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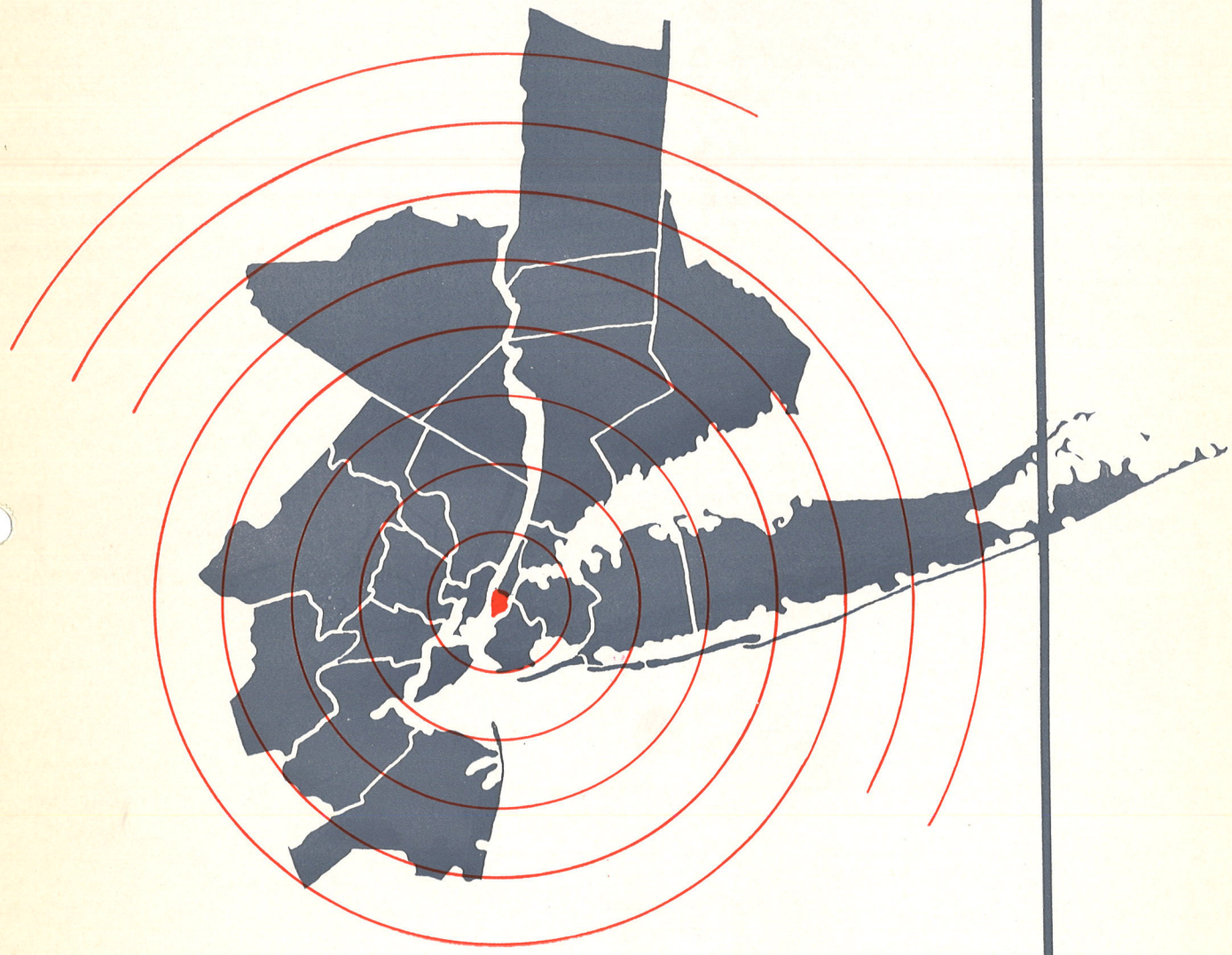

HUB-BOUND TRAVEL
IN THE TRI-STATE METROPOLITAN REGION

Persons and Vehicles Entering Manhattan South of 61st Street, 1924-1956

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RECENT RPA BULLETINS

HUB-BOUND TRAVEL
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Persons and Vehicles Entering Manhattan South of 61st Street, 1924-1956

This bulletin was prepared under the general supervision of Henry Fagin, executive director, by Douglas S. Powell, planning director. Its findings are based on analyses of the data made by David Malamud, planner, with the advice of Stanley B. Tankel, senior planner. The charts and maps were drawn by George A. Schiller, planning engineer.

ACKNOWLEDGEMENTS

We wish to give special and full acknowledgement of the contribution of the Port of New York Authority and particularly to the Planning Division of its Port Development Department, without which the findings of this bulletin could not have been developed. The Port Authority arranged, as it had periodically in the past, for a large number of independent agencies to make field counts at the same time in the year. The Authority collected this data and made it available for analysis and publication by the Regional Plan Association.

We wish to acknowledge also the important and difficult contributions of the New York City Department of Traffic and the New York City Department of Public Works, which counted not only the vehicles but the persons in them on the numerous avenues and bridges leading into the hub. This was a most difficult but essential part of the survey. We appreciate too the helpfulness of other agencies which maintain records of pertinent data which they made available in order that this count could be a complete one.

HIGHLIGHTS

On a typical business day in 1956, 3.3 million persons entered the lower half of Manhattan south of 61st Street. This was a ten per cent, 375,000-person decrease in the daily volume of in-bound travelers since 1948. The drop reversed a continuously upward trend going back at least to 1924.

The drop in hub travel between 1948 and 1956 had these characteristics:

- While over half a million (546,000) fewer people entered the hub by subway, railroad, trolley, bus and ferry, 171,000 more persons came in via automobile, taxi and truck.

- The decline was more severe during the nonrush hours than it was during the 7-10 a.m. period. An estimated 229,000 fewer persons entered during the hours when shoppers and other intermittent travelers predominate. This was a 12 per cent drop since 1948. On the other hand, 146,000 fewer persons entered during the three-hour morning rush when persons heading for jobs predominate. This represented a 9 per cent drop since 1948.

- The long-term shift from public transit to automobiles and taxis picked up speed between 1948 and 1956. While the passenger load carried by automobiles and taxis had hovered between 15 and 16 per cent of the total between 1932 and 1948, it rapidly rose to 22 per cent in the eight years from 1948 to 1956. But despite this rise the big burden of transportation movements into the hub continued to be borne by subways, other rail lines and buses.

- The accelerating shift to automobiles and taxis brought the total number of vehicles crowding into the hub to a new high of 519,000 per day. This was 137,000 more autos, taxis, trucks, and buses than entered in 1948. (An unknown number of these are vehicles that pass directly through the hub without stopping.)

- The combined total of morning rush-period travelers carried into the hub in 1956 in railroads (other than subways), buses, ferries, automobiles, trucks and taxis was about the same as the combined total for these carriers in 1948. But there was a 142-000-person decline in the number of persons coming in by subway during this three-hour period.

CONTENTS

COMMENTARY

WHAT ARE the implications of these changes in the patterns of travel to the hub? What are the changing economic and social forces that underlie the decline in Manhattan-oriented travel? Is the hub threatened with an economic decline? Will the numbers of persons entering it continue to drop in the future despite the region's prospect of continuing population growth?

Within the limits of this bulletin we cannot attempt to answer these questions in a definitive way. Indeed, a search for definitive answers was an important reason for the launching of the Regional Plan Association's three-year New York Metropolitan Region Study, which is currently being completed for the Association by a special New York staff assembled by Harvard University's Graduate School of Public Administration. The questions will be dealt with thoroughly in the forthcoming volumes of that study which will be published by Harvard University Press beginning in the Fall of 1959.

We do not believe, however, that the evidence of recent hub travel trends presented in this report should be taken to suggest that the hub is losing its fundamental importance. Rather the facts indicate that the hub may be experiencing a fundamental revision in the array of functions it serves for the almost 16 million people of the Tri-State Metropolitan Region.

A SHIFT OF FUNCTIONS

As the hub shifts from one array of functions to a new array, it is also shifting from one set of traffic generating uses to a new set. The net effect of these shifts to date has been a reduction in daily travel movement.

But the experience of the past eight-year survey period does not necessarily presage an endless decline in hub travel. Sooner or later the current reshuffling of business area functions as between the hub and the environs may reach a new equilibrium. If so, a new ratio will be established between the region's total population and the number of daily hub-oriented trips. In this case the region's expected future population growth may produce new increases in hub travel. Judgment on whether this will occur in the near or far distant future, however, will have to await the findings of the New York Metropolitan Region Study.

In this bulletin we have pointed out a number of strong trends associated with the patterns of travel to the hub. What will be the main effects of these trends on other aspects of metropolitan transportation?

FOUR EFFECTS

First, the decline of manufacturing and of retail trade at the hub and the rapid growth of these activities at the outer edges of the city and in suburban counties suggest new problems for the city's subway system and the region's transportation system. The subway system—designed almost exclusively to funnel persons to the hub—is not efficient for carrying the increasing numbers of city shoppers who wish to travel across their Boroughs to such growing store centers as Fresh Meadows and Jamaica. Nor is the subway system well adapted for carrying the growing numbers of city dwellers who work at jobs in suburban stores or manufacturing plants.

