

THE UNIVERSITY OF MANITOBA

DELIMITATION OF THE CBD: AN EXAMINATION OF
RESEARCH AIMS AND TACTICS, WITH SOME
EXAMPLES DRAWN FROM DOWNTOWN WINNIPEG

by

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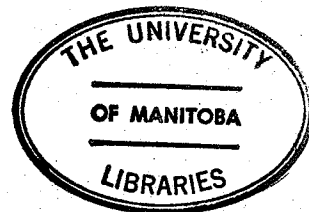
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Chapter I

Introduction

Geography has always been concerned with problems of areal delimitation in one way or another. Such concern has often been peripheral to the major purpose of research of late but once dominated the discipline, sometimes to the exclusion of all else.

In urban geography, the delimitation of the Central Business District (CBD) has become widely accepted as a valid research procedure. This thesis attempts to evaluate the delimitation method proposed by Murphy and Vance (1954 A) known as the Central Business Index (CBI) method.

The evaluation is carried out in three phases. In chapter two, the development of the CBD concept is traced in the literature of economics, sociology, and geography. The CBD concept is seen to originate in models of urban land use which postulate that competition for space is the major structuring factor, and thus all urban functions are interrelated by this competitive mechanism. It is the highly commercial center which is designated as the CBD: the concentration of uses able to pay the highest rents, deriving the greatest utility from access to the entire urban population.

The delimitation procedure of Murphy and Vance, it is argued, proposes a research strategy which is incompatible with this conceptualization of the area. The nature of the CBD is little understood if the city is viewed as a collection of spatially distinct parts, each separable from the others by precise, objectively determinable boundaries.

It is this 'paradigm' which is imposed by the CBI method, and which originates in the geographic concern with such 'atomization' of space into regions. The method forces CBD research to ignore factors of centrality (hinterland) and functional linkages with non-central uses, and to concentrate on the contents of an objectively (but arbitrarily) defined box.

Chapter three investigates the method itself: how it has been used, the problems it presents regarding evaluation of results, and the question of what is, and what is not, a central business function. The method is shown to ignore major theoretic constructs in the last instance, which exacerbates its incompatibility with conceptual notions of urban structure.

Considerable attention is paid in this phase to an assessment of the purpose which the method was designed to serve: generalizations based on comparisons of uniformly defined CBD's. The position taken here is that where comparative studies have been carried out, the results are either concerned with shape parameters and trivial, not dependent on uniform delimitation, or not based on comparison at all.

Chapter four examines the last defense of the CBI method: its possible use as a taxonomic device for delimitation of 'the CBD.' Data pertaining to the central area of Winnipeg are employed in a series of procedures designed to produce a CBD through moderate variations in the CBI method, or by alternate means entirely. It is postulated that if the CBI method produces a result not significantly different from the

others, then it is a valid 'measure' of the CBD.

The final chapter collects the findings into an evaluation of the CBI method at various levels, and presents conclusions regarding the place of delimitation procedures in studies of urban commercial structure.

Chapter II

Origin and Development of the CBD Concept

Conceptualization of the CBD as a distinct 'atomic' component of a 'molecular' city should be examined first in the context of the evolution of notions of urban commercial structure. As demonstrated in the next chapter, these 'atomic' studies encounter their most fundamental methodological obstacles in dichotomizing business functions into 'central' or 'non-central' categories. This chapter intends to show that the CBD concept derives from attempts to order the functions of the city according to competitive mechanisms, and hence that 'centralness' is not a trait particularly suited to binary (presence-absence) measures.

Urban structure as the outcome of competition for space.

The CBD concept originated in North America, presumably because of the very distinctive identity of this part of the urban landscape. The central area of the city has developed its outstanding identity as a business district through time in the process of urban growth. The present century has witnessed the overwhelming growth of cities accompanied by continuously growing urban population, rapidly advancing technology and rising standards of living. Among these, successive improvements in transportation and communication systems have had great impact in shaping the structure of cities, in both a spatial and a functional sense.

The city was very compact when horse-drawn vehicles were the only means of intro-urban transportation. After the steam railroad was introduced in 1850, urban functions were pulled toward the railway

station. This was followed by the period of suburban railroads, cable and electric cars when the city began to extend along axial lines of transportation. Drastic changes in urban structure took place with widespread use of private automobiles. Since then the city has spread away from the center in all directions, unless hindered by topography, beyond the limits of mass transit lines.

This change in structure is associated with subsequent reorganization of functional activities within the city. The city, which was an undifferentiated settlement of intermingled activities in its embryonic stage, has developed complicated functional areas due to increasing specialization and regionalization of activities.

In 1903, Hurd related this growth process and the continually changing structure of land use to economic mechanisms. In his model of the evolution of urban land rent, the land is first conceived in its naked form. When the land is first occupied by early settlers they are endowed with the opportunity of free use of choice land. At that time the land is used but there is no value until competition for its use causes the competitors to bid against one another, with the land eventually being assigned to the highest bidder. The highest bidder is the one who can profit most from the use of that location.¹ The argument is the same as that of Thunen² for agricultural land rent, but it is the first direct application of the concept to the use of urban land, and Hurd was most concerned with the notion of servicing the urban populace.

Accessibility to that populace was the determinant of urban land value.

Since value depends on economic rent, and rent on location, and location on convenience, and convenience on nearness, we may eliminate the intermediate steps and say that value depends on nearness.³

But nearness means different things for different uses. Although the most accessible location is desirable for many uses, a locational decision is based on consideration of a multitude of requirements for proper functioning of the use. Activities locate themselves at different sites according to their needs.

The pioneer work of Hurd was elaborated by Haig (1927) who maintained that accessibility, or minimization of transport cost, is the prime factor influencing land rent. He formally introduced the concept of friction cost, which is the sum of transport cost and site rent paid to overcome the friction of space.

An economic activity in seeking a locations finds that, as it approaches the centre, site rents increase and transportation costs decline. As it retreats from the centre, site rents decline, and transportation costs increase . . . The theoretically

perfect site for the activity is that which furnishes the desired degree of accessibility at the lowest costs of friction.⁴

Haig discussed the vital question of where things belong in an urban area, analyzing the varying needs of different functional parts and changing trends of business structure. He observed the increasing specialization of functions within businesses and differentiated among office work, buying and selling, fabrication, and warehousing. In general, offices and buying and selling outlets remained in the center; fabrication and warehouse functions moved to the periphery, at least in New York in that period.

The work of Haig and contemporary land economists⁵ succeeded in providing a precise description of the relation between land use and land value, particularly of the commercial sectors of the city. The basic model of Haig and Hurd remains the conceptual base of land valuation theory,⁶ but it has become refined by consideration of the exogenous factors of zoning, building suitability, and taxation. The central area remains, however, the zone of highest land values for commercial enterprise, since more than often than not, these activities demand accessibility to the population at large, or to other activities which demand such accessibility.

Contemporary with the work of land economists are the studies in urban ecology, wherein the competition for land is couched in a different terminology. The process of development from the simple to the complex,

from the general to the specialized, and from centralization to decentralization in urban growth is perceived with emphasis on the people who comprise the city. The city is viewed by urban ecologists 'as a habitat of civilized man',⁷ and hence is characterized by the culture of its inhabitants. Urban society is made up of individuals of varied life and culture; it is an aggregate of communities 'spatially separated, territorially distributed, and capable of independent locomotion.'⁸

Park observed that the process of urban expansion is analogous to that in plant ecology of competition among various population groups, dominance of one group forming a natural or functional area, and invasion of a natural area by a competing group, leading to succession and dominance of the area by a new group.

The idea is incorporated in the model of Burgess (1925), in which he postulates that:

The typical process of the expansion of a city can be best illustrated, perhaps, by a series of concentric circles, which may be numbered to designate both the successive zones of urban extension and the types of areas differentiated in the process of expansion.⁹

The zones are five in number:

- 1) The central business district, which is the center of expansion, is considered the focus of the city's commercial, social, cultural,

industrial life and of transportation.

2) The zone in transition, encircling the CBD, is the deteriorated residential area of mixed land uses invaded by light manufacturing and businesses, and of blighted conditions and slums.

3) The zone of working men's homes, is the residential area of second generation immigrants who have escaped from the zone transition but still derive easy access to their work downtown.

4) The zone of better housing is characterized by high-class apartments or exclusive restricted districts of singly-family dwellings.

5) The commuters' zone of suburban and satellite communities forms the dormitory suburbs beyond the city limits.

'The conceptual basis of the model is founded primarily on the socio-economic scene of North America in the later part of the nineteenth and the early twentieth centuries, when there was enormous migration from Europe,¹⁰ and on the assumption of upward mobility in social status of immigrants associated with the process of invasion and succession.

The change in arrangement of land use in a definite order with distance from the center is more hypothetical than real. The linear distance is offset by improved communications, but not evenly. In cognizance of excessive expansion along rapid transportation routes, McKenzie (1929) interprets distance in terms of time-cost. Improvement in communication systems and consequent massive migration toward the outer territory of satellite cities led McKenzie to perceive the metropolitan area as a constellation of communities with varying degrees

of dependency upon the central city. Implicit in his view are the multiple growth centres later elaborated by Harris and Ullman (1945). The transportation corridor anomaly was elucidated by Hoyt (1939) as the sector model of urban growth and for some time arguments raged in the literature as to the nature of the city as concentric or sectoral in structure.

Harris and Ullman suggested that the general land use pattern is neither concentric nor sectoral, where both models assumed the expansion of the city from one single centre, the central business district. Rather the pattern is developed around several distinct nuclei. The number and location of nuclei depends on the size of the city, its operating forces, and historical development. The larger cities tend to have a greater number of and more specialized nuclei than smaller places.

Distinctive districts developed around nuclei in most American cities are identified as: the central business district as the focus of intra-city facilities; the wholesale and light manufacturing district near the focus of extra-city facilities; the heavy industrial district near the present or former edge of the city; various residential districts of differing social status; and peripheral suburbs. The nuclei may have existed from the very origin of the city or have developed as the growth of the city stimulated migration and specialization. The requirements of specialized facilities for certain activities are: cohesion of certain like activities for profit from association; repulsion of some unlike activities; and differences in rent-paying ability.

All three models are complementary in describing urban structure in its growth process. In general, they sort the city into distinct parts and the central part represents the identity of the city, in the same way that Jefferson's Primate City embodies the identity of a country.¹¹ But the parts are conceptual entities in the models of both the land economists and human ecologists, without precise outlines on the ground. In fact, the functional interaction among the uses to which urban land is put is conceived as the structuring element in all the models.

The delimitation problem

While geographers like Harris and Ullman participated in this functional relation approach to urban structure another segment of the field devised a research method which has gained widespread, if not universal, attention. The Central Business Index (CBI) method of delimiting the CBD was introduced by Murphy and Vance in 1954. They were concerned that although the term CBD had become generally accepted, it connoted different areas to different users.

Their purpose was to provide a practicable method for areal definition so that the CBD could be delimited on a uniform basis. Using a measure of land use which was likely to be readily available, they formulated a delimitation procedure

based on the classification of land use types into 'central' and 'non-central' categories, and the computation of a measure of intensity of central land uses. This provided the data used to discriminate between 'central' and 'non-central' blocks according to the CBI method, as detailed in the next chapter. The limit of the continuous mass of 'central' blocks provided the boundary of the CBD.

The method was extensively applied in the United States by Murphy and Vance, tried abroad by several workers, notably D. H. Davies (1959), Scott (1959), and Hartenstein and Staack (1967), and is a continuing source of master's theses in North America.¹²

The method was to be one '. . . that was practicable and at the same time could be defended on philosophical grounds.'¹³ The contention of the proposers was that only the analysis of comparably measured CBD's could lead to useful generalizations regarding the functional identity of the area. This proposition is extensively challenged in the next chapter, but the concern of the current argument is whether any such method could be defended on philosophical grounds, given the conceptual context in which it is embedded. It was the purpose of the method, ultimately, to contribute 'a necessary step to gaining a deeper understanding of the nature and functioning of the CBD,'¹⁴ although the CBI method was only 'a first step in that direction.'¹⁵

Several authors have questioned the CBI method, but mostly have concerned themselves with its technical aspects. However in his review of Murphy's book (1972) summarizing work using the CBI method and mentioning, briefly, other CBD studies, Garner (1973) implies that the

process of delimitation is hardly a rich source of insight into the structure of the central area.

Carter (1972) is much more thorough in his appraisal of the methods and, as is befitting the role of a text book, quite generous in his assessment of the contributions potentially derivable from such an approach, although it is clear that he is inclined to hold a more skeptical view privately. But his last of four objections to the method is, as he says, the main one, and is the key to interpreting the shortcomings of research of this kind: 'what is the whole point and purpose of defining such a boundary?'¹⁶ Carter seems to think that the question is largely rhetorical, for he does not tenuously pursue and slay the dragon--the purpose of comparability created by Murphy and Vance.

The desire for areal definition is shown by Carter to proceed from the geographic tradition of regionalization. In light of conceptual frameworks provided by early work in land economics and human ecology, such work must bear sterile fruit. 'The time when extrapolation of complex cause from a pattern of areas was productive of progress in this field has long since gone.'¹⁷

It is the contention here that Carter is indeed correct in his assertions regarding the futility of CBD delimitation, but for reasons which are in a way more fundamental than those cited by him. Carter in effect is proposing that some conceptualization of a functional system is the proper framework for work on intra-urban structure, and that the atomic paradigm is inappropriate. It can

be argued that the regionalization of the city, in its application as a research tool, defeats the purpose of systematic studies of activity linkages over time.

Murphy and Vance were at least superficially aware of the criticisms being levelled in geography and from without concerning the folly of partitioning space on the basis of static and perhaps arbitrary information. They believed that in claiming for comparative studies the only fruitful approach to unravelling the mysteries of the core, these objections would be obviated. It is superficially apparent that comparative studies are possible with uniformly defined objects. On the other hand, it would seem to be almost as apparent that uniform a priori delimitation on any basis cannot yield new a posteriori information, through comparison, about the nature of the delimited areas. The answers are predetermined by the definitions.

Post-War urbanization and the core

Since World War II, the process of urbanization, at least in North America, has undergone such a transformation that conventional models of the ordering of urban functions require a great deal of revision. The once recognizable CBD of Burgess is no longer as recognizable as it once was, and thus provides a further setback to those who try to delimit it.

The widespread use of private automobiles after World War II created a demand for commercial access which was manifest in the abandonment of existing mass transit in favor of the congesting

sedan. Cores of cities designed for predominantly mass transit and pedestrian traffic, became congested menageries as the motor car muscled its way into spaces designed for much smaller actors. Suburbs, formerly nucleated around mass transit terminals, have been able to spread in all directions, and the competition for valuable space 'downtown' intensified further. Inevitably, the ability to travel widely in any direction lessened the competitive advantage of the central area, and the foundation of the centralist models of Hurd, Haig, and Burgess began to crumble. Emphasis in commercial expansion is directed away from the CBD to a new phenomenon--the planned shopping center.

Conveniently located on major transportation routes (built to take automobiles downtown or to connect suburbs laterally), providing a wide range of goods and services, in climate-controlled and, usually, architecturally attractive surroundings, they captured the trade area of the core and augmented the strangulation pressures begun by automobile congestion. The functions of the city which are most easily recognised as requiring maximum population access are retail goods outlets, and these form the backbone of the land rent models. With the rise of the planned shopping center, it is this backbone which is displaced, carrying with it many ancillary activities, whose presence in the CBD was due to the spin-off from retail shopper concentration, and which now find the relic rent structure too rich for them.

Consequently, there is a tendency for a breakdown of the

traditional hierarchical central structure and the emergence of a new system of different networks for different businesses and institutions located at many highly accessible points throughout the urban area. As Vance (1966) comments,

in the past we have called it the central business district but that term is hardly adequate today. There is central business all over the city.¹⁸

The problems which accrue to the maintenance of structural order in the city under conditions of residential and commercial sprawl have generated in the planning literature schemes to revitalize the central area. The early approach to physical renewal has been coupled with a concern for proper and effective functioning of the business area.¹⁹

Several proposals have been put forward: to improve congestion in both pedestrian and vehicular movement by subsidizing the public transportation system; to provide convenience in parking; to facilitate shopping with malls and parkways on principal streets; to allow tax concessions and to provide modern buildings and equipment as incentives for action; to remove blight; and to encourage new centres for public attraction. Downtown development plans have been perhaps the most popular and active phase of practice in city planning, and research is called for in related studies to focus on the core. Whether this research should include delimitation schemes is not at issue here. The problem posed by delimitation is what uses are served by its application, and thus whether a rigid code such as that proposed by Murphy and Vance is warranted.

The need for a historical perspective

The form of the city at any time is brought about by a long sequence of events during which its physical constructs have been changed in response to a complex web of circumstances. Throughout its evolutionary process, new structures have been added to the existing stock while the older ones have been retained or adjusted by renovation and replacement. Consequently the form of structures at any point of time can never represent an ideal solution to the needs of that period. Hence a mere counting of characteristics of formal structures, either buildings or blocks, at one point in time, will not likely provide a meaningful basis for the definition of that city or any of its parts.

In consideration of the process and forces that shape the city, some attempts have been made through this historical process to unravel the complex contemporary situations. Ward (1966) studied the sequence of changes that had taken place since the early nineteenth century until Boston's central area emerged as a business district as a result of the industrial revolution in America.

In their study of Cardiff, Carter and Rowley (1966) analyzed the growth and the controlling factors of growth in a European CBD that has a longer history of urban genesis and therefore is divergent in form from that of the American city. In such areas as Europe where every central area is the product of a long evolutionary process, they warned that 'there is always danger in lifting out of context arbitrarily defined parts of cities.'²⁰

Mattingly (1964) attempted to apply the standard CBI method to trace the fluctuations and boundaries of Harrisburg's CBD in the years 1890, 1929, and 1960. His intention to use the CBI method, without modification, was thwarted for the earlier periods because information was not consistently available for upper floors. Thus computation of indices was based on the ground floor use only. Although it was stated that he had to make some changes in central business uses in order to be consistent with the situation of the past, the only example mentioned was the switch from livery stable to parking lot.

It is of interest here to note that retailing, business services (including financial), wholesaling and manufacturing were taken into account by Rannells (1966) in a study of Philadelphia's CBD. In order to trace the changes in patterns of land use within the CBD, movements of the central concentration as well as changes in activities over time were considered. For the complete description of central city activities, he felt that the study area should certainly not be limited to the main concentration of high-rent commercial buildings, since these merely provide accommodation for selected groups of establishments whose operations could scarcely be understood without studying their relationships with other kinds of establishments in the central area. He also suggested taking some territory beyond the present main concentration in the study area for future expansion and adjustment of central activities.

Subsequent research on the core

A few years after Murphy and Vance had published, an important contribution to the CBD literature was put forward by Horwood and Boyce (1959). They recognised the CBD as a unit made up of two component parts: core and frame.

The core of the CBD was defined with the general properties of intensive land use, vertical growth, concentrated day-time population, and internal linkages among establishments. It is characterized by the city's tallest buildings, heaviest pedestrian traffic, focus of mass transit, largest retailing of goods and personal services, concentration of professional services, offices of executives and policy-making functions of government, business and industrial activities.

In contrast, the frame of the CBD, surrounding the inner core, is an area of mixed land use, mainly occupied by wholesaling, warehousing, light manufacturing, and various kinds of transport facilities. The use of land is less intensive; buildings are not very tall, and sites may be partially built on or devoted temporarily to parking. Functional subregions are well-developed within this area but are not commonly linked to each other. Vehicular movement among establishments is characteristic of this area.

On the operational level, this definition is to be employed as a guide line for establishing areal units for analysis, presumably blocks or portions thereof. Specific numerical criteria will be involved according to the degree of refinement required. The CBD of Horwood and Boyce will obviously have a larger extent than that of Murphy and Vance.

The core may be comparable to the CBD delimited by the CBI method. Murphy (1960, 1972) was unhappy with the inclusion of the frame as part of the CBD and the failure to provide an exact method of delimitation:

' . . . such a mental construct may have value for abstract conceptualization, especially in great cities, but without a delimitation technique it is hard to see how it could be used to compare CBD's and thus to arrive at generalizations.'²⁰

The value of such comparative studies is examined in the next chapter. For the moment, the writer wishes only to recall the argument regarding a priori delimitation. If the problem is to delimit a study area for the purpose of examining the results of processes carried on within it, then it is best to make it oversize. Whether such generosity will detract from the precision of generalizations through comparison remains to be seen.

The divergent aims outlined above were brought into focus again in Murphy's (1972) criticism of the statistical CBD defined by the U. S. Bureau of the Census:

an area of very high land value; an area characterized by a high concentration of retail businesses, offices, theatres, hotels, and service businesses; an area of high traffic flow';²²

and following lines of one or more census tracts. The census CBD's,

as can be expected, are substantially larger than the CBD delineated by the CBI method, but cover most of the downtown businesses, as well as some of the residential and non-central business areas.

Murphy complained that:

The Census Bureau did not have time or funds to go into a serious field program of CBD delimitation. The unit area they chose may represent a convenient solution but can hardly be regarded as a result of a scientific attempt to delimit the district . . . The central business district concept of the Census Board gives no basis for comparing the central business districts of various cities as morphologic units and arriving at sound generalizations.¹²³

Conclusion

The issues raised in this chapter have concerned the relation between the research aims propounded by Murphy and Vance in 1954, and conceptual notions of the CBD held by researchers in various fields. Investigation of this relation is presented as a preamble to an evaluation of the CBI method for two reasons. The first of these is that the method was proposed as a research tool to aid in understanding the CBD. The proposition that atomization of the city is incompatible with theories of commercial structure leads to the expectation of small accomplishment when the CBD is disconnected before it is dissected. Secondly, since the method is seen as an exogenous imposition on the evolving CBD concept, a skeptical examination of the results of the method need have no ill effects on the concept itself. If the results prove substantial, then the arguments of Murphy cited

above against imprecise a priori delimitation are valid, although the respective positions of Rannels, Carter and Rowley, and Horwood and Boyce are no less so. On the other hand, if the method accomplishes little, it might be dismissed without further injury to our understanding of the CBD.

