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THE GROWTH AND DEVELOPMENT OF SINGLE-ENTERPRISE COMMUNITIES: THE CASES OF YELLOWKNIFE AND WHITEHORSE

by

GEORGE BUSE

A THESIS

SUBMITTED TO THE FACULTY OF GRADUATE STUDIES AND RESEARCH

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ABSTRACT

Single-enterprise communities because of their perceived social problems, have been studied primarily by sociologists. Over the past five years, a new philosophy has emerged which suggests that these communities are not merely short term bunk camps, but are a viable part of the settlement frontier. Part of this philosophy also recognizes that in order to make these northern areas viable, there must be a greater awareness of the quality of life in these communities.

This thesis examines a model of single-enterprise development from an urban geographic perspective. The model, developed by J.A. Riffel, takes into account the fact that single-enterprise communities go through distinctive stages in urban development, each stage having unique social, demographic, and economic conditions. This study examines the model by utilizing two case studies to verify the existence of stages in the growth and development of single-enterprise communities.

The study examines the communities of Yellowknife and Whitehorse, and includes several other single-enterprise communities to exemplify various stages of the model. These investigations provide the basis for a new model of single-enterprise community development.

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Linda Abbott diligently and patiently typed the many drafts of this manuscript. My wife and family, whose support brought me to this point, must also be recognized. I would like to thank the Boreal Institute for Northern Studies, for providing a grant to collect the necessary information. I am endebted to the Government of Alberta which allowed me two months of education leave to complete this thesis.

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I. INTRODUCTION

Canada as a relatively new state is still experiencing settlement in its frontier areas. These frontier areas can be thought of as one distinctive type of ecumene or inhabited region. Canada as a whole has been described in terms of four types of ecumene, each having distinctive population, settlement and economic characteristics. (Putnam and Putnam, 1970, 6) and (Gertler and Crowley, 1976, 256)

The concept of ecumene, used by geographers to mean inhabited land, or inhabited space, was applied to Canada as early as 1960 by Roman Gajda. Most maps of Canadian ecumene are based on Gajda's paper of 1960 "The Canadian Ecumene - Inhabited and Uninhabited Areas." Gadja (1960) suggested that the Canadian ecumene consists of five zones. Hamelin (1966) revised the terminology used to describe these five zones and suggested that a water ecumene could also be added to this classification scheme.

Hamelin (1978) in reviewing the concept of Canadian nordicity, defined as "...the state of level of being polar in the Northern Hemisphere", suggested a more appropriate zonation of Northern Canadian ecumene would consist of four zones. The Extreme North, the Far North, the Middle North, and the Near North. (Hamelin, 1978, 70-84). The three sets of terminology basically refer to the same zones and are as follows:

	Gajda 1960	Hamelin 1966	Hamelin 1978
Zone 1	Intensive	Bloc	Near North
Zone 2	Extensive	Broken	Near North
Zone 3	Exploitation	Pioneer Frin	Middle North
Zone 4	Sporadic	Sporadic	Far North
Zone 5	Non-ecumene	Unattractive or Repulsive	Extreme North

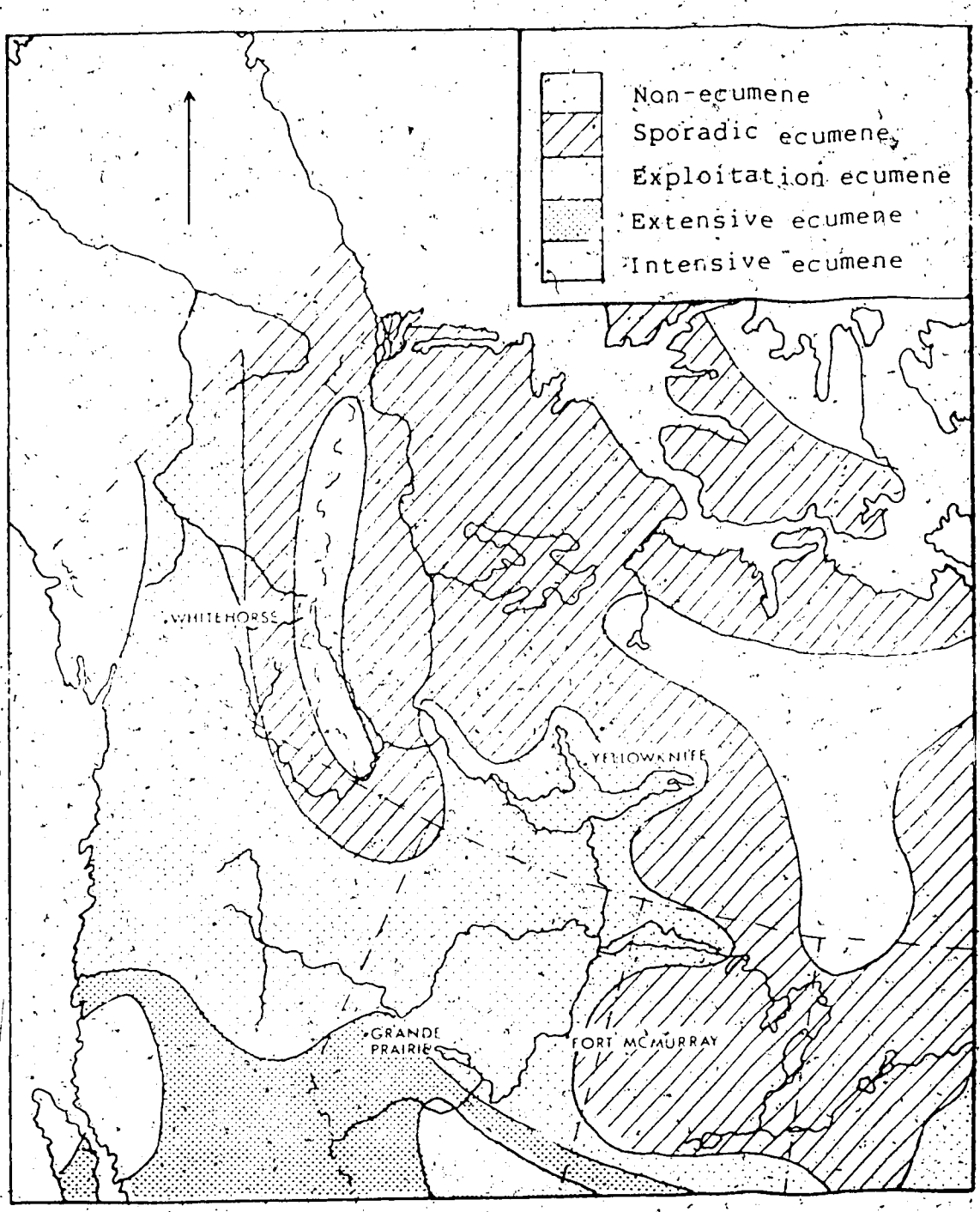
Hamelin basically collapsed Zone 1 and 2 into the " category called "the Near North and Core Ecumene" Zone 3 corresponds roughly to the Middle North ; the Far North corresponds to Zone 4 the sporadic ecumene and the Extreme North corresponds to the Non-ecumene. Because Hamelin utilized an averaging technique for his 1978 map, the Middle, Far and Extreme North are more regular and less detailed than either Gajda or Hamelin's earlier maps. Hamelin identified a minimum of eleven areas which are anomolies within his classification scheme. These anomolies point to a serious methodological shortcoming in Hamelin's work as any classification scheme must follow its criteria once they are set.

Due to this shortcoming Gajda's original concept of ecumene will be utilized in this thesis. It should be noted that Hamelin's concept of denordification is recognized as a

potentially valuable concept and the model which will be investigated in this thesis fits within the concept of denordification or changing the relative nordicity of given locations.

Gajda's core ecumene consists of a narrow belt of densely settled area close to the U.S. border. (See Figure 1) This intensive ecumene has a wide variety of communities of differing population size, an extremely productive agriculture base and a wide variety of employment and occupational choice. Zone 2 and 3, which are the areas of ecumene with which this thesis is concerned, are both resource based areas. Zone 2, sometimes referred to as the extensive ecumene, or more recently resource exploitation zone, is settled according to the distribution of resources. Arable land is found in widely dispersed areas and the communities are most often the result of a single industrial enterprise. Zone 3, the sporadic ecumene, is characterized by the same features as Zone 2 but virtually no agricultural potential exists. Zone 4, the non-ecumene, consists of the high Canadian Arctic, and encompasses the most northerly parts of Canada.

Zone 2 and 3 are unique due to the single-enterprise economic base of the communities, but are also distinctive because the location of resources in these regions requires that completely new towns be built to house the labour force. (Pressman, 1974, 79) Although the extension of settlement into these areas is haphazard and widely



Adapted from Gajda 1960

Figure 1

Northern Ecumene

dispersed, emphasis is shifting from concern for the individual community as an entity unto itself to a concern for broader regional patterns.

The involvement of government has seen a shift to settlement and development programs with a regional emphasis. Pressman, (1974) and Riffel, (1975) identify that this shift in emphasis has brought with it a demand in these settlements and regions for an improved quality of life. This emphatic expression of whites and natives for improved living quality is evident in single-enterprise communities where residents demand single-family housing at subsidized rates before committing to move to these communities. (Riffel, 1975, 18)

It is most likely that the quality of life issue has come to the forefront in these communities for two reasons. Firstly, the quality of life in these communities in the pre-1970's has been perceived as being particularly low. It should be noted that this thesis does not deal specifically with quality of life issues. Quality of life is mentioned here only because quality of life was a catalyst for Riffel to develop the model under consideration.

The second and perhaps more important trend has been the societal shift identified by W.W. Rostow (1960). As Canadian society evolved it has moved through four stages of growth, each with a unique ethic. The movement from pre-industrial with subsistence as its guiding ethic through industrial growth with production as the guiding more, to a

mass consumption stage guided by predominantly consumption and growth and finally to the post-industrial society, where quality of life has become the primary guiding moral principle. With the increased technological requirements of resource extraction, the specialization of the labour force and greater awareness of issues such as quality of life; industry can no longer dictate the living conditions of its employees in these northern frontier regions.

The quality of life in single-enterprise communities is therefore a current issue which has impact upon the settlement of the Canadian north and the potential for planning urban complexes with new economic, demographic and social structures. Before these futuristic urban communities can be planned there is a requirement for a greater understanding of single-enterprise communities and the development process through which they pass. These communities can no longer be thought of as monolithic, static fixtures in isolated areas but must be considered as dynamic, evolving parts of a regional settlement pattern.

This thesis examines single-enterprise communities from this new philosophical perspective: denordification. This thesis attempts to provide evidence of the dynamic nature of single-enterprise communities by providing quantifiable evidence of the evolution of single-enterprise communities through distinctive economic, demographic and social stages of development. Although the model, which will be presented later, refers specifically to resource town development it

will be expanded to include all types of single-enterprise communities, because resource communities are but one type of single-enterprise community. (Institute of Local Government, 1953, iii)

As this is the first attempt to quantify this urban model, the economic, demographic and social characteristics will be examined independently to determine if the seven development stages hypothesized by the model have distinguishable economic, demographic and social characteristics.

Although the basic objective of this study is to identify changes in demographic, economic and social characteristics related to urban development, the study holds implications for single-enterprise communities and the future of these communities in the region. The interrelationships of communities in regions, which are spatial phenomena, cannot be understood without first examining the dynamic growth and development of these urban communities. Without understanding the changes occurring during urban development, regional planning and development are not only impractical, but are virtually impossible.

II. LITERATURE REVIEW

A. INTRODUCTION

This chapter provides a theoretical framework for this thesis. The literature review touches upon existing single-enterprise community studies, a more philosophical discussion of models in general and a more detailed description and critique of the model being tested in this thesis.

B. SINGLE-ENTERPRISE COMMUNITY DEVELOPMENT

Popularly considered to be 'researched to death', Siemens points out that: "From a search of the literature one quickly notes that most of what has been written about Canada's single-enterprise communities has been of a popular rather than a scientific nature." (Siemens, 1973, 1) The romance of frontier areas has been largely responsible for the popular slant on these studies. But a new interest in the character of these communities has come from the realization that they are to be a permanent feature of our national life. "Hitherto, they were often regarded as temporary settlements, as lumber and mining camps which could be abandoned as the resources were consumed." (The Institute of Local Government, 1953, 1)

The single-enterprise community, as distinct from the resource community, the new town, or the planned community, is described best by the Institute of Local Government.

> These are communities which have come into being by reason of the decision or action of a single-enterprise, be it an industry, a government agency, a defense establishment or a transportation system. Neither the long accepted term 'company town', with its unfortunate connotation, nor the more recent term 'new town', which has a specialized meaning seems to meet the need adequately. (The Institute of Local Government, 1953, iii)

This is not to say a single-enterprise community cannot be a new town, a resource community, or a planned community. The term single-enterprise is used here to be inclusive of resource communities. Since new towns are a planning tool, they are normally comprehensively planned, are used to accomodate rapid population growth, and also have the sanction and support of the government. Single-enterprise communities, therefore, need not be planned nor be new towns. In the majority of cases resource communities are new towns by virtue of their remote location and rapid growth.

The Institute of Local Government (1953) study Single Enterprise Communities in Canada, was one of the first comprehensive studies of single-enterprise communities. The study identified 175 single-enterprise communities with a population totaling in excess of 189,000. Although the study was oriented towards the planner and policy maker, there was a recognition of the complex nature of these communities. This early study, despite its emphasis on planning, policy and administration, recognized that these types of communities had social needs.

C. STUDIES EMPHASIZING CLASSIFICATION AND TYPOLOGY

Nine years later the next major study of single-enterprise communities appeared. Robinson (1963), studying Kitimat, Drayton Valley, Elliot Lake, and Schefferville, was more concerned with the physical layout than the social problems of these communities. Dealing only with one type of single-enterprise community, the industrial new town, Robinson presented a discussion of the problems with life in these new towns. Robinson used historical development to devise a typology of resource communities. Three distinct types of communities were described.

The first type was resource towns which consisted of bunk or tent camps, limited to providing room and board to the workers engaged in extracting the resource. Once the resource was exhausted these communities were either abandoned or if they were portable enough they were simply moved to the site of new unexploited resources. These camps consisted of a cookhouse, bunk houses and tents. (Robinson, 1963, 4)

The second type of resource town which evolved was the company town. This type of resource town was owned and controlled by the parent company. Not only were the resources owned by the parent company but the housing, stores and all available services were owned and controlled by the single-enterprise sponsor. Much of the negative criticism of company towns has been on the basis of company control of the employee's non-work hours. (Robinson, 1963,

5)

The third type of resource town to appear in Canada was the comprehensively planned new town. Robinson, (1963) and Lucas, (1971), both agree that this type of resource community was brought about by several developments, including the advance of technology, the negative connotations of the company town, and the tremendous financial investment required to build the industrial plant and community.

Concomitant to improved technology was a need for skilled, highly qualified manpower. Typically middle-clas this labour force brought with it a strong family orientation and middle-class expectations and mores. It has become imperative that these communities provide facilities and services conducive to modern family life. This skilled labour force demanded higher order services if they were to be permanent residents of these communities. This change in the type of labour force required to extract resources, has created demands for urban services and institutions more typically found in the core of Canada's ecumene.

Shaw (1970) classified resource communities as either planned or unplanned communities. Studying the differences between planned and unplanned communities, Shaw found no evidence to suggest the planned community was a better place to live. Shaw's (1970) study was the first study of single-enterprise communities that presented a detailed analysis of the demographic characteristics of these

communities. Shaw dealt specifically with resource communities, a particular kind of single-enterprise community.

Although Shaw's study failed to prove that planning community made it a better place to live, it did recogn that modern resource communities have changed. The mode single-enterprise communities are planned communities. T change was a response to a number of factors. The negati image of the company town, the drain on corporate financ required to build the community, and the articulation of citizen demands for improved quality of life forced corporations to recognize the need for community plannin

Neither Robinson's (1962) historical development classification nor Shaw's (1970) planning dichotomy appe to completely satisfy the entire spectrum of single-enterprise development.

Lucas (1971) provided a comprehensive study of industrial towns from a sociological perspective. Minet Milltown, Railtown made three important contributions t study of single-enterprise communities. First, the study articulated an argument that communities of single-enterprise were very similar to non-resource base communities with a population of less than 30,000. Secon Lucas incorporated into the literature some of the findi of classic American studies of single-enterprise communities. Third, Lucas (1971) provided a model of community development which emphasized the social aspect

community development rather than the physical development. Lucas proposed a four stage model based on twenty years of comprehensive social study.

Stage I, construction of the community, was typified by mobile construction workers, immigrant newcomers, tradesmen, and get rich workers. Lucas (1971) stated these unstable construction groups were the first inhabitants of the single-enterprise communities. Some of the construction workers remained in the community when the permanent citizens arrived.

During the second stage, the recruitment of citizens, the single-enterprise company recruited employees from other parts of the company as well as outside the company. For a period of time the community experienced high mobility due to isolation, a lack of facilities, and the unmet expectations of single personnel and wives of married men. This transient population was generally very youthful. The other characteristic which became apparent during this stage was the ethnic affiliation of the immigrants. (Lucas, 1971, 69)

The transition stage was the transfer of community control from the company to the population. The responsibility for the management and administration was decentralized and diffused. The citizens assumed both responsibility and authority for the community.

Maturity, the fourth stage, was achieved with the passing of time. New interpersonal relationships developed,

mobility was significantly reduced, with older people retiring in the community while youth was forced to emigrate due to the stable labour force in the community.

The model which Lucas proposed is based on the demographic changes of a single-enterprise community. Lucas does not consider the possibility that some single-enterprise communities attract other industries and diversify the economic base. The model does not take into account that there may be a native population in the vicinity of this community, nor does the model present the impact which the single-enterprise has on the native culture and society. As Morrison (1977) points out, the native population experiences culture shock when the single-enterprise community intrudes into the native society.

D. STUDIES EMPHASIZING QUALITY OF LIFE AND MOBILITY

The first studies undertaken by the Center for Settlement Studies at the University of Manitoba were quality of life and mobility studies. Matthiasson (1970) examined resident perception of quality of life in Fort McMurray and also released a second study on resident mobility. Since the central theme of this thesis does not revolve about quality of life, studies emphasizing quality of life will only be mentioned as they relate to issues within the scope of this thesis.

Of the mobility studies published by the Center, two studies are significant: Matthiasson's "Resident Mobility in Resource Frontier Communities: An Examination of Selected Factors", and Jackson and Poushinsky's "Migration to Northern Mining Communities: Structural and Social-Psychological Dimensions". Matthiasson (1971) found that 77 per cent of respondents came to Fort McMurray because of employment opportunity. Sixty per cent of the sample also indicated employment as a primary reason for staying. Jackson and Poushinsky (1976) verified this finding when studying four Ontario mining communities. Respondents indicated they left their previous communities because there was little future in jobs held there.

Nickels, *Et al.* (1976) similarly concluded that the employment of the male head of the family was the primary determinant of migration to Lynn Lake, Manitoba. This study also revealed that the males' job satisfaction was the primary determinant of retention in the community. Porteus (1976) found three predominant reasons for moving to single-enterprise communities: 1) the drive to get rich quick; 2) the newcomers couldn't make it elsewhere; and 3) attempting to change to a new way of life.

Riffel (1975) integrated some of the literature on single-enterprise communities and explained the apparent inconsistencies in the literature. Lucas (1971), for example, states that the single-enterprise community is comprised of young married population, while Robinson (1962)

stated the resource community is predominantly male. Riffel states that the community is comprised of both elements. During the early construction stages the community is dominated by single men who migrate to the community in search of the 'fast buck'. The permanent work force, who do not appear in the community until the construction is mostly complete, are predominantly young married couples with young families.

Doyle (1976) examined four mature single-enterprise communities including Whitehorse. In these mature communities, over 75 per cent of the respondents were married and were born in Canada. Most of these families were nuclear and had some children. Almost half of the sample studied were recent movers within the community and had moved to the community within the last five years.

Mobility and migration are signs of population turnover. An associated economic variable is labour force turnover. Although they are not necessarily related in the case of single-enterprise communities, where employment is the predominant reason people come to the community, it is highly likely that labour turnover is strongly related to population turnover. The information on turnover is inconclusive. MacMillan *Et al*, (1974) found an 80 per cent labour turnover rate among 196 companies surveyed. A conflict of personal and company goals was recognized by Jackson and Poushinsky (1971) whose study identified the goal of the company as high profit, the goal of the

community to provide services and the goal of the individual to maximize achievement of individual values. The expectancy levels of each of these groups in goal attainment leads to conflicts and a need for compromise in the community, since the maximization of any one of these goals brings all these goals into conflict.

Morrison's (1977) study of Grande Cache presented an articulate argument that a number of stressers were at work in negatively affecting the population of the new town of Grande Cache. Morrison found the Metis population to be suffering from culture shock and a general animosity seemed to be at work between the various ethnic groups in the community. Drinking was not merely a recreational event but was a means to temporarily relieve the stress. (Morrison, 1977, 225)

Gartrell (1980), in his study of Fort McMurray described and analyzed the social and personal adjustment of the town people and found a highly mobile population, a high dependency ratio, a high proportion of married adults, and a relatively transient population. Gartrell found a high proportion of subsidized housing and very high intra-urban mobility. The research recorded some service delivery problems, notably in medical care and entertainment. With an average family income in excess of $24,000 a year it is not surprising that the population expects better service delivery and demands local opportunities to spend their money.

Although the literature on single-enterprise communities is prolific there are a number of inherent problems with this type of research. First, little research on social impact has been conducted with regards to interpersonal and family adjustment. Second, many single-enterprise community studies emphasize quality of life and community satisfaction. Third, where questionnaires were administered they resulted in data which were not comparable.

