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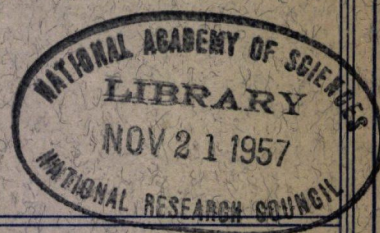
Bulletin No. 15

Parking

REPORT OF COMMITTEE

AND

THREE PAPERS



1948

PRESENTED AT THE
TWENTY-SEVENTH ANNUAL MEETING

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1948

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2101 Constitution Avenue

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HIGHWAY RESEARCH BOARD

Bulletin No. 15

PARKING

*REPORT OF COMMITTEE AND THREE PAPERS
PRESENTED AT THE TWENTY-SEVENTH ANNUAL MEETING
1947*

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Washington 25, D. C.

December 1948

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COMMERCIAL VEHICLE PARKING IN NEW HAVEN, CONNECTICUT

ARTHUR C. ENGLAND JR.
Assistant Highway Engineer
Connecticut State Highway Department

This paper is based upon data obtained from the study of parking in the Central Business District of New Haven, Connecticut and it has been undertaken with the hope that the information herein presented will not only be of assistance to those interested in the solution of New Haven's parking problem, but also will stimulate an interest in factual data.

The parking study in New Haven was made under the supervision of the Bureau of Highway Planning Studies of the Connecticut State Highway Department. The personnel for the field interviewing in connection with the study was supplied by the New Haven Chamber of Commerce.

The characteristics of parking in New Haven's Central Business District have been discussed in a report entitled "New Haven Parking Study" which was prepared for the New Haven Traffic Commission by the Bureau of Highway Planning Studies. This paper may be considered a supplement to that report.

I gratefully acknowledge the assistance and cooperation of my associates in the Highway Department who aided me in the preparation of this paper.

AREA OF STUDY

The New Haven Parking Study was conducted over an area designated the "Central Business District." This area as set up includes five of the nine original squares of the city. It is nearly rectangular in shape, being about four blocks wide and five blocks long containing

twenty-five blocks of the present business area of the City. Figure 1 shows the area covered by the study and its location relative to the surrounding development.

The area under study is relatively small in size, compared to the areas studied in some other cities. However, it covers most of the shopping, financial and retail market area of the City. There are also included in the study two areas which, although not strictly part of the business area, contain parking facilities known to serve the "Central Business District."

The question may be raised as to the completeness of the coverage obtained by studying this relatively small area.

The City of New Haven appropriated a sum of \$4,000 as its share of the cost of the project, and stipulated that the study was to be confined to the central area of the City. A preliminary study of existing parking conditions revealed limits beyond which there was unoccupied parking space. Other areas were found which were congested but used for specific purposes. These areas such as the vicinity of the railroad station, the produce market and Yale University were then excluded from the study as special problems to be studied at a later date. This same decision was reached in the case of the area east of the New York, New Haven and Hartford Railroad cut. This area which is separated from areas of high demand only by the railroad had parking

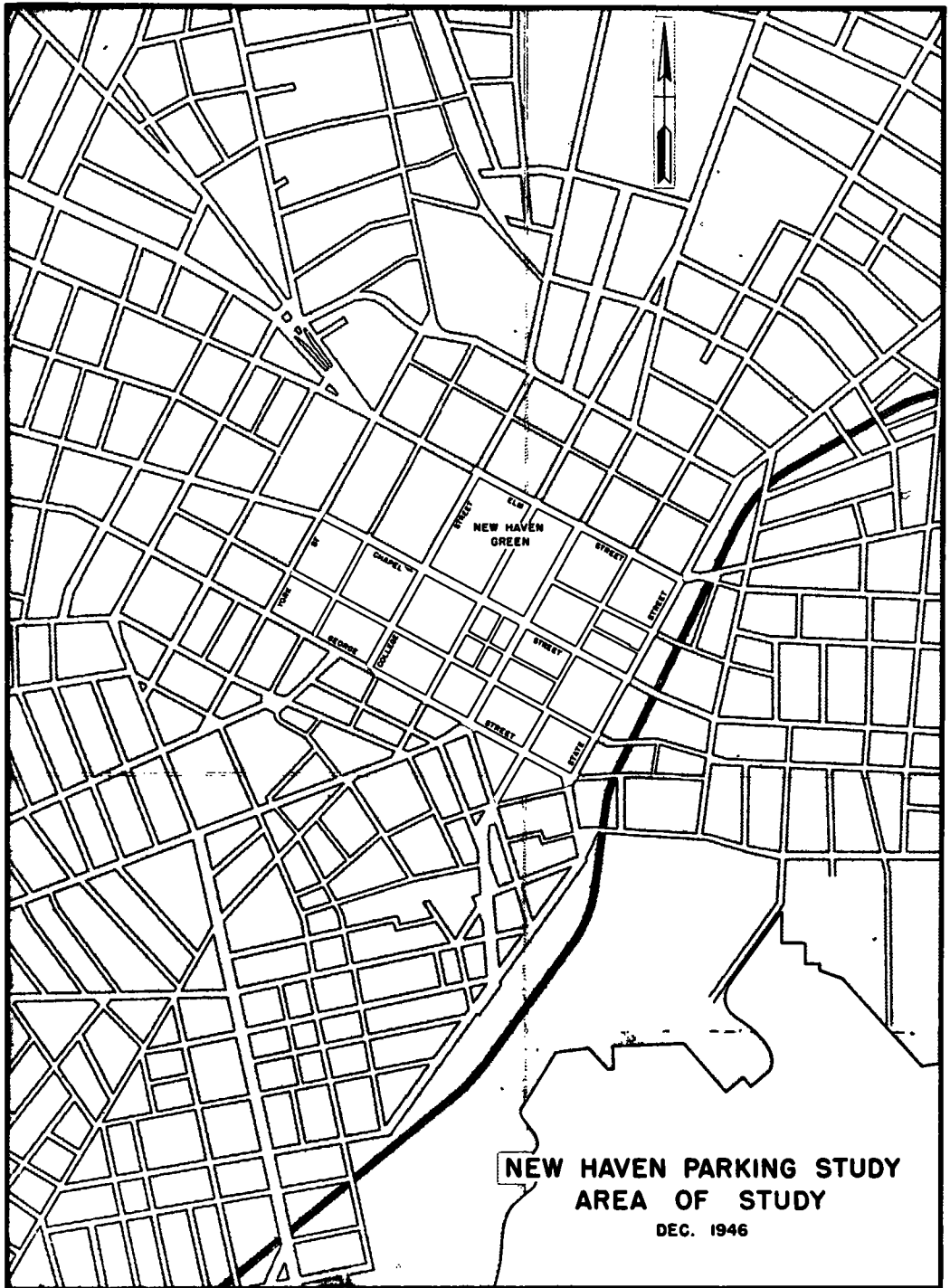


Figure 1

space unoccupied even during the peak periods of the central area.

THE PARKING PROBLEM

Traffic engineers and police officials are in general agreement that the parking problem is one of the major traffic problems confronting the cities and towns of our nation.

A lack of parking facilities conveniently located to the large generators within the central business districts and which are easily accessible from the surrounding towns has been leading to decentralization of the business of these districts, resulting in deterioration of the area, lowering of property values and the accompanying loss of tax revenue from the area so affected.

Parking is, in general, a local problem. The solution of this problem is the responsibility of the individual city or town and whether it is to be financed by public or private funds is for the residents of that city or town to decide. The parking of commercial vehicles is a very vital part of this problem. New Haven, which had a population of 160,000 in 1940 is estimated to have grown to 175,000 by January 1947 and the immediately adjacent towns probably have another 100,000 population. New Haven's retail sales for 1946 were estimated at over 185 million dollars and the wholesale sales at over 350 million dollars. These figures are quoted to illustrate the magnitude of New Haven's transportation problem.

Almost all of the merchandise sold in our cities is moved by some form of motor transport. Facilities for loading and unloading these vehicles must be provided. The problem is where, how and by whom are these facilities to be provided.

INFORMATION OBTAINED FROM THE STUDY

A. TRAFFIC

During the course of the study

automatic traffic counts were made during the months of November and December of 1946 with the interviewing taking place from December 3 to 13 inclusive of that year.

Manual counts were made of the traffic using each street which provided an entrance or exit to the Central Business District. These vehicles were classified into two groups, passenger or commercial. No counts were made of the busses and trolley cars. At the 26 cordon stations each classification was recorded at half hour intervals from 9:30 AM to 5:30 PM. These counts show for the eight hours of the study a total movement of 37,356 vehicles entering and 37,323 leaving the area of the study. Of this number 21 percent were commercial vehicles.

B. PARKING

Any vehicle which stopped was considered to be parked for the purpose of this study, unless the vehicle stopped in the normal movement of traffic or momentarily for the discharge or pickup of passengers.

