AN ANALYSIS OF MASS TRANSPORTATION IN WILMINGTON, DELAWARE

ROBERT WILLIAM LANG

JUNE 1964

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AN ANALYSIS OF MASS TRANSPORTATION

IN WILMINGTON, DELAWARE

by

Robert William Lang

A dissertation submitted to the Faculty of the University of Delaware in partial fulfillment of the requirements for the degree of Master of Business Administration.

June, 1964

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ACKNOWLEDGEMENTS

Mass transportation affects the daily lives of almost every citizen of the city. For an analysis to be of credible value, it is understandable that many concerned persons of the community must make generous and willing contributions of time and effort to its development. The following account attests to the receipt of such unqualified cooperative support.

To Charles W. Croft, Carle H. Salley, Jr., and Harry W. Springer of the Delaware Coach Company, I am especially indebted for placing at my disposal corporate records and other pertinent information. They gave wholeheartedly of their time to acquaint me with the many facets of the transit industry not readily available to the average layman.

My thanks are extended to Paul A. Wilhelm of the Greater Wilmington Development Council, Dr. Frederic R. E. Durr of the University of Delaware's Division of Urban Affairs and numerous other civic leaders for their assistance and guidance.

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To my supervision of the General Services Department of the E. I. du Pont de Nemours & Company, Inc., my thesis advisor Dr. Blaine G. Schmidt of the Department of Business and Economics, my typist, my wife, and my friends, I wish to express my thanks for their assistance in the compilation and reproduction of this work. This analysis certainly could not have become a reality were it not for the efforts of these many assistants, and as a gesture of my grateful-ness, this thesis is dedicated to them.

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CHAPTER I

INTRODUCTION TO THE SUBJECT MATTER

Background

Today mass transit companies face a number of problems that similarly confront cities and metropolitan areas. The meteoric rise of the automobile-oriented society that has choked city streets has also contributed to a major portion of the decline in mass transit patronage. The exodus of the masses to the suburbs has decreased occupancy densities per square mile in many of the heavily traveled mass transit corridors. The creation of more and wider highways, eating up precious tax base property has forced inhabitants to seek housing in other localities. The pursuit of the consumer by the retailer to more fashionable shopping center sites; the flight of the office building to the wide open spaces; and finally the growth of low cost credit along with a rising disposable personal income has made it easier, more convenient, and more desirable to own a home in suburbia along with a second car.

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It is no wonder that city governments have become concerned with dwindling populations in the core areas, decaying tax bases, and a growing number of businesses daily deserting the blighted conditions found in most center city areas. So to, have transit company officials been faced with ever decreasing ridership, stable or declining incomes, and increasing costs and taxes. The obvious question of the hour seems to be "Where will it all end?".

Purpose

The main objective of this thesis is to analyze mass transportation, its systems and facilities as they exist in Wilmington and the surrounding Metropolitan area, and the environment in which these systems must operate.

The data and information included, from which the alternatives and recommendations have been developed, should be useful in the formulation of decisions by mass transit company officials, local government officials, and regional planners. Further, it is hoped that these plans will prove beneficial to all inhabitants of this region and any other region in the country faced with similar problems and circumstances.

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Scope

This thesis presents a comprehensive look at the operations of the dominant company in mass transportation in Wilmington, namely the Delaware Coach Company. Other companies operate bus lines in the area but only on a limited scale by comparison. Where information about the operations of these companies is considered pertinent, it will be included and appropriately noted.

The obvious breadth and complexity of the subject of mass transportation precludes the analysis of many of its facets. However, an effort has been made to introduce and develop subject areas which relate significantly to the problems of the day.

No effort has been made to more than mention information concerning railroads, major interstate bus lines, and taxis. It is believed that the effect of all these modes of transportation combined is relatively insignificant. The analysis is concerned primarily with an historical development of mass transportation facilities in the Wilmington area; a broad look at the environment in which mass transportation operates; a more detailed look at the internal workings of the company itself; and a discussion of remedial

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courses of action and their feasibility to the Wilmington area. The closing chapter presents a number of recommendations based on the data reviewed in the thesis and directed toward the development of a new mass transit concept for the Wilmington of the future.

Methodology

Virtually all data referring to the Delaware Coach Company of an historical, financial, or operational nature have been developed from information contained in official company records, or from discussions with company officials. City and regional environmental data have been gathered from local governmental and planning agencies, and certain facts have been taken directly from portions of the Economic Analysis of the Greater Wilmington Area developed by the Division of Urban Affairs of the University of Delaware. Extensive use has been made of mass transportation industry publications and specialized studies conducted in this and other cities. Where assumptions have been made, they are clearly defined.

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CHAPTER II

HISTORICAL FACTORS WHICH HAVE INFLUENCED THE PRESENT DAY OPERATION

The Changing Technology of Mass Public Transportation

Animal Power

Surface operations of urban transit had their beginning in the United States in the year 1830 when horse-drawn omnibuses first appeared in New York City. [1] The horse car was the next mode to appear in the year 1832, also in New York, on a one mile road built in the Bowery. [2] The horse car differs from the omnibus in that it has flanged wheels and operates on steel rails laid in the street. The smoother surface of the rails makes it possible to operate much larger vehicles at higher speeds. By 1890, horse cars reached their peak of popularity operating over more than 6,600 miles of track comprising 70 per cent of the total street railway trackage of the United States in that year, despite the fact that the electric railway car had been in existence for about four years. [3]

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Cable Power

The next mode of urban transportation to appear on the scene was the cable car, introduced in San Francisco in 1873 to negotiate steep grades. The cable car was found to be a very efficient mass movement type of vehicle. [4]

Electric Power

Probably one of the greatest innovations in public transit vehicle propulsion was the adaptation of electricity to the movement of railway cars. It will be shown later in an analysis of the growth of electric railways in the Wilmington area that electrification contributed much to the development of American cities during the late 19th Century and early 20th Century.

Frank Sprague, America's "Father of the Electric Railway," is credited with installing the world's largest, most successful, commercially operated electric street railway in Richmond, Virginia, in the year 1888. [5]

To illustrate what a significant start electric railways had in this country, an analysis was made in the year 1890, two years following the completion of the Richmond installation. About one-fourth of the 6,861 miles of track in the country was converted in two years to electric

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railways. By the year 1902, twelve years later, electric railways operated on 22,500 miles of track, while only 669 miles were operated by means other than electric power. [6]

Automotive Power

Shortly after the turn of the Century, transportation modes turned from the successful electric street railway to automotive power. In 1905, the operation of the first motor bus was accomplished by the Fifth Avenue Coach Company of New York. [7] The motor bus was not accorded the warm welcome that the electric street railway was given, mainly because the first buses were rather crude, quite uncomfortable, noisy, and generally unreliable from an operating standpoint. Even up to the year 1920, there were only about 60 buses operating in the United States. [8] The major period of expansion in motor bus usage was not until the middle 1920's when bus bodies were being built on special purpose chassis rather than on the old truck-type chassis. The next important technological change was the relocation of the engine from the front of the vehicle to a position somewhere at the center of the bus underneath the seating area.

As rubber tires became more prevalent and more highly developed and street paving methods were improved, the

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bus form of transportation took on a new status in the transportation field. The flexible wheeled type of vehicle was much more adaptable to city streets than was the vehicle which had to conform to rails. And so, as continued improvements were made in motor buses, the vehicles became more generally accepted by the public as a practical and efficient mode of mass transportation.

Return to Electric Power

Trolley coaches (or trackless trolleys as they are more commonly known) are a combination of the old electric trolley and the new rubber-tired motor bus, and they first appeared in the year 1910 in California. [9] The trolley coach had the advantage of being more reliable to operate because it derived its power from overhead lines instead of from a combustion engine.

Two important factors contributed to the rapid growth of the trolley coach. In the depression days, large quantities of electricity were more readily available at costs considerably less than comparable quantities of gasoline. Also, during the war years when gas rationing was in effect, trolley coach operations were not hindered by the lack of petroleum products.

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The Diesel Engine

The next major innovation in surface mass transit was the introduction of diesel fuel powered buses in the late 1940's. The greater capacities of these vehicles, coupled with the flexibility and economical operating advantages that they possessed over the gas powered buses, helped to catapult them into almost exclusive usage by today's modern, efficient bus companies.

Historical Growth of Transit Companies and Routes in the Greater Wilmington Area

The Birth of the Horse Drawns

In the early days, the first form of what may justly be called mass transportation in the Wilmington area consisted of only one company. In 1864, the Wilmington City Railway Company was incorporated in Dover, Delaware, on the 4th of February. [10] The first line which ran from the old Philadelphia, Wilmington, and Baltimore Railway Station on Front Street to Market Street, north to Delaware Avenue, and along Delaware Avenue to Riddle Road which was then located near Du Pont Street and on to Rising Sun was completed in the same year. [11] The first offices, stables, and carhouse were located at the intersection of Delaware Avenue and Du Pont Street, then known as Middle Depot. Figure I is an illustration of the first horse drawn car.

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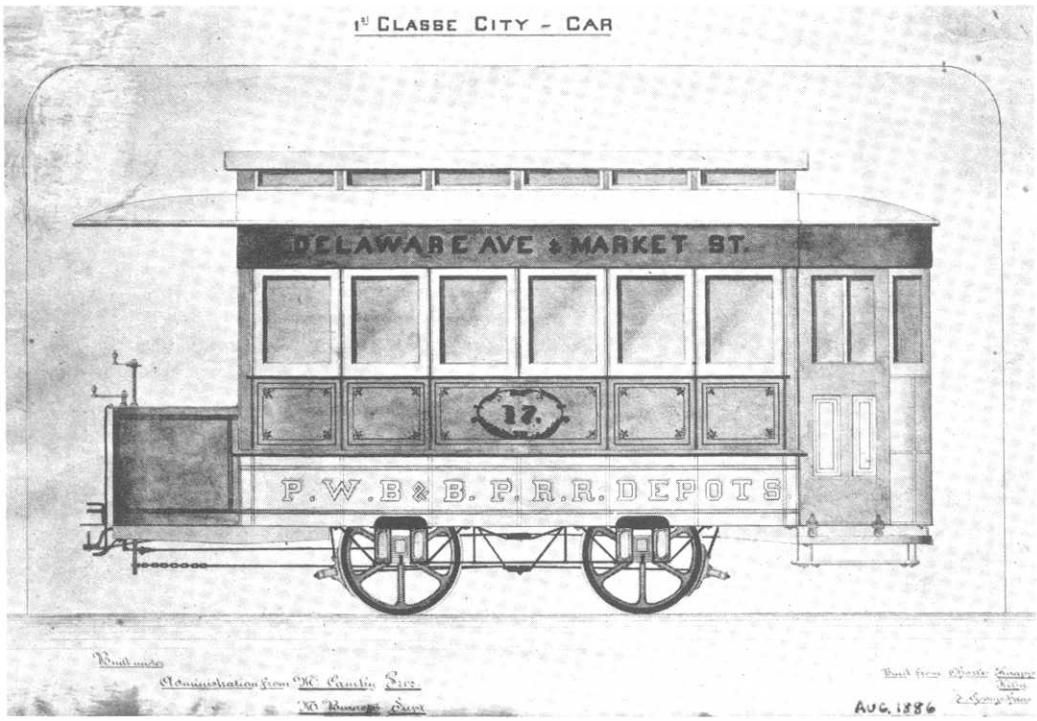

FIGURE I

Wilmington's First Horse Car #17 - 1886

Source: Delaware Coach Company

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Service was inaugurated on this first Wilmington horse car line on June 28, 1864. [12] The line operated daily on a regular schedule as indicated by the time table shown in Figure II. This line was the sum total of all service available in Wilmington for the next 17 years.

The Front and Union Streets Railway was chartered in 1877 but four years elapsed before the line along Front Street from Market Street to Union Street was placed in operation. [13] Offices and stables were located at the intersection of Front and Union Streets. The Wilmington City Railway Company added to their original line in 1881 with a branch along East 4th Street from Market Street to the Christiana River. [14] A second branch horse car line was added in 1882 from 4th Street, northward along Spruce Street. [15] Map I shows the entire route system of the horse drawn car lines.

Enter Electricity

On March 7, 1888, the first electric trolley car line was placed in service by the Wilmington City Railway Company from 10th and Market Streets to the Riverview Cemetery along Market Street. [16] The conversion of old horse drawn car lines to electric trolley lines and the creation of new electric lines in the Wilmington area followed quickly.

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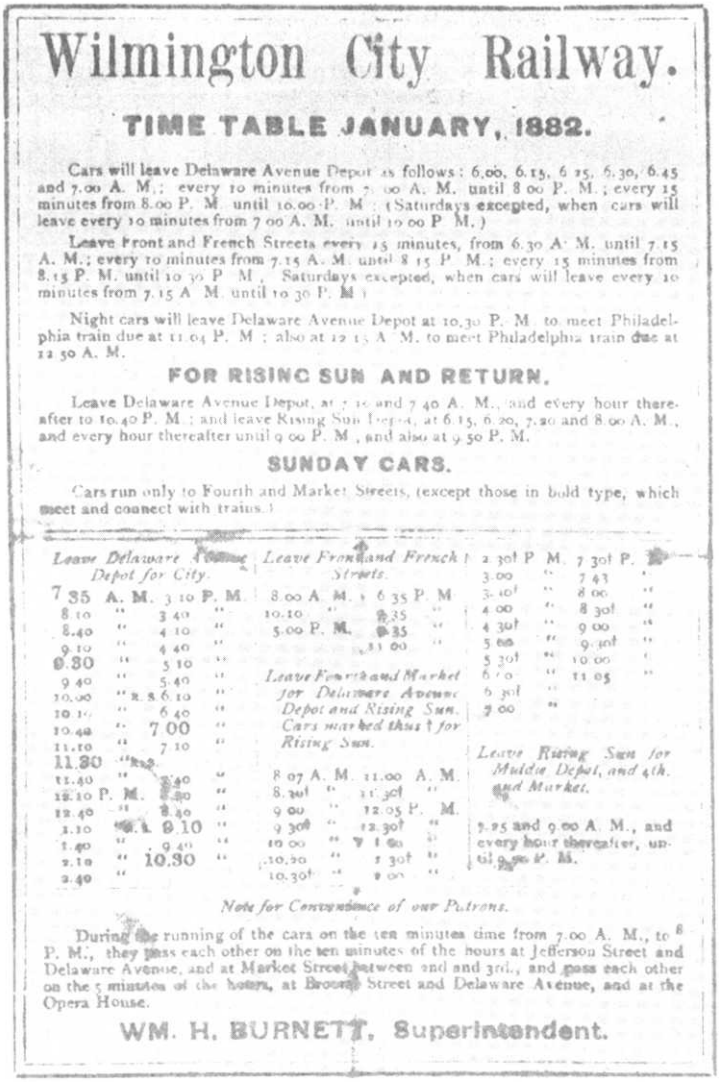

Wilmington City Railway.

TIME TABLE JANUARY, 1882.

Cars will leave Delaware Avenue Depot as follows: 6.00, 6.15, 6.25, 6.30, 6.45 and 7.00 A. M.; every 10 minutes from 7.00 A. M. until 8.00 P. M.; every 15 minutes from 8.00 P. M. until 10.00 P. M. (Saturdays excepted, when cars will leave every 10 minutes from 7.00 A. M. until 10.00 P. M.)

Leave Front and French Streets every 15 minutes, from 6.30 A. M. until 7.15 A. M.; every 10 minutes from 7.15 A. M. until 8.15 P. M.; every 15 minutes from 8.15 P. M. until 10.30 P. M., Saturdays excepted, when cars will leave every 10 minutes from 7.15 A. M. until 10.30 P. M.)

Night cars will leave Delaware Avenue Depot at 10.30 P. M. to meet Philadelphia train due at 11.04 P. M.; also at 12.15 A. M. to meet Philadelphia train due at 12.30 A. M.

FOR RISING SUN AND RETURN.

Leave Delaware Avenue Depot, at 7.10 and 7.40 A. M., and every hour thereafter to 10.40 P. M.; and leave Rising Sun Depot, at 6.15, 6.20, 7.20 and 8.00 A. M., and every hour thereafter until 9.00 P. M., and also at 9.50 P. M.

SUNDAY CARS.

Cars run only to Fourth and Market Streets, (except those in bold type, which meet and connect with trains.)

Leave Delaware Avenue Depot for City.	*Leave Front and French Streets.*	2.30† P. M. 7.30† P. M.
7.35 A. M. 3.10 P. M.	8.00 A. M. 6.35 P. M.	3.00 " 7.43 "
8.10 " 3.40 "	10.10 " 8.35 "	3.40† " 8.00 "
8.40 " 4.10 "	5.00 P. M. 9.35 "	4.00 " 8.30† "
9.10 " 4.40 "	11.00 "	4.30† " 9.00 "
9.30 " 5.10 "		5.00 " 9.30† "
9.40 " 5.40 "	*Leave Fourth and Market for Delaware Avenue Depot and Rising Sun. Cars marked thus † for Rising Sun.*	5.30† " 10.00 "
10.00 " 6.10 "		6.10 " 11.05 "
10.10 " 6.40 "		6.30† "
10.40 " 7.00 "		7.00 "
11.10 " 7.10 "		
11.30 "	8.07 A. M. 11.00 A. M.	*Leave Rising Sun for Middle Depot, and 4th. and Market.*
11.40 " 8.40 "	8.30† " 11.30† "	
12.10 P. M. 8.40 "	9.00 " 12.05 P. M.	7.25 and 9.00 A. M., and every hour thereafter, until 9.50 P. M.
12.40 " 8.40 "	9.30† " 12.30† "	
1.10 " 9.10 "	10.00 " 1.00 "	
1.40 " 9.40 "	10.20 " 1.30† "	
2.10 " 10.30 "	10.30† " 2.00 "	
2.40 "		

Note for Convenience of our Patrons.

During the running of the cars on the ten minutes time from 7.00 A. M., to 8 P. M., they pass each other on the ten minutes of the hours at Jefferson Street and Delaware Avenue, and at Market Street between 2nd and 3rd., and pass each other on the 5 minutes of the hours, at Brown Street and Delaware Avenue, and at the Opera House.

WM. H. BURNETT, Superintendent.

FIGURE II

Early Horse Car Time Table - 1882

Source: Delaware Coach Company

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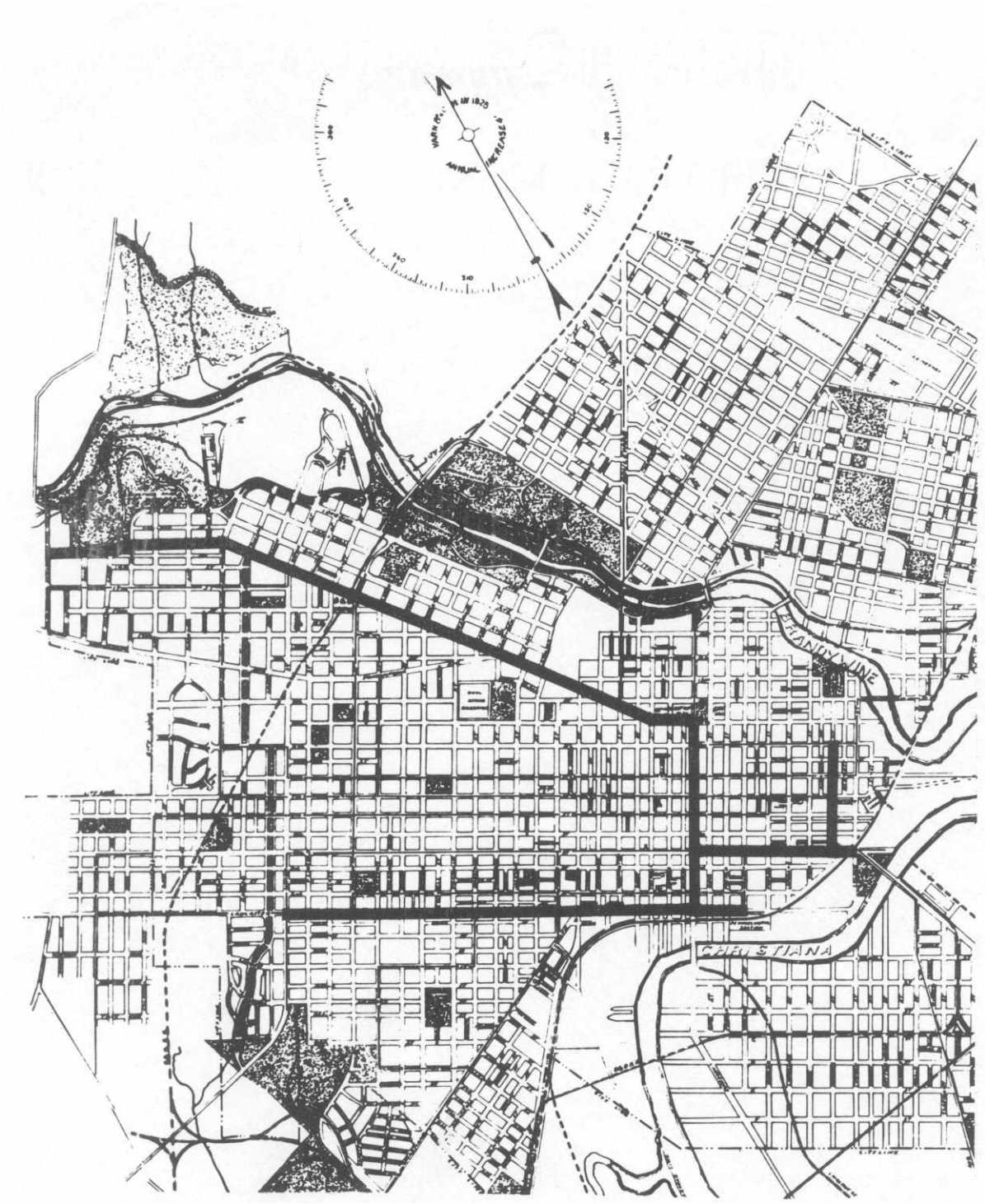

MAP I

Horse Car Routes - Wilmington - 1882

Source: Delaware Coach Company

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By the turn of the century, there were six electric street railway companies operating in the Wilmington area. The foundation for the present day mass transit system had essentially been laid; however, this foundation was yet only the skeleton of an even more expanded system which almost saturated the area with new companies and new lines during the next 12-year period. The first and most important company to be chartered in the new century was The People's Railway Company on May 12, 1900. [17] It acquired the routes and rights of a number of smaller companies, as well as the authority to operate in the city of Wilmington. The first new track to be laid by the company ran along Greenhill Avenue to 6th Street, on 6th to Poplar Street, on Poplar to 7th Street, and on 7th to Railroad Avenue. This line, however, was officially opened on May 30 (Memorial Day), 1901. [18]

Important lines established in the 12-year period immediately following 1900 that are the basis for many of today's bus routes were the New Castle-Delaware City route; the Rockford Park line; the Vandever Avenue extension; the Washington Street-Boulevard line; the Newport line; the Rising Sun, East Lake, and South Harrison Street extension; the Edgemoor route (Todd's Cut); and finally the Lobdell line to

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the Marine Terminal area. [19] Two of the most widely used trolley car models on Wilmington streets are depicted in Figures III and IV.

On July 1, 1910, the Wilmington and Philadelphia Traction Company was organized as a holding company, and acquired the Wilmington City Railway and its subsidiary lines and leased them back to the Wilmington City Railway Company. [20] This holding company also controlled the Wilmington City Electric Company, the Wilmington Light & Power Company, the Wilmington Automatic Telephone Company, and various other utilities operating in Chester and vicinity.

The following year, the New Castle and Delaware City Traction Company was incorporated on April 24, 1911. [21] This company acquired the rights and routes of the New Castle and Delaware City Railway Company which had been established in 1900. The following year, the Wilmington, New Castle, and Delaware City Railway Company was incorporated and immediately this company consolidated with the New Castle and Delaware City Traction Company into a new company called the Wilmington, New Castle, and Delaware City Railway Company whose charter became effective June 3, 1912. [22] The resulting company operated the lines between New Castle and Delaware City and to the Wilmington City Line along New Castle Avenue.

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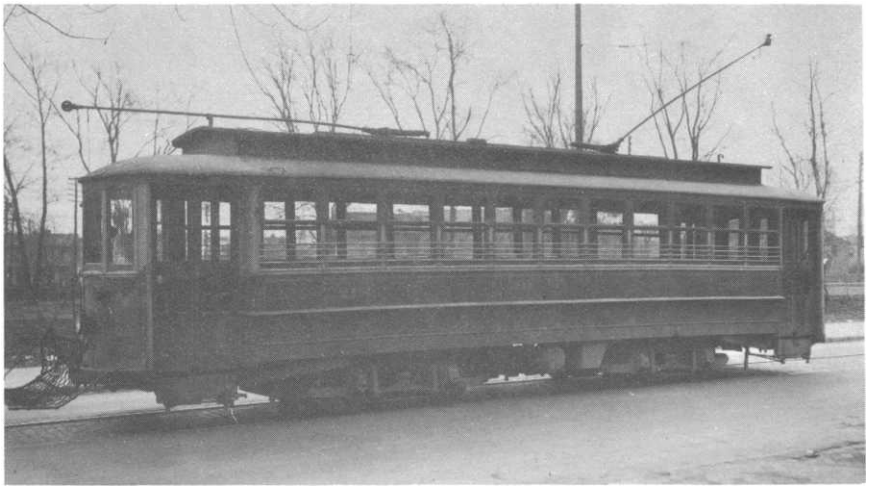

FIGURE III

Trolley Car Style - 1899

Source: Delaware Coach Company

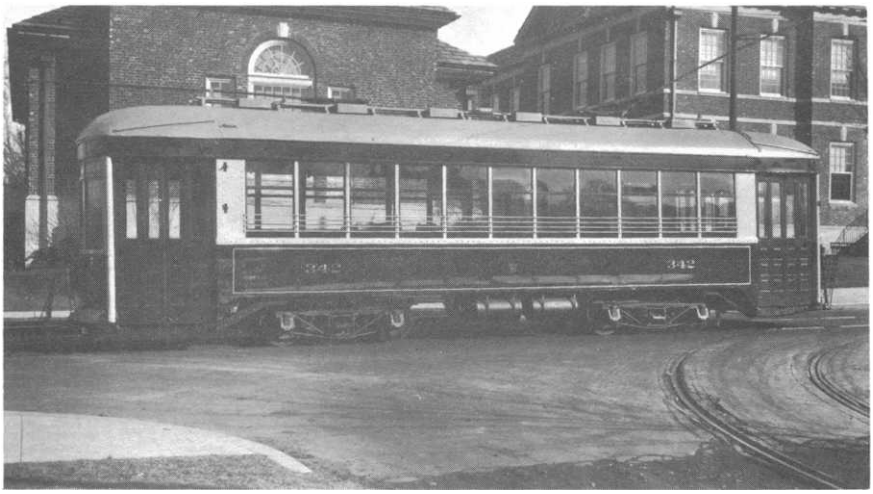

FIGURE IV

Trolley Car Style - 1916

Source: Delaware Coach Company

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In January of 1911, the Wilmington Southern Traction Company was incorporated. [23] This company built a track from Rogers Corner (at New Castle Avenue), along Rogers Road and across the causeway to the foot of Market Street.

