

SPATIAL PROCESS AND CHANGE
IN A DEPRESSED AREA:
A STUDY OF MIGRATION IN
NORDLAND COUNTY, NORWAY

Thesis for the Degree of Ph. D.
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OLE GADE
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This is to certify that the

thesis entitled

SPATIAL PROCESS AND CHANGE IN A
DEPRESSED AREA: A STUDY OF MIGRATION IN
NORDLAND COUNTY, NORWAY

presented by

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has been accepted towards fulfillment
of the requirements for

Ph.D. degree in Geography

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Date June 8, 1972

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ABSTRACT

SPATIAL PROCESS AND CHANGE IN A DEPRESSED AREA; A STUDY OF MIGRATION IN NORDLAND COUNTY, NORWAY

By

Ole Gade

A perplexing problem of the technologically advanced world is the persistence within it of areas characterized by economic and social lag. This study analyzes the extent to which human migration can function as an index of regional disparity in socio-economic development. Geographic concepts, theory, and literature contribute to the development of a theoretical framework within which the implications of spatial variation in migration is assessed.

Nordland County, Norway, provides the data base for a detailed analysis of the migration process in the economically peripheral and marginal region. Factor analysis enables a delineation of time and space persistent processes and patterns for the period of research, 1951-1969. These dimensions, most notably urbanization, demographic change, industrialization, and spatial variation in economic activity, are related to migration. The periodic dissimilarities in the roles played by the different processes as they influence migration streams are identified. Particular attention is paid to the effect of decision making process as energized by public agencies in the pursuit of national and regional development objectives.

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Migration is discovered to have a profound impact upon the conditions of life and livelihood in the marginal region. Time persistent net outmigration and migrant selectivity leads to a changing age structure which in turn causes population stagnation and decline. People move away from areas dominated by primary activities and low incomes with the net effect of debilitating the economy of the more peripheral districts. Migration clearly does not influence a redistribution of economic opportunity nor does it tend to even out existing spatial differences in economic prosperity. Instead the migration process enhances the preservation of social barriers to change in communities affected by continuing net outmigration. Once initiated the process tends to persist in strength and direction. Thus Nordland County's future appears to be one of continued net selective outmigration with an increasing role played by the central government in order to prevent further erosion of economic viability and political stability.



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By

Ole Gade

A THESIS

Submitted to
Michigan State University
in partial fulfillment of the requirements
for the degree of

DOCTOR OF PHILOSOPHY

Department of Geography

1972

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The completion of this dissertation is in large measure due to the willing cooperation of many Norwegians who unstintingly gave of their time during the author's period of field research in Norway. Particularly helpful were the officials of the Norwegian Census Bureau where work space and access to unpublished data were provided; Eigil Axelsen, Director of Studieselskabet for Nord-Norsk Naeringsliv in Bodø; Dr. Hallstein Myklebost, Director of the Institute of Geography at Oslo University who provided guidance and stimulation at a particularly trying time; administrators and scholars of the Norwegian Institute for Urban and Regional Research, Norwegian Institute of Transportation Economics, Department of Agriculture, and the Regional Development Fund. A special debt of gratitude is owed my good friend Lars Østby who introduced me to the Norwegian way of life.

Stimulation and patient guidance was provided in generous measure by the author's thesis director, Dr. Lawrence M. Sommers. Additional thanks for aid in time of need goes to other members of my guidance committee, particularly to Dr. Leonard Kasdan. The author accepts total responsibility for all mistakes and misinterpretations which may have found their way into the finished copy of this study.

Ole Gade

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CHAPTER I

INTRODUCTION

The problem of regional disparities in socio-economic development has long been a concern of geographers and other social scientists. Recent years have seen an intensification of this interest.¹ One approach emphasizes the identification, delineation, and assessment of the character and severity of regional differences while another concerns itself chiefly with devising the means of coping with the problems resulting from these areal diversities.

Of the threads of communality which seem to serve as an organizing fulcrum for research in this problem area, the role of human migration is probably most relevant.² Migration is often identified as a cause-effect factor leading to or

¹Brian J. L. Berry, "Identification of Declining Regions: An Empirical Study of the Dimensions of Rural Poverty," in Areas of Economic Stress in Canada, ed. by W. D. Wood and Richard S. Thomas (Kingston, Ontario: Queen's University, Industrial Relations Centre, 1965), 22-49; Brian J. L. Berry, Strategies, Models, and Economic Theories of Development in Rural Regions, U. S. Department of Agriculture, Economic Reports No. 127 (Washington, D. C.: Government Printing Office, 1967); John P. R. Friedmann, "Regional Development in the Post Industrial Society," Journal of the American Institute of Planners (May, 1964), 84-90; John P. R. Friedmann, Regional Development Policy: A Case Study of Venezuela (Cambridge, Mass.: Massachusetts Institute of Technology Press, 1967).

²Migration is defined as a change of residence between minor civil divisions.

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resulting from regional differences.³ This study will assess the extent to which the migration phenomenon can function as an index of regional disparity. That this has not been attempted before is possibly due to the dearth of detailed areal migration statistics over time, but more probably it is because of the lack of a comprehensive theoretical framework within which to diagnose the implications of spatial variation in population mobility. Such a theoretical framework will be developed in the second chapter. Related hypotheses will be tested with data collected in Nordland County, one of three counties in North Norway (see Figure 1).

The Study Region

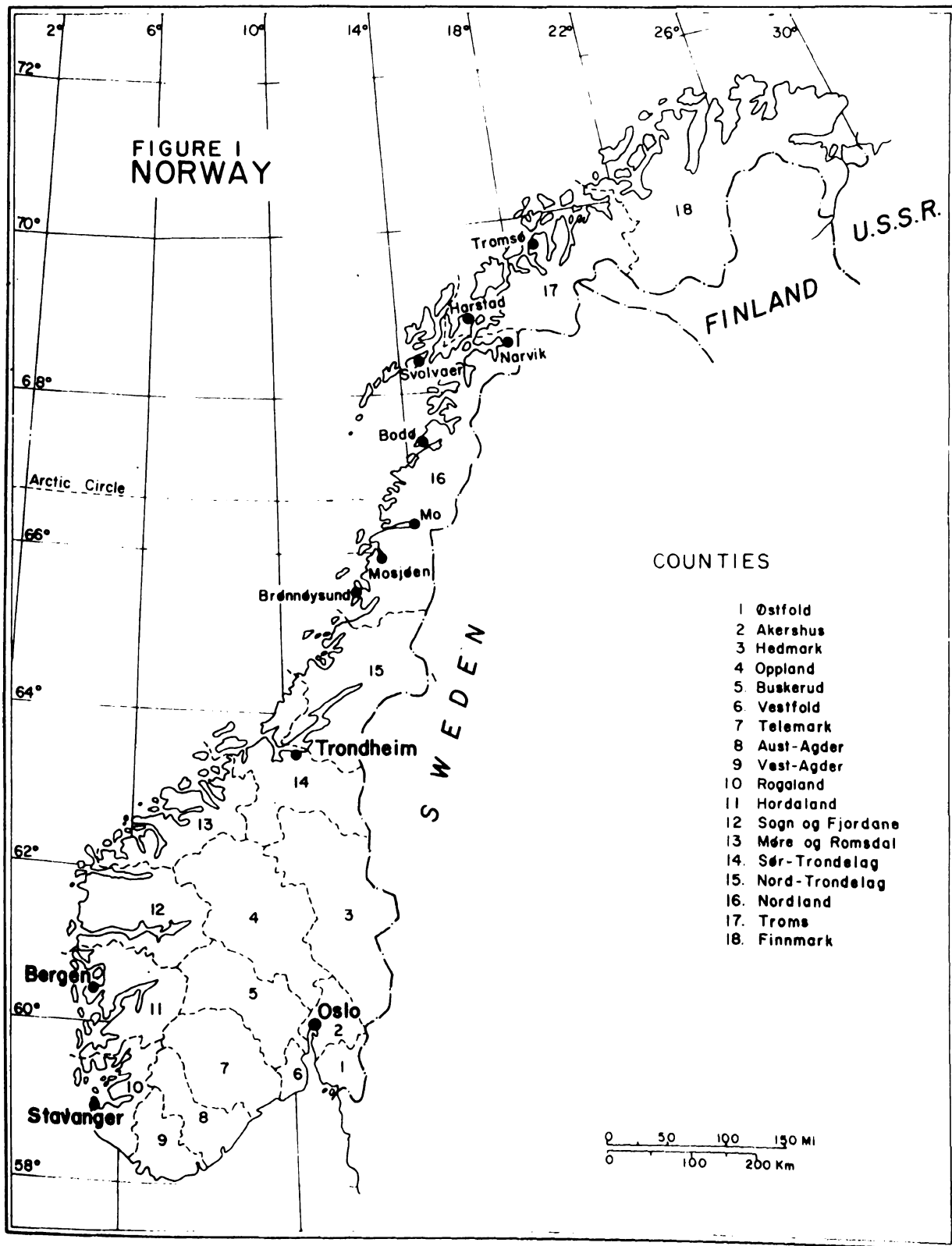
Norway was chosen for research for a number of reasons. Chief among these was the fact that Norway is a developed country with a rapid urbanization following World War II and a nagging persistence of large, predominantly rural areas imperfectly integrated with the national economy. Williamson has shown that Norway in the West European context stands out as more severely affected by regional income disparities than most other countries.⁴ His analysis involved the use of a weighed coefficient of variation measuring the dispersion of regional income on a per capita basis relative

³Berry, "Declining Regions," 22-40; Friedmann, "Regional Development in the Post Industrial Society," 84-90.

⁴J. G. Williamson, "Regional Inequality and the Process of National Development," Economic Development and Cultural Change, XIII (January, 1963), 1-84.

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**FIGURE I
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to the national average. The larger the resultant the greater the size of regional income differentials. Of the West European countries analyzed Norway (.309) was exceeded only by Italy (.360) and Finland (.331). Lower ratings were obtained for France (.283), Ireland (.268), West Germany (.205), Sweden (.200), and the United Kingdom (.141). For comparative purposes the United States was analyzed and found to be a relatively low .182.

Ease of access to comprehensive and detailed data was another reason for selecting Norway. In addition to the materials published by the Norwegian Census Bureau, the author was privileged with access to vital unpublished materials. The author's familiarity with Scandinavian life and languages was an additional factor favoring the choice of Norway.

Nordland County was chosen for detailed field research since it is clearly representative of the North Norway economic problem area. The county comprises eleven per cent of the total land area and 6.7 per cent of Norway's total population. It is the southern, most densely populated part of a region which has experienced a persistent out-migration tendency for several decades. Nordland and the remainder of North Norway has been favored since World War II by a comprehensive government directed regional planning effort because of its recognized marginal social and economic

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characteristics;⁵ several regional plans have been devised to cope with the problems.⁶ Thus the region offers an excellent opportunity for an investigation into migration and regional disparity. Socio-economic data covering several decades have been collected for Nordland County and several of its kommuner⁷ (Brønnøy, Grane, Skjerstad, Evenes, and Vestvågøy) have been chosen for more detailed field studies (see Appendix A Figure 32).

On a larger scale the county may be considered representative of depressed areas within the economically advanced countries of the world. Generalizations deriving from this study therefore should contain important implications for other countries.

Divisions of the Study

This study comprises four main divisions: 1. an introduction to the major factors, objectives, and relations

⁵Fridtjov Isachsen, "Regional Planning in Norway," Norsk Geografisk Tidsskrift, XIV (1953-1954), 358-62; Gunnar Eimo, Regional Development in Post-War Norway (Bergen, Norway; The Norwegian School of Economics and Business Administration, 1963).

⁶Odd J. Breivik, Om Distriktsutbyggingen og Distriktenes Utbyggingsfond (Oslo, Norway: Distriktenes Utbyggingsfond, 1968); Diderich H. Lund, "The Revival of Northern Norway," Geographic Journal, IX (June, 1946), 185-97; K. Scott Wood, North Norway Plan (Bergen, Norway: The Chr. Michelsen Institute, 1964).

⁷The Norwegian kommune is akin to a U. S. township in the administrative hierarchy but individual kommuner vary greatly in area and population characteristics that make township comparability a problem. Thus the term kommune has been retained throughout.

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to be considered in migration research within an economically marginal region (Chapter II); 2..an analysis of the evolution of Nordland County settlement patterns (Chapter III), and an identification of related spatial processes (Chapter IV); 3. a delineation of the spatio-temporal migration pattern and an analysis of the processes and factors influencing it (Chapters V and VI); and 4. an assessment of the spatial impact of migration through time (Chapter VII).

Within the study as deemed relevant, due consideration is given to regional planning implications. The summary and conclusion of Chapter VIII are followed by two appendices which contain statistical data, kommune location maps, and a listing of variables used in the statistical analysis.

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CHAPTER II

GEOGRAPHIC RESEARCH, SPATIAL PROCESS, AND THE TIME DIMENSION

Introduction

The objective of this study is to extend existing knowledge of spatial processes as they affect geographical patterns. Little attention has been paid by geographers to such an endeavor despite Berry's comment that "geographers are identified more by the processes and integrating concepts they stress than the phenomenon they study."¹ In contrast Harvey says "we are generally ignorant of the nature of processes shaping the evolution of spatial patterns in human geography."² King suggests that "the laws of spatial pattern do not necessarily tell us anything as regards process....," and "geographic theorizing in the past has failed to combine the statements of spatial form with the knowledge of process."³

¹Brian J. L. Berry, "Approaches to Regional Analysis: Synthesis," Annals of the Association of American Geographers, 54 (March, 1964), 2-11.

²David W. Harvey, "Editorial Introduction: The Problem of Theory Construction in Geography," Journal of Regional Science, VII (Supplement, 1967), 211-15.

³Leslie J. King, "The Analysis of Spatial Form and its Relation to Geographic Theory," Annals of the Association of American Geographers, LIX (September, 1969), 593.

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The lack of concern for spatial process is only partially explained by King. Berry and others place spatial process directly or inferentially at the apex in a hierarchy of geographic research.⁴ The argument is that geographic research builds upon a clear understanding of the static structure of patterns in space; therefore the interest in central place systems⁵ and location theory.⁶ From this follows an associated, though later developed, interest in the study of more dynamic spatial relations like the connectivity of places, spatial flows, and spatial interaction,⁷ and as a result the more recent surge of interest in

⁴ Berry, "Regional Analysis," 2-11; Edward A. Ackerman, "Where is A Research Frontier," Annals of the Association of American Geographers, LIII (December, 1963), 429-40; J. D. Chapman, "The Status of Geography," The Canadian Geographer, (September, 1966), 133-44; Clyde F. Kohn, "The 1960's: Decade of Progress in Geographical Research and Instruction," Annals of the Association of American Geographers, X (June, 1970), 211-19.

⁵ Brian J. L. Berry and Allen Pred, Central Place Studies, A Bibliography of Theory and Applications (Philadelphia: Regional Science Research Institute, 1965); Walter Christaller, Central Places in Southern Germany (Englewood Cliffs, New Jersey: Prentice-Hall, Inc., 1966).

⁶ Peter Haggett, Locational Analysis in Human Geography (New York: St. Martin's Press, 1966).

⁷ Edward L. Ullman, "Human Geography and Area Research," Annals of the Association of American Geographers, XLIII (March, 1953), 54-66; Edward L. Ullman, American Commodity Flow (Seattle: University of Washington Press, 1957); Edwin H. Thomas, "Areal Associations Between Population Growth and Selected Factors in the Chicago Urbanized Area," Economic Geography, XXXVI (April, 1960), 158-70.

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gration,⁸ commutation,⁹ diffusion of innovation and decision making,¹⁰ and consumer behavior.¹¹

The basic barrier to arriving at the top of the search hierarchy has been the problem of dealing with spatial matters in a temporal context. To study dynamic, inter-related spatial processes requires consideration of change through time and there is wide agreement that geographers have been generally negligent with respect to the temporal dimension.¹²

Of the geographers who have mentioned an interest

⁸Torsten Hägerstrand, "Migration and Area. Survey of Sample of Swedish Migration Fields and Hypothetical Considerations on Their Genesis," in Migration in Sweden, ed. by Frid Hanmerberg, et al (Lund Studies in Geography, Series B, 13 (Lund, Sweden: C. W. K. Gleerup, 1957)), 27-158; Richard L. Morrill, Migration and the Spread and Growth of Urban Settlements (Lund Studies in Geography, Series B, No. 26 Lund, Sweden: C. W. K. Gleerup, 1965)).

⁹James O. Wheeler, Research on the Journey to Work Urbana, Illinois: Council of Planning Librarians, 1969).

¹⁰Julian Wolpert, "The Decision Process in A Spatial context," Annals of the Association of American Geographers, (December, 1964), 537-58; Julian Wolpert, "Behavioral Aspects of the Decision to Migrate," Papers and Proceedings, National Science Association, XV (1965), 159-69; Lawrence A. Brown, Diffusion Processes and Location (Philadelphia: National Science Research Institute, 1968).

¹¹Gerard Rushton, "Analysis of Spatial Behavior by Revealed Space Preference," Annals of the Association of American Geographers, LIX (June, 1969), 391-400.

¹²Walter Isard, Methods of Regional Analysis (New York: John Wiley and Sons, 1960), 24; Morrill, Migration and Urban Settlements, 10.

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in spatial process¹³ only Brookfield and Wolpert have pursued the subject much beyond simply identifying its relevance in the broader scheme of geographic research. Brookfield's detailed study of cultural change processes among indigenous groups in central New Guinea was based upon his own field research. Wolpert's in depth field study of the decision making process in Sweden was aided by detailed statistics available in Scandinavian countries.¹⁴

The time dimension is crucial to this study for the following reasons:

1. The migration process is both temporal and spatial.

The brief time span involved in the moving of an individual or a family from one place to another is in itself unimportant, but the temporal variation in the composition, size, and direction of migration streams¹⁵ is highly significant.

¹³See, for example, Ackerman, "Where is a Research Frontier;" Berry, "Regional Analysis;" J. M. Blaut, "Space and Process," Professional Geographer, XIII (January, 1961), 1-7; H. C. Brookfield, "Local Study and Comparative Method: An Example From Central New Guinea," Annals of the Association of American Geographers, LII (June, 1962), 242-54; H. C. Brookfield, "Questions on the Human Frontier of Geography," Economic Geography, XL (July, 1964), 283-303; Wolpert, "The Decision Process;" Wolpert, "Behavioral Aspects."

¹⁴For a recent and very detailed analysis of the study of spatial process in geography and other social sciences see Richard W. Wilkie, "On the Theory of Process in Human Geography: A Case Study of Migration in Rural Argentina" (unpublished Ph.D. dissertation, University of Washington, 1968).

¹⁵Migrants who depart from a common area of origin and arrive at a common area of destination during a given migration interval constitute a migration stream. Donald J. Bogue, Principles of Demography (New York: John Wiley and Sons, 1970), 757.

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To meaningfully assess this variation and its causative forces several consecutive time periods of observation are necessary. Such an approach will result in an analytic description of temporal changes in migration (a delineation of the actual pulsating nature of migration through space), and an identification of the periodic dissimilarities in the roles played by the different factors inducing migration.

2. Economic location decisions are made at specified points in time. These decisions remain as static symbols of conditions which may no longer exist since patterns in space are inexorably bound to dynamic spatial change. What may seem an optimally located industrial plant or retail business at one moment may not at another due to constantly changing circumstances.¹⁶ The study of temporal variation of migration patterns will reveal the degree of obsolescence in economic location decisions.

3. The diffusion thorough space of technology, transportation linkages, and the perception of an improved way of life elsewhere is, by definition, a function of time. In so far as migration is affected by these factors it will vary in its spatial pattern through time.

4. The discovery or the depletion of natural resources as well as the improvement in human productivity are factors which are periodic or evolutionary in nature and which may encourage population movement.

¹⁶Morrill, Migration and Urban Settlements.

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Yet another reason for the apparent past neglect of the temporal dimension in geographic research is the difficulty of efficiently managing the vast amount of data necessary for the identification of spatial processes. The application of statistical data reduction techniques and computerization is now increasingly resolving this difficulty. Prior to dealing in greater detail with the data and quantification problems of this study it is important to identify more precisely the nature of the forces and processes seen to influence migration.

Spatial Processes Influencing Migration

Regional disparity is founded on the fact that economic growth and accompanying settlement proceed unevenly through space. Industrialization, centralization of economic activity, and urbanization are some of the different though interrelated processes that begin and spread out from given locales. The momentum of an early start of a central place for example, provides an initial advantage which will "at a critical stage become magnified in the course of development."¹⁷ The diffusion through space of these and other processes have important implications for migration and associated spatial reorganization. As Harvey has noted, it is clear that the real world patterns are usually the

¹⁷ Edward L. Ullman, "Geographic Theory and Underdeveloped Areas," in Essays on Geography and Economic Development, ed. by Norton Ginsburg (Chicago: The University of Chicago Press, 1960), 28.

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result of highly complex interacting processes, not all which can be interpreted very easily in terms of some simple system or theory."¹⁸ It is a major objective of this study to separate as much as possible these processes as they operate in space in order to discover their varying relationship to migration.

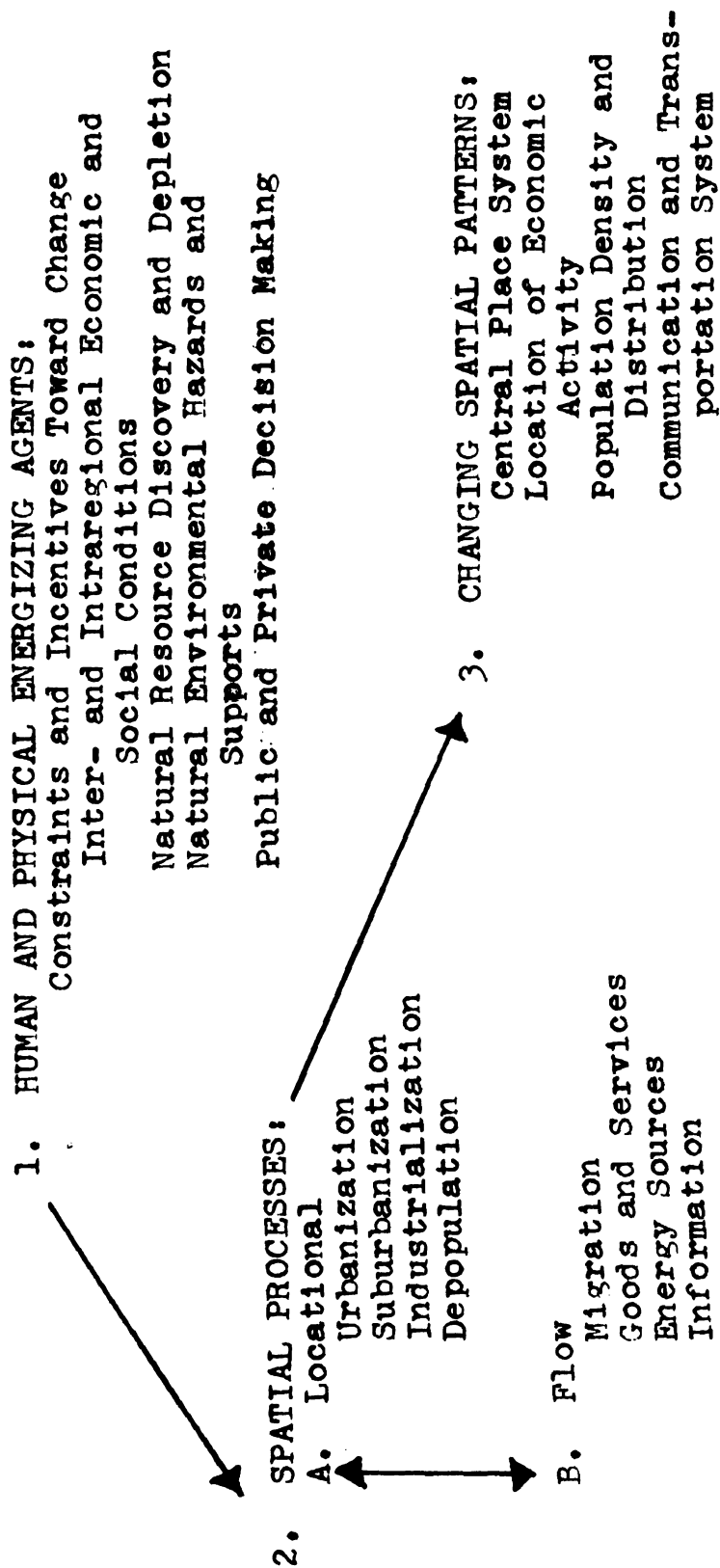
Process differentiation is important also because each is induced and influenced by substantially different mechanisms (see Figure 2). These mechanisms comprise the wealth of human and physical energizing agents which give rise to, or in some way influence the character of processes that cause and explain change in spatial patterns. Wilkie has provided a particularly enlightening analysis of the interrelatedness between energizing agents, spatial process, and spatial change.¹⁹

These different processes vary in intensity over time and differ in their degree of spatial influence. Thus, a persistent urbanization process will diffuse gradually through the landscape pulling people into the migration streams as they perceive the value of moving in order to gain urbanity. Improved urban transportation and continued concentration of population in central areas may initiate the suburbanization process characterized by people moving away from core areas

¹⁸David W. Harvey, "Geographical Processes and the Analysis of Point Patterns," Transactions and Papers, Institute of British Geographers, XL (1966), 81.

¹⁹Wilkie, "Theory of Process."

THE STUDY OF SPATIAL CHANGE IN THE CULTURAL REGION



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places within commuting distance of urban employment. Permittent, though well directed, attempts at inducing industrialization may encourage a migration stream with different time and space components and varying implications for spatial economic growth.

After population mobility patterns are identified, the varying relationship between the several locational space processes (see Figure 2) and migration must be determined. In this way it becomes possible to gauge the role of the individual process in reordering the landscape through migration. Success in this endeavor can have very practical implication in regional and social planning.

In order to structurally control this 'situation of unorganized complexity,' this investigation will emphasize the differentiated roles of the urbanization, suburbanization, and depopulation processes in stimulating and affecting migration. The main reason for focusing upon these particular processes is that each involves a distinct kind of population movement with substantially different implications for spatial change. Other relevant processes, like industrialization and commercial centralization will be considered in the degree they influence urbanization, suburbanization, and depopulation.

Urbanization and Depopulation.--Urbanization and depopulation are probably the most important spatial processes operating in the study area. Urbanization may be defined simply as

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the "process of population concentration proceeding in two ways: the multiplication of points of concentration and the increase in size of individual concentration."²⁰ Though simplistically defined, urbanization is a rather complex spatial dimension involving the transformation of the basic residential pattern from rural to urban with its attendant socio-economic changes. The diffusion of urbanization through the landscape may result in a zone of population decrease some distance away from the urban place involved.²¹ In this fashion urbanization may give rise to depopulation or areal population loss. It should be noted that while urbanization involves any movement to an urban area, depopulation does not take effect until the net migration loss for the time period in question exceeds the net natural population increase (births minus deaths).

Suburbanization.--The increased commuting range resulting from an expanding urban area, improved transportation, and better living conditions are the essential features of suburbanization. People move from the heart of the city to its periphery. Important spatial changes include a concentration

²⁰Hope Tisdale Eldridge, "The Process of Urbanization," Demographic Analysis, ed. by J. J. Spengler and O. D. Duncan (Glencoe, Illinois: Free Press, 1956), 338; see also Philip M. Hauser and Leo F. Schnore, The Study of Urbanization (New York: John Wiley and Sons, Inc., 1967).

²¹Peter Scott, "Population Origins in a Hobart suburb," Australian Geographer, X (March, 1967), 197-203.

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central place functions in the urban fringe area at the expense of adjacent smaller towns and villages.²² Thus suburbanization operates spatially in close symbiosis with centralization of commercial activity.²³

Other Significant Processes.--In most economically advanced countries, industrialization and urbanization are mainly the product of free market forces through which "differentiation of function, spatial arrangement, resource allocation, and economic growth were largely achieved."²⁴ The governments of many of these countries have attempted to restore regional economic balance by the artificial stimulation of growth industries in marginal areas.²⁵ The result has been an increasing importance of regional planning in urban growth and its population resettlement.

Manufacturing, if it locates in response to the

²²Sidney Goldstein, "Some Economic Consequences of Suburbanization in the Copenhagen Metropolitan Region," American Journal of Sociology, LXVIII (March, 1963), 551-64.
H. Holmes, "The Suburbanization of Cessnock Coalfield Towns: 1954-1964," Australian Geographical Studies, III (October, 1964), 1-28; Edgar Kant, "Suburbanization, Urban Sprawl and Mutation," in Migration in Sweden, 244-309.

²³Brian J. L. Berry, "The Impact of Expanding Metropolitan Communities Upon the Central Place Hierarchy," Annals of the Association of American Geographers, L (June, 1950), 112-16.

²⁴Philip M. Hauser, "Urbanization: An Overview," The Study of Urbanization, 35.

²⁵E. Casetti, L. J. King, and J. Odland, "On the Formal Identification of Growth Poles in A Spatial-Temporal Text," Proceedings: Canadian Association of Geographers (1970), 39-43.

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development of relatively isolated natural resources, tends to disrupt expected economic growth patterns. In Nordland county several industrial centers have emerged as a result of a combination of market responses to favorably situated resources, natural as well as human, and government interest in establishing growth industries. Migration patterns relating to this kind of centralization process will be found to be quite different from those associated more directly with the processes previously discussed.

Thus, migration is the end result of a combination of processes working through time in a spatially discriminant manner. By analyzing the varying impact of the different processes we may be able to more clearly predict future migration response.

Migration and Changing Spatial Patterns

An improved ability to predict and plan on a regional basis should result through attaining greater insight into the spatial impact of migration. Scientific research has yielded a number of migration models since Ravenstein first presented his laws of migration in 1885.²⁶ There have, however, been few attempts at bringing together the components of an

²⁶H. ter Heide, "Migration Models and Their Significance for Population Forecasts," Millbank Memorial Fund Quarterly, XLI (Spring, 1963); Walter Isard and Gerald P. Carrothers, "Migration Estimation," in Methods of Regional Analysis, 51-79; E. S. Lee, "A Theory of Migration" Demography, III (1966), 47-57; Morrill, Migration and Urban Settlements; R. G. Ravenstein, "The Laws of Migration," Journal of the Royal Statistical Society, XLVIII (1885), 167-235.

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1-encompassing migration theory. One of the more important reasons for this is segmentation in research focus. Economists have emphasized 'push-pull' and economic equalization theories.²⁷ Sociologists and demographers have focussed on migrant selectivity, i.e. the study of differences in the rate of migration between various economic, social, and demographic groups of the population.²⁸ Anthropologists have entered upon changes in social structure deriving from the migration of given culture groups.²⁹

Geographers have shown a more diversified interest.

²⁷ Richard Lycan, "Interprovincial Migration in Canada: The Role of Spatial and Economic Factors," Canadian Geographer, XIII (Fall, 1969), 237-54; Gunnar Olsson, Distance and Human Interaction (Philadelphia: Regional Science Research Institute, 1965); Bernard Okun and R. W. Richardson, "Regional Income Inequality and Internal Population Migration," Economic Development and Cultural Change, IX (January, 1961), 38-43; Robert L. Raimon, "Interstate Migration and Wage Theory," The Review of Economics and Statistics, LIV (1962), 38-38.

²⁸ O. D. Duncan, "Occupation Trends and Patterns of Internal Mobility," Demography, III (1966), 1-18; Larry A. Sjaastad, "The Relationship Between Migration and Income in the United States," Papers of the Regional Science Association, VI (1960), 37-84; Conrad Taeuber, "Economic and Social Implications of Internal Migration in the United States," Journal of Farm Economics, XLI (December, 1959), 1141-51.

²⁹ Chandra Jayawardena, "Migration and Social Change: A Survey of Indian Communities Overseas," Geographical Review, LVIII (June, 1968), 426-49; Leonard Kasdan "Family Structure, Migration and the Entrepreneur," Comparative Studies in Society and History, VII (July, 1965), 345-57; Leonard Kasdan, Migration and Anthropology (Seattle: University of Washington Press, 1971).

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This has ranged from a holistic approach³⁰ to a more specific concern with the problem of migration distance;³¹ migration by stage, also referred to as stepwise migration;³² and the migration field, defined as the spatial distribution of migrants as viewed from the community of origin.³³

An Outmigration Spatial Impact Model.--Many of the concepts introduced above will be further elaborated later in this study. Since primary concern is with migration as a factor of regional disparity, emphasis must be placed on its spatial

³⁰Robert S. Harrison, "Migrants in the City of Tripoli," Geographical Review, LVII (July, 1967), 397-423; Akin L. Mabogunje, "Systems Approach to A Theory of Rural-Urban Migration," Geographical Analysis, II (January, 1970), 1-19; James W. Simmons, "Changing Residence in the City; A Review of Intra-Urban Mobility," Geographical Review, LVIII (October, 1968), 622-51.

³¹Lawrence A. Brown, Frank E. Horton, and Robert I. Wittick, "On Place Utility and the Normative Allocation of Intra-Urban Migrants," Demography, VII (1970), 175-83; Gunnar Olsson, "Distance and Human Interaction," Geografiska Annaler, XLVII-B (1965), 3-43.

³²Torsten Hagerstrand, "The Movement of a Rural Population," Swedish Geographic Yearbook, XXVI (1947); Hagerstrand, "Migration and Area."

³³Reino Ajo, "An Approach to Demographical Systems Analysis," Economic Geography, XXXVIII (October, 1962), 359-71. Reino Ajo, "Fields of Population Change," Acta Geographica, XVII (1963), 1-19; Hagerstrand, "Migration and Area;" Kalevi Rikkinen, "Change in Village and Rural Population With Distance From Duluth," Economic Geography, XLIV (October, 1968), 312-25. For a more complete review of migration literature see Ole Gade, "Geographic Research and Human Spatial Interaction Theory: A Review of Pertinent Studies in Migration," in Migration and Anthropology, 72-93; Edgar Kant, "Migrationernas Klassifikation och Problematik," Svensk Geografisk Arsbok, (1953), 180-209; and J. J. Mangalam, Human Migration: A Guide to Migration Literature in English, 1955-62 (Lexington: University of Kentucky Press, 1968).

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impact, especially in the marginal region. Such a region frequently exhibits a recurring net population loss, therefore the particular interest of this study in outmigration.

A rather large body of literature deals with migration induced change. This research has a special concern with the economically backward or depressed area. In addition it shows evidence of a relatively large degree of interdisciplinary crossfertilization, and a significant measure of similarity in crosscultural findings. For these reasons it is possible to derive from this literature a framework for a descriptive model of outmigration effects in Nordland County. In Chapter VII a number of hypotheses will be statistically tested to assess the model's validity.

The spatial impact model involves four principal divisions with expected relationships as shown by the flow diagram (see Figure 3).

1. Demographic structure. Those who migrate are primarily young adults particularly women. In the area of outmigration a relative deficit of young women may be expected,³⁴ as well as a high median age of adults,³⁵ and falling birth

³⁴Bertil Wendel, "Regional Aspects of Migration and Mobility in Sweden, 1946-1950," Lund Studies in Geography, XII-B (1957), 7-26; H. R. Jones, "Migration Within Scotland," Scottish Geographical Magazine, LXXXIII (1967), 151-60.

³⁵Howard L. Bracey, "Some Aspects of Rural Depopulation in the United Kingdom," Rural Sociology, XXIII (December, 1958), 385-91; W. H. Metzler and J. L. Carlton, "Employment and Underemployment of Rural People in the Ozark Area," University of Kansas Agricultural Experiment Station Bulletin, No. 604 (1958); Stephen L. Schensul et al., "The Twilight Zone of Poverty: A New Perspective on An Economically Depressed Area," Human Organization, XXVII (Spring, 1968), 30-40.