Fifteen thousand nine hundred and fourteen parking acts were observed. One thousand nine hundred seventy-nine or 12.5 percent of these acts were by commercial vehicles.

During the eight hours from 9:30 AM to 5:30 PM approximately 7,400 commercial vehicles entered and a slightly greater number left the area under study. Excluding the vehicles which were parked before 9:30 AM 1,827 parking acts by commercial vehicles were observed to take place between 9:30 AM and 5:30 PM. In 373 of these acts the vehicles were noted to have had the origin of the trip within the limits of the Central Business District. Therefore approximately only 1,450 commercial vehicles which passed the cordon stations during the eight hours included in the study were observed to park during the same

period. Some of the vehicles entering during the last few minutes of the study may have parked but would not have been recorded.

No adjustment has been made in any of the accompanying tables. (Tables 1 to 7, see p. 8 - 14) They have been compiled directly from the field interviews.

Many of the following findings confirm what many of us have suspected from casual observations. They are of interest, however, as factual evidence of the behavior of the commercial vehicle operators. I wish that I had had data available on other cities, that comparisons might have been made. It is quite possible that the size of the city and the type of area studied may affect the results.

SUPPLY OF PARKING SPACE -- There were available within the Central Business District 3,668 parking spaces providing 29,157 space hours of legal parking. This does not include approximately 250 parking spaces available to commercial vehicles, but which were located along the curbs of blocks where regular parking was prohibited. About 30 percent of the space hours of available parking was located at the curbs.

The supply of available parking space cannot be discussed in terms of commercial vehicle demand due to the fact that the majority of the space was occupied by passenger vehicles. Obviously if there were no passenger vehicle parking there would be more than sufficient curb space to supply the commercial demand even within the short distance of one-half block of the vehicle's destination.

PARKING FACILITIES USED

Eighty-eight percent of the commercial vehicles were parked at the curb leaving only one vehicle in eight which was provided or used off-street facilities.

About 71 percent of the com-

mercial vehicles parked at the curb where commercial vehicle parking is permissible. This includes 307 vehicles whose operators took advantage of the traffic regulation permitting the parking of commercial vehicles along the curb of blocks where parking was normally prohibited. Approximately 12 percent of the commercial vehicles were parked where parking was prohibited, such as at hydrants, corners, bus stops and on the sidewalk, etc. This was a very small percentage of the total vehicles parked, however 20 percent of the commercial vehicles parked were in "no parking" zones, contributing in a large measure to the traffic congestion and yet cannot be designated as being illegally parked.

LENGTH OF TIME PARKED -- The majority of the commercial vehicles were parked for less than 15 minutes and 74.4 percent were parked less than 30 minutes. Only 2.4 percent were parked for more than four hours; and of these about one-half were in garages.

No attempt has been made to determine the percentage of commercial vehicles which overstayed the time limits of various parking facilities.

BLOCKS WALKED TO DESTINATION--

In the general study of parking 75 percent of the vehicles were parked less than one block from the destination of the operator and similarly 73.5 percent of the commercial vehicles were parked within one block of the destination of these operators. In addition another 20.7 percent were in the group from which no destination was recorded. It is probable that the majority of this 20 percent were also parked within a block of their destinations.

There is nothing to indicate that the time limit of the parking facility used had any effect upon the distance walked. This, of course, is reasonable, proximity of the parking space to the destination of

the operator being of prime importance in making deliveries.

PURPOSE OF TRIP -- As was to be expected the large majority of the commercial vehicles were parked while the operators were on what was classified as business and work. These groups constituted 72.2 percent of the interviews. It is interesting to note that 10.4 percent of the operators of commercial vehicles admitted that they were leaving their vehicles for the purpose of shopping or other unclassified reasons.

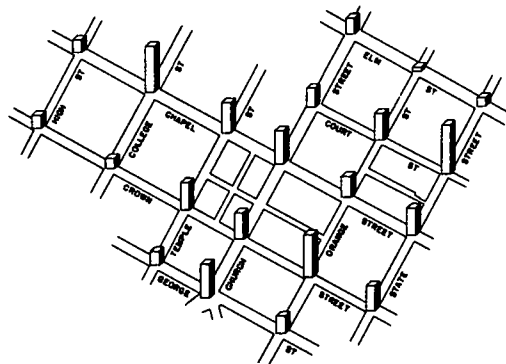
SECONDARY DESTINATIONS -- As part of the New Haven Study the operators were asked if they were going to more than one destination while parked at a given facility. It was interesting to note how few motorists said that they had more than one destination. Only 63 commercial vehicle operators indicated two destinations. Three hundred eighty-nine of the commercial vehicles were found to have started their trip within the Central Business District. Over one-half of these trips were less than two blocks in length. This may be explained in that deliveries were being made from many of the vehicles.

DEMAND FOR PARKING -- The cumulative space hours of parking of vehicles whose operators have a given destination is referred to as the "demand" for parking of that destination.

The commercial vehicle parking demand for the eight hours of the study, illustrated by Figure 2, was relatively uniform throughout the Central Business District compared to the total parking demand. This demand amounted to an average of slightly over 40 space hours for area within one-half block of each major intersection. This commercial demand pattern is very different from that of the passenger vehicle parking demand in which there was a high eight hour demand located on

the two main streets of New Haven -- Church Street and Chapel Street.

The commercial demand reached a high of 82.7 space hours within a half block of the intersection of State Street and Court Street. There were three intersections at



SPACE HOUR
COMMERCIAL VEHICLE
PARKING DEMAND
NEW HAVEN
WITHIN ONE HALF BLOCK OF MAJOR INTERSECTIONS
IN THE CENTRAL BUSINESS DISTRICT
BETWEEN 9:30 A.M. AND 3:30 P.M.
SCALE
0 100 200 300 400 500 600 700 800 900 1000 FEET
MAP COURTESY OF THE U.S. DEPARTMENT OF TRANSPORTATION

Figure 2

which the commercial demand was about twice the average demand of the intersections of the Central Business District. In two instances an attempt has been made to meet this need for parking space by providing off-street parking areas.

The commercial demand was only 5 percent of the total demand for the eight hours covered by the study. This does not necessarily mean that only 5 percent of the demand in the city is by commercial vehicles. This study is confined chiefly to the retail and financial areas of the city with high commercial parking demands.

The peak of the total demand and the peak of the commercial demand do not coincide. During the peak hour the total demand was 3039.9 space hours. In this period there was a commercial demand of only 123.8 space hours or 4 percent of the total peak hour demand.

The inventory of parked vehicles taken at half hour intervals indicated that the greater number of commercial vehicles were parked in the Central Business District during the morning hours.

EXISTING PARKING REGULATIONS --

Some of New Haven's buildings were built before the advisability of providing customer and commercial parking space became apparent and it is regrettable that new buildings have been built with no regard for this need. In addition there are in New Haven's Central Business District many relatively small buildings. Many of these buildings are so small that a loading area could not be economically provided within the building.

New Haven has recognized the need for providing parking facilities for the commercial vehicles serving these buildings. Accepting the fact that curb facilities were being used to practical capacity by passenger cars the traffic regulations were drawn to provide additional space for commercial parking. A paragraph in the Traffic Regulations permits commercial vehicles "to stand, while loading and unloading with reasonable dispatch," in designated areas where parking is otherwise prohibited. This provision provides considerable space along Crown Street, Center Street, Temple Street, and State Street. Three hundred and fifty-four commercial vehicles parked in these restricted areas during the eight hours of the study and an additional 395 passenger cars were illegally parked in these areas.

The above-mentioned traffic regulation while providing some space for the parking of commercial vehicles tends to hamper the free movement of traffic by the reduction of the roadway width available to traffic. This reduction amounts in some instances, notably Crown Street, and State Street, to 1/3 and 1/2 of the width of roadway

available to traffic.

CONCLUSIONS AND RECOMMENDATIONS

1. Complete conclusions regarding parking in New Haven cannot be drawn solely from the data herein presented. It is necessary to consider the parking of passenger vehicles.

2. In New Haven the commercial vehicle operator has been shown to be, generally speaking, a short term parker requiring parking space within one block of his destination. That he parked at the curb by preference is questionable as few off-street facilities were provided, however he did park his vehicle at the curb and often the location was such that the free flow of traffic was impeded. It was also noticeable that while the large majority of the vehicles were operated for business purposes many were used as a means of personal transportation.

3. Streets and highways were built to permit the movement of people and goods from place to place. Provisions of terminal facilities for the carriers of these persons and goods is also essential. However I do not believe that these facilities should be provided within the established travel way, either for passenger or commercial vehicles, if there is, as a result, an economic loss to the public.

4. While stricter enforcement of existing regulations will aid in the solution of the parking and traffic problem, it is suggested that the traffic regulations permitting commercial vehicles to park in otherwise restricted areas be revoked and provision made for necessary curb parking of commercial vehicles by the creation of small loading zones along curbs where regular parking is also permitted.

