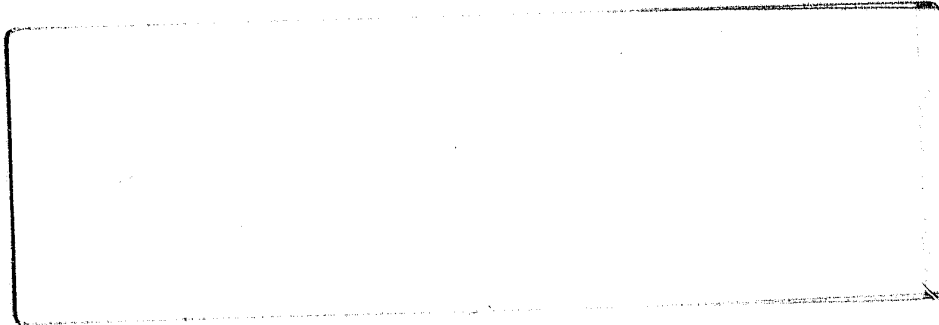


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Calspan

Technical Report



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Calspan Corporation
Buffalo, New York 14221

Formerly Cornell Aeronautical Laboratory, Inc.

Calspan

ANALYSIS OF CRIMINALISTICS LABORATORY EFFECTIVENESS IN CRIMINAL JUSTICE SYSTEMS

VOLUME II THE USE OF PHYSICAL EVIDENCE EXAMINATION IN ADJUDICATION OF CRIMES

August 1974

Calspan Report No. DC 5414-X-1

by
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Computer Systems Department

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PREFACE

The research on which this report is based has been performed as part of the National Institute for Law Enforcement and Criminal Justice program of addressing problems of resource allocation within forensic laboratories, performance and effectiveness measurement. The MITRE Corporation, as prime contractor for the program, has been assisted by two subcontractors: The PRC Systems Science Company has developed internal measures of criminalistics laboratory performance and the Calspan Corporation has been responsible for developing external measures of their impact on criminal justice systems. Both subcontractors collected data on on-going operations at three sites: Contra Costa County, California; Dade County, Florida; and Columbus, Ohio.

The study by the Calspan Corporation has been conducted during the period 1 October 1973 to 30 September 1974. Data were collected by resident observers at the three sites from November 1973 to July 1974. Results are reported as "Analysis of Criminalistics Laboratory Effectiveness in Criminal Justice Systems", in four volumes:

- I - The Use of Physical Evidence Examination in Investigation of Crimes
- II - The Use of Physical Evidence Examination in Adjudication of Crimes
- III - Measures of Effectiveness of Criminalistics Laboratories
- IV - Summary and Recommendations

The success of the study was predicated on full cooperation and support by the criminalistics, investigative and adjudicative agencies at the three sites. The cooperation and assistance of the following officials, their staff and colleagues, is gratefully acknowledged.

CONTRA COSTA COUNTY

Harry D. Ramsey, Acting Sheriff - Coroner
Cpt. Harry Deram, Chief, Investigation Division
Duayne J. Dillon, Chief, Criminalistics Laboratory
Gerald T. Mitosinka, Supervising Criminalist
Lourne G. Phelps, Chief, Richmond Police Department
Cpt. Robert W. Wood, Richmond Police Department
Cpt. John Huddleston, Concord Police Department
Lt. Bud Savage, Concord Police Department
Wm. A. O'Malley, District Attorney
Hon. Wm. R. Channel, Presiding Judge, Supreme Court
Wm. R. Higham, Public Defender

COLUMBUS

Earl Burden, Chief of Police

Maj. Lloyd V. Forbus, Chief, Investigative Subdivision

Richard O. Pfau, Supervisor, Crime Laboratory

Hon. Frederick T. Williams, Administrative Judge, Court of
Common Pleas

Hon. G. W. Fais, Chief Judge, Municipal Court

George Smith, County Prosecutor

Daniel Johnson, City Prosecutor

Roy F. Martin, Director, Legal Aid and Defender Society

DADE COUNTY

E. Wilson Purdy, Director, Public Safety Department

Charles Black, Chief, Central Services Division, P.S.D.

Edward Whittaker, Supervisor, Crime Laboratory

Richard Gerstein, State Attorney

Hon. Gene Williams, Administrative Judge, Circuit Court

Phillip A. Hubbart, Public Defender

In addition, the leadership, guidance and assistance by the staff of
the MITRE Corporation under Fernando Biagi, Group Leader, Forensic Laboratory
Analysis Program, is gratefully acknowledged.

At Calspan, the project was under management supervision by Miles W.
Hall, Head, Computer Systems Department. Paul Rosenthal was project manager
and Dr. D. A. Travnick, associate project manager. They were assisted by
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The study was supported by three consultants: Professor Joseph D. Nicol,
Criminal Justice Department, University of Illinois, actively participated in
all phases of the program. The Hon. Charles Desmond, Chief Judge, New York
Court of Appeals (retired) advised on court-related problems and D. M. Lucas,
Director, Centre of Forensic Science, Toronto, Canada, provided helpful comment
on the program plan during its formative stage.

Section 1

BACKGROUND

The goal of the study reported in these volumes is to develop means to improve the utilization of physical evidence in the investigation and adjudication of felony crimes. Several problems have prompted initiation of the study:

- a. Scientific examination of physical evidence plays a role in only a small percentage of reported crimes. In 1963 it was found that abroad and in the United States, such examination is conducted in less than 2% of reported criminal violations^{(1)*}. Of the evidence available at the crime scene only a small fraction is collected and submitted for laboratory examination⁽⁶⁾. In the last decade the number of criminalistics** laboratories in the United States has increased substantially. The proportion of physical evidence examination in major crimes has not been resurveyed but is believed to have remained low. Further, while it has not been established what the percentage ought to be, it is generally acknowledged that it ought to be increased⁽²⁾. For instance the United States Supreme Court in pursuance of its goal that no injustice is done has declared a preference to fact finding based on physical evidence examination over fact finding based solely on eyewitnesses or confession.

* References are cited in Section 13.

** See the Glossary, Section 14, for definition of terms.

- b. An increasing proportion of criminalistics laboratory activity is spent on dangerous drug and sobriety-related analyses.

This trend is caused by the increasing number of arrests for drug abuse and alcohol-related traffic offenses and by the need to establish prima facie evidence of these offenses through analysis. The particular concern here is that this trend has diverted criminalistic activity away from the investigation of other offenses.

- c. Although crime laboratories have grown in number, it is not evident that the quality and scope of output in terms of the investigator's needs has kept pace with the state-of-the-art or adjudicatorial expectations. Thus, neither the investigator nor his supervisor are motivated toward a greater use of criminalistics.

- d. The use and the effectiveness of criminalistics in criminal justice operations has not been investigated systematically.

For instance, the various uses of criminalistics in criminal justice operations have not been investigated quantitatively and on a crime-specific basis, and such information is needed to assess the need for changes, if any. Measures of effectiveness are needed in order to assess the result of such changes.

In recognition of the above problems the following three study objectives were formulated:

1. Describe the role of criminalistics operations in criminal justice systems.
2. Develop and apply methods for measuring the effectiveness of criminalistics operations.
3. Recommend steps to improve their utilization.

To meet these objectives, detailed information on ongoing criminal justice operations had to be obtained. A major part of the study effort was therefore devoted to data collection and observation of criminal justice operations in three locations, a California county, a Florida county and a city in Ohio.

The study was designed to concentrate on actual use and on the user's view of criminalistics operations. A concurrent, independently conducted, study addressed activities within the criminalistics laboratory at the same three sites. Its results are reported elsewhere⁽³⁾.

The use of the term "criminalistics operations" in the statement of the above objectives follows a distinction made by Kirk and Bradford⁽⁴⁾ and is broader than the term "criminalistics laboratory". The latter denotes a facility. As used here, the former encompasses all scientific support of the criminal justice system involving physical evidence, excluding forensic pathology. For instance, lifting, processing and evaluating latent fingerprints, as well as comparing them with fingerprints on file are considered criminalistics operations, though they may or may not be performed by criminalistics laboratory personnel or in a criminalistics laboratory.

The meaning of "criminal justice system" depends of course on the context in which the term is used. In the context of the study objectives it must encompass all actual and potential users of criminalistics. Functions unrelated to criminalistics, e.g., detention or parole, need not be included. It is depicted as the largest block in Figure 1 and includes crime scene search, investigation and adjudication. The arrows in the Figure indicate the information flow in the system. The crime scene is searched for physical evidence by criminalistics laboratory or other personnel. Physical evidence (containing information) is brought to the criminalistics laboratory with a request for examination. The criminalistics laboratory reports its findings to the investigator and a dialog with the investigator may ensue. Information on the findings of the criminalistics operation may be used in the adjudicatory process. Typical outputs from the investigation subsystem are information leading to arrest, dismissal, prosecution of a suspect; the adjudicatory process typically results in

