THE TIME REQUIRED TO COMMIT CRIME*

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INTRODUCTION

In a previous paper (1) the theory of random patrol was applied to the police problem of intercepting crime while it is in progress with a mobile patrol force. At that time it was not possible to determine if it were feasible for the police to place a major emphasis on this tactic. The difficulty existed because of a complete lack of factual data as to the length of time required to commit a crime, and what percentage of crime occurred at locations where it could be intercepted by the police.

If it is assumed that at least 50 percent of all crime occurs at a location where it can be seen by the police patrol, and that the average time required to commit a crime is two minutes, then it appears that many municipal police departments have sufficient manpower to insure about a 10 percent interception rate using the random patrol tactic. (2)

A preliminary study in Chicago indicates about 60 percent of the crime occurs at sites accessible to the police patrol. (3) A more recent and more controlled study in Syracuse (4), however, shows that perhaps only about 40% of all crime occurs at such locations.

During the past two years the opportunity was presented in Syracuse to obtain some factual data on the time required to commit a crime. Since mid-1968 the Syracuse Police have been involved in the Crime Control Team experiment. (5) One of the principal tactics used by the Teams is the random patrol. Sufficient interceptions have been made during this period so that it

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is now possible to use the theory of random patrol to calculate the average time required to commit

- a crime in general
- a Part I crime
- a Part II crime
- an aggravated assault
- a mugging
- a residential burglary
- a commercial burglary
- a theft from an automobile

The results of this study should be considered as being very preliminary. They are being published at this stage of the work only because of the complete lack of such information in the literature.

THEORY OF RANDOM PATROL

The theory of random patrol predicts the probability of interception, p, as

$$p = 1 - \exp(-qtnv/c) = 1 - \exp(-qt/T) \quad (1)$$

where:

- q is the probability of the patrol detecting (i.e., observing) the crime if it visits the location of the crime while it is being committed.
- t is the time required to carry out the crime plus the time the perpetrator remains in the area and is identifiable by the patrol as the perpetrator of the crime.
- v is the velocity of the patrol unit
- n is the number of patrol units
- c is the length of the area that is vulnerable to attack and is being protected by the patrol (that is, the sum of the length of all of the streets and alleys in the area), and
- T is the average time to completely patrol the area once in a continuous manner.

For small values of the exponent, Equation (1) can be written as

$$p \approx qtnv/c = qt/T \quad (2)$$

Both Equations (1) and (2) are displayed in graphical form in Figure 1.

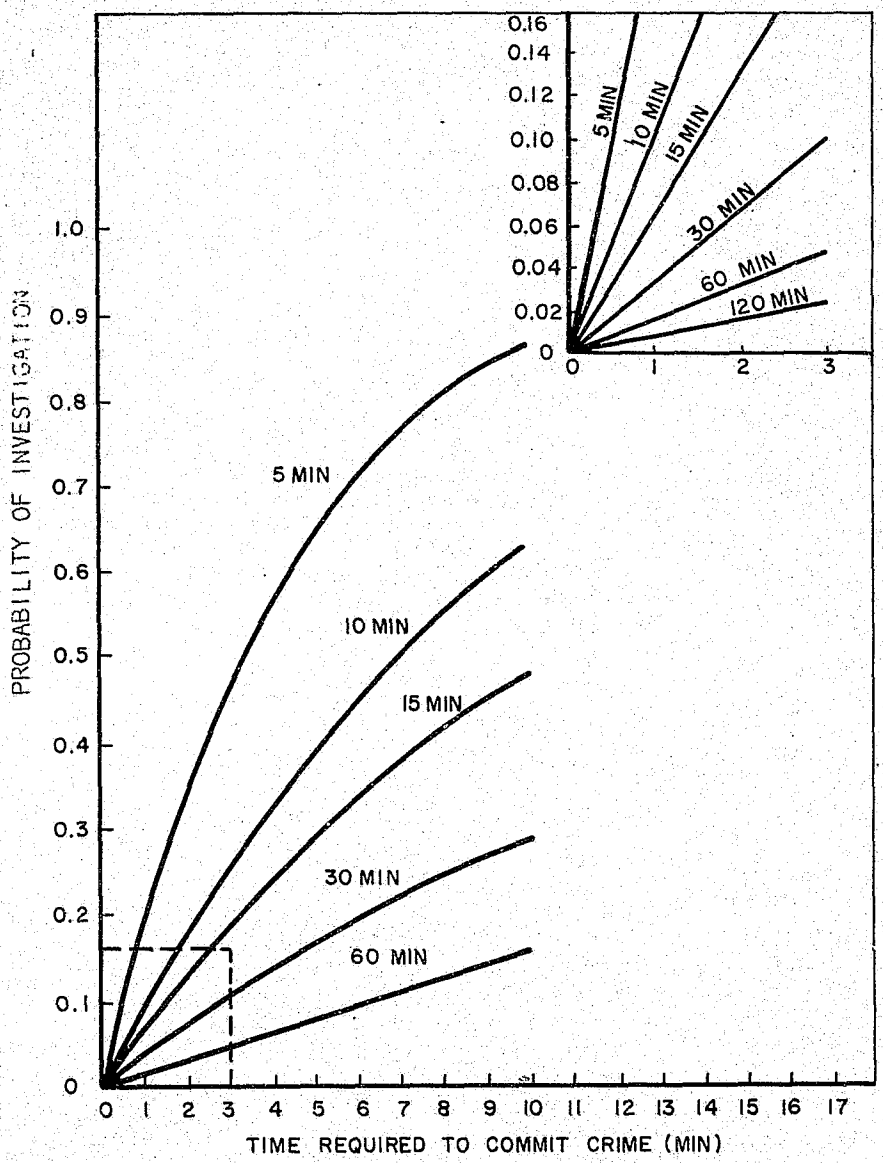

Figure 1. The Probability of Interception as a Function of the Time Required to Commit a Crime. The parameter is the average time required to visit every point in the area being protected in a continuous manner.

