GENESIS, EARLY GROWTH, AND IMPACT OF THE TRANSPORTATION SYSTEM ON DETROIT, 1805-1900

by

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ABSTRACT

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Transportation networks are of primary significance in present-day America. They were equally significant in the American past. This research is about the evolution of the transportation network and its impact on the changing spatial distribution of people and manufacturing and business activities in Detroit from 1805 to 1900. The transportation system is here defined as the internal overland public transportation network.

To examine the impact of the transportation network, the residential patterns by occupations (white-collar, skilled, and semi-skilled or unskilled), and by ethnic groups (the British, the Irish, and the Germans), and the pattern of the business (businesses and manufacturing establishments) area in Detroit were reconstructed for four different dates (1837, 1854, 1874, and 1894). Maps representing the transportation networks and the three different spatial patterns were drawn for each study year. Sampling techniques were used to draw the reconstruction maps. The dissimilarity index was computed for each time period for occupations, ethnic groups, and businesses to determine the changes in segregation. The spatial units to

measure segregation were one-quarter mile zones from the city's center.

The omnibus, first used in 1847, was the only internal public transportation mode in Detroit for over a decade. It disappeared finally with the acceptance of the street car railways. First pulled by horses and then by electric power, the street car railway began operation in 1863 to carry people to and from working places and residences on regular schedules. Its lines were dispersed in all directions from the city's center; by 1895 a few cross-town lines were added in the upper part of the city.

The extension of the transportation network did not increase the segregation of the residential areas by occupations and ethnic groups according to the dissimilarity indices, but was a factor in the changing spatial distribution of Detroit's population and business and manufacturing activities. With the development of the transportation network, manufacturing areas tended to disperse over the city along major roads and street car lines while business areas tended to concentrate in the CBD where the street car railway lines converged.

To My Mother and Father

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CHAPTER I

INTRODUCTION

Transportation networks are of primary significance in present-day America. They were equally significant in the American past, especially before the development of the modern communications system. In American urban history, the development of transportation systems has greatly influenced the diffusion of settlement, the movement of population, the creation of towns or cities and their development, and the rate of industrialization.[1] In a very real sense, American cities evolved very rapidly during the nineteenth and twentieth centuries. Included in the evolution were a number of technical innovations in the transportation system.

In the nineteenth century, the railroads carried people from the east coast to the interior and then to the west coast, and from the rural areas to the urban areas. These railroads indirectly influenced the growth of cities. Horses and buggies, omnibuses, and horse-drawn and electric street car railways connected the working places and the residential places within the city. These

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[1]Ralph H. Brown, Historical Geography of the United States (New York: Harcourt, Brace and World, Inc., 1948).; Charles N. Glaab and A. Theodore Brown, A History of Urban America, 2nd edition (New York: Macmillian Publishing Co., Inc., 1976).

transportation modes evolved through time, and had an important bearing on city growth. The operation of the street car railways in particular played a major role in the development of the city. With the extension of street car railway lines the cities grew outward. In short, prior to the coming of the automobile the street car railways were really the "shaper of American cities"[2] in the nineteenth and early twentieth centuries.

George Taylor studied the growth of population and the development of new modes of public transportation, both omnibuses and street car railways, which encouraged city dwellers to live in outlying areas and travel to work in New York, Boston, and Philadelphia.[3] Frederick Speirs, Alexander Easton, William Tindall, and Louis Pursley described how street car railways originated and developed in their respective study areas; they discussed the importance of each on their area's development.[4] Yasuo Sakakibara focused on the beginnings of the horse-drawn street car railway in New York, Boston, and Philadelphia, the advantages over established methods of local transportation, and the

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[2]George M. Smerk, "The Streetcar: Shaper of American Cities," Traffic Quarterly, Vol. 21 (1967), pp. 569-84.

[3]George Rogers Taylor, "The Beginnings of Mass Transportation in Urban America: Part I," The Smithsonian Journal of History, Vol. 1, No. 2 (1966), pp. 35-50.; _____, "The Beginnings of Mass Transportation in Urban America: Part II," The Smithsonian Journal of History, Vol. 1, No. 3 (1966), pp. 31-54.

[4]Frederick William Speirs, The Street Railway System of Philadelphia, Its History and Present Condition (Baltimore, 1897), XV.; Alexander Easton, Practical Treatise on Street or Horse-Power Railways (Philadelphia, 1859).; William Tindall, "Beginnings of Street Railways in the National Capital," Columbia Historical Society Records, XXI (1918), pp. 22-30.; Louis H. Pursley, "Street Railways of Toronto, 1861-1921," Interurbans, XVI (June 1958).

contribution to early city growth in his research.[5] Joel Tarr indicated the growth of the transportation system and its impact on changing spatial patterns in Pittsburgh in 1850-1934.[6]

Concerning Detroit's transportation system, there are studies which provide information on the street car railway as the primary public transportation mode in the nineteenth and twentieth centuries.[7] Other studies on Detroit, including studies of its social structure, do not discuss the impact of its transportation network.[8] Almon Parkins discusses the transportation network and Detroit's development,

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[5]Yasuo Sakakibara, "The Influence of the Introduction of Street Railways upon Urban and Industrial Growth in Eastern Massachusetts, 1855-1875" (Master's thesis, Amherst College, 1956).

[6]Joel Tarr, Transportation Innovation and Changing Spatial Patterns in Pittsburgh, 1850-1934 (Chicago: Public Works Historical Society, 1978).

[7]Harry Dahlheime, Public Transportation in Detroit (Detroit: Wayne University Press, 1951).; William H. Henning, ed., Detroit, Its Trolleys and Interurbans (Fraser, MI: The Michigan Transit Museum, 1976).; Graeme O'Geran, A History of the Detroit Street Railways (Detroit: The Conover Press, 1931).; Jack E. Schramm and William H. Henning, Detroit's Street Railways, Volume I: City Lines 1863-1922, Bulletin 117 of Central Electric Railfans' Association (Chicago: Central Electric Railfans' Association, 1978).; W. Scott, Street Railways of Detroit (New York, 1895).

[8]Donald R. Deskins, Jr., Residential Mobility of Negroes in Detroit, 1837-1965, Michigan Geographical Publication No. 5 (Ann Arbor: University of Michigan, 1972).; John C. Schneider, "Public Order and the Geography of the City: Crime, Violence, and the Police in Detroit, 1845-1875," Journal of Urban History, Vol. 4, No. 2 (February 1978), pp. 183-208.; _____, Detroit and the Problem of Order, 1830-1880: A Geography of Crime, Riot, and Policing (Lincoln, NB: University of Nebraska Press, 1980).; Olivier Zunz, Detroit en 1880: Essai D'histoire Urbaine, 2 volumes, A Special Working Paper of the Center for Research on Social Organization of the University of Michigan, January, 1977.; _____, "The Organization of the American City in the Late Nineteenth Century: Ethnic Structure and Spatial Arrangement in Detroit," Journal of Urban History, Vol. 3, No. 4 (August 1977), pp. 443-66.

but The Historical Geography of Detroit is quite broad and general.[9] In short, no previous research deals with the relationship between the public transportation system of Detroit and the city's development. Hence, this research will explore the evolution of public transportation in Detroit through time and its impact on the city.

Study Area and Study Period

The study area of this research is the city of Detroit from 1805, when the city became the capital of the new Territory of Michigan, to 1900, when the automobile started to appear as a new transportation mode and the automobile industry began to flourish (see Map 1). The reason for choosing Detroit as the study area is that the city has been an important site in the State of Michigan since its foundation. Detroit was the first administrative center, and has been a major economic, social, and cultural center. Today Detroit is the largest city in Michigan, and one of the important industrial cities and metropolitan areas in the United States. Detroit is located in the heart of the Great Lakes region, where two of the Great Lakes are connected, providing a series of waterways leading from the interior to the east coast. Its existence was of great significance, even before the railroad in the middle of the nineteenth century, because it served as one of the important gateways to the West. Therefore,

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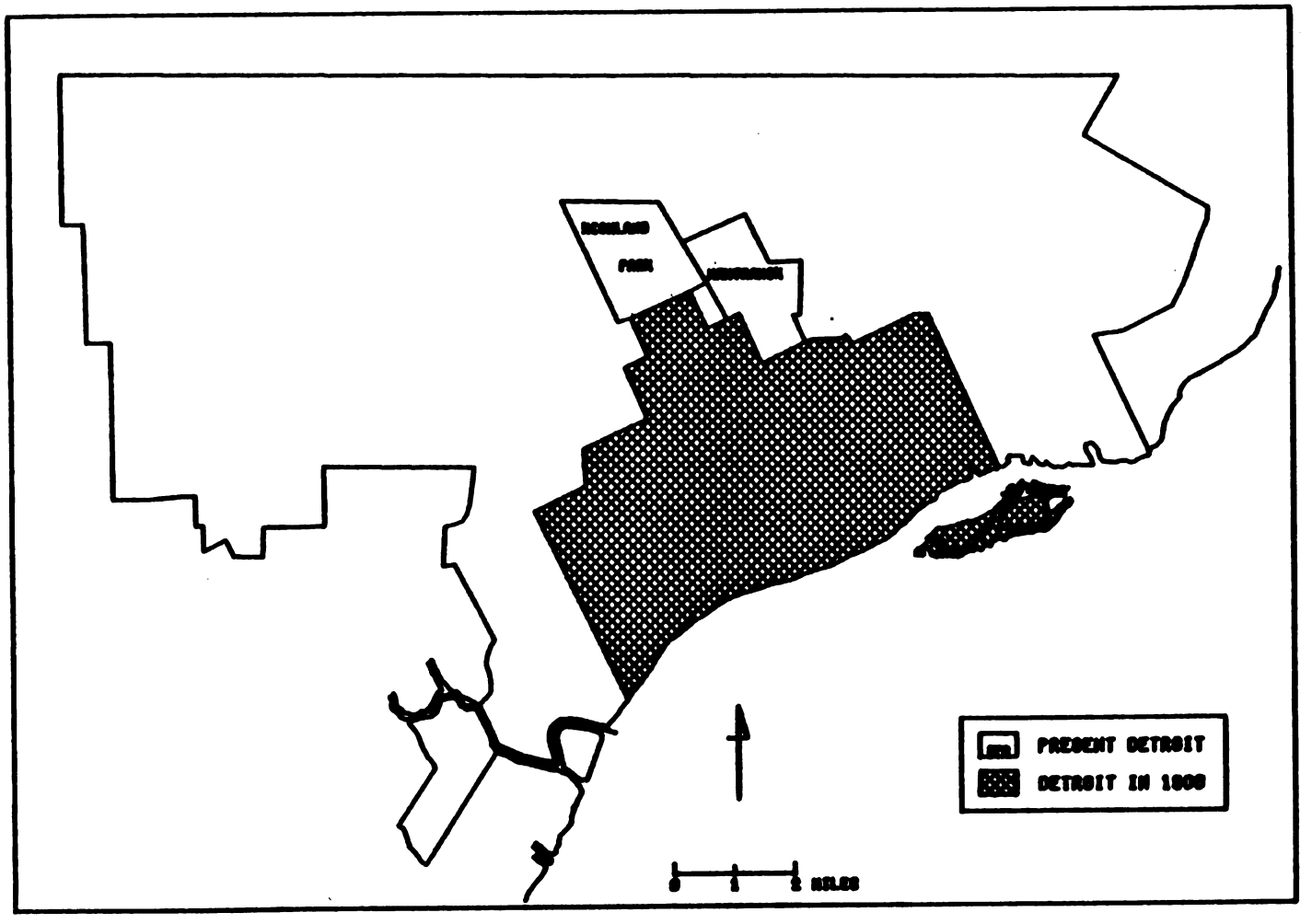
[9]Almon Ernest Parkins, The Historical Geography of Detroit (Lansing: Michigan Historical Commission, 1918).



Map 1 The Study Area

three nations, France, Great Britain and the newly founded United States, struggled and shed blood for its possession.

Under the influence of the French and then the British, Detroit was merely a military and trading post; its growth was minimal. Real development did not begin until the early part of the nineteenth century when the American frontier expanded to the city. Once it became an integral part of the United States, Detroit grew rapidly.

In the nineteenth century Detroit's population, in each decade except 1810 to 1820, increased continuously (see Table 1). The percentage change varied by decade, with peak periods of growth in the 1830s, 1840s, and 1850s. Detroit shifted in rank from the fifty-second city in the United States in 1830, with a population of 2,222, to the thirteenth city in 1900, with a population of 285,704. The area of Detroit was also tremendously enlarged in these years through ten additional annexations (see Map 2). Each decade included one or two additional annexations except the decade of the 1860s (see Table 1 and Map 2).

In its early years as an American city, Detroit was both an administrative and a commercial center. However, this changed somewhat with the growth of the city and the shift of its state administrative functions to Lansing in 1850. After completion of the Erie Canal in 1825, a large number of immigrants came to Detroit and helped create a boom in its trade, both wholesale and retail. By the late 1830s, Detroit was already a growing commercial city, and the expansion of the railroads in the 1840s provided another stimulus to the economic growth of the city.

Detroit's public transportation system was begun in the early

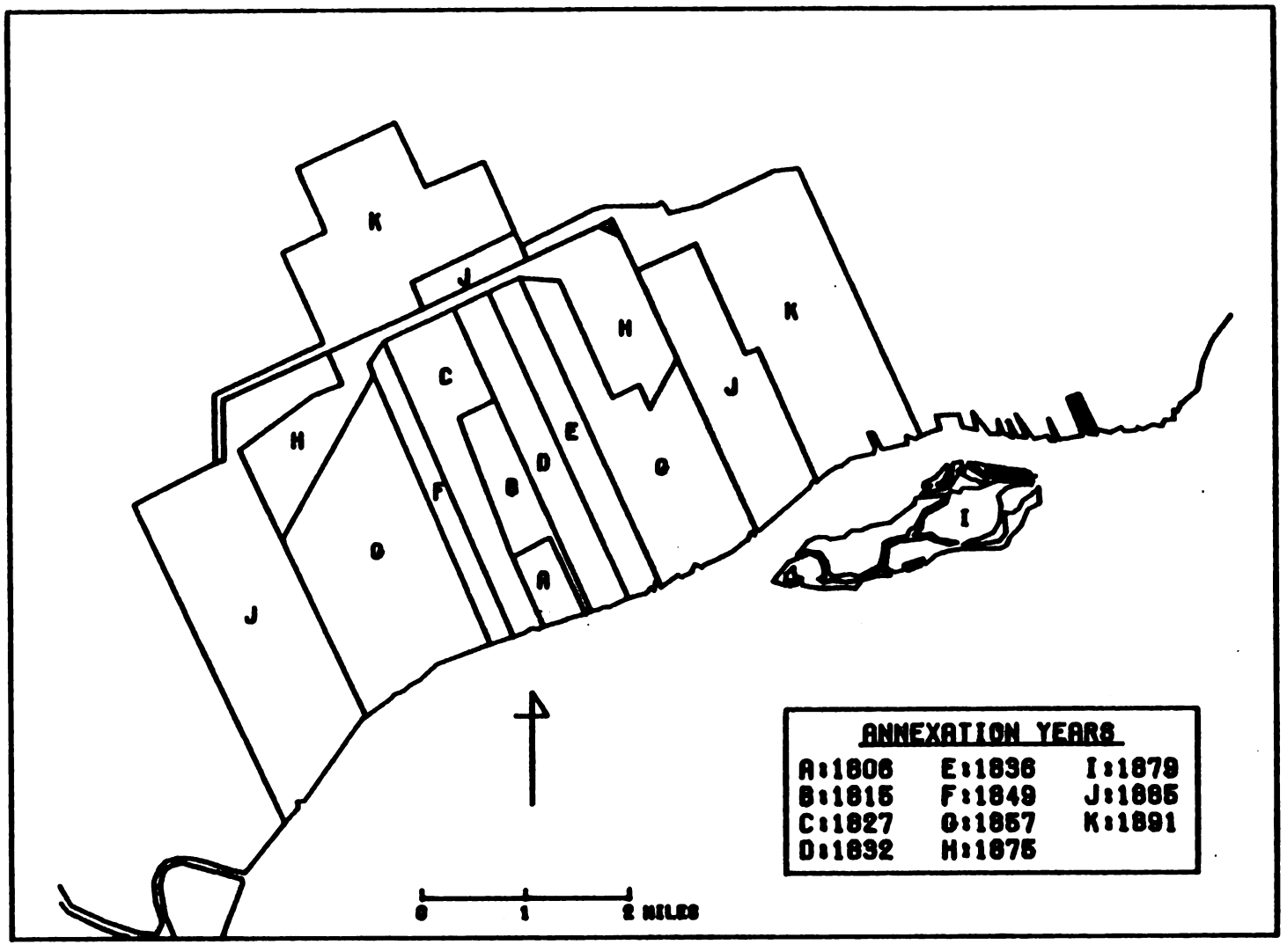
Table 1 Population Growth and the Changing Area of Detroit from 1810 to 1900

Year	Population	# of increase	% of increase	Rank	Area (Sq. Miles)
1810	1,650*	-	-	-	0.33
1820	1,422	-228	-13.8	46	1.36
1830	2,222	800	56.3	52	2.56
1840	9,102	6,880	309.6	33(42)@	5.26
1850	21,019	11,917	130.9	24(31)@	5.85
1860	45,619	24,600	117.0	19	12.75
1870	79,577	33,958	74.4	18	12.75
1880	116,340	36,763	46.2	18	16.09
1890	205,876	89,536	77.0	15	22.19
1900	285,704	79,828	38.8	13	28.35

Sources: Clarence Monroe Burton, The Building of Detroit (Detroit?: 1912), p. 44.; _____, ed., The City of Detroit, Michigan, 1701-1922, Vol. I (Detroit-Chicago: The S. J. Clarke Publishing Co., 1922), p. 347.; Report on Population of the United States at the Eleventh Census: 1890, Part I, pp. 370-71.; Thirteenth Census of the United States Taken in the Year 1910, Vol. I, pp. 82-83.

*Population data in 1810 was recorded differently in Burton's The Building of Detroit and Parkins' The Historical Geography of Detroit. Burton's data were chosen to compile this table because Burton's data in other respects were the same as data from other sources. They were also chosen because concerning the population of Detroit, Angelo states in Yesterday's Detroit, that "... July 11, 1796, Detroit's population was 2,200, and it dropped sharply as many British left for Canada..... In the years after the War of 1812 (Detroit's population at that moment was about 850)....."

@Detroit's rank in 1840 and 1850 was reported with small discrepancies in the Eleventh Census and Thirteenth Census. Both data were recorded. The data in parentheses are from the Thirteenth Census.



Map 2 Detroit's Changing Boundaries, 1805-1900

nineteenth century; the first regular stage coach operated between Detroit and Ohio in 1827;[10] the Detroit and St. Joseph Rail Road Company commenced operations in 1837;[11] the first omnibus operated in 1847;[12] and the first street car railway in 1863.[13] The development of an internal public transportation network--particularly the omnibuses and street car railways--greatly influenced the city's development; the spatial distribution of economic activities and population, and the internal structure of the city were remarkably changed. Many commercial and manufacturing activities developed and sorted themselves out in urban space; and Detroit became a setting for distinct neighborhood areas.

By 1880, the future of Detroit as an industrial city was already apparent in statistics on its manufacturing activities.[14] At this time the city produced nearly ninety percent of the manufactured products in Wayne County and about twenty percent of the goods manufactured in the State. Among the cities of the country, it ranked nineteenth in manufacturing and eighteenth in size. By 1900, Detroit was one of the leading industrial cities and metropolitan areas in the country.

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[10]Edith C. Forster, Yesterday's Highways: Traveling Around Early Detroit (Detroit: Wayne University Press, 1951), p. 12.

[11]Julius P. Mac Cabe, Directory of the City of Detroit, with its Environs, and Register of Michigan, for the Year 1837 (Detroit: William Harsha, 1837), p. 36.

[12]Dahlheime, op. cit., p. 4.

[13]Ibid., p. 5.

[14]Parkins, op. cit., pp. 301-2.

Statement of the Problem

In this research, the genesis and early growth of the transportation system in Detroit will be traced and described through four time periods: 1837, 1854, 1874, and 1894. The changes of three different spatial patterns--the residential pattern by occupations, the residential pattern by ethnic groups, and the pattern of manufacturing and business areas--will be discussed. Then the relationship between the growth of Detroit's transportation system and the changes of the three different spatial patterns of the city will be determined. The transportation system is here defined as the internal overland public transportation network. It does not include private transportation modes.

Hypotheses

On the basis of the above statements, the following hypotheses are proposed:

1) The extension of the transportation network increased the segregation of the residential areas by occupations.

2) The extension of the transportation network increased the segregation of the residential areas by ethnic groups.

3) Manufacturing areas dispersed with the growth of the transportation network; business areas became larger and tended to concentrate in the central part of the city where the internal transportation network converged.

Data Sources

Useful materials for this research were derived from a variety of sources. Primary sources were most important. The primary sources were official documents of the City (Detroit), State (Michigan), and Federal Government--city directories, official records, and census data; records of private companies; contemporary writings--books, travel accounts, newspapers, and pictures; and maps. These were found at the State Archives and the State Library in Lansing, the Michigan State University Library, the Burton Historical Collection and Municipal Reference Library of the Detroit Public Library in Detroit, and the Library of Congress in Washington, D.C.

Secondary sources such as books, theses, and research papers, written at later times, supported the study. These sources were also found at the institutions mentioned above.

Metholology

This research is based upon the methodology of historical geography. Daniel Jacobson suggests that historical geography "... is primarily concerned with place. Its practitioners attempt to reconstruct the past geographies of particular sites or areas; ... to trace the changes that occur at particular places through time."[15]

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[15]Daniel Jacobson, "Historical Geography," in Methods of Geographic Instruction edited by John W. Morris (Waltham, MA: Blaisdell Publishing Company, 1968), p. 276.

E. W. Gilbert points out that "The real function of historical geography is to reconstruct the regional geography of the past. Historical geography should confine itself to a descriptive geographical account of a region at some past period, ... not endeavour to make the explanation of historical events its main objective."[16]

In short, historical geography is a study which deals with both space and time. Its themes include the long-lasting, stable elements of the geographical scene, and the many changes that take place in the social, economic and physical aspects of a region through time.[17] Based on these considerations, the purposes of historical geography have been outlined in the following manner:

1) reconstructions of the real world of the past

2) images of the world in the past held by contemporary or by later observers

3) models of abstract worlds of the past created by theoreticians.[18]

Among these, the reconstruction of the real world of the past has been most frequently used by historical geographers.

To examine and analyze the above hypotheses, therefore, the transportation network, the residential pattern by occupations, the residential pattern by ethnic groups, and the pattern of manufacturing

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[16]E. W. Gilbert, "What is Historical Geography?" The Scottish Geographical Magazine, Vol. 48, No. 3 (May 1932), p. 132.

[17]J. B. Mitchell, Historical Geography (London: The English University Press Ltd., 1954).

[18]Gilbert, op. cit., pp. 132-35.; Hugh C. Prince, "Real, Imagined and Abstract Worlds of the Past," Progress in Geography: International Reviews of Current Research, Vol. 3, edited by Christopher Board, Richard J. Chorley, Peter Haggett, and David R. Stoddart (London: Edward Arnold, 1971), pp. 4-5.

and business areas of Detroit were reconstructed at four different dates based on the available data. The dates chosen were 1837, 1854, 1874, and 1894.

In 1837 Detroit, an incorporated city, became the capital of the State of Michigan, and was a walking city without any internal public transportation mode. Only the external transportation modes, stage coaches and newly operated railroads, connected the city to other areas. The first city directory was published in 1837; it was used as a main source to reconstruct the transportation network and the three different spatial patterns of Detroit at that time. Detroit in 1854 was still a walking city, with omnibuses operating as the only public transportation mode within the city. It was a commercial city with an important role in connecting the East with Chicago and in linking other cities in the State by railroads.

By 1874, Detroit had started to become a manufacturing city; it was being enlarged outward because of the newly operated public transportation mode (horse-drawn street car railways), the continued use of omnibuses, and the improved railroads. Detroit in 1894 was a manufacturing city with diverse products and showed the potential of becoming a metropolitan area. It had both horse-drawn and electric street car railways, and railroads and suburban railways connected it with external areas. City directories, census data taken by the State government, and maps of the street car railways are available sources to reconstruct the transportation network and the three different spatial patterns of Detroit for 1854, 1874, and 1894.

In the process of reconstruction, four different kinds of maps were drawn for each year. These are maps of the transportation

network, the residential pattern by occupations, the residential pattern by ethnic groups, and the pattern of manufacturing and business areas. To draw these maps, city directories for each study year, the transportation maps, and the street maps from city directories were used.

The three different spatial patterns were mapped using sampling techniques. A certain proportion of residents' names with their occupations and addresses were derived from the whole name list of city directories by using a systematic sampling. For example, the population of Detroit in 1837 was 9,763, but 1,106 names were listed in the city directory. The sample consists of ten percent of the names listed in the city directory. This sample size was 110 using every 10th person (see Table 2). The same method was used for 1854, 1874, and 1894. Manufacturing and business addresses were taken by random sampling.

