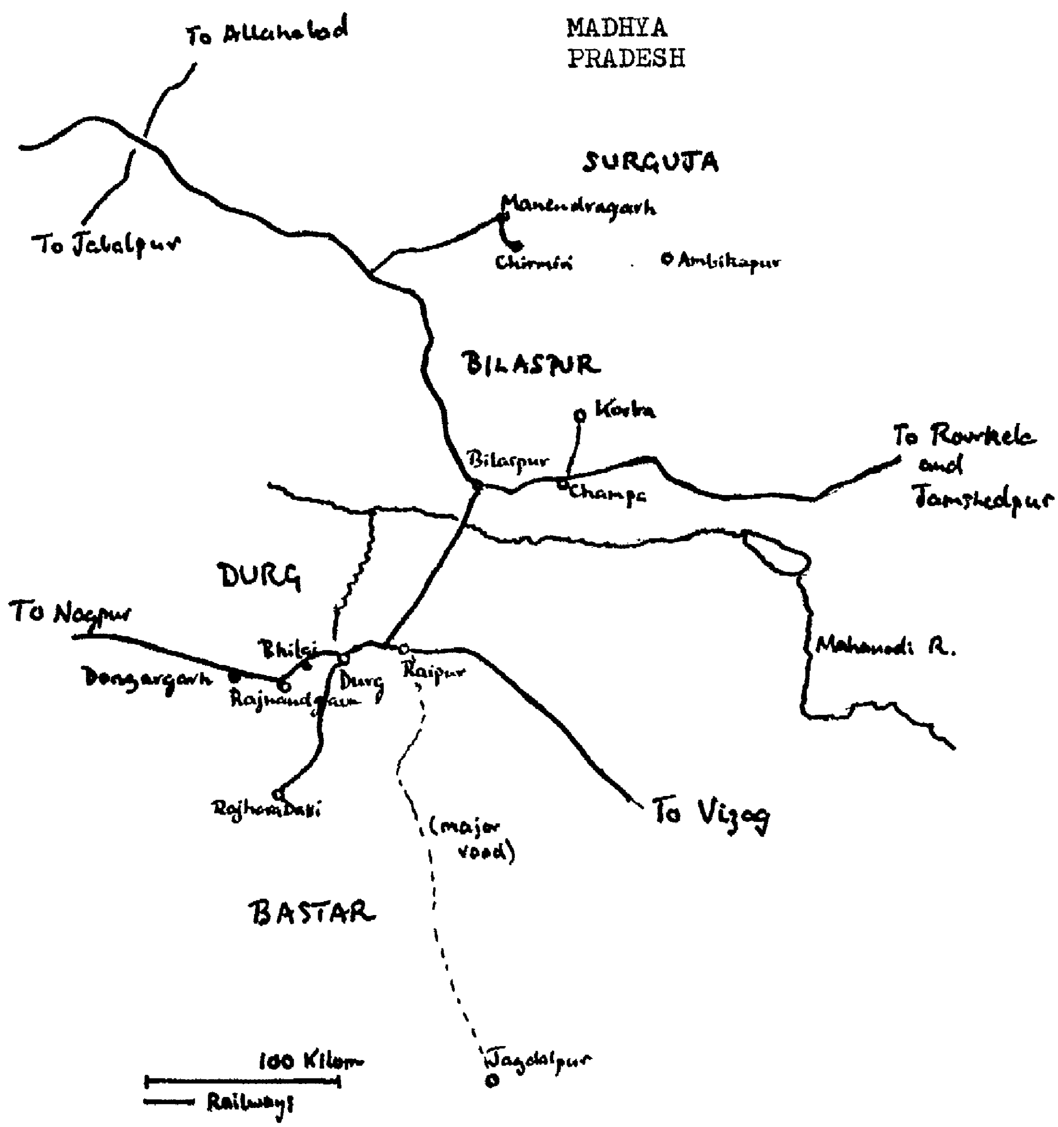


Table 6.1 a

Selected Indices from the Model for Empirical Comparison

SEX RATIOS (f:m in total population with current migrants below)

Year: Model Type	0	5	10	15
1b	841	680	736	759
	(484)	(347)	(1241)	(486)
1a	841	742	816	830
	(484)	(521)	(1862)	(486)
1c	841	426	588	631

CHILD : POPULATION RATIOS (0-4 by total population with 0-14 m+f by total population below) (%)

Year:	0	5	10	15
1b male	12.7	12.3	11.4	12.1
fem.	14.5	15.8	15.9	15.7
		(35.8)		(35.2)
1a	12.7	12.3	12.4	13.4
	14.5	15.9	16.1	15.9
		(35.9)		(36.5)
1c	12.7	10.4	8.3	10.9
	14.5	16.5	17.2	16.9
		(31.9)		(32.5)

URBAN GROWTH RATES (decadal growth) (%) below

Years:		0 - 5		5 - 10		10 - 15
1b	male	66.8		9.1		9.7
			81.9		19.8	
	female	34.7		18.2		13.1
			59.2		33.7	
1a	male	66.8		10.4		11.3
			84.2		22.9	
	female	47.0		21.5		13.2
			78.6		37.5	
1c	male	604.0		3.3		5.8
			627.3		9.3	
	female	256.6		42.5		13.6
			408.1		61.8	

Table 6.1 a continued

SEX RATIOS

Year:	0	5	10	15
2b	841	800	785	811
	(484)	(442)	(488)	(713)
(2a		818	819	)
		(555)	(635)	
BASE	841	843	846	850

CHILD: POPULATION RATIOS

2b male	13.5	16.2	15.1	13.4
female	15.0	17.7	17.7	16.3
		(37.4)	(36.3)	
(2a		16.4	15.5	)
		18.3	18.3	
BASE	12.6	13.7	13.5	13.4
	13.6	15.9	15.6	15.4
		(38.2)	(36.7)	

URBAN GROWTH RATES (decadal rates below)

	0 - 5		5 - 10		10 - 15
2b decadal males		56.9		36.4	
females		46.5		38.3	
BASE males	13.9		13.1		12.7
		28.8		27.4	
females	14.2		13.4		13.2
		29.6		28.5	

NATURAL INCREASE @ 0.02 per annum

Decadal growth 22.0

Source: Simulation Model (See further Table 3.1)

Table 6.1b

Grouping of Empirical Cases by Model variants

SEX RATIOS

		1961	1971			1961	1971			1961	1971
1a	Bilaspur	901	907	2a	Bastar	903	846	B-3	Baudh	949	865
	Ranchi	817	815		Bankura	905	920		Raigarh	901	901
	Mayurbanj	810	840		Birbhum	844	893		Bolangir	923	923
	Bhagalpur	832	821		Ganjam	951	955		Calcutta	612	636
					Gaya	861	874		Shahabad	846	845
1b	Burdwan	699	785		Monghyr	903	864		(Bankura	905	920)
	Howrah	644	702								
	24-Parg	737	702	2b	Hoogley	749	784				
	Singbhum	797	802		Patna	813	822				
	Cuttack	745	772		Midnapore	830	865				
					(Bhagalpur	832	821)				
1c	Durg	706	864								
	Dhanbad	646	675								
	Sundargarh	630	790								

CHILD÷POPULATION RATIOS

		1961 males			1961 males			1961 males
1a	Bilaspur	13.5	2a	Bastar	13.6	B-3	Baudh	9.3
	Ranchi	13.1		Bankura	13.6		Raigarh	13.7
	Mayurbanj	12.6		Birbhum	13.1		Bolangir	14.2
	Bhagalpur	12.7		Ganjam	14.6		Calcutta	7.2
				Gaya	13.5		Shahabad	13.0
1b	Burdwan	10.3		Monghyr	14.2		(Bankura	13.6)
	Howrah	9.6						
	24-Parg	10.5	2b	Hoogley	10.5			
	Singbhum	12.9		Patna	12.8			
	Cuttack	11.0		Midnapore	12.5			
				(Bhagalpur	12.7)			
1c	Durg	11.2						
	Dhanbad	10.2						
	Sundargarh	9.3						

DECADAL GROWTH

		1951-61	61-71			1951-61	61-71			1951-61	61-71
1a	Bilaspur	140	57	2a	Bastar	44	111	B-3	Baudh	11	220
	Ranchi	63	62		Bankura	29	24		Raigarh	21	27
	Mayurbanj	206	41		Birbhum	46	24		Bolangir	22	75
	Bhagalpur	53	19		Ganjam	36	67		Calcutta	8	8
					Gaya	30	28		Shahabad	28	40
1b	Burdwan	73	59		Mongyhr	40	23		(Bankura	29	24)
	Howrah	58	23								
	24-Parg	64	49	2b	Hoogley	47	34				
	Singbhum	55	45		Patna	30	35				
	Cuttack	53	47		Midnapore	32	26				
					(Bhagalpur	53	19)				
1c	Durg	200	68								
	Dhanbad	294	120								
	Sundargarh	783	79								

Notes:

Model allocation:

1951-61 % decadal Growth	Model
100+	1c
50-100	1b
30-50	2b
30-	B-3

1961 sex ratio 50%>b = a

See Table 6.1a for Models

Table 6.2

Demographic Indices from the Study Districts over Two Decades

	Decadal 1941-51	Growth (%) 51-61 (sex ratios below)	61-71	% aged 0-4 1961	current migration rate 1961 (previous average)[a]	sex ratio current migrants (previous average)[a]
E.MADHYA PRADESH						
Durg	30	200 (706)	69 (864)	12.9	14.3 (7.9)	649 (544)
Bilaspur	12	140 (901)	57 (907)	14.2	9.9 (3.8)	701 (853)
Bastar	14	44 (903)	111 (846)	13.8	11.7 (3.4)	560 (797)
Raigarh	55	21 (901)	27 (901)	13.9	8.1 (3.1)	658 (868)
Case-Study Selected Towns						
Bhilainagar	- to	86,116 (486)	102 (799)	b	n.a.	
Bilaspur		122 (893)	13 (51)[c] (897)		.	
Rajnandgaon		92 (944)	25 (932)		.	
Korba	- to	12,424 (705)	149 (815)		.	
Jagdalpur		48 (891)	54 (874)			
Chirmiri	-ve to	6563 (792)	35 (836)			

Notes: a average in-migration rate for the previous 5 years (see text for interpretation); ditto sex ratio. (f:m).

b n.a., but see Table 6.7 for % aged 0-14.

c including outgrowth

Table 6.2 continued

	Decadal Growth (%) 1941-51 (sex ratios below)	51-61	61-71	% aged 0-4 1961	current migration rate 1961 (previous average)	sex ratio current migrants (previous average)
WEST BENGAL						
Howrah	22	58 (644)	23 (702)	11.4	5.2 (3.0)	593 (481)
Calcutta	25	8 (612)	8 (636)	8.8	3.0 (2.2)	382 (381)
24-Parganas	50	64 (737)	49 (702)	12.2	4.8 (3.3)	676 (893)
Hoogley	23	47 (749)	31 (784)	12.1	6.0 (3.3)	788 (854)
Burdwan	45	73 (699)	59 (785)	12.1	4.5 (2.9)	820 (595)
Midnapore	34	32 (830)	26 (865)	12.5	3.4 (2.3)	720 (791)
Birbhum	14	46 (844)	24 (893)	14.0	4.8 (2.8)	768 (1017)
Bankura	3	29 (905)	24 (920)	14.0	2.5 (1.7)	1339 (908)
ORISSA						
Mayurbanj	12	206 (810)	41 (840)	14.0	5.8 (3.2)	414 (499)
Sundargarh	-	783 (630)	79 (790)	11.6	11.1 (5.6)	698 (820)
B-K	-4	11 (949)	221 (865)	11.2	1.7 (2.8)	93 (743)
Cuttack	40	53 (745)	47 (772)	12.6	7.4 (2.3)	440 (636)
Ganjam	27	36 (951)	67 (955)	13.7	3.8 (1.7)	566 (1089)
Bolangir	37	22 (923)	75 (923)	14.3	6.7 (3.0)	1130 (1173)

Table 6.2 continued

	Decadal Growth (%) 1941-51	51-61	61-71	% aged 0-4 1961	current migration rate 1961 (previous average)	sex ratio current migrants (previous average)
BIHAR						
Gaya	23	30 (861)	28 (874)	14.4	4.2 (2.0)	551 (842)
Patna	31	30 (813)	35 (822)	13.8	5.1 (2.4)	633 (602)
Shahabad	24	28 (846)	40 (845)	13.8	5.3 (1.8)	555 (618)
Bhagalpur	22	53 (832)	19 (821)	13.8	3.2 (1.9)	429 (665)
Monghyr	29	40 (903)	23 (864)	14.8	2.9 (1.9)	660 (897)
Singbhum	33	55 (797)	45 (802)	14.3	5.4 (3.0)	785 (653)
Ranchi	63	62 (817)	76 (815)	13.9	8.5 (3.1)	659 (654)
Dhanbad	87	294 (646)	120 (675)	12.8	8.8 (4.2)	471 (543)

Sources: Government of India, <u>Census of India 1961, 1971</u>, (relevant States), General Population Tables, Social and Cultural Tables (C II), Migration Tables (D III), Delhi.

Table 6.3

Sex Ratios among Workers in Manufacturing Industry

District (Urban Area)	Sex ratios female to male with % of female manufacturing labour in household industry (bracketed)	
	Household Manufacturing	Non-Household Manufacturing
WEST BENGAL		
Calcutta	.088 (12)	.018
Howrah	.066 (9)	.021
24-Parganas	.154 (15)	.031
Hoogley	.327 (8)	.057
Midnapore	.227 (44)	.048
Burdwan	.363 (22)	.028
Birbhum	.172 (23)	.120
Bankura	.487 (73)	.133
BIHAR		
Patna	.322 (77)	.048
Gaya	.562 (82)	.064
Singbhum	.211 (15)	.062
Ranchi	.411 (65)	.074
Dhanbad	.156 (28)	.058
Monghyr	.467 (80)	.051
Shahabad	.428 (80)	.053
Bhagalpur	.467 (92)	.059
MADHYA PRADESH		
Raigarh	.877 (65)	.191
Durg	.595 (46)	.067
Bilaspur	.795 (79)	.219
Bastar	.682 (42)	.247

Table 6.3 continued

ORISSA		
Mayurbanj	.498 (94)	.024
Sundargarh	.155 (14)	.073
B-K	.755 (84)	.667
Cuttack	.225 (73)	.035
Ganjam	.776 (86)	.138
Bolangir	.583 (81)	.137

Source: Government of India, Census of India 1961, General Population Tables (relevant States), Delhi.

Table 6.4

Examples of Age Distribution in Stagnating Areas

CALCUTTA DISTRICT male population, proportions by age (with comparisons)

Age	Proportion		Comparison	
0-4	.072	.251	Burdwan	.345
5-9	.093			
10-14	.086			
15-19	.088			
20-24	.119			
25-29	.118			
30-34	.106			
35-39	.087	.281	Cuttack	.244
40-44	.073		Asansol	.253
45-49	.049		Patna	.244
50-54	.042			
55-59	.030			

Table 6.4 continued

Calcutta's age distribution continued

Age	Proportion		Comparison
60-64	.019	.039	Cuttack .046
65-69	.010		Burdwan .041
70+	.010		Asansol .031
			Burnpur .022

Comparison with Stable model used as basis of this analysis:

Calcutta 35+ .320 Model .242

BAUDH KHONDMALS URBAN DISTRICT (Orissa) male population and female population

Age	Proportion (m,f)			
0-4	.093	.342	.131	.364
5-9	.139		.142	
10-14	.110		.091	
15-19	.100		.094	
20-24	.107		.085	
25-29	.087		.086	
30-34	.079		.069	
35-39	.064		.071	
40-44	.056		.046	
45-49	.043		.045	
50-54	.048		.046	
55-59	.028		.029	
60-64	.023	.040	.031	.065
65-69	.016		.008	
70+	.010		.026	

Sources: Calcutta, Government of India, Census of India 1961, West Bengal, Social and Cultural Tables; Baudh, G.O.I., Census of India 1961, Orissa, Cultural and Migration Tables, Delhi, Tables CII and CIII.

Table 6.5

Origins of the Migrant Men in Case Study Areas, 1961

BURDWAN DISTRICT
(West Bengal)

Burdwan City	Proportion from each origin		Proportion from urban origins (in each row, with weighted average at end of column)
from Same District (SD)	0.36		0.28
Another District (OD)	0.28		0.36
Another State (OS)	0.36		0.27
Tot.	1.00	w.a.	0.30
Asansol City			
SD	0.23		0.34
OD	0.23		0.50
OS	0.54		0.29
	1.00		0.35
Other Towns Durgapur, Burnpur etc.			
SD	0.31		0.17
OD	0.18		0.31
OS	0.51		0.24
	1.00		0.23

Note: Table 5B.1 for urban District-wise data

Table 6.5 continued

EASTERN MADHYA PRADESH

Durg District:		
Durg Town Group		
SD	0.15	0.11
OD	0.12	0.43
OS	0.72	0.30
	1.00	0.28
Other Towns		
SD	0.50	0.10
OD	0.13	0.46
OS	0.37	0.34
	1.00	0.23
Bilaspur District		
SD	0.44	0.12
OD	0.21	0.45
OS	0.35	0.53
	1.00	0.33
Raigarh District		
SD	0.33	0.11
OD	0.30	0.29
OS	0.37	0.41
	1.00	0.28
Bastar District		
SD	0.31	0.14
OD	0.23	0.58
OS	0.46	0.46
	1.00	0.39

Source: Government of India, Census of India 1961, (relevant States), Migration Tables, Delhi, derived in conjunction from Tables DII and DV.

Table 6.6

Comparison of Growth of Manufacturing and General Populations in Selected Towns of Eastern Madhya Pradesh

Town[a]	Decadal Growth in Population (%) / % of male workers in manufacturing in 1961 bracketed below (factory) / % growth 1961-71 of male workers in manufacturing bracketed alongside			Principal Manufactures (1971)
	1941-51	1951-61	1961-71	
DURG DISTRICT				
Bhilainagar (86116)	-	- (55)	102.5(22.1) (15.6)	pig iron, steel shapes and rail
Durg (47114)	20.8	132.7 (28)	50.2(-22.7)	poha oil, brass metal
Rajnandgaon (44679)	22.4	91.8 (34)	-7.8(-35.4)	pulses, poha, cloth, cement pipes, curtains
Dongargarh (14119)	27.3	12.1 (10)	4.4(9.5)	groundnut oil, bidi, charcoal
BILASPUR DISTRICT				
Bilaspur (86706)	4.4	121.8 (11)	13.5(0.4) 50.8[b]	bidi, soap, bronze & brass utensils
Korba (12424)	-	- (5)	149.2(101.1)	coal, kosa
Champa (16258)	20.7	36.5 (7)	12.7(36.3)	kosa cloth, bronze utensils, ornaments
SURGUJA DISTRICT				
Manendragarh (9708)	9.0	79.0 (2)	21.7(68.8)	exports: oilseeds, coal, lakh
Ambikapur (15240)	21.7	47.1 (8)	51.1(65.6)	exports: oilseeds, timber
BASTAR DISTRICT				
Jagdalpur (20412)	22.0	48.0 (11)	53.6(7.7)	kosa cloth, bell-metal goods

Notes: a Municipalities, not Urban Agglomerations
b Urban Agglomeration

Sources: Government of India, Census of India 1961, 1971, Madhya Pradesh, General Population Tables, and Town Directory (1971), Delhi.

Table 6.7

Youth Dependency Ratios in Selected Towns of Eastern Madhya Pradesh

Town	Proportion of Population aged 0 - 14: 1961	1971	Decadal Growth of Population 1961-71(%):[a] Male	Female
Bhilainagar	.250	.421	67.3	174.9
Durg	.232	.424	39.4	49.7
Rajnandgaon	.375	.398	25.8	17.2
Dongargarh	.378	.404	30.6	28.1
Rajhara Jharan Dalli (iron ore colony) 23346	.232	.421	-0.0(-100.0)[a]	36.4
Bilaspur	.375	.395	12.8	14.3
Korba U.A. (includes mining area)	.296	(.398)[b] .389	(50.5 146.9(20.8)[a]	51.1)[b] 185.4
Champa	.344	.390	10.2	15.3
Ambikapur	.385	.408	51.4	61.0
Manendragarh	.361	.409	23.3	33.5
Jhagrakhand (colliery) 5744	.297	.372	44.0(20.0)[a]	50.4
Chirmiri Colliery 6563	.344	.377	31.7(8.0)[a]	39.1

Note a-Some mining towns have been added to the selection given in Table 6.6 above. The growth of mineworkers from 1961-1971 is given in brackets. b Urban Agglom.

Source: As for Table 6.6, with addition of General Economic Tables for 1971, Table B I.

Table 6.8

Demographic Characteristics of Major Towns in Burdwan District

1961 Town & Population	Sex Ratio (f:m)	Per Cent: under 15	over 59	% of male workers in factory manufacturing	Major Manufacture
Asansol 103405	.664	37.2	3.6	20.1	locomotives, garments, vehicle repairs
Burnpur 65284	.653	36.6	2.5	68.4	iron & steel, railway equip.
Burdwan 108224	.789	37.2	4.5	16.2	flour & rice, sweetmeats, textiles
Durgapur 41696	.338	21.2	1.4	60.0	iron & steel
1971 (Decadal Growth)			Male pop. growth		Additional Products
Asansol (54.6)	.752	41.4	48.6	21.8	liquid oxygen, liquor, glass
Burnpur (31.4)	.764	41.7	23.3	67.2	-
Burdwan (32.4)	.807	36.6	31.2	11.5	mustard oil, steel furniture, soap
Durgapur (395.6)	.764	39.1	275.7	56.3	bricks, fertiliser, food & beverage

Note: Decadal growth rates are given as percentages.

Source: Government of India, Census of India 1961, 1971, West Bengal, General Economic Tables, Delhi, Table B I; Government of West Bengal, District Census Handbook 1961; and Town Directory 1971 (G.O.I. Census cited above).

Table 6.9

Backward Classes in Developing Areas

Urban Locality	% of Backward Classes in Population[a] 1961	1971	Sex Ratio: of BCs 1971 (f:m)	of TP[b] 1971 (f:m)	% of male workers in factory manufacturing (or mining)[c] 1971: BCs	TP
Durg District	9.8	8.9	.906	.864	29.1	38.5
Bhilainagar Steel Town	7.1	6.1	.798	.795	0.0	61.5
Rajnandgaon	6.7	8.3	.970	.932	45.9	29.0
Dongargarh	7.1	12.2	1.072	1.002	21.3	12.3
Chirmiri Mining Colony	20.1	28.8	.836	.941	83.1	76.9
Surguja District (mining)	17.1	18.5	.915	.847	49.8	37.3
Burdwan District:						
Durgapur Steel Town	5.8	12.3	.842	.764	2.8	56.3
Chittaranjan (loco works)	7.0	6.4	.702	.774	74.5	85.1
Jamuria (mining)	22.5	34.5	.899	.792	22.1	28.2
Raniganj (r+u) (mining)	35.1	29.1	.794	.695	40.3	38.5
Burdwan City	10.6	7.8	.913	.806	15.5	11.4

Sources: Government of India, Census of India 1961, 1971, (relevant States), General Population Tables, and Social and Cultural Tables (Tables on Scheduled Castes and Scheduled Tribes), New Delhi.

Notes:
a The Scheduled Castes and Tribes (above) summed.
b The total population.
c Mining is substituted for manufacturing where indicated in first column.

Table 6.10

Industrial Participation of Backward Classes in Selected Districts of Eastern Madhya Pradesh in 1961

In each case the figure for the total population is included (in brackets)

District Urban	sex ratio of workers	% of males in factory manufacturing	sex ratio in fact. manufacturing
Durg District	.523(.238)	19.5 (37.9)	.356 (.067)
Bilaspur "	.678(.388)	9.4 (9.9)	.527 (.219)
Surguja "	.263(.143)	2.1 (4.7)	.246 (.078)

	% of males in household industry	sex ratio in house. ind.	% of males in mining/ construction	sex ratio in mining/ construct.
Durg	4.9 (3.6)	.642 (.595)	12.4 (10.0) (construction)	.653(.270)
Bilaspur	9.0 (10.3)	.887 (.795)		
Surguja	4.6 (5.1)	.291 (.208)	45.5 (30.0) (mining)	.049(.043)

Source: Government of India, Census of India 1961, Madhya Pradesh, Social and Cultural Tables, Tables for Scheduled Castes and Scheduled Tribes (Special Table SCT 1), and General Population Tables, Delhi.

Table 6.11

Backward Classes in Contrasting Cities of Bihar, 1971

	% of BCs in District's rural population	% of BCs in the City population	% of BCs in manufacturing/ mining (same for total pop. bracketed)
Monghyr City	17.9	6.5	17.6
Jamalpur City	17.9	10.6	42.6
Gaya City	25.8	8.6	13.4
Bhagalpur City	15.3	6.6	11.9
Developing Areas:			
Bokaro U.A.[a]	32.3	22.2	11.4
Dhanbad U.A.	32.3	16.4	4.4 75.3 (mining)
Ranchi U.A.	69.3	17.3	28.3
Jamshedpur U.A.	61.6	12.8	54.4
Comparisons from Maharashtra			
Poona District:			
Poona Municipal Corp.		6.9	
Pimpri Chinchwad (New-town)		3.9	
Junnar		6.4	
Indapur		8.0	
Greater Bombay		4.0	
Sholapur M.C.		8.9	

Note: a- Urban Agglomeration

Source: Government of India, Census of India 1971, Bihar, and Maharashtra, General Population Tables, and Social & Cultural Tables (C VIII), New Delhi.

Table 6.12

The Linguistic Composition of Burdwan District between 1961 and 1971

BURDWAN District
rural + urban

	Growth rates (decadal %) 1961-1971: males	females	Sex ratios: (f:m) 1961	1971
Bengali (1671000 males)	27.3	27.4	.934	.935
Hindi (224000 males)	25.6	56.8	.459	.573
All non-Bengali	17.1	40.4		

Non-Bengalis as % total: 1961	1971
17.6	17.4

DURGAPUR Police Station
rural + urban.

	Growth rates 1961-71: males	females	Sex ratios: 1961	1971
Bengali	119.4	207.5	.576	.808
Non-Bengali	43.1	130.8	.377	.608

Ratio of non-Bengali to Bengali Population: 1961 males	1961 females	1971 males	1971 females
0.38:1	0.25:1	0.25:1	0.19:1

Sources: Government of West Bengal, Burdwan District Census Handbook, 1961, Calcutta, Table C V.
Government of India, Census of India 1971, Social and Cultural Tables, New Delhi, Table C V (A ii).

Appendix 6.1 A Note on the Statistical Significance of Three Types of Urban Demographic Growth (Table 6A.1)

Clearly one would expect one industrial category of urban area to shade into another. Few towns are simply heavy engineering towns for instance. Their demographic characteristics would also tend to merge therefore. Nonetheless it seemed worthwhile to see how far there are distinct clusters of urban areas, with broadly similar demographic, and industrial, features within each cluster, by which the clusters might be differentiated. For a statistical assessment of this hypothesis we undertake some Discriminant analysis.

We have taken three characteristics of urban areas within our sample (of Homogeneous Districts - see Appendix to Chapter 1): (i) demographic growth rates, (ii) percentage of male working population in (non-household) manufacturing, and (iii) percentage of the latter engaged in heavy industry (defined in Table 6A.1). Each in turn is subjected to discriminant analysis to see if there are three distinct groups of towns: the three groups postulated range from high to low, - more than 55% growth, 30% - 55% growth, less than 30% growth, for example.[1] We use three variables by which to try and

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1 These can be regarded as roughly corresponding to three sets of our model types: (1 a,b,c) (2 a,b) (Base, 3).

distinguish the groups: the variables are sex ratio, child to population ratio, and elderly to population ratio.[1] The programme then investigates whether the three groups (of urban areas) can be regarded as significantly different in respect of this bundle of variables; in our case it tries out two different weighting systems, and presents them in order of significance as functions 1 and 2 (Table 6A.1).

It can be seen from the Table that the three characteristics (sex, youth, and senility) divide the urban Districts into three significantly different groups, whether the group is defined in terms of growth rates, manufacturing intensity, or heavy industrial importance. This merely confirms more strongly our contention that urban areas can be distinguished on the basis of their industrial structure (which we have shown to correlate closely with their rates of demographic growth), and that the distinguishing features do indeed include demographic structural variables like sex ratios and dependency.

More specifically, the analysis indicates predictable features and a few anomalies. The three urban growth groups are best distinguished (with 99% confidence) by a combination of the variables that gives most prominence to the per cent of

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1 The sex ratio is f:m, child population is 0-4 (m+f), elderly is 60+ (m+f).

elderly, and secondary importance to the sex ratio; taking account of children reduces the difference between the groups. The three manufacturing intensity groups are best distinguished by the sex ratio, which is a dominant variable here. Finally the heavy industrial categories are best distinguished by the sex ratio (almost as important an effect as in the previous case), and children once again detract from the discrimination; the elderly are of moderate importance in distinguishing the groups. In this latter case a second function is also significant (with an alternative weighting system), wherein the sex ratio and per cent of children retain their direction of influence, but the elderly detract from the discrimination.

A general conclusion is that sex ratios are especially associated with the character of the urban growth (its speed and industrial composition), which conforms with our observations on differential sex ratios among migrants. The observation that children are only a moderate influence, and in the unexpected direction, can be understood by noting some of the individual anomalies (that have been explained in the course of the Chapter). For instance, in the third group (e.g. the low growth areas) there are urban areas with <u>low</u> (unexpected) proportions of children due to adversely distorted age structures (e.g. Table 6.4), and in the first group (e.g. fast growth rate areas) there are urban areas with high proportions of children due to high rates of female in-migration (the Model "1 a" types) in conjunction with favourable age structures. It is constructive to note here that, as a group, the stagnating towns are not so obviously characterised by large proportions of children; but they are characterised by larger than average proportions of elderly.