5. Satisfactory off-street passenger vehicle parking facilities are not in all cases suitable for commercial vehicles. It is advisable that facilities for commercial ve-

hicles be adjacent to the destination served in order that loading and unloading may be made directly between the vehicle and business establishment.

6. New Haven is fortunate that there are within the Central Business District several block interiors suitable for use as both passenger vehicle parking and commercial vehicle loading facilities. These areas are now used chiefly for passenger vehicle parking. It is suggested that these areas be developed beyond the present use through cooperation with the adjacent business establishments to provide for commercial vehicle access to loading platforms of the surrounding buildings.

7. Realistic regulations written into the zoning and building codes can and should require that, at the time of construction, all new buildings, within the central business districts of our cities, provide for the inclusion of off-street parking and loading facilities adjacent to the building. Existing structures may be required to conform to similar regulations within a given period of years.

8. No other study has come to my attention which has given any attention to commercial vehicle parking. The findings in this study, however, indicate that commercial vehicle parking is an integral part of the parking problem and a part which should merit consideration in any future studies.

**NUMBER and PERCENTAGE of COMMERCIAL VEHICLES Observed PARKED
at each TYPE OF PARKING FACILITY
Between 9:30 A.M. and 5:30 P.M.**

TYPE OF FACILITY	NUMBER OF VEHICLES	PERCENTAGE
Curb - Metered		
<u>30 min. limit</u>	1006	50.8
<u>1 hr. limit</u>	35	1.8
<u>2 hr. limit</u>	5	0.2
Unmetered		
<u>30 min. limit</u>	20	1.0
<u>1 hr. limit</u>	39	2.0
<u>2 hr. limit</u>	1	0.1
<u>No Parking Block</u>	307	15.5
Total Permissably Parked	1413	71.4
No Parking Areas		
<u>Corner</u>	69	3.8
<u>Fire Hydrant</u>	61	3.1
<u>Drives</u>	40	2.0
<u>Sidewalks</u>	41	2.0
<u>Bus Stops</u>	7	0.4
<u>Double Parked</u>	27	1.4
<u>Restricted Areas*</u>	85	4.3
Total in "No Parking" Areas	330	16.7
Total Curb	1743	88.1
Lot - Public	72	3.6
<u>Restricted</u>	115	5.8
Garage	49	2.5
Total Off-Street	236	11.9
Grand Total	1979	100.0

*No Parking Areas in metered
or unmetered blocks

NUMBER and PERCENTAGE
vs FACILITY TYPE

Table 1

**NUMBER and PERCENTAGE of COMMERCIAL VEHICLES PARKED Between 9:30 A.M. and 5:30 P.M.
Grouped by LENGTH of TIME PARKED and TYPE of PARKING FACILITY Used**

TYPE OF FACILITY	NUMBER and PERCENTAGE	LENGTH OF TIME PARKED							Total	
		Less than 15 min.	15 to 29 min.	30 min. but less than 1 hr.	1 hr. but less than 2	2 hrs. but less than 4	4 hrs. but less than 6	6 hrs. and over		
Curb - Metered	Number	595	322	207	78	23	8	3	1236	
	30 min. limit	%	30.1	16.4	10.4	3.9	1.2	0.4	0.1	62.5
	1 hr. limit	Number	31	13	2	1	1	0	0	48
		%	1.6	0.7	0.1	--	--	--	--	2.4
	2 hr. limit	Number	1	0	2	2	0	0	0	5
		%	0.1	--	0.1	0.1	--	--	--	0.3
	Unmetered	Number	10	5	2	4	1	0	0	22
		30 min. limit	%	0.5	0.2	0.1	0.2	0.1	--	--
1 hr. limit		Number	56	8	6	3	1	2	0	76
		%	2.8	0.4	0.3	0.1	0.1	0.1	--	3.8
2 hr. limit		Number	1	0	1	0	0	0	0	2
		%	--	--	0.1	--	--	--	--	0.1
No Parking Block		Number	243	82	20	7	2	0	0	354
		%	12.2	4.2	1.0	0.4	0.1	--	--	17.9
Lot	Number	15	10	10	12	15	6	4	72	
	Public	%	0.8	0.5	0.5	0.6	0.7	0.3	0.2	3.6
	Restricted	Number	43	30	22	13	5	1	1	115
		%	2.1	1.5	1.1	0.8	0.2	0.1	--	5.8
Garage	Number	3	2	2	6	12	5	19	49	
	%	0.2	0.1	0.1	0.3	0.6	0.2	1.0	2.5	
Total Commercial Vehicles	Number	998	472	274	126	60	22	27	1979	
	%	50.4	24.0	13.8	6.4	3.0	1.1	1.3	100.0	

NUMBER and PERCENTAGE
vs DURATION
vs FACILITY TYPE
Table 2

Includes only time parked during 8 hours of study

NUMBER and PERCENTAGE of COMMERCIAL VEHICLES PARKED Between 9:30 A.M. and 5:30 P.M.
Grouped by BLOCKS WALKED to DESTINATION and TYPE of PARKING FACILITY Used

TYPE OF FACILITY	Number and Percentage	BLOCKS* WALKED TO DESTINATION					
		Less than 1	1 but Less than 2	2 but Less than 3	3 or over	Refusals and No Contacts	Total
Curb - Metered	Number	933	48	19	13	223	1236
	30 min. limit %	47.2	2.4	0.9	0.7	11.3	62.5
	Number	38	0	1	0	9	48
	1 hr. limit %	1.9	—	0.1	—	0.4	2.4
	Number	2	0	1	1	1	5
	2 hr. limit %	0.1	—	0.1	0.1	—	0.3
	Number	20	1	0	0	1	22
	30 min. limit %	1.0	0.1	—	—	—	1.1
Number	56	1	0	0	19	76	
1 hr. limit %	2.8	—	—	—	1.0	3.8	
Number	1	0	0	0	1	2	
2 hr. limit %	0.1	—	—	—	—	0.1	
No Parking Block	Number	291	7	0	0	56	354
	%	14.7	0.4	—	—	2.8	17.9
Lot	Number	32	1	6	2	31	72
	Public %	1.6	—	0.3	0.1	1.6	3.6
	Number	74	1	0	0	40	115
	Restricted %	3.7	0.1	—	—	2.0	5.8
Garage	Number	8	0	5	5	31	49
	%	0.4	—	0.2	0.3	1.6	2.5
Total Commercial Vehicles	Number	1455	59	32	21	412	1979
	%	73.5	3.0	1.6	1.2	20.7	100.0

*One block is equivalent to approximately 400 ft.

NUMBER and PERCENTAGE
vs BLOCKS WALKED
vs FACILITY TYPE
Table 3

**NUMBER and PERCENTAGE of COMMERCIAL VEHICLES PARKED Between 9:30 A.M. and 5:30 P.M.
Grouped By PURPOSE OF TRIP and TYPE OF PARKING FACILITY Used**

TYPE OF FACILITY	NUMBER and PERCENTAGE	PURPOSE OF TRIP					
		Shopping	Business	Work	Other	Unknown	Total
Curb - Metered	Number	80	804	112	44	196	1236
	%	4.1	40.6	5.7	2.2	9.9	62.5
30 min. limit	Number	2	32	1	5	8	48
	%	0.1	1.6	--	0.3	0.4	2.4
1 hr. limit	Number	0	4	0	0	1	5
	%	--	0.2	--	--	0.1	0.3
2 hr. limit	Number	0	18	1	2	1	22
	%	--	0.9	--	0.1	0.1	1.1
Unmetered	Number	1	50	1	4	20	76
	%	--	2.5	0.1	0.2	1.0	3.8
30 min. limit	Number	0	1	0	0	1	2
	%	--	0.1	--	--	--	0.1
1 hr. limit	Number	17	290	6	12	29	354
	%	0.9	14.7	0.3	0.6	1.4	17.9
2 hr. limit	Number	8	30	6	4	24	72
	%	0.4	1.5	0.3	0.2	1.2	3.6
No Parking Block	Number	11	31	26	12	35	115
	%	0.5	1.6	1.3	0.6	1.8	5.8
Lot	Number	0	9	6	4	30	49
	%	--	0.5	0.3	0.2	1.5	2.5
Public	Number	119	1269	159	87	345	1979
	%	6.0	64.2	8.0	4.4	17.4	100.0
Restricted	Number						
	%						
Garage	Number						
	%						
Total Commercial Vehicles	Number						
	%						

**NUMBER and PERCENTAGE
vs PURPOSE
vs FACILITY TYPE
Table 4**

NUMBER and PERCENTAGE of COMMERCIAL VEHICLES PARKED Between 9:30 A.M. and 5:30 P.M.
 Grouped by BLOCKS WALKED TO DESTINATION and LENGTH of TIME PARKED

