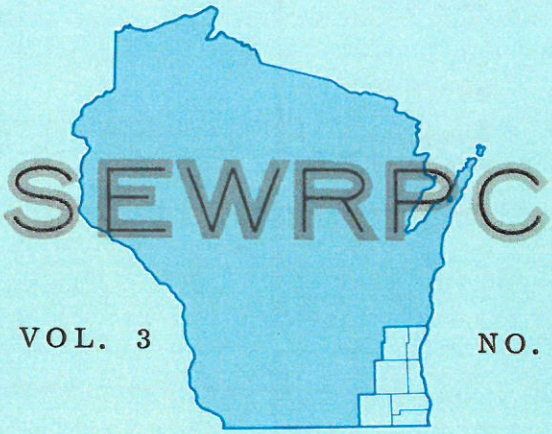
TECHNICAL RECORD



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* * * * * IN THIS ISSUE * * * * *

* * * CHARACTERISTICS OF TRAVEL IN THE MILWAUKEE CENTRAL BUSINESS DISTRICT * *

* COMPUTING THE CENTER OF POPULATION AND THE GEOGRAPHIC CENTER * * * * * * *

* * * * A BACKWARD GLANCE—DOWNTOWN YESTERDAYS * * * * * * * * * * *

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THE TECHNICAL RECORD

Volume three Number two

1969

TABLE OF CONTENTS

CHARACTERISTICS OF TRAVEL IN THE MILWAUKEE CENTRAL BUSINESS DISTRICT 1
by Sheldon W. Sullivan, Administrative Officer

COMPUTING THE CENTER OF POPULATION AND THE GEOGRAPHIC CENTER 29
by Wayne H. Faust, Associate Planner

A BACKWARD GLANCE DOWNTOWN YESTERDAYS 37
by Gerald P. Caffrey, Milwaukee Municipal Reference Librarian

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CHARACTERISTICS OF TRAVEL IN THE MILWAUKEE CENTRAL BUSINESS DISTRICT

by Sheldon W. Sullivan, Administrative Officer

INTRODUCTION

The central business district of the City of Milwaukee, in common with similar districts in most cities throughout the country, is the commercial heart of the Region in which it is located. It is in this most highly developed, yet relatively small, land area of approximately 1.25 square miles[1] that many important activities within, and many important decisions affecting, the Region take place. Located here is the Region's largest concentration of multi-storied office buildings containing many hundreds of firms and agencies, which employ collectively many thousands of persons in financial, legal, medical, engineering, communication, and other commercial, industrial, and governmental operations. Located here, too, are the Region's largest department stores and hotels and some of the Region's finest specialty shops and restaurants.

This busy, complex area, however, is far more than a mere commercial center; for in addition to the multitude of offices and stores, it contains such cultural institutions as an art center; two public museums; a large central library; a public auditorium; and a legitimate theater, which also serves as the home of one of the nation's finest symphony orchestras. Located here also are such educational institutions as two major technical schools and a score or more of specialty training schools, as well as an entertainment center containing the Region's largest motion picture theaters, numerous supper clubs and cafes, and the Region's largest indoor sports arena. This area serves also as the principal terminus within the Region for two intercity railway passenger lines and as the principal focal point for inter-regional and intra-regional motor coach lines. It also contains some of the largest concentrations of automobile parking facilities within the Region.

With such diversities in the uses of the land and in the activities associated with these land uses, the designation "Central Business District," if not a misnomer, is surely a mean description of this intensively used, heterogeneous area. Throughout the remainder of this article, then, this area will be referred to as the "Metrocenter" in the sense that it is the center, or major seat of activity, of a large metropolitan Region.

The data upon which this article is based were obtained in various origin-destination studies conducted by the Southeastern Wisconsin Regional Planning Commission as a part of a regional land use-transportation study initiated in 1963 and completed in 1966. Because the number of external person trips, that is, trips which either began or ended at a point outside the seven-county Region, amounted to less than 3,000 trips per average weekday, or only about 1 percent of total Metrocenter travel, and because data obtained in the surveys for such trips are not entirely compatible with data obtained for internal person trips (those which both began and ended within the Region), only the latter trips will be discussed in this article.

TOTAL TRIPMAKING IN THE METROCENTER

Since the amount of tripmaking generated by a given area is largely determined by the amount, kind, and intensity of land development in that area, it is not unusual that the amount of tripmaking generated by the Metrocenter far exceeds that generated by any other area of comparable size within the Region. On an

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[1] *The area covered by the business district of the City of Milwaukee (1960 population of urbanized area 1,150,000) is relatively large when compared to that of other cities of the United States. The central business district of the City of Pittsburgh (1960 population of urbanized area 1,800,000) covers an area of only 0.7 square mile; the "Loop" of the City of Chicago (1960 population of urbanized area 5,960,000), an area of 1.0 square mile.*

average weekday in 1963, there were approximately 284,000 person trips entering, leaving, or made entirely within the Metrocenter. Of these approximately 134,000 entered the area; and 134,000 left the area, while the remaining, approximately 16,000 trips, were made within the Metrocenter. It is the purpose of this article to examine the characteristics of these trips and of the people who made them.

Mode of Travel

Of the total of approximately 268,000 person trips which were found to enter and leave the Metrocenter on an average weekday, approximately 132,000, or nearly one-half were auto-driver trips; approximately 90,000, or about 33 percent, were motor bus trips; approximately 44,000, or about 16 percent, were auto-passenger trips, while the remaining approximately 2,000, or less than 1 percent, were taxi, school bus, railway, or truck passenger trips in that order of importance. Of the approximately 16,000 daily person trips made entirely within the Metrocenter, nearly 8,100, or about 51 percent, were auto-driver trips; nearly 6,200, about 39 percent, were motor bus trips; approximately 1,400, or about 9 percent, were auto-passenger trips; while the remaining approximately 200, or a little more than 1 percent, were taxi passenger trips (see Table 1).

The total of more than 96,000 daily motor bus trips, although representing a minority of total daily Metrocenter-oriented person trips, was and is, nevertheless, of crucial importance to the maintenance of a viable mass transit system within the most highly urbanized area of the Region, accounting for approximately 30 percent of the total mass transit trips made daily within the entire seven-county Region.

Mass Transit Trips, Choice and Captive

It was possible to determine from the survey data, in approximately 49,000 of the nearly 52,000 total daily mass transit trips made to the Metrocenter, whether or not the mass transit passengers could have driven to the Metrocenter by automobile on those particular trips had they chosen to do so. The findings were significant. Of the approximately 49,000 transit trips, more than 42,000 transit passengers, or nearly 86 percent, had no such choice. Nearly 33,000 persons either did not have a license to drive or lived in households not owning automobiles, and more than 9,000 persons who did have driver's licenses and lived in auto-owning households did not have automobiles available to them at the times the trips were made. Less than 7,000 of the transit passengers, therefore, or less than 14 percent, really had a choice concerning the mode of transportation to be used.

As shown in Table 2, mass transit passengers who did have a choice of mode were substantial in numbers only in trips for work purposes (22 percent). In other trips such choice transit passengers engaged in

TABLE 1
PERSON TRIPS ENTERING, LEAVING, AND WITHIN THE METROCENTER
ON AN AVERAGE WEEKDAY BY MODE OF TRAVEL: 1963

Trip Classification	Mode Of Travel														Total	
	Auto Driver	Percent Of Total Trips	Auto Passenger	Percent Of Total Trips	Railroad	Percent Of Total Trips	Motor Bus	Percent Of Total Trips	School Bus	Percent Of Total Trips	Taxi Passenger	Percent Of Total Trips	Truck Passenger	Percent Of Total Trips	Person Trips	Percent
Entering	66,145	49.3	22,059	16.4	145	0.1	45,251	33.7	203	0.2	427	0.3	26	--[a]	134,256	100.0
Leaving	65,707	49.2	21,389	16.0	215	0.2	45,192	33.9	207	0.2	659	0.5	26	--[a]	133,395	100.0
Within	8,094	51.0	1,395	8.8	--	--	6,156	38.8	--	--	221	1.4	--	--[a]	15,866	100.0
Total	139,946	49.4	44,843	15.8	360	0.1	96,599	34.1	410	0.1	1,307	0.5	52	--[a]	283,517	100.0

[a] *Less than 0.1 percent.*

Source: SEWRPC.

travel for personal business or social-recreational purposes amounted to only 6 percent each; for school trips, 5 percent; shopping trips, 4 percent; and home trips, 7 percent. It should be explained that a choice mass transit passenger entering the Metrocenter was considered to remain as such in subsequent mass transit trips until the tripmaker returned to the location where the choice was originally made.

Trip Purpose to the Metrocenter

The importance of the Metrocenter as a place of work within the Region is clearly attested by the more than 75,000 trips to work occurring daily within this area. In 1963 these work trips comprised approxi-

TABLE 2

CHOICE AND CAPTIVE MASS TRANSIT TRIPS TO THE METROCENTER
ON AN AVERAGE WEEKDAY BY TRIP PURPOSE: 1963

Trip Status	Trip Purpose												Total	
	Work		Personal Business		School		Social-Recreation		Shopping		Home		Transit Trips	Percent
	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent		
Choice	5,456	22.0	414	6.0	112	5.0	190	6.0	306	4.0	230	7.0	6,708	14.0
Captive	19,639	78.0	6,099	94.0	2,306	95.0	2,784	94.0	8,426	96.0	3,106	93.0	42,360	86.0
Total	25,095	100.0	6,513	100.0	2,418	100.0	2,974	100.0	8,732	100.0	3,336	100.0	49,068	100.0

Source: SEWRPC.

mately one-half of the total daily trips to the Metrocenter and more than 10 percent of all work trips made within the Region on an average weekday. Trips for personal business reasons, next in importance in trips to the Metrocenter, amounted to nearly 32,000, or about 21 percent of the total daily trips. Included in this category, in addition to more than 10,000 trips to serve passengers and over 4,000 trips for medical and dental services, were trips for legal, financial, and other professional services. Of the remaining categories, there were more than 16,000 shopping trips, or about 11 percent; 14,000 social-recreational trips, or about 10 percent; nearly 7,000 trips by residents returning to their homes in the Metrocenter, and over 5,000 school trips, each less than 5 percent of the total trips made to the Metrocenter on an average weekday (see Table 3).

TABLE 3

PERSON TRIP DESTINATIONS IN THE METROCENTER
ON AN AVERAGE WEEKDAY BY TRIP PURPOSE AND MODE OF TRAVEL: 1963

Mode Of Travel	Trip Purpose												Total	
	Work	Percent Of Total Trips	Personal Business	Percent Of Total Trips	School	Percent Of Total Trips	Social-Recreation	Percent Of Total Trips	Shopping	Percent Of Total Trips	Home	Percent Of Total Trips	Trips	Percent
Auto Driver	39,374	53.0	19,530	26.3	2,010	2.7	6,801	9.2	4,692	6.3	1,832	2.5	74,239	100.0
Auto Passenger	28,559	37.2	5,627	23.3	586	2.4	4,536	18.8	2,924	12.1	1,496	6.2	24,128	100.0
Mass Transit	26,897	52.0	6,773	13.1	2,793	5.4	3,028	5.8	8,856	17.1	3,408	6.6	51,755	100.0
Total All Modes	75,230	50.1	31,930	21.3	5,389	3.6	14,365	9.6	16,472	10.9	6,736	4.5	150,122	100.0

Source: SEWRPC.

Trip Purpose by Mode of Travel

Trips to work, trips for social-recreational purposes, and trips for personal business reasons in the Metrocenter were much more likely to be made by automobile than by motor bus; but trips to shop, trips to school, and trips to home within this area were more apt, although barely so, to be made by motor bus. Table 3 also indicates that automobile trips (auto drivers and auto passengers) accounted for nearly four-fifths of the total trips for personal business and for social-recreational trips and nearly two-thirds of total work trips, while motor bus trips accounted for just slightly more than one-half of the total trips each to shop, school, and to home.

Trip Purpose by Auto Occupancy

The average number of persons per auto entering the Metrocenter on an average 1963 weekday was 1.33 persons. By trip-purpose categories, the auto occupancy rates in ascending order were: in trips to work, 1.22 persons; in trips for personal business reasons and in trips to school, 1.29 persons each; in trips for social-recreational purposes, 1.50 persons; in trips for shopping, 1.62 persons; and in trips to home by residents of the Metrocenter, 1.81 persons.

Land Use

Of the total 797 acres of land and water which make up the Metrocenter, land devoted to all transportation, communication, and public utility uses together totaled approximately 446 acres, or nearly 56 percent. Of this total, approximately 280 acres were devoted to street and highway rights-of-way and 109 acres

to off-street parking. In other land use categories, land devoted to retail and service uses amounted to 99 acres, or about 12 percent; open land and water areas totaled 57 acres, or a little over 7 percent; institutional and governmental uses and wholesale and storage uses each amounted to about 53 acres, or nearly 7 percent each; manufacturing uses totaled 33 acres, or about 4 percent; and recreational areas amounted to about 17 acres, or about 2 percent (see Table 4).

Nearly 82,000 daily person trips, or almost 55 percent of the total daily person trips to the Metrocenter, were attracted to retail and service land uses, reflecting to a large extent the many commercial offices and large and small retail establishments in the area. Governmental and institutional land uses, including, among others, city, county, state, and federal governmental offices and such other institutions as the central library, the public auditorium, the public museums, and the public and private schools, drew more than 34,000 trips, or about 23 percent, into the area. The scattered manufacturing establishments in the Metrocenter, most of them occupying relatively small quarters, attracted approximately 15,000 person trips, or about 10 percent, into the Metrocenter. Of the remaining land use categories, transportation, communication, and utility land uses, which, among others, include railroad, motor bus, and taxicab terminals and facilities and telegraph, telephone, electric power, gas supply, and water supply facilities, but not offices, drew more than 8,500 person trips, or about 6 percent; residential land drew nearly 8,000, or about 5 percent; and wholesale and storage uses attracted about 2,000, or less than 2 percent.

Table 4

TRIP DESTINATIONS PER ACRE IN THE METROCENTER ON AN AVERAGE WEEKDAY BY LAND USE CATEGORY: 1963

Land Use	Number Of Trip Destinations	Percent	Area In Acres	Percent	Number Of Trips Per Acre
Retail and Service	81,754	54.4	99.1	12.4	824.9
Governmental-Institutional	34,206	22.8	53.4	6.7	640.5
Manufacturing	15,122	10.1	33.0	4.2	458.2
Transportation, Communication and Utilities, Excluding Street and Highway Rights-of-Way, Railroad Rights-of-Way, and Off-Street Parking	8,590	5.7	44.7	5.6	192.2
Residential	7,829	5.2	39.0	4.9	200.7
Wholesale and Storage	2,227	1.5	52.9	6.6	42.1
Recreation Areas	394	0.3	17.2	2.2	22.9
Open Land and Water	--	--	56.8	7.1	--
Subtotal	150,122	100.0	396.1	49.7	379.0
Street and Highway Rights-of-Way, Railroad Rights-of-Way, and Off-Street Parking	--	--	400.9	50.3	--
TOTAL	150,122	100.0	797.0	100.0	188.4

Source: SEWRPC.

Table 4 also indicates that an overall average of 379 trips per acre were attracted to the Metrocenter on an average weekday, excluding acreage in street, highway, and railroad rights-of-way and in off-street parking facilities, which land uses are not true generators of trips. The average number of trips per acre attracted by land use categories were: retail and service lands, 825 trips per acre; governmental and institutional lands, 641 trips per acre; manufacturing land, 458 trips per acre; residential land, 201 trips per acre; transportation, communication, and utility lands, excluding the street, highway, and railroad rights-of-way and off-street parking facilities, 192 trips per acre; wholesale and storage lands, 42 trips per acre; and recreation areas, 23 trips per acre.

Time of Travel

The pattern formed by the hourly distribution of person trip destinations in the Metrocenter, shown in Figure 1, provides a graphic description of the kinds of activities which take place in this highly diversified, teeming area each weekday. Clearly identifiable in this figure are the thousands of commuters, who arrived early in the morning to report for work, and during the same period, albeit in smaller numbers, the influx of students and trainees enrolled in secondary public, technical, and specialty schools. Later in the morning and continuing until early evening, many hundreds of persons arrived each hour on various personal business errands and to shop. Readily recognizable in this figure also are those who come into the Metrocenter for social or recreational purposes, such as, for example, luncheon engagements and perhaps a matinee or later in the evening for dinner, the theater, a cafe, or a sports event. Even the return of residents to their homes in the Metrocenter at the end of the workday can be easily distinguished in this figure.

The hourly distribution pattern of persons arriving and departing and the accumulation of persons within the Metrocenter is shown in Figure 2. The peak period of arrival on an average weekday occurs in the two-hour period between 7:00 a. m. and 9:00 a. m., when approximately 47,000 persons, or more than one-third of the total arrivals reach their destination in the Metrocenter, most of them, as previously noted, enroute to work. The peak period of departure is somewhat more pronounced, when more than 52,000 persons, or very nearly 40 percent of the total departures, leave the Metrocenter between 4:00 p. m. and 6:00 p. m. The maximum accumulation of persons on an average weekday in the Metrocenter may be expected to occur around 1:00 p. m., when nearly 60,000 persons may be expected to be found in this area, excluding the resident and transient population of the Metrocenter.

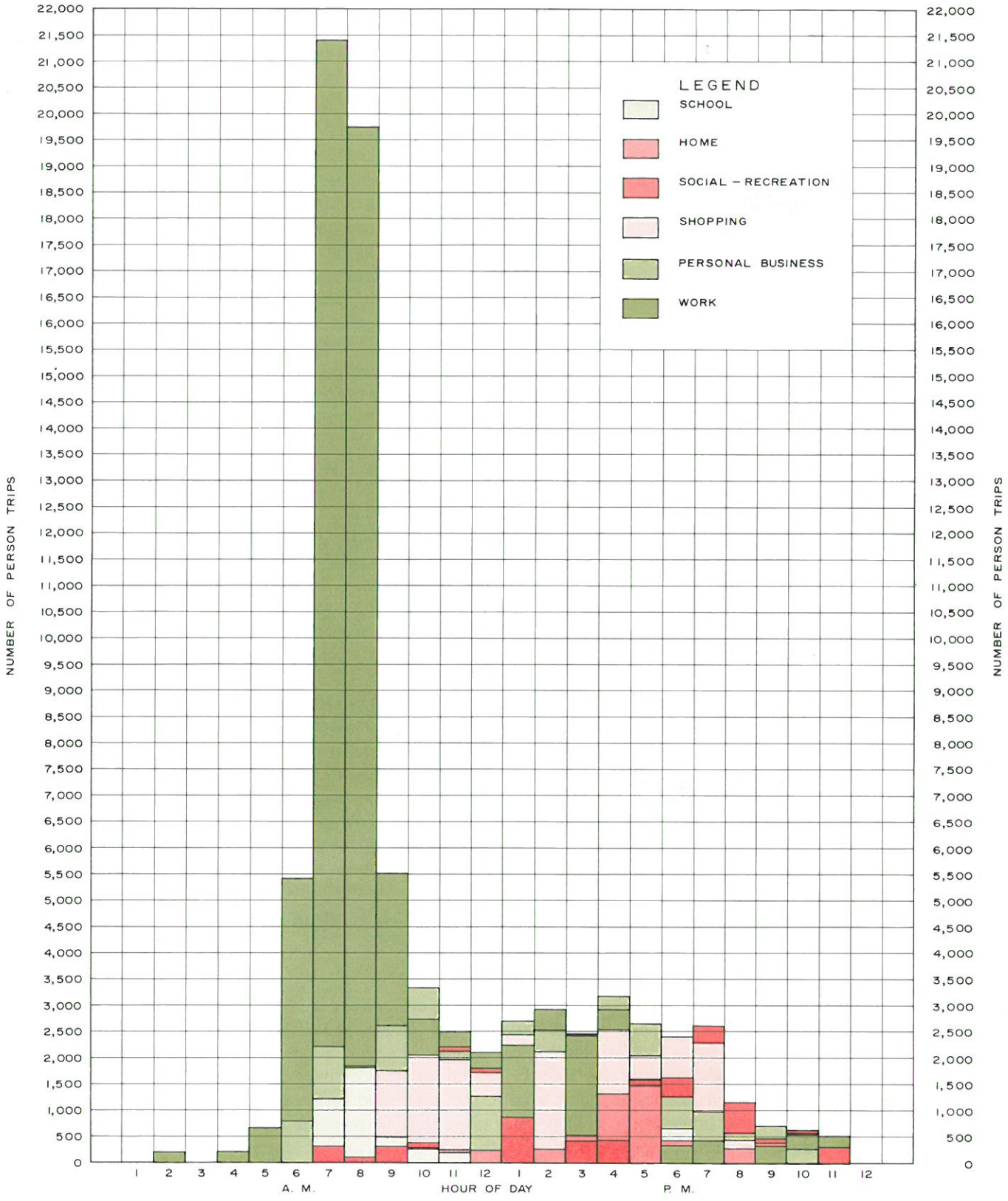
The hourly distribution pattern of automobiles entering and leaving the Metrocenter and the accumulation curve for automobiles shown in Figure 3 are almost replicas in miniature of those for persons in Figure 2, but this is hardly surprising since auto-driver trips account for nearly one-half of Metrocenter travel. The peak periods for automobiles coincide exactly with those for persons, and the percentages of peak period arrivals and departures to total arrivals and departures also agree very closely. The maximum accumulation on an average weekday may be expected to occur around 1:00 p. m., when more than 24,500 automobiles may be expected to be present within the Metrocenter. In the single hour beginning at 7:00 a. m., more than 10,700 automobiles may be expected to enter the Metrocenter. It should be noted, however, that not all automobiles which had destinations in the Metrocenter actually parked there. Many of them stopped in the Metrocenter only momentarily before continuing to another destination, such as those, for example, which stopped only long enough to pick up or discharge passengers.

Origins of Person Trips to the Metrocenter

Map 1 clearly shows that the attraction of the Metrocenter on an average weekday reached into every part of the seven-county Region—urban, as well as rural. The larger concentrations of the origins of person trips were found, quite naturally, within the highly populated areas in proximity to the Metrocenter. The largest concentrations of such origins lie mostly to the west, northwest, and north of the Metrocenter; but scattered large concentrations were found also to the south and southwest. The Metrocenter itself was also the point of origin for a large number of person trips that were made entirely within the Metrocenter. Beyond the most highly populated areas, however, the attraction to the Metrocenter decreased generally with increasing distance. Since tripmaking between two given points is largely reciprocal, the distributional pattern shown on this map would serve equally well as a representation of the distributional pattern of the destinations of trips leaving the Metrocenter.