Table 6A.1 Discriminant Analysis

A Urban Growth Rates: Groups (% decadal)

			≥55	54-30	<30
	Number of cases		10	10	6
	Function 1				
Significance	0.001				
Standard coeffs.					
Sex	0.7107				
Child	-0.5219				
Elderly	1.0999				

B Manufacturing proportion in workforce (%)

			≥30	29-10	<10
	Number of cases		7	14	5
	Function 1				
Significance	0.004				
Standard coeffs.					
Sex	1.6847				
Child	-0.5409				
Elderly	-0.0588				

C Heavy Industrial*proportion in manuf. lab. (%)

			≥35	<35	as for B
	Number of cases		9	12	5
	Function 1	Function 2			
Significance	0.001	0.016			
Standard coeffs.					
Sex	1.1269	1.7586			
Child	-0.6106	-0.7599			
Elderly	0.5789	-1.4743			

*Industrial Manuf. groups 32,33,34,36,37,38: described App. 5B, Note b to first Analysis.

A brief Overview of Chapter 6

A number of empirical patterns emerge in line with the Model (of Chapter 3), and some inconsistencies that the Model helps to elucidate. There are heavy industrial towns, with many working adults at one Census, and significantly more children at the next. There are some rapidly growing light industrial towns with many more women present. There are more steadily growing mixed industrial town areas with a modest proportion of adult males and fairly constant composition over time. There are wildly fluctuating mining towns. Finally there are stagnant towns with relatively more children and considerably more old people. And in the latter two cases there is a high proportion of the lowest caste groups.

PART THREE

Implications of the Hypotheses

CHAPTER 7

Demography, the State, and Social Welfare: The Housing Problem

A Summary of the Analysis

We turn to the more serious social and economic implications of these emerging demographic patterns. We consider a major "welfare" expenditure, housing. Increasing dependency experienced in newly industrialising urban areas leads to an increase in occupancy rates. But areas with low incidence of modern industrialisation continue to endure poor quality housing; and a failure of productivity to rise significantly in the wake of continued in-migration in high productivity areas results in the emergence of low quality housing. The initially high investment rates in this welfare sector are not sustained, despite increased need, i.e. dependency. It is made clear in a quantitative assessment that without dramatic change (that is hardly proposed in the planning literature) in technical construction standards, newly industrialising towns must face severe internal inequalities in housing provision. And without municipal transfers of funds towards the stagnating cities, existing housing standards will deteriorate as occupancy rises.

Demographic Recapitulation

To help focus the problem now under discussion we will recapitulate the basic demographic scenario, underlining some of the features that impinge most closely on the housing question, and restricting our review to the extreme types in our demographic continuum.

The heavy industrial towns are distinguished by the very rapid growth in their labour forces (Model types "1 c" and "1 b" or "1 a"). The first numerically large component in that growth is a category of wage labour which, for various reasons, will command an income that is perhaps 50 to 100% above the equivalent in rural areas, i.e. between Rs 7 and 10, rather than Rs 3 to 5, a day (in 1970 prices).[1] These labourers, after an initial period of living alone in the city, will rapidly form a small household, usually bringing into the town not only a wife, but up to two children already born to the couple. And within the first decade of the husband's residence in the town, a third child will be born; (the case study of Bhilainagar in Chapter 9 illustrates this process quite vividly). The point to note in the context of this Chapter is the speed of growth, and the fact that the

1 The evidence for this comes from various sources. The monthly wage of engineering workers can be obtained

single-member, or split, households are only very temporary.

In association with these migrants two other large population movements are found. The first (which actually pre-dates the core labour migration flow just described) consists of construction labour, about which we have said very little, except to note that in the case of the Steel towns where a subsequent expansion in capacity is expected, the labour is not encouraged to move away. In practice construction labour is never eager to abandon a developing city. Again, sometimes contrary to initial impressions of those who live there, a population is being established that will become far from temporary. Of greater numerical importance usually is the second population movement associated with the core migration, that is the rapid build-up of what I have termed a "multiplier" population, a migration stimulated by the prospects of supplying the goods and services demanded by the core labourers and their families. Typically

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footnote continued

from Government of India labour statistics, and, after deflating for urban-rural price differentials, compared with average agricultural incomes, or agricultural wage rates. This is a rather crude methodology, but sophistication yields roughly similar results. For similar estimates, see H. and V. Joshi and L.Deshpande, references in following note. Ved Prakash, New Towns in India, Duke University, 1969, found from a survey that average public sector incomes in the Steel Towns were Rs 2,200 per annum in 1963-4.

its incomes are only marginally superior to those in rural areas (around Rs 3 to 5 per day).[1] Again there is rapid family formation (indeed a proportion, the worst off, tend to migrate as complete families). And again the striking characteristic is the speed of growth; (in five years Rourkela grew from scattered villages to a population of 90,000; in the next decade it grew to beyond the size of Middlesbrough in the U.K., and by 1981 had reached a third of a million. At the current rate of growth it will have taken three decades to reach the size of Sheffield; the Durg-Bhilai agglomeration is already that size (1981)).[2]

This scenario has been presented as a stereotype, and the variations, in particular the different migration behaviours of different social groups or classes, will be commented upon in more detail when we come to discuss the

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1 The best comparative estimates for the service and petty manufacturing population can be obtained from the Joshis' study of Bombay, and L.Deshpande's survey of the same. H. and V. Joshi, Surplus Labour and the City, OUP, Delhi, 1976; L.K.Deshpande, The Indian Labour Market (mimeo), Dept. of Economics, University of Bombay, 1979, who kindly allowed me to read his valuable manuscript. The Labour Bureau Family Living Surveys, described in Chapter 8, indicate differentials among factory sector workers.

2 Rourkela (1961) 90278, (1971) 172502, (1981) 321326, Middlesbrough (1981) 149770; Durg-Bhilai (1981) 490158, Sheffield (1981) 477142.

strategies migrants adopt to ensure adequate housing for themselves and their families. How far the demographic implications differ in the less rapidly expanding, more balanced industrial towns, will be discussed when we analyse the planning policies actually adopted by the State.

The other extreme stereotype to recapitulate at this stage is the case of towns going into industrial decline or stagnation (Model type "Base" and "3"), of which many of the mining towns are a special case. These populations consist of fully mature families, often of two generations, with large average household size (except in the most extreme cases of out-migration). The demographic change is usually more gradual than in the growth areas. It amounts to steady out-migration of the better-endowed (usually better educated) workers, who have the higher income potential. The older generations are more likely to be left behind, as are the poorer sections of the work-force generally. This can be seen particularly clearly from Table 6.9 where we reviewed the caste composition of towns in a developing area. The stagnating towns retained their relatively high proportions of Backward Classes (i.e. Scheduled Castes and Scheduled Tribes): this is especially true of mining towns. The only case where a segment of the higher-income population remains in those towns is where the latter acquired an administrative, religious, or educational significance which ensured the presence of an elite whose bargaining power in the state political arena was not easily suppressed. This may assist the maintenance of a social infrastructure even where there is a lack of industrial prosperity.

The Housing Problem

We will now present an economic model of the problem that arises in the housing question. The first observation is that the basic economic-demographic model put forward by Coale and Hoover[1] is especially relevant in New-town growth (type "1 c"), though they did not particularly observe this fact. Before the mills begin to deliver steel (or whatever), a huge investment is required in social infrastructure. This is a net investment in the economy: the rural or urban dwelling from which the migrant comes continues to be occupied by other members of the family, or is allowed to decay.[2] For the same reason it is a net capital expenditure to

1 A.J.Coale and E.M.Hoover, Population Growth and Economic Development in Low-income Countries, Princeton U.P., Princeton, 1958, (discussed in Chapter 1 above).

2 Migrants from other urban areas may be able to realise some of the value of their abandoned asset by sale: towns typified by out-migration, however, suffer a low valuation of social assets.

the migrant, and immediate ownership is out of the question. The first implication then is that these very heavy capital expenditures (in proportion to local incomes) lasting over a ten to fifteen year period in the life of the rapidly expanding town (and to a lesser extent beyond that time) will have to be born by the State (or Central) Government, unless the local Municipality, drawing revenues from its own local incomes only, is prepared to devote most of its budget to these causes. In a quantified model (Chapter 7 Appendix, which could be read in detail at the end of this section) we estimate that the tax burden implied in this policy is prohibitive. This is simply because of the coincidence of the requirements of a large number of newly migrant labourers to a "greenfield" site, where there is no pre-existing local population with savings to invest in municipal construction.[1]

The second point to be made arises from the detailed costing attempted in the budgeting exercise (Appendix). For if investment levels are not allowed to rise on a permanent basis (i.e. regardless of the temporary problem of the huge concentration of in-migration), then housing costs must keep in line with urban worker

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1 The problem is that the whole population is at the same point in its collective life-cycle; so is industry. In both cases this is before the point of maximum saving. The Model type "1 b" would of course be a less extreme case, where there is a pre-existing local population.

productivities. As we indicated above that the rural-urban income differential reaches 100% for industrial workers, this means that dwelling costs (usually rents) borne by the industrial worker should not exceed rural dwelling costs (which usually means maintenance costs) by more than 100% (with 50% being a safer target).[1] That is to say, if we take the value of rural housing to be between Rs 1500 and Rs 2500 for a landless labourer or small farmer[2], then the new urban investment should not exceed Rs 5000 per dwelling for the core-sector industrial worker (i.e. between 2 and 2½ times his industrial income). For the remaining 75% of the (non-elite) population who are not core-sector workers (the multiplier workforce), housing costs must approximate those in rural areas experienced by the lowest income

1 Studies have shown that income elasticities of demand for housing are over 1, and increase with income. In developed countries a norm is usually established (e.g. by building societies) that the house value should not exceed 2½ times the annual income. See L.S.Burns and L.Grebler, The Housing of Nations, Macmillan, London and Basingstoke, 1977.

2 Rs 1000 was the compensation offered in the late 1950s by Hindustan Steel to the villagers whose homes were destroyed to make way for the Rourkela plant (Rs 1500 in 1970 prices). Government of India, Census of India 1961, "Social Processes in the Industrialisation of Rourkela", (Special Monograph), New Delhi.

groups (i.e. should not exceed Rs 2000). One simple but striking observation emerges from that requirement: urban housing has to adopt rural construction technology (or some adaptation thereof).

However, a third consideration complicates the picture. In a land-scarce economy, new investment in housing has a positive land cost. In terms of space alone, the social requirements of a Steel Town amount to the building of a hundred-odd villages of 2000 population size each (within the first fifteen years). To minimise land-use costs, population densities higher than those in the villages (which were initially conceived when land was less scarce) are desirable. The equilibrium population density of course depends on the quality of the land, but it should be noted that true land values (i.e. socially costed) may rise on the periphery of the new town if the neighbouring agriculture is intensified and channelled into the production of high-value cash crops (like vegetables) to feed the city.[1] Higher population densities, however, or indeed even the equivalent of rural village population

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1 The assumption is that the high industrial worker (and professional) class wages are regarded as socially optimal: otherwise problems of Second-Best valuation arise. It is certainly true that market prices of land rise on the city peripheries, sometimes enormously: see for example K.Wadhva, "Land-use Patterns in Urban Fringe Areas", Economic and Political Weekly, 2nd April, 1983.

densities, require vastly different social infrastructure if the same level of welfare is to be maintained over time. Briefly put, this is because the environment is incapable of disposing of the domestic waste or providing water for a large population (the threshold size depending partly on the local ecology) at these densities without the installation of latrines, drains, garbage disposal, and piped water facilities. Small villages can, in theory, cope.[1] These land development costs usually double the cost of providing a basic dwelling, even if the latter costs are kept low by the adoption of a rural technology: indeed sites and services alone work out at Rs 2500 (in 1970 prices) per unit before any dwelling is constructed above foundations. This implies a rent about double that we could expect the non-core sector (or multiplier) worker to afford.[2]

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1 This is not to argue that villages are inherently healthy places: with settled agriculture, disposal of waste becomes a matter of concern if diseases like dysentery and hookworm are to be avoided. But knowledge and organisation alone are sufficient to maintain levels of welfare in this case. A further pollutant comes from the burning of soft fuels: again costs are incurred if this problem is to be mitigated in cities.

2 The question here arises, should not the "multiplier" population flows cease when its productivity levels fall so far as to be unable to finance these infrastructure costs? Would not the socially optimal level of the multiplier force be about 2 to 3, rather than 4 to 5, times the core labour force? The answer might be yes,

We have now discussed the problem of funds for housing development. The other problem is immediately due to the rapidity of growth (rather than one of incomes and technology). For even given the need for high population densities and heavy social infrastructure to meet the implications of large-scale migration, high levels of

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footnote continued

if (i) the infrastructure costs were truly parametric, and not subject to technological innovation; and (ii) the migrant streams were truly undifferentiated, in that all migrants were attracted to the city by the prospects of higher incomes <u>and</u> subsidised cost of living. But in fact new technologies are constantly lowering urban development costs (while at the same time population growth is raising rural infrastructural costs as villages reach the threshold sizes referred to above), and it would be premature to argue that urban growth is potentially too costly (even though it may have been so at some time in the past). Secondly, a proportion of migrants are pushed out of the rural economy by reduced employment opportunities: these migrants may be the last to arrive in the New-towns - witness the fact that the Backward Classes are over time increasingly represented in the Steel Town of Durgapur (Table 6.9). In a political system where the rural economy is very little under social control, the achievement of welfare targets by permitting the Backward Classes to migrate where opportunities dictate may still be a less costly policy than trying to initiate programmes to meet these targets in rural areas. But whatever the answer, we will leave aside here, as we do elsewhere, the broader question of whether migrants should be restrained, and concentrate on how society does and can maintain the standards of welfare of those who do migrate and live in different types of towns.

organisation are also required to ensure optimal location of housing (to minimise the cost of meeting targeted levels of welfare over time). In the case of heavy industrial centres, it would not be premature to plan for a city of a million when the current population is a hundred thousand.[1] The pure planning problem is of course much eased in the case of a better distributed pattern of demographic growth: the Model types "2 b" (and "2 a") may be compared with the types "1 b" ("1 a") in this respect, in that the absolute volume of migration is the same, but the phasing over time is different.

To turn now to the mature towns (types "Base" and "3" in our Model), as we have said, they have a larger percentage of Backward Classes and an older population. The more they are subject to outmigration, the older,

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1 This is no new problem. Observations on the disorganised incorporation of villages as the city expands, and the resultant deterioration in welfare, are very similar whether one reads Engels on Manchester and other industrialising areas in England in the 19th Century, or Sivaramakrishnan on Durgapur today: the only difference is that the latter is growing far faster than ever did the cities in England's industrial revolution (see Chapter 2 above). F.Engels, The Housing Question, 1872; K.C.Sivaramakrishnan, "Case Study of an Indian New Town" in J.L.Taylor and D.G.Williams (eds,) Urban Planning Practice in Developing Countries, Pergamon, Oxford, 1982.

and usually poorer, they become. There is then a dis-investment in social infrastructure. Merely to maintain existing levels of welfare requires expenditure on the housing stock (for a quantification, see the Appendix). That should not, however, create so much of a problem in terms of local expenditures, as occurs with very rapid growth. But a rather more serious problem does occur. For it is not possible to upgrade the social fabric of older towns - provide drainage for instance - without a considerable degree of demolition, as well as new investment, thereby considerably increasing the costs involved, particularly those of organisation incurred in relocating, even locally, an ageing population. (At this point it might be helpful to read through the Appendix to this Chapter).

Analysis of Official Planning

We proceed now to an analysis of planning policy, with particular reference to housing, in the newly expanding towns, and the older stagnating towns, of India. The first thing that strikes us is the lack of a co-ordinating body in New-town areas. None of the Steel towns for instance had Municipal Councils, nor initially did any of them even have a Development Authority.[1]

1 K.C. Sivaramakrishnan, "New Towns in India", Indian Institute of Management, Calcutta, 1979, (mimeo).

The planning was done purely by the public sector industry, and catered exclusively for its core-sector heavy industrial work-force. As was mentioned above, the planners did envisage a "civil township" of the order of 100,000 people (given an industrial output of 1 million tonnes of steel). But the actual administrative system did no more than lay down guidelines in the form of zoning for future land use. A striking example is the case of Durgapur, where, inspite of the setting up of a Development Authority (after the initiation of the core industrial investments), the official construction of a central business area did not begin until ten years later (1971), by which time an unofficial business area had already been established, on land zoned for residential purposes only![1]

As regards housing, the public industrial companies were eager to maintain their core work-forces (some of whom had been trained in colleges at public expense to the required level in engineering knowledge, and all of whom were assumed to be acquiring an expertise on the job that made them far less dispensable than, for instance, workers in the textile industries). This requirement of retaining

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1 See K.C. Sivaramakrishnan, "Case Study of an Indian New Town", in J.L.Taylor and D.G.Williams (eds.) Urban Planning Practice in Developing Countries, Pergamon, Oxford, 1982.

the work-force implied ensuring adequate housing for employee and family. In the Steel Towns the cost of housing alone worked out at about Rs 15,000 per housing unit (in 1970 prices) for those with average incomes of about Rs 3000, plus a further Rs 6500 for land development and provision of public utilities. The total cost of Rs 22,000 per unit required a huge subsidy, if we assume the industrial core-sector workers were not prepared to pay a rent equivalent to more than, say, 15% of their income: for a rental return of 8% this would imply a property value of no more than Rs 6000 (as against the Rs 22,000 actually expended). In fact the subsidy provided amounted to around 80%. A survey carried out in Bhopal and Bhilai industrial townships (both in Madhya Pradesh) found that 40.6% and 44.8% respectively of their core industrial labour forces were provided with public housing,[1] (and it will be recalled that the core labour forces in the Steel Towns was supposed to be 7500 men in total, not, as emerged in fact, 12,000 to 15,000 (see Chapter 2 above)).

Regarding the remainder of the city's population, no provision was made at all. It was blindly supposed

1 V. Prakash, New Towns in India, Duke University, Durham, 1969.

that much of this population would be temporary, relating to construction requirements (and estimates of such labour forces run into very large numbers, averaging, for instance, 40,000 men for the public sector steel plants).[1] Assuming that this labour was actually counted at all at the 1961 Census it must have been largely classified outside the construction sector (which is recorded as quite small), and much of it was clearly enumerated outside the formal boundaries of the town (see further below). Visually it would be easy to confuse such large numbers of truly temporary workers with equally large numbers of non-temporary workers, who were to service the town in the trades and consumer goods manufacturing sectors. Indeed, in the event they will have been many of the same people.

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1 Compare V.S.D'Souza, writing about the New-town of his own residence, Chandigarh, in Punjab: "The slum problem has been allowed to grow because of misconceptions about the relationship of the slum dwellers with the community. They were regarded as a transient population catering to the temporary needs of the community such as building and road construction", Economic and Political Weekly, 18th Sept., 1976.

The author of the current thesis witnessed this blatant manifestation of blindness, followed by self-inflicted blindness, on the part of the urban Authority in this particular City, in that unauthorised housing was eventually "authorised" in the form of "labour colonies" beyond the City boundary: these were kept behind a city wall with slots in to allow access. This population amounted to 13% of the City in 1971. It was quite impossible to see it unless you went through one of the slots.

It would appear that a very sharp duality emerged in the rapidly industrialising areas. Part was planned, part was not. The low level of facilities was experienced by a population far beyond those who could be described as the poorest (and indeed the Backward Classes were initially a small minority in these towns, and in some, though not all, cases have tended to remain so (Table 6.9)). But it was not of concern to the public sector industry to provide amenities for the "multiplier" sector work-force, while the latter's own employers (insofar as this sector consisted of wage labour at all) regarded their work-force as dispensable, and hence were unconcerned about the risks of low productivity that might result from poor health or general domestic dissatisfaction. There is admittedly not much explicit evidence on this duality of attitude, but data on provision of basic amenities at place of work (included in the Labour Bureau Family Living Surveys) are suggestive. A simple index (compiled by the current author) of water supply, latrines, canteens and medical services does indicate how the lighter manufacturing industries were less likely to provide such items at their own expense than were the heavy industries (Table 7.1). The same general pattern holds regarding housing, though here the mining sector was exceptional in providing housing, but not other facilities (Table 7.2).

At the same time as not providing housing, the public authorities have often purchased land, earmarked it for future development, and then left it vacant. No private developer, or cooperative, could acquire that land for low-income housing schemes.[1] Furthermore, "Low Income Group" construction loans available from public funds were only permitted to finance up to 75% of the construction costs, the total of which must amount to at least Rs 15,000 per unit to be eligible (in 1977 prices, or about Rs 8000 in 1971 prices). What was clearly required was for rather lower cost schemes to be implemented on public land. The Housing and Urban Development Corporation had expended Rs 2590 million by the mid-1970s, but only Rs 40 million (1.5%) was for sites and services schemes (according to press reports). As time went on, it was not as though funds were theoretically lacking at the local level of the New-towns, and least of all in the the thriving new industrial towns built on the oil and chemicals boom in Western India, but without a Municipal Authority in existence there was very little attempt to mobilise them. Of the public sector Steel Towns for instance only Durgapur accepted an authority (a Notified Area Authority) with

1 The inevitable squatting that takes place on such land eventually becomes legitimised, as the author has witnessed in Poona, with the resulting complications of re-planning that becomes necessary when drainage and water are supplied, all of which could have been organised or prepared for in the first place.

power to levy a rate on the various company townships that loosely made up the urban agglomeration (as it became called). And in some cases where funds were mobilised through the eventual creation of a Municipal Authority, they were kept, like the land, for more spectacular purposes than co-operative housing, - the New-town of Pimpri-Chinchwad in Maharashtra (in our comparative case-study area) being an outstanding example.[1] But in the case of these rapid growth towns the effect of keeping funds idle is to encourage unplanned development of a socially costly nature: again the case of Pimpri-Chinchwad comes to mind, where unauthorised housing has severely encroached on the main Bombay-Poona highway.[2]

Official attention in the 1970s began to dwell upon (or at least hover over) some of the contradictions mentioned above. In 1972 the Working Group on slums reported to the Planning Commission on fifteen years of slum clearance and improvement schemes.[3] It is indicative of the failure to grasp the dynamics of the

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1 V.K.Bawa, "Industrialisation, Urbanisation, and Planning in the Pune Metropolitan Region: A Study of Pimpri-Chinchwad", paper presented to the 7th European Conference on Modern South Asian Studies, London 1981, collected papers in press, eds. K.A.Ballhatchet and D.D. Taylor.

The author of this thesis heard the City described on more than one occasion as being flush with funds, which were reserved for (among other things) the building of a stadium.

2 Reported in local press, e.g. Poona Herald, 22nd Oct. 1980.

3 Government of India, Planning Commission, Report of the Working Group on Slums, New Delhi, 1972.

problem that the Group's terms of reference were confined to cities of a population of 300,000 and over alone. To the credit of the Group, they did point out this anomaly: "slum growth is not exclusive to Metropolitan Cities and is prevalent to a varying degree in almost every town".[1] By the time of the 1971 Census the Steel Towns' insubstantial (or "katcha") housing stock had reached between 10% and 20% of the total (Table 7.3), but in 1961 when the previous enumeration was made none of these towns had reached 300,000 in size, so that concern with slum growth would have been regarded as premature. Similarly, the deterioration of housing stock of more substantial quality (or "pucca" housing), and the continued low level of basic amenity provision, ensure that the populations in those stagnating industrial cities that have the misfortune to be smaller than 300,000 in size, will continue to lag behind the larger cities' populations in their quality of life (as they do also in their average incomes and hence in their

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1 An anecdote quoted to the author comes to mind. Research students at a University in Northern India were given the brief to investigate the possibility of a project analysing the slum areas of small towns in Uttar Pradesh. They reported back utterly perplexed, and asked for a clear indication of what areas of small towns they could possibly <u>exclude</u> from the definition of a slum. (Reported to the author by Professor Bigit Ghosh of the School of Planning and Architecture in New Delhi).

taxable base). Provision of "welfare" tends to be regressive also. In Table 7.4 we have assembled the data provided by the Municipal Authorities to the Census Authorities in 1971 on local expenditures and amenity provision; I select "protected water supply" as an example. Considerable ommissions (noted at the foot of the Tables) constrain the quality of these data, and a detailed discussion would demand too much faith in their precision, but, for what they are worth, we can draw attention to some general implications. Not surprisingly the standards of amenity provision deteriorate inversely with town size (from 100% in the larger to a mere 40% in the smaller towns of Madhya Pradesh, for example); and yet the smallest town class sizes in these data contain towns that are far larger than the threshold village populations that might be able to deal with fresh water supplies (for example) without raising resources for social expenditure. These class-wise averages tell us nothing of course about the distribution of amenities within those classes (some of whose towns will be growing and prospering, while some stagnate or decline), nor do they tell us anything about the distribution of amenity provision within individual towns. The larger cities might be more clearly dual cities, in the sense noted above. But there is little a priori reason to assume this, and indeed the only city within our area to have instituted a fairly comprehensive slum rehabilitation scheme at an early date was Calcutta, with 100% grant from Central Government, as recorded in the above-mentioned Planning Commission report.[1]

At the end of our period of current reference a further committee reported to the Ministry of Works and Housing on slum clearance and environmental improvement schemes. The latter programme has been transferred to the State administration (a major advance, given the lack of Municipal Authorities in New-towns and the lack of a local tax base in the declining towns).[2] The recommended policy, which is fully costed out, is approaching the possible: i.e. land and service provision

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1 In 1975 the author was told by the Secretary of Calcutta Metropolitan Development Authority that this scheme was concentrated in the North of the City (Baranagar especially); the vast areas in the South (around Garden Reach) had to await the World Bank financed project of the late 1970s.

In the mid-1970s Bombay instituted a large slum clearance (not upgrading) scheme in several Northern Wards of the City. Relocation was supposed to be to prepared sites, but these included distant areas like Deonar (on the main highway inland), some of which were reported not to have been "prepared" at all, and which, in any case, as the author observed, are highly polluted and generally in need of drainage. (See Economic and Political Weekly, 4th October, 1975).

2 Government of India, Ministry of Works and Housing, Report of the Committee set up to Review the Slum Clearance/ Improvement Scheme and Scheme for Environmental Improvement in Slum Areas and Other Matters, New Delhi, 1975.

costing Rs 1850 per unit in 1975 prices, and materials provided for do-it-yourself construction, worth Rs 150, the total amounting to below Rs 2000 in 1970 prices. And for the first time there is a recommendation to prepare and use hilly and low-lying land and even land earmarked for parks. As our calculations in the Appendix to this Chapter suggest, these costs are still a little too high for a comprehensive housing of the incremental urban population, and besides, the problem of a backlog still remains. Furthermore they do not address the question of the deteriorating standards in the older towns, or the declining towns (or the old-town areas in the modest-growth towns, like Patna, Cuttack, or Poona). Laudable as it is to stress the need for safe water, and electrification, in villages, the same applies to the more "backward" towns which are areas of out-migration and declining productivity just as much as are the backward villages.

Strategies adopted by the People themselves

We have reviewed official planning policy on growing and stagnating towns and cities (relevant to the cases under our study): on the whole we have condemned it as inadequate. What then have been the unofficial strategies adopted by the people themselves to bridge the gap between their perceived needs (but insufficient purchasing power or collective organisation) and the provision of social infrastructure by authorised bodies? Can these strategies be relied upon to ensure a reasonable level of welfare, or more concretely, an increasing life-expectancy for example (toward which the social infrastructure on which we are concentrating is an undoubted contributor)?[1] For our evidence we turn again to the Census, from which we can make suggestive inferences regarding residential behaviour, specifically from the tables on migration. Secondly, we attempt some assessment of the degree of unauthorised hutment building in the areas under study, and its adequacy (though here, for reasons discussed in the notes to the Tables, the quality, or comparability, of the data leave much to be desired for our interpretations to be conclusive).

It is sometimes taken to be an obvious strategy for migrants to keep their families permanently divided. In the past that was believed to be the natural way of relieving the urban authorities (or private industrialists) of the economic costs associated with the agglomeration of large populations, and, at the same time, it could

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1 Good housing could be regarded as a "merit" good, worthy of provision in itself on direct welfare grounds. That it also contributes to better health is widely postulated, but not so precisely documented: see M.Bapat and N.Crook, "The Environment, Nutrition, and Health in Urban Hutment Settlements: a study of Poona" (manuscript submitted to Habitat International) and references therein.

happily be rationalised in the case of North India on the grounds that the Hindu culture did not expect a woman to work outside the house: hence, interestingly, Conlon, writing about the housing problem in Bombay in the 19th Century, need hardly allude to the question of providing <u>family</u> housing.[1] Tables 8.4 (and 8.7) below indicate that Bombay and Calcutta have a higher than average proportion of single-member, predominantly male, households. Table 7.2 shows how industrial labour in the oldest textile Cities is still predominantly housed in "pucca" chawls (witness Bombay and Ahmedabad). Furthermore, the sex ratios of migrants from other States living in these Cities remain remarkably skewed at least as late as 1961, and in the particular case of Bombay, where we have later data, down to 1971,(Table 7.5 - note Bombay, Calcutta and Howrah; the same can be shown for Ahmedabad). This is despite the fact that these are not the fastest growing cities where men tend to predominate awaiting the arrival of their wives: that is to say, their sex ratios are permanently skewed (being more so than our Model would predict from their modest growth rates.) If we look at the more specific areas of origin of these migrants, we

1 F.C.Conlon, "Working Class Housing in Colonial Bombay", paper presented at the 7th European Conference on Modern South Asian Studies, London, 1981, collected papers in press, eds. K.A.Ballhatchet and D.D.Taylor.

find that those from Uttar Pradesh are particularly prone to remain single (as they always have been, Table 7.5a and 4.2 for the case of Bombay). Of course, split families are not an impossible solution to the housing problem, but such a policy, if officially adopted, would be socially restrictive, and not necessarily attract the most potentially productive (or the fittest) migrants - simply those under acute economic stress. Industrialists in the heavy industries were quickly convinced of the need to attract whole families to migrate (as we noted above), and all the evidence from other urban areas shows that only a small minority, even of the more long-distance migrants, prefers to remain as a split family, given the opportunity to do otherwise (Table 7.5).[1] That is to say, by the mid-20th Century the preference (if it ever existed) of the Indian workers to keep their womenfolk back in the village was much reduced. Table 7.2 shows that the first Steel City of Jamshedpur

1 The evidence here, and that given in Chapters 4 and 5, suggests that the long-distance migrants are divided into two streams: those attracted and recruited and able to find family housing in the city; and (a smaller contingent) those under acute pressure, but not destitute, who will migrate singly to help out the family income, like those from Uttar Pradesh, and to a lesser extent Bihar. The interpretation is generally consistent with findings from village surveys: J.Connell et.al., Migration from Rural Areas, O.U.P., Delhi, 1976.