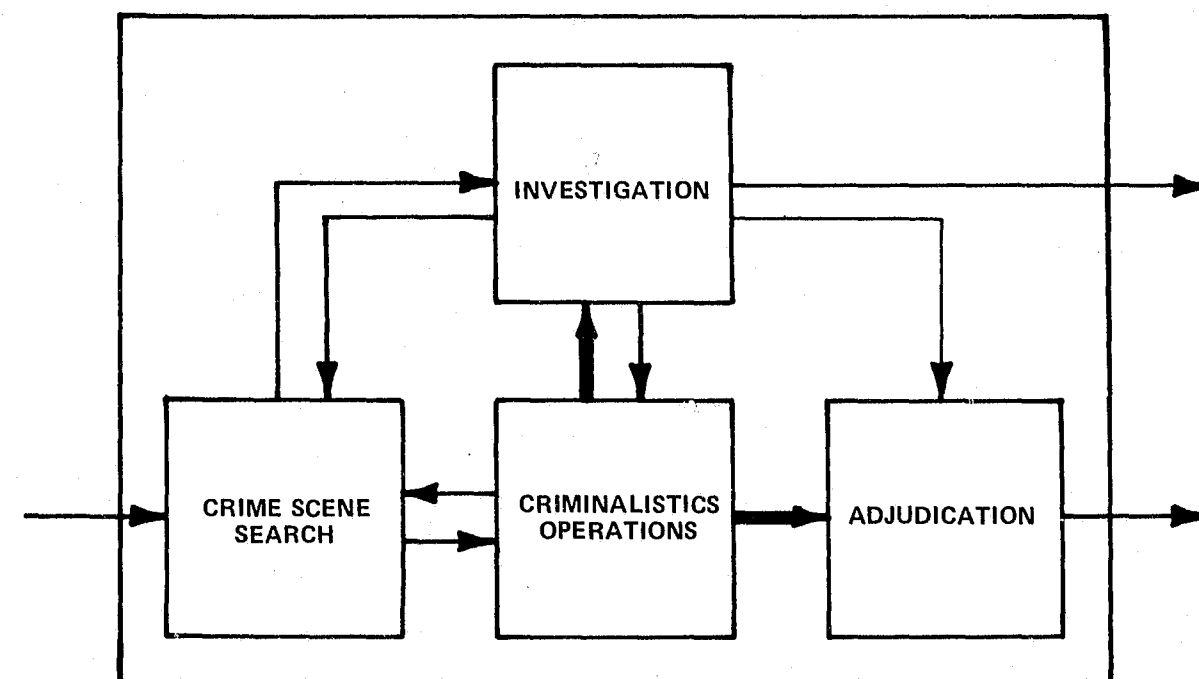


Figure 1 THE CRIMINAL JUSTICE SYSTEM

a guilty plea, verdict, appeal, etc. The two information links shown by heavy lines are the outputs of the criminalistics operation whose effectiveness is to be measured. The flow of information from crime scene to the criminalistics operation is recognized a priori as a strong influence on effectiveness.

Each of the blocks in Figure 1 represents a complex activity; further there are many information links to these activities that must be considered even if they are not expected to be changed as a result of this study. To that end Figure 2 expands on the activities represented by each of these blocks and indicates some of the key physical evidence related activities.

We may note first that the criminalistics operation remains a single "black box" in this presentation. However, its scope of activity, its available analytical methods, the process time, and its capacity are relevant here.

Participants in crime scene search for physical evidence are shown on the upper left of Figure 2. The police patrol unit responding to a reported crime is usually the first investigator on the scene. The police patrol may proceed to investigate or it may secure the crime scene and call for a detective or evidence-squad investigation. The latter may proceed to the crime scene with or without a mobile evidence unit. The detective or the evidence squad may call for assistance from crime lab personnel, if needed and if an appropriate procedure has been established. The crime laboratory personnel may, in turn, find that a yet higher level and specialization of skill is required and may call for a consulting criminalist. The prosecutor is, or expects to be, called to the scene of serious crimes and may call for a medical examiner, or the latter is called by the detective.

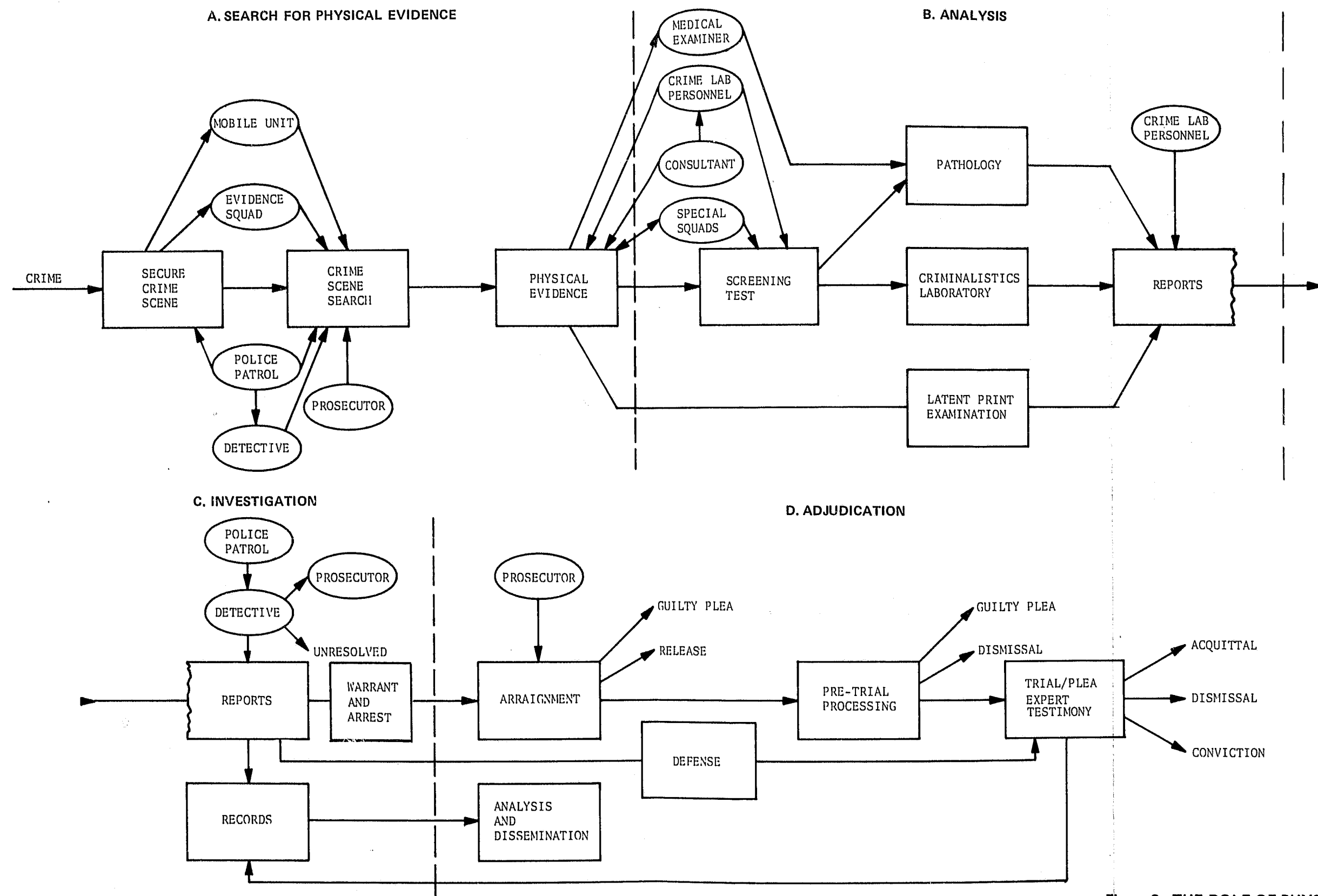


Figure 2 THE ROLE OF PHYSICAL EVIDENCE

Which of the officers shown in Figure 2 participates in the crime scene search depends on the nature of the crime and on other circumstances such as the availability of personnel, and who is notified of the crime. Further, organizational relations differ from site to site; for instance, mobile unit and evidence squad have the same function; the mobile unit may be attached to the criminalistics laboratory rather than to the detective division. Further, more than one police jurisdiction may be involved in crime scene search; in the city, the city police department is responsible, whereas in the suburbs the county sheriff or a town police department may assume responsibility; further, depending on the nature of the offense, state or federal police may become involved at the crime scene.

Analysis of physical evidence discovered in crime scene search is shown performed in Figure 2 by several operations, only one of which is the "criminalistics laboratory". We note particularly that evidence may come to the criminalistics laboratory directly from the crime scene or after a screening test (e.g. colorimetric indication of certain dangerous drugs) which may or may not be administered under the control of the criminalistics laboratory.

The upper main line in Figure 2 represents the flow of physical evidence through two stages, Search (A) and Analysis (B). The main line is continued in the lower part of the figure through Investigation (C) and Adjudication (D).

*In some instances these mobile evidence units are called mobile "laboratory" units; however, they do not perform analyses of evidence.

It is seen that some of the participants in Stage A, also are involved in Stage C, e.g., the detective and prosecutor. They receive laboratory reports and (sometimes) engage in dialog with the laboratory which may lead to additional laboratory analysis. The prosecutor also participates in adjudication from arrest and arraignment through pre-trial proceedings and trial. Each of these stages is of a complex nature and has a number of possible outputs, such as a guilty plea or dismissal; the effect of physical evidence analysis on these outputs have been a study objective.

In keeping with these concepts the study had to be structured to gather data from the police department, the laboratory, the prosecutor, defense attorneys and courts, since they are all potential users or processors of physical evidence.

The primary purpose of the data gathering effort was to learn how criminalistics effort and its results are currently used, so that measures of criminalistics operations effectiveness could be developed and their validity tested. A further purpose was to describe this use, its frequency, timing and any other important attributes for the guidance of the criminalistics users at any location - and that has been done in this volume of the report. It was not the purpose of the information and data gathering effort to evaluate any one person or agency or the handling of any one case.

The effectiveness of criminalistics operations is related with two major aspects of their results, frequency of use and value. Any variable of a criminalistics operation is a candidate measure of effectiveness if it can be shown to be highly correlated with frequency of use and value. Further, candidate measures of effectiveness must be tested for validity, the data necessary for their application must be obtainable and they must be "practical". Since it was not known at the outset how many measures of effectiveness would survive the above tests, the study was structured to search initially for data for a large number of candidate measures of effectiveness so as to assure an adequate number of acceptable measures at the end.

The final study objective, recommendations leading to improved utilization of physical evidence examination, could be attained through three approaches: Application of the measure of effectiveness to the sites, comparison between sites and observations at the site.

The results of the study are reported in four volumes:

1. The use of physical evidence examination in crime investigation.
2. The use of physical evidence examination in crime adjudication.
3. Measures of effectiveness of criminalistics operations.
4. Summary and recommendations.

Section 2

THE STUDY SITES

The study sites had been selected before the project began. Selection criteria included the willingness of the affected agencies to cooperate with the project staff; their interest in the study and in possible follow-on demonstration projects; "representative" population and laboratory capability; and manageable sample size.

As much as possible the results of the study are reported without reference to a particular site. The reader should bear in mind the limited generality of the findings that is imposed by the small number and limited variety of sites. For instance, areas served by strong central laboratories, areas with much larger distances between criminalistics laboratory and crime scenes, areas served by criminalistic laboratories not operated by law enforcement agencies, or sites with much smaller or much larger populations, may have characteristics that may limit the applicability of these reports.