Figure 1

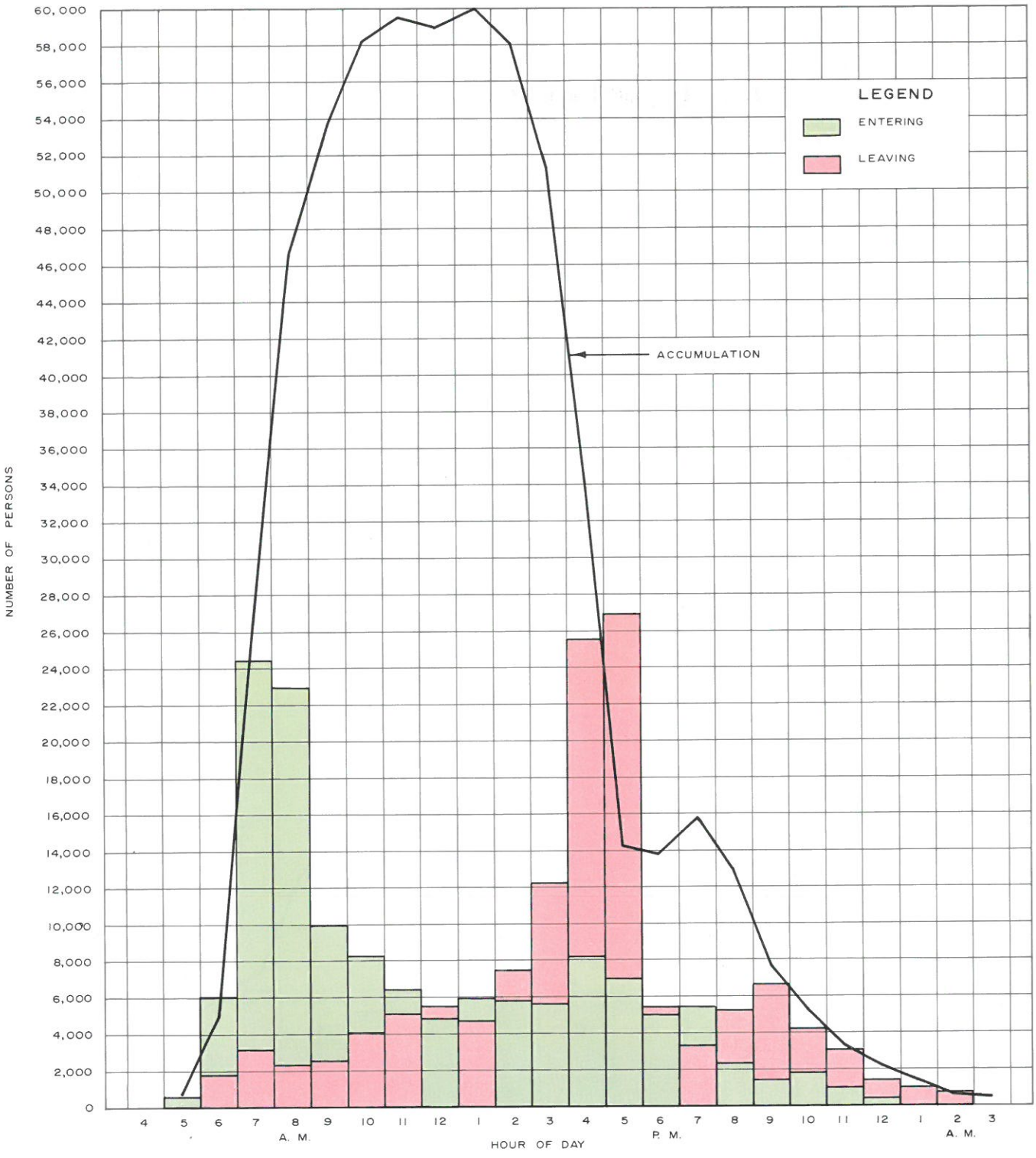
HOURLY DISTRIBUTION OF PERSON TRIPS TO THE METROCENTER BY TRIP PURPOSE ON AN AVERAGE WEEKDAY IN 1963



Source: SEWRPC.

Figure 2

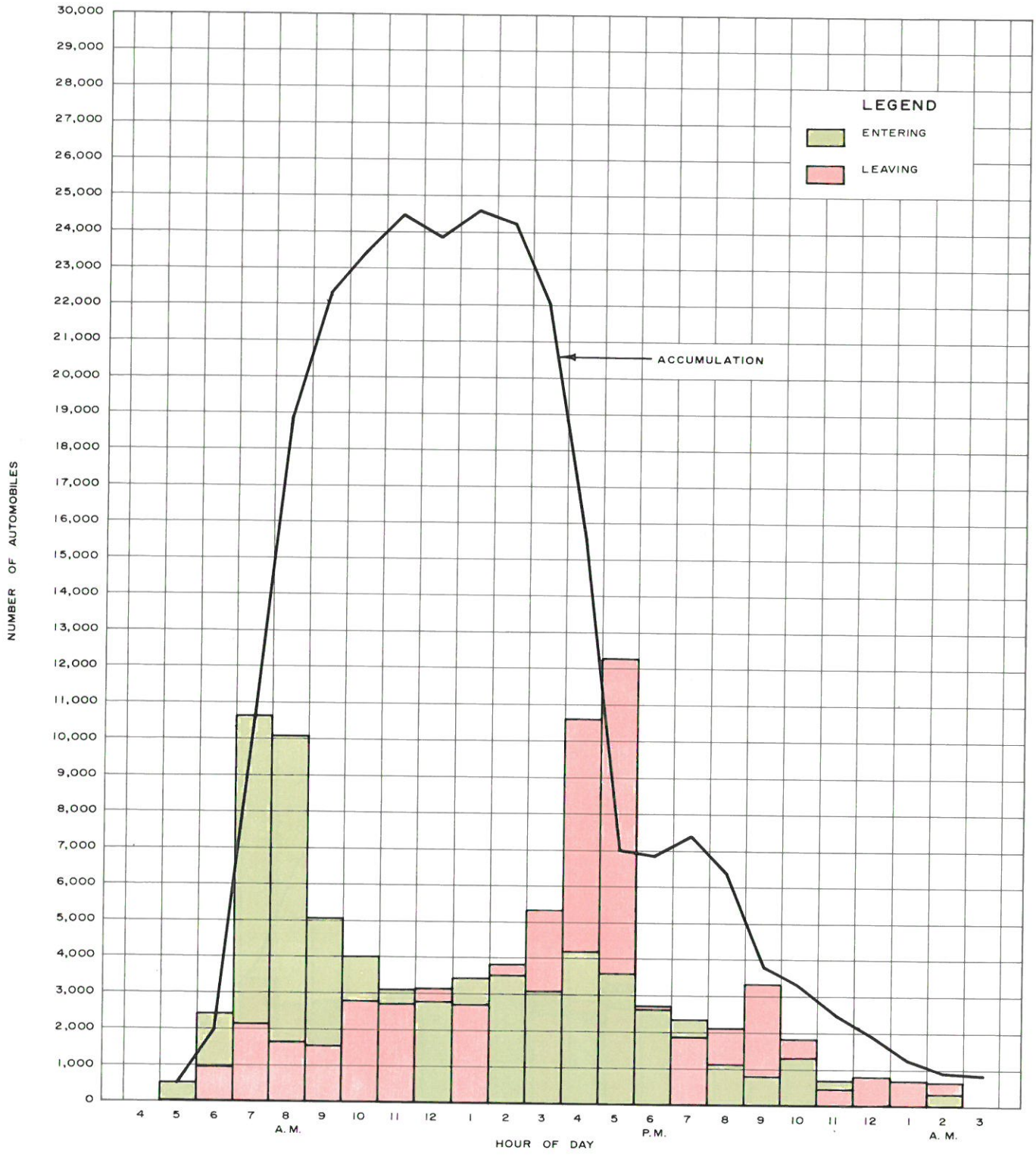
THE HOURLY DISTRIBUTION OF PERSONS ENTERING AND LEAVING, AND THE ACCUMULATION OF PERSONS IN, THE METROCENTER ON AN AVERAGE WEEKDAY IN 1963



Source: SEWRPC.

Figure 3

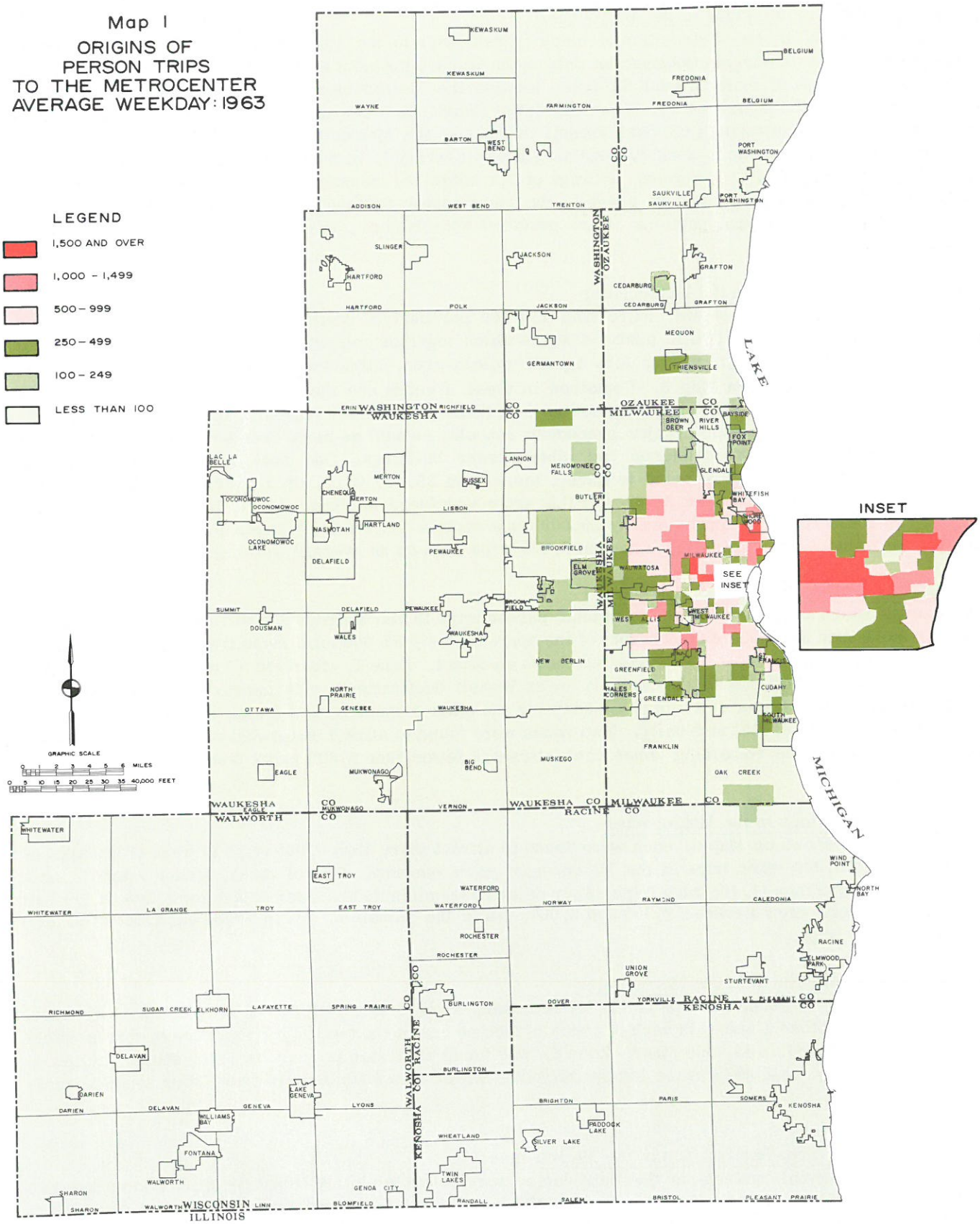
THE HOURLY DISTRIBUTION OF AUTOMOBILES ENTERING AND LEAVING, AND THE ACCUMULATION OF AUTOMOBILES IN, THE METROCENTER ON AN AVERAGE WEEKDAY IN 1963



Source: SEWRPC.

Map 1

ORIGINS OF PERSON TRIPS TO THE METROCENTER AVERAGE WEEKDAY: 1963



Source: SEWRPC.

Origins of Mass Transit Trips to the Metrocenter

The pattern created by the distribution of mass transit trips to the Metrocenter by zone of origin on an average weekday is strongly reflective, not only of the demand upon but also of the location of mass transit facilities or the lack of mass transit facilities serving the Metrocenter (see Map 2). In many areas in close proximity to the Metrocenter, high-residential density and low-automobile availability resulted in the Region's highest utilization of mass transit in trips to the Metrocenter. The number of automobiles available to residents in these densely populated areas averaged, in most instances, less than 0.7 autos per household compared to a regional average of 1.1 autos per household. As distance and automobile availability increased, mass transit usage to the Metrocenter declined. Large areas within the Region, especially in the more rural portions, were provided with little or, in some instances, no mass transit service.

Person Trip Destinations in the Metrocenter

There were, as previously shown, more than 150,000 person trip destinations in the Metrocenter on an average weekday. Of the 17 traffic analysis zones which together comprise the total Metrocenter area of 1.25 square miles, 4 zones, totaling 0.38 square mile in area, attracted 82,000 trips, or 55 percent of the daily total, as shown on Map 3. Contained in these 4 zones are the Region's 2 largest department stores and such important public buildings as the Courthouse, the Public Museum, the State Office Building, the Central Library, and 2 major secondary schools, as well as more than a score of the Region's largest commercial office structures and other lesser buildings. One zone alone, Zone 1, totaling 0.06 square mile in area, was found to attract more than 25,000 trips, or 16 percent of the total each weekday, while each of the other 3 zones in this group was found to attract from 15,000 to 20,000 trips daily. Two zones received approximately 10,000 trips each; 4 zones drew between 5,000 to 10,000 trips; and the remaining 7 zones attracted less than 5,000 trips each on an average weekday.

Transit Trip Destinations in the Metrocenter

The 4 zones which figured prominently in total person trips in the Metrocenter were found also to attract together more than 31,000, or 60 percent, of the approximately 52,000 total mass transit trip destinations made in this area on an average weekday, as shown on Map 4. Zone 1, which led all others in daily person trip destinations, led all others also in daily mass transit destinations, with approximately 11,600 trips, or 22 percent of the total on an average weekday. In the other 3 zones in this group, such trip destinations ranged from 6,000 to 8,000 trips daily. Two zones were found to attract somewhat more than 2,500 mass transit trips, while the remaining zones each attracted fewer than 2,500 mass transit trips on an average weekday.

Work Trip Destinations in the Metrocenter

Three zones, as shown on Map 5, each were found to attract more than 9,000 trips to work of the total of approximately 75,000 work trips in the Metrocenter each weekday. Two of these, Zones 1 and 3, each accounted for more than 11,500 such trips. Four other zones attracted between 5,000 and 7,500 daily work trips; three others drew between 2,500 and 5,000, while the remaining seven zones each attracted less than 2,500 work trips.

Shopping Trip Destinations in the Metrocenter

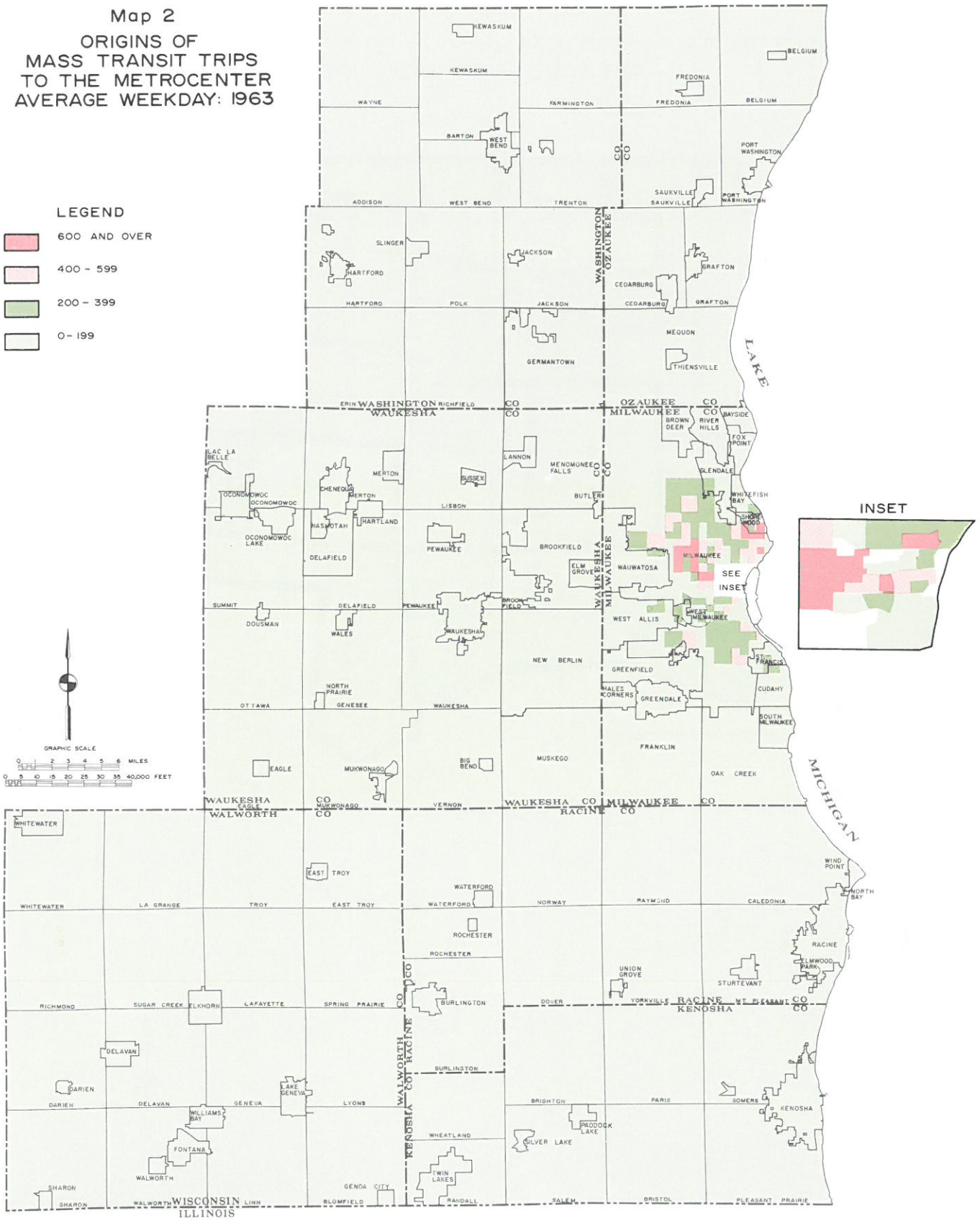
The large majority of shopping trips in the Metrocenter, approximately 12,800 of 16,500 total such trips, were attracted to Zones 1 and 4, in each of which is located one of the two largest department stores within the Region (see Map 6). Only one other, Zone 2, was found to attract as many as 1,000 shopping trips on an average weekday. All other zones but one attracted fewer than 500 shopping trips—four zones attracting none.

Personal Business Trip Destinations in the Metrocenter

Total trips for personal business in the Metrocenter were found to amount to nearly 32,000 on an average weekday, as previously noted. Three zones, as shown on Map 7, received more than 4,000 such trips; one other zone received about 3,400; two zones received approximately 2,500 trips each; four other zones received slightly over 1,000 trips each, and the remaining seven zones each received fewer than

Map 2

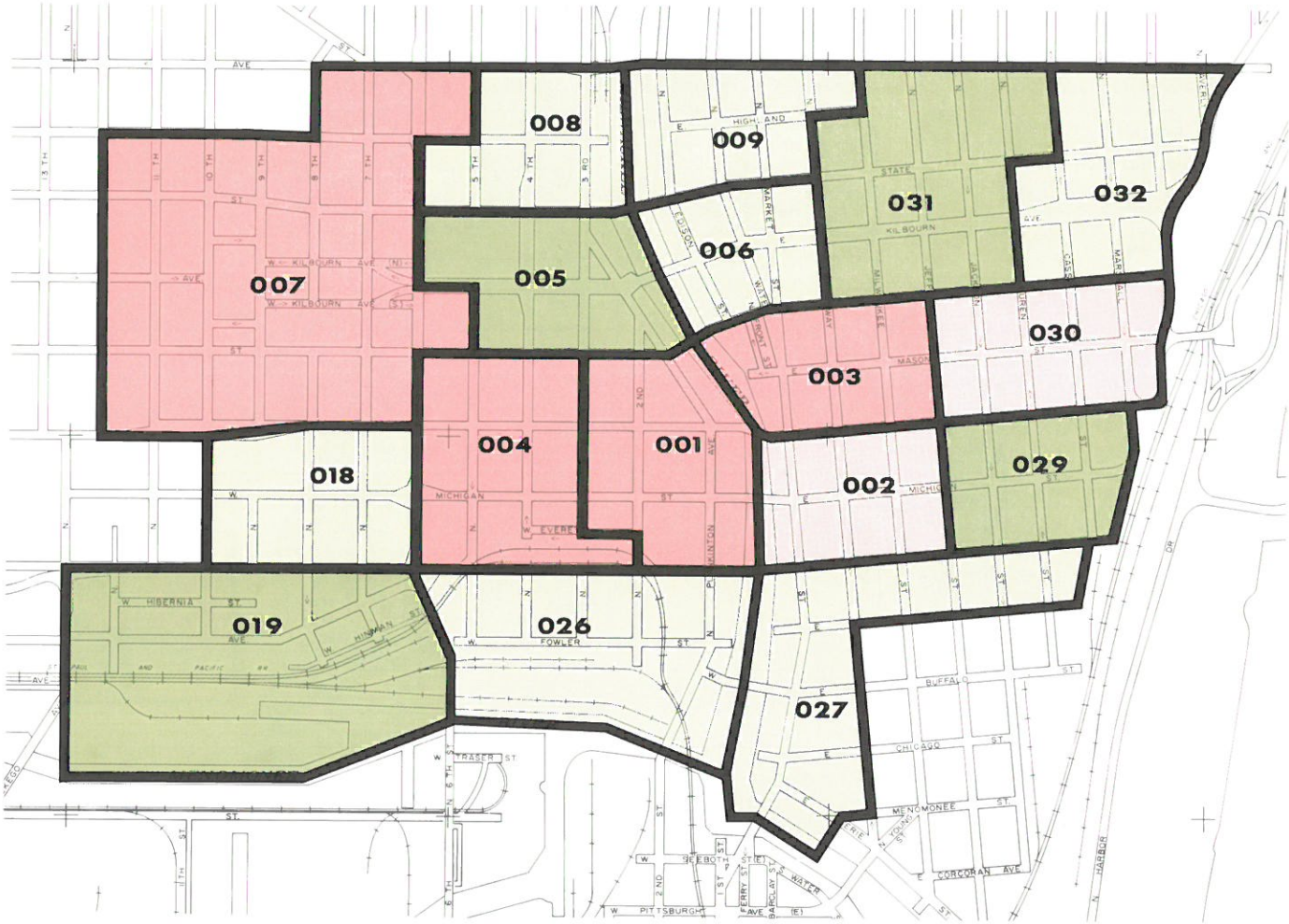
ORIGINS OF MASS TRANSIT TRIPS TO THE METROCENTER AVERAGE WEEKDAY: 1963



Source: SEWRPC.

