R-529-NYC
SEPTEMBER 1970

AN ANALYSIS OF THE APPREHENSION ACTIVITIES OF THE NEW YORK CITY POLICE DEPARTMENT

Peter W. Greenwood

THE
NEW YORK CITY
RAND
INSTITUTE

545 MADISON AVENUE NEW YORK NEW YORK 10022 (212) 758-2244

Rand

The New York City-Rand Institute is a nonprofit research institution founded, as its Articles of Incorporation state, "... primarily to conduct programs of scientific research and study, and provide reports and recommendations, relevant to the operations, planning or administration of the City of New York." The Institute was established in 1969 by the City of New York and The Rand Corporation as a center for the continuing application of scientific and analytic techniques to problems of urban life and local government. It is governed by a Board of Trustees appointed jointly by the City and Rand.

R-529-NYC
SEPTEMBER 1970

AN ANALYSIS OF THE APPREHENSION ACTIVITIES OF THE NEW YORK CITY POLICE DEPARTMENT

Peter W. Greenwood

This study was sponsored by the City of New York.
Its contents, however, do not purport to represent
the official views or policy of the City of New York.

THE
NEW YORK CITY
RAND
INSTITUTE

545 MADISON AVENUE NEW YORK NEW YORK 10022 (212) 758-2244

Rand

Published by The RAND Corporation

PREFACE

This Report analyzes New York City Police Department programs for apprehending serious criminal offenders. The study was part of an effort by the New York City-Rand Institute to provide rational criteria for choosing among alternative law enforcement programs and to suggest new methods of operation and technological changes that will improve the effectiveness of police department operations. It was performed during the period from April through December 1968. Since that time, many changes have been made in the Department's operations, so that the findings should not be interpreted as descriptive of current procedures.

This Report, an abridged version of a report to the New York City Police Department, should be useful to law enforcement personnel for the methods of analysis and evaluation demonstrated in the study.

SUMMARY

The governing aim of this study is to develop criteria for evaluating apprehension efforts that are consistent with the overall objectives of the criminal justice system, and to apply these criteria to existing programs. The study concentrates on programs leading to the arrest of Part I offenders: those who commit homicide, rape, robbery, assault, burglary, grand larceny, and auto theft.

After an examination of the possible evaluative data, the traditional "clearance rate" was rejected for this analysis because of its susceptibility to bias and the pressure it places on police officers to bargain with offenders. Simply stated, the clearance rate is the fraction of crimes reported to the police that the police claim to have solved. As a substitute, "probability of arrest" was adopted as a more accurate measure of apprehension program effectiveness. The study suggests that in counting the arrests made by a particular unit, as a measure of the unit's output, each arrest should be qualified by the seriousness of the offense and the final court disposition of the case, so that detective work resulting in arrest of the more serious offenders or in higher conviction rates will be favorably recognized and encouraged.

In determining the preferred allocation of manpower among apprehension activities, such as investigation, patrol, stakeouts, and tails, it is necessary to estimate the marginal productivity of additional manpower in terms of arrests per man-day. For Part I crimes, it was found that the probability of arrest differs vastly between the crimes of passion--homicide, rape, and assault--and the crimes of profit--robbery, burglary, and larceny. This probability is high for crimes of passion; and the study of assault showed that the probability increases as more effort is devoted to each case. For crimes of profit the probability of arrest is extremely low (0.06 robbery, 0.01 for burglary, and 0.02 for grand larceny), nor does it appear to increase if more effort is devoted to each case. In fact, the vast majority of arrests for property crimes are pickup arrests made near the scene of the crime or as a result of evidence that is readily apparent at the time the crime is reported.

The study also examines the uses and deployment of detective patrol. It was found that general patrol activity was more productive than tails or stakeouts during the period of time covered by our data. In comparison with other activities, such as uniformed patrol and investigation, plainclothes detective patrol proved to be the most productive technique in arresting serious offenders.

All the inferences of this analysis are based on data that were not collected primarily for evaluative purposes. Greater precision or confidence in the results would require new data-gathering procedures.

ACKNOWLEDGMENTS

This study was carried out in close cooperation with members of the New York City Police Department. I am indebted to the officers of the department, who contributed greatly to this study by allowing me to participate in their daily activities, and who contributed to my own education from their vast experience in law enforcement.

I particularly wish to thank Commissioner Howard Leary for subjecting his department to such an unusual form of study by an outside organization. Finally, I must express my gratitude to Inspector Neil Behan, Captain Charles Peterson, and Sergeant James McSloy of the Planning Division for their cooperation and assistance throughout this entire effort.

CONTENTS

PREFACE iii

SUMMARY v

ACKNOWLEDGMENTS vii

Section
I. INTRODUCTION 1

II. CRIME AND THE POLICE IN NEW YORK CITY 4
Crime Characteristics 4
Homicide, Rape, and Assault 4
Robbery 7
Burglary 7
Larceny 7
Auto Theft 8
Police Department Characteristics 8
Data Base 12
Unreported Crime 13

III. EVALUATING THE EFFECTIVENESS OF APPREHENSION ACTIVITIES .. 15
Clearance Rate: A Traditional Measure 16
Objectives of the Criminal Justice System 18
Apprehension Effectiveness 20
Use of Effectiveness Criteria 22

IV. CRIMINAL INVESTIGATIONS 25
Precinct Squad Activities 25
Effect of Workload on the Detective Arrest Index 28
Effect of Seriousness on the Detective Arrest Index 31
Case Profiles 37

V. DETECTIVE PATROL 40
Organization and Tactics 40
How Patrol Manpower is Used 41

VI. ARREST PRODUCTIVITY 45
Investigation 46
Detective Patrol 46
Stakeouts 47
Uniform Patrol 48

VII. SUGGESTIONS FOR FURTHER RESEARCH 50

CONTENTS--continued

Appendix
A. CASE PROFILE COMPUTATIONS 51
Data Source 51
Sample Selection 51
Coding Technique 52
Processing the Data 53
Calculation of the Burglary Profile 57

B. BURGLARY SQUAD SURVEY 59
Instructions for Completing Weekly Activity Report 59
Instructions for Completing Tail and Stakeout Report ... 59
Instructions for Completing Arrest Report 60

FIGURES

1. Organization of the New York City Police Department, 1968 9
2. Organization of NYPD Detective Division, 1968 11
3. Distribution of the Average Number of Clearances per Burglary Arrest for the 79 Precincts of New York City, January 1-June 30, 1967 19
4. Robbery Case Profile 39
5. Burglary Case Profile 39
6. Grand Larceny Case Profile 39

TABLES

1. Definition of Part I Offenses 5
2. Serious Crimes Reported in New York City During 1967 6
3. Clearance Rate, Arrest Index, and Detective Arrest Index for Part I Offenses 24
4. Detective Arrest Indexes for High- and Low-Case-Load Squads .. 31
5. Workload and Arrest Data for Manhattan Precincts 32
6. Definitions and Sources of Workload and Arrest Variables in Table 5 33
7. Victim Losses for Crimes Against Property 35
8. Detective Arrest Rates for High- and Low-Value Crimes 36
9. Average Daily Allocation of Manpower for Borough Burglary Squads and Safe, Loft and Burglary Squads, July-August 1968 42
10. Source Activity Report 43
11. Man-Tours Devoted to Tails and Stakeouts 44
12. Arrest Productivity 49
13. Values of Sample Variables 55
14. Intermediate Calculations for Three Case Profiles 56

I. INTRODUCTION

The apprehension of criminal offenders is central to the criminal justice system. Laws and statutes specify the kinds of behavior in which we may and may not indulge. Our own moral judgments, public opinion, and the police deter us from violating these codes. When an infraction occurs, the police have the responsibility of identifying and arresting the suspected offender so that the sanctions of the justice system may be applied. Once arrested, the eventual disposition of the offender becomes the concern of the District Attorney and the courts.

For many types of criminal behavior there is a great deal of controversy over the value of apprehension and the degree of aberrant behavior that is sufficient grounds for arrest. Few will disagree, however, that killers, rapists, robbers, thieves, and those who commit violent attacks should be arrested and punished. This is one reason that this study is confined to programs leading to the arrest of the most serious criminal offenders: those who commit the Part I offenses making up the FBI Crime Index (homicide, rape, robbery, aggravated assault, burglary, grand larceny, and auto theft). Other reasons are that the seriousness and volume of these crimes make their control the primary concern of urban police departments, and they seem to be reported more accurately than any other type.*

Any large police force engages in a variety of specialized activities that serve the apprehension objective. When several proposed or existing programs are at hand to facilitate the arrest of a particular type of offender, the police administrator must determine to what degree the programs are complementary and to what degree they are competitive. He must judge their relative merits and make budgetary and resource decisions based on this evaluation. Where aspects of the apprehension programs are carried out in decentralized units or by men not

---

*_Crime and Its Impact: An Assessment_, Task Force Report, The President's Commission on Law Enforcement and Administration of Justice, U.S. Government Printing Office, Washington, D.C., 1967, p. 18.

under his direct supervision, he must develop a means for rating the relative competence of unit commanders and individuals.

The resources at the disposal of individual unit commanders or police officers must be selectively applied so as to enhance effectiveness. If past crimes are to be investigated, which ones will be closed after a cursory examination and which will be pursued until all avenues of investigation are closed? If detectives are to patrol high-risk areas, what locations are to be selected and when should the patrols take place?

Finally, in a large police department, just as in any other large organization, consideration must be given to the organizational structure and to the procedural rules for carrying out routine daily affairs. These two entities affect the quality of supervision, the ways in which useful information is communicated between personnel, and the way in which innovations in work methods occur.

In order for analytical methods to assist police administrators in resolving these difficult problems, it would be desirable to have a suitable data base and reliable methods for estimating the effectiveness of particular activities from the data. Accordingly, this study was undertaken to determine the extent to which it was possible to estimate the effectiveness of existing activities by making calculations based on available data. In cases where the data prove to be adequate, conclusions can be drawn about specific activities; where they are inadequate, it is possible to justify the effort which is required for careful data collection.

The first step of the study was to develop rational criteria for evaluating the effectiveness of apprehension programs and operating units. These criteria had to be compatible with the objectives of the justice system and the administrative constraints inherent in police organizations.

The second step was to apply these criteria to existing programs, using existing departmental data where possible and otherwise using small samples of new data. It should be recognized that police department records, in general, are not collected for analytical purposes such as these. Instead, they are compiled to fulfill operational needs and to document compliance with established procedures. Thus, the analyst may find that the records lack some important explanatory variables which

he would like to have or that records collected at two different dates are not wholly comparable because recordkeeping procedures changed in the meantime.

Also, an analyst who does not design and observe the process by which his data are collected must be wary that biases may be present. But because the collection of more complete and accurate data requires significant effort, as well as possible disruption of the activities being studied, it is worthwhile to begin with whatever data are available.

This Report describes the data used and the findings which emerged from analysis of the data. In addition, we reported separately to the New York City Police Department our suggestions for change which were based on these findings.

Section II describes the crimes and criminals with which this study is concerned, and the organizational structure for programs within the Police Department intended to deal with these crimes.

Section III develops various criteria for evaluating the effectiveness of apprehension programs and individual units by examining the objectives of the criminal justice system and considering the statistical limitations of various data.

Section IV describes an analysis of the investigative efforts of the Department in dealing with the seven index crimes. The analysis probes the way in which individual workload, seriousness of the offense, and preliminary evidence affect the probability of ultimately solving a case.

Section V describes the activities encompassed under detective patrol, and Section VI compares the effectiveness of this type of activity with investigations and uniformed patrol. Section VII points to additional research required into the investigation and apprehension process.

II. CRIME AND THE POLICE IN NEW YORK CITY

CRIME CHARACTERISTICS

The reason for focusing on Part I crimes is that their seriousness and volume make them the primary concern of most urban police departments, and the fact that because each offense involves an unwilling victim, the reporting rate for these offenses is higher than for most other crimes.

Even though we are primarily interested in Part I offenders, some police activities will result in their arrest on other charges. For instance, a burglar may be arrested in the hallway of a building for the possession of burglary tools before he commits the burglary, or on the street for possession of stolen property after it is completed. Table 1 gives a complete definition of each of the Part I offenses, plus a listing of other offenses that are usually related to Part I crimes.

People who deal with criminals and criminal behavior can legitimately argue that each criminal act has its own unique aspects and deserves to be examined individually. On the other hand, both researchers and policymakers who wish to predict or prescribe behavior in future incidents find it useful to classify crimes. A method of classification can be considered useful when the amount of variance encountered in the variables under consideration is much less within a classification than between classifications. For this study, the crime types listed above will prove useful in distinguishing among offenses according to the seriousness of the act, the motivations of the offender, the probability that he will commit similar acts, and the difficulties in apprehending the offender.

