

CA1
EA933
80C17

DOCS

CASE STUDIES IN CANADIAN POPULATION GEOGRAPHY

by

Michael Hewitt - editor

David Anderson

John Bentley

Philip Dean

John King

Canada 

LIBRARY DEPT. OF EXTERNAL AFFAIRS
MINISTÈRE DES AFFAIRES ÉTRANGÈRES

CASE STUDIES

IN

CANADIAN

POPULATION GEOGRAPHY

by
Michael Hewitt--editor
David Anderson
John Bentley
Philip Dean
John King



CANADIAN HIGH COMMISSION

LONDON

1980

43-237-431

Copies of this publication are available free of charge from:

Academic Relations Section,
Canadian High Commission,
Canada House,
Trafalgar Square,
London SW1Y 5BJ,
England.

Prepared by a London-based Canadian Curriculum Development Group:

DAVID ANDERSON

Lecturer in Geography,
Luton College of Higher Education

JOHN BENTLEY

Senior Lecturer in Geography,
King Alfred's College, Winchester

PHILIP DEAN

Head of Geography Department,
Tower Hamlets School, London

MICHAEL HEWITT

Inspector for Geography and
Environmental Studies,
Inner London Education Authority

JOHN KING

Assistant Geography Teacher,
Tiffin School, Kingston-upon-Thames

in collaboration with
MICHAEL J. HELLYER

Academic Relations Officer,
Canadian High Commission

CONTENTS

Foreword	Michael Hellyer	v
Introduction	Michael Hewitt	vi
Resources	Michael Hellyer	ix
Acknowledgements	Michael Hewitt	x
1. The National Setting	Michael Hewitt	1
2. Montreal	Michael Hewitt	7
3. Pine Point	John King	39
4. Cartwright	David Anderson	69
5. Regina	Philip Dean	107
6. The Okanagan Valley	John Bentley	119
7. Prince Edward Island	Philip Dean	143

Michael J. Hellyer
Academic Relations Officer
Canadian High Commission
Ottawa

FOREWORD

The Academic Relations Section of the Canadian High Commission was established in September 1977 to support and encourage the study and teaching of Canada at the senior levels of secondary schools and in higher education in Britain.

After consultations with a wide range of educationalists, a need for resource-based classroom materials about Canada, geared to the specific demands of new 'A' level syllabuses in Britain was identified. This series of case studies in Canadian population geography represents the first fruits of efforts made by the High Commission to meet this need. Our role, however, was that of the facilitator, for the real work of research and preparation of the materials was undertaken by a Curriculum Development Group formed for the purpose under the auspices of both the Inner London Education Authority and the High Commission itself.

The group was convened and guided, and the studies edited by Michael Hewitt, at the time an advisory teacher for geography within the I.L.E.A. with particular responsibilities for 'A' level work. Other members of the team included David Anderson, lecturer in geography at Luton College of Higher Education; John Bentley, at that time senior lecturer in geography at Stockwell College of Education; Philip Dean, I.L.E.A. geography teacher at Tower Hamlets School and Sixth Form Centre; and John King, geography teacher at Tiffins Grammar School for Boys, Kingston upon Thames. Each member has had experience of 'A' level geography teaching and first-hand knowledge of Canada. The I.L.E.A. Learning Materials Service are responsible for the colour slides. Elizabeth Hewitt has prepared the illustrations and Ella Whitehead the text for publication. The High Commission is grateful for the efforts put into this work by all concerned, which for the Curriculum Development Group has been done at the same time as carrying full professional responsibilities.

Michael J. Hellyer
Academic Relations Officer
Canadian High Commission
London

INTRODUCTION

This series of studies has been written with the aim of supporting classroom teaching in geography at G.C.E. Advanced Level, particularly for the new syllabuses e.g. University of London and the Associated Examining Board. These syllabuses are organised around specific ideas and techniques rather than the more traditional regional approach. However regional study has not been abandoned; Paper 3 of the London Board (Regional Geography) requires "the application of the principles and techniques of physical and human geography in (any) regional context" and the A.E.B. syllabus for first examination June 1982 "tests the candidate's ability to understand and to apply knowledge of the (syllabus) topics A-G to specific locations of the candidate's own choice... No specific regions/areas/towns will be named; instead, the wording of the questions will allow the candidate to use his/her own choice of case study to examine the particular concept or topic which is being discussed".

The reader may then ask why this volume has a focus on only one country, confining the potentiality for the development of a global viewpoint by the student and reducing the freedom of choice of the teacher. The answer partially rests in attempting to avoid the danger of replacing an encyclopaedic knowledge of capes and bays with an encyclopaedic knowledge of concepts allied to a world organised according to the ideas of von Thünen, Weber, Crystaller and Ravenstein. Models of spatial patterns and human behaviour become laws, if they are applied only to landscapes around the world where their predictions are proven. In such a situation students are unable to analyse everyday situations; akin to the student unable to recognise a river meander in the field if he has only been introduced to those of the lower Mississippi in the classroom. One of the great attractions of geographical methodology is its ability to give a deeper appreciation of present-day problems through its application to real-life situations. Consistent quarrying of exemplar material from one area e.g. Canada, avoids the danger of ignoring situations where a theoretical idea does not fit and also allows the student to gain a coherent view of a tract of the earth's surface.

The authors of this volume welcomed the initiative of the Canadian High Commission to facilitate, in conjunction with the Inner London Education Authority, the production of a series of case studies set in Canada, a country highly suited for study by the approach outlined above. With a physical geography and pattern of historical development more straightforward than that for other continental areas there is less danger of oversimplification. Yet the very wide range of man-environment situations allows a full exploration of geographical ideas as required by the A.E.B. 1982 syllabus and the forthcoming Schools Council 16-19 Project. In particular, readers are referred to the forthcoming paper from the Canadian High Commission, "Opportunities for Studying and Teaching Canada at 'O' and 'A' Level G.C.E. Examinations Number 5: Canadian Geography" by M.B. Hewitt.

Our choice of case studies in population geography was related to several factors. The recent addition of this aspect of geography to e.g. Joint Matriculation Board Syllabus B (1977) and the London Syllabus (1978), was an important consideration. Also it was considered that Canada's

varied ethnic composition; the importance of relatively recent and large-scale internal migration and immigration; the spatial contrasts in age-sex structure (some communities exhibiting characteristics commonly found in Third World countries); and the relevance of characteristics of population to such current issues as regionalism, resource development and depletion, conservation and pollution, makes such studies particularly apt. Furthermore, the study of population geography does not require complex quantitative methods to obfuscate the student but is very susceptible to the use of a wide range of graphic techniques. Finally the ready availability (Canada House) of Census of Population data collected from 1861, a coincident census year with the U.K. to render easy comparison, and the opportunity to "appreciate the dynamic nature of geography, both in time and space" (A.E.B. syllabus), an aim common to all syllabuses, made population case studies an obvious choice.

Our selection of studies was less easy. They represent both population growth and decline "with reference to examples on a local, regional, national and supranational scale" (University of London syllabus). In view of the size of Canada a spatial spread was also necessary. Practicalities reduced both our type localities (now five, omitting e.g. a growing exurb settlement and a declining mining settlement) as well as the spatial spread (see map page i) e.g. the populous Province of Ontario is not mentioned (recognising its wide coverage in other publications). The geographer is conscious of the chance factor in decision-making e.g. the author spent a very enjoyable visit to Montreal in 1972. Montreal is atypical of Canadian cities but all the more likely therefore to provide a useful yardstick for testing a series of hypotheses about the inner city, if they are expected to have general validity. Our final list of studies developed as:

Population trend	Type locality	Exemplar
Increasing population	Resource frontier (mineral)	Pine Point
	Recreation/retirement, in a traditional specialised farming region	Okanagan Valley
Relatively stable population	Rural region	Regina
		Prince Edward Island
Decreasing population	Fishing settlement	Cartwright
	Inner city district	Montreal

The ordering of the studies is from the small-scale area to the large-scale region in the hope that the student will increasingly realise that small changes, often counter to the general trend, will operate within, and may be obliterated by, data representing a large-scale areal unit.

A feature common to all geography examinations at Advanced Level is "a competence in the collection and analysis of data and the use of published data sources, including maps, photographs and statistics" (University of London Syllabus). Short-answer structured and data response questions are now an important component of 'A' Level examinations e.g. London (33%), J.M.B. Syllabus B (40% in addition to an assessment of practical work 20%) and 1982 A.E.B. (40%) of the final examination mark. Therefore all five studies incorporate a large amount of data, including census tables, photographs, topographic map extracts and literary extracts. Two colour slides for each case study are enclosed in a separate plastic wallet. We believe that the inclusion of slides of a tourist map and topographic map extracts is innovative and extremely useful whether used in a group or an individualised learning situation. One problem arose with regard to a common date for data abstracted from the Census of Population. Whilst the studies were being compiled the recently instituted mid-decade Census of Population (1976) was being published. In some instances the 1976 Census was considered important to delineate or confirm recent trends (Cartwright); in others (Montreal) 1971 was used as the sampling date (coincident with the year of the photograph of the city incorporated into the study), enabling the 1976 census data figures to be stated as a postscript, in cognisance of "the study of spatial distributions has yielded a number of theories in an attempt both to explain them and also to forecast future developments" (London 'A' Level).

The approach of the studies is enquiry-based and detailed; again most examination boards seek evidence that parts of the syllabus have been pursued to great depth. The studies are varied in approach, format and length. We regard this as a strength just as the good classroom teacher seeks a varied approach from one lesson to another.

It is hoped that this resource book will be used in a number of different ways: a unit for individualised independent learning by students; a structured teacher-guided exploration of a topic; a source for a study of migration, selecting data from all case studies simultaneously; a means of developing a generalisation following a study of separate data provided by the teacher on a similar theme; and hopefully as a possible model for the development of case studies in other parts of Canada.

Michael Hewitt

RESOURCES

Originals of all the official publications used in these studies may be referred to at Canada House, Trafalgar Square, London. Statistical data may be consulted in the Reference Library (10.00 a.m. to 5.00 p.m.) on weekdays, except for British and Canadian Public Holidays; Canadian topographical maps may be referred to by appointment with the Academic Relations Officer.

In addition, Canada House holds a number of other Canadian resources which may be referred to at the times already indicated. These include newspapers, "live" C.B.C. broadcasts, Telephone Directories, a wide range of Federal Government documentation, 140 periodicals, many basic reference works, newspaper clippings, books on many aspects of Canadian life, exhibitions in the gallery, slides, tourist information for visitors to Canada, and aspects of education in Canada. The Film Library operates a loan service for 16mm sound films, for which they issue a catalogue free of charge. A limited number of publications are also available free of charge to teachers. Further details appear in *Canadian Academic Newsheet Number 5: Autumn 1979* on "Canada House as a Teaching Resource Centre" available from the Academic Relations Officer.

Considerable quantities of Canadian teaching resources are held in the Commonwealth Institutes in Edinburgh (8 Rutland Square) and in London (Kensington High Street, W8 6NQ). Further information is available from the Director in each case. A number of universities have strong Canadian holdings and in some cases it may be possible to refer to collections. Universities which have received support from the Government of Canada and, in some cases Provincial Governments also, include Edinburgh, Hull, Leeds, Manchester, Birmingham, Leicester, Oxford, Cambridge, Reading, London (Birkbeck, Queen Mary Colleges, London School of Economics and the Institute of Commonwealth Studies), Exeter, Wales (Aberystwyth) and Queen's Belfast. In addition the North American Studies Centre at the College of St. Mark and St. John, Plymouth has a wide variety of Canadian resources. For further details write to the Academic Relations Officer at Canada House for *Canadian Academic Newsheet Number 6: Spring 1980* on "Canadian Studies Resource Centres in Britain".

Many of the resources used in these studies may be purchased from the following addresses in Canada:

1. Topographical maps -- Canada Map Office, Surveys and Mapping Branch, Department of Energy, Mines and Resources, OTTAWA, Ontario, K1A 0E9, Canada.

Index maps (No. 1 Ontario eastwards; No. 2 Manitoba westwards) are available free of charge to assist you in your purchases and the Director will send you information about how to order.

2. Census and other Statistical Data --
Statistics Canada, R.H. Coats Building,
OTTAWA, Ontario, K1A 0T6, Canada.

Michael J. Hellyer

ACKNOWLEDGEMENTS

We gratefully acknowledge permission to use copyright material from many organisations and individuals. Slides 3A, 5B, 6A and 7A are reproduced with the permission of the Department of Energy, Mines and Resources, Ottawa. Information on purchasing these and other maps of Canada can be obtained by writing to the Canada Map Office, Surveys and Mapping Branch, Department of Energy, Mines and Resources, Ottawa, Canada. Slide 2B is reproduced by courtesy of Tourisme Québec. Slide 3B was provided by Bob Johns, Matonabee School, Pine Point, Slide 2A by Michael Hewitt, Slides 4A, 4B and 7B by David Anderson and Slides 5A and 6B by John Bentley. The slides were reproduced by the publishing division of the ILEA Learning Materials Service.

Extracts from the Census of Canada are reproduced by permission of Statistics Canada, Ottawa, Ontario KIA OT6. These have been incorporated into the Montreal study -- 1971 Census of Canada, Census Tract Bulletin 95-734 (CT-4B), Montreal; the Pine Point study, 1971 and 1976 Census of Canada, unpublished data; the Cartwright study, 1971 and 1976 Census of Canada, unpublished data; the Regina study, 1976 Census of Canada, Census Tract Bulletin 95-816, Regina and 1976 Census of Canada Volume 13 Census of Agriculture for the Western Province; the Okanagan study 1976 Census of Canada 92-823.

We also acknowledge the following sources: Shelter (the Poverty cycle Fig. 2.3) reproduced in the Open University publication Patterns of Equality Unit 15; the Guardian newspaper 12 November 1979 and 21 April 1980; the Town Council of Pine Point (Fig. 3.12, Fig. 3.14); the Travel Industry Association for the extract from the Arctic Road Map, published 1975/6; The Vancouver Sun 2 March 1978 and 22 August 1978; the University of British Columbia for the excerpt from their Trans-Canada Field Excursion Guide edited by A.L. Farley; and G. Humphrys for the extract from 'The fruit growing industry and resort functions in the Okanagan Valley, British Columbia', pp. 4-8, Panorama Volume 14, 1973 with the permission of the Isle of Thanet Geographical Association.

The Mayors of Charlottetown and Regina have provided data in connection with these studies. In addition we are grateful for all those who have assisted in the provision of advice and information to the group. In particular we should like to mention Paul Jarvis of the Government of the Northwest Territories, A. Osing of Pine Point Mines, Janice Pereira, Michael Storm and John Wolforth.

The interpretation of the data and the views expressed are entirely those of the authors concerned and do not purport to represent the views of the Government of Canada and the Inner London Education Authority.

Michael Hewitt

1 THE NATIONAL SETTING

Canada's population growth has been recorded by the decennial census of population, first held in 1871, and by the more recent (since 1956) quinquennial returns. Fig. 1.1 illustrates the increasing colonisation of a new continent. Although growth continues

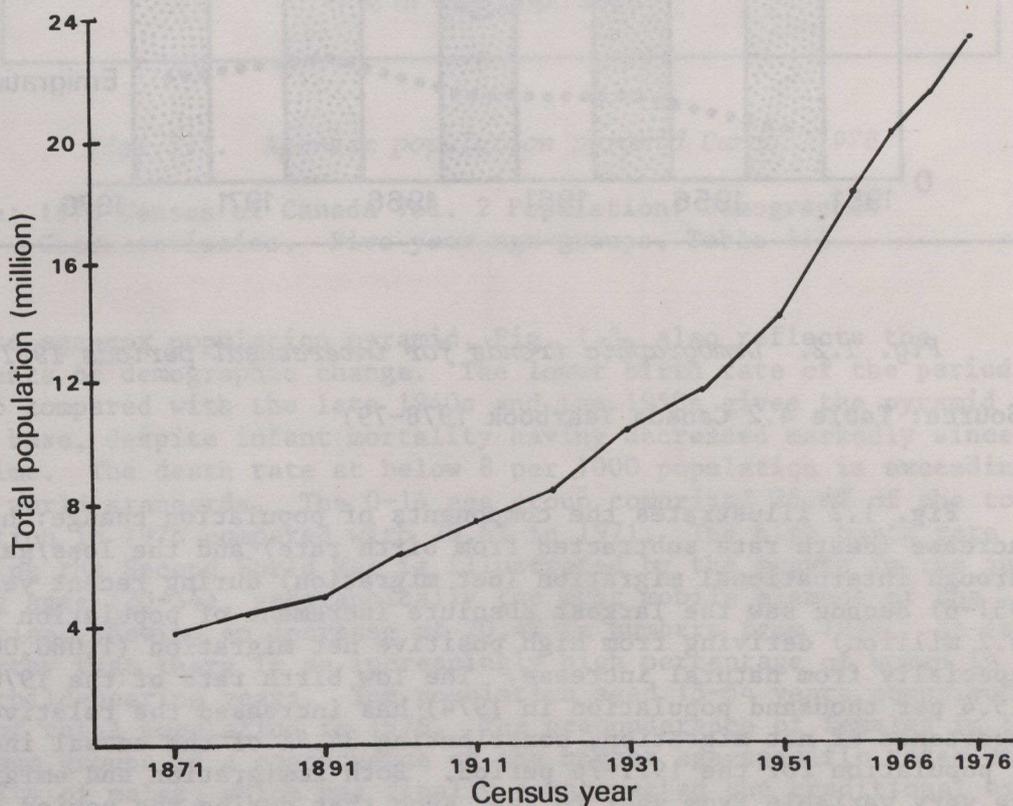


Fig. 1.1. Graph to show growth of Canadian population

(Source: Table 4.1 Canada Yearbook 1978-79)

to be rapid, its rate has declined in recent years from an average rate of 2.8% (1956) to 1.3% (1976). This is reflected by the decreasing actual increase of population for each five year intercensal period -- Fig. 1.2.

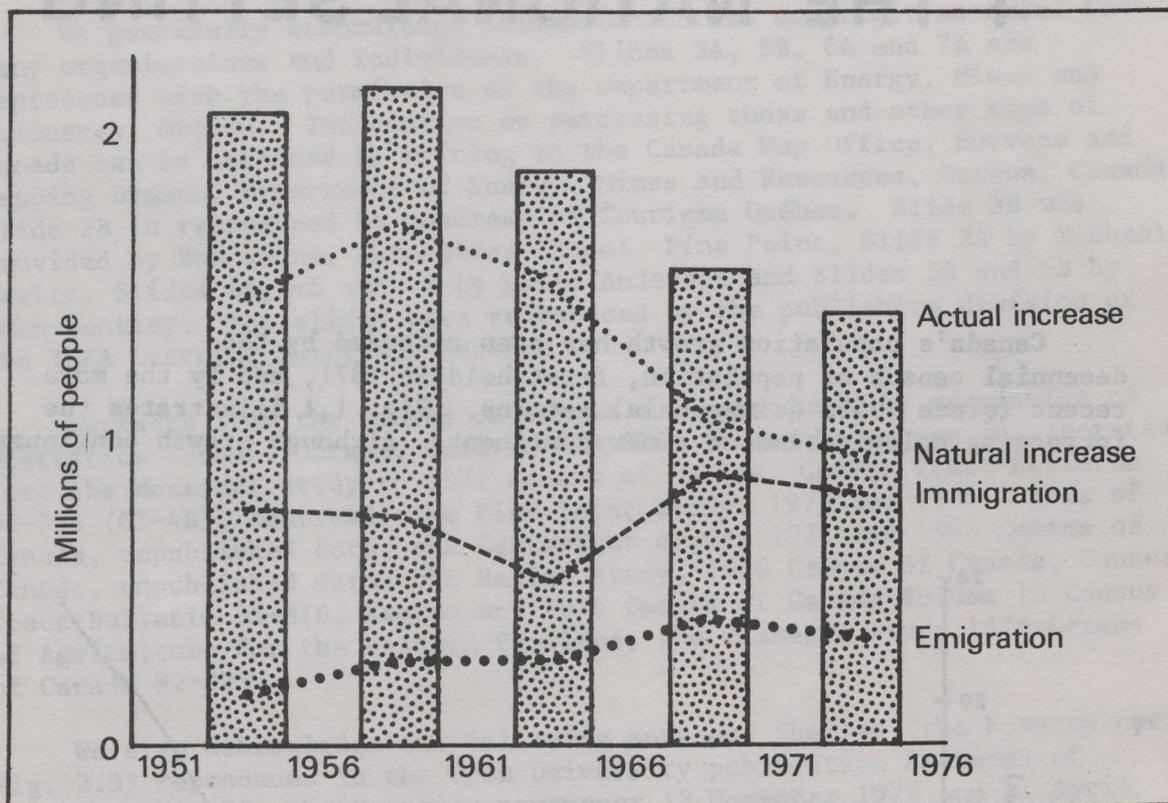


Fig. 1.2. Demographic trends for intercensal periods 1951-76

(Source: Table 4.2 Canada Yearbook 1978-79)

Fig. 1.2 illustrates the components of population change: natural increase (death rate subtracted from birth rate) and the loss/gain through international migration (net migration) during recent years. The 1951-61 decade saw the largest absolute increment of population increase (4.2 million) deriving from high positive net migration (1,080,000), but especially from natural increase. The low birth rate of the 1970s (15.4 per thousand population in 1974) has increased the relative importance of net migration, contributing 34.4% of the actual increase of population for the 1971-76 period. Both immigration and emigration are very variable from year to year such that during the period 1961-77 arrivals varied between a maximum of 222,876 per year (1967) and 71,689 (1961) and emigrants (for which obviously there are no census returns!) estimated between 81,100 (1965) and 38,100 (1976); destined principally for the United Kingdom and especially the United States.

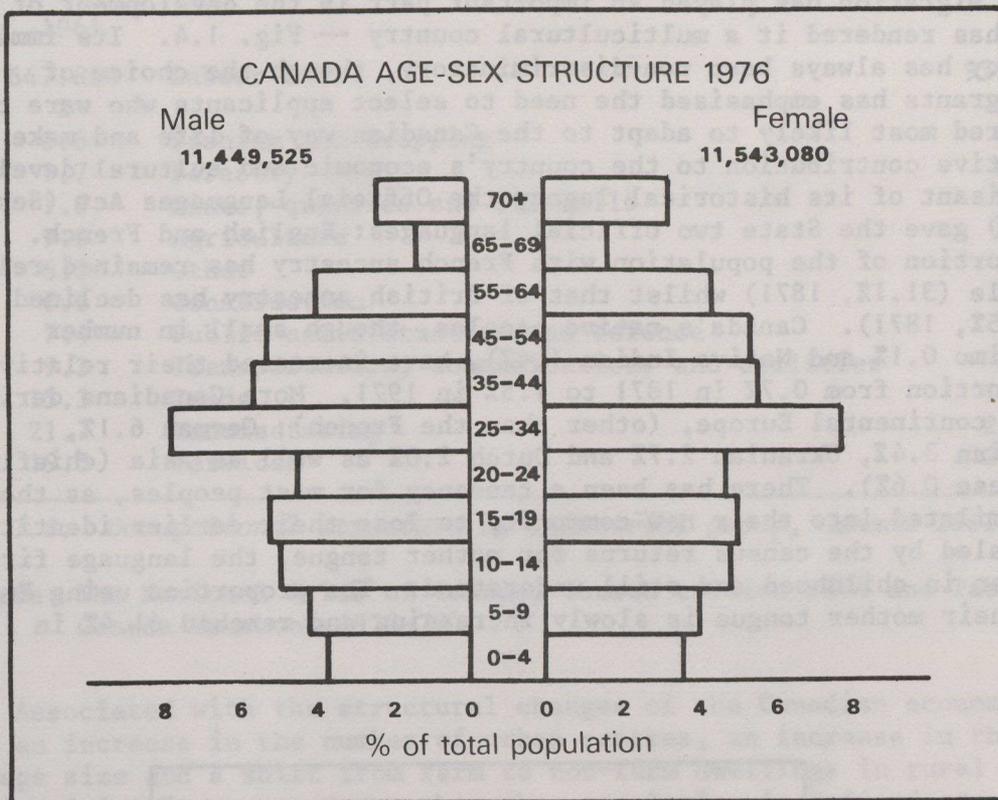


Fig. 1.3. Age-sex population pyramid Canada 1976

(Source: 1976 Census of Canada Vol. 2 Population: Demographic Characteristics. Five year age groups, Table 11)

The age-sex population pyramid, Fig. 1.3, also reflects the components of demographic change. The lower birth rate of the period 1961-76 compared with the late 1940s and the 1950s gives the pyramid a narrow base, despite infant mortality having decreased markedly since that time. The death rate at below 8 per 1000 population is exceedingly low by world standards. The 0-14 age group comprised 25.6% of the total population in 1976 compared with 29.6% in 1971. The high birth rate following the Second World War is illustrated by the growth in the junior working ages (20-34), geographically the most mobile element of the population, showing an increase of 20.4% in numbers from 1971. It is noteworthy that there is an increasingly high percentage of women in their child-bearing years. The population aged 15-64 years comprised 65.5% of total population in 1976. The preponderance of females in the older age groups is a consequence of the higher age-specific rates of mortality of males, which has finally counteracted the traditional excess of males nationally. Traditionally the majority of immigrants were male, such that in 1911 there were 113 males per 100 females within the national population. The 1976 Census was the first to record more females than males (see Cartwright study Fig. 4.5). See also Fig. 6.2.

Migration has played an important part in the development of Canada and has rendered it a multicultural country -- Fig. 1.4. Its immigration policy has always been non-discriminatory, though the choice of immigrants has emphasised the need to select applicants who were considered most likely to adapt to the Canadian way of life and make a positive contribution to the country's economic and cultural development. Cognisant of its historical legacy the Official Languages Act (September 1969) gave the State two official languages: English and French. The proportion of the population with French ancestry has remained relatively stable (31.1%, 1871) whilst that of British ancestry has declined (60.5%, 1871). Canada's native peoples, though small in number (Eskimo 0.1% and Native Indian 1.4%), have increased their relative proportion from 0.7% in 1871 to 1.5% in 1971. More Canadians derive from continental Europe, (other than the French): German 6.1%, Italian 3.4%, Ukrainian 2.7% and Dutch 2.0% as well as Asia (chiefly Chinese 0.6%). There has been a tendency for most peoples, as they are assimilated into their new community to lose their earlier identity, as revealed by the census returns for mother tongue, the language first spoken in childhood and still understood. The proportion using English as their mother tongue is slowly increasing and reached 61.4% in 1976.

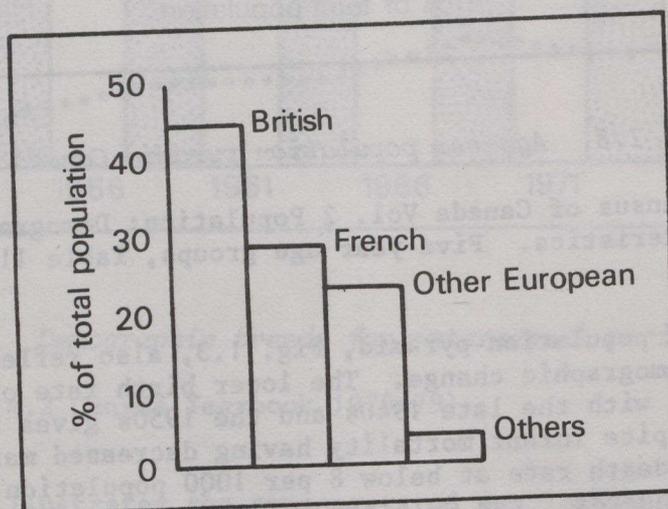


Fig. 1.4. Canadian population by ethnic groups, 1971

(Source: Table 4.19 Canada Yearbook 1978-79)

Migration, whether at an international, inter-regional or local scale is frequently related to perceived economic opportunities. Much of the growth and re-distribution of the Canadian population can therefore be related to the evolving economy of Canada, expressed in terms of employment opportunities -- Fig. 1.5.

1961		1976
6471850	Labour Force	9572000
%		%
0.6	Fishing and trapping	0.2
1.7	Forestry	0.6
1.8	Mines, quarries and oil wells	0.6
9.9	Agriculture	4.9
6.2	Other	6.4
6.6	Construction	6.7
7.4	Public administration and defence	7.2
9.3	Transportation, communications and utilities	8.7
15.3	Trade	17.3
21.7	Manufacturing	20.3
19.5	Services	27.1

Fig. 1.5. Occupational structure by industrial group, Canada 1961, 1976

(Source: The National Atlas of Canada, fourth edition 1974 and Table 8.4 Canada Yearbook 1978-79)

Associated with the structural changes of the Canadian economy have been an increase in the number of urban centres, an increase in their average size and a shift from farm to non-farm dwellings in rural areas -- Fig. 1.6. In census terms the urban population is defined as persons

	1961	1971	1976
Total population	%	%	%
Rural farm	12.3	5.3	4.5
Rural non-farm	16.6	18.7	20.4
Urban	70.1	76.0	75.1
Urban settlements:			
over 5000	63.3	69.3	69.1
over 500000	27.2	33.2	42.1

Fig. 1.6. Urban and rural population, Canada

(Source: Census of Canada 1976 Vol. 2 Population: Geographic distribution, Table 7 urban and rural distribution)

living in an area having a population concentration of 1000 or more and a population density of at least 386 per square km and the rural non-farm population includes all persons living in rural areas in dwellings not situated on census farms.

This brief outline of some of the main components of the demography of Canada has not indicated the wide spatial variations that occur throughout this vast nation for each component. Some of these varied manifestations are apparent in the following case studies in Canadian population geography.

MICHAEL HEWITT

2 MONTREAL

INTRODUCTION: THE APPARENT PARADOX OF MONTREAL

This is a study of the concept of the inner city. It takes as an example a small part of the inner city of Montreal and, largely through the medium of census data, attempts to identify and characterise the nature of the inner city. The sample area studied is compared to the Montreal Metropolitan Area (the continuously built-up area of Montreal), the area within which people wishing to live in Montreal will choose their place of residence.

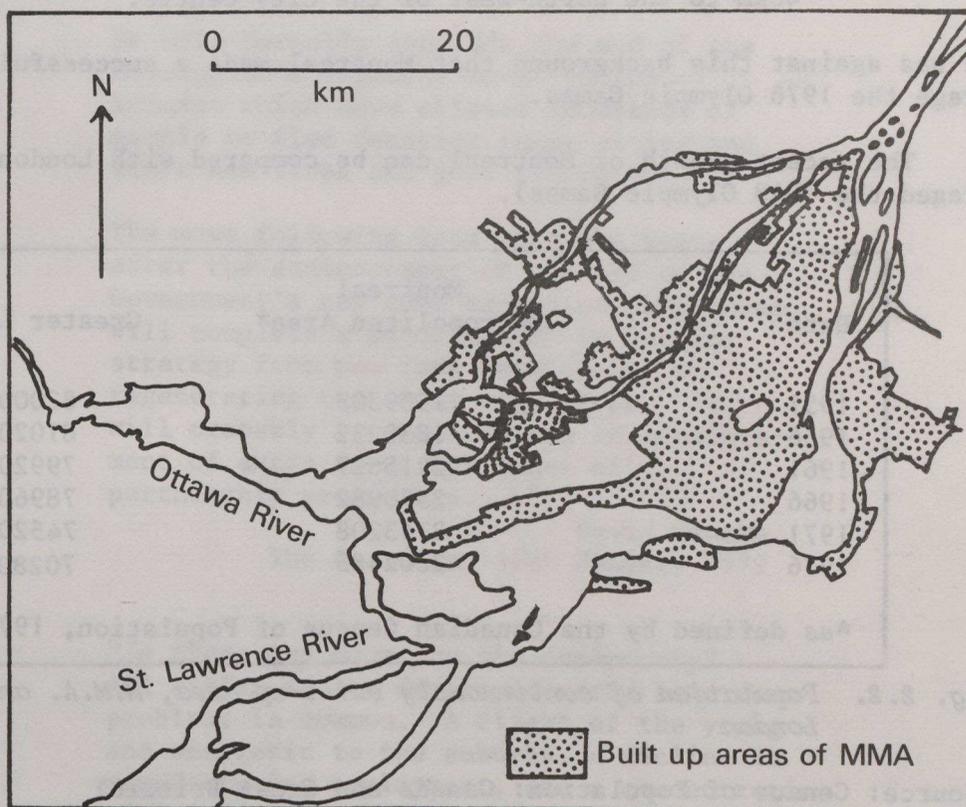


Fig. 2.1. Montreal Metropolitan Area, 1971

During the 1960s there was unprecedented development within the Montreal Metropolitan Area. Some of the more important developments included:

- 1962 Completion of first stage of *Place Ville Marie*, the first major office development since the 1930s. This complex of buildings includes the Royal Bank Building, 185m high with 145 storeys (inclusive of underground space), yielding over 200,000sq.m of office floor space and an *underground* complex of 70 shops, car parking, cinemas, restaurants and theatre.
- 1966 Opening of a *metro* (underground railway) system.
- 1967 *Place Bonaventure* opened with just under 300,000sq.m of floor space to the public. Built above 2ha. of the Canadian National Railway track system it houses an international exhibition and convention centre and provides the most *extensive underground shopping system* in the world as well as underground pedestrian access to the two main rail termini, Place Ville Marie and much of the city centre.
- 1967 Expo '67 world fair and exhibition.
- 1975 New Mirabel international airport opened at Ste Scholastique, 40km to the north-west of the city centre.

It was against this background that Montreal made a successful bid to stage the 1976 Olympic Games.

The recent growth of Montreal can be compared with London (which staged the 1948 Olympic Games).

Date	Montreal Metropolitan Area*	Greater London
1951	1539308	8200000
1956	1830232	8102000
1961	2215627	7992000
1966	2570982	7896000
1971	2743208	7452000
1976	2802485	7028000

*as defined by the Canadian Census of Population, 1971

Fig. 2.2. Population of continuously built-up area, M.M.A. and Greater London

(Source: Census of Population: Canada and Great Britain)

- 1.(a) Using the same axes, draw line graphs to show the total population of Montreal and London over the period 1951-1976.
 - (b) In which five-year period was there the largest percentage change in total population for (i) Montreal and (ii) London?
2. Compare the recent history of population growth in Montreal with that of Canada as a whole (Fig. 1.1). To what extent does the Montreal trend reflect the Canadian trend?

Inner city problems have become a matter for government action, and for considerable coverage in newspapers, over recent years in Great Britain. Typical examples are:

"Closing the escape routes from Britain's inner city slums

A decision is to be announced soon by Mr Peter Shore, the Secretary of State for Environment, which could affect the future of thousands of tenants living in central London, Birmingham, Liverpool, Manchester and Newcastle.

He will formally conclude the end of the Government's expanded towns policy -- schemes which have allowed thousands of people to flee decaying inner cities and start new lives and jobs elsewhere.

The move following less than two years after the announcement of the end of the Government's new town expansion programmes, will complete a major switch in housing strategy from new town development to regenerating the inner city areas. It will probably be coupled with an announcement of extra funds for inner city partnership programmes...."

David Hencke
The Guardian, 16th January 1979

"Is there any hope for the inner city?

All cities in the developed world have some problems in common. A flight of the young and energetic to the suburbs, a decline in manufacturing employment, and a concentration of relatively poor and under-privileged people in the inner areas are universal phenomena."

John Mills
The Guardian, 12th November 1979

"Is it the inner city miasma that causes unemployment?"

The main cause of Inner Area unemployment is the result, not of the collapse of the economy of Inner Areas but because Inner Areas have for 150 years or more been the areas in which those most vulnerable to unemployment live."

Paul Cheshire

The Guardian, 12th November 1979

"Report says self-help is the way to beat inner city 'fuel poverty'"

A new energy policy for Britain's run-down inner cities, harnessing the unemployed and community self-help groups, is suggested in a report published today by the National Council for Voluntary Organisations.

It would involve them in a home insulation programme and a fuel advisory service.

Local and central government are criticised by the report for their lack of initiative in this field and it proposes: 'Opportunities for tackling energy and inner city problems simultaneously, stimulating economic development and community self-help, and commencing more positive action to redress problems of fuel poverty'....

A specific energy policy is required for inner city areas because they have a high proportion of pensioners, single parents, unemployed and disabled people. The report argues that these people, who can least afford high heating costs, are most likely to spend all day at home and run up large bills, unlike the working population.

The inner city housing stock is also more likely to have a high proportion of badly insulated homes built in the days when energy was cheap and plentiful. The people who live in such homes are statistically less inclined to take up existing Government insulation grants than those who live in more affluent areas, says the report."

Staff Reporter

The Guardian, 21st April 1980

As these extracts show, London and many of Britain's major cities face serious problems within the inner city. Recent experience of population change in London and Montreal would appear to be very different. Amidst such an atmosphere of growth and prosperity does Montreal have similar inner city problems? This study intends to explore this theme.

The concept of the inner city

The above extracts mention some inner city problems in social terms. These are sometimes summarised in a cycle of poverty to give us a concept of multiple-deprivation:

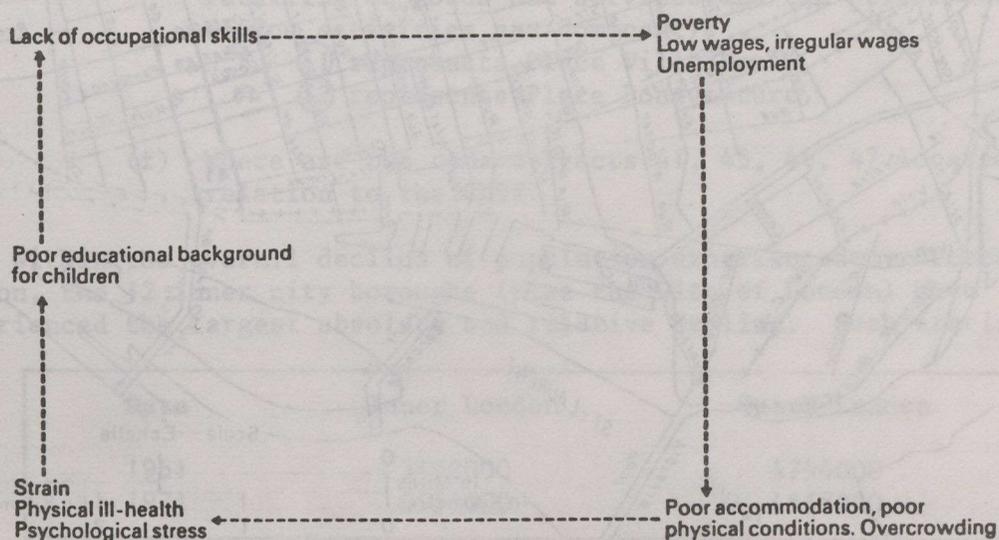


Fig. 2.3. The poverty cycle

(Source: C. Hamnett, Multiple Deprivation and the Inner City, Unit 16 Course D302 Patterns of Inequality, Open University Press)

Deprived members of the population tend to be concentrated in the least pleasant areas of the city, obsolescent areas suffering from neglect and physical decay, which, in major cities of developed countries, tend to be in the older inner parts of the city: hence the term inner city is associated with both the characteristics of these areas as well as their location. This deprivation has a physical expression as well as social and economic manifestations.

3. State one example of each characteristic given in the poverty cycle.

Location of study area

The map below shows the location of the area of Montreal that forms the basis of this study. Census tracts 41, 45, 46 and 47 are part of the inner city of Montreal.

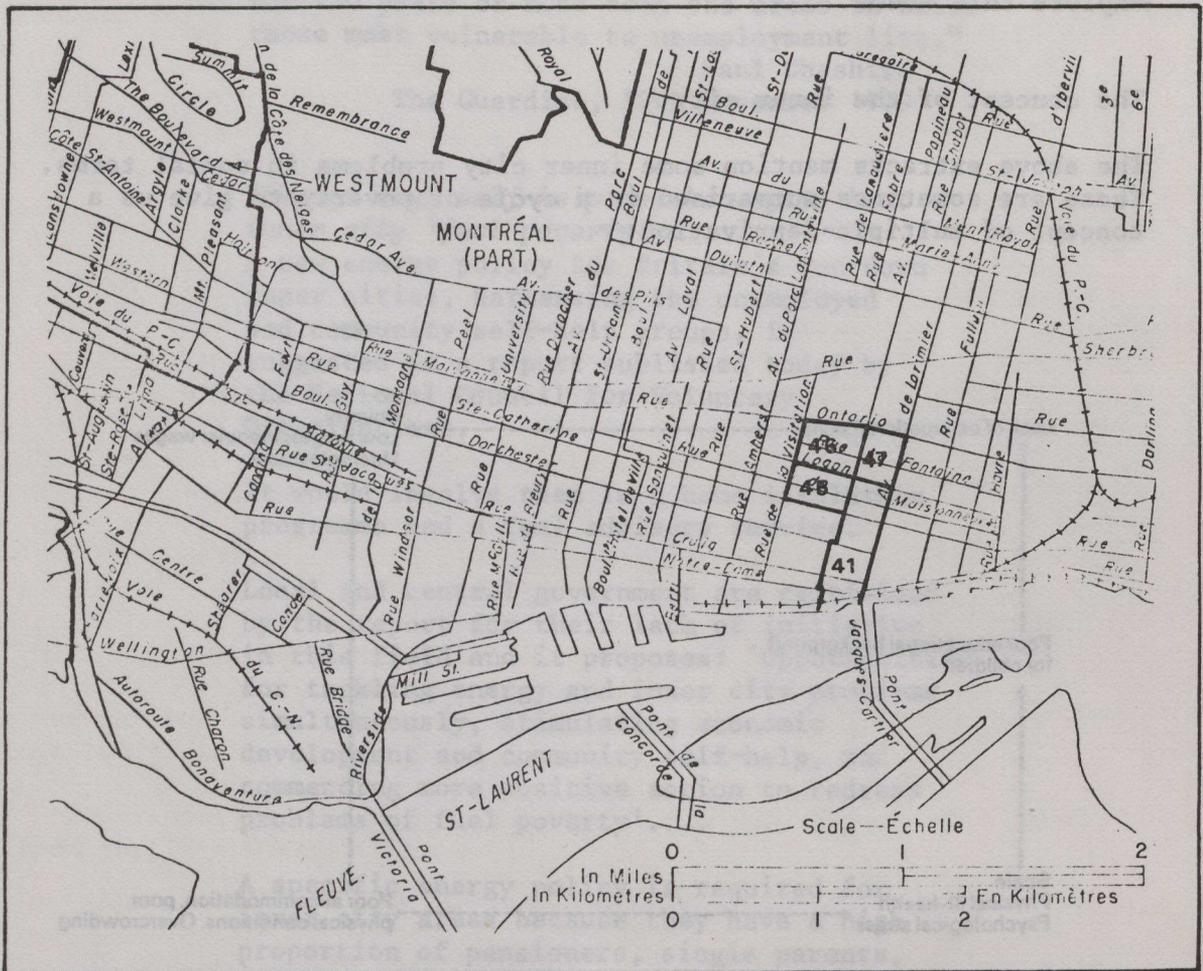


Fig. 2.4. Location of study area

(Source: 1971 Census of Canada, Census tract bulletin Montreal, Index Map)

The Census of Canada defines a census tract as "a small permanent statistical area of a large urban community that has:

1. a population between 2500 and 8000,
2. an area as homogeneous as possible in terms of economic status and living conditions,
3. boundaries that follow permanent and easily recognisable geographical features,
4. a shape as compact as possible." -- Introduction to Montreal Census Tract Bulletin A, 1971.

In terms of a declared aim of examining the social and economic characteristics of a distinct part of a city population, criterion 2 suits our needs well.

4. Calculate the approximate area of each of the four census tracts (1 hectare = 10,000 sq. metres).
- 5.(a) Examine slide 2B and relate it to Fig. 2.4 locating the census tracts.
 - (b) Why are criteria 3 and 4 readily met in Montreal?
 - (c) State two reasons why tract 47 has the smallest population total.
 - (d) State two reasons why tract 41 (the largest area) does not have the largest population total.
 - (e) What evidence is provided on slide 2B for the location of the central business district (CBD) or 'downtown' area (defined as the central area of a city where the retailing of goods and services and the performance of office activities are dominant)?
 N.B. ④1 represents Place Ville Marie
 ⑤2 represents Place Bonaventure
 - (f) Where are the census tracts 41, 45, 46, 47 located in relation to the CBD?

Within the overall decline of population experienced by Greater London, the 12 inner city boroughs (plus the City of London) have experienced the largest absolute and relative decline. Such statistics

Date	Inner London	Outer London
1961	3198000	4794000
1971	2554000	4558000

Fig. 2.5. Changes in population of Greater London

(Source: London facts and figures, Greater London Council 1973)

were compiled from small enumeration districts of the British Census (analogous to the Canadian census tract). Population trends in inner Montreal at this smaller scale are illustrated below:

Date	41	45	46	47
1961	3462	3647	4589	2157
1966	2747	3187	3813	1416
1971	2260	2585	3045	1135
1976	1647	1537	2002	915

Fig. 2.6. Declining population of census tracts: Montreal

(Source: Census of Canada, Census tract bulletins 1966, 1976)

- 6.(a) Draw comparative vertical bar graphs to represent the change in total population for the census tracts 1961-1976.
 - (b) Calculate the percentage decline in population for each tract for each five-year period.
 - (c) Is the trend accelerating, constant or diminishing?
 - (d) Was your answer to part (c) readily apparent from the bar graphs drawn for part (a)?
7. How do your answers to questions 6(b) and 6(c) relate to the criteria for census tract definition given previously?
 8. Compare your answers given for questions 6(b) and 6(c) with that for question 2 and indicate the differences.