Finally, and most importantly, there is an obvious lack of theory. Theory provides the limits and organization of a field of study, giving credibility to selection of variables, interconnection of variables and facilitates explanation and prediction. Without a theoretical framework, studies of single-enterprise communities will continue to be descriptive, providing little in the way of explanation or solution to the problems these communities face.

E. MODELS AND GEOGRAPHY

Urban geography as a part of geography overlaps with many other urban oriented sciences. As a discipline urban geography purports to describe and explain areal differentiation within urban areas and within urban systems. (Yeates and Garner, 1971, 1-6) Carter (1972) states that urban geography concentrates not on process but on consequence. If urban geography concentrates only on consequences or resulting morphology, then it would make the

discipline entirely descriptive and lacking explanatory powers. There is a growing recognition that urban places are not only in continual flux, but that the morphology of cities must be explained through other systematic studies such as economics, sociology, history or political science. In order to describe and explain, urban geography must, of necessity, be multi-disciplinary in nature and focus on both consequence or spatial pattern and process. (Berry, 1964; Murphy, 1966)

This thesis, through the use of a model will attempt to describe and explain the spatial organization and development of a particular type of urban place, the single-enterprise community, keeping in mind the necessity of utilizing other systematic studies.

The use of models in geography is not new but appears to have gained a more central place in geographic study in the 1960s. The foremost work in this area was produced in the 1960s and is synthesized in Chorley and Haggett's Models in Geography (1967). The definition of models chosen by Chorley and Haggett was devised from work by Skilling in 1964. Taking a broad universal view of models, Skilling argued that models can be theories, laws, hypotheses or simply structured ideas. Put another way, models are man's simplified and intelligible portrayals of a rather complex world. "According to this view, reality exists as a patterned and bounded connexity which has been explored by the use of simplified patterns of symbols, rules and

processes." (Meadows, 1957, 3-4) Much like reality, models as a structured reflection of reality, must reflect the dynamics of the situation they portray.

As reflections of urban reality, geographic models as applied to urban places must be dynamic, incorporating change because urban places grow and decline in accordance with economic, demographic and social changes in society. Due to the multi-disciplinary nature of urban geography it is central to any urban geographic model that it consider those factors which came to bare in producing urban pattern.

Models have a number of characteristics and functions. First, models represent selective information reflecting the connectivity of some significant aspects of reality. Second, models are structured, seeking out pattern in some relationship. Third, models are suggestive, tempting us to formulate new hypothesis and drawing out our intuition or Gestalt knowledge. Finally, models must be applicable to other similar occurrences in reality. (Chorley and Haggett, 1967, 23-24)

The functions of models are many, but one of their most important functions is intellectual in enabling a phenomenon to be comprehended where the reality is too complex to grasp. Models perform an organizational function by providing a framework for the definition, collection and ordering of information. There is also a logical function to models, through the explanation and prediction of phenomenon. Models perform a normative function by comparing

some phenomenon with a more familiar one. (Hutton, 1953, 285-6) The constructional function of models is derived from the fact that they form stepping stones to theories and laws. Models and theories are closely linked. (Theobald, 1964, 260) The major difference between theory and model is the degree of probability with which they predict reality.

One last function of models, and a very important one, is the cognitive function. The use of models in teaching and research to communicate scientific ideas must not be underestimated because communication of knowledge is central to science. Communication leads to new ideas and a furthering of science. Communication is "not a matter of merely the sociology of science, but is intrinsic to its logic; as in art, the idea is nothing till it has found expression". (Kaplan, 1964, 269) The argument can logically be extended to say the expression is nothing unless it is comprehensible by others. Models are therefore extremely important in science when they can be used as tools of communication.

Models have themselves been classified and modelled, (Chorley, 1964, 44), and have been divided into descriptive and normative models. Descriptive models, represent a systematic description of reality, while normative models involve substitution of a more familiar situation for a less familiar one. Descriptive models, which are the concern of this thesis, are either static, concentrating on structural features in equilibrium, or dynamic, centering on process

and function over time. Suppes (1962) stated that descriptive models concerned with the organization of empirical information can be data, taxonomic or experimental design models. The model to be described later in this chapter is a conceptual model, describing the dynamic process of single-enterprise community development. The model is a classification (taxonomic) model because it simplifies the development process by describing it in stages.

Models have been used in urban geography for many years, but the pervasive view among urban geographers that the discipline is concerned more with consequence than process has resulted in urban geographic models being static in nature, reflecting the urban landscape at a point in time.

Models on an inter-urban scale, despite the recognition of urban places as dynamic, have been of a static nature. The exception has been urban growth models based on economic concepts. Two such models are the Multiplier Effect Model (Tiebout, 1956) and An Evolutionary Model of Settlement Growth proposed by Martin (1969). The Multiplier Effect Model assumes the function of a city is economic and population size is directly tied to economic growth and follows what Myrdal (1957) called "the principle of circular and cumulative causation." Although this multiplier concept was developed to explain metropolitan growth it can no doubt be applicable to smaller communities.

Martin (1969) utilized a dynamic model and integrated the basic non-basic concept into a stage model which is essentially a long run theory of internal growth. The growth of urban areas distinguishes three stages:

1. The stage of original implementation.
2. The stage of linked implementation and extended economics.
3. The metropolis stage.

During Stage One, firms choose an urban area for reasons other than the size of existing population or the presence of other firms. During Stage Two, new firms locate in the urban area because of the earlier settlement of other firms. The third stage shows external diseconomies and a proliferation of non-basic service industries aimed at serving the urban population.

Although both of these models are dynamic they have a number of deficiencies from an urban geographic perspective. First, these models explain only industrial location (economic growth) as it relates to total population growth. There is no emphasis in these models on the social, demographic or political aspects of the urban process. Second, neither model states a consequence or links the model to a number of definite spatial outcomes or landscapes. Finally, the communities which will be dealt with in this thesis are included within Martin's initial stage.

Before presenting Riffel's Model of Resource Town Development, it is worthy to present a note on the pitfalls of model building. Although models can provide a means of making a complex world seem understandable, a number of problems also come to the forefront. Simplification can lead to covering up significant facts which are important to the overall system being modelled. In structuring models after the real world there must be a continual guard against spurious correlation. The suggestiveness of models must be carefully thought out as it could lead to improper prediction. The use of analogy in models must be continually questioned to ascertain if the analogy is in fact an unjustifiable leap into another domain. Chorley and Haggett suggest that these dangers are problems "of overemphasis on symbols, form, simplification, rigor and prediction." (Chorley and Haggett, 1964, 26) Finally, models in research and science require continual updating or discarding as they are outdated. This statement applies to urban geographic models as well.

Given these pitfalls of model building, what criteria are essential in an urban geographic model? First and foremost, an urban geographic model must be dynamic, reflecting the nature of urban places. The model must deal not only with process, but also with consequence; what is the resulting urban morphology. The model must include all relevant significant factors in order to stimulate further evolution of the model.

F. THE DEVELOPMENT MODEL

Riffel's model of resource communities is significant to the study of geography because the model is dynamic, recognizing the change which occurs in urban communities. The emphasis of Riffel's model is process rather than consequence providing the potential for prediction. Although Riffel does not deal specifically with morphology or consequence it is implied in his seven stages.

Riffel, examining the quality of life in single-enterprise communities suggested that these communities passed through seven developmental stages which have different economic, demographic and social characteristics encompassing much of the three stages identified by Robinson. These seven stages are as follows:

I) Natural or pre-discovery,

II) Prospecting, discovery, exploitation and survey,

III) Industrial and community construction,

IV) Industrial operation and community improvement,

V) Industrial and community operation, including expansion of secondary and service industries,

VI) Community diversification,

VII) Community maturation. (Riffel, 1975, 12-13)

Riffel hypothesizes that each stage will have a different set of economic, demographic and social characteristics. It should be noted that not all communities will or can pass through all seven stages. Some communities will become "frozen" at some stage of development or may

fluctuate between an operating stage and an expansion o
secondary and service industries stage. From a planning
perspective each stage in development, with its varying
demographic, economic and social characteristics, requi
entirely different services to deal with them.

The seven stages as hypothesized by Riffel will no
discussed in terms of the expected economic, demographi
social characteristics of each stage. Figure 2 provides
synopsis of the model and a guide to the description wh
follows. Riffel makes several points about the model wh
should be mentioned at the outset. First, single-enterp
communities do not necessarily follow an orderly patter
from the first to the last stage of development and may
subjected to periods of boom and bust, regressing to an
earlier stage of development then recovering to later
stages.

Second, movement through the stages has been left
chance and no deliberate attempt to plan for the stages
the corresponding characteristics and required services
associated with each stage has been made. The maturity
occurs only after a significant time, perhaps as long a
three generations. It is important to note that no stag
suggested as optimum and no value judgement is attached
the "goodness" of any stage. The result or objective fo
communities is not necessarily maturity. For example, t
may be a resource so isolated yet important that it mus
extracted. If no regional population or communities exi

Figure 2
Stages and Characteristics of Resource Town Development

Stages of Development	Economic Characteristics	Demographic Characteristics	Social Characteristics
I Natural or Pre-discovery	No economic activity or only hunting and fishing by native peoples.	No population or only small bands of native peoples.	Unpopulated or small, isolated native communities in limited contact with white society.
II Prospecting to Survey	Short-term activity. Money spent "outside." Traditional native economy persists, with some trade with whites.	Short-term, summer residents. Young men, no women. If there originally, native people in the majority.	Isolated. Usually, access by air only. Shack towns without amenities. Some contact with native peoples.
III Industrial and Town Construction	The first boom period. Mushrooming economic activity. Natives may be employed.	Mostly single men me young workers with families. Very high turnover rates. Native in minority: only stable group in population.	Isolated, but easier access to outside. Trailer towns with basic amenities, and "pub." Signs of social problems among native peoples.
IV Industrial Operation and Community Improvement	Shift in construction from industrial to residential and commercial. More money spent in town. Falling off in employment of natives.	Slowing rate of turnover. Increasing number of married workers. Native peoples a small minority.	Improvement of housing and community facilities. Completion of roads and communications services. Reduced social problems among whites. Increased among natives.
V Industrial and Community Operation	Construction over. Services established. Much of labour skilled. Few natives employed.	Turnover rates reduced to 60 per cent. Young married workers in majority.	Amenities well developed. Few social problems among whites but boredom among wives. Natives on welfare. Marked stratification.
VI Community Diversification	Stabilization of industry. Expansion of other services. Small manufacturing.	Labour turnover stabilizes at 35 per cent. Young married in majority.	Employment for wives available. Special programs, created largely for native peoples.
VII Community Maturity	Diversified economic base. Limited opportunities for expansion.	Balanced population structure in terms of age and sex. Low rates of turnover.	Sense of community and belongingness. Whites and natives on welfare. Less racial tension.

Adapted from: J.A. Riffel, 1975, pp. 12-13.

and the resource will be exhausted in five years, then the community will never advance beyond the industrial and town construction stage. The model is important in a planning and geographic sense since it implies that the regional context must be considered when each community is planned.

I. The Natural or Pre-discovery Stage is characterized by a lack of economic activity or if any exists it consists of hunting, fishing and trapping by native peoples. Demographically the area has little or no white population and perhaps small bands of native peoples. The social characteristics are typical of small isolated native communities in unpopulated areas. These communities usually have little contact with white society.

II. The Prospecting to Survey Stage is typical of short term activity and consists of survey crews, seismic crews, or a team of geologists collecting information about resource potential. This information is typically sent back to the metropolis where it is evaluated, and if favorable, land is assembled and various regulatory agencies contacted for permission to proceed. The majority of the money is spent in the southern metropolis. Typically this stage is characterized by settlements of non-permanent residents, usually summer, with very few if any women. If there was a native settlement at the site, then the natives will be in the majority. Socially, the conditions are far from perfect, being accessible only by air, the community is isolated, perhaps even desolate, and is typically comprised of

temporary housing structures, such as tents, temporary bunkhouses or shack towns with no amenities. There may be some contact with the native population.

III. The Industrial and Town Construction Stage is the first boom period. A decision has been made to extract the resource and regulatory bodies have approved the industrial construction. The economy mushrooms from nothing to one requiring a very large labour force and huge injections of capital. If natives were in the area they may be employed, usually in unskilled labour jobs. The area still consists primarily of men, but if housing is available, some workers with families will be present. Labour turnover rates during this stage are very high and the only stable group in the population, if present, is the native minority. Socially the area is still isolated but access will be easier, e.g., perhaps a road will have been built to bring in the necessary industrial equipment. The community will consist largely of mobile homes, some services may be available, and most likely a "pub" or beer parlor will be in full service. Native peoples may begin to exhibit social problems.

IV. The Industrial Operation and Community Improvement Stage is typical of a shift from industrial to residential and commercial construction. The major economic investment shifts from the industrial site to the town site. Labour turnover rates are still high but have slowed. Married workers, normally the work force of the industrial plant, begin to move into the community, bringing their families.

Native peoples become a small minority usually segregated to an area of town. Socially, there is an improvement in housing and community facilities. Roads, communication services, and medical facilities are completed. Social problems among whites begin to decline, while they are increasing among the native population.

V. Industrial and Community Operation is typical of a highly skilled labour force, a reduction in employment in native and manual labour. The construction boom is over and the community and services are established. The majority of the community is comprised of young married workers with young children. Labour turnover rates may be reduced to 60 per cent but population is still highly mobile. The community amenities are well developed, but lacking opportunities for employing wives. The community displays signs of social stratification, and the native population have become almost entirely removed from the labour force, and are mainly on welfare.

VI. Community Diversification shows stabilization of industry, an expansion of available services, primarily government. Some secondary industry or small manufacturing has entered the community. Labour turnover will remain relatively high but stabilize at about thirty five per cent. The community will still consist of a young married population. One of the most significant characteristics of this stage is the expansion of employment opportunities and the increased opportunity for wives to work. Special

programs may be created to assist native peoples. This is also the stage when social problems become apparent. The bored housewive with "bush fever" or psychosis is typical.

VII. Community Maturity shows a diversified economic base with an expansion to at least two major industrial employers. The economic expansion of the community will be very limited. The population structure will be balanced in terms of age and sex, and low turnover rates will be the norm. Socially there will exist a sense of community and belongingness. The residents will be more committed to the community as their town or community. Welfare recipients will include more whites and racial tension will be lowered.

In earlier portions of this Chapter reference has been made to planning. Urban planning is closely related to urban geography in that both are concerned with urban morphology. While planning is a deliberate attempt to bring about a desired state or morphology; urban geography is concerned with all aspects of urban places. As modern single-enterprise communities are planned communities a discussion of planning in single-enterprise communities follows.

In terms of planning it is worthy of mention that responsibility for planning the community changes rather dramatically over the development stages. The traditional pattern of responsibility for planning has been as follows. The corporate body or industry has the highest level of responsibility for planning in the early stages. As the

community progresses through the stages this responsibility is diminished and almost completely depleted in most cases, when the industrial operation is in full service. Lucas (1971) calls this stage transition. The responsibility for planning which is borne by the community itself or some government agency, is working in completely the reverse manner. The early stages of development are characteristic of low government and community involvement and as the community moves toward maturity there is an increasing responsibility for the community's planning.

Most of the community or government involvement in planning, will occur when a community complete with infrastructure, services, and housing will be inherited, perhaps with little or no concern for regional settlement patterns, quality of construction, or long term debt problems, from the single-enterprise parent. Richardson in Plan Canada (1963) says it best

> This failure to consider Kitimat as anything but an expedient design, however competently, to meet the exigencies of an immediate practical problem has in fact been apparent from its very inception. Consider the circumstances; here was a town established in a region with a great and almost untouched store of natural resources, a town confidently expected to be the largest in hundreds of thousands of square miles, yet next door to another (Prince Rupert) which had been founded only a few decades earlier amid even rosier hopes only to become a shabby fishing community. But almost no thought was given to its prospects as a regional centre, almost none, in fact to the eventual settlement pattern of the region or to the appropriateness of Kitimat's location from this point of view, or even from the point of view of the eventual development of resources other than hydroelectric power. Here was a site that met the requirements of the company for the production of aluminum; that was sufficient. Its

> suitability in terms of the future economic development or human settlement of the region was simply not a relevant consideration. (Richardson, 1963, 120)

Even though no comprehensive plan using the model has been developed, one study and one plan have at least implicitly utilized some type of staged development approach. Richardson, albeit not working in this framework, identified the similarity of the development of these two communities despite the fact that Kitimat was planned and developed some fifty years after Prince Rupert. Perhaps the most significant thing which comes from the article is the need to consider the regional context of the single-enterprise community, its relationship to the settlement pattern and its future integration into the settlement pattern. The fact that neither community achieved its planned destiny resulted not from poor planning but from poor economic planning.

Richardson states that economic planning and regional planning should be viewed as "two sides of the same coin." (Richardson, 1963, 122). Corporate enterprises generally are concerned with the profit and loss statement of their company, and regional development is well beyond the responsibility and interest of the corporate body. The development of single-enterprise communities demands more than a plan for housing a workforce, but also requires regional planning which in turn requires public participation, initiative and responsibility.

In order to achieve regional goals it is necessary to understand and plan the development of communities not in isolation but in relation to each other and this implies comprehensive regional planning. In order to achieve regional planning goals it is critical that the single-enterprise community, its growth, development, and regional contribution be understood and planned. Particularly in areas of resource exploitation such as the exploitation ecumene. Not every community will be able or should be planned as a regional center, but to leave the development of regional centres to chance will have catastrophic impact on the settlement pattern, and perhaps a result which is not entirely desirable.

The second example of the use of a development model and an attempt to integrate a single-enterprise community into the development of a regional settlement pattern is the community plan for the development of Leaf Rapids, Manitoba.

Regenstreif (1977) identified three stages in the community plan for development. Stage A, with a population of 900, included all the essential community functions. Infra-structure was in place. Stage B, with a population of 1500, allowed for increases in the existing residential, recreational and retail-commercial facilities. Stage C, with a population of 3500, allowed for a highway bypass and increased residential facilities. This stage brings the community to the limits of capacity and the community plan is essentially completed. Although the planning for stages

in development considered the regional context of the community, the community was not planned to reflect the varying economic, demographic and social changes which are presented in Riffel's model.

G. CRITICAL EVALUATION OF RIFFEL'S MODEL

Riffel's Development Model is a conceptual model, representing an idealization of resource based community development. As a conceptual model it reflects the multi-disciplinary approach to urban geography, emphasized by Yeates and Garner (1971). As a conceptual model, Riffel's model, has sprung la e from intuition and some observed results reported by other authors.

Riffel's model, conceptual in nature, is only the first step of the analog reasoning process and like most conceptual models is too complex to handle. The model must now be subjected to further simplification by discarding extraneous information to discern the simplest and most significant aspects of the process being modelled. The verification which will be attempted in this study is an attempt to simplify Riffel's model throught the reduction of extraneous information in the conceptual framework.

The *Natural or Pre-discovery Stage* is very poorly documented in terms of the three characteristics Riffel uses to describe each stage. This stage could be better described as a non-stage, as there is no population, no economic activity and without population there can be no social

interaction. Even when native populations are present they are most often nomadic and have little or no impact on the location of the single-industry or the single-industry town.

The *Natural or Pre-discovery Stage* is important, however, in as much as the native population experience the greatest degree of culture shock when their bio-physical, social and cultural environments are changed. When the bio-physical environment is changed it often changes the native economy by pollution of rivers, disruption of wildlife migration patterns and the like. Morrison (1977) studying Metis culture shock in the community of Grande Cache, found that the Metis were capable of handling the culture shock during the Natural or Pre-discovery Stage by limiting the duration of contact with white society and through close support relationships with family members.

Although Riffel recognizes the importance of environment it is lacking from his model. The harsh climate of many northern communities, the limited soil development in many areas and the issue of pollution of potential recreation areas are an obvious oversight in this stage of development. Physiography and geology are important aspects of this stage of development, but are lacking from the discussion of the model.

Another missing component of the model in all stages is the urban consequence, or resultant urban pattern. Riffel's use of such adjectives as small, limited, isolated, reduced, and balanced detract from the model's usefulness and make it

difficult to quantify. These terms lend a rather loose subjective interpretation to the stages of development.

The economic characteristics which Riffel attributes to this stage should also include trapping and guiding. Natives are also often engaged in construction or bush work for periods of short duration. Perhaps the most important social characteristic of this stage has been missed completely by Riffel. The amount and type of contact with white society is controlled by Natives. The importance of the family as a support mechanism is also missing from this development stage. (Morrison, 1977, 192-194)

The *Prospecting to Survey Stage* in Riffel's model is similar to the *Natural or Pre-discovery Stage*. The impact of development is minimal since the economic activity is short term. The Natives see the activity as non-threatening because of the short-term, limited disruption of their traditional economy. Their ability to limit contact or withdraw to their family for support further reduces the threat. Morrison (1977) states that in the pre-town stage "One of the primary functions the family seemed to fulfill was providing psychological support. ... home where a person could relax without constantly having to worry about someone (Euro-canadian) telling them what to do." (Morrison, 1977, 194)

Using the example of Grande Cache, this stage lasted some forty-seven years with very limited impact on the area. The tar sands of Fort McMurray show a similar pattern, in

that the sands were discovered in the late 1800's and could not be developed until the late 1960's, when technology was developed to process the tar sands and the international economy made processing cost effective. These first two stages could perhaps be grouped together and using Morrison (1977) be termed as pre-town or pre-industry stage.

