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A FORENSIC SCIENCE DIGEST  
FOR  
CRIMINAL JUSTICE PLANNING

FERNANDO BIAGI  
JOHN O. SULLIVAN  
LIVIO L. VAGNINA

APRIL 1974

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**FERNANDO BIAGI  
JOHN O. SULLIVAN  
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ABSTRACT

This document is a compendium of information to assist local state planning agencies in the allocation of Law Enforcement Assistance Administration (LEAA) funds for Forensic Science Laboratories (Crime Laboratories). The emphasis is on providing information to state planning agencies so that they may identify and extract rationale to justify resource allocation. Programs, literature, priority areas of research and development in criminalistics, and other information are described.

## ACKNOWLEDGMENTS

The assistance provided by the numerous state planning agencies and regional offices, federal, and local crime laboratories is acknowledged. Police specialists were most helpful in describing the situation existing in their states and many provided us with state plans whenever possible.

Particular thanks are offered to Robert W. Drake, Chief, Program Support Branch of the California Department of Justice; Anne Petersen, Acting Police Specialist of the Wisconsin Council on Criminal Justice; Edwin S. Schriver, Police Specialist of Regional Office III Philadelphia; Jack Jenks of the Law and Justice Planning Office of Washington State; and Tim Crowe, Technical Staff of The MITRE Corporation, who reviewed the draft of this document and offered suggestions.

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EXECUTIVE SUMMARY

This document places in the hands of the state planning agencies a readily identifiable set of information to assist them in planning their statewide Forensic Science laboratory systems, along with a method of using the information. A survey of 46 State Planning Agencies and five LEAA regional offices established that 76 percent (76%) of the states contacted have plans or plans in progress for potential funding in this area.

Information and aids are given on Forensic Science laboratory management, personnel, equipment and resources without cost-benefit relationships. A compendium of information on prior LEAA funding, research and development in forensic sciences, forensic organizations, laboratory instrumentation and forensic literature are presented to aid the state planning agencies in their task of forensic science resource allocation.

## 1.0 INTRODUCTION

LEAA regional offices and state planning agencies require up-to-date information in fulfilling their function of funding forensic science action and research programs. This document provides a compendium of information to assist the planner to meet the current needs of SPA's and Regional Offices who are charged with the improvement of criminalistics and crime labs and the review of state plans.

This Forensic Science Digest presents material gathered from many sources and is arranged for ready reference. Topics are discussed in the following order: Forensic Science Laboratory Planning, Factors to Consider in Funding Grants, Forensic Literature, Instrumental Techniques in Criminalistics, New Techniques, General Priority Areas Where Research and Development Efforts in Criminalistics are Needed, Organizations Performing Research and Development in Forensic Science and Education in Criminalistics. A set of appendices addresses NILE research grants in Forensic Science during the period 1970-1972, state criminal justice plans for crime laboratories, a selected biography of forensic science literature, a glossary of instrumental techniques and a section on standards and goals for crime laboratories.

## 2.0 OVERVIEW OF STATEWIDE FORENSIC SCIENCE LABORATORY PLANNING

A survey of state planners and regional offices conducted by The MITRE Corporation indicated a need for guidelines and background information to assist them in funding requests for Forensic Science laboratories. Seventy-six percent (76%) of the state planners contacted reported that plans existed or were in the process of being prepared. A review of 23 plans submitted to The MITRE Corporation for the purposes of this study established that there is no uniform system to fund an existent or new Forensic Science laboratory. Other information on state criminal justice plans, recent awards and forensic science items of interest, are provided in Appendix A.

### 2.1 Factors Commonly Used by State Planners for Crime Laboratories

Factors that appear to be commonly used by state planning agencies in sizing and locating crime laboratories are:

- (1) Experience has shown that any city or county with a population of 100,000 or more can support a forensic science operation. It can be shown that an area of this size should not be without a laboratory even if there is only one full-time scientist on the premises. For each 100,000 population increment, an additional trained criminalist will be needed.
- (2) Physical evidence may be defined as potential clues to be collected, examined, identified and evaluated toward the solution of a crime.<sup>[1]</sup> The effect of distance on the generation of evidence and its submission to a crime laboratory for examinations or comparisons has been the subject of much discussion throughout the history of crime laboratories in the United States. The Alabama State Department of Toxicology and Criminal Investigation made an in-depth study on this particular phase and compiled much data. A sharp decrease in physical evidence cases submitted to the laboratory at the distance of 25 to 50 miles was observed. Beyond 50 miles, the utilization of the laboratory steadily decreased for cases involving physical evidence.

- (3) Another consideration is the total number of sworn officers in a given police agency. Studies have shown that on the average, each police officer submits three (3) cases annually to the Forensic Science laboratory.
- (4) In staffing a crime laboratory it may be useful to consider that a professional laboratory examiner can process between 150-500 cases per year, depending on the nature of the evidence to be examined.

### 3.0 FACTORS TO CONSIDER IN FUNDING GRANTS

In considering the funding of any Forensic Science laboratory request, the following factors are most important:

- (1) crime specific patterns;
- (2) improvement of services to the police, prosecutor and court system;
- (3) improvement in detection and apprehension capabilities of law enforcement agencies;
- (4) crime reduction

Quantitative assessment of these factors can rarely be provided to the state planners. They must therefore base decisions on the results and experiences of other agencies. In funding requests to establish or improve an existing Forensic Science laboratory system, they should consider the following factors.

- (1) Management of Forensic Science Laboratory
- (2) Qualification of Personnel
- (3) Equipment
- (4) Facilities and Their Proper Utilization
- (5) Relation of Laboratory to User Organizations

One of the most important requisites for a Forensic Science laboratory is to have adequately trained personnel. This is one of the most significant requirements of the entire criminalistics operation, because competence of the staff can overcome many deficiencies of the facilities, whereas, the reverse is never true.

Since the Forensic Science laboratory director is responsible for the selection, training and supervision of the criminalist, it is essential that the laboratory be directed and managed by an individual with proper credentials.

Common sense and perseverance of the individual processing the crime scene is as important as intensive training and specialized equipment. In a statewide program that specifically excludes metropolitan cities, a police officer with 40 hours of crime scene search training and miscellaneous equipment (that can be stored in the trunk of a sedan) could perform this duty quite satisfactorily in the majority of cases.

In a metropolitan city, advanced training of the evidence technicians, and the use of mobile crime scene units (preferably station wagons) are very important and useful. Most Forensic Science laboratory directors prefer to have the evidence analyzed in the laboratory and tests not performed at the scene or in a mobile laboratory unless unusual circumstances prevail.

