CURBSIDE DETERRENCE?

An Analysis of the Effect of a Slug-Rejector Device, Coin-View Window, and Warning Labels on Slug Usage in New York City Parking Meters

John F. Decker

With the increased utilization of parking meters by many American cities has come an increase in associated criminal problems. In New York City, for example, parking meters are frequently vandalized, broken into, and completely stolen. Far more common, however, is the rapidly growing problem of illicit slug usage in the meters.

Data on New York City parking meter use for the last thirteen years is shown in Table 1. Between 1958 and 1970,

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AUTHOR'S NOTE: *This is the final report on a field research project, conducted by the Criminal Law Education and Research Center (CLEAR) of New York University. The findings of the first part of this study, which was conducted by Robert Barry, were published in* Criminologica *6, 4 (1969) and entitled "To Slug a Meter: A Study of Coin Frauds." In that study, an analysis was made of the mechanics of parking meters, methodology of meter collections, the degree of slug use in the city, the difficulty of apprehending slug users, and possible proposals for eradicating slug use. This paper is the culmination of that study.*

JOHN F. DECKER is presently a J.S.D. candidate working on his doctoral dissertation. He works with the Criminal Law Education and Research Center at New York University in the summers as a research fellow, and is Assistant Professor of Law at DePaul University College of Law in Chicago the rest of the year.

TABLE 1
SLUG USAGE IN NEW YORK CITY 1958-1970

Year	Revenue	Slugs	Slugs Per 1,000 Insertions
1958	6,963,913.12	62,060	0.9
1959	7,112,264.41	67,387	0.9
1960	7,347,825.59	71,516	1.0
1961	7,164,410.85	76,920	1.1
1962	7,199,223.40	131,845	1.9
1963	9,094,984.19	506,911	5.6
1964	9,216,485.17	818,200	8.9
1965	9,858,604.79	1,307,237	13.3
1966	9,817,906.77	2,065,126	20.8
1967	9,667,350.75	2,452,904	25.0
1968	10,564,740.99	3,903,845	35.7
1969	11,213,740.59	4,211,182	35.7
1970	11,603,073.27	3,826,956	32.3

the number of slugs placed into the meters rose from a low of 62,060 in 1958 to a high of 4,211,182 in 1969, an increase of 6,167%, although in 1970 the figure dropped to less than 4,000,000. In terms of rate of slug use, this means that in 1958 one slug was found in every 1,128 coins collected from the meters, while in 1970 every thirty-first object inserted into a meter was a slug. In terms of revenue, we find one slug for every $112 revenue in 1958, and one slug for every $3 of income in 1970.

During 1958 through 1961, rate of slug use never rose by more than 5% over the preceding year. In 1958, rate of slug use (in terms of slugs per 1,000 insertions) was approximately 0.9, and, in 1961, the figure was 1.1. This increase could be attributed to the general rise in petty larceny. However, a high of approximately 36 slugs per 1,000 insertions was observed in 1969, an increase of nearly 4,000% from 1958, although the rate of slug use then decreased somewhat in 1970 to 32 slugs per 1,000 insertions.

This sharp increase in illicit meter use cannot be attributed to a similar increase in either the number of meters or the

amount of their use. In 1961, there were approximately 57,000 meters in New York City; today there are approximately 72,000 meters, an increase of about 26%. Revenue from 1958 to 1970 increased by 67%, from nearly $7 million in 1958 to over $11.5 million in 1970. The number of coins inserted into New York City parking meters in 1961 was approximately 71 million, and in 1970 approximately 119 million, an increase of 68%. A corresponding increase of 68% in slugs from 1958 to 1970 would show 104,000 slugs collected in 1970, whereas the actual figure was nearly 4 million.