Census tracts 41, 45, 46 and 47 show a different pattern of changing population from the Montreal Metropolitan Area. The pattern bears some resemblance to the inner London Boroughs (which relate to a far larger unit area -- 30,142 hectares). However, a declining population is not necessarily indicative of deprivation and a cycle of poverty and disadvantage.

URBAN FABRIC

The deprived inner city is most easily recognised by the physical appearance of its buildings (urban fabric). The basic function of housing is to provide shelter, and therefore the character of housing should be studied partly in the light of the extremes of climate experienced.

- 9.(a) Suggest reasons for the lack of correlation between the two sets of figures for precipitation (Fig. 2.7).
 - (b) Construct a simple bar and line graph to represent the climate of Montreal. Using the same vertical scale as for total precipitation represent the average depth of snow.
- 10.(a) Comment upon the assertion that the average resident of Montreal considers central heating in winter and air conditioning in summer to be essential. On labour day (first Monday in September) the midge screens of summer are replaced by winter windows (double glazed).
 - (b) Why are the underground facilities linking Place Ville Marie and Place Bonaventure physical and economic assets?

Years of Record	Temperature (°C)	Precipitation		Humidity
	Mean daily	Mean total (mm)	Mean snowfall (cm)	Mean relative hum. (%)
	1941-70	1941-70	1941-70	1957-66
Jan	-8.9	79.5	53.9	75
Feb	-7.6	71.4	55.6	76
Mar	-1.4	75.2	38.1	71
Apr	6.7	77.0	10.9	63
May	13.6	74.9	1.5	58
June	19.1	87.1	0.0	64
July	21.6	93.0	0.0	67
Aug	20.4	91.7	0.0	68
Sept	15.8	86.6	Trace	71
Oct	10.1	79.0	1.5	70
Nov	2.9	92.7	23.6	76
Dec	-5.7	90.9	57.9	78

Fig. 2.7. Climatic data for Montreal at McGill University, elevation 57m

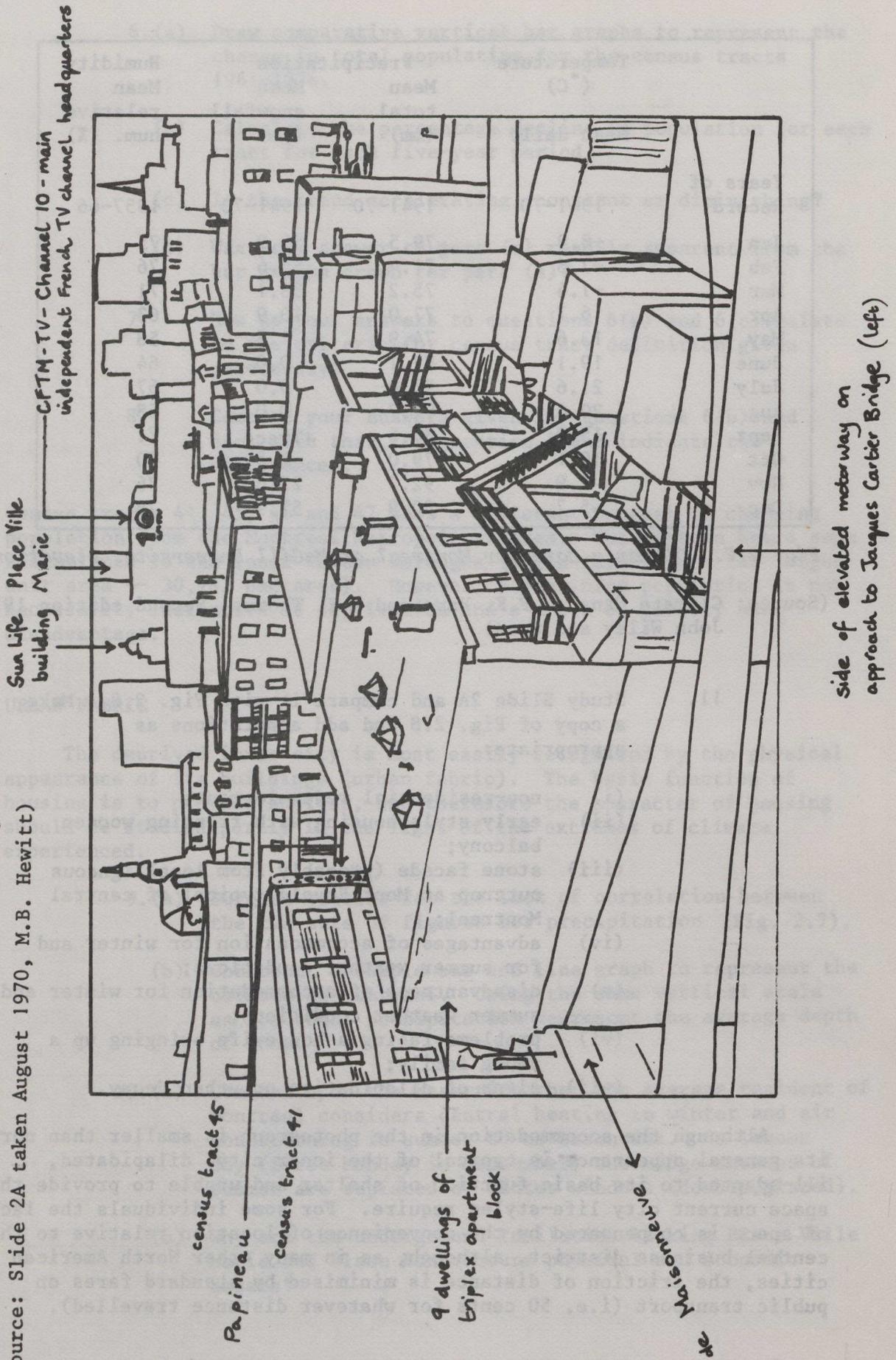
(Source: Climate Canada, F.K. Hare and M.K. Thomas. Second edition 1979, John Wiley and Sons)

11. Study Slide 2A and compare it with Fig. 2.8. Make a copy of Fig. 2.8 and add annotations as appropriate:
- (i) non-residential redevelopment;
 - (ii) early style housing with fronting wooden balcony;
 - (iii) stone facade (probably from local igneous outcrop at Mont Royal) typical of central Montreal;
 - (iv) advantages of accommodation for winter and for summer weather conditions;
 - (v) disadvantages of accommodation for winter and summer weather conditions;
 - (vi) problems facing a housewife bringing up a young family;
 - (vii) signs of dilapidation or urban decay.

Although the accommodation in the photograph is smaller than normal, its general appearance is typical of the inner city: dilapidated, ill-adapted to its basic function of shelter and unable to provide the space current city life-styles require. For some individuals the lack of space is compensated by the convenience of location relative to the central business district, although, as in many other North American cities, the friction of distance is minimised by standard fares on public transport (i.e. 50 cents for whatever distance travelled).

Fig. 2.8. Sketch of urban fabric of inner city Montreal

(Source: Slide 2A taken August 1970, M.B. Hewitt)



	MMA	41	45	46	47
OCCUPIED DWELLINGS	805,770	665	870	1,090	285
Owner-occupied	284,080	30	40	45	5
Tenant-occupied	521,690	630	830	1,040	275
Single detached	190,780	15	40	40	5
Single attached	206,235	495	655	835	230
Apartment (flat)	407,780	150	175	205	40
Rooms per dwelling (average)	4.9	4.5	4.4	3.9	5.1
Persons per room (average)67	.74	.66	.70	.77
Flush toilet (exclusive use)	793,795	655	815	1,040	275
Bath or shower (exclusive use)	778,180	555	615	650	230

Fig. 2.9. Tenure, 'dwelling' types and amenities

(Source: 1971 Census of Canada, Census tract bulletin, Montreal Series A -- population and housing characteristics)

Single attached dwellings referred to in Fig. 2.9 form terraced accommodation in which dwellings are not found one above the other as in the apartment blocks. In London nineteenth century inner city dwellings are associated with various indices of housing stress, e.g. overcrowding (households with more than 1.5 persons per room) and sub-standard amenities, e.g. households without exclusive use of hot water, bath or toilet.

12. To what extent can the Montreal study area be described as exhibiting elements of housing stress?
13. With reference to Fig. 2.9 and Fig. 2.10 discuss the assertion that the poverty found in our study area is relative rather than absolute in nature.

	MMA	41	45	46	47
<u>Dwellings with:</u>					
Automatic clothes dryer	245,485	45	60	65	35
Colour television	110,560	40	40	40	30
Vacation home (owned)	68,320	60	55	65	25
One automobile	453,810	210	305	355	80
2 or more automobiles	88,305	10	25	25	5
Oil as principal heating fuel	618,740	375	420	660	180
Gas as principal heating fuel	113,745	235	340	345	85
Electricity as principal heating fuel	66,335	35	55	70	-

Fig. 2.10. Indices of standard of living

(Source: 1971 Census of Canada, Census tract bulletin, Montreal Series B Table 2 -- housing and labour force characteristics)

Note: "All figures in this tabulation have been subjected to a

confidentiality procedure to prevent the possibility of associating small figures with any identifiable individual. The particular technique used is known as 'random rounding'. Under this method, all last or 'unit' digits in a table (including all totals) are randomly rounded (either up or down) to '0' or '5'. This technique provides the strongest possible protection against direct, residual, or negative disclosures without adding any significant error to the census data. However, since totals are independently rounded they do not necessarily equal the sum of individual rounded figures in distributions. Also, minor differences can be expected for corresponding totals and cell values in various census tabulations."

Census of Canada

(This applies to any Census tract where population totals might allow individuals to be identified.)

The urban fabric of the study area reflects the development of mass housing, providing no more than rudimentary shelter for its occupants, built at a high density for the minimum cost. As you will have observed, staircases were built outside in order to conserve interior space! The street pattern and the terrace plan reflects the early French settlement of this region; the narrow strips of the French farmlands were subdivided into lots 7-8 metres wide, 25-40 metres deep. The location of this housing needs to be studied in relation to the initial siting and subsequent growth of the city of Montreal.

THE HISTORICAL BACKGROUND

In 1535 Jacques Cartier, the first European to visit the site of Montreal, found a Huron Indian settlement and after climbing 'the mountain' named the location Mount Royal in honour of his king. However it was not until 1642 that Europeans colonised the site; Paul de Chomedey de Maisonneuve and 72 comrades founded a catholic mission. Dependence on water transport necessitated a riverside site, which was established on a low ridge between two streams, the R. St. Pierre and its tributary, the R. St. Martin. Settlement by the R. St. Lawrence further upstream was discouraged by the Lachine rapids. Despite the inherent defensive nature of the site a palisade was soon constructed against the hostile Iroquois Indians and in 1717 an 18' stone wall fortification was built, necessitated by the advance of the British, to whom the settlement fell in 1760.

Thereafter the fur trade, which already sustained the settlement, developed rapidly. Accordingly the population of Montreal increased from 5500 in 1784 to 19000 in 1821 after which date the fur trade fell into decline in the face of competition from the Hudson's Bay Company with its shorter (great circle) export route in Hudson Bay to Europe. However, the completion of the Lachine Canal in 1825, the continued widening and deepening of the St. Lawrence navigation channel from Quebec City to Montreal, and the faster crossing of the Atlantic by the steamship service after 1853, ensured an important role for the city as an outfitting post for settlers arriving from Europe as the frontiers of the ecumene pushed westward. The opening of the Victoria Bridge across the St. Lawrence River (1862) and the completion of the transcontinental

railways (CPR in 1885 and the future CNR in 1918) further emphasised the nodality of Montreal and extended its hinterland. Industrial development kept pace with port development, associated with its location at a break of bulk point and was concentrated at the entrance to the Lachine Canal and along the waterfront downstream from the old core. The first grain elevator (for the export of Prairie wheat) was opened in 1904. By 1901 the MMA as defined by the 1971 Census had a population of 410,000 and in the following decade this grew by a further 50%.

14. With the aid of the information given below, Slide 2B will enable you to draw a large sketch map to show the initial site advantages and subsequent growth of Montreal.

- (a) Draw the St. Lawrence waterfront and the Lachine Canal (crossed by the Autoroute Bonaventure).
- (b) Insert the position of the former St. Pierre and St. Martin streams. The St. Pierre reached the St. Lawrence at King Edward dock having flowed straight along the line of the present-day road from the 'N' of the Bonaventure Autoroute. The upper reaches of this stream followed the line of St. Jacques as far as Windsor before reaching the downstream section in a convex loop (away from the city) to the line of the Bonaventure Autoroute. The St. Martin stream flowed towards the St. Pierre, along the line of Craig Street; the confluence coincides with the present-day Windsor Notre-Dame road intersection.
- (c) Insert the line of the ridge (25m terrace) between these streams which corresponds to Notre-Dame (street).

The area drawn represents the original walled site of Montreal, 'Old Montreal', which today is the centre of government functions, e.g. ⑥1 City Hall and ⑥0 Court Houses.

15.(a) Slide 2B is an extract from a tourist map of Montreal, and clearly defines the CBD (the upper town and 'Old Montreal') in terms of the concentration of places of interest (① to ⑥4). The 'upper town' comprises a concentration of high-order service functions. The most noteworthy representatives might comprise:

- ④0 Sun Life Building, completed 1931 and the only skyscraper of Montreal until the 1960s
 - ④1 Place Ville Marie
 - ⑤2 Place Bonaventure
- leading department stores (with year of opening)
- ②1 Henry Morgan Co. Ltd. (1891)
 - ②3 Simpsons Ltd. (1894)
 - ③7 J.A. Ogilvy's Ltd. (1896)
 - ②2 T. Eaton Co. Ltd. (1925)

In 1892 the electric tram system was inaugurated (on St. Catherine). The transcontinental railway companies built their main stations as

central to the city as land availability permitted; ④⑥ Windsor Station (CPR) and ④② Central Station (CNR). ①① is the location of the Central Bus Terminus. Development was blocked to the north by the steep slopes of Mont Royal, part of which was designated for a park in 1860. On the lower slopes residences for affluent members of Montreal society were built utilising the advantages of viewpoint as well as west and south facing slopes above the mosquito belt.

- (b) On your sketch map drawn for question 14 delimit the present-day relatively dispersed CBD of Montreal.
- (c) Annotate to show the site advantages of the ancient core in providing for man's needs from the seventeenth century until the early nineteenth century.
- (d) Annotate to represent evidence of:
 - (i) early French explorers
 - (ii) French inheritance
 - (iii) subsequent British settlement
 - (iv) Mont Royal

16.(a) Annotate the CBD to show the extent to which it:

- (i) shows internal zoning
- (ii) represents the most accessible location within the city.

(b) Shade the study area (use Fig. 2.4 as a guide).

By the date of the Confederation of Canada (1867) the study area comprised part of the built-up area of Montreal. There was a large demand for cheap rented accommodation for the influx of workers seeking employment in the growing port and associated industrial activities. In the absence of a public transport system these workers were locationally tied close to their place of work. This historical legacy of the study area has influenced the development of the present-day community residing in the area.

DEMOGRAPHIC STRUCTURE OF PRESENT DAY MONTREAL

The study area contains relatively old housing stock located near the centre of the city (Slide 2A). The model of the inner city (Fig. 2.3) suggests hypotheses that the resident population differs significantly in character from that of the rest of the urban area. Is this the case? This section investigates four aspects of the inner city population: Age and sex structure; Residential mobility; Ethnic composition; and socio-economic characteristics.

Age and Sex Structure

- 17.(a) Study Fig. 2.11, Age and sex pyramids for the MMA and Census tract 46 (which contains the largest population of the four census tracts within the study area). List (i) their similarities and (ii) their differences.

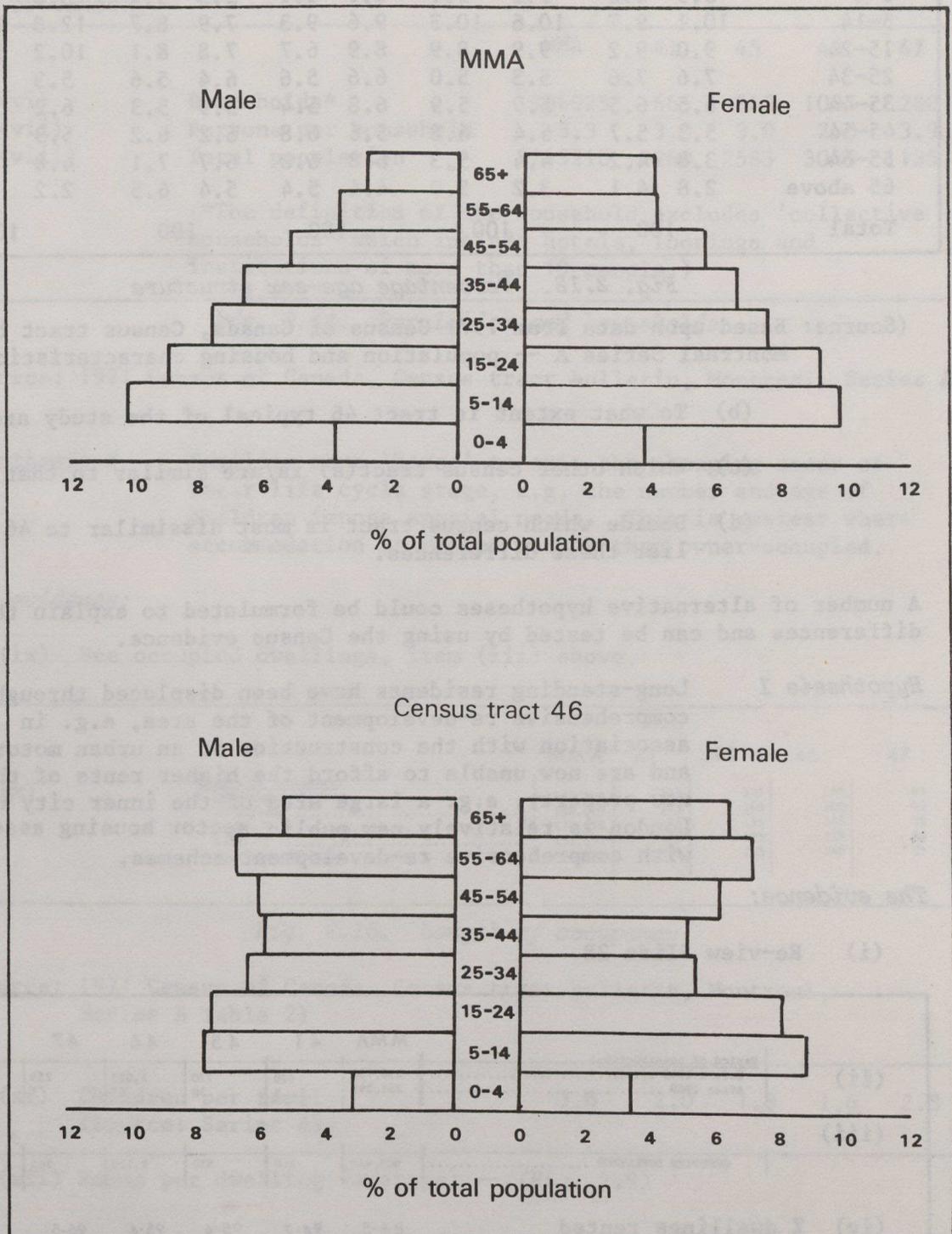


Fig. 2.11. Age-sex pyramids for Montreal Metropolitan Area and Census tract 46, 1971

(Source: 1971 Census of Canada, Census tract bulletin, Montreal, Series A -- population and housing characteristics)

Age group	MMA		41		45		46		47	
	M	F	M	F	M	F	M	F	M	F
0-4	3.9	3.8	3.5	3.1	3.1	3.1	3.3	3.4	3.1	4.0
5-14	10.1	9.7	10.6	10.3	9.6	9.3	7.9	8.7	12.8	11.9
15-24	9.0	9.2	9.9	8.9	8.9	6.7	7.8	8.1	10.2	10.6
25-34	7.6	7.6	5.3	5.0	6.6	5.6	6.4	5.6	5.3	6.2
35-44	6.5	6.5	5.9	5.9	6.8	5.4	5.9	5.3	6.2	5.7
45-54	5.3	5.7	6.4	6.8	5.6	6.8	6.2	6.2	5.3	5.7
55-64	3.8	4.2	4.4	5.3	6.8	6.0	6.7	7.1	4.8	4.0
65 above	2.8	4.1	3.2	5.0	4.4	5.4	5.4	6.5	2.2	2.6
Total	100		100		100		100		100	

Fig. 2.12. Percentage age-sex structure

(Source: Based upon data from 1971 Census of Canada, Census tract bulletin Montreal Series A -- population and housing characteristics)

- (b) To what extent is tract 46 typical of the study area?
- (c) Which other census tract(s) is/are similar to that of 46?
- (d) Decide which census tract is most dissimilar to 46 and list these differences.

A number of alternative hypotheses could be formulated to explain these differences and can be tested by using the Census evidence.

Hypothesis 1 Long-standing residents have been displaced through comprehensive re-development of the area, e.g. in association with the construction of an urban motorway, and are now unable to afford the higher rents of the new property, e.g. a large area of the inner city of London is relatively new public sector housing associated with comprehensive re-development schemes.

The evidence:

- (i) Re-view Slide 2B

	MMA	41	45	46	47	
(ii) <u>Period of construction:</u>	Before 1946	250,750	620	770	1,025	255
	After 1960	261,295	5	30	65	5
(iii) OCCUPIED DWELLINGS	805,440	660	830	1,120	265	
(iv) % dwellings rented	84.5	94.7	95.4	95.4	96.5	
(v) <u>Tenant-occupied dwellings:</u>	Average cash rent	99	63	62	54	59

Fig. 2.13. Tenure and age of housing

(Source: 1971 Census of Canada, Census tract bulletin, Montreal, Series B Table 2. Item (iv) is based upon Fig. 2.9)

Hypothesis 2 A boarding school is located within the tract.

The evidence:

		MMA	41	45	46	47
(vi)	Households*	806025	665	865	1085	280
(vii)	Persons per household	3.3	3.3	3.0	2.8	3.9
(viii)	Total population	2743210	2260	2585	3045	1135

(*The definition of the household excludes 'collective households' which include hotels, lodgings and institutions of more than 10 people.)

Fig. 2.14. Population and households

(Source: 1971 Census of Canada, Census tract bulletin, Montreal, Series A)

Hypothesis 3 Families move 'house' to suit the changing needs of their life cycle stage, e.g. the number and age of children impose special needs. This is easiest where accommodation is rented rather than owner-occupied.

The evidence:

(ix) See occupied dwellings, item (iii) above.

		MMA	41	45	46	47
(x)	<u>Length of occupancy:</u>					
	Less than one year	157,240	145	175	195	65
	1-2 years	160,070	145	140	200	45
	3-5 "	132,855	55	155	165	55
	6-10 "	152,850	130	125	215	50
	More than 10 years	202,415	185	235	340	55

Fig. 2.15. Length of occupancy

(Source: 1971 Census of Canada, Census tract bulletin, Montreal, Series B Table 2)

(xi)	Children per family (Source: Series A)	3.6	2.0	1.8	1.6	2.3
------	---	-----	-----	-----	-----	-----

(xii) Rooms per dwelling (average) -- (Fig. 2.9)

18. Which hypothesis(es) is/are substantiated?

Migration

Migrants, as defined by the Canadian Census, are persons whose place of residence five years prior to the Census was outside the

municipality in which they were residing at the Census date.

	MMA	41	45	46	47
Birthplace and immigration:					
Born in Canada	2,337,555	2,240	2,540	2,960	1,130
Born outside Canada	405,680	55	80	50	45
Immigrated after 1945	330,335	20	50	30	35
Migration:					
Non-migrants	1,945,865	1,995	2,210	2,590	915
Same dwelling	1,216,750	1,020	1,085	1,420	415
Different dwelling	729,115	975	1,125	1,175	495
Migrants	584,415	150	250	210	155
From an MA	314,920	45	55	60	45
Same MA	269,990	40	30	50	45
Different MA - Same province	17,685	-	15	10	-
Different province	27,240	-	5	5	-
From a non-MA	118,685	50	80	90	95
Same province	101,885	45	70	80	65
Different province	16,800	5	10	10	30
From outside Canada	115,345	20	40	20	5
Place of residence in 1966 not stated ...	35,470	30	75	45	5

Fig. 2.16. Birthplace, immigration and migration

(Source: 1971 Census of Canada, Census tract bulletin, Montreal, Series B Table 1)

19. Complete the following table:

%	MMA	41	45	46	47
Urban to urban					
Rural to urban					
Short distance* (same Province)					
Long distance* (from other Province)					
From overseas					
Total migrants					
Non-migrants, changed dwelling					
(*Distinction not fully justified since Montreal is close to a Provincial boundary, though few people live a long distance from Montreal in Quebec Province)					

Fig. 2.17. Table to summarise residential mobility

20. To what extent are each of the following commonly held generalisations valid?

- (a) Most migrants are short-distance movers.
- (b) Long-distance migrants generally locate in large cities.

- (c) Rural dwellers are more prone to migrate.
 - (d) Migrants move to places of better economic opportunity.
 - (e) The inner city provides a bridgehead for immigrants.
 - (f) In-migrants concentrate in inner city areas.
 - (g) The inner city has a transitory population.
21. Does the following information confirm your conclusion in 20(g) above?

	MMA	41	45	46	47
Households with lodgers	45825	90	130	110	45
Households with lodgers (%)	5.7	13.5	15.0	10.1	16.0

Fig. 2.18. Households with lodgers

(Source: 1971 Census of Canada, Census tract bulletin, Montreal, Series A)

- 22.(a) Compare Fig. 2.17 with Fig. 2.11.
- (b) What inferences can you draw concerning the age and sex of migrants?

Ethnic Composition

This has three separate facets:

(1) Ethnic Origin

	MMA	41	45	46	47
TOTAL POPULATION	2,743,230	2,295	2,615	3,015	1,170
<u>Ethnic group:</u>					
Asian	36,500	15	-	-	-
British Isles	438,500	90	155	100	30
French	1,762,690	2,140	2,405	2,860	1,070
German	38,440	-	5	-	5
Hungarian	11,480	-	-	-	-
Italian	160,605	40	5	5	10
Netherlands	9,040	-	5	-	-
Polish	20,410	-	5	-	-
Russian	3,605	-	-	-	-
Scandinavian	6,355	-	-	-	-
Ukrainian	18,050	5	5	-	-

Fig. 2.19. Ethnic group

(Source: 1971 Montreal Bulletin B Table 1)

(2) Religion

Religion:	MMA	41	45	46	47
Anglican	125,975	30	15	5	15
Baptist	22,075	45	15	95	5
Greek Orthodox	57,685	5	-	5	40
Jewish	109,485	-	-	-	-
Lutheran	20,380	-	5	-	5
Pentecostal	6,445	-	15	-	-
Presbyterian	42,050	-	15	20	5
Roman Catholic	2,133,180	2,185	2,495	2,700	1,050
Salvation Army	2,830	-	-	10	-
Ukrainian Catholic	14,430	10	-	30	15
United Church	116,370	15	30	90	25
No religion	58,620	5	25	40	10

Fig. 2.20. Religion

(Source: 1971 Montreal Bulletin B Table 1)

(3) Language

Official language:	MMA	41	45	46	47
English only	508,215	40	25	35	20
French only	1,163,535	1,605	1,975	2,215	890
Both English and French	1,017,360	630	610	765	250
Neither English nor French	54,125	15	-	-	5

Fig. 2.21. Official Language

(Source: 1971 Montreal Bulletin B Table 1)

23. The study area is culturally homogeneous; a community French in origin and Roman Catholic, the vast majority of whom are not attuned to the international community and the cosmopolitan flavour of the city. Quantify this statement from the above evidence.

Socio-Economic Structure

The socio-economic structure of a population frequently reflects three related indices of that population: educational background, occupation, and income. The cycle of poverty implies a causal relationship between these characteristics of people.

(1) Educational attainment

	MMA	41	45	46	47
POPULATION 5 YEARS AND OVER	2,532,100	2,140	2,465	2,795	1,070
Highest level of schooling:					
Less than Grade 9	1,253,385	1,510	1,860	2,045	780
Grades 9-10					
- No other training	400,955	395	295	425	185
- With other training	89,145	35	40	50	15
Grade 11					
- No other training	204,255	55	95	85	25
- With other training	89,880	20	25	30	15
Grades 12-13					
- No other training	140,655	60	60	80	15
- With other training	95,005	20	30	10	-
Some university					
- No other training	100,210	30	30	40	20
- With other training	39,200	5	10	10	5
University degree					
- No other training	95,640	5	10	10	5
- With other training	23,775	5	-	5	-

Fig. 2.22. Level of Schooling

(Source: 1971 Montreal Bulletin B Table 1)

24.(a) Complete the following table:

Education Categories	MMA	41	45	46	47
Elementary					
Secondary					
Univ. degree					

Where grades 1-8 (including no schooling) is defined as elementary, and grades 9-13 is defined as secondary (grade 13 achieved at 18 years of age).

Fig. 2.23. Summary of level of schooling

(b) Why should the elementary level of attainment form such a large proportion of the group?

(2) Occupational Structure

(I) Industry division, both sexes

Industry division:	MMA	41	45	46	47
Both sexes	1,079,785	805	830	715	305
Divisions 1, 2, 3, 4	6,005	5	5	-	-
Division 5	276,650	230	185	170	60
" 6	50,950	20	30	30	10
" 7	102,805	110	75	75	30
" 8	161,550	115	85	90	30
" 9	61,505	25	20	20	5
" 10	264,205	175	165	125	75
" 11	56,005	25	40	30	10

Fig. 2.24. Industry division

(Source: 1971 Montreal Bulletin B Table 2: Labour force characteristics)

If the respondent was not employed in the week prior to enumeration, the information relates to his/her job of longest duration since January 1st 1970.

Division 1	- Agriculture
Division 2	- Forestry
Division 3	- Fishing and Trapping
Division 4	- Mines (including Milling), Quarries and Oil Wells
Division 5	- Manufacturing Industries
Division 6	- Construction Industry
Division 7	- Transportation, Communication and Other Utilities
Division 8	- Trade
Division 9	- Finance, Insurance and Real Estate
Division 10	- Community, Business and Personal Service Industries
Division 11	- Public Administration and Defence

Fig. 2.25. Explanation of industry division

(Source: 1971 Montreal Bulletin B explanatory notes)

25. To what degree is the pattern of occupation in the study area similar to that of the MMA as a whole? Explain your conclusion.

A more detailed classification of jobs is given by

(II) Occupation by major group, males only

Occupation major group:	MMA	41	45	46	47
Males	699,305	525	640	505	200
Group 11	55,995	-	5	10	-
" 27	17,275	-	5	-	-
" 31	12,465	-	-	10	-
Groups 21, 23, 25, 33	52,270	15	10	20	-
Group 41	81,565	60	75	40	15
" 51	81,685	40	35	40	15
" 61	67,445	85	120	35	30
Groups 71, 73, 75, 77	6,900	-	-	-	5
Group 81/82	26,310	10	30	25	5
Groups 83, 85	96,685	95	70	40	20
Group 87	49,815	35	20	35	15
" 91	40,280	40	50	40	30
Other	50,385	90	45	80	20

Fig. 2.26. Occupation major group

(Source: 1971 Montreal Bulletin B Table 2)

- 26.(a) For each census tract rank the major groups.
- (b) To what extent does this substantiate your conclusion for question 25?
- (c) Estimate for both (i) the MMA and (ii) the study area, the relative importance of basic compared with non-basic occupations.

- Group 11 -- Managerial, Administrative and Related Occupations
- Group 27 -- Teaching and Related Occupations
- Group 31 -- Occupations in Medicine and Health
- Group 21 -- Occupations in Natural Sciences, Engineering and Mathematics
- Group 23 -- Occupations in Social Sciences and Related Fields
- Group 25 -- Occupations in Religion
- Group 33 -- Artistic, Literary, Recreational and Related Occupations

- Group 41 -- Clerical and Related Occupations
- Group 51 -- Sales Occupations
- Group 61 -- Service Occupations
- Group 71 -- Farming, Horticultural and Animal Husbandry Occupations
- Group 73 -- Fishing, Hunting, Trapping and Related Occupations
- Group 75 -- Forestry and Logging Occupations
- Group 77 -- Mining and Quarrying including Oil and Gas Field Occupations
- Group 81/82 -- Processing Occupations
- Group 83 -- Machining and Related Occupations
- Group 85 -- Product Fabricating, Assembling and Repairing Occupations
- Group 87 -- Construction Trades Occupations
- Group 91 -- Transport Equipment Operating Occupations
- Other (for males) -- Materials Handling and Related Occupations, n.e.c., Other Crafts and Equipment Operating Occupations and Occupations Not Elsewhere Classified.

Fig. 2.27. Explanation of occupations by major group

(Source: 1971 Montreal Bulletin B explanatory notes)

(III) Blue and white collar workers

White collar workers are defined by major occupation groups: 11, 21, 23, 25, 27, 31, 33, 41 and 51.

The remaining major groups are regarded as blue collar workers.

27. Calculate the percentage of blue collar workers for the MMA and the four census tracts.

(IV) Self-employed males

	MMA	41	45	46	47
Males	699,305	530	640	505	200
Wage-earners	655,180	500	585	485	190
Self-employed	41,140	20	40	10	10

Fig. 2.28. Class of worker

(Source: 1971 Montreal Bulletin B Table 2)

(v) Participation or activity rate of females 15 years and over in the labour force

	MMA	41	45	46	47
%	38.3	34.7	21.5	19.4	27.3

Fig. 2.29. Female participation in labour force

(Source: 1971 Montreal Bulletin B Table 2)

(VI) Unemployment (males)

	MMA	41	45	46	47
%	8.9	15.6	15.2	19.8	11.9

Fig. 2.30. Male unemployment

(Source: 1971 Montreal Bulletin B Table 2)

28. Does the sample area differ significantly from the MMA in terms of occupational structure? Use a diagram to illustrate your conclusion.

(3) Income

The basic cause of deprivation is poverty. Table 3 -- Income distributions by census tracts of the 1971 Census of Canada, Montreal, Series B is very informative.

The main subdivisions within the Census tabulation are:

- (i) Total income -- defined as the total income of one person received during 1970 from wages and salaries, business or professional practice, family and youth allowances and other government payments, retirement pensions and interest and dividends from investments.
- (ii) Employment income -- defined as the total income of one person received in 1970 as wages and salaries and net income from business or professional practice.
- (iii) Family income -- defined as the sum of the incomes received by all members of the family 15 years and over, from all sources, during 1970.
- (iv) Household income -- defined as the sum of the incomes received by all members of the household 15 years and over, from all sources, during 1970.

29. Discuss the relative merits of the above measures of income as a measure of relative poverty within an urban area.

	MMA	41	45	46	47
Family income:					
Under \$2,000	29,855	40	85	130	25
\$ 2,000-\$ 2,999	26,490	45	55	135	30
3,000- 4,999	62,840	115	115	120	40
5,000- 6,999	95,020	80	115	90	55
7,000- 9,999	162,000	105	90	105	35
10,000- 14,999	166,005	80	25	45	20
15,000- 19,999	59,990	—	10	20	5
20,000 and over	44,690	—	—	5	5
Average total income per family	10,292	6,222	5,393	5,131	5,610
Median total income per family	9,023	5,927	4,929	4,042	5,218
Average total income of family heads	8,005	4,680	3,948	4,119	4,180
Average employment income of family heads ..	8,060	5,223	4,294	5,279	4,502

Fig. 2.31. Family income

(Source: 1971 Montreal Bulletin B Table 3 -- Income characteristics)

- 30.(a) Complete the following table:

	Percentage				
Family Income	MMA	41	45	46	47
Under \$5,000					
\$5,000-10,000					
\$10,000-15,000					
\$15,000 and over					

- (b) Using the table enlarge the statement that the people in our study area are relatively poor compared with the population of the entire MMA.

31. "Lower educational attainment gives a reduced scope for employment, for range of employment and for final income." Evaluate the evidence available in the inner city of Montreal to support this statement.

DYNAMIC PICTURE

Montreal is a city of rapid change: a growth in population of virtually one million occurred during the period 1956-71 and the comparable generation of wealth allowed the city to embark upon a number of spectacular prestige construction projects from the mid-1950s. Movement of people to the city presents a clear example of migration responding to a centre of greater economic opportunity (though by 1971, in common with much of the western world, rates of unemployment were high). The economic base of the city has been manufacturing industry:

1951	37.6
1961	31.6
1971	25.6

Fig. 2.32. Manufacturing employment (percentage) within MMA

Although in relative terms this has been in decline, twenty per cent of total Canadian manufacturing capacity is located within the limits of the MMA. The advantages of Montreal as a manufacturing (and service) centre are best summarised by drawing an annotated sketch map to show:

The Situation of Montreal

32. With the aid of an atlas draw a map outline of Eastern Canada (east of Lake Huron) and represent:

(a) land over 200m (600'), Canadian Shield, Appalachian and Adirondack Mountains.

(b) St. Lawrence River, Ottawa River, Richelieu River, Montreal, Ottawa, Toronto.

(c) advantages (annotated notes) to explain factors contributing to the growth of

(i) *Montreal as a regional centre*

position relative to lowland Quebec;
 position relative to U.S. border (there was no effective competing centre to the south);
 position relative to Canadian Shield (raw material source and HEP source, important in the light of the local absence of coal, oil and and natural gas deposits).

(ii) *Montreal as a national centre*

access to the interior via the Ottawa Valley (Great circle route);
 access to the interior via the Great Lakes;
 access to the interior via the two trans-continental railways with headquarters in Montreal; Ontario boundary (1976- Ontario 36% and Quebec 27% of Canadian population).

(iii) *Montreal as an international centre*

route to New York;
 route across the Atlantic to Europe;
 Lachine rapids (initial head of navigation) and St. Lawrence Seaway (with associated HEP).

The supply of rural to urban migrants has been sustained by the traditionally high birth rate of rural Quebec (now drastically reduced in the 1970s), the decline of the acreage of cultivated land, and mechanisation of farming. The role of the inner city as a reception zone for migrants from overseas has declined as immigration into Canada has fallen in the 1970s.

In a dynamic situation, the total housing stock is increased rapidly to keep pace with the demand for accommodation from the people moving into the city. Such housing, built to accord with expectations of current amenities and space standards, is relatively expensive, whether for purchase or rental. Built at increasing distance from the CBD (the main focus of employment) the journey to work imposes further living costs. It is the perception of the majority of the population that the setting and amenities of suburban life outweigh these costs and the time involved in commuting to work. In addition there is a movement from the old inner city areas to the new suburbs (some of which have developed their own industries, e.g. oil refining at the eastern end of the island) but it is a selective out-migration. It is only the families with higher income that can afford to make this move, thus leaving disadvantaged families residing in the inner city. At the same time the extension of urban development increases the environmental disadvantages of the inner city; atmospheric pollution, traffic congestion, noise and the lack of safe space for children's play areas.

GENERALISATIONS

This study of a sample area -- census tracts 41, 45, 46 and 47 of part of the inner city of Montreal has demonstrated that it does differ from the overall city area, albeit comprising a very small proportion (0.32%) in population of the MMA. It is necessary to consider the extent to which the sample area typifies a wider inner city zone and to attempt to delineate its spatial expression. Since the manifestations of the inner city are related to the cycle of poverty an appropriate measure for this task is *average total income of family head*. For census purposes the City of Montreal is subdivided into 291 census tracts (although data is not recorded for a small number of tracts because they were unpopulated in 1971, e.g. census tract 40: Le Sainte-Hélène Island). However the MMA is subdivided into a total of 915 census tracts, the City of Montreal and many independent municipalities, some of which, e.g. Westmount, are completely encircled by the City. With but one exception (census tract 364 within the municipality of Outremont) all the tracts with a relatively low average total income of family head are to be found within the City of Montreal. It is on this area that we must concentrate if we are to map the extent of the inner city.

33. Draw a scatter/dispersion graph to show the average total income of family head for each census tract of the City of Montreal, representing each point on the graph by the number of the census tract. To simplify the vertical axis of the graph use only the first two

CT	ATI	CT	ATI	CT	ATI	CT	ATI	CT	ATI
1	6843	53	4491	105	9295	157	4962	209	5278
2	6738	54	3805	106	8348	158	5264	210	5613
3	6972	55	14179	107	6433	159	5237	211	5398
4	7045	56	2585	108	13692	160	4588	212	5817
5	6970	57	4361	109	9883	161	3870	213	6035
6	7086	58	3470	110	7369	162	4985	214	5266
7	7059	59	4254	111	8096	163	4375	215	5945
8	7299	60	2490	112	6478	164	4502	216	5039
9	6997	61	2964	113	8938	165	4266	217	5337
10	6501	62	9289	114	17021	166	5085	218	4823
11	7407	63	6255	115	11957	167	4613	219	4745
12	6390	64	8148	116	8073	168	4495	220	4749
13	6866	65	8092	117	6491	169	4608	221	5390
14	5884	66	5696	118	6760	170	4573	222	5296
15	5843	67	4141	119	5656	171	4652	223	5621
16	5879	68	3647	120	8918	172	5434	224	4965
17	6466	69	3888	121	13919	173	5775	225	7459
18	5805	70	4063	122	5714	174	5568	226	6372
19	5361	71	-	123	7171	175	5509	227	5893
20	5332	72	5253	124	6848	176	5374	228	5967
21	6038	73	4711	125	8539	177	5141	229	-
22	5363	74	4908	126	11754	178	5301	230	6090
23	5635	75	4647	127	8513	179	5829	231	5861
24	5576	76	4797	128	22089	180	5460	232	5947
25	5184	77	4373	129	19509	181	5998	233	5293
26	5733	78	4151	130	5647	182	6095	234	5556
27	5190	79	4728	131	5750	183	5515	235	5937
28	5484	80	4451	132	5326	184	6089	236	6213
29	5465	81	5401	133	4872	185	6488	237	5937
30	5911	82	5271	134	4704	186	6091	238	6580
31	6385	83	5337	135	4326	187	6582	239	6140
32	5993	84	4845	136	4619	188	6416	240	5909
33	5484	85	5789	137	4785	189	-	241	5325
34	4733	86	6563	138	4422	190	7930	242	5873
35	5276	87	5606	139	4184	191	8595	243	5628
36	5382	88	6331	140	4878	192	6231	244	5905
37	4702	89	6565	141	5117	193	8030	245	5906
38	4926	90	6701	142	4298	194	6696	246	5544
39	4836	91	-	143	5294	195	9151	247	5652
40	-	92	6406	144	4988	196	9031	248	5620
41	4680	93	5815	145	-	197	6974	249	6552
42	6600	94	5600	146	5568	198	7356	250	6143
43	4545	95	5713	147	5607	199	6421	251	6181
44	4382	96	5724	148	6629	200	6367	252	5904
45	3948	97	6689	149	5464	201	6674	253	6152
46	4119	98	9718	150	5836	202	6599	254	6962
47	4180	99	9098	151	5667	203	6263	255	6213
48	4180	100	8722	152	5650	204	6211	256	6095
49	4594	101	7312	153	6274	205	6503	257	6386
50	4687	102	9830	154	4614	206	6002	258	6153
51	3941	103	10690	155	5468	207	5964	259	6081
52	3878	104	12411	156	5461	208	5817	260	6912

(Fig. 2.33, cont.)