FIGURE 3

HYPOTHESIZED SPATIAL CHANGE IN THE
DEPOPULATING REGION

I: Spatial Process

Outmigration

II: Structural Impact

<u>Component</u>	<u>Effect</u>
Demographic Structure	Depopulation
Economic Structure	Economic Stagnation and Decline
Political Structure	Emerging Political Minorities
Psychological Character	Changing Environmental Perception
Social Organization	Spatial Centralization of Institutions

III: Changing Spatial Patterns

Population Redistribution

Urban Decline

Abandonment of Farms, Fishing Hamlets,
and Public Structures and Service Systems

Relative Deterioration of Remaining
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and population replacement rates.³⁶ In fact, "an absolute decline will result in a changing age structure which will in turn lead to stagnation and decay."³⁷

2. Social organization. Outmigration becomes a social tradition as friends and family who have already migrated provide a powerful attractive force on those who remain.³⁸ The traditional family organization is broken up;³⁹ the educational level is lowered;⁴⁰ and the burden to pay for the upkeep of public services, including social welfare, increases with the proportional rise in the relative importance of the inactive population.⁴¹

3. Economic structure. Selectivity in migration, in terms of age, education and occupation, creates conditions

³⁶D. G. Symes, The Population Resources of the Connemara Gaeltacht; An Analysis of the Employment Potential (Hull, England: The University of Hull, Department of Geography, 1965).

³⁷United Nations, Department of Economic and Social Affairs, "Problems of Regional Development and Industrial Location in Europe," Economic Survey of Europe (1954), 149.

³⁸David Lowenthal and Lambros Comitas, "Emigration and Depopulation," Geographical Review, LII (April, 1962), 195-210; Symes, Population Resources.

³⁹Edward C. Banfield and Laura F. Banfield, The Moral Basis of A Backward Society (Glencoe, Illinois: The Free Press, 1950; Bert F. Hoselitz, Sociological Aspects of Economic Growth (Glencoe, Illinois: The Free Press, 1960).

⁴⁰Mancio Rossi-Doria, "Problems of Planning in Under-developed Areas," Sociologia Ruralis, II (1962), 110.

⁴¹Dale E. Hathaway, "Migration From Agriculture, the Historical Record and Its Meaning," American Economic Review, L (May, 1960), 390; Brian Heenan, "The Population of Dunedin," New Zealand Geographer, XXI (1965), 53-64; Rossi-Doria, "Problems of Planning," 110; United Nations, "Problems of Regional Development," 148.

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in the outmigration area which tends to retard recombination of the remaining resources;⁴² so outmigration may not have the anticipated positive effects on mechanization in agriculture.⁴³ In fact, decreasing standards of husbandry⁴⁴ and disruptive changes in agricultural land use⁴⁵ may be notable effects. Competitive adjustments in primary industries lag behind those of other regions,⁴⁶ thus one may expect an increasing dependency on outside resources and employment.⁴⁷ With continuing depopulation, purchasing power will decrease below certain minimum thresholds necessary for production, sales and services so entrepreneurs may curtail or cease operation.⁴⁸ Local credit restrictions will make it increasingly difficult for local firms to survive; a decline in real

⁴²H. R. Jones, "A Study of Rural Migration in Central Wales," Transactions of the British Institute of Geographers, XXXVII (1965), 31-45.

⁴³Hathaway, "Migration From Agriculture," 385; United Nations, "Problems of Regional Development," 148.

⁴⁴Aa H. Kampp, "Landbrug i den Nordlige Del af Mølø Herred," Geografisk Tidsskrift, LXI (1962), 99-118.

⁴⁵Bo Christenson, "Anienedalen - ett Italienskt avfolkningsområde," Forskningsrapporter, (Uppsala Universitet, Kulturgeografiska Institutionen) X (1968), 1-47.

⁴⁶Metzler and Carlton, "Underemployment of Rural People."

⁴⁷Banfield and Banfield, The Moral Basis; R. A. Gailey, "Settlement and Population in the Aran Islands," Irish Geography, IV (1959), 65-78; Lowenthal and Comitas, "Emigration and Depopulation."

⁴⁸J. B. Parr, "Outmigration and the Depressed Area Problem," Land Economics, XLII (May, 1966), 154.



estate values will set in and the tax base will decrease.

In sum, migration debilitates the economy of the originating region.⁵⁰

4. Psychological character. People left behind will increasingly show signs of resignation, apathy and complacency, and lack of optimism and progressive thinking.⁵¹

In a more generalized form the model contains the basic relationships of vigorously growing urban places, within or outside the study region, which attract young jobseekers at the expense of areas less able to provide similar opportunities. Therefore the migration process is on the one hand a positive factor in enabling continued population growth with concomittant economic expansion of urban places, and on the other hand it contributes at least potentially to disaffection and economic decline in areas of

⁴⁹ Charles L. Leven, "Population, Migration, and Regional Economic Development," Current Economic Comment, XXI (1959), 31-42; Parr, "Outmigration," 154.

⁵⁰ Gunnar Myrdal, Economic Theory and Underdeveloped Regions, (London: Methuen, 1957); See also, Frank T. Bachamura, "Migration and Factor Adjustment in Lower Mississippi Valley Agriculture," Journal of Farm Economics, XXXVIII (November, 1956), 1024-42; Charles E. Bishop, "Economic Development and Adjustments in Southeastern Low Income Agriculture," Journal of Farm Economics, XXXVI (December, 1954); R. G. Ironside, "Britain's Rural Area, Problems, and Prospects," Occasional Papers in Geography, Canadian Association of Geographers, British Columbia Division, VI (1964), 53-65; R. J. Johnston, "Components and Correlates of Victorian Rural Population Change," Australian Geographical Studies, V (1967), 165-81.

⁵¹ Lowenthal and Comitas, "Emigration and Depopulation;" Symes, "Population Resources;" D. Turnock, "Population Studies and Regional Development in West Highland Scotland," Geografiska Annaler, IL-B (1967), 260-70.



large scale net-outmigration. It is a major goal of this study to test this generalized descriptive migration model in Nordland County.

Summary of Research Objectives

The underlying assumption of this study is that human migration is a major factor leading to or resulting from regional differences in economic and social welfare. Therefore this analysis initially develops a theoretical framework within which the implications of spatial variation in migration may be diagnosed. A major objective is to discover the nature of recent migration streams and then to substantiate the existence of the forces and processes thought to influence them. Specifically the objective is to assess the relation to and impact of the processes of urbanization, suburbanization, industrialization, depopulation, and decision making. The periodic dissimilarities in the roles played by these different processes as they govern migration will be identified.

The study seeks to discover the extent to which the migration process in Nordland County, Norway, affects negatively or positively the conditions of life and livelihood. Implications for regional development planning will be noted. Specific research hypotheses deriving from the theoretical framework and models presented in Chapter II will be introduced in appropriate sections and tested to assess the validity of migration relationships and conditions thought



to exist in the study area. The discovery of the more precise nature of the relationships existing between major spatial processes as well as the impact of these processes upon geographical patterns will hopefully contribute toward the development of general theory in geography.



CHAPTER III

EVOLUTION OF NORDLAND COUNTY

SETTLEMENT PATTERNS

This chapter will introduce the character of land and life in Nordland County and show how they are continually shaped and reshaped by changing socio-economic and demographic conditions. The initial portion will set the stage through a brief overview of the historical impress of man on the land. This will be followed by a more penetrating look at recent changes in population settlement patterns.

Population and Economy in Nordland

Nordland County is a long, slender, and physiographically complex region bisected by the Arctic Circle (see Figure 1). The form of the landscape evolved largely from Quaternary glacial erosion and subsequent land uplift. Its present appearance alternates from groups of rugged islands almost devoid of trees to the fjorded coast where sinuous arms of the sea reaches far into the mainland. The interior is a barren upland plateau area cut deeply in places by long valleys lush in vegetation.

In spite of its extreme northerly location this part of Norway shows evidence of human settlement from the



time of Fosna culture (c. 7000-4500B. C.).¹ Up through the Middle Ages, people showed a particular affinity for an island or coastal location. The climate here ranges up to 25° C higher than the norm for the latitude, and the sea offers an abundance of fish of various species. Especially important in influencing the early settlement pattern has been the annual return of the cod to the Lofoten spawning grounds during the months of January through April (see Figure 4).

The existence of the strandflat, a fairly extensive coastal platform resulting from the erosional activity of past glaciers and wave action,² together with climatic mildness has permitted an early development of agricultural lands (see Figure 5). These have subsequently become the traditional subsidiary support of a population engaged predominantly in fishing and related activities. Settlement has since expanded toward the interior fjords and valleys with agriculture, particularly emphasizing fodder crops, cattle, and sheep, assuming a greater role in the local economy. The discovery of minerals and increasing exploitation of the forest resources of the southern interior valleys have encouraged greater concentration of people in the interior (see Figure 6).

¹ Povl Simonsen, "The History of Settlement," in Norway North of 65, ed. by Ørnulv Vorren (Oslo: University Press, 1960), 100-21.

²K. Landmark, et al., "Northern Norway: Nature and Livelihood," Norsk Geografisk Tidsskrift, XVII (1959-1960), 147.





Figure 4.--Lofoten fishing village of Stamsund on sheltered eastern shore of Vestvågøy and adjacent to the rich cod spawning ground in the Vestfjord. The Lofoten volcanic arch rises prominently in the backround.



Figure 5.--Small dairy farm on strandflat covered with morainic materials. Brønnøy kommune in Coastal Helgeland.





Figure 6.--Interior Helgeland. The agriculture-forestry combination of economic activity is favored here. Farms are small and the growing season short. With increasing emphasis upon mechanization and full-time employment in forestry many farms are being abandoned.



Figure 7.--Densely populated interior valley on Vestvågøy, Lofoten. The fishing-farming combination is most common though people thus engaged are on lowest level in income.



Nordland County has presently (1969) 6.5 per cent of the nation's population distributed over 11.5 per cent of its land surface. This gives the county a population density slightly more than half of the Norwegian average of 12.5 people per km². Great internal variation exists with some coastal and island areas being quite densely populated. Lofoten, for example, has more than 25 per km² (see Figure 11). Rural population (fifty-nine per cent in 1969) dominates throughout the county (see Figure 7).

When industrialization became an important aspect of Norwegian life, Northern Norway was left behind. Sufficient risk capital was not available for industrial development in an area remote from major internal markets and urban concentrations. The communication difficulties between small and quite dispersed local market centers are a major barrier to social and economic interaction (see Figure 8). Southern Norway benefitted from a rapidly expanding railnet but the rails did not reach as far north as Mosjøen until 1940 and Bodø until 1962. With industrial expansion elsewhere in the country, Nordland's competitive position became even less tenable. Marked regional developmental differences evolved. When industry did locate within the county it was based upon local natural resources and rarely progressed beyond extracting and/or primary processing (see Figure 9). Early investments in minerals extraction took place in an almost colonial tradition with, for example, the Swedes capitalizing Sulitjelma copper and the British developing Dunderland





Figure 8.--The harbor at Brønnøysund, one of a few towns which have been able to capitalize on a coastal location in Helgeland. The region is seeing a major shift in the regional transportation system away from coastal shipping to the rapidly improving interior rail and road network.



Figure 9.--A part of the Mosjøen industrial complex built primarily on the basis of available hydroelectric power. Primary aluminum processing depends almost entirely upon foreign markets.



iron ore. English businessmen also invested in Lofoten fish oil plants and brought several decades of prosperity to the Interior Helgeland region through lumbering until resources gave out (see Figure 11).

Nordland has traditionally exhibited the typical dependence of an economically marginal area upon export markets for extractive products whether derived from fishing, minerals, or other primary processing. Marked internal differences in the physical landscape, economic activities, and social characteristics give the area a distinctive geographic flavor. This will now be explored with respect to recent patterns of population change and the spatial processes at work within the county.

A Historical Comparison of Population Growth in Norway and Nordland County

Temporal patterns of population change in Nordland County reveal the recency of rapid socio-economic shifts particularly in the direction of increased urbanization and rural population decrease. This feature has meant a telescopic effect of present-day change. Thus what is happening may be likened to the rapid, even catastrophic change that is currently taking place in lesser developed nations.

A brief look at population growth and urbanization in Norway since 1845 is helpful in comparing the expansions and contractions within Nordland (see Table 1). Probably the

NORWEGIAN POPULATION GROWTH AND URBANIZATION, 1845-1970

Year	Total Population	% Rural Sparsely Populated	% <u>Rural</u> <u>Kommuner</u> Densely Populated	% <u>Urban</u> <u>Kommuner</u>	Population per km ²	Nordland Population	Nordland's % of total
1845	1,328,471	84.4	3.4	12.2	4.3	66,379	5.0
1875	1,806,900	75.6	6.3	18.1	5.9	103,369	5.7
1900	2,240,032	64.3	7.7	28.0	7.2	152,144	6.8
1930	2,814,194	52.7	18.8	28.5	9.1	186,920	6.6
1950	3,278,546	47.8	20.0	32.2	10.6	221,487	6.6
1960	3,591,234	42.6	25.3	32.1	11.6	237,193	6.6
1970	*	*	*	*	*	243,179	*

Source: Historisk Statistikk (Oslo: Statistisk Sentralbura, 1969), 3; and
and author's collected data.

*not available



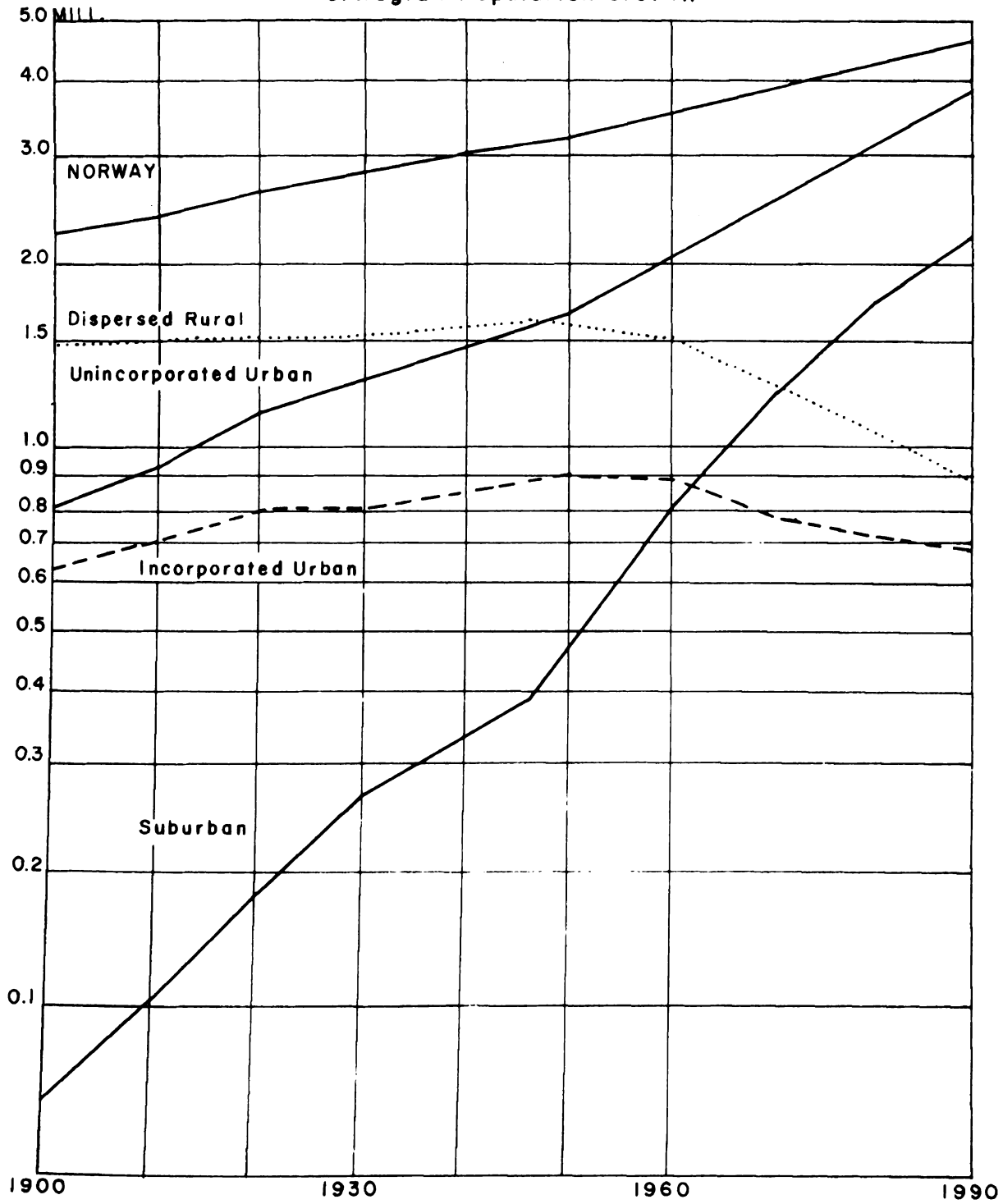
best indication of spatial change in the nation through the past century has been the steady decrease in the percentage of dispersed rural people. This decrease was especially large in the several decades just prior to the turn of this century and has again been notable in the decades following World War II. Two factors are largely responsible for this changing situation. One has been the threefold increase in the country's population since 1945 and an associated filling-in of thinly populated interstices. The other has been the centralization process deriving from industrialization and expanding urban places. Norway, like Britain, has been affected by "a drift to the South," though Norway's situation is more like the French with one dominant primate city providing most of the magnetism, in this case, of course, the Oslo urban region.⁴

An attempt to project settlement changes in the country as a whole over the past seventy years into the immediate future is expressed in Figure 10. Most important is the continued rapid increase in the suburban population, rendered distinct from the urban by its unincorporated nature. It is anticipated that dispersed rural settlement will account for less than twenty per cent of the total population

⁴ John Greve, "Strømmen Sørøver - Norway's Drift to the South," Town and Country Planning, XXXIII (1965), 310-11. Clifford J. Jansen, ed., Readings in the Sociology of Migration (New York: Pergamon Press, 1970), 3; Hallstein Myklebost, "Urbanization and Regional Concentration in Norway in the 1950's and 1960's," Norsk Geografisk Tidsskrift, XXII (1968), 227-44.



FIGURE 10: Norwegian Population Growth





by 1990.⁵

Since 1854 population growth has proceeded more rapidly in Nordland than in the country as a whole. Nordland's population increased from 66,379 in 1845 to 243,312 in 1970 while its proportionate share of the total population went from 5.0 per cent to 6.6 per cent. The greatest relative increase occurred the latter quarter of the nineteenth Century with the remarkable expansion of the Lofoten fishing industry. By the 1890's over 30,000 went each year from temporary bases in Lofoten fishing hamlets (fiskevaer) out to catch the spawning cod. Dependable markets for the dried or salted fish had been found. Coldevin relates that the days of subsistence economy were over and few were the families on the Nordland coast which did not depend directly on fishing for most of their cash income.⁶ Nordland's gradually declining share of Norway's population since 1900 is in part related to the lessening fortunes of the Lofoten fisheries, which in 1968 had only 6123 active participants.

Seven coastal Nordland kommuner reached their population peaks by 1900. They were poorly located with respect to the fishing banks, had inadequacies in their agriculture base, or were simply bypassed by the evolving transportation system. Through 1930 only one more kommune peaked in its

⁵ Magne Helvig and V. Johannessen, Norway, Land, People Industries (Oslo: Johan Grundt Tanum, 1966).

⁶ Axel Coldevin, Et Bidrag Til Rana-Bygdens Sosialhistorie, Mo-Stensil No. 6 (Oslo: Instituttet For Sosiologi, 1958).



population, but by 1946 these eight were joined by an additional twenty-eight. Major alterations in the settlement pattern were obviously occurring.⁷

Patterns of Recent Nordland County

Population Change

Striking regional contrasts in population change have long been a feature of settlement in Nordland. While earlier periods were dominated by a more rapid expansion of population in the coastal and island district, particularly Helgeland and Lofoten (see Figure 11), the emerging importance of the more interior located districts is shown in Figure 12. Though the county experienced a gain in all of its kommuner for this 1930-1946 period, major differences existed in the degree of increase. Coastal Helgeland and Interior Helgeland stand in strongest contrast, with the former having more than half of its kommuner in the less than five per cent increase category and the latter having most of its kommuner in the above twenty per cent increase category.

Within few years after World War II the greater

⁷For the purpose of preparing an analysis of these changes one map showing the evolution of central places and four maps depicting population change by decade since 1930 have been compiled. Appendix A presents the detailed statistical base and kommune location maps. It should be noted that extensive administrative unit consolidation and boundary shifts were carried out in the early 1960's reducing the number of kommuner from sixty-nine to forty-four, thus the need for two location maps.



FIGURE II: Regions and Urban Places in Nordland

MAJOR REGIONS

- A - Coastal Helgeland
- B - Interior Helgeland
- C - South Salten
- D - North Salten
- E - Ofoten
- F - Lofoten
- G - Vesteraalen

URBAN PLACES

(200 inhabitants attained by year indicated)

1875

- | | |
|-------------|-----------------|
| 1. Bodø | 36. Storforshel |
| 2. Mosjøen | 37. Inndyr |
| 3. Kabelvag | 38. Sør Arngøy |
| 4. Hellsøy | |

1950

- | | |
|-----------------|-------------|
| 5. Hemnesberget | 39. A Tind |
| 6. Svolvær | 40. Ramberg |
| 7. Henningsvåg | 41. Leivset |
| 8. Andenes | 42. Mornes |
| | 43. Terrak |

1900

- | | |
|-------------|---------------|
| 9. Stamsund | 44. Leknes |
| 10. Eggum | 45. Ramsund |
| 11. Mo | 46. Korøen |
| 12. Rømsdal | 47. Myre |
| 13. Narvik | 48. Hommelstø |

- | |
|------------------|
| 14. Brønnøysund |
| 15. Stokmarknes |
| 16. Melbu |
| 17. Ballstad |
| 18. Skrova |
| 19. Lødingen |
| 20. Sulitjelma |
| 21. Fauske |
| 23. Basmo |
| 24. Sandnessjøen |

1930

- | |
|----------------|
| 25. Finneid |
| 26. Sørvaagen |
| 27. Bleik |
| 28. Sigerfjord |
| 29. Bjørkasen |
| 30. Kjøpsvik |
| 31. Glomfjord |
| 32. Sortland |
| 33. Nesna |
| 34. Rime |
| 35. Bogen |

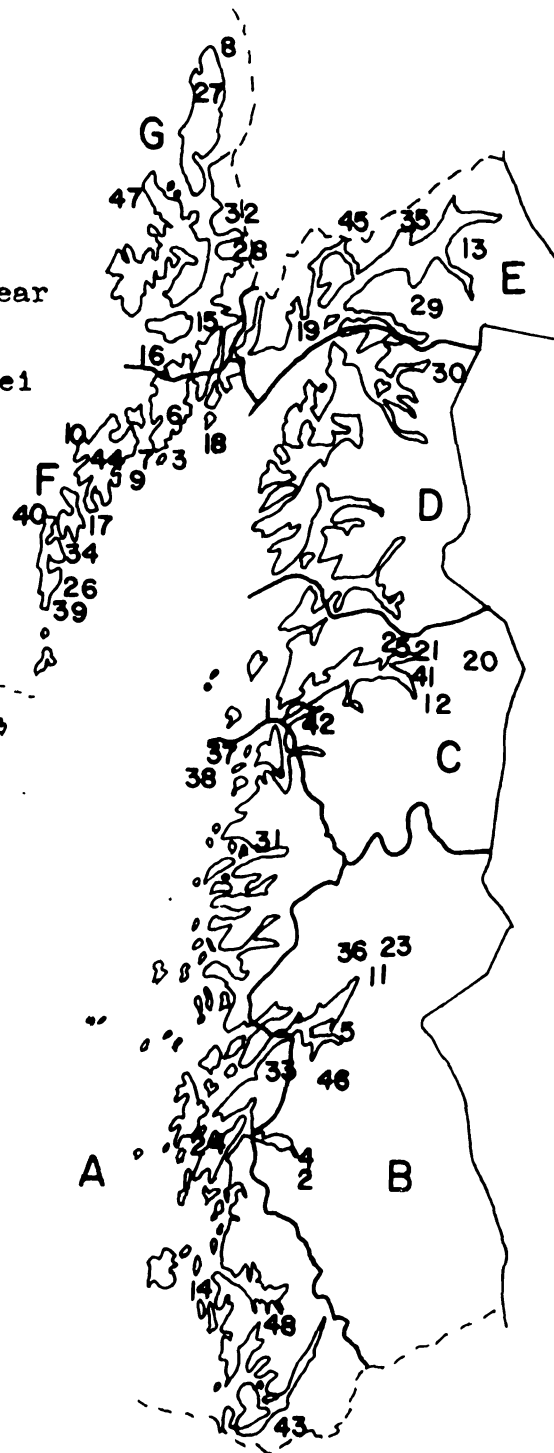
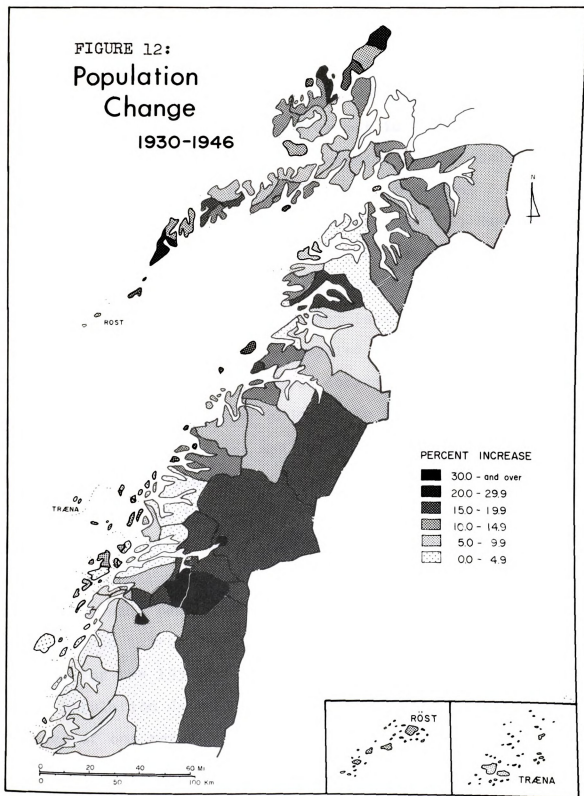




FIGURE 12:
Population
Change
1930-1946





degree of inequality in Nordland regional development became evident on the kommune level. Actual population decline was a feature of most coastal administrative units by 1950, the striking exceptions being the continued growth pole development in Meløy, with its hydroelectric based Glomfjord saltpeter industry, and the rapidly growing county administrative center of Bodø. Population boom conditions focused around the industrial expansion in Mosjøen and Mo-i-Rana in Interior Helgeland. The larger central places of Narvik, outshipment port of Swedish iron ore, and Svolvær in Lofoten continued at stable rates of expansion (see Figure 13).

Internal differences intensified during the following decade (see Figure 14). Population decreases were particularly marked in the kommuner adjacent to the growth nuclei of Mosjøen, Mo-i-Rana, Bodø, and Narvik. These along with the smaller central places of Brønnøysund, Sandnessjøen, and Andenes identify the increasing roles of industrialization and urbanization in areas of differentiated population expansion in Nordland. Out of a total of sixty-nine kommuner, the number losing people has increased from zero in the 1930-1946 period to thirty-two during 1946-1950 and finally to forty-two for the 1950-1960 period. Notable was the increasing rate of population decrease. While only one kommune decreased in excess of one per cent per annum in 1946-1950, eleven did so during the following decade. The location of most of the latter renders further evidence of the especially strong overall population contraction in the southern half of



FIGURE 13:

Population
Change

1946-1950

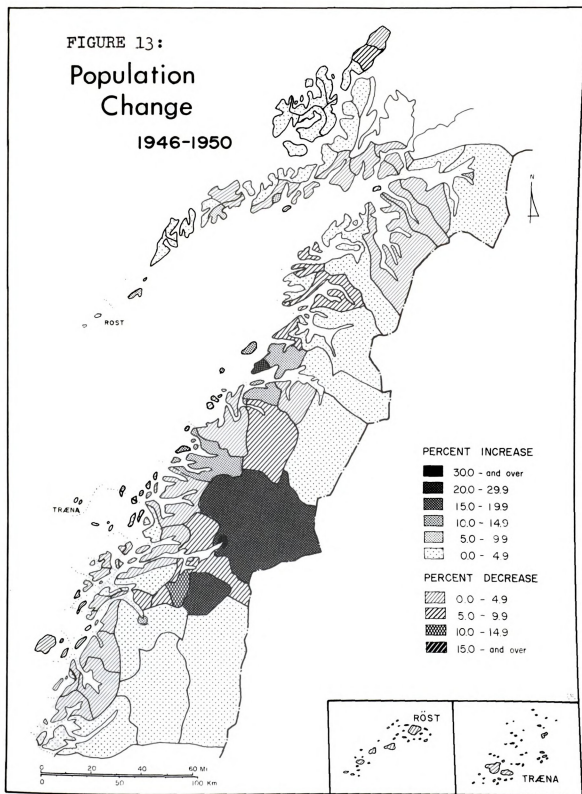
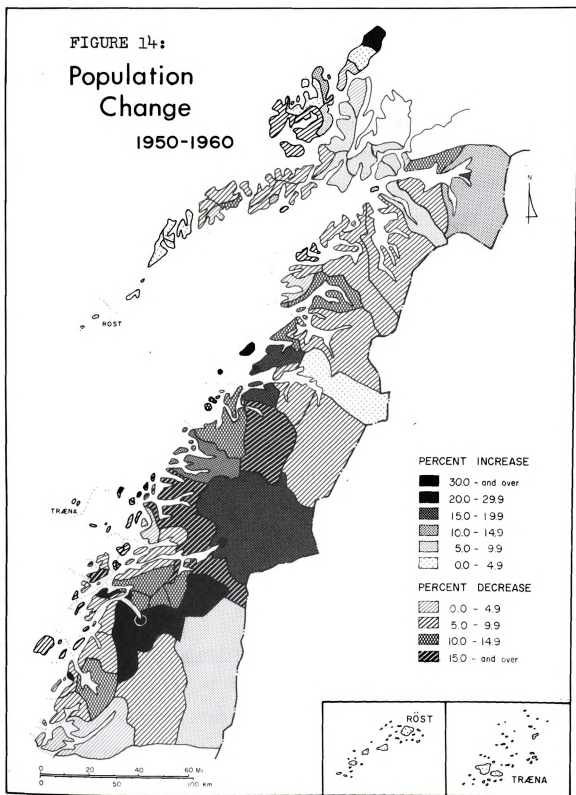




FIGURE 14:
Population
Change
1950-1960





Nordland in the 1950's.

Population change during 1960-1970 is shown in Figure 15. The administrative reorganization taking place in the early 1960's integrated some areas of growth with those declining in population. This contributed significantly to a lessening of the differences in growth rates, at least in Helgeland where the four larger central places were administratively joined with adjacent rural kommuner. Strong regional contrasts in population growth expanded, however, into the northern portion of the county where several districts sustained losses in excess of one per cent per annum. The city of Narvik decreased while the adjacent suburban kommune of Ankenes continued expanding.

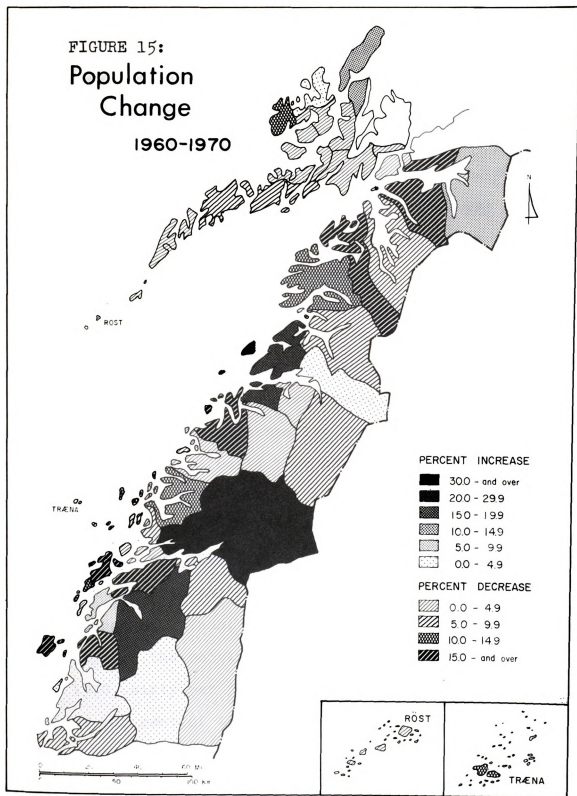
Whereas the tendency in prior decades was toward rapid growth in the interior at the apparent expense of the coastal and islands districts, increases are now centered in four distinct areas: Brønnøysund-Sandnessjøen to Mosjøen-Mo-i-Rana; Bodø-Fauske; Narvik area; and Northern Vesterålen. Elsewhere Nordland County exhibits varying degrees of population decline.

The Population Concentration Process

The intensity of the population concentration process during the 1930-1970 study period will now be briefly analyzed. One way of measuring this intensity is to determine the changing percentages of the total population living within a given area. The ten kommuner with the most people in



FIGURE 15:
Population
Change
1960-1970





1960 and 1970 respectively are identified (see Tables 2 and 3) and their percentage of the total county population is shown for a number of years beginning with 1930. These kommuner accounted for 31.2 per cent of the population in 1930 and 38.6 per cent of the total in 1960. This represents a concentration increase of 23.7 per cent or a 8 per cent per annum. Following administrative changes in 1961-1963, the ten most populated kommuner accounted for 54.4 per cent in 1965 and 56.3 per cent in 1970, or a concentration increase of 3.5 per cent or 0.75 per cent per annum.

The population concentration data for 1930-1970 may be summarized by using a Lorenz curve comparing the actual with a theoretical population distribution. If Nordland's inhabitants were evenly distributed over all its kommuner in terms of their respective physical size then a given per cent of people would live on an equal per cent of land area. Plotting this theoretical distribution on a cumulative percentage graph will result in a diagonal line (see Figure 16). The degree to which the actual distribution deviates from the theoretical will show the extent of population concentration. Thus, in 1930, it can be seen that sixty per cent of the people lived on fifty per cent of the area. By 1970, sixty per cent of the people lived on but thirty-three per cent of the area.

Use of this method of population concentration analysis allows the derivation of a concentration index by calculating the ratio of the area between the curved and



TABLE 2

PER CENT OF NORDLAND COUNTY POPULATION LOCATED
IN TEN MOST POPULATED ADMINISTRATIVE UNITS,
1930-1960

	1930	1950	1960
County Population	186,920	221,487	237,193
Narvik	5.3	4.9	5.6
Bodø	2.8	3.4	5.3
Hadsel	5.3	5.0	4.4
Bodin	3.3	3.7	4.1
Nord Rana	2.5	3.2	3.9
Fauske	3.8	3.6	3.6
Mo-i-Rana	0.7	1.9	3.5
Meløy	2.5	2.8	3.1
Ankenes	2.5	2.5	2.4
Sortland	<u>2.6</u>	<u>2.5</u>	<u>2.9</u>
Total First Ten	31.2	33.6	38.6
Second Ten	20.0	20.3	19.1
Third Ten	14.2	14.0	13.8
Fourth Ten	12.7	11.7	10.3
Fifth Ten	9.5	9.0	8.1
Sixth Ten	8.0	7.6	6.3
Final Nine	4.2	3.9	3.4
Total*	99.6	100.1	99.8

*may not total 100.0 due to rounding.