In 1966, a Department of Justice study of crime laboratories in the United States revealed that most, if not all, laboratories were under-equipped and poorly staffed. Since that time, LEAA has awarded funds to a number of Forensic Science laboratories for the purchase of new equipment and upgrading the facilities. It would be of value for the state planner to ensure that funds are available for additional training of laboratory personnel in new techniques and that specialized training is provided when new instruments are requested.

The planner should include in his planning collaborative laboratory resources available in the immediate area or at the federal level. For example, the FBI laboratories will routinely process physical evidence and provide opinion testimony for all authorized law enforcement agencies at no cost.

In addition, there are a number of highly sophisticated instruments which are useful in forensic science examinations. These instruments are available through coordination with universities and other public institutions, or by contractual arrangement with private entrepreneurs. It may not be economically feasible to purchase these instruments until such time that a cost-benefit for their ownership can be demonstrated.

The following are instruments or analytical services, the employment of which could be arranged on a consulting basis:

- (1) Emission Spectrograph and Densitometer Comparator
- (2) Mass Spectrometer
- (3) X-Ray Diffractometer
- (4) Nuclear Magnetic Resonance Spectrophotometer
- (5) Electron Microprobe
- (6) Neutron Activation Analysis
- (7) Scanning Electron Microscope

Space requirements for a Forensic Science laboratory will depend upon the anticipated personnel and distribution of the activity. These requirements are determined primarily by the case load of the laboratory and not by the total number of laboratory personnel. Table I lists minimum space requirements for a typical central Forensic Science laboratory.

In reviewing plans on the development or improved utilization of resources of a forensic laboratory, consultation with experts is advantageous. Excellent background material on specifics such as staff, administration, instrumentation and building specifications of a forensic laboratory can be obtained from review papers by Gunn and Frank,<sup>[2]</sup> by Curry,<sup>[3]</sup> and from The Crime Laboratory a book by Kirk and Bradford.<sup>[4]</sup>

### 3.1 Standards and Goals

The National Advisory Commission on Criminal Justice Standards and Goals, Report on Police, has developed standards on The Evidence Technician (12.1), The Crime Laboratory (12.2) and recommendations for the certification of Crime Laboratories (12.1). These standards<sup>[5]</sup> (listed in Appendix B) are vital to the proper development of a Forensic Science laboratory system and should be the eventual goals of each state plan. The standards should be essential reading for the Forensic Science state planner before any serious discussion on funding of a Forensic Science laboratory is undertaken.

### 3.2 LEAA Research Grants

The state planning agencies were established to develop comprehensive state plans for improving law enforcement and criminal justice. These agencies receive planning grants from LEAA for that purpose. They also receive action and discretionary grants from LEAA to put the comprehensive plan into effect.

Through its regional offices and directly from headquarters in Washington, D.C., LEAA provides policy guidance, coordination and technical assistance to the state planning agencies. Nevertheless, it is the state level that addresses the crime problem most directly.

A list of grant awards allocated for Forensic Science laboratories is given in Appendix C. These consist of funds provided as a result of discretionary grants, action grants and National Institute of Law Enforcement and Criminal Justice grants. A brief review of these grant applications will give the state planner an idea of acceptable Forensic Science laboratory plans and funds requested to fulfill these endeavors.

TABLE I  
SUGGESTED MINIMUM SPACE REQUIREMENTS (SQUARE FOOTAGE)  
FOR A FORENSIC SCIENCE LABORATORY (REGIONAL)

<u>AREA</u>	<u>SQ. FOOTAGE</u>
Toxicology Laboratory	600
Chemical Laboratory	600
Instrumental Laboratory	1200
Microanalytical Laboratory including three examining rooms	1000
Firearms Laboratory	800
Vault	200
Microscope Room	120
Document Laboratory including two examining rooms	760
Photography Laboratory with three darkrooms	800
Library Conference Room	800
Shop	400
Office Space including breathalyzer room	<u>1300</u>
TOTAL SQUARE FT.	8580

### 3.3 Forensic Literature

Before reviewing the literature, it is perhaps appropriate to define and note the distinction between "forensic science" and "criminalistics." Forensic science is the study and practice of the application of science to the purposes of the law. Criminalistics, on the other hand, as defined by the California Association of Criminalists is "that professional occupation concerned with the scientific analysis and examination of physical evidence, its interpretation and its presentation in court. It involves the application of principles, techniques and methods of the physical sciences, and has as its primary objective a determination of physical facts which may be significant in legal cases."

It would be worthwhile for the state planner to review the chapter on "Criminalistics and the Prosecutor" by Wilkaan Fong (The Prosecutor's Sourcebook).<sup>[6]</sup> A more recent text which should help bridge the communication between science and law is the work of three eminent law professors, A. Moenssens, R. Moses and F. Inbau entitled Scientific Evidence in Criminal Cases.<sup>[7]</sup> This book, while not intended to be a technical treatise, does give an individual an opportunity to become acquainted with the various disciplines with which he may come in contact, both inside and outside the courtroom.

Since the forensic literature is extensive, articles useful to the state planner for planning have been selected as reference material and are listed in Appendix D.

### 3.4 Instrumental Techniques in Criminalistics

Instruments and techniques differ, and to select the proper one which will yield the required information is of greatest importance. Cost and sensitivity of the instruments are factors to be considered.

Table II describes instrumental techniques and applications commonly used in a full-service forensic science laboratory along with a cost estimate and type of laboratory which might use them. To guide the reader, instrumental techniques are reviewed in Appendix E. In addition, a booklet<sup>[8]</sup> which can be considered a useful introduction to the role of analytical instruments for forensic science problems is available to the state planner for use.

TABLE I I

## INSTRUMENTAL TECHNIQUES &amp; APPLICATIONS

Technique	Application	Utilization	Type of Laboratory	Approximate Cost \$1000
Chromatography (Thin layer, gas/liquid)	Separation and Identification of Complex samples	1	A,B	TLC .05-1 GLC 5-10
Electrophoresis	Characterization of Blood specimens	1	A,B	1-4
Light Microscopy	Visual Examination and Photographic Recording	1	A,B	1-6
Soft X-Rays	Gunpowder residue patterns, Examination of suspicious items/packages, etc.	1	A,B	1-3
6 Emission Spectrography	Inorganic Analysis	2	A	10-25
Atomic Absorption Spectroscopy	Trace Elemental Analysis	2	A	5-25
Infrared and Ultraviolet Spectrophotometry	Identification of Chemical Compounds (qualitative & sometimes quantitative)	1	A,B	6-10
X-Ray Diffraction	Identification of solid Crystalline substances	3	A	10-25
Gas Chromatography - Mass Spectrometry	Qualitative and Quantitative Analysis of Trace Chemical Compounds	4	A	40-100
Nuclear Magnetic Resonance Spectrometry	Chemical Group Determination	4	A	2

TABLE II, Cont.