Notes

¹Hurd (1903)

²Thunen (1826)

³Hurd (1903), p. 13

⁴Haig (1927), p. 39

⁵For example, Dorau and Hinman (1928), Ely and Wehrwein (1940),

Ratcliff (1949)

⁶Alonso (1964B)

⁷Park (1925), p. 2

⁸Burgess (1925), p. 64

⁹Burgess (1925), p. 50

¹⁰Yeates and Garner (1971), p. 246

¹¹Jefferson (1939)

¹²For example, Decicco (1966), Graham (1962), Aiken (1967), Outwater

(1967)

¹³Murphy and Vance (1954A), p. 195

¹⁴Ibid., p. 192

¹⁵Ibid., p. 221

¹⁶Carter (1972), p. 203

¹⁷Carter (1972), p. 241

¹⁸Vance (1966), p. 119

¹⁹For example, see Jackson (1973), p. 165 ff

²⁰Carter and Rowley (1966), p. 134

²¹Murphy (1972), p. 116

²²As reported by Murphy (1960), p. 478

²³Murphy (1972), p. 111

Chapter III

Evaluation of the Concept of CBD Delimitation

Examining the existing literature on delimitation of the CBD, one notes that there was practically no previous study specifically devoted to this purpose until that of Murphy and Vance in 1954. Since then a series of research papers has been generated, mostly centered on 'testing' of their method in other cities. The purpose of the method was to provide researchers with a practicable method for areal definition of the CBD so that this part of city could be delineated on a uniform basis. The method was formulated based on the observed phenomena of the central areas of North American cities.

The heterogeneous character of the central area of North American cities, with marked variation in intensity of commercial use and associated uses is well established in recorded observations. Murphy and Vance pointed out that this was reflected in the tendency of some writers to use the designation 'commercial core,' 'hard core,' or 'primary area' for its more highly intensive and concentrated portion which is usually devoid of residential population. Within this area there is a point known as the peak land value intersection (PLVI) around which the average front foot value is the highest and pedestrian traffic is a maximum.

Various measures of intensity of commercial use decline outward from the PLVI in all directions, but not at equal rates. The same is true of the change in type of land use with distance from this point. The area of high intensity gradually merges into the surrounding blighted

zone and finally into the residential district without sharply defined boundaries except in places hindered by barriers. In spite of this awareness of the zonal character of the boundary, Murphy and Vance believed that 'it should be possible to draw a line that would approximate this zonal edge.'¹

Two indices were developed: the central business height index (CBHI), and the central business intensity index (CBII), which express, for each block, the amount of floor space in central business (CB) use as proportions of the ground floor area, and of the total floor area respectively. Critical values of 1 and 50% are provided, and the central business index (CBI) proposed as a binary measure of the CBness of the blocks. Blocks with CBHI or CBII values less than either of the respective critical values are given a CBI value of zero, or non-inclusion. The remainder are valued at unity and included in the CBD if they are part of the contiguous group which includes the peak land value intersection. Rules are provided for drawing the boundary so as to include enclosed blocks which do not qualify otherwise, and to include non-contiguous CB blocks.

They applied the method to nine moderate-sized cities, in the 150,000 to 250,000 size range, scattered through the United States. The CBD's thus defined were compared in a subsequent paper (Murphy and Vance, 1954B) 'on the basis of the total picture that each presents.'² A third paper (Murphy, Vance and Epstein, 1955) examined the internal structure of the individual cities, noting the tendency of uses to locate near the PLVI or the boundary, and the spatial associations of different business types.

Scott (1959), following this comparative approach, analyzed the zonal structure of uses within six Australian CBD's. In Germany, Hartenstein and Staack (1967) compared six CBD's delimited by the CBI method, with certain modifications, for cities of different size.

Testing the CBI method

The technique has not been found entirely adequate in application, even to those who accept it as satisfactory conceptually. Consequently, modifications, which involve changes in index values, changes in functions which qualify as central uses, or changes in units of measurement have been made. In some cases the technique has been totally altered to suit the needs of a particular situation.

Where it has been applied directly, the method has seldom been tested against specified criteria. D. H. Davies (1959) compared the CBI boundaries with those resulting from similar delimitation operations on traffic flow and land value data, and found varying degrees of agreement. He felt that the method was 'satisfactory' in the case of Cape Town. Other authors, most notably Murphy and Vance (1954A), have used the same term without reference to the basis of testing. It seems clear from their description of CBD character that the comparison is with some intuitive image of what should be in the CBD in each case. Their claim that '. . . it works and can be carried out rapidly'³ is offered to counter a sequence of shortcomings which they identify, and thus the determination of whether it works is a substantial issue in evaluation of the method. It is interesting in this context to examine the cases in which it did not work.

Murphy and Vance noted that one of the shortcomings was the method's applicability to cities of moderate size only. They suspected that in small cities (population 25,000) there would be 'too great a percentage of error'⁴ in using the block as a unit, and that in large cities more than one business district might be delimited. The latter problem would, of course, arise from the use of the contiguity constraint. A

Application outside American style urban systems has led to substantial modification of the method. In Durban, R. J. Davies and D. S. Rajah (1965) reduced the critical values in accordance with the significant break in slope of frequency graphs of CBHI and CBII in order to identify the Indian CBD. Majid (1970) employed these lowered cut-off values, but made further modifications because blocks, in the American sense, did not exist in Dacca, East Pakistan. De Blij (1968) had similar difficulty in Laurenço Marques, Mozambique, as well as no way of determining the PLVI. He employed 'frontage' ratios similar to the block ratios of Murphy and Vance, and cut-off values derived from break-in-slope considerations. Khan and Uddin (1967) applied his method in Chittagong, East Pakistan.

Some attempts to modify the method for application to smaller cities in the U. S. have broken down the block into lots, at least for edge areas (e.g. Decicco, 1966).

On the basis of the works cited, there would be little reason to suppose that the CBI method, uniformly applied, would lead to meaningful comparisons in cross-cultural contexts about the 'identity' of the CBD. The applications since those of Murphy and Vance have demonstrated some

interest in cut-off criteria chosen according to their ability to discriminate within the data set, and thus they provide some test of the resulting boundaries. Murphy at least would argue, no doubt, that local modification of the cut-off values would render inter-city comparison useless. It remains to be seen, later in this chapter, whether such comparison is not useless in any case.

Measurement units

It is difficult to follow the reasoning of Murphy and Vance regarding choice of the block as the unit of analysis. It poses problems for the delineation of small CBD's, by admission, and by experience makes the technique inapplicable to most non-Western cities. Even in Western cultures, the local conditions of street platting are sufficiently divergent to warrant using lot measures and more flexible contiguity constraints. D. H. Davies (1959) in Cape Town, Scott (1959) in six Australian state capitals, and even Murphy and Vance (1954A) in Worcester, Mass. had difficulty with block sizes varying either within each study area, or between cities being compared. It cannot be argued that the use of lots would take much more time, since the field surveys are carried out on a lot basis. It would seem intuitively appealing to have a method which could identify a block face, rather than an entire block, as part of the CBD. Also, if the main purpose of the exercise is comparison to determine the functional nature of the CBD, then one should be careful to not cut the part from the whole too crudely.

What functions belong in the CBD?

The term central business use was introduced by Murphy and Vance, who felt that

the real essential central business activities appear to be retailing of goods and services and the performing of various financial and office functions.⁵

Various types of land use, though found within the central area, are not considered as central business uses. Public, administrative, and institutional uses are excluded from the central business list for the absence of a profit motive. But wholesaling, one of the profit-making activities, is left out because of its tendency to locate more by the presence of railways and major highway routes through the city than by the pull of centrality. Manufacturing and residential uses, in the view of Murphy and Vance, are obviously of non-central character. However, in exception to this rule, newspapers are identified as central business uses because the whole operation is closely identified with other central business activities.

The word 'centrality' used in this context seems to carry the meaning of the need to be in a central location. Differentiation of land use based on centrality is in conflict with the broad generalization of industrial types, especially in the retail and wholesale groups, which include diverse functions and locational requirements within the group. However, Murphy and Vance argued that a whole series of centrality judgements were unnecessary and beyond the scope of simple delimitation.⁶ Similarly large specialized office buildings that can locate anywhere in the city are included in central business because

they undoubtedly derive benefits from association with places such as banks, lawyers' offices, hotels, and restaurants, that do belong in the district.

While talking about the exclusion of public, administrative, and institutional establishments it was admitted that

the establishments included in this group perform necessary functions, and they add to the crowding, and hence to the problems, of the CBD.⁸

This admission is justification enough for Mabogunje (1964) to include these functions in characteristic uses of the CBD.

Khan and Uddin (1967) added governmental, public, religious and educational uses to the central business category. For the CBD of Chittagong they suggested excluding the wholesale function which catered to the whole of East Pakistan and was neither located by the pull of centrality nor derived any special advantage from central location. It is of interest to note here an added criterion of centrality in relation to the service area. In a non-port city, where wholesaling is only serving the local area, it is considered to be a central use. In fact, wholesaling is generally accepted as a central business use in the CBD's of developing countries. In her study of Dacca, Majid (1970) classified wholesaling under the central business group in addition to the list of Murphy and Vance. She explained that

wholesaling in this less complex urban setting is still operated on face to face contact, hence it benefits from its central location.⁹

The term central business use has never been properly defined. Murphy and Vance used the term in contrast to non-central business use since 'not all the land uses represented in the CBD are equally at home.'¹⁰

Implied in this statement is the differentiation of land uses based on their location with respect to the area perceived as the CBD. The functions that are characterized by the area and the area that is characterized by the functions are apparently confused in the conceptualization of Murphy and Vance. In cognizance of the circular reasoning by which the central uses are distinguished Carter (1972) notes that Allpass et al. (1967) define the central business function as 'the function which has not yet left the central business district.'¹¹

The lack of conceptual precision with classification is further revealed by such statements as:

In any CBD, most of the land uses are unquestionably central business in character but others, though occurring to some extent, are better classified as non-central business.¹²

In pursuit of a systematic delimitation, functions are classified by a mix of criteria from different typological schemes, since one single criterion alone cannot provide desirable groups as required.

The various functions nucleated in the central area owe their presence to different factors. The central area has been the seat for governmental and institutional functions ever since the city was founded. Many offices of professional and financial services, executive functions, and large banks maintain their concentration at the center by tradition. In retailing, high order functions such as department stores and specialty shops enjoy the accessibility of a central location to the whole metropolitan service area. They are accompanied by certain retail functions of low order goods and services which cater to passers-by and

the working population within the district. Some types of wholesaling may need to stay in the center for access to customers--the retailers.

In the prevailing state of advances in communication, a business that is considered as ripe for a move toward the periphery may delay its locational change for a number of reasons. Decision making in business location is a highly complicated process and locational requirements vary widely for different types of business. For many retail shops, familiarity to customers may be as vital as future space need is to an expanding office. Moreover, locational changes are taking place within the restraint of availability of choice locations outside the center, legal bonds to the present site, and planning practices enforcing the preservation of the traditional structure of commercial centers within the city.

More than twenty years before Murphy and Vance, Haig had pointed out the changing nature of business structure: increasing functional specialization and the consequent split of functional units within businesses. Due to the changing location of diverse functional units, it is necessary to doubt the validity of a broadly generalized grouping of land use types in delimitation of the area to which locational analysis of detailed functions may further be confined.

In passing, it is interesting to note that Murphy and Vance nowhere recognize the contributions of the land economists to the theory of urban structure. In fact they claim that land values are inappropriate measures for CBD delimitation because land values do not directly reflect land use.¹³ While it is true that adequate measures

of land values are often difficult to obtain, and are therefore not practicable aides in delimitation, it is ridiculous to argue that the two are unrelated.¹⁴ The ad hoc dismissal of the organizing concept of the major contribution to the theory of urban land use should be bothersome to those attempting to impute some logical basis to the reasoning of Murphy and Vance regarding the classification of functions. As ambiguous as they are, the rationalizations regarding each land use category are of less concern than the purpose for which they are devised --to delimit a portion of the city which is recognized as unique, for the purpose of discovering what it is and how it works. It is apparent that Murphy and Vance are already largely convinced of the answer, and use that conviction freely in determining the object for study.

As indicated previously, the most fundamental methodological problem of delimitation stems from the attempt to impose boundaries on a fabric of functional relations which is more continuous than discrete in the region of the edge of the core. Likewise, the most fundamental objection to the CBI method in particular is the conceptualization of 'central' and 'non-central' functions as though the range of urban functions could be meaningfully dichotomized. In fact, a substantial body of geographic literature has been devoted to the applications of Central Place concepts to patterns of metropolitan land use.¹⁵ While centrality is a constituent of the CBI method, the meaning is distorted by the delimitation process. Carol (1960) elaborates the central place notion inherent in the analysis of retail structure by Proudfoot (1937). His central business district in

Zurich, Switzerland, is determined by the location of high order central functions (serving the whole city or more). Bowden (1971) attempts to improve the CBI method by explicitly introducing centrality judgements in the choice of central functions in his longitudinal study of San Francisco's CBD. He maintains the Murphy and Vance assertion that significant comparisons have been made, and are only possible through objective methods of delimitation. Although Carter and Rowley (1966) are said by Bowden to have adopted the CBI method in their work on Cardiff, it is clear that their purpose was to demonstrate that it did not work. They claim, in fact, that at least in Britain, acceptance of any objective boundaries introduces 'gross simplification or generalization which defeats its own end.'¹⁶

Does the CBI method facilitate meaningful CBD comparisons between cities?

While the arguments heretofore have dealt with shortcomings of the CBI method, criticisms have tended to be weakened by the assertion that only an objective, consistent delimitation procedure could be used for meaningful CBD comparisons. It has already been pointed out that such comparisons might not yield interesting results since the CBI method is not sensitive to maintaining an organic unity in the area delimited as the CBD. However, the comparative work that has been done should be reviewed to determine whether:

- a) comparative studies have been productive of generalizations about CBD structure.
- b) the results of comparative studies depended upon prior delimitation.

Three major comparative studies of CBD's have been published. The first, of course, is that of nine American cities described in Murphy and Vance (1954A, 1954B) and Murphy, Vance, and Epstein (1955). Scott (1959) and Hartenstein and Staack (1967) carried out similar works in Australia and West Germany respectively.

Among the objectives of comparative studies, Murphy and Vance cite the following:

To what factors does the size of the CBD appear to be related? Does the District have a typical shape? Why are some CBD's centrally located in their urban areas and others not? What land use proportions are typical for the Districts of cities of the size studied? How do the CBD's vary with the economic specialization of the city? How do the CBD's of the older cities of the East differ from those of the West?¹⁷

These are hardly the questions one would have supposed the authors would ask towards gaining '... a real knowledge of the content and functioning' of the CBD.¹⁸ It appears that they subconsciously regard these boundaries as final, for the questions are not directed towards internal relations or hinterland dependencies. The economic specialization question receives no answer. The questions are largely morphological, and this reinforces the view that the writers were not really concerned with their avowed purpose. They were attempting to impose on a conceptual scheme of metropolitan organization, a framework that denied the essential nature of that scheme; that the city was a continuum --a system.

Of the twenty conclusions offered, few are really outcomes of the comparative analysis resulting from applying the CBI method. That 'CBD size varies with incorporated city population more than with that of the urbanized area or that of the tributary market area of a city',¹⁹ is only interesting if it is not spurious. Strengths of relations are not mentioned, however. The four conclusions regarding shape are possibly dependent upon an objective method of delimitation. However, they are profound from neither a geometric nor a functional standpoint. It is difficult to imagine, for example, a case where a CBD has 'two intersecting axes of approximately equal importance' and yet does not approach '. . . an equidimensional outline.'²⁰

It does not follow that uniform delimitation was a prerequisite to determining that the early transportation nodes form the 'nucleus of the modern CBD',²¹ or that 'as cities grow, many CBD's tend to become more and more off center for their urban area as a whole',²² especially in ports; or that railroads, rivers, groups of parks and public buildings, or slopes are barriers to CBD expansion.

That typical CBD land uses are offices and retail outlets is not a conclusion, but an assumption governing the choice of central business functions. The conclusion that 'the CBD, more than any other business area of the city, serves the entire community rather than any one part of the city or any one ethnic group',²³ is undoubtedly true. It has been known since Burgess, at least, but it could not have been determined in an objective manner by Murphy and Vance. To suggest that inter-CBD comparison can lead to this conclusion can only enhance the skepticism

of the reader, and it becomes evident, with skeptical reading, that most of the 'conclusions' are similarly not dependent on objective methods of delimitation.

Only two points remain to be made about the results of Murphy and Vance. Since 'the size of a CBD is best measured by the total floor space devoted to "central business" uses,'²⁴ the present writer feels that precise delimitation is thus made unnecessary. One could measure, for example, such floor space within census tracts containing the CBD (the census CBD in the U. S.). Secondly, the authors referred to a close correspondence between the number of employees in commercial activities in a city, and the size of the CBD. The significant aspect of this, to them, was that here was a surrogate measure of CBD size. To this writer, the significance lies in the indication that, whatever the CBD size, it existed in constant relation to the total commercial activity of the city. The centrality hierarchy may have been fundamentally the same within these cities. One cannot help feeling that it was such zealous rationalizing of 'their' delimitation procedure that obscured any real significance in the findings.

Scott's (1959) study of six Australian state capitals is almost entirely concerned with the location of the various businesses in the CBD. The CBI method is used to delimit the areas, and it is only the relation of the PLVI to the geographic center which depends on the method of delimitation. The closest Scott comes to a generalization here is that '... the location of the office district relative to the component retail zones has an important bearing on how near the

PLVI approaches to the geographic center.²⁵ Which is to say, if the office district (part of the CBD) is located on one side of the inner retail district, and the outer retail district on the other side of the office district, then the 'geographic center' of the CBD will be removed from the PLVI (almost always within the inner retail zone). While this relation is interesting generally, precise determination of its extent is not, and hence it does not depend on objective delimitation for its enunciation.

It is interesting that Scott, while employing the CBI method in its full rigidity, further differentiates the area into concentrations of land use using additional objective criteria. When drawing the maps of these infra-CBD zones, he notes that 'since it was not intended to calculate the areas of the zones, their boundaries were simplified with regard to the buffer lots with non-CBD uses.'²⁶ The literal meaning of this indicates that the CBI boundary was insufficiently sensitive to uses in transition zone blocks--a matter of some interest when examining the spatial distribution of land types in the CBD. However, from the context, the author may mean that the boundary between zones was simplified. Perhaps the only use of objective boundaries is the calculation of area enclosed by them. It is certainly true that Scott found the use of an established technique advantageous in providing a study area whose choice required no justification.

Hartenstein and Staack (1967) studied six West German cities in order to determine the relation between size of the core area and its structure, regularities in the spatial distribution of different types

of use, and the degree of clustering of various uses. The delimitation is based on the CBI method, denoting as 'central' all uses devoted to service activities, 'except public buildings such as schools, churches, hospitals, theatres, etc.'²⁷ The point of the exercise is thus much the same as that of Murphy, Vance and Epstein (1955) and Scott (1959). Again, apart from the computations regarding size and distance from the center, little depends on delimitation. Since all the studies begin with floor space surveys of the area including all blocks ' . . . which might conceivably fall within the urban core;'²⁸ one wonders why it is then necessary to determine a set of boundaries at all. Since Murphy and Vance concluded that the size of the CBD was best measured by the floor space devoted to central functions, comparisons of that figure for the entire survey region would provide at least as much information as comparisons of the figure within the region defined by the CBI method.

Hartenstein and Staack believe that their comparative approach has given new insight into the structure of the urban core by examining the percentages of floor space in each use. They claim that 'the comparative method relies on a very rigid procedure. The categories of floor space use have to be defined carefully, the urban core itself has to be delimited by uniform criteria, and the main activities have to be localized on a fine regional grid.'²⁹ Presumably the 'uniform criteria' refer to cut-off values in the location of the boundaries, but in light of their findings, it is apparent that this is so only because of the need to find the center, and to express land use activities as percentages of the total floor space. The former objective is trivial, while the latter has been treated in the previous paragraph.

Bohnert and Mattingly (1964) studied the CBD's of five small Illinois cities through time, employing the CBII part of the CBI method, and modifying the cut-off criteria by using 'break-in-slope' values. However, they did nothing of a comparative nature with the results, and the methods employed in determining the cut-offs are questionable.

In summary, it seems that the delimitation of the CBD, by whatever method, only serves to define a study area. On the basis of what has been published, it is not apparent that meaningful generalization depends on uniform delimitation. It is more likely that uniform objective delimitation introduces simplifications and generalizations on a much greater scale for several CBD's than for one, wherein Carter and Rowley (1966) objected that the purpose of such delimitation was defeated.