Table 2 lists the numbers of offenses within the seven index categories reported in New York City during 1967. Some of the general differences among crime types that have operational implications for any apprehension program are discussed below.

HOMICIDE, RAPE, AND ASSAULT

Because homicide, rape, and assault involve an attack against the victim, the public usually has a strong desire to see the offender

Table 1

DEFINITION OF PART I OFFENSES

1. CRIMINAL HOMICIDE

   The killing of one human by another. Homicides are further subdivided into willful (nonnegligent) acts and negligent acts. Excludes attempts.

2. FORCIBLE RAPE

   The carnal knowledge of a female forcibly and against her will. Includes attempts.

3. ROBBERY

   Stealing or taking anything of value from the person by force or violence or by threat of force. It includes armed robbery (with a weapon), strong-armed robbery, assault to rob, or attempt to rob.

4. AGGRAVATED ASSAULT

   An assault with intent to kill or for the intent of inflicting severe bodily injury.

5. BURGLARY

   Any unlawful entry of a structure to commit a felony or a theft.

6. GRAND LARCENY

   The wrongful taking or carrying away of property from the possession of another, where the property value exceeds some specified amount ($50 for index classification, $200 for New York). Petit larceny is the theft of property of lesser value.

7. AUTO THEFT

   Stealing or driving away and abandoning a motor vehicle.

OFFENSES ASSOCIATED WITH PART I CRIMES:

Possession of stolen property

Possession of burglary tools

Dangerous weapons

Petit larceny

arrested. Victimization studies indicate that assaults and rapes may occur at 2 to 3 times the reported rates.* From an investigator's perspective, these crimes against the person are distinguished from other offenses by the high proportion of cases in which the victim and offender are acquainted. A special victimization study conducted by the President's Commission on Crime in the District of Columbia found that in 79 percent of the homicides, 64 percent of the rapes, and 81 percent of

Table 2

SERIOUS CRIMES REPORTED IN NEW YORK CITY DURING 1967

Offense	Number	% of Part I Offenses
Homicide	746	0.2
Forcible rape	1,905	0.5
Robbery	35,934	10.3
Felonious assault	24,827	7.1
Burglary	149,765	42.9
Grand larceny	82,778	23.8
Grand larceny of a motor vehicle	52,946	15.2
Total, Part I	348,901	100.0
Other felonies	22,707	
Misdemeanors	408,169	

the assaults, the offender was acquainted with the victim prior to the crime. For homicides and assaults, the victim and offender were related in 37 percent and 21 percent of the crimes, respectively.

In these circumstances, an investigation of a past crime entails obtaining a clear account of the event and the identification of the offender from the victim or from a witness. This task often involves overcoming a reluctance to discuss the crime because of shame, fear of

*_Ibid._, p. 17.

retribution, or a desire to protect the offender from the law. When the victim will not or cannot cooperate, the investigator's most fruitful line of attack is to attempt to identify a small set of acquaintances who may have had the opportunity and motivation to commit the crime, and attempt to link them to the offense through interrogation or physical evidence.

ROBBERY

In robbery, the victim and the offender or offenders are most likely unacquainted. If the robbers cannot be captured while escaping from the crime scene, the detectives have two distinct ways to proceed. The police maintain files of known criminals containing their descriptions and past modus operandi (M.O.). If the victim or witnesses can accurately describe the offender, identify his photograph, or provide a description of the crime that identifies his M.O., the suspect can be put under detailed scrutiny. The second approach involves going to informers for tips on the identity of the offender. Robbery, more than any other type of street crime, requires the use of Departmental intelligence files designed to identify suspects.

BURGLARY

A burglar is only rarely observed in the commission of a crime, and even when he is, the witness may be unaware that he is observing a crime. For crimes involving sophisticated attacks against elaborate protective devices, the investigators may concentrate their concern on individuals who have demonstrated the necessary skill in previous crimes. For crimes involving a cruder M.O., the detectives are restricted to attempting to identify a suspect through physical evidence left at the crime scene or attempting to locate the stolen property when it is sold. Witnesses are seldom found who can identify a suspicious person near the crime scene.

LARCENY

Evidence in a larceny typically consists of the complainant identifying someone with a special opportunity or motive to commit the crime.

Other than this suspicion, the detective is left with the same approach as in burglary--attempting to locate the stolen property when it is sold.

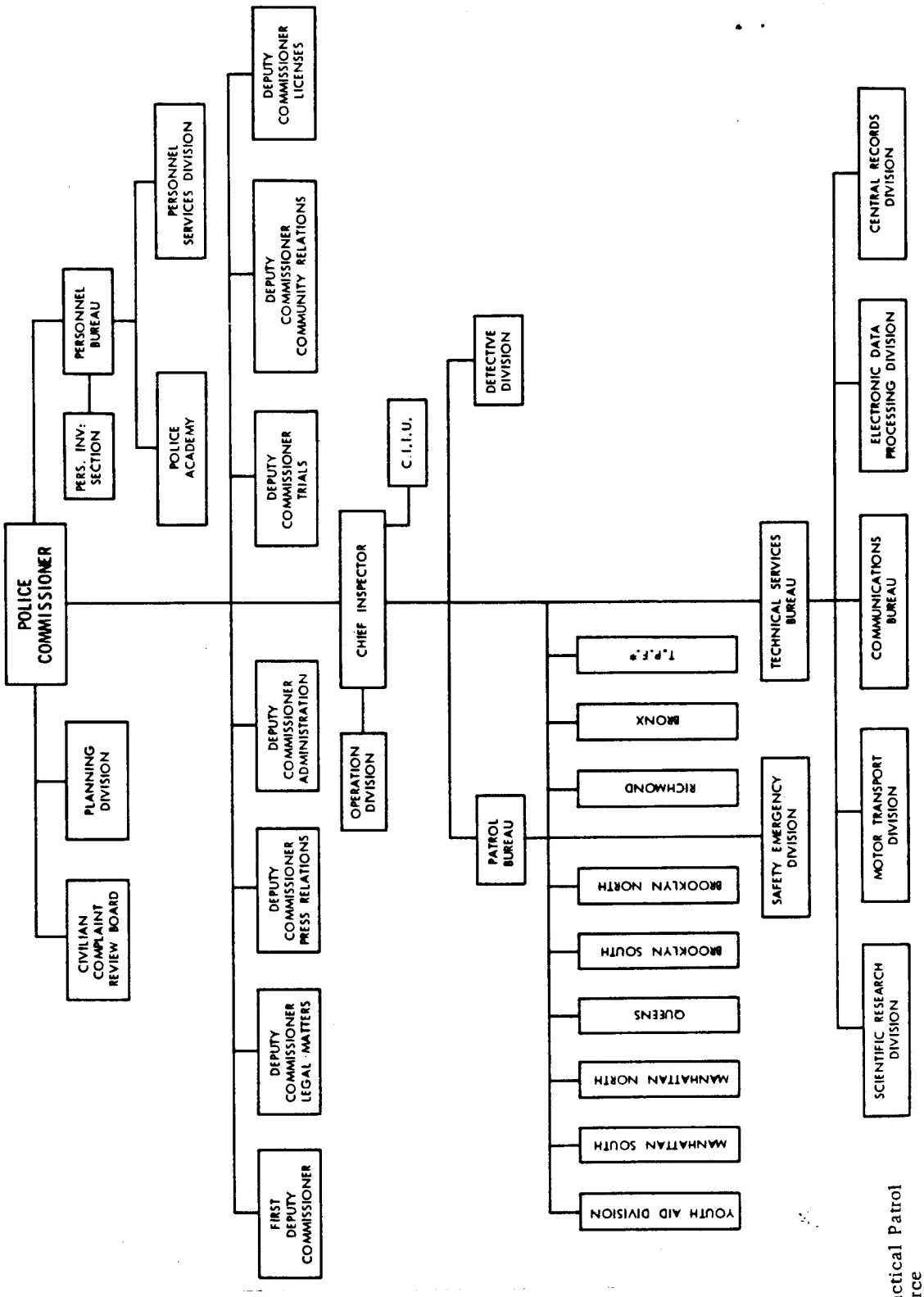
AUTO THEFT

Solving an auto theft is hampered by the simplicity of the crime and the thief's opportunities for speedy disposal of the vehicle. The most likely method of solution is to locate the car through its description and trace the thief through the current driver.

POLICE DEPARTMENT CHARACTERISTICS

The New York City Police Department consists of some 30,000 uniformed men and 7,000 civilians operating from 77 station houses. The annual budget for the Department is about $500 million, 95 percent of which goes for salaries and benefits. Together with the 2400-man Transit Police and the 1200-man Housing Police, the Department provides police protection, enforcement, and emergency services for the eight million people residing, visiting, or working within the City. Figure 1 shows the basic organization of the Department.

The Patrol Bureau is by far the largest unit in the Department, accounting for almost 25,000 of the total uniformed strength. For administrative and operational purposes, the City is divided into the seven Borough Commands of Manhattan North, Manhattan South, the Bronx, Brooklyn North, Brooklyn South, Queens, and Richmond. Each Borough Command is in turn divided into three or more Patrol Divisions, and the Divisions are subdivided into three or more Patrol Precincts. The precinct is the basic administrative unit of the Department, providing the full range of patrol services for its specified jurisdiction. These services include providing preventive patrol coverage by car, scooter, and footmen. They also include responding to calls for assistance and enforcing local ordinances. Certain specialized functions of the Patrol Bureau, such as highway patrol and the provision of emergency services requiring special equipment, are contained in the Safety and Emergency Division. These men do not operate from precincts, but are organized on a more aggregated geographic basis.



*Tactical Patrol Force

Fig. 1--Organization of New York City Police Department, 1968

The Detective Division performs almost all of the investigative functions carried on by the Department and the majority of activities aimed at facilitating the arrest of criminal offenders. The only investigations not performed by the detectives are concerned with individuals within the Department and are handled by special units reporting directly to top officials. The organization and authorized manning quotas for the Detective Division are shown in Figure 2.

A comprehensive description of the tasks performed by the Detective Division would have to include:

1. The investigation of all reported crimes to determine the nature of the crime, apprehend the offender, and recover any stolen property.

2. The performance of plainclothes patrol for the purpose of apprehending offenders in the performance of serious crimes.

3. The investigation of all unattended deaths and serious accidents to determine if criminal action was involved.

4. The location of persons reported missing or wanted and the identificaton of all unknown dead.

5. The inspection of premises dealing in used property to insure that ordinances are followed and to identify stolen property.

6. The collection of evidence to support the prosecutions of the District Attorney.

7. The gathering of intelligence concerning the activities of persons believed to be engaged in the commission of felonies, gambling, the distribution of dangerous drugs, organized crime, or subversive acts.

Certainly, all of these tasks contribute to the apprehension of serious criminals in one way or another; however, tasks 1 and 2 serve this objective most directly. The execution of these two tasks falls primarily on the Precinct Detective Squads, which coexist with each Patrol Precinct, the Burglary Squads located in each Borough Command except Richmond, and men within the Safe & Loft Squad. These are the units which were examined to gain detailed knowledge concerning the performance of various apprehension activities.