INSTRUMENTAL TECHNIQUES & APPLICATIONS

Technique	Application	Utilization	Type of Laboratory	Approximate Cost
Scanning Electron Microscopy	Visual Examination and Photographic and Recording Highly Magnified Images	4	A	50-100
Differential Thermal Analysis	Identification of Minerals, Polymers, etc.	4	A	5-6
Neutron Activation Analysis	Trace elemental determination	4	A	1000

Description of Utilization

1. Essential or relatively low cost
2. Extensively used but more costly
3. Desirable but costly
4. Either limited by high cost of equipment and/or infrequently used.

Type of Laboratory: A - Central  
B - Branch

### 3.5 New Techniques

Bryan Culliford and Margaret Pereira of the Metropolitan Police Forensic Science Laboratory, London, England, are considered the authorities in the identification of polymorphisms in dried blood stains. On September 14, 1970, a group of 20 criminalists from Forensic Science laboratories throughout the nation completed four weeks of training on new techniques in blood stain examination developed by Culliford and Pereira. This was held at the John Jay College of Criminal Justice in New York under the auspices of LEAA. Though the techniques are reported to be relatively simple and the equipment standard, it is reliably reported that only a few criminalists are utilizing this method at the present time. The Forensic Science laboratory criminalist should become thoroughly familiar with the state-of-the-art and avail themselves of this new powerful technique. Joseph<sup>[9]</sup> has stated that techniques used in the United States are not as successful on old blood stains as methods utilized in England. The use of these new techniques could potentially challenge fingerprinting as a method of identification. Funds for training laboratory personnel to develop this new technique in a Forensic Science laboratory should be provided with high priority.

### 3.6 General Priority Areas Where Research and Development Efforts in Criminalistics are Needed

To assist the state planners in establishing priorities, a review of the state-of-the-art in criminalistics development was made.

One of the papers reviewed concerning national criminalistics research programs is the work of Charles R. Kingston.<sup>[10]</sup> In his paper, he identifies research and development needs in the following six areas:

- Area 1 - Development of management reporting system that will permit the measurement of the involvement and effectiveness of criminalistics in the investigative process.
- Area 2 - Testing of candidate criminalistics operations structures that appear to offer the greatest effectiveness within reasonable cost limits.
- Area 3 - Development of an automated single fingerprint processing system.
- Area 4 - Developing improved methods and procedures for identifying narcotics and dangerous drugs.

Area 5 - Developing a data base of characteristics of materials most often involved in crimes.

Area 6 - Evaluating procedures that will cut down on the time spent relative to testimony in court by criminalists.

Other areas of interest, not in order of priority, are as follows:

- (1) Development of blood stain identification systems using polymorphic enzyme and protein system as well as other polymorphisms of human blood.
- (2) Standardization of physical examination procedures and methods of analysis.
- (3) Internal branding of "clue" materials such as inks, paper, paints, glass, lipstick, and many other products.
- (4) Development of advanced analytical procedures.
- (5) Development of automated analysis equipment.
- (6) Establishment of a National Forensic Sciences Institute.
- (7) The establishment of a system for collecting data on Forensic Science laboratory performance and effectiveness.
- (8) The development of data banks and quality control methods.
- (9) Development of Forensic Science laboratory management procedures.

Specific research areas concerning physical evidence which may be considered of priority in a Forensic Science laboratory include the individualization of blood stains, seminal stains, hairs and the detection of primer residues on the hands of suspects.

To avoid duplication in time and effort, it would be wise for the state planner to coordinate all proposed research efforts with other institutions, laboratories, and federal agencies on a national level prior to awarding grants for research and development in Forensic Sciences.

### 3.7 Organizations Performing Research and Development in Forensic Sciences

#### 3.1.1 The Forensic Sciences Foundation, Inc.

The Forensic Sciences Foundation, Inc. was founded in 1969 as a non-profit research organization designed to advance the study and practice of the application of science to the purposes of law. In February, 1973, it was officially adopted by the American Academy of Forensic Sciences for the purpose of serving as the Academy's agent to receive funds to execute projects designed to accomplish the educational and research objectives of the Academy.

Specifically, the Foundation is concerned with criminalistics, jurisprudence, odontology, pathology/biology, physical anthropology, psychiatry, questioned documents, and toxicology. It also is concerned with the emerging forensic professions.

The Foundation is governed by a Board of Trustees who are elected by the Foundation's membership. Its executive office is at 11400 Rockville Pike, Rockville, Maryland 20852, telephone (301) 770-2723. Kenneth S. Field is the Executive Director.

#### 3.1.2 The FBI Laboratory

Priority areas of research which the FBI Laboratory plans to pursue include the following:

- (1) Blood - Individualization and sex determination of blood stains, as well as population frequency studies on polymorphic components
- (2) Semen - Individualization
- (3) Hairs - Individualization
- (4) Detection of primer residues on hands of suspects
- (5) Research on the statistical significance or frequency of occurrence of glass, fibers, paint and soils, etc.
- (6) Application of computers to laboratory operation

Further information can be obtained by contacting Dr. Cornelius McWright, Chief of Biological Research, telephone (202) 393-7100.

3.1.3 The Forensic Branch of the Bureau of Alcohol, Tobacco and Firearms, Department of the Treasury

The Forensic Branch of the Bureau of Alcohol, Tobacco and Firearms (ATF), Department of the Treasury has five sections: Arson section, Bomb residue examination, Neutron Activation Analysis, Comparative Analysis of Trace Evidence and Serology. They have research projects either contemplated or in progress in the following areas:

- (1) Characterization of gasoline, the most commonly encountered accelerant, with respect to brand grade.
- (2) Development of an explosive tagging program. This program has a two-fold application; detection of the explosive before detonation (e.g. a dynamite bomb in a suitcase) and identification of the explosive and its source after detonation.
- (3) Trace elemental composition studies of various materials using Neutron Activation Analysis.
- (4) Development of field kits for identification of explosive residues in bomb scene investigations. Although these kits are being designed principally for ATF usage, the law enforcement community in general may have some interest in this.
- (5) Primer residue analysis.

The Chief of ATF's Forensic Branch, C. Michael Hoffman, can be contacted for information at (202) 964-6277.

3.1.4 Drug Enforcement Administration, Washington, D.C.

The Drug Enforcement Administration (DEA) operates six regional laboratories located as follows: New York City; Washington, D.C.; Chicago, Illinois; Miami, Florida; Dallas, Texas; and San Francisco, California. In addition to providing support to DEA special agents, these laboratories offer assistance to state and local law enforcement agencies. This assistance includes the analysis of narcotics and/or dangerous drugs and providing opinion testimony at no charge to the requesting agency. However, this service supplements but does not replace state, county, or municipal laboratories.