Occupations were classified in three categories--white-collar, skilled, and semi-skilled or unskilled, based on Olivier Zunz's research on Detroit.[19] Originally Zunz classified the occupations into four categories--high white-collar, low white-collar, skilled, and semi-skilled or unskilled. In this research, however, high white-collar and low white-collar are included in a single category, i.e., white-collar.[20] Hence, the category of white-collar includes: high positions of public service (judges, officers, ministers, etc.); high

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[19]Zunz (1977), op. cit., pp. 152-75.

[20]The number of workers in high white-collar occupations for each study year was too small to be considered as a separate category.

Table 2 Sample Size used in this Research

Year	Population	# of names listed in City Directory	% of names listed in City Directory	Sample Size
1837	9,763	1,106*	10 (every 10th)	110@ (3)
1854	39,426	8,344*	5 (every 20th)	415@ (9)
1874	101,255	36,996	2 (every 50th)	740@ (17)
1894	237,798	110,296	1 (every 100th)	1,100@ (25)

Sources: City Directories in 1837, 1854, 1874, and 1894.; Census Data taken by the State Government in 1854, 1874, and 1894.

*Counted by author

@Numbers in parentheses indicate the number of colored people (Blacks) in the sample size.

professionals (doctors, professors, architects, etc.); businessmen (bankers, car builders, real estate people, etc.); managers, officials and keepers; proprietors; manufacturers; business specialists and agents; wholesalers; dealers; salesmen; retail store clerks; technical traders; educators; and artisans (artists, journalists, musicians, etc.). Skilled labor contains: general craftsmen; technicians, mechanics and machine operators; personnel in apparel trade; construction workers; food and beverage workers; and those employed in special services. Semi-skilled or unskilled labor includes: apprentices; industrial workers; craftsworkers; workers in transportation, public

service, and other service workers; vendors and store workers; and general labor.

The ethnic groups were classified by surname and, if needed, the first name. The classified ethnic groups were limited to the English, German, and Irish in this research. Many other ethnic groups, including the French, Scotch, and Jews, lived in Detroit, but their numbers were relatively few. Also, a number of Blacks lived in Detroit, but the sample was also very small (see Table 2).

In order to determine the changes in segregation as a result of the growth of the transportation network, a dissimilarity index was computed for each time period for occupations, ethnic groups, and manufactures and businesses. The spatial units to measure segregation were one-quarter mile zones along major transportation routes from the center of the city (Campus Martius) (see Map 3). The index of dissimilarity can be mathematically expressed as:

$$D = \frac{\sum_{i=1}^{n} \left| X_i - Y_i \right|}{2}$$

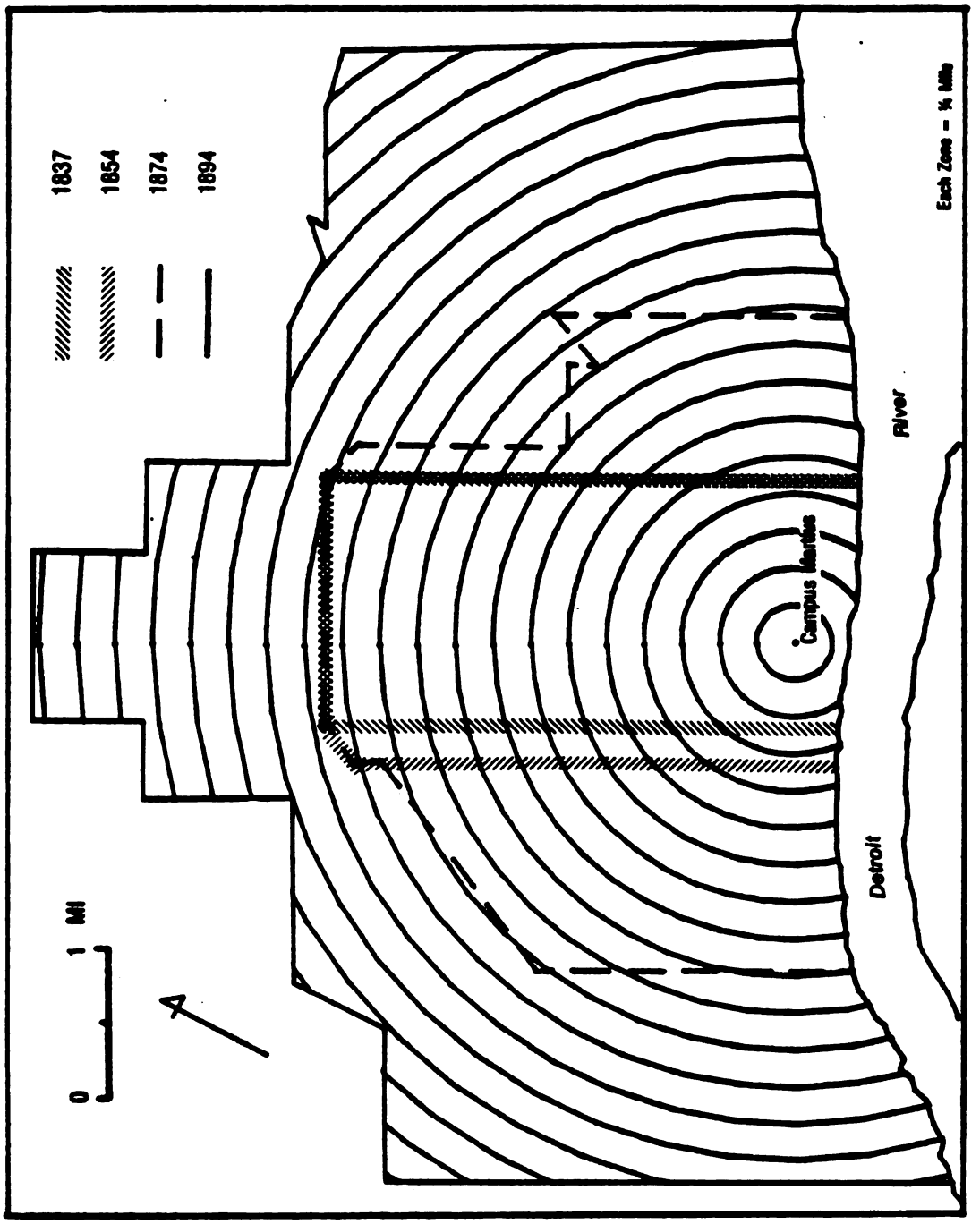
where X_i = the percent of the number of one category in zone i over the total number of the category in the city

Y_i = the percent of the number of the other category(ies) in zone i over the total number of the category(ies) in the city

D = $1/2$ of the sum of the absolute difference between the spatial distribution of one category and the other category(ies)

The index (D) ranges from 0 to 100, with 0 indicating no segregation and 100 indicating complete segregation.

This dissimilarity index measures the degree of unevenness in



Map 3 One-Quarter Mile Zones at Each Study Year

the spatial distribution of certain phenomena by zones. That is, it takes into account only differences in the percentage of the two different groups in each zone, but it reveals nothing about intrazone distribution. Thus it is possible that in a zone classified as nonsegregated, with equal percentages of two different groups, there could still be total segregation by block.

After drawing four different maps and computing the dissimilarity indices for each year, the transportation network and the three different spatial patterns of Detroit were compared at each year--and in sequence--to seek the changes and development that had taken place in Detroit, as its transportation network grew and changed. Then the hypotheses were examined and analyzed according to the results of the research.

Limitations of the Study

There were a number of limitations to this research. The city directories, for example, did not supply all the necessary information. They did not list the entire population of Detroit for any given year. Sampling errors were likely for the reconstruction of business and manufacturing areas of Detroit in 1837 and 1854 respectively because the city directories for those years did not include separate business addresses. The sampling distribution of the residential areas by occupations and the residential areas by ethnic groups for 1874 and 1894 might be biased because relatively small proportions (2% and 1%) are used as the sample. Plotted dots on the maps are not always

exactly located because detailed maps showing the correct addresses were not always available. And the use of surnames to classify Detroit's people into several ethnic groups was a risk because some surnames were ambiguous, difficult to judge and might have led to errors.

Significance of the Study

This research describes the evolution and growth of the internal public transportation system of Detroit in the nineteenth century, and analyzes the correlation between the growth of Detroit's transportation network and the development of the city. This is the first attempt to analyze the influence of the growth of Detroit's internal public transportation network on the expansion of the residential areas by occupations and by ethnic groups, and the differentiation of the manufacturing and business areas of Detroit in the nineteenth century. This research can be the basis for further research on the impact of the transportation network on the city's development in both the nineteenth and twentieth centuries.

Order of Presentation

Chapter II is about Detroit from 1805 to 1836. It consists of general descriptions of Detroit itself, such as the population growth, the social structure, and the economic development, and the

transportation network during the period.

Chapters III to VI include the reconstruction of the transportation network, the residential patterns by occupation groups and by ethnic groups, and the pattern of business and manufacturing areas in Detroit for 1837, 1854, 1874, and 1894. Each chapter describes and summarizes the transportation network and the three different spatial patterns based upon the reconstructed maps and computed dissimilarity indices.

Chapter VII covers Detroit from 1895 to 1900. It explains the changes and development of the transportation network of Detroit and the changes in Detroit itself during this period.

In Chapter VIII, the findings of the research are summarized and concluding statements are made. Recommendations for further research are also included.

CHAPTER II

DETROIT BEFORE 1837

From 1805 to 1836, Detroit was a relatively small city, but showed much potential for future growth. After the War of 1812, the entire city was under the political control of the United States. The population of Detroit decreased because of the war; later, with the development of the external transportation network, including steamboats and stage coaches, it increased rapidly. The population growth and the transportation development helped to enhance the economic development of Detroit. By 1836, Detroit was a busy commercial city as well as an administrative center.

The new Territory of Michigan was officially formed in January, 1805. On July 1, 1805 Detroit became the capital of the territory.[21] At that time the city was little more than a scene of devastation because of a fire in June. Before the fire the city was located on a site southwest of the center of the present-day city.[22] The buildings were built of wood, and the streets were narrow. The fire completely destroyed the little town, burning down all of the buildings except

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[21]Reginald Horsman, Frontier Detroit, 1760-1812, "Michigan in Perspective" Conference Occasional Publication No. 1, 1964, p. 15.

[22]Mac Cabe, op. cit., p. 8.

one; most of the personal property was also destroyed. However, the fire may have been a blessing, for Detroit was better able to plan for the future. The fire made it possible to enlarge the city's boundaries and to rebuild on a larger scale, with wider streets, public squares and parks.

The city plan of Detroit--developed after the fire--provided for the modern city. The plan, originated by Augustus Woodward, United States judge for the Territory of Michigan (1805-1824), indicated that the streets running north and south and east and west would all be 200 feet broad, and the other principal streets would be 120 feet wide while the cross streets would be 60 feet in width (see Map 4).[23] This plan was somewhat altered in other parts of the city as new conditions arose. The Military Department occupied the land that was north of the old village site, extending to Michigan Avenue, including the fort(Fort Shelby; E on Map 4) and all the land lying west of Griswold Street (the first street west of Woodward Avenue). This indicated the military importance of Detroit. At that time most people were concentrated on both sides of Woodward Avenue (the former Court House Avenue) below Jefferson Avenue (the former Main Street). The streets such as lower Woodward, Woodbridge and Atwater were busy trade centers.

With survey and sale of the land, Detroit started to boom in business and settlement. However, as a result of the War of 1812 Detroit's growth was impeded; in fact it even retrenched. The war

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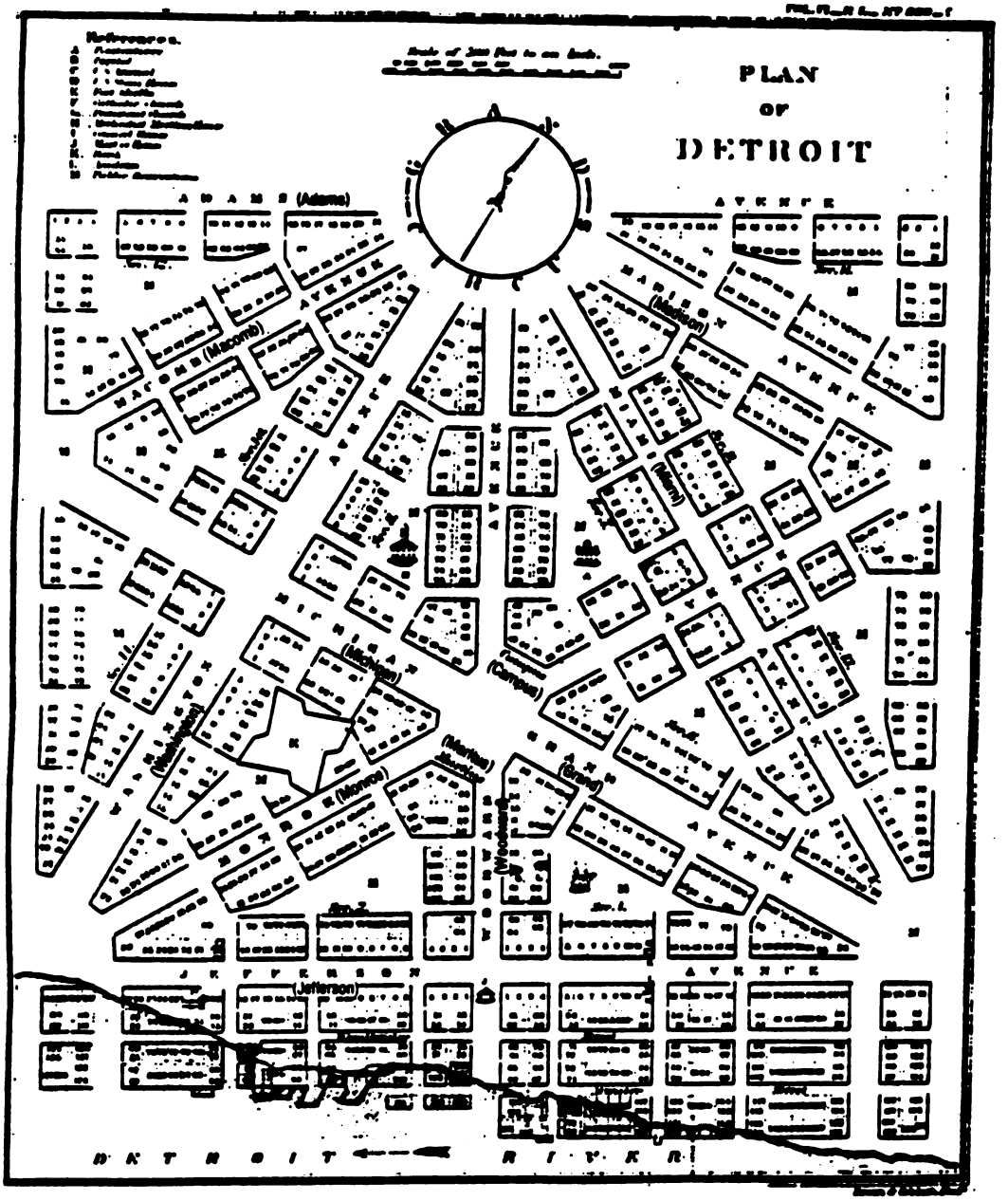
[23]Clarence Monroe Burton, The Building of Detroit (Detroit?: 1912), pp. 25-27.; Plan of Detroit (Phila.: Bowen & Co's., Lith., [1807]).



Map 4 The Original Plan of Detroit by Woodward

seriously damaged the city's economy, political situation, and social order. Detroit was a hopeless and discouraging place when peace returned in 1815. Many people were gone. Most experienced problems in providing food and clothing, and in housing shortages; the conflicts with the Indians became more severe. The only good thing that resulted was the recognition of the necessity of road building. After the war, several roads were built mainly for military purposes, and these roads led a large number of immigrants to the city.

With the arrival of the first steamboat, Walk-in-the-Water, in 1818, the opening of the Erie Canal in 1825, the completion of road construction, and the operation of stage coaches, the number of immigrants continuously increased. Also the fine descriptions of Detroit by travellers and residents gave people on the East coast good impressions of the city, and helped to increase the city's population. A worker employed in a Detroit store, for example, explained the city's fine business climate in letters to his father in 1831:

> I think I was never in a place where money seemed so plenty. I have traded about two thousand dollars since I came here.[24]
>
> He is going to make his store larger early next spring and get on a very large stock. I have concluded to stay with him another year. He said he will raise my wages.[25]

Detroit was also described by a traveller as

> a pleasant New England town, church steeples rising

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[24]Charles M. Bull to his father, January 29, 1831, in Sidney Glazer, ed., "In Old Detroit (1831-1836)," Michigan History Magazine, Vol. 26 (1942), p. 203.

[25]Charles M. Bull to his father, July 24, 1831, in Ibid., p. 204.

> gracefully above the high-pitched roof-tops . . . bustle of a growing western city funneling settlers from the east into the heartland of Michigan Territory. The land office in Detroit was alive with activity, doing an annual business of up to one hundred and fifty thousand dollars. As many as seven hundred people per day arrived in the city in 1831, . . .[26]

Thus, the population of Detroit increased rapidly, especially after 1830. In 1820 the population was 1,422; 2,222 in 1830; and 6,927 in 1836.[27] Most of the people in the city were of French extraction. The city grew considerably. The percentage increase in population was 211.7% for the six years between 1830-1836; the percentage increase was 56.8% for the decade 1820-1830. The foreign immigrants in this period were mainly Irish, English and German, with a sprinkling of Scotch and Canadians. The Irish, English and German ethnic groups became the majority of Detroiters.

Increased population brought a boom in commerce, especially in retail trade. The demand for goods increased greatly, and caused the opening of more stores. The concentration of businesses along Jefferson Avenue made it the chief business street of the city. In 1836, therefore, Detroit was making great progress in business activity, so much so that the number of businesses in the fall of 1836 doubled compared to that of the same season the year before.[28]

Transportation developments during the 1820s and 1830s made

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[26]John C. Schneider, "Urbaniztion and the Maintenance of Order: Detroit, 1824-1847," Michigan History, Vol. 60 (1976), p. 261.

[27]Burton (1912), op. cit., p. 32.

[28]George Newman Fuller, Economic and Social Beginnings of Michigan: A Study of the Settlement of the Lower Peninsula During the Territorial Period, 1805-1837 (Lansing, MI: Michigan Historical Publications, 1916), p. 139.

Detroit the commercial hub of trade in Michigan and helped join the Upper Lakes with the East. It was a kind of halfway station for Great Lakes shipping. Trade goods became varied, but fur was still the most important trade item. The goods like furs, pelts, and salt of the Upper Lakes were often deposited at Detroit--then carried to Ohio, Pennsylvania and New York ports by other vessels. Many products were redistributed from Detroit to the other areas of the Upper Great Lakes. The wholesale trade of Detroit developed largely because of its locational advantages.

In addition to the developments in commerce, manufacturing also developed: brewing, shipbuilding, the manufacture of tinware, cabinet making, etc. But these remained at rudimentary levels; their capital and products were produced on a small scale. Therefore, the economic development of Detroit, rather than being dependent on its manufactures, was largely dependent on commerce for its growth.

Many residents commented about Detroit's good business climate, its fine environment, and the fact that more people were coming. They did mention unpleasant things, of course, like the cholera, which struck Detroit in 1832.

> In the year 1832 that scourge of nations, the Asiatic cholera, smote the people of Detroit, and laid prostrate many of its inhabitants--friends and foes, the young and the old; the delicate and the strong were not spared, and Detroit presented at this dreadful season a deserted city, with nearly one-half of its inhabitants either dead or dying, and the rest having taken flight to other parts through fear; . . .[29]

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[29] J. A. Girardin, "Life and Times of Rev. Gabriel Richard," Michigan Pioneer and Historical Society Collection, Vol. 1 (1877), p. 494.

During the epidemic, Father Gabriel Richard (1797-1832) ministered to the needs of the afflicted.

> Faithful and true to his flock, amid the dying and the dead he was administering the consolations of religion to them, night and day, "though afflicted himself with symptoms of the prevailing epidemic for nearly three months, and most of the time greatly debilitated, he never ceased to discharge the duties of his office with his accustomed zeal, until he was at length completely overpowered by disease." When, a few days after the attack, he was informed that he could not survive it, he expressed his willingness to die, and after receiving the last sacraments of the church, he calmly expired with those words of holy Simeon on his lips: "Now, O Lord, dost Thou dismiss Thy servant according to Thy word, in peace."[30]

The good Father died on September 13, 1832. Yet Detroit survived the cholera epidemic and continued to grow in population and economic wealth. One resident, for example, wrote a letter to his father just one year later stating the reasons why he lived in Detroit:

> You ask how I am pleased with the place. Detroit of all the places in the United States is the best situated for an industrious, economical, young man to get and live in because it is in the first place healthy. It is also growing very fast, and will, . . . be then the best place for business in that state. We have the advantage over all the other places in the state in situation, in the growth of the place, and in the health and independence of its inhabitants. Consequently if a young man comes here determined to do well and grows up with the place and gets his friends and customers firmly established he will stand a better chance to get rich than those who come some years from this. . . . It is for this reason that I am pleased with the place.[31]

By 1836 Detroit was a pleasant, busy city and a growing commercial center.

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[30] Ibid.

[31] Hampton C. Bull to his father, October 19, in Glazer (1942), op. cit., p. 208.

The Transportation System

Earlier, because of an undeveloped transportation network, Detroit was isolated and accessibility to the city was difficult in spite of the advantages of its location. The Black Swamp was especially difficult to cross for people who travelled to and from Ohio.[32] Most of Detroit's commerce, and travellers, had to go through Canada. During the War of 1812, a road through the Black Swamp was built by soldiers. The road was not used very much after the war, but every once in a while it was repaired by soldiers. Later a more permanent road was built.

After the war, several other roads from Detroit, including the Saginaw Turnpike, the Gratiot Road, and the Chicago Road, were built. These roads helped to link Detroit to other areas in Michigan and to Chicago as well. They were important to Detroit's development, especially after the opening of the Erie Canal in 1825. Since the arrival of the first steamboat in Detroit, the city played a role as a gateway city to the Western frontier. Many people came from the East coast; some of them stayed in Detroit, while others continued to move into the interior on these roads. The city's function as a gateway was made stronger by road construction.

Soon after the completion of the roads out of Detroit, stage lines were established. The first public stage coach ran from Detroit to Mt. Clemens, Michigan in 1822, carrying people from the steamboat

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[32]Martin R. Kaatz, "The Black Swamp: A Study in Historicla Geography," Annals of the Association of American Geographers, Vol. 45, No. 1 (March 1955), pp. 1-35.

dock to other places on the very same day.[33] In 1827 the first stage coach going out-of-State began to operate on a regular schedule, linking Detroit to Ohio. Two lines of the stage coach were operating from Detroit in 1835.[34] One ran on a route through Ypsilanti, Coldwater, and Niles to Chicago. It left three times a week, taking four and a half days to make the passage. The other went through Monroe to Toledo, and on to Buffalo. The stage coaches, mostly Concord coaches, carried nine to twelve people. They were the most convenient to use, and were the main external transportation modes in Detroit during this period.

Detroit's streets were unpaved until Atwater Street, between Woodward and Randolph, was paved with cobblestones in 1835.[35] Hence, whenever it rained the streets turned to seas of deep sticky mud. The streets were particularly bad in the fall and spring of the year. The men had to wear heavy boots with their pants tucked inside. In spite of the difficulty of walking on the streets, there was no public transportation mode inside Detroit. Only two-wheeled carts, pushed or pulled by oxen or by small French ponies, were used by most families.[36] The carts were originally designed and used by the French, but the American settlers also used them to great advantage. However, they too had trouble with the deep sticky mud.

A big innovation in the transportation network, the railroad,

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[33] Detroit Gazette, May 31, 1822.

[34] Foster, op. cit., p. 12.

[35] Ibid., pp. 10-11.

[36] Ibid., pp. 4-5.

had not yet been introduced in Detroit. In 1830 the Detroit and St. Joseph Rail Road Company was incorporated, and several miles of track had been built by 1836. Another company, the Detroit and Pontiac Railroad Company, was granted a charter in 1834. However, neither railroad company had commenced operations by 1836.

In short, there was no internal public transportation in Detroit during this period. Only the stage coach was operating and it served to connect Detroit with other places as an external public transportation mode.

CHAPTER III

DETROIT IN 1837

In 1837 when the State of Michigan was created, Detroit, an incorporated city, became its capital. The population of Detroit at that time was 9,763, an increase of 2,837 (29.0%) over the previous year. The increase in population was even greater than the entire population of the city in 1820. The number of dwellings and stores also increased rapidly, and finally exceeded 1,300. The rapid population growth and the increasing number of dwellings and stores indicates how Detroit was growing during this period. In 1837 Detroit was truly a booming urban area.

