

An Investigation into Central Place Aspects of
Portage la Prairie, with Special Emphasis on the Establishment
of an Hierarchy and the Delimitation of the Complementary Area

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To my wife

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CONTENTS

Page

ACKNOWLEDGMENT	iii
CONTENTS	iv
LIST OF FIGURES	vii
LIST OF TABLES	viii
LIST OF MAPS	ix

PART I

INTRODUCTION

1

CHAPTER

I	Statement of the Problem	1
	Complementary Region	3
	Study Area	5

PART II

THE HIERARCHY OF CENTRAL PLACES
IN THE PORTAGE LA PRAIRIE AREA

6

II	Examination of Some Previous Hierarchical Studies	6
	A. Central Places in Southern Germany	7
	B. Hierarchical Studies in the United States	14
	C. Hierarchical Studies in Europe	21
	D. Hierarchical Studies in Western Canada	25
III	The Hierarchy of Central Places in the Portage Area	34
	A. Population and Distance as a Tool for the Establishment of the Hierarchy	37
	B. The Hierarchy of Central Places Based on Central Place Functions	43
	- Source of Information	44
	- Measurement of Central Place Functions	45
	- Auxiliary Centers	47
	- Groups of Developed Centers	53
	- Comparison to other Hierarchical Systems	60
	- Examination of Functions	63
	- Central Place Functions of Portage la Prairie	70
	C. Portage la Prairie's Employment Structure	76
	D. Relationships between Central Place Functions and Population	82
	E. Spatial Examination of the Central Places in the Portage la Prairie Area	89

PART III

<u>CHAPTER</u>		<u>Page</u>
	THE COMPLEMENTARY AREAS OF PORTAGE LA PRAIRIE	97
IV	Investigation into Complementary Areas	97
	A. Theoretical Areas	97
	B. Review of Some Former Investigations	99
V	Method Used to Delimit Portage la Prairie's Complementary Area	105
	A. The 'Inside' Approach	106
	B. The 'Outside' Approach	112
VI	The Agricultural Products Purchasing Complementary Area	117
VII	Cultural Complementary Areas	129
	A. Recreational	129
	B. Social Recreational	134
VIII	Communication Complementary Areas	153
	A. Daily Paper	154
	B. Weekly Paper	158
	C. Radio	160
IX	Portage la Prairie's Employment Complementary Area	164
X	Financial Complementary Area	167
	A. Banks and Credit Unions	167
	B. Insurance	170
XI	Professional Services Complementary Area	175
XII	Retail Trade Complementary Area	187
	A. The Rural and Urban Component of Retail Trade	187
	B. Trade Area of Portage Based on Reilly's Law of Retail Gravitation	192
	C. Complementary Areas of Lower Order Retail Goods	197
	D. Complementary Areas of Medium Order Retail Goods	217
	E. Complementary Areas of Higher Order Retail Goods	223
XIII	The Hospital Service Area	237
XIV	Administrative Hinterland of Portage la Prairie	239

PART IV

CONCLUSION 249

XV	A. Findings of the Study	249
	- Hierarchy of Centers in the Portage Area	249
	- Portage la Prairie's Sphere of influence	254
	B. Practical Recommendations	257

BIBLIOGRAPHY

259

- APPENDIX A Questionnaire Used in the Interview of Managers
and Proprietors of Establishments in
Portage la Prairie.
- APPENDIX B Questionnaire Used in the Survey of the Rural
People.
- APPENDIX C Central Place Theory - A Precis.

LIST OF FIGURES

<u>Figure</u>		<u>Page</u>
1	Population-Distance to Portage Relationship	41
2	Function-Establishment Relationship	57
3	Function-Functional Unit Relationship	58
4	Functional Unit-Establishment Relationship	59
5	Relationship between Population and Number of Functional Units of a Center	83
6	Relationship Between Population and Number of Establishments of Centers in the Portage la Prairie Area	86
7	Relationship between Population and Number of Functions in the Centers of the Portage la Prairie Urban System	88
8	Theoretical Complementary Areas of a Fourth Level Center	98

LIST OF TABLES

<u>Table</u>		<u>Page</u>
1	Types of Central Places in Southern Germany	13
2	Actual and Theoretical Number of Centers in Wisconsin	17
3	Central Place Functional Inventory of Centers in the Portage la Prairie System	48
4	Functional Unit Grouping as Tested by the Reflexive Pair of Point Method	55
5	Frequencies of Functions of Different Level Centers	68
6	Employment Comparison of Portage la Prairie to Canadian Cities	80
7	Comparison Between Actual Nearest Neighbor Measurement in the Portage la Prairie Area and Nearest Neighbor Measurement in a Random and a Hexagonal Distribution	92
8	Professional Services Complementary Areas Data Showing Population and Types of Centers	184
9	Percentage of City and Non-City Clientele and Business for Different Retail Establishments	189
10	Data of Retail Trade Complementary Areas Showing Population and Types of Centers	196

LIST OF MAPS

<u>Figure</u>		<u>Page</u>
1	Portage la Prairie Urban System Areal Extent	36
2	Minimum Distance Measurement Between Centers of the Portage la Prairie System	91
3	Service Areas of Agriculture Products Purchasing Farms	118
4	Agricultural Complementary Area of Portage la Prairie	119
5	Service Areas of Recreational Establishments	130
6	Curling Complementary Area of Portage la Prairie	135
7	Bingo Complementary Area of Portage la Prairie	138
8	Portage la Prairie Church Complementary Area	140
9	Portage la Prairie Dancing Complementary Area	144
10	Portage la Prairie Theatre Complementary Area	146
11	Portage la Prairie Golfing Complementary Area	148
12	Portage la Prairie Bowling Complementary Area	150
13	Portage la Prairie Daily Newspaper Complementary Area	156
14	Portage la Prairie Weekly Newspaper Complementary Area	157
15	Circulation of Weekly Paper as a Percent of Post Office Box Holders	159
16	The Portage la Prairie Radio Listening Complementary Area	161
17	The Portage la Prairie Work Complementary Area	165
18	Service Areas of Financial Institutions of Portage la Prairie	168
19	The Portage la Prairie Financial Complementary Area	169
20	Service Areas of Insurance Agents	172
21	Portage la Prairie Insurance Complementary Area	173
22	Service Areas of Professional People in Portage la Prairie	176
23	Portage la Prairie Medical Complementary Area	178

<u>Figure</u>		<u>Page</u>
24	Portage la Prairie Accountant Complementary Area	179
25	Portage la Prairie Dental Complementary Area	180
26	Portage la Prairie Lawyer Complementary Area	181
27	Portage la Prairie Veterinarian Complementary Area	182
28	Portage la Prairie Trade Area According to Reilly's Law of Retail Gravitation	193
29	Portage la Prairie Building Material Sales Complementary Area	198
30	Portage la Prairie Seeds, Fertilizers, and Chemical Sales Complementary Area	200
31	Service Areas of Automobile and Farm Implement Dealers	201
32	Portage la Prairie Car Purchase Complementary Area	202
33	Portage la Prairie Car Service Complementary Area	205
34	Portage la Prairie Farm Equipment Purchase Complementary Area	207
35	Portage la Prairie Farm Equipment Repair Complementary Area	208
36	Portage la Prairie Fuel Distributors Service Areas	210
37	Portage la Prairie Fuel Purchase Complementary Area	211
38	Portage la Prairie Food Store and Dairy Farms Service Areas	214
39	Portage la Prairie Perishable Food Complementary Area	215
40	Portage la Prairie Non-Perishable Food Complementary Area	216
41	Portage la Prairie Work Shoe Purchase Complementary Area	218
42	Portage la Prairie Household Appliances Complementary Area	219
43	Portage la Prairie Furniture Purchase Complementary Area	220
44	Portage la Prairie Men's Work Clothes Purchasing Complementary Area	221

<u>Figure</u>		<u>Page</u>
45	Portage la Prairie Medical Supply Purchase Complementary Area	222
46	Service Area of Small Department Stores in Portage la Prairie	225
47	Portage la Prairie Children's Wear Purchase Complementary Area	226
48	Service Area of Ladie's Specialty Stores of Portage la Prairie	228
49	Service Area of Shoe Store of Portage la Prairie	229
50	Portage la Prairie Ordinary Ladie's Clothes Purchasing Complementary Area	230
51	Portage la Prairie Better Shoes Purchasing Complementary Area	232
52	Portage la Prairie Better Men's Clothes Purchasing Complementary Area	233
53	Portage la Prairie Better Ladie's Clothes Complementary Area	234
54	Government Institution Service Areas	241
55	Government Institution and Utilities Service Areas	244

PART I

INTRODUCTION

CHAPTER I

Statement of the Problem.

Ever since Christaller expounded his Central Place Theory in the early 1930's, researchers have turned to the field to find evidence of its theoretical base. This search has been met with varying degrees of success. Most research of this nature has been directed toward establishing the hierarchical levels of centers. Although the hierarchy of centers has been found in many areas, it has by no means been established in every part of the world. In Canada only a few studies have been done and in Manitoba only one study has concentrated on finding an hierarchy of central places.¹ Therefore, the examination of an hierarchy of central places in the Portage la Prairie area of Manitoba is the task of the first part of this study.

Of the studies that have concentrated on finding the hierarchical levels of centers, few have tested their findings against Christaller's theoretical base. Hence, the initial problem is to examine some of the well-known studies with regards to their research methods and their findings. Such an approach will clarify the methods used in the past and the extent to which they are reliable, as measured by their comparison to Central Place Theory.

The establishment of an hierarchy of central places has previously been approached by a preselection method, in which an

¹This study by T. G. Sosa, of the service centers in the Interlake region of Manitoba is discussed at length in Chapter II, pp.30-34

area was chosen and the researcher decided to examine all the centers within the selected area. Sometimes this area included centers belonging to other urban systems. At other times, centers belonging to the urban system being examined, were not included because they were located outside the chosen area. In this study a center is chosen (Portage la Prairie) and the hierarchy problem is approached from the fact that certain centers are dependent upon it. The whole array of centers that are under the influence of Portage la Prairie are then examined for hierarchical levels. This approach eliminates the problems arising from the preselection method and should produce more accurate results.

The methods used in order to decipher an hierarchy of central places, influences the final results. According to Christaller's theory, the difference between the centers depends on the services and goods offered in the centers. Higher level centers offer a greater number and variety of services and goods than lower order centers. Christaller used telephone connections as an index of the difference in goods and services offered at the centers. Others have used population data, special services and the number of establishments or types of goods found in a center. In this study these methods are examined before the most suitable one is chosen. This method is then used to establish the hierarchy in the Portage area.

Once established, the results are then compared to a number of other well-known studies and to the theoretical base. Many authors have published their results without comparing them,

to the original theory. Thus they have neither proved nor disproved the original hypothesis.

Complementary Region.

An integral part of Christaller's Central Place Theory is the concept of a complementary area for each center. The complementary area is defined as "the region for which a central place is the center".² Christaller postulated that these complementary areas would vary in size for different order centers, that the configuration of the complementary areas would be hexagonal in shape and that each different level of goods and services of a particular center would have a different size of complementary area. In this study the hinterland of Portage la Prairie is examined in the light of some of the above concepts. This constitutes the second major section of the investigation of the central place aspects of the Portage area.

As mentioned above, the complementary area is defined as the region for which a central place is the center. People living in this area will depend upon this center for particular goods and services. Thus one can speak of the complementary area of a particular good or service provided by the city. The influence of this good should, in theory, be known to two groups of people, those that provide the good or service and those that acquire it. As one group lives in the city and the other outside the city, the boundaries of the complementary region of the center can be established by two methods:

²W. Christaller, Die Zentralen Orte in Suddeutschland, Translated by C. W. Baskin as Central Places in Southern Germany, Englewood Cliffs, N.J., Prentice-Hall, Inc., 1966, p.21.

- (i) gathering information from the people giving the service or selling the good; and
- (ii) from the people purchasing the good or service.

Thus it is either an 'inside city approach' or an 'outside city approach'. Both approaches are used in this study. The 'inside' approach consists of interviewing³ managers and proprietors of retail, social, professional and administrative services and collecting information regarding their service areas. The 'outside' approach consisted of circulating a questionnaire⁴ in the towns, villages and rural areas around Portage la Prairie.

As there are literally hundreds of goods and services offered in a center, the selection of a few for the questionnaire presented a problem. In this study 38 goods and services were selected in such a way as to include goods and services from different levels of needs. These were chosen on the basis of economic and cultural needs so as to give a good cross section of the total requirements of rural people.

Since most administrative functions of a city have well-defined service areas, no aspect of this central place function was placed on the questionnaire. Service areas of governmental institutions were established from the interviews with the managers and directors of these governmental services.

³ In all 142 interviews were conducted in Portage la Prairie.

⁴ The response to this questionnaire was quite favourable. In all some 1,000 questionnaires were sent home with rural students and 718 questionnaires were returned.

Study Area.

The city of Portage la Prairie is situated in the heart of South Central Manitoba. It is located 54 miles due west of Winnipeg, on the north bank of the Assiniboine River. The area around Portage is extremely flat with no physical barriers to transportation except Lake Manitoba, some 15 miles to the north. The surrounding area is predominantly a grain growing area with some vegetables now being grown along the river.

The reasons for choosing Portage la Prairie and its surrounding area for a central place study are many. The first and probably the most obvious one is that no study of this kind has been done in the Portage area. Secondly, the writer lived in the area for a year previous to this study and thus he was familiar with it and was very interested in examining it. Thirdly, Portage la Prairie is still considered to be primarily a service city with few industries or activities other than those of a central place. Also, the physical conditions envisaged by Christaller for the development of a central place pattern, such as uniform population distribution, ease of transportation, and homogeneous land area, are all as uniform in the Portage area as in any other area of Manitoba. Since Portage la Prairie is only 54 miles from Winnipeg, which is the writer's home, the proximity of the study area was a final reason for choosing Portage la Prairie.

PART II

THE HIERARCHY OF CENTRAL PLACES IN THE PORTAGE LA PRAIRIE AREA

CHAPTER II

Examination of Some Previous Hierarchical Studies.

If urban centers are to be classified on the basis of their importance, it is easy to fall into the misconception that importance of a place is synonymous with the number of people living in that place. The problem is enhanced when in cases this turns out to be true. Thus, for instance, Greater Winnipeg with its greater population (475,989) is more important than Brandon (28,166), which in turn is more important than Portage la Prairie (12,388)¹. The problem thus emerges as one of defining the word importance.

The index of importance of a town should measure the purpose or chief profession for which this settlement exists. According to Christaller "the chief profession or characteristics of a town is to be the center of a region".² Gradman under whom Christaller studied called the chief profession of a town "to be (the) center of its rural surroundings and mediator of local commerce with the outside world".³ Both statements of the purpose of a town stress the point that the service center is the media

¹Canada, Dominion Bureau of Statistics, Census of Canada: 1961 Population, Vol.1, Part 1, Ottawa 1963, p.537.

²Christaller, op.cit., p.16.

³Robert Gradman, "Schwaebische Staedte", Zeitschrift der Gesellschaft fuer Erdkunde, Berlin 1916, p.427.

of communication in the economic, social, and institutional realms between the rural and urban people. Since these two groups of people make up the whole population of the world, one can say that the purpose of the city is to provide the contact or communication between people. One can distinguish between institutions of communication on the basis of whether they are used extensively by the city dwelling people or whether they are used by both rural and urban people. It is with the latter group of institutions that Christaller was concerned in his classification of centers in Southern Germany. Thus, any classification of centers into groups of more important and less important centers has to be performed taking into consideration the number of institutions of communication present in these centers. A perfect classification of service centers should also take into consideration the quality of the central services. In classifying functions, a large department store should not be counted as being in the same category as a small department store. Although in theory this is easily done, but in reality one finds it difficult to state when a small department store becomes of medium size.

Before presenting the classification of centers used in this thesis, a review is made of the methods of the noted scholars in this field.

A. Central Places in Southern Germany

In his study of Southern Germany⁴ Christaller devised a method which allowed him to by-pass the enormous amount of work which consisted of adding all the institutions found in a central

⁴Christaller, op.cit., p.230.

place, then weighing them according to their importance, and establishing the centrality or importance of a central place. His method device consisted of using the number of telephone installations in a central place. At the time of Christaller's research, telephones in Southern Germany were mainly restricted to functional institutions other than residences in settlements. The number in a settlement was used as a good indicator of the centrality⁵ or importance of the central place. But Christaller refined this rough measure of the centrality. He did this by finding the density of telephones $(\frac{T_g}{E_g})^6$ in the complementary region of the central place concerned, multiplying this density by the population of the central place and subtracting the resulting figure from the total number of telephone connections found in the central place. The resulting number he called the centrality index of a place. It was to be indicative of the importance of the urban place. In reality, this number gave a measure of surplus of the central place telephones over the number of telephones in the surrounding area. In mathematical terms the centrality index of any center can be written in the following way: $Z_z = T_z - E_z (\frac{T_g}{E_g})$.⁷ Christaller

⁵Christaller defined centrality of a center as being "equal to its surplus of importance, that is equal to the relative importance of this place in regard to a region belonging to it". Christaller, op.cit., p.147.

⁶See Footnote 7 for explanation.

⁷In this equation Z_z represents the centrality index, T_z the number of telephone connections of the central place, E_z the number of inhabitants in the central place, T_g the number of telephone connections in the region and E_g the number of inhabitants in the region. Ibid.

realized that these centrality index numbers for the different centers could be compared only if the telephone connections were of uniform density over the whole of Southern Germany. But such uniformity did not always exist. Since the city people of larger centers usually have more private telephones than people in smaller centers, the centrality index increased in favour of the larger centers.⁸ This in actuality was true but Christaller dismissed this argument on the grounds that large cities have large institutions; since only one telephone connection had been counted for each of these larger institutions, extra private connections to the city total would only weigh these institutions properly. Other inequalities, such as wealthier regions within the region of Southern Germany and special regions such as tourist areas which would upset this uniform density prerequisite, were dismissed. He claimed that these areas were too small in number and in size to alter the end product.

In determining the density of telephones for the complementary region of a central place, Christaller did not explain how he calculated the area of the complementary region. He acknowledges that this region is not easy to determine but the delimitation of this area for each center is a prerequisite for the determination of the centrality index. Since no field work was done which could have delimited these complementary regions, Christaller defined them rather imprecisely in the following way. "The region of a central place of the lowest order

⁸This is true because centrality according to Christaller's formula is directly proportional to total telephone connections in a center.

was found to include only the neighborhood of the central place, and in no case to include another central place".⁹ And in a similar manner "the region of the central place of a middle order was assumed to be identical with the lower administrative district".¹⁰ Since within administrative regions there were sometimes found central places other than the administrative center, an adjustment was made on both the number of telephones and the number of people in the complementary region. This adjustment was due to these unwanted centers, and Christaller accomplished this by mere subtraction of both telephone and population figures of these centers from the telephone and population figures of the whole complementary region. It is this inaccuracy in the determination of the complementary region which makes the centrality indexes of the cities, towns, and hamlets in Southern Germany questionable.

Having derived the centrality index of all urban settlements by the method outlined, Christaller was confronted with the greater, at least theoretically, more meaningful task of classifying them into groups of centers with similar importance. Each group should have, according to his logically deduced economic theory, institutions selling goods or services of similar maximum and minimum ranges. Central places of a certain class were to have all the goods and services of the lower class center. In addition they should offer goods or services not found in any lower order center being representative of this the next highest class of centers.

⁹Christaller, op.cit., p.149.

¹⁰Ibid.

This additional group of goods and services could only be offered in this higher center because of the greater population both in the center and in the complementary region. The lower centers with their smaller population and smaller complementary region could not offer these goods and services because the threshold population¹¹ requirements demanded by these higher order goods and services were too high. An example can be given to illustrate this point.

A department store cannot exist (economically speaking) in a village because the number of customers that this village can offer from itself and its small complementary region is not enough to support the department store. A city can support a department store because of its own greater purchasing power and the greater purchasing power of its complementary region. A grocery store in contrast to the department store can be supported by both the village and the city because of the smaller number of customers needed. Thus before a retail outlet can locate anywhere the threshold population requirement has to be met.

From the spacing of central places in a hexagonal arrangement, the arrangement that allows the coverage of a whole area without overlapping of complementary areas of equal level service centers, Christaller was able to determine theoretically the number of centers in each level of the hierarchy. If the actual pattern in Southern Germany had been formed by economic-geographical laws, the actual hierarchy in Southern Germany should be similar to his

¹¹The term threshold population refers to the minimum number of people required before a good or service can be offered without a financial loss.

theoretically derived one. To make such a comparison possible, he first had to divide his centers of Southern Germany into groups. This he did by making use of centrality indexes of the different centers which ranged from $-.5$ to $2,825$. The total number of groups of centers was eight, each with a specific range of the centrality index. Since the smallest group had a centrality index ranging only from $-.5$ to $+.5$ he considered them to be centers deficient in service even for their own people. Nor did they have extra services for the surrounding area and hence could not be considered as central places. He thus called these centers auxiliary central places (hilfszentrale Orte) or type H centers. Because of the relative unimportance of these centers, Christaller did not examine them thoroughly. All other centers were classified into seven groups according to their centrality index. The final results are shown in Table 1, page 13.

From the table it can be seen that the actual number of central places corresponds quite well to the theoretical numbers at the higher level of the hierarchy, but not so at the lower level. A statistical technique called chi-square¹²(X^2) can be used in this case to test the compatibility of the observed (actual number) and expected frequencies (theoretical number) of service centers. The only prerequisite for using the chi-square test is that the observed frequencies or sample frequencies should be normally distributed about the theoretical frequency to

¹²Since the X^2 test of compatibility is a common statistical test found in nearly every statistical book, it is not explained here. For a simple explanation see G. H. Hoel, Elementary Statistics, (New York: John Wiley & Sons, 1960), pp.157-170.

which each value is compared. This prerequisite is fulfilled in Christaller's study. The chi-square value is given by the following relationship:¹³

$$X^2 = \sum_{i=L}^H \frac{(O_i - E_i)^2}{E_i}$$

Table 1
Types of Central Places in Southern Germany

Type	Approx. Pop.	No. of Telephones	Centrality	Theoretical No. of each type in 2/3 of system*	Actual No. in Munich system in Germany
H	800	5-10	-.5-.5	-	-
M	1,200	10-20	.5-2	324	180
A	2,000	20-50	2-4	108	81
K	4,000	50-150	4-12	36	59
B	10,000	150-500	12-30	12	18
G	30,000	500-2,500	30-150	4	6
P	100,000	2,500-25,000	150-1,200	1	1
L	500,000	25,000-60,000	1,200-3,000	1	1

Source: W. Christaller, Central Places in Southern Germany, p.158.

*Christaller reasoned that in Southern Germany there were only 2/3 of the total number of central places belonging to the L system of Munich. The other 1/3 were found in the countries bordering Germany and hence outside of his area of investigation.

The calculated value of X^2 is 83.89 for Christaller data. Since the critical value of X^2 at the five percent level and five degrees of freedom is only 11.07, a value substantially less than the calculated value of 83.89, one should reject the hypothesis that such a sample could have come from a population of service centers as presented under the theoretical data. But as the M class contributed 67 percent of the chi-square deviation, one should not reject the whole experiment, but rather re-evaluate the number of

¹³Where X^2 is the chi-square value, O_i the observed frequency and E_i the expected frequency.

lower centers.¹⁴ Yet it is somewhat surprising that Christaller's own sample study does not correspond significantly with his theoretical data.

Having thus re-examined the original attempt at classifying central places into an hierarchy, it is now necessary to review the methods and results of recent investigations in this field.

B. Hierarchical Studies in the United States

One investigation in North America into the hierarchy of central places that has received both praise and criticism is that of J. E. Brush.¹⁵ He not only established an hierarchy of service centers in Wisconsin, but also investigated the spacing of central places. In addition, he delimited the complementary areas of these centers. This aspect of his work is discussed in a later chapter.

The basis on which Brush devised an hierarchy consisted of examining and grouping the functions found in a central place. Having chosen a rural area, Brush's method of classification was restricted to the lower level centers in the hierarchy of central places. All the centers that he examined had a population of less than 7,217. Using functions performed in the city as a basis, Brush deciphered three categories; the hamlet, the village, and

¹⁴The actual errors could have occurred because of a wrong division of centers into groups or in the assumption of Christaller that his study area of Germany made up 2/3 of the L system of Munich. Further, the actual data could have been a rare sample (less than .005 percent prob.) taken from a population having the theoretical composition of cities.

¹⁵J. E. Brush, "The Hierarchy of Central Places in Southwestern Wisconsin", Geographical Review, Vol. XXXIII (1953), pp. 380-402.

the town. Although he mainly used functions as a basis for his classification, other criteria were also used. Thus a hamlet "must consist of at least five residential structures or other buildings used for commercial or cultural purposes clustered within one quarter of a mile (linear distance), and it must contain at least one, but no more than nine retail and service units".¹⁶ The grocery store and the elementary school were typical units while taverns, filling stations and churches were common units.

A village, in contrast, had to have a minimum of ten retail and service units of any type, yet not more than a total of 50 units. The units that were found to be common and typical in hamlets were typical in villages while implement and automobile dealers, appliance stores, lumber and hardware or livestock feed units were common only in villages. In addition to these the village had to have banking facilities and a telephone exchange or postal delivery. Most of the villages also were served by truck transfer instead of rail, not being large enough for the latter. The recreational facilities usually were poorly developed, if present at all. High schools were found in over 50 percent of them while most had the political status of a village. The average population was 481 people, although the range was quite great, varying from 115 to 1,415 people.

The minimum requirement for a town or a center of third order in the hierarchy was that it had to have at least 50 retail units. Thirty of these had to be of a type other than grocery stores, taverns and filling stations. The minimum requirement

¹⁶Brush, op.cit., p.385.

in the field of education was a high school. In the professional fields such people as physicians, dentists, veterinarians and lawyers were a necessity. The recreation developments such as parks, libraries, and golf courses were represented. The average population in this group or class was 3,324 people with a range from 1,329 to 7,217 people.

It is interesting to note that the number of functions required correspond well to the number of telephones per center in Christaller's area. His lowest center, H, (auxiliary center) had 5 to 10 telephones, while the range of his M and A centers varied together from 10 to 50 telephone connections similar to the number of functions required of Brush's village class center.

It is the division of service centers into exactly three groups or classes by Brush and the implied distinctiveness of one group from the other that has been criticized by other scholars. Brush established the upper and lower limits of the number of functions for the different groups at natural breaks in his number of functions per central place data. Advocates of a continuum in importance of urban settlements have criticized Brush for this unsophisticated method of establishing three classes of centers. Vining states: "There is no evidence...that exactly three natural partitions may be observed in this array of number of establishments...the terms hamlet, village and town are convenient modes of expression".¹⁷ Even Berry, although a strong advocate of

¹⁷R. Vining, "A Description of Certain Spatial Aspects of an Economic System", Economic Development and Cultural Change, Vol.III (1955), p.167.

central place theory, criticizes Brush on his classification in "that he used an arbitrary division and then proved what he had in fact assumed".¹⁸

It is interesting to compare the number of central places in the different classes in Southwestern Wisconsin with theoretically derived numbers. Christaller showed that if the market principle was the main force in the development of central places, then for each center of higher order there would be a demand equal to two centers of the next lower order dependent upon this higher center. Although Brush did not test the compatibility of the number of centers in the different groups with the number derived from the theory, such a test would support his number of classes if it was favourable. A chi-squared test is applied to his data as was done to Christaller's data.¹⁹

Table 2
Actual and Theoretical Number of Centers in Wisconsin

Type	Theoretical* (k=3)	Actual Number of Centers
Town	18	19
Village	54	73
Hamlet	162	142

Source: Brush, "The Hierarchy of Central Places in Wisconsin", Geographical Review, Vol. XXXVIII, p.390.

*Values derived for a six class hierarchy of which only the bottom three are considered here.

¹⁸B. J. L. Berry and W. L. Garrison, "The Functional Bases of the Central Place Hierarchy", Economic Geography, Vol. XXXIV (1958), p.146.

¹⁹See page 13 of this chapter for more information on the chi-square test.

The calculated chi-square value turned out to be 9.1. On entering the theoretical chi-square distribution table with two degrees of freedom, we find that such a value is found about 1.5 percent of the time. If a critical value of one percent is the limit, then the hypothesis that this sample came from a $(k=3)$ ²⁰ urban settlement network with an hierarchy of six classes has to be accepted. This test thus supports Brush's establishment of a three level hierarchy, as being a possible one, although it does not go as far as to claim that this is the only classification that could have fitted the theoretical $(k=3)$ urban network.

In recent years much work in the establishment of an hierarchy of urban centers has been done by B. J. L. Berry and Associates. Berry and Garrison²¹ established in 1958 by means of subjective statistical means the presence of an hierarchy of urban centers in Snohomish County, Washington. The 33 centers which they examined could be grouped into a three level hierarchical class system.

In establishing a three level hierarchy the number of central functions in a central place was again used as a basis. The number of central functions was ranked in a descending order, ranging in number from 64 to 1. These numbers of central functions

²⁰The $k=3$ urban network consists of an arrangement of urban centers in which each higher order center has two lower order centers depending upon it for the services not provided in the lower order center. It is the basic hierarchical concept of cities advocated by Christaller in which all centers of one kind are arranged hexagonally over an area, with the higher order center superimposed on the lower order center.

²¹Berry and Garrison, op.cit., pp.145-154.

were considered to be a random sample of the population of a line continuum with points ranging from 1 to 64. Clark's test of randomness was then applied to their sample values.²² The chi-square test showed that randomness was not the case and by using Clark's concept of a group--that every member of the group should be closer to some other member of the group than to any other point--three groups could be discerned. The number of central functions in these groups ranged from 1 to 16 in the lower group, from 22 to 42 in the middle group and from 56 to 64 in the higher group.

Berry and Garrison also examined the kind of functions present in these centers, to see if certain functions could be associated with lower centers. In order to do this the functions were divided into two groups, variates and attributes.²³ Variates were ranked according to threshold population per function, the latter having been determined from central place population versus number of establishment graphs of that particular function. Because it fitted the data best, the exponential growth series $P=A(B^N)$,²⁴ logarithmic transformation was necessary before a least square technique equation could be formed. From these equations the actual value of threshold population of the particular function under question could be received by setting N (the number of

²² Philip I. Clark and Francis C. Evans, "Distance to Nearest Neighbor as a Measure of Spatial Relationships in Population", Ecology, Vol. XXXV (1954), pp.445-452.

²³ The term variate referred to those functions of which a central place might have none, one or more than one while the term attribute referred to those functions of which the city had either one or none, for example, sewer, running water, city status, etc.

²⁴ Where P is the population, N the number of stores and A and B constants to be determined.

establishments of this particular function) equal to 1. Again by using Clark's method of testing for randomness in the distribution of threshold population figures randomness had to be rejected. the data turned out to be grouped rather than being more evenly distributed than what randomness would allow.

The attribute data of functions was treated slightly differently. Here the point biserial coefficients of correlation between each of the activities or functions and the population of the centers were determined. These were treated similar to the threshold population data and with the exception of the general store attribute, could again be divided into three groups.

After having shown that there existed a three level hierarchy of urban centers and central functions, it remained only to be shown that there was an association between the level of central place and levels of central functions. An analysis of variances showed that there were significant differences between the groups of central functions and the groups of central places at the five percent level of confidence. Therefore, variation between groups was shown to be greater than variation within groups, confirming the hierarchy.

Having thus deciphered the hierarchy in a subjective way, it is pleasing to note that Berry and Garrison derived three classes of central places from centers with less than 4,000 people. The same number of classes were observed by Brush in Southwestern Wisconsin among centers of nearly equal size.

Again the same number of classes of central places were found in Southwestern Iowa by Berry, Barnum and Tennant.²⁵ Here

²⁵B. J. L. Berry, H. G. Barnum and R. J. Tennant, "Retail Location and Consumer Behavior", Papers and Proceedings of the Regional Science Association, Vol. IX (1962), pp.65-106.

the authors used factor analysis of an incident matrix to discover what part was due to an hierarchy. As it turned out, both the continuum part was demonstrated as well as a three level hierarchy in centers of less than 10,000 people. The continuum was more prominent at the aggregate level while the hierarchy was more discernable at the local level.

This second method of Berry and Associates, although more sophisticated in the determination of an hierarchy, has the fault that only the presence or absence of a function was considered. In this way, no consideration was given to more than one store or function found in a center.²⁶ To what extent the different moments represent the different levels of the urban hierarchy is also not properly explained by the authors.

C. Hierarchical Studies in Europe

In contrast to the approach of Berry, Brush and Associates of establishing an hierarchy of centers based upon the services present in a center other geographers have used Christaller's method of first deriving an index of centrality for each center and then establishing the hierarchy from this index. This index is to be representative of the importance of all functions in the city. Since it does not concern itself directly with the establishments of a center it can be classified as an indirect approach in finding the hierarchy of urban centers. Thus there are two methods of establishing an hierarchy, based upon importance of a place. One

²⁶W. K. Davies, "The Ranking of Service Centers: A Critical Review", Institute of British Geographers Transactions, No. XXXX (1966), p.58.

is based upon a direct count of establishments present in a center (Berry, Brush) and the other uses some indicator (Index) of the importance of a center and is known as the indirect method.

Sven Godlund used the indirect method of establishing an hierarchy in Southern Sweden.²⁷ As his index of centrality, Godlund used the number of persons engaged in retail trade and services as a percentage of the total number of people living in that center. This index, ranging from 3.5 percent to over 6.5 percent was then divided into five segments, the centers of each segment supposedly representative of a certain level in the hierarchy. The center, with more than 6.5 percent of its total people employed in retail or service trade, he called regional centers corresponding to the G level of a center in Christaller's Hierarchy in Southern Germany. Similar to Christaller, Godlund also called his lowest centers auxiliary centers with indexes of centrality ranging from 3.5 to 4.4.

Another geographer who used the indirect method with some modifications in establishing an hierarchy in England was A. E. Smailes.²⁸ Although Smailes considers the actual central institutions in establishing an hierarchy, his classification is based on a few typical institutions, which according to him have to be present before the city under consideration can reach a certain level. In this way Smailes used the indirect method of

²⁷ Sven Godlund, "Bus Service, Hinterland and the Location of Urban Settlements in Sweden Especially Scania", Lund Studies in Geography, Series B, No. III, 1951.

²⁸ A. E. Smailes, "The Urban Hierarchy in England and Wales", Geography, Vol. XXIX (1944), pp. 41-51.

establishing an hierarchy. To be a full fledged town in England, Smailes reasoned that it should have three to four banks as well as a secondary school, a cinema, a weekly newspaper, and a hospital. If an agglomerated settlement did not have some of these, it was considered to be a sub-town. In all, Smailes was able to recognize a five level hierarchy in England ranging from a sub-town to the major city.

R. J. Johnston,²⁹ in examining the lower order centers in a rural area in Yorkshire, was able to establish a three level hierarchy within them. This he accomplished by calculating a centrality index based upon the number of functions in the village and complementary area, and the population in these two areas.³⁰ By graphing the centrality index of the different villages against the number of establishments in these villages, Johnston was able to decipher three distinct groups. It is encouraging to see that, taking Johnston's classification of villages into a three level hierarchy together with Smailes' classification of higher order centers, an hierarchy consisting of seven levels is found in

²⁹R. J. Johnston, "Central Place and the Settlement Pattern", Annals of the Association of American Geographers, Vol. LVI (1966), pp.541-549.

³⁰The numerical centrality index he derived from the formula $C = \left(\frac{PH}{CH} - \frac{PV}{SV} \right) \left(\frac{100}{PH/SH} \right) (SV)$ where PH represents the population of urban hinterland, PV the population of the village, SH the number of shops in the urban hinterland and SV the number of shops in the village. In the case where the answer could turn negative the formula was changed to

$$C = \frac{\left(\frac{PH}{SH} - \frac{PV}{SV} \right) \left(\frac{100}{PH/SH} \right)}{SV}$$

England. This corresponds well with the seven level hierarchy in Southern Germany and a six level hierarchy in the Chicago area of the middle-west as established by Philbrick.³¹

F. H. W. Green,³² although mainly concerned with delimitation of spheres of influence or complementary regions of the British cities, also classified the urban centers into an hierarchy. Altogether he was able to decipher a five level hierarchy ranging from the service village to the metropolis. Since Johnston was able to break the service village category into three groups the total number of levels of central places again came out to seven.

In America Borchort and Adams,³³ in classifying the trade centers of the Upper Midwest, were also able to establish an hierarchy consisting of seven levels. It was based on the volume of business, both wholesale and retail transacted by the centers, and on specific types of business that had to be present before the center would be considered as representative of a certain class. Although the authors did not use all of the urban functions (they left out cultural, social and administrative institutions) an hierarchy consisting of seven levels was derived.

³¹ Allen K. Philbrick, "Principles of Areal Functional Organization in Regional Human Geography", Economic Geography, Vol. XXXIII, (1957), pp.299-336.

³² F. H. W. Green, "Community of Interest Areas", Economic Geography, Vol. XXXIV (1958), pp. 210-226.

³³ John R. Borchort and Russell B. Adams, Trade Centers and Trade Areas of the Upper Midwest, Upper Midwest Economic Study, Urban Report No. 3 (1963), p.43.

H. E. Bracy³⁴ used a somewhat different approach in classifying urban centers into an hierarchy. He based the importance of a town on the basis of the size of the rural area that they serve. This method is sound from the theoretical point of view (more important centers will have greater complementary regions), but his method of delimiting the complementary regions could be questioned.³⁵ The hierarchy of centers which he was able to show corresponded well with the hierarchy of centers derived by Smailes in the same area, confirming the usefulness of such an approach.

D. Hierarchical Studies in Western Canada.

Having examined some of the published investigations into central place hierarchy concepts, a survey of what has been done in this area of research in Western Canada³⁶ is essential. Despite the fact that the basic physical assumptions³⁷ for the development

³⁴H. E. Bracy, "Towns as Rural Service Centers: An Index of Centrality with Special Reference to Somerset", Institute of British Geographers, Vol. XIX (1953), pp.95-105.

³⁵See page 97 of Chapter IV for an explanation of the method.

³⁶Two theses dealing with central place aspects in Western Canada are: Thomas G. Sosa, "Service Center Study of the Interlake Region, Manitoba" (unpublished Master's thesis, The University of Manitoba, Winnipeg, 1964), and Peter Woroby, "Functional Relationship Between Farm Population and Service Centers in South Western Saskatchewan", (Master's thesis, The University of Manitoba, Winnipeg, 1957).

³⁷Christaller's basic physical assumption was that the productivity of the land under consideration should be uniform; this he reasoned would produce a uniform population density-- the basic requirement for a uniform urban settlement pattern.

of a settlement pattern as envisaged by Christaller are close to ideal in Western Canada, few geographical studies have dealt exclusively with central place aspects. In order to find social and economic homogeneous regions, Woroby classified the service centers into a hierarchy of central places in South Western Saskatchewan. Although Sosa's main aim was to "obtain an understanding of the relationship between centers and their surrounding areas...and more particularly the role that the centers play with regards to the services they provide for the surrounding population"³⁸ a great part of his work was directed towards establishing an hierarchy of service centers. Since Woroby preceded Sosa and Sosa relied upon Woroby's findings with regards to an hierarchy of centers, Woroby's work is reviewed first.

Woroby was concerned with the complex problem of rural-urban relationships. In the theoretical part of his study he examined the needs of the rural people and how these needs are best satisfied by an hierarchy of service centers. The reasons and arguments for the existence of many small centers supplying the frequent necessities of the rural people, for the fewer medium-sized centers supplying the less frequent needs, and for the demand for a few larger centers supplying the infrequent and specialized requirements, followed closely to the Christaller's line of reasoning. His deductively arrived settlement pattern has Christaller's $k=3$ network³⁹ character-

³⁸Thomas G. Sosa, "Service Center Study of the Interlake Region, Manitoba" (unpublished Master's thesis, University of Manitoba, Winnipeg, 1964), p.1.

³⁹For a theoretical graphical arrangement see Figure 8, Chapter IV, p.98.

istics. In this network of service centers the ratio of the number of higher class centers to the number of centers belonging to the class one step lower in the hierarchy is one to two. In the geographical arrangement every center of k status has six centers of $k-1$ status surrounding itself, spaced equidistant from this center and from each other. By joining these $k-1$ centers with a line, the familiar hexagonal pattern emerges.

In South Western Saskatchewan, Woroby was able to discern a five level hierarchy. The hierarchical groups of hamlets, villages, towns, greater towns, and cities distinguished themselves one from another in the diversity of services offered. The population of his service centers ranged from 24,355 (Moose Jaw), to a few families for some hamlets. In all, he examined 255 centers, the greater portion of which were hamlets (154). The only other city center besides Moose Jaw was Swift Current, with a population in 1951 of 7,458. In addition, there were eight greater towns, 26 towns, and 65 villages. Although Woroby did not test the compatibility of his sample data to the theoretical data, he did conclude that except for some modification the actual observation fitted the theoretical data well. On applying a more precise measurement, the chi-squared (X^2) test of compatibility, to Woroby's data, one finds the value is 6.1, a value well within the five percent limit of significance.

Because Woroby's results compared well with the theoretical number of centers, it would be a matter of great interest to review the methods used by him.

The basic and most important criteria used by Woroby to distinguish between centers of different rank was the service

diversity index. Christaller had postulated that an hierarchy of centers would develop on the basis of different services given and goods sold by the centers. Woroby reasoned that a good indicator of the number of different central services and goods offered by a center could be derived from the occupation statistics of the centers. The total number of different central place occupations thus became his service diversity index for a center. The information on the different occupations in a center was obtained from the postal directory of Saskatchewan.

Woroby supplemented the postal directory information on services offered by the centers with information from the rural telephone directory and Dun & Bradstreet's Business Rating Directory for that province.

In cases where the service diversity index was undecisive in establishing the rank of a center, Woroby used the decline or increase of population data to determine the rank.⁴⁰ The location of the center under consideration with respect to the centers of higher rank also influenced Woroby in assigning a certain hierarchical level to the center.⁴¹ Because of these additional criteria, the final boundary between centers of different ranks, with regards to the diversity index, was not distinct. Thus the

⁴⁰ If a center was declining in population or in postal revenue, Woroby designated it to a lower level group; if it was increasing in both then it belonged to a higher level group of centers.

⁴¹ Thus if the geographical location is such that there should be, say, a level k center but the service diversity index indicated only a well-qualified (k-1) level center, Woroby would elevate this center to a k level on the basis of its geographical location in relation to the (k+1) center.

diversity index of the town group ranged from 28 for the smallest to 64 for the greatest, while the service diversity index of the greater town group ranged from 58 to 115, an overlap of six units. Similar overlaps were found between the village and town groups and the greater town and city groups.

Although Woroby's method of classification gave him good results with regard to the number of centers in the different levels of the hierarchy, some aspects of his method of classification are somewhat too subjective. The main original problem had been to determine which occupational services were central services, and which were not. Thus, for instance, the occupation of a railway switchman is considered by Woroby to be a central service and hence used in the classification, while the service that an ordinary railway employee renders is classified as a non-central service and not used. Furthermore, Woroby excluded from central services such occupations as social welfare workers, agricultural representatives, school superintendents and secretary treasurers, all of which have much to do with the rural people and hence perform central services.

The validity of excluding such community enterprises as curling and skating rinks and meeting halls from central services can also be questioned. Since the up-keep and operation of such places is performed voluntarily or on a part-time basis, this service would not be recorded in the occupational data of the center and hence it was overlooked by Woroby.

In treating the occupational data of a center as representative for that center's services, Woroby assumed something which is not always true. Because many people work in larger centers yet live

in smaller centers in the country, taking the occupational figures of a center's population to be representative of the importance of that center would exaggerate the importance of the smaller centers.

Sosa, in his hierarchical classification of service centers in the interlake region of Manitoba, also used a service diversity index as the main instrument in determining the different classes of centers. Sosa's service diversity index differed from Woroby's in that he considered not only central services, but rather all service units present in a center. In addition to the service diversity index, Sosa used the population data and the morphological arrangement of buildings in the centers in establishing the hierarchy of centers. Using these three criteria, Sosa was able to establish a four level hierarchy, the different levels of which he called hamlets, villages, larger villages and towns. The distinctions between the different levels was based on data and impressions collected by him in the field.

The requirements which a hamlet had to fulfil in order to be classified as such were as follows:

- (i) have six actively used buildings within a one quarter mile radius from the center;
- (ii) have from five to ten service units, one of which had to be a business unit; and
- (iii) have from 15 to 100 people.

The first requirement was established for an American hamlet, first by Trewartha⁴² and subsequently also used by Brush.⁴³ The other

⁴² Glenn I. Trewartha, "The Unincorporated Hamlet: One Element of the American Settlement Fabric", Annals of the Association of American Geographers, Vol. XXXIII (1943), pp. 32-81.

⁴³ Brush, op. cit., pp. 380-402. See also p. 14 of this chapter for a short review of the criteria of a hamlet.

criteria are Sosa's own and based upon personal investigation.

The range of the service units for the village group was slightly larger than for the hamlet group. The minimum number for a village was 11 units, while the maximum was 25 units. The number of actively used buildings ranged from 25 to 75, while the population of this group of centers ranged from 78 to 300 people.

The diversity of service units in the greater village class ranged from 26 to 50. Although most of these units served both the rural people and the village people, some services started to appear which served the village people only. Because of this, Sosa thought of these centers as immature towns and thus they were classified as greater villages. The population in these centers ranged from 190 to 808.

Towns in the Interlake region represented the highest level of urban development. The minimum number of services was 51. The population figures for the four town centers which he found in the Interlake region ranged from 749 to 1,841.

In order that he might draw the line of distinction more clearly between centers of different rank, Sosa categorized the different types of services into four categories. Category I referred to those service units performing retail and wholesale transactions. Category II referred to those service units that were established by the government, such as schools, municipal offices, welfare services, telephone exchange, and post offices. Category III referred to those services used by the urban people only. Category IV referred to manufacturing units.⁴⁴

⁴⁴The list of services belonging to each of these four different categories are given by Sosa in Table 8, p.45 of his thesis.

In addition to categorizing the service units as noted above, Sosa classified service units with respect to frequency of occurrence in the four levels of centers. The name typical unit was referred to those units which were found in 75 percent of the centers of the class under consideration. The name common unit was applied to those units found in more than 25 per cent of the centers, while the name uncommon applied to those service units found in less than 25 percent of the centers of a particular group.⁴⁵

With the extra information on the service units in the Interlake region, Sosa was able to refine the service unit requirements of the different levels of centers. Thus, of the services found in a hamlet, at least three had to be typical service units of the hamlet class. Of these three units, one had to be of Category I or Category II, or both. Of the services found in the village class at least two had to be typical units of this class. The particular village under consideration also had to have at least two units common to the village group. These typical and common service units could be from either Category I or Category II. The greater villages each had to have ten service units from both the typical and the common units representative of these centers. These 20 units again had to be made up of units belonging to the first two categories. Of the town service units 20 had to come from the typical service unit group. This group of centers also accounted for most of services classified under Category III.

⁴⁵Sosa lists for each of the four groups of centers the typical, common, and uncommon units in Tables 11, 12, 13 and 14 on pp.60-63 in his thesis.

Using the method as outlined above, Sosa received four town level centers, seven greater villages, 16 village centers, and 18 centers of hamlet rank. Because he had specified that the lowest number of function of a hamlet was five service units, six centers could not be classified as not having this minimum number of centers. In comparing the frequency of centers in the different levels with the theoretical frequency⁴⁶ from a $k=3$ network as presented by Christaller, it was found that the compatibility is quite poor at the lower level of the hierarchy. The calculated chi-square (χ^2) value is 26.37, substantially greater than the one percent critical value of 13.28. From this one has to reject the idea that the centers in the Interlake area have the same basic association to each other as the centers in Christaller's theoretical $k=3$ urban network have. The other possibility, that the urban center in the Interlake area is a bad sample from a population (this term is used here in the statistical sense meaning the total array of urban centers) having a $k=3$ urban network characteristic, has to be discarded because of the extremely small possibility of such a bad sample. The possibility that is still left is that the centers follow Christaller's theoretical urban pattern but that Sosa was unable to decipher the different hierarchical groups.

⁴⁶The theoretical $k=3$ network has the following number of centers of each group in a five level system: 1, 2, 6, 18 and 54. Since Winnipeg acts as the higher order center for the Interlake region, the actual frequency of centers in the Interlake should be compared to the latter four numbers.

CHAPTER III

THE HIERARCHY OF CENTRAL PLACES IN THE PORTAGE AREA

Investigators of central place hierarchies have in the past paid little attention in choosing an area with one nodal point, comprising an urban system.^{1,2} Woroby in Saskatchewan studied an area with two nodal points; Brush in Wisconsin had 18 nodal points; Sosa in Manitoba had four, while Christaller in Germany studied the partial nodal system of Munich. Christaller and Woroby also discussed the hierarchy of urban centers in terms of nodal regions, showing the relationship between the higher and lower centers. This chapter examines the nodal region or urban system of Portage la Prairie in terms of central place hierarchical concepts.

The first problem that one encounters in such an approach is that of determining the areal extent of the system under consideration. The area considered to be part of the Portage la Prairie system is based upon the data collected from field work.³ All centers located within the boundary (page 31) are considered to belong to the Portage system and have to be included in the establishment of an hierarchy. The boundary corresponds to the outer edge of

¹E. A. Ackerman, "Where is a Research Frontier", Annals of the Association of American Geographers, Vol. LIII (1963), p.435. In this Presidential address Ackerman stresses the point that geographers should study the world of man from the system point of view.

²P. Haggett, Location Analysis in Human Geography (London: Edward Arnold Ltd., 1965), p.18. Haggett distinguishes between two types of systems, the open and the closed. Nodal regions are open systems because of the intercourse of a settlement with more than one settlement.

³The field work was done in the fall and winter of 1966-1967.

influence of the institutions of Portage la Prairie. This areal extent of Portage la Prairie system is based on information gathered in interviews with owners and managers of business and social establishments in Portage la Prairie and on the returns of questionnaires from the rural areas.⁴ Additional help in delimiting the Portage system was received from an examination of the road network in this region. All those centers from which the roads improved in travelling towards Portage (eg. from dirt to gravel to paved) were considered to be part of the Portage la Prairie system.⁵ An exception occurred in the south and north-east of Portage la Prairie where the roads focused more upon Winnipeg.

Within the area delimited (page 36) all centers performing one or more services were examined. The examination consisted of gathering information on population,⁶ number of functions,⁷ types of functions,^{8,9} as well as visiting most centers.

⁴Detailed and specific areas of influence of Portage la Prairie are presented in Part III.

⁵J. E. Brush used traffic breaks and traffic counts to delimit hinterlands for Southwestern Wisconsin. It is proposed that the quality of a road is a good indicator of vehicular traffic and hence can also be used to establish the complementary region of a city. J. E. Brush "The Hierarchy of Central Places in Southwestern Wisconsin", Geographical Review, Vol. XXXXIII (1953), p.395.

⁶Canada Census, 1961, Volume I, Part 1, pp. 92-530. Although the 1966 population data would be more satisfactory it was not available. The partial census of 1966 had not been published at the time of writing. The population of the smaller centers, those with a 1961 population of less than 50, was estimated. Counting the number of houses in each center and multiplying by an estimated four persons per house gave the total estimated of population in each smaller center.

⁷Community Report on the City of Portage la Prairie, Regional Development Branch, Department of Industry and Commerce, June, 1966.

⁸Manitoba Provincial Exchanges Telephone Directory, November, 1966.

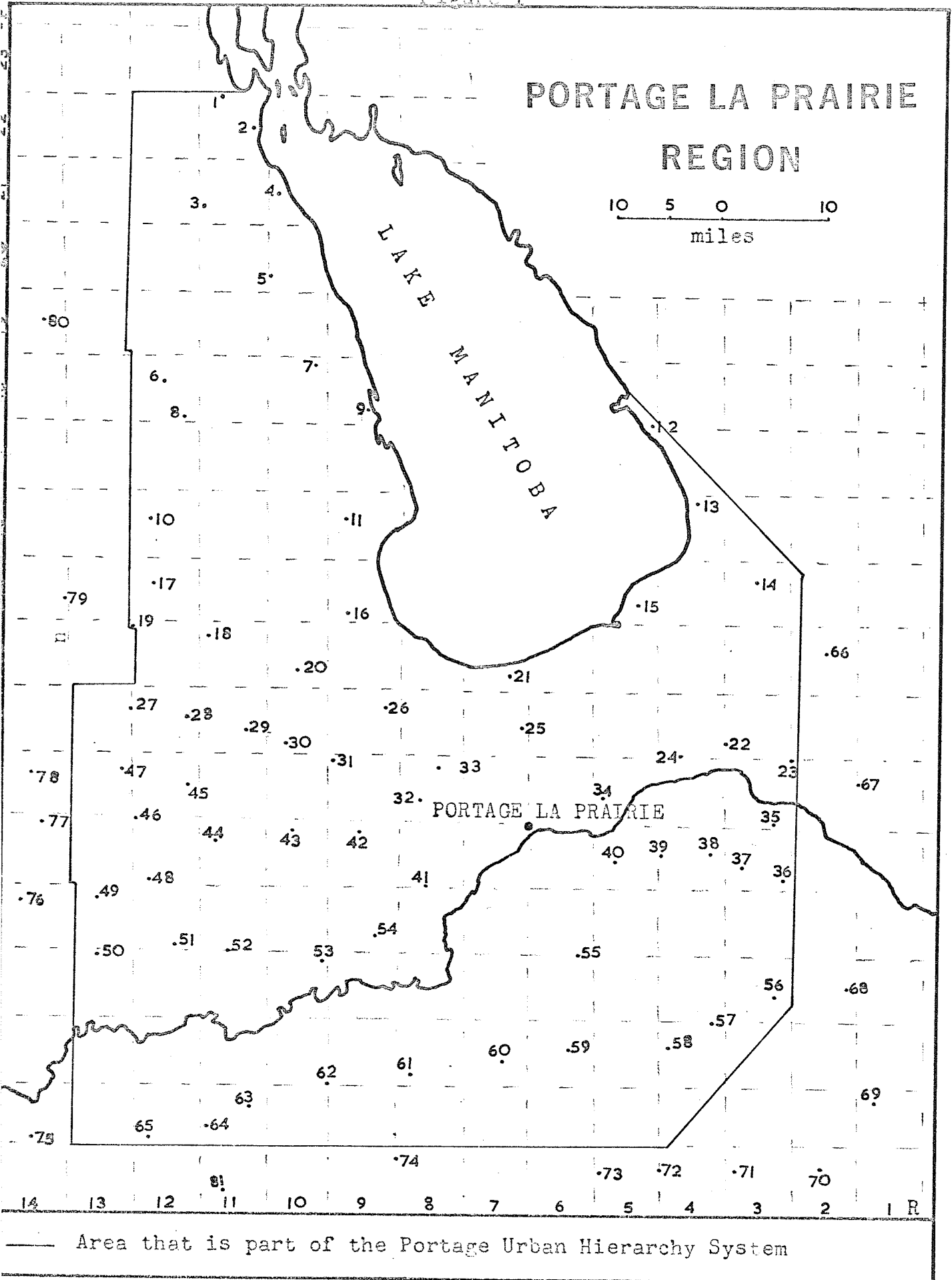
⁹Number of Householders (Non-Letter Carrier Post Offices), Canada Post Office Directory.

PORTAGE LA PRAIRIE
REGION

Scale



Figure 1



Centers in the Portage la Prairie Area

1	Reedy Creek	42	Bagot
2	Kenosoto	43	MacGregor
3	Alonsa	44	Austin
4	Bluff Creek	45	Pine Creek
5	Harcus	46	Firdale
6	Waldersee	47	Edrons
7	Amaranth	48	Sidney
8	Grass River	49	Millbourne
9	Marius	50	Pleasant Point
10	Plumas	51	Worby
11	Langruth	52	Pratt
12	Oak Point	53	Lavenham
13	St. Laurent	54	Rosendale
14	Lake Francis	55	Layland
15	St. Ambroise	56	Fannystelle
16	Lakeland	57	Culross
17	Ogilvie	58	Elm Creek
18	Gladstone	59	Haywood
19	Keyes	60	St. Claude
20	Woodside	61	Rathwell
21	Delta	62	Treherne
22	Reaburn	63	Holland
23	Marquette	64	Landseer
24	Poplar Point	65	Cypress River
25	Oakland	66	Woodlands
26	Westbourne	67	Meadows
27	Helston	68	Starbuck
28	Mayfeld	69	Brunkild
29	Muir	70	Sperling
30	Katrine	71	Homewood
31	Beaver	72	Carman
32	Rignold	73	Grayville
33	Macdonald	74	Notre Dame de Lourdes
34	High Bluff	75	Glenboro
35	St. Eustache	76	Carberry
36	Elie	77	Gregg
37	Benard	78	Wellwood
38	Fortier	79	Arden
39	Oakville	80	Glencairn
40	Newton	81	Bruxelles
41	Edwin		

A. Population and Distance as a Tool for the Establishment of the Hierarchy.

The first attempt at classifying the centers in the Portage system was based on population. Christaller postulated that through the income mechanism the population of a center would be representative of the status of the center. This would be true in a purely rural economy with no manufacturing performed in the urban center. Sociologists such as Hawley,¹⁰ Marshall,¹¹ and Winsborough¹² classified small centers on the basis of the number of inhabitants. Both Woroby and Sosa considered population data as a possible source for classifying centers. Each one rejected the idea on the grounds that too many other factors other than the employment possibilities in the central services influence the population of the centers. Some of these factors are: different demographic characteristics prevalent in different centers, location of industries giving local employment, centers acting as a retirement centers for farmers and local people, and centers having a large proportion of sidewalk farmers.

In Christaller's model of a settlement pattern, the distance between centers played an important part in the Hierarchy. Higher

¹⁰H. A. Hawley, "A Ecological Study of Urban Service Institutions", American Sociological Review, Vol. VI (1941), pp.629-639.

¹¹D. G. Marshall, "Hamlets and Villages in the United States: Their Place in the American Way of Life", American Sociological Review, Vol. II (1946), pp.159-165.

¹²H. H. Winsborough, "Occupational Composition and the Urban Hierarchy", American Sociological Review, Vol. XXV, pp.894-897.

order centers were postulated to be further apart than smaller centers. Also, the distance from a high level center to the lower level center would increase correspondingly with an increase in the status of the center. By using this assumption together with the population data, it was hoped that an hierarchy of service centers could be recognized.

Many of the smaller hamlets could not be included in this attempt at classification because only population for settlements of over 50 people are given in the Canadian census.¹³ The straight line distance in miles between the centers considered, and Portage la Prairie, was taken as the distance measurement. These two phenomena, population and the straight line distance to Portage, were plotted against each other in Figure I, (page 41). It must be remembered that only centers within the Portage system as outlined at the beginning of this chapter were used.

It is clear from Figure II that larger centers are further away from Portage la Prairie than smaller centers. No center with more than 500 people is found within a 22 mile radius of Portage. Slight clustering of centers occurs around the 15, 22, and 35 mile radius from Portage. The sparsity of centers as shown by the graph beyond the 35 mile radius of Portage is not due to the absence of centers, but due to the limiting influence of Portage la Prairie in the south and in the east.

¹³ Although the population was estimated for centers of less than 50 people as described in Footnote 6, page 35, it was thought to be not accurate enough to allow a classification on these estimated figures.

The division of the population data of the centers as presented in Figure II, into distinct groups representing different levels of an hierarchy, presents a problem. At first glance the population data seems to follow no definite pattern. The sizes of these centers follow one another in a manner similar to points selected randomly from a continuous line of an increasing variable. A closer inspection on Figure II reveals population clustering around the 900, 600, 400, and 125 population mark. There are only two centers with more than 500 people (Group IV), three centers having between 500 and 800 (Group III), 12 centers having from 200 to 500 (Group II), and nine centers having less than 200 but more than 50 people (Group I). This last group certainly would be greater in number if centers of less than 50 people had been used.¹⁴

Within the groups of centers as delimited above, each center in a group is closer to another center from that group than to any other center.^{15, 16} Although this fact demonstrates grouping, the number of groups can be questioned. Clark's criteria gives groups, but the number depends on the investigator's intuition or knowledge of the object under study. The number of groups can range from one,

¹⁴The use of centers of less than 50 people was prevented from being used because no accurate population data is available for such small centers.

⁵Clark and Evans, op.cit., pp. 445-452. This was the criteria used by Clark and Evans in defining a group and was used by Berry in establishing an hierarchy of central places in Snohomish County, Washington.

⁶B. J. L. Berry, "Geographical Aspects of the Size and Arrangement of Urban Centers" (Unpublished Master's Thesis, University of Washington, Seattle, 1956), p.38.

where all phenomena are thought to be similar regarding the characteristic under study, to N (where N represents the total number of phenomena) meaning that all are different.

Although Christaller stated that population data could be used to classify centers because it would be representative of the number of goods and services offered at the center, this method is unreliable in areas where service centers also perform non-central functions. Thus, if a center performs primary and secondary industries, its population will be increased by the people finding employment in these industries and hence the population of the center will not be representative of the tertiary industry present in that center. In the Portage la Prairie area, Amaranth, for instance, has a mining industry (gypsum). This fact naturally increases the total population of the center, making it look like a high level service center, if one uses population as the criterion for establishing an hierarchy. Another center in the Portage la Prairie area that is elevated to a high level because of large population clustering in St. Laurent. The 1961 census gives St. Laurent's population as 869 people, putting it in the same category as Gladstone, which has 941 people. But a comparison of the services offered in both places reveals that St. Laurent is a center of far lower status. Gladstone has 56 different functions while St. Laurent has only 14. The whole settlement of St. Laurent lacks the cohesiveness that one expects in a center of such population size.¹⁷ It could be compared to a suburban settlement with a small shopping

¹⁷The settlement was examined in February of 1967.