Map 3

PERSON TRIP DESTINATIONS IN THE METROCENTER AVERAGE WEEKDAY: 1963



LEGEND

- 15,000 AND OVER
- 10,000 - 14,999
- 5,000 - 9,999
- LESS THAN 5,000
- ZONE BOUNDARY

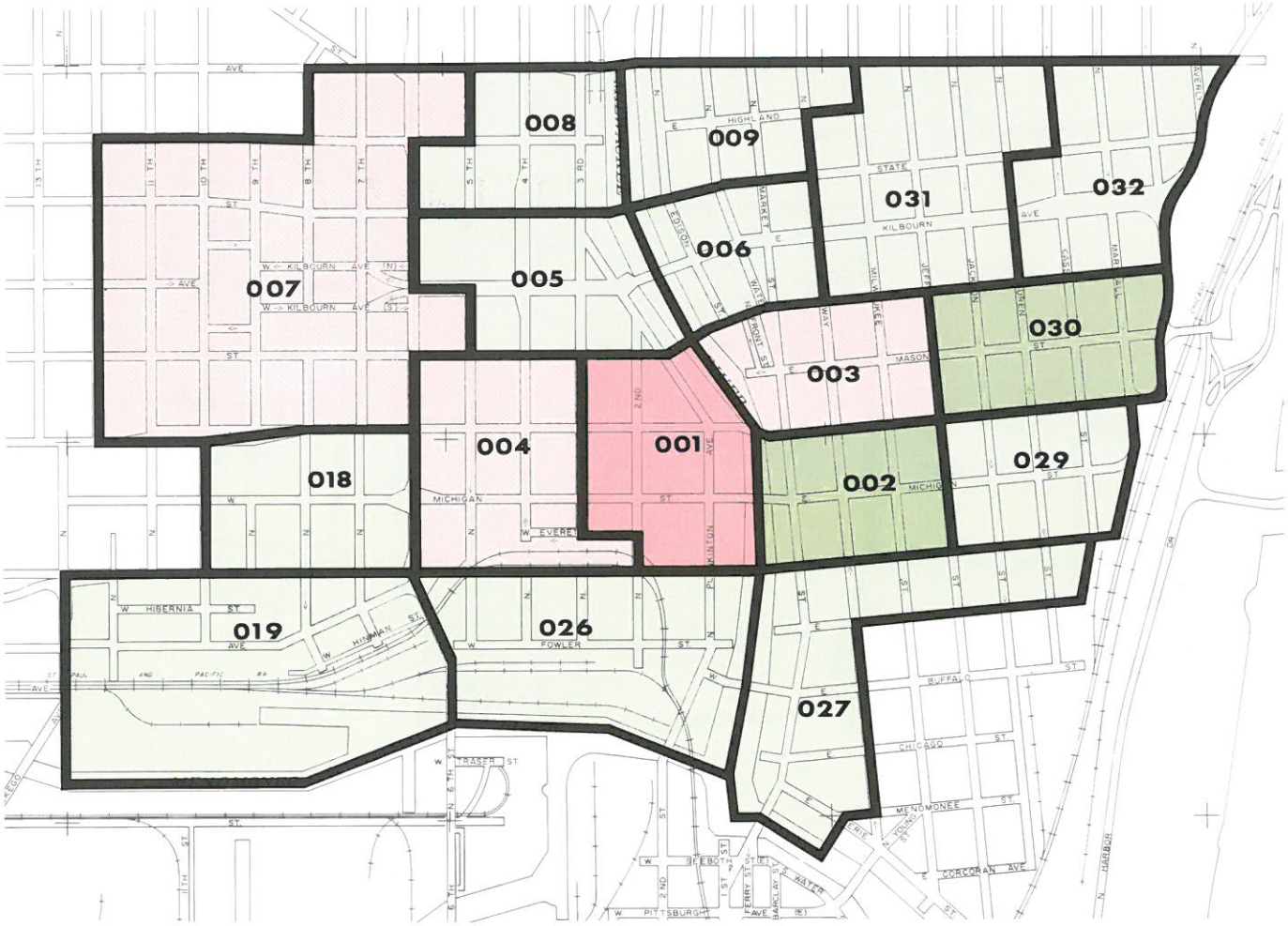
GRAPHIC SCALE

0 400 800 1200 1600 2000 FEET

Source: SEWRPC.

Map 4

MASS TRANSIT TRIP DESTINATIONS IN THE METROCENTER AVERAGE WEEKDAY: 1963



LEGEND

- 10,000 AND OVER
- 5,000 – 9,999
- 2,500 – 4,999
- LESS THAN 2,500
- ZONE BOUNDARY

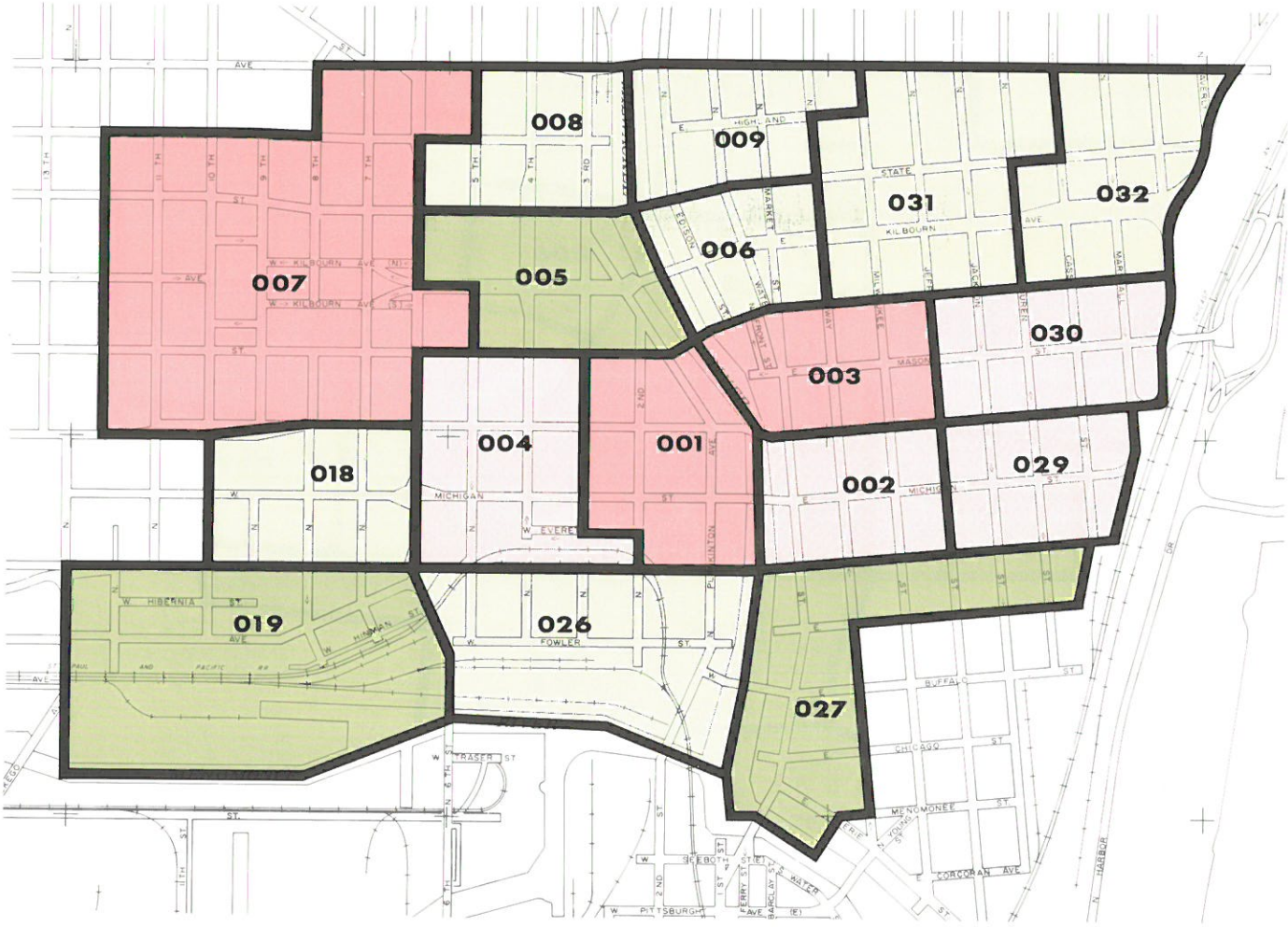
GRAPHIC SCALE

0 400 800 1200 1600 2000 FEET

Source: SEWRPC.

Map 5

WORK TRIP DESTINATIONS IN THE METROCENTER AVERAGE WEEKDAY: 1963



LEGEND

- 7,500 AND OVER
- 5,000 - 7,499
- 2,500-4,999
- LESS THAN 2,500
- ZONE BOUNDARY

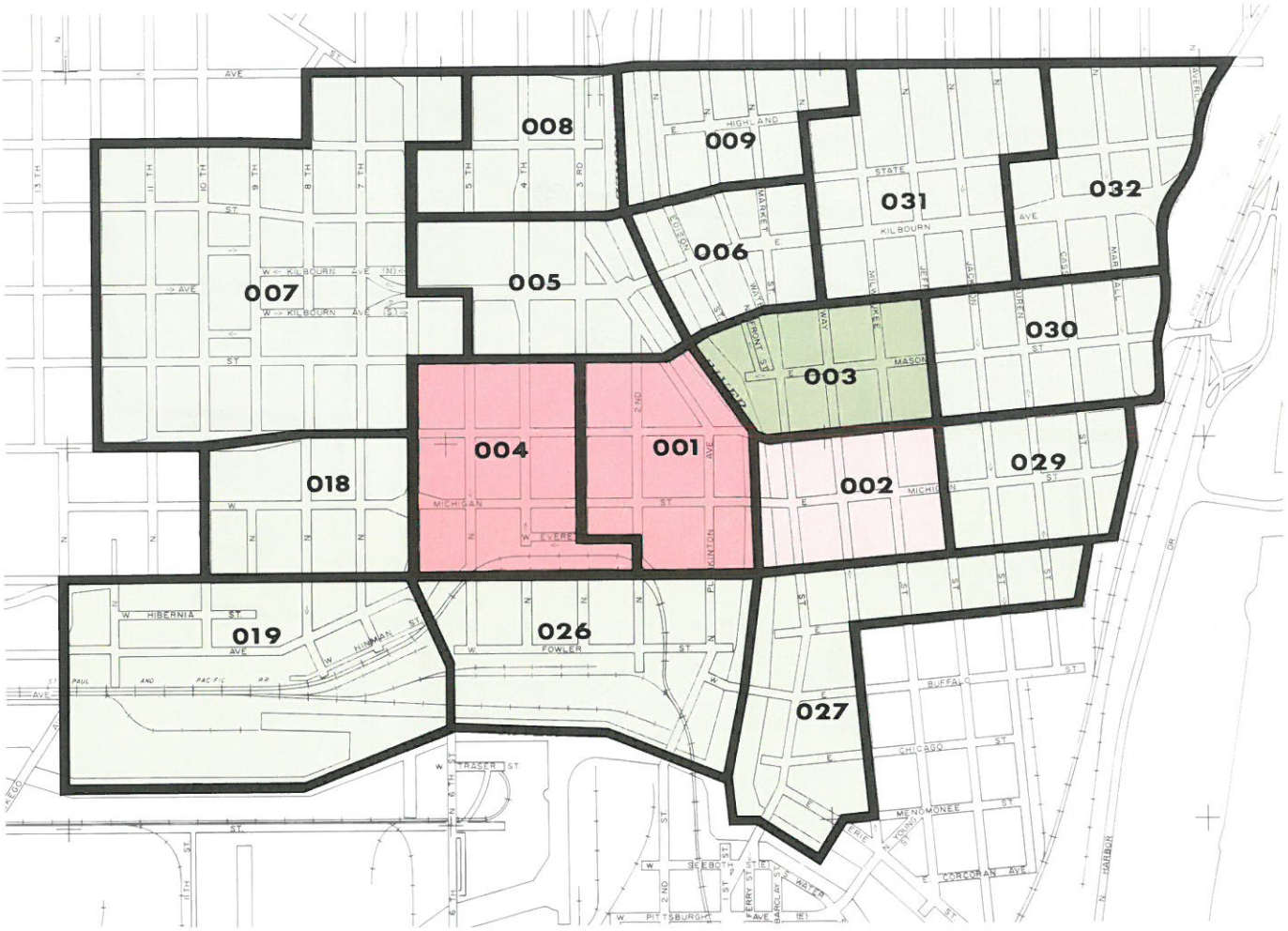
GRAPHIC SCALE

0 400 800 1200 1600 2000 FEET

Source: SEWRPC.

Map 6

SHOPPING TRIP DESTINATIONS IN THE METROCENTER AVERAGE WEEKDAY: 1963



LEGEND

- 3,000 AND OVER
- 1,000 - 2,999
- 500 - 999
- LESS THAN 500
- ZONE BOUNDARY

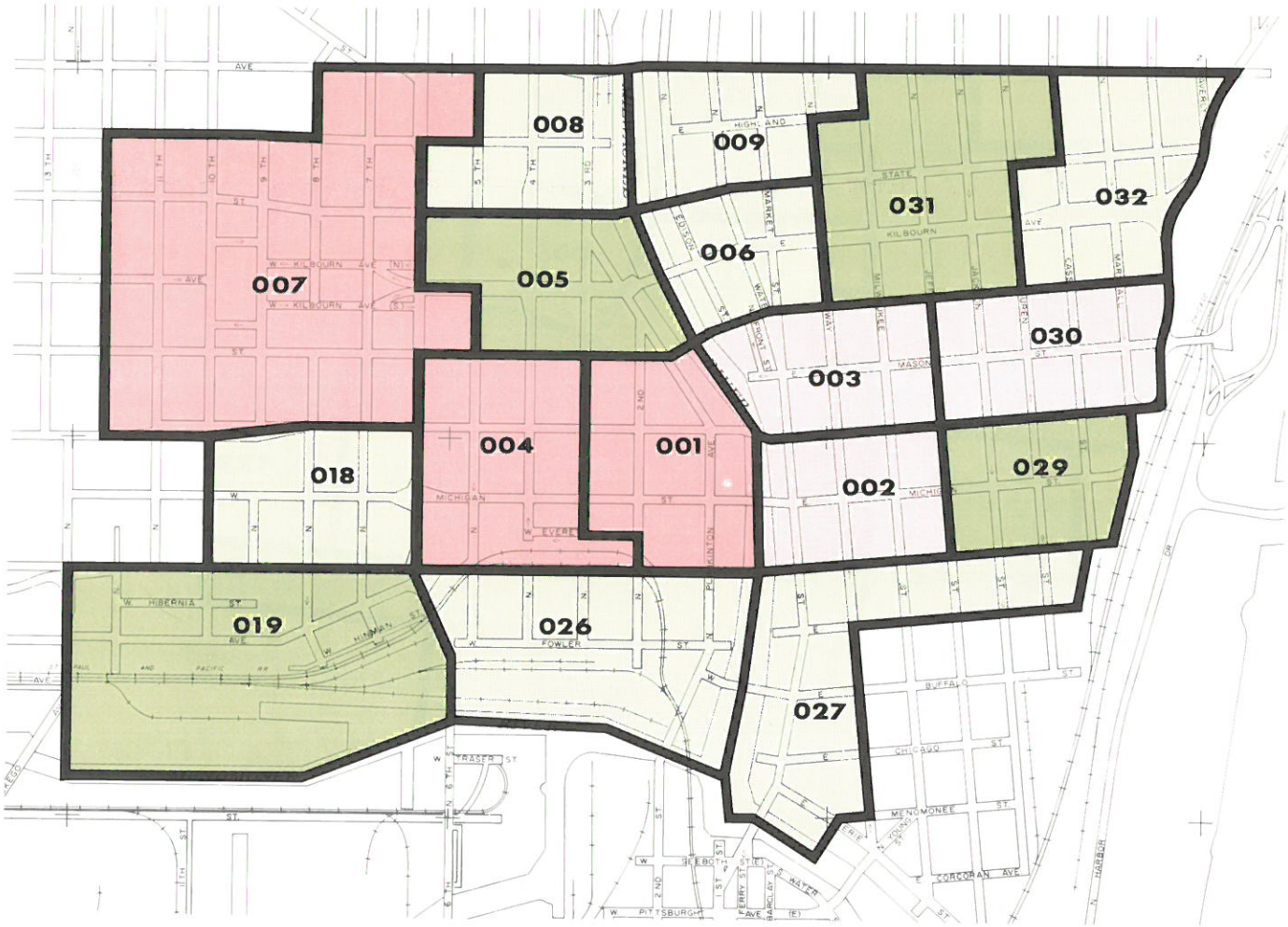
GRAPHIC SCALE

0 400 800 1200 1600 2000 FEET

Source: SEWRPC.

Map 7

PERSONAL BUSINESS TRIP DESTINATIONS IN THE METROCENTER AVERAGE WEEKDAY: 1963



LEGEND

- 4,000 AND OVER
- 2,500 - 3,999
- 1,000 - 2,499
- LESS THAN 1,000
- ZONE BOUNDARY

GRAPHIC SCALE

0 400 800 1200 1600 2000 FEET

Source: SEWRPC.

1,000 personal business trips daily. Zone 1, again, was found to lead all zones with more than 5,700 such trips. As previously noted also, trips to serve passengers comprised about one-third of the total daily personal business trips in the Metrocenter. Approximately the same ratio, in most instances, was found to exist to the zones within the Metrocenter.

Social-Recreation Trip Destinations in the Metrocenter

Social-recreation trips on an average weekday were found to total more than 2,000 in one zone and more than 1,000 in each of six other zones within the Metrocenter, as shown on Map 8. Of these six zones which attracted more than 1,000 trips, two zones, Zones 1 and 3, attracted more than 1,500 such trips. Four other zones drew between 500 and 1,000 such trips each, and the remaining zones attracted fewer than 500 trips; one of them, Zone 9, drew none.

Mode of Travel to the Metrocenter by Driving Status and Sex

The majority of trips to the Metrocenter on an average 1963 weekday, about 55 percent, were made by males. Males also accounted for a very large majority, about 81 percent, of total auto-driver trips to this area. Females, however, comprised large majorities of total auto-passenger trips, 73 percent, and of total mass transit trips, 69 percent (see Table 5).

TABLE 5
MODE OF TRAVEL TO THE METROCENTER ON AN AVERAGE WEEKDAY
BY DRIVING STATUS AND SEX: 1963

Driving Status And Sex	Mode Of Travel						Total	
	Auto Driver	Percent	Auto Passenger	Percent	Mass Transit	Percent	Trips	Percent
Male Driver	59,923	80.7	5,039	20.9	8,788	17.0	73,750	49.1
Male Non-Driver	--	--	1,555	6.4	7,387	14.3	8,942	6.0
Total Male	59,923	80.7	6,594	27.3	16,175	31.3	82,692	55.1
Female Driver	14,316	19.3	7,916	32.8	10,781	20.8	33,013	22.0
Female Non-Driver	--	--	9,618	39.9	24,799	47.9	34,417	22.9
Total Female	14,316	19.3	17,534	72.7	35,580	68.7	67,430	44.9
Total	74,239	100.0	24,128	100.0	51,755	100.0	150,122	100.0

Source: SEWRPC.

Nearly 90 percent of the males, but less than 50 percent of the females, who made trips to this area were licensed to drive. Most male auto passengers and the majority of male mass transit passengers were licensed to drive, but the majority of female auto and mass transit passengers were not. It is significant that almost one-half of the total mass transit trips to the Metrocenter were made by females who were not licensed to drive an automobile.

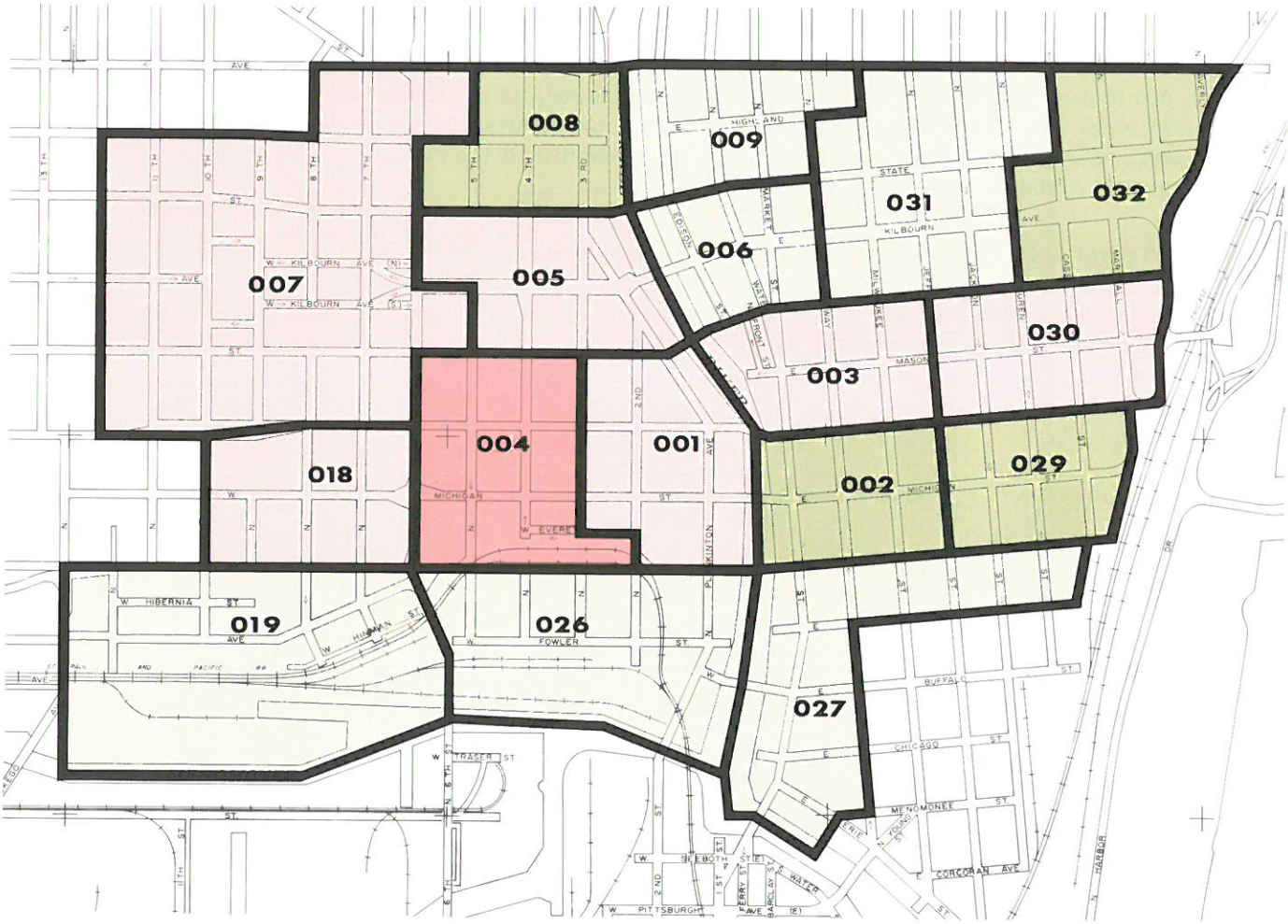
Trip Purpose to the Metrocenter by Driving Status and Sex

The majority of trips made to the Metrocenter for work, personal business, social-recreational purposes, and for trips to school were found to be made by males, while the majority of the shopping trips and trips to home within the Metrocenter were found to be made by females, as shown in Table 6.