(a private Company Town of the Tatas) had housed 43% of its industrial work-force in flats by the late 1950s (as against chawls or bustees), and even Asansol, a modern industrial City in Burdwan District, managed 18% at this relatively high standard.[1] It is clear from the 1971 Census that migrants from the other States to the Steel Towns were forming families in the New-towns like other migrants: in both Rourkela and Durgapur there are 700 women to a thousand men, still below the ratio experienced by short-distance migrants, but above that for 1961 when these towns were recently formed (Table 7.5a).

The other strategy that might be adopted by the migrant labour forces is to seek accomodation in neighbouring villages, and to commute from there. Insofar as migrants remain single men, this would show up as a distorted sex ratio in the neighbouring villages. As Table 7.6 shows, there is no evidence of such a strategy being adopted in

1 The Manager of a petro-chemical complex at Vellore in Madras told the author of this thesis that local people could not be persuaded to migrate without assurance of adequate services. His company provided workplace facilities, but not housing, as this proved to be prohibitively costly. (His firm could have taken out a loan, but as with Tata Steel, it is only after a lapse of time that the value of a more satisfied labour force becomes apparent; see Chapter 5 above).

the environs of the newly industrialising areas, with the possible exception of the Durgapur complex. (In Burdwan generally it is important to distinguish between the mining and other rural areas, since mining settlements are often defined as rural, when manufacturing towns of similar size might not be). It is true that Durgapur locality (tehsil) had a heavily distorted sex ratio in 1961, though not so in 1971: as a temporary expedient the migrants may have housed themselves in the neighbouring villages. In the case of Durgapur we know that such villages became absorbed within the new townships' areas. Similar practice of migration residence is reported for Bhilai, though it does not show up in the Census of 1961, possibly because the villages were partly included in the urban area already.[1] We observe a substantial proportion of houses recorded as having "roofs of thatch" in Bhilai in the 1961 Census (Table 7.3); but there are none in Durgapur until 1971, when they mushroom to 20% of all dwellings, presumably as a result of the incorporation of villages.

Of equal importance would be evidence of complete families taking up residence in surrounding villages, the husband commuting to the city. These should be

1 S.D.Badgaiyan, "A Sociological Study of the Effects of Industrialisation of Bhilai on the Surrounding Villages", Ph.D. thesis, Department of Sociology, University of Delhi, 1974.

recorded as resident in the rural areas of the District but engaged in industrial occupations. Table 7.7 indicates the extent of this practice in the Steel town areas. Again there is very little evidence of factory sector employees in the core industry residing in villages, and virtually none (less than 1%) of the iron and steel workers do so, with the exception again of Burdwan District (where 10.8% of these workers are recorded in rural localities).

What can be said of the strategies adopted by the non-core sector workers? The first point that should be made is that in the industrial towns (of light or heavy industry) outside of the major Metropoles (Bombay and Calcutta) it is the majority's behaviour to try and form the family within the area of employment: in all cases the sex ratios improve over time. This strategy is clearly achieved by building one's own dwelling on private or public land, or by renting from private landlords (or slumlords) dwellings of similar quality, or, to a lesser extent, by renting a room in an existing house in the old-town area of a City . The Census is not very helpful in identifying the extent of this practice, since its definition of housing quality depends simply on the materials used in construction. Studies of hutment settlements have shown that such hutments are rapidly upgraded by the occupants (if owners) themselves, so that materials alone become a rather inadequate indicator of deprivation or lack of planning: it is possible to have a solid roof but not even a shared latrine. These studies emphasise another point (that should also have become clear from our Census analysis by now): most hutment dwellers regard themselves as permanent, given the restricted scope of the private or public formal housing provision.[1] Hence to argue that services provision (latrines and drinking water, for example) is an unnecessary luxury in what amounts to an encampment, is wrong. Field surveys depict about 40% of the habitation in the three Steel Towns as slums by the mid-1970s (the same being true of the later Steel Town of Bokaro).[2] The Census recorded 30% of the houses in Bhilai as being constructed of "roofs of grass" in 1961, and 21% in urban Sundargarh (there being no specific information on Rourkela itself), but barely 0.5% in Durgapur, probably for reasons outlined above, (Table 7.3). In some cases these proportions are above, in some cases below, the State average, and sometimes they increase and sometimes decrease over the decade. The

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1 M.Bapat, Shanty Town and City: the Case of Poona, Pergamon, Oxford, 1982.

2 K.C.Sivaramakrishnan,"New Towns of India" (mimeo), Indian Institute of Management, Calcutta, 1979.

most one can safely say is that the existence of insubstantial dwellings emerges in all the heavy industrial towns, and is still apparent after the lapse of a decade (but it is quite impossible to make a useful comparison with the other towns in our area). Certainly the prestigious New-towns in our study did not escape this urban phenomenon (Table 7.3).

A little more analysis may be made of the populations within these urban areas of industrialising Eastern India. It was argued earlier that the non-core workers in the rapid growth heavy industrial towns came substantially from local areas. Local migrants have higher sex ratios (f:m), indicative of earlier or more universal family formation (Table 7.5). The question of split families arises even less here. This is also true of the more Backward Classes among migrants, who, as we have said before, are also more local. The sex ratios among the Scheduled Castes is always above average (Table 7.8). As these migrants are more likely to have been forced out of their agricultural livelihood it is not surprising that the whole family migrates. On construction labour, an occupational group of predominantly low socio-economic status, there is evidence of rural residence (Table 7.7) while their employment is almost certainly in the rapidly expanding towns. In 1961, for instance, there were recorded some 23,000 formal sector construction workers in the Raipur Division of (Eastern) Madhya Pradesh, of which only 13,000 were resident in urban areas, and of these only 9000 in the towns in Durg District, although the majority of the 23,000 must have been employed at some time in building Bhilai steel works (and Town). Of the services and trades sector workers in these cities, whose employment is usually more permanently dependent on the core-manufacturing process, we cannot say anything definitive regarding residence. Some of these must be seasonal migrants and hence unrecorded in the towns at time of Census taking: but their presence in the towns is related to marketing at harvest or at festivals, and is of short duration, and they are usually only a minority (except in centres of pilgrimage). On balance it seems that most of the low-income population in out towns will have sought residence as well as employment within the urban boundaries. Rapid growth will not have made the organisation of this very easy. Nor do migrants fully appreciate the effect of the coincidence of so much of the population in the same age cohort implying a coincidence of family formation and dramatic increase in the demand for space.[1]

An industrial sub-group that retains a tradition of split families are the miners (see further in Chapter 8 below). This is apparent whether we observe the urban or the rural areas of mining districts. We can see also that these areas have a particularly high concentration of Scheduled Castes and Tribes (Table 6.9). These Backward Classes, however, retain higher sex ratios than average, and we infer therefore that they are not dividing their families,

1 The author visited a number of hutment settlements that had grown very rapidly in the City of Poona in 1980. Areas bounded by existing buildings or natural features had often been settled upon initially, but very soon the area had become heavily populated. The local communities' own attempts at re-organisation to make way for drainage, for instance, proved frustrated in some cases by the difficulty in accomodating the re-aligned hutments within the same settlement area. Inevitably tensions arose: the author's interpreter vividly described one settlement as a case of the "Lord of the Flies". But on the whole the author was more impressed by the attempts at organisation than by the lack (or frustration) of them. Rapid demographic growth over a short period was not given as a cause of conflict or resentment, but it was cited as a reason for the repeated need to press the Municipal Authority for more toilet facilities, merely to maintain the existing standards, in one settlement populated predominantly by industrial workers: one of the author's informants pointed out that the settlement had grown from 138 huts in 1965 to between 1,400 and 1,500 in 1980, a tenfold increase over fifteen years. These anecdotal observations are unlikely to be very different from those one could make in some of the rapidly growing Steel Town hutment areas.

(Table 7.8). Indeed the Backward Classes will be predominantly locally born. Even among miners the Backward Classes remain a minority (though a much larger one). The rest of the mining population consists predominantly of divided households, with single males being housed in Company housing (88% in Raniganj, 74% in Jharia so housed, for example, Table 7.2). They are extremely badly provided with facilities at home or at place of work, over 90% being without a communal latrine in the late 1950s (Table 7.1, 7.2). This poor quality of welfare cannot be attributed to lack of planning during rapid demographic growth. Here is an industry where it apparently remained profitable to keep the work-force present on a temporary basis. Mining towns are subject to rapid growth and decline, and are inherently very unstable demographically (shifting rapidly from our Model type "1" to type "3"). The full demographic implications are mitigated by the migrants retaining a stronger link in the rural areas than do other industrial groups. The male workers, however, suffer from the under-provision of facilities, and the whole population, 50% of which after all does consist in complete families, suffers from the inadequate urban infrastructure, from investment in which no-one sees any long-term financial gain.

From Table 7.5 it can be seen that the stagnating towns (characterised by urban areas of Districts like Shahabad or Bankura) have exceptionally high sex ratios among the short-distance migrants, and among migrants from urban areas (with more females than males frequently occurring in the latter case). Male members of the household will have sought employment back in the place of origin, or more likely in another town. Such high sex ratios must indicate out-migration, in some cases net out-migration (and this is confirmed by the household sex ratios in small households, in Chapter 8); its particular high incidence in the case of migrants from urban areas is a reminder that the better endowed will be more mobile and more able to depart if prosperity dries up. Since figures on housing give no indication of the value of housing stock, we cannot tell whether such families manage to maintain their housing in good order despite the unfavourable age and sex ratios they experience. What is clear, however, is the following: the dependant family does not return to some rural haven whence it came, nor does it migrate out with the potential job-seeker to a new urban location. This underlines the need to regard the declining towns as particularly vulnerable to deteriorating standards in whatever low levels of residential welfare and infrastructural provision they had once acquired. The only problem they may escape is that of over-crowding over time, although some of the slower growing areas (which are subject to positive natural increase) are still characterised by high dwelling-occupancy rates in 1961,(see Table 7.9 and note for instance Patna, Midnapore, and Bolangir, all with occupancy rates above the rural average, despite their slow growth).

Table 7.1

Welfare Facilities at Place of Work by Industrial Type of Town

Type	Number in Sample	Per Cent of Industrial Workers: i) in specified industry	ii) reporting facilities[a]
Mining Towns	8	mining 91	63
Cotton Textile Towns	6	textiles 83	85
Heavy Industrial Towns	4	heavy industry 78	91

Note a These are calculated as an unweighted average of workers reporting
i) latrines
ii) canteens
iii) medical facilities, at place of work.

Source: Government of India, Labour Bureau, Ministry of Employment, Family Living Surveys among Industrial Workers 1958-9.

Table 7.2

Housing Conditions of Factory Workers in selected Industrial Cities

Percentage of Industrial Workers living in accomodation described

Type of Accomodation	ASANSOL	JAMSHED-PUR	RANI-GANJ	JHARIA	MONGHYR	SHOL-APUR
Chawls/bustees	35.0	38.7	63.3	46.2	98.3	66.7
Flats	17.8	42.9	13.3	0.4	0.8	1.1
Independent Bldgs	42.8	12.1	7.5	7.5	0.3	10.0
Other	4.4	6.3	15.8	45.8	-	22.2
Employer owned	38.9	56.2	88.3	73.7	6.7	3.9
Self owned	21.7	22.9	10.8	18.3	72.5	21.7
Private owner	38.3	19.2	0.8	6.7	20.8	74.4
Permanent kaccha	28.3	35.6	19.2	21.2	44.2	19.4
" pucca	41.7	57.9	46.7	36.7	33.3	60.6
Temporary kaccha	16.7	0.4	15.0	6.2	16.7	8.9
" pucca	12.8	7.1	19.2	35.8	5.8	11.1
Without latrine	46.1	18.3	90.8	96.7	72.5	23.3
With private lat.	27.8	33.3	0.0	1.7	10.8	0.0
With communal lat.	26.1	48.3	9.2	1.7	16.7	76.7

Table 7.2 continued

Type of Accomodation	BOMBAY	CALCUTTA	HOWRAH	AHMEDABAD
Chawl/bustee	90.6	80.0	60.4	90.4
Flats	5.4	13.7	7.4	0.8
Independent Building	-	2.9	22.1	6.2
Other	3.5	3.3	10.1	2.1
Employer owned	7.7	12.5	20.1	5.8
Self owned	2.3	7.1	19.1	5.0
Private owner	72.5	80.0	56.0	77.9
Permanent kaccha	12.1	22.9	43.4	20.4
" pucca	59.8	27.5	31.2	54.2
Temporary kaccha	16.2	19.6	8.2	10.8
" pucca	11.2	30.0	16.9	14.6
Without latrine	11.9	2.5	17.3	7.1
With private latr.	3.3	2.5	11.3	9.6
With communal latr.	82.5	95.0	71.3	83.3

Source: Government of India, Labour Bureau, Ministry of Employment, Family Living Surveys among Industrial Workers, 1958-9 (for selected Cities and towns), Simla.

Table 7.3

Size and Growth of "Pure Slums"

Percentage of housing with roofs of grass or similar material in the urban areas

District	1961	1971
ORISSA		
Sundargarh	21.2	13.8
Mayurbanj	53.1	39.9
Cuttack	68.9	55.5
B.K.	85.5	73.2
Bolangir	29.5	21.2
Ganjam	62.5	53.2
E.MADHYA PRADESH		
Durg	23.4	10.2
Bilaspur	4.8	1.5
Bastar	1.3	2.7
Raigarh	3.3	1.6
Towns:		
Bhilainagar	29.4	13.1
Bilaspur	4.8	0.7
WEST BENGAL		
24-Parganas	6.2	2.9
Hoogley	5.2	3.1
Burdwan	17.4	14.8
Birbhum	56.5	43.1
Bankura	53.2	40.4
Midnapore	43.1	31.0
Towns/Cities:		
Calcutta	2.0	1.2
Howrah	1.0	0.5
Burdwan	39.2	29.3
Asansol	6.5	2.9
Durgapur	0.4	20.0

District	1961	1971
BIHAR		(n.a.)
Patna	2.2	
Gaya	5.4	
Shahabad	2.6	
Monghyr	6.7	
Ranchi	7.1	
Bhagalpur	13.0	
Dhanbad	9.3	
Singbhum	3.4	
Towns/Cities:		
Patna	2.3	
Gaya	2.2	
Bhagalpur	8.6	
Ranchi	0.2	
Dhanbad	6.6	
Jharia	11.5	
Jamshedpur	1.9	

Source: Government of India, Census of India, 1961, 1971, Housing Tables, New Delhi, Tables E IV (1961), H II (1971).

Table 7.4

Municipal Revenues, Expenditures, and Services, according to Size Class of Towns, 1970

State & Size Class	Per Capita Receipt (Expenditure) Rs per annum	Tax as % of Receipt	Per Cent of Towns with Protected Water
BIHAR I,II	12.6 (12.8)	40.1	100.0
III & below	9.4 (11.4)	30.9	93.4
ORISSA I,II	23.3 (23.9)	39.1	n.a.
III & below	13.3 (13.9)	32.9	n.a.
MADHYA PRADESH I,II	27.6 (26.5)	66.0	100.0
III & below	15.6 (14.7)	60.7	41.4
MAHARASHTRA I,II	47.8 (46.7)	62.5	95.2
III & below	13.8 (12.4)	48.4	51.0

Note: Data are only available in some cases where Municipalities, (not, e.g., Notified Areas) exist. I have given unweighted averages for groups of size classes. It is possible that the Census authorities, who give averages for each size class, took unweighted averages for the towns within each class. If they did not, but took weighted averages according to population size, then Bombay heavily dominates Maharashtra's class I.

Source: Government of India, Census of India 1971, Town Directories, New Delhi; (data for previous 2 or 3 years).

Table 7.5a

Sex Ratios among Migrants to Urban Areas

Cities & other Urban areas	sex ratios f:m among migrants from: (1961) RURAL area of: same District	other State	URBAN area of: same Distr.	other St.
BIHAR				
Patna Munic.	.953	.690	1.102	.904
Gaya Munic.	1.093	.631	1.608	1.041
Shahabad	1.515	.869	1.456	1.283
Ranchi Munic.	.990	.542	1.053	.932
Dhanbad	1.212	.536 (from U.P. .251)	1.100	.880
Jamshedpur	.942	.728	1.003	.843
Monghyr	2.464	.736	2.072	1.092
Bhagalpur	1.318	.883	.910	1.234
WEST BENGAL				
Howrah City	.735	.269	.928	.514
Calcutta City	(.610)[a]	.237	(.571)[a]	.397
Burdwan Municip.	.836	.529	.741	.511
Asansol Munic.	.224	.609	.447	.795
Birbhum	1.009	.583	1.180	.839
Bankura	1.249	.375	3.373	.927
Kharagpur Munic.	.599	1.515	.253	1.243
WESTERN INDIA growth areas (1971)				
Gt.Bombay	(.580)[a]	.467 (from U.P. .204)	(.881)[a]	.700
	(.584[a]	.470	.865[a]	.695)[b]
Thana City	(.962	.422	.955	.604)[b]

Notes: a from another District of the same State

b migrants classified by place of last residence, not birth

Table 7.5a continued

Steel Town Urban areas	from Rural area same Distr.	from Rural area other St.	from Urban area same Distr.	from Urban area other St.
		(1961)		
Sundargarh	.824	.875 (from U.P. .647 from Bihar 1.054)	.589	.509
Burdwan	.695	.480 (from U.P. .323 from Bihar .531)	.763	.586
Durg	1.067	.397	1.332	.616
		(1971)		
Sundargarh	1.199	.696 (from Bihar .734)	1.193	.780
Rourkela City	(.961	.680)[a,b]		
Burdwan	1.109	.530 (from Bihar .540)	.964	.732
Durgapur City	(.895	.686)[a,b]		

Notes: a classified by place of last residence

b rural + urban origins together

Table 7.5 b

Sex Ratios among Short and Long-Distance Migrants in Contrasting Urban Areas

Steel Towns 1971	Migrants from: Same State*	Another State*
Durgapur	.764	.644
Rourkela	.724	.680

*(place of last residence)

Contrasting Urban Areas 1971

	Migrants born in: Same State	Another State	Same State	Another St.
	RURAL		URBAN	
Calcutta	.478	.273	.776	.405
Burdwan District (Durgapur)	.943	.530	.808	.732
Bankura District	2.405	.535	.806	1.083
Birbhum District	1.221	.958	.808	1.211
Sundargarh D. (Rourkela)	.514	.696	.854	.780
Ganjam	1.390	1.299	.828	1.216

Source: Government of India, Census of India 1971, Migration Tables, New Delhi.

Table 7.6

Sex Ratios in Rural Areas neighbouring the Towns

BURDWAN DISTRICT Rural Locality	Sex Ratio f:m 1961	 1971	Main Industry in Principal Town
Chittaranjan	.885	.917	locomotive works
Salanpur	.815	.895	
Kulti	.685	.785	iron works
Hirapur	.866	.818	Burnpur steel mills
Asansol	.720	.799	engineering
Barabani	.808	.875	
Jamuria	.696	.752	mining
Raniganj	.649	.660	mining
Ondal	.625	.671	mining
Faridpur	.772	.801	
Durgapur	.719	.976	iron and steel plant
Kaksa	.938	.939	
(All West Bengal	.878	.891)	

Other STEEL TOWN AREAS in 1961

	Rural Locality	Sex Ratio	
Rourkela (Sundargarh)	Panposh	.995	
	Sardar	1.010	(All Orissa 1.001)
	Bonai	.942	
Bhilai (Durg)	Kawardha	1.032	
	Khairagarh	1.044	
	Bemetara	1.051	(All Madhya Pradesh .953)
	Rajnandgaon	1.050	
	Durg	1.021	
	Sanjari Balod	1.053	

Source: Government of India, Census of India 1861, 1971, (relevant States), General Population Tables, Delhi.

Table 7.7

Participation of Resident Rural Population in Core-Sector and Construction Industries in Steel Town Areas

	Iron and Steel occupations		Construction Workers	
District (rural)	Number	% of all in that occup. in District	Number	% of total in District
Durg District	250	1.0	4075	30.4
Raipur Division	253	1.0	9885	43.0
Sundargarh Dist.	0	0.0	440	8.5
Burdwan Dist.	3629	10.8	7211	40.3

Source: Government of India, Census of India 1961, (relevant States), General Economic Tables, Delhi.

Table 7.8

Comparison of Sex Ratios among Backward Classes and the General Population in Selected Towns

Town or Urban Area	Sex Ratio f:m : General Population 1961	Backward Classes	% of BCs in area
Durg District	.864	.906	9.8
Bhilainagar (steel town)	.795	.798	7.1
Rajnandgaon	.932	.970	6.7
Dongargarh	.967	1.002	7.1
Chirmiri (mining)	.836	.941	20.1
Surguja District (mining)	.847	.915	17.1
Bilaspur District	.907	.936	14.1

Table 7.8 continued

	Sex Ratio: General Pop. 1961	BCs 1961	% of BCs in area
Burdwan District (urban)	.785	.835	11.1
Jamuria (mining)	.651	.680	22.5
Raniganj r+u (miningarea)	.687	.843	35.1
1971	.695	.794	29.4

Note: See also Table 6.9

Source: Government of India, Census of India 1961, 1971, (relevant States), General Population Tables, Delhi.

Table 7.9

Housing Occupancy Rates

	Persons per house	(same divided by rural State average)
WEST BENGAL		
Calcutta	5.01	(1.26)
Howrah	4.88	(1.23)
24 Parganas	5.01	(1.26)
Hoogley	4.81	(1.21)
Midnapore	5.19	(1.31)
Burdwan	5.15	(1.30)
Birbhum	5.16	(1.30)
Bankura	4.95	(1.25)
BIHAR		
Patna	6.94	(1.02)
Gaya	6.22	(0.92)
Shahabad	6.57	(0.97)
Bhagalpur	7.14	(1.05)
Monghyr	6.90	(1.02)
Singbhum	5.40	(0.80)
Dhanbad	5.79	(0.85)
Ranchi	6.74	(0.99)
E.MADHYA PRADESH		
Raigarh	4.76	(0.92)
Durg	3.81	(0.74)
Bilaspur	4.68	(0.91)
Bastar	4.54	(0.88)
ORISSA		
Mayurbanj	5.32	(1.00)
Sundargarh	4.15	(0.78)
B-K	4.87	(0.92)
Cuttack	5.90	(1.11)
Bolangir	5.69	(1.07)

Source: Government of India, Census of India 1961, (relevant States), Housing Tables, Delhi.

Appendix 7.1 Projections of Housing Needs:
Two Models

NEW-TOWNS
(rapid growth: to 240,000 population in 15 years, and decadal growth of 66.6% for a further 10 years).

1961 - 1971

Core Labour
Households: 15,000

Household income
per month Rs 250

Industrial
Housing & Utilities
Capital cost
per unit:
Rs. 22,000

Rent/rates at
8% =

Maximum expenditure on
rent: 10% x 250 x 12 = Rs 300 < 1760 per annum

Multiplier Labour
Households (middle income):

50,000

Household income
per month Rs 150

Low-income
Housing Scheme
Capital cost
per unit:
Rs 7500

Rent etc. at
8% =

Maximum expenditure on
rent: 10% x 150 x 12 = Rs 180 < 600 per annum

Sites and
Services
Capital cost
per unit:
Rs 2500

Rent etc. @
8% =

$\simeq$ Rs 200 p.a.

1971 - 1981

Incremental Core
Labour Households:

10,000

Annual Housing
1,000 units @
Rs 22,000 =

Rs 22 million

Total Income of
Core sector
Households:

1971: 15,000 x
Rs 300 x 12 =
Rs 54 million

1981: 25,000 x
Rs 350 x 12 =
Rs 105 million

Incremental
Multiplier Labour
Households

40,000

Annual Housing
4,000 units @
Rs 2500 =

Rs 10 million

Total Income of
Multiplier Sector:

1971: 60,000 x
Rs 150 x 12 =
Rs 108 million

1961 - 1971			1971 - 1981
<u>Backward Classes</u> Households: 10,000 Household income per month Rs 100 Max. expenditure on rent: 2% x 100 x 12 = Rs <u>24</u>	<	Sites and Services Capital Cost Rs 2500 per unit Rent at 8% = <u>200</u> per annum	

OLD TOWNS
(stagnation: 100,000 population in 1961, decadal growth of 12% until 1981)

1961 - 71	1971 - 81
All labour (male): 25,000	All labour (male) 25,000
Dependant Population 75,000	Dependant Population 100,000
(Housing units 100,000 ÷ 5 = 20,000)	(House units 125,000 ÷ 6 =20,000)

....

1961 - 71		Housing		1971 - 81
<u>Higher Income Population</u> 20,000: Income Rs 250 Affordable rent (10%)=Rs <u>300</u>	$\geq$	Housing Capital Value from Rs 10 - 15,000 Maintenance costs @ 2% = <u>200 - 300</u>	$\lessgtr$	Higher Inc. Pop. 24,000: Inc. Rs 250 Rent affordable (8%)= <u>240</u> per annum
<u>Middle Income Population</u> 40,000: Income Rs 150 Rent affordable (10%) = Rs <u>180</u>	$\geq$	Housing Value from Rs 5 - 10,000 Maintenance costs @ 2% = <u>100 - 200</u>	$\lessgtr$	Middle Inc. Pop. 48,000: Inc. Rs 150 Rent affordable (8%)= <u>144</u> per annum
<u>Low Income Population</u> 40,000: Income Rs 100 Rent affordable (2%) = Rs <u>24</u>	>	Housing Value around Rs 1000 Maintenance costs @ 2% = <u>20</u>	>	Low Inc. Pop. 48,000: Inc. Rs 100 Rent afford. (1.5%)= <u>18</u> per annum

Notes:

1. Projection 1 represents a rapid- growth town (like Rourkela or Bhilainagar). The initial core-labour force of 15,000 males migrates to a "green-field" site. A "multiplier" labour force of 60,000 males follows (1961-71).

2. Assume that in each case family household size will stabilise at between 4 - 6 members in ten years (average of 5 members) with maximum of two members earning. Then family income is Rs 250 per month (1971 prices) for families with the main worker in the core sector, and Rs 150 for most of the multiplier sector families, but with the lowest 10,000 earning only Rs 100.

3. Assume that the core-sector families and the better-off multiplier families can afford 10% of their income on service and interest charges that are made for urban living (typically in the form of rents and rates): i.e. Rs 300 and Rs 180 per annum respectively for the two groups; assume the poorest families can afford only 2%, i.e. Rs 24 p.a.

4. The housing and facilities capital costs are taken as follows: for the core sector, Rs 22,000 per household unit (for explanation and sources see text above). The economic rent, at a minimum of 8%, totals Rs 1760 p.a. - i.e. about five to six times the ability to pay. This is as far as the official housing scheme goes. For the middle-income multiplier families assume a universal provision of the L.I.G. housing scheme (see text), capital cost Rs 7500, rent Rs 600 p.a. - i.e. over three times the ability to pay. For the poorest group assume a sites and services scheme, costing Rs 2500, rent Rs 200, - say ten times the ability to pay. (A village dwelling without services would cost about

Rs 1000, and could be maintained at a charge of about 2% of the capital cost. Construction materials would have been gathered from the land over time, and building over time would employ family labour only. No cash payments would be required as interest on loans, and material costs for maintenance would just be covered, at Rs 20.)

Conclusion 1

Using standards currently adopted in New-town construction, a housing scheme cannot be self-financing.

5. Now take alternatives: self-financing is possible with capital costs of Rs 3750, 2250, 300 for each group (which is implausible for the poorest group given any imagineable technology beyond a pavement dwelling). Self-financing is possible with costs of Rs 3000, 2000, 2000 for each group, i.e. with sites and services for all the multiplier population (using the cheapest technology developed up to 1975), and fully constructed single-storey tenements as currently developed for the Economically Weaker Section (so called) for the core-labour sector families (politically difficult, if not unacceptable). If, however, core-sector incomes grow at 2% p.a. in real terms, then in 35 years tenements of Rs 6000 would be affordable under the latter scheme, (and so on).

6. Consider now the incremental growth, given the initial establishment of the population just described. The core-labour force grows by 10,000 between 1971 and 1981. By 1981 the incomes of the core-sector families are Rs 300 per month (with average family size still 5). Incremental capital

cost of housing 1,000 families per annum is Rs 22 million. Can that sum be financed from municipal savings? In 1971 the core sector aggregate income amounted to Rs 54 million, so that a savings rate of about 50% would be required.

Conclusion 2

The incremental growth of heavy industrial towns cannot be financed entirely out of municipal revenues (without changes in construction standards).

7. Again there are alternatives. Housing plus facilities costing Rs 5000 could be financed; or with half the net migration rate and costs of Rs 10,000 financing would be possible, and so on. For the multiplier population various scenarios may be adopted too. Suppose for example an annual growth of 4000 per annum (adult males). Take the average family income for the whole group to be Rs 150 per month. Adopt sites and services at per unit cost of Rs 2500 for the whole group. The total incremental cost amounts to Rs 10 million annually, which has to be financed from an initial total multiplier family income of Rs 108 m. This implies a 10% savings rate (devoted entirely to "urban development bonds", or an equivalent), leaving nothing over to finance industrial investment, unless the savings rate of the middle-income group exceeds 10%.

8. Projection 2 assumes a stagnating population. The total male labour force remains at a level of 25,000 over 20 years (like some of the large towns in Bihar, e.g. Monghyr). The dependant population rises from 3/4 to 4/5 of the total. Divide it into three income groups: say 40% at Rs 100 p.m., 40% at 150, 20% at 250, none of which increases over time.

9. The top two groups pay 10% of their income in rent etc., the poorest pays 2%, on dwellings valued at Rs 10-15,000, 7,500-10,000, and 1,000-2,000 respectively. Rent/rates

average at 2% per annum on stock that is about 50 years old for the top two groups, or that consists of self-built village-like accomodation, that may have started as slum hutments in earlier periods of prosperity or at Independence with the large urbanward migrations associated with Partition).

10. By 1981 per capita incomes have been reduced by 1/5, owing to increased dependency, and on assumption of no remittances sent by out-migrating males, and that households have increased in size rather than split (see text above). Hence the maximum maintenance charges affordable are assumed to drop to 8% of family incomes for the upper two groups, and to 1.5% for the lowest group. This is below the cost of maintenance on the higher values of housing stock (i.e.assuming that it has not deteriorated to below those values). The poorest groups, if originally in rented accomodation, will, cet. par.,have become pavement dwellers.