GRAPH SHOWING RELATIONSHIP BETWEEN POPULATION OF CENTERS
AND THEIR DISTANCE FROM PORTAGE LA PRAIRIE

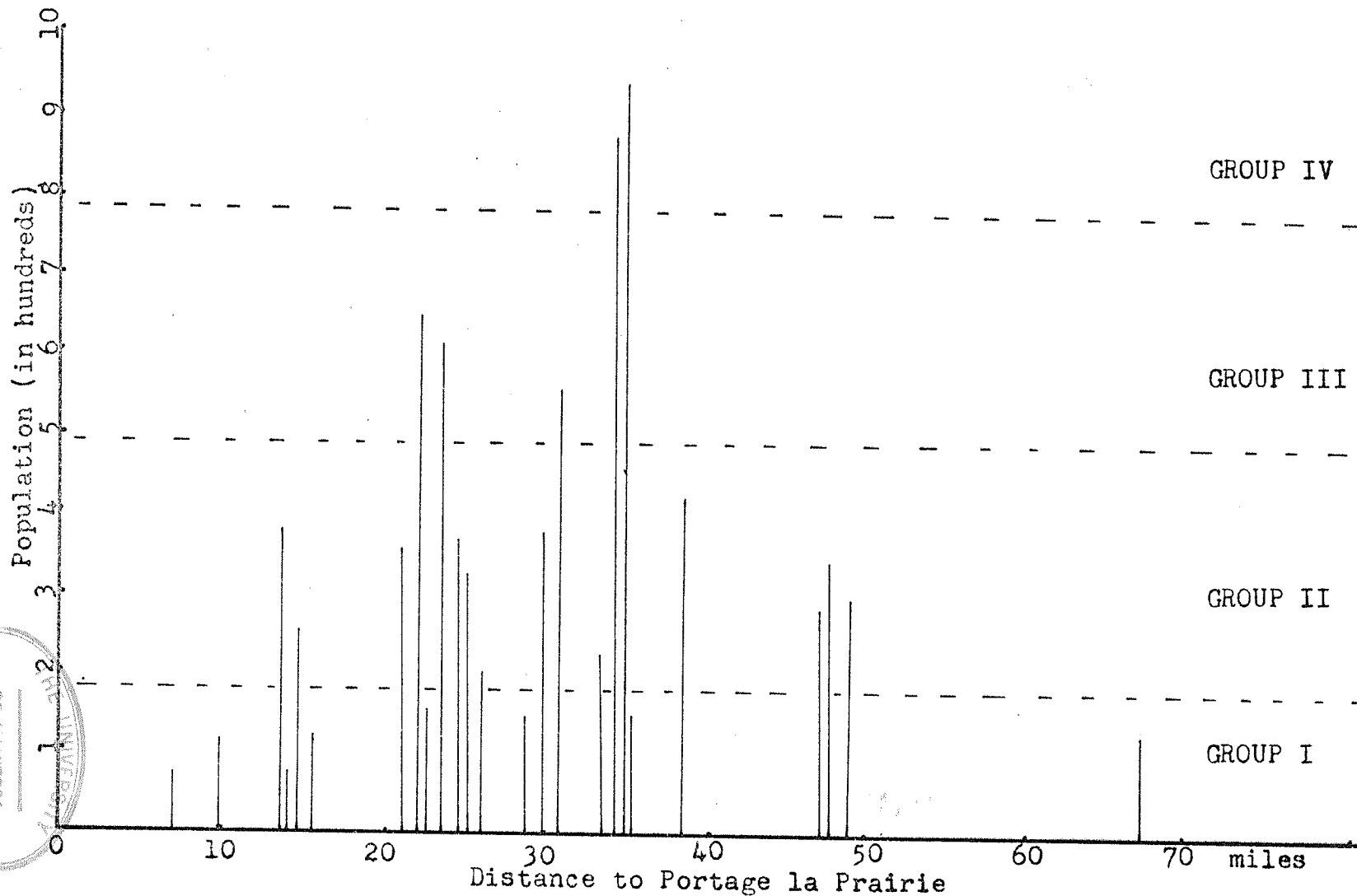
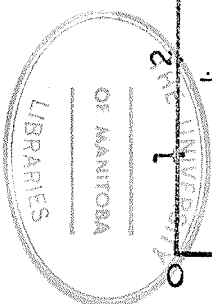


FIGURE I



center, except that there is no larger urban center for 30 miles. The population is large partly due to a Roman Catholic missionary residential school and also due to a convent of this Church.

Other centers in the Portage la Prairie area that have large population figures in comparison to the services they offer are St. Ambrose, St. Eustache, and Delta. The first two are settlements of some 300 people but lack both the physical appearances¹⁸ as well as the services offered in service centers of such population size. Delta, being a summer resort, naturally would have more people in the summer, the time when the census was taken than what its few services indicate.

To what extent the population of these centers and others are affected by the settlement of retired people, sidewalk farmers, commuters, and other people living in the centers but not gaining their livelihood from central place institutions is hard to determine yet is important when one wants to use population figures as indicators of central place importance. Macdonald, High Bluff and Poplar Point, for instance have Portage la Prairie commuters living in them.¹⁹ Newton Siding has some sidewalk farmers living in it while Oakville's population is increased by a number of retired people.²⁰ Due to ethnic differences, there is also a difference in

¹⁸ Both settlements were examined during the fall of 1966. St. Ambrose consisted of only one building used for commerce, with a few residential buildings scattered about on the rural road. St. Eustache was slightly larger with some houses and businesses arranged along both sides of the road.

¹⁹ Information collected during the field-work and from returned questionnaire.

²⁰ The writer lived for a year in Oakville and thus can speak from personal knowledge about this place.

the population of centers offering equal services. In general, the French-speaking families of Manitoba are larger than the Anglo-Saxon ones.²¹ This might account for the somewhat larger population in the French centers of St. Ambrose, St. Eustache, St. Laurent, and Elie, in comparison to other centers of equal service status in the area.

It is because of factors mentioned above that the population index of a center cannot be used with reliability in determining the importance of a center as a central place. It can give a fairly good indication in an ethnic homogeneous region and in one where there is an absence of both primary and secondary industries. Since both obstacles mentioned are present in the Portage la Prairie area, "the comparison of smaller towns or cities must be made upon the basis of the tertiary functions they perform, population is far too crude a measure".²²

B. The Hierarchy of Central Places
Based on Central Place Functions

Christaller based his hierarchy of service centers upon different population threshold values of the goods and services offered in the centers. The best indicator of whether the threshold population for a particular good or service has been reached in an

²¹ Although it is not the appropriate place to go into the reasons for the difference here, it will suffice to say that most French-speaking people in Manitoba are of Roman Catholic faith. That the church is against birth control is well known; this encourages large families.

²² W. K. D. Davies, "Some Consideration of Scale in Central Place Analysis", Tijdschrift Voor Economische en Sociale Geographie, Vol. LVI (1965), p.221.

area, is the presence or absence of an establishment in the center offering the good or service (function). Thus an hierarchy of centers, if it exists, should be discernible by an examination of the economic, cultural and administrative establishments in the centers. This approach has been used by Berry, Brush, Johnston,²³ Woroby, Stafford,²⁴ Sosa, Thomas,²⁵ Wakeley,²⁶ and others,²⁷ and will now be used here.

Source of Information.

As already mentioned in the beginning of this chapter, the basic source of information with regards to the functions performed by the center was the Manitoba Rural Telephone Directory of 1966. Christaller used the excess of urban telephones over rural telephones as an indicator of the centrality of a center. What it actually represented was the number of telephones in a center after the subtraction of private phone numbers. Thus the centrality index was equal to the number of non-residential establishments having a

²³R. J. Johnston, "Central Place and the Settlement Patterns", Annals of the Association of American Geographers, Vol.LVI (1966), pp.541-549.

²⁴H. A. Stafford, Jr., "The Functional Bases of Small Towns", Economic Geography, Vol.XXXIX (1963), pp.165-175.

²⁵E. N. Thomas, "Some Comments on the Functional Bases for Small Iowa Towns", Iowa Business Digest, 1960.

²⁶R. E. Wakeley, "Types of Rural and Urban Community Centers in Upstate New York", Department of Rural Sociology, Cornell University, Mimeograph Bulletin No. 59.

²⁷For other studies not mentioned in this thesis see B. J. L. Berry and A. Pred, Central Place Studies: A Bibliography of Theory and Application, Regional Science Research Institute, Bibliographic Series I.

telephone. Christaller thus implied that his number of telephones would measure the total number of independent establishments. It is not the actual number that is of value, but the information given with the telephone number. Neither is the total number of telephones in a central place as important today as it was during the time of Christaller's study. It was reasoned, for this thesis, that every establishment in Manitoba, be it cultural, administrative or economic, would have a telephone and hence be registered in the telephone directory. In North America at present the telephone is ubiquitous both in homes and businesses.

The telephone directory states whether a phone number is associated with a private home or with an establishment. In the case of the latter the type of establishment is stated, and for a business establishment, the main lines of products sold or the service given is also mentioned. It is this fact that makes the Manitoba telephone book a useful source of information on central services in a center and hence it is used in this thesis.

Measurements of Central Place Functions.

For each of the 73 centers located in the area outlined at the beginning of the chapter, three measurements of central place aspects were recorded: 'number of functions', 'number of establishments' and 'number of functional units'.²⁸ The number of each type for each center can be seen in Table 3, page 48.

²⁸ H. A. Stafford compares the relationship between these three central service measurements in his study area of Southern Illinois to two other studies in the United States and one in New Zealand and finds extreme similarity in the association between these three phenomena.

'Number of functions' refers to the number of different types of services offered or goods sold. The services offered could be either business such as dry cleaning, tailoring, service station or they could be cultural such as churches, theatres, meeting halls, curling rinks, or they could be of the governmental or administrative type such as schools, post offices, land title offices, municipal offices and others. Functions situated in centers but performing no central services were excluded. Except for Portage la Prairie only one such function was encountered, and that was in Amaranth (gypsum mine). Such manufacturing industries as creameries and bakeries were considered to be central functions because of their close association with the rural people. Contractors and construction firms were also considered to perform central services since the days where a farmer used to build his own house, barn, shed or granary are gone. In all, including Portage la Prairie, 91 distinct central functions could be discerned.

To the number of establishments, only those that performed central services were counted. The word establishment does not only refer to commercial establishments, but also to social, cultural, administrative, and educational institutions. An establishment was considered to be independent if it had its own phone number (eg. the home for mentally retarded in Portage la Prairie was considered to be one establishment). Telephones in the different departments were extension phones and thus did not add to the number of establishments. In this way equal weight was given to each independent establishment.

The 'number of functional units' in a center was derived at by adding the total number of functions in a center. As a result

the 'number of functional units' in any center was greater when the 'number of establishments' or the 'number of different functions'.

To show the difference and interrelationships of these three measurements, a hypothetical example is given below. Suppose a center has three establishments called A, B, and C. Let A be an establishment which operates as a service station and is also a bulk oil distributor. Let B be a food store and a service station. If establishment C would also sell food in addition to lumber, then the number of establishments of this center would be three, the number of functions would be four, while the number of functional units would be six.

Auxiliary Centers.

Table 3, page 48, gives the number of establishments, functions, and functional units for each center in the Portage la Prairie system. The range for each measurement is quite large, with Portage la Prairie having substantially more in each category of central place measurement. Many centers (19) have only one establishment with no more than two functions. Eighteen centers have only two establishments with the number of functions and functional units ranging up to four. A visit to some of these smaller centers (Oakland, Kinosoto, Ogilvie, Reedy Creek, St. Ambrose, St. Mark)²⁹ showed that no agglomeration of houses existed to give the appearance of an agglomerated settlement. The central place service establishments usually have very few residential buildings

²⁹These and other small places were visited during the process of collecting information in regards to the hinterland of Portage la Prairie.

Table 3
Central Place Functional Inventory of Centers
in the Portage la Prairie System

<u>Rank+</u>	<u>Urban Centers</u>	<u>No. of Functions</u>	<u>No. of Establishments</u>	<u>Total No. of Functional Units</u>	<u>Population</u>
Group D	Portage la Prairie	91	332	379	12,388
Group C	Gladstone	56	66	91	944
	MacGregor	51	45	66	642
	Treherne	49	50	62	569
	St. Claude	40	44	57	609
Group B	Holland	30	37	38	433
	Elm Creek	28	24	32	337
	Cypress River	27	27	30	288
	Austin	26	32	34	384
	Elie	23	31	38	370
	Oakville	23	27	30	377
	Langruth	23	23	28	236
Group A	Haywood	16	14	18	156
	Plumas	16	17	19	344
	Amaranth	15	19	19	294
	St. Laurent	14	16	19	869
	Rathwell	13	18	18	197
	Fannystelle	12	18	18	153
	Sidney	11	11	13	154
	Westbourne	10	7	15	123
	Poplar Point	9	7	10	257
	Alonsa	8	9	9	133
	St. Eustache	8	8	10	332
	High Bluff	7	3	7	77
	Newton Siding	6	6	8	44*
	Oak Point	6	6	6	120*
	Rosendale	6	6	7	54*
	Marquette	6	7	7	16*
	Culross	5	4	6	12*
Macdonald	5	3	5	118	
Bernardin	5	4	5	32*	

<u>Rank+</u>	<u>Urban Centers</u>	<u>No. of Functions</u>	<u>No. of Establishments</u>	<u>Total No. of Functional Units</u>	<u>Population</u>
Auxiliary Centers	Walderssee	4	4	4	24*
	Helston	4	3	4	28*
	Keyes	4	4	4	24*
	Firdale	4	3	4	16*
	Marius	4	3	4	72*
	Lakeland	3	2	3	16*
	Pratt	3	2	3	4*
	Beaver	3	2	3	12*
	Katrime	3	2	3	20*
	Reaburn	3	2	3	12*
	Kensoto	3	2	3	16*
	Tenby	3	2	4	16*
	Oakland	3	2	4	12*
	Bagot	3	2	3	40*
	Edwin	3	2	3	20*
	Rignold	3	2	3	8*
	Curtis	2	2	3	4*
	Longburn	2	2	2	4*
	Stockton	2	2	2	8*
	Woodside	2	1	2	12*
	Mayfeld	2	1	2	8*
	Oglivie	2	1	2	20*
	Worby	2	1	2	4*
	Muir	2	1	2	12*
	Landseer	2	1	2	4*
	Reedy Creek	2	1	2	12*
	Grass River	2	1	2	8*
	St. Ambrose	2	1	2	359
	Delta	2	1	2	74
	Layland	2	1	2	20*
	Lavenham	2	1	2	40*
	Melbourne	2	1	2	20*
	Castle Point	2	1	2	8*
	Golden Stream	2	2	2	12*
	Cawdor	2	2	2	8*
	St. Mark	2	2	2	8*
	Pine Creek	2	2	2	8*
	Burnside	1	1	1	4*
	Lake Francis	1	1	1	12*
	Silver Ridge	1	1	1	4*
	Bluff Creek	1	1	1	8*
	Colby	1	1	1	4*

Source: Manitoba Provincial Exchange Telephone Directory, November, 1966.

+ For the procedure of classification of centers into different ranks, see page 56.

* Estimated population, for procedure see page 35, footnote 6.

in close proximity. In nearly all such centers the functions present are either an elevator, general store or an elementary school. The absence of any form of an agglomerated settlement indicates that these small centers do not attract settlers to them. Their function is similar to the function of Christaller's auxiliary centers in southern Germany performing minimum requirement services in areas which are far from better developed centers. Many of these centers are found in economically poorer areas and of the centers found in better areas, they represent the last remnants of formerly greater centers, whose existence has become obsolete because of rapid automobile transportation.

By the time a center has acquired about five different functions,³⁰ a transformation in its outward appearance occurs. The first arrangement of houses and establishments along roads occurs giving the appearance of a street and some form of internal order. In most of these centers the first specialization of function occurred. The general store no longer sold gasoline, oil, dry goods, and groceries. The first garage or service station appeared along with other less specialized functions, such as community halls, curling rinks, elevators, churches, and others. Because of these differences between centers with more than five and the ones with less than five functions, the auxiliary central places are defined as those places performing four or less functions while the minimum requirement of a full-fledged central place is five functional units. Using this method of distinction, the number of auxiliary centers in the

³⁰It is hard to say why this transformation should occur by the time five functions are performed by the budding center, except that it does and that it can be seen in the field.

Portage la Prairie system is 42, while the number of full-fledged central places is 31.

An examination of the services offered by all the auxiliary centers reveals the unspecialized nature of their functions. In the 42 auxiliary centers, only 16 different functions are offered. Only five services are found in more than five centers. These are, in descending order of frequency of occurrence, the post office, the general store, elevator, elementary school and church. Two of these auxiliary centers have a meeting hall and a billiard room. The following functions are present in only one of the centers, namely, a curling rink, meeting hall, high school, insurance agent, garage, implement dealer, railroad station, section house, telephone exchange, and a health and welfare office. Thus the only two functions representative of the auxiliary center are the general store and the post office, both of which are found in more than three-quarters of all auxiliary centers. The post office is usually the second function of a general store proprietor. Without the revenues derived from the post office many a general store would close. Even in terms of householders, the post offices are small for these auxiliary centers, as seen in the case of Grass River, an auxiliary center, where only twelve families receive their mail.

The high frequency of elevators (in 17 of the 42 centers), reveals the dominance of cereal crops in the agriculture of this area. Because most of the elevators were built in the earlier part of this century when the grain was transported by means of horse and wagon, the spacing along the railway is quite close, the maximum distance separating the elevators being 20 miles. During

the days of wagon transportation, 10 miles was considered to be the maximum distance a farmer could transport grain economically.

As mentioned above, eight auxiliary centers had elementary schools and only five had churches. These two institutions are ubiquitous to this part of Manitoba, not necessarily having to be situated in any kind of center. The presence of a small country school in the open countryside with no other buildings around it for at least one-quarter of a mile is quite common. The Manitoba Government has attempted to consolidate the small elementary school districts to enable the construction of bigger and better schools in villages and towns. But these have been meeting strong opposition from the people in the rural areas.³¹ Here the small country school with its relative closeness to home, and its communal spirit, is valued more than the advantages that children might receive by attending bigger village schools. Attending the latter would entail a bus ride of up to one hour's duration. To this the parents object. Despite the opposition, however, more and more of the small one-room schools are disappearing from the countryside. The process is being speeded up at present by a shortage of qualified teachers that are willing to teach in one and two-room schools.

Similar to the distribution of schools, but not as frequent, is the country church. Again, because of the small population in auxiliary centers, churches are more convenient for the members if

³¹ This opposition to consolidate elementary school districts was demonstrated in Manitoba on March 10, 1967, when 19 out of 33 secondary school divisions voted down a referendum to consolidate the elementary school districts.

they are built in an area where the greatest proportion of the members are situated. Since churches serve only certain groups, their need is not as universally demanded, as is the general store, and because of localized needs, their location will not necessarily correspond to the location of the general store in the auxiliary center. Furthermore, if a particular denomination is not strongly represented in an area, the best location for its church is in the bigger village or town. In this way, the family can satisfy other requirements as well on the same trip, thus reducing the cost of transportation. Few people are willing to travel long distances only for the church service.³²

Of the other functions, none is representative of the auxiliary centers. Most are found in higher order centers. This is especially true of garages, implement dealers, high schools, curling rinks and community halls. A discussion of these functions follows the classification of central places into groups.

Groups of Developed Centers.

Having divided all the centers of the Portage area into auxiliary centers and full-fledged central places, the next step is to decipher the hierarchy of the full-fledged central places. Here the approach will be similar to that of Berry, whose method

³²That the demand for church service is quite low in terms of distance travelled was shown by Golledge, Rushton, and Clark in "Some Special Characteristics of Iowa's Dispersed Farm Population and their Implications for the Grouping of Central Place Functions", Economic Geography, Vol. XXXXII (1966), pp.261-272. On examining the special behavior of some six hundred rural Iowa families in regards to 33 commodities, they found that the average distance travelled to church was the least, being 5.4 miles. The standard deviation was also the least (4.1), indicating that few travelled long distances for church services.

has been reviewed in chapter II. The basic difference between different level hierarchical centers as postulated by Christaller and others, is due to the different number of functions offered at the centers. Berry demonstrated this to be true in Snohomish County of Washington,³³ and Southwestern Iowa.³⁴ In the first study he treated the number of functional establishments of each center as the points on a continuum proceeding from the lowest number of functions to the highest. By comparing this distribution of points with a random point distribution on a line, he found it significantly different. His number of functions were more clustered than a random distribution of functions would be. This he took as evidence of an hierarchy of centers. He then used Clark and Evans³⁵ technique to establish the different hierarchical groups. In his second study Berry used factor analysis of an incident matrix. It showed the existence of an hierarchy even after the continuous part of the hierarchy of functions had been subtracted. In this thesis, Berry's first procedure is followed because of its simplicity and because its results are easily interpreted geographically.

To see if an hierarchy of centers exists in the Portage la Prairie area, Clark's technique of testing for randomness of points along a line was used.³⁶ The number of functions was listed in

³³Berry and Garrison, op.cit., pp.145-154.

³⁴Berry, Barnum and Tennant, op.cit., pp.65-106.

³⁵Clark and Evans, op.cit., pp.445-452.

³⁶P. J. Clark, "Grouping in Spatial Distribution", Science, Vol. CXXIII, (1956), pp.373-374.

descending order for each center. This order was then examined for 'reflexive pair of points'. A reflexive pair of points is one in which each point has the other as its nearest neighbor. The distance between centers was measured in number of functions. Clark had shown that for a random distribution along a line the ratio of reflexive centers to the total number of centers followed the $(2/3)^n$ relationship where "n" represented the nth reflexive order. If the calculated values for the different order of reflexive points were less than the theoretical calculated value, then groups were present. The calculated proportions for the centers in the Portage la Prairie area are given below. In each case the observed proportion for the first four nearest neighbor measurements are less than the expected proportion of random distribution. This evidence definitely confirms the fact that grouping of functions into similarly sized centers occurs in the Portage la Prairie area.

Table 4
Functional Unit Grouping
As Tested by the Reflexive Pair of Point Method

Nearest Neighbor Order	Number*	Observed Proportion	Expected Proportion	Description
First	6	.286	.667	Grouped
Second	2	.095	.444	Grouped
Third	4	.190	.296	Grouped
Fourth	0	.000	.198	Grouped

*Because some centers had equal number of functions, the total number of distinct centers was reduced to 21 from 30. Thus the number of reflexive points was divided for each reflexive order by 21.

Having proven the existence of groups, the next step is to establish the number of groups, their differences and their internal homogeneity. For this purpose additional data on the

number of establishments, and the number of functional units was collected for each center. Since both measurements deal with the function of a central place, it was hoped that they would help to establish the hierarchy. Thus the following three graphs (Figures 2, 3 and 4, pages 57, 58, and 59) were constructed showing the relationship between the three measurements of central functions.

Graph 2 (page 57) shows the relationship between the number of establishments and the number of functions. The natural breaks in numbers of functions about the 20 and 35 mark are enhanced by the simultaneous break in the number of establishments around the 21 and 40 mark. The graph shows quite distinctly the three groups of centers, A, B, and C. Group A has from five to 16 functions and from three to 19 establishments. Group B has from 23 to 30 functions while the number of establishments ranges from 23 to 37. Group C's number of functions ranges from 40 to 56 and the number of establishments from 44 to 65.

Both Graphs 3 and 4 (pages 58 and 59) portray the same three groups of centers. Only Group C's cohesiveness can be questioned because of the remoteness of one of its centers from the other three. Although the number of functional units and the number of establishments for the remote center are somewhat greater than those of the other three, its number of functions as shown in Graph 3 are not much greater. The difference in number of functions between the removed center and the other is only five functions. The remote center, Gladstone, is well developed for its size and is located in a well populated and prosperous rural area. This accounts for its greater number of functional units and establishments, yet not for its greater number of functions. Therefore, there is justification for including the somewhat removed center in Group C.

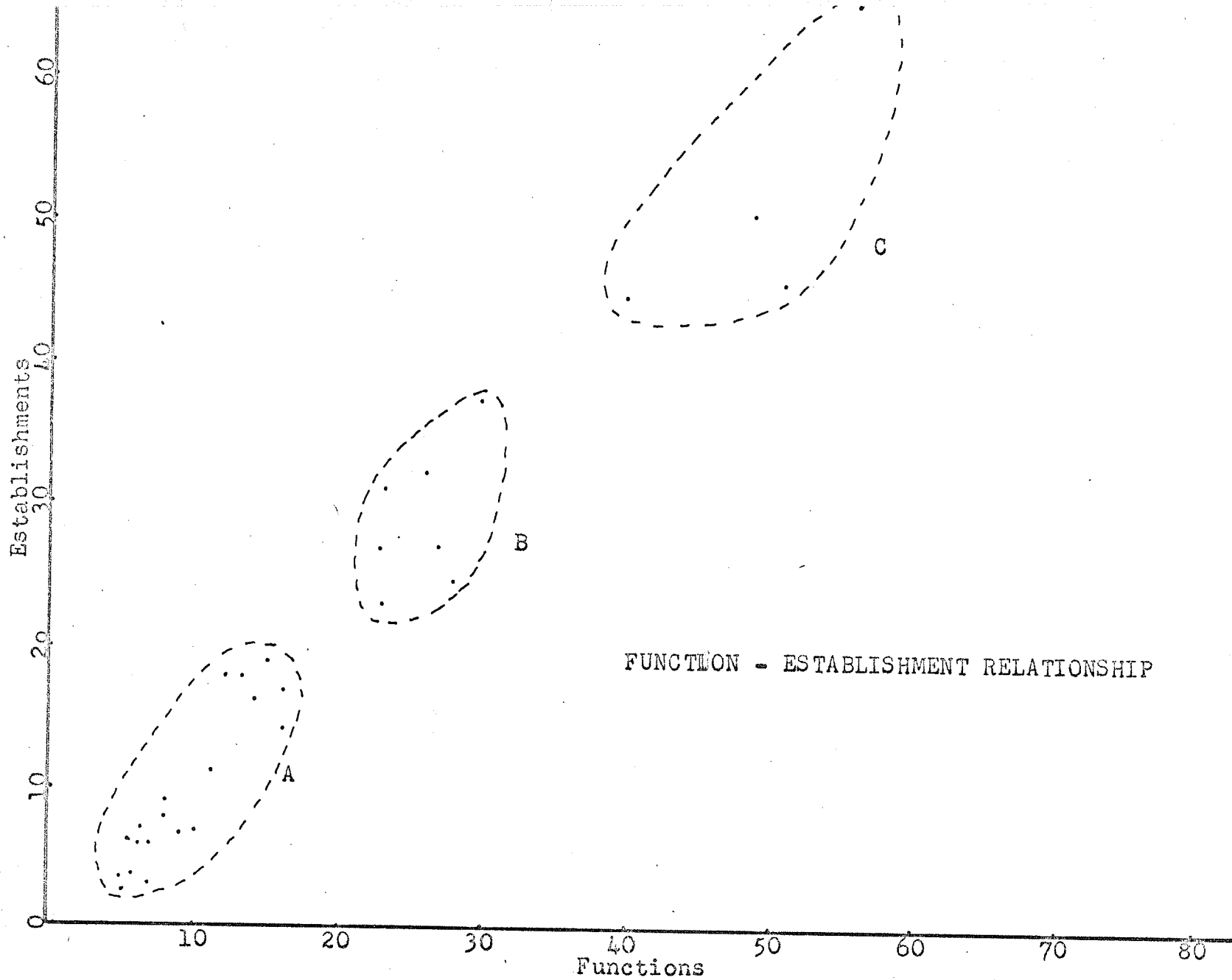


FIGURE 2

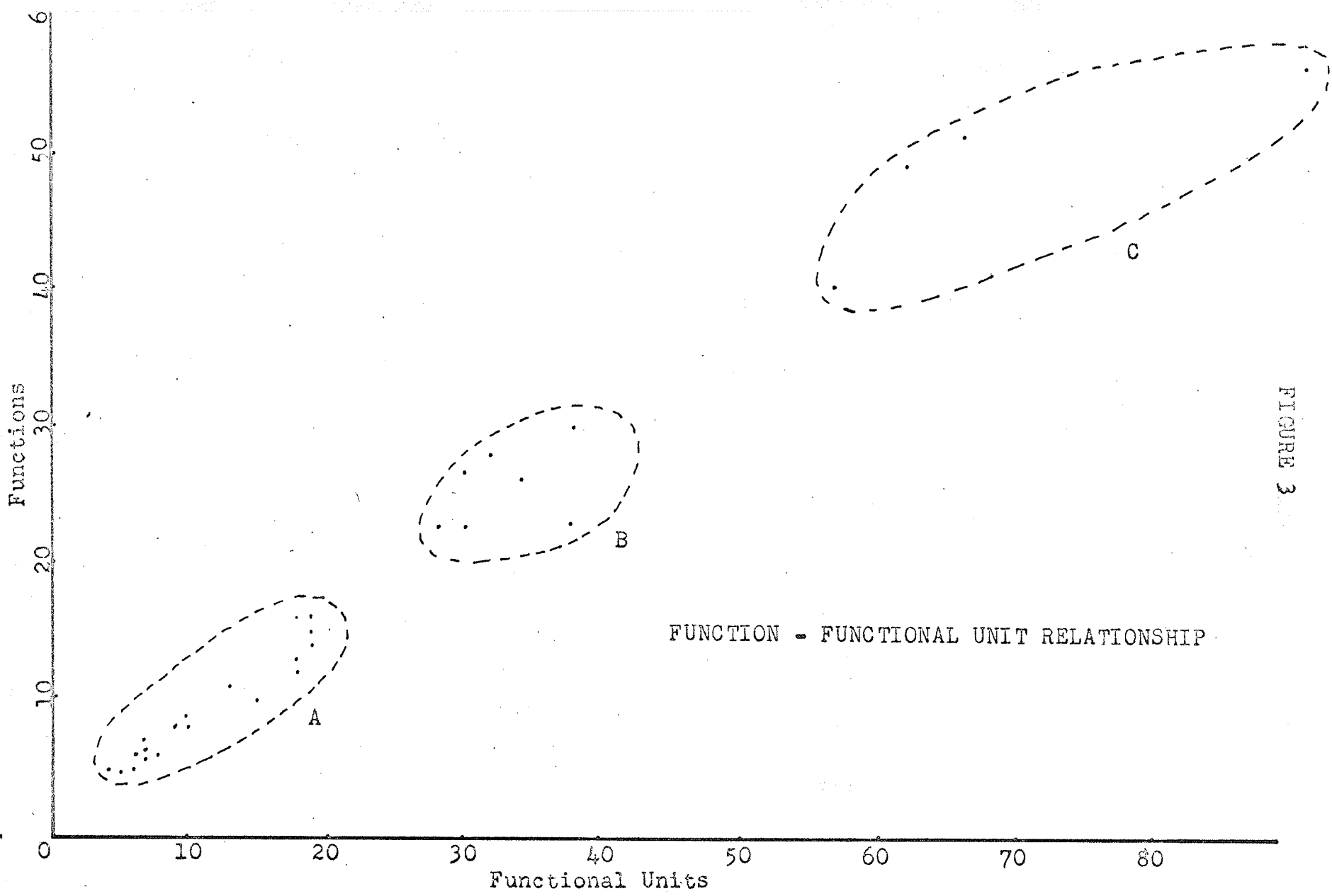


FIGURE 3

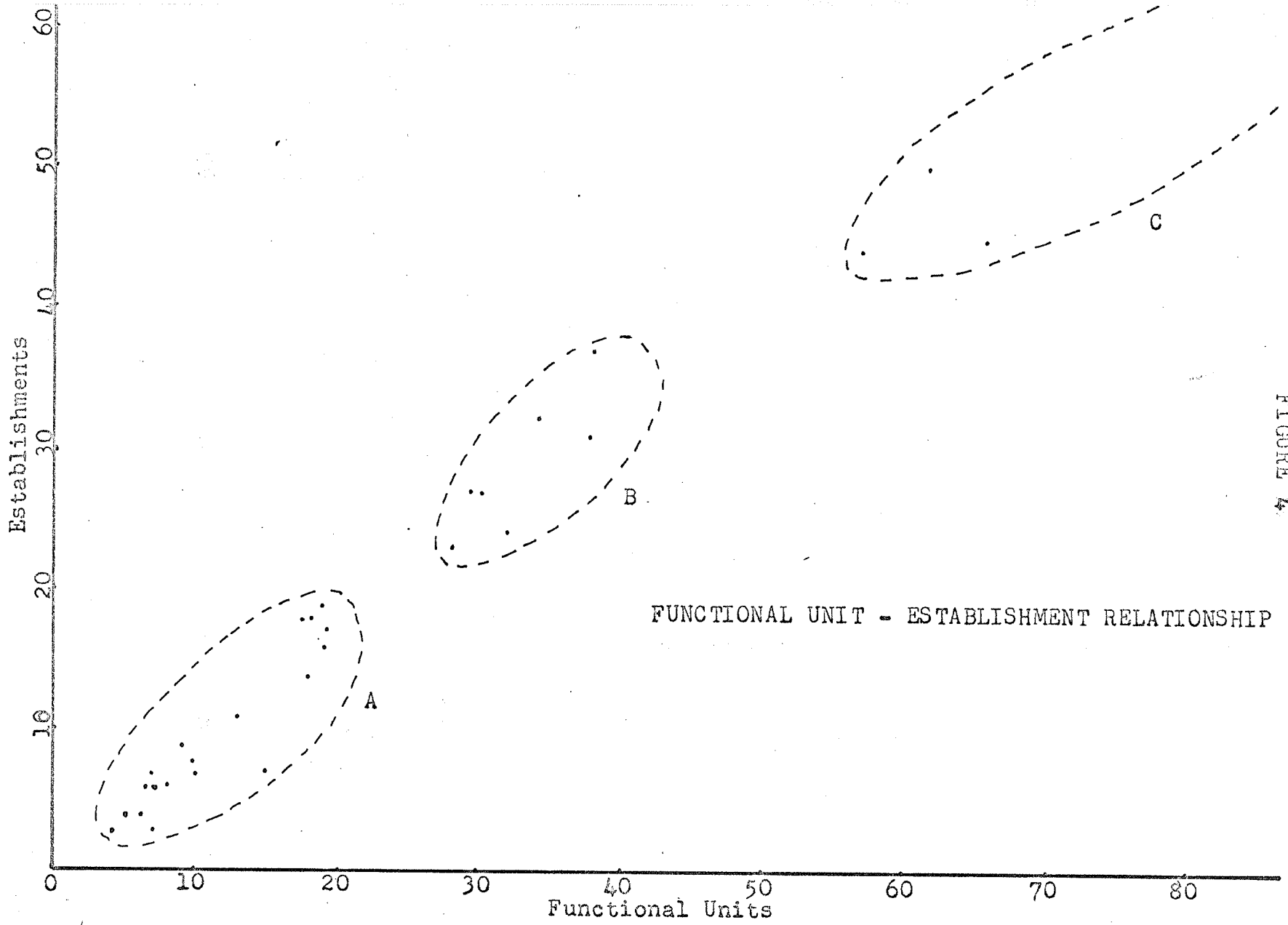


FIGURE 4

Since Portage la Prairie has 91 functions, 332 establishments, and 379 functional units, it could not very well be included on the graph without changing the scale of the graphs. Thus it is quite clearly in a group by itself, making the total number of functional levels of full-fledged central places equal to four. Centers of the Portage la Prairie class would then consist of Group D.

Of the 31 centers considered only one, Portage la Prairie, belonged to Group D, the highest level of urban development. Group C consists of four centers, Group B has seven, while Group A has 19. Since theoretically a $k=3$ hierarchical system of centers has one (Group D), two (Group C), six (Group B), and 18 (Group A) number of centers at the different levels, one can easily see a very close similarity between what the hierarchical system should be (1, 2, 6, 18) and how it is in the Portage la Prairie system (1, 4, 7, 19). The total number of centers, 31, compares quite favourably to the total theoretical number of 27. The chi-squared (X^2) value confirmed the compatibility of the actual to the theoretical, being only one point five four (1.54) substantially less than the one percent level of significance value of 11.34.³⁷ Thus the data confirms an hierarchy of centers where each higher level center having two lower level centers dependent upon it.

Comparison to Other Hierarchical Systems.

A comparison of the breaks or steps in the functional data of the centers with those of American investigators reveals a

³⁷ Because of the small values in the first two cells of the data these were combined into one, satisfying the minimum value of two per cell. The resulting degrees of freedom of the X^2 value is naturally decreased by one being now two in this test.

great similarity. In Southwestern Iowa, Berry, Barnum, and Tennant³⁸ classified those centers as cities that had more than 50 functions. In this study, Group C, has from 40 to 56 functions. Actually only one center is somewhat removed from the 50 mark having 40 functions while the others have 49, 51, and 56. Towns in Iowa were classified as having from 25 to 50 functions. In the Portage system Group B centers have from 23 to 30 functions. Since there is no definite boundary between groups B and C, one can take the upper limit in the number of functions for Group B as being 35. Villages, the lowest group of centers in Iowa, had between 10 and 25 functions, while the lowest group in the Portage system has between five and 15 functions. Since Group B's smallest center has 23 functions, any center with less than 20 functions belongs to group A. Centers with less than 10 units in Iowa were called hamlets. In this study the lowest center, called an auxiliary center, had less than five functions. It was thought that these small centers do not have the facilities usually thought of as being present in hamlets and thus they could not be classified as such. The term hamlet would apply more readily to Group A centers, but since a precise definition of the term hamlet does not exist it was not applied to any of the centers in the Portage system.³⁹

³⁸Berry, Barnum, and Tennant, op.cit., pp.65-106.

³⁹The term hamlet is applied to any small urban settlement which is not incorporated. Thus geographers find it hard to use the term because of its relativity. Usually they must define the term to suit them. It is proposed here to leave the term hamlet in its impreciseness and to use a different term to prescribe specific characteristics to some small settlement.

In Snohomish County, Washington, Berry and Garrison⁴⁰ have established a three level hierarchy, the lowest centers belonging to Group A, and having from one to 16 functions comparing well to this study range from five to 14. The second level (B) consisted of centers having from 22 to 42 functions. This spread again is similar to Group B centers in this study. The number of functions in their Group C centers was on the average somewhat higher than in this study ranging from 56 to 64. In the Portage la Prairie area the range was from 40 to 56.

Sosa⁴¹ in the Interlake region of Manitoba found a four level hierarchy. His fourth level centers had a functional diversity index of more than 50, while in this study, Portage la Prairie, the only fourth level center, had a functional diversity of 91. This leads to the question of whether Portage is not really a fifth level center. Fourth order centers would then be Neepawa, with a population of 3,197 (1961) located 54 air miles northeast of Portage, and Carman, with a population of 1,930 (1961) located 31 miles south and southeast of Portage la Prairie. Both centers are outside of Portage la Prairie's influence. Neepawa being only some 28 air miles from Brandon belongs to the city's sphere of influence, while Carman looks to Winnipeg as its next higher order center, being only 35 miles by air from Winnipeg. Thus Portage la Prairie's status as a fifth level center can be questioned on the basis that no fourth level center depends upon it for goods and

⁴⁰Berry and Garrison, op.cit., pp.145-154.

⁴¹Sosa, op.cit.

services.⁴² It is because of this that Portage la Prairie will be considered as being at least a fourth order center.

Examination of Functions.

An examination of the functions present in Group A shows that a total of 41 different functions are present in the nineteen centers. The general store and the post office appear most frequently, occurring in 17 and 19 of the 19 centers respectively. Elevators and elementary schools are functions found in over half of all the centers. Nearly all of these centers used to have elementary schools but because of consolidation of school districts many centers with populations too small to support a five-room school are losing their one or two-room elementary school.⁴³ The elevator, a former ubiquitous function for any center is also disappearing from the smallest centers, especially those near larger ones because of the objection of the railways to stopping every few miles as well as because of the closing of uneconomical lines.⁴⁴ This means that farmers have to truck their grains further, but they can do very little against this trend.

⁴² Although Neepawa and Carman do not look to Portage for the satisfaction of economic and social requirements, they are dependent on some governmental function located in Portage la Prairie. For example, the Portage Canada Manpower Center, serving Neepawa, the Children's Aid Society and Welfare Departments serving Neepawa and Carman, as well as such provincial institutions as the Home for Boys, Home for Mentally Retarded and Provincial Gaol for Women, serving all of Manitoba.

⁴³ As an example, the 1964 Government Road Map shows elementary schools in Marquette, Newton Siding and Macdonald, all of which have now been closed.

⁴⁴ As an example, the abandonment of the Northern track of Canadian National Railway between Portage and Winnipeg in 1965 the elevator at Fortier had to be closed. Secondly, the abandonment of the railway service between Amaranth and Alonsa has made the elevator at Alonsa useless.

The presence of a telephone exchange in seven out of the 19 centers demonstrates the existence of what sociologists call a community, the center of which is the central place. One might say that a community is a group of people who have more to do with each other than with people outside of this community. The decision to be part of the group is expressed by wanting a telephone belonging to the exchange in the central place. This allows them to telephone people or businesses in this communal area without paying long distance charges, thus keeping telephone expenses at a minimum. The telephone is one of the functions which focuses on a central place and helps to form a community unit.

Of the Group A centers, six already had such higher order functions as lumber suppliers, hotels and fuel distributors. Of these three functions, the hotel is disappearing slowly from the centers. Most of the hotels found in these centers are old, having been built in an era when transportation was not developed as well as it is today and when more frequent stops were required by travellers. Even the secondary function of these hotels, that of providing alcoholic beverages, is decreasing because of the limited variety (usually only beer) which they can offer. Lumber yards are usually more diverse in function than the name would imply. Besides selling lumber, hardware, and paint supplies are also sold. The main function of the fuel distributor is that of providing fuel to rural homes. Even in this field he is beginning to experience competition from the natural gas companies. Thus his occurrence in Group A centers might decline in the near future.

Six of the Group A centers also had the following functional establishments: churches, transfer services, implement dealer,

service stations, cafes and railroad stations. The distribution of churches was already discussed under the functions of auxiliary centers.⁴⁵ The presence of a transfer service shows the importance of the local need for communication in the field of trade. Most of these transfers operate between their local centers and Winnipeg. If the local demand for goods from Winnipeg is not enough for an economically viable business, one transfer might serve two or three centers situated in the same general area or on the same road to Winnipeg.

Implement dealers, although still quite numerous, are also decreasing in number. Their decrease can be attributed to the fact that they do not have the financial resources or the business volume to stock the many different kinds of farm machinery and the parts that go with it. Furthermore, most present day farmers demand fast and expert repair service which they cannot get from the smaller dealers. As a result, many big farm implement producers are building their own 'outlets', staffing them with highly skilled mechanics so as to provide fast and expert service for the complicated farm machinery of today.⁴⁶

Of the other functions not yet mentioned, high schools are the most frequent. But even the number of high schools in the Group A centers is decreasing. For example, the high school in

⁴⁵For a discussion of the distribution of churches, see page 52.

⁴⁶These views were confirmed by the manager of the Case franchise in Portage and by Mr. Christianson, owner of the John Deere franchise in Portage la Prairie. The former is a new, modern dealership owned by Case, while the latter is owned by Mr. Christianson.

in Alonsa was closed in 1966, while the high school in Rossendale⁴⁷ is being closed in 1967. Although in High Bluff the high school is still operating, it is expected to close in the fall of 1967. This high school has remained open to date only because of the presence of a good teacher, Miss Creighton, who did not mind teaching all subjects in grades IX to XI.

In some centers the general store has made way for a grocery store and another store, usually selling dry goods. Specialized stores such as the hardware store, the meat market, the appliance store, the co-op and the children's wear shop also started to appear. Recreational facilities such as curling and hockey rinks, bowling and billiard facilities and general meeting halls such as for bingo games are present in some centers. Only one center had a financial institution, a credit union, demonstrating the general absence of this function in smaller centers.

In the seven centers, belonging to Group B, can be found 52 different functions. Seven functions can be considered ubiquitous for this group being present in each one. These functions are the post office, telephone exchange, fuel distributor, general store, elementary school, elevator, implement dealer, and transfer service. Since most of these are found, in part at least, in Group A centers, it demonstrates Christaller's contention that all higher order centers also perform the services of the lower order centers. Another 12 functions (see Table 5, page 68) were found in over half of the Group B centers. Of these 12 functions the service of a medical doctor is the only one which is not present in any of the

⁴⁷This opinion was verified by the principal and only teacher there.

lower order centers.

The financial institutions are better represented in Group B than in Group A centers, since the Group B centers had three banks and three credit unions. Three of the Group B centers act as focal points for the municipality having the municipal offices located in them. Already two centers also have drug stores and paint stores. The personal services such as the beauty parlour for women and the barber shops for men are also starting to appear. A further specialization of these centers can be seen by the presence of a florist and a funeral home. In general, these centers differ from those in Group A in that the functions performed in perhaps one or two of the Group A centers are performed in most of the Group B centers. Thus one can conclude that Group B centers have a greater number of functions as well as more of the specialized functions.

Altogether the four centers belonging to Group C can offer 72 different kinds of goods and services. In this group the number of ubiquitous functions has increased to 24 as compared to seven such functions in Group B. Naturally the functions ubiquitous in the lower order centers are ubiquitous in Group C, the higher order centers.

A function which appears for the first time and which is found in each of the Group C centers is the hospital. Although these hospitals are not large, they demonstrate the fact that a center has to reach a certain status before a hospital will be found in it. Also, in these centers, the service of a dentist first appears, in addition to such medical services as X-ray units, medical clinics and ambulance service.

Table 5

Frequency of Functions of Different Level Centers

Auxiliary Centers (42)

<u>Function</u>	<u>Frequency</u>	<u>Function</u>	<u>Frequency</u>
Post Office	31	Section House	1
General Store	30	Railroad Station	1
Elevator	17	Health & Welfare	1
Elementary School	8	High School	1
Church	5	Insurance Agent	1
Billiards	2	Implement Dealer	1
Meeting Halls	2	Garage	1
Curling	1	Telephone Exchange	1

Group A Centers (19)

<u>Function</u>	<u>Frequency</u>	<u>Function</u>	<u>Frequency</u>	<u>Function</u>	<u>Frequency</u>
Post Office	19	Service Station	5	Printer	1
General Store	17	Cafe	5	Fisheries	1
Elevator	13	High School	4	Hydro Main	1
Elementary School	12	Grocery Store	3	Elec. Store	1
Garage	9	Contractor	3	Hockey Rink	1
Telephone Exchange	7	Meeting Hall	3	Blacksmith	1
Fuel	6	R.C.M.P.	2	Appliances	1
Hotel and Motel	6	Section House	2	Credit Union	1
Lumber Supply	6	Auto Dealer	2	Curling Rink	1
Church	5	Meat Market	2	Co-op store	1
Transfer Service	5	Hardware	2	Health & Welfare	1
Implement Dealer	5	Billiard	1	Agr. Processing	1
Railroad Station	5	Bowling	1	Children's Wear	1
		Tire Store	1	Ambulance Ser.	1

Group B Centers (7)

<u>Function</u>	<u>Frequency</u>	<u>Function</u>	<u>Frequency</u>	<u>Function</u>	<u>Frequency</u>
Post Office	7	Contractors	4	Real Estate	1
Telephone Exch.	7	Doctor	4	Florist	1
Fuel Distrib.	7	Insurance Agent	3	Bakery	1
General Store	7	Co-op	3	Funeral Home	1
Elementary School	7	Bank	3	Barber Shop	1
Elevator	7	Club	3	Confectionary	1
Implement Dealer	7	Beauty Parlour	3	Dry Goods	1
Transfer Service	7	Hydro Main	3	Herd Builders	1
Garage	6	Municipal Offices	3	Cold Storage	1
Service Station	6	Paint Store	2	Meeting Hall	1
Motel & Hotel	6	Drug Store	2	Hockey Rink	1
Church	5	Credit Union	3	Elec. Store	1
Curling	5	Section Line	2	Radio & TV Repair	1
Cafe	5	Blacksmith	2	Fishery	1
Lumber Yard	5	Meat Market	2	Coal	1
Hardware	5	Auto Dealer	2		
High School	5				
Grocery Store	4				

Group C Centers (4)

<u>Function</u>	<u>Frequency</u>	<u>Function</u>	<u>Frequency</u>
Post Office	4	Credit Union	2
Telephone	4	Meat Market	2
Fuel Distributor	4	Florist	2
General Store	4	Funeral Home	2
Elementary School	4	Herd Builders	2
Elevator	4	Health & Welfare	2
Implement Dealer	4	Coal Distributors	2
Transfer Service	4	Ladies Wear	2
Garage	4	Elec. Contractor	2
Service Station	4	R.C.M.P.	2
Motel and Hotel	4	Dentist	2
Bank	4	Furniture	2
Hospital	4	Printing	2
Bakery	4	Milk Service	1
Hydro Main	4	Clubs	1
Auto Dealer	4	Section House	1
Railroad Station	4	Real Estate	1
Gift Store	4	Barber Shop	1
Church	3	Elec. Store	1
Cafe	3	Fam. Clothes Store	1
Contractor	3	Medical Clinic	1
Beauty Parlour	3	X-Ray Units	1
Municipal Offices	3	Auction Market	1
Paint Store	3	Shoe Store	1
Drug Store	3	Veterinarian	1
Dry Goods Store	3	Men's Wear	1
Cold Storage	3	Radio & TV Sales	1
Radio & TV Repair	3	Agr. Processing	1
Body Shop	3	Tire Store	1
Restaurant	3	Golf Course	1
Lawyer	3	Lumber Yard	4
Creamery	3	High School	4
Ambulance Ser.	3	Grocery Store	4
Plumbing & Heat.	3	Doctor	4
Appliance	3	Insurance Agent	4
Curling	2		
Co-op	2		

In the field of apparel goods, one center had a family clothing store, two had ladies' clothing shops and one had a men's clothing shop. These stores offer additional services to supplement the general store and dry goods store.

Each center of Group C also has a gift store, a bakery, a railroad station, a bank, an insurance agent, a high school, a doctor, a hardware store and a grocery store. Two centers (Treherne and MacGregor) have printing services and thus produce a local paper. Legal services are represented by lawyers in three of the centers, while the Royal Canadian Mounted Police are stationed in two of the three centers. Such slow selling and relatively expensive commodities as furniture are also sold in centers of Group C.

In general, one can say that the Group C centers, although small from the point of view of population, have most of the goods and services offered in larger centers, except that the choice which they can offer is very limited. The choice is further restricted by the relative closeness of the centers to metropolitan Winnipeg, both in terms of actual distance and in terms of being able to use mail order facilities available in Winnipeg.

Central Place Functions of Portage la Prairie.

As can be seen from Table 3, the total number of different central functions present in Portage la Prairie is 91. This is the minimum value since the title of some of the establishments in the telephone books infers one function while in actuality the establishment may offer several. The number of central place establishments comes to 332 while the number of functional units is 379. In comparison to the other centers in the Portage la Prairie

area, this represents a large figure. To see why Portage is classified at least one class higher than Class C centers, one has to compare the functions present in both Class C centers and in the city of Portage la Prairie.

In the field of retail trade Portage offers everything that Group C centers offer. In addition Portage has such specialty shops as jewellery stores (4), ladies' style shops, furriers, variety stores, camera shops, record and toy shops, and an exclusive fabric store, to mention just a few which are not found in any of the smaller centers. In the line of food stores, such nationally wide food chain stores as I.G.A. and Safeway⁴⁸ are located in Portage.

Personal services are also better represented than in the smaller centers. Dry cleaning service is well looked after by numerous establishments. In the smaller centers this service was completely lacking. People who wanted clothes dry cleaned had to go to Portage or else wait for pick-up service where it was available. Besides having the services of doctors and dentists, Portage also offers the services of optometrists, chiropractors, and veterinarians, all of which serve a substantial rural area.⁴⁹ Barber shops and beauty parlours are also represented in substantial number as are lawyers and accountants.

⁴⁸ A new Safeway food store was completed in the fall of 1967 with a complete bake and butcher shop. It is modern and big enough to compete with any food store in Winnipeg.

⁴⁹ The areal extent in which people depend upon these services from Portage la Prairie can be seen in Part III.

The financial aspect is well looked after through four modern banks, a credit union, two loan companies, a finance company, and a trust company.

The wholesale trade, on the other hand, is quite undeveloped. This might be due to the nearness of Winnipeg. Thus, besides a few fuel dealers, a retail-wholesale food outlet, an automotive parts department and a tobacco wholesaler, very few wholesalers are present. In all only 109 persons are employed in the wholesale trade of the city out of a total work force of 4,129 in 1961.

The recreational and entertainment facilities, although well developed in comparison to the smaller centers, could still be improved. Thus Portage as yet does not have an arena big enough to support even a junior hockey team.⁵⁰ This is in comparison to Selkirk and Flin Flon, both smaller centers, yet having junior hockey franchises. The Portage arena or skating rink, although modern (completed in 1966), can seat no more than 1,000 people and thus is inadequate for such purposes. In the field of bowling and billiard, Portage seems to be adequately provided for by two modern and large establishments.⁵¹ For swimmers, Portage has only one public pool and that an open-air one. Crescent Lake and the Assiniboine River are not used for swimming. Two beaches are located not far away at Delta and Norquay, the former on Lake

⁵⁰ This has been rectified for the 1967-68 winter, when the Portage Terriers a junior hockey team was formed, playing in a league against teams from Dauphin, Selkirk, and Fort Garry.

⁵¹ Delta Lanes is also selling bowling equipment. Here strong leagues in both bowling and billiards are operating, sponsored by firms in the city which supply bowling shirts with advertisement on the back. The manager, Mr. Gilesby, considered the bowling market to be saturated at present, since the complementary area of Portage according to him had only 22000 people.

Manitoba and the latter five miles east of the city. Boating, tennis, picnicking and golfing can be enjoyed on Island Park in the city. Curling is provided for in the winter by the Portage Curling Club, which has a seven sheet heated curling rink. In addition to these sheets, the hockey rink can be converted to a curling rink if necessary, providing an additional five sheets. Baseball facilities are available in the numerous school yards and on Island Park. At present, no indoor facilities are available for such recreational activity as weight-lifting, table tennis, volleyball, basketball, track and field, and boxing, all of which are usually offered by a Y.M.C.A.

Portage la Prairie has the only theatres in its urban system outside of the one in Gladstone. The city itself has two indoor theatres with a drive-in theatre just west of Portage on the Trans-Canada Highway. Furthermore, the annual Portage Fair is a great attraction for the city as well as for the rural people from south-central Manitoba.

Besides having transfer service similar to the smaller centers, Portage has a local bus company. Although no regular bus service is carried on in the city or to any other center from the city, many chartered runs are performed by the company both for the city and for rural groups. Portage also has excellent railroad connections. It is the only place in Canada where the two great Canadian railroads, the Canadian Pacific and the Canadian National, are a 'stone's throw' from each other. In addition to this the Trans-Canada Highway goes right through the city.⁵² Although

⁵²At present a by-pass is under construction between the occupied portion of the city and the Assiniboine River, and will be completed in 1968.

Portage has an airport, it is used exclusively by the Portage Flying Club. Besides having daily passenger service offered by the two railways, Portage also has daily continental bus connections offered by the Greyhound Bus Company. Thus the city is well equipped with transportation facilities.

It is in the field of community and administrative service that Portage ranks far above its smaller neighbors. The offices of the municipality of Portage la Prairie are located in the city. Other government institutions include: a regional post office, a Canada Forces Base,⁵³ a regional Manitoba Telephone Office and Manitoba Hydro district office, a highway department branch,⁵⁴ a Manpower and Immigration office, a provincial Gaol for Women and a rural and urban Royal Canadian Mounted Police detachment. In the field of community services, Portage has a large school for mentally retarded (at present there are about 1,100 patients), a provincial home for boys, health and welfare offices, a branch of the Department of Indian Affairs, a Children's Aid Society Office,

⁵³The Canadian Forces Base, Southport, is located five miles south of the city. It is an advanced flying and instructors school with some three thousand people associated with it. Although the base has one hundred and eighty-eight permanent married quarters, this is not enough and a substantial number of families are living in Portage la Prairie. Source: Portage and District Chamber of Commerce Information Pamphlet.

⁵⁴The establishment of Portage as a center for a new highway department district was recently announced by the Manitoba government. The Portage Leader, July 6, 1967.

108 bed hospital, two high schools and seven elementary schools,⁵⁵ an Indian Friendship Center,⁵⁶ and some 18 churches.

In the field of agriculture, Portage offers the service of a government agricultural representative and a special crop research station within its city boundaries. In all, Portage la Prairie is a very important service center in the field of governmental services, whether they are municipal, provincial or federal.

As has been mentioned earlier, such enterprises as mining (in Amaranth), and most manufacturing, are not considered central place functions. In this study, only such manufacturing industries as baking, bottling of soft drinks, and similar consumer-orientated enterprises were considered to be central. An examination of the manufacturing industries present in Portage reveals the fact that Portage la Prairie is mainly a service center. The greatest manufacturing employer in Portage is a soup manufacturing company employing about 300 people, the number fluctuates with the season.

⁵⁵In the field of education, Portage is also presently presenting a brief to the Provincial Government for the establishment of a technical school in Portage. In 1966/67, two upgrading classes were held in Portage to enable school dropouts and older people to raise their level of education so as to enable them to enter a technical school. Thus far only three technical schools are operating in Manitoba. The aim of the Manitoba Government is to have at least ten such schools distributed in Manitoba to enable unskilled people to acquire a skill.

⁵⁶This social institution tries to help Indians to adjust to modern life and thus plays a vital role in the Portage area where a substantial number of Indians live just outside of the city. In addition many Indians from the Sandy Bay and Long Plain Reserves visit the city frequently because of social and economic needs.

This naturally has encouraged vegetable growing in the area.⁵⁷ Other agricultural processing industrial firms are B.C. Pea Growers and McCallister Pea and Seed, both of which are concerned with the processing of peas. In addition to this, Portage has two agricultural implement manufacturers employing a total of sixteen persons. A coca-cola franchise, bottling the world-wide product as well as producing some local soft drink types, employs some 14 people. Portage also has a textile industry employing about 100 people, mainly women. It is strongly controlled from Winnipeg, from where it receives its work orders and to where the finished products are shipped to. This firm was established in Portage in 1961 to take advantage of the female labour supply and the relatively low wage scale. Although expansion is desirable, the absence of additional female labour prevents the growth.⁵⁸ Thus one can see that even in manufacturing an occupation usually not associated with the central place function of a center, Portage la Prairie tends to lean in this direction. Each of these manufacturers has a close association with the rural areas around Portage la Prairie.

C. Portage la Prairie's Employment Structure

The true nature of the functional specialization and the 'raison d'etre' of a city is best seen by a comparison of its

⁵⁷ Campbell Soup of Portage la Prairie was only established in 1961. Before this time the Portage area was not known as a strong vegetable growing area. Climatic conditions restrict the growth to a short period in summer. Despite this fact, more and more of the vegetables needed by the plant are grown locally.

⁵⁸ This was the reason given by the manager during an interview in the spring of 1967 for not expanding the premises at present.

functions to those of other cities of the same class. Such an examination can be carried out by comparing the employment structure of Portage la Prairie to that of other Canadian cities of similar size. The functional structure of a city in most classifications of urban centers is thought to be equivalent to its employment structure. Based on 1951 Census data, Maxwell⁵⁹ classified Canadian cities according to their employment structure. He had to limit himself to centers of over 10,000 people because of the absence of detailed employment figures for smaller centers. As a result Portage was not included in this classification, since its 1951 population was only 8,511. This study uses 1961 employment data to study the city's functional profile and compares this profile to the national level as shown by Maxwell.⁶⁰

⁵⁹J. W. Maxwell, "The Functional Structure of Canadian Cities: A Classification of Cities". Geographical Bulletin, Vol. VIII (1965), pp.79-104.

⁶⁰Although it seems at first that such a comparison is not valid because of the difference of 10 years in data, this turned out not to be the case. To show that a city's employment figures do not change very much over 10 years, five urban centers (Penticton, Medicine Hat, Brockville, Rimonski, Trenton) from the different parts of Canada with population figures between 10,000 and 20,000 in both 1951 and 1961 were chosen. For each center the percentage employed in the 13 industrial categories used by Maxwell was calculated for both the 1951 and 1961 figures. Two cities (Penticton and Medicine Hat) had no industry gain or loss five percent of its share of the total city labour force over a 10 year period. Two cities (Brockville, Rimonski) had each one industry gain or lose 5 percent while only one city, Trenton, had two industries change more than five percent of their share of total labour force. In terms of changes in specialization one center (Penticton) had no industry change as much as one standard deviate of mean excess employment. Three centers (Medicine Hat, Brockville, Rimonski) each had one industry change, one standard deviation and one city (Trenton) had two industries change one standard deviate of mean excess employment. This general stability supports the notion that cities as a whole change only gradually in their industrial employment composition through such relative short periods of time as ten years.

In his classification of the 80 geographical cities of Canada, Maxwell considered basic employment to characterize a city's functional structure. "It is the basic employment that identifies the 'raison d'etre' of a city and reveals the functional relationships that exist between the city and its hinterland".⁶¹ In calculating the basic part of different functions, Maxwell used the minimum requirement method of Ullman and Dacey.⁶² This minimum requirement approach states that the employment in a particular function can be made into two categories; one serving the city and the other serving the hinterland. Dacey and Ullman state that the part serving the hinterland is basic employment, while the fraction serving the city is non-basic. Maxwell based his classification on the basic employment figures of 13 industries (functions). In doing this he followed Ullman and Dacey's method of determining the minimum employment of 13 functions, necessary to serve the city's population adequately. These 13 functions are listed in Table 6, page 80.

All 80 Canadian cities were grouped, according to population, into four groups. These groups were similar to Ullman and Dacey's in size ranging from 10,000 to 19,000; 20,000 to 29,000; 30,000 to 100,000; and over 100,000. For each center the employment in each of the 13 functions was calculated as a percent of the city's total labour force. Maxwell then reasoned that the minimum percentage in

⁶¹ Ibid., p.80.

⁶² E. L. Ullman and F. M. Dacey, "The Minimum Requirements Approach to Urban Economic Base", Papers and Proceedings of the Regional Science Association, Vol. VI (1960), pp.175-194.

a particular function of any center in a group was a good estimator of the requirements of that city alone, that is, the city was considered to serve only itself in that function, having no hinterland. Hence the minimum percentage of that city group was equivalent to the non-basic requirements of that city. By plotting the minimum requirements of the four groups against the log of population figures for the centers, Maxwell was able to determine regression equations for each function. For these equations he could then determine the minimum requirement in any function for the four different groups of centers.

To see in which employment field a city specialized, the minimum requirement of the function under consideration was subtracted from the city's actual city percentage. This new or excess percentage represented the basic fraction of the employment in the function. Maxwell treated the distribution of this excess as a normal distribution. By observing the location of a function in this normal distribution, one can see the extent to which a city is specialized or non-specialized in a particular function. Maxwell was able to recognize four classes of distinctive functions. To Class I belong those centers having at least one function in which the excess employment is more than two standard deviations above the mean excess for the function and the particular groups under consideration. What it means in terms of probability is that only about one center in forty would have such a high employment in this function. A Class II center has between one and two standard deviations above the mean while Class III is between the mean and one standard deviation and Class IV has less than the national average of the particular function and group of centers under

Table 6

Employment Comparison of Portage la Prairie to Canadian Cities

INDUSTRIES	Number Employed	Percentage of Total	Minimum Canadian Percentage	Portage la Prairie Excess	Mean of Canadian Excess	St.Dev. of Mean Cdn.Excess	Classifica- tion of Portage la Prairie
EXTRACTION	2	.10	.0	.10	3.76	12.49	Class IV
MANUFACTURING	315	7.62	2.7	4.9	30.91	18.25	Class IV
PUBLIC UTILITIES	109	2.64	.4	2.2	1.04	1.01	Class II
CONSTRUCTION	250	6.05	1.8	4.3	3.85	2.28	Class III
TRANSPORTATION	394	9.54	2.4	7.1	5.56	5.11	Class III
WHOLESALE TRADE	109	2.64	.4	2.2	2.62	2.35	Class IV
RETAIL TRADE	568	13.76	4.2	9.5	5.52	2.91	Class II
FINANCE	139	3.37	1.1	2.2	1.22	.92	Class II
COMMUNITY SERVICE	653	15.83	4.7	11.1	4.23	3.63	Class II
GOVERNMENT SERVICE	850	20.59	1.9	18.7	5.06	6.31	Class I
RECREATION	27	.65	.2	.5	.15	.14	Class II
BUSINESS SERVICE	36	.87	.2	.7	.65	.81	Class III
PERSONAL SERVICE	407	9.85	4.4	5.5	2.63	1.74	Class II
OTHERS	266	6.44					
TOTAL	4,129	100.00					

Source: Census of Canada, 1961.