Many new houses were built, many new streets laid out, and many stores were newly opened or enlarged. Most new buildings were located on or near Jefferson Avenue. Some buildings were the large and handsome brick houses; other were generally of wood, painted white, with bright green doors and windows.[37] And, at that time, most people lived within one-half mile from the center of the city, concentrating residentially in the region between the river front and Fort Street, especially along Jefferson Avenue. Generally speaking living places

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[37][Ms. Jameson], "Impressions of Detroit, 1837," Michigan History Magazine, Vol. 8 (1924), p. 61.

and working places in Detroit were usually synonymous, with residences and working areas in the same buildings. Therefore, distance between working place and residence was either short or nonexistent, and Jefferson Avenue was the most important and busiest street in the city.

There were several manufacturing activities; the city had an iron foundry, a soap and candle making establishment, and a place where tinware was made. But most were generally domestic industries on a small scale. Accordingly, these were not big enough to be considered as contributors to the development of Detroit's economy in 1837. Retail and wholesale commerce, however, were growing considerably. There were more than 100 large mercantile establishments in Detroit. The city's function of delivering goods to other areas was getting stronger. In other words, the rapid growth of population and the advantages of the city's location stimulated the development of Detroit as a commercial center in the Great Lakes area. In 1837 the city commanded much of the area's internal commerce.

The social structure of Detroit indicated a system of marked stratification, including upper, middle, and lower classes. These classifications were determined largely by income, occupation and education, as well as religious affiliation and ethnic group. Some private schools were educating young people who belonged to particular ethnic groups or religions. The specific name chosen in a school helped to identify the ethnic group or religion with which it was associated. Many people were active in social clubs, including women's societies. These societies usually represented a particular religious or ethnic group. Each church was related to a particular

ethnic group and social class. The descendants of the French settlers, primarily Roman Catholic, were members of the lower class as were those of the Methodist Chapel. The upper class, composed of the most respectable, serious minded and well-dressed people in the society, were mostly British and attended the Baptist and Episcopal churches.[38]

The Transportation System

The streets of Detroit in 1837 were difficult to walk upon because they were dirty and turned to seas of sticky mud whenever it rained. They were not paved except for a short distance on Atwater Street. The internal public transportation network was not yet developed, because the city itself was small in size--a walking city--and because private carts could be used if needed.

As an external transportation network, there were railroads and stage coaches available in Detroit. Railroads were introduced to the city as a fast and convenient transportation mode, but they were not ready for carrying people in 1837. Rather stage coaches played a decisive role in solving the problem of travel to and from Detroit.

According to the map of Detroit in 1837, there were two different railroad tracks and two different planned tracks (see Map 5).[39] Four different railroad companies built the railroad tracks,

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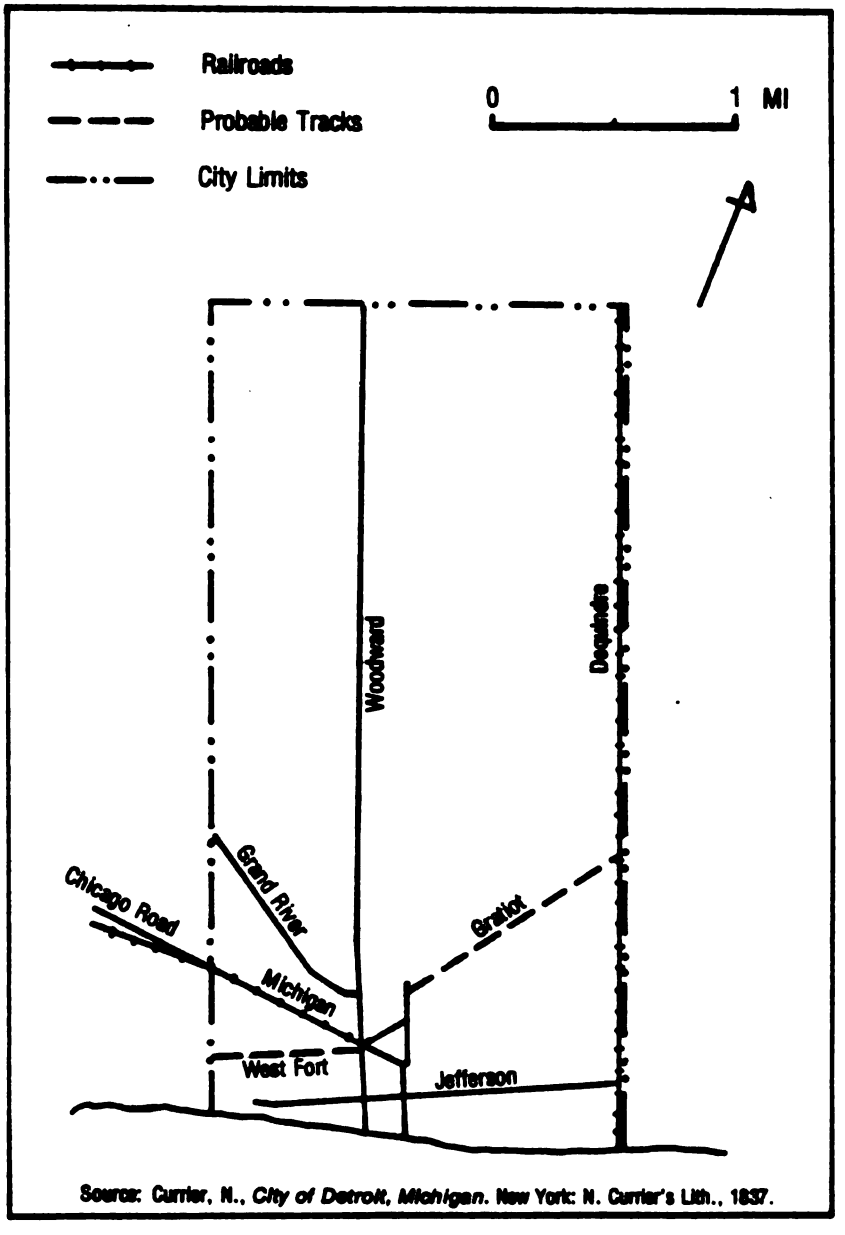
[38]Ibid., pp. 74-75.

[39]Nathaniel Currier, City of Detroit, Michigan (N. York: N. Currier's Lith., 1837).



Map 5 The Transportation Network in Detroit, 1837

and were involved in planning the others. The Detroit and St. Joseph Rail Road Company (later the Michigan Central Railroad) constructed thirty miles of track for its railroad, and commenced the operation. The track started at the corner of Woodward and Michigan avenues, followed Michigan Avenue to city limits, and then made a curve to extend a little south of Chicago Road. Another railroad company, the Pontiac and Detroit Rail Road, built twelve and a half miles of track quite rapidly and was ready for operation in the following year. Its track ran along Dequindre Street from the river front.

One of two probable tracks was planned by the Detroit and Maumee Rail Road, beginning from Military Square (Campus Martius) and extending west along Fort Street; the other was planned by the Detroit and Shelby Rail Road, starting at Randolph and Gratiot streets and following Gratiot Street. However, the organization of these railroad companies was not recorded in the city directory for 1837. It was assumed that these plans for constructing tracks were only probable plans rather than completed ones. Four different tracks of railroads, including two probable tracks, were predicted for further development of the transportation network in Detroit.

In 1837 there were five different stage coach lines. These stage coaches left for five different places through five different routes on regular schedules. One was the western route (Territory road), which ran through Ann Arbor, Jacksonburgh, Marshall, and Kalamazoo, and finally to St. Joseph. Mail stages on this route left at noon on Sunday, Tuesday, Thursday and Saturday. The accomodation stages left at five o'clock in the afternoon on Monday, Wednesday and Friday. Every morning at 5:00 A.M., the mail stage coach on the

eastern route left for Buffalo via Monroe, Manhattan, Toledo, Maumee City, Perrysburgh and Sandusky. The destination of the western route was Chicago by way of Ypsilanti, Saline, Clinton, Tecumseh, Jonesville, Coldwater, White Pigeon, Niles and Michigan City. This stage left at five o'clock in the morning on Monday, Wednesday and Friday, and at noon on Sunday, Tuesday, Thursday and Saturday. The northern route was to Flint River via Bloomfield, Pontiac and Grand Blanc. On Tuesday and Friday the stage coach on this route continued to run to Saginaw. Everyday this stage coach left at nine o'clock in the morning and arrived at three o'clock in the afternoon. The final stage coach route was to Fort Gratiot via Mount Clemens. The stage left the office of Mr. Cornelius Clarke every morning at half past nine o'clock. Besides this line, Mr. Clarke was prepared to furnish an extra stage to go to any part of the country at all times. The above stage coach routes, except the stage line owned by Mr. Clarke, started from Woodworth's Steamboat Hotel on Woodbridge Street at the corner of Randolph Street.[40]

All stage coaches left and arrived daily on regular schedules. The lines were increased from two to five within two years (1835-1837), indicating an increased traffic. Most travellers from the East came to Detroit by steamboat, and took trips from Detroit to the interior using stage coaches. In contrast to the railroads, therefore, the stage coaches were widely used, and became the most important external transportation mode in Detroit in 1837.

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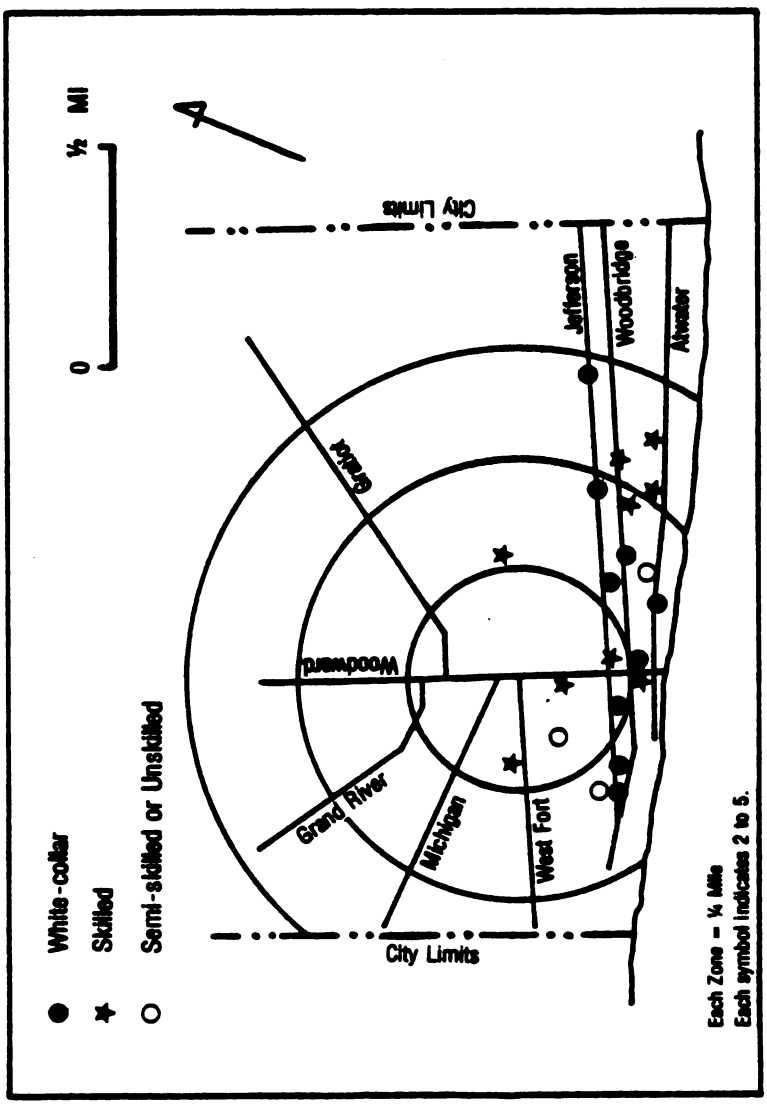
[40]Mac Cabe, op. cit., p. 105.; Forster, op. cit., p. 13.

The Residential Pattern by Occupations

In 1837 Detroit's population was distributed in the residential area within a half mile of the center of the city. The residential area was concentrated below Jefferson Avenue (see Map 6). More people lived on east of Woodward Avenue than on west of the avenue. The residential area in Detroit extended farther to the east of Woodward Avenue than to the west of it at that time.

Table 3 shows dissimilarity indices by one occupation versus all occupations over zones in Detroit in 1837. According to the table, white-collar workers were the least segregated of the total population with an index of 12.1. Skilled workers were the most segregated with the highest dissimilarity index of 20.9. In the case of semi-skilled or unskilled workers, they were less segregated than skilled workers, and more segregated than white-collar workers with an index of 18.1. The difference between the highest index and the lowest index of dissimilarity was less than 10.

Dissimilarity indices for one occupation versus another occupation over zones in Detroit in 1837 are shown on Table 4. Among three indices, an index of dissimilarity for white-collar workers versus semi-skilled or unskilled workers was the lowest (8.3), which was almost one-third of the other indices. White-collar workers were segregated from skilled workers with an index of 18.7. This indicates that white-collar workers were much more segregated from skilled workers than semi-skilled or unskilled workers in 1837. The dissimilarity index by skilled workers with semi-skilled or unskilled workers was 20.7, which was the highest index among three indices. Therefore,



Map 6 The Residential Pattern by Occupations in Detroit, 1837

Table 3 Dissimilarity Indices: One Occupation vs. All Occupations over Zones in 1837

White-collar	12.1
Skilled	20.9
Semi-skilled or Unskilled	18.1

white-collar and semi-skilled or unskilled workers seemed to have been close together in the residential areas. But skilled workers were more segregated from both white-collar and semi-skilled or unskilled workers.

Map 6 shows the spatial distribution over the residential area by three different occupation groups. White-collar workers lived mostly on Jefferson Avenue, with some on Woodbridge and Atwater streets. Skilled workers were scattered all over the residential area, but they clustered on Woodbridge, Franklin and Atwater streets on the far east side of the city. In the case of semi-skilled or unskilled workers, they lived only a short distance from the city's

Table 4 Dissimilarity Indices: One Occupation vs. Another Occupation over Zones in 1837

	White-collar	Skilled	Semi-skilled or Unskilled
White-collar	-	18.7	8.3
Skilled		-	20.7
Semi-skilled or Unskilled			-

center. Most of them lived here and there in the residential area without obvious residential clustering. Only a few of them lived together on Atwater Street. None of the semi-skilled or unskilled workers lived outside of a half mile from the city's center. However, a few of the white-collar workers and some of the skilled workers lived at distances beyond a half mile from the center of the city in 1837.

The Residential Pattern by Ethnic Groups

It was difficult to determine the residential pattern by ethnic groups in Detroit in 1837. This was because the number of the Irish and Germans in the sample for this research was relatively small, and because more than half of the sampled residents were British. This aspect indicates the composition of Detroit's population at that time. The population of the city consisted of a British majority, and few Irish, Germans, and people from other ethnic groups.

Table 5 represents dissimilarity indices for each ethnic group with the total population over zones in Detroit in 1837. Based on the table, the Germans were the most segregated of the total

Table 5 Dissimilarity Indices: One Ethnic Group vs. All Ethnic Groups over Zones in 1837

British	7.9
Irish	8.6
German	23.2

population among the three ethnic groups with an index of 23.2. The British and Irish, with indices of 7.9 and 8.6, were less segregated from the total population. Hence, the data indicates that the Germans clustered themselves more than the British and Irish, showing a much higher index than the others (the differences were more than 10).

Dissimilarity indices for each ethnic group with another ethnic group are represented in Table 6. There was a significant distinction among the ethnic groups in terms of the dissimilarity index. The Irish mingled the most with other ethnic groups as indicated by the lowest dissimilarity index of 3.4. The British seemed to live close together in the residential areas with the Irish and other ethnic groups, showing indices of 8.6 and 8.3. However, the Germans separated from the British, the Irish and other ethnic groups with indices higher than 20 (23.9, 25.3 and 22.2). The Germans and Irish were segregated from each other with the highest dissimilarity index of 25.3.

Table 6 Dissimilarity Indices: One Ethnic Group vs. Another Ethnic Group over Zones in 1837

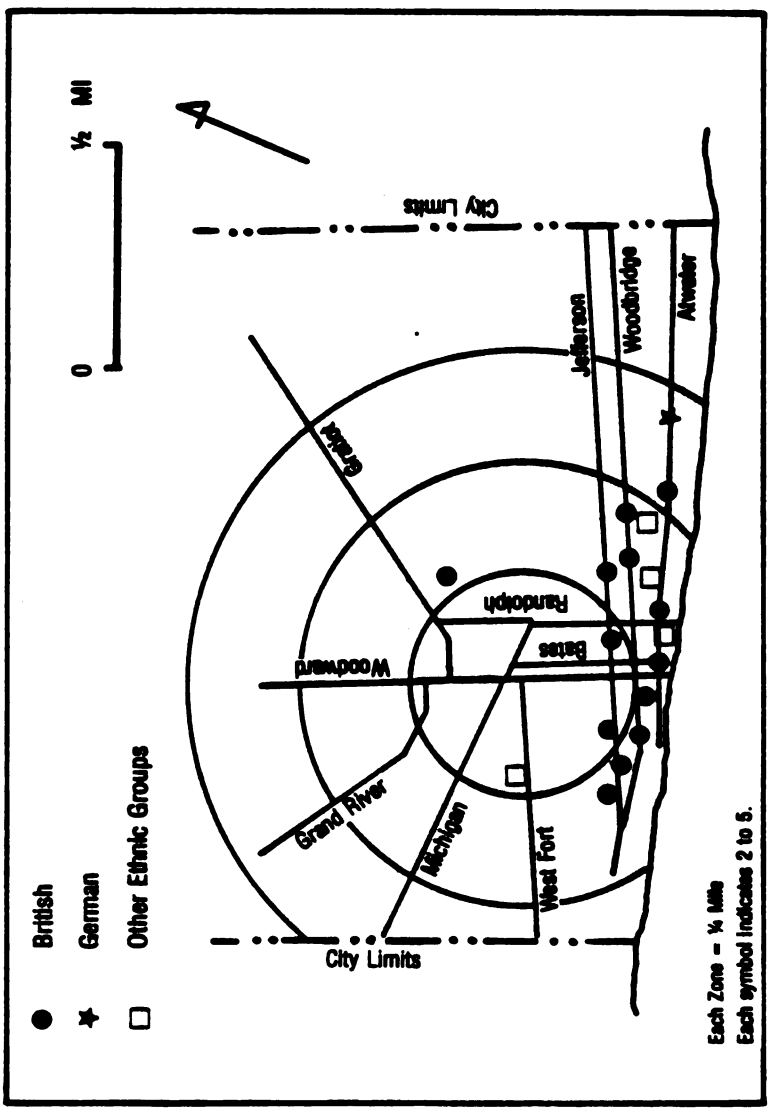
	British	Irish	German	Others*
British	-	8.6	23.9	8.3
Irish		-	25.3	3.4
German			-	22.2
Others				-

*'Others' indicates the ethnic groups excluding the British Irish and Germans in Detroit. It equals other ethnic groups in the text.

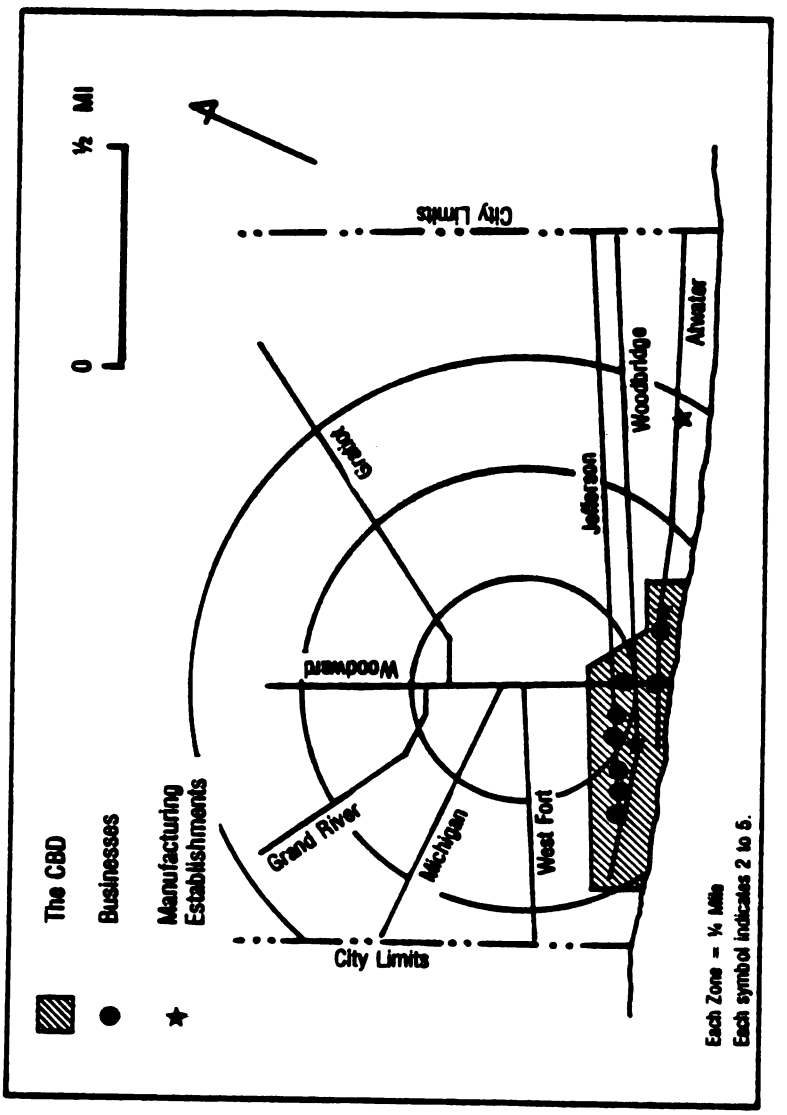
Map 7 represents the spatial distribution of the population in the residential areas of Detroit in 1837. The British lived mostly on Jefferson Avenue, Woodbridge and Atwater streets, and along Woodward Avenue. Few of them spread to the northeastern part of the city. In some regions such as the western parts of Jefferson Avenue and Woodbridge Street, the areas along Bates and Randolph Street, and the places on Jefferson Avenue near Woodward Avenue, they clustered residentially. The Irish were distributed throughout the residential areas without any residential clustering. All Germans lived on or below Jefferson Avenue, and most of them were distributed in the east side of the city. Little residential clustering by Germans existed, rather they were scattered and lived near the places where the British and other ethnic groups lived. According to the maps, therefore, there was no particular residential clustering by ethnic groups in Detroit at that time.

The Business Area

The business area of Detroit in 1837 was located on lower Woodward Avenue, the western part of Jefferson Avenue and on Atwater Street (see Map 8). The area was concentrated south of the center of the city, near the river front. Generally the manufacturing and business areas were mingled together in this area, and it constituted the central business district (CBD) of Detroit. Only small clusters by manufactures and businesses are shown on the map. Most business activities were distributed within the CBD of the city, while some



Map 7 The Residential Pattern by Ethnic Groups in Detroit, 1837



Map 8 The Business Area in Detroit, 1837

manufacturing areas were completely segregated from business areas outside of the CBD.

The dissimilarity index by manufacturing area with business area over zones in Detroit was 14.6 in 1837. The index itself could not explain how much the manufacturing and business areas were segregated from each other at that time. But it might show that there was some segregation between manufacturing areas and business areas.

Summary

In 1837 there was no internal transportation mode in Detroit, despite the fact that people had difficulties in walking on the streets, especially on rainy days. The stage coach connecting Detroit with other places was the only external transportation mode and was widely used.

According to Maps 6, 7 and 8, Detroit was a walking city, where most people lived within a half mile of the center of the city, and where the business area was not segregated from the residential area. Generally, the maps do not show the obvious residential clustering by occupations and by ethnic groups, but they do show the different spatial distributions within the residential areas by occupations and ethnic groups in 1837. Among the occupation groups, white-collar and skilled workers showed some residential clustering in the residential areas of Detroit. None of three ethnic groups showed particular residential clustering at that time. The manufacturing and business areas mingled together in the CBD, but some manufacturing activities

were distributed far outside the CBD of the city in 1837.

The dissimilarity index indicates that each occupation group was segregated from the total population, and skilled workers were the most segregated among them. The German ethnic group was the most segregated from the total population among the three ethnic groups, in terms of the index of dissimilarity. The manufacturing and business areas were segregated from each other with a dissimilarity index of 14.6.

CHAPTER IV

DETROIT IN 1854

The population of Detroit in 1854 was 39,426 in an area of 5.85 square miles. Since 1837, its population had been increased by 29,663 (303.8%), while its area was enlarged by 0.59 square miles (11.2%). The rapid growth of the population made Detroit a crowded city, although its residential area spread outward up to one mile distant from the city's center. The population density of Detroit was 6,739 persons per square mile. This figure indicates clearly the crowdedness of the streets in the city at that time.