Second, whether total hub travel increases or decreases, one trend in particular portends more rather than less trouble for the financing and operation of the public transportation companies in the future. This is the growing tendency for rush-hour travel by public transportation to become an increasingly dominant proportion of total daily travel. As this occurs, unit transport costs for such carriers inevitably must rise. Instead of equipment and labor costs being spread throughout the day, these costs must be recaptured in the relatively few hours of concentrated rush-hour travel.

MORE VEHICULAR CONGESTION

Third, and again whether hub travel increases or decreases, the recorded shift to automobile travel portends even more serious vehicular congestion in the hub. If present trends continue in the future and if little or noth-

ing is done to improve facilities for mass transportation, the region and New York City in particular must look torward increasing pressures for more expenditures for expressways to the hub and better automobile parking facilities in the hub to serve an auto-oriented public. Similarly, in response to the same pressures, the City will be forced to consider additional measures to make Manhattan's street system more efficient in serving the movement of traffic. This might include the conversion of more avenues into one-way thoroughfares, the extensive provision of off-street loading facilities, stricter enforcement of street parking regulations, and possibly outright prohibition of curb stops of any kind in selected areas.

Fourth, the rise in numbers of hub-bound automobiles and the decline in hub-bound rail patronage and service both raise fundamental questions about the future parts to be played in the regional transportation system respectively by all the various means for moving people and goods—the subways, railroads, buses, taxis, private cars, ferries, airplanes, helicopters, barges, car floats, lighters, pipelines, belt lines, elevators escalators, and things still to be invented.

DEFINITION OF TRANSPORTATION FUNCTIONS

These effects point to an increasingly clear definition of the functions for which the region's different forms of transportation are best suited.

The convenience and flexibility of the automobile is emerging as best suited to provide access to the increasingly diffuse pattern of shopping facilities and employment centers in the outer edges of New York City and in the suburban counties. Similarly the increasing popularity of the automobile for mid-day travel to the hub attests to its superior convenience for the intermittent hub shopper or traveler during nonrush hours.

On the other hand, given their speed and very high passenger capacities, the subways, suburban railroads, and buses persist as the most effective carriers for the great volumes of hub travelers during the rush hours. The fact that the shift to automobile travel during the past eight-year period resulted in an estimate of only 37,000 more persons entering the hub in automobiles and taxis during the rush hours while 122,000 more entered during the off-peak hours, is still another evidence of the continuing importance of mass rail and bus transportation in serving rush-hour travel.

DIFFERENT KINDS OF TRANSPORT MOVEMENT

Our Tri-State Metropolitan Region is the scene of exceptionally complex interacting systems of human activities. Its continued functioning requires reasonable provision for a multitude of different kinds of transport movement: for taking young people back and forth to school as well as supplying their homes with fuel; for carrying exurbanites to work in the hub as well as taking central city residents to jobs in suburban shopping centers and suburban plants; for bringing materials to the machines, doctors to the patients, salesmen to the customers, repairmen to the TV sets; and for trips in search of things like entertainment, recreation, sociability, or justice.

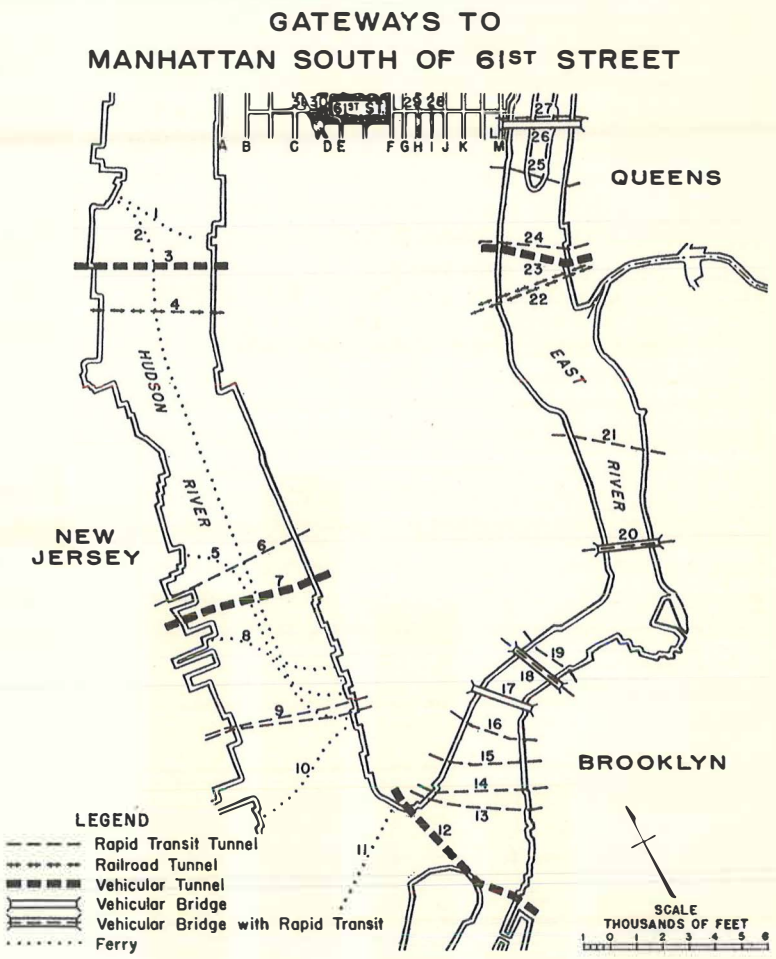
The transportation trends identified in our survey reveal clearly that drastic shifts are occurring in the past balance in use of the various transport means. Vast social and economic changes that are also under way to alter the locations of homes and jobs and the patterns of travel between them are deepening some of the old transportation problems and creating new ones. Happily, too, these changes are eliminating a few of the still unsolved problems.

NEXT STEPS

The main significance, perhaps, of the facts we have brought together in this bulletin is the big question they pose: *What next steps must the region take to organize its transportation resources and agencies to assure that the various forms of transportation will serve the functions for which each is best suited in the new region we are building?*

GATEWAYS TO THE HUB

New York Central Railroad Ferry—Weehawken—42nd St.	1
New York Central Railroad Ferry—Weehawken—Cortlandt St.	2
Lincoln Tunnel	3
Pennsylvania Railroad Tunnel	4
Delaware, Lackawanna and Western Railroad Ferry	5
Hudson and Mahattan Railroad Tunnel	6
Holland Tunnel	7
Erie Railroad Ferry	8
Hudson and Manhattan Railroad	9
Central Railroad of New Jersey Ferry	10
Staten Island Ferry	11
Brooklyn Battery Tunnel	12
New York City Transit Authority Tunnel (IRT)	13
New York City Transit Authority Tunnel (BMT)	14
New York City Transit Authority Tunnel (IRT)	15
New York City Transit Authority Tunnel (IND)	16
Brooklyn Bridge	17
Manhattan Bridge	18
New York City Transit Authority Tunnel (IND)	19
Williamsburg Bridge	20
New York City Transit Authority Tunnel (BMT)	21
Long Island and Pennsylvania Railroad Tunnels	22
Queens Midtown Tunnel	23
New York City Transit Authority Tunnel (IRT)	24
New York City Transit Authority Tunnel (IND)	25
Queensboro Bridge	26
New York City Transit Authority Tunnel (BMT)	27
New York City Transit Authority Tunnel (IRT)	28
New York Central and New Haven Railroad Tunnel	29
New York City Transit Authority Tunnel (IND)	30
New York City Transit Authority Tunnel (IRT)	31
Westside (Miller) Highway	A
West End Avenue	B
Columbus Avenue	C
Broadway	D
Seventh Avenue	E
Fifth Avenue	F
Madison Avenue	G
Park Avenue	H
Lexington Avenue	I
Third Avenue	J
Second Avenue	K
York Avenue	L
Franklin D. Roosevelt Drive	M



The data presented and analyzed in this study were obtained from actual counts and estimates of persons and vehicles passing specified points on all road, rail and ferryboat entrances into the portion of Manhattan Island south of 61st Street. The figures cover a 24-hour period for a typical Thursday in October, 1956.

There are two limitations to the data presented here. First, since the count is only of the number of persons and vehicles *entering* the central district, the study does not separate those who travel through to destinations beyond Manhattan.