Notes (Chapter III)

- ¹Murphy and Vance (1954A), p. 191
- ²Murphy and Vance (1954B), p. 189
- ³Murphy and Vance (1954A), p. 221
- ⁴Ibid., p. 203
- ⁵Ibid., p. 204
- ⁶Ibid., p. 204
- ⁷Ibid., p. 203
- ⁸Murphy (1972), p. 26
- ⁹Majid (1970), p. 10
- ¹⁰Murphy and Vance (1954A), p. 203
- ¹¹Allpass, et al. (1967), p. 103
- ¹²Murphy (1972), p. 26
- ¹³Murphy and Vance (1954A), p. 200
- ¹⁴Carter (1972), p. 196
- ¹⁵Carter (1972), chapter 14
- ¹⁶Carter and Rowley (1966)
- ¹⁷Murphy and Vance (1954B), p. 303
- ¹⁸Murphy and Vance (1954A), p. 189
- ¹⁹Murphy and Vance (1954B), p. 335 (#4)

²⁰Ibid., p. 335 (#9)

²¹Ibid., p. 334 (#1)

²²Ibid., p. 334 (#2)

²³Ibid., p. 335 (#14)

²⁴Ibid., p. 335 (#3)

²⁵Scott (1959), p. 294

²⁶Ibid., pp. 292-93 (footnote)

²⁷Hartenstein and Staack (1967), 37

²⁸Ibid., p. 36

²⁹Ibid., p. 52

Chapter IV

Evaluation of the CBI Method of CBD Delimitation

The CBI method, in light of many theoretical and philosophical objections, must stand or fall on its utility as a taxonomic technique for the delineation of intra-urban space. In spite of objections mentioned heretofore, if this technique is a valid descriptor of city space, then the consistency which results from such description is justification enough for the employment of the technique, for example as in determining a study area.

It is the purpose of this chapter to evaluate the CBI method of delimitation as an exercise in taxonomy. Specifically the CBI method of Murphy and Vance is regarded as a taxonomic device for the classification of units as CB or non-CB categories. The application of taxonomic principles to this spatial context requires the addition of contiguity constraints, since all studies of this kind have implicitly or explicitly demanded spatially connected sets, at least where measurement was directed at the block level.

In particular, the writer is concerned with the question of sensitivity of the results of a classification to minor or moderate changes in the input or in the criteria on which the input is evaluated. The input data are highly susceptible to availability, and the criteria are often arbitrary, or subject to apparent frequency breaks in the data themselves. It would be useful to investigate the changes in CBD pattern which result from:

- a) changes in data input
- b) changes in criteria of acceptance
- c) changes in unit of measure
- d) changes in contiguity constraints.

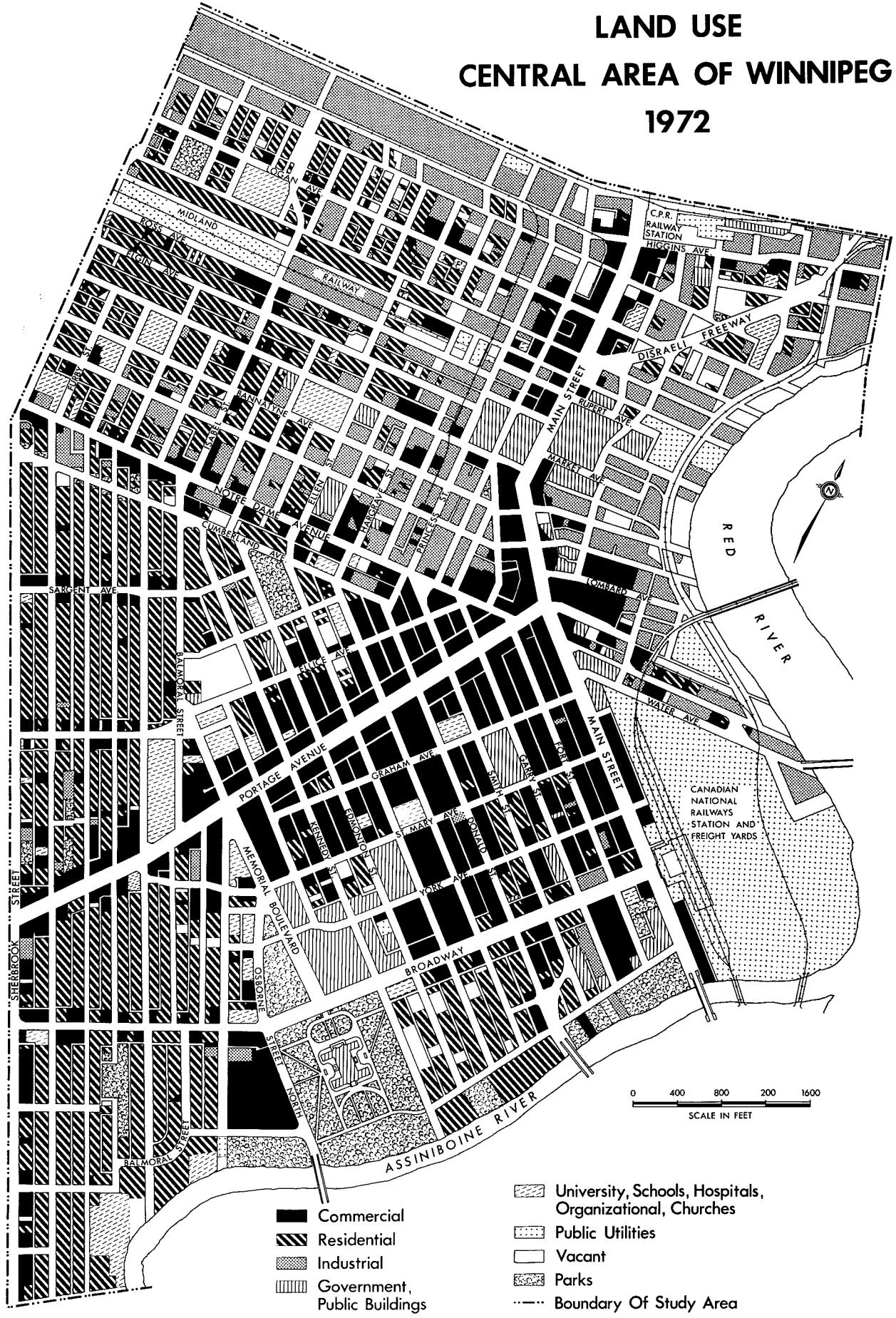
No one supposes that the areas thus derived could be spatially coherent throughout this process. The question of interest is the degree of difference, as investigated by D. H. Davies (1959) in Cape Town.

The data employed in this study were collected in 1971 and 1972 in the central area of Winnipeg (map 1), bounded by the Assiniboine and Red Rivers, the CP Rail mainline, and Sherbrook Street, under the direction of Dr. R. C. Tiwari, Department of Geography, University of Manitoba. These data were checked entirely for accuracy against the Henderson Directory for Winnipeg and information supplied by the City of Winnipeg Planning Office. The required land use mapping for delimitation of the CBD was carried out by the writer in 1974. Map 2 shows the index numbers of all potential CBD blocks in the area at the end of 1972.

The CBI method

The procedure of Murphy and Vance (1954A) was applied to the study area around the PLVI at Portage and Hargrave (index values are shown in Appendix A). The results are shown in map 3, as are potential modifications, based on a CBHI value of 1.0 and CBII of 50%. In the sense of boundary stability in the face of modifications to different aspects of

LAND USE CENTRAL AREA OF WINNIPEG 1972

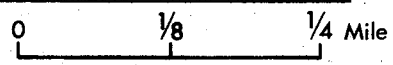
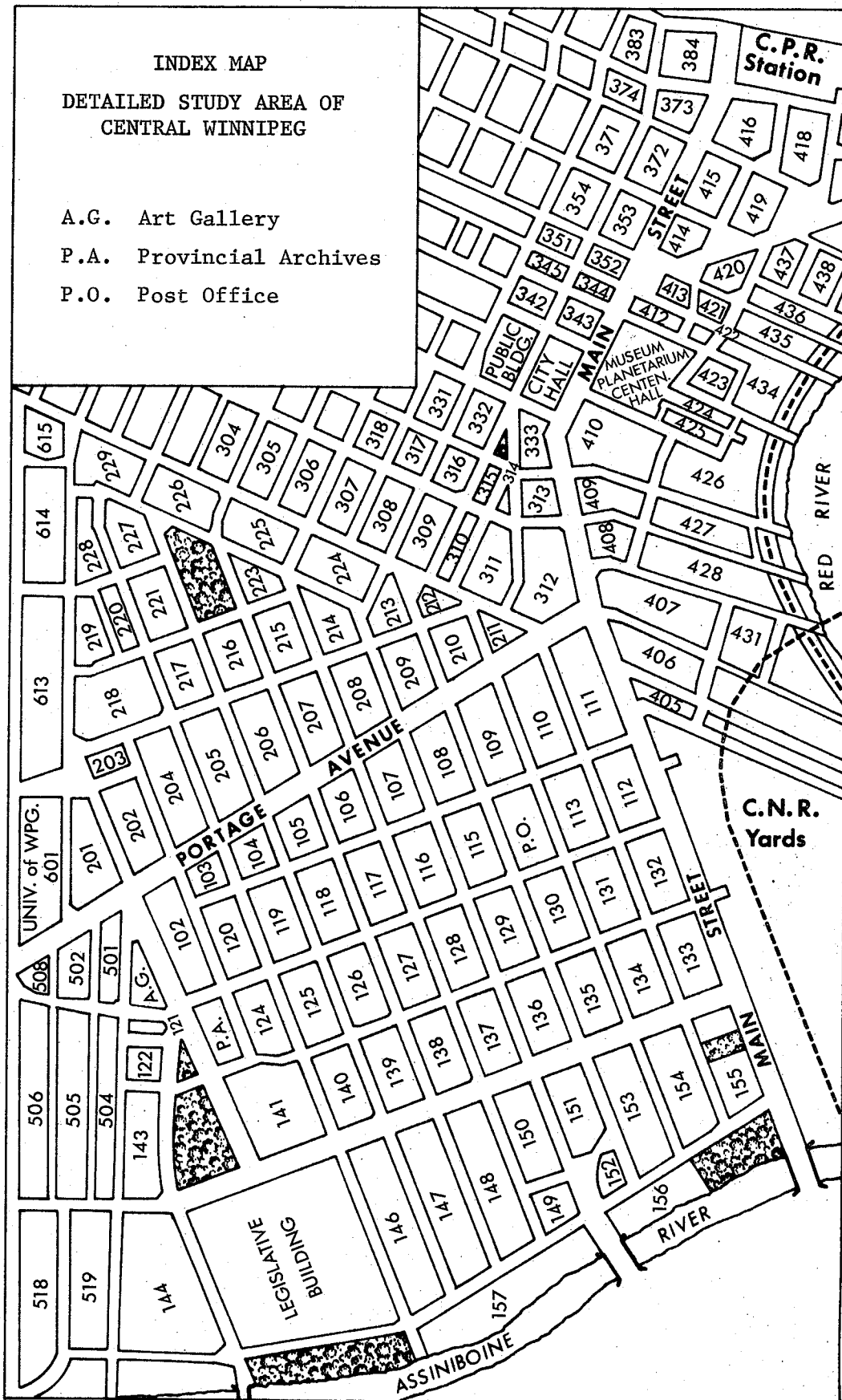


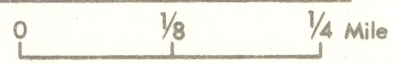
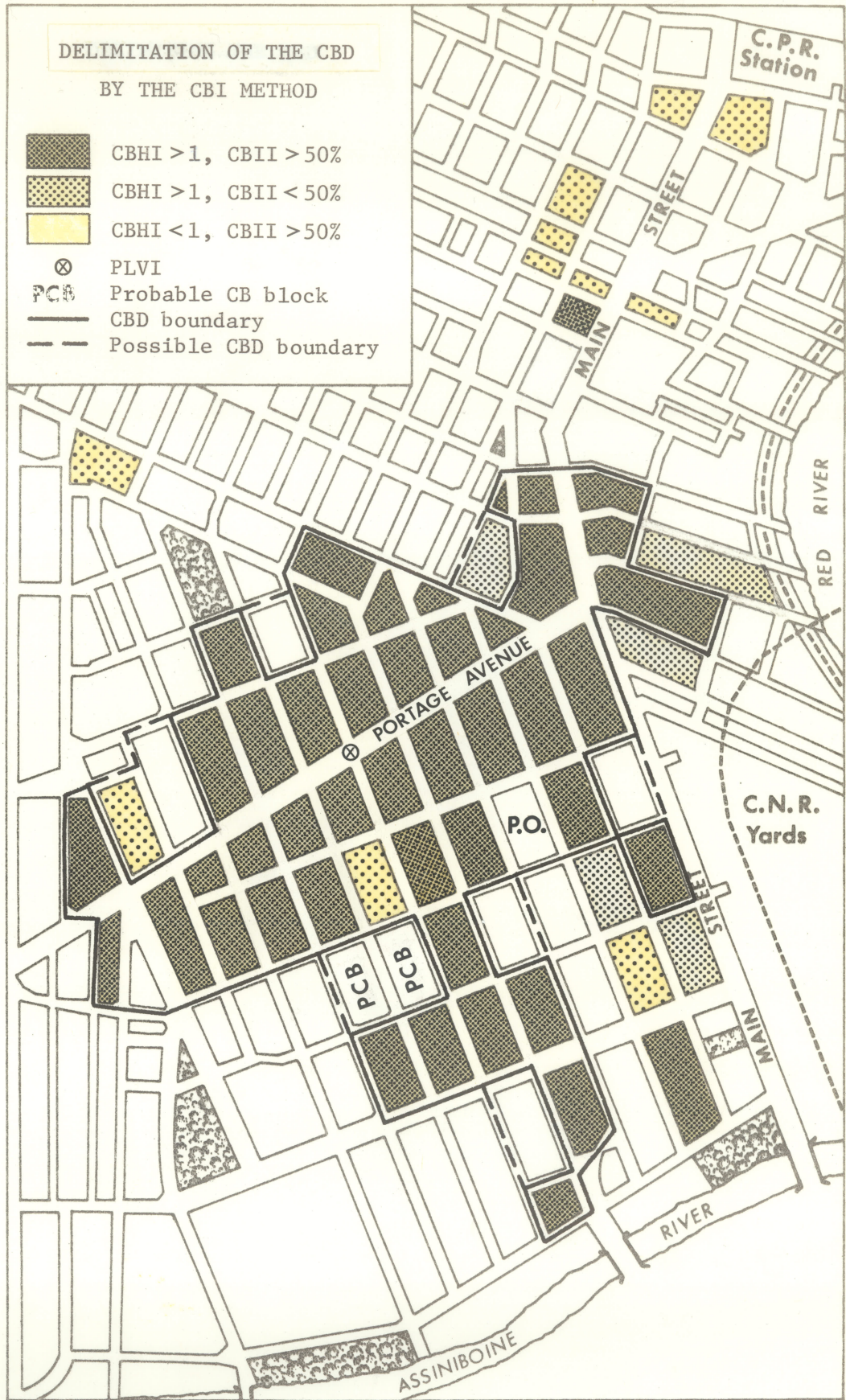
- Commercial
- ▨ Residential
- ▩ Industrial
- ▧ Government, Public Buildings

- ▨ University, Schools, Hospitals, Organizational, Churches
- ▩ Public Utilities
- Vacant
- ▩ Parks
- Boundary Of Study Area

INDEX MAP
 DETAILED STUDY AREA OF
 CENTRAL WINNIPEG

- A.G. Art Gallery
- P.A. Provincial Archives
- P.O. Post Office





the method, this map represents the norm. In the sense of evaluating the technique as a taxonomic procedure, the map requires evaluation against other 'objective' results, and against intuitive images of the CBD.

The dark shading represents the CBI value of 1. Lighter shades denote blocks which qualified on only one constituent index, while the boundaries indicate results which would occur through different interpretations of contiguity criteria.

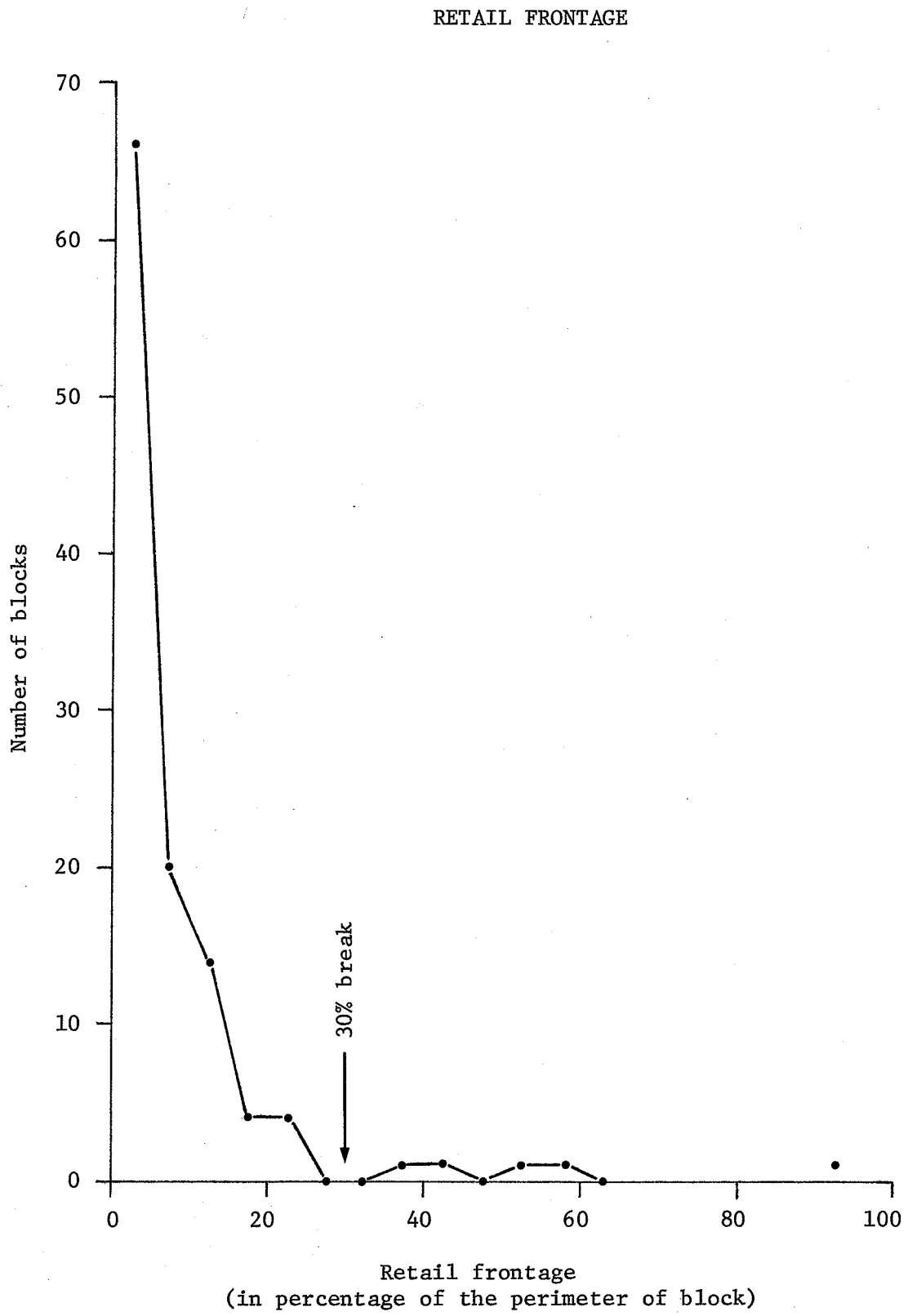
Changing the data input

In the previous chapter, the discussion of the determination of CB functions indicated that there was widespread modification of the Murphy-Vance list in underdeveloped countries, and in West Germany. Hartenstein and Staack (1967) used 'service activities' as the basis of their CB classification.¹ In historical studies, Bohnert and Mattingly (1964) modified the Murphy-Vance list because of 'change in the form of functions which have occurred with the passage of time.'² Bowden (1971) introduces centrality measures to distinguish CB and non-CB uses within the categories of wholesale, manufacturing, and non-profit organizations, previously excluded entirely by Murphy and Vance. It is the present writer's view that it is indeed the judgement of CB usage which makes the method most troublesome, but modification of this kind must be considered major, and be expected to have a major effect on the outcome. Therefore, in assessing the CBI method as a taxonomic technique, the Murphy-Vance list of activities is adhered to where land use data are employed.

Scott (1958) analyzed the location and frontage use of different business types within the delimited CBD's of the Australian capitals. Frontage along the most accessible streets has been the determining factor to many establishments retailing goods and services. Other non-retailing businesses also demand a range of accessible frontage. Since business establishments locate themselves along streets of varying accessibility it is of interest to delineate the CBD based on the proportion of frontage use in each block.