The rapid growth of the population in Detroit in 1854 was caused not by natural increase but by migration. A large number of newcomers from outside the State of Michigan and from foreign countries had arrived in the city.[41] New comers from other states came chiefly from the eastern states: New York, New Jersey, Pennsylvania, Ohio, and the New England states. The foreign immigrants were mostly from Ireland, Germany, England and Scotland. Few people came from southern Europe.

This rapid population growth was common in the Great Lakes states including Michigan at that time.[42] People from the East

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[41]Parkins, op. cit., pp. 188-90.

[42]Ibid., pp. 190-92.

stimulated the development of Detroit. With their energetic activities, liberal public spirit, and high order of intelligence, they built the stores, factories, wagon roads, and railroads, founded schools, academies and colleges, settled the places far from the rivers, and carried the products of the growing settlement, both raw and manufactured, to the markets of the East. They gave real and remarkable development to Detroit. These people also settled and helped to develop other cities in the Great Lakes region. These cities, including Cleveland, Toledo and Chicago, grew up, made remarkable progress, and competed successfully with Detroit for the commerce of this region.

Detroit's businesses grew continuously, and the chief business streets began to be enlarged toward Woodward Avenue above Jefferson Avenue.[43] The retail business in Detroit was already specialized and included grocery, provision and liquor stores, boot and shoe stores, bakeries, clothing stores, hat, cap and fur stores, dry goods stores, and drug stores. With the operation of railroads connecting with Chicago in 1852 and with the East in 1854, the city's market enlarged to encompass nearly the entire country, and then the wholesale trade grew in keeping with its importance in the city's economy.

Enlarging the size of its market also encouraged the development of manufacturing in Detroit. Thus existing factories increased the amount of products and the number of employees, and a few new

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[43]Silas Farmer, History of Detroit and Wayne County and Early Michigan: A Chronological Cyclopedia of the Past and Present, 3rd edition--revised and enlarged (Republished by Gale Research Company, Book Tower, Detroit, 1969), p. 773.

industries, like car (wagon) works, were established. People employed in manufacturing numbered 3,807, or 9.7% of the total population of Detroit, in 1854. The products became exporting goods, and the trade goods of Detroit soon became dependent upon its own manufactured products. However, Detroit's economic base did not yet shift from commerce to manufacturing. Detroit was a well-established commercial city with manufacturing, a secondary activity, in 1854.

The rapid growth of population in Detroit influenced changes in the city's social structure.[44] The increasing numbers of foreign-born immigrants made Detroit a heterogeneous place. Newcomers lived in their clustered places, used their own language, and kept their traditions. These aspects led to strong sub-communities composed of separate ethnic groups. There was no professional police department in the city at that time; only a handful of elected constables and appointed sheriff's deputies served the city. They were not strong enough to maintain social order. Social problems such as crime and violence increased very rapidly and disturbed the public order. Nevertheless, the effort to establish a professional police department came to naught at the hands of the stubbornly parsimonious tax-payers in 1854. Detroit had developed so much in its economy, but at the same time it had great difficulties winning the support of its people for expenditures to police the city.

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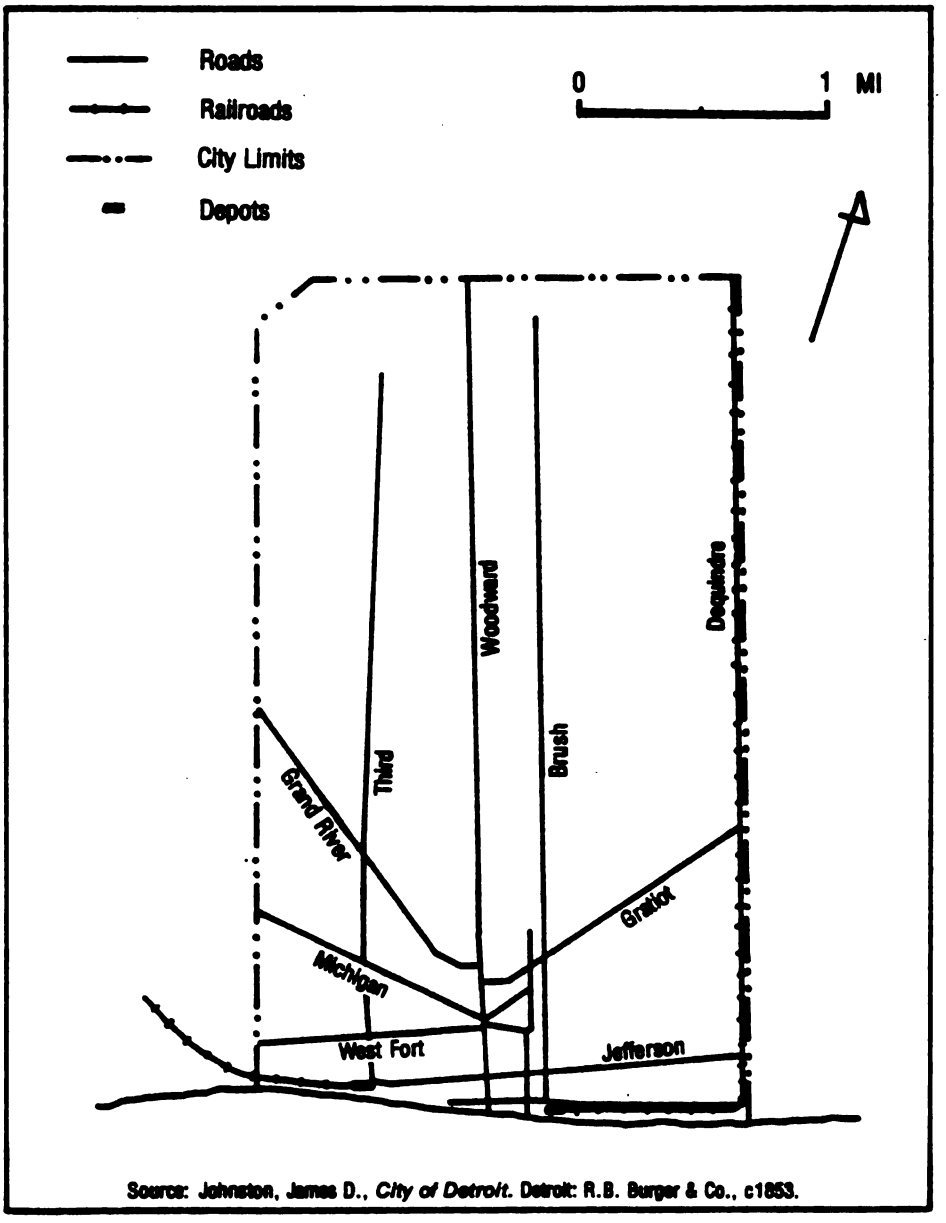
[44]Schneider (1978), op. cit., pp. 184-87.

The Transportation System

A new era dawned in the Detroit of 1854, in terms of the transportation system. State coaches and newly operated railroads were the external transportation modes. Omnibuses were the first and only internal public transportation mode. Stage coaches had been widely used in the past, but with the operation of railroads their use declined rapidly. In 1854 stage coaches continued to be operated, but they did not contribute to carrying people and freight as much as the railroads.

Two railroads, the Michigan Central Rail Road and the Detroit and Pontiac Rail Road, were the speedy and convenient external transportation modes in 1854. These railroads, especially the former, contributed to the development of Detroit through its connections with the interior and the East. The tracks of these railroads were changed from their original places in 1837 (see Map 9).

The Detroit and Pontiac Rail Road connected Detroit with Pontiac; its depot was located at the foot of Brush Street. The tracks started at the depot, stretched east to the corner of Atwater and Dequindre streets, and then followed along the trail--Dequindre Street. In the case of the Michigan Central Rail Road, its tracks were completely changed. The depot was located at the foot of Third Street; the track started at the depot and stretched westward. This railroad operated from Detroit to Chicago, a distance of 280 miles. The company employed 34 people--14 for passenger business and 20 for freight buisness--and 1,167 cars--35 for passengers and 1,132 for freight and other purposes. And the railroad was able to transport



Map 9 The Transportation Network in Detroit, 1854

ten thousand barrels of flour in, one thousand tons of merchandise out, and eighteen hundred passengers daily.[45]

Omnibuses had operated for seven years as an internal public transportation mode since their beginnings in 1847. Horse-drawn omnibuses were mostly owned and operated by hotels. Their chief purpose was to carry people to and from the boat docks and the railroad depots to hotels. Sometimes the omnibuses conveyed passengers from the railroad stations and steamboat landings to private residences at the same rate as to the hotels. Most of these omnibuses were dependent upon the schedule of arrivals and departures of the railroads and steamboats. They were operating whenever their operation was necessary, rather than running through given routes on regular schedules. There was a line of omnibuses running on Jefferson Avenue from the Central Railroad Depot to Elmwood Cemetery on regular schedules.[46] It left each end of the route once every three-quarters of an hour, commencing at seven o'clock in the morning and running till seven o'clock in the evening.

The omnibus was a convenient means of transportation in Detroit, but it did not solve the city's transportation problem. This was because most of them did not run on regular schedules, were too small in size to carry many people, and were relatively expensive. There continued to be a need for a transportation innovation inside the developing city.

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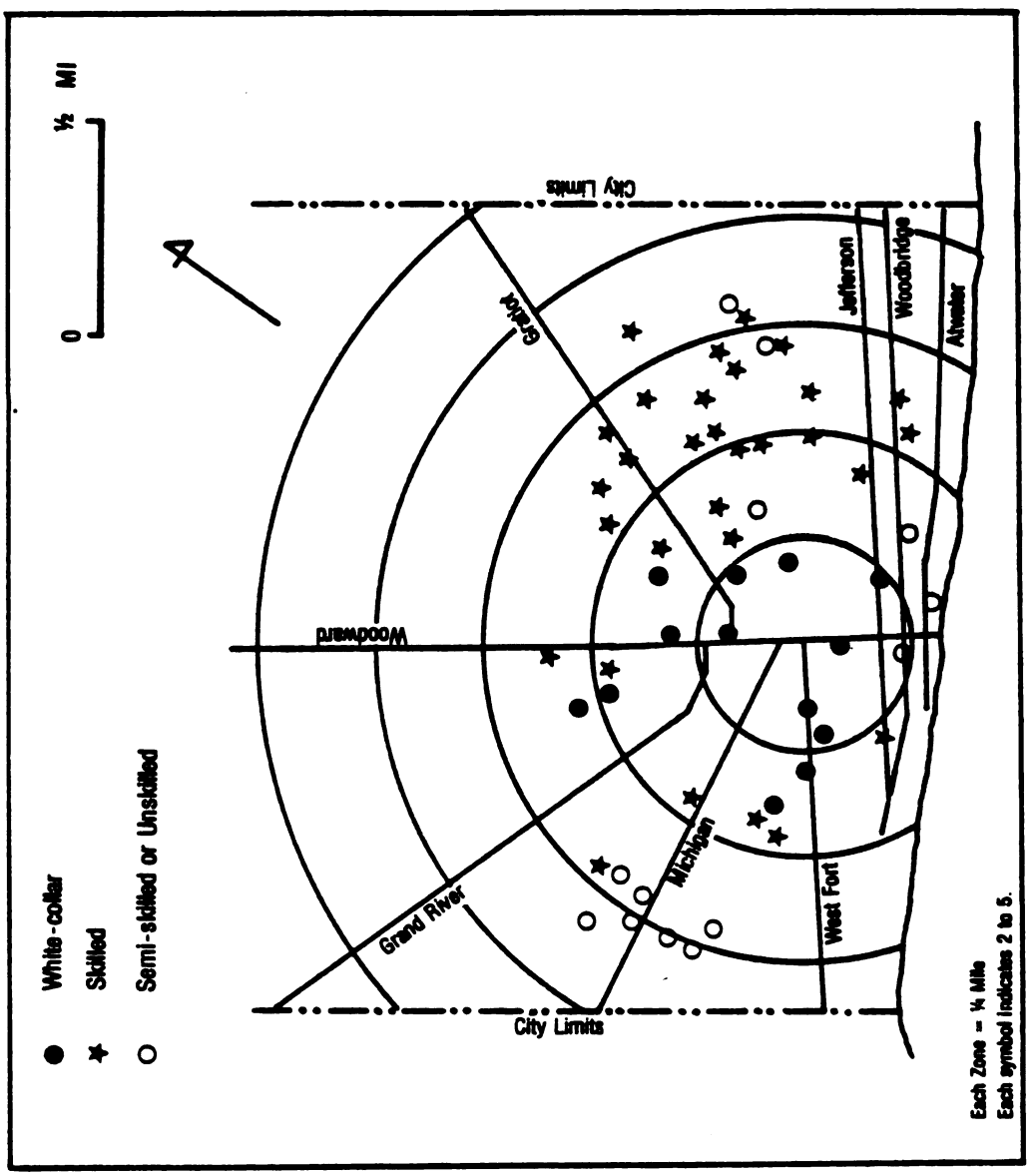
[45]James Dale Johnston, Johnston's Detroit Directory and Business Advertiser, for 1853-54 (Detroit: George E. Pomeroy & Co., 1854), pp. 274-77.

[46]Detroit Free Press, August 26, 1853.

The Residential Pattern by Occupations

The residential area of Detroit in 1854 was extended to the city limits, with some vacant areas in the far northern parts, in the southeastern parts and near the center of the city (see Map 10). Most people lived within one mile of the city's center. More people continued to live in the eastern part of the city than in the western part. This was natural, perhaps, as the city had more land on the east side than on the west side. It was also difficult to determine which street was the main residential street in 1854, because the residential areas were spread out without concentrating on any particular street.

Table 7 indicates dissimilarity indices by one occupation versus all occupations over zones in Detroit in 1854. White-collar workers were segregated the most from the total population with the highest index of 28.0. The index more than doubled between 1837 and 1854. White-collar workers, therefore, were much more segregated from the total population in 1854 than in 1837. Skilled workers were the least segregated from the total population in 1854 with an index of 14.3. The dissimilarity index by skilled workers decreased from the index in 1837. This indicates that skilled workers in 1854 were less segregated from the total population than in 1837. The dissimilarity index by semi-skilled or unskilled workers versus all workers was 18.7, and it was slightly decreased based on the index in 1837. The segregation of semi-skilled or unskilled workers from the total population was reduced between 1837 and 1854. According to dissimilarity indices, the segregation of white-collar workers from the total



Map 10 The Residential Pattern by Occupations in Detroit, 1854

Table 7 Dissimilarity Indices: One Occupation vs. All Occupations over Zones in 1854

White-collar	28.0
Skilled	14.3
Semi-skilled or Unskilled	18.7

population increased greatly between 1837 and 1854, while skilled and semi-skilled or unskilled workers were less segregated during the same period, with the development of the internal transportation network in Detroit.

Increasing segregation of white-collar workers from other occupation groups is clearly shown in Table 8. This table represents the degree of segregation between the occupation groups over zones in Detroit in 1854 by dissimilarity indices. White-collar workers were segregated from skilled workers with an index of 27.9, and from semi-skilled or unskilled workers with a dissimilarity index of 30.2. The former index was increased by 9.2 from the index in 1837, and the

Table 8 Dissimilarity Indices: One Occupation vs. Another Occupation over Zones in 1854

	White-collar	Skilled	Semi-skilled or Unskilled
White-collar	-	27.9	30.2
Skilled		-	15.5
Semi-skilled or Unskilled			-

latter was almost quadrupled. An index of dissimilarity by skilled workers with semi-skilled or unskilled workers was 15.5 in 1854, decreasing by 5.2 from the index in 1837. In short, the segregation of white-collar workers from other occupation groups, especially from semi-skilled or unskilled groups, increased sharply between 1837 and 1854. However, the segregation between skilled workers and semi-skilled or unskilled workers decreased during this period. With the development of the transportation network, therefore, the segregation between white-collar workers and skilled workers, and between white-collar workers and semi-skilled or unskilled workers increased, and the segregation between skilled workers and semi-skilled or unskilled workers decreased in 1854.

Map 10 shows more residential clustering by skilled workers than by white-collar and semi-skilled or unskilled workers in the residential area of Detroit in 1854. Most of the white-collar workers lived within a half mile distant of the city's center, showing little residential clustering. Skilled workers lived throughout the residential area, but their residences were mostly distributed in the area beyond one-quarter mile from the center of the city; they showed greater residential clustering in the eastern part of the city than in the western part. Semi-skilled or unskilled workers scattered together in the far western part of the city at that time. Compared with Map 6, the residential area generally moved toward the north, and semi-skilled or unskilled workers started to show residential clustering in the residential area of Detroit in 1854.

The Residential Pattern by Ethnic Groups

With the rapid growth of the population, especially foreign-born immigrants, the residential pattern of ethnic group settlement in the Detroit of 1854 was sharply different than the pattern in 1837. And the development of the transportation network in Detroit and the city's economic growth contributed to changes in the spatial distribution of people in the city.

Table 9 shows dissimilarity indices by ethnic groups over zones in Detroit in 1854. The British ethnic group was segregated from the total population with an index of 18.8. This index increased sharply--more than doubled--compared with the index in 1837. Among the three ethnic groups, they were more segregated than the Irish and less segregated than the Germans, from the total population in 1854. In the case of the Irish, they were segregated the least from the total population with an index of 13.3, increasing by 4.7 from 1837 to 1854. Germans remained the most segregated ethnic group with a dissimilarity index of 28.1 in 1854. The index was also increased by 4.9 from that in 1837. As a result, all three indices of dissimilarity in 1854 increased much over those in 1837. This indicates that three ethnic

Table 9 Dissimilarity Indices: One Ethnic Group vs. All Ethnic Groups over Zones in 1854

British	18.8
Irish	13.3
German	28.1

groups began to segregate themselves from the total population over zones in the residential area of Detroit in 1854.

Increasing segregation by ethnic groups is more clearly represented in Table 10. The table shows dissimilarity indices by one ethnic group versus another ethnic group over zones in 1854. All indices except one, the index by Germans with other ethnic groups, were increased greatly by 0.7 to 12.9 from 1837 to 1854. Thus each ethnic group clustered rather than mingled over zones in 1854, according to the dissimilarity indices. The Germans were also the most segregated ethnic group from the other ethnic groups at that time although the index by Germans with other ethnic groups was decreased by 1.3 from 1837 to 1854, because three indices by the Germans with the British, Irish, and other ethnic groups are the top three (32.7, 26.0, and 20.9) among the indices on the table. Among Detroit's people, therefore, the British and Germans were segregated from each other with the highest index of 32.7. The British were the least segregated from the Irish with an index of 12.6. The British and Germans were segregated from other ethnic groups at nearly similar rates (20.3 for the

Table 10 Dissimilarity Indices: One Ethnic Group vs. Another Ethnic Group over Zones in 1854

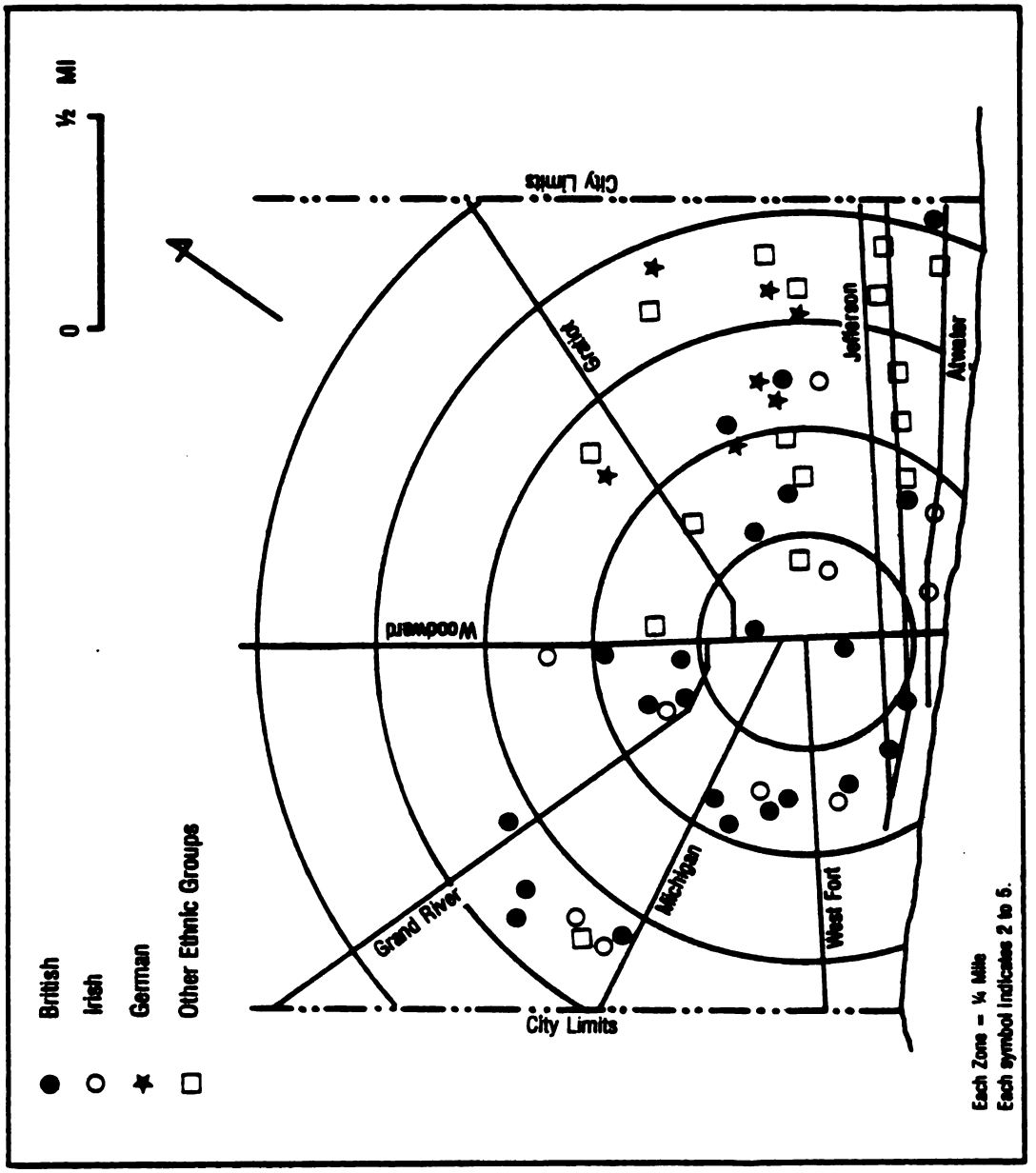
	British	Irish	German	Others
British	-	12.6	32.7	20.3
Irish		-	26.0	16.3
German			-	20.9
Others				-

British and 20.9 for the German) over zones in 1854. In general, the development of the transportation network in Detroit increased the segregation between the ethnic groups in 1854.

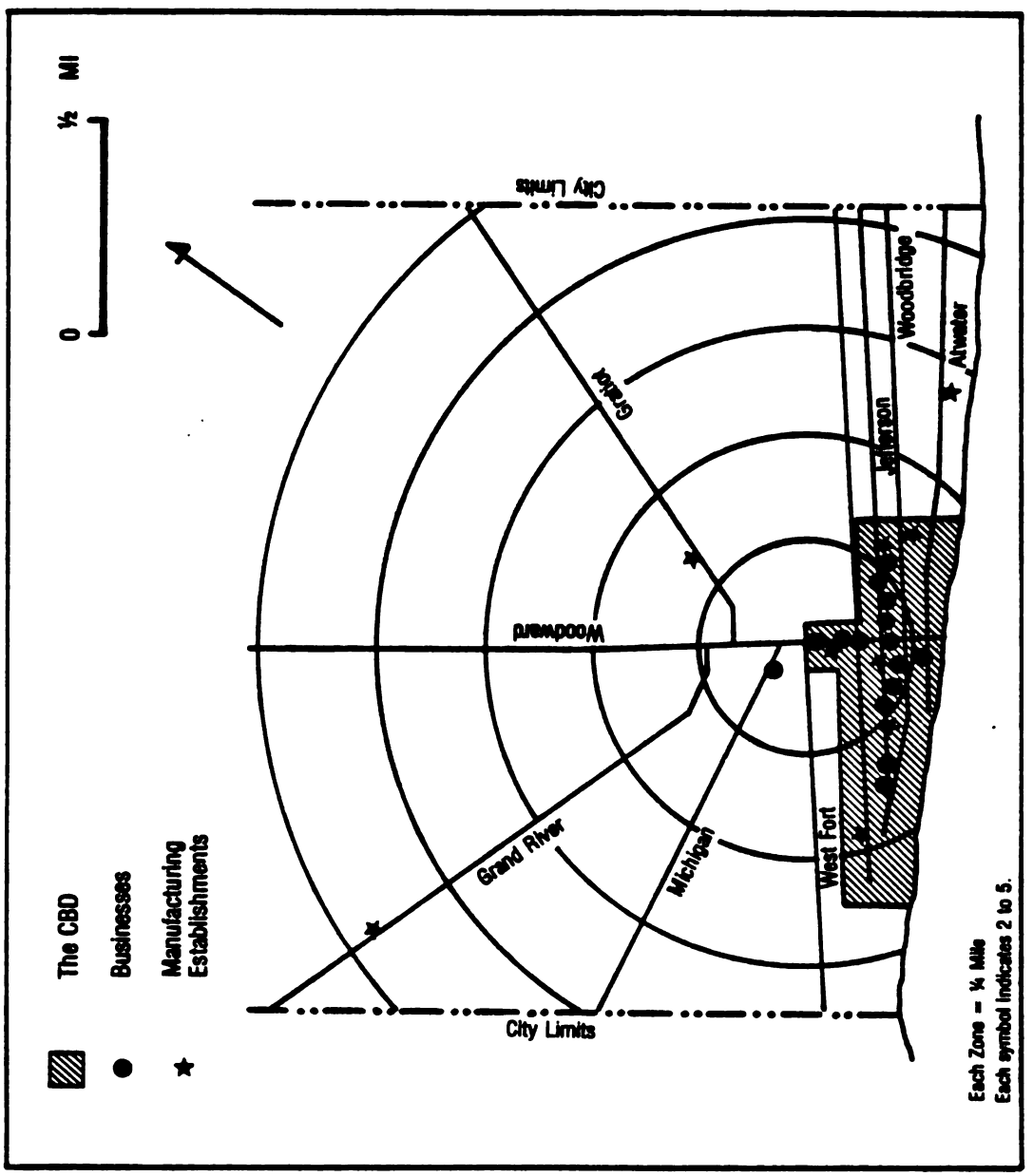
The spatial distribution of ethnic groups in Detroit in 1854 is represented on Map 11. There was no distinctive residential clustering by one particular ethnic group at that time. However, general trends in the spatial distribution of ethnic groups in the residential area was found. Most Germans lived in the eastern part of Detroit with some clustering. The British and Irish scattered throughout the residential area, and they mingled together. But in some regions, especially in the western part of the city, the British showed some residential clustering. Thus Germans revealed the most regional segregation in the residential area, while the British and Irish were distributed without regional segregation in 1854.