In 1915, further consolidation of existing companies was made. On June 1, the Wilmington and Philadelphia Traction Company which controlled the Wilmington City Railway Company purchased The People's Railway Company which had been operating since 1901; and on October 1 of the same year, they acquired the Wilmington and Southern Railway Company which operated the line on the causeway; and on October 19, the Wilmington, New Castle, and Delaware City Railway Company was purchased. [24] All major lines in the Wilmington area were now under the control of the Wilmington and Philadelphia Traction Company, which in turn was controlled by the National Properties Company in 1912, and shortly after by the American Railways Company owned by the American Electric Power Company. [25]

In 1891, 1903, and 1909, three Acts were passed in the General Assembly in Dover that were of interest as far as the establishment of public street railway routes on Wilmington streets. They prohibited the laying of street

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railway tracks on Gilpen Avenue, 9th Street west of Market Street, and on 10th Street west of West Street, respectively. [26] A comparison of the electric street railway routes of 1919-20, shown on Map II, with the present day bus routes (see Map V. Page 70) shows that the street railway routes of the past were very influential in the determination of today's bus routes.

From Tracks to Tires

The street railway industry began to feel the competition of the oncoming automobile in 1922. Revenues and ridership began to decline rapidly. Independent bus lines in local and suburban areas were making rapid strides and the results of this competition were evident in the city. The Wilmington and Philadelphia Traction Company, now a subsidiary of the American Gas & Electric Company which had bought the American Electric Power Company in 1924, decided to acquire local bus companies to augment the present trolley system in Wilmington. [27] A new company was organized to operate the bus routes, and on May 1, 1925, the bus line to Newark was acquired. [28] During the following nine months, the Red Arrow Line between Wilmington and Marcus Hook was acquired, the United People's Transit Company which ran a bus from Wilmington to Marshallton was acquired, as was the line from

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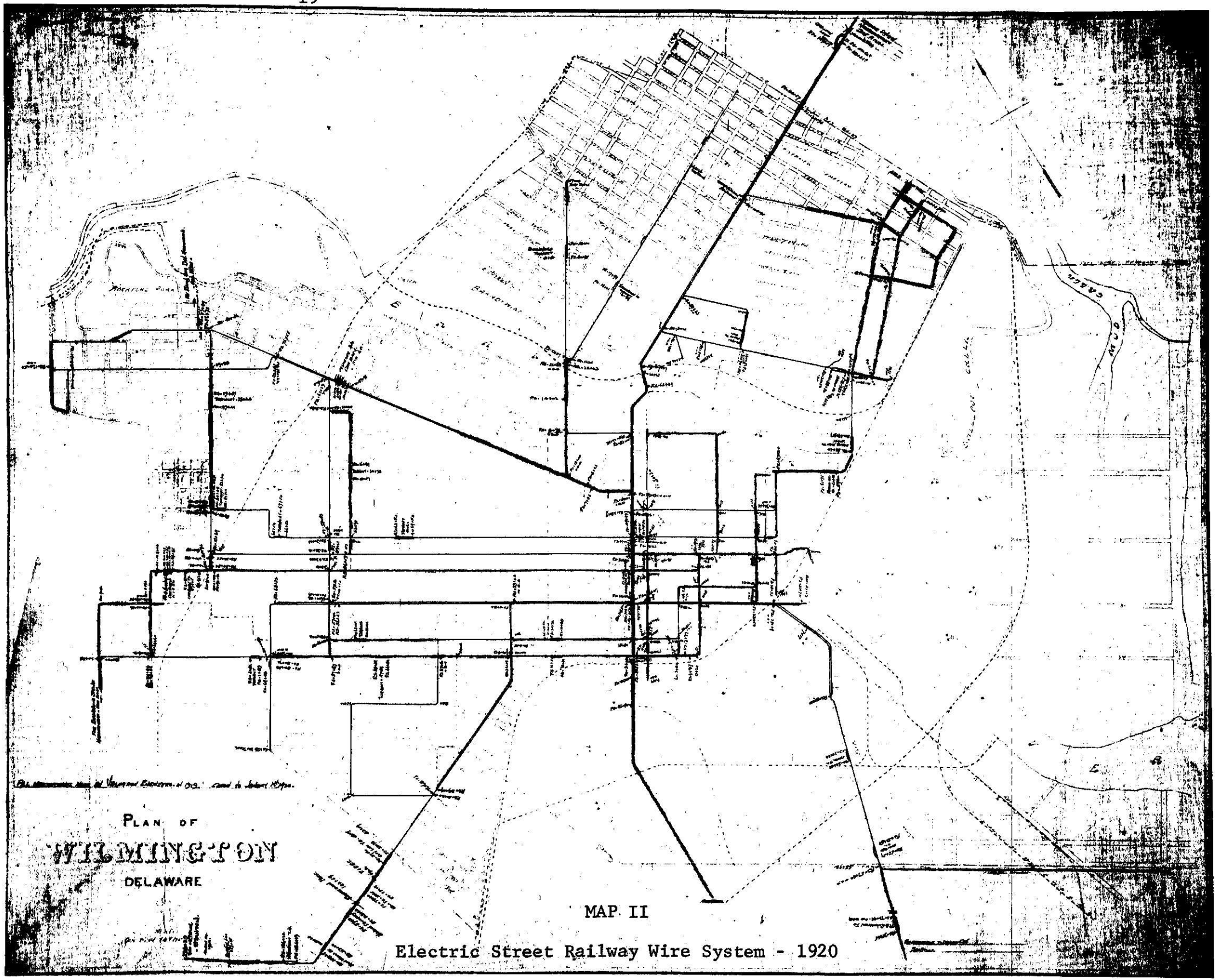

MAP II

Electric Street Railway Wire System - 1920

Source: Delaware Coach Company

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Wilmington to New Castle. [29] Replicas of the modern buses servicing these routes are shown in Figures V and VI.

The Wilmington and Philadelphia Traction Company changed its name in November of 1927 to the Delaware Electric Power Company. [30] In effect as of this date, the Delaware Electric Power Company became the local major holding company. The Wilmington City Railway Company owned and operated the city trolley lines; the Delaware Bus Company owned and operated the bus routes; and the Delaware Power & Light Company and other utilities in the Wilmington area provided their respective utilitarian services to the general public.

In 1929, a significant change in control took place when the United Gas Improvement Company (UGI) obtained all the stock of the Delaware Electric Power Company. [31] During the depression years that followed, ridership and revenues fell to an all-time low, causing expansion and modernization plans to be shelved. The Wilmington City Railway Company was finally merged into the Delaware Electric Power Company in 1936, losing an identity which had existed since 1864.[32]

In May of 1938, a franchise was obtained from the City Sewer & Street Department to operate trackless trolleys

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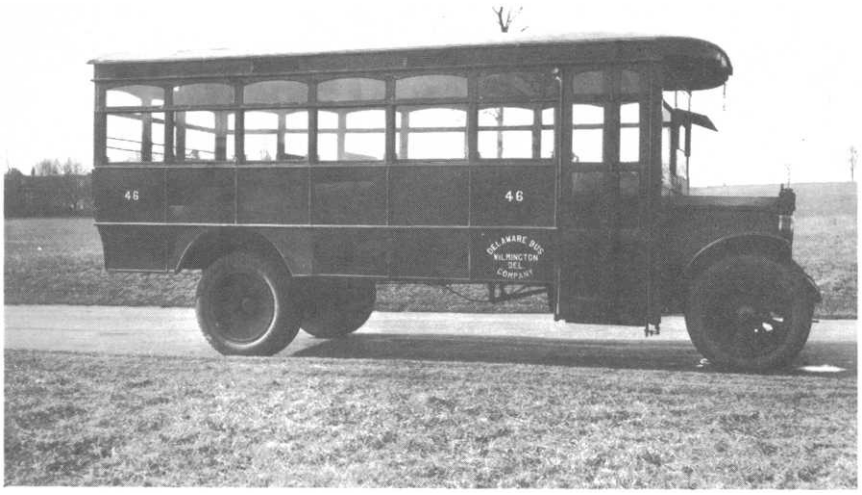

FIGURE V

"Duplex" 21-Passenger Bus - 1923

Source: Delaware Coach Company

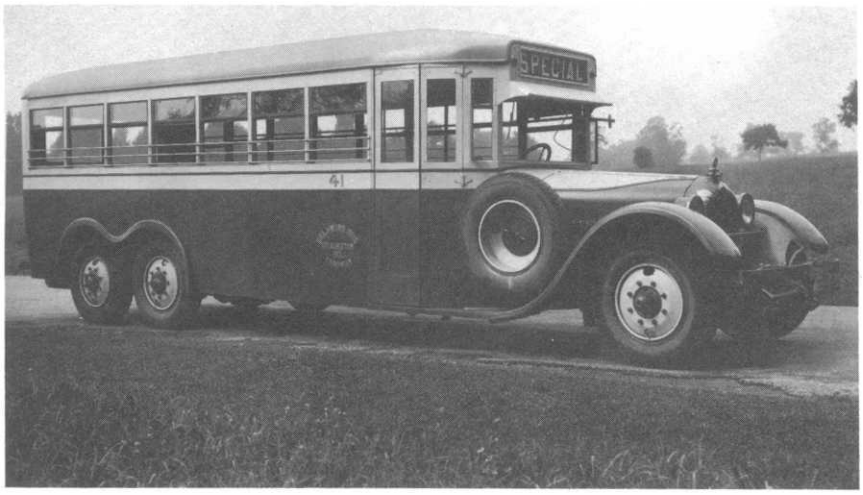

FIGURE VI

"Safeway" 27-Passenger Bus - 1925

Source: Delaware Coach Company

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and buses in Wilmington on 85 separate street sections totaling 23.7 miles.[33] A franchise was also received from the State Highway Department in the same year to operate the trolley coaches on certain roads outside the city limits. This was the beginning of the coordinated trolley coach (Figure VII) and gas bus (Figure VIII) system.

The first route to be converted from street car to trolley coach was the Delaware Avenue line. This was accomplished on September 24, 1939.[34] As the new trolley coaches arrived, they were pressed into service quickly. By the end of 1940, the conversion was completed and Wilmington was the first city in the country to have a modern coordinated trolley coach and gas bus system.[35] (Map III shows the layout of the trolley coach wire system.)

On June 17, 1941, the Delaware Electric Power Company changed its name to the Delaware Coach Company to more accurately describe the nature of the business; thus two separate entities were created - the Delaware Coach Company and the Delaware Power & Light Company.[36]

Modern Day

In the years immediately following the war, ridership remained very high. It was not until the early 1950's

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FIGURE VII

"Brill" Trolley Coach - 1939

Source: Delaware Coach Company

FIGURE VIII

"Twin Coach" Gas Bus - 1935

Source: Delaware Coach Company

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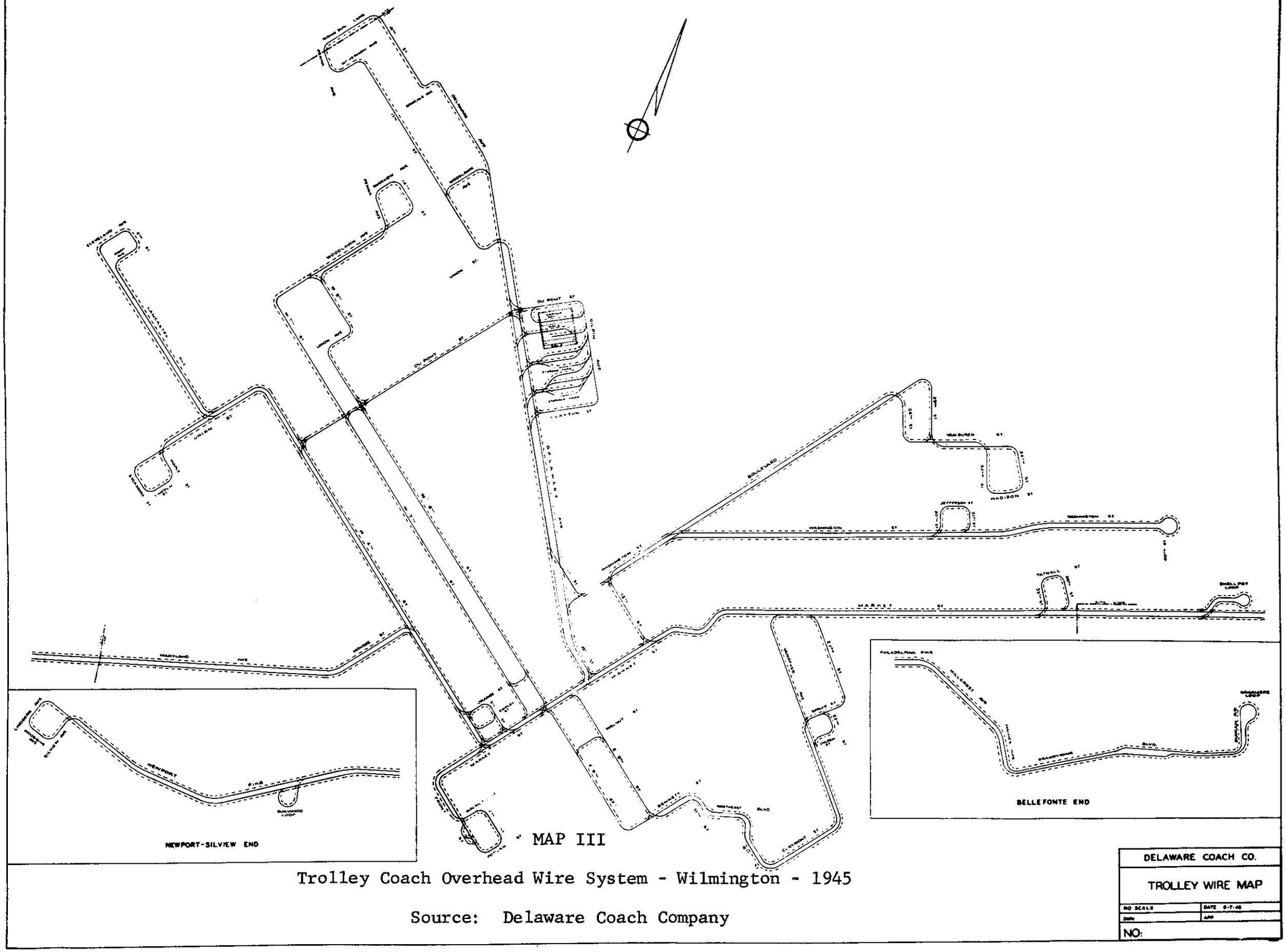

Trolley Coach Overhead Wire System - Wilmington - 1945

Source: Delaware Coach Company

DELAWARE COACH CO.

TROLLEY WIRE MAP

NO SCALE | DATE 8-7-46

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when automobiles again became plentiful that concern for the future of mass transportation facilities became apparent. The first diesel bus (Figure IX) appeared on Wilmington streets in 1948.[37] After much deliberation, United Gas Improvement Company sold the Delaware Coach Company on October 16, 1950, to Mr. Russell Stoughton of Westtown, Pennsylvania.[38] Mr. Stoughton was recognized as the first private owner of the company in the last 40 years.

In 1956, Mr. Stoughton made arrangements to sell the entire company to American Transportation Enterprises (ATE) of New York.[39] The sale was consummated on August 28 and to the present day ATE owns and operates the Delaware Coach Company.

ATE began to phase out the trackless trolleys which had served the public so well during and since the war years. Finally, the Delaware Avenue line, the last of the trackless trolley lines, ceased operation in 1958.[40] Today all equipment is diesel powered in the form of 85 buses (Figure X) operating over ten local routes and charter service.

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FIGURE IX

"General Motors" Transit Coach - 1957

Source: Delaware Coach Company

FIGURE X

"General Motors" Suburban Coach - 1961

Source: Delaware Coach Company

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The Automobile and the Highway

The Automobile

Mass transportation's greatest asset and no doubt its greatest liability was born in the year 1769 in Paris when Nicholas Joseph Cugnot introducted the first self-propelled vehicle.[41] The vehicle was steam driven, but it wasn't the method of propulsion that was so significant, but the fact that it made possible vehicular movement without the need for animal power.

Many years later, in 1885, the first internal combustion engine, the forerunner of today's automotive power plant, was successfully used by a German inventor named Karl Benz.[42] From this engine, and the more improved model built in the same year by another German named Gottlieb, Daimler, evolved the present day motor cars.[43] The new internal combustion concept quickly spanned the Atlantic, for in the early 1890's, men such as Dwyer, Haynes, Ford, Olds, and Winton were producing automobiles in the United States.[44] As early as 1903, Detroit was recognized as the automotive capital of the world.

In the formative years, prior to 1910, production was widely scattered and development of the engine and the

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car itself were hindered by patent and litigation problems. Finally in 1911, the courts ruled that a patent awarded to George Seldon for the basic workings of the gasoline engine was only applicable to two-cycle engines.[45] The gates were open and the remainder of the story is well known today. Henry Ford pioneered the first popularly-priced automobile as a result of his unique process called mass production. His concepts of production and merchandizing are still with us today, and the automobile industry is the largest single production industry in the world when measured by value added.[46] Ford introduced his famed Model T in 1908, from which eminated 19 years of monumental success for the industry and his company.[47]

Also in 1908, William C. Durant, working from his base in the Buick Motor Company, formed the General Motors Company, the predecessor of today's number one American corporation - the General Motors Corporation.[48] It is alleged that no two men, although representing different points of view and philosophy, better understood the true opportunity that the automobile represented at that day and age to the people of the world. Ford represented the centralized form of corporate structure, with assembly-line production, high minimum wages, low-priced, one-model

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output.[49] His car dominated the field during the teens and twenties while General Motors and more than 200 other companies fought valiantly to stay afloat.

Mr. Durant, however, was not to be denied. Through many years, both good and bad, he persisted with dogged determination. His philosophy, which ultimately proved to be the trend of the industry as it evolved in later years, was corporate decentralization - a variety of cars produced by a single company each to serve a different size pocketbook.[50] In essence, a class system for automobiles.

The significant point to remember is that these two dynamic forces working on this industry were enough to propel it to a point of supremacy which it still holds today. Table I clearly indicates the overwhelming acceptance Americans have accorded the automobile and its cousins, the bus and truck, in the short history of a little over 60 years. Some significant milestones reached in 1962 were the manufacturing of the 200 millionth vehicle; the annual registration of over 78 million vehicles; and the annual total of 767 billion vehicle-miles travelled in the United States.[51]

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TABLE I

U.S. MOTOR VEHICLE SALES, REGISTRATION AND MILEAGE STATISTICS 1900-1962
(Selected Years)

	Factory Sales Total Annual Units		Registrations Total Annual Units		Annual Total Vehicle-Miles Travelled	
1900	4,192		8,000		-	
1910	187,000		468,500		-	
1920	2,227,349		9,239,161		-	
1930	3,362,820		26,531,999		50,000	Est.
1940	4,472,286		32,035,424		206,320,000	
1950	8,003,056		49,195,212		302,188,000	
1960	7,869,271		73,795,182		458,246,000	
Total 1900-1962	200,500,412		1962 - 78,660,000		1962 - 767,000,000	

Source: Automobile Manufacturers Association and U. S. Bureau of Public Roads

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The Highway

The automobile alone would not have been so eagerly accepted if it had not been for the meteoric rise of its counterpart - the road system. Automobiles were not designed to follow cow paths or to take off across fields, but required graded surfaces on which to operate. Therefore, the country and its taxpayers were faced with the overwhelming task of providing roads in order to make it easier to move by motor vehicle from place to place. The country rose to the task rather reluctantly at first. Finally, when it was obvious that more roads were needed to accommodate the rapidly rising number of registered vehicles, the Federal Government began to take matters into its own hands.

In 1916, Congress passed the Federal-Aid Highway Act providing for the sharing of highway construction costs between the states and the Federal governments. The initiative for choosing projects and carrying them out was to be retained by each state.[52] The Act created the Bureau of Public Roads which was charged with the responsibility of supervising the Federal portion of each project. From this time, highway construction began to flourish up to the present date when something in excess of 3,573,000 miles of roads and streets exist in the United States.[53]

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The greatest effect of the new Act was seen in the construction of roads in rural areas and the urban fringes. Cities benefitted from the national road building program through the gradual improvement of the already established way. Vehicular mass transit companies were primarily concerned with the improvements in the cities because city street systems are where the bulk of their operations occur.

City street improvements took the form of new surfaces and widening. As traffic increased, cities grew, street systems were extended, and main arterial roads were improved to take care of the increased traffic demands. While street and highway improvements benefitted vehicular mass transit, they also made it more convenient for the individual citizen to travel by automobile. And so, the paradox of an asset to an industry becoming a major liability was created.

During the past decade, this liability has gradually overshadowed the asset through the increased development of limited access highways and freeways to speed the ever increasing traffic flows over, under, and around center cities. The narrow, choked city streets are still a problem and to add to the confusion, the new highways feed more and more traffic into these already overcrowded labyrinths.

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CHAPTER III

THE FACTORS OF TRANSIT ENVIRONMENT

Definition of Transit Environment

What is "environment"? To a transit company, it is the product of all things external which affect the company, its operations, or its employees. The extent of the "environment" in which a transit company operates is a powerful determinant of the ultimate success of that company. If an atmosphere exists where few factors are compatible to a transit company's health and growth, the ability to effectively service the community and compete favorably is severely affected.

Growth, Population, and Land Use Factors

The growth, population, and land use characteristics of a city and its metropolitan area are but a few of the more important environmental factors which determine the type of transit operations present at any given time. Other major environmental conditions facing a company include weather, climate, and terrain of the area; taxation and

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regulation by local governmental agencies; and finally, competition by other transit forms and firms.

The primary growth characteristics of a city are its age and size. The characteristics of population are density and mobility; income and educational levels; and the people's relative needs and desires for mass transportation. The manner in which land has been used to either permit or restrict the free flow of traffic is a vital land use influence on transit operations. The amount of land devoted to industrial, commercial, and residential uses, and their locations in relation to one another, is an additional environmental influence.

Of the many factors, influences, and conditions noted above, none stands out as all-important in determining the fate of a transit operation in a given community. Each one, however, exerts its weight upon the aggregate and upon every other segment of the whole, helping to create the "environment" in which the company must operate.

The ability to assess this multiplicity of variable factors is of constant concern to those who are charged with the responsibility of operating a transit company. Operating policies and programs that harmonize with an environment

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must be developed by an aware management if a company is to live and prosper. Prosperity in the transit business is the end result of the correct mixture of men, materials, and methods employed by a concern in tune with its environment. These internal processes of a firm are considered important enough to be explored separately and in more detail in the next chapter.

Returning to the environmental factors, one may start by examining certain gross characteristics of cities that might be expected to produce an insight into the commuting behavior of the public. This all-inclusive approach is taken, rather than an individualistic approach, because of the immediate availability of useful and reliable data of this nature for cities and their populations.

City Age

Cities of different ages grew up in radically different technological periods.[54] older cities that matured before the 1920's came into the present age equipped with extensive public transit facilities. New cities which reached maturity after the automobile became the vogue had little or no existing mass transit facilities and were obliged to pattern their growth with the automobile in mind.

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The relative importance of mass transit for the movement of persons and its association with city age is seen in the following table.

TABLE II

USE OF PUBLIC TRANSPORTATION BY AGE OF CITY, 1960

Census Year in Which Central City First Exceeded 50,000 Inhabitants	Employed Persons in CBD Using Public Transit to Work		Average (unweighted mean for age group)
	0.0 - 19.9 Per Cent	20.0 Per Cent or More	
1800-1850	1	7	34.3
1860	2	4	27.7
1870	0	7	26.7
1880	8	2	15.0
1890	14	6	16.1
1900	15	1	13.9
1910	24	1	11.5
1920	24	1	12.2
1930	25	1	10.3
1940	9	0	7.5
1950	28	1	7.8
1960	32	0	5.4
	182	31	12.5

Source: Traffic Quarterly , October, 1962

Wilmington came of age (over 50,000 inhabitants) in 1890 and so is classed as an older city. [55] According to the findings shown in the table, one of every six workers living within the city limits uses mass transit to commute. However, results of the 1963 "Journey to Work Survey," made by the Division of Urban Affairs of the University of Delaware,

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show that actually one out of every three workers, who resides within the city limits and who is employed in the center city area (Census Tract No. 1), uses mass transit to commute. By factoring this ratio to account for the many workers who live in the city, but the lesser ratio who travel by bus to work places other than in center city, it will more closely approximate the one to six ratio. City age can therefore be classified as moderately influential on Wilmington's transit environment.

City Size

Size determines the limits of the market for public transportation.[56] The following table relates city size with the use of public transportation.

TABLE III

USE OF PUBLIC TRANSPORTATION BY CITY SIZE, 1960

Size of Central City, 1960	Employed Persons in CBD Using Public Transit to Work		Average (unweighted mean for size class)
	0.0 - 19.9 Per Cent	20.0 Per Cent or More	
1,000,000 or more	1	5	33.5
500,000-1,000,000	5	11	24.8
250,000-500,000	23	4	15.2
150,000-250,000	27	5	13.2
100,000-150,000	34	0	9.9
50,000-100,000	92	6	9.0
	182	31	12.5

Source: Traffic Quarterly, October, 1962

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It is significant to note that generally as population (city size) increases, more and more persons rely on public transportation. Cities the size of Wilmington (50,000-100,000 people) or smaller indicate a theoretical public transit usage of less than one out of every ten workers, whereas in a city the size of Philadelphia (1 million or more), almost one in every three workers would be expected to use public transit for commuting purposes. Wilmington's actual usage factor, however, tends toward that of the significantly larger city (e.g., Philadelphia) and therefore, city size can be largely discounted as being influential to Wilmington's transit environment.