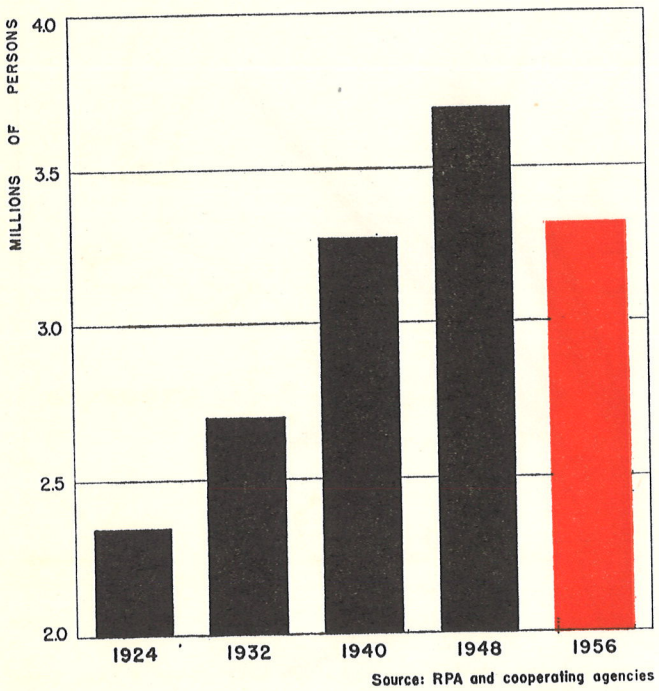
Second, the data cannot be used to determine the real points of origin for daily travelers. Persons who cross the cordon line at 61st Street can come not only from northern Manhattan, the Bronx, Westchester, Putnam, Dutchess and Fairfield counties but also via the George Washington Bridge from Rockland, Orange and Bergen counties and via the Triborough Bridge from Queens, Nassau and Suffolk counties.

PERSONS AND VEHICLES ENTERING MANHATTAN SOUTH OF 61st STREET 1924-1956

ON A TYPICAL work day in 1956, 3.3 million persons entered the heart of Manhattan. The striking fact is that this was 375,000 *fewer* people than had come to the region's hub on a similar day eight years earlier. For the first time since 1924 or earlier there was a decline in the total number of persons who traveled to Manhattan

CHART 2

PERSONS ENTERING MANHATTAN SOUTH OF 61ST STREET ON A TYPICAL BUSINESS DAY IN 1924, 1932, 1940, 1948 AND 1956



Source: RPA and cooperating agencies

to jobs, business meetings, government headquarters, cultural places, shopping sprees, and places of entertainment or through Manhattan to places beyond. In less than a decade the number of people coming into the nation's biggest and most dynamic metropolitan center declined by ten per cent.

This startling decline in hub-bound trips occurred during a period of very substantial population and economic growth for the region as a whole. Not only were well over 1½ million persons added to the region between 1948 and 1956 but more than 360,000 additional regional jobs were created as well. Yet in the midst of this surging growth, the region's cultural and business hub stopped attracting increased numbers of people; in fact the number entering actually started to decline.

What were the characteristics of the drop? Why did it happen? What does this trend mean for the future of the region? And particularly, what effect should it have on policies and programs for improving transportation to Manhattan?

The Changing Patterns of Travel Into Lower Manhattan

Four facts stand out when the most recent changes in the patterns in hub travel are analyzed:

1. A striking reversal took place in a 30-year trend toward increased trips into the lower half of Manhattan.
2. The drop in hub travel is less pronounced at the rush hours when people are going to work and more pronounced during hours when shoppers and intermittent travelers tend to come in.
3. An increasing proportion of the persons who travel into lower Manhattan each day use automobiles and a decreasing proportion use the older forms of public transit (including subways, suburban railroads, buses, etc.). In spite of the overall decline in hub travel, Manhattan south of Central Park is now burdened with more cars each day than at any time in the city's history.
4. Despite decades of rapid population growth in most of the nine New Jersey counties of the Tri-State Region, and despite the addition of the Lincoln Tunnel, fewer people now come into Manhattan via the ferries and tunnels that connect New Jersey to Manhattan south of Central Park than did in 1924.

Fewer People by Public Transportation But More by Auto and Truck

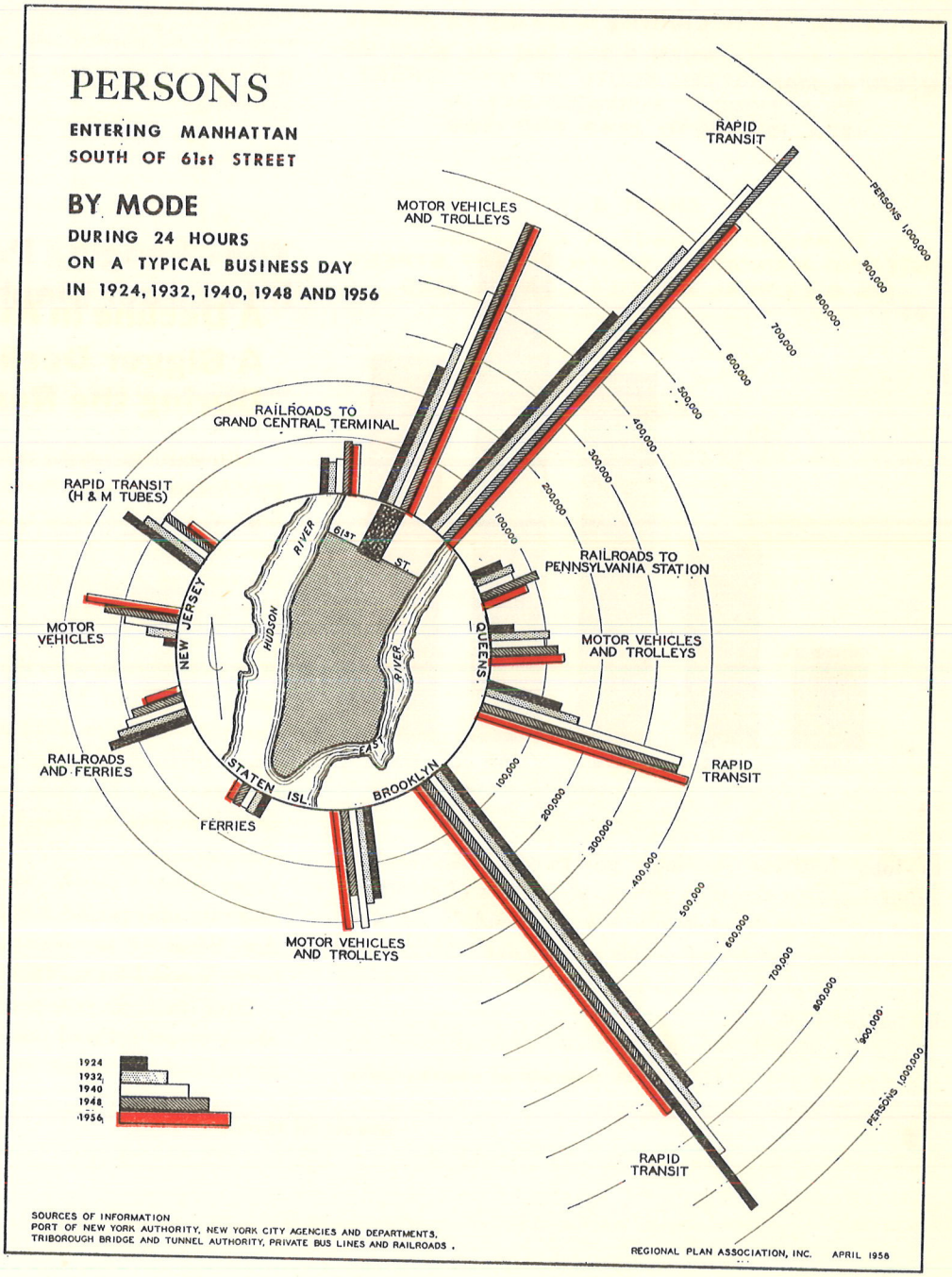
The 375,000-person net decline from 1948's high of 3,691,000 daily hub travelers was the result of decline in the patronage of the five modes of mass travel not fully balanced by gains in private auto, taxi and truck occupancy. Fewer people came in by subway, by trains, by ferry, and by trolley; and even the bus lines suffered a drop in riders.

Between 1948 and 1956 (see Table 1):

- weekday subway passengers to the hub dropped from 2,389,000 to 1,970,000;
- railroad passengers from 283,000 to 233,000;
- bus passengers from 290,000 to 246,000;
- ferry passengers from 48,000 to 36,000.
- trolley patronage become virtually nonexistent.

All told the eight-year drop in public transportation patronage amounted to 546,000 passengers per day.