Maxwell, "The Functional Structure of Canadian Cities",
Table II, III, & IV, pp.83 and 87.

consideration. In this way a center can be specialized in more than one function. Portage la Prairie, as Table 6 shows, is a Class I center in governmental service, a Class II in public utilities, retail trade, finance, community service, recreation and personal service and a Class III center in construction, transportation, and business services. In all these functions, Portage's employment figures are greater than the average Canadian city's. As nearly all of these functions are central place functions, the importance of Portage la Prairie as a central place is demonstrated. Besides being Portage's most distinct function (Class I), government service is also the dominant function, that is, it has the greatest number of people employed. This is in part due to the Air Force personnel in Portage. In the non-central function of manufacturing, Portage is only a Class IV center.

That Portage la Prairie is specialized in a particular area of employment is further illustrated by a specialization index⁶³ of 15.95. In comparison, Portage's two greater neighbors, Brandon and Winnipeg, have specialization indexes of 1.41 and 2.00 respectively. The high degree of specialization in Portage is due

³ Maxwell devised an index which allowed him to see how much different a city's employment structure is from that of an ideal city (one with equal specialization in all fields). This he calculated for each city from the following relationship:

$$S = \left[\sum_i \left(\frac{P_i - M_i}{M_i} \right)^2 \right] \div \frac{(\sum_i P_i - \sum_i M_i)^2}{\sum_i M_i}$$

where "i" refers to each of the 13 functions, P to the percentage of labour force employed in each of the "i" functions, M the minimum requirement for each function, and "Σ" the summation of all the functions. For a city of ideal structure, S the specialization index, was one while increased deviation also increased the absolute number.

in addition to the nearby Air Force Base, to the number of governmental institutions such as the home for mentally retarded, the home for boys, the Provincial Gaol for women and the health and welfare institutions.

D. Relationships Between Central Place Functions and Population

At the beginning of this chapter a classification of centers into an hierarchy was attempted, based on the population of the centers. This had to be rejected because of such exceptional centers as St. Laurent. The actual classification was then based on the central functions of the centers. Christaller states that a close association exists between the population or size of a center and the function of that center. This relationship was statistically investigated for the centers of the Portage la Prairie system. A simple regression and correlation analysis was done for each of the central place measurements, namely functional units, functions, establishments and population.

The relationship between the number of functional units and population in the Portage area is quite close, as seen by figure 5, page 83. The high degree of association as depicted by the scatter diagram is confirmed by the high correlation coefficient (r) of 0.910. A yet higher coefficient would have been obtained if it were not for St. Laurent, a center of high population value and low functional unit value. All other centers had similar increases of functional units with increasing population size. The regression equation for this association showed that with each increase of 100 people, there is an increase of eight functional units. Furthermore, since with a population of zero, a center is expected to have only .7 functions, the number of functions

RELATIONSHIP BETWEEN POPULATION AND NUMBER OF
FUNCTIONAL UNITS OF A CENTER

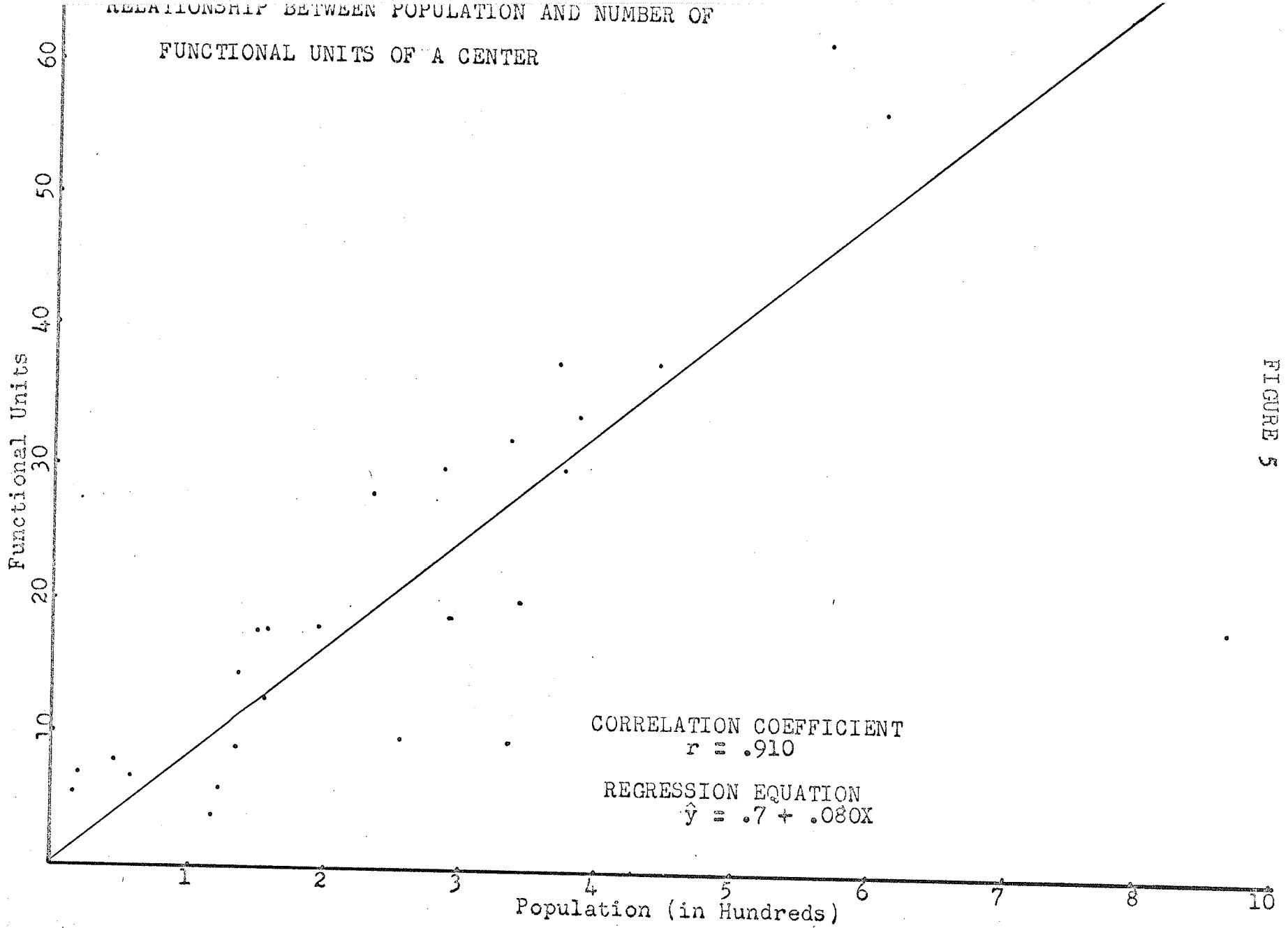


FIGURE 5

can be determined for any size center. By comparing the predicted number of functional units to the actual number it can be shown whether a center is under-developed or over-developed. It is known that Gladstone has 91 function units. Its predicted⁶⁴ number of functions as calculated from the regression equation is 75.8 or 76, somewhat less than the actual. This empirical measurement supports the former statement that Gladstone is a well developed Class C center. A center which is under-developed is St. Laurent. Its actual number of functional units is 19, while the theoretical number for such a sized center is 70.3.

Stafford,⁶⁵ who examined the functions of small towns in southern Iowa also found a strong positive relationship between number of functional units and population. His correlation coefficient of 0.934 is even greater than the one for the Portage la Prairie area. He compared this coefficient value to others calculated from Berry and Garrison's⁶⁶ data on Snohomish County, Washington and King's⁶⁷ data from the Canterbury Provincial District of New Zealand. Berry's value of .789 is the lowest while King's value of .930 is

⁴This regression equation can only be used for prediction of the number of functional units from population data. The reverse, that of predicting population from functional unit data does not give true results. Furthermore, centers of population size similar to the ones from which the equation was formed can only be used. In this case, only the number of functional units of centers with less than 944 people can be predicted. Portage la Prairie with its 12,388 people and 367 functional units was not used since such great figures, in comparison to the other data, would reduce the influence of data of the smaller centers whose population functional unit association one wants to establish.

⁵H. A. Stafford, Jr., "The Functional Base of Small Towns", Economic Geography, Vol. XXXIX (1963), pp. 165-175.

⁶Berry and Garrison, op.cit., pp. 145-154.

⁷L.J. King, "The Functional Role of Small Towns in Canterbury," Proceedings of the Third New Zealand Geographical Conference, Palmerstone, North, 1961, pp. 139-149.

nearly as high as Stafford's. These high correlation coefficients certainly support Christaller's hypothesis that there is a close association between the population of a center and its number of functional units.

Stafford also devised regression equations for his data. Since his number of functional units was of a greater range (1 to 141) than the range of the Portage la Prairie data (5 to 91), the actual equations are not the same. But a comparison can be made between the rate of increase of functions per unit of population. Stafford found that the number of functional units increased by 4.2 for each increase of 100 people, which is about half as great as the value for the Portage la Prairie area. The increase in functional units per 100 people for the Portage area is identical to the value derived by Thomas⁶⁸ for Iowa, to which Stafford also compared his results. Both Stafford and Thomas had substantially greater than zero y-intercepts in their regression equations, being 6.14 and 15.03 respectively. What this indicates is hard to say, since the actual statistical interpretation of having six and 15 functional units when there is no population in the center, is impossible.

The statistical relationship between the number of establishments and population for the centers in Portage la Prairie system is given in Figure 6, page 86. The relationship again is linear. With an increase of one variable there is a corresponding increase in the other. The very high correlation coefficient of .870 supports the idea of Stafford that inertia prevents the population-establishment ratio to change rapidly even after a center

⁶⁸Thomas, op.cit.

RELATIONSHIP BETWEEN POPULATION AND NUMBER OF ESTABLISHMENTS
OF CENTERS IN THE PORTAGE LA PRAIRIE AREA

98

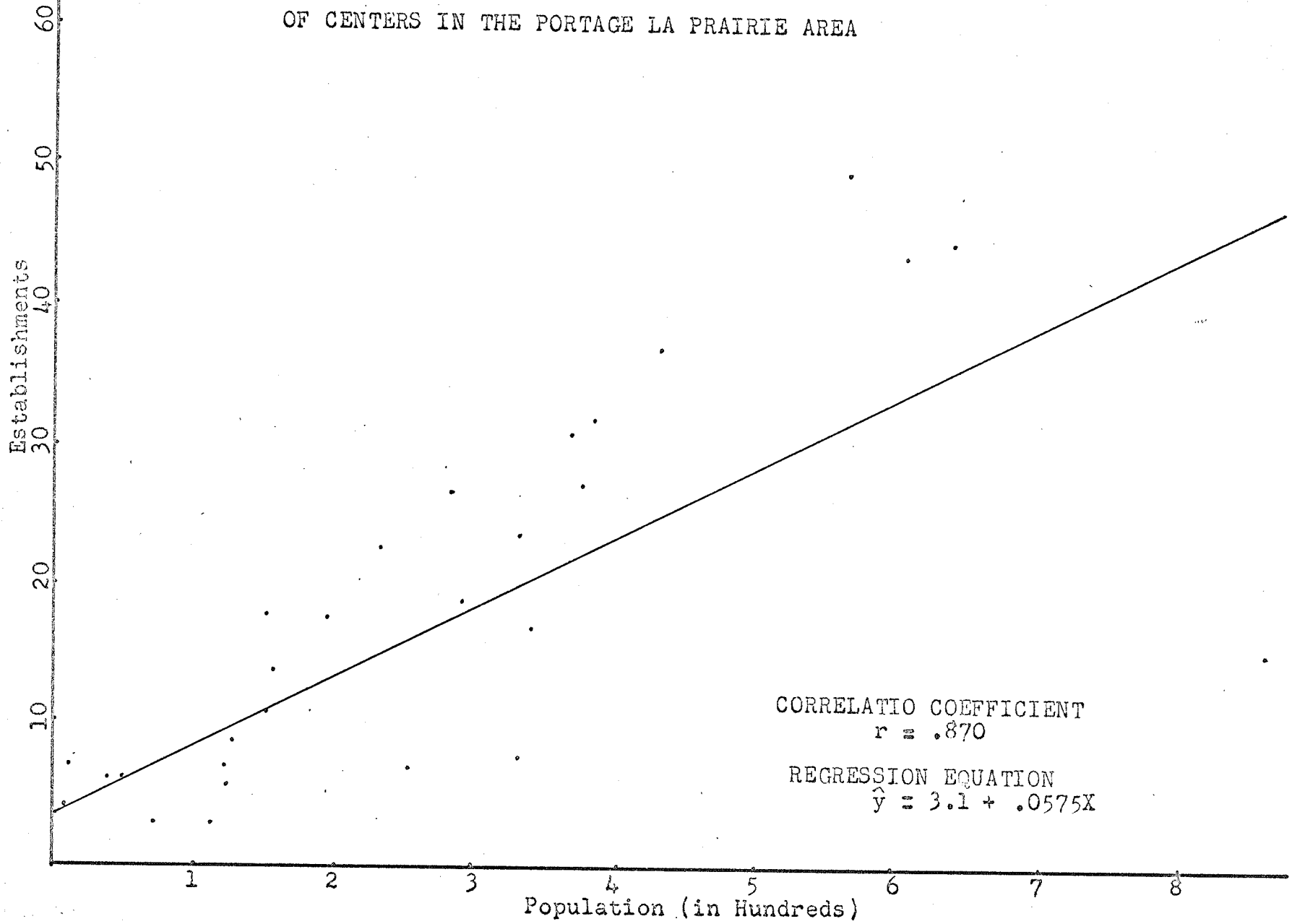


FIGURE 6

is declining.⁶⁹ In Illinois Stafford⁷⁰ found this correlation coefficient to be 0.929. The regression equation for the Portage area shows that the number of establishments increases at a rate of 5.75 per increase of 100 people in the center. It is a slightly higher value than the value of 3.8 for southern Illinois, yet somewhat smaller than the 6.6 value for Iowa.

The relationship between the number of functions and population when first plotted on a scatter diagram revealed a curvilinear relationship. A continuous increase in population did not result in a similar continuous increase in functions. Bigger centers have a smaller ratio of functions to population than smaller centers. There is a limit to the functional complexity of a center. After having all the functionally different units a city adds functional units of the same kind so as to provide better and faster services.

The curvilinear relationship between population and functions was made linear by means of a logarithmic transformation of the population data⁷¹ (see Figure 7, page 88). The calculated regression coefficient is 0.867, again similar to Stafford's southern Illinois value of 0.892, Berry's value of .751 and King's value of 0.823. All these were also formed after logarithmic transformation

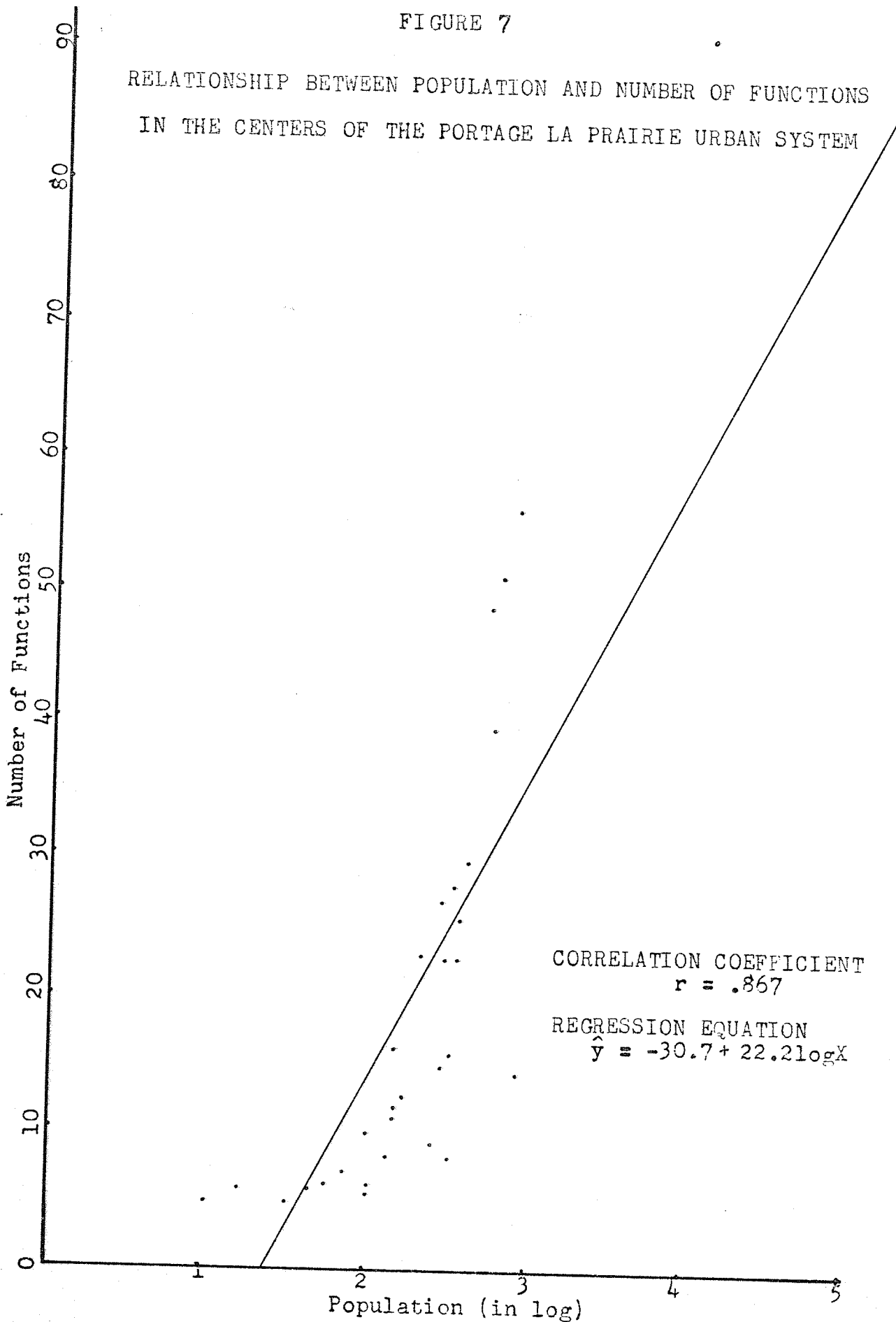
⁶⁹Portage was again left out of the calculation for the same reasons as given in Footnote ⁶⁴, page 84.

⁷⁰Stafford, op.cit., p.169.

⁷¹For the calculation of the statistical relationship between functions and population the data of Portage La Prairie was included. Because of the logarithmic transformation of the population data the effect of the large population in Portage on the calculation of the correlation coefficient and the regression equation was reduced.

FIGURE 7

RELATIONSHIP BETWEEN POPULATION AND NUMBER OF FUNCTIONS
IN THE CENTERS OF THE PORTAGE LA PRAIRIE URBAN SYSTEM



of the population data. Now, for an increase of one log value there is an increase of 22.2 functions.

The high positive correlation between the three indices of central place functions of a city and population suggests that Christaller's hypothesis is true. If it were not for the exceptions, population would be a good indicator of the status of a center in the urban hierarchy. Furthermore, there seems to be a strong similarity of the small centers in Iowa, Illinois, Washington, Caterbury and Manitoba whose 'raison d'etre' is to serve the rural areas.

E. Spatial Examination of the Central Places in the Portage la Prairie Area.

Having exposed in the preceding pages the urban hierarchy of the Portage la Prairie system, a test of its viability consists of examining the spatial distribution of the different level centers. Christaller reasoned that the spacing of central places for each level would be in a hexagonal manner, so as to keep aggregate transportation costs at a minimum. Furthermore, because each group of centers, belonging to a particular tier in the hierarchy, has twice as many centers as all centers above this tier, the area supporting each level of centers will be one-third as great as the area supporting the next higher level center. This naturally causes the higher level centers to be 3 times as far apart as one level lower centers. The theoretical hexagonal distribution also allows the calculation of the theoretical spacing of centers.⁷² In addition to the hexagonal distribution, the actual

⁷²The spacing of centers in a hexagonal pattern was formulated by J.A. Barnes and A.H. Robinson, "A New Method for the Representation of Dispersed Rural Population"; Geographical Review, Vol. XXX (1940), pp. 134-137. The equation they derived is as follows: $D = 1.07 \sqrt{\frac{A}{n}}$ where D represents the distance between centers, A the area and n the number of centers.

distribution of centers can be compared to that of a random distribution of centers.

To test for randomness in the areal distribution of the centers, the technique developed by Clark and Evans is used.⁷³ All centers, including the auxiliary ones, were plotted on a map. Next the straight line distance from each center to the nearest neighbor was measured and recorded, as shown on the map (page 91). A similar procedure was followed with Groups A, B, C, and D, then with groups B, C, and D, and then only with Group C and D centers. In this manner the maximum distance to the nearest neighbor for centers offering goods of the auxiliary center type, of the group A type, of the Group B type, and of the Group C type, were recorded. These four sets of minimum distances were then tested for randomness.⁷⁴

⁷³Clark and Evans, op.cit., p.447.

⁷⁴The significance of the departure of the average nearest neighbor statistics (\bar{r}_A) from the theoretical random average (\bar{r}_E) can be tested by the normal curve. The formula used for this test is:

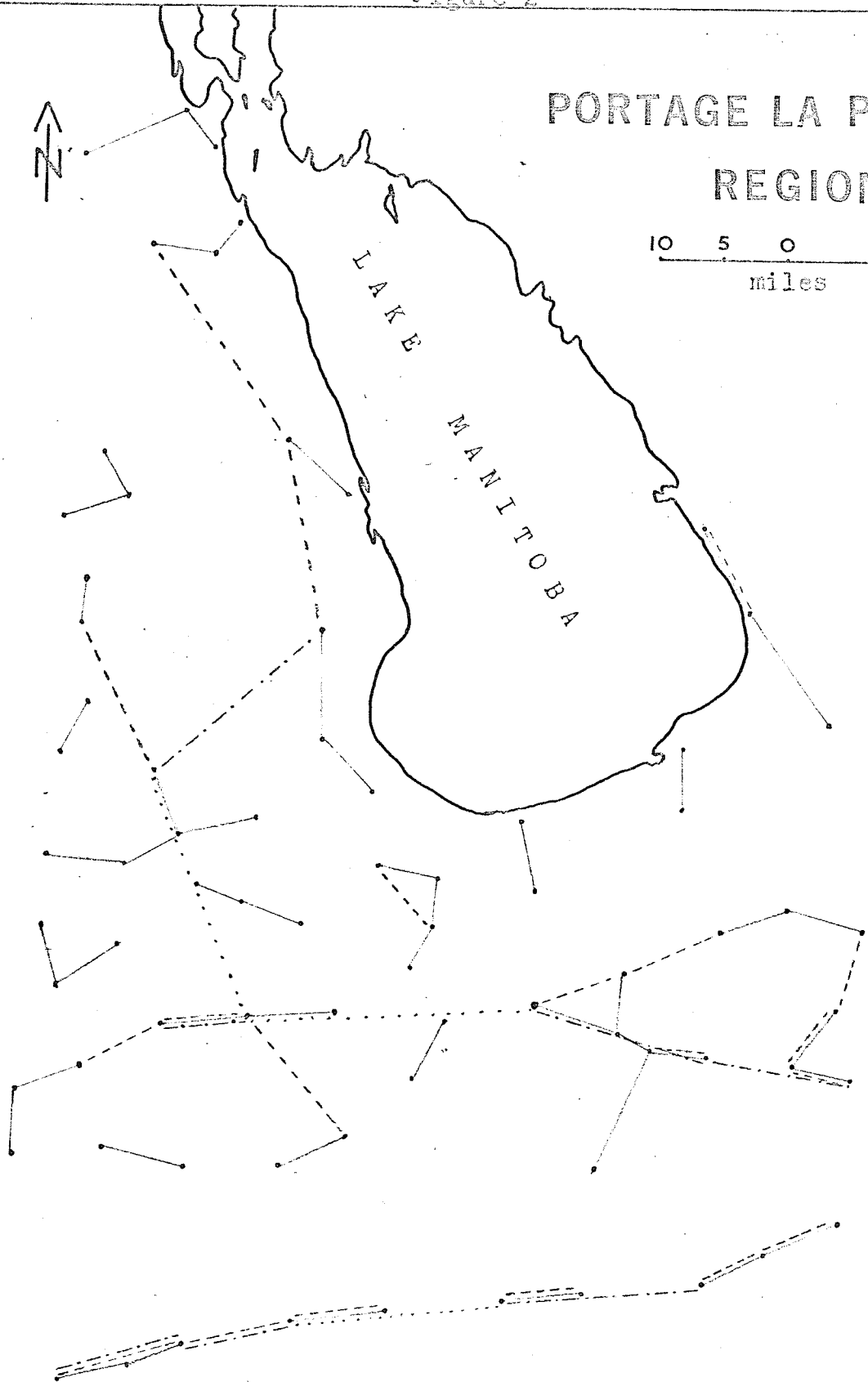
$$Z = \frac{(\bar{r}_A - \bar{r}_E)}{\sigma_{r_E}}$$

where \bar{r}_A is the average nearest distance, \bar{r}_E the expected average distance in a random distribution of centers (for the formula to calculate this value see Footnote under Table 7), and σ_{r_E} is the standard error of the mean distance to the nearest neighbor. The value of \bar{r}_E for a population density is $\frac{.26136}{NP}$. ($P = \frac{N}{A}$ where N is the number of measurements of distance made and A is the area under consideration).

Figure 2

PORTAGE LA PRAIRIE REGION

10 5 0 10
miles



Minimum Distance Measurements

- _____ between all Centers
- between Centers B,C and D
- between Centers A,B,C&D
- . - . between Centers C and D

Table 7

Comparison between Actual Nearest Neighbor Measurement in the Portage la Prairie Area and Nearest Neighbor Measurement in a Random and a Hexagonal Distribution.

	N	Actual Nearest Neighbor	Nearest* Neighbor in Random Distribution	Rn**	Dist.bet.*** Centers of Hexagonal Distribution
All centers	73	5.30	3.73	1.42	7.97
Groups A,B,C & D	31	8.18	5.71	1.43	12.21
Groups B,C, & D	12	12.20	9.18	1.33	19.65
Groups C & D	5	19.20	14.25	1.34	30.50

The area considered to belong to Portage system has 4,050 square miles.

* The distance to nearest neighbor in a random distribution having the number of centers equal to the number in Portage la Prairie area was calculated from the following relationship:

$$\bar{r}_E = \frac{1}{2\sqrt{p}} \quad \text{where } \bar{r}_E \text{ is the expected nearest}$$

neighbor distance and p is the density of centers.

** Rn is the ratio between the actual and the random nearest neighbor average.

*** These values were calculated from the formula given in Footnote 72, page 89.

The preliminary work to the actual testing involved seeing if the areal distribution of centers was grouped, randomly distributed or more even than randomly distributed. Clark and Evans showed the by determining the ratio of actual nearest neighbor to expected nearest neighbor of a random distribution these aspects of a distribution were focused upon. This ratio (Rn) ranged in value from zero when all points are clustered in one location, through 1.00 which represents a random distribution, up to 2.15 for a uniform hexagonal distribution. Table 7 shows the nearest neighbor statistics (Rn) for the four groups of centers. In each case the ratio is more than one, supporting the proposed notion

that the centers were more evenly distributed than a random distribution. Furthermore, the higher value of R_n for the centers offering lower central goods, demonstrates the more uniform distribution of these lower order centers.

King,⁷⁵ in a comparative analysis of 20 sample areas within the United States, found that his R_n values range from .70 to 1.38 for Utah and Missouri respectively. Of his 20 samples, three had centers which were more clustered than a random distribution while in the other 13 samples the centers were more evenly than randomly distributed. But because of the small values of R_n the evidence for a random distribution for urban centers in the United States seems to be stronger than for a regular pattern.

Dacey⁷⁶ also studied the distribution of small centers in Southwestern Wisconsin by means of this nearest neighbor method. He compared the actual distribution of the hamlets, villages and towns with a hexagonal distribution. In each case the difference between the actual distribution and the random distribution was less than the difference between the hexagonal and the actual distribution. Of the three levels examined, Dacey observed that the smallest centers, hamlets, approached a regular pattern more than the higher level centers.

From Table 7, page 92, one can see that the nearest neighbor average is about midway between the values for a random distribution

⁷⁵L. J. King, "A Quantitative Expression of the Pattern of Urban Settlements in Selected Areas of the United States", Tijdschrift, Voor Economische en Sociale Geographie, Vol. LIII, pp. 1-7.

⁷⁶M. F. Dacey, "Analysis of Central Place and Point Pattern by a Nearest Neighbor Method", Lund Studies in Geography, Series B, Human Geography, No. 24 (1962), pp. 55-75.

and those for a hexagonally arranged distribution. To see if the actual nearest neighbor values are statistically significantly different from the random distribution, the normal deviate test was applied.⁷⁷ The first three groups of centers in Table 7 were statistically significantly⁷⁸ different as tested by means of a two-tailed test and at a five percent level of significance. Thus the hypothesis that the centers were arranged at random had to be rejected. The hypothesis of a random distribution for Group C and D centers could not be rejected at the five percent level. Its actual value of 1.64 is not much smaller than the 1.96 theoretical value. One reason for the non-significant difference between Group C and D centers and a random distribution can be attributed to the small number of centers involved.

Having rejected a random distribution as the possible one for the distribution of centers in the Portage La Prairie area one has to accept the alternative, that the distribution is regular. The maximum distance spatial distribution (that is, having centers spaced as far from each other as possible) is the hexagonal distribution. This distribution is also given in Table 7, page 92. In comparing the actual distribution to this distribution it can be seen that the difference is even more than the difference between the actual and the random. Christaller reasoned that centers would arrange themselves in this hexagonal manner in a physical homogeneous

⁷⁷For the exact formula, see Footnote 74, page 90.

⁷⁸The respective "Z" values starting with the all center group were 6.7; 4.6; 2.17; and 1.64. The first two values are even significant at the one percent level.

rural area. Because this uniformity prerequisite is not fulfilled the average distance in the Portage area deviates from the theoretical. Negative deviation (and this is the only possibility) can be caused by too few centers considered as central places or by too great an area considered as settled. Since the former criticism does not apply because all centers no matter how small were considered, it is in the measurement of the latter where the deviation must lie.

The total area belonging to the Portage la Prairie system as delimited, on page 36, is 4,050 square miles. A small unoccupied area of 72 square miles in the south-west consisting of the Spruce Wood Forest Reserve has already been subtracted. All other land was considered to be settled and thus able to support service centers. But a close inspection reveals that this is not true. West of the Amaranth ridge, lying parallel to the shore of Lake Manitoba, is a substantial region of unsettled land. This area, known as the Big Grass Marsh, is used for the preservation of fowl life and for public pasture. The total area under such use is about two and one-half townships (90 square miles). Similar land use occurs just south of Alonsa and again in the north-eastern part of the Portage la Prairie municipality. Other areas counted into the total land area, belonging to the Portage la Prairie system yet agriculturally unproductive, are the marshes surrounding the southern and western shores of Lake Manitoba. Some trappers and fishermen live in this area, yet their number is small. In an area only a few miles south and west of Portage the population is sparse. This is the former delta of the Assiniboine River and is quite sandy. Thus one can see that the uniform agricultural area prerequisite for

the establishment of a hexagonal urban pattern as envisaged by Christaller is not fulfilled. Areas with few people were included in the Portage la Prairie system causing the theoretical hexagonal spatial distribution to be greater than the actual.

Christaller further postulated that the higher level centers would be further apart by a factor of 3 or 1.73 than the next lower level centers. In the Portage la Prairie area the distance ratio of the C level centers and the B level centers is 1.61. Between the B level and the A level centers it is 1.49, and between the A level centers and the auxiliary centers it is 1.54. Although each value is somewhat less than the theoretical ratio value, the magnitude of these ratios is similar.

Having examined the spatial distribution, of centers in the Portage la Prairie system, one has to reject the hypothesis of a random distribution of centers. The alternative is a non-random distribution. The only non-random distribution model of urban centers is that of Christaller. But the hexagonal distribution is even further removed from the actual than the random distribution. Although part of this deviation can be accounted for a more thorough investigation is still needed to expose the basic hexagonal urban pattern.

PART III

THE COMPLEMENTARY AREAS OF PORTAGE LA PRAIRIE

CHAPTER IV

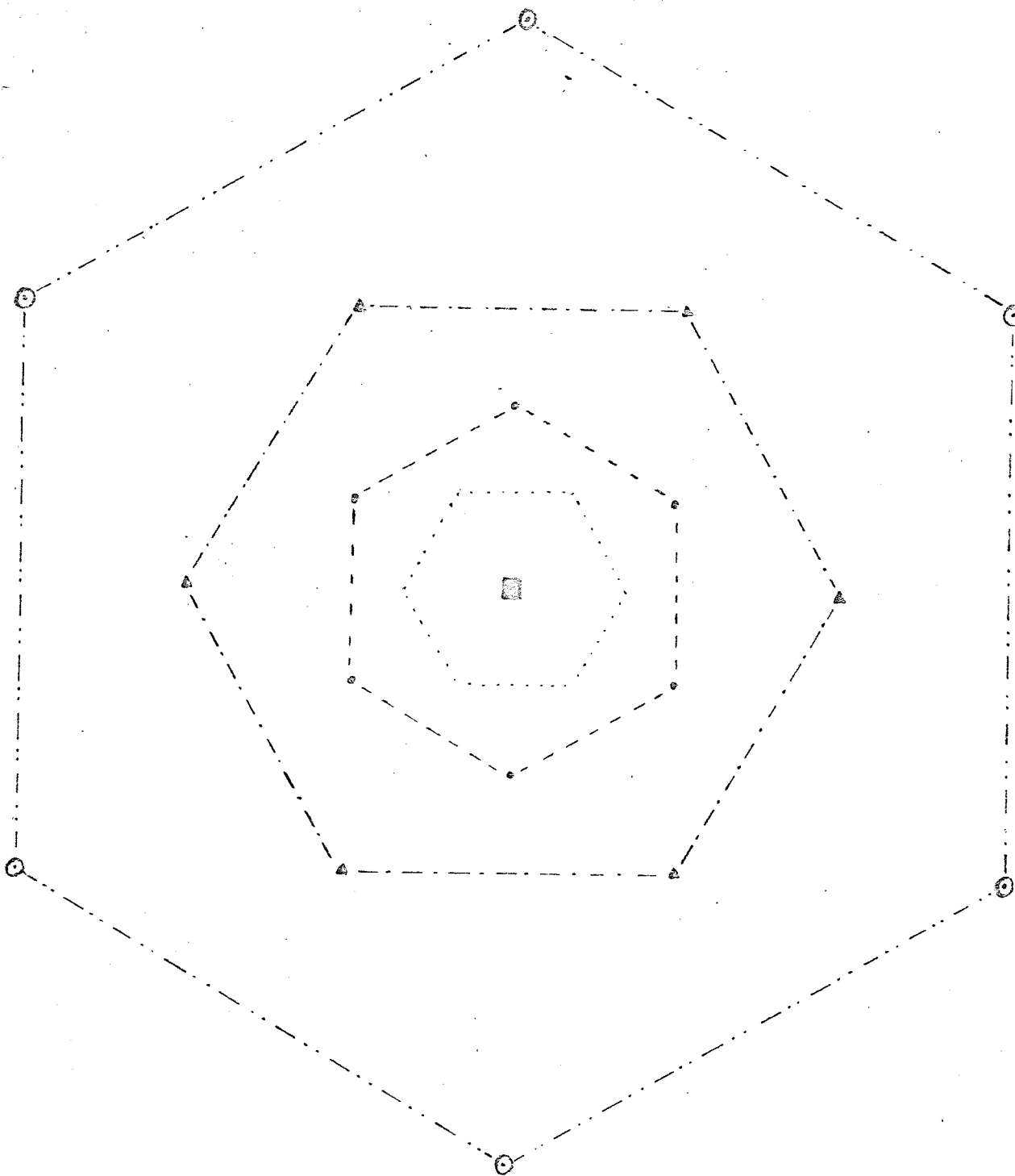
Investigation into Complementary Areas.

A. Theoretical Areas.

An integral part of Christaller's urban settlement pattern is the complementary¹ region or sphere of influence of the central place. Christaller reasoned that through the desire of the individual to minimize transportation cost the complementary region of a center would be symmetrical about the center and in such a way that no area would be served by two centers. The symmetrical figure which covers an area completely without overlap and which comes to minimizing transportation cost to a center located in this area is the hexagon (Figure 8, page 98). Christaller further showed that the hexagonal-shaped complementary areas of higher order centers would encompass the complementary areas of lower order centers. In his work in Southern Germany, Christaller found that the complementary areas were not always hexagonal in shape. Part of this deviation from the theoretical is due to the fact that the prerequisites of uniform agricultural area were not always met.

¹This term is used by Baskin in his translation of Christaller's work from German into English. The actual German term "Ergansungsgebiet" signified that area about a center which depends upon the city and upon which the city as well depends. This latter aspect is not too well brought out in the English translation. Other terms used by geographers and standing for the same idea of mutual dependence are sphere of influence, hinterland, umland, city region, urban fields and service area. The term catchment area is used mainly for the service areas of hospitals and high schools. In this study the term service area is used for the complementary area of individual establishments. The term umland is used to refer to that part of a complementary area which is dominated (more than 50 percent dependence) by a particular center. All other terms are used in the same sense as the word complementary, meaning the area having something to do with a particular center.

FIGURE 8
 COMPLEMENTARY AREA OF A FOURTH LEVEL CENTER



- First Order Center Complementary Area of 1st. Order Good
- ▲ Second Order Center ---- Complementary Area of 2nd. Order Good
- ⊙ Third Order Center - - - - Complementary Area of 3rd. Order Good
- Fourth Order Center Complementary Area of 4th. order Good

Furthermore it is difficult to determine the complementary region of a central place. This difficulty arises from the fact that the size of the complementary region is different for the different types of goods. Secondly, the complementary area of a city changes through time. In many cases the complementary areas of competing centers overlap, making it hard to establish the dividing boundary. It is the purpose of this discussion to examine the complementary region of Portage la Prairie by delimiting the service areas of numerous individual economic, social, and administrative institutions.

B. Review of Some Former Investigations

In the preceding Part some studies were investigated which tried to establish an hierarchy of urban centers. In most cases the researchers also examined the complementary² areas of the central places under investigation. Thus Brush³ in Wisconsin used traffic sheds to establish the complementary areas of his central places. Green⁴ in England used bus services to delimit the hinterlands of the English cities. Sosa⁵ in the Interlake region of Manitoba used

²Some of the methods used to delimit the complementary area of a city are: newspaper circulation, hospital and high school catchment areas, bus service, commuter area, retail drawing area, traffic counts, and the drawing areas of such professional people as doctors, dentists, lawyers, accountants and others.

³J. E. Brush, "The Hierarchy of Central Places in Southwestern Wisconsin", Geographical Review, Vol. XXXVIII (1953), pp.380-404.

⁴F. H. W. Green, "Community of Interest Areas", Economic Geography, Vol. XXXIV (1958), pp.210-226.

⁵I. G. Sosa, "Service Center Study of the Interlake Region" (Unpublished Master's Thesis, University of Manitoba, Winnipeg, 1964).

the interview method to establish the tributary areas of his centers and checked the accuracy of the delimitation with field checks. Philbrick⁶ also used the interview method to establish the sphere of influence in Indiana of Boshwell and South Bend. In England, Bracy⁷ established the complementary areas of central places by having one responsible person in each parish state to which center the parishioners go in shopping for particular goods. This allowed Bracy to show the decreasing influence of a center by allotting points to the different questions. Thus each of the 15 requirements⁸ allotted one point. If a particular parish looked to one center for all of the 15 requirements, then all 15 points were allotted to the center. If only 6 requirements were purchased there, then only 6 points were given. In this way the decreasing influence with increasing distance from centers was shown, allowing Bracy to qualify the relationship between center and tributary area.

Many good central place studies have been done, which have examined the complementary areas without going into much detail regarding the establishment of an hierarchy of centers first. Thus Whitelaw⁹ in New Zealand tried Bracy's method. He classified the

⁶Allen K. Philbrick, "Principles of Areal Functional Organization in Regional Human Geography", Economic Geography, Vol. XXXIII (1957), pp.299-336.

⁷H. E. Bracy, "Towns as Rural Service Centers: An Index of Centrality with Special Reference to Somerset", Institute of British Geographers, Vol. XIX (1953), pp.95-105.

⁸These requirements were: gent's outfitting, ladies' outfitting, boots and shoes, hardware, electrical, radio, furniture, doctor, dentist, optician, dispensing chemist, bank, solicitor, chartered accountant, and auctioneer.

⁹J. S. Whitelaw, "The Measurement of Urban Influence in the Waikato", New Zealand Geographer, Vol. XVIII (1962), pp.72-93.

different parts of the complementary area of a center into three classes or levels. The first level, the one which depended most on the central place, consisted of that area which had between 9 and 16 points and was called the intensive hinterland. The area with 5 to 9 points he called the extensive area while the remaining area having between 0 and 5 points was called the fringe area.

In a recent study of the hinterland of Upsala, a small center in Minnesota, Brown¹⁰ was able to show the 75, 50 and 25 percent lines of dependence. This he was able to do by doing field checks along all major roads leading from Upsala. To reduce wasteful interviews, he had first established the approximate hinterland boundaries of the center.

A detailed and comprehensive tributary study was done in Finland by Tuominen.¹¹ To each teacher in south-western Finland, Tuominen sent two questionnaires, one for himself and one for any farmer in the teacher's school district. In these questionnaires Tuominen asked in which center particular goods were bought, which newspaper was read, and to which center agricultural products were delivered. From his 1,500 returns, Tuominen was able to define the tributary area of Turku, the main center, as well as the tributary areas of some smaller centers. This method is more reliable than Bracy's as more than one person is involved per unit area. Secondly, the answers were based on personal activities and not on the

¹⁰ Robert Harold Brown, "The Upsala Minnesota Community: A Case Study in Rural Dynamics", Annals of the Association of American Geographers, Vol.LVII (1967), pp.267-300.

¹¹ Oiva Tuominen, "Das Einflussgebiet der Stadt Turku in System der Einflussgebiete S.W. Finlands", Fennia, Vol.LXXI (1949), pp.1-134.

opinions of the asked person.

From the resulting hinterlands, Tuominen was able to establish empirically that the areal extent of the complementary area of a city depends upon the force of attraction that the city has for the rural area. He advocated that this force could be measured crudely by the number of stores in the city. His empirical evidence showed the the force of attraction was directly proportional to the number of stores and inversely proportional to distance. His findings are thus similar to Reilly's,¹² except that the latter used population as a measure of the retail force of attraction.

Important contributions towards hinterland studies have been made by such well-known geographers as Dickinson,¹³ Harris,¹⁴ and Ullman.¹⁵ All three used information that could be gathered from within the city. Thus in establishing the complementary areas of Leeds and Bradford in Yorkshire, England,¹⁶ Dickinson used newspaper circulation areas, the catchment area of higher institutions and the

¹²W. J. Reilly, "Methods of the Study of Retail Trading Relationship", Bulletin No. 2944, University of Texas (1929).

¹³R. E. Dickinson, "The Regional Functions and Zones of Influence of Leeds and Bradford", Geography, Vol. XV (1930), pp.548-557.

¹⁴C. D. Harris, "Salt Lake City", Economic Geography, Vol. XVII (1941), pp.204-212.

¹⁵E. L. Ullman, Mobile: Industrial Seaport and Trade Center (Chicago: Department of Geography, University of Chicago, 1943).

¹⁶R. E. Dickinson, City and Region, (London: Routledge L. Kegan Paul Ltd., 1964), pp.588.

retail drawing area of some large retail stores as representative for the whole complementary area of these cities. In his book¹⁷ Dickinson discusses numerous hinterland studies from both Europe and North America. He stresses the importance of studying the hinterland of a city in conjunction with the city itself, as together they form a unit of its own.

Harris, in his classical study of Salt Lake City, used some 13 individual service areas to establish the complementary area of the city. These service areas ranged from administrative boundaries (Utah State) to economic boundaries (retail trade, wholesale trade) to newspaper circulation areas.

For the delimitation of the complementary area of Mobile, Alabama, Ullman again used newspaper circulation, retail trade, and wholesale trade boundaries. Ullman introduced some quantification into the hinterland study when he restricted the 50 percent isopleth line to delimit the service area of Mobile. In a later study of hinterlands in the Philippines,¹⁸ Ullman used highway traffic counts to delimit the sphere of influence of the service centers. In this study Ullman tested for the reliability of interviewing store proprietors regarding their trade areas and found good correlation between their areas and the hinterland as outlined from highway traffic.

¹⁷ Dickinson, op.cit.

¹⁸ E. L. Ullman, "Trade Centers and Tributary Areas of the Philippines", Geographical Review, Vol. L, No.2 (1960), pp.203-218.

In Canada, particularly Manitoba, besides the work of Sosa in the interlake already mentioned, Warkentin¹⁹ examined the hinterland of Dauphin, a service center in mid-western Manitoba. To establish this hinterland, Warkentin used 15 criteria. Besides such usual criteria as newspaper circulation, retail and wholesale trade, Warkentin used the catchment area of the local radio station.

In central Alberta, Rendall²⁰ used two methods to establish the service areas of Camrose, Wetaskiwin, and Ponoka. After establishing the trade area boundary of these towns from interviews with proprietors, Rendall chose 41 random cross sections of these boundaries and performed field checks along these lines. This enabled him to define the complementary areas more precisely.

The service area of Red Deer in southern Alberta was established and examined by Baker.²¹ In establishing the service area Baker only used three criteria; the daily newspaper circulation, fluid milk collection, and wholesale grocery sales. In the absence of a physical well-defined separate Red Deer region, Baker thus used the Red Deer nodal region for an areal study.

In Ontario, Peart²² used 12 criteria to establish the hinterland of Hamilton. These criteria again were mainly retail service areas. In these delimitations no real agreement in boundaries occurred and hence through doubt on the idea of using individual service areas to establish the complementary area of a whole city.

¹⁹ John W. Warkentin, "The Dauphin Area an Example of Regional Differentiation in the Canadian West," Canadian Geographer, No.V(1955)pp.71-85.

²⁰ H.A. Rendall, "The Trade Areas of Camrose, Wetaskiwin and Ponoka", (Unpublished Master's Thesis, University of Alberta, Edmonton, 1962), pp.107.

²¹ A.M. Baker, "The Red Deer Region" (Unpublished Master's Thesis, University of Alberta, Edmonton, 1962)pp.160.

²² H.J. Peart, "The Umland of Hamilton" (Unpublished Bachelor Thesis, McMaster University, Hamilton, 1953).

CHAPTER V

Method used to Delimit Portage la Prairie's Complementary Area.

For the delimitation of the complementary area of Portage la Prairie a two-fold approach was taken. One consisted of a 'within' city approach and the other from 'outside' the city. The sphere of influence or complementary area of a city exists because of the interdependence of city and rural people. From this fact one can postulate that two groups of people collectively know about the extent and degree of interdependence of the complementary area. One group consists of the merchants, administrative officials and other establishment proprietors. In their daily work they come in contact with the people that their establishments serve. This contact gives the proprietors the knowledge of the areas they serve. It probably also gives them a good understanding to what degree these people depend upon them for the requirements they sell. By examining the service areas of the individual establishments, whether economic, social, or administrative, the investigator comes to an understanding as to what constitutes the complementary area of the whole service center. As such information is usually gathered through interviews with city proprietors, this approach can be classified as the 'within' city approach, also called method "A" by Brown.¹

The second approach or 'outside' approach consists of finding the complementary area of a city by getting the information from the rural people themselves. Brown classified this approach as the "B" type.² As the rural people make up the complementary area, the

¹Brown, op.cit., p.269.

²Ibid.

correct complementary area should be based upon information gathered from the rural people. This approach allows an investigator to show the inverse relationship between influence and distance. It allows a direct check on Christaller's contention that the complementary boundaries of a center are sharp and distinct.

In this study both methods have been used. As method A ('inside') is much quicker and less expensive than method B ('outside'), it has been used much more extensively by geographers in the past. This does not mean it is fool-proof and in this study it is compared to the results from the type B approach.

A. The Inside Approach

For the delimitation of the complementary area according to method A the main source of information came from the interviews with proprietors in Portage la Prairie. In all, 141 interviews were conducted during the fall of 1966 and early part of 1967. All major establishments were visited and asked a set of seven basic questions (see Appendix for questionnaire). The degree of co-operation ranged from no co-operation (only one), to full co-operation. In all, most establishments were quite helpful except where it involved giving away the 'trade secrets'.

Of the 141 establishments the largest group consists of retail business establishments, having a total of 55. Professional services such as those of doctors, dentist, veterinarians, optometrists, chiropractors, lawyers, and accountants were the next largest group, with 12. The number of financial institutions visited was 7, while the number of community and governmental institutions numbered 13. Other establishments visited were

personal service establishments such as hairdressing shops, barber shops, dry cleaners and funeral homes. All agricultural product processing and purchasing establishments, of which there were 6, were also interviewed. The wholesaling institutions in Portage are mainly fuel distributors, and retail/wholesale outlets in automotive industry. Portage has only one retail/wholesale food distributor and one tobacco wholesaler, whose main office is located in Dauphin.

Portage la Prairie has two funeral home establishments, both of which were interviewed. People tend to go to towns in which they are known and in which they are most familiar during times of sorrow. Thus, the service area of a funeral home should well delimit the complementary area of a city.

A business establishment closely associated with the funeral home is the florist. Portage la Prairie has two florists. Both were interviewed and the area which they serve delimited.

Of the two other places of business, closely associated with funeral services, namely the engraving and selling of tombstones, only one was visited and its rural service area established.

Both local newspapers and the local radio station were visited. The circulation of the Portage weekly paper was noted. Although Portage has a daily paper, its circulation is almost completely confined to the city. The daily papers distributed in hamlets, villages, and towns in the Portage area are nearly all from Winnipeg, a few in the western part being from Brandon. The Portage daily paper is small in size compared to Winnipeg, and thus cannot compete against the bigger, more informative papers. The Portage la Prairie radio station manager was also interviewed and the area delimited which they considered to be Portage la Prairie's

area for business transactions. The radio listening area is somewhat greater, including a substantial part of the Interlake region, an area from which few economic and social transactions are done with Portage la Prairie. The oddity of this comes from the nature of the radio programmes. The music played over the station is mainly western and folk music, entertainment which is enjoyed by people of low social and economic standing.³

Of the recreational establishments, four were visited. The Portage curling rink, the Portage Arena, a billiard-bowling recreational center and a billiard hall. Curling is a popular sport in Portage and surrounding area with substantial participation from farmers from the rural areas. The arena is used mainly for hockey, skating, and curling. Due to the small capacity it cannot be used for any competitive sport requiring financial backing from spectators.

All firms purchasing farm products that are located in Portage la Prairie were visited. These consisted of three separate firms of grain buyers, each having at least one elevator in Portage; two pea purchasing companies, and a vegetable purchasing firm, Campbell's Soup. Although Campbell's Soup does purchase most vegetables from the Portage area, it still depends for some imports from the United States. It is more of a manufacturing firm using local labor as the main source of dependence on Portage and its region.

³The Interlake Region of Manitoba is an agriculturally and industrially poor region of Manitoba. Its inhabitants are mainly Indians, Metis, Ukrainians, and Icelandic people. Due to the poor soil and brush the farms are generally small and poorly mechanized, leading to a low standard of living.

Although the ideal situation for a study of this type would be a complete cover of all establishments, whether economic, social, educational, or administrative, this was not possible because of lack of time and funds. The attempt was made to interview all large and important establishments while for the smaller a stratified random sampling technique was used. The stratification was used in order that all different services would be covered. Thus some barber shops, some beauty stylists, some grocery stores, some restaurants, some insurance agent offices, etc. were contacted, in addition to the larger firms in each of these fields. Large firms were considered to be large only in respect to other firms established in Portage la Prairie. Such establishments as filling stations, churches, and service clubs were not interviewed because of their heavy dependence on the city people alone, although this service was covered in the 'outside' approach in establishing the relation between city and hinterland.

The interview questionnaire⁴ was set up in such a way as to establish the relationship between an individual establishment and its rural service area.

Question 1 was used to establish the service performed. From this an indication could be deduced as to what type of people his establishment catered to, whether rural, urban, or both.⁵

See Appendix for Questionnaire.

Although one would think that such knowledge could be received from the title, this is not always true. Thus, for instance, the firm, Enterprise Press, might imply the printing of a paper and thus an institution selling news media to the rural people. This was not so, since the firm sold office equipment and printed advertisement sheets.

The second question established the permability of the establishment concerned in a center of the size of Portage la Prairie. Thus, if an establishment had been in Portage la Prairie for a long time, it demonstrated that Portage la Prairie is at least equal in the hierarchy of urban centers, to the level of the good sold or the service given. Secondly, the question established the reasons why people chose to have a business in Portage, why they did not locate in some smaller villages or why they did not go to the metropolitan center of Winnipeg.

Question 3 was asked in order to establish the rural area, which the central function served, and as such was the most important. It was postulated that managers and owners of establishments would know the relative addresses of their clients or customers. They were asked to delimit their primary drawing area on an outline map attached to the Questionnaire. The latter part of Question 3 tried to establish the dynamics of the complementary area. It showed whether an establishment was growing, declining, or remaining stationary. The aggregate gave an indication of the dynamics of Portage la Prairie.

Question 4 and 5 tried to establish the precise degree of dependence of the establishment on the rural area. In some cases this obviously was 100 percent. In others such as in the retail field, this was not so. Question 4 tried to establish patron dependence in percentage, while Question 5 established dependence in terms of revenues from the rural areas in comparison to the total.

An attempt was also made to establish the area upon which Portage la Prairie depends for workers in addition to workers from the city. This was accomplished by means of Question 6, which

asked for the number of employees living outside of Portage out of the total working force.

The last question pertained to the state of the business, whether it had expanded (physically), since it was founded, when this expansion had occurred, and if there was any consideration for expansion in the future. Although the near standard answer when this question was asked was yes, closer questioning revealed that this expansion had only taken place in the form of added sales or service and not a physical expansion of the premises. For the last part of the question it was surprising to note the number of establishments that had no expansion in mind, some even wanted to sell the business.

Although not on the questionnaire, of what effect the presently under construction Trans-Canada Highway by-pass around Portage will have on their establishments and on the city as a whole was frequently asked. The by-pass, when completed, will allow Trans-Canada Highway traffic to by-pass Portage la Prairie. This will certainly reduce the highway traffic through the city and thus most likely reduce the transient business. To what extent it will influence people living west of Portage la Prairie to go to Winnipeg via the by-pass instead of to Portage is debatable. Studies in the United States by Berry⁶ have shown that a by-pass about a fourth order center leading to a metropolis causes an increase of first and second order goods, yet a substantial decrease in sales of third order functional goods and services.

⁶B. J. L. Berry, "The Impact of Expanding Metropolitan Communities upon the Central Place Hierarchy", A.A.A.G., Vol.L (1960), pp.112-16.

B. The Outside Approach

Method B or the 'outside' approach used to establish the areal relationship of Portage la Prairie and its complementary area was based on a questionnaire⁷ sent home with high school students from the Portage area.⁸ For this purpose the co-operation of the principals in the schools visited was secured. They handed the questionnaire to the students and collected them again when they were returned. In cases where parents had more than one child in high school care was taken so as to collect only one questionnaire per family. In most cases the returned questionnaires were picked up after one or two weeks of waiting. In a few instances the filled-out questionnaires were sent back by the principals. This procedure was also followed in those cases where questionnaires were returned to the school after the rest had been picked up.

⁷For a sample Questionnaire see Appendix B.

⁸The high schools in which questionnaires were given to students to be filled out by their parents were: Elie, Oakville, Warren, St. Laurent, High Bluff, Rossendale, MacGregor, Austin, Gladstone, Langruth, Amaranth, Treherne, St. Claude, and Elm Creek. In Portage la Prairie itself, both high schools received questionnaires, but only those students living outside of Portage la Prairie were asked to take them home and have their parents fill them out. Two elementary schools in Alonsa and Cypress River were also used, since no high schools were located in these centers. In Warren only those students living west of Highway 6 were asked to take home a questionnaire. East of Highway 6 people go to Winnipeg and Stonewall, both being much closer than Portage la Prairie. Travelling to Portage la Prairie involves a substantial increase in travel distance.

For two school divisions, Pine Creek and Portage la Prairie, the co-operation of school board was first obtained. In all other cases permission to have the high school students take home the questionnaire was received directly from the principals.

The total number of returned questionnaires was 729. Of these, 11 had to be rejected either because the geographical location of the returned questionnaire was not stated or the questionnaire had none of the questions answered. All others (718) were retained.

The response for the different schools varied. In those instances where the principal knew the number of families having children in his school, the degree of co-operation could be determined. Since this was not always the case the exact response could not be determined. The lowest response came from Treherne Collegiate where only 23 questionnaires were returned out of a student body of some 160 students. With an approximate number of families equal to 100, this would mean a 23 percent return. The response in other schools was usually substantially higher with Elie returning 78 from a possible 82 families.

The questionnaire had three parts to it. The first part asked the person from which city, town or village he acquires the 38 goods or services listed. With the whole questionnaire set up in a table form, this involved checking the center or centers used for the different requirements. For those centers not typed in, space was left so as to allow the person filling out the questionnaire to write in the name of the center and check the goods or services purchased from it. The requirements covered ranged from physical requirements such as food, clothing, shelter, medical help, to recreational entertainment and religious requirements. In general, this section was answered well.

The second part of the questionnaire dealt with the reason why the householder did or did not use Portage la Prairie for the

38 different requirements. For this purpose, nine possible reasons were stated, from which the person filling out the questionnaire could choose. A person could also write in his own reason as a blank space was provided for it. Five of the nine reasons given are reasons for the affirmative of coming to Portage la Prairie for the requirement listed and four are negative reasons, reasons why they do not come. Due to the slightly more complex nature of this section the response was not as good as in the first section. Many only filled in the reason for going or not going to Portage la Prairie for perishable food requirements, the first requirement listed.

The third section of the questionnaire dealt with the dynamic aspect of the hinterland of Portage. The household was asked how long they had been going to the center as checked off in the first part of the questionnaire. Again, many people only checked off the years they had been going to a particular center for perishable food requirements. It was thought that this part of the questionnaire would demonstrate if the hinterland of Portage la Prairie was increasing, staying stagnant or decreasing.

The processing of the final results of the household questionnaire was performed on the Township/Range basis.⁹ Thus, all returned questionnaires from a 36 square mile area were combined and taken to be representative for this geographical area. In this way the degree of dependence upon a center could be shown as a

⁹The Canadian West is covered with an astronomical grid of square-mile sections and six-mile townships, except in those areas where settlement had taken place before 1869. Donald F. Putnam, Canadian Regions, A Geography of Canada, J.M. Dent & Sons (Canada) Ltd., 1952, p.371.

percentage of all answered questionnaires for that Township/Range. Those townships for which less than four returns had been received were added together with the neighbouring townships till the minimum requirement of four returns had been satisfied. In many cases the total area of a township/range covered was less than 36 square miles. This was due to either water bodies, parishes¹⁰ or part of it belonging to a school division not covered in the survey. In a total of 15 cases, two township ranges, or parts thereof, had to be combined to give four returns. In ten cases, three townships or parts thereof were combined to satisfy the requirement for total number of returns per area considered. Besides the townships, the parishes of Portage la Prairie, High Bluff, Poplar Point, Bai St. Paul, and St. Francois Xavier, were considered each individually as being homogeneous and areally large enough to use as unit areas.¹¹ Because of the size of the parish of Bai St. Paul, it was divided into three unit areas, with river lots one to 102 south of the Assiniboine River contributing one unit, lots 103 to 175 and 176 to 246 north of the river contributing another two units. The parish of St. Francois Xavier was similarly divided

¹⁰ Before the survey of the west into Townships/Ranges, the settled part had been organized, because of religious and political reasons, into parishes. Since settlements had been established along the Assiniboine River up to Portage la Prairie before the coming of the grid system, land along the Assiniboine is divided into river lots and organized on the parish basis.

¹¹ The word 'unit area' refers to a land area from which there were at least four returns. In some cases it consisted of three townships, while in others it consisted of only one or two, or a parish or part of a parish, as in the case of the three unit areas in the parishes of Bai St. Paul and St. Francois Xavier.

into three units, one being south of the river, with river lots one to 112, and the other two being north of the river, with the unit furthest to the west having lots 113 to 163 and the area to the east having lots 164 to 227.

For the determination of the complementary area of Portage la Prairie, the geographical center of the unit areas were considered as reference point for that unit area. The percentage of dependence on Portage la Prairie was postulated as being centered here and isoslines, lines of equal dependence, were drawn. This method of determining the complementary area of a center allows the investigator to show the decreasing influence of a center with increasing distance from it. It can be used to investigate the nature of the boundaries of a center, whether the influence stops abruptly as suggested by Christaller, or whether the influence decreases gradually.

Despite the care taken in having four returned questionnaires per unit area, not every unit area had four answers for each of the asked 38 requirements asked about. This was due to partial completion of some questionnaires. In some cases the requirement asked about was not relevant, as for instance, the question of golfing, if the person did not golf. In other cases the completion of the whole questionnaire must have demanded too much work and hence was not complied with.

CHAPTER VI

The Agricultural Products Purchasing Complementary Area.

A sign on the western outskirts of the city of Portage la Prairie, in full view of all traffic entering the city from the west, states "Portage la Prairie, the hub of Manitoba Agriculture". Many responsible citizens that were interviewed stated that Portage la Prairie was an agricultural town. To what extent it acts as an agricultural product purchasing town can be seen in Figures 3 and 4 (pages 118 and 119). Figure 3 shows the complementary area of six agricultural product purchasing establishments, three being cereal purchasing establishments and two being dairy product collecting firms. All the areas were delimited by the managers and represent the dominant drawing areas.