LENGTH OF TIME PARKED	NUMBER AND PERCENTAGE	BLOCKS* WALKED TO DESTINATION					Total
		Less than 1	2 but Less than 2	2 but Less than 3	3 and over	Refusals & No Contacts	
Less than 15 min.	Number	768	30	10	3	187	998
	%	38.8	1.5	0.5	0.2	9.4	50.4
15 to 29 min.	Number	347	14	6	3	102	472
	%	17.5	0.7	0.3	0.3	5.2	24.0
30 to 59 min.	Number	202	5	6	6	55	274
	%	10.2	0.3	0.3	0.3	2.7	13.8
1 hr. but less than 2	Number	93	7	3	4	19	126
	%	4.7	0.3	0.2	0.2	1.0	6.4
2 hrs. but less than 4	Number	35	2	2	5	16	60
	%	1.8	0.1	0.1	0.2	0.8	3.0
4 hrs. but less than 6	Number	7	1	3	0	11	22
	%	0.4	0.1	0.1	--	0.5	1.1
6 hrs. and over	Number	3	0	2	0	22	27
	%	0.1	--	0.1	--	1.1	1.3
Total	Number	1455	59	32	21	412	1979
	%	73.5	3.0	1.6	1.2	20.7	100.0

*One block is equivalent to approximately 400 feet.

NUMBER and PERCENTAGE
 vs BLOCKS WALKED
 vs DURATION
 Table 5

**NUMBER and PERCENTAGE of COMMERCIAL VEHICLES PARKED Between 9:30 A.M. and 5:30 P.M.
Grouped by PURPOSE OF TRIP and LENGTH OF TIME PARKED**

LENGTH OF TIME PARKED	NUMBER AND PERCENTAGE	PURPOSE OF TRIP					
		Shopping	Business	Work	Other	Unknown	Total
Less than 15 min.	Number	50	708	52	42	146	998
	%	2.5	35.8	2.6	2.1	7.4	50.4
15 to 29 min.	Number	25	308	35	17	87	472
	%	1.3	15.7	1.8	0.8	4.4	24.0
30 to 59 min.	Number	28	150	33	15	48	274
	%	1.4	7.6	1.6	0.8	2.4	13.8
1 hr. but less than 2	Number	9	72	18	8	19	128
	%	0.5	3.6	0.9	0.4	1.0	6.4
2 hrs. but less than 4	Number	3	22	17	3	15	60
	%	0.1	1.1	0.9	0.2	0.7	3.0
4 hrs. but less than 6	Number	4	6	2	2	8	22
	%	0.2	0.3	0.1	0.1	0.4	1.1
6 hrs. and over	Number	0	3	2	0	22	27
	%	--	0.1	0.1	--	1.1	1.3
Total	Number	119	1269	159	87	345	1979
	%	6.0	64.2	8.0	4.4	17.4	100.0

NUMBER and PERCENTAGE
vs PURPOSE
vs DURATION
Table 6

**NUMBER OF VEHICLES Having Their Trip ORIGIN WITHIN
the CENTRAL BUSINESS DISTRICT**

Classified by Type of Vehicle and Time of Parking

TIME AT WHICH PARKED	TYPE OF VEHICLE		
	Passenger	Commercial	Total
Before 9:30 A.M.	56	16	72
Between 9:30 and 9:59	46	32	78
10:00 " 10:29	81	52	133
10:30 " 10:59	98	46	144
11:00 " 11:29	92	33	125
11:30 " 11:59	74	28	102
12:00 " 12:29PM	86	18	104
12:30 " 12:59	96	30	126
1:00 " 1:29	107	19	126
1:30 " 1:59	105	23	128
2:00 " 2:29	108	20	128
2:30 " 2:59	94	18	112
3:00 " 3:29	90	15	105
3:30 " 3:59	89	10	99
4:00 " 4:29	71	13	84
4:30 " 4:59	80	10	90
5:00 " 5:29	44	6	50
Total	1417	389	1806

NUMBER WITH ORIGIN IN CENTER

Table 7

REPORT OF THE PROJECT COMMITTEE ON PARKING

S. T. HITCHCOCK, *Secretary*
Highway Economist, Public Roads Administration

Those of you who were in Oklahoma two years ago may recall a local statement about parking congestion in that city. This was not impressive to many of us when it was possible to park within 1½ blocks of the best downtown hotels. This is particularly true when 3 to 4 blocks is as close to destinations as many people are able to park under any circumstances in many other cities. That the people in Oklahoma City consider they have a parking problem, as well as those in larger cities, would make it appear that the parking problem is purely relative.

The basic considerations leading to the selection of a research group in the Department of Traffic and Operations to study parking problems at that time are even more apparent now with the return of unrestricted peacetime use of the automobile.

Reports from time to time from meetings on parking problems throughout the country indicate that our efforts will eventually furnish some of the facts which are needed. There are indications, too, that more information is needed than we have been able to obtain.

Indications that the program of the committee is in line with current problems were found at a conference held in Spokane, Washington, some months ago to discuss the needs for a parking study in that city. Three members of the Merchant's Downtown Parking Association participated in the discussion. This is what they wanted to know about parking in the Central business district:

1. The number of parking spaces

presently available at the curb and off the street in each block.

2. The demand for parking spaces in each block.
3. The present rate of turnover in the use of space
4. Where should new off-street facilities be provided - not where can they be provided?
5. Will long-time or short-time parkers use them?
6. What rates should be charged?
7. Can the proposed facilities be economically justified?

Retailers in cities would like to know what proportion of their customers, who shop in person, come in their own automobiles, what proportion of their car-owner customers is deterred from making more frequent trips because of parking congestion, and how many of their exclusively mail and phone customers within personal shopping distance would come to the store if there were convenient parking space.

The work of the committee has been directed toward the development of facts which will provide the basis for planning parking facilities properly integrated with streets and with the demands of the individual buildings, stores, or other traffic generators in the congested business district.

At the 26th annual meeting, the program of this committee was developed for 1947:

1. To evaluate parking habits of drivers
2. To determine the desirable location of off-street facilities

3. To design the capacity of those facilities for the demand.
4. To determine the amount of parking generated by the creation or improvement of a parking facility
5. To study the integration of transit operations and the location of parking facilities
6. To appraise and develop methods for obtaining these facts
7. To apply these facts to zoning ordinances, building codes, regulations dealing with parking and truck deliveries and pickups.

A study of the trip purposes and lengths of time people park in the downtown area indicates a sizeable group of "errand" parkers--business, shopping, or other purposes, who park less than one-half hour. Many of these even park less than 15 minutes. Offstreet parking even one block distance would be inconvenient for this group, taking as much or more time to park and walk to the destination than it does to do the errand. It does not, therefore, seem that complete elimination of curb parking can be recommended but that curb parking should be reserved for this type of use.

A full parking lot with cars in aisles is no measure of where the drivers would have liked to park their cars. Actual destination of persons after they leave their parked cars is the best information which can be used without question for determination of location of new facilities. Block by block comparisons between usage of existing facilities and the demand for space, where such information is available, invariably show a considerable disparity in the location of supply with respect to demand.

Fringe parking is a solution to the parking problem frequently cited and has been tried in many cities. An over-all transportation plan in a city involves the integration of mass transit units with not only the street development plan but also with private motor vehicle operation.

Since the 1946 meeting it has been possible to make a preliminary appraisal of several modified procedures of the direct interview type of study for obtaining information on parking needs. This basic method (described in the 1945 Proceedings of the Highway Research Board) has been used in more than 25 cities.¹ It involves the observation of each parking facility in the business district for an 8- or 10-hour period and the interviewing of each user of parking space during the stated period.

One of the questions most often asked in discussing the analysis of data obtained from these parking studies is "How much parking will be generated by the creation or improvement of a parking facility at this location?" Present methods obtain facts concerning current usage and demand for space block by block for those who now drive downtown and park their cars. The program of this committee on this point has been directed to the study of newly developed facilities to determine how many of the users are new users. In Baltimore, for

¹ Portsmouth, N. H.; Providence and Pawtucket, R. I.; New Haven, Conn.; Baltimore, Md.; Harrisburg and Reading, Pa.; Toledo and Cleveland, Ohio; Charlotte, N. C.; Atlanta and Athens, Ga.; Jacksonville, Fla.; Nashville, Knoxville, and Chattanooga, Tenn.; Alexandria, Monroe, and Lake Charles, La.; Albert Lea, Minn.; Wichita, Kans.; Corpus Christi, Texas; Portland, Ore.; Seattle, Spokane, and Walla Walla, Washington.

example, 34 percent of the users of the fringe lot developed by the Baltimore Transit Company had not previously driven cars downtown. Hence it must be assumed that this volume was generated by the development of the lot.