It is interesting to note that when monthly data on meter use in New York City was examined for the years 1966 to 1970, seasonal variations in illicit meter use were observed, as shown in Figure 1. The periods showing the greatest number of slugs were spring and autumn, with May and October highest in slug usage. The least illicit meter use occurred in February and August, and there was a rise and fall in slug usage between the seasonal highs and lows. Thus it seems the amount of slug use decreased during extreme weather conditions, be they hot or cold, while during periods of more moderate weather the slug problem increased. Revenue followed a similar trend in seasonal variation. To analyze these seasonal variations quantitatively, we developed the index of seasonal variation in slug use for the five years studied, shown in Table 2. The January index of 87 indicates that over the five-year period, slug usage in January was 13% below the average. The month with the highest index was October, showing an amount of slug use 14% above the average.

SCHEMES UNDERTAKEN TO DECREASE SLUG USE

In the last several years, various proposals were presented and attempts made to decrease slug use in New York City

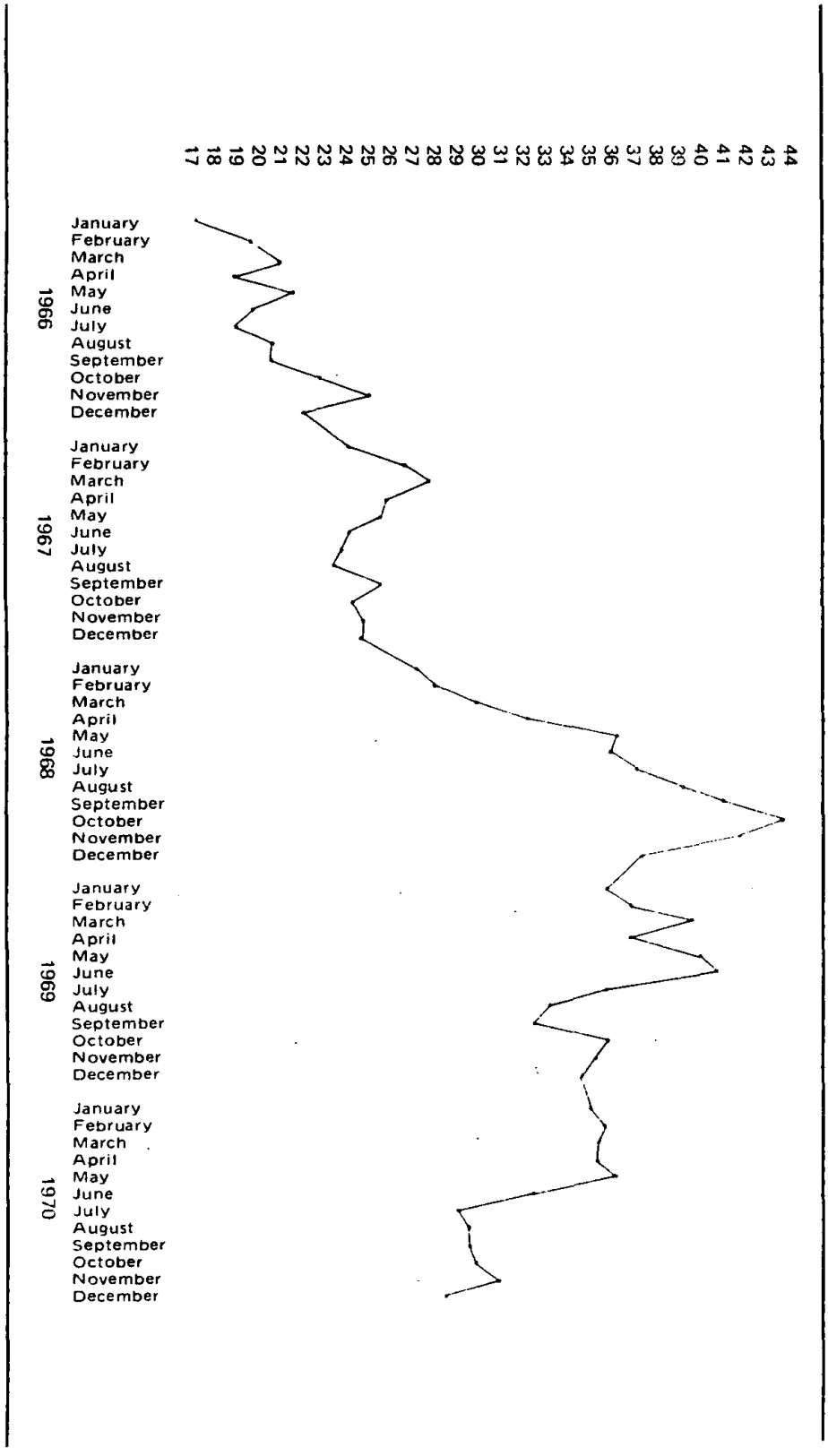

Figure 1: RATE OF SLUG USE IN NEW YORK CITY PARKING METERS (slugs per 1,000 insertions)

TABLE 2
INDEX OF SEASONAL VARIATION IN SLUG USAGE 1966-1970

Month	Index
January	87
February	74
March	105
April	106
May	112
June	107
July	98
August	96
September	100
October	114
November	98
December	103

parking meters. One attempt by the city of New York is the introduction of a parking meter which mechanically rejects certain types of slugs, and also supposedly deters potential slug users through use of a coin-view window. The decision to install parking meters with both these devices was made following a study conducted by the city which projected that such meters would retard illicit meter use. The slug-rejector device prevents the meter from registering time if a slug with a hole in it is inserted into the parking meter. Mechanically, any object inserted into a meter with this device rubs against a pin in the meter. If the object inserted has a hole in it, it passes through the pin and drops into the coin box without registering time. Since the vast majority of slugs inserted are of a washer or pull ring variety from a soft drink or beer can, theoretically much of the slug use will be eliminated. A meter with a coin-view window displays the last object inserted into the meter. Hence, if a slug user inserts a slug into the meter it will be visible to everyone, including the police or meter-maids. Theoretically, this window, which is made of a strong, durable plastic called "lexon," also deters slug use. The new