Population Density

The greater the number of inhabitants per square mile of city, the greater the potential usage of mass transit facilities. It follows that the more closely people are grouped into an area, the easier and more economical it is to serve them with desirable mass movement facilities. In contrast, a widely dispersed population, irrespective of its size, would not only be difficult to serve but the task would be prohibitively expensive. The following table indicates the association of population density with the use of mass transit.

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TABLE IV

USE OF PUBLIC TRANSPORTATION BY CITY DENSITY, 1960

Central City Density, 1960	Employed Persons in CBD Using Public Transit to Work		Average (unweighted mean for density class)
	0.0 - 19.0 Per Cent	2.0 Per Cent or More	
7,000-10,000	4	14	28.4
6,000-7,000	14	2	13.5
5,000-6,000	26	3	11.3
4,000-5,000	29	0	10.2
3,000-4,000	42	3	11.2
2,000-3,000	37	1	8.7
Under 2,000	19	0	6.9
	182	31	12.5

Source: Traffic Quarterly, October, 1962

The city of Wilmington ranks somewhere in the highest density group and therefore 20 per cent (one of five) or more of the workers might be expected to use public transportation to get to work. Actually, this closely approximates the situation in Wilmington, giving support to the theory that population density is one of the most influential factors in the determination of Wilmington's transit environment.

Before leaving these three measures of environment, it should be stressed that although only two, density and age, exert any significant influence on transit usage in

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Wilmington, the three are closely inter-related and together provide an even more valuable insight into understanding the environment which surrounds a mass transit operation. The inter-relation is that "older cities tend to be larger and more densely settled than newer cities."[57] When each of these three factors is treated as an independent variable, holding the others constant in a multiple correlation analysis, city age is usually the most reliable factor.[58] Density, however, ranks as most significant in Wilmington, with age rated as moderately significant, and size has little or no bearing.

Other Components of the Population Influence

The mobility of a population is worth highlighting in any analysis of a transit environment. Population mobility is defined as the population turnover rate, or the percentage of people in a given area who change their place of living each year. Delaware's annual mobility index is about 15.[59] Since the Wilmington metropolitan area accounts for the greatest portion of the population, it might be assumed that mobility in the Wilmington area would tend to be a little greater. Because the city lost nearly 15,000 inhabitants between 1950 and 1960 and during that period the suburban areas grew rapidly, it can be reasoned that the

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general direction of this mobility is outward away from the city.

This rate of mobility coupled with the directional trend presents transit company operators with the fact that annually up to one-sixth of their potential ridership moves to another location, usually out of the city where transit facilities are for the most part limited. Assuming that all of these potential riders move to distant locations not served by mass transit and that they are not replaced by new transit riders, then it is easy to calculate that a transit company might be left without a single commuter in a little over five years. The picture, however, is not that bleak, but the significant point is that if these negative trends continue unchecked, then the environment can become less and less compatible for efficient and profitable transit operations.

Population mobility and dispersion of its density are affected by another significant influence called income level. Transit riders tend to be in the lower income brackets generally.[60] As income of a family unit increases, so does its standard of living, and eventually income reaches a point where the lure of a more luxurious neighborhood is tantamount

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to the attractive power of a magnet. One indication that higher income families tend to gravitate to the suburbs is the fact that in 1950 city families had an average of $500 less income annually than their suburban counterparts; and by 1960, this dispartity had increased to $1,700.[61]

For many families, a move to the suburbs is followed closely by the purchase of a second car. In 1962, 40 per cent of all multi-car households were located in the suburbs, 26 per cent in metropolitan area centers, and 34 per cent in rural areas.[62] The additional family automobile serve two purposes - one as a means of commuting to and from work, and second as a better way of utilizing an increasing amount of leisure time. The cycle is complete; the one-time city dweller and mass transit commuter, partially because of an ever increasing income, has become a suburbanite and a private auto commuter.

There are many other characteristics which relate to population that may influence mass transit usage, such as: educational levels, racial and national origins, cultural backgrounds and social habit practices. However, these influences cannot be readily measured with regard to Wilmington's transit environment within the scope of this thesis.

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Land Use and Its Environmental Effects

One of the fundamental characteristics of any transportation system's environment is land use. It is a strong determinant in the casting of a modern-day transit system. The way that a city controls or miscontrols its uses of disposable land, either by sale or by zoning regulations, ultimately determines the layout of its transit system. The system layout, like a river seeks the routes offering the least resistance, or those where traffic flows easily and where potential customers are most likely to make use of the facilities.

The location of industrial enterprises in a city is a major influence on the location of a transit route. A route will normally originate in a densely populated area of town and proceed along a main artery to its termination point in the middle of, or adjacent to, a complex of industrial or commercial establishments. This fact is borne out strikingly in the establishment of Wilmington's first horse car line. In Wilmington, industrialized areas existed at the terminal ends of the first transit route with a commercial and a residential area in between. The Brandywine area near Rising Sun Village and the area along the Christiana

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River south of Front Street were both heavily industrialized areas in the 1800's. Market Street, then as now, was the center of retail and commercial trade, and the residential area skirting Delaware Avenue was one of the most heavily populated areas in town. As transit routes were added in later years, each was chosen primarily because of the uses that were made of the land surrounding each route.

Land use exerts its influential forces today on the flow of traffic in a city - witness the growth of traffic congestion where new shopping centers and newly established plants are located. Also apparent is the decline of traffic in areas vacated by industrial and commercial establishments.

In general, when an industrial, commercial, or residential area declines, transit usage declines proportionately; and in some cases to a point where service is curtailed or discontinued completely. Service curtailments, however, must be approved by the Public Service Commission following a thorough review and sometimes public hearings.[63]

It is not sound business thinking for the profit-minded transit operator to ignore past land utilization experience. The transit route must not only traverse the paths of least traffic resistance, but also must closely

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parallel the paths of greatest resistance because this is where the riders are and where they want to go.

Parking as a Panacea

There is no doubt that on-street and off-street parking contributes significantly to the "mass transit atmosphere" of a city. Traffic congestion and parking problems have been the subjects of many more detailed reports and treatises than this one; and rightly so because the problems which arise from a city's administration of automobile parking are in many instances as important as life and death to that community.

Wilmington faced this seemingly insurmountable problem in 1958, and in an effort to describe accurately the problem and determine a number of remedial courses of action, commissioned Wilbur Smith and Associates to make a thorough study of "Traffic and Parking." The report was published in May of 1959 and a number of the more important facts with respect to parking follow: [64]

> In 1959, there were 5,949 individual parking spaces in the CBD, representing an increase of 225 spaces, or 4 per cent, in three years. Spaces located in commercial and private off-the-street facilities increased 5 per cent in the three-year period to about 60 per cent of the total spaces. Curb parking potential declined 5 per cent. The average daily parking space demand for 1960 was estimated

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> at 6,140 spaces. When compared with supply, an estimated overall deficiency of 1,472 spaces was noted. Estimated 1970 deficiency of parking spaces, based on a projected demand of 7,400 spaces and assuming a stability of supply, is 2,732.

These facts and projections point to a need for additional parking capacity in the center city area, a problem that should be considered more than casually. Evidently these problems are being considered because a recent working paper on Wilmington's "Land Use in the Core Area," noted a significant increase in the supply of parking spaces, primarily the off-street variety in newly constructed commercial and private lots. A 60 per cent increase in land use devoted to parking has also been noted in the core area from 1954 to 1963. [65]

While mass transit companies are anything but pleased at the thought of new parking facilities in the core area, they are less disturbed by the fact that the increase is in off-street spaces. This means that traffic, in which buses must operate, should not become further congested and the costs to park in these new facilities should be competitive with existing transit fares.

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The Phenomenon of the Shopping Center

While there are many excellent reasons for the growth of shopping centers, such as relief from taxes, congestion, and parking problems, exploration of some of the effects this relatively new innovation to the American scene has had on the environment of mass transit is in order.

First, the location of these retail complexes is usually just outside the city limits, in the midst of suburban neighborhoods, and always on a main thoroughfare leading into the central part of the city. This strategic location has had the effect of diverting the flow of shoppers on route between their homes and the central business district, creating a form of strangulation on downtown merchants. [66] If all the main arteries into the city are cut in this fashion, center city experiences general economic decline complete with idle land uses, fleeing merchants, and eroding tax bases. When this happens as it seems to have in Wilmington, it is a monumental task to reverse the trend.

The transit companies also suffer in an environment of this type because it is the "shopper" who, by making use of mass transit facilities during off-peak hours in the

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morning and afternoon, keeps many a transit company operating profitably. Transit routes are already established, oriented primarily from peripheral city areas to center city. Alteration of these routes to serve shopping centers is either impossible because route rights are not available or just not economical because of the low density suburban areas through which they would pass. [67] The result is that the shopping center problem is a challenge that most mass transit operators have not been able to successfully cope with as yet.

Significant Independent Environmental Factors

While the many foregoing factors are most significent in the determination of transit environment, there are a number of other independent factors not closely allied with either population, growth, or land use that bear mentioning. Those which have specific application in the Wilmington area are terrain and climate; taxation; regulation; and competition, both within the industry with other bus lines, and outside the industry with the automobile and various other modes of travel.

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Terrain and Climate

The characteristics of terrain and climate bear minor significance in Wilmington because each is not relatively extraordinary. Wilmington has its share of hills, but grade ascents and descents, except on 4th Street, are not abnormal.

The climate of Delaware is best described as "humid, temperate" with hot summers and for the most part, mild winters. [68] While the Appalachian Mountains tend to moderate the cold air masses and heavy snows of the winter before they arrive in Delaware, five and six day stretches of sub-freezing weather are not uncommon, and 60 inches of snow in a winter has occurred more than once. The unpredictability of these climate variations makes it necessary to prepare for the worst; which means the provision of snow removal equipment and extensive winterizing of revenue equipment. Ridership tends to increase in spells of abnormally cold or snowy weather because people become apprehensive about driving and parking conditions and elect to ride the bus. [69]

Summer weather in the Wilmington area is equally unpredictable. Rainfall data on a month-to-month and year-to-year basis show very erratic patterns. [70] One thing that is

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consistent is the humidity; which fact becomes an important influence on the transit environment. The more expensive air-conditioned buses become most desirable, if not a necessity. In addition, the threat of humid weather helps accentuate the flight of people from crowded city quarters to the seashore resorts on weekends, with the resultant almost complete loss of demand for mass transit travel.

The Inevitable Taxes

The tax problem is especially acute for the transit company because not only does it pay a tax on corporate income, as does any corporate enterprise, but it also pays real estate, equipment, gasoline, franchise and excise taxes, and a number of other license and registration fees.

Table V summarizes the federal, state, and local operating taxes and license fees paid by the Delaware Coach Company in the fiscal year of 1963. In addition to those noted, the company also paid a Federal Income Tax amounting to 49 per cent and a State Income Tax of 5 per cent.

The magnitude of the tax problem produces an added depressing effect on the maintenance of a healthy mass transit environment. Relief from some of these taxes and fees has been granted by many governmental bodies to other transit

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TABLE V

FEDERAL, STATE AND LOCAL OPERATING TAXES AND LICENSE FEES
DELAWARE COACH - DELAWARE BUS COMPANY 1963

	Federal		State		Local		Total
Fuel and Oil Taxes	$12,761		$33,523		$		$46,284
Vehicle and Registration Fees			10,606				10,606
Real Estate:							
City of Wilmington					6,528		
New Castle County					1,093		
							7,621
Other Licenses:							
Rights and Privileges (Franchise)					15,724		
License Fees - Wilmington					3,800		
License Fees - New York					268		
							19,792
Payroll Taxes	35,836		10,107				45,943
Corporation Taxes			115				115
Federal Excise Tax	5,787						5,787
Miscellaneous Taxes (Sales)			90				90
Total Annual Taxes and Fees	$54,384		$54,441		$27,413		$136,238

Source: Delaware Coach Company

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companies throughout the country, but as yet no action has been taken in Delaware. It is the belief of some transit operators that the burden of all of these assessments has a limiting effect on the ability of the bus to compete successfully with the automobile as an economical means of mass movement.

Public Utility Regulation

Delaware's mass transit industry is at best a very small industry but its role as a conveyor of the public makes it subject to the regulation and review of the Public Service Commission. This state agency oversees and regulates all mass transit operations in the state. It approves or rejects, usually following public hearings, petitions for fare changes or for changes in route rights that permit the expansion or curtailment of service of certain routes. The Commission not only regulates the industry but also performs the equally important function of trying to help the industry compete successfully with the automobile and other forms of transportation. In recent years, the Commission has been very understanding of the problems facing the transit industry and has been receptive to new ideas that might help stem the decreasing tide of transit ridership. [71]

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The Competitive Picture

The one most significant factor which influences the mass transit environment of Wilmington is the rate of growth of automobile registrations in New Castle County since 1946. When compared with the annual ridership figures for the Delaware Coach Company, as shown in Figure XI, the picture becomes very clear. Using 1946 as a base year, car registrations have risen in the past 17 years by almost 200 per cent while ridership has experienced a 75 per cent decrease.

It would seem that a continuation of these trends would spell disaster for the transit business as well as contribute to a hopelessly crowded downtown area. But even though ridership has decreased so dramatically, there is still a significant number of workers and shoppers who daily rely on bus transportation to get them to and from center city. The "Journey to Work Study" indicates that one out of every three persons working in Center City Wilmington and living inside the city limits still uses the bus to commute to work, and the Coach Company notes that 26 per cent of its riders use the lowest fare plan (Big 45). [72]

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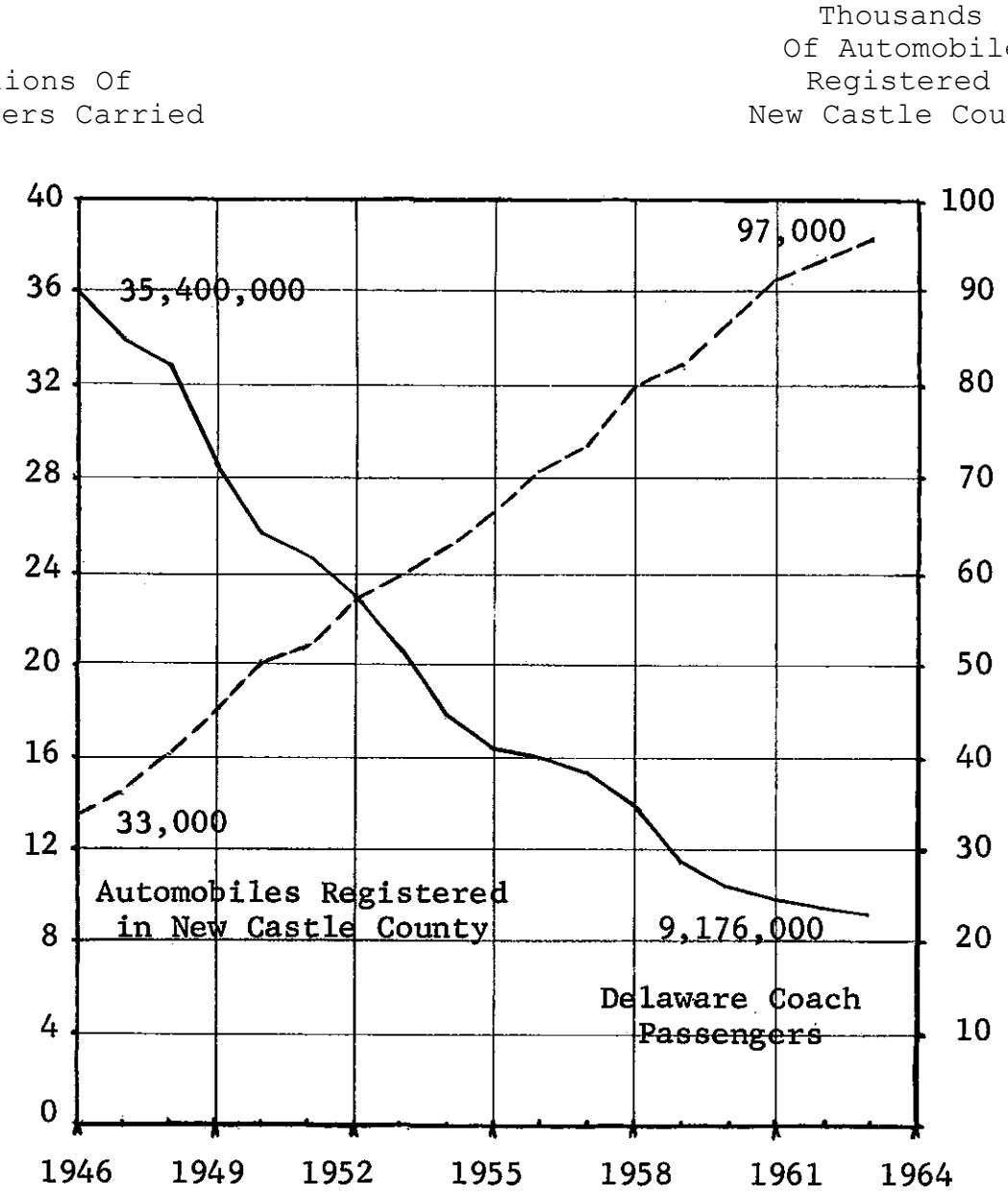

FIGURE XI

A Comparison of Delaware Coach Ridership
with Automobiles Registered in New Castle County, 1946-1963

Source: Delaware Coach Company

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Local competing bus lines are but two in number, the Short Line Inc. and the Diamond State Bus Company. The Short Line Company is the larger of the two rivals with routes connecting Wilmington with Kennett Square, West Chester, and numerous other towns north and west. In addition, this company operates commuter routes from Wilmington to Fairfax and Talleyville, and a number of trips daily to many points in southern Delaware. In all, nearly 75 "Short Line" trips either begin or end in Wilmington on the average work day.[73]

The Diamond State Bus Company operates only two lines, one to the south serving Manor Park, Wilmington Manor Gardens, and Delaware City, and the other to Arden, north of Wilmington. The service on both lines is infrequent and most trips are not heavily patronized.

Competition from other modes of travel other than automobiles or buses is limited to a small number of commuter trains that operate between Wilmington and Claymont on the north and Newark on the south. The taxicab must be mentioned, but it is more of a complementary type of service than a competitive one.

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CHAPTER IV

THE ANATOMY OF A LOCAL TRANSIT COMPANY

Introduction

An analysis of Wilmington's mass transit system is not complete without examining the organization and daily inner workings of the Delaware Coach Company and its affiliate, the Delaware Bus Company. The previous chapter oriented the reader with Wilmington's transit environment, while this chapter will help provide a basic understanding of the day-to-day operations of the Delaware Coach Company. All statements of fact pertaining to current operations contained in this chapter, unless otherwise noted, have been obtained from the records and files of the Delaware Coach Company or from conversations with its management.

Organization

The Delaware Coach Company is one of a number of wholly owned, operating subsidiaries of American Transportation Enterprises, Inc. (ATE) of New York. ATE is owned by Marc Haas, and members of the families of Charles and

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Herbert Allen. All of the owners are associated in the operation of Allen and Company, an investment banking firm located in New York City. Allen and Company was organized in 1944 when the first of the subsidiaries, a transit company serving the Cincinnati area, was purchased. The Delaware Coach Company is organized as indicated in Figure XII.

The Delaware Bus Company is a separate company and like the Delaware Coach Company is also a wholly owned subsidiary of ATE. In a manner of speaking, however, the company does not really exist, as it has no vehicles or management of its own. The Delaware Coach Company leases vehicles to the Delaware Bus Company and manages its entire operations. The two companies are affiliated in this manner so that the Delaware Coach Company can operate a charter service across state lines. The route rights to the route between Wilmington, Chester and Darby, Pennsylvania, have been assigned to the Delaware Bus Company; thus, without the affiliation, the Delaware Coach Company would not be able to operate any form of transit service outside the state of Delaware.

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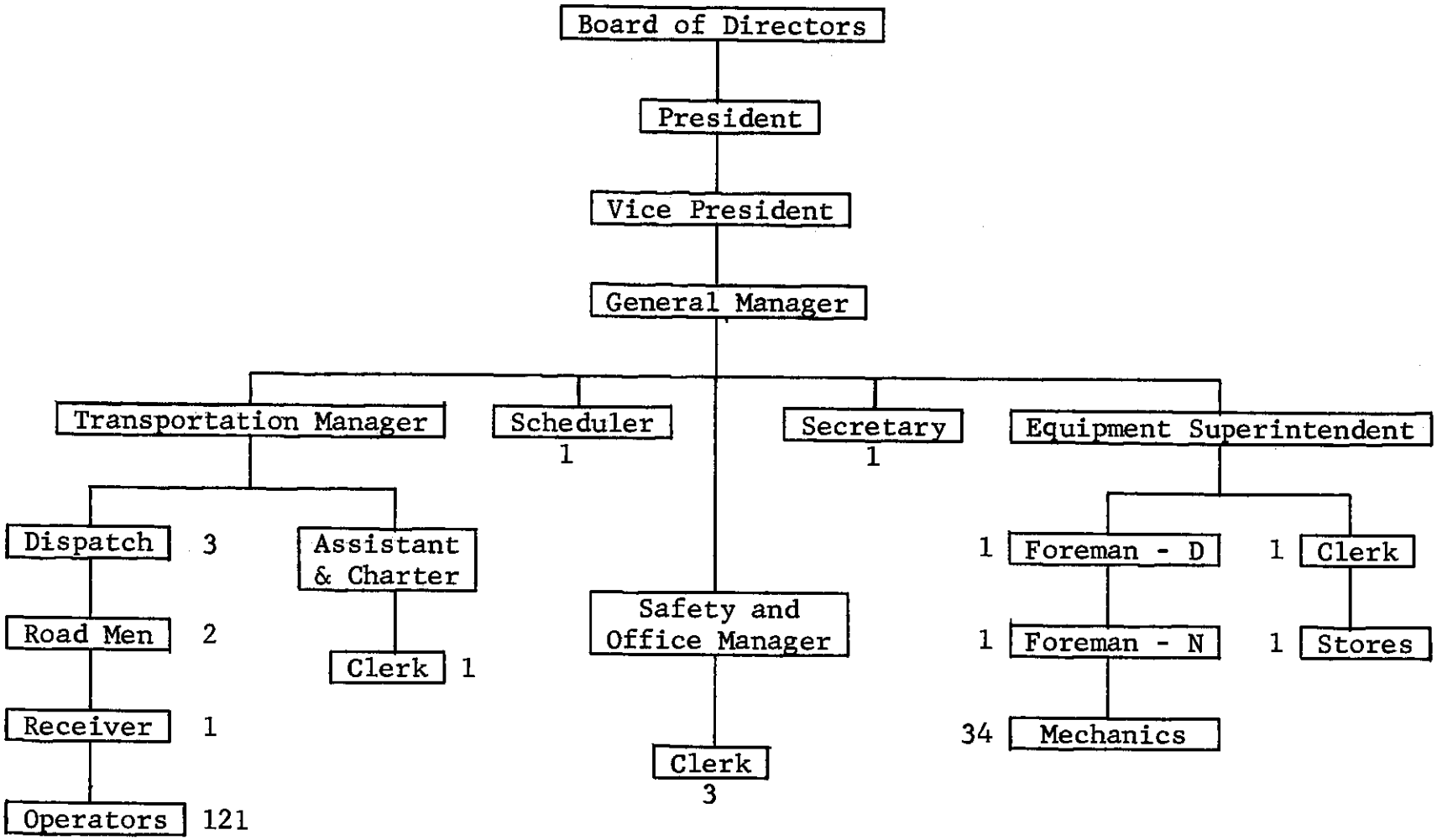

FIGURE XII

Delaware Coach Company Organization Chart - January, 1964
(Figures indicate non-management employees)

Source: Delaware Coach Company

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Revenue Equipment

As of the opening day of business in 1964, the Delaware Coach Company owned and operated 85 buses. All but three of these vehicles are equipped for regular use on the ten routes which comprise the local service. The remaining three vehicles are specially equipped and used for charter service exclusively. Only 72 vehicles are required for peak hour coverage of the ten local routes, leaving ten buses which are scheduled for maintenance, special school service or as additional charter vehicles.

All buses in the fleet operate on diesel fuel and 13 of the more recently purchased models are air conditioned. The fleet is kept as attractive, efficient, and modern as possible through the efforts of the maintenance and painting crews and a planned schedule of retirement and replacement of older coaches with new equipment. Four vehicles were retired late in 1963, while three new ones of larger capacity were purchased.

The oldest vehicle in the fleet was manufactured and purchased in 1948. Many of these older vehicles have logged in excess of 750,000 route miles while in service. The fleet as a whole has traveled over 33 million miles,

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and averages about 3,700,000 miles annually on the 144 miles of local service routes and charter service operated by the combined companies. A current roster of pertinent information about revenue producing equipment is shown in Table VI.

Equipment costs have skyrocketed as compared with the early days of the horse car and electric trolley car. A new modern transit coach costs about $35,000 to $40,000, whereas a fully equipped, 16-foot, electric trolley car in 1900 cost from $3,500 to $4,000. [74] However, the comfort, style, and speed of today's vehicle is easily ten times more acceptable.