Conclusion 3

Towns subject to outmigration are likely to face deteriorating welfare levels if relying on local finance.

11. Clearly, somewhere between these projections there are cities that could finance ~~their~~ own housing and facilities. Typically they will be of the Type 2 Demographic Model (Chapter 3). Cities of the demographic Type 1, especially 1 c, and of Base or Type 3, will need outside finance, certainly over some periods of their life. Type 1 cities will have to adopt generally lower standards of housing (for core-sector and multiplier families) than have commonly been prescribed if they are ever to self-finance their maintenance charges. These standards can be improved, as incomes improve, over time.

A brief Overview of Chapter 7

This chapter shows empirically that without Central Government intervention the stagnant or declining towns have been unable to raise the same per capita resources for infrastructure in social amenities as have the more rapidly growing areas. This disequilibrium is enhanced by their age composition. Similarly, low quality housing is the norm in slowly growing areas (as would be expected from household age composition); in rapidly growing areas low quality housing develops over time in so far as migrant families with lower income prospects migrate in. The State has come too late in the day to appreciate the dimension of these problems; the strategies adopted by the people themselves (in New-towns) could have been economically incorporated in overall planning from the start. At the same time positive intervention will be needed in the case of the slow-growing towns.

CHAPTER 8

The Family, Migrant Groups, and their Employment Strategies

A Summary of Empirical Findings

The implications of the foregoing demographic factors impinge on the long-term employment and income prospects of the families established in specific localities. The distribution of family structures with cities of contrasting types is investigated: we are particularly interested in the strategies adopted by families, or by larger groupings of migrants, to spread their employment over various industries or occupations. We find that families in heavy industrial towns usually rely on a single industrial earner; families in lower productivity towns require more. There is apparently an attempt by migrant subgroups of similar regional background to concentrate all their employment over time on the most rewarding industrial sector to which they have access: a strategy of risk-spreading is not adopted. In towns dominated by a single industry such a strategy would in any case be ruled out; and in the stagnating towns of this type the regular links with the rural economy (the security of last resort) have usually, it seems, been severed.

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At the theoretical level we can observe the following distinctions. A family may be composed of a number of earners of various ages. In India its major source of income is likely to be from one or two adult males. In the latter case, if both are employed as wage labour in the same industry, or, in a more extreme case, in the same factory, the whole family is very vulnerable to the fortunes of that industry or factory. Security is not much enhanced in an alternative model, where the main bread-winners are all employed in an industry providing goods and services for the core industrial labour force. A slightly better position is offered by the familial mode of production, as work-sharing always becomes possible provided the average productivity in the family does not fall below average consumption requirements. But once again, the closer the work is tied to a single basic industry (for example through its contracting out to the household) the more risky the household industrial mode of production becomes. Clearly what emerges from all this is that the safest strategy is to diversify the family portfolio, as it were. To have two or more adult workers in quite distinct industries would be ideal. To have one member in an industry as a wage labourer, and one self-employed in a less closely related sector, would be a moderately secure strategy (perhaps at the cost of a higher income than would have been enjoyed with both members in the same industry). Similarly, a mixture of household industry and wage labour (even in another family's household) could be more secure, but again this implies income foregone.[1] In practice in India the choice is often limited, even in the urban economy. There is some evidence that security is preferred despite income foregone, even in low-income families,[2] but there is no evidence to my knowledge of strategies being deliberately adopted to diversify income at the family level in the manner I outline here. Quite apart from the constraints of an imperfect labour market,[3] there is the constraint of a lack of industrial diversification in precisely those cases where the problem arises. You cannot easily diversify your portfolio in an undiversified world.

Whether or not families, let alone broader social groups of caste, class, regional or ethnic distinction,

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1 It may be argued of course that a sufficiently high income will generate savings enough to carry the family through periods of instability or unemployment, thus reducing the risk involved in this option (a point made to me by Camilla Toulmin).

2 This was suggested to me by Meera Bapat from her study of low-income families in Poona, where she has worked and lived most of her life.

3 Such imperfections reduce the amount of choice a family from a Backward Caste, for example, may have.

consciously adopt such strategies, it is worthwhile investigating whether in practice the familial vulnerability problem arises. Are family income sources particularly concentrated, or more concentrated than they need be, given the range of opportunities? For if they are, the failure to diversify local industry in India becomes even more socially undesirable (though whether the less costly solution is to diversify industry, or to change family behaviour, remains an open question). Furthermore it would be possible to indicate to what extent the demographic structure of the family, resulting from high or low fertility in conjunction with various patterns of migration, exacerbates, or alleviates, this vulnerability. And if the strategies adopted are conscious, we could indicate in turn how the vulnerability problem imposes constraints on demography. For example, lower fertility might imply higher family per capita income, but less scope for security through diversification of employment that becomes possible with a larger family.[1]

1 The implications for fertility reduction programmes need hardly be spelled out. Yet the literature has focussed on the high fertility hedge against risks associated with ill-health and mortality, not on the security issue raised here. See, for example, R.H.Cassen, India: Population, Economy, Society, Macmillan, London, 1978, Chapter 3.

This chapter is devoted to implications. It is not the intention to investigate the problem empirically beyond establishing some indicators from our region of study in India regarding the existence or otherwise of the family vulnerability problem. The first such indicator deals with the household composition, and some evidence on sources of household income through employment, in towns enjoying various degrees of industrial diversification. The second considers the concentration of geographical origins of migrants in particular industries in the newly industrialising regions of Bihar (for which special Census tabulations were undertaken). This, strictly speaking, is evidence on community or ethnic concentration, from which a few implications for the family may be drawn. Later an even broader overview of the evidence will be taken, on the industrial concentration of migrants in general.

Family Formation and Household Distributions in Urban Areas

It has already been established that towns of different industrial character differ, often quite markedly, in their demography. Among the economic implications this might have at the local level, one that we are particularly concerned to suggest is the effect on family welfare, and especially family income, and on the security of family income over time. To do this we need to reconstitute household structure from aggregate demographic structure: this is fairly immediately done since the Census tabulates household structure for the urban areas of the Districts.[1] But it is a frustrating limitation to draw our conclusions simply from the observation of the mean, and a sad reflection on statistical imagination how often this, and this alone, is done. Fortunately there are two sources of information from which ideas may be culled on the distribution of household types <u>within</u> the urban areas under study: the first is the simple distribution of household size from the Censuses, the second is the Labour Bureau Study of industrial worker households in selected towns, carried out in 1958-9.[2]

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1 A household is defined for Census purposes as a unit consisting of people eating at the same table, as it were (and it is closely co-terminous with residents in a single building): in India there are almost as many "houses" as "households" recorded in the Censuses. A family is less easy to define. Generally speaking we will take it to be co-terminous with an Indian rural household not subject to past or present urbanward migration. Sometimes, however, we will be taking a somewhat more liberal interpretation. For our present economics analysis, what matters is how far financial or other welfare obligations would generally extend.

2 Government of India, Labour Bureau, Ministry of Labour, <u>Report on Family Living Surveys among Industrial Workers, 1958-9</u>, Delhi, 1968.

The latter can be compared with the 1961 Census to see how far industrial wage-earner families are distinct from other families in these towns and cities: additionally, and unlike the Census, these Surveys indicate the distribution of family composition within the urban wage-earner category.[1] They also enrich our knowledge, for these types of households at least, of members' contributions to household income (though without unfortunately stating the occupational source, only the value, of that contribution). And finally they have some (though not much) usable information on remittances.

We should begin with some controls in mind. One of the more striking observations of demographers working on household composition has been on the similar mean value (and similar distributions) of household size in historical Western European countries and contemporary India (among other Oriental cases).[2] For our rural areas of India, the mean size is about 5 members (Table 8.1). The striking difference, on the other hand, between the Orient and historical Western Europe is that in the latter the fifth

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1 A household was defined as "industrial" if the main contributor to family income was a wage-earner in industry.

2 See J.Hajnal, "Household Formation Patterns in Historical Perspective", Population and Development Review, Sept. 1982, Vol 8:3. The reference is to a period pre-dating the industrial revolution in Europe.

member was typically a non-family member, living in as a servant, whereas in the former he or she is a member of the family. But equally striking in the current author's view is the fact that only a minority of families are exactly of that five-member composition, or more significantly, that the distribution is quite evenly spread (not uniform, but distinctly "platycurtic"). In other words, most of the time families are experiencing either some transition toward or away from this "norm" of mean value 5, with fertility adding to the base of a family's pyramid or mortality subtracting from its apex (and from below also), or else they are stabilising at lower or higher "norms" than the average, in association perhaps with their economic mode of production or with their cultural background. It is not our purpose here to explain the rural family composition, though some interpretation has to be offered owing to the observed fact (to which we later refer) that some urban households represent split rural families. Suffice it to remark on the following. Rural households of single members only are rare (around five per cent), and must represent, on the whole, single males migrating for employment as agricultural labour, or as rural infrastructural or in some cases industrial labour; or they are single females left behind in the course of such migration, (or widowed).[1] The 2-6 size group will consist of families that are in the process of formation and dissolution within that group, with high mortality among agricultural labour households for instance, or a greater tendency towards nucleation among some social groups (tribals, for instance) keeping the maximum size of such households usually below six. The quite significant proportion of households above six in size (around 30%) will include a lower mortality (probably higher fertility) subgroup whose size will range from 5 - 10 in the course of its life-cycle, associated with trading and commerce and land-ownership, and having little tendency towards nucleation. The proportion of rural households with above ten members (approaching 10%) is remarkable,

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1 Seasonal migration of labour was not captured in the Censuses, taken as they were in February and April. The definition of "rural" and "urban" can also be misleading here. The Census distribution of manufacturing establishments by size of workforce shows a small number of large enterprises established in rural areas. Similarly mining employees are often housed in "rural" villages; and so also in the rapidly industrialising areas are some of the urban workforce. Tables 7.6 and 8.2 are of relevance here.

especially when one considers that about 20% of the rural population live in households of this size. A majority, but not an overwhelming majority, of rural households, will represent the small-peasant stereotype, evolving during the family life-cycle between the limits of 3 to 7 members on the whole, the stereotype that Hajnal has reported as the "norm".

It has not been the purpose of this thesis to determine who migrates and why. The analysis of migration has been restricted to changes in the demand for labour, resulting from differential industrial composition of urban localities, and the consequent change in the (broadly defined) locational origin of the supply. Labour also migrates, however, when conditions change at the rural end of the migration chain. The family composition of such migration is often very different: as an extreme example, in distress, total families move; in acute distress, only the able-bodied do so.[1] It would be of considerable interest, however, if we knew rather more about the rural background of these urban migrants, as it might help explain the family earning strategies adopted. In an earlier Chapter we argued that the balanced sex ratios and local origin of social groups like the Scheduled Castes, and their lack

1 For a summary of the demographic characteristics of rural out-migrants see J.Connell, B.Dasgupta, R.Laishley, and M.Lipton, Migration from Rural Areas, Oxford University Press, Delhi, 1976.

of participation in the core industries in the newly industrialising areas, all suggested that these were migrants who were virtually forced to migrate out, and were not being recruited, nor very specifically attracted, into the cities. In this case they were almost certainly landless (or with very small holdings) otherwise they would have left family members behind, at least for a while, while they reconnoitred for suitable urban accomodation, as did their urban colleagues employed in the manufacturing industries. Further light was shed on this in the surveys referred to in Chapter 5 above, giving evidence that factory industrial workers were more likely to own small amounts of land than were migrants who finished up in self-employment, in smaller enterprises, or as casual labour in the cities.

With this sketch of rural household composition as a background, let us consider in more detail the composition in the towns, focussing on the manual labour categories, and especially on manufacturing wage labour. A generalisation we could make is that urban households are smaller than rural in our region (Table 8.1). This will tend to follow if urban households are fragments of rural families (and not just of the largest rural families). Apart from the Labour Bureau Survey data (and survey evidence in general), the population structures we have derived from the Census for urban areas is clear evidence of such split families, (note especially the detailed analysis of Bhilai in Chapter 9, where it is found that a majority of males-only households consist of married males). Generally speaking then, households of one, two, or three members are proportionally greater in number in urban areas due to migration, not differential mortality, fertility, or cultural traits, (though the latter two factors undoubtedly work towards lowering urban household size among the professional and even the more-skilled wage labour categories, especially in the larger cities).[1] The largest size class, households above ten, are distributed in rather similar proportions in rural and urban areas, so that it is the rural concentration of families in the 4 - 9 size group that is especially responsible for the larger average rural household size. Again, this is partly due to the lower fertility in urban areas, partly due to the absence of older relatives living

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1 See above Chapter 4 for evidence on the marital status of the urban populations, compared with their rural counterparts: other things being the same, later marriage will result in smaller household size. By "cultural traits", as distinct from "fertility" we refer to preferences for living in nucleated rather than extended households in urban areas.

with the urban migrant at the early stages of migration, and partly the absence of married sons and their wives in these young households. This interpretation is consistent with the smaller number of married relations (if we exclude brothers) in the urban households (Table 8.3) (though married relations could be living as couples in separate households), and, more significantly, with the absence of the higher age groups recorded in the aggregate urban age structures. On the whole, the small number of differences (and their small degree) between the rural and the urban is a striking feature, and this characterises above all the experience of the moderate growth towns, and the relatively stagnant towns. The real differences arise when we look at the rapidly growing towns.

The heavy engineering localities are immediately distinguished by one feature - the high proportion of single-member households. These are predominantly male, (Table 8.4); the urban areas of Durg and Sundargarh are good examples here. Given our estimate of a time-lag between initial male migration and the joining of wives and family, this phenomenon is clearly a function of rapid growth, and indeed between 1961 and 1971 these high proportions of single-member households in the Steel Town localities have declined from around 20% to around 12%

(see Durg and Sundargarh Districts in 1971). The migration data we examined suggest that individual families tend not to remain split for more than 2 years on average. So that although we are dealing with urban societies having large numbers of split families, they are not chronically split (with some notable exceptions to which we referred in Chapters 4 and 5).[1] And over a ten-year period the most noticeable change in family composition in these heavy industrial towns, apart from the addition of a spouse, is the addition of "never-married" members, i.e.predominantly children, (Table 8.5), which the aggregate age structure changes also confirm (see, for example, Figure 6.1). Continuing this aspect of the detective analysis further, we observe high proportions of the 2 - 3 member households in these rapidly growing urban areas: but what distinguish them markedly are their distorted sex ratios, indicative of brothers, or simply friends, among migrants, sharing accomodation, (note in Table 8.4 Sundargarh, Durg, Dhanbad, and Burdwan, among the non-Metropolitan examples).

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1 It is also clear from the more detailed 1971 data that urban households have a larger number of unrelated members living in than do rural households (Tables 8.3, 8.5). We may also note the high proportion (relative to rural areas) of already married males, mainly brothers, (not sons), (Tables 8.3 and 8.5), though we cannot confidently distinguish heavy industrial areas in this respect. The family composition data were collected on a 20% sample basis only.

It would be advantageous to be able to analyse the core industrial sector migrants separately (in the hope of discovering something regarding their vulnerability, as families, to economic shocks). This we cannot do for the most rapidly growing towns, but we do have the industrial labour surveys for the heavy engineering and Steel Towns of a slightly older generation, whose iron and steel works were expanded during our period of study: namely, Asansol-Burnpur and Jamshedpur (Table 8.6, 8.7). Asansol's industrial workers are of remarkably small households: 35% single members, 43% between 2 and 5, (a proportion well above the average for Burdwan District urban households as a whole, as is clear from Table 8.7). One third of the single-member households consist of unmarried members. There are very few households of adults alone living together: usually children are present. This suggests that the single-member households consisting of married men are in the course of transition towards becoming multiple-member households consisting of married couples and children, as we suggested above. Nonetheless, the larger proportion of single-member households among industrial workers, as compared with the general urban population, is remarkable. There are two possible explanations: first, that industrial workers are more likely then other workers to remain as split families (i.e. it is not just a question of being in a transitional stage)[1]; secondly, that industrial migrants are more likely to migrate singly than are other migrants.[2]

Jamshedpur, on the other hand, is sharply in contrast. Only 14% of the households are single (yet the urban District average compares well with that of Burdwan). Jamshedpur's population grew more slowly over the 1951-61 decade than did Asansol's (39% versus 78%, and the male population much more slowly, 40% versus 98%). It would be tempting to infer from this that the industrial migrants in Asansol-Burnpur are indeed in a state of transition, and not that, in this respect as in many others, Jamshedpur is simply a special case. By 1971, Asansol City has as few single-member households as has the less industrialised Burdwan City (7%), and roughly the same as Jamshedpur. Tentatively we conclude that the migrant in heavy industry seeks to detach his nuclear family, at least, from its rural origin. Perhaps this weakens the rural link, and to some extent the support from two economic sources. We should now ask how far he broadens the basis of his family's income in the urban

1 We know this is true of migrants from Uttar Pradesh: see Table 7.5 for evidence on Burdwan District (as well as Bombay).

2 This is supported by survey data for Bombay (Chapter 5).

area.

In the case of both Jamshedpur and Asansol the answer is that multiple sources of income from work are rare in industrial households, (Table 8.6). In 80 and 89% of households respectively there was a sole earner (but in only 14 and 35% of cases was there a single-member, and in 26 and 23% of cases there was an adult member in addition to the married couple). This is in line with survey data from elsewhere, showing that industrial workers either do not allow, or do not need, their wives or children to enter the labour market (at least in times of prosperity).[1] In Jamshedpur and Asansol wage income was average or above for industrial employees, and 57 and 66% of the workers were in the iron and steel industry, most of the rest being in other branches of heavy engineering.

To evaluate these findingsa little further, we proceed to look at some contrasting types. We will keep first to the case of the "monocultural" industrial town, and observe a group subject to large fluctuations in growth and prosperity, the mining towns. The Labour

1 This is apparent from the survey carried out by Meera Bapat in Poona (references in Chapters 5 and 7), the relevant data and information being kindly communicated to the present writer.

Bureau Surveys include Raniganj (West Bengal) and Jharia (Bihar)in our region. Neither is characterised by fast demographic growth during the 1951 - 1961 decade. (Indeed Raniganj was clearly subject to net outmigration given its growth rate of 16%, while Jharia grew at a modest 27%). Both survey samples consist almost completely of mine workers (Table 8.6), though not all will actually have been miners (below surface). Once again, single male households are a large proportion of total households (50 and 43% respectively). Given the towns' modest growth rates, these would appear to be permanently split households (especially when we consider that 3% or less are of unmarried males, far fewer than in the Steel Towns above). The other contrast with manufacturing industrial towns is that 15 to 20% of households have additional family members who are earning in the coal producing towns(in 5 - 8% of cases the wife is an earner). This is high, given that out of the 450 households only 50% have more than one member in the town.
A combination of lower wage rates, and probably larger families to support overall (including the rural counterpart), has compelled this higher participation. Notice, for instance, in support of this interpretation, (Table 8.6), that a

4-member household earns a per capita income Rs 25 to 35 per month with an average of 1.6 workers in Jharia (1.4 in Raniganj), whereas in Asansol a 5-member household manages to earn the same per capita income with only 1.1 working members, and in Jamshedpur a 6-member household manages to obtain the same income with only 1.2 worker members (and in that City a 4-member household needs only 1.3 workers to achieve a per capita income twice as high, at between Rs 50 and 65). In addition, Table 8.9 shows the relatively large number of multiple-member households who report sending home remittances in the coal mining towns, similar proportions, though lower monetary amounts, as those recorded in the richer industrial towns. In the two mining towns the additional earners in the household must be employed in the mining industry, the women presumably as surface workers, since only 2 and 1% of the workers surveyed are employed outside the coal industry, (whereas 14 and 20% of them are not the principal breadwinner). This extreme vulnerability is witnessed in a tragic sequence of events, reported in the press, that followed the closure of mines in the same area of Bihar in the late 1970s: in 1979 there were accounts of widespread starvation among miners. That could not have been possible if mining families either held reasonable land acreages, or divided their employment between mining and trading or services related to agriculture or rural industry. It would also have been less likely if public investment in mining towns had ensured the establishment of independent manufacturing or food-processing activities.[1]

At this point we feel the need to learn more precisely about the non-core industrial households in these industrial cities. Are they different in their demographic character? Above we remarked that migrants in these households may migrate more as a family unit than do the industrial worker migrants. Do these households show a higher proportion of non-nuclear families, with, say, seven or more members (taking this size range to be a proxy indicator of non-nuclear families)? There is rather little evidence that suggests this, despite the writer's prior expectation that it would be the case . For the fact, for instance, that Jamshedpur's industrial

1 It is not possible from the Labour Bureau data to undertake a rigorous analysis of how many earners are needed to prevent destitution, since the per capita family incomes are not cross-classified by occupational earnings. The families of 7 members that engage two earners in Jamshedpur may be just as compelled by economic necessity as similar families in Raniganj. But we can argue that, if it is possible to live off 10-15 rupees per month per head, then a family of 7 needs an income of Rs 70 - 105, making it unlikely that a single earner would be sufficient for family survival in Raniganj, Jharia, or indeed Sholapur, to take three examples.

sector has fewer large households than does the urban area of Singbhum District generally, may still reflect the transitional status of industrial households in the former. For we observe how Asansol City in 1971 had almost the same proportion of large households as has its non-industrial neighbour Burdwan City (and Jamshedpur in 1971 resembles the average for Bihar). The evidence we have already looked at does point, however, to the likelihood that the non-core sector households will have more earners per family than those with a core-sector industrial worker,(holding constant family size).

The only direct evidence available on this point relates to households engaged predominantly in a familial mode of production, defined loosely as "household industry" in the Census. There are drawbacks in using these data in direct comparison with the industrial worker surveys used above. In common they have the disadvantage that households are defined by predominant source of income; the subsidiary home-based economic contribution of women is probably under-reported in both cases. But subsidiary non-wage male labour is possibly under-reported in the industrial labour surveys, whereas wage labour is certainly not reported if undertaken outside the household in the Census data. Hence a biased dichotomy is created between the two household types. With these reservations in mind we can make some general points. The total contribution to household labour is characteristically much higher in the household industry households than in the industrial labour households. There are on average two members participating (including, however, one in ten households hiring in a worker). Between $\frac{1}{2}$ and $\frac{1}{3}$ of households have a second male participating, (excluding hired-in labour, and therefore, incidentally, suggestive of larger family size). Looking in more detail (Table 8.10) at the heavy industrial localities, most household industries employ two family members. In most cases this appears to be the principal source of household income in that at least one male member is involved: in food production,for instance, in Singbhum District (containing Jamshedpur) usually two males are involved, and this is true of half the households in Dhanbad. In the locality of Durg, cotton textile-producing households employ a second male family worker in two out of three cases.

It is one thing to observe higher rates of participation; diversification is less easy to establish, but we can argue that those industries where households have two or more members involved are unlikely to be less than a major source of the household income. We would add to this that food production is less likely to be an urban "export" industry, and hence more vulnerable to changes in the purchasing power of the core-industrial workers in engineering or iron and steel production. But the evidence is scanty, and the case of undue concentration among the non-core sector households is not proven; what is clear (from Table 8.10) is their reliance on multiple earners.[1]

As a further control against which to observe the heavy engineering workers, we turn again to textile manufacture. Here we are confronted with a wide range of technologies, as discussed earlier, and a range of modes of production. We draw upon two comparative case studies from Western India, the Cities of Ahmedabad and Sholapur, (Tables 8.6 and 8.7). The similarity between these two lies in their both being dominated by the cotton mills. The difference lies in the more modernised industry in Ahmedabad, the more backward industry in Sholapur, and in the corresponding demographic growth and structure of the two localities, with the latter having a predominant contribution from natural growth, and the former a greater contribution from migration, (1951-61 decadal growth was 37% in Ahmedabad and 22% in Sholapur).

1 As we have mentioned earlier, there is a further factor that can constrain family diversification of income source: caste. The clearest evidence here (Table 8.10) is in the leather-making households, which are consistent in having more than one male worker (on average) per family in the same industry.

Ahmedabad would seem to resemble Asansol or Jamshedpur, with 21% of its households consisting of single-members and 22% of six members and over; 77% of its households derive their incomes from one principal breadwinner, and 91% of its industrial employees are in the mills.

When we look at Sholapur, we are turning from cases of industrial growth to a case of industrial stagnation. The potential problem of the industrial monoculture is underlined in these cases, (though one problem is missing, in that the unstable demographic dynamics associated with an initially distorted age and sex structure are absent in the industries where economies of agglomeration are more important than economies of plant size). Of Sholapur's industrial workforce in the survey, 71% are in the textile mills. Only 4% of households are single-member, a striking contrast, and 45% have over six members. This is almost exactly the same as the distribution given for Sholapur City in the 1971 Census, and also for the whole of the urban District. The second and related point to note is the proportion of single-earner households, which, at 53%, is very low. Finally we note that the principal earners can expect to earn only about a third of the income of a fellow weaver or spinner in Ahmedabad, or of an iron and steel worker in Eastern India. Even after correcting for differences in purchasing power in the Cities being compared this will be a large differential. The effect of the second earner is unlikely to raise per capita income much above subsistence; rather, it will be prevented from falling below. In view of the low wage it is perhaps surprising there are not more second-earner households; only 20% of them have man and wife at work (or recorded as such). Actually the household industry data (Table 8.10) indicate that the textile industry households (operating handlooms) have on average at least one female at work in the household industry.[1] Indeed the textile household industry has on average 3.8 persons employed per unit. And textile household industry accounts for 73% of all household industry in the Census sample. This represents an extreme degree of concentration of earning power in a single industry; (in contrast, in Ahmedabad, only 50% of the household industry sector consists of textile households). The City of Sholapur as a whole has both a family and age structure almost identical with that in the rural area of the District. The scope for income transfers on an inter or intra-

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1 The distinction between factory and household industry is likely to be extremely blurred in the case of Sholapur. It would not be surprising if workers in small factories received more than their marginal product in order to maintain the level of employment by work-sharing, exactly as in the household mode of enterprise. A similar lack of distinction is seen in that the so-called household sector hires on average one non-family worker.

family basis, between country and town, would seem to be minimal, unless urban households are also hiring out their labour to rural or other urban sectors. Here therefore we may witness over time the full implication of the single-industry town.

Sholapur happens to be a well-recorded case of a declining or stagnating town, owing to its large size. There are no truly comparable examples from our area of Eastern India (though the City of Monghyr has similarities). Looking at the District-wise data, we would not be able to discern much difference in these localities from the average experience in terms of household structure. We have indicated earlier that their demographic structures are such as to suggest the presence of more children and old people, and in extreme cases there appears something of a hollow in the centre of the age structure on the male side (e.g. Table 6.4) due to outmigration. A deeper analysis, however, reveals an important difference in the sex composition of the smaller households. For example, Bolangir and Mayurbanj in Orissa both have a similar minority of single-member households (10%), and between 25 and 30% of 2-3 member households. In 1961, only Bolangir was the declining area, (with a decadal growth of 22%), whereas Mayurbanj's small urban sector had grown very fast (206%). In Mayurbanj, as we would expect, these households are male-dominated. In Bolangir they are not,(Table 8.4), which is clear evidence of outmigration (or mortality) among men. For a comparison, observe Sholapur and Thana Districts (Table 8.4) also in 1961: similar proportions of single-member households are found, but in Sholapur about ⅓ consist in lone women. These declining urban areas bear comparison with rural areas in this respect. The small female-dominated households are only as viable, in India, as the link with other families, or other family members, is robust. That these absent members (if alive) are employed in a different economic environment is a strength, provided their purchasing power is channelled back to the original urban household. Unfortunately the only evidence we have on remittance flows is on those that are outward from urban areas ,(Table 8.9). As would be expected, households in the growth areas remit above average, those in the declining areas below average, indeed in Sholapur virtually not at all.[1] The question is whether

1 Note also how small are the remittances from industrial workers in Monghyr, with virtually all coming from single member households, which are themselves a minority. Monghyr is a declining town, but the industrial workers have retained reasonable incomes. On the whole it seems that they have broken their economic links with the rural areas.

there are net flows in the reverse direction.[1] Without these there will be an unfortunate coincidence of both familial and aggregate local deprivation.

Industrial and Occupational Employment Concentration among Migrants

Our interest in employment diversification among migrants is threefold. First, as we have said, the major concern of this Chapter is with the stability of income (or, more broadly, welfare), which, we have suggested, depends on the mechanism for transferring incomes from those with employment to those without it. Generally speaking, this will occur <u>within</u> families. But additionally it will usually occur <u>between</u> families that feel in some way a moral , emotional, or expedient responsibility for others. One of the strongest links here will be ethnicity; and a strong, if less strong, link will be place of birth.

1 Hiring out one's family labour, in the historical Western European manner, to work in other households, may be a source of security, provided the household's economic base is different from one's own. It is among the strategies that individual families could adopt when faced with the problem of "monoculture". The author is informed that, in historical England the domestic servant did <u>not</u> usually work in a family very far distant from his or her own, (a mean distance of 8 miles; personal communication from R.Schofield of the University of Cambridge); not perhaps the safest of strategies if crop failures, like coal pit closures, are fairly localised.

Hence migrant families of common origin, born in the same State for instance, may be expected to be supportive of one another in distress.[1] If those migrants draw their incomes form diverse sources, the reliability of this source of security is enhanced; if they do not, then distress itself will more likely be concentrated, and inter-family income stabilisation less easy.

Secondly we wish to assess what the strategy of migrants in this situation actually is. Do they themselves see the importance of diversification or not? It is, after all, possible that a conflict arises in that the best incomes or best security for the <u>individual</u> is to be found in particular industries or occupations. Hence migrants would aspire, through whatever links they manage to forge via their own kith and kin, to enter those industries: furthermore, the more of their members they can establish therein, the easier entry becomes. Thus the future wage of the potential migrant may be higher (i.e. the waiting period shorter) if he seeks entry to an employment in which his fellows are already well-represented. These atomistic advantages may appear to outweigh any collective

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1 This likelihood is enhanced by the observation of residence patterns and social networks in the cities. It can be observed by eye how house-types among 'self-built' hutments tend to cluster, indicative of the common origin of their inmates. Rather less casual evidence, however, can be obtained from, inter alia, M.S.Gore, <u>In-migrants and Neighbourhoods</u>, Tata Institute of Social Sciences, Bombay, 1970.

advantage of diversified employment (assuming the individual actually observes the collective advantage; a true case of the "isolation paradox"). We attempt to cast some light on the strategies adopted by observing, retrospectively, migrant behaviour over time (accepting the limitations that must be imposed by such a method).