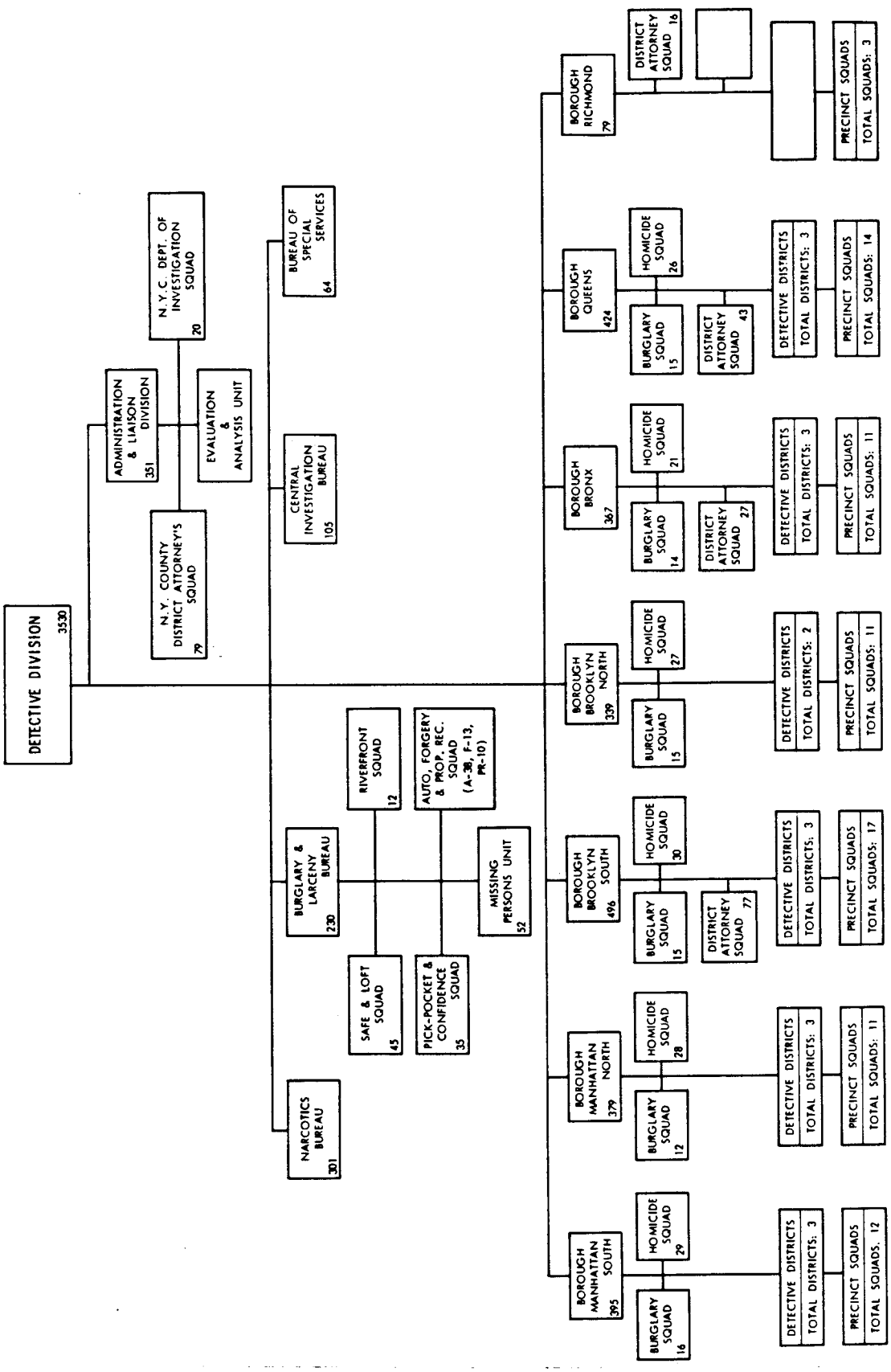


Fig. 2--Organization of NYPD Detective Division, 1968

The Precinct Detective Squads are responsible for the investigation of all crimes reported in their precinct. In addition, they investigate traffic accidents where personal injuries are incurred, and they investigate all suspicious deaths. Precinct detectives also assist in the investigation of missing persons or persons wanted in some other police jurisdiction. Their investigative responsibilities also include the task of performing all correspondence and notifications associated with a case.

The Burglary and Safe & Loft Squads do not carry any routine investigative responsibilities, but instead attempt to make pickup arrests at the scene of serious crimes. This task is accomplished by performing plainclothes patrol in high-crime areas or by acting on information supplied by informants within the community.

Other units of the Detective Division perform more specialized functions, most of them obvious from the units' names. The District Attorney's units perform investigations at the direction of the D.A. to support his cases. These usually involve crimes of fraud, racketeering, extortion, etc. The Central Investigation Bureau and the Bureau of Special Services are intelligence units; C.I.B. concentrates on organized crime, and B.O.S.S. concentrates on personnel who pose a threat to visiting dignitaries and on the operations of various militant groups.

Within the Patrol Bureau, approximately 700 men are assigned to plainclothes duty at the Division or Borough level. These men are responsible for the enforcement of gambling, prostitution, and public morals laws. The work of these men falls under the careful scrutiny of the First Deputy Commissioner.

DATA BASE

In examining the activities of the Precinct Detective Squads, this study relied on data provided by the New York City Police Department. The primary record source pertaining to the investigation of serious crimes is the U.F. 61 crime report. Selected data from each U.F. 61 are keypunched by the Department and placed on magnetic tape. Subsequent reports (U.F. 61's or D.D. 5's) that modify any of the original information are also punched and added to the tape.

The second data source is the Arrest Record (U.F. 4). This document is completed for each person arrested, listing his personal characteristics, the time of arrest, the crime, and the arresting officer. Certain portions of this data are also placed on magnetic tape.

In order to construct a reliable picture of the average workload faced by the investigators, and to examine the results of their investigation efforts, the data sample chosen consisted of all Part I crimes reported in the first six months of 1967. During this period, there were no changes in the reporting system, nor is the final disposition of any case in this sample likely to change in the future. In addition, it was possible to trace a small sample of arrestees through the final court disposition of their cases.

The U.F. 61 tapes, when received from the New York City Police Department, contained unsorted records for each U.F. 61 and D.D. 5 submitted. The first editing step in constructing a data base involved sequencing all records by report number (U.F. 61) and discarding records that failed to contain a report number, occurrence date, or a report date. These records composed less than 1 percent of the total. After the preliminary editing, the file still contained multiple records for each report number, since the data pertaining to a specific report (U.F. 61) might be altered several times. In the next editing step, multiple entries were consolidated into a single record for each number. At the same time, records were deleted for crime reports that subsequent investigation revealed to be unfounded. The final step eliminated from the data tapes all but the seven most serious felony offenses (Part I crimes). Thus, the final data base was made up of a single record for each homicide, rape, robbery, assault, burglary, grand larceny, and auto theft reported to the police in the first six months of 1967.

UNREPORTED CRIME

The use of "crimes reported by the police" as a measure of criminal activity has its limitations. The President's Crime Commission discovered that on the average only *half* of the serious crimes are actually reported to the police. If the fraction of crimes actually reported varies in some systematic way among precincts, conclusions based on

reported crime data may not be correct. Yet short of conducting an independent victimization survey of a large enough size to reflect the full spread of police activity, we must be satisfied with reported crime data, recognizing its deficiencies. When a reporting bias might affect the conclusions of this study, specific attention will be called to that possibility.

III. EVALUATING THE EFFECTIVENESS OF APPREHENSION ACTIVITIES

Most expenditures of physical effort or material resources are undertaken with a particular goal in mind. Some goals are specific, such as the building of a bridge, and some can be indicated by degree, such as reducing crime. If the goal is specific, the rational manager will attempt to achieve it with a minimum expenditure of his limited resources and labor so that the maximum amount of these factors will remain for the accomplishment of other desirable goals. If his goal is unspecific, it can be made specific by setting up some arbitrary target of attainment. The goal of reducing crime can be modified to the goal of reducing crime by 20 percent, and one can contemplate the achievement of this goal with a minimum expenditure of resources. Another tack for unspecific goals is to assume that the amount of resources and labor to be devoted to achieving the goal is fixed. In this circumstance, the rational manager will attempt to maximize the effect of his resources on the goal, i.e., achieve a maximum reduction in crime. There are many ways in which human behavior varies from that prescribed for our mythical rational manager; however, for most of his actions, experience has shown that we do well to consider the rational man as a model and deal with individual inconsistencies or paradoxes as they occur.

The administrator of an apprehension activity finds himself in the last circumstance described above. With a fixed complement of men and equipment, he is attempting to apprehend as many criminals of a specific type as possible, where he assigns different utilities to the arrest of different types of offender. Arresting a bank robber may be considered better than arresting a car thief, but if it is desirable to arrest car thieves, arresting two is better than arresting one.

As long as there are alternative methods of achieving arrests, the economic administrator must ask which methods or activities make the best use of his resources. If the nature of the activities changes over time because of changing technology and personnel skills or changes in the volume and nature of crime over time, then the question of which activities are effective must also be asked continuously.

Even within the scope of a single activity, the administrator of a large police organization faces the task of evaluating the work of individual units and personnel. If the activities of the unit allow no room for innovation or personnel skill but can be completely specified by rules and procedures, then individual performance can be measured by compliance with these rules. If skill and innovation do play a part in the work, then the administrator is well advised to use evaluative criteria that measure these qualities to some degree. In practice, this entails developing evaluative criteria that indicate the degree of achievement toward the unit's primary goals.

The remainder of this section discusses traditional measures of police effectiveness and why they are inappropriate for evaluating apprehension activities. Alternative criteria are then suggested.

CLEARANCE RATE: A TRADITIONAL MEASURE

The "clearance rate" is the traditional measure of effectiveness invoked by writers on police affairs.* Simply stated, the clearance rate is the fraction of crimes reported to the police that the police claim to have solved.

According to the definiton of "clearance" in the FBI *Uniform Crime Reporting Handbook*, a crime is cleared by arrest when a suspect is arrested, charged with the offense, and turned over to the court for prosecution. Certain "exceptional clearances" are granted when the police have sufficient information to support an arrest, to charge, locate, and turn the suspect over to the court, but are prevented from making an arrest by circumstances beyond their control, e.g., when the suspect is dead or in prison. The definition of clearance specifically allows multiple clearances for one arrest if the suspect can be established as the offender for each case cleared. The prevalence of multiple clearances is the chief cause for disputing clearance figures.

---

*O. W. Wilson, *Police Planning*, Charles C. Thomas, Springfield, Ill., 1962; John Griffin, *Statistics Essential for Police Efficiency*, Charles C. Thomas, Springfield, Ill., 1958.

Clearance rates are one of the few indices which are routinely collected and relate directly to the performance of professional police administrators. Therefore, it is not surprising that some administrators may be concerned with achieving a high clearance rate. Unfortunately, a high clearance rate does not necessarily reflect high performance. It may only indicate that the detectives in that unit are extremely thorough in connecting an arrestee to several of his past crimes. As a hypothetical example, one squad may receive 1000 crime reports during a month and make 100 arrests but claim no multiple clearances, thereby achieving a 10-percent clearance rate. Another squad with 1000 reported crimes may make only 50 arrests but succeed in linking each suspect to two additional cases, thereby achieving a 15-percent clearance rate. But it is questionable whether the second squad is really superior in performance.

The dilemma is that the small gain to society from substantiating multiple clearances, after a suspect has been arrested, does not appear to justify the considerable effort which may be required of the detectives concerned.

In some cases a suspect possesses stolen property from past crimes, and this will be used as evidence that he was the offender and that the case is cleared. The large majority of cases cleared that meet the FBI definition rely on the suspect's admission of guilt. This leads to the question of what induces an offender, arrested for one crime, to admit several, maybe hundreds, of others. For some crimes against the person, such as rape, robbery, or assault, there is a good chance that the victim can identify the offender. Recognizing this probability, an offender may be willing to confess to other crimes rather than wait for identification by the victim, hoping to receive a lighter sentence in return for his cooperation. Even when he cannot be connected to other crimes by hard evidence, a suspect may be willing to confess to these crimes if he believes he will receive more lenient treatment from the police and courts for his cooperation in clearing cases. Jerome Skolnick found this to be true in his studies of a Western police department.* In one case, a burglar who confessed to and cleared

*J. H. Skolnick, *Justice Without Trial*, John Wiley and Sons, New York, 1966.

over 400 cases was allowed to serve out a previous sentence and was released within thirty days, while his codefendants, who had no similar favors to offer the police, received substantial sentences.

Many police units do not rely exclusively on hard evidence and confessions to clear additional cases. They may also claim clearances on the basis of M.O. (modus operandi). When an offender is arrested, the Detective Squad Commanding Officer can compare the offender's M.O., place of operation, and other known characteristics with the known facts in unsolved cases. If in his judgment the crimes were committed by the same offender, he might claim a clearance. Since the decision as to when multiple cases have been cleared is a matter of judgment, it is likely that the decision to clear is not consistently applied across police units. In fact, the number of cases cleared by an arrest in any unit is probably influenced by how important the unit commander feels his clearance rate is.

In an attempt to examine the consistency in claiming clearances among individual commands within New York City, the author computed the ratio of cases cleared to cases in which arrests were made for different crime types in each precinct. The distribution of these ratios for burglary is presented in the histogram of Fig. 3. It is most unlikely that the wide variance in these ratios can be explained by differences among the population or police tactics of individual precincts or by simple chance variation. A more likely explanation is that individual commanders define clearances differently.

OBJECTIVES OF THE CRIMINAL JUSTICE SYSTEM

In any particular jurisdiction, laws and ordinances specify certain types of unacceptable behavior. For large segments of the population, the law alone is a sufficient deterrent. A minority do engage in proscribed acts, and the criminal justice system is the institutional method by which society deals with their behavior. Society has decreed that unless certain mitigating factors are involved in a criminal act, the offender should be punished. The criminal justice system carries out the routine tasks of identifying offenders, placing them in custody, determining the degree of their guilt, and administering their punishment and possible rehabilitation.