The Business Area

Detroit's economy developed and shifted in its spatial arrangement, with the growth of population. Commerce, both retail and wholesale, grew continuously, and manufacturing, both already existing or newly established, also grew. The economic base of the city was largely dependent on commerce, but manufacturing began to compete with it. Working places tended to separate from the residential places, and the central business district of Detroit was changed to include Woodward Avenue above Jefferson Avenue and Jefferson Avenue itself in 1854 (see Map 12).



Map 11 The Residential Pattern by Ethnic Groups in Detroit, 1854



Map 12 The Business Area in Detroit, 1854

The main business area had moved eastward and northward. Below Jefferson Avenue, much less manufacturing and business activities remained; at Jefferson Avenue, the chief business area was located on both sides of Woodward Avenue; and above Jefferson Avenue, both some manufacturing and business activities were distributed along Woodward Avenue. However, clustering business areas remained along Jefferson Avenue, and this avenue was the most important business street in Detroit in 1854.

The difference in the regional distribution of manufacturing and business areas is sharply shown by the dissimilarity index in Detroit at that time. The index representing the segregation of manufacturing areas from business areas over zones in 1854 was 45.3, increasing by 30.7 (more than three times) from 1837. Most business activities were located within the central region, a quarter mile from the center of the city. More manufacturing activities were distributed in the region, between a quarter mile and a half mile from the city's center. Even though the internal transportation network, omnibuses, did not contribute much to city growth in 1854, some manufacturing activities were distributed far from the CBD of the city. A few, including boot and shoe manufactures, and vinegar factories, were located in the far northeastern section, on Grand River Avenue, of the city. In short, manufacturing areas tended to move out or locate far from the central business district, while business areas were enlarged but remained mostly in the central area in 1854.

Summary

In 1854 two railroads, the Michigan Central Rail Road and the Detroit and Pontiac Rail Road, contributed to the economic development and the population growth of the city. The only internal public transportation mode was the omnibus. The omnibus was the first public transportation mode within the city, but did not solve the transportation problem because it carried people to and from the railroad depots and steamboat docks to the private residences and public places like hotels, rather than to and from the working places to residential places.

The residential areas of Detroit were spread out over the city in 1854. The central business district moved north along Woodward Avenue, and vacant areas near the center of the city in the residential areas were filled in by the business and manufacturing areas. This indicates that the working places were being separated from the residential places. Most business activities were distributed within or near the central buisness district of Detroit, while some manufacturing activities were located far from the CBD at that time. In fact, the manufacturing and business areas were segregated from each other over zones with an dissimilarity index of 45.3, more than tripled during the period 1837 to 1854.

Based on dissimilarity indices, the segregation of white-collar workers from the total population increased from 1837 to 1854, but the segregation of skilled and semi-skilled or unskilled workers from the total population decreased during the same period. White-collar workers were segregated the most in 1854, and skilled workers were the

least segregated from the total population at that time. In the case of ethnic groups, all dissimilarity indices by the three ethnic groups were increased from 1837 to 1854. This indicates that the three ethnic groups began to segregate themselves from the total population over zones in the residential area of Detroit in 1854. The Germans were the most segregated ethnic group, and the Irish were the least segregated from the total population.

There was much residential clustering by each occupation group throughout the residential area. Few residential clusters by white-collar workers were located less than a quarter mile distant from the city's center, and most clusters in residential areas by skilled workers were distributed on the east side of the city. Some residential clustering by semi-skilled or unskilled workers took place in the far western part of the city. There was no distinctive residential clustering by one particular ethnic group at that time, but each ethnic group lived in some clustered residential places. Most Germans lived in the eastern part of Detroit, while the British and Irish scattered throughout the residential area in 1854. Hence, there was a trend which indicates that the residential clustering was accomplished by occupations more than by ethnic groups in Detroit in 1854.

In short, the development of the internal transportation network increased the segregation of white-collar workers from the total population over zones in 1854, but it decreased the segregation of skilled and semi-skilled or unskilled workers from the total population. On the other hand, the development of the transportation network increased the segregation of the three ethnic groups from all Detroiters over zones in Detroit in 1854. Also, the segregation between business and

manufacturing areas increased with the growth of the transportation network at that time. Business areas tended to be concentrated in the CBD of the city, while manufacturing areas tended to grow more dispersed.

CHAPTER V

DETROIT IN 1874

The population of Detroit in 1874 numbered 101,255, having increased by 156.8% over that in 1854. The growth of the population was caused by the continuous flow of immigrants to the city from the East and foreign countries. This population flow also solved the problem of the labor scarcity and contributed to the development of manufacturing in Detroit.

After the Civil War, Detroit entered a new economic era. The city experienced rapid industrial growth, and, in 1874, Detroit stood at the end of the transition period from a commercial city to an industrial city. Many favorable circumstances contributed to the industrial growth of the city. These were: the availability of capital to supply funds for economic expansion; the benefits of the national railroad system, which enlarged Detroit's hinterland; Detroit's prominence as a wholesale center; the ability of Detroit manufacturers to sell their products to national or international markets as well as the local market; and the presence of many enterprising men.[47]

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[47]Sidney Glazer, Detroit: A Study in Urban Development (New York: Bookman Associates, Inc., 1965), pp. 51-52.

In 1874 about 8,017 employees were engaged in fifty-three manufacturing enterprises whose products were valued at more than $3,000 each and whose total value of products was $21,906,000. Some manufacturers hired many employees and produced a larger output by value, while some were still small in size, in number of employees, and in the value of products. For example, twenty foundry and machine enterprises had 857 workers and a total value of products at $2,029,000; only two people engaged in the one vinegar and cider enterprise, and the value of products was but $6,000. There were some predominant industries in Detroit in 1874, in terms of the total value of products and their importance.[48] These were saw milling, iron and steel manufactures, car building, malt making and brewing, brass making and stove making. Besides these, tobacco and cigars, flour and feed mills, and furniture industries were also leading industries in terms of the total value of products. With the development of Detroit's manufacturing, the economic base of the city relied more on manufacturing than on commerce, and the wholesale trade of Detroit was heavily dependent upon its own diverse products.

Detroit covered 12.75 square miles in area, having grown by an additional annexation of 6.9 square miles. The residential area was enlarged outward, and was increasingly separated from the working places. Horse-drawn street car railways stimulated the expansion of the residential area in Detroit at that time. With the organization of a professional police force and its continuous efforts, the operation

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[48]Melvin George Holli, ed., Detroit (New York: New Viewpoints, 1976), pp. 82-86.

of street car railways and the separation of the residential area from the business area contributed to the decline of crime. Detroit in 1874 was a streèt car city and public order was restored for the most part.

The Transportation Network

There were railroads and stage coaches as external transportation modes and omnibuses and street car railways as internal transportation modes in Detroit in 1874. But the main transportation modes in the city were railroads and street car railways. This was because railroads were fast replacing stage coaches as the main links between Detroit and the outside by 1874. Similarly, this was because street car railways were fast replacing omnibuses as the main means of internal public transportation.

The railroad network in Michigan was almost completed by 1874. Twelve railroads, including the Michigan Central Rail Road, operated in Detroit in 1874. The Detroit and Pontiac Rail Road discontinued its operation and was replaced by the Detroit and Milwaukee Rail Road. Most railroads used two depots, located at the foot of Brush Street and at the foot of Third Street. Only one railroad, Great Western Railway of Canada, used the depot in Windsor, Canada, opposite Detroit, although the ticket office of this railroad was in Detroit. The railroads contributed to the economic growth of Detroit by enlarging its hinterland, connecting the city with market places, and transporting raw materials and products.

The street car railway drawn by horses started operations in

1863. In 1874 nine street car railway lines operated by six different companies ran along the major roads (see Map 13).[49] The line built by Fort Street and Elmwood Railway was operated on West Fort Street from the city limits, Michigan Grand Avenue, Randolph Street and Croghan Street to Elmwood Avenue, and its length was five and a half miles. The Grand River Street Railway operated a line of two and three-quarters miles starting at Woodward Avenue and running on Grand River Avenue to National Street. Congress and Baker line, built by Detroit and Grand Trunk Junction Railway, was three miles in length. This started at the corner of Congress and Randolph Street, and ran along Congress Street to Seventh Street, then north to Baker Street and then west to Twenty First Street. Three and one-eighth miles of line built by Central Market, Cass Avenue, and Third Street Avenue Railway started at the corner of Larned and Griswold Street, and followed along Griswold Street to State Street, then northwest to Cass Avenue, north to Ledyard Street, then west to Third Avenue, and along Third Avenue to Prescott Street (Hudson Street). The Russell line of three miles built by Russell Street, St. Aubin and Detroit and Milwaukee Junction Street Railway extended north on Russell Street from Gratiot Street to Kirby Avenue, then east to St. Aubin Avenue and then north to the city limits.

The Detroit City Railway commenced operations in 1863, and, in 1874, operated four different street car railway lines with a total length of 10 miles.[50] The Jefferson line, two and five-eighth miles,

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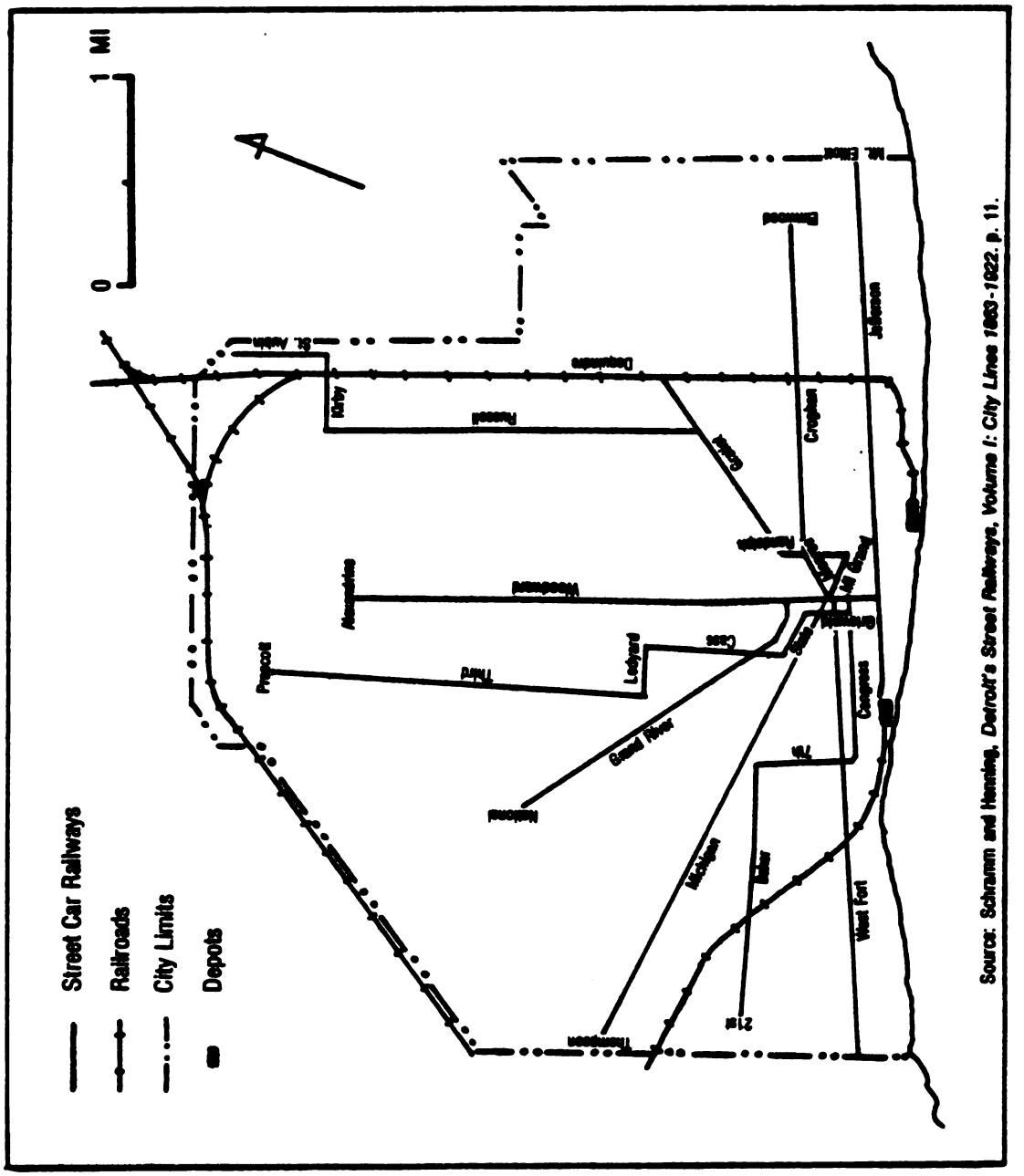
[49] Schramm and Henning, op. cit., pp. 10-18.

[50] Ibid., pp. 10-14.; O'Geran, op. cit., pp. 26-27.



Map 13 The Transportation Network in Detroit, 1874

was laid on Jefferson Avenue, extending from the Michigan Central Depot at Third Street to Mt. Elliott Avenue. Twelve cars ran at intervals of five minutes, and a round trip took one hour. The Woodward line operated with eleven cars with six-minute intervals over two and three-quarters miles, travelled from Jefferson Avenue to Alexandrine Avenue. The round trip for this line took one hour and six minutes. The Gratiot line extended northeast on Gratiot Street to Dequindre Street, from Woodward Avenue through Monroe Avenue and Randolph Street. The distance was one and three-quarters miles. Three cars ran every fifteen minutes; a round trip on this line took forty-five minutes. The Michigan line followed Michigan Avenue from Woodward Avenue to Thompson Street. Ten cars ran three miles at intervals of six minutes; it took one hour and twelve minutes for a round trip.

The horse-drawn street car railways ran throughout the city, carrying people on regular schedules. Annually, almost three million Detroiters used street car railways to get from place to place in 1874.[51] In short, the horse-drawn street car railway was the principal means of travel in Detroit, even though the average speed of these railways was relatively slow, about 2.5 miles per hour.

The Residential Pattern by Occupations

The residential area of Detroit in 1874 moved outward along the street car railway lines. Most of Detroit's population lived within

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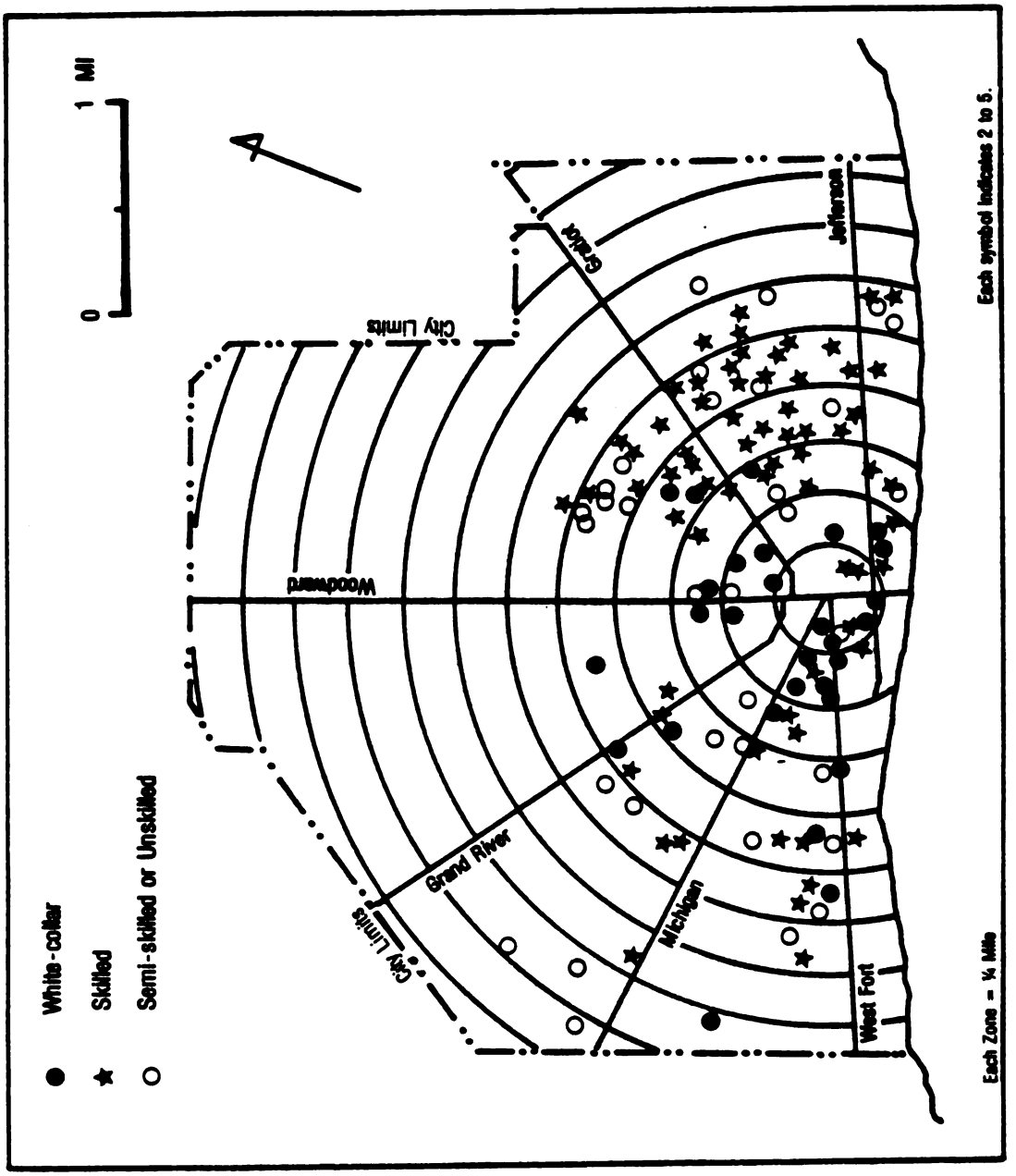
[51] Ibid., pp. 25-26.

one and three-quarter miles of the city's center (see Map 14). In the eastern part of the city, the population was densely distributed, much moreso than the western part. In the western section of the city, people were scattered over the residential area and lived at greater distances from the city's center than in the eastern section. This was because the street car railways ran farther to the west than to the east. Some vacant areas in the residential area were located along Woodward Avenue.

Table 11 shows dissimilarity indices by one occupation versus all occupations over zones in Detroit in 1874. Skilled workers were the least segregated from the total population among the three occupation groups with an index of 10.8. The index was decreased by 3.5 from 1854, and it had decreased continuously since 1837. An index of dissimilarity by white-collar workers with all workers over zones was the highest one, 25.6, in 1874. This was also decreased by 2.4 from 1854. In 1874, semi-skilled or unskilled workers were much more segregated from the total population than skilled workers and slightly less segregated than white-collar workers, with an dissimilarity index of 23.7. The index by semi-skilled or unskilled workers, different from the case of white-collar and skilled workers, was increased by 5.0 from 1854. With the development of the transportation network, therefore, white-collar and skilled workers were less segregated from the total population through time, while semi-skilled or unskilled workers were more segregated from the total population in 1874 than in 1854.

Dissimilarity indices computed in comparison with the differences of the residential distribution in Detroit between the occupation



Map 14 The Residential Pattern by Occupations in Detroit, 1874

Table 11 Dissimilarity Indices: One Occupation vs. All Occupations over Zones in 1874

White-collar	25.5
Skilled	10.8
Semi-skilled or Unskilled	23.7

groups over zones in 1874 are shown on Table 12. White-collar workers were segregated from skilled and semi-skilled or unskilled workers indicated by the top two indices, 23.9 and 28.9. The most segregation among the three occupation groups was represented by white-collar workers with semi-skilled or unskilled workers at that time. Skilled and semi-skilled or unskilled workers were the least segregated from each other with the lowest index of 9.7. All indices on the table were decreased by 1.3 to 5.8 from those in 1854. This indicates the segregation between the occupation groups over zones in Detroit was reduced between 1854 and 1874, with the development of the internal transportation network.

Table 12 Dissimilarity Indices: One Occupation vs. Another Occupation over Zones in 1874

	White-collar	Skilled	Semi-skilled or Unskilled
White-collar	-	23.9	28.9
Skilled		-	9.7
Semi-skilled or Unskilled			-

Map 14 represents the spatial distribution in the residential area by occupation groups in Detroit in 1874. More clustered residential places by white-collar workers were distributed west of Woodward Avenue than east of the avenue. They clustered especially in the area between West Fort Street and Michigan Avenue within a half mile of the center of the city. Most skilled workers lived in the eastern part of the city. Clustered residential places by skilled workers were located in the eastern part of Detroit more than in the western part of the city. Semi-skilled or unskilled workers were scattered throughout the residential area of the city, and most of the residential clusters were distributed beyond a half mile from the city's center. The residential pattern by occupation groups in 1874 was similar to the distribution in 1854, in the enlarged residential area.

The Residential Pattern by Ethnic Groups

The population of Detroit increased continuously, and the composition of its people by ethnic groups was changed because of continuous increases of foreign-born immigrants. Besides the three ethnic groups sampled, there were the French, the Jews, Scotch, Blacks and other ethnic groups from eastern or southern European countries who were listed in the city directory for 1874. Thus the percentage indicating the composition of each ethnic group in the sample was changed between 1854 and 1874. For example, the British sample was decreased from 46.8% in 1854 to 29.5% in 1874; the Irish was increased 16.8% to 17.2%; the German from 13.2% to 21.0%; and other ethnic groups

from 23.2% to 32.3%. Although the British were still the majority ethnic group in numbers, the percentage of the British among the total population had decreased because the other ethnic groups, including the Irish and German, had increased rapidly.

Dissimilarity indices by one ethnic group versus all ethnic groups over zones in Detroit in 1874 are shown on Table 13. Among the three ethnic groups, the British were segregated from the total population with the lowest index of 10.4. The dissimilarity index for the British in 1874 was decreased by 8.4 from 1854, indicating less segregation of the British from other Detroiters in 1874 than in 1854. The Irish were the most segregated ethnic group among the three ethnic groups with an index of 15.7, increasing by 2.4 from 1854. This indicates the segregation of the Irish from the total population over zones was increased through time. The German ethnic group was more segregated from the total population than the British, and less segregated than the Irish in 1874 with an index of 14.3. The dissimilarity index for the Germans with the total population in 1874 was almost half of the index in 1854. Thus, through time the Germans tended to live close to the total population in the residential area of Detroit. In short, the development of the internal transportation network helped

Table 13 Dissimilarity Indices: One Ethnic Group vs. All Ethnic Groups over Zones in 1874

British	10.4
Irish	15.7
German	14.3

to increase the segregation of the Irish from the total population, but helped to decrease the segregation of the British and German ethnic groups from the total population in 1874.

Table 14 represents dissimilarity indices by one ethnic group with another ethnic group over zones in Detroit in 1874. The most segregation between the ethnic groups is revealed by the segregation between the Irish and Germans with an index of 18.8. The British were the least segregated from other ethnic groups with an dissimilarity index of 10.8. Four of six indices, including the above indices, were decreased dramatically with a range of 7.2 to 14.6 between 1854 and 1874. Two indices, showing the segregation between the British and Irish, and between the Irish and other ethnic groups, were increased slightly by 0.4 and 1.1 in 1874. But the changes were too small to indicate the increasing segregation over zones through time. As a result, the growth of the transportation network in Detroit influenced generally the decreasing segregation between the ethnic groups in the residential area of the city in 1874.