meters, which the city began installing in April of 1969, are the Duncan "VIP" meters, which have both the slug-rejector device and the coin-view window.

Another scheme, which was constructed by this writer, used warning labels affixed to the meters. Three sets of labels warned potential offenders that use of a slug is a violation of the respective federal, state, and city laws, and is punishable by imprisonment or fine or both. Theoretically, these warning labels would deter potential slug users from placing slugs into the meters.

ANALYSIS OF THE TWO SCHEMES TO REDUCE SLUG USAGE

In order to evaluate the effectiveness of the Duncan meter in deterring slug usage, ten regions with 100 to 400 meters each, located in the Manhattan, Brooklyn, and the Bronx, covering a wide variety of socioeconomic levels, were studied during 1968, 1969, and 1970. The study was to provide an estimate of any change in illicit meter use following installation of meters with the slug-rejector device and the coin-view window to determine their effectiveness as deterrents to slug usage. The new Duncan VIP meters were installed during the first six months of 1969.

The study revealed a marked decrease in amount of slugs used in each area from 1968 to 1969, following installation of the new meters. Examination of revenue, however, showed smaller variation from year to year, and rate of slug usage for all ten regions decreased substantially from 1968 to 1969. This downward trend in rate of slug usage continued from 1969 to 1970 in five of the areas; in one area, the rate did not change. Two areas showed a slight increase in rate of illicit meter use from 1969 to 1970, and two other areas were not considered due to lack of meaningful data for the year 1970. However, the rates for both 1969 and 1970 were far below that of 1968 in *all* areas.

Figure 1 shows that the peak period of slug usage was the last quarter of 1968, after which began a gradual decline in illicit meter use that has continued to the present. This would indicate that installation of the coin-view window and slug-rejector device in New York City parking meters, begun in early 1969, has had a significant impact on the citywide rate of slug usage.

