

THE UNIVERSITY OF MANITOBA

AN ANALYSIS OF COMMERCIAL STRUCTURE ALONG A
MAJOR TRAFFIC ARTERY IN WINNIPEG: A CASE
STUDY OF PORTAGE AVENUE

by

PENG-TONG LING

A THESIS
SUBMITTED TO THE FACULTY OF GRADUATE STUDIES
IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE
OF MASTER OF ARTS

DEPARTMENT OF GEOGRAPHY

WINNIPEG, MANITOBA

October 1974

AN ANALYSIS OF COMMERCIAL STRUCTURE ALONG A
MAJOR TRAFFIC ARTERY IN WINNIPEG: A CASE
STUDY OF PORTAGE AVENUE

by

PENG-TONG LING

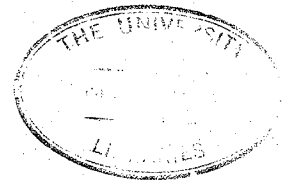
A dissertation submitted to the Faculty of Graduate Studies of
the University of Manitoba in partial fulfillment of the requirements
of the degree of

MASTER OF ARTS

© 1974

Permission has been granted to the LIBRARY OF THE UNIVER-
SITY OF MANITOBA to lend or sell copies of this dissertation, to
the NATIONAL LIBRARY OF CANADA to microfilm this
dissertation and to lend or sell copies of the film, and UNIVERSITY
MICROFILMS to publish an abstract of this dissertation.

The author reserves other publication rights, and neither the
dissertation nor extensive extracts from it may be printed or other-
wise reproduced without the author's written permission.



ACKNOWLEDGEMENTS

I would like to express my special gratitude to Mr. Daniel J. Old for his invaluable help without which this thesis would not have been possible. Special thanks are due to Dr. R. C. Tiwari for initiating my research interest in this topic and providing the research grant for the project. I would also like to thank Mr. Robert Bednarz of the Department of Geography, Northwestern University for acting as the external examiner.

Finally, to members of the 'GFA', who made my years in this department enjoyable, I also owe them my debts.

TABLE OF CONTENTS

	PAGE
ACKNOWLEDGEMENTS	i
TABLE OF CONTENTS	ii
LIST OF FIGURES	iii
LIST OF MAPS	iv
LIST OF TABLES	v
CHAPTER ONE INTRODUCTION	1
1-1 RESEARCH PROBLEMS AND THE STUDY AREA	
1-2 DATA	
1-3 LIMITATIONS OF THE STUDY	
CHAPTER TWO REVIEW OF LITERATURE	5
CHAPTER THREE ANALYSIS OF BUSINESS STRUCTURE ALONG PORTAGE AVENUE	14
3-1 INTRODUCTION	
3-2 CLASSIFICATION OF BUSINESS FUNCTIONS	
3-3 COMPOSITION OF BUSINESS LAND USE	
(I) THE GENERAL OVERVIEW	
(II) DIVISIONS OF PORTAGE AVENUE	
3-4 THE SPATIAL PATTERNS OF BUSINESS ESTABLISHMENTS DISTRIBUTION	
(I) PERCENTILE VALUES ANALYSIS	
(II) TEST OF RANDOMNESS	
3-5 THE SPATIAL ASSOCIATION AMONG DIFFERENT BUSINESS TYPES	
CHAPTER FOUR SUMMARY AND CONCLUSION	82
APPENDIX I CLASSIFICATION OF BUSINESS CLASSES	85
APPENDIX II DERIVATION OF ORDER NEIGHBOR STATISTICS FOR A CLASS OF RANDOM PATTERN IN ONE DIMENSIONAL SPACE	90
APPENDIX III CLASSIFICATION OF BUSINESS TYPES	93
BIBLIOGRAPHY	95