Other factors will influence the volume of parking generated, such as improved transit service, improved expressway and arterial routes, and improved traffic control on city streets. Living costs can influence the amount of money in the family pocketbook for parking and for operating the family car.

If parking facilities are developed in a plan integrated with other urban improvements, it appears logical to develop them in stages, basing the primary plan on current facts. As each element in the program is developed, it should be evaluated for generated usage modifying plans for subsequent elements before they are constructed.

In an effort to reduce the amount of work involved in studies of this type, a series of 25-percent samples was taken by using the records of all interviews obtained in an actual completed study (described in the 1945 Proceedings of the Highway Research Board).

These samples for curb parking were selected uniformly throughout the area.

First method - Alternate sides of parallel streets.

Second method - One curb face in four of every block.

Third method - All curb faces of one block out of every four blocks

Fourth method - One fourth of the spaces in each time restriction class.

The samples were selected in two ways for offstreet facilities.

First method - One fourth of the spaces, distributed uniformly according to location of the facility.

Second method - One fourth of the spaces, distributed uniformly according to rate structure of the facility.

In general these sampling procedures proved to be reliable when studying the parking habits of drivers. If, for example, parking information classified according to trip purpose, length of time parked, or kind of parking used, is desired, a 25-percent sample can be obtained which will be reasonably accurate in comparison with similar classifications of other 25-percent samples or of 100 percent of the information.

When similar procedures were applied to information classified according to destinations of the parkers--this is the demand for space, not where the car was parked such erratic patterns appeared as to raise questions as to use of any sample for the selection of a location for a facility.

Facts obtained from studies made thus far have not been used to establish or to revise zoning ordinances, building codes, or regulations dealing with parking and truck deliveries and pickups. Nor should they be. More data are needed and more analysis of existing information must be made. It has been possible to summarize existing ordinances, codes, and regulations. Mr. Levin has developed a paper to present this summary for trucks.

To those of you who have information available which will add to the case history experience of the committee, you may be sure it will be a welcome contribution. It is only by the assembly of many individual cases that generalizations can be made for practical application. Only in this way is your committee able to do its part in the Research Program of the Department of Traffic and Operations.

FRINGE PARKING IN RELATION TO TRANSIT OPERATIONS

ADRIAN HUGHES, *Assistant to the President*
The Baltimore Transit Company

This discussion of the fringe parking lot as related to transit operations is complementary to the paper by Mr. F. W. Lovejoy, "Fringe Parking in Relation to Traffic Congestion" published in Vol. 27. Proceedings of the Highway Research Board. Actually, of course, the interest of transit operators in fringe parking is also in its effect on traffic congestion. With that understanding, it is the endeavor in this paper to deal particularly with the transit operators relation to the operation of fringe parking lots and garages, which is but one phase of the subject of "Fringe Parking".

The idea of fringe parking is a somewhat recent development in the efforts to solve the parking problem. The Baltimore Transit Company began the operation of a fringe parking lot with a shuttle bus line into the downtown shopping and business district on August 26, 1946. It was but a short time before we discovered that it was a matter of great interest to traffic engineers, city officials and transit operators everywhere. Operators of transit systems in a number of other cities have been considering some form of transit service in connection with fringe parking and some have such services in operation.

Every city, large or small, has its "parking problem", the problem of providing off-street terminal facilities for the many privately owned automobiles which are now in use for transporting people into and about the downtown business sections of our cities. Ever since the constantly growing use of automobiles

has clogged up our city streets, making it even more difficult and more dangerous for people to travel through the streets whether by transit, by automobile, or even on foot, the provision of off-street parking space in the congested areas has been considered one of the important remedies for traffic congestion. The extreme wastefulness of curb parking has become more widely recognized both because it is too expensive a space for storage of automobiles and because it interferes with the primary purposes of streets, the movement of vehicles, and is, therefore, one of the factors contributing to traffic congestion. It is this traffic congestion which is now generally ascribed as the cause of the economic and physical deterioration of the centers of our cities. You are all familiar with the results of this deterioration. The parking problem then is that of providing off-street storage for the automobiles, the drivers of whom need, or prefer, terminal facilities in the downtown business section.

One might ask, why should the operators of public transit service be interested in the parking problem, in the off-street parking of automobiles? As a matter of fact they are not interested in the parking problem as such. Storage facilities for transit vehicles at or near the destinations of transit passengers are not required. Transit operators are interested in relief of the traffic congestion resulting from the use of our city streets by so many automobiles. They are interested in the parking problem only

as its solution may help to solve the traffic problem. If the question of off-street parking is to be viewed in proper perspective shouldn't it be recognized as merely a means to an end, that end being to keep the flow of people through our streets moving with maximum efficiency? More vehicles are moving through the streets today than was ever dreamed of when they were laid out. But those streets are carrying fewer people to the downtown business districts, otherwise the property values would not have decreased and the taxable basis would not have shrunk so alarmingly.

It is now more generally realized that transit vehicles are the most efficient in the use of street space for moving people. One transit vehicle can carry as many people as 30 or 40 automobiles and requires only a small fraction of the street space. A transit vehicle is many times more efficient than an automobile for moving large numbers of people. An efficient transit system, used by a large portion of the people is essential to the continued existence of cities.

But transit service has become less attractive as traffic congestion has increased. The speed of transit vehicles has become slower and the regularity of their operation has been reduced. Slower speed and more irregularity adds to the cost of operation too. So transit operators see their service becoming both less attractive to their customers and more costly to operate. It is obvious to transit operators, as it is to other students of city traffic, that transit service will not move freely, with greater safety, speed and regularity unless all traffic moves more freely, unless there is some relief from traffic congestion.

This is sufficient explanation of the transit operators' interest in the parking problem. Now, what about their interest in the question

of fringe parking? The best way for me to give that explanation is to tell first how the company I am associated with, came to start the operation of a fringe parking lot and shuttle bus line in Baltimore.

Our venture into the operation of a fringe parking lot and shuttle bus line really came about as a result of, or at least it followed upon, the development of a rather ambitious postwar modernization program and the coordination of that program with the City's plans for traffic improvement.

Work on the Company's plan was started in the early part of 1945. While it was still underway, and before any public announcement of it had been made, the Chief Engineer of Baltimore published a report on May 21, 1945, entitled, "Analysis of Traffic Conditions And Present And Post-War Highway Requirements". It included not only plans for expressways and new highways in and around the city, but also plans for the improvement of existing streets and the designation of more streets for one-way operation. It was pointed out that a number of his recommendations would require changes by The Baltimore Transit Company in its routes and services.

After studying the City's report the Company offered it's cooperation in coordinating the two plans into a general plan for traffic and transit improvement in Baltimore. This offer was accepted and a revised transit plan was completed, which in general met with the approval of all. The capital expenditure estimated at that time was about \$8,000,000 for the purchase of about 500 new free wheel vehicles and other changes. It was expected that the entire transit plan could be completed in 2 years or less. Actually, the first of the buses were not received until May, 1947, and the plan will not be completed until some time in 1948.

Continued or increased traffic congestion would mean that despite all the money which the Company was going to spend for new equipment to modernize its system the operation of its vehicles, nevertheless, would become slower and slower, there would be more and more delays, more irregularity, and the service would continue to grow less attractive for riders and more costly. It is true the City was proposing expressways and new highways and additional off-street parking facilities, but these would cost many millions and take years to complete. Over a period of years millions of dollars has been spent in many of our cities for such things and yet traffic congestion has not been relieved, but has become worse.

Recognizing that traffic congestion simply is too many vehicles trying to use the streets, that is to say, too many automobiles, we began to search for something that could be done at once to reduce the number of automobiles in the downtown section. The simplest and cheapest thing would be abolish all curb parking. That should be done, but it cannot be accomplished quickly, nor can it be done without providing at least an equivalent amount of off-street space. But more off-street space in the downtown section, while a popular idea, might not reduce congestion on the streets, in fact, might even increase it. So this led to the idea of parking outside the congested area.

As there was no agency in the city which could function to provide fringe parking lots or any other parking facilities, it was evident that if the transit company wanted anything done quickly it would have to make the first move. It was decided, therefore, that the Company would try to find a lot which it would operate together with a shuttle bus line to the downtown

business district.

The greatest difficulty was to find a suitably located lot. The location is important. Preferably such lots should be on main highways and accessible by a right hand turn for inbound automobiles, if the highways carry traffic in both directions. They must be out-side of the congested district and yet close enough to be attractive to motorists and also to hold down competition with the regular transit lines at the regular rate of fare. It was desirable also for the first lot to be north of the downtown business district because 50 percent of the automobile traffic of Baltimore is from the North.