Within each trip purpose category, males licensed to drive outnumbered those unlicensed by a large majority, while females licensed to drive outnumbered those unlicensed by small majorities in trips to work, for personal business, and for social-recreational purposes; and females not licensed to drive made up the majority of trips to school, to shop, and in trips returning to home in the Metrocenter. Considering both sexes, licensed drivers formed the majority within each trip purpose category except in trips for shopping.

Map 8

SOCIAL – RECREATION TRIP DESTINATIONS IN THE METROCENTER AVERAGE WEEKDAY: 1963



LEGEND

- 2,000 AND OVER
- 1,000 – 1,999
- 500 - 999
- LESS THAN 500
- ZONE BOUNDARY

GRAPHIC SCALE

0 400 800 1200 1600 2000 FEET

Source: SEWRPC.

TABLE 6

TRIP PURPOSE TO THE METROCENTER
ON AN AVERAGE WEEKDAY BY DRIVING STATUS AND SEX: 1963

Driving Status and Sex	Trip Purpose												Total	
	Work	Percent Of Total Trips	Personal Business	Percent Of Total Trips	School	Percent Of Total Trips	Social Recreation	Percent Of Total Trips	Shopping	Percent Of Total Trips	Home	Percent Of Total Trips	Trips	Percent
Male Driver	44,008	59.7	16,013	21.7	2,800	3.8	5,850	7.9	2,754	3.7	2,325	3.2	73,750	100.0
Male Non-Driver	2,876	32.2	2,187	24.4	677	7.6	1,578	17.6	947	10.6	677	7.6	8,942	100.0
Total Male	46,884	56.7	18,200	22.0	3,477	4.2	7,428	9.0	3,701	4.5	3,002	3.6	82,692	100.0
Female Driver	15,026	45.5	7,755	23.5	531	1.6	3,554	10.8	5,014	15.2	1,133	3.4	33,013	100.0
Female Non-Driver	13,320	38.7	5,975	17.4	1,381	4.0	3,383	9.8	7,757	22.5	2,601	7.6	34,417	100.0
Total Female	28,346	42.1	13,730	20.4	1,912	2.8	6,937	10.3	12,771	19.0	3,734	5.5	67,430	100.0
Total	75,230	50.1	31,930	21.3	5,389	3.6	14,365	9.6	16,472	11.0	6,736	4.4	150,122	100.0

Source: SEWRPC.

Mode of Travel to the Metrocenter by Number of Automobiles Available Per Household

The term "automobiles available" used in this article refers to the number of automobiles garaged at household residences and differs from the term "automobiles owned" only in that it includes company-owned automobiles.

Persons living in households in which only one automobile was available were found to account for approximately 84,000 trips, or about 56 percent, of the total trips to the Metrocenter on an average 1963 weekday, while persons in two-auto households were found to account for nearly 34,000 trips, or about 23 percent; persons in 0-auto households, for a little more than 26,000 trips, or 17 percent; and persons in households having three or more autos accounted for less than 6,000 trips, or about 4 percent (see Table 7).

TABLE 7

MODE OF TRAVEL TO THE METROCENTER BY NUMBER OF AUTOMOBILES
AVAILABLE PER HOUSEHOLD: 1963

Autos Available	Mode Of Travel						Total	
	Auto Driver	Percent Of Total Trips	Auto Passenger	Percent Of Total Trips	Mass Transit	Percent Of Total Trips	Trips	Percent
0	320	1.2	3,360	12.9	22,405	85.9	26,085	100.0
1	44,003	52.2	15,444	18.3	24,827	29.5	84,274	100.0
2	25,051	73.9	4,729	13.9	4,134	12.2	33,914	100.0
3 or More	4,865	83.2	595	10.2	389	6.6	5,849	100.0
Total	74,239	49.5	24,128	16.1	51,755	34.4	150,122	100.0

Source: SEWRPC.

Table 7 also shows that as the number of automobiles available to households increased, the tendency to drive to the Metrocenter by automobile sharply increased and, by the same token, the tendency to travel by mass transit to this area rapidly decreased.

Trip Purpose to the Metrocenter by the Number of Automobiles Available Per Household

The distribution of trips to the Metrocenter by trip purpose on an average weekday by the number of automobiles available was not found to vary significantly from the overall distribution except in the 0-auto household category, in which trips to shop and trips returning to places of residence within this area were substantially higher than the overall average and trips to work were significantly lower, as shown in Table 8.

TABLE 8

TRIP PURPOSE TO THE METROCENTER BY THE NUMBER OF AUTOMOBILES AVAILABLE PER HOUSEHOLD: 1963

Autos Available	Trip Purpose												Total	
	Work	Percent Of Total Trips	Personal Business	Percent Of Total Trips	School	Percent Of Total Trips	Social-Recreation	Percent Of Total Trips	Shopping	Percent Of Total Trips	Home	Percent Of Total Trips	Trips	Percent
0	10,233	39.2	4,362	16.7	891	3.4	2,041	7.8	4,816	18.5	3,742	14.4	26,085	100.0
1	43,687	51.8	18,808	22.3	2,614	3.1	8,147	9.7	8,168	9.7	2,850	3.4	84,274	100.0
2	18,335	54.1	7,319	21.6	1,591	4.7	3,487	10.3	3,036	8.9	144	0.4	33,912	100.0
3 or More	2,975	50.8	1,441	24.6	293	5.2	690	11.7	452	7.7	--	--	5,851	100.0
Total	75,230	50.1	31,930	21.3	5,389	3.6	14,365	9.6	16,472	11.0	6,736	4.4	150,122	100.0

Source: SEWRPC.

Mode of Travel to the Metrocenter by Age Group

A rather even distribution in total daily tripmaking to the Metrocenter on an average 1963 weekday was found among the four age groups between 15 and 54 years, as shown in Table 9, ranging from about 26,000 total trips to about 31,000 total trips, or from about 17.4 percent to 20.8 percent of total trips in these age groups. Since weekday trips to the Metrocenter are heavily weighted by trips to work, it is natural that the youngest and the oldest age groups are not strongly represented in this table.

TABLE 9

MODE OF TRAVEL TO THE METROCENTER ON AN AVERAGE WEEKDAY BY AGE GROUPS: 1963

Age Group	Mode Of Travel						Total	
	Auto Driver	Percent Of Total Trips	Auto Passenger	Percent Of Total Trips	Mass Transit	Percent Of Total Trips	Trips	Percent
5-14	--	--	2,008	50.9	1,939	49.1	3,947	100.0
15-24	9,739	35.8	5,926	21.8	11,564	42.4	27,229	100.0
25-34	17,689	64.6	3,893	14.2	5,794	21.2	27,376	100.0
35-44	19,706	64.0	3,795	12.3	7,306	23.7	30,807	100.0
45-54	13,574	52.4	3,708	14.3	8,623	33.3	25,905	100.0
55-64	8,351	42.7	2,450	12.5	8,743	44.8	19,544	100.0
65-Over	4,667	34.3	1,961	14.4	6,994	51.3	13,622	100.0
Total	73,726	49.7	23,741	16.0	50,963	34.3	148,430[a]	100.0

[a] *Does not include 1,692 trips in which age was not given.*

Source: SEWRPC.

The highest utilization of the automobile, both in terms of absolute numbers and by percentage, was found in the two age groups between 25 and 44 years. It was found also that mass transit utilization was relatively higher in the two youngest and the two oldest age groups than in other groups, as also shown in this table.

Trip Purpose to the Metrocenter by Age Group

Trips to work, as indicated in Table 10, accounted for the majority of total trips to the Metrocenter in each of the four age groups between 25 and 64 years and for the plurality of trips in the 15-24 age group. Trips for personal business and social-recreational purposes made up the majority of trips in the youngest age category, while trips for personal business, for work, and to shop in that order accounted for most trips in the oldest age category. It is interesting to note that persons 65 years of age and older made more trips to shop, both proportionately and numerically than those in any other groups.

Mode of Travel to the Metrocenter by Income Group

Data obtained in the 1963 travel surveys, representing approximately 129,000 persons, or about 86 percent of total persons who entered the Metrocenter on an average weekday, indicate that approximately

Table 10

TRIP PURPOSE TO THE METROCENTER ON AN AVERAGE WEEKDAY BY AGE GROUP: 1963

Age Group	Trip Purpose												Total	
	Work	Percent Of Total Trips	Personal Business	Percent Of Total Trips	School	Percent Of Total Trips	Social-Recreation	Percent Of Total Trips	Shopping	Percent Of Total Trips	Home	Percent Of Total Trips	Trips	Percent
5-14	56	1.4	1,324	33.5	362	9.2	1,338	33.9	668	16.9	199	5.1	3,947	100.0
15-24	11,606	42.6	4,975	18.3	3,658	13.4	2,813	10.3	2,693	9.9	1,484	5.5	27,229	100.0
25-34	16,100	58.8	5,013	18.3	706	2.6	2,590	9.5	1,764	6.4	1,203	4.4	27,376	100.0
35-44	18,180	59.0	6,456	21.0	237	0.8	2,869	9.3	2,677	8.7	388	1.2	30,807	100.0
45-54	15,062	58.1	4,909	19.0	193	0.7	1,839	7.1	2,868	11.1	1,034	4.0	25,905	100.0
55-64	9,877	50.5	4,892	25.0	36	0.2	1,283	6.6	2,659	13.6	797	4.1	19,544	100.0
65-Over	3,519	25.8	3,831	28.1	118	0.9	1,558	11.4	2,965	21.8	1,631	12.0	13,622	100.0
Total	74,400	50.1	31,400	21.2	5,310	3.6	14,290	9.6	16,294	11.0	6,736	4.5	148,430[a]	100.0

[a] *Does not include 1,692 trips in which age was not given.*

Source: SEWRPC.

20,000 persons, or about 15 percent, lived in households having an annual income of less than $4,000; more than 58,000 persons, or about 45 percent, lived in households in which the annual income was between $4,000 and $8,000; more than 34,000 persons, or about 27 percent, in households having an income between $8,000 and $12,000; and about 16,000 persons, or about 12 percent, in households in which the annual income exceeded $12,000 (see Table 11).

It can be noted also in this table that as income increased progressively the percentage of auto driver trips to the Metrocenter also increased, while the percentage of mass transit trips generally decreased.

TABLE 11

MODE OF TRAVEL TO THE METROCENTER ON AN AVERAGE WEEKDAY BY INCOME GROUP: 1963

Annual Household Income	Mode Of Travel						Total	
	Auto Driver	Percent Of Total Trips	Auto Passenger	Percent Of Total Trips	Mass Transit	Percent Of Total Trips	Trips	Percent
$ 0- 1,999	1,616	23.7	1,191	17.5	4,006	58.8	6,813	100.0
2,000- 3,999	3,835	28.1	1,642	12.0	8,177	59.9	13,654	100.0
4,000- 5,999	11,461	42.3	4,259	15.7	11,375	42.0	27,095	100.0
6,000- 7,999	14,816	47.5	5,890	18.9	10,458	33.6	31,164	100.0
8,000- 9,999	12,756	56.5	3,706	16.4	6,114	27.1	22,576	100.0
10,000-11,999	7,556	63.0	1,879	15.7	2,550	21.3	11,985	100.0
12,000-13,999	3,741	65.6	900	15.8	1,059	18.6	5,700	100.0
14,000-15,999	2,589	66.4	654	16.8	657	16.8	3,900	100.0
16,000-Over	5,290	81.9	793	12.2	379	5.9	6,462	100.0
Total	63,660	49.2	20,914	16.2	44,775	34.6	129,349[a]	100.0

[a] *This total excludes 21,773 trips for which the income range was not reported.*

Source: SEWRPC.

Trip Purpose to the Metrocenter by Income Group

Persons living in households where the annual income was less than $4,000 in 1963 made relatively fewer trips to work and relatively more trips to school and to shop in the Metrocenter than did those in other income groups, as indicated in Table 12. This table also shows that persons living in households in the highest income category made proportionately far more trips for social-recreational purposes in the Metrocenter than did those in other income groups.

Mode of Travel to the Metrocenter by Occupation Group

The occupations of nearly one-half of the persons who had destinations in the Metrocenter on an average weekday in 1963 are included in just three occupational categories; namely, clerical and kindred workers, 21 percent; professional, technical, and kindred workers, 14 percent; and housewives and other

TABLE 12

TRIP PURPOSE TO THE METROCENTER

ON AN AVERAGE WEEKDAY BY INCOME GROUP: 1963

Annual Household Income	Trip Purpose												Total	
	Work	Percent Of Total Trips	Personal Business	Percent Of Total Trips	School	Percent Of Total Trips	Social-Recreation	Percent Of Total Trips	Shopping	Percent Of Total Trips	Home	Percent Of Total Trips	Trips	Percent
$ 0- 1,999	1,900	27.9	1,346	19.7	444	6.5	723	10.6	1,790	26.3	610	9.0	6,813	100.0
2,000- 3,999	5,068	37.1	3,534	25.9	710	5.2	987	7.2	1,424	10.4	1,931	14.2	13,654	100.0
4,000- 5,999	13,085	48.3	5,696	21.0	1,008	3.7	2,289	8.5	3,095	11.4	1,922	7.1	27,095	100.0
6,000- 7,999	15,831	50.8	7,139	22.9	1,217	3.9	3,556	11.4	2,947	9.5	474	1.5	31,164	100.0
8,000- 9,999	12,535	55.5	4,391	19.4	691	3.1	1,934	8.6	2,290	10.1	735	3.3	22,576	100.0
10,000-11,999	7,316	61.0	2,419	20.2	424	3.5	1,101	9.2	725	6.1	---	---	11,985	100.0
12,000-13,999	3,423	60.1	911	16.0	177	3.1	615	10.8	430	7.5	144	2.5	5,700	100.0
14,000-15,999	2,014	51.6	728	18.7	39	1.0	269	6.9	441	11.3	409	10.5	3,900	100.0
16,000 - Over	3,513	54.4	1,074	16.6	76	1.2	1,260	19.5	467	7.2	72	1.1	6,462	100.0
Total	64,685	50.0	27,238	21.1	4,786	3.7	12,734	9.8	13,609	10.5	6,297	4.9	129,349[a]	100.0

[a]*This total excludes 21,773 trips for which the income range was not reported.*

Source: SEWRPC.

unpaid home workers, 12 percent. In other occupational categories, managers, officials, and proprietors accounted for about 9 percent; students accounted for nearly 9 percent; craftsmen, foremen, and kindred workers, about 8 percent; salesmen, 7 percent; operatives and kindred workers, 7 percent; service workers, about 6 percent; retired or incapacitated persons, nearly 5 percent; while the remaining three categories—laborers, private household workers, and the unemployed—each accounted for about 1 percent or less.

The highest utilization of mass transit in trips to the Metrocenter on an average weekday in 1963 by major occupation category was found to be: clerical and kindred workers, 14,353 trips, or 47 percent; housewives and other unpaid workers, 8,021 trips, or 45 percent; students, 5,695 trips, or 45 percent; service workers, 4,483 trips, or 50 percent; and retired and incapacitated persons, 3,906 trips, or 57 percent, as indicated in Table 13.

Similarly, the highest utilization of the automobile, either as a driver or a passenger in such trips was found to be: professional, technical, and kindred workers, 16,505 trips, or 87 percent; managers, officials, and proprietors, 11,485 trips, or 87 percent; craftsmen, foremen, and kindred workers, 9,036 trips, or 81 percent; and salesmen, 8,392 trips, or 81 percent. The very strong inclination of persons in these four occupational categories to travel by automobile in Metrocenter-oriented trips points out that, if a better balance is to be achieved between mass transit and automobiles in Metrocenter travel, some way must be found to make mass transit more attractive to persons in these occupational groups.

Trip Purpose to the Metrocenter by Occupation Group

Added incentive for the diversion of auto trips to mass transit trips in Metrocenter travel is found in Table 14, where it is shown that, within each of these same four occupational categories, trips to work constituted the majority of Metrocenter travel on the average 1963 weekday; and trips to work because of their regularity are best served, of all trip types, by mass transit.

This table also indicates that of the major occupational groups proportionately more trips are made for shopping and for personal business reasons by persons in the categories which include housewives and retired persons than by persons in other groups and that persons in these same two groups, along with students, make proportionately more trips for social-recreational purposes than do those in other groups.

Parking Supply in the Metrocenter in 1963

Approximately 26,600 spaces were available for public parking in the Metrocenter in 1963. Of these, nearly 14,000 spaces, or 52 percent, were located in privately owned surface lots; over 2,000 spaces, or 9 percent, were located in city owned surface lots; more than 4,000 spaces, or 15 percent, were in privately owned parking structures; over 1,000 spaces, or 5 percent, were in city-owned parking structures; and the remaining approximately 5,000 spaces, or 19 percent, were curb spaces on streets.

TABLE 13
MODE OF TRAVEL TO THE METROCENTER ON AN AVERAGE WEEKDAY
BY OCCUPATION GROUP: 1963

Occupation	Mode Of Travel						Total	
	Auto Driver	Percent Of Total Trips	Auto Passenger	Percent Of Total Trips	Mass Transit	Percent Of Total Trips	Trips	Percent
Professional, Technical, and Kindred Workers	13,980	69.3	2,525	17.5	3,673	13.2	20,178	100.0
Managers, Officials, and Proprietors	10,044	76.4	1,441	10.9	1,662	12.7	13,147	100.0
Clerical and Kindred Workers	10,347	34.1	5,632	18.6	14,353	47.3	30,332	100.0
Salesmen	7,700	74.3	692	6.7	1,975	19.0	10,367	100.0
Craftsmen, Foremen, and Kindred Workers	8,028	72.0	1,008	9.0	2,111	19.0	11,147	100.0
Operatives and Kindred Workers	5,163	51.0	702	6.9	4,269	42.1	10,134	100.0
Private Household Workers	117	43.3	41	15.2	112	41.5	270	100.0
Service Workers	3,481	39.0	959	10.7	4,483	50.3	8,923	100.0
Laborers and Farm Workers	810	59.8	113	8.3	432	31.9	1,355	100.0
Housewives and Other Unpaid Home Workers	4,963	27.6	5,022	27.9	8,021	44.5	18,006	100.0
Students	3,373	26.5	3,642	28.7	5,695	44.8	12,710	100.0
Retired and Incapacitated Persons	2,260	32.9	704	10.3	3,906	56.8	6,870	100.0
Unemployed Persons	614	33.4	497	27.0	727	39.6	1,838	100.0
Total	70,880	48.8	22,978	15.8	51,419	35.4	145,277[a]	100.0

[a] *This total excludes 4,845 trips for which the occupation was not reported.*

Source: SEWRPC.

This total of approximately 26,600 spaces was, of course, more than adequate to accommodate the approximately 24,500 automobiles, previously shown to be the maximum accumulation of automobiles in the Metrocenter on an average weekday. Another indicator of the overall adequacy of the parking supply in the Metrocenter is set forth in a report prepared by a nationally known transportation consulting firm[2] wherein it is recommended that a desirable level of parking supply to serve the downtown area of the principal city of an urbanized area the size of the Milwaukee urbanized area range from approximately 0.22 spaces per trip destination by car, or 21,600 spaces to achieve minimum standards, to 0.27 spaces per person trip destination by car, or approximately 26,500 spaces to achieve desirable standards, both levels below the more than 26,600 spaces actually available in the Metrocenter in 1963.

Trip Purpose to the Metrocenter by Parking Type

The 1963 origin-destination studies provided information concerning the type of parking utilized by more than 71,000 of the total of 74,000 auto drivers who had destinations in the Metrocenter on an average weekday in 1963.

[2] *Parking in the City Center, Wilbur Smith and Associates, New Haven, Connecticut, 1965.*

Table 14

TRIP PURPOSE TO THE METROCENTER ON AN AVERAGE WEEKDAY BY OCCUPATION: 1963

Occupation	Trip Purpose												Total	
	Work	Percent Of Total Trips	Personal Business	Percent Of Total Trips	School	Percent Of Total Trips	Social-Recreation	Percent Of Total Trips	Shopping	Percent Of Total Trips	Home	Percent Of Total Trips	Trips	Percent
Professional, Technical, and Kindred Workers	12,930	64.1	3,180	15.8	141	0.7	1,575	7.8	1,104	5.4	1,248	6.2	20,178	100.0
Managers, Officials, and Proprietors	8,380	63.7	2,682	20.4	38	0.3	1,119	8.5	392	3.0	536	4.1	13,147	100.0
Clerical and Kindred Workers	23,022	75.9	2,823	9.3	140	0.5	1,651	5.4	1,543	5.1	1,153	3.8	30,332	100.0
Salesmen	7,794	75.2	1,207	11.7	198	1.9	1,009	9.7	159	1.5	--	--	10,367	100.0
Craftsmen, Foremen, and Kindred Workers	6,342	56.9	2,611	23.4	232	2.1	749	6.7	597	5.4	616	5.5	11,147	100.0
Operatives and Kindred Workers	4,622	45.6	2,738	27.0	230	2.3	685	6.8	1,216	12.0	643	6.3	10,134	100.0
Private Household Workers	87	32.2	40	14.8	--	--	105	38.9	38	14.1	--	--	270	100.0
Service Workers	6,278	70.3	1,302	14.6	79	0.9	496	5.6	596	6.7	172	1.9	8,923	100.0
Laborers and Farm Workers	733	54.1	365	26.9	--	--	112	8.3	73	5.4	72	5.3	1,355	100.0
Housewives and Other Unpaid Workers	1,307	7.3	7,099	39.4	239	1.3	2,443	13.6	6,222	34.5	696	3.9	18,006	100.0
Students	1,227	9.7	3,190	25.1	3,686	29.0	2,503	19.7	1,544	12.1	560	4.4	12,710	100.0
Retired and Incapacitated Persons	228	3.3	2,541	37.0	118	1.7	1,206	17.6	2,065	30.0	712	10.4	6,870	100.0
Unemployed Persons	--	--	1,039	56.5	77	4.2	164	8.9	230	12.5	328	17.9	1,838	100.0
Total	72,950	50.2	30,817	21.2	5,178	3.6	13,817	9.5	15,779	10.9	6,736	4.6	145,277[a]	100.0

[a] *This total excludes 4,845 trips for which the occupation was not reported.*

Source: SEWRPC.