Thirdly we postulate that migrant occupational or industrial diversification may cast some light on family diversification of economic activity. For provided that family behaviour in this respect is fairly uniform throughout a particular migrant group, and provided migrant groups do not inter-marry, the more concentrated are occupations in specific migrant groups, the more concentrated will be occupations in families within the same groups. In Northern India, many of the migrant groups under discussion are Hindi-speaking. One is told that inter-marriage between, for example, Biharis and Uttar Pradeshis, is quite likely. This does indeed weaken the use of this methodology, (though, as has been pointed out, most of the first generation migrants in the new industrial towns are married before they arrive, so that inter-State marriages are less likely). It is also possible that an occupationally concentrated migrant group may contain families that are more prone to seek diversification than any in a less concentrated group. Nevertheless, the more occupationally concentrated a migrant group is, the less likely are families to achieve the same degree of diversification: if more than 50% of workers are in the same occupation, and each family has two workers, some families simply cannot be diversifying. They may be constrained, or they may have chosen, not to follow such a strategy.

Now we turn to the evidence. The weakest evidence, available for the large cities only, simply distinguishes the migrant from the non-migrant. It shows that in these Cities at least there is altogether rather little difference between the distribution of migrants and non-migrants in occupational categories; nor is it immediately apparent whether migrants or non-migrants are the more likely to be diversified (though this is not a central issue). Part of the problem of interpretation is statistical: the residual category of "other labourer" is often unhealthily large (amounting to 30% of production workers or more) and usually particularly large among migrants. Insofar as this is a real (i.e. accurately recorded) observation, it may represent the pool of migrants hoping for more specific employment[1], or a more permanent

1 Migrants, that is, waiting for entry into the high-wage sector in the manner immortalised by M.P.Todaro, "Rural Urban Migration.." in A.J.Coale (ed.), Economic Factors in Population Growth, Macmillan, London, 1976.

group of casual workers among the migrants, doomed for all time to be nothing else[1]; on this we throw a little more light below. It would be more suggestive, and more important for our study, to look closely at the experience in the "monocultural" towns, but none of these in Eastern India was large enough to feature in the City sample in 1961. The most pertinent observation would be that in Asansol City, where tool-makers and machinists form 25% of the production worker force, migrants are a little more concentrated than non-migrants (only 5% difference), (Table 8.11); and in parts of the Calcutta Metropolitan region, notably Baranagar and Kamarhati in Hoogley District, jute workers form about a tenth (11.6%) of the production workforce, but with the migrants being more concentrated: in Baranagar 21.5% of migrant production workers work in textiles, and in Kamarhati 10.7%, whereas the non-migrants in the two localities together have only 2.7% of their workforce in the mills. Though the differences between groups may be very large, the concentration is still below 50%: its significance would be greater for the employment stability of the migrant group as a whole, and for inter-family financial support, than for the internal stability

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1 As would be argued by the anti-Todaro school: see for instance H. and V. Joshi, <u>Surplus Labour and the City</u>, O.U.P., Delhi, 1976.

of family earnings. In a City in Western India, Ahmedabad, 60% of the production workforce is engaged in cotton textile manufacture, with the migrants having 7% higher participation than the non-migrants. In Sholapur exactly similar proportions are found, but with the significant difference that the non-migrants outnumber the migrants in absolute size: hence as high a proportion of migrants as 75% are employed in textiles. We have shown that in Sholapur families typically have more than a single earner in industry: they have little option than for their second earner to be in the textile industry too.

More discriminatory evidence must be sought by relating migrants in particular occupational or industrial groups to their regions of origin. This can be done in detail for Jamshedpur and for the Dhanbad-Jharia-Sindri group of towns in Bihar (using the special Census tabulations, see our Table 8.12). For Jamshedpur, it may be seen that the iron and steel industry employed 29.4% of the native Biharis, but 37.9% of the West Bengalis (a clearly distinct regional and linguistic group), and 38.7% of the Orissans. In the Dhanbad Town Group, 36.9% of Biharis were in mining, but as high as 48.8% of Uttar Pradeshis. These are fairly clear indications of particularly high degrees of concentration among particular migrant groups in town complexes that are already characterised by employment concentration in specific industries, and hence especially vulnerable to economic fluctuations. (If we divide even further into Districts of origin, we reveal even further degrees of concentration: for instance, 43.3% of workers from neighbouring Hazaribagh are miners in Dhanbad).

Comparing these observations with those from a textile City, Ahmedabad reveals a clear parallel. Only 41.6% of local Gujarati migrants are employed in the textile industry, but 65.5% of the Uttar Pradeshis are so employed (a quite distinct regional group). The skewed sex ratios among these migrants indicates that part of the family remains in the rural locality of origin. These families must have land, (like the industrial workers referred to in Poona, Chapter 5 above) but clearly feel the need to supplement their income. The rural home will offer security in time of industrial distress, but the capacity of the village as a whole to perform that function is limited if there is a concentration of migrants in the textile industry in those villages, (like the Bombay textile workers from Ratnagiri, or the Dhanbad miners from Hazaribagh).[1]

It remains to observe how these migrant groups have behaved over time. We have only evidence of those who have remained in the town in question, - in some sense

1 The currently protracted strike of the Bombay textile workers (1982-83) would provide an opportunity for field research into this phenomenon.

they may be referred to as the satisfied migrants. Have they become more concentrated in their employment characteristics over time or not? On the whole it would appear that they have. Production process workers in Jamshedpur (Table 8.13), i.e. mainly iron and steel workers, are nearly twice as likely to be found among those migrants of 1 to 5 years duration of residence as among new arrivals. This intensification is most strong among the West Bengalis (who we noted were already more concentrated in iron and steel work than the rest). In the case of the Dhanbad Town Group, there is, in contrast, very little evidence of such intensification. And in the case of the Dhanbad miners, the reverse, if anything, is true. Not surprisingly perhaps, there is an attempt to get out of mining over time, (which is both badly paid <u>and</u> insecure, so that no question of a trade-off on that score need arise). These inter-temporal movements are fairly uniform across the various migrant groups.

In the case of Ahmedabad (Table 8.14) we can distinguish further between industry and occupation. But either way, the overall pattern is uniform. All migrant groups tend to move towards jobs as production workers over time, whether in textiles or not. This movement applies no less to the Uttar Pradeshis, whose employment is more heavily concentrated in production work in the first place. What particularly distinguishes them from other groups is their initial degree of concentration. Indeed these migrants from U.P., of whom we noted a majority were in textile occupations (spinning and weaving), intensified their concentration in the textile industry over time, from a participation of 65% to 90% (of those employed in manufacturing), an above average increase, and an extreme level of concentration indeed. It is true that migrants from Rajasthan and Maharashtra also achieved very high levels of concentration of their workforce within the textile industry: but interestingly they were less likely to be operatives (spinners and weavers): for only about 65% of them (as against 75% of the Uttar Pradeshis) finished up in the production worker category, the rest being in service or supervisory employment within the same industry. We also note that a far larger proportion of Uttar Pradeshis started off as operatives in any industry (67%) than did their fellow migrants from Rajasthan (50%) or Maharashtra (33%).[1] The implications of such extreme concentration, not only in a single industry, but in a

1 We noted above some general observations on using and interpreting this retrospective information. We add here that there may have been more jobs in textiles offered 6 to 10 years ago in proportion to other employment. This would indicate the more extreme vulnerability of the

single occupation within that industry, has manifold ramifications. It seems to have particularly characterised the textile industry within India. And now (1980s), of all the industries we have studied in this thesis, the textile industry is becoming the most "sick". In the case of the Uttar Pradeshis there is a ray of hope: the extremely skewed sex ratios among the migrants indicates that only the male members of the families are so employed in the Cities. By carrying on their employment at two centres, at home and in a "foreign" city, they may have perhaps maintained at the family level the diversification we argue is so important (probably splitting their income between manufacturing and agriculture). A contrast may be made here with the family employment in textiles in Sholapur City, where the rural links may have been severed for good.

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footnote continued
older migrants, but not necessarily be indicative of an attempt by the migrants to improve their employment status by consolidating their position in textiles over time. However, I suspect that this is not the burden of what the data reveal. For the Uttar Pradeshis have, among <u>current</u> migrants, a slightly lower than average degree of concentration among all the migrant groups, but among those of 6-10 years duration an above average concentration. Now there is unlikely to have been a relatively higher supply of textile jobs specifically for U.P. migrants in the past than in the present in comparison with the other migrant groups. It seems more likely that they have penetrated the textile industry more successfully over time than have the other groups. They seek the personal security or companionship, and risk the group instability associated with a single-industry participation.

Table 8.1

Household Size Distributions in Bihar and West Bengal

Per Cent of Families in each Family Size range

Number of Members:

	1	2-3	4-6	7-9	10+			Average Size
BIHAR rural 1961	5.3	20.9	44.2	20.2	9.3		100.0	5.5
urban	9.9	23.2	37.6	19.1	10.2		100.0	5.3
WEST BENGAL								
rural 1961	6.7	21.5	42.9	20.2	8.6		100.0	5.3
urban	13.4	25.9	34.7	17.2	8.6		100.0	4.8
BIHAR rural	1	2	3	4	5	6+		
1971	3.8	7.2	10.4	14.1	15.5	49.0	100.0	5.7
urban								
1971	9.1	9.8	10.5	12.6	12.9	45.1	100.0	5.4

Source: Government of India, Census of India 1961, 1971, for 1961: Household Economics Table B XVII; for 1971 Housing Table H IV, Delhi.

Table 8.2

Sex Ratios in Rural Areas associated with Mining and Industrial Towns: Bihar

	Sex ratio (f:m)
DHANBAD DISTRICT	
Rural	0.846
Urban	0.647
District Subdivisions:	
1 (containing Dhanbad-Jharia-Sindri industrial area; and Jharia coal fields)	
Rural Gobindpur	0.959
Rural Jharia	0.619
Rural Dhanbad	0.657
Rural Baliapur	0.994
Rural Nirsa	0.882
Rural Tundi	0.969
2	
Rural Baghmara	0.901

Source: Government of India, Census of India 1961, Bihar, General Population Tables, Delhi.

Table 8.3

Household Composition in Bihar and West Bengal, 1971

	Total	Members per household: Head's Spouse	sons (married)	other males (married)	other females (married)	males (unmarried)	females (unmarried)	males (unrelated)	females (unrelated)	Single-member Households: males	Single-member Households: females
BIHAR rural	5.7[a]	.77	.36	.15 (.09)[b]	.62	1.44	1.32	.02	.00	.03	.02
urban	5.4	.71	.24	.18 (.10)	.42	1.49	1.23	.08	.01	.11	.01
WEST BENGAL rural	5.8	.80	.19	.09 (.05)	.31	1.70	1.59	.04	.01	.03	.03
urban	5.5	.70	.15	.20 (.13)	.27	1.62	1.33	.09	.03	.09	.02

Notes: [a] Rows + 1 (head of household) sum to total

b Married brothers

Sources: Government of India, Census of India 1961, 1971, Social & Cultural Tables, Delhi, Table C I. (also for Table 8.5)

Table 8.4

Urban Household Size and Sex Distributions in the Study Districts

(% of households in selected size groups with sex ratios, f:m, bracketed below)

	1 member	2-3 members	10 members +
West Bengal (1961)			
24-PARGANAS	13.1 (.154)	26.4	8.4 (.864)
CALCUTTA	14.4 (.194)	26.1	9.0 (.875)
HOWRAH	15.8 (.151)	29.0 (.513)	7.1 (.811)
HOOGLEY	16.1 (.263)	27.5 (.604)	8.5 (.907)
These Districts comprise CALCUTTA METROPOLIS			
BURDWAN (1961)	13.0 (.156)	26.0 (.578)	8.7 (.833)
BURDWAN (1971)	9.6	22.2	n.a.
Burdwan City	7.4	9.3	n.a.
Asansol City	7.6	10.4	n.a.
Durgapur Steel	12.2	11.6	n.a.
BIRBHUM	10.3 (.484)	24.5 (.901)	9.4 (.912)
BANKURA	9.5 (1.09)	20.8 (.976)	11.4 (.909)
MIDNAPORE	11.5 (.337)	23.1 (.881)	8.7 (.908)

Table 8.4 continued

ORISSA 1961	1	2-3	10+
Bolangir	10.2	30.1	5.4
	*	(1.02)	*
B.K.	10.6	25.3	3.3
	*	*	*
Ganjam	9.0	28.6	4.9
	(1.22)	(1.04)	(.962)
Sundargarh	18.3	39.4	2.5
	(.091)	(.561)	(.961)
Sundargarh 1971	12.2	30.5	n.a.
Cuttack	10.0	25.5	10.3
	(.245)	(.664)	(.871)
Mayurbanj	10.8	26.3	7.4
	(.303)	(.764)	(.958)
E.MADHYA PRADESH 1961			
Bastar	13.2	33.3	5.5
	*	(.950)	(.873)
Durg	22.5	39.1	2.7
	(.142)	(.625)	(.870)
Durg 1971	12.7	27.9	n.a.
Bhilai 1971	13.8	29.2	n.a.
Raigarh	11.4	34.7	5.5
	(.525)	(.910)	(.880)
Bilaspur	13.6	34.5	5.1
	(.488)	(.885)	(.952)

Note * small numbers

Table 8.4 cont'd

Bihar (1961)	1 member	2-3 members	10members +
PATNA	9.0 (.243)	21.3 (.693)	11.9 (.889)
GAYA	10.5 (.324)	22.1 (.751)	10.8 (.948)
RANCHI	8.6 (.217)	21.9 (.707)	11.0 (.902)
SINGBHUM	10.8 (.202)	27.5 (.659)	7.3 (.888)
DHANBAD	15.4 (.066)	28.3 (.465)	7.0 (.777)
BHAGALPUR	7.0 (.398)	20.6 (.812)	11.1 (.925)
SHAHABAD	9.3 (.317)	22.4 (.747)	11.8 (.944)
MONGHYR	8.7 (.362)	20.9 (.815)	10.7 (.926)
Rural Bihar	5.3 (.994)	20.9 (1.044)	9.3 (.998)

Sources: Government of India, Census of India, 1961, 1971 (relevant States): for 1961, Household Economics Tables, Table B XVII; for 1971, Housing Tables, Table H IV, Delhi.

Table 8.5

Changing Family Composition in Selected Industrial Areas between the Censuses

Members per household

	Total	Head's Spouse	sons (married)	other males (married)	other females (married)	males (unmarried)	females (unmarried)	males (unrelated)	females (unrelated)	Single-member Households males	Single-member Households females
SUNDARGARH urban District (Rourkela)[a]											
1961	3.61	.58	.06	.14	.23	.75	.62	--	n.a.	--[b]	
						1.37					
1971	4.29	.73	.06	.11	.14	1.15	1.01	.07	.03		
						2.16					
ORISSA RURAL											
1961	4.90	.78	.20	.11	.60	1.18	1.01	--	n.a.	--	
						2.19					
1971	5.31	.80	.21	.09	.35	1.41	1.42	.02	.00		
						2.83					
BURDWAN urban District											
1961	4.93	.65	.13	.20	.28	1.31	1.11	--	n.a.	--	
1971	5.07	.73	.12	.15	.24	1.50	1.23	.07	.02		
rural											
1961	5.25	.73	.19	.15	.37	1.41	1.35	--	n.a.	--	
1971	5.60	.75	.18	.12	.32	1.65	1.54	.04	.01		

Notes

a This is the only District in our sample with data available (1983) which is dominated by a heavy industrial town.

b Unrelated, but part of household, and unrelated, not part of household, were combined in 1961.

Source: See Table 8.3

Table 8.6

Composition of Family Earners and Income among Industrial Workers in Selected Cities

	Predominant Industry	Average income per Employee	% single-earner families	Description of 2nd Major Earner	Number of Earners per Family by per cap. income (family) (family size bracketed) Rs 10-15	25-35	50-65
ASANSOL (858)	iron & steel (66%)	112.2	89.2	child	1.3(6.8)	1.1(5.0)	1.1(1.5)
JAMSHEDPUR (897)	iron & steel (57%)	158.7	80.2	child	1.3(7.0)	1.2(6.0)	1.3(4.1)
RANIGANJ (615)	coal mining (98%)	82.9	85.9	wife	1.1(6.0)	1.4(4.0)	1.2(1.5)
JHARIA (1384)	coal mining (99%)	93.4	78.3	wife	1.1(6.2)	1.6(4.3)	1.2(1.5)
AHMEDABAD (899)	cotton textile (92%)	118.0	77.2	child + wife	1.2(7.7)	1.5(5.3)	1.6(2.9)
SHOLAPUR (842)	cotton textile (71%)	54.9	53.0	wife	1.7(6.7)	1.6(3.1)	1.4(1.6)
MONGHYR (564)	cigarettes & loco assembly	124.8	81.5	child	1.4(7.8)	1.4(6.0)	1.0(3.5)

Note: Number of households in sample, and % of survey employees in predominant industry given in brackets.

Source: Government of India, Labour Bureau, Family Living Surveys 1958-9, Delhi, 1968.

Table 8.7

All Households and Industrial Households compared by Size Distributions: selected Cities, Eastern India

		Members per Household (% in each group) 1	2-3	4-5	4-6
Burdwan District Urban	1961	13.0	26.0		36.0
Asansol City Industrial	'58	34.8	14.8	27.8	
Asansol City (all)	1971	7.6	22.2	25.5	
Singbhum Dist. Urban	1961	10.8	27.5		36.6
Jamshedpur Industrial	1958	13.7	23.8	24.4	
Jamshedpur (all)	1971	7.3	20.6	26.4	
Monghyr Dist. Urban	1961	8.7	20.9		39.0
Monghyr-Jamalpur Ind.	1958	10.2	6.4	25.1	
Calcutta City	1961	14.4	26.1		33.8
Calcutta Industrial	1958	54.5	13.0	20.5	
Howrah Urban	1961	15.8	28.9		33.5
Howrah Industrial	1958	52.5	14.8	15.7	

(each row, inclusive of 5/6 and above, sums to 100.0)

Table 8.7 continued

		Members per household (% in each group)			
		1	2-3	4-5	4-6
Mining Areas					
Raniganj (Burdwan)	1961	not available - see Burdwan urban above			
Raniganj Miners	1958	50.3	20.1	19.9	
Jharia (Dhanbad)	1961	not available - see Dhanbad urban Table 8.4			
Jharia Miners	1958	42.5	21.4	21.2	

Note: These are Cities in the Eastern Region sample Districts and included in the Labour Bureau Surveys. To ensure comparability of data, only distributions up to 5/6 can be given.

Source: Government of India, Labour Bureau, Ministry of Labour and Employment, Family Living Surveys 1958-9, Delhi 1968.

Table 8.8

All Households and Industrial Households compared by Size Distributions: selected Cities, Western India

		Members per Household (% in each group)				
		1	2-3	4-5	4-6	
Gt. Bombay	1961	9.1	25.7		39.7	(each row
Bombay Industrial	1958	48.7	19.1	18.5		including 5/6
Sholapur District Urban	1961	9.3	23.0		39.8	and above
Sholapur City Industrial	'58	3.6	17.1	24.4		sums to 100.0)
Sholapur City (all)	1971	3.5	19.2	28.9		
Ahmedabad City	1961	8.1	24.6		42.4	
Ahmedabad Industrial	1958	25.0	23.7	28.9		

Sources: Government of India, Labour Bureau, Ministry of Labour and Employment,

Government of India, Census of India 1961, 1971,
1961: Household Economic Tables, Table XVII,
1971: Housing Tables, Table H IV, Delhi.

Table 8.9

Remittances and Family Structure among Industrial Workers

	Decadal Growth 1951-61 %	Percentage of households reporting remittances in each size group (members per household)					Average	Average Level of Remittance	All Industrial Households:	
		1	2-3	4-5	6	7+		Rs	% single married member	% single un-married member
Asansol	35.6[a]	69	35	11	11	9	34.7	13.0	24.7	10.1
Jamshedpur	39.1[b]	58	36	17	17	13	26.3	13.4	12.1	1.7
Raniganj	16.1	71	25	8	4	0	42.5	13.9	47.3	3.0
Jharia	27.2	74	32	11	9	7	41.9	12.7	40.2	2.3
Ahmedabad	37.4	54	30	16	11	7	27.6	11.4	22.9	2.1
Sholapur	21.8	13	5	1	0	0	1.8	0.3	3.4	0.2
Monghyr	20.7	97	13	4	3	3	13.3	5.3	9.4	0.9

Notes: a Asansol Town Group 78.0
b Jamshedpur T.G. 50.4

Sources: Government of India, Labour Bureau, Ministry of Labour and Employment, Family Living Surveys 1958-9, Delhi, 1968.
Government of India, Census of India 1961, General Population Tables, Delhi.

Table 8.10

Concentration of Workers in Household Industry, by Industry

This table gives the number of recorded workers per household in each specified household industry, for a selection of Districts.

mph = males per household

fph = females per household

hwph = hired workers per household

(number of households in Census sample is provided in brackets)

Overview and controls at the State level:

ORISSA		mph	fph	hwph
All manufacturing household industry				
	rural	1.40	0.94	0.10
	urban	1.27	0.61	0.29
BIHAR				
All manufacturing household industry				
	rural	1.61	0.95	0.35
	urban	1.45	0.60	0.45
WEST BENGAL				
All manufacturing household industry				
	rural	1.40	0.57	0.22
	urban	1.40	0.39	0.48
E. MADHYA PRADESH				
All manufacturing household industry				
	rural	1.51	1.09	0.15
	urban	1.22	0.78	0.15
Food processing				
	rural	1.59	1.34	0.38
	urban	1.21	0.70	0.38
MAHARASHTRA				
All manufacturing household industry				
	rural	1.43	0.92	0.09
	urban	1.19	0.83	0.24

Table 8.10 continued

ORISSA (urban Districts)

GANJAM	mph	fph	hwph	(606)
food	0.87	0.96	0.31	(114)
textiles	1.26	1.06	0.01	(124)
wood	0.88	0.94	0.03	(162)
SUNDARGARH				(54)
food	1.00	0.25	0.37	(8)
textiles	1.25	1.00	0.00	(4)
wood	1.00	0.27	0.36	(11)
non-metal minerals	1.50	0.25	0.25	(8)
basic metals	1.50	0.33	0.00	(6)
CUTTACK				(432)
food	1.29	0.63	0.27	(59)
textiles	1.41	1.32	0.06	(85)
wood	1.43	0.33	0.22	(46)
non met. min.	1.59	0.26	0.38	(42)
miscell.	1.65	0.09	0.29	(95)

BIHAR (urban Districts)

SINGBHUM	mph	fph	hwph	(140)
food	1.76	0.32	1.24	(25)
wood	0.92	0.58	0.33	(36)
non met. min.	1.67	0.83	0.08	(12)
DHANBAD				(201)
food	1.51	0.35	0.38	(74)
wood	2.15	0.62	0.46	(13)
RANCHI				(253)
food	1.25	0.52	0.16	(77)
wood	2.24	0.29	0.82	(17)
non met. min.	1.47	0.83	0.42	(36)
basic metals	1.44	0.89	0.00	(9)
PATNA				(1083)
food	1.45	0.54	1.21	(217)
wood	1.75	0.28	0.31	(113)
non met. min.	1.63	0.83	1.46	(72)

Table 8.10 continued

WEST BENGAL (urban Districts)

BURDWAN	mph	fph	hwph	(209)
food	0.82	0.36	0.14	(22)
tobacco	1.08	0.28	0.16	(25)
cotton text.	0.97	0.29	0.17	(35)
misc. text.	1.43			(7)
wood	1.07	0.34	0.45	(29)
leather	1.70			(10)
chemicals	0.75	0.50	1.25	(4)
non met.min.	1.30	0.47	0.23	(30)
basic metals	1.60	0.00	0.27	(15)
BIRBHUM				(83)
food	0.73	0.45	0.09	(11)
tobacco	1.05	0.32	0.11	(19)
wood	1.75	0.58	0.00	(12)
CALCUTTA				(791)
food	1.85	0.15	0.71	(48)
tobacco	1.23	0.36	0.95	(44)
text. misc.	1.37	0.07	0.90	(89)
wood	1.47	0.19	0.47	(103)
paper	1.11	0.82	0.63	(38)
leather	2.65	0.12	0.91	(159)
non met.min.	1.95	0.59	0.53	(73)
basic metals	2.09	0.11	0.51	(47)
24-PARGANAS				(1247)
tobacco	1.12	0.29	0.26	(58)
cotton text.	1.24	0.61	0.38	(157)
misc. text.	1.66	0.04	0.40	(659)
wood	1.31	0.50	0.72	(132)
non met. min.	1.48	0.40	0.89	(63)

E. MADHYA PRADESH (urban Districts)

DURG	mph	fph	hwph	(473)	BILASPUR	mph	fph	hwph	(587)
food	0.92	0.93	0.15	(71)		1.02	0.79	0.26	(43)
cotton text.	1.53	1.40	0.10	(30)		1.69	1.73	0.04	(116)
misc. text.	1.13	0.35	0.14	(72)					
wood	1.11	0.73	0.15	(62)		1.23	0.54	0.19	(26)
basic metal	1.32	0.16	0.68	(25)					

Table 8.10 continued

MAHARASHTRA (urban Districts)

GREATER BOMBAY	mph	fph	hwph	(1738)
tobacco	0.56	1.19	0.04	(373)
text. misc.	1.08	0.28	0.29	(399)
THANA				(376)
food	0.30	1.20	0.12	(82)
text. misc.	0.66	0.57	0.10	(131)
wood	1.03	0.56	0.16	(32)
POONA				(1263)
tobacco	0.49	1.17	0.02	(398)
cotton text.	1.05	1.00	0.31	(51)
text. misc.	0.96	0.35	0.12	(237)
wood	1.08	0.73	0.10	(130)
leather	1.22	0.18	0.11	(107)
SHOLAPUR				(1570)
cotton text.	1.22	1.14	1.49	(869)
text. misc.	1.05	0.50	0.15	(153)
wood	1.13	0.85	0.10	(113)
leather	1.30	0.17	0.07	(54)

AHMEDABAD	mph	fph	hwph	(855)
food	1.50	0.27	0.35	(26)
tobacco	1.01	0.62	0.04	(68)
cotton text.	0.85	0.84	0.22	(190)
misc. text.	0.85	0.56	0.02	(234)
wood	1.36	0.35	0.04	(97)
leather	1.32	0.07	0.63	(60)
non met.min.	1.25	0.46	0.58	(24)
basic metals	1.21	0.51	0.12	(57)

Source: Derived from Government of India, Census of India 1961, Household Economic Tables, (relevant States), Delhi, Table B XVI.

Table 8.11

Migrant versus Non-Migrant Concentration of Industrial Occupations

	Distribution of Selected[a] Occupations among Production Workers										
	70	71	72	73	74	75	76	77	78	79	continues overleaf
Asansol City											
Migrant		10.7	2.7			24.3	8.2	8.6		6.0	
Non-Migrant		8.6	6.9			19.2	2.4	10.7		6.1	
Burdwan City											
Migrant		6.5			3.2	9.7		5.9		6.8	
Non-Migrant		6.1			4.0	10.6		4.5		9.1	
Calcutta City											
Migrant	3.2	4.6	4.5			12.5	3.9			4.5	
Non-Migrant	2.5	5.4	3.4			19.7	6.2			5.4	
Calcutta Metropolitan Area											
Baranagar M	21.5	11.3				18.5					
Kamarhati M	10.7	2.7				20.4					
Baran. + Kam.											
Non-Migrant	2.7	11.7				2.9					
Howrah City											
Migrant	16.3	2.6		7.2		21.9				2.7	
Non-Migrant	9.9	2.3		8.0		27.6				2.0	

Key to Occupations 70 - 79

70 spinners & weavers
71 tailors
72 leather-workers
73 furnacemen
74 precision instrument makers
75 tool makers
76 electricians
77 carpenters
79 bricklayers

Table 8.11 continued

	80	81	82	83	84	85	86	87	88	89
Asansol M			3.6					3.6		26.5
NM			6.9					1.7		15.4
Burdwan M		3.4	15.4		8.6					27.6
NM		3.4	12.5		6.4					30.7
Calcutta M						3.3				39.2
NM						4.8				19.8
Baranagar M				3.2						22.7
Kamarhati M				3.2						39.5
B + K NM			6.1							14.4
Howrah M										34.3
NM										27.4

small cells omitted:

complete rows sum to 100.0

Key to Occupations 80 - 89

81 potters
82 millers & bakers
83 chemical workers
84 tobacco preparers
85 other craftsmen
86 -
87 stationary engine workers
89 other labourers

Table 8.11 continued

	70	71	72	73	74	75	76	77	78	79
Jamshedpur and Jugsalai										
Migrant				15.8		26.7	5.2			3.2
Poona City										
Migrant	1.8	2.4				6.6	1.0	2.3		1.9
Non-Migrant	2.4	6.3				23.9	3.1	8.3		3.2
Sholapur City										
Migrant	75.1	3.5				2.6		1.4		2.1
Non-Migrant	61.2	6.1				6.2		3.3		3.3
Thana City										
Migrant	18.0	3.0		3.3	1.3					
Gt. Bombay										
Migrant	25.5	4.4	1.6			13.5	2.3			
Non-Migrant	14.5	7.4	0.1			23.4	6.2			
Ahmedabad City										
Migrant	65.0	3.6		2.8		5.7		2.8		3.2
Non-Migrant	57.9	4.1		2.6		8.1		2.8		2.7

Table 8.11 continued

	80	81	82	83	84	85	86	87	88	89
Jamshedpur & Jugsalai M								6.4		29.3
Poona M	1.3		1.9	1.0						13.5
NM	8.3		2.2	1.4						16.3
Sholapur M			1.7					1.3		7.8
NM			6.5					1.0		6.8
Thana M										
Gt Bombay M			1.5					1.5		32.5
NM			0.7					2.7		26.8
Ahmedabad M										7.4
NM										8.2

Notes: a The Census only records limited occupations (of reasonable cell size.) Entries above 20% have been underlined (except col. 89).