TABLE 3

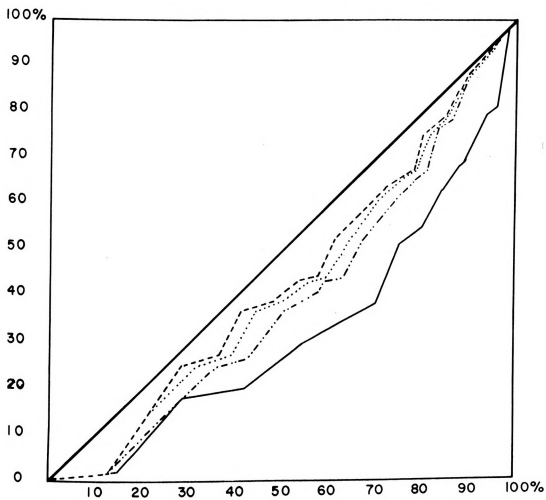
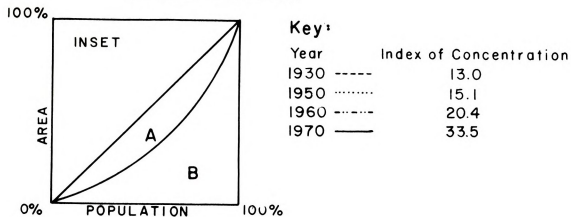
PER CENT OF NORDLAND COUNTY POPULATION LOCATED
IN TEN MOST POPULATED ADMINISTRATIVE UNITS,
1965-1970

	1965	1970
County Population	243,513	243,312
Bodø	10.9	11.7
Rana	9.9	10.7
Vefsn	5.2	5.5
Narvik	5.5	5.5
Vestvågøy	5.0	4.7
Vagan	4.2	4.0
Hadsel	3.6	3.6
Fauske	3.2	3.6
Brønnøy	3.6	3.6
Andøy	<u>3.1</u>	<u>3.3</u>
Total First Ten	54.4	56.3
Second Ten	23.2	22.8
Third Ten	12.6	11.7
Fourth Ten	8.5	7.9
Final Four	1.4	1.4
Total*	100.1	100.1

*may not total 100.0 due to rounding



FIGURE 16: NORDLAND COUNTY POPULATION
CONCENTRATION





the diagonal line to the total area below the diagonal line. Figure 16 (inset) illustrates this concentration index as the ratio of area A to area A + B. Increasing values of the index indicate increasing concentration. The results show a remarkable rise in population concentration in the past two decades. The index increase of only 2.0 points over the twenty year period prior to 1950 supports the conclusion derived from the study of population change that growth was relatively stable throughout the county during this interval. The index moved up 5.4 points during the 1950's and a further escalation of the rate of concentration continued with an increase of 13.5 during the 1960's. It will later be shown that there is little reason to expect much of a decrease in the rate of population concentration within Nordland in the near future.

In sum, there is ample evidence for concluding that not **only** will the population of the county continue to be crowded into an increasingly smaller portion of the land area but also that this will occur at a faster rate. Just how rapid the population will contract spatially is difficult to diagnose. Evidence in subsequent sections of this study will suggest, for example, that movement out of the county will continue apace with the areas of higher population concentration providing an increasing share of the net outmigration.



CHAPTER IV

SPATIAL PROCESSES AND PATTERNS IN NORDLAND

The major objective of this chapter is to identify the existing spatial processes in Nordland County. Implications of these dimensions of spatial change for migration will be treated in the subsequent chapter.

The major processes and spatial patterns existing in Nordland will be established by the use of factor analysis. This technique mathematically reduces a large number of variables describing empirical conditions within the study area to a smaller number of factors which are assumed to represent major regularities in the input data. The regularities are variously referred to in the literature as 'basic patterns', 'underlying structure', and, as used in this study, 'dimension'.¹ Though most often used inductively as an aid in discovering the major dimensions existing in an array of data this technique can also be employed deductively.² Thus the existence of particular patterns may be hypothesized and

¹Berry, "Declining Regions;" Brian J. L. Perry, "The Logic and Limitations of Comparative Factorial Ecology," Economic Geography, XLVII (June, 1971), 209-19.

²R. B. Cattell, Factor Analysis: An Introduction and Manual for the Psychologist and Social Scientist (New York: Harper and Bros., 1952), 13-14; R. J. Rummel, "Understanding Factor Analysis," Conflict Resolution, XI (1967), 451-52.



empirical data factor analyzed to see whether these dimensions in fact appear. It is relevant to look first at the results of a factor analysis of conditions in Nordland County kommuner for a two decade study period covering the years, 1947-1970.

Data, Sources, and Related Problems

A study encompassing at least twenty years was considered necessary to deal effectively with the dynamic changes recently characterizing life in Nordland. Limitations in data and research time were major barriers to extending the mathematical analysis of this study further into the past. However, a more important reason for not using materials dating prior to the late 1940's is the questionable use of a time interval where changes in spatial patterns were conditioned largely by wartime exigencies.

For the purpose of identifying persistent and ongoing patterns and processes in Nordland's kommuner the data of two different time intervals are factor analyzed. The 1947-1962 and 1960-1970 time periods into which the study was divided, were imposed by the extensive administrative changes which occurred in the early 1960's. Dissimilarities in the variables used for the different periods of observation are due primarily to the lack of continuity normally offered by the decennial national censuses. These provided most of the data collected for the initial period but was not conducted in time for the inclusion of such materials in the latter period. In addition, the assembly of information



particularly relevant to a study of this nature was not begun by the various government department until the 1969's and was not available for the initial period.

For comparative analysis Berry notes the advantage of using more than one time period of observation with temporal variation in the areal composition as well as in the basic character of variables employed.³ Such an advantage lies in defining coherent structures in different temporal and areal scale situations. Ongoing and persistent patterns and processes, dimensions of great similarity identified in both time periods, should result primarily from the continuing influence and direction of the same forces operating within the study region and only partly from similarities in variables utilized. The resulting comparative factor analysis, or comparative factorial ecology, should give "a greater sense of security of the perception of an underlying 'reality'."⁴

Dimensions derived from the two different factor analyses are first examined. The factor scores of the dimensions most meaningful to this study are mapped (see Figures 17, 18, 19, and 20). Then follows an analysis of the

³Berry, "Comparative Factorial Ecology," 215-16; other studies using this comparative approach include Gerald H. Romsa and Wayne L. Hoffman, "Some Temporal Considerations of Basic Urban Dimensions in the Southeast: A Factor Analysis Solution," Southeastern Geographers, IX (1969), 1-12; and Leslie King, "Cross-sectional Analysis of Canadian Urban Dimensions: 1951 and 1961," Canadian Geographer, X (1966), 205-24.

⁴Berry, "Comparative Factorial Ecology," 216.



persistence or changing character of the processes identified in Nordland County. This analysis will include commentary on the implications of existing differences in areal size of the kommuner and nature of the variables for the two time periods.

A Factorial Ecology - Phase I

In the attempt to identify the main processes and spatial patterns in Nordland Phase I is a factor analysis of the 1947 to 1962 data set. The data comprises forty-six demographic, economic, political, social, and areal variables describing conditions in each of sixty-nine kommuner in Nordland (see Appendix A). A complete description of all variables used in this study will be found in Appendix B. Procedurally two factor analysis computer programs⁵ were used in obtaining a normal varimax (orthogonal) rotation of factors⁶ plus a listing of factor scores. The derived dimensions are therefore statistically uncorrelated though it should be noted that non-correlation and independence are not necessarily the same thing.⁷ Approaches to handling this particular

⁵David J. DeTemple and Anthony V. Williams, Factor C: Oblique Rotations of Factor Matrices, Varimax (Normal) Rotations and Factor Score Computations, Technical Report No. 35 (East Lansing, Mich.: Michigan State University Computer Institute for Social Science Research, 1968).

⁶H. G. Kaiser, "The Varimax Criterion for Analytic Rotation in Factor Analysis," Psychometrics, XXIII (September, 1958), 187-200.

⁷R. J. Johnston, "Some Limitations of Factorial Ecologies and Social Area Analysis," Economic Geography, XLVII (June, 1971), 314-23.



problem are still highly tentative while being quite complex, therefore the implications of this notion are not pursued in this study.

Ten factors are rotated in Phase I. This includes only those factors that have an eigenvalue of at least 1.00 in a preliminary principal component analysis. The proportion of total variance accounted for by Phase I is .8176 and the four factors accounting individually for less than 4.9 per cent of the total variance are excluded. This standardized parametric research design⁸ leaves a total of six factors for examination. A listing of contributing variables, factor loading, and communalities are found in Table 4. The individual factors are discussed in order of their importance.

Factor I - Demographic Change Dimension.--On the first dimension twenty variables have loadings of at least .30. With 19.12 per cent of the total variance accounted for this dimension is the strongest extracted in Phase I. High positive values on the dimension belongs to kommuner with the more rapid natural population growth rates (variable 32) as well as the greater percentage of immigrants (43,44) and thus total population expansion (8, 9, 10). There is a tendency for these areas also to exhibit more of a dependence upon employment in manufacturing (35) and retail service (36)

⁸Berry, "Declining Regions;" Rummel, "Understanding Factor Analysis;" K..Uberla, Faktoranalyse (Berlin: Springer Verlag, 1968).



TABLE 4

PHASE I: FACTOR LOADINGS AND COMMUNALITIES

Variable Code	I	II	III	IV	V	VI	Commun- ality
1. INCPC 57	.40			-.68			.92
2. INC47 57							.87
3. INC57 65				.30			.91
4. INC47 65				.35			.93
5. WEAL4757	.60						.72
6. TOTPOP50		.75		-.53			.97
7. TOTPOP60	.39	.62		-.62			.97
8. POPM5060	.86			-.42			.95
9. POPF5060	.88			-.37			.96
10. POP50 60	.87			-.40			.96
11. SPECED60				-.80			.86
12. AGFO5060							.82
13. FISH5060	.64						.76
14. MANF5060	.31						.80
15. FARM4959							.67
16. CULT4959							.67
17. FARMS 49		.91					.93
18. CULTIV49		.82				-.42	.93
19. CULTIV59		.87				-.30	.95
20. INCPC 65	.51			-.61			.80
21. ROAD 59		.33	-.36	.61			.83
22. MECH 59			.38			-.65	.80
23. VOTPAF51				-.35	.51		.56
24. LABOR 51							.65
25. CONSER51				-.75			.67
26. AGRAR 51						-.85	.79
27. CHRIST51							.69
28. LIBERA51				-.39			.57
29. APOLIT51							.70
30. SCHOCHIL				-.84			.88
31. POPOST61	.51			-.70			.86
32. GROWRATE	.74						.70
33. AGFO 60	-.49			.37	.40	-.34	.82
34. FISH 60				.32	-.81		.93
35. MANF 60	.50				.53		.81
36. RETAIL60	.46			-.72			.89
37. TRANS 60			-.39	.57			.70
38. SERVIC60	.36			-.73			.73
39. RETIRE60	-.82						.78
40. OLDPOP60	-.85						.89
41. SPINSTER				-.71	.32		.76
42. POPSTAB				.61	-.39		.90
43. POPFLOW1	.73						.74
44. POPFLOW2	.79			-.33			.83
45. LATITUDE			-.89				.92
46. LONGTITU			-.80				.87

Proportion of
Variance

.1920 .0839 .0517 .1797 .0569 .0498



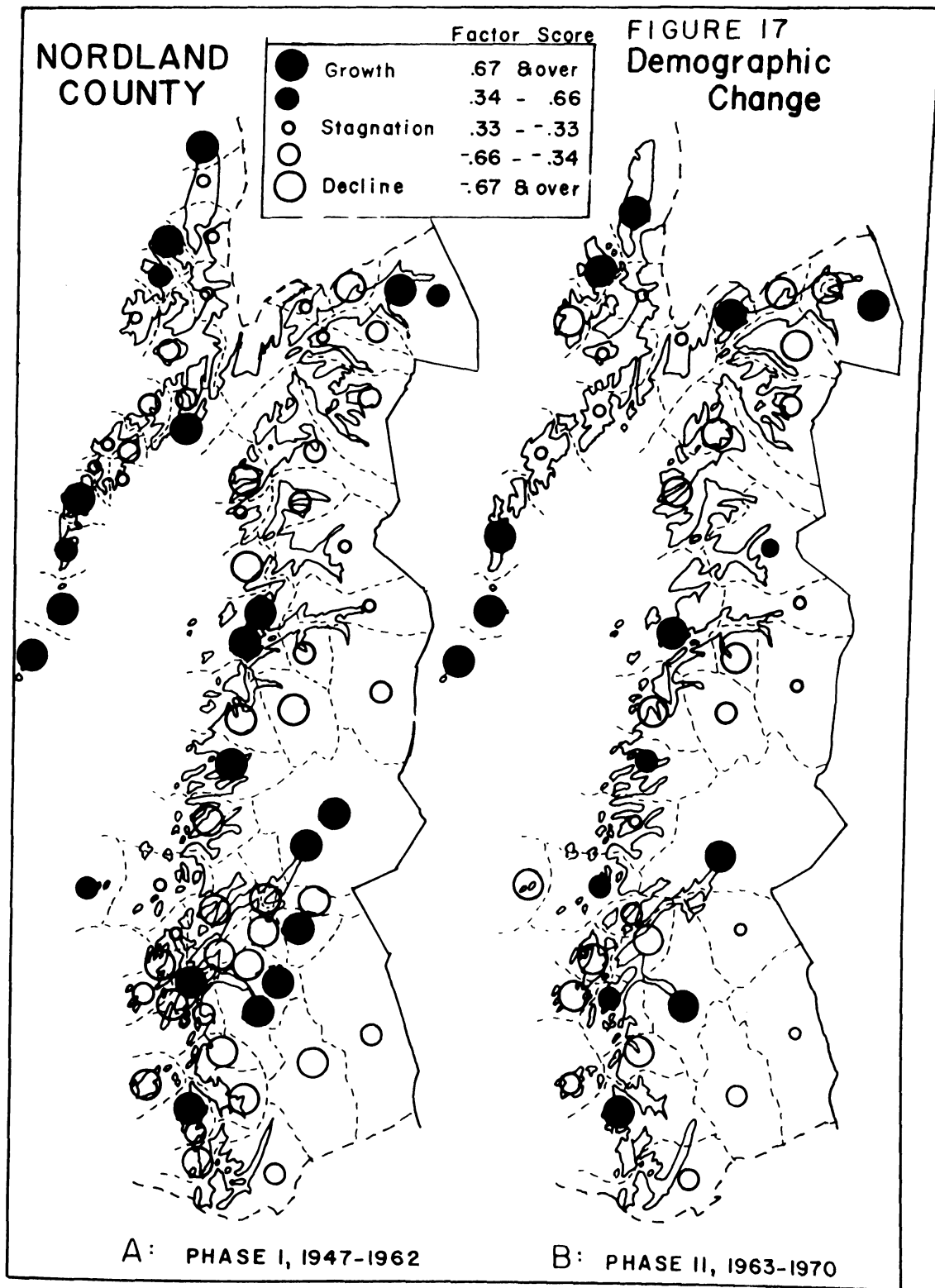
together with greater relative improvement in the standard of living (51). The higher loadings in population per post office (31) and per cent increase in fishing employment (13) suggest a certain degree of population concentration in addition to the population increase.

In contrast, the negative values belong to kommuner with a high percentage of older, retired people (40) who were born in the kommune in which they presently reside (42). Thus the dimension differentiates between areas of dynamic population expansion and areas of relative stagnation.

Plotting the factor scores along a continuum from the high positive to the high negative values shows the relative position of each kommune in terms of their changing demographic characteristics during the study period. The spatial character of this dimension is derived by mapping the factor scores (see Figure 17-A). The results support the strong contrasts in population growth in the Helgeland region identified in Chapter III and the relatively vigorous expansion in outer Lofoten and Vesteralen.

Factor IV: Urbanization Dimension.--It has already been argued that urbanization is one of the more dominant spatial processes for this time period. A large array of variables, twenty-four in all, contribute in such a way to Factor IV that the resulting dimension quite well defines the urbanization process. The dimension accounts for about 18.0 per cent of the variance. Examination of the variables shows that the more negative the location of the individual kommuner on the







continuum from high positive to high negative factor scores the more urbanized they are. The areas with high negative values, for example, are associated with a higher degree of specialized education attained (11), with a greater percentage of employment in retail trade (36), personal services (38), and transportation (37), and with a dominant position of the urban Conservative Party (25). Also these areas display an expected high position on the indices of population concentration, which for 1949 is number of school children per school district (30), and for 1961 is population per post office (31). Neither of these indices is apt to be very high in rural districts with a generally dispersed population. The urban kommuner, in addition, tend to have a higher per capita income (1), a greater percentage of unmarried adult females (41), and of course, more people (6, 7). It is not surprising that the population change variables (8, 9, 10), indicating a flow of people from the rural to the urban areas (44) contribute to this dimension as well.

Kommuner with a high positive value, on the other hand, have a greater concentration of newly built agricultural roads (21). This aspect is associated with the recent government attempt to better integrate agriculture into the regional economy and to improve the dispersed population's access to urban places. The population stability variable (42), which shows the percentage of population residing in kommune of birth in 1960, also is high on this dimension. This means that rural areas exhibit a lack of recent immigration.

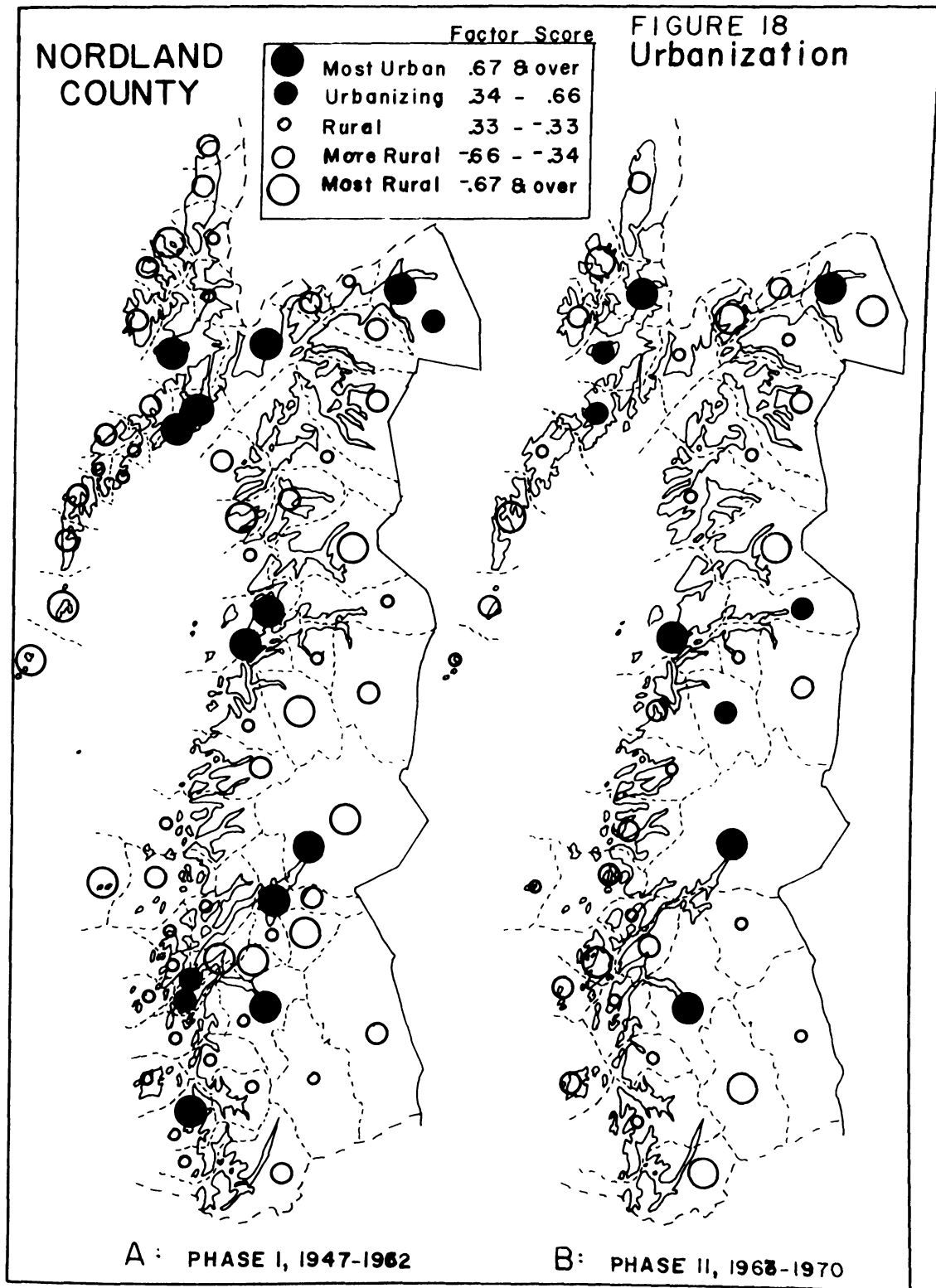


Certainly this supports the view of demographically stagnating rural areas. The urbanization dimension is mapped in Figure 18.

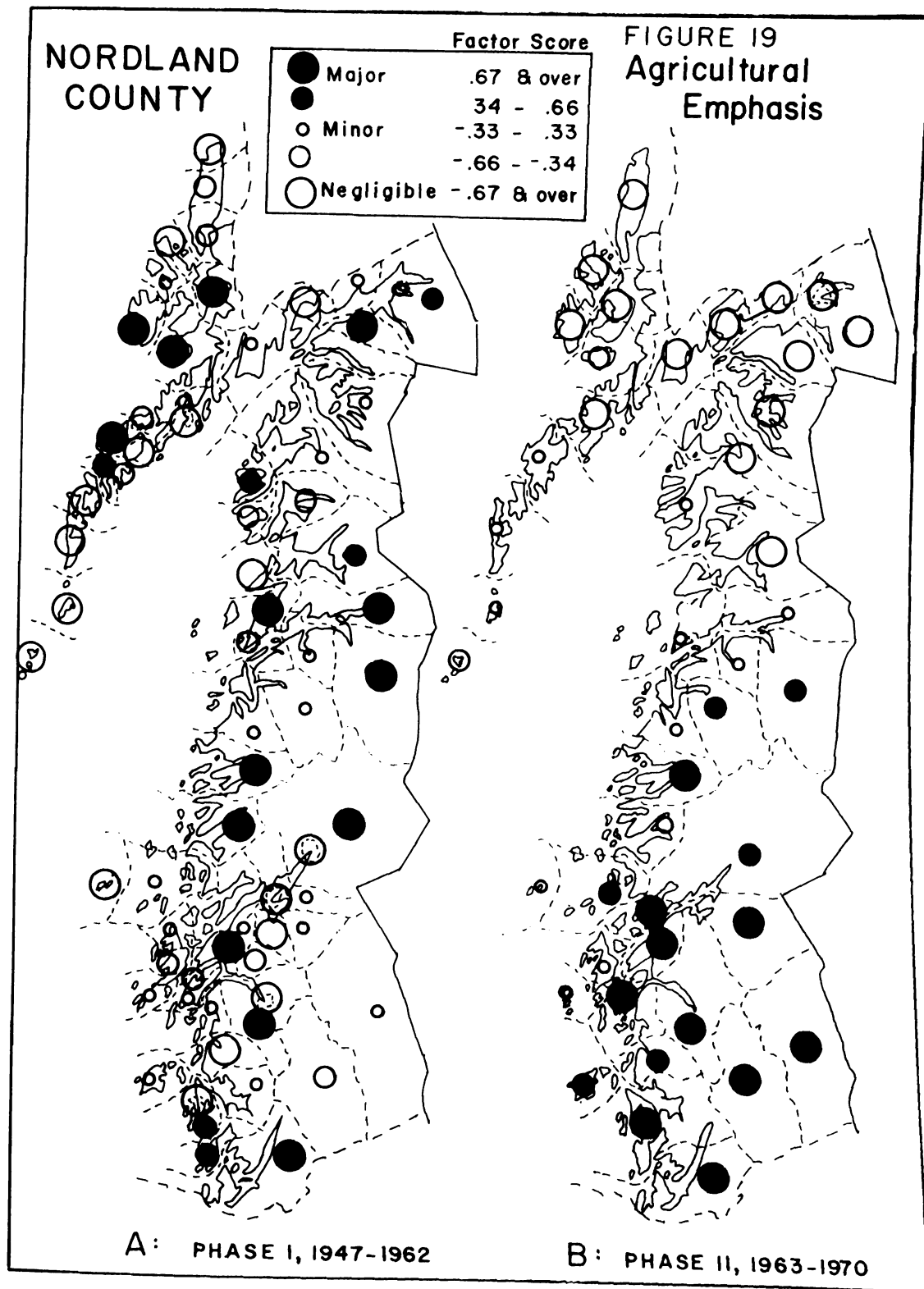
Factor II: Agricultural Emphasis Dimension.--Factor II is a dimension of medium strength that explains 8.39 per cent of the total variance. It contains six variables of relevance (i.e. with loadings of at least .30). Kommuner are ranked by this dimension in terms of their number of farms and the size of their cultivated area (17, 18, 19). It is important to note the strong association here between agricultural dependence and population size (6, 7). Thus, the greater the population size the larger the area of cultivated land and the greater the number of farms. The spatial patterns reveal the locational proximity of most urban places to areas of strong agricultural emphasis and the importance of agriculture in the central part of the islands (see Figure 19).

Factor V: Manufacturing-Fishing Continuum.--Factor V is best characterized as a dimension identifying the contrasting roles of manufacturing and fishing in the occupational structure of the individual kommune. Thus an area dominated by employment in the fishing industry (34) will rank high negative on the continuum while the area where manufacturing (35) is more important will rank positive. There seems to be several sub-dimensions underlying this factor. For example, some kommuner with a high employment percentage in fishing are experiencing an increase in manufacturing employment from 1950 to 1960 (14), and thus a probable in-flow of people. Other fishing areas











rank high in population stability (42). The reason for this apparent dichotomy is probably that the government, in its efforts at improving the economies of scale in the fishing industry, is pursuing a centralization policy which has favored some fishing districts at the expense of others.

At the manufacturing end of the continuum there is some evidence of a rural-urban dichotomy. Here are joined areas obviously urban, a high female electoral participation (23) and some concentration of unmarried females (41), with areas where employment in agriculture and forestry (33) plays the larger role. The suggestion is that manufacturing does not invariably occupy urban space. With only 5.7 per cent of the total variance explained this is not a strong dimension.

Factor III: Location Dimension.--This is a dimension of little analytic relevance with slightly over 4.0 per cent of the variance explained. Only two variables are loading high. These two identify the latitudinal and longitudinal mid-points of each unit area (45, 46), therefore little is demonstrated beyond the northeasterly orientation of the county. Since the cut-off point in deciding on variable relevance is arbitrarily set at loadings of .30 it should be noted that three variables attain loadings of between .30 and .40 on this dimension. These identify the weak tendency of agricultural interdependence (21) to decrease with latitude while employment in transportation tends to increase with latitude (37).



Factor VI: Political Ruralism Dimension.--Accounting for less than 5.0 per cent of the total variance and controlled largely by just two variables Factor VI identifies a particularly weak dimension. The important variables aid in locating areas where the rural based Agrarian Party (26) has some support among the electorate and where agriculture is more modern (22). The Agrarian Party, however, was quite weak in Nordland in 1951 with representation in only seven of the sixty-nine kommuner.

A Factorial Ecology - Phase II

Identification and analysis of processes and spatial patterns in Nordland continues with a factorial study of thirty-two variables describing conditions and changes, 1963-1970. Eight relevant factors are extracted by the normal varimax rotation with an explained variance of 79.5 per cent. As in Phase I the communalities are quite high for most variables.⁹

A major difference between the two phases is the reduction in the number of kommuner. Only forty-four remain today following the extensive administrative changes of the early 1960's. The question of comparability raised not only by this disparity but also by notable differences in data content has in part been dealt with but will be considered again following the discussion of Phase II factors. Table 5

⁹Communalities, which derive from summing the square of each variable loading, indicate the degree to which each variable can be explained by the remainder.



TABLE 5
PHASE II: FACTOR LOADINGS AND COMMUNITIES

Variable Code	Dimensions								Commun- ality
	I	II	III	IV	V	VI	VII	VIII	
1. VOTFAP65				.58		-.44	.34		.76
2. LABOR				.75			-.38		.82
3. CONSERV		-.65							.74
4. CECHRIST	-.32	.30		-.50	-.41			.42	.81
5. COMMIE				.47				-.70	.78
6. SOCIPEP					.41			-.80	.94
7. LIBERAL	.36					-.31	.58		.70
8. POCG570			-.45		.80				.88
9. MOBILE 4	.32				.52				.64
10. TOTPOF69	.78				.41				.87
11. YOUTNES	.45				.72				.78
12. OLDPOF67					-.86				.83
13. MOBILE 3	.34				.76				.73
14. HOUSEPUR	.80				.34				.89
15. HYTHANS	.47			-.66					.73
16. PERINCPC	.62			.39	.48		.31		.91
17. LETTER65	.93						-.87		.85
18. POPBUS67	.81						.36		.89
19. PERSALE	.82						.33		.87
20. PERSATAF	.77						-.32		.87
21. RETSAFUS				.43		.66			.76
22. MICCHILD						-.66			.86
23. MOLDAGE		-.73	-.52						.89
24. LONGTUD		.88							.88
25. LATITUDE				-.67					.71
26. MIDYOUNG			.36	-.38	-.58				.73
27. MP RATIO		.72							.58
28. NEWPLOW		.59	-.36						.70
29. AGROAD									.84
30. DEVELAID	.78				.78				.83
31. GROWRATE	.36								
32. PERCFISH			.85						
Proportion of Variance	.2058	.0942	.0622	.0983	.1613	.0499	.0678	.0554	
Source: Compiled by author									

Source: Compiled by author



provides a listing of contributing variables, factor loadings, and communalities for eight factors.

Factor I: Urbanization Dimension.--During this more recent time period the urbanization process appears strengthened. Half of the thirty-two variables used in Phase II are of some significance to this factor with the result that it accounts for 20.6 per cent of the total variance.

Kommuner with high positive factor scores are those most urbanized. They account for a high percentage of personal sales taxes (20), high retail sales per capita (19) as well as per business (21), total household purchases (14), and high per capita income (16). In addition, these areas have the most people and these tend to be younger in age (11), fairly mobile (9, 13), and highly concentrated (17). It is interesting that governmental development aid programs since 1952 have been directed largely toward the more urban kommuner (30).

The rural end of the continuum contains districts which have a relatively high cost of medical transportation borne by national health insurance (15). These kommuner are located some distance from the major medical centers. The increased percentage of older people (12), that segment of the population more illness prone, is the probable factor contributing to the high medical transportation cost. All in all, this latter variable qualifies well as an index of relative isolation. Figure 18-B shows the spatial pattern



of urbanization in the county.

Factor V: Demographic Change Dimension.--Phase II, like Phase I, shows areal change in population characteristics to be a major component of conditions in Nordland County (see Figure 17-B). Factor V with 16.1 per cent of the total variance contains twelve demographically oriented variables with loading of at least .30. Kommuner attaining high negative factor scores on this dimension exhibit substantial increases in population (8) during the study period. With this is associated a high degree of mobility (9, 13) which relates to the youthfulness of the population structure (11) and a large natural rate of growth (31).

The underlying dimension demonstrates the existence in the data of a continuum ranking those kommuner vigorously expanding in population to those displaying the greatest degree of outmigration and in the process leaving behind a relative surplus of older people (12) and males (27).

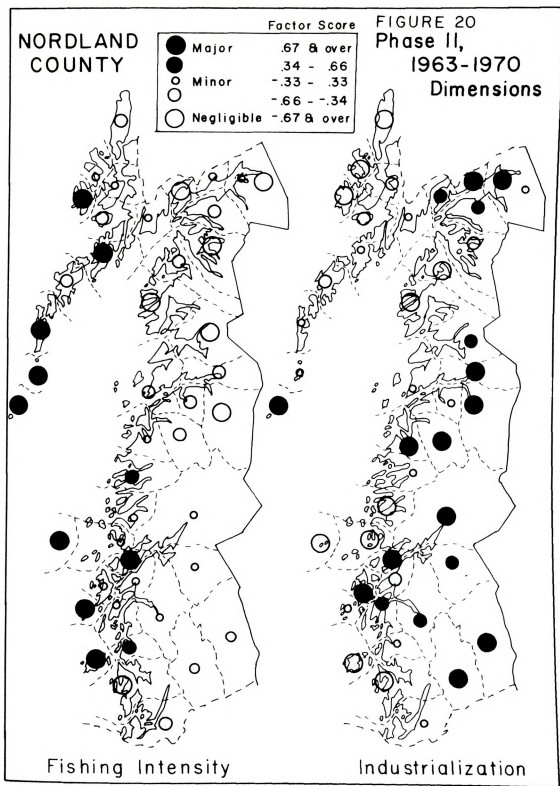
Factor IV: Industrialization Continuum.--Factor IV with about 10.0 per cent of the total variance is one of the more meaningful factors to be extracted in Phase II. This dimension locates, through the strong dichotomization of certain political variables, each district on a continuum where positive values signify economic growth and high negative values signify stagnation and isolation. Kommuner situated within the expansion end of the spectrum exhibit a relatively high degree of political activism with a strong Labor Party component (25).



They are not necessarily the areas with the highest per capita incomes (16), but are nevertheless capable of attracting the more vital part of the migration stream, the young people (26). This leads to the conclusion that this dimension represents the industrialization process. Young people are in relative decline in the kommuner occupying the isolation portion of the continuum. Here are also the greater costs in medical transportation (15), already identified as an isolation index. The Christian Peoples and Center parties (4), both largely rural in concentration and somewhat conservative in outlook, are well represented in these areas. The factor scores as expected locate the industrial concentrations in Interior Helgeland and Ofoten. Outer Helgeland and parts of Salten and Vesteralen are the more isolated areas in Nordland County (see Figure 20-B).

Factor II: Agricultural Improvement and Expansion.--Factor II identifies a dynamic spatial dimension that explains 9.4 per cent of the total variance. This factor sorts the kommuner by the change in the size of their cultivated land (28) plus addition to their agricultural transportation system (29). These fairly dynamic agricultural areas are quite rural in nature as evidenced by the negative loading of the urban Conservative Party vote (3). With a very strong geographic coordinate loading (24, 25) there is a spatial aspect to this dimension. This illustrates the location of most of the new agricultural lands in the southwestern portion of the county







with expected gradual decreases toward the northeast (see Figure 19-B).

Factor III: Fishing Intensity Dimension.--This is a relatively weak factor accounting for 6.2 per cent of the total variance and containing only one strong contributing variable. This is the per capita fish catch in 1966, a variable highly skewed due to the great regional variation in fishing intensity. Even so, this dimension does contribute to a better understanding of the fishing kommuner by identifying their eastern location (24) (see Figure 20-A), their predominance of males (27), the relative lack of agricultural development (29), and their support of the outmigrant stream during 1967-1969.

Factors VI and VII.--These factors are difficult to label and analyze. Factor VI differentiates between areas where young families with children control the outmigration stream and areas where there is relatively little net outmigration (12). This dimension will not be further considered because it lacks high loadings and explains a low percentage of the total variance.

Factor VII, on the other hand, explains 6.8 per cent of the total variance and does contain one high loading variation, the number of people per general store per district (18). Though it might be suspected that this dimension measures a condition of rurality, a plotting of factor scores and a study of the correlation matrix reveal evidence to the contrary. There are, for example, urban kommuner (Bodø,



Mo-i-Rana) which have gone beyond the general store stage with many specialty shops and larger supermarkets. Other urban kommuner (Narvik, Svolvær) continue to retain the small town or rural image with many retail businesses still classified by the Norwegian Census Bureau as general stores. The dichotomy is intensified by the grouping of some of the poorest rural districts together with some of the most rapidly growing urban kommuner.

Factor VIII: Political Disparity Dimension.--The final factor extracted contributes primarily to a grading of kommuner along a continuum expressing political ideology from ultra-leftist (5, 6) to ultrarightist (4). With an absence of variables identifying the relative weight of occupational groups this dimension comes closest to delineating the role of manufacturing. The factor accounts for 5.4 per cent of the total variance.