Of prime significance, however, is the fact that automobiles, taxis, and trucks carried *more* people into lower Manhattan in 1956 than in 1948. During the earlier year 657,000 persons entered in these carriers, while in 1956 828,000 was the figure. *Yet their contribution of 171,000 additional travelers was more than offset by the over half-million person drop suffered by the other modes of travel.*



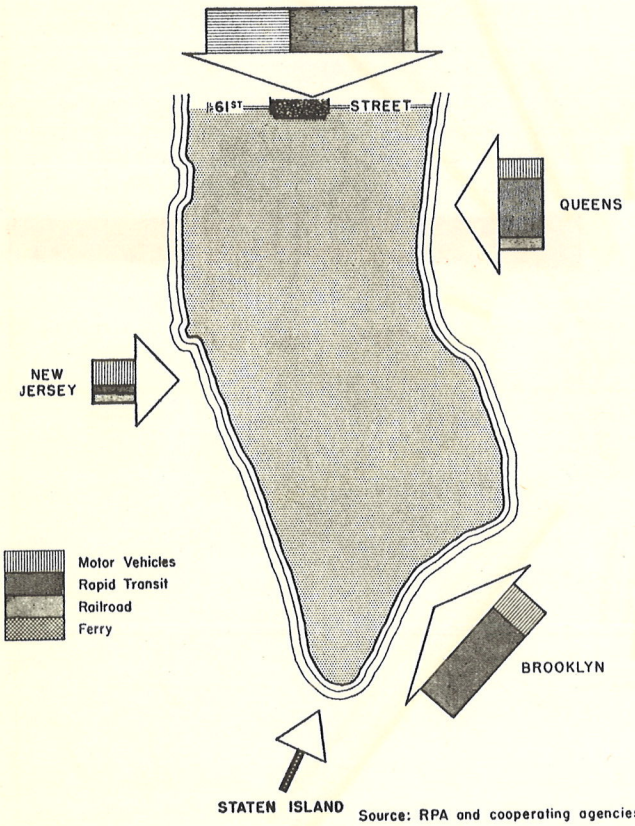
Fewer People Entering Lower Manhattan From All Hub Gateways Except Queens

The decline was reflected in other ways. Fewer persons came into lower Manhattan from these four directions that funnel travelers into the hub: crossing 60th Street from the north; up the harbor from Staten Island; across the group of bridges and underwater tunnels from Brooklyn; and via the group of tunnels to lower Manhattan from New Jersey (see Table 2). But direct travel from Queens increased principally because of increased travel through Queens Midtown Tunnel.

The sharpest drop occurred in travel from Brooklyn. Fifteen per cent fewer persons came into the hub from that borough. Travelers arriving in the hub via northern Manhattan also dropped at a rate that was above the regional average.

CHART 4

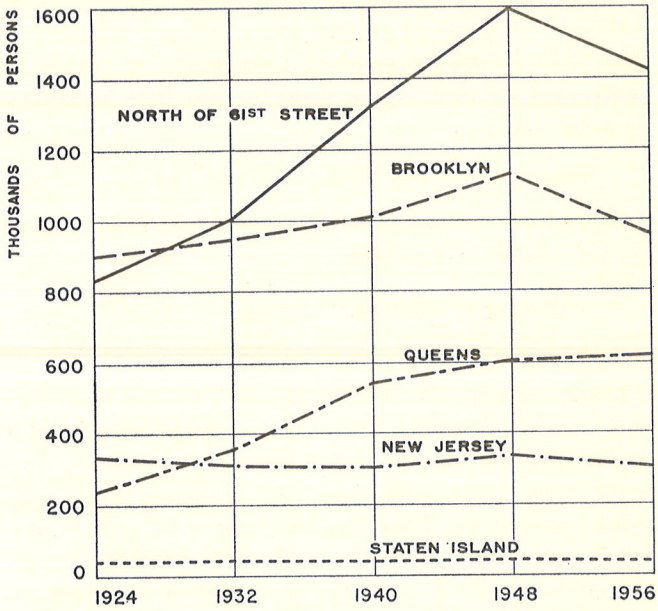
PERSONS BY SECTOR AND MODE
ENTERING MANHATTAN SOUTH OF 61ST STREET
ON A TYPICAL BUSINESS DAY IN 1956



Source: RPA and cooperating agencies

CHART 5

PERSONS BY SECTOR
ENTERING MANHATTAN SOUTH OF 61ST STREET
ON A TYPICAL BUSINESS DAY IN
1924, 1932, 1940, 1948 AND 1956



Source: RPA and cooperating agencies

A Decline in Rush Hours, A Bigger Decline During the Rest of Day

Although the ten per cent, 375,000-person drop in daily travel shows clearly the downward trend from the 1948 high of 3,691,000 trips to the 1956 total of 3,316,000, the overall figure does not reveal the marked difference in the rates of decline during different periods of the day. The drop in hub travel was more pronounced during off-peak hours, when shoppers and other intermittent travelers tend to come into the lower half of Manhattan, than during the rush hours when job-bound travelers predominate. Between 1948 and 1956 an estimated 229,000 fewer persons came into the hub during periods other than the morning rush hour. In contrast only 146,000 fewer travelers were counted during the 7 to 10 a.m. rush. The importance of this contrast rests on the fact that just about as many people enter the hub during the three-hour morning rush period as enter during the remainder of the day. Some 47 per cent of the daily travelers enter between 7 and 10 a.m. (See Table 9.)

Over the eight-year period the contrasting figures cited above reveal rates of decline that are 34 per cent greater during nonrush hours than during the 7 to 10 a.m. period.

This difference between the two periods is even more pronounced for subway travel. Here nonrush-hour movements dropped at almost twice the rate experienced in rush-hour travel.

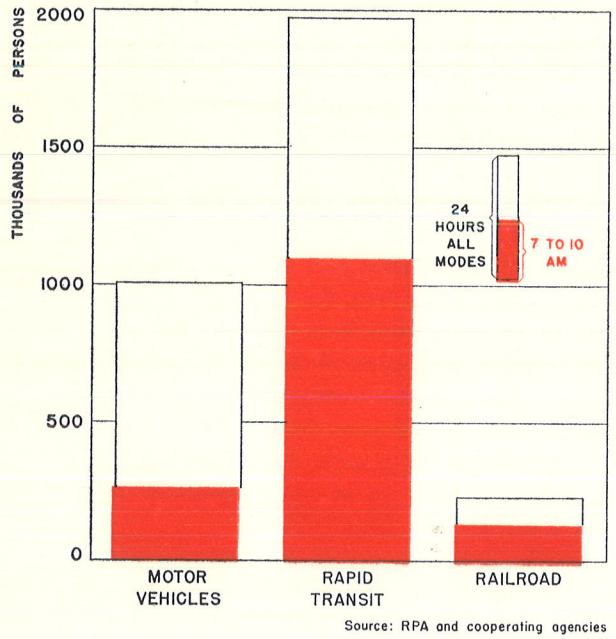
PERSONS ENTERING THE HUB
VIA SUBWAY RAPID TRANSIT
1948 - 1956

	1948	1956	Decline Absolute	Decline Percent
24 hrs.	2,288,000	1,911,000	—377,000	—16.5
7-10 a.m.	1,208,000	1,066,000	—142,000	—11.7
21 hrs. (excl. 7-10 a.m.)	1,080,000	845,000	—235,000	—21.8

Finally, despite the shift to automobiles and taxis the rush hour proportions of the daily passenger travel loads carried into the hub by motor vehicles is markedly different from the proportions carried by railroads and rail rapid transit lines. While the latter carry 67 and 56 per cent of their daily passenger loads during the three-hour rush period, only 23 per cent of the passenger loads in motor vehicles arrives in the hub during the 7-10 a.m. period. (See Table 8.)

CHART 6

PERSONS BY MODE
ENTERING MANHATTAN SOUTH OF 61ST STREET
DURING 24 HOURS AND THE
COMMUTING HOURS 7 TO 10 AM. 1956



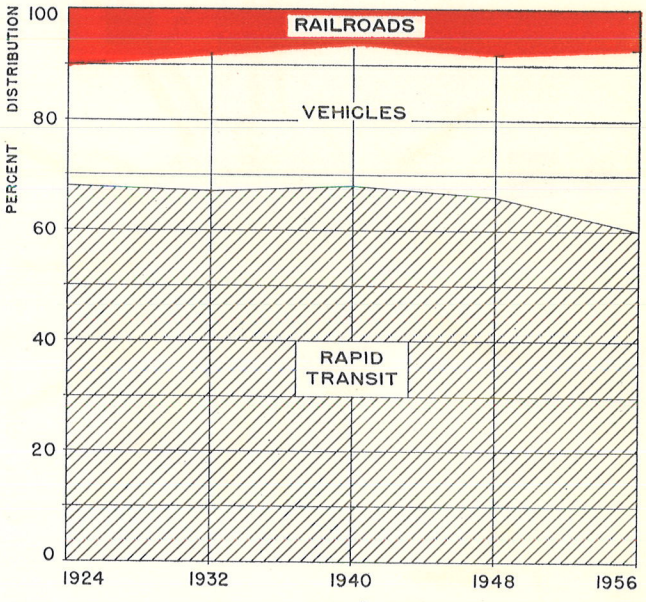
Source: RPA and cooperating agencies

Acceleration of a Long-Term Shift from Public Transit to Private Automobiles

The 1948-56 figures also reveal a continuing shift from older and generally more rigid means of transportation toward newer and more flexible means of travel among the people who still make the trek to the hub district during the day. While in 1924 private autos and taxis had carried only a little more than ten per cent of the total passenger load and their share of hub-oriented trips hovered between 15 and 16 per cent from 1932 to 1948, it swelled to over 22 per cent by 1956. The accelerating shift in emphasis to automotive transportation to or through the hub resulted in a very appreciable jump in motor vehicles entering the lower half of Manhattan. By 1956, 137,000 more autos, taxis, buses and trucks came into the hub each day than had been driven to the area in 1948. This was by far the greatest numerical increase that the hub had experienced in any eight-year span since our series of surveys was begun in 1924. *It brought the total number of motor vehicles entering the hub each day to a new high of 519,300.* (They carried just over one million persons.)