Where the CBI method uses ratios of floor space, maps 4 and 5 indicate the frontage proportions of blocks given over to retail and to all central functions (excluding parking and parkades). The categories are based on the frequency breaks in figures 1 and 2. From map 4 it is clear that retail establishments are confined mainly to Portage Avenue and to a lesser extent to Main Street. The shape of the CBD indicated by central business frontage (map 5) differs from that of the CBI method, extending along Main Street south of Portage rather than along Broadway Avenue. The cluster of blocks north of the City Hall stands out more clearly than the blocks along Broadway that are included in the CBD by the CBI method. This is because the CBI technique does not consider frontage use, which does not always reflect the size and intensity of uses. Inclusion of the blocks along Donald Street north of Broadway Avenue in map 3 is largely due to the presence of a number of parking lots. Blocks used entirely as parking lots will have the index values of 1 and 100% respectively whereas the rest, with

FIGURE 1



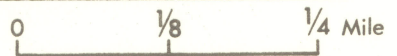
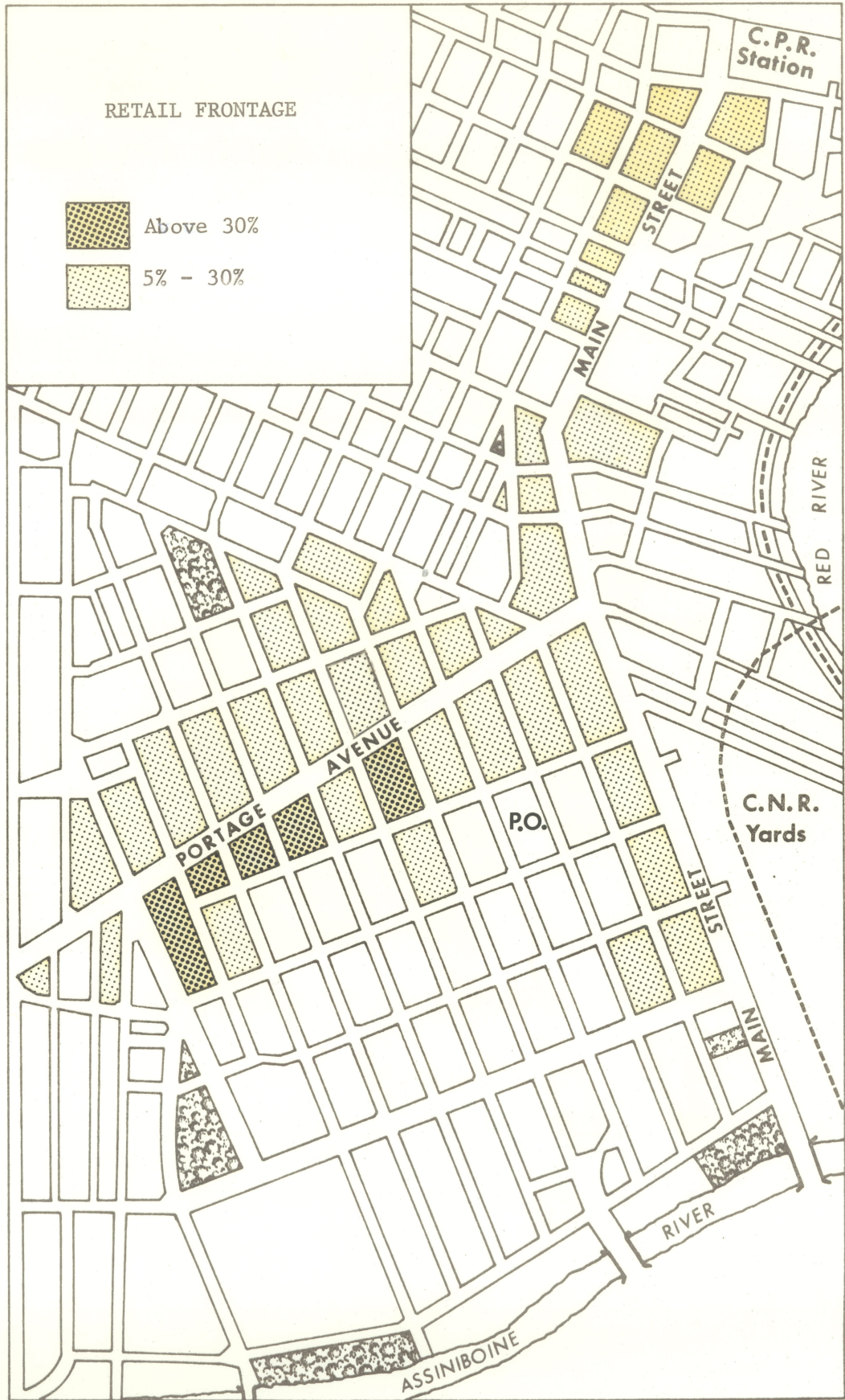
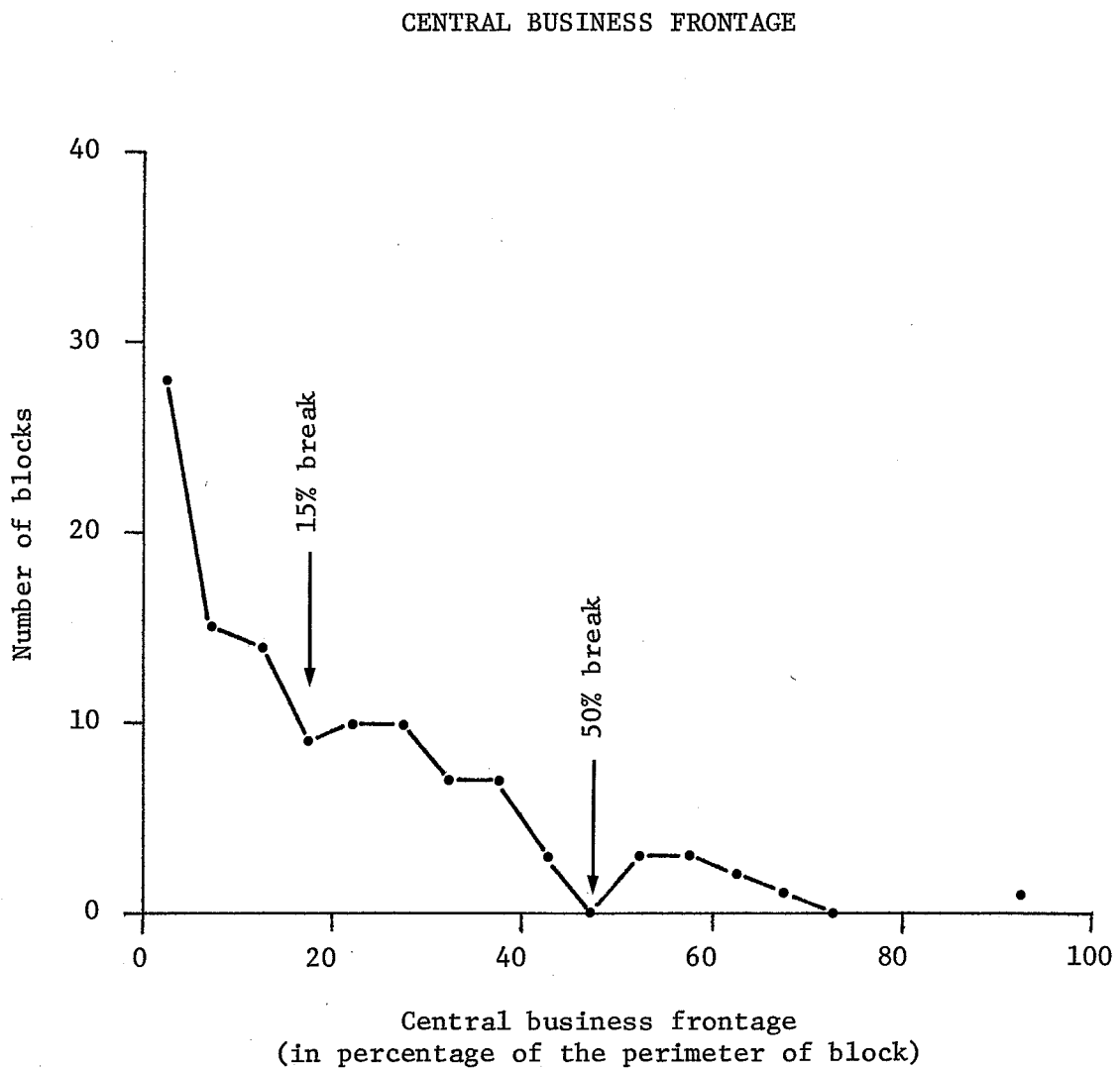
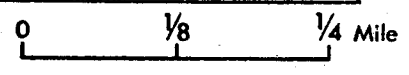
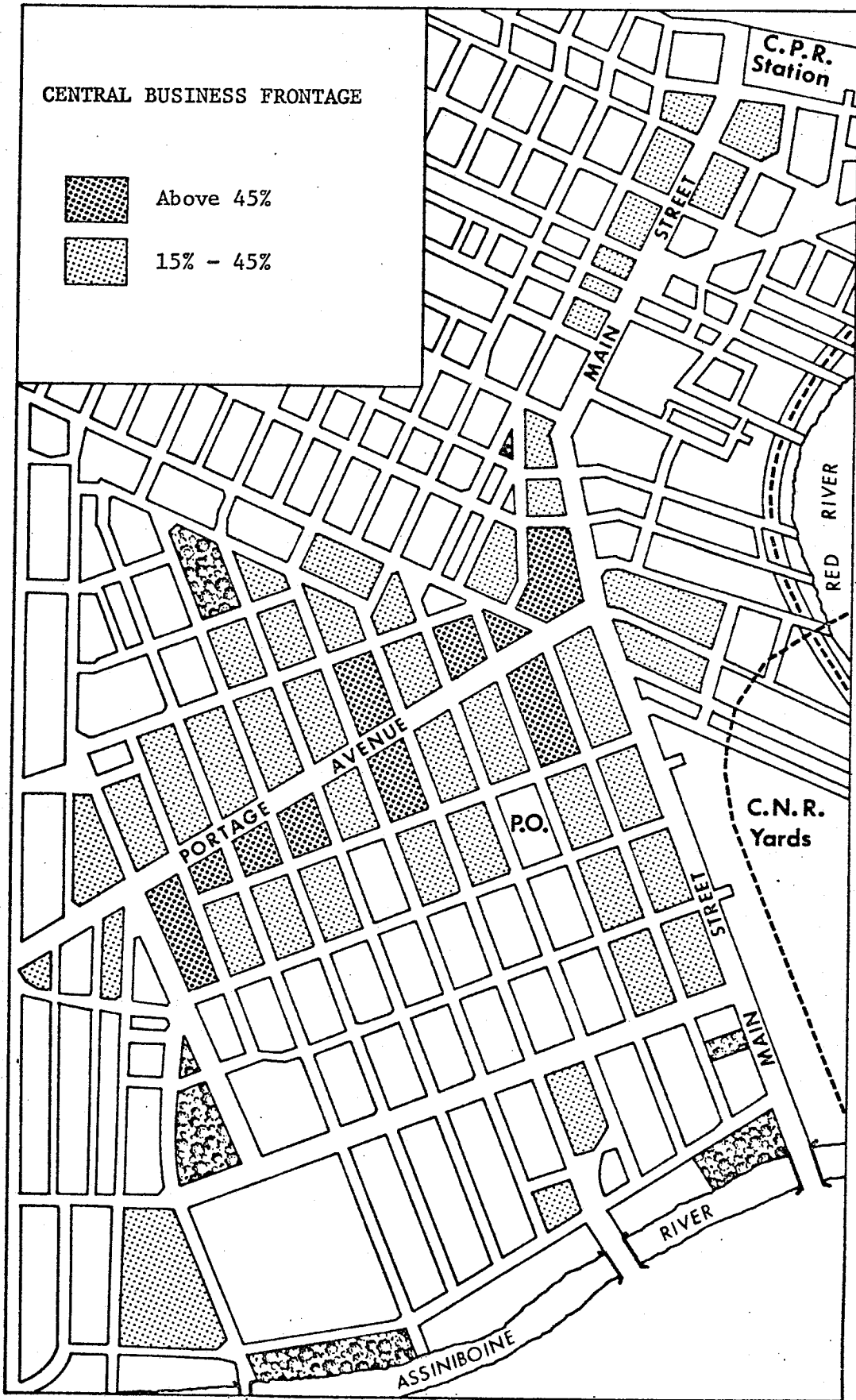


FIGURE 2





the exception of one block (Eaton's) have some non-CB space, and do not reach the 100% value. Murphy (1972), aware of this overemphasis on parking, admitted that commercial parking lots

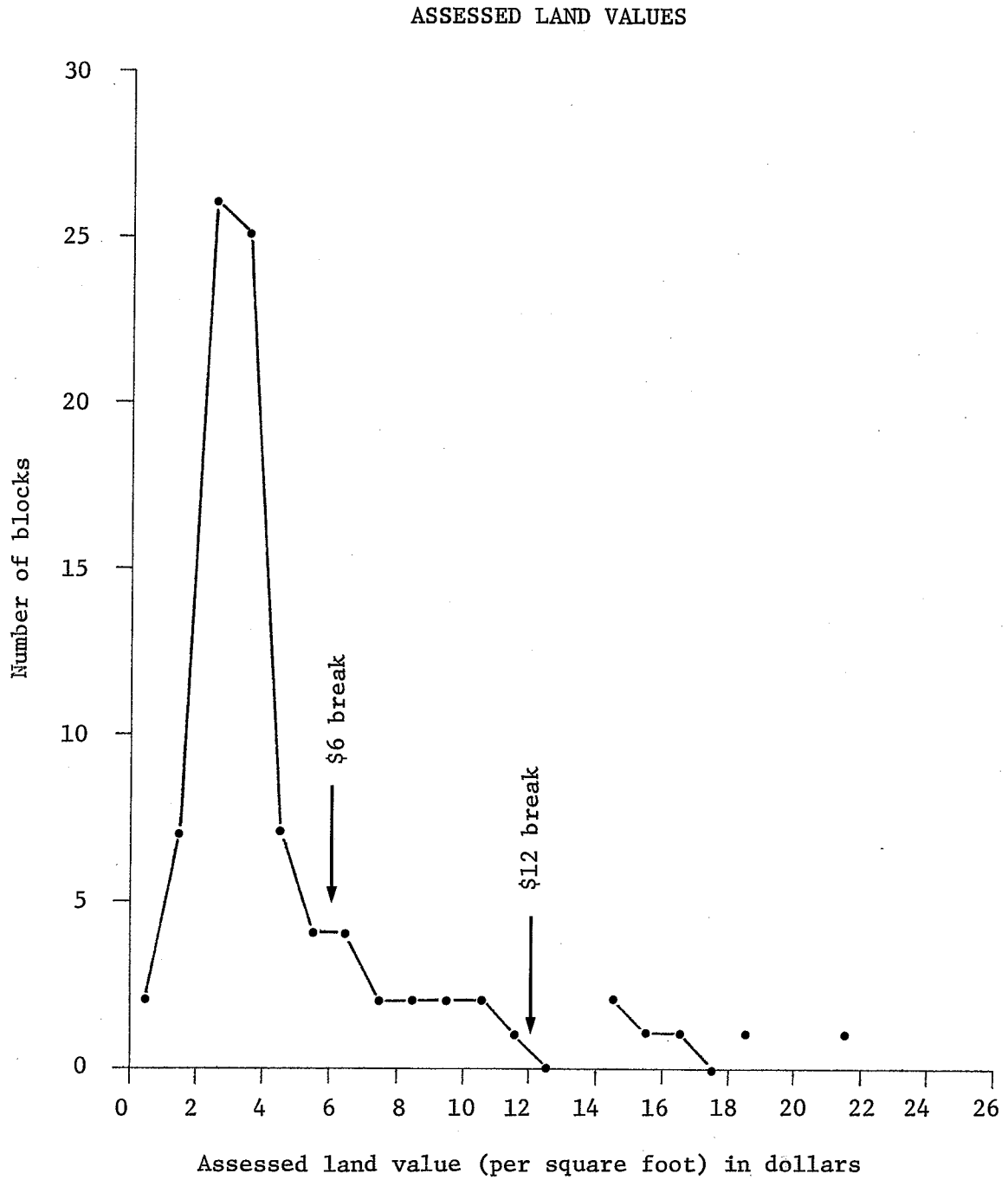
do not represent a very intensive commercial use. Perhaps a commercial parking lot should be considered the equivalent of only half a floor of other central business uses.

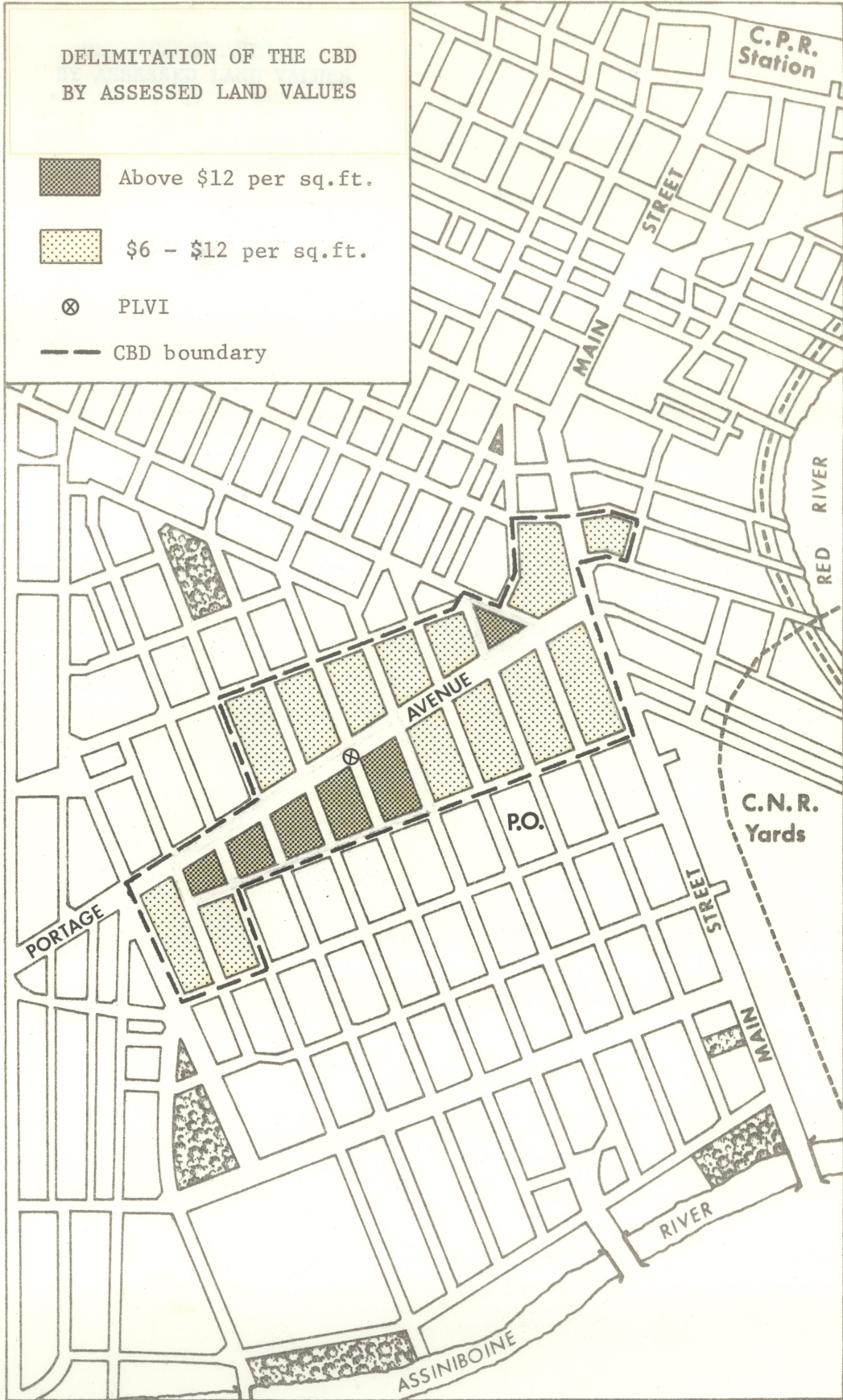
If the parking lots were to be considered as half a floor of other central business uses, the Broadway extension of the CBD would not emerge, since even if the index values were sufficient, it would be cut off from the main cluster. It is connected only by one block (128), which is all parking lot (if the probable CB blocks are not taken into consideration).

It is a different question whether the employment of land valuation data produce a similar boundary. Murphy and Vance (1954A) applied a boundary based on 5% of the highest valued lot in six of their nine cities. The 5% values 'seemed best to represent the edge of the CBD'⁴ but they complained that 'land values do not discriminate among CB and non-CB uses.'⁵ D. H. Davies (1959) used a similar measure in Cape Town, but obtained better results than Murphy and Vance in that the results tended to confirm the CBI boundary.

Figure 3 and map 6 illustrate attempts to provide assessed land value boundaries in Winnipeg. Based on breaks in the frequency graph, the over \$6 and \$12 per square foot blocks are shaded. The next lowest break point, \$1 to \$2 per square foot, would include almost the entire study area. The 5% value would correspond to this last value, and grossly exaggerate the CBD compared with that by the CBI method.

FIGURE 3





The CBD defined by the \$6 break is compact in shape, mainly consisting of blocks facing Portage Avenue. It is much smaller than that delimited by the CBI method, but corresponds much more to intuitive ideas regarding the extent of the CBD, and to the retail core identified on the basis of retail frontage (map 4).

Change in criteria of acceptance

The CBI technique has been objected to partly for the selecting of arbitrary criteria for determining CB blocks. To avoid this shortcoming, D. H. Davies (1960) initiated the use of 'break of slope' points as appropriate limiting values for delimitation of the hard core.

The frequency break technique tends to identify natural clusters in the data, and thus, it is usually argued, provides more realistic class divisions than those based on external considerations. It has been used to determine the CBHI and CBII cut-off values for the CBD in a number of cases. However, the frequency density curves, used by D. H. Davies (1960), de Blij (1962) and Bohnert and Mattingly (1964), among others, require that the datum points be amalgamated into frequency intervals--a sort of pre-categorization. Such prefiltering has a substantial effect on the location of observable break points, as the last two authors have demonstrated. Cumulative frequency, or 'rank-size' distributions require no prefiltering, although R. J. Davies and D. S. Rajah (1965) did so, obscuring the critical breaks in their cumulative curves.