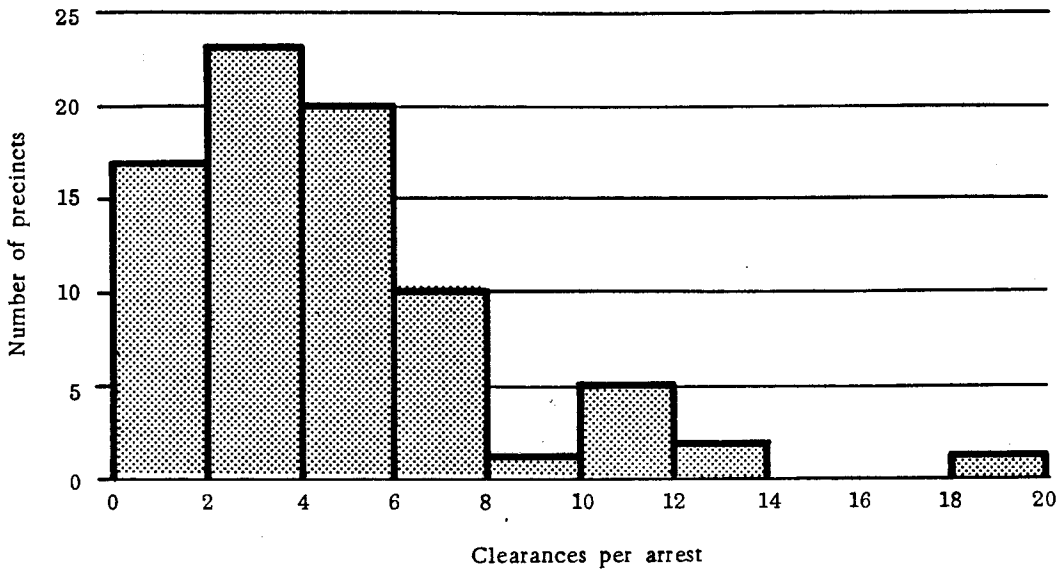


Fig. 3--Distribution of the average number of clearances per burglary arrest for the 79 precincts of New York City, January 1-June 30, 1967

The apprehension effort of the police is but one element within this system. To determine its value, we must first contemplate its objectives or the benefits that are supposed to flow from the operation of the system in its entirety. Only then can we establish the ways in which the apprehension process contributes to the social good.

There appears to be broad agreement that the criminal justice system serves the dual purposes of limiting or reducing the amount of criminal behavior in society and satisfying society's desire to inflict punishment on the guilty. Although there may be consensus on the objectives, however, there is a strong controversy concerning the allowable procedures in the operation of the system. This controversy stems from different perceptions of the harm that can be caused by the criminal justice system and the likelihood that this harm will occur.

Two extreme models of the justice system and the values that support them are described by Herbert L. Packer.* The models are not meant

*_The Limits of the Criminal Sanction_, Stanford University Press, Stanford, California, 1968.

to embody any one person's or agency's views, but to define the end points of a wide spectrum of viewpoints.

The Crime Control Model is more akin to the perspective of the police and prosecutors. It is based on the proposition that the repression of criminal conduct is by far the most important function of the criminal justice system. This view requires that the system have the capacity to arrest, convict, and dispose of a high proportion of the criminals whose offenses become known. To do so with the resources available, the system must rely on informal administrative fact-finding and not be hampered at every turn by the ceremonial rigmarole of the formal justice system. The crime control view accepts the reliability of police fact-finding and treats arrestees as if they are already found guilty.

The Due Process Model is the model portrayed in the law books and more closely subscribed to by the courts. Much more skeptical of administrative fact-finding, it relies instead on adversarial proceedings to establish legal innocence or guilt as opposed to the factual innocence or guilt determined by the police. The Due Process Model is much more concerned with the abuses of official power and is willing to accept a diminution in processing efficiency in order to protect the individual from the possibilites of oppression by the state.

APPREHENSION EFFECTIVENESS

Within the criminal justice system, the police function is to identify and arrest suspected offenders and gather evidence for the final determination of legal innocence or guilt. A supporter of the Due Process Model would hold that, all other factors being equal, an arrest that leads to conviction is more valuable than an arrest that does not, since only in the former is legal guilt established and the criminal sanction properly applied. A more extreme proponent of the Due Process Model might even argue that an arrest that does not lead to conviction inflicts a net cost on society since the defendant is liable to feel some undesirable effects even though he is not legally guilty. Crime Control advocates would agree that an arrest that leads to conviction is more valuable than one that does not, since conviction is likely to

engender more powerful deterrent and rehabilitative effects than is mere arrest. They would not agree that arrests without conviction are valueless, because the simple act of arrest carries some deterrent and punitive effects, and their faith in the system would often lead them to attribute factual guilt to the arrestee, even if legal guilt could not be proven. They would therefore view the effects as deserved and desirable, not the reverse.

These arguments suggest that if arrests are to be used as a measure of police effectiveness in apprehending offenders, arrests that lead to conviction are to be valued more highly than arrests that do not. Since the relative weighting between these two types of arrests is a matter of subjective judgment, the number of arrests and the percentage of convictions must be reported separately, so that an evaluator can apply his own weighting rather than accept some formal scheme that obscures these figures.

One desirable feature of clearances as a criterion is that they give more credit for the arrest of a repetitive criminal than of the one-time offender. If the police have the ability to direct their efforts against specific offenders, we would wish that they do so against repeated offenders. This suggests that it might be desirable to further qualify arrests by assigning greater value to arrests that result in convictions for multiple offenses committed at different times.

Finally, arrests must be distinguished by type of crime, with the degree of classification made consistent with differences in seriousness of the offense. If the arrest of a robber is viewed as having twice the value of arresting a burglar and four times the value of arresting a heroin addict, then it is not useful to lump all of these together under the heading of felony arrests when evaluating an activity, since this would penalize a unit that is concentrating on the more serious crimes. It is also necessary to avoid distinctions among crime types that hinge on an arbitrary judgment of seriousness, such as the distinction between petit and grand larceny or simple and aggravated assault. Otherwise, some units will bias their reported arrests toward the more serious offenses.

The remainder of this section defines "arrests" to mean the number of arrests, qualified by disposition, crime type, and number of offenses for which the offender is convicted.

USE OF EFFECTIVENESS CRITERIA

Effectiveness criteria are used in two distinct ways in evaluating apprehension programs. One involves comparing apprehension activities operating in the same crime environment; the other involves comparing activities in different environments--different either in time or in geographic location.

The purpose in comparing apprehension activities within the same jurisdiction is to determine which should receive more resources, and which less. For this purpose, we are interested in the marginal change in output (arrests) associated with marginal changes in resources. If the activities use a significant proportion of equipment or supplies, resources should be expressed in dollars. If the resources are almost entirely manpower, as they are in the present police force, then resources can be expressed in man-months or man-years. The appropriate measure of effectiveness is then arrests per man-month.

In comparing units operating in different crime environments, one is attempting to compare the quality of personnel performance if the activities performed by the units are essentially the same. The most obvious way of distinguishing between crime environments is in the crime rate. Locations with more crime should generate more arrests. To compensate for this difference in opportunity to make arrests, it is useful to indicate the fraction of offenses that result in arrest, rather than the sheer number of arrests. This fraction would provide an estimate of the probability that an offender would be arrested for any particular offense, just as the clearance rate now provides an estimate of the probability that the police will eventually claim to have solved a particular case.

In the present data collection systems operated by the New York City Police Department, data are not available in a suitable form to qualify arrest figures without a great expenditure of clerical effort. Each specific crime reported is categorized sufficiently to indicate

its seriousness; however, the charge and final disposition are not routinely recorded, nor are additional offenses for which the offender is also charged or convicted. For that reason, any evaluation of current activities has to be done on the basis of arrest figures alone.

For the present study, in an effort to evaluate the D.A.'s and court's findings as a way to qualify arrests, a sample was traced of 258 offenders arrested for robbery, burglary, and grand larceny by precinct detectives, and processed through the courts. Less than 5 percent of the offenders were initially dismissed or arraigned on charges different from those recorded by the arresting officers. However, over 70 percent were not indicted for felony offenses. Since significant charge reduction occurred in every case which resulted in a guilty plea or a verdict, this charge reduction process must be examined in much greater detail before the usefulness of court findings as a measure of police performance can be determined.* We can only speculate as to how many, if any, arrest charges are inflated to make the arresting officer "look good" and increase the D.A.'s bargaining power, and how many charge reductions are granted simply to keep the court calendar moving.

In determining the number of opportunities to make an arrest, it is necessary to know the number of offenders involved in each offense--an impossibility if the offenders are not observed committing the crime. To surmount this problem, we may construct an "Arrest Index," defined as the fraction of crimes that result in at least one arrest. This definition is consistent with the way in which the term "clearance rate" is used to indicate the fraction of cases solved. In addition, we may construct a "Detective Arrest Index" as the fraction of cases assigned to the detectives for investigation that eventually result in a detective arrest. The Arrest Index is an estimate of the probability that at least one offender will be arrested for any particular crime. The Detective Arrest Index is an estimate of the probability that any particular case assigned to the detectives for investigation will result

---

*For a discussion of the plea bargaining process, see D. J. Newman, *Conviction: The Determination of Guilt or Innocence Without Trial*, Little, Brown and Company, Boston, 1966.

in at least one arrest. A precise definition of these indices is given in the next section.

In order to place the following discussion of apprehension activities into perspective, Table 3 presents the Clearance Rate, Arrest Index, and Detective Arrest Index for the Part I offenses reported during the data base period. Differences between the Clearance Rate and Arrest Index are accounted for by multiple clearances. Differences between the Arrest Index and the Detective Arrest Index indicate pickup arrests made by uniformed patrolmen at the crime scene.

Table 3

CLEARANCE RATE, ARREST INDEX, AND DETECTIVE ARREST INDEX FOR PART I OFFENSES

Crime	Cases	Clearance Rate	Arrest Index	Detective Arrest Index
Homicide	338	.7456	.7130	.6632
Rape	906	.5143	.4834	.3914
Robbery	15,847	.2203	.1327	.0558
Assault	13,392	.4936	.4599	.3075
Burglary	67,028	.1640	.0434	.0135
Grand larcey	40,822	.1077	.0420	.0216
Grand larceny, MV[a]	20,792	.1957	.0810	.0221

[a]Motor vehicle.

IV. CRIMINAL INVESTIGATIONS

This section describes the activities and the effectiveness of the precinct detective squads in criminal investigations. Its purpose is to point out areas of the investigative process where changes might improve effectiveness, and to provide a basis for comparing investigative efforts with other means of securing criminal arrests.

PRECINCT SQUAD ACTIVITIES

Depending on workload, a precinct detective squad comprises from 15 to 33 men commanded by a Detective Lieutenant. Within the squad the men rotate duty assignments on the basis of a "six-day chart." Assignments are either day duty (8 a.m. to 5 p.m.), night duty (5 p.m. to 8 a.m.), patrol day (free for paper work or street patrol), or a day off.

On either day or night duty, the hours of the tour are divided into the same number of equal time segments as there are detectives on duty. Crime reports ("squeals") received by the squad are assigned to the detective responsible for ("catching") that time slot. This procedure insures that all detectives will receive equal exposure to different kinds of criminal investigations, satisfying the Detective Division's desire to train generalists with broad experience.

Immediate supervision of precinct detective activities is provided by the squad commander and a sergeant supervisor. The performance of the squad and the handling of important cases are supervised by the District and Borough Commanders. Individual detectives are judged by their arrest records, their aggressiveness and attitude toward their job, and their knowledge concerning criminal activity within their precinct.

The first step in criminal investigation occurs when the police become aware of the crime. Their knowledge may come from a complaint by the victim or a witness, or it may derive from the police discovering a physical situation suggesting the commission of a crime. In either case, the first police to arrive on the scene or to have contact with the victim are usually a uniformed patrol unit. The patrolmen

will offer any immediate assistance required by the victim and learn the necessary facts to complete a crime complaint form (U.F. 61). This includes the name and address of the victim, any witnesses actually present, the location and time of the crime, and a brief description of the criminal act and, where possible, the offender. These data are immediately relayed to the man "catching" in the detective squad.

The detective is supposed to conduct an investigation sufficiently thorough to establish that the crime indeed occurred, to obtain a description of any identifiable property, and to uncover any leads concerning suspects. A minimal investigation requires interviewing the complainant and possibly visiting the scene of the crime.

For some crimes, such as burglary, the timing of the investigation insures that there will usually be additional information available at the time of the followup investigation. The first indication that a burglary has occurred will usually be evidence that someone illegally entered a residence or commercial establishment. It usually takes the complainant a longer time than the patrol car can wait at the scene to determine the exact nature of his loss. For many other crimes, little useful new information can be obtained by the followup investigator.