The only space that could be found was a small triangular shaped lot with a capacity of 206 spaces owned by the City, about $\frac{1}{4}$ mile from the main shopping district and about one mile from the financial and business section. Consequently a letter was written to the Mayor on February 7, 1946, stating that the only sure way to remedy the bad traffic situation downtown is to reduce the number of vehicles operating in it during rush hours, suggesting that parking lots be established on the fringe, probably a mile or a mile and a half from the center of congested area, operated in conjunction with bus lines, the fare for which would be included in the parking charge and offering as a beginning to lease and operate the City owned lot referred to above.

The operation was started on August 26, 1946, and in a few days the lot was being used to capacity. Last Spring we were parking an average of 270 automobiles a day and in addition to the drivers of the automobiles were carrying about 1800 cash fare riders each day. The bus line traverses the main shopping section, the financial section and the civic center, covering a one-way distance of about

1-1/3 miles. The buses run from 7:30 a. m. to 6:30 p. m. with a 5-minute headway during rush hours and a 7½-minute headway during the middle of the day.

The plan as operated in Baltimore appeals particularly to the all-day parker. The charge, including two tickets for the bus line is 25¢. Other passengers may board the bus in the lot or at any intersection and ride for 5¢, but without transfers.

Of course, such a small operation does not relieve traffic congestion, nor give a reliable indication of bus revenue and costs. If we had perimeter parking lots for 5000 or 6000 automobiles there might be some traffic relief, if other traffic plans were coordinated. Also it would then be possible for the shuttle bus lines to operate between several lots creating a better use factor.

All we have proven about the value of fringe parking for relieving congestion so far in Baltimore is that this particular fringe parking lot and bus line are popular with the motorists and that the idea of fringe parking seems to meet with general approval. There seems to be an interest in expanding the plan. It was the Transit Company's hope when the experiment was started that other locations would be made available soon. This can be done only as part of slum clearance projects. It is evident now that slum clearance will not be undertaken at least until the supply of housing has been increased and this all lies in the uncertain future.

The Operation of the lot and bus line by the transit company has not been profitable, the revenue has not even met the out-of-pocket costs. From so small a sample it is difficult to tell whether or not the expansion of the plan with more locations and larger lots, permitting

the bus line or lines to shuttle between such location, would be profitable to the company. Apparently that would help, but it might increase the demand for peak service which is relatively expensive and not produce any additional off-peak revenue from cash rides to help pay for the service during the mid-day period.

The charge of 25¢ for parking and a round trip bus ride is too low to meet expenses. Probably also it is too low in relation to parking rates charged in Baltimore for privately owned and operated lots and garages. With a rate of 35¢ or 40¢, the parking lot would be profitable, assuming there were no loss in patrons, but the parking lot comes close to meeting expenses now. The loss is on the operation of the bus line. The profit on the parking lot at 40¢, if applied against the cost of operating the bus line, would just about offset the out-of-pocket expenses, but to obtain this benefit the transit company has to continue the operation of the parking lot. It is doubtful if transit companies should operate parking lots.

If the rate of fare on the bus line were increased so that it represented a smaller reduction from the regular rate of fare, it would reduce the chance of obtaining additional revenue from cash riders. Such additional revenue can come only from people who otherwise would walk to and from their destination within the downtown business district.

This raises the question whether or not the mere convenience of special bus service from fringe parking lots to downtown would be sufficiently attractive for patrons of such parking lots if the regular rate of fare were charged, perhaps with a transfer to regular lines. Regular transit lines which pass by fringe parking lots would not be

attractive to motorists because at such points on the lines the vehicles would ordinarily be crowded in peak hours. A special service to assure quick transportation for the motorists is essential.

Is there any encouragement from experiences in other cities? In Boston and Philadelphia parking lots at the end of high-speed subway or elevated lines have attracted relatively large numbers of motorists who use the transit service to downtown at the regular fare. They have a quick trip and the lots being at termini assure room on the vehicles. This is not what we mean by fringe parking, but it does have possibilities as an adjunct in cities where express buses on a regular bus line might give an attractive service.

In several cities, notably, Cleveland and St. Louis, reduced fare downtown loop bus lines provide service to a number of fringe lots and garages privately or municipally operated. They enjoy a good volume of business throughout the day. It is my understanding they are not yet profitable, but they warrant future trial and study.

A different type of transit service to a fringe parking lot is that operated by the Connecticut Company in Hartford, Connecticut. There a bus line operating only between 9 a. m. to 4 p. m. serves an 800 car lot located at the State Armory, one-half mile from the center of the shopping district which is owned by the state. The charge is 20¢ including a round trip on the bus line. Cash passengers are carried also and transfers are issued to the regular transit lines.

The service started November 30, 1946. Two reasons were given for the limitation on hours of service; one, the company could not spare buses during peak hours; and two, the 9 to 4 service would get

shoppers out of the business district before the 5 p. m. rush developed. This kind of transit service can be operated at a profit.

There are also several experiments of fringe parking and shuttle bus lines with the expense met by the merchants. In Atlanta, Georgia, a department store operates a lot of 530 car capacity and charters two buses for 10 minute service. The rates are 25¢ for 3 hours to 35¢ for all day, including transportation to and from the store only. A free parking service with buses chartered from the transit company operating from two fringe parking lots to the shopping district from 9:15 a. m. to 3:30 p. m. was tried out in Richmond, Virginia, during the Christmas shopping period last year. A similar operation was tried for 90 days last spring from a 300 car city owned lot. It averaged only about 125 cars and was discontinued. The transit company is considering the possibilities of a loop bus line serving fringe parking lots and carrying also cash riders.

In Paterson, New Jersey, a free service somewhat similar to the Richmond experiments was inaugurated last August by the Chamber of Commerce. Chartered buses operating from 9:30 a. m. to 6:30 p. m. over a 1.7 mile circuit pass municipal and private parking lots accommodating about 3000 cars, but reports of the patronage have been disappointing.

The interest in fringe parking both on the part of transit operators and communities is evident from the several examples recited here. With these and some dozen or more other transit operators taking part in a variety of experiments related to fringe parking a practicable basis for transit participation should develop. To study all of them would be a large project and the result probably inconclusive, because even the largest are on a relatively

small scale and the experience is quite limited.

Can any definite conclusions as to fringe parking in relation to transit operations be drawn from the information so far available? To attempt to do so certainly would be brash indeed on my part. However, before closing this discussion, the attempt will be made to set down a number of observations, most of which appear to be self-evident, for further consideration by the Committee on Parking of the Highway Research Board. Fringe parking does seem to hold promise as an important factor in remedying traffic congestion on downtown streets, the No. 1 Problem of all our cities. It would be helpful if we could establish some principles or guides which might encourage transit participation to the fullest extent possible and proper, or at least provoke further thought and study.

The following observations are submitted:

1. Just as all off-street parking is a means to an end, the purpose of fringe parking in particular has for its primary purpose the reduction of traffic congestion on the streets in the downtown business sections of our cities, by reducing the number of automobiles using those streets.

2. Generally, little physical change or improvement can be expected in the downtown streets.

3. The addition of off-street parking facilities within the congested area will not reduce congestion in the streets. A considerable quantity of off-street parking space has been provided (in Baltimore 9000 off-street spaces with 3000 still legal at the curbs) but traffic congestion steadily has become worse.

4. It is evident, therefore, that a large number of automobiles, the owners of which are destined for downtown, must be stopped at the

perimeter.

5. This requires a cordon of fringe parking facilities of large capacity operating under conditions that are convenient and attractive to motorists.

6. The reduction in automobiles downtown must be maintained by the coordination of plans and regulations.

7. Apparently many of the motorists destined for the downtown business district will use fringe parking.

8. Possibly some regulation or control to make it less convenient or more difficult to drive into the downtown area is necessary. In any event the quantity of off-street parking space should be related to street capacities.

9. This points to some form of governmental control over the location and design of all off-street parking facilities.

10. The assembly of land and possibly the provision of the parking facilities will have to be accomplished through a governmental agency.

11. A frequent, fast and convenient public transit service into the business district is essential to fringe parking. Usually this will require a special bus service.

12. Special bus lines serving fringe parking probably will have to carry cash riders also to help support them.

13. Cooperation and participation by the transit system operator is, therefore, necessary to the success of fringe parking.

14. It is to the interest of the transit operator to encourage the development of fringe parking because of the indirect benefits to the regular transit riders.

15. The transit operation whether transit lines only, or lines and lots, should be profitable. There is no more reason for transit systems to contribute financially

to a service primarily for autoists, than for a paving contractor to construct public streets and highways without a profit.

16. It is doubtful whether public utility commissions or other transit regulatory authorities will approve transit lines for fringe parking if the lines operate at a loss.

17. Even though it is to the interest of the transit operator to encourage and participate in the development of fringe parking because of the indirect benefits to the regular transit riders, the riders should not be burdened to provide a convenience for those who can or will use a more expensive form of transportation and one which, because of its inefficiency in use of street space, is costly to communities in

other respects.

18. The proper relationship among the city, the downtown business interests and the transit agency will need to be developed.