CT	ATI	CT	ATI	CT	ATI	CT	ATI	CT	ATI
261	6396	268	7769	275	6844	282	8219	289	-
262	6186	269	7100	276	6888	283	10763	290	6607
263	5851	270	7648	277	7333	284	11904	291	5611
264	9268	271	7344	278	7041	285	8817		
265	6861	272	7995	279	9755	286	9633		
266	6327	273	6685	280	8538	287	9227		
267	6414	274	6341	281	8866	288	14403		

N.B. City of Montreal Average \$6634
MMA Average \$8005

Fig. 2.33. Average total income \$ of family head (ATI) by census tract (CT) for the City of Montreal, 1971

(Source: 1971 Census of Canada, Census tract bulletin, Montreal Series B Table 3 -- Income distributions)

digits of the income figure, e.g.

census tract	46	\$ 4119
	47	4180
	48	4180
	67	4141
	70	4063

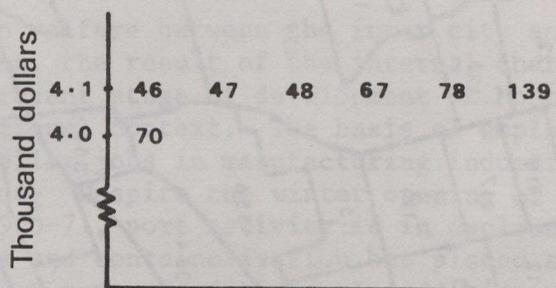
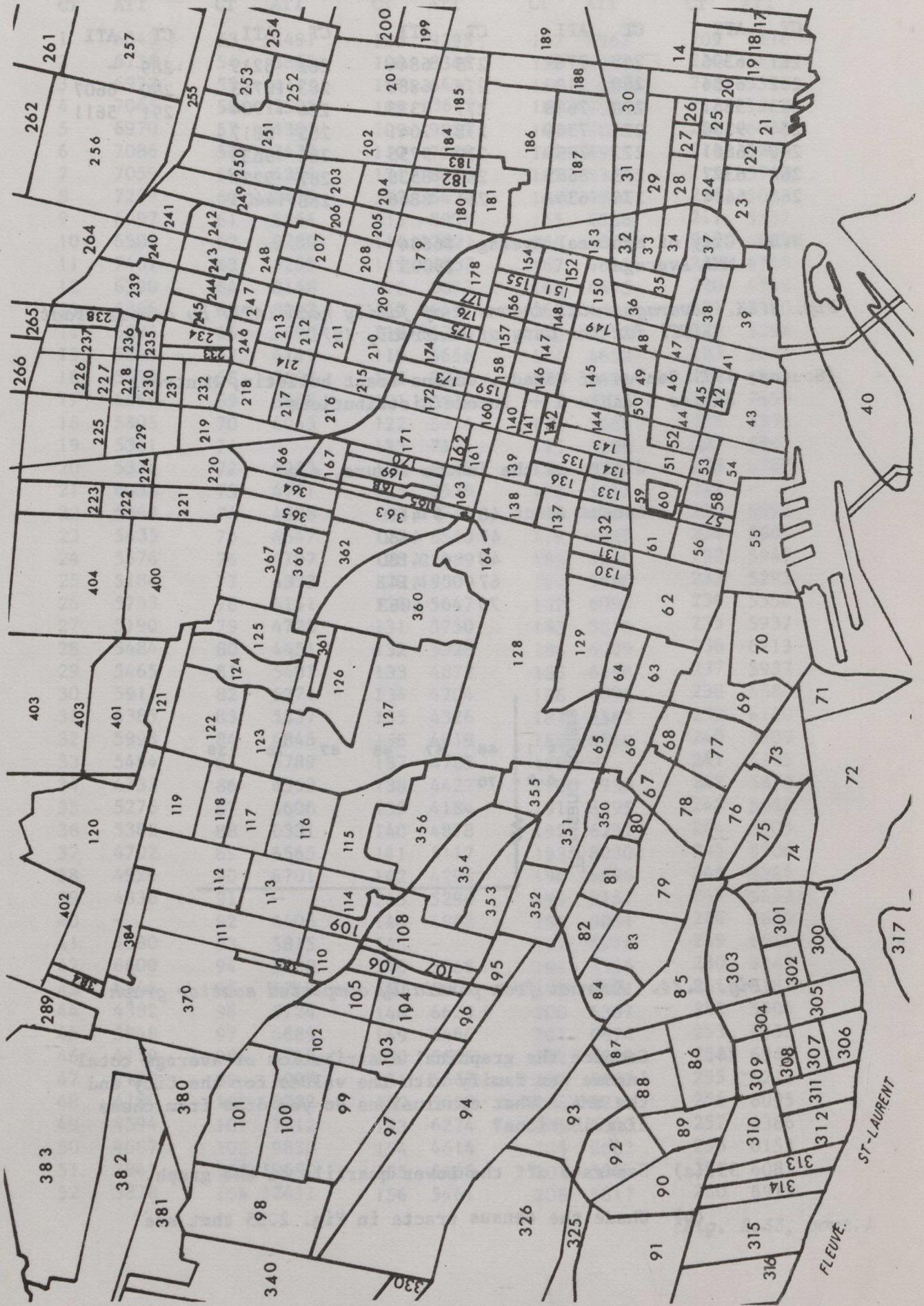


Fig. 2.34. Extract from partially completed scatter graph

34. Compare the graphical distribution of average total income per family with the values for the City and the MMA. What conclusions do you draw from these distributions?
- 35.(a) Separate off the lower quartile on the graph.
- (b) Shade the census tracts in Fig. 2.35 that are

Fig. 2.35. Index map of inner city census tracts, City of Montreal
 (Source: 1971 Census of Canada, Montreal Census tract bulletin index map)



represented in the lower quartile of average total income per family.

- (c) Mark distinctively the CBD as defined in this study.
- (d) Mark distinctively the sample census tracts in this study.

36. Comment upon the completed map, Fig. 2.35, in the light of this entire study. What is the nature of the distributions shown?

CONCLUSIONS

1. Differences between the four census tracts of the study area are small when compared with the Montreal Metropolitan Area.
2. Elements of the cycle of poverty characterising the study area are:
 - (a) poor physical condition of housing
 - (b) low educational background for children
 - (c) limited occupational skills
 - (d) low wages
 - (e) unemployment

However these differences are relative; on a global scale a viewpoint asserting poverty in the Montreal inner city cannot be sustained on such an absolute scale. Nevertheless these inequalities of the inner city compound one another so that the sense of deprivation is greater than the sum of the individual components.

3. The disparity in welfare between the inner city and the rest of Montreal is increasing, the result of the internal character of the inner city and the present stage of development of Montreal within its national and international context. The basis of employment within the inner city -- blue collar jobs in manufacturing industry and the docks is in relative decline. Despite the winter opening of the port of Montreal from the winter of 1970-71, port activity is in decline. The increasing size of bulk carriers and containerisation has placed a premium on deep water ports with a fast turn-round time. In addition, patterns of trading are changing; trade with Europe, especially Britain is in relative decline and the U.S.A. and Asia has increased in importance. The opening of the St. Lawrence Seaway has transferred the head of navigation to Thunder Bay so that many vessels pass through rather than dock at Montreal. Further, manufacturing activity is in decline relative to service occupations in the national economy and the traditional advantages of Montreal for the growth of manufacturing industry are less strong with the westward shift of the centre of gravity of the Canadian market and the reduced reliance on railways. The poorer educational background and fewer occupational skills will make the inner city population more vulnerable to unemployment. Amelioration of conditions is not encouraged by a declining and ageing population.

4. Causal relationships implicit in the cycle of poverty have not been

fully explored. The concept of the inner city might best be defined in terms of the coincident location of indices of disadvantage. This would be a spatial definition and might be expressed as in the following Venn diagram.

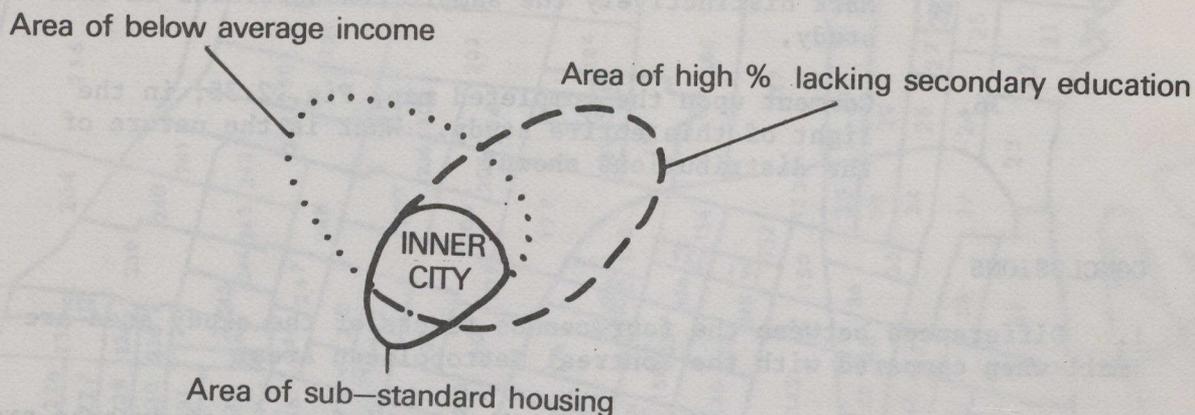


Fig. 2.36. Venn diagram to represent the inner city area of multiple deprivation

5. Analysis of the urban fabric and census data (readily quantifiable) and a comparable basis for all areas has only given us a partial picture. The inner city might be more amenable to definition through the analysis of data that is less readily available. Additional criteria might include school truancy, juvenile delinquency, assault, debt, infant mortality, job instability and welfare payments.

6. The concepts of the inner city, of the cycle of poverty and of multiple deprivation, discussed in this study are applicable to most large cities within the developed world. However, Montreal, one of the oldest established of Canadian cities, is not necessarily typical of other Canadian cities since much of the rest of Canada has been permanently settled for a relatively short period of time.

37. With the aid of all data studied rank the sample census tracts in order of deprivation.
38. With the aid of Census Tract Bulletins A and B (Montreal) attempt a spatial definition of the 'inner city' as suggested in the fourth conclusion above.
39. Discuss the validity of models of urban structure as applied to Montreal.
40. Analyse census data for your nearest major city to ascertain (a) the existence, (b) location, and (c) character, of an 'inner city' area.

MICHAEL HEWITT

3 PINE POINT

LOCATION

This is a study of a modern mining town in the resource frontier of the Mackenzie District of the North West Territories.

1. With the aid of an atlas
 - (a) Construct a sketch map to show the situation of Pine Point, marking the Mackenzie River, Great Slave Lake, Athabasca River and Peace River. (The Slave River flows from the Athabasca Lake into the Great Slave Lake.) Insert Pine Point, Fort Resolution, Yellowknife, Hay River, Fort Smith and the railway line to Pine Point. Add 60°N and the Arctic Circle and indicate the direction of Edmonton. Mark on your map any other features which will help you locate the study area.
 - (b) Measure the direct distance in km from Pine Point to Yellowknife, Edmonton, Vancouver and Toronto. (By comparison the distance from London to Edinburgh is 550km.)

These facts reflect in part the isolation, northness and marginality of this area from the rest of settled Canada. In the early twentieth century Edmonton became the only commercial centre for a large area of Northern Alberta, the Mackenzie River Basin and the Yukon. It has retained and enlarged upon this function and at present is the most important central place for northern development in Canada.

PINE POINT--A RESOURCE FRONTIER TOWN

The following characteristics of population reflect the town's role: (Fig. 3.1).

2. Draw a line graph to show the growth of population of Pine Point for the period 1955-1976. What is the main trend?

1955	20 (approx.)
1963	200 (approx.)
1966	459 (census)
1971	1217 (census)
1974	1451 (estimate)
1976	1915 (census)

Fig. 3.1. Population of Pine Point

(Source: Census of Canada--unpublished--and information supplied by Pine Point Town Council.)

Such a recent growth is typical of many northern towns, e.g.

	1971	1976
Yellowknife	6122	8256
Hay River	2406	3268
Inuvik	2669	3116

Fig. 3.2. Recent population growth of northern towns

(Source: 1976 Census of Canada Vol. 2 Population: Demographic characteristics, Table 2.)

3. What are the percentage increases for these settlements in the period 1971-76? How do they compare with Pine Point?

This growth can also be compared with the population growth in the North West Territories and the Yukon as a whole.

	NWT	Yukon
1951	16,004	9,096
1956	19,313	12,190
1961	22,998	14,628
1966	28,738	14,382
1971	34,805	18,385
1976	42,609	21,836

Fig. 3.3. Population growth of North West Territories and Yukon

(Source: 1976 Census of Canada Vol. 1 Population: Geographic Distributions, Table 1.)

- 4.(a) Compare in percentage terms the growth of population in the North West Territories and the Yukon for the period 1951-76 with that for Pine Point.
- (b) Compare these trends with those depicted in the Cartwright study (Fig. 4.6 and Fig. 4.9).

However, as J. Wreford Watson has written, "much as it fires the imagination, population growth on the frontier bulks very small beside that in the metropolitan communities". Although in percentage terms this growth is rapid, in total it remains very small.

Further characteristics of the population are shown by the age-sex structure for Pine Point.

	1971				1976			
	M	%	F	%	M	%	F	%
0-4	90	7.4	85	7.0	110		130	
5-9	80	6.5	65	5.3	120		110	
10-14	75	6.1	55	4.5	95		80	
15-19	55	4.5	45	3.7	105		85	
20-24	95	7.8	85	7.0	160		100	
25-29	95	7.8	65	5.3	140		110	
30-34	65	5.3	45	3.7	100		70	
35-39	55	4.5	30	2.5	75		55	
40-44	35	2.8	20	1.6	60		35	
45-49	35	2.8	10	0.8	30		20	
50-54	10	0.8	10	0.8	25		10	
55-59	10	0.8	5	0.4	15		15	
60-64	5	0.4	-		10		5	
65-69	-		-		-		-	
70-74	-		-		5		-	
75-79	-		-		5		-	
Total	695	57.2	520	42.7	1085		830	

Fig. 3.4. Age-sex structure, Pine Point 1971, 1976

(Source: 1971, 1976 Census of Canada--unpublished.)

- 5.(a) Construct an age-sex pyramid using percentage total population for Pine Point in 1976.
- (b) What are the main characteristics of the population as shown by the pyramid? What percent of the population are under 15? Are there concentrations in specific age ranges? Does this vary for the sexes? Are there any particular age ranges which appear under represented? Does this vary for the sexes?
- (c) Compare this age-sex pyramid with those for Canada as

a whole (Fig. 1.3), the Prairie Provinces, the Yukon, and the North West Territories (Fig. 6.2).

- (d) What are the main changes in the age-sex distribution that have taken place between 1971 and 1976 in Pine Point? What do the changes in the under-15 age group suggest?
- (e) What is the male/female ratio for Pine Point in 1971 and in 1976?

As Fig. 6.3 demonstrates, currently there are 99 males per 100 females in Canada as a whole. The imbalance shown by Pine Point is typical of many northern resource towns where, in the initial stages of development, migration tends to be sex selective. As development continues more families move in.

The characteristics of rapid population growth, a broadly based age-sex pyramid and an imbalanced male/female ratio reveal the distinctive elements of the demography of Pine Point. The settlement is classed as urban in Canadian terms, having achieved a hamlet status in 1969, village status in 1973 and town status in April 1974.

Pine Point is characteristic of much of the north today and its development should be viewed in the context of Fig. 3.5, a model of mineral resource development in the northlands. In turn this should be compared with the following table (Fig. 3.6) which chronicles the historical development of Pine Point.

- 19thC Fur traders knew of lead and taught Indians how to use it as fishing shot.
- 1898 First mining claims staked in the area--search for gold and silver prompted by the Klondike gold rush--only minute amounts found in lead/zinc deposits.
- 1899 Deposits of lead/zinc reported by Dr. Robert Bell, Director of Geological Survey of Canada.
- 1914 Report to Geological Survey by Dr. Camsell on lead/zinc deposits.
- 1920 Claims staked to the lead/zinc ores.
- 1926 Cominco (Consolidated Mining and Smelting Co.) became interested in exploration of Pine Point area.
- 1928 Drilling exploration programme by Atlas Exploration Co.
- 1929 Cominco/Atlas join forces but discover only limited deposits.
- 1930-48 Cominco maintains claims in Pine Point area.
- 1948 Cominco renews investigations by drilling.

- 1955 Ore body of 5 million tons (4% lead/7% zinc) confirmed. Development of ore will require transport and power.
- 1961 'Roads to Resources' Federal Government programme permits building of Great Slave Lake Railway so that Cominco can bring the mine into operation. Northern Canada Power Commission agrees to build 18,000kw plant on Taltson River to supply power to Pine Point.
- 1962 Railway construction begins.
- 1963 Townsite laid out in collaboration with Department of Northern Affairs. Ore stripping begins for opencast mining.
- 1964 Railway reaches Pine Point.
- 1965 Power plant completed, together with concentrator for lead/zinc ore (5000 tons per day capacity). First ore shipped to Trail (British Columbia) smelter with local lead and zinc ores at Kimberley (Cominco operated) approaching exhaustion. Mining interest in Pine Point area generates a major claim staking rush. Late in year Pyramid Mining Company find a major ore body to south-east of Cominco claim.
- 1966 Cominco take over Pyramid Mining Company.
- 1970-4 Feasibility study undertaken of underground mining.
- 1975 Underground mining starts. Population exceeds 1800.

Fig. 3.6. Historical development of Pine Point

(Source: Pine Point Town Guide.)

- 6.(a) Compare Figs. 3.5 and 3.6. What time period elapsed from the ore discovery to the decision to mine? How long was the actual development period?
- (b) What other factors may influence the model of development?

The long time span from the discovery of the ores to their development contrasts markedly with the subsequently rapid population growth. But development requires a massive investment in terms of basic infrastructure in an isolated area and a difficult environment. The development of Pine Point can further be placed in the context of the historical development of the northlands shown in Fig. 3.7.

Pine Point is typical of recent planned growth in the North West Territories and can be compared with Inuvik and Yellowknife. It should be contrasted with Dawson City, a classic example of a "boom" and "bust" mining cycle, which arose out of the Yukon wilderness in 1898 to become, in two years, a bustling city of 40,000 only to fade quickly into a

Fig. 3.7. Historical development in the northlands

	1850	1900	1950	1980
PEOPLE	Native Indians Eskimos (Inuit) Fur Traders Missionaries Male/Female Imbalance in Immigrant Population Decreases	Govt. Officials RCMP Prospectors		Miners
ECONOMY	Subsistence Hunting/ Gathering/Fishing Commercial Fur Trade	Geological Exploration and Resource Evaluation Drilling Precious Minerals (Low Bulk) Local Forestry	Semi-Precious Minerals High Bulk Metals Defence Establishments	
SETTLEMENT	Few Permanent Largely Nomadic	Hudson's Bay Stores RCMP Posts Log Cabins	Hamlets Company Towns Imported Building Materials	Permanent Indian Settlements Planned Mining Camps/Towns Defence (Dew Line) Pre-fabricated Houses/ Trailer Units
COMMUNICATIONS	LAND Indian Trails Horse/Sleigh WATER Birch Bark Canoe AIR	Winter Roads Pack Horse/Ox/Mule Aluminium Canoe	Tracked Vehicles Snocats Landrovers, Jeeps, Lorries Resource Railway Barge & Tug Hovercraft	Surfaced Roads (All Weather) Airstrips Jet Aircraft Radio Local Telephone Satellite Microwave
ENERGY	Wood	Imported Oil & Paraffin Diesel Generators	Local Water Power HEP	Power Lines
AGRICULTURE	None	Missionary Gardens	Reindeer	Market Gardening

ghost town when the initial rich placer-gold discoveries were exhausted.

The early investor sought to combat high costs by providing only bare, essential living facilities for an all-male workforce. Town sites were clustered close to headframes or sluice boxes. Such primitive conditions could not last for long following the movement of women into the resource frontier. Company towns began to appear; settlements established, operated and controlled by the company owning the surrounding mineral rights. However, companies planned towns with a view to the maximum return on investment. Employees were frequently crowded into sub-standard rental accommodation in settlements lacking aesthetic appeal. Recreation halls were provided by the company but these were minimal and the total impact of such towns was one of drab, unexciting, uniformity. Such company towns obviously suffered many problems. Pine Point is an example of a modern planned mining community known as an "open town". It is a co-operative development between the mine company, Pine Point Mines Ltd., and the Federal and Territorial Governments. Consequently the town is free of one of the major problems faced in the planning of northern mining towns: a relatively short life-span which requires rapid recovery of all capital expenditure.

This study shows the problems of establishing a mining operation and new town in an environmentally difficult area as well as its characteristics, particularly those of population.

THE LOCAL ENVIRONMENT

The local environment exerted both positive and negative influences upon the development of Pine Point.

(i) The uninhabited frontier

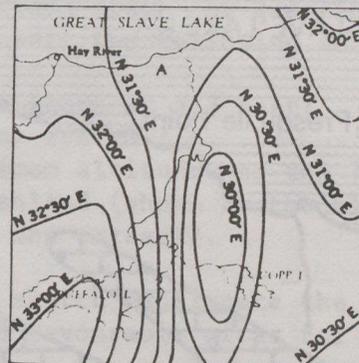
7. Examine Slide 3A, an extract from sheet 85B (second edition), Buffalo Lake topographic map. Locate all the place names incorporated into the map. Where are the majority of names to be found? Can you suggest a reason for the distribution shown?

Most of the named features are on the shores of the Great Slave Lake. Historically the shoreline has been the most accessible area with regard to ease of transport. There are few other named features on the map. The map itself presents further problems. It is at a scale of 1:250,000. It was originally drawn and compiled, largely from aerial survey, between 1956 and 1959. Interim corrections were made in 1967. This map is the most up to date available, but the scale and the date of compilation present difficulties for land-based activities in a landscape where there are few distinctive features.

Movement over the land is complicated by the problem of magnetic variation or declination. This is the angle, at any point on the earth's surface, between the magnetic needle of a compass and True North expressed in degrees E. and W. of True North. This variation is more marked as one moves further north. To cope with this special problem a map (Fig. 3.8) is incorporated within the topographic map key showing

the declination of the compass needle together with decreasing value. The variation obviously complicates land and air navigation so that this information is particularly valuable in an area where there are few easily recognisable landmarks.

DECLINATION OF THE COMPASS NEEDLE, 1958



The declination of the compass needle at any place along a red line is the declination given on that red line. At other places the declination is between those given on the neighbouring red lines; thus at the place marked A, the declination is between N. 31°00' E. and N. 31°30' E. The easterly declinations of the compass needle are decreasing 7.5 minutes annually.

Fig. 3.8. Declination of the compass needle, 1958, for area represented by Buffalo Lake topographic map

(Source: Sheet 85B.)

8. As a member of a team of planning consultants suggest a list of requirements for a town and mine to be built in this frontier region. You might consider unfavourable circumstances it would be advisable to avoid as well as positive attributes sought for the site.

(ii) Geology

The solid geology derives from the Middle Devonian period, and comprises mainly limestones and shales which are little disturbed. In these deposits are found the coarse crystalline dolomite from which the lead/zinc ores are mined (Fig. 3.9). The strata dip gently to the south-west. The dolomite forms a ribbon 36km long, 7-8km wide and 130m thick. The percentage content of the ore body varies but averages 4.5% lead and 7.8% zinc with traces of gold, silver and cadmium.

Pleistocene deposits of sands and gravel are superficial to the ore deposits which are therefore not readily apparent at the surface. To reveal the solid geology cut lines were excavated. The cut lines depicted on the map (Slide 3A) are also revealed on the aerial photograph (Slide 3B) and are the result of geological survey work carried out over a number of years by Cominco and the Geological Survey of Canada. Lines

are cut through the forest and the overlying sand and gravel is removed. It is along these lines that drilling is carried out. These cut lines stand out because of their regularity and will remain as a feature of the environment for many years.

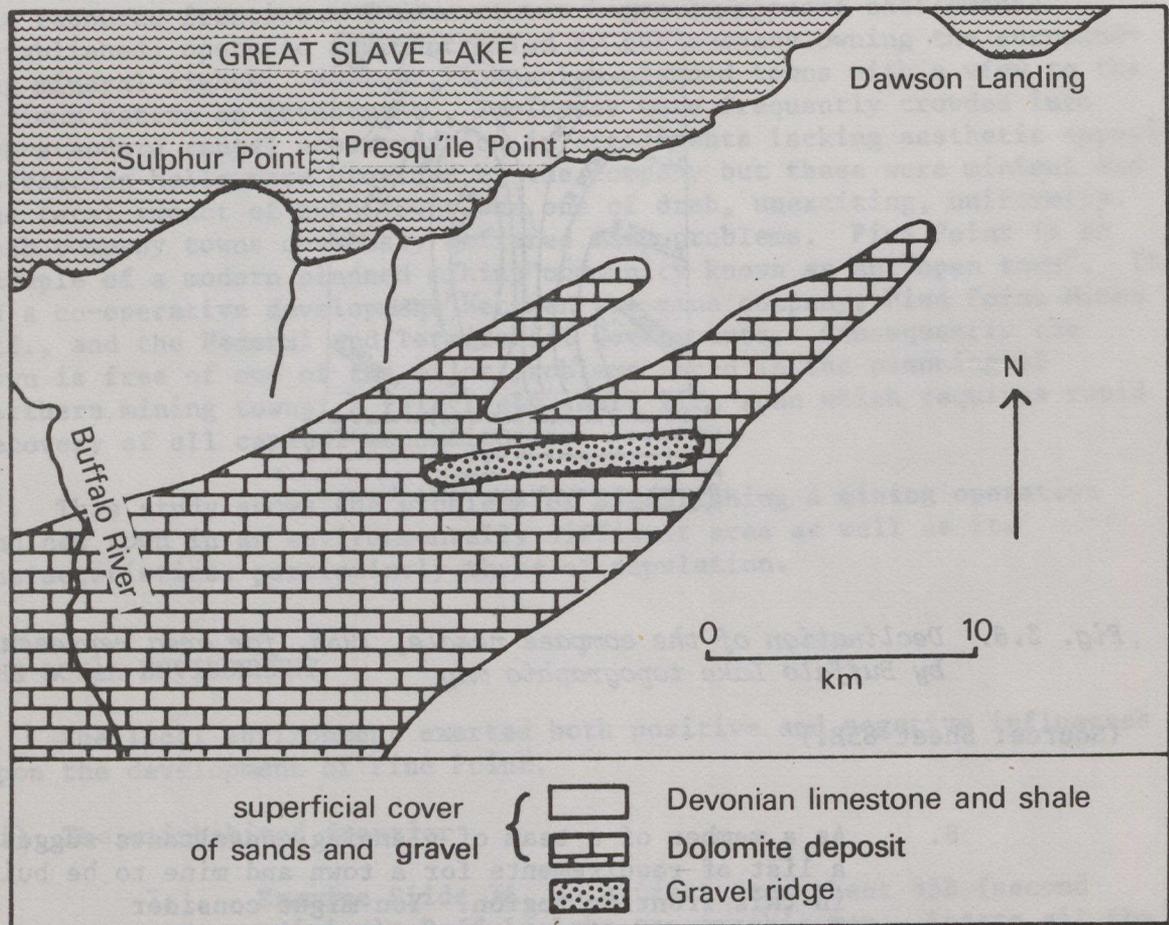


Fig. 3.9. Geology map of Pine Point area

9. Draw a frame 14cm x 21cm to represent the area shown by Slide 3A. Insert the area of 'cut lines' to illustrate the location of the lead/zinc ore body.

By 1955 the area of the ore body had been delimited and a decision to mine had been taken although a number of important developments were necessary before ore could be marketed.

(iii) Geomorphology and drainage

This area is part of the interior plains of Canada, known locally as the Great Slave Lake plain, sloping gently down to the southern shore of the lake. Its continuity is broken in places by rivers, which feed the Mackenzie River via the Great Slave Lake, cutting down to base level as

Precipitation: total, 319.8mm
rainfall, April-October (43 days) 184.4mm
snowfall, Sept.-May (53 days) 1353.8mm
Wind: average 6.2 knots, prevailing north easterly
Hours of daylight: March 11.8; June 18.6; September 12.9;
December 6.1 (hours). Between 26 April and
22 August there is a semblance of almost
continual day. At midnight on 21st June it is
still light. On 21st December the sun rises
soon after 0900 and sets by 1500 hours. Given
the weather conditions at this time of year,
the daylight period can seem much shorter.

Pine Point is within the zone of discontinuous permafrost and is near the southern boundary of widespread permafrost. The surface ground is frozen for between four and five months, and at depth for much longer, with consequent effects upon drainage. The rivers are completely frozen from mid-November until mid-May, while the Great Slave Lake is frozen for four months.

- 12.(a) Describe the weather conditions likely to be experienced during residence at Pine Point for a full year.
- (b) Suggest how man's activities are limited by climate.
- (c) What are the beneficial effects of the winter climate?

(vi) Townsite

The town is located in the north-east corner of the ore field where the ore is closest to the surface and is sited on a flat-topped gravel ridge (Fig. 3.9). This allows easy excavation for the underground

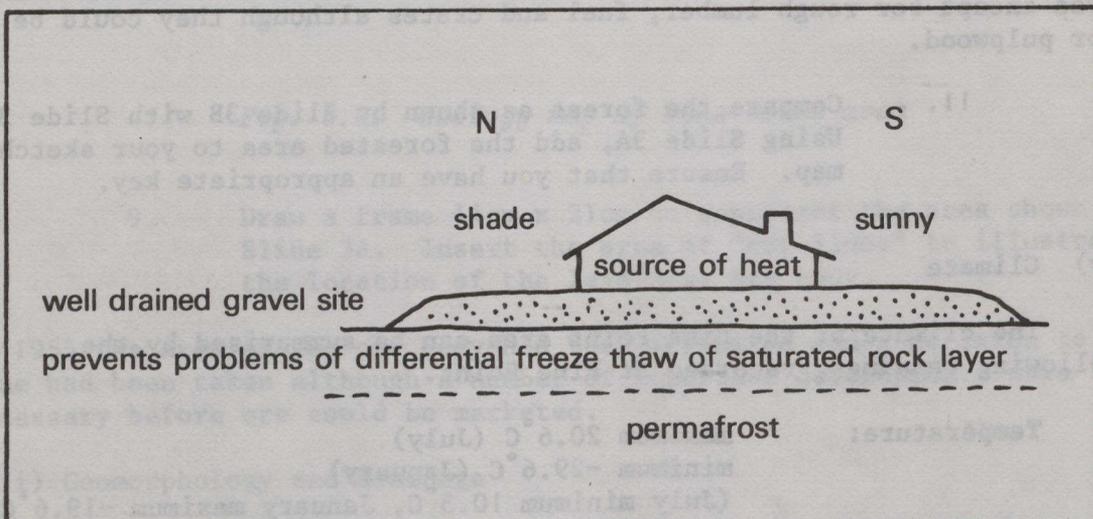


Fig. 3.10. Building on frozen ground

installation of water and sewer lines, a technical advantage not available at an alternative site on the limestone 6km to the north. The sandy gravel ridge is well drained and affords protection from frost heave associated with frozen ground.

On the topographic map (Slide 3A), Pine Point can be placed immediately north of the word Pine in Pine Point (west of easting 64) with the mine located to the north-east where the dolomite is close to the surface. The mine and the town were purposely separated to avoid the problems that occurred in many of the earlier mining camps and settlements of the north.

(vii) Transport and power

The means of exporting the ore and the power for operating both a mine and town were crucial factors on which the decision to develop Pine Point were dependent.

Access to the mining site before the 1950s was largely by canoe on the Great Slave Lake during the summer months. During winter, the winter road, a route cut through the forest, originally for pack horses and later for tracked vehicles was used. This seasonal route avoids most of the muskeg but the softness of the poorly drained soils means that the road is unable to support heavily laden vehicles in summer, whereas in winter the packed snow and ice bridges over lakes and rivers provide a firm surface as well as an even grade. Following the decision to develop the mine, building materials were barged in from Hay River to Dawson Landing, materials which had in turn been brought to Hay River by road (the Mackenzie Highway from Alberta). From Dawson Landing an all-weather road (shown as a red dashed line in Slide 3A) had been constructed to Pine Point. An all-weather road is one made of gravel, well drained and constructed to avoid slumping and icing commonly associated with permafrost regions. Access to the mine site was also made possible by air when an airstrip was carved out of the forest in the early 1950s. The airstrip has since been improved and enlarged. It too has a gravel surface 1000m x 30m and can take light aircraft

The following information is issued to all road travellers entering the North West Territories on the Mackenzie Highway at the Sixtieth Parallel Visitor Information Office or upon hiring a vehicle within the North West Territories:

"Whether you are travelling in the winter or the summer, you should take several precautions before travelling on NWT Highways. It is advisable to put a protection pad on your gas tank and to cover your headlights with plastic rock protectors. You should carry a tow rope or chain, at least one spare tire, an axe and matches, tools, first aid kit, extra gas, oil, fan belt and fuses and some extra food such as chocolate bars, canned goods, hard fruit. Summer travellers should carry bug repellent and water. For winter travel a snow shovel is recommended, as is a parka, mitts or gloves, warm up or ski pants and a sleeping bag for each person in the car. Cars and trailers must be in proper condition with all fluids topped up, tires at recommended pressures and loose wires or connections fastened securely to

prevent trailing on the gravel. Trailer loads must be properly balanced. We recommend that a piece of half inch plywood be screwed to the lower front of trailers to prevent damage from flying gravel. If your vehicle requires parts or tires that are normally hard to find, carry additional spares with you. Should there be any periods of prolonged or heavy rain you are advised to check with the Sixtieth Parallel Visitor Information Office, RCMP or any Highways Division Office to determine highway conditions."

(Source: Arctic Road Map, published 1975/6 for the Tourist Association of the North West Territories.)

The section of the Mackenzie Highway from Alberta to Hay River is an all-weather gravel road completed in the late 1950s as part of the "Roads to Resources" programme and an all-weather road from Hay River to Pine Point was completed in 1965 (shown on the map of Slide 3A as a purple dashed line). There is no real significance in the use of different colours, merely that the later road was an overprint made in 1967 on the original map. This all-weather gravel road has since been extended to Fort Smith (Highway 5) and Fort Resolution (Highway 6).

The railway line (shown by Slide 3A as +---+ parallel to Route 6) allows the export of the lead/zinc concentrate. This single track railway was built from Grimshaw, in the Peace River Valley on the North Alberta Railway, to Hay River, a distance of 540km with a branch line 86km to Pine Point. The cost of the line was \$75m or about \$123,000 per km. The line was funded by the Federal Government, and Pine Point Mines Ltd. is repaying part of the cost. Construction started in 1962 and the line was completed in 1966. The building of the line was eased by the fact that it traverses gentle slopes, was located close to the Mackenzie Highway with access for construction work, and links the Mackenzie barge system to the transcontinental railway system without the need for a break of bulk at Fort Smith on the Slave River. The impact of the railway line on northern development is therefore wider than the Pine Point mine. The line will serve areas adjacent to its route and with the Hay River water terminus will partially serve the Mackenzie valley and Western Arctic. The branch line to Pine Point is primarily used for the export of the lead/zinc concentrate, there being neither passenger nor general freight transport facilities. At present there are three trains a week to and from the mine.

Within the town a local bus service operates to take the mine employees to the various working centres. There is also a bus service for senior school students to Hay River. A daily bus service operated by NWT Coach lines links Pine Point to Hay River and Fort Resolution. The airstrip has regular services to Hay River (20 minute flight) and Yellowknife by light aircraft and has the additional facility of an air taxi. Internal Canadian flights can be made from Yellowknife. Although the range of public transport may seem inadequate by some standards, in northern terms, Pine Point is very well served.

- 13.(a) With the aid of an atlas construct a sketch map of Canada to show the railway lines which extend north of latitude 54°N.

- (b) Annotate each line to show its date of construction, the main freight transported (differentiate between northern and southern flows) and links with the main Canadian railway network and southern markets.
- (c) How does the pattern of railway lines fit into the Taaffe-Morrill-Gould model of transport development?
- (d) Summarise the broad physical problems that man has faced in the development of transport within the Pine Point area.
- (e) 'The real constraints on the development of transport are economic rather than physical.' Discuss.

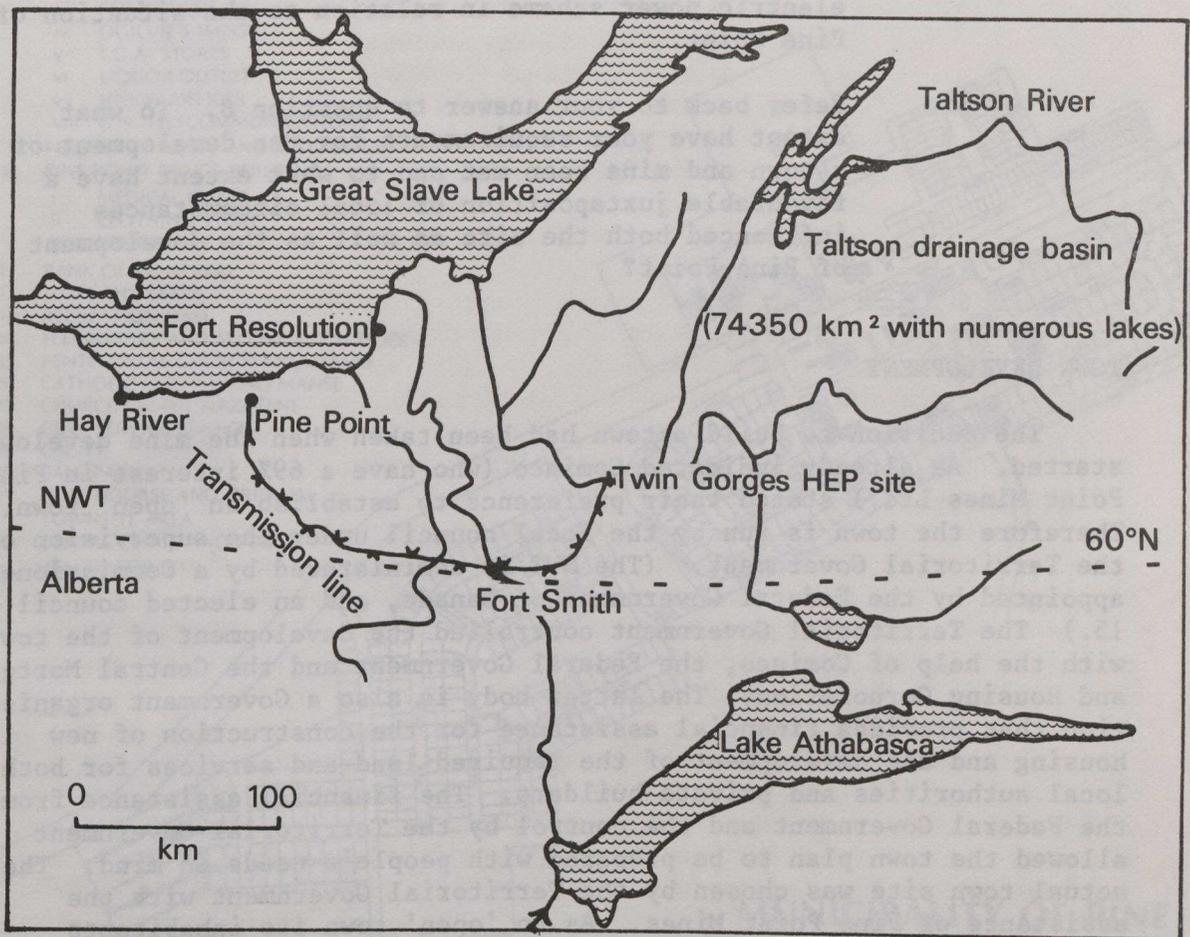


Fig. 3.11. The provision of hydro-electric power for Pine Point

The provision of cheap power was a problem related largely to the mine and mill where the lead/zinc ore has to be concentrated before export. Many northern towns generate power from diesel generators (at some cost) but the mill required far more power than could be economically provided by generators. The Northern Canada Power

Commission was approached by Cominco with a view to the development of HEP. The commission selected the Taltson River basin and Twin Gorges as the best site, 240km SE of Pine Point and 65km north of Fort Smith (Fig. 3.11). The site of the dam was reached by a new road and 25,000hp turbines were installed to produce 18,000kw (18mw). A transmission line, 275km long, was built to Pine Point via Fort Smith. The transmission line (approximate position) is shown on the map (Slide 3A) approaching from the south. For much of its length it parallels the road from Pine Point to Fort Smith, which made construction access much easier. The dam and generating station cost \$6m with a further \$3m for the transmission line and substations. Capital costs will be partly repaid by Pine Point Mines Ltd. over a 40-year period. Power costs at Fort Smith (previously diesel powered) have been reduced by at least one-third. There are plans to expand the transmission line to Hay River.

14. Assess the advantages of the Twin Gorges hydro-electric power scheme in relation to the situation of Pine Point.
15. Refer back to your answer to question 8. To what extent have your requirements for the development of a town and mine been met and to what extent have a favourable juxtaposition of local circumstances influenced both the site as well as the development of Pine Point?

TOWN DEVELOPMENT

The decision to build a town had been taken when the mine development started. As already indicated Cominco (who have a 69% interest in Pine Point Mines Ltd.) stated their preference to establish an 'open' town. Therefore the town is run by the local council under the supervision of the Territorial Government. (The NWT is administered by a Commissioner, appointed by the Federal Government of Canada, and an elected council of 15.) The Territorial Government controlled the development of the town with the help of Cominco, the Federal Government and the Central Mortgage and Housing Corporation. The latter body is also a Government organisation that provides financial assistance for the construction of new housing and the development of the required land and services for both local authorities and private builders. The financial assistance from the Federal Government and the control by the Territorial Government allowed the town plan to be prepared with people's needs in mind. The actual town site was chosen by the Territorial Government with the assistance of Pine Point Mines. As an 'open' town its inhabitants participate in democratic local government, and the assured life of the mine should provide an adequate tax base for financing municipal affairs.

In February 1963 a 'development area' of 15 miles around the townsite was established by the Commissioner of the NWT, to prohibit squatters who are frequently attracted to new construction projects. The Territorial Government then appointed Pine Point Mines to be its construction agent. Construction goods were shipped in during the winter and building began during the short 'open season' in the summer of 1963. All land was brought under control of the Crown and building permits were

issued as required. Building continued during the 'open seasons' of 1964 and 1965.

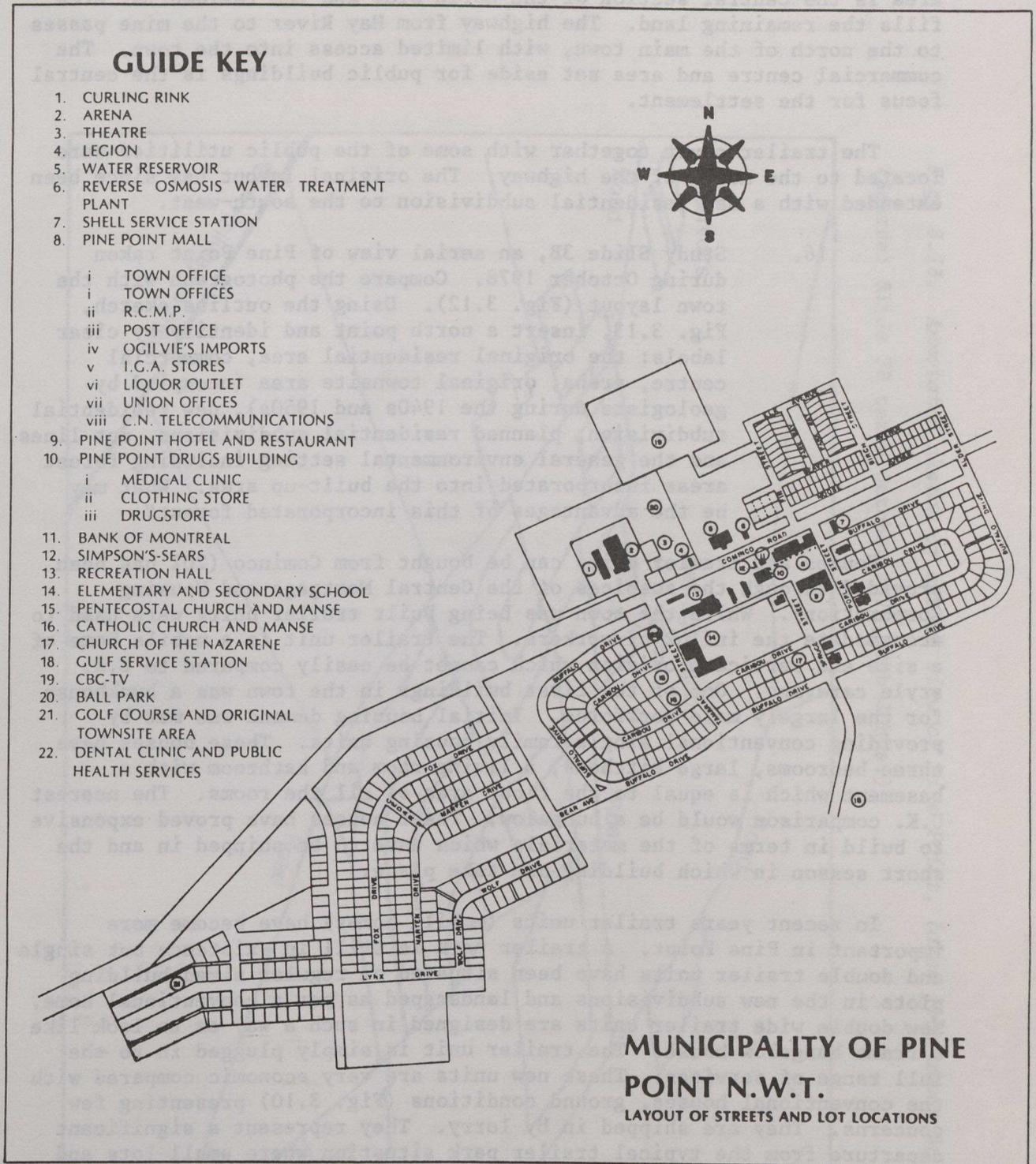


Fig. 3.12. Layout of streets and lot locations

(Source: Pine Point Town Guide.)

The original town layout is roughly similar in shape to an elongated oval football stadium trending almost due east-west (Fig. 3.12). This shape is picked out by Buffalo Drive and Caribou Drive. The commercial area is the central section of the north side and the residential area fills the remaining land. The highway from Hay River to the mine passes to the north of the main town, with limited access into the town. The commercial centre and area set aside for public buildings is the central focus for the settlement.

The trailer court together with some of the public utilities were located to the north of the highway. The original layout has since been extended with a new residential subdivision to the south-west.