Fuel is a significant item in the budget of a modern transit company. Today's buses with automatic transmissions consume great quantities of diesel fuel. In 1963, over 556,000 gallons of diesel fuel were used. On the average, a vehicle on a local run will operate at the rate of 4 to 5 miles to a gallon, whereas on a charter run the more efficient engines will get as high as 6 miles to the gallon. The average fuel consumption rate for the entire fleet for 1963 was 4.7 miles per gallon. Fuel costs the Delaware Coach Company 19.3 cents per gallon, or about 5 cents a mile. In 1900, when a transit vehicle was powered by

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TABLE VI

REVENUE EQUIPMENT

DELAWARE COACH COMPANY - DELAWARE BUS C014PANY

JANUARY 1, 1964

					Acquired			
						New		Average Annual
			Number of	Year		or		Mileage
Units	Company Numbers	Manufacturer	Passengers	Manufactured	Date	Used	Cost	(Since Acquired)
Delaware Coach Company								
6	706-711	GMC	40	1948	1/55	Used	$ 8,430	23,000
10	716, 718, 720-724,							
	726, 728, 729	GMC	36	1948	4/48	Used	13,908	45,000
7	788-792, 795, 796	GMC	36	1948	10/55	Used	6,529	30,000
1	798	GMC	36	1948	6/56	Used	6,529	30,000
9	712-714, 782-787	GMC	36	1948	10/56	Used	5,613	25,000
8	730-736, 738	GMC	36	1949	4/49	New	16,574	52,000
3	740, 741, 743	GMC	36	1951	4/51	New	16,807	50,000
2	742, 744	GMC	36	1951	8/54	Used	8,430	40,000
2	701, 702	GMC	42	1951	4/57	Used	5,450	36,000
3	703-705	GMC	45	1953	4/57	Used	12,687	36,000
2	749, 750	GMC	42	1953	9/57	Used	12,800	38,000
12	751-762	GMC	45	1957	12/57	New	21,685	47,000
1	763	GMC	45	1957	2/58	New	22,791	45,000
5	764-768	GMC	45	1960	6/60	New	25,921	78,000
1	769	GMC	45	1960	1/61	New	26,620	61,000
8*	772-779	GMC	45	1961	6/61	New	31,195	59,000
2*	770, 771	GMC	45	1961	6/61	New	36,602	69,000
Delaware Bus Company								
2*	370, 371	GMC	37	1948	8/63	Used	7,500	Not Applicable
1*	380	GMC	38	1961	12/63	Used	39,000	Not Applicable
85	TOTAL			Fleet's Average Annual Mileage				3,700,000
*Air Conditioned								

Source: Delaware Coach Company

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electricity, 1.3 cents was the average cost of power to propel a car over one mile of track. [75]

Regular and exacting maintenance is one of the reasons the Delaware Coach Company has been able to render such efficient service over the years to Wilmington area riders. All revenue vehicles are scheduled for a thorough check every 3,000 miles. With the advent of new low maintenance type vehicles, consideration is being given to switching to a 6,000-mile interval for newer model vehicles. However, experience has shown that brakes need attention and adjustment every 3,000 miles. Through the installation of automatic slack adjusters, a vehicle can safely operate for 6,000 miles without a brake check, because these devices adjust the brakes automatically. Most other maintenance excluding daily checks of tires, fuel and oil is accomplished at 6,000-mile intervals. The company's maintenance creed is to adjust, repair or replace whenever safety or efficiency of operation is involved. With this philosophy and the program of purchasing vehicles for which parts are interchangeable, the company's buses are seldom out of service for more than one day for repair, and maintenance costs are kept to a minimum.

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To present the most attractive appearance and as a matter of good common sense, every vehicle is refueled, safety checked, washed and vacuumed thoroughly every day at the end of its run. Special equipment has been installed in a separate service lane at the car barns for this purpose. Every vehicle must be checked through the lane before it can be cleared for dispatch on the following day. This procedure has earned the company many compliments and awards for cleanliness and attractiveness from distant as well as local sources.

Vehicles are depreciated over a 14-year period under the government's new scale of depreciation rates. Forty-five per cent of the value is depreciated in the first four years; 40 per cent over the next five years; and 15 per cent over the last five years until a standard salvage value of $250 per vehicle has been reached.

A number of interesting comparisons between the equipment and transit system of today and those of approximately 15, 30, and 60 years ago point to the progress that has been made over the years.

Immediately following World War II, late in 1947, before the transit system in Wilmington was converted to

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diesel equipment, there were 72 trackless trolley coaches and 54 gasoline buses operating on about 105 miles of routes in and around the city. [76] The trolley coach system consisted of 29 miles of overhead wires (Map III, Page 24) and carried about 74 per cent of all the passengers riding the system at that time. [77]

Fifteen years earlier, in 1932, the trolley car was the principal transit vehicle within the city, but the bus was taking over most of the longer suburban runs. The 54 trolley cars traveled 6,835 miles daily over 50 miles of track, 34 of which were inside the city limits. [78]

At the turn of the century, the electric trolley, then the most modern form of mass transit, was well established in Wilmington with 17 miles of track inside the city limits. [79] In that day, one 16-foot car, one mile of track, poles and wire, and a proportionate amount of real estate and electrical power to operate the car, could be obtained for the average investment of $18,550. [80] At this rate, and assuming one car for every mile of track (standard operating ratio), [81] Wilmington's 17-mile system, shown by Map IV, could have been installed for the initial investment of about $325,000.

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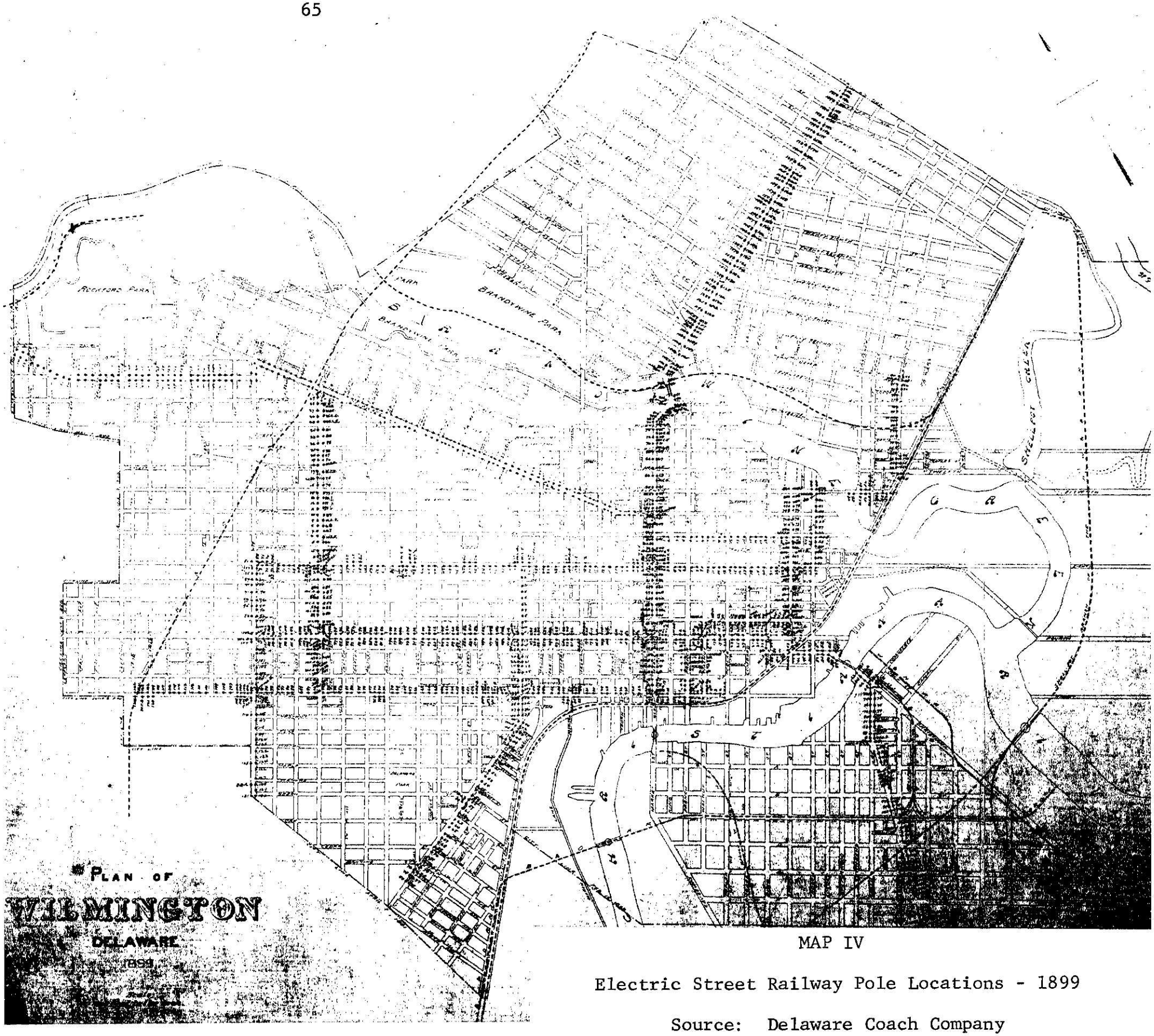

MAP IV

Electric Street Railway Pole Locations - 1899

Source: Delaware Coach Company

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The initial investment for 17 transit vehicles at today's average cost of $39,000 per vehicle would be $660,000, or twice the cost of the entire system back in 1900. Presently, the fleet is five times that of 60 years ago, and in addition, real estate values and fuel costs are many times higher.

Manpower

The Delaware Coach Company had 176 employees an its rolls as of January 1, 1964, down from 188 employees in 1963. The 176 employees consist of 121 operators, 34 maintenance men, 16 clerical and 5 management persons. During the past two years, the work force has been reduced slightly with neither layoffs nor hirings being evident. These reductions in force have been effected mainly through attrition even though the company has no compulsory retirement at age 65. The oldest operator is 71 years of age while the youngest is 34 years old. The senior operator has been driving for the company since 1918 while the operator with the least seniority has over nine years of service.

Labor Relations

The operating and maintenance personnel are represented every other September at the bargaining table by Local 842 of the Amalgamated Association of Street and

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Electric Railway and Motor Coach Employees of America. The most recent contract was signed October 1, 1962, and provided for a 15 cent an hour wage increase spread over the two year life of the contract. Five cent an hour increases became effective in October, 1962; June, 1963; and February, 1964. This resulted in a present operators' rate of $2.50 an hour, a 134 per cent increase over the $1.07 an hour rate paid in 1946. A graphic example of Delaware Coach operators' wage rates is shown in Figure XIII. Labor costs are the largest single cost item in the annual budget of the company, comprising about 68 cents of every dollar spent.

The local union members use the seniority system to choose their individual working schedules or operating runs. Operating runs are weekly segments of work that total 40 hours or more. Company management sets up the operating runs to cover all the company's routes for a regular week and then divides them into as close to 40-hour segments as possible. The operators bid on these runs by seniority. The company's entire route system is re-scheduled once or twice a year, so the procedure of bidding takes place each time the system is revamped. Those operators without a regular run fill in on school trips, charter trips, extra service trips, and for vacations and disability.

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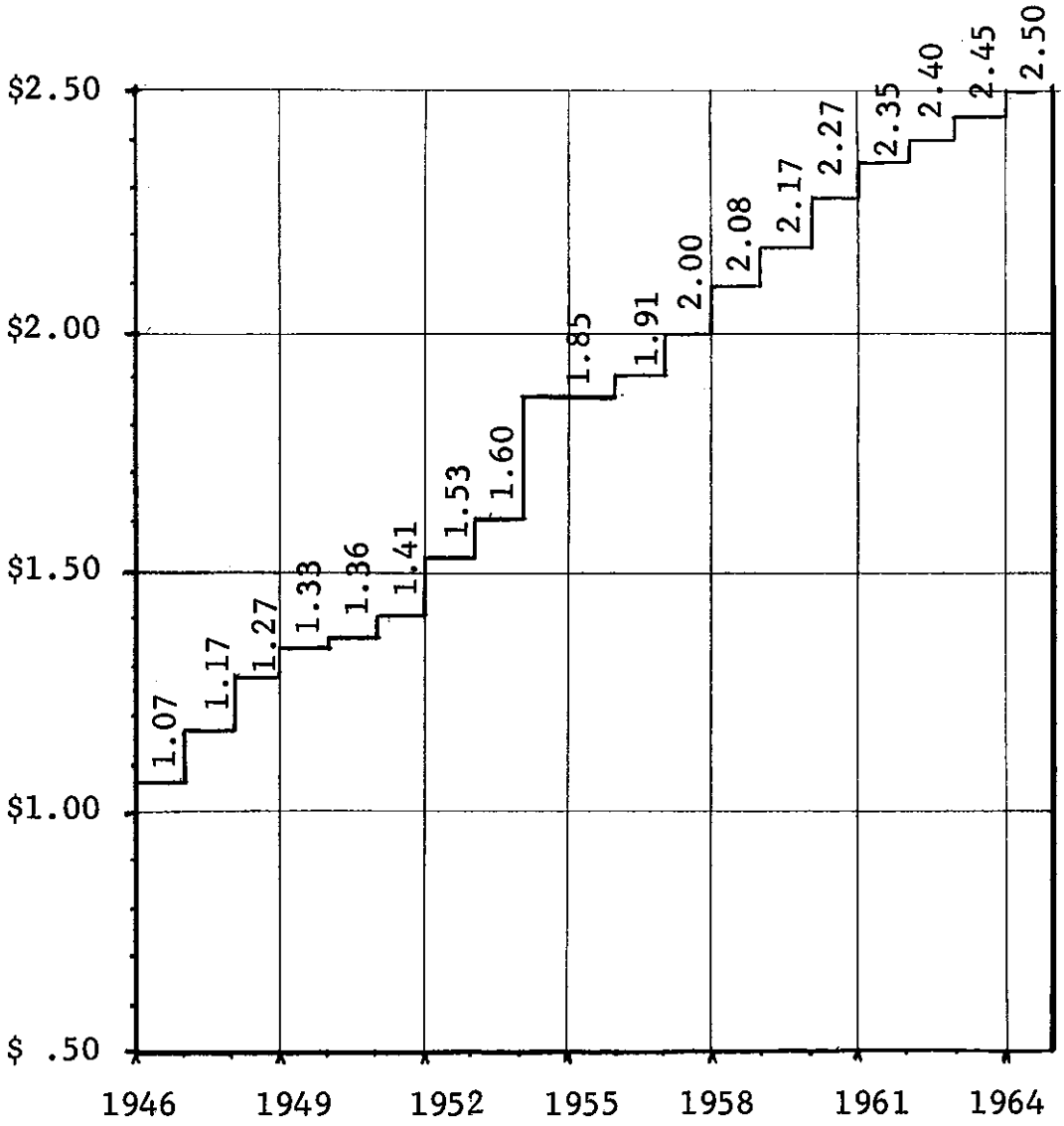

FIGURE XIII

Delaware Coach Operators' Wage Rates 1946 - 1964

Source: Delaware Coach Company

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The benefit program for all employees is not significantly different from that of any other average private company in the transit industry.

ATE employs a central staff of personnel in a number of functions such as accounting and specialty consulting services to assist all of its subsidiary companies. Local specialty staff work is largely unnecessary and when a company uses a central staff service or person, they are charged accordingly, thereby keeping overhead costs at minimum levels. The Delaware Coach Company can operate successfully with only five full-time management persons.

Routes

The Delaware Coach Company operates nine regular routes, two small feeder or extension lines, and a number of spurs to the regular routes. The Delaware Bus Company operates only the one interstate route to Pennsylvania. Map V shows the combined systems with the exception of the termination points of Route 1 (Chester and Claymont) and Route 6 (Newark). Following is a short description of each route.

ROUTE 1 WILMINGTON - CHESTER - CLAYMONT

This route originates in Wilmington at 9th and Shipley Streets, proceeds north on King Street

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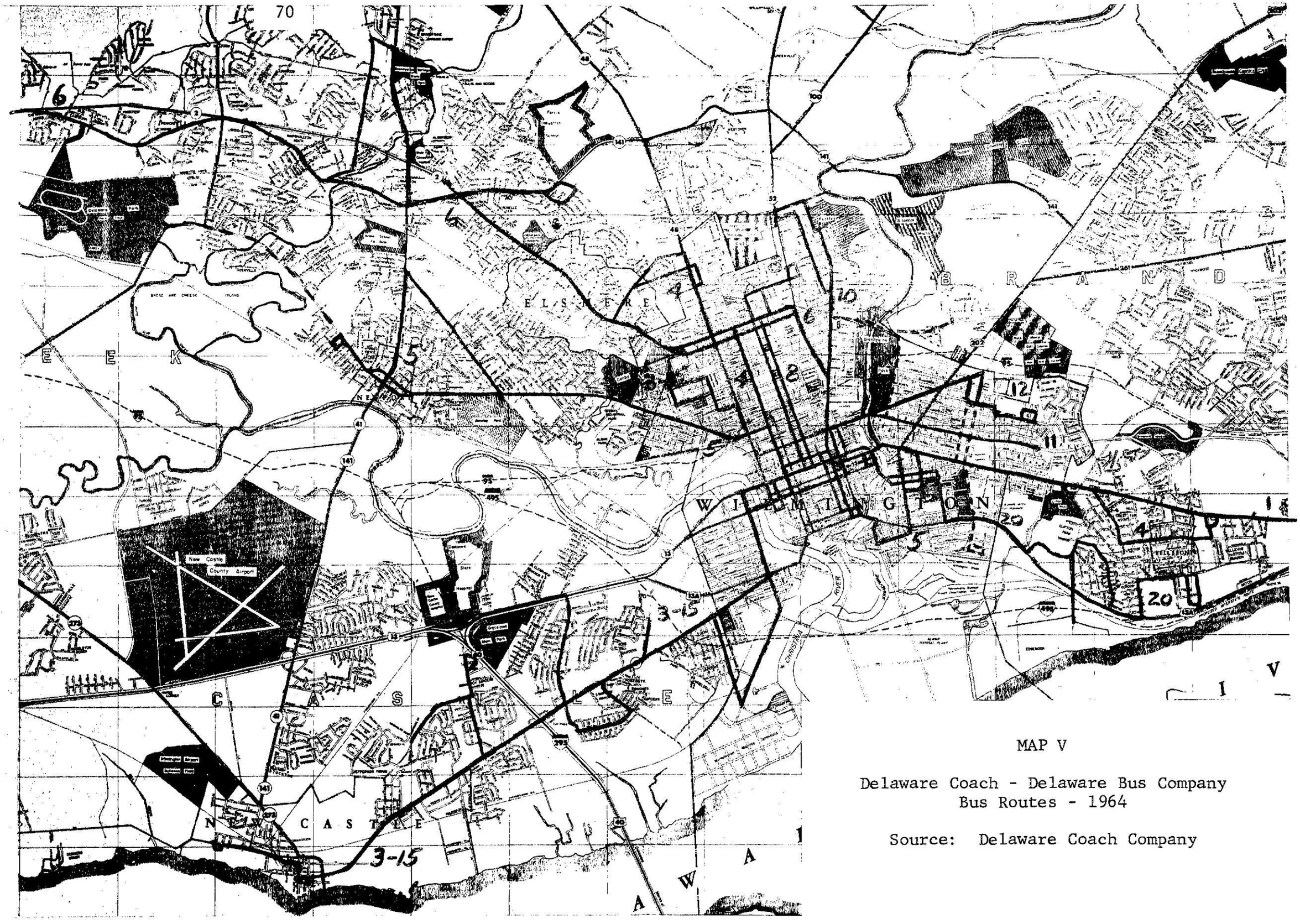

MAP V

Delaware Coach - Delaware Bus Company
Bus Routes - 1964

Source: Delaware Coach Company

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to Market Street, north on Market Street and Philadelphia Pike to the Claymont area where it crosses into Pennsylvania, proceeds through Marcus Hook to its termination point in Chester. The return trip to Wilmington retraces the route exactly except for the use of adjacent streets where one-way streets occur. The route has a spur into Asbourne Hills via Darley Road which operates on weekdays only. There is an extension to Ridley Park and Darby, Pennsylvania, which operates on Saturdays only.

The normal running time to Chester is 38 minutes one way, and the round-trip mileage of the trunk route is about 23.80 miles.

ROUTE 3-15 NEW CASTLE - SOUTH HARRISON

This route is a combination of two main routes and a number of spurs. In essence, Route 3 is the South Harrison end of the line and Route 15 is the New Castle end. Using 4th and Market Streets as the terminal of both lines, Route 3 proceeds west on 4th Street to Monroe Street, south to Lancaster Avenue, west on Lancaster Avenue to Harrison Street, south on Harrison Street to Linden Street, around a loop comprised of Clayton, Broom and Cedar Streets, then returning to 4th and Market Streets via the same route. This section of Route 3-15 has a nine minute one-way running time and measures 3.17 round-trip miles.

The trunk route to New Castle proceeds south on French Street over the Walnut Street Bridge, east on A Street to New Castle Avenue and south to New Castle proper. The only extension to this route is from New Castle to Shawtown. The first of five spurs to this trunk route is to the Marine Terminal using Christiana and Terminal Avenues. The second spur is on Rogers Road west to Hastle Drive. The third spur is a loop through Holloway Terrace via Lamsons Lane, Central and West Avenues. The fourth, a major spur, leaves New Castle Avenue in a westerly direction on Memorial Drive to the Du Pont Highway, where it turns south to the Farnhurst turnaround and then returns. The last spur is into Castle Hills and Landers Park via Landers and Moores Lanes.

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The one-way average running time from 4th and Market Streets to New Castle exclusive of the spurs is about 26 minutes. The basic round-trip route measures 11.17 miles.

ROUTE 4 WEST 4TH STREET - BELLEFONTE

This line operates through Center City from Bellefonte, in the northern suburbs to two spurs located in southwest Wilmington known as Union Gardens and Cleveland Avenue in Colonial Heights. The spur routes separate at Lancaster Avenue and Union Street as follows: Union Gardens buses operate south on Union Street to Sycamore Street, then east to Lincoln Street, then back to Lancaster Avenue where they join the trunk line. Cleveland Avenue buses operate West on Lancaster Avenue to Gray Avenue to 2nd Street to Cleveland Avenue, then back to Lancaster Avenue and south to Union Street to the trunk line. The trunk line proceeds north to 4th Street, east to Market Street, then north on Market, King, and Market Streets to the Philadelphia Pike, then on to Hillcrest Avenue to Haines Avenue, and finally to Brandywine Boulevard in Bellefonte. Return trips retrace the trunk line to Union Street and Lancaster Avenue alternating every other bus to each spur.

From Bellefonte to the end of either spur, the one-way running time is about 31 minutes. The round-trip mileage for the Union Gardens route is 11.91 miles, and for the Cleveland Avenue route is 12.54 miles.

ROUTE 5 NEWPORT - SILVIEW - VANDEVER AVENUE

This route operates through Center City from one terminal in Silview southwest of Wilmington to the other terminal at Vandever Avenue and Market Street on the north. Northbound trips leave Wilmington Pike at Lindberg Avenue following Wilmington Pike through Newport to Maryland Avenue, through Richardson Park to Monroe Street, to 4th Street, east on 4th Street to Market Street, and then north to 10th Street. The route then proceeds east on 10th Street

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to Church Street where it crosses the Brandywine, to 12th Street, Claymont Street and Vandever Avenue, then west to the Market Street terminal point. Southbound trips retrace the same route except for a loop that is made at the beginning of the trip involving Market Street, 23rd Street and Spruce Street before joining Vandever Avenue. There is a triangular spur in the Newport area involving Boxwood Road and Newport-Gap Pike. There is also an extension to the line from Silview out Wilmington Pike to Stanton and the Delaware Race Track.

The trunk line one-way running time is about 36 minutes, and the round-trip route mileage for the trunk route is 14.02 miles.

ROUTE 6 NEWARK - PRICES CORNER

This line originates in Center City at 4th and French Streets and operates outbound to Newark over the following trunk route: 4th Street to Orange Street to 10th Street to Market Street to 11th Street to Delaware Avenue to Pennsylvania Avenue to Union Street, then south on Kirkwood Highway through Elsmere to Prices Corner. Here the route leaves Kirkwood Highway following Old Capitol Trail through Cranston Heights and Marshallton, then back to the Kirkwood Highway at Limestone Road. Still following Old Capitol Trail, the route leaves Kirkwood Highway again and rejoins it at Eastburn Acres continuing westward to and through Newark on Main Street to a terminal point at Amstel Street on Elkton Road. Return trips follow the same route in reverse, substituting Lincoln Street for Union Street, and French Street for Orange Street in the downtown area. There are a number of spur routes - one to Willow Run using Centre Road; another to The Cedars and Dunlinden Acres using Newport-Gap Pike and Duncan Road; and another to Colonial Park using Du Pont Road in Elsmere and Lancaster Pike to return to the trunk line.

The normal running time from 4th and French Streets to the Newark terminal is about 48 minutes. The round-trip mileage is 26.70 miles for the basic route exclusive of spurs.

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ROUTE 8 WEST 8TH STREET

The Center City terminal of this line is at 7th and Market Streets. Outbound trips travel west on 7th Street to Woodlawn Avenue, then north to 14th Street, west to Riverview Avenue, south to Pennsylvania Avenue, east to Woodlawn Avenue again, and south to 9th Street. Inbound trips travel east on 9th Street to Union Street, south one block to 8th Street, then east on 8th Street to Market Street.

The normal one-way running time for this trip is about 15 minutes outbound and 10 minutes inbound. The round-trip route mileage is 4.27 miles.

ROUTE 10 DELAWARE AVENUE

Outbound trips originate at Front and French Streets, opposite the Pennsylvania Railroad Station, proceeding east on Front Street to Poplar Street, north to 2nd Street, west to Market Street, north to 11th Street, then turning west and proceeding out Delaware Avenue to Brinkle Avenue. The route then loops using 19th Street, Rising Sun Lane and Mount Vernon Avenue. Inbound trips proceed east on 17th Street joining Delaware Avenue, whereupon the route retraces itself to Front and French Streets.

The normal one-way running time is 17 minutes, and one round-trip measures 6.68 miles.

ROUTE 11 WASHINGTON STREET

This route originates at Front and French Streets and makes the same Front Street, Poplar Street, 2nd Street initial loop as Route 10. The route then proceeds north on Market Street, west on 11th Street, and north on Washington Street to termination at 41st Street. The reverse trip is identical except 12th Street substitutes for 11th Street.

A round-trip on this route measures 6.05 miles, and the one-way running time is about 18 minutes.

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ROUTE 12 BOULEVARD

This route is identical to Route 11 south of 16th Street where Washington Street veers to the east. The Number 12 route follows Baynard Boulevard to 29th Street to Van Buren Street, then north past P. S. Du Pont High School on Monroe Street to a loop made up of 39th, Van Buren, and 37th Streets. The inbound route retraces itself to Front and French Streets, substituting 28th Street for 29th Street, and 12th Street for 11th Street.

Round-trip mileage for Route 12 is 6.70 miles, and the average one-way running time is 18 minutes.

ROUTE 20 EDGEMOOR - KYNLYN

This line originates in Center City at 11th and Market Streets and operates outbound over the following route: north and east on King, 14th, Walnut and 16th Streets to Pine Street, crossing the Brandywine Creek and north to 26th Street where it turns east to the Governor Printz Boulevard. It then proceeds north to Clifton Park Drive, around the Merchandise Mart to Rising Drive in Edgemoor Gardens, and east back to the Governor Printz Boulevard. The inbound trip starts south on Governor Printz Boulevard to Edgemoor Road, west to Clifton Park Drive, then retraces the outbound route substituting Jessup Street for Pine Street inbound. The Kynlyn extension is operated only during rush hours and consists of a route north on Governor Printz Boulevard from Rising Drive to Lore Avenue, west to River Road, north to Kynlyn Drive, around a loop and back via the same route to Rising Drive and Governor Printz Boulevard. Another peak hour spur is maintained east on Edgemoor Road to a number of industrial plants.