The laboratories of the Drug Enforcement Administration have over 30 research projects under study developing new analytical methods for the analysis of narcotics and dangerous drugs. Some of these projects include: application of liquid-liquid chromatography to forensic drug analysis, study of dyes in tablets and capsules by electrophoresis, the development of microchemical tests for drugs, and the development of isotopic dilution methods for drug analysis.

The Directors of these regional laboratories are available as consultants to duly authorized law enforcement agencies to assist in laboratory planning, evidence handling, narcotic and drug analysis, and other areas of forensic science in which they have expertise.

A Special Testing and Research Laboratory is also operated by the Drug Enforcement Administration in McLean, Virginia. This laboratory handles special analysis problems encountered by the regional laboratories as well as other federal, state or local law enforcement laboratories. This laboratory has sophisticated instrumentation and the necessary expertise to handle complex analytical problems. In addition to the services provided as described, new methods of analysis for various controlled drugs are developed for the law enforcement scientific community.

The laboratory also maintains an extensive repository for controlled drugs comprising of about 8,000 different items. This National Authentic Drug Library is used in conjunction with the examination of various tablets submitted which enables the laboratory to trace some exhibits to a common source, either a known manufacturer or clandestine operation. This laboratory provides this service on an international scale.

The following scientific publications are available to all duly authorized Forensic Science laboratories from the Drug Enforcement Administration:

- (1) Microgram (a newsletter published monthly)
- (2) Manual on the Analysis of Drugs
- (3) Basic Training Program Manual for Forensic Drug Chemists

The publications may be obtained by writing to:

Mr. John W. Gunn, Jr., Chief  
Scientific Services Division  
Office of Research and Technology  
Drug Enforcement Administration  
Washington, D.C. 20537

### 3.8 Consultants and Experts in Criminalistics

Mr. Kenneth S. Field, Executive Director, Forensic Science Foundation of the American Academy of Forensic Sciences, 11400 Rockville Pike, Rockville, Maryland 20852, telephone (301) 770-2723, is an excellent source of information for professional contacts who can lend assistance or consultation in forensic matters.

### 3.9 Education in Criminalistics

Standard 12.2 on The Crime Laboratory as defined by the National Advisory Commission on Criminal Justice Standards and Goals states in part "that every employee responsible for the completion of scientific analysis or testing hold at least an earned baccalaureate degree in chemistry, criminalistics or closely related field from an accredited institution, and have a thorough working knowledge of laboratory procedures." This latter skill is acquired by directed laboratory experience in the field of criminalistics and should be considered absolute minimum training.

The following institutions provide specialization in forensic science and criminalistics:

Sacramento State College  
Dept. of Police Science and Administration  
6000 Jay Street  
Sacramento, Ca. 95819

University of California  
Dept. of Criminology  
Berkeley, Ca. 94720

George Washington University  
Dept. of Forensic Sciences  
Washington, D.C. 20006

Florida Technological University  
Dept. of Chemistry  
Orlando, Fla. 32816

University of Illinois  
Box 4348  
Chicago, Ill. 60680

Michigan State University  
School of Police Administration and Public Safety  
East Lansing, Mich. 16802

University of Pittsburgh  
Dept. of Chemistry  
Pittsburgh, Pa. 15213

The Georgetown University Forensic Sciences Laboratory, under the direction of Professor Joseph M. English, 3600 M Street, N.W., Washington, D.C., Room 203, telephone (202) 338-9565, offers a number of short courses in Forensic Sciences. In 1974, 16 one-week short courses and three two-week short courses of concentrated laboratory work and lecture/demonstrations consisting of 40 contact hours per week, for the professional education and training of laboratory personnel are being offered in the following areas:

- (1) Forensic Photointerpretation
- (2) Forensic Document Examination
- (3) Forensic Examination of Contact Trace Evidence consisting of specialized courses in:

Forensic Microscopy  
Modern Textile Fiber Identification  
Microscopy of Human Hair and Animal Fibers  
Nuclear Methods in Criminalistics  
Special Problems in Nuclear Criminalistics  
Blood and Other Body Fluid Stains  
Forensic Serology

The Georgetown University full time education and training program for the professional preparation of Forensic Document Examiners, which program was instituted in September of 1972, will complete two full years of operation in August 1974. Classes are limited to nine to ten certificate candidates at any one time.

The National Training Institute of the Drug Enforcement Administration conducts seminars on the analysis of Narcotics and Controlled Drugs for forensic chemists and law enforcement specialists at the Special Testing and Research Laboratory in McLean, Virginia. The courses are one week in duration and include pill ballistics, microtechniques, X-Ray diffraction, thin layer and gas liquid chromatography, as well as spectroscopic techniques. Information concerning the courses can be obtained by contacting:

John W. Gunn, Jr., Chief  
Scientific Services Division  
Office of Research and Technology  
Drug Enforcement Administration  
Washington, D.C. 20537

The FBI Laboratory also conducts specialized scientific training for crime laboratory personnel at Quantico, Virginia. Interested parties may contact the following individual for further information.

Dr. B. J. White, Director  
FBI Laboratory  
Washington, D.C. 20535

For background information, on December 3-6, 1973, the FBI sponsored a National Symposium on Crime Laboratory Development in which 46 crime laboratory directors attended the LEAA sponsored workshop. At that time the FBI reported the results of a survey made of 189 crime labs throughout the country. It resulted in a count of 2400 examiners and technicians. Of this number, there are 2106 examiners who testify in court in some phase of criminalistics and 282 technicians who do not testify. There are 533 clerical and 963 evidence technicians in the country for a total of 3884 personnel engaged in criminal investigation laboratory operations. In 1972, a total of 994,313 cases were processed in Forensic Science laboratories, 42,727 of which required the presence of experts in court testimony. These figures are independent of the FBI Laboratory personnel or cases examined by the FBI. For purposes of comparison, the FBI Laboratory for the year 1973 (fiscal year) processed a total of 120,498 cases for non-federal law enforcement agencies. The average turn around time for the FBI Laboratory to examine an item of physical evidence is eight days.

In summary, specialized scientific training is available and strongly recommended for laboratory personnel. Funds awarded for this purpose by state planning agencies will find the results quite rewarding.

## APPENDICES

### HOW TO USE THESE APPENDICES

#### Appendix A

Appendix A contains a listing of state agencies contacted during the period of October-November, 1973. Recent grants and other items of interest are provided to give the planner an idea of the plans in existence or contemplated.

#### Appendix B

Appendix B "Standards on Support Services as defined by the National Advisory Commission on Criminal Justice Standards and Goals - January 1973," contains standards on the evidence technician and the crime laboratory and recommendations for certification of crime laboratories.

#### Appendix C

Appendix C consists of NILE funded grants during the period 1970-1972. The information was furnished as a computer listing through the courtesy of the National Criminal Justice Reference Service.