16. Study Slide 3B, an aerial view of Pine Point taken during October 1978. Compare the photograph with the town layout (Fig. 3.12). Using the outline sketch, Fig. 3.13, insert a north point and identify by clear labels: the original residential area, commercial centre, arena, original townsite area (occupied by geologists during the 1940s and 1950s), new residential subdivision, planned residential subdivisions, cut lines, and the general environmental setting including forest areas incorporated into the built-up area. What may be the advantages of this incorporated forest?

Houses and trailer units can be bought from Cominco (20% has been provided through the auspices of the Central Mortgage and Housing Corporation). While the town was being built trailer units were used to accommodate the influx of workers. The trailer unit is a mobile home of a size and service provision which cannot be easily compared to U.K. style caravans. One of the first buildings in the town was a bunkhouse for the largely male workforce. Initial housing demand was met by providing conventional single family housing units. These houses have three bedrooms, large kitchens, a living room and bathroom with a basement which is equal to the floor area of all the rooms. The nearest U.K. comparison would be a bungalow. These houses have proved expensive to build in terms of the materials which have to be shipped in and the short season in which building can take place.

In recent years trailer units (mobile homes) have become more important in Pine Point. A trailer park is still in existence but single and double trailer units have been situated on regular sized building plots in the new subdivisions and landscaped as per a conventional home. New double wide trailer units are designed in such a way as to look like a frame bungalow house. The trailer unit is simply plugged in to the full range of services. These new units are very economic compared with the conventional houses, ground conditions (Fig. 3.10) presenting few concerns. They are shipped in by lorry. They represent a significant departure from the typical trailer park situation where small lots and poor landscaping detract from the aesthetics of the subdivision.

The first residential area around the commercial centre consists of conventional houses while in the south-west subdivision and the new subdivisions the majority of plots are occupied by mobile homes.

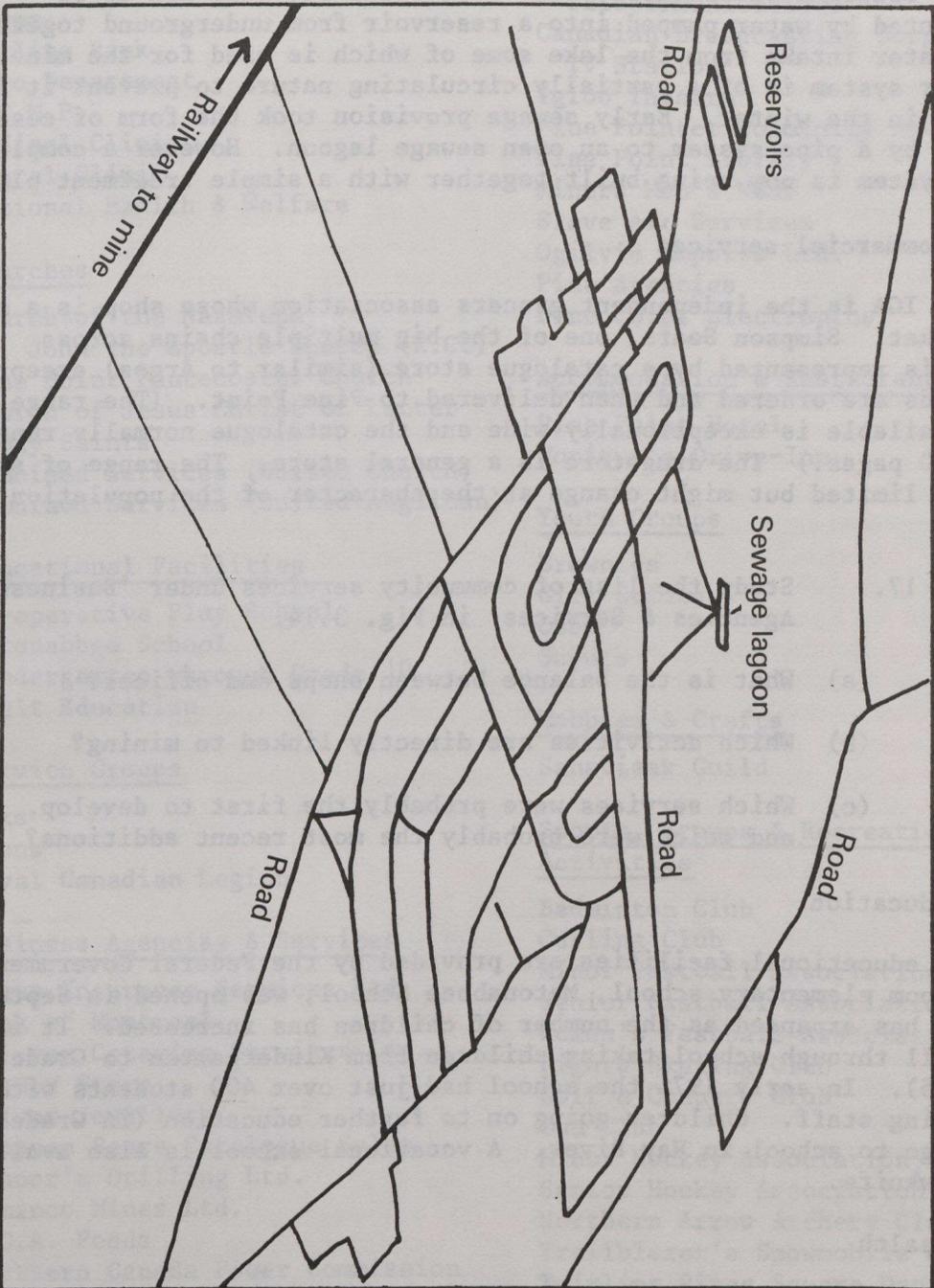


Fig. 3.13. Annotated sketch of aerial view of Pine Point, taken from about 300m
(Source: Slide 3B taken October 1978, Bob Johns.)

SERVICE PROVISION

This is readily summarised in the town guide (Fig. 3.14).

Essential services such as street lighting, water treatment and mains, sewers and sewage lagoon were provided by the Territorial Government.

The original water supply came from wells but this had to be supplemented by water pumped into a reservoir from underground together with a water intake from the lake some of which is used for the mine. The water system is of a partially circulating nature to prevent it from freezing in the winter. Early sewage provision took the form of cesspits followed by a pipe system to an open sewage lagoon. However a complete sewage system is now being built together with a simple treatment plant.

(i) Commercial services

The IGA is the independent grocers association whose shop is a mini-supermarket. Simpson Sears, one of the big multiple chains across Canada, is represented by a catalogue store (similar to Argos) except that goods are ordered and then delivered to Pine Point. (The range of goods available is exceptionally wide and the catalogue normally runs to over 1000 pages.) The drugstore is a general store. The range of shops is still limited but might change as the character of the population changes.

17. Study the list of community services under 'Business Agencies & Services' in Fig. 3.14.

- (a) What is the balance between shops and offices?
- (b) Which activities are directly linked to mining?
- (c) Which services were probably the first to develop, and which were probably the most recent additions?

(ii) Education

The educational facilities are provided by the Federal Government. A four-room elementary school, Matonabee School, was opened in September 1965 and has expanded as the number of children has increased. It is now an all through school taking children from Kindergarten to Grade 10 (age 5-15). In early 1976 the school had just over 400 students with 20 teaching staff. Children going on to further education (in Grades 11 and 12) go to school in Hay River. A vocational school is also available in Yellowknife.

(iii) Health

There is no hospital in Pine Point, although one was originally planned. The cost of providing a hospital was considered too great although one may still be provided in the future. The medical and dental clinics are staffed by nurses while doctors and dentists visit from Hay River almost daily. Most of the medical facilities are provided free for

Town Services

Town Office
Works Department
Recreation Director
Municipal Parks Board
Recreation Association
Arena
Curling Rink
Fire Department
R.C.M.P.
Medical Clinic
Dental Clinic
National Health & Welfare

Churches

Church of the Nazarene
St. John the Apostle Church (R.C.)
Pine Point Pentecostal Church
Church of Jesus Christ of Latter
Day Saints
Combined Services (United Church)
Combined Services (United-Anglican)

Educational Facilities

Co-operative Play School
Matonabee School
Kindergarten through Grade 10
Adult Education

Service Groups

Elks
Lions
Royal Canadian Legion

Business Agencies & Services

Argus Insurance Services Ltd.
Bank of Montreal
Cal-van Catering Services Ltd.
Liquor Store
Calver Jewellers
Simpson Sears Catalogue Sales
Connor's Drilling Ltd.
Cominco Mines Ltd.
I.G.A. Foods
Northern Canada Power Commission

Pacific Western Trucking Division
Pine Point Drugs
Shell Service Station
Gulf Service Station
Pine Point Taxi
Canadian National
Telecommunications
Canadian Broadcasting Corp.
TV Station
Igloo Theatre
Pine Pointer Community Newspaper
Pine Point Library
Miners Men's Wear
Slave Air Services
Ogilvie Imports Ltd.
Pine Agencies
Pine Point Electronics

Accommodation & Restaurant

Pine Point Hotel
Monique's Drive-Inn

Youth Groups

Brownies
Girl Guides
Cubs
Scouts

Hobbies & Crafts

Sanavisak Guild

Sports, Groups & Recreational Activities

Badminton Club
Curling Club
Minor Fastball Association
Senior Fastball Association
Women's Fastball Association
Figure Skating Club
Golf & Country Club
Gun Club
Minor Hockey Association
Senior Hockey Association
Northern Arrow Archery Club
Trailblazer's Snowmobile Club
Twirling Pines Square Dance Club

Fig. 3.14. Community services in Pine Point

(Source: Pine Point Town Guide.)

Cominco workers and their families. The main hospital services are provided in Hay River.

(iv) Leisure

18. Study Fig. 3.14. Comment upon the range of recreational facilities available and list those which are (i) environmentally linked and (ii) pioneer linked.

Problems of environment and isolation mean that recreational provision is impressive and extensive. Much of this investment has been provided by Cominco. The town has a recreation director who runs the Recreation Association embracing all facets of recreation in Pine Point. The recreation hall complex has a large auditorium used for banquets, dances and classes. Under the same roof is the public library, Sanwasak Guild (the craft centre), and the summer swimming pool. The Arena sports complex contains a full hockey rink with seating for 500 spectators. This rink is also used for curling and skating. A meeting room is available for clubs and public meetings. The town provides a nine-hole golf course, a wooded hill park for summer picnics and winter tobogganing and a summer 'beach' at Polar Lake to the north of the town. The school gymnasium is also used by the town people. Radio and TV are available in Pine Point. CBC Radio is based at Yellowknife and the CBC TV National Service is beamed from Vancouver with some local programming.

Church life is well established in Pine Point. This has been encouraged by Cominco since the Church represents an important stabilising factor within the community. The United Church comprises Methodists, Presbyterians and Congregationalists and are very close to the Anglican Church. The Roman Catholic Church is represented through the influence of the Irish and Scottish and Eastern European migrants. The Pentecostal and Church of Nazarene are non-conformist churches which are strong in the rural areas of the Prairie Provinces.

(v) Communications

Canadian National Telecommunications, under a franchise agreement with the Territorial Government, installed a 50-outlet dial telephone system in 1964. This was connected by land line to the microwave terminus at Hay River. A microwave tower has now been installed at Pine Point providing more efficient direct dialling to most parts of Canada. The microwave towers and radio 'dishes' are an important feature of northern towns. Conventional land lines are very expensive considering the distances involved.

(vi) Conclusion

To obtain a wide selection of commercial services a resident of Pine Point must visit either Yellowknife or Edmonton. The cost factor in this travel is high.

19. Calculate the cost of a return journey by car to Yellowknife and Edmonton assuming a cost of 60p per

gallon of petrol and an average consumption of 20 miles per gallon.

Petrol is more expensive the further north one goes (even though Pine Point is close to oil rich Alberta). Air travel is also expensive but widely used since it offers an important time saving (1 hour to Yellowknife and 3 hours to Edmonton).

The range of services provided in Pine Point is fairly typical of a modern mining town in the resource frontier. Such services would not be found in some of the older mining settlements or the native settlements (where the only service may be a Hudson Bay store). In particular the range of recreational facilities is untypical but in the case of Pine Point shows the interest of Cominco in providing for its workers. The planning and provision of services will ensure that Pine Point will have a longer 'life' than many of the early mining settlements in the north.

POPULATION CHARACTERISTICS

The analysis of the development of Pine Point shows a number of distinctive elements associated with a town located in the frontier region. Fig. 3.15 is an attempt to illustrate the evolving population characteristics associated with rapid growth of new towns in the north. It should be viewed in the context of resource and transport development and cannot be related to newly developed native settlements. By using census data, this section aims to see how Pine Point fits into the suggested general pattern.

Fig. 3.1 shows the rapid growth in population which can be regarded as typical of most new northern resource towns, whilst Fig. 3.4 demonstrates the town's distinctive age-sex structure. The marital status of the population underlines the sex structure of the population.

(i) Marital Status

	Total	Single	Married	Widowed	Divorced	Separated
Total	1230	345	840	15	15	20
Male	715	280	420	0	10	15
Female	515	70	415	10	0	5

Fig. 3.16. Marital status (population 15 years and over) 1976, 003/004 enumeration area (nearest approximation to Pine Point)

(Source: 1976 Census of Canada, unpublished data.)

20.(a) What is the proportion of single to married people?

(b) What is the proportion of single males and of females as

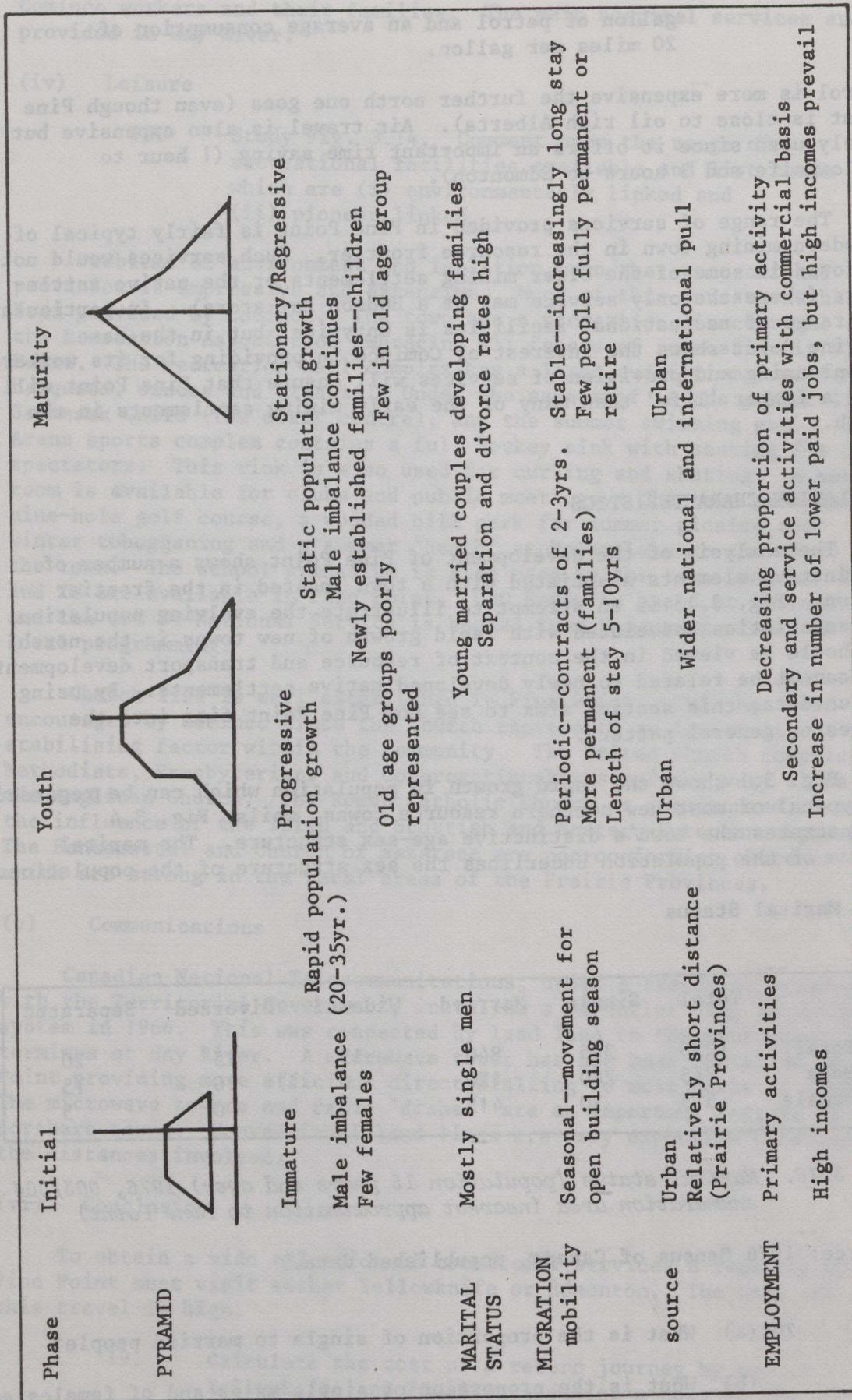


Fig. 3.15. Population characteristics associated with new towns in the Canadian north

a percentage of the total and suggest reasons for this?

- (c) What percentage are divorced or separated? Suggest reasons why this may be a significant feature of the northern population.

N.B. As referred to in the previous study (Montreal), where the number of people enumerated is relatively small, all figures are subjected to a confidentiality procedure.

Married people or those with families are not attracted in the early stages of development partly because of the facilities available. The single man in the 20-35 age group, economically the most active, therefore forms a distinctive element of the population. As development continues more married men arrive, followed by families which creates a progressive type age-sex structure. Divorce and separation are a characteristic feature of northern development partially induced by the psychological problems of living in a difficult environment. Fig. 3.16 does not, however, suggest that divorce and separation is unduly common. A study of the migration pattern reveals why this characteristic is not directly evident.

(ii) Mobility of labour

	1971	1976
Total Population (15yrs. and over)	1065	1230
Non-migrant (since 1966 and 1971 respectively)	180	455
Migrants (same province--NWT)	130	80
Migrants (different province)	620	620
Migrants (from outside Canada)	85	60
Residence not stated	50	20

Fig. 3.17. Migration to Pine Point 1971 and 1976 (003/004 enumeration area)

(Source: 1971 and 1976 Census of Canada, unpublished data.)

- 21.(a) What percentage of the population (15+) can be classed as non-migrants in 1971 and in 1976?
- (b) What do these figures suggest about the mobility of population and what trends are revealed?

Information supplied by the Town Council indicates that there is a fairly rapid turnover in the single male workforce which cannot be revealed by five-year samples in the Census. For example in 1967 Pine Point Mines reported a labour turnover of 150-160% for a workforce of 270. The trend appears to be towards a greater stability of population

as revealed by the growing proportion of children (Fig. 3.4).

Fig. 3.17 can be elaborated to show the source, by province, of Canadian migrants:

	MALES	FEMALES	TOTAL
NON-MIGRANTS (SAME DWELLING)	35.	40.	75.
NON-MIGRANTS (DIFF. DWELLING)	65.	40.	105.
MIGRANTS (SAME PROVINCE)	75.	55.	130.
MIGRANTS (DIFF. PROV.)			
NEWFOUNDLAND	10.	5.	15.
P.E.I.	0.	0.	0.
NOVA SCOTIA	0.	0.	0.
NEW BRUNSWICK	5.	0.	5.
QUEBEC	15.	10.	25.
ONTARIO	20.	10.	30.
MANITOBA	20.	20.	40.
SASKATCHEWAN	70.	50.	120.
ALBERTA	125.	95.	220.
BRITISH COLUMBIA	85.	75.	160.
YUKON	0.	5.	5.
NWT	0.	0.	0.
MIGRANTS FROM OUTSIDE CANADA	45.	40.	85.
MIGRANTS 1966 RESIDENCE NOT STATED	30.	20.	50.
TOTAL	600.	465.	1065.

Fig. 3.18. Source of migrants (1966-71) resident in Pine Point 1971 (003/004 enumeration area)

(Source: 1971 Census of Canada, computer print-out by Statistics Canada of unpublished data.)

22.(a) Rank the provinces in order of importance as source of migrants. Rank the provinces in order of distance of their centre of gravity of population from Pine Point.

(b) Is there a good correlation between these variables, i.e. does migration decrease with increasing distance from Pine Point?

(c) Suggest reasons for your conclusions.

23. English (85%) was the most important mother tongue of the inhabitants of Pine Point in 1976. This was followed followed by French (4%) and Japanese and Chinese (1.5%). To what extent does this confirm your conclusions reached in question 22?

(iii) Occupational structure

OCCUPATION	MALES	FEMALES	TOTAL
MANAGERIAL ADMINISTRATIVE AND RELATED OCCUP.	5.	0.	5.
TEACHING AND RELATED OCCUPATIONS	0.	5.	5.
MEDICINE AND HEALTH OCCUPATIONS	0.	0.	0.
TECH. SOCIAL ARTISTIC RELIGIOUS & RELATED OCC	45.	0.	45.
CLERICAL & RELATED OCCUPATIONS	20.	30.	50.
SALES OCCUPATIONS	0.	5.	5.
SERVICE OCCUPATIONS	10.	5.	15.
FARMING HORTICULTURE & ANIMAL HUSBANDRY	0.	0.	0.
OTHER PRIMARY OCCUPATIONS	70.	0.	70.
PROCESSING OCCUPATIONS	30.	0.	30.
MACHINING PRODUCT FABRICATING ASSEMBLY REPAIR	70.	0.	70.
CONSTRUCTION TRADES OCCUPATIONS	30.	0.	30.
TRANSPORT EQUIPMENT OPERATING OCCUPATIONS	35.	0.	35.
OTHER OCCUPATIONS	25.	0.	25.
OCCUPATION NOT STATED	55.	10.	65.
TOTAL	395.	55.	450.

Fig. 3.19. Occupational structure 1971, Pine Point
(003/004 enumeration area)

(Source: 1971 Census of Canada, computer print-out by Statistics Canada of unpublished data.)

The type of employment offered has a direct influence upon the characteristics of population.

- 24.(a) Calculate the relative proportions of primary, secondary and tertiary occupations.
- (b) What is the male/female ratio in total jobs? Suggest reasons for this figure.
- (c) Although detailed figures are not yet available for 1976, 650 people were employed on the census date. Which jobs are likely to have
 - (i) declined in importance,
 - (ii) grown in importance (including new forms of employment) in the town?

The town's occupational structure is heavily biased towards its *raison d'être*, the mine and the mill. This is also reflected by an analysis of income (excluding fringe benefits: free health facilities and recreational provision).

(iv) Income

dollars per head	
Less than 2,000	77
2,000-4,000	74
4,000-6,000	56
6,000-8,000	54
8,000-10,000	65
10,000-12,000	52
12,000-15,000	111
15,000-20,000	234
20,000+	209
Total	932

Fig. 3.20. Income categories 1976

(Source: 1976 Income Tax returns, Registrar General N.W.T.)

- 25.(a) What percentage of the working population earns more than \$12,000 per annum (average Canadian income)?
- (b) Which jobs would you expect to be the most poorly paid?

Income levels in Pine Point are on average 20% above the national norm and 45% above the average for the N.W.T., although this figure is inflated by inclusion of the native Indian and Eskimo population. The high cost of food, some services and transport must be set against these high incomes.

26. To what extent, and where, might Pine Point be fitted into the model of population development in Fig. 3.15?

Pine Point appears as a wealth centre in the context of northern development. There are no figures to support the suggestion in Fig. 3.15 that with development and more settled conditions more lower paid jobs appear in the economy, but the development of service activities will not attract the high incomes which are a major pull factor in northern development.

CONCLUSION

The population characteristics of Pine Point still illustrate the conditions of the pioneer frontier. The trend is towards stability and normality but imbalances will probably always be characteristic of northern towns. Although Pine Point has more of an assured future than many earlier mining settlements there remains a question of how permanent the settlement really will prove to be. The mobility of the population means that the town may not develop an established character. The

importance of seasonal and periodic migration is not revealed in the five-year census data.

27. Compare the development of Pine Point with Myrdal's model of economic development. Describe and account for any disparities between the case history of Pine Point and the general model.

Pine Point exists primarily to serve the mining operation. No other mines are likely to be developed in this area for lead/zinc and there are no other known resources in the area, apart from lumber, which could create new activities. Even lumber has a limited potential, problems of soil and drainage ensuring that it is not an easily renewable resource.

Pine Point has thus had a minimal multiplier or spread effect, except at specific locations, such as at Hay River. The proximity of Pine Point to the 'south' (Edmonton and Alberta in general) has meant that many benefits have not accrued to the North West Territory particularly in the development of secondary business. If Pine Point had been located at a greater distance from the settled core of Canada, the town might have contributed more benefits locally.

Pine Point's range of services remains limited and the town is still dependent on services and facilities in Hay River. The town's population is planned to grow to 2,400 by 1981 with no further increases after that date though it is expected some new services will be established. A new medical facility is to be built and the Matonabee school will be extended. More commercial space will be provided since the lack of space has prevented the establishment of new businesses and restricted the expansion of existing operations.

The planned population growth will be influenced by the increase in local employment in the town. Pine Point Mines anticipate the addition of 50 permanent staff by 1981 as their operations increase. The estimated residential requirement will be for at least 150 additional dwelling units by 1981. The changing population structure from single staff to families has created pressure on the remaining building lots in the town.

Beyond the developments outlined above there is no further planned growth. The future of Pine Point depends on the mine which at present is expected to have a life of at least another 40 years. The future is more assured than many of the mining camps of the early years of this century but the question remains what will happen to Pine Point when the resource is exhausted? The town exists for the mine and has not developed any regional functions like Hay River and Fort Smith. It begs the question whether this is a permanent extension of the frontier, both in terms of the utilisation of resources and of its population characteristics.

JOHN KING

importance of seasonal and periodic migration is not revealed in the
live-year census data.

Compare the development of Pine Point with Niydai's
model of economic development. Describe and account
for any disparities between the case history of
Pine Point and the general model.

Pine Point exists primarily to serve the mining operation. No
other mines are likely to be developed in this area for lead/zinc and
there are no other known resources in the area, apart from lumber,
which could create new activities. Even lumber has a limited potential,
because of soil and drainage ensuring that it is not an easily
renewable resource.

Pine Point has been a mining multiplier or spread effect,
except at specific locations, such as at Bay River. The proximity of
Pine Point to the "south" (Bismarck and Alberta in general) has meant
that many benefits have not accrued to the North West Territory part-
icularly in the development of secondary business. At Pine Point has
been located a substantial distance from the settled core of Canada, the
town might have contributed more benefits locally.

Development of services remains limited and the town is
dependent on services and facilities in Bay River. The town's
population is planned to grow to 2,400 by 1981 with no further increases
after that date though it is expected some new services will be
established. A new medical facility is to be built and the Hainan
school will be expanded. More commercial space will be provided since
the lack of space has prevented the establishment of new businesses and
restricted the expansion of existing operations.

The development of services and facilities in Bay River will be
influenced by the migration of the population in the town. Pine Point
local employment in the town. Pine Point local employment in the town
of 50 permanent staff by 1981 as their operations increase. The
additional investment in equipment will be for at least 100 additional
staff. The changing population structure from single
staff to families has created pressure on the remaining building lots in
the town.

3.3. The town is a mining multiplier and as a result there is an
expected increase in the town's population. The town's population
is expected to have a size of at least another 1,000 by 1981. The
more assumed that many of the mining camps of the early years of this
century but the question remains what will happen to Pine Point in the
resource is exhausted? The town exists for the mine and has not
developed any regional functions like Bay River and York Smith. It begs
the question whether this is a permanent extension of the resource or
the town's population of resources and of its population.

Development of services and facilities in Bay River will be
influenced by the migration of the population in the town. Pine Point
local employment in the town. Pine Point local employment in the town
of 50 permanent staff by 1981 as their operations increase. The
additional investment in equipment will be for at least 100 additional
staff. The changing population structure from single
staff to families has created pressure on the remaining building lots in
the town.

4 CARTWRIGHT

GENERAL INTRODUCTION TO SANDWICH BAY

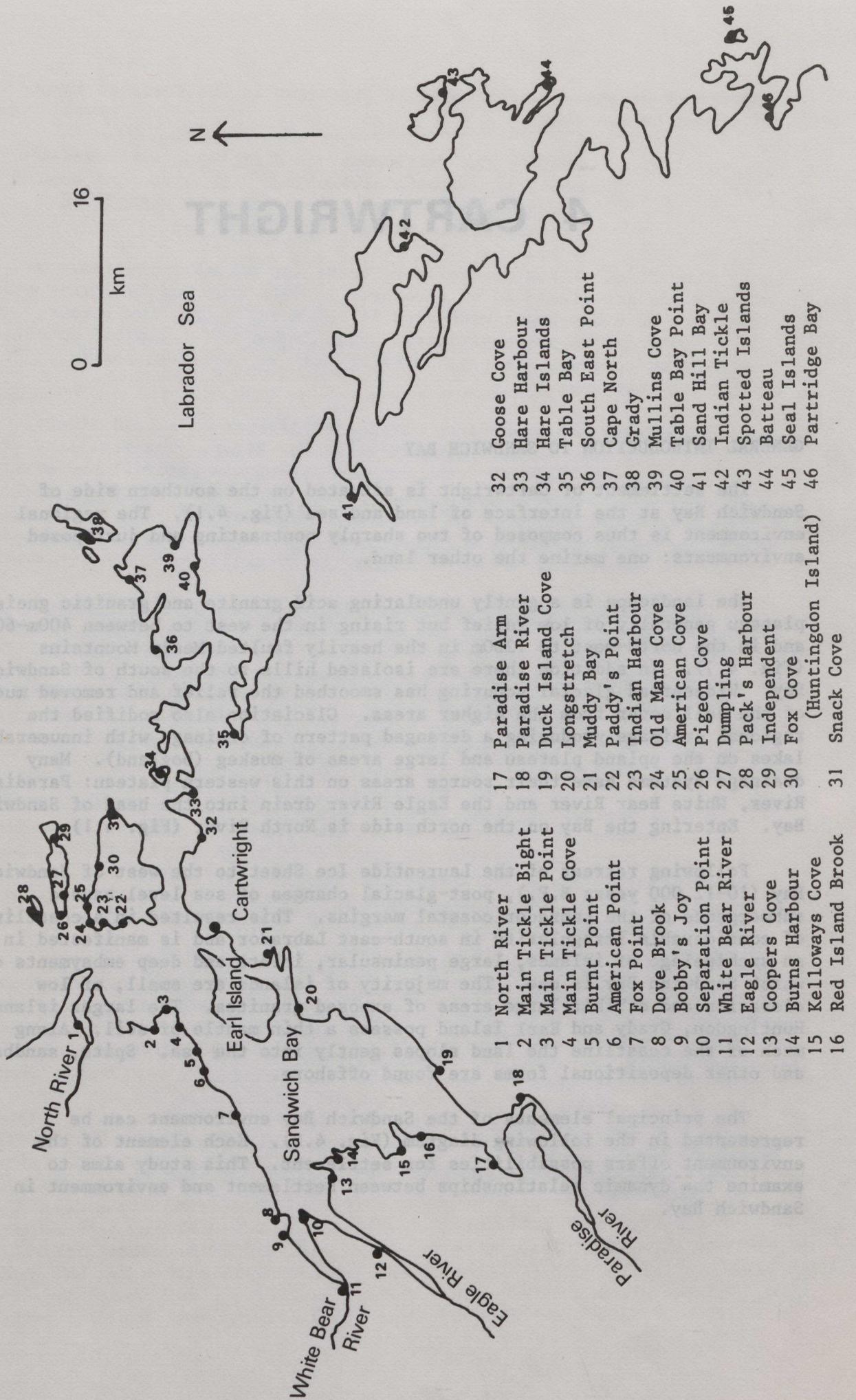
The settlement of Cartwright is situated on the southern side of Sandwich Bay at the interface of land and sea (Fig. 4.1). The regional environment is thus composed of two sharply contrasting and juxtaposed environments: one marine the other land.

The landscape is a gently undulating acid granite and granitic gneiss plateau generally of low relief but rising in the west to between 400m-600m and in the north-west to 1200m in the heavily faulted Mealy Mountains (Fig. 4.7). In addition there are isolated hills to the south of Sandwich Bay. Widespread glacial scouring has smoothed the relief and removed much of the soil cover from the higher areas. Glaciation also modified the regional drainage producing a deranged pattern of drainage with innumerable lakes on the upland plateau and large areas of muskeg (bogland). Many drainage systems have their source areas on this western plateau: Paradise River, White Bear River and the Eagle River drain into the head of Sandwich Bay. Entering the Bay on the north side is North River (Fig. 4.1).

Following retreat of the Laurentide Ice Sheet to the west of Sandwich Bay (10-12,000 years B.P.), post-glacial changes of sea level caused submergence of the Labrador coastal margins. This resulted in a coastline of considerable irregularity in south-east Labrador and is manifested in an archipelago of islands, large peninsular, inlets and deep embayments of which Sandwich Bay is one. The majority of islands are small, of low elevation and exhibit large areas of exposed granites. The larger islands, Huntingdon, Grady and Earl Island possess a thin mantle of soil. Along much of the coastline the land slopes gently into the sea. Spits, sandbars and other depositional forms are found offshore.

The principal elements of the Sandwich Bay environment can be represented in the following diagram (Fig. 4.2). Each element of the environment offers possibilities for settlement. This study aims to examine the dynamic relationships between settlement and environment in Sandwich Bay.

Fig. 4.1. Map to show place names of Sandwich Bay (south-east Labrador)



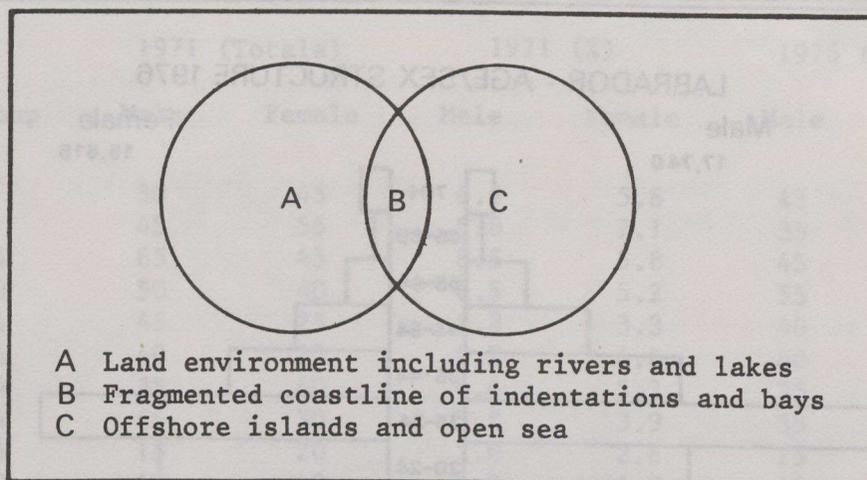


Fig. 4.2. Venn diagram to show relationship between elements of the Labrador coast

POPULATION

Prior to European settlement in the eighteenth century, Labrador was inhabited by two discrete populations: the nomadic Indians in the interior Boreal Forest region and groups of Eskimos along the tundra like coast. At first European contact was seasonal, confined to the short summer despite the diverse resources of land and sea favouring year round settlement. This latter was not however British policy which was to sail annually to Labrador to exploit the summer resources, principally cod (the summer season lasts from July-October/November).

Considerable disparities thus existed between the summer fishing population total and the permanent population, there being a permanent population of only 153 in 1785 along the entire Labrador coast. As recently as 1870 Grady had a summer population of 1000. This was also reflected in the number of sites occupied at both seasons.

The year round population has to live with a severe and hostile environment (photograph 4A). The photograph is of a group in Cartwright preparing to make a long journey -- taken April 1970.

1. What evidence is there of severity of environment in the photograph 4A?

The population of Canada's tenth Province, Newfoundland-Labrador was 557,725 in 1976 (522,105, 1971) of whom 94.1% in 1976 (94.6%, 1971) were residents of the Island; the remaining 33,050 in 1976 (28,166, 1971) were distributed unevenly along the Labrador coast and at a few localities in the interior. (The area of Labrador is larger than that of the U.K.) The settlement pattern of Labrador is dominated by a diminishing number of peripheral small settlements spread along an often rugged coastline. Cartwright is one such settlement which had 680 inhabitants in 1976. Only one other settlement site, Paradise River (population 112 in 1976) is currently occupied and this is situated in the upper bay (Fig. 4.1).

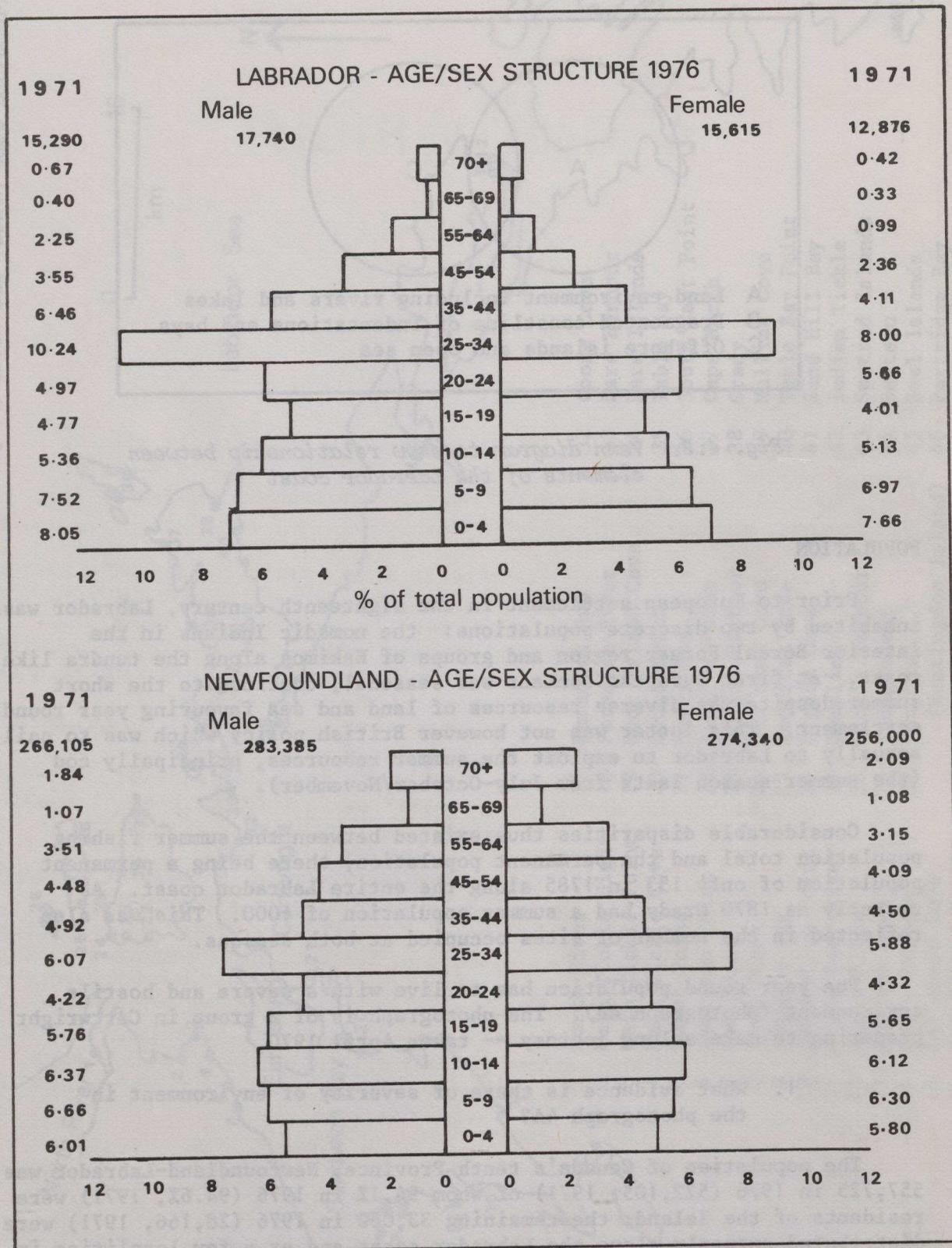


Fig. 4.4. Age-sex pyramids for Labrador and Newfoundland 1976

(Source: 1976 Census of Canada Vol. 1 Population: Demographic Characteristics. Five-year age groups. Table 11 [Newfoundland] and Table 13 [Labrador Div. No. 10])

Age Group	1971 (Totals)		1971 (%)		1976 (Totals)	
	Male	Female	Male	Female	Male	Female
0-4	50	45	6.5	5.8	45	30
5-9	45	55	5.8	7.1	35	35
10-14	65	45	8.5	5.8	45	45
15-19	50	40	6.5	5.2	55	40
20-24	45	25	5.8	3.3	40	30
25-34	40	35	5.2	4.6	40	30
35-44	35	40	4.6	5.2	35	20
45-54	45	30	5.8	3.9	35	40
55-64	15	20	2.0	2.6	25	20
65-69	10	10	1.3	1.3	10	10
70+	15	5	2.0	0.7	15	5

Fig. 4.3. Population Structure of Cartwright

(Source: 1971, 1976 Census of Canada -- unpublished.)

- 2.(a) Using the information contained in Fig. 4.3, construct an age-sex pyramid for Cartwright in 1976 using % total population.
 - (b) Does the age-sex distribution for 1971 differ from that of 1976?
 - (c) How do the age-sex pyramids for (i) Labrador and (ii) Newfoundland-Labrador (Fig. 4.4) compare with those for Cartwright?
- 3.(a) For the three pyramids (1976) calculate the male-female ratio and enter your calculations in the table (Fig. 4.5). [The male/female ratio is defined as the number of males per 100 females in a population. Thus a figure of 110 means there are in that population 110 males for every 100 females -- $\frac{\text{number of males}}{\text{number of females}} \times 100.$]

Year	Cartwright	Labrador	Newfoundland-Labrador	Canada
1951		138	105	102
1956		159	105	102
1961		130	105	102
1966		132	104	101
1971	121	119	104	100
1976				99

Fig. 4.5. Male/female ratios

(b) How have the male/female ratios changed for the regions specified?

(c) What do the distinctive values for Labrador and Cartwright suggest and comment upon possible causes.

The age-sex composition of the population is changing. In addition population totals have changed.

Date of Census	Cartwright	Paradise River	Sandwich Bay	Labrador Coast	Labrador	Newfoundland -Labrador
1864	*	**	N/A	2062	***	***
1869	*	**	194 (1874)	2479		
1884	*	**	338	4003		
1891	*	**	344	4054		
1901	30	74	244	3902		
1911	49	N/A	268	3896		
1921	87	N/A	278	3749		
1935	148	N/A	457	4716		
1945	183	112	552	5525	5525	321819
1951	244	115	445	5104	7847	361416
1956	359	114	546	5704	10866	415074
1961	493	161	664	6140	13534	457853
1966	616	134	780	7078	21157	493396
1971	752	146	898	7895	28166	522104
1976	680	112	792	8230	33050	557725

Fig. 4.6. Population totals relating to Labrador

(Source: Census of Canada, Census of Newfoundland, various years.)

Notes for Fig. 4.6

Cartwright and Paradise River are individual settlement populations.

* Population totals for Cartwright not segregated from Sandwich Bay.

** Population totals for Paradise River not segregated from Sandwich

Bay.

Labrador Coast excludes interior settlement (Happy Valley/Goose Bay; Labrador City; Wabush). The totals include census division 10B (Fig. 4.7) having population totals of 3495 (1971) and 2725 (1976).

Labrador totals are inclusive of interior and coast.

Newfoundland-Labrador refers to the Provincial population.

N/A -- not available; *** -- until 1940 only nomadic Indians in the interior.

Groups of Eskimo included in Labrador coast population. Only after 1927 was the jurisdiction of Labrador transferred to Newfoundland. Previously it had been restricted to only the coast.