From these data it was found that nearly 62,000 automobiles, or about 87 percent, were parked in public and private parking facilities; over 8,000 automobiles, or about 11 percent, were not parked at all but circulated to pickup or discharge passengers; about 1,200 automobiles, or under 2 percent, were parked on residential properties; and a little more than 100 automobiles, or a fraction of 1 percent, were parked at garages or service stations for services or repairs, as shown in Table 15.

Of the approximately 62,000 automobiles which were parked in public and private parking facilities, nearly 34,000 automobiles, or about 47 percent, were parked in parking lots, the privilege being paid for more often than not; about 24,000 automobiles, or about 34 percent, were parked in curb spaces on streets, about two-thirds of which were free; and approximately 3,400 automobiles, or about 5 percent, were parked in parking garages, in which a charge was made in most cases.

This table shows also that persons in the Metrocenter for work or shopping purposes tended to park more often in off-street parking facilities; those persons in the area for personal business and on trips to school were more likely to park in curb spaces on streets, while those on social-recreational trips were likely to use either type.

Duration of Parking in the Metrocenter by Parking Type

Information obtained in the 1963 origin-destination studies, representing about 90 percent of the auto-driver trips to the Metrocenter on an average 1963 weekday, indicated that of those automobiles which were parked in public and private parking facilities about 28 percent remained parked for less than 1 hour; 37 percent, for less than 2 hours; 55 percent, for less than 4 hours; and 68 percent, for less than 8 hours, leaving, therefore, 32 percent, or nearly one-third, which were parked for a period of 8 or more hours (see Table 16).

Table 15

PARKING IN THE METROCENTER BY TRIP PURPOSE BY PARKING TYPE: 1963

Type Of Parking	Trip Purpose						Total	
	Work	Personal Business	School	Social-Recreation	Shopping	Home	Number	Percent
Street Free	7,440	4,606	1,104	2,528	711	--	16,389	23.0
Street Paid	3,292	2,940	126	674	952	--	7,984	11.2
Lot Free	12,716	1,655	150	1,804	1,306	158	17,789	25.0
Lot Paid	11,090	2,042	487	1,100	1,193	216	16,128	22.7
Garage Free	867	49	--	--	--	73	989	1.4
Garage Paid	1,810	79	40	118	37	329	2,413	3.4
Subtotal	*37,215*	*11,371*	*1,907*	*6,224*	*4,199*	*776*	*61,692*	*86.7*
Residential Property	116	37	--	--	--	1,057	1,210	1.7
Not Parked	266	7,377	--	375	121	--	8,139	11.4
Service and Repair	74	41	--	--	--	--	115	0.2
Subtotal	*456*	*7,455*	*--*	*375*	*121*	*1,057*	*9,464*	*13.3*
Total	37,671	18,826	1,907	6,599	4,320	1,833	71,156	100.0

Source: SEWRPC.

TABLE 16

PERCENTAGE DISTRIBUTION OF PARKING IN THE METROCENTER ON AN AVERAGE WEEKDAY BY DURATION AND TYPE OF PARKING: 1963

Parking Duration (In Hours)	Type Of Parking						Total
	Street, Free	Street, Meter	Lot, Free	Lot, Paid	Garage, Free	Garage, Paid	
Less Than 1.0	43	63	17	11	10	13	28
1.0-1.9	8	16	9	7	5	7	9
2.0-3.9	18	13	16	23	10	24	18
4.0-7.9	11	5	14	17	15	8	13
8.0 and Over	20	3	44	42	60	48	32
Total	100	100	100	100	100	100	100

Source: SEWRPC.

This table also illustrates that, as expected, autos parked in curb spaces, especially metered curb spaces, tended to remain parked for much shorter periods generally than those parked in parking lots and garages. Nearly 80 percent of autos parked in unmetered curb spaces, for example, remained parked for less than 2 hours, while only 15 to 26 percent of autos parked in parking lots and garages remained for such a short period.

Blocks Walked at Destination by Trip Purpose to the Metrocenter by Mode of Travel

The highly convenient locations of parking facilities and the only slightly less convenient locations of bus stops in the Metrocenter in 1963 made it possible for the very large majority of tripmakers to this area to walk only a block or two after parking their automobiles or, as the case might be, after alighting from motor buses, to reach their ultimate destinations in the Metrocenter.

Of those who drove to the Metrocenter, approximately 88 percent found it necessary to walk less than one block to reach their destinations; and only 8 percent were required to walk two or more blocks (see Table 17). Automobile passengers, who are often dropped off virtually at the doors of their destinations, were required to walk even shorter distances usually, with 94 percent who walked less than one block and only 3 percent who walked two or more blocks. Those who traveled to the Metrocenter by mass transit, however, were required to walk somewhat greater distances on the average. Still, approximately 67 percent of these riders walked less than one block; and only 17 percent walked more than 2 blocks to reach their destinations.

The percentage distribution of blocks walked by trip purpose exhibited few conspicuous differences from the overall distribution within each mode of travel except in the percentages of trips to shop and trips to home by mass transit passengers.

TABLE 17
PERCENTAGE DISTRIBUTION OF BLOCKS WALKED TO DESTINATION IN THE METROCENTER ON AN AVERAGE WEEKDAY BY TRIP PURPOSE AND MODE OF TRAVEL: 1963

Trip Purpose	Blocks Walked					
	Less Than 1	1.0-1.9	2.0-2.9	3.0-3.9	4.0 And Over	Total
Work						
Auto Driver	84	4	5	2	5	100
Auto Passenger	94	2	2	1	1	100
Mass Transit	63	18	12	4	3	100
Personal Business						
Auto Driver	95	3	1	0	1	100
Auto Passenger	94	4	1	0	1	100
Mass Transit	68	14	9	7	2	100
School						
Auto Driver	88	4	8	0	0	100
Auto Passenger	84	0	0	0	16	100
Mass Transit	64	14	12	3	7	100
Social-Recreation						
Auto Driver	94	3	2	0	1	100
Auto Passenger	94	4	1	0	1	100
Mass Transit	72	13	9	4	2	100
Shop						
Auto Driver	89	6	2	2	1	100
Auto Passenger	91	3	3	0	3	100
Mass Transit	86	9	1	3	1	100
Home						
Auto Driver	84	8	4	4	0	100
Auto Passenger	95	5	0	0	0	100
Mass Transit	53	25	16	2	4	100
All Purposes						
Auto Driver	88	4	4	1	3	100
Auto Passenger	94	3	1	0	2	100
Mass Transit	67	16	10	4	3	100

Source: SEWRPC.

Duration of Stay in the Metrocenter by Trip Purpose

Approximately one-fourth of those who came to the Metrocenter on an average 1963 weekday remained there for less than one hour, about one-half remained less than four hours, and a little more than one-third remained eight or more hours (see Table 18). This table also indicates, as could be anticipated, that those who came for work purposes or to go to school were found to remain longer generally than those who came for other purposes. More than two-thirds of those who came on personal business remained for less than an hour, but it must be remembered that approximately one-half of the personal business trips made to the Metrocenter were those in which auto drivers stopped only for a minute or two while picking up or discharging passengers. Many of those who came to the Metrocenter to shop must have known what they wanted to buy and where to buy it, for more than one-third of them remained for less than one hour, while 84 percent of the shoppers stayed for four hours or less. The large majority of those who came for social or for recreational purposes also stayed in the Metrocenter for less than four hours.

TABLE 18
PERCENTAGE DISTRIBUTION OF DURATION OF STAY IN THE METROCENTER ON AN AVERAGE WEEKDAY BY TRIP PURPOSE: 1963

Duration Of Stay (In Hours)	Trip Purpose					All Purposes
	Work	Personal Business	School	Social-Recreation	Shop	
Less Than 1	10	67	3	24	37	27
1.0 - 1.9	3	11	2	13	15	7
2.0 - 3.9	8	15	32	42	32	17
4.0 - 7.9	15	5	38	19	14	14
8.0 and Over	64	2	25	2	2	35
Total	100	100	100	100	100	100

Source: SEWRPC.

SUMMARY AND CONCLUSIONS

The Metrocenter, the most highly developed area of the Region, generated on an average 1963 weekday approximately 284,000 person trips, exceeding the number of trips of the second largest trip generator, the Allis Chalmers-West Allis industrial-commercial complex, by more than three times and exceeding the number generated by a major traffic generator, such as the Milwaukee County Airport, for example, by more than 25 times. Approximately 134,000 trips each entered and left the area, and nearly 16,000 trips were made wholly within the Metrocenter.

Very nearly one-half of all Metrocenter travel was made by auto drivers; about one-sixth was made by auto passengers; and the remaining approximately one-third, or about 96,000 trips, was made by mass transit passengers. The importance of these 96,000 mass transit trips to the maintenance of a balanced transportation system within the Region becomes apparent when it is realized that these trips represented approximately 30 percent of the total daily mass transit trips generated within the entire Region. The number of Metrocenter-oriented auto-driver trips, by way of comparison, amounted to only about 7 percent of total daily auto-driver trips generated within the Region.

The approximately 75,000 daily trips to work in the Metrocenter accounted for almost one-half of the total daily trip destinations in the Metrocenter and more than 10 percent of total daily trips made to work within the Region and indicate the importance of the Metrocenter as a place of work within the Region. Of other trip purposes, personal business trips accounted for about 32,000 trips, or about 21 percent; shopping trips amounted to 16,000 trips, or about 11 percent; social-recreational trips totaled 14,000, or about 10 percent, while trips to home by residents of the Metrocenter and trips to school each amounted to less than 5 percent.

It was found in this study that the attraction of the Metrocenter extended into every part, urban and rural, of the Region but that the largest concentrations of trip origins were found, as might be expected, in those

highly populated areas of Milwaukee County located in proximity to the Metrocenter. The origins of mass transit trips to the Metrocenter were, of course, restricted by the location of mass transit lines and concomitant service areas; and the highest utilization of such service was found in areas in close proximity to the Metrocenter where automobile availability was often far lower than the regional average.

One of the most important findings emerging from this study is that only a small minority, about 15 percent, of those who traveled to the Metrocenter by mass transit really had a choice of mode available to them. All others were "captive riders" in the sense that they either were not licensed to drive, did not own an automobile, or otherwise did not have an automobile available to make the trip. Since the proportion of persons in each of these three categories has decreased almost annually since the advent of the automobile and can be expected to continue to decrease in the foreseeable future, mass transit must attract a larger proportion of those who have a choice of travel mode if the 1963 proportion of mass transit ridership in Metrocenter travel is to be maintained, as recommended under the adopted transportation plan.

A new type of mass transit service, inaugurated by the Milwaukee and Suburban Transport Corporation about one year after data employed in this article were obtained, gives promise of providing the kind of service which will attract such "choice" mass transit riders. In this new service, appropriately named "freeway flyer" service, motor coaches utilizing freeway facilities for nearly the entire length of each route provide fast, direct, nonstop service during the commuting periods of each weekday between free parking lots in outlying regional shopping centers and the Metrocenter.

Beginning service with a single route in the spring of 1964 and an average weekday volume of about 280 revenue passengers, by January 1966 another route had been added to the freeway flyer service; and the average weekday volume had increased to about 1,150 revenue passengers. Moreover, by January 1969 two additional routes were in operation; and the average weekday volume had increased to more than 2,000 revenue passengers, or slightly more than one-half million revenue passengers per year.

Surveys of freeway flyer passengers conducted by the Commission, in cooperation with the Transport Corporation in November 1966, brought to light three important facts: 1) that the freeway flyer service had attracted a very substantial number of new transit riders, 2) that the large majority of these new transit riders had commuted as auto drivers prior to the establishment of freeway flyer service, and 3) that nearly two-thirds of the freeway flyer patrons could have commuted as auto drivers if they had so chosen.

The freeway flyer service now in operation can be considered as a prototype of the modified rapid transit and rapid transit system proposed in the regional transportation plan recommended by the Regional Planning Commission and subsequently adopted by the State Department of Transportation, Division of Highways, and by the governing bodies of all seven counties within the Region. The results of these surveys were, therefore, particularly encouraging to the Commission because they demonstrated that auto drivers could be attracted to mass transit in substantial numbers by providing attractive transit service with travel times competitive with those of the automobile.

COMPUTING THE CENTER OF POPULATION AND THE GEOGRAPHIC CENTER

by Wayne H. Faust, Associate Planner

INTRODUCTION

Knowledge of the location of centers of population and geographic centers is useful in analytical and quantitative studies of diverse subjects, ranging from industrial plant site selection to the monitoring of intranational population migration. Planning agencies, such as the Southeastern Wisconsin Regional Planning Commission, compute the centers of population within their jurisdictions as adjuncts to the monitoring of residential population shifts with respect to adopted plan elements. It is evident from Table 1 that centers of population and geographic centers can be derived for areas which greatly differ in both size and shape. (See Map 1 and Map 2 for graphic presentations of the centers of population and geographic centers of the Southeastern Wisconsin Region and each county in the Region.) Several methods for estimating centers of population or geographic centers have been developed. This article presents a description of the computation of centers of population and geographic centers within the Region: first, utilizing a conventional computation technique and, second, utilizing a more refined technique readily adaptable to electronic computer application.

The concepts of the center of population and geographic center are analogous to, and probably derived from, the concept of the centroid of an area developed in the science of mechanics. The centroid of an area is defined as the point in the area whose distance from any axis, multiplied by the area, is equal to the moment of the entire area about the axis. This definition may be expressed mathematically as:

$$A\bar{x} = \int x dA \qquad (1)$$

$$A\bar{y} = \int y dA \qquad (2)$$

where A is the total area and $\bar{x}$ and $\bar{y}$, known as centroidal distances, are the coordinates of the centroid, with respect to the y and x axes, respectively.

These two equations may be interpreted as follows: the centroid of an area is a point at which the whole area may be conceived to be concentrated so that the moment of the concentrated area about any axis is equal to the moment of the actual distributed area about the same axis. Other closely associated concepts in mechanics are the center of mass and the center of gravity, which extend the concept of the centroid from geometric figures—lines, areas, and volumes—to physical bodies. For areas of simple shape, the centroid, being at the geometric center of the area, can be located by inspection. For areas of more complex shapes, the centroid can be located by integration, as indicated by the foregoing equations.

The significance of the concept of the centroid when applied to a geographic area is obvious. The significance when applied to population lies in the fact that the location of an activity at or near the center of population minimizes the sum of the air line distances from that location to the distributed location of the entire resident population. The center of population is usually determined on the basis of the residential distribution of the population but could be determined for other population distributions.

The concept expressed in the foregoing equations for locating the centroid of an area is applied in both the conventional methodology usually used to calculate the center of population and the more refined technique developed for computer application.

LOCATING THE CENTER OF POPULATION BY CONVENTIONAL TECHNIQUE

To compute the center of population of the Region by conventional technique, the Region was first divided into 120 elements, or subareas, whose centers of population could be readily identified by inspection of

Table I

SELECTED GEOGRAPHIC AND POPULATION CENTERS FOR 1967 OR 1968

Geographic Unit	Year	Geographic Center	Center of Population
United States	1968	Lebanon, Kansas[a]	15 miles south and 40 miles east of St. Louis, Missouri[b]
State of Wisconsin[c]	1968	9 miles southeast of Marshfield in Wood County	Not available
Southeastern Wisconsin Region[d]	1968	0.2 mile east and 0.3 mile south of the intersection of CTH I and CTH F in Section 26 in the Town of Waukesha	N. 71st Street and W. Burdick Avenue in the City of Milwaukee
Kenosha County[d]	1968	Center of Section 5, T1N, R22E, in the Town of Bristol	Intersection of STH 31 (Green Bay Road) and 64th Street in the Town of Pleasant Prairie
Milwaukee County[e]	1968	In the SW 1/4 of Section 1, T6N, R21E, in the Village of West Milwaukee	N. 32nd Street between W. Wisconsin Avenue and W. Wells Street in the City of Milwaukee
Ozaukee County[d]	1968	In the SE 1/4 of Section 26, T11N, R21E, in the Village of Saukville	In the NW 1/4 of Section 19, T10N, R21E, in the Town of Grafton.
Racine County[d]	1968	In the SE 1/4 of Section 6, T3N, R21E, in the Town of Yorkville	Center of Section 10, T3N, R22E, in the Town of Mount Pleasant
Walworth County[d]	1968	NE corner of Section 1, T2N, R16E, in the Village of Elkhorn	In the SW 1/4 of Section 1, T2N, R16E, in the Town of Delavan
Washington County[d]	1968	NW corner of the NE 1/4 of Section 3, T10N, R19E, in the Town of Polk	In the SW 1/4 of Section 2, T10N, R19E, in the Town of Polk
Waukesha County[d]	1968	SE corner of Section 36, T7N, R18E, in the Town of Delafield	In the SW 1/4 of Section 24, T7N, R19E, in the Town of Pewaukee
City of Milwaukee[f]	1967	Intersection of N. 42nd Street and W. North Avenue in the City of Milwaukee	Intersection of N. 27th Street and W. Brown Street in the City of Milwaukee

[a] *Source: U. S. Department of the Interior, Geological Survey.*

[b] *Source: U. S. Department of Commerce, Bureau of the Census, Series P-25, No. 388, March 14, 1968.*

[c] *Source: Lawrence Martin, Physical Geography of Wisconsin, February 1965.*

[d] *Source: SEWRPC.*

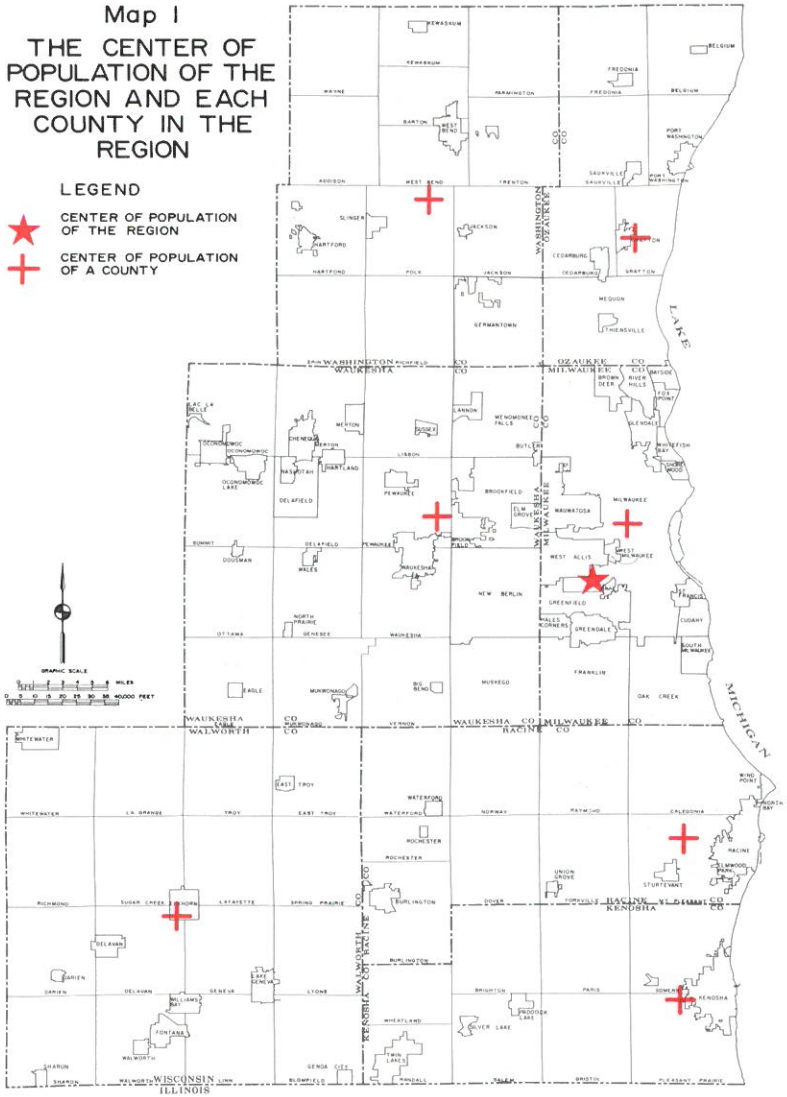
[e] *These centers were located by the SEWRPC. The City of Milwaukee has located the geographic center of Milwaukee County at STH 59 (Greenfield Avenue) and C. & N.W.R.R. (east of Waukesha) and the center of population of the County at N. 31st Street and W. Wells Street.*

[f] *Source: City of Milwaukee, 1968 Directory and Report of Milwaukee's Progress in 1967, 1968.*

the residential development patterns shown on an existing land use map of the Region. The moments of these elements were then determined by multiplying the population of the elements by the coordinates of the centers of population of the elements. The selected elements were made congruent with city, village, and/or town boundaries in all cases except one. The exception was Milwaukee County, which was used as

Map 1

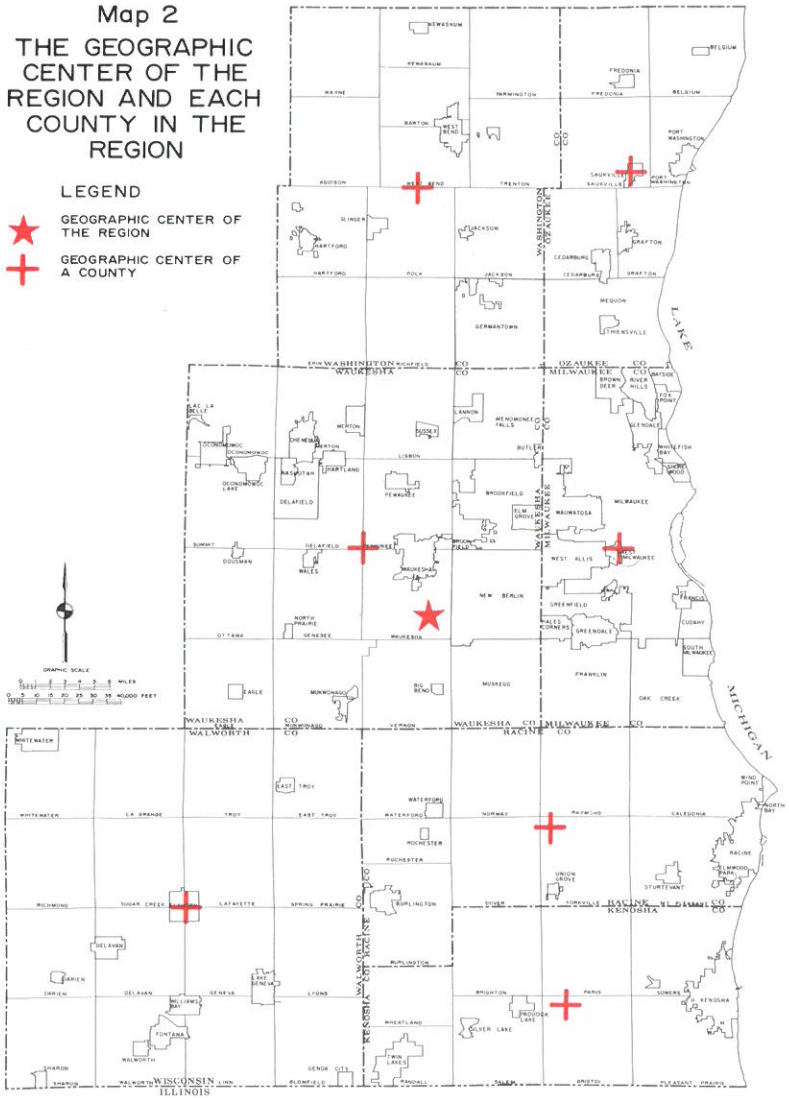
THE CENTER OF POPULATION OF THE REGION AND EACH COUNTY IN THE REGION



Source: SEWRPC.