#### Appendix D

Appendix D is a bibliography of selected articles and books suitable for background research in planning criminalistics programs.

#### Appendix E

Appendix E is a glossary of the instrumental techniques most commonly used in a crime laboratory.

APPENDIX A

STATE PLANNING AGENCIES CONTACTED

This Appendix contains an alphabetical listing by state of those state agencies that were contacted by a telephone survey. It provides status of their criminal justice plan, information pertaining to their recent grant awards and other items which may be of interest to a planner. To facilitate contact of an individual police specialist, refer to the LEAA directory of "Safe Streets - The LEAA Program At Work" which gives the address and telephone number of each state planner.

ALABAMA

CRIMINAL JUSTICE PLANS - Plan has been prepared, includes forensics

RECENT AWARDS

This award in the amount of \$60,000 will provide the Alabama State Department of Toxicology and Criminal Investigation a project to improve the impact of physical evidence on criminal justice in Alabama. The basic goal of the project is to provide training in criminalistics and develop expertise at the crime scene and within the crime lab.

OTHER ITEMS

In a recent, extensive national review of forensic science operations, the development of the Alabama Statewide Toxicology and Criminalistics Laboratory System was considered outstanding. In little more than two years, an operational program involving eight regional laboratories (two more are planned) has been implemented and is today, providing model service to the people of that state.

ALASKA

CRIMINAL JUSTICE PLANS - information unavailable

ARIZONA

CRIMINAL JUSTICE PLANS - Plan issued

RECENT AWARDS

The Phoenix Police Department was awarded a \$50,500 grant by LEAA for 16 months (from July 1972) to improve laboratory techniques in the crime lab. This was due primarily because serious crime had risen 79% between 1966 and 1971, the Phoenix crime lab caseload had risen 617.37%, and laboratory examinations were up 639.32%. The equipment obtained as part of the project will permit the crime lab to meet the projected workload while providing high quality proof which will improve the county prosecutor's case presentation at preliminary hearings and court trials.

LEAA awarded additional funds totaling \$98,611 for the period May 1, 1973 - June 30, 1974 for expansion purposes in the state crime laboratory. This amount represents the anticipation of employing five additional personnel in the coming fiscal year and acquiring other needed laboratory facilities.

Tucson received total grant of \$14,757 (federal 75%, local 25%) from June 1, 1972 - May 31, 1973 for additional criminalist.

OTHER ITEMS

Arizona Dept. of Public Safety has requested \$46,300 grant to be matched with \$8,171 for a total of \$54,471 during the period May 1, 1973 to June 30, 1974. The pending expansion of the state crime laboratory and recent trends in drug cases dictate the needs for additional, more sophisticated equipment in the very near future. Equipment will consist of two microscopes, one balance, one Mass spectrometer-gas chromatograph system.

ARKANSAS

CRIMINAL JUSTICE PLANS - in preparation

OTHER ITEMS

Arkansas is preparing plans for the establishment of a state crime laboratory.

CALIFORNIA

CRIMINAL JUSTICE PLANS - plan issued

OTHER ITEMS

Concept of Master Plan

Criminalistics throughout California consists of limited service to the sparsely populated areas and autonomous facilities, primarily servicing the parent department, in the metropolitan areas. This situation creates two problems: (1) nonurban areas with their populations spread across vast geographic distances are not receiving the level of criminalistics services that is needed, and (2) the large metropolitan areas, containing approximately 70 percent of the population, are serviced by jurisdictionally independent laboratories which are parochial in concept and represent an inefficient deployment of resources.

To rectify this situation and provide equal service to all citizens of the state, the California Council on Criminal Justice is taking a bold step and recommends the establishment of a Statewide Criminalistics Service. Initially this system will supplement the existing services and facilities. However, its designed purpose is to eventually replace the independent laboratories and provide one master system operated by and throughout the state. The Council recognized the magnitude of this recommendation and estimates approximately ten years for total implementation.

A five-year project for the State of California includes:

Year	State	Cost
1st	Install 2 Regional laboratories	\$636,000
	(to serve as pilot installation)	
	Install 2 Satellite laboratories	246,000
	(to serve as pilot installation)	
	Establish training facility	<u>100,000</u>
		\$982,000
2nd	Install 1st core laboratory	\$662,000
	Install 4 Regional laboratories	1,272,000
	Install 3 Satellite laboratories	369,000
	Expand training capability	<u>50,000</u>
		\$2,353,000

CALIFORNIA, Cont.

Year	State	Cost
3rd	Install 2nd Core Laboratory	\$ 662,000
	Install 4 Regional Laboratories	1,272,000
	Continue Satellite Installation	369,000
	Commence Assimilation of Independents	<u>150,000</u>
		\$2,453,000
4th	Complete Satellite Installation	
	Continue Independent's Assimilation	\$1,320,000
5th	Complete Independent's Assimilation	
	Complete Entire System Installation	\$1,320,000

The California system is to consist of a new bureau under the State Department of Justice to be totally independent and encompass all present Department of Justice laboratory and allied functions. Under the new bureau, regional and statewide advisory boards will be created to provide response to local needs. Two core laboratories with the ability to provide the most sophisticated work and ultimately to provide training and research functions will be established in the population centers. Ten regional laboratories, subordinate to the area core laboratory, possessing the capability to perform the most common services necessary in its region, will be established as needs dictate; and five satellite laboratories with the ability of handling tests inherent in drunk driving and narcotic arrests plus performing elementary crime scene preservation and evidence gathering, will be established within the areas subordinate to the regional laboratory.

COLORADO

CRIMINAL JUSTICE PLAN - in preparation

RECENT AWARDS

Colorado's Bureau of Investigation is similar to the Federal Bureau of Investigation. Its crime laboratory recently received four (4) subgrants for the purpose of improving its facility and equipment. Grants were as follows:

1969 Grant	\$12,165 Total Cost
1970 Grant	10,155
(2) 1973 Grants	95,000 and
	35,002

CONNECTICUT

CRIMINAL JUSTICE PLANS - in preparation

DELAWARE

CRIMINAL JUSTICE PLANS - none

RECENT AWARDS

Delaware received two discretionary grants (2) of approximately \$45,000 each for an additional lab and equipment. The state laboratory is located in Wilmington at the medical examiner's office. The staff consists of two criminalists and one medical examiner. The state plan is now in the second phase of implementation, however, no block grants have been given for the laboratories.

FLORIDA

CRIMINAL JUSTICE PLANS - plan issued

OTHER ITEMS

The State Planning Agency (SPA) coordinates and administers LEAA action grants under Program Description D-2, FY-72 Action Plan, State of Florida. The objective of this program is to provide modern crime lab services, facilities and resources to local units of government. Under their current charter, grants can be provided for:

- (1) expansion of existing facilities and services;
- (2) development of mobile and fixed facilities; and
- (3) expansion of technological skills and information resources.