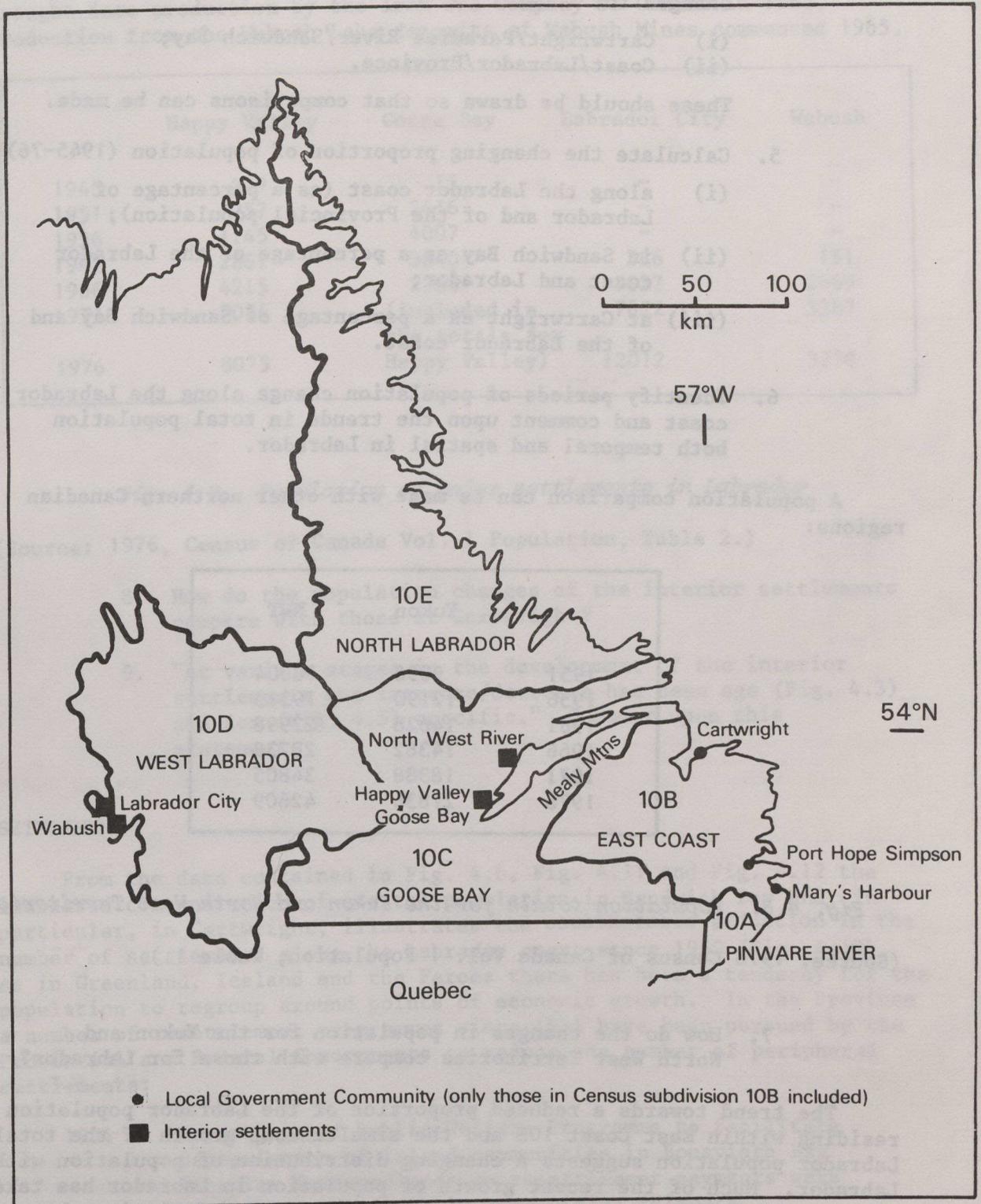


Fig. 4.7. Census divisions of Labrador

(Source: 1976 Census of Canada Vol. 1 Population: Geographic Distributions Reference Maps: Map 1-5 Labrador, Province of Newfoundland.)

4. Construct superimposed line graphs to show population changes for

- (i) Cartwright/Paradise River/Sandwich Bay;
- (ii) Coast/Labrador/Province.

These should be drawn so that comparisons can be made.

5. Calculate the changing proportion of population (1945-76)

- (i) along the Labrador coast (as a percentage of Labrador and of the Provincial population);
- (ii) in Sandwich Bay as a percentage of the Labrador coast and Labrador;
- (iii) at Cartwright as a percentage of Sandwich Bay and of the Labrador coast.

6. Identify periods of population change along the Labrador coast and comment upon the trends in total population both temporal and spatial in Labrador.

A population comparison can be made with other northern Canadian regions:

	Yukon	NWT
1951	9096	16004
1956	12190	19313
1961	14628	22998
1966	14382	28738
1971	18388	34805
1976	21836	42609

Fig. 4.8. Population totals for the Yukon and North West Territories

(Source: 1976 Census of Canada Vol. 1 Population, Table 1.)

7. How do the changes in population for the Yukon and North West Territories compare with those for Labrador?

The trend towards a reduced proportion of the Labrador population residing within East Coast 10B and the simultaneous growth of the total Labrador population suggests a changing distribution of population within Labrador. Much of the recent growth of population in Labrador has taken place in three inland centres, Happy Valley/Goose Bay following the establishment of a United States Air Force Base in 1941, and at the two mining centres of Labrador City and Wabush. In 1958 a decision was reached to proceed with plans to mine and concentrate iron ore in Labrador. A townsite was constructed at Labrador City. A few prefabricated buildings was all that existed in 1959 whereas today a

fully planned and zoned township exists. The Carol Lake deposits were brought into production by the Iron Ore Company of Canada in 1962. Production from the Wabush Lake deposits of Wabush Mines commenced 1965.

	Happy Valley	Goose Bay	Labrador City	Wabush
1945	229	15	-	-
1951	257	2416	-	-
1956	1145	4007	-	-
1961	2861	3040	386	151
1966	4215	2364	5037	2669
1971	7024	(included in the totals for	7622	3387
1976	8075	Happy Valley)	12012	3770

Fig. 4.9. Population of major settlements in Labrador

(Source: 1976, Census of Canada Vol. 1 Population, Table 2.)

8. How do the population changes of the interior settlements compare with those at Cartwright?
9. "At various stages in the development of the interior settlements the increase/decrease has been age (Fig. 4.3) and sex (Fig. 4.5) specific." Comment upon this statement.

SETTLEMENT

From the data contained in Fig. 4.6, Fig. 4.11 and Fig. 4.12 the increased concentration of coastal population in Sandwich Bay and, in particular, in Cartwright, illustrates the considerable reduction in the number of settlements along the Labrador coast since 1950 (Fig. 4.10). As in Greenland, Iceland and the Faroes there has been a tendency for the population to regroup around points of economic growth. In the Province a number of resettlement programmes since 1954 have been pursued by the Provincial and Federal Governments to reduce the number of peripheral settlements:

- 1954 Department of Public Welfare Programme to facilitate depopulation of island communities in Bonavista Bay (insular Newfoundland) -- resettlement payments were available to help whole communities relocate.
- 1965 replaced by the Newfoundland Fisheries Programme. The Federal Government became a co-sponsor of the Programme. No longer required entire community to agree to move.

1966 Newfoundland Department of Community and Social Development.

1967 Federal/Provincial Newfoundland Fisheries Programme -- government financed rural depopulation.

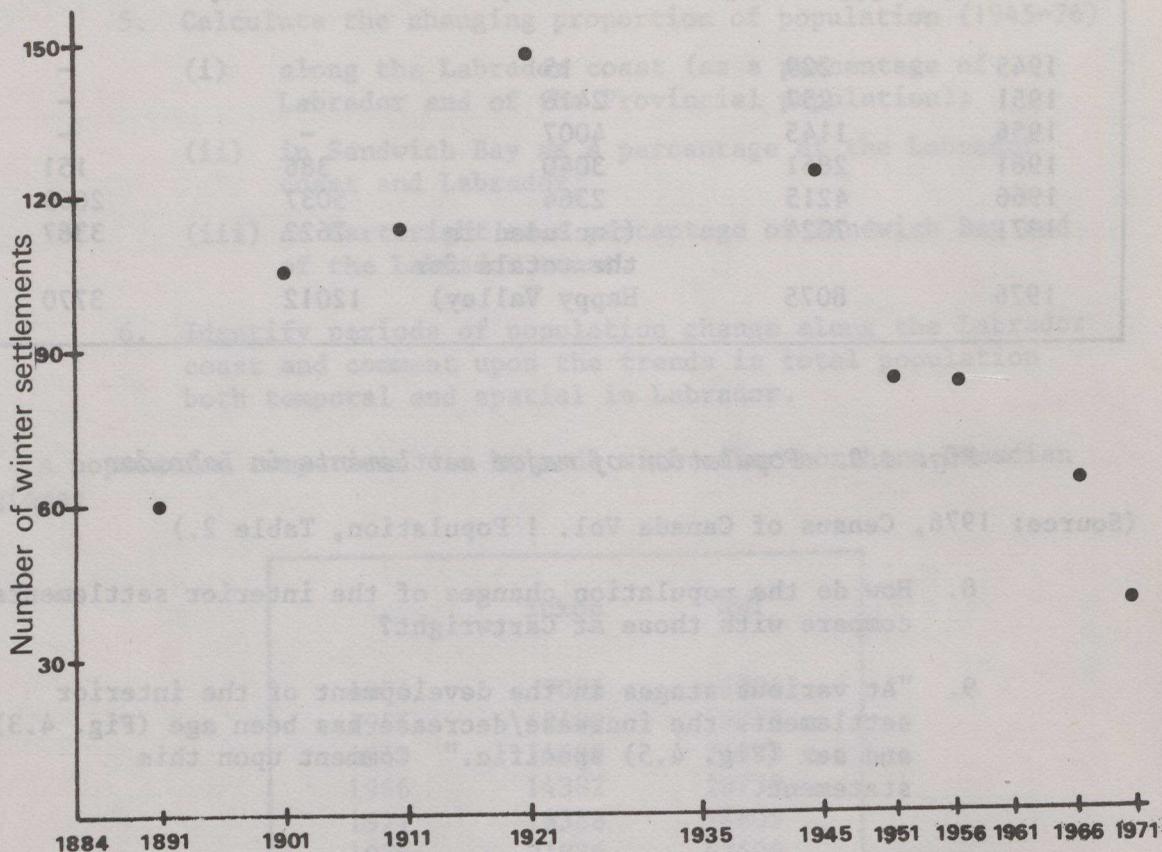


Fig. 4.10. Graph to show number of settlements (winter*) along the Labrador coast

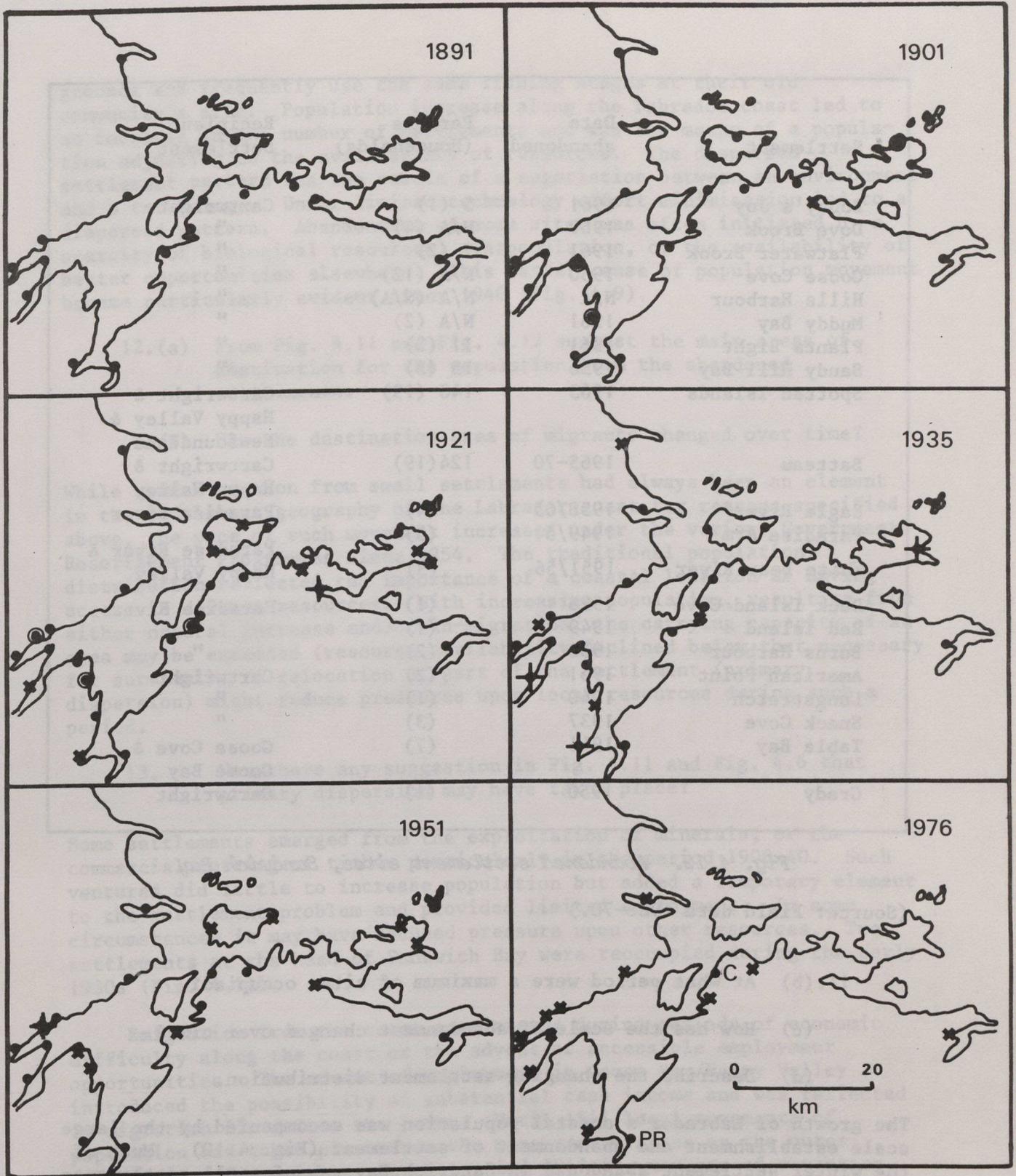
(Source: Census of Canada, Newfoundland tables various years.)

*Much of the coastal population of Labrador reside in a number of settlements and practice a form of transhumance (seasonal winter settlements smaller in number than summer settlements).

10. To what extent does the trend in diminishing settlement numbers compare with the trends in total coastal population (Fig. 4.6)?

In common with much of the Labrador coast the number of settlements occupied in Sandwich Bay has fluctuated. Fig. 4.11 illustrates those locations which had a recorded winter population for the years selected.

- 11.(a) Compare Fig. 4.12 with Fig. 4.11 and using Fig. 4.6 draw proportional bar graphs on Fig. 4.11 to represent the total population of Sandwich Bay for each of the years represented.



- Inhabited site
- ✕ Abandoned since previous date
- ⊙ Site occupied for the first time
- ✚ Site occupied for the second time
- C Cartwright
- PR Paradise River

Fig. 4.11. Maps to show winter settlement sites 1891-1976, Sandwich Bay

Settlement	Date abandoned	Persons (Households)	Recipient Settlement
Bobby's Joy	1961	5 (1)	Cartwright
Dove Brook	1960	N/A (4)	"
Flatwater Brook	1961	7 (2)	"
Goose Cove	1960	N/A (12)	"
Hills Harbour	N/A	N/A (N/A)	"
Muddy Bay	1961	N/A (2)	"
Plants Bight	1961	11 (3)	"
Sandy Hill Bay	1956	15 (3)	
Spotted Islands	1965	140 (19)	Cartwright & Happy Valley & Newfoundland
Batteau	1965-70	124 (19)	Cartwright & Happy Valley
Eagle River	1958/65	(4)	Paradise River
Paradise Arm	1949/51	(5)	Paradise River & Happy Valley
White Bear River	1951/56	(3)	Paradise River
Duck Island Cove	1926	(1)	"
Red Island	1949	(1)	"
Burns Harbour	1930	(2)	
American Point	1951	(2)	Cartwright
Longstretch	1940	(1)	"
Snack Cove	1937	(3)	"
Table Bay	1941	(7)	Goose Cove & Goose Bay
Grady	1950	(1)	Cartwright

Fig. 4.12. Abandoned settlement sites, Sandwich Bay

(Source: Field data 1968-70.)

- 11.(b) At what period were a maximum of sites occupied?
- (c) How has the scale of abandonment changed over time?
- (d) Describe the changing settlement distribution.

The growth of Labrador's coastal population was accompanied by the large scale establishment and abandonment of settlement (Fig. 4.10). Much of the winter settlement abandoned in Sandwich Bay was of small settlements and began along the outer more exposed coastline, especially on the islands and only later at the head of Sandwich Bay. The pattern of abandonment was not uniform (Fig. 4.11). There was some establishment/abandonment of winter sites before 1945 but the majority of sites abandoned as winter settlement occurred after 1945 (Fig. 4.11 and Fig. 4.12). Many of the abandoned sites retain importance as summer sites. Despite resettlement, the population commonly use the same fishing

grounds and frequently use the same fishing stages at their old community's site. Population increase along the Labrador coast led to an increase in the number of settlements and was the means of a population adjusting to the availability of resources. The dispersed settlement pattern was the result of a negotiation between an environment and a technology. Under limited technology effort minimisation led to a dispersed pattern. Abandonment of some sites was often initiated by a scarcity of biological resources, overpopulation, or the availability of better opportunities elsewhere. This latter cause of population movement became particularly evident after 1940 (Fig. 4.9).

12.(a) From Fig. 4.11 and Fig. 4.12 suggest the main areas of destination for the population from the abandoned settlements.

(b) Has the destination area of migrants changed over time?

While some migration from small settlements had always been an element in the settlement geography of the Labrador coast for reasons specified above, the pace of such movement increased under the various Government Resettlement Programmes since 1954. The traditional population distribution reflected the importance of a coastal location as having access to diverse resources. With increasing population, resulting from either natural increase and/or in-migration, the carrying capacity of an area may be exceeded (resource availability declined below that necessary for survival). A relocation of part of the settlement (primary dispersion) might reduce pressures upon local resources during such a period.

13. Was there any suggestion in Fig. 4.11 and Fig. 4.6 that primary dispersion may have taken place?

Some settlements emerged from the exploitation of minerals, or the commercial cutting of timber particularly in the period 1900-40. Such ventures did little to increase population but added a temporary element to the settlement problem and provided limited employment. In some circumstances it may have reduced pressure upon other resources. Two settlements at the head of Sandwich Bay were reoccupied during the early 1930s (Fig. 4.11).

Emigration from the coast accelerated during periods of economic difficulty along the coast or the advent of accessible employment opportunities. The advent of employment in Goose Bay/Happy Valley introduced the possibility of substantial cash income and was reflected in migration flows from the coast. Until 1941 local movements of population had taken place from the more remote areas on the outer islands into Cartwright. In the period 1941-43, members of seventeen families from Sandwich Bay moved to Goose Bay. Most of the individuals were young single men. This was followed by only a limited return flow. Further permanent moves were made in the early/mid-1950s and consisted almost entirely of complete families (this movement was associated with the construction work at Happy Valley).

Hourly wage work provided during the construction phase of the USAF radar site at Cartwright (1951) attracted families from a number of

smaller settlements in Sandwich Bay.

Prior to Resettlement (1954), movement to Cartwright was unassisted (no grants available for relocation). Between 1954 and 1960, 26 households had been assisted in moving to Cartwright. Under the First Federal/Provincial Resettlement Programme (Community Consolidation Programme) which ran from 1/4/65-31/3/70, a total of 240 persons were assisted in moving to Cartwright (Reception Centre).

Settlement	Households	Persons	Evacuation
Spotted Islands	8	63	Total
Batteau	17	115	"
Independent	1	5	"
Partridge Bay	5	33	"
North River	1	5	"
Seal Islands	1	3	"
Paradise River	3	16	Partial
		240	

Fig. 4.13. Numbers (households and persons) moving to Cartwright, under the First Resettlement Programme

(Source: Field data.)

Under the Second Federal/Provincial Resettlement Programme 1/4/70-31/3/75:

Settlement	Households	Persons
Partridge Bay	1	11
Seal Islands	1	10

(Both these households moved before the 1971 census)

Fig. 4.14. Numbers moving to Cartwright, under the Second Resettlement Programme

(Source: Federal/Provincial Resettlement Program Statistics, 1975.)

Of the total population assisted in moving to Cartwright (261) only 26 (5 households) were moves within Sandwich Bay. Without this movement to Cartwright from outside Sandwich Bay the 1971 population would have been a maximum of 491 cf. 1961 population total 493. Within Sandwich Bay much of the movement from small settlements was towards Paradise River, especially from the Upper Bay area.

14. What has been the contribution of a resettled population to the growth of Cartwright?
15. Might it be possible to consider the small peripheral settlements as having been a reservoir of migrants to Cartwright?

Age Group	1966	1976
5-14	188	160
15-24	111	165
25-34	61	70
35-44	74	55
45-54	50	75
55-64	33	45
65+	21	40

Fig. 4.15. Population Structure, Cartwright 1966, 1976

- 16.(a) What changes have occurred in the structure of population 1966-76?
- (b) How does it relate to data presented at an earlier stage?
- (c) What are the future implications of these statistics?

Assisted migration under Resettlement Schemes also aided the growth of population at both Happy Valley 130 households (669 members), Fig. 4.16, and Mary's Harbour 23 households (91 members).

Spotted Island	53	Bear Cove	8	Quirpon	8
Birch Island	321	Griquet	24	Raleigh	11
Eskimo Island	10	Roddickton	23	St. Lunaire	19
Mud Lake	7	Salmon Rock	5	Square Islands	3
Rigolet	12	South Brook	16	Fox Harbour	2
Cunninghams Bight	3	Durrell's Arm	4	Green Island Brook	6
Bluff Head Cove	7	Eddie's Cove East	4	Point au Mal	8
Batteau	4	Hampden	6	Makkovik	4
Nain	9	Lance au Claire	7	Western Bay	3
Battle Harbour	5	Main Brook	6	Ship Cove	8
Hopedale	21	Pilley's Island	5		
Cook's Harbour	29	Port Hope Simpson	8	Total	669

Fig. 4.16. Movement to Happy Valley (reception centre), Labrador under the First and Second Federal-Provincial Resettlement Programs (1965-75)

(Source: Federal-Provincial Resettlement Program Statistics 1975.)

Cartwright acted as a centralisation node for the southern Labrador coast. Its further growth depended upon a continued supply of migrants from smaller isolated settlements. However the catchment area has been vacated of potential migrants. The considerable population reduction in Cartwright 1971-76 suggests that Cartwright is now no longer in a position to 'hold' its population and much movement is taking place to better prospects.

There are both spatial and temporal stages in this migration sequence as Fig. 4-17 demonstrates.

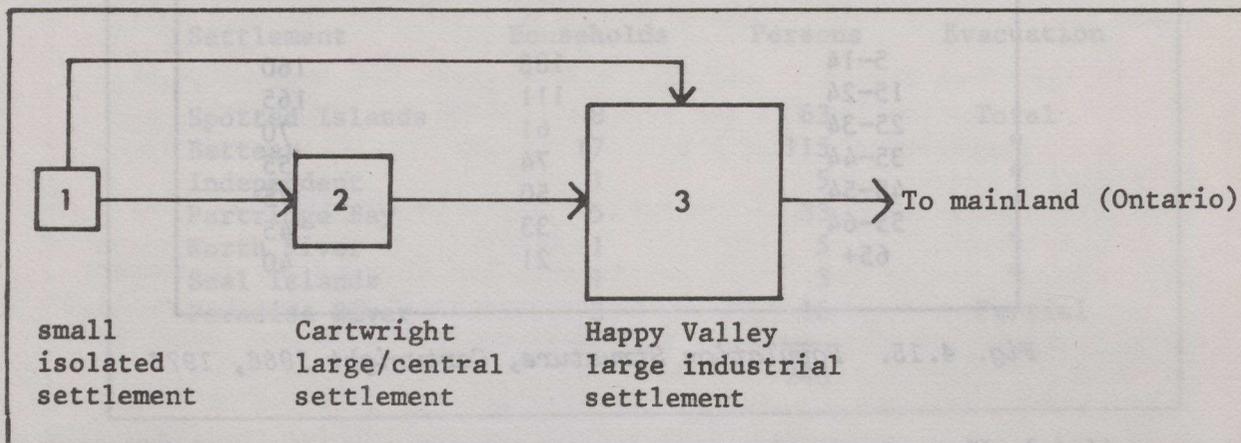


Fig. 4.17. The migration sequence

Under the various Resettlement Schemes only seven settlements have despatched population to Cartwright (Fig. 4.13) whereas thirty-four settlements (Fig. 4.16) have supplied population to Happy Valley. Only Batteau and Spotted Islands supplied migrants to both Cartwright and Happy Valley. These two settlements contributed eight households (57 members) to the population of Happy Valley at the same time as supplying twenty-five households (178 members) to Cartwright.

17. What conclusions can you arrive at regarding the relative importance of Cartwright and Happy Valley as reception centres for migrants?

The historic population dispersal, which had been an effective compromise for fishing, fur trapping etc. at a low stage of technology began to look old fashioned and anachronistic. Human values were changing and access to the "new" resources was becoming more important.

Fig. 4.18 draws attention to the development of services in Cartwright and indicates that there was a marked growth in services after 1930. The establishment of permanent (compared to the earlier itinerant) education and religious facilities in the 1880s did not in themselves act as major inducements to settlement. Under a traditional dispersed settlement pattern access to resources and a trader were more important. Although a trader has been intermittently established at Paradise River, and a number of other settlements in Sandwich Bay have had church and/or educational facilities of a seasonal nature, Cartwright remains the focus for the development of services.

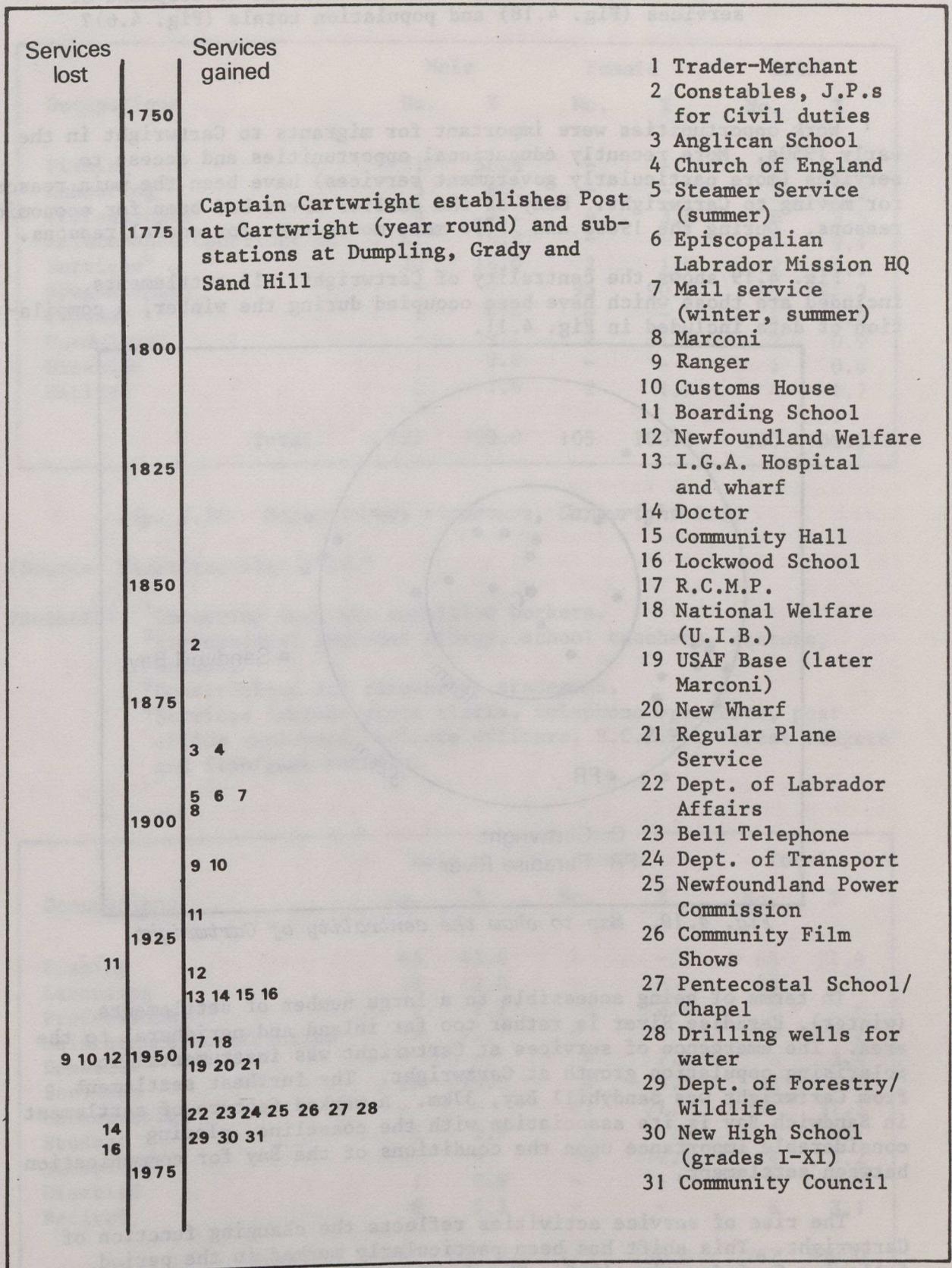


Fig. 4.18. The development of services in Cartwright

(Source: Journal of House of Assembly, St. John's and local field studies.)

18. What relationships are there between the development of services (Fig. 4.18) and population totals (Fig. 4.6)?

Work opportunities were important for migrants to Cartwright in the early 1950s. More recently educational opportunities and access to services (more particularly government services) have been the main reasons for moving to Cartwright. Many of the earlier moves had been for economic reasons. During the 1960s and 1970s most moves were for social reasons.

Fig. 4.19 shows the centrality of Cartwright: all settlements included are those which have been occupied during the winter, a compilation of data included in Fig. 4.11.

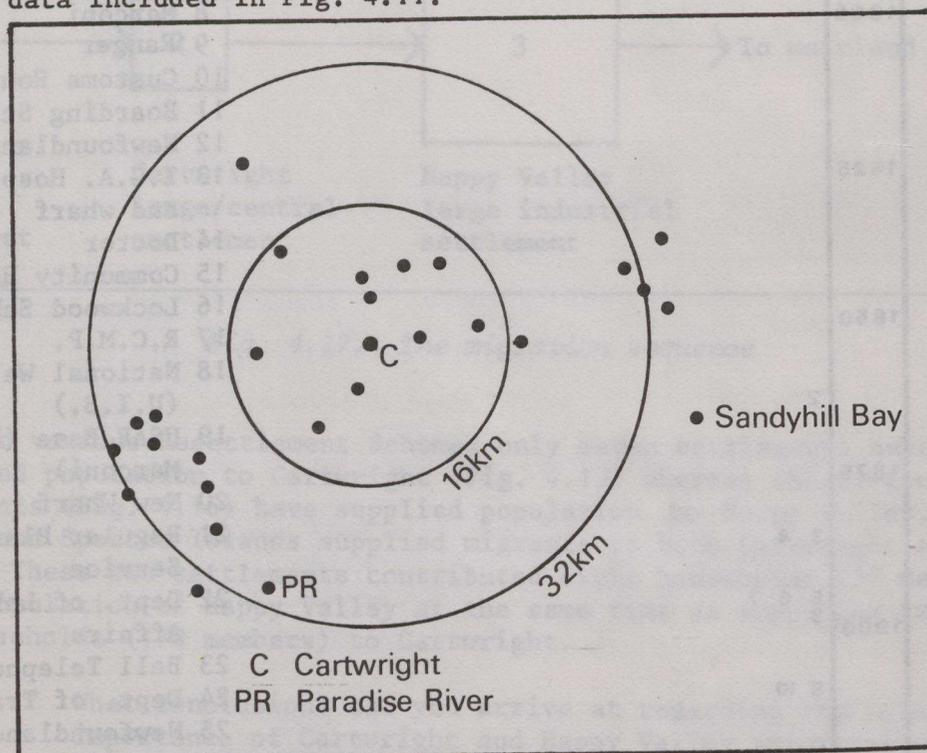


Fig. 4.19. Map to show the centrality of Cartwright

In terms of being accessible to a large number of settlements (winter), Paradise River is rather too far inland and peripheral to the area. The emergence of services at Cartwright was instrumental in polarising population growth at Cartwright. The furthest settlement from Cartwright was Sandyhill Bay, 37km. A marked feature of settlement in Sandwich Bay is its association with the coastline, placing considerable importance upon the conditions of the Bay for communication between settlement.

The rise of service activities reflects the changing function of Cartwright. This shift has been particularly marked in the period following Confederation 1949. The development of service activities is reflected in the occupational structure of Cartwright (Fig. 4.20 and Fig. 4.21).

Occupations	Male		Female		Total	
	No.	%	No.	%	No.	%
Fishing	71	56.8	-	-	71	30.9
Labouring ¹	5	4.0	-	-	5	2.2
Professional ²	4	3.2	4	3.8	8	3.5
Maintenance/Construction ³	21	16.8	-	-	21	9.1
Services ⁴	20	16.0	2	1.9	22	9.6
Housekeeping	-	-	95	90.5	95	41.3
Student	1	0.8	-	-	1	0.4
Unemployed	-	-	2	1.9	2	0.9
Disabled	1	0.8	-	-	1	0.4
Retired	2	1.6	2	1.9	4	1.7
Total	125	100.0	105	100.0	230	100.0

Fig. 4.20. Occupational structure, Cartwright 1966

(Source: Electoral list 1966.)

Footnotes: ¹Labouring includes unskilled workers.

²Professional includes clergy, school teachers, doctors, nurses.

³Construction and carpentry: tradesmen.

⁴Services include store clerks, telephone operators, post office employees, welfare officers, R.C.M.P., forest rangers and fish/game wardens.

Occupations	Male		Female		Total	
	No.	%	No.	%	No.	%
Fishing	65	43.6	-	-	65	24.9
Labouring	18	12.0	-	-	18	6.7
Professional	4	2.7	3	2.6	7	2.6
Maintenance/Construction	19	12.7	-	-	19	7.2
Domestic	-	-	9	7.9	9	3.4
Services	28	19.0	4	3.5	32	12.2
Housekeeping	-	-	81	71.7	81	31.3
Student	6	3.9	2	1.9	8	3.1
Unemployed	-	-	14	12.4	14	5.2
Disabled	1	0.8	-	-	1	0.3
Retired	8	5.3	-	-	8	3.1
Total	149	100.0	113	100.0	262	100.0

Fig. 4.21. Occupational structure, Cartwright 1971

(Source: Electoral list 1971.)

19.(a) Compare Fig. 4.21 with Fig. 4.3. What are the labour activity rates -- the proportion of population age 16-60/65 in employment -- for females and males and have these changed 1966-1971?

(b) How would you describe the economy of Cartwright?

(c) Does the change in the size and composition of the labour force 1966-71 reflect the change in population?

(d) Do your answers agree with the conclusions reached following an examination of Fig. 4.5?

A move from a small settlement to a central settlement (see the migration sequence, Fig. 4.17) involved a residential shift (winter) but with the exception of those employed in service industries or labouring was accompanied by limited occupational shift. For some Cartwright was a step, an intervening opportunity, eventually leading them to (3). The move to (3) may also occur directly from (1) as occurred during the period 1939-45 and in the early 1950s Goose Bay/Happy Valley; and again more recently under Resettlement (Fig. 4.16). Such a move may lead to a cessation of links with Sandwich Bay and the emergence of a new 'work territory' (the area containing work patterns). For most the move to Cartwright was for access to services, not for improved work opportunities. With the exception of those who had moved from Battean and Spotted Islands the increased distance between their new winter settlement (Cartwright) and their traditional fishing site was not excessive. As a result of migration seasonal patterns of movement to resources have changed.

ENVIRONMENT AND RESOURCES

Access to all resources is however restricted by the nature of the physical environment. Fig. 4.22 shows the temperature regime for Cartwright; Fig. 4.23 ice thickness (Cartwright Harbour) and Fig. 4.24 precipitation totals for Cartwright.

20.(a) How would you describe Cartwright's precipitation regime?

(b) On Fig. 4.22 insert a line to represent $+6^{\circ}\text{C}$.

(c) What are the characteristics of the temperature regime?

(d) How important are the mean values?

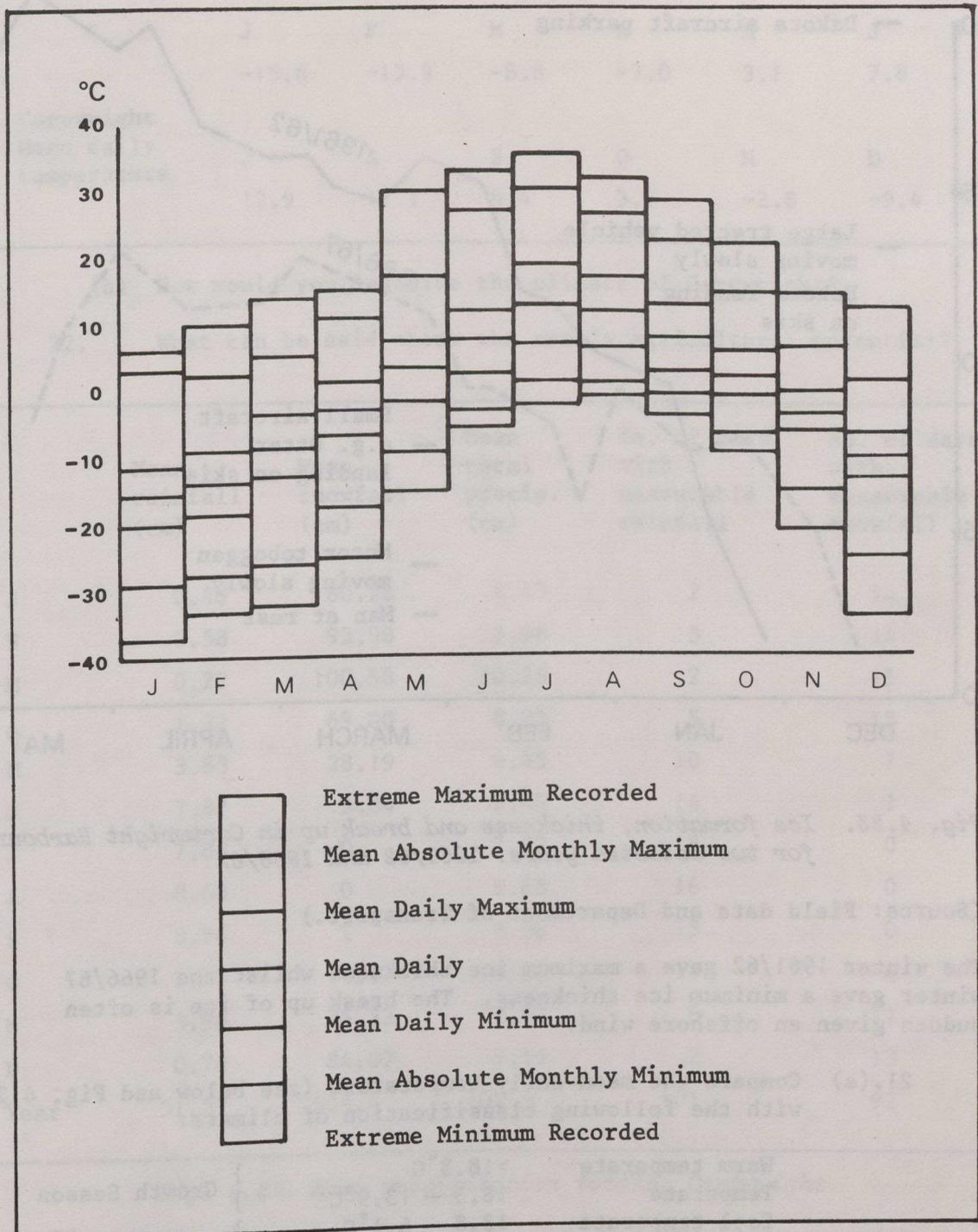


Fig. 4.22. Graph to show temperature regime for Cartwright
 (Source: Circular 4019 (CLI 30) Canada -- Department of Transport.)

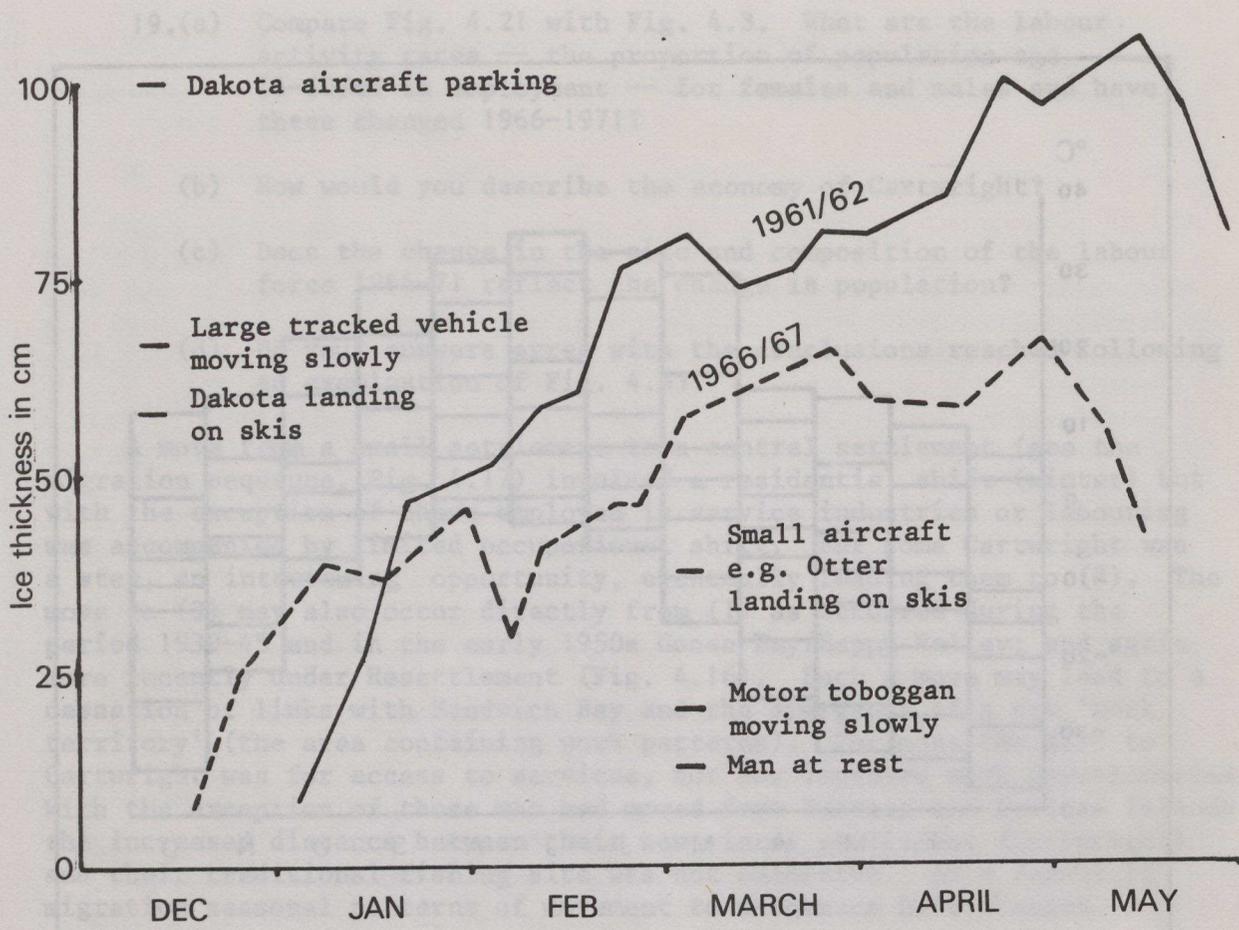


Fig. 4.23. Ice formation, thickness and break up in Cartwright Harbour for two selected years: 1961/62 and 1966/67

(Source: Field data and Department of Transport.)

The winter 1961/62 gave a maximum ice thickness whilst the 1966/67 winter gave a minimum ice thickness. The break up of ice is often sudden given an offshore wind.

21.(a) Compare the mean daily temperature (see below and Fig. 4.22) with the following classification of climate:

Warm temperate	>18.3°C	} Growth Season
Temperate	18.3 - 13.9°C	
Cool temperate	13.8 - 6.1°C	} Transition
Cool	6.0 - 0°C	
Cold	0 - -17.8°C	} Frost
Very cold	-17.9°C - -28.9°C	
Ice	-29.0 - -40°C	
Polar	<-40°C	

(The temperatures indicate the divisions for placing mean daily temperature for each month.)

	J	F	M	A	M	J
	-15.6	-13.9	-8.6	-3.0	3.1	7.8
Cartwright Mean daily temperature	J	A	S	O	N	D
	12.9	12.1	8.4	3.3	-2.8	-9.4

(b) How would you describe the climate of Cartwright?

22. What can be said about the area's agricultural potential?

	Mean rainfall (cm)	Mean snowfall (cm)	Mean total precip. (cm)	No. of days with measurable rainfall	No. of days with measurable snowfall
J	0.40	80.26	8.43	2	14
F	0.58	93.98	9.98	3	14
M	0.22	100.58	10.28	2	15
A	1.32	69.08	8.23	5	13
M	3.63	28.19	6.45	10	7
J	7.87	5.84	8.46	14	1
J	7.82	0	7.82	15	0
A	8.68	0	8.68	16	0
S	8.96	T	8.96	15	0
O	7.13	11.17	8.25	11	4
N	3.98	36.32	7.62	6	11
D	0.78	84.07	9.19	2	13
Year	51.37	509.4	102.3	101	92

Fig. 4.24. Mean precipitation totals, Cartwright

(Source: Circular 4019 (CLI 30) Canada -- Department of Transport.)

A measure of cold is Degree Days of Cold [defined as: 'there are as many degree days of cold in any one day as the mean daily temperature falls below 18.3°C (65°F)]. Thus for January, mean daily temperature is -15.6°C; thus $-15.6^{\circ}\text{C} + 18.3^{\circ}\text{C} = 33.9^{\circ}\text{C} \times 31$ (days in Jan.) = 1050.9°C.

23.(a) For Cartwright calculate the totals for each month, using the mean daily temperature values above.