Map 2

THE GEOGRAPHIC CENTER OF THE REGION AND EACH COUNTY IN THE REGION



Source: SEWRPC.

a single element because of the prior availability of the location of that county's center of population.[1] The relatively small number of elements used and the relatively large size and variance in the size, shape, and population of the elements are in opposition to the concept of integration expressed in the foregoing equations, in which the product of an infinite number of uniform, infinitely small elements and their centroidal distances are summed. The sheer size of the task of calculating the center of population of the Region when done "by hand" limits, as a practical matter, the uniformity and refinement of elements and, therefore, the results.

Measurements and Computations

North-South and East-West axes were drawn on a regional work map (see Map 3). The origin of this coordinate system was arbitrarily taken at the intersection of S. 123rd Street and W. Greenfield Avenue in the City of West Allis but could have been placed elsewhere within or outside the Region without affecting the results.

The next step entailed the measurement of the perpendicular distances from the estimated center of population of each element to each of the two axes using an ordinary Engineers' scale and recording the distances on a computation sheet (see Table 2, columns (3) or (4) and (5) or (6). The distances are signed either plus or minus, depending in what quadrant the related centroid happens to be located. If there are n population elements p_1, p_2, ..., p_n whose centers of population are located at distances $\bar{x}_1$, $\bar{x}_2$, ..., $\bar{x}_n$ from the y axis, the distance of the center of population of the Region from the y axis is $\bar{X}$, given by:

$$\bar{X} = \frac{p_1\bar{x}_1 + p_2\bar{x}_2 + \ldots + p_n\bar{x}_n}{P} \qquad (3)$$

where P is the total population under consideration, equal to $p_1 + p_2 + \ldots + p_n$.

Similarly:

$$\bar{Y} = \frac{p_1\bar{y}_1 + p_2\bar{y}_2 + \ldots + p_n\bar{y}_n}{P} \qquad (4)$$

These two formulae provide a convenient basis for the tabular computation of the center of population, as indicated by Table 2. It should be noted that for convenience the $\bar{x}$ and $\bar{y}$ distances of the 120 elements used in the computation were measured on the work map in inches, $\bar{X}$ and $\bar{Y}$ computed in inches and then converted to miles by application of the map scale, 1:96000, upon which the $\bar{x}$ and $\bar{y}$ values were originally measured. Population levels for the 120 elements were taken from SEWRPC 1968 population level estimates for civil divisions within the Region.

The center of population in the Region as of January 1, 1968, was thus computed to be located at the intersection of W. Burdick Avenue and S. 71st Street in the City of Milwaukee.

LOCATING THE GEOGRAPHIC CENTER BY CONVENTIONAL TECHNIQUE

The geographic center may be defined as the centroid of the area under consideration as delineated on a map projection. To compute the geographic center of the Region by the conventional technique, the Region was first divided into 35 elements, the centroids of which could be readily located by inspection. A representation of the work map employed to locate the geographic center of the Region is shown on Map 4, with the accompanying measurements and moment summations given in Table 3.

Similar formulae were used as previously described for calculating the center of population, formulae (1) and (2), wherein the area-weighted means are substituted for population-weighted means:

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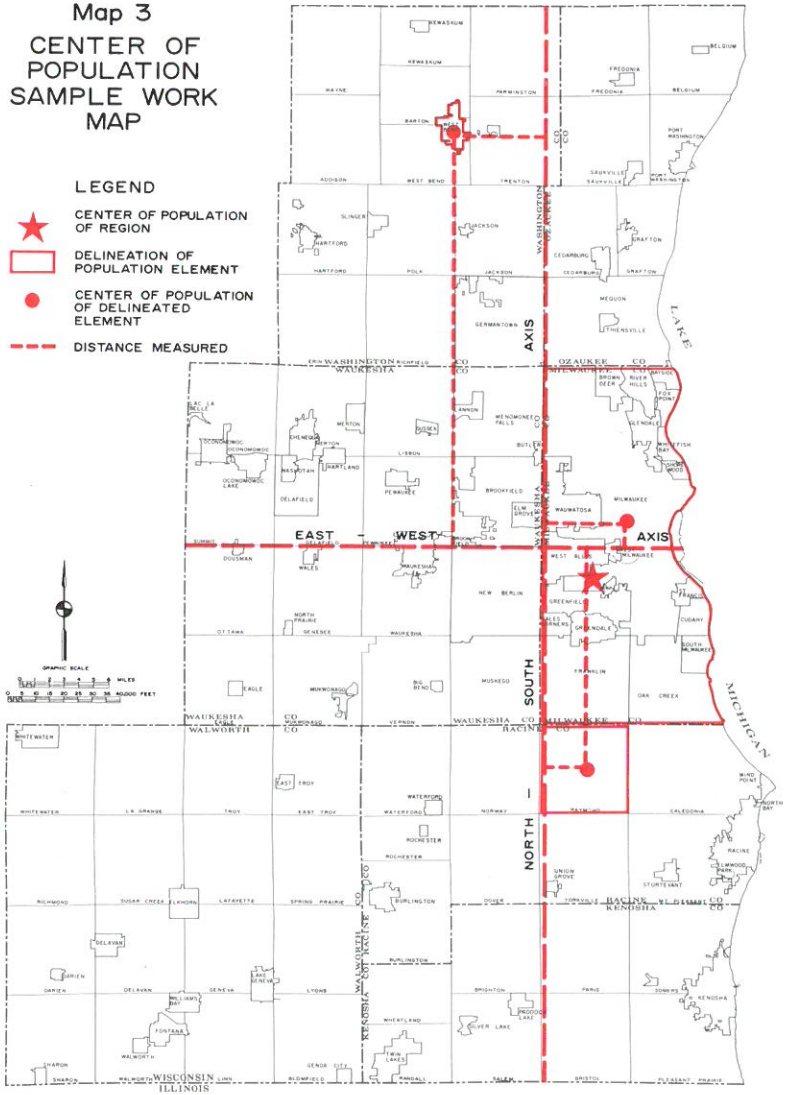
[1] *1968 Directory and Report of Milwaukee's Progress in 1967, City of Milwaukee, 1968.*

Map 3

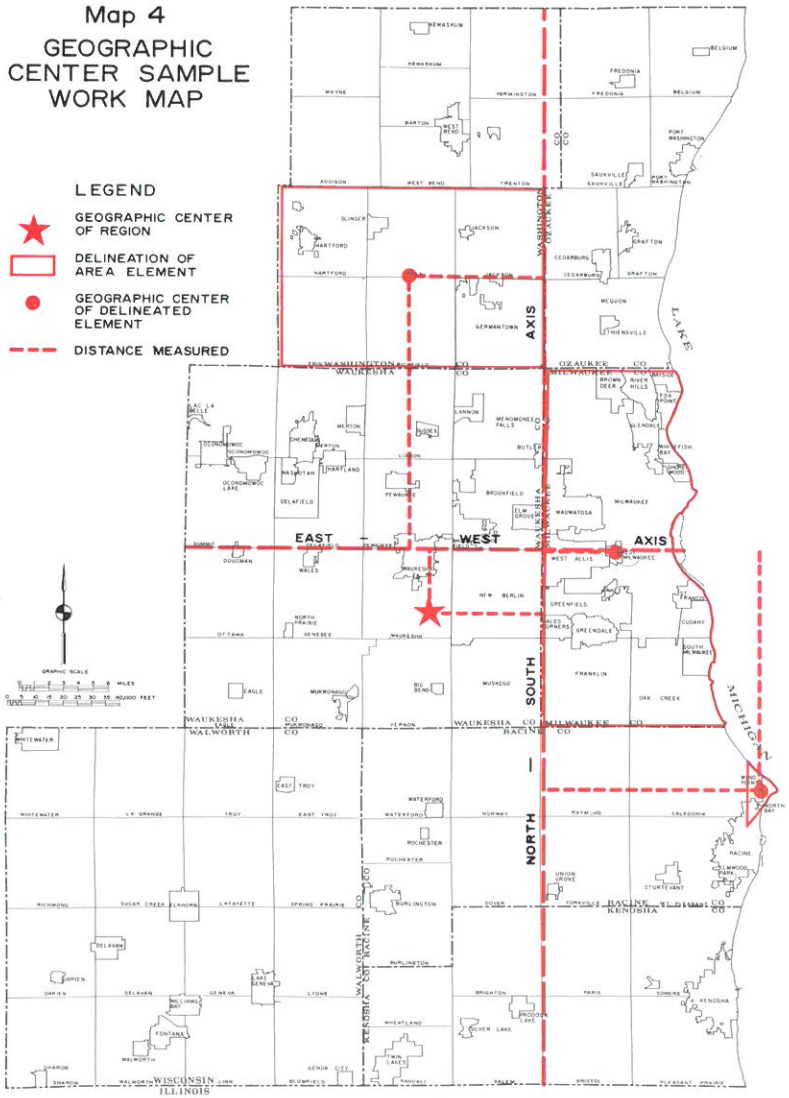
CENTER OF POPULATION SAMPLE WORK MAP



Source: SEWRPC.

Map 4

GEOGRAPHIC CENTER SAMPLE WORK MAP



Source: SEWRPC.

Table 2

POPULATION CENTER SAMPLE COMPUTATION SHEET WITH SAMPLE ENTRIES OF 3 ELEMENTS FROM THE TOTAL OF 120 ELEMENTS[a]

Element	Estimated 1968 Resident Population of Element, p	Distance of Estimated Center of Population of Element East or West of Vertical Axis, + $\bar{x}$ or - $\bar{x}$, Respectively (In Inches)		Distance of Estimated Center of Population of Element North or South of Horizontal Axis, +$\bar{y}$ or - $\bar{y}$, Respectively (In Inches)		Population Moment, + p$\bar{x}$ or - p$\bar{x}$ and +p$\bar{y}$ or -p$\bar{y}$, With Respect To Selected Axes.			
		East	West	North	South	East	West	North	South
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
1	1,134,000	3.79		1.07		4,297.86		1,213.38	
2	15,100		4.15	18.42			62.67	278.14	
120	3,200	1.87			9.87	5.98			31.58
Total	1,809,500					6,465.41	2,563.78	3,297.93	5,856.87

$$\bar{X} = \frac{\Sigma \text{Column 7} - \Sigma \text{Column 8}}{\Sigma \text{Column 2}} \qquad (5)$$

$$= \frac{6,465.41 - 2,563.78}{1,809,500}$$

$$= + 2.16 \text{ inches or } 3.26 \text{ miles east of the y axis}$$

$$\bar{Y} = \frac{\Sigma \text{Column 9} - \Sigma \text{Column 10}}{\Sigma \text{Column 2}} \qquad (6)$$

$$= \frac{3,297.93 - 5,856.87}{1,809,500}$$

$$= - 1.41 \text{ inches or } 2.14 \text{ miles south of the x axis}$$

[a] *Measurements were made with an Engineers' scale graduated to 0.02 inch.*

Source: SEWRPC.

$$\bar{X} = \frac{a_1\bar{x}_1 + a_2\bar{x}_2 + \ldots + a_n\bar{x}_n}{A} \qquad (7)$$

$$\bar{Y} = \frac{a_1\bar{y}_1 + a_2\bar{y}_2 + \ldots + a_n\bar{y}_n}{A} \qquad (8)$$

where A is the total area under consideration, equal to the summation of n areal elements:

$$a_1 + a_2 + \ldots + a_n.$$

The centroidal distances of the 35 elements used in the computation were scaled from the work map in inches using an ordinary Engineers' scale and recorded on a computation sheet. The area of the elements were measured by polar planimeter and similarly recorded. The geographic center of the Region was thus computed to be located at a point 0.2 mile east and 0.3 mile south of the intersection of the CTH I and CTH F in Section 26 in the Town of Waukesha.

COMPUTING THE CENTER OF POPULATION AND GEOGRAPHIC CENTER BY COMPUTER TECHNIQUE

The availability of population data for the Region by U. S. Public Land Survey quarter section and the availability of Wisconsin State Plane Coordinates for all quarter section corners within the Region, either from second-order field surveys or from maps prepared to National Map Accuracy Standards, provided the basis for refined techniques which more closely approximate true integration than do the conventional techniques for locating both the center of population and the geographic center. Considering each of the

Table 3

GEOGRAPHIC CENTER SAMPLE COMPUTATION SHEET WITH SAMPLE ENTRIES FOR 3 ELEMENTS OF THE TOTAL OF 35 ELEMENTS USED[a]

Element	Surface Area of Elements[a] (Square Inches)	Distance of Estimated Geographic Center of Element East or West of Vertical Axis, + $\bar{x}$ or - $\bar{x}$ Respectively (In Inches)		Distance of Estimated Geographic Center of Element North or South of Horizontal Axis, + $\bar{y}$ or - $\bar{y}$ Respectively (In Inches)		Geographic Moment, + $a\bar{x}$ or - $a\bar{x}$ and + $a\bar{y}$ or - $a\bar{y}$, With Respect To Selected Axes.			
		East	West	North	South	East	West	North	South
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
1	105.49	3.27		0	0	344.96		0	0
2	94.32		5.85	12.40			551.77	1,169.57	
35	2.02	9.69			10.67	19.52			21.50
Total	1,185.27					1,317.01	7,419.93	5,023.31	8,316.52

$$\bar{X} = \frac{\Sigma \text{Column 7} - \Sigma \text{Column 8}}{\Sigma \text{Column 2}} \qquad (9)$$

$$= \frac{1,317.01 - 7,419.93}{1,185.27}$$

$$= -5.15 \text{ inches or } 7.80 \text{ miles west of the y axis}$$

$$\bar{Y} = \frac{\Sigma \text{Column 9} - \Sigma \text{Column 10}}{\Sigma \text{Column 2}} \qquad (10)$$

$$= \frac{5,023.31 - 8,316.52}{1,185.27}$$

$$= -2.78 \text{ inches or } 4.21 \text{ miles south of the x axis}$$

[a] *Measurements were made with an Engineers' scale graduated to 0.02 inch.*

Source: SEWRPC.

10,799 quarter sections within the Region as an element, it was possible to readily compute by machine the centroidal distances for every element. The acreage and population of each quarter section could then be multiplied by its respective centroidal distances, the products summed, and then divided by the total area and population of the Region to obtain the geographic center and center of population, all by machine. The process can be readily repeated for any subarea of the Region, such as counties, civil divisions, or watersheds whose boundaries can be approximated by quarter-section lines. Due to the relatively small elements which quarter sections represent, it could be assumed that the population is evenly distributed within each quarter section. The moments, one pair each for both centers, were summed and formulae similar to (3), (4) and (7), and (8) were utilized (see Table 4). After substitution of the data into the formulae, the resultant quotients were plotted and found to be within one-tenth mile of their respective centers, as computed with the conventional technique.

SUMMARY

It is apparent that the machine method of computation based on the U. S. Public Land Survey System, as related to the State Plane Coordinate System grid, allows relatively accurate and efficient identification of the population and geographic centers. Without the availability of this refined data, the conventional technique is, however, quite adequate. Given the requisite data as identified in this article, either technique is feasible for any useful subject area, such as county, city, village, school district, or marketing area.

Table 4

POPULATION AND GEOGRAPHIC MOMENTS AND FORMULAE-COMPUTER TECHNIQUE

Total Population Moments[a], $+ p\bar{x}$ and $+ p\bar{y}$ With Respect To Selected Axes		Total Geographic Moments[b], $+ a\bar{x}$ and $+ a\bar{y}$ With Respect With Respect To Selected Axes	
East	North	East	North
9595795525.2	6564262499.7	8180657360.11	6051951153.01

Population formulae:[c]

$$\bar{X} = \frac{\sum \text{Column 1}}{P} \qquad (11)$$

$$\bar{Y} = \frac{\sum \text{Column 2}}{P} \qquad (12)$$

Geographic formulae:[c]

$$\bar{X} = \frac{\sum \text{Column 3}}{A} \qquad (13)$$

$$\bar{Y} = \frac{\sum \text{Column 4}}{A} \qquad (14)$$

[a] *Total population moments are* $p_1 \bar{x}_1 + p_2 \bar{x}_2 + \ldots + p_n \bar{x}_n$ *and similarily for* $p\bar{y}$.

[b] *Total geographic moments are* $a_1 \bar{x}_1 + a_2 \bar{x}_2 + \ldots + a_n \bar{x}_n$ *and similarly for* $a\bar{y}$.

[c] *Only one factor is necessary in the numerator since all* $\bar{x}$*'s and* $\bar{y}$*'s are positive, as evidenced by the omission of moments west and south.*

Source: SEWRPC.

A BACKWARD GLANCE

by Gerald P. Caffrey, Milwaukee Municipal Reference Librarian

DOWNTOWN YESTERDAYS

INTRODUCTION

In the Christmas season of 1964, a petite blond entertainer from England, who was anything but petite when it came to lung power, was belting out a song that soon made the top One Hundred in popularity.

When Petula Clark screams "I wanna go DOWNtown," you'd better believe it. But why? What does Downtown have that other places don't have? In fact, just what is Downtown? Is it a real place or just a state of mind?

How the term as it is now used crept into our language is hard to say. But we do know that, in a great many cities, the business district is located centrally and at a lower level than much of the surrounding area.

The word as a reference to the business center is found in the Second Edition of Webster (1934), but not in March's Thesaurus of 1902. In John Gregory's History of Milwaukee, published in 1931, the author uses the words "down town" in quotation marks, suggesting the newness of the expression. On the other hand, back in 1898 (albeit on April Fool's Day) the Milwaukee Police Chief, J. T. Janssen, voiced a now familiar plaint in a report to the Common Council:

> As the city grows and traffic increases, it becomes necessary to detail a larger proportion of police officers in the downtown section for duty at street crossings and bridges, thus leaving other territory with diminished protection.

If only Chief Janssen could come back today, where would he station his policemen (provided, of course, the City Fathers would grant him the additional positions on the force, and provided he could recruit them)? We wonder, too, what he would think of the robot cops we call traffic signals, which appeared, if not first, at least earlier in Milwaukee than in most American cities.

In Janssen's day posting an officer at bridges was a big part of the picture, as river traffic was great, and the tie-ups of both vehicles and shipping were frequent. The Grand Avenue bridge in that year of 1898 was a swing bridge, and new cast-steel wheels were supplied that year for its turntable.

But enough about bridges for the moment. They were built mostly years after the town of Milwaukee began. The real question is why is Milwaukee located where it is and, more especially, why is Milwaukee's downtown where it is?

The answer is, and was, transportation, man's age-old need for the easiest (and usually that meant the cheapest) way to get from here to there. In the first half of the nineteenth century, the easiest and cheapest method was by water, just as it had been for at least 150 years before, when a Jesuit missionary, Pere Jacques Marquette, in 1673 skirted the west shore of Lake Michigan in a canoe. The namesake of Marquette University is believed to have been the first white man to visit this area. According to Father Raphael Hamilton, S. J., the good Padre paddled up the Milwaukee River to about the point where a new park is being developed opposite the Center for the Performing Arts. It is hard today, for us who have seen Lake Michigan in one of her temper tantrums, to imagine canoeing any great distance on her waters; but perhaps the storms of the 1670's were the very reason why the missionary and his Indian guides sought the haven, not only of Milwaukee harbor but of her "inner harbor" as well; that is, the triad of streams converging at one mouth and known today as the Milwaukee, Menomonee, and Kinnickinnic.

The early French visitors called the last named river the Bois-de-Gris, or "trees of grey," presumably because there were such trees lining its shore. The permanent name was also due to trees, according to William F. Hooker, a local historian, who wrote that red willow, which grew abundantly in the area, when combined with tobacco made what was called by the Indians "kinnickinnic."

Milwaukee—A Meeting Place by the Waters

But whatever we call these three waterways and the broad curving bay into which they empty, it was their existence that resulted in an Indian village being located here. Wisconsin's red men from many tribes met here to trade with the French, beginning about the year 1800. The Indian Agent at Green Bay in 1817 took a census of the red men at Milwaukee and showed that there were about 300 of them from these tribes: the Saques, Foxes, Menomonies, Chippewas, Ottawas, Winnebagoes, and Pottawatomies.

Because of the variety of Indian tongues and no written language, the exact meaning of many of today's Indian place names, including "Milwaukee," can only be approximated by guessing which Indian language furnished the name that to the early white settler sounded the most like the present name.

Scholars have pointed out that the explorers' versions of what the Indians called this place vary in spelling from Mahnawauk-seepe to Melleoki and in meaning, depending on which tribesman was making the sound, from "pleasant land" to "meeting-place-by-the-waters." Take your choice.

We prefer "meeting-place-by-the-waters," for such Milwaukee was and is. All the early history of the town, village, and city points to the use of both the rivers and the bay. In the early 1800's, when Robert Fulton was steaming up the Hudson in the Clermont, French traders, such as Antoine Le Clair, La Framboise, Jacques Vieau, Jean Baptiste, Mirandeau, and Thomas G. Anderson (how did he get in here?), visited Milwaukee in sailing vessels or by long trips overland.