The spatial distribution by ethnic groups in the residential

Table 14 Dissimilarity Indices: One Ethnic Group vs. Another Ethnic Group over Zones in 1874

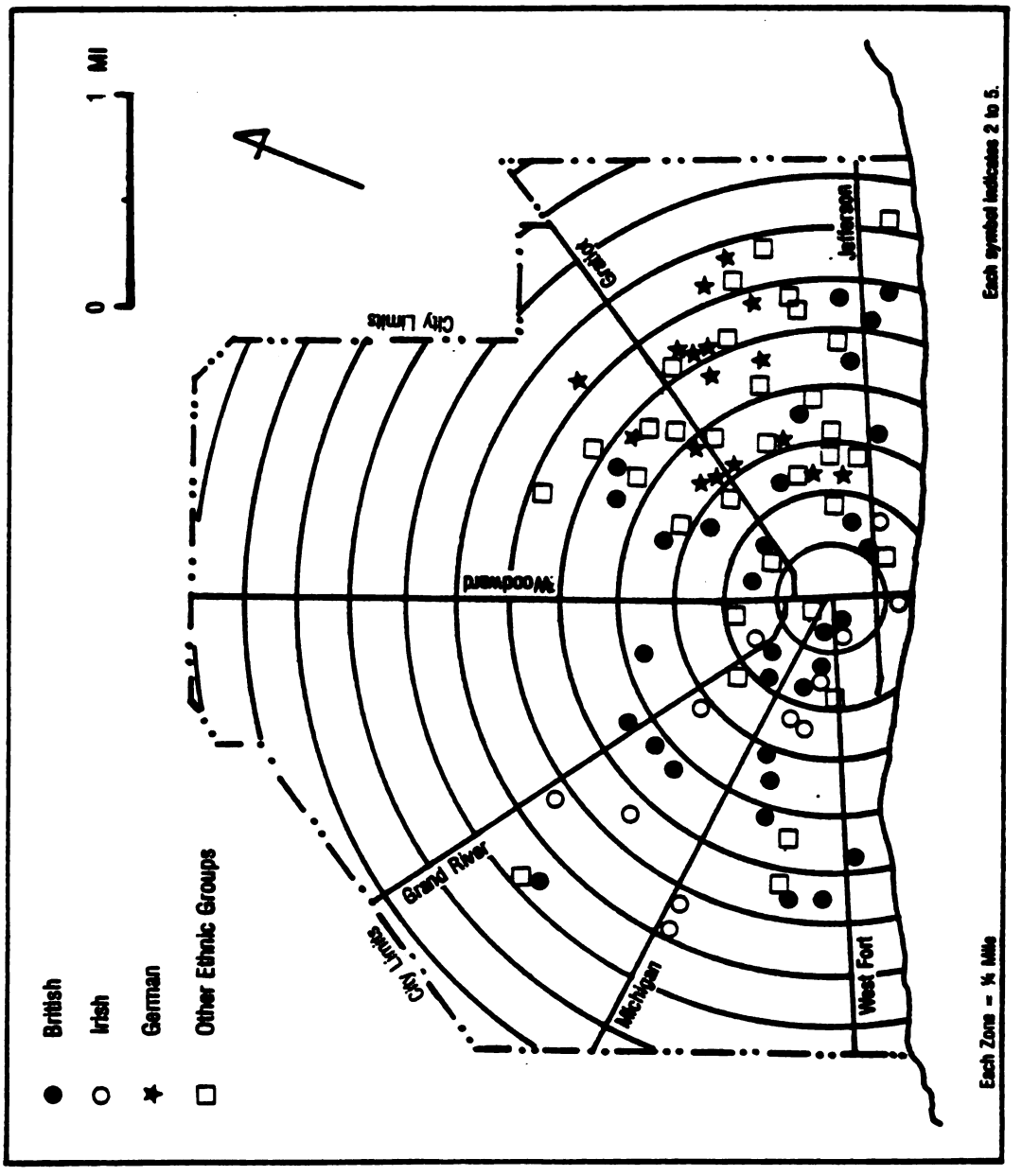
	British	Irish	German	Others
British	-	13.0	18.1	10.8
Irish		-	18.8	17.4
German			-	11.3
Others				-

area of Detroit in 1874 is shown on Map 15. Generally speaking, more British and Irish lived in the western part of the city; most Germans and a majority of other ethnic groups were distributed in the eastern part of Detroit. The British moved outward along the major roads with some residential clustering. Few Irish residential clusters were distributed along Michigan Avenue. And some clustered residential places by the Germans were located in the eastern part of the city. At that time some people lived far distant from the city's center (up to two and half mile distant) along the major roads. This was made possible by the operation of the street car railways up to those places. Hence, the development of the internal transportation network influenced the extension of the residential areas outward, but did not stimulate the increasing segregation of ethnic groups in the residential area of Detroit in 1874.

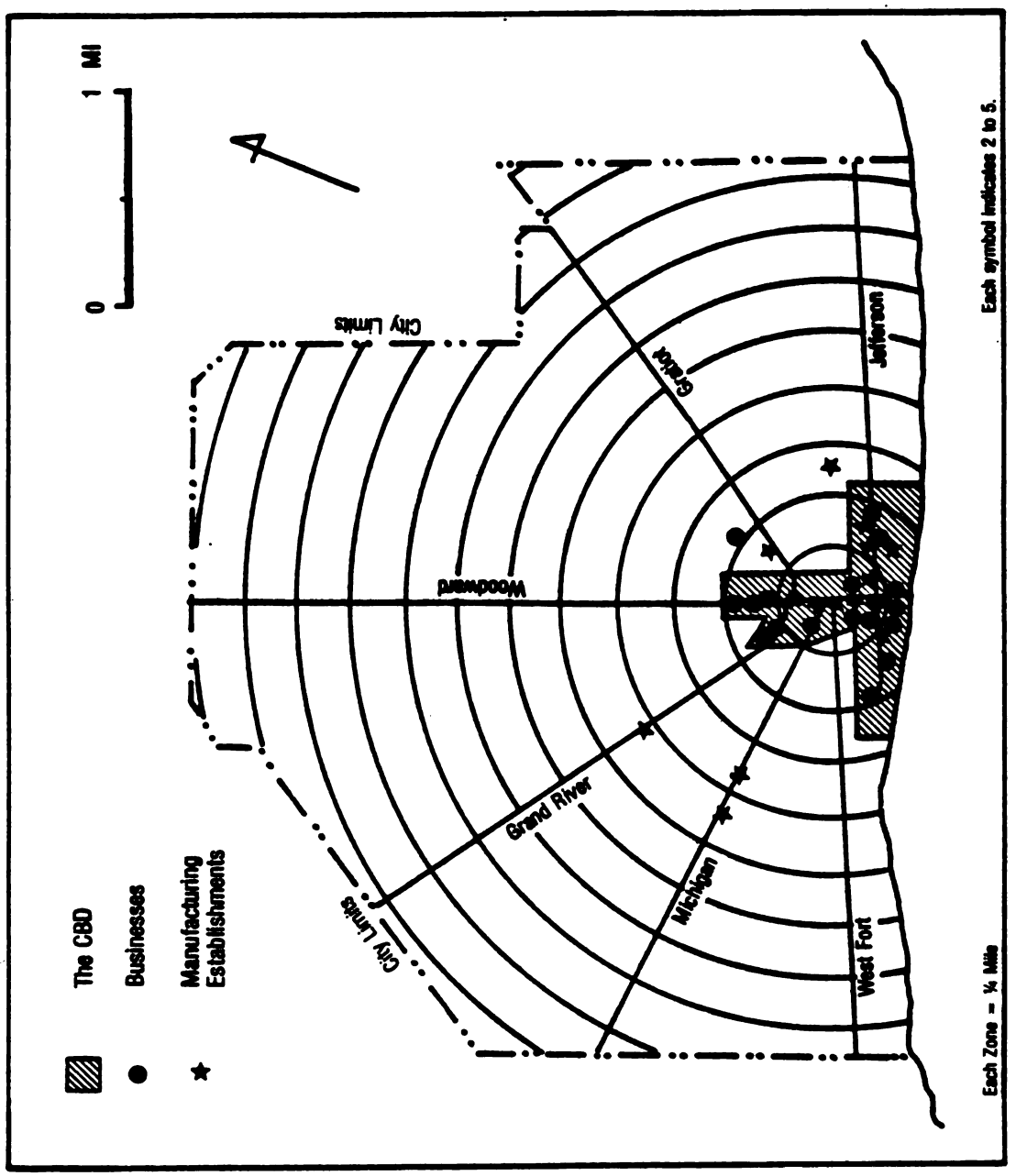
The Business Area

The growth of the transportation network, both internal and external, influenced the economic growth of Detroit. Manufactures of the city developed remarkably, and the city's commerce grew continuously with the industrial development. Thus the economic base of Detroit in 1874 was more dependent upon manufactures than upon commerce.

Map 16 shows the spatial distribution of the business and manufacturing areas of Detroit in 1874. The central business district of the city was enlarged northward along Woodward Avenue to a half mile



Map 15 The Residential Pattern by Ethnic Groups in Detroit, 1874



Map 16 The Business Area in Detroit, 1874

from the center of the city. The main business streets were Jefferson and Woodward avenues at that time. More business activities were located west of Woodward Avenue, and more manufacturing activities were distributed east of the avenue in the CBD. Some businesses also existed along Michigan and Grand River avenues in the CBD, and along Gratiot Street outside the CBD of the city. Some manufacturing activities, including broom making, cigar manufacturing, and boot and shoe making, were distributed at considerable distances from the central business district of Detroit along major roads such as Grand River, Michigan and Jefferson avenues, and West Fort Street. This was because some manufactories had to move outward where the price of land was cheap enough to buy large areas for enlarging their operations. This was also because the operation of the street car railways made it possible to locate manufactories at greater distances.

The dissimilarity index indicating the degree of the segregation between manufacturing and business areas over zones in Detroit in 1874 was 22.3. The index was almost half of that in 1854. This rapid decrease of the dissimilarity index indicates much less segregation of manufacturing areas from business areas over zones in 1874 than in 1854. In 1874, in other words, manufacturing and business activities tended to be distributed close together over zones in Detroit rather than to be separated from each other, based upon the dissimilarity index. The reason for this could be that with the expansion of the business area both activities started to be located in the same zones although they were distributed in different regions in a zone.

Therefore, the central business district of Detroit in 1874 was enlarged northward along Woodward Avenue. Business activities

were mostly distributed in the CBD, while manufacturing areas started to disperse outward along major roads.

Summary

In 1874 Detroit's main transportation modes were railroads and horse-drawn street car railways. The railroad as an external transportation mode contributed to the development of Detroit by connecting the city with its large hinterland. The horse-drawn street car railway as an internal public transportation mode was an efficient and convenient means for travel, connected places with places within the city, and influenced the changes of the spatial distribution of people in Detroit at that time.

The residential area of Detroit was enlarged outward, and most people lived within one and three-quarter miles distant of the city's center in 1874. More people were densely distributed in the eastern part of the city than in the western part. And people lived at greater distances in the western and northern parts of Detroit than in the eastern part of the city. This was because the street car railways operated farther to the west and to the north than to the east. Vacant areas near the center of the city in the residential area were filled by the business and manufacturing areas. A clear segregation between residential areas and working places existed in Detroit in 1874.

With the development of the street car railway, the central business district of Detroit in 1874 was extended north along Woodward

Avenue. Most business activities were located in the CBD, while many manufacturing activities were distributed outside the CBD. In the residential area of Detroit, white-collar workers clustered mostly near the center of the city, many skilled workers were clustered in the eastern part of the city, and a few clusters by semi-skilled or unskilled workers were located in areas far from the city's center. In the case of ethnic groups, most British and Irish lived in the western part of Detroit, while most Germans lived in the eastern part of the city. There was not much residential clustering by ethnic groups.

Dissimilarity indices by occupations, ethnic groups, and manufacturing areas with business areas changed significantly during the period 1854 to 1874. The segregation of white-collar and skilled workers from the total population was reduced (indicated by a decrease of dissimilarity indices), but the index by semi-skilled or unskilled workers increased indicating more segregation from the total population between 1854 and 1874. The Irish were the most segregated ethnic group in 1874 with an increase of the dissimilarity index (2.4), while the British and Germans were less segregated from the total population with a decrease of indices between 1854 and 1874. The segregation between business and manufacturing areas was much reduced; the dissimilarity index in 1874 was almost half of the index in 1854.

In short, with the operation of the street car railways in Detroit the segregation of semi-skilled or unskilled workers increased, and the segregation of white-collar and skilled workers decreased, from the total population in the residential area between 1854 and 1874. During the same period, the development of the transportation

network contributed to increase the segregation of the Irish ethnic group from all Detroiters, in the residential area, and to decrease the segregation of the British and German ethnic groups. Manufacturing areas tended to disperse with the extension of the transportation network at that time, while business areas tended to remain in the CBD of the city where the internal transportation network converged.

CHAPTER VI

DETROIT IN 1894

In 1894 the population of Detroit was 237,798, an increase of 136,543 (134.9%) between 1874 and 1894. In twenty years, the city had more than doubled its area by four annexations. Detroit, then, was 28.35 square miles. Total dwellings were 44,222 and average number of persons to a dwelling was 5.37.[52] The number of dwellings was less than the total number of families in Detroit (51,298). This indicates that all families did not live in their own houses, and some families shared dwellings with others.

The continuous growth of Detroit's population was shaped by European immigration to the United States. The foreign-born population in Detroit in 1894 amounted to 40% of the total. An enormous immigration to America was recorded from 1879 to 1893.[53] Indeed, 788,992 European immigrants, mostly from eastern Europe, came to the United States in one singly year--1882. Another reason for the increasing population was the increased job opportunities in Detroit. With the

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[52]The Secretary of State, Census of the State of Michigan, 1894, Vol. 1 (Lansing: Robert Smith & Co., 1875), p. 658.

[53]Ann Cook, Marilyn Gittell, and Herb Mack, City Life, 1865-1900: Views of Urban America (New York: Praeger Publishers, 1973), pp. 68-70.

change in the major economic activity from commerce to manufacturing, many people were needed as workers. Consequently, expanded job opportunities served as an important attractive force, pulling immigrants to Detroit; a large number of people came to the city to find work in manufacturing.

In 1894 Detroit was an industrial city with more than 150 big and small industries and almost 40,000 employees. Around 607 manufacturing establishments and almost a half of the total employees (19,688) were engaged in the 46 leading industries. The five leading industries in terms of the number of employees were cigar manufactures (3,058), stove and heating furnace works (2,703), medicine, drug, and chemical manufactures (1,586), planing mills, with sash, door and blind factories combined (1,272), and boot and shoe factories (1,243). Some industries among the total industries of Detroit were the only manufacturing activities in Wayne County at that time. These manufactories were: agricultural implement factories; box and box shook factories; box factories--cigar and paper; broom and brush factories; brass casting, platings and trimmings factories; casket and burial case factories; clothing, including custom work and repairing, factories; corset, dress stay, etc., factories; furniture factories; and millinery establishments. The five leading industries of Detroit in 1894 in terms of the amount of invested capital were breweries and distilleries ($2,712,411), medicine, drug and chemical manufactures ($2,366,800), stove and heating furnace works ($2,125,000), electric light and power plants ($1,555,000), and cigar manufactures ($1,125,423).

Detroit was changing much under the influence of Mayor Pingree.

A Republican, Hazen S. Pingree, was elected Mayor of Detroit in 1890. During his terms in office (1890-1896) he reformed Detroit in many ways.[54] When Pingree bacame Mayor of Detroit, he found that the city was controlled by a group of private vested interests (gas, electric, transit, etc.) in both politics and business interested only in their own welfare. Thus he pressed vigorously for low and reasonable rates for gas, electric light, transit, and water, which intimately influenced the welfare of the vast majority of urbanities. He also saved Detroit from the panic of 1893 by carrying the plan of "The Pingree Potato Patch,"[55] and made the city one of the cleanest and most beautiful cities in the United States by paving the streets. In 1894 Detroit was struggling for the people's benefit by changing the ownership of the street car railway and electric plant from private to public under the strong support of Mayor Pingree.

The Transportation Network

In 1894 Detroit's main public transportation modes were railroads, suburban railways and street car railways. Another

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[54]Ibid., pp. 63-64, 110-16.; Clarence Monroe Burton and M. Agres Burton, eds., History of Wayne County and the City of Detroit, Michigan, Vol. V (Chicago-Detroit: The S. J. Clarke Publishing Company, 1930), p. 510.

[55]When Detroit suffered from the panic, Mayor Pingree made a public appeal to the landowners for the use of vacant property to be temporarily turned into gardens and potato patches for the use of poor families. This was called "The Pingree Potato Patch" which scored a great success.

transportation mode, the gasoline auto, was also introduced to the city by C. B. King for the first time.[56] However, this was not adapted readily by Detroiters as a new transportation mode. Railroads, operated by thirteen railroad companies, were still the most important external transportation mode linking Detroit to many places inside and outside Michigan. The suburban railways began operations in 1881.[57] These railways connected with the street car railway lines in the city, and were established for carrying people to and from working places in Detroit to residential places in the suburbs of the city. The first electric system of the city applied to the suburban railway running on Dix Avenue by Detroit Electric Railway in 1886.[58] But the operation of electric street car railways in Detroit failed the very same year, because the new bare overhead electric wires and the noise irritated prople, and even worse, the street car was terribly unreliable.[59] In 1894 nine suburban street car lines were operated by one company--the Detroit Suburban Railway.

The street car railway was the only internal public transportation mode in Detroit in 1894. Its lines were distributed throughout the city, extending the older lines to the city limits or establishing new lines (see Map 17). The lower eastern part of the city had a

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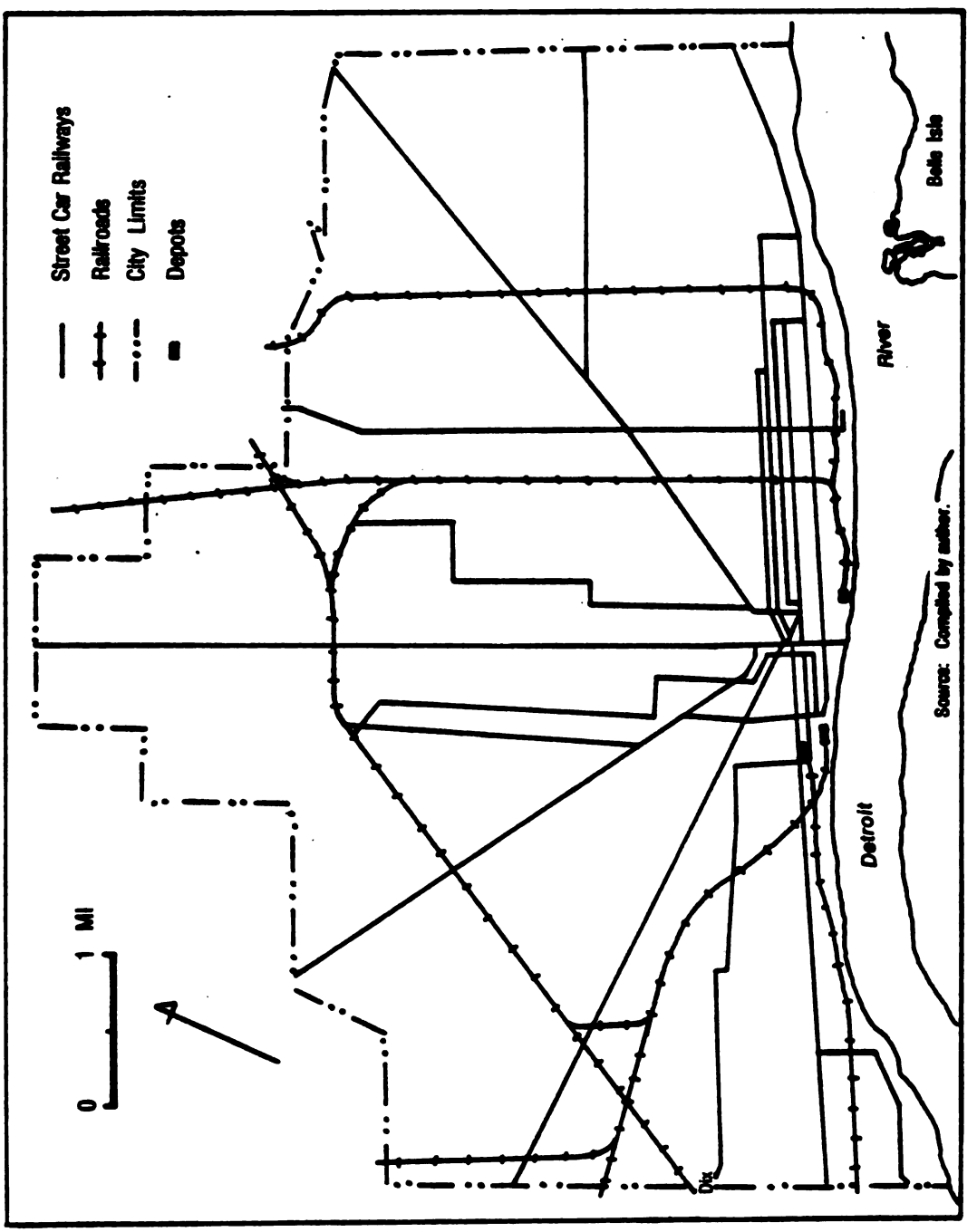
[56]George W. Stark, In Old Detroit (Detroit: Arnold-Powers, Inc., 1939), p. 440.

[57]Schramm and Henning, op. cit., p. 73.

[58]Ibid., p. 69.

[59]Electric Railways of Michigan, Bulletin 103 of Central Electric Railfans' Association (Chicago: Central Electric Railfans' Association, 1959), p. I-1.



Map 17 The Transportation Network in Detroit, 1894

relatively dense distribution of lines. Street car railway lines converged at lower Woodward Avenue, near the center of the city. Suburban street car railways connected directly with the street car railway lines in the city; it was often difficult to distinguish the changing points between the two railways. Detroit Citizens' Street Railway was the only company operating street car railway lines within the city in 1894. The total length of the lines was 67 miles: 37 miles of lines were operated by horses; 30 miles of lines by electric power.[60] This was an increase of 38 miles (131%) in twenty years (1874-1894).

In 1894 the street car railways were pulled by horses and by electric power. After the failure of using electric power for the operation of suburban railways in 1886, all railways were pulled by horses. Meantime, electric trolley lines were proving themselves successful in other large cities in the United States. Thus Detroit was far behind the times in respect to modern street car equipment. Mayor Pingree called this fact to public attention, and the leading street car proprietors agreed that their lines should be electrified. As a result the first electric street car railway was operated on Jefferson Avenue in 1892. However, the companies wanted assurance that they would be allowed to operate a sufficient number of years to justify the added investment, since electrifying street car railways would cost a large amount of money for necessary equipment. In 1893 they finally agreed to electrify all railway lines within three years.

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[60] Henry B. Poor, Poor's Manual of the Railroads of the United States, Vol. 27 (New York: Poor's Publishing Company, 1894), p. 1052.

The year 1894, therefore, was the transition period for changing the power of the operation from horses to electricity. The electric street car railways were faster and more efficient than the horse-drawn street car railways. They stimulated the expansion of the residential area of the city.

Mayor Pingree tried to change the fares and the ownership of railways for the public benefit. His effort for these changes started in 1893 when the Detroit Citizens' Street Railway demanded the five cents fare. Against this, Pingree insisted on the municipal ownership of railways and the maintenance of the three cent fare. He proposed to grant a new franchise for thirty years to the company conditioned upon a three cent fare and universal transfers, but this was rejected. As a result, the Detroit Railway Company, as a new company called the Three Cents Lines, was formed in December, 1894.[61] This company was granted a thirty-year franchise, and was to build a cross-town line to provide service at the rate of eight tickets for twenty-five cents and universal transfers. In consideration of the reduced rate, the city agreed to concrete and pave between the tracks of the Detroit Railway on all unpaved streets, while the company was to repair all pavements distributed in the laying of its lines. In 1894 the municipal ownership of the street car railways in the city had not yet succeeded, but changes for the public benefit started to appear in Detroit with the continuous efforts of Mayor Pingree.

