

## PARKING METERS NEED BETTER ENFORCEMENT

MATTHEW C. SIELSKI, *Director*  
 Safety and Traffic Engineering Department  
 Chicago Motor Club

*An analysis of parking habits before and after the installation of meters to determine the effectiveness of meters to reduce over-time parking.*

### SUMMARY OF FINDINGS BEFORE AND AFTER INSTALLATION OF METERS

1. There was no appreciable change in the number of parkers remaining one-hour or less.
2. There was no appreciable change in the number of space hours used by parkers remaining one-hour or less.
3. Seven out of the ten cities studied showed an increase in the number of space hours used by long-time parkers after meters were installed.
4. Two out of the ten cities indicated a decrease in the number of space hours used by long-time parkers, and one city showed no change at all.
5. The number of available parking spaces was reduced due to the creation of stalls of uniform size adequate for the longest vehicle necessary for parking meters.
6. There is a definite need for enforcement based upon observation of vehicles through tire marking rather than upon examination of parking meters. Motorists are able to remain at the curb for a long time without detection by simply adding coins to the meters.
7. A study made in Evanston, Illinois revealed that an enforcement program which included tire marking and parking meter enforcement resulted in a lesser amount of long-time parkers.

Parking continues to hold its lead as a major traffic problem. More and more business men are becoming alarmed at the prospect of business decentralization resulting from a lack of proper parking facilities in their shopping district. Parking meters have mushroomed into many communities and by 1947, they were in use in 888 cities over 5,000 population<sup>1</sup>. Almost 70% of the cities in the 250,000 to 500,000 population group have installed meters. However, notwithstanding the tremendous increase in meters, widespread interest on the part of municipal officials and various organizations, most of our motorized cities still lack adequate

parking facilities.

On the basis of these developments, are we to conclude that parking meters have been greatly overrated as a tool for curing our parking problems? Obviously, such a surmisal could not be made without the background of a thorough study. It is for that reason that this research project has been undertaken. A comprehensive study was undertaken in 10 mid-western cities of various population classifications, to ascertain the difference in parking behavior of motorists before and after the installation of parking meters. In addition, further factual information has been included in this re-

port obtained from studies in other cities.

*What Constitutes a Good Parking Program*

Obviously, those cities wishing to solve their parking problems must accomplish the following two objectives:

(1) The most efficient use of present curb parking spaces.

(2) The provision of adequate off-the-street parking facilities.

In regard to the first objective, an efficient use of curb parking space will meet at least these requirements:

(1) A rapid turnover of short time parkers.

(2) Proper time limits designed for the length of time the majority of the

<sup>1</sup>The Municipal Year Book, 1948.

parkers choose to remain in respective business blocks.

(3) Long-time parkers are entirely eliminated.

The "before" and "after" studies were conducted in the 10 midwestern cities to determine how effective meters were in eliminating the objectionable overtime parkers. This study was not made to discredit the use of meters, but rather to determine what steps should be taken to improve upon their present operations. Meters are at the stage that traffic signals were some 20 years ago. The signals were rapidly replacing the manual police officer, but on the other hand, they required a vast amount of improvement in order to control the flow of traffic more effectively. Consequently, traffic engineers soon developed such devices as progressive systems, flexible synchronized signal systems, timing programs, turning arrows etc. So it is today with our parking meters. They have replaced the officer on the beat, but they require more research work in order to obtain better parking regulations. This conclusion is based on the following before and after study.

THE SCOPE OF THE STUDY

Before and after studies were conducted in the following cities:

City	Popula- tion	Parking Limits	
		Before	After
Princeton, Ill.	5,500	90 min.	1 hr.
Downers Grove, Ill.	10,000	2 hrs.	1 hr.
Dixon, Ill.	11,000	none	1 hr.
Streator, Ill.	15,000	90 min.	1 hr.
Mattoon, Ill.	16,000	2 hrs.	2 hrs.
Marion, Ind.	27,000	90 min.	1 hr.
Elkhart, Ind.	34,000	1 hr.	1 hr.
Moline, Ill.	35,000	1 hr.	1 hr.
Joliet, Ill.	42,000	1 hr.	1 hr.
Aurora, Ill.	47,000	1 hr.	1 hr.