LIST OF FIGURES

Figure	Page
3-1 Cumulative % Curves of Food stores (1) and Eating places (2)	40
3-2 Cumulative % Curves of Apparel & accessories stores(4), Furniture & Appliance dealers (5) and Lumber, Building Material & Hardware (6)	41
3-3 Cumulative % Curves of Automotive (7) and Drug stores(8)..	42
3-4 Cumulative % Curves of Other retail (9)	43
3-5 Cumulative % Curves of Finance (10) and Business service (12).....	44
3-6 Cumulative % Curves of Personal service (11) and Professional service(13)	45
3-7 Cumulative % Curves of Household repair (14), Entertainment (15) and Hotels (16)	46

List of Maps

Map		Page
3-1	Commercial Land Use in Downtown Winnipeg	16
3-2	Commercial Land Use in the Study Area	35
3-3	Residential Land Use in the Study Area	36
3-4	Distribution of Food Stores on Portage Avenue	62(a)
3-5	Distribution of Eating Places on Portage Avenue	62(b)
3-6	Distribution of Furniture & Home Furnishing Stores	62(c)
3-7	Distribution of Gas & Service Stations on Portage Avenue	62(d)
3-8	Distribution of Auto Dealers on Portage Avenue	62(e)
3-9	Distribution of Drug Stores on Portage Avenue	62(f)
3-10	Distribution of Banks on Portage Avenue	62(g)
3-11	Distribution of Real Estates on Portage Avenue	62(h)
3-12	Distribution of Barber & Beauty Shops on Portage Avenue ...	62(i)
3-13	Distribution of Physicians and Dentists on Portage Avenue	62(j)
3-14	Distribution of Recreation & Entertainment on Portage Ave.	62(k)
3-15	Distribution of Hotels on Portage Avenue.....	62(l)

List of Tables

Table	Page
3-1 Business Classes used as Basic Functional Units	19
3-2 Portage Avenue- Business Composition; number of establishments and percentages	22
3-3 Section 1 (Memorial to Strathcona)- Business Composition; number of establishments and percentages	25
3-4 Section 2 (Queen to Woodlawn)- Business Composition; number of establishments and percentages	26
3-5 Section 3 (Whytefold to Booth)- Business Composition; number of establishments and percentages	30
3-6 Section 4 (Sturgeon to David) - Business Composition; number of establishments and percentages	33
3-7 Subsections of Business Dtstricts on Portage Avenue	34
3-8 Order Neighbor Statistics for Food Stores	57
3--9 Order Neighbor Statistics for Eating Places	58
3-10 Order Neighbor Statistics for Furniture and Home Furnishing Stores	58
3-11 Order Neighbor Statistics for Gas & Service Stations	59
3-12 Order Neighbor Statistics for Auto Dealers	59
3-13 Order Neighbor Statistics for Drug Stores	60
3-14 Order Neighbor Statistics for Banks	60
3-15 Order Neighbor Statistics for Real Estates	61
3-16 Order Neighbor Statistics for Barber and Beauty	61
3-18 Order Neighbor Statistics for Physicians & Dentists	62
3-19 Order Neighbor Statistics for Recreation	62
3-20 Order Neighbor Statistics for Hotels	62
3-21 (A) to (L) Spatial Relationships Among Business Types Based on The Menas and Variances of Nearest Neighbor Distances	69 - 80
3-22 A Summary of Spatial Relationships Among Business Types Shown in Table 3-21 (A) to (L), Based on Mean Nearest Neighbor Distances Only	81

CHAPTER 1

INTRODUCTION

1 - 1 Research Problems and The Study Area

The era of the automobile has brought about drastic changes in North America's urban landscape in the last few decades. One of the most obvious effects has been the emergence of commercial ribbons, i.e. the development of business establishments along major urban traffic arteries. Early studies of urban business structure have provided the basis for a general consensus that commercial ribbon development exists because of its ability to attract clientele from the passing traffic.¹ These findings explained the cause of emergence of such phenomena but failed to provide any further insight into the relation of the structure to the functions of the ribbon, or the relative strengths of various businesses in competing for ribbon locations.