Source: Calculated from Government of India, Census of India 1961, Economic Tables and Migration Tables, relevant States, Delhi. The reconstruction is from Tables B V and D IV, but lack of uniformity in tabulation limits us to this sub-sample of Cities.

Table 8.12

Indices of Industry-specific Concentration among Migrants of different Origins in two Centres of Heavy Industry

Migrants to DHANBAD-JHARIA-SINDRI, Bihar (1961)

Origin	Percentage of Male Workers of specified origin who are employed in: Mining	(number in brackets)
Bihar	36.9	(14543)
Within Bihar:		
Dhanbad	38.3	(1933)
Gaya	33.9	(2607)
Monghyr	26.8	(1646)
Hazaribagh	43.3	(2279)
Uttar Pradesh	48.8	(3633)
West Bengal	43.3	(2880)

Migrants to JAMSHEDPUR, Bihar (1961)

Origin	Percentage of Male Workers of specified origin who are employed in: Iron & Steel	(Numbers)	Transport Equipment	(Numbers)
Bihar	29.4	(8843)	8.8	(2648)
Orissa	38.7	(3072)	12.7	(1008)
Punjab	34.3	(1364)	13.7	(545)
U.P.	34.5	(2372)	12.8	(881)
West Bengal	37.9	(3682)	11.6	(1127)
Outside India	38.4	(2916)	4.8	(364)

Sources: Government of India, Census of India, 1961, Special Migration Tables for Dhanbad-Jharia-Sindri Town Group, Delhi, Table 5; Special Migration Tables for Jamshedpur, Delhi, Table 5.

Table 8.13

Concentration of Industrial Employment according to Duration of Residence at two Centres of Heavy Industry

DHANBAD-JHARIA-SINDRI Bihar, 1961

Migrants from:	Duration of Residence in Dhanbad: 1 year	1-5 years	6-10 years
	Proportion of all male workers[a] in Production Work		
Other States (than Bihar)	.202	.206	.249
Uttar Pradesh	.168	.167	.249
All places	.264	.279	.308
	Proportion in Mining[a]		
Uttar Pradesh	.557	.524	.386
All places	.386	.353	.327

JAMSHEDPUR

	Proportion in Production Work[a]		
Other States (than Bihar)	.364	.610	.530
Uttar Pradesh	.352	.644	.503
Orissa	.343	.538	.513
Punjab	.367	.509	.473
West Bengal	.356	.676	.567
All places	.384	.625	.540

Notes: a The proportion of all male workers from the specified origin and of the specified duration who are recorded in the occupation of production worker (miner).

Sources: See Table 8.12 above.

Table 8.14

Concentration of Industry-specific Employment among Migrants to Ahmedabad, according to Duration of Residence

Origin	1 year	1-5 years	6-10 years
	Proportion of all male workers in Manufacturing[a]		
All places (numbers)	.311 (4320)	.463 (20070)	.563 (23190)
Maharashtra (7535)	.269	.539	.597
Uttar Pradesh (21764)	.480	.651	.731
Rajasthan (14826)	.269	.392	.575
	Proportion of all male manufacturing workers in Textiles[a]		
All places	.660 (2852)	.743 (14911)	.820 (19027)
Maharashtra (6491)	.749	.765	.882
Uttar Pradesh (19389)	.647	.795	.895
Rajasthan (12649)	.582	.779	.895
	Proportion of all Production Workers who are Spinners and Weavers[a]		
Maharashtra (5396)	.495	.544	.651
Uttar Pradesh (18009)	.577	.636	.781

Notes: a The proportion applies to each origin-duration-specific cell in following bank of figures.

Source: Government of India, Census of India, 1961, Special Tables on Migrants to Ahmedabad City, Delhi, Tables 4 and 5.

A brief Overview of Chapter 8

If the State does not resolve the labour market disequilibria and resultant income losses, how far can families protect themselves? It becomes clear that migrant groups do not attempt to spread their sources of employment, but rather seek to concentrate it in particular industries or occupations. At the same time families in urban areas tend to loosen their rural links by family formation in the towns (an exception being the miners).

CHAPTER 9

Family Income Security, Employment Aspirations, and the State

A Summary of the Argument

The adverse implications of rapid demographic growth for the equilibrium of the future labour market, and the adverse implications of single-industry towns for the long-term family income security, are considered finally in the light of possible interventions by the State. Empirically a reconstruction of the local demography of Bhilai Steel Town helps to illustrate the first problem, and this is taken down to 1981. Costs of alternative strategies that the State might adopt towards alleviating both these problems, - subsidised diversification or suboptimal scale of plant -, are assessed: in some cases the costs are less than the loss of social income involved in the event of a local industrial stagnation or closure. Finally, an original hypothesis is put forward: that family, or other social group, income security is at its worst when both direct income-producing employment and indirect transfer incomes from fellows in the same social group (or family) are, at source, concentrated in the same industry.

Concentration of Industry and Security of Incomes: the Policy Issues

Our interest in the relationship between demography and industrial structure, or demography and industrial technologies, has been prompted by a concern for some of the welfare implications of industrialisation strategy. A particular problem worth investigation has been the security of incomes obtained through employment in single-industry towns. It is a commonplace to observe that changes in industrial structure or technologies may render a high proportion of the workforce unemployed, and a higher proportion in such towns than in more diversified locations.[1] Before proceeding further it would be pertinent to ask whether that observation alone is in any way an argument for encouraging (i.e. subsidising) local diversification. The question is more complex than may be immediately appreciated. Some of the major points, in regard to which careful quantification is needed, (and an illustration is attempted in the Appendix), are as follows.

1 For instance in the case of our comparative study from the U.K., we note unemployment rates of approximately 40% soon after the closure of Consett steel works.

If there is a freely operating market, industries of a similar nature, or highly inter-dependent industries (in an input-output sense), will tend to locate in close proximity to one another to reap certain economies of production, related to (inter alia) the physical fact of their mutual proximity itself.[1] To attract wholly unrelated industries to the same area may require heavy subsidies continuing over time. This we will document below. To be sure, it will often be possible to attract modern industries providing consumption goods (particularly food) for the local population at rather low levels of subsidy, especially if the local population is close to the threshold size at which local industry (also subject to economies of scale) would in any case become profitable. But then, as we shall argue, the social benefit of a subsidy in the case of a consumption goods industry will also be considerably smaller.

The question to ask is, how could any subsidies be justified? Clearly they could not be justified on any grounds of industrial efficiency (if, as we say, factor and product markets are competitive). The short answer would seem to be that if the State has a policy of providing

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1 The availability of a particular factor of production will often decide the location in the first place. On the economies of location and agglomeration there is a voluminous literature. For a summary, see, e.g., E.S.Mills, Urban Economics, Harvard University Press, Cambridge (Mass.), 1979.

unemployment relief (for the wholly unemployed) it is arguable at least that, provided unemployment levels would be higher in the economy as a whole if industry remained locally concentrated, then the reduction in future unemployment relief might more than compensate for the cost of a continuing subsidy needed to promote and maintain some degree of local diversification.

But why should open unemployment rates be higher if industry is more concentrated? The argument is that in a recession or decline in demand for a locally produced commodity exported from the locality for national (or inter national consumption), the reduction in incomes from direct employment in the depressed industry further depresses local demand for consumer goods and services, due to a reverse multiplier, as it were, setting in.[1] This puts more of the local workforce wholly out of work. Whereas if, say, 50% of local industrial output (for export beyond the community) held up in the case of a more diversified town despite recession or changes in the structure of aggregate demand, then those employed in consumer goods and services production, through working shorter hours and receiving

1 If the recession is severe enough, the opportunity for viable work-sharing among the workforce supplying the "multiplier" goods is severely curtailed: some people become wholly unemployed once average income from work reaches subsistence levels.

lower incomes, would not be out of work altogether, even if one of the core industries closed down. This effect would be even stronger in a largely self-employed or household production economy. Shopkeepers will take a cut in income rather than close down and seek unemployment relief or new work outside the locality. The fall in demand and employment is spread throughout the community and survival remains possible: if the fall is a more significant proportion of local demand, then spreading the incidence becomes impossible without reducing the average income from work to below an acceptable subsistence level, and hence the work-sharing ethic breaks down, and the marginal producers become wholly unemployed. Thus the social returns to a policy that attracts a second exporting industry (unrelated to the first) would of course be higher than those from attracting an industry purely intent on providing commodities or services for immediate consumption in the town itself: for the consumer goods industry would add to local unemployment if the first industry goes into a severe enough recession (since the first industry's wage labour is the source of local consumption demand.[1]

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1 There is a further consideration here, arguably in the realms of the unquantifiable, but almost certainly of significance. A level of unemployment concentrated in a locality may be socially more costly than the same amount of unemployment dispersed over a region. The psychology of aggregate depression may encourage crime and other social malaise, may discourage labour itself from seeking re-training or new job opportunities, or may discourage new private investment from entering the area (for reasons other than the more objective economic

So far we have been discussing the issue on the assumption that the State provides unemployment relief. Insofar as it does not, the matter becomes one of income distribution alone. Inequalities clearly become sharper if 40% of the town becomes wholly unemployed (i.e. 20% due to the closure of the basic industry, and a further 20% due to the reverse multiplier described above), than if only 15% of a town twice as large and more diversified becomes unemployed (i.e. 10% due to the closure of the basic industry and only 5% due to the reverse multiplier), with an additional 5 to 10%, also affected by the reverse multiplier, taking a considerable cut in income, but due to the continuation of other basic industries, not losing employment (at subsistence level remuneration) completely.[1] Of course the effect of a local reverse multiplier is much more severe on individual families if the workers in the core industry, who are made jobless, have to share in the existing <u>local</u> income to survive (thus considerably cutting local aggregate consumption), than it would be in a State with full unemployment relief financed out of <u>national</u> income

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footnote continued
ones suggested above). Together these arguments may well justify an additional element of subsidy in an effort to encourage diversification (which is not to say they should be used to justify <u>any</u> level of subsidy).

1 It is appreciated of course that definitions of inequality differ. At least one can say that the distributional effects are different in the two cases. The author's own value judgement would be that they are worse in the first case.

(implying a consumption transfer toward the locality under relief). Indeed if large redundancy payments are also made, the immediate effect may be to increase aggregate consumption in the locality (again an experience of the British Steel Towns). But as pointed out above, there is no indication that such additions to consumption compensate over time for the welfare loss in being out of work in a morally depressed community. That is to say, the unemployed labour force is constrained to use its incremental income to purchase goods, rather than to purchase the satisfaction of being at work. Unless the redundancy pay is enormous, there may be a net welfare loss. And if it is enormous, the question arises whether this plus unemployment relief (plus any subsidies used to attract new industry) may together be more costly than the option of keeping the original industry open.

But it is in the context of an economy without unemployment relief, but with a developing system of industrial wage labour, that the demographic aspects of single-industry towns become more important. This is because the source of income to the wholly unemployed is the family in the broadest sense (as we have argued in Chapter 8 above). The scope for income sharing, by transfers alone, outside of the immediate or extended family is very limited. There might be, cet. par., opportunities for work (and hence income) sharing outside the wage sector, but at times of industrial closure the redundant wage labour will find it less easy to become absorbed in the non-wage sector: the potential entrants will be just too many in an indiversified town. This is why we focus on the family.

The fact that there is no State unemployment relief does not necessarily imply no State intervention in, or planning of, industrial location. The National and State Governments of India have enacted and implemented rather more effectively regarding location than regarding unemployment.[1] Furthermore, though one cannot immediately suggest political strategies that could be adopted at the community or family level toward the effective adoption of unemployment relief, one may be able to suggest strategies to ensure a more even sharing of the unemployment burden. This may look like a recipe to prevent structural reform. I shall argue later, though cannot prove, that it is not.

In summary, the problem may be presented as follows. Welfare transfer systems operate between <u>individuals,</u> but the organisation of these transfers may take place

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1 For details on regional subsidies see the references noted in the Appendix to this Chapter. For an appraisal and critique see J.W.Mackie, "Industrial Location and Regional Policy in South India", Ph. D. thesis, School of Oriental and African Studies, London, 1982; I am grateful to him for some useful references.

at the level of the family, local community, industry, region, or nation. There is typically, but not necessarily, a spatial dimension involved here. On the other hand factor incomes, as distinct from welfare transfers, that is, in this context, wages or payments dependent on work, are distributed across individuals in ways that make them, as individuals or groups of individuals, vulnerable to recessions or structural changes in the economy. Again there is typically a spatial dimension here, of the kind that this thesis has emphasised. But there need not be. All Chinese overseas in India might be restaurant workers for instance, but they could be geographically scattered in all the major cities. Now the interesting problem arises with the overlapping of these two sets: the income transfer, and the income source, (Figure 9.2). If they overlap completely (as would be the case if the Chinese re-distribute income among their own overseas community, receiving nothing from outside), then individual welfare is at its most insecure in the event of economic structural change (a fall in the demand for Chinese cuisine).[1]

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1 Another example would be that of the textile workers from Ratnagiri in Maharashtra. Thay may work in textile towns all over the State, and live permanently where they work, but if they transfer income among themselves, the problem of the overlapping sets arises, should the textile industry fail. In practice there is probably a spatial dimension: these migrants all work in Bombay and return to Ratnagiri regularly: the closure of a cotton mill could impoverish a village.

The Implications for Employment over time: Local-level Disequilibria Explored

A striking, and some would argue depressing, feature of the Indian Censuses is that they indicate consistently a failure of the labour force to shift proportionally into non-agricultural employment, and a similar failure of the manufacturing sector to grow proportionally to the rest. This is thought to be depressing because productivity is believed to be higher in manufacturing (even when social pricing of outputs is used), and above all in particular branches of manufacturing outside the household sector, than it is in agriculture. There are reasons to believe that it is in India's economic interests to develop the manufacturing sector: quite apart from achieving goals of dynamic independence (which Governments of developing countries have rightly or wrongly regarded as being promoted by the development of the manufacturing sector), India undoubtedly has comparative advantage in world production in certain industries in that sector.[1]

1 Quite apart from the question of the undesirability of a slow growth of industry, per se, the failure to absorb significant quantities of labour in this sector (even at times of its fairly rapid expansion) would be undesirable, given the importance of employment as a means to income in India. These are complex and fundamental issues, beyond the scope of the discussion in this thesis (but see Chapter 2).

This phenomenon is well illustrated in our region of study. Its implication for growth of income is acutely observed at the level of the locality. At the start of our period of study, in the mid-1950s we witness a major investment in this region. This is physically centred on a few localities. The investment leads to a national income flow that induces further investment: in physical terms the output of basic materials like steel plates is followed by the establishment of factories for manufacturing finished products, downstream, as economists say: these developments in turn promote the creation of more capacity in steel production, and in mining (through backward linkage, in the jargon). In aggregate we are examining an accelerator effect, again creating employment at the level of the community.

The accelerator effect operates over time. But of more immediate reaction is the change in purchasing power of the working community (and families) employed in these investment goods industries: this will stimulate a further utilisation of productive and service capacity, as in turn will the increased purchasing power of those employed in providing these consumer goods and services. The local potential of this multiplier effect is often missed in discussion of employment problems of developing countries, simply because the disaggregation to the level of the locality is not done. But in actual fact there is no doubt that towns neighbouring the growth centres just described expand their processing of consumer goods to meet the demand of the wage-labour migrating into the area (though it cannot be denied that some of that demand is met by importing finished goods into the area, and even into the country, - leakages as the economist would say).[1]

1 This is not the place for a social cost-benefit analysis of investment of this kind. Suffice it to say that a major dis-benefit is the rise in the local retail prices induced by the arrival of a high-productivity workforce: in the short-run at least this will cause a fall in the real income of the working members of the original community who are not sufficiently integrated into the new economy, and of dependent household members whose monetary allocation is fairly inflexible, and of those on fixed incomes established by non-market forces outside the locality (e.g. State transport workers). This point was made forcibly to the author by the manager of a chemicals factory outside the industrial areas in Madras .

We are to focus here on three growth centres, in the Districts of Burdwan, Durg, and Sundargarh. Each District's urban area achieved a proportion of workforce in manufacturing of between 30 and 40% in 1961. During the following decade that proportion stabilised in Burdwan, fell slightly in Sundargarh, and stabilised in Durg (Table 9.1). Distinctions between Burdwan and Durg will become clearer when we view these Districts at the level of Municipalities. Both Districts achieved a higher crude proportion of working males in manufacturing than did Sundargarh. There is no a priori reason why the proportion should level off at around 30 to 40%; in the non-central Districts of Metropolitan Calcutta the proportion is around 50% (and in that case at least the high level cannot be ascribed to the high initial level of manufacturing with new growth running ahead of the expansion of tertiary establishments).

In each case the surrounding Districts have a far lower proportion in manufacturing, and no notable improvement in that proportion over time (in the case of Durg, see Table 9.1, quite the reverse).[1] Within Burdwan District (Table 9.1), as within the other rapidly growing Districts,

1 Owing to a change in the Census definition of activity status (among other inconsistencies) the safest comparisons are restricted to adult males only; see J.Krishnamurty, "Working Force in 1971 Census: Unilluminating 'Final' Results", Economic and Political Weekly, August 1973.

there is considerable variance between urban localities: the manufacturing labour force grew fast from 1961-71 in Durgapur, moderately in Asansol-Burnpur, and fell absolutely in Burdwan City. In Sundargarh (using slightly different data) we find it grows slowly in Rourkela, but falls in Sundargarh Municipality, and particularly in Birmitrapur. In Durg it grows moderately in Bhilainagar, but falls in Durg Municipality, and, more importantly, in Rajnandgaon (see also Table 6.6).

It is a major thesis of this study that due to the demographic nature of income-sharing, the material and social prosperity of a community requires it not being dependant on a single industry (see Chapter 8). A glance at the composition of manufacturing will help establish how far this was avoided over the 1961 - 1971 decade (Tables 9.2, 9.3, and Figure 9.3). The heavy concentration of large units in the basic metals, machinery, and transport equipment industries in Sundargarh and Durg Districts in 1961 is immediately apparent. In Sundargarh other developments are under way by 1971, noticeably a large-scale chemicals sector. That is a crucial diversification. Burdwan achieves a similar mix of heavy industry, including electricals. It also has a large-scale food and beverage manufacturing sector dating from the initial period. Arguably the broader base accounted for the maintenance of the manufacturing sector in Burdwan despite the depression in the basic metals industry. In the latter sector, the large-scale units in Burdwan increased only slightly. In Sundargarh, however, there was a considerable expansion. But ten years is a short time on which to form the basis of a judgement. Confining our-selves to observing the Steel Towns themselves we find the contrasts are even stronger. Durgapur grew far faster than the other two, <u>and</u> diversified at the same time. In this analysis, the question inevitably arises, where should we draw the boundaries of the local economy, given the ability of labour to migrate? Migration between towns as close as Durg and Bhilai may cause no serious social upheaval; migration between Durg and Bhopal may do so: family income and social ties become weakened. It is true that inter-State migration took place readily when the New-towns were formed. But the rapid family formation indicated that the migrants expected to stay in their new location: and as they age, their propensity to move again is diminished (so that the social costs of forcing them to do so increase). The point to be made here is simply that such a skewed industrial structure as that of Durg or Sundargarh is known to be particularly vulnerable to overall change in comparative advantage, economic strategy, and national prosperity. The Western world's experience is not irrelevant. Corby and Consett Steel Towns (see Chapter 2) are smarting from just such an affliction. When incomes of local populations are largely determined locally the problems are even more acute. Industrial monocultures have severe future employment and hence welfare implications. We have illustrated the contrast between Durg District and Burdwan in their degree of industrial diversification in Figure 9.1 (employing a technique that resembles the familiar Lorenz curve analysis).

Earlier we drew some contrasts between regions of Eastern and Western India (Chapter 1). The case we want to review here for Western India is the urban District of Poona, in Maharashtra. This consists predominantly of the large City of Poona itself, and the emerging New-town area of Pimpri-Chinchwad close by. The City has a history of commercial and administrative activity in Mughal and British days; it was a military centre and hill station for escape from the sweltering heat of Bombay by the sea. After Independence a steady growth of manufacturing was experienced in nearly every industrial sector (Table 9.2). This was maintained through to 1971. The growth was sustained for several reasons. First, the City was not wholly dependant on the production of a commodity for which national demand was to level off; admittedly there are metal products and machinery establishments in Poona, and their expansion was limited during the 1961 - 1971 decade, but they do not dominate the industrial sector. As can be seen from Table 9.2 almost every sector (at the two-digit level of aggregation) is represented with a large-scale unit. Secondly there is an established chemicals industry, a sector least affected by the depression of the 1960s. Thirdly there has been little experience of labour unrest, a situation possibly assisted by the continued steady expansion and well-balanced age structure of the City. As an aside it may be observed that in the late 1960s the City was subjected to an unprecedented in-migration due to drought in rural areas. But these migrants were not, and had no more than fleeting aspirations to be, absorbed in the modern industrial sector. They came with their families, and (initially at least) they presented little opposition to authority.

But the real expansion of chemical and modern consumer-durable manufacturing has centred around Pimpri and Chinchwad. By 1971 Poona and these outliers were regarded as a single urban agglomeration. But even taken separately, the proportion of the workforce in manufacturing underwent a steady increase over the 1961-71 decade, from below to above 30% in Poona, and from 40 to 65% in Chinchwad. It cannot be said that such a desirable industrial mix was planned; but it may be predicted that the results will be happier for employment and welfare prospects over the coming decades, than the results of industrial expansion in parts of the iron and steel belt of Eastern India, (Table 9.3, Figure 9.1).[1] So long as the District has a broad manufacturing potential it can more rapidly expand in whatever sector it finds its comparative advantage to lie: and that way the second and third generations (and indeed other dependants of the initial migrant families) will more readily find local employment.

Strategies to Achieve Economic-Demographic Equilibria: case-study of Bhilainagar revisited

We now return to the site of the most outstanding demographic disbalance, the Steel Town of Bhilainagar. We try to reconstruct exactly what the demographic evolution has been, in some detail down to 1971, and with some speculation beyond that date. We relate the expansion of the steel plant to the expansion of the labour force to see in practice how far an equilibrium has been achieved. We then propose a scenario for future strategists posed with similar economic questions, the planners of Bokaro and Vizag being among them. Taking a number of parameters, social and political, as given, we suggest alternative investment

1 There is a fairly strong assumption here that the labour-to-capital ratios will not significantly change.

strategies in order to enquire how the desired equilibrium might have been achieved. Finally we investigate alternative demographic strategies to meet the same ends. In short we are posing the following question: given that India intends to make steel, and to make it at Bhilai (or at some specified location), how can the supply of, and demand for, manufacturing labour be matched, to avoid prolonged periods of local unemployment, especially of the sons of the original migrants, by the use of a limited number of policy variables over which we can assume control?

In Figure 9.4 we present the essential demographic data. A consistent reconstruction of what happened after the arrival of the first 15,000 steel workers (that is operatives and service workers for Hindustan Steel, not including construction labour per se) is offered in a note that follows below. Here we pinpoint the more startling conclusions. First we note that Bhilainagar grew from 86,000 to 174,000 in a decade (the exact figures are in the Tables 9.4 and following). However, the work force in steel production increased to only 25,000, and the total male labour force rose from 46,000 to only 57,000. What is more, we estimate that only 8,000 to 10,000 male migrants joined the labour force during that decade.[1] In other words, nearly 90% of the 100% decadal

1 And perhaps only 5000 if we exclude migrating sons of the original 46000 workforce.

demographic growth came from "natural" demographic forces: given the structure of the population that had amassed between 1956 and 1961, the rest followed naturally on the road to demographic stability.

But demographic stability takes nearly 100 years before it achieves its recognisable characteristics, its unchanging age structure for instance, not a mere decade.[1] Hence our second rather surprising conclusion (surprising in the light of demographic-industrial relationships that had generally been experienced historically in India, and partly incorporated in our Model type "1 c"): to Bhilainagar was transposed a segment of the stable rural population, with very little interruption resulting from the process of migration. Most of the men were already married, and their wives followed soon after their husbands' arrival, brought their existing children with them, and continued their child-bearing. Hence by 1971 a familiar age-pyramid was restored in Bhilai, similar in structure to the rural population except for its youthfulness (being more youthful than the almost stable population from which it was drawn; see illustration in Figure 6.1). The built-in potential for a fast natural increase that might have been seriously retarded by an adverse sex ratio

1 A.J.Lotka, "A Contribution to the Theory of Self-renewing Aggregates, with Special Reference to Industrial Replacement", Annals of Mathematical Statistics, 10:1, March 1939.

suffered no perceptible retardation. In ten years the sex ratio had reached 0.800 (females to males), against the expected 0.600. I estimate the birth rate as being about 42 per thousand in Bhilai in 1971; in the Model it is still 36 per thousand 15 years after the first major migrations, though in the stable state it reaches 43. The interruption caused by the process of migration was hardly sufficient to lower the fertility of the couples concerned (the pattern traced out in Model "1 a" seems more appropriate).

If we concentrate now on the sons of the migrants in the manufacturing industries (whom I have called the "second generation" in this thesis), this phenomenon means that we have a quinquennial addition to the labour supply of between 6,000 and 9,000 (allowing for mortality from birth) starting in 1970 and continuing and increasing until 1985 (Figure 9.4).[1] This is a dramatic increase (the male population under 15 in 1961 had only been 11,000), and the absolute numbers are very large too; the instability of our Model is there, but without the period of slow or negative growth in labour force entrants (at least as far as our decennial data can indicate), (Table 3.1). On the demand side we have already noted the lack of diversification of industry in the urban areas of the District of Durg between

1 The sons of the 46000 (1961) workforce increase the workforce by between 9000 and 14000, the sons of the core-sector steel workers by between 3000 and 5000, over this decade.

1961 and 1971. Figures for manufacturing employment are hazardous to use due to the redefinition of employment between the Censuses, but it seems that males in factory manufacturing hardly increased as a percentage of the male labour force. From 1971 to 1981 we are rather in the dark, but using alternative models to reconstruct figures consistent with the few published so far from the 1981 Census, around 11,000 adult males seem to have been attracted into the township. We also know that "downstream" metal-goods manufacturing capacity was installed during this period, coming on stream towards the end of the decade.[1] Let us suppose some 30% of the adult migrants were recruited into manufacturing. The crucial question then is, were they recruited after the second generation entrants to the labour force (numbering about 23,000)[2] had sought, and some failed to gain, employment in manufacturing, (in which case the latter may have faced a period of unemployment or underemployment), or before they had done so, (in which case the latter may have faced a period of under-employment towards the end of the decade)? And certainly the prospect of mismatch still arises since the early 1980s will experience the largest second generation cohort to date.

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1 Various reports in Financial Express (Bombay) in 1980, e.g. on 6th October, 1980, page 10, column 3.

2 That is , over ten years: perhaps 8,000 the sons of "core-sector" fathers.

No disequilibrium need have arisen if the demand and supply had been contemporaneous, more or less. However, the core industry was in iron and steel making. This employed 15,000 men in 1961 and 25,000 by 1971 (Table 9.8) by which time capacity had risen to 2 million tonnes, implying an output-employment elasticity of 0.78 at this scale of production. By 1977, 2½ m.t. output was achieved. All this implies severely diminishing employment potential (in the face of increasing supply, at least of steel workers' sons).[1] A well targeted expansion programme toward the original goal of 10 million tonnes could have provided all the employment needed at Bhilai: but the time-phasing becomes crucial. The current expansion programme to 4 m.t. will be particularly welcome if it is achieved by the mid-1980s.

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1 Some occupational mobility is to be expected, though I have been told that steel workers' sons do aspire towards the secure and well-paid employment in that industry. Spatial mobility, the out-migration of the second generation in search of work is taken as an unacceptable solution to disequilibrium in this thesis. This may strike the reader as an unacceptable limitation on our solution strategies. The problem is the scale of redeployment needed, compressed into so short a space of time, when economic expansion is now being concentrated in other parts of the country. When professional and academic people I met in India in 1976 raised the objection that the population in India was too mobile, not insufficiently so, they were thinking of the initial process of population formation in urban areas, of small-holders

We can now review alternative strategies toward labour market equilibrium in the context of the demographic situation at Bhilai (see also Appendix, Figure 2). They are fivefold:

(i) Industrial diversification (see Appendix).
(ii) Phased creation of additional capacity in steel production (in discrete "lumps" of not less than 1 million tonnes capacity each, - this being the minimum efficient scale in 1955).
(iii) In-migration controls.
(iv) Delayed fertility (especially among wage labour, to prevent the build-up in new labour-force entrants pre-dating the planned investment expansion) (see note that follows).
(v) Mini steel plants, preferably to be installed from start of any new investment programme (i.e. in 500,000 tonne range, as are currently being built following the Direct Reduction technology (see Chapter 2)).

We note en passant the alternatives that I am taking to be unacceptable, socially or politically, in the contemporary Indian context. They are (i) the disallowance of green-field steel plants, or, more strongly, disallowance of any steel plants, or similar heavy engineering investment involving huge economies of scale; (ii) the forced out-migration of large cohorts of young (or old) members of the

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footnote continued

and landless labourers, rapidly drawn into one centre of industrial growth; my discussants were not, I would claim, trying to imagine the reversal of this process.

community, whether initially in-migrants or not (and, it might be noted here, for reasons suggested in Chapter 5 the strategic option (iii) of in-migration controls is not favoured)[1]; (iii) prevention of marital unions, by adopting a sex selective migration control policy, or, a weaker control, the restriction on marital fertility by limiting severely ultimate family size, for example to a single child per couple. To repeat, our objective behind the strategies put forward is first to minimise second generation underemployment, especially among the families of manufacturing labour (and especially when that underemployment is specific to ethnic or regional groups), and second, to maximise family income security over time, as discussed above (favouring the adoption of option (i) above). In all, a reliance on options (i) and (ii), and perhaps (v), would appear most practical and sensible.[2]

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1 The efficience and equity of migration control policies are described in N.R.Crook, "On the Management of Urban Migration and Residence", <u>Asian Journal of Public Administration</u>, 5:1, June 1983.

2 As we noted in Chapter 2, we are having to make strong assumptions here that the new technologies are not seriously labour displacing.