In most cases, the "before" studies were made just prior to the installation of meters and "after" studies were taken from three to six months following the first use of meters. In this study, two different types of checks were made. In the first type of study, license numbers of parked vehicles were recorded every one-half hour of one day, starting at 10:00 a.m. and continuing until 3:00 p.m. The second type of study made on different days, was a sort of "case history" study on detailed parking habits of persons using metered parking spaces. In this study, checkers observed for each parking space studied, approximately twelve cars and recorded the exact time vehicles entered and left a parking stall. These observers would also indicate how many coins were deposited by these parkers. These two studies were conducted identically for before and after meter installations. In the ten cities studied, over 1700 parking stalls were observed and this work required approximately 300 man hours in the field. The entire study involved an analysis of the parking habits of some 25,000 motorists. The before and after studies where license numbers were recorded every one-half hour period, covered the major portion of the main business district where parking meters were installed. It will be noted that in most cities, there was no appreciable change in time limits before and after the installation of meters. Where changes have been made, the new limits were shortened which would help to create a faster turnover of curb spaces.

## RESULTS OF STUDY

The chart "Tabulation of Results of Parking Habits Before and After the Installation of Parking Meters" summarized the before and after findings for the cities studied.

the report, that long-time parkers were recorded as those that had remained over 90 minutes. The parkers remaining 60 to 90 minutes were regarded as borderline cases and consequently were not mentioned in the study.

*Downers Grove, Illinois - 10,000 popula-*

TABULATION OF RESULTS OF PARKING HABITS  
BEFORE AND AFTER THE INSTALLATION OF PARKING METERS

CITY		Percent of Vehicles				Percent Full	Percent of Space Hours Used				Percent Full	Increase or Decrease in Parking Space Turnover
		0-30	30-60	60-90	over		0-30	30-60	60-90	Over		
Princeton, Ill Pop 5,500	Before	65	21	7	7		41	33	18	8		
	After	69	20	7	4	64%	43	32	5	20	61%	Slight Decrease
Downers Grove, Ill Pop 10,000	Before	81	14	3	2		58	26	8	8		
	After	71	21	4	4	67%	42	31	10	17	57%	Slight Decrease
Dixon, Ill Pop 11,000	Before	62	17	8	13		24	23	13	40		
	After	68	19	8	5	81%	36	25	19	20	67%	Increase
Streator, Ill Pop 15,000	Before	73	16	6	5	Not Known	42	23	16	19		
	After	70	18	7	5		39	25	17	19	65%	No Change
Mattoon, Ill Pop 16,000	Before	59	22	9	10		27	24	17	32		
	After	63	23	7	7	82%	31	27	14	28	79%	Slight Increase
Merion, Ind Pop 27,000	Before	60	20	9	11		28	21	18	35		
	After	52	28	10	10	73%	20	28	16	36	90%	No Change
Elkhart, Ind Pop 34,000	Before	64	24	7	5		32	30	15	23		
	After	63	24	6	7	95%	32	29	13	26	86%	No Change
Moline, Ill Pop 35,000	Before	59	27	8	6		30	34	17	19		
	After	62	24	7	7	89%	29	28	14	29	91%	Decrease
Joliet, Ill Pop 42,000	Before	63	23	8	6		34	31	16	19		
	After	55	29	8	8	89%	25	33	15	27	91%	Decrease
Aurora, Ill Pop 47,000	Before	65	21	7	7		32	27	15	26		
	After	39	24	9	8	89%	27	27	18	28	90%	Slight Decrease

*Princeton, Illinois - 5,500 population* - This was the smallest of the cities studied. The fact that parking spaces never exceeded 64 percent full, either with or without meters, indicates that this city never did have a serious parking problem. Before parking meters went into effect, 86 percent of the parkers remained one hour or less and used 74 percent of the available space hours, (one space hour is one parking space used for one hour). After the installation of parking meters, 89 percent of the parkers remained less than one hour. This increase in "curb parking availability" created by a slight increase in curb turnover was offset by lost space due to long-time parked vehicles. Before meters, 7 percent of the parkers remained over 90 minutes and used 8 percent of the total space hours. After meters were installed, 8 percent of the parkers used 20 percent of the available space hours. As a consequence, parking meters failed to provide more curb parking availability in this city.

It might be mentioned at this point of

*tion* - This city maintained a good enforcement program before parking meters went into effect and consequently experienced a good turnover of parking spaces. Before meters, 95 percent of the parkers remained one hour or less and consumed 84 percent of the available parking space. Only 2 percent of the parkers remained over 90 minutes, which for all intents and purposes could be labeled as perfect observance of time limits. After meters were installed, the percentage of parkers remaining one hour or less decreased from 95 percent to 92 percent and violators increased to 4 percent, probably because of less effective enforcement. Thus parking meters did not create any additional curb parking availability and in reality decreased the amount of curb turnover.