Emphasis has largely been placed on establishing evidence-processing centers, satellite laboratories, mobile laboratories, and two-year (community or junior college) criminalistics programs.

A study made by Midwest Research Institute was recently completed for the Florida Department of Law Enforcement. The study developed a statewide six-year crime lab master plan that calls for 68 criminalists by 1978. This represents a requirement for 16 additional criminalists beyond that originally projected in their detailed three-year plan by the end of 1975. These additional criminalists are to be assigned according to areas of greatest need at the time they are added to the state system. Possibilities for their assignment include:

- (1) assignment to satellite laboratories expanding to achieve full service status;
- (2) assignment to regional laboratories in instances in which the work load demands and travel time requirements exceed the capabilities of the basic regional lab as originally recommended in this report;
- (3) assignment to laboratories newly created in response to new demands for criminalistics services.

GEORGIA

CRIMINAL JUSTICE PLANS - plan issued

OTHER ITEMS

In designing a master plan for the further provision of crime laboratory services for the State of Georgia, the first consideration has been a response to anticipated demands by law enforcement agencies for expanded services. All available statistical trends indicate that these demands will increase in the state during the next ten years.

CAUSES

The following four broad categories heavily influence the demands for crime laboratory services in Georgia:

1. An increase in those factors which promote crime.
2. An expansion in community services designated for crime control.
3. A heightened awareness of the usefulness of scientific techniques in crime control.
4. An enlargement of the role of scientific investigation in crime control through new advances in forensic science.

DETAILED PLAN FOR EXPANSION OF STATE CRIME LAB SYSTEM

Based on statistical studies a detailed plan for the expansion of the state crime laboratory has been worked out using the expected needs of the state for scientific criminal investigation by 1982 as the criterion of growth. A system has been designed to serve Georgia's special geographic distribution of population and crime, and in ten years should result in the completion of a main lab/six-branch lab complex of facilities. The plan provides for a large central lab, located in Atlanta, serving the needs in forensic science of the metropolitan population center and surrounding counties; and housing the administrative offices, research and training divisions, and special projects divisions for the state as a whole. Six smaller branch labs, located throughout the state, will be utilized to increase the effectiveness of the service to that portion of the state's population geographically removed from Atlanta. By distributing a greater proportion of the total service to branch labs,

Georgia, Cont.

greater efficiency will be achieved since branch labs are nearer the crime scene, courts, and responding jurisdictions of their areas, saving time and travel expense for crime lab personnel and local police alike.

COMPUTER

A plan is under study in conjunction with personnel of the state computer center to devise a high speed transmitted data system for the entire main lab/branch lab system at an installation cost of \$75,000. The lab's three main filing systems will be replaced by data storage on a shared state computer and on two auxiliary computers designated for crime lab use. Data retrieval will be accomplished by video readouts for all labs, with printouts on demand, including the automatic typing of standardized reports.

HAWAII

CRIMINAL JUSTICE PLANS - information unavailable

IDAHO

CRIMINAL JUSTICE PLANS - information unavailable

ILLINOIS

CRIMINAL JUSTICE PLANS - plan issued

OTHER ITEMS

To augment the previously existing full service state crime laboratories in Joliet and Springfield, a program of satellite laboratories and crime scene technician units were developed throughout the state from 1970 through 1973. The major criteria in location of such services was that a crime scene would normally be reached within a one hour time limit. The state was divided into ten crime scene areas and, at this time, all areas are served by operational units. For the purpose of laboratory services, the state is served by seven facilities. An additional laboratory, now under construction, will serve the highly populated Cook County area.

As a result of this program, the application of scientific analysis of physical evidence has increased in the state laboratory system from 2,541 cases in 1968 to almost 9,000 cases during 1972.

CRIMINALISTICS

Summary of Awards  
by Plan Year\*

	<u>1969</u>	<u>1970</u>	<u>1971</u>	<u>1972</u>	<u>1973</u>	<u>Total</u>
No. of Grants Awarded	0	2	1	3	1	7
Amount: Fed.	-0-	-0-	\$176,400	\$ 34,496	\$82,879	\$293,775
State	-0-	\$442,741	-0-	174,900	-0-	617,641
Totals	-0-	\$442,741	\$176,400	\$209,396	\$82,879	\$911,416

\*Period covers 1-01-69 to 8-31-73

INDIANA

CRIMINAL JUSTICE PLANS - plan issued

OTHER ITEMS

Improvements are being made to the following laboratories:

State Police - The state police will expand their central laboratory by adding a civilian chemist, two civilian darkroom technicians and a typist.

Gary - Continued financial support will be provided the Northwest Indiana Toxicology Laboratory.

Indianapolis - Continued support will be provided the Indianapolis Police Department Laboratory in the form of two full-time chemists.

Terre Haute - Additional and replacement equipment will be provided the Terre Haute Police Department

Bloomington - Continued funding will be given the Bloomington Laboratory so that the lab will be completely operational by October of 1973.

Evansville - A small amount of equipment will be provided the Evansville Police Department.

IOWA

CRIMINAL JUSTICE PLANS - plan issued

OTHER ITEMS

The state crime lab will be supported with the purchase of a mass spectrometer/gas chromatograph (MSGC), a differential scanning calorimeter, and a liquid chromatograph. The MSGC is primarily needed for sample identifications and comparisons when submitted samples (soil, fabric, plastics, etc.) are in quantities too minute to be dealt with by conventional laboratory techniques. The differential scanning calorimeter allows comparison of materials by subjecting them to heat stress, allowing the changes to be studied. The liquid chromatograph will allow samples to be tested in liquid form, and will allow such examinations as detecting foreign substances in blood and other body fluids.

At the local level, technical detection equipment such as fingerprint kits, photographic equipment, and drug identification kits will be funded. Approximately 15 projects in this category are anticipated involving the 20 largest jurisdictions in the state.

KANSAS

CRIMINAL JUSTICE PLANS - plan issued

OTHER ITEMS

No formal study is being conducted at this time, but the 1973 Comprehensive Law Enforcement Action Plan reports that the Laboratory Section of the Kansas Bureau of Investigation consists of one Agent I supervisor and document examiner, five civilian forensic chemists, one Photographer II, one Agent I mobile crime lab technician and one identification technician and is equipped to examine evidence submitted by local officers, agents of the bureau and other agencies of the state. The scientific aids of this division have proven to be a tremendous assistance in the solution of crimes and prosecution of criminals. A mobile crime laboratory, fully equipped to assist in the collection and preservation of evidence at a crime scene, is a part of this service rendered by this division.

The 1973 Action Plan included in its objectives to improve the apprehension capabilities of law enforcement agencies with more specialized technical services. They are needed to handle the necessary demands of laboratory examinations.