	Wild Fruits	Beaver	Salmon	Cod	Duck	White Partridge	Spruce Partridge	Rabbit	Porcupine	Trout	Caribou	Harp Seal	Harbour Seal	Ringed Seal	Hooded Seal
Fruiting Season	x					x									
Nesting Season						x	x								
Changing Salinity Levels			x	x						x					
Water Temperature			x	x									x		
Lack of Available Food Resources				x	x	x	x	x	x			x			
Unfavourable Winds			x	x											
Local/Regional Migration												x			
Long Distance Migration			x	x	x							x			x
Snow Depth						x	x		x		x			x	
Ice Conditions		x	x		x				x		x	x	x	x	x
Breeding Season												x	x	x	x
Changed Habitat	x	x				x	x		x		x				
Storms			x	x		x	x				x				
Glitter (Hard Crust)						x	x				x				

Fig. 4.25. Some environmental and biological processes influencing the availability and accessibility of food resources

(b) What is the distribution of 'cold'?

The annual totals of Cold for a number of settlements are:

Aklavik	11,260°C
Inuvik	11,615
Montreal	4,937
Vancouver	3,447
Winnipeg	6,674

The effect of this level of cold is intensified by wind. An air temperature of 0°C and wind speed of 20 m.p.h. will give a windchill temperature of -11.5°C.

The intensity of cold is sufficient to cause fresh and salt water bodies to 'freeze over' for a variable period each winter but normally for about five months (see Fig. 4.23). During this period the ice, as measured in the harbour at Cartwright is of variable thickness. At the onset of the 'freeze over' and during the 'break up' period conditions are suitable for neither water-borne nor ski-borne transport. Access to resources is severely restricted during these periods. Fig. 4.23 suggests a number of critical limits for certain forms of transport.

24.(a) Calculate the 'safe' period for the various forms of transport mentioned.

(b) What conclusions do you deduce from this?

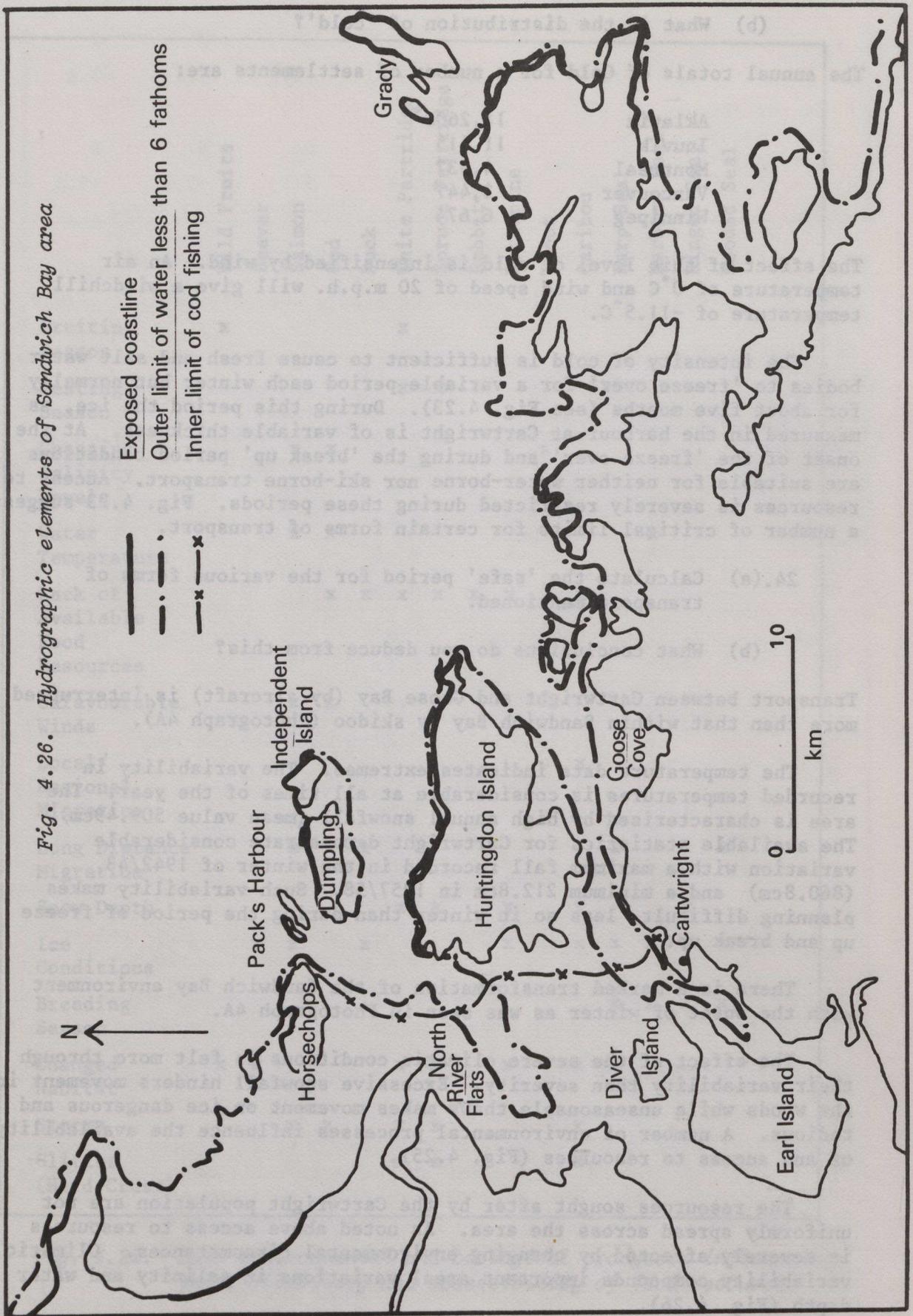
Transport between Cartwright and Goose Bay (by aircraft) is interrupted more than that within Sandwich Bay by skidoo (Photograph 4A).

The temperature data indicates extremes. The variability in recorded temperatures is considerable at all times of the year. The area is characterised by high annual snowfall (mean value 509.49cm). The available statistics for Cartwright demonstrate considerable variation with a maximum fall recorded in the winter of 1942/43 (860.8cm) and a minimum 212.8cm in 1957/58. Such variability makes planning difficult, less so in winter than during the period of freeze up and break up.

There is a marked transformation of the Sandwich Bay environment with the onset of winter as was seen in Photograph 4A.

The effect of the severe climatic conditions is felt more through their variability than severity. Excessive snowfall hinders movement in the woods while unseasonable thaws makes movement on ice dangerous and tedious. A number of environmental processes influence the availability of and access to resources (Fig. 4.25).

The resources sought after by the Cartwright population are not uniformly spread across the area. As noted above access to resources is severely affected by changing environmental circumstances. Climatic variability compounds important areal variations in salinity and water depth (Fig. 4.26).



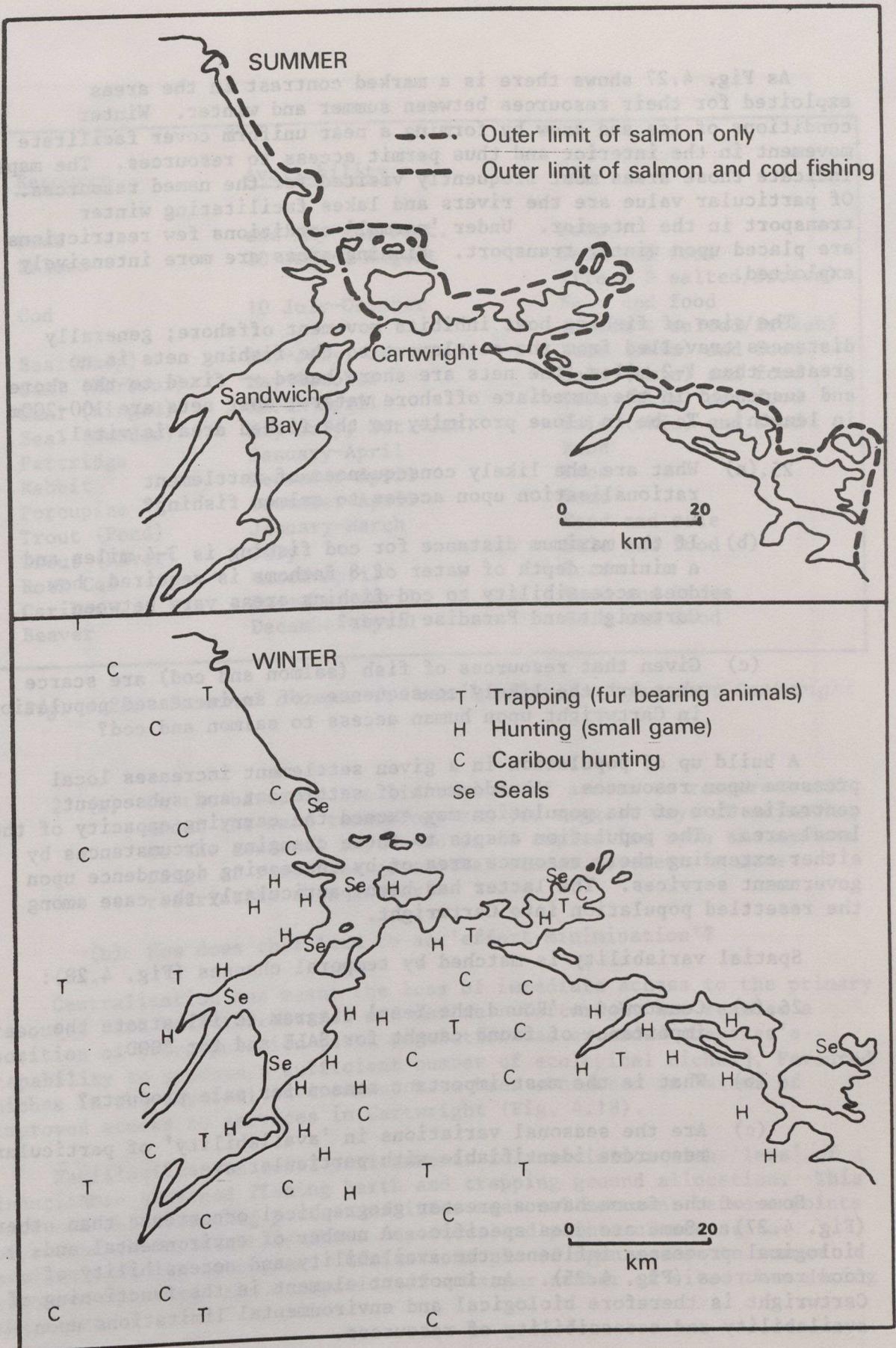


Fig. 4.27. Areas of resource exploitation, summer and winter, Sandwich Bay

As Fig. 4.27 shows there is a marked contrast in the areas exploited for their resources between summer and winter. Winter conditions of ice and snow by forming a near uniform cover facilitate movement in the interior and thus permit access to resources. The maps indicate those areas most frequently visited for the named resources. Of particular value are the rivers and lakes facilitating winter transport in the interior. Under 'normal' conditions few restrictions are placed upon winter transport. Fishing areas are more intensively exploited.

The size of fishing boat inhibits movement offshore; generally distances travelled from the settlement to the fishing nets is no greater than 1-2 miles [the nets are shore based -- fixed to the shore and suspended in the immediate offshore waters; most nets are 100-200m in length]. To be in close proximity to the fished area is vital.

- 25.(a) What are the likely consequences of settlement rationalisation upon access to salmon fishing?
- (b) If the maximum distance for cod fishing is 3-4 miles and a minimum depth of water of 8 fathoms is required, how does accessibility to cod fishing areas vary between Cartwright and Paradise River?
- (c) Given that resources of fish (salmon and cod) are scarce what are the likely consequences of an increased population in Cartwright upon human access to salmon and cod?

A build up of population in a given settlement increases local pressure upon resources. Abandonment of settlement and subsequent centralisation of the population may exceed the carrying capacity of the local area. The population adapts to these changing circumstances by either extending their resource area or by increasing dependence upon government services. The latter has been particularly the case among the resettled population into Cartwright.

Spatial variability is matched by temporal changes (Fig. 4.28):

- 26.(a) Construct a 'Round the Year' diagram to illustrate the importance of fauna caught for SALE and for FOOD.
- (b) What is the most important season for sale products?
- (c) Are the seasonal variations in 'availability' of particular resources identifiable with particular areas?

Some of the fauna have a greater geographical occurrence than others (Fig. 4.27). Some are area specific. A number of environmental and biological processes influence the availability and accessibility of food resources (Fig. 4.25). An important element in the functioning of Cartwright is therefore biological and environmental limitations upon availability and accessibility of resources.

<u>Resource</u>	<u>Availability</u>	<u>Use</u>
Duck	end May-end Sept.	Food
Salmon	20 June-5 August	Sale and food (fresh & salted/frozen)
Cod	10 July-October	Sale and food (fresh & salted/frozen)
Seal (Harp)	May-July; Oct.-Jan.	Sale (skin) and food
Seal (Harbour)	May-October	Sale (skin) and food
Seal (Ringed)	March-April	Sale (skin) and food
Seal (Hooded)	May-July; Oct.-Jan.	Sale (skin) and food
Partridge	January-April	Food
Rabbit	December-April	Food
Porcupine	December-April	Food
Trout (Pond)	January-March	Food and sale
Trout (River)	July	Sale and food
Rock Cod	March-April	Food
Caribou	December-April	Food and hides
Beaver	December-April	Sale and food

Fig. 4.28. Seasonal changes in 'availability' of fauna at Cartwright

27.(a) On the basis of the limitations of access to resources and under the same technology can you suggest ways of adjusting to the seasonal rhythm so as to capitalise upon the maximum range of resources given that summer movement is more restrictive than winter?

(b) How does this lead to an 'effort minimisation'?

Centralisation has meant the loss of immediate access to the primary resource base both terrestrial and marine. Cartwright has reached a position of overpopulation [area population has exceeded the area's capability to produce a sufficient number of ecological niches]. Favoured niches in the physical environment have been abandoned in favour of improved access to services in Cartwright (Fig. 4.18).

Familiarity with local environments in association with 'laws' of inheritance governed fishing berth and trapping ground allocation. This produced an entrenched pattern of inter-seasonal movement between points of access to exploitable winter resources and points of access to available summer resources. Limitations placed upon access to summer resources favoured the occupation of a larger number of sites than during the winter.

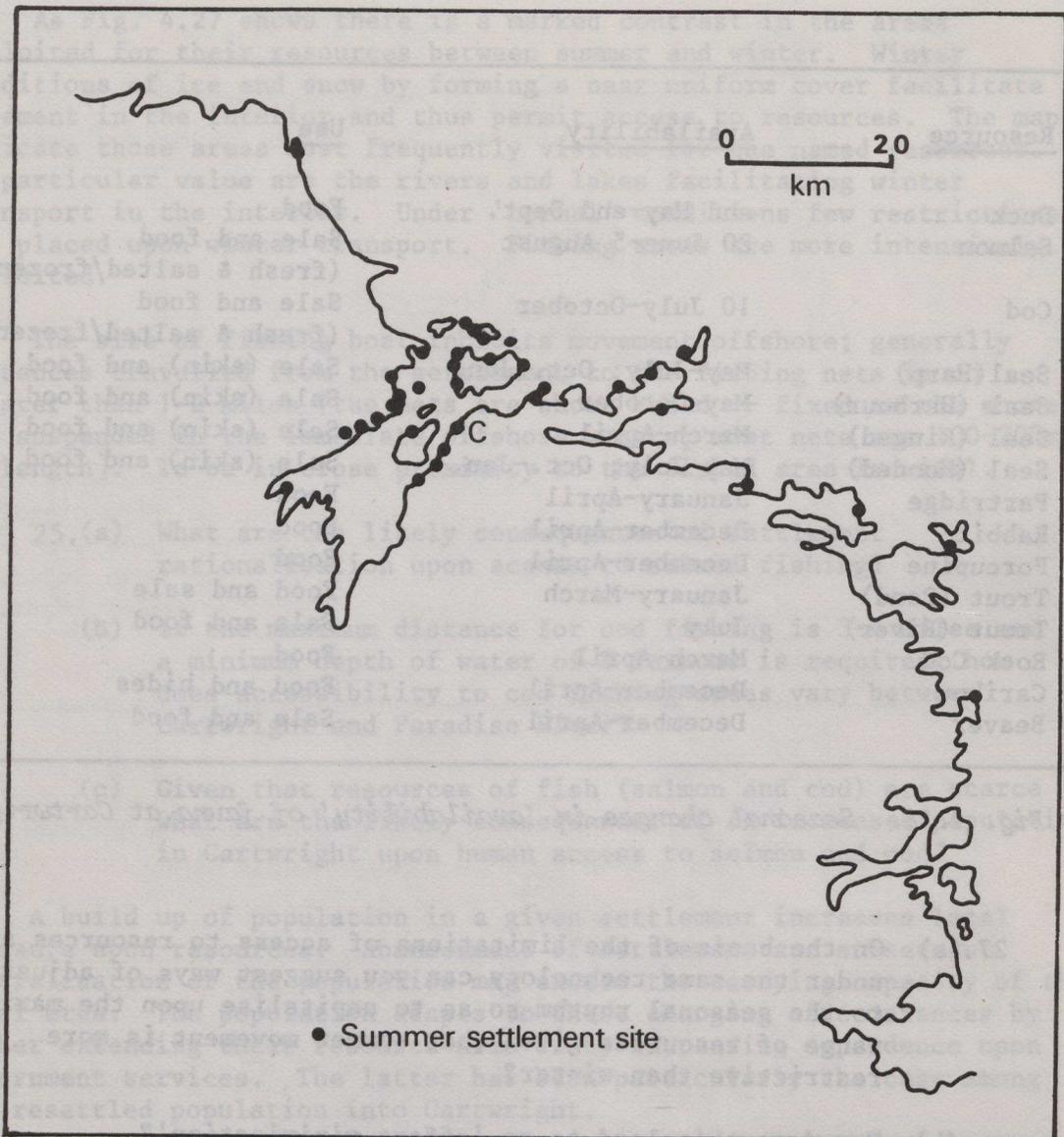


Fig. 4.29. Distribution of Cartwright population engaged in salmon/cod fisheries, July 1969.

(Source: field work.)

A number who move initially to a salmon only station subsequently move to a further station for cod fishing.

28.(a) Which sites are suitable as bases for salmon only and which for both cod and salmon?

(b) What has been the effect of population centralisation in Cartwright upon access to resources?

Only part of the Cartwright population move to summer fishing stations as represented below:

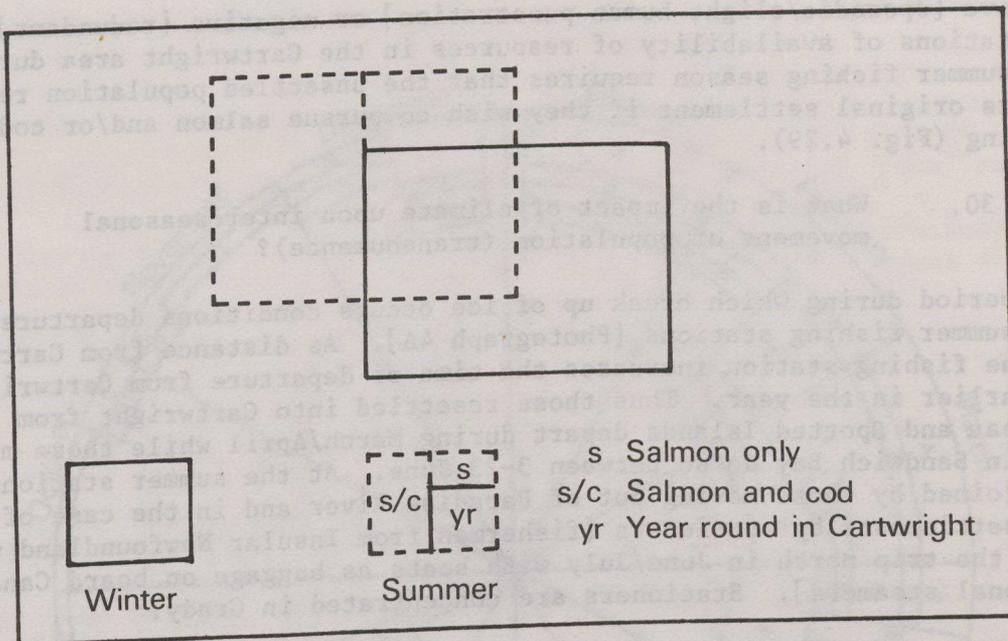


Fig. 4.30. Distribution of Cartwright population in summer

Photograph 4B of Pack's Harbour is one of the larger summer settlements, sometimes accommodating twenty families. Its importance is highlighted by the existence of a fish merchant who likewise moves out from Cartwright at the beginning of the summer. The buildings painted red in the photograph belong to the fish trader. The other buildings to the left of the quayside are the homes of those who have moved out from Cartwright or Paradise River for the summer salmon and cod fishing.

29. Consult Fig. 4.26 which shows the location of Pack's Harbour. Then draw a large fully annotated sketch of the Photograph 4B to summarise:

- i. characteristics of the settlement;
- ii. siting factors;
- iii. immediate environment as portrayed by the photograph taken during August 1969;
- iv. the environmental conditions likely to be experienced at this uninhabited site during winter.

Differentiate each set of annotations by a different ink colour.

A number of authors have commented upon man's use of the land. Some areas are used more intensively than others -- some areas have the function of providing habitation space for dwellings etc.; others are areas of exploitation, adjacent to 'habitation' areas but which may vary in intensity of exploitation; yet other areas are repugnant. To each of these areas the term ecumene has been applied [inhabited areas]. Centralisation of population has led to change in ecumene status -- active areas [constantly inhabited] have been downgraded to either

passive [sporadic/slight human penetration] or negative [redundant]. Limitations of availability of resources in the Cartwright area during the summer fishing season requires that the unsettled population returns to its original settlement if they wish to pursue salmon and/or cod fishing (Fig. 4.29).

30. What is the impact of climate upon inter-seasonal movement of population (transhumance)?

The period during which break up of ice occurs conditions departure to the summer fishing stations [Photograph 4A]. As distance from Cartwright to the fishing station increases the time of departure from Cartwright is earlier in the year. Thus those resettled into Cartwright from Batteau and Spotted Islands depart during March/April while those moving within Sandwich Bay do so between 3-23 June. At the summer stations they are joined by those moving out of Paradise River and in the case of a few settlements by stationers [fishermen from Insular Newfoundland who make the trip north in June/July with boats as baggage on board Canadian National steamers]. Stationers are concentrated in Grady.

The seasonal movement of population winter-summer frequently involves both fishermen and dependent families. The difficulties of transport during and immediately following 'break up' and the demand for labour during the fishing season frequently necessitates the early moving of schoolchildren. The effect is loss of schooling; similarly in the autumn September and October when the cod fishing season is drawing to an end a total of 71 pupils lost between one and ten weeks schooling during 1968:

Weeks	1	2	3	4	5	6	7	8	9	10	
Pupils	13	19	16	3	2	3	11	2	0	2	Total 71

Fig. 4.31. School weeks missed by Cartwright children, 1968

(Source: Cartwright school attendance records.)

WORK PATTERNS

The ergograph, Fig. 4.32, shows the input by month (in hours worked) spent in performing the major work activities.

- 31.(a) What does the graph suggest about general work patterns?

- (b) Which activities are more concentrated (in a time sense) and require the more intensive work input?

- (c) Where time is important (summer fishing) what adjustment does the fishing population make leading to travel minimisation?

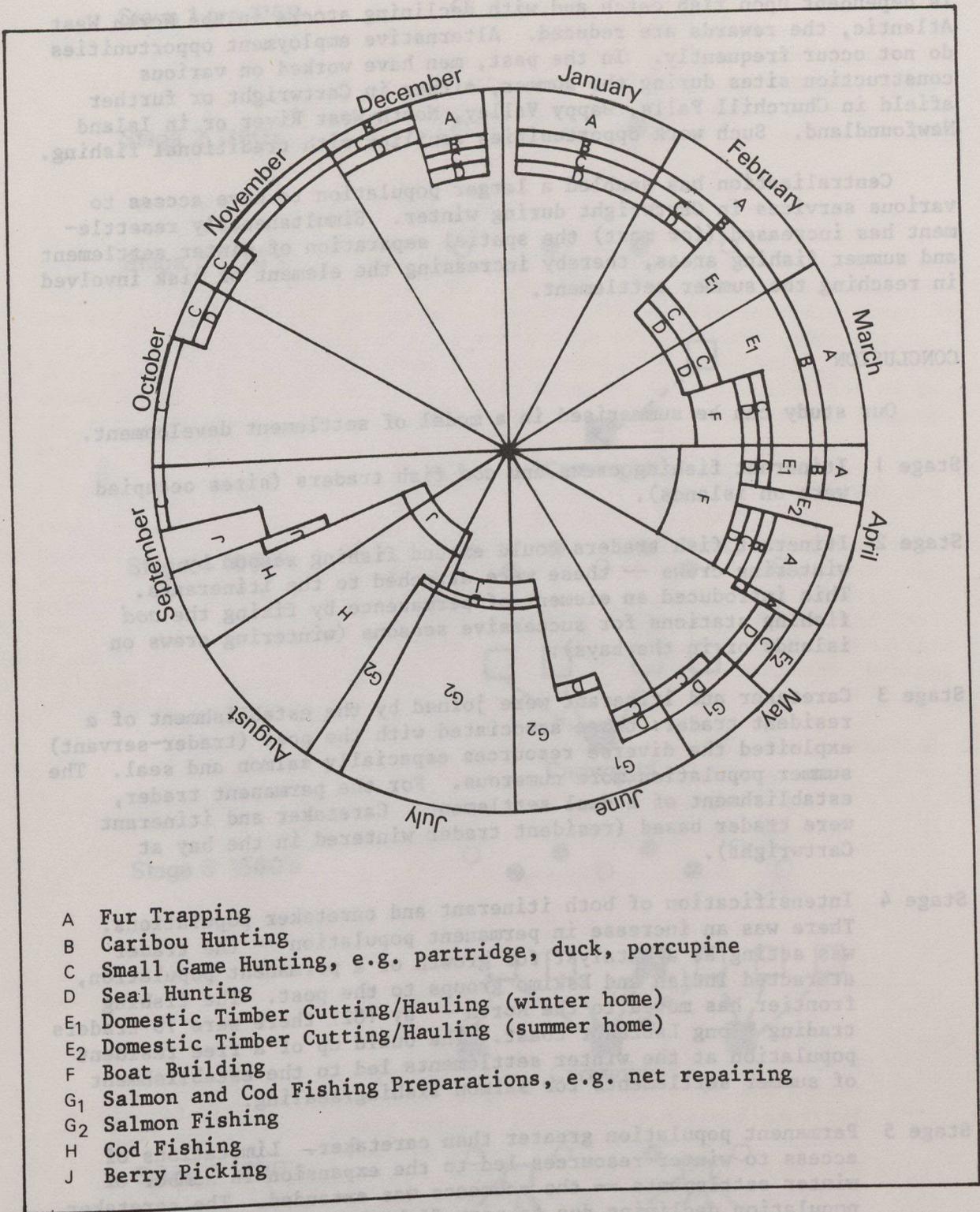


Fig. 4.32. Ergograph to show typical work patterns

Incomes reflect the work patterns, the summer salmon and cod contributing the major proportion of earnings. The importance of fishing is extended to the winter when Unemployment Insurance Benefit can be drawn. Locally this is known as 'Fishing for Stamps'; the amount payable

is dependent upon fish catch and with declining stocks in the North West Atlantic, the rewards are reduced. Alternative employment opportunities do not occur frequently. In the past, men have worked on various construction sites during the summer, either in Cartwright or further afield in Churchill Falls, Happy Valley, North West River or in Island Newfoundland. Such work opportunities conflict with traditional fishing.

Centralisation has enabled a larger population to have access to various services in Cartwright during winter. Simultaneously resettlement has increased (for most) the spatial separation of winter settlement and summer fishing areas, thereby increasing the element of risk involved in reaching the summer settlement.

CONCLUSION

Our study can be summarised in a model of settlement development.

- Stage 1 Itinerant fishing crews and *cod* fish traders (sites occupied were on islands).
- Stage 2 Itinerant fish traders could extend fishing season by wintering crews -- these were attached to the itinerants. This introduced an element of permanence by fixing the *cod* fishing stations for successive seasons (wintering crews on islands or in the bays).
- Stage 3 Caretaker and itinerant were joined by the establishment of a resident trader: those associated with the post (trader-servant) exploited the diverse resources especially salmon and seal. The summer population more numerous. For the permanent trader, establishment of a dual settlement. Caretaker and itinerant were trader based (resident trader wintered in the bay at Cartwright).
- Stage 4 Intensification of both itinerant and caretaker populations. There was an increase in permanent population -- the trader was acting as a catalyst for growth of a permanent population, attracted Indian and Eskimo groups to the post. The fishing frontier has moved to the North -- by 1827 there were 70 traders trading along Labrador coast. The build up of a free resident population at the winter settlements led to the establishment of summer settlements for salmon fishing/sealing.
- Stage 5 Permanent population greater than caretaker. Limitations of access to winter resources led to the expansion in number of winter settlements -- the ecumene was extended. The caretaker population declining due to poor fisheries. The seasonal movement becomes more complex. Large influx of seasonal fishermen -- 1870 Grady summer population 1000.
- Stage 6 Permanent population began moving to *cod* stations along outer coast -- the permanent population inhabited a threefold settlement system. Expansion in number of winter settlements (Fig. 4.10). Collapse of seasonal traders reduced the caretaker

Stage 1 pre 1760



Stage 2 1760's

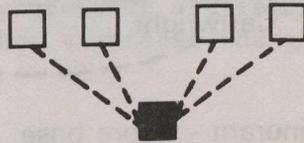
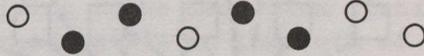


Stage 3 1770's



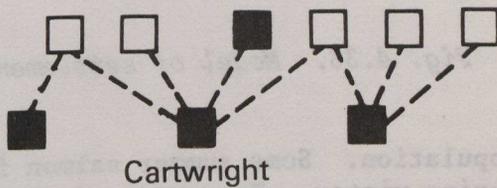
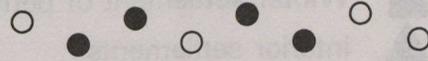
Cartwright

Stage 4 1830's



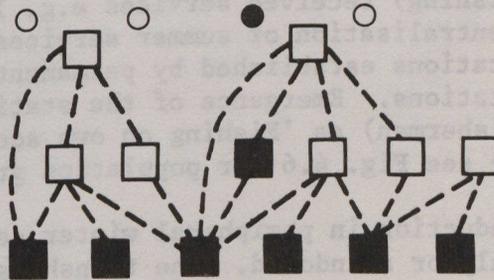
Cartwright

Stage 5 1860's



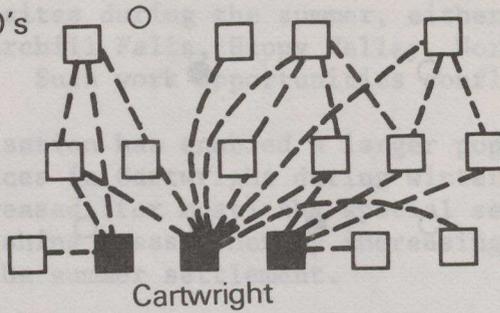
Cartwright

Stage 6 1890's

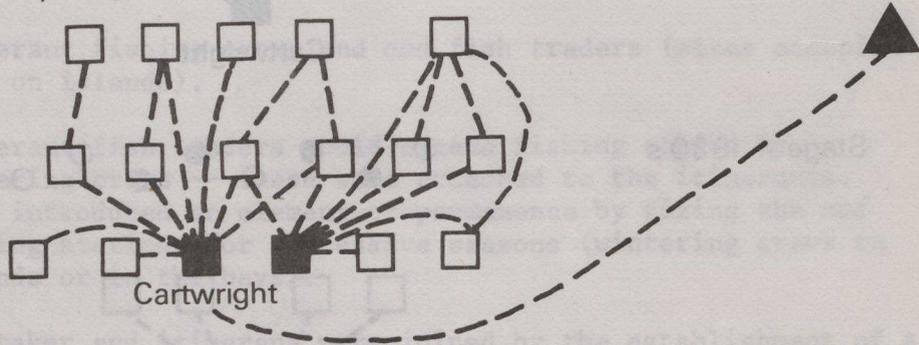


Cartwright

Stage 7 1940's



Stage 8 contemporary



- Itinerant - Shore base
- Caretaker
- Fishing station for permanent population
- Winter settlement of permanent population
- ▲ Interior settlements

Fig. 4.33. Model of settlement development

population. Some summer salmon fishing stations occupied during winter. Emergence of year round population to perform services (centre selection). Larger summer settlements (cod fishing) received services e.g. lighthouses, postmasters, centralisation of summer services. The number of cod fishing stations established by permanent residents fewer than salmon stations. Emergence of the stationer and floater (schooner fisherman) as 'Fishing on own account' (not tied to merchant) -- see Fig. 4.6 for population growth.

Stage 7 Reduction in peripheral winter settlement -- degraded to summer only or abandoned. The transhumance distances increasing. See (Fig. 4.10)

Fig. 4.10, Fig. 4.11 and Fig. 4.12.

Stage 8 Major centralisation of winter settlement in Cartwright and Paradise River (less important). Movement into Sandwich Bay from other 'settlement systems', e.g. Batteau and Spotted Islands. Return to former 'system' during fishing season (Fig. 4.29). Migration to Goose Bay and Newfoundland increasing (Fig. 4.16).

The model of settlement development suggests that during the early twentieth century the number of settlements in Sandwich Bay was at a maximum. Prior to that period population growth was restricted. Following the 1920s the greater provision of services and their polarisation at Cartwright has reduced the number of winter settlements (compare stage 5). The result has been a greater dependence upon store bought goods etc. The diminishing fish stocks reduces the viability of the area. With the exception of the increasing number attending colleges/universities whose job expectations are raised beyond that of a part-time fisherman or unskilled labourer, the alternatives are few.

The environment has offered resources for exploitation. During the twentieth century these have become progressively insufficient in quantity to permit a 'suitable' living to be made from fishing and fur trapping alone. Substitute resources mainly in the form of welfare payments and canned foods attracted population to Cartwright. While environmental limitations remain intangible, the coastal population has adjusted to resource scarcity by a process of settlement rationalisation. Such a concentration of population has tightened the grip of the physical environment upon human life.

DAVID ANDERSON

5 REGINA

SITE, SITUATION AND GROWTH

This is a study of a town, Regina; its relationships with its local region and with its province, Saskatchewan. Regina is often neglected by geographers as a focus of study because, as Fig. 5.1 demonstrates, growth has been unspectacular compared with other major Prairie towns. Nevertheless, growth has been substantial, despite unpromising beginnings, and the present rate of growth contrasts markedly with the provincial trend.

Year	Edmonton	Calgary	Regina	Saskatoon	Winnipeg
1901	4200	4400	2200	100	43300
1976	554200	469900	151200	133800	578200

Fig. 5.1. Population of major Prairie cities

(Source: Census of Canada)

1. Study Slide 5A, an aerial view (looking south) across the southern half of the city including the central business district. Within a rectangle 12cm x 9cm to represent the picture locate the central business district, surface water, the outer limit of the built-up area and Victoria Park (in the right foreground of the photograph). On the southern limit of the park is Victoria Avenue, the main east-west route traversing the city. The main north-south route (Highway 6), known locally as Albert Street, can be seen as the diagonal route in the top right of Slide 5A.

Reference to Albert, Regina and Victoria as significant locations is not unrelated, for this settlement was christened Regina in honour of Queen Victoria by her daughter, Princess Louise, the wife of the Governor General of Canada when the first train arrived on August 23rd 1882. At that time the site was unsettled and known as "Pile o' Bones", the result of buffalo bones alongside the marshy ditch known as Wascana Creek

(subsequently dammed for recreational purposes). The lack of significance of the Wascana Creek is illustrated by the development of the initial settlement some distance from it. A further handicap to the development of this level but virtually treeless plain was the lack of timber for firewood or for the construction of shelter and fencing. The Canadian Pacific Railway therefore chose Moose Jaw, another virgin site, 75km to the west as its divisional headquarters.

Nevertheless Regina was made capital of the North West Territories in 1883 and became capital of the newly formed province of Saskatchewan in 1906. The CPR received land as a subsidy for building the railway who

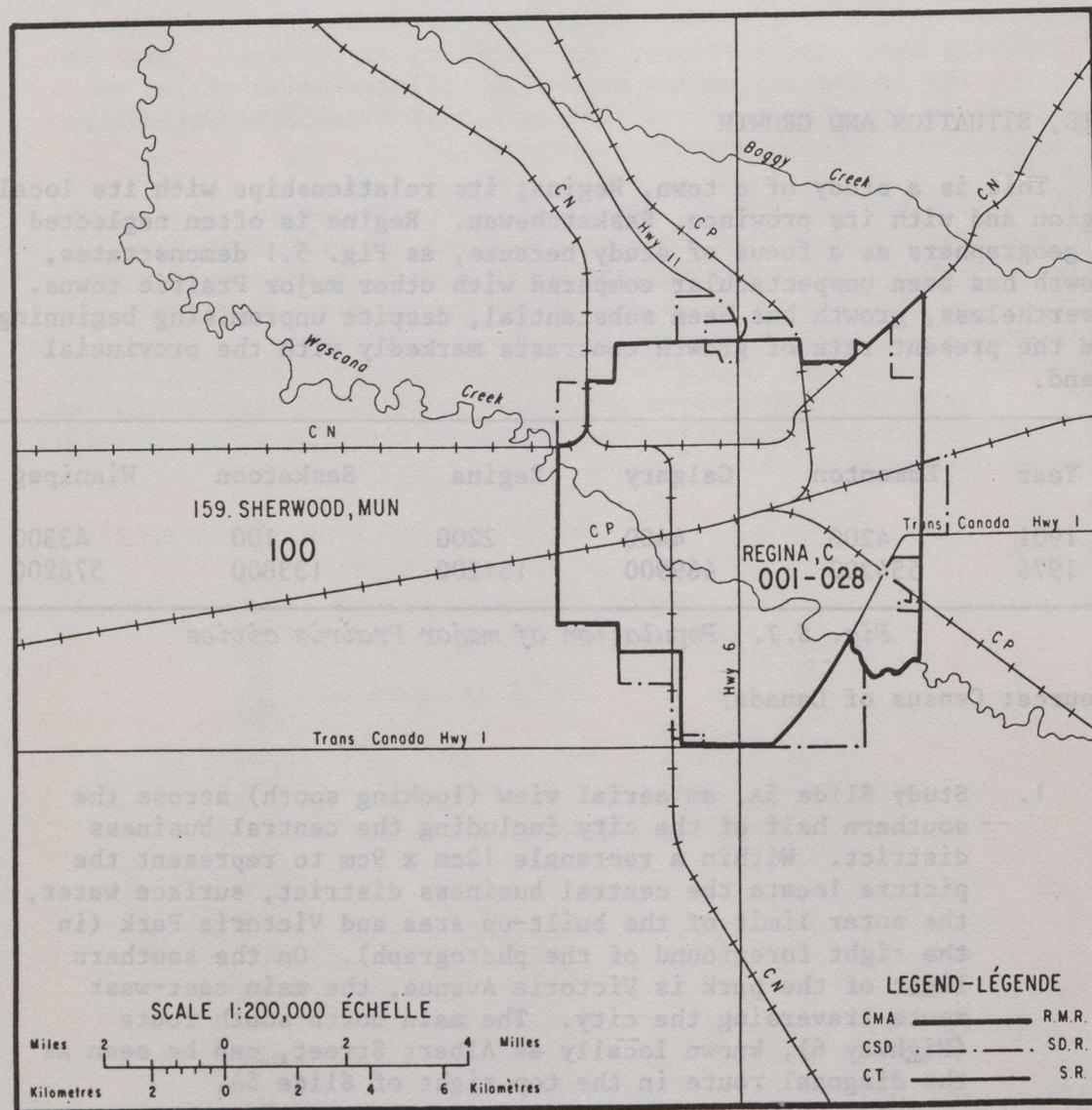


Fig. 5.2. Census Map of Regina Census Metropolitan Area

(Source: 1976 Census of Canada, Census tract bulletin, Regina)

in turn gave free land or sold it cheaply to the vast number of immigrants leaving a troubled Europe. Consequently the number of farms in the Prairie Provinces increased from 55200 in 1901 to over 288000 in 1931. Many farms were established in the zone highly suited to the cultivation of wheat centred on Regina. The railway network was extended rapidly with Regina a focus of communications providing marketing financial and administrative services for the wheat farmers. (By only 1921 Regina's population had grown to 34497 in contrast to the 19285 in 1921 and 32581 in 1976 of Moose Jaw.) At present 80 road haulage firms operate from Regina.

Regina has also benefited from its central position relative to the provincial energy resources. Saskatchewan with production in 1976 of 56 million barrels of oil (to the west and to the south-east of Regina) is self-sufficient in oil whilst providing two-thirds of its natural gas needs (to the south-east of Regina) though output is declining. Lignite is produced to the south of the city (5.2 million tons, 1976). Potash produced to the west and north-west of Regina is another major post-war development (5.2 million tons, 1976).

The CMA includes part of the terrain of another municipality in addition to the city area (CSD) though the difference in population is little more than 1000 people. However most of the census data is most readily available for the CMA.

2. Using Slide 5B, an extract from sheet 72-1/7, the 1:50,000 topographical map of Regina, draw a sketch map on twice the scale of Fig. 5.2 and add in different colours:

- (i) the C.P. railway, the C.N. (Canadian National Railway built in the early part of the twentieth century);
- (ii) the Trans Canada Highway (Highway 1), Highway 6 and Highway 11;
- (iii) oil pipeline and natural gas pipeline (gas line in the bottom right hand corner of the slide) and the oil refineries;
- (iv) Wascana Creek and lake;
- (v) CBD;
- (vi) older grid iron residential areas;
- (vii) more recent residential areas typified by crescents and cul-de-sacs.

Add an appropriate title to your map. N.B. the city limit to the south-east is just within the frame of Slide 5A; that to the east and to the north is just outside the frame.

Year	Regina	Saskatchewan
1901	2249	91279
1911	30213	492432
1921	34432	757510
1931	53209	921785
1941	58245	895992
1951	72731	831728
1956	91215	880665
1961	113749	925181
1966	132432	955344
1971	140734	926245
1976	151191	921325

Fig. 5.3. Growth of population, Regina and Saskatchewan

(Source: Census of Canada)

- 3.(a) List (i) the similarities and (ii) the differences in the pattern of growth of the population of Regina and Saskatchewan.
- (b) Insofar as you are able, explain the patterns of growth.
4. Review Slide 5A. Add further relevant annotations to your sketch drawn in answer to question 1 to illustrate the site, situation and growth of Regina.

DEMOGRAPHIC CHARACTERISTICS

The contrasts in the growth of population of Regina and its province are also reflected in other demographic characteristics. Population change by census divisions 1971-1976 shows only five of Saskatchewan's eighteen census divisions (Fig. 5.4) registering an increase of population (including 06 the census division incorporating Regina). The divisions 01, 02, 03 and 13 showed a loss of population between 9% and 13%.

- 5.(a) From the data in Fig. 5.5 -- the 1976 age and sex structure of Regina, draw an age-sex pyramid for Regina superimposed over Fig. 5.6 (Saskatchewan). Use the same age cohorts.
- (b) Using different colours shade the pyramid to represent (i) the population of Regina not represented within the Saskatchewan pyramid, and (ii) the population of Saskatchewan unrepresentative of the Regina population.
- (c) List the major similarities and differences between the two pyramids.