As can be seen on the first glance, the grain purchasing firms have quite small drawing areas. The basic reason for this is the nearly ubiquitous elevator building on the prairies. Nearly every center, no matter how small, has an elevator. Even such small auxiliary centers close to Portage la Prairie as Edwin, Longburn, Oakland, and Rignold, have at least one elevator. Such close spacing of elevators reduces transportation cost for the farmers, as most grow at least some grains in the Portage area. In Portage la Prairie there are five elevators owned by three different purchasing agents.¹ Theoretically the location of three identical product purchasing firms should encourage competition, but this

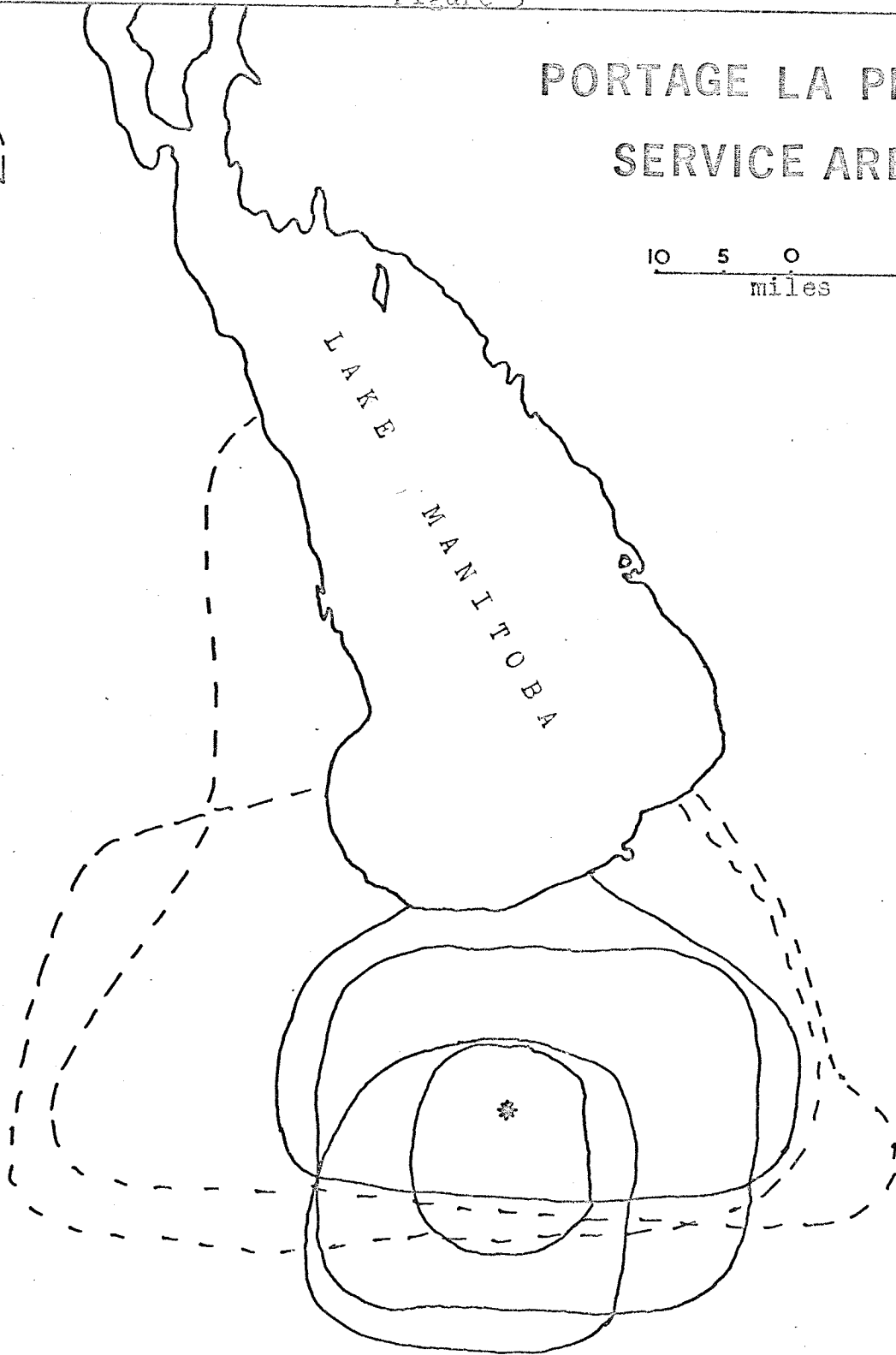
¹The three different purchasing agents are Manitoba Pool Elevators, United Grain Growers, and McCabe Grain Company.

Figure 3

PORTAGE LA PRAIRIE SERVICE AREAS



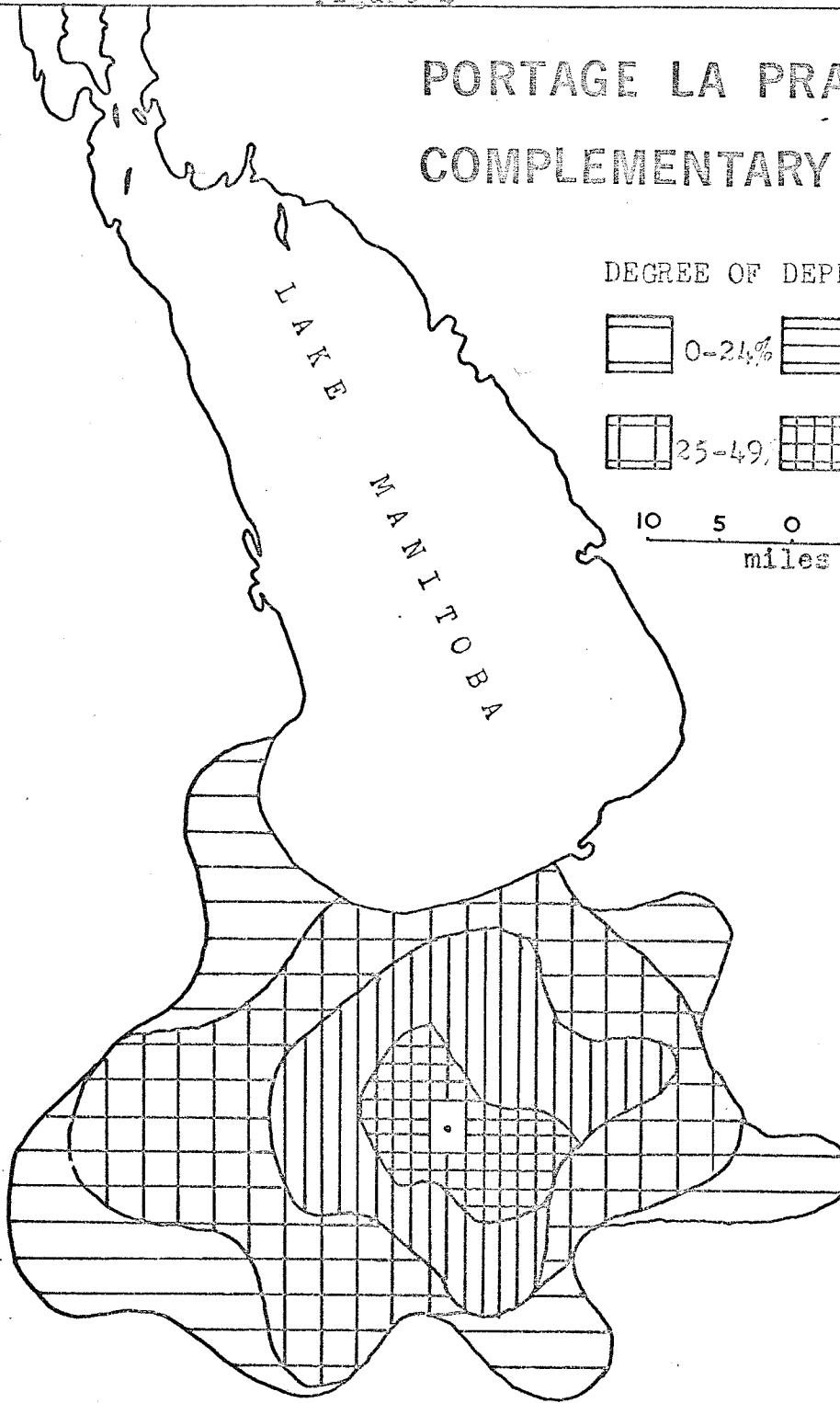
10 5 0 10
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———— Grain Purchasing Comp. - - - - - Dairy Products Purch. Comp.

Figure 4

PORTAGE LA PRAIRIE COMPLEMENTARY AREA



Area dependent upon Portage for the sale of AGRICULTURE PRODUCTS

is largely reduced by standardized prices,² set by the Canadian Parliament upon advice from the Canadian Wheat Board and the issuing of delivery permit books in which the quota that a farmer can deliver is stated. Thus, the purchasing of such grains as wheat, barley, oats, and rye are effectively controlled by the Canadian Wheat Board and not open to a free market.

Of the grain purchased by the elevator agents in Portage, 65 percent is wheat, with oats and barley contributing about equally for the other 35 percent.³ Although agents do purchase some rye, the amount is not great. Of the total quantity of different crops purchased by the elevators, 80 percent is grain crops. Of the other crops, flax accounts for 15 percent of the total while mustard seed and rye⁴ account for 5 percent. With the exception of the United Grain Growers, the variety of crop purchases is restricted to the

² Prices for grains are set by the Canadian Wheat Board, for which the different grain elevators act as purchasing agents. Thus a farmer delivering grain to an elevator will receive the same price as if he would have delivered the grain to the competitive elevators. The only differences that might occur would be due to the difference in the grading of the grain. In such a case naturally the price would be different. During a particular year (grain year goes from August to July), a farmer is further tied to a particular elevator through the grain delivery permit. This permit allows the farmer to deliver the grain to the elevator which he had chosen at the beginning of the season. Only in special cases where the farmer has a legitimate complaint about the grading of his grain will he be allowed to change elevators during the year. This permit system of delivering grain to only one elevator during a particular year is the result of the quota system, which allows all farmers to sell first a basic amount of grain so as to attain a minimum standard of living. Subsequent deliveries are based proportionately upon the farm acreage of the farmers. Manager-Manitoba Pool Elevators, Portage la Prairie and Carl F. Wehrwein, "Government Grain Programs of Canada, Australia, Japan, and the United Kingdom", Journal of Farm Economics, Vol. XXXXVII, 1965, p.995.

³ This is an estimate given by the Manager of Manitoba Pool Elevators as based upon their three elevators in Portage la Prairie.

⁴ This estimate was made by the Manager of McCabe Grain Company.

six varieties mentioned. In addition, the United Grain elevator has facilities to clean mustard seeds. It is the only plant of its kind west of Winnipeg. It thus has as its drawing area all of Western Canada and does receive mustard seeds from as far west as Saskatchewan and Alberta. The quantity processed in 1965 was 30,000 bushels, which was double what it had in 1964.⁵ That the acreage for mustard seeds is not large, yet increasing fast, can be seen from the fact that the average acreage in Manitoba from 1954 to 1960 was only 323 acres.⁶ Confidence in the expansion of this service was evident by the construction of facilities to handle the increasing amount produced by farmers. Nearly all processed mustard is shipped to mustard producing factories in New York. Thus the main drawing area of United Grain Growers is quite small, its extensive area is quite large.

Despite the importance of these grain purchasing institutions to the farmers, they employ few people. In Portage the operation of the five elevators requires only nine men.

At present the grain elevator is a ubiquitous structure in any settlement in Western Canada. This prominence will certainly decline in the future. The collection of grain cars, the maintenance of infrequently used railroad lines, are economical drawbacks which the railroad companies in Western Canada are trying to shed as fast as possible.

⁵Information from the Manager, United Grain Growers, Portage la Prairie.

⁶S. W. Garland and T. O. Rieken, A General Classification of Land for Agricultural use by Townships, Manitoba Economic Division, Canada Department of Agriculture, p.6.

With the improvement in fast transportation, the basic advantage, that of being close to the producer, is disappearing. Thus, at present, small country elevators, especially those in auxiliary centers, are being dismantled or moved. A concrete example is the United Grain Growers elevator in Portage built only in 1961. The reason for moving to Portage was that the company did not want to be 'left in the cold' with the closing of the smaller elevators in the country due to railroad abandonment.⁷ Grain officials of McCabe Grain elevators expect the Portage grain drawing area to increase up to Gladstone, engulfing such centers as Newton, Macdonald and perhaps even Oakville. This would mean that with time all A and B class centers, as well as the auxiliary centers, would lose their grain collecting function. Grain officials are also looking for new elevator types to replace the present ones, most of which were built at the beginning of this century. The new elevators might very well be of the huge brick type predominantly found in Kansas. Such great buildings naturally would only be built in centers of large size, to which railroad abandonment would be highly unlikely.

Figure 3 also shows us the drawing areas of Portage la Prairie's two dairy companies. Portage's milk shed corresponds very well with the grain purchasing area. It extends up to Lake Manitoba, as far west as MacGregor, as far south as Edwin, and as far east as St. Eustache. The cream drawing area of Portage Creamery is substantially larger, extending along the western shore

⁷This concern and subsequent action of locating in Portage la Prairie was expressed by the Manager of United Grain Growers of Portage la Prairie.

of Lake Manitoba as far north as Amaranth. In the west it includes the Katrine, Austen, and MacGregor areas. In the south and east it corresponds well with the milk drawing area, with the exception of the inclusion of the Elie and St. Ambrose areas. The milk drawing area of Manco Dairy is best developed to the west. It does not extend up along Lake Manitoba, but does include the class C center of Gladstone, and further south the small centers of Muir, Pine Creek, Sidney and Rossendale in addition to those centers also covered by the Portage Creamery. In the south, the boundary corresponds with the other boundaries. In the east, however, it excludes the Elie area. The somewhat western skewed form probably is due in part to the infringement of Winnipeg's milk shed⁸ in the east.

The method of collection of milk in the Portage area was in 1966 in a transient stage. One company had changed over to tankers in 1966 while the other changed over in 1967. Only Portage Creamery has a butter manufacturing and milk bottling plant. Manco's milk is shipped to Brandon, where it is processed and the products shipped back to Portage la Prairie. Because of the relatively small milk market in Portage, more emphasis is placed on the production of butter, as is brought out by the fact that Portage Creamery has 300 cream shippers but only 23 milk shippers, although it must be said that the milk shippers have on the average three times as many cows as the cream shippers. Most cream shippers still milk by hand as most of them own only between eight and ten cows. Manco Dairy and Poultry Products also collects eggs. In this field a great change

⁸ Although this seems most likely, the manager of Portage Creamery did state that competition from Winnipeg milk collectors was not noticeable.

has taken place. Whereas ten years ago there were 365 egg producers, there are now only ten. Small inefficient farmers simply cannot compete with well-organized, mechanized, volume-producing chicken farms.

At present, the dairy industry in Portage la Prairie is stagnant and has been for the last three years. Expansion in the future seems unlikely, with farmers turning to vegetable growing and beef raising to complement the heavy commitment to grain farming. Further, the building of a milk processing plant in St. Cloud will prevent expansion to the south. The close proximity of Winnipeg and Brandon with their modern dairies allows them to compete effectively with the smaller, consequently less efficient, dairy plant in Portage la Prairie.

For the three vegetable processing firms⁹ the complementary area is hard to define. Peas are grown in an area west of Poplar Point to Bagot, 15 miles west of Portage la Prairie, and from Macdonald south to the American border. All three companies operate on contract basis, giving the contract to specific farmers to grow specific vegetables. In the case of the pea cleaning and processing companies, the seed is brought in from Alberta, since Manitoba seeds are inferior due to excess of moisture. Outside of this south-central Manitoba section, peas are also grown on a commercial basis in the Swan River area, some 200 air miles north-west of Portage la Prairie, between the Porcupine and the Duck Mountains. Despite this

⁹The three vegetable processing firms in Portage are Campbell's Soup, B.C. Pea Growers, and McCallister Pea and Seed Cleaning Ltd. All three firms were visited during the collection of data for this project.

distance, they are shipped to Portage la Prairie. Besides peas, such vegetables as potatoes, carrots, mushrooms,¹⁰ celery, beans and onions are grown along the Assiniboine, in some cases with the help of irrigation from the Assiniboine River. Nearly all vegetables for Campbell's Soup are grown on contract basis. Because of poor ripening conditions in Manitoba, tomatoes for Campbell's Soup are imported from the United States of Eastern Canada.

The processed vegetables in the case of peas are shipped mainly to Eastern Canada and Overseas. Campbell's soups are shipped to Winnipeg, from where they are distributed to all of Western Canada and eastward up to the Lakehead.¹¹

The aggregate complementary area for the agricultural purchasing distributions in Portage la Prairie, as delimited by the 'outside' method, is shown in Figure 4, page 119. The 75, 50, 25, and 0 percent areas of dependence are shown in this figure. The area of more than 75 percent dependence encompasses only one auxiliary center. Its shape is somewhat elongated from northwest to southeast. The area of dominance (50 percent) is substantially larger. The shape is irregular, resembling a five-sided area more than the theoretical six-sided one. All seven centers within the area of dominance are auxiliary centers. This supports the notion that the agricultural products acquiring institutions are institutions of the

¹⁰ A large mushroom growing farm just west of the city is the property of Campbell's Soup, providing this plant with its mushroom requirements.

¹¹ Not all size soup cans are made at the Portage la Prairie plant. The western region thus has to bring these in from the eastern plants. The Portage plant produces almost 250,000 tins of the 10 fluid ounce sizes a day, employing some 300 people to do this job.

lowest order, in this case level A institutions. The extensive agricultural area extends westward just past Austin, northward to Lakeland, and in the south includes the northeastern township in the South Norfolk Municipality, as well as two townships of the Municipality of Gray, just south of the Municipality of Portage La Prairie. In the east, Oakville and Elie are included but very little south of these centers. The eastern boundary does not include St. Eustache, and only the western portion of the Municipality of St. Francois Xavier.

A comparison with the road network of the area reveals the fact that roads influence the hinterland of a center. The greatest extent in the hinterland of Portage La Prairie is along Highway No. One, both east and west of the city. A further extension occurs to the northwest, along Highway 4, and Highway 50. Poor highway connections to the northeast account for the non-existence of a hinterland along the eastern shores of Lake Manitoba. The direct highway leading to Elm Creek and Carman, southeast of Portage, seems to account for the non-existence of the hinterland there. It is also along these highways that the decreasing degree of dependence is most regular. It is in areas from where no roads are leading to Portage that the hinterland boundaries of the different degrees of dependence coincide, as for instance in the northeast, in the southeast, and in southwest.

With the exception in the west, the two methods of delimiting the hinterland of Portage La Prairie are quite similar. Naturally, none of the complementary areas of the different agriculture product purchasing firms correspond exactly to the area of agricultural products delimited by method B. Taken together, the correspondence

between the two methods is quite good, except for the areas previously mentioned.

The population in the agriculture product purchasing area of dominance numbers about 4,850 people.¹² This includes the Canadian Armed Forces Base, Southport, in which there are some 1,200 people.

The farmers living within the area of agricultural dominance, yet not delivering their farm products to Portage la Prairie, raise mainly beef cattle and vegetables. Since Portage la Prairie has no commercial livestock¹³ market, all such products from the Portage area are shipped to Winnipeg or Brandon. Most of the cattle raising is done just south and southwest of Portage on the sandy land of the former Assiniboine delta. Those farmers that do not grow vegetables on a contract basis for the three local agricultural processing plants have to take their products to Winnipeg as well. Portage has no open market where milk products could be sold. Also, the local stores are mostly chain stores, receiving even their fresh vegetables from their wholesale supplier in Winnipeg.

To the east of the Portage agricultural dominance area, people deliver their farm products to centers other than Portage la Prairie because of the distance to the latter. Grains can be and are usually sold at the local center. Strong sentiments in favour of doing business transactions in the local centers were expressed in many returns. Farmers and village people knew that they do not

¹² Population figures are from the 1961 Census, Volume 1, Part 1, pp.38-46.

¹³ Portage la Prairie has one abattoir which caters to custom slaughtering only.

have to use local centers any more, but do so because of the danger of losing them if this was not done. If the products could only be sold in a greater center, Winnipeg would be chosen over Portage la Prairie because of the better prices the farmers would receive there. Further east, the distance to Winnipeg also becomes less, which in conjunction with the added attraction of a large city, makes the choice of Winnipeg even more favourable.

To the west of Portage, again, the main reason for not delivering products to Portage la Prairie is distance. Thus, farmers in township 10, range 10, all stated that Portage was too far for delivering farm products even though it is only some 25 miles from Portage. It is also surprising that the second choice in many cases next to the local center was Winnipeg and not Portage la Prairie.

In the south the main reasons for not going to Portage la Prairie are bad roads and distance. In addition, along Highway 2 there are two C type centers which can offer most services needed by farmers. Furthermore, replies received also pointed out the fact that such centers as Carman and Winnipeg were reached sooner, because of their location on direct and good roads.

CHAPTER VII

Cultural Complementary Areas.

The extent to which a service center acts as an economic and administrative center depends in part on the extent to which it acts as a social and recreational center. Close social contact usually results in close business contact. Good recreational facilities will always foster community spirit and hence lead to communal action. Thus the hinterlands of the social and recreational institutions represent an important part of total hinterland of the city. Because of the close relationship between social and recreational establishments and their clients, the hinterlands of these establishments represent the areas of greatest interaction between the rural areas and the city.

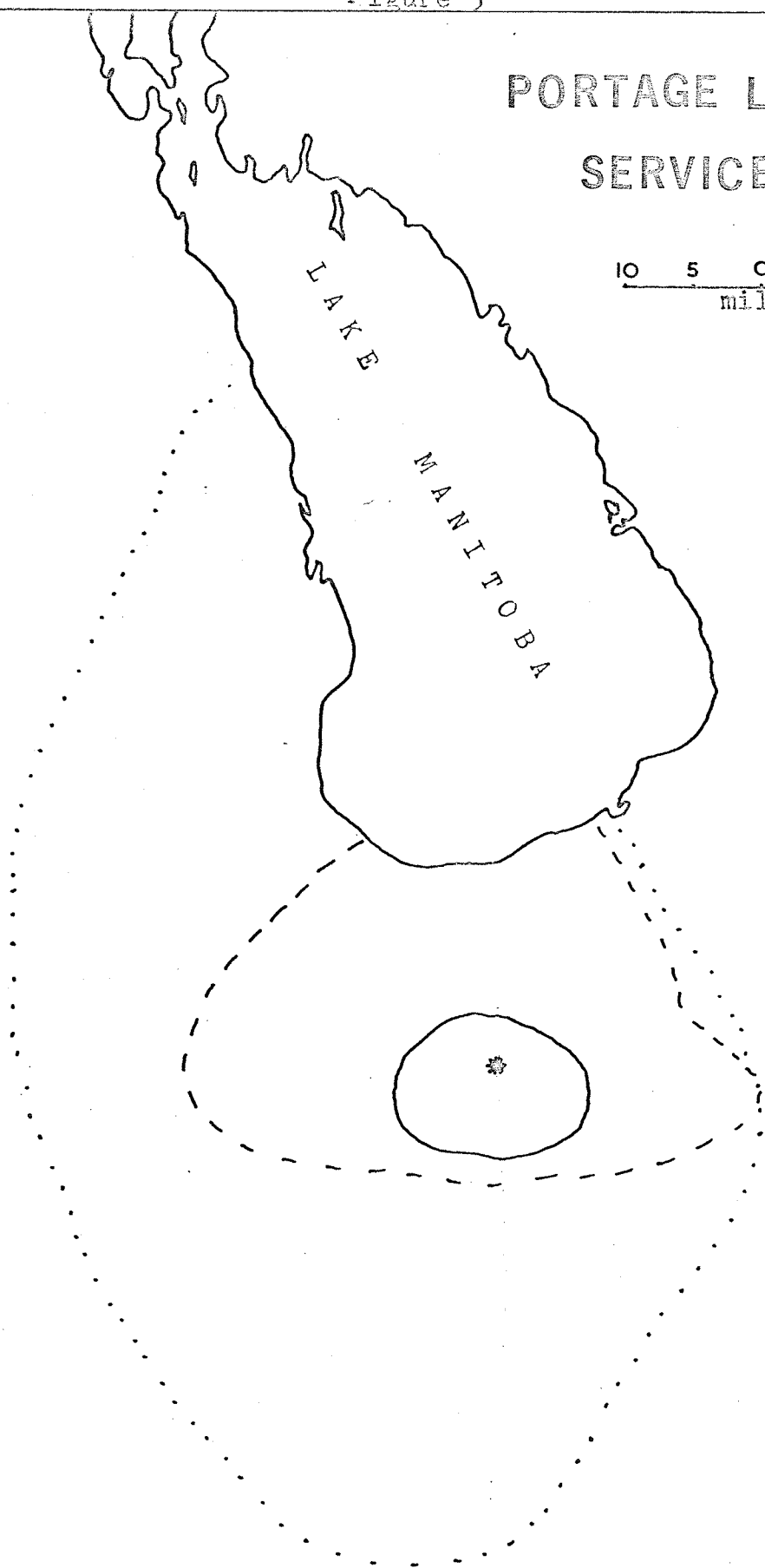
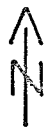
A. Recreational

The establishment of the recreational hinterland of Portage La Prairie as delimited by method A can be seen in Figure 5, page 130. In this figure the service areas of three institutions visited can be seen. A fourth recreational establishment, the skating rink, was also visited, but no complementary area could be established.

The establishment with the smallest hinterland as shown in Figure 5 is a combination ten-pin bowling alley and pool hall. It is the only establishment providing ten-pin bowling in Portage. Some competition is encountered from an establishment offering five-pin bowling. Only one other establishment offers facilities for pool. The facilities at the pool and bowling establishment are new and modern. Built in 1964, the building is well kept, spacious, and attractive. Known as a family recreational center, it allows

Figure 5

PORTAGE LA PRAIRIE SERVICE AREAS



— Bowling

- - - Curling

..... Flying

youngsters as young as twelve years to play pool if they have written permission from their parents. The formation of leagues for both pool and bowling is advocated to the extent where now nearly every evening league bowling is taking place. The economic community is being drawn in by being asked to sponsor teams, the members of which wear shirts with their sponsor establishment's name printed on the back. The private ownership of bowling equipment such as a custom fitted bowling ball, as well as bowling shoes, is recommended and naturally sold on the premises.

As seen on the map, the hinterland of this establishment is quite small. The distance varies from five to ten miles as estimated by the manager. The estimate was given that one bowling lane per 1,000 people would be economically feasible. Portage la Prairie, having 10 ten-pin lanes and 10 five-pin lanes would thus be supplying bowling facilities for 20,000 people. This corresponds well to the estimated drawing power of Portage la Prairie of 22,000 people.¹ Thus besides the city population of 13,000, a rural population of 9,000 depends upon Portage. Figure 12 shows the rural area from which the majority of people go to Portage la Prairie for bowling. The total rural population in the area of dominance and complete dominance comes to 15,500, substantially more than the number estimated by the manager of Delta Lanes. Some of this difference might be due to the fact that more people from the country bowl five-pin than ten-pin, or because they are not that well represented in league bowling, which most rural people cannot engage in due to distance and farm chores in the evenings. It was estimated² that

¹This estimate was given by Mr. Galesby, Jr., during the interview at Delta Lanes.

²Ibid.

that only ten percent of the bowlers were rural people.

In the field of curling, Portage la Prairie, like every other community in Western Canada, has its own curling rink. Its drawing area, as seen in Figure 5, is somewhat larger than the bowling drawing area. Part of this fact can be explained by the increased participation of farmers in this sport. Curling rinks are found in the rural areas in such small centers as Westbourne, Burnside, Poplar Point, Oakville, and MacGregor. Naturally, the Portage la Prairie curling rink has better facilities than the rural rinks. It has artificial ice, and is centrally heated. Thus, any curler in the Portage la Prairie area, who aspires to be a good curler, comes to Portage, where the curling season is longer, due to the artificial ice, and the ice not so variable.

Although the curling rink was built in 1947, it is in good condition. The artificial ice plant was installed in 1956 and the heating equipment in 1965. Facilities are also provided for some 300 spectators. During the winter of 1966-67, 170 rinks participated in different leagues, including the ladies', men's, high school and mixed leagues. In all 680 active curlers used the rink in 1966-67. The Provincial Championship 'Brier' for mixed curling was held at Portage in 1967-68, which shows the importance of Portage la Prairie as a curling center.

Curling facilities are also provided for at the Canadian Armed Forces Base three miles south of Portage la Prairie. This five-sheet curling rink is used by the city whenever demand exceeds supply for ice time in Portage la Prairie; otherwise it is used mainly by Air Force personnel. At the new Portage la Prairie skating rink facilities are such that five curling sheets of ice

can be made on short notice, should the demand, as in a large bonspiel, warrant this. With the increased demand for good curling conditions such as artificial ice and heated rinks, Portage might in the future encounter a shortage of ice, although at present facilities are adequate.

A new skating rink provides recreational facilities for skating and hockey in the winter, and basketball, volleyball, badminton, and tennis in the summer. Moved and remodelled in 1966, the rink has modern indoor facilities with a good artificial ice surface. The only drawback, as stated in the previous unit, is the lack of spectator facilities. Only some 1,000 seats are installed on one side of the ice sheet. This fact restricts the building to use for minor league sport teams.

The Portage Flying Club has the greatest hinterland of all the recreational facilities interviewed. Although only five percent of its clients come from outside the city, they come from as far away as Morden and Winkler. The main purpose of the flying club is to teach individuals how to fly, but some commercial sight-seeing flying is also done. Although the aim is to get a commercial license, this possibility seems far off, due to the proximity of the air force base and Winnipeg. In addition, the relative small size of Portage discourages this.

Of the recreational establishments visited, none had plans of expansion. All indicated that Portage, as far as they were concerned, was well provided with recreational facilities. Besides, the ones mentioned above, Portage la Prairie also has a golf course, a swimming pool, baseball facilities, a park and grand stand facilities for harness racing.

According to the 1961 census, Portage la Prairie had 27 people employed in recreational activities. This constituted .65 percent of the total labour force. In 1951 the minimum employment value in recreation for cities of 10,000 to 19,900 population was only .20, while the mean excess was .15 with a standard deviation of excess employment of .14.³ This puts Portage la Prairie in the category between mean of excess and two standard deviation, thus having substantially more people employed in recreational facilities than most cities of similar size, confirming the managers' and owners' claim that Portage is well provided with recreational facilities.

B. Social Recreational

In order to establish the complementary area of the recreational and social establishments by method B, seven criteria were used. These criteria are: curling, bingo, church, dancing, theatre, golfing and bowling. These criteria were chosen as representative of the total field of physical and mental recreational activities, of which some others might be skating, libraries, swimming, dining, etc. Although church might not be considered as a social or recreational activity but rather spiritual, it was included in this group because of the many social functions associated with or sponsored by the church.

Of the seven hinterlands established, the one pertaining to curling (Figure 6, page 135) in Portage la Prairie is the smallest.

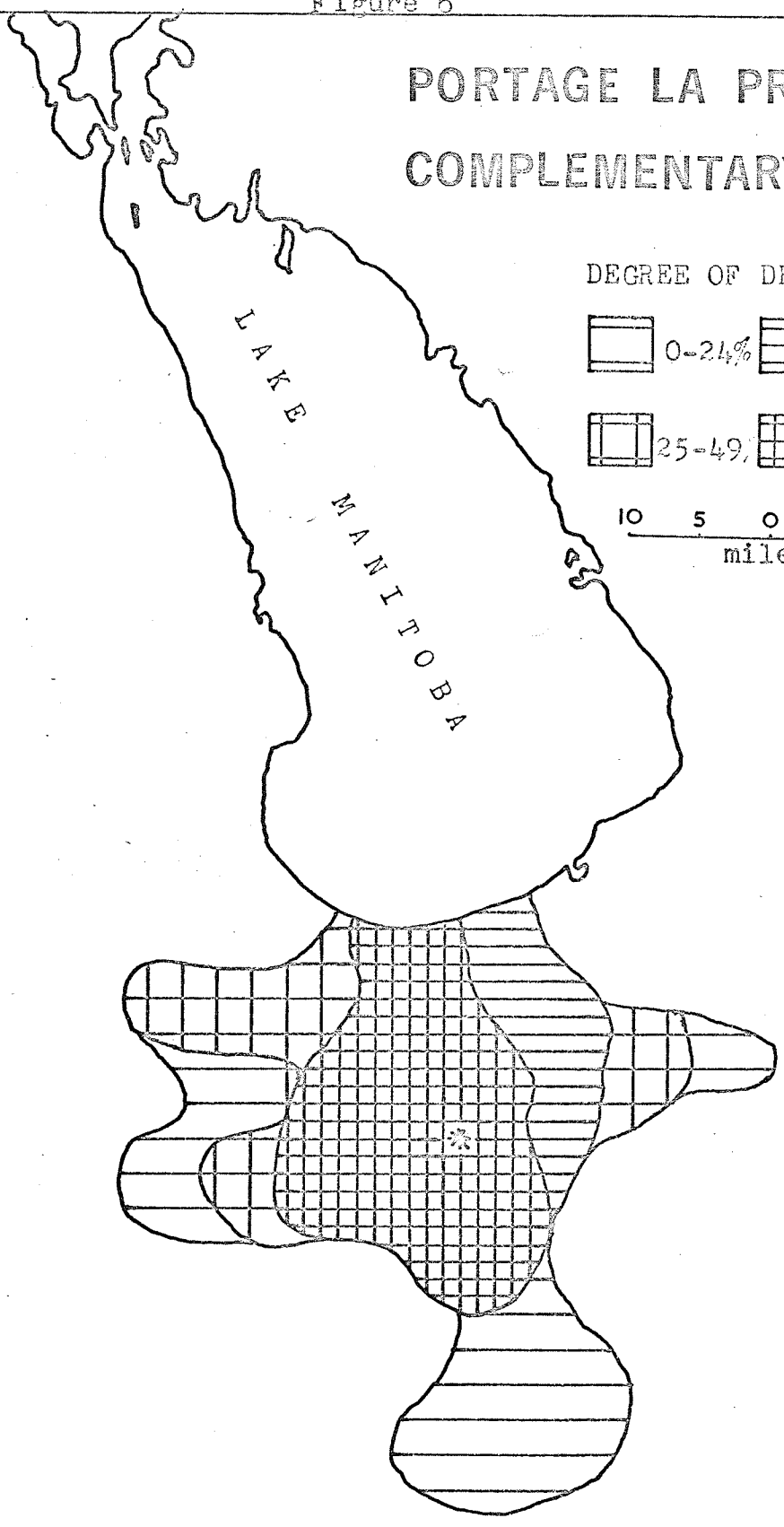
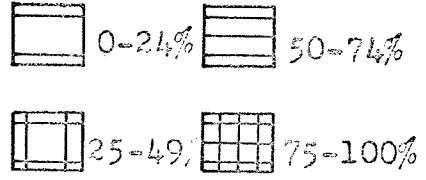
³J. W. Maxwell, "The Functional Structure of Canadian Cities, A Classification of Cities", Geographical Bulletin, Vol. VII, No.2, (1965), p.87. See also page 77, footnote⁶⁰, for justification of a comparison of 1961 and 1951 census data.

Figure 6

PORTAGE LA PRAIRIE COMPLEMENTARY AREA



DEGREE OF DEPENDENCE



Area dependent upon Portage for CURLING

The area of dominance stretches from Lake Manitoba to the southern boundary of the Municipality of Portage la Prairie, a north/south direction of some 26 miles. The west/east extent is only some 20 miles, starting at the western municipality boundary and going east to where Highway 1 crosses the Assiniboine River. It thus does not include the north-western, the south-eastern, or the eastern part of the Municipality of Portage la Prairie. The total rural population covered by its area of dominance is some 4,675 people. Portage la Prairie is located very nearly in the geometric center.

Within this area of dominance of curling in Portage are located eight auxiliary centers. If we assume that a curling rink is an A center function, then this would represent two centers above Christaller's theoretical of six. No A center is located within this area of dominance, substantiating the hypothesis that a curling rink must be a type A center good.

The total curling hinterland of Portage is somewhat bigger than the just umland area. Its greater extent occurs mainly in the west and south. A small extension occurs along Highway 4 towards Poplar Point and Reaburn. Within the total hinterland area there are 14 auxiliary centers, three type A centers and two type C centers. The exclusion of type B centers is somewhat odd in this case.

An interesting aspect of the curling hinterland of Portage la Prairie is its decreasing influence with an increasing distance. To the southeast and southwest the change is abrupt, going from complete dependence (75 percent) to no dependence, and to very little dependence straight south of Portage la Prairie. In the west and east this is different. Here dependences change from dominance to

no dominance on a gradual scale. In the north naturally the lake forms an abrupt physical boundary.

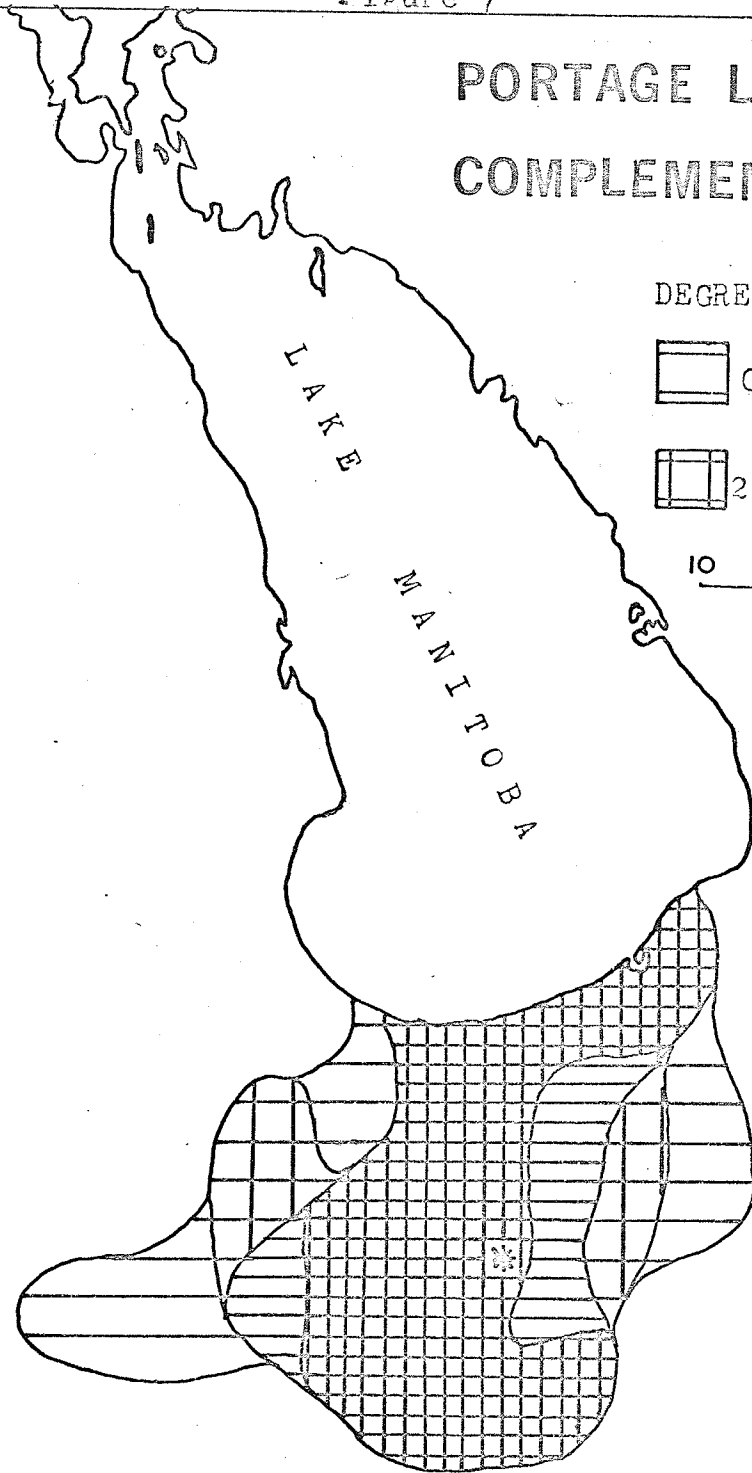
The second smallest unland of the recreational group is the Portage la Prairie area of dominance for bingo playing. (Figure 7, page 138). Bingo is a chance game played by adults in halls, church basements, and auditoriums. It is popular because of the prizes being offered to winners, as well as for its simplicity, excitement and social gatherings it provides. The prizes at large bingo games are quite commonly new automobiles.

The area of dominance encompasses the same basic area as the curling unland, with the addition of the northeastern corner of the Municipality of Portage la Prairie and Township 11, Range 9 in the Municipality of North Norfolk, just west of Portage. The eastern boundary of bingo dominance area is not as large as curling, due to bingo games in Poplar Point and High Bluff. Within this area of dominance are some 5,550 people, 900 people more than in the curling dominance area.

Within this area of dominance are located ten auxiliary centers. This is two more than in the curling unland. These two extra auxiliary centers are the centers of St. Mark and St. Ambroise, in the north-eastern corner of the Municipality of Portage la Prairie. This total of ten centers is four more centers than Christaller's theory postulates. Bingo thus is at least a type A good. The notion that it is such is supported by the absence of any type A center in Portage's bingo unland. The total bingo hinterland is somewhat larger than the area of dominance. It stretches westward along Highway 1 as far as Austin and northwest to beyond Westbourne.

Figure 7

PORTAGE LA PRAIRIE COMPLEMENTARY AREA



DEGREE OF DEPENDENCE

0-24% 50-74%

25-49% 75-100%

10 5 0 10
miles

Area dependent upon Portage for playing BINGO

In the east it stretches as far as Poplar Point. The influence of the highways can be seen in both directions, as it is elongated along these provincial highways. Within this total area of influence are 14 auxiliary centers, two type A centers and one type B and type C center.

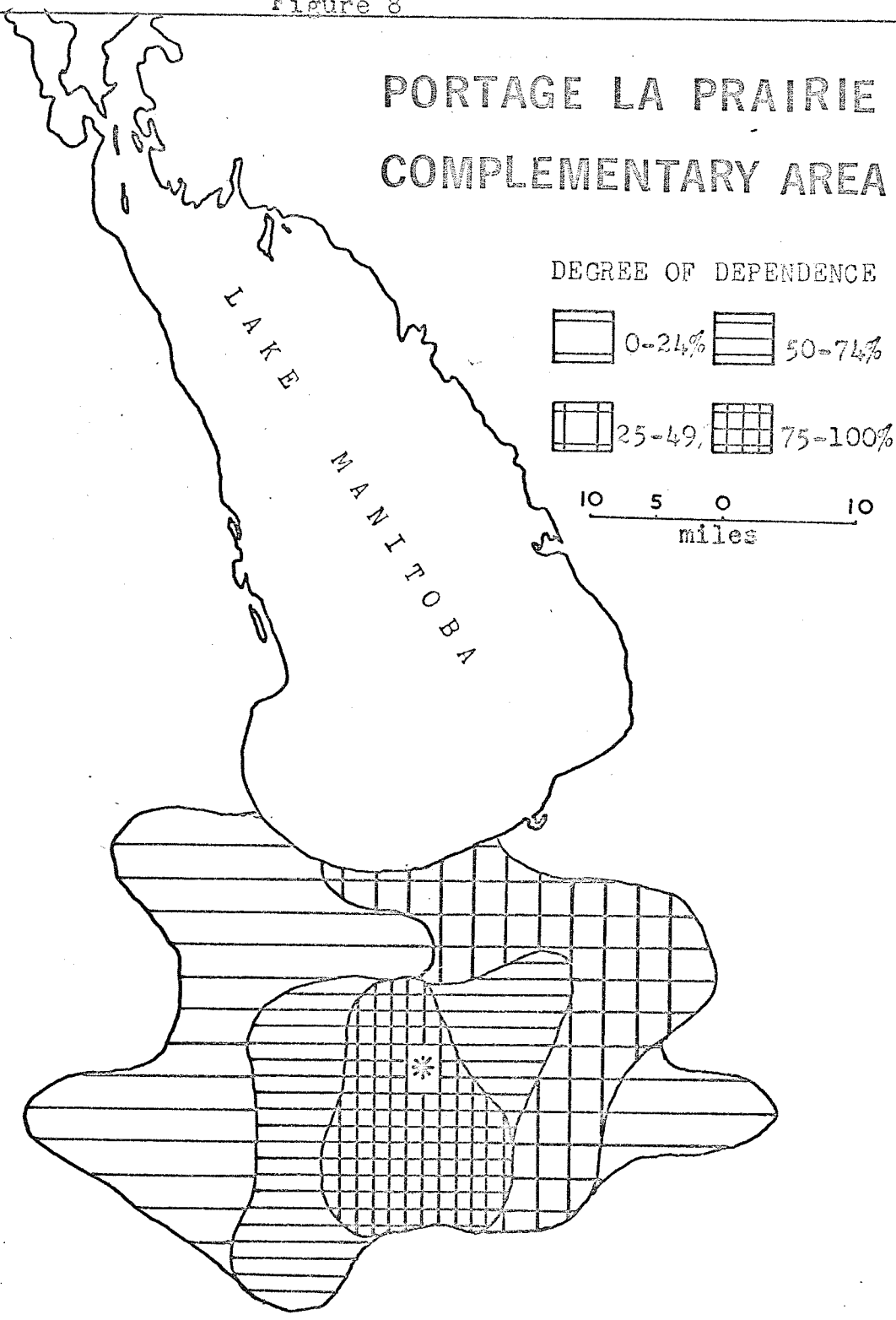
The slope of decreasing dependence for bingo games in Portage varies in different directions from Portage la Prairie. Towards the north and south the change is sudden and abrupt. Complete dependence (75 percent) occurs right up to Lake Manitoba, where this natural boundary prevents any further dependence, simply because of its great size. In the south the change is also quite abrupt, going from complete dependence to no dependence. This southern boundary corresponds well to the municipal boundary. Towards the west the slope of dependence is more gradual, changing from complete dominance (75 percent), to dominance (50 percent), to some dependence in the MacGregor, Austin area. In the east complete dominance occurs for only a few miles east of Portage la Prairie. It changes to dominance for about five miles then to 25 percent dependence and then finally to some dependence in the Poplar Point area.

The hinterland of churches has always been an interesting subject. Although most people in Western Canada are members of some church, and thus have a specific church to which they pay a visit, this is changing because of increasing mobility. Golledge, Rushton and Clark found that in Iowa people would travel the shortest distance (of 33 requirements asked about) to a church service.⁴

⁴R.G. Golledge, G. Rushton and W.A.V. Clark, "Some Spatial Characteristics of Iowa's Dispersed Farm Population and their Implication for the Grouping of Central Place Functions", Economic Geography, Vol. XXXVII, 1966, p.263.

Figure 8

PORTAGE LA PRAIRIE COMPLEMENTARY AREA



Area dependent upon Portage for CHURCH services

In grouping the travel distance for the 33 commodities investigated the distance travelled to church had to be classified into a group by itself because of its low travel distance. Figure 8, page 140, confirms this fact that people in general do not travel far to church. The area of dominance is closely packed around Portage. It is the only complementary area of dominance that does not extend northward to Lake Manitoba. The high value of 5,600 people in the area of dominance is somewhat inflated by the Long Plain Indian Reservation in the southwestern part of the Municipality of Portage la Prairie. Secondly, although the air base has less than half of its people going to church service in Portage la Prairie, its population is included in the population of the church dominance area. The actual area is nearly rectangular in shape, occupying the south-western 325 square miles of the Municipality of Portage la Prairie, as well as one township (36 square miles) from the Municipality of South Norfolk.

Within this area of Portage la Prairie church dominance are located seven auxiliary centers, only one more than Christaller's theoretical six, and the lowest number of any function. The absence of centers of higher order in this area of dominance makes the facts correspond well with the theory.

The total hinterland area of Portage la Prairie's church function is substantially greater. This is probably due to denomination of small numbers for which building a church in smaller centers is not economically feasible and hence have located in Portage la Prairie. The east/west cross section of the church hinterland is some 55 miles, along Trans-Canada Highway. Other

extensions occur along Highway 4, both towards Winnipeg and towards Gladstone. Within this church hinterland are altogether 15 auxiliary centers, four type A centers, two type B centers and one type C center.

With a large hinterland area and a small dominance⁵ area the slope of decreasing influence is not as steep as seen in the complementary areas examined. A gradual decline occurs in every direction from Portage la Prairie except south. Here again the degree of dependence changes from complete dependence and dominance to no dependence.

An interesting recreation institution hinterland of Portage la Prairie is the area from which people come to dance. Because dances are usually sponsored by groups of people having similar interests, such as church groups and clubs, it is a good indicator of the areal distribution of the members of these different groups. It represents an area closely associated with Portage la Prairie, as most social requirements will not induce long periods of travel.⁶

The actual shape of the area of dominance as seen in Figure 9 resembles the bingo area of dominance. It is elongated somewhat from southwest to northeast, measuring some 40 miles air distance. Portage la Prairie is situated nearly in the center with the area of dominance being smallest toward the southeast. Except for a

⁵For a definition of the term umland see footnote 1, page 97.

⁶Exceptions to this generalized fact would be requirements such as professional sports, operas, symphony orchestras, and others that are generally restricted to large urban centers, upon which they depend more heavily than upon the hinterlands of these centers.

small region in the Poplar Point area, the area of dominance is also the area of complete dependence. In this area of dominance live some 6,320 people, by far the greater number of which are also within the boundaries of the Municipality of Portage la Prairie.

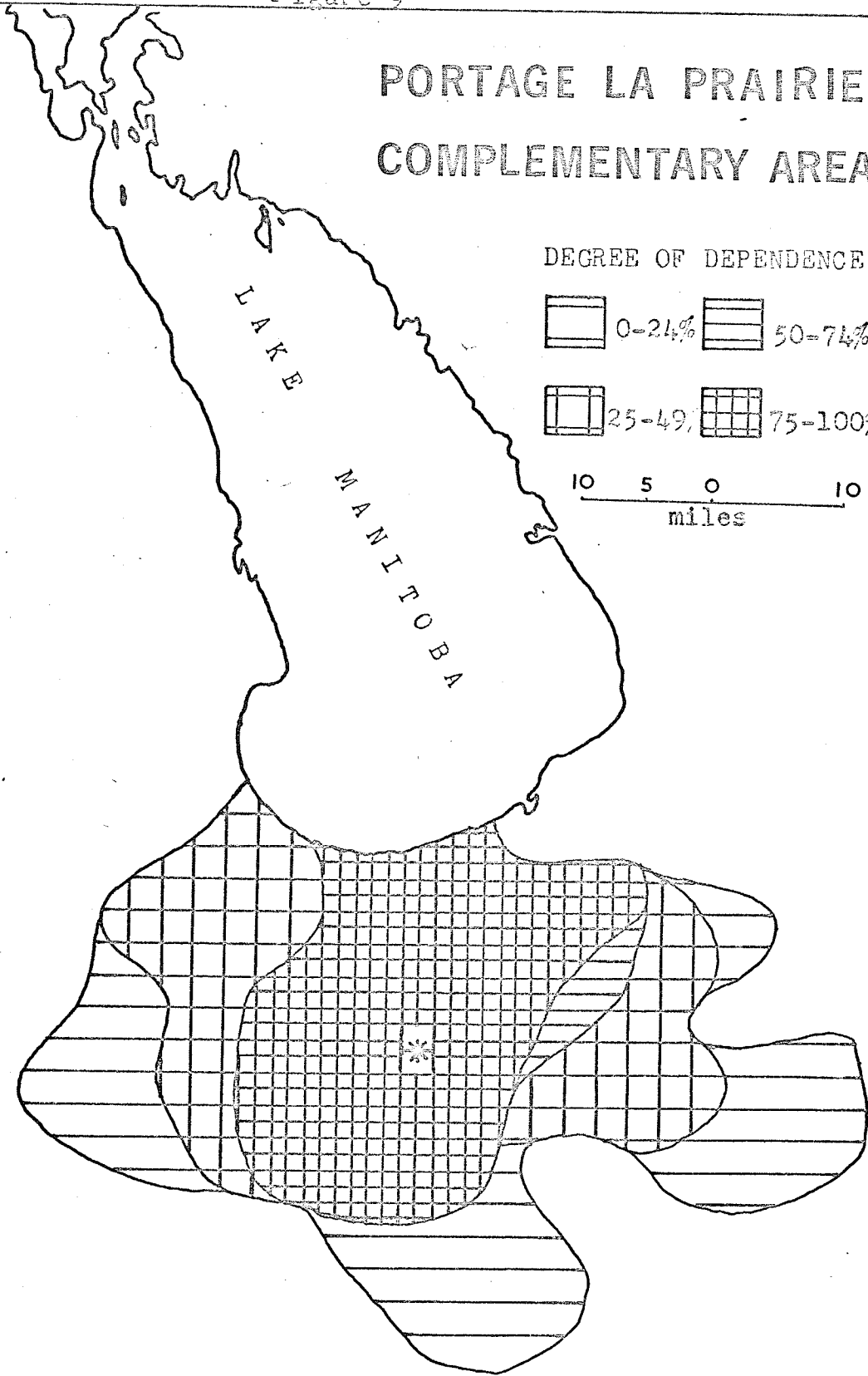
As the population of an area of dominance increases so does the number of central places within this area of dominance. In this area of dancing dominance are located eight auxiliary centers and one type A center. The type A center is Poplar Point, near the northeastern boundary of dominance. It might be significant that Poplar Point is located in an area of dominance only and not in an area of complete dependence as is the case for the other service centers.

The Portage la Prairie hinterland area for the social function of dancing is substantially greater than the area of dominance. This greater area is quite irregular in shape, with two major areas being to the west and east of the city. The greatest eastwest extent is some 60 miles long, following the Trans-Canada Highway both east and west of Portage la Prairie. In this extended area there are seven additional auxiliary centers, bringing the total to 15 for the hinterland of the city of Portage la Prairie. The number of A centers is six. Within this area of some dependence are also included the three type B centers of Oakville, Elie and Austin, as well as the C center of MacGregor.

With the exception of the southwest and the northeast areas, the dancing hinterland decreases gradually with distance. The two areas of exception are also exceptions in most other hinterland and are due to lack of proper roads leading to Portage la Prairie.

Figure 9

PORTAGE LA PRAIRIE COMPLEMENTARY AREA



Area dependent upon Portage for DANCING

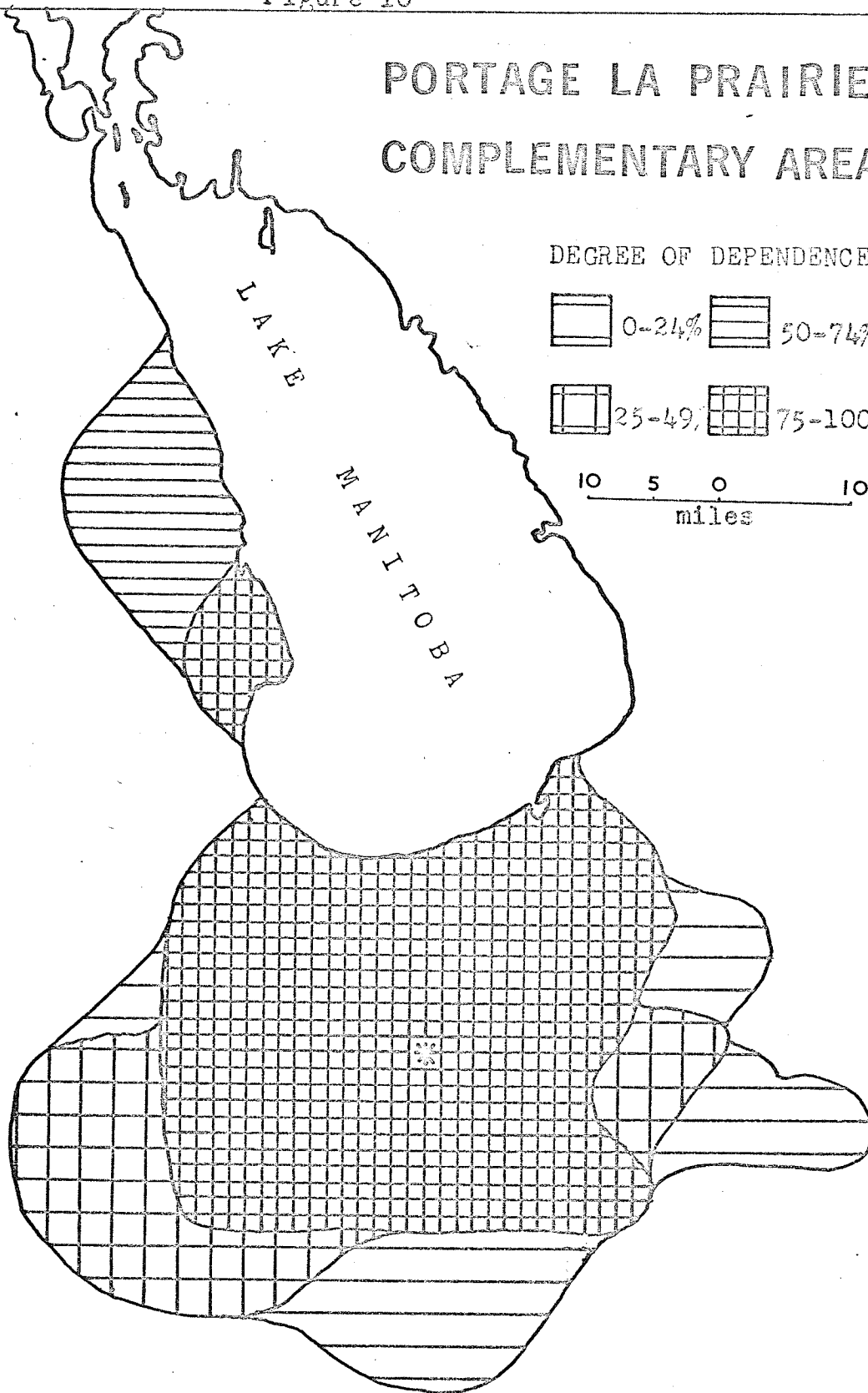
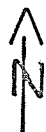
There is a substantial increase in the area of dominance of the theatre hinterland to those of church, curling, dancing, and bingo, Figure 10, page 146. Golledge, Rushton, and Clark,⁷ found that of the 33 commodities asked about movies demanded the ninth highest average travel distance to the center used most frequently for this commodity. Secondly the standard deviate was exceptionally high (31.5 miles) being fourth highest. This fact of travelling substantial distances to see a movie thus is true both in Iowa as well as in Manitoba. This may partly be due to the absence of movie theatres in smaller centers resulting in high average distance travelled. Yet the high standard deviate brings out the fact that many people do travel substantial distances even though closer theatres were available. The hinterland of Portage la Prairie's theatres is comprised of two areas separated by an area of no dependence. The Langruth, Amaranth area of dominance is separated from the Portage dominance by an area of no dependence in the Lakeland region. The small area between the two areas of dominance is sparsely settled. The people living here find it more convenient to go to Gladstone.

With the exception of the Amaranth/Langruth area, the Portage la Prairie theatre dominance area is quite compact. It includes the whole Municipality of Portage la Prairie with the exception of the southeastern township. It also includes the eastern townships of the Municipality of North Norfolk and the Westbourne area in the Municipality of Westbourne. This total area of dominance contains 9,825 people, only some 3,000 less than the city of Portage la Prairie itself.

⁷ Golledge, Rushton, and Clark, op.cit., p.263.

Figure 10

PORTAGE LA PRAIRIE COMPLEMENTARY AREA



DEGREE OF DEPENDENCE

0-24% 50-74%

25-49% 75-100%

10 5 0 10
miles

Area dependent upon Portage for THEATRE

This area of dominance has 15 auxiliary centers, five type A centers and two type B centers. From this fact one must conclude that theatres are C type center goods. A check on theatre facilities in the C centers of the Portage la Prairie area shows that four out of five of these centers do not have theatres, while only one lower order center, Plumas (type B) has a theatre. The actual ratio of 1:2:5:15 centers ranging down from type C to auxiliary corresponds quite closely to Christaller's theoretical 1:2:6:18 ratio of central places.

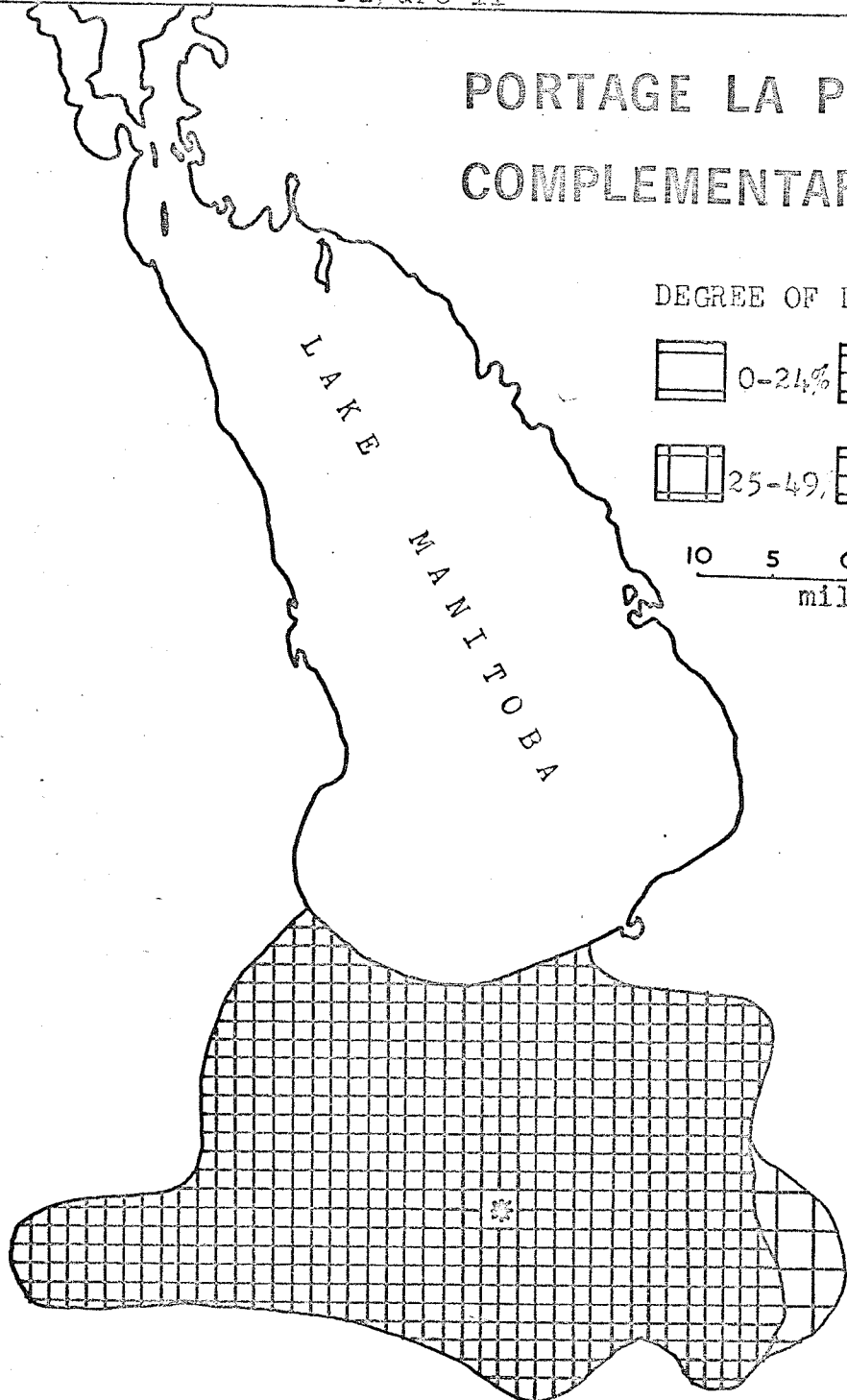
As already mentioned, the continuous area of dominance about Portage la Prairie is quite compact. It is surrounded in the west, south, and east by a small area of some dependence. Towards the southwest of the city this area of some dependence is still more than 25 percent dependent. This is surprising, since there is a theatre in MacGregor. A further 25 percent dependence area occurs to the east of Portage la Prairie in the Oakville area. Within the total hinterland area there are 18 auxiliary centers, eight A centers, four B centers, and two C centers.