The study sites were Contra Costa County, California, the City of Columbus, Ohio and Dade County, Florida. The characteristics of these sites are tabulated in Figure 3.

Figure 3 SITE CHARACTERISTICS

	TOTAL POPULATION x 1000	RECTANGULAR SIZE miles		STUDY AGENCIES	STUDY POPULATION x 1000
CONTRA COSTA COUNTY	560	32 x 72	16 MUNICIPALITIES INCL. 1 "SUBURB", 93,000 POP. 1 INDUSTRIAL CITY, 81,000 POP. LARGE SUBURBAN, RURAL AND UNINHABITED AREAS	SHERIFF'S DEPT. CONCORD RICHMOND	172 } 93 } 346 81 }
COLUMBUS	533	10 x 12	LARGEST CITY IN FRANKLIN COUNTY, 11 OTHER POLICE AGENCIES	COLUMBUS	533
DADE COUNTY	1268	55 x 49	26 MUNICIPALITIES INCLUDING MIAMI (335,000)	COUNTY PUBLIC SAFETY DEPT.	557

Contra Costa County, California, extends eastward from the northeast portion of San Francisco Bay and covers an area exceeding 2000 square miles. To the south-east it is part of a continuous urban area extending from the cities of Hayward, Oakland and Berkeley in Alameda County to Richmond, Contra Costa County. The total population of 560,000 (1970 Census) is composed of 15 municipalities, the largest of which is Richmond with a population of less than 100,000. Richmond is an industrial city with a large, poor, black population. The next largest city, Concord in the southeastern part of the county might be called a "bedroom community" having a large part of its white population commute to the large bay area cities outside the county.

The County has 14 separate police agencies; two municipalities contract with the Sheriff's Department for their police service. The Sheriff's Department polices the unincorporated areas of the county which include a number of large sparsely populated areas as well as densely populated areas adjacent to or surrounded by the cities. The population policed by the Sheriff's Department is 172,000, just under 31% of the county population.

In order to contain the study at a readily manageable level only offenses reported in three agencies were included: Concord, Richmond and the Sheriff's Department. Together they comprise a population of 346,000, 62% of the county.

The Superior Court, which handles all felony trials, is located in Martinez, the county seat, population 16,000, located in the north central part of the county. Arraignments and misdemeanors are under jurisdiction of five municipal courts, one of which is also located in Martinez.

The Criminalists Laboratory is a part of the Sheriff's Department. Its director reports directly to the undersheriff and sheriff. As tabulated in Figure 4, the Sheriff's Laboratory has 8 criminalists, one crime scene technician and one fingerprint examiner. The Richmond Police Department has 9 crime scene and 2 fingerprint technicians; the Concord Police Department has 5 and 1, respectively. On request, the Criminalistics Laboratory provides crime scene service in the Sheriff's Department jurisdiction and crime scene consulting services to the 15 municipalities in exceptional, major cases. Laboratory services include firearms, chemistry and document examination*. The county is also served by the State's Criminalistics Laboratory in Sacramento, about 60 miles northeast of Martinez. The Concord Police Department currently has all its document and latent print identification work done in Sacramento. In addition, all three agencies have sobriety testing and toxicological analyses performed by commercial laboratories. Forensic pathology is the responsibility of the County's coroner and services are provided by commercial laboratories at the direction of the pathologist. Finally, Contra Costa County is the only one of the study sites in which the Public Defender makes regular use of a commercial laboratory for criminalistics.

* Details on the organization and capabilities of the criminalistics laboratories at the study sites will be found in reference 3.

	CRIMINALISTICS LABORATORY	CRIME SCENE TECHNICIANS	FINGERPRINT IDENTIFICATION
CONTRA COSTA	8	1 SHERIFF 9 RICHMOND 5 CONCORD	1 2 1
COLUMBUS	6	8	2
DADE	16	21	4

Figure 4 - PHYSICAL EVIDENCE EXAMINERS

The City of Columbus, Ohio, population 533,000, is located in Franklin County, population 833,000. The entire county contains 26 villages and municipalities, and 12 police departments. The study was confined to the City of Columbus which is the State Capital and County Seat.

Franklin County also has a two-court system for criminal procedures. The Common Pleas Court is the upper court and handles all felony trials. Arraignments and misdemeanors are under jurisdiction of the Municipal Court.

The Criminalistics Laboratory with a staff of 8 (Fig. 4) is a part of the Police Department's Investigative Subdivision. Crime scene technicians are organized in a "Mobile Crime Laboratory" unit which is also part of the Investigative Subdivision though operated independent of the Criminalistics Laboratory. Fingerprint identification operations are conducted by a section attached to the Service Subdivision of the Police Department. Criminalistics Laboratory services are provided for firearms, chemistry (including dangerous drug and sobriety testing) and document examination. Forensic pathology services are provided under contract to the medical examiner by Ohio State University.

Dade County, Florida, with a population of 1,268,000* has an area comparable to Contra Costa County. This population is made up in part by the central cities of Miami, population 335,000; Hialeah, 102,000; Coral Gables, 87,000; Miami Beach, 87,000; North Miami, 35,000; and North Miami Beach, 31,000; each of these have their own police department. The Metropolitan Dade County Public Safety Department has jurisdiction over the unincorporated area of the County, population 557,000. The unincorporated area consists of densely populated areas that are contiguous to the cities, and large practically uninhabited areas, including a part of the Everglades National Park. The study has been restricted to the offenses originating in the jurisdiction of the Public Safety Department.

The Crime Laboratory Bureau is located in the main building of the Public Safety Department and is a part of its Central Services Division. As of November 1973, it numbers 16 criminalists and provides services in chemical analysis (including dangerous drugs and blood alcohol), firearms, toolmark comparison and document examination. Sobriety testing is provided by a separate section of the laboratory with branch locations at district stations of the Public Safety Department.

A large Crime Scene Section (see Figure 4) is a part of the laboratory. It provides services to the Police Division of the Department in most "major" ** crimes and on special request, mostly in homicide investigations, to other police agencies of the County. Fingerprint identification service is provided by a section in the Records and Identification Bureau which, as the laboratory, is a part of the Central Services Division. The Dade County cities do not have laboratory operations, with the exception of fingerprint identification service in the City of Miami.

* 1970 U.S. Census

** Crime categories are discussed and defined in Section 4 below.

As the other two sites, Dade County has a two-tier felony court system. The Criminal Division of the Circuit Court handles all felony adjudication while misdemeanors and arraignments are the responsibility of the County Court's Magistrate Division.

The staffing of the laboratory, investigative, and adjudication operations in the three study sites are summarized in Figure 5. The offenses reported in State and FBI reports for the sites are listed in Figure 6.

Data were collected at the three sites on extensive questionnaires which were filled out by the project's field observers in the period from November 1973 to July 1974. These observers obtained information through available case records and interview of criminalist, investigative and adjudicatory agency staff, as well as defense attorneys, judges and (by court permission) jury foremen. The information recorded on the questionnaires was supplemented by informal case-by-case information. Following data collection, broader questions raised by analysis of the data, were reviewed with appropriate agency personnel at the sites.

The data collected in the above manner are incomplete and, to some extent, inaccurate, because they reflect the incomplete, fragmented and inaccurate state of record-keeping at the sites in general and particularly as regards physical evidence use. This unsatisfactory state of record-keeping has by itself become a major finding of the study. To the extent that data were obtained through interviews that were conducted from one week to 3 months after the event, they also reflect the state of recollection of the participants. This inaccuracy is particularly great in cases receiving relatively little investigation.

SITE	STUDY AGENCY	POPULATION X1000	PHYSICAL EVIDENCE EXAMINERS ¹	UNIFORMED PATROL	DETECTIVES	PROSECUTORS ²	JUDGES ³
CONTRA COSTA COUNTY	SHERIFF'S DEPT.	172	10	151	46	25	10
	CONCORD	93	6	50	10		
	RICHMOND	81	11	77 ⁴	26		
COLUMBUS	COLUMBUS	533	16	625	103	25	10
DADE COUNTY	PUBLIC SAFETY DEPT.	537	41	782	76	35	8

¹CONDENSED FROM FIGURE 4.

²ASSIGNED TO FELONY PROSECUTION.

³ASSIGNED TO CRIMINAL DIVISION.

⁴NOT INCLUDING 11 UNIFORMED EVIDENCE TECHNICIANS.

Figure 5 - STAFFING SUMMARY

	SOURCE	POP. x 1000	M & NN HOMICIDE	FORCIBLE RAPE	ROBBERY	AGGR. ASSAULT	BURGLARY	LARCENY
SHERIFF'S OFFICE RICHMOND CONCORD	CA	346	43	144	596	874	7266	10,151
COLUMBUS CITY	FBI	533	72	362	1570	890	10,941	8,574
DADE COUNTY UNINCORPORATED AREAS	FA	568	96	112	2027	3154	11,110	17,580

Figure 6 REPORTED OFFENSES - 1973

Section 3

PURPOSE, SCOPE AND ORGANIZATION OF VOLUME II.

Together, four volumes report the results of the entire project and readers interested in applying measures of effectiveness of criminalistics operations as a formal management and planning tool will want to read all four volumes. This volume has been written to serve as a self-contained qualitative guide toward improved utilization of criminalistics operations in adjudication. While it is addressed primarily to prosecuting and defense attorneys and to the courts, it may also stimulate inclusion of criminalistics topics in law school and criminal justice curricula. Further, it details for criminalists the role of the information they provide at the various stages of adjudication.

While it does not profess to offer a solution, the report indicates the dilemma between the impartial mission of the criminalist and the use (or non-use) of his findings in adversary proceedings.

The interrelations between criminalistics services and the elements of the adjudicative process are treated systematically. Quantitative findings from data at the three study sites illustrate and support conclusions on the actual use of criminalistics in adjudication, its strengths and its weaknesses. In Volume III, the data obtained at the sites are examined for their relation with the effectiveness of criminalistics services and their practicality in measures of effectiveness.