The normal one-way running time to Edgemoor is about 18 minutes with an additional 6 minutes needed to get to Kynlyn. The round-trip mileage for the Edgemoor trip is 8.74 miles, and for the Kynlyn round trip is 12.29 miles. Both mileages contain the industrial loop route east on Edgemoor Road.

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THE WANAMAKER FEEDER

This is a subsidized line which originates at Delaware Avenue and Du Pont Streets. It is primarily a shoppers' route and does not operate on Sundays or during hours when Wanamaker's is closed. The route proceeds across the Augustine Cut-off to Wanamaker's and returns, with spurs to Alapocas, and east on 18th Street to the Boulevard (12) and Washington Street (11) Routes.

This feeder route including the 18th Street spur measures 3.53 round-trip miles.

TODD'S CUT EXTENSION

This is an infrequently operated line (once a day) tieing Routes 12, 11, 1, 4, and 20 to the Pennsylvania Railroad Shops and the Purina Chow Plant. The line starts at 30th and Market Streets, continues east to Todd's Lane, makes a loop and returns over the same route to Market Street. It then proceeds west on 30th Street to Van Buren Street, then turns around and returns to Market Street via 29th Street.

A round-trip on the Todd's Cut Extension consists of 3.09 miles.

The Total Route System

The entire Delaware Coach route system including spurs and extensions covers 88.3 miles of roads and streets in and around Wilmington. There are 35.7 miles of city streets over which at least one route passes and 52.6 miles of county roads are also served by the system.

Table VII recaps the total daily and weekly bus miles and bus hours for the entire system. Each route

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TABLE VII

SCHEDULED BUS MILES AND BUS HOURS
DELAWARE COACH - DELAWARE BUS COMPANY
SCHEDULE DATE - SEPTEMBER 8, 1963

		Bus Miles					Bus Hours				
No.	Route Name	Wk	Shp	Sat	Sun	7-Day	Wk	Shp	Sat	Sun	7-Day
1	Chester	841	841	720	445	5,370	57	57	46	24	355
3-15	New Castle	1,175	1,212	783	488	7,183	89	91	59	32	538
4	W. 4th St.	1,103	1,134	914	588	7,048	109	114	91	50	691
5	Vandever	1,249	1,321	942	561	7,820	114	123	87	47	713
6	Newark	1,024	1,055	595	298	6,044	78	80	47	19	458
8	W. 8th St.	282	299	231	72	1,730	33	35	26	9	202
10	Delaware	519	542	346	170	3,134	63	67	41	17	377
11	Washington	399	418	220	98	2,332	50	54	27	9	290
12	Boulevard	276	314	131	60	1,609	31	35	16	6	181
20	Edgemoor	317	331	162	27	1,788	28	30	15	2	159
W	Wanamaker	91	104	78	0	546	12	13	10	0	71
-	School Serv.	134	134	-	-	670	21	22	-	-	106
System Totals		7,410	7,705	5,122	2,807	45,274	685	721	465	215	4,141
KEY:	Wk - Weekday Schedule										
	Shp - Shopping Day Schedule										

Source: Delaware Coach Company

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shows the scheduled miles and hours for a weekday, a shopping day, a Saturday and a Sunday; and the total for a seven-day week. The 45,274 scheduled miles logged each week compared with the average weekly revenue passenger count shows that during 1963, 3.2 passengers were carried per mile. Assuming 40 seats to the average bus, this indicates a utilization factor of 8 per cent of capacity.

The total weekly bus hours compared with the weekly revenue passengers shows that about 35 passengers are carried per hour of bus operation. Throughout the average day, thirty 40-seat buses are operating, indicating an average utilization per hour of only 3 per cent of capacity. In essence, 29 of the 30 vehicles are operating empty, but they must operate to maintain route coverage so that the 35 passengers can be accommodated.

Table VIII shows the headways (distance between buses in minutes) for each route. This information is based on the published schedule as of September 8, 1963. The weekday, Saturday and Sunday statistics are shown for the AM peak, Base Service (BS), the PM peak, and for 9 PM and 11 PM service. It is interesting to note that during the PM peak when 72 buses are in operation, the headways on all routes

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TABLE VIII

SCHEDULED BUS HEADWAY TIMES
DELAWARE COACH - DELAWARE BUS COMPANY
SCHEDULE DATE - SEPTEMBER 8, 1963

		Weekday					Saturday					Sunday				
No.	Route Name	AM	BS	PM	9	11	AM	BS	PM	9	11	AM	BS	PM	9	11
1	Chester	15	25	15	60	60	35	35	35	60	60	120	60	60	60	60
3	So. Harrison						35	35	35							
3-15	New Castle-S.H.	10	20	10	35	60				35	60	35	35	35	60	60
15	Farnhurst-C.H.						20	20	20							
4	W. 4th St.	8	13	9	23	30	17	14	14	23	30	30	23	23	30	30
5	Vandever	9	15	9	23	35	24	14	14	35	35	30	24	24	35	35
6	Newwark-Marsh.	10	30	11	120	120	30	30	30	120	120	120	120	120	120	120
8	W. 8th St.	11	14	11	60	60	30	16	15	60	60		60	60	60	60
10	Delaware	10	12	10	40	40	20	17	17	40	40	40	40	40	40	40
11	Washington	11	16	12	40	60	40	25	25	30	75	35	60	60	60	60
12	Boulevard	15	20	15	78		35	35	35				60	60		
20	Edgemoor	15	40	25	60	60	40	40	40	60			T	T		
21	Wanamaker's		12	12	12			12	12							
KEY:	AM - Morning Peak		9 - 9 P.M.													
	BS - Base Service															
	PM - Evening Peak		T - One Trip Only													

Source: Delaware Coach Company

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but one are 10 to 15 minutes. This is the period of maximum service. Minimum service is indicated by the figures for Sunday 11 PM service. Three routes have no service, and all headways exceed 30 minutes.

Transfers

Recently, a color-coded transfer system was initiated on all of the Delaware Coach Company's routes. Its purpose was to curtail misuse of the transfer and make it easier for the driver to control the program. The new transfer system, samples of which are shown in Figure XV, has been well received and has successfully accomplished the objectives for which it was created.

Fares

The life blood of a transit company is its fare schedule. The Delaware Coach and Bus Company's fare package is one that not only favors the regular rider but provides an annual income that remains relatively stable despite a declining ridership. The basic fare plan is made up of seven separate rates.

Children - under 6 with an adult . .	Free
Students - to or from school	10¢
Students - all other times	15¢
"Downtowner Zone"	15¢
Daily Rider - using "Big 45"	20¢
Occasional Rider - using tokens . . .	25¢
Infrequent Rider - paying cash . . .	30¢

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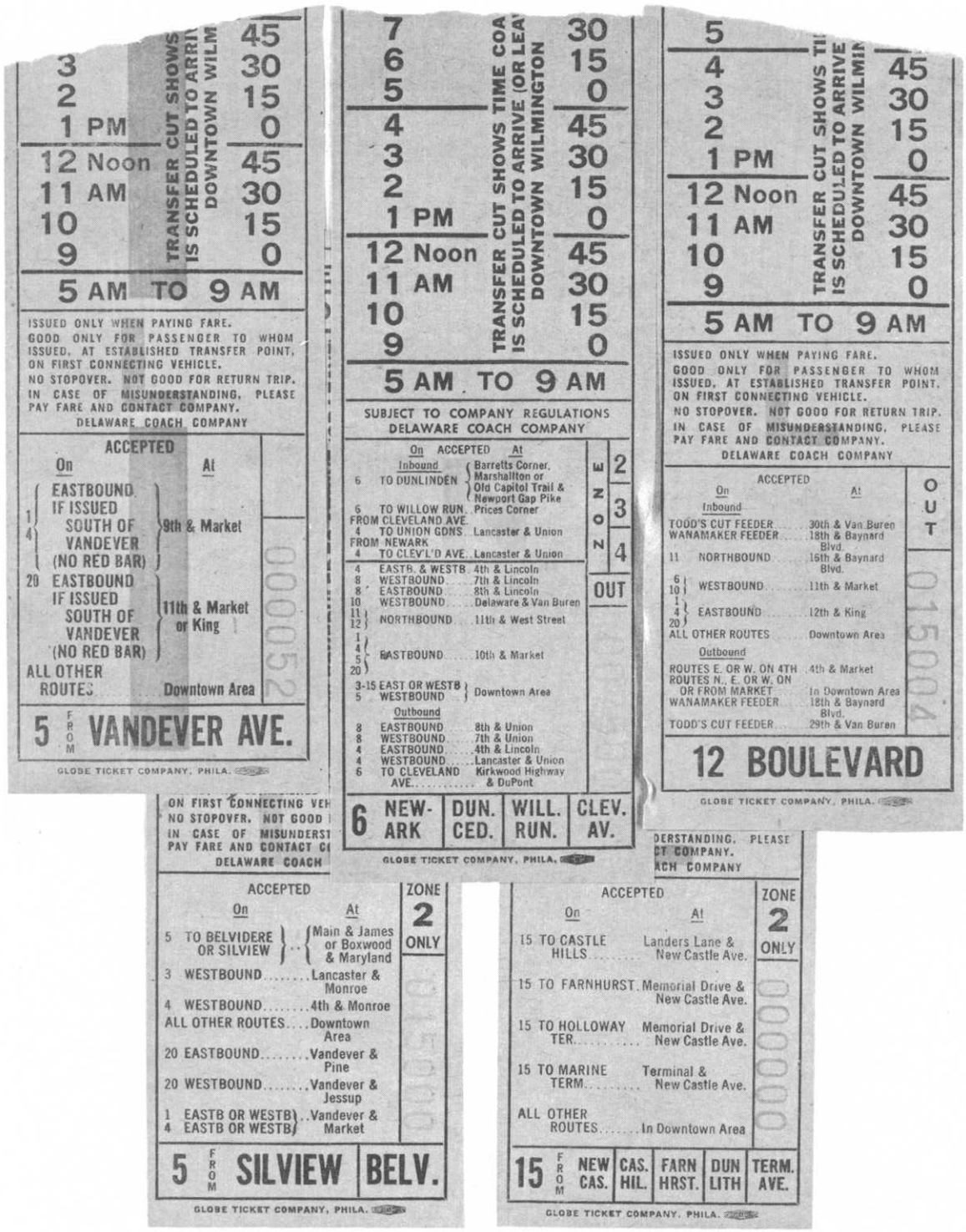

FIGURE XIV

Delaware Coach Company Transfers - 1964

Source: Delaware Coach Company

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The most attractive rate is offered through the purchase of a "Big 45" ticket which entitles the rider to 45 rides for $9.00, or 20 cents a ride. The regular rider (26%) is the primary recipient of this bargain rate, and only because there are enough infrequent riders (47%) paying the cash fare, keeping the average fare sufficiently high, can this bargain fare be offered.

Tokens are used by the more occasional rider (13%) at the rate of five for $1.25, or 25 cents per ride. The combination of these three major fare components with the "Students" and "Downtowner" rates results in an average fare of 25.2 cents. This is about two cents higher than that of the average fare before the last rate change in July, 1963. The important points to remember are that the 20-cent ride plan ("Big 45") has not been changed, and the burden of supporting stand-by transit service has been effectively shifted to the infrequent cash fare rider.

A more detailed explanation of the fares and the regulations governing them can be found in a pamphlet published by the Company and available to the riding public. The following four Figures are reproductions of this pamphlet - Figures XV, XVI, XVII, and XVIII.

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SINGLE-ZONE FARES

Cash Fare **30c**
Tokens . . . . . **5 for $1.25**
BIG 45 Ride Ticket **$9.00**

Children below age 6
accompanied by an adult . . . . . FREE

2-Zone 10-Ride Ticket
(Not valid on Route 1) $3.25

CHILDREN'S FARES

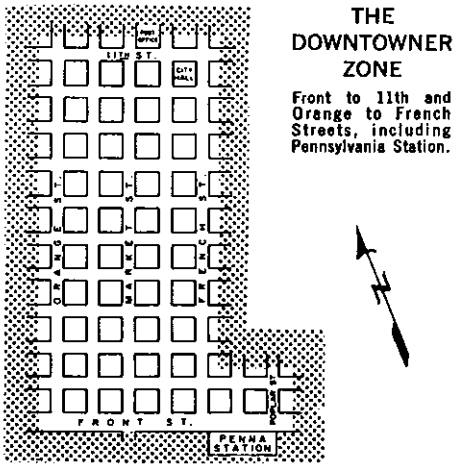
- Children under six years of age will be carried FREE.
- Children six thru twelve years of age, accompanied by an adult, will be carried ANY NUMBER OF ZONES upon payment of ANY SINGLE-ZONE ADULT FARE (30c cash, 1 token or 1 punch on BIG 45).

EXTENDED STUDENT PRIVILEGES

- **For students thru age 18, grade 12.**
- **Students in grades 7 thru 12 must present a valid STUDENT IDENTIFICATION CARD, obtainable FREE at schools.**
- TO OR FROM SCHOOL, between 7 AM and 4:30 PM on SCHOOL DAYS ONLY, 10c per zone ride, transfers free.
- AT ANY TIME, other than riding to or from school, 15c per zone ride, transfers free.

HOW TO USE THE DOWNTOWNER 15c FARE

THE DOWNTOWNER 15¢ FARE is for riders BOARDING AND LEAVING WITHIN THE DOWNTOWNER ZONE (see map); that is, it is for SHORT-TRIP RIDERS using a bus ENTIRELY WITHIN THE DOWNTOWNER ZONE.



You may use ANY bus in the zone. The fare collecting method varies with the bus routes, and with the direction the bus is going.

ON ALL ROUTES EXCEPT 3/15, 4 and 5, PAY 15¢ FARE for a DOWNTOWNER ride: ON BOARDING, if the bus is INBOUND; ON LEAVING, if the bus is OUTBOUND.

ON ROUTES 3/15, 4 and 5, DEPOSIT 15¢ IN FARE BOX on ENTERING bus, HAND THE OPERATOR 10¢ and ASK FOR A DOWNTOWNER IDENTIFICATION CHECK. HOLD THIS CHECK.

ON LEAVING, use the front door. Return check to operator. He will REFUND the 10¢ DEPOSIT. You must return the identification check TO THE SAME DRIVER, ON THE SAME TRIP, to obtain the 10¢ refund. No transfers on DOWNTOWNER fare.

FIGURE XV

Delaware Coach Company Fare Regulations - 1964

Source: Delaware Coach Company

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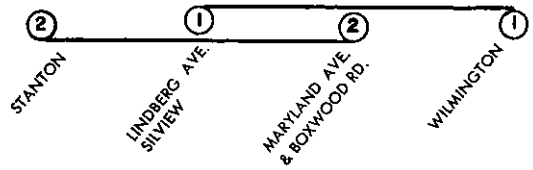
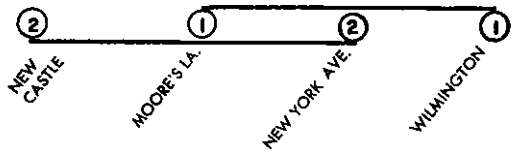
TWO-ZONE ROUTES

ROUTE 5–SILVIEW –STANTON



ROUTE 15 – NEW CASTLE



The fare for a TWO-ZONE RIDE is:
50¢ Cash, or
1 Token and 20¢, or
2 Punches on BIG 45 Ticket, or
1 Punch on 2-ZONE 10-RIDE Ticket
(sold for $3.25), or
1 DCCo Transfer and 20¢, or
1 Punch on BIG 45.

FIGURE XVI

Delaware Coach Company Fare Regulations - 1964
(continued)

Source: Delaware Coach Company

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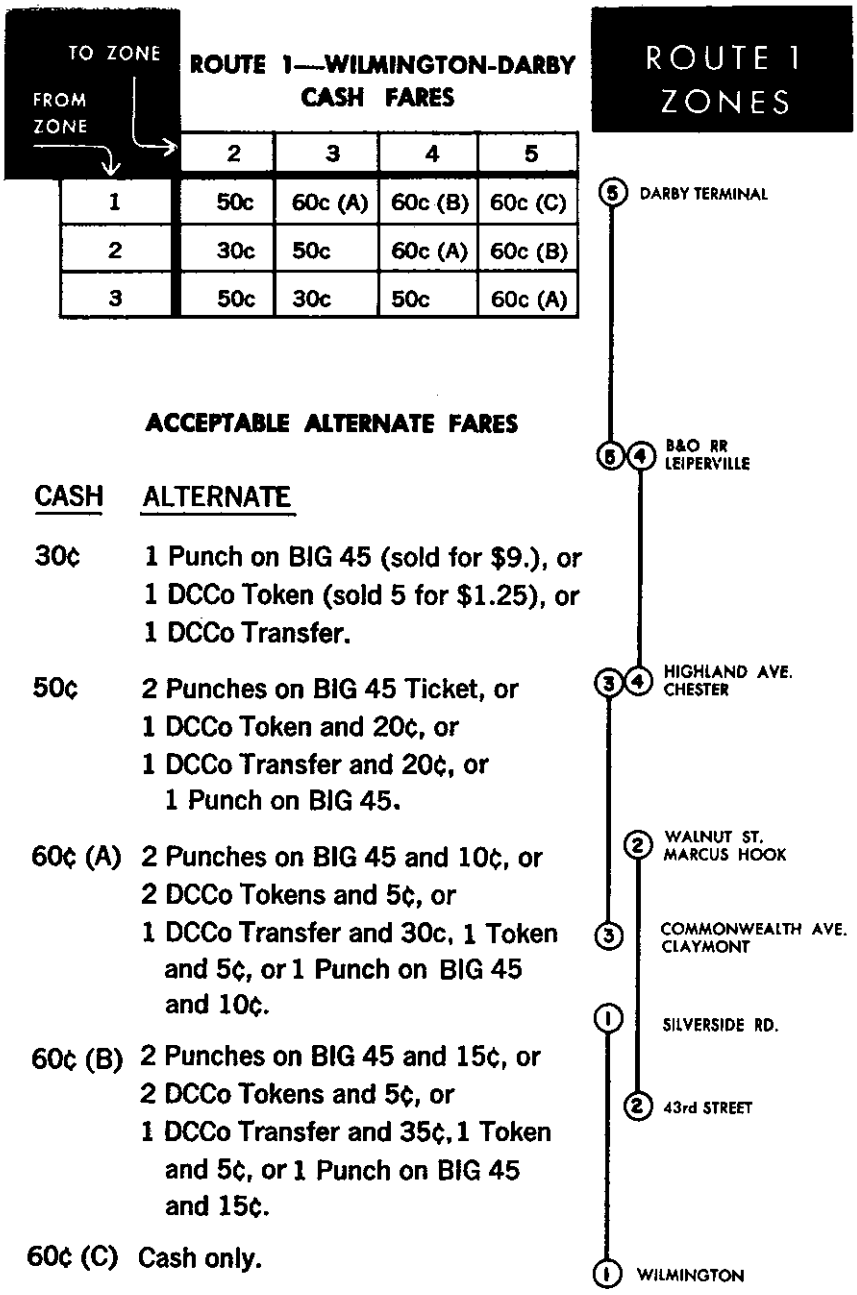

FIGURE XVIII

Delaware Coach Company Fare Regulations - 1964
(continued)

Source: Delaware Coach Company

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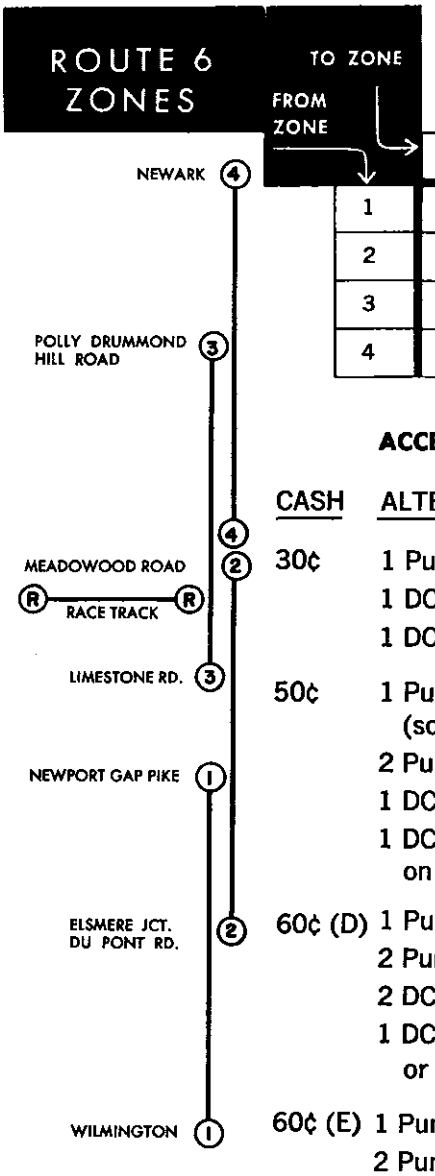

ROUTE 6—WILMINGTON-NEWARK CASH FARES

FROM ZONE \ TO ZONE	2	3	4	R
1	50¢	60c (D)	60c (E)	60c (D)
2	30c	50¢	60c (D)	50¢
3	50¢	30c	50¢	50¢
4	60c (D)	50¢	30c	60c (D)

ACCEPTABLE ALTERNATE FARES

CASH	ALTERNATE
30¢	1 Punch on BIG 45 (sold for $9.), or 1 DCCo Token (sold 5 for $1.25), or 1 DCCo Transfer.
50¢	1 Punch on 2-Zone 10-Ride Ticket (sold for $3.25), or 2 Punches on BIG 45, or 1 DCCo Token and 20¢, or 1 DCCo Transfer and 20¢, or 1 Punch on BIG 45.
60¢ (D)	1 Punch on 2-Zone Ticket and 10¢, or 2 Punches on BIG 45 and 5¢, or 2 DCCo Tokens, or 1 DCCo Transfer and 30¢, 1 Token or 1 Punch on BIG 45 and 5¢.
60¢ (E)	1 Punch on 2-Zone Ticket and 15¢, or 2 Punches on BIG 45 and 10¢, or 2 DCCo Tokens and 5¢, or 1 DCCo Transfer and 35¢, 1 Token and 5¢, or 1 Punch on BIG 45 and 10¢.

FIGURE XVIII

Delaware Coach Company Fare Regulations - 1964 (continued)

Source: Delaware Coach Company

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Financial

The primary source of revenue for the Company is fares paid by passengers of the regularly scheduled routes. These fares constituted 91.6 per cent of the Company's gross annual revenue in 1963 and totaled $1,840,940. other income from charter and contract bus services and advertising pushed the gross revenue figure slightly over the $2,000,000 mark. This amount, however, was some $52,000 below the comparable 1962 gross revenue figure, a decrease of 2.5 per cent. At the same time, the year-to-year decrease in revenue passengers was 9.0 per cent. This difference between these rates of decline reflects the impact that the latest fare package had on the Company's income.

The relationship of total operating revenue figures to total bus miles traveled in 1963 shows that 76.2 cents was collected in fares per mile of operation as opposed to 75.4 cents per mile in 1962. A comparison of total operating revenue per hour of operation was also more favorable in 1963 - $8.44 compared with $8.22 the previous year. This again points out that while passengers, miles, and hours all decreased slightly in 1963, operating revenue by comparison with these factors improved moderately. These improved relationships were a direct result of the recently redesigned

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fare structure. The new fares were only selectively higher, maintaining the same 20-cent rate for the regular rider and shifting the burden of financing the stand-by service to the pocketbook of the infrequent passenger.

Total operating expenses for the year 1963 reflected the continued efforts of management to reduce costs wherever possible without reducing service. The 1963 total operating expense figure was $1,859,887, some $67,000 lower than for the previous year. This cost reduction plus the improved revenues from charter service (up $20,000 year to year) helped establish a net income before taxes of $149,656, about $15,000 above the figure for 1962. Improvements in all phases of the operating expense schedule, except for operating taxes and licenses, contributed to the lower overall expense level.

Significant major expense categories for 1963 were: transportation - $887,000; equipment and maintenance - $336,000; provision for depreciation - $135,000; and operating taxes and licenses - $136,000. Personnel costs are estimated at 67 per cent of the Company's total expense bill.

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Net operating income after payment of corporate income taxes in 1963 was $72,193. This figure compared favorably with that of the year earlier, exceeding it by some $5,400.

Transit companies are measured by the per cent return they make on their rate base. A rate base is the current valuation of the Company's investment as fixed by the Public Service Commission. Delaware Coach Company's rate base for 1963 was $1,565,000 and consequently the net income after taxes resulted in a 4.6 per cent return on investment. While this is an improvement over the prior year's 4.1 per cent net return, it is a relatively small margin of profit.

The Company is allowed to make a net profit of 7 per cent on its rate base without being subject to scrutiny by the Public Service Commission. Should a transit company consistently exceed this allowable limit, actions might be taken to adjust fares downward.

While 1963's 4.6 per cent net return is the best mark attained by the Delaware Coach Company in the past five years, the Company has still not been able to materially alleviate the pressures from the problems of declining ridership and revenue, and rising costs.

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CHAPTER V

REMEDIAL ALTERNATIVES AND THEIR FEASIBILITY TO WILMINGTON'S PROBLEMS

The Problem

The basic problem which faces mass transit operations in Wilmington is that of a steadily declining ridership. Efforts to reverse this trend, which has persisted since the years immediately following World War II, have for the most part been unsuccessful. Related, but not of direct concern, are the problems of traffic congestion and parking in the Center City area, where a major portion of the transit routes exist. These problems if not corrected will undoubtedly become more acute in the years to come.

Since it is assumed that a case for the continuation of mass transportation in Wilmington has already been built, this chapter is mainly concerned with the exploration of possible remedies to the problem of declining ridership. However, some of the following remedial proposals also consider the problems of efficient transit operation in the

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Center City area, on the assumption that improved efficiency will result in increased transit patronage. No significance should be attached to the order in which alternatives are discussed, as no effort has been made to rank this information according to its success in other areas, or to its relative feasibility in Wilmington. Barring the introduction of rapid rail transit service into the area, which seems highly improbable, the following remedies are limited to those pertaining to bus or other flexible-wheeled vehicles of the mass transportation media.