It is hoped that from consideration of these observations there can be found a sound, acceptable basis for the coordination of plans and procedures which will clear the way for a rapid development of fringe parking, followed by a prompt improvement in street traffic. In closing may I say that if we really want to reduce traffic congestion and save our downtown business sections, then everyone, business men, transit riders, autoists, citizens generally, must be willing to take the measures necessary to that end.

ZONING REQUIREMENT FOR OFF-STREET TRUCK LOADING AND UNLOADING FACILITIES

DAVID R. LEVIN, *Head*
Special Administrative Studies Unit
Division of Financial and Administrative Research
Public Roads Administration

Within the memory of all of us, the truck has grown from an industrial and agricultural upstart to one of the dominant factors in our national economy. The truck performs a fast, flexible and economical service from any origin to any destination desired. Approximately six and a half million trucks are moving an unprecedented tonnage of goods and produce today. On rural roads, freight movement by truck that has either its origin or its destination in a city now exceeds 63 billion ton-miles, an all-time high. Additionally, trucks carry practically all goods moved in wholesale and retail delivery in urbanized areas. The resulting benefits have been many.

But urban congestion has also been augmented by these vast trucking operations that take place in our cities because of the lack, in part at least, of adequate terminal facilities for their loading and unloading activities.

Truck terminal facilities may consist of centrally-located, multi-million dollar structures as are being planned and constructed by the Port of New York Authority in the New York-New Jersey metropolitan area; or they may be individual or multiple, enclosed or unenclosed, loading and unloading berths or platforms, located adjacent to or in the vicinity of specific commercial, industrial or other establishments. This paper is an analysis of only the latter type of truck terminal facility as required by zoning ordinances, building

codes, or other local ordinances in connection with specific uses.

As of December 1, 1947, there were in the United States at least 66 local governmental units in 28 States that had zoning or other ordinances requiring the provision of off-street truck loading and unloading facilities in connection with various property uses.¹ Of this total, 53 were cities, 4 towns, 4 villages, and 5 counties. It is significant to note that over two-thirds of the communities that have used their police power to cope with the truck terminal problem have utilized the same device to require the provision of off-street automobile parking facilities in connection with designated property uses.

Classification of the 66 units requiring off-street truck berths indicates that approximately two-thirds of the localities have populations of 50,000 or less. Thirteen communities have over 100,000 persons, while four of these contain over 1,000,000. Sixty-one of the units were incorporated or urban areas, while the remaining five were unincorporated, four being counties and the other a New England

¹ Statistics contained in this report are based on research covering hundreds of zoning ordinances. It was not practical, however, to canvass all possible local units which may have similar loading and unloading requirements, and there are doubtless many more than the 66 units known to have such requirements at the present time.

town. Apparently, local units of all sizes and complexions have been concerned with the problem of off-street truck loading and unloading facilities and have chosen the zoning mechanism to solve that problem, in part at least.

One of the earliest cities to require the provision of off-street truck loading and unloading facilities was Memphis, Tennessee, which amended its ordinance to require such provision effective October 18, 1927, over two decades ago. Among other early zoning ordinances are those for Sterling, Colorado, adopted May 6, 1929; El Paso, Texas, September 25, 1930; Thomasville, North Carolina, October 6, 1930; Pueblo, Colorado, June 1, 1931; and Croton-on-Hudson, New York, July 31, 1931.

In most instances, it was difficult to ascertain, from the information available, when truck loading and unloading provisions were first included in the ordinances. It is probable, however, that the great majority of provisions in ordinances requiring off-street truck loading and unloading facilities in connection with designated property uses were adopted or added by amendment within the last decade or so.

I should like to invite your attention to a few details relating to the administration of zoning requirements for the provision of off-street truck loading and unloading facilities. These concern agencies vested with regulatory authority, advisory bodies and enforcement officials.

In most instances, the local legislative body retains primary regulatory authority over the provision of off-street truck loading facilities through the zoning process. Of the 66 local units that have such ordinances, the city or common council, with or without the assistance of the mayor, is

designated as the regulatory agency in 30 cities. The board of city commissioners, with or without the mayor, is specified in 9 other cities. A great variety of other local public bodies or officials is vested with such authority in the remaining 27 places, including the zoning commission, the city planning commission, county commissioners of roads and revenues, and others.

In keeping with the observed trend in local legislation, it would seem desirable for the local law-making body to retain primary regulatory control with respect to the mandatory provision of off-street truck loading and unloading facilities. However, it might be appropriate for the local legislature to delegate some of its regulatory functions to a competent public parking agency, if such exists, so that the provision of off-street parking and truck loading facilities, in all their various forms, might be appropriately integrated.

Frequently, advisory agencies are designated for the purpose of investigating and making reports and recommendations to the local legislative body in connection with any proposed change in the zoning ordinance. In 37² of the 66 ordinances contained in this analysis, the planning commission or board is designated as the advisory body. In other instances, the zoning commission, the board of adjustment, the board of zoning appeals, or the planning and zoning commission are so indicated.

Because local planning bodies are generally intimately associated with zoning objectives and are concerned with the over-all development of the urban community, they should be accorded the undisputed right to serve in an advisory capacity on matters relating to the provision of off-street truck loading and un-² Of these, 29 are cities, 3 incorporated towns, 2 villages, and 3 counties.

loading facilities by means of zoning.

In addition to regulatory and advisory bodies, machinery for enforcement is almost invariably provided. In 27 instances³ the building inspector is named as the enforcement official. In 6 cities, it is the commissioner or superintendent of buildings; in 3 cities, the city manager; and in two cities, the zoning administrator. In the remaining instances, the enforcement officer has been designated to be the city engineer, an official designated by the mayor, the department of building and safety engineering, the commissioner of public utilities, grounds and buildings, the street and sewer department, and a variety of others.

It seems quite obvious that the local building inspector or the department where that function is lodged is probably best equipped to enforce zoning requirements for the provision of truck loading facilities as an adjunct to buildings.

The essence of these ordinances concerns the extent of off-street truck loading and unloading facilities required for the various property uses. Study of the local laws investigated reveals that consistency in designating the extent of facilities required is strikingly lacking. Variations exist as between specifically designated property uses. Further differences are found to exist between local and general business districts. Some ordinances apply to any business, industrial, manufacturing, or other district, while others are specifically concerned with specified districts or areas. The number of permutations or combinations of these, as found in the various ordinances, is seemingly endless. Mathematical averages are all but impossible.

A grouping that is common to 14 different places in 9 States⁴ deals

with hotels, institutional buildings, hospitals and mortuaries. In commercial and manufacturing districts in Arlington County, Virginia, for example, truck loading space not less than 15 feet in width for every 50 feet of building width, nor less than 25 feet in length and 15 feet in height is required for these uses. In Detroit and Highland Park, Michigan, on the other hand, one space is required by law for every 20,000 square feet in excess of 3,000 square feet of building-floor-use or land-use for hotel, hospital or mortuary purposes. A more complex requirement is contained in the Los Angeles ordinance, namely, one space for each 2,000 square feet of lot area, but not more than two spaces unless the building has a gross floor area of more than 80,000 square feet, in which case one additional space for each additional 40,000 square feet in excess of 80,000 square feet, or fraction thereof above 10,000 square feet, in the case of a hospital, institution or hotel. In contrast, one of the simplest provisions, found in Henrico County, Virginia, merely requires space for the loading and unloading of goods, for hotel or institutional use.

Ten cities in 6 States⁵ have ordinances containing provisions relating to retail or wholesale

³ These consist of 21 cities, 1 village, 3 incorporated towns, 1 unincorporated town, and 1 county.

⁴ Los Angeles, California; Denver, Colorado; Fulton County, Florida; Detroit, Highland Park and Trenton, Michigan; Kansas City, Missouri; New York City, New York; Cleveland and Parma, Ohio; Arlington, Chesterfield, and Henrico Counties, Virginia; and Vancouver, Washington.

⁵ Detroit, Highland Park and Trenton, Michigan; Rochester, Minnesota; Kansas City, Missouri; Plainfield, New Jersey; New Rochelle and New York City, New York; and Cleveland and Parma, Ohio.

stores or markets, warehouses, supply or display houses, loft buildings, laundry or dry cleaning establishments. Perhaps one of the best known is the New York City provision requiring one space for each 25,000 square feet and fraction thereof in excess of 5,000 square feet of aggregate gross floor area designed or used for storage, goods display or department store purposes. An ordinance in Pochester, Minnesota, requires that in commercial districts, a plant for pasteurization, bottling, or distribution of milk must be provided with adequate facilities for loading and unloading within the structure housing the plant.