Implementation - to provide the funding necessary for the continuation of one state crime laboratory service.

At this time, there are no National Institute programs being funded in Kansas.

KENTUCKY

CRIMINAL JUSTICE PLANS - plan issued

RECENT AWARDS

The Kentucky State Police proposes to expand the present crime lab with additional personnel and equipment to facilitate the technical evaluation of evidence and utilization of police laboratory facilities in performing a wide variety of analyses and tests. The project is designed to provide criminalistic laboratory services to all state's local police agencies, other state agencies, as well as the investigative command of Kentucky State Police. The total grant is for \$120,000 (federal funds \$90,000 with a matching contribution of \$30,000).

Factors considered in funding the grant were:

- (1) Increased work load. Work load has doubled over a two-year period. Many local police departments are better equipped to gather and submit evidence than ever before.
- (2) Existing laboratory facilities, equipment and staffing are not adequate to meet the needs of law enforcement agencies in Kentucky. Thus basic lab equipment needed.
- (3) Employment of a new chemist.
- (4) Ever increasing demands placed upon the scientific aspects of criminal law insist that the upgrading of all phases of the laboratory continue to expand.

LOUISIANA

CRIMINAL JUSTICE PLANS - in preparation

MAINE

CRIMINAL JUSTICE PLANS - none

RECENT AWARD

Maine is in the planning stage to create a crime lab. The lab has not formally requested their funds. A \$37,500 grant for 18 months is for the salary of a new crime lab director. Everything is in the initial stages.

MARYLAND

CRIMINAL JUSTICE PLANS - in preparation

RECENT AWARDS

LEAA has funded two major crime laboratories. Baltimore City Police Crime Lab was funded first for the city and surrounding metropolitan area. Their backlog has prohibited them from accepting evidence from other jurisdictions. Secondly, a state crime lab at Pikesville was funded in 1972. However, it is not yet fully operational due to delays in obtaining equipment and staff. There is a need for four-five chemists (three filled) as of October 12, 1973. It hopes to be operational soon. The state lab will provide service to all other police jurisdictions. The FY74 plan calls for two satellite labs from the Pikesville State Lab - one in western Maryland and one on the Eastern shore. Mobile crime lab vans have also been funded for field tests.

Funding factors now are 1) work load and 2) turn around time. All evidence pertaining to narcotics is to be completed in three days; all other evidence in seven days. This is the desired goal.

OTHER ITEMS

LEAA has provided funds for two major crime laboratories in the state of Maryland. The 1974 fiscal year plan calls for two satellite laboratories, one in western Maryland and the other on the Eastern shore.

MASSACHUSETTS

CRIMINAL JUSTICE PLANS - plan under review by the state

RECENT AWARDS

A 1973 grant of \$75,000 for additional laboratory equipment was awarded.

MICHIGAN

CRIMINAL JUSTICE PLANS - plan issued

OTHER ITEMS

Funding in 1974 will be dedicated to the development of a state satellite laboratory at Bridgeport and to continue improvement and expansion of services at the central laboratories of the Michigan Department of Public Health and State Police in Lansing and East Lansing. Along with the technician training program, development of satellites in other parts of the state is planned, thus providing all law enforcement agencies with immediate access to forensic services.

The following are the factors which the state planner uses in funding forensic science programs.

Evaluation Factors

- (1) subjective evaluation by affected parties
- (2) number of cases processed
- (3) compare delivery of service before and after
- (4) specify improved services
- (5) percent of cases leading to positive identification of suspect

Inspection Factors

- (1) verify employment of project staff
- (2) verify acquisition and installation of equipment
- (3) inspect procedure and documentation evaluating project effectiveness
- (4) examine project facility for adequacy
- (5) obtain subjective evaluation from affected agencies
- (6) examine extent of project's effect geographically

MINNESOTA

CRIMINAL JUSTICE PLANS - plan issued

OTHER ITEMS

Based on a study made by Midwest Research, the state's two full service laboratories and drug laboratory are adequately staffed with criminalists (laboratory analysts). The general equipment level of the three laboratories appears better than average.

The law enforcement community is concerned with lack of adequate crime scene search training; difficulty in getting evidence to the laboratories; and poor turnaround time by the BCA Laboratory. The establishment of regional laboratories, including a third full-service laboratory for Hennepin County, was advocated by 20 percent (20%) of the respondents to the Commission's survey.

In comparison with other states, laboratory utilization in the metropolitan area is low while in the rest of the state it is about average.

Recommendations made by Midwest include:

1. an expanded Crime Scene Search training program;
2. relocation of the State BCA Laboratory to Minneapolis;
3. a Secure Evidence Transit System is recommended to reduce problems faced by outlying departments in submitting physical evidence to labs in the metropolitan area;
4. a crime laboratory management information system and a quality control program covering all laboratories is recommended.

The proposed "Five-Year Plan" of the Bureau of Criminal Apprehension (BCA) Laboratory calls for the following:

I. Present - 1973

- A. Expansion of BCA Laboratory
  1. Legislative Approval of Budget Request
  2. Approval of Grant for "Expansion of Laboratory Capability for Drug and Narcotic Analyses"
- B. Establishment of one BCA Satellite Laboratory (Approval of Federal Grant)  
and/or  
Establishment of BCA Crime Scene Processing Unit

Minnesota, Cont.

- C. Expansion of St. Paul Police Department Laboratory (Approval of Federal Grant)

II. Future

- A. Establishment of Second BCA Satellite Laboratory (1975)
- B. Establishment of Third BCA Satellite Laboratory (1977)

MISSISSIPPI

CRIMINAL JUSTICE PLANS - in preparation

OTHER ITEMS

Midwest Research is making a five (5) month study on the crime lab needs for the state.

MISSOURI

CRIMINAL JUSTICE PLANS - information unavailable

MONTANA

CRIMINAL JUSTICE PLANS - in preparation

OTHER ITEMS

The Board of Crime Control formed a science task force to assist in the preparation of a plan to provide a crime lab and medical examiner's office. Legislation is being written to provide these under a newly created Department of Law Enforcement and Public Safety.

NEBRASKA

CRIMINAL JUSTICE PLANS - none

OTHER ITEMS

Studies have been made on a survey of needs.

The State Health Department, in conjunction with the State Highway Patrol, has built a new state crime laboratory. It presently consists of four staff members under the State Health Department, but it is anticipated that two more chemists and two additional members will be hired on a part-time basis for law enforcement purposes. The state laboratory provides training, toxicology, and some basic research.

In the Omaha metropolitan area, the local law enforcement agencies contract analyses of blood and body fluids, blood-alcohol, etc., to the hospitals. The Omaha police Division is in the process of developing their own crime laboratory. They have a questioned documents examiner and a fingerprint section to process latents, etc. Outside the metropolitan area, general criminalistics evidence is sent to the FBI Laboratory.