"Park-N-Ride"

"Park-N-Ride" is not a new concept for it has been practiced in many cities for many years with varying amounts of success. The usual procedure calls for establishing automobile parking lots in the suburbs adjacent to arterial highways and operating non-stop or limited-stop bus service to the Central Business District (CBD).

In Boston, the Metropolitan Transit Authority, working with the Mass Transportation Commission and three drive-in theater owners worked out a plan whereby commuting motorists pay 25 cents for parking in the theater grounds. [82] The theater refreshment stand doubles as a sheltered terminal

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and the express buses use the fastest possible means of getting into town, operating on five-minute headways during rush hours. [83] In Seattle, a similar program is in the test phase. The only difference being that parking in the now little used World's Fair lot is free to commuters who purchase a round-trip, 50-cent bus fare on one of the four bus lines that services the lot. [84] In Miami, "Park-N-Riders" for years have used the Orange Bowl parking lot instead of a drive-in theater.

Authorities in Boston estimate that the three outdoor theater lots account for 4,500 cars that would otherwise clog downtown streets each day. [85] It is agreed, however, by these experimenting groups that the key to the success of "Park-N-Ride" systems is proper promotion. The components of this system can be found in and around Wilmington and therefore it seems possible that a project of this type might meet with success.

Express Services

The term "Express Service" denotes many types of service, such as, express freeway bus service; express bus streets in the CBD; express bus lanes on arterial streets; and semi-express type bus service. The latter is more

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properly called non-stop service because no restrictions are placed on traffic or the street network.

Many of the larger cities, such as Chicago and Los Angeles, already utilize express bus service on freeways from outlying suburban areas to Center City. [86] This type of service is sometimes called "trunkline" service because the expressway is used as a trunkline. At the origin of the inbound trip, the buses operate on gathering loops in suburban areas close to a freeway interchange. This type of service, while not yet possible in Wilmington because the freeway is not complete, could become a reality. The heavily developed areas adjacent to the planned route of Interstate 95 north and south of Wilmington make this type of service not only feasible but also very attractive.

The setting aside of exclusive express bus lanes on the streets of Wilmington seems highly improbable because the width of most streets would limit the effectiveness of such a venture. Some cities, however, have been moderately successful in this field by limiting the curb side lanes of downtown main streets to bus traffic only during rush hours. This procedure creates entire express streets because automobile traffic cannot turn off or on to the street except

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at the ends of the express bus lane zones or at major lighted intersections. Automobiles are restricted and cannot stop on this type of street for any reason except traffic lights. This procedure has proved effective in cities with large central business districts and wide, long, main center city streets. Wilmington with but one really major street, and that one only ten or twelve blocks long, is not a likely candidate for such an experiment.

A system of express streets where traffic is either mixed or exclusively buses, but with a restriction on the stopping points and the absolute prohibition of parking, has worked in some cities. The selected streets, however, must have an environment conducive to such a scheme because it places an extreme hardship on the merchants and residents of the restricted streets. In Wilmington, Shipley Street between 10th and 4th Streets or 10th and Front Streets might qualify as an express street, exclusively for the two-way traffic of buses. To accomplish this suggestion, all bus routes which now operate on Market Street could be shifted to Shipley Street, automobile traffic and parking prohibited, and truck deliveries allowed only during certain off peak periods. Such a venture might relieve congestion on Market Street and help buses maintain better schedules.

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Downtown Loop

An example of a "downtown loop" transit operation can be seen in Fort Worth, Texas. Here, Victor Gruen has created a large, square city mall out of the center city area making it necessary for traffic and transit to go around rather than through this area. [87]

Atlantic City has two single-street loops. On both Pacific and Atlantic Avenues, many nine-passenger jitneys operate on an unscheduled pattern back and forth, picking up and discharging passengers wherever the need exists. A loop operation usually calls for continuous operation with no headways and minimum fares.

A jitney downtown loop route might be feasible in Wilmington (see Map VI) utilizing King, 11th, Delaware, 10th, Shipley, and Front Streets without the need for changing any of the present street directions. Major bus routes which now operate on, or cross the proposed "loop" streets, could stop at each point of crossing to exchange passengers and then proceed non-stop through the "loop" area. The jitney fare on the "loop" route should be nominal, and the present "transfer" system would not have to be altered. By making it possible for the larger buses to operate non-stop through

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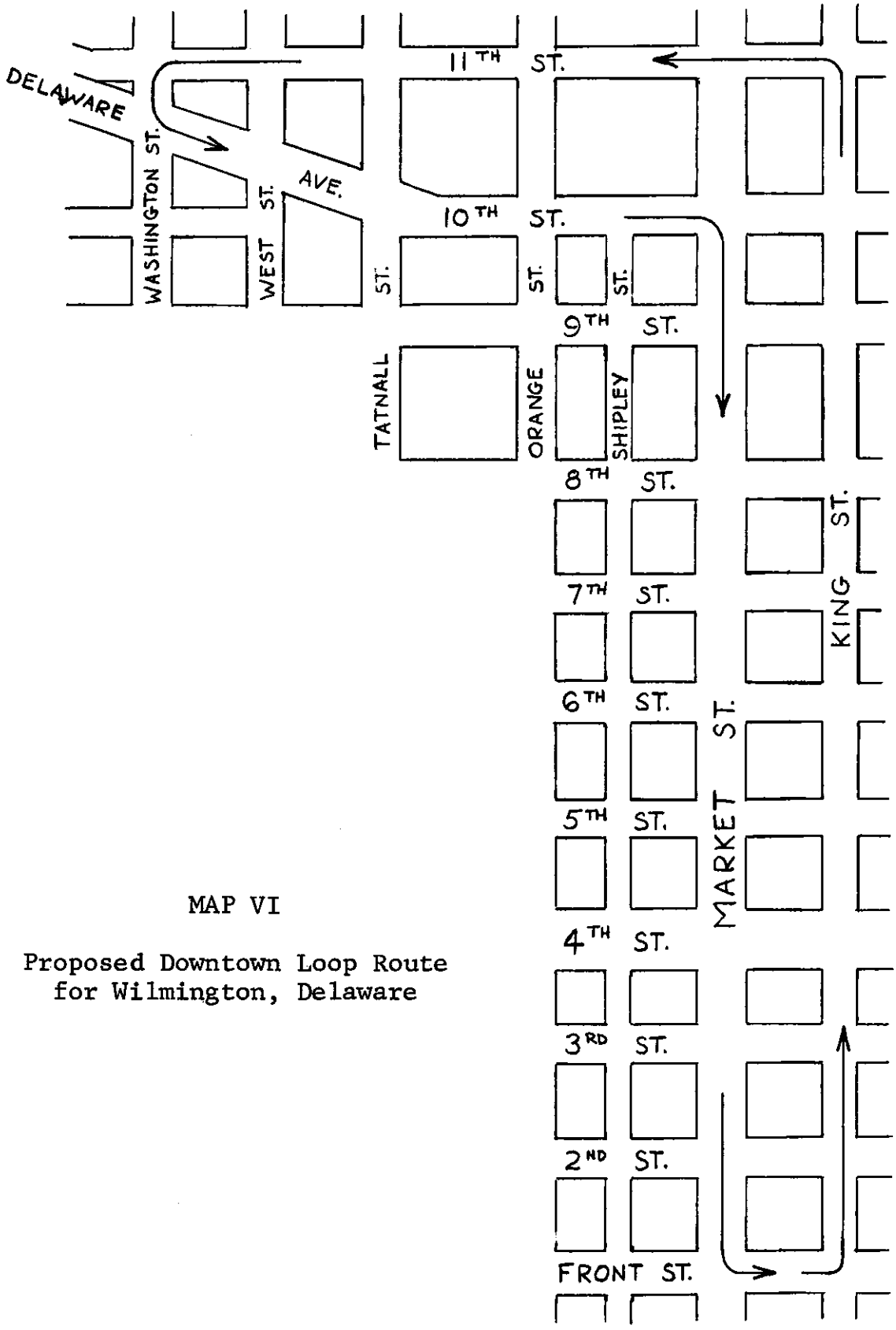

MAP VI

Proposed Downtown Loop Route
for Wilmington, Delaware

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the central business district, congestion might be materially reduced and operating schedules could be maintained more easily.

One-Way Streets

Omaha, Nebraska, has installed a system of one-way streets and restricted parking on its major downtown streets to help alleviate congestion and speed the flow of traffic. [88] In Omaha, 16th Street is one way with bus stops occupying entire city blocks on the right hand curb side of each block preceding cross streets where traffic is one way to the left. Parking is permitted on the left hand side of these streets during off peak periods only. This procedure has been highly successful because bus and automobile traffic does not conflict. The buses are to the right in blocks where automobile traffic turns off to the left; and where automobile traffic turns right, there is ample street area for the buses to pass to the left. If Market Street in Wilmington were changed to a one-way street with traffic moving south, it is easy to visualize this pattern of traffic movement working rather effectively (Figure XIX).

Limited On-Street Parking

On-street parking has been the center of a great deal of controversy in Wilmington in recent years. There

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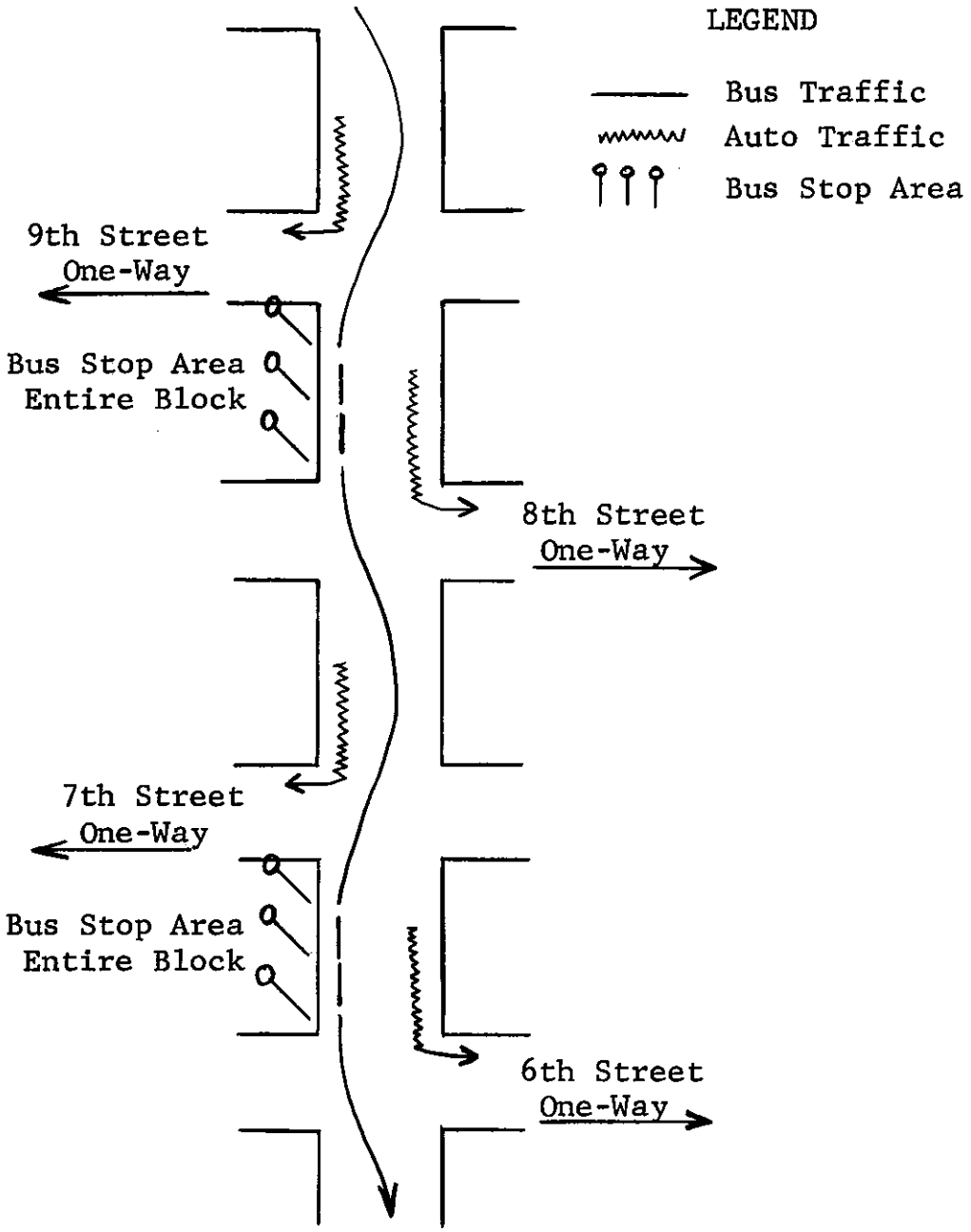

FIGURE XIX

Adaptation of Omaha's One-Way Street Traffic Pattern to Market Street, Wilmington Delaware

Source: Charles W. Croft

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is little doubt that where on-street parking is prohibited, traffic congestion problems are lessened. However, many concerned businessmen contend that the limiting of on-street parking drives the shopper away from downtown. [88] On the other hand, transportation engineers and mass transportation officials point out that on-street parking causes congestion and slows mass transit operations to a crawl. [90] They feel that the number of on-street spaces and their relative turnover is not a great enough incentive to draw significant numbers of new shoppers to center city.

As an answer to the problems put forth in this thesis, more on-street parking in Wilmington seems to be in direct conflict with the best interests of all concerned. In fact, complete prohibition of on-street parking in the CBD, strictly enforced, might prove to be even more of a business stimulant than any other one action that could be taken. It would certainly put the burden of proof on the mass transportation companies, who have continually contended that mass transit delivers the bulk of the shoppers to the downtown merchants.

Central Transportation Terminal

On two underground levels of a building facing on Fountain Square in Cincinnati, Ohio, there are plans to

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build a center city transportation terminal. [91] All bus routes in the city will begin or end here, whether the service is local or express to some distant location. The buses will remain below ground while traveling within the Central Business District thereby turning the city streets over to automobile and truck traffic exclusively.

New York's Port Authority Terminal Building located at 41st Street on Eighth Avenue is another example of terminalizing bus traffic in the city. Officials who are planning the Wilmington of tomorrow may do well to examine the central transportation terminal idea for possible inclusion in the Civic Center Project.

Skip-Stop Operations

Presently, most of the Delaware Coach Company's bus routes provide stopping areas at every corner for passenger pick up and discharge. This policy was inaugurated during the war years and has not been altered since. In actual practice, the operator only stops the bus where a pick up or discharge is called for, but potentially this is many more times than would be necessary if every other stop were eliminated. Half as many stops per route would require the potential rider to walk one more block each way for every

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round trip, but service on each route would be speeded up so that more runs could be made in a day's time, thus providing greater frequency of service. Fuel costs per mile of run would be reduced because of less starting and stopping; traffic congestion would be reduced since buses would not have to be pulling in and out of traffic so often; and the ratio of running time to stopped (loading and unloading) time would be improved from the present estimated one-to-one basis.

Suburban Routes

It is a popular opinion that more extensive suburban transit service would solve many of the declining ridership problems of mass transit companies. However, in actual practics, very few suburban routes prove to be practical. Futuristic mass transportation planners speak of suburban bus loops honeycombing through suburban areas and then entering the freeway for an express ride to the workers' office door.[92] In many areas, this is still only a theory.

Still the question is asked, "Why not more bus routes serving the suburbs?". The implication is that if the bus company would go out after patrons it might help solve its problem of declining patronage. Discounting the fact that in certain areas of the suburbs, transit companies

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are prohibited from initiating new service, because the rights to operate have been granted to another carrier by the Public Service Commission; there is only one very basic reason for not starting new suburban routes, and that is economics. Usually the revenue per mile is considerably lower than the cost per mile and therefore, unless the service is subsidized, it is not economical.

The two basic factors of "rider density" and "rider desire lines" combine to nullify the conception that the suburbs are ripe for new bus routes. Wilmington's average population density within the city limits is about 7,000 persons per square mile, whereas highly developed areas in Brandywine Hundred have an average density of less than 2,000 persons per square mile. [93] This means that there are only about 25 per cent as many potential riders in the suburbs as there are in the city. In addition, transit studies show that few persons will walk more than two or three blocks to a bus line. [94]

Whereas present bus routes serve people who are traveling from various outlying points to center city, the "rider desire lines" for suburbanites spread out more - to other suburban areas, shopping centers, and suburban locations

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of employment. [95] This lack of concentration of travel desire coupled with low population densities presents a warning sign to the transit operator who contemplates expansion of his suburban routes.

Bus lines operate at a relatively constant cost per mile regardless of the type of area through which they pass. [96] Therefore, if the revenue per mile does not equal or surpass the cost of operation per mile, then the service is not economically realistic. If fares are raised to cover the cost of the additional suburban service, the city riders would be in effect subsidizing the suburban riders. [97] If suburban fares alone are set at break-even levels, they would likely be too high to attract even the most stalwart of riders. The validity of these economic factors has been demonstrated time and time again in areas throughout the country, to the extent that most well-managed transit companies are cautious in their dealings with requests for new suburban bus routes.

All the foregoing negative experience is not to aver that all suburban bus routes are not economical or doomed from the start. Many alert bus firms have capitalized on new suburban routes where the people demonstrate a high

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degree of public transportation usage. [98] Wilmington and its environs may contain areas where a new bus route or the realignment of a present route might produce a healthy increase in public transit usage.

The "Journey to Work Survey," conducted by the University of Delaware in the summer of 1963, indicates that majorities of persons living in certain areas in and around the city might consider traveling to and from their workplaces by bus if the service would save them time and money. Table IX and Maps VII and VIII indicate those areas where the highest concentrations of potential commuters live. Of course, in order to save time, some types of express service would be necessary; and to save money, fares would probably have to be set at lower than cost levels.

Is Monorail Feasible?

Monorail is a combination of two present day modes of mass transit, the railroad and the bus. Its route is fixed by the placement of the beamways but the trains themselves ride with the comfort of rubber-wheeled vehicles, which in some cases, they are. In addition, the entire system occupies a minimum amount of land because it operates above the ground in otherwise unused air space.

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TABLE IX

CITY AND COUNTY AREAS WHERE A SIGNIFICANT NUMBER OF INHABITANTS WHO WORK IN CENTER CITY INDICATED THAT THEY MIGHT USE MASS TRANSIT TO COMMUTE IF IT WOULD SAVE THEM TIME AND MONEY

Census Tracts	Numbers of Potential Users	Present Service By	Route Numbers
City			
2-5	258	Delaware Coach	1, 4, 11, 12
6	39	Delaware Coach	1, 4, 5, 20
11	75	Delaware Coach	6, 10
13 & 14	135	Delaware Coach	4, 6, 8, 10
15 & 16	83	Delaware Coach	6, 8, 10
25 & 26	71	Delaware Coach	3, 4, 5, 6
County			
101	54	Delaware Coach	1
103 & 104	92	Delaware Coach	1
105	72	Delaware Coach	1, 4, 20
107	93	Delaware Coach	1, 4, 20
108-110	297	Short Line	-
111	88	Diamond State	-
112-116	476	Short Line	-
118	98	Short Line	-
120	45	Delaware Coach	5, 6
121 & 122	139	Delaware Coach	6
132-134	147	Delaware Coach	6
135 & 136	159	None	-
144	41	None	-
149	37	None	-
152	35	Diamond State	-

Source: "Journey to Work Survey"
University of Delaware
Division of Urban Affairs
November, 1963

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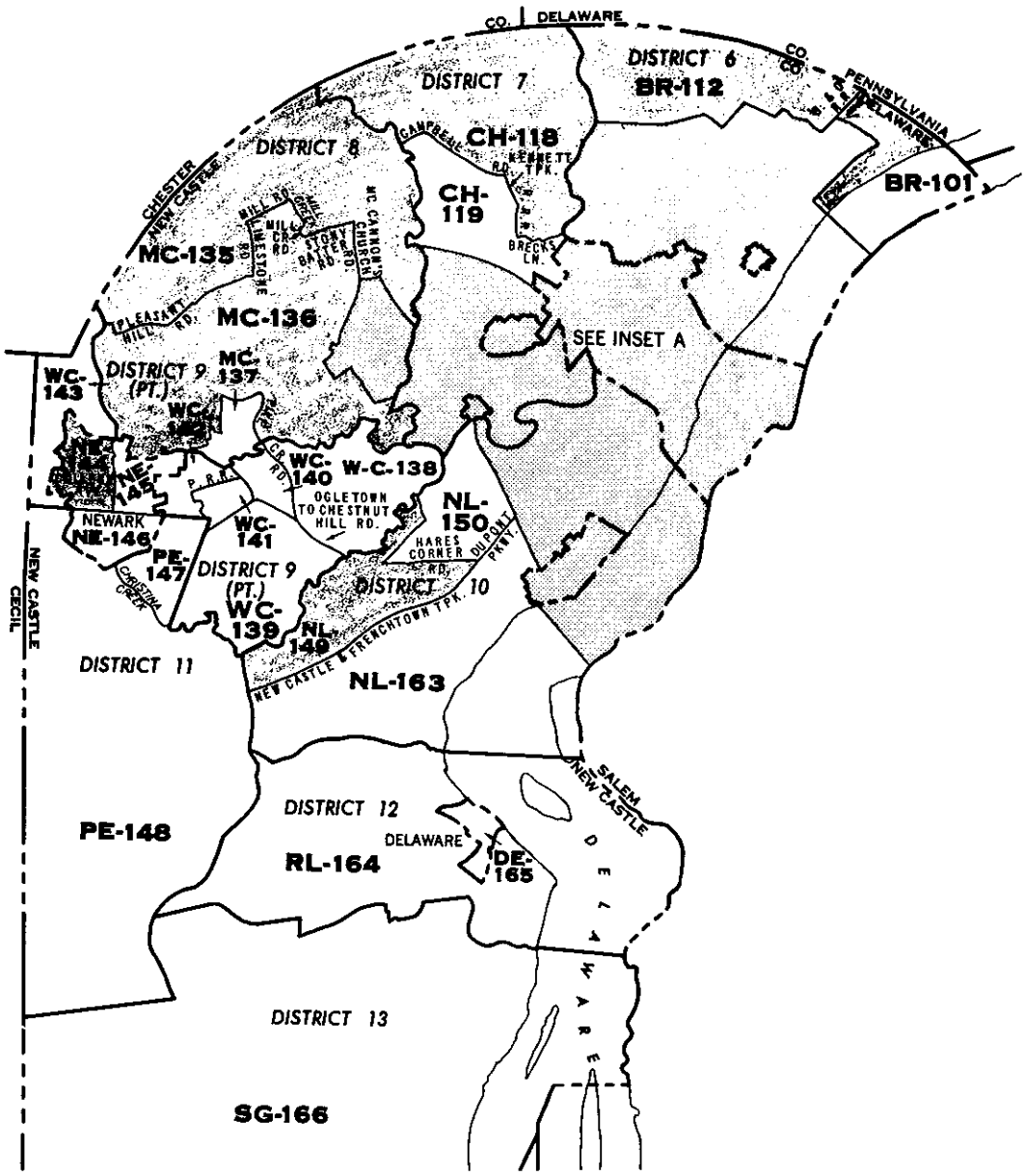

MAP VII

Northern New Castle County Census Tracts Showing Areas (shaded) Where Additional Transit Ridership Potentials May Exist - 1963

Source: University of Delaware, Division of Urban Affairs

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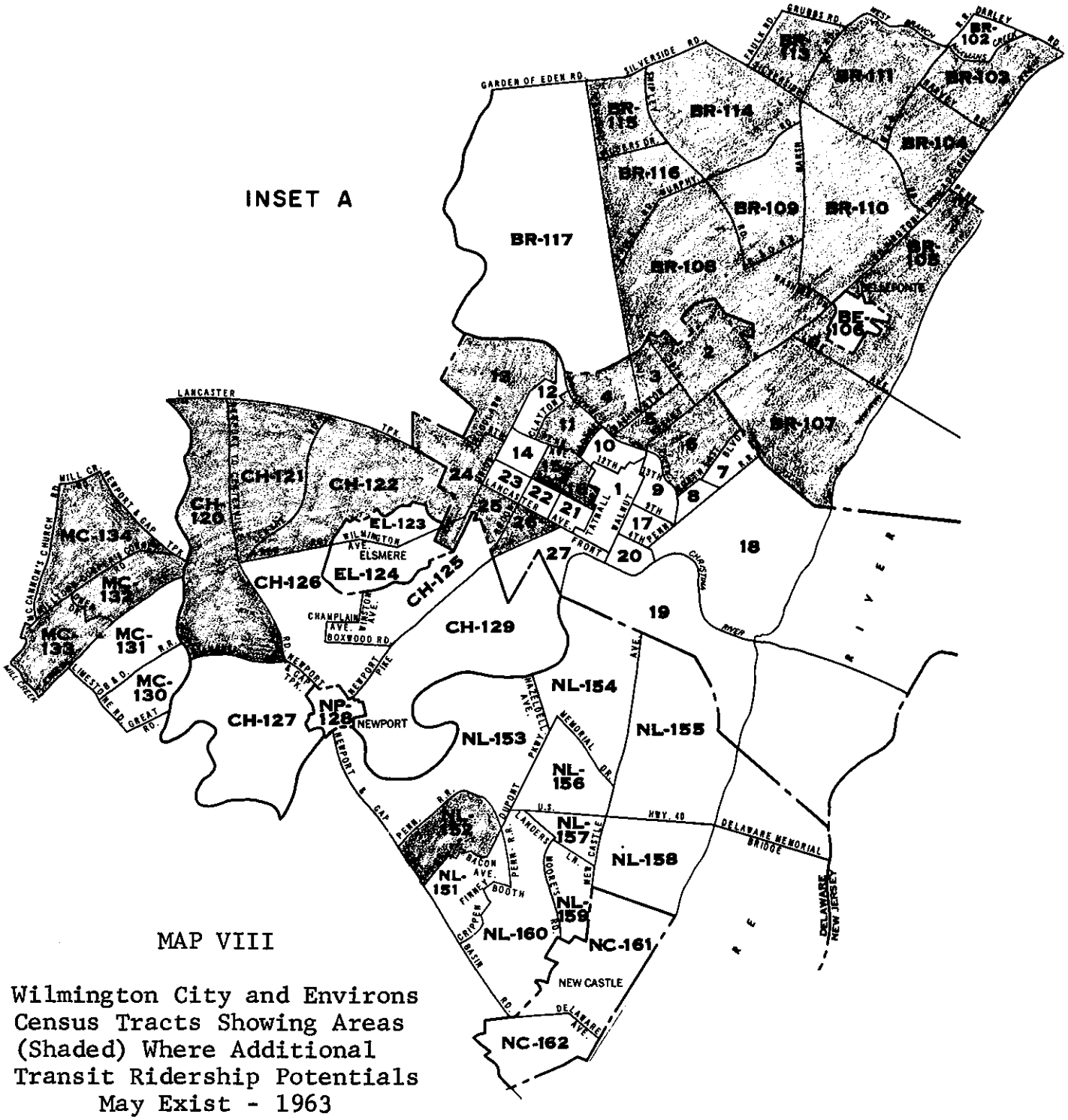

MAP VIII

Wilmington City and Environs
Census Tracts Showing Areas
(Shaded) Where Additional
Transit Ridership Potentials
May Exist - 1963

Source: University of Delaware
Division of Urban Affairs

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The highly successful operation of the Seattle Monorail, during the World's Fair held in the summer of 1962, makes monorail a definite contender as a future means of rapid mass transit. In general, its usefulness will be restricted to cities where large concentrations of individual travel "desire lines" become apparent. While public acceptance, and the high costs of initial installation are large hurdles that must be overcome before widespread usage develops, the largest inherent disadvantage of monorail is its relative inflexibility. Once the system or route is located, like a subway or elevated railway, there are few changes that can be made. In addition, it takes a relatively high concentration of regular users to even justify the installation. Should the "desire lines" for this ridership change, a normal occurrence over a period of years, then a change of route would be warranted but not feasible.