Today, commercial ribbons have become an integrated part of the overall commercial structure of many cities, although physically they can still be quite easily distinguished from other types of business districts.² Functions catering to passing traffic no longer dominate the business composition of such streets. In fact, almost any business functions can be found favouring ribbon locations. Each of the establishments on the ribbon serve a unique combination of passing traffic

1. See Chapter 2.

2. Commercial ribbon is defined in this study as "a major street fronted by commercial establishments where the intersecting streets are devoted to a different type of land use."

and the nearby residential area. Due to the complicated nature and functional overlap of all the establishments on the ribbon today, the more recent studies in ribbon developments which aimed at classifying business establishments on ribbons as highway-oriented or hierarchic reveal only part of the true nature of these patterns.

A review of the pertinent literature indicates the limitation of the existing models as aids of understanding the true nature of commercial ribbon development. The structure of commercial ribbons has long been the subject of vague definition, and the ambiguities which have resulted suggest that further examination of the structure of commercial ribbons is warranted. The present study is aimed at clarifying some of these issues through an analysis of establishments in a commercial ribbon of Winnipeg.

Portage Avenue, the major traffic artery and the most prominent and well-developed commercial ribbon in Winnipeg, is selected for the study. This study deals only with the business structure and its spatial pattern along a commercial ribbon outside the central business district (CBD), hence that portion of Portage Avenue which is part of the CBD is excluded.³

The purpose of this study is to examine the structure and spatial pattern of businesses along Portage Avenue. The analysis is carried out in terms of the following framework. First, functional compositions of

3. See Chapter 3 for the delimitation of the study area.

establishments on Portage Avenue is examined to determine the functional structure of the commercial ribbon. Second, the spatial patterns of business classes are examined by means of nearest neighbor and percentile values analysis. Lastly, the spatial associations among different classes are examined in order to understand the spatial relationship existing between different types of functions when located along a commercial ribbon.

1 - 2 Data

The data used in this study are mainly based on field work carried out by the author during 1971. Each business establishment fronting on Portage Avenue is classified in terms of its business type⁴. Each establishment is treated as a single observation i.e. stores with more than one function are entered only once, hence the scheme of classification employed is not a precise measure of function.⁵

The field observations were plotted on a base map of scale 1 inch to 200 feet. Distances used in the nearest neighbor analysis were derived therefrom.

1 - 3 Limitations of the Study

It rarely seems possible for research of this kind to be as comprehensive as one would like since the researcher has to operate within

4 See Appendix I for the classification of business types.

5. e.g. When a gas station also performing repair service is entered under Gasoline Service Station (5541).

a time constraint, and the present case is no exception. Three inevitable deficiencies of the study at hand are evident.

(1) It is concerned with only a particular point in time. This in itself sets constraints upon the usefulness of the results at the practical level, for they can only give a static representation of a dynamic situation. One might hope, though, that as a means of identification of an existing spatial pattern, the study's result would still prove useful.

(2) There is no differentiation between business "units". Commercial establishments are all treated as single units regardless of their size, business volume or quality. Also, multi-purpose stores are treated as single units. Undoubtedly, some information will be lost during the analytical process and it might affect the validity of conclusions which are based on these results.

(3) Only the resultant behaviour, the location of the business, is observed. Thus the varied effects of market accessibility, serviced location availability, and zoning bylaws, in determining those locations are unknown. It is clear that longitudinal studies of some magnitude will be required before the nature of these forces can be delineated.

CHAPTER 2

REVIEW OF LITERATURE

There have been relatively few studies published referring specifically to the structure and functions of commercial ribbons. Earliest reference to this form of business development can be found only as part of studies which dealt with the entire business structure. In 1937 Proudfoot undertook a pioneering effort in studying the pattern of city retail activities.¹ He concluded that business centers within urban areas could be classified into five types: (1) the central business district; (2) the outlying business centers; (3) the principal business thoroughfares; (4) the neighborhood business streets; and (5) the isolated store clusters.