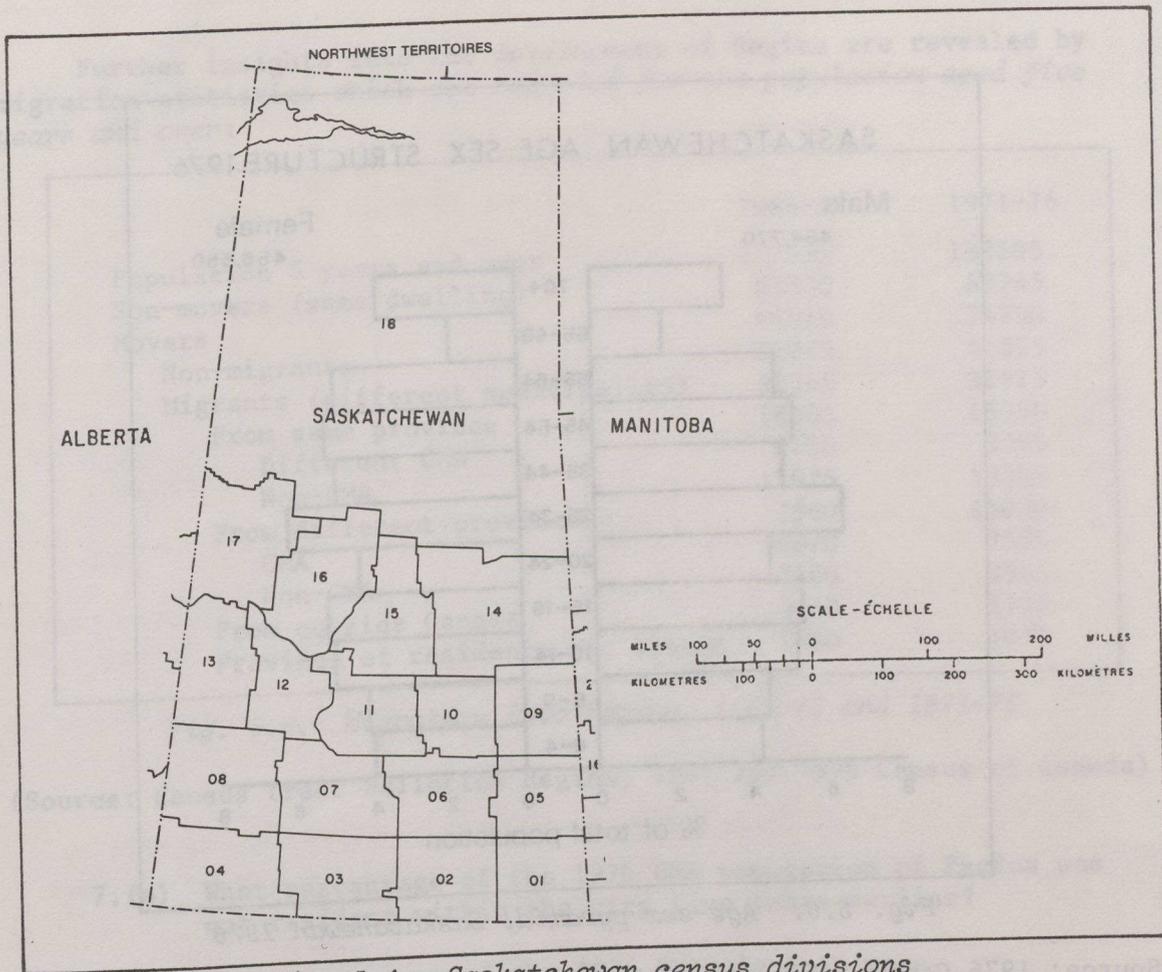


Fig. 5.4. Saskatchewan census divisions

(Source: 1976 Census of Canada Vol.2)

Sex and age group:	
Male, Total	73,970
0-4 years	6,400
5-9 "	6,255
10-14 "	7,250
15-19 "	7,680
20-24 "	8,275
25-34 "	11,610
35-44 "	7,945
45-54 "	7,325
55-64 "	5,645
65-69 "	1,995
70 and over	3,595
Female, Total	77,220
0-4 years	6,100
5-9 "	6,035
10-14 "	6,845
15-19 "	7,940
20-24 "	8,635
25-34 "	11,615
35-44 "	8,030
45-54 "	7,735
55-64 "	6,685
65-69 "	2,480
70 and over	5,115

Fig. 5.5. Age and sex structure for Regina, 1976

(Source: 1976 Census of Canada Regina Census tract bulletin 95-816)

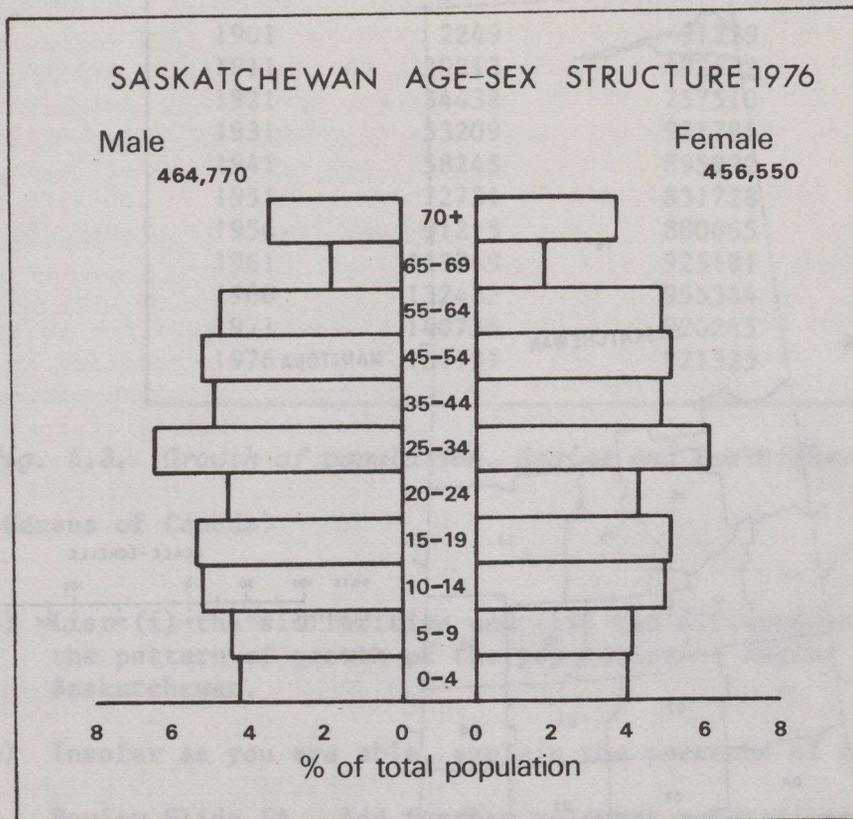


Fig. 5.6. Age-sex pyramid, Saskatchewan 1976

(Source: 1976 Census of Canada Vol. 2 Population: Demographic Characteristics, Table 11)

6. To what extent are the different demographic trends shown in Fig. 5.5 and Fig. 5.6 the result of differences in birth and death rates?

	Regina			Saskatchewan		
	Birth Rate	Death Rate	Natural Increase	Birth Rate	Death Rate	Natural Increase
1951	25.2	7.3	17.9	27.5	7.6	19.9
1956	28.6	7.6	21.1	26.9	7.5	19.4
1961	28.4	6.2	22.1	24.4	7.8	16.6
1966	22.7	6.8	15.9	19.9	7.7	12.1
1971	19.3	5.6	13.8	17.3	8.0	9.3
1976	18.2	6.3	11.8	16.8	8.2	8.7

per 1000 population

Fig. 5.7. Birth Rate, Death Rate and Rate of Increase

(Source: Regina City Health Department and Saskatchewan Economic Review 1978)

Further insights into the development of Regina are revealed by migration statistics which are recorded for the population aged five years and over:

	1966-71	1971-76
Population 5 years and over	127935	138505
Non-movers (same dwelling)	61330	63745
Movers	66610	74790
Non-migrants	36015	42875
Migrants (different municipality)	30595	31915
From same province	18105	16950
Different CMA	2130	3395
Non-CMA	15975	13365
From different province	7560	11030
CMA	4870	7555
Non-CMA	2690	3355
From outside Canada	3080	2730
Province of residence not stated	1680	1010

Fig. 5.8. Migration into Regina, 1966-71 and 1971-76

(Source: Census tract bulletins Regina, 1971 and 1976 Census of Canada)

- 7.(a) What percentage of the 1976 CMA population of Regina was not resident within the city five years earlier?
 - (b) What percentage of the 1976 CMA migrants were
 - (i) from the province of Saskatchewan
 - (ii) from outside a metropolitan area?
 - (c) How does the overall pattern shown for 1971-76 compare with that for 1966-71? What conclusions can you draw about the nature of recent migration into Regina?
8. What is the relative importance of natural increase and migration in the growth of Regina's population since 1966?

THE ATTRACTION OF REGINA AND THE UNFRIENDLY PRAIRIE

The migration of people to Regina can be readily understood in terms of push and pull factors. Prairie weather is a major push factor in favour of Regina.

- 9.(a) Draw a temperature and rainfall climate graph to represent the weather of Regina as shown in Fig. 5.9.
 - (b) To what extent do the means give an accurate picture of weather conditions?
10. Consider the differing impact such weather is likely to have on rural and urban living.

	Temperature (°C)			Precipitation		
	Mean daily	Maximum	Minimum	Mean total (mm)	Mean snowfall (cm)	Max. precip. in one day (mm)
Jan	-17.3	8.9	-50.0	17.8	19.3	14.0
Feb	-14.4	15.6	-47.8	17.3	18.0	15.2
Mar	- 8.3	24.4	-40.6	18.3	18.0	25.4
Apr	3.3	32.8	-28.9	23.4	10.4	30.2
May	10.6	37.2	-13.3	41.4	3.6	57.2
June	15.3	39.4	- 5.6	82.6	Trace	160.3
July	18.9	43.3	- 2.2	57.9	0.0	76.5
Aug	17.9	40.6	- 5.0	49.8	0.0	78.7
Sept	11.6	37.2	-16.1	36.3	1.8	79.8
Oct	5.3	31.1	-26.1	19.1	7.6	31.2
Nov	- 5.2	22.8	-37.2	18.0	17.3	23.9
Dec	-12.9	15.0	-48.3	16.3	18.5	13.5

Fig. 5.9. Temperature and precipitation records at Regina

(Source: Climate Canada, F.K. Hare and M.K. Thomas. Second edition 1979, John Wiley and Sons)

The increasing reliance on expensive new machinery for efficient agriculture, changes in farm size and the vagaries of farm income have also had their impact upon the Prairie farmer.

Item - Détail	1951		1961		1971		1976	
	Number - Nombre	%	Number - Nombre	%	Number - Nombre	%	Number - Nombre	%
Total number of farms - Nombre total de fermes.....	82,894	100.0	82,499	100.0	71,319	100.0	69,578	100.0
Farms classified by size of farm - Fermes classées selon la taille de la ferme:								
Under 3 acres - Moins de 3 acres.....	30	--	36	--	74	0.1	81	0.1
3- 9 acres.....	83	0.1	82	0.1	162	0.2	144	0.2
10- 69 ".....	231	0.3	202	0.2	397	0.6	530	0.8
70- 239 ".....	7,177	8.7	5,275	6.4	4,217	5.9	6,206	8.9
240- 399 ".....	22,320	26.9	17,656	21.5	11,024	15.5	9,785	14.1
400- 559 ".....	18,029	21.7	16,618	20.1	11,439	16.0	9,262	13.3
560- 759 ".....	14,839	17.9	15,305	18.6	12,506	17.5	10,833	15.6
760-1,119 ".....	12,072	14.6	15,346	18.6	15,236	21.4	14,627	21.1
1,120-1,599 ".....	5,279	6.4	7,412	9.0	9,242	13.0	9,903	14.2
1,600-2,239 ".....	1,703	2.0	2,742	3.3	4,176	5.9	4,752	6.8
2,240-2,879 ".....	499	0.6	825	1.0	1,313	1.8	1,614	2.3
2,880 acres and over - et plus.....	632	0.8	1,000	1.2	1,533	2.1	1,841	2.6

Fig. 5.10. Census farms classified by size of farm

(Source: 1976 Census of Canada Volume 13 Census of Agriculture for the Western provinces. Table 6)

Item - Détail	Unit - Unité	1951	1961	1971	1976
Value of machinery and equipment(1) - Valeur des machines et du matériel(1).....	\$	472,831,754	663,945,400	1,010,573,100	2,568,182,886

Fig. 5.11. Value of machinery and equipment

(Source: 1976 Census of Canada Volume 13 Census of Agriculture for the Western provinces. Table 7)

Year	Millions of dollars
1962	673
1967	972
1970	686
1975	2469
1977	2131

Fig. 5.12. Cash receipts (before governmental supplementary payments) of Saskatchewan farmers

(Source: Statistics Canada 21-201 and 21-001 Farm cash receipts)

11. Calculate the percentage of farms over 760 acres for the years 1951, 1961, 1971 and 1976.
12. Suggest reasons for the variability of cash receipts on Saskatchewan farms.
- 13.(a) What are the probable linkages between the data displayed in Figs. 5.10, 5.11 and 5.12?
- (b) Why should this data and their linkages encourage people to leave rural areas?

By 1931 about 80% of the farmers in the wheat growing districts of Saskatchewan lived within 15km of a railway station/grain elevator. Small villages, (the focus of community life and the source of community services) grew up along the railway lines. However, life for the Prairie farmer was relatively lonely and in marked contrast to that of the nucleated village of Europe from which many of the farmers had earlier departed. Rising living standards has increased the range and quality of services demanded by the population and the convenience of the motor car has led to branch railway line closures and a downward spiral of decline in railway services. This has reinforced the drift to the towns, especially the larger settlements, which correspondingly have an increased sphere of influence.

	1956	1966	1976
Total population	880665	955344	921325
Urban	322003	468327	511330
Rural	558662	487017	409995
Farm	360651	279642	192570
Non-Farm	198011	207375	217425

Fig. 5.13. *Urban and rural population, Saskatchewan*

(Source: Census of Canada 1976, Population: Geographic Distribution, Urban and rural distribution. Table 7)

14. With the aid of Fig. 5.12 and Fig. 1.6 compare (i) the relative proportion of population resident in different settings in 1976 in Saskatchewan and in Canada as a whole (ii) the trends.

It is interesting to note that over one thousand residents of Regina are farmers. This suggests that some people travel out to their farms rather than remain in a relatively isolated rural area or, in the case of the 'suitcase farmer', visit their farm (arable) only at the planting and harvesting seasons. The places of residence of others is defined as a 'summer village'. These people leave their rural Prairie home for a second, city home, during the winter months.

Employment opportunities are a crucial factor in the migration of households to Regina. The employed labour force was 81040 in 1976, 52676 male and 28364 female. Some of the major sources of employment are summarised in Fig. 5.14.

- 15.(a) What major elements of the occupational structure of Regina are not included in Fig. 5.14?
- (b) Attempt a classification of the major types of employment as shown in Fig. 5.14.
- (c) Attempt to explain the major characteristics of the occupational structure of Regina.

The attractiveness of Regina as a service centre has already been implied.

- 16.(a) What evidence does Fig. 5.14 yield to indicate that Regina is a high-order service centre.

- (b) Examine Slide 5B. Draw a rectangle 18cm by 12cm to represent the map extract. Locate within the rectangle evidence to show that Regina is a major service centre, annotating by different colours (i) evidence to illustrate Regina as a regional/provincial centre and (ii) evidence of the range of services provided more especially for the local community.

Enterprise	No. of Firms	Employment
Enterprise	126	842
Eating places	150	704
Building contractors	116	649
Non local trucking	102	434
Service stations	80	403
Furniture stores	34	367
Motor vehicle dealers	69	356
Plumbing and heating	22	326
Food processing	25	305
Farm equipment	27	288
Machinery	18	277
General merchandise	47	256
Electrician	46	255
Auto repairs	25	252
Electrical machinery	37	240
Auto body repair shops	32	238
Printing, publishing	63	235
Grocery stores	13	228
Metal products	51	208
Local trucking firms	29	203
Lumber yards	30	186
Drug stores	26	164
Auto supply stores	25	153
Mens and boys clothing	22	141
Masonry	20	125
Sheetmetal	15	122
Dry cleaners	63	119
Painting and decorating	7	117
Local and suburban transit	19	109
Business cleaning	28	109
Womens clothing	17	107
Plastering	14	106
Paper and wood products	9	95
Bulk oil trade	27	90
Photo studios	21	88
Sports stores	16	85
Jewellery stores	15	84
Oil and gas extraction	13	83
Hardware stores	7	80
Chemicals		

Fig. 5.14. Some major employers in Regina

(Source: "Community profile: Regina" published by the Saskatchewan Department of Industry and Commerce)

PREDICTIONS

This study has looked at population change in the CMA of Regina and its province. The City Planning Department study similar statistics, extrapolate population trends, and hopefully design a Regina of the

future. Prediction is always a precarious task because of the large number of assumptions that have to be made. Consequently the city planners have predicted a range of population totals for the city. Fig. 5.15 shows their predictions made in 1971 for the period up to the year 2001.

	1976	1986	1996	2001
Absolute Low	147,000	161,000	172,500	176,000
Preferred low	147,000	162,000	174,500	179,000
Preferred	148,500	167,000	183,000	188,000
Preferred High	148,500	173,000	194,000	204,500
Absolute High	154,500	197,500	243,500	269,000

Fig. 5.15. Summary forecast population for Regina

(Source: Regina City Planning Department)

17.(a) How accurate was the prediction for 1976?

(b) With the aid of some of the information in this study, suggest factors which would push Regina's population level towards:

- (i) the absolute low forecast for 2001
- (ii) the absolute high forecast for 2001.

PHILIP DEAN

6 THE OKANAGAN VALLEY

INTRODUCTION

The theme of this study is population change in a distinctive area of southern central British Columbia. It is an examination of some effects of population change and population structure on the character of settlement, land use and service provision. The information and exercises provide a detailed study of a small area (census division) which illustrates two broader concepts of geography.

1. The man-land relationship

The earlier ideas of environmental determinism in which the physical environment was believed to control the social, economic and cultural development of people fell from favour in the early years of this century. Determinism was replaced by possibilism, an opposite extreme, which discounted the significance of the physical environment. The reality of the relationship between man and land lies somewhere between these two extremes. The actual balance depends on the level of a society's technological ability to transform or modify the natural world. In the Okanagan valley changes in population and population structure can be viewed as responses to the physical environment.

2. The decision-making process of resource appraisal

When people make choices about where and how to live their decisions are judgements of the resources "seen" in a particular location. The decision to move may originate from either the "pull" attractions of an alternative location or the "push" disadvantages of the existing location. Therefore, changes in the population of an area reflect the evaluations and decisions made about an area's resources. The decisions made in resource appraisal are basic causes of population change. In this study population change illustrates the relationship between man and land.

In some areas population change is predominantly one of decline and out-migration. Such areas are clearly unpopular; for example, the decline can be a response to and a cause of a deteriorating environment as in the case of an inner city area (Chapter 2 - the Montreal study). Conversely, an increase in population through migration reveals an area which is popular. The reasons for popularity, the "pull factors" of migration, are

varied. In the example of Pine Point (Chapter 3) it is the development of mineral resources which is causing the growth in population. Although the areas experiencing decline are generally seen as problem regions growth also produces difficulties. Rapid population increase and expansion of settlement can produce severe planning problems, especially for essential services like water supply and sewage disposal.

An analysis of population change is, therefore, an important initial step in the geographical study of a region.

	1931	1941	1951	1961	1971	1976
CANADA	10376786 (18.1)	11506655 (10.9)	14009429 (21.8)	18238247 (30.2)	21568311 (18.3)	22992604
Newfoundland	281500*	303300*	361416*	457853 (26.7)	522104 (14.0)	557725
Prince Edward Island	88038 (-0.7)	95047 (8.0)	98429 (3.6)	104629 (6.3)	111641 (6.7)	118229
Nova Scotia	512846 (-2.1)	577962 (12.7)	642584 (11.2)	737007 (14.7)	788960 (7.0)	828571
New Brunswick	408219 (5.2)	457401 (12.0)	515697 (12.7)	597936 (15.9)	634557 (6.1)	677250
Quebec	2874662 (21.8)	3331882 (15.9)	4055681 (21.7)	5259211 (29.7)	6027764 (14.6)	6234445
Ontario	3431683 (17.0)	3787655 (10.4)	4597542 (21.4)	6236092 (35.6)	7703106 (23.5)	8264465
Manitoba	700139 (14.8)	729744 (4.2)	776541 (6.4)	921686 (18.7)	988247 (7.2)	1021506
Saskatchewan	921785 (21.7)	895992 (-2.8)	831728 (-7.2)	925181 (11.2)	926242 (0.1)	921323
Alberta	731605 (24.3)	796169 (8.8)	939501 (18.0)	1331944 (41.8)	1627874 (22.2)	1838037
British Columbia	694263 (32.3)	817861 (17.8)	1165210 (42.5)	1629082 (39.8)	2184621 (34.1)	2466608
Yukon	4230 (1.8)	4914 (16.2)	9096 (85.1)	14628 (60.8)	18388 (25.7)	21836
North West Territories	9316 (14.4)	12028 (29.1)	16004 (33.1)	22998 (43.7)	34807 (51.3)	42609

*Estimate. (Newfoundland did not join Confederation of Canada until 1949.)

Fig. 6.1. Table to show population totals for Canada, Provinces and Territories 1931-76
(Percentage change by decade shown in brackets)

(Source: 1971 Census of Canada Vol. I Population: Geographic Distributions Table 1)

- 1.(a) From the population figures given in Fig. 6.1 produce a graph to illustrate the general rate of change in Canadian and provincial populations between 1931 and 1971.
- (b) What are the general trends of population change within Canada during this period? Summarise your answer in three general statements.
- (c) In the period 1971-76 which areas are above the national average rate of increase and which areas are below the national average?

It is evident that within the general context of an increasing Canadian population there are considerable variations. Some areas are growing more quickly than the national average; some have experienced slower growth whilst others have actually shown an absolute decline in population. However, a general trend, e.g. at provincial level, can conceal local variations which are in opposition.

Growth and decline in population totals are not the only significant changes. It is important to examine the age-structure of a region's population. The consequences of a high proportion of younger age-groups are very different to the consequences of a high proportion of elderly. For the former, education services will be major requirements, whilst the latter will need specialised medical facilities and retirement amenities.

The population pyramids shown in Fig. 6.2 indicate the considerable variations between the structure of the national population and those of the provinces and territories, and between the individual provinces and territories. The population pyramids reflect variations in birth and death rates and different patterns of migration.

2. With reference to the population pyramid for Canada make a general statement about each of the following:
 - (a) The size of the age-cohorts below the age of 10.
 - (b) The size of the cohorts between 30 years and 50 years of age.
 - (c) The size of the cohorts from 50 years of age upwards.
- 3.(a) Which of the pyramids shown in Fig. 6.2 display distinct contrasts with the national situation?
 - (b) On the basis of their population structures divide the twelve provinces/territories into three broad groups and describe the general characteristics of each of your groups.
 - (c) In which areas are there indications of loss of population due to out-migration of the working age groups (i.e. the 15-year old to 60-year old groups)?

Percentage Distribution of the Population by Age Group and Sex, Canada and Provinces, 1976

Répartition en pourcentage de la population par groupe d'âge et selon le sexe, Canada et provinces, 1976

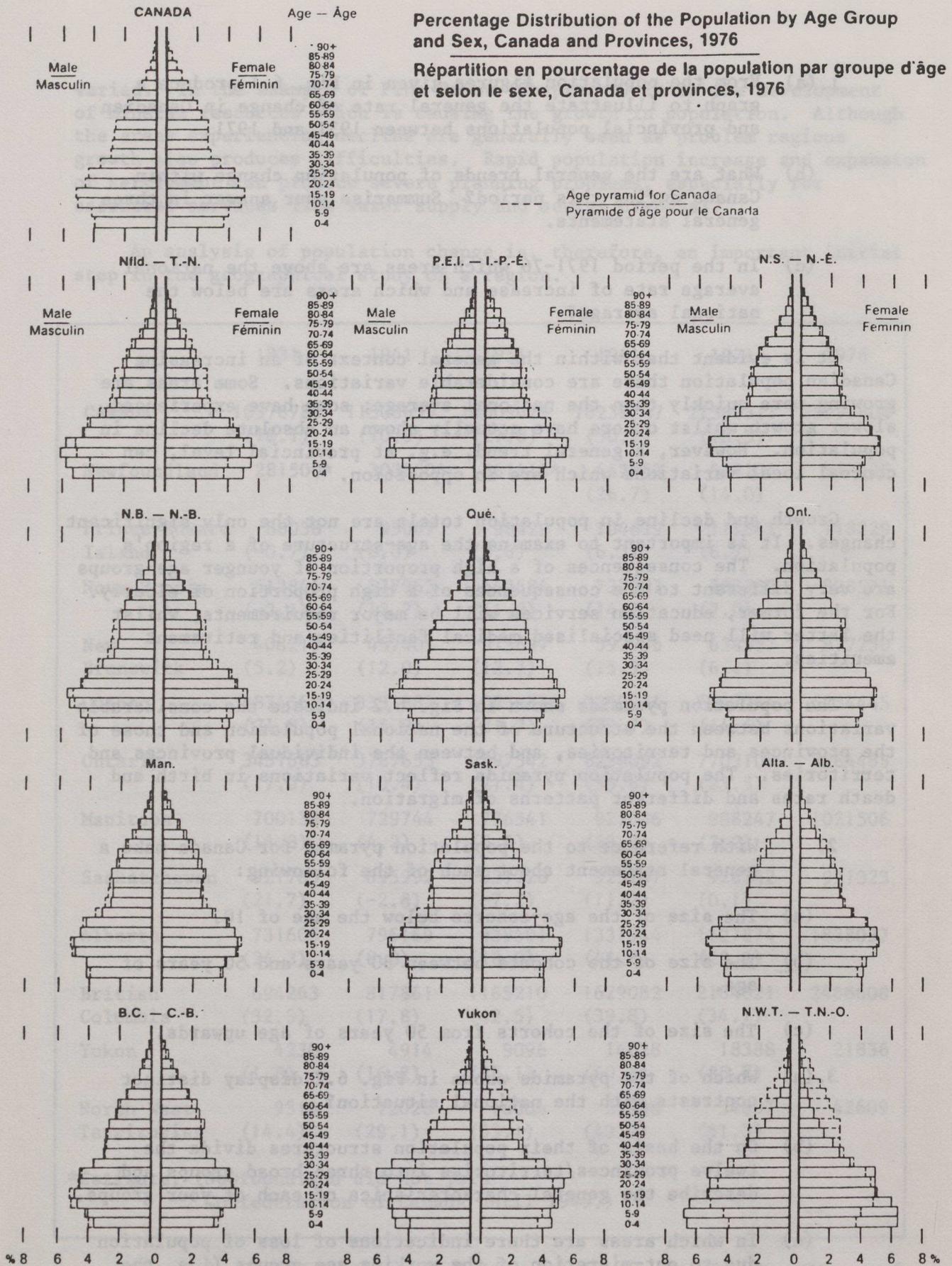


Fig. 6.2. Age-sex pyramids, Canada and Provinces, 1976

(Source: 1976 Census of Canada Vol. 2 Population: Demographic Characteristics)

Census year and sex Année de recensement et sexe		Total	Under 1 Moins de 1	1-4	5-9	10-14	15-19	20-24	25-29	30-34		
CANADA												
1971	T.	21,568,310	355,870	1,460,285	2,254,005	2,310,735	2,114,345	1,889,405	1,584,125	1,305,420		
	M.	10,795,370	182,195	747,410	1,152,430	1,181,450	1,074,430	941,775	800,710	660,875		
	F.	10,772,945	173,675	712,880	1,101,575	1,129,290	1,039,915	947,630	783,410	644,550		
1976	T.	22,992,605	346,545	1,385,455	1,887,805	2,276,375	2,345,235	2,133,805	1,993,060	1,627,485		
	M.	11,449,525	177,690	710,950	966,730	1,164,645	1,195,975	1,065,765	1,000,520	822,690		
	F.	11,543,080	168,850	674,505	921,080	1,111,730	1,149,280	1,068,040	992,540	804,795		
British Columbia - Colombie-Britannique:												
1971	T.	2,184,620	34,630	140,815	212,225	222,300	201,120	185,150	160,125	132,945		
	M.	1,100,375	17,765	71,970	108,335	113,240	102,760	93,150	81,805	68,220		
	F.	1,084,245	16,870	68,845	103,895	109,065	98,360	92,000	78,320	64,730		
1976	T.	2,466,610	34,395	138,865	193,970	227,890	237,890	221,470	218,860	176,880		
	M.	1,232,510	17,590	71,030	99,170	116,170	120,990	110,305	110,470	90,330		
	F.	1,234,095	16,805	67,835	94,800	111,720	116,900	111,160	108,390	86,550		
35-39	40-44	45-49	50-54	55-59	60-64	65-69	70-74	75-79	80-84	85-89	90+	Median age - Âge médian
CANADA												
1,263,870	1,262,525	1,239,040	1,052,535	954,725	777,015	619,960	457,380	325,510	204,170	100,010	37,380	26.2
645,045	640,765	613,415	518,895	472,415	381,690	296,050	205,575	139,995	85,680	40,625	13,940	25.7
618,820	621,760	625,630	533,640	482,315	395,320	323,910	251,800	185,515	118,490	59,385	23,440	26.7
1,328,790	1,268,220	1,252,845	1,220,180	1,019,035	905,400	720,815	533,725	362,705	220,560	112,380	52,160	27.8
671,335	643,575	630,475	595,715	492,265	435,790	338,520	241,365	150,430	85,250	41,475	18,365	27.2
657,450	624,640	622,370	624,465	526,775	469,615	382,300	292,360	212,275	135,310	70,900	33,795	28.4
British Columbia - Colombie-Britannique:												
127,170	128,610	129,100	114,205	106,600	84,615	68,240	50,920	38,595	27,360	14,550	5,345	27.9
66,965	66,970	63,925	55,300	52,435	41,975	34,205	23,570	16,920	12,190	6,395	2,280	27.6
60,200	61,645	65,175	58,900	54,165	42,635	34,035	27,350	21,675	15,170	8,150	3,065	28.3
144,720	135,160	134,595	134,075	117,095	108,680	84,865	63,015	42,755	27,755	15,830	7,835	29.1
74,105	70,695	69,225	63,195	55,460	51,885	40,655	30,380	18,455	11,140	6,205	3,060	28.7
70,615	64,465	65,375	68,880	61,640	56,795	44,210	32,635	24,300	16,615	9,625	4,775	29.5

Fig. 6.3. Population by five year age groups and sex, for Canada and British Columbia, 1971 and 1976

(Source: 1976 Census of Canada Vol. 2 Population: Demographic Characteristics Table 11)

4. Study the 1976 data given in Fig. 6.3 for Canada and British Columbia and also the corresponding age and sex pyramids in Fig. 6.2.
 - (a) What significant differences are there between the two pyramids?
 - (b) What changes have occurred since 1971?

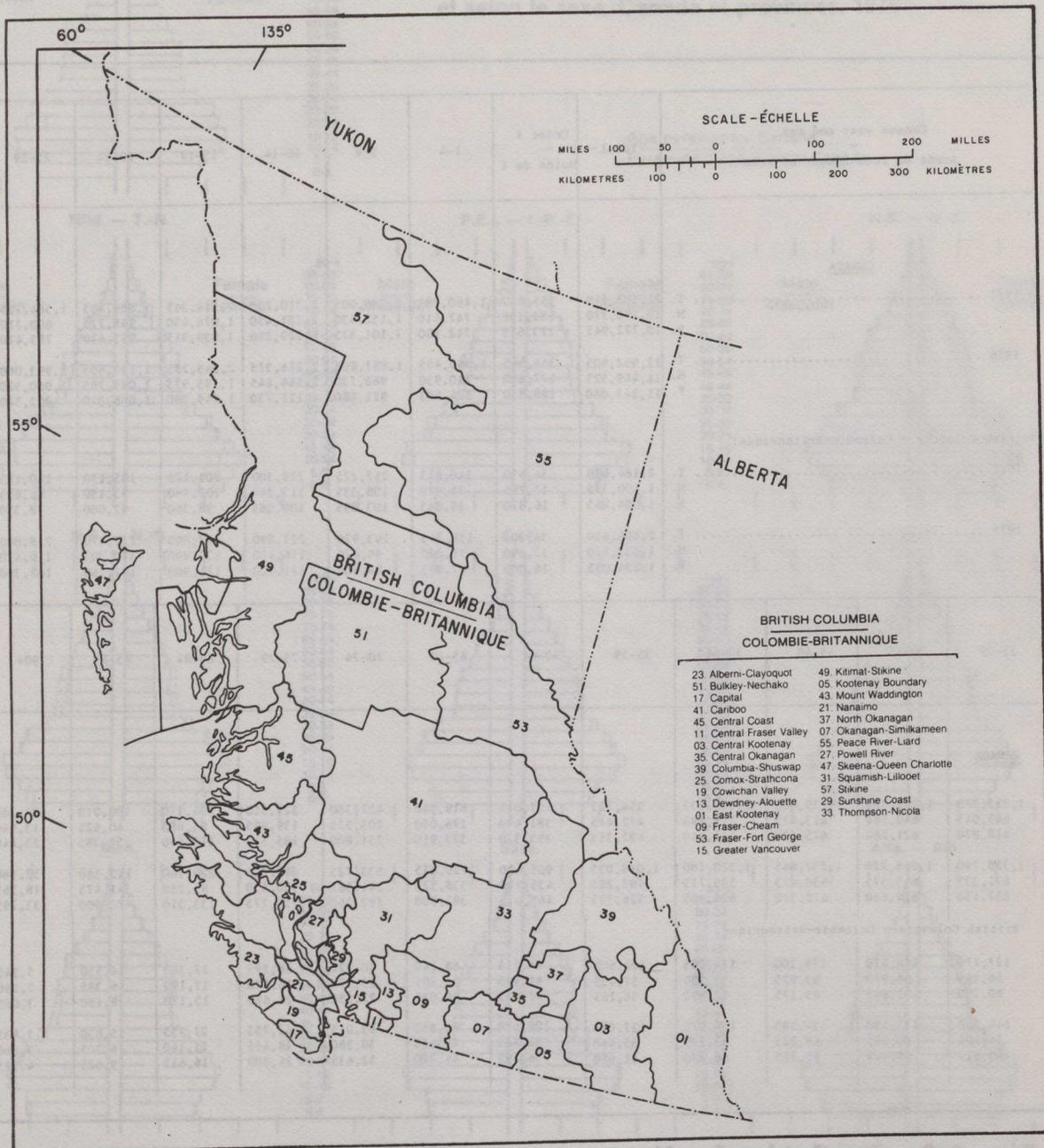


Fig. 6.4. Index map of Census divisions of British Columbia

(Source: 1976 Census of Canada, Vol. 2)

These exercises on changes in population totals and population structure make it clear that there are considerable variations within Canada. On the basis of population characteristics it is possible to identify areas of decline and to distinguish between growth regions, for some have predominantly youthful populations (e.g. the North West Territories) and there are others where the proportion of the age groups above 50 years is greater than the national average (e.g. British Columbia). Factors of location and environment play their parts in producing these population patterns. In turn, the characteristics of population play their part in creating and modifying the landscape, for

people of different ages have different needs and interests. It is this aspect which is to be illustrated in the case study of the Okanagan valley in British Columbia.

THE OKANAGAN VALLEY

It is evident from the data given in Fig. 6.1 that in terms of population British Columbia is a leading growth area of Canada, and in the decade 1961-71 it had the highest rate of increase (34%) of all the provinces. Nevertheless, as with Canada, there are important local variations in population change.

The Census of Canada has devised 29 regional divisions of British Columbia and these are shown on the map (Fig. 6.4).

The population data for a representative group of eight census divisions are given below.

	1941	1951	1961	1971	1976
B.C.	817861	1165210	1629082	2184621	2466608
Greater Vancouver	393898	562462	790741	1028334	1085242
Peace River	8444	14625	31352	43996	44842
East Kootenay	18701	24897	29739	39720	46450
Kitimat-Stikine	7983	9669	23031	37326	38718
Fraser-Cheam	17871	28320	38016	46119	51430
Capital	86492	121546	161947	204803	230592
Cariboo	9155	13086	27103	39357	51616
*Okanagan-Similkameen	18453	28481	33486	42752	51520

Fig. 6.5. Population totals for British Columbia and eight selected census divisions. 1941-1976

(Source: Census of Canada, various years)

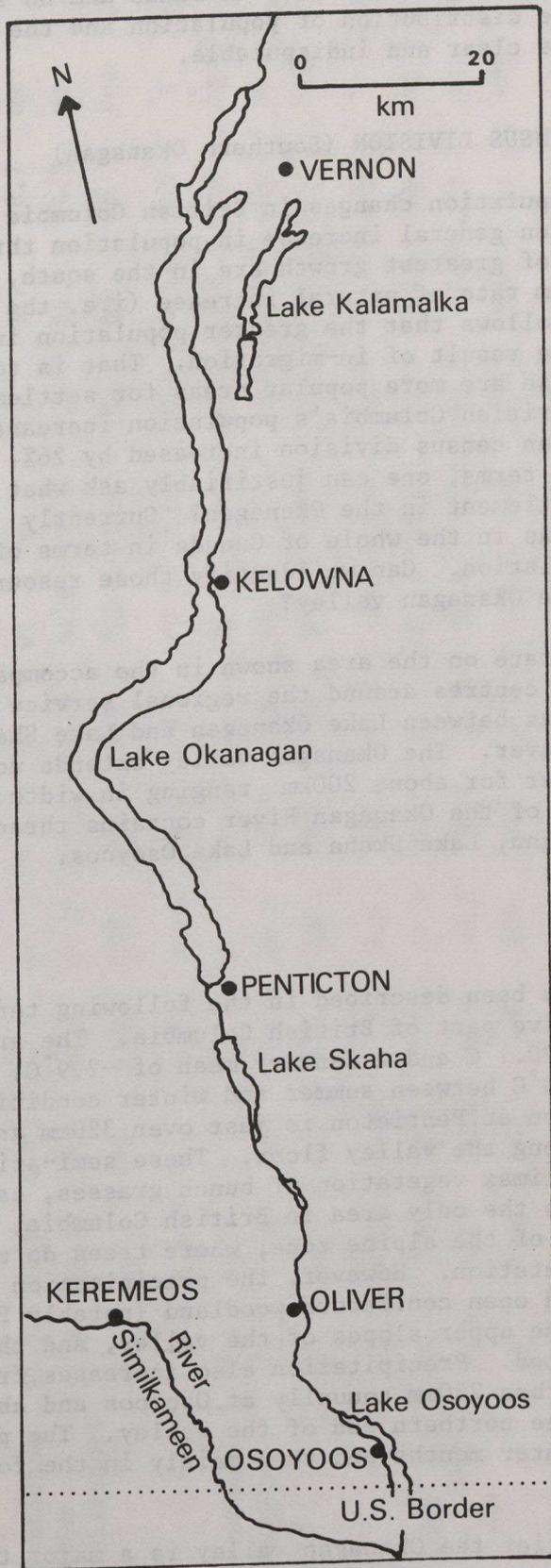
*The Okanagan valley comprises three census divisions: North Okanagan (1976 population 46860), Central Okanagan (1976 population 711250) and Okanagan-Similkameen. For the purposes of this study the Okanagan-Similkameen division is to be used as the representative example.

5. Draw a graph to help answer each of the following questions:
- (a) Which census division has had the largest population increase by number in the period 1941-76?
 - (b) Which division has had the highest rate of population increase in the period 1941-76?
 - (c) Which division has had the smallest increase in population in the period 1941-76?
 - (d) For the period 1951-76 classify the eight divisions into two groups: those above the Province's average rate of population increase, and those below the average.
6. On an outline map of the census divisions in British Columbia construct a series of located bar-diagrams to show the population totals of each of the eight divisions for 1941, 1951 and 1971. Describe the regional variations in population indicated by your map.

In seeking explanations for the distribution of population in British Columbia and the evident differences in the growth rates of population it is important to have some knowledge of the Province's basic physical geography, its physiographic regions and the main features of settlement and transport networks.

7. With the aid of an atlas produce a sketch map of British Columbia in an outline frame 24cm x 18cm. Entitle your map "Features of Relief and Settlement in B.C.". Include the following information:
- (i) Land below 150m.
 - (ii) Major river systems: e.g. Fraser, Peace, Columbia, Skeena, Okanagan.
 - (iii) Major mountain ranges: Rocky Mountains, Coast Mountains, Selkirk Mountains.
 - (iv) Interior plateaux: Fraser Plateau, Nechako Plateau, Stikine Plateau.
 - (v) Major settlements: Vancouver, Victoria, Prince Rupert, Prince George, Kamloops, Dawson Creek, Fort St. John, Burns Lake, Cranbrook, Penticton.
 - (vi) Major highways and railways.
8. From the evidence of the sketch map make a brief summary of evidence which may help to explain the population distribution trends observed in question 6.

The general indications are that the population is limited to the southerly parts of the Province. One half (53%) of the provincial population lives in the urban areas of Vancouver and Victoria. Away from that south-western corner of British Columbia settlement avoids the higher elevations above 600m and is largely confined to the major river valleys of the southern interior. The areas to the north of Prince George are mainly uninhabited; these are mountainous and inaccessible



Population totals:

Vernon	
11098	'66
13283	'71
17546	'76

Kelowna	
16654	'66
19142	'71

Penticton	
14978	'66
18146	'71
21344	'76

Oliver	
1774	'66
1615	'71
1641	'76

Keremeos	
563	'66
605	'71
702	'76

Osoyoos	
1022	'66
1551	'71
2100	'76

Fig. 6.6. Settlement centres in the southern Okanagan valley

districts with few highways. Large areas have no roads and no settlement. The relationship between the distribution of population and the physical character of the Province is clear and indisputable.

THE OKANAGAN-SIMILKAMEEN CENSUS DIVISION (Southern Okanagan)

The evidence of the population changes in British Columbia indicates that there has been general increase in population throughout the Province but the areas of greatest growth are in the south. Since there is a generally uniform rate of natural increase (i.e. the excess of births over deaths) it follows that the greater population increases of some areas are mainly the result of in-migration. That is to say, the areas of greater increase are more popular areas for settlement. In the period 1971-76 whilst British Columbia's population increased by 13%, the Okanagan-Similkameen census division increased by 26%. Although these are relative terms, one can justifiably ask what are the obvious attractions for settlement in the Okanagan? Currently it is one of the major growth areas in the whole of Canada in terms of percentage increase of population. Can we identify those resources that draw people to settle in the Okanagan valley?

The study will concentrate on the area shown in the accompanying sketch map (Fig. 6.6) which centres around the regional service centre of Penticton. Penticton lies between Lake Okanagan and Lake Skaha, 260km to the east of Vancouver. The Okanagan valley extends northwards from the United States border for about 200km ranging in width between 4km and 12km. The valley of the Okanagan River contains three principal lakes: Lake Okanagan, Lake Skaha and Lake Osoyoos.

THE PHYSICAL RESOURCES

The Okanagan valley has been described in the following terms: 'The Okanagan is a distinctive part of British Columbia. The area has a July mean temperature of 20.1°C and a January mean of -2.9°C; a continental-type range of 23°C between summer and winter conditions. The mean annual precipitation at Penticton is just over 320mm and this is typical of conditions along the valley floor. These semi-arid conditions give rise to a climax vegetation of bunch grasses, sagebrush and cacti, and this is the only area in British Columbia, apart from the highest elevations of the alpine zone, where trees do not form part of the climax vegetation. However, the precipitation increases with elevation and open coniferous woodland (notably Ponderosa Pine) begins to appear on the upper slopes of the valley, and the plateau surfaces are forested. Precipitation also increases from south to north, being less than 250mm annually at Osoyoos and about 500mm annually around Vernon at the northern end of the valley. The precipitation maxima occur in the winter months and then mainly in the form of snow.

In general terms of relief the Okanagan valley is a major trench-like valley running north to south and cutting deeply into the Fraser Plateau which lies between the Rocky Mountains to the east and the Coast Mountains to the west. The valley floor lies about 500m below

	J	F	M	A	M	J	J	A	S	O	N	D	
Penticton 400m (altitude)	-2.1	1.0	5.5	8.6	12.6	17.3	21.2	19.1	14.0	8.4	0.2	-4.3	°C
	45.9	16.6	0.2	0	0	0	0	0	0	0	3.7	18.7	cm
	37.3	26.7	13.0	60.4	21.2	18.5	26.0	44.9	36.8	2.3	24.3	14.3	mm
	27	63	141	154	254	281	319	205	140	192	69	59	hrs
Vancouver Airport 10m	3.5	5.6	7.3	9.2	11.8	16.1	18.1	17.3	13.7	10.4	4.1	2.0	°C
	22.6	16.7	0	0	0	0	0	0	0	0	1.4	2.8	cm
	125.5	94.8	94.1	101.8	89.8	20.5	7.8	104.4	111.2	45.4	127.3	94.3	mm
	35	78	124	132	300	268	320	235	113	157	87	94	hrs
Fort St. John 610m	-16.8	-9.7	-3.8	2.9	8.6	15.0	16.3	13.6	9.3	7.3	-7.1	-10.8	°C
	17.1	7.3	32.3	7.3	11.8	0	0	0	0	1.6	16.4	30.5	cm
	15.7	3.4	26.4	16.0	50.5	30.4	29.5	36.8	52.7	13.0	22.0	28.1	mm
	73	132	160	148	279	327	305	256	162	160	82	67	hrs
Burns Lake 1000m	-12.9	-6.9	-2.2	4.1	7.1	13.0	15.3	13.2	9.0	6.1	-5.4	-12.2	°C
	19.5	13.9	19.9	3.1	0.8	0	0	0	0	0	39.9	49.0	cm
	18.5	12.0	24.3	23.1	33.2	41.6	21.4	74.4	55.6	21.2	52.0	43.9	mm
	49	94	113	152	223	336	326	201	136	124	62	45	hrs

°C - mean monthly temperature
 cm - snowfall
 hrs - bright sunshine
 mm - total precipitation

Fig. 6.7. Climatic data for selected stations in British Columbia 1978

(Source: Canadian Weather Review 1979, Environment Canada)

the general plateau level and was unevenly scoured and over-deepened by glaciers. Today there are extensive fluvio-glacial deposits which form discontinuous terrace features along the lower valley sides. There are also alluvial materials in the form of deltas and alluvial fans which have been deposited by the short tributary streams which flow down steep gradients from the plateau surface. The upland surfaces reach elevations in excess of 2200m and have been smoothed by glacial actions and covered by variable thicknesses of boulder clay. Other relict glacial features found along the sides of the valley are glacial overflow channels.'

9. Draw an outline frame 16cm by 21cm. With the aid of the description of the Okanagan valley, produce a fully annotated sketch map to show the physical features of the valley as represented by the map extract of the Penticton area incorporated on slide 5A.