While a systematic treatment of the subject has been attempted, no claim for comprehensiveness is made. For instance, this volume concentrates on criminalistics operations involving 9 offense categories:

1. Homicide and non-negligent manslaughter
2. Rape
3. Robbery
4. Aggravated assault
5. Burglary
6. Larceny
7. Arson
8. Bombing and explosives
9. Hit and run

The first 6 of these offense categories will be recognized as the Type I crimes of the Uniform Crime Reports, UCR (5). They have received primary emphasis in our data collection because they are the crimes on which government and public attention is focused, if only to maintain continuity of reporting. Also, together, these offenses give rise to a large part of the non-routine criminalistics operations. The other offenses, arson, bombing and explosives, and hit and run, were included, though they are not reported in the UCR, because they are major crimes whose investigation and adjudication may require extensive and essential physical evidence examination. Three other offenses that were included in the study of the use of criminalistics

on investigation (Volume I of this report) have been omitted here: Forgery, drug abuse and driving under the influence of alcohol. In contrast to the nine listed offenses, in which physical evidence is often corroborative, these three will be recognized as offenses in which physical evidence is necessary for proof of guilt or innocence. Therefore, their use and utilization present different problems. Since these offenses are high-volume physical evidence generators, they were omitted from the adjudication study so as to conserve the allocated data collection resources.

In prior research, the criminalist's tasks have been described in terms of many physical evidence material categories brought to him for examination, e.g. references 6 and 7. In this study, an 8-item, problem-oriented physical evidence classification has been found useful because by aggregating information on fewer evidence categories, their relation to offense categories could be shown more readily. The evidence classification used is listed below:

PHYSICAL EVIDENCE CLASSIFICATION

1. Finger, Palm and Footprints
2. Physiological Material (Tissue, Blood, Semen, Hair, Saliva, Perspiration, Fecal Matter)
3. Physical Match Problems (Tools, Tool Marks, Shoe Impressions, Tire Impressions, Broken Glass, Fabrics, Fracture, Cut and Tear Patterns)
4. Weapons (Firearms, Ammunition and Components, Gunshot Residue, including Clothing, Stabbing, Cutting or Blunt Instruments)
5. Structural Materials (Safe Insulation, Glass, Wood, Paint)
6. Transfer Materials (Dust, Soil, Plants, Fibers, Grease)
7. Document Materials (Documents, Execplars, Ink, Paper)
8. Chemical Problems (Drugs, Alcohol, Toxic Materials, Petroleum)

Our purpose is to describe the use of criminalistic operations in felony adjudication. This description in the following sections will be guided by a diagram, Figure 7. The top of the diagram indicates the three principal "actors" in the process: Defense, Prosecution and Criminalistics Operations. Prosecution has the central role in the events of the process from complaint to trial.

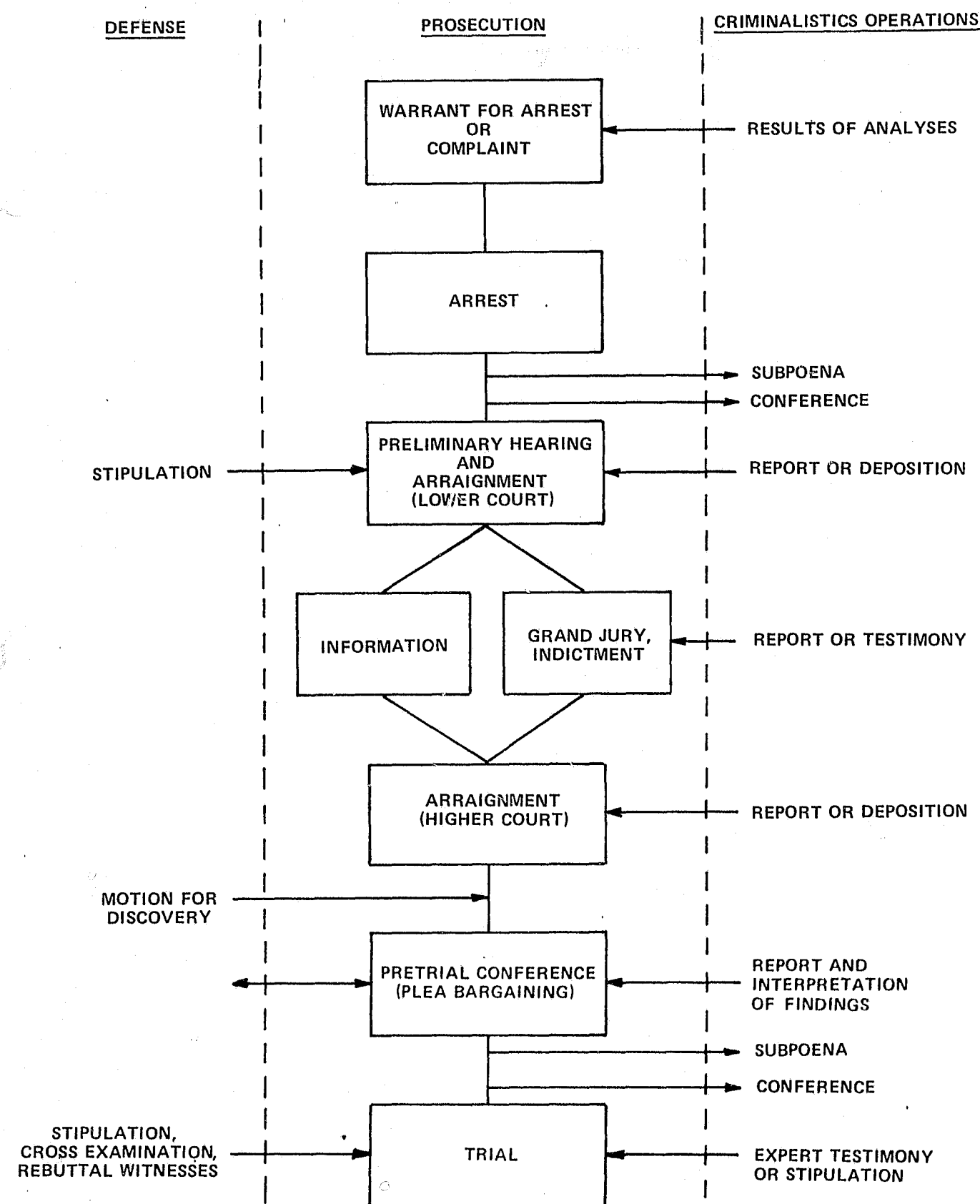


Figure 7 USE OF CRIMINALISTICS OPERATIONS IN FELONY ADJUDICATION

It is realized that this representation of the process as prosecution-controlled may be faulted for being both oversimplified and not entirely realistic. However, we believe that it best conveys the essentials of the process as presently practiced. This representation emphasizes that criminalistics operations or their results enter the process under prosecution control as discussed in Sections 4 and 5. It is not meant to convey that prosecution alone controls the timing of the events of the process. Further, it does not show, though it is understood, that presentation of evidence in court is under the rules of the court and that the acceptance of physical evidence opinion as fact is a jury decision. No direct link between the defense and criminalistics operations is shown; possible links and the few links observed in the study are discussed in Section 4.

Felony cases may, of course, terminate through dismissal or may be short circuited through guilty pleas at any of the process stages in Figure 7; the role of physical evidence and data in case dispositions is discussed in Section 7. Sections 8 and 9 present data and discuss perceptions of criminalists. Training and Education, Section 10, and Communication, Section 11, are presented as two means through which the utility of criminalistics operation may be greatly enhanced.

Section 4

THE ROLE OF PHYSICAL EVIDENCE IN THE DECISION TO PROSECUTE

While the police may under certain conditions make an arrest without a warrant and a warrant for arrest may be issued by a court without involving the prosecutor, the latter must determine before or soon after an arrest whether he will prosecute. Also even after he has made an affirmative decision, he may decide to drop prosecution at any stage of the adjudication process that precedes trial. Of interest to a study of the effectiveness of criminalistics is the role physical evidence information plays in this decision.

In two of the study sites the decision to press charges is made as follows: When a (detective) investigator has brought his investigation to the point at which he has identified and apprehended the alleged offender(s), the investigation status is summarized and brought (or sent) to the prosecution with the request to prepare a charge. The prosecutor may find that the information presented by the detective is adequate for him to prosecute, or he may decide that it is not. In one of these two sites, the administrative manager of prosecution stated that 20-25% of felony cases presented for prosecution fell into the latter category. This count includes, however, all requests for prosecution, including citizen's complaints. No information was available through his office on the number of cases which are considered not suitable for prosecution for lack of physical evidence information. At the other study site, a similar practice is followed. In addition, the chief (prosecution) investigator reviews the case after the charge is laid for adequacy of investigation information, including that on physical evidence.

In practice, this investigator may note the need to include a written laboratory report if a needed one is not yet in the file; however, the principal prosecution investigator activity appears to center around locating and transporting witnesses.

At the third site, the detectives prepare arrest warrant and charge forms; both are signed by the clerk of the municipal court as a routine matter, and the prosecutor is not even aware of the case until he is notified of the preliminary hearing.

At none of the three sites did the record contain information on the contribution of criminalistics to this decision to prosecute, although informal verbal consultation particularly in major cases often takes place.

A number of questions in our surveys were designed to explore if an unfilled need exists at this stage of adjudication. Questions posed were relative to the timeliness of physical evidence information (i.e. was it there when needed by the prosecutor) and to its importance for arrest, arraignment or release of alleged offenders. Also asked was whether the prosecutor conferred with the criminalist at these early adjudication stages. Unfortunately very few answers were obtained - which is in keeping with our on-site observation that the initial role of prosecution is in a twilight zone which receives little attention. The problem is compounded by the widespread practice that the prosecutor handling this very first stage of the adjudication process has very little time to become acquainted with the facts of the case that assignment changes are frequent, and staff turnover is high. Our concern remains therefore that if inadequate utilization of physical evidence information exists when the decision to prosecute is made, the study was not able to make an assessment.