The Dynamic Implications and Politics of Migration: a Conclusion

To pursue the implications of the dynamics of industrialisation, non-industrialisation, and de-industrialisation that we have been describing is obviously a complex undertaking. To attempt to forecast would be patently absurd. We can only point to a few specific implications, some more concrete in that the precedents are clear, some more speculative in that either there is no precedent, or the precedents were in their time strongly influenced by different conditions.

The most clear-cut case is that of the rapid development of New-towns on green-field sites. It has been shown that, under certain conditions on the age (and sex) structure of migrants, the age group ready to enter the labour market is itself subject to periods of fairly dramatic expansion over the medium term of 25 years. As far as employment is concerned, such fluctuations could be handled by the work-sharing character of the non-factory sector. The implication at the family level is that sons employed in the non-factory sector may become partly dependent on their fathers for the maintenance of their income. That in itself may create tension within the family - perhaps especially in a society where the inter-generational income flows are expected to be in the reverse direction, from son to father. A further source of tension, however, is that the sons are expected at least to achieve employment of the same status as that of their fathers. This situation is exacerbated if the family is from another urban area or the sons are educated. Aspirations will be at their highest.

Another source of tension arises not from the age structure as such, but from the fact that the immigrants are foreign. They may enjoy initial acceptance if expansion in employment is rapid enough for migrants and locals to have equal access to jobs: once it slows down, there is rivalry between the "sons of the soil" and the migrants themselves, who are then seen to be occupying jobs that the local growing labour force feels it should have by right. The more rapid the initial industrial expansion, the less likely the same rate of growth can be maintained; in any case, continued growth depends on the investment decisions of industrialists, not the social considerations of the community. The more specific the conditions favouring the original location of the industry (or the less commercially competitive the reasons for the original location), the less likely it is that the growth of investments can be sustained, unless similar or other non-competitive forces are perpetuated or introduced.

Now, to take this point a little further, the political response encountered is likely to be anti-migrant (by whatever local interest group it was that promoted the original investment), rather than pro further investment. And in an environment of regional stagnation, the original industrial concern is unlikely to favour further expansion. The upshot will be to keep migrants out rather than to provide more jobs. This response is exacerbated if the migrant population subgroups are growing owing to favourable age structure (or high fertility). In cases where migrants are more local, it is not unlikely that the more enterprising of them will emigrate from the locality, but as we have suggested, the more local migrants seem, on the whole, to be the less well endowed (the less likely to own land); the rest simply fail to politicise, or, worse still, are easily bought off by the promises of the local party who have already achieved their major objective on the investment front. And hence, for example, the Backward Classes have remained backward in these areas of industrial growth. But neither of these gloomy stories is inevitable, though demographic factors alone could not distinguish between alternatives. An alternative is that the tension described gets channelled into bargaining, through political mobilisation, for further investment from outside the locality, to maximise local growth as well as to ensure its equitable distribution (between groups, and over time). Here, as we have said, the danger is that bargaining is seen as disruptive, so that capital is simply scared away.

If the failure story is the real one, what are the developments over time? There is continued impoverishment or out-migration of the young. Given the failure to diversify there is a brittleness in the industrial sector: trade fluctuations, fortunes specific to the industry, all immediately affect the household income of the family, whose opportunities are not diversified either. In the case of an industrial closure there is maximum disruption. If this occurs within thirty years, the current first generation migrants are still alive, though they are becoming older so that the prospects of out-migration to alternative livelihoods are hopeless. If the manufacturing migrants have retained their small land-holdings they may return to a life of relative (and perhaps absolute) deprivation.

These are extreme cases. Lesser degrees of the same may be found in other towns and cities. Particular industries may have attracted or recruited from a particular area.[1] Sons of migrants may have aspirations related to a particular expansion of employment within a city. But in these cases it can be claimed that the local presence of alternative employment tends to blunt the issue, and the non-manufacturing sectors are no longer so closely tied to the prosperity of a single industry. To take an example, construction workers expect to be mobile: but they would rather be mobile within than between cities, for the latter mobility is a hazardous basis for livelihood.

We have been addressing two problems. The first is the employment of the "second generation" migrant. The second is the sustained employment of the first generation over time. The latter naturally leads us to focus on the areas of urban stagnation, though none of these, with the possible exception of Calcutta, was ever a

1 The heavy flows of industrial migrants from Orissa and Bihar into Calcutta are a good example. Similarly, in Bombay, some of the more vociferous political movements relate to the the question of in-migrants from the South (the Siva Sen movement).

a strong industrial city. It is the fact of economies of scale, broadly defined, that has made it a possibility that the vigorous industrial cities of today may become areas of urban stagnation in the future.

The stagnating towns in India are, on the whole, at the other end of the spectrum, where the industrial sector is typically small and unsophisticated, even if diversified. It can be argued that they possess none of the demographic features that could potentially promote the will to fight for themselves. Insofar as the whole family is present, often having been born in the town itself, the income structure of the family will be little differentiated and no rural land will be maintained: sons will follow in the low-income trade of their parents with little expectation to do otherwise. The whole family is not, however, present in every case: out-migration of a minority of males occurs[1], and whole families also migrate out, presumably, though we have no evidence for our area, this involves migration to another town. This may well parallel the picture of rural out-migration in that it is not the poorest who leave, but those with the resources and enterprise to

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1 See M.K.Premi, Urban Outmigration, A Study of its Nature Causes and Consequences, Sterling, New Delhi, 1980.

The best evidence on rural out-migration is collected in J.Connell et al., Migration from Rural Areas, O.U.P., Delhi, 1976.

contemplate a move, with at least the prospects of success. The Backward Classes, as we have seen, are not among them. In which case, the income base of the locality is further depressed.

As we stated at the outset, urban poverty has many fundamental ingredients similar to those of rural poverty. That is nowhere clearer than in the towns whose economic base is completely in the non-factory sector. For they are overgrown villages. As such they share the same problems. A rural monoculture risks the scourge of a pest. A manufacturing monoculture risks the fluctuations, or worse, secular change, in market demand. This may occur at the lowest levels of industrial sophistication. Pottery is replaced by stainless steel, cotton textiles by synthetics. The worst scourges of poverty may lie in these (often neglected) towns. And although the new growth areas cannot be said to drain specifically the most backward urban areas of their human resources (see Chapter 5), yet they may in this way have precipitated their lack of industrial competitiveness.

Of course these changes are a necessary feature of the desirable shift towards higher productivity. It would be absurd to seek perfectly balanced growth in every region or locality. But without it, there must be lack of demographic stability also. Their inter-relationship has been our major theme. It seems a desirable exercise to explore the social processes that not only promote the rapid continuity of the shift toward higher productivity, but also ensure that the side effects are not too painful (even though the mitigation of the latter may carry its own economic costs). These processes have been an underlying concern in this demographic account of industrialisation.

Figure 9.1

Industrial Employment Diversification in Three Contrasting Localities

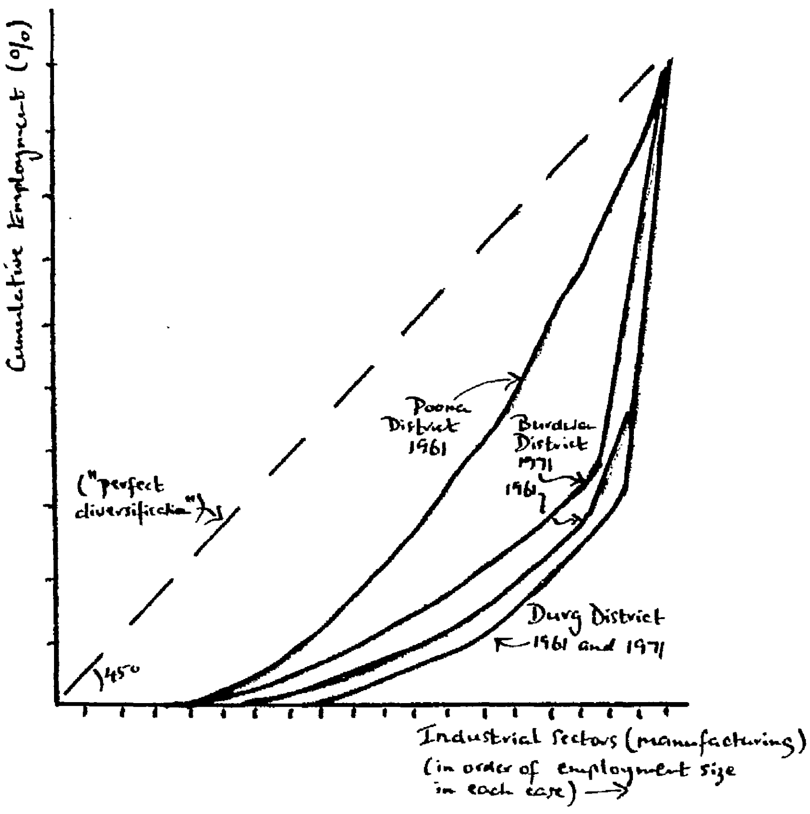
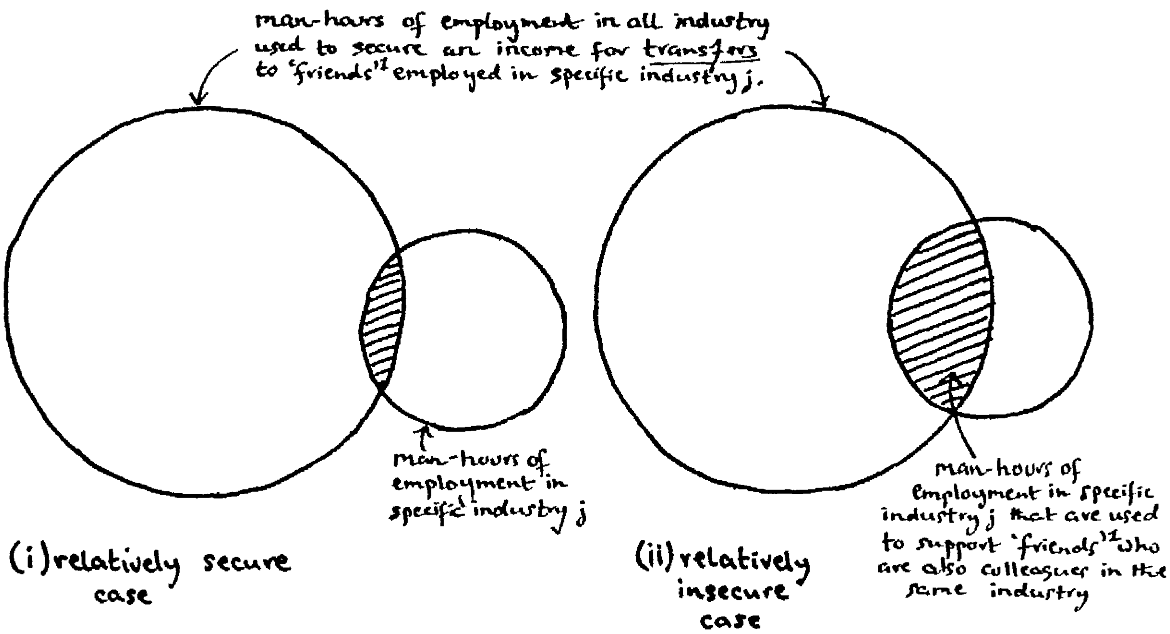


Figure 9.2

Diagrammatic Illustration of Family-level Income Security



[1] 'friends' may be family members, or members of similar ethnic or migrant group: i.e. whoever has claims on private transfers as income support.

Figure 9.3 a

Concentration of Manufacturing Industry

(Eastern Industrial Region 1961)

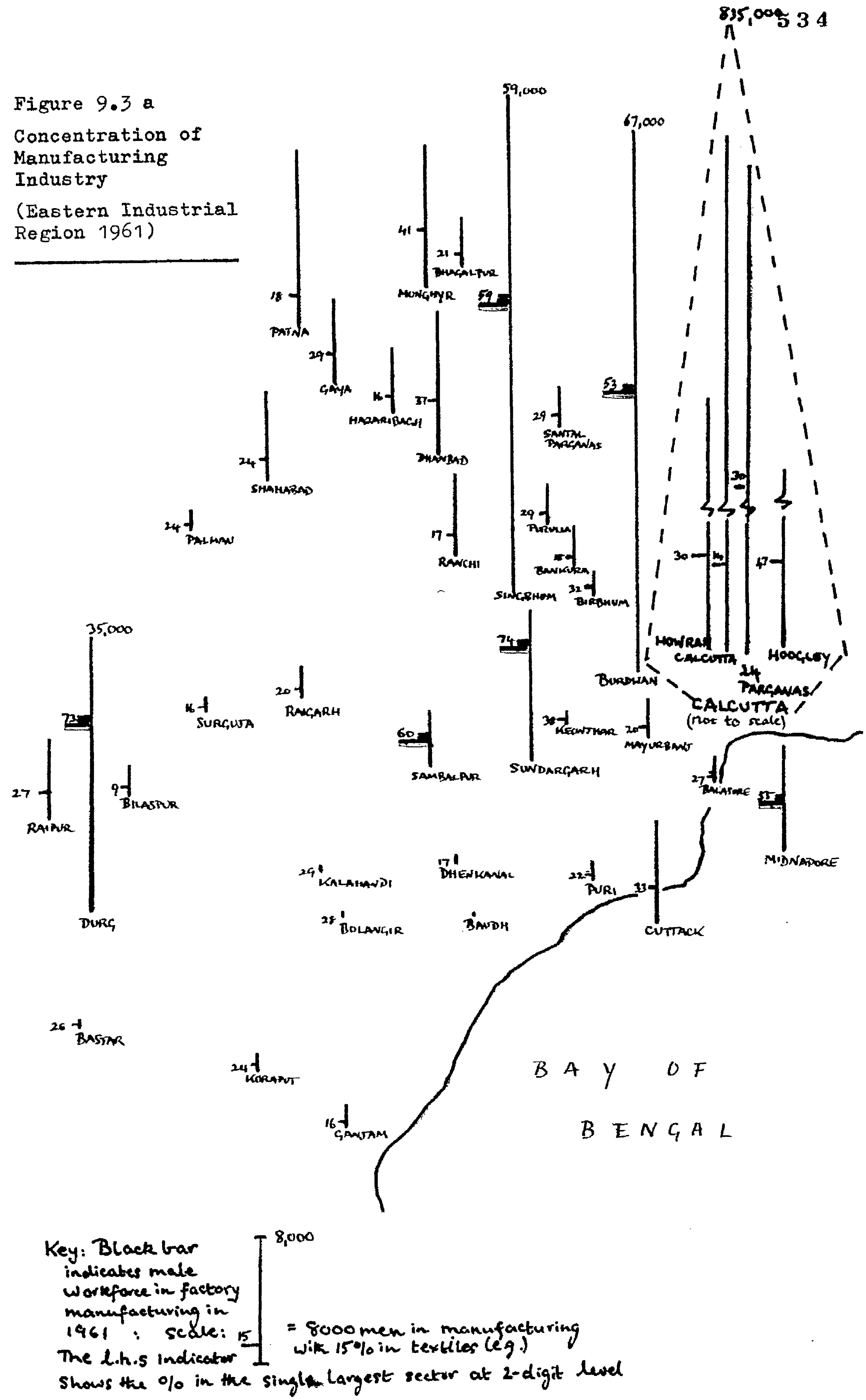
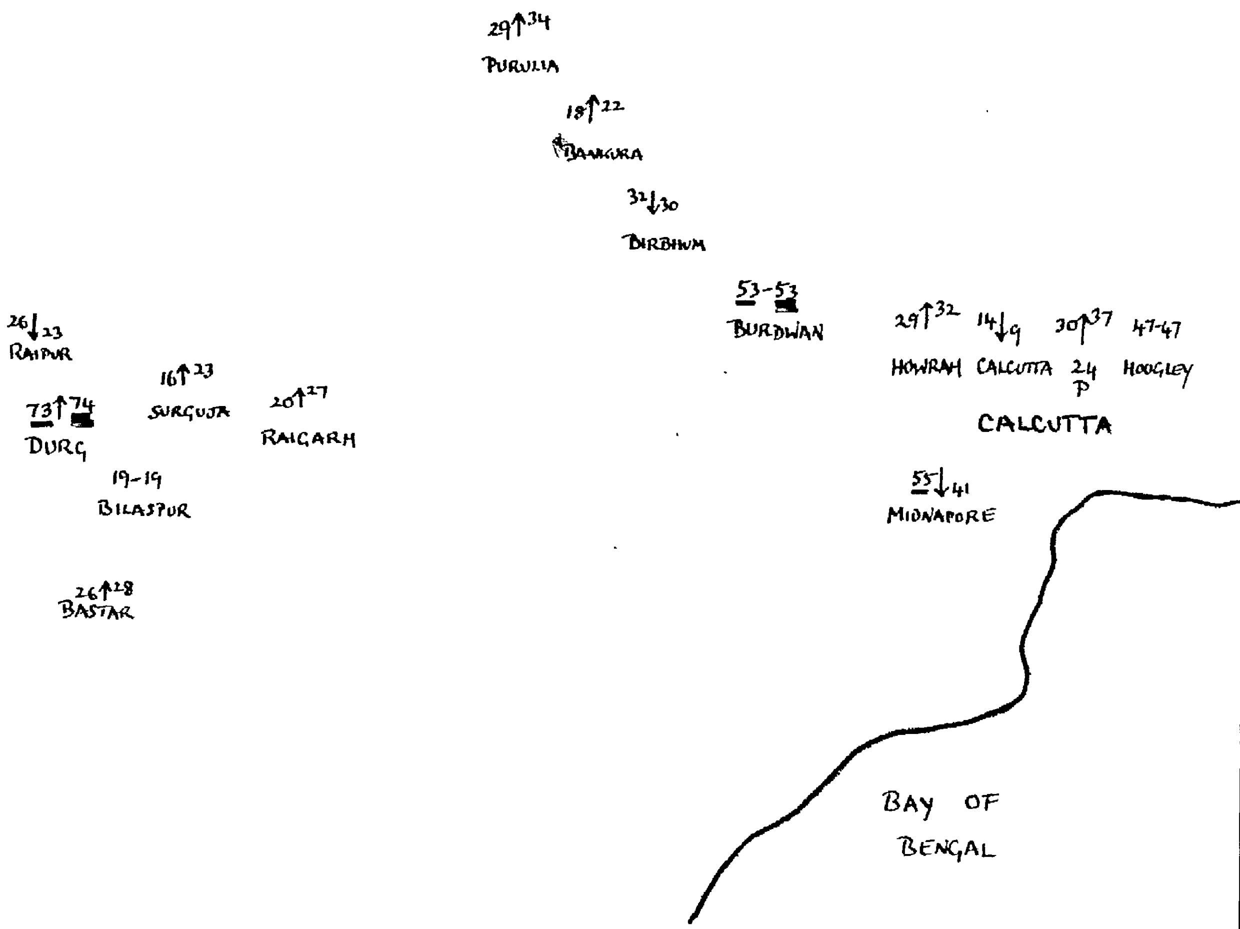


Figure 9.3 b

Change in the Concentration of Manufacturing Industry in the Eastern Industrial Region, 1961 - 1971



Key: The figures indicate the % of male manufacturing labour in single largest sector : l.h.s = 1961
r.h.s = 1971

Figure 9.3 c

Concentration of Manufacturing Industry

(Western Maharashtra, 1961)

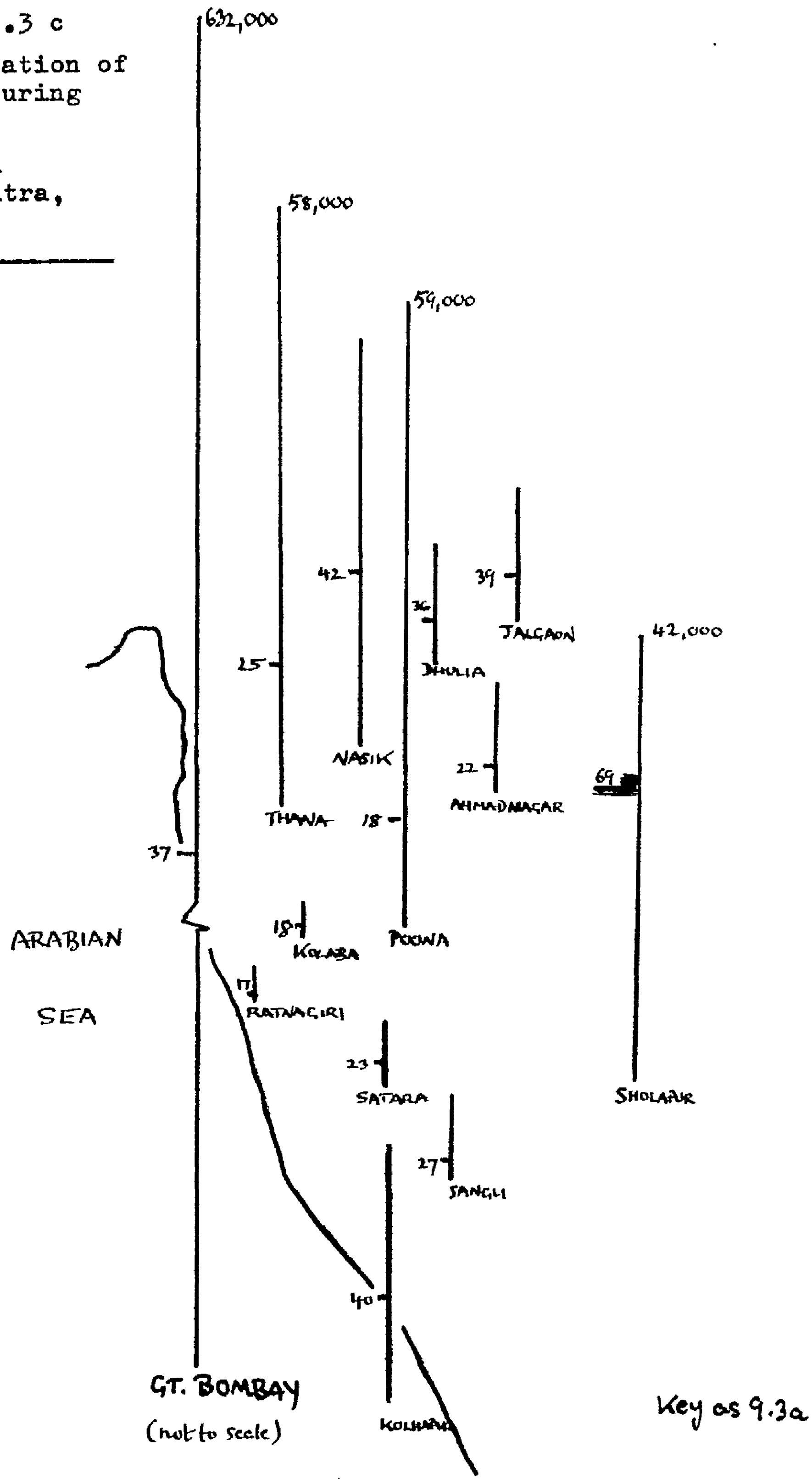


Figure 9.4 Illustrative Model of Dynamic Economic-Demographic Relationship based on Bhilainagar

	1961		1971		1981	
	Total Population 86000		Total Population 174000		Total Population 319000	
	m 58000	f 28000	m 97000	f 77000	m 172000	f 147000
	(15-59) $\boxed{46000}$	(15-49) 15000 migrated, 19000 to migrate	(15-59) 57000 (49000 natives)	(15-49) 37000 migrated, 5000 to migrate	(15-59) 83000 (72000 natives)	(15-49) ?62000

	Births 1950-55	Births p.a. 1955-60	Births 1960-65	Births p.a. 1965-70	Births 1970-75	Births p.a. 1975-80
	3000	4900	7100	7400	7300	8000
Quinquennial males:	7000	12000	18000	18500	18200	20000
Sons of the 46000 males, aged 15-19 (core-sector below):			?3000 →	?5000	9000 →	14000
Migrants excluding sons of the 46000:			(1000	2000	3000	5000)
			2500 +	2500	4000 +	4000
New Jobs in Steel (core)		15000	10000		?5000	

Sources: See Tables 9.4 to 9.9.

A Note on the Demography of this Case Study (Figure 9.4)

The demographic reconstruction of Bhilainagar over the three post-Independence decades is as follows; (we refer throughout to the 1981 boundaries wherever possible). The Census gives us total population figures for each sex for each decade, whence the sex ratio is obtained. Additionally we have broad age distributions (usually in 15-year age groups), but only an indication of the adult population for 1981.

To begin in 1961, virtually the whole of the population was migrant. There were approximately 58,000 males and 28,000 females, a total of 86,000.[1] The 0-14 population numbered 11,000 (males), and adult males below 60 numbered 46,000, of which ⅓ were working as operatives in the iron and steel plant.

Table 9.4 gives the female age structure as reported in the 1971 Census, the only modification I have made being to split some of the age groups into two. We project this population backwards in a simple model that initially assumes no mortality, to give a minimum population in each age group in 1961 (Table 9.5a). This (female) population will have been partly resident in Bhilai and partly still in rural areas prior to migration. (Thus the 10,900 women aged 25-30 in 1971 (Table 9.4) will have been aged 15-20 in 1961 (Table 9.5a, last quinquennium)). We then calculate the births these women would have, regardless of whether they were living in Bhilai or in a rural village, if their total fertility was

1 To avoid spurious precision in this reconstruction, and to help the eye follow the gist of the calculations, we have rounded figures. The exact reported figures are given in the Tables.

to be 5.0 (births per woman) and their age pattern of child-bearing as in the age-specific schedule shown in Table 9.5b. This would give annual births, male plus female, numbering 7500 by the late 1960s (Table 9.5a, first quinquennium), and we go on to assume, following the argument in the text (Chapter 9) and detailed below, that these children were indeed born during that period and brought in to Bhilai (by 1971, if not born there in the first place). The birth rate of this migration cohort is at its maximum in this period since the largest cohorts are at their maximum-fertility ages. This gives a total possible of between 70,000 and 75,000 births during the decade (7000-7500 per annum), or about 35,000 males under 15 in 1971 ;(we are still ignoring corrections for mortality: this correction would raise the number of births in a back-projection, but reduce the number of survivors. Applying the correction parameters given in Table 9.6 produces 30,000 as the net result). According to the 1971 Census about 40% of the male population fell into this (0-14) group, i.e. 38,000 (Table 9.4). The difference between this, and the 30,000 or so projected, will be made up of the survivors of the births pre-dating 1961: i.e. a proportion of the youngest of the 11,000 males of the 0-14 urban cohort of 1961 (say 3,500), plus any children of the migrants, who were also born prior to 1961; in our back projection the two groups sum together as 4,900 births annually (Table 9.5a, final quinquennium).[1] This fills the gap of 8000 sufficiently: our fertility rates are possibly too high. The sums, however, add up quite well.

In 1971, the remaining 58,000 adult males comprise the following: the survivors of the 0-14 cohort recorded in 1961 at Bhilai, now aged into the 20-29 age group, say 7500,

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1 I.e. about 12000 male births over 5 years.

the surviving adults of the 1961 adult cohorts, and new migrants. The 1961 adult cohorts were heavily concentrated in the low-mortality 15-34 age group (Table 9.4), so that over 90% could have expected to have survived for ten years (using parameters in Table 9.6)[1], amounting to 41,500. Thus the total survivors in this age group amount to between 48,000 and 49,000. The total recorded in the 1971 Census is 57,000. This allows for between 8,000 and 9,000 adult male migrants (rather small compared with the population growth of 88,000!).[2]

Over the next decade the births due to the initial in-migrations will decline from their 1970s peak, but, to judge from the sex ratios pertaining in the more mature heavy industrial cities, there may be 5000 women still to come.

We do not have an age distribution for 1981 from which to project backward any further births. But by 1975-80 the daughters of the large initial migrant cohorts have themselves begun to reproduce, though still in the early, low fertility, years of childbearing (that is to say, before the ages where universal marriage can be expected). The net effect is to over-compensate for the effect of their own mothers' ageing, so that the aggregate number of births due to the original migration (whether as children or grandchildren) increases to over 7000. The sinuous quinquennial birth pattern is immediately apparent (Figure 9.4). Our only clue on the age

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1 Here we assume a mortality table approximating that of the "Princeton South" level 13. This is a departure from the "West" level 9 used heretofore. A projection model for a specific area may as well attempt to incorporate local parameters. Mortality in North and Central India seems to conform rather more closely to the South models with their high levels of child mortality, and level 13 (females' life-expectation of 50) seems more appropriate for the 1970s, and for the core-sector industrial population.

2 These may include some 3000 sons of the original 46000 workers.

distribution in 1981 is the classification of 48% of males as workers. Roughly speaking, and following the same methodology as above, this means that there were 11,000 new male migrants of working age during the decade, (sons included).

The objective of any policy intervention is to mitigate the effect of the rapid increase in new entrants (15-19) to the male labour force from the 5000 born and surviving of the first generation migrants (whether pre or post 1961 migrations), and entering the labour force in the five years 1966-71, to the 14000 entering the labour force in 1976-81 (a decadal increase of 180%). To mitigate the effect itself, changes in the pattern of labour demand have been suggested (in the text), as well as the possibility of temporarily halting the in-migration of the 11,000 new migrants that were to arrive between 1871 and 1981. But a purely demographic intervention is to influence the pattern of childbearing. The first variation of the latter attempted here (in illustration) is to delay the pace of childbearing without reducing the overall level (5 births per woman), that is to extend the early birth intervals, and contract the middle and later ones. This smoothing process causes a tangible reduction in the total number of births during the period in question (without affecting the total number that will occur altogether), since the peak age of childbearing no longer coincides with the peak in the migrant age composition.[1] There is a (temporary) reduction of 6.% in the number of births, reducing accordingly the 1976-81 labour force entry to 13,200. The alternative demographic intervention is a fertility reduction at the later ages of childbearing only (reducing the births per woman to 4.4, and this reducing the total number of children to be born): But this reduces the birth cohort specific to our concern

1 The point is that we can reduce the total number of births over a given period of time, without reducing the total births that an age-cohort of mothers will bear throughout their lifespan. As a policy, this may strike the reader as bizarre; it is, but the Chinese are seriously considering it as a solution to precisely the problem we are discussing here.

by less than 6 %, to 13,400. Clearly, however, a combination of overall reduced fertility and delayed childbearing would have the greatest effect. On a practical note, the fertility reduction, whether through marital fertility control, or delayed age at marriage, needs to be instigated in the rural areas, since it is here, as we have seen, that the high fertility (and universal marriage) takes place, prior to the migration of the women.