A Factorial Ecology - Summary and Conclusions

The main purpose of this chapter is the identification and analysis of major processes and spatial patterns in Nordland through the use of factor analysis. It is appropriate to offer the following review of the findings in the context of the major study objectives. Briefly summarized these center on the discovery of the major spatial processes persisting over a period of time within the research area, on the relationship between these processes and human migration, and on the effects of the latter on spatial



reorganization, regional disparity, and regional development.

An examination of Table 6 will identify those processes and spatial patterns which are important in Nordland County for the two study periods, Phase I and Phase II. The table also defines the relative strength of these dimensions as they vary through time as well as within each phase. Figures 17, 18, and 19 identify the spatial variations from phase to phase in the demographic change, urbanization, and agricultural emphasis dimensions.

One of the more important factors extracted identifies, as earlier hypothesized, ongoing patterns of population flow, contraction, growth, and decline. The dimension obviously involves dynamic spatio-temporal shifts and is therefore labelled demographic change. It is the factor having the greatest proportion of the total variance in Phase I but is replaced in this position by the urbanization dimension in Phase II. This leads to the logical, though statistically as yet unsupported, conclusion that urbanization in Nordland is, at least partially, a result of previous radical demographic alterations. Urbanization merely commences with the movement of people to the city. This process increases in strength from Phase I to Phase II, a finding which is well supported by the graphic display and discussion of recent population change and concentration presented in Chapter III. Industrialization, appearing only in Phase II, is not as prominently displayed as an independent process. However, a Phase I factor containing loadings leading to its potential



TABLE 6

NORDLAND FACTORIAL ECOLOGY

Dimension	Phase I (1947-1960)		Phase II (1960-1970)	
	Factor	Per Cent Variance	Factor	Per Cent Variance
Demographic Change	I	19.2	V	16.1
Urbanization	IV	18.0	I	20.1
Industrialization	..	....	IV	10.0
Agricultural Emphasis	II	8.4	II	9.4
Manufacturing-Fishing	V	5.7	III	6.2
Political Ruralism or Disparity	VI	5.0	VIII	5.4
Location	III	5.2	....	...
General Store	...	...	VII	6.8
Others	...	20.4	...	5.0
Total Explained Variance		81.8%		79.5%

definition accounts for only 4.7 per cent of the total variance. Therefore it was left out of the analysis. Now that the dimension approaches 10.0 per cent in Phase II its weak appearance in Phase I bears noting. Industrialization, like urbanization, is apparently a process of increasing importance within the county.

Two of the remaining factors which are persistent through time, i.e. they appear in both phases, delineate spatial patterns of economic activities. Thus a comparison



of factor scores derived from the different phases will show relative spatial changes in (1) agricultural emphasis and (2) manufacturing-fishing importance. Dimensions of economic activity in Phase II suffer in their definition in part from the absence of occupational information in the data set. The final persistent dimension extracted relates to political ideology and, in defining an ideological dichotomy, is most effective in Phase II. The degree to which this can be used as evidence in support of the hypothesis that outmigration begets political dichotomization will be analyzed later.

In Chapter IV we have delineated a number of time and space-persistent processes and patterns in Nordland County. Though more detailed analyses of the implications of these findings are appropriately relegated to subsequent chapters it should be noted, in summary, that demographic change, with population contraction an important component, urbanization, and industrialization are statistically distinguishable and increasingly significant processes in Nordland County.



CHAPTER V

FACTORS AND PROCESSES INFLUENCING MIGRATION

How then is the flow of people encouraged, impeded, or otherwise related to the various processes and spatial patterns identified in Nordland County? Chapter V will attempt to answer this question; first by describing the changing areal character of migration in Norway as well as within the study region; then by examining how this character is affected by the prevailing processes, especially urbanization and industrialization.

Migration in Norway - A Historic Overview

A brief look at migration and population change in Norway over the past century will introduce the more recent inter-and intraregional population flows. Some of the main events and factors temporally influencing movement through space will be identified.

Industrialization and the centralization of commercial activity created conditions favorable for large scale rural to urban migration during the latter half of the 19th Century. Associated with this directional flow was a major shift in occupational structure away from agricultural and other rural based economic activities. Rural occupations accounted for 32.0 per cent of the adult population in 1875, as compared



with 24.9 per cent in 1900, 20.7 per cent in 1930, and 10.3 per cent in 1960. Counteracting the gains for the cities was the continuing outmigration from Norway to countries outside of Europe, chiefly North America. Though there were more rural emigrants the relative loss to the cities was larger.

A study of Tables 7 and 8, will support a more detailed discussion of recent interregional migration streams in Norway. For this purpose the country is divided into five major regions: Østlandet (the East), Sørlandet (the South), Vestlandet (the West), Trøndelag, and Nord Norge (Northern Norway) of which Nordland is one of three counties (Figure 1). Table 7 provides a look at the average annual net migration from or to these regions during four time periods commencing with 1951-1954. The only region receiving a constant large net influx of people is Østlandet which contains the Oslo core area. Notable variations exist between the different time periods for each of the remaining regions but only Nord-Norge shows a definite increasing trend in net outmigration. Nordland County is by far the leading contributor to the Nord-Norge outmigrant stream, and will probably continue to provide an increasing proportion of this net loss of people.

A general idea of the regional direction of migration in Norway may be obtained by specific reference to only the most recent time period since the relative weights have in the past two decades remained about the same (see Table 8). The magnetism of Østlandet with its Oslo nervecenter is



TABLE 7

NORWEGIAN REGIONS, NET MIGRATION, 1951-1967

(Annual Average)

REGIONS	1951-54	1955-59	1961-64	1966-67
Østlandet	+3692	+4789	+5055	+3611
Sørlandet	- 107	- 38	+ 17	+ 299
Vestlandet	- 964	-1477	-2082	- 543
Trøndelag	- 873	-1036	- 936	- 461
Nord-Norge	-1749	-2236	-2055	-2906
Nordland	-1144	-1376	-1332	-1965

Source: Compiled by author.

TABLE 8

NORWEGIAN REGIONS, NET MIGRATION MATRIX,¹
1966-1967

From:					
To:	Østlandet Sørlandet Vestlandet Trøndelag Nord-Norge				
Østlandet	...		2178	1425	3698
Sørlandet	79	...	192	45	281
Vestlandet			...	73	1212
Trøndelag				...	621
Nord-Norge					...

¹ A net migration matrix identifies the net flow of people between the regions shown.

Source: Compiled by author



readily apparent. Even the most distant region, Nord-Norge, contributes over two-thirds of its net migration loss to Østlandet. In Vestlandet the force of attraction is Bergen, Norway's second city.

Recent Migration Patterns in Nordland

The Kommune as a Unit of Analysis.--In any kind of areal study one of the more difficult problems is the identification of proper units of analysis; this is particularly true in a migration study. It is therefore important to preface a section on migration within Nordland with a discussion of the character of the primary unit of observation, the kommune. Most migration research employs a macro-analytic approach which is based upon interregional flows between areal units. These may be defined either in terms of the smallest minor civil division for which appropriate data are recorded or some aggregation of unit data. It is obvious that administrative divisions are not ideal for assessing causal relationships, but the kommune does approach the ideal.

Considerable disagreement exists as to whether the proper unit for a migration study should be an areal or a population unit.¹ Conclusions upon which certain kinds of inferences are founded are most validly supported by units of equal population weight. Greater theoretical strength might in other instances be derived from a study of similarly

¹Julian Wolpert, "The Basis for Stability of Inter-regional Transaction," Geographical Analysis, I (1969), 158.



sized areal units or areal units having a great degree of internal homogeneity giving rise to relative uniformity in mover-stayer decisions and in the selection of destinations for those who migrate.² In the case of Nordland most kommuner evolved in past centuries as readily definable ecologic units and retained their early boundaries, with a few exceptions, at least into the early 1960's. To carry further the ecologic analogy, this suggests that they evolved as political, social, and economic niches, in fact, as nearly self-contained functional units often effectively separated by physical barriers. Each kommune would in an earlier period readily fit within Ackerman's definition of a functional subsystem.³ Recent improvements in transportation and communication linkages, as, for example, the major shift away from a dependence upon coastal transportation, plus increased centralization of economic life and habitat has resulted in a gradual decrease in the internal functional independence of the typical kommune.

Faced with the increasing costs of maintaining large numbers of small administratively independent districts the government began in the 1950's to consider a major overhaul in the areal size of these civil divisions. One of the main goals in administrative reorganization was to take into account the changing spatial character of the functional

² Ibid., 1963.

³ Ackerman, "Where is a Research Frontier."



subsystems.⁴ Thus, in Nordland, the cities of Mosjøen, Bodø, Sandnessjøen, Brønnøysund, and Svolvær were joined with their adjacent suburban-rural kommuner of Vefsn, Bodin, Alstahaug, Brønnøy, and Vægan, respectively. However, retained is the continuing problem of Narvik and its suburban kommune of Ankenes. In statistical analysis Narvik often stands out as an anomaly since it is the only remaining relatively large urban place which is administratively disjoined from much of its neighboring commutation field. It is felt that administrative realignments do not impair the overall analysis since they in general improve the functional delineation of subregions and are thus reflective of the changing conditions within the county.

The preceding discussion on the kommune as a functional, internally homogenous unit is supported in varying degrees, directly or indirectly, by recent Norwegian research.⁵ One might argue with some degree of assurance that a Nordland

⁴Hallstein Myklebost, "Regioninndeling Med Enkle Midler; Midt- og Sør Troms og Nordre Nordland," Norsk Geografisk Tidsskrift, XXI (1967), 242-47.

⁵J. A. Barnes, "Clan and Committee in a Norwegian Island Parish," Human Relations, VII (1954), 39-58; Fredrik Barth, Models of Social Organization (London: Royal Anthropological Institute, 1966), 14-16; Andreas Holmsen, "The Old Norwegian Peasant Community," Scandinavian Economic History Review, III (1955), 17-32; Francisco Kjellberg, "Politisk Lederskab i en Utkantkommune," Tidsskrift for Samfunnsforskning, VI (1965), 74-90; Hallstein Myklebost, Norge's Tettbygde Steder, 1875-1950 (Oslo: Universitetsforlaget, 1960); Myklebost, Nord-Norge; Myklebost, "Regioninndeling," Sverre Strand, Urbanization in Norway - General and Special Aspects (Oslo: Institute of Transportation Economics, 1968).



County migration study offers the best of both worlds, an analysis based on small areal units nearly homogenous in character and functionally independent, and on meaningful population units as well. The population weights are relatively small ranging from 620 to 13,311 in Phase I (1949-1962), and from 597 to 28,545 in Phase II (1963-1970).

One obvious major effect of administrative consolidation has been the statistical decrease in total mobility as measured in migrants per 1000 population moving across kommune boundaries. This decrease has been shown to include 867 people from 1964 to 1965 when fifteen Nordland kommuner disappeared, and to involve an overall decrease in mobility of 3.6/1000 as a result of the total reduction in the number of minor civil divisions from sixty-nine to forty-four.⁶ This simply means that 3.6 per thousand population were recorded to have moved within the enlarged districts whereas these moves without consolidation would have been recorded between the districts and thus have assumed statistical significance for this study.

Interregional Migration in Nordland, 1951-1957.--Nordland County migration records, 1951-1969, are separated for analysis according to the two phases of study necessitated by the administrative organization and discussed in Chapter IV. Average annual net migration rates during Phase I are shown

⁶ Lars Østby, Geografisk Mobilitet, Meddelelser fra Geografisk Institut, Kulturgeografisk Serie No.4 (Oslo: University of Oslo, 1970).



for two consecutive sets of years, 1951 to 1957, and 1957 to 1961; while Phase II averages are described for 1964 to 1967, and 1967 to 1969, respectively.⁷ Due to the number of observation units involved the changing character of migration is discussed in the context of the five Nordland subregions delineated on Figure 11. The spatial patterns of migration rates are mapped in Figures 21, 22, 23, and 24, while frequency distributions and related statistics are displayed comparatively in Figure 25.

A close correlation may be expected to exist between population change and migration rates.. By regressing population change, 1950-1960, against the net migration rate, 1951-1957, this relationship is found to be quite strong with a product-moment correlation coefficient of .7614. Statistically this means that about fifty-eight per cent of the difference in one variable can be explained by variation in the other. A visual comparison of Figures 14 and 21 supports this finding.

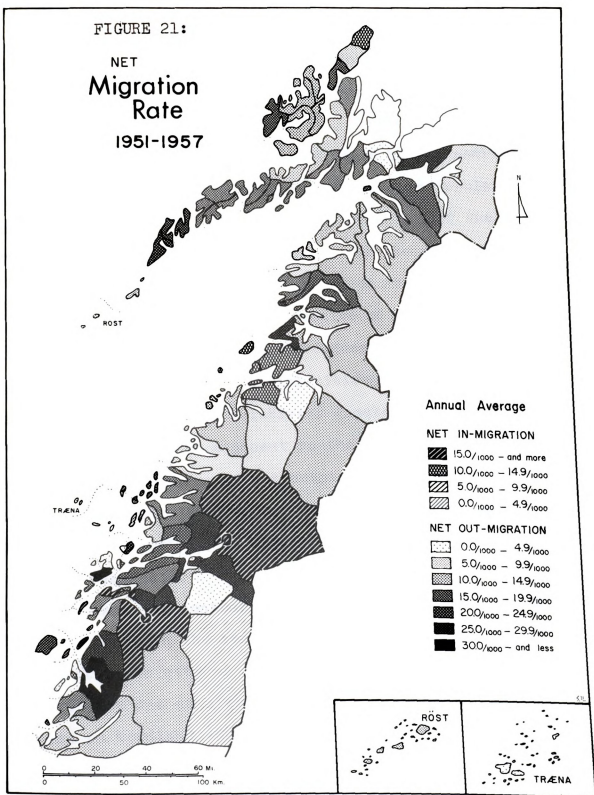
The Coastal Helgeland region (see Figure 11) is one of strong contrasts in migration behavior during the first time period (see Figure 21). Only the urban places of Brønnøysund and Sandnessjøen show a net gain in migrants, though this is quite substantial with the annual average exceeding ten per thousand. The rural kommuner close to

⁷ A visual comparison with the maps supporting the analysis of population change variations in Chapter II may prove of value to the reader.



FIGURE 21:

NET
Migration
Rate
1951-1957





the expanding urban places are those which have experienced the highest rates of net outmigration in the whole of the county. Velfjord near Brønnøysund and Nordvik near Sandnessjøen both show rates of loss surpassing three per cent per year.

In the Interior Helgeland and South Salten regions are found the kommuner with the greatest gain in population growth due to migration. No less than seven out of the eleven Nordland kommuner with surplus migrants are located here. Leading the growth areas are the cities of Mosjøen, Mo-i-Rana, and Bodø, together with their respective adjacent rural districts of Vefsn (39.3/1000), Nord-Rana (25.6/1000), and Bodin (11.2/1000). The industrial cities of Mosjøen and Mo-i-Rana experienced the relatively greatest growth during this period. And it is adjacent to these growth centers that the greatest degree of net outmigration occurred, -26.4/1000 per annum in Drevja, -25.0/1000 in Sør-Rana, and -29.4/1000 in Kjerringøy adjacent to the administrative center of Bodø-Bodin.

The spatial contrast in net migration rates are not nearly as strong in the remainder of Nordland. In North Salten-Ofoten the city of Narvik is the only area exhibiting a net increase due to migration. Though the largest city at this time in Nordland, Narvik does not show the degree of expansion evidenced in other urban areas of the county. Probably this condition is due to the city's dual function as a central service center in a region of population decline



and as a transshipment port for Swedish iron ore, an economic facet which has encouraged little industrial or commercial development in recent years. Evenes (-25.8/1000) experienced at an early stage in its development the closing of its iron mines; this act was followed during this period of analysis with the demise of Bogen Verft, a shipbuilding industry introduced into the kommune with government support only a few years earlier. Most of the remainder of this region has in excess of 10/1000 net outmigration.

The Lofoten group of districts demonstrate relatively slight spatial variation in migration rates with only the two outmost island kommuner, Røst and Vaerøy, losing less than 15/1000. The Lofoten districts are rural with the exception of Svolvær (-19.6/1000) and dependent primarily upon fishing or the fishing-agriculture combination of livelihood. Mobility characteristics of the Vesteralen region are quite similar to those of the Lofoten Islands. Only Andenes, with its military base, shows a gain in population due to migration.

Two conclusions are strongly supported in the 1951-1957 analysis. The areas of greatest gain as well as loss are in close proximity to each other. An obvious spatial relationship is displayed, the rural areas closest to the more rapidly growing urban places are first affected by the outmigration tendency. Secondly, it is the more populated kommuner which have the greatest gains and the less populated kommuner which sustain the relatively largest losses. (Refer



to Appendix B for detailed comparisons).

Interregional Migration in Nordland, 1957-1961.--Coastal

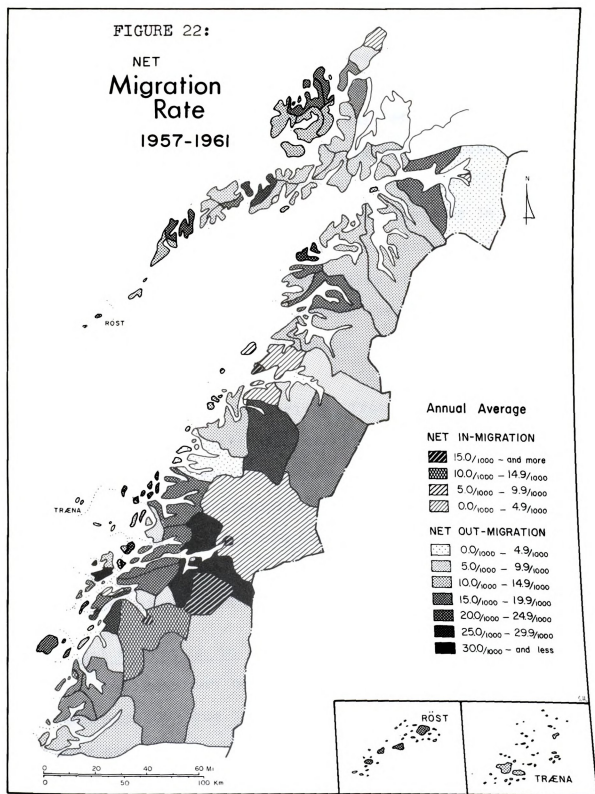
Helgeland continues to be a region of strong internal contrasts in migration behavior (see Figure 22). The urban places persist as areas of attraction and all other kommuner, with the exception of Meløy, loose in varying degrees with the largest negative net migration rate again sustained by Nordvik (-32.2/1000) on the island of Dønna. Meløy benefits from the expansion of its hydroelectric based industry.

Interior Helgeland and South Salten also exhibit a persistence in migration patterns established during the 1951-1957 period. Thus urban places and their adjacent suburban-rural kommuner continue in their rate of expansion but with a definite edge to the cities. Mo-i-Rana, for example, reaches the highest average annual net immigration achieved during any of these four study periods with 61.6/1000. It should be noted that the integrated iron-steel plant, which now employs in excess of 2000, began operation in 1955; and also that aluminum refinery facilities, following several years of construction, opened at Mosjøen in 1958. Minor changes include the rapid population growth in Korgen due in part to construction work on the Rossaga River dams south of Mo-i-Rana and in part to increased employment in the mining of lead, zinc, and copper pyrites at Bleikvassli. Note again the adjacency of these centers of attraction to those kommuner which show the greatest relative losses,



FIGURE 22:

NET
Migration
Rate
1957-1961





Elsfjord (-38.0/1000) and Sørørrana (-45.7/1000). The migration loss of nearly five per cent of the total population each year for five years in Sørørrana is the greatest absorbed by any district during the four periods studied and reflects again the migration behavior characteristic of rural, largely agricultural, districts in close proximity to districts where employment opportunities have rapidly expanded.

There is little to note of major consequence in the remainder of Nordland. Narvik continues to attract a limited number of migrants, now to the benefit also of Ankenes (2.1/1000). The districts most adjacent absorb the greatest relative losses. On the islands Andenes (7.7/1000) attracts migrants though at a slower pace.

A summary of findings deriving from the 1957-1961 migration analysis adds little to conclusions earlier presented. Proximity and rurality continue to be major aspects of the migration tendency. The apparent lack of reluctance to exchange traditional livelihoods for new employment opportunities seems to be a function also of agricultural dependency. But more about this facet in the next chapter.

Interregional Migration in Nordland, 1964-1966.--No meaningful comparative analysis can be performed on migrational behavior during 1962 and 1963 due to the extensive boundary revisions and kommune consolidations taking place these years. The net effect of this wholesale administrative change of major consequence to a migration study has been the absorption by



most large urban places of their developing suburbs in what formerly were adjacent independent kommuner. Except in the case of Narvik-Ankenes where consolidation did not take place, it is no longer possible to record suburban growth on the kommune level of aggregation. In essence this means that the strong contrasts between districts with large gains and those of great losses have in most instances been absorbed through administrative revisions. A look at the frequency diagrams of the migration rates for the four different time periods will confirm this (see Figure 25). The various measures of central tendency, the standard deviation, skewness, and kurtosis, have changed to show a greater clustering around the mean.

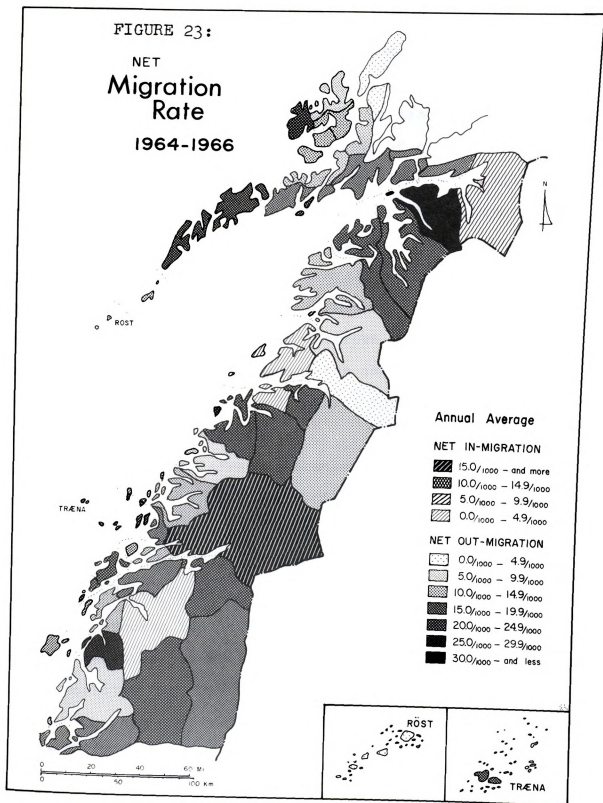
The Coastal Helgeland region now includes the only district exhibiting large scale outmigration ranging from Brønnøy (-9.0/1000) to Vevelstad (-28.3/1000) (see Figure 23). Meløy, which was not affected by administration reorganization, shows a net migration rate of -9.8/1000 after several years of industry stimulated immigration. This identifies a persistent problem in Nordland. New industry does not necessarily lay the foundation for self-sustained growth especially if situated in a relatively peripheral location, such as in Meløy.

Interior Helgeland and South Salten has the anticipated gains in Vefsn (Mosjøen), Rana (Mo), and Bodin (Bodø). Particularly Rana continues to attract migrants at a high rate. Aside from these developing urban centers no other



FIGURE 23:

NET
Migration
Rate
1964-1966





kommune has a positive net migration rate. In fact, out-migration is generally intense with four of eight rural districts in excess of -20.0/1000. The location of these four districts lends support to Norling's thesis that "the process of rural depopulation and its variations in time and space may be thought of as the spread of an idea, namely the idea to leave isolated low income areas for large villages, towns, and cities."⁸ It is quite likely that rural depopulation can be best described as a spatial diffusion process in which an increasing propensity to move to a given location gradually diffuses through the landscape. No further attempt will be made at this point to prove or disprove this thesis, but the reader is encouraged to compare the changing net migration rates of Grane, Hattfjelldal, and Beiarn, for example, up through this period of analysis.

Given the administrative changes and their migration behavior history, North Salten and Ofoten exhibit unexpectedly strong internal contrasts in net migration rates for the 1964 to 1966 period. Two conditions are well illustrated and both contribute to interregional differences. The suburbanization process in the Narvik area has gone to the point of a negative net migration rate for the city (-9.7/1000), with the positive rate for Ankenes greater than at any time in the past. Secondly, large scale outmigration from

⁸Gunnar Norling, "Abandonment of Rural Settlement in Västerbotten Lappmark, North Sweden," Geografiska Annaler, XLII (1960), 232-43.



Ballangen (-37.5/1000) is less a function of the Narvik area's attractiveness than the shutting down of a major source of local employment, the Bjørkasen iron ore mines in February, 1964.

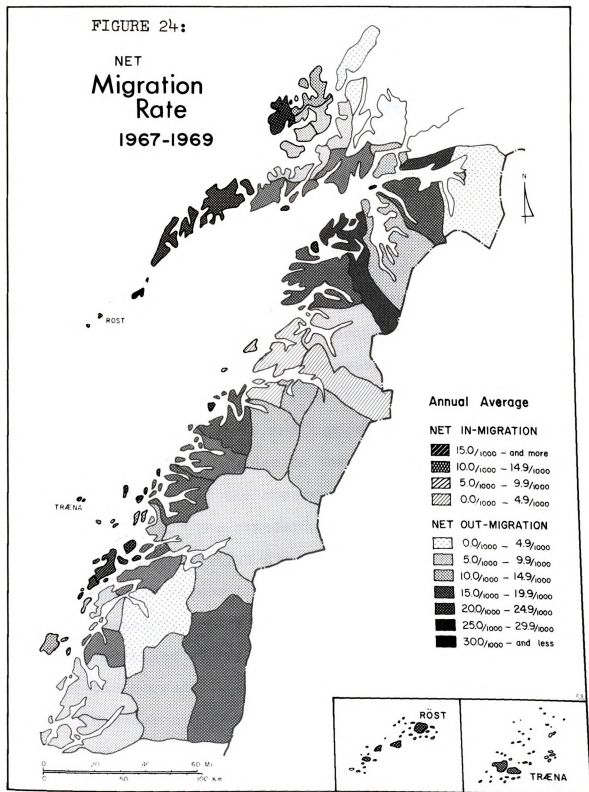
Migration behavior on the islands remains remarkably constant, particularly in Lofoten. In Vesteralen some of the interregional contrasts have been engulfed by administrative boundary revisions, as, for example, in Andenes. Within both island regions many more people are leaving than entering. The extent to which this condition is tied to modernization and centralization of the fishing industry will be explored later in this study.

Interregional Migration in Nordland, 1967-1969.--The striking picture of net outmigration in all of Nordland's kommuner, urban as well as rural, comes into focus as the net migration rates for the 1967-1969 period are surveyed (see Figure 24). Only two districts are sustaining a net immigration, the administrative center of Bodø (0.1/1000), and its neighbor, Fauske (2.4/1000). The latter is apparently the main beneficiary of the Siso hydroelectric power dam construction and the associated expansion of the Salten Verk (primary production of ferrosilicon) in adjacent Sørfold. Elsewhere the county seems to have adjusted to an almost spatially even net outflow of people. Notable is the abrupt shift to net outmigration in the industrial kommuner of Vefsn (-1.4/1000), Rana (-7.5/1000); and Meløy (-19.5/1000). Kommuner with



FIGURE 24:

NET
Migration
Rate
1967-1969





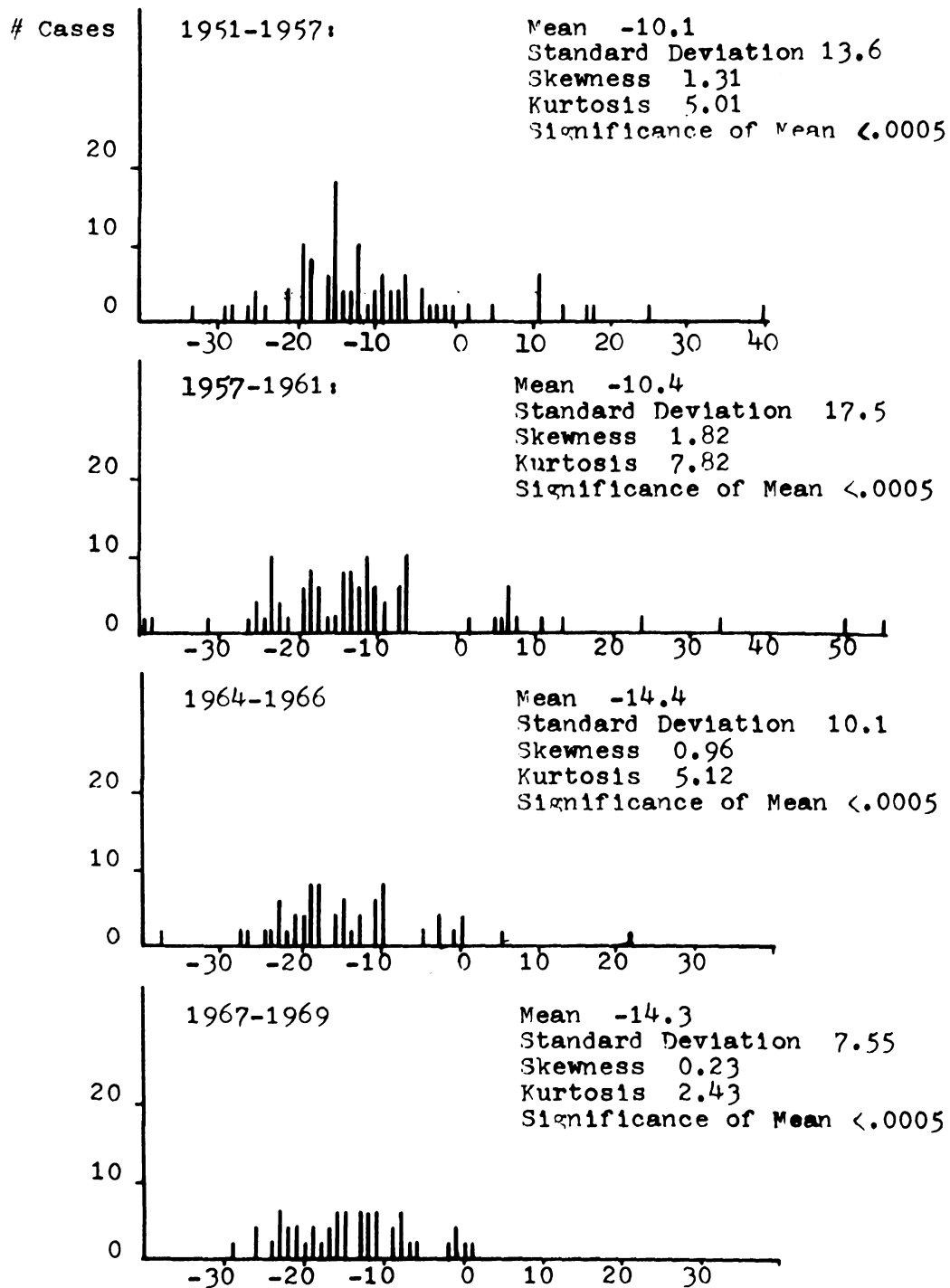
important service centers fare little better, for example, Brønnøy (-8.8/1000), Alstahaug (-9.1/1000), Narvik (-12.1/1000), and Vagan (-16.5/1000). In general it is the coastal and island areas which show the highest rates of net outmigration. Moreover, the weight of the outflow has shifted away from its formerly prominent southern position in the county during the initial study period to a more northerly location (compare Figures 24 and 21).

To gain a more penetrating understanding of temporal changes in migration rates, their frequency distributions are compared (see Figure 25). The mean, which may conveniently be thought of as each distribution's center of gravity, is persistently negative; in fact increasingly so, as it moves from -10/1000 in the 1950's to -14/1000 in the 1960's. Standard deviation, skewness, and kurtosis, all of which measure data dispersion, change in the direction of increasingly closer grouping of the observations and approximation of the normal curve. The standard deviation decreases markedly from a high of 17.5 to 7.6 thus indicating the lessening range of values through time. Skewness, which measures asymmetry, decreases from 1.82 to .023. Perfect symmetry is attained with a reading of 0.0. Kurtosis, indicating the spread of the frequency distribution, is equal to 3.0 under conditions of normality; thus normality is approached with a kurtosis changing from 7.82 to 2.43.

In sum, on the kommune level of aggregation, Nordland County has moved persistently away from the spatially strong



FIGURE 25: FREQUENCY DISTRIBUTIONS OF MIGRATION AVERAGES,
NORDLAND COUNTY KOMMUNER





contrasts in migration behavior of the 1950's. Analysis of changing migration patterns reveal a number of basic relationships. The migration process added initially a relatively great number of people to the industrializing urban areas. This net immigration reached its peak for the several urban places at different times. Nonetheless, the peak was attained and was followed by decreasing net inflow, and finally net outmigration, leading to the conclusion that none of the manufacturing centers expanded to the point of selfsustained growth. Secondly, the migration process tapped first those districts in closest proximity to the urban places. Subsequently the rate of outflow increased in the more peripherally located areas and decreased to the point of net immigration in communities which, in the suburban sense, began acting as reservoirs for urban overspill, as was true in the case of Narvik-Ankenes. Thirdly, on a larger scale it was shown that the spatial mobility contrasts tend to move in one large wavelike motion from initially strong in the southern portion of the county, which is closer to the urban areas of southern Norway, to finally only relatively strong in the northern portion. All of these temporal-spatial changes in the migration process tend to support the Norling thesis earlier quoted that migration as a spatial process can be defined in the language of diffusion theory.



Relating Migration to Other Spatial Processes
and Patterns in Nordland

Procedural Problems.--The preceeding section identified the changing migration patterns in Nordland over the past two decades and offers a few generalizations regarding their evolution. These generalizations may be considered as a kind of progress report based upon the interpretation of evidence thus far accrued. In addition they support the formulation of a number of statistical hypotheses which will hopefully engender a more penetrating view of spatial process inter-relations.

As will shortly be obvious these hypotheses are not couched in the formal non-deductive probability language normally prescribed for the testing of statistical hypotheses. It is commonly held that statistical tests are in order only when applied to a sample;⁹ a condition which this study does not meet since the statistical population herein used (Nordland kommuner) constitute the universe (Nordland County). One way around this is to view the kommuner as a set of all minor civil divisions found in environs similar to that of Nordland. And it has been previously argued that Nordland County is representative of regional economic depression, social lag, and net outmigration not only within Norway, but within other economically developed areas in the world. A logical argument supporting the use of statistical hypotheses

⁹David Harvey, Explanation in Geography (New York: St. Martin's Press, 1969), 281-86.



framed in probability language can be constructed but need not be in this particular situation. The primary intent at present is to gauge the direction and strength of associations found between migration behavior and a range of existing spatial processes and patterns as these reflect conditions of life within the study region. Substantive inferences deriving from the findings will focus upon future changes in the character of Nordland's socio-economic conditions and cultural landscape as contrasted to the identification of conditions in similar environments elsewhere in Norway, or in the world.

Using the previously derived dimensions (see Chapter IV) in this analysis poses a major problem. The factorial ecologies earlier performed include those migration variables now to be correlated thus inhibiting the necessary assumption of variable independence. It is, however, a simple matter of running additional factor analyses without the offending variables, therefore none of the variables strongly contributing to the demographic change dimension will be included. An additional reason for this latter data structure modification will become apparent in Chapter VII. Reshuffling of the data structure means a final use of twenty-seven variables for Phase I (1947-1962), and thirty-one variables for Phase II (1964-1970).