*Dixon, Illinois - 11,000 population* - This city experienced a greater turnover of parking spaces as a result of parking meters. Before their installation, 79 percent of motorists remained one hour or less and used only 47 percent of the

available space hours. After meters went into effect, 86 percent of parkers remained one hour or less and consumed 61 percent of the available space hours.

Evidence of more parking accommodations created through meters lies in the finding that after meters were installed only 5 percent of parkers remained longer than 90 minutes and consumed 20 percent of the available space hours. This is in contrast to 13 percent of parkers using 40 percent of the available space hours before meters went into effect.

*Streator, Illinois - 15,000 population -* A study of parking conditions in this city revealed that no additional curb parking availability was created by parking meters. Before their installation, 89 percent of the parkers remained one hour or less and consumed 65 percent of the available space hours. Long-time parkers were kept down to a minimum of 5 percent. After the installation of meters, it was found that 88 percent of the parkers remained one hour or less and consumed 64 percent of the available space hours. Again, long-time parkers were held down to 5 percent.

*Mattoon, Illinois - 16,000 population -* Meters did not materially change the parking habits of the motorists in this community as is evidenced by the fact that 81 percent of them parked one hour or less before the installation of meters and in doing so consumed 51 percent of the total available space hours. Contrast this to 86 percent parkers remaining one hour or less in a metered area and consuming 58 percent of the total available space hours. It is interesting to note that in this particular study it was found that the number of available curb spaces was reduced by 17 percent due to the larger amount of curb space required with meters because each marked stall must be long enough to accommodate the longest passenger car.

*Marion, Indiana - 27,000 population -* Long time parking is just as much of a problem in this city today as it was before parking meters went into effect. Before meters, 11 percent of the parkers remained over 90 minutes and consumed 35 percent of the space hours. With meters, 10 per-

cent used 36 percent of the space hours. Obviously, more rigid enforcement based on police observance of vehicles and not on examination of meters is essential. The number of short time parkers and the number of space hours used was almost the same with and without meters. (See Fig.1)

*Elkhart, Indiana - 34,000 population -* Our study showed that very little space has been gained through the use of parking meters in this city. It is, however, important to note that after meter installation, 13 percent of parkers remained over the one hour limit and by so doing consumed 39 percent of the parking space. In this study, it was observed that the average time parker remained was 15 minutes. If this overtime parking were eliminated, an additional 276 average time parkers, or a net gain of 26 percent of average time parkers, could be accommodated. Before meters went in, 88 percent of the parkers remained less than an hour and consumed 62 percent of the available space hours. With meters, 87 percent stayed for an equal time and used 61 percent of the space, which is about the same as without meters.

*Moline, Illinois - 35,000 population -* Typical of cities over 25,000 population, the parking problem in this city is serious. Curb parking space is 90 percent full throughout the day and parking lots get their share of surplus parkers. Before parking meters were installed, 83 percent of the parkers remained one hour or less and consumed 64 percent of the curb availability. After meters, 86 percent parked one hour or less and consumed 57 percent of the space. The big difference in curb use resulted in a larger number of long time parkers after meters were introduced. Before studies indicated 6 percent of the parkers using 19 percent of the curb availability while after results indicated 7 percent of parkers using 29 percent of the space. Thus, the need for proper enforcement of time limits is very apparent.

*Joliet, Illinois - 42,000 population -* Before meters went into effect, 1408 downtown parking spaces were available in the day and were 89 percent full. After the installation of meters the number of spaces

PARKING

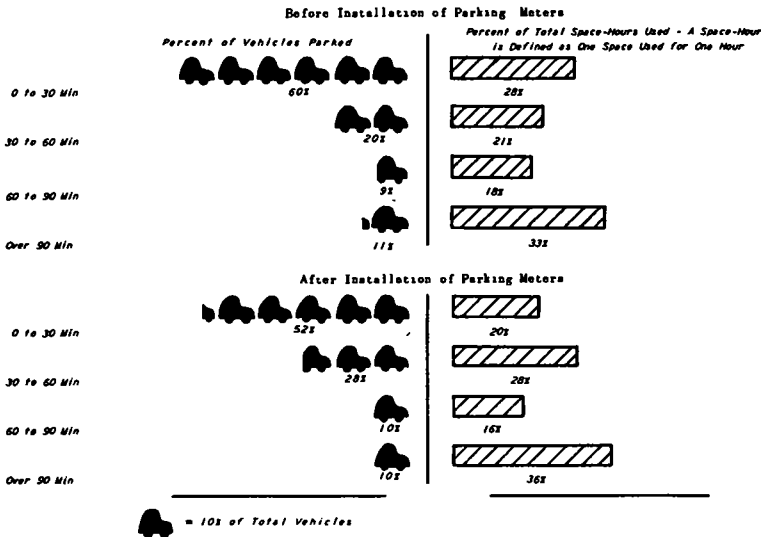


Figure 1. Use of Curb Parking Space in Business District of Marion, Indiana.