Rear yards, of prescribed size, of business and commercial or personal service establishments in local business districts are frequently designated to be used as loading space. Such facilities or their equivalents are required in thirteen localities in 5 States.⁶ In Tuscumbia, Alabama, for example, in connection with any business structure or use on a corner lot or on any lot accessible to or adjoining a public or private alley, a rear yard of not less than 20 feet in depth is required, appropriate to provide space adequate in the opinion of the building inspector for loading and unloading.

A few ordinances are applicable specifically to business and commercial or personal service establishments in general business districts. There are 7 local laws of this character in 5 States.⁷

In three other instances, requirements are applicable to any business district.⁸ In twelve places,⁹ business and commercial or personal service establishments in any business or industrial district are involved.

Twelve cities have ordinances requiring the provision of truck loading and unloading facilities in

specified business or industrial districts.¹⁰ Other property use groupings exist, too numerous to mention in this brief summary.

Ordinance requirements dealing with the location of off-street truck loading and unloading facilities for various property uses lack uniformity. In the majority of cases, the loading facilities are required to be provided on the same lot or premises. In other instances, they are specified to be within the building, along the entire alley frontage of the lot, in the rear or side yards, or elsewhere.

It is apparent, of course, that for truck loading facilities to be of maximum benefit to those who will use them, they must be located as close as possible to the premises to which they are an adjunct. It seems thoroughly realistic to require that truck loading facilities be located on the premises convenient to the buildings or uses they are to serve.

⁶ Clanton, Decatur, Dothan, Mountain Brook, Talladega, and Tuscumbia, Alabama; New Castle, Indiana; Montclair, New Jersey; Bristol, Clinton and Johnson City, Tennessee; and Bristol and Richmond, Virginia.

⁷ Clanton, Dothan and Talladega, Alabama, Boulder County, Colorado; Montclair, New Jersey, El Reno, Oklahoma, and Clinton, Tennessee.

⁸ Lawrence, Massachusetts, Thomasville, North Carolina; and Clinton, Tennessee.

⁹ Tucson, Arizona; Hamden, Connecticut; Fulton County, Georgia, Cambridge, Massachusetts; Biloxi, Mississippi; Omaha, Nebraska; Piqua, Ohio; Bolivar and Centerville, Tennessee; Arlington County, Virginia; Charleston, West Virginia; and Racine, Wisconsin.

¹⁰ Denver, Pueblo, and Sterling, Colorado; Ft. Lauderdale and Lake Worth, Florida; Dayton, Memphis and Nashville, Tennessee; El Paso and San Angelo, Texas; Madison, Wisconsin; and Cheyenne, Wyoming.

Design features of off-street truck loading facilities, most of them relating to access, are mentioned in approximately 25 local ordinances. The best considered provisions state that loading and unloading facilities are to be provided in such a manner as not to obstruct traffic upon the streets or alleys. Some provide merely that the loading spaces shall be accessible or that convenient and adequate access at least 12 feet wide shall be provided. A well-considered requirement as to placement and character of access is desirable.

Only 8 of the 66 ordinances contained in this analysis designate the size of the off-street loading and unloading berth in precise terms. Three indicate the dimensions to be 10 feet by 25 feet, with a 14-foot height clearance.¹¹ Two specify 200 square feet of area, with minimum clear height of the area and its approaches of 14 feet.¹² Another provides that a space shall be 10 feet in width, 20 feet in length measured perpendicularly to the alley, and 14 feet in height.¹³ Twenty-five feet by 10 feet, with a minimum clear height of the berth and its approaches of 12 feet, is still another specification.¹⁴ Finally, a single ordinance requires a space not less than 10 feet in width and 30 feet in length.¹⁵

The adequacy of a prescribed size of loading berth is a function of a number of variables that include (1) the size of the vehicle which will use the space, (2) the nature of the property use to which the loading facility is accessory, and (3) the design and character of the access. Since motor transports are being designed for greater and greater capacities, truck loading space that has been provided in the past has a tendency to become more and more inadequate. Reasonableness, in light of all the circum-

stances, should prevail.

Penalties for the violation of legal requirements for the provision of off-street truck loading and unloading facilities are mandatory in 40 ordinances and discretionary in 10 others. Minimum penalties range from \$1 to \$50 and costs, maximum penalties from \$19 to \$500 or 90 days imprisonment, or both.

The severity of penalty provisions will vary, of course, from place to place, depending upon local custom or practice. In any event, should be of sufficient magnitude to serve as an effective deterrent to violation.

A matter that has vexed students of the problem for some time is the retroactive application of ordinance requirements for the provision of off-street truck loading and unloading facilities and the ultimate liquidation of non-conforming uses. Unfortunately, existing non-conforming facilities cannot be eliminated in the same manner that a tough commanding general issues an order of the day. What the courts ultimately will do when confronted with the issue on the merits is something for the judicious to ponder. Suffice it here to suggest that thus far at least, there has been nothing encouraging to proponents of retroactivity in existing legislative trends, and little more in judicial acceptance.

Existing ordinances requiring the provision of designated off-street truck loading and unloading facilities apply uniformly to all new structures and uses, unless specifically exempt. Additionally, a non-conforming use (with respect

¹¹ Detroit and Highland Park, Michigan, Kansas City, Missouri.

¹² Plainfield, New Jersey; New Rochelle, New York.

¹³ Los Angeles, California.

¹⁴ New York City.

¹⁵ Village of Bronxville, New York.

to truck loading facilities) may be terminated upon the occurrence of certain events. The provision for Detroit, Michigan is typical: A non-conforming use shall be discontinued if the building is physically changed, except as may be required or as was originally planned, or if building is reconstructed following damage at an expense exceeding 60 percent of the assessed value at the time of such damage. If the non-conforming use is abandoned or discontinued for a period of two years or if it is changed to a conforming use, the building or land may not again be used for a non-conforming use. In most instances, the period of non-use is limited to one year rather than two years, as found in the Detroit ordinance.

A rather belabored attempt at the gradual elimination of non-conforming uses, at least with respect to residential zones, is found in the zoning ordinance for Los Angeles: In "R" residential zones, a building or structure designed, arranged, or intended for a use not permitted therein is to be completely removed or converted so as to be conforming at the following ages, computed from the date of erection. Buildings defined in Los Angeles City Building Code as Classes 1 and 2, 40 years; Classes 3 and 4, 30 years; and Class 5, 20 years. This regulation is not to become operative until 20 years from the effective date of article. It is apparent that this provision has little application, if any, to the adequate provision of truck loading facilities, as the zones involved are residential in character.

Zoning ordinances, building codes and other local laws are conceived of under the general police power of the State. What, precisely, are the elements of this authority, which at least 66 local units, ranging in population from approximately 1,000 to seven and a half

million, have chosen to exercise in connection with truck loading and unloading facilities? The term "police power" as used in this sense does not refer to billy-sticks, bluecoats, or brass-buttons, of course. Rather, it has been said to involve the authority of the State and of the community to project and preserve the general community welfare against abuse and injury arising from the acts of individual citizens, and to do so without compensation.

In theory, the use of zoning in providing off-street truck loading and unloading facilities, promotes the public health, safety, morals and the general welfare. This legalism can easily be translated into more tangible form.

To start with, the provision of off-street truck loading facilities through the zoning mechanism is a positive, rather than a negative approach to betterment of the urban community. For it stimulates the local citizenry to do what is right in the right place, rather than restraining them from doing the wrong thing in the wrong place. As such, it should be supported by city planners, highway administrators, traffic engineers, transportation authorities and others interested in a rational development of the city area. Truckers, shippers, consignees, commercial and industrial interests will all be benefited by the adequate provision of off-street truck loading facilities. Transportation costs will be lower, congestion will be alleviated. Property to which loading and unloading facilities are adjunct, will be rendered more accessible thereby and will become more valuable accordingly. The use of the zoning device to provide the loading facilities so urgently needed today will work on economic hardship on no one. Nobody's toes will be stepped upon.

For these many reasons, then, it is desirable for every urban community that has not already done so to amend its zoning code so as to require the reasonable provision of off-street truck loading and unloading facilities in accordance with the indicated needs of the respective property uses.

I might mention at this time that all the underlying data of this study of off-street truck loading and unloading facilities will soon be published by the Highway Research Board in bulletin form similar to our two previous monographs on parking enabling legislation.¹⁶

Suggestions for legislative use

will be included as derived from a study of existing legislation and the present need for off-street truck loading and unloading facilities. A select group of experts on the practical aspects of this problem will assist in this endeavor.

I hope that these collective efforts will be helpful to the many local communities that are now bedeviled with the bothersome truck terminal problem.

¹⁶ AN ANALYSIS OF GENERAL STATE ENABLING LEGISLATION DEALING WITH AUTOMOBILE PARKING FACILITIES, Bulletin No. 2; and AN ANALYSIS OF STATE ENABLING LEGISLATION OF SPECIAL AND LOCAL CHARACTER DEALING WITH AUTOMOBILE PARKING FACILITIES, Bulletin No. 7

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