The frequency break technique has one substantial shortcoming in regionalization applications. The clusters are numerically coherent, but not necessarily spatially so. Arguments could be put forth that spatial contiguity is too rigidly demanded by delimitation techniques discussed heretofore, or that the clusters usually turn out to be spatial after all. However, one should be aware that class membership in this case is usually conceived as being more than a particular index value or two. Hence it is a happy coincidence that cumulative frequency distributions allow the construction of regions unit by unit, potentially allowing for the simultaneous inclusion of frequency breaks and contiguity criteria.

Figures 4 and 5 show the rank-size distribution of the blocks in the study area according to their CBHI and CBII measures respectively. The CBHI curve is transformed to the logarithm because of the exaggerated reverse 'J' shape of the untransformed graph.

Wherever the breaks are in the data series, they clearly do not occur at the values 1 and 50%. Natural breaks occur at 0.9 for CBHI, and at 60% and 40% for CBII. These are 'moderate' modifications of the CBI values, both numerically and in the number of blocks reclassified.

Maps 7 and 8 show blocks above index values 0.9 and 60% respectively. In maps 9 and 12 the CBD boundaries are drawn using the natural breaks (0.9 and 60%, 0.9 and 40%) and the contiguity rules of the CBI method. The boundaries thus produced by the modified values are compared with the CBI boundary. Map 11 shows the residue of the CBI boundary minus

the boundary drawn according to index values of 0.9 and 60% and contiguity rules similar to those of the CBI method. The result is a difference of 11 blocks not included by the modified cut-offs, near the peripheral areas of Portage and Main, Notre Dame, and Broadway. This difference of 11 blocks results in a decrease in floor space of 15% in service and professional functions and 22% and 24% in other office and financial functions respectively.

Using the CBII cut-off at 40% the difference in boundaries is reduced to four blocks, after contiguity. This time, necessarily, the surplus occurs in the modification. In visual terms (map 13) the difference is slight but is substantial in terms of non-retail functions, mainly in the service and financial sectors. The change in cut-off criteria has caused a floor space increase of 8.9% in service trade and 16.7% in financial trade. Under these changes in criteria, retailing has shown the highest stability while the others fluctuate considerably (see Appendix C).

Map 14 shows the CBD using the cut-offs at 1.4 and 70%. In this case the shape of the CBD has been greatly changed--the intersection of Portage and Main has been deleted and the resultant CBD is similar to that of map 6--the CBD delimited by the average assessed value of \$6 per square foot.

Changing the unit of measurement

The use of the block as the basic unit for delimitation is, according to Murphy and Vance (1954A) one of the obvious shortcomings of the technique, a point touched upon in the previous chapter.

FIGURE 4

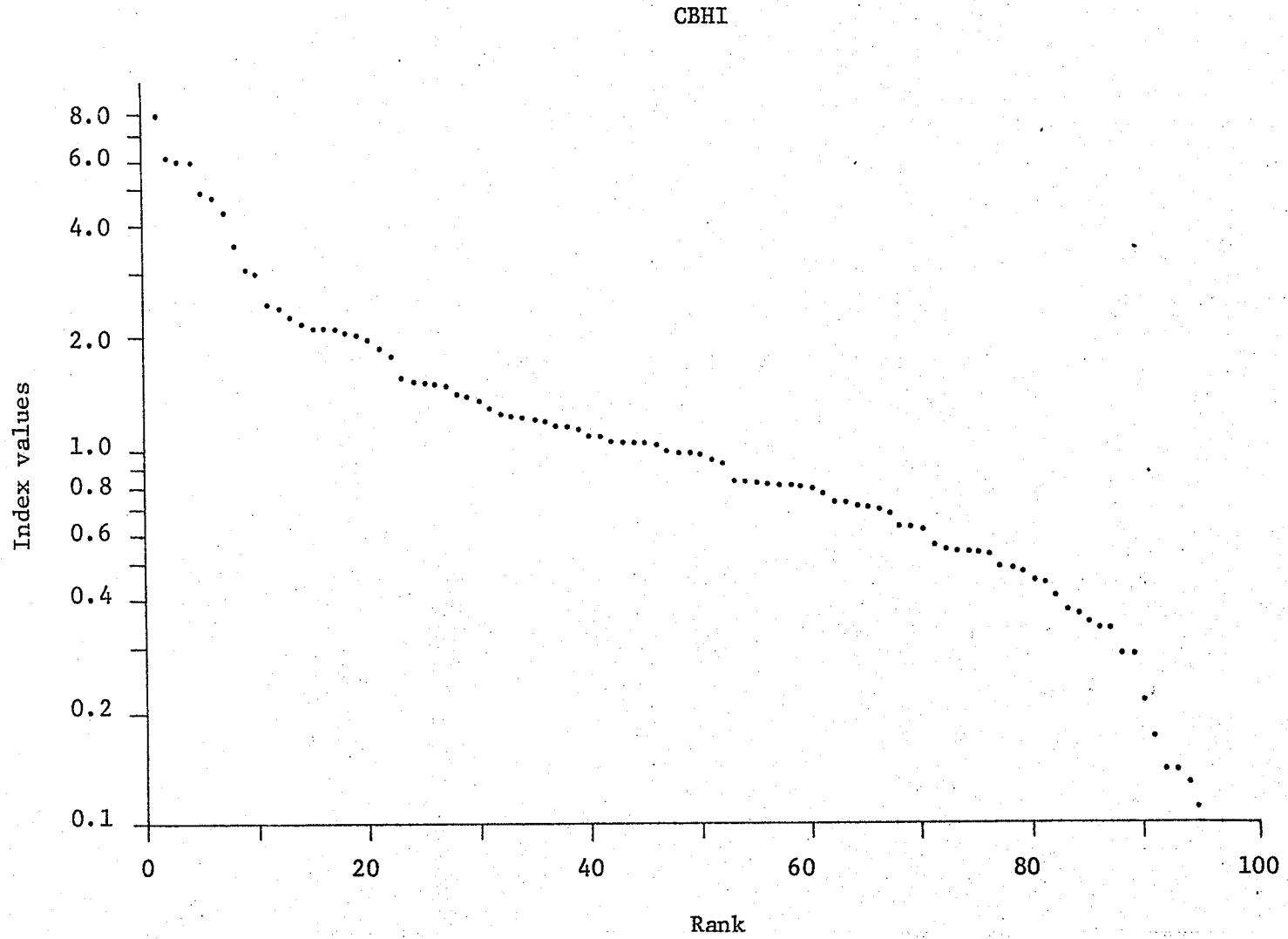
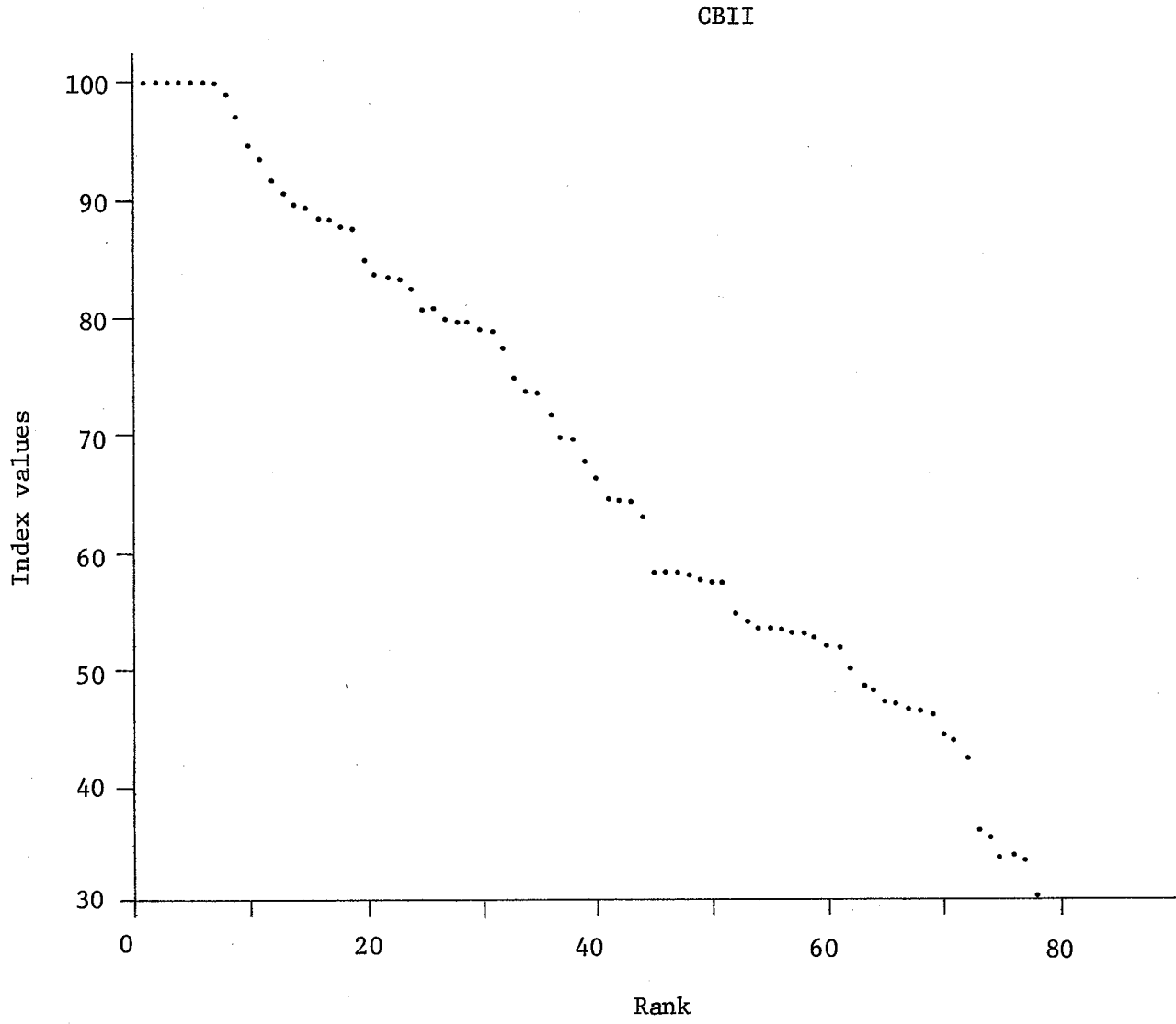
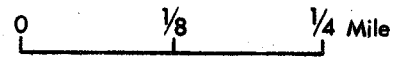
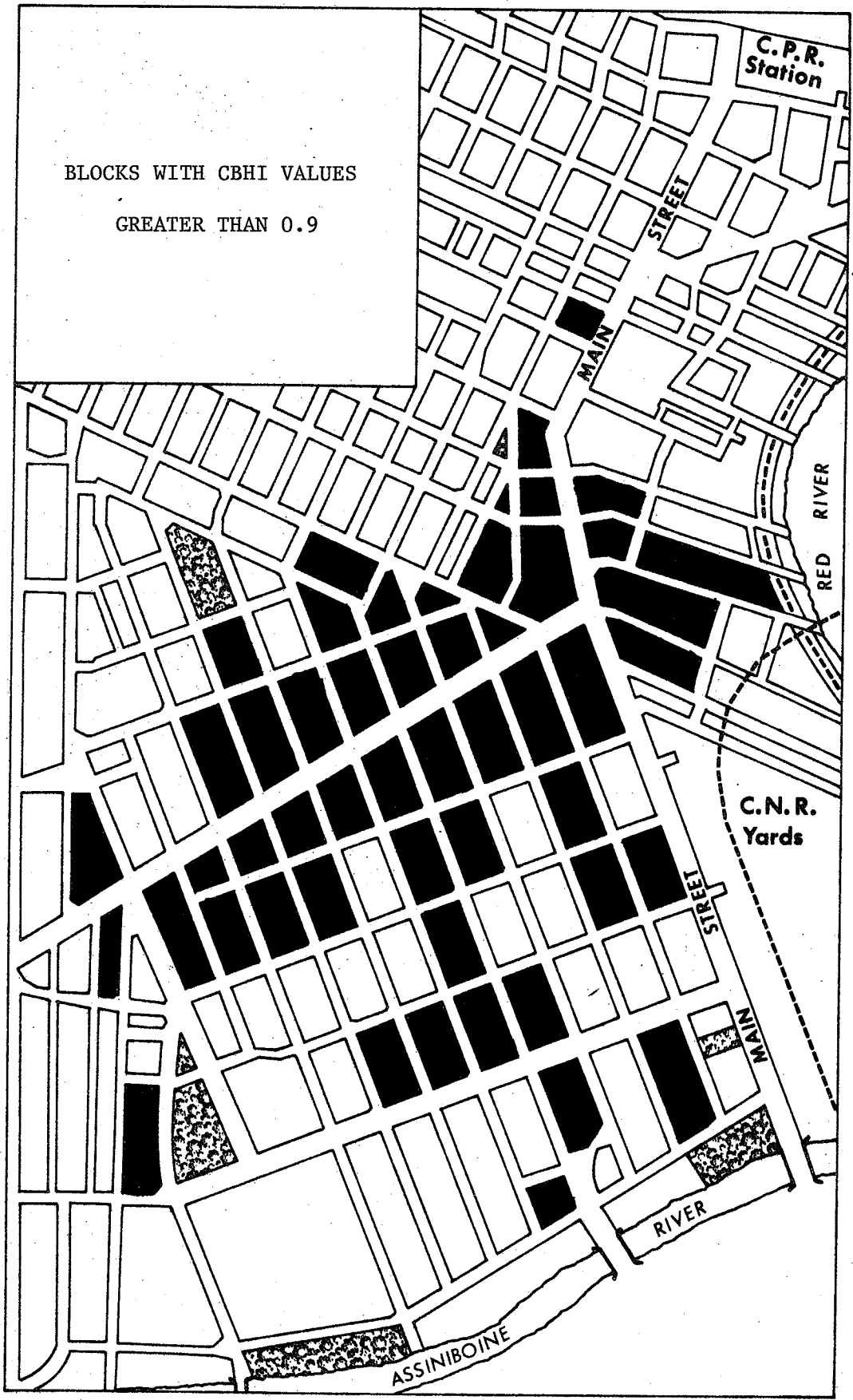
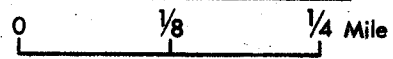
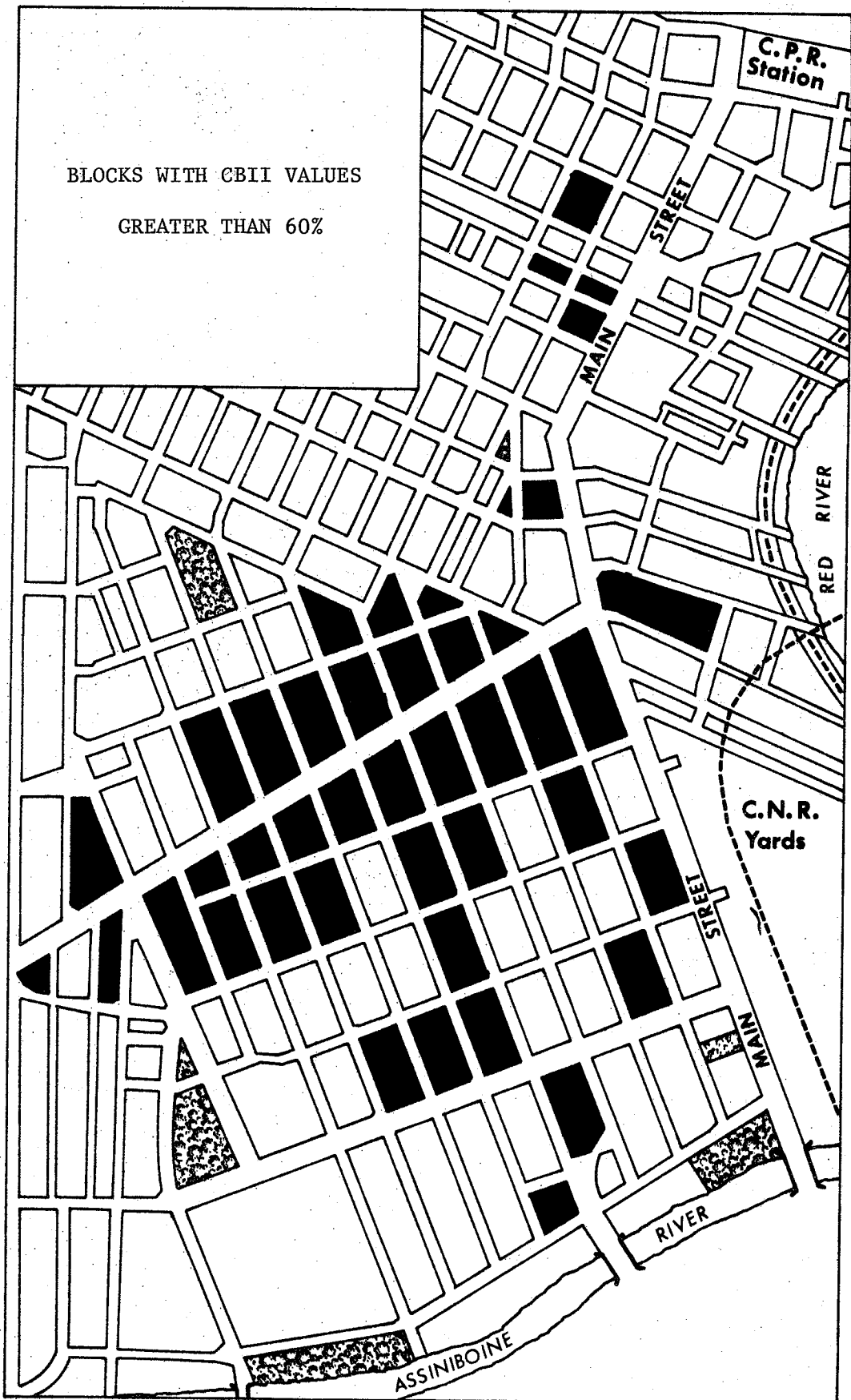
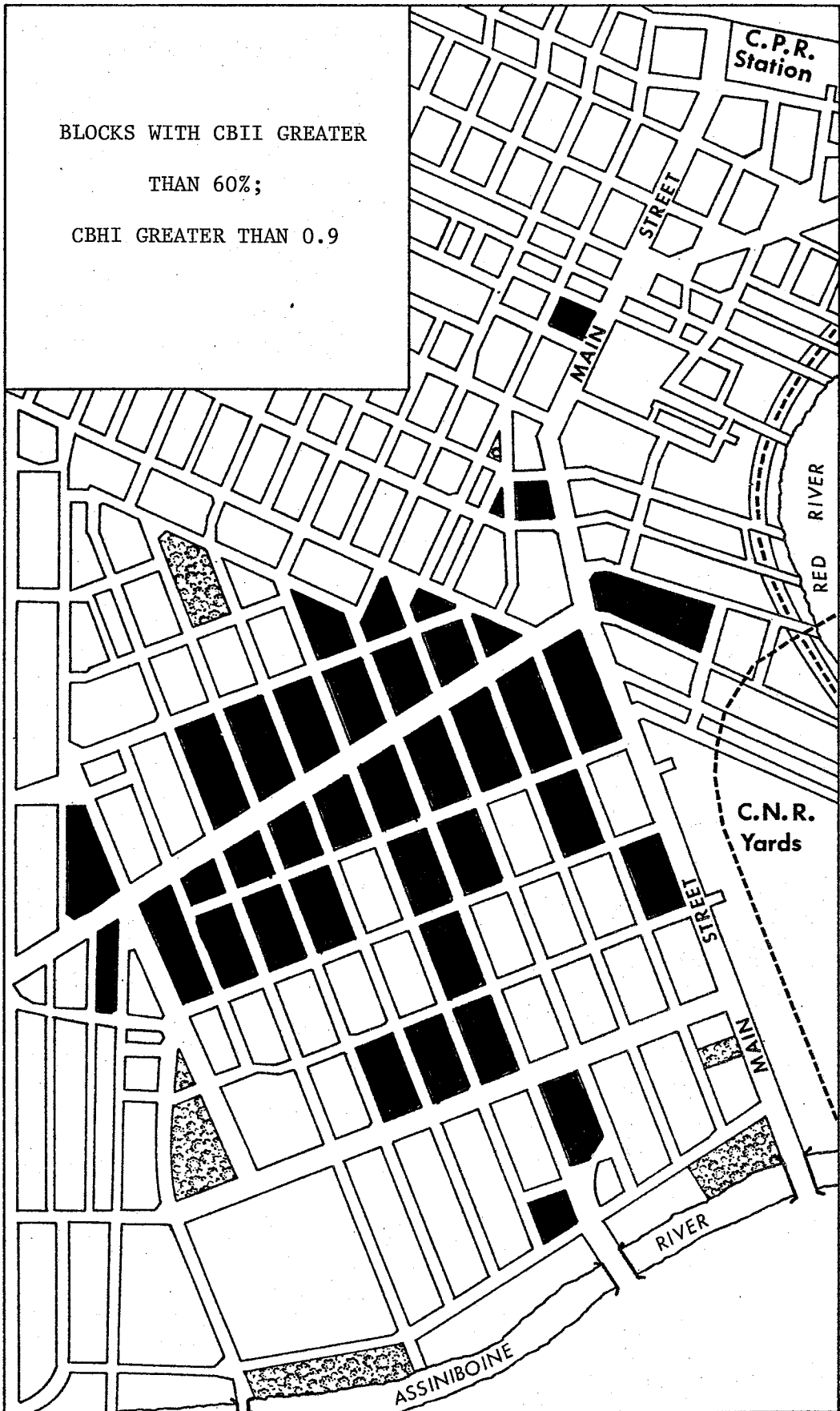