Section 5

PROSECUTION USE OF PHYSICAL EVIDENCE INFORMATION

The prosecutor's first opportunity to obtain physical evidence information is during crime scene search. In all three sites, prosecutors are supposed to be notified of reported homicides so that they may observe or participate in crime scene search. We did not find any record of such crime scene visits by prosecutors in our review of police department and prosecution case files, although in one of the sites such homicide scene visits by prosecutors are usually made. This participation by prosecutors may of course be concerned with any aspect of the crime and in the absence of the record it is not possible to make any conclusions as to their physical evidence relevance.

The next occasion at which the prosecutor may use physical evidence information is when he makes the initial decision whether to prosecute or not as has been discussed in Section 4 above. In the following paragraphs we will deal with those felony cases in which results of physical evidence examination have been made known to the prosecutor and he has decided to prosecute.

Before the prosecutor (who, as mentioned, is not usually the same person who decided to prosecute) presents his case at Preliminary Hearing and at Arraignment in a lower court, he will involve the results of criminalistics effort in several ways: (i) he may disregard it, i.e. he may decide to press his case at this stage without referring to criminalistics; (ii) he may confer with criminalist(s) so that he can better evaluate the role their work will have in the case; (iii) he may subpoena criminalist(s) to make a deposition; or (iv) he may cite the criminalist's results without involving him in the process at this stage. In our study we consulted case files and asked the prosecutor about the role of physical evidence including its role if the charge was dropped at this stage of the process. We found no information in the record of conferences between criminalist and prosecutor at this stage. This finding does not exclude the possibility of unrecorded telephone or direct conversations, and again our interviewers were told of occasional such instances. It does, however, tell that for management review purposes no such information is available.

Figure 8 summarizes the pre-trial role of physical evidence information that was obtained on a case-by-case basis for cases involving physical evidence. Since the information was obtained after the case was through adjudication, it reflects the state of the prosecutor's recollection or the opinion of the observer. The latter was invoked if the prosecutor was not questioned because too much time had elapsed between event and review or if in the opinion of the observer the record clearly conveyed the needed information. A significant role of physical evidence in support of dropping the charge, pressing the charge or plea bargaining was reported for about 8% of the surveyed cases. For cases in which no answer was obtained, either the question was not applicable or, more frequently the information was not available. Criminalist testimony at the pretrial stage was recorded for only 2% of the cases. In assessing this low figure it must be remembered that this survey did not include forgery, narcotics and DUI cases in which such testimony is almost the rule.

ROLE		CONTRA COSTA COUNTY	COLUMBUS	DADE COUNTY	3 SITES
SIGNIFICANT	SUPPORT IN DROPPING CHARGES	2	0	2	4
	SUPPORT IN PRESSING CHARGES	6	2	3	11
	PLEA- BARGAINING	6	0	0	6
	CRIMINALIST TESTIMONY	2	1	3	6
NO INFORMATION OR NOT APPLICABLE		74	67	94	234
NUMBER OF CASES WITH PHYSICAL EVIDENCE EXAMINATION		90	70	102	262

Figure 8 THE ROLE OF PHYSICAL EVIDENCE INFORMATION IN THE PRE-TRIAL STAGE

It will be noted that Figure 8 does not include the number of subpoenas issued to criminalists as an indicator of pre-trial contribution of physical evidence information. The fact that a subpoena is issued is an indication of the prosecutor's awareness of potentially important physical evidence. The information was not readily available on a crime-specific basis. Further, the fact that there was a pre-trial deposition or criminalist testimony does not necessarily indicate significant support of the case.

The next step in the prosecution process is either the filing of an information or presentation to the Grand Jury. In the latter case calling criminalist witnesses is possible but apparently rare. None of the cases whose record was investigated or which were observed in the study involved Grand Jury appearances of criminalists. However, analysis results are relayed verbally via investigator and prosecutor or conveyed through examination of Laboratory Reports.

Following the filing of Information or Grand Jury indictment preliminary hearing and arraignment in the higher court takes place. As in the lower court this proceeding may involve the criminalist through his report in the hands of the prosecutor or through deposition. Again, we found no record of conferences between prosecutor and criminalist prior to the proceeding.

The pre-trial conference which is indicated in Figure 7 as following arraignment in higher court does not always take place. For instance, the case may terminate through guilty plea by the defendant before the conference or some cases proceed from arraignment to trial without the conference. The interest of this study in the pre-trial conference resides in the fact that plea bargaining frequently takes place at this stage. The practice of plea bargaining as such, its merits or drawbacks not being the subject of study our only interest was the question what the role of physical evidence information was if a reduced charge resulted at that stage. The need for this question is illustrated by the fact that a rather comprehensive study of the criminal justice system in one of the sites presents information on many aspects of plea bargaining practice but has no data on availability of physical evidence in such cases (8).

At this point the prosecutor has the laboratory report and its interpretation, implicit, or through input by the criminalist or the investigator. In Figure 9, guilty pleas to reduced charge are listed and those pleas which were influenced by knowledge of the results of physical evidence examination are so indicated. Of particular interest are the results obtained in one of the sites where an Office of Case Control makes a deliberate effort through plea bargaining to keep the case load on prosecutors and the courts at a level such that adequate preparation time is available for a given staff size. While this site has the highest proportion, 26% of adjudicated cases terminate by a reduced charge as a result of plea bargaining, only 17% of these plea bargains were considered to be induced by physical evidence consideration. The Director of Case Control at that site considered physical evidence information as only a minor one of many factors entering his decision to bargain. The actual numbers and rates derivable from Figure 8 must be viewed with some caution since the number of plea bargained cases in each site is small. The three-site total is 31 such cases and of these 11 or 35% were reported as induced by physical evidence.

	CONTRA COSTA COUNTY	COLUMBUS	DADE COUNTY	3 SITES
NUMBER OF CASES WITH PHYSICAL EVIDENCE EXAMINATION	90	70	102	262
NUMBER OF GUILTY PLEAS TO REDUCED CHARGE	29	22	4	55
REDUCED CHARGE RESULT OF PLEA BARGAIN	11	18	2	31
GUILTY PLEA INDUCED BY PHYSICAL EVIDENCE	8	3	0	11

Figure 9 THE ROLE OF PHYSICAL EVIDENCE IN PLEA BARGAINING

Not shown in Figure 7, because it could occur at almost any stage of prosecution, is the plea of guilty as charged. Again the interest of the study is in the relative number of these pleas that are ascribable to the results of physical evidence examination and Figure 10 lists our survey results. The total number of these guilty pleas is larger than the guilty pleas reported to a reduced charge (79 versus 55) and their distribution over the three sites is somewhat more uniform. For the three-site total, 16 of the pleas or 20% were reported induced by physical evidence information, a lower percentage than for the pleas to a reduced charge as a result of plea bargaining 35%.

	CONTRA COSTA COUNTY	COLUMBUS	DADE COUNTY	3 SITES
NUMBER OF CASES WITH PHYSICAL EVIDENCE EXAMINATION	90	70	102	262
NUMBER OF PLEAS OF GUILTY AS CHARGED	27	16	36	79
GUILTY PLEA INDUCED BY PHYSICAL EVIDENCE	4	2	10	16

Figure 10 THE ROLE OF PHYSICAL EVIDENCE IN PLEAS OF GUILTY AS CHARGED

Before a case goes to trial formal subpoenas go again to criminalists if their testimony may be required. The actual notice to appear may take the form of a telephone call. A conference between prosecutor and criminalist is usually held and is more necessary than at preliminary hearing for several reasons: (a) more time has elapsed since physical evidence examination, and criminalist and prosecutor must be sure of their recollection of facts and their interpretation; (b) the prosecutor needs to know how the criminalist will answer his questions, as this may influence the formulation of his prosecution strategy; (c) there may be a need for the prosecutor to learn from the criminalist the interpretation of his findings, their limitations, the methods he employed to arrive at them, etc. While our questionnaires established that some conference is usually held before trial it did not indicate its length and depth. On-site observation and discussions indicate that these conferences may take anywhere from a few minutes to hours and they may take place minutes before the trial or well in advance when there still is time to plan and discuss changes in prosecution. Our observations were not frequent or detailed enough to allow characterization of these conferences as to offense type, prosecutor's experience, or site etc. However, we must observe that - again - the absence of the written record makes it impossible to exercise management control over or review of the use of this important communication.

In view of the well-established fact that the number of felonies going to trial, before judge only or jury, is but a small fraction of the felonies on which formal charges are made, it is appropriate to view expert testimony on physical evidence in the adversary atmosphere of trial as but the final link in the chain of possible uses, rather than as the all-important climax. We inquired about the use of physical evidence at trial, whether it was as demonstrative evidence (e.g. enlarged pictures or drawings), whether there were opposing expert witnesses called to rebut the prosecution expert, whether physical evidence testimony was made unnecessary by stipulation of the results, and whether the prosecutor considered the physical evidence information as necessary for his case or as corroborative only. The answers obtained are summarized in Figure 11. They indicate that at the three sites 42 (or 45%) of the 90 tried cases with prior physical evidence examination also used physical evidence in court. In an additional 14 (16%) physical evidence results were stipulated by defense and prosecution. In 39 of the 90 cases (43%), the use of physical evidence was reported decisive and in 36 (or 40%) it was called corroborative. In inspecting these data for intersite differences, it may be noted that frequency of in-court use of physical evidence is well correlated with frequency of demonstrative evidence. Further, while there is a spread from 28-81% in physical evidence use in court, the site with the lowest use has the largest number of stipulations; when stipulations and in-court use of physical evidence are combined, this spread reduces to 60 to 85%.

	CONTRA COSTA COUNTY	COLUMBUS	DADE COUNTY	3 SITES
NUMBER OF CASES WITH PHYSICAL EVIDENCE EXAMINATION	90	70	102	262
NUMBER OF TRIALS	27	16	47	90
PHYSICAL EVIDENCE USED IN COURT	22	7	13	42
DEMONSTRATIVE USE	22	0	6	28
EXPERT REBUTTAL WITNESS	2	2	0	4
STIPULATION OF PHYSICAL EVIDENCE RESULTS	1	3	10	14
PHYSICAL EVIDENCE USE DECISIVE	16	9	14	39
PHYSICAL EVIDENCE USE CORROBORATIVE	19	5	12	36

Figure 11 USE OF PHYSICAL EVIDENCE AT TRIAL

Section 6

DEFENSE USE OF PHYSICAL EVIDENCE INFORMATION

Defense functions involving physical evidence noted in Figure 7 are stipulation of criminalistics results, plea bargaining, cross examination of witnesses and calling expert witnesses for rebuttal. Some cross-examination of witnesses by opposing counsel is almost always employed after direct interrogation a witness. Therefore this defense function involving physical evidence was not further examined in our study. Data on the use of stipulation and rebuttal witnesses was included in Figure 11.