Assuming that conditions in an area might warrant consideration of a monorail installation, a closer look at the Seattle operation is of interest. This system while only 1.2 miles in length was designed and built by the Alweg Corporation of Sweden, to accommodate an hourly traffic volume of 10,000 passengers. [99] The Alweg monorail train

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is an over-riding system with load carrying, driving wheels centered directly over a prestressed concrete beam, and with side wheels providing lateral stability and guidance along the beamway. [100] In the Seattle operation, two trains, one on each beamway or rail, shuttle back and forth between the central business district and the World's Fair site. [101] Each train is made up of two cars, and each car of two sections - the total two-car train provides for 124 seated passengers and standing room for 300 more. [102] Most of the supporting structure consists of T-shaped columns spaced about 90 feet apart and providing a minimum clearance under the rail beams of 20 feet. [103]

The average time for a one-way, 1.2 mile trip is about 160 seconds. This time is comprised of 30 seconds for loading, 25 seconds for unloading, and 105 seconds of travel. [104] During heavy traffic periods, trains depart from the downtown terminal every 2 minutes and 40 seconds (headway). [105] Maximum acceleration speed is 2.4 miles per hour per second up to an operating speed of 53 miles per hour, and maximum deceleration is 3.3 miles per hour per second. [106] The Alweg system has been operated successfully at speeds up to 90 miles per hour where there is sufficient distance between stations and where noise is not a factor.

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A University of Washington study team notes that tests for speed, traction, roughness of ride, and passenger safety were found to be at acceptable levels when compared with conventional trains, buses, and automobiles. At increased speeds, the noise level, or the suddenness of the noise, became a noticeable problem. In extremely hot weather, the cars acted as solar ovens, and so for passenger comfort, air conditioned equipment is recommended.

The cost of installation and operation are most important factors in the consideration of a monorail system. Based on the experience of the Seattle system, the Alweg Company provided an estimate for a hypothetical 7.5-mile system similar to the Seattle installation. The basic assumptions included a double beamway system with two terminals and six stations along the route. The passenger traffic was assumed at 30,000 in each direction daily. The operating time for the 15-mile round trip was estimated at 28.5 minutes, with an overall average operating speed of 31.5 miles per hour.[107]

From these basic assumptions and agreeing to provide service for a maximum hourly one-way volume of 6,000 passengers on two car trains, it was determined that nine trains

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plus one spare (20 cars) would be needed. [108] Base service would consist of six trains operating on 5-minute headways. During rush hours (6 of 19 hours of operation daily), the other three trains would be placed in service and the headways cut to about three minutes.

The total 7.5-mile installation would cost about $18,600,000, or $2,500,000 per mile. [109] Annual operating costs, including manpower, maintenance, and power, would approximate $1,000,000, or 37 cents per mile. [110] If installation costs are depreciated at 3 per cent per year, then the total annual operating expenses for this hypothetical system would be $1,558,000, or 57.7 cents per car mile. [111]

Using these estimated figures as a base, the feasibility of installing a monorail in the Wilmington area rests with the ability to locate a route that would be patronized by 60,000 riders a day. A possible route might be from an area near 10th and Market Streets in the downtown area to the County Engineering Building on the Kirkwood Highway. However, it is highly unlikely that a daily patronage of 60,000 riders could be generated along this route because the present demand for mass transit is not readily apparent. [112]

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Federal Legislation

The role of the Federal Government in urban transportation is that of long-range federal aid and technical assistance to help plan and develop comprehensive and balanced urban transportation systems throughout the United States. [113] Three specific programs of assistance to local communities and regional bodies were first authorized by Congress under the Housing Act of 1961. These programs are administered under the Commerce Department, by the Housing and Home Finance Agency (HHFA). The first is a low interest loan program to local public agencies for improvements to their mass transportation systems, where private financing is not available at comparable terms. [114] The second program is one of "demonstration" grants, whereby the Federal Government will contribute two-thirds of the cost of short-range projects to test new methods to improve mass transit systems and service. [115] These grants are limited to public agencies who will provide competent professional direction and at the completion of each project submit a detailed report to the HHFA. The third program is one of aid to comprehensive planning agencies for the inclusion of transportation planning within their scope of operations. This program increases the Federal Government's

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share of grants to cover planning costs, from 50 per cent as authorized under the "701 Program" of the Housing Act of 1954, to 66-2/3 per cent. [116] Efforts to broaden the scope of urban transportation aid through additional legislation have thus far been unsuccessful; but pressure is evident in Congress and eventually more liberal legislation will undoubtedly become law.

The Federal Government seems to view mass transportation as an essential public service, not solely as an enterprise from which a maximum financial profit is to be derived. [117] The latter part of this viewpoint is not always enthusiastically shared by managements of private transit companies, but one universal point of agreement is that mass transit is an essential public service." Federal legislation is designed specifically to aid communities who have taken upon themselves the added responsibilities of a mass transit facility, without discouraging the initiative of the private operator. As a result, the aforementioned legislation does little to directly aid private transit companies, like the Delaware Coach Company. In other cities where private companies operate, direct aid usually takes the form of subsidies or tax relief.

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Subsidy

Subsidies are not uncommon where certain routes are proven not economical. A company or municipality may consider the route essential and agree to make up the difference in costs so that the route can remain in operation with no burden on the transit company. The Delaware Coach Company has one such route in operation at the present time, but the subsidy payment in this case is made by a private company and is relatively minor.

Other types of subsidy programs are used to meet the expenses of large capital improvement plans. In general, transit companies and local businessmen are overwhelmingly opposed to large scale Federal subsidy programs for the mass transit industry because of the controls and regulations that would accompany such programs. [118]

Tax Relief

Limited tax relief has been a favored form of assistance to the transit industry during recent years. Since 1945, many states and cities throughout the country have granted partial or full relief from various forms of taxation to mass transit firms. 119

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As noted in Chapter III (Table V), the Delaware Coach Company pays out about $136,000 annually in the form of taxes and registration fees. The transit industry contends that many of these state and local taxes are in effect special taxes on transit users. These taxes in essence are passed onto the rider in the form of higher fares that might otherwise be unnecessary.

The taxes noted as being particularly discriminatory against bus passengers are: the local franchise taxes paid to cities as license fees for the right to operate on city streets; the state vehicle registration fees; and the state fuel tax paid on diesel fuel. [120] If all or part of these taxes, which total about $80,000 annually, were absorbed into the general tax base, efforts to retain favorable fare schedules would be greatly enhanced. It has been stated by authoritative sources that should the City of Wilmington or State of Delaware ever have to take over the bus service now supplied by the Delaware Coach Company, these taxes would be one of the first items to automatically disappear from the books. [121]

Municipal Versus Private Ownership

Since 1945, private transit companies have experienced declining ridership, and increasing operating costs

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that have become harder to cover by incoming revenue from fares. As a result, a large number of smaller cities (populations under 500,000) have lost their mass transportation systems because these private companies have abandoned operations. [122] Between 1945 and 1960, some 346 cities in the United States were faced with the choice of doing without mass transit or operating the lines as a public service. [123] In general, the decision was to do without the service, but in recent years, there has been a trend toward increased municipal ownership. Dissatisfaction with the present service offered by private companies has also added impetus to the municipal take-over trend. As of 1962, about 8 per cent of mass transit systems in the smaller cities were publicly owned (57 out of 713). [124]

The basic difference between private and public ownership is that the publicly operated service, while obliged to operate at a break-even point, can if conditions warrant, operate indefinitely at operating losses. In essence, the public interest must be served by both types of ownership, but in addition, the private company must operate profitably in order to stay in business.

It is not the municipal ownership is such a new thing because cities have owned and operated many utility

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type companies for years. However, now they are obliged in many cases to take over and operate a business radically different from the usual public utility. The city is forced to compete with a very formidable opponent, the automobile; and likewise to market its newly acquired service. This becomes a monumental task in cities like Wilmington, where people habitually choose their own automobile to any other form of commutation. [125]

Marketing is historically a function of private enterprise and is a strange subject to even the most skilled appointed or elected official. Because marketing skills are not commonly found in municipal governments, many of the publicly owned and operated transit companies find it difficult to provide service comparable with that of the private operator. Because the private company is usually better qualified to provide transit services, municipal ownership of mass transit companies is not usually the best way to solve the mass transportation problems of a city.

Personalized Transit Service

In recent years, transit companies throughout the country have adopted the philosophy of "How can we serve you better?". [126] This policy of wooing the public back

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to mass transit has not had any revolutionary effect on halting the declining ridership trend, but it is contributing greatly toward keeping regular riders from abandoning transit for the automobile. Some of the more successful forms of personalized service are discussed in the following paragraphs.

Questionnaires are used in a number of cities to find out what type of service the present riders and the potential riders want. In Philadelphia, transit representatives visit industrial sites, apartment houses, stores, and offices interviewing everyone they meet.

Memphis has instituted a unique service of providing "custom tailored" schedules free of charge to all persons who request them. This procedure provides the company with information about its riders - where they work or shop, where they live, and the hours when they travel. Upon request, the passenger receives a carefully worked out timetable indicating bus boarding locations, times, transfer points, wait times at transfer points, and destination arrival locations and times. [127] Where 40 or 50 persons with similar commuting desires are found living in the same general area, the company can arrange express service for them.

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Requests for personalized timetables from locations not serviced by a present route indicate areas where new service might be inaugurated.

In Youngstown, Ohio, a comprehensive study of routes has resulted in changes that now route the buses closer to the residential areas. Crosstown connections have also been rearranged so that fewer transfers are required. [128]

Revised system maps are distributed house to house in Albuquerque to all residents within walking distance of the various routes. In Boston, new bus routes are being tested in areas where rail service has been abandoned recently. [129]

Driver courtesy is the theme used in Cleveland and Santa Monica, California, to attract ridership. [130] Emphasis is placed on carrying the service to the customer through training programs for drivers. The training includes the assistance of handicapped and senior citizens, extensive personal delivery of schedules, and permission to carry baby strollers and small shopping carts on the buses. Additional personalized service to transit riders includes shelters at bus stops, special rates for senior citizens, free shopping bags, "welcome" decals on fare boxes, and coloring books for children.

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And so, the list of special inducements goes on, limited only by the ingenuity of the transit people involved and by their available capital resources. [131] The goal of all this special service is to attract new riders and keep the old passengers riding.

Wilmington is not without its own forms of personalized service. On "Dollar Days," extra buses are put on the regular routes; and on "Downtown Days," special bonuses are offered in stores to persons who travel to shop by bus (see Figure XX). Recently a new "Ride and Shop" program has been proposed, whereby a rider who purchases more than $5.00 worth of merchandise in a participating store will have a special ticket validated for a free bus trip home. This promotion program is aimed not only at increasing ridership but also at stimulating interest in shopping in Center City stores.

Charter Service

A growing part of many local transit company's operations is "charter service." In recent years, much emphasis has been placed on promoting this type of profitable sideline. Delaware Bus Company is no exception as Table X indicates by the 100 per cent growth of this speciality service in the past four years.

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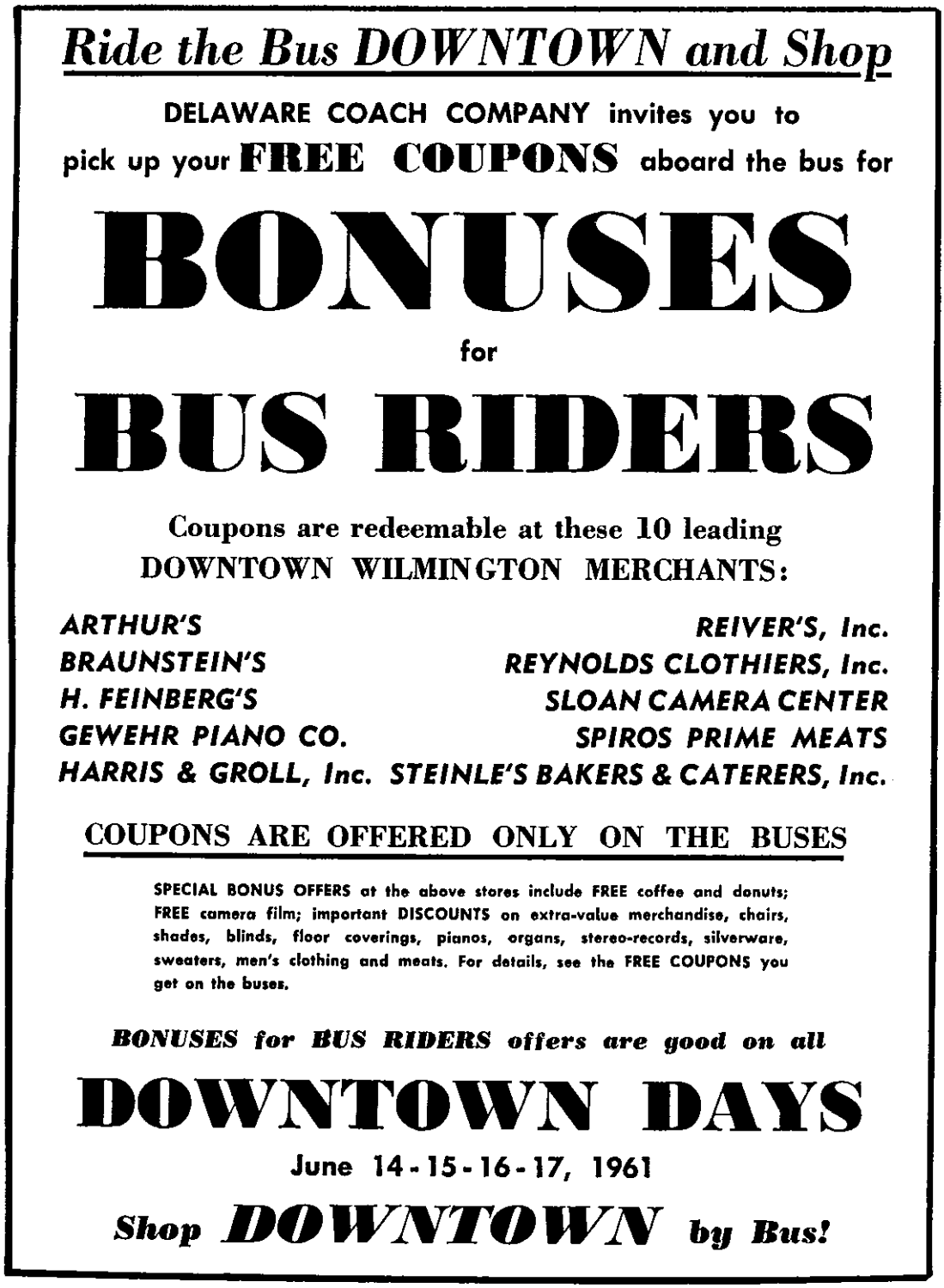

FIGURE XX

Example of Personalized Transit Services

Source: Delaware Coach Company

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TABLE X

GROSS REVENUES FROM CHARTER SERVICE
DELAWARE BUS COMPANY

1960	$ 71,000
1961	104,000
1962	126,000
1963	146,000
Source: Delaware Bus Company	

Charter service has developed into an important diversification for the transit business. It helps private companies combat seasonality in their service as well as provide for increased utilization of their equipment. Further profitable development of charter service may also help to offset or delay future pressures to raise fares on local service routes.

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CHAPTER VI

PROPOSALS FOR IMPROVED MASS TRANSPORTATION IN WILMINGTON

Restatement of the Problems

It is a popular conception that Center City areas can be revived by restoring the kind of transportation that existed years ago when cities were assumed to be thriving. It is believed that rapid transit systems should be built or improved or subsidized to the point where they will drive most of the automobile traffic off the city streets. [132] But having a good transit system has not guaranteed its use, no matter whether the system is exclusively bus, rail, or a combination of both. Boston's combination system, reputed to be one of the best in the country, has experienced a declining ridership of 50 per cent, from 400 million in 1946 to about 200 million in 1960. [133] Wilmington's situation parallels that of Boston even though the systems are different in make-up.

This experience suggests that improvements in any mass transit system will not guarantee a substantial shift

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in transportation habits, unless the improved system is vastly more elaborate. [134] Such elaborate systems, however, usually cost much more than they are worth. [135] The decline of mass transportation popularity could be halted by increased ridership and recognition by local governments that mass transit is vitally necessary and must be maintained. More ridership in Wilmington does not seem to be readily obtainable, at least at the present; and support of an unprofitable transit system means subsidy. Since Wilmington's transit service is presently self-supporting, it seems advantageous to keep it that way. Therefore, short of starting from the beginning again, what practical approaches should be explored in Wilmington to curtail the decline in mass transit ridership and relieve traffic congestion in the downtown streets?

Chapter II examined the dramatic technological changes that have taken place in mass transportation over the last 160 years. There is no reason to believe that utopia has been reached and that a solution to today's problems will be good forever. In fact, it is possible that someday the wheeled vehicle will be obsolete.

Transit environment has shown a propensity to change continually from day to day. As seen in Chapter III, there

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are many great forces within and about a city that affect the environment of the entire area and everyone who lives and works in it. So today, it is necessary for transit firms to be flexible and develop new ideas to cope with the problems of the day.

Chapter V was devoted to a discussion of methods employed or explored by other transit companies and cities to improve mass transit ridership and efficiency. Only a few of these remedies have real practical merit for Wilmington with the transit environment found here. The following recommendations might contribute to the solution of the basic problem of declining mass transit ridership and simultaneously help increase the efficiency of local bus service.

Program of Suggested Trial Projects

Recognizing that time and environmental factors will change the mass transportation picture in Wilmington for better or worse, the following suggested projects have been grouped into four categories. They are:

1. Projects for Immediate Attention
2. Intermediate Range Proposals (2-5 years)
3. Long-Range Future Proposals (over 5 years)
4. Continuing Improvement Processes (gradual)

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Projects for Immediate Attention

Skip-Stop Operations

Each route should be critically reviewed for the elimination of low use stops, especially in areas where the blocks are relatively short, and are away from the Center City area. Re-evaluation of the recent ridership studies made by the Delaware Coach Company for each route will indicate the stops that are used the least. Putting the skip-stop program into effect is the most difficult part of the proposal. One route should be chosen to test public reaction, and a well-defined public relations undertaken some time before the effective date of the skip-stop introduction. This can be accomplished by placards on the buses, handouts to riders showing the stops to be eliminated and the location of the next nearest stop, and a verbal notation by the driver to each person boarding or alighting at a stop that will be discontinued later. Care should also be taken to remove the bus stop signs from the eliminated stop locations and if necessary bright new signs should be installed at the remaining stops.

Successfully accomplished, skip-stop operations will save fuel, reduce congestion, improve the buses "stopped to

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running" ratio, and improve the frequency of service. It is not primarily designed to increase ridership.

Realignment of Routes

The Delaware Coach Company has recently proposed changes to Routes 3, 5, 8, and 10 in an effort to keep abreast of changes in transit environment and to realign routes where possible. These realignments are usually the result of many months of painstaking surveys, and each change is designed to provide more service to areas with improved ridership potential. The freeway construction area between Adams and Jackson Streets has affected the patronage of Routes 3 and 5 significantly, and so they were realigned to pass through more densely populated areas adjacent to the construction areas.

These changes, if approved, will be the first major changes in Delaware Coach routes in over 25 years. It would seem, therefore, that there is ample room for added improvements of this type. In fact, the University of Delaware's "Journey to Work Survey" has provided invaluable information (Table IX) that can be used as an indicator to show where potential riders live and what routes presently service these areas. This information for city areas coupled with the

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Company's ridership studies and the City of Wilmington's population density maps will pinpoint future route realignment areas.

Suburban Routes

While most indicators point to the fact that suburban routes are usually not profitable, it is the wise transit firm that keeps looking and testing. The mere fact that many suburban dwellers would consider using mass transit to go to work if it would save them time and money indicates that there are people who are becoming disenchanted with driving their personal automobiles in the city, at least during the rush hours. Table VII again indicates where the majorities of these people live in the suburban areas. Detailed specialized surveys should be made in these areas to determine more accurately potential mass transit usage. If only one area proves worth a trial route, it may be worth the effort. Consideration should also be given to routes meandering through suburban areas and terminating at major shopping centers instead of downtown.

"Park-N-Ride"

Considering the relative success of "Park-N-Ride" in other cities, it becomes apparent that this type of

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program has a good chance of succeeding in the Wilmington area. There are some 1,300 on-street parking places in Wilmington near Poplar Street Project A and the Adams and Jackson Streets Freeway construction sites that will be eliminated in the near future. [136] When this takes place, people who park there will seek new parking locations either further away from downtown or in lots inside the CBD. A well-planned "Park-N-Ride" plan utilizing drive-in theaters or other open spaces for parking and a low-fare, non-stop bus service to the CBD might attract a significant number of these displaced parkers.

"Park-N-Ride" can help boast ridership, relieve congestion from downtown streets and provide an attractive service to the commuter if it is well-planned and adroitly publicized.

"Ride-N-Shop"

The Delaware Coach Company is planning to team up with a number of the major stores in the downtown area in an attempt to attract the shopper who comes to town by bus. If a shopper purchases goods costing $5.00 or more from a member store, she will receive a free return trip home on the bus. This will not only be a means of promoting

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transit ridership but also a way of stimulating an interest in shopping downtown.

Intermediate-Range Proposals

Exclusive Street for Bus Traffic Only

The plan would be to convert Shipley Street to an exclusive bus thoroughfare. All bus traffic presently using Market and King Streets between 10th and Front Streets would be shifted to Shipley Street. In effect, Shipley Street would become a transit terminal in Center City for the exclusive use of buses. The movement of automobiles and parking would be prohibited, and truck deliveries would be allowed only during off-peak travel periods.

This scheme makes it possible to reduce congestion greatly in the downtown area. It also permits present bus routes to be cut in half, thus terminalizing each new route on Shipley Street.

One-Way Main Street Operation

A second alternative to help correct congested conditions in Center City is to convert Market Street to a one-way street south, and limit parking as was done in Omaha, Nebraska (Figure XIX, Page 98). This proposal is not as

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desirable as the Shipley Street plan because it would necessitate the re-routing of all northbound traffic to King Street and ultimately the movement of the King Street Farmers' Market to another location. In addition, the same rules that would apply to Market Street should apply on King Street, i.e., full block bus stops and limited parking.

The obstacles that would have to be overcome to make One-Way Main Street Operation effective in Wilmington seem almost insurmountable at this time. However, if the King Street Farmers' Market problem can be resolved, this plan would provide Wilmington with a traffic system in its downtown area that would be the envy of many other cities.

Downtown Loop Route

The establishing of a downtown loop route in Wilmington is the boldest proposal thus far made. The loop route, as outlined on Map VI, would consist of six or eight jitney buses operating continuously without scheduled headways. A uniform fare structure would be set at a rate that would allow the route to be self-supporting, and yet make the service as attractive as possible. Major bus routes which operate on, or cross the loop streets would stop at

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each point of crossing to exchange passengers and then proceed non-stop through the loop area.

While this proposal would require the purchasing of jitney equipment and the hiring of additional drivers, the service it would provide and the income produced might more than justify the initial costs involved. This proposal should be thoroughly studied before a trial is made to determine the probable usage and acceptability of a loop route in Wilmington. The use of leased equipment should be considered for the trial operation.