The central business district (CBD) was recognized as the retail heart of the city, with a marked concentration of shopping-goods stores and was at the point of maximum accessibility to the entire city population. Outlying business centers were considered as miniatures of the central business district, developed at focal points of the intra-city transportation system and distinguished from them by having a more restricted customer tributary and a greater proportion of convenience-goods stores. Principal business thoroughfares were characterized by the

1. M.J. Proudfoot, "City Retail Structure," in Readings in Urban Geography ed. by H.M. Mayer and C.F. Kohn (Chicago: University of Chicago Press, 1959), pp. 395-398.

co-existence of two related attributes: as business streets they possessed widely spaced convenience and shopping-goods stores; as traffic arteries they carried a high density of mass and vehicular traffic. The stores in these business centers were catering to and mainly dependent on customers derived from traffic along the thoroughfares. Neighborhood business streets formed a regular network throughout the city with convenience-goods stores dominating and having customer tributary areas restricted to walking distance. Isolated store clusters were characterized by non-competitive convenience-goods stores serving the immediate wants of families living within easy walking distance.

Ten years later, Ratcliff showed that beyond the CBD the pattern of business structure consisted of combinations and variations of two basic conformations: string street development (business thoroughfares) and nucleations.² He introduced patterns of land values and the concept of complementarity to further describe the retail structural types. Nucleations typically appeared at the more important intersections and created a "pyramiding of land values to a peak adjacent to the intersection."³ The essential difference between the nucleations and string streets was "the lack of internal organizations in the case of the string street as compared with the more definite pattern in arrangements of uses characterizing the nucleations."⁴ Ratcliff had found that the nature of uses along the string street depended upon the extent to which

2. R.U. Ratcliff, "Internal Arrangement of Land Use," in Readings in Urban Geography ed. by H. M. Mayer and C. F. Kohn (Chicago: University of Chicago Press, 1959) pp. 410-417.

3. Ibid p.412

4. Ibid p.412

the street was a main traffic artery and the degree to which it was the core of residential area. Business functions catering to the transients and those intended to serve the immediate residential areas were both attracted to the artery.

A more recent attempt to construct a comprehensive classification of urban business structure was undertaken by Berry.⁵ The application of central place theory to the internal business structure of the city has allowed the development of a more precise classificatory scheme. By obtaining groups of spatially associated business types through the use of factor and linkage analysis, Berry has provided empirical evidence of the existence of four conformations of businesses, and the business districts or functional areas they create. These are:

- (1) nucleated shopping centers,
- (2) urban arterial business districts,
- (3) highway-oriented business districts,
- (4) automobile-row functional areas.

The conformations are "mutually exclusive as functional groups but need not be spatially exclusive."⁶ Thus it is not clear whether Berry's scheme is, in the classic context, primarily "formal" or "functional."

5. B.J.L. Berry, "Shopping Centers and the Geography of Urban Areas." (unpublished Ph. D. dissertation, University of Washington, 1958).

B.J.L. Berry, "Ribbon Developments in the Urban Business Pattern," Annals of the Association of American Geographers, Vol. 49, 1959, pp. 145-155.

6. B.J.L. Berry (1959) op. cit. p.149

Within the pattern of nucleated shopping centers, a hierarchy of three levels of centers is distinguished as 'neighborhood', 'community', and 'regional' shopping centers. The names are descriptive of the area served by each level of center. Within each type of center, orders of goods that are characteristic to that center will be found.⁷

Highway-oriented businesses are located with respect to a set of demands occurring spatially as a flow along highways or they are business types requiring large and expansive sites with easy access. Business types characterising this business district are gasoline and service stations and drive-in restaurants.

Urban arterial business districts are found within urban areas but "which within urban areas are apparently most successful when located along urban arterial highways."⁸ Automobile repair is the typical urban arterial function. As the size of urban centers increases, additional members of the group appear. Arterials that are immediately adjacent to the CBD are characterized by the appearance of office equipment and supply establishments, and in large cities, there will usually be a "skid-row".