Our observation that the defense essentially has access to physical evidence information only through the prosecution has been stated in Section 4 and illustrated in Figure 7. In principle, defense counsel may at any time after arraignment obtain access to the criminalistics results and may view evidence while in possession of the criminalist, upon obtaining court or prosecution permission. The practiced way is to use the discovery motion, which may of course include information on other evidence and on prospective witnesses. With the exception of one site, to be noted below, we did not encounter a single instance of defense access to the criminalistics laboratory during our observation period. At one of the sites, discovery is made deliberately less productive than it could be by systematically refraining from disclosing on the laboratory report the method used to obtain the analysis. At another site, it was observed by the public defense attorneys that they "hardly ever get to see the laboratory reports". At that site a case was reported by our field observer that the laboratory had made a negative finding (non-match of suspects shoeprint with that found on scene). The prosecutor did not introduce the information into the record and the public defender never became aware of the laboratory examination.

While all three of the sites have public defenders for the benefit of financially indigent defendants or for defendants not providing their own counsel, only at one of the sites does the public defender have the regular practice of engaging independent criminalist aid. The public defender at that site is funded so as to enable him to engage the services of a commercial forensic laboratory, and such a laboratory happens to be in a reasonable distance, 30 miles from the county seat. The laboratory is used in several functions: crime scene search, laboratory analysis, consultation before and during trial, and rebuttal testimony. During the observation period the laboratory was utilized on behalf of the part of the county that was studied in 10 cases as shown in Figure 12. This use must be compared with some 120 cases involving physical evidence examinations at the county laboratory on request of the police.

At the other two sites, the public defender's office occasionally engages a criminalist consultant. Although in one case, prior to the study's observation period, the public defender was able to rebut successfully prosecution testimony on a firearm - ammunition match and thereby obtained the acquittal of a defendant, time and funding constraints prevent regular or more frequent engagement of consultants. In the case on record the consultant had to be called in from a city several hundred miles from the site.

TOTAL NUMBER OF CASES	CRIME SCENE	CASE REVIEW	CONSULTATION	LABORATORY SERVICE
10	4	4	2	9

*DATA PROVIDED BY INSTITUTE OF FORENSIC SCIENCES, OAKLAND, CA.

Figure 12 DEFENSE USE OF INDEPENDENT CRIMINALISTICS LABORATORY SERVICES*
3 CONTRA COSTA AGENCIES, 7 MONTHS

It is interesting to note that at the third site, where no record of independent public defender use of criminalistics laboratories was found, the previously mentioned criminal justice system survey (8) recommended hiring additional investigators to the public defender staff. A need for independent physical evidence examination was apparently not perceived.

At the two sites in which the public defenders are not in the practice of engaging paid consultants or commercial laboratories, there is also a reluctance to use public laboratories, e.g. the state criminalistics laboratory. The reasons for this reluctance were expressed in informal interviews as a mistrust of these laboratories as being prosecution-oriented or at least not likely to contradict the local police-administered criminalistics laboratory. In fact it is a common practice of criminalistics laboratories not to testify, even when they know the other laboratory's results are suspect, and this practice is independent of defense considerations. No judgment is possible here on the objective basis for the reluctance to use these resources, but the fact that they are not used must be acknowledged. Two other facts tend to make it advisable to seek means to provide better defense access to criminalistics laboratories: (1) Throughout the country, there are very few independent forensic laboratories that could provide the necessary services for the defense and (2) while in principle the criminalist's and the police ethical responsibility to exonerate the innocent is strictly adhered to, there is not established policy on the part of the police, or prosecution-administered criminalistics laboratories, to affirmatively seek out evidence that will exonerate an alleged offender. The controlling drive is to seek evidence that implicates the suspect.

Section 7

CASE DISPOSITION

The role of physical evidence examination in adjudicatory case disposition has already been touched upon in preceding discussions (see, for instance, Figures 9 and 10). In this Section, we present data on a survey of case disposition in an earlier year; the cases adjudicated during the study's observation period are discussed on a crime-specific basis; finally, a categorical breakdown of the criminalistics contribution to adjudication is attempted.

The survey of case dispositions was conducted at the beginning of the project to obtain an overview of the caseload to be expected, the extent of physical evidence involvement, the case dispositions and the duration of the process. The record of every 10th completed felony adjudication on file by the prosecutor in the higher court in one county for 1972 was reviewed, but no interviews were conducted for this survey. Its results are summarized in Figure 13. Only 11% of the cases which are bound over to the higher court are adjudicated in trial. In 22% of the cases, physical evidence examination, including latent prints, was on record. These numbers are in essential agreement with the case dispositions observed during the study. The mean time between arrest and sentencing was 154 days; for this number which covers a period before adoption of a speedy-trial rule, the study could not establish a comparison with the observation period, which was after introduction of that rule. However, a large number of cases for which arrests were noted early during our observation period were not yet filed as adjudicated 180 days later at all three sites.

CRIME CATEGORY	SAMPLE SIZE (CASES)	DISPOSITION							PHYSICAL EVIDENCE EXAMINED INCL. LATENT PRINTS	CRIMINALIST TESTIMONY	DAYS* ARREST TO SENTENCING				
		NO BILL	GUILTY PLEA	NOLLE PROSEQUI	GUILTY BENCH TRIAL	GUILTY JURY TRIAL	NOT GUILTY JURY TRIAL	NO CONTEST			LOW	HIGH	MEDIAN	MEAN	STANDARD DEVIATION
MURDER, N.N. HOM.	5	0	4	0	0	1	0	0	5	0	90	367	200	209	101
RAPE	13	4	2	0	4	0	3	0	4	0	31	361	145	158	90
ARMED ROBBERY	9	0	5	0	0	2	0	0	4	0	28	180	140	128	67
AGG. ASSAULT	14	3	8	1	0	1	0	1	2	0	15	343	185	194	111
BURGLARY, B & E	50	10	34	3	0	3	0	0	12	2	7	299	150	145	81
GRAND LARCENY	18	5	8	4	0	1	0	0	1	0	41	286	120	128	98
FORGERY	28	8	15	5	0	0	0	0	3	3	47	686	165	193	145
TOTALS	137	30	76	15	4	8	3	1	31	6	7	686	150	154	85

*THESE TIMES ARE FOR A TOTAL OF 125 OF THE SAMPLE

Figure 13 10%-SURVEY OF FELONY ADJUDICATIONS – FRANKLIN COUNTY, OHIO, 1972

In Figure 14a, dispositions of offenses are listed in two categories. Set 1 contains those cases in which there was physical evidence examination other than that of latent prints, i.e., the count excludes all cases in which there was no physical evidence examination as well as those in which latent prints were the only physical evidence. This listing is for the 7.5 month observation period in 1973-4 at each site and includes additional cases at the beginning of the period for which no data on crime scene search, laboratory examination and investigation were collected. Not included in the count are cases that were not adjudicated until after the end of the period, although these earlier observations were made. Set 2 is based on all case dispositions in the 9 felony categories of interest that were on record for the time period of the case-by-case observations.

A total of 86 surveyed cases with physical evidence examination and 341 cases, representing a 7.5 month county total with or without physical evidence examination*, are listed in the Figure. A consistent difference in the ratio of pleas of guilty as charged (column 2) to pleas to a reduced charge (column 3) may be noted. The only exceptions are murder (and non-negligent homicide) and crimes for which not enough data were available. This difference may be attributed to the effect of physical evidence on guilty pleas that was also found in Figures 9 and 10 among physical evidence cases. The absence of guilty pleas to the charge of murder may be attributable to the tendency to seek a full trial rather than plead guilty to this charge.

*Some, but not all of 86 cases surveyed in 3 County agencies are contained in the 341 County total. In addition, the sampling time periods are not identical.

CASES WITH PHYSICAL EVIDENCE EXAMINATION	NO. OF CASES	NO BILL	GUILTY PLEA AS CHARGED	GUILTY PLEA REDUCED CHARGE	GUILTY BY JURY	ACQUITTED BY JURY	GUILTY BENCH TRIAL	ACQUITTAL BENCH TRIAL	DISMISSAL BY JUDGE	NOL. PROS.
1 MURDER, N.N.M.	24 ¹ 19 ²	0 0	0 0	9 8	11 10	0 0	0 0	2 0	1 1	1 0
2 RAPE	6 10	0 0	2 1	3 8	0 0	0 0	1 0	0 0	0 1	0 0
3 ROBBERY	12 73	0 0	6 0	4 48	0 13	0 3	2 0	0 0	0 8	0 1
4 AGG. ASSAULT	15 29	0 0	5 1	7 21	2 5	0 1	0 0	0 0	0 1	1 0
5 BURGLARY, B & E	26 176	0 0	13 6	6 149	2 3	1 5	2 0	1 1	1 10	0 2
6 GRAND LARCENY	1 33	0 0	0 0	0 26	0 1	1 0	0 0	0 0	0 3	0 2
7 ARSON	2 0	0 0	1 0	0 0	1 0	0 0	0 0	0 0	0 0	0 0
8 BOMBING & EXPL.	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0
9 HIT & RUN	0 1	0 0	0 0	0 1	0 0	0 0	0 0	0 0	0 0	0 0
9 CRIME CATEGORIES	86 341	0 0	27 8	29 261	16 32	2 10	5 0	3 1	2 24	2 5

¹3 AGENCIES, CASES WITH PHYSICAL EVIDENCE EXAMINATION

²ENTIRE COUNTY, ALL CASES, 7.5 MONTHS

Figure 14a CASE DISPOSITIONS, CONTRA COSTA COUNTY

Figures 14b and c present the case dispositions for the other two sites. Here the comparison with all case dispositions was not possible due to lack of data in one site (Fig. 14b) and in the other site the available summary disposition records did not include guilty pleas or a comparable basis. Nevertheless the ratios between columns 2 and 3 for the two guilty pleas in physical evidence cases are consistent with the trends seen in Figure 14a.