A detective records the results of his investigation (or at least an indication that the investigation occurred) by typing them onto a copy of the crime report. The few arrests that do occur as a result of a detective's investigation usually result from the complainant's being able to give the exact identity or residence of the suspect because they were acquaintances before the crime. It is a rare event when a property crime is solved through the clever piecing together of a fragile chain of evidence.

For a serious crime, an arrestee is booked in the precinct where the arrest occurred. The booking process, as performed in New York City, can usefully be divided into three separate steps. The first involves bringing the arrestee before the desk officer in the station house, where statements are made by the arresting officer concerning the nature of the arrest and a formal record of the arrest is made in the records of the precinct. From the desk, the action then moves to the detective squad room for the remaining two steps. There, detectives

complete the many records needed to process the arrest through the courts and to notify all of the agencies concerned with certain aspects of the case. All of these records require basic data about the prisoner, such as his description, residence, and marital status, plus specific data of concern to a particular agency. (For instance, is the prisoner a drug user or a juvenile?)

The last step, which can be performed in any sequence or even during the other two steps, is interrogation. The interrogation concerns both the present offense for which the arrest was made plus other offenses the arrestee may have committed and be willing to divulge. With the long list of uncleared cases, squad commanders exercise varying amounts of diligence in attempting to obtain these multiple clearances, depending on their concern with the squad's clearance rate. The questioning about the present offense usually involves verifying a set of known facts, since the evidence leading to the arrest is usually sufficient to sustain the case in court. In addition to delving into the activities of the arrestee, the detectives may encourage him to provide information then or in the future concerning the activities of other criminals. The arrestee may comply to strike at his personal enemies or to secure friendly treatment by the detectives.

The arrest processing usually consumes several hours at the station house and then several more hours while the prisoner is photographed, his arrest record is obtained, the District Attorney's charge is drawn up, and the prisoner receives his initial hearing by a judge.

In addition to investigating assigned cases, precinct squad detectives devote some time to patrol activities. This may include plainclothes patrol on foot or by car or a stakeout in a high-hazard location. Detectives are also supposed to circulate through the community to develop and maintain sources of information concerning criminal activity. Finally, investigators must handle a significant clerical workload involving correspondence and reports concerning their cases, or requests for other kinds of information; and like other units of the department, they are called upon to provide manpower for special details, such as parades or demonstrations.

EFFECT OF WORKLOAD ON THE DETECTIVE ARREST INDEX

The investigation of Part I offenses can be viewed as a series of experiments, similar to tossing a coin or performing any test that has two possible outcomes with a specified probability of success (arrest) or failure (no arrest) at each attempt. If the probability of solving a case increases with the amount of investigation devoted to it, then the fraction of cases solved should increase when the total case load on a detective is reduced. On the other hand, if cases essentially solve themselves, given that the minimum amount of manpower is available to complete the required steps leading to an arrest, then the solution rate will be insensitive to changes in individual case loads. A test was performed in an attempt to determine which of these situations actually exists, given the current investigative techniques routinely used by the New York Police Department.

The approach taken was dictated by the available data sources. Ideally, one would prefer to collect data for a large number of essentially similar cases investigated by similar groups of investigators, varying the amount of time available for each case in some controlled fashion. Realistically, the potential interference with the daily operations of the Detective Division and the extensive time required to gain an adequate sample size led to testing the hypothesis on existing data. These data consisted of records reflecting the nature and disposition of each case assigned to the individual detective squads during the data base period, and the approximate number of men assigned to each squad. The test involved separating squads into high and low case-load categories and determining if there were any statistically significant differences in the fractions of cases they solved.

The first step required finding a reasonable indicator of individual detective workload. This step is complicated by the fact that there are no data for New York City that would indicate the amount of time required for different types of cases.

If the relative proportion of time each detective devotes to investigations and the relative proportion of different case types were roughly similar across precincts, then a reasonable indicator of relative workload would be the total number of cases in any particular

class reported in some specified period, divided by the number of detectives available for investigations. In fact, the measure chosen was the number of Part I crimes reported during the data base period divided by the number of detectives assigned to the squad:

$$W_i = \frac{C_i}{D_i}$$

where W_i = the workload in the i^{th} squad,

C_i = the number of Part I crimes reported to the i^{th} squad during the first six months of 1967, and

D_i = the number of detectives assigned to the i^{th} squad.

This choice is defended on the following grounds:

a. Part I crimes are the most accurately reported and tend to reflect the actual investigative workload, being considered more serious and more amenable to solution than other crimes.

b. Although the proportional makeup of the total universe of crime exhibits considerable variation among precincts, the variations appear equally distributed among the high and low case-load precincts used in this study.

c. The proportion of his total time that a detective has to devote to investigations varies considerably among squads, but the actual amount of investigative time in each squad is consistently related to workload. The greater the case load, the smaller the fraction of his time each detective can devote to investigations. This relationship was uncovered by a Bureau of the Budget survey of detective squads, which found that high-case-load squads devoted a greater proportion of their time (in excess of 60 percent) to clerical tasks, court appearances, and arrest processing than did low-case-load squads. This result is understandable since the clerical time required for each case is relatively fixed, as is the amount of time required for each arrest. As arrests and cases increase, the only task that can be compressed is the investigation. The end result is that the differences in investigative time per case will be greater than those reflected in the

workload measure. As the case load doubles, the time per case is reduced by more than half, since the total investigative time is also reduced.

During the data base period, average case loads varied by as much as a factor of three among squads. The observation of this great difference provided the initial motivation for the present analysis.

Having determined a measure of detective workload, the next step was to determine a fair measure of detective success in solving a case. For the reasons discussed in Sec. III, clearance rates were rejected because of their possible bias. This left arrests as the only available measure.

For purposes of this study, a case was considered solved (a "success") when the detectives arrested the first offender for that crime. Since detectives cannot make arrests in those cases where the patrol officer has made a pickup arrest at the scene of the crime, we calculate the total number of trials in which the detectives attempt to solve a case by subtracting the number of crimes for which the patrol made the initial arrest (P_i) from the total number of Part I crimes reported during the data base period (C_i). This number, divided into the number of cases in which a detective arrest was made (A_i), is the Detective Arrest Index (R_i) mentioned in the previous section:

$$R_i = \frac{A_i}{C_i - P_i} .$$

Great differences prevail among precincts over the entire city. To keep these differences to a minimum while retaining as large a sample as possible, it was decided to consider only the data for the 22 Manhattan precincts (excluding the Harbor and Central Park).

It is also true that solution rates vary considerably among different types of crimes because of inherent differences in the relationship between victim and offender and in the resulting amount of physical evidence. One must therefore consider each type of crime individually. In order to maintain a large sample size for each test, it was decided to focus exclusively on the crimes of felonious assault, robbery, and burglary--by far the most numerous in any precinct.

For the test, the 22 precincts were separated into two categories of case load, high and low. The Detective Arrest Index was calculated for each category, and a 2 x 2 chi-square test was used to determine whether the observed differences in Detective Arrest Indexes were statistically significant. This was the simplest test that would indicate whether success and workload were at all related.

Table 4 shows the Detective Arrest Indexes for each category; Table 5 lists the pertinent data for each precinct, and Table 6 gives the exact definition and source for the various columns of Table 5. Some unexplained anomalies appear in these data. Predictably, Table 4 shows a significantly higher (at the .001 level) Detective Arrest Index for assault in low-case-load precincts than in the high-case-load precincts; but the robbery and burglary Indexes were lower in the low-case-load precincts (although the differences between high- and low-case-load categories were not significant).

It is possible that a lower fraction of crimes is actually reported in high-crime precincts because of victim apathy, so that the actual fraction solved is smaller than for low-crime precincts. There is no proof one way or the other, however.

If no such bias exists, these results imply that either the differences in case load affect the time devoted to assaults, but not to robberies and burglaries, or the amount of time devoted to robberies and burglaries does not affect the probability of solution, given some minimum amount of effort.

Table 4

DETECTIVE ARREST INDEXES FOR HIGH- AND LOW-CASE-LOAD SQUADS

Crime	Low-Case-Load Squads	High-Case-Load Squads
Robbery		
Detective cases	3,989	2,472
Detective arrest index	*0.050*	*0.056*
Assault		
Detective cases	2,640	1,417
Detective arrest index	*0.313*	*0.247*
Burglary		
Detective cases	12,432	12,939
Detective arrest index	*0.013*	*0.016*

Table 5

WORKLOAD AND ARREST DATA FOR JANUARY, 1967 (MANHATTAN PRECINCTS)

i Precinct	D_i Detectives	C_i Cases	W_i Cases per Detective*	J Robberies Assigned	K Robberies Arrests	L Assaults Assigned	M Assaults Arrests	N Burglaries Assigned	O Burglaries Arrests
4	15	955	64	40	1	33	18	480	5
5	22	1461	66	135	15	144	34	676	12
1	15	1140	76	32	4	13	2	579	4
10	29	2253	78	179	8	125	41	1075	9
7	22	1833	83	200	5	146	49	725	9
30	29	2439	84	535	33	372	134	946	10
6	29	2609	90	116	5	57	14	1099	5
26	22	1981	90	354	19	133	52	638	14
34	22	2086	95	178	17	118	42	1100	13
20	29	3029	104	266	14	200	53	1025	11
32	33	3486	106	808	37	502	157	1054	13
28	33	3635	113	805	25	535	129	1327	29
24	33	3663	111	341	15	262	101	1749	30
16	29	3350	116	233	14	145	24	959	8
9	33	3882	118	466	11	251	59	2187	29
23	29	3446	119	379	23	209	73	1266	19
25	29	3468	120	548	30	452	85	1303	18
13	29	3617	125	97	12	63	19	1723	13
18	22	2898	132	116	14	66	28	609	13
19	29	4566	157	176	11	68	25	2038	19
14	33	5222	158	366	18	111	25	1440	18
17	29	4608	159	91	6	52	12	1414	13
	595								

*Average, 110 cases per detective.

NOTE: Definitions and data sources are given in Table 5.

Table 6

DEFINITIONS AND SOURCES OF WORKLOAD AND ARREST VARIABLES IN TABLE 5

Col.	Definition	Source
i	Precinct	
D_i	Number of detectives	Manning figures from OCD
C_i	Number of Part I cases	U.F. 61 tape, Jan 1-Jan 30, 1967
W_i	Cases per detective	$C_i \div D_i$
J	Number of robbery cases in which patrol did not make arrest	U.F. 61 tape, Jan 1-Jun 30, 1967
K	Number of robbery cases in which detective made arrest	same
L	Number of assaults in which patrol did not make arrest	same
M	Number of assaults in which detective made arrest	same
N	Number of burglary cases in which patrol did not make arrest	same
O	Number of burglary cases in which detective made arrest	same

EFFECT OF SERIOUSNESS ON THE DETECTIVE ARREST INDEX

The Detective Arrest Index for crimes against property showed no sensitivity to individual workloads, indicating that the solution of such crimes is a chance event not affected by the amount of investigative effort expended, within the range of current experience. Another possible way to verify this hypothesis is to compare the success rate for property crimes, to which the police admittedly devote more attention, with the rate for those eliciting less concern. This subsection will attempt to determine whether the seriousness of a property offense (as measured by property loss) is related to the probability that an arrest will be made.

Crimes resulting in physical harm to the victim are regarded by the police as the most serious type. The police accordingly devote a large proportion of their investigative manpower to their solution. In a property crime where no bodily harm occurs, seriousness is usually measured by the value of the lost property. In addition, crimes in which recent incidents indicate an unusually high victimization rate for a particular individual or neighborhood are viewed as more serious than is a random incident.

Table 7 lists the frequency distribution and average loss for various types of property crimes, based on crimes across the entire City during the data base period. Examined by individual precincts, these figures reveal a wide variation in the average loss per crime. This would imply that the attention given a particular crime could not be determined by the value of the loss alone, but would also depend on the precinct of occurrence. In order to eliminate some of the differences among precincts, this analysis was limited to comparisons between crimes occurring within the same Borough Command. The specific crime types covered in this test are retail robbery, residential burglaries, and commercial burglaries. Residential and commercial burglaries differ not only in the type of target, but also in the time of occurrences. Commercial establishments are usually burglarized at night when no one is present, while residential burglaries occur predominantly during the day.

As in the previous analysis, our strategy here was to divide the crimes of interest into two distinct groups according to the variable of interest (loss), compute the Detective Arrest Index within each group for each crime, and then to use the chi-square test to determine whether any significant differences were encountered.