was reduced to 1376 and they were 91 percent full. 86 percent of the parkers stayed for one hour or less before meters and consumed 65 percent of the available space hours. After meters, the number of short-time parkers was reduced to 83 percent who consumed 58 percent of the available space hours. Thus it is apparent that no gain in "curb parking availability" was made through the use of parking meters. Further indication of this is evidenced by the increase in the use of space hours by long-time parkers from 19 to 27 percent an indication that proper enforcement certainly is desirable.

*Aurora, Illinois - 47,000 population* - In this study we found that 81 percent of the parkers remained at the curb one hour or less before meters, and consumed 59 percent of the available space hours. After parking meters were installed, 83 percent of the parkers remained one hour or less and consumed 54 percent of the available space hours. There was very little change in violations since 7 percent overstayed 90 minutes without meters and consumed 26 percent of the available space hours, while with meters 8 percent were violators, consuming 28 percent of the available space hours.

COMPARISON OF AVAILABLE PARKING SPACES BEFORE AND AFTER THE INSTALLATION OF PARKING METERS

This study was made to determine whether or not parking spaces were reduced as a result of creating parking stalls. Data obtained from five of the cities could not be used because in some cases parallel parking was substituted for angle parking. In other cases, parking was eliminated for moving traffic, and for the establishment of loading zones. The five cities eliminated are: Princeton, Dixon, Streator, Mattoon and Marion.

The five cities upon which data are based are: Downers Grove, Elkhart, Moline, Joliet and Aurora. All of the "before" and "after" studies, with the exception of Downers Grove, were made six months apart.

Downers Grove showed an increase of two parking spaces, from 111 to 113 stalls, but a decrease in the number of cars coming into the district from 595 to 516.

Elkhart has an increase in available spaces from 126 to 133, but a decrease in the number of cars coming into the district from 964 to 914.

Moline reduced its number of curb park-

COMPARISON OF AVAILABLE PARKING SPACES  
BEFORE AND AFTER THE INSTALLATION OF METERS

City	Before Meters			After Meters		
	Number of spaces	Number of vehicles <sup>1</sup>	Percentage Full	Number of spaces	Number of vehicles	Percentage Full
Princeton <sup>2</sup>	181	939	64%	150	729	61%
Downers Grove	111	595	67%	113	516	57%
Dixon <sup>2</sup>	245	1589	81%	198	1066	67%
Streator			No study made			
Mattoon <sup>2</sup>	211	1386	82%	177	1081	79%
Marion <sup>2</sup>	135	794	73%	114	825	90%
Elkhart	126	964	95%	133	914	86%
Moline	175	1238	88%	164	1119	85%
Joliet	176	1254	89%	172	1259	91%
Aurora	303	2087	89%	288	2080	90%

<sup>1</sup>Number of cars parked throughout the survey.

<sup>2</sup>Angle parking eliminated or parking spaces removed for loading zones.

City	Percent of Overtime Parkers	Percent of Space Hours
Moline, Ill.	7%	29%
Joliet, Ill.	8%	27%
Aurora, Ill.	8%	28%

*Why Street Enforcement is Necessary* - By observing the charts illustrating the before and after curb use in the ten cities mentioned at the start of the report, it will be noted that the percentage of parkers remaining over the time limit is small. (about 7%) On the other hand, the amount of curb space used by this small number is worthy of consideration. (17-36%)(Fig. 2)

In the 47 curb spaces which were continuously observed, 20 parkers were found to reinsert coins after the one hour limit had expired. As a result of this practice, valuable curb space has been "hogged" by a relatively small number of parkers - space which could have been used by a large number of average time parkers.