Table 3 shows a great percentage decrease in slug use from 1968 to 1969, immediately following installation of the new meters, in areas 4 and 5, which were the two most economically deprived regions under study. The least decline in slug usage was observed in areas 1, 2, and 3, which were the most affluent regions under study. It should also be noted that the greatest meter use was also found in these three districts, which indicates the least decline in illicit meter use occurred in areas where meter use was greatest.

As a further look at the decreased rate of illicit meter use, the 1968 rate of slug use, prior to the installation of the new meters, was projected to 1969, and comparison was made between the actual number of slugs collected in 1969 and this projected figure. Figure 2 illustrates graphically the substantially lower number of slugs illegally placed in the Duncan meters in 1969.

TABLE 3

RATE OF SLUG USAGE (slugs per 1,000 insertions)

Area	Year			% Decrease After Installation of New Meters (1968-1969)
	1968	1969	1970	
1	33.7	23.8	13.3	29.4
2	19.4	13.4	6.7	30.9
3	34.8	25.9	16.1	25.6
4	215.3	65.1	153.4	69.8
5	182.0	53.5	60.7	70.6
6	55.9	12.6	13.5	77.5
7	138.5	28.4	25.2	79.5
8	68.1	28.1	23.6	58.7
9	91.2	31.7	34.1	65.2
10	68.1	24.4	24.4	64.2