The definitions for high- and low-value crimes of each type were set as follows:

Crime	Low Value	High Value
Retail robbery and commercial burglary	Greater than $10 but less than $250	Equal to or greater than $250
Residential burglary	Greater than $10 but less than $500	Equal to or greater than $500

Table 7

VICTIM LOSSES FOR CRIMES AGAINST PROPERTY

Crime	No. of Crimes	Avg Loss	$0-10	$10-50	$50-250	$250-1,000	$1,000-5,000	$5,000-25,000	$25,000 or More
Robbery									
Retail	3,489	404	843	557	1,252	601	198	35	3
Residence	4,669	150	1,715	1,265	1,290	308	74	16	1
Bank	16	10,593	9				4	1	2
Payroll	76	2,230	15			9	46	6	
Other	7,597	202	3,264	2,147	1,717	318	125	20	6
Total, robbery	15,847	251	5,846	3,969	4,259	1,236	447	78	12
Burglary									
Commercial	13,830	443	4,403	1,673	3,640	3,009	952	136	17
Residence	31,760	474	6,336	2,818	10,676	8,939	2,627	345	19
Other	21,438	478	7,722	1,553	5,174	4,977	1,748	243	21
Total, burglary	67,028	469	18,461	6,044	19,490	16,925	5,327	724	57
Grand larceny									
From truck	774	520	66	7	347	284	62	8	
From auto	11,751	386	380	17	5,982	4,729	619	23	1
From building	11,900	659	422	55	5,643	4,508	1,112	139	21
From pier	71	4,104	6		15	20	22	7	1
Other	16,326	236	3,744	4,035	6,364	1,709	405	60	9
Total, grand larceny	40,822	425	4,618	4,114	18,351	11,250	2,220	237	32

The specific dividing lines were placed as high as possible, while still retaining a reasonable sample of high-value offenses and arrests. Crimes of less than $10 loss were excluded from the study because they probably constitute a disproportionate share of crimes that are hard to substantiate, or in which a detective made the arrest at the scene of the crime before any property could be taken, as opposed to the arrest's resulting from an investigation.

Table 8 lists the number of cases and the Detective Arrest Index for each crime category. None of the differences in the Index between high- and low-value cases had statistical significance at the .01 level.

Table 8

DETECTIVE ARREST INDEX FOR HIGH- AND LOW-VALUE CRIMES

Crime	Manhattan North		Bronx	
	Low Value	High Value	Low Value	High Value
Retail robbery				
Detective cases	367	147	283	123
Detective arrest index	*.041*	*.034*	*.025*	*.041*
Residential burglary				
Detective cases	4312	1336	3465	1094
Detective arrest index	*.009*	*.010*	*.007*	*.007*
Commercial burglary				
Detective cases	766	519	759	511
Detective arrest index	*.010*	*.008*	*.004*	*.006*

An additional test of the relationship between loss and the Detective Arrest Index was performed, using all crimes of burglary and robbery in the data base. The Detective Arrest Index for burglaries involving a property loss greater than $5000 was found to be .0064, which is less than half the Index for lesser burglaries. The Detective Arrest Index for robberies involving more than $1000 loss was found to be no different from the Index for robberies in general.

The results of these tests indicate that detectives are no more successful in solving cases to which they assign high priority than they are for cases of less significance. This finding agrees with the

results of the previous analysis, indicating that the solution of any particular property crime is a chance event, insensitive to the amount of investigation conducted.

CASE PROFILES

More than half the arrests for crimes against property are made at the scene of the crime. Table 3 disclosed that the probability that any particular case of robbery, burglary, or grand larceny will result in an arrest through a detective investigation is extremely small--.06 for robbery and about .02 for burglary and grand larceny.

This state of affairs suggests that a great deal of detective manpower that is possibly wasted investigating unsolvable cases might be saved or made more productive by improving the procedures for selecting cases to be investigated and those to be closed without detective followup. In order to select cases with the highest probability of solution, the factors that lead to a successful investigation must be determined. Factors that might be considered important are the exact nature of the crime, the time of police notification, the initial police response, the evidence initially available to the police, the steps taken during the followup investigation, and the timing of new evidence.

Unfortunately, documentation of these factors is not routinely available for New York City crimes, although it probably could be constructed for individual cases by interviewing the officers involved. Rather than devoting extensive time to developing complete documentation for past crimes or attempting to institute a new documentation procedure without knowing the type of information that should be obtained, it was decided to analyze first only those data obtainable from existing case records.

To carry out this study, a sample of about 600 cases were examined, half of which had been solved and the other half closed without results. A research assistant reviewed the records for each case and extracted the desired data on a coding form suitable for keypunching. The data were then placed on IBM cards and a computer program written to summarize it in the desired format. The summary data were then

displayed in what were called case profiles (see Figs. 4 to 6), which make use of decision tree techniques.* (Documentation of all data processing is included in Appendix A.)

When a case profile is read from left to right, it shows the alternative paths that any particular type of case may follow from first report to final closing. The case profile is characterized by a tree-like structure with diverging branches as one moves from left to right. The number on any branch is the fraction of those cases at the preceding branch point that can be expected to follow that branch. The numbers on all the branches leading from a particular branch point always add to 1.0.

Looking at Fig. 4, for example, we see that 8.1 percent of reported robberies result in an arrest by uniformed patrol at the scene of the crime, 1.3 percent result in a detective arrest at the scene, and 90.6 percent are initially unsolved. Of these unsolved cases, the victim can name a suspect in 1.9 percent, a description can be obtained in 67.4 percent, etc. For those cases with a named suspect, 46 percent result in an arrest, while a mere 2 percent of the cases with only a description result in an arrest.

It can be seen that the case profiles make it possible to estimate the probability that any particular case will be solved as the case progresses. Only those factors in the investigative procedure are shown that are documented in the case records and appear to affect the final disposition of a case. In the initial processing of the same data, it was found that the time of police notification about the crime (greater or less than four hours) and the existence of identifiable stolen property did not appear to affect the case outcome.

These three case profiles demonstrate differences both in the probability of pickup arrest and in the probability of finding any evidence in robbery cases as opposed to burglaries and larcenies. Even with evidence, the probability of solving burglaries and larcenies remains low. Only 4.2 percent of the grand larcenies with named suspects result in arrests.

---

*For a complete discussion of decision trees and their use in analyzing decisions under uncertainty, see H. Raiffa, *Decision Analysis*, Addison-Wesley, Reading, Mass., 1968.

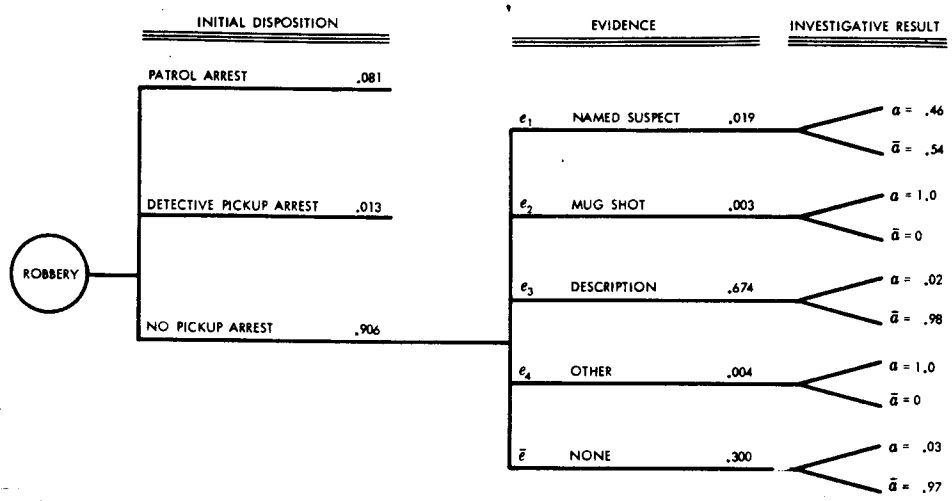


Fig. 4--Robbery case profile

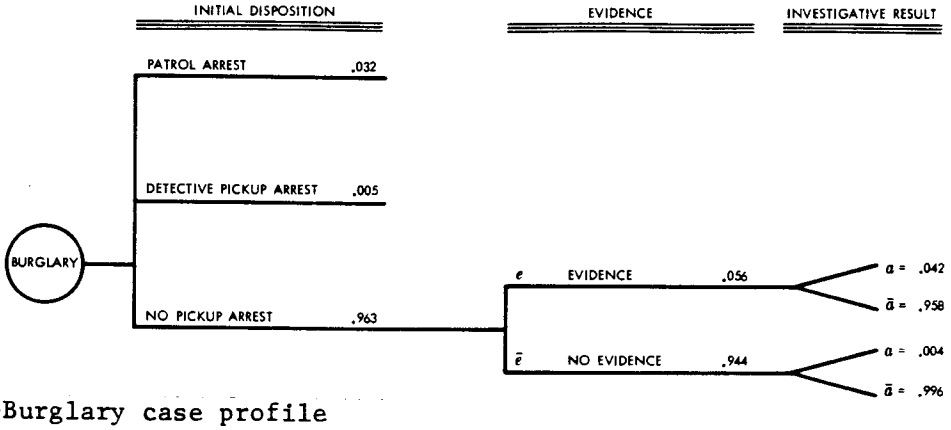


Fig. 5--Burglary case profile

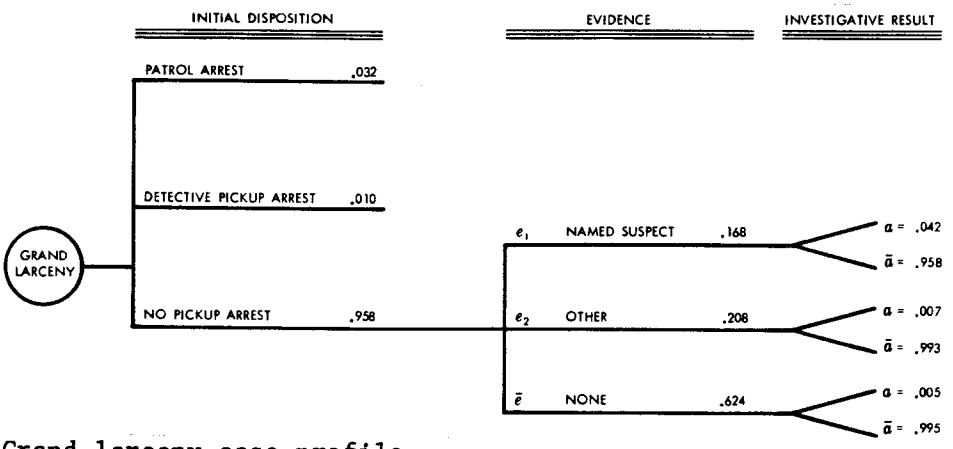


Fig. 6--Grand larceny case profile

V. DETECTIVE PATROL

ORGANIZATION AND TACTICS

Every Borough Command except Richmond has a Burglary Squad consisting of 15 men. These squads were formed to provide a supply of detectives who would not be tied down by routine case work and would be free to develop independent sources of information and attempt to make pick-up arrests. In addition to the Burglary Squads, there is a Safe, Loft, and Burglary Squad of 55 men within the Burglary Larceny Bureau that performs a similar function on a city-wide basis in addition to pursuing cases of long-term duration.

Not surprisingly, the methods of operation adopted by these squads are quite different from normal precinct squad activity. Their most common task is street patrol in areas historically known to be hazardous or where they expect a crime to occur because of some specific information.

Patrol can be performed either on foot or in private cars. The detectives wear clothing that will allow them to pass unnoticed among the local population of their patrol area. While on patrol, they are alert for any suspicious signs of serious criminal activity. Likely suspects are persons who walk along the curb looking into parked cars or stand outside a bank watching to see who takes out money, or linger around locations where merchandise is being handled but not carefully watched.

When detectives come across a person who looks as though he might "caper," they attempt to "tail" him in order to determine his intentions. A tail can also result from information provided by a confidential informant who identifies someone as a potential criminal and indicates where or how he might pull his next job.

If previous observations or information provided by informants lead the detectives to suspect that a specific premise will soon be victimized (or is the location of some criminal activity), they may stake out the location by either placing men inside with the cooperation of the proprietor, or unobtrusively nearby.

To gain a more comprehensive picture of the activities of these squads, a special data-collection effort was conducted in July and August of 1968. Special forms and instructions were provided to each squad for the purpose of collecting daily information on squad activities and resulting arrests. Copies of the instructions are provided in Appendix B.

HOW PATROL MANPOWER IS USED

In looking at the daily activities of these squads, three distinct patterns become obvious. On Sunday, most of the men are off duty; Saturdays have a little more activity than Sunday; weekdays have the most activity, with the number of men on duty about equally distributed over all five days.