Let us take, as an example, a typical study made in Moline, Illinois. In this check one observer constantly watched 10 parking spaces from 2:00 p.m. to 5:00 p.m. He recorded the exact time a car arrived and departed. He also observed the number of coins that were deposited by overtime parkers. In this particular check it was found that forty cars used the ten spaces. Of these, thirty-five or 87 percent parked one hour or less and consumed a total of 682 minutes or an average of 19.5 minutes per car. The overtime parkers, which constituted but five or 13 percent of the total consumed 502 minutes or an average of one hour and forty minutes per car. ing stalls from 175 to 164 and reduced the number of parkers using stalls from 1238 to 1119.

Joliet for all intents and purposes

It can be seen that in the case of Evanston, more enforcement is necessary in order to cut down the percent of space hours that are used by long-time parkers. Since this enforcement program is relatively new in Evanston, even better results are expected as the enforcement program continues.

To further strengthen the belief that enforcement of vehicles is necessary to obtain proper use of curb space with meters, another study was made in Oak Park, Illinois. This municipality has a population of 66,000 and its characteristics, income of citizens, and general physical aspects are very similar. However, the enforcement of parking regulations comprises of the observation of parking meters rather than tire marking as in Evanston. Here are the results of that survey:

Time Parked	Percent of Vehicles Parked	Percent of Total Space Hours Used
0-30 min.	56%	26%
30-60 min.	27%	32%
60-90 min.	10%	19%
over 90 min.	7%	23%
	100%	100%

PARKING

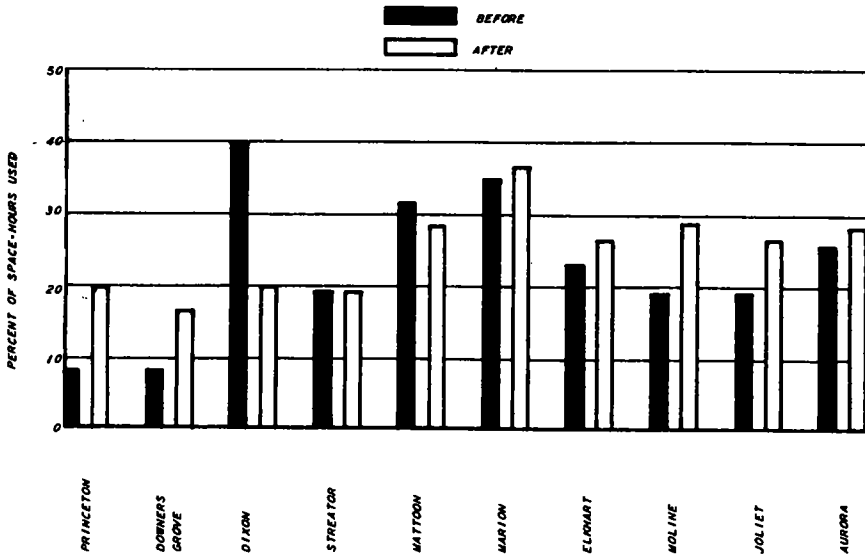


Figure 2. Comparison of Space-hours Used by Overtime Parkers Before and After the Installation of Parking Meters.

showed no change in the number of available spaces or number of parked vehicles.

Aurora, however, showed a decrease from 303 to 288 spaces after the installation of meters. Approximately the same number of cars came into the district and parked at the curb before and after meters. Combining the amount of spaces and vehicles entering the business district before and after in the five cities mentioned it was found that a 3 percent reduction in the number of spaces resulted and a 4 percent reduction in the number of cars coming into the business district. These comparisons are shown in the table "Comparison of Available Parking Spaces Before and After the Installation of Meters."

A BETTER ENFORCEMENT PROGRAM IS NECESSARY

On the basis of this study it can be concluded that parking limits cannot be enforced merely by the examination of the parking meters to determine when coins were last inserted. It must be based upon an inspection of the automobiles parked to determine whether or not they have been standing for longer than the

permitted period. Proper enforcement under a system in which patrolling police officers would check the vehicles, rather than the meters, would add materially to the available parking spaces at the curb.

To demonstrate the effectiveness of such enforcing methods, a study was made in Evanston, Illinois population 65,000, to determine the number of space hours consumed by over-time parkers. This city has recently installed parking meters, but instead of checking the meters for violators, police officers stationed on three wheel cycles mark tires.