The *Industrial and Town Construction Stage* as described by Riffel, is riddled with descriptors such as mushrooming, very high, mostly, stable, basic, and easier. (Riffel, 1975, 13). The problem this generated is that they all conjure up very subjective connotations. What is easier access, what comprised basic amenities, what are signs of social problems, what does mostly single men mean? Intuitively, these descriptors fall well within our stereotype of single-enterprise communities. Riffel has not defined any parameters in this or any of the other stages, nor has he defined concepts such as 'labour turnover', or 'social problems'.

Riffel's fourth stage, *Industrial Operation and Community Improvement*, would seem to be a part of stage three and the major difference appears to be a shift of construction from the industrial plant to the community. Although Riffel seems to imply that the completion of roads and communications are social characteristics, it would seem more logical that these roads are being completed to service the industrial entity and reduce the cost of supplying the community. This is not to suggest that improved access to

other areas would not have a social impact.

It would seem more logical that these two stages be grouped together, as a construction phase. This would also give a more definable time frame for the stages as the start and finish of construction are more easily understood. This would also provide more definite milestones which could define chronological frames for studying the development stages.

The *Industrial and Community Operation Stage* is signalled by the end of construction and the establishment of services. This stage, like the others suffers from the use of vague and ill-defined descriptors. Riffel also states that the turnover rates are reduced to sixty per cent. Any rate must also specify the time frame. For example, sixty per cent turnover in a year is high, but sixty per cent turnover in five years is low. Labour turnover must also be clearly defined and in this case it has not been.

Riffel identifies boredom among wives as a major social problem. Often referred to as bush fever, this myth has been dispelled. Nichels *Et al.*, (1976) in their study of psychoactive drug usage found that the use of psychoactive drugs was seasonally higher in winter but not higher among females. MacKinnon and Neufield (1972) found that there were a myriad of problems in northern living but they were problems for both sexes. MacKinnon and Neufield (1972) found some evidence of anxiety and depression but no evidence to suggest boredom was the cause of the depression.

Lucas (1971) identified a transition stage during responsibility for planning and administering the comm was turned over to the community.

The *Community Diversification Stage* is described having a stabilized industry. When in fact a new or se industry is being added through industrial diversifica often government. Riffel may have been trying to sugge that the single-enterprise industry stabilizes. Riffel suggests that labour turnover stabilizes at thirty-fiv cent. Once again the time frame of this turnover is mi- The availability of employment for wives also seems to conflict with the stabilization of industry. The stage '*Community Diversification*' implies change, yet parts the stage description suggest stability, or maintenanc an existing balance. This research will suggest that t stage is a dynamic stage with significant changes in industrial composition, population change and social implications.

Community Maturity is not clearly defined by Riff Maturity must be clearly articulated because of its rat subjective nature. Riffel states that a sense of commun and belongingness is achieved. Unfortunately, this cann measured effectively. There is also the problem that th gemeinschaft type of society very rarely develops in ou gesellschaft oriented post-industrial society.

In terms of economic differences from the communit diversification stage, maturity does not appear to have

significant differences. Riffel states that this stage has a balanced population structure in terms of age and sex. It is not clearly stated what a balanced age-sex structure is or should be. Riffel also states that racial tension is lessened during maturity. No evidence is presented to support this statement, nor is any mention made during earlier stages that racial tension exists or comes into being at some prior stage of the model.

H. SUMMARY

Riffel's model, although it is attractive intuitively, it is weak because of its lack of documentation and rather subjective description. The model is also attractive because of its synthetic nature and the need for dynamic models in urban geographic research. The model does not deal with the geographic aspect of development or the urban consequence.

The model appears to be what Chorley (1968) calls the first step of model building, conceptualization. Riffel has attempted to go beyond this stage by introducing some observed results - high turnover, racial tension - without first going through the second step of model building.

Despite its shortcomings, the model is important in geography because of its multi-disciplinary approach, its potential for clarifying the development process of single-enterprise communities or leading to a better understanding of the interrelationship between the characteristics of urban places.

III. METHODOLOGY

The purpose of this chapter is to describe the methodology, selection of communities and techniques used in this thesis. A description of model testing in the context of this research will be presented. The selection of study areas will be explained. The Census, as an information source is described and the limitations of using census data is documented. Finally, the various techniques utilized in the research are presented.

A. STUDY OBJECTIVES

The objective of this research is to test Riffel's model of single-enterprise growth and development. The following hypothesis will be examined:

> single-enterprise community development occurs in stages which have distinctive economic, demographic and social characteristics.

This study will attempt to support the hypothesis by identifying and comparing the changes in economic, demographic and social indicators of single-enterprise communities in predictable historical development stages.

Utilizing the communities of Yellowknife and Whitehorse as analogous natural cases, the history of these communities is traced. Data from the Census of Canada were compiled and analyzed to determine if seven developmental stages occurred in the growth of these communities. When data were unavailable for the developmental stage, data from two single-enterprise communities in the exploitative ecumene

were substituted. This was necessary because only quinquennial data were available from the censuses.

In the search for development stages with distinctive economic, demographic and social characteristics, shortcomings of this approach were evident. The periodicity of censuses resulted in data not being available for several stages in the development of the two communities being studied. The small size of these communities made data accessible only by enumeration area. The data available from censuses after 1971 were subjected to random rounding. Random rounding results in data being rounded up or down to the nearest multiple of five. This mitigates against adding more than a few enumeration areas together because as more cells are added together the error increases exponentially. The use of newer communities would have alleviated this problem to some degree. A data source with more frequent measurement would have provided better data for analysis.

B. MODELS AND AN INDICATORS APPROACH

Model building, or analog theory, has been used sparingly in the social sciences because of the complexity of experimental design needed to support such models. Despite these problems, the employment of analog theory remains a useful tool for furthering inductive reasoning.

Chorley (1968) identifies three stages of model building: (1) Idealization and Simplification; (2) Mathematization, Substantiation and Translation; and (3)

Interpretation. Riffel has used his knowledge of the real world to develop a conceptual model, idealization, of single-enterprise community development. Through direct reasoning Riffel has also simplified the model to seven stages.

In the overall process of model building the primary emphasis of this thesis is in Mathematization, Substantiation and Translation. As this study will not attempt to develop mathematical formulae or to develop experimental designs to substantiate those formulae, the study is by default a translation. Translation is the process of using an analogous natural circumstance and providing observation which can then be reapplied to draw conclusions about the real world, or provide feedback for the conceptual model. Two communities in Canada, Yellowknife and Whitehorse, are two natural models of single-enterprise community development which can provide observed results for all stages of development.

When information for various stages is unobtainable it is necessary to supplement the research data with data applying to other communities of single-enterprise in the development stage being examined. To this end, data applicable to Fort McMurray and Grande Cache will be introduced in the analysis.

C. SELECTION OF THE COMMUNITIES

There were a number of reasons underlying the choice of Yellowknife and Whitehorse as the study communities. In order to fulfill the objective of this study it was necessary to pick communities which potentially had gone through the stages and reached maturity. T o elements were critical in this context. First, the economic base must be diversified and no longer dependent upon its single-enterprise parent. Second, a number of years must have passed to allow the community to become mature, resulting in a stable population with a commitment to the community. Both Yellowknife and Whitehorse are at this stage in their development. These two communities are also appropriate for another reason, both have proceeded through an unplanned stage with spontaneous growth and were later replanned as new towns. (Pressman, 1974, 32). Both communities are in the Canadian north, defined as that territory north of 60° Latitude (Koroscil, 1975, 116)(See Figure 1). Both communities fall into the Exploitive Ecumene of Canada, an area of vast distances and extreme mineral wealth, requiring comprehensive regional and economic planning. The study focusses on these two northern communities and considers them case studies which may have implication for the development model.

Attempting to determine if seven development stages exist and because the information available from the Census will be limited to every fifth year, information from two

other single-enterprise communities located in the extractive ecumene was used. Fort McMurray and Grande Cache were selected on the basis of being located in the exploitive ecumene and the involvement of government in planning both communities. The underlying assumption is that if a stage occurs in one single-enterprise community it will occur in all single-enterprise communities. In order to operationalize the concept of maturity it will be necessary to examine a community which is in the extractive ecumene, but is not dependent on a single-enterprise. Grande Prairie is such a community. It is anticipated that the use of these communities will facilitate the testing of the model when data for Whitehorse and Yellowknife were not available. Figure 3 provides a schematic diagram of the seven Stages and when proxy communities were used.

D. DATA SOURCES

All information, unless specifically annotated differently, is derived from the Censuses of Canada. One additional source of information which will be used is the Municipal Census of Fort McMurray. Although the Municipal Census was not subject to the same rigorous testing and application the Census of Canada requires, the definitions used in the Municipal Census were patterned after the Census of Canada.

Thesis research has traditionally included primary research including field work and interviewing. Since this

Figure 3

Study Communities and Development Stages

Stages of Development	Study Community
I Natural or Pre-discovery	Northwest Territories 1921
II Prospecting to Survey	Northwest Territories 1931
III Industrial and Town Construction	Fort McMurray 1966, 1976
IV Industrial Operation and Community Improvement	Fort McMurray 1971, 1979
V Industrial and Community Operation	Grande Cache 1971, 1976 Whitehorse 1951 Yellowknife 1951
VI Community Diversification	Whitehorse 1961-1971 Yellowknife 1971, 1976
VII Community Maturity	Whitehorse 1976 Grande Prairie 1976

thesis has deviated from this norm it is worthy of note that a secondary data source has proven valuable in conducting research. The expanded coverage which the Census provides can be a valuable component in explaining urban change. The Census in and of itself, however, provides only information, which must still be interpreted and analyzed to understand and comprehend the meaning of the data.

The flexibility of primary research cannot be matched by the Census. The use of the Census data is constraining in terms of the timing of measurement as well as the design of questions for general information rather than addressing a specific problem a researcher may want to address. The use of secondary data sources for research purposes provides the greatest benefit for the least cost. Attempts to gather the data needed to calibrate the model addressed in this thesis would be staggering in cost. This thesis suggests that secondary sources could be utilized more before a researcher begins the expensive and time-consuming effort of gathering primary data.

The Census is but one source of data and the validity of this development model must be set to more rigourous tests using different measures of economic, demographic, social and geographic information because a model, be it descriptive or quantitative in nature, requires that a certain set of parameters be established which will uniquely identify each of the stages of model.

Data used in this thesis were retrieved primarily from published Census data. Where information was not published, enumeration area data were aggregated to provide the relevant information.

In order to undertake this study some standard comparable longitudinal data base is necessary in order to make valid comparisons. The only source of this type of data is the Census of Canada, conducted every five years. The study will be restricted, therefore, by the data available from the Census. The study will remain macro in its emphasis, concentrating on the community as a whole rather than neighborhoods within the community. The exception is the stages of social development where an examination of enumeration areas will be undertaken to establish if some residential segregation exists.

Censal symptomatic indicators provide a comparative longitudinal data base which can provide an indication of the economic, demographic and social conditions of the community at a given time. It is important to understand that as indicators these statistics are a reflection of some phenomenon which occurred in the community.

Censal indicators can be viewed as proxies of the conditions of the economic, demographic and social system and are only

> ...as good as and subject to the researchers practical experience and intuition as to the relevance of the statistics (Henderson, 1974, 32).

The selection of censal indicators is based in part on prior

research, the practical experience of the researcher and to some degree intuition. Census data remain one of the most reliable and accurate sources of information available to researchers.

E. SELECTION OF INDICATORS

The selection of indicators to be used in this study is limited by the descriptive nature of the model developed by Riffel. In order to operationalize the model it is necessary to establish the parameters of each stage. For example, each stage must be distinct from each other stage by some expected degree or the stage is not a unique stage in development.

Two economic variables which are collected and published in each decennial census are the industrial and occupational structures of the labour force. For each period that data are available, the level of dependency of the labour force on a given industry can be identified. Occupational groupings provide further evidence of single-industry dependence by revealing high proportions of occupations specific to various industries.

Employment by sector was used because it is available from the Census and prior work by Wilson, studying Australian mining communities, developed a methodology to classify and characterize communities by the relative proportion of employment in the primary industry. The model also called for diversification of the labour force in Stage

VI and employment by industry provides this information. Wilson found that 87.5 per cent of all mining communities in Australia had more than thirty-two per cent of the labour force employed in mining, the dominant economic activity. (Wilson, 1962, 129).

The Department of Regional Economic Expansion (1977) used thirty per cent of the labour force employed in a single industry to operationalize the concept of single-enterprise community. In this study thirty per cent employment in a specific industrial [illegible] will be considered as a single-enterprise community. Diversification will be considered to be less than twenty per cent employment in any given industrial classification.

Demographically, the model identifies population growth, numbers of married and single people, population turnover and the sex balance as distinct in the various phases of development. For the demographic portion of the study these demographic facts will be analyzed. If there are seven stages in development, then the parameters of the demographic characteristics will be described. To establish if there is a significant [illegible] population growth and imbalance in the sex ratio; a control community will be used to compare against the single-enterprise communities in the maturity stage. Grande Prairie was chosen because it has a diversified economic base, a stable population, and is located in the extensive ecumene.

The concept of life cycle stages will be used in analysis of the age structure of the development stages. The concept is that people pass through stages in the life cycle from childhood, to youth, early and late maturity and finally into retirement. (Lansing and Kish, 1957, 512-519) The concept will be used in this thesis primarily in a descriptive manner.

We have mentioned the decline in the sex ratio and implied that the modern single-enterprise community is different from the earlier single-enterprise communities. In order to establish this, a number of dissimilarity indices were derived and the modern resource community, was compared with the earlier single-enterprise community. The index consists of a derived number which indicates the relative amount of difference between two populations. The mathematical formula used is as follows:

$$ID = \frac{1}{2} \sum \left| r_{2a} - r_{1a} \right|$$

where

ID is the index of dissimilarity

r_{2a} is the percentage of population in the age groups 0-4 to 65+ of the second population

r_{1a} is the percentage of population in the age groups 0-4 to 65+ of the first population.

Shryock and Siegel (1973, 233) warn that the number of age groups will influence the index and the index is most useful for comparisons calculated using the same number of age groups.

This thesis will examine the social characteristics of the single-enterprise community by analyzing a number of social indicators including: occupational structure, income, education, religious affiliation, ethnic origin, marital status, and housing type and tenure.

The social characteristics portion of the study will deviate slightly from the methodology used previously. This part of the thesis will use a social geography approach which will map the social characteristics of the Whitehorse, Yellowknife, Fort McMurray and Grande Cache communities by 1971 enumeration areas. This approach was used because of the work conducted by L.D. McCann. In his study of Kitimat, utilizing 1971 enumeration area data, McCann found a pattern of residential segregation which was differentiated primarily on the basis of social class. The objective of this part of the thesis is to examine various communities which were in differing stages of development to determine if the pattern of residential segregation changes during the stages of social development.

A number of variables were selected and information about the variables was collected for all enumeration areas in the community. Included in this analysis were: occupation, educational attainment, religious affiliation,

income, ethnic origin, and housing by type and tenure. should be noted that the resulting patterns are influe by the shapes and sizes of the enumeration areas. The enumeration areas are set by Statistics Canada to capt the Census data and may not give a very accurate refle of the ecological order of residential differentiation.

A social geography approach is more useful than a community profile approach for the following reasons. F the communities tend to lack occupational diversificati because of the single-enterprise employer. Second, hous is primarily of the same era and quality since it was a built at the same time. The social distinction often expressed by high quality housing, is therefore blurre eliminated. Instead of a better grade of housing, clas position is reflected in location within the community. Third, the social status of an employee corresponds to employee's position in the company. Lacking is the anon of communities with a wide variety of employers. The en community knows the social position of everyone else be they know his position in the company.

As the available comparable data relates to 1971, information relates to only the later stages of develop Fort McMurray was in Stage IV in 1971, Whitehorse and Yellowknife were in Stage VI, and Grande Cache was in S V. The very small population size of Grande Cache influ the patterns which are observable. McCann (1978) studie Kitimat data for 1971 and found a distinct social patte

not unlike the pre-industrial city. This is not at all surprising given the single-enterprise is normally located outside the bounds of the community, leaving the central areas for community services and retail activities.

The most desirable locations are within easy access of the downtown shopping area, permitting the housewife to have access to shopping by walking downtown. Schools are usually centrally located as are the majority of services and facilities. This results in a desire to be near these facilities and land adjacent to this central area is in high demand. Marsh (1970) postulates that the social status normally associated with housing is lacking in resource communities because of the very uniform quality of housing.

One variable which could indicate status and maturity in such communities is tenure. The higher socio-economic status groups would most likely own their homes while the majority of employees would be renters. The earliest stage for which data is available from the five communities in this study is Stage IV, Fort McMurray and the community will therefore be the starting point for this analysis. In all cases the comparisons are made across enumeration areas and all percentages are representative of the proportion of the enumeration area expressed as a percentage of the total.

F. LIMITATIONS

Whenever data are collected there is a limit to the accuracy of the data and this must be recognized at the outset. In the case of the Census of Canada there are two types of data collected. Data which are collected for all persons in the country, such as, age, sex, marital status, mother tongue, number of households, number of families. These data collected on the short form provide very accurate information, and had an associated sampling error of 1.5 per cent in 1976. Clearly these data are the most reliable and accurate available.

The remainder of the data are collected on a long form, a sample of one-third of the population. These data are then extrapolated to cover the entire universe of the population. Published statistics therefore pertain to the entire population. The reliability and accuracy varies with the complexity of the questions asked. Error rates as high as twenty per cent have been identified in the occupation data responses from males aged 20-34.

In the case of Whitehorse the population reported in the census figures was adjusted to control for annexation. Without this adjustment the population growth of the community would appear to be erratic.

The accuracy of census information is limited further by random rounding. Each figure reported in census publications after 1971 was rounded to the nearest five randomly. Although this does not seriously affect the

accuracy of individual figures, enumeration area data which must be aggregated are seriously compromised if a large number of enumeration areas are aggregated. As more individual information is added the error rate increases exponentially. This problem makes the 1971 data for Whitehorse suspect.

Only 1971 Census information was used in the social indicators because of the definitional changes introduced in the 1971 Census. All information presented in the thesis was derived from Census information and therefore reflects data reported by place of residence.

IV. ECONOMIC CHARACTERISTICS OF SINGLE-ENTERPRISE TOWN DEVELOPMENT

A. INTRODUCTION

Due to the vagaries of the international market place and the history of Canadian resource towns, the evolution of a model of development which has distinct stages and allows for both progression and regression is not at all surprising. From a geographic perspective it could be stated that each stage with its accompanying characteristics represents a relative change in the situation of the town. These changes vary from environmental potential to an economically diversified community, acting as a regional service centre. These changes occur partially through geographic inertia but can result from decisions which are imposed upon the environment by man. As an example, the community of Dawson City lost the economic function of both service centre for the Yukon and capital of the Yukon because of the decision to transfer the territorial capital from Dawson City to Whitehorse.

One of the problems of these single-enterprise communities is that the continued existence of the community is dependent upon the one industry located there. Changes in technology, world demand, or a depletion of the resource, give rise to lay-offs, slow growth or even ghost towns. Because communities take on individual characteristics over time and development occurs in differing time frames, this

study will examine the communities of Yellowknife and Whitehorse separately dealing with the development of each community chronologically and attempt to identify the economic characteristics of each stage of development. The summary at the end of the chapter will attempt to fit these characteristics into Riffel's model.

B. YELLOWKNIFE: ECONOMIC CHARACTERISTICS OF DEVELOPMENT

This portion of the study will draw heavily from the prior work conducted by L.S. Bourne in his masters thesis "Yellowknife, N.W.T. A Study of its Urban and Regional Economy." (1963) and "Urbanization in the Canadian North: Yellowknife, N.W.T." by Paul Koroscil (1971). The objective of this particular exercise will be not to duplicate these two studies but rather to interpret these studies in the framework of Riffel's model, generating a description of the economic characteristics of each of the stages. Due to the length of development at least some of this thesis must be of an historical geographic perspective.

Riffel's model characterizes the *Natural or Pre-discovery Stage* of development as comprising no economic activity other than hunting and fishing by native peoples. This period is the pre-1934 era for Yellowknife. Although not specifically identified by Riffel there are a number of natural or pre-discovery environmental factors which will help clarify the development process. Three particular aspects of the physical environment must be considered. The

physiography and geology, the climate and the soils of the region must be considered if the economic activities of the region are to be understood. The physiography and geology are important aspects because in the north they will determine the future of the area and the potential to act as a service centre for the region.

Yellowknife is located in the Canadian Shield, an irregular, hummocky peneplain varying in altitude from 200 feet in the northern parts of Great Slave Lake to 1,000 feet near Great Bear Lake. During the last Ice Age, glaciers moved over the area causing scouring and striation of rock outcropping changing the drainage system to an irregular, almost confused pattern. Glacial retreat left shallow deposits of glacial till reducing relief and adding to the areas peneplained appearance. The townsite of Yellowknife is a glacial deposit of sand and gravel, located in the perma-frost region of the north. A surface layer of active thawing varies in depth from one to two feet or four to five feet in cultivated areas. The glacial sands of the townsite are the most suitable construction sites in the Mackenzie District.

The geology of the area is comprised of consolidated rock of the Precambian Age. The oldest known types are the Archean volcanic flows of the Yellowknife group. Also known as the Yellowknife greenstones, this base group consists of andesitic and basaltic flows. The faulting in this area has displaced a large gold body into two distinct ore bodies,

the Giant and Con systems. Commercially, these two deposits are the most significant in the Yellowknife area. Within the the region there are also large commercially viable deposits of uranium, lithium molybdenum, mica, silica, and tungsten. Although some of these deposits have been exploited there exists considerably more mineral wealth.