Table 9 shows the average distribution of manpower among activities for the six burglary squads and the Safe, Loft, and Burglary Squad. The patrol, tail, and stakeout activities have already been described. Investigations include both the investigation of past crimes and the personal investigation of particular suspects. Court activities include time spent prior to an arrest securing search warrants or wiretap orders, plus time spent after an arrest in arrest processing and subsequent court appearances. Special details involve tasks directed from outside the squad that do not contribute to its primary mission of arresting felons. Time listed under "other" is almost exclusively accounted for by men who are off duty, either because they are not scheduled to work or they are on annual vacation. In the summer months this fraction can be expected to be higher than normal.

The numbers in Table 9 reflect man-tours of eight hours duration. Two-thirds of the patrol activity took place during the daytime, one-third at night. Tails and stakeouts occurred almost exclusively during the day.

Surprisingly similar percentages of total manpower were devoted to each activity by the two types of squad. The only major difference is in the use of tails. Among burglary squads, there were a few striking differences. Much of the investigative effort listed is accounted for by the Queens Burglary Squad, which averaged 3.33 tours per weekday

on this activity. Much of the tail activity can be attributed to the Manhattan North and Brooklyn North Squads, which averaged 1.28 and 2.5 tours, respectively, per day on tails.

Table 9

AVERAGE DAILY ALLOCATION OF MANPOWER FOR BOROUGH BURGLARY SQUADS AND SAFE, LOFT AND BURGLARY SQUADS, JULY-AUGUST, 1968

Day	Patrol	Tail	Stakeout	Investi-gation	Court	Special Detail	Other
Average 15-Man Burglary Squad Deployment in Man-Tours							
Sunday	0.54	0.04	0.63	0.07	0	0.46	13.26
Saturday	1.79	0.37	0.70	0.04	0.03	0.91	11.20
Weekday	5.07	0.738	0.98	1.24	1.10	1.10	4.65
Average Safe, Loft and Burglary Squad Deployment in Man-Tours							
Sunday	6.75	0	0.50	0	0	1.25	41.13
Saturday	12.44	0	0.22	0	0.56	2.56	32.89
Weekday	19.84	0.7	3.26	3.93	4.24	2.89	14.27

The most frequent users of stakeouts were the Bronx and Brooklyn South Squads, who averaged more than two tours per day on this activity during the week. The squads most often hit by special details were Manhattan North and South, both of which lost more than two men per day.

The three activities of the burglary squads that are expected to produce arrests are patrols, tails, and stakeouts. Table 10 presents data for each squad, describing the number of man-tours devoted to each activity, the arrests and arrest incidents resulting from each activity, and the average number of man-tours required for the activity to produce an arrest or arrest incident. The arrests counted in this table are only those for Part I and theft-related offenses, such as possession of stolen property and petit larceny. An arrest incident is a crime involving at least one arrest. Thus, if three men in a car are arrested for possession of stolen property, this would be three arrests and one arrest incident.

Table 10

SOURCE ACTIVITY REPORT

Borough or Squad	Tours			Arrests						Tours per Arrest					
				Patrol		Tail		Stakeout		Patrol		Tail		Stakeout	
	Patrol	Tail	Stake-out	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)
Bronx	250.00	6.80	94.40	33	14	2	1	0	0	7.58	17.8	3.4	6.8	---	---
Manhattan															
North	87.50	34.00	8.50	8	4	6	4	0	0	9.4	21.8	5.7	8.5	---	---
South	302.05	3.85	26.25	7	5	0	0	0	0	43.2	60.4	---	---	---	---
Brooklyn															
North	207.15	117.5	29.16	18	9	3	1	2	1	11.5	23.0	39.2	117.5	14.60	29.16
South	204.3	19.08	133.92	22	13	0	0	6	2	9.3	15.7	---	---	23.3	66.96
Queens	316.08	0.90	0	14	7	2	1	0	0	22.6	45.1	---	---	---	---
Safe, Loft, & Burglary	1046.32	3.15	157.18	119	72	0	0	0	0	8.8	14.5	---	---	---	---
Total	2413.40	185.28	449.41	221	124	13	7	8	3	10.92	19.46	14.25	26.46	56.18	149.80

NOTE: Col. (1) = arrests; col. (2) = arrest incidents.

Manhattan South's high number of man-tours per arrest can no doubt be attributed to the fact that its men were primarily concerned with bombings in midtown Manhattan and could not devote much attention to Part I crimes.

The total line in Table 10 reveals that the average number of man-tours per arrest incident is 19.46 for patrol, 26.46 for tails, and 149.8 for stakeouts. If the types of arrest resulting from each activity are of equal quality, then the men performing stakeouts during the survey period could have been more productively used on tails or patrol. Of course, the data on stakeouts represent an extremely small sample.

As a part of the Burglary Squad Survey, squad commanders were asked to indicate the reason for initiating each tail or stakeout. A summary of these data is shown in Table 11.

There was not enough tail activity to draw conclusions from the data. The Brooklyn North Squad, by far the largest user of tails, instituted them on the basis of confidential information regarding suspected truck robberies. The initiation of stakeouts can be equally attributed to investigation, informants, previous observation, and previous knowledge of a suspected condition. Equal time was devoted to robberies and burglaries.

Table 11

MAN-TOURS DEVOTED TO TAILS AND STAKEOUTS

Suspected Crime	Origin of Suspicion				
	Investigation	Informant	Request from Other Unit	Observation	Previous Condition
A. Tails					
Robbery	8	115.5	0	2	3
Burglary	0	2	0	15.5	0
Grand larceny	0	0	0	2	0
Receiving stolen property	0	2	0	0	0
Other	0	3	0	2	0
B. Stakeouts					
Robbery	0	89	2	12	41
Burglary	111	21	10	43.5	14
Grand larceny	0	3	0	0	15.5
Receiving stolen property	2	64.5	0	0	0
Other	0	8.5	0	0	0

VI. ARREST PRODUCTIVITY

The previous sections of this Memorandum have discussed the two chief tactics employed by the Detective Division in seeking arrests for Part I crime: investigation and detective patrol. This section briefly considers activities of other Police Department units that contribute to the arrest of the same offenders, and attempts to compare the arrest productivity of these activities with those of the Detective Division.

In considering arrest productivity or the arrests per month for each man engaged in a specific activity, two different statistics are of interest. The first is the marginal productivity for each activity, which is the additional number of arrests that would be made if one additional man were employed in that activity. Marginal productivities at a given resource level should provide the basis for changing the number of men devoted to each activity.

The other statistic of interest is the average productivity for all the men engaged in one particular activity. Average productivity is of interest because it reflects the men's actual workload and is more readily estimated from Department records. This section estimates the average productivity for each activity by using Department records and then speculates on how marginal productivities can be expected to differ from this figure.

For this comparison, attention is restricted to the police units operating in the Manhattan North Borough Command. This command was chosen because good records of police activity were available and because Manhattan North contains the full spectrum of urban neighborhood types.

As in other parts of this study, the concern here is only with arrests for Part I and related offenses--serious crimes of personal violence and crimes against property. These include murder and non-negligent manslaughter, forcible rape, robbery, felonious assault, burglary, grand larceny, theft of a motor vehicle, possession of stolen property, dangerous weapons, or burglar tools, and petit larceny. The remainder of this section refers to these crimes as "primary" offenses.

INVESTIGATION

The records of the Detective Division show that on February 1, 1968, there were 379 detectives assigned to Manhattan North and total manning remained close to this figure for the time period under study. Of these 379 men, 15 were assigned to the Burglary Squad performing detective patrol. The rest were assigned to precinct squads or the homicide squad, where their principal task was to investigate cases, or to the division or borough offices, which provide supervision of the precinct squads. Therefore, 364 men were associated with the investigation of cases.

During the first nine months of 1968, the precinct squad detectives made 2822 primary arrests.* Their primary arrest productivity is therefore (2822/(9 x 364) = 0.86 arrests per man-month.

About one-third of the primary arrests were for violent crimes against the person while two-thirds were for property crimes. The analysis in Sec. IV of the relationship between case load and probability of solution leads to the conclusion that adding to the number of investigators will yield a relatively small increase in arrests for crimes against the person, but no increase in arrests for crimes against property, since the fraction of property crimes solved appears to be independent of the number of men available to investigate them.

DETECTIVE PATROL

Two sources of data on detective patrol are available for this part of the city. The first pertains to the Burglary Squad operation described in the previous section. The other pertains to the Nighttime Neighborhood Task Force, a unit that operates one unmarked car containing four plainclothesmen in each detective district. Although this task force was instituted primarily to deal with violent street crimes such as mugging, the men make many other kinds of arrests. During June and July, 1968, the twenty men of the Manhattan North Nighttime Neighborhood Task Force made 86 primary arrests, for an average primary arrest productivity of (86)/(2 x 20) = 2.15 arrests per man-month.

*NYCPD September Arresting Officer Report.

For the 15 men of the Burglary Squad, Department records show that they made 165 primary arrests during the period May 1, 1967, to April 30, 1968, for an average primary arrest productivity of 0.92 arrests per man-month.

No data are presently available that will tell us the marginal effect on arrests of adding men to the detective patrol function. However, officers on patrol, unlike investigators who have only a limited selection of solvable cases to work on, can make an arrest for almost any crime if they are in the right place at the right time. Since there is no evidence that the current detective patrol force is able to cover all areas of high crime potential, it can be expected that additional men devoted to detective patrol work would have the same productivity as the average experience by the present units, providing they were equally skilled.

STAKEOUTS

One of the techniques used by burglary squads is to stake out premises they expect to be victimized. The Burglary Squad Survey did not provide sufficient data on stakeouts to obtain a very reliable estimate of their productivity. The estimate derived from 450 man-tours of stakeout activity was about 56 man-tours per arrest. If a man works 20 tours per month, his arrest productivity would be 20/56 or 0.36, lower than the average productivity for detective patrol in general.

There is a special Stakeout Unit within the Safety and Emergency Division, which performs only stakeouts that result from requests from a precinct commander for such assistance. One might suspect, with this system of referral, that the detectives would select for stakeout those premises they think are likely to be hit, and refer to the Stakeout Squads premises that are to be staked out more to sooth proprietors than to generate arrests. The records of the 40-man Stakeout Unit show they made 15 arrests during the period May 3, 1968, to December 31, 1968, for an average arrest productivity of $15/(8 \times 40) = 0.05$ arrests per man-month, which is extremely low even when one considers that the unit was not fully deployed during the initial months of the period. Only three of the fifteen arrests were actually for robbery.

UNIFORM PATROL

Uniformed patrolmen make arrests either in response to calls from their dispatchers or because they have observed crimes or suspicious circumstances from the street while on preventive patrol. Since all calls of a "crime in progress" type are answered by the present force, any additional men assigned to patrol duty would primarily increase the number of arrests made by observation. An increase in arrests in response to dispatch calls could be expected only if the increase in manpower caused a significant decrease in response time to "crime in progress" calls. In order to measure the productivity of the strictly preventive patrol force, it is necessary to estimate the size of this force and the number of their arrests from various data sources.

On a typical day during 1968, approximately 725 men were assigned to uniform patrol duties in Manhattan North, with the men about equally distributed across the three tours. About 9 percent of the men are on foot posts, with the rest assigned to radio motor patrol cars (RMPs).

Radio run statistics for September 1968 showed an average of 1173 radio runs per day in Manhattan North. A special study in the 20th Precinct (in Manhattan North) showed that cars average 40 minutes away from preventive patrol to service a call. Since two men are assigned to each car, we can estimate that the manpower per day devoted to answering calls for service is $(1173 \times 2 \times 0.67)/8 = 196$ man-tours. The average preventive patrol force is thus $(725 - 196) = 529$ men. The number of policemen required to maintain the 529 men per day on the street is $529 \times (5/3) = 882$ men, due to scheduled days off, sick leave, and annual vacation.

Data collected in the 20th Precinct also indicated that approximately half the arrests made by uniform patrolmen are in response to calls and half result from observation. Applying this factor to the 3436 primary arrests made by patrolmen during the first nine months of 1968,* our estimate for the average primary arrest productivity for the preventive patrol force is $(3436)/(882 \times 9 \times 2) = 0.22$ arrests per man-month.

---

*NYCPD September Arresting Officer Report.

Table 12 summarizes the average arrest productivity figures for the activities considered. The implications of this analysis are that shifting men from either uniformed patrol or case investigations to detective patrol activity will increase the number of primary arrests made by the Department.