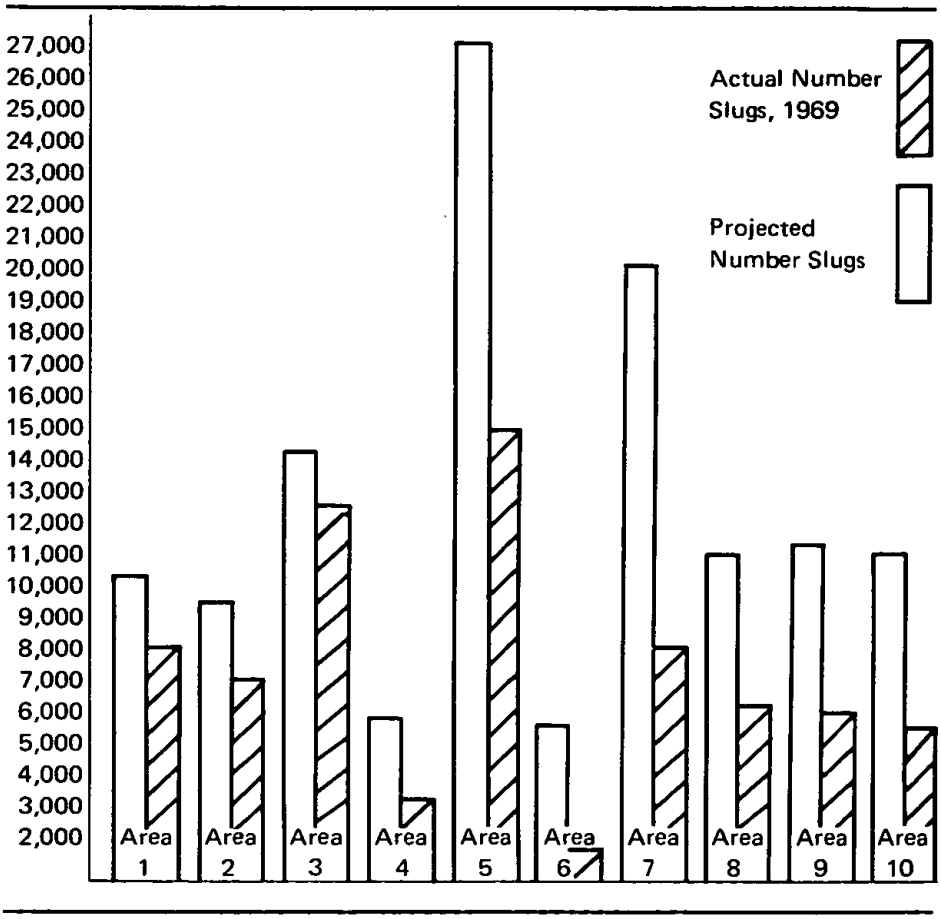

Figure 2: 1969 PROJECTED NUMBER OF SLUGS AND ACTUAL NUMBER OF SLUGS

THE SECOND SCHEME

The second part of the study conducted by this writer examined whether potential slug users were deterred by use of warning labels affixed to the meters. Analysis was made to determine whether the number of slugs found in those parking meters decreased from previous years or from that of other meters in the city without warning labels. Specifically, there were three types of labels, each applied to a selected group of meters. All the labels were approximately six inches long and two inches wide, with bold black lettering on a

bright yellow background, and yellow lettering on black (see Figure 3). Labels on meters in the first area read:

SLUG USE IS A VIOLATION OF NEW YORK CITY ORDINANCE
$50 FINE[1]

Meter labels in the second area read:

SLUG USE IS A VIOLATION OF STATE LAW
3 MONTHS IMPRISONMENT AND $500 FINE[2]

Labels in the third area read:

SLUG USE IS A FEDERAL CRIME
1 YEAR IMPRISONMENT
AND $1,000 FINE[3]

A control area where no labels were attached to the meters was also used for comparison purposes.

The four areas studied were in the same borough, in areas of similar socioeconomic backgrounds, and had similar histories of slug problems in the past, although none of the areas was immediately adjacent to another. The four regions, each of which had approximately 100 meters, were studied during the first five months of 1971. The various warning labels were affixed to the respective meters the last week of February. None of the meters under observation was equipped with any other slug deterrent device, such as the slug-rejector or coin-view window. Thus, differences in slug usage observed within any area could be attributed to the warning labels affixed to the meters in that region.

Initially, a comparison was made of the 1970 rate of slug usage in each of the four areas under study with the comparable 1970 citywide monthly rates in order to learn of the relative significance of illicit meter use between the regions under study and the entire city. Table 4 shows that for all months under study, slug usage in 1970 was greater in the four regions being observed than it was for the city as a