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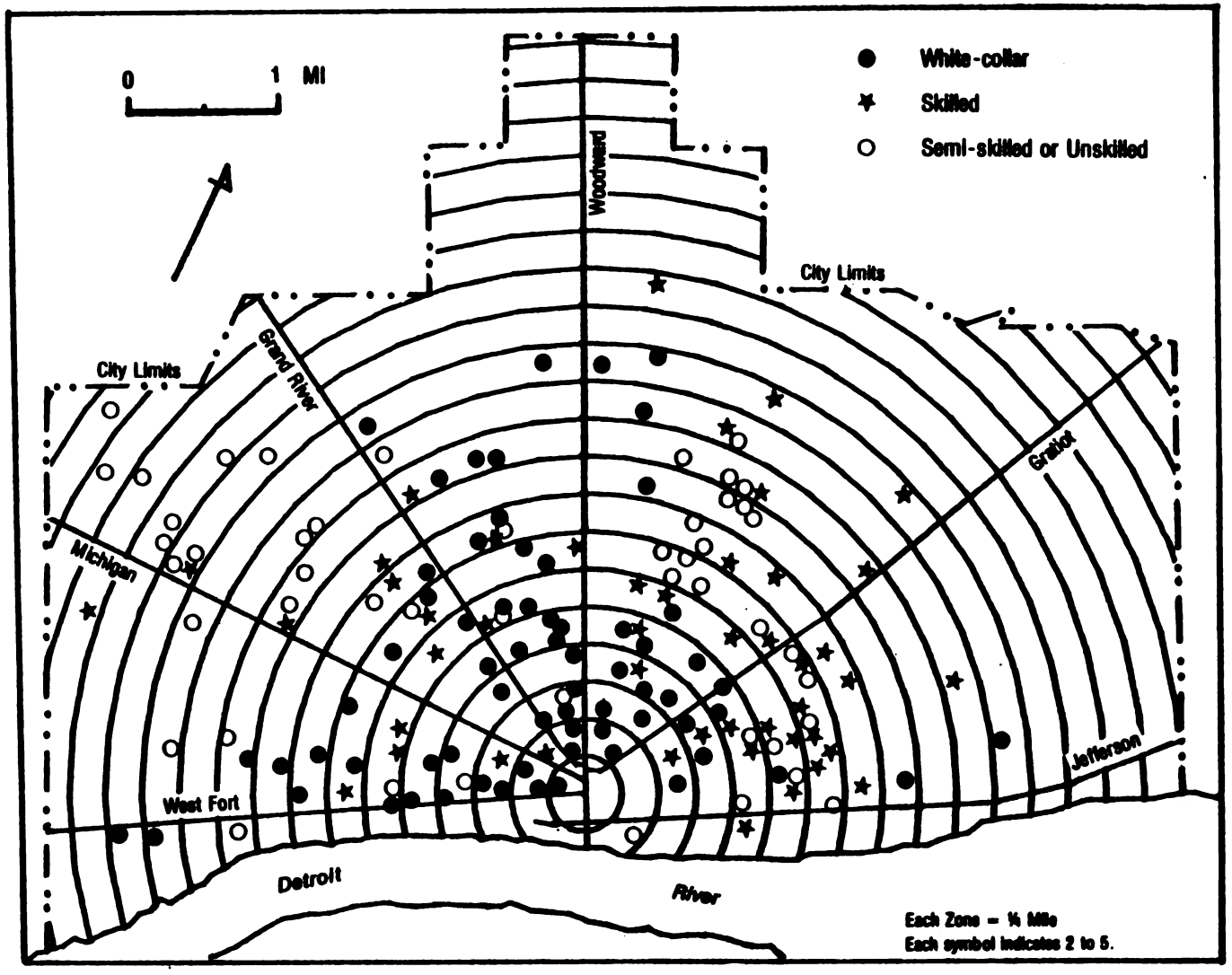
[61] Robert B. Ross and George B. Catlin, Landmarks of Detroit: A History of the City, Revised by Clarence M. Burton (Detroit: The Evening News Association, 1898), pp. 548-49.

The Residential Pattern by Occupations

The residential area of Detroit in 1894 was enlarged outward with the additional annexations and with the development of the transportation network. The population of the city distributed itself more widely, most people living within three and a half miles of the center of the city (see Map 18). In general, Detroiters lived along the major roads and the street car railway lines. The most populous area was between Gratiot Street and Jefferson Avenue within two miles of the city's center, where the street car railway lines were densely established. Another area, however, the one-quarter mile zone, where the street car railway lines converged, was not a residential area. It was filled in by business and manufacturing activities.

The segregation of each occupation group from the total population over zones in Detroit in 1894 was represented by the index of dissimilarity (see Table 15). White-collar and semi-skilled or unskilled workers were segregated from the total population at nearly the same degree with indices of 20.1 and 19.1. Both indices were decreased by 4.4 and by 4.6 between 1874 and 1894. Skilled workers were the least segregated from all Detroiters over zones with an index of 13.2. The index was increased by 2.4 during the same period, indicating more segregation of skilled workers from the total population in 1894. In short, with the expansion of the street car railway lines in Detroit in 1894, the segregation of white-collar and semi-skilled or unskilled workers decreased and the segregation of skilled workers increased, from the total population over zones.

Table 16 shows dissimilarity indices by one occupation with



Map 18 The Residential Pattern by Occupations in Detroit, 1894

Table 15 Dissimilarity Indices: One Occupation vs. All Occupations over Zones in 1894

White-collar	20.1
Skilled	13.2
Semi-skilled or Unskilled	19.1

another occupation over zones in Detroit in 1894. White-collar workers were the most segregated from semi-skilled or unskilled workers over zones with the highest index of 26.5. But the index was decreased by 2.4 between 1874 and 1894. White-collar and skilled workers were segregated from each other with an index of 19.1, decreased by 4.8 from the index in 1874. Skilled and semi-skilled or unskilled workers were the least segregated from each other with a dissimilarity index of 13.6. The index, different from the above two indices, was increased by 3.9 in twenty years. With the growth of the transportation network, therefore, white-collar workers were less segregated from skilled and semi-skilled or unskilled workers in 1894 than in 1874,

Table 16 Dissimilarity Indices: One Occupation vs. Another Occupation over Zones in 1894

	White-collar	Skilled	Semi-skilled or Unskilled
White-collar	-	19.1	26.5
Skilled		-	13.6
Semi-skilled or Unskilled			-

and the segregation between skilled workers and semi-skilled or unskilled workers was increased from 1874 to 1894.

The spatial distribution of occupation groups in the residential area of Detroit in 1894 is shown on Map 18. Generally speaking, Detroit's people seemed to mingle together throughout the city. Nonetheless, there was more residential clustering by occupations in 1894 than in 1874. Each occupation clustered in certain sections of the city. White-collar workers clustered mostly in the near west between Michigan Avenue and West Fort Street, in the near north and northeast on both sides of Woodward Avenue and between Woodward Avenue and Gratiot Street, and in the far northwest along Grand River Avenue and between Grand River and Woodward avenues. Skilled workers clustered by themselves mostly in the areas between Gratiot Street and Jefferson Avenue and along Gratiot Street. Semi-skilled or unskilled workers distributed themselves in clusters in the far northeast section between Woodward Avenue and Gratiot Street, and in the far northwest section between Michigan and Grand River avenues. In short, the growth of the transportation network had enlarged the residential area and had increased residential clustering by the three occupation groups in Detroit in 1894.

The Residential Pattern by Ethnic Groups

With the growth of population in Detroit, the ethnic groups in the city became much more diverse in 1894. Consequently, other ethnic groups besides the three sampled ones, such as the Dutch, the Poles,

and the Italians were found in the list of sampled names. They were a small proportion of Detroit's residents at that time, but could have been a factor for changing the residential pattern of the city.

Dissimilarity indices by ethnic groups versus the total population over zones in Detroit in 1894 are shown on Table 17. The differences among three indices were small, and this indicates that each ethnic group was segregated from the total population at a similar rate in 1894. The British and German ethnic groups were especially segregated from all Detroiters over zones at almost the same degree (13.8 and 13.2). The Irish were the most segregated from the total population over zones with the highest index of 15.7. The index in 1894 was the same as that in 1874, so there was neither increasing nor decreasing segregation of the Irish between 1874 and 1894. The German ethnic group was segregated least from the total population over zones with a dissimilarity index of 13.2. The index was decreased by 1.1 from the index in 1874, indicating that the segregation of the Germans from the total population over zones was slightly reduced in 1894. On the other hand, the dissimilarity index for the British, showing their segregation from the total population, increased by 3.4 to 18.8 in 1804. The development of the transportation network in Detroit,

Table 17 Dissimilarity Indices: One Ethnic Group vs. All Ethnic Groups over Zones in 1894

British	13.8
Irish	15.7
German	13.2

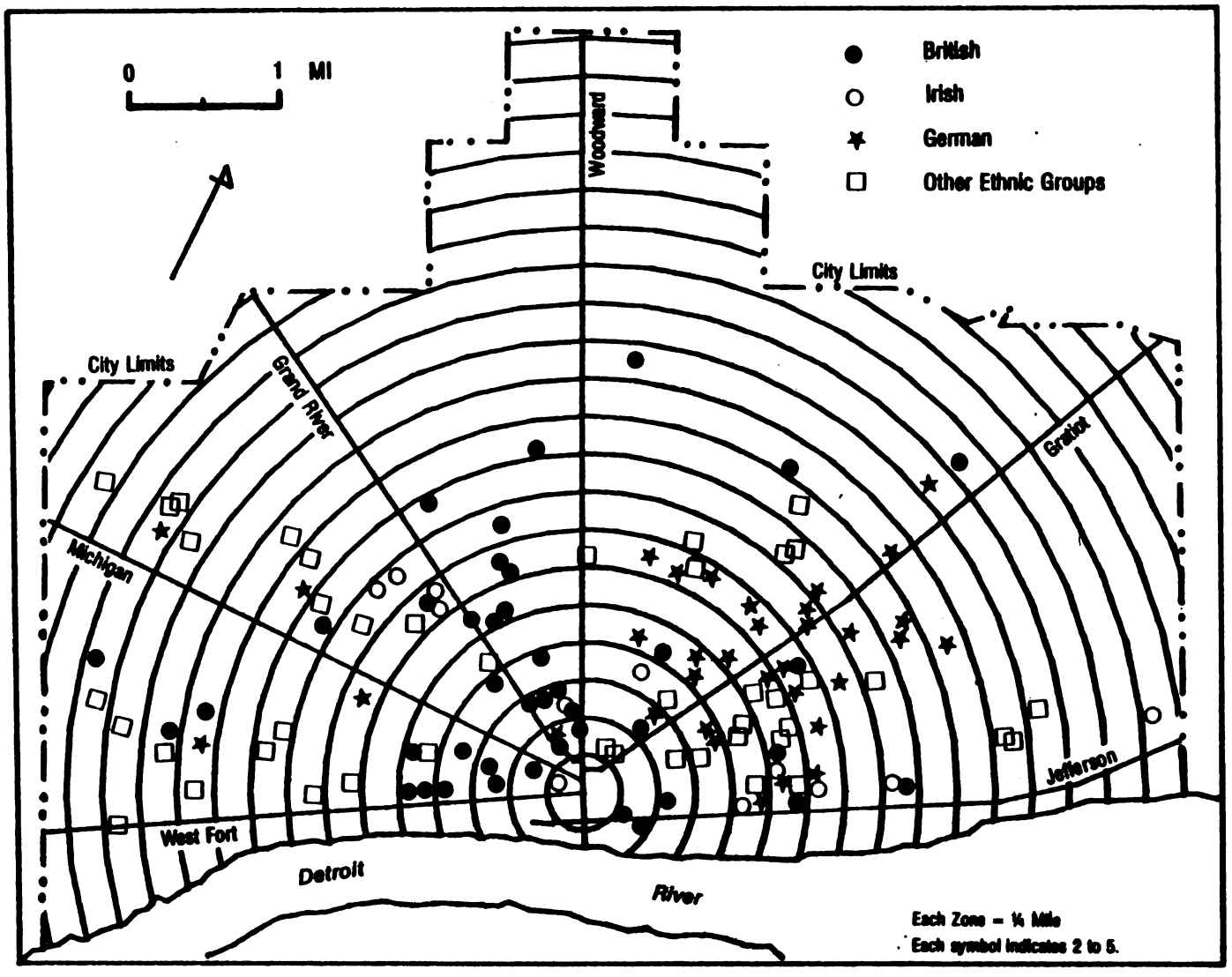
therefore, increased the segregation of the British, decreased the segregation of the German and did not influence the segregation of the Irish, from the total population over zones in 1894.

Table 18 shows the degree of segregation between the ethnic groups over zones in Detroit in 1894 by dissimilarity indices. The British were segregated most from the Irish ethnic group over zones with the highest index of 20.6, and the German and other ethnic groups were segregated least from each other with the lowest index of 13.3. All indices except one, a dissimilarity index for the Irish versus the Germans, were increased by 1.1 to 7.4 between 1874 and 1894. The index indicating the segregation between the Irish and the Germans was 17.5, a decrease of 1.3 from the index in 1874. This indicates that the segregation of the Irish from the German ethnic group was reduced over time, but the changes in reducing segregation between them over zones were too small to show the differences. In general, the expansion of the street car railway lines increased the segregation between the ethnic groups over zones in 1894.

Map 19 represents the spatial distribution of the ethnic groups

Table 18 Dissimilarity Indices: One Ethnic Group vs. Another Ethnic Group over Zones in 1894

	British	Irish	German	Others
British	-	20.6	19.2	14.9
Irish		-	17.5	18.8
German			-	13.3
Others				-



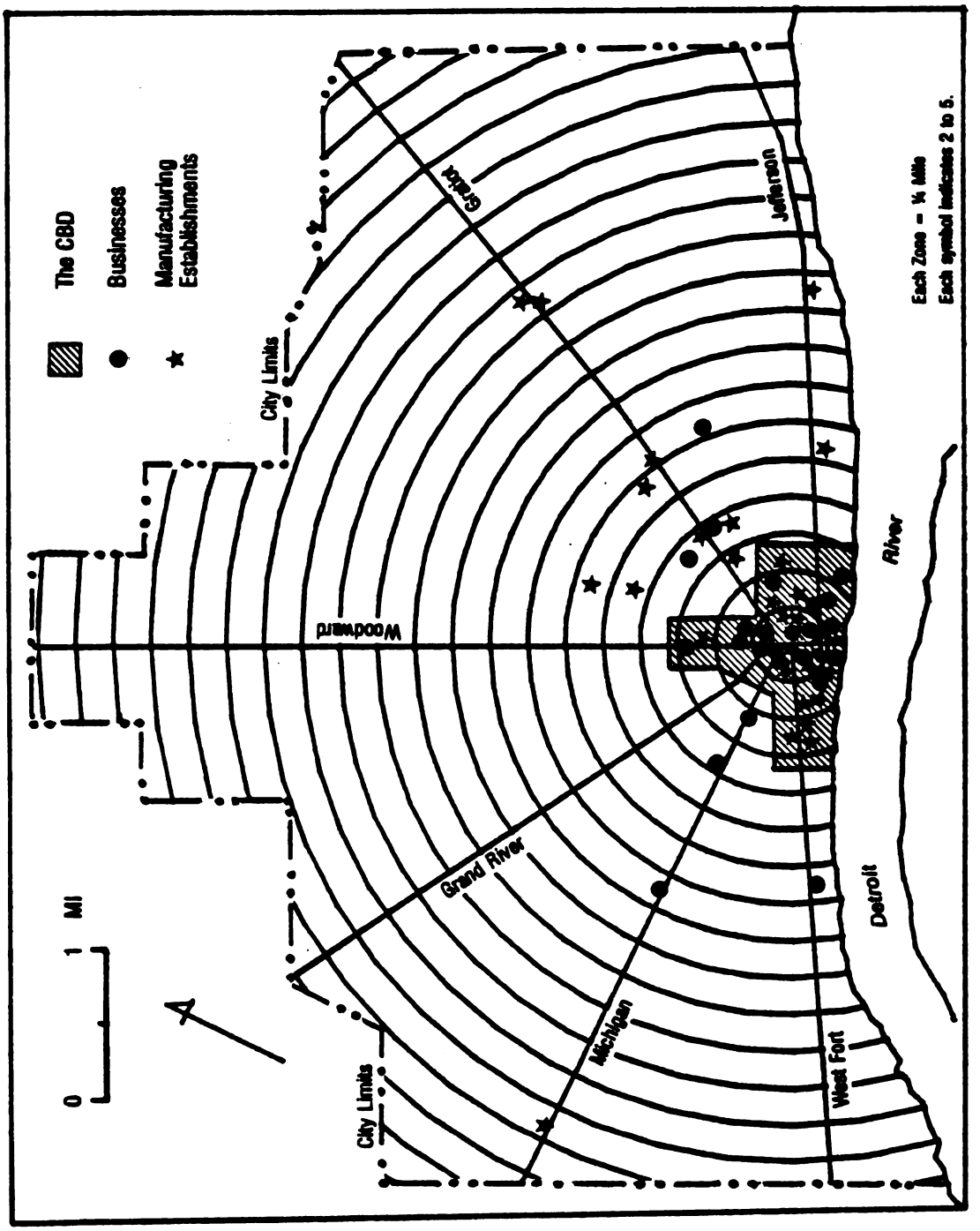
Map 19 The Residential Pattern by Ethnic Groups in Detroit, 1894

in Detroit in 1894. The residential clustering of the British was most frequent west of Woodward Avenue. They clustered especially in areas between Michigan Avenue and West Fort Street, and in the north and far northwest areas along Grand River Avenue and between Woodward and Grand River avenues. The Irish were scattered throughout the city, showing some residential clustering in the far northwest section between Grand River and Michigan avenues. The Germans clustered mostly east of Woodward Avenue, especially along Gratiot Street. They also showed some residential clustering in the western part of the city in 1894. This indicates that the Germans seemed to disperse throughout the residential area, because it was the first time for them to cluster in the western part of the city through time. In 1894 more residential clustering by ethnic groups existed than in 1874. Hence, the growth of the transportation network contributed to increase the residential clustering by ethnic groups in the residential area of Detroit in 1894.

The Business Area

In 1894 Detroit's economy was more dependent on manufacturing than commerce, and Detroit was an industrial city with diverse manufactures. Detroit's commerce also grew up continuously with the development of manufacturing. The economic growth influenced on the spatial distribution of business and manufacturing activities.

Map 20 reveals the spatial distribution of activities in business and manufacturing in Detroit in 1894. The business area dispersed throughout the city along the major roads. The central



Map 20 The Business Area in Detroit, 1894

business district was also enlarged outward, especially to the north along Woodward Avenue. Most business activities were concentrated on both sides of Woodward Avenue and along Michigan and Jefferson avenues within the CBD. Some other busienss activities were distributed over the city along the main roads outside the CBD. Most of them included retail businesses for the residents in that area, so they spread out with the expansion of the residential area. Manufacturing activities were scattered all over the city. In the CBD, they clustered along West Fort Street and the area between Gratiot Street and Jefferson Avenue. Outside the CBD, they were distributed along the major roads showing some clustered manufacturing places along Gratiot Street.

The spatial distribution of manufacturing and business areas in the CBD was changed in some aspects in 1894. In the past, more manufacturing activities were distributed on the east side of Woodward Avenue, especially on Jefferson Avenue, while more business activities were located on the west side of Woodward Avenue. On the map of 1894, business activities concentrated near Woodward Avenue and were fairly distributed on both sides of the avenue. Some manufacturing activities mingled together with business activities near Woodward Avenue in the CBD, while some manufacturing activities were newly clustered in the far western section inside the CBD. Consequently, more manufacturing activities were distributed west of Woodward Avenue than east of the avenue inside the CBD. In short, manufacturing areas dispersed over the city, while business areas concentrated in the area where the street car railway lines converged in 1894.

The dissimilarity index by manufacturing areas with business areas over zones in Detroit was 27.1 in 1894. The index was increased

by 4.8 between 1874 and 1894. The increasing index indicates that the segregation of manufacturing areas from business areas over zones was increasing. Thus the economic growth and the development of the transportation network influenced more segregation between manufacturing areas and business areas over zones in Detroit in 1894.

Summary

The transportation modes of Detroit, an industrial city, in 1894 were railroads, suburban railways and street car railways. The first gasoline auto was introduced, but was not used by the public. Horse-drawn and electric street car railways were the only internal public transportation means in Detroit in 1894. The total length of the street car lines had more than doubled between 1874 and 1894. The electric street car railway was welcomed by people as a faster and more efficient transportation mode, and was stimulating the enlargement of the residential area in Detroit.

The residential area of Detroit in 1894 was enlarged with the expansion of the area by additional annexations and with the growth of the transportation network. Most people were distributed within three and a half miles of the center of the city, living along major roads and street car railway lines. The central business district was separated from the residential area, indicating the segregation between working places and residences.

According to dissimilarity indices, the segregation of white-collar and semi-skilled or unskilled workers from the total population

over zones was decreased between 1874 and 1894, while the segregation of skilled workers from the total population over zones was increased during the same period. In 1894 the dissimilarity index for the British with the total population over zones was increased, the index for the German was decreased, and the index for the Irish remained the same, comparing with the indices in 1874. But most indices computed by comparing the differences of the residential distribution between the ethnic groups were increased. The dissimilarity index by manufacturing areas with business areas was increased between 1874 and 1894. Hence, the development of the transportation network contributed to increase the segregation of white-collar and semi-skilled or unskilled workers and to decrease the segregation of skilled workers, and did not much influence the segregation of ethnic groups, from the total population over zones. It also helped to increase the segregation between manufacturing and business areas in Detroit in 1894.

The residential clustering in the residential area of Detroit in 1894 was increased, both by occupations and by ethnic groups. In general, the residential pattern by occupations showed some mixing of three occupation groups, indicating some clustered residences by each occupation in certain regions. Each ethnic group spread out over the residential area of Detroit in 1894, showing regional segregation by each ethnic group. The residential pattern by ethnic groups in 1894 was more or less similar to the pattern in 1874; the only difference was the distribution of residential clustering by the German ethnic group in the western part of the city. Most business activities concentrated near the center of the city, where the street car railway lines converged, and some businesses were distributed near the CBD

along the main roads. Manufacturing activities dispersed throughout the city along the main roads. Thus with the development of the transportation network, manufacturing areas tended to disperse outward, while business areas tended to concentrate near the city's center in 1894.

CHAPTER VII

DETROIT 1895 TO 1900

The year 1900 was a turning point in Detroit's history. Detroit was the thirteenth most populous city in the United States, with a population of 285,704 in 1900. Its population had increased by 47,906, or 20.1%, from 1894. The number of increased population was much more than the entire number of residents in the city in 1854, although the percentage increase was relatively small. During the period 1895 to 1900, the transportation network developed rapidly. In 1895 all street car railways were pulled by electric power; new street car railway lines were built mostly in areas not formerly used for the purpose; and the suburban and newly established interurban railways stimulated the city's expansion. The economy of Detroit also developed remarkably during the same period.

By 1900 Detroit's commercial advantage and trade preeminence had long vanished. Some of the institutions of the earlier period were still present, however. Wholesale jobbers, dry goods sellers, commission agents and brokers continued to do important work and, along with real estate speculators and lumber barons, the descendants of this merchant aristocracy formed the city's social and economic elite. They shared this distinction with the nouveaux riches and rising manufacturers. Most of city's mayors up to 1900 were drawn from the old

merchant aristocracy.[62] The professional politician had not yet emerged in the nineteenth century.

Detroit in 1900 was the fifteenth city in manufacturing among American cities, with a total value of products of $88,649,635.[63] Approximately 54,000 workers, 18.9% of the total population, were employed in 1,259 manufacturing establishments. The ten leading industries in terms of the value of products in 1900 were foundry and machine shop, tobacco and cigar manufactures, patent medicines and compounds and druggists' preparations, slaughtering and meat packing, printing and publishing, iron and steel, steel works and rolling mills, liquors and malt manufactures, lumber and timber products, bread and other bakery products, and furniture and refrigerator manufactures. Besides these industries, stove making, railroad car building, shoe making, paint and varnish manufacturing and shipbuilding were also important industries in Detroit at that time. The value of products of foundry and machine manufacturing ($12,714,000) was almost double that of the second leading industry, tobacco and cigar manufacturing ($6,536,000), but it formed only 13.4% of the total value of products. Thus no single industry dominated Detroit's manufacturing or gave it a special character, and Detroit in 1900 was an established medium-sized manufacturing city with diverse manufactures.

One of the most significant events in the development of Detroit during this period was the establishment of the automobile

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[62] Holli, op. cit., pp. 117-18.

[63] Twelfth Census, Vol. Manufacturing, pp. ccxxvi-ccxxvii.; Thirteenth Centus, Vol. Supplement for Michigan, pp. 696-98.

industry. The introduction and the use of the automobile stimulated Detroit's development of a specialization. In 1892, before the introduction of the first gasoline auto to Detroit, Henry Ford, an engineer and machinist in the Detroit Edison Company, completed his first motor car.[64] His first sale of a motor car was made in 1896. In 1899, he was joined by others in organizing the Detroit Automobile Company, of which he was the chief engineer and a small stockholder, and which went out of business in late 1900.