Employing the same factor analytic approach applied in Chapter IV eight factors are rotated in Phase I with a proportion of total variance explained of .7833. These



dimensions are individually listed in Table 9. In Table 10 are listed the nine factors extracted for Phase II. The proportion of total variance explained in this phase is .8003. The factor analysis in Chapter IV will hereafter be referred to as Run One and the present factor analysis as Run Two. Table 11 shows comparatively the results of the two runs in terms of the dimensions judged most significant to the research objectives.

Hypotheses and Their Testing.--With the dimensions of spatial processes and patterns as the independent variables (see Table 11) the following listing defines the dependent migration variables:

Y_1 - Pro mille annual average net migration, 1951-1957

Y_2 - Pro mille annual average net migration, 1957-1961

Y_3 - Pro mille annual average net migration, 1964-1966

Y_4 - Pro mille annual average net migration, 1967-1969

The strength and direction of relationships existing between the two sets of variables are established by means of a simple correlation-regression analysis. A summary of correlated variables, the pertinent hypotheses, and the research findings is shown in Table 12.

Summary of Findings.--The results support the leading hypothesis of the existence of a strong correlation between the urbanization process and migration. Urban areas act as powerful magnets in attracting migrants from rural areas; in fact, the more rural the kommune the greater the relative degree



TABLE 9
 PHASE I, RUN TWO: FACTOR LOADINGS AND COMMUNITIES

Variable Code	Dimensions								Commun- ality
	I	II	III	IV	V	VI	VII	VIII	
1. ROAD 59	.66				-.37				.71
2. MECH 59	.41				-.56				.70
3. VOTRAP 51	-.46						-.31		.58
4. LAPOR 51		.57						-.46	.67
5. SCHOCHIL	-.83	.33			.37				.81
6. POPOST 61	-.77	.39							.83
7. GROSALPC			-.73					-.38	.78
8. GROSARUS		.66	-.51					-.39	.88
9. POFRUS 63		.74			.41				.79
10. INCPC 57	-.70	.40			.32				.89
11. INC47 57		.70					-.34		.85
12. MEAL47 57						.88			.92
13. TOTPOP 50	-.33					.83			.95
14. TOTPOP 60	-.47								.86
15. SPECED 60	-.85								.81
16. AGF050 60			.44	.71				.30	.80
17. PISH50 60			-.74	.85					.71
18. MANP50 60									.59
19. PARM49 59					-.79			.73	.81
20. COLT49 59								-.31	.86
21. AGPO 60	.56		.46						.75
22. PISH 60		-.57	-.42		-.32				.90
23. MANP 60		.80			.35				.71
24. RETAIL60	-.86								.69
25. TRANS 60	-.64								
26. SERV 60	-.75								
27. RETIRE60			.57						
Proportion of Variance	.2264	.1365	.0917	.0616	.0590	.0850	.0588	.0643	

Source: Compiled by author.





TABLE 11
COMPARATIVE FACTORIAL ECOLOGY

Dimensions	RUN ONE		RUN TWO	
	Phase I Factor Per Cent Variance	Phase II Factor Per Cent Variance	Phase I Factor Per Cent Variance	Phase II Factor Per Cent Variance
Demographic Change	I 19.2	V 16.1	N.P.*	N.P.*
Urbanization	IV 18.0	I 20.1	I 22.6	I 26.5
Industrializa- tion	V 4.7	IV 9.8	VIII 6.4	III 9.5
Manufacturing- Fishing	VIII 5.7	III 6.2	II 13.5	VIII 7.1
Agricultural Emphasis	II 8.4	II 9.4	V 5.9	II 6.8
Population Size	N.P.*	N.P.*	VI 8.5	N.P.*
Manufacturing- Agric. Expansion	VI 3.6	N.P.*	IV 6.2	N.P.*

*N.P. - not present in data.



TABLE 12
VARIABLES, HYPOTHESES, AND RESEARCH FINDINGS

Dependent Variables	Independent Variables	Hypothesized Relation	r	S.L. ¹
Y ₁ - $\frac{3}{4}$ Net Migration Ave., 1951-1957	X ₁ -Urbanization, I	Positive	.2959	.95
Y ₂ - $\frac{3}{4}$ Net Migration Ave., 1957-1961	X ₁ -Urbanization, I	Positive	.4519	.99
Y ₃ - $\frac{3}{4}$ Net Migration Ave., 1964-1966	X ₁ -Urbanization, II	Positive	.5843	.98
Y ₄ - $\frac{3}{4}$ Net Migration Ave., 1967-1969	X ₂ -Urbanization, II	Positive	.5255	.98
Y ₁ - $\frac{3}{4}$ Net Migration Ave., 1951-1957	X ₃ -Industrial I	Positive	-.1244	N.S. ²
Y ₂ - $\frac{3}{4}$ Net Migration Ave., 1957-1961	X ₃ -Industrial I	Positive	.0247	N.S.
Y ₃ - $\frac{3}{4}$ Net Migration Ave., 1964-1966	X ₃ -Industrial II	Positive	.1140	N.S.
Y ₄ - $\frac{3}{4}$ Net Migration Ave., 1967-1969	X ₄ -Industrial II	Positive	.0677	N.S.
Y ₁ - $\frac{3}{4}$ Net Migration Ave., 1951-1957	X ₅ -Manuf., Fish., I	Positive	.4007	.99
Y ₂ - $\frac{3}{4}$ Net Migration Ave., 1957-1961	X ₅ -Manuf., Fish., I	Positive	.5601	.99
Y ₃ - $\frac{3}{4}$ Net Migration Ave., 1964-1966	X ₅ -Manuf., Fish., II	Positive	.0814	N.S.
Y ₄ - $\frac{3}{4}$ Net Migration Ave., 1967-1969	X ₆ -Manuf., Fish., II	Positive	.1349	N.S.
Y ₁ - $\frac{3}{4}$ Net Migration Ave., 1951-1957	X ₇ -Agriculture, I	Negative	-.2313	N.S.
Y ₂ - $\frac{3}{4}$ Net Migration Ave., 1957-1961	X ₇ -Agriculture, I	Negative	-.0082	N.S.
Y ₃ - $\frac{3}{4}$ Net Migration Ave., 1964-1966	X ₇ -Agriculture, II	Negative	-.0096	N.S.
Y ₄ - $\frac{3}{4}$ Net Migration Ave., 1967-1969	X ₈ -Agriculture, II	Negative	.0614	N.S.
Y ₁ - $\frac{3}{4}$ Net Migration Ave., 1951-1957	X ₉ -Population, I	Positive	.2900	.95
Y ₂ - $\frac{3}{4}$ Net Migration Ave., 1957-1961	X ₉ -Population, I	Positive	.2324	N.S.
Y ₁ - $\frac{3}{4}$ Net Migration Ave., 1951-1957	X ₁₀ -Agric., Manuf. I	Positive	.3217	.99
Y ₂ - $\frac{3}{4}$ Net Migration Ave., 1957-1961	X ₁₀ -Agric., Manuf. I	Positive	.2306	N.S.

Source: Compiled by author.

¹Significance level.

²Not significant.



of net outmigration. The relationships between the two processes are strengthened through time beginning with a relatively low correlation coefficient of .2959 for the 1951-1957 period and reaching a high of .5843 for the 1964-1966 period. A slightly lower r value for the most recent period reflects the tendency toward migration stability in the more urban kommuner during the 1960's. This tendency was clearly identified in the initial section of this chapter (see Figure 24).

Migration was found to be less clearly related to industrialization. Reasons for this are thought to include the relatively weak statistical position of this dimension in the data as well as in the nature of the contributing variables. A stronger dimension more readily definable may give greater strength to the industrialization-migration hypotheses. The manufacturing-fishing dimension aligns the kommuner on a continuum from those with a high percentile employment in manufacturing industry to those with a high percentile employment in fishing. The expected relationship between this dimension and migration is supported by the correlation analysis for Phase I only. Centers of manufacturing served as points of attraction for migrants, while the typical fishing kommune made relatively large contributions to the migration streams. This is at least true in the 1950's. For the 1960's this relationship might have weakened. It is difficult to assess since the dimension may have changed slightly in character due to the absence of employment statistics.



In relating migration to agricultural conditions it was hypothesized that people would move away from those areas most heavily committed to the rural pursuit of agriculture (agricultural emphasis dimension) but in the direction of those areas which experienced an expansion in agriculture when this coincided with an expansion in manufacturing employment (agriculture-manufacturing expansion dimension). A statistically significant relationship was obtained only for the 1951-1957 migration period and this with the expansion dimension only. This latter factor did not appear in the Phase II analysis.

Another factor which appeared only in Phase I was identified as a population size dimension. Such a variable has with some degree of frequency been related to migration in the literature.¹⁰ It is postulated that the greater the population size of the kommune the less its net out-migration or the greater its net immigration. The relationship was found statistically significant for the 1951-1957 migration period but only at the .95 level. The population size variable used in Phase II rather than emerging as a contributor to a size dimension joined the variables which grouped under urbanization. This indicates that the expected close affiliation between increasing size of the population mass and urbanization has been enhanced by the administrative

¹⁰See, for example, Claes-Fredrik Claeson, "Zone Preference in Intraregional Population Movement," Geografiska Annaler, L-B (1968), 133-41.



reorganization of the early 1960's.

In this chapter has been analyzed the changing spatial character of inter-kommune migration in Nordland County over the past two decades. From initially strong areal contrasts in migration behavior almost all of the county's districts now exhibit a small range in their net outmigration rates. The relationship of a number of spatial processes, identified through factor analysis, to migration is found to be increasingly strong and time-space persistent only in the case of urbanization. Industrialization is a process of decreasing influence possibly because it is gradually merging with urbanization and thus losing much of its independent character. Agricultural emphasis and population size factors are found to be correlated with migration in a slight degree.

The next chapter will consider in some detail the effects on migration of the decision making process. This process is comprehensive in scope and intermittent in its impact through time and space and therefore does not lend itself readily to quantitative identification and measurement.



CHAPTER VI

THE DECISION MAKING PROCESS AND MIGRATION

In the study of spatial change in the cultural region public and private decision making is viewed as a change agent which in a variety of ways enhances or directly stimulates the evolution of spatial processes like urbanization or industrialization (see Figure 2). Were the decisions of government and private interests limited to very general concerns their impact upon spatial flows like migration streams might be difficult to discern. However, in North Norway a major characteristic of the decision making process for the past several decades is its very comprehensive and compartmentalized scope. As pursued by the government in its efforts to achieve national and regional development goals this process plays a significant role in inducing or deterring migration streams and as such merits special attention in this study.

Government decision making reflects in general the national interest in; a. reconciling the need for a wide and popular participation in political life; b. satisfying a need for highly integrated and effective leadership; and c. attaining greater status through improved social



mobility.¹ These criteria are relevant for the initiation of government activity throughout the country. Thus the central government has influenced life in Nordland as it has in all other counties through a diversity of policies implemented by the central ministries and departments, and through its influence on local and regional administrations.

The nature of this study suggests that an attempt be made to distinguish between this kind of government decision making and the decisions motivated by purely regional developmental concerns. On the one hand this regional policy concern has stabilized demographic conditions in some areas and encouraged an increase in the outmigration rate elsewhere. On the other hand the spatially more broadly conceived national government policies have proven to be universally detrimental to demographic stability. That is, they have consistently improved conditions favoring higher rates of outmigration from the more peripheral locations within Nordland County and possibly from the county as a whole.

The relationship existing between government decision making and the migration process will be explored in terms of these two basic components, decision making in support of national goals and in support of regional development objectives.

¹ David E. Apter, "Nationalism, Government, and Economic Growth," Economic Development and Culture Change, VII (January, 1959), 117.



Decision Making: Achieving National Goals

Broadly conceived national government objectives as they particularly affect the economically marginal region evolve from the popular desires for full employment, persistent economic growth, and an equal share in the social welfare legislation and the nationwide improving conditions of life. The fact that economic development and concomitant personal attainment has not permeated the landscape with an equal speed and intensity has simply meant a favoring in some national programs of those areas which were left behind. These government measures will be examined in some detail in terms of their impact on spatial mobility patterns.

Government Removal Grants.--The Norwegian government has for some time been involved in a comprehensive program to improve the conditions of life of those who live in areas officially identified as having problems of accessibility so severe that these cannot economically be remedied by in situ state support. Such areas tend to be sparsely populated, without local central places or services, lacking in employment opportunities, and some distance from existing communication systems, transportation arteries, and electrical power networks. Thus they exemplify the most peripheral of life situations in the country.

The expense of introducing or upgrading the life support systems generally available in a modern social welfare state within these areas has proven too great. As a



result the government enacted a removal grants program which subsidizes the migration of families to places identified as having the essential amenities. Until very recently the governmental perception and therefore determination of extreme remoteness affected only people who live on islands or on stretches of isolated fjordbottoms, people who normally derive the greater part of their cash income from fishing. For this reason the removal grants program has in the past been administered by the Department of Fisheries.

In Nordland County 317 families, an estimated 1500 people, have received a total of kr. 2.3 million in removal grants from January 1, 1952 to September 1, 1969.² The sum granted per family varied from an early year (1952-1953) average of kr. 5,000 to an average in 1969 of kr. 14,000 (compare with a 1969 Nordland mean per capita income of kr. 4,688). Of the total amount funded for the 1952-1969 period two-thirds went to just eight of the forty-four kommuner. The location of these eight identifies the continuing periphery problems of the Helgeland coast, the fjords of central Salten, and the outer islands of Lofoten and Vesteralen (see Figure 26).

Only 14.2 per cent (forty-five) of the grant families have moved from one kommune to another, the remainder have moved to a more central location within their home kommune. Thus the net effect of this type of government assistance

² Much of the subsequent information derive from an interview with Mr. Nils Gjerde, Nordland County Inspector of Fisheries, Bodø, September 9, 1969.





has been to further centralize the settlement pattern within the peripheral area and has not been a major factor in initiating migration between kommuner. However, it is quite likely that the initial move becomes a first stage in a family migration history which will see the second stage as migration out of the home kommune.

The one-sided orientation of the removal grants program toward coastal and island districts has been the subject of increasing concern on the part of those who felt that interior isolated valley and plateau farmers may have as great a need for this kind of support. This concern culminated in a 1969 state edict that interior regions henceforth are to receive the same degree of attention on the basis of similar criteria as the coastal and island regions. Government aid may normally not exceed kr. 30,000 under this new ruling and presupposes movement of grantees to a place with employment opportunities. The state will further refund up to eighty per cent of the cost to the kommune resulting from the purchase of the grantee's house and real estate when so desired.³

The effect of extending government removal support on this scale to remote agricultural districts is difficult to measure. It will undoubtedly bring an increasing number of removal grant applications in future years until the most peripheral localities have been entirely depopulated.

³Lofotposten (Svolvær), August 16, 1969. See also Henrik Lunde, "Oversikt over Virkemidler i Distriktsutbyggingen," Plan og Arbeid (October, 1970), 16.



Though this is by far the most visible and direct government influence upon migration relatively few people are or will be affected, and in the end it will simply mean the hastening of a process already well under way without direct state interference.

Post Office Centralization.---The Norwegian postal system is a major contributor to local employment and welfare. It operates through a hierarchical structure comprising the central office in Oslo, regional offices, and a great number of local post offices and letter stations. When a bureaucracy this large decides to economize, following several decades of vigorous expansion in facilities and services, the effect is bound to be wide ranging and particularly noticeable in the peripheral region. The number of permanent post offices in the country increased from 2413 in 1900 to a maximum of 4946 in 1955. Then followed an abrupt decrease to 3981 by 1968, a closing down of twenty per cent in thirteen years.⁵

Table 13 identifies the postal service reorganization which has taken place in Nordland County from 1961 to 1968. The decrease in minor post offices and letter stations may be expected to continue. Only one county has less people per postal service facility than does Nordland, in spite of its recent increase. It bears noting that the centralization policy in general is not influenced by a decrease in

⁵Norges Postverk Statistikkarbok, 1967 (Oslo: Poststyret, 1968), 15.



TABLE 13

POSTAL SERVICE IN NORDLAND, 1961-1968

	Post Offices		Letter	Total	Population	Letter Volume
	Major	Minor	Stations		per Facility	per Person
1/1/61	15	483	125	623	356	71
1/1/68	14	412	81	507	483	81
Per cent change	-6.7	-14.7	-35.2	-18.6	+35.7	+11.3

Source: Norges Postverk, Statistikkarbok, 1960 (Oslo: Poststyret, 1961), 16; Norges Postverk, Statistikkarbok, 1967 (Oslo: Poststyret, 1968), 16.

per capita mail volume. However, it is suspected that selectivity in the process of closing down facilities is influenced by the decreasing population weights of the periphery.

The impact upon a peripheral district where the local post office facility offers the only or one of a very few central place services can be quite drastic. Not only does this mean a loss of employment but it also increases the chances for an early closing of the small rural general stores whose *raison d'être* has been strongly tied to their former role as postal facilities. Though the post office centralization program undoubtedly will improve mail delivery and pick-up service the net effect within the peripheral region is an intensification of the outmigration process through the rippling effects of a decrease in central place services.



This is a sensitive issue within the Norwegian Postal Administration, a condition that may influence a more gradual reorganization program. Administration spokesmen are well aware that other government programs have been initiated with the expressed purpose of halting the outflux of people from some of the more sparsely populated regions, particularly from North Norway.⁶

Regional Administrative Consolidation.---The following are transcribed excerpts from an interview with an elected Brønnøy kommune leader.⁷

'The kommune administration is spread over four widely separated villages. This is costly and has caused popular discontent, most of all on the part of those who must now travel great distances for local community services. One must consider this a major moment in the agitation against the newly constituted and consolidated kommune. In terms of accessibility our problem is worsened by the centralization of some administrative functions and the continuing scatter of others. The leadership is aware of the difficulties and is striving to make improvements. To this end it unanimously supports the consolidation of all community administrative functions in a new Brønnøysund building. An architect was appointed and presented his recommendation in 1966. Since then the matter has been allowed to rest unattended due to the increased burden upon community finances of the new schoolbuilding program.'

Brønnøy resulted from the agglomeration January 1, 1964 of the town of Brønnøysund, the rural kommuner of Sømna,

⁶ Conversation with Mr. Tverteraas, First Secretary in the Traffic Office of the Norwegian Postal Administration, Oslo, July 9, 1969; and Torbjørn Weiseth, Postgangen på Landsbygda, Områdsplanlegging (Namsos, Norway: Private Printing, 1966), 1.

⁷ Interview with Mr. Torolf Bjørn, Speaker of Brønnøy Kommune, Brønnøysund, October 21, 1968.



Brønnøy, Velfjord, and a portion of Bindal. It exemplifies the government program to improve community service efficiency while decreasing the local cost of maintaining these services (see Chapter V). Interviews conducted by the author in Vestvågøy (formerly four separate kommuner) and evidence collected elsewhere supports the notion that the Brønnøy birth pangs are not atypical. People in the afflicted areas initially ignored or supported half-heartedly the administrative reorganization, but in many kommuner strong voices are now belatedly raised in protest to the point of vocal support for a return to the pre-consolidation condition.

The change or strengthening in attitude is caused not only by a worsening of the distance problem, but also by the unexpected high cost of the transition (an estimated kr. 3 million for a new office building in Brønnøysund). In addition, those who live in the smaller former administrative centers, like Vik, Berg, and Hommelstø in Brønnøy, increasingly fear that this decrease in centrality for the respective villages will cause a further drain in other central services coupled with an intensification of the outmigration tendency.

Contrary to the feelings expressed by the Brønnøy Speaker, quoted earlier in this section, the Brønnøy leadership responded in October, 1968 to popular dissatisfaction by voting twenty-eight to thirteen in favor of splitting off Sømna and Velfjord as independent kommuner.⁸ There are suggestions

⁸Aftenposten (Oslo), October 7, 1968.



that the tide may since have turned against deconsolidation in Brønnøyg, but for many other reconstructed communities the transition is in its most sensitive period. On the island of Vestvågøy, where the former districts of Borge, Buksnes, Hol, and Valberg were administratively joined, very vigorous movement toward deconsolidation has recently been initiated.⁹ A similar popular mood has been expressed in Moskenes and elsewhere.¹⁰

Nordland County had a thirty-six per cent decrease in local administrative districts in the early sixties. It is difficult to measure the effect of this upon migration. The number of people who have moved with their jobs to the new office location is small if only because the centralization process is not yet completed in many of the new kommuner. As with the consolidation of postal services, there exists a wider impact upon the central service structure of the more peripheral and thinly populated areas.

Recent Changes in the Educational System.--Aubert has recently stated that the school problem frequently is critical in the migration decision making process.¹¹ This problem is

⁹ Lofotposten (Svolvær), May 8, 1969, and Nordlands Framtid (Bodø), August 30, 1969.

¹⁰ Lofotposten (Svolvær), May 21, 1969, and June 3, 1969.

¹¹ Wilhelm Aubert, "Regionalplanleggingens Sosiale Aspekter," Tidsskriftet Sosialt Arbeid, VI (1965), 178-90.



most acute when the pupil population base has decreased to a point below the threshold necessary for the maintenance of an independent school district. Then parents may consider migration to the center of a viable school district the only acceptable alternative. This is particularly true where the school lies so far from the home that the daily journey to school becomes overly time consuming, if not dangerous due to slippery roads, rocky overhangs, or impossible sea conditions for an otherwise seaworthy school boat. The Norwegian peripheral population sets a high prize on getting the best education available for their children. Frequently the result is an increase in the outmigration rate for those families who have children approaching school age.

Loss of the community elementary school no matter how small has a serious effect on local life.¹² The school is accepted as a center of cultural and recreational, as well as educational activity. It is the functional community center and thus the *raison d'être* of youth clubs, orchestra and chorus, scout groups, and a variety of local celebrations and festivities the year around. The district loses a significant part of its self identity with the closing of its school and not only because its traditional functional community boundaries typically coincide with the school district boundary.

A visible hastening of the school centralization process is occurring with the adoption of a nine year compulsory

¹² Robert Solomon, Ytre Senja (Oslo: Norsk Institutt for By- og Regionforskning, 1969), 150.



¹³ school system. This system expands the obligatory elementary education period from seven to nine years, and is vigorously pushed by county and state authorities. The individual kommune must on its own make the decision to change and by 1969 only eight of the forty-four kommuner had not adopted the new system.¹⁴

To make this change often requires the kommune to thoroughly reassess its educational structure. This can be a painful process which necessitates the building of a new centrally located facility, a costly and frequently difficult and contentious location decision.¹⁵ The new facilities cannot be built without state financial support since state accreditation is determined in part by minimum floor area and the availability of specialized class rooms and equipment. Thus the small kommune is faced with a momentous decision which will impose a reordering of its community expenditure

¹³ Many of the conclusions relating to the school situation draw heavily from interviews conducted with leading school authorities in Nordland, particularly Olav Nyaas, Nordland County Superintendent of Schools; Einar Fyhn, Inspector of Schools, Vestvågøy; and Aasmund Brekke, Inspector of Schools, Skjerstad; as well as numerous teachers and parents, Fall, 1969.

¹⁴ Aftenposten (Oslo), June 7, 1968.

¹⁵ In Evenes kommune this decision was held in obedience for years because of apparently unreconcilable demands made by the two competing settlements, Liland and Bogen. The deadlock was broken when an exasperated county administration informed the kommune that either it makes a choice or it will see its children commuting to or interned in a school of a neighboring kommune. Liland got the school and, it is suggested, Bogen lost its major industry in the process. From an interview with Mr. Corneliussen, member of Evenes community council, September 29, 1969.



priorities, increase taxes, incur sizeable long term indebtedness, stir up intracommunal rivalries for the location of the new school, increase the rate of closing of the smaller and more isolated schools, and thereby also the incidence of busing if not actual internment of school children.

Many examples of the difficulties involved can be cited.¹⁶ In Grane and Hattfjelldal kommuner the recommendation from the county superintendent of schools favored the joint operation of a new nine year facility in Trofors, the largest settlement in the two districts. Acceptance of this would mean having to intern upper class students not only from the more remote areas of Grane (about thirty pupils), but for most of Hattfjelldal where an excess of one hundred pupils would have to live in Trofors during the regular school week. Hattfjelldal with the larger student population decided against the recommendation and as a result must build its own facility. In Grane the new central school built at a cost of kr. 2.77 million opened August 25, 1969.¹⁷ For purposes of accreditation it has been built to serve a population twice the size of that currently residing in the kommune. And Grane has been afflicted with a steadily declining population base since 1950 (see Appendix A) with no apparent hope for stabilization let alone recovery in the foreseeable

¹⁶ The examples are restricted to the kommuner where the author through field work was able to gain an objective evaluation of the issues involved.

¹⁷ Helgeland Arbeiderblad (Mosjøen), August 25, 1969.



future. Projections of future student populations in the eighth and ninth grades made by the county school administration in 1961 show an anticipated decrease of twenty-four per cent (seventy-five to fifty-seven) from 1961/62 to 1972/73. In view of the continuing net outmigration of predominantly young and middle aged families even this somber forecast must be considered optimistic.

In Skjerstad kommune improvements in the transportation network and the centralization of the school system is now resulting in the gradual phasing out of half a dozen periphery schools. The net effect on migration is viewed by some as a two-pronged problem. Closing of the periphery schools heightens the chance for increased outmigration and possible total depopulation in their service area. And Skjerstad is now even less capable of supplying jobs to young people better educated and even more likely to seek opportunities in an urban environment.¹⁸ For the local economy heavily dependent upon agriculture the future looks increasingly dim as the replacement rate of the agricultural labor force rapidly decreases. Almost all of the farmers are over age fifty with no one at home to take over the farm. It should be noted that many of the more remote and thinly populated school districts offer education down to four

¹⁸ Solstad's research on nineteen predominantly rural Nordland kommuner substantiates this thesis. Se Karl Jan Solstad, "Seleksjon ved Flytting fra Utkantstrøk," Tidsskrift for Samfunnforskning, IX (1968), 291-310.



students in a small school house with one full time teacher who is most frequently without a teaching college degree. The adoption of the central school and nine years of obligatory attendance is a measurable educational improvement.

For Nordland County in general the problem is really no less acute. Though the migration stream of youngsters with completed elementary educations is oriented toward urban places within the county these as a rule are ill equipped with advanced or specialized schools. One result is a lower average educational attainment as compared with the national average. In 1963 10.4 per cent of Nordland's seventeen year olds attended college preparatory schools while the comparable national percentage was 19.7. The county did see an increase from 3.3 per cent in 1950 but the national increase was from 8.9 per cent.¹⁹ So the gap between the peripheral county and the nation in fact widened during this period! Even more problematic for Nordland is the fact that one third of its college preparatory students attend a school outside the county for to attend any of the Norwegian universities and colleges, with the exception of teachers colleges, means having to go south. Each year one thousand young people leave for advanced education in southern Norway.²⁰ How many of these can be expected to return?

A number of other factors affect the Nordland

¹⁹Anders Madslien, Utdannelsesforhold i Nord-Norge (Bodø, Studieselsskabet for Nord-Norsk Naeringsliv, 1965).

²⁰Lofotposten (Svolvær), August 27, 1969.



educational system. The thinly spread rural population has ordained school districts with a small pupil base, frequently inadequate facilities, in remote locations, and with the associated problem of attracting good teachers. The percentage of teachers with university degrees in Nordland is substantially lower than in the country as a whole, forty-two per cent versus sixty-seven per cent. No doubt that the quality of education is affected by this, particularly in the rural kommune where the contrast is even greater. Nordland has not been able to encourage locally an interest in academia commensurate with its need for teachers. Thus the county must rely heavily upon imported manpower with a resulting high turnover rate, increased subsidy for teacher housing, and an elementary education even more geared toward the urban value system represented by most of the incoming teachers. Having established a high priority for educating its young people Nordland County has placed itself on a treadmill which seems to encourage an increase in the rate of population concentration within the county as well as an increase in the rate of selective migration out of the county.

Government Support of Health.--The problem of finding qualified teachers for the peripheral county in general and the remote rural locations within it more particularly is exceeded by the even greater problem of obtaining adequate health services and personnel. Here as with teachers the problem tends to increase with increasing distance from a large urban area.



To attract doctors, dentists, nurses, medical technicians, and veterinarians the poverty stricken outlying districts must offer direct amenities even greater than do the urban areas. Thus Grane subsidizes up to sixty per cent of the rent of its medical practitioners while other kommuner must build or furnish at no or negligible cost new homes with complete furnishing and office equipment.²¹ No county or state support exists for these expenses. The problem borders on the catastrophic.

The problem is not confined to the more peripheral districts though it no doubt is most severe here. In Rana, which has not in the past seen fit to provide its dentists with near gratis living accommodations nine of its total of eleven dentists left town in 1969 with no replacements in sight.²² The kommune has since decided to comply with the demand for free or low cost housing and is building a number of dentist residences.

As with dentists so with doctors. The two doctors in Meløy both left without immediate replacement in 1969 and the district with a population of 7386 is presently serviced by an intern.²³ Tysfjord benefitted in 1968 by the choice of a Dutch couple, both practising MD's, to spend their one year of voluntary service to an underdeveloped

²¹ Helgeland Arbeiderblad (Mosjøen), August 19, 1969; and Nordlys (Tromsø), September 24, 1969.

²² Aftenposten (Oslo), February 24, 1969.

²³ Lofotposten (Svolvær), May 7, 1969.



area in the kommune. The following year when the couple had done their stint for humanity they were replaced by an intern.²⁴ Meanwhile the public is exhorted to forego their routine check-ups here and elsewhere in the county.²⁵

Where medical service is available in the county it is frequently inexperienced and temporary. The state, the county, and the kommune efforts at attracting competent people thus far has had little noticable results. The effect upon population stability particularly in the more isolated and sparsely settled areas, is strongly negative. Particularly the very young and the very old families are affected by this lack of medical service and are those most likely to migrate to where conditions are more favorable.

Government Decision Making Within the Economic Sphere.--The process of centralization within the economic sphere has proceeded unabated since World War II. In this area it is more difficult to assess whether government intervention has aided or deterred population movement. On the one hand, it has been the avowed purpose of some of the regional development interests to halt a centralization process tied to the evolution of a nationally highly developed economy. These interests favor the maintenance of present settlement patterns. On the other hand, various government departments are in the active pursuit of a policy designed to improve

²⁴Artenposten (Oslo), September 18, 1968 and Lofotposten (Svolvær), May 7, 1969.

²⁵Lofotposten (Svolvær), July 8, 1969.



the national and international competitive capability of all Norwegian industries primary or secondary, local or regional. This is effectively a centralization policy. The government has shown a good measure of concern for enhancing the conditions under which individual companies develop and retain an edge in the international free market.

The peripheral region in Norway, as exemplified by Nordland County, is tied to the export market more so than is the remainder of the nation. At the same time this region is characterized by an overwhelming emphasis upon extractive activities. In the case of Nordland this means large scale, labor intensive fishing and agricultural industries with a lesser role played by mining and forestry. In order to maintain a hold on the foreign market, while insuring the economic viability of the areas affected by an occasional failure of this market, the government finds it necessary to intercede at strategic moments. As a result a frequently dichotomous situation exists in which government policies often seem contradictory, particularly when an attempt is made to assess their impact on migration. A few examples are discussed below.

Fishing. The fishing industry in Nordland is decidedly export oriented.²⁶ It is further characterized by the major

²⁶Forty to fifty per cent of the Norwegian fish exports come from the three counties of the North. This amounts to about two per cent of the total world fish catch. Chr. A. Jakhell, "Åpning av Fiskerikonferanse," Nord-Norsk Fiskerikonferanse III (Bodø: Studieselskabet for Nord-Norsk Naeringsliv, 1968), 2.



role played by small, inefficient fishing boats, large seasonal manpower needs, and many relatively small processing plants evenly distributed through the coastal zone. These plants, however, process only a small percentage of the Nordland fish catch much of which is dried on racks or slated. Most of the cash income for the majority of fishermen comes from the hectic thirteen week Lofoten cod season. In 1969 this provided 5126 fishermen with a catch of 43,878 ton cod valued at kr. 64 million.²⁷ If the sale of this catch is in jeopardy the state must step in to avert a potentially catastrophic economic loss for the region. When the author visited the area in the Fall of 1969 some of the 1968 catch was still taking up storage space. The problem was the loss of most of the African market when the Biafran conflict prevented shipment of dried cod to Nigeria. Dried cod normally comprises over fifty per cent of the total catch. To alleviate an obvious economic squeeze the government stepped in and purchased that part of the production destined for the African market at sixty per cent of the production cost. No doubt that such action is necessary to insure maintenance of the coastal population base which is composed largely of people who depend upon the cash income from seasonal fishing and who must resort to household, largely subsistence, farming for the long off-season.

To reduce the problem of seasonality while establishing

²⁷ Lofotposten (Svolvær), April 26, 1969.



a more competitive climate the government encourages a deemphasis on small boats and seasonal fishing. This combination comes from the existence of numerous small off shore fishing banks and its continuance insures the even spread of population in the coastal zone. The state favors the adoption instead of a highly mechanized, ocean worthy, and internationally competitive trawler fleet coupled with a greater centralization of the processing industry. It also favors a greater degree of secondary processing of fresh fish to the point of local manufacture of complete fish dinners.²⁸ What if the region should succeed in providing manufacturing plants for secondary processing of even one half of its fish catch? We may then expect a substantial stabilizing of the coastal economy. This will occur through the capital investment, additions to value added and the permanently employed labor force, together with the rippling effects of attracted symbiotic industry and services. Unfortunately up to now the trawler fleet remains small and must confine its activity to areas more than six miles off shore. This limitation was imposed for political reasons from fear of offending

²⁸The Staburet company in Svolvær, Lofoten, has recently embarked on an expansion of its production facilities aided by a long term, low interest government guarantee and loan. The aim is to double present production of frozen completely prepared fish dinners. Lofotposten (Svolvær), September 13, 1969.



the owners of smaller boats.²⁹

The fishing industry is obviously undergoing a period of transition. One which sees an increasing number of fishing dependent families depart the more remote locations for the nearby larger central place offering better freezing and processing facilities. At the same time the average age of those active in fishing is on an upward spiral increasing at an annual rate exceeding one year during the late nineteen fifties and early sixties.³⁰ Thus the younger element is leaving and efforts at finding replacements are largely failing. The technical fisheries school at Gravdal, Vestvågøy, for example, is unable to attract more than thirty students though it has a capacity of sixty.³¹ It is indeed doubtful that young people can be attracted into the fishing profession except through an expansion of the kind of year around employment opportunity offered by the large trawler.

It should be noted that the number of people in

²⁹ A summary of areas where governmental organs and public law variously regulates, controls, or influences different aspects of the fishing industry is found in Einar Moxnes, "Myndigheternes Medvirkning med hensyn til Markedsføring og produktutvikling," Nord-Norsk Fiskerikonferanse III, Chapter 12; see also Rolf Voldnes, "Fiskerinaeringen; en Naering i Krise," Plan og Arbeid (June, 1969), 20-33; and Anders Aune, "Synspunkter på problematikk og perspektiv i naeringsutbygging i Nord Norge," Foredrag om Utbyggings og Lokaliseringsspørsmål, Kirkenes, June, 1969 (Oslo: Distriktenes Utbyggingsfond, 1968), 1-11.

³⁰ Sverre Møller, "Utvikling av moderne fiskebater," Nord Norge, Naeringsliv og Økonomi, XXXI (1964), 16.

³¹ Helgeland Arbeiderblad (Mosjøen), September 13, 1969.



Nordland actively pursuing fishing decreased 1960 to 1965 from 13,672 to 11,502, or sixteen per cent, while the decrease in registered fishing boats was from 10,508 to 9,747, or seven per cent. Eighty per cent of the registered boats in 1965 were less than thirty feet in length. This is the lower threshold value for boats generally capable of work beyond the most immediate off-shore fishing banks.³²

Modernization and the associated centralization of activity is a slow but inevitable process in Nordland. The government is torn between a policy favoring a status quo of settlement and activity in the coastal region and one encouraging further economies of scale in the fishing industry. This conflict is all the more difficult to resolve as long as the majority of fishermen (6700 in 1965) are small time and part time.