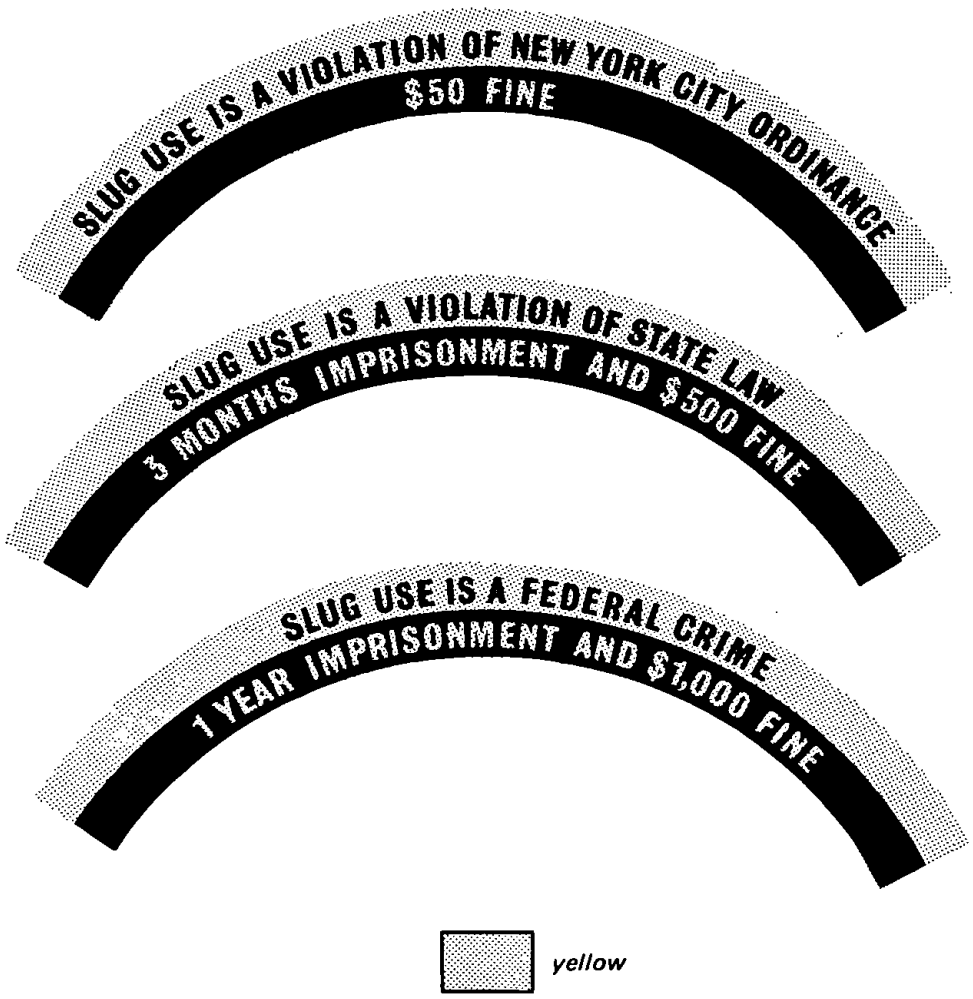

Figure 3.

whole. In 1971, the control region continued to experience a greater rate of slug usage than the citywide rate throughout the five months studied. The region where federal warning labels were used also showed greater slug usage than the citywide rate, both prior to and after application of the warning labels, whereas the area where state warning labels were used showed a greater rate prior to use of the labels and a lesser rate after use of the labels. However, in May, the rate

TABLE 4
RATE OF SLUG USAGE IN COMPARISON WITH CITYWIDE RATE (slugs per 1,000 insertions)

	Type of Label				
	Federal	State	City	Control	Citywide (no labels)
January					
1970	56.5	82.0	52.6	52.1	34.8
1971	45.5	44.1	26.5	40.0	29.2
February					
1970	86.2	63.3	36.5	63.7	35.3
1971	31.2	33.2	22.2	38.3	29.8
March					
1970	65.8	70.4	41.8	56.2	35.2
1971	40.3	27.3	18.4	34.7	29.5
April					
1970	68.5	61.0	36.6	52.9	34.8
1971	38.6	27.5	21.3	42.7	28.2
May					
1970	57.1	57.5	43.9	49.3	35.2
1971	55.9	38.9	30.3	45.9	29.3

in the state area once again was greater than the citywide rate. This might indicate the deterrent effect of the state labels was short-lived. Examination of the 1971 rate of slug usage in the region where city warning labels were applied showed this area experienced a lesser rate of slug usage than the citywide rate throughout the entire study, until May 1971, when the rate was somewhat higher.

Examination of meter use data within each of the four areas under observation showed that for all months under study the monthly rate of illicit meter use in each area was less in 1971 than it had been in 1970, as shown in Table 4. Even the months of January and February, prior to the application of the warning labels, experienced a decreased rate in slug use from 1970 to 1971. Also, the control group, where no labels were affixed to the meters, showed a decline in illicit meter use for all months. Thus, unlike in the study

of the deterrent effect of the slug-rejector device and coin-view window, no immediate effect of the warning labels was obvious. Rate of slug usage decreased in the months prior to the use of the warning labels, as well as in the months after their application. Although it seems difficult to account for this decrease in areas which do not have the slug-rejector device and coin-view window, it is possible that such decreases might be attributed to the experiences of slug users having their slugs rejected by nearly identical meters which were equipped with the slug-rejector device. But whatever the cause of this decline, we obviously cannot attribute all the decreased illicit meter use observed in March, April, and May 1971 entirely to the warning labels.