Table 12

ARREST PRODUCTIVITY

Activity	Average Arrest Productivity: Primary Arrests per Man-Month
Uniformed patrol	0.22
Investigation	0.86
Detective patrol:	
Burglary Squad	0.92
Neighborhood Task Force	2.15

The effectiveness of detective patrol is a function of crime density and observability. As either crime density or observability increases, so does the probability that a detective on patrol will be able to spot a suspect and keep him under surveillance. Therefore, detective patrol can be expected to be much more productive in high-hazard areas with heavy pedestrian traffic, such as Manhattan or the Bronx, than areas of low hazard where there are fewer people on the street, such as Queens. The arrest productivity of the Burglary Squads in these areas during this study's survey substantiate this finding (see Table 10).

VII. SUGGESTIONS FOR FURTHER RESEARCH

This document would be incomplete without a discussion of other research that should be done in the investigation and apprehension area of police activity. One rewarding subject for research would be the determination of how different types of cases are solved. This research would aid in the evaluation of specific investigative techniques, and would provide the basis for improved case selection if the Department adopted a selective investigation policy. Such a study would involve decomposing each type of crime investigation into a set of specific tasks and, for each case, recording which tasks were accomplished and determining how they affected the final outcome of the case.

Also, our ability to analyze the preferred mix of preventive patrol and investigative activity suffers from our ignorance about the relationship between apprehension rates and crime rates, in both the short and long term. Our studies of burglary and robbery suspects have shown that only about half of those arrested are ever convicted, and of the convictions less than half are for felonies.

What are the benefits to society when a young mugger, armed robber, or burglar is arrested some time after he commits a crime? After a short stay in prison, is he more or less criminal than if he had been left on the street? Is the social benefit of keeping him out of circulation for some specified period worth the cost?

The answers to these questions can be answered only by intensive social research focused on the population groups with high criminal potential. Such research should attempt to estimate the effect that the risk of apprehension and the apprehension experience have on the individual's mode of behavior.

Appendix A

CASE PROFILE COMPUTATIONS

DATA SOURCE

When a citizen reports a crime to the police, either he will be told to go to the nearest precinct for assistance, a patrol car will be sent to the complainant's location, or possibly a detective will respond to the complainant. In any case, a U.F. 61 Complaint Report is completed in the precinct of occurrence. The Complaint Report contains facts about the complainant, about the crime, and about evidence that might lead to the offender. The results of any followup investigation conducted by the detectives are also added to the Complaint Report or entered on a Followup Report, which becomes part of the case record. If an offender is apprehended, this fact and his identity are also noted in the case record.

SAMPLE SELECTION

In choosing cases to review, we had several objectives. First, we wanted some cases to come from precincts in which we had visited and were familiar with the personnel. Second, we wanted cases from precincts with identifiable socioeconomic characteristics and from different parts of the city, to see if there were differences in the pattern of investigations. And lastly, we wanted cases in which the courts had made final dispositions of the offenders, so that we could examine the effect of police practices on the conviction of offenders. These objectives led us to identify seven precincts with the desired mix of characteristics. For each of these precincts, we identified every arrest made by the precinct detectives for robbery, burglary, and grand larceny during the first six months of 1967. Besides classifying crimes by major type, we also subclassified them by their targets. For robberies, this subclassification distinguishes among payroll robbery, bank robbery, tavern robbery, etc. A sample of unsolved crimes was determined by examining the subclassification of each detective arrest and choosing the next chronological unsolved case that fell into the same subclassification.

CODING TECHNIQUE

After several attempts at extracting data from the case records, we finally settled on the following classification of data:

Time Police Notified	Determined by examining the difference between time of crime and time reported in the text of the report. The records reveal that this time could be as much as four hours, even when the patrol made an arrest at the scene of the crime, due to delays in clerical processing. Some officers record "time reported" as when they complete the U.F. 61.
During the crime	
Within four hours	
After four hours	
Unknown	
Stolen Property Identifiable	Either by serial number or exact description.
Yes	
No	
Unknown	
Suspect Identification	We recorded the first appropriate category.
Pickup arrest	
Suspect named	
Mug shot identification	
Description	
Associates identified	
Neighborhood identified	
Traceable objects	
Auto identified	
None	
Unknown	
Victim/Offender Relationship	
Relative	
Employer/employee	

Named acquaintance

Unnamed acquaintance

Unknown

Type of Arrest

Held by complainant
At scene of crime
Canvass of crime area } Combination 1

At residence
On street for name alarm } Combination 2
On street for descriptive alarm

On street for possession of property
Identified by stop and frisk or arrest for other offense } Combination 3

Combination 2 + Combination 3 } Combination 4

Unknown

No arrest

Every possible attempt was made to avoid using the unknown category for any factor. Most of the data were obtained by reading the description of the case and attempting to combine the reported facts with the various times and dates indicated in the report. In the "Type of Arrest" categories, we even included some combinations where perfect discrimination was not possible. For instance, if the suspect was named on one date and arrested several days later, we would select Combination 2. On the other hand, if the suspect was simply arrested several days after the crime without prior reference in the case records, we would select Combination 4.

PROCESSING THE DATA

Since the purpose of this study was to identify those cases with a high probability of solution, it was decided to display the data in decision tree format with each event appearing in the same order as it does in the actual investigation of a case.

As a first step, the data were sorted by crime type and the percentage breakdown for each category was examined. At this time, it was determined that factors of Property Identification and Victim/Offender Relationship were unsuitable for analysis because of the small number of cases in which they were involved. Property was identified in less than 2 percent of the cases examined, a figure that was the same for both solved and unsolved cases. Whether or not the victim and offender were acquainted can be determined when the suspect is named. There were not enough of these cases to determine the types of relationships that existed.

The vast majority of cases in which arrests were made were assigned to one of the combinations under "Type of Arrest" and even within combinations, there was some uncertainty as to which combination applied. For this reason, the only four classifications used were: *pickup arrests*, which consist of any code in Combination 1; *unknown arrests; followup arrests*, which consist of any arrests other than pickup and unknown; and *no arrests*.

After these adjustments in the data were made, the calculation of conditional probability estimates was made for each event. The results showed that the time of police notification had no effect on the probability of successfully investigating a case. Consequently, the "Time of Notification" data were ignored and the decision trees recalculated. The final results are displayed in Figs. 4 to 6 in Sec. IV.

If the data sample represented a random sample of reported cases, then the fractional division of cases at each event could have been used for an estimate of the probability. However, the sample purposely represented a much higher fraction of arrests than is achieved in practice, so that those cases could be examined in detail. For this reason, the conditional probabilities on each branch are calculated from different pieces of data. The calculation of the Burglary Profile is explained below; the data supporting all of the profiles are contained in Tables 13 and 14.

Table 13

VALUES OF SAMPLE VARIABLES

Variable	Robbery	Burglary	Grand Larceny
R	2355	8003	6356
PA	190	251	205
DA	112	95	141
PU	25	36	54
FU	68	39	62
f	.27	.48	.47
$[e_1 a]$	17	15	37
$[e_1 \bar{a}]$	1	5	18
$[e_2 a]$	6	--	8
$[e_2 \bar{a}]$	0	--	23
$[e_3 a]$	20	--	--
$[e_3 \bar{a}]$	66	--	--
$[e_4 a]$	8	--	--
$[e_4 \bar{a}]$	0	--	--
$[\bar{e} a]$	17	24	17
$[\bar{e}\bar{a}]$	29	86	69
$[a]$	68	39	62
$[\bar{a}]$	96	91	110

Table 14

INTERMEDIATE CALCULATIONS FOR THREE CASE PROFILES

Probability Estimate	Robbery	Burglary	Grand Larceny
P_1	.0807	.0317	.0322
P_2	.0128	.0051	.0104
P_3	.9065	.9636	.9574
$P(e_1/a)$	.2500	.3846	.5968
$P(e_2/a)$	.0882	--	.1290
$P(e_3/a)$	.2941	--	--
$P(e_4/a)$	.1176	--	--
$P(\bar{e}/a)$	.2500	.6154	.2742
$P(e_1/\bar{a})$	.0104	.0549	.1636
$P(e_2/\bar{a})$	0	--	.2091
$P(e_3/\bar{a})$	.6875	--	--
$P(e_4/\bar{a})$	0	--	--
$P(\bar{e}/\bar{a})$	.3021	.9451	.6273
$P(a)$	.0347	.0062	.0118
$P(\bar{a})$	.9653	.9838	.9872
$P(e_1)$	.0187	.0563	.1685
$P(e_2)$	.0031	--	.2079
$P(e_3)$	.6738	--	--
$P(e_4)$	.0041	--	--
$P(\bar{e})$	.3003	.9437	.6236
$P(a/e_1)$	.4639	.0424	.0418
$P(a/e_2)$	1.0	--	.0073
$P(a/e_3)$	.0151	--	--
$P(a/e_4)$	1.0	--	--
$P(a/\bar{e})$	.0289	.0040	.0052

CALCULATION OF THE BURGLARY PROFILE

Following Fig. 5 from left to right, we must first estimate the probability of *patrol arrest* (P_1), *detective pickup arrest* (P_2), and *no pickup arrest* (P_3). Let R be the number of reported burglaries during the data base period in the sample precincts, PA be the number that resulted in patrol arrest, and DA be the number that resulted in detective arrest. In the sample data, we will make the assumption that the types of arrest for the unknown arrests are distributed in the same manner as those that can be identified. Letting PU stand for the number of detective pickup arrests in the sample, and FU stand for the number of detective followup arrests,

$$f = \frac{PU}{PU + FU}$$

is an estimate of the fraction of detective arrests that are pickup. The first group of estimates are then:

$$P_1 = \frac{PA}{R}$$

$$P_2 = \frac{(f)(DA)}{R}$$

$$P_3 = 1 - (P_1 + P_2)$$

Now, in any particular case, let (e_i) denote the existence of the i^{th} type of evidence and ($\bar{e}$) the lack of any evidence. Let (a) denote the occurrence of a followup arrest and ($\bar{a}$) the lack of an arrest. Also, let [X] denote the number of cases with characteristic X, observed in the sample. From the sample data, we have estimates of:

Probability of evidence, given an arrest occurred

$$P(e_i/a) = \frac{[ae_i]}{[a]}$$

Probability of evidence i, given no arrest occurred

$$P(e_i/\bar{a}) = \frac{[\bar{a}e_i]}{[\bar{a}]} .$$

An estimate of P(a) is provided by P(a) = (1-f)(DA)/R. The probability of evidence type i being found in any case is then

$$P(e_i) = P(e_i/a)P(a) + P(e_i/\bar{a})P(\bar{a}) = P(e_i a) + P(e_i \bar{a}) .$$

The probability of a followup arrest, given the degree of evidence, is found to be

$$P(a/e_i) = \frac{P(ae_i)}{P(e_i)} = \frac{P(e_i/a)P(a)}{P(e_i)}$$

$$P(\bar{a}/e_i) = 1 - P(a/e_i) .$$

The values of the sample variables are presented in Table 13 and the intermediate calculations used in the three case profiles is presented in Table 14. For robbery and grand larceny, the possible states of evidence are increased to five and three, respectively.

Appendix B

BURGLARY SQUAD SURVEY

INSTRUCTIONS FOR COMPLETING WEEKLY ACTIVITY REPORT

For each day, enter the manpower expended for each activity, with accuracy to the 1/2 man-day. A full man-day is one complete tour. If a man's working hours do not fit into the normal tours, or if he is not working that day, list him on the line marked "other." Account for every man assigned to the squad each day. The definitions of each activity are as follows:

Patrol--Active street patrol either on foot or by car. Includes short tails of suspicious individuals and stakeouts of less than 1/2-hour duration.

Crime Investigation--Investigating any aspect of a past crime.

Personal Investigation--Investigating past activities of a suspect or suspicious individual.

Tail--Following and observing a suspected criminal.

Stakeout--Observing premises where crime is believed to be occurring or about to occur.

Pre-Arrest Court--Time spent securing a warrant or wiretap order.

Post-Arrest Court--Time spent appearing in court in connection with an arrest.

Special Details--Time spent on special details outside command.

Other--Any significant activity that is not described above.

Not Working--Individual did not work this day.

INSTRUCTIONS FOR COMPLETING TAIL AND STAKEOUT REPORT

If a detective team goes out with the specific intention of tailing an individual or staking out premises, record the date and tour, indicate whether a tail or stakeout by a T or S, and list the suspected criminal activity to be observed and the grounds for suspicion, such as:

Information tip
Previous observation
Evidence disclosed by investigation
Wiretap
Request from other squad or commander.

INSTRUCTIONS FOR COMPLETING ARREST REPORT

List each arrest made by members of the squad for the week covered by the report. For each arrest give:

The name of the arrestee
The date and time of arrest
The crime with which he is to be charged
The detective activity leading to the arrest, such as:
Investigation of past crime
Investigation of suspect
Planned tail
Planned stakeout
Patrol tail
Patrol stakeout
General patrol.