Agriculture. As discussed in Chapter III agriculture has not in the past been looked upon as an activity capable of supporting independently the livelihood of people in Nordland. Indeed where it exists it does so under the most fragile of ecologic and economic conditions. Generally poor soils, a brief growing season that is usually too wet, and a thinly spread population permitting little in the way of a local market, all are conditions which tend to prevent success in agriculture. Farming, even as an occupation traditionally subsidiary to fishing, forestry, and mining, is on the decline.

³² Anders Aune, "Synspunkter....," 7.



The total number of farms have decreased twenty five per cent from 1949 to 1968.³³ More of a problem is the high percentage of part time farmers, a total of eighty per cent in 1959. In addition the agricultural population is rapidly aging with the average age of farmers in most districts now exceeding fifty-five.³⁴

Governmental influence in agriculture is pervasive and varied. In general the Department of Agriculture offers a generous assortment of educational opportunities, as well as guarantees, loans or outright cash grants for costs incurred in expansion or improvement of agricultural lands, buildings and equipment.³⁵ These aids are not geared necessarily toward the peripheral region. The latter, however, having greater production problems, receives more than its proportionate share. The peripheral region, especially North Norway, suffers more frequently from natural disasters or year long adverse conditions of climate as was true in 1968. In October of that year the state government granted

³³Aftenposten (Oslo), April 5, 1968.

³⁴A wealth of material exists on the conditions of Nordland agriculture. See, for example, Nordland Landbruks-selskab Arsmelding; Norden, Nord-Norges Landbrukstidsskrift; the regional studies of the Institute of Agricultural Economics particularly Arnt Leiramo, Landbruket i Vestvågøy (Oslo: Norges Landbruksøkonomiske Institutt, 1966); Odd Maeland, Prøvebygda Leiranger (Oslo: N. L. I., 1964); and Eivind Elstrand and Svein Robbestad, Landbruket i Ballangen (Oslo: N. L. I., 1963); also Rudolf Antonsen, Jordbrukets Plass i Ofotregionen (Narvik: By the author, 1969); and the very detailed and comprehensive agricultural census materials published in Oslo by the Norwegian Census Bureau.

³⁵Some of these are discussed in Lofotposten (Svolvær), September 5, 1969.



over kr. 7 million in emergency relief to farmers in the three northern counties.³⁶

Continuing programs which decidedly favor the remote agricultural areas include transportation subsidies for milk, imported feed, and fertilizer. The basic premise is that no farm in Norway shall suffer due to distance and relative inaccessibility. These factors are of course particularly severe north of the Arctic Circle. Of a variety of agricultural price support systems the milk subsidy carries a special meaning for Nordland. Under the milk subsidy the farmer is allotted, on the basis of a prior production record, a quota for which he is paid the full support price by the cooperative dairy. Any milk he manufactures in excess of the quota is paid for at a rate commensurate with its use and real market value. The milk support system is in effect a kind of income maintenance which acts as a barrier against production increases while keeping the otherwise uneconomic farm in business. In 1968 the price reduction per kilogram milk sold in excess of the quota was thirty øre, which was about fifty per cent of the support price.³⁷

The net consequence of the state agricultural support systems in Nordland has been to establish the county as a major surplus producer of dairy goods. Milk production

³⁶Aftenposten (Oslo), October 4, 1968.

³⁷Norden, Nord-Norges Landbrukstidskrift, LXXXII (April 20, 1968), 267; and interviews with agricultural agents in Vestvågøy, Evenes, Grane, Skjerstad, and Brønnøy, Fall, 1969.



from 1949 to 1968 increased over 400 per cent. Noteworthy gains were also made in hog and sheep raising.³⁸ And yet the productivity of the average Nordland farm remains thirty per cent below the national average.³⁹ One study which sampled seventy-five Nordland farms in 1966 found the average agricultural earning power to be kr. 3.79 per hour. The comparable hourly earning in the nation was kr. 5.34.⁴⁰ The principal reason for the low productivity is the still large percentage of small and part time farmers.

Through its varied programs the government hopes to establish a regionally selfsufficient agriculture. In the process it has encouraged specialization in dairying and the continuing existence of the small farm operation. The effect upon human migration behavior has been to retard the outmigration tendency though the agricultural districts continue to provide more than their share of outmigrants.

Transportation and Communication Improvements.--In a continuing effort to improve telecommunications, recent central government decisions seem to have caused an increase in the outmigration process. The state subsidizes directly the Nordland air, bus, coastal shipping, and ferry lines. In

³⁸ Nordland Landbruksselskab, Arsmelding, 1968
(Bodø: Nordland Boktrykeri, As., 1968), 85.

³⁹ Aftenposten (Oslo), April 5, 1968.

⁴⁰ Karl Sørsgaard, "Nord-Norsk Naeringsliv i 1967-68," Nord-Norge, Naeringsliv og Økonomi, XXXVIII (1968), 140.





Figure 27.--Near Stamsund, Vestvågøy abandoned farms stand in mute testimony to the change in life style caused by road network extension into peripheral areas.



Figure 28.--Vitting agricultural district, Vestvågøy. Most farms have been abandoned in the past five years in spite of recent electrification. Note stone fence, unimproved rough pasture, and the generally harsh nature of the surroundings.



1966 this amounted to nearly kr. 30 million.⁴¹ The government also supports the upkeep and expansion of the transportation system. Extraordinary provisions are made for the improvement of the road conditions within peripheral districts. Of the kr. 25 million so provided on a national basis in 1967, close to twenty-five per cent went to the development of the coastal highway in Helgeland.⁴²

Expansion of the transportation and communication network into remote districts is in part motivated by the desire to insure the maintenance of the population base. There are indications that this objective is not met. In fact we may suggest that such improvements in thinly settled areas tend to hasten the urge to migrate out. The following examples support this conclusion.

On the island of Vestvågøy a small farming-fishing district was totally depopulated only a short time following the completion of a road to Stamsund town (see Figure 27). The district had previously benefitted from generous government agricultural price and farm building subsidies and the road should have insured a relative degree of agricultural permanence in the area. The improved agricultural supply and market situation introduced the district's inhabitants at the same time to employment opportunities not before perceived. Before long people were commuting to permanent

⁴¹Hakon Kyllingmark, "Nord-Norge og kommunikasjonene," Nord-Norge, Naeringsliv og Økonomi (1967), 32.

⁴²Ibid., 30.



jobs in Stamsund. Agriculture and part time fishing rapidly declined in importance and all families opted in the end to settle near their jobs and the schools of their children.

Figure 28 illustrates a similar situation in another remote district on the island of Vestvågøy. Road connection to Leknes, twenty kilometers distant, has existed for several decades but the provision of electricity is fairly new to the district. Introduction of the latter brought in television which resulted in a heightened awareness of the good life elsewhere and, it is suggested, an increase in the out-migration tendency.⁴³ Nine farms and one rural general store with postal service have ceased operation in recent years.

This problem is not confined to the Lofoten islands. In Helgeland an embittered director of the district electrical power company complains about the rapidly decreasing earnings resulting from the depopulating of rural districts only recently provided with electricity.⁴⁴ Evidence that stronger government safety measures in public transportation has the potential of disrupting local settlement stability has also come to light in Helgeland. Here the small community of Sørnes on the Vefsnfjord has maintained for some time its only communication link with life elsewhere over an ancient and rapidly deteriorating dock. State inspectors recently declared the dock area unsafe and off limits to fjord traffic

⁴³From an interview with Kare Olsson, agricultural agent in Vestvågøy kommune, September 15, 1960.

⁴⁴Helgeland Arbeiderblad (Mosjøen), August 16, 1969.



until such time that improvements are made. The district's thirty people are herewith effectively isolated. Farms cannot be serviced by the milk boat, children cannot go to school or they must stay in a dormitory, and mail delivery and pick up is in jeopardy.⁴⁵ Temporary measures will be taken to improve the situation but further incentive for depopulation has been provided.

The agricultural settlement of Haugnes on the island of Andøy (Andenes kommune) in Vesterålen shows on a larger scale the impact of transportation network expansion. Haugnes occupied a flat coastal stretch adjacent to the state highway. In 1953 it was separated from the highway by a new airfield which was to service military as well as commercial needs of the region. The resulting transportation problem no doubt helps explain the 1953 to 1969 decrease in population from 332 to 114.⁴⁶ The remaining families sued the state for damages and a settlement allowing them to turn the remaining property over to the state. Total abandonment is now following the state agreement to abide by a court directed settlement of kr. 4.1 million!⁴⁷

Administrative centralization efforts have reached the national telecommunication system with probable adverse results for the small central place of Lødingen. This place

⁴⁵ Helgeland Arbeiderblad, (Mosjøen), August 25, 1969.

⁴⁶ Lofotposten (Svolvær), September 13, 1969.

⁴⁷ Lofotposten (Svolvær), October 3, 1969.



was established in 1909 as the North Norway regional telecommunication administrative headquarters.⁴⁸ Gradually the diffusion of settlement and economic development caused the creation of independent regional centers in Finnmark (1921) and in Troms (1954). Lødingen's main economic function is to be transferred to the much larger, and for Nordland more centrally located, city of Bodø. With a reduction of an estimated twenty per cent of the kommune tax base and a good deal more from the loss of supporting industry and services strong fears are expressed that Lødingen will not survive.⁴⁹

The Effects of Decision Making in the National Sphere: A Summary.--The central Norwegian government and its departments display a mesh of divergent motives and policies in the peripheral region. Government removal grants, centralization of administration and services, and improvements in the amenity structure have tended to hasten the outmigration process. Only through the agricultural support programs is government intervention in the national sphere succeeding in retarding the outflow of people.

Government decision making coupled with present day rapid changes in technology, socio-economic conditions, and man's perception of environment and opportunity have very much affected the life style and attitudes of the peripheral

⁴⁸ Harstad Tidende, August 29, 1969.

⁴⁹ Lofotposten (Svolvær), June 19, 1969 and July 23, 1969; Fremover (Narvik), July 16, 1969; and Harstad Tidende, September 1, 1969.



inhabitant. Though some may wish for a return to the simpler life⁵⁰ is is not possible to turn back the clock. Improved mobility and increasing technological prowesses have combined to sweep the peripheral region along though at a certain distance behind the more advanced areas; always it seems with some degree of reluctance. Change in the depressed area does not frequently occur from within, rather it is imposed from the outside and as such is not as readily accepted. Some communities unable to institute changes as rapidly as demanded loose industry, employment and people.

Young people vote with their feet for what they perceive to be a more fullfilling life elsewhere. Improved local educational conditions expand their horizons and enable them to compete on a broader base for manufacturing and urban jobs.

Though the policies of the national government have in many instances a measurable impact upon conditions in the economically marginal area it is not always the impact intended. Here this has been shown to be particularly true for the policies motivated in part by the desire to stabilize the periphery population base.

⁵⁰ See particularly the published materials of Ottar Brox as exemplified by "Avvisning af storsamfunnet som økonomisk tilpasningsform, Tidsskrift for Samfunnsforskning, V (1964), 167-78; "Geografi eller Sciencefiction," Minerva's Kvartalskrift, III (1967), 314-18; and Hva Skjer i Nord-Norge? (Oslo: Pax Forlag, 1966). See also Aasmond Stokke "Hvorfor Oslo-Regionen's vekst bør dempes," Plan og Arbeid, IV (1967), 26-27.



Decision Making: Toward Regional
Economic Development

Though the peripheral regions are clearly affected by the spasmodic and highly sectoralized approaches toward national socio-economic improvement, it is an easier task to evaluate the impact upon migration of regional policies. These are strongly purposive programs designed to achieve a regional economic uplift. For Nordland in the past two decades this regional effort has been buttressed variously by, 1. a national growth point policy; 2. the North Norway Development Fund (NNDF); 3. the District Development Fund (DDF); and 4. the more recent Industrial Estate Corporation (IEC).⁵¹

Regional development policy in Norway focuses broadly upon the expansion of employment opportunity and the improvement of socio-economic conditions in marginal areas.⁵² This regional policy concern dates back to the 1930's with the government's interest in developing water resources

⁵¹ Though no published research has tied together the impact of government decision making in pursuit of national objectives many authors have considered the purpose, character and impact of Norwegian regional policy programs. See for example Odd J. Breivik, Om Distriktsutbyggingen og Distriktenes Utbyggingsfond (Oslo: Distriktenes Utbyggingsfond, 1968); Henrik Lunde, "Oversikt over virkemidler i distriktsutbyggingen," Plan og Arbeid, IV (October, 1970), 12-16; and Lawrence M. Sommers and Ole Gade, "The Spatial Impact of Government Decisions on Postwar Economic Change in North Norway," Annals of the Association of American Geographers, LXI (September, 1971), 522-36.

⁵² Breivik, Om Distriktsutbyggingen, 8.



and in expanding the electrical power grid to thinly populated areas. In the thirties came also the Fund for New Industries with the objective of aiding industries wishing to locate in areas having little industrial activity. World War II disrupted the emerging regional programs but extraordinary efforts at rebuilding a war devastated economy refocused attention on regional development problems. The character of post-war regional policies and their economic impact has recently been analyzed in some detail⁵³ and will only be briefly dealt with here as it relates to migration.

Growth Point Policy.--The idea of a growth point emphasizes the importance of establishing regional centers as foci of economic development regions.⁵⁴ By establishing the state owned iron and steel complex at Mo-i-Rana the Norwegian government supported the need to equalize income between regions while recognizing the correlation existing between urbanization and economic growth. Growth pole development was also encouraged by state supported private industrial

⁵³Sommers and Gade, "Spatial Impact of Government Decisions."

⁵⁴The growth pole idea was first advanced by F. Perroux, "Note sur la notion de pôle de croissance," Economic Appliquée, VIII (1955), 307-20. The resulting vast literature has been recently analyzed in D. E. Keeble, "Models of Economic Development," in Models in Geography, ed. by R. J. Chorley and P. Haggett (London: Methuen and Company, 1967), 281-87. The effect of implementing the idea in Norway has been analyzed in detail by Paul Olav Berg, Ringvirkninger av ny Storindustri (Oslo: Distriktenes Utbyggingsfond, 1965); and Jens Chr. Hansen, "Industriel Utvikling og Tettstedsvekst," Norsk Geografisk Tidsskrift, XX (1965-1966), 181-265.



investment in Glomfjord and Mosjøen. As discussed in Chapters III and V all of these industrial towns have succeeded in a short term vigorous population expansion by pulling in people from adjacent rural districts. Recent indications are that none of these urban places have a capacity for selfsustained growth. They merely act as sophisticated vocational training centers which import unskilled labor from the rural periphery and export well trained labor to employment centers in southern Norway.⁵⁵

Therefore it can be suggested that the government in its support of a growth point policy has succeeded in creating a number of towns which act as parasites within their respective regions rather than as centers of enduring regional economic growth.⁵⁶ The kommuner which include Mo, Glomfjord, and Mosjøen sustained a net migration loss of 520 in 1969 and an estimated net migration loss of 698 in 1970!

North Norway Development Fund.--The NNDF was initiated in 1952 as the financing leg of the North Norway Plan. Its purpose was to furnish financial support of any economic activity which would bring lasting support to the region. The comprehensive program included: 1. the granting of loans,

⁵⁵Aftenposten (Oslo), January 31, 1969.

⁵⁶A notion which supports the argument of Bert Hoselitz that some cities rob rather than pay their hinterland, in "Generative and Parasitic Cities," Economic Development and Cultural Change, III (1955), 278-94.



guaranties, and the purchase of company stocks and bonds;

2. the development of a favorable tax support structure;

3. aid in expansion of the communication system; and

4. special support efforts for the primary activities.

Regional development aid has continued with the absorption of the NNDF by the spatially more broadly conceived District Development Fund in 1961. From March 18, 1952 to December 31, 1966 the two funds supported 362 individual ventures in Nordland to the tune of kr. 219,593,000.⁵⁷ Nordland County has received 26.1 per cent of the total expenditures and guaranties.

In Chapter IV the spatial distribution of development funding is represented by the variable DEVELAID which is shown to be strongly tied to the urbanization dimension (see Tables 5 and 10). Unfortunately the nature of the data does not permit correlating it with the migration patterns of the 1950's. For the 1960's an interesting relationship exists between development aid and the two migration variables, MOBILE 3 (annual average net migration, 1964-1966), and MOBILE 4 (annual average net migration, 1967-1969).

It is clear that the main effort of the NNDF and the DDF was directed toward those areas most likely to exhibit a potential for selfsustained growth, the more urbanized kommuner. Development aid has obviously influenced the

⁵⁷ Stortingsmelding, Number 15, 1967-68: Om Virksomheden til Distriktenes Utbyggingsfond i 1966 (Oslo: Kommunal of Arbeidsdepartementet, 1967), 36.



urbanization process though the data does not permit establishing more precisely the degree. We can, however, expect a positive relationship between DEVELAID and the migration variables. For MOBILE 3 the correlation coefficient r is .42 with an F value significance of .002. For MOBILE 4 the correlation coefficient is .50 with an F value significance of .001. Though the relationship is not particularly strong it is statistically significant and it increases in strength from the early to the later period. Thus the kommune receiving the greater amount of aid is increasingly attractive to outmigrants from the more rural districts.

In a report to the Storting (Norwegian Senate) the DDF Directorate noted that the present rate of modernization in primary activities together with the increasing role of secondary and tertiary occupations, and the resulting movement of people to urban places is persistent and pervasive. So much so that the DDF does not have the resources available to counteract the more negative aspects of this evolution.⁵⁸ The Storting responded in 1963-1964 with expanding the role of the DDF to include the offering of removal support to industries which located in congested areas like Oslo might be encouraged to move to a peripheral region.⁵⁹ Little industry has thus far taken advantage of this amenity.

⁵⁸ Brøivik, Om Distriktsutbygging, 12. ⁵⁹ Ibid., 13-14.



The Industrial Estate Corporation.--At the behest of the DDF and the Department of Local Government and Labor the Storting approved on January 11, 1968 the establishment of the Industrial Estate Corporation.⁶⁰ The role of this organization is patterned after the British industrial estate system. To attract industry into depressed areas the government will develop the necessary industrial supports (transportation access, electrical power, water and sewage, building, etc.) for a given site and then lease parts of the developed site to prospective firms under favorable financial conditions.⁶¹

One of five areas thus far selected for development is situated in a rural district thirty kilometers south of Harstad in Troms County yet only five kilometers north of the Nordland boundary. With the anticipated creation here of an industrial employment base of at least 500 the estate will have an enormous influence upon regional migration patterns. The outmigration tendency in adjacent rural kommuner can be expected to increase markedly and it will be more difficult for places like Harstad, Narvik, and Mo-i-Rana to obtain additions to their labor force. Whether or not this particular venture will establish the longed for center of selfsustained economic growth remains to be seen. If it follows the pattern set by Glomfjord, Mosjøen, and Mo-i-Rana

⁶⁰Ibid., 43-44.

⁶¹See for example, "Industrial Estates in Great Britain," in Regional Policy in EFTA; Industrial Estates (Geneva: European Free Trade Association, 1970), 27-70; and "Industrial Estates in Norway," Ibid., 71-80.



it is more likely to hasten the outflow of skilled labor from North Norway.

In sum the Norwegian regional policy concern as it relates to Nordland County has been shown to affect human mobility as follows: 1. development funding is aiding the urbanization process; 2. the migration of low skilled labor from the more remote and rural districts is intensifying; and 3. while vocational skills of the local labor force is upgraded that labor force is leaving the county at an increasing rate.

Decision Making: The Private Initiative

In an environment of relatively great economic uncertainty, as that offered by North Norway, private investment decisions are guided more by government inducement than is true elsewhere. Few opportunities exist without government intercession. With or without state support opportunities are severely restricted to either primary extraction such as fishing and mining, or the secondary and tertiary support thereof. As a result of this lack of diversity in investment possibilities excellent human resources either go to waste or migrate out if they are not absorbed into the rather limited local labor market.

Southern companies have come to appreciate the existence of a substantial, well educated and trained labor pool in Nordland and have reacted by sending in recruiting teams, Electricians in the communication center of Lødingen



have recently seen their number reduced through the hard sell efforts of a recruiting team representing a South Norway company.

Though vigorous protests are raised against such raiding of skilled labor already permanently employed it is obviously difficult to close the door on the diffusion of the knowledge that equal or better opportunities exist elsewhere. The region loses out on even that portion of the labor force which with a great deal of local expense has acquired a high degree of specialized skill. Seemingly few alternatives exist with which to combat the raiding of skilled labor. Perhaps a more emphatic attempt at improving the image of local conditions is needed. The peripheral region does offer a complex of amenities not available in the traffic congested, pollution choked, and hectic urban environments of the South.



CHAPTER VII

THE SPATIAL IMPACT OF MIGRATION

Factors and processes which influence and direct the changing patterns of migration have been identified and analyzed in previous chapters. In this chapter an attempt will be made to assess the spatial impact of migration. The increasing concern with spatial processes and patterns in the discipline of geography have led several authors to contemplate the relationship of the movement of people to the evolution of spatial patterns.¹ How does the migration process contribute to the reordering of the cultural landscape and to the changing spatial character of demography, socio-economic activity and structure, political organization, and man's environmental perception?

A complex of hypotheses designed to establish the more precise nature of these relationships are derived from the outmigration spatial impact model introduced in Chapter II. These hypotheses will be statistically tested through regression analysis. The results in general will indicate that due to the highly selective nature of the migration process

¹See for example, Harvey, "The Problem of Theory Construction in Geography;" Morrill, Migration and the Spread and Growth of Urban Settlements; and Simmons, "Changing Residence in the City."



its impact upon the peripheral region is apt to be negative in terms of socio-economic development. In fact the more isolated and primary activity oriented the region is the more negative the impact.

Migration and Demographic Change

Demographic variables tend to be strongly inter-related. Migration may thus be expected to correlate with other demographic characteristics like population change, age composition, sex ratio, natural growth rate, and population concentration. The nature of the interrelationships for the depressed region with a high degree of outmigration is described in Chapter II under the heading, the spatial impact of migration. Conclusions in Chapter II are derived from an analysis of the relevant migration literature and serve as the nuclei of hypotheses designed to uncover expected conditions in Nordland County.

Tests of Simple Linear Correlation.--With demographic characteristics, except migration, as independent variables XI through XI2, the following listing defines the dependent migration variables:

- Y1-pro mille annual average net migration, 1951-1957
- Y2-pro mille annual average net migration, 1957-1961
- Y3-pro mille annual average net migration, 1964-1966
- Y4-pro mille annual average net migration, 1967-1969



Simple correlation-regression analysis is used to determine the strength and direction of variable relations. A summary of correlated variables, applicable hypotheses, and research findings is shown in Table 14.

It is hypothesized that Nordland migration streams are chiefly composed of young people thus leaving behind an increasingly older population in the area of outmigration. An inverse relation exists between migration during the 1950's and per cent population sixty years of age and over in 1960 (X3). The coefficients of correlation, $r = -.5990$ for Y1 and $r = -.7242$ for Y2, substantiate the hypothesis. The independent variable, per cent population sixty years and older in 1967 (X9) has an $r = -.7044$ with Y3. Similarly the correlation coefficient is relatively high (.6715) between age group 20-29 as a percentage of age group sixty and over in 1966 (X10) and Y3. It can be said that age selectivity in the migration process contributes to a youthful age composition in the area of immigration and leaves the area of outmigration with a relatively high percentage of older people.

It is also hypothesized that women predominate in the migration stream leaving behind an excess of males in the marginal (outmigration) area. Y1 and Y2 are correlated with per cent unmarried adult women of the adult female population (X5). The respective coefficients of correlation of .4782 and .4795 substantiates the hypothesis for the 1950's. For the following decade a hypothesized negative relationship



TABLE 14

DEMOGRAPHIC STRUCTURE:
VARIABLES, HYPOTHESES, AND RESEARCH FINDINGS

Dependent Variables	Independent Variables ¹	Hypothesized Relation	r	Significance Level
Y1	X1 TOTPOP60	Positive	.4632	.99
Y2	X1 TOTPOP60	Positive	.5332	.99
Y1	X2 POP5060	Positive	.7614	.99
Y2	X2 POP5060	Positive	.8991	.99
Y1	X3 OLDPOP60	Negative	-.5990	.99
Y2	X3 OLDPOP60	Negative	-.7242	.99
Y2	X4 GROWRATE	Positive	.6781	.99
Y1	X5 SPINSTER	Positive	.4782	.99
Y2	X5 SPINSTER	Positive	.4794	.99
Y3	X6 TOTPOP65	Positive	.6477	.99
Y4	X7 TOTPOP69	Positive	.5264	.99
Y3	X8 POCH6570	Positive	.8090	.99
Y4	X8 POCH6570	Positive	.8451	.99
Y3	X9 OLDPOP67	Negative	-.7044	.99
Y3	X10 YOUTHNES	Positive	.6715	.99
Y3	X11 MFRATIO	Negative	-.4272	.99
Y4	X11 MFRATIO	Negative	-.4451	.99
Y3	X12 GROWRATE	Positive	.6564	.99
Y1	Y2 MOBILE 2	Positive	.6915	.99
Y3	Y4 MOBILE 4	Positive	.5543	.99

Source: Compiled by author.

¹These are defined in Appendix B.



between the migration variables, Y3 and Y4, and the sex ratio in 1966 (X11) is supported with r values of $-.4272$ and $-.4451$, respectively. Though the correlation is weaker than anticipated, it is statistically significant above the chosen confidence level of .99. Sex selectivity in Nordland migration streams results in outmigration areas where the excess of males increases with an increasing scale of net population outflow.

Migrant selectivity is expected to have an impact upon the natural growth rate. A positive correlation is thus hypothesized between migration and the annual average rate of natural increase 1960-1962 (X4), and 1966-1968 (X12), respectively. For Y2 and X5 the $r = .6781$ while the correlation coefficient for Y3 and X12 is $.6564$. This means that the natural rate of growth decreases with an increasing rate of net outmigration, a fact which may have serious consequences for the marginal region. The latter will after a prolonged and/or intensive net outmigration fail to replenish its population base by natural means and will face depopulation even if outmigration ceases. In Nordland there were only two kommuner in 1964 with an excess of deaths over births; by 1967 there were three. In 1969 six kommuner were in this situation and in 1970 there were eight (Vega, Herøy, Leirfjord, Gildeskal, Beiarn, Hamarøy, Evenes, and Røst).

It is hypothesized that the migration process will direct the human flow from thinly populated areas to areas of greater and denser population. This has in some degree



already been shown in Chapter VI. Urbanization exerts a powerful attractive pull in migrants from the more rural areas and these migrants contribute significantly to relative population increase and size. Thus migration has a high correlation with population change (X2 and X8) and with population size (X1, X8, and X9) (see Table 14).

Finally it is hypothesized that migration streams once initiated will persist in direction and strength. For the 1950's a statistically significant degree of correlation, $r = .6915$, does exist between the two migration variables. During the 1960's migration streams did intensify but they also shifted slightly in direction accounting for a lower correlation coefficient, $r = .5543$, between the two migration variables (Y3 and Y4).. This shift in direction was uncovered and discussed more thoroughly in Chapter V. The hypothesis is substantiated though the intercorrelation between net migration variables is seen to weaken over time..

Population Pyramid Analysis.--To further support the guiding research hypothesis that migration relates to and affects other components of demographic structure a series of population pyramids of kommuner with differing migration characteristics are analyzed (see Figure 29 and Table 15).² Population

²The strong relationship existing between migration and other demographic variables was demonstrated by the factor analysis of Chapter IV. Demographic dimensions, tying together a number of population characteristics, emerged as Factor I in Phase I (see Table 4) and as Factor V in Phase II (see Table 5).



**FIGURE 29: Population Pyramids for
Selected Nordland Kommuner**

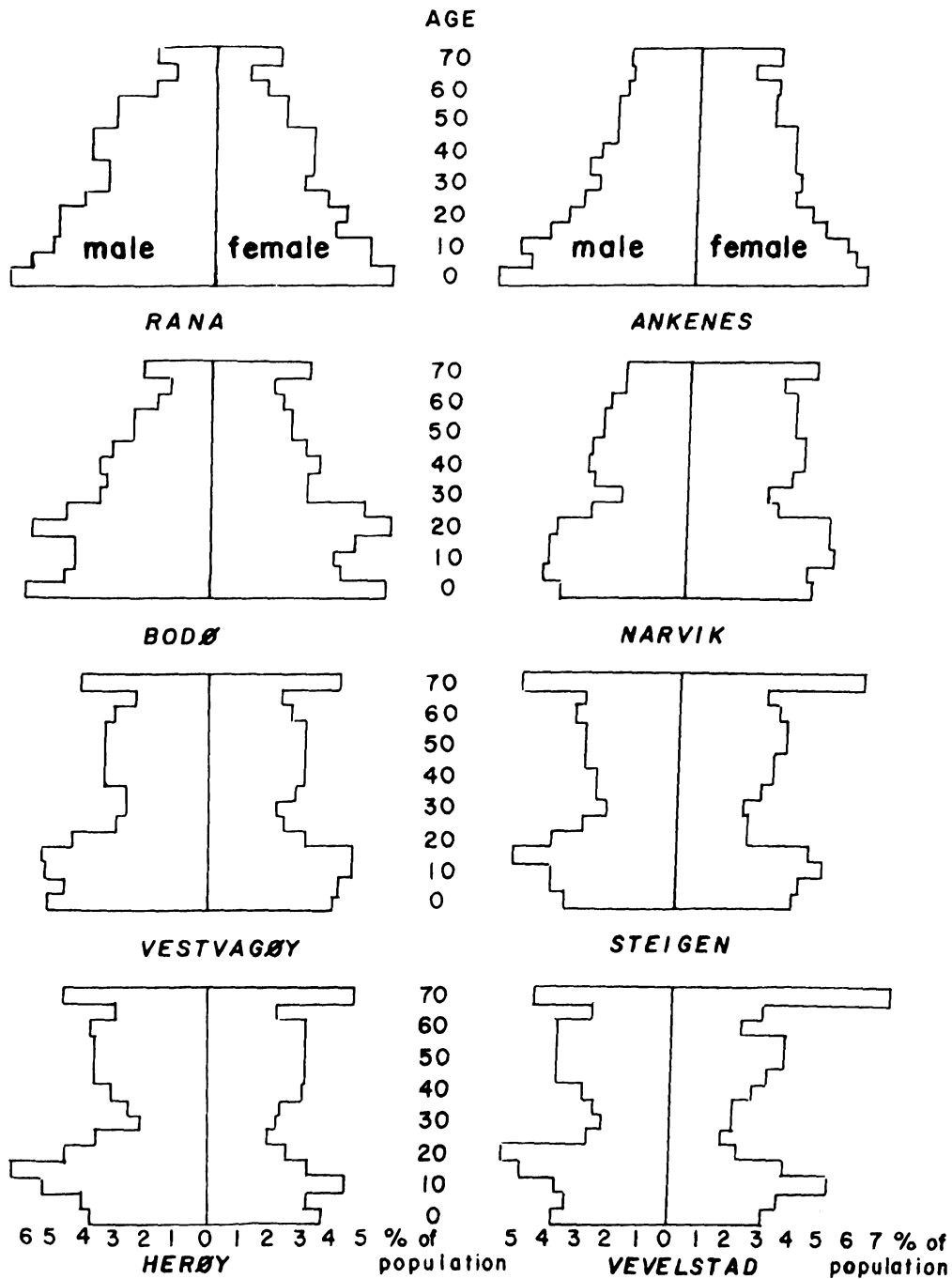




TABLE 15

DEMOGRAPHIC STRUCTURE: SELECTED KOMMUNER

<u>Kommune</u>	Y3	Y4	X9	X10	X11	X12	Population 1967
Rana	+20.7	- 7.5	9.0	178.9	1.16	18.4	25,847
Ankenes	+ 5.8	- 2.2	13.2	100.9	1.10	13.2	6,622
Bodø	+ 0.4	+ 0.1	11.4	154.3	.99	16.2	27,575
Narvik	- 9.7	-12.1	16.3	82.0	1.03	10.3	13,427
Vestvågøy	-19.1	-16.2	17.6	71.0	1.20	8.9	11,757
Steigen	-14.9	-20.6	23.1	48.5	1.38	-1.9	4,266
Herøy	-23.0	-17.8	20.8	61.5	1.80	5.5	2,675
Vevelstad	-28.3	-16.8	22.1	50.9	1.70	2.5	809

Source: Compiled by author

Key: Y3 = Pro mille annual average net migration, 1964-1966
 Y4 = Pro mille annual average net migration, 1967-1969
 X9 = Percentage population sixty years and older, 1967
 X10 = Age group 20-29 as a percentage of age group
 60 plus, 1966
 X11 = Male-female ratio for age group 25-29, 1966
 X12 = Pro mille annual average rate of natural increase,
 1966-1968



pyramids show the percentage distribution of age and sex groups for a given population. The male percentage is plotted on the left and the female on the right. A population whose pyramid has a broad base and a progressive narrowing toward the top may be identified as being highly reproductive.³

In Nordland this is best exemplified by Rana kommune which for two decades prior to the compilation of the pyramid data benefited from a steady net immigration of people. Rana is at the same time the most industrialized kommune in the county and therefore does not show the anticipated surplus of women in the young adult age group. The district does have a decidedly youthful population and a very high rate of natural increase.

Ankenes is the only kommune that can be classified suburban following the administrative changes of the early 1960's. Since Ankenes is the recipient of the urban overflow from Narvik the two kommuner are interesting to compare and contrast. Ankenes with its higher natural growth rate shows the effects of the immigration of predominantly young families from Narvik. Still the contrast between city and suburb is not as strong as anticipated. Narvik has unexpectedly less excess males for the 15-29 age group⁴ and its percentage

³ Donald J. Bogue, Principles of Demography (New York: John Wiley and Sons, Inc., 1969), 150.

⁴ Though Narvik has earlier been identified as a way station on the road to Oslo particularly for young women. See Hallstein Myklebost, Ofoten Region: Befolkning og Naeringsliv (Haslum, Norway: Andersson og Skjanes A/S, 1967), 29.



of older people is not so much greater than is true for Ankenes. But the weight of the old population is significantly greater for Narvik than for either Rana or Bodø. As noted in Chapter III Narvik's population growth has been stagnating or decreasing for the past decade. Therefore the city finds itself in what appears to be a transitional stage between a young and an old dominated population. One might expect Ankenes to follow this evolution within the next decade since the suburban kommune four years ago changed from a situation of net immigration to one of net outmigration, and since Narvik's rate of net outmigration appears on the rise.

Bodø, Nordland's chief administrative center, has experienced over many decades a low but persistent rate of immigration. This is reflected in its young-mature population profile. Bodø is also the only district with a surplus of young women, and the only one with a continuing net inflow of people.

The strong relationship existing between outmigration and an old-age dominated population pyramid is apparent from a glance at those of Vestvågøy, Steigen, Herøy, and Vevelstad. The basic relationships are that the greater the degree of net outmigration the older the average population and the lower the rate of natural growth. The end result is a top heavy pyramid as is particularly true in the case of Vevelstad, a small rural and largely agricultural kommune, which has had a negative rate of natural increase for a number of years. This district also identifies the tendency for young



women to precede men in the process of outmigration. Vevelstad has over twice the number of males than females in the 20-24 age group though the male-female ratio for the 15-29 group is somewhat less at 1.70. Herøy also exemplifies the marginal district with a tradition of outmigration. Here the male-female ratio of 1.80 for the young adult age group is the highest in the county. For both Herøy and Vevelstad the decrease in net outmigration in the late sixties is partially explained by the decreasing proportion of their populations in the high mobility age groups.⁵

In the technologically advanced world urban populations in general tend to have an older age composition than do rural populations.⁶ Just the opposite is true in the depressed region as exemplified by Nordland County. Here it can be said that the more rural the kommune the older the age composition. In summary it has been found that the migration process as it affects Nordland causes stagnation in population growth and a deficit of young women. In an increasing number of cases there exists an active depopulation and a negative rate of natural growth.