Examination of the percentage of decreased monthly slug usage from 1970 to 1971 also revealed no immediate trend, as shown in Table 5. The most obvious effect of the warning labels was seen in the area where state labels had been used, where the percentage of decrease in illicit meter use was 90.5% from February 1970 to February 1971 (prior to the use of the warning labels), and 157.7% from March 1970 to March 1971 (after application of the labels). The percentage decrease was also great comparing April rates (121.3%). However, in May the figure dropped to 47.7%, perhaps indicating that the deterrent effect of the state labels was short-lived.

The area where city labels were applied also showed a great percentage of decrease in slug usage from March 1970 to March 1971, the month after application of the warning labels in 1971, 127.2%. But the April percentage decrease dropped to 72.2%, less than the January decline of 98.9%, and in May the figure was 44.7%. It might be argued that the deterrent effect of the city warning labels was also short-lived.

The area where federal warning labels were used showed greatest monthly percentage decrease in February (176.7%), *prior* to the use of the labels. But, in March and April, *after*

TABLE 5
PERCENTAGE DECREASE IN SLUG USAGE
1970 TO 1971 COMPARISON BY MONTH

Federal Warning Labels	
January	24.3
February	176.7
March	63.2
April	77.4
May	2.3
State Warning Labels	
January	86.1
February	90.5
March	157.7
April	121.3
May	47.7
City Warning Labels	
January	98.9
February	64.6
March	127.2
April	72.2
May	44.7
Control Area	
January	30.2
February	66.2
March	61.8
April	23.8
May	7.4

application of the labels, the respective decreases were only 63.2% and 77.4%, and in May the figure was a mere 2.3%. Thus, no noticeable deterrent effect of the federal warning labels was observed.

The control region showed nearly the same percentage of decrease in slug usage from 1970 to 1971 for the months of February and March, giving further weight to our statement that the state and city warning labels did have a noticeable effect immediately after their application to the meters, although the effect was only temporary. As a final analysis, one-way analysis of variance showed no significant difference in illicit meter use in any of the four regions after the warning labels were applied.

CONCLUSION

Illicit meter use in the ten areas under study showed a dramatic decline following installation in 1969 of the Duncan "VIP" meters with coin-view window and slug-rejector device. In fact, the decrease was so great that it affected citywide slug use totals for 1969 and 1970, although only 16,074 of the city's approximately 72,000 meters were the new type of meters. Rate of illicit meter use in both 1969 and 1970 were significantly lower than the 1968 rate (before installation of the Duncan meters). In addition, the majority of the areas studied showed 1970 slug usage was significantly less than even the 1969 rate. However, in two of the areas under study the rate of illicit meter use *increased* substantially between 1969 and 1970, although, as previously stated, the rates for both 1969 and 1970 were *far* below that of 1968. Whether this subsiding in illicit meter use will continue can only be revealed by future studies.

The districts with the greatest slug problem when the study was initiated were the areas which experienced the greatest rate of decrease in illicit meter use following installation of the new meters. Areas with the greatest amount of meter use showed the least percentage decrease in slug usage with the new Duncan meters. And it was interesting to note that these areas were the most affluent of the regions under observation.

The decreased illicit meter use shown by this study is attributed to the new meters. However, since all meters in the districts studied had both the slug-rejector device and the coin-view window, it was not possible to test which of these devices afforded the greater deterrence. It is contended by some that the coin-view window invites vandalism and future meters should be equipped with only the slug-rejector device. Due to the successful deterrence by the present meters with both devices, it would seem wise that two studies be made before initiating any change in the meters: (1) a study of slug

usage with meters having only the slug-rejector device, and (2) a study of vandalism in meters with the coin-view window.