Yellowknife, with its preponderance of mineral resources does face severe problems for settlement and development. The problem of construction of roads and buildings on perma-frost have been known for some time. The lack of arable land or even areas suitable for construction hinder development. Despite these problems the physical environment does provide some positive aspects for development, including the large number of potential sites for hydro-electric power. The physiography of the area with its vast expanse of exposed bedrock has facilitated efficient and cost effective prospecting throughout the area.

The most restrictive of the natural conditions is the climate. The long, cold, subarctic winters lasting an average seven months of the year are characterized by below freezing temperatures and few hours of daylight. Summers tend to be three months long with moderate temperatures. Temperature extremes are perhaps the most outstanding phenomena of the climate ranging from -51°C in the winter to 32°C in the summer. The presence of the Great Slave Lake acts as a moderating influence in Yellowknife's climate

reducing the effects of continentality of the area. Perhaps the most profound effect of the climate is not economic but social; the cold dark winters cause social problems which in turn is reflected in labour turnover, alcoholism and a myriad of other social problems.

Another inhibiting factor in development is the type of soils in the Yellowknife area. Typically azonal or intra-zonal the soils of this area are unconsolidated glacial tills, sands and gravels, silts and clays. Soil development is retarded by perma-frost, the inadequate drainage, the short summers and the light summer precipitation. A phenomenon known as "muskeg" caused by accumulation of peat is also encountered in the Yellowknife area. These soil types are the fundamental reason that no agricultural hinterland can develop. The muskeg areas also impede the development of a timber industry.

In keeping with the model a description of the economy of the native population follows. The native population survives through hunting, fishing and trapping. Although the area did support some big game the livelihood of the native population was primarily from trapping beaver, fox, muskrat, marten, mink, ermine, and bear. The area also had good stocks of whitefish, trout, pike and bluefish. Commercially, however, the fishing and trapping industries have little potential.

In light of the long-range development of the region the economy of the Yellowknife area is excessively dependent

upon the extraction of mineral resources for development. This limits the potential for diversification in Stage VI of the model.

Traditionally, the economic characteristics of the *Prospecting to Survey Stage* represents the search for suitable resources, such as minerals, hydro-electric power sites, transportation links or forest products. Such activity is normally started far beyond the local area in southern metropolises. The activity is usually short term, entailing short visits to the locality, with the majority of expenditures ma outside of the area being investigated. The hunting, trapping, fishing and guiding economy of the native people continues to dominate the economy of the local area.

Although the initial knowledge of the presence of gold occurred during the Klondike Rush, very little prospecting developed until the late 1920's. Large scale prospecting activity started in 1926 when Consolidated Mining and Smelting Company (Cominco or Con) began exploration around Yellowknife Bay. From 1926-'93' Cominco continued exploration. Due to the depression and the inaccessability of the area, prospecting was halted until 1934 when air transport was first used for northern development. In the summer of 1934, Bear Exploration and Radium Limited discovered a vein of gold in the east side of Yellowknife Bay. In the following year gold was discovered in close proximity to the present site of Yellowknife. This find of

free gold in a surface showing led to a flurry of activity as prospectors staked claims in the area. At the end of 1936 Yellowknife consisted of one log building named the Corona Inn. The impact on the local economy had been minimal, consisting of summer prospecting. This stage ended in 1937 when construction of the Con mine started.

Of all the stages in the development of a single-enterprise community, the best known stage is the *Industrial and Town Construction Stage*. The vast input of capital to a region, which in northern Canada is generally characterized by a hunting and fishing economy, leads to a booming local economy. The stigma of vast economic resources attracts many would-be opportunists.

Yellowknife is no exception in this regard. In 1937, Con mining started construction of a vertical mine shaft and mill. At the same time Con began construction of camp buildings, an apartment, a hospital, a packing plant and some single family homes. Investment in the townsite was still quite minimal, consisting of these buildings, the Corona Inn, the RCMP building, and a multitude of tents. This initial boom period ended in February 1938 when Con began production.

In early 1938, during the *Industrial Operation and Community Improvement Stage* the townsite of Yellowknife was surveyed and some buildings erected. The boom of industrial construction led to optimistic investment in the community. More mines came into production and investment in

Yellowknife continued unabated. With labour attracted to work in the mines the townsite in 1938 saw an increase of 100 newly leased lots. Commercial agencies such as lawyers offices, lumber yards and churches were included in the new leases. The federal government spent $15,000 for local improvements and a water and sewer infrastructure was built.

In 1939, despite the fact that new mines were coming into production, some persons were unemployed. Rae, Settlement of the Great Slave Lake Frontier, 1964, 289. This high unemployment in a small community was most likely a typical characteristic of communities in this stage. Labour involved in the industrial infrastructure lingering due to the optimistic climate found that their skills are not transferable to residential construction or mining. Another group of opportunists attracted to the "hot money" available in the community found the mining companies had recruited from southern mining communities in order to obtain qualified and experienced labour; the result, unemployment. The decline in prospecting, due to the advent of World War II, brought a slow-down in the development of gold mining as more strategic minerals were sought.

Development did continue at a reduced level through 1944 when the last mine ceased operation. Consolidated Mining and Smelting Company built a hydro-electric facility to serve the Con, Rycon and Negus mines as well as the community. The economic effect of mine closure was reflected in the population which declined to 200 in the summer of

1943. (Koroscil, 1975, 126).

Despite the interruption created by the Second World War, the boom period started again in 1945, with extensive prospecting. In 1945, interest in Yellowknife had increased to the point where 100 mining companies owned claims and some 22,000 people had entered the area. This was an estimate by the R.C.M.P. and should be viewed with some skepticism. (Page, 1964, 303) Gold production had also resumed and [illegible] of the mines built prior to the war were in production. Giant Yellowknife mine, whose discovery in 1943 had set up the extensive prospecting in 1944 and 1945, came into production in 1948.

Perhaps the most important milestone in the development of Yellowknife occurred in 1945 when the federal government decided to build a new townsite with a proper water and sewer infrastructure on a site where modern zoning and building regulations could be enforced. The new townsite construction was completed to facilitate the movement from the old town to the new town in 1947.

Some 100 new residential and commercial buildings formed the core of the new town. [illegible] facilities and services available were comparable to s[illegible]mmunities of the same size. Several other facil[illegible]e constructed during this stage, including a landing strip, and access to the landing strip, another hydro-electric plant and the MacKenzie highway was completed to Hay River. In 1948, the *Community Improvement Stage* came to an end with a

stabilization in labour requirements of the gold mining industry.

Characterized by an end in construction, and the establishment of services for the labour employed in the single-enterprise, this stage represents the end of the boom period for a single-enterprise community. In Yellowknife the *Industrial and Community Operation Stage* lasted from 1949 to 1967. Investment was very much reduced since the size of the labour force and its dependent population was reasonably well-established. The level of services required for the community had been well-established and become dependent upon the labour force for their support. Bourne presents statistics which although collected eleven years apart, indicate the economic characteristics of this period reasonably well. These statistics for the years 1951 and 1962 clearly identify mining as the many employer in the community in both years. In 1951, this employment represented 56.5 per cent of the total labour force and in 1962 43.3 per cent of the labour force, despite a decline of 218 jobs in the mining sector. These declines were the result of a reduction of mining personnel at both Con and Giant and closure of the Negus mine in 1953.

Using Wilson's criteria and the Canadian criteria for industrial dominance, the community of Yellowknife would be a single-enterprise community dependent upon mining in both 1951 and 1962. The decline in the mining sector was offset by growth in the service sector, notably government.

There remained a dependency on the mining sector for continued economic viability. The total labour force participation rate remained relatively high at 71.6 per in 1951 and 68.4 per cent in 1962. The level of diversification of the economy was relatively minor dur this period.

As mentioned earlier, some diversification of the economy had started prior to 1967, primarily in the are local government. The *Diversification Stage* started in through the decision of the Federal government to make Yellowknife the capital of the Northwest Territories. Th milestone was chosen as the start of the *Diversificatio Stage* because diversification requires an industry whic provide long-term employment and is not dependent upon single-enterprise of the community. The diversification result in a new demand for labour, which will usually b high, skilled and be for occupations in industries not related to the single-enterprise base.

By 1971, the mining industry had been displaced as largest employer by government. Public administration h the largest number of employees with 610 or 21.0 per cen the total labour force while mining had 575 employees or 19.8 per cent of the labour force. Community, Business a Personal Services Group comprised 21.0 per cent of the employed labour force in 1971. Transportation, Communica and other Utilities had increased to include 10.2 per c of the labour force or 295 employees. As suggested by

Riffel, the services sector expanded substantially as did government. Between 1971 and 1976 the labour force increased by 1,335 or 46.0 per cent. The diversification of the economy of the community produced a new wave of migrant workers. The influx of new migrants set off another round of investment in the community producing a small boom period.

The *Community Maturity Stage* is characterized as a diversified economic base with little opportunities for expa[illegible]. Given the vast resources of the Yellowknife reg[illegible] possibility of a change to provincial status and the movement towards a resource [illegible] the opportunities for expansion in Yellowknife seem optimistic. It is doubtful that Yellowknife has yet reached this stage since community maturity may take up to three generations. Riffel, p. 14). Clearly the wave of migrants who arrived in the *Community Diversification Stage* have not yet had time to accumulate three generations from this stage in the development of Yellowknife.

Regardless of the future fluctuations in the international market place the future of Yellowknife seems reasonably secure. As the primate city of the N.W.T., the potential for the future appears to be assured.

C. WHITEHORSE: ECONOMIC CHARACTERISTICS OF DEVELOPMENT

Whitehorse had its beginning some 39 years before Yellowknife, but its development albeit over a longer time frame is very similar to that of Yellowknife. As the

objective of this part of the study is the establishment [illegible] the economic characteristics of the stages of development in Riffel's model and since the community had [illegible] before 19[illegible], this section will draw [illegible] historical geography by Paul [illegible], [illegible] located at latitude 63°43' N and longitude [illegible] W [illegible] the same distance north as [illegible].

[illegible] the Nature of Pre-[illegible] Stage was the period [illegible] to 1898. As in the case [illegible] the physiography and geology, the climate and soils of the region [illegible] presented in order to understand the future potential [illegible] the [illegible]. The Yukon is situated [illegible] the northern [illegible] of the North American Cordillera [illegible] between the Coastal Range and the Mackenzie Range [illegible] the Yukon Plateau. The Yukon Plateau [illegible] of many irregular plateau between the two mountain systems.

This plateau is an average 5,000 feet in altitude with river valleys cutting from 1,500 to 4,000 feet into this plateau. The last Ice Age influenced the area and the resultant topography includes hanging valleys, moranic deposits, roche moutonnes and glacial deposits of sands and silts. The townsite is located in the Yukon River valley and in the perm frost region of the north.

Geologically, the Yukon Plateau is granitic and batholithic, most likely Precambian in Age, interrupted by volcanic rocks of earlier origin. The bedrock has been

[illegible]

[illegible] temperatures [illegible]. The climate is [illegible] the Yukon River [illegible]

[illegible] extremes from [illegible] have been recorded [illegible] Whitehorse. Psychologically, the climate is perhaps the most negative of the natural conditions.

Climate, of course, affects soil development resulting in soils which tend to be acidic and underdeveloped because of deficiencies in precipitation. Alluvial deposits have not developed because they are podzolized and acidic, resulting in low fertility. The development of the soils is further restricted due to perma-frost and the short frost-free period.

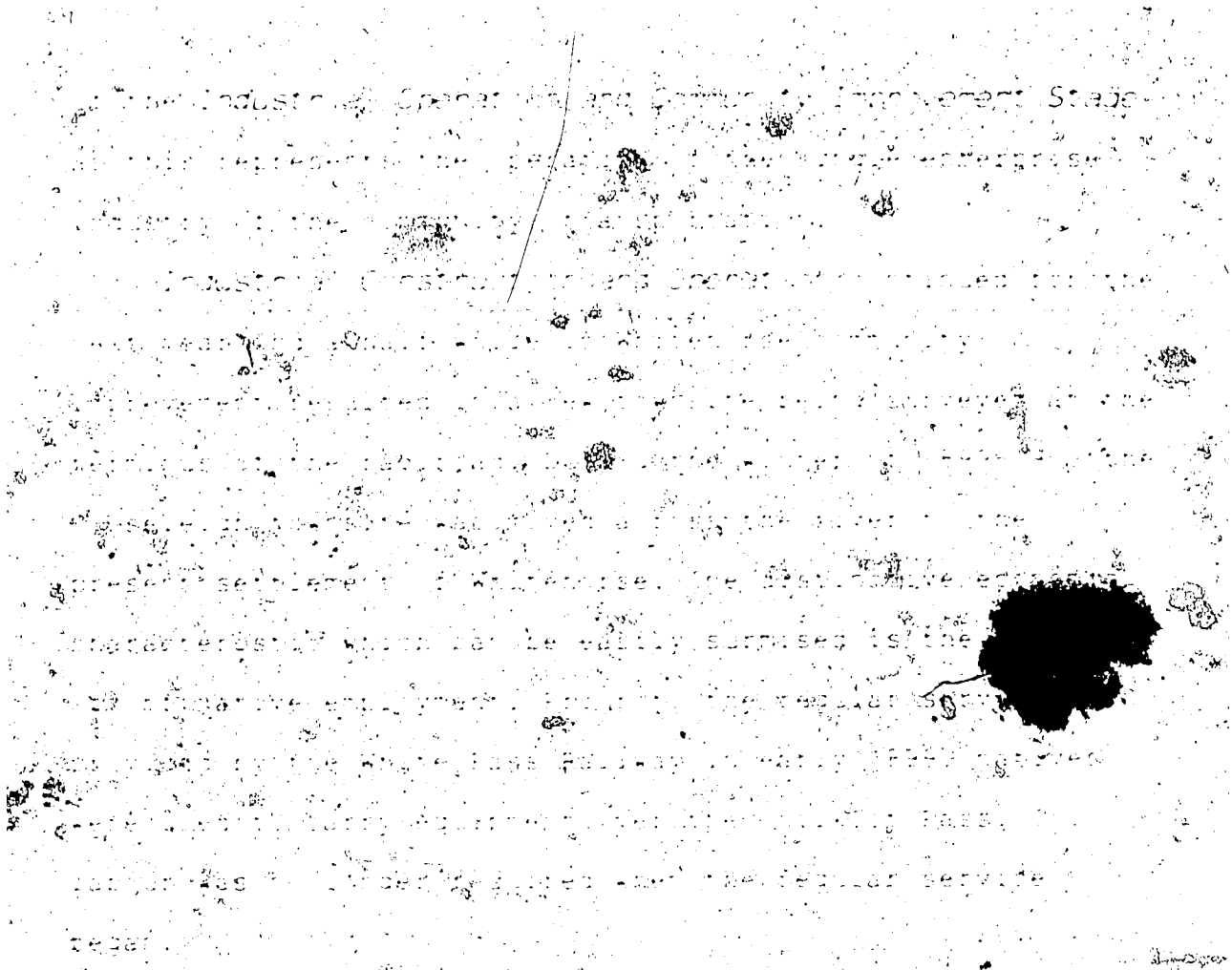
The native economy in the area is predominantly hunting, fishing and trapping. The indigenous tribe of the Yukon Valley were the Taglish. The Taglish were nomadic,

reached their destination. There is no doubt that the economic attraction of the Yukon was gold, but the development of Whitehorse as a settlement was due to transportation.

Several routes already existed into the Klondike in 1896 including the Chilkoot Pass, and the Bering Strait, St. Michael route. In 1897 the Skagway-Whitehorse approach over the White Pass was discovered. By 1896 Whitehorse was already acting as a staging point for the Klondike Rush. The settlement was on the east side of the river, and was called Closeleigh. The community was located at the north end of a five mile portage around Miles Canyon and Whitehorse Rapids

crews met at Carcross and regular service commenced in August. The railroad in conjunction with a steamer service to Dawson City became the main distribution system for the Territory, as a result of cheaper and shorter transportation to the Klondike.

Construction of the narrow gauge railway of the Yukon and White Pass was not completed until July 1900 and went into regular service in August 1900. The demand for access into the Klondike forced the rail company to set up a regular service via rail and horse drawn cart early in 1899. This later milestone has been chosen to represent the start



The Industrial and Community Operator Stage

1910-1938, made Whitehorse the transportation centre and therefore also the distribution centre for the Yukon. The community prosperity reflected the needs of the world. Its economy fluctuating with the requirements of the world market for various minerals. Due to the decline of gold production, attempts were made in the late 1920's and early 1930's to diversify the economy by attracting tourists. Although the influx was important in bolstering Whitehorse's faltering economy the mining industry and economy generally suffered during the depression.

[illegible] community regresses to an earlier stage of development there may be a tendency for some of the [illegible] the impact of the stages to be [illegible] consistence of a community which [illegible] already entered the fifth stage of development. The [illegible] World War had an enormous influence on [illegible] Yukon [illegible] which experienced a [illegible] experienced a positive impact. This stage started in [illegible]38 when an Order-in-Council established a Commission to investigate alternative routes [illegible] Alaska Highway. [illegible] routes were investigated and [illegible] was [illegible] for the [illegible] Fairbanks [illegible] the war [illegible] the [illegible] because [illegible] inland [illegible] location being [illegible] susceptible to Japanese air attack. The selection of the route and the feasibility studies were carried out in Ottawa and Washington, D.C. Along with the highway, the necessity of a supply of fuel was recognized and the Canol pipeline and service road from Norman Wells to Whitehorse were also approved.

During the construction of both projects, early 1942 to late 1942, Whitehorse was the operational base and distribution centre for work in the Yukon. This period saw the construction of many military facilities including barracks, storage and transportation facilities in Whitehorse. The airport was expanded and the settlement expanded east of the river and along the highway.

The continued military threat from Japan and the requirement for fuel for military purposes brought the Canol Pipeline Project into being. The rapid build up of the military generated an optimistic investment environment in Whitehorse. Private investment in hotels, stores and electric power led to a community with a strong service economy. Whitehorse now had three transportation routes as its economic mainstay, the airport, the Alaska Highway, and the White Pass railway.

The decreased threat of the Japanese in the Pacific theatre brought a decline in the population of Whitehorse. The reduction of U.S. military forces coupled with the abandonment of the Canol project resulted in a slowing economy and much reduced private investment. The slowing economy stabilized as Whitehorse became the dominant settlement of the Yukon. This stage of development lasted only eight years as the *Diversification Stage* of Whitehorse development became a reality in 1953.

As stated in the case of Yellowknife, diversification required a commitment of long term capital and jobs for the community. In the case of Whitehorse, this assurance came in 1953 when the federal government moved the capital of the Yukon to Whitehorse. By 1961, the economy of Whitehorse had diversified into four sectors, no longer dependent upon the transportation sector as in the 1900-1938 period.

The major sector in terms of employment was Public Adminstration and Defense, contributing 587 jobs to the

labour force and representing twenty-[illegible] per cent of the total labour force. The second [illegible] sector was the Community, Business and Personal [illegible] Group with [illegible] per cent of the [illegible] labour force. Trade, with retail and wholesale, provided [illegible] jobs in 1961 and was the third largest sector of the economy as represented by employment. The trade sector is reflective of the growth of Whitehorse as the hub of the Yukon transportation system. The fourth largest sector of the economy in 1961 was the Transportation, Communication and Utilities Group. Employing [illegible] people and comprising [illegible].4 per cent of the labour force, it is clear that the White Pass Railroad no longer dominated the employment of the labour force in Whitehorse.

Perhaps a case could be made that Whitehorse had reached *Community Maturity* since there was little change in the economic base between 1961-1971. The four major groups which dominated the economy in 1961 still dominated the economy in 19[illegible]. A mitigating circumstance, however, is that opportunities for expansion may still exist. A strong policy of regional development could increase manufacturing and the finance sector of the economy. The advent of solar energy schemes holds potential for agriculture. The mineral wealth of the Yukon is still largely untapped; with known oil and gas reserves the potential for expansion seem real.

D. ECONOMIC CHARACTERISTICS OF SINGLE-ENTERPRISE COMMUNITIES DURING DEVELOPMENT

With the dates of the various stages of development established for Yellowknife and Whitehorse, this section provides the available empirical evidence for each stage of development. The early stages of development of the two communities were either prior to accurate census reporting in the north or the communities were too small in population size to have detailed statistics. Recognizing this deficiency in the data series, information for earlier stages will be augmented with information from more recently emerging single-enterprise communities such as Fort McMurray.

The earliest stage in development is the *Natural or Pre-discovery Stage*, wherein the community and the region has little economic activity with the exception of hunting and fishing by native peoples. In the case of Yellowknife this period was the pre-1926 period and in the case of Whitehorse it was the pre-1896 period. The economy of Whitehorse was somewhat of an exception because the single-enterprise which developed was transportation. Transportation implies movement to and from someplace, and Whitehorse was the result of the need for transport into a remote area. Stage I and II for the community of Whitehorse paralleled Stage V for the Klondike gold rush.

The data which best describes this stage comes from the 1931 Census of Canada. Although Yellowknife had already

entered into the second stage of development, prospecting to survey, the impact of the gold discovery had not yet had any impact on the region and the native economy of Stage I had persisted into Stage II. The 19[illegible] data for the Territory, therefore, provided an indication of the employment of the labour force for both stages I and II. The economy was clearly dominated by Hunting, Fishing and Trapping accounting for 79.4 per cent of all occupations in the Territory (Table [illegible]). The labour force was male dominant with [illegible]53 males or 95.[illegible] per cent of the total employed labour force being masculine. Of the females employed, 56.4 per cent [illegible] occupations related to the [illegible] industry.