Migration and Economic Structure

Recent structural changes taking place in the Norwegian

⁵For further analysis on the relation in general existing between population pyramids and migration potential see Jens Chr. Hansen, "Flyttinger i Norge, 1967," Norsk Geografisk Tidsskrift, XXV (1960), 91-103.

⁶Bogue, Principles of Demography, 164.



economic system are associated with the evolution of a modern service society and relates directly to patterns of migration. Primary activities have in terms of their manpower demands declined in importance in comparison with other employment groups. The redistribution of employment is taking place at the expense of the primary activity labor pool and therefore also at the expense of the more thinly populated and rural areas. New job opportunities are as a rule found in the more densely populated areas with these gaining gradually a disproportionate share of the total population. A key to understanding the direction and rapidity of change in economic structure is provided through an analysis of the correlations existing between migration and economic conditions and change.

The complex of hypotheses tested in this section are rooted in the central belief that as persistent outmigration causes population growth stagnation or depopulation in the areas afflicted, so will it cause a worsening of economic conditions. This thought is well supported by the literature cited in Chapter II and in part supported by recent Norwegian research.⁷

⁷ Mook, for example, speaks of the spiral of outmigration and worsening economic conditions probably existing in Helgeland, see Mook, "Flyttings- og Befolkningsutvikling," 309; while Akselsen considers the negative effects upon the tax and service base of outmigration in Egil Akselsen, "Studieselskapets virksomhet i l. halvår 1964," Nord Norge: Næringsliv og Økonomi, XXXI (October, 1964), 40-44. Ottar Brox maintains to the contrary that migration streams include upper as well as lower elements of the social strata, leaving behind a viable population of farmers and fishermen in the rural districts, see his, Hva Skjer i Nord-Norge. Brox's conclusions are in general not well supported by the finding of this study.



Tests of Simple Correlation.--In this analysis of migration and economic factors the dependent variables are again the four migration streams listed as Y1 and Y4 in the previous section of this chapter. The independent variables, hypothesized relations, and research findings are found in Table 16.

Understanding the recent changes in economic activities is basic to understanding the impact of migration upon economic structure. These shifts in economic activity, however, are in part conditioned by the migration process. Thus it is hypothesized that people move from areas where primary activities, like agriculture, forestry and fishing, predominate to areas of manufacturing and tertiary service concentrations. The expected negative relationship of migration (Y1 and Y2) to agriculture and fishing employment (X1 and X2) is only poorly substantiated for the 1950's. Only the 1951-1957 migration stream (Y2) and percentage employment in agriculture and forestry in 1960 (X1) has a negative correlation coefficient, $r = -.4371$, exceeding the chosen confidence level. On the other hand the expectation that migration is in the direction of employment concentrations in manufacturing (X3 and X12) and service industries (X4) is well supported by the findings, at least into the mid-1960's. The 1964-1966 migration stream (Y3) correlates well with the index of manufacturing employment, industrial labor input in 1967, $r = .6806$, but the 1967-1969 migration stream (Y4) does not, $r = .3523$. This explains in part why the Nordland migration streams have experienced a recent shift



TABLE 16

ECONOMIC STRUCTURE:
VARIABLES, HYPOTHESES, AND RESEARCH FINDINGS

Dependent Variables	Independent Variables ¹	Hypothesized Relation	r	Significance Level
Y1	X1 AGFO60	Negative	-.2913	.98
Y2	X1 AGFO60	Negative	-.4371	.99
Y1	X2 FISH60	Negative	-.2941	.98
Y2	X2 FISH60	Negative	-.2922	.98
Y1	X3 MANF60	Positive	.4729	.99
Y2	X3 MANF60	Positive	.6022	.99
Y1	X4 RETAIL60	Positive	.4571	.99
Y2	X4 RETAIL60	Positive	.5888	.99
Y1	X5 RETIRE60	Negative	-.4734	.99
Y2	X5 RETIRE60	Negative	-.5856	.99
Y1	X6 AGFO5060	Positive	.2328	.96
Y2	X1 AGFO5060	Positive	.2432	.95
Y1	X7 MANF5060	Positive	.2865	.98
Y2	X7 MANF5060	Positive	.1829	> .95
Y1	X8 FISH5060	Positive	.3070	.99
Y2	X8 FISH5060	Positive	.4079	.99
Y1	X9 INCPC57	Positive	.5183	.99
Y2	X9 INCPC57	Positive	.6170	.99
Y1	X10 INC4757	Positive	.0402	> .95
Y3	X11 PERCFISH	Positive	.1864	> .95
Y4	X11 PERCFISH	Positive	.3063	.95
Y3	X12 LABIN67	Positive	.6806	.99
Y4	X12 LABIN67	Positive	.3523	.98
Y3	X12 PERINCP	Positive	.5999	.99
Y4	X12 PERINCP	Positive	.5698	.99
Y3	X13 HOUSEPUR	Positive	.5542	.99
Y4	X13 HOUSEPUR	Positive	.5075	.99
Y3	X14 PERSATAX	Positive	.5255	.99
Y4	X15 PERSATAX	Positive	.5144	.99

Source: Compiled by author

¹These are defined in detail in Appendix B.



in direction. Industrial centers have reached the optimum limit in manufacturing employment and no longer provide the force of attraction of the earlier periods.

The associated hypotheses linking migration to temporal change in employment categories similarly fail to be substantiated. Here it is anticipated that migration will encourage an increase in all employment classifications in places of destination (net immigration) and a decrease in place of origin. The feeling is that expanding manufacturing and service centers will influence some measure of expansion in primary activities in close proximity. Some of the farmers who leave the periphery will be encouraged to remain in their profession because of improved market conditions, if land is available. Though these relationships are shown to be positive only one is statistically significant. Migration influenced an increasing concentration of employment in fishing (X8) during the 1950's. Due to the lack of comparable data for the 1960's it is difficult to draw comparisons. However, the substitute variable of per capita fish catch in 1966 (X10) does relate increasingly positive to migration (Y3 and Y4) though not significantly so in either case.

A negative relation between migration (Y1 and Y2) and percentage of the population deriving its income from retirement and social security benefits (X5) is hypothesized and statistically substantiated. This is simply an affirmation of migrant selectivity which leaves the older population



behind.

An improved visual impression and understanding of the changing relationship between migration and the concentration of economic activity may be gained through an analysis of Figure 30 and Table 17. Each kommune is located on the pie chart by its percentile importance of primary, secondary, and tertiary occupations (see Figure 30, Chart IV). Variations in location symbols indicate in general how the individual kommune is affected by migration. Figure 26, Chart I is based upon the 1960 occupation statistics and the 1957-1961 migration stream and identifies 1. the striking importance of agriculture, fishing, and forestry (primary activities) in Nordland, and 2. the tendency for secondary, tertiary, and diversified districts to either have a net gain or a very slight loss due to migration. Primary activity districts which reveal a lesser degree of net outmigration are all within the Lofoten and Vesteralen region where fishing predominates.

With administrative changes in the early 1960's the clustering of kommuner in the A and B-1 primary activity groups is partially broken up, but there is little change in the relative importance of the different occupations (see Table 17). The migration-economic emphasis relationship continues for Chart II which is based upon 1965 occupation statistics and the 1964-1966 migration stream. Some degree of change appears in Chart III which relates 1965 occupations to the 1967-1969 migration stream. The increasing degree



FIGURE 30. MIGRATION AND ECONOMIC EMPHASIS

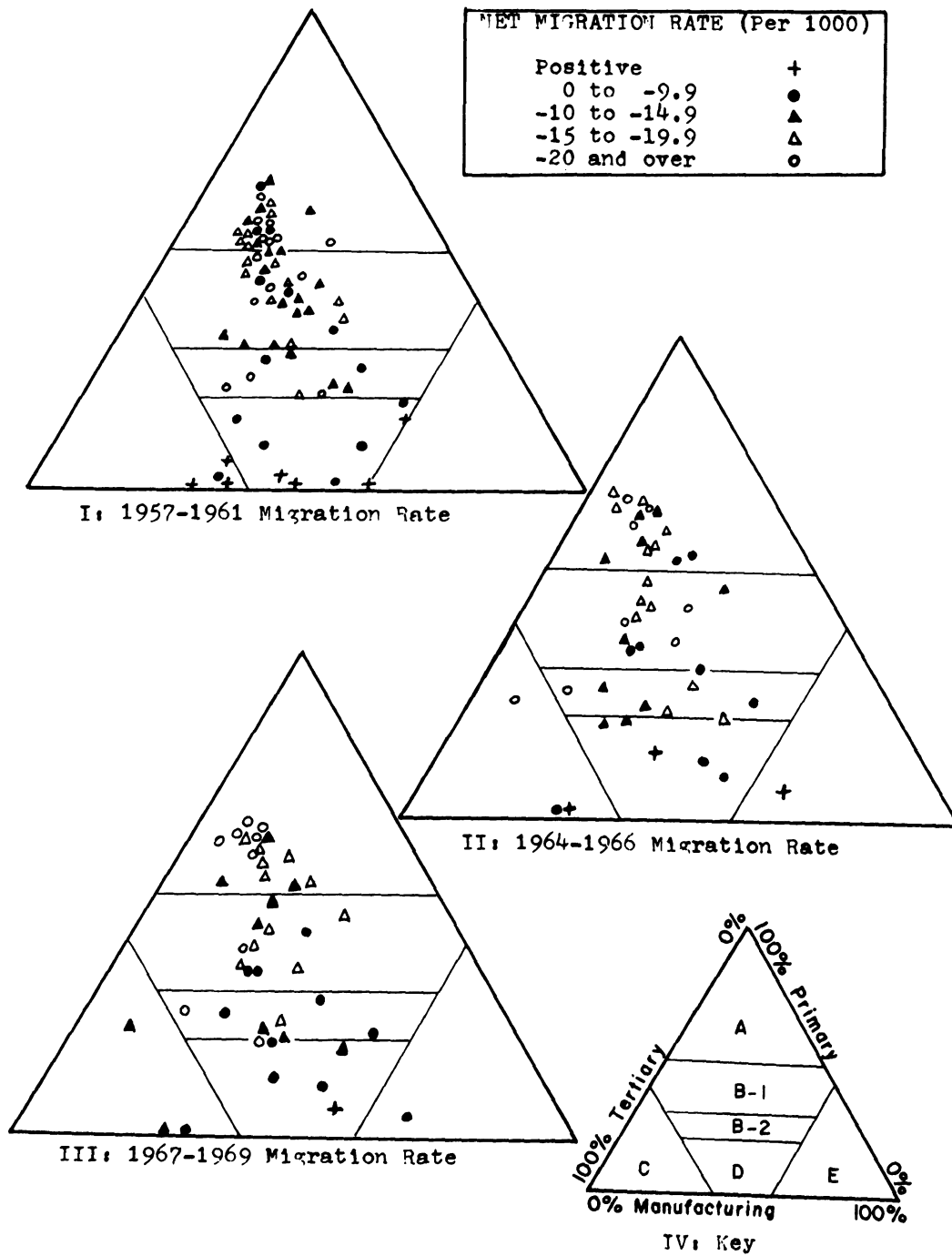




TABLE 17

ECONOMIC ACTIVITY BY KOMMUNE, 1960-1965

Activity Categories ¹		Kommune	
		1960	1965
A	Primary: <50% primary	23 (33%)	15 (34%)
B-II	30-50% primary	24 (35%)	11 (25%)
B-II	20-30% primary	9 (13%)	8 (18%)
C	Tertiary: <60% service	4 (5%)	3 (7%)
D	Diversified: >20% primary	9 (13%)	6 (14%)
	>60% service		
	>60% manufacturing		
E	Secondary <60% manufacturing	1 (1%)	1 (2%)
Total		69 (100%)	44 (100%)

Source: Compiled by author

¹Classification scheme after G. Enequist and L. Back, "Central Places in Sparsely Populated Areas; Three Examples From Northernmost Sweden," Geografiska Annaler, Series B, XVIII (1966), 36-50.

of net outmigration from the island fishing districts identifies more convincingly the primary emphasis kommuner as those hardest hit by net outmigration.

In sum, the migration process in Nordland discriminates between economic activity groups pulling people from areas dominated by agriculture and fishing and depositing them in centers of manufacturing and service employment. At the same time the migration process results in spatio-temporal changes in employment structure. The areas of net



immigration gain in all employment categories though most importantly in manufacturing and the services. Areas of net outmigration are left with a surplus of retirees and a decrease in primary activities employment.

What then is the effect of migration on relative economic prosperity? Economists have posed this question and derived an economic equalization theory with which to explain it.⁸ The basic tenet of this theory is contained in the following quote, "migration is the main mechanism of adjustment to the redistribution of economic opportunities caused by natural resource development and technological change which impinge unequally upon industries and areas."⁹ Migration is therefore seen as a means for attaining a state of spatial equilibrium in income and employment by pulling out of the depressed region that part of the labor force which is unemployed or underemployed. This will have the effect of raising the full employment level in peripheral areas and solve the problem of labor hunger in regions of industrial and urban expansion.

But the Nordland migration process has been found to be highly selective by removing the educated young people and leaving behind a more tradition bound older population. Will this tend to bridge the gap in prosperity existing

⁸ See Chapter II for references.

⁹ O. D. Duncan, "Population Redistribution and Economic Growth; A Review," Economic Development and Culture Change, VII (October, 1958), 90.

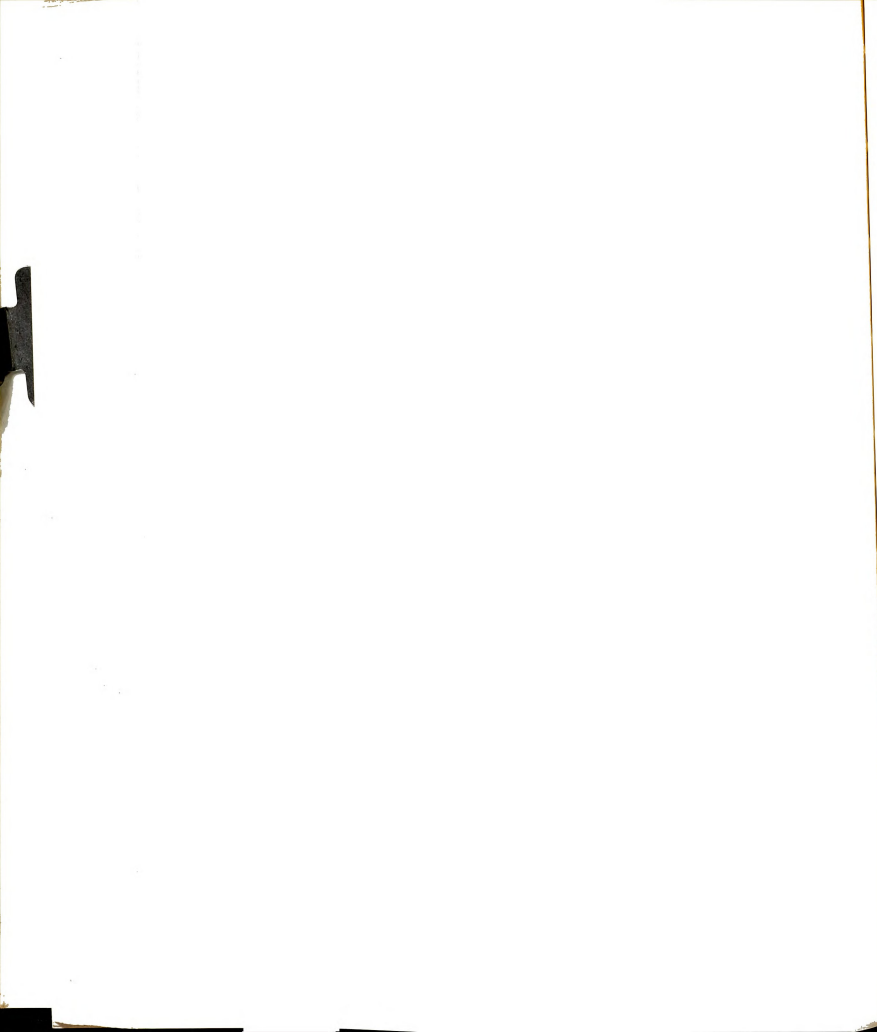


between urban and rural communities? It is hypothesized that migrant selectivity results in a widening of the gap between the prosperous and the less prosperous kommune in Nordland County.

In all cases the hypothesized relation between migration streams (Y1, Y2, and Y4) and per capita income (X9 and X12) are substantiated well above the chosen confidence level. That is, mobility is strongly related to spatial differences in per capita income, though the data does not allow a conclusion as to whether population movement begets or results from these differences. For the 1950's the early migration stream (1951-1957) is less strongly related to per capita income, 1957 ($r = .5183$), than the latter is to the 1957-1961 migration stream ($r = .6170$). This might lead to the conclusion that income variations push or pull people more than they are caused by the flow of people. However, the situation appears reversed for the 1960's where migration is related to per capita income, 1965 (see Table 16).

Unexpectedly, the relatively strong migration-income relationship cannot be shown to result in a widening of the income gap between Nordland kommuner. No significant correlation exists between Y1 and X10, per cent change in per capita income, 1947-1957 ($r = .0402$). On the basis of existing data and the low correlation coefficient this hypothesis must be rejected.

On the other hand there is no evidence that migration



aids in equalizing income. From 1957 to 1965 the per capita income gap widened from kr. 3,460 to kr. 4,291 with the leading kommune (Narvik) increasing from kr. 4,833 to kr. 7,499 and the last from kr. 1,373 (Borge) to kr. 3,208 (Rødøy). The relative percentage increases, 234 per cent for the low position and 155 per cent for the high, is therefore somewhat deceptive. It might also be an easier task to prove the existence of migration-income widening correlation if not for the increase in state support of the more marginal districts through tax rebates, welfare payments, and social security. Much of the deleterious impact of outmigration has been softened by state intervention.

Migration and Social Organization

There is little quantitative material available to aid in documenting the impact of migration upon social organization and social change. Sufficient evidence has already been introduced to support the notion that the traditional family organization is broken up in those areas afflicted by persistent outmigration. The young depart the peripheral areas in great numbers leaving behind parents who are often tied to a tradition-rich past and an unpromising future. In any case the marginal region suffocates with the burden of an old population, traditional approaches to economic pursuits, and a lack of recent infusion of innovative, energetic, and openminded young blood. When opportunity does seem to beckon in agriculture and fishing often the waiting period is too long. Who wants to wait till



one's father elects to retire from the farm or the boat to become an independent farmer or fisherman? Very few young men are willing and their decision not to wait is made easier by the clear unwillingness of young women to settle down for a life of relative hardship on the farm.

Outmigration from the marginal area is, as suggested in Chapter II, becoming a social tradition. Of the literally hundreds of teenagers the author came into contact with during field work¹⁰ there were few who did not indicate a desire to move out of the home district when graduated from school. The outbound mobility of school leavers is more than just accepted within the community, it is expected. School officials, elected community leaders, and many parents speak forebodingly about the community's failure in retaining its educated young people. Many of the youngsters remain in the district only until they can graduate from school, their father already having employment outside the community. In several classes in the town of Brønnøysund close to fifteen per cent of the students found themselves in this situation. Even in case their parents decide to stay the likelihood that the children will leave is increased due to

¹⁰ Contacts were made while collecting consumer behavior and other spatial interaction data in the kommuner of Skjerstad, Vestvågøy, Evenes, Grane, and Brønnøy. Information was gathered on 1328 households through the county school system. The collection method was suggested by Hallstein Myklebost, Chairman of the Institute of Geography, Oslo University, and officially supported by Nordland County School Superintendent Olav Nyaas as well as all kommune level school officials and teachers.



their heightened awareness of job opportunities elsewhere. The process is cumulative. In Grane kommune one school official expected not even one student from the graduating class (1970) of the new nine year school to remain in the local area more than a month or two following graduation. Outmigration generates its own *raison d'être*.¹¹

In Bø kommune one small school district is approaching total depopulation. Over one hundred people left the district for a manufacturing town in Southern Norway from 1961 to 1968.¹² The wholesale outmigration was apparently initiated with the marriage of a prolific letter writer, a seaman from Bø, to a woman in the manufacturing town. Friends and relatives gradually were convinced of the positive job outlook and followed the seaman south. The nucleus of Bø residents in the manufacturing town has done much to alleviate one of the greater barriers to migration, the uncertainty of being able to adjust to the new environment.

The kind of change in social outlook initiated by the movement into an area of a group of people carrying with them an alien value system can be illustrated by a case study of agricultural change conducted in Brønnøy kommune. During the field work period the author gradually became aware of some of the major social barriers to change existing in the more marginal districts. One lead was the

¹¹Also a conclusion of Lowenthal and Comitas in "Emigration and Depopulation," 199.

¹²Harstad Tidende, July 16, 1969.



persisting uniformity of the upper limit of dairy herds, even on farms which could obviously support a much greater number.

On the island of Vestvagøy there were in 1968 only ten per cent of the milk producing farms with more than four dairy cattle (see Figure 7).¹³ Vestvagøy is somewhat unique in that many of its farms have subsidiary income from other farm animals like sheep, goats, and mink, and from seasonal fishing. Agricultural agents, however, suggested that an adequate profit could be insured if each farm increased its dairy herd to ten. In Evenes kommune, between Harstad and Narvik, dairying is much closer to being the only source of farm income. Of forty farms sampled only two had more than eight dairy cows (see Figure 31) while the local agent believes that twelve cattle is the minimum for adequate income maintenance. To account for the difference the agent identified the reluctance of the average farmer to break with social tradition by acquiring more cattle than the norm for his peer group. The threshold for encouraging social ostracism thus appears to be about eight dairy cows in Evenes.

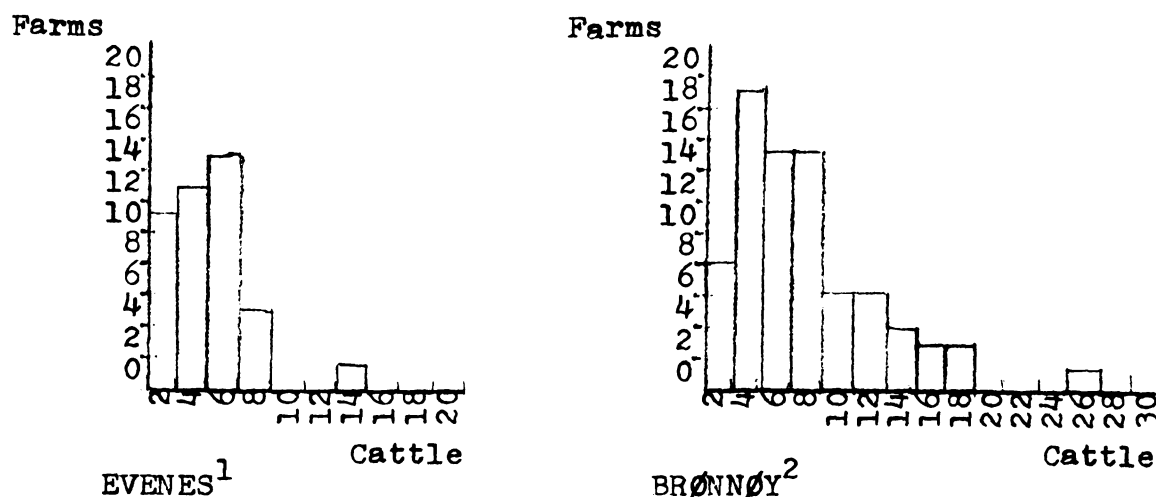
In the agricultural kommune par excellence of Brønnøy such a threshold is not as readily apparent. When inquiries were made concerning social barriers to agricultural expansion the county agents identified the past existence of a socially acceptable optimal limit in the size of the dairy herds,

¹³From a ten per cent sample of Vestvagøy's 781 milk producing farms.



FIGURE 31

FREQUENCY DISTRIBUTIONS OF DAIRY CATTLE
ON FARMS IN EVENES AND BRØNNØY



Source: Compiled by author

¹From a thirty-eight per cent sample of the 110 Evenes farms in 1969.

²From a 17.5 per cent sample of the 352 full-time farms in Brønnøy in 1969.

in this case up to twelve producing milk cows. But attitudes were in the process of change. The breakthrough came with the recent movement into full-time agriculture of a number of fishermen who had abandoned their occupation and remote island location. Relying apparently without reservation on advice from local agronomers they began to build dairy herds to an average size of thirty cows. In addition they build, with generous aid from the government, the necessary barns and purchased, often in cooperation, the necessary machinery and equipment. They are quite successful and are



looked upon with some envy by the older local farmers who are now forced to consider more closely the socially imposed restrictions if they wish to keep up.

While immigration may aid economic expansion by causing a crumbling of the existing local social barriers to progress, there is no doubt that outmigration acts in an opposite way. Selectivity in the migration stream insures a relative increase of those who would stand in strong support of the status quo. And the situation is further perpetuated through the apparent acceptance of local values by government employees hired to aid the farmers. On Vestvågøy, which has seen a decrease in dairy farms from 1263 (1963) to 781 (1968), agricultural agents believe ten milk producing cows will mean an 'economic' operation. In Evenes twelve to thirteen cows are deemed necessary; while in Brønnøy, where incidentally the physical environment is less marginal for agriculture, county agronomers favor a dairy herd of thirty cows.

Clearly the perception of what is desired and what is possible within given environments is conditioned by social organization, tradition, and value systems, which in turn are affected by the intensity and direction of migration streams. As Barth's model of social organization postulates, social change is not apt to occur and economic expansion be



initiated without conditions favorable for entrepreneurship.¹⁴ These are the conditions in which the marginal Nordland kommuner are notably lacking as evidenced by the continuing outflow of the people most likely to provide entrepreneurial leadership.

Migration and Political Structure

A brief discussion of some notions central to understanding political structure and party politics in Norway are necessary before investigating the impact of migration. Rokkan and Valen have identified a number of cleavages and alignments which through time have contributed to the emergence of five dimensions of conflict in the Norwegian political system.¹⁵ Four of these dimensions are of special interest to this study. They are:

1. Territorial opposition between the capital city and the provinces which at times extends to incorporate all center-periphery contrasts.

2. Socio-cultural conflict between the urban academically educated officials and the increasingly status

¹⁴ See Fredrik Barth, ed., The Role of the Entrepreneur in Social Change in Northern Norway (Oslo: Norwegian Universities Press, 1963); and Barth, Models of Social Organization.

¹⁵ Stein Rokkan and Henry Valen, "Regional Contrasts in Norwegian Politics," in Mass Politics, ed. by Erik Allardt and Stein Rokkan (New York: The Free Press, 1970), 192-93; see also Ulf Torgeresen, "The Trend Toward Political Consensus," Acta Sociologica, VI (1962), 159-72; and Stein Rokkan, "Geography, Religion, and Social Class: Cross-cutting Cleavages in Norwegian Politics," in Party Systems and Voter Alignments, ed. by Seymour M. Lipset and Stein Rokkan (New York: The Free Press, 1967), 367-444.



conscious rural peasants.

3. Religious opposition between liberal urban populations and the fundamentalist Lutherans of many rural districts.

4. Economic conflict between the buyers and sellers of primary products.

Northern Norway has traditionally stood out as peripheral and frequently radical in its political interaction with the urban south. Nordland rural kommuner as a result cannot be expected to reflect as strongly the urban-rural dichotomy underlying the dimensions cited above. The three left leaning parties of Labor, Socialist Peoples, and Communist, though normally considered urban and labor oriented, have been able to mobilize significant electoral resources in rural districts of Nordland. The strength of Labor, for example, departs little from fifty per cent of the vote (1965) in urban as well as rural districts. It was a finding of Rokkan and Valen that in the more peripheral areas of the North economic growth plays a minor role in changing party allegiance.¹⁶

Even so it may be expected that a positive relationship exists between the leftist parties (X2, X3, and X4) and migration (Y3 and Y4). The hypothesis is that the dynamic elements of the migration streams will enhance the position of the socially more conscious, if not radical,

¹⁶Rokkan and Valen, 204.



urban parties. Relating the migration variables described earlier in this chapter to the array of political party support of the 1965 elections provides only weak support for the hypothesis (see Table 18). Migration is only slightly related to the Labor and Communist vote, albeit positively. A relationship in the same direction but statistically even weaker exists for the party to the farthest right, the Conservatives (X5), traditionally a party of the business element and white collar employees.

Somewhat of a surprise is therefore the fairly strong correlation coefficient for the Socialist Peoples (X3), $r = .5374$. This is statistically significant at the chosen level of confidence. Urban places, to which people have been attracted, display a relatively strong support for the party of the radical left and anti-economic unionists. The relationship weakens to a relatively low r of $.3740$ for the 1967-1969 migration stream.

It is also hypothesized that areas affected by persistent outmigration will correlate with support for the more fundamentalist and rural parties of Center and Christian Peoples (X6). The hypothesis is fairly well substantiated for the early period (Y3), $r = -.4692$, but less well for the later period (Y4), $r = -.3742$. Further it is expected that the dominance of young women in the migration streams will relate to active female participation in the electoral process (X1). A positive but weak correlation coefficient exists, $r = .1759$, for Y3. Though the anticipated correlation



TABLE 18

POLITICAL STRUCTURE
VARIABLES, HYPOTHESES, AND RESEARCH FINDINGS

Dependent Variable	Independent Variable ¹	Hypothesized Relation	r	Significance Level
Y3	X1 VOTPAF65	Positive	.1759	.95
Y4	X1 VOTPAF65	Positive	.2968	.95
Y3	X2 LABOR 65	Positive	.1447	.95
Y4	X2 LABOR 65	Positive	.1576	.95
Y3	X3 SOCIPEP	Positive	.5374	.99
Y4	X3 SOCIPEP	Positive	.3740	.98
Y3	X4 COMMIE65	Positive	.1956	.95
Y4	X4 COMMIE65	Positive	.2069	.95
Y3	X5 CONSER65	Positive	.1775	.95
Y4	X5 CONSER65	Positive	.0185	.95
Y3	X6 CECHRIST	Negative	-.4692	.99
Y4	X6 CECHRIST	Negative	-.3747	.98

Source: Compiled by author

¹These are defined in Appendix B.

is strengthened for Y4 the coefficient, $r = .2968$, falls short of the adopted confidence level.

Irrespective of the lack of a clear spatial variation in the power base of most political parties in Nordland, two of the smaller parties do indicate a degree of regionalization along lines of economic development. So the migration process tends to strengthen the urban activist Socialist



Peoples as well as female electoral participation, while favoring the entrenchment of political traditionalism in the peripheral districts.¹⁷ Political dichotomies in Nordland of a center-periphery, or urban-rural, nature are in some degree affected by the migration process.

Migration is discovered to have a profound impact upon the conditions of life and livelihood in the marginal region. Time persistent net outmigration and migrant selectivity leads to a changing age structure which in turn causes population stagnation and decline. People move away from areas dominated by primary activities and low incomes with the net effect of debilitating the economy of the more peripheral districts. Migration clearly does not influence a redistribution of economic opportunity nor does it tend to even out existing spatial differences in economic prosperity. Instead the migration process enhances the persistence of social barriers to change in communities affected by persistent net outmigration. Once initiated the process tends to persist in strength and direction. Thus Nordland County's future appears to be one of continued net selective outmigration with an increasing role played by the central government in order to prevent further erosion of economic viability and political stability.

¹⁷This is also a conclusion in a recent study of political leadership in a North Norway peripheral kommune. See Kjellberg, "Politisk Lederskab i en Utkantskommune."



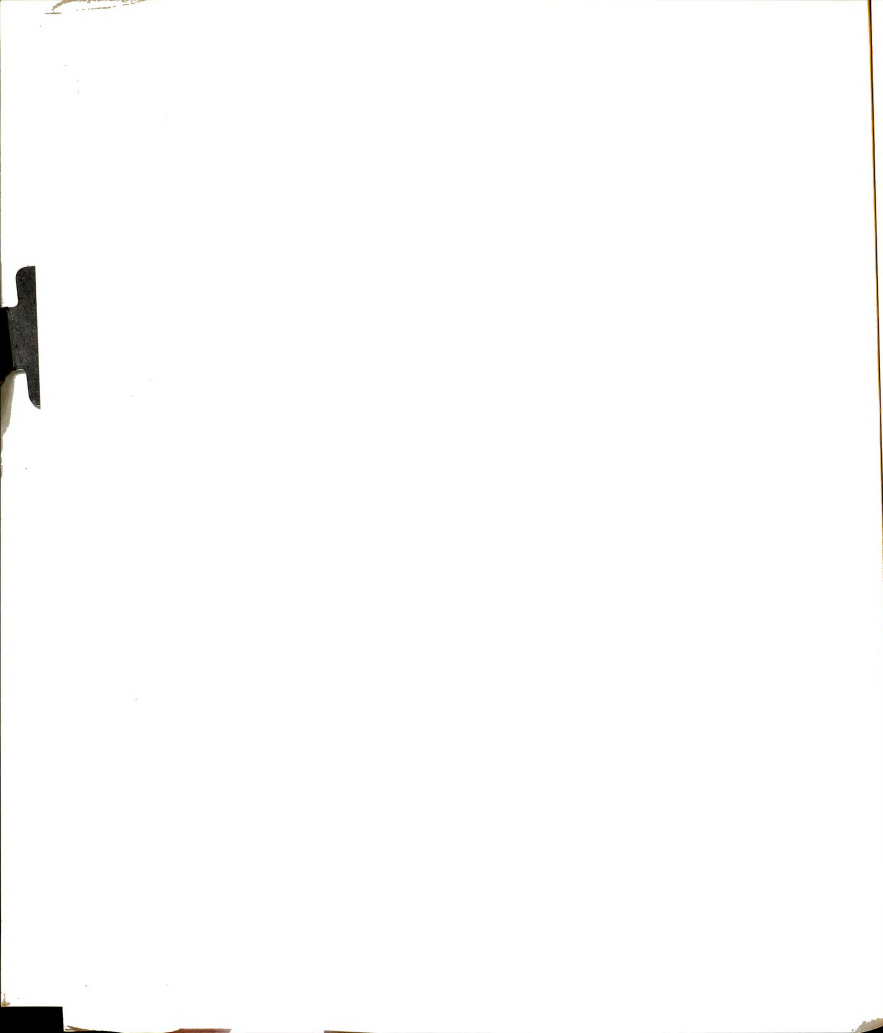
CHAPTER VIII

SUMMARY AND CONCLUSIONS

The central focus of this study is an analysis of human migration as a spatial process closely related to regional socio-economic development. Thus the following relations are postulated.

1. Migration in the economically marginal region is initiated or stimulated by a number of space-time persistent processes. Among these are industrialization, urbanization, and depopulation.
2. Migration is affected also by the decision making process as energized by public agencies in the pursuit of national or regional development objectives.
3. The depressed region is dominated by a recurring net loss of people due to migration.
4. As exemplified by this net outflow of people the migration process has important implications for spatial change and socio-economic development.

A main objective of this study is to assess the existence of the postulated relations within the chosen area of research, Nordland County, Norway. This county is considered representative of depressed areas within the technologically developed portions of the world. Generalizations deriving from this research therefore apply in



some degree to problems of regional development disparities in countries like the United States, the United Kingdom, and Finland, but are likely to apply with greater certainty to other marginal areas within Norway.

An initial set of generalizations relates to the character of recent migration streams in Nordland County. It was found that especially strong areal contrasts in mobility pattern existed for the initial portion of the 1951-1969 period of research. Rural areas contributed in a major way to the growth of industrial and other urban places. The period of rapid urban expansion reached a peak and most urban places have since experienced a net outflow of people to places outside the county.

It appears that the more industrialized communities, particularly those with a single industry emphasis, are most susceptible to an increasing rate of net outmigration in recent years. An important conclusion reached is that no manufacturing town has managed to attain the threshold of selfsustained growth. Resulting from the urban reexporting of incoming labor from rural areas the spatial contrasts in net migration patterns have weakened measurably. For the county this means that most urban places are now acting as migration funnels through which the county can expect to suffer increased losses of the better educated and more innovative part of its population.