Although data on adjudicative disposition of cases in which fingerprint identification was the physical evidence were not collected, an estimate can be made from data on burglary arrests based on latent print identification. These data are reported and discussed in Volume I; note particularly Figure 22 of that volume.

The role of physical evidence examination in the adjudication process was explored directly by two sets of questions to the prosecutor for each felony case observed. He was asked to assign the purpose of presenting at trial physical evidence information to (i) crime scene description (ii) reconstruction of the crime or (iii) linking the alleged offender to the offense. The second set of questions related to the contribution of physical evidence examination, whether or not testimony was given in court. The questions were: Did physical evidence examination contribute to (i) support or refutation of witnesses, (ii) establishment of proof with or without other supporting evidence or (iii) any other distinct part of the process. The replies are summarized in Figure 15.

CASES WITH PHYSICAL EVIDENCE EXAMINATION	NO. OF CASES	NO BILL	GUILTY PLEA AS CHARGED	GUILTY PLEA REDUCED CHARGE	GUILTY BY JURY	ACQUITTED BY JURY	GUILTY BENCH TRIAL	ACQUITTAL BENCH TRIAL	DISMISSAL BY JUDGE	NOL. PROS.
1 MURDER, N.N.M.	14	1	1	8	1	0	1	0	1	0
2 RAPE	20	3	5	5	1	0	0	0	2	4
3 ROBBERY	2	1	1	0	0	0	0	0	0	0
4 AGG. ASSAULT	5	2	1	0	0	0	0	0	1	1
5. BURGLARY, B & E	22	1	8	8	0	1	0	0	3	1
6 GRAND LARCENY	2	0	0	1	1	0	0	0	0	0
7 ARSON	1	0	0	0	0	0	0	1	0	0
8 BOMBING & EXPL.	0	0	0	0	0	0	0	0	0	0
9 HIT & RUN	2	0	0	0	0	0	0	0	1	1
9 CRIME CATEGORIES	68	8	16	22	3	2	1	1	8	7

¹3 AGENCIES, CASES WITH PHYSICAL EVIDENCE EXAMINATION

²ENTIRE COUNTY, ALL CASES, 7.5 MONTHS

Figure 14b CASE DISPOSITIONS, COLUMBUS

CASES WITH PHYSICAL EVIDENCE EXAMINATION	NO. OF CASES	NO BILL	GUILTY PLEA AS CHARGED	GUILTY PLEA REDUCED CHARGE	GUILTY BY JURY	ACQUITTED BY JURY	GUILTY BENCH TRIAL	ACQUITTAL BENCH TRIAL	DISMISSAL BY JUDGE	NOL. PROS.
1 MURDER, N.N.M.	15	1	6	0	1	3	2	0	2	0
2 RAPE	6	1	2	0	0	0	0	0	2	1
3 ROBBERY	15	0	11	0	1	1	0	0	0	2
4 AGG. ASSAULT	43	0	8	3	0	1	6	5	13	7
5 BURGLARY, B & E	17	0	9	1	1	0	1	0	1	4
6 GRAND LARCENY	1	0	0	0	0	0	0	0	1	0
7 ARSON	0	0	0	0	0	0	0	0	0	0
8 BOMBING & EXPL.	0	0	0	0	0	0	0	0	0	0
9 HIT & RUN	0	0	0	0	0	0	0	0	0	0
9 CRIME CATEGORIES	97	2	36	4	3	5	9	5	19	14

ALL CASES 5 MONTHS, 1973	NUMBER OF CASES	CONVICTED	ACQUITTED	DISMISSED	NOLLE PROS.	ALL OTHER DISPOSITIONS
MURDER & NNM	37	19	8	3	2	6
RAPE	7	2	1	1	1	2
ROBBERY	152	56	17	22	16	42
AGG. ASSAULT	190	86	12	33	22	36
BURGLARY, B & E	282	172	15	19	15	61
5 OFFENSE CATEGORIES	630	335	52	77	57	146

Figure 14c CASE DISPOSITIONS, DADE COUNTY PSD

	CONTRA COSTA COUNTY	COLUMBUS	DADE COUNTY PSD	3 SITES
NUMBER OF CASES WITH PHYSICAL EVIDENCE EXAMINATION	90	70	102	262
NUMBER OF TRIALS	27	16	47	90
PURPOSE OF PRESENTING PHYSICAL EVIDENCE				
a) TO DESCRIBE CRIME SCENE	2	4	20	26
b) TO LINK SUSPECT & OFFENSE DIRECTLY	5	5	13	23
TO LINK SUSPECT & OFFENSE INDIRECTLY	1	8	1	10
c) TO RECONSTRUCT CRIME	3	3	15	21
CRIMINALISTICS CONTRIBUTION TO				
a) SUPPORT OR REFUTATION OF WITNESSES	4	5	5	14
b) ESTABLISHMENT OF PROOF WITH SUPPORTING OTHER FACTS	6	7	8	21
WITHOUT SUPPORTING OTHER FACTS	2	0	4	6
c) NO SIGNIFICANT CONTRIBUTION NOTED	0	1	7	8

Figure 15 PHYSICAL EVIDENCE ROLE AT TRIAL

A summary finding of our study on the use of physical evidence examination in investigation in Volume I of this report has been that in the bulk of the investigations the result of criminalistic analysis is to corroborate findings based on other evidence. This trend is reflected in Figure 15 in that 3 to 4 times as many criminalistics contributions are reported as establishing proof with other supporting evidence as were without such support. In fact, the argument may be made that it is a rare case in which criminalistics evidence is strictly the only evidence.

Section 8

DEFENSE, COURT AND JURY PERCEPTIONS

Some of the findings on the use and, more so, those on the utility of physical evidence examination results to the adjudication process are based on subjective criteria. Either a member of the research team or the prosecutor made a judgment, for instance, to determine whether a guilty plea was induced by the results of physical evidence analysis. Since they have different viewpoints and other sources of information, questions based on perception of the process were repeated to defense, jury and judge in case-specific interviews. In addition certain questions were raised only with jury and judge.

The principal duplicate questions asked of the defense pertained to reasons for reduction of charge, the purpose of presenting physical evidence and the reason for a guilty plea.

Jury foremen were asked three definite questions:

What was the influence of the physical evidence on the verdict?

Did the jury review physical evidence in the jury room?

Did the jury understand expert witness testimony on physical evidence findings?

Judges were questioned in unstructured interviews on specific cases. Topics of discussion, not necessarily covered in each interview were: The necessity for physical evidence; the prosecutor's purpose in presenting physical evidence; the reason for a guilty plea; the influence of physical evidence on the verdict; whether expert witness testimony was well presented; and how they assessed the contribution of the criminalistics service.

For a variety of reasons, which included interview scheduling obstacles and unwillingness to be interviewed, the data obtained in a total of 13 interviews with jury Foremen and 9 interviews with judges are insufficient to permit meaningful tabulation and interpretation. The following comments on these interviews are based on the recorded data and are combined with critiques provided by the observers at each site.

Jury Foreman and judges found the laboratory witnesses to be well prepared, understandable and convincing. They reviewed laboratory evidence in the jury room in all but one case. The judges also found the witnesses well prepared, but in several instances found their presentation to be weak. In most cases, the judges were in agreement with the jury's and the prosecutor's assessment of the purpose and relevance of the evidence presentation. Though they commented on the need for the physical evidence testimony, they were reluctant, in 5 of 9 cases, to comment on the influence of physical evidence on the jury's verdict. This reluctance appears to be in contrast with the willingness of many judges to record how they would have decided a case had it not been a jury case in an earlier much deeper and more extensive survey (12). While the judges were thus somewhat reluctant to discuss specific cases, several were emphatic on the need for physical evidence examination and on the current underutilization of laboratory services.

Section 9

THE CRIMINALIST'S VIEW

While the ideal role of the criminalist is that of an active and objective participant in the investigation of an alleged offense, his role in adjudication is by nature of the process more than that of an outsider. He is not asked whether he will accept a plea to a lesser charge (detectives' concurrence is sometimes solicited), regardless of the extent of his laboratory effort, or how sound a case he thinks he has built up. However, criminalists do look at "win/lost" figures and look to maintain their personal records of accomplishment.

As stated earlier, the criminalist's opportunity to really confer with the prosecutor is rare. He appears at any part of the proceeding to answer questions when asked; in particular he does not ordinarily participate in developing the strategy of prosecution or defense at trial; also, he is not usually privy to reasoning, which may or may not be completely unrelated to physical evidence considerations, and which leads to a plea to a lesser charge or acquittal by the court. In many cases his report upon completion of his laboratory work constitutes his last contact with a case and he knows neither its disposition in investigation nor that in adjudication. Often he has further news, in the form of a subpoena, but is never called to appear. This constellation tends to cause a sense of isolation and even frustration, the latter particularly if local lore has it that the police or the courts are "soft" on this or that kind of an offender. As discussed in Section 11 below, this sense of isolation may be reduced and other benefits accrued by providing more communication between criminalist and prosecutor.

The most extensive contact between criminalist and prosecutor occurs when the criminalist is on the witness stand. Very often, the criminalist has given testimony on the same type of analysis many times and also not infrequently this may be the prosecutor's and the judge's first exposure to such testimony. In routine analysis, e.g. sobriety testing, there has been established a procedure and sequence of interrogating the arresting officer, the alcohol test technician, his supervisor and the criminalist responsible for testing standard reference materials which validate the accuracy of the instrument. Adherence to this procedure assures that all facets of the analysis are testified to by qualified witnesses and the opportunity for challenge or subsequent weakening of credibility of the testimony is minimized. In a case observed during the study's observation period, lack of experience with the procedure on the part of a prosecutor seriously threatened the effectiveness of routine laboratory testimony. In another case, a determination that a recovered bullet was fired from a certain weapon, testimony of the laboratory witness was held so brief by prosecution and defense that the criminalist felt he had insufficient opportunity to convince the jury of his expertise or to inform them of the method used by him to arrive at his conclusion.