The Prospecting to Survey Stage occurred twice in the history of both communities. In Yellowknife, the first such stage occurred in 1926-1937 when the initial prospecting for gold occurred and it occurs again in 1944-1945 when new major gold finds were made around Yellowknife. The native economy, as evident from the prior discussion, remained dominant in Stage II. In the case of the second Stage II in 1944-1945 the traditional native economy which persists is now replaced by the established mining economy of Yellowknife. The native economy was interpreted to mean the economy which existed at the time of a new *Prospecting to Survey Stage*. In Whitehorse, this stage (1896-1898), was characterized by the search for new transportation routes into the Klondike. It was the relatively short overland portion of the White and Chilkoot Pass that made these

Labour Force Comprising the [illegible]

Ten Years of Age and over by Industry [illegible]

Industry/Occupation	[illegible]	[illegible]	[illegible]
All Occupations	1,[illegible]	[illegible]	[illegible]
Agriculture	[illegible]	[illegible]	[illegible]
Fishing, Hunting & Trapping	1,628	[illegible]	[illegible]
Logging, Mining, Quarries & Oil Wells	41	[illegible]	[illegible]
Manufacturing	48	[illegible]	[illegible]
Building & Construction	19	[illegible]	[illegible]
Transportation, Comm. & Utilities	34	[illegible]	[illegible]
Trade-Warehousing & Storage	124	[illegible]	[illegible]
Finance, Insurance & Real Estate	[illegible]	[illegible]	[illegible]
Service	[illegible]	[illegible]	[illegible]
Clerical Occ	[illegible]	[illegible]	[illegible]
Other & Not Specified	61	[illegible]	[illegible]

Source: Dominion Bureau of Statistics, Census of Canada, [illegible]

routes particularly attractive over the other routes. However, from Koroscil's study of Whitehorse, the impact of the discovery of the White Pass was minimal since it was still an arduous journey to Whitehorse. This study also showed that the major activity during this stage was the approval of charters from the various governments and the arrangement of the financing for a railway over the White Pass.

The second time in Whitehorse's history that this stage occurred was from 1938 to 1942. This period was characterized by a search for the best alternative route for the Alaska Highway. Again, decisions were made by the federal governments of the United States and Canada, resulting in the signing of agreements, setting of specifications and financing for the route. In all four periods that these communities were in the *Prospecting to Survey Stage* economic impact for the community during Stage II was minimal. This is due to the fact that decisions made in the southern metropolises determined the future of the single-enterprise community.

The reason very little economic benefit is felt in the community is that approvals for right of ways, mineral rights and a myriad of other regulations must be satisfied before a corporation is willing to invest large sums of money in remote areas. Private capital, therefore, does not enter the community without some assurance of return. This period was also the time when corporations began to evaluate

the findings of their engineers and consultants to det
the economic feasibility of a project.

The third stage in the development of a single-enterprise community, *Industrial and Town Construction*, was experienced twice by both communitie
first periods of Stage III in Whitehorse was, 1898-189
in Yellowknife it was 1937 to early 1938. In the case
Whitehorse this stage began with the construction of t
railway in 1898. The community of Whitehorse was estab
on the west bank of the Yukon at the site of the rail
Housing and warehousing were built in the town to faci
railroad construction and provide stakes for the miner
Yellowknife this stage started when Consolidated Main
their first vertical mine shaft. Koroscil describes
Yellowknife townsite in 1937:

> At this point in time, Yellowknife was a small airpl[illegible] terminal comprised of three buildings and seri[illegible]f tents. (Koroscil 1975, 124).

Both Communities experienced this stage again arou
the time of the Second World War. In the case of Whiteh
the second Stage III occurred in 1942 when the Alaska
Highway was built and the Canol Pipeline was constructe
the period 1946-1948, when Giant Yellowknife Mine was b
constructed, Yellowknife experienced a second Stage III
This Stage III was different from the Stage III of the
initial development. Since a townsite already existed,
stage largely comprised industrial construction. The
community and a basic level of services already existed

the concentration of low levels of completed schooling are concentrated in the outlying areas and the central areas are low in population having completed only elementary schooling. No differentiation in terms of education occurs because education in Canada is compulsory to age 15 and the probability of having completed some secondary schooling is high.

Due to the tendency of native populations to be drawn to the single-enterprise community, squatter settlements often appear near the edge of single-enterprise communities. (Siemens, 1973, 6) In order to determine if natives are in the community the distribution of population of native indian origin was examined. The enumeration areas with the highest proportion of native population were all adjoining the boundaries of the community.

The two major religions in Fort McMurray were Roman Catholic and United. The religious segregation appears to be very similar to the pattern of native population and may be reflective of social status. The outside enumeration areas were highest in proportion of population of the Roman Catholic faith, while the central enumeration areas had higher concentrations of United Church supporters.

During Stage IV there appears to be a significant segregation along occupational, income, education, housing, religious and ethnic lines. The high social status groups occupy the central areas around the retail and community facilities, while lower status groups appear to occupy more

peripheral areas which are not as accessible to the retail shopping area or other community facilities. Much like the pre-industrial city the prestigious areas are in the central areas close to the amenities.

INDUSTRIAL AND COMMUNITY OPERATION

Stage V, the operational stage for both industry and community will be exemplified by the community of Grande Cache. Grande Cache is being used to portray Stage V because no Census data were available for the Study communities during Stage V. Grande Cache is a small coal mining community north of Hinton, Alberta. The community has a very small population base of 2,500. The relatively small size of the population resulted in only four enumeration areas being used during the 1971 Census. (Figure 17) The ecological arrangement of Grande Cache is slightly different than Fort McMurray. The highest concentration of managerial professions occurring in enumeration areas 321 and 318 while income was distributed such that enumeration area 319 and enumeration area 321 had the highest average family income. (Figures 18 and 21) The highest concentration of primary occupations (mining in this case) was enumeration area 319 and enumeration area 320. Enumeration area 320 was also the only enumeration area with very reduced proportions of processing occupations. (Figure 19)

Sales, Service and Clerical occupations were concentrated at the periphery with 29.4 per cent of

Figure 17

Enumeration Areas,

Grande Cache: 1971

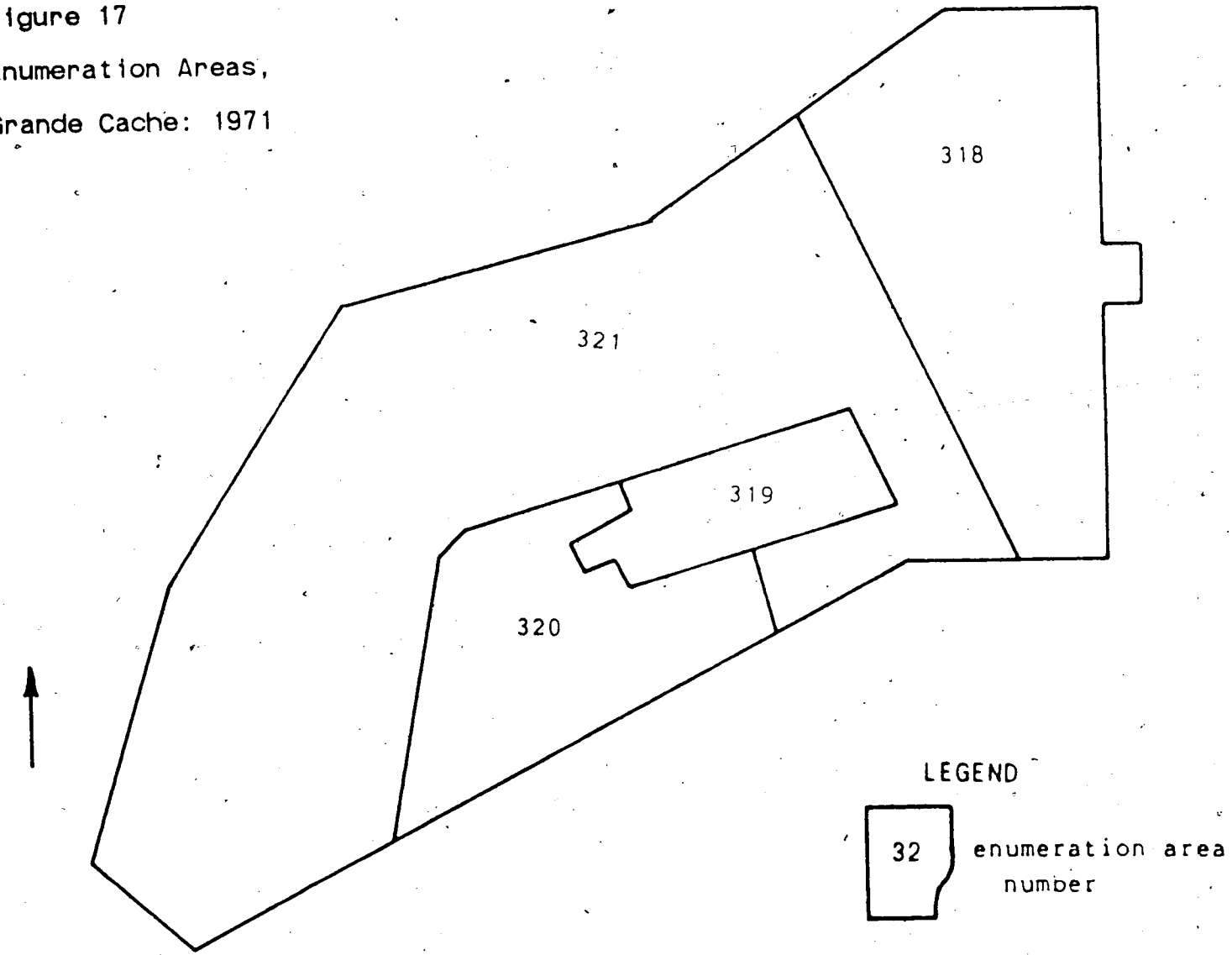


Figure 18

Distribution of Managerial, Professional and Technical Occupations: Grande Cache, 1971

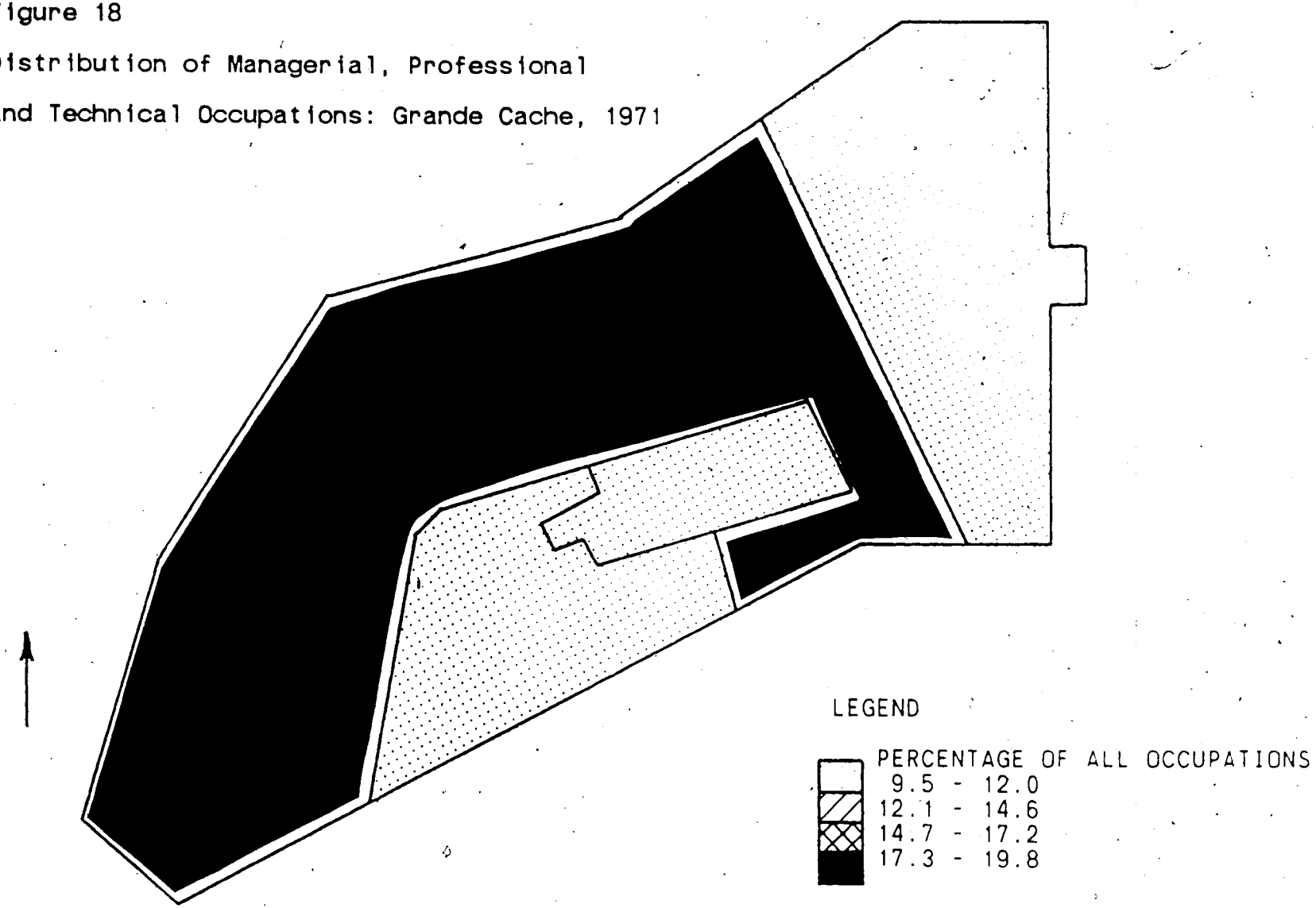


Figure 19

Distribution of Processing and Related Occupations: Grande Cache, 1971

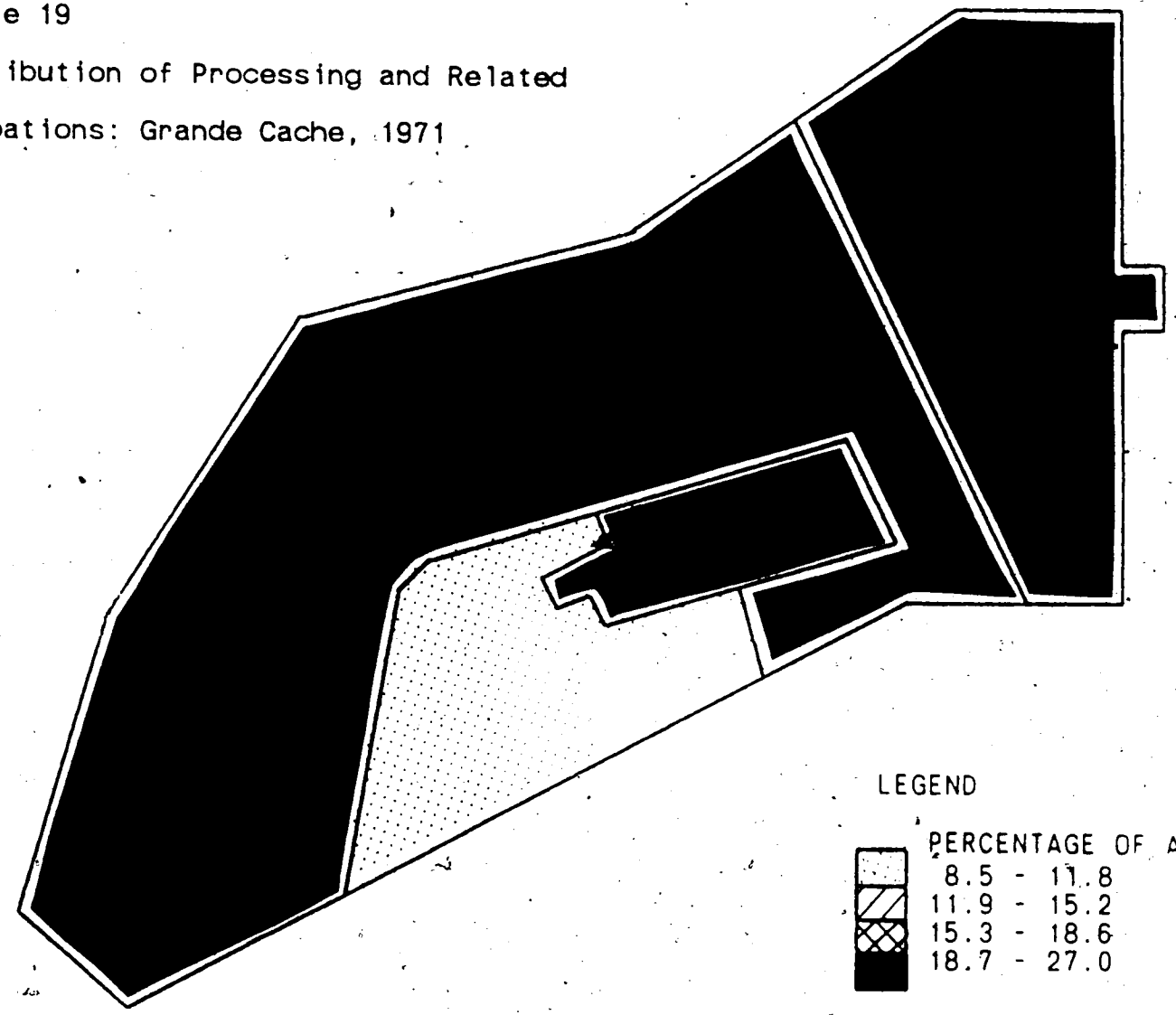
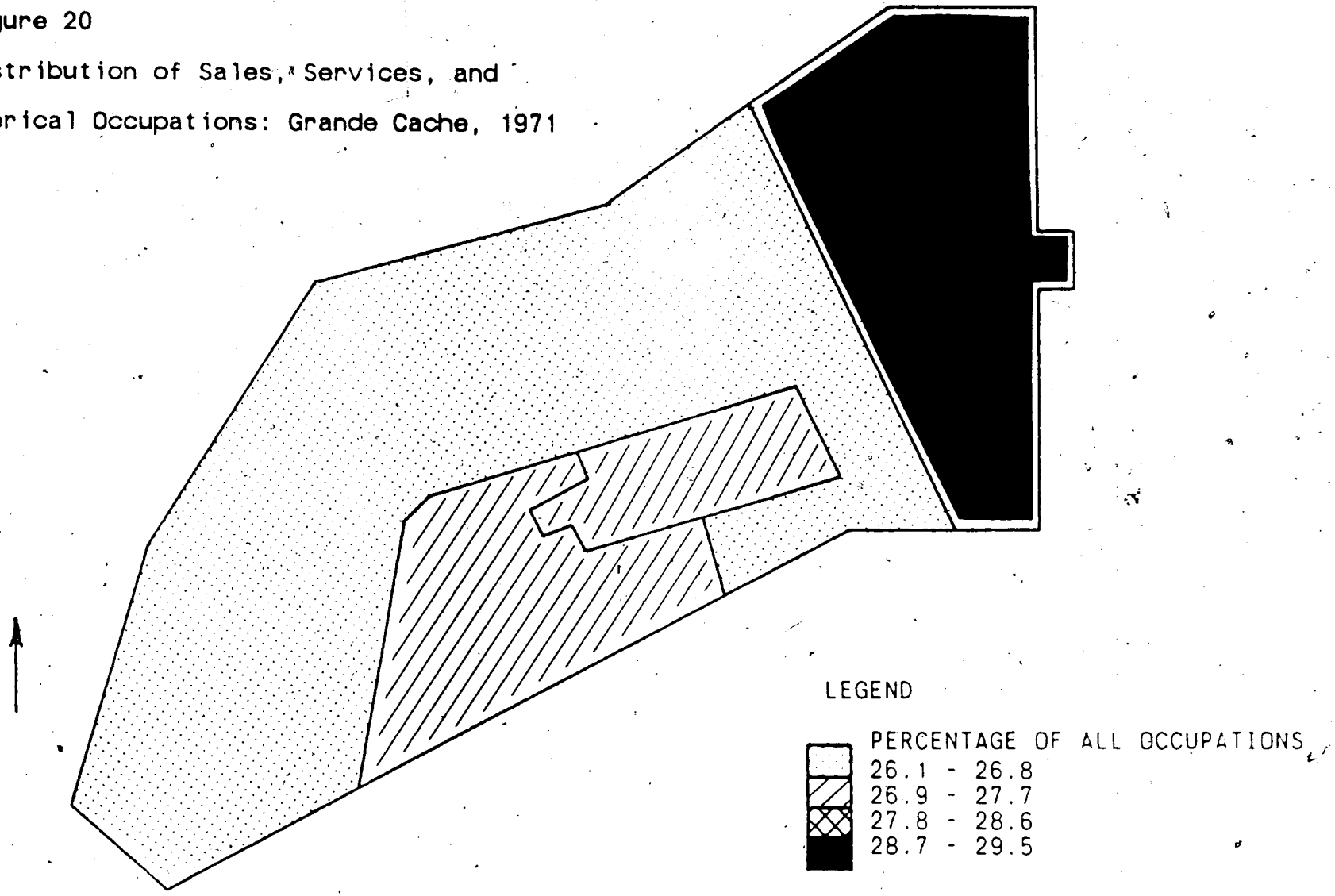


Figure 20

Distribution of Sales, Services, and Clerical Occupations: Grande Cache, 1971



enumeration area 318 employed in Clerical Occupations. (Figure 20) Enumeration areas 319 and 320 had the highest concentration of both owned homes and single-detached homes. (Figure 22) Virtually all of the housing in enumeration area 318 consisted of mobile homes; 92.6 per cent were mobiles and 7.4 per cent were single detached. The only apartments in the community were located in enumeration area 321.