It is evident that there are marked climatic differences between lower and higher elevations. It is important to note, however, that in the context of British Columbia the climate of the Okanagan is distinctive.

10. On a suitable map of British Columbia use the data given in Fig. 6.7 to produce located graphs for temperature and total precipitation to illustrate the major variations in climate within British Columbia. (Burns Lake is 200km west of Prince George.)
- 11.(a) With reference to the information given in Fig. 6.7 and your climatic graphs what generalisations can be made about the climate of British Columbia? Include in your answer reference to
 - (i) location;
 - (ii) elevation;
 - (iii) latitude.
- (b) What would you consider are the distinctive characteristics of the Okanagan valley as illustrated by the climate data for Penticton?
- (c) What do you consider to be the major climatic attractions and/or disadvantages of the Okanagan valley? Give your answers in relation to
 - (i) agriculture;
 - (ii) settlement;
 - (iii) recreation.

HUMAN RESPONSE

The map extract of the Okanagan valley around Penticton provides a useful introduction to the human geography of the area. The relationship between settlement, land use, communications and the form of the land can be summarised effectively in the form of a further sketch map.

12. By producing a tracing-paper overlay for the sketch map already completed and providing a further title: e.g. "Settlement and land use in the Okanagan valley", illustrate the relationship between the human and physical geography of the area.

Include the following information on this over-lay sketch map:

- Penticton urban area;
- dispersed settlement (isolated black dots);
- orchards (green stippled shading);
- Canadian Pacific Railway (C.P.);
- major roads;
- airport;
- trailer parks (mobile homes);
- sawmill and burner;
- cement plant;
- gas pipeline;
- parks.

The information contained in the map (Slide 6A) indicates the importance of agriculture in the landscape.

13. Read the following statement about the sequent occupance of the Okanagan valley and the development of its agriculture, and produce an annotated sketch map of Slide 6A with brief notes to summarise this information.

'The first phase of agriculture in the Okanagan was ranching and wheat farming which began in the 1860s. The interior areas of British Columbia were opened up to settlement by the several gold rushes which occurred in the latter half of the nineteenth century, and the farms developed to provide the miners with food. By the end of the nineteenth century cheaper wheat could be obtained from the Prairies and the farmers turned to mixed farming and orchard crops. Ranching, however, continued on the open grasslands of the plateau and the upper valley slopes above the irrigated land. At the higher elevations where coniferous woodland predominates, forestry was and still is an important local economic activity. The production of fruit and vegetables depended on irrigation and the construction of flumes (wooden troughs), and irrigation channels began as private enterprises in the 1890s. By the 1920s local government began to take over the private irrigation projects and now the municipally-owned irrigation districts coordinate extensive irrigation systems for the whole Okanagan valley. The water is obtained by gravity-feed from the lakes and streams of the well-watered (snow melt) upland plateau areas. Most of the irrigated land is on the gently sloping surface of the benches just above the bottom of the valley. This is important, for the colder air then flows down to the lowest levels of the valley floor. This air drainage lessens the incidence of frost-damage to the orchards. The major irrigated crops are deciduous fruits (apples, pears, peaches, apricots, cherries and plums) and small fruits and

vegetables. These crops are often interplanted amongst the orchard rows to make full use of the water which is mainly supplied by sprinklers. The farms in the Okanagan are generally small, averaging about 28ha., and to ensure competitive marketing cooperatives of fruit growers have been developed.'

14. Using the headings of

- (i) Distribution of Settlement,
- (ii) Economic Activities,

write a brief summary of the general human response to the physical conditions of the Okanagan valley. Draw upon the relationships illustrated by your summary maps as well as Slide 6A.

It is not always possible to obtain information about changes in agriculture from the evidence of a map or photograph. This is where Agricultural Census data are important because the statistics can indicate the trends of change at given time intervals.

Area	No. of Census Farms			Area of Census Farms (hectares)	
	1971	1976	% Change 1971-76	1971	1976
British Columbia	11014	13033	18.3%	2092353	2351802
Capital	330	358	8.5%	11724	10709
Cariboo	502	686	36.7%	295723	334527
East Kootenay	240	267	11.3%	69442	73963
Fraser-Cheam	824	772	-6.4%	19745	19891
Greater Vancouver	991	915	-7.7%	20825	19938
Kitimat-Stikine	36	82	128%	9138	13807
Okanagan-Similkameen	1091	1306	19.7%	111809	75424
Peace River	1157	1625	40.4%	579619	736609

Fig. 6.8. Number and area of census farms, 1971 and 1976, by selected census division for British Columbia

(Source: 1976 Census of Canada Agriculture -- Number and Area of Census Farms by Census Divisions Table 2.)

15.(a) Study the farm data for the eight selected census divisions of British Columbia and with the aid of a located bar-diagram and with reference to the information provided (e.g. the climate data and the general physiographic background of the Province) describe and explain the general trends in the number and area of census farms in British Columbia.

(b) Compare the changes in the number of farms with changes in the area of farms. What conclusions do you draw?

In Canada generally in the period 1971-76 there has been virtually no change in the number of census farms recorded (i.e. farms with sales greater than \$1,200 p.a.) and a 3% increase in the area of census farms. It has been a very stable period and only four provinces showed an increase in the number of farms in that same period: Ontario (1.7%), Manitoba (1.2%), Alberta (7.7%) and British Columbia (18.3%).

16. Comment on the extent to which the Okanagan-Similkameen census division compares with the general Canadian picture.

The human response to the physical resources of the Okanagan has produced a carefully managed farming system; the pattern of land use reflects nature's physical limitations and man's technological abilities in the use of machines, irrigation techniques, marketing etc. Similarly, from the evidence of map, photograph and general census data the human response can be viewed in the character and distribution of settlement within the Okanagan.

Study the photograph in Slide 6B. This photograph shows the settlement of Keremeos in the valley of the River Similkameen, a tributary of the Okanagan River. The small town is situated 24km to the west of Lake Osoyoos.

17.(a) In a frame outline 18cm x 12cm make a sketch drawing of the photograph taken during October 1973 and annotate your picture with the following information:

snow on upper slopes and plateau surface (at 1550m);
tree cover increasing with elevation;
grazing land;
irrigated hayfields;
characteristic truncated spurs of U-shaped valley with
steep valley sides and flat valley floor;
large fruit-farmers' cooperative building;
single-storey woodframe modern housing;
settlement confined to valley floor.

(b) The photograph of Keremeos indicates a settlement of recent growth. The houses are woodframe and have been built mainly since the 1950s. It is a settlement which reflects the substantial growth of population that has occurred in the Okanagan region since the 1951 census. It is evident from the photograph that Keremeos is also associated with the fruit-farming typical of the Okanagan. Do we conclude,

therefore, that the growth in population and settlement is because of an influx of farmers, people attracted by the distinctive agricultural resources and traditions of the area? It is an unlikely situation for, in terms of human responses to the resources of the area, the growth of settlement and the growth of fruit-farming must be seen as conflicting interests. Settlement and agriculture are competing land uses. In the Okanagan the nature of the topography provides only limited and restricted areas which are suitable for settlement and fruit-farming. The result of the competition has in fact been a loss of farmland to settlement. This decline in farmland is reflected in the agricultural statistics given earlier which show that between 1971-76 the area in farms was reduced by 32.5% in the Okanagan-Similkameen census division. An article on settlement in British Columbia states that "many orchards are now little more than sidelines for their owners as well as pleasant places to live" (p. 25 in Chapter 2 of "British Columbia" edited by J. Lewis Robinson, University of Toronto Press, 1972). The problems of fruit-farmers are high production costs (irrigation, pest control etc.), distance from large markets and difficulty of obtaining labour for picking fruit.

The question remains, therefore, what are the significant attractions that have produced more than an 80% increase in population in the Okanagan area since 1951? In the information already provided there have been several clues to the answers.

In many instances a major attraction to settle in a particular region is the economic advantages of employment opportunities with higher income levels.

- 18.(a) Study the information given in Fig. 6.9 on income levels and produce a series of bar-diagrams to illustrate the data on a comparative basis.
- (b) Which income group has the highest percentage of families for (i) Canada (ii) British Columbia (iii) Okanagan-Similkameen?
- (c) Which income group has the lowest percentage of families for (i) Canada (ii) British Columbia (iii) Okanagan-Similkameen?
- (d) Comment upon the ways in which British Columbia and Okanagan-Similkameen compare in income terms with the rest of Canada.
- (e) What general conclusions can you draw about the attractive status of the Okanagan-Similkameen in terms of family income levels?

	Canada	British Columbia	Okanagan- Similkameen
Total Families	5038310	530710	10965
\$ < 2000	603280	56060	1805
\$ 2000-2999	334305	31520	1035
\$ 3000-3999	351745	31375	1035
\$ 4000-4999	387480	31960	940
\$ 5000-5999	458375	36945	880
\$ 6000-7999	1030175	106900	2050
\$ 8000-9999	785060	99870	1380
\$ 10000-11999	448720	58655	860
\$ 12000-14999	298990	39080	465
\$ 15000-19999	181915	20875	290
\$ 20000+	158265	17465	220
Average	7507	8033	6426

Fig. 6.9. Number of families by income group (as measured by income of head of family) 1970

(Source: 1971 Census of Canada, Vol. 2 Population: Families-Incomes Part 2 Table 86)

From the evidence of family income levels given in Fig. 6.9 it is clear that the Okanagan-Similkameen does not offer financial inducements. Generally speaking in terms of land values, house prices, employment opportunities and wage levels, the Okanagan area does not provide advantageous living standards which would give strong incentives for new settlers. Indeed, from the information provided in the extracts from newspapers and articles included in the concluding section of this study, it would appear that the price of land and housing is a severe disincentive to in-migration. We must assume that in spite of high prices and problems of settlement the Okanagan offers particular advantages and attractions for certain groups of people.

19.(a) Using the 1976 Census data given in Fig. 6.10, produce a population pyramid for the Okanagan-Similkameen district and compare it with the population pyramids for British Columbia and Canada (Fig. 6.2).

(b) What cohorts of the Okanagan-Similkameen population are over-represented compared with those of British Columbia and Canada?

- 20.(a) Study the map extract (Slide 6A). From the evidence of this map what are the attractions and amenities offered to senior citizens?
- (b) What map evidence is there to indicate that the Okanagan offers broader attractions to all age groups and tourists?
- (c) Produce a sketch map of the map extract and mark on the sketch map those factors and/or facilities which, in your opinion, would attract people to settle in the Okanagan valley.
- (d) What climatic evidence have you to substantiate the evidence of the map?

There is considerable indication of the recreation resources and amenities of the Okanagan valley shown on the map. Moreover, the climatic data show that the Okanagan is not only scenically attractive but has hot, dry summers with long hours of sunshine. It also has the winter attractions of snowfall for skiing on the steep slopes and freezing conditions for skating on the smaller lakes. All the evidence of map, photograph and climate indicates that the Okanagan, in both summer and winter, is a major tourist and recreation area, because of its significant and particular physical resources.

CONCLUSIONS

In the preceding study the growth in population in the Okanagan area has been shown to be amongst the highest rates of growth in Canada. The population increase has been significant in the recent decades and the perceived benefits of an ideal climate and distinctive landscapes with facilities and resources for recreation have led to the considerable expansion of urban areas. That is, people have made decisions to settle in an area whose resources are assessed as advantageous and attractive; the decision-making process of resource appraisal. Unfortunately spreading settlement competes and conflicts with the earlier agricultural developments of irrigated fruit-farming and vegetable production. This emphasises an important generalisation which is that through time there is a continuing re-appraisal of resources because of changes in attitudes, values and technology. In the Okanagan tourism and recreation are becoming the major economic activities and a further element of the changing population and landscape is the growth of the area as an ideal retirement centre.

There are, however, disadvantages in rapid growth.

21. Read the following extracts from articles and newspapers and make a summary of the problems that they discuss.

Extract (a): Eutrophication in the Okanagan Lakes

"Eutrophication of freshwater lakes is an increasingly urgent problem in water quality management, particularly in areas like the Okanagan Valley, where tourism is an important feature of the

local economy. Eutrophication is the process of biological enrichment of freshwater lakes, which is accelerated dramatically by the addition of nutrient materials stemming from agricultural drainage, municipal sewage and the addition of nitrogenous particles to the atmosphere. The two principal nutrients are nitrogen and phosphorus though a number of micronutrients such as cobalt, carbon, molybdenum and silica need to be present. The *limiting* nutrient is however the crucial one: this is that nutrient which is least available to generate biological growth. This is usually phosphorus, but depending on the circumstances could be other substances. The manifestation of eutrophication is, of course, increased plant life, particularly water weeds and algae. Not only are these organisms unsightly and malodorous but also upon decay they lead to a reduction of dissolved oxygen in the lower levels of the lake, a situation which is detrimental to fish life.

The Okanagan lakes receive substantial amounts of nutrients every year from agricultural runoff from the heavily fertilized valley benches, and from municipal sewage. Readings of up to 5 parts per million (p.p.m.) nitrogen and 0.3 p.p.m. phosphorus have been recorded in some of the streams entering the lake. At present the South Okanagan Health Unit is monitoring some of these streams to discover what part they play in the nutrient budget of the lakes.

In the past, B.C. Pollution Control Board standards required that all sewage be of secondary standard. Unfortunately this level of treatment does not remove the nitrates and phosphates contained in the sewage and higher standards of treatment are being sought by the three major municipalities in the valley. The City of Penticton has recently completed a phosphorus removal plant and an experimental ammonia (nitrogen) stripping tower. The City of Kelowna is also in the process of constructing a tertiary treatment scheme, while Vernon is presently irrigating its sewage into nearby pasture land in an experimental attempt at utilizing effluent. In addition, the Government of Canada has banned the sale of detergents containing phosphorus (the principal source of phosphates in lakes) beginning in 1972, and already a number of phosphate-free detergents are on the market.

The Okanagan Basin Water Board is responsible for studying aspects of water use in the valley. This Board, composed of representatives of the three regional districts in the area, is monitoring existing and potential waste discharges into the lakes. In addition the whole valley is the subject of a joint Federal-Provincial water management study in which all aspects of the region's water use are being analysed. While eutrophication may not be solved in the Okanagan, it is certainly being combatted vigorously."

(Source: A.L. Farley, editor. Trans-Canada Field Excursions. Department of Geography, University of British Columbia.)

Extract (b):

"The growth of the holiday industry has stimulated the demand for land for urban development and this is aggravated by the increasing number of retired people. Speculative building is apparent in a number of places. The most desirable land for such development is that also most suited to fruit growing, and the resulting competition is forcing land prices to levels at which its use for fruit growing is uneconomic. Even in the early 1960s orchard land prices were \$2,000-\$2,500 an acre, at a time when farm economists thought the economic price for orchard operations was only \$1,000 an acre. At that time it was pointed out that more than seventy per cent of the growers had less than ten acres of orchard, and that 'half the orchardists of the province cannot make a living from their fruit trees. The average grower can expect his orchard investment and labour to provide him with a house, a garden, and enough cash to pay for depreciation on his equipment. To support his family he must augment his orchard income with off farm earnings'. (Krueger, 1965)

The major pressure from the holiday industry is clearly being felt around the towns of the valley and especially around Penticton. There is little doubt that it will continue to grow. Away from the main settlement nuclei, the Okanagan will remain predominantly a fruit growing valley, but the functions and landscapes of the holiday industry are already making their mark, and must be included in any assessment of the continuing distinctiveness of the Okanagan in the geography of British Columbia in the late twentieth century."

(Source: G. Humphrys, 'The Fruit Growing Industry and Resort Functions in the Okanagan Valley, British Columbia', Panorama Vol. 14, 1973, Isle of Thanet Geographical Association.)

Extract (c): Land Reserved for Agriculture Shrinks

"B.C.'s agricultural land reserve has shrunk by 35,000 acres since it was set up in 1973, even though thousands of acres have been added.

The Cariboo is the region that has lost and gained the greatest acreage.

And in most cases, the cabinet has followed the recommendations of the B.C. Agricultural Land Commission.

These are the key points that emerge from a study of the commission's statistics up to Jan. 1 of this year.

The B.C. Land Commission Act was proclaimed in July, 1973, when the province was losing agricultural land to urban sprawl at a rate of 15,000 acres a year.

The reserve was established at 11.66 million acres. Since then it has gained 26,879 acres and lost 61,726. It now totals 11.63 million acres.

Land was added to the reserve for various reasons. For instance, full information on the extent of agricultural land in remote areas was not available when the reserve

was established.

In other cases, regional district boundaries were revised. Two new districts (Central Coast and Skeena-Queen Charlotte) were designated in 1975 and one new district (Mount Waddington) was set up in 1976.

Some of the largest additions of land were nearly 10,000 acres in the Cariboo in 1977, and in 1975 about 8,800 acres in the Mud River area (northwest of Prince George) and 5,120 acres in the Kitimat-Stikine regional district.

A commission spokesman said several additions, each totalling about 50,000 acres, have been tabled for consideration in the near future.

The most serious shortcomings of the commission's statistics is that they are not broken down into the different land classifications.

Seven different classes of land are included in the reserve ranging from class one (capable of producing the widest range of crops) and two (capable of producing a fairly wide range of regional crops) to class six (rangeland) and seven (no agricultural capability).

A commission spokesman said classi-

(Source: Moira Farrow in *The Vancouver Sun*, Thursday March 2nd 1978)

Extract (d): Save the Farm

"A serious threat to British Columbia's agricultural land reserve lies in a recent switch in policy by the Provincial Agricultural Land Commission.

The commission, by a split 5-3 vote, has decided to let farmers split off their homesites -- permanently -- when they retire. The B.C. Federation of Agriculture

and the B.C. Fruit Growers' Association, the principal voices of farming in the province, are themselves alarmed. So is the former commission chairman.

Since the reserve was established, the commission has received and processed 1,251 requests from individuals for the exclusion of a total of 53,706 acres from the reserve.

The land commission ruled that 23,945 of these acres must stay in the reserve but gave permission for 12,336 acres to be excluded.

As for the remaining 17,427 acres, the commission said they could be sub-divided but must remain in the reserve. This conditional use of reserve land comes under section 11 (4) of the Act which receives little publicity but provides the majority of the commission's work.

Since the commission opened its doors it has received 3,429 applications under this section of the Act.

For government, which includes municipalities and regional districts, the commission has processed 67 requests for land exclusions involving a total of 63,528 acres since the reserve was established."

In the past, the commission has allowed farmers to sell their farms, then enter into an arrangement with the new owner to lease back the farmhouse. In this way a

retired farmer can, if he wishes, stay on his land till the end of his days. When he moves away or dies, the farmhouse is once again incorporated with the farm, and the province's scarce farmland is preserved.

This concession, however, isn't enough for a minority of farmers. So the commission majority in June devised a new policy which, if carried out, will allow a retired farmer to subdivide his farmhouse, severing it from the farm for all time. The new owner, in most cases, can then build his own farmhouse.

Recognizing some of the problems this policy will cause, the commissioners have set restrictions. The retiring farmer must have been on his property for the past six years; subdivision will be

permitted only at the time of sale; usually only half an acre may be split off; and applicants will have to go through regional districts and municipalities before coming to the land commission.

In addition, the retired farmer will not be allowed to sell his small lot for at least five years. But if he dies, his estate can sell it. At the end of the time period, anyone can buy the parcel.

Clearly, these restrictions are not going to stop a gradual, but certain, erosion of the farmland reserve. For every time a farmer retires, the temptation will be overwhelming for him to apply to cut off just another little piece. In his own economic self-interest, any farmer would be foolish not to. The potential for abuse is worrisome."

(Source: *The Vancouver Sun*, Tuesday August 22nd 1978)

22. Faced with a series of problems resulting from rapid change in the Okanagan what, in your opinion, should be the order of priority for dealing with them? Give the reasons for your recommendations.
23. As a final conclusion to this study write an essay on one of the following, in note form if time is short:
 - (a) Account for and describe the effects of the recent population growth in the Okanagan valley, British Columbia.
 - (b) "An area's resources change with time". Discuss.

JOHN BENTLEY

7 PRINCE EDWARD ISLAND

INTRODUCTION

This island, varying in width from 6-64km, represents Canada's smallest province (with a land area of only 5657 sq km) and is separated from the mainland by the relatively narrow Northumberland Strait. Today, a ferry crossing from Borden (P.E.I.) to Cape Tormentine (New Brunswick) takes fifty-five minutes, with ice-breaking ferries maintaining a winter service. A ninety-minute ferry service links Wood Islands (P.E.I.) to the mainland (Caribou, Nova Scotia), though the operating season only extends from 1st May until 20th December. Historically this stretch of water has been instrumental in preserving the isolated, rather independent, character of Prince Edward Island.

1. Using an atlas, locate the province of Prince Edward Island and describe its position relative to Europe and to the other provinces of Canada.

Some of Canada's earliest immigrants made a landfall on Prince Edward Island, aided by its position relative to Europe, the source of the migrants; though Europeans did not settle permanently on this tree-covered island until the second decade of the eighteenth century. These migrants came spasmodically as conditions dictated in their home country, risking an extremely perilous Atlantic crossing.

2. Look at Slide 7A, an extract from the 1:250,000 topographic map of Prince Edward Island. List all the place names on the map which appear to have a European origin, grouped under the four headings:
English Irish Scottish French and others.

Place name evidence illustrates that the European influence on Prince Edward Island has been considerable. Such evidence, however, must always be treated circumspectly, many names being commemorative e.g. Charlottetown, named in 1855 by an English surveyor Samuel Holland, after the consort of George III. Early settlement took the form of coastal farming communities, first concentrated around Charlottetown, since the sand dune coast of the north shore discouraged early settlement. Irish settlers tended to make their new homes in the west of the island and Highlander Scots the east, although a major Scottish centre was around

Tracadie (Slide 7A), established 1770-75. Slide 7A represents most of Queens County, the central of the three Counties that comprise Prince Edward Island, and thus received representatives of both these major early immigrant groups, as well as smaller numbers of other ethnic groups.

Fig. 7.1 illustrates that Prince Edward Island continues to attract people, who were born elsewhere, to its shores.

Total population	111640
Canada	107940
P.E.I.	94855
Europe	2160
U.S.A.	1300
Others	240

Fig. 7.1. Prince Edward Island population by place of birth, 1971

(Source: 1971 Census of Canada, Vol. 1 Population Part 3 Birthplace, Table 35)

3. What proportion of the population of Prince Edward Island was born (i) outside the province (ii) outside Canada?

Year	Prince Edward Island	Canada
1891	109000	4833239
1921	88615	8787949
1931	88038	10376786
1941	95047	11506655
1951	98429	14009429
1956	99285	16080791
1961	104629	18238247
1966	108535	20014880
1971	111640	21568311
1976	118230	22992604
1979*	123000	23690500

*July estimate

Fig. 7.2. Growth of population of P.E.I. and Canada

(Source: Census of Canada, various years)

4. Present migration into Prince Edward Island from non-Canadian sources was recorded as 192 in 1977 and 145 in 1978 compared to 114914 and 86313 respectively for Canada as a whole (source: Canadian Statistical Preview vol. 55). With the aid of Fig. 1.1 and Fig. 1.2 consider the extent to which Prince Edward Island is attracting its proportionate share of immigrants (measured in terms of provincial population -- 120,400 in 1977 and 122,100 in 1978 -- compared to the national population -- 23,279,900 in 1977 and 23,498,900 in 1978)-- all figures for July (source: Quarterly Estimates of Population for Canada and Provinces).

A census taken by the British in 1798 indicated that the population of Prince Edward Island had reached 4372. Joining the Confederation of Canada in 1873 the Census of Canada showed, almost a century later, a population of 109,000.

- 5.(a) How is the pattern of development of population within Prince Edward Island and Canada (i) similar (ii) different?
- (b) Suggest hypotheses for the differences you have listed.

Other facets of the recent population geography of Prince Edward Island are summarised in Fig. 7.3 to Fig. 7.7:

1951-56	0.9
1956-61	5.4
1961-66	3.7
1966-71	2.9
1971-76	5.9

Fig. 7.3. P.E.I. percentage change in population from quinquennial census returns

(Source: Table 4.4 Canada Year Book 1978-79)

1871	2.55
1901	1.92
1931	0.85
1951	0.70
1971	0.52
1976	0.51

Fig. 7.4. P.E.I. population as a share of the Canadian population

	population change	natural increase	net migration	net migration to/from Canadian provinces
1966-71	3106	5207	-2101	-2763
1971-76	6588	4498	2090	3754

Fig. 7.5. P.E.I., components of population change 1966-1976

(Source: Table 4.5 Canada Year Book 1978-79)

The period 1971-77 has been a period of rapid population growth relative to the 1960s, despite an absolute decline in births from 2838 (1961) to 2103 (1971) and to 1936 (in 1976). However, the decline in the number of births has been offset by a reversal in migration patterns relative to the other Canadian provinces. A net out-migration of 2970 (1961-66) has been replaced by a net in-migration of 1314 for 1976-77! In fact the province was a 'net importer' of over 5000 people from other provinces from 1971-77. The temporal changes shown in Fig. 7.5 are illustrated as spatial changes in Fig. 7.6 and Fig. 7.7.

	In-migration From	Out-migration To	Net migration
Newfoundland	819	689	130
Nova Scotia	4934	4531	403
New Brunswick	3664	3170	494
Quebec	1581	922	659
Ontario	9111	6478	2633
Manitoba	891	720	171
Saskatchewan	276	254	22
Alberta	1101	1638	-537
British Columbia	748	929	-181
Yukon	81	120	-39
Total	23206	19452	3754

Fig. 7.6. P.E.I. migration patterns with other Canadian provinces, 1971-76

(Source: Statistics Canada 91-208)

	Prince	Queens	Kings
1971	42082	51135	18424
1976	43237	56414	18578

Fig. 7.7. Prince Edward Island population by County

(Source: 1976 Census of Canada Vol. 1 Population: Geographic Distributions -- Atlantic Provinces Table 3 Population for census divisions and subdivisions 1971 and 1976)

Most of the preceding case studies of population geography in this book have focussed upon areas with a strong inflow or outflow of migrants. By comparison the demographic picture of Prince Edward Island has, by some, been described as relatively stable. To what extent is this a reliable or appropriate description of Prince Edward Island? To what extent do the overall provincial trends, or indeed the census returns for the three counties, represent a fair appreciation of both the recent past and of the current population geography of the Island? This short study aims to provide some help in answering these questions.

6. Consider the justification for the description "relatively stable population characteristics" when it is applied to the data given (a) to the Island as a whole (b) at county level (c) in the national context.

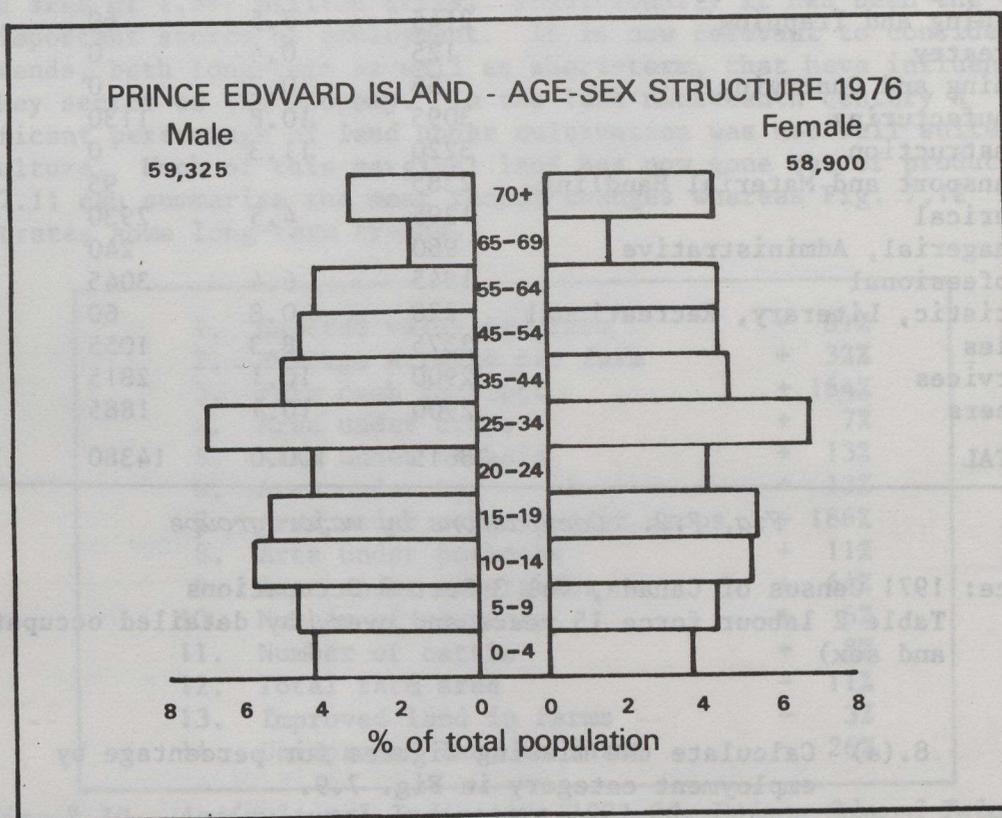


Fig. 7.8. Age-sex pyramid, P.E.I. 1976

(Source: 1976 Census of Canada Vol. 2 Population: Demographic Characteristics, Table 11)

- 7.(a) To what extent does the shape of the pyramid indicate stable population growth? Should it be described as a progressive or regressive population pyramid?
- (b) Compare the age-sex pyramid for P.E.I. with that for Canada (Fig. 1.3). List the similarities and differences between the two pyramids.

- (c) List the ways the age-sex pyramid for P.E.I. reflects the data given in this introductory section to Prince Edward Island.

LANDSCAPE AND LIVELIHOOD

Patterns of migration at all geographical scales are often explained in terms of employment opportunities. The table below summarizes the broad types of employment within Prince Edward Island.

	Male		Female	
	Total	%	Total	%
Farming	5105		1000	7.0
Fishing and Trapping	2145	7.5	60	0.4
Forestry	125	0.4	0	0
Mining and Quarrying	55	0.2	0	0
Manufacturing	3095	10.8	1130	7.9
Construction	3220	11.3	0	0
Transport and Material Handling	2385		95	0.7
Clerical	1295	4.5	2930	
Managerial, Administrative	960		240	1.7
Professional	1845	6.4	3045	
Artistic, Literary, Recreational	220	0.8	60	0.4
Sales	2375	8.3	1055	7.3
Services	2900	10.1	2815	
Others	2900	10.1	1885	13.1
TOTAL	28615	100.0	14380	100.0

Fig. 7.9. Occupations by major groups

(Source: 1971 Census of Canada, Vol 3 Part 2 Occupations Table 2 labour force 15 years and over, by detailed occupation and sex)

- 8.(a) Calculate the missing figures for percentage by employment category in Fig. 7.9.
- (b) Assess the importance of primary activities as a source of employment within Prince Edward Island. How does this compare with that for Canada as a whole (Fig. 1.5)?
- (c) What are the main differences between the patterns of male and female employment within Prince Edward Island?
9. Slide 7B shows an aerial view of a typical rural landscape of Prince Edward Island, taken August 1972.
- (a) Draw a large sketch of the photograph to include the following detail, with annotations where appropriate:

- i) the southern coastline in the foreground contrasting with the North Shore;
- ii) the layout of the gravel roads;
- iii) the dispersed farmsteads;
- iv) the size and shape of the fields;
- v) the pattern of the varying types of land use.

- (b) Add a footnote to your sketch, to draw attention to the landscape evidence for the sequence of European colonization of this initially wooded island.

Agriculture: a closer look

Agriculture occupies approximately 50% of the area of the island, comprising 774636 acres in 1971 and 687076 acres in 1976 of a total island area of 1.397 million acres. Traditionally it has been the single most important source of employment. It is now relevant to consider the trends, both long-term as well as short-term, that have influenced this key sector of the economy. In the late nineteenth century a significant percentage of land under cultivation was not well suited for agriculture. Much of this marginal land has now gone out of production. Fig. 7.11 can summarise the most recent changes whereas Fig. 7.12 illustrates some long-term trends.

1. Capital value per farm	+ 81%
2. Average acreage per farm	+ 32%
3. Farm cash receipts	+ 164%
4. Area under crops	+ 7%
5. Area under cereals	+ 13%
6. Area under hay	+ 13%
7. Area under other fodder crops	+ 186%
8. Area under potatoes	+ 11%
9. Area under vegetables	+ 64%
10. Number of tractors	+ 6%
11. Number of cattle	+ 8%
12. Total farm area	- 11%
13. Improved land in farms	- 3%
14. Unimproved land in farms	- 26%

Fig. 7.10. *Agricultural Indicators 1971-76, Prince Edward Island*

(Source: Economics, Marketing and Statistics, Dept. of Agriculture and Forestry 1979; 1976 Census of Canada Volume II Agriculture Tables 6, 7 and 8)

- 10.(a) Complete the graph to show agricultural indicators by drawing lines of length proportional to each indicator:

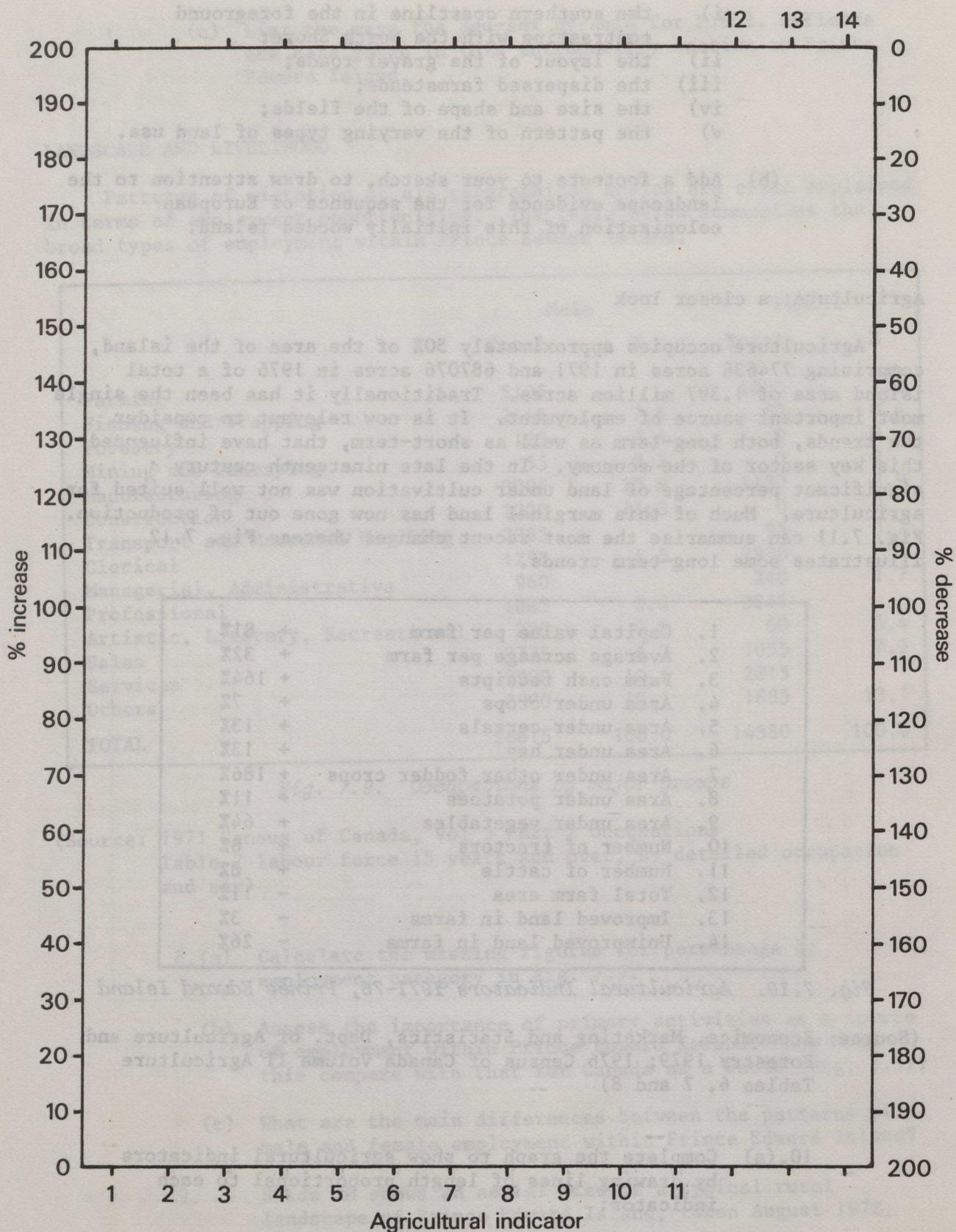


Fig. 7.11. Graph to show recent changes in agriculture, Prince Edward Island

- (b) What are the limitations of only considering percentage change?
- (c) To what extent are the different indices (i) compatible and (ii) incompatible with one another?
- (d) What picture emerges of farming within P.E.I.?
- (e) What conclusions do you reach concerning employment within the farming sector of the economy?

One of the most significant changes, not illustrated by Fig. 7.10 has been the recent move from diversification to specialisation on individual farms.

	Number of Census Farms	Total Farm area (acres)	Average Farm size (acres)	Total Improved land (acres)	Cropped (acres)
1921	13701	1216500	89	767319	461322
1931	12865	1191000	93	765772	497114
1941	12203	1168900	96	737400	470351
1951	10137	1095300	108	645795	426210
1956	9432	1065500	113	645492	419099
1961	7335	960200	131	579558	391112
1966	6357	927000	146	569799	398373
1971	4543	774630	171	494131	351384
1976	*	687076	*	479749	375208

*comparable figures are unavailable. The definition of a census farm changed for the purpose of the 1976 census: "an agricultural holding of one acre or more with sales the previous year of \$1200 or more".

Fig. 7.12. Long-term trends in farming 1921-1976, P.E.I.

(Source: Census of Canada, Agriculture volume, various years)

- 11.(a) To what extent do the 1971-76 trends confirm those operating since 1921?
- (b) To what extent does Fig. 7.13 compare with your conclusions reached in answer to question 10(e) and 11(a)?
- (c) To what extent does Fig. 7.14 add to your understanding of population changes affecting Prince Edward Island?

1961	1966	1971	1976
7300	5100	4600	3500

Fig. 7.13. *Employment in agriculture, Prince Edward Island*

(Source: Estimates of Value Added and Employment by Sector 1961-76 by R.S. Harvey)

	1951	1976
Less than 35 years	895	454
55 years and over	1691	1103
Total	5253	3054

Fig. 7.14. *Age of operator in agriculture, Prince Edward Island*

(Source: 1976 Census of Canada Vol. 11, Agriculture, Prince Edward Island Table 6)

In the 1970s, thanks in part to government incentives and development programmes, giving financial and technical assistance, the gradual decrease in land under crops was halted. The reduction in farm numbers slowed and new programmes to assist new young farmers to enter agriculture promise to reverse this downward trend as well. After a period of disruption brought about by mechanisation and farm consolidation, Island agriculture appears now to be settling into a period of increasing prosperity and slow growth.

CONCLUSIONS

One might assume that a change in the demand for farm labour would lead to a corresponding change in the settlement pattern and distribution of population on Prince Edward Island. In addition, changes in agriculture have repercussions for the pattern of employment generally because, for example, agriculture generates employment in such activities as the manufacture of fertilizer and machinery, the processing of farm products and in transportation.

The broad distribution of the increased population of Prince Edward Island during the period 1971-76 is shown by Fig. 7.15.

- 12.(a) Where has the increase in population been accommodated?
- (b) With reference to Fig. 7.7, consider to what extent this increase has been evenly distributed between the three counties.
- (c) What hypotheses might explain the conclusions reached in answer to (a) and (b) above?

	1971	1976
Urban *	43440	43880
Rural Farm **	16165	12190
Rural Non-Farm	52085	62155
Total	111690	118225

* Centres of a size greater than 1000 population
 ** Based upon the definition of a census farm unit having an annual sale of \$1200 or more

Fig. 7.15. Urban/Rural population distribution, Prince Edward Island

(Source: 1976 Census of Canada Vol. 1 Population: Geographic Distribution, Table 7 Urban and Rural Distribution)

Town	County	1971	1976
Alberton	Prince	973	1062
Borden	Prince	624	589
Charlottetown	Queens	19133	17063
Georgetown	Kings	767	732
Kensington	Prince	1086	1150
Montague	Kings	1608	1827
Parkdale	Queens	2313	2172
Souris	Kings	1393	1447
Summerside	Prince	9439	8592
Tignish	Prince	1060	1077
O'Leary	Prince	795	805

Fig. 7.16. Population for towns (census divisions) 1971 and 1976

(Source: 1976 Census of Canada Vol. 1 Population: Geographic Distributions -- Atlantic Provinces Table 3 Population for census divisions and subdivisions 1971 and 1976)

- 13.(a) What is the share of total urban population living in Charlottetown and Summerside?
- (b) To what extent are different trends exhibited by small, medium-sized and large towns (in Prince Edward Island terms)? Suggest possible reasons for any differences observed.
- (c) With reference to Slide 7A and Fig. 7.15 suggest reasons to explain why the trends shown in Fig. 7.15 and Fig. 1.6 (the national picture) are not dissimilar.

		1971	1976
Summerside	town	9439	8592
	suburban ring	4552	5988
Charlottetown	town	19133	17063
	suburban ring	9087	13761

Fig. 7.17. Suburbanisation of major urban centres

(Source: 1976 Census of Canada Bulletin 92-807)

14.(a) With reference to Fig. 7.9 suggest some factors which might explain Fig. 7.17.

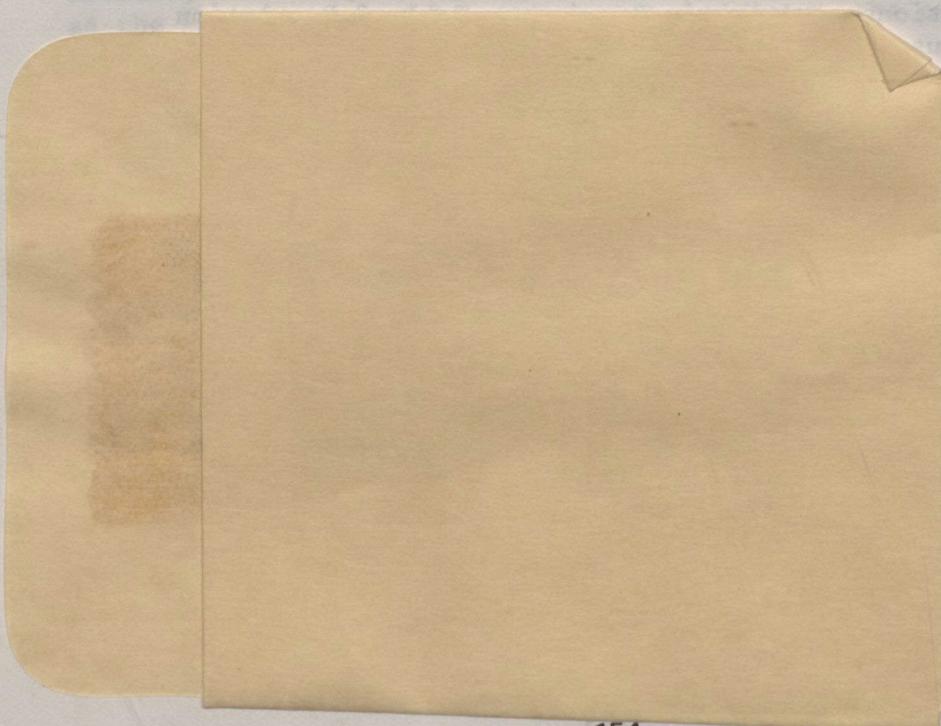
(b) With the aid of Slide 7A construct a fully annotated sketch map to illustrate the reasons for the increasing dominance of Charlottetown within the economic and social life of Prince Edward Island.

15. Summarise within the context of national developments the population geography of Prince Edward Island at the following geographical scales: (i) Provincial (ii) County (iii) local.

This view of Prince Edward Island has analysed statistics compiled on a provincial scale. Although Prince Edward Island is the smallest of Canada's Provinces there are many spatial variations and trends which are not readily discernible when the provincial scale at five or ten-year intervals is the main focus of geographical study. Most of the census divisions of the Canadian Census are much larger in area. All census returns should therefore be interpreted in the context of these drawbacks.

16. To what extent can census returns give an accurate appreciation of the population geography of an area?

PHILIP DEAN



Canadian population studies



● Montreal

2 A

Canadian population studies



● Montreal map

2 B

Canadian population studies



● Pine Point map

3 A

Canadian population studies



● Pine Point

3 B

Canadian population studies



● Leaving Cartwright

4 A

Canadian population studies



● Pack's Harbour

4 B

Canadian population studies



● Regina

5 A

Canadian population studies



● Regina map

5 B

Canadian population studies



● Penticton map

6 A

Canadian population studies



● Keremeos

6 B

Canadian population studies



● Prince Edward Island map 7 A

Canadian population studies



● Prince Edward Island

7 B



Canadian population studies



● Pine Point

3 B

Canadian population studies



● Pine Point map

3 A

Canadian population studies



● Montreal map

2 B

Canadian population studies



● Montreal

2 A

Canadian population studies



Canadian population studies



Canadian population studies



Canadian population studies