The Portage la Prairie golfing area of influence is quite unique (Figure 11, page 148). With the exception of a small area in the east, the area of complete dominance is the same as the area of some influence. It thus comes closest, of the functions so far discussed, to the theoretical idea of distinct sharp boundaries.

The actual shape of the golfing hinterland is somewhat irregular. An extension along Highway 1 west of Portage la Prairie gives the panhandle picture. The relative short extent of the area to the southwest is a reflection of not only non-dependence in

Figure 11

PORTAGE LA PRAIRIE COMPLEMENTARY AREA



DEGREE OF DEPENDENCE

0-24% 50-74%

25-49% 75-100%

10 5 0 10
miles

Area dependent upon Portage for GOLFING

golfing upon Portage la Prairie, but also of the general disinterest of the people in this area in golfing, as few people indicated that they golfed. This might be due to the relative poverty of this area.³

In the Portage golfing umland are 11 auxiliary centers. In addition there are three type A centers and two type B centers, Oakville and Austin. In the western panhandle is also located the type C center of MacGregor. This fact indicates that the golfing function must be a type D center. Although the C center of Gladstone also has a small golf course, having nine holes. In all the area of dominance there are some 10,225 people, some 400 people more than the theatre hinterland.

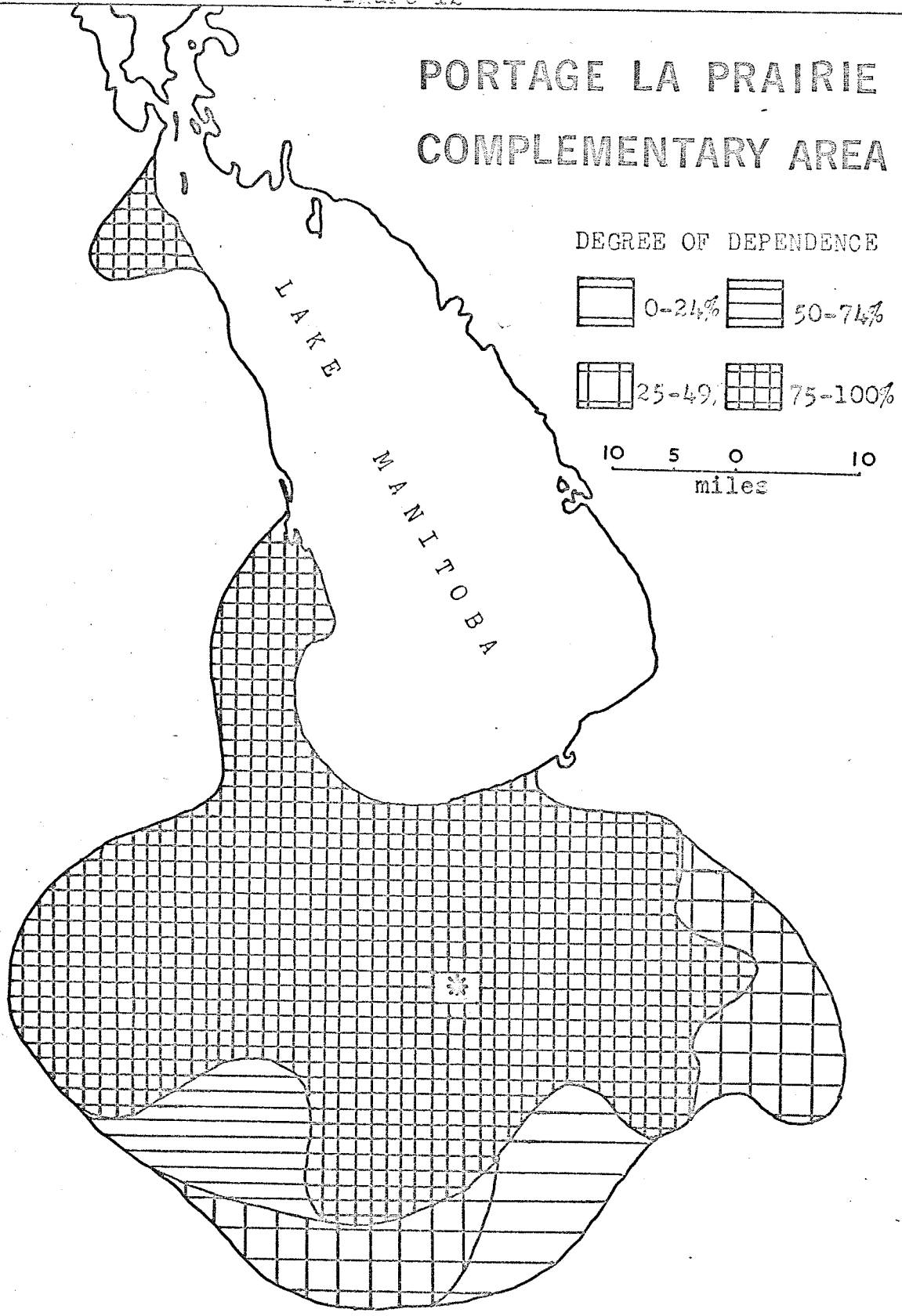
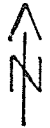
An interesting complementary area of Portage la Prairie is that of bowling. Of the areas so far discussed, it is the largest. The agreement with the complementary area as delimited by the Delta Lanes manager is so poor that one doubts the claim that the manager knew his customers. The poor correspondence could probably be explained on the basis that few rural bowlers are league or regular bowlers, and hence not as well known. Secondly, as only the ten-pin bowling establishment was visited, it could be that most rural people bowl only five-pin.

The actual shape of the bowling area of dominance upon Portage la Prairie is quite odd. The greatest portion of the area of dominance lies to the west of the city. A curious patch of

³In this area is located the Long Plain Indian Reserve, the members of which are definitely quite poor. The area is the former delta of the Assiniboine River when the Caber flowed into Lake Agassiz. It is a sandy area where the vegetation is quite studded because of the lack of moisture needed by such soils.

Figure 12

PORTAGE LA PRAIRIE COMPLEMENTARY AREA



Area dependent upon Portage for BOWLING

dominance lies east of Alonsa in the Kinesoto, Silver Ridge, Bluff Creek area. It is separated from the closer area of dominance at Langruth by some 25 miles of no dependence. It is also curious how the area of dominance extends north along the western shores of Lake Manitoba, giving again the panhandle effect. Besides covering the Municipality of Portage la Prairie, with the exception of the northeastern section and one township in the south, the area of dominance covers about 80 percent of the Municipality of North Norfolk, about half of the Municipality of Lakeside, and substantial sections of the Municipalities of Westbourne, South Norfolk, Gray, Cartier, St. Francois Xavier, Woodlands, and the local government district of Alonsa. The actual population comes to 15,500 which together with the population of the city of Portage la Prairie gives a bowling population potential of some 28,800 people.

Of the social umlands so far discussed, the area of bowling is largest and has the greatest number of subordinate centers in it. In all, there are 21 auxiliary centers, six type A centers, three type B centers, and one type C center. This would indicate that the function of bowling is a D type function. Of the four type C centers under consideration, only Treherne has bowling facilities.⁹ Theoretically, this means that two type C centers should look to Portage la Prairie for bowling facilities. In reality only MacGregor is in the dominance area. St. Claude (type C center) is located in the 25 to 50 percent area of dependence.

⁹This does not mean that no smaller center will have bowling lanes, as bowling facilities are provided at Plumias, only a type B center.

People from Gladstone are going to Neepawa.¹⁰

The complete hinterland is not much greater than the area of dominance. The additional area of some dependence borders the south, southeastern, and eastern border of the area of dominance. Nowhere is this additional band of some dependence wider than 15 miles, making the whole bowling hinterland quite compact. In the eastern area the influence of Winnipeg is felt, while in the south Carman is being used more than Portage la Prairie. In the area of some influence are located three more auxiliary centers, three more type A centers as well as one more of each type B and C centers. The greatest east/west extent is now 67 miles, while the north/south extent is 62 air miles.

¹⁰ Neepawa is thought to be a type D center. This is assumed to be so because of the size of the town (3,100 people) although the center was not thoroughly studied.

CHAPTER VIII

Communication Complementary Area.

Portage la Prairie and surrounding area is well serviced with news media. It has a radio station, as well as a daily and a weekly newspaper. In addition, radio and television stations are received quite clear from Winnipeg, the metropolis some 50 miles east. Winnipeg's two daily newspapers have a high circulation in Portage and surrounding smaller centers. In the western and northern parts of Portage la Prairie's area of influence, radio stations from Brandon and Dauphin respectively can also be received. Brandon also has a daily newspaper which is sold to some extent west of Portage but not in Portage itself.

To what extent newspaper circulation can be used to delimit the tributary area of a city has intrigued many researchers. The reasons put forth for such an approach are as follows:

Newspapers are sold today like any other commodity. The purchaser or consumer buys it for the purpose of informing himself regarding happenings in his community. This purchaser is also a retail trade consumer. Thus it is a prime place for advertisements of the retailer. The reader purchases the newspaper mainly for the reason of receiving information about the world and about the community in which he lives and the events which might influence his own personal life. At present many readers purchase a paper also for the advertisements that are in it.

Thus the weekly advertisements of food stores become important to the thrifty housewife. In the case of rural people, this paper has to originate at the center which is accessible to them, and is of interest to them because of the social and economic activities offered there.

Because of the reasons outlined above, researchers have used newspaper circulation as a criterion to establish the complementary area of a city. Park and Newcomb go as far as to state that the simplest and most definite procedure for determining the territory directly dominated by a particular city is to map the area surrounding the city wherein its communications, especially its daily newspapers, show more intensive coverage than do those from competing metropolitan centers.¹ Although this statement was made in regards to metropolitan centers, it is certainly true for smaller centers. Other researchers that have used newspaper circulation to delimit the complementary region of a city are Harris,² for Salt Lake City, Ullman,³ for Mobile, and Green,⁴ for New York and Boston.

A. Daily Paper

As mentioned in the previous paragraphs, Portage la Prairie has two newspapers, one a daily and one weekly. At present the daily newspaper has a circulation which is twice as great as the circulation of the weekly paper. On June 30, 1965, the daily newspaper's paid circulation was 3,194, of which 90 percent was sold in

¹R. E. Park and Charles Newcomb, "Newspaper Circulation and Metropolitan Regions", in R.D. McKenzie, The Metropolitan Community, (McGraw-Hill Book Company, Inc., New York, 1933), Chapter VIII.

²C. D. Harris, "Salt Lake City: A Regional Capital," Doctoral Dissertation, University of Chicago Libraries, Chicago, 1940.

³E. L. Ullman, "Mobile: Industrial Seaport and Trade Center," Department of Geography, University of Chicago, 1943.

⁴H. L. Green, "Hinterland Boundaries of New York City and Boston in Southern New England", Economic Geography, Vol. XXXI, (1955), pp. 283-300.

in the city of Portage la Prairie itself, and the rest in the complementary area.⁵ This area is shown in Figure 13, page 156, and is based on the questionnaire. As can be seen, the area of complete dependence is somewhat elongated from southwest to northeast. The area of dominance is somewhat larger especially to the southwest and west of Portage. The total population in this area of dominance is 7,060 people. Although more than 50 percent of those people who receive a daily newspaper in this area take the Portage daily paper, this does not mean that these people do not receive other daily papers. Many people, especially in Portage la Prairie, receive both the local daily paper and a daily Winnipeg paper.

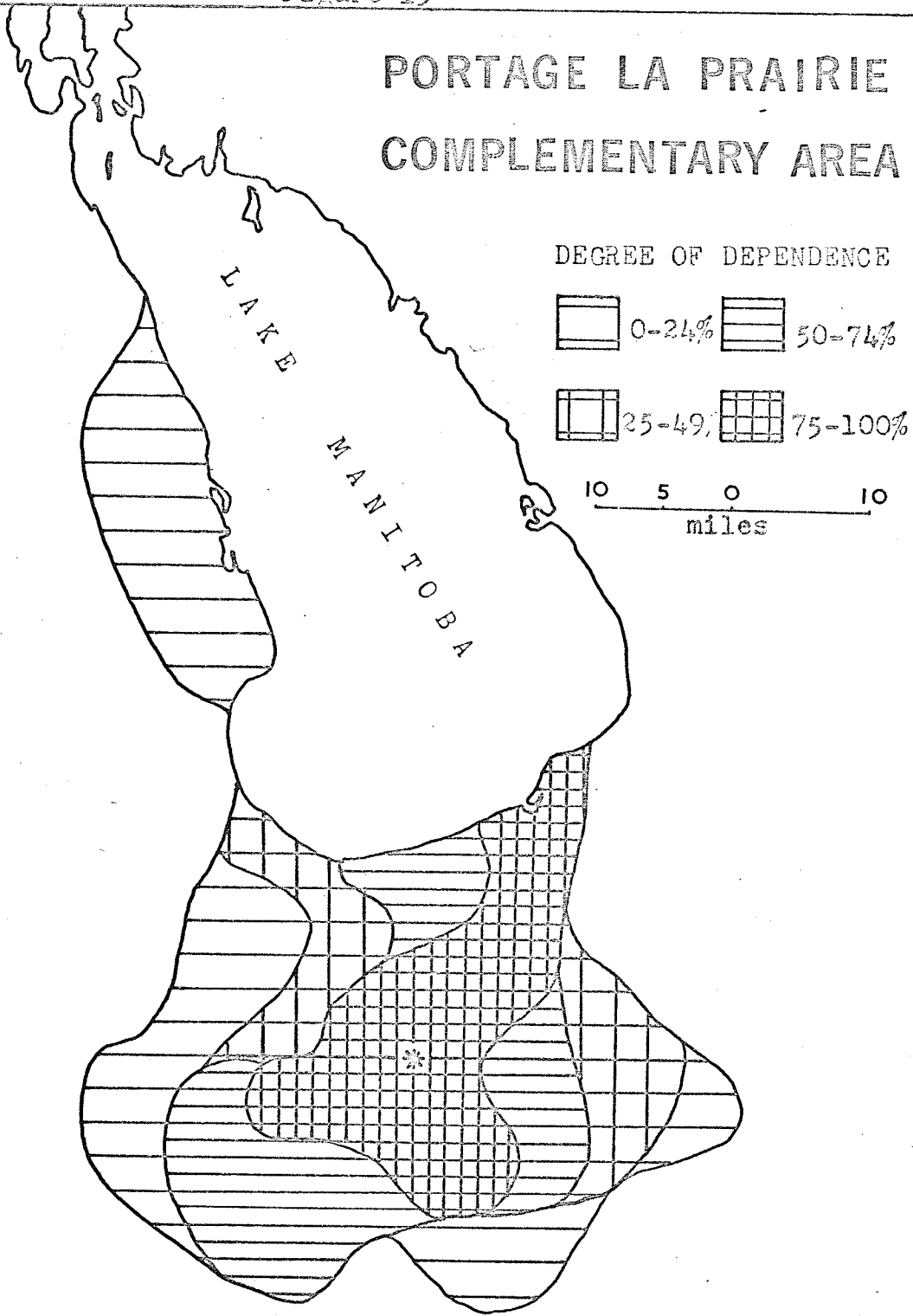
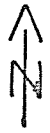
Within this area of daily newspaper dominance there are located ten auxiliary centers and two type A centers. Although this would suggest that a daily newspaper is a type B center good, this is not true. No type B or even C centers in the Portage area have daily newspapers. The strong influence of Winnipeg papers is seen here as the neighboring centers receive the Winnipeg daily papers rather than the Portage one.

In the whole area of some dependence on Portage la Prairie for daily newspapers, there are 16 auxiliary centers, five type A centers, two B centers and one type C center. As can be seen in Figure 13 the area is fairly symmetrical about Portage with the exception of the Langruth/Amaranth areas, which, although dependent to some degree upon Portage, are separated from the continuous

⁵Information in regards to circulation was received from the Audit Bureau of Circulation, Chicago, Illinois, 1965, and from Mr. Stan Schram, Circulation Manager, for Vopnie Press, which publishes both the daily and weekly paper.

Figure 13

PORTAGE LA PRAIRIE COMPLEMENTARY AREA



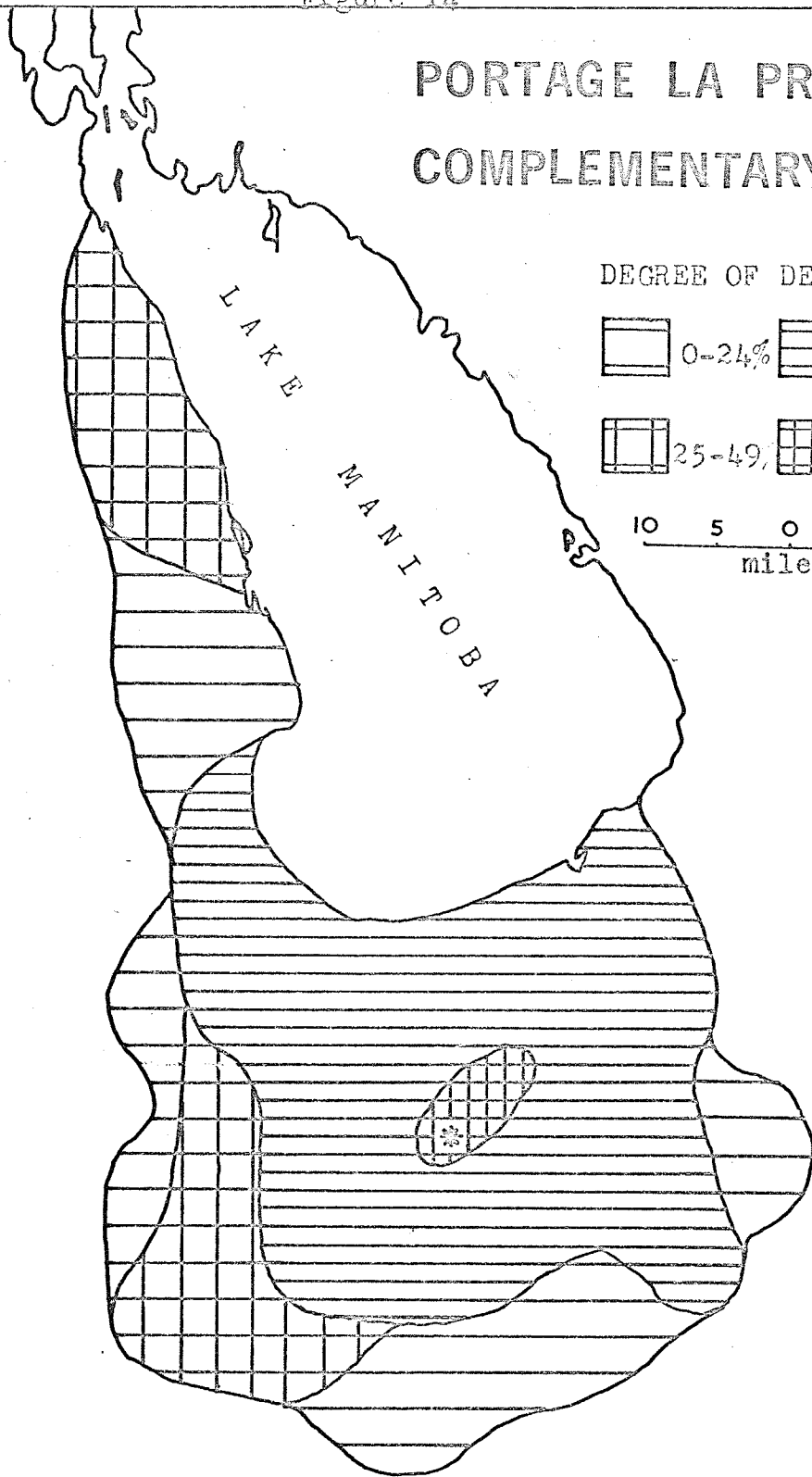
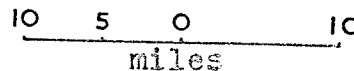
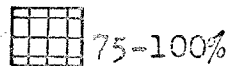
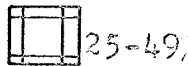
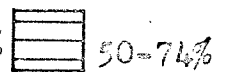
Area dependent upon Portage for DAILY NEWSPAPERS.

Figure 14

PORTAGE LA PRAIRIE COMPLEMENTARY AREA



DEGREE OF DEPENDENCE



Area dependent upon Portage for WEEKLY NEWSPAPERS

area of dominance by an area of no dominance. This oddity demonstrates the close daily contact this area has with Portage la Prairie.

B. Weekly Paper.

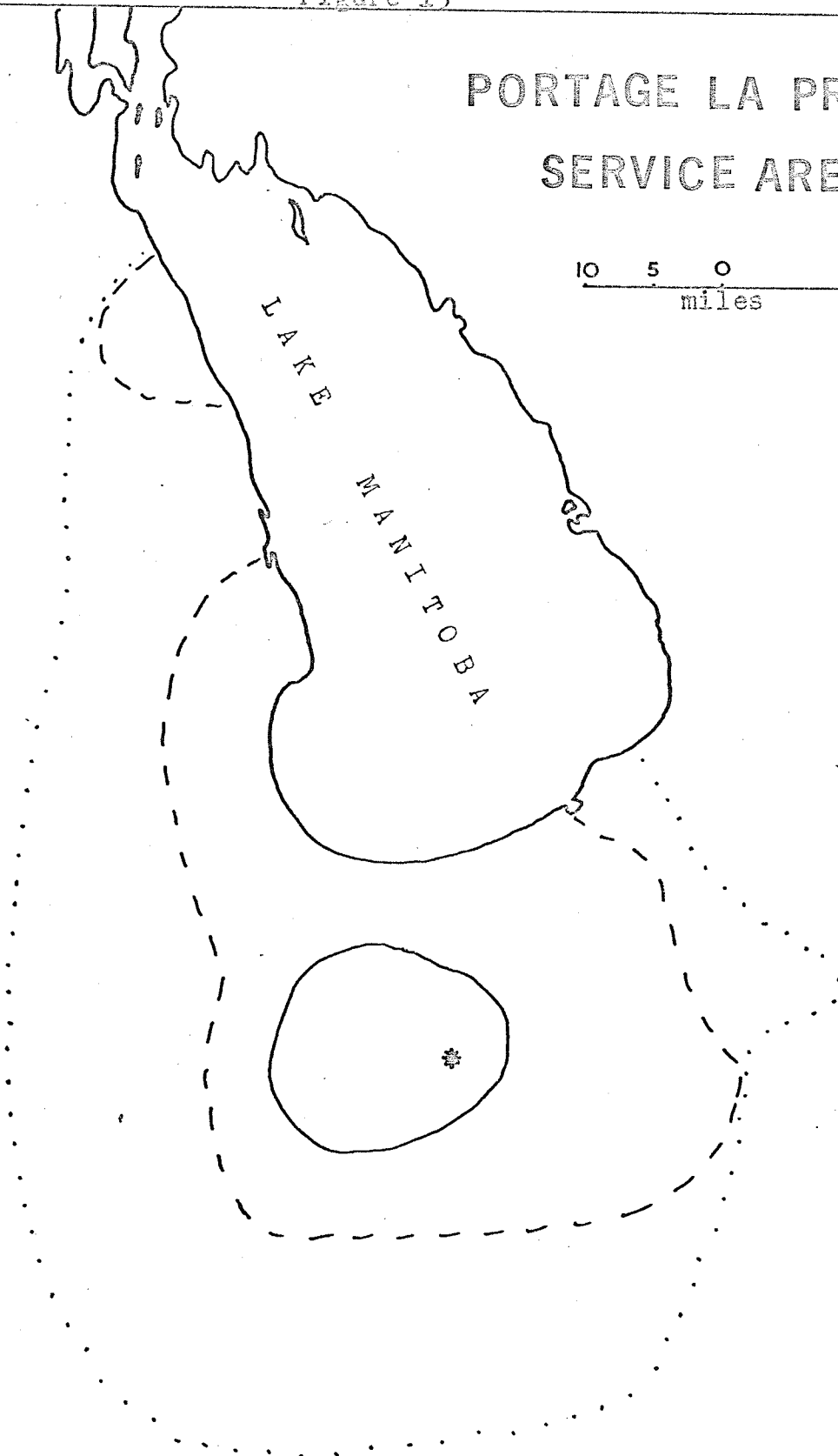
Although 90 percent of the daily newspapers are sold in the city of Portage la Prairie, 90 percent of the weekly newspapers are sold outside of the city of Portage. That the areal extent of the weekly newspaper circulation is greater than the daily newspaper can be seen by comparing Figure 14, page 157 with Figure 13, page 156. The main difference between these two service areas is the greater dominance area for the weekly paper in comparison to the daily paper's area of dominance. Secondly the Amaranth and Langruth areas, separated by an area of no dependence in Figure 13 are now joined by an area of some continuous dependence. Thirdly, the area of complete dependence for the weekly paper is nearly non-existent compared to a substantial area for the daily paper.

In the area of dominance for the weekly papers there are 9,200 people, nearly 2,000 more than the daily newspaper's area of dominance. This area has 12 auxiliary centers, three type A centers and one type B center. Within the greater area of some dependence there are 21 auxiliary centers, six type A centers, two type B centers, and two type C centers. From this one would conclude that a weekly newspaper should be a level C center type of good. This seems quite correct as the type C centers of Gladstone, MacGregor, and Teherne all have weekly papers. The only exception is St. Claude.

An interesting test for the validity of the questionnaire method of determining the service area of a central place institution is provided by Figure 15, page 159. This map shows the weekly

Figure 15

PORTAGE LA PRAIRIE SERVICE AREAS



Circulation of Weekly Paper as a percent of Post Office Box holders

—— more than 50% - - - - from 25% and up more than 0%

newspaper circulation area in a somewhat different light than Figure 14. The degree of dependence for weekly newspapers is based on the percentage of householders that receive the weekly paper from Portage la Prairie.⁶ The great similarity of the two maps can be seen. Areas of high dependence in Figure 14 correspond to areas of high correspondence in Figure 15. The difference in the percentage of dependence is due to the difference of definition of dependence in each case.

The Audit Bureau of Circulation also defines the complementary area of dependence of a center based upon newspaper circulation.⁷ This can be used by newspaper as a tool for advertising purposes. For Portage this area was defined as the Municipality of Portage la Prairie, Municipality of Gray, and the Municipality of North Norfolk. It thus left out substantial sections of the Municipalities of Westbourne, Lakeside, and the local government district of Alonsa. It included the Municipality of Gray, which only depends to a small degree for weekly newspapers on Portage la Prairie.

C. Radio

Few researchers have used the local radio or television station as a source for complementary area delimitation of a center. One reason for this might be the limitation to the outreach of rural

⁶To calculate the degree of dependence, the number of mail box holders receiving the Portage weekly paper at a particular post office was divided by the total number of mail box holders at that post office. The former information was received from Mr. Stan Schram, Manager, Circulation, and the latter from the manager of the Portage la Prairie post office.

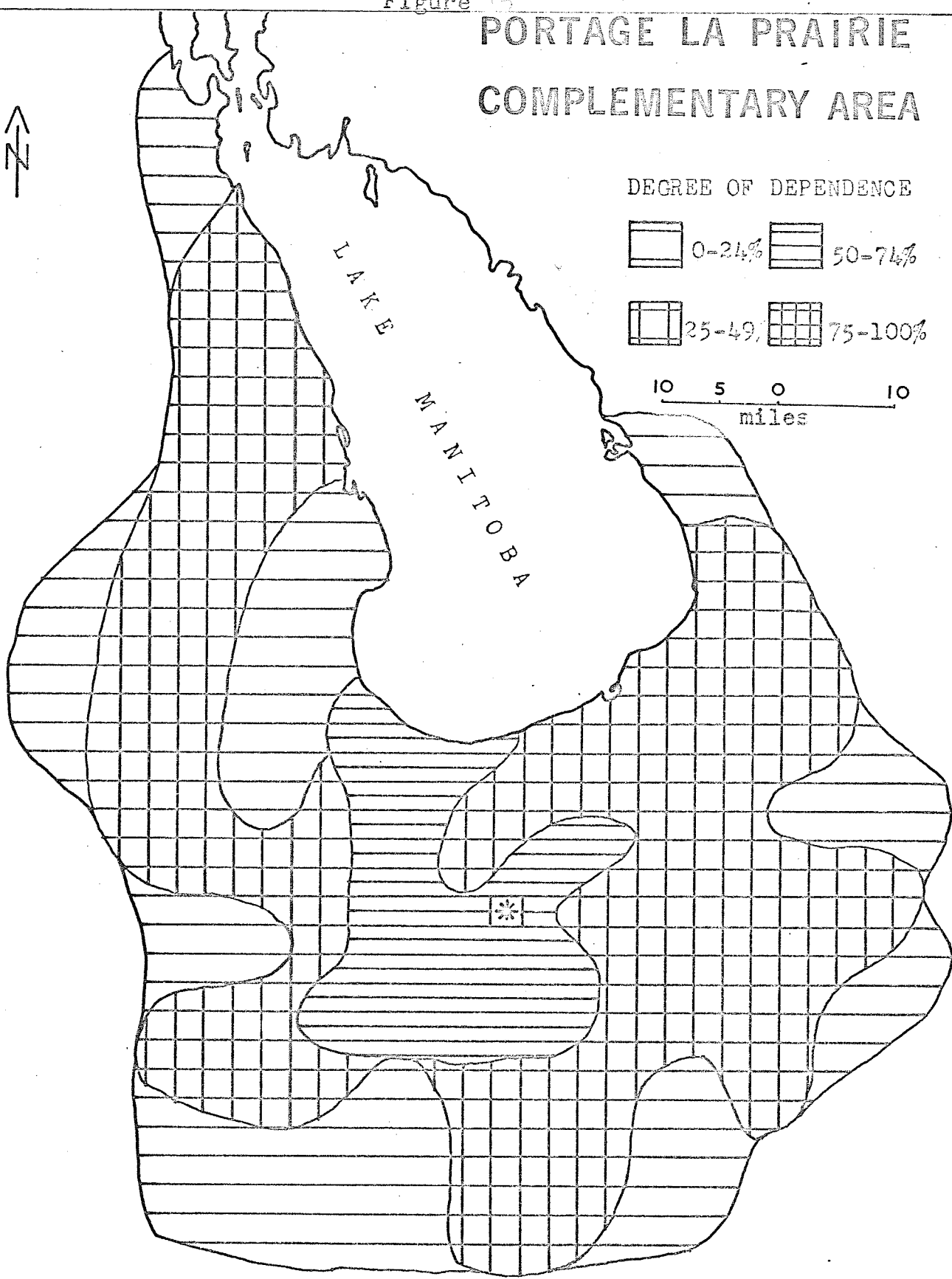
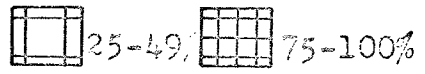
⁷The Portage Leader, Audit Bureau of Circulation Report, Chicago Illinois, 1965.

Figure 16

PORTAGE LA PRAIRIE COMPLEMENTARY AREA



DEGREE OF DEPENDENCE



Area dependent upon Portage for RADIO listening

institutions due to technical difficulties. But in populated areas radio stations are close enough that areas of outreach overlap. When this occurs, people have a choice and the radio station they listen to should be a good indicator in which centers their interest lie. This does not always hold true as people might listen to particular programmes which have nothing to do with the city from which they are broadcast.

In the Portage area radio stations from three⁸ centers other than Portage can be heard. This gives the people a choice of stations. In Figure 16 the degree to which people in the Portage area listen to the Portage la Prairie radio station can be seen. There is no area of complete dependence. The area of dominance occurs mainly south and west of Portage la Prairie. It is a relatively small area, having only 4,400 people, being the smallest of the 38 services enquired about in the questionnaire. In it there are seven auxiliary centers and two type A centers.

In contrast to the dominance area the area of some dependence is large. It encompasses the whole area in which questionnaires were sent out with the exception of the Cypress River and Sidney areas.⁹ The Cypress area is actually out of reach of the Portage station. Although only part of the Interlake region of Manitoba was questioned, it is an area in which many people listen to the Portage station because of the latter's country-music type of

⁸ These centers are Winnipeg, Dauphin and Altona. In the western section of the Portage area Brandon can also be heard.

⁹ A measure of performance in July, 1962, showed that Cypress River is outside the 0.25 mv^{3/4}m contour line of Portage la Prairie's station.

programmes.¹⁰ The area of some dependence actually stretches to Winnipeg. In a national contest, advertised over the Portage station, this was confirmed. The returns were divided into three groups, those from Portage, those from Winnipeg, and those from the country. The respective percentages were 32, 29, and 39.¹¹

Although a substantial part of the listening audience is outside of the Portage area, it contributes little to the financial income of the station, as 80 percent of the advertisements come from Portage la Prairie establishments and 20 percent from national advertisements.¹²

Part of the reason for the relative non-dominance of the radio station over the local listening area could be due to the recent establishment of the station (1956). Secondly, it caters mainly to country music listeners. Thirdly, it is a station that trains announcers, a fact which might affect the type of programmes offered. Also the close proximity of Winnipeg with its five stations will certainly attract listeners, as all of them can be received quite clearly.

For television viewing, the Portage area residents depend upon the two Winnipeg stations and one American, located across the border, 70 miles south of Winnipeg.

¹⁰This opinion was expressed by the business manager of CFRY. A check on requests for songs, as read over the station, substantiates this opinion.

¹¹Information gathered in an interview with the business manager at CFRY.

¹²Ibid.

CHAPTER IX

Portage la Prairie's Employment Complementary Area.

The area from which a city draws its workers, outside of itself, has been investigated previously by researchers. Dickinson¹ calls this area the "city settlement area". It usually stretches in a radius of 20 miles from the city along the highways and railroads, and thus is accessible to the city on a daily basis. Because of this proximity it "has intimate social and economic associations with the activities of the city".² It is this area that Eugene Van Cleif³ denoted with the term of "umland".

In Figure 17 we see the area from which Portage la Prairie draws part of its workers on a daily basis. The area of dominance is nowhere more than 20 air miles from Portage la Prairie. It thus agrees with Dickinson's 20 mile limit. The 'some dependence' area is somewhat larger, extending along Highway 1 west and Highway 4 northwest.

In the area of dominance of work there are 5,900 people. It is thus the eighth smallest area of the 38 services surveyed. In this area there are seven auxiliary centers and one type A center. This suggests that work is at least a level B service. In the area of some dependence there are 12 auxiliary centers, four type A centers, one type B center and one type C center.

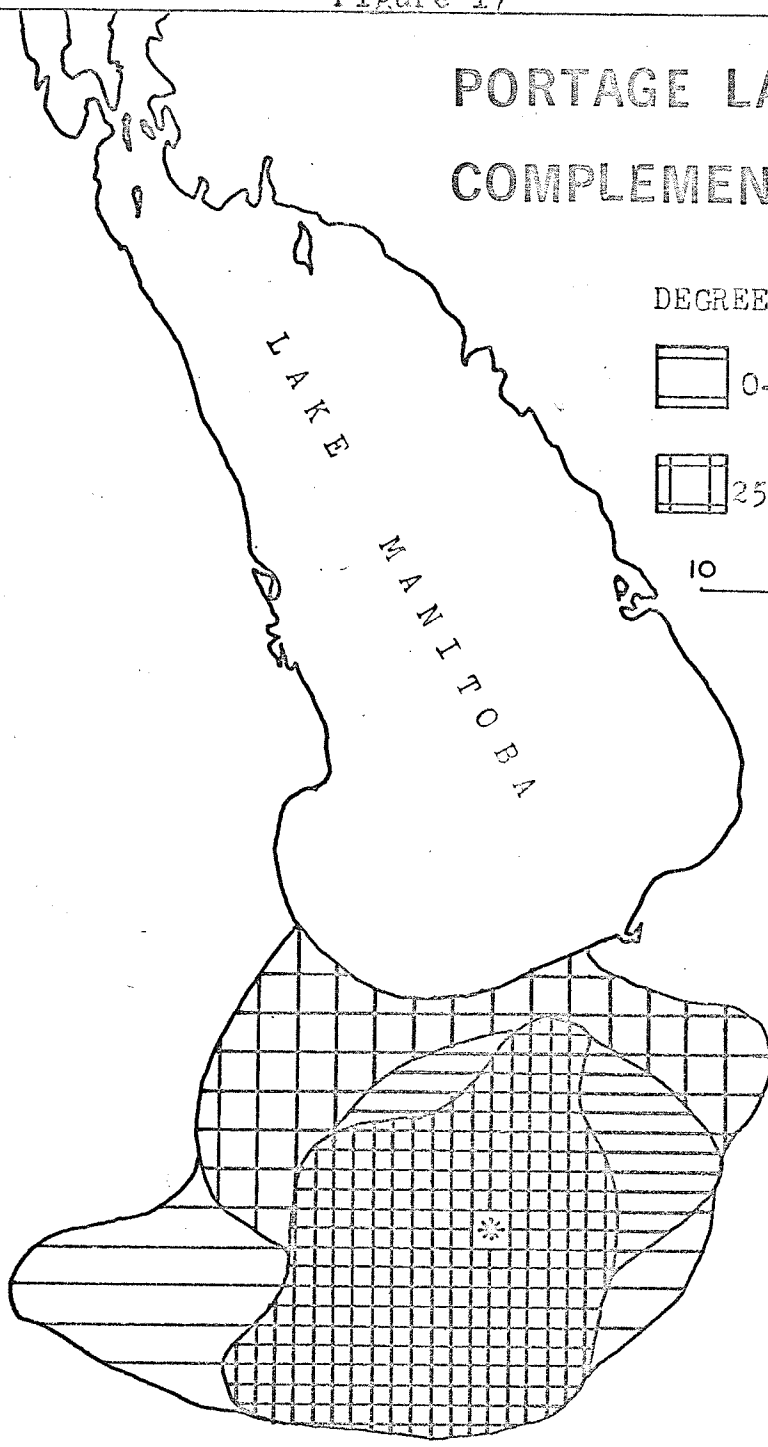
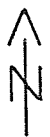
¹ Robert E. Dickinson, City and Region (London, Routledge and Kegan Paul Ltd., 1964), p.237.

² Ibid., p.238.

³ Eugene Van Cleif, "Hinterland and Umland", Geographical Review, Vol. XXXI, 1941, p.308.

Figure 17

PORTAGE LA PRAIRIE COMPLEMENTARY AREA



DEGREE OF DEPENDENCE

0-24% 50-74%

25-49% 75-100%

10 5 0 10
miles

Area dependent upon Portage for WORK

In the area outlined in Figure 17 the people commute to Portage on a daily basis. This does not mean that Portage does not receive workers from other areas. A substantial number of workers in the city come from such centers and areas as Oakville, MacGregor, Westbourne, Amaranth, and Alonsa.⁴ Usually people from these areas will stay in the city and return home for the weekends.

Portage also has some daily as well as some weekly commuters, from Winnipeg. In winter many farmers will come to the city for work. In summer the flow reverses when city youth move to the farms to help on vegetable and grain farms.

⁴Information collected in interviews with Mr. Frank Besplug, Manager of Portage la Prairie Canada Manpower Center.

CHAPTER X

Financial Complementary Area.

As our whole western society is based upon money, the delimitation of the service areas of institutions dealing exclusively in money should be quite significant. At present nearly every person has some dealings with these institutions, may they be banks, credit unions, trust companies or loan companies. It is because of this fact that the service area of the financial institutions of a central place could represent the tributary area of the center.

A. Banks and Credit Unions

In Portage la Prairie all four banks were visited and the managers interviewed. Also one trust company and two finance companies were called on. Five of their estimated service areas are shown in Figure 18. The service areas of the two loan companies could not be shown as they claimed the area of south central Manitoba up to the American border.

Of the financial institutions interviewed, the average dependence for clients on the rural area comes to 46 percent, while the financial dependence comes to 55 percent. The difference comes from the fact that the farmers have more money to deal with. Naturally, this is not true for all institutions, as some deal more with businesses in the city and others more with private people both in town and in the rural area.

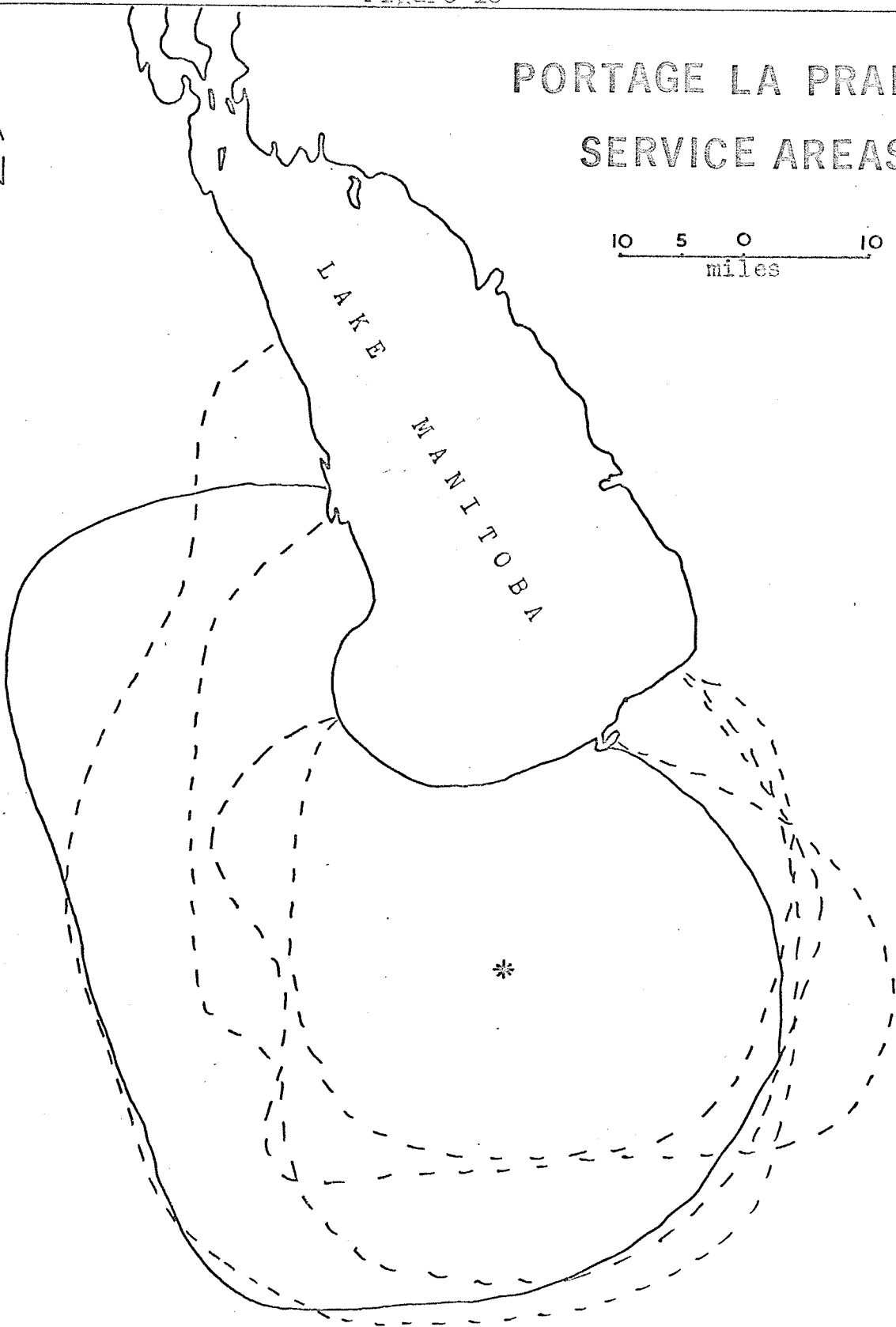
The actual dependence on Portage la Prairie's banks and credit union, as established by the questionnaire technique, is shown in Figure 19, page 169. With the exception of the Amaranth area, it is continuously leading away from Portage. The greatest

Figure 18

PORTAGE LA PRAIRIE SERVICE AREAS



10 5 0 10
miles

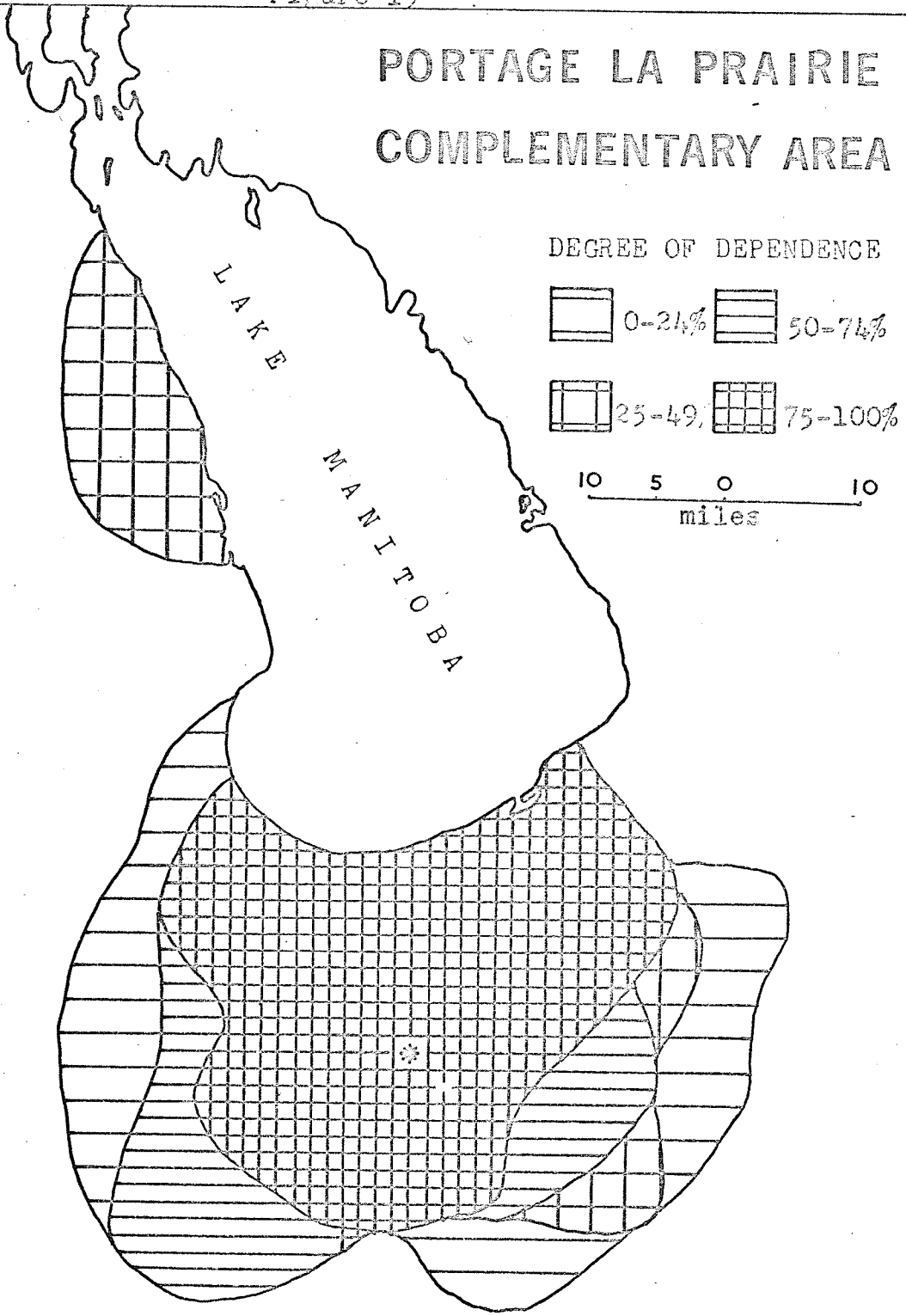
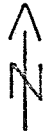


—— Trust Company

---- Banks

Figure 19

PORTAGE LA PRAIRIE COMPLEMENTARY AREA



Area dependent upon Portage for BANKS and/or CREDIT UNIONS

area of dominance occurs towards the northeast and southwest. In both directions there are no centers having credit unions or banks. In this area of dominance there are 10,225 people having 15 auxiliary centers, four type A centers, and two type B centers.

A comparison between Figure 18 and Figure 19 shows that in most cases the managers' delimited service areas corresponded well with the ones derived from the questionnaire. Only two institutions claimed an area substantially larger. This might be true in reality but did not come out from the questionnaire because of the relatively small sample of households reached.

B. Insurance

A central place service closely associated with the financial services offered by the center is insurance. Today every farmer as well as city dweller has some kind of insurance. This may be house, household, car, life, or accident insurance, and in the case of farmers, also crop insurance. In North America one can purchase some kind of insurance against accidents for nearly anything of value. It is because of this high demand for insurance that insurance agents were visited in Portage la Prairie and the question regarding purchase of house and car insurance put on the questionnaires.

In the field of insurance agents, Portage la Prairie is well represented. In most cases the insurance is sold in conjunction with real estate, both in the city and in the country. In addition to the real estate business, one insurance agent also acts as a broker. Changes in the stock and bond market are relayed to him daily by a long distance telephone call from Winnipeg. With the advance of telex this may change again.

In all, four insurance agents were visited. All had offices on the main street demonstrating the importance of close contact with the people. The number of clients served, who come from outside of the city, ranges from 25 to 75 percent with an average of 40 percent. But this 40 percent accounted for 50 percent of the business of these agents, as on the average farm people needed more insurance for houses, barns, equipment, and other items of value than city people. In Figure 20 we can see the service areas of each of the institutions. Except for one, the areas correspond quite well. The areas which all agents claimed as their service areas correspond extremely well to the insurance dominance area of Portage, as seen in Figure 21.

Portage la Prairie is the head office of the Portage la Prairie Mutual Insurance Company. It is a general insurance company having been established in Portage la Prairie in 1884. This establishment came into existence at the time when a group of people organized themselves for protection against fire accidents for their thatched-roof houses.¹ No insurance could be bought for such roofed houses or barns at that time. At present they serve the three Prairie Provinces and Ontario. Altogether there are 575 agents serving this area with branch offices in all major cities of the Prairies and in Windsor and St. Catherines, Ontario. The head office in Portage employs 65 people, making the company one of the larger employers in Portage la Prairie.

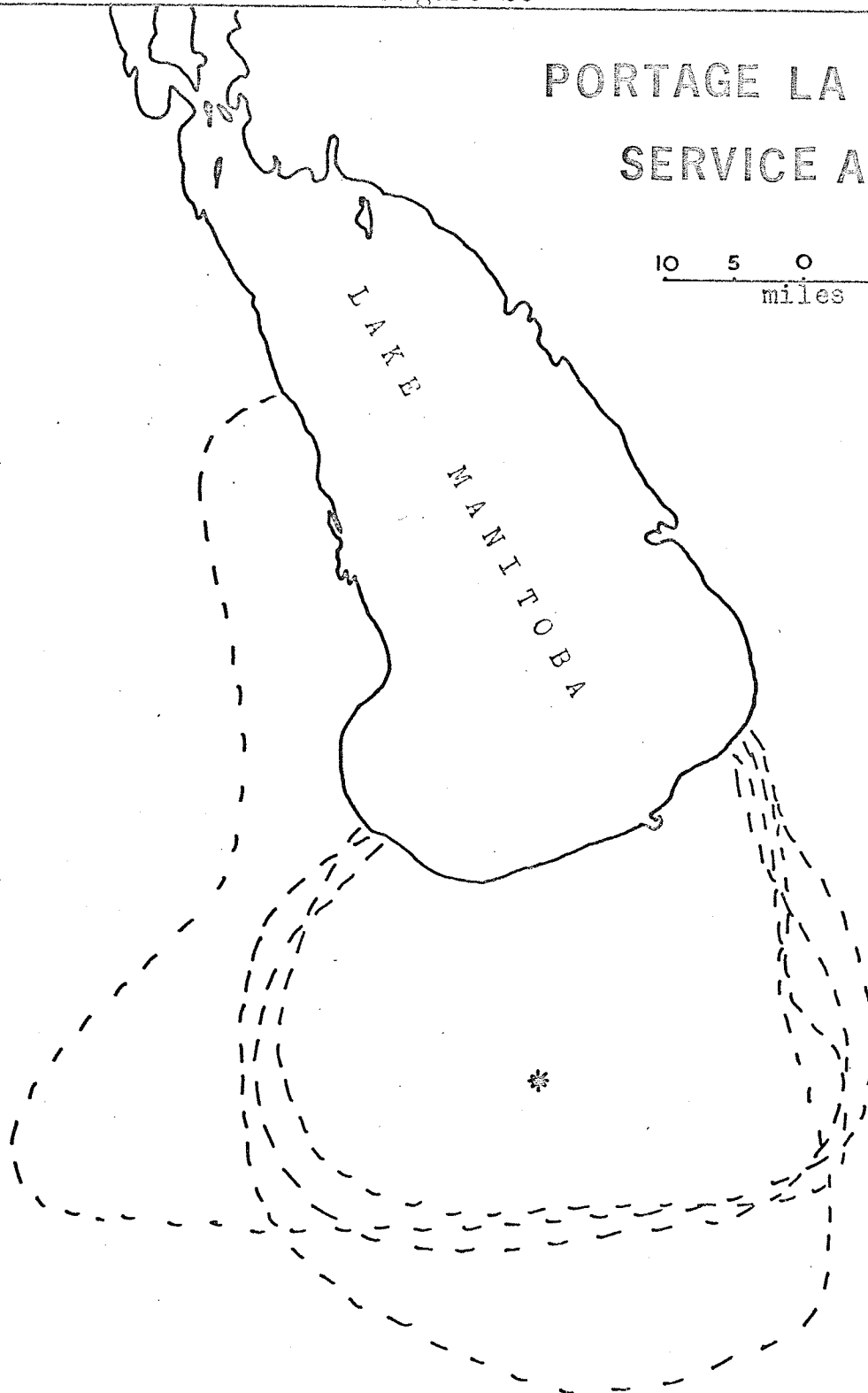
¹Mr. E. M. Brown, General Manager of Portage la Prairie Mutual Insurance Company. Also in 1961 a \$300,000 new office was opened in Portage la Prairie, firmly establishing the Headquarters in this city.

Figure 20

PORTAGE LA PRAIRIE SERVICE AREAS



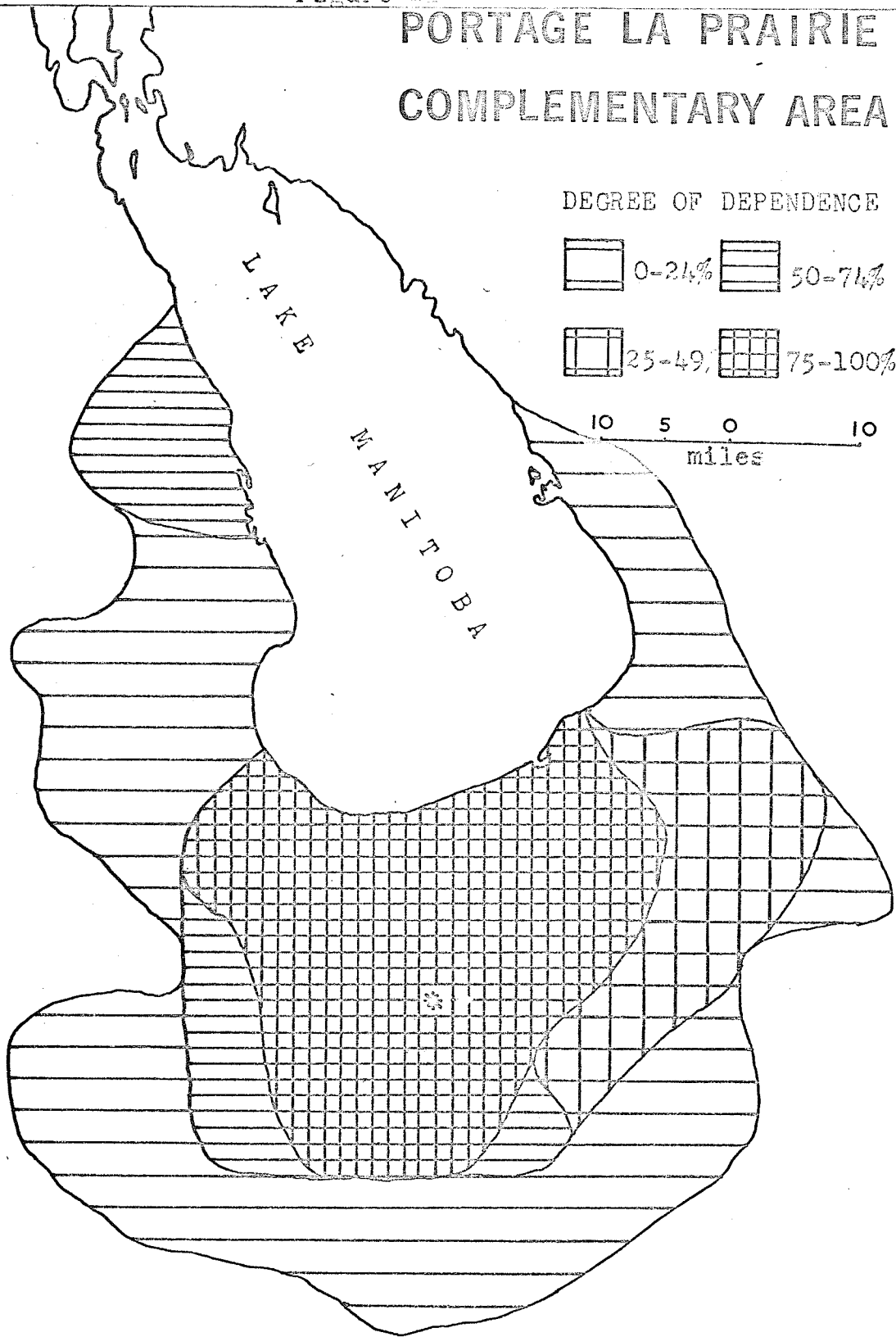
10 5 0 10
miles



----- Real Estate and Insurance Agents service areas

Figure 21

PORTAGE LA PRAIRIE COMPLEMENTARY AREA



Area dependent upon Portage for house and/or car INSURANCE AGENTS

As already mentioned, Figure 21 shows some dependence on Portage la Prairie on both sides of Lake Manitoba. Again, the Amaranth area shows heavy dependence on Portage, being separated from the latter by an area of only some dependence. The 50 percent or more area of dependence, covers the whole Municipality of Portage la Prairie with the exception of the southeast corner. In the west the umland also includes the adjacent townships in the Municipalities of North Norfolk and Westbourne.

In this umland there are 10,525 people. This is only slightly larger than the number living in the banks or credit unions area of dominance.

The number of auxiliary centers in this area of dominance is the same as the number in the bank and credit union area of dominance, namely 15. Secondly, there are four type A centers in this area of dominance, yet no other type center. In the whole hinterland the number of auxiliary centers is 24, the number of type A is ten, the number of type B four, and the number of type C three. This indicates that the insurance agency is a type B good, which is substantiated by the fact that type C centers such as Oakville, Langruth, and Plumas have insurance agents.

CHAPTER XI

Professional Services Complementary Area.

The services offered by professional people to the rural people are of great significance in this modern age. The services of a doctor, dentist, lawyer, etc. are needed just as much as the services of the economic institution such as retail outlets and farm product purchasing establishments. In all, seven different kinds of professional services were interviewed. These ranged from accounting firms to the service of a veterinarian, doctors, dentists, chiropractors, lawyers, and optometrists.

The degree of dependence of these professional people on the rural people naturally varied with the occupation. A lawyer visited, for instance, depends upon people from outside Portage la Prairie for 90 percent of his business. Because of the nature of his profession, some clients come to him from as far away as Vancouver. He also receives substantial business from the Morden-Winkler area of Manitoba, as well as Winnipeg.

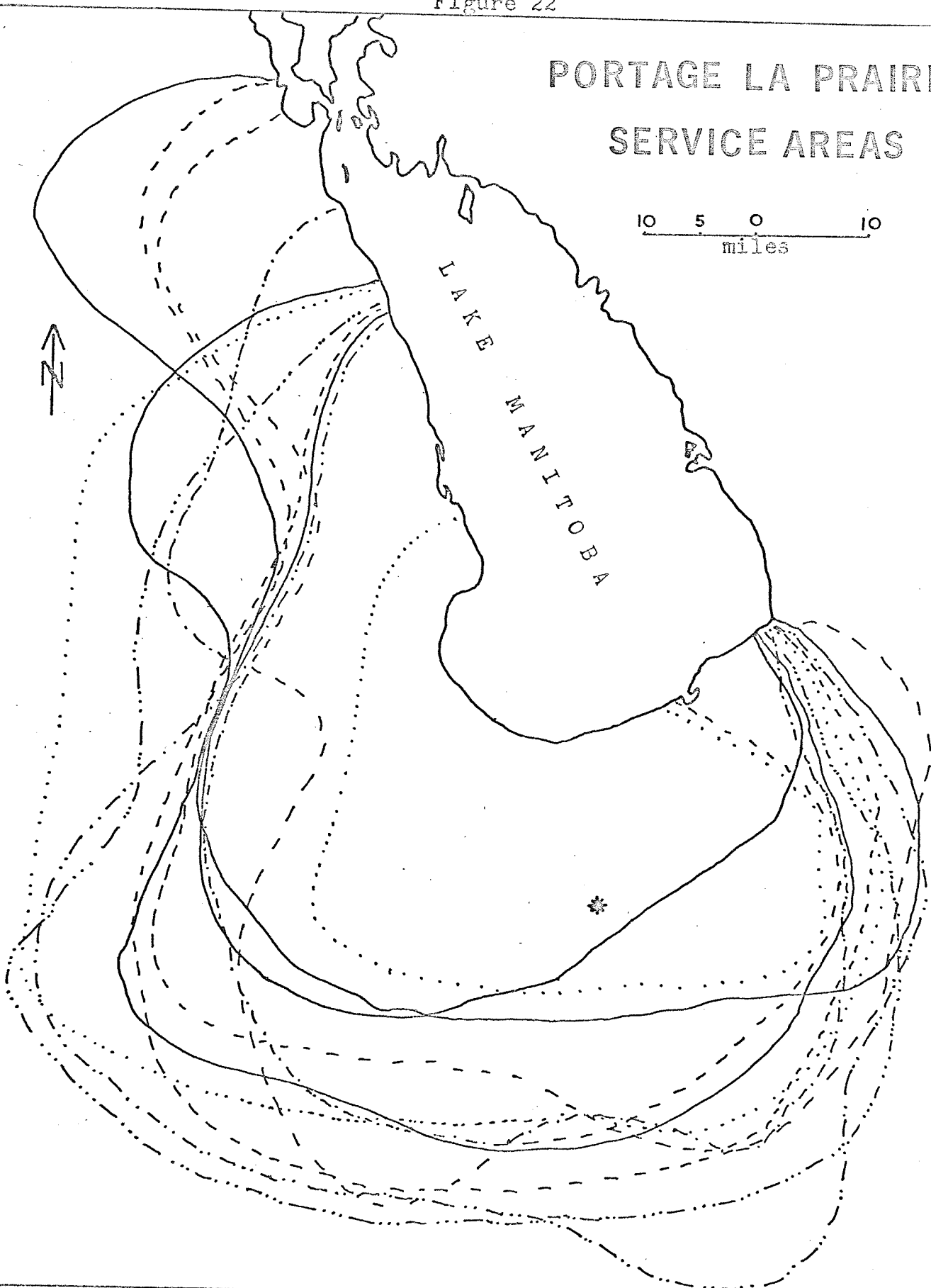
Again, because of the nature of the business, the Animal Hospital visited depended heavily upon the rural people for the business. From the city it receives only 25 percent of the business. Secondly, the rural area served is one of the greatest, as can be seen in Figure 22.