The automobile row functional area is characterized by a concentration of used and new car dealers.

7. For the list of goods that are characteristic to each level of centers, see B.J.L. Berry (1958, 1959) op.cit.

8. B. J. L. Berry, 1959, op. cit., p.148.

In his studies, Berry had recognized two types of ribbon development: highway-oriented business districts and urban arterial business districts. Differentiation between the two could be achieved by examining the business functions that were present.

In the later study of Chicago,⁹ a similar kind of classification is recognized by Berry, but with important modifications. In this later study, both highway-oriented and urban arterial business districts are combined under a general heading: ribbon. The relative location of ribbon with respect to nucleated business centers is used as the criterion for differentiating the two sub-types: ribbons adjacent to centers and isolated ribbons. Nucleated, urban arterial and highway-oriented business facilities can all be found on ribbons adjacent to centers. These several different elements were intertwined in an inseparable way in many stretches of Chicago's ribbons. The isolated ribbons are far more devoted to convenience and neighborhood-goods stores, to highway-oriented uses and to restaurants, bars, liquor stores etc., than the ribbons adjacent to centers. Such urban arterial uses (like heating and plumbing dealers, lumberyard etc.) are missing on isolated ribbons.¹⁰

As has been mentioned earlier, literature devoted specifically to studies of commercial ribbons alone is relatively scarce. Interest would appear to stem from two main sources. The first is the general disfavor

9. B.J.L. Berry, "Commercial Structure and Commercial Blight", (Chicago: Department of Geography, Research Paper No.85, University of Chicago, 1963).

10. Ibid p.77

with which planners view such developments. The opposition of planners is based on a dislike for the visual character of commercial ribbons and the apparently unfavorable effects these developments have on the free flow of traffic. That such streets fulfill important functions in a city's commercial structure is also recognized by planners, but it is felt that these functions could be performed in some alternative physical form; one that would not have the physical disadvantage of commercial ribbons. However, Wolfe (1964) has shown that many accidents occurring on ribbon streets are associated not with movements into and out from roadside shops, gas stations, and so on, but with normal traffic intersections.¹¹ Berry has also pleaded strongly for the retention of the ribbon function because he found it of such wide spread occurrence that it is obviously a fundamental part of city's overall commercial structure.¹²

The second main source of interest in commercial ribbon studies has been the study of spatial patterns and functional associations of establishments as well as the more abstract problem of how such developments fit into existing theoretical concepts of urban retail and service structure.

Foster and Nelson studied a 15 mile long string street development in suburban Los Angeles for a highway impact study.¹³ Four groups of business establishments were distinguished by them on Ventura Boulevard:

11. R. Wolfe, "Effect of Ribbon Development on Traffic Flow," Traffic Quarterly, Vol 18, 1964, pp. 105-117.

12. B.J.L. Berry, "A Critique of Contemporary Planning for Business Centers," Land Economics, Vol. 30, pp. 306-312, 1959.

- (1) stores serving essentially neighborhood needs;
- (2) stores serving a wider trade area where customers deliberately come to the establishments;
- (3) stores serving casual customers from a wider trade area and
- (4) stores whose location on Ventura Boulevard reflects a peculiarity of the Boulevard itself.

Foster and Nelson noted that ribbon business differed according to its location in one of three zones: extensions of the CBD; inner zones of nodal and arterial retailing; and an outer zone, mainly highway-oriented. They stressed that the important location factor was accessibility to actual or potential purchasers, not the traffic level.

Berry (1959) used his findings and information concerning business groups and conformations developed in the Spokane study to interpret and analyze commercial ribbons.¹⁴ Both intra- and inter-city ribbons were analyzed. He found that using that body of generalization that he had developed in the Spokane study (1958), it was possible to differentiate nucleations, special functional areas, stretches of urban arterial, and highway-oriented business districts on a commercial ribbon.