Le Clair, by way of illustration, had arrived at Milwaukee in 1800 and settled with his family about three miles above the mouth of the Milwaukee River on the north, or lake side, of the stream. He and La Framboise were about equal as traders, exchanging tobacco, knives, and textiles, but no liquor, for furs that Le Clair took to Detroit and La Framboise to Mackinaw.

Lyman C. Draper, a Wisconsin historian, writes:

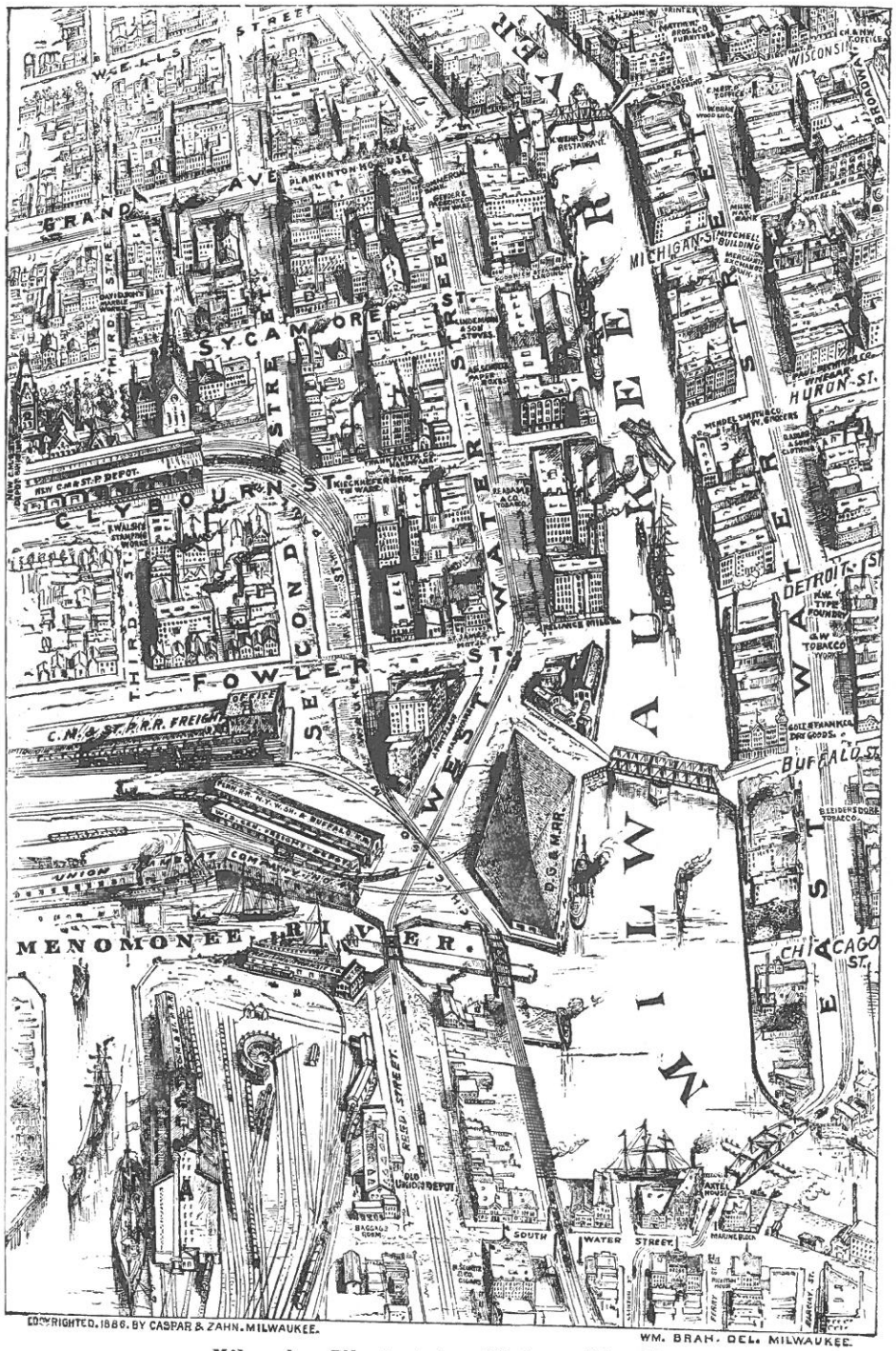
> Le Clair would go to Detroit in the spring, and about the month of May, a small sailing vessel would leave Detroit with his purchases...and deliver them. The vessel would then take the year's gathering of furs, etc., as a return cargo to Detroit...Thus were matters of transit managed on upper Lake Michigan, say from about 1800 to 1809.

But the place which was to become a thriving city was thinly populated by white men until after the treaties of 1831 and 1833 between the United States and the Indians, whereby the latter's land titles were extinguished. The place developed rapidly thereafter.

In this period before the railroads came, Milwaukee's "downtown," which then meant Milwaukee itself, could logically be nowhere else. It had to be at lake and river level for the sake of transit.

Early views of Milwaukee show picturesque sailing vessels in the harbor or moored at quays along the rivers (see Figure 1). Milwaukee's future as a business center eventually found expression along very few streets, with Wisconsin Street east of the river in Juneautown, and Spring Street west of the river in Kilbourntown, becoming the chief retail thoroughfare and, therefore, the "Main Street" of the young city. Even after Spring Street became Grand Avenue on December 18, 1876 (by a vote of 28 to 2 in the Common Council), and West Wisconsin Avenue on December 20, 1926 (by a vote of 17 to 7), there were many who called Milwaukee "a one-street town." For Grand Avenue was the chief shopping street for many years. In 1926, when hundreds of Milwaukee's street names were changed as part of an effort toward systematic nomenclature, there were at least some downtown businessmen who held out for the name Grand Avenue.

Figure I



Milwaukee Illustrated. — Birdseye View I.

Looking North from Union Depot and South Water St. to Grand Ave. and Wisconsin St.

The sketch, made in the 1880's, shows the importance of the river for transportation and its competition with the railroads. Note also the location of the old Union Depot (lower center) and the new depot at Third and Clybourn.

At a hearing before the entire Common Council, the following spoke in vain for retaining the old name: Messrs. Archie Tegtmeyer, a well-known jeweler; Carl Herzfeld of the Boston Store; Mr. Pace, representing Gimbel Brothers; Mr. A. J. Harvey, representing the Plankinton Building Properties, Inc.; Mr. Herman Reel, a ready-to-wear merchant; and Mr. S. J. Brouwer, a dealer in footwear.

But enough of street problems. Milwaukee may still be a one-street town, but in the 1840's that didn't matter so much since it was a three-river town, and that's where the action was—the transit action.

"BATTLE OF THE STRAIGHT CUT"

An important step in the future location of downtown was the "Battle of the Straight Cut." This was a controversy beginning in the 1830's over the site of a proposed new opening of the Milwaukee River into the lake. At the time the river ran parallel to the lake, at least as far south as Railroad Street (now Greenfield Avenue) where it was joined by the Kinnickinnic before turning east and into the lake. This meant that a narrow sandspit was all that separated the river from the lake for a distance of more than half a mile. Was the natural mouth of the river at the more southerly point the ideal point of entry for lake ships into the river? Many thought not, and indeed there was even some question as to whether this was the "natural" mouth.[1]

Plans were soon afoot to make a new and more adequate opening as a harbor entrance farther north, cutting the peninsula at some narrow point and leaving an island. Later, when the earlier, more southerly opening into the lake would be closed, the result would be a peninsula pointing north, which it is to this day, although it is still called an island (Jones is the name, after an early shipbuilder who had his yard located there). The French, long before, called it the Isle of Death.[2]

The exact location of this straight cut was so important to certain Milwaukeeans in the forties that it resulted in a street being named as a testimony to perfidy and in a prominent "South Sider" resigning from the State Legislature.

The straight cut was finally opened in 1857; but as early as 1836, ten years before Milwaukee became an incorporated city, the Federal Government sent army engineers to survey the harbor area. Two of these men, Lieutenants Center and Rose, recommended a straight cut 3,000 feet north of the natural outlet of the river. Another man, Lieutenant Abert, favored location at the natural outlet. In 1846 the new city's first Common Council passed an ordinance naming streets in the area. There was a Mahnawauk Street after another version of the city's Indian name. There was a Rose Street and a Center Street named after the "good guys" and close to the proposed straight cut, while down at the other end of the 3,000-foot island, fronting on the "old harbor" as it was called, was Abert Street; and according to the ordinance, it was so named "in perpetual remembrance of his ill-advised location of the harbor."

Perhaps because of the difference of opinion on the ideal site for the straight cut—the city had many site controversies thereafter, as any planner knows, right down to today—perhaps because of the controversy, it took 21 years until the Rose and Center plan was actually followed. In the meantime, federal funds were obtained on two occasions for improving the harbor; but both times the money was applied to improving the southerly site rather than the recommended one.

Strangely devoid of first names, the army engineers, Lieutenants Center and Rose have been immortalized in the original Charter of the City of Milwaukee. When that document was enacted by the Wisconsin Territorial Legislature in January of 1846, it contained only two personal names, those of the men who rec-

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[1] *James Buck, in his Pioneer History of Milwaukee, wrote in the '70's: "There have been four changes in the mouth of the river in the last fifty years, viz.: In 1822 it debouched near the foot of Washington street; in 1836 it was at the old harbor; in 1837 it cut for itself a new channel near where the present harbor is, where it discharged all summer, when it returned to its old mouth. It is very evident, however, that its oldest mouth is Deer creek, at the rolling mill; but that was many years ago."*

[2] *Those were grim days. The Indian name for the river outlet was "Death's Door."*

ommended the site of the improved harbor, or straight cut.[3] In Section 32 of the Charter, the city was authorized to vote for, and collect taxes for the building of, the cut at this site. But the words of the provision were strange in that they called for a vote in only four of the five wards of the city, carefully exempting, by omission, the Fifth Ward, or South Side, from both a vote on the matter and a special assessment. No one could claim it was taxation without representation, but it certainly could be called discriminatory. Apparently smarting at this slight, and at one repeated when the first State Legislature in 1848 sought to implement this order, Horace Chase, an early and prominent South Side pioneer, actually resigned from the State Assembly!

To understand why the choice of one site for the straight cut over another could create such controversy is to know both the importance of shipping in early Milwaukee and the growth of business generated by that shipping.

In 1969 there is a parallel in the trouble the City Fathers are having with unsightly abandoned gasoline filling stations. Who would have dreamt ten years ago, with the great promise of the automobile, that such a phenomenon would occur? And yet it has simply because the formerly busy intersections, once ideal for gasoline retailing, are today losing out to more profitable locations close to expressway off-ramps.

Thus, in 1857 when the straight cut was finally made, directly east of what is now E. Bruce Street, it promptly ended a prosperous situation for a number of hotels and other businesses that had been flourishing in that part of Walker's Point (the near South Side) that included Clinton and Reed Streets.

Today a light industrial district, much of this area was "downtown" in the early shipping days and even in the days of the first railroads; but it received a second, and knockout blow—a TKO if you will—when the Union Depot was moved from its location on Reed Street to its new home near Third and Clybourn. More about this when we describe early railroads in Milwaukee, but now we are discussing the waterways.

Before Milwaukee became a city in 1846, it was composed of only three wards, which coincided with the three separately settled towns on the East, West, and South Sides, also known as Juneautown, Kilbourntown, and Walker's Point, respectively, with the last named being the area immediately south of the Menomonee and the eastward bend of the Milwaukee. Important as these rivers were, to carry ships into the new settlements, they were also a divisive element. While the three early promoters, George Walker, Byron Kilbourn, and Solomon Juneau, were busy platting and subdividing, someone had to carry the mail and other goods between the towns.

The first method was by ferry; and as early as 1835, Horace Chase began ferrying near the mouth of the river, bringing a mail wagon and other vehicles from the south into Juneautown.

Milwaukee was a boom town in those days, with much land speculation going on; and the need to cross the rivers from one ward to another was growing in importance. In the next year or two, other ferries were established at Spring Street[4] and at Water Street (now N. Water Street); and the business of ferrying

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[3] *Although the two men are not further identified in the usual histories of Milwaukee, Lyman C. Draper, in a footnote to p. 372 of Volume VII of the Wisconsin Historical Collections identifies one engineer, Center, as follows: ''Alexander J. Center, a native of New York, a cadet from 1823 to 1827, when he entered the army, serving on a frontier duty, participating in the Black Hawk War, and assigned to topographical duty from 1832 to 1836, when he resigned. He has since been much engaged as a civil engineer on canals and railroads; superintendent of the overland mail-route to California; president to a Maryland coal company, and of the Cumberland and Pennsylvania Railroad, retiring in 1866 to New York City.'' The first Territorial Census of 1836 for Milwaukee County listed a John Rose, with a family of 4, among a total of 1,406 males over 21 and a total county population of 2,893.*

[4] *In the summer of 1839, the ferryman at the Spring Street crossing, was a teenager, who grew up to be a successful merchant, Clerk of Circuit Court, Tax Commissioner, Secretary of the Board of Commissioners that built the Milwaukee Water Works, Alderman, Trustee and Vice-President of Northwestern Mutual Life Insurance, Regent of the University of Wisconsin, and Trustee of the Milwaukee Public Library. His name was Matthew Keenan.*

became regulated by the Territorial Legislature. Act No. 55 of the Territorial Laws of 1837-38 required that a ferryman have "a good tight boat or boats if more than one be necessary, and other small craft of sufficient number, size, and dimensions, strength and steadiness, for the safe and speedy transportation of all passengers, their horses, cattle, and other animals, as well as their goods, chattels, and effects."

Although we find no record of any female operators of ferries, it is interesting to note that there was no sex discrimination so far as the territorial legislators were concerned, for the Act is carefully worded to include both sexes, perhaps against the day when some Tugboat Annie would engage in the service.

The law also required that the service be provided from daylight to dark and that public messengers and jurors going to court be transported without charge. Night service, if provided, could be at "double the rate of ferriage, or toll, allowed to be taken in the daytime."

THE BRIDGE WAR

As each of the three parts of the future city grew, bridges became necessary. However, their necessity varied in the opinion of residents of each section. One of the earliest bridges was planned by Kilbourn to be built across the Menomonee, thus connecting the West and South Sides. The bridge was never built because the lumber he had piled on the shore, to be used in its construction, mysteriously took to the water one night and floated out into the lake. It appeared that some East Siders were afraid a union of the other two parts of Milwaukee would offer them too much competition.

This was probably the opening gun in the "Bridge War" that has become a Milwaukee legend. Excellent accounts of this display of sectional rivalry can be found in several Milwaukee histories, especially Gregory,[5] and Austin.[6] Let it suffice to say here that so long as river transit was equal to, or superior to, land transit, the thought of cross-river devices that might speed the latter was unthinkable to men like the West Side's Kilbourn. He saw the East Siders as promoters trapped on their relatively narrow spit of land, whereas he had everything west of the river to develop. Any easy crossing would benefit the East Siders, so why should the residents of promising Kilbourntown lift one finger to aid the cause? In order to facilitate access to his burgeoning town, however, he built a steamboat, the Badger, and used it to bring immigrants and other land buyers to docks on the west side of the river.

WATER-BORNE VERSUS LAND-BORNE COMMERCE

Even after bridges were finally built (and seldom at right angles to the shore since they had to connect the mismatched streets), river traffic continued to be the principal mode of transportation. The masts of many schooners were to be seen tied up at docks all along the river, and the long story of water-borne versus land-borne commerce can best be illustrated by the story of bridge openings.

The first bridges were floating bridges, followed by swing bridges (see Figure 1) that pivoted on a foundation in the center of the river in order to open the waterway to ships. The first "permanent" bridge at Spring Street was a swing bridge built in 1842.[7] The eventual effect of this and other bridges was to unite the three towns and pave the way to incorporation in 1846. The Spring Street bridge had two stores on it, perhaps a harbinger of its position today as the bridge in the heart of downtown.[8]

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[5] *Gregory, John J., History of Milwaukee, Wisconsin, Vol. I, Chicago, Clarke, 1931.*

[6] *Austin, H. Russell, "The Milwaukee Story," The Milwaukee Journal, 1946.*

[7] *The last swing bridge on the Milwaukee River is still (1969) in operation, connecting E. and W. Pleasant Streets. The first bridge there--a wooden one--was built in 1872, replaced by an iron bridge in 1887, which was condemned in 1935.*

[8] *Even the bridge can last only so long. Plans are being made and funds scheduled in the City's Capital Improvement Program to replace this span, probably in 1970, with a million dollar vertical lift bridge similar to the new ones at the Clybourn Street and St. Paul Avenue crossings.*

Another Spring Street bridge, now long forgotten, was built a few years later some 14 blocks westward.

What is now W. Wisconsin Avenue was not named Spring Street without a reason. One of the many springs along the way fed a creek that intersected the street at about 14th Street, where a bridge was required. Probably feeding the same creek was the "ol swimmin' hole," a spring-fed pond a block and one-half farther west, where today stands a modern towering dormitory of Marquette University.

But water was everywhere in Milwaukee in the early days, with, of course, the Milwaukee River and Lake Michigan serving the practical business of transportation. Today even the bascule bridges are opened only occasionally; but until shipping was surpassed by trains and automobiles, the frequency of bridge opening was vital to Milwaukee commerce.

Not that there were no complaints. In the City Ordinances of 1875, one section reads:

> Whenever, between the hours of six o'clock in the morning and eight o'clock in the evening, persons, teams, or vehicles, have been delayed at said bridges fully ten minutes, by reason of said bridges being open for vessels to pass, it shall be the duty of the bridgetenders, or other persons in charge of the bridge or bridges, to display said signal, and immediately close the same, and keep the same closed for fully ten minutes, for such persons, teams, or vehicles to pass over, if so much time shall be required, when the same shall be opened again, and kept open (if necessary for vessels to pass) for the like period; and so alternating (if necessary) during the hours aforesaid.

The City Fathers of the time were trying to be fair to both the river traffic and the street traffic. Earlier editions of the city ordinances contain no such arrangement, but by 1875 there was clearly a problem. Today's ordinances on the matter are even more verbose, but give the nod to people on wheels rather than to people afloat. Bridges may now be kept open only five minutes, not at all during morning or evening "rush hour" for wheel traffic; and as to bridges across the Milwaukee River north of and including Buffalo Street, they may be opened only upon two hours advance notice by telephone or otherwise. Two exceptions are fire boats and ships belonging to the United States. Today, instead of employing one or more bridgetenders at every span, the city uses roving crews, who leapfrog (via automobiles) from bridge to second bridge beyond when a vessel makes a lengthy trip up or down the river.

About the time the horseless carriage was really here to stay, let's say 1911, river traffic was still a big factor in the city's commerce. That year, from January 1 to November 1, the Broadway bridge was opened an average of 46 times a day; and the E. Water (now N. Water) Street bridge, (see Figure 1), 47 times a day or 14,355 times in 10 months. Upriver the bridgetenders were less busy. The Holton Street bridge was opened only once a day; and the Pleasant Street bridge, three times a day. Now, according to figures for the first 10 months of 1968, the Broadway bridge is opened on an average of 10 times a day and the Pleasant Street bridge only once a week. Were it not for the fact that the Broadway bridge needs to be opened for vessels entering the Menomonee River to serve the industrial valley rather than downtown, the number of openings would be far fewer (see Figure 2).

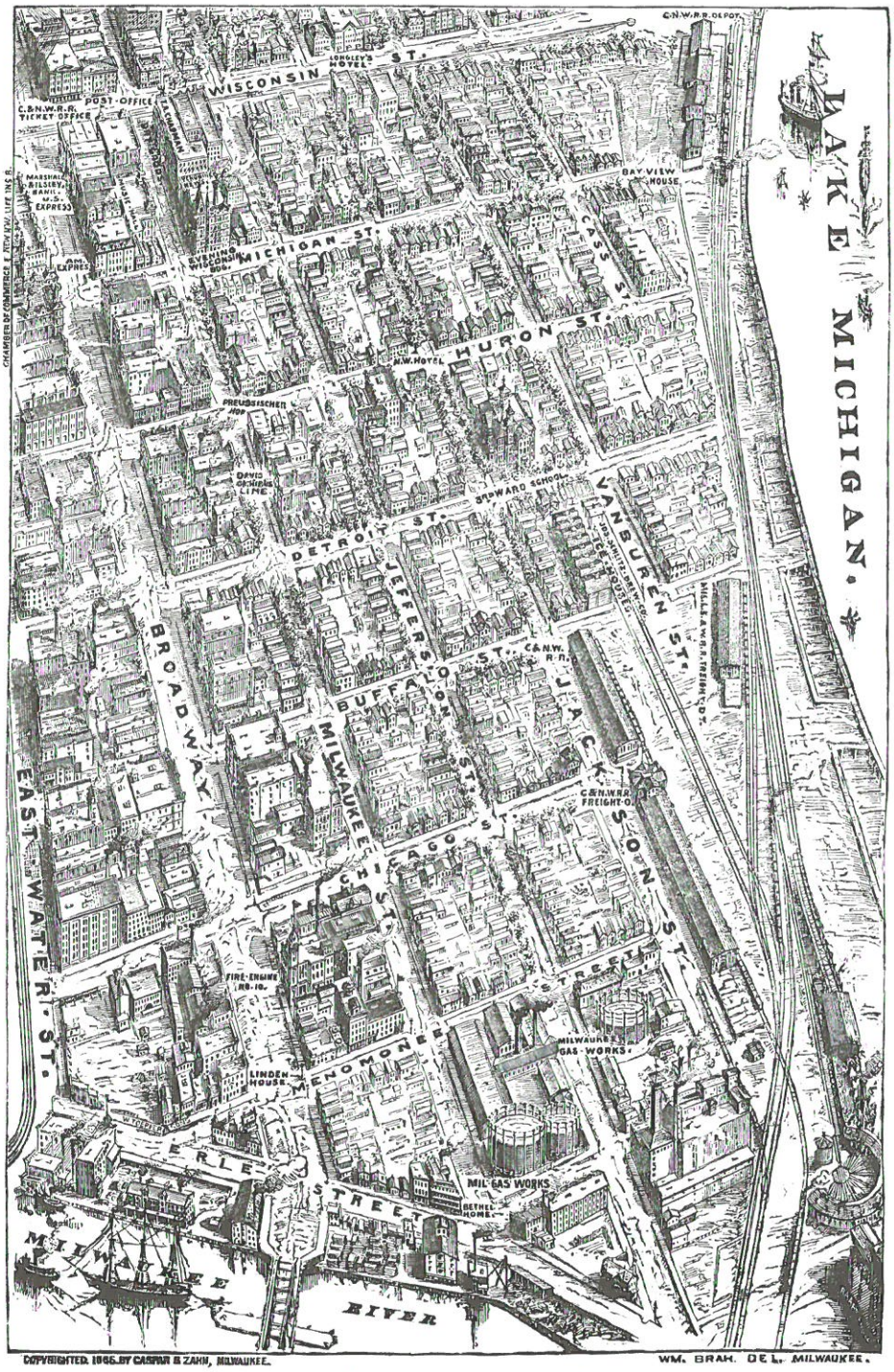
The importance to the young city of both the downtown and of shipping was pointed out in 1846 by Solomon Juneau. In his inaugural address to the first Common Council, Mayor Juneau said:

> Our commercial interest should receive a proper share of your attention and every facility should be afforded those engaged in commercial business, to transact the same in a prompt and efficient manner, and nothing should be wanting on the part of the city, to render the whole of the commercial part of it easy of access to the vessels navigating our lakes.