CHART 7

PERCENT DISTRIBUTION OF PERSONS BY MODE
ENTERING MANHATTAN SOUTH OF 61ST STREET
ON A TYPICAL BUSINESS DAY IN
1924, 1932, 1940, 1948 AND 1956



Source: RPA and cooperating agencies

Some of these additional automobiles, taxis and trucks were entering merely to pass through to destinations beyond the hub. The nature of the data presented in the survey does not permit any determination of the size of the through-travel factor. However, studies of trans-Hudson travel by the Port of New York Authority and surveys of hub-bound travel in other metropolitan areas suggest that through vehicular travel may well be forming an increasingly significant portion of the New York hub's present traffic pattern.

The pattern of the shift away from public transportation had these characteristics:

- The oldest and slowest forms of public urban transit, the trolleys and ferries, continued their downward slip toward obscurity between 1948 and 1956. While in 1924 these had carried some 11 per cent of the hub-bound travelers, in 1956 their combined share had dropped to just over one per cent.
- Railroad travel, which for the past three decades had been claiming a shrinking portion of the load (except for a brief war-dominated rise from 1940 to 1948, due mainly to war-time gasoline rationing), found its role becoming smaller again. In 1924 the commuter and other railroads had carried some nine per cent of the hub travelers but by 1956 their share had dropped to seven per cent.
- Even the subways and Hudson and Manhattan transit system, which together still carry the heaviest burden of daily in-bound travelers, found their share continuing to decline slowly from a 1940 peak of 66 per cent of the total. In 1956 they were carrying 59 per cent of the travel load.

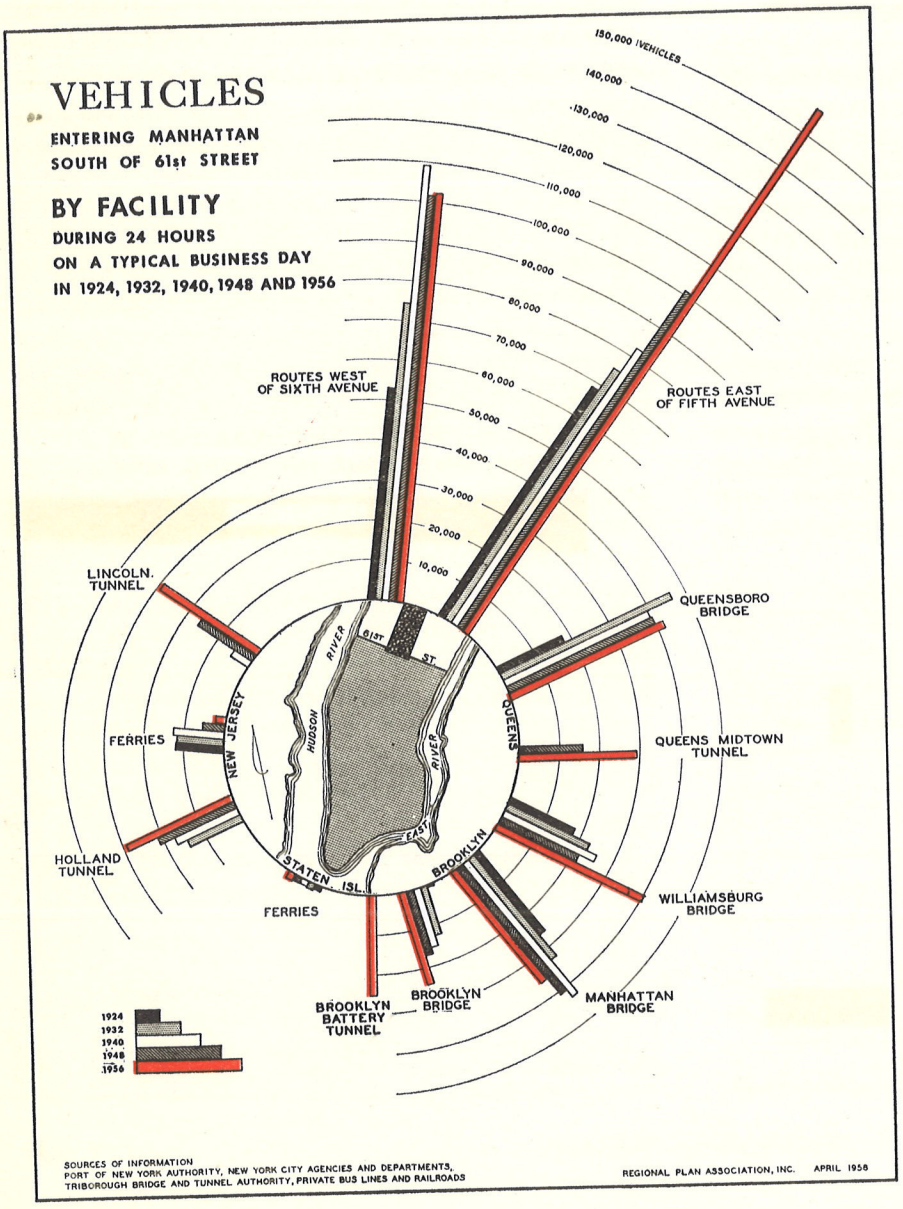
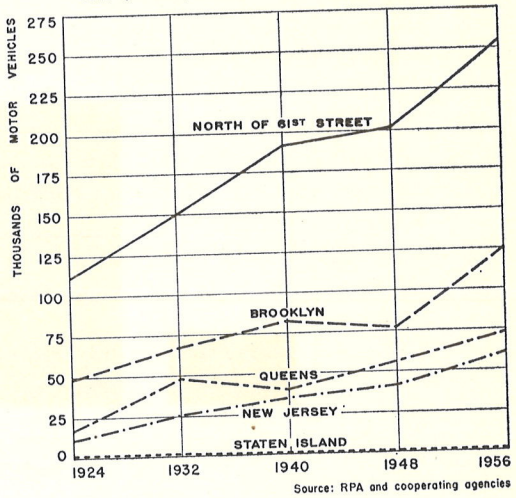


CHART 9
MOTOR VEHICLES BY SECTOR
ENTERING MANHATTAN SOUTH OF 61ST STREET
ON A TYPICAL BUSINESS DAY IN
1924, 1932, 1940, 1948 AND 1956



Source: RPA and cooperating agencies

SOME WHYS AND WHEREFORES

So much for the characteristics of the changing patterns of hub-oriented travel. Why did the changes occur? No single answer will suffice. A wide variety of forces were acting to affect hub-bound travel: region-wide changes in shopping habits; in the distribution of homes, income and employment; and in the relative standards of transportation service in different parts of the region.

The Decline of 146,000 Rush-Hour Travel Movements

No one has published conclusive data covering total employment in lower Manhattan. There are indications, however, that the hub's employment may have declined between 1948 and 1956. Data show definite declines in some important categories of employment.

Just how large a *net* decline occurred, if any, is difficult to determine, for no accounting is made on a year by year basis of *all* persons employed in the hub or for that matter in Manhattan as a whole.

Attempts to develop a picture of total employment in Manhattan and in the hub have been made in recent years by the Regional Plan Association. The RPA estimates were prepared in connection with its regional population and employment analysis of 1957 *(People, Jobs and Land, 1955-1975)*. This study estimated total employment for Manhattan in 1950, 1954, and 1955.

The RPA figures indicated that employment on Manhattan, covered by the RPA data, had declined by 50,000 jobs in the span of five years from 1950 to 1955.

Manufacturing and retail trade are two identifiable segments of the hub's economy for which U.S. census data are available. These data show employment drops during part of the survey period. The number of manufacturing jobs reported for Manhattan declined by 72,000—from 589,000 in 1950 to 517,000 in 1954. Similarly a loss of some 30,000 jobs was recorded in Manhattan's retail employment between the federal retail trade censuses of 1948 and 1954.

Data for these two industries are not available for the entire recent eight-year period of our transportation survey. It is likely, however, that the combined decline of retail trade and manufacturing exceeded 100,000 jobs in these eight years. But, while employment in these two industries was slipping, a very significant expansion of office space was occurring in the hub. This suggests that a *growth* in office employment was taking place.

The Decline of 229,000 Non-Rush-Hour Travel Movements:

I. More Shopping in the Suburbs and Less in the Hub

Recent changes in the shopping habits of suburbanites and city dwellers alike have reoriented the travel patterns of many persons who formerly entered the hub during the nonrush-hour period. New suburban shopping centers have been built and opened. Older suburban centers have expanded with branches of hub department and specialty stores.[1] Shoppers living not only in the suburban counties but even in the outer portions of New York City have shifted much of their purchasing from Manhattan's hub to the outlying centers in places like Queens, the Bronx, Nassau, Westchester, Bergen, and Essex counties. This change, more perhaps than any other, has caused the 229,000 drop in nonrush-hour trips.