13. G. J. Foster and H. J. Nelson, "Ventura Boulevard: A String Type Shopping Street," (Los Angeles: Real Estate Research Programme, University of California, 1958).

14. B. J. L. Berry, 1959, op. cit.

Berry found that locational patterns of urban arterial and highway-oriented facilities are highly similar when located on intra-city ribbons. In the case of inter-city ribbons, urban arterial functions are more concentrated than the highway-oriented facilities and are located in or near nucleations.

Boal and Johnson (1965) traced the customers linkages between business establishments along a commercial ribbon in Calgary.¹⁵ Centers and ribbons were distinguished in this study on the basis of consumer linkages rather than by physical proximity. Interviews with customers are conducted at establishments belonging to seven business types in order to determine the customer-use pattern. Using the four functional conformations of Berry they find a considerable overlap of locational and functional attributes along the commercial ribbon. Each establishment serves unique combinations of passing traffic and nearby residential, industrial and shopping areas. Hence, to classify any particular establishment on ribbon as highway-oriented or nucleated is to express only part of the truth. They also point out that the application of central place concepts to the commercial ribbons would seem to be legitimate but operationally complex because of the mixture of business types and their functional overlap. The concept of linear hinterland, as suggested by Marble¹⁶ and Bunge¹⁷, is highly constrained

15. F.W. Boal and D.B. Johnson, "The Functions of Retail and Service Establishments on Commercial Ribbons," Canadian Geographers, Vol. 9, 1965, pp. 154-169.

16. D.E. Marble in "Proceeding of the IGU Symposium in Urban Geography, Lund 1960," (Lund: Department of Geography, University of Lund) 1962, p.159

17. W. Bunge, "Theoretical Geography," (Lund: Department of Geography, University of Lund), 1962, pp. 53-54.

as Boal and Johnson have found that establishments located along ribbons do not depend solely on passing traffic, but a combination of traffic and nearby area.

This literature as a whole reveals the major weakness of commercial structure studies to date: the confusion of form and function in the classificatory schema. Terms utilized as descriptive labels consistently refer to partly spatial and partly behavioural (functional) identifying characteristics. No doubt, this shortcoming has been unavoidable, and will remain so until studies of this kind become more intensive and longitudinal. The researcher is, after all, faced with an "instantaneous" map which results from the operation of many factors which are variously forcing and retarding change in the pattern which appears on the map. He is armed with a ruler and some concepts about the economic nature of access, distance and congestion. He has no choice but to assume that his map represents some stable equilibrium, and that the pattern on it makes sense. One of the strategies in this study is to relate types of form of pattern to functional aspects of a traffic artery. This development is regarded as a necessary next step in the elaboration of commercial ribbons theory, it is recognized that present resources are inadequate to allow this study to go beyond the formulation of tentative statements of relation.

CHAPTER 3

ANALYSIS OF BUSINESS STRUCTURE ALONG PORTAGE AVENUE

3 - 1 Introduction and Delimitation of Study Area

Commercial development along Portage Avenue is not a recent phenomenon. The development can be traced back to the early twentieth century, when the shift of the retailing capacity in downtown Winnipeg from Main Street to Portage Avenue projected a westward orientation of commercial development along Portage.¹ Furthermore, the growth of Winnipeg during the nineteenth and twentieth centuries, which produced a very marked bias of urban development westward² has also contributed to the development of commercial establishments along this artery.

Today, Portage is not only one of the two busiest traffic arteries in Winnipeg³ but has also become the most prominent and well developed commercial ribbon of the city. The business development on this artery is not only a natural extension of the downtown's business district, but it stretches out almost unbroken to the Perimeter Highway (Map 3- 2).