In order to identify the major forces and processes influencing migration a comprehensive set of socio-economic,

political, demographic, and spatial variables are factor analyzed for two periods of observation, 1947-1962 (Phase I), and 1963-1970 (Phase II). Pervasive and time persistent dimensions extracted include demographic change, urbanization, and spatial variation in economic activities. Correlating these dimensions to patterns of migrations it is discovered, as anticipated, that the urbanization process is fairly strongly related to the patterns of migration. Migration streams tend to emanate from thinly populated and poorly endowed agricultural areas and move toward areas of larger population as well as those predominantly urban. Industrialization as an independent process does not play the expected strong role in directing streams of migration. Probably this is due to the gradual merging of this process with urbanization thus diminishing its direct and observable impact.

Human mobility is influenced in an extraordinary way through steps taken by the national government in its attempts to reach national and regional development objectives. In most situations the efforts to improve conditions of life and livelihood are encouraging an increase in the rate of net outmigration. This despite the prevailing wish for population stability in peripheral areas. Government removal grants, centralization of administrative, educational, postal, and other services, as well as improvements in accessibility and the amenity structure are all facets acting to enhance the conditions for outmigration.

Nordland County has for a number of decades been



one of the foci of a continuing government attempt at improving local economic circumstances. A variety of regional development schemes have been implemented through the years. The net effect has been to stimulate the urbanization process and thus the movement of unskilled labor from the more remote and rural areas to urban places. Here vocational skills are acquired and the labor force is increasingly attracted to opportunities in Southern Norway. There is a developing tendency to favor an overall decentralization policy in behalf of the depopulating peripheral districts and the overcrowding urban places like Oslo. But such a policy runs counter to the existing powerful spatial concentration and contraction of industry and business seeking to attain improved economies of scale.

Evidence gathered for this study indicates that a decentralization policy favoring a maintenance of the present settlement pattern will be inordinately difficult to implement. Anything short of an all out effort at stabilizing the population base of the marginal region will only encourage further outmigration.

It is obvious that migration itself influences spatial change in demographic, socio-economic, and political character. The degree of this influence is assessed by applying an outmigration spatial impact model to aspects of migration and spatial change in Nordland County. A substantial portion of the model is found to be well supported by existing conditions. Since migration here emerges as a distinctive

factor of regional disparity the research findings for the 1951-1969 period of analysis are briefly summarized below.

A. Migration and demographic structure.

1. Age selectivity in the migration process contributes to a youthful age composition in the area of net immigration and leaves the area of net outmigration with a relatively high percentage of older people.

2. Sex selectivity results in an excess of young males in areas of outmigration.

3. A persistent net outflow of people will eventually cause active depopulation due to the decreasing rate of natural increase ordained by age selectivity.

4. Migration contributes significantly to the population concentration process.

5. Migration once initiated tends to persist in direction and strength.

In sum, time persistent net outmigration in the peripheral area leads to a changing age structure which in turn causes population stagnation and decline.

B. Migration and economic activity.

1. People tend to move from areas dominated by primary activities to manufacturing and urban service centers.

2. Migration does not stimulate the hypothesized degree of increase in agriculture activity adjacent



to expanding urban places.

3. Migration influences an increasing concentration of those employed in primary activities, particularly fishing.

4. Urban places appear in general to have reached an optimum limit in industrial employment.

5. People move from areas of low per capita income to areas of greater prosperity.

6. With the more innovative and better educated part of the population leading the outmigration from the more peripheral areas migration does not tend to equalize spatial variations in income. The gap between the poorest and the wealthiest districts in fact is widening rather than closing.

8. Areas affected by persistent outmigration depend to an increasing degree upon retirement and social security payments.

In sum, migration discriminates among economic activity groups by pulling people from areas dominated by agriculture and fishing and depositing them in urban centers. This process has the effect of debilitating the economy of peripheral areas.

C. Migration and social change.

1. Selectivity in migration breaks up the traditional family organization of rural areas.

2. Outmigration is now a social tradition in many peripheral communities.

3. Areas of persistent net outflow of people are notably lacking in entrepreneurs and change makers.

4. Social change thresholds vary with intensity of outmigration.

5. Social barriers to change are affected by the immigration of innovative and resourceful people.

In sum, net outmigration enhances the entrenchment of social tradition and values while net immigration liberalizes social values and encourages change.

D. Migration and political structure.

1. The peripheral region displays unexpectedly strong contrasts in political party affiliation.

2. The hypothesis that selective migration will aid the position of the socially more conscious urban parties is not well supported.

3. A stronger relationship exists between areas of net outmigration and the concentration of fundamentalist and conservative voters.

4. Female electoral participation is positively correlated with a decreasing rate of net outmigration.

In sum, political differences of an urban-rural, center-periphery, nature are not related to the migration process in the degree anticipated.

Thus the peripheral region, as exemplified by Nordland County, exhibits a pattern of migration which aids the expansion of urban places at the expense of areas not



able to provide similar opportunities. The migration process affects negatively the conditions of life and livelihood in areas of persistent net outmigration and as such is a major factor leading to regional differences in economic and social welfare.

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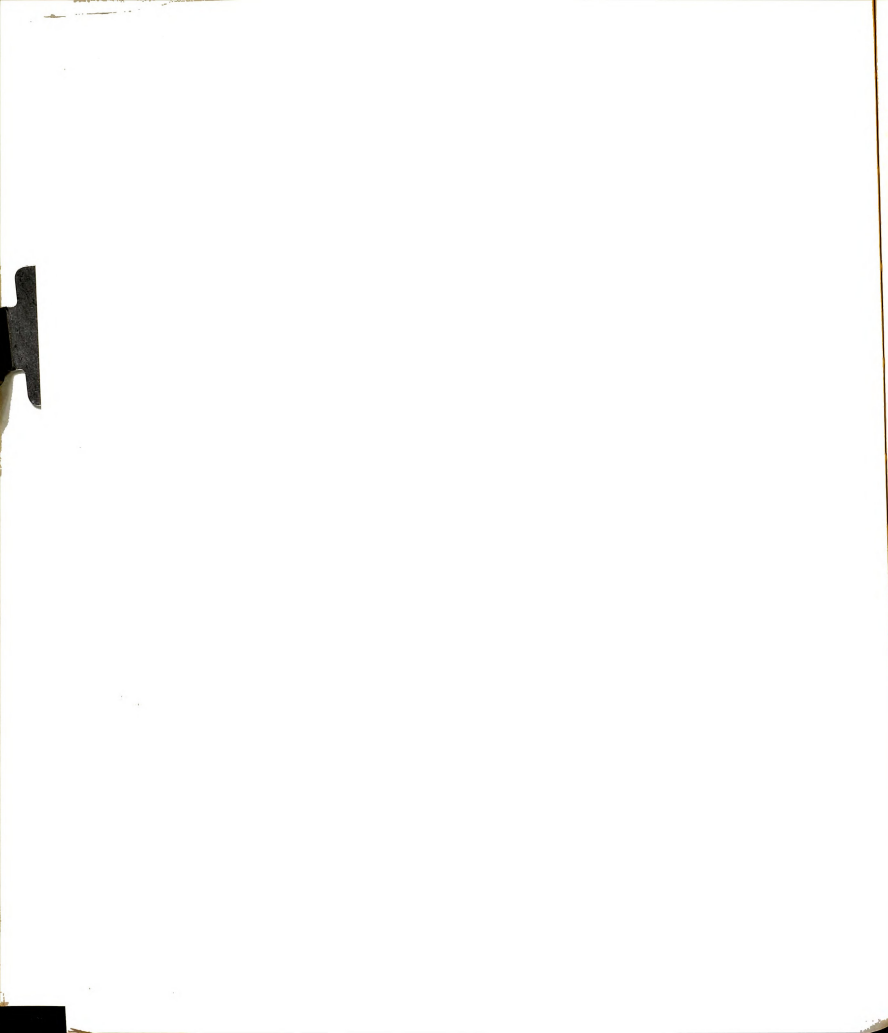
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APPENDICES



APPENDIX A



APPENDIX A

NORDLAND COUNTY: KOMMUNE AREA AND POPULATION CHARACTERISTICS, 1930-1960

			Total Population			Pro-mille Annual Ave. Net Migration	
Area (km ²)			1930	1950	1960	1951-1957	1957-1961
Helgeland							
<u>Coastal</u>							
1.	Brønnøysund ¹	4.6	1255	1422	1854	10.5	11.1
2.	Bindal	1452.7	2623	2930	2835	-14.6	-11.6
3.	Sømna	230.5	2513	2625	2396	-18.9	-19.9
4.	Velfjord	572.2	1572	1767	1473	-30.3	-19.6
5.	Brønnøy	139.1	2803	2816	2598	- 4.6	-19.6
6.	Vega	141.9	2414	2393	2188	-19.0	-19.8
7.	Vevelstad	516.5	999	989	938	-26.6	- 7.1
8.	Tjøtta	321.6	2205	2261	1942	-18.6	-25.7
9.	Herøy	60.0	2650	2694	2575	-16.4	-16.0
10.	Nordvik	111.5	1507	1523	1318	-33.7	-32.2
11.	Alstahaug	90.6	1569	1630	1492	-16.9	-22.3
12.	Sandnessjøen	44.7	2160	2467	3398	17.2	6.7
13.	Leirfjord	264.4	2018	2294	2015	-16.2	-23.9
14.	Dønnes	85.3	1493	1627	1543	- 2.9	-11.5
15.	Nesna	572.1	3349	3346	3106	-22.3	-23.2
16.	Lurøy	255.6	2665	2953	2893	-13.6	- 7.6
17.	Traena	15.0	625	663	669	- 2.4	-12.5



Area (km²) 1930 1950 1960 1951-1957 1957-1961

18.	Rødøy	685.6	2952	3040	2581	-15.9	-24.8
19.	Meløy	819.4	4682	6230	7275	- 9.4	5.3
20.	Gildeskal	626.5	4334	4756	4182	-10.4	-14.9

Interior

21.	Mo-i-Rana ¹	3.1	1340	4211	8348	18.5	61.5
22.	Mosjøen ¹	2.3	1967	3349	4649	17.5	24.1
23.	Drevja	186.0	964	1124	1001	-26.4	- 9.7
24.	Vefsn	1153.2	311	2610	4964	39.7	14.0
25.	Grane	1904.2	1746	1791	1704	-13.1	-18.7
26.	Hattfjelldal	2786.6	1437	1889	2031	4.9	-13.5
27.	Elsfjord	274.9	765	1008	895	-14.4	-38.0
28.	Korgen	596.7	1437	2421	3223	- 0.5	49.9
29.	Sør-Rana	736.9	1708	1927	1628	-25.0	-45.7
30.	Hemnes	1.7	1077	1307	1372	- 8.6	- 7.7
31.	Nord-Rana	3821.0	4584	7190	9308	25.6	6.1

Salten

South

32.	Bodø ¹	2.2	5142	7531	12618	12.6	34.4
33.	Beiarn	1191.7	2071	2199	1859	- 7.2	-26.0
34.	Saltdal	2092.0	3782	4758	4516	-13.0	-19.1
35.	Fauske	1115.2	7089	8036	8551	- 9.7	- 7.0
36.	Skjerstad	483.5	1932	2068	1930	- 4.1	- 6.7
37.	Bodin	623.7	6232	8145	9797	11.2	7.9
38.	Kjerringøy	167.7	728	699	620	-29.4	-12.3

Area (km²) 1930 1950 1960 1951-1957 1957-1961

North

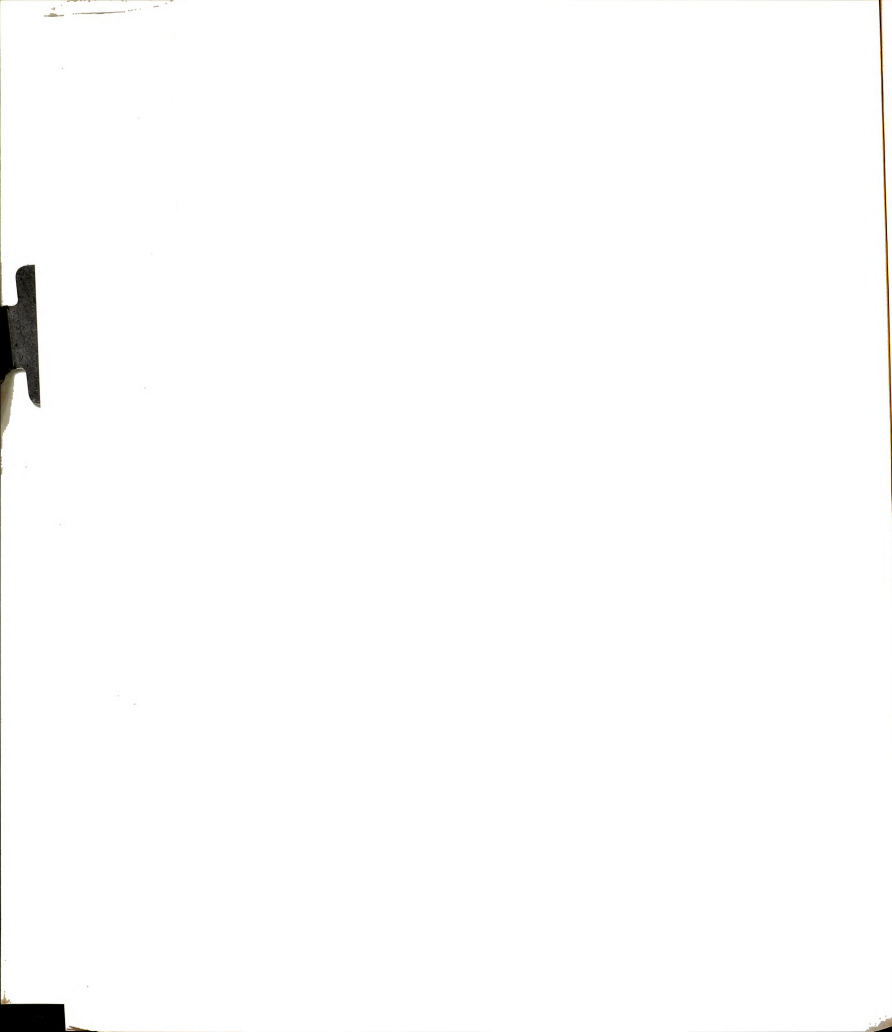
39.	Sørfold	1420.8	2908	3175	2913	-14.5	-11.8
40.	Nordfold	540.8	1500	1740	1547	-21.8	-23.8
41.	Leiranger	182.9	1212	1473	1427	-15.5	-10.5
42.	Steigen	244.0	2139	2109	1909	- 7.2	-24.2
43.	Hamarøy	1085.9	3303	3468	3188	-12.2	-10.9
44.	Tysfjord	1351.7	3058	3489	3256	-11.4	-14.1

Ofoten

45.	Narvik ¹	10.4	9920	10941	13311	1.9	7.1
46.	Lødingen	1000.0	3462	3819	4020	-16.4	-11.1
47.	Tjeldsund	218.1	1451	1654	1770	- 4.7	-14.7
48.	Evenes	235.7	2202	2608	2330	-25.8	-22.6
49.	Ballangen	452.1	3577	4173	3848	-20.1	-24.0
50.	Ankenes	1929.7	4666	5447	6024	- 7.8	2.1

Lofoten

51.	Svolvær ¹	6.8	2722	3412	3812	-19.6	- 7.1
52.	Røst	10.8	731	777	816	- 7.5	-18.8
53.	Værøy	17.7	941	1175	1218	- 9.8	- 6.8
54.	Moskenes	111.9	1618	2054	2066	-20.4	-11.8
55.	Flakstad	170.8	1722	1982	2060	-16.9	-17.6
56.	Busknes	98.6	3666	4604	4369	-15.8	-14.8
57.	Hol	66.7	2572	3194	3140	-16.4	-12.7
58.	Borge	182.8	4093	4496	4106	-17.0	-14.9
59.	Valberg	56.3	625	742	668	-19.5	-23.9



	Area (km ²)	1930	1950	1960	1951-1957	1957-1961
60. Gimsøy	179.8	1571	1786	1642	-16.2	-27.1
61. Vaagan	273.3	4623	5468	5083	-18.5	-13.9
Vesteralen						
62. Hadsel	692.9	9901	11096	10421	-11.4	-12.7
63. Bø	200.8	4884	5856	5585	-19.5	-14.3
64. Øksnes	253.2	2714	3327	3382	-13.3	-17.8
65. Langenes	98.6	1323	1891	2083	-13.0	-18.1
66. Sortland	411.0	4768	5494	5932	-10.8	-10.2
67. Bjørnskinn	298.6	1617	1947	1908	-15.8	-18.2
68. Dverberg	260.7	1573	1672	1678	- 6.9	- 8.0
69. Andenes	66.3	2350	2720	3396	11.2	7.7
Nordland	37,990.0	221,700				
		186,920	237,193			

Source: Various publications of the Norwegian Census Bureau
and author's own compilation.

¹Incorporated urban place.



NORDLAND COUNTY: KOMMUNE AREA AND POPULATION
CHARACTERISTICS, 1965-1970

			Total Population		Pro-mille Annual Ave. Net Migration	
	Area (km ²)	1965	1970	1964-1966	1967-1969	
Helgeland						
<u>Coastal</u>						
1. Brønnøy	1203	8,758	8,718	- 9.0	- 8.8	
2. Bindal	1296	2,432	2,374	-17.6	- 7.9	
3. Vega	161	2,179	2,012	-13.9	-14.7	
4. Vevelstad	530	854	790	-28.3	-16.8	
5. Herøy	62	2,827	2,615	-23.0	-17.8	
6. Alstahaug	408	6,303	6,389	-13.0	- 9.1	
7. Leirfjord	452	3,648	2,419	-17.8	-19.3	
8. Dønna	193	2,504	2,310	-23.9	-18.7	
9. Nesna	202	1,020	1,891	-10.6	-23.9	
10. Lurøy	262	2,746	2,703	-15.7	-12.5	
11. Traena	15	650	597	-19.0	-15.7	
12. Rødøy	871	2,479	2,292	-14.3	-22.0	
13. Meløy	706	7,537	7,244	- 9.8	-19.5	
14. Gildskaal	664	3,880	3,520	-22.9	-20.5	
<u>Interior</u>						
15. Vefsn	1683	12,549	13,423	1.1	- 1.4	
16. Grane	2017	1,777	1,717	-26.7	-10.7	



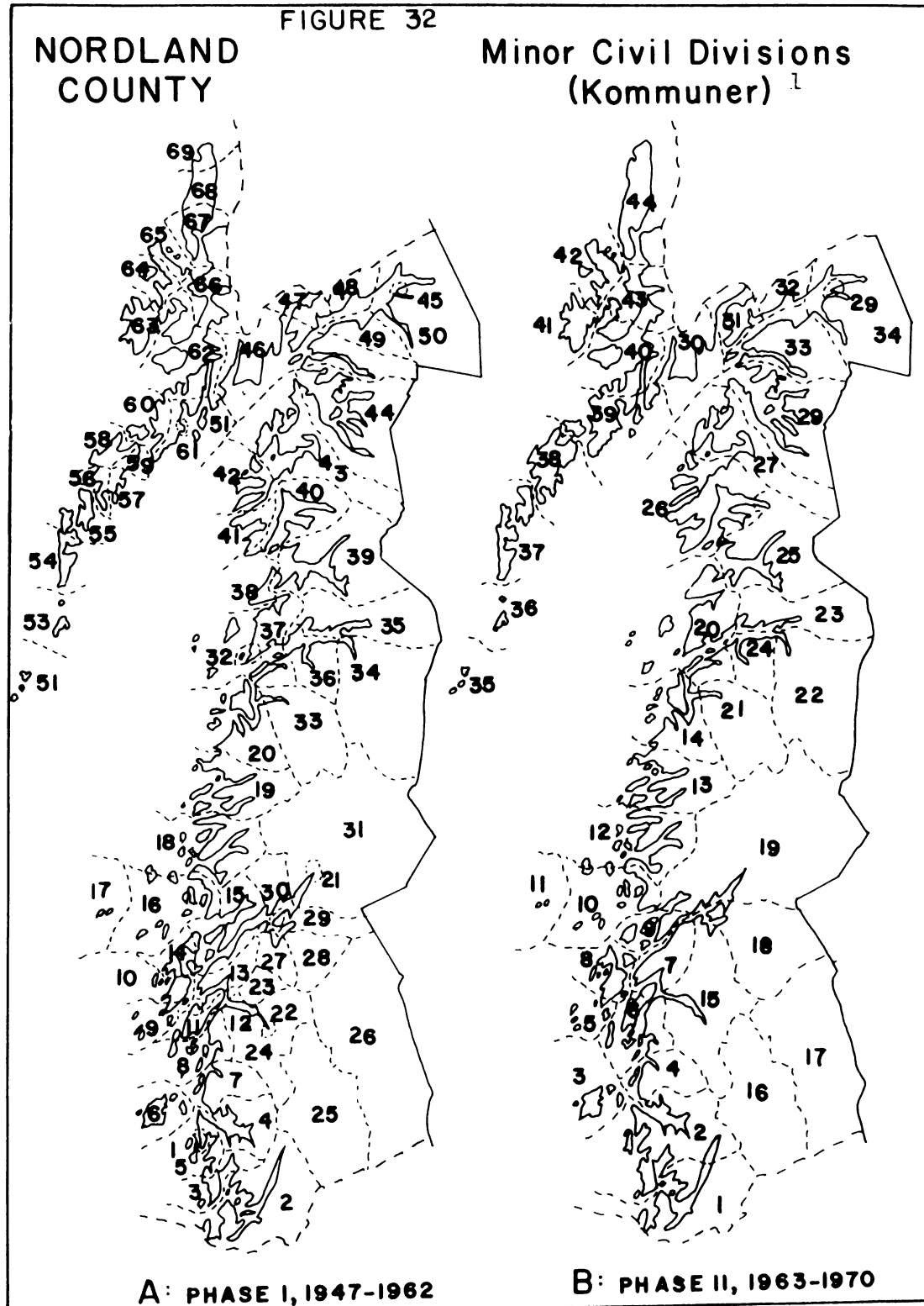
	Area (km ²)	1965	1970	1964-1966	1967-1969
17. Hattfjelldal	2682	1,948	1,800	-24.9	-21.7
18. Hemnes	1605	5,395	5,232	-22.1	-12.1
19. Rana	4462	24,116	26,109	20.7	- 7.5
20. Bodø ¹	475	26,458	28,445	0.4	0.1
21. Beiarn	1223	1,867	1,777	-21.0	-12.1
22. Saltdal	2213	4,380	4,238	-14.5	-10.8
23. Fauske	1208	8,350	8,742	- 2.6	2.4
24. Skjerstad	465	1,715	1,622	-20.7	-12.7
25. Sørfold	1693	2,390	2,846	- 9.6	- 5.6
26. Steigen	987	4,505	4,083	-14.9	-20.6
27. Hamarøy	1032	2,897	2,494	-20.1	-26.4
28. Tysfjord	1463	3,195	3,000	-20.4	-14.7
Ofoten					
29. Narvik ¹	13	13,514	13,297	- 9.7	-12.1
30. Lødingen	531	3,207	3,128	-17.9	-15.0
31. Tjeldsund	317	2,096	2,004	-19.3	-13.1
32. Evenes	242	2,104	1,860	-18.6	-28.5
33. Ballangen	930	3,811	3,344	-37.5	-23.3
34. Ankenes	930	6,287	6,690	5.8	- 2.2
Lofoten					
35. Røst	11	820	802	- 3.2	-22.8
36. Vaerøy	18	1,196	1,152	-11.4	-25.8
37. Moskenes	300	4,075	3,972	-18.2	-16.3
38. Vestvågøy	422	12,056	11,540	-19.1	-16.2

	Area (km ²)	1965	1970	1964-1966	1967-1969
39. Vaagan	477	10,196	9,721	-16.4	-16.5
40. Hadsel	566	8,793	8,828	-12.8	- 7.0
41. Bø	248	5,461	4,978	-22.8	-23.4
42. Øksnes	317	5,188	5,311	- 5.4	-10.6
43. Sortland	577	7,257	7,215	-11.3	- 8.1
44. Andøy	659	7,463	7,968	- 0.9	- 1.0
Nordland	37,990	243,423	243,312 ²		

Source: Various publication of the Norwegian Census Bureau and author's own compilation.

¹Incorporated urban place.

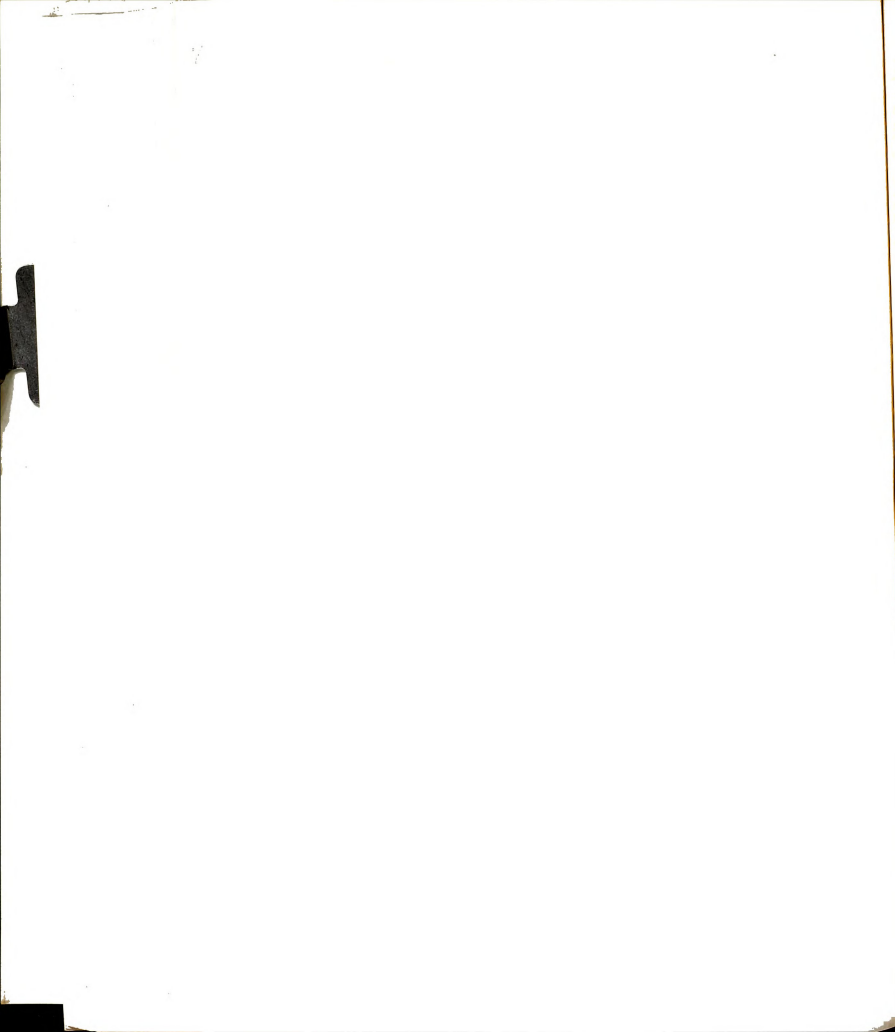
²Preliminary census. Corrected census not available in time for use in study. Corrected census gives the Nordland population total as 243,179 in 1970; the difference between the two figures are not analytically significant.



¹Numbers identify the location of kommuner listed in preceding pages of Appendix A.



APPENDIX B



APPENDIX B

VARIABLES USED IN STATISTICAL ANALYSES PHASE I, 1947-1963

<u>Designation</u>	<u>Description</u>
	Demographic:
TOTPOT50	Population, 1950
TOTPOP60	Population, 1960
OLDPOP60	Percentage population aged 60 ⁺ , 1960
GROWRATE	Average annual rate of natural increase, 1960-1962, per 1,000.
POP5060	Percentage population change, 1950-1960
POPM5060	Percentage male population change, 1950-1960
POPF5060	Percentage female population change, 1950-1960
POPSTAB	Percentage population residing in <u>kommuner</u> of birth, 1960
MOBILE 1	Average annual net migration, 1951-1957, per 1,000
MOBILE 2	Average annual net migration, 1957-1961, per 1,000
SPINSTER	Percentage unmarried adult females, 1960
	Socio-economic Characteristics:
AGFO60	Percentage employment in agriculture, 1960
FISH60	Percentage employment in fishing, 1960
MANF60	Percentage employment in manufacturing, 1960
RETAIL60	Percentage employment in retail and wholesale, 1960
TRANS60	Percentage employment in transportation, 1960



SERVIC60	Percentage employment in private and public service, 1960
RETIRE60	Percentage supported by retirement funds, 1960
INCPC57	Per capita income, 1957
GROSALPC	Per capita grocery sales, 1963
GROSABUS	Grocery sales per business, 1963
FARMS49	Number of farms, 1949
CULTIV49	Cultivated land, 1949
MECH59	Per farm expenditure of gas and oil, 1959
SPECED60	Advanced education 15 years or older, 1960
Socio-economic Change:	
AGFO5060	Percentage change in dependency upon agriculture, 1950-1960
FISH5060	Percentage change in dependency upon fishing, 1950-1960
MANF5060	Percentage change in dependency upon manufacturing, 1950-1960
INC4757	Percentage change in per capita income, 1947-1957
INC5765	Percentage change in per capita income, 1957-1965
INC4765	Percentage change in per capita income, 1947-1965
WEAL4757	Percentage change in total wealth, 1947-1957
FARM4757	Percentage change in number of farms, 1949-1959
CULT47-57	Percentage change in cultivated land, 1949-1959



Spatial Characteristics (location, connectivity, and densities):

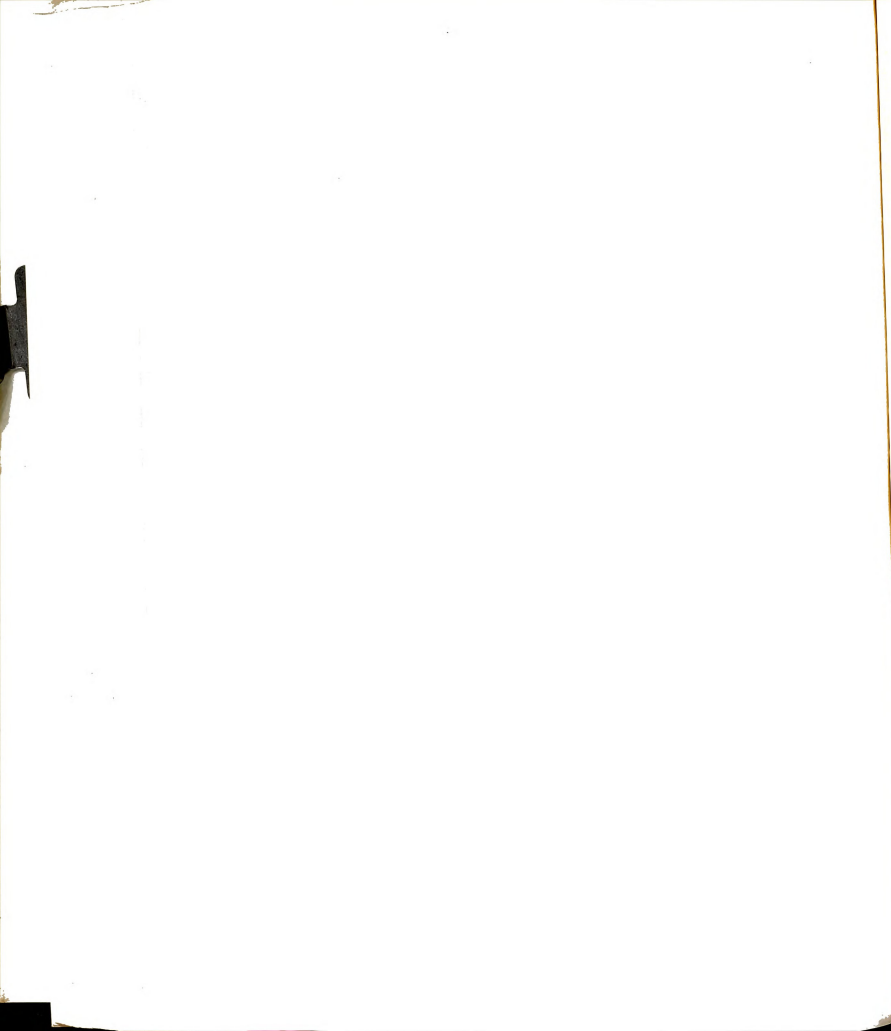
ROAD59	Percentage of farms with year round road access to nearest urban center, 1959
SCHOLCHIL	Children per school district, 1951
POPOST61	Population per post office, 1961
POPBUS63	Population per retail business, 1963
LATITUDE	Latitudinal midpoint
LONGITUD	Longitudinal midpoint
Political Characteristics:	
LABOR51	Percentage Labor Party representative, 1951
AGRAR51	Percentage Agrarian Party representatives, 1951
CONSER51	Percentage Conservative Party representatives, 1951
CHRIST51	Percentage Christian Peoples Party representatives, 1951
LIBERA51	Percentage Liberal Party representatives, 1951
APOLIT51	Percentage non-party affiliated representatives, 1951
VOTPAF51	Percentage female voting participation, 1951

PHASE II, 1964-1970

<u>Designation</u>	<u>Description</u>
Demographic:	
TOTPOP69	Population, 1969
YOUTHNES	Age group, 20-29, as percentage of age group 60+, 1966
OLDPOP67	Percentage 60 years and over, 1967
MFRATIO	Male-female ratio, 1966



GROWRATE	Annual average rate of natural increase, 1966-1968, per 1,000
POCH6570	Percentage population change, 1965-1970
MOBILE 3	Annual average net migration, 1964-1966, per 1,000
MOBILE 4	Annual average net migration, 1967-1969, per 1,000
MIGCHILD	Percentage of outmigrants in 0-14 age group, 1967
MIGYOUNG	Percentage of outmigrants in 15-29 age group, 1967
MIADULT 1	Percentage of outmigrants in 25-34 age group, 1967
MIADULAT 2	Percentage of outmigrants in 35-44 age group, 1967
MIOLDAGE	Percentage of outmigrants in 45+ age group, 1967
	Socio-economic Characteristics:
HOUSEPUR	Expenditures per household, 1968
PERINCPC	Per capita income, 1965
PERESALE	Retail sales per capita, 1967
PERSATAX	Per capita sales tax, 1969
RETSABUS	Retail sales per business, 1967
NEWFLOW	Newly cultivated land, 1968
AGROAD	New agricultural roads, 1965-1969
DEVELAID	District development loans, 1952-1968
FISH66	Volume fish catch, 1966
PERCFISH	Per capita fish catch, 1966
PRIVASPC	Per capita private assets, 1965
CORPASPC	Per capita corporate assets, 1965
PROFIT63	Percentage retail business profit, 1963



SALEAREA	Sales per m ² retail business floor area, 1963
GSSALECH	Percentage change in grocery sales, 1963-1967
POPBUS67	Population per retail business outlet, 1967
	Spatial and Political Characteristics:
LONGITUD	Kommune longitudinal midpoint, 1967
LATITUDE	Kommune latitudinal midpoint, 1967
LETTER65	Letter pieces per post office, 1965
NHITRANS	National health insurance transportation costs, 1967
VOTPAF65	Percentage female voting participation, 1965
LABOR65	Percentage Labor vote, 1965
CECHRIST	Percentage Center and Christian Peoples vote, 1965
CONSER65	Percentage Conservative vote, 1965
COMMIE65	Percentage Communist vote, 1965
LIBERAL	Percentage Liberal vote, 1965
SOCIPEP	Percentage Socialist vote, 1965









MICHIGAN STATE UNIVERSITY LIBRARIES



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