It has not been within the scope of the study to explore this aspect of the use of criminalist effort in depth. However, the impression was definitely left that in the area of education, training, and communication, more mutual support between criminalist and prosecution would be helpful.

Section 10
TRAINING AND EDUCATION

The need for training and education of prosecutors in physical evidence has been pointed out in the preceding section. While their legal education usually includes the law of evidence, they need education in what evidence is and what it proves. In two of the sites informal arrangements exist for newly appointed prosecutors to spend one half to two days at the criminalistics laboratory where they are briefed and can observe laboratory procedures. In one of these sites this indoctrination is also provided for public defenders. Such contact with their local resources is considered by us to be a highly advisable supplement to general case law manuals and text books on criminalistics addressed to the needs of attorneys (9,10), and the special summer courses that are regularly offered by some universities. In addition to providing first-hand information on analytical capabilities of the local laboratory such training sessions establish potentially useful person contacts between prosecutors and criminalist. Extension of this concept appears advisable to one of continuing education whereby all prosecutors could have, say annually, the opportunity to refresh and update their information on locally practiced criminalistics analyses. Similar benefits could be derived by providing such training and educational opportunities for the staff of the public defender.

Similar needs appear to exist relative to the knowledge that both criminalist and detective investigators should have regarding the prosecutor's physical evidence needs. The physical evidence needs of the prosecutor exceed those of the investigator, because the former must convince the jury of the facts "beyond reasonable doubt" whereas the latter need only show "probable cause". For instance, in rape cases, at one of the sites it appears customary for the investigator to base his charge on laboratory verification of the presence of semen or spermatozoa in a vaginal swab and on polygraph corroboration of the victim's story. Since the latter is not admissible in court, except by stipulation, it is desirable to have physical evidence on the use of force. At that site, we noted few instances of search of crime scenes, victims, or suspects for such evidence and believe that this is but one example of mutual education requirements. It appears that joint seminars or workshop sessions for defense attorneys, prosecutors, investigators and criminalists would be a good vehicle for providing the necessary information where it is needed and for establishing understanding and cooperation.

Section 11
COMMUNICATION

In all three study sites prosecution and criminalistics operations are administered and controlled in separate organizations. In the preceding Sections we have indicated several distinct steps along the adjudication process during which communication between the two operations is essential: notification of the occurrence of major offenses, review of physical evidence results and their interpretation when the prosecutor decides whether to prosecute or not, and conferences prior to criminalist testimony. To those should be added communication at the end of each case and, finally, communication via education and training sessions as discussed in Section 10 above.

In one of the sites, prosecutors have a notice form which identifies the case and states "the above case resulted in a conviction/acquittal with the defendants being sentenced to - - -. Thank you for your assistance." We became aware of very few instances where this minimal communication is forwarded; we understand that it is a custom to write especially prepared letters of commendation in rare, important, cases where the assistance rendered by a criminalist was outstanding and decisive. We believe that a formal notice such as the one above should be sent to the criminalist at the conclusion of each case in which a criminalistics report is part of the record, including cases ending by guilty plea or dismissal. Perhaps this type of information could be incorporated into the court reporting system, providing an automatic, institutionalized response.

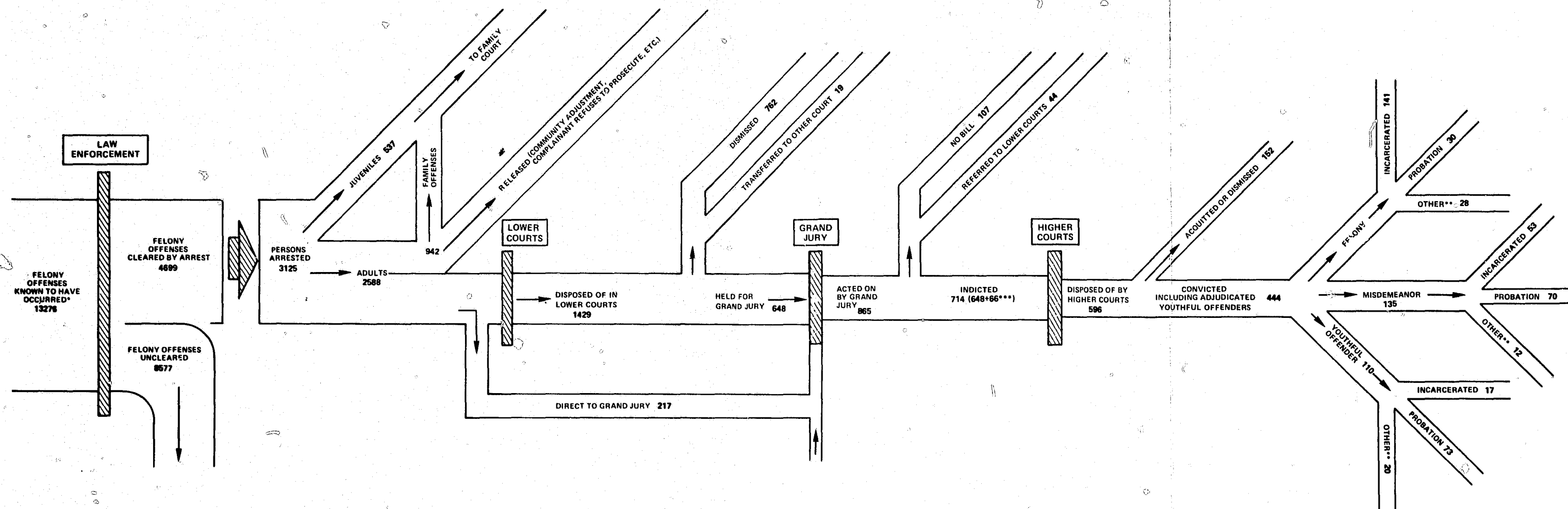
In the course of our site observations we were systematically seeking out the written record for manifestations of formal or informal communication between prosecutors and criminalists. The record found is sparse and spotty, and permits only the conclusion that prosecution management is not aware of a need for reviewing utilization of physical evidence information. It is hoped that effectiveness measures developed under this project and discussed in Volume III of this report will demonstrate the profitability of such review.

Police management interest in liaison with the courts is manifested in two sites. In one, the police department has located a former high-ranking police official as a liaison officer in the Justice Building, which houses courts and prosecutors. In the other site a Court Liaison Office is maintained in the Justice Building; its principal function is to minimize lost time of subpoenaed Public Safety Department employees, principally police officers and detectives, but also including criminalists. It appears possible to extend the responsibility of such a group to provide Public Safety Department management with case disposition information that will allow assessment of the impact of physical evidence information and possibly the entire felony investigation operation.

Section 12
SUMMARY OF FINDINGS

Our purpose, in this volume, has been to describe the use of criminalistics in felony adjudication. Our findings as presented in the preceding Sections have been drawn from qualitative and quantitative observations made during a six to eight month period at three sites. In keeping with the overall goal of the project - to point the way toward higher utilization of physical evidence in criminal justice systems - this concluding section summarizes those findings which may guide such effort.

One finding of the study is that only a small fraction of the reported offenses that involve physical evidence examination enter adjudication and, of those that do, few go to trial. This finding may be put into perspective by the reminder that this is a nationwide trend, regardless of whether physical evidence is examined or not. While it was not within the scope of the project to gather such data at the 3 observation sites, data obtained for all felony offenses at another site and time (11) will serve to illustrate this attrition (Figure 16).



*DOES NOT INCLUDE OFFENSES REPORTED BY NEW YORK STATE POLICE
 **OTHER INCLUDES: FINE ONLY
 UNCONDITIONAL DISCHARGE
 CONDITIONAL DISCHARGE
 OTHERS
 ***INDICTMENTS IN WHICH YOUTHFUL OFFENDER
 TREATMENT IS RECOMMENDED

FROM REFERENCE 11.

Figure 16 CRIMINAL JUSTICE DATA
 ERIE COUNTY, NEW YORK
 1968

The role of physical evidence in adjudication is found to be primarily corroborative. A stronger role, i.e. more cases in which physical evidence uniquely identifies a suspect or the perpetrator of a crime, may result from development of closer cooperation between criminalist and detective as pointed out in Volume I of this report. It has been found difficult to determine from examination of the record and observation to what extent in a given case the balance between reliance on physical evidence and, say, eye witness testimony, is a preference of prosecution and defense, or is controlled by the evidentiary value of the two.

The study has found that the role of physical evidence information, particularly in the earlier stages of adjudication where so many cases terminate, is not readily apparent from the record. Therefore, review and control by administrators of courts, prosecution and criminalistics operations over frequency, timing and manner of physical evidence use in those early stages is not now possible. Specific requirements for physical evidence documentation would indicate management interest and might thereby alone make a contribution toward improved utilization.

The need for more systematic and continuing effort in training and education of prosecutors, criminalists and investigators in their mutual requirements has been pointed out and recommendations for specific action has been made.

The need to communicate among these three categories of physical evidence examiners and users has been pointed out. In particular we called attention to the need for adequate pre-appearance conferences between prosecutor and criminalist, and the need to inform the criminalist of all case dispositions in which he had a potential role.

Section 13

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Section 14

GLOSSARY

Case	An incident that is the subject of a police Offense Report or a court action.
Criminal Justice System	All criminal justice operations that use or are affected by physical evidence information.
Criminalistics Operations	All scientific support of the criminal justice system involving physical evidence, excluding Forensic pathology. (Note: This definition includes lifting, processing, evaluating and comparing latent fingerprints).
Demonstrative Evidence	A method of presentation that is made instructive, tutorial and readily understandable, e.g., through graphics or photographs.
Effectiveness	How often used and/or how valuable is information on physical evidence examination in obtaining investigative and/or adjudicatory disposition of a reported offense.
Forensic Laboratory Criminalistics Laboratory Crime Laboratory	Used interchangeably.
Measure of Effectiveness	A function of a controllable variable of the criminal justice system that is highly correlated with effectiveness.

END