ADVENT OF THE RAILROAD

We have mentioned earlier the fact that it took Milwaukee some 21 years to move from talking about improving the harbor (1836) to actually getting the straight cut completed (1857). The controversy over the exact site was only one reason for the delay. Another was that the City Fathers were greatly dis-

Figure 2



Milwaukee Illustrated.—Birdseye View II.

Looking North from Milwaukee River and Erie Street to Wisconsin Street and the Lake Shore.

The "lower Third Ward" in the '80's. In 1892 a fire destroyed many of these smaller buildings. N. Water Street was then named E. Water Street because it was east of the river, and N. Plankinton Avenue was W. Water Street. Note the Lake Front Depot (upper right).

tracted along about 1847 by a new (and therefore better?) means of transportation, the Rail Road.[9] The term was frequently printed as two words in the early days and used interchangeably with the unit term "railway."

Although Byron Kilbourn proposed a railroad in Milwaukee as early as 1836 (only 11 years after the first steam locomotive was built in America), sectional rivalry and other obstacles held up realization until 1847 when the Milwaukee and Waukesha (later called the Milwaukee and Mississippi) was incorporated (see Figure 3).

The actual building of the road, slowly paid for by subscription of farmers, merchants, and a handful of Milwaukee promoters, was given a substantial boost by the city itself when it subscribed to $100,000 in stock, with the taxpayers becoming stockholders in the young corporation. By 1851 the first railroad was finished as far as Waukesha, and the happy event was marked with an excursion trip to the end of the line. Here a band concert and speeches ushered in this great new era for Milwaukee and Wisconsin.

Figure 3

A full page advertisement in an 1856 city directory. The growth and rivalry of the early roads spelled financial trouble for the city.

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[9] *See "A Backward Glance -- Railroad Transportation in Southeastern Wisconsin,"* Technical Record, *Vol. 2 - No. 2, December 1964 - January 1965.*

For, indeed, it was "a matter of statewide concern," as the jurists say today, since the real aim of the early rail enthusiasts was to link with steel the two great waterways—Lake Michigan and the Mississippi.

In the fifties the iron rail fever grew; and although eventually it made Milwaukee the chief transportation center of the state, for a time it meant trouble—economic trouble—for the growing city.

In the 1850 and 1851 sessions of the Legislature, acts either granting or amending the incorporation of more than a dozen railways in the state were passed. Even the names of the budding enterprises are of interest in that they show how the fever spread:

Shullsburgh Branch Road
Madison and Kenosha Road
Milwaukee and Beloit (amended)
Milwaukee and Waukesha (amended)
Potosi and Dodgeville
Milwaukee and Fond du Lac
Milwaukee and Mississippi (amended)
Madison and Swan Lake
Milwaukee and Watertown
Rock River Valley Union RR Co.
Green Bay, Milwaukee, and Chicago
Fort Winnebago, Baraboo Valley, and Minnesota
Manitowoc and Mississippi
Delevan Railroad Company

In April of 1853, the Legislature passed an act authorizing the City of Milwaukee to lend its credit in aid of certain railroads. In 1854 it raised the ceiling on the amount of bonds to be issued to aid in construction of any one railroad to $300,000 and in the aggregate not to exceed $1.5 million. In 1856 the limit was raised to $2 million. In the meantime, according to historian Lawrence Larson:

> The public seems to have been a frenzy over railroads. Meetings were held and elections were called to legalize bond issues that the council was eagerly waiting to authorize; in every case the majorities for the loan were overwhelming.[10]

By the end of the decade, the city was close to bankruptcy; and her credit was a long way from the Triple A rating she would be enjoying a century later.

But not all of this was due to railroads. It was an era of growth in many directions, including schools, health, fire and police, and, most of all, streets. In this day when there was neither a Board of Public Works nor a single Commissioner as today, each Alderman was a Street Commissioner; and streets were opened up, graveled, graded, and even paved at a tremendous rate, we hope in the interests of the city, but we fear at times it was more in the interest of land-owning speculators, elected or otherwise.

Railroads continued to grow, to consolidate, and to extend themselves in the late sixties and seventies. According to Bayrd Still, in his "Milwaukee: the History of a City":

> By 1873, ten lines of railroad, with fourteen branches radiated from the city. Four years later connections were completed with Ashland on Lake Superior; and the establishment of a line of steamers from Milwaukee to Ludington, Michigan, linked the city with trunk line railroads leading to the eastern coast.[11]

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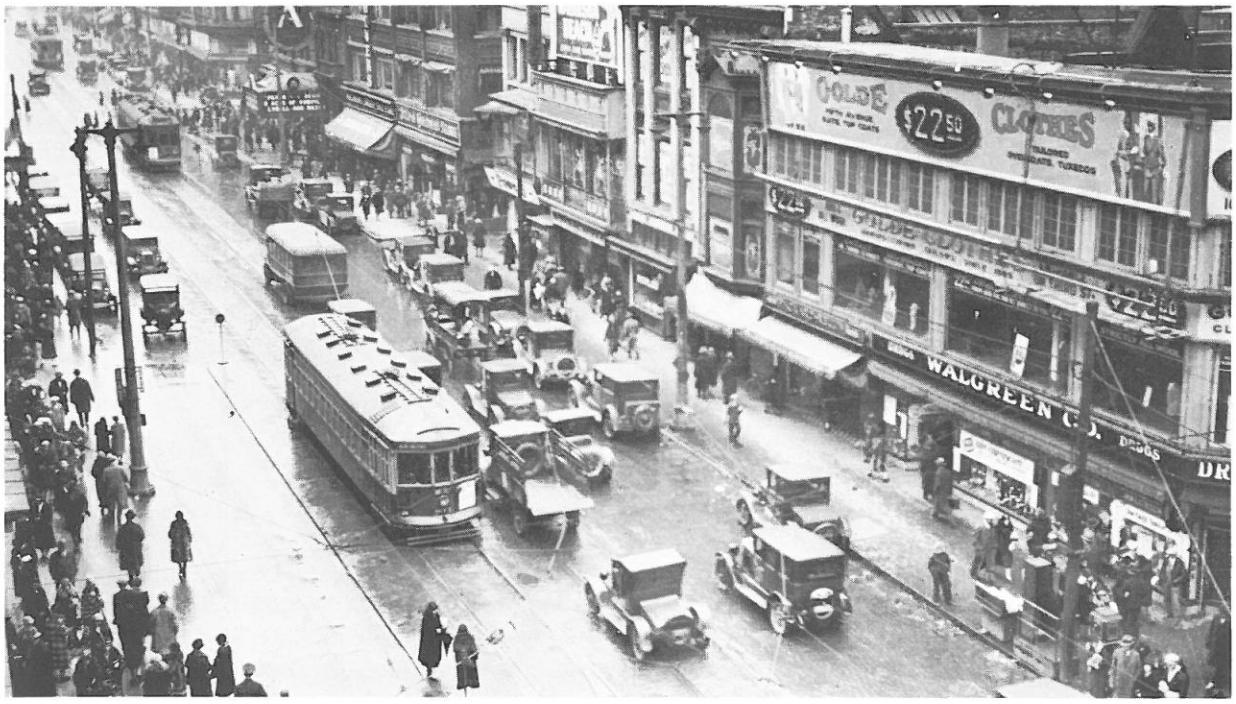
[10] *Larson, Lawrence M., "A Financial and Administrative History of Milwaukee," Bulletin of the University of Wisconsin, No. 242, June 1908, p. 212.*

[11] *Op. cit., p. 327.*

Figure 4



W. Wisconsin Avenue looking West from N. Third Street.

Figure 5

W. Wisconsin Avenue looking East from N. Third Street.

During this growth the Union Depot in Milwaukee was located on Reed Street (now S. Second) at the corner of Point Street. This was the first street south of the Menomonee River and running parallel to it. We have mentioned the impact on Milwaukee's future that was caused by moving the harbor, that is, the mouth of the rivers, north to where the straight cut was built. It hurt the growth of a business and hotel area near what is now S. Second and Greenfield. When the railroads came and the Union Depot, served both by the Milwaukee and St. Paul Road and the Chicago and Northwestern, was located just south of the Menomonee River, a new business area, benefiting from the straight cut and the railroads, began to flourish along both Reed Street and Clinton.

But the number two punch was still to come. In the eighties the new Union Depot was built between Third and Fourth Streets north of Clybourn, definitely moving the center of commercial equilibrium away from the South Side and close to what became and long remained the "real" CBD, to use a planners' term for downtown. Small wonder that the Boston Store, located only a block north of the new depot, long called itself "The Heart of Milwaukee" (see Figure 1).

An 1869 map by Increase A. Lapham, that indefatigable man-of-all-work in Old Milwaukee, shows two railway lines leading into and past the Reed Street depot. One from the south is labeled "Chicago Rail Road"; and that coming from the west, through the Menomonee valley, is called "Milwaukee and St. Paul R. R." Later records show that the Reed Street depot was genuinely a union depot in that it served a number of the short-lived independent lines that grew up during the early railroad boom. The two major roads, however, were what are known today as the Milwaukee Road and the Northwestern. Once again they share a new union depot; but in 1886, when the "new" union depot was opened at Third and Clybourn, it was to be used mainly by Alexander Mitchell's Chicago, Milwaukee, and St. Paul Road. The Northwestern had already been depositing its passengers, not at the Reed Street station, but at the lake front depot, shared with the Milwaukee Lake Shore and Western, a line later absorbed by the Northwestern (see Figure 2).

In 1889 and 1890, the Northwestern built its own beautiful romanesque station, which it advertised as the "Lake Front depot at the head (!) of Wisconsin Street." Small wonder that the other "new" depot had been variously called over the years the "union," "Milwaukee," or "St. Paul" depot. Now both edifices are gone, and the present colonnaded, but relatively small, union passenger station on St. Paul Avenue is a memorial to the great past glory of railroads in the carrying of human freight.

DEVELOPMENT OF THE PLANK ROAD

Somewhat parallel to the growth of railways in helping Milwaukeeans to get from here to there in the fifties and sixties was the development of plank roads.[12] For example, in the year 1854 one of the longest of these roads, built with wooden planks, was the so-called Watertown Plank Road, which at the time extended westward 45 miles. The goal of its builders was more distant than that, however, for the name of its company, organized in 1848, was "The Madison, Watertown, and Milwaukee Plank Road Co." A study of old and present maps would indicate that this "plank" (as they were sometimes called, rather than "plank road") began at N. 27th Street (then called Washington Street) at a point south of State Street. Vestiges of the plank still remain in the fact that W. Dunbar Place, at 27th and the jog in State Street at 35th match the route of the early road, and the name is still attached to sections where it passes through the grounds of the Milwaukee County Institutions and through Elm Grove.

Other plank roads in 1854, which still have their names echoing down to today, were also only partly completed. There was the Milwaukee and Janesville, finished as far as Mukwonago, 24 miles; the Milwaukee and Fond du Lac, begun by Increase A. Lapham, and planked to Cedarburg, 20 miles; and the Milwaukee and Lisbon with 22 miles planked, plus a four-mile branch to Hartland.

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[12] *See "A Backward Glance," Technical Record, Vol. 1 - No. 1, October - November 1963, and "A Backward Glance--Highway Development in Southeastern Wisconsin," Technical Record, Vol. 2 - No. 5, June - July, 1965.*

Only five miles had been planked by that year on the Milwaukee and Green Bay Road. However, two less ambitious but completed projects were the Milwaukee and Waukesha and the Milwaukee and Wauwatosa Roads. Magic Milwaukee names were connected with this road building. We have mentioned Increase A. Lapham, who was secretary of the Fond du Lac group. Others who were better known for other endeavors were Dr. E. B. Wolcott, G. D. Dousman, Guido Pfister, and Leander Comstock.

Plank road or not, Milwaukeeans of 1854 had reasons of their own for traveling out into the state; and if they did not want to follow the Iron Horse, there was always a stage coach. The Stage Office was on Wisconsin Street between E. Water and Main (now Broadway). Of course, you had better be an early riser. Any day, except Sunday, you could catch a coach for Fond du Lac at 4 a.m., or one for Janesville by way of Troy, or for Ozaukee. The latter left only on Mondays, Wednesdays, and Fridays—yes, at 4 a.m.

Or, if you wished to go to Chicago or Buffalo, you could call upon Hard & Griffin, Passenger Agents at the corner of Main and Huron (Broadway and E. Clybourn). Their "steam boats and propellers" ran daily between Buffalo and Chicago, calling at Milwaukee and other intermediate ports.

OMNIBUSSES AND STREET RAILWAYS

As the city became more prosperous, the important matter of getting around within the city came to the fore; and both omnibusses and street railways[13] became commonplace. Again taking 1854 as an example, we find that railroad passengers were met at the depot and ship passengers at the dock by a variety of vehicles. Most hotels ran their own omnibusses and baggage wagons, or drays; and competition was keen. The Baltic House "in the business part of the city," at Main and Detroit Streets, and Central Hotel on Walker's Point advertised free transportation for their guests. Besides plugging "One Dollar per Day for Board," D. N. Jones, owner of both these hotels, complained of an omnibus line in his advertising: "There are plenty of good houses in Milwaukee," Jones wrote, "that run FREE Omnibusses, and the prices are not as high as those connected with the Omnibus monopoly. Beware of those selling Tickets on Boats and Cars, and save your 15 cents," (see Figures 4, 5, and 6).

There were also separate businesses that called themselves "Livery and Exchange Stables." George F. Oakley ran one at the foot of Mason Street near the river, "Where can be found at all times good Carriages and Horses, single or double, with or without careful drivers, for the country or city."

Livery stables usually advertised their proximity to certain hotels, from which presumably they drew many of their customers; but sometimes men in the livery business grew into being hotel keepers themselves. Such apparently was the case with the Kirbys, who in 1854 owned Kirby's Block on E. Water (now N. Water) and Wisconsin, as well as a Livery and Hack Stable on Main (Broadway between Wisconsin and Mason). By 1877 Abner Kirby and Hiram A. Chase were proprietors of the Kirby House at E. Water and Mason, a well known hostelry. Abner, who had been Mayor of Milwaukee in 1864, was at this time also a partner in Kirby and Sons, Commission Merchants at 91 Michigan Street. His brothers in the business carried the distinctive names of Welcome U. and Oak A. Who knows? In spite of what the dictionaries say, perhaps the last named gentleman originated the synonym for correct, O. K. ? O. K.

Although Solomon Juneau is usually considered the Founder of Milwaukee, one who considers the matter in the perspective of history will agree that the city actually had three founders. Juneau was first and developed the East Side; but right on his heels were Byron Kilbourn, who pioneered west of the Milwaukee River, and George Walker, who did the same for the area south of the Menomonee. We have seen that the principal business area of the city developed north of the Menomonee on both sides of the Milwaukee River, with Juneautown, or the East Division as the area was sometimes called, having a slight edge over Kilbourntown, at least until enough bridges were built to make the economic future of the two areas mutually interdependent.

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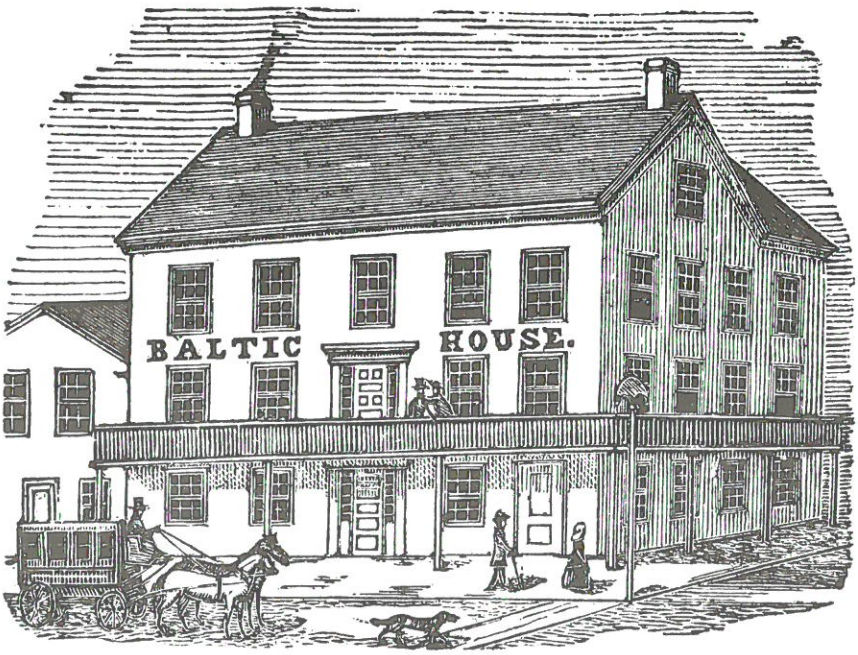
[13] See *"A Backward Glance - - The Street Railway in Milwaukee,"* Technical Record, *Vol. 2-No. 3, February-March 1965.*

Figure 6



BALTIC HOUSE,

— AND —

Central Hotel,

BY D. N. JONES.

BALTIC HOUSE, *corner Main and Detroit Streets.*

CENTRAL HOTEL, *on Walker's Point, nearest House to R. R. Depot.*

Opposition to Omnibus Line.

There are plenty of good houses in Milwaukee, that run FREE Omnibusses, and the prices are not as high as those connected with the Omnibus monopoly.

Beware of those selling Tickets on Boats and Cars, and save your 15 cents.

The BALTIC HOUSE is situated in the business part of the City. Also, the CENTRAL HOTEL, on Walker's Point, is the nearest to the Rail Road Depot. These are *One Price Houses.*

One Dollar per day for Board.

☞ Omnibus and Baggage Wagon in attendance to convey Passengers and Baggage to and from the Boats and Cars, FREE OF CHARGE.

A full page advertisement in an 1854 city directory.

George Walker, active in the incorporation of the city in 1846, did not become Mayor until 1851. He was again elected in 1853; but as the leader of the South Side, he saw the need for good transportation north to the heart of the commercial district.

In 1860 he started the first street railway, known as the City Railway Company. Its first tracks, a single pair of rails with turn-outs at intervals, was laid from the Milwaukee River up E. Water Street to Wisconsin, east on Wisconsin to Jefferson, and north through the residential area to Albion and Prospect. The cars were drawn by mules.

By 1877 three companies were in the field with horse drawn streetcars. The two newer ones were the Cream City Railway and the West Side Railway, with Cream City operating three lines. By 1883 Milwaukee City Railway had five lines; West Side, three; and Cream City, only two.

ELECTRIC STREET RAILWAYS

Back in the 1930's, the standard advice by way of consolation to a lovelorn girl was "Men are like streetcars; there'll be another one along any minute." Girls today can be glad that men didn't go the way of the tram, but are still rolling along. So far as Milwaukee is concerned, the last streetcar rolled into retirement in 1958, when what was left of the Wells Street line, a stretch 6.3 miles long, was converted to motor bus operation. This was an artistic finish to the story of the streetcar in Milwaukee because it was also on Wells Street that the first electric streetcars were run.

On April 3, 1890, the city's first electric streetcar made two trips along Wells Street, much to the consternation of horses and timid souls who feared the sparking trolley. This "first" was a victory of the West Side Street Railway Company and spoke well for the future of electric transit in this midwestern city. It was only three years after the first large electric railway system was operated in any city in America. The national honors went to the line built in 1887 in Richmond, Virginia.

Six years later, after various mergers and consolidations, The Milwaukee Electric Railway and Light Company was organized[14] and became known to several generations of Milwaukeeans as the "TMER&L Company" in a day when acronyms and alphabet soup were less frequently a part of the daily news fare. The same firm is today The Milwaukee and Suburban Transport Company, more often shortened to simply The Transport Company.

Although the automobile did not come until the internal combustion engine was invented, there was a going, horseless carriage in Milwaukee as early as 1878. It, being a steam driven, self-propelled pumping engine, was known as the "self-propeller"; and a fearsome creature it was. Breathing fire and smoke, as any self-respecting fire engine of the time should, this demon roared down the street frightening women, children, and horses until a public clamor arose to get rid of it once and for all.

Between September 1878 and March 1879, everyone talked about the self-propeller. Alderman Shaughnessy called for a study to learn if it could be converted to a horse-drawn engine. Alderman Niederman suggested making it into a steam road roller. Alderman Stirn wanted to tell the Fire Department not to use "the so-called Self-Propeller in day times, but confine its services only to night time," because "At almost every turn-out... some more or less serious accidents by runaway horses occur, which are generally followed by suit for damages against the City." Mayor John Black called it a "costly nuisance" and brought to the Council a petition that he said was "signed by some of the principal taxpayers of the City." The Committee on Fire Department replied that they could not dispense with the self-propeller unless they would buy a new engine. They recommended getting a new one and converting the monster to a horse engine to be held in reserve because "she would be too heavy for ordinary use." This was eventually done, and Fire Chief Claymier reported at the end of 1879 that the conversion had cost $1,025.

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[14] *See "A Backward Glance--The Electric Interurban Railway," Technical Record, Vol. 1 - No. 4, April - May 1964.*

Well, that was that; and no more Milwaukee horses were frightened, for a decade at least, until Gottfried Schloemer, a cooper, and Frank Toepfer, a machinist, began putting together that gas buggy that is now on display at the Milwaukee Public Museum.

A later article can describe the rise of the automobile in Milwaukee, with all that it meant to downtown and the growth of the metropolitan area (see Figure 7). Certain questions come at once to mind. How soon, for example, was the automobile's impact felt in city government? (see Figures 8 and 9). And what did the people of Milwaukee do about it? In the meantime, let's go listen to that new album, "The North Water Street Tavern Band." It's almost as good as going downtown—with Petula Clark.

Figure 7

Wisconsin Avenue, west from N. Third Street in 1926.

Streetcars, double decker buses, and Model T Fords gave a hint of the traffic congestion still to come.

Figure 8

W. Juneau Avenue looking West from N. Third Street.

Figure 9

N. Water Street looking North from E. Wisconsin Avenue.
City Hall in background.


KENOSHA · MILWAUKEE · OZAUKEE
WAUKESHA · WASHINGTON · WALWORTH · RACINE
SOUTHEASTERN
WISCONSIN
REGIONAL
PLANNING
COMMISSION