Sales volume figures clearly reveal the shift in shopping emphasis between the hub and the rest of the region between 1948 and 1954.

In 1948 retail stores of all types in the central business district of Manhattan, which lies within the hub, sold $2.08 billion of goods and merchandise. By 1954 this annual sales volume had increased only 4.9 per cent to $2.19 billion. In marked contrast the total retail sales volume for the parts of the Standard Metropolitan Area outside the hub rose 30 per cent from $10.23 billion in 1948 to $13.25 billion in 1954. (Unadjusted dollars used for both cases.)[2]

But the slight dollar increase in sales in the hub disguises a 3.5 per cent decline in actual sales if the 1954

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[1] See, *Suburban Branch Stores in the New York Metropolitan Area*, Regional Plan Association Bulletin Number 78.

[2] See, *Central Business District Statistics: New York, N.Y. 1954 Census of Business*. U.S. Department of Commerce, Bureau of the Census, Washington, 1956.

figures are expressed in terms of the value of the 1948 dollar.

These very different rates of change occurred during a period in which the region's population was not only growing rapidly in total numbers but in which a reshuffling was taking place in the geographical distribution of income groups within the population. A measure of the relative changes in suburban and central city population is afforded by the Association's estimate that between 1950 and 1955 New York City's population remained at an almost constant level while the surrounding suburban counties grew by over a million new inhabitants.

The changing pattern of *department store* sales as between the suburbs and the hub from 1948 to 1954 provides a more meaningful measure of the shift in purchasing habits, for the buying sprees of hub-bound shoppers are most frequently focused on the major department stores.

Between 1948 and 1954 general merchandise (department store-type) sales in the Manhattan central business district dropped almost eight per cent. The equivalent sales total of the other parts of the region jumped 22 per cent. This divergence occurred over a six-year span during which McCreery's, Hearns, and Wanamakers closed in downtown Manhattan and the first of the big outlying suburban centers—Cross County and Ridgeway—opened in Yonkers and Stamford. The divergence also reflected the continued opening of hub department and specialty store branches in such older but expanding centers as White Plains, Hempstead, and Morristown.

Direct evidence that shoppers who formerly made trips to Manhattan are not doing so now has been revealed by a number of surveys of shopper habits at the new suburban centers.

SHIFT TO SUBURBAN CENTERS

For example, the Westchester County Planning Department found in 1955 that at the newly-opened Yonkers Cross County Center 22 per cent of the shoppers had regularly made some of their purchases in Manhattan prior to the opening of the new center.[3] After the opening only 12 per cent continued to make some of their purchases in Manhattan. A similar survey conducted in 1957 by the New York University School of Retailing found that about 20 per cent of the shoppers at three large new centers on Long Island had regularly made purchases for selected goods in New York City before the opening of the centers. Following the opening these shares dropped to about 10 per cent.[4]

The shopping surveys also showed that the new centers were attracting New York City residents as well as the suburbanites. At least 12 per cent of the shoppers at the three large Long Island centers were from New York, principally from Queens. In Westchester, over 22 per cent of the purchasers at the Cross County Center were from the Bronx and upper Manhattan. This suggests that fewer shoppers than formerly are coming to the hub from Brooklyn, Queens, upper Manhattan, and the Bronx during the late morning, afternoon, and evening hours.

Although we have no data to provide a direct explanation for this trend, two reasons may be supposed. First, it is likely that the frequency of shopping at retail centers at the outer edges of New York City such as Jamaica, Fresh Meadows, Parkchester, and Fordham Road in preference to Manhattan, has increased substantially with the development or expansion of these centers in response to the growing middle-income populations near them.

LOWER INCOMES AFFECT HUB SHOPPING

Second, in upper Manhattan, lower Bronx, and portions of Brooklyn it is likely that a steady influx of low-income families replacing former middle-income residents has reduced the hub-shopping potential of these areas. This is true because of a tendency for the limited purchasing power of low-income families to be absorbed largely by expenditures for day-to-day needs: food, clothing, rent, etc. Since most of the daily shopping items are bought in local grocery, clothing, and other neighborhood shops and since there is comparatively little money left over to purchase luxuries and specialties in the big central stores, fewer hub oriented shopping trips are likely to emanate from low-income areas than from middle- or upper-income communities.[5]

Recent data developed by the New York Metropolitan Region Study have documented the steady rise in the proportion of low-income families in the core counties at the center of the region: Manhattan, the Bronx, Queens, Brooklyn, and Hudson County, N.J. In 1939 the per capita income of the core counties was eight per cent above the

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[3] *An Analysis of the Cross County Shopping Center and Its Impact on Established Shopping Areas.* Westchester County Planning Department, White Plains, N.Y. October 1956.

[4] *The Impact of Long Island Centers on Shopping Habits.* By T. D. Ellsworth, Dolores Benjamin and Herman Radolf. Long Island Business, Hofstra College Bureau of Business and Community Research, Hempstead, N.Y. January 1958.

[5] Studies of the relationship between income and trip generation show conclusively that fewer trips per capita to any portion of a city begin in low-income neighborhoods. See *Part I: Report on the Detroit Metropolitan Area Traffic Study,* July 1955.

average of the region. In 1947 the lead had dropped to just under five per cent. By 1956, however, the core area per capita income had shrunk to two per cent *less* than the regional average.

II. No Apparent Decline in Entertainment Attractions

Is Manhattan's attraction as an entertainment and cultural center slipping? If so, has this contributed to the drop in hub-bound travelers during the non-rush-hour periods? Apparently not appreciably. While some aspects of Manhattan's entertainment industry appear to have declined, others have increased. The net effect appears to have resulted in a continuing strength in the hub's attraction as an entertainment center.

Between 1948 and 1954 the unadjusted dollar volumes of business done in the motion picture theaters of Manhattan south of Central Park dropped 0.6 per cent. In terms of constant 1948 dollars, however, this decline amounted to 4.6 per cent.

FIRST RUN THEATERS STILL STRONG

Much of this decline probably can be ascribed to lower attendance at neighborhood or "second-run" movie theaters catering to residents of lower Manhattan. The evidence of frequent lines outside the "first run" houses suggests that these theaters have continued to draw patrons from all parts of the region. It is acknowledged, however, that total attendance at even the first run theaters probably declined somewhat as a result of the further inroads of television. The contrast between neighborhood and first run theaters is heightened when the 1948-54 change in motion-picture theater revenue for the hub (with its concentration of first run houses) is compared with the change that occurred in the rest of the metropolitan area where neighborhood and second-run theaters predominate. An 18 per cent drop in theater revenues occurred in the area outside the central district in contrast to the almost negligible revenue drop at the center. Of the motion picture theaters throughout the region outside lower Manhattan, 179 or 19 per cent closed in the six-year period. In the same period there was a gain of five theaters in the hub district.

While the theater business in the hub declined slightly, eating and drinking places, including night clubs and cabarets, registered gains in total sales volume. Drinking place sales increased seven per cent between 1948 and 1954. In other parts of the region such sales declined by three per cent. And despite the fact that fewer people were working in the hub and fewer were coming in to shop, sales in restaurants and other eating places increased 16 per cent during the same period.

It is probable that the largest part of these increases may be ascribed to a general rise in per capita spending for eating and drinking as a result of the nation's rising standard of living. Some of the increase may have resulted from greater spending by out-of-the-region businessmen and convention-goers and by tourists. Finally, part of the increase may be due to some rise in the numbers of persons coming to the hub for a night "on the town" in restaurants and night clubs. It is probable that all factors were operating, for the sales gains occurred in the face of smaller numbers of people entering the hub to work or shop.

ENTERTAINMENT STILL A STRONG DRAWING CARD

When these facts are viewed along with such others as the growth of the off-Broadway theater movement and the major increase in museum attendance, a picture emerges of Manhattan's entertainment industry continuing to act as an important drawing card. If there was a net decline in the total number of customers coming to the hub's entertainment industry, it is likely that it was very slight indeed and had an almost negligible effect on the non-rush hour travel.

III. No Change in Persons Seeking Services

One additional industry that draws patrons to the hub during nonrush-hour periods should be mentioned. This is the service industry—especially the professions.

Many persons come into the hub to attend to personal affairs: to see a lawyer, broker, doctor, or dentist. In most regions these form a significant part of the daily total entering a central business area. While we have no data that establish the particular proportion for New York's hub, an indication is afforded by data collected in the Detroit area. There, 11 per cent of all trips made by people to downtown Detroit were made to conduct some form of personal business.