Long-Range Future Proposals

Freeway Express Bus Service

The completion of Interstate 95 will afford the Delaware Coach Company the opportunity to initiate express bus service from selected areas in the suburbs to Center City. Map IX indicates seven potential express routes where buses could circulate through a number of suburban developments and then enter the freeway for the express trip to Center City. Although the completion date of interstate 95 is still a number of years away, preliminary feasibility studies should be undertaken soon so that trial run dates will coincide with the opening dates of certain

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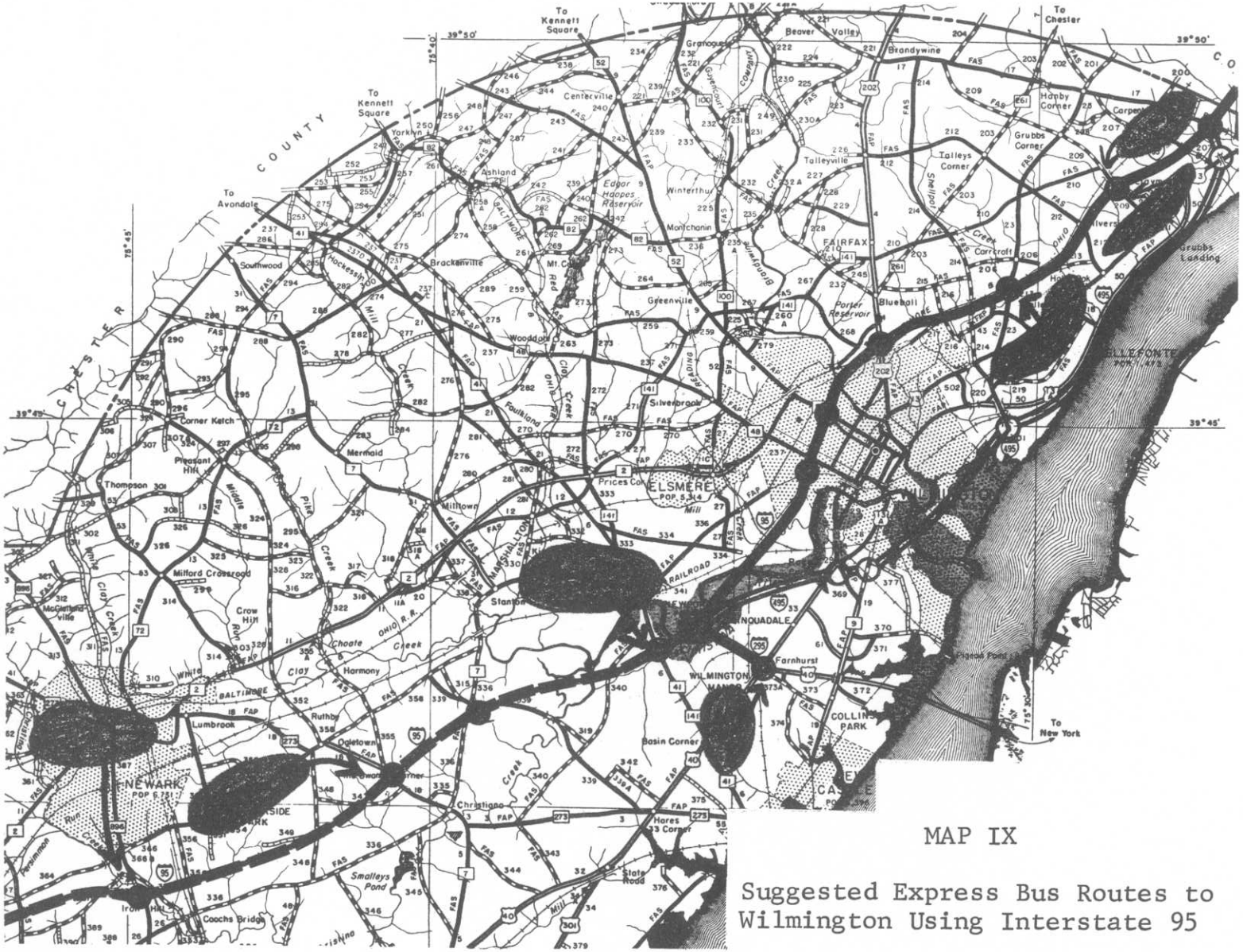

MAP IX

Suggested Express Bus Routes to Wilmington Using Interstate 95

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sections of the freeway. In fact, a route from the Newark area and another from the Newport area could be tested in the not too distant future. The potentials for expanded route systems and for increased ridership afforded by express bus routes using the freeways are quite enticing. Not to take full advantage of every possibility that the freeway presents would be a public indication that mass transit is not interested in its own future development and healthy growth.

Transportation Center

With the apparent construction of a Civic Center in Wilmington, it might be wise to analyze the effect that a central transportation terminal would have on the City's mass transit system. The construction of a building for this purpose would create similar conditions to those outlined in the Shipley Street terminal proposal, and would demonstrate the City government's enlightened concern for a balanced full service system in the Wilmington area.

Continuing Improvement Processes

Tax Relief

Should all other efforts fail to improve the ridership and financial pictures of the Delaware Coach Company,

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a program of gradually reduced taxes should be sought from local governments. A system of checks and balances could be set up such that incentives for the private company to remain self-supporting are not destroyed. A lump sum total tax cut is not as desirable to either the transit company or the local government as a gradual reduction of the tax burden over a period of years. While relief from certain state and local taxes won't of itself affect ridership, it will provide revenue and time for the Company to experiment with new methods to help its own cause. In addition, tax relief will help bolster the Company's ability to maintain present service and further delay the need for upward adjustments in fares.

Personalized Service

To compliment any or all of the proposed programs, it appears that a new outlook toward public relations should be initiated. The present approach while not as appealing or dynamic as it might be, is adequate as far as it goes, but the personal touch could be improved. The approach should be, "How can we serve you better?", with the emphasis on the you and the better.

The company should become involved with the people and the community on a personal level. To do this they must

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take the first step and continue to show a personal concern for the health of the community and the welfare of its inhabitants. The individual personalized schedule mentioned in Chapter V is an excellent method of promoting this sense of personal involvement. Another way to reach the citizenry is to advertise on local radio stations. The use of public service announcements over the radio on bad weather days keeps the public aware as to when and where transit service is available.

These are but two suggestions as to how a local transit company can involve itself in the daily lives of its customers, and at the same time promote ridership.

Conclusion

This analysis has attempted to discover where mass transportation fits into the daily life of the city and the citizen. For the most part, the analysis has established that mass transit systems have declined in stature and importance in many localities throughout the country. Many factors have contributed to this decline. Those of significant note are the rise of individual automobile ownership; an accompanying shift in public transportation habits; and a changing transit environment in metropolitan areas.

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The Delaware Coach Company has not been excepted from the effects of the above factors. The serious problems of declining ridership and revenue, and rising costs have plagued the Company for over 17 years. The Company, however, has demonstrated its determination to provide the best service possible according to the conditions present and to continue operating profitably.

An examination of the transit environment in and around Wilmington reveals little or no potential for substantial growth in transit ridership. It is still too economical and convenient to drive and park a private automobile in the greater Wilmington area.

Recognizing all this, the foregoing recommendations have been presented in an attempt to assist the Delaware Coach Company with its problems. While not specifically designed to increase ridership, it is hoped that some of these proposals will help maintain present patronage levels and improve the efficiency of the Company's operations. The attraction of significant numbers of new riders will probably have to await some significant change in public transportation habits and the transit environment of Wilmington and its suburbs.

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MAP of WILMINGTON, DELAWARE

★ WILMINGTON
★ NEWARK
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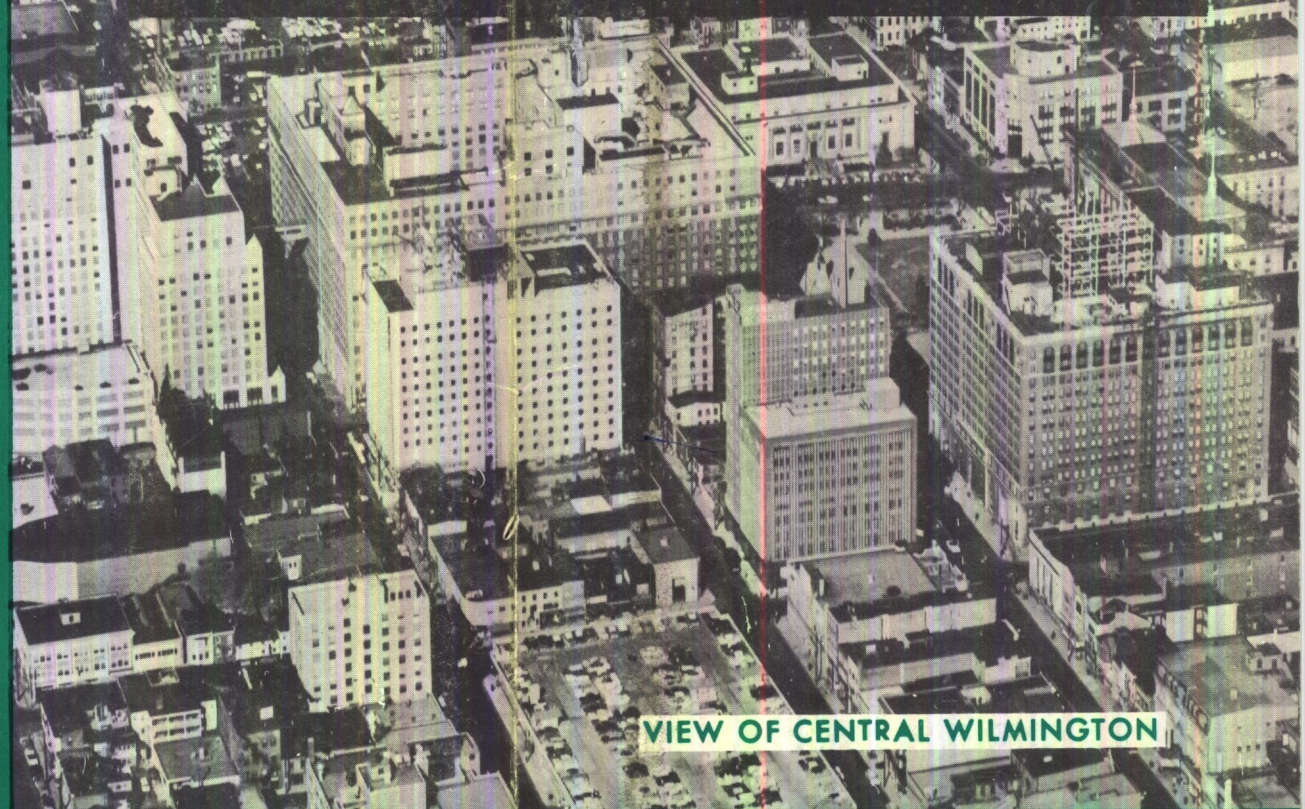
MAP of Greater WILMINGTON and NEW CASTLE COUNTY DELAWARE



VIEW OF CENTRAL WILMINGTON

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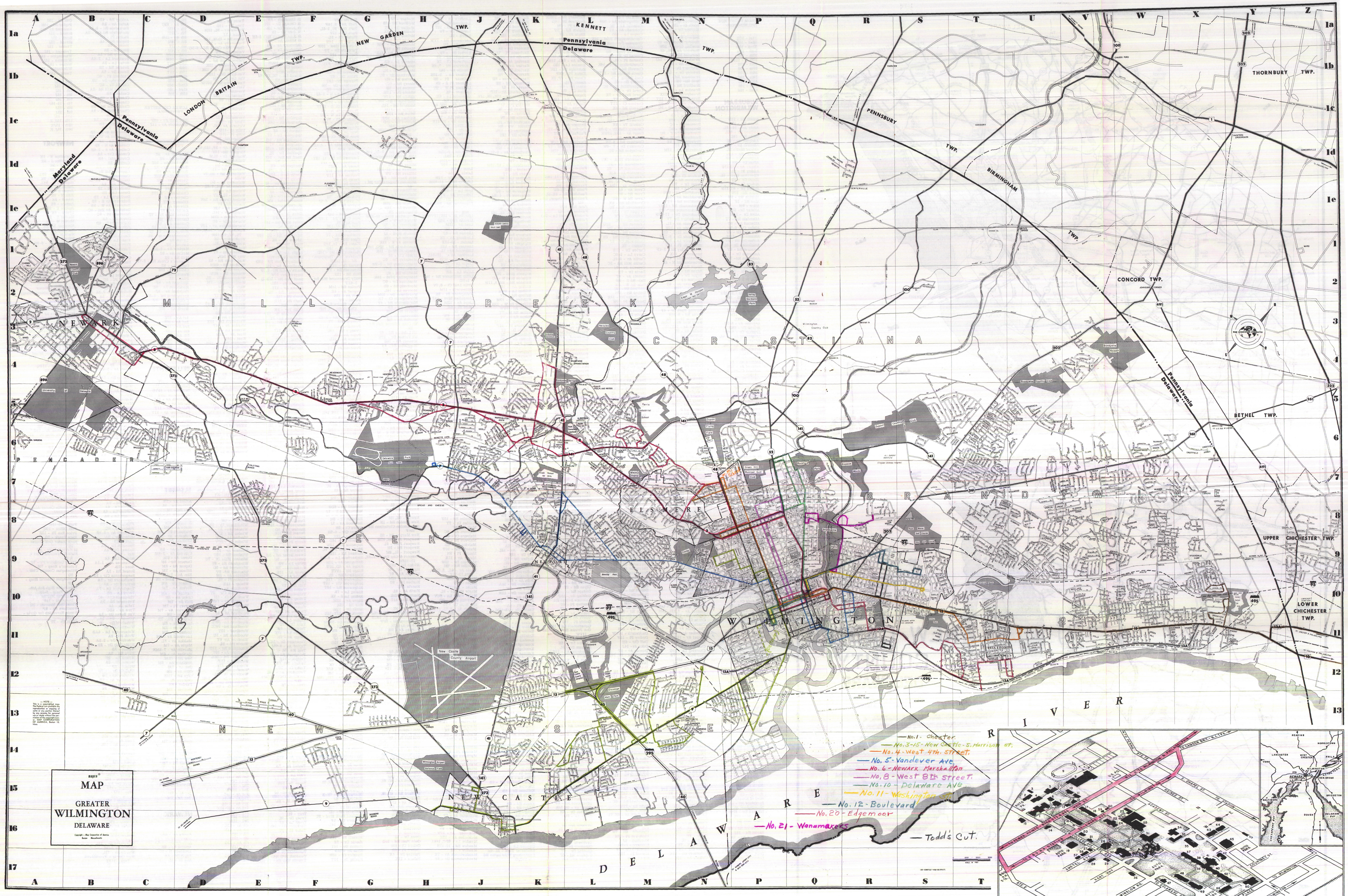
MAP
GREATER
WILMINGTON
DELAWARE
No. 1 - Chester.
No. 3-15 - New Castle - S. Harrison St.
No. 4 - West 4th. Street.
No. 5 - Vandever Ave.
No. 6 - Newark Marshallton
No. 8 - West 8th Street.
No. 10 - Delaware Ave.
No. 11 - Washington St.
No. 12 - Boulevard
No. 20 - Edgemoor
No. 21 - Wanamakers
— Todd's Cut.
WILMINGTON
NEWARK
ELSMERE
NEW CASTLE
DELAWARE RIVER
MILL CREEK
CHRISTIANA
BRANDYWINE
CLAY CREEK
PENCADER
NEW CASTLE
Pennsylvania
Delaware
Maryland
Delaware
KENNETT TWP.
NEW GARDEN TWP.
LONDON BRITAIN TWP.
PENNSBURY TWP.
BIRMINGHAM TWP.
THORNBURY TWP.
CONCORD TWP.
BETHEL TWP.
UPPER CHICHESTER TWP.
LOWER CHICHESTER TWP.
EDGEMOOR
SEWAGE DISPOSAL PLANT
SCALE IN FEET
136-JG86F212-1456-85(R907)
The University of Delaware
1 Old College
2 Maintenance Storage
3 Military Shed
4 Taylor Gymnasium
5 R.O.T.C. Building
6 Phys. Ed. (Men)
7 Recitation Hall
8 Carpenter Field House
9 Frazer Field
10 Sigma Nu Fraternity
11 Sigma Phi Epsilon Fraternity
12 Elliott Building
13 Purnell Hall
14 Evans House
15 Pi Kappa Alpha Fraternity
16 Brown Res. Hall
17 Harter Hall
18 Sharp Hall
19 The Knoll
20 Engineering Storage
21 Univ. Extens'n Bldg.
22 Wolf Hall
23 South Hall
24 P. S. du Pont Hall
25 Evans Hall
26 Mitchell Hall
27 Johnston House
28 Kappa Alpha Frat.
29 Delta Tau Delta Fraternity
30 Hullihen Hall
31 Brown Laboratory
32 Memorial Library
33 Maintenance Center
34 Boiler Room
35 Alison Hall
36 Phi Kappa Tau Fraternity
37 Cannon Hall
38 New Castle Hall
39 Kent Dormitory
40 Sussex Hall
41 Kent Dining Hall
42 Smyth Hall
43 East Campus Dorm.
44 East Campus Dorm.
45 Dining Hall-Student Center
46 Laurel Hall
47 Steno. Services Ctr.
48 Robinson Hall
49 Warner Hall
50 Women's Gym.
51 Home Mgmt. House
52 Theta Chi Frat.
53 University Farm
54 Newton Poultry Bldg.
55 Agricultural Hall
56 Delaware Stadium
57 Bonham House
58 Tiffany House
59 Delaware Avenue Dorm.
60 Delaware Avenue Dorm.
61 New Men's Dorm.
62 New Women's Dorm.
Alpha Epsilon Pi
151 W. Main Street
Alpha Tau Omega
153 W. Main Street
AMSTEL AVE.
KENT WAY
WINSLOW RD.
TO DELAWARE STADIUM
TO B & O R.R. STA.
B&O R.R. STA.
RTE. 2
UNIVERSITY of DELAWARE

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WILMINGTON

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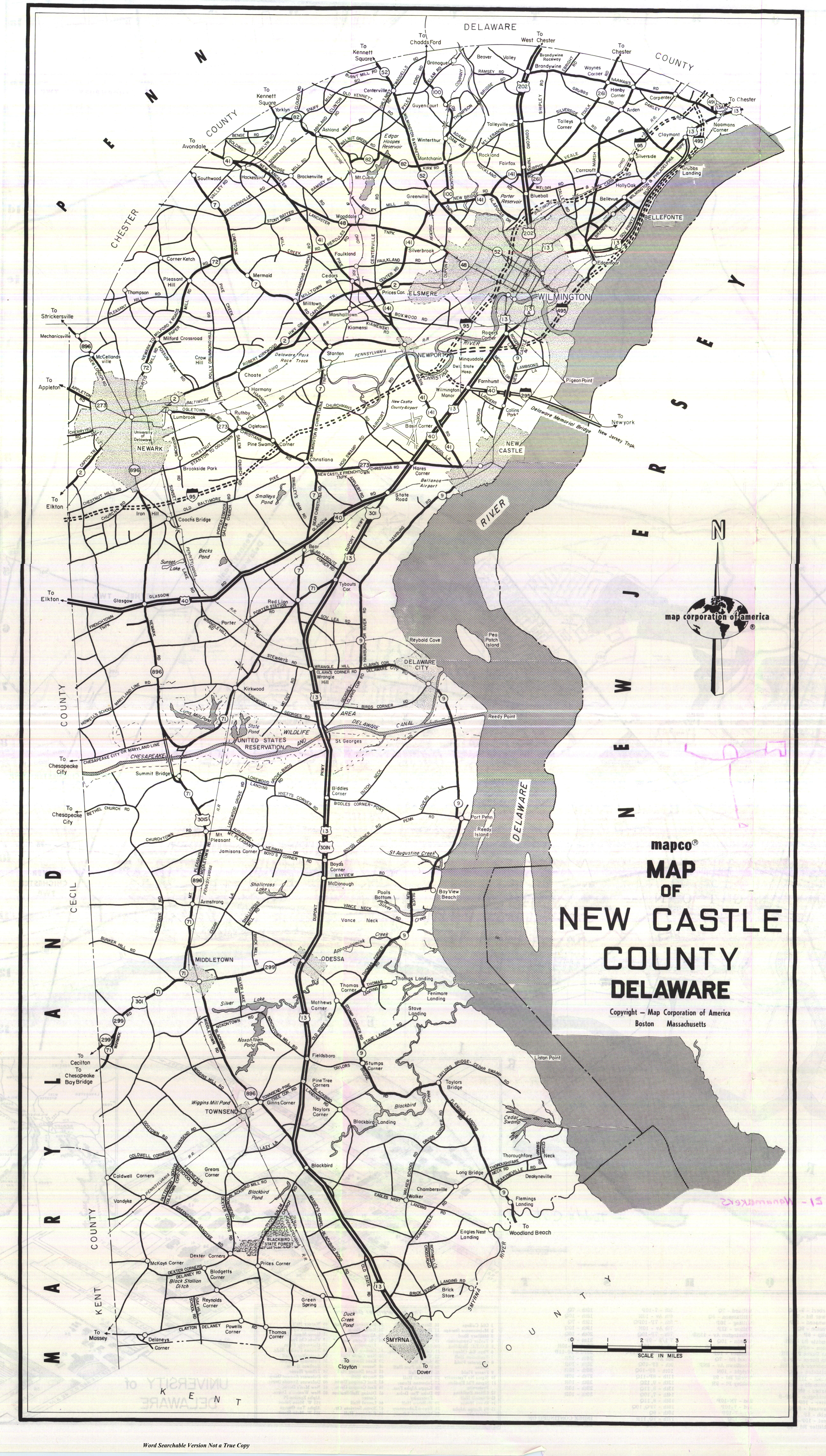

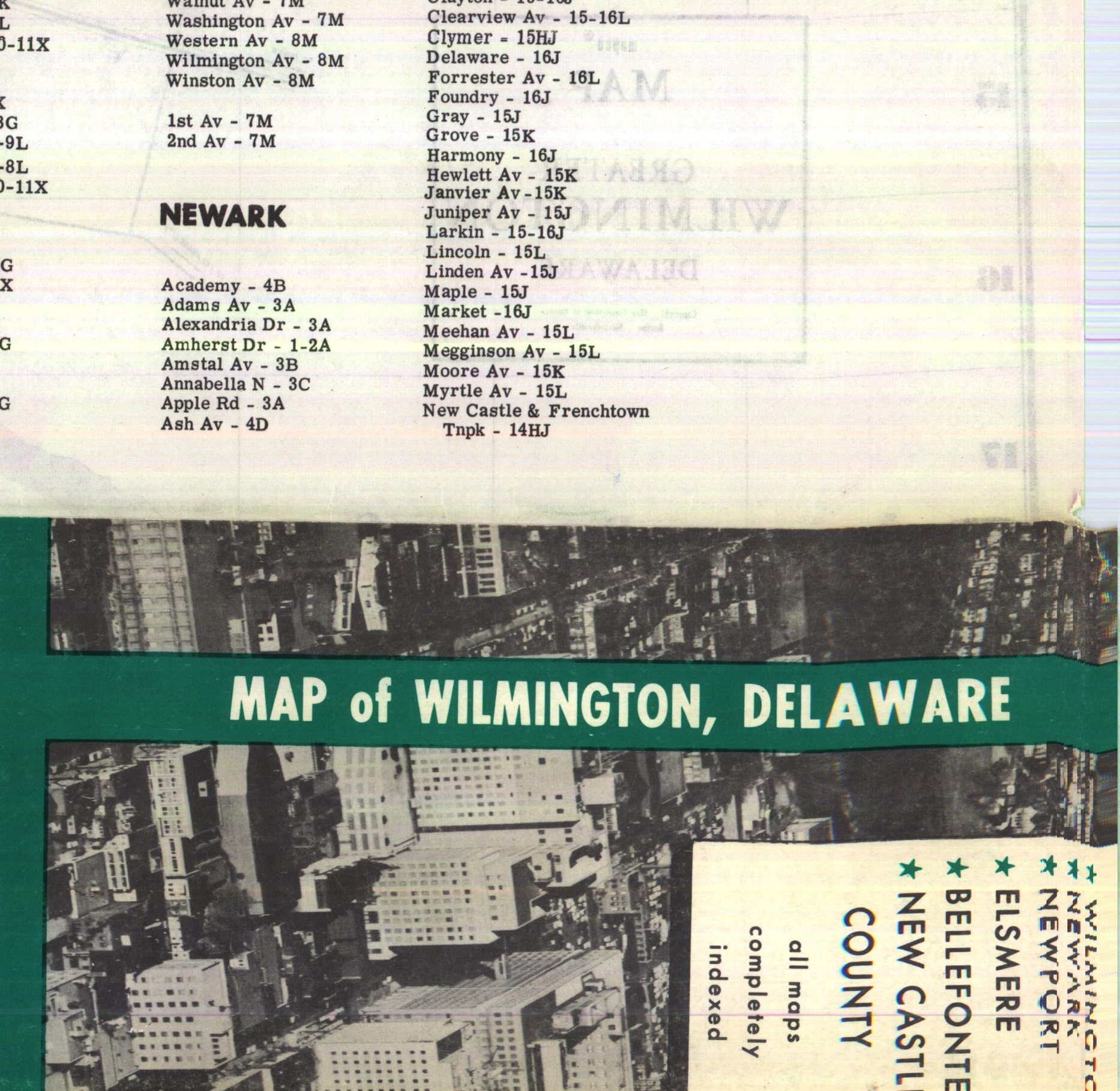

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WILMINGTON INFORMATION

Wilmington is located at the confluence of the Delaware, Christina and Brandywine Rivers, 70 miles from the Atlantic Ocean and 26 miles below Philadelphia. With an area of 15.77 square miles, Wilmington has a population of 105,000 within the corporate city limits and within the metropolitan area 363,527 persons.

Wilmington was first settled by the Swedes in 1638, then occupied by the Dutch from 1655 until 1664 when it was taken over by the English. It was named in honor of Spencer Compton, Earl of Wilmington in England. The settlement of Wilmington having been continuous since 1638, it is credited by historians as being the "Cradle of European Civilization in the Delaware River Valley."

Situated at the head of the productive Del-Mar-Va Peninsula, Wilmington is the largest city and port of this peninsula.

Today Wilmington is a city of diversified industries. Wilmington is known as "The Chemical Capital of the World" for here are located the headquarters and laboratories of large chemical manufacturing interests. Wilmington is the world's center of vulcanized fibre manufacture and manufacture of glazed kid and morocco leathers. Here is the largest plant in the world devoted to the manufacture of braided rubber hose. The largest single cotton dyeing and finishing works in the world also is located here. Other important products include automobiles, leather belting, boilers, casting of all types, clothing, cork products, hard floor coverings, fluorspar, iron and steel articles, steel, hosiery, jute products, machinery, paper and paper products, paper-making machinery, pyrites, rayon, and shower bath fixtures.

Delaware is served by two major railroads, three major airlines and 30 motor freight carriers. On the county level, agriculture plays an important role. It has been estimated that the average Delaware farm covers approximately 114 acres and that agriculture alone employs over 25,000 people. Poultry farming and truck gardening are the chief sources of agricultural income.

Wilmington is a wholesale center serving southern New Jersey, Southeastern Pennsylvania, the State of Delaware and the eastern shore of Maryland and Virginia. It is also an active retail center.

From a recreational standpoint Wilmington is most fortunately situated. Within two to five hours are the seashore resorts of Delaware, Maryland, and New Jersey. A like distance away are the mountains of Pennsylvania and New York. For the hunter and fisherman, the Del-Mar-Va Peninsula possesses abundance of game. All of this region is within a maximum of three hours of Wilmington.

Within the city there are many recreational facilities. There are approximately 30 open parks. Along the banks of the historic Brandywine is Brandywine Park, a natural park, considered by many as one of the finest in the country.

(From data furnished by Delaware State Chamber of Commerce, Inc.)

(Coverphoto by Brooks Studio, courtesy of Delaware State Chamber of Commerce.)

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