1. R.G. Morris, "An Evaluation of the Functions and Characteristics of a Regional Shopping Center - Polo Park," (unpublished M.A. thesis, University of Manitoba, 1966), p.16

2. Ibid, p.11

3. Winnipeg Area Transportation Study (The Metropolitan Corporation of Greater Winnipeg: Transportation Division, 1966), Vol.1, p.44

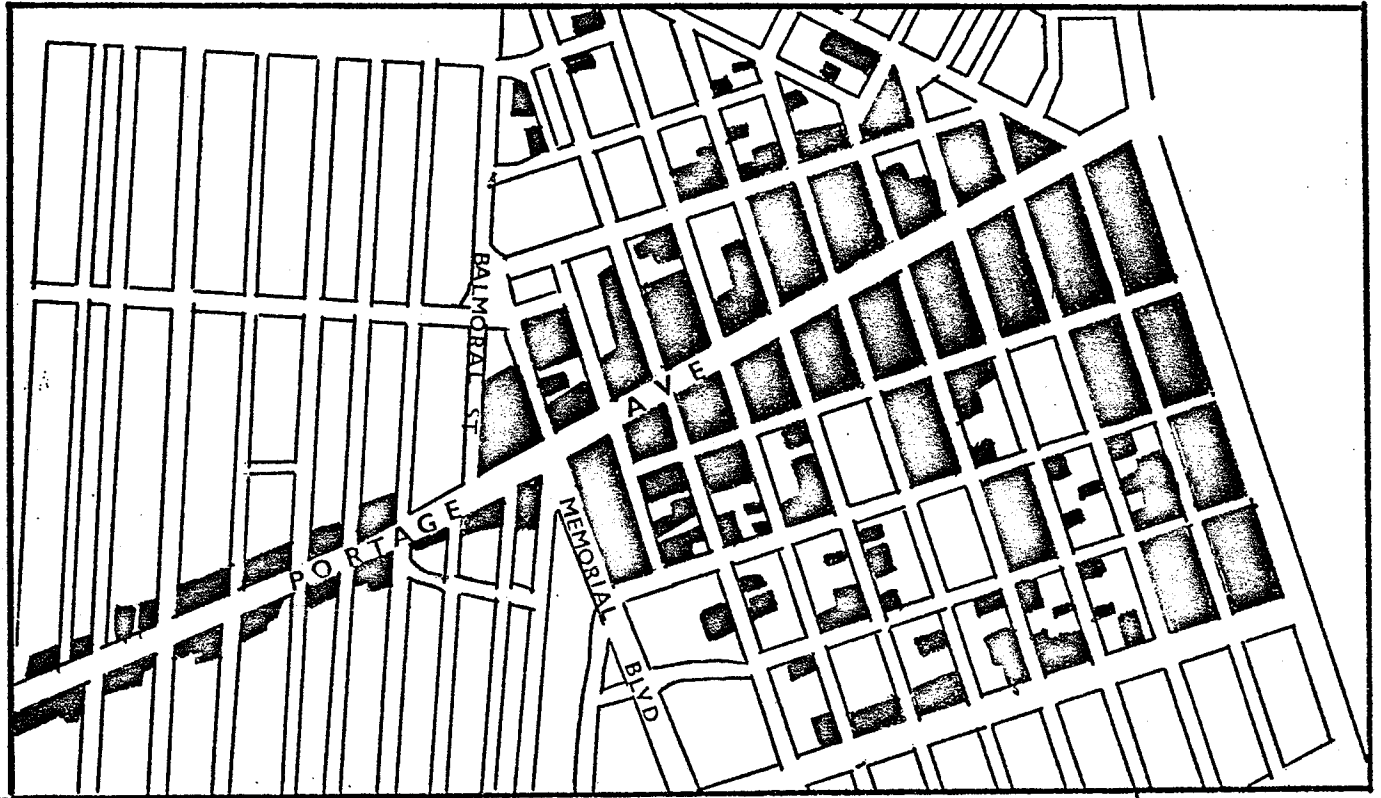
This study deals only with the commercial structure and its spatial pattern along an urban artery outside the central business district (CBD), hence, that portion of Portage Avenue which is part of the CBD will be excluded from this analysis. Most students in ribbon studies generally agree that ribbon development can be defined as being a major street fronted by commercial establishments where the intersecting streets are devoted to a different type of land use.⁴ In other words, ribbon development is linear in form and rarely runs down the intersecting streets. Inspection of Map 3-1 indicates that ribbon development on Portage Avenue starts at Memorial and Balmoral Streets since west of these two intersecting streets commercial establishments front only onto Portage Avenue and show a linear development in form (Map 3-1). Hence, Memorial Boulevard on the south and Balmoral Street on the north side of Portage Avenue will be the eastern boundaries of the study area. The western boundary of the study area is the Perimeter Highway. The total length of this segment is approximately 8.1 miles.