In contrast to the two professions just mentioned, the business of the two accounting firms interviewed is more city-orientated than rural. There is a difference in the amount of business being done with the clients from the rural area and the ones from the city. Rural people usually require an accountant only once a year. In contrast, the business establishment in the city requires the services of an accountant on a yearly basis.

Figure 22

PORTAGE LA PRAIRIE SERVICE AREAS

10 5 0 10
miles



- | | | |
|----------------|---------------------|----------------------|
| ——— Doctors | Accountants | — · — · Veterinarian |
| - - - Dentists | - · - · Optometrist | - · - · Lawyer |

Usually the number of record books to check through for an establishment is also greater than that of a farmer.

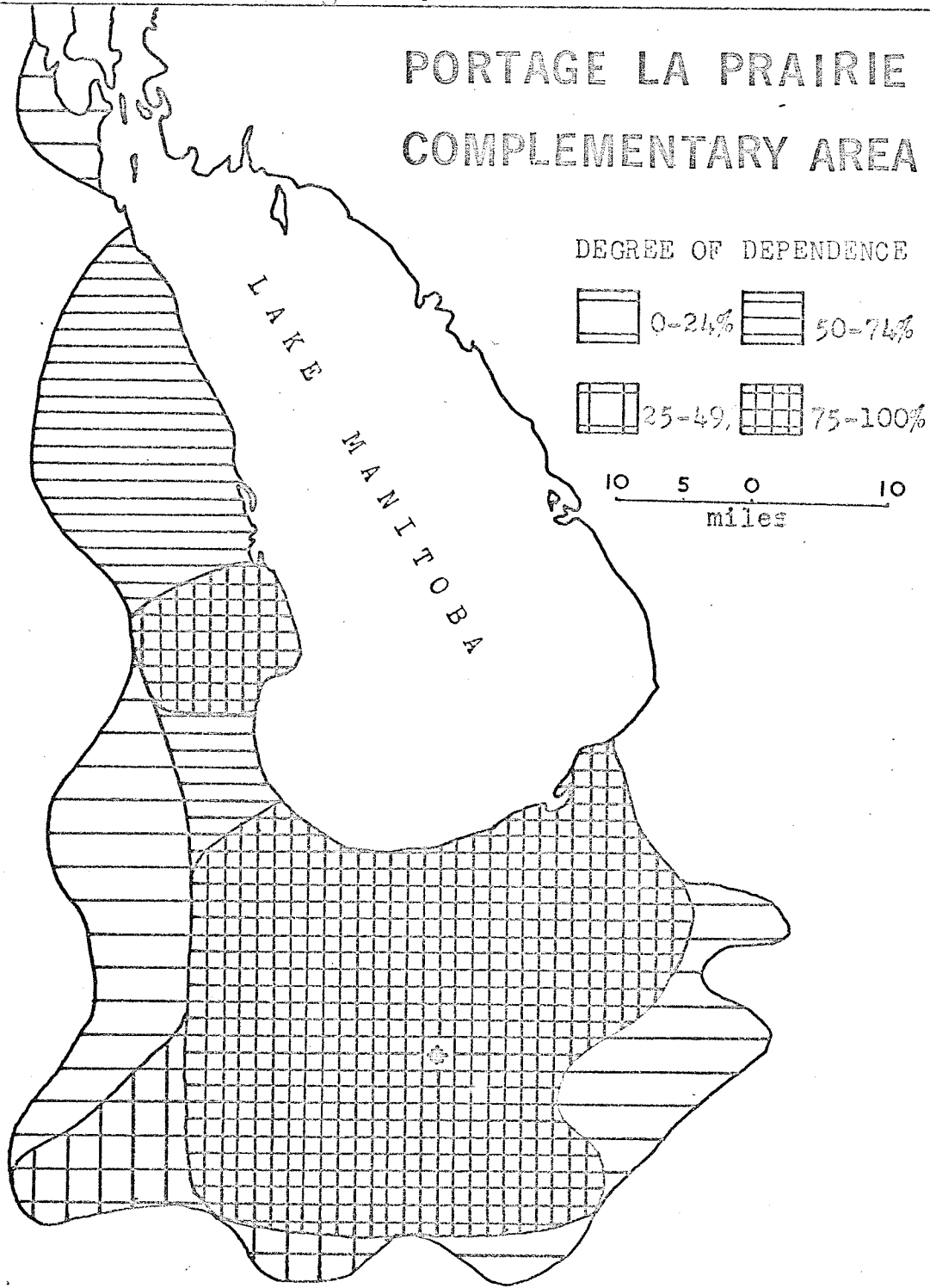
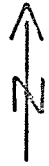
In the field of health services, the number of clients coming to Portage la Prairie is equal to the number visiting the dentist, doctor, optometrist, and chiropractor from the city. On the whole, the amount of business these professional people receive from the rural people does not vary in amount from the city clients. Only one dentist expressed the opinion that on a whole the rural people would wait longer to see a dentist than the city people, and consequently required more work.

The service areas of eleven professional people are shown in Figure 22, page 176. As can be seen, there is great variation even for people of the same profession. Despite this fact, the overall agreement as to the area served is surprisingly similar. The greatest degree of agreement occurs east of Portage, while the greatest amount of disagreement occurs in the northwest where some services extend only up to Langruth, yet others extended past Alonsa, some 30 miles north of Langruth.

The service areas as delimited by the professional people in Figure 22 can be compared to the different professional complementary areas based on the results of the rural questionnaire. The individual areas are shown in Figures 23 to 27. All five figures cover basically the same area, around Portage la Prairie and along the western shore of Lake Manitoba. This fact corresponds with the delimitation of the area serviced by the professional people in Portage; the difference occurs in the extent of the area serviced. In every case, except in the field of accounting, ~~is~~ the area delimited by the professional people ^{is} larger than the one delimited by the questionnaire.

Figure 23

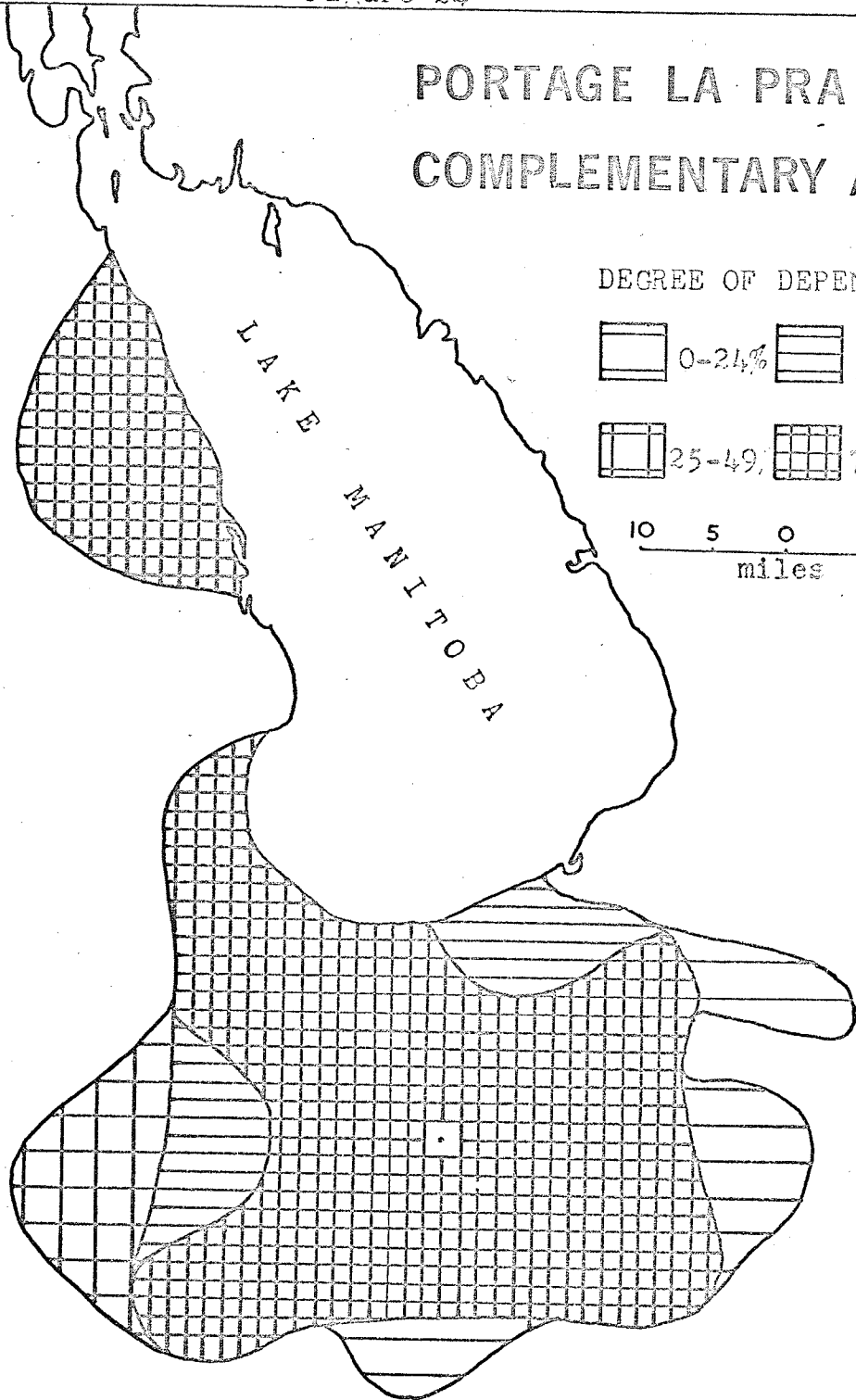
PORTAGE LA PRAIRIE COMPLEMENTARY AREA







Area dependent upon Portage for the services of DOCTORS

Figure 24

PORTAGE LA PRAIRIE COMPLEMENTARY AREA



DEGREE OF DEPENDENCE

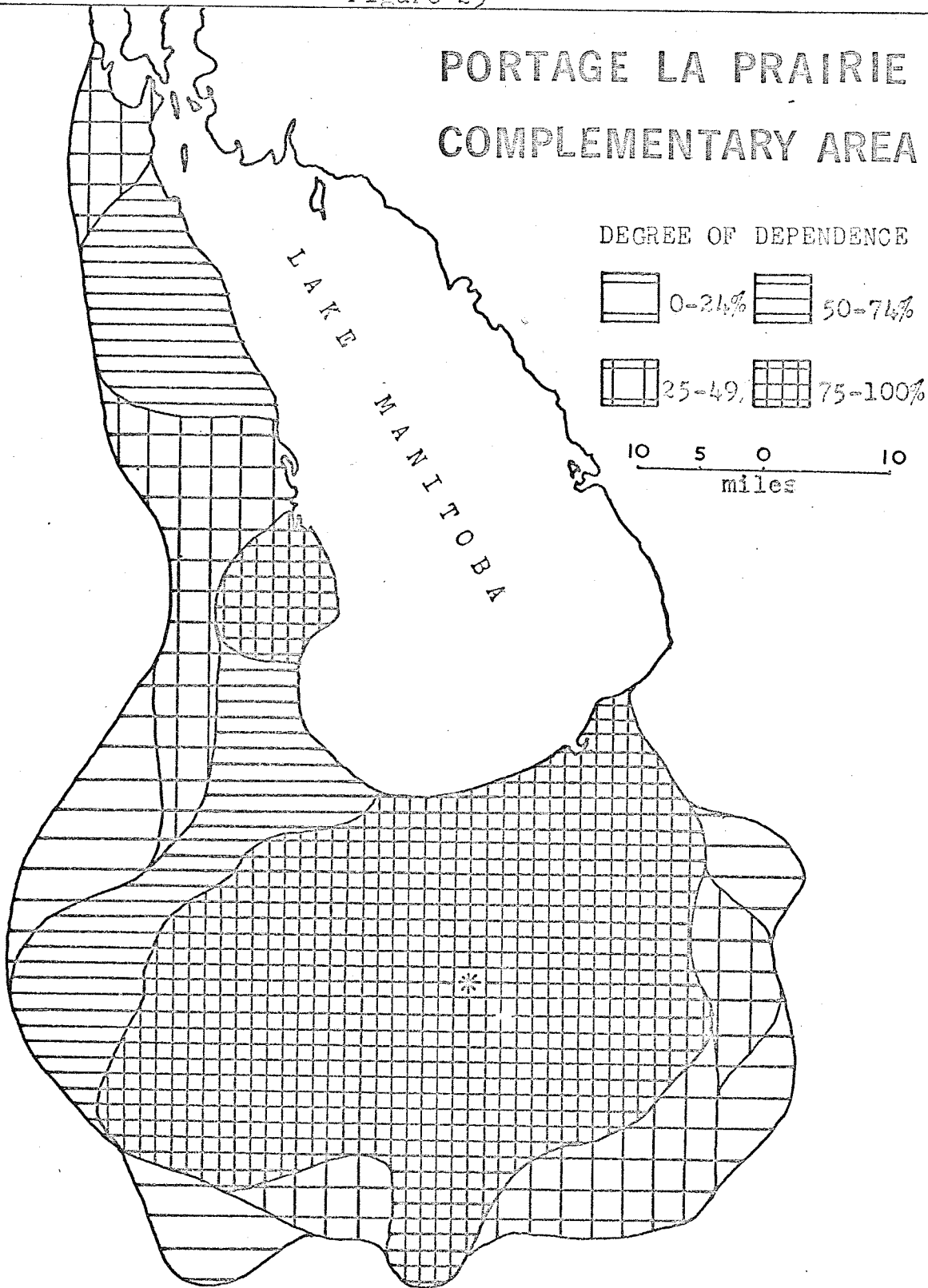
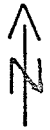
	0-24%		50-74%
	25-49%		75-100%

10 5 0 10
miles

Area dependent upon Portage for the services of ACCOUNTANTS

Figure 25

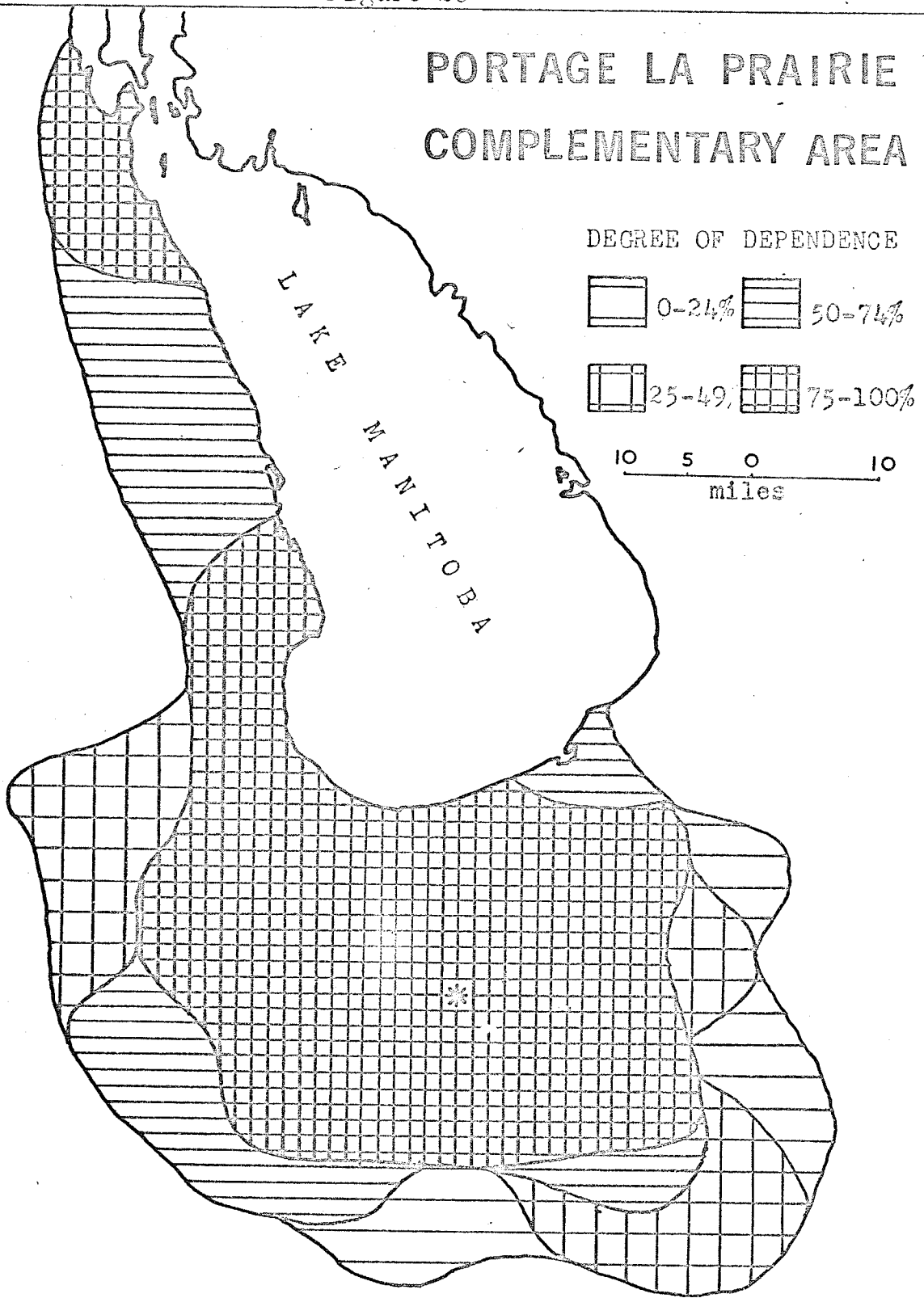
PORTAGE LA PRAIRIE COMPLEMENTARY AREA



Area dependent upon Portage for the services of DENTISTS

Figure 26

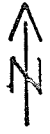
PORTAGE LA PRAIRIE COMPLEMENTARY AREA



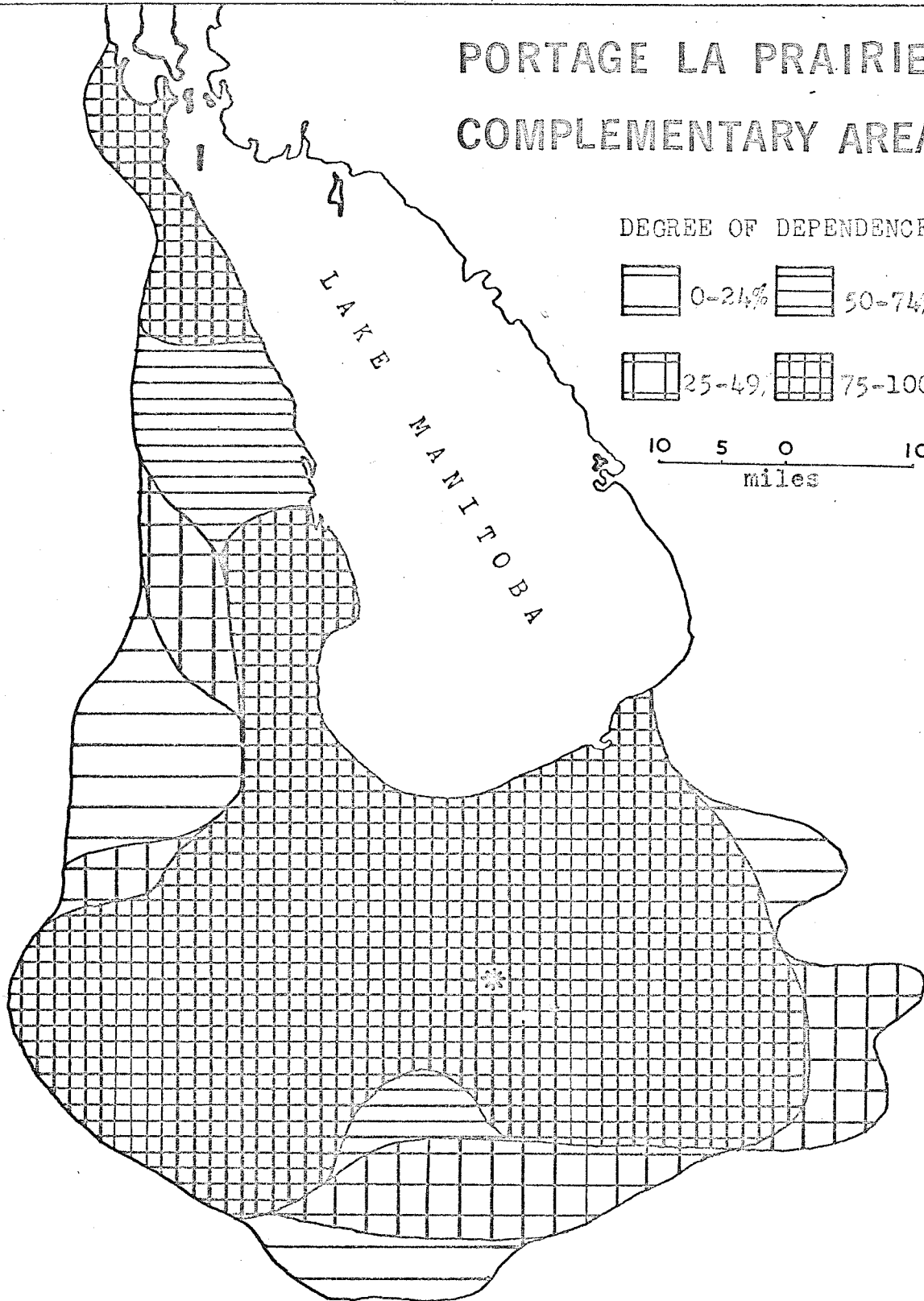
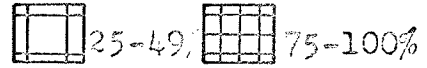
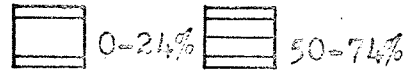
Area dependent upon Portage for the services of LAWYERS

Figure 27

PORTAGE LA PRAIRIE COMPLEMENTARY AREA



DEGREE OF DEPENDENCE



Area dependent upon Portage for the services of VETERINARIANS

The reasons for this discrepancy could be many. One reason could be that the professional people did not know from where their clients came. Secondly, they might have had a few clients from far away, causing them to take note and hence claiming these extensive areas as their servicing areas. Thirdly, it could be that the questionnaire sample missed these farther away clients, by the mere fact of being a sample. Also, since the questionnaire asked to which center the householders looked for the services asked most of the time it could be that the people in the areas claimed by the professional people did not go to Portage la Prairie for the service under consideration most of the time, but only some of the time. Another reason could be, and in some instances certainly was, that the people asked to delimit their service area looked upon it as a promotion and hence inflated their service areas.

Looking at the service areas represented in Figures 23 to 27, one can see a substantial difference in the extent of the areas served, in the degree of dependence and the slope of decreasing influence away from Portage.

In the Table on page 184 is shown the population in the five professional service areas investigated. As can be seen, the population in the areas of dominance ranges from 11,250 in that for a doctor to 18,450 people for the unland area of the veterinarian. The latter figure is the second largest from all 38 service areas of dominance. In fact, all five professional unland areas are within the 13 largest service areas. This fact indicates that the professional services are higher order functions, requiring large population thresholds before they can be offered at a central place.

Table 8

Professional Services Complementary Areas Data Showing
Population and Types of Centers

Professions		Doctor	Accountant	Dentist	Lawyer	Vet.
Population of Dominance Area		11,250	12,075	16,125	16,425	18,450
Area of Dominance (Umland)						
Centers:	Auxiliary	18	17	22	23	27
	Type A	4	5	7	6	7
	Type B	1	1	3	3	4
	Type C	-	-	2	1	1
Area of Some Dominance						
Centers:	Auxiliary	24	19	30	29	30
	Type A	6	6	9	9	9
	Type B	3	2	4	5	4
	Type C	2	1	3	3	3

Table 8 also gives the number and types of central places in the different professional service areas. Thus it can be seen that the umland area of the Portage la Prairie doctors has 18 auxiliary centers, four type A centers, and one type B auxiliary center. This is similar to the number of centers in the umland of the Portage la Prairie accountants. The only difference is that the latter has one less auxiliary center but one more type A center. Great similarity in the number of service centers of different levels exists also in the area of dominance of dentists, lawyers and veterinarians. The latter only differs slightly in that it has four more auxiliary centers.

From the above observations it can be seen that the services of doctors and accountants are C level services while the services of dentists, lawyers, and veterinarians are D level services. This is brought out in reality as no dentist, lawyer, or veterinarian is

located in such type C centers as St. Claude, Treherne, and MacGregor. Gladstone has a dentist but no veterinarian. In contrast, each of these centers has a doctor and in some cases even a hospital. In the field of accounting much is done by travelling chartered accountants from Winnipeg, as this service is usually required once a year. They may come to the smaller towns on a weekly or monthly basis, having a small local office. Such service is usually sufficient for the yearly or monthly business of the farm population and/or the small local business.

The similarity in the number of service centers in the areas of some dominance again shows the similarity in area serviced and the hierarchical level of the service. As can be seen, the number of centers of the different levels is very similar for the service areas of doctors and accountants from Portage. Great similarity also exists in the other three professional service areas of some dominance. Taken on an aggregate basis, the number of centers in the hinterland area of dentists, accountants, and veterinarians comes to 46. This agreement certainly supports the previous contention that these services are on similar levels of importance to the rural community and hence of similar hierarchical level.

Despite the similarity in population and number of lower level centers served, there is substantial difference in the areas served. This fact is demonstrated in the service areas of doctors and accountants (see Figures 23 and 24). The dominance service area of doctors is continuous along the western shores of Lake Manitoba as far as Silver Ridge. In contrast, the dominance service area of the accountant is discontinuous in the Langruth area. Also the accountants dominance service area stretches further

south-eastward than the doctors area. This probably is due to the fact that there is a doctor in Oakville, some 14 miles east of Portage. Again, a substantial difference between these two service areas exists to the southwestern and northeastern areas. The doctors service area extends substantially beyond Poplar Point in the northeast which the accountants complementary area does not. The opposite is true for the region southwest of Portage.

The service areas of the three other professional services do not differ as much between themselves as the first two. The veterinarianian area of dominance is the largest, covering greater areas to the west and to the east of Portage. In the north, along the western shore of Lake Manitoba and towards the south of Portage, all three service areas are very similar.

The areas under consideration in this section have a distinct difference from most other service areas in this chapter. Nearly every hinterland has a steep slope of decreasing influence in every direction. There usually is a definite break over a short distance in which people change from the use of one center to another. The professional service areas thus come closest to Christaller's theory of abrupt boundaries of dependence.

CHAPTER XII

Retail Trade Complementary Area.

Of the different service areas of a city, its retail trading area is probably the most important. In terms of economic power the retail business section of a city contributes most to the welfare of the city. The most valuable sites in a city are occupied by retail establishments. This usually means the most central position, the position where there is the highest concentration of day-time population, other than the working force. Because of the fact that the retail establishments depend upon people coming to them to purchase goods, they have to locate centrally in terms of their total customer travel distance. This applies both to people from the city as well as for people from outside the city.

A. The Rural and Urban Component of Retail Trade

The high degree of dependence of the merchants in Portage upon the rural people could be seen during the interviews with managers and owners of retail establishments. Most proprietors stated that the main reason which persuaded them to start their business in Portage was the rich agricultural areas surrounding the city. Crop failures are uncommon. Rain usually is adequate and frost comes later than in most areas of Manitoba because of the effect of Lake Manitoba. The soils in the Portage Plains are heavy, and well drained allowing farmers on the fields early in the year. As many retail employers stated, Portage is a farmer town and the well-being of the town depends upon the well-being of the farmers of this area.

The degree of dependence on the rural areas of the individual establishments naturally varied. The basic¹ component of the

¹The basic component is that part of the business that is derived from people living outside of the city itself.

individual store's business varied directly with the size of the store. Thus the larger grocery stores had more rural customers, and did more rural business (percentage-wise) than the smaller grocery store. In Portage the largest supermarket received 40 percent of its business from rural people while the smallest grocery store visited, had only 15 percent.

Also, the degree of dependence on the rural areas varied with the types of stores. The fuel distributors for instance, depended on an average for 64 percent of their business on rural clients. In contrast, pharmacies only did 32 percent of their business with the rural people, slightly less than the 34 percent of the department stores. In Table 9, page 189, the average dependence of the different business establishments is given.

It is interesting to note that in some instances the average amount of business is higher than the average number of clients. This is true for food stores, hardware stores, men's specialty stores, lumber yards and parts departments. In each case the rural person either purchases more than his city counterpart or else he does not do as much shopping.² Only in the case of fuel suppliers is the percentage of rural clients larger than the percentage of the rural business.

Of the establishments visited a great number did not know the breakdown into city and non-city clients and business. Only

²The idea that city people are better 'shoppers' was expressed by some owners and managers. They tend to look more before purchasing an item. Also the opinion was expressed that more people from Portage la Prairie go shopping in Winnipeg which seems to be not true for the people in the immediate area around Portage.

Table 9

Percentage of City and Non-City Clientele and Business For Different Retail Establishments

Establishments

	Food	Hardware	Furniture	Department	Men's store	Ladies' store	Dining	Pharmacy	Flowers	Lumber	Automobiles	Auto Parts	Fuel
Mean percentage of non-city clients	29	40	50	34	41	39	62	32	37	32	36	51	66
Mean percentage of non-city business	32	45	50	34	44	39	62	32	37	39	38	51	64

Source: Interviews with store managers and owners.

one retail establishment³ checked into their files to find out the actual breakdown. This lack of knowledge of clients was especially true for chain stores. As a knowledge of this kind is essential for proper advertisement,⁴ it was surprising to learn that so few knew their clientele.

³This establishment was Linden Florist. Mr. Linden checked through the receipts for the last few days before the interview and based his non-city client percentage on this. Although only one retail establishment did this, more checking of this kind was done by some financial institutions and professional offices.

⁴Thus if a store wanted to increase in sales in the rural areas it should advertise in the proper rural papers.

The non-city business can be further divided into two components: (i) rural farm and villages, and (ii) tourists and transient. The latter is important to restaurants,⁵ gift shops, gas stations and to some degree to the other retail establishments. For shopping as such by tourists, Portage is too small and secondly Winnipeg is too close. Many tourists only drive through Portage on their way to the big metropolitan center or else are just on the road away from the metropolis, and hence will not stop. One fact which should induce shopping in Portage la Prairie is the fact that all Trans-Canada traffic goes through Portage. Traffic has to slow down to 30 miles per hour in the city and hence allows window shopping from the cars. In case the tourist wishes to stop, there is parking space available. Naturally all this highway traffic makes Portage la Prairie's main street busy and noisy all the time. Crossing the main street, whether on foot or by car, can become difficult as well as dangerous.

In order to remove this noise and crossing hazard, the Provincial Government is building a by-pass around Portage la Prairie, which should have a tremendous impact on the city. It will allow traffic to by-pass Portage at high speeds. The possible economic effect of this change upon the city was surmised by most establishments. Most employers were glad of the change and thought

⁵Of the two restaurants visited this transient business varied between summer and winter. In summer it accounted for one-third of the business and hence is an important part of the business. Also, Mr. Linden of Linden Florist stated that tourists and transients supplied him with 5 percent of his business, the little extra or the 'gravy' in his business.

that the reduction in business⁶ would be minimal. Only a few expressed the opinion that if other establishments thought there would be no change they were only kidding themselves.

As already mentioned, much attention has been given to the retail trading area in the past. Since an understanding and knowledge of a city's retail area contributes to the well-being of the establishments, people have investigated the area of dependence in the past not for its own sake so much as for the sake of being able to serve the area better and hence acquire more business from it. Christaller based most of his theory regarding hierarchy of centers and hinterlands on the market principle. From the firms visited only one, the T. Eaton Company, had made its own study of the retail trading area of Portage.⁷ Cadham⁸ in 1948 studied the market area of Portage la Prairie. He was able to establish the main market area as well as the greater market area. The former consisted of the rural Municipality of Portage la Prairie with the exception of the southeastern township. Other areas included were Westbourne in the northwest and the Edwin, Rossendale and Lavenham areas in the southeast. The greater or more extensive area included

⁶ Alderman Linden in the interview ^{at} of his florist shop expressed the opinion that the city would lose about two million dollars worth of business at the 1966 level of the dollar. This, out of a total of about 13 million, is a substantial part.

⁷ This study was undertaken in 1961 by an T. Eaton research employee. The area he delimited as the retail trading area of the T. Eaton store in Portage la Prairie extended from north of Langruth to just west of Gladstone and Austin, south of Rossendale and Layland and east of Oakville, Poplar Point, and St. Ambroise.

⁸ T. O. Cadham, "A Marketing Study of Portage la Prairie", Bachelor of Commerce Thesis, University of Manitoba, April, 1948.

also the Amaranth, Langruth, MacGregor and Austin areas in the west, and the Oakville, Poplar Point areas in the east. In the south the main marketing area corresponded with the greater market area. The same held true in the north, where Lake Manitoba formed the boundary.

The configuration of the hinterlands as predicted by Christaller would be hexagonal in shape.⁹ Although so far few similarities in shape between theoretical and actual hinterlands have been found, this might change once geographers are able to introduce variables into Christaller's rigid hexagonal areas.

B. Trade Area of Portage la Prairie Based on Reilly's Law of Retail Gravitation.

A method of delimiting the retail hinterland of a service center which has attracted attention, has been put forward by William J. Reilly.¹⁰ Reilly claims that a city attracts retail trade from its surrounding area in direct proportion to its population and in inverse proportion to the square of the distance from the city. Carrying this principle further, Strohkard and Phelps¹¹ showed that the break in dominance of retail trade between any two cities can be determined from the following Formula:

$$\text{distance from city A to B} = \frac{\text{miles between A and B}}{1 + \frac{\text{Pop. of city B}}{\text{Pop. of city A}}}$$

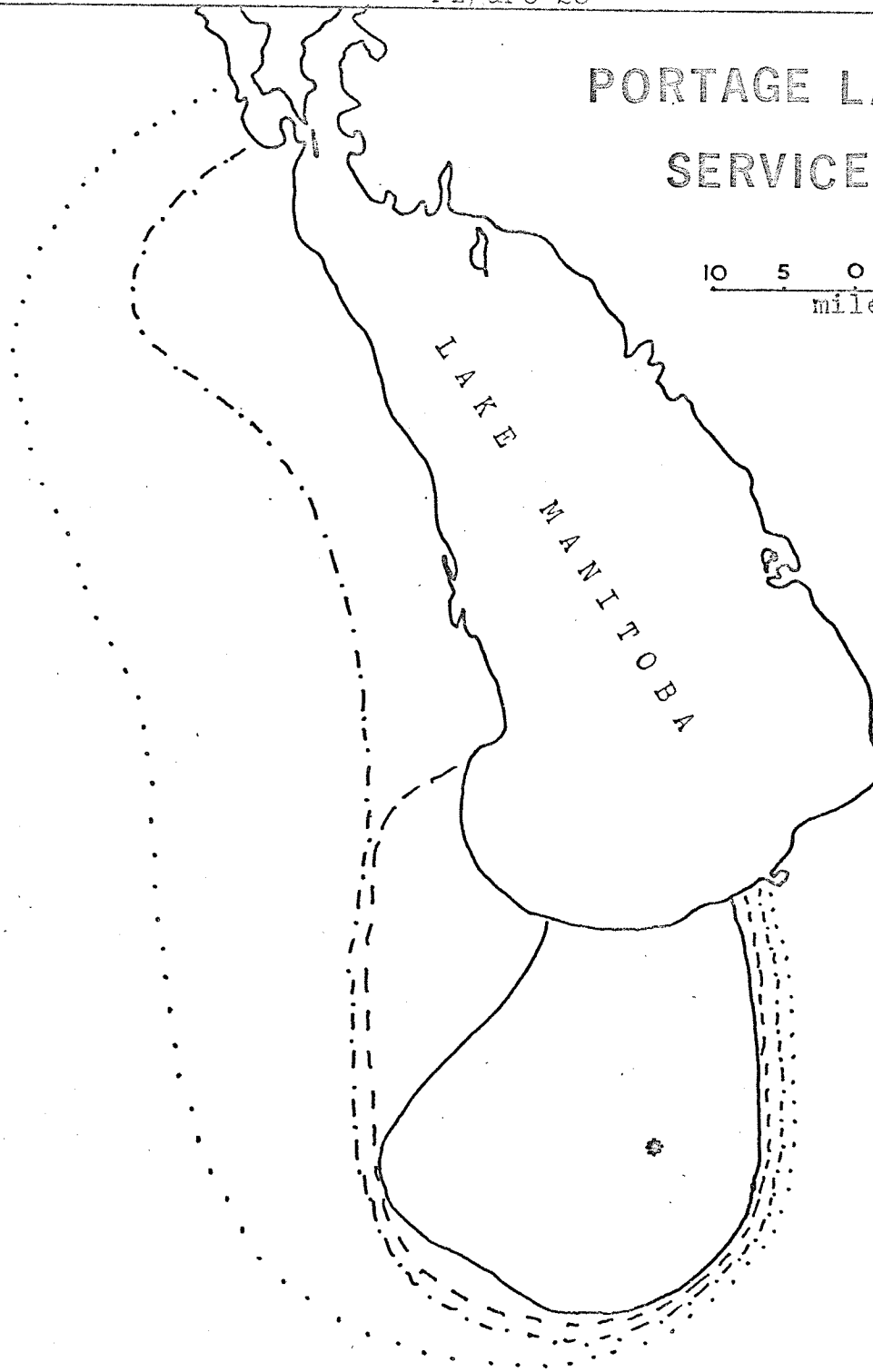
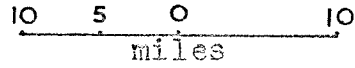
⁹For a pictorial view see page 193 of this chapter.

¹⁰William J. Reilly, The Law of Retail Gravitation, Pillsbury Publishers, Inc., New York, 1931, Second Edition, 1953.

¹¹Frank Strohkard and Katherine Phelps, "The Mechanics of Constructing a Market Area Map", Journal of Marketing, Vol. XII, (1948), pp. 493-496.

Figure 28

PORTAGE LA PRAIRIE SERVICE AREAS



Theoretical Trade Areas According to Reilly's Law of Retail Gravitation

———— 'A' Level Goods

- · - · - 'C' Level Goods

- - - - 'B' Level Goods

· · · · · 'D' Level Goods

The hinterland of Portage la Prairie according to this formula is seen in Figure 28, page 193. Since the different retail establishments sell goods of different hierarchical levels, four levels of hinterland were calculated, based on the fact that Portage is at least a fourth level center. To determine the D level type of good hinterland, competition for such centers as Winnipeg, Brandon, Dauphin, and Neepawa were considered. All four urban centers were considered to be at least class D centers. For the determination of the C level good hinterland the centers of St. Claude, Treherne, MacGregor, Gladstone, McCreary, and Winnipeg were used. Only McCreary has not been discussed in Part I, as it is located outside the Portage la Prairie area. Its size of 600 people and strategic location would indicate the same level as the other centers mentioned, with the exception of Winnipeg. Winnipeg was included because there is no C level center between Winnipeg and Portage.

As can be seen, the B level hinterland is somewhat larger than the A level, the smallest. In the determination of the B level hinterland such B level centers as Langruth, Gladstone, MacGregor, Oakville, and Winnipeg were considered. Most centers mentioned also have higher level status but because of their strategic location, can be considered as B level centers as well.

The smallest hinterland is the A level area of dominance. At this level of competition, Portage competes against such small centers as Westbourne, Rossendale, Newton, and Poplar Point.

In all cases it can be seen that the general shift of influence is to the west and northwest. The absence of any large center in this direction allows Portage la Prairie to extend its

influence substantially in this direction. In the south and east Winnipeg's theoretical influence is far greater than Portage's, causing the northwesterly skewed hinterland.

The actual retail hinterlands of Portage la Prairie as seen in Figures 29 to 53 can now be examined in the light of Christaller's hexagonal trade areas and in the light of Reilly's retail law of gravitation.

The importance of the retail trade area of a center was recognized in this study and hence half of the enquiries on the questionnaire were directed towards the establishment of this area. Also, most interviews considered in the city were with the proprietors of retail establishments. The results of both methods are again compared and evaluated in the effort to establish the retail trading area of Portage la Prairie.

To what extent the population and types of service centers vary from the different retail trade umlands can be seen in Table 10, page 196. The population in the areas of dominance ranges from 5,275 for the building material umland to 18,595 for ^{the} service area of better ladies' clothes.¹² The former refers to the materials used in the construction of buildings, fences, and related products. Better ladies' clothes on the other hand is somewhat more interpretive. What might be considered as a good quality dress to one person does not mean the same to a different person. Yet both will try to shop at a place that can satisfy their best clothes requirements. This 'better ladies' clothes hinterland, as can be seen from the Table, has the largest population.

¹²This term refers to the clothes that ladies wear on important occasions.

Table 10

Data of Retail Trade Complementary Areas Showing Population and Types of centers

	Dominance Areas					Total Hinterland			
	Pop.	Aux.	Type A	Type B	Type C	Aux.	Type A	Type B	Type C
Building Material	5,275	8	2	-	-	18	7	4	1
Seed, Fertilizer	5,300	7	1	-	-	17	6	2	1
Buying a Car	6,875	13	3	-	-	25	7	5	2
Servicing a Car	7,550	11	2	-	-	21	6	3	2
Fuel	7,750	13	2	-	-	17	4	2	1
Perishable Food	7,850	12	2	-	-	24	7	4	2
Non-Perishable Food	7,875	11	3	1	-	20	7	3	2
Repair Farm Impl.	8,175	12	3	1	-	20	5	3	2
Buying Farm Equip.	9,650	13	3	1	-	19	7	3	2
Work Shoes	9,775	13	4	1	-	24	9	5	4
Household Appliance	9,975	14	4	1	-	28	9	4	3
Furniture	10,325	15	3	1	-	31	7	4	3
Men's Work Clothes	11,775	17	5	1	-	28	10	4	2
Medical Supplies	11,775	21	5	1	-	25	8	4	2
Children's Wear	13,050	17	5	1	-	26	11	4	4
Ordinary Lad. Clothes	13,625	19	5	1	-	30	11	6	4
Better shoes	16,375	21	5	3	1	35	10	5	4
Better Men's Clothes	17,450	20	5	3	1	32	13	4	3
Better Lad. Clothes	18,595	21	5	3	2	34	12	5	3

An examination of the number and types of centers in the areas of retail trade dominance reveals the fact that there are at least three levels of retail trade establishments. The first six retail trade hinterlands listed have no type B centers in their areas of dominance, and thus qualify as level B goods. The next ten retail trade areas listed in Table 10, all have one type B center located in their areas of dominance. This implies that these goods are of C level. The reason why each area of dominance only has one level B center is due to the fact that Winnipeg, being quite close to Portage, extends its influence over B centers which should belong to Portage. The last three retail trade areas mentioned in Table 10 are of type D, as each one has at least one type C center in its area of dominance.

An examination of the different types of centers in the areas of some influence¹³ of the retail trade areas mentioned in Table 10 reveals part of the shopping power¹⁴ of the goods mentioned. Again, the higher level goods attract customers from more higher level centers than lower level goods. Thus better shoes, better men's and ladies' clothing areas have more than 50 centers in their areas of some dominance. All three are D level goods. Only one B level good, ordinary ladies clothes, has also more than 50 centers in its complementary area. This might be due to the nature of the good, as it is well known that ladies 'shop around' for their clothes. The next highest level good, children's wear, has only 45 centers in its hinterland. The area with the smallest number of centers in its complementary area is fuel, having only 24 centers.¹⁵

C. Complementary Areas of Lower Order Retail Goods

A closer look at the retail trade areas of Portage la Prairie as delimited in figures 29 to 53 allows for some interesting observations. Figure 29 shows the retail trading area of Portage la

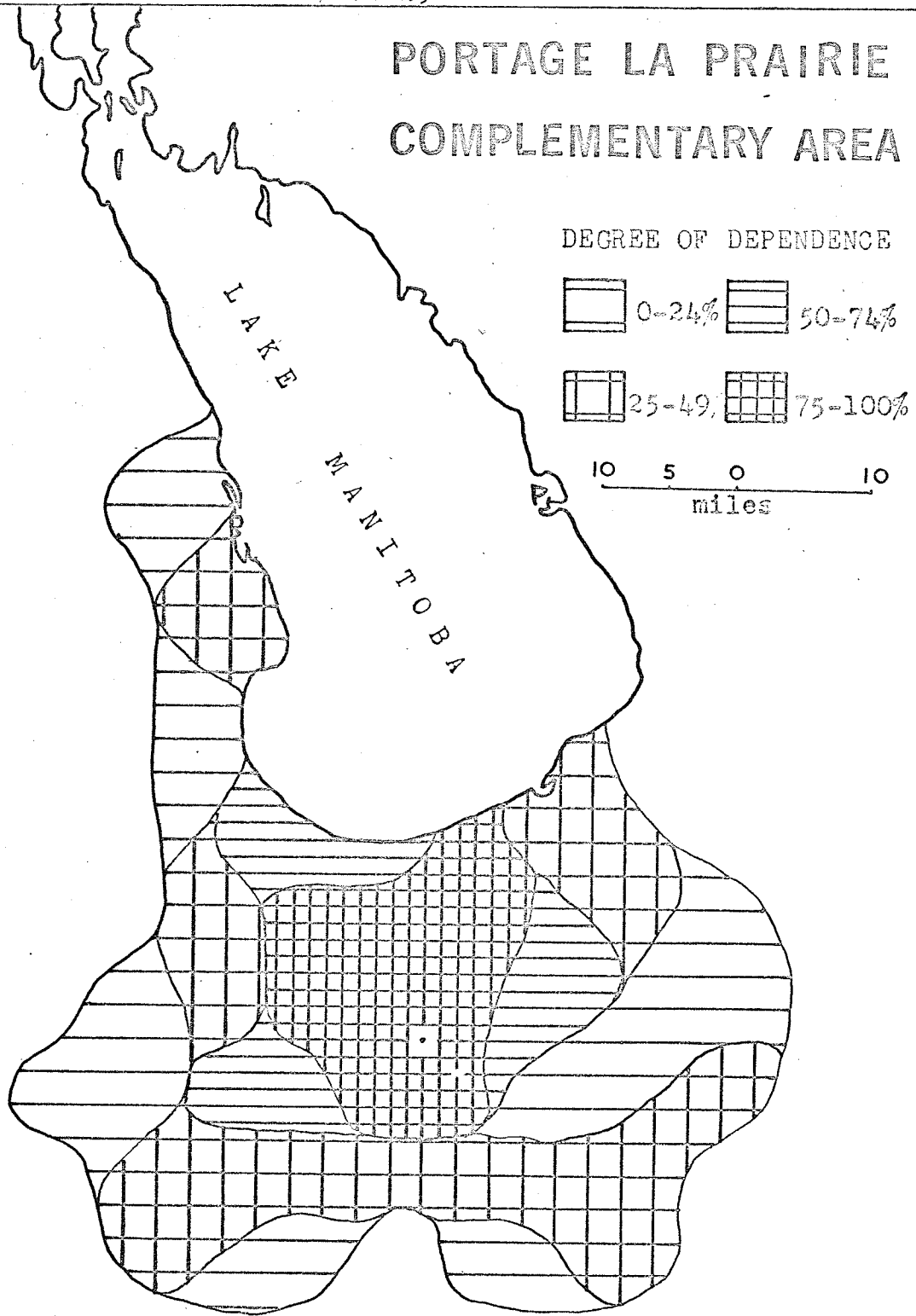
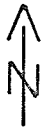
¹³This area includes also the area of complete dominance and dominance (i.e., it consists of all centers in the hinterland area).

¹⁴What is meant here is the ability of a good to attract people from far away.

¹⁵The main reason being that fuel oil distributors receive commission on the number of gallons of fuel they sell. Since all expenses of delivering the fuel to the farmers is borne by the fuel dealer, there is a limit to the distance they can deliver fuel before the expense for gas, truck-wear, and wages is higher than the intake. It is because of this fact that no fuel dealer interviewed, was pushing areal expansion of their service areas but rather was concentrating on increasing his service in the area he already serves.

Figure 29

PORTAGE LA PRAIRIE COMPLEMENTARY AREA



Area dependent upon Portage for BUILDING MATERIALS

Prairie for building material. As can be seen the decrease of influence is quite smooth. No area of dominance changes over to an area of no dependence with the exception in the Lake Manitoba direction. Again, the extension along the western shores of Lake Manitoba shows the prominence of Portage in that area. A comparison to Figure 28, page 193, reveals that Portage's influence extends further eastward than the theoretical hinterlands as determined by Reilly's law of retail gravitation. It is not extended as far north as a type B good should. Also, in the south the area of dominance is not as great as the theoretical area calculated according to Reilly's law.

The seed fertilizer/chemical trade area is quite unique. (Figure 30, page 200). The area of dominance is nearly circular about Portage. Its area of zero to 50 percent dominance is relatively small, distributed in a circular area about the area of dominance. The relative compactness of the area can be explained by the fact that most fertilizers and chemicals are bought from fuel distributors.¹⁶ It is also of note that the least extent occurs south of Portage, an area from which no good roads lead to Portage.

An important part to the economy of a city today is the automotive industry, whether this be manufacturing or retailing. In Portage it is only the latter. Every major North American auto manufacturer¹⁷ has at least one dealer in Portage. All four main

¹⁶Why the fuel distribution area of Portage la Prairie is relatively small, see Footnote 15, page 197.

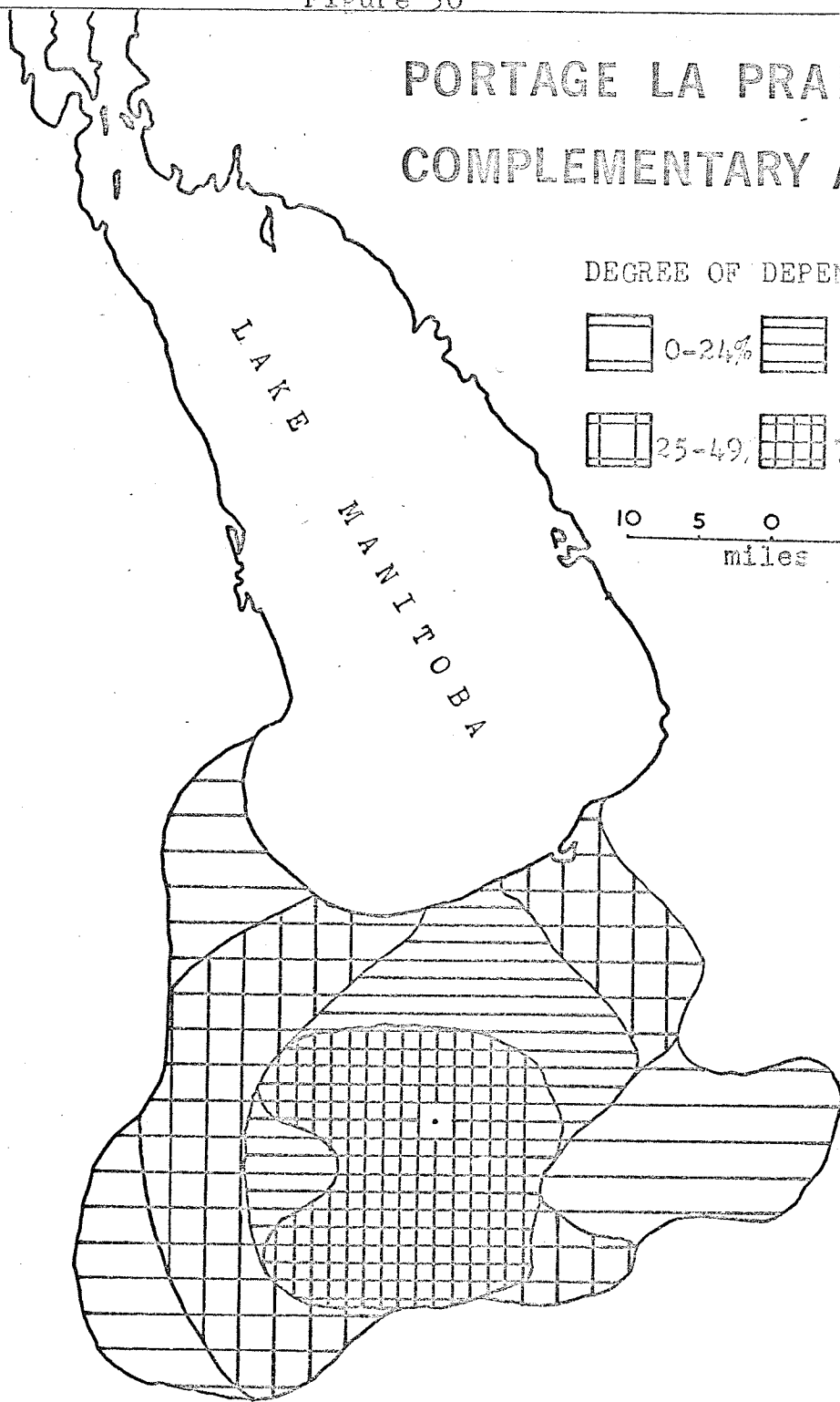
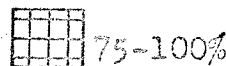
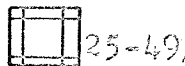
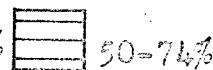
¹⁷The manufacturers are Ford, General Motors, Chrysler and American Motors. Portage also has an exclusive car import dealing in European cars.

Figure 30

PORTAGE LA PRAIRIE COMPLEMENTARY AREA



DEGREE OF DEPENDENCE



Area dependent upon Portage for SEEDS, FERTILIZERS and CHEMICALS

Figure 31

PORTAGE LA PRAIRIE SERVICE AREAS

10 5 0 10
miles



LAKE
MANITOBA

—— Automobile Dealers

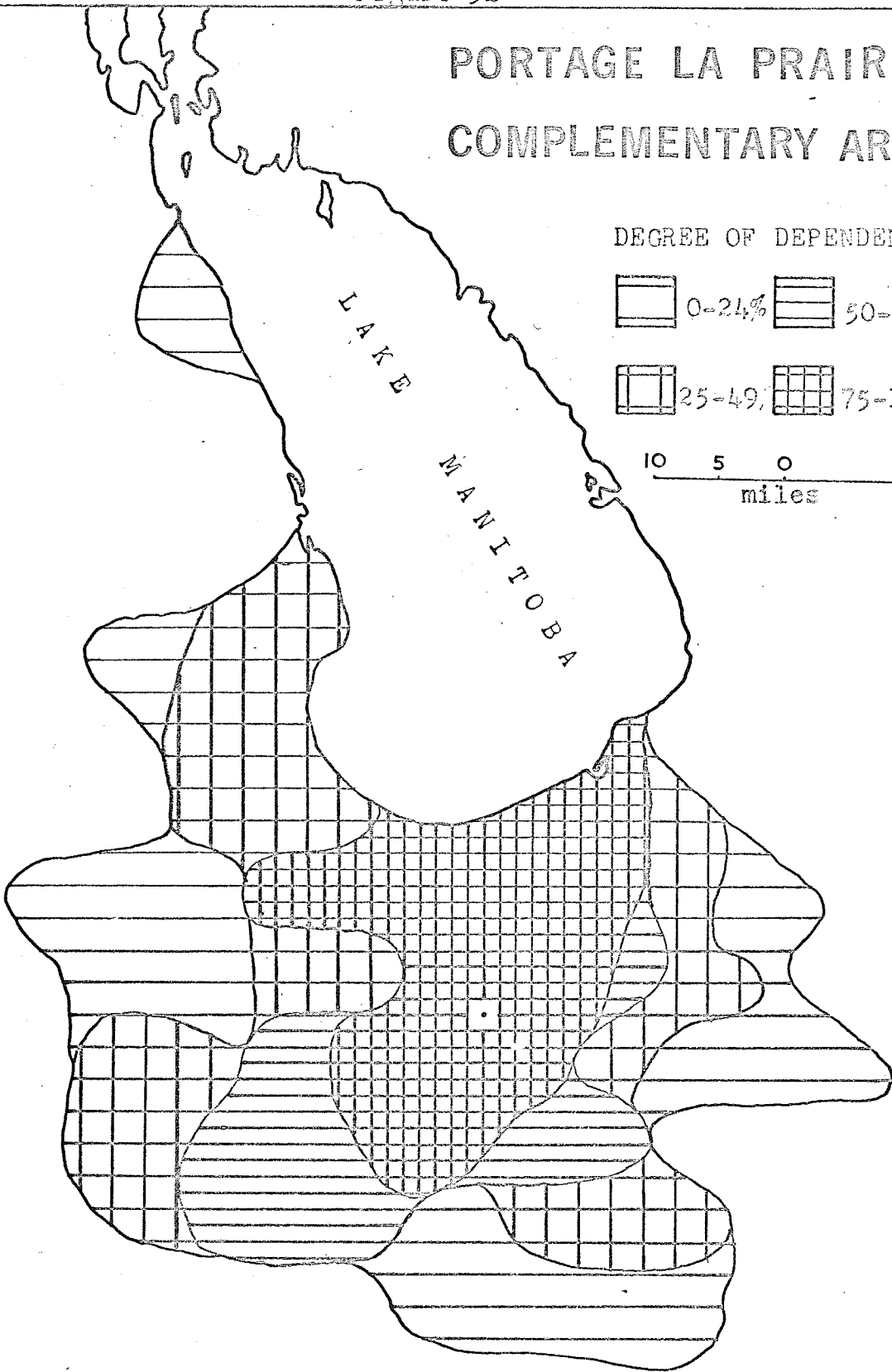
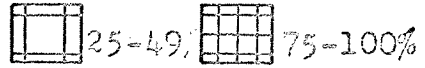
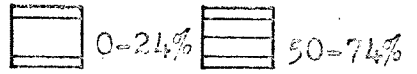
- - - - Farm Implement Dealers

Figure 32

PORTAGE LA PRAIRIE COMPLEMENTARY AREA



DEGREE OF DEPENDENCE



Area dependent upon Portage for the purchase of CARS

dealership proprietors were interviewed and their respective drawing areas delimited. This can be seen on page 201, Figure 31. In general, their areas correspond quite well with each other with the exception ~~in~~^{of} the northwest and the southwest.

Comparing the service areas of the automobile dealers with the one delimited from the questionnaire reveals some dissimilarity. This is especially true for the southwest and northwest where disagreement also occurred between the drawing areas of the individual dealer. In both areas mentioned the actual area as delimited from the questionnaire is substantially less than the ones delimited through interviews. Close agreement occurs only to the east of Portage la Prairie. It should be noted that the agreement occurs between the outer area of some dependence and the dealer service area boundaries.

The area of dominance of car purchase is elongated in shape. Its major axis goes from southwest to northeast, with the minor axis being shortest in the Portage area. Part of this is due to such well-developed centers as MacGregor in the west and Oakville in the east. Another reason is the closeness to a good transportation route, the Trans-Canada Highway. On this road it takes only one hour to go to Winnipeg. As cars in general can be bought somewhat cheaper in Winnipeg (due to greater turnover), people will shop there in order to receive a better deal as was indicated on many questionnaires.

The hinterland of the automobile service area (Figure 33) is somewhat different than the car purchase area (Figure 32). The dominance of the car service area is far more regular in shape than the dominance area of the car purchase area. The car service area

is nearly circular in shape about Portage. It does not include the St. Ambroise area in the northeast, which is somewhat too far away from Portage, for services for a car.

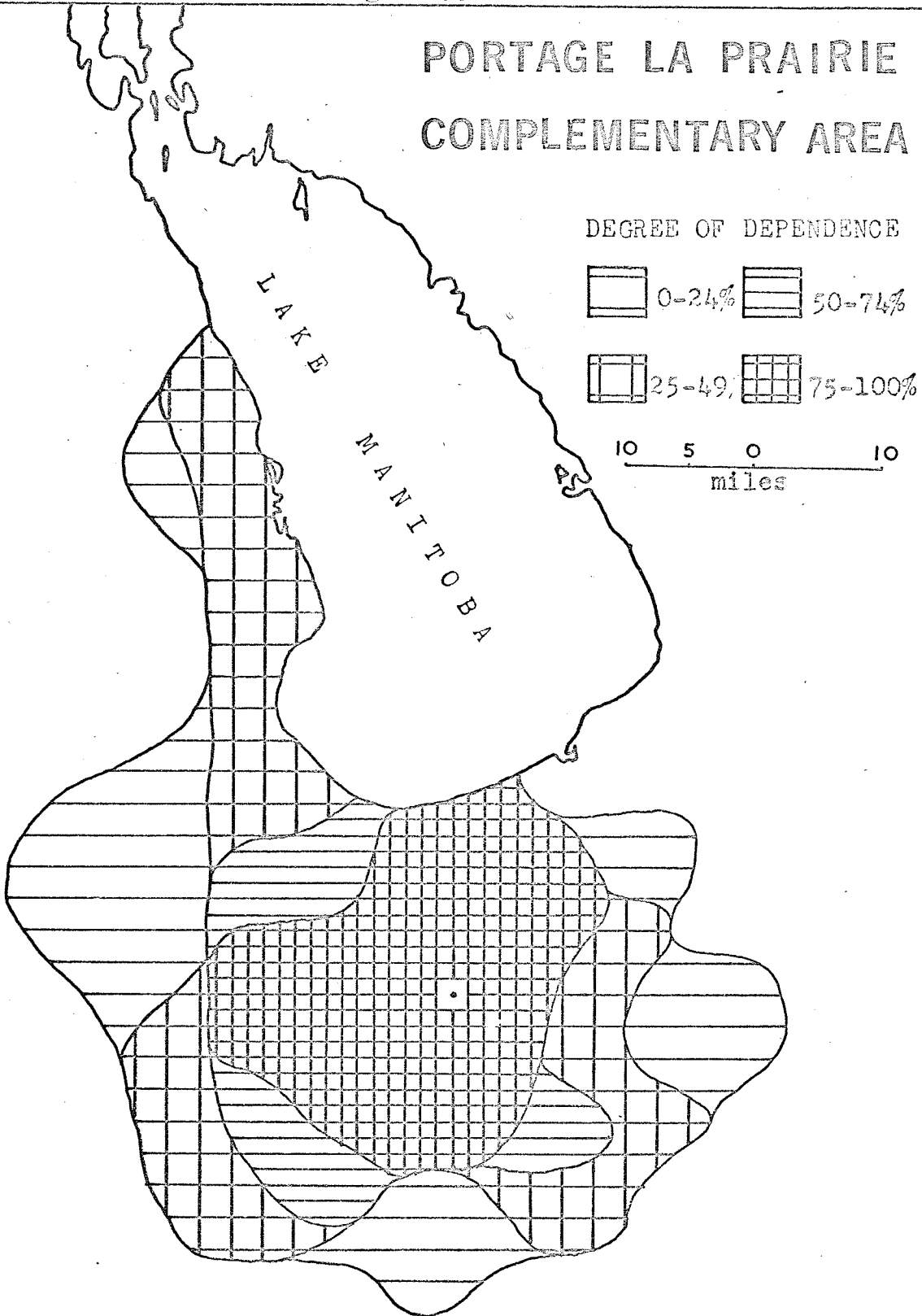
In the past there used to be a definite difference between the place a person bought his automobile and the place where he would have it serviced. There was no need to go back to the dealer as no guarantees were available on the cars. At present with the introduction of up to five year guarantees on automobiles,¹⁸ buyers go back to the dealers for most repair work. With the introduction of the so-called free 'check ups' at specific mileage intervals, the dealers are doing most of the service work which until recently was done by the smaller garages and service stations. As the automobiles become more sophisticated, smaller garages and service stations cannot service them properly as they are lacking the equipment. They do not have the money for modern new expensive equipment and hence are unable to do repairs properly. It is probably for these reasons that even small country car dealers are losing the service and repair aspects of their dealerships to the big city dealers. This latter fact may explain why the car purchase area of dominance is smaller than the car service area of dominance.