The educational attainment of the population in Grande Cache was distributed in a similar pattern to income. Enumeration areas 321 and 319 had the lowest concentration of population with only elementary schooling and enumeration area 321 also had the highest concentration of population with a university degree.

Segregation along ethnicity and religious affiliation show a similar social pattern. Enumeration areas 319 and 321 have the lowest concentration of native population and enumeration area 321 has no native population. Enumeration area 318 also ranked highest on French ethnic origin. Religious affiliation shows a pattern similar to the pattern already noted, with the highest concentration of United Church supporters corresponding to the two enumeration areas with the highest social status, enumeration area 319 and 321. Enumeration areas 318 and 320 show the highest concentration of Roman Catholics.

The social segregation seems to be very high in the community with a tendency for higher status groups to gravitate to enumeration area 319 and 321. Enumeration area

Figure 21

Distribution of Income:

Grande Cache, 1971

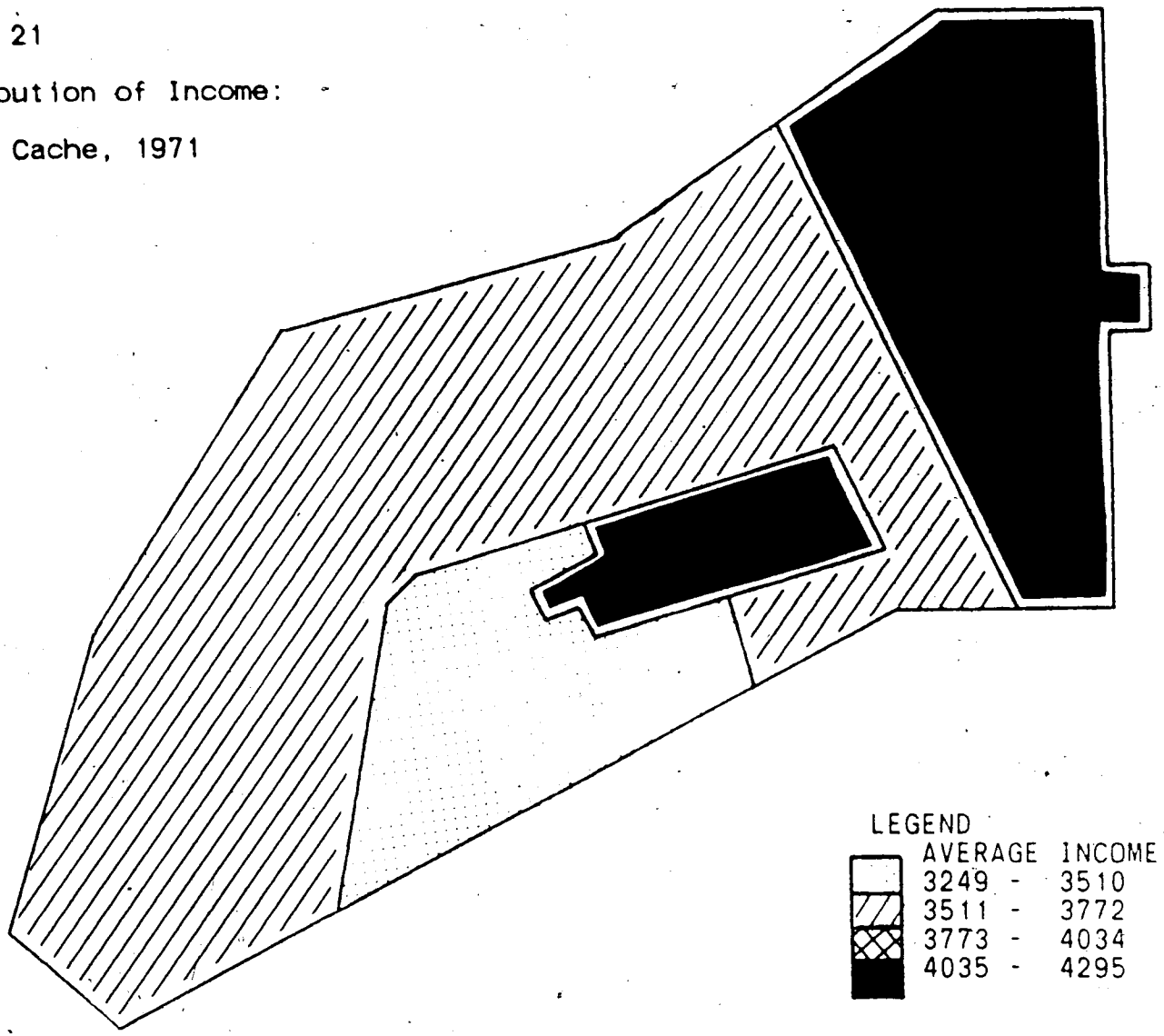
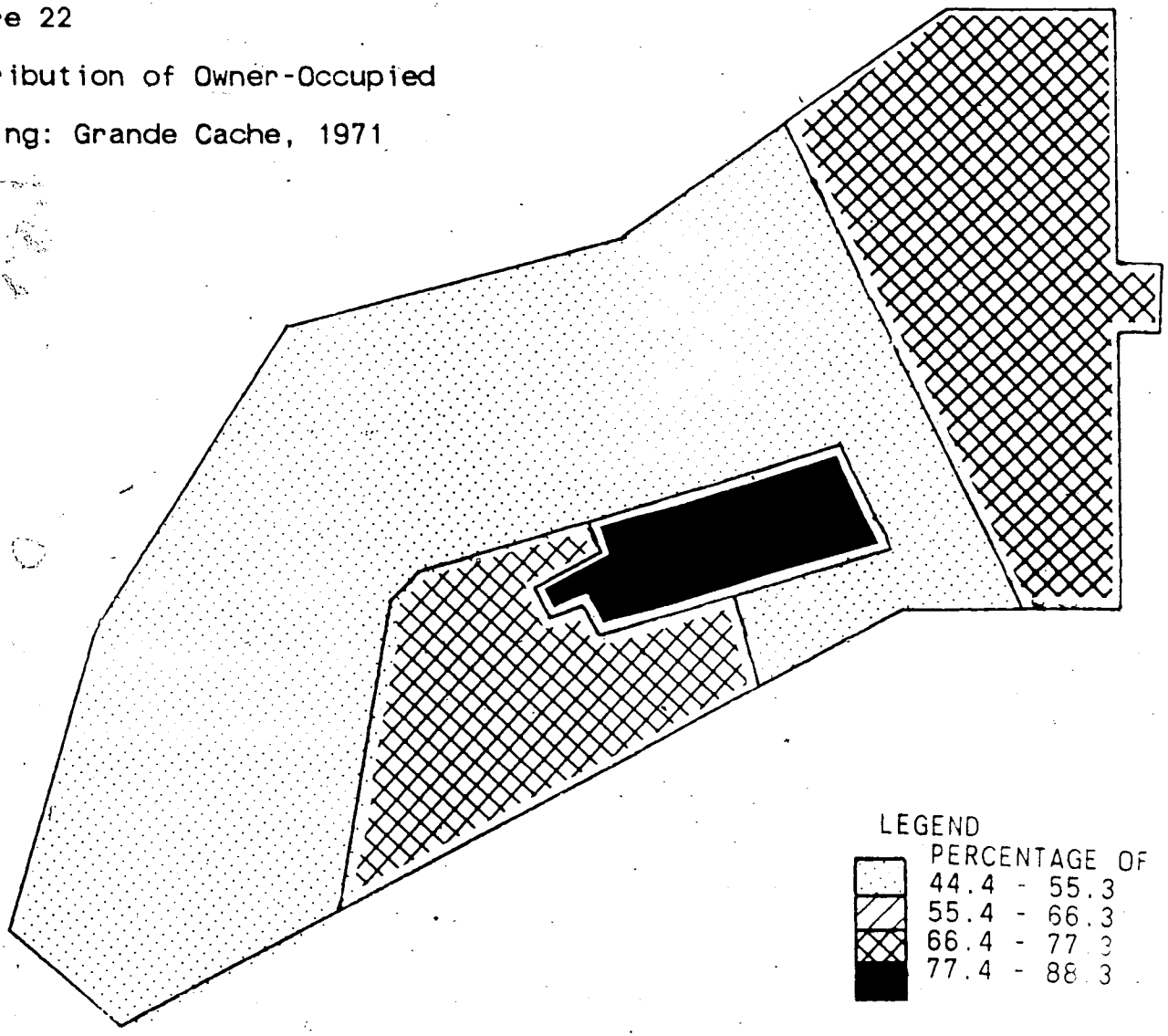


Figure 22

Distribution of Owner-Occupied Housing: Grande Cache, 1971



321 consistently had the highest proportion of population with high status variables and the lowest proportion of population with low status variables. The enumeration area map shows a configuration which tends to obscure any definite pattern from emerging. This may be the result of the small size of the population. Both of the high status enumeration areas encompass the central area of Grande Cache and the enumeration area with the consistent low status was at the periphery.

COMMUNITY DIVERSIFICATION

The ecological arrangement seems to change when the community enters Stage VI. The upper class having dominated the central area of the city, now disburse to the outlying areas as a new period of growth and residential development occurs. Due to the relatively small size of the community prior to diversification, very little land is available for new migrants. The need for housing the new migrants generates suburban growth at the edge of town. The expansion of services also increases land values in the central area, causing the upper class to sell and move to the new suburbs.

Yellowknife in Stage VI experienced rapid population growth. The requirements for more residential space to serve the expanding territorial government employees and the expansion toward Consolidated Mining property imposed a new social pattern on the community. In 1971 the segregation of professional occupations resulted in three enumeration areas

with very high proportions of managerial, professional or technical occupations. An enumeration area map, Figure 23, provides a reference to enumeration area numbers. Enumeration area 20, the most westerly of the enumeration areas reported the highest proportion of professionals in both numeric and percentage terms, 32.1 per cent or 125 people reported occupations that were professional in nature. (Figure 24) Enumeration area 62, which is at the end of the commercial area of Yellowknife, and also in the western part of the city had the second highest percentage of professional occupations, 29.8 per cent. Enumeration area 69, also had a high proportion of occupations that were of a managerial, professional or technical nature.

The enumeration areas with the lowest proportion of high status occupations were enumeration area 66, 64, 65, 68. All of these enumeration areas contain large tracts of commercial and industrial land. Enumeration areas 65 and 60 are lease holdings of Giant Mines, and Consolidated Mines respectively, and enumeration area 64 is a dock area where shipping is unloaded from Great Slave Lake shipping. These areas of industrial and commercial use are segregated to the east while the professional occupations are concentrated in the west, removed as far as possible from the industrial land use. Enumeration area 60, the Consolidated Mining property is the only industrial use in the western part of the community. These groups concentrated in the western part of the city had the highest average incomes in the

Figure 23

Enumeration Areas,

Yellowknife: 1971

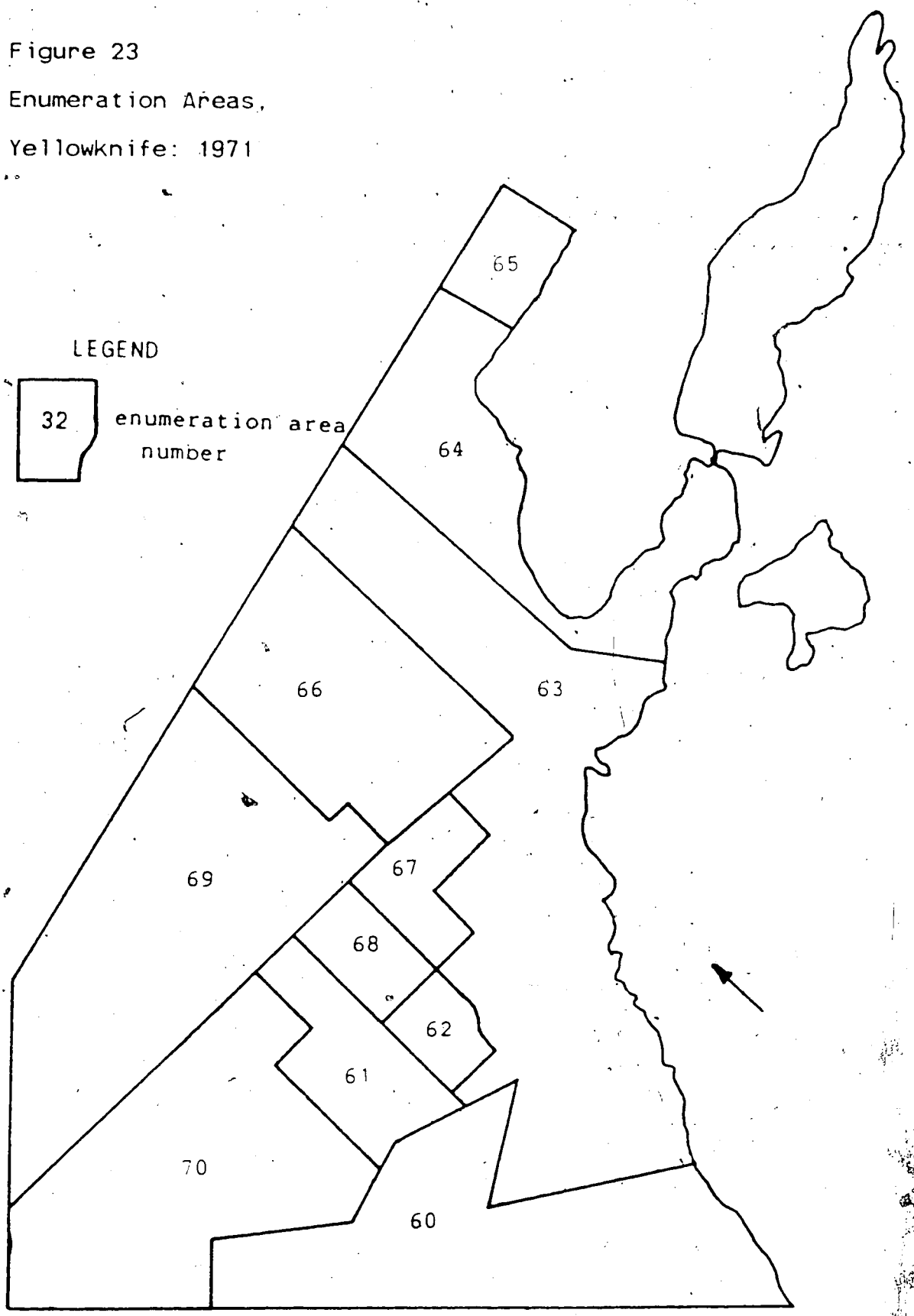
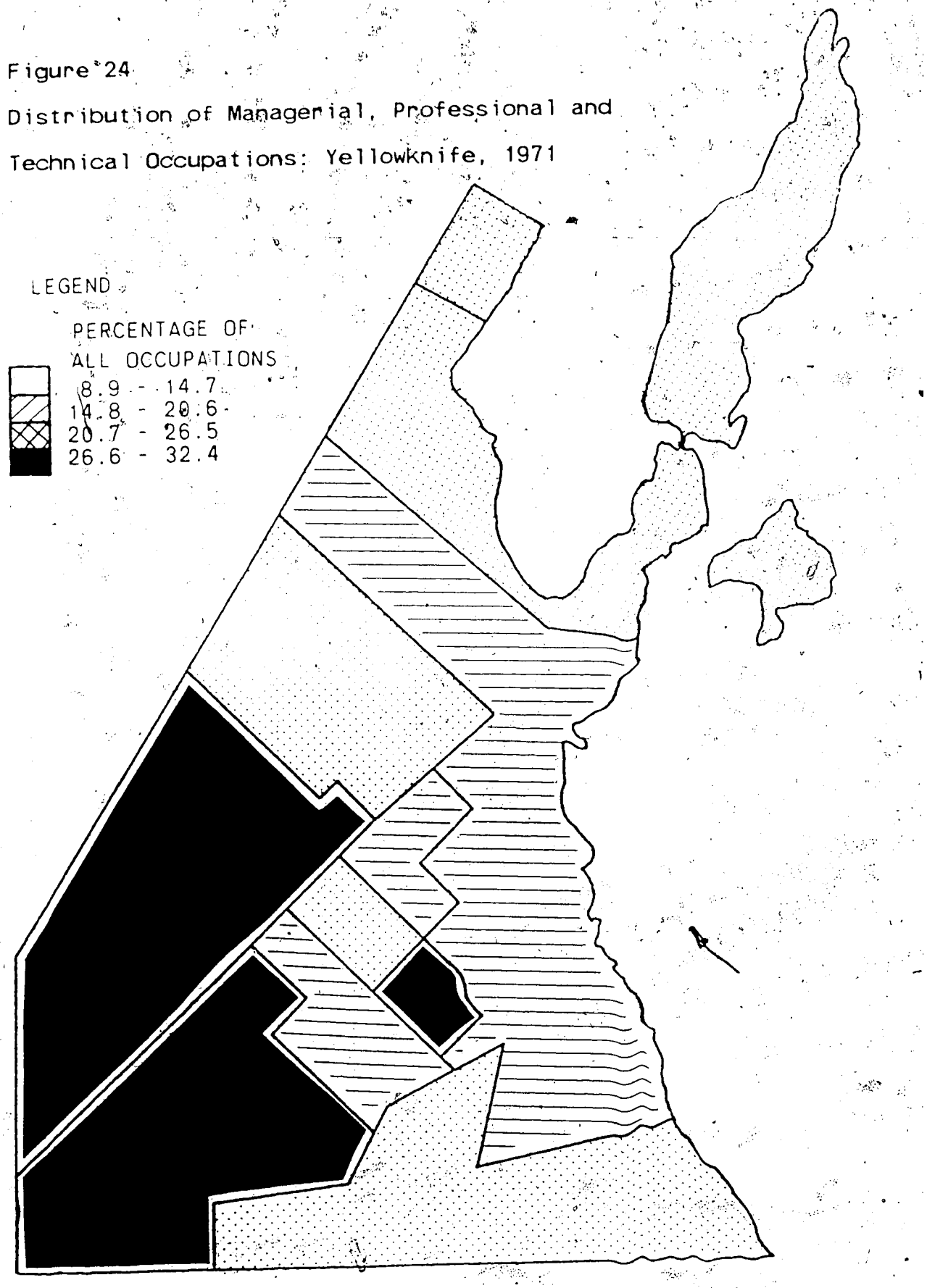


Figure 24

Distribution of Managerial, Professional and Technical Occupations: Yellowknife, 1971



community. The population of enumeration area 62 had an average income of $6,259 in 1971, and population in enumeration areas 70 and 69 had average incomes of $6,135 and $6,097 respectively. (Figure 25) The lowest reported incomes were in enumeration areas in the east, enumeration areas 64 and 66 where the heavy industrial and commercial properties were located.

The highest concentration of Mining and other Primary Occupations, was in enumeration areas 60 and 65. The two mines provide some housing for miners at the mine site. Outside these two enumeration areas the concentration of miners was in the enumeration areas to the east end of Yellowknife. Enumeration areas 66, 64, and 67 had high concentrations of mining personnel. More than ten per cent of the total population of these three enumeration areas were single.

During Stage VI, *Community Diversification*, the type and tenure of housing at least in Yellowknife do not reflect social status. Three enumeration areas have no privately owned dwellings and the highest proportion of owned dwellings occurs in the enumeration area where the old town of Yellowknife was located and is now predominantly heavy industry and commercial enterprises. This reversal in tenure pattern is due to the government providing its employees with subsidized housing.

The educational attainment of the population who had completed their education in 1971 supports the high-low

status pattern varying from east to west. The higher the education attainment the more likely the person will be located away from the commercial and industrial area. Enumeration area 62 had 17.2 per cent of its population who had completed a university degree, enumeration area 70 had 13.1 per cent and enumeration area 69 had 8.7 per cent.