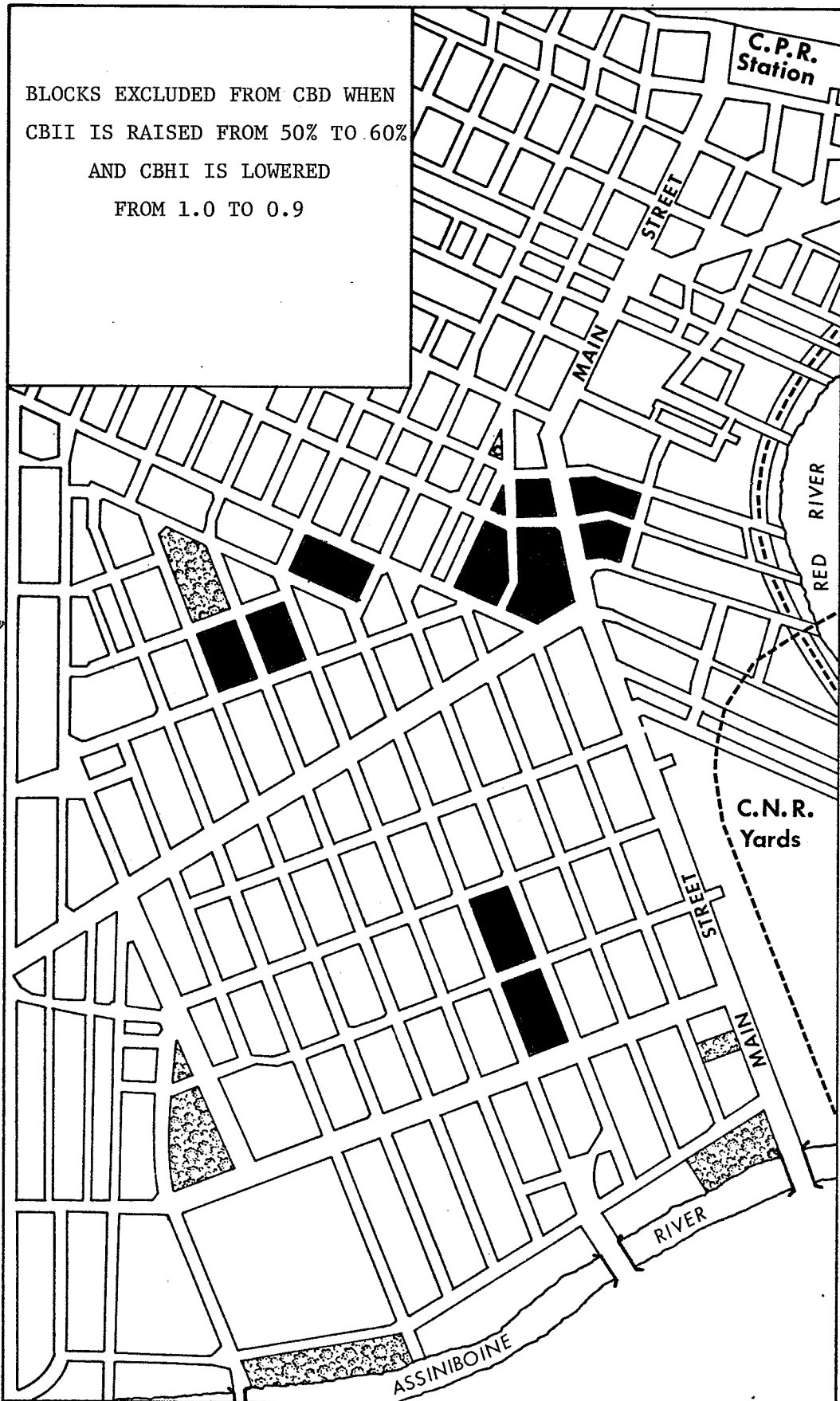
FIGURE 5



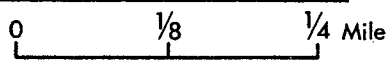


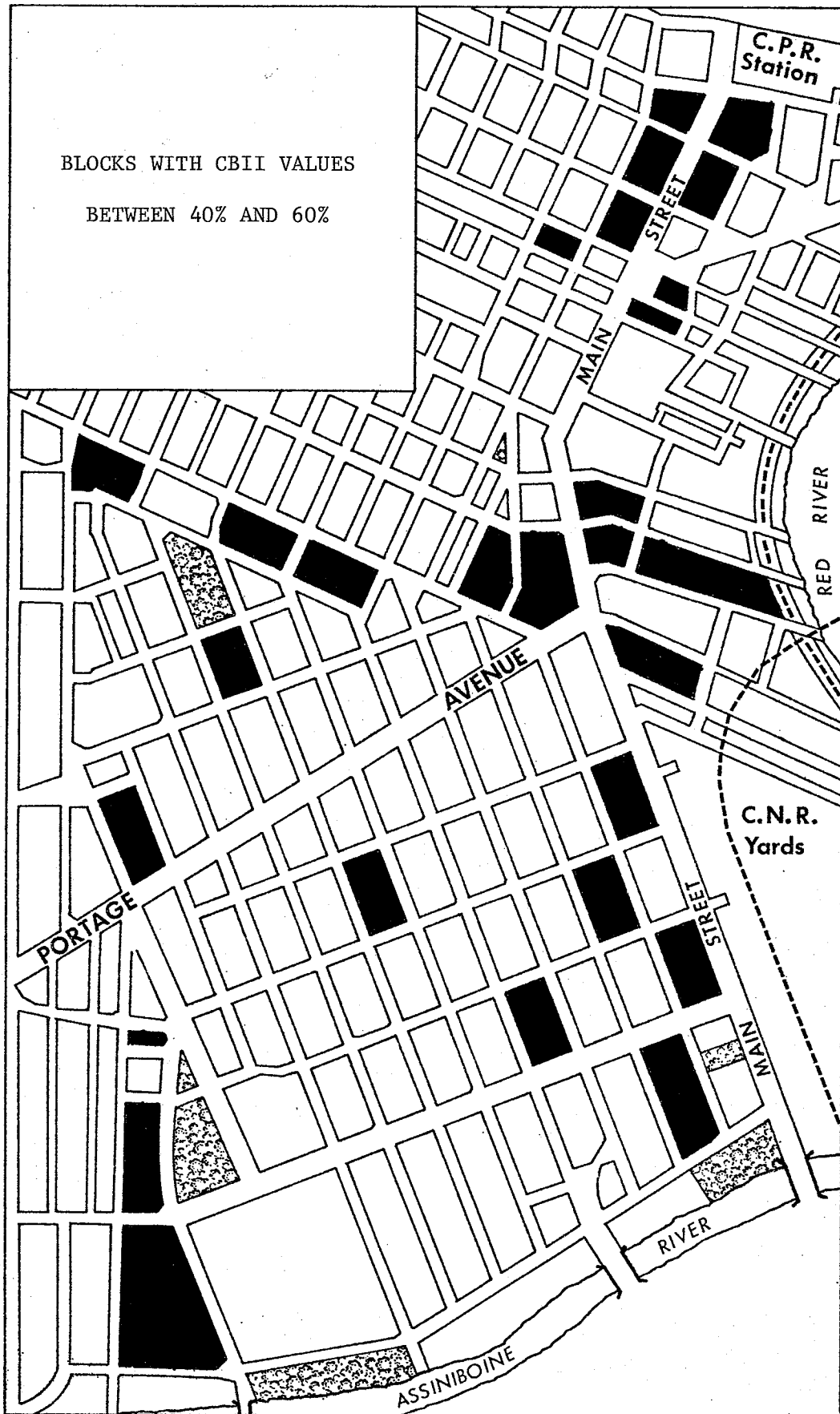






BLOCKS EXCLUDED FROM CBD WHEN
CBII IS RAISED FROM 50% TO 60%
AND CBHI IS LOWERED
FROM 1.0 TO 0.9





BLOCKS WITH CBII VALUES
BETWEEN 40% AND 60%

C.P.R.
Station

STREET

MAIN

RED RIVER

AVENUE

C.N.R.
Yards

PORTAGE

STREET

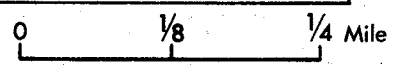
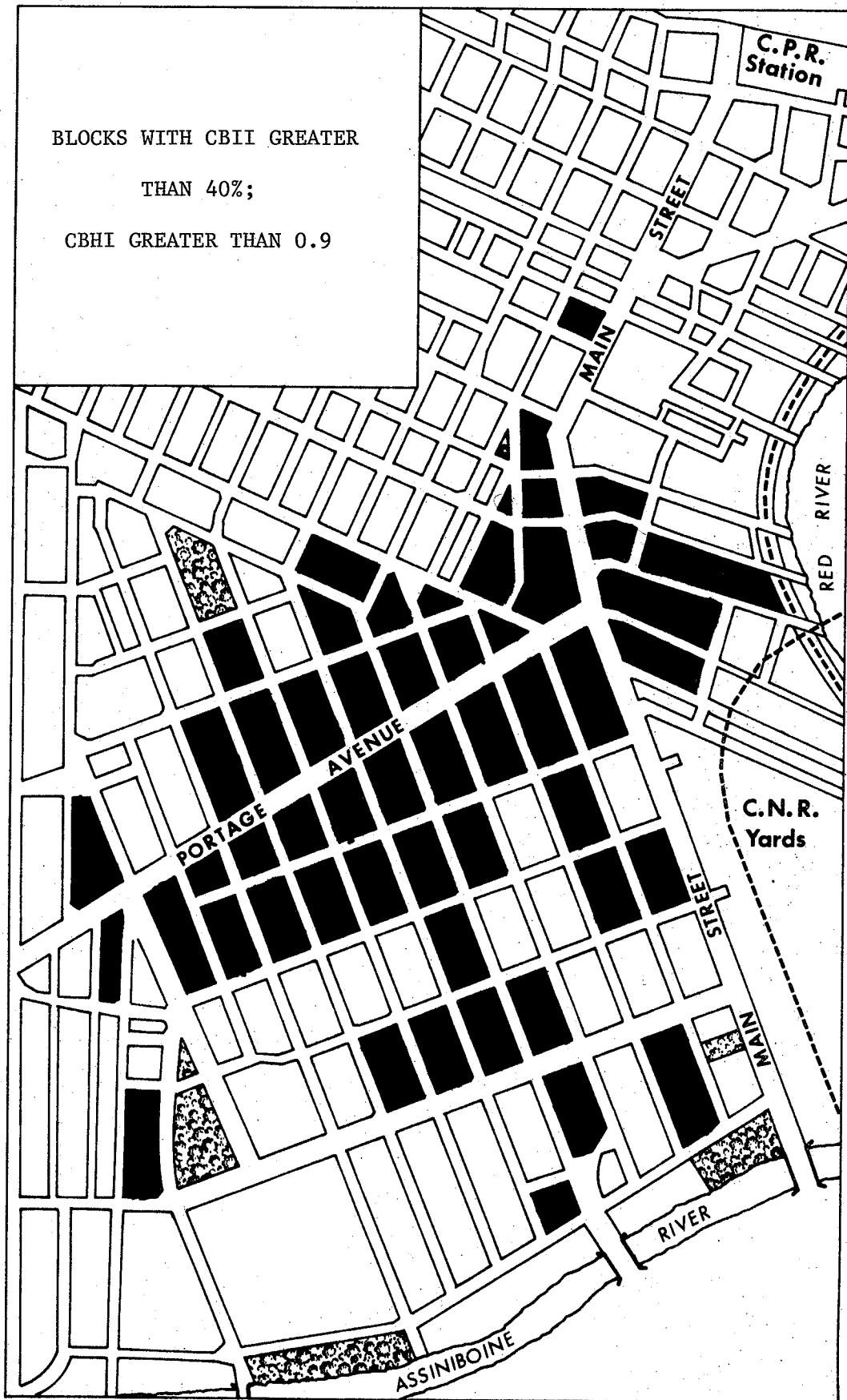
MAIN

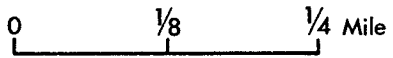
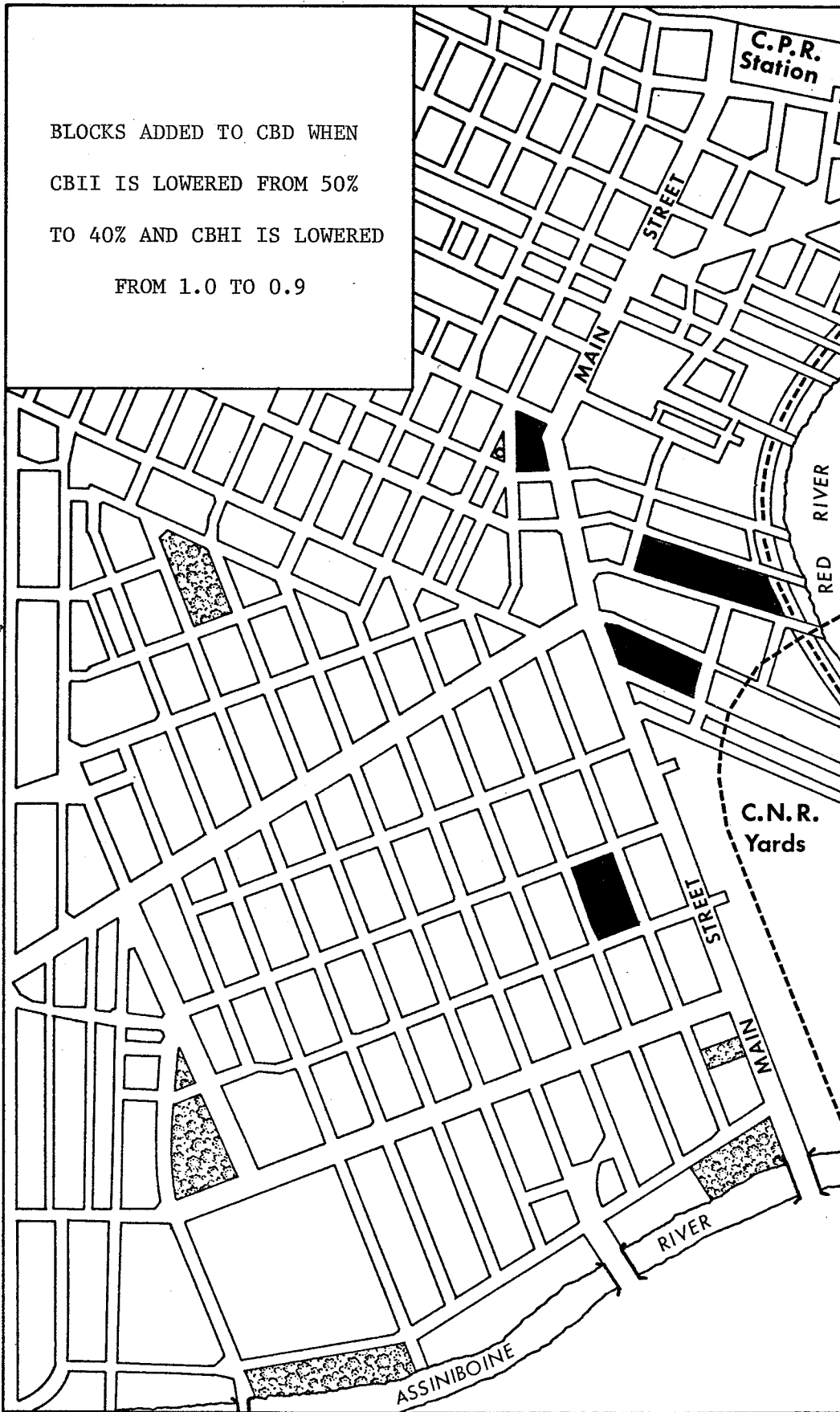
RIVER

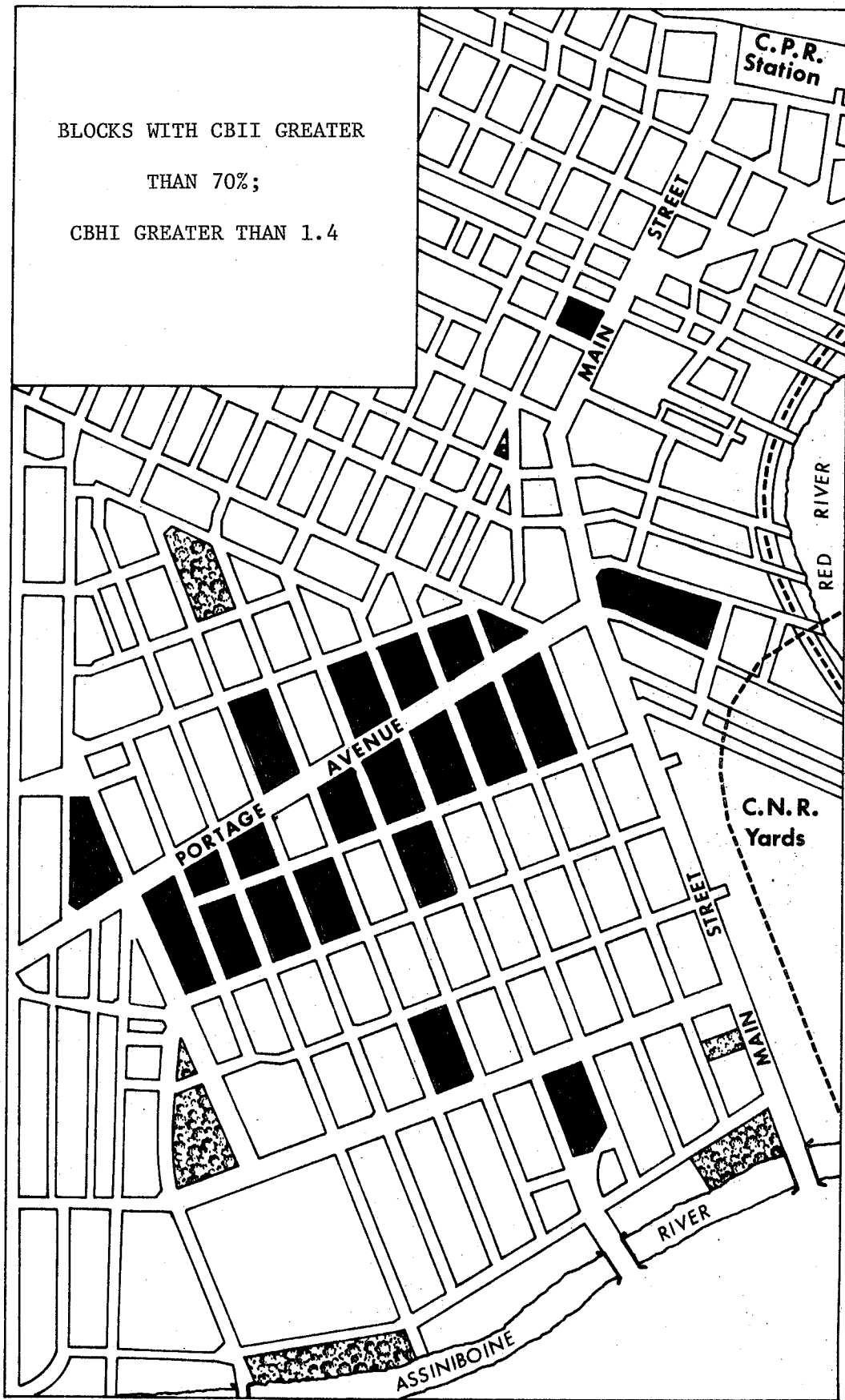
ASSINBOINE



0 1/8 1/4 Mile







The index values of a block are discernably affected by its size, since the ratio of CB to non-CB uses generally decreases with block size, especially, near a transition zone or periphery. D. H. Davies (1959) encountered the problem in Cape Town; and in Winnipeg, there are few blocks that one would say, on observation, are circumscribed by CB uses. Each face of most central blocks in Winnipeg is likely to be quite different from the others, and more like the face of the block across the street. While the writer has little experience with other North American cities, the situation locally seems in no way peculiar. In light of the nature of urban commercial activity, the conceptual nature of which was reviewed in chapter II, it is the streets that should define the CBD, not the blocks. Hence the block face or the lot would likely provide more fruitful bases for delimitation. It is puzzling to this writer that studies of this genre that have used frontages or lots as the unit of measure have usually done so as a last resort, because blocks were not available.⁶

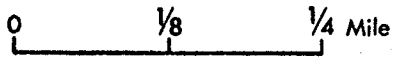
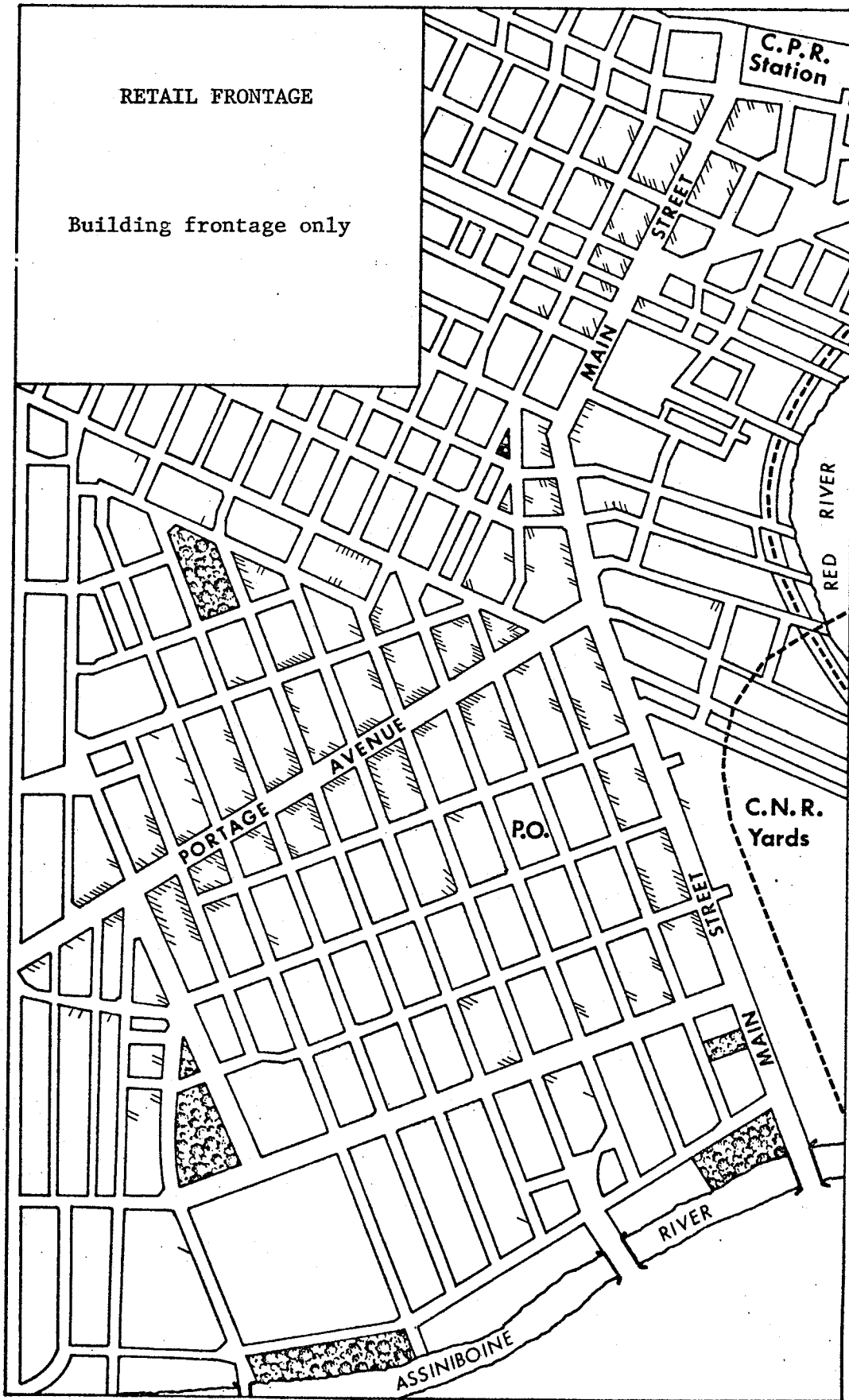
Due to the 'radial' pattern of major streets, there are several blocks of odd shape in central Winnipeg, and many elongated ones near the rivers. Block 428, despite a sizable concentration of business uses in the western section, is excluded by the CBI method because of its length. Blocks 147, 148 and 150, on the south side of Broadway, are similar cases. Business establishments which front on Main Street by the CNR yards are not part of blocks, and by the CBI criteria are excluded from the study.