A service institution orientated completely towards the rural population is the farm implement dealer. In Portage the farm implement dealers have congregated to the western outskirts of the city. Here, three large well-known dealers are located within 'shouting' distance of each other. Only one major dealer is located near the

¹⁸At present Ford and Chrysler offer a five-year warranty on the power and main parts of a car. Ford, in addition, gives a two-year or 24,000 mile warranty on all defective parts.

Figure 33

PORTAGE LA PRAIRIE COMPLEMENTARY AREA



Area dependent upon Portage for CAR SERVICE

city center where it has been since 1936. The close proximity of similar retail outlets seems to increase business for all concerned.

From the delimitation of the farm equipment sales areas in Figure 31, the close similarity between this area and the car purchase area can be seen. Only one farm implement dealer disagreed with the others regarding the Langruth, Amaranth, Austin areas. In the south and east close agreements exist between the different individual service areas. Fairly good agreement exists between the complementary areas of the sale of farm equipment and the farm equipment service area.

In recent years a change in the sales pattern of farm equipment has occurred and is still taking place. As few as ten years ago most farm equipment was bought from small privately-owned dealerships in even the smallest centers. With the increase in many different types of farm machinery the small dealer is forced out of this business as he does not have the capital to stock the many kinds of machines and the spare parts. As a result, many farm equipment manufacturers have built their own outlets in the somewhat larger centers. In this way machinery and parts can be kept close to the users. These modern shops allow for fast service which is a must for today's mechanized farms.¹⁹ Also, with the increase in price of farm machinery and the relatively short period of use of such equipment, such company outlets might lend themselves in the future to the renting of farm equipment. At present the farm equipment manufacturers do not have such a policy.

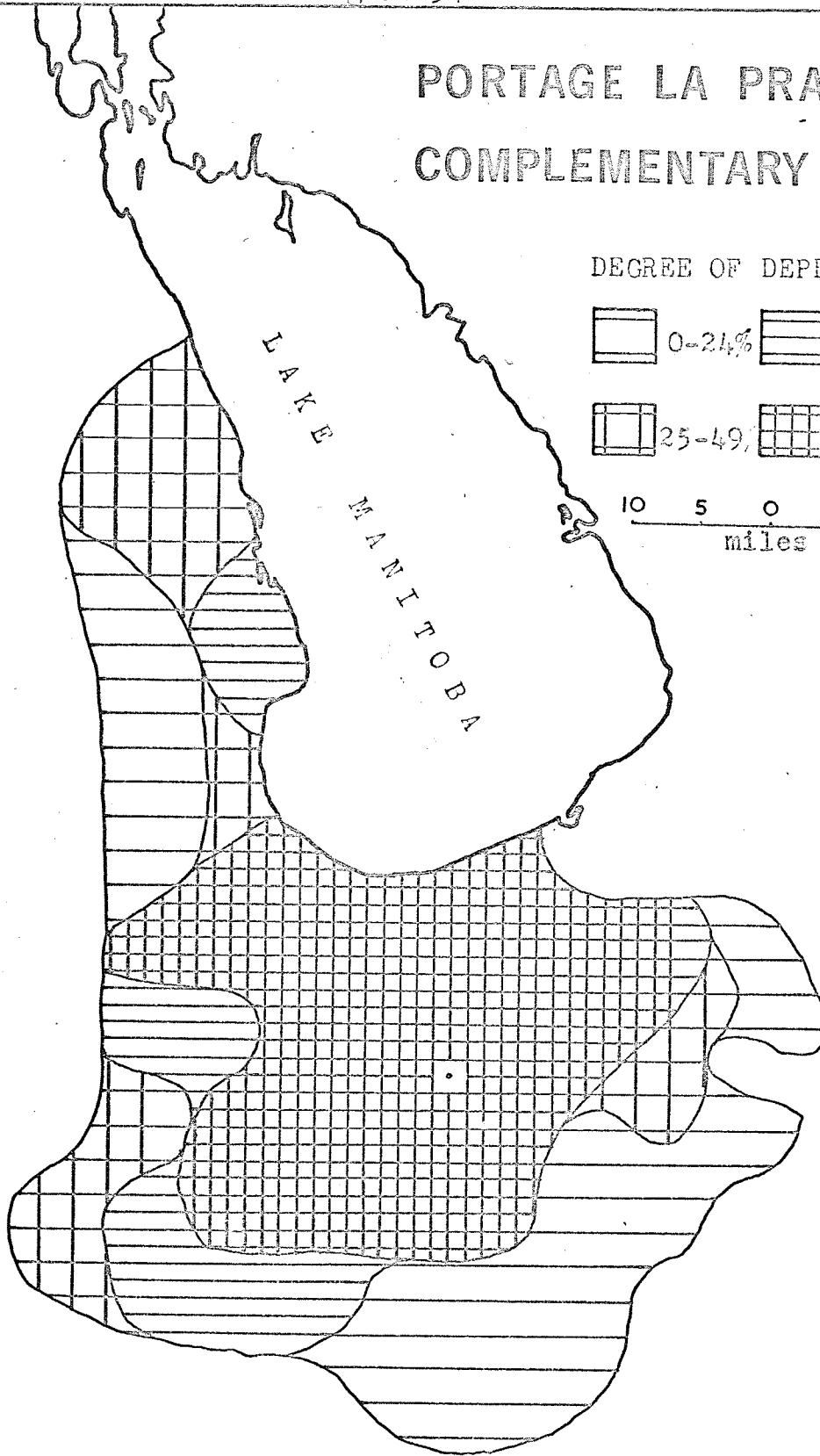
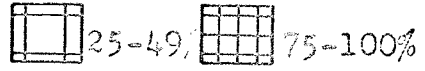
¹⁹This opinion was expressed by the managers of Case and John Deere Dealerships.

Figure 34

PORTAGE LA PRAIRIE COMPLEMENTARY AREA

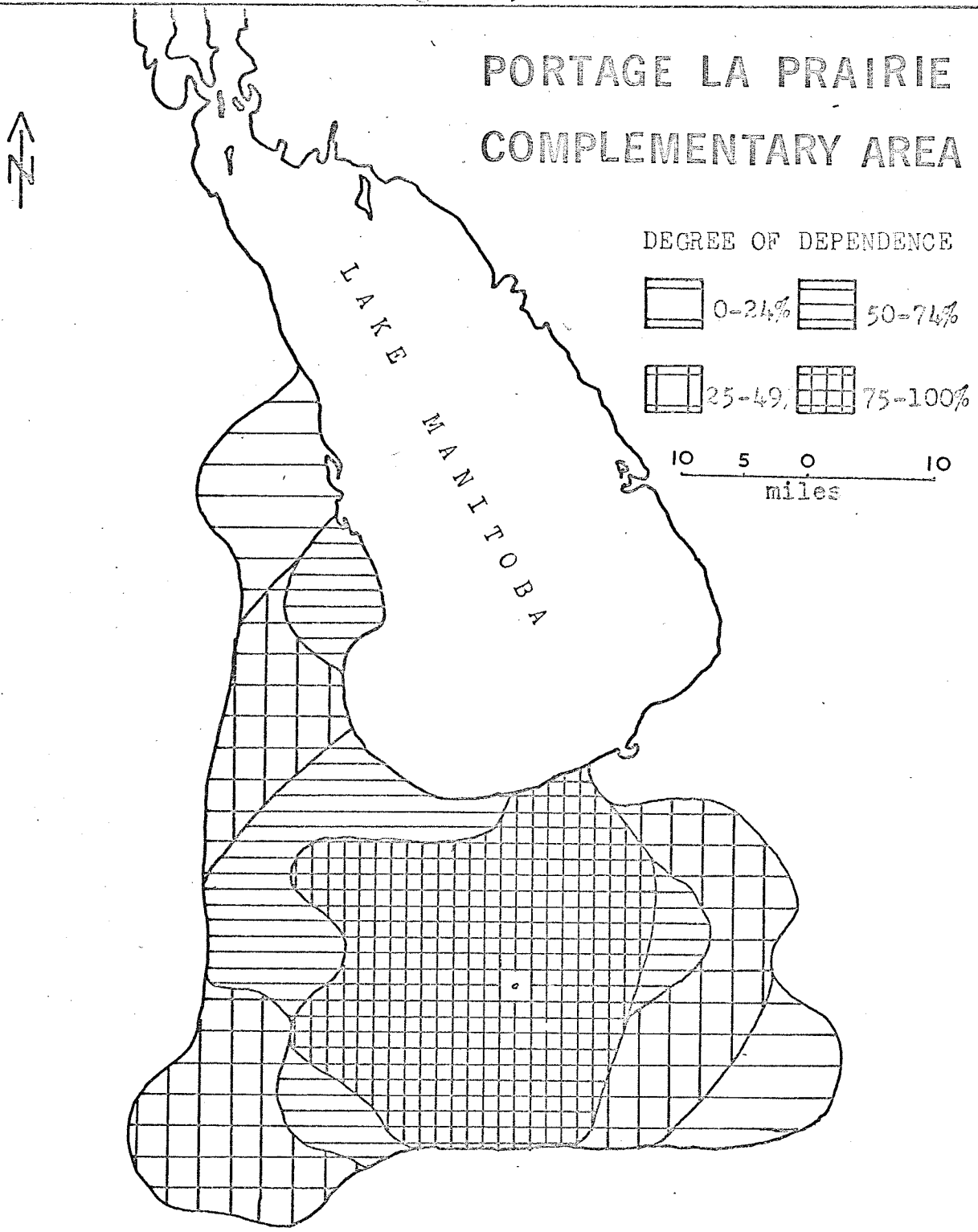


DEGREE OF DEPENDENCE



Area dependent upon Portage for FARM EQUIPMENT

Figure 35



Area dependent upon Portage for the REPAIR of FARM EQUIPMENT

Portage la Prairie's farm equipment purchase and farm equipment repair complementary areas are nearly equal in size testifying to the fact that only a few farmers repair their own equipment. Usually the farmer has not the equipment necessary for precision repair work. The day when a farmer was also a mechanic, blacksmith, welder, and service man seem to have gone forever.

Until recently coal or wood was the main household fuel, especially in the rural areas, at least the former of which was bought in the town. With the advent of oil furnaces there is a complete dependence on the city. Conversion back to wood or coal from oil furnaces is nearly impossible, and fuel oil has become ubiquitous requirement of the rural people. In winter the fuel oil delivery truck is a common sight in the back lanes of cities and on the rural roads in the country.

The degree to which Portage acts as fuel selling center can be seen in Figures 36 and 37. Portage has numerous fuel oil distributors representing every major oil company. For a number of them their rural service areas are delimited in Figure 36. In some cases the boundaries are affected by the existence of another fuel distributor of the same company in a nearby center.²⁰ In such cases the area is divided between those of the same brand of fuel in such a way as to service the total area most economically.

Although coal was the main heating fuel in the Portage area until quite recently, it acts as a minor fuel at present. In Portage the sale of coal has dropped to 5,000 tons per year (1966),

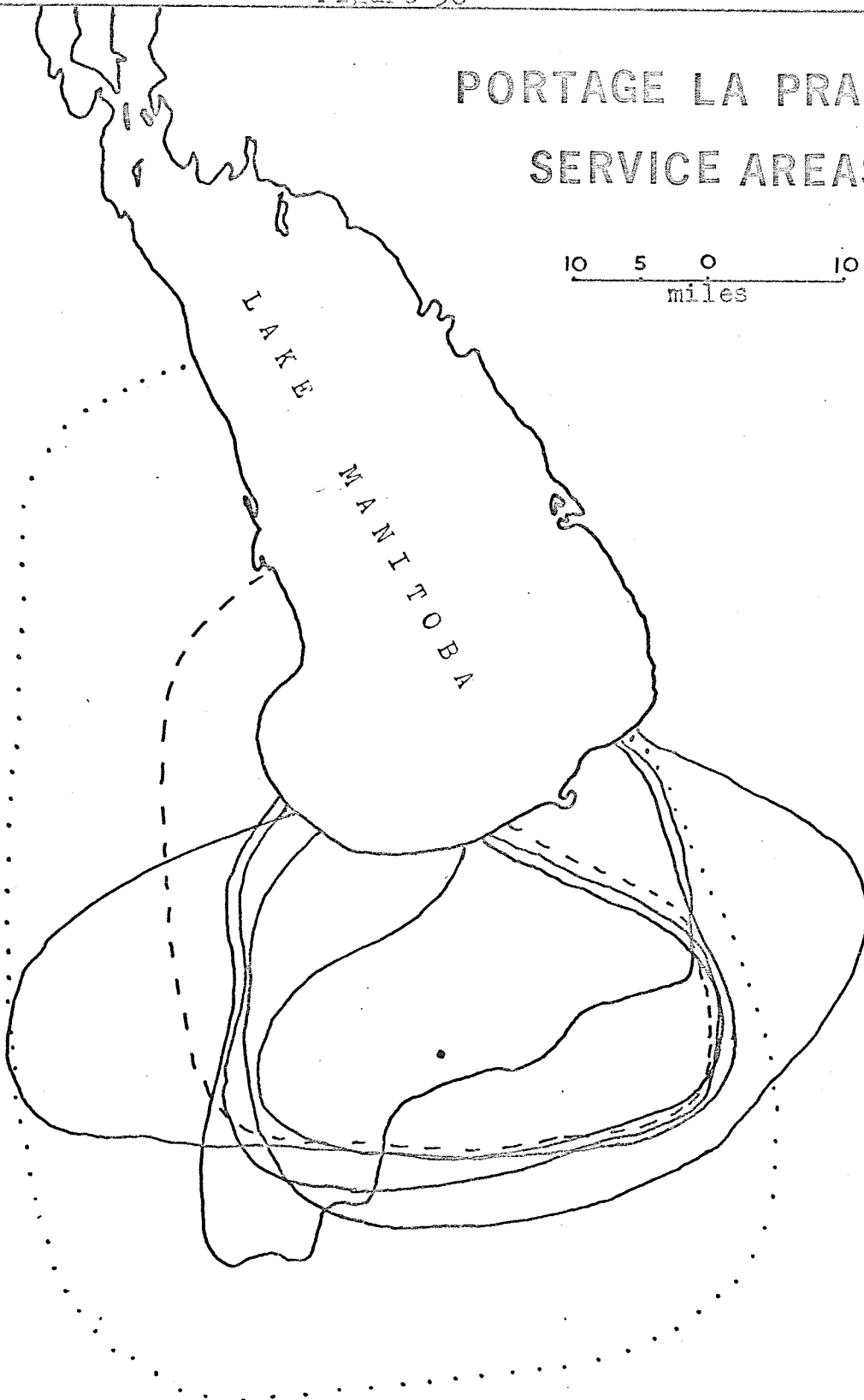
²⁰ There are, for instance, fuel distributors in Oakville (Esso), and Westbourne (British American). They serve their little local area in competition with other different brand fuel distributors from Portage.

Figure 36

PORTAGE LA PRAIRIE SERVICE AREAS



10 5 0 10
miles



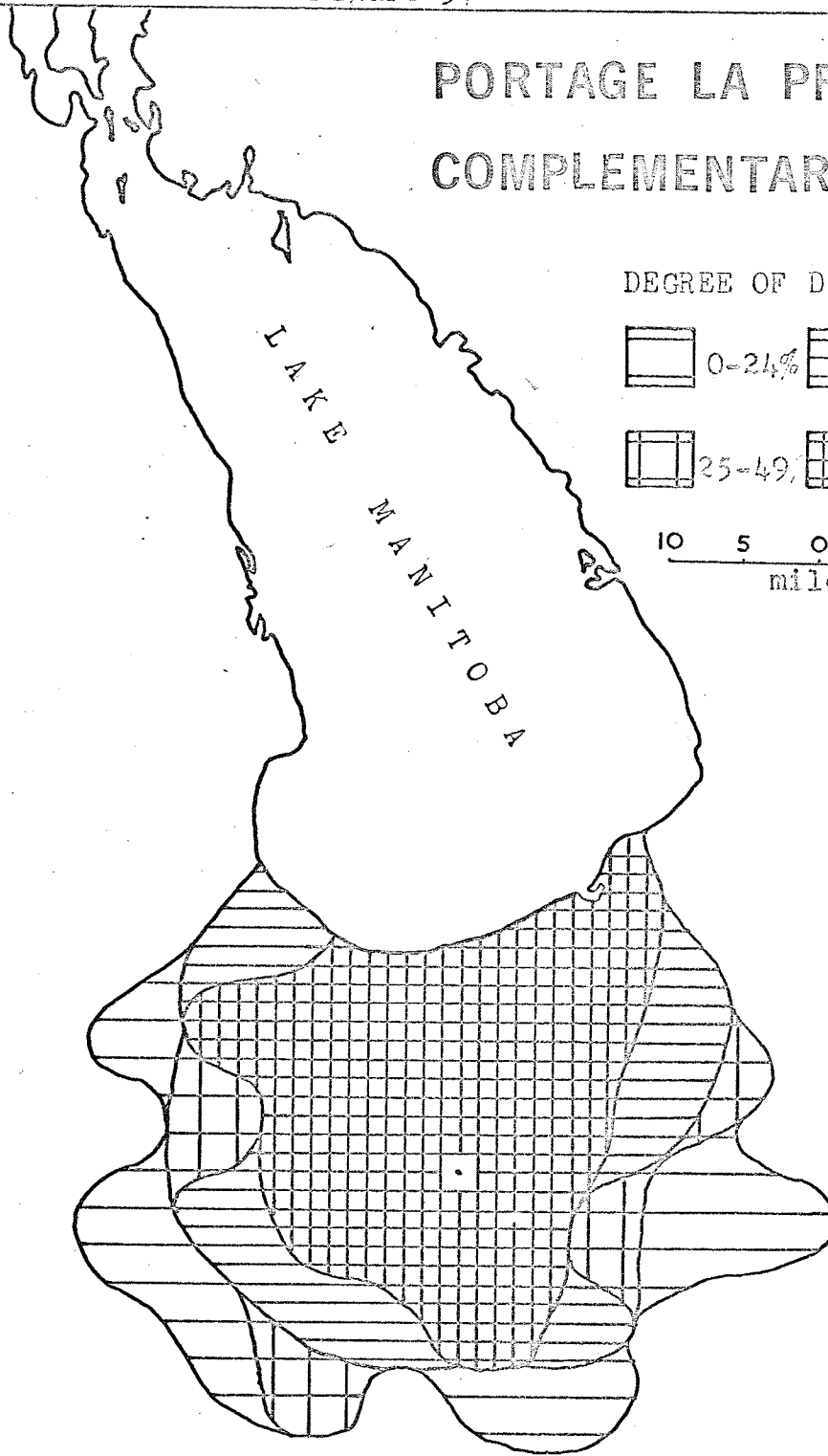
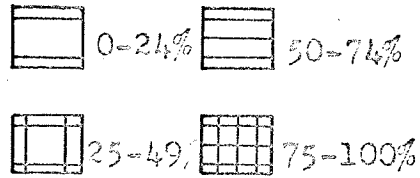
———— Fuel Oil Dealers - - - Coal Dealer Propane Gas Dealer

Figure 37

PORTAGE LA PRAIRIE COMPLEMENTARY AREA



DEGREE OF DEPENDENCE



Area dependent upon Portage for household/vehicular FUEL

from a high of 35,000 tons only 20 years ago.²¹ Despite this fact Portage la Prairie's coal servicing area is increasing, the reason being that many other rural coal dealers are going out of the business. The area delimited in Figure 36, page 210, represents the area to which coal is delivered. With the closing of smaller coal dealers in smaller towns, people come to Portage from as far as Treherne, Sidney, and Neepawa to purchase coal in Portage la Prairie. Despite this temporary increase in service area, the use of coal as a household fuel is diminishing fast.

A new household fuel with considerable promise is propane gas. Already it is used extensively in such appliances as fridges, stoves, lamps, and heaters where they are used in mobile homes or in areas where there is no electricity. At present an effort is made by people selling the gas to have it used to heat homes in winter.

A comparison between Figures 36 and 37 shows the great similarity in areas delimited. Fuel dealers know from where they receive their customers and together these customers make up the fuel hinterland of Portage la Prairie.

A distinguishing characteristic of the fuel hinterland is its nearly uniform dependence on Portage. The area of dominance is nearly as large as the total area of some dominance. In this aspect, the boundaries of fuel hinterland come close to Christaller's theoretical hinterland, where the boundary of dependence is abrupt. The whole area of some dominance is nearly circular about Portage and hence does not show the influence of Winnipeg in the east.

²¹Information received from Mr. H. Forsythe of Forsythe A. Coal Co. Ltd., during interview in Spring of 1967.

This comes from the fact that the distance fuel can be delivered is more influenced by actual cost of delivery,²² than most other products. Only Oakville, because of its closeness to Portage, has been able to influence the shape of Portage's fuel oil hinterland.

The basic commodities produced by farmers are food products. Yet, despite this fact the modern-day farmer purchases most of the food from stores in central places. This is in part due to the specialization of farmers in producing only one or only a few types of products. Today's grain farmers usually do not bother with vegetables, cattle, pigs, or chickens. Similarly, a farmer who raises chickens usually will purchase beef or pork or other agricultural products. Food store managers stressed the point that farmers purchase the same amount and the same kind of goods as the city dwelling persons.

In Figure 38 are the service areas of the different food selling establishments. As can be seen the areas are different, both in size and area of influence. The small grocery store in the western part of the city has a different area than the big supermarket in the center of the city.

Portage la Prairie's perishable and non-perishable food hinterlands can be seen in Figures 39 and 40. Both figures show a very interesting hinterland. In each case the Langruth/Amaranth areas are separated from the continuous hinterland of Portage by areas of no dependence. This intermittent area belongs, in each case, to Gladstone. It is also worthwhile to note that for non-perishable goods the St. Ambroise area is included in the Portage dominance area, yet is not included in the perishable. It is

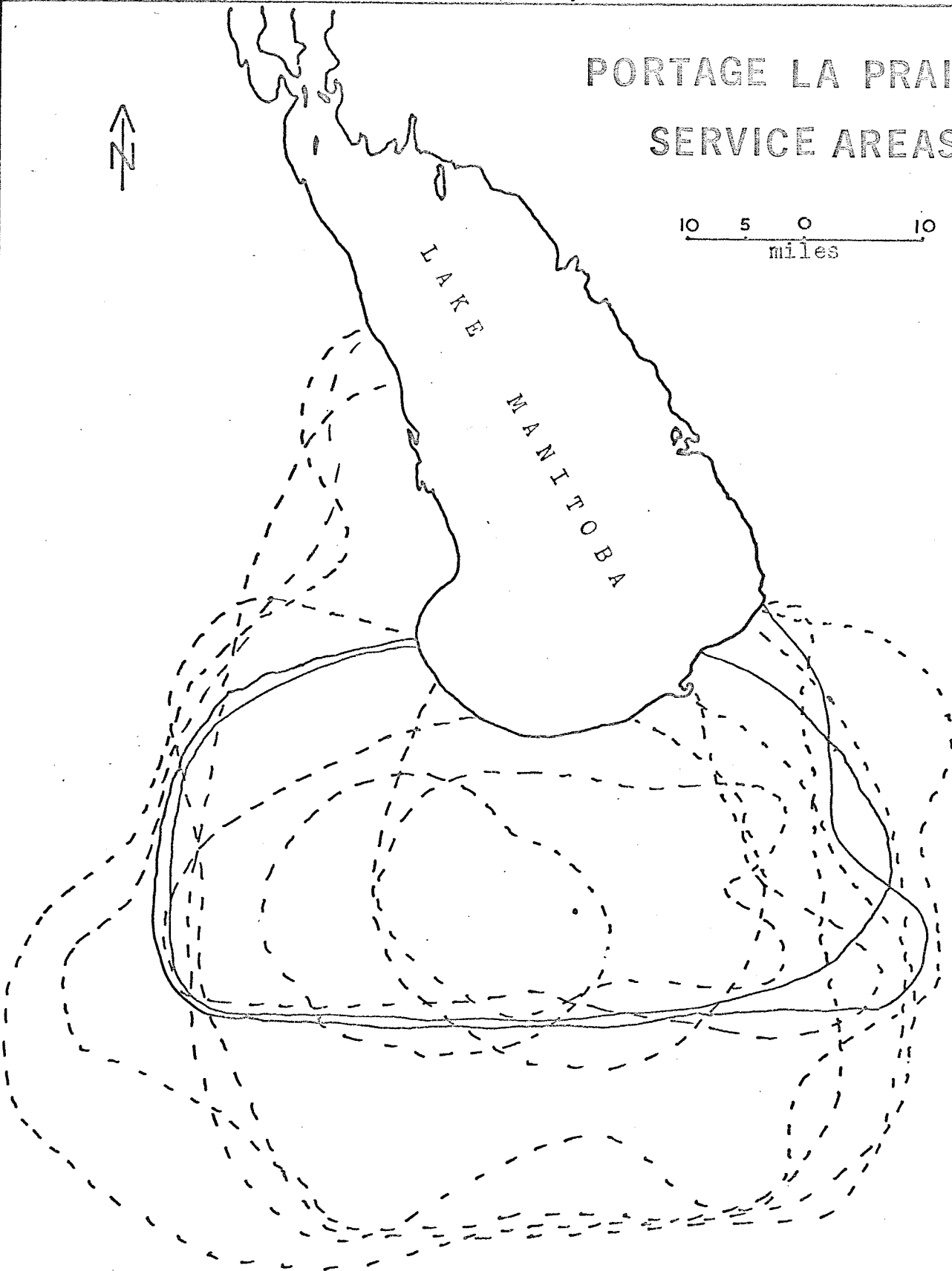
²²For a discussion on fuel oil selling and delivering see Footnote 15, page 197.

Figure 38

PORTAGE LA PRAIRIE SERVICE AREAS



LAKE
MANITOBA

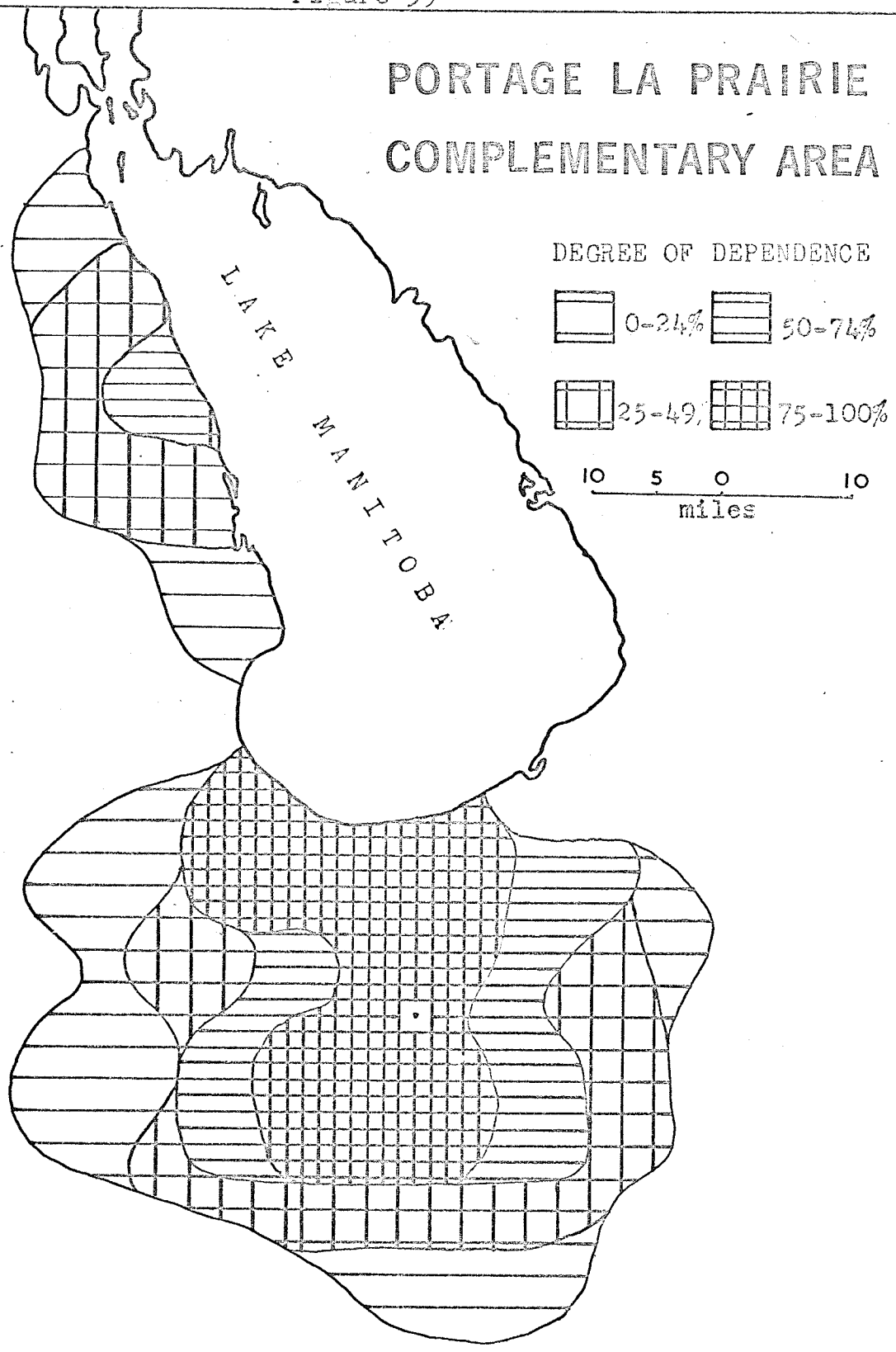
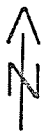


———— Dairy Firms

----- Food Stores

Figure 39

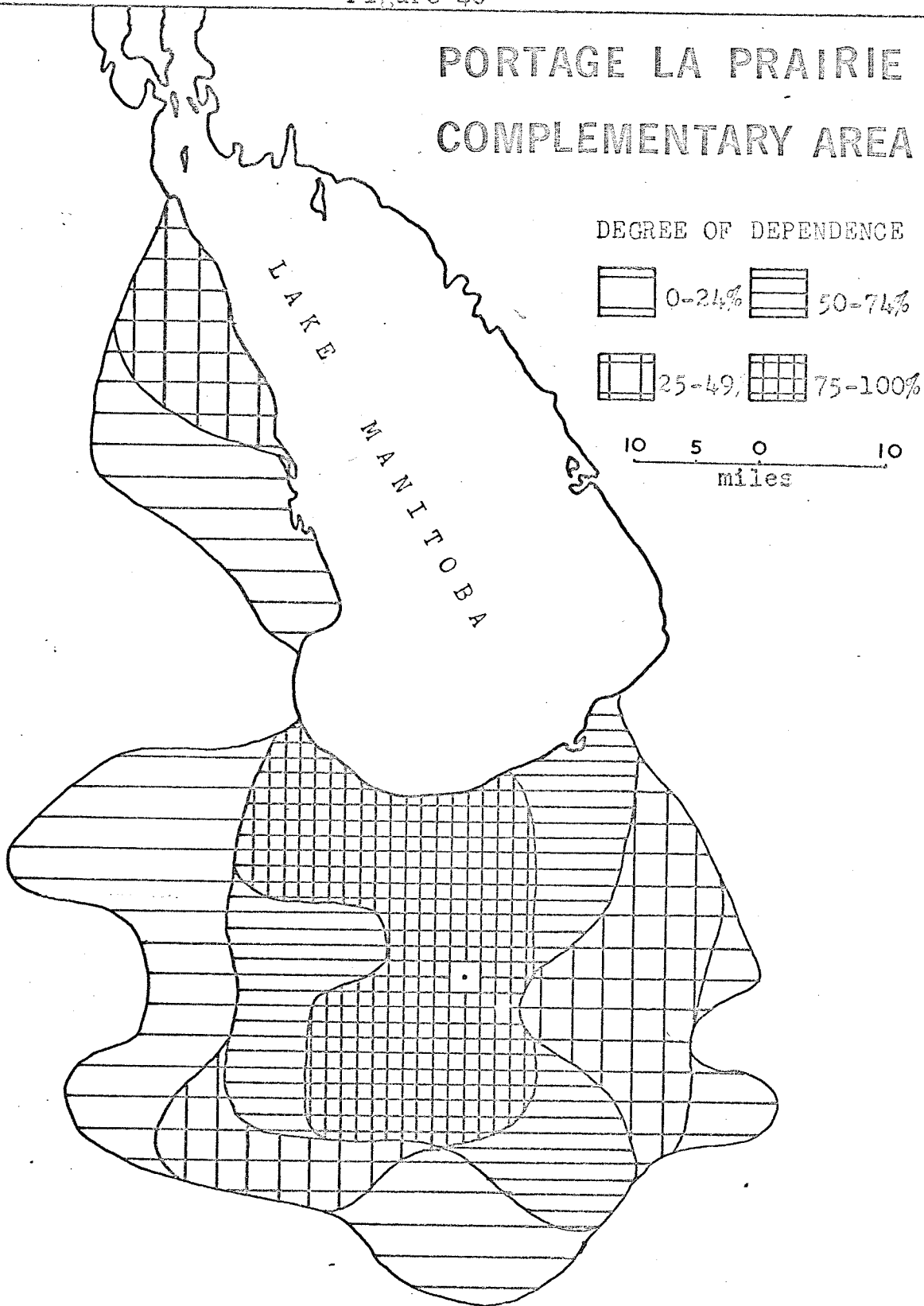
PORTAGE LA PRAIRIE COMPLEMENTARY AREA



Area dependent upon Portage for PERISHABLE FOOD

Figure 40

PORTAGE LA PRAIRIE COMPLEMENTARY AREA



Area dependent upon Portage for NON-PERISHABLE FOOD

surprising to note that the umland in each case is poorly developed along the Trans-Canada Highway, both east and west from the city.

From the two hinterlands some conclusion regarding the similarity of the two products can be drawn. As already mentioned, with the exception of the St. Ambroise area, both areas are very similar. This fact removes the notion that there is much difference in shopping for these two products. Fresh food used to be only sold in large stores where turnover would warrant getting this product. Today with the universal use of refrigerators, fresh fruit can be kept even by the smallest proprietor.

D. Complementary Areas of Medium Order Retail Goods.

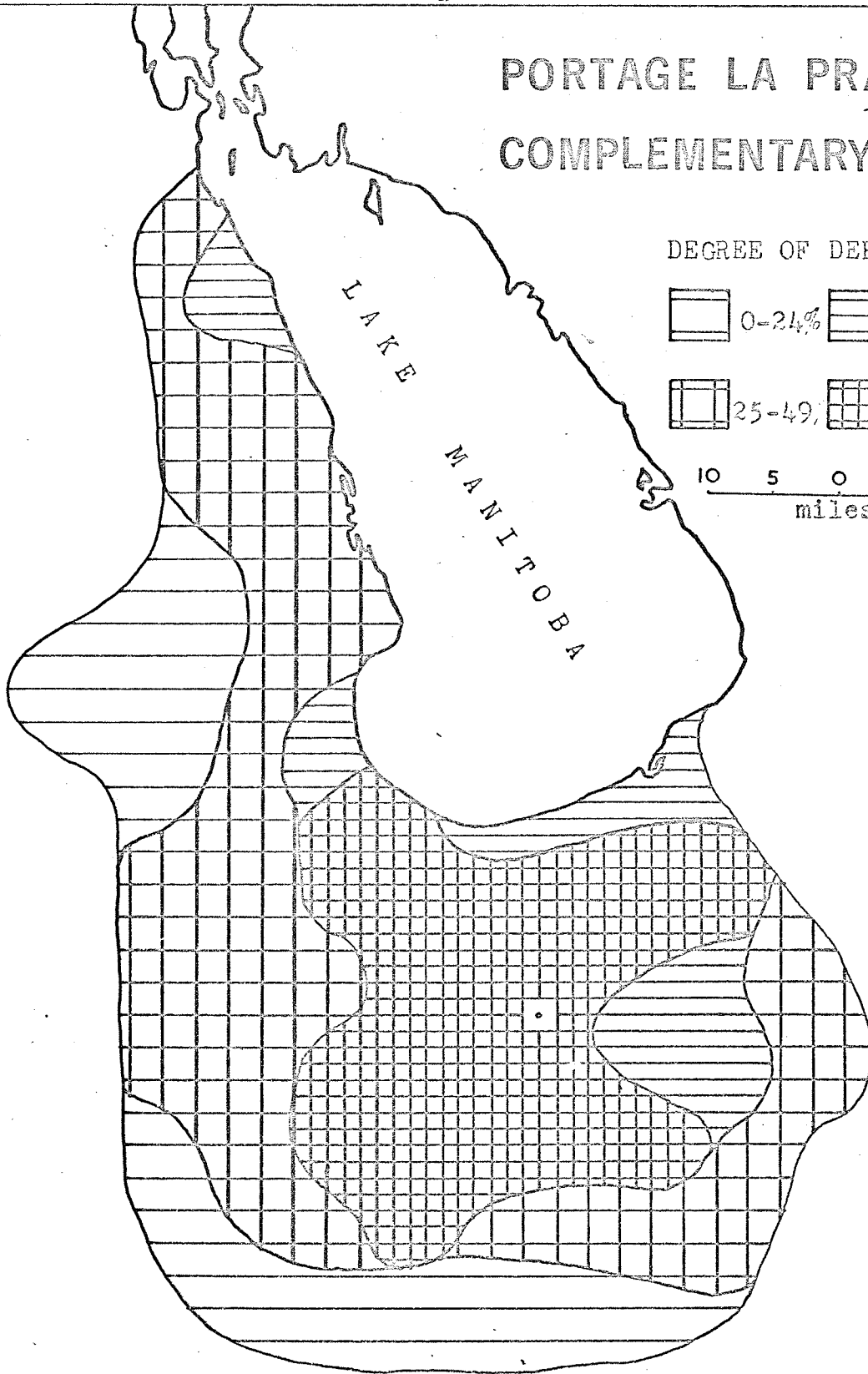
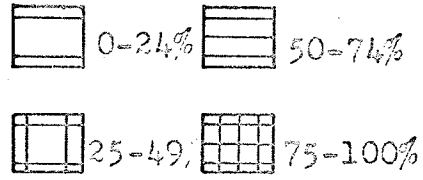
A group of Portage la Prairie areas of medium hierarchical level type goods is represented in Figures 41 to 45, pages 218 to 222. The population in their areas of dominance varies from 9,775 to 12,000. This similarity in population size is surprising in the fact that the hinterlands represent such different goods as work shoes, appliances, furniture, work clothes, and medical supplies. Each service area stretches north along the northwestern shores of Lake Manitoba, although they vary in degree of dependence on Portage. In only the medical supplies complementary area do the people living west of Lake Manitoba depend for more than 50 percent of their requirements on Portage. The medical supplies hinterland has a very shallow band of some dependence about the area of dominance. This indicates that medical supplies are usually not shopped for but bought at the nearest center.

Of the establishments visited, that sell the goods, whose hinterlands are graphed in Figures 41 to 45, few claimed drawing areas similar to the ones represented in the above Figures. No

Figure 41

PORTAGE LA PRAIRIE COMPLEMENTARY AREA

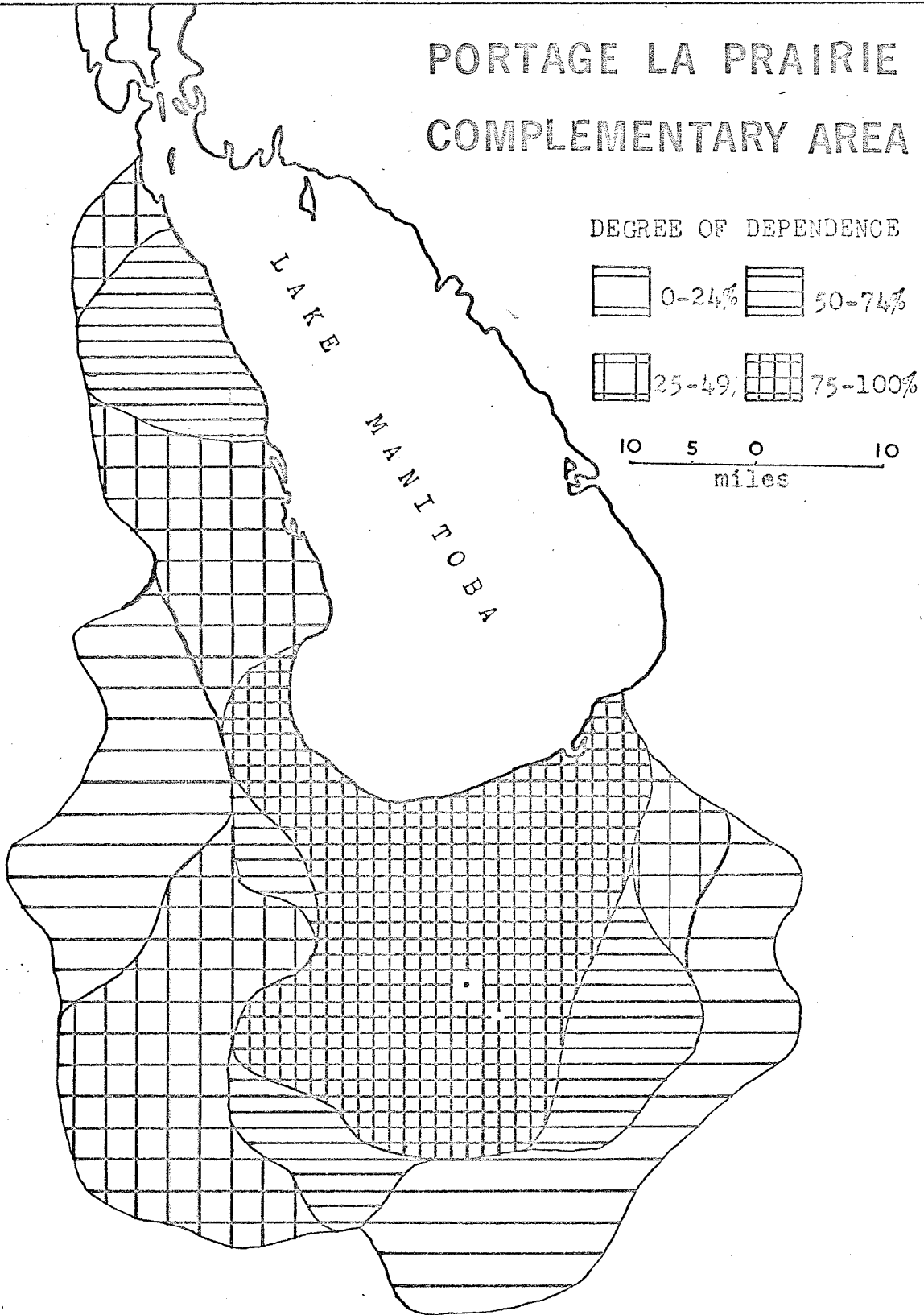
DEGREE OF DEPENDENCE



Area dependent upon Portage for the purchase of WORK SHOES

Figure 42

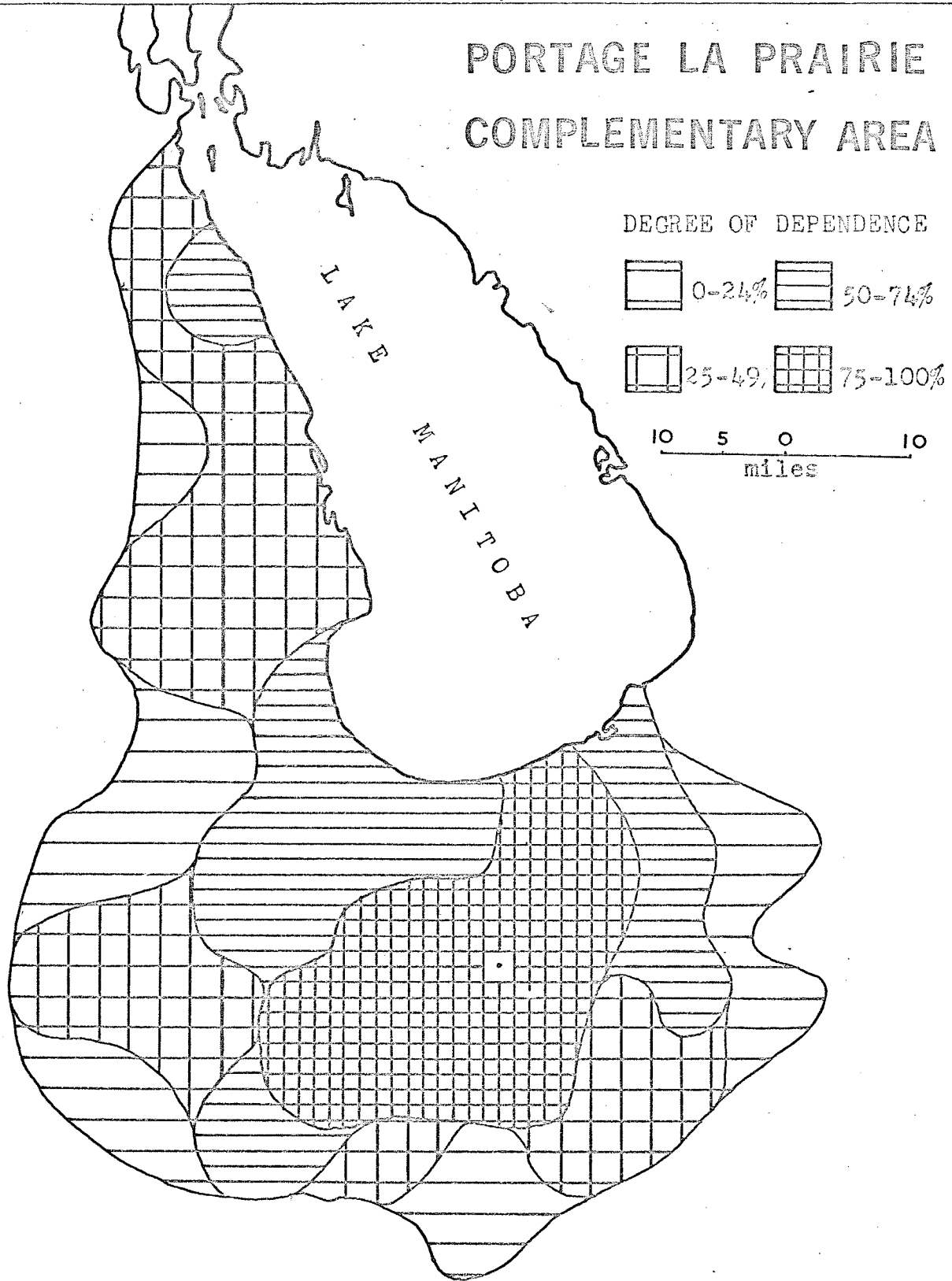
PORTAGE LA PRAIRIE COMPLEMENTARY AREA



Area dependent upon Portage for HOUSEHOLD APPLIANCES

Figure 43

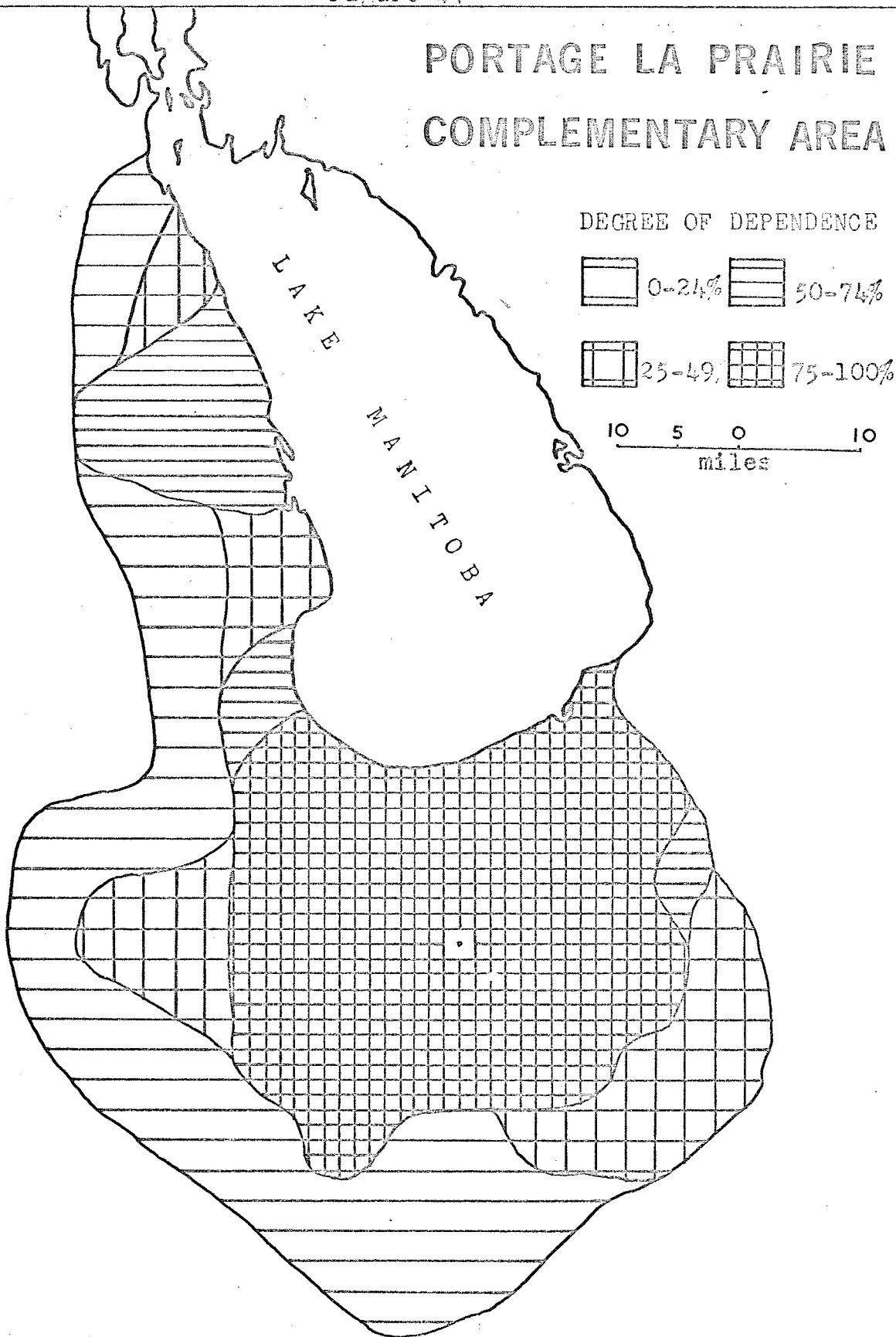
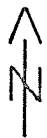
PORTAGE LA PRAIRIE COMPLEMENTARY AREA



Area dependent upon Portage for FURNITURE

Figure 44

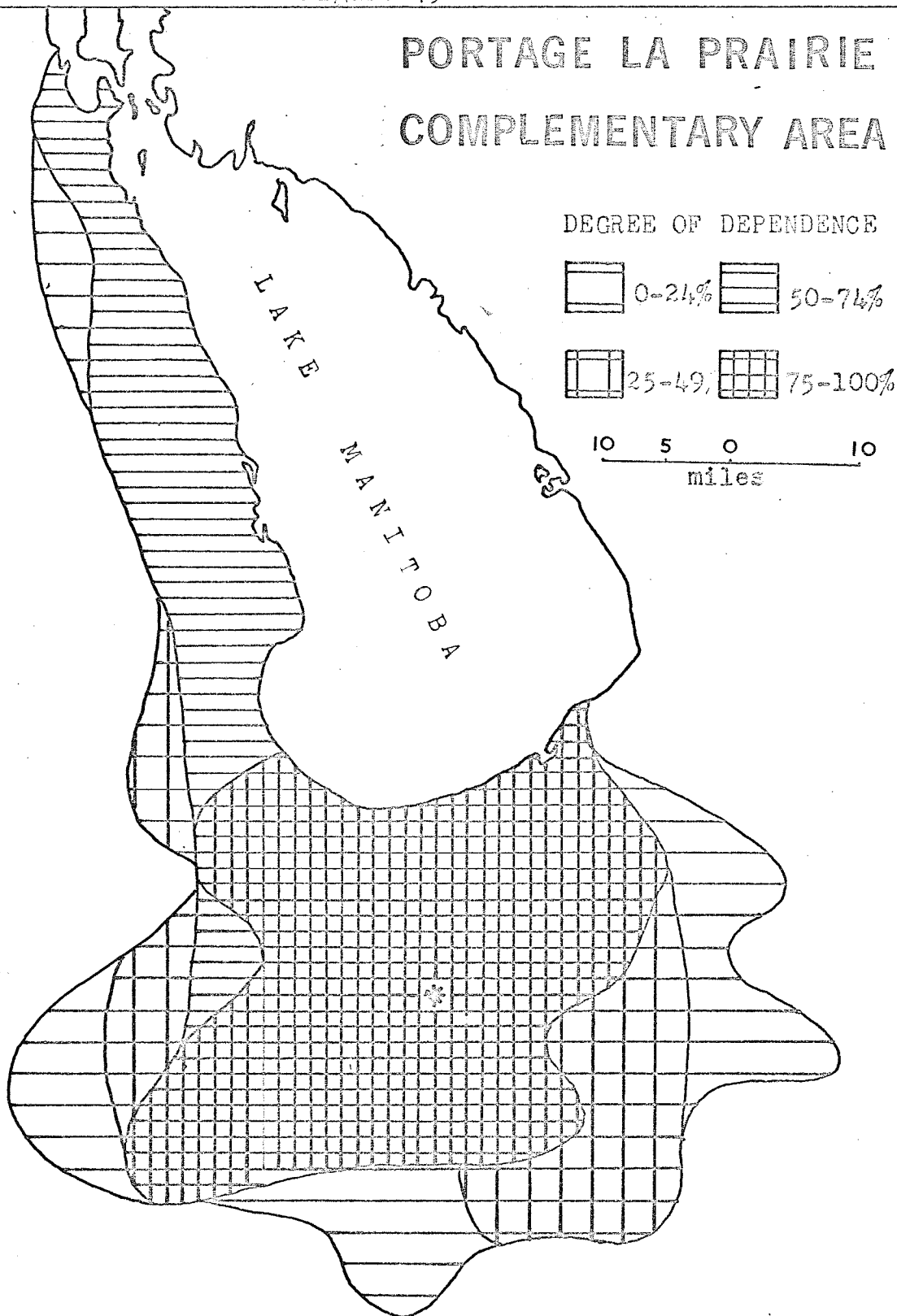
PORTAGE LA PRAIRIE COMPLEMENTARY AREA



Area dependent upon Portage for the purchase of MENS' WORK CLOTHE

Figure 45

PORTAGE LA PRAIRIE COMPLEMENTARY AREA



Area dependent upon Portage for MEDICAL SUPPLIES

manager of either drugstores, shoe stores, furniture stores, or hardware stores claimed the area north of Amaranth as his drawing area. Usually, claims were made of areas much further west as the ones seen in the maps. Some managers also claimed the Gladstone area as their drawing area, whereas only the work shoes area includes the town of Gladstone in the area of some dependence.

Although in general the hinterlands mentioned above are somewhat skewed to the west, they are not as much as one would expect from Reilly's law of retail gravitation.²³ It would seem that Portage is especially strong in its influence towards Winnipeg if one takes the latter's size into consideration.

E. Complementary Areas of High Order Retail Goods

The department store has frequently been considered the highest service offered in a city or town. Usually a town that has a department store is thought to be higher in the urban hierarchy than one that has no department store. The settlement with two or more department stores is correspondingly higher in the urban hierarchy than the one with only one department store. Until quite recently the number and size of department stores has been a pride of the particular city. At present the dominance of the department store in retail trade is declining. The big downtown department stores are now encountering strong competition from suburban shopping centers. Here smaller department stores, sometimes two at one shopping center, compete quite successfully with the large downtown stores.

²³For a theoretical hinterland of Portage la Prairie based on Reilly's law of retail gravitation, see Figure 28, page 193.

The shopping facilities in Portage can be compared to the shopping facilities of suburban shopping centers. There are no large department stores in Portage la Prairie but numerous smaller ones, a number of which were visited and their customer drawing areas delimited in Figure 46. With the exception of one store, all agreed in their drawing area boundaries in the east, south and west of Portage. In the delimitation of the northern boundaries two opinions emerged. One group thought their influence stopped at Amaranth, while the other thought it included the Alonsa area farther north.

One of the major sections in a department store is the children's wear section. This is especially true of the majority of department stores in Portage la Prairie.²⁴ The children's wear complementary area of Portage is delimited in Figure 47, page 226. Again, except for the western shores of Lake Manitoba, the area is nearly symmetrical about Portage la Prairie. Again, as in the case of medical supplies, the area west of Lake Manitoba is dominated by Portage. The area north of Amaranth depends completely (more than 75 percent) upon Portage la Prairie. The competitiveness of this good can be seen by the relatively wide band of some dependence around the area of dominance.²⁵

²⁴ Children's wear is one line of clothes^{of} which the Portage department stores usually have a full line. Because of the small size and the nature of the good they are relatively inexpensive and hence can be carried by stores in even small centers. In comparison few high quality adult clothes are found in the department stores, as the low overturn does not warrant carrying them.

²⁵ This fact agrees with Golledge, Rushton and Clark's findings in Iowa. People travel on the average long distances for girl's clothing. Also, the individual distances vary immensely for different people. Golledge, Rushton and Clark, op.cit., p.263.

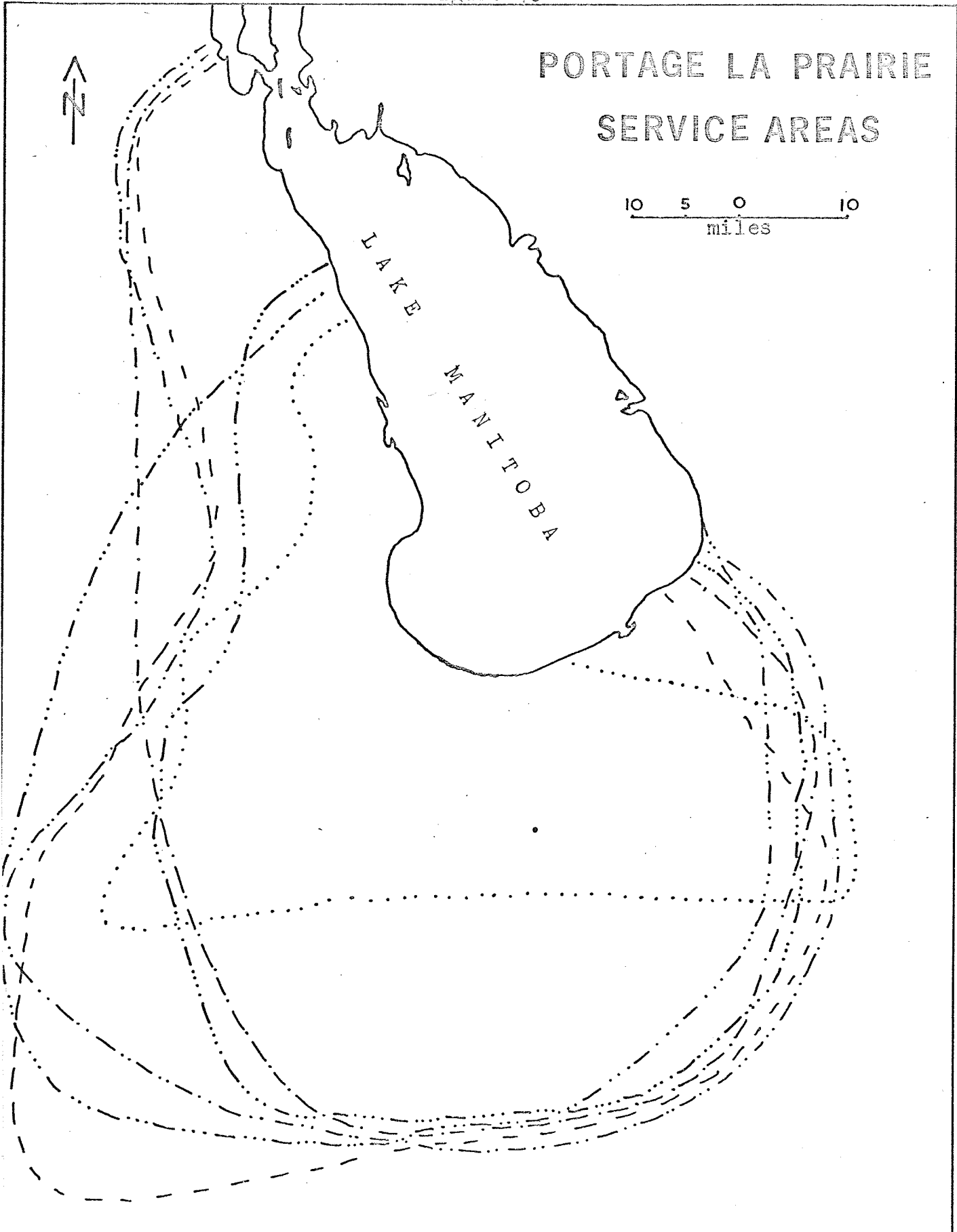
Figure 46

PORTAGE LA PRAIRIE SERVICE AREAS

10 5 0 10
miles



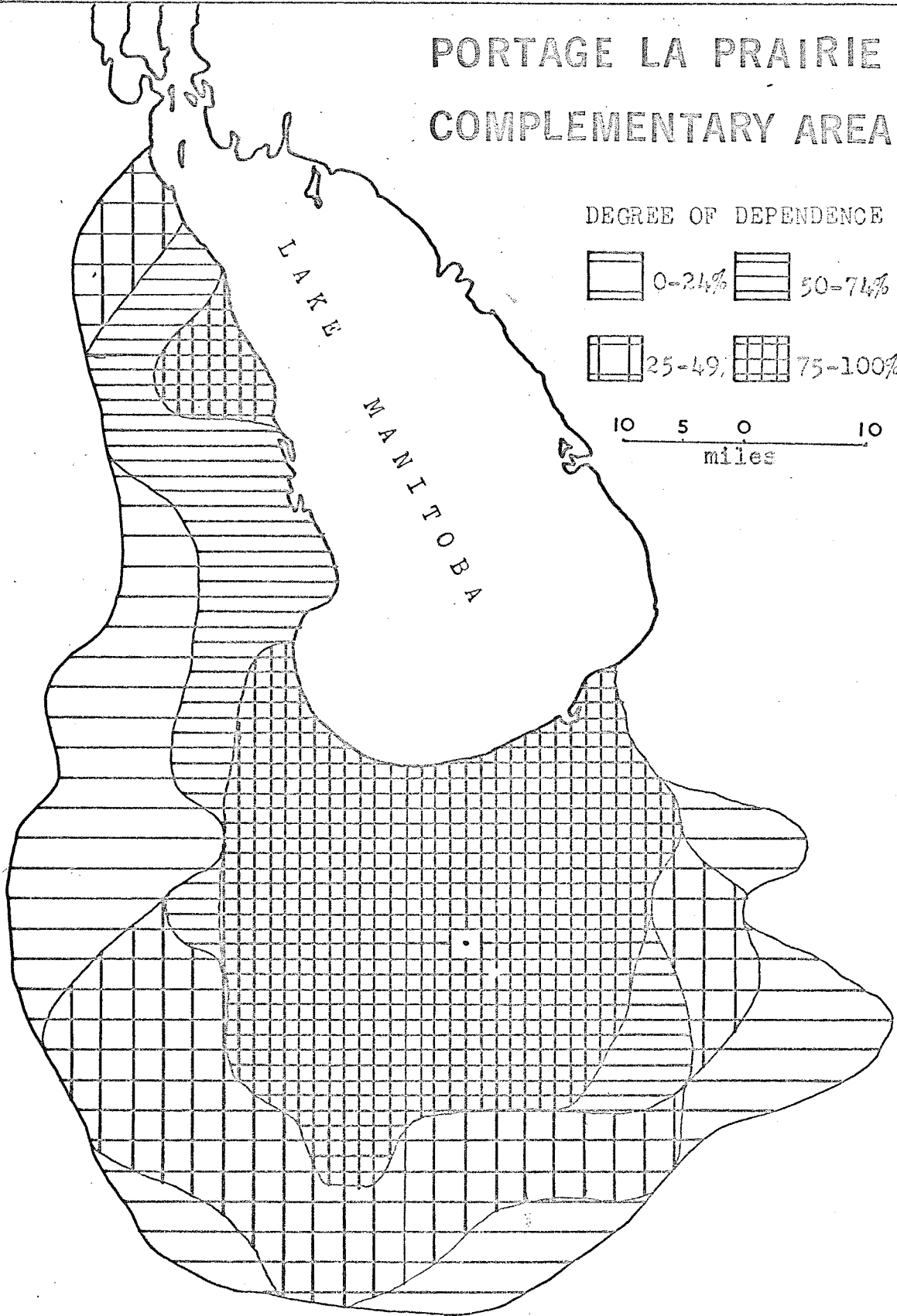
L A K E
M A N I T O B A



Areas served by different small Department Stores

Figure 47

PORTAGE LA PRAIRIE COMPLEMENTARY AREA



Area dependent upon Portage for CHILDREN'S WEAR

In the remaining retail hinterlands which have not been discussed (Figures 48 to 52) attention is focused only on specialized clothing requirements. Such commodities as ladies' clothes are extremely competitive,²⁶ and hence Portage should demand a large hinterland. In Portage there are a substantial number of ladies' wear shops. Most ladies' shops in Portage, even though they cater exclusively to ladies' wear, stay in the medium to low-price range of goods. Despite the fact that many stores sell at Winnipeg prices, proprietors admit that^a substantial number of shoppers from the Portage area are going to Winnipeg. In many cases a shopping trip to Winnipeg also acts as an outing and hence serves a double purpose.