One of the persistent problems in studies of ribbon development has been whether to include planned shopping centers located on commercial ribbons as an integral part of the ribbon development or to exclude them from the analysis. Even though, physically, the planned shopping centers form an inseparable part of commercial structure of the ribbon, the present author would still agree with the resolution that they be excluded from the analysis. The functional make up of the planned shopping

4. e.g. Foster and Nelson, 1960, op. cit., p.7

Map 3-1

Commercial Land Use in Downtown Winnipeg



Scale 1" to 1000'

Sources: 1. The Metropolitan Corporation of Greater Winnipeg,
Planning Division, "Downtown Winnipeg", 1969.

2. Field work, 1971

centers are controlled and planned by some authority before the shopping center begins its operation. The duplication of similar functional types have been kept to a minimum so as to ensure the successful operation of each commercial establishment in the shopping center. They contrast with ribbon developments which are usually considered as a form of 'uncontrolled' commercial development sprawling along major urban arteries. The ribbons are 'uncontrolled' not only in terms of their physical appearance, but also in their functional composition, in contrast to the planned shopping centers. The author feels that the inclusion of planned shopping centers into the study might distort the real pattern of ribbon commercial structure, and consequently, would hamper the understanding of the true nature of these commercial developments.

Altogether, there are four planned shopping centers located within the study area as of September 1971 and they are all excluded from further analysis. The shopping centers, listed according to their distances away from the downtown area, are shown in the following table (see Map 3-2 for their locations):

<u>Shopping Centers</u> ⁵	<u>Number of Business Establishments</u>
1. Polo Park	103
2. Silver Height	18
3. Court of St. James	19
4. Westwood ⁶	56

5. The definition of planned shopping centers is adopted from Winnipeg's Shopping Center 1972 (Planning Division, City of Winnipeg, 1973).

6. According to Winnipeg's Shopping Centers 1972, Westwood shopping center is made up by three separate shopping centers, namely Westwood, Crestview Park and Village Inn. As they are located (cont'd)

3 - 2 Classification of Business Functions

There has been a lack of standardization in business types classification in previous studies of urban commercial structure. A researcher usually uses the classification type which seems most appropriate to his particular study, either adopting an established classification system directly or modifying that classification to accomodate his own needs. In this case, 16 business classes are identified and used as the basic functional units for studying the spatial structure of business land use on Portage Avenue (Table 3-1). Nine retail classes ((1) to (9)) and seven service classes ((10) to (16)) are delineated. The classification of businesses is adopted from Montgomery's Vancouver study.⁷ Individual business functions under each of these 16 headings are directly adopted from Standard Industrial Classification Manual.⁸ (For the list of business functions under each heading, see Appendix I).

(cont'd) ... in close proximity to each other the physical distinction between them is not easily made. Since their functional characteristics are excluded from the study, they are simply referred to as a single shopping center.

7. D. Montgomery, "The Internal Arrangement of Urban Arterial Business Districts", (unpublished M.A. thesis, University of British Columbia, 1969).

8. U.S. Bureau of the Budget, Standard Industrial Classification Manual (Washington: Government Printing Office, 1957).