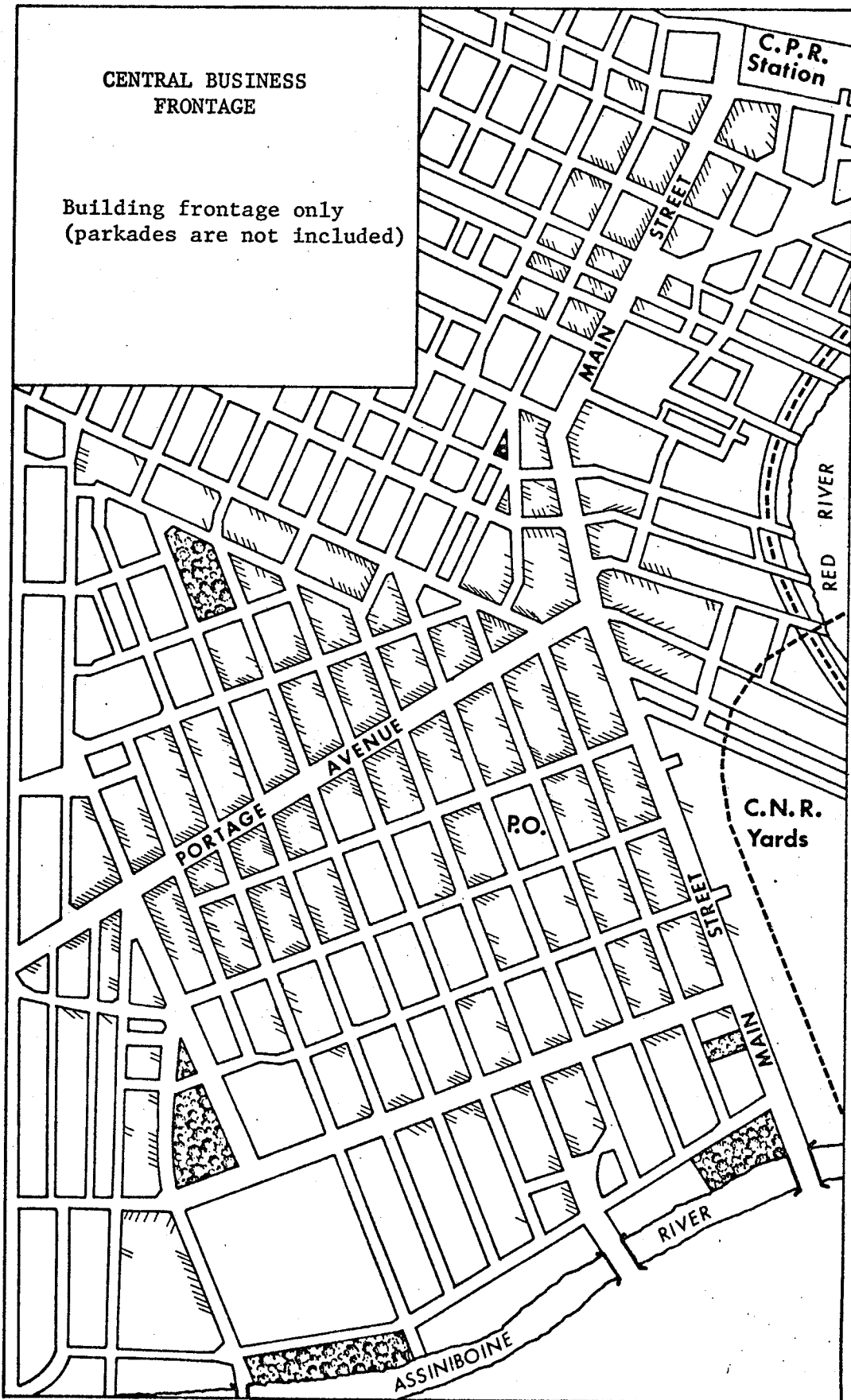
The retail frontage of each building is indicated in map 15, and central business frontage (all CB uses except parking) in map 16. The problems of the block as a unit are apparent from these maps alone, or through comparison with any of the block maps presented previously.

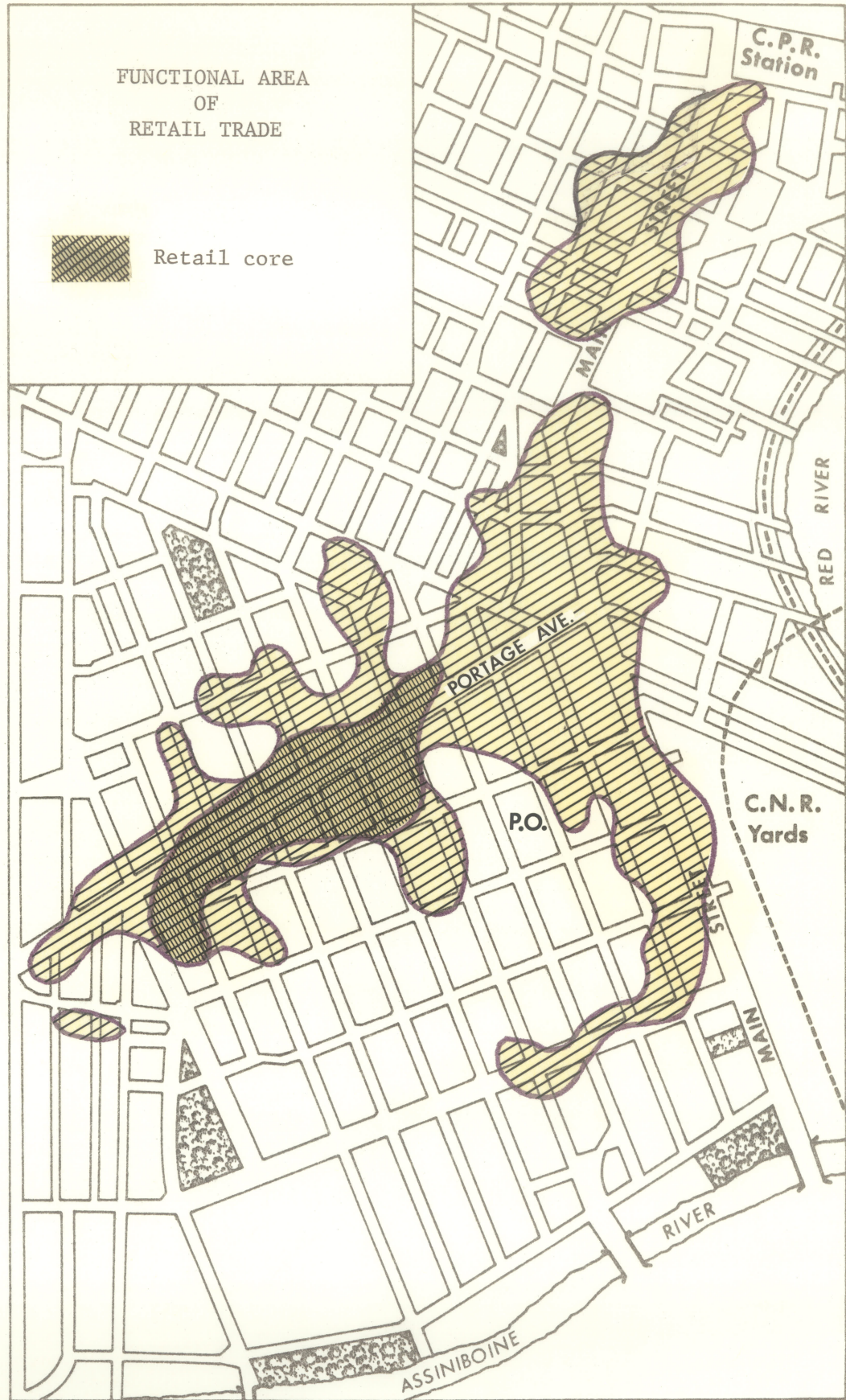
Maps 17 through 20 show the writer's impression of each of the major functional zones based on the distribution and intensity of floor space use of establishments found within the central area. Business types are classified into four functional categories: retail trade, service trade, financial, and professional services (for the classification, see Appendix B). Within the functional areas the sub-districts and cores are also identified according to concentrations of sub-groups of activities.

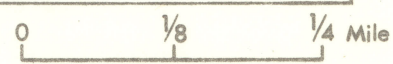
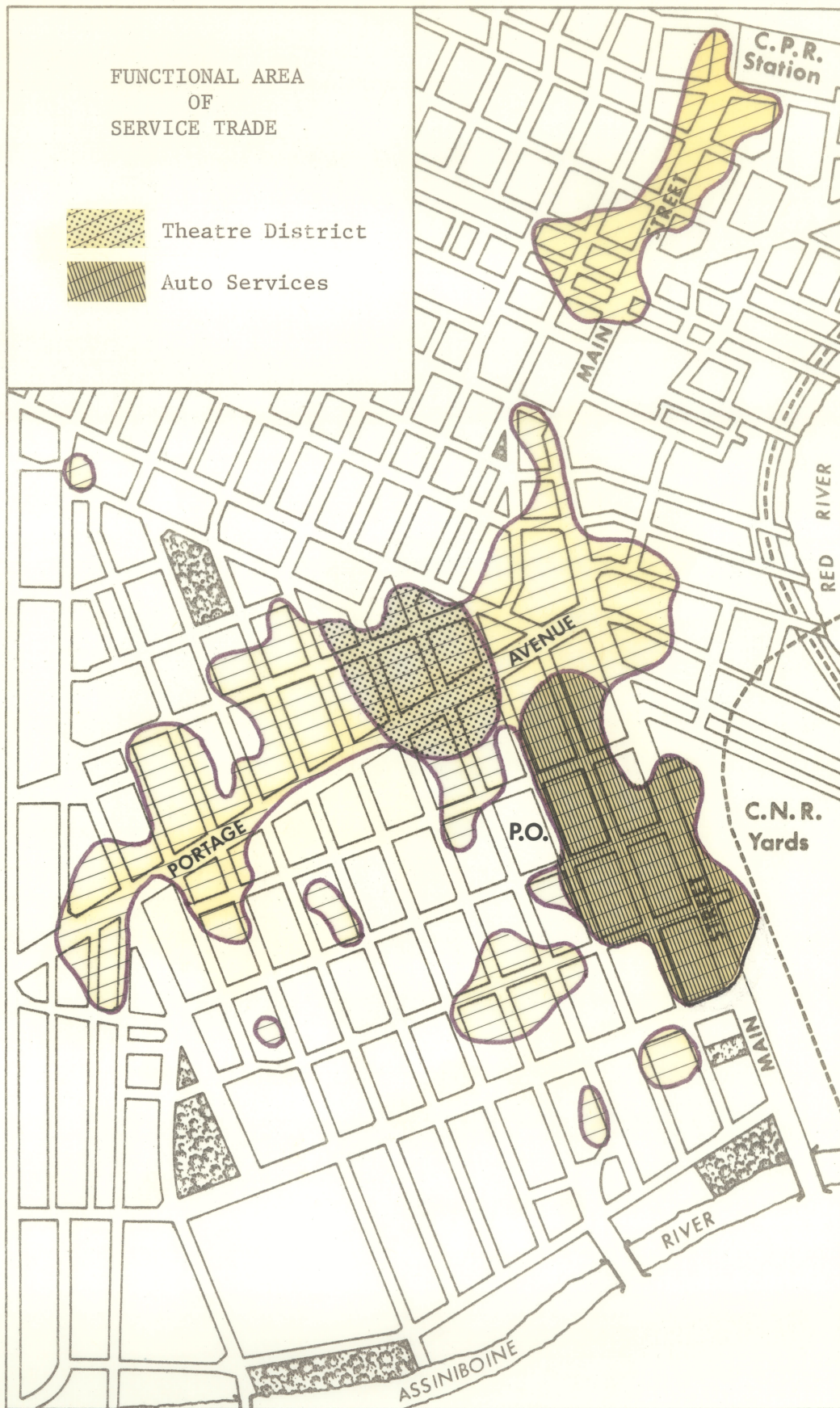
From these maps one can observe the locational orientation of the functional areas and their cores. Retail and service trade are oriented along Portage and Main and professional and financial services concentrate more strictly along Portage Avenue.

However they all tend to aggregate in different sections along Portage Avenue, and to share the accessibility of central locations. The retail core is found between Memorial Boulevard and Smith Street, mostly south of Portage. Service functions flourish north of Portage and also along Main Street. Both professional and financial services extend along Portage from Memorial Boulevard to well east of Main Street. The intersection of Portage and Main forms the center of the financial core and a secondary financial district has developed along Broadway Avenue.












FUNCTIONAL AREA
OF
PROFESSIONAL SERVICES

 Medical Complex

0 1/8 1/4 Mile

MAP 20





FUNCTIONAL AREAS

- Retail Trade
- Service Trade
- Financial Services
- Professional Services



0 1/8 1/4 Mile

Map 21, produced by overlapping the functional areas, presents the general picture of the existing pattern of business concentration in the central area. As in almost all other delimitation attempts, the part of Portage Avenue from Memorial Boulevard to Notre Dame Avenue is consistently present, and thus seems to correspond to the 'hard core' of D. H. Daview, the 'inner retail zone' of Scott, the 'core' of Horwood and Boyce. The delimitation seems more 'satisfactory' because long blocks north of Portage near Memorial are not entirely excluded when block faces are the bases of measurement.

Change in contiguity constraints

In applying the CBI method to nine cities, Murphy and Vance experienced problems of ambiguity in drawing the boundary of the CBD since CB blocks cannot be expected to be arranged in a compact group around the PLVI. There can be outlying CB blocks separated from the main cluster or inlying non-CB blocks within the cluster. If a line has to be drawn exactly to include the CB blocks only, the CBD will be irregular, perhaps with holes. In order to smooth out the boundary and to restore the compact shape of the CBD, Murphy and Vance set up the following rules of delimitation:

- 1) To be considered part of the CBD a block must be part of a contiguous group surrounding the peak value intersection. Even though a block touches the others only at one corner it is considered contiguous.
- 2) A block that does not reach the required index values but is surrounded by blocks that do is considered part of the CBD.⁷

The rules of contiguity are quite generous in accepting blocks as part of the CBD. However, in Winnipeg, they fail to include CB block 154, which is contiguous to blocks that satisfy only one of the index values.

As shown in map 3, a number of non-CB blocks (150, 129, 112, 202, 204, 215, 311) are situated in close contact with other CB blocks but are not totally bounded by CB blocks. If the word 'surrounded' refers to being enclosed by CB blocks, none of the mentioned blocks will be considered as part of the CBD; if it means to be bounded on at least three sides, all the blocks except 202 and 204 will be included in the CBD. The change in meaning involves a difference of 5 blocks in the extent of the CBD.

Inclusion in this way of non-CB blocks which do not satisfy either of the required index values should lead to an argument for inclusion of those blocks which are able to meet one of the index values and are also adjacent to the main cluster. Changes of a few blocks have already been shown to result in substantial changes in content of non-retail central business categories. The contiguity rules of the CBI method substantially affect the location of the boundary, and accept or reject substantial parcels of land in an offhand manner.

Notes (Chapter IV)

¹Hartenstein and Staack (1967), p. 37

²Bohnert and Mattingly (1964), p. 338

³Murphy (1972), p. 39

⁴Murphy and Vance (1954A), p. 198

⁵Ibid., p. 200

⁶For example, de Blij (1968)

⁷Murphy and Vance (1954A), p. 219

Chapter V

Conclusion

The previous chapters have attempted to assess the concept of delimitation of 'the' CBD as advanced initially by Murphy and Vance (1954A). The discussion has been presented in three parts, hopefully to make more coherent the range of the arguments that occurred to the writer in the course of the work. The major points are summarized below.

The CBD concept has come into being since the turn of the century in cognizance of the development of a distinct business concentration, at the center of the city, brought about by increasing functional regionalization of urban activities largely due to improvements in the transportation system. The peculiar identity of the CBD and its supremacy in intra-urban business center structure is well recorded in the literature.

The wake of interest in the CBD in fields of urban study, mainly after World War II, is associated with the emerging trend of change in intra-urban business structure due to the widespread use of private automobiles for personal transportation and electronic media for inter-firm communication. The status of the CBI as the sole business center has been endangered by the growth of large shopping centers and other business offices throughout the urban region.

The lack of consensus regarding use of the term CBD was cited as demonstrating the need for delimitation of the area. The initial work of Murphy and Vance on delimitation of the CBD with operational precision was followed by a substantial amount of similar research.

Of course it is necessary to have methodologies for areal delimitation of the CBD and other areas. The primary application for such methods would stem from some concern with the limits of a study area or the drawing of maps. It is exactly these applications which are cited by Murphy and Vance (1954A) as providing the impetus for development of a uniform delimitation procedure for the CBD. Localized studies by planning agencies utilize various methods depending on the purpose and design of the research, and the availability of data of various kinds. It is probable that these methods do not often produce results suitable for inter-city comparison, but it is not clear that this makes them any less useful locally. Neither is it clear that a standardized procedure uniformly applied will enhance this local utility. Studies attempting such application have often been forced to modify the standard method in response to local conditions. Whether one should persist in the application of a uniform delimitation procedure for the CBD depends on two things: the method proposed and the results, both potential and actual, of its application.

Murphy and Vance claimed that such a technique was the only approach to useful generalizations regarding the nature and functioning of the CBD. The context of their research was outlined in chapter II, and it seems that the statement about generalization is more a rationalization of a peculiarly geographic concern with dividing up the earth into regions than a logical result of research on urban structure to that point in time. Thus Murphy (1972) later ponders the state of CBD research and notes that little work had been generated in North America of a kind

he would consider worthwhile. Studies of the central area and urban commercial structure abound, but few follow the lead provided in 1954.¹ The present writer feels that this is largely because the CBI method was conceived out of an outmoded research tradition, and had little applicability to the purpose claimed for it. Subsequent developments in the conceptualization of commercial structure were only peripherally concerned with delimitation of the core, if at all. To the extent that they avoid concern with precise delimitation and comparative studies, they demonstrate the fallacy of the position taken by Murphy and Vance on comparability. Notable among these are the works by Horwood and Boyce (1959), Rannels (1956), Carter and Rowley (1966), Carol (1960), and even Vance (1960). The IGU symposium in Urban Geography in 1960 demonstrates that this time was a watershed. In Part IV, 'The City Centre,' articles by Murphy and Diamond pay lip service to the need for comparability via the CBI method, while Vance, Carol, and Edwards direct their attention elsewhere. Klöpffer holds a sort of middle ground, in German, by concerning himself with a delimitation procedure, essentially for understanding of the local core of Mainz.