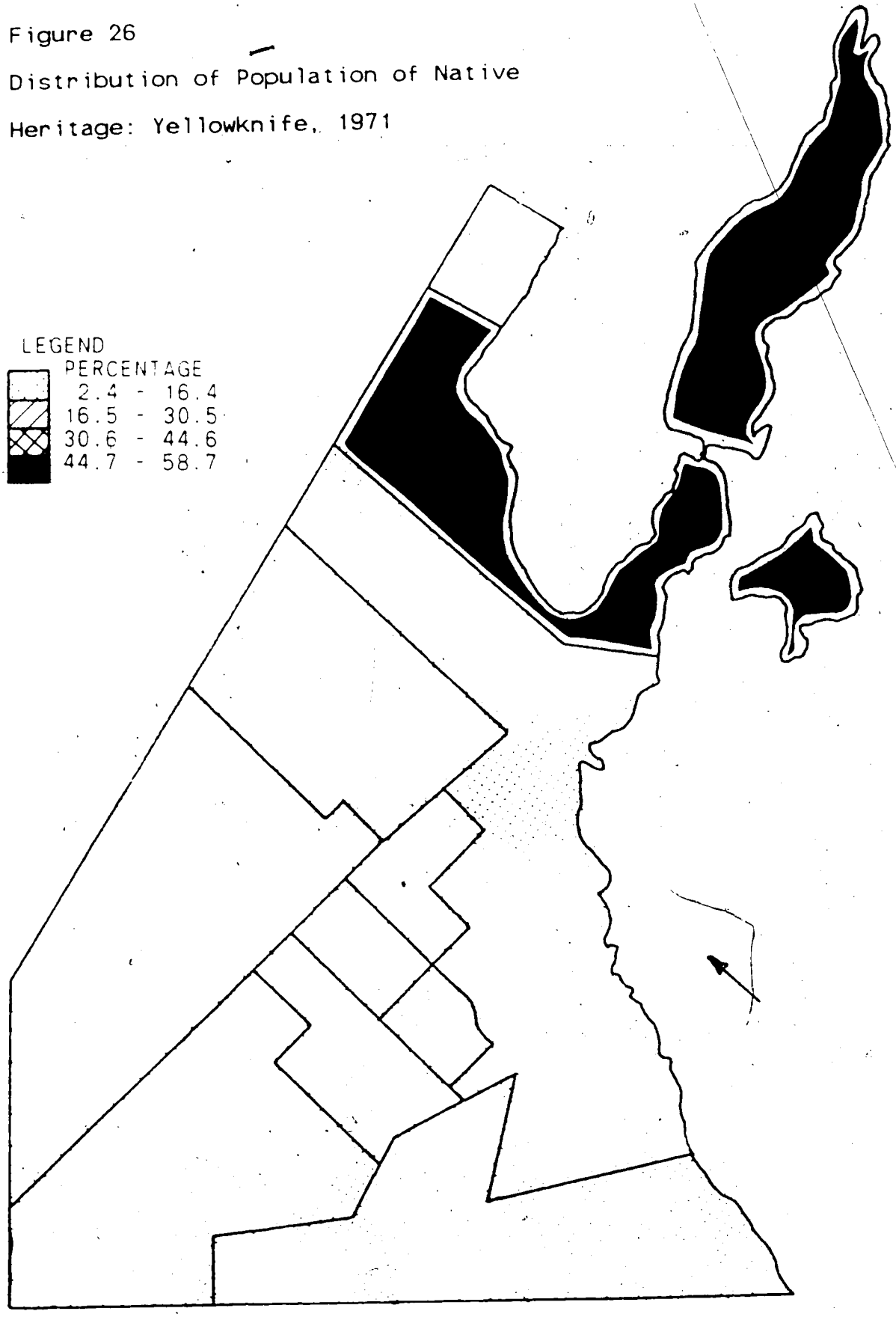
By contrast, low education attainment levels, were concentrated toward the commercial and industrial eastern part of the city. Enumeration area 64 had the highest proportion of population who had elementary schooling. Enumeration areas 68 and 63, both of which adjoin the downtown were areas of high concentration for population with lower levels of educational attainment. Twenty-four per cent of the population in enumeration area 64 had reported completing no schooling in 1971.

Information as to the ethnic origin of population in various enumeration areas indicates that enumeration area 64 is predominantly Native Indian, in that 58.4 per cent reported Native Indian as their ethnic origin. (Figure 26) The native population concentrations generally decline from highest in the east to lowest in the high status suburbs in the west.

Unlike Stage IV and V the religious denomination of Roman Catholic is no longer concentrated at the edge of the city but is now located in the central areas. The highest proportion of Roman Catholic followers occurred in enumeration areas in eastern Yellowknife where the lower

Figure 26

Distribution of Population of Native Heritage: Yellowknife, 1971



status groups are concentrated. The United Church supporters are now concentrated in the west in the newer suburbs. (Figure 27)

The Community Diversification Stage of Yellowknife is a suburbanization process, but due to physical constraints, particularly Yellowknife Bay, the process has been concentrated at the west end of the commercial main street.

Community Diversification in Whitehorse started in 1953 when Whitehorse became the capital of the Yukon. Enumeration area data for Whitehorse in 1971 were not readily available, however, 1971 data for occupation, income, and housing were available. These three variables will therefore comprise the majority of analysis on Whitehorse during the community diversification stage.

The spatial organization of Whitehorse is such that the enumeration areas 15-21 are located in the central part of Whitehorse near the commercial center of the city. (Figure 28) Enumeration areas 7-13 and 23-29 are located in areas removed from the downtown. Enumeration areas 7-13 are south of the downtown core and enumeration areas 23-29 are north of the downtown core.

The distribution of managerial, professional or technical occupations is similar to the pattern in Yellowknife. (Figure 29) The six enumeration areas with the highest proportions of these occupations were external to the central area. In enumeration areas external to the downtown area there was a concentration of the enumeration

Figure 27

Distribution of United Church Supporters: Yellowknife, 1971

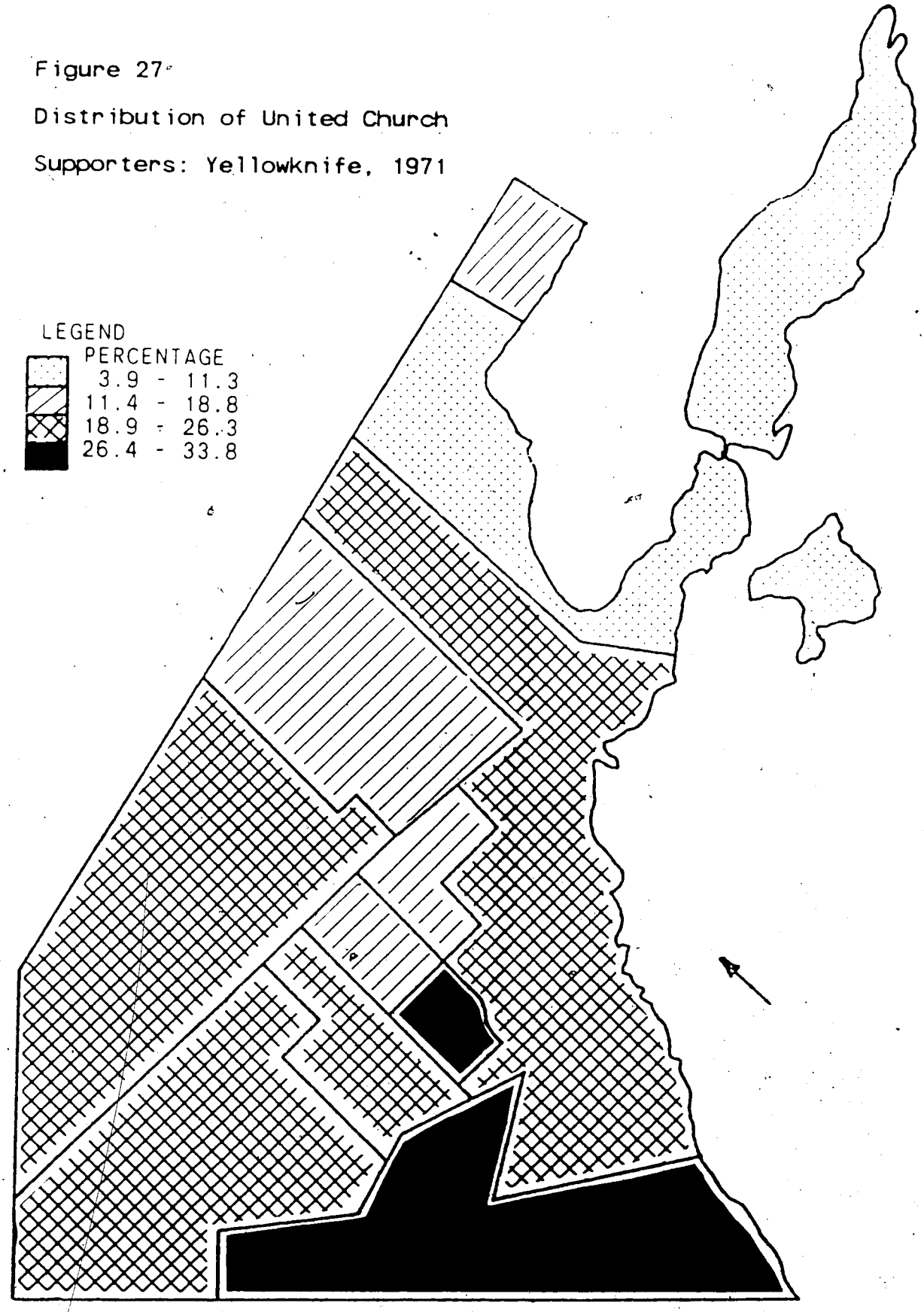
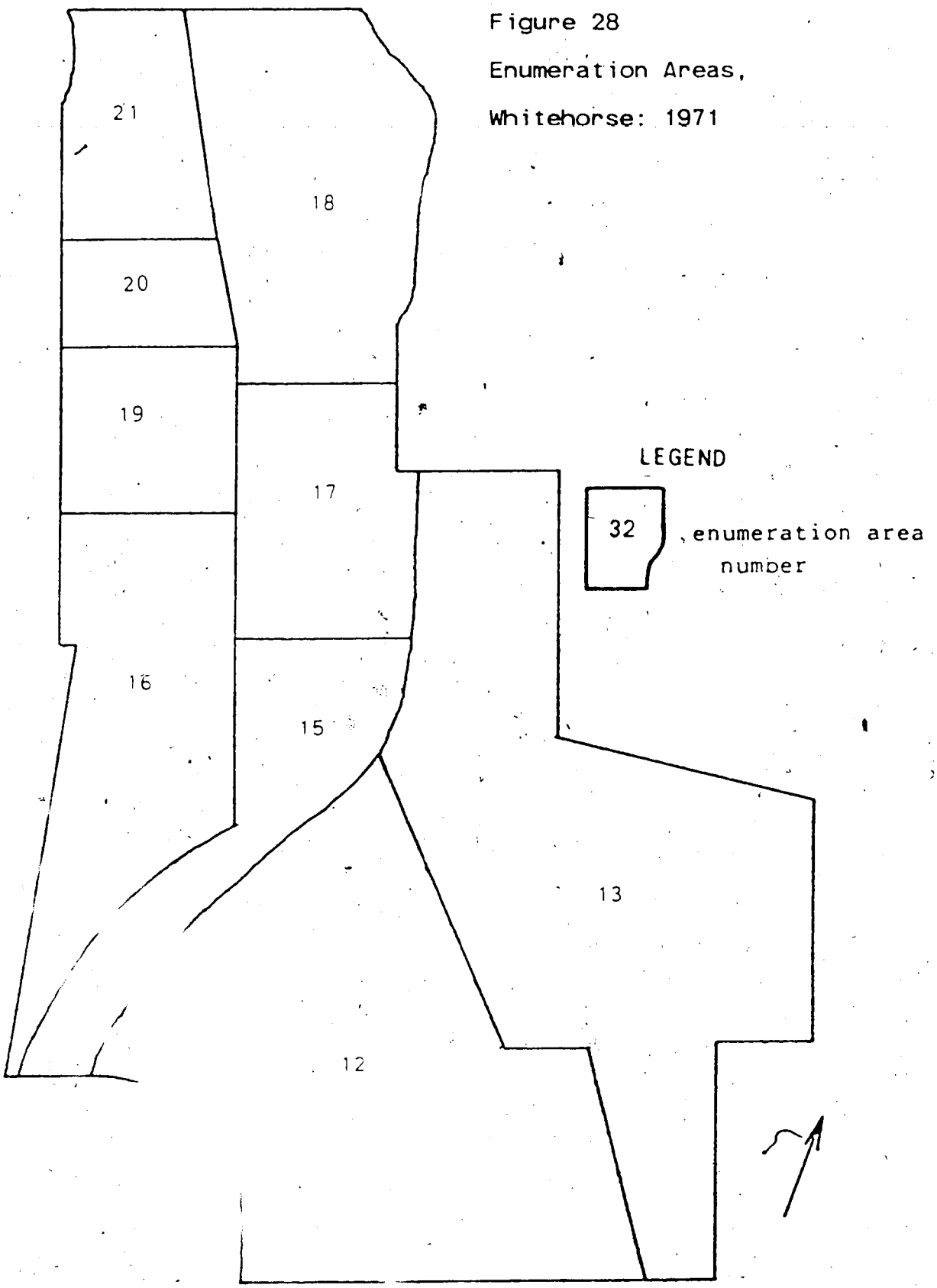


Figure 28

Enumeration Areas,

Whitehorse: 1971



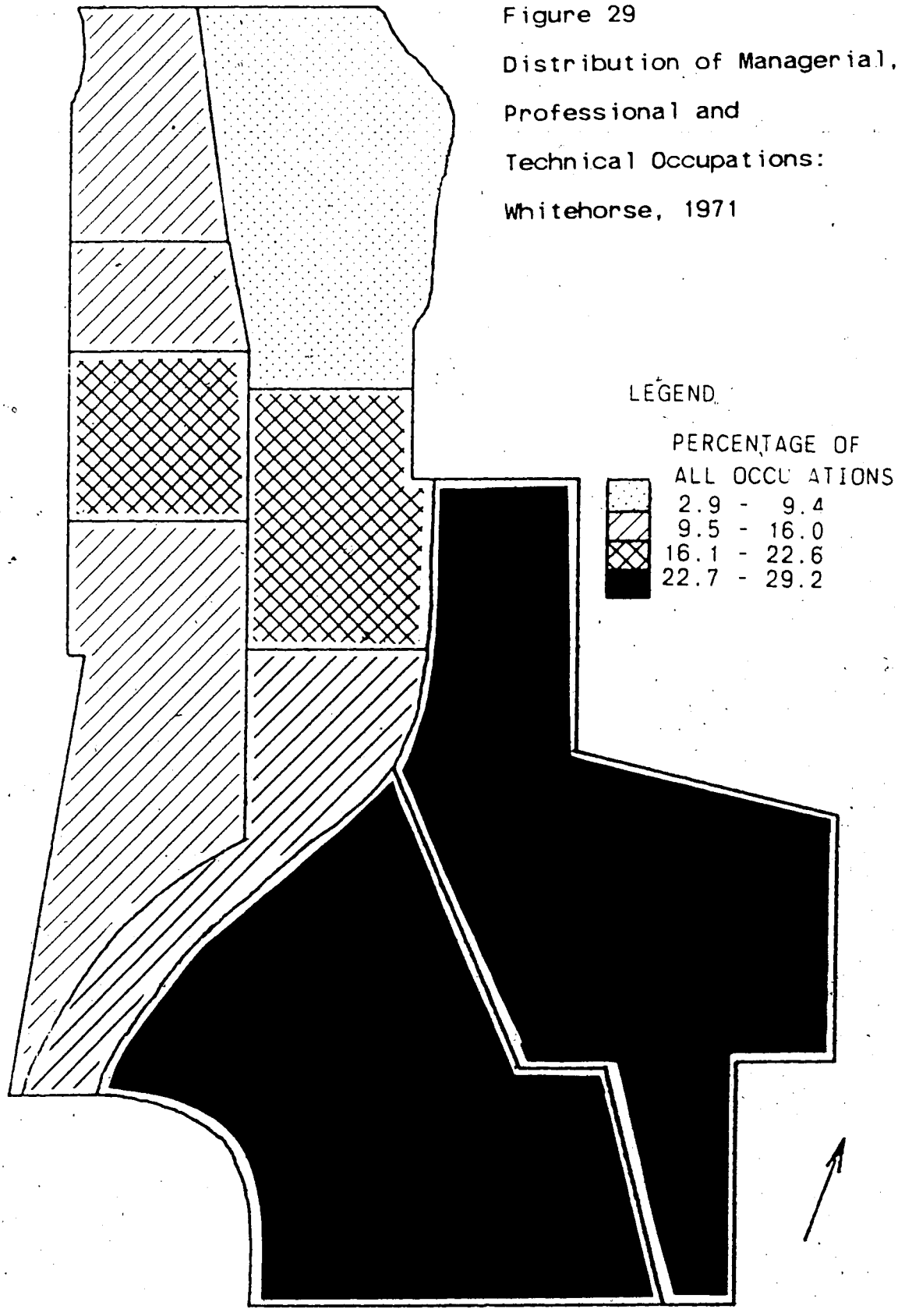


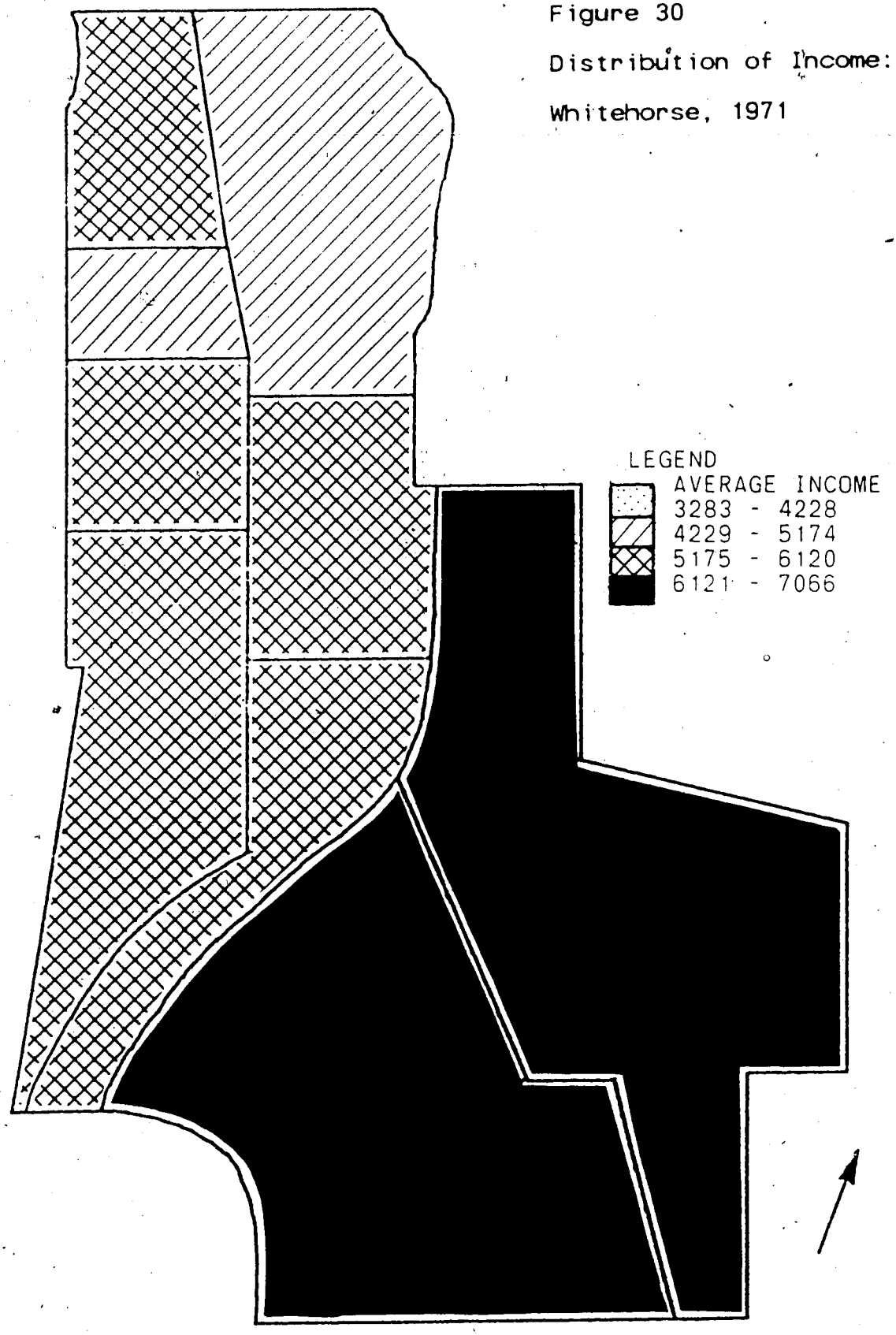
Figure 29

Distribution of Managerial, Professional and Technical Occupations: Whitehorse, 1971

Figure 30

Distribution of Income:

Whitehorse, 1971



the central area. In enumeration areas external to the downtown area there was a concentration of the enumeration areas which exhibited high proportions of managerial occupations. There appear to be two distinct types of enumeration areas in the outlying suburban areas, those which have the highest concentration of managerial and related occupations and those which have the lowest concentration of managerial occupations.

Enumeration areas 15 and 18 are the only two central enumeration areas which had very low percentages of population in managerial and related occupations. These two enumeration areas also ranked highest in proportion of clerical, sales, and service occupations. The enumeration areas which were external to the central area, also had low concentrations of managerial, professional and technical occupations and ranked high on processing and related occupations. Transportation and communication occupations were also concentrated in the external enumeration areas, particularly the ones with relatively low concentrations of managerial and related occupations.

Average income was distributed in a similar pattern as managerial occupations. Of the five enumeration areas with the highest average incomes, four were outside the downtown core of Whitehorse. Enumeration area 19, the only high income enumeration area in the downtown, was the area originally inhabitated by the community elite in the post Klondike Gold Rush era. (Figure 30) Enumeration area 12 and

reflecting the conspicuous consumption of elite groups such as the Commission and Territorial Council. (Koroscil, 1978, 34). Much like the suburbanization process in the metropolitan areas there would appear to be areas of elite upper class with middle class groups attempting to cluster near the upper class and gain some status by proximity.

E. CONCLUSION

Socially, the single-enterprise community appears to have differing patterns according to its stage of development. Much like the demographic stages of development the seven stages of social development collapse into four distinct stages. The first two stages are similar and can be collapsed into a single stage with unique social characteristics. The predominant native culture with low income persists in both Stage I and II. This stage could be characterized more appropriately as a "Gemeinschaft" type of society.

Tonnies used the terms Gemeinschaft and Gesellschaft to characterize urbanization and the resulting social changes. The native population in the pre-industrial development stage have a sense of belonging to a community or culture with personal attachment to the social setting. During Stage III, IV and V the social structure is in transition from a Gemeinschaft to a Gesellschaft type of social organization. (Cortese and Jones, 1979, 10)

The influx of southern construction workers whose cultural and social patterns are more in line with the southern urban society, creates a very different set of social expectations from the unstructured, informal role structures existing in the native populations. Although the construction workers are the first group to arrive in the new community, a limited number of senior managers will have arrived and have had the first opportunity to select housing in the new community. This group has first choice in the housing, and because of its uniform quality these groups will tend to pick the best locations in the community. These locations are normally near the central area close to retail stores, schools, and community facilities.