In the second aspect of the study, various methods of analysis showed the federal warning labels had no noticeable effect, while the state and city warning labels had a noticeable, although short-lived, effect. It appeared that warning potential offenders that slug use is a violation of the

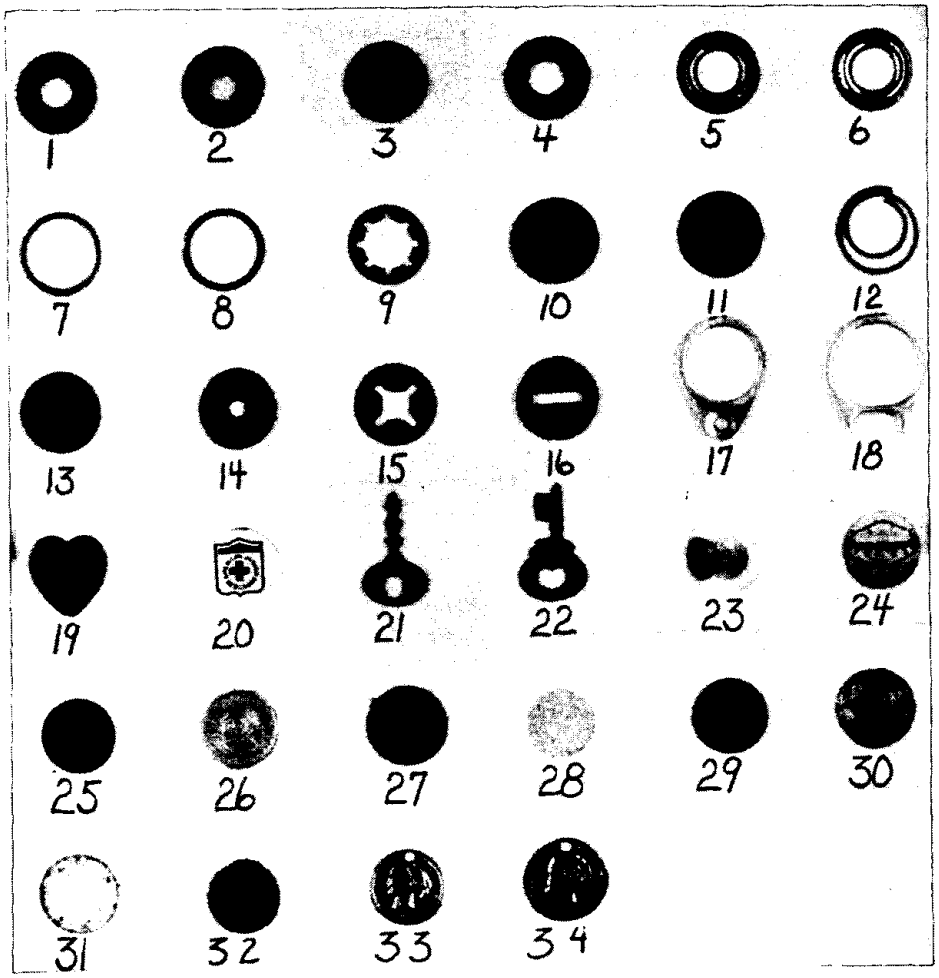

Figure 4.

law and punishable by substantial sanctions had little deterrent value.

It is obvious that the parking meters with the coin-view window and slug-rejector device were more effective in reducing illicit slug use than use of warning labels. The minimal deterrent value of the labels can probably be attributed to the slim chance a slug user will be apprehended, much less convicted and subjected to the maximum penalty. This might indicate that potential slug users are not greatly deterred by the coin-view window either, since the object of the window is also to instill fear of apprehension. Hence, it seems that a mechanical device, such as the slug-rejector, which makes law violation difficult, is superior to a scheme or device which is dependent upon the potential violator's fear of apprehension. This finding is critical in light of the theoretical structure of criminology based on a punishment-deterrence-rehabilitation model, and it suggests a serious look at programs based on a prevention model and environmental design (see Jeffery, 1971).

NOTES

1. New York, N.Y., Traffic Regulations art. 8, §93(f).
2. N.Y. Revised Penal Law §170.55; N.Y. Revised Penal Law §70.15(2); N.Y. Revised Penal Law §80.05(2).
3. U.S.C.A. §491(a).

REFERENCE

JEFFERY, C. R. (1971) Crime Prevention Through Environmental Design. Beverly Hills: Sage Pubns.