The other half of the comparability case--whether such comparison was in fact productive--was discussed in chapter III. On the basis of the 'tentative generalization' of Murphy and Vance (1954B), and the results of Scott (1959) and Hartenstein and Staack (1967), the statements which can be regarded as demanding objective, uniform delimitation, are those which assess the shape or eccentricity of the CBD. The others, some of which are potentially useful, could easily be derived without such

constrained delimitation criteria, and probably be made more accurate in the process. It seems a logical result that a method such as CBI, which attempts more to exclude non-CB uses than to include all CB uses, is not a reliable tool for the determination of the content of the CBD. To some extent, this is indicated by the modifications made abroad and for application to smaller cities. Even where modifications are not made, little is done to test the validity of the result. Most of these authors seem to find it useful as an established technique which will serve to delimit a study area with little or no qualification required of them. If the only reason for using the method is to define a study area, it would be better to err on the side of generosity.

The theoretic stumbling block of the method is the determination of central uses. The arguments of Murphy and Vance are highly intuitive on one hand, and highly operational on the other. The result is a confusion of criteria relating to accessibility, centrality and industrial classification. This confusion carries over to testing of the method. Because CB uses are defined intuitively, the blocks that contain them are, intuitively, part of the CBD. It is therefore easily argued that whatever one claims to have learned as a result of such work, he really knew it all before the work was carried out.

There remains one potential justification for the use of the CBI method: that it works. It was claimed to by Murphy and Vance (1954A) and others, and in that context, 'to work' implied that some subjective image or alternate criterion was fulfilled. The evidence for Winnipeg indicates a contrary result, but the validity of the testing device, the

image, is doubtful.

In another sense, 'to work' implies that whatever uncertainty one may have as to the operational procedures, the results of the technique are relatively insensitive to fluctuation within the limits of uncertainty. In the CBI method, there are four areas of uncertainty: data input, criteria of acceptance, unit of measurement, and contiguity rules.

Uncertainty regarding data input is closely related to the most fundamental problem facing the method in the theoretic sphere: the determination of central functions. Given a list of these, however, the researcher is still faced with the problem of how to measure them. Two forms were used in Winnipeg: the floor space ratios (CBHI and CBII), and frontage proportions. The results significantly alter the extent of the defined CBD--a problem which occurs partly because of the inclusion of parking lots. Murphy and Vance (1954A) argue that the first of these is better, but in the case of Winnipeg, the second corresponds more to experience.

Data which are free of the problems involved in the definition of CB functions, assessed land values, provide a different picture, delineating only the Portage Avenue arm.

Uncertainties in cut-off criteria arise because the values of 1 and 50% for CBHI and CBII have only an algebraic validity. Frequency breaks in the Winnipeg data occur at 0.9 for CBHI and at 60% and 40% for CBII. The areas which result from substituting these values are compared with the CBI results. Visually, the areas are not significantly different. However, the changes in floor space proportions for all but

retail functions are substantial. Increasing the cut-off values to 1.6 and 70%, a 'hard-core' is delimited, which again picks out the Portage Avenue arm.

Changing the unit of measurement to the lot from the block produces a result which allows block faces to be incorporated in 'core areas' for the major classes of CB functions--a much more realistic basis from experience, and more satisfying conceptually.

As a taxonomic device, the CBI method does not produce results which are insensitive to moderate alteration of the technique. It seems only the Portage Avenue arm is common to all the variations used, and if this is the 'hard core' or 'inner retail zone,' then the CBI method certainly includes it. However, the peripheral areas, or non-retail zones, seem to be very susceptible to variations in delimitation procedures. Hence the CBI method is not a valid device for the delimitation of 'organs' which include these functions by definition.

In sum, there would seem to be little value in retaining a method which attempts to impose an inappropriate structure on the object of study, whose purpose leads only to trivial results, and which is not even a valid descriptor of its operational referent. There remains a need for the delimitation of study areas to allow investigation of core functioning, but its boundaries cannot be construed as the limits of the organism in question, if it is supposed that one exists. The writer recognizes that Murphy and Vance (1954A) admitted that the CBI boundaries were not the boundaries of the CBD.² Unfortunately, the

writer is not convinced that if this is true, one should proceed with inter-city comparisons. It is precisely this problem which demands a larger study area for useful study of 'the nature and functioning' of the core area.

Notes (Chapter V)

¹Murphy (1972). For expressions of what is required, see p. 66.

For comments on recent directions, see especially chapters 6 and 7.

²Murphy and Vance (1954A), p. 221.

APPENDIX A

Winnipeg Core Block Values

| Block | CBHI | CBII | Retail Frontage % | Central Business Frontage % |
|-------|------|--------|-------------------------|--------------------------------------|
| 101 | -- | -- | 3.60 | 3.60 |
| 102 | 5.99 | 100.00 | 59.80 | 59.80 |
| 103 | 1.51 | 87.60 | 40.40 | 57.50 |
| 104 | 1.90 | 82.38 | 35.58 | 57.20 |
| 105 | 1.17 | 77.30 | 53.20 | 68.70 |
| 106 | 4.77 | 80.52 | 11.94 | 26.60 |
| 107 | 8.00 | 100.00 | 85.00 | 85.00 |
| 108 | 6.05 | 93.60 | 8.90 | 37.95 |
| 109 | 2.50 | 94.70 | 12.84 | 36.70 |
| 110 | 1.44 | 89.40 | 8.70 | 50.40 |
| 111 | 2.99 | 67.89 | 12.30 | 35.60 |
| 112 | 0.74 | 46.50 | 14.20 | 30.00 |
| 113 | 1.03 | 89.57 | 0.0 | 31.70 |
| 114 | -- | -- | -- | -- |
| 115 | 1.27 | 79.65 | 3.00 | 24.90 |
| 116 | 6.20 | 100.00 | 9.17 | 32.10 |
| 117 | 0.54 | 54.00 | 0.0 | 0.0 |
| 118 | 1.43 | 84.65 | 1.35 | 28.90 |
| 119 | 5.02 | 99.01 | 2.70 | 34.40 |

| Block | CBHI | CBII | Retail Frontage % | Central Business Frontage % |
|-------|------|--------|-------------------------|--------------------------------------|
| 120 | 2.21 | 83.71 | 9.10 | 36.10 |
| 121 | 0.95 | 52.63 | 0.0 | 6.50 |
| 122 | 0.0 | 0.0 | 0.0 | 0.0 |
| 123 | -- | -- | -- | -- |
| 124 | 0.48 | 16.69 | 0.0 | 4.30 |
| 125 | 0.34 | 15.17 | 3.40 | 3.40 |
| 126 | ? | ? | ? | ? |
| 127 | ? | ? | ? | ? |
| 128 | 1.0 | 100.00 | 0.0 | 0.0 |
| 129 | ? | ? | 0.0 | 10.50 |
| 130 | ? | ? | 0.0 | 8.50 |
| 131 | 1.08 | 46.98 | 0.0 | 22.30 |
| 132 | 1.00 | 97.10 | 14.50 | 27.70 |
| 133 | 0.65 | 53.51 | 10.60 | 18.80 |
| 134 | 0.67 | 64.74 | 8.90 | 18.00 |
| 135 | 0.35 | 24.64 | 2.00 | 5.40 |
| 136 | 1.04 | 52.93 | 0.0 | 5.40 |
| 137 | 1.19 | 73.80 | 3.40 | 11.80 |
| 138 | 1.55 | 91.50 | 0.0 | 8.50 |
| 139 | 1.39 | 88.40 | 0.0 | 7.80 |
| 140 | 0.17 | 14.58 | 0.0 | 9.60 |
| 141 | 0.0 | 0.0 | 0.0 | 0.0 |
| 142 | -- | -- | -- | -- |

| Block | CBHI | CBII | Retail Frontage % | Central Business Frontage % |
|-------|------|-------|-------------------------|--------------------------------------|
| 143 | 1.11 | 53.01 | 4.60 | 13.20 |
| 144 | 0.83 | 57.76 | 3.90 | 25.60 |
| 145 | 0.0 | 0.0 | -- | -- |
| 146 | 0.0 | 0.0 | 0.0 | 0.0 |
| 147 | 0.14 | 4.55 | 0.0 | 3.90 |
| 148 | 0.14 | 6.56 | 1.70 | 6.60 |
| 149 | 1.04 | 73.87 | 0.0 | 16.90 |
| 150 | 0.49 | 24.37 | 0.0 | 6.11 |
| 151 | 2.44 | 69.96 | 2.80 | 24.10 |
| 152 | 0.22 | 9.84 | 0.0 | 0.0 |
| 153 | 0.0 | 0.0 | 0.0 | 0.0 |
| 154 | 1.11 | 58.36 | 0.0 | 9.90 |
| 155 | 0.11 | 7.63 | 6.00 | 3.10 |
| 156 | 0.0 | 0.0 | 0.0 | 0.0 |
| 157 | 0.0 | 0.0 | 0.0 | 0.0 |
| 201 | 2.29 | 79.83 | 11.10 | 26.50 |
| 202 | 0.83 | 53.61 | 9.60 | 25.70 |
| 203 | 0.0 | 0.0 | 0.0 | 0.0 |
| 204 | 0.55 | 33.59 | 12.40 | 24.10 |
| 205 | 1.08 | 74.89 | 9.70 | 20.60 |
| 206 | 1.61 | 69.80 | 18.30 | 31.80 |
| 207 | 1.19 | 80.72 | 15.90 | 38.10 |
| 208 | 2.05 | 90.32 | 24.70 | 52.90 |

| Block | CBHI | CBII | Retail Frontage % | Central Business Frontage % |
|-------|------------------------|--------|-------------------------|--------------------------------------|
| 209 | 2.11 | 83.33 | 20.40 | 40.00 |
| 210 | 4.40 | 88.52 | 20.90 | 53.10 |
| 211 | 2.17 | 83.11 | 16.20 | 60.40 |
| 212 | 1.00 | 100.00 | 0.0 | 0.0 |
| 213 | 101.31 1.31 | 100.00 | 15.60 | 35.40 |
| 214 | 2.18 | 64.47 | 5.50 | 29.50 |
| 215 | 0.34 | 18.75 | 14.10 | 21.50 |
| 216 | 1.29 | 57.27 | 1.20 | 17.60 |
| 217 | 0.13 | 5.50 | 0.0 | 0.0 |
| 218 | 0.0 | 0.0 | 0.0 | 0.0 |
| 219 | 0.0 | 0.0 | ? | ? |
| 220 | 0.0 | 0.0 | ? | ? |
| 221 | 0.0 | 0.0 | ? | ? |
| 222 | -- | -- | -- | -- |
| 223 | 0.86 | 10.51 | 6.90 | 18.20 |
| 224 | 1.07 | 57.28 | 8.90 | 32.86 |
| 225 | 0.74 | 46.62 | 0.0 | 10.10 |
| 226 | 0.29 | 7.16 | 1.70 | 2.40 |
| 227 | 0.0 | 0.0 | 0.0 | 0.0 |
| 228 | 0.0 | 0.0 | 0.0 | 0.0 |
| 229 | 0.84 | 53.63 | 1.10 | 7.80 |
| 310 | 0.42 | 10.36 | -- | -- |
| 311 | 1.22 | 48.38 | 3.60 | 16.30 |

| Block | CBHI | CBII | Retail Frontage % | Central Business Frontage % |
|-------|------|-------|-------------------------|--------------------------------------|
| 312 | 1.80 | 58.32 | 12.00 | 65.10 |
| 313 | 1.24 | 64.37 | 23.00 | 42.70 |
| 314 | 1.50 | 87.80 | 8.40 | 11.80 |
| 333 | 0.97 | 28.77 | 5.60 | 35.60 |
| 342 | 0.49 | 30.15 | 2.30 | 10.90 |
| 343 | 1.97 | 79.62 | 8.90 | 20.00 |
| 344 | 0.85 | 66.25 | 7.10 | 20.00 |
| 345 | 0.85 | 78.65 | 4.90 | 14.90 |
| 351 | 0.78 | 54.92 | 0.0 | 11.50 |
| 352 | 0.55 | 36.04 | 14.00 | 27.50 |
| 353 | 0.76 | 43.70 | 6.70 | 16.50 |
| 354 | 0.33 | 71.83 | 3.70 | 12.80 |
| 371 | 0.38 | 35.20 | 6.20 | 10.00 |
| 372 | 0.54 | 47.00 | 11.20 | 40.00 |
| 373 | 0.83 | 58.00 | 5.00 | 30.00 |
| 374 | 0.37 | 22.81 | 0.0 | 6.50 |
| 405 | 0.0 | 0.0 | 0.0 | 0.0 |
| 406 | 1.53 | 48.08 | 0.0 | 18.60 |
| 407 | 3.15 | 78.96 | 2.30 | 24.70 |
| 408 | 3.64 | 51.82 | 0.0 | 13.40 |
| 409 | 2.17 | 58.54 | 4.10 | 12.50 |
| 410 | 0.46 | 24.39 | 7.50 | 13.90 |
| 411 | -- | -- | -- | -- |

| Block | CBHI | CBII | Retail Frontage % | Central Business Frontage % |
|-------|------|--------|-------------------------|--------------------------------------|
| 412 | 0.73 | 51.92 | 3.33 | 8.90 |
| 413 | 0.79 | 42.02 | 4.20 | 4.20 |
| 414 | 0.45 | 33.40 | 2.10 | 7.50 |
| 415 | 0.73 | 44.08 | 11.50 | 20.20 |
| 416 | 0.57 | 50.00 | 9.40 | 25.50 |
| 428 | 1.27 | 46.03 | 1.14 | 8.00 |
| 501 | 1.00 | 100.00 | 13.30 | 29.50 |
| 502 | 0.55 | 33.69 | 3.20 | 14.90 |
| 503 | 0.63 | 63.17 | 9.20 | 19.20 |

APPENDIX B

Classification of Functions

The classification of functions into retail and service trade, financial and professional services according to the following typology. The code numbers refer to the Business Classification Codes used in Business Premise Listing prepared by the Assessment Department of the City of Winnipeg.

RETAIL TRADE

- 001 - Agricultural Supply Stores
- 002 - Antique Store
- 003 - Art Stores - Camera Stores
- 004 - Auction Mart - Proprietor or Conductor of
- 005 - Automobile Sales - New and Used - Truck Sales
- 006 - Automobile Supply Stores
- 007 - Bakery Stores
- 008 - Book and Stationery Stores
- 009 - Building Material Stores
- 010 - Bicycle Stores
- 011 - Carpet and Rug Stores
- 012 - Clothing Stores
- 013 - Confectionery Stores
- 014 - Department Stores - Mail Order Business
- 015 - Drug Stores

- 016 - Fabric Shops
- 017 - Florists
- 018 - Food Stores
- 019 - Food Stores - Supermarkets
- 020 - Fuel Dealers
- 021 - Fur Stores
- 022 - Furniture Stores and Electric Appliance Outlets
- 023 - General Dry Good Stores
- 024 - Gift and Novelty Stores
- 025 - Hardware Stores
- 026 - Herbalist
- 027 - Hobby Stores - Stamps, Coins, Toys, etc.
- 028 - Jewellery Stores
- 029 - Leather Goods Stores
- 030 - Millinery Houses
- 031 - Miscellaneous Stores
- 032 - Music Stores
- 033 - Newstands - Tobacconists
- 034 - Office Machine and Equipment Stores
- 035 - Optical Stores
- 036 - Paint and Wallpaper Stores
- 037 - Pawn Shops
- 038 - Pet Shops - Dog Kennel
- 039 - Plumbing and Heating Equipment Stores
- 040 - Salvage and Second Hand Material Stores
- 041 - Second Hand Stores

- 042 - Shoe Stores
- 043 - Sporting Goods Stores
- 044 - Surgical Supply Stores
- 045 - Tailoring Shops
- 046 - Tire Stores (and Retreading)
- 047 - Variety Stores
- 048 - Variety Second Hand Stores
- 049 - Others

SERVICE TRADE

- 100 - Art Moulder
- 102 - Baby Sitting Agency
- 103 - Barber Shops - Beauty Parlors
- 104 - Building Cleaning and Janitorial Services
- 105 - Chicken Killer
- 106 - Cold Storage Plants
- 107 - Costume Rentals - Dresswear Rentals
- 108 - Dry Cleaning and Laundry - Garment Repair -
Pressing
- 109 - Egg Candler
- 110 - Electrical Appliance Repairs (includes Radio and
T.V.)
- 111 - Engraver
- 112 - Funeral Directors
- 113 - Fur Repair
- 114 - Furniture Polisher
- 115 - General Automobile Repairs - Specialty Repairs -

Auto Body Builder & Auto Wrecking

- 116 - Interior Decorators
- 117 - Jewellery Repairs - Watch Repairs
- 118 - Key Making - Blacksmiths - Locksmiths - Gunsmiths
- 119 - Landscape Gardener
- 120 - Linen and Sanitary Supply Houses
- 121 - Massage Parlors - Turkish Bath - Reducing Salons
- 122 - Miscellaneous Repair Shops
- 123 - Miscellaneous Services (includes Car Washes)
- 124 - Monuments and Monummetal Work
- 125 - Photographic Studios
- 126 - Piano Tuners and Repairers
- 129 - Restaurants and Caterer
- 130 - Restaurants - Drive In
- 131 - Rug and Furniture Cleaning Establishments
- 132 - Service Stations
- 133 - Shoe Repair - Shoe-Shine Shops
- 134 - Stampmaker
- 135 - Storage and Warehousing
- 136 - Tattoo Artist
- 137 - Upholsterer
- 138 - Others - (Card, Sand, Palm, and Tea Readers, Fortune Tellers, etc.)
- 283 - Rent-a-Car Services
- 402 - Billiard Parlours
- 403 - Bowling Alleys
- 404 - Cabarets and Night Clubs

- 405 - Dance Halls
- 406 - Golf Courses - Miniature and Driving Ranges
- 407 - Gymnasiums
- 408 - Legitimate Stage Theatres
- 409 - Motion Picture Theatre
- 410 - Other Amusement and Recreation Centres
- 411 - Rinks - Curling, Skating and Roller Skating
- 412 - Shooting Galleries
- 413 - Others
- 530 - Hotels

PROFESSIONAL SERVICES

- 200 - Accounting Services (Chartered)
- 201 - Appraiser
- 202 - Architectural Firms
- 203 - Aurist
- 204 - Barristers or Solicitor
- 205 - Business Consultant
- 206 - Chiropodist
- 207 - Chiropractic Clinics, etc.
- 208 - Consulting Engineer
- 209 - Customs Attorney
- 210 - Dentists
- 211 - Dental Laboratories
- 212 - Dermatologist
- 213 - Economists

- 214 - Electro - Therapist
- 215 - Engineering Offices
- 216 - Laboratory Analysis Services
- 217 - Marketing Research
- 218 - Marriage Consultants (includes Personal Consultants)
- 219 - Medical Clinics
- 220 - Notary Public
- 221 - Optician
- 222 - Optometrists
- 223 - Osteopath
- 224 - Patent Attorney
- 225 - Physical Specialist
- 226 - Physicians and Surgeons
- 227 - Physiotherapist
- 228 - Surveyors
- 229 - Veterinary Services
- 230 - Others

FINANCIAL SERVICES

- 240 - Banks
- 241 - Bank Clearing House
- 242 - Brokers - Stock, Bond, Customs, etc. - Investment Dealers
- 243 - Grain Exchange
- 244 - Insurance Offices
- 245 - Land Development Offices

- 246 - Loan Companies - Finance Companies
- 247 - Mortgage Offices
- 248 - Real Estate Offices
- 249 - Safety Deposit Organizations
- 250 - Stock Exchange
- 251 - Trust Companies
- 252 - Other Financial Institutions
- 253 - Others
- 254 - Real Estate or Construction Trade Offices

APPENDIX C

Floor Space by Functions for Various Delimitation Schemes

| | Taxable Floor Space** (in square feet) | | | | |
|--------------------------------|--|------------------------|----------------------|------------------------|----------------------|
| | Retail | Service | Professional | Financial | Other Offices |
| 1. Study Area | 3,627,368 | 2,459,455 | 786,859 | 1,649,750 | 458,300 |
| 2. CBD (CBHI 1, CBII 50%) | 3,222,857 (88.88%)+ | 1,579,895 (64.21%)+ | 726,677 (92.37%)+ | 1,140,441 (69.13%)+ | 389,955 (84.93%)+ |
| 3. CBD (CBHI 0.9, CBII 60%) | 3,061,811 (86.00%)+ | 1,328,176 (54.00%)+ | 614,624 (78.11%)+ | 863,580 (52.33%)+ | 301,027 (65.72%)+ |
| 4. CBD (CBHI 0.9, CBII 40%) | 2,235,337 (89.19%)+ | 1,721,364 (69.99%)+ | 746,599 (94.89%)+ | 1,330,712 (80.65%)+ | 411,795 (89.83%)+ |
| 5. 2 - 3 (11 blocks) | 161,046 (5.00%)* | 251,719 (15.93%)* | 112,053 (15.42%)* | 276,861 (24.28%)* | 88,928 (22.80%)* |
| 6. 4 - 2 (4 blocks) | 12,480 (0.38%)* | 141,469 (8.95%)* | 19,922 (2.74%)* | 190,271 (16.68%)* | 21,840 (5.60%)* |

**Data is obtained from the Listing of Business Premises compiled by the Assessment Department of the City of Winnipeg. Classification of business types is according to the typology in Appendix B.

*As percentage of the CBD (CBHI 1, CBII 50%).

+As percentage of the study area.

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