This pattern of high status groups occupying the central areas is similar to the social pattern of pre-industrial cities. Unlike the pre-industrial city where the elite grouped close to the central area because of the distance which had to be walked, the central clustering in resource communities is more likely due to the desire of these groups to be close to each other for socializing and secondly to keep undesirable lower status groups away from them.

There may even be a subconscious attempt to form a protective subcommunity. Once established, this pattern of segregation remains the same until there is some external force which brings on renewed growth and expansion. This pattern of central segregation of the elite groups is

dominant through stages III, IV, and V.

During Stage VI, the community experiences renewed expansion and the arriving elite are forced to take up residences beyond the location of the outer ring of lower status population. The expansion assisted by diversification creates pressure for more commercial space which can lead to commercial invasion into the elite areas. The displaced elite then move to the new suburbs. Some of the elite central areas are left to middle class populations willing to upgrade to the older but perhaps better maintained housing.

During Stage VII a further change in residential segregation will occur as a spatial pattern of socioeconomic status similar to the sectoral pattern of larger Canadian cities will begin to emerge. This transition is at least in part a function of community size and will be related to both the perception of the community and the commitment of its residents.

VII. SINGLE-ENTERPRISE COMMUNITIES: A REVISED MODEL OF DEVELOPMENT

A. INTRODUCTION

In this thesis an intuitively based model of community growth and development was examined in an effort to determine if single-enterprise communities are similar, as implied by prior research or if identifiable stages occur in the development of these communities which manifest themselves in distinctive economic, demographic and social characteristics.

Utilizing the communities of Yellowknife and Whitehorse as analogous natural cases, the history of these communities was traced. Data from the Census of Canada were compiled and analyzed to determine if seven developmental stages occurred in the growth of these communities. When data were unavailable for the developmental stage, data from two single-enterprise communities in the exploitation ecumene served as proxies. This was necessary because only quinquennial data were available from the Censuses.

In the search for development stages with distinctive economic, demographic and social characteristics some shortcomings of this approach were evident. The frequency of Censuses resulted in data not being available for several stages in the development of the two communities being studied. The small size of these communities made data accessible only by enumeration area, which required

manipulation of random rounded information. The use of newer communities would have alleviated this problem to some degree. A data source with more frequent measurement would have provided better time series data for analysis.

The thesis could have been more analytic had the research concentrated on only one of the three aspects of the model. The examination of the economic, demographic and social characteristics limited the amount of time which could be devoted to each of the three aspects of the model. The censal indicators chosen to provide a broad indication of community development could have been limited to primary indicators at the outset. The use of study communities which had developed over a shorter time frame would have provided more comparable information from the Censuses.

The most significant finding of this research is that variable economic, demographic and social characteristics are evident in development stages. Although this research did not support Riffel's seven stages, at least four distinctive stages were documented.

Economically there was a transition from an almost total dependence upon hunting, fishing and trapping to a broader based economy with a service sector emphasis. In the case of Yellowknife approximately eighty per cent of the labour force was involved in the subsistence economy during the initial development stage. During the second stage, emphasis shifted to single-enterprise. The dependence of the community on single-enterprise employment is very high,

exceeding thirty per cent of the total labour force. In the early part of this stage, construction emerges as the single-enterprise dominating the local economy. Later in this stage, the single-enterprise (resource) upon which the community was founded dominates the economy. During the last two stages the economy diversifies and all sectors decline to less than thirty per cent of the total labour force employed in any single industry.

During the first stage of development, the population reflected demographic attributes similar to those characteristics of lesser developed countries. High fertility and shorter life expectancy generates a population pyramid with a broad base and an extremely low proportion of population aged sixty years of age and over. The second phase is typified by migrant populations with largely single male population and the balance of the population was comprised of young families in the early maturity stage. The population pyramid displays a pinched waist effect. Retirement aged population was very small, comprising less than three per cent of the total population. Migration and labour force turnover continued in Stages II and III. Very few people become permanent residents of the community during these stages. Only in the final stage (Stage IV) did mobility decline sufficiently resulting in at least fifty per cent of the population to be identified as non-movers.

During development the social change experienced by the native population was dramatic. The development of the

nuclear family, the institutionalization of many aspects of life, and the shift away from community interdependence resulted in a culture shock for the native population. This second stage of development resulted in an ecological order similar to that found in the pre-industrial city. Higher socioeconomic status groups, as measured by occupation and income, locate in the central areas close to schools, shopping and recreation facilities, while lower status groups settle in the periphery. As the community's economic structure diversifies, the third development stage exhibits suburbanization. The higher status populations located centrally in earlier stages, moved beyond the lower status groups leaving the central areas for conversion to commercial or multiple rental units.

B. RESEARCH FINDINGS

Despite shortcomings in the data and problems in gaining access to some information, there appears to be sufficient evidence to support the existence of stages in development and each stage can be characterized by unique economic, demographic and social characteristics. Unfortunately this thesis does not support sequential development because of significant data gaps.

The model seems to be a reasonable approach to the analysis of growth and development in the exploitation ecumene of northern Canada. The model provides a framework which can be used to explain urban growth of

single-enterprise communities. In this particular case the stages of the model were developed with reference to the economic activity of these communities. From the data analysis in the economic, demographic and social chapters, a slightly different model seems to emerge. The economic, demographic and social characteristics do not appear to fit into the seven stages. It seems, therefore, most appropriate to collapse the stages when describing the different characteristics, recognizing that the demographic and social aspects of quality of life are closely related to the economic aspects of quality of life and manifest themselves in the social geography of the community.

An alternative to the seven stage development model proposed by Riffel would be the integration of Riffels model into tne four stage growth model of Canadian society as suggested by W.W. Rostow. This simpler model of societal growth is suggested on the assumption that growth and development of single-enterprise communities represents a microcosm of Canadian society, in which (several hundred) years of societal growth and development are compressed into a much shorter time frame.

Integrating Riffel's seven stage model into the four stages of societal evolution results in Stages I and II, *Natural or Pre-discovery* and *Prospecting to Survey*, being subsumed under the pre-industrial stage of Rostow's model. Renamed pre-town for our purposes. The industrial growth stage encompasses Stages III, IV and V, *Industrial and Town*

Construction, Industrial Operation and Community Improvement and *Industrial and Community Operation*. These stages seem to fall together naturally as the predominant ethic Rostow gives for this stage is production and these three stages in Riffel's model are clearly oriented toward production of the community's resource.

Rostow's mass consumption stage with emphasis on consumption and growth is equivalent to Riffel's *Community Diversification*, Stage VI. During Stage VI the community shifts from pure production to concern for growth in the basic economy. The *Post-Industrial Stage* can be compared to community maturity at which time the community has attained the same status as southern communities of a similar size.

The seven stages as identified by Riffel may be more useful for purposes of analyzing the labour force or the economic base of the community than providing a model which reflects the stages of economic, demographic and social change. Riffel may have fallen into a traditional shortcoming of many classification schemes, overlooking much of the urban character by over-emphasizing the simple economic differences. The demographic and social aspects of this model are much more complex than Riffel has suggested.

As indicated in Chapters 2 and 3, the information and analysis derived here may provide additional information which leads to model simplification or to substantiation of the model as proposed. Using an indicators approach the seven stage model was rejected but a simpler model is being

proposed.

Table 19 summarizes the revised stages of the development model and integrates within the model certain geographic characteristics not previously incorporated in the model. The model will now be described according to each of the four characteristics and the way they manifest themselves during each of the four stages of development.

C. ECONOMIC CHARACTERISTICS OF THE FOUR STAGE MODEL

The economic characteristics which are unique to the *Pre-Town stage* are inclusive of two sub-stages. These sub-stages are integrated because the traditional native economy persists during both of the sub-stages. The dominant employment sector of the economy is hunting, fishing and trapping accounting for more than eighty per cent of the labour force. The geology and physiography of the area set the stage for the potential future exploitation. The Prospecting to Survey sub-stage provides a signal that active industrialization may be imminent, but no capital has been committed to the area.

The *Industrialization Stage* of development starts when construction of the industrial plant begins. Large investments of capital, both human and monetary are committed to the industrial plant and the community will house the work force. The completion and operation of the industrial plant takes precedence over construction of the residential and commercial buildings in the town. The

TABLE 19

Summary of Revised Stages and Characteristics of Single Enterprise Town Development

STAGE	ECONOMIC CHARACTERISTICS	DEMOGRAPHIC CHARACTERISTICS	SOCIAL CHARACTERISTICS	GEOGRAPHIC CHARACTERISTICS
PRE-TOWN	traditional subsistence economy. short term activity. prospecting in the area	high birth and death rates low levels of migration age-sex pyramid not unlike lesser developed countries	isolated role differentiation limited extended kinship pattern unspecialized labour force "Gemeinschaft" society	rural no definite geographic location other than region nomadic
INDUSTRIALIZATION	emphasis on industrial construction and operation getting return from investment provision of services secondary to industrial operations	high levels of migration reduced death rates youthful population age-sex pyramid not unlike new towns 20-30 per cent of population non-migrants	pressure from new migrants for "Gesellschaft" relationships more specialization of labour force emphasis on production nuclear family introduced	urban geographic location tied to single-enterprise organized much like pre-industrial city high status groups near centre stress and strain as old society and new society meet
DIVERSIFICATION	shift in emphasis from production to growth diversification of economy through secondary employer	reduced fertility signs of aging in population 50 per cent of population non-migrants sex ratio declines to about 110	emphasis on expansion of roles increased occupational diversity specialization "Gesellschaft" relationships necessary because of size	suburbanization growth creates pressure for elites to move away from central area beyond lower classes some residential high status groups remain centrally located
POST-INDUSTRIALIZATION	diversified economic base. limited opportunity for expansion economic base is similar to southern service centres of the same size	low death rates controlled fertility increase in older population population growth dependent on migration 70 per cent of population non-migrants	emphasis on technology and communications cosmopolitan view choice of lifestyles	sectoral pattern of segregation develops multiple nuclei develop similar to southern Canadian cities

emphasis during this stage is on production, and getting a return on invested capital. At the beginning of this stage the labour force will be dominated by construction workers, the proportions will vary depending on the type of project and the duration of the construction period. The labour force of the community early in this stage could be described as a community of single-enterprise, that enterprise being construction.

At some point during this stage, the industrial plant is completed, the majority of construction workers leave or move to residential and commercial construction jobs in the town. Production jobs in the single-enterprise now become the dominant employment type and the construction workers are replaced by an entirely different work force. Generally, this period will have a dominant single-enterprise representing more than thirty per cent of the labour force and a secondary employer, construction, will represent between ten and twenty per cent of the labour force. Once the remaining residential and commercial construction is completed, the construction industry will decline to a much smaller proportion of total employment. Emphasis is now centered on the exploitation of the resource.

During the *Diversification Stage*, called *Community Diversification* in Riffel's model, the emphasis shifts from production to growth. Growth is viewed in positive terms and the diversification of the economy is actively promoted. Employment dominated by the single-enterprise now declines

through the introduction of a secondary employer, in many cases government. The growth of this sector and many supporting industries results in a more even split of employment. The services sector will increase dramatically, often showing growth rates of over 100 per cent in employment.

The *Post-Industrialization Stage*, identified by Riffel as *Community Maturity*, is postulated to be the final stage of development. This stage, as yet not attained by the communities being studied, is characterized by a diversified economic base, with little opportunity for expansion. This stage will see the community achieve a status similar to southern communities of similar size. The major growth sector in the economy will be the wholesaling and manufacturing sectors.

D. DEMOGRAPHIC CHARACTERISTICS OF THE FOUR STAGE MODEL

The demographic changes which accompany development vary significantly from stage to stage and the implication of these changes should be recognized and planned for in the development of single-enterprise communities. The *Pre-Town Stage* is typical of a very stable population, migration into the region is minimal as very few urban communities exist. The birth and death rates of this population are very high. The mortality rate is high because of the lack of modern medical facilities. Fertility remains high to ensure the survivorship of the family. This combination of vital events

results in an age-sex pyramid similar to that of less developed countries.

During the *Industrialization Stage* modern medical facilities are introduced and death rates are reduced through increased medical care. Migration levels are very high as construction workers and production workers enter the area. High labour turnover ensures that the population remains youthful. The labour turnover results in a very small proportion of stable population, as few as twenty per cent of the population being non-migrants. This continual turnover of population prevents the natural aging of the population. This process culminates in a unique age-sex pyramid through this stage, which resembles the age-sex distribution of migrants. This distribution has an over representation of 20-30 year old population. The sex ratio will vary substantially during this period but will generally start at a high level and decline through the period, being lowest at the end of the stage.

The *Diversification Stage* is characterized by reduced fertility, a core of stable residents establishes itself and approximately half of the population are non-migrants. The age-sex distribution now shows signs of an aging population. An infilling of population occurs in the 15-19 age group, reducing the pinched waist effect of the *Industrialization Stage*. The broad base of young children is reduced as are the population in the early maturity life cycle stage. The sex ratio shows further decline to about 110. Migration is

heavy as the diversification of the economy leads to increased job opportunities in the community. This migration stream is different from the stream of migrants during Stage II as this group of migrants are high in educational attainment and occupational status.

The *Post-Industrialization Stage* has reduced death rates due to more low risk jobs being available and further improvements in health care. Fertility is controlled as more options become available. A stable core of population, up to seventy per cent, are non-migrant and have a relatively high commitment to the community. The late maturity and retirement life cycle stages show the majority of population increase. The major proportion of population growth in the community is the result of migration.

E. SOCIAL CHARACTERISTICS OF THE FOUR STAGE MODEL

The social evolution of the single-enterprise community is summarized according to the four stages and reflects growth of the Canadian society. The *Pre-Town Stage* is typified by isolated native groups with limited economic role differentiation. This kinship pattern has a family unit which includes parents and other relatives of the family depending on custom. The labour force is limited to hunting and fishing and occupational structure is very uniform. The society is perhaps best described by the concept of "Gemeinschaft" where a feeling of belonging to the group exists.

During the *Industrialization Stage* of development migrants from southern cities arrive with very different social expectations. These groups with higher levels of education and high technology occupations create stress by demanding amenities and political structures. As the traditional social structure comes into contact with modern society culture shock is experienced by the Native population. (Morrison, 1977, 332-340) The introduction of the nuclear family and pressure for voluntary association because of mutual needs rather than group belonging generates friction in the community.

The *Diversification Stage* will emphasize the expansion of economic roles through increased occupational diversity and labour force specialization. "Gesellschaft" relationships will be necessary because of the expanded population size of the community.

The *Post-Industrialization Stage* introduces a cosmopolitan view of society with a wider choice of lifestyles. During this stage, emphasis will shift to communication and technology. Communication with metropolitan centres of business and culture will be central to the functioning of the community.

F. GEOGRAPHIC CHARACTERISTICS OF THE FOUR STAGE MODEL

Although geographic characteristics of development were not previously addressed there are a number of geographic characteristics which should be integrated into the model.

Rather than a catch-all statement that single-enterprise communities occur at the site of natural resource exploitation thereby lending a unique pattern to settlement in the Canadian north it can be stated that, each stage of development imposes a new pattern of residential organization on the community.

The *Pre-Town Stage* of development is characteristic of a rural nomadic society. Migrating as the game moves indigenous populations build temporary shelter in areas where hunting, fishing and trapping provide sufficient food for the immediate future.

The *Industrialization Stage* of development is a shift to an urban settlement form. This settlement will be tied to a specific location normally at or near the site of resource exploitation. As stated in Chapter 4, the residential pattern established during this stage is very similar to the pre-industrial city where the high status groups occupied areas adjacent to the central area. This pattern develops because the community services are located centrally and the elites having first choice of location, prefer easy access to the community recreation and shopping area.

The *Diversification Stage* is typical of suburbanization. The expansion of the economy generates pressures for an expansion of the central core area. This pressure increases land values in the central area and the high status groups relinquish their central location for substantive gain. These displaced high status groups now

move out beyond the lower class periphery, resulting in a reversal of the pattern which existed during Stage II. The extent of economic growth during this stage will dictate the degree of suburbanization and the degree of high status residual near the central core.

The *Post-Industrialization Stage* will result in a sectoral pattern of social segregation similar to larger southern Canadian cities. The increase in population and the required level of services will result in a multiple nucleii pattern with decentralization of retail and service establishments.

G. FUTURE RESEARCH

Modelling single-enterprise community development is still in the initial phases. Riffel conceptualized the first model of such development. In any modelling process the next step must be simplification of the Model. As part of this modelling process this research has reduced the number of development stages to four. Future research must attempt to mathematize the simplified model and search for the relationships between economic, demographic, social and geographic phenemena.

Substantive improvements in the model are possible through the collection of longitudinal data on single-enterprise communities during development. This would eliminate the need for the use of proxy communities. The comparison of new towns with single-enterprise communities

could be developed into a major research effort as demographic similarities are evident from the comparison with Millwoods.

Single-enterprise community development requires further study in relation to the demographic characteristics of the stages. The Demographic Transition Model could also be related to the development of single-enterprise communities.

The unique characteristics of the various stages points toward the need for a more interdisciplinary approach to research since the cause and effect of economic, demographic, social and geographic phenomena appear to be very closely tied. This type of approach would seem to be a better framework for the study of urban geography since it allows for the dynamic nature of urban places and recognizes that urban areas regardless of size are a system of inter-related components which are interconnected but each of these parts is a system unto itself. In the revised model, is an implicit recognition that changes occur as urban places grow and develop into larger systems. Recognizing that the economic, demographic, social and geographic parts each represent a system within the overall system.

Although the model provides a framework for simplifying and keeping track of the complex interrelationships within the urban system it must be remembered that it works for these specific cases and may not be representative of the development process in other single-enterprise communities.

In order to establish whether the model is effective in predicting the development process in all single-enterprise communities, a more comprehensive study of the 200 single-enterprise communities in Canada could be undertaken. (Siemens, 1973, 2).

Not only will future research require that more communities be studied, but more sophisticated analytic techniques will have to be used to establish if the process of development in stages is in fact valid. The model will require that each stage be tested and verified to establish the utility of the four stage model.

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APPENDIX

TABLE 29

Selected Social Statistics, Fort McMurray, 1971

Enumeration Area Number	Total %	Managerial Professional and Technical %	Clerical Sales and Service %	Processing and Related %	Transportation and Communication %	All Other Occupations %	Average Income $
161	100.0	10.5	32.1	21.1	5.3	21.0	2,821
162	100.0	12.9	35.1	18.9	5.1	22.8	4,372
163	100.0	12.5	37.1	32.1	0.0	18.3	5,129
164	100.0	29.5	24.6	11.8	3.1	27.8	5,977
165	100.0	17.1	31.0	17.1	9.4	21.3	3,281
166	100.0	11.9	22.0	27.1	3.4	35.6	3,651
167	100.0	20.0	23.1	16.9	1.5	38.5	3,398
168	100.0	17.9	29.9	26.9	5.2	20.1	3,166

TABLE 21

Selected Social Statistics, Grande Cache 1971

Enumeration Area Number	Total %	Managerial Professional and Technical %	Clerical Sales and Service %	Processing and Related %	Transportation and Communication %	All Other Occupations %	Average Income $
318	100.0	11.8	29.4	21.6	9.8	27.4	4,097
319	100.0	9.5	27.0	21.6	1.4	40.5	4,292
320	100.0	10.6	27.7	8.5	2.1	51.1	3,249
321	100.0	19.6	26.1	21.7	2.2	30.4	3,716

TABLE 22

Selected Social Statistics, Yellowknife 1971

Enumeration Area Number	Total %	Managerial Professional and Technical %	Transportation and Communication %	All Other Occupations %	Average Income $
60	100.0	14.3	11.3	74.4	5,256
61	100.0	20.0	18.8	61.2	5,491
62	100.0	29.8	8.8	61.4	6,259
63	100.0	20.6	22.2	57.2	5,060
64	100.0	10.3	15.1	74.3	3,075
65	100.0	10.3	13.8	75.9	5,854
66	100.0	8.9	20.0	71.1	4,855
67	100.0	16.0	12.0	72.0	4,876
68	100.0	10.7	23.2	66.1	4,892
69	100.0	29.2	13.8	57.0	6,097
70	100.0	32.1	11.5	56.4	6,135

TABLE 29

Selected Social Statistics: Whitehorse, 1971

Enumeration Area Number	Total %	Managerial Professional and Technical %	All Other Occupations %	Average Income $
7	100.0	1.8	98.2	5,231
8	100.0	7.1	92.6	4,283
9	100.0	2.9	97.1	4,781
10	100.0	17.9	82.1	5,410
12	100.0	28.2	71.8	6,362
14	100.0	27.4	72.7	6,565
15	100.0	13.2	86.8	5,580
16	100.0	15.0	85.0	5,498
17	100.0	17.1	82.9	5,531
18	100.0	5.3	94.7	4,717
19	100.0	17.6	82.4	6,070
20	100.0	11.5	88.5	4,932
21	100.0	13.0	87.0	5,808
23	100.0	29.0	71.0	5,563
24	100.0	12.1	87.9	5,041
25	100.0	26.8	73.2	7,065
26	100.0	19.4	80.6	5,556
27	100.0	8.8	91.2	5,983
28	100.0	4.2	95.8	5,650
29	100.0	3.4	96.7	4,946