Unfortunately, we have few ways to measure changes in the particular types of professional and other services that tend to draw people into the New York hub. A com-

parison of the change in receipts of selected service trades located in Manhattan between 1948 and 1954 reveals an unadjusted dollar growth of 15 per cent in personal services and a 28 per cent growth in automobile repair services and garages. While these figures demonstrate a real growth in service activity despite a relatively stable population for Manhattan, they are not particularly helpful in measuring the types of services that tend to draw additional *hub* travelers. For personal service establishments—barbers, beauty shops, laundries, etc.—are primarily oriented to serve a purely local population. The same may be said for automobile repair garages. But it would be reasonable to assume that the higher per capita spending by Manhattan residents in their home neighborhoods reflects the general rise in the total dollar spending for personal, professional, and other services. Hence, it is unlikely that changes in the service industries between 1948 and 1956 had appreciable effect on non-rush hour travel.

TABLE 1. PERSONS ENTERING THE HUB BY MODE OF TRAVEL ON A TYPICAL BUSINESS DAY 1924, 1932, 1948 AND 1956

(In Thousands)

MODE OF TRAVEL	1924 Number of Persons	1924 % of Total	1932 Number of Persons	1932 % of Total	1940 Number of Persons	1940 % of Total	1948 (r) Number of Persons	1948 (r) % of Total	1956 Number of Persons	1956 % of Total
Auto & Taxi	249	10.6	430	15.9	503	15.4	577	15.7	736	22.2
Bus	—	—	40	1.5	150	4.6	290	7.8	246	7.4
Truck	82	3.5	86	3.2	116	3.5	80	2.2	92	2.8
Trolley	161	6.9	88	3.2	59	1.8	24	0.6	3	0.1
Rapid Transit	1,531	65.3	1,752	65.0	2,169	66.3	2,389	64.8	1,970	59.4
Railroad	217	9.3	216	8.0	206	6.3	283	7.6	233	7.0
Ferry (a)	103	4.4	85	3.2	68	2.1	48	1.3	36	1.1
ALL MODES	2,343	100.0	2,697	100.0	3,271	100.0	3,691	100.0	3,316	100.0

EIGHT YEAR CHANGES

	1924-1932 Absolute	1924-1932 Percent	1932-1940 Absolute	1932-1940 Percent	1940-1948 Absolute	1940-1948 Percent	1948-1956 Absolute	1948-1956 Percent
Auto & Taxi	181	72.7	73	17.0	74	14.7	159	27.6
Bus	40	—	110	275.0	140	93.3	— 44	— 15.2
Truck	4	4.9	30	34.9	— 36	— 31.0	12	15.0
Trolley	— 73	— 45.3	— 29	— 33.0	— 35	— 59.3	— 21	— 87.5
Rapid Transit	221	14.4	417	23.8	220	10.1	— 419	— 17.5
Railroad	— 1	— 0.5	— 10	— 4.6	77	37.4	— 50	— 17.7
Ferry (a)	— 18	— 17.5	— 17	— 20.0	— 20	— 29.4	— 12	— 25.0
ALL MODES	354	15.1	574	21.3	420	12.8	— 375	— 10.2

(a) As pedestrians or non-railroad passengers
(r) Revised

Note: Column totals may not add correctly due to rounding.

TABLE 2. PERSONS ENTERING THE HUB BY SECTOR ON A TYPICAL BUSINESS DAY 1924, 1932, 1940, 1948 AND 1956

(In Thousands)

ENTERING FROM	1924 Number of Persons	1924 % of Total	1932 Number of Persons	1932 % of Total	1940 Number of Persons	1940 % of Total	1948 (r) Number of Persons	1948 (r) % of Total	1956 Number of Persons	1956 % of Total
North of 61st Street	832	35.5	1,046	38.8	1,320	40.4	1,599	43.3	1,422	42.9
Brooklyn	899	38.4	946	35.1	1,074	32.8	1,124	30.5	953	28.7
Queens (excluding Triborough Bridge)	237	10.1	355	13.1	538	16.5	602	16.3	613	18.5
New Jersey (excluding George Washington Bridge)	335	14.3	309	11.5	302	9.2	326	8.8	292	8.8
Staten Island	40	1.7	41	1.5	37	1.1	40	1.1	36	1.1
ALL SECTORS	2,343	100.0	2,697	100.0	3,271	100.0	3,691	100.0	3,316	100.0

EIGHT YEAR CHANGES

	1924-1932 Absolute	1924-1932 Percent	1932-1940 Absolute	1932-1940 Percent	1940-1948 Absolute	1940-1948 Percent	1948-1956 Absolute	1948-1956 Percent
North of 61st Street	214	25.7	274	26.2	279	21.1	— 177	— 11.1
Brooklyn	47	5.2	128	13.5	50	4.6	— 171	— 15.2
Queens	118	49.8	183	51.5	64	11.9	11	1.8
New Jersey	— 26	— 7.8	— 7	— 2.3	24	7.9	— 34	— 10.4
Staten Island	1	2.5	— 4	— 9.8	3	8.1	— 4	— 10.0
ALL SECTORS	354	15.1	574	21.3	420	12.8	— 375	— 10.2

(r) Revised

Note: Column totals may not add correctly due to rounding.

TABLE 3. PERSONS ENTERING THE HUB BY SECTOR, FACILITY AND MODE, ON A TYPICAL BUSINESS DAY IN 1956

(In Thousands)

ENTERING FROM	*Total Persons via All Modes*	*Persons in Motor Vehicles*				*Persons on Railroads*			*Persons on Ferries (Non Railroad Passengers)*
		Total	*Auto & Taxi*	*Bus*	*Truck*	*Total*	*Rapid Transit*	*Railroad*	
NORTH OF 61ST STREET	1,422	561	383	140	38	861	772	89	—
West Side Highway	82	82	82	—	—	—	—	—	—
4 West Side Avenues	640	141	71	57	13	499	499	—	—
7 East Side Avenues	622	260	152	83	25	362	273	89	—
F. D. Roosevelt Drive	78	78	78	—	—	—	—	—	—
BROOKLYN	953	212	174	14	24	741	741	—	—
Manhattan Bridge	253	55	45	1	9	198	198	—	—
Williamsburg Bridge	135	73	51	12	10	62	62	—	—
Brooklyn Bridge	39	39	38	a	1	—	—	—	—
Brooklyn Battery Tunnel	45	45	40	1	4	—	—	—	—
Rapid Transit Tunnels	481	—	—	—	—	481	481	—	—
QUEENS	613	132	102	19[1]	11	481	398	83	—
Queensboro Bridge	78	78	56	15[1]	7	—	—	—	—
Queens Midtown Tunnel	54	54	46	4	4	—	—	—	—
Rapid Transit & RR Tunnels	481	—	—	—	—	481	398	83	—
NEW JERSEY	292	169	74	76	19	120	59	61	3
Holland Tunnel	50	50	34	4	12	—	—	—	—
Lincoln Tunnel	116	116	38	72	6	—	—	—	—
4 Ferries	39	3	2	—	1	33	—	33	3
Rail Tunnels	87	—	—	—	—	87	59	28	—
STATEN ISLAND FERRY	36	3	3	—	a	—	—	—	33
ALL SECTORS	3,316	1,077	736	249	92	2,203	1,970	233	36

a Less than 500

1 Includes 3000 trolley passengers

Note: Column totals may not add correctly due to rounding.

TABLE 4. MOTOR VEHICLES ENTERING THE HUB FROM EACH SECTOR ON A TYPICAL BUSINESS DAY 1924, 1932, 1940, 1948 AND 1956

(In Thousands)

ENTERING FROM	1924		1932		1940		1948		1956	
	Absolute	*Percent*	*Absolute*	*Percent*	*Absolute*	*Percent*	*Absolute*	*Percent*	*Absolute*	*Percent*
North of 61st Street	122	60.9	150	51.1	192	54.5	203	53.1	259	49.9
Brooklyn	47	23.5	69	23.6	84	23.9	79	20.7	126	24.3
Queens	18	9.0	46	15.8	40	11.3	56	14.6	71	13.7
New Jersey	12	5.9	26	9.0	35	9.9	43	11.2	61	11.7
Staten Island	1	0.7	2	0.5	1	0.4	1	0.4	2	0.4
ALL SECTORS	200	100.0	293	100.0	351	100.0	382	100.0	519	100.0

EIGHT YEAR CHANGES

	1924-1932		1932-1940		1940-1948		1948-1956	
	Absolute	*Percent*	*Absolute*	*Percent*	*Absolute*	*Percent*	*Absolute*	*Percent*
North of 61st Street	28	22.7	42	28.2	11	5.8	57	27.9
Brooklyn	22	47.0	15	21.6	— 5	— 5.6	47	59.3
Queens	28	157.8	— 7	— 14.7	16	40.7	16	27.8
New Jersey	15	121.8	8	31.4	8	23.6	18	41.2
Staten Island	—	15.4	—	— 13.3	—	7.7	1	35.7
ALL SECTORS	93	46.4	58	19.9	31	8.8	137	35.9

Note: Column totals may not add correctly due to rounding.