Here are the results of that survey:

<u>Time Parked</u>	<u>Percent of Vehicles Parked</u>	<u>Percent of Total Space Hours Used</u>
0-30 min.	57%	28%
30-60 min.	30%	36%
60-90 min.	9%	18%
Over 90 minutes	4%	18%
	100%	100%

Thus it can be seen that with such an enforcement program, only four percent of all motorists were found to remain

over-time at the curb. This is in sharp contrast to the experience found in other cities mentioned in this report. For example, here are the number of over-timed parkers mentioned earlier in the report having a population comparable to Evans-ton:

when coins were last inserted rather than upon inspection of the automobiles parked to determine whether or not they have been standing for longer than the permitted period. Proper enforcement under a system in which patrolling police officers would check the vehicles, rather than merely

City	No. of spaces studied	Vehicles parked less than 1 hr			Vehicles parked over 1 hour			Additional cars that could have been accommodated
		No. of cars	%	Average time parked	No. of cars	%	Average time parked	
Moline	13	36	92%	30 min.	3	8%	90 min.	13
Moline	10	35	87%	19.5 min.	4	13%	100 min.	20
Elkhart	13	85	96%	14.7 min.	4	4%	89 min.	24
Elkhart	11	51	85%	24.2 min.	9	15%	95.5 min.	35

If these long-time parkers were eliminated, there would be space available for 25 additional average time parkers.

Here are some examples of other studies of this same abuse:

This study clearly demonstrates the need for rigid enforcement of parking limits if more parking space is to be found at the curb. As this study, and countless other parking studies repeatedly point out, the number of long-time parkers are few, but their violations are expensive to other motorists in terms of space "hogged" at the curb. As the table above points out, in just one section of a block, violators constitute but 15 percent of the total, yet, if these violators were eliminated, space could be provided for an additional 31 more average time parkers. Obviously, these overtime parkers will not be eliminated if officers confine their efforts to looking at the meters without noting the time individual cars remained at the curb.

CONCLUSIONS

The studies here reported lead to the conclusions that, as generally administered, parking meter ordinances have not aided in the creation of additional parking spaces and that, apparently, this shortcoming has been the result of imperfect enforcement, based upon examination of the parking meters to determine

the meters, would add materially to the available parking spaces at the curb in the cities which employ these devices. (This has been demonstrated in Evanston, Illinois.) Apparently, enforcement through the actual checking of the vehicles has been lax within the municipalities studied because of the assumption by the enforcement officials that meters are self-enforcing because parkers would be deterred from overtime parking because of the necessity of inserting additional coins in the meters to obtain additional parking time. This assumption has been proved incorrect because the survey shows a marked increase in the number of overtime parkers who escape detection under the generally followed system of enforcement through checking the meters alone.

Proper enforcement alone will not provide a complete solution to the parking problem. With the present and the expected increase in the number of vehicles, adequate curb space for parking will not be available even under the most rigid enforcement of parking time limit restrictions. The use of parking meters can contribute to the ultimate solution of the problem because in addition to maintaining a rapid turnover of space, they can produce revenue which is generally more than adequate to defray the cost of parking regulation and the surplus revenue may be utilized for the purchase and construction of municipally owned off-the-street parking fac-



ilities. Municipalities commonly use such surplus parking meter revenue for a variety of purposes, such as street repair, the purchase of police and fire department vehicles and other expenditures not directly related to the parking problem. It is recommended that where existing laws do not authorize the use of parking meter revenue for the purpose of acquiring and constructing municipal parking lots, legislation should be adopted to permit this use of parking meter funds and that parking meter ordinances should be amended to provide for this expenditure.

#### DISCUSSION

Mr. Burrage: The cruising method of determining parking time as described in this study does not give accurate lengths of parking time. Usually it indicates only a portion of those overstaying a fixed parking time limit.

Mr. Sielski: The limitation on this type of study is recognized and by definition allowance is made. The interval in which parking checks were made is relatively unimportant in these studies because

long time parkers only were considered. No overtime parkers were considered unless the vehicles had been in a space 90 minutes although the zones studied were one-hour zones.

Mr. LeVerne Johnson, American Automobile Association: Has any attempt been made to consider the amount of enforcement of time restrictions during the period of the studies?

Consensus of several replies: The degree of enforcement is difficult to appraise. Variation in amount of enforcement undoubtedly exists between different cities, within the same cities and even between metered and unmetered areas of the same city.

Several comments emphasized the limitations of this paper and of the paper presented by Messrs. Burrage and Hitchcock. These should be recognized in any comparison of the data presented in the two papers.

Limitations to the paper by Mr. Sielski.

All cities studied were less than 50,000 population.

Overtime usage is limited to drivers parking 90 minutes or more.

Overtime usage is expressed only in time and not numbers of parkers.