Comparison between the Model "1 c" and Bhilai

The chief difference between the demographic experience at Bhilai and the simulation intended to represent the case of green-field urban demography is due to the assumption I made on marriage and child-bearing behaviour. In the Model, male migrants were assumed to arrive single and marry subsequently, or at least to start their child-rearing in the city, on the arrival of their wives (or wives to be). Hence the peak entry to the labour force would be delayed until 1981-85. If that assumption is kept for the Bhilai migrants, insufficient births are generated to equal the size of the population recorded as under 15 in 1971. Hence childbearing must have started before those migrations began; nor were any of the children left behind in the rural area once the women arrived. Further corroborating evidence is this, (Table 9.7). If we take the Durg District urban population as a whole, we have about 34,000 married men aged 15-30 in 1961. Let us assume their female partners to be aged 15-25. We only have 18000 recorded in urban Durg. That leaves 16,000 married women to be accounted for elsewhere. If we assume the District marriage rates to apply to Bhilai specifically, then we have 24,000 married men, and 12,000 married women in Bhilai in 1961. That leaves 13,000 married women still in the rural areas of out-migration (or elsewhere). Their existing fertility is apparently grafted on to the demographic structure of Bhilai the moment they arrive.

The other difference has been discussed in Chapter 6 above. In the Steel Towns the pace of female marriage response migration is rather faster than that estimated from more aggregate data. To judge from sex ratios of recent migrants, families are formed rather faster within the decade.

Together these differences are sufficient to account for the very dramatic growth in the age cohort of young people in Bhilai, which increases from 25% to 42% of the total population in the course of a decade, in contrast to the perhaps less unstable picture given by the Model (which does however include a modest <u>decline</u> followed by a modest rise in the growth of the 15-19 cohort for example, rather than precipitous growth) where the proportion remains around 33%. Both populations are unstable, but the character of the instability is different.

A Note on the Labour Demand

The original plan was for the expansion to 10 million tonnes of all the public sector plants. It is also reported that it would cost twice as much to start a new integrated works (e.g. Vijaynagar) as to expand the existing plant at Bhilai. This suggests that there is a purely economic justification for the adoption of a strategy of incremental growth on an initially green-field site. This would ensure a continuing increment in labour demand, so that the second generation and incremental migration effects, on which we have been commenting on the supply side, would be less difficult to absorb on the demand side.

In practice what has happened is rather different. Output of finished steel has been hovering around the 1.5 million tonne mark, implying an output of pig of about 2 m.t. over the 1970s (the latest figure to hand is October 1980, - 1.6 m.t.). This is the expanding production towards a capacity of $2\frac{1}{2}$ m.t. We estimate that only 5000 new jobs in steel-making will have been created since 1971 (taking into account economies of scale, the quantitative effect of which we discussed in Chapter 2). These prize jobs will be competed for by the 14,000 new entrants derived from the 1956-1971 migrations, and the 11,000 entirely new migrants. Only between $\frac{1}{3}$ and $\frac{1}{2}$ of the 14,000 are sons of the steel workers. Clearly the labour market is tight, and the possibilities of conflict are serious (between migrants and non-migrant groups). Nevertheless, the problem would have been exacerbated if there had been no expansion in steel, with 14,000 local born 15 year olds seeking employment, and perhaps 5 - 7000 of them hoping for a job in heavy industry.

By the early 1980s the prospects of taking up the labour supply seem more hopeful, with continuing on-site expansion (though no apparent diversification out of iron and steel): this is in downstream production, - a new flat-products mill, and a continuous casting mill;[1] additionally work is starting on a new oxygen plant, a captive power plant, and a new converter shop, inter alia, for the expansion phase to bring the integrated steel plant to its now revised capacity target of 4 m.t.[2] The employment created up to the 1970s decade can be gauged from Tables 9.8 and 9.9; that generated by the expansion phases (in the integrated works) has had to be estimated (Figure 9.4).

1 Column in Financial Express, Bombay, 6th October, 1980.

2 Times of India Yearbook, 1979.

In all this discussion we have said little about the problem of construction labour. Here the records are nearly impossible to interpret. From Table 9.8 it can be seen that Bhilai had 12,000 workers in Hindustan Steel engaged on construction work in the mid-1960s, but only 7500 by 1970. This does not square with the payroll figures, but the fluctuations are in the right direction. The 1961 Census records 6,000 construction workers at Bhilai (Table 9.9), but a number of workers actually engaged in construction may have been recorded as being in the manufacturing industry, and besides, we have already shown (Chapter 7) that many of those engaged in construction are resident in neighbouring rural areas. In any case, under which category they should be recorded may be a moot point, as Hindustan Steel are known to have kept initial construction labour on the payroll ostensibly in preparation for expansion phases , but no doubt embarrassed by the political difficulty of laying off. The new steel plant at Bokaro in Bihar is reported in 1980 to be saddled with 4000 redundany labourers for just that reason.[1] It can be seen therefore that the employment of the core construction labour which is relatively immobile is subject to the same problem of massive upsurge in demand followed by only modest recurrent demand cycles that characterises the labour market for the core steel-making operatives, an important difference being that in the case of construction an actual fall in demand is experienced, but as this is a typical feature of the industry the workforce is prepared to be more mobile (which simply says that the whole construction industry is characterised by a social hardship not peculiar to Bhilai alone). The truly temporary and mobile sector of this construction labour will be missed by both Hindustan Steel records

1 Column in Financial Express (Bombay), 6th October, 1980.

and the Censuses. Its massive numbers can be gauged from a manual on the Durgapur steel works project. Comparative data are given for Rourkela and Bhilai. The latter, during the initial construction phase (pre-1960) employs 40,000 contract and 20,000 direct construction labourers, i.e., it is claimed, 60,000 in all on the site![1]

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1 Iron and Coal Trades Review (U.K.), "A Technical Survey of the Durgapur Works", (undated, ?1960).

Table 9.1

Change in the Proportion of workers in non-household Manufacturing in Steel Town Areas

District (urban)	Percentage of male workers in non-household manufacturing 1961	1971	
Durg	38	39	
Sundargarh	33	31	
Burdwan	36	37	
	Percentage of males aged 15-59 in non-household manufacturing 1961	**1971**	**Decadal Growth (%)**
Districts neighbouring Durg (all urban)			
Durg	36	33	14.9
Bilaspur	10	7	21.1
Raigarh	18	12	0.2
Bastar	11	6	19.4
Towns within Burdwan			
Asansol	21	22	28.3
Outer Burnpur	65	62	-0.1
Burnpur	78	76	-0.0
Durgapur	61	56	127.2
Burdwan City	17	12	-15.0
	Percentage of male workers in non-household manufacturing 1961	**1971**	
Districts of Orissa (urban)			
Sundargarh	33	31	
Mayurbanj	9	10	
Bolangir	6	9	
Cuttack	19	18	
B.K.	5	4	
Ganjam	9	8	

Comparative New-town area in Maharashtra: % males aged 15-59 in non-household manufacturing:

	1961	1971
Poona	28	33
Pimpri-Chinchwad	45	66

Source: Government of India, Census of India 1961, 1971, General Population Tables, & Economic Tables (B I), Delhi.

Table 9.2

Industrial Diversification in 1961 and 1971:

Steel Town areas and a comparative New-town area

Industrial Establishments in:	Number of manufacturing units (number with more than 50 employees bracketed) in: SUNDARGARH		DURG		BURDWAN	
	in: 1961	1971	1961	1971	1961	1971
food	28	224	472	*	785(17)	1595(19)
beverage tobacco	- 5	14	17 62		46(1) 164(2)	158(1)
cotton	8	7	107(1)		29	65
jute	-	1	-		2(1)	3
wool silk, synthetics	- -	2	13 -		1 1	1
misc. textiles (1971 incl. products)	46	228	430		353	972
wood	49	97	173		167(1)	
paper printing	- 3	17	- 18		1 74	159
leather	22	12	64		45	72
rubber, petrol., coal	-	20(4)	4		17	37
chemicals	8	46(10)	21(1)		37	125(2)
minerals	23(5)	31	109(1)		14	147(4)
earthenware	2		-		45	
basic metals metal products	17(2)	23(14) 48(3)	89(11)		202(11)	15(11) 350(4)
machinery	-	28	33(8)		63(1)	73
electrical mach.	-	1	-		-	48(5)
transport equip.	15(2)	1	164(11)		311(6)	17(4)
misc.	16(3)	44	307(1)		408	822(3)
repair (1971 only)		367				871(2)

Notes: * not available at time of writing. The 1961 and 1971 categories are not all strictly comparable. In particular, "repair" became a separate category in 1971.

Source: Government of India, Census of India, 1961, 1971, Establishment Tables, Delhi.

Table 9.2 continued

Industrial Establishments in:	Number of establishments in POONA DISTRICT (those with more than 50 employees bracketed) in: 1961	1971
food	1197(4)	4180(3)
beverages and tobacco	908(7)	1003(4)
cotton	154(9)	117(6)
synthetics		3
jute	2	13
textile products	1685(1)	2072(5)
wood	404(4)	1129(5)
paper & printing	255(22)	480(21)
leather	356	264(1)
rubber & plastic	32(1)	92(4)
chemicals	141(12)	174(9)
non metal. minerals	163(5)	207(23)
basic metals & products	736(11)	892(20)
machinery	200(9)	539(48)
transport equip.	911(14)	69
other	1030(4)	598(4)
repair	n.a.	1056(21)

Note: As for first part of table.

Source: Government of India, Census of India 1961, 1971, Maharashtra, Establishment Tables, Delhi.

Table 9.3

Industrial Workforce Distributions in Case-Study Districts, 1961

Sector of Manufacturing	Number of workers in: DURG	BURDWAN	POONA
food	2406	3730	7435
beverage	229	202	297
tobacco	2010	2471	5808
cotton textile	3178	753	3849
jute textile	-	189	396
wool textile	74	7	23
silk textile	3	69	44
misc. textile	1379	2596	6652
wood	1936	2671	5384
paper	12	136	933
printing	176	840	3822
leather	462	661	2097
rubber & petrol.	21	1621	1306
chemicals	277	633	11493
non metal minerals	522	1324	3340
basic metals	26738	36472	5425
machinery	1656	1875	4242
transport equip.	752	12047	8172
misc.	973	3513	4231
TOTAL	42804	71814	52252

Source: Government of India, Census of India, 1961, General Economic Tables, Delhi, (relevant States).

Table 9.4

Age and Sex Distributions in the Durg Town Group

1961	Bhilai	(total population 86116)
age	m	f
0-14	11228	10292
15-34	36365	13777
35-59	9670	3409
60+	620	624
	Durg Municipality	(total 47114)
0-14	8768	8237
15-34	10981	8353
35-59	5046	3913
60+	771	959

1971	Bhilai (and Outgrowth, total population 174370)	
0-14	38333	34856
15-59	57171	40767
60+	1478	1845
	Durg Municipality (total 70754)	
0-14	15591	14473
15-59	20320	17674
60+	1234	1462

Detail of 15-59	m	f
15-	5987	4566
20-	6640	8881
25-	9376	10944
30-	23141*	11015
40-	9286	3350
50-	2667	1952

*10-year cohorts

Source: Government of India, Census of India 1961, 1971, Madhya Pradesh, General Economic Tables, Delhi.

Table 9.5

Estimation of Birth Cohorts among Married Women with Husbands working in Bhilai

a) Crude illustrative model based on age structure recorded in 1971 Census; no mortality.

Ages of Women	Number of women in age group 1965-71	1960-65	1955-60
15-	4600	8900	10900
20-	8900	10900	7000
25-	10900	7000	4000
30-	7000	4000	2100
35-	4000	2100	1200
40-	2100	1200	1000
45-	1200	1000	900
		(1961 total= 35000)	

Alternative Fertility Schedules			Births generated from above cohorts (period specific) and, for ASF(1), in the two following quinquennia* per annum		
ASF(1)	8500*	7600*	7400	6800	4900
ASF(2)	(calculated for '60-65)			6400	
ASF(3)	(calculated for '60-65)			6500	

b) Age specific fertility used

age	ASF(1)	ASF(2)	ASF(3)
15-	.136	.100	.136
20-	.259	.210	.259
25-	.234	.300	.244
30-	.187	.210	.150
35-	.125	.125	.091
40-	.054	.054	.000
45-	.007	.007	.000
TFR:	5.0	5.0	4.4

Note: * the 15-19 cohorts of 1971-85, generated from births of 1961-75 (and consistent with the 1971 0-14 cohort) are:

71-75	75-80	80-85	
8900	12600	13700	per annum.

Table 9.6

Survival Ratios used in the Bhilai Simulations

Males: Princeton "South" model, level 13 (female e^{o} = 50)

Survival Ratios

$$\frac{L_{15-24}}{L_{5-14}} = 0.965$$

$$\frac{L_{40-59}}{L_{15-34}} = 0.814$$

Average 10-year ratio for 5-year age groups from 15 to 59 = 0.914

Females:

Survival Ratios

Birth to 15-19 = 0.736

Average 10-year ratio for 5-year age groups from 15 to 49 = 0.944

Source: A.Coale and P.Demeny, Regional Model Life-Tables and Stable Populations, Princeton University Press, Princeton, 1966.

Table 9.7

Age-specific Marriage Rates in Durg District Urban Populations

Age	Rate Male	(number)	Female	(number)
15-19	0.31	(2864)	0.84	(7247)
20-24	0.57	(13348)	0.86	(11480)
25-29	0.76	(17627)	0.96	(10313)
30-34	0.92	(13021)	0.93	(6745)
weighted average	0.67		0.90	

Source: Government of India, Census of India 1961, Madhya Pradesh, Social and Cultural Tables, Delhi.

Table 9.8

Categories of Steel Workers at Bhilai

Category	Date	1964	1967	1970	1973	1977
Process and Main workers		5623		9929		
Services		11647		15522		
Construction		12026		7578		
Total on Payroll by date		1964	1967	1970	1973	1977
		44158	49768	46386	49914	n.a.
Total Output Pig-iron (000 tonnes)		1257	2080	2152	n.a.	(2400)*

Sources: Hindustan Steel Limited, Iron and Steel, Ranchi 1970, (mainly), and * press reports.

Table 9.9

Industrial Distribution of Workers at Bhilai, 1961 and 1971

	1961	1971 (includes Outgrowth area)
Mining & Quarry.	851	18
Household Ind.	462	765
Manufacturing	24691	30156
Construction	6671	2389
Trade & Commerce	2976	6019
Transport etc.	2593	3524
Other services	6102	6986
Total (males)	44825	51132
(Manufacturing Workers at Durg Municipality	4236	3274
Total Workers	15072	16844

Source: Census of India, 1961 and 1971, Madhya Pradesh, General Population Tables, Delhi.

Appendix 9.1 Industrial Location Policy Issues: A Quantitative Assessment

Unemployment relief is not the only policy tool available to neutralise the social effects of industrial restructuring. Incentives to labour mobility will also serve. For these to be effective it is crucial that there is a well-developed housing market also. But what is often neglected by planners is that physical housing is not a sufficient incentive to mobility. A satisfactory social environment has to be created as well. That is why people are so reluctant to leave their communities the moment there is a local industrial recession, and especially people of the older age groups. Additionally of course they have to be assured that they can move to secure alternative employment. But the latter is not assured when a large number of workers of like experience are thrown on the labour market together. Absorption may take years. Unemployment relief therefore may be a necesaary Second-Best (to mobility); the question arises whether subsidised diversification would be a better Second-Best. The problem is that one is estimating quantities under uncertainty over a time horizon of ten to fifteen years at least:

it would be efficient to postpone consideration of the subsidy until early-warning signals of industrial restructuring were seen (but not, as so often in practice, later than that).

In India there has been a package of subsidies available to encourage industrial location in specific areas;[1] many of these have been restricted to the small-scale industrial sector, on the mis-apprehension that such industries would be more inclined to favour de-centralised locations in any case. That this has not been the case is well-documented.[2] Industrial estates, establishing the necessary infrastructure for new small-scale industry, have similarly failed to attract entrepreneurs.[3] Our present study is however concerned with large-scale industry. The subsidy needed to attract investment out of the existing agglomerations (the Calcutta-Howrah belt, for instance) could be estimated from the comparative costs of locating in these agglomerations as against the new growth areas like Burdwan District of West Bengal. Studies that have attempted this estimate suggest that the costs of

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1 See the Indian Investment Centre booklets: Industrial Investment: Facilities and Incentives, for individual regions, New Delhi, 1979; also, Government of West Bengal, West Bengal Industrial Development Corporation, Assistance from Concepts to Commissioning, Calcutta. The latter State includes subsidies in growth areas, like Asansol and Durgapur.

2 S.K.Saha,"Industrial Policy and Locational Dynamics of Small-scale Enterprises in India", European Modern South Asian Studies Conference, London (SOAS), July, 1981.

3 Government of India, NCAER, Perspective Plan of Industrial Development of Bihar, New Delhi, 1979.

of location in Calcutta are in fact higher - the main component in the differential being the cost of land (four times as high as in Burdwan, in the 1960s).[1] That this differential only just reflects the intangible benefits of agglomeration can be gauged from the fact that through the subsequent twenty years the workforce grew faster in the urban areas of Burdwan than in the suburbs of Calcutta (e.g. Hoogley District and 24-Parganas), and marginally faster in the less developed Districts of Midnapore and Birbhum. The differences have become substantial by the 1971-1981 decade (though here some problems of interpretation arise, owing to the non-comparability of Census definitions). The above-mentioned studies make it clear that a major deterrent to firms shifting out of Calcutta was sheer lack of information on conditions in the Burdwan-Durgapur region. Nonetheless, even by 1971, a substantial number of firms (in the private sector) in the chemicals industry and in textiles, had located in this region, thereby promoting its diversification. It would appear therefore that a major constraint on earlier location in the area was the need for assurance that sufficient other enterprises were going to do the same to ensure a resulting economic agglomeration with as attractive economies as Howrah-

1 J.MacDougall, Ancillary Industries in Asansol-Durgapur, Asia Publishing House, London, 1965.

Calcutta and suburbs had. The lacking input was information, and a capital subsidy would therefore be a rather poor Second-Best.

But the case of Bhilai was different. Its relative physical isolation meant that it would not be an economic centre of attraction for many decades (except for industries particularly related to the natural resources of iron and coal). But that allows sufficient time for the possible collapse, or stagnation, of the local steel industry. Hence the question of a subsidy to promote early diversification arises. The Government of India (in conjunction with the State Governments in some cases) offers a capital subsidy of 15% to industries prepared to locate in designated backward areas. Because of a ceiling on permitted subsidy per project, these measures will tend to favour medium-scale enterprises (or smaller). And only in exceptional cases are they supplemented with employment subsidies as such (as, for instance, currently is the case in West Bengal).[1] These instruments were not therefore really designed to cure the malaise on which much of this study focuses; though they could cure the malaise of the stagnating small towns.

1 The different States offer a complex collection of subsidies and incentives, relating to capital and current inputs. These are summarised in the Indian Investment Centre booklets, referred to in a note above.

For the purposes of the illustrative exercise attempted here (Figure 1 in this Appendix), we have taken a subsidy of 15% on capital and 15% on current costs (approximately), which is not out of line with some of the packages offerred in India, but we have applied these to a project as large as Rs 50 crores (of initial investment). It must, however, still be stressed that adequate information is often the lacking input, and also that appropriate policies for establishing socially efficient industrial localities often go beyond mere cash subsidies. As was remarked earlier (Chapter 5), the potential docility of the local labour force may feature highly in a location decision (whether taken by private or nationalised industry).[1]

The simulation exercise (Figure 9A.1) takes as a model, for the diversification intervention, a plant of capital cost of Rs 50 crores (the size of a 50,000 tonne steel plant in 1982, or a fertiliser plant about 50% of the size of the Trombay units near Bombay). The gross annual revenue is Rs 20 crores, with current costs of Rs 15 crores at the location to which this enterprise is directed. In an optimal location the costs of operation would be Rs 13 crores (about 13% lower than at this location), and capital cost would be heavily reduced (15% below that incurred at the current location). The plant comes on stream in year three, and is assumed to become obsolescent in year sixteen. At a

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1 See P.Townroe, Planning Industrial Location, Leonard Hill Books, London, 1976, for evidence of this factor having an important weight in the location decisions of both U.K. and U.S. firms.

10% discount rate the present value of the project's net revenue is 30% below its capital cost. A 15% capital subsidy plus a 10% gross revenue subsidy would be financially sufficient to attract the industry to the location (which is currently occupied by a single undiversified industry); the subsidy would be provided by, say, a $7\frac{1}{2}$% sales tax holiday and a $3\frac{1}{3}$% input subsidy, lasting for six years, i.e. half-way through the project's life. The workforce is 8000 per annum, with monthly wages of Rs 500, so that the wage bill amounts to $\frac{1}{3}$ of the recurrent costs.

In the first scenario, illustrated in Figure 9A.2a the justification for the subsidies is that the full 8000 workforce (to be employed in the new plant) would be otherwise redundant for five years from the date of initial operation of the subsidised project, due to insufficient additional investment being undertaken in the core industry that dominates this undiversified town; the additional investment would have been needed to take up the labour generated by the original migration dynamics. (Alternatively, as in Figure 9A.2b, we can imagine the core plant having to be closed, with the result that 8000 or more men would lose their jobs.) We assume that the State would be committed to the consumption costs of maintaining that workforce (or be regarded as socially responsible for its continuing consumption needs). This would cost Rs 5 crores per annum,

1 See P.Townroe, Planning Industrial Location, Leonard Hill Books, London, 1976, for evidence of this factor having an important weight in the location decisions of both UK and US firms.

the complete annual wage bill of the project. We examine the effect of taking different values and assuming different scenarios in the notes to Figure 9A.1.

It should be said immediately that there are no simple conclusions. But two general and important points can be made. If the total value of the subsidies required is closer to 15% than 30% of the present value of the investment, then subsidised diversification is more likely to be a superior policy to the financing of unemployment relief. And if the wage bill is closer to $\frac{2}{3}$, than $\frac{1}{3}$, of the recurrent costs, as might be the case in a labour-scarce economy, then the same is true again. It cannot therefore be said that subsidised diversification is an uneconomic strategy under any plausible conditions.

Similarly, a subsidised medium-scale investment, losing some 15% to 30% of the potential net present value to be got from a (larger) optimal scale investment, would also be viable in certain circumstances, the object being to ensure the continuing take-up of the labour supply generated on the spot (as a repercussion of labour migration), or to ensure less demographic instability over time. In this case we need to add in additionally the social expenditure savings that result from a better overall utilisation of welfare infrastructure over time (due to a more stable demographic growth), insofar as the State would be committed to the provision of such services.

Finally we observe that the high rates of discount used here (10%) militate strongly against starting a subsidised industry well in advance of any forseen unemployment. But as calendar time proceeds, and, maybe, aggregate labour supply reduces, driving up real wage costs (cet. par.), and reducing equilibrium interest rates, it becomes socially viable to subsidise diversification rather earlier in the lifetime of the core industrial plant.

Figure 9A.1 Social Evaluation of a Subsidy to promote Diversification

Project data:	Capital cost:Rs 50.0 crores
	Variable costs:Rs 15 cr. per annum
	of which Labour: Rs 5.0 cr.
	(workforce 8,000; wages Rs 500 p.m.)
	Gross revenue: Rs 20.0 cr. p.a.
	Discount rate: 10% p.a.
	Capital cost is incurred years 1 & 2
	Project on stream years 3 - 16
Social Subsidies:	Capital subsidy (15%): Rs 3.7 cr. (in years 1 & 2)
	Sales tax rebate: Rs 1.5 cr. (13% costs, year 3-8)
	Input subsidy: Rs 3.3 cr.
	Unemployment relief or "cost": Rs 5.0 cr. years 3 - 8

Private Net Present Value of Project =

$$\left(-25 - \frac{25}{1.1} \right) + \sum_{t=3}^{17} \frac{20 - 15}{(1+0.1)^{t-1}} = 33.5 - 47.7$$

Net Present Value of Social Costs of Subsidised Project =

$$(0 + 25.0 + 3.7) + \frac{(0 + 25.0 + 3.7)}{1.10} +$$

$$+ \frac{(-20.0 + 15.0 + 1.5 + 0.5 - 5.0)}{1.21} + \ldots\ldots \text{ (until year 9)}$$

$$+ \frac{(-20.0 + 15.0)}{2.14} + \ldots\ldots \text{ (until year 16)} + \frac{(-20.0 + 15.0)}{4.18} .$$

Notes:

1 The basic assumption is that cost and revenue subsidies last until year 8, and unemployment costs saved last until year 8.
Then the net P.V. of the social recurrent costs due to the intervention is Rs-11.9 crores.
And the Net P.V. of the Capital Subsidy is Rs 7.1 crores.
Hence the Net Social Value of the Intervention is Rs 4.8 cr.
(Due to rounding, the subsidy is a little too generous, as can be seen from the alternative calculation, that the private project makes a loss of Rs 14.2 cr. in order to save Rs 19.8 cr. of unemployment (in value), a social gain of Rs 5.6 cr.).

2 This is simple but unrealistic. In practice the subsidy would be needed throughout the life of the project (to make up for the high current costs), or else the costs would fall over time (due to economies of agglomeration as other firms were attracted to the site). Suppose that a subsidy of Rs 1.2 crores per annum is needed from years 3 to 16, or that a subsidy of Rs 1.2 cr. is needed from years 3 to 8, after which costs fall to 13.8 until year 16. In either case the firm breaks even; and in the first case the social value is the same as before, in the second it is higher (7.9).

3 Suppose the capital cost is lower: Rs 23 cr. in year 1, and 22 in year 2. Then the capital subsidy needed to ensure the firm break even is approximately Rs 2.2 cr. (i.e. 5%). The social value of the subsidised diversification is raised to 9.7. The high discount rate makes the scheme very sensitive to the capital subsidy.

4 If the unemployment relief saved were to cost only Rs 2.5 cr., then the social value would become negative (-5.1). This would be true whether the relief offered were halved per person, or the wage bill in the redundant industry were half what we assume, or if the new project only employed half of the unemployed.

5 The quantification here attempts to address the intervention of subsidised diversification only (Figure 9A.2a). Subsidised suboptimal scale is unlikely to be viable (given the economies of scale discussed in the text in the case of the iron and steel industry following conventional technology), unless the discount rate is very low, since unemployment relief is not saved until 10 to 15 years after the subsidies begin (Figure 9A.2). Indeed, we need a discount rate as low as 2% to yield a social benefit of Rs 5 cr., i.e. roughly similar to that in the first intervention model (4.7); this is with a capital subsidy of 15% on two mini-plants, each half the size of the current one, initiated respectively in years 1 and 8, with no subsidy on current costs, and unemployment of Rs 2.5 in value saved from years 10 - 15.

Figure 9A.2

Scenarios of Public Policy Interventions in the Economic-Demographic Relationship

(a) **Year:** 0 5 10 15 20

Industry I — (replacement investment only)

core project initiated.......second generation labour supply

INTERVENTIONS:

(i) social welfare commitment — unemployment relief.... (or equivalent social welfare transfer with shared under-employment)

(ii) subsidised diversification — Industry II

Investment.....plant on stream

(locational subsidy............)

(iii) subsidised sub-optimal scale

Industry I — Industry I

core project mini - 1 .... core project mini - 2

(uneconomic scale subsidy throughout........)

(b) Industry I — close down

core project initiated.......second generation & redundant labour

INTERVENTIONS:

(i) social welfare — unemployment relief etc.

(ii) subsidised diversification either: — Industry II

Investment.....plant on stream (subsidised)

2nd Investment...etc.

or:

Industry II

investment

(locational subsidy..........expansion (?subsidy)*

2nd investment (?subsidy)*

Note: *Subsidies for agglomeration type economies no longer needed. Raw material/finished product transport subsidies may still be needed.

A brief Overview of Chapter 9

If rapidly growing areas fail to diversify their industry, local labour market disequilibria are enhanced further (and the prospects for family income diversification outlined in Chapter 8 are reduced). This is apparent from a detailed demographic study of a Steel Town. A solution that may be taken by the State would be to diversify industry (under subsidy) rather than bear the welfare costs of underemployment in a locality.

Modern technologies and contemporary demography combine in India to accentuate employment and welfare problems in urban areas, as they evolve over time. Strategies to mitigate these externalities of industrialisation may be devised at the level of the State, or the level of the family. Either way, the implications of not doing so have to be seen well in advance. For these populations have a built-in momentum: large migrant cohorts, once established, can no more have their progress checked than a huge groundswell in a calm sea.

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A POSTSCRIPT

The study confirmed my hunch that modern industrial technology in certain fields - especially heavy engineering - adopted by developing countries would give rise to curious social phenomena in towns; curious in that demographic structures would arise leading to serious second generation employment prospects. To this was added the observation that if, as was likely, such towns remained single industry towns, the total workforce would be as vulnerable to a change in industrial fortunes as would be an agricultural labourer or small-holder to the failure of the crop in a monoculture. It also became apparent that, at the other end of the scale, the older towns, in failing to attract new populations, would also face economic problems arising from their emerging demographic structures, notably a lack of taxable surplus for social spending. In all, the average or aggregate picture of the Indian urban population was misleading: at each end of the spectrum demographic phenomena exacerbated social difficulties.

What recommendations follow from this work? There is, I believe, little social change without political revolution. But I also happen to believe that there is a human drive for social (as well as individual) survival, despite the fact that the two are often in conflict. There are implications in what I have to say for public policy, and for the strategies of smaller social groupings, right down to the family.

I advocate the adoption of a more balanced urban growth, by promoting a more diversified industrial structure in each town (despite the economic costs), and not uniformly, but selectively. This could be done through the complex of location subsidies that exist.

I advocate some demographic understanding to make these controls sensible: new industry too early or too late for the second generation is useless.

I am not certain if it is wise for extended families or people from particular origins, the same village or even district, to congregate in the same industry. If they would not all grow millet, they should not all make steel: the former could fail for two years running, the latter could fail for ever.

I advocate cross-financing of urban social development; and the planning for large areas of spontaneous settlements in rapidly growing towns from their inception.

Note that I am not suggesting pouring industrial development finance into sick cities: I am easing the death pangs, just as I am preventing fatal accidents to those of headlong growth.

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