An examination of Figures 48 and 49, pages 228 and 229, reveals that most shoes, and ladies' clothes stores have similar service areas. To the east and south of Portage la Prairie, the boundaries of these service areas correspond extremely well. Good agreement occurs in the north where the general boundary extends a few miles north of Amaranth. Only to the west of Portage is some disagreement observed, as the greatest service area boundary is 20 miles further than the smallest.

A closer examination of the complementary areas of these goods as delimited from the questionnaires revealed some interesting points. Figure 50, page 230 represents the ordinary ladies' clothes hinterland. The complete area of the complementary area with the exception in the north corresponds quite well with the area outlined in Figure 48, page 228. In the north, Figure 50 shows a larger area dependent upon Portage than what the merchants indicated.

²⁶Of the 33 commodities examined, female clothing had the greatest average distance travelled to purchase it, in Iowa. Ibid.

Figure 48

PORTAGE LA PRAIRIE SERVICE AREAS



LAKE
MANITOBA

Areas served by stores specializing in Ladies Clothe.

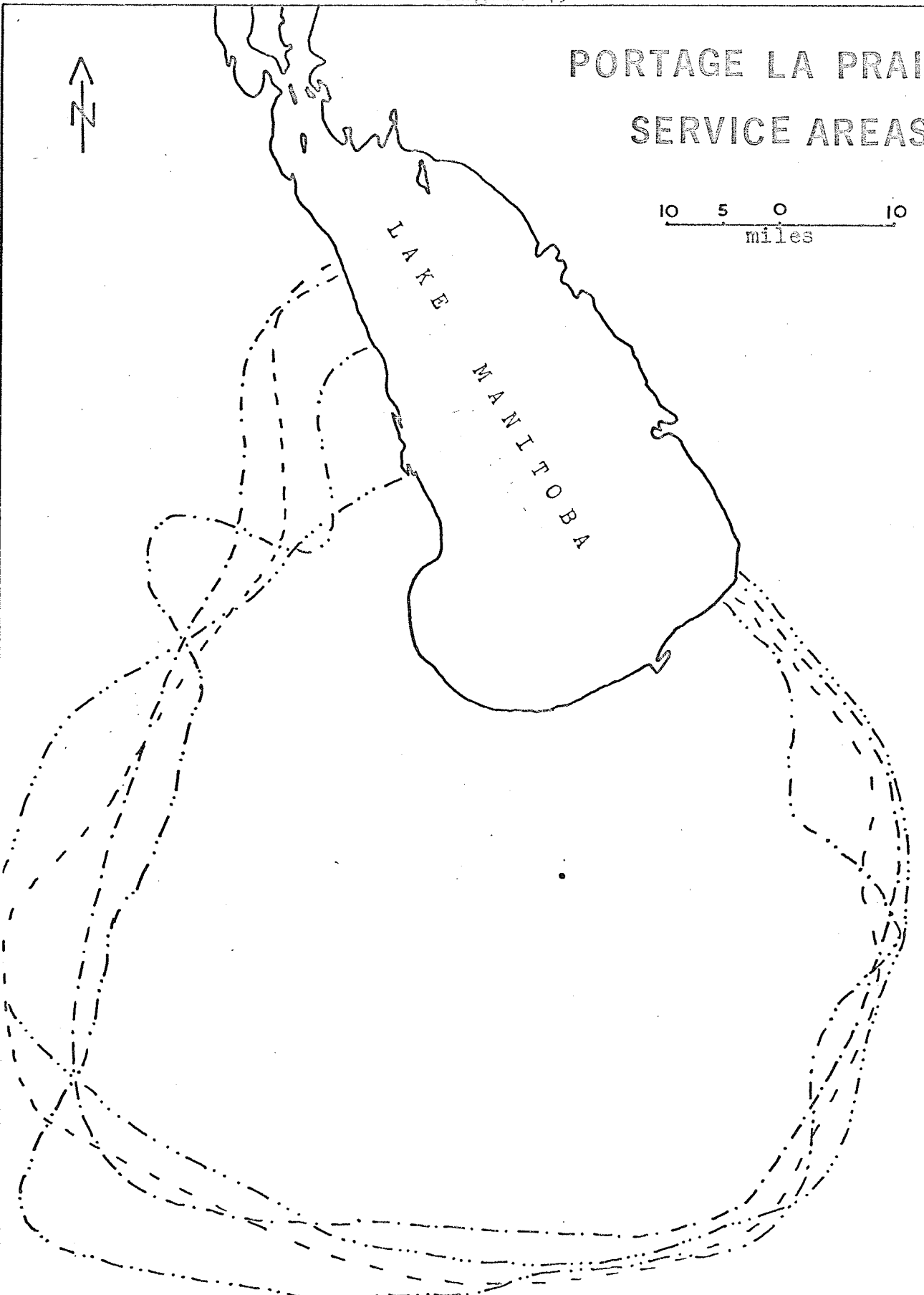
Figure 49

PORTAGE LA PRAIRIE SERVICE AREAS



10 5 0 10
miles

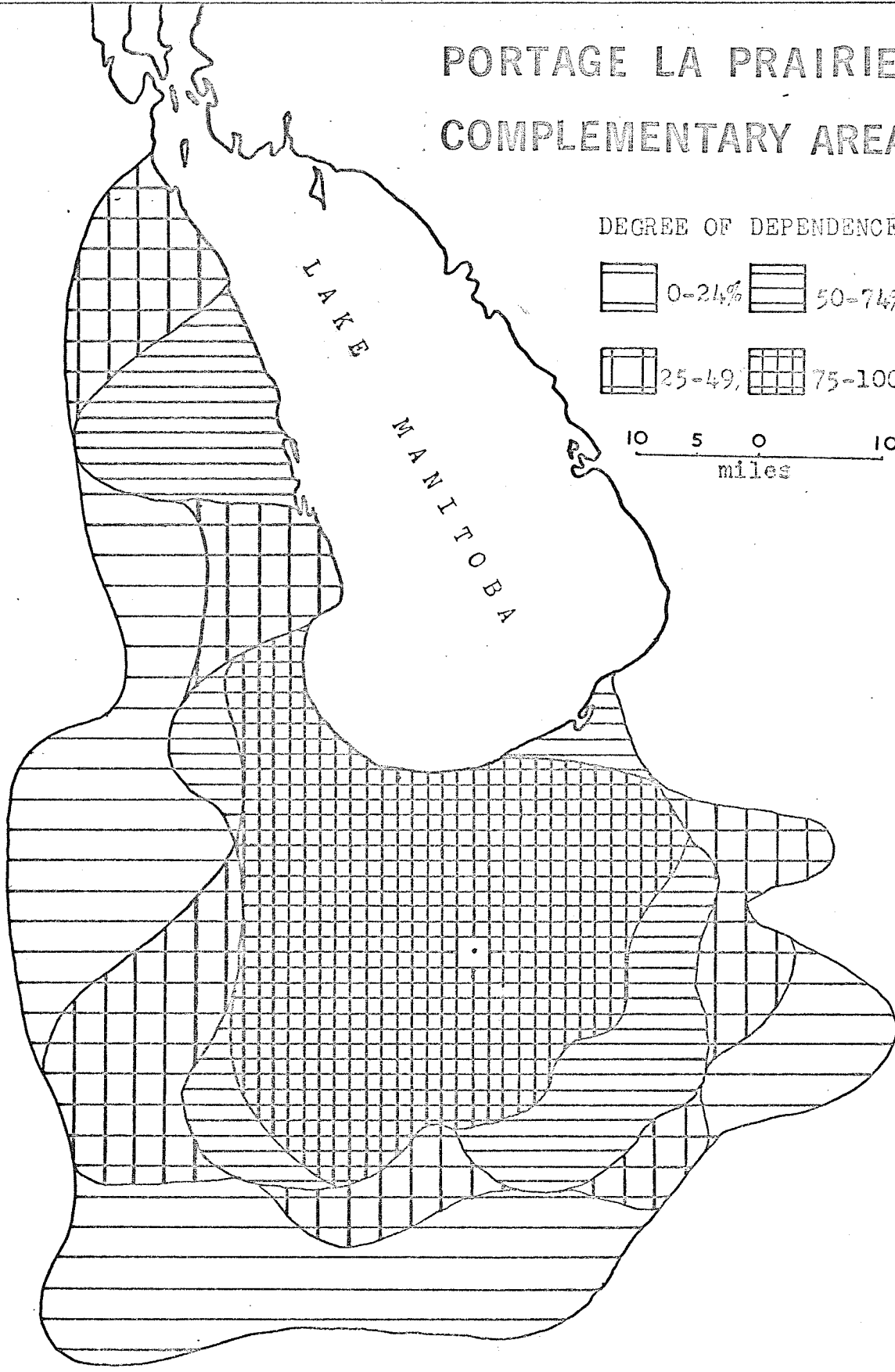
LAKE
MANITOBA



Areas served by different Shoe Stores

Figure 50

PORTAGE LA PRAIRIE COMPLEMENTARY AREA



Area dependent upon Portage for ORDINARY LADIES CLOTHES

Figure 50 also indicates a surprising strong influence of Portage along the Trans-Canada Highway towards Winnipeg, even more than what the merchants indicated.

The area of dominance or umland in Figure 50 is, with the exception in the Amaranth area, nearly circular about Portage la Prairie. Nearly all of the umland is also an area of complete dominance, supporting the fact that Portage dominates the ordinary ladies' clothes retail trade of its immediate area.

A somewhat surprising strong influence of Portage in the sales of high quality shoes can be seen in Figure 51, page 232. Portage acts as the most important shoe center for a minimum radius of 15 miles. To the west and north this dominance area stretches for 30 and 45 miles respectively. Outside of this continuous area of dominance right around Portage there is a small area of dominance in the Silver Ridge area, some 15 miles north of Amaranth.

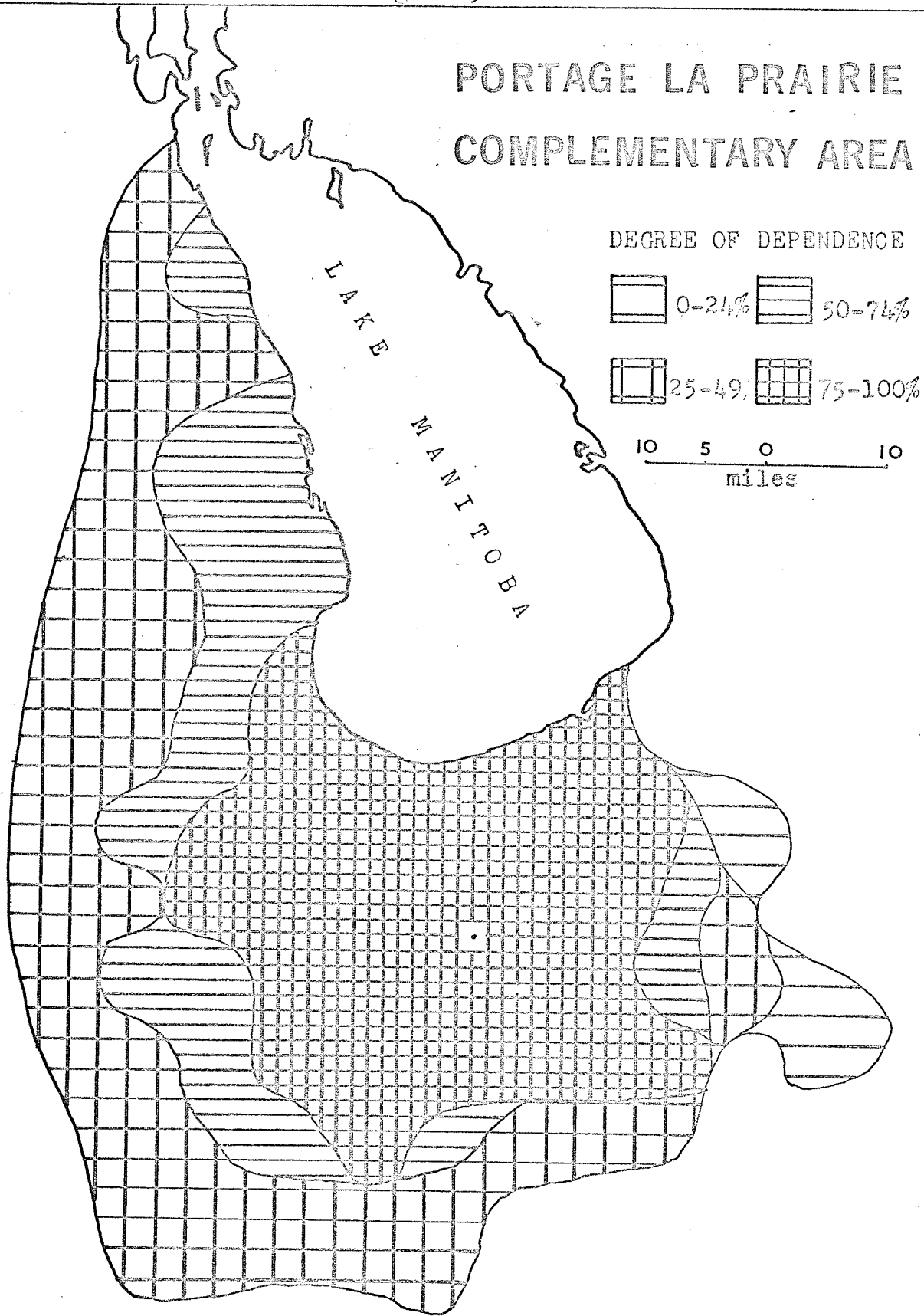
The strength of Portage as a shoe sales center can also be seen in the fact that nearly all the area of some dominance depends far more than 25 percent on Portage. Only a small area of some dominance east of Portage depends for less than 25 percent for their quality shoes on Portage.

A very different hinterland in comparison to the ones so far examined is presented in Figures 52 and 53, pages 233 and 234. Figure 52 represents the better men's clothing retail trade area of Portage. Although the total area of the better men's clothing hinterland is quite large, the area that depends completely upon Portage for this service is quite small. The area of complete dominance extends mainly in a southwesterly direction of Portage la Prairie. The area of dominance, on the other hand, is quite large,

Figure 51



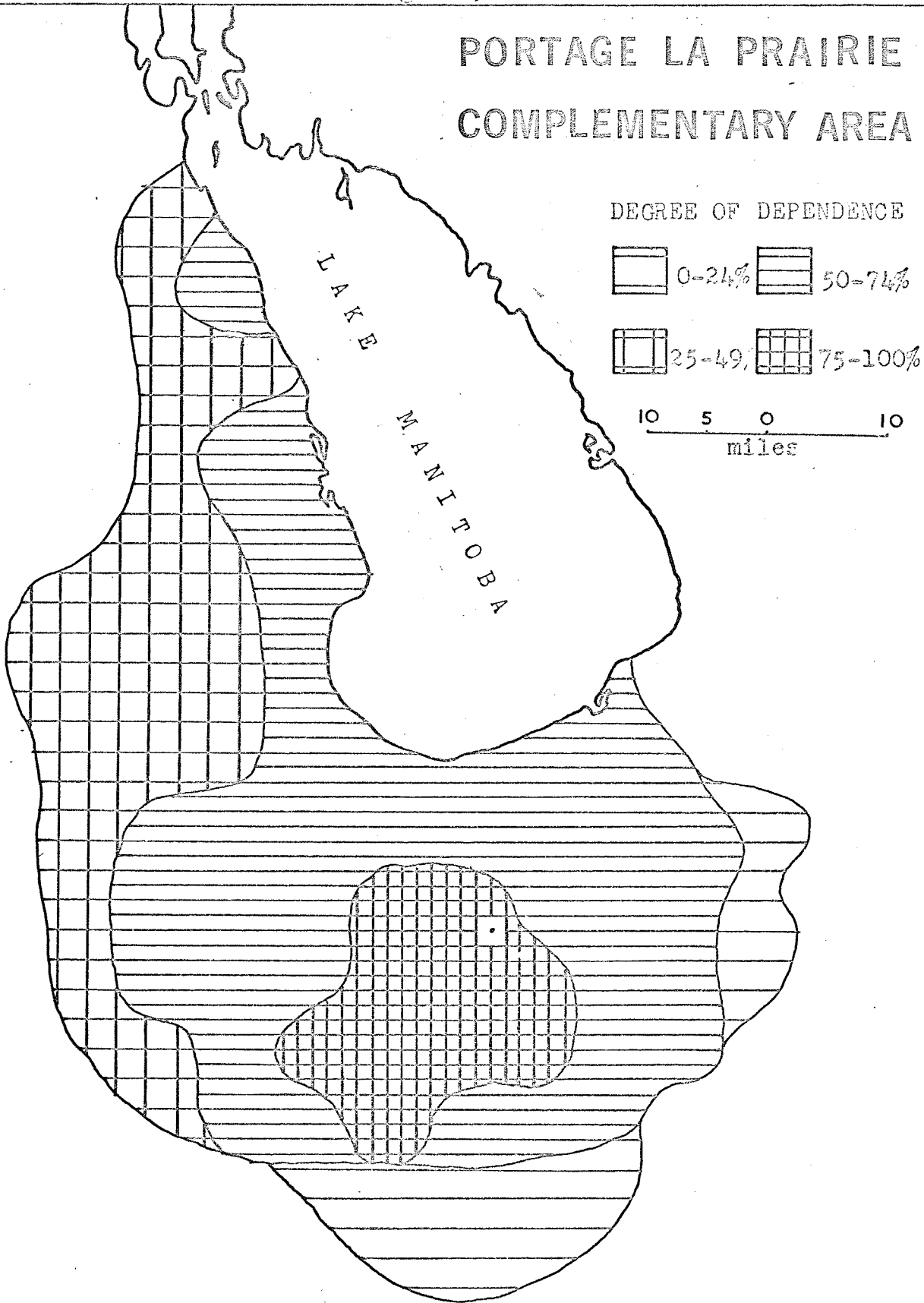
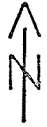
PORTAGE LA PRAIRIE COMPLEMENTARY AREA



Area dependent upon Portage for BETTER SHOES

Figure 52

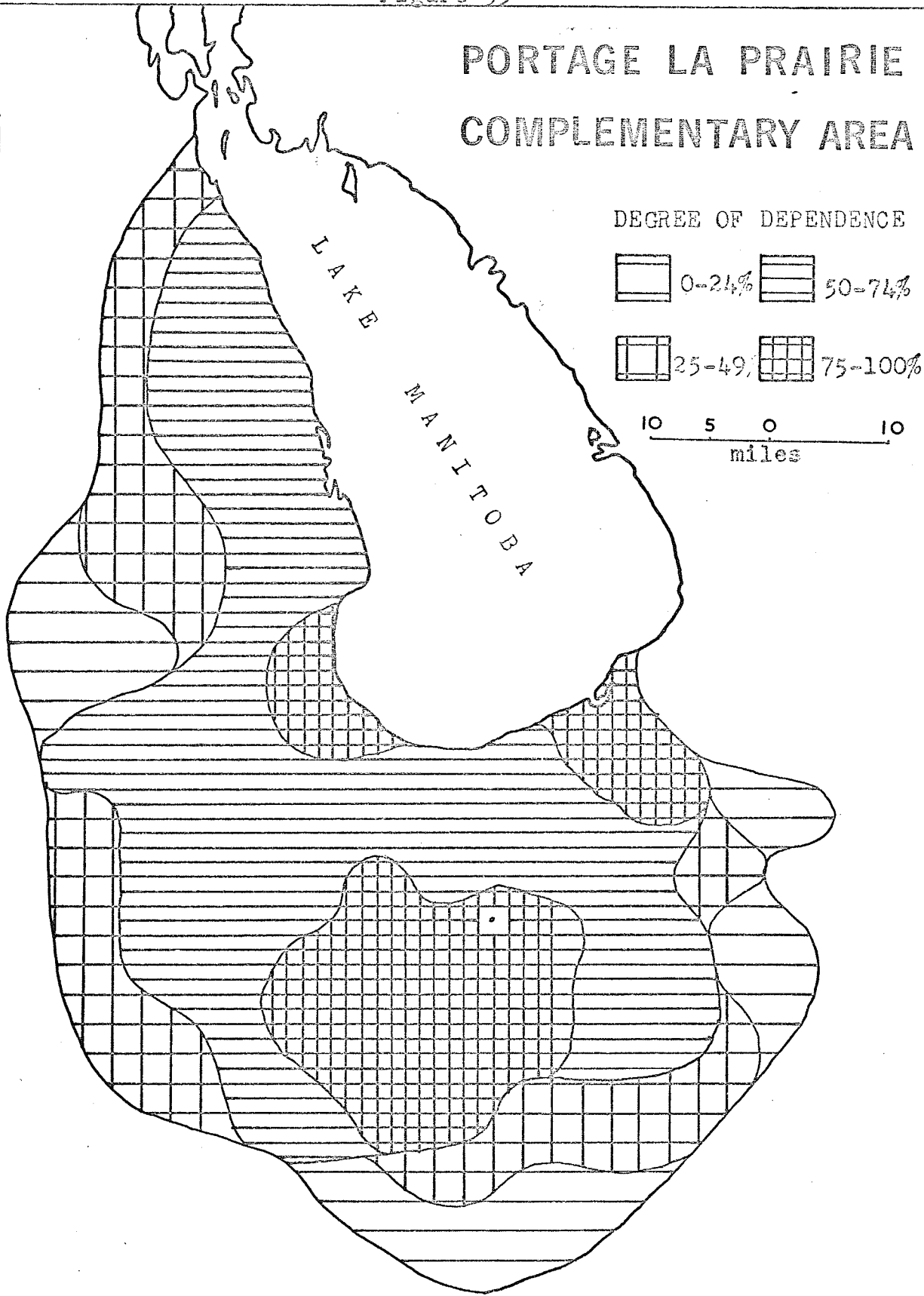
PORTAGE LA PRAIRIE COMPLEMENTARY AREA



Area dependent upon Portage for BETTER MEN'S CLOTHES

Figure 53

PORTAGE LA PRAIRIE COMPLEMENTARY AREA



Area dependent upon Portage for BETTER LADIES' CLOTHES

having a population of some 17,450 people. What this indicates is that Portage, although offering this good, is experiencing stiff competition from Winnipeg. Most people stated that they go to Winnipeg for better men's clothing because Portage cannot offer them enough choice of goods. This reason holds true even for the area west of Portage. People in this area also prefer Winnipeg, although it is some 50 miles further. Only a very small number of returns indicated Brandon as an alternative center to Portage la Prairie.

The good demanding the largest Portage area of dominance is better ladies' clothes as represented in Figure 53, page 234. As already mentioned, the greatest extent of influence corresponds well with the drawing area delimited by proprietors of ladies' shops in Portage. Again, it is the degree of dependence of this area upon Portage that is of special interest. Three independent areas, Rossendale, St. Ambroise, and Lakeland, make up the area of complete dominance. All three areas are economically relatively poor areas. People probably cannot afford anything better than the best Portage can offer. Secondly, they probably are as a result, not as mobile as the rest of the farmers in the Portage area. This means that both time and transportation to Winnipeg for shopping trips are not as readily available, hence forcing them to use the local centers.

The area of dominance of Portage in women's better clothes is the largest encountered, having some 18,595 people living in it. It is also the only area that includes the C level center of Gladstone. It is least developed, understandably, towards the east. Although it corresponds in general with the hinterland drawn

according to Reilly's law of retail gravitation, it is not as large in the northwest as the latter, yet is bigger to the east and south of Portage.

CHAPTER XIII

The Hospital Service Area.

The service areas of some specific urban institutions have been used in the past to delimit the hinterland of an urban center. One of these institutions has been the hospital¹ located in the service center. As Portage la Prairie has a general hospital, this possibility was also investigated.

The Portage General Hospital, located on the eastern edge of town, is an 86-bed hospital.² Its patients are almost^{all} of either the city or municipality of Portage la Prairie. During the 1965 year, 51 percent of the patients came from the city and 35 from the municipality. Of the remaining patients, three percent came from the municipality of North Norfolk, one percent came from the municipality of Cartier, while the remaining ten percent came from other areas in Manitoba as well as other provinces.

The above paragraph demonstrates the fact that the Portage hospital has a service area which is delimited very well by the Portage la Prairie municipal boundary. The explanation can be found in the fact the "The Portage District Hospital...is a municipal institution serving primarily the city and the Rural Municipality of Portage la Prairie",³ and hence it would discourage non-residents of the municipality or city to use it. Secondly,

¹A. E. Smailes, "The Analysis and Delimitation of Urban Fields", Geography, Vol. XXXII (1947), pp.151-161.

²Mr. Devine, the Hospital Administrator, supplied most of the data on the Portage General Hospital.

³Manitoba Hospital Survey Board Report on Hospital Facilities in Manitoba, 1960 Queen's Printers, p.333.

each of the four type C centers in the Portage area has a hospital, making it unnecessary for people to go to Portage for hospital care. This probably will change in the future as small hospitals are being closed.⁴

At present there is no school of nursing in the Portage Hospital but there had been a school operating from 1899 to 1951. The school was closed because of lack of accommodation for students as well as the lack of qualified teaching staff. A number of unsuccessful attempts have been made to reopen the school.

The present hospital was built in 1956. At present an extension to the old building is under consideration which, if implemented, would increase the capacity to 108 beds. This addition would reduce the dependence on Winnipeg Hospitals for patients that have to stay under long medical attention. Until now such cases were transferred to Winnipeg.

As can be seen from the above description the catchment area of the Portage hospital would not delimit the hinterland of Portage accurately as its area is completely dependent upon municipal boundaries.

⁴The Manitoba Hospital Survey Board recommended for example that the facilities at the MacGregor Hospital should not be increased but that increased facilities should be provided in the Portage Hospital for the MacGregor clients forcing the closure of the former's hospital with time.

CHAPTER XIV

Administrative Hinterland of Portage la Prairie.

The importance of government and community¹ establishments in Portage la Prairie can be realized by examining these institutions and their service areas somewhat more closely than was done in Chapter III. The term government and community service institutions is also applied in this investigation to institutions which, although not under direct control of the government, nevertheless are either owned by the government or are dependent upon the latter's financial help.²

All government or community services in the Portage area are sponsored by either one of the four levels of government present in Portage la Prairie. These levels of government are the City of Portage la Prairie, the Municipality of Portage la Prairie, the Manitoba Provincial Government and the Federal Canadian Government.

Of these four levels of governments, the city of Portage la Prairie has a very limited areal extent over which it exercises authority. This authority is limited to the city boundaries. City run services such as city welfare, recreation, sanitation, sewer and water, public works, police and fire are only concerned with the needs of the people within the city limits, and thus are not central place services. An exception exists in case of the fire department. This department has a financial agreement with a

¹In Table 6, page 80 it was shown that Portage la Prairie is a Class I (the greatest degree of specialization) government service center and a Class II community service center.

²Examples of such institutions are: Manitoba Hydro, Manitoba Telephone System and Children's Aid Society of South Central Manitoba.

specific rural area (see Figure 54, page 241) whereby they look after their needs in case of fire. In 1966 only 21 fires out of a total of 124 were in the rural areas. The agreement between the city fire department and the rural areas was entered upon in 1960 when it was clear that only through co-operation could both parties maintain a well-equipped fire-fighting unit.

At the municipal level of government the city of Portage la Prairie acts as the governing center for the municipality of Portage la Prairie. In this capacity it acts as a focus point for all rural residences of the municipality for such requirements as health,³ welfare,⁴ police, municipal roads, drainage, and education.⁵ In the latter field close co-operation exists with the city.

At present a change is taking place in the Manitoba School System. With the abolition of small rural elementary school districts, one school board will look after the education from Grade I to Grade XII. In the Portage area this board has both rural and urban representatives. The areal extent of the Portage la Prairie school division (Figure 54, page 241) follows closely the boundary of the rural municipality. In the southwest it excludes the Long Plain Indian Reserve and also the St. Ambroise area in the north-

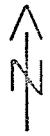
³The Rural Municipality of Portage la Prairie operates the hospital in conjunction with the City. Besides this it operates a Municipal Farm on which care is provided for some 30 elderly people.

⁴A small welfare service is also operated by the Municipality for its residents.

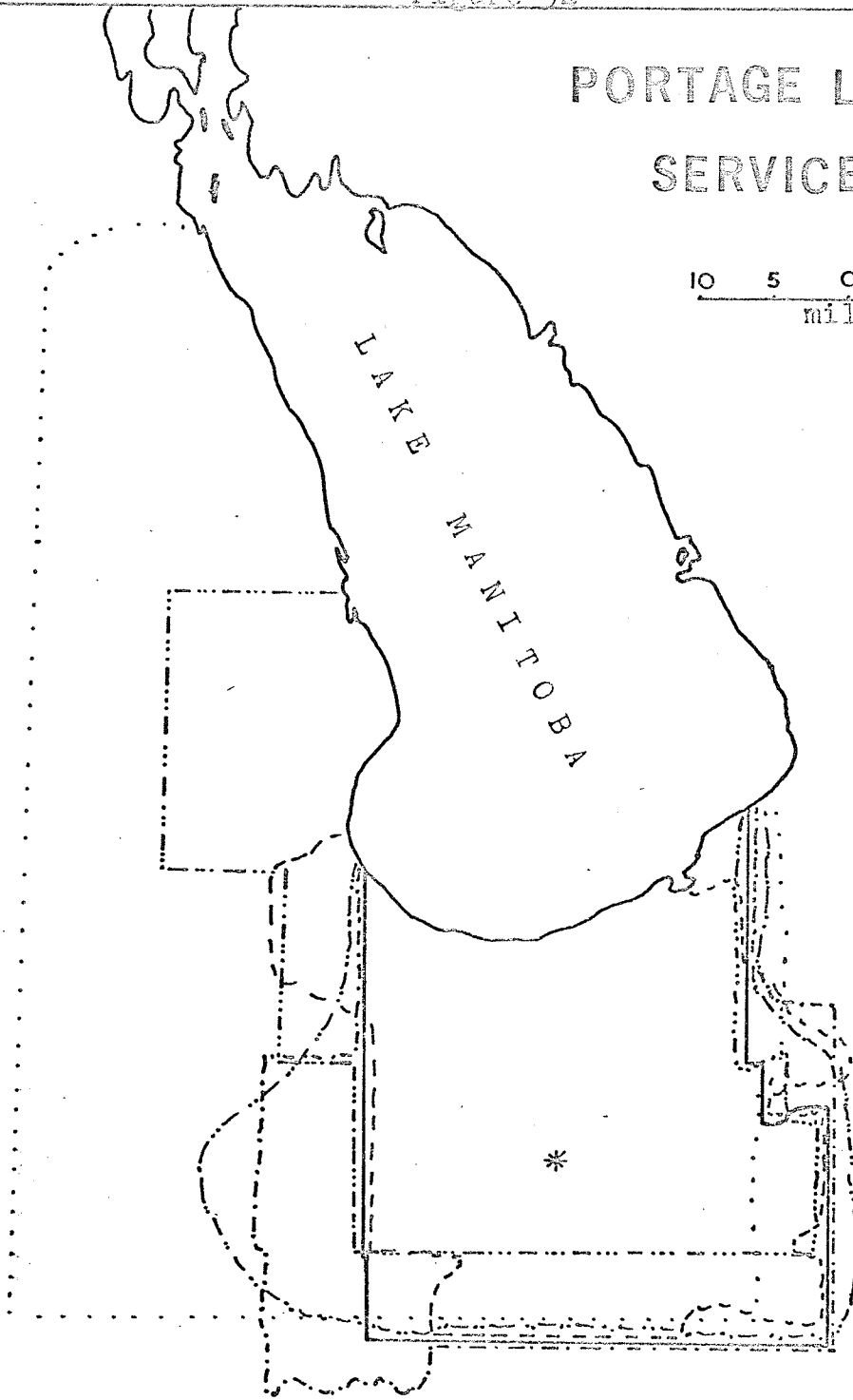
⁵In this field co-operation again exists with the City of Portage la Prairie. Rural students are brought into the city to attend the high schools there. At present more and more elementary students are also transported to the city.

Figure 5L

PORTAGE LA PRAIRIE SERVICE AREAS



10 5 0 10
miles



..... R.C.M.P. Highway -.-.- Agriculture Rep. -.-.- Fire Department
-.-.- R.C.M.P. Criminal -.-.- School Division -.-.- Municipality

east corner and a small part in the southeast corner of the municipality. The school division boundary goes beyond the municipal boundaries in the northwest and in the Poplar Point areas of the municipality. The latter area has been serviced by the Portage la Prairie school board for a number of years but the former was added to the Portage la Prairie school division only in 1966.

One of the main functions of the municipality is to maintain and improve municipal roads. This includes all roads in the municipality with the exception of the main highway arteries which fall under provincial jurisdiction. As good roads can make or break a center, this function of the municipality is a very important one. It keeps a fleet of trucks, bulldozers, and snow-removing equipment ready at all times. With recent emphasis on good roads, the area south of Portage la Prairie has become more accessible. Many farmers south of Portage la Prairie stated in the questionnaire that only recently have roads improved towards Portage la Prairie. As paving of roads by the Provincial Government is based on highway traffic counts, those roads that already are in fair condition are improved. In this way the improvement of a road or the formation of a road carries within it a momentum towards continuous improvement.

The creation of drainage ditches and the up-keep of dikes is another important responsibility of the municipality. As the land in the Portage area is extremely flat, flooding is a constant problem. Originally much of the area around Oakville and the area bordering Lake Manitoba was in swamps. Drainage ditches have been built to make these areas productive farm lands. As the Assiniboine

River also had a tendency to flood, dikes have been built along its source from Portage la Prairie to the eastern boundary of the municipality. With the completion of the Portage diversion channel⁶ set for the fall of 1968 these dikes should become obsolete.

It is in the field of Provincial Government service that Portage la Prairie is well equipped. Two institutions, the Manitoba School for Mentally Retarded and the Manitoba Home for Boys serve as centers for all of Manitoba. In the former case similar institutions are found at Brandon and Selkirk. Furthermore, as the institution is operated by the Provincial Government and hence paid by the taxpayer, only residents of Manitoba are admitted. In the case of Manitoba Home for Boys it is the only institution of its kind in Manitoba. Boys from the northwest territories are also admitted, making the service area even larger than the Province of Manitoba. The Home caters to Juvenile law offenders, being somewhat less strict on its inmates than the strictly penal institutions.

The service areas of two publicly-owned utilities are shown in Figure 55. These two are the Manitoba Telephone System and Manitoba Hydro. Both have supervisory offices^{7,8} in Portage.

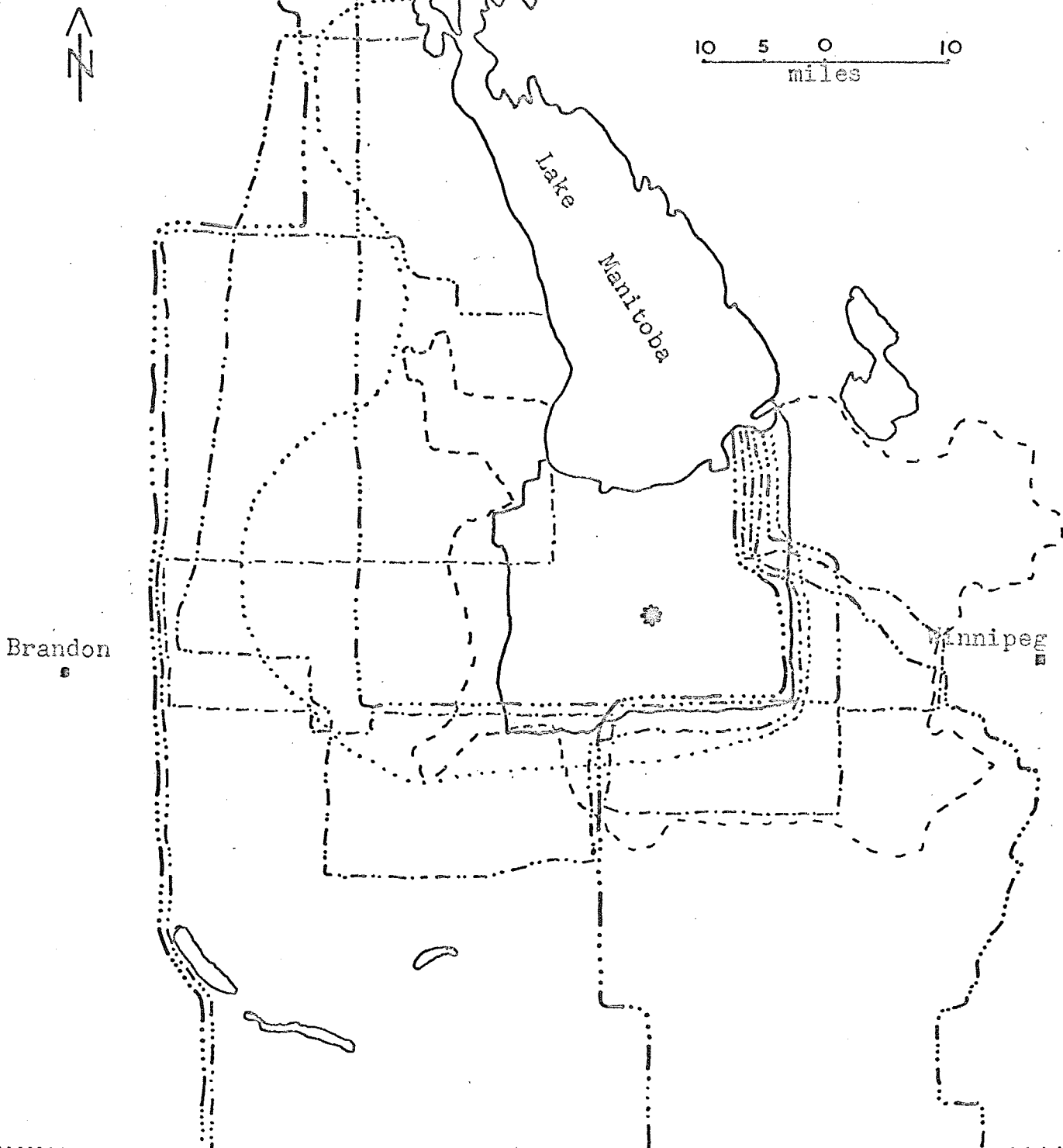
⁶ A diversion channel from the Assiniboine River to Lake Manitoba is being built three miles west of Portage la Prairie. This channel will allow water from the Assiniboine to flow into Lake Manitoba during the spring run-off period and hence reduce flooding in the lower part of the Assiniboine.

⁷ The Portage Telephone office acts as business office to two telephone systems; the Portage la Prairie and the Oakville.

⁸ The Portage Hydro offices are classified as an area office. To this area office are responsible 11 districts, the latter usually consisting of one or two men performing maintenance work. Portage only received this area office ten years ago before which time all supervisory work was done from Winnipeg. Mr. Fraser, Manager, Portage Manitoba Hydro Office.

Figure 55

PORTAGE LA PRAIRIE SERVICE AREAS



10 5 0 10
miles

Brandon

Winnipeg

U. S. A.

- | | | |
|---------------------|-------------------------|---------------------|
| —— Telephone System | ----- Manpower Dept. | Welfare Dept. |
| --- Hydro | ----- Childrens Aid | Post Office |
| ----- Health Unit | ----- Land Title Office | |

As can be seen from the map, the supervisory area of the Portage Manitoba Hydro Office is quite unique. It extends further eastward from Portage than westward. It supervises and directs workers whose areas touch the boundaries of greater Winnipeg. The Portage district itself is small, stretching from the southern boundary of the municipality north to Lake Manitoba but is nowhere wider than 15 miles. In 1966 the Portage Hydro supervisory area had some 12,000 meters, of which just over 4,000 were in the city of Portage.

The Portage la Prairie telephone system together with the Oakville one, encompasses an area somewhat larger than the municipality. Both systems can be taken together as one, as no long distance charge is involved in phoning from one to the other. It thus represents a community in which the members are more concerned with being able to get in easy contact with each other than with members of other communities. The inclusion of Range 9, Townships 10 to 14 on the western boundary of the municipality, in the Portage la Prairie telephone system certainly shows the strong influence of Portage there.

The Royal Canadian Mounted Police-Highway Department, patrols the area in which the retail drawing power of Portage is greatest. The eastern boundary corresponds to the municipal boundary, the southern boundary to southern municipal boundary and the western boundary runs straight north from Sidney to Plumas to Alonsa and then east to Lake Manitoba (Figure 54, page 241). In this area the provincial highways are patrolled by a detachment situated in Portage la Prairie.

Being a good agriculture area Portage naturally is the center for an agriculture representative of the Provincial Government. As can be seen (Figure 54, page 241) this area consists of the municipalities of Portage la Prairie and Lakeview and the western area of Westbourne Municipality.

The Land Titles Office has been located in Portage la Prairie since the 1880's at which time Portage became an important service center. (Figure 55, page 244). Its present area has remained unchanged since 1936. Before that time people from part of the Inter-lake area had to come to Portage for land transactions. With the exception of the northern-most section, this Land Titles Office services an area similar to the retail trading area of Portage.

The Portage health unit extends its service area mainly west and east of Portage la Prairie. In the west it goes up to a few miles from Brandon and to the east it includes the Municipality of Cartier, which is only ten miles from Greater Winnipeg.

The Welfare and Children's Aid service societies of Portage are of substantial size (see Figure 55). Both areas extend as far south as the American border. Before 1957 the Welfare department also served the municipalities bordering the present southeastern service area boundary. Because of poor roads to Portage these municipalities were transferred to the Winnipeg office.⁹

In Figure 55 are also shown the service areas of two federal government services, the Canada Manpower Service and the Post Office. The service area of the Manpower office is quite large

⁹Mr. Dawshka, Manager, Portage Welfare Office.

including the town of Neepawa. Its western boundary borders close to Brandon, being somewhat unrealistic as the latter center also has a Manpower office. The population of this huge rural area comes to some 45,000 people. Although most rural people do not need the employment placement service, other programmes¹⁰ sponsored by the Manpower centers are being demanded in ever increasing fashion as more and more rural people try to prepare themselves for employment in the cities.

The other federal service institute with a substantial service area is the Post Office. From the area outlined, mail is funneled through Portage la Prairie mainly to Winnipeg. In some cases mail to these centers also goes first through the city although with the use of trucks as mail carriers flexibility of mail routes has been introduced, and mail from ~~the~~ outside the Portage area may go directly through to the small post offices in the Portage la Prairie hinterland. Direct daily mail delivery into the country-side is provided at present along five routes leading away from Portage. At present these routes are fairly short, the longest going eight miles to Delta.

As can be seen from the service areas of the few government service institutions discussed, these areas are generally larger than the economic and social hinterlands discussed previously. Portage can be considered as a center one step below Winnipeg in governmental services, as the classification showed Portage has a high specialization in government and community service. This

¹⁰ At present the upgrading of people so as to be able to acquire a trade through courses taken at vocational centers in Manitoba is one of the major programmes offered. Mr. Frank Besplug, Manager of Portage la Prairie Canada Manpower Center.

is also reflected in this section by the large areas these institutions serviced.

Having expounded the service areas of a great number of central place institutions in Portage, the geographer is tempted to draw from this information the complete hinterland of Portage on one map. Owing to the large areal differences between the individual services, it is not possible to draw one map which shows the hinterland of Portage la Prairie. One can speak of specific service areas of specific institutions or of complementary areas of specific goods but not of the hinterland of a whole city.

It might be wise for institutions to study their service areas as well as those of others. Servicing of similar areas could reduce the cost of these services to the clients living in the rural areas. In the field of governmental services this certainly would be true. Such co-ordination would help in the creation of a community with one focus, that would, in time, develop similar characteristics.

PART IV
CHAPTER XV
CONCLUSION

A. Findings of the Study

The main conclusions of this study are summarized into two main sections; the establishment of an hierarchy in the Portage area, and the findings of the complementary areas of Portage la Prairie.

Hierarchy of Centers in the Portage Area

In recent years much research has been done on the establishment of hierarchical levels of central places. Christaller started this research when he was able to decipher an eight level hierarchy of centers in Southern Germany on the basis of the central place functions they performed. The main basis of this hierarchical level of service centers was the market principle.

For the determination of the actual location of a center in the hierarchy, Christaller used the centrality index, which was derived mainly from the number of telephones in the central place. In comparing his number of higher level centers to his model number of higher order centers a close agreement was found. But, the agreement was not as good at the lower level centers where he had \approx substantially less centers than his theoretical model stated. When the chi-square (X^2) test of compatibility was applied to Christaller's data, the hypothesis that the actual data came from a population¹ having the basic distribution of the theoretical data had to be rejected, although most of the deviation was caused by the lower level centers.

¹The term population is used here in a statistical sense referring to the central places in Christaller's model.

In North America much research has been done in order to establish an hierarchical structure. In 1953 Brush found a three level hierarchy of lower level service centers in Wisconsin. His data corresponds quite well to the theoretical scheme as envisaged by Christaller under the $k=3$ network, having only a 1.5 percent probability of rejection.

By the mid-1950's Berry and Garrison were working on an hierarchy of central places in Snohomish County, Washington. By the use of statistical techniques they were able to show that the number of functions in small central places fell into distinct groups. It proved, with the help of an objective test, the existence of hierarchical levels of centers.

Besides the research in the United States, a number of studies have been conducted in various parts of the world. In Sweden, England and Canada similar studies have shown the same basic levels of centers. Woroby found a five-level hierarchy of centers with the highest level center having 25,000 people in Southwestern Saskatchewan. Again, a compatibility test (X^2) of his data to Christaller's theoretical data showed significant agreement.

In the Interlake Region of Manitoba, Sosa found a four level hierarchy of central places among the centers with less than 2,000 people. Although the X^2 test for compatibility showed a significant difference between the number of centers in the different levels and their theoretical counterparts, Sosa showed that the service centers in the Interlake Region are arranged in an hierarchy.

The establishment of an hierarchy in the Portage la Prairie area was studied after the nodal area of Portage la Prairie had

been delimited. Each center in this area was then examined regarding the central place functions performed, the population of the center, and the distance from Portage la Prairie.

According to Christaller the population of a center is proportional to the importance of the central place, and therefore the centers in the Portage la Prairie nodal region ^{were} ~~was~~ examined for hierarchical classes as based on population. In addition, because the distance of a lower order center from a higher order center varied with the different levels, it was thought that the distance of the different levels of centers from Portage la Prairie would help in deciphering the hierarchy. A graph relating population and distance from Portage was constructed. This graph showed four population clusters with some clustering of centers at the 15, 24, 30, 35, and 48 mile distances from Portage.

An examination of the four population clusters showed that some centers with few service institutions were found in the upper groups; namely St. Laurent, Amaranth. Such centers as St. Ambroise, St. Eustache and Delta, although not in the highest group, were located in groups of centers which had far more central place functions and hence were placed too high in the hierarchy. On the basis of these evidences the use of population data as an indicator of the hierarchy had to be rejected.

The test for an hierarchy of urban centers in the Portage la Prairie nodal region was then directed to services offered in the central places. For each center the number of functions, the number of functional units, and the number of establishments were recorded. It was found that the auxiliary centers did not have an agglomeration of buildings. By the time a central place offered

about five or more services, the physical forms of an urban place started to appear.² These auxiliary centers usually offered the service of a grain elevator, a general store, and a post office. In all, there were 42 auxiliary centers and 31 full-fledged central places.

The full-fledged central places were then classified by means of a group test using the functional data and graphs depicting the relationship between the three measures of central place functions. From the array of full-fledged central places three hierarchical levels were discernible, with Portage la Prairie being at the fourth level. The lowest level (A), of these full-fledged central places consisted of 19 centers with the number of functions ranging from 5 to 16. The second lowest level (B) was made up of seven centers with a range of functions from 23 to 30. The highest level (C) outside of Portage la Prairie had four centers with a range of functions from 40 to 56. Portage la Prairie, the D level center had 91 functions. By comparing the distribution of centers in the different hierarchical classes to Christaller's theoretical distribution, significant agreement was found.

In comparing the hierarchical findings regarding the number of central functions in the different levels to similar studies again close agreement was found. On examining the functions in these hierarchical levels of centers it was shown that the difference in levels was due to the fact that higher order centers offered additional functions to the ones found in all the lower order centers. At present many of the lower order centers and especially

²By this is meant such forms as streets, business areas and residence areas.

the auxiliary centers are declining or vanishing because of the removal of central place functions such as grain elevators and schools.

A comparison of Portage la Prairie with the C level centers brought out its higher hierarchical level. All functions found in C level centers were also found in Portage la Prairie in addition to a great number serving substantial areas of Manitoba and in some case the whole province.

The true nature of Portage la Prairie as a central place was seen when its employment structure was compared to similar sized centers in other parts of Canada . Portage was found to specialize in such central place functions as government service, finance, recreation, personal service, retail trade, and public utilities.

After having established the hierarchy in the Portage area the relationship between the measures of central place functions and population were examined. Although the correlation between population and number of functions, number of establishments and number of functional units was high, it was shown that population cannot be used to decipher the hierarchy of central places. The similarity in magnitude, between these correlation coefficients and those determined by Stafford, Berry, King, and Thomas, was great.

A check on the results of the hierarchy of centers in the Portage la Prairie area was made by examining the spatial distribution of the centers. The nearest neighbor measurement method for an areal distributed phenomena was used. The actual distribution was somewhere between random and hexagonal. Part of the deviation

could be accounted for by non-homogeneous agricultural areas in the Portage la Prairie region.

Portage la Prairie's Sphere of Influence.

For the delimitation of Portage la Prairie's sphere of influence, two different approaches were taken, an 'inside' approach and an 'outside' approach. The former established the service areas of individual central place institutions as based on information gathered through interviews with managers and proprietors of establishments. The 'outside' approach consisted of a questionnaire sent to the rural areas establishing the degree to which Portage la Prairie was being used for the purchase of goods and services.

The main advantage of the inside approach was that it took less time to collect the hinterland data as well as to interpret it. The disadvantages occurred mainly in the form of inaccuracy. The exact location of clientele's residences were unknown to the majority of the managers and proprietors. Therefore, the degree of dependence of the rural people upon the services and goods in the city was also unknown. Also, some managers and proprietors considered such information as confidential. Whether the secrecy was the policy of the institution or whether it was a cover-up for a lack of knowledge is debatable. A few of the people interviewed also considered such research as a means of promotion and wilfully exaggerated the extent of their services.

The outside approach was by far the superior one. Here the element of the hinterland, the individual or family, was asked directly regarding his city or town preferences for services and goods. Problems associated with this technique were only technical, such as constructing a proper questionnaire and the problem of

distributing the questionnaire. In the latter case, the use of school children worked well.

For the purpose of processing the questionnaire data, all questionnaires from a Township/Range unit (36 square miles) were combined, and the stated preferences of going to Portage for a particular service or good was expressed as a percent of the total number of preferences stated. Although this worked well in most cases where there was a fair density of population, in areas where the population density was low, two or even three townships had to be combined so that the percentage of preference was meaningful.

In cases where the hinterlands derived by these two methods could be compared, this was done. In nearly all cases the hinterlands claimed by managers and proprietors were either equal to or even greater than the outside boundary of some dependence derived from the questionnaire.

Although central place theory claims that the purchase area of a good or service will have sharp boundaries, this was not upheld by the findings of this study. In most instances the decline of Portage la Prairie's influence in a particular good or service was gradual, although not equal in the different directions from Portage. In most cases the decline was gentle along good highways leading away from Portage, while the influence declined abruptly in the direction where there were poor roads or none at all. Different services and goods also had varying degrees of decline of slope. The golfing area, for example, had an abrupt change from complete dependence on Portage to one of no dependence with only a small area of 25 percent dependence. Contrary to the golfing, the Portage hinterland for better ladies' clothes occupied

a large area with gradual decline, ranging from complete dependence near Portage to no dependence at substantial distances from the center. Only the professional services and social hinterlands had steep gradients of change of dependence. In the field of retail goods the degree of dependence on Portage gradually declined, as distance increased.

The actual size of the complementary area of the different level services and goods was found to vary. The complementary areas of those goods and services which could also be obtained in lower order centers were smaller than those that were only offered in Portage. The service areas of C level goods were in general, greater than the complementary areas of auxiliary A and B level goods. Also, goods that were very competitive, such as clothes, had larger areas than their level indicated. Thus, for example, most work clothes could be bought from dry goods stores which were found in most B and C level centers, yet the complementary area of Portage for this kind of good was quite large.

In most cases very little agreement was found between the actual shape of the complementary areas of different Portage La Prairie goods and services and the hexagonal shape advocated by Christaller. The agreement between the theoretical hinterlands derived by Reilly's law of retail gravitation and the actual ones derived from the research was quite poor. Portage exhibited stronger influences towards Winnipeg and less towards the northwest as predicted by Reilly's law.

By observing the number of people living in the areas in which more than 50 percent of the people depend upon Portage for goods and services one can see the increasing threshold requirements

with the increasing level of the good. Although the population data for the 38 complementary areas derived from the questionnaire showed a general increase with the level of the good it did not demonstrate³ four distinct levels of goods. With consideration (of the people) in the areas of less than 50 percent dependence and an adjustment of the population figures in the areas of more than 50 percent dependence, this might serve as a useful method for a future study to determine the precise level of the good, and the population threshold required.

The number and levels of centers in the 50 percent or more dependence areas of Portage usually corresponded well with Christaller's theoretical presentation. The ratio of higher to lower order of centers usually followed the 1:2:6:18:54 ratios.

An examination of the governmental institutions showed that Portage la Prairie acts as a high government service center. The complementary areas of most provincial and federal government institutions are substantially larger than any retail, social, or professional service hinterlands.

B. Practical Recommendations

Although this investigation was made with no practical implications in mind, such a study can be useful to society in a number of ways. Business institutions can use such a study as a basis for determining the size of the population on which they will depend. Governments, in their effort to improve training facilities, can use such a study to see where technical vocational schools

³As there were four distinct level of centers in the Portage area, there should have been four levels of goods each having a different threshold population.

should be located. For the changing or establishing of boundaries for such institutions as municipalities and schools the knowledge of the nodal area is important. In the area of road planning, before beginning of construction, a knowledge of the cities or towns used by a particular area is important. In short, any activity which is performed in a central place and which depends in part or in whole on the rural areas will find such a study useful. Thus, it is hoped that this study could not only have theoretical but also a practical value.

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APPENDIX A

QUESTIONNAIRE FOR THE INTERVIEWS OF COMMERCIAL ESTABLISHMENTS

NAME _____

ADDRESS _____

1. Service performed or goods produced by Establishment.
2. When Establishment was founded and why Portage was chosen as site.
3. Area served by Establishment as delimited on map by proprietor or manager.
Has this changed recently?
4. How many of your total number of clients or customers come from outside Portage?
5. What percentage of your business revenue do you derive from non-residents of Portage?
6. How many of your employees live outside of Portage? _____ (total _____)
Where?
7. Has this establishment expanded since it was founded? _____
When? _____ Do you consider expanding?

* * * * *

APPENDIX B

SOCIAL - ECONOMIC SURVEY

INSTRUCTIONS:

Indicate with a check mark, the town or city from which you obtain the greatest amount of each of the requirements listed. In columns five and six you may write in the name of other centres which you go to.

In column seven, please state the reason why Portage la Prairie is or is not used by your household. Choose your reason from the following list and insert the corresponding number for that reason in the space provided.

If you go to Portage la Prairie:

- 1) Because Portage la Prairie is the closest city for this requirement or service.
- 2) Because Portage la Prairie can offer you the quality and choice of goods or service.
- 3) Because you go to Portage la Prairie anyway for other reasons.
- 4) Because one or more members of the family or household work in Portage la Prairie.
- 5) Because you have always gone to Portage la Prairie for the requirement or service.
- 6) State your own reason if it differs from the ones given above. _____

If you do not go to Portage la Prairie:

- 7) Because Portage la Prairie can not offer you enough choice of goods or service.
- 8) Because Portage la Prairie is too far away from your place.
- 9) Because the roads to Portage la Prairie are in poor condition.
- 10) Because you have no friends or relatives in Portage la Prairie.
- 11) State your own reason if it differs from the ones given above. _____

In column eight indicate by means of a check mark the length of time you have utilized, that is, shopped or done your business, at the centres you have checked off.

PLEASE FILL IN THE FOLLOWING:

Your Location: Section or Parish Lot _____
 Township or Parish _____
 Range _____
 Municipality _____
 Town, City, or Village _____

Distance in road miles from Portage la Prairie

of Hard-Top _____
 of Gravel _____
 of Dirt _____
TOTAL _____

	1	2	3	4	5	6	7	8			
	Portage la Prairie	Winnipeg	Gladstone	Neepawa			Reason why Portage la Prairie is or is not used	How long has this been so?			
								In Years			
								5	10	20	More
Perishable food											
Non-perishable food											
Ordinary Ladies Clothing											
Better Ladies Clothing											
Mens' Work Clothes											
Better Men's Clothing											
Children's Wear											
Work Shoes											
Better Shoes											
Furniture											
Household Appliances											
Building Material											
Buying a Car											
Servicing your car											
Buying Farm Equipment											
Repairing Farm Equipment											
Fuel (for home, for vehicles)											
Seed, Fertilizer, Chemicals											
Veterinarian											
Medical Supplies											
Doctor											
Dentist											
Lawyer											
Accountant											
Bank or Credit Union											
Insurance Agent (House, Car)											
Daily Newspaper											
Weekly Newspaper											
Radio Station											
Place of Work											
Bowling											
curling											
Golfing											
Dancing											
Playing Bingo											
Theatre											
Church											
Where Deliver Farm Products to											

THANK YOU FOR YOUR CO-OPERATION AND ASSISTANCE IN THIS SURVEY.

APPENDIX C

Central Place Theory - A Precis

In his original work on central places in Southern Germany, Christaller laid the foundations of central place theory. It explains the size, number and distribution of towns on the basis of a general deductive theory. The most important features of this theory as outlined by Berry and Pred in Central Place Studies: A Bibliography of Theory and Application are:

- (1) The basic function of a city is to be a central place providing goods and services for a surrounding tributary area. The term "central place" is used because to perform such a function efficiently, a city locates at the center of minimum aggregate travel of its tributary area, i.e. central to the maximum profit area it can command.
- (2) The centrality of a city is a summary measure of the degree to which it is such a service center; the greater the centrality of a place, the higher is its "order".
- (3) Higher order places offer more goods, have more establishments and business types, larger populations, tributary areas and tributary populations, do greater volumes of business, and are more widely spaced than lower order places.
- (4) Low order places provide only low order goods to low order tributary areas; these low order goods are generally necessities requiring frequent purchasing with little consumer travel. Moreover low order goods are provided by establishments with relatively low conditions of entry. Conversely, high order places provide not only low order goods, but also high order goods sold by high order establishments with greater conditions of entry. These high

order goods are generally "shopping goods" for which the consumer is willing to travel longer distances, although less frequently. The higher the order of goods provided, the fewer are the establishments providing them, the greater the conditions of entry and trade areas of the establishments, and the fewer and more widely spaced are the towns in which the establishments are located. Ubiquity of types of business increases as their order diminishes. Because higher order places offer more shopping opportunities, their trade areas for low order goods are likely to be larger than those of low order places, since consumers have the opportunity to combine purposes on a single trip, and this acts like a price-reduction.

(5) More specifically, central places fall into a hierarchy comprising discrete groups of centers. Centers of each higher order group perform all the functions of lower order centers plus a group of central functions that differentiates them from and sets them above the lower order. A consequence is a "nesting" pattern of lower order trade areas within the trade area of higher order centers, plus a hierarchy of routes joining the centers.

(6) Even more specifically, with Thunen-type limiting assumptions relating to uniformity, of population distribution, the hierarchy may be organized according to (a) a market principle, according to which nesting follows a rule of threes. Deviations from the market principle may be explained by (b) the principles of traffic, which give rise to linear patterns and nesting according to fours, or (c) the socio-political or administrative "separation" principles, with the hierarchy organized according to a rule of sevens, and with low-order twin cities where one would predict a high order place to be located if only the marketing principles were operative.