Before the organization of the Detroit Automobile Company, the first automobile factory in Detroit, the Olds Motor Works, was established by Ransom E. Olds; S. L. Smith and H. Russel supplied most of the capital for the venture in 1899.[65] The Olds Motor Works was incorporated in a reorganization of the Olds Motor Vehicle Company and the Olds Gas Engine Works in Lansing. Olds moved the factory from Lansing to Detroit because he believed that Detroit offered more in the way of skilled labor and accessibility of materials. In fact, Detroit had many favorable conditions for the automobile industry: gas engines, carriages, buggies and wheels were produced from the middle of the nineteenth century; the city was the center of malleable iron manufactures, and had manufactories of copper and brass; fine color works were available for painting cars; there were many skilled workers in various manufactures; the city was a good distributing point for the whole central, southern, and western trade; and there was abundant capital to

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[64]Burton and Burton, op. cit., Vol. V., p. 465.

[65]John B. Rae, The American Automobile: A Brief History (Chicago: University of Chicago Press, 1965), p. 23.

invest in the automobile industry.[66] The Olds Motor Works manufactured 400 automobile in 1900.[67] The success of this factory brought immediate fame to Detroit, and gave the city a flying start toward the goal of being the foremost automobile manufacturing city in the world.

The development of the industry had an effect on the increasing population in 1900 and on the changes of the spatial distribution of people and business and manufacturing in Detroit. In 1900 many skilled workers, including wagon makers and blacksmiths, came to Detroit from other places inside Michigan to find jobs in the automobile factories. The central business district was enlarged outward, and Woodward and Jefferson avenues were still important business streets. Most business activities were distributed in the CBD, especially the area where street car railway lines converged and where skyscrapers of the city were located. A few business activities, which were mostly retail activities, were scattered in the residential area. Most manufacturing activities were dispersed over the city at greater distances from the city's center without any particular manufacturing clusters. Some manufacturing activities, including wholesale activities like boot and shoe manufactures, were still located in the CBD.

Land prices in the CBD became higher and higher through time; more skyscrapers were built near the center of the city. Business activities were concentrated near the city's center, while the residential area moved outward. The expansion of the transportation

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[66]Clarence Monroe Burton, ed., The City of Detroit, Michigan, 1701-1922, Vol. I (Detroit: S. J. Clarke Publishing Co., 1922), pp. 566-69.

[67]Ibid., p. 564.

network encouraged people to live at considerable distances from the center of the city, and even at the outskirts of the city. Generally wealthy people moved outward first, but their houses were located not very far from the CBD. Their residences were directly connected with the very edge of the business area; some of the most expensive homes in Detroit were located within two miles from the center of the city at that time.[68] In fact, some white-collar workers, who had telephones, including physicians, lawyers, dentists, and bankers, lived near the CBD. Thus, in Detroit a classical pre-industrial living pattern persisted in which the upper classes remained at and near the center and core of the city and continued to do so until right after the turn of the century.

The Transportation System

During this period, the transportation modes of Detroit were the railroads, interurban railways, suburban railways, and street car railways. The railroad, operated by the steam engine, was an important external transportation mode connecting Detroit with its markets throughout the country. The interurban and suburban railways pulled by electric power were also external public transportation modes. The interurban railway connected Detroit with other cities near Detroit, and competed with the railroad in carrying people. The suburban street car railway was also an important public transportation mode

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[68]Glazer (1965), op. cit., p. 77.

linking the city to its suburbs. The street car railway was the only internal public transportation mode in Detroit at that time. The auto had been introduced to Detroit, but there were few autos in the city and these were used only by a few people for private purposes.

The interurban line was built by the Rapid Railway Company to connect with Mt. Clemens in 1895; it was the first interurban line in Detroit.[69] By 1900, Detroit boasted more extensive interurban mileage than any other city in the United States. There were six lines reaching out in all directions, varing in length from 20 to 75 miles. The fares of the interurban railways averaged a penny a mile, and its speeds were 40 to 50 miles per hour and often faster. The tracks ran besides roads, often cutting across to the opposite side, then back again. The intervals between cars in each line were 30 minutes, and rarely over an hour. The interurban railway was a much more efficient and convenient means for traveling around the Detroit area than the railroads at that time. Thus more people used the interurban railways than railroads to and from the places where the interurban lines were operating. For example, the Detroit, Ypsilanti and Ann Arbor Railway was carrying an average of 4,000 passengers per day, while the competing steam railroad carried barely 200, in 1899.[70] On December 31, 1900, all interurban lines in Detroit were consolidated into a single giant corporation, the Detroit United Railway.

Between 1895 and 1900, the suburban street car railways in

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[69] Electric Railway of Detroit, p. II-2.; Henning, op. cit., p. 23.

[70] Ibid.

Detroit were operated by the Detroit Suburban Railway and the Detroit, Utica and Romeo Railway Company.[71] The Detroit Suburban Railway electrified the suburban railway lines in 1895, and operated until December 31, 1900 when the company was merged in the Detroit United Railway. The Detroit, Utica and Romeo Railway was incorporated in 1898 because people needed street car service in the northern part outside of the city. The suburban line operated by this company connected Detroit with Utica and Romeo, thirty miles north of the city, and stimulated the development of new territory.

The suburban railway became a more important transportation mode in Detroit, as the residential areas became larger and even expanded into the suburbs of the city. The use of the suburban railways increased rapidly during this period, because this was the most efficient transportation mode connecting Detroit with its suburbs. Consequently, the length of the suburban lines in 1900 was 297 miles, and more than half of them were built during the last year of the nineteenth century.[72]

The street car railways, as the only internal public transportation mode in Detroit, developed continuously. All street car railways were electrified in 1895, and the Detroit Railway established many new lines. Hence, the street car railway lines were distributed all over the city, concentrating in the lower central part of Detroit (see Map 21). The total length of the lines was almost tripled, to

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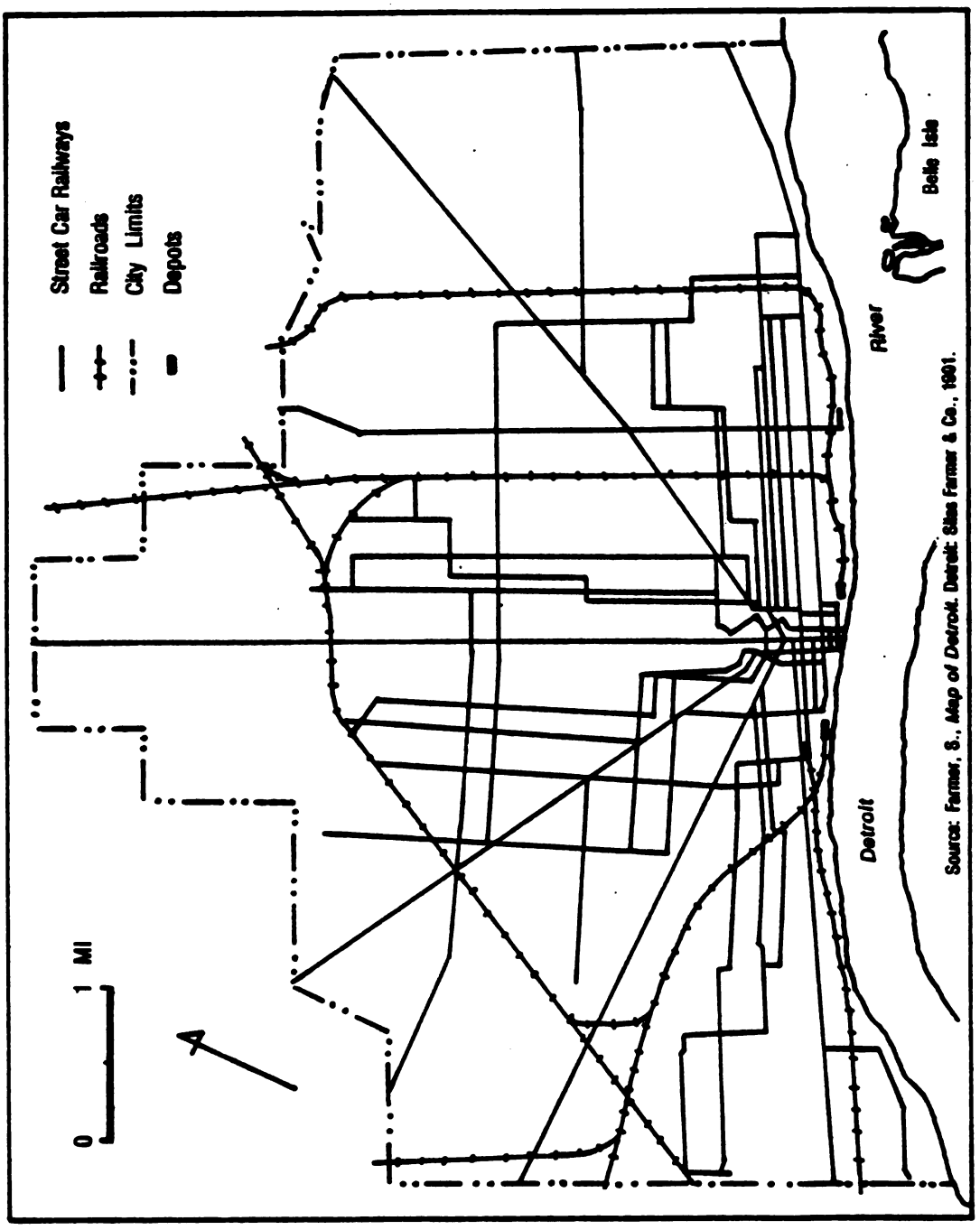
[71] Schramm and Henning, op. cit., pp. 69-70.

[72] Detroit City Directory for the Year Commencing August 15th 1900 (Detroit: R. L. Polk & Co., 1900), p. 11.



Map 21 The Transportation Network in Detroit, 1900

185 miles of double track, in 1900.[73] The three cent fare remained common during the period 1895 to 1900.

During this period, the number of operating companies was reduced to two and then increased to three with several name changes. The Detroit Railway was under the control of the Detroit Citizens' Street Railway in 1896, and changed its name to the Detroit Electric Railway.[74] The Fort Wayne and Belle Isle Railway was renamed the Detroit, Fort Wayne and Belle Isle Railway in 1898, with the change in its management to the Citizens Company.[75] Therefore, one company controlled all street car railways in Detroit under three different company names. These were the Detroit Citizens' Street Railway, the Detroit Electric Railway, and the Detroit, Fort Wayne and Belle Isle Railway.

With the lines under a single control, the management of the Detroit Citizens' Street Railway next set out to make improvements in the system.[76] A number of re-routings were made to eliminate overlapping or competing routes. A great deal of unneeded trackage in the downtown area was removed (see Maps 17 and 21). The fares were six tickets for twenty-five cents, except on the three cent lines built by the Detroit Railway in 1895. And there were special car services--an official car and a funeral car. An official car service was outfitted for use by railway officials when on inspection or other

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[73] Ibid.

[74] Schramm and Henning, op. cit., pp. 56-59.

[75] Ibid., p. 59.

[76] Ibid.

official trips. A funeral car service was used to transport people and the casket to the cemeteries. The car was rebuilt with upholstering throughout, a special compartment for the coffin and seating for thirty persons.

The municipal ownership of the street car railways was still advocated by Governor Pingree. He tried to secure the municipal ownership of all railways for the benefit of the people rather than for the benefit of a private company. The McLeod Act was passed to give the right to Detroit to own and operate its own street railway system. But this act was declared unconstitutional by the Supreme Court of Michigan, based upon the fact that the city did not have the power to acquire the street railways under the state constitution. Pingree kept trying to achieve the municipal ownership through the Detroit Common Council. However, the continuous efforts by Pingree to secure a city owned street car railway system was ended with the letter from the Citizens Company about terminating negotiations. Rather it was announced that all of the street car railway systems in Detroit area had been consolidated into a new system to be known as the Detroit United Railway on December 30, 1900.[77] All franchises of the Detroit Electric Railway, the Detroit, Fort Wayne and Belle Isle Railway, the Detroit Citizens' Street Railway, and all remaining trackage of the Detroit Suburban Railway were transferred to the new company, which was the final private company in Detroit.

In short, there was remarkable development in the transportation network in Detroit during the period 1895-1900. The interurban

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[77]Ibid., p. 69.

railway connecting Detroit with other cities started to operate as a faster, more convenient transportation link than the steam railroad. The suburban railway played an important role in the development of the city. The extension of the suburban railway lines stimulated the development of the suburban area of Detroit. And the street car railway lines within the city were enlarged tremendously, covering most of the city.

CHAPTER VIII

SUMMARY AND CONCLUSIONS

Detroit, the capital of the Territory of Michigan, was a relatively small city in population and size in 1805. It was a commercial and an administrative center in the Great Lakes area. In 1837, when Detroit became the capital of the State of Michigan, its economic base was more developed and was highly commercial. By 1900, Detroit was ranked as the thirteenth city in the United States in size with a population of 285,704 and an area of 28.35 square miles. It was also the fifteenth city in terms of the value of products, and had become a diversified industrial city. These changes in Detroit were accomplished as a consequence, in part, of the development of the transportation network.

In 1805 there was no public transportation, either external or internal, in Detroit. External public transportation modes, including stage coaches, railroads, suburban railways and interurban railways, developed in the nineteenth century and helped to stimulate the growth of transport in Detroit. The stage coach connected Detroit with other places inside and outside Michigan in the early period, and then was used widely by people until the advent of the railroads. The steam railroad was faster, more convenient, and carried a large amount of freight and many people, linking Detroit to Chicago and the East.

This contributed to the development of Detroit's economy by enlarging its hinterland and transporting flour and other merchandise from and to other places.

In the late nineteenth century, the suburban and interurban railways linked Detroit to its suburbs and to other cities. These railways stimulated the expansion of the city and the enlargement of the residential area. At first, the suburban railway was pulled by horses and electric power, and then was completely electrified. The interurban railway started to operate just before the turn of the century, and competed with railroads for carrying people.

The internal public transportation modes in Detroit were omnibuses and street car railways. The omnibus started to operate in 1847, and was the only transportation mode of the city for a while. Its main purpose was to transport people to and from railroad depots and steamboat docks to hotels and private residences. The omnibus, although welcomed by people when it began operation, did not solve the transportation problems of the city. It was too small to carry many people at once, its fare was relatively expansive, and it did not run on a regular schedule. As a result, the use of horse-drawn omnibuses diminished with the operation of the street car railways, and finally the omnibuses disappeared altogether in Detroit.

The horse-drawn street car railway began operations in 1863. The main purpose of the street car railway was carrying people to and from working places to residential places. The street car railways ran on regular schedules. With the change in power to electricity, the street car railway became the main internal transportation mode in Detroit. The street car railway lines went in all directions from the

center of the city; there were a few cross-town lines in the upper part of the city in 1895. The growth of the street car railways stimulated the expansion of the residential area in Detroit in the late nineteenth century.

Dissimilarity indices by occupations over zones in Detroit changed over time (see Table 19). Indices of dissimilarity for white-collar workers with the total population increased sharply from 1837 to 1854, and then decreased. In the case of skilled workers, indices decreased from 1837 to 1874, and then increased in 1894. Dissimilarity indices by semi-skilled or unskilled workers versus all Detroiters increased slightly from 1837 to 1854, continued to increase till 1874, and decreased in 1894.

Table 20 shows the changes of dissimilarity indices by ethnic groups over zones in Detroit through time. Indices by all three ethnic groups increased from 1837 to 1854. Between 1854 and 1874, indices by the British and Germans versus all Detroiters decreased dramatically while the dissimilarity index for the Irish increased. During the period 1874 to 1894, the index of dissimilarity for the British

Table 19 Dissimilarity Indices: One Occupation vs. All Occupations over Zones through Time

	1837	1854	1874	1894
White-collar	12.1	28.0	25.5	20.1
Skilled	20.9	14.3	10.8	13.2
Semi-skilled or Unskilled	18.1	18.7	23.7	19.1

Table 20 Dissimilarity Indices: One Ethnic Group vs. All Ethnic Groups over Zones through Time

	1837	1854	1874	1894
British	7.9	18.8	10.4	13.8
Irish	8.6	13.3	15.7	15.7
German	23.2	28.1	14.3	13.2

increased, the index for the Irish remained the same, and for the Germans it decreased.

The changes of dissimilarity indices indicating the segregation between manufacturing and business areas over time are shown on Table 21. Based on the table, the dissimilarity index for manufacturing areas versus business areas was changed differently in each time period. From 1837 to 1854, the index was more than tripled. But it was decreased to almost half of the former between 1854 and 1874. The index in 1874-1894 increased again, but showed much less changes.

According to the dissimilarity indices, therefore, each time period revealed different changes in the segregation by occupations, ethnic groups, and businesses over zones. In the period 1837 to 1854, when the first internal public transportation mode, the omnibus,

Table 21 Dissimilarity Indices: Manufacturing Areas vs. Business Areas over Zones through Time

	1837	1854	1874	1894
M vs B	14.6	45.6	22.3	27.1

began operations, the segregation of the three ethnic groups from the total population and of manufacturing areas from business areas was increased. In the case of occupation groups, the segregation of white-collar and semi-skilled or unskilled workers from the total population was increased, but the segregation of skilled workers was reduced. During next twenty years 1854-1874, when two internal transportation modes, the omnibus and the street car railway, were operating, the segregation of ethnic groups and occupation groups from all Detroiters and between manufacturing and business areas was generally decreased. Only two cases, the segregation of semi-skilled or unskilled workers and of the Irish from the total population, were increased. The last period of this study between 1874 and 1894, when horse-drawn and electric street car railways were the only internal public transportation mode, showed diverse changes in segregation of people and businesses. Among the three occupation groups, the segregation of white-collar and semi-skilled or unskilled workers from all workers was decreased while the segregation of skilled workers was increased. In the case of the three ethnic groups, the British were more segregated and the Germans were less segregated, from the total population, while the Irish ethnic groups showed the same degree of segregation from all Detroiters. The segregation between manufacturing and business areas was increased during this period.

According to the reconstruction maps, the spatial distribution of people and businesses in Detroit also changed during the study period. The residential area was enlarged with the growth of the transportation network. In 1837 there was no distinctive residential clustering or regional segregation by occupations and ethnic groups.

Only few residential clusters by white-collar and skilled workers were distributed in the southern part of the city, especially along or south of Jefferson Avenue.

Since 1854, white-collar workers tended to spread over the city, but most of them lived west and north of the CBD, showing some residential clustering. Skilled and semi-skilled or unskilled workers tended to scatter throughout the city, indicating more skilled workers clustering residentially in the eastern part and some residential clustering by semi-skilled or unskilled workers in far northwestern and northeastern parts of the city. The residential clustering by ethnic groups in the residential area did not increase obviously, but regional segregation by ethnic groups was existent in Detroit. Through time, most of the British and Irish scattered throughout the residential area, showing some residential clustering in the western part of the city. The German ethnic group lived mostly in the eastern part of the city with residential clustering; in 1894 a few German residential clusters first appeared in the western part of the city. The central business district was enlarged north along Woodward Avenue and west along West Fort Street; the main business streets were Woodward and Jefferson avenues through time. Manufacturing activities spread out along major roads; some remained in the CBD, showing regional segregation from business areas. Most business activities remained in the CBD, where the street car railway lines converged; some were located in the residential area near the CBD.

In this research, discrepancies were found between reconstruction maps and dissimilarity indices for the different spatial patterns by occupations, ethnic groups and businesses. Maps gave additional

information not available from the use of dissimilarity indices. For example, dissimilarity indices demonstrated that the segregation of white-collar workers from the total population increased remarkably from 1837 to 1854, then decreased continuously over zones. However, maps of the residential pattern by occupations for four different years showed decreasing residential clustering by white-collar workers between 1837 and 1854, but a continuous increase of residential clusters after 1854. Maps also revealed that white-collar workers concentrated near Jefferson Avenue in 1837, scattered over the residential area in 1854, and continued to scatter throughout the city in 1874 and 1894 showing the concentration of residential clusters near the CBD in the western and northern parts of Detroit.

In the case of the German ethnic group, their segregation from all Detroiters increased between 1837 and 1854, then decreased continuously after 1854, based on the dissimilarity indices. Maps, however, showed a continuous increase of residential clustering by the Germans and obvious regional segregation through time. All Germans lived in the eastern part of the city until 1874, showing the trends that their main residential areas moved from near Jefferson Avenue to the north, near Gratiot Street. In 1894, some Germans lived in the western part of Detroit, while most of them were distributed in the eastern part, especially along or near Gratiot Street.

A final example concerns businesses. The segregation of manufacturing areas from business areas increased dramatically from 1837 to 1854, reduced greatly between 1854 and 1874, and increased again from 1874 to 1894, according to the dissimilarity indices. But maps revealed increasing regional segregation of manufacturing areas from

business areas through time. Business activities concentrated along Jefferson and Woodward avenues around the center of the city, i.e., the CBD, while manufacturing establishments were diapersed along the major roads of Detroit.

The reason why those different patterns between maps and dissimilarity indices exist is that residential clustering within a zone could increase without influencing the dissimilarity indices, and that the indices do not reveal anything about intrazone distribution. In other words, the dissimilarity indices only indicate how many people of a certain group or manufacturing establishments were distributed in each zone versus how many people or business activities were distributed in the same zone, without considering where they were distributed within a zone.

Conclusions

The research conclusions were made by examining the proposed hypotheses, based on the result of the research. The hypotheses and the results were the following:

1) The extension of the transportation network increased the segregation of the residential areas by occupation.

   To accept the hypothesis, the dissimilarity index should increase continuously over time. But none of the three occupation groups showed the continuous increase of indices from 1837 to 1894. Indices of dissimilarity for white-collar workers increased between 1837 and 1854, then decreased continuously.

For skilled workers indices decreased continuously until 1874, then increased. Indices for semi-skilled or unskilled workers increased from 1837 to 1874, then decreased. Thus this hypothesis was rejected.

2) The extension of the transportation network increased the segregation of the residential areas by ethnic groups.

Each ethnic group showed different changing patterns of dissimilarity indices over time. Indices for the British were so changeable, i.e., indices increased in 1837-1854, decreased in 1854-1874, and increased again in 1874-1894. Dissimilarity indices for the Irish increased continuously until 1874, then remained the same. For the German ethnic group, indices increased between 1837 and 1854, then decreased continuously. Hence, the hypothesis should be rejected.

3) Manufacturing areas dispersed with the growth of the transportation network; business areas became larger and tended to concentrate in the central part of the city, where the internal transportation network converged.

This hypothesis was examined by maps and dissimilarity indices. Even though indices decreased once between 1854 and 1874 when the use of omnibuses was reduced and street car railways started to be used, dissimilarity indices by manufacturing areas versus business areas increased in each period when the time period was divided, based upon the changes of the transportation network, into the omnibus era (1837-1854) and the street car railway era (1874-1894). The reconstruction maps of the business area for four study years proved this hypothesis very clearly. As a result, the hypothesis was accepted.

In short, the main conclusion of the research was that the extension

of the transportation network did not increase the segregation of the residential areas by occupations and ethnic groups over zones, according to data analyzed by dissimilarity indices. However, the extension of the transportation network was a factor in the changing spatial distribution of Detroit's population and business and manufacturing activities, because the reconstruction maps of the resdiential areas by occupations and ethnic groups for four time periods showed increasing residential clusters and regional segregation by occupations and ethnic groups with the development of the transportation network, and because manufacturing areas dispersed over the city along major roads and street car railway lines while business areas mostly concentrated in the CBD where the street car railway lines converged.

Future Research

To determine the impact of the transportation network on the changes in the spatial distribution of Detroit's population and businesses through time, researches using different methods are recommended. First is the extension of the study period. Detroit itself changed and developed dramatically right after 1900 with the development of the automobile industry. A new public transportation mode was introduced, a single industry became dominant in manufacturing, the population of the city increased rapidly with immigration, and its area was enlarged by additional annexations. Thus the trends of the influence of the transportation network on the changes of the three different spatial patterns would be determined more clearly

with the extension of the study period.

In this study, the years chosen for the reconstruction of the transportation network and the three different spatial patterns were roughly twenty-year intervals. If the time intervals were reduced such as ten-year or five-year intervals, the trends of changing residential patterns and the impact of the transportation network on them would be traced much more easily and obviously. Hence, the research with shorter time intervals for the reconstruction is suggested for another possible study in the future.

Using the sampling technique might lead to error from the original residential patterns by occupations and by ethnic groups and the pattern of manufacturing and business areas. Thus the research using all residents and business addresses listed in city directories of Detroit at each study date for the reconstruction of the transportation network and the three different spatial patterns would more fully represent the influence of the transportation network on the three different spatial patterns.

The influence of the transportation network on the three different spatial patterns might be represented differently when the zones for measuring the dissimilarity index are chosen in different ways. For example, administrative districts (wards) or election districts in Detroit might be used as subunits, or the city might be divided into two--east of Woodward Avenue and west of the avenue, each of which might be a zone. There are some evidences of the regional segregation by occupations and by ethnic groups which was revealed on the reconstructed maps of the three different spatial patterns in this research. Therefore, different subunits to compute the dissimilarity

index by occupations, ethnic groups, and manufacturing and business areas are suggested for use in further research.

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