Under the State Patrol there are six (6) evidence collecting vans of the Sirchie type which are scattered throughout the state. They are on call to local and state police.

Through a LEAA grant a satellite laboratory is planned in North Platte to do mostly drug work. It will have two full-time employees.

NEVADA

CRIMINAL JUSTICE PLANS - in preparation

OTHER ITEMS

The state crime laboratory, strictly a narcotics testing facility, is located in Reno. A statewide plan for criminalistic laboratories is being prepared.

NEW HAMPSHIRE

CRIMINAL JUSTICE PLANS - none

OTHER ITEMS

The single State Police Crime Lab at Concord is adequately staffed.

NEW JERSEY

CRIMINAL JUSTICE PLANS - plan issued

OTHER ITEMS

Multi-year Forecast of Results and Accomplishments

- 1973
1. Staff and equip. new Regional North Laboratory
  2. " " " " " South "
  3. " " " " " East "
  4. Continue training programs for 10 more professional lab personnel
  5. Continue training programs for 25-50 additional local criminal investigators
  6. Staff and equip Forensic Sciences addition to central lab
  7. Begin training of 10-15 new Forensic Sciences professional personnel
- 1974
1. Provide additional specialized scientific equipment to new satellite laboratories
- 1977
1. Expansion of central lab capabilities through construction, staffing and equipping of three new regional satellite labs
  2. Hiring and training of 60 new professional lab personnel
  3. Training of 125-230 county and municipal criminal investigators on scientific methods and procedures
  4. Expansion of central crime lab in West Trenton by construction, staffing, and equipping of new Forensic Sciences building
  5. Make available to every police department in the state the services of a forensic laboratory

"While New Jersey has made some progress in obtaining more and better research and information systems, the present level is still inadequate. There is not enough research and evaluation in the criminal justice problems of the state to determine what works and does not work in reducing crime. There is not enough quality information for the decision makers of the criminal justice system to make completely reliable decisions."

NEW MEXICO

CRIMINAL JUSTICE PLANS - in preparation

OTHER ITEMS

There is a state crime lab in Sante Fe and a regional lab in Albuquerque. The Albuquerque Police Department has organized a Technical Services Division which will eventually include all photographic laboratory and criminalistic laboratory services and proposed that a survey be conducted by a qualified criminalist, over approximately a one-year period, to gather pertinent data that will be used when initiating the actual crime lab project. This survey should include: (1) needs for services of a regional criminalistic laboratory; (2) similar operations in other areas; (3) local support available; and (4) hardware and personnel needs. The criminalist will work directly with the Albuquerque Police Department on related current crime cases. This project complemented a block grant commitment by the State of New Mexico to the statewide needs for a criminalistic laboratory. A complete regional crime laboratory is expected to be set up eventually that will handle a large volume of varied evidence for analyses, resulting in an increased level of successful prosecution.

NEW YORK

CRIMINAL JUSTICE PLANS - plan issued

RECENT AWARDS

Provision has been made for comprehensive laboratory services throughout the State.

Funding of \$69,110 will be used to better equip and staff major forensic laboratories in the state so they may serve as regional service centers. Such efforts were funded in the City of Syracuse and in Nassau County during fiscal year 1972.

OTHER ITEMS

Multi-year plans will include: the establishment of completely equipped laboratories serving five regions north of New York metropolitan area; an improved means of handling the tremendous volume of narcotics analyses; and appreciable expansion in the number of personnel sufficiently trained to staff these facilities; and will provide expert testimony in court. In 1973, New York City will receive funds to develop automated means to facilitate narcotics analysis. It is expected that assistance will be given to Westchester County, the Black River/St. Lawrence region, and perhaps Herkimer and Oneida Counties to enhance lab capabilities.

Training in crime scene investigation techniques in Mid-Hudson, Nassau County and perhaps Buffalo, is planned for 1974.

NORTH CAROLINA

CRIMINAL JUSTICE PLAN - plan issued

OTHER ITEMS

Since North Carolina's criminalistics system will have been upgraded to satisfactory levels at the end of 1974, funds are being sought to help maintain this level. Laboratory funds are distributed between the Charlotte Police Laboratory and the SBI Crime Laboratory roughly in a one to three ratio.

Staffing problems are somewhat relieved by the use of laboratory interns. Working on a one-half time basis, they have been found to be extremely valuable. Not only are they able to perform many routine tasks around the laboratory, but they are also a source of new permanent personnel. A one-year position as an intern allows one to see the type of work done in a crime laboratory and gives the laboratory an opportunity to carefully evaluate the intern's suitability as a criminalist.

Funds have been planned for new equipment, replacements for worn out or obsolete equipment, and crime scene search vehicles for the recommended expansion of the SBI Mobile Unit System. A large increase in 1977 funding is needed to replace old mobile units purchased during the 1970-1972 period.

One of the most important necessities of a criminalistics laboratory is reference material - books, journals and various data collections. A funding request for these materials is anticipated in 1974, with continuing aid for subscriptions to journals and new materials as they appear. Funding for special courses and for professional society meetings held twice a year is planned.

Only by close cooperation and exchange of knowledge between criminalists and investigating officers can a crime laboratory services delivery system realize its potential as an aid to the criminal justice system. Funding for local officer training is planned.

NORTH DAKOTA

CRIMINAL JUSTICE PLANS - in preparation

OTHER ITEMS

North Dakota presently bases its funding on police agency requests. They presently are using the University of North Dakota and FBI for laboratory services. They are planning a full-service laboratory in the future.

OHIO

CRIMINAL JUSTICE PLANS - plan issued

OTHER ITEMS

Anticipated crime laboratory needs include purchase of equipment, supplies and professional staff support for three regional crime laboratories and two state crime laboratories. The Miami Valley Regional Crime Laboratory, established in 1971 in the Dayton Police Department, is supervised, supported and receives its caseload from a five-county area including the City of Dayton. During the year 1973, this laboratory will move its facilities from the Dayton Police Department to new quarters on the campus of Sinclair Community College. Funds will support: the operation of the crime laboratory; the provision of technical services to police, prosecutors and courts; the analysis and evaluation of physical evidence; provision of expert witness services in court; and supervision of the mobile crime laboratories in the five-county area. By relocating at Sinclair Community College, the crime laboratory will have ready access to courses of instruction in introductory and advanced forensic sciences in cooperation with Sinclair Community College, the University of Dayton and Wright State University.

Statewide crime laboratory services are offered by the BCI&I Laboratory at London and its two satellite laboratories at Richfield and Fremont. The goal of the BCI&I is to provide efficient criminalistic services on a statewide basis. The program will proceed in several phases: (1) provide space, equipment and staff at BCI&I