Average Time, T, to Patrol the Area

A rigorous application of Equations (1) or (2) to calculate the time to commit a crime $|t|$, requires that the quantity $c/nv = T$ be known during the interval of time, t. Since it is often impossible to chronologically fix the time period, t, an exact value of T is not known. To determine, theoretically, accurate values of t would require a much more elaborate theory of random patrol than is presently available.

In this paper an average value of T is used. In order to obtain an appreciation for the meaning of this average it is necessary to provide a description of the deployment and mode of operation used by the field units that obtained the experimental data.

The Crime Control Team, which collected the test data, consisted of an average of 16 policemen during the data collection period. The Team consistently deployed only two patrol units during the hours of 0400 to 2000. The remaining manpower was committed from 2000 to 0400. While the Team has several basic tactics at its disposal, its principal tactical objective during the hours of darkness is to intercept crime while it is in progress; that is, it is a random interception patrol.

Each policeman provides about 2000 hours to the Department per year, or the Team has about 26,160 man hours available. Of this, about 11,680 man hours are committed during the hours 0400-2000. The remainder of 21,320 hours, or about 58 hours per day on the average, is available for an interception patrol. Since each policeman has available seven man hours of effort per duty shift, the maximum average number of patrol units that were deployed was about eight per night during the hours of 2000-0400.

The CCT patrolman has considerable latitude as to the particular tactic or set of tactics he will employ. From personal observations of the authors, together with a review of the patrolman's log, it is possible to set a minimum and maximum time the CCT officer consistently employs the interception tactic. Very seldom will the officer spend less than half of his duty tour patrolling; very seldom will he devote the total tour to this tactic. Thus the manhours available per man-tour for the interception tactic is 4-7 hours; with the average probably close to the lower limit. Therefore, of the eight units available each night, on the average somewhere between 4 and 8 units are engaged in the interception tactic.

The patrol units of the CCT, on the average, travel about 40 miles per night, or the total interception patrol travels between 160-320 miles per night.

Since the area where the CCT is committed contains about 27 miles of roadway, on the average the patrol should visit every location in the area every 44-88 minutes. These are the values that are assumed for the quantity, T.

One further assumption is made; that is that all the crimes considered are assumed to have occurred during the period of 2000-0400. This is not correct and the assumption will tend to make the calculated values of t too small.

EXPERIMENTAL RESULTS

The experimental results obtained to date are displayed in the first four columns of Table I. The number of crimes of each specific crime type that was reported to the police during the data collection period is recorded in the first column. The number of these crimes which the CCT officers judged as being detectable is in the second column. A crime is defined as detectable if it occurred at a location where it could have been observed by a patrolman in the course of his normal patrol activities.

The number of intercepts is noted in the fourth column, which provides the experimental interception probability of column five. This probability times the patrol time, T, calculates the quantity, qt, of the last column. The smaller value for qt assumes a 44 minute patrol, the larger an 88 minute patrol.

The quantity, qt, is the parameter that is directly of interest in examining the usefulness of the random patrol tactic. The interception probability depends not only on the time, t, to commit the crime but also on the probability that the patrolman will observe the crime and recognize that a crime is being perpetrated.

Some preliminary data obtained in Syracuse in patrol observation experiments [6] indicates that q is between 0.25 and 0.50 under simulated nighttime field conditions. Thus, approximate values of the time, t, to commit a crime are obtained by multiplying the value of the final column by a factor of 2 or 3.

CONCLUSIONS

Two major assumptions were made in obtaining the values for qt in Table I:

(a) The crimes considered all occurred during periods of the day when the random patrol was operational.

(b) The true value of T is between 44-88 minutes.

Assumption (a) tends to make the calculated values of qt smaller than they actually are. As noted before, the authors' subjective feeling is that 88 minutes is a more realistic value of T than is 44 minutes. This implies that the larger values of qt in Table I are more realistic.

TABLE I [4]

Type of Crime	Number in Sample	Number Detectable	% Detectable	Number Intercepted	Interception Probability	qt
Rape	32	10	31	1	0.100	4.4-8.8 min.
Aggravated Assault*	172	90	52	5	0.055	2.4-4.8
Strong arm/mugging	48	40	83	1	0.025	1.1-2.2
Burglary						
Residential	355	80	22	4	0.050	2.2-4.4
Commercial	182	135	74	2	0.015	0.6-1.3
Larceny from automobile	320	170	53	1	0.006	0.2-0.5
Part I	1678	655	39	17	0.026	1.1-2.3
Part II	1314	600	46	43	0.072	3.1-6.3
All Crime	2992	1250	42	60	0.048	2.1-4.2

* Does not include aggravated assaults that were a result of a family argument.

The experimentally obtained average value obtained for the quantity, qt, for all crime confirms the assumed value used in previous calculations. Thus, the data available to date affirms the contention that many municipal police departments do have sufficient manpower to implement an effective random patrol.

While data collection of the type used in this paper will be continued, it should be realized that such additional data will probably only provide approximate values of qt for other specific crimes. Additional data is not expected to make a major revision in the accuracy of the present values. This is a result of the difficulty (if not impossibility) of obtaining an accurate value of T during the time interval, t, during which the crime is being perpetrated.

A more fruitful approach to refining the value, t, would seem to be the re-enactment of crimes based upon descriptions of witnesses and victims and the physical evidence available.

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