TABLE 5. MOTOR VEHICLES, BY TYPE, ENTERING THE HUB, BY SECTOR AND FACILITY, ON A TYPICAL BUSINESS DAY IN 1956
(In Thousands)

ENTERING FROM	*Total*	*Auto & Taxi*	*Bus*	*Truck*
NORTH OF 61ST STREET	259	225	5	29
West Side Highway	49	49	—	—
4 West Side Avenues	54	42	2	10
7 East Side Avenues	111	89	3	19
F. D. Roosevelt Drive	46	46	—	—
BROOKLYN	126	106	—	20
Manhattan Bridge	36	28	—	8
Williamsburg Bridge	41	32	—	8
Brooklyn Bridge	25	24	—	1
Brooklyn Battery Tunnel	25	22	—	3
QUEENS	71	61	1[1]	10
Queensboro Bridge	42	35	1[1]	7
Queens Midtown Tunnel	29	26	—	3
NEW JERSEY	61	41	3	16
Holland Tunnel	29	19	—	10
Lincoln Tunnel	29	21	3	5
4 Ferries	2	1	—	1
STATEN ISLAND FERRIES	2	2	—	—
ALL SECTORS	519	435	10	75

[1] Includes 100 trolleys

Note: Column totals may not add correctly due to rounding.

TABLE 6. PASSENGERS ENTERING THE HUB BY SECTOR, FACILITY AND MODE, DURING RUSH HOURS — 7 TO 10 A.M. ON A TYPICAL BUSINESS DAY IN 1956
(In Thousands)

ENTERING FROM	*Total Persons via All Modes*	*Persons in Motor Vehicles*				*Persons on Railroads*			*Persons on Ferries (Non Railroad Passengers)*
		Total	*Auto & Taxi*	*Bus & Trolley*	*Truck*	*Total*	*Rapid Transit*	*Railroad*	
NORTH OF 61ST STREET	602	131	82	43	6	471	412	59	—
West Side Highway	21	21	21	—	—	—	—	—	—
4 West Side Avenues	307	37	17	18	2	271	271	—	—
7 East Side Avenues	255	55	26	25	4	200	141	59	—
F. D. Roosevelt Drive	19	19	19	—	—	—	—	—	—
BROOKLYN	471	54	45	2	6	417	417	—	—
Manhattan Bridge	113	13	10	—	3	100	100	—	—
Williamsburg Bridge	49	15	11	2	2	34	34	—	—
Brooklyn Bridge	11	11	11	—	—	—	—	—	—
Brooklyn Battery Tunnel	14	14	13	—	1	—	—	—	—
Rapid Transit Tunnels	284	—	—	—	—	284	284	—	—
QUEENS	335	40	31	5	3	296	237	58	—
Queensboro Bridge	21	21	15	4	2	—	—	—	—
Queens Midtown Tunnel	19	19	17	1	1	—	—	—	—
Rapid Transit & RR Tunnels	296	—	—	—	—	296	237	58	—
NEW JERSEY	121	46	11	30	5	73	35	38	2
Holland Tunnel	9	9	4	1	3	—	—	—	—
Lincoln Tunnel	36	36	6	29	2	—	—	—	—
4 Ferries	29	1	—	—	—	26	—	26	2
Rail Tunnels	47	—	—	—	—	47	35	12	—
STATEN ISLAND FERRY	23	1	1	—	—	—	—	—	22
ALL SECTORS	1,551	270	170	80	21	1,257	1,101	156	24

Note: Column totals may not add correctly due to rounding.

TABLE 7. MOTOR VEHICLES, BY TYPE, ENTERING THE HUB, BY SECTOR AND FACILITY, DURING RUSH HOURS — 7 TO 10 A.M. ON A TYPICAL BUSINESS DAY IN 1956 (In Thousands)

ENTERING FROM	*Total*	*Auto & Taxi*	*Bus*	*Truck*
NORTH OF 61ST STREET	54	48	1	5
West Side Highway	12	12	—	—
4 West Side Avenues	11	9	—	2
7 East Side Avenues	19	15	1	3
F. D. Roosevelt Drive	12	12	—	—
BROOKLYN	33	28	—	5
Manhattan Bridge	9	6	—	2
Williamsburg Bridge	9	7	—	2
Brooklyn Bridge	7	7	—	—
Brooklyn Battery Tunnel	8	8	—	1
QUEENS	21	18	—	3
Queensboro Bridge	11	9	—	2
Queens Midtown Tunnel	10	8	—	1
NEW JERSEY	11	6	1	4
Holland Tunnel	5	3	—	3
Lincoln Tunnel	6	3	1	1
4 Ferries	—	—	—	—
STATEN ISLAND FERRY	—	—	—	—
ALL SECTORS	119	100	2	17

Note: Column totals may not add correctly due to rounding.

TABLE 8. PERCENTAGES OF RUSH-HOUR (7-10 A.M.) TO 24-HOUR TRAVEL FOR PERSONS AND VEHICLES ENTERING THE HUB ON A TYPICAL BUSINESS DAY IN 1956

PERSONS	*All Sectors*	*North of 61st Street*	*Brooklyn*	*Queens*	*New Jersey*	*Staten Island*
ALL MODES:	46.8%	42.3%	49.4%	54.7%	41.2%	62.8%
RAIL:	57.1	54.7	56.3	61.6	61.0	—
Rapid Transit	55.9	53.3	56.3	59.7	59.0	—
Railroad	67.0	66.6	—	70.2	63.0	—
MOTOR VEHICLES:	25.1	23.4	25.3	29.8	26.9	22.4
Auto and Taxi	23.0	21.4	25.8	30.8	14.4	20.7
Bus	32.0	30.4	17.8	24.6	39.4	—
Truck	22.7	17.0	25.4	29.7	26.1	34.0
FERRY (Non RR Passengers)	65.9	—	—	—	59.3	66.5
MOTOR VEHICLES						
ALL VEHICLES:	22.9	20.7	26.3	29.0	18.4	22.6
Auto and Taxi	23.0	21.2	26.5	29.0	14.8	20.6
Bus	22.4	20.6	18.7	19.2	26.8	—
Truck	22.9	17.0	25.4	29.8	26.0	33.9

TABLE 9. CHANGES IN NUMBERS OF PERSONS ENTERING THE HUB DURING THE 7-10 A.M. RUSH HOURS — 1948 TO 1956
(In Thousands)

MODE OF TRANSPORTATION	*Persons Entering in 24 Hours* 1948	1956	*Ratio 7-10 AM Travel to 24 Hour* 1948	1956	*Persons Entering 7-10 AM* 1948	1956	*Change in 7-10 AM Travel* 1948-1956
Rapid Transit	2,288	1,911	.53	.56	1,208	1,066	— 142
Hudson and Manhattan Railroad	101	59	.47	.59	48	35	— 13
Railroad	283	233	.63	.67	178	156	— 22
Bus and Trolley	314	249	.27	.32	85	80	— 5
Ferry	48	36	.58	.66	28	24	— 4
Auto and Taxi	577	736	.23	.23	133	170	+ 37
Truck	80	92	.23	.23	18	21	+ 3
TOTALS	3,691	3,316	.46	.47	1,698	1,552	— 146

		Absolute	*Percent*
24 Hour Change	1948-1956	— 375	— 10.2%
7-10 AM Rush Hour Change	1948-1956	— 146	— 8.6%
Non Rush Hour Change	1948-1956	— 229	11.5%

Mention should be made of the methods used in constructing the comparison of rush-hour and nonrush-hour travel.

For the first time since these surveys were begun in 1924, the 1956 data included hourly counts of persons entering the hub by *all* modes of transportation. These hourly counts made it possible to develop a clear picture for 1956 of the proportion of travelers coming into lower Manhattan during the 7-10 a.m. rush hours and the proportion entering during the remainder of the day.

With the exception of subway passenger volumes, however, the 1948 survey did not provide such hourly counts.

The key factor in estimating the missing 1948 rush-hour figures lay in determining how the ratio of travelers in the rush-hour to total daily travelers had changed between 1948 and 1956. In recent years transportation specialists have noted a marked tendency for greater proportions of daily mass-transport trips to occur in the peak hours.

The Port of New York Authority has documented the changes in rush-hour "peaking" between 1948 and 1954 for various modes of transportation crossing the Hudson River from New Jersey into Manhattan. The Authority's data reveal that while 43 per cent of the persons traveling by bus on a typical day in 1948 crossed the Hudson during the 7-10 a.m. rush hours, this proportion had risen to 50 per cent by 1954. Similarly the rush-hour proportion for non-railroad ferry passengers rose from 54 per cent of the daily load in 1948 to 61.5 per cent by 1954. Railroad passenger volumes also reflected this tendency toward greater rush-hour peaks. But interestingly enough the proportion of automobile passenger volumes during the rush hours did not show any appreciable change in the same six-year period. (The same basic pattern of change had been documented for rush-hour travel into the central business area of Boston, Mass., between 1950 and 1955.)

By working backward from the known ratio of rush hour to all-day travel for 1956 and by assuming that the change in peaking observed for each mode of trans-Hudson travel also reflected the pattern for hub-bound travel from other parts of the region, we have prepared estimates of ratios of rush hour to all day travel for 1948. Based on these estimated ratios, we then made estimates of rush-hour passenger volumes to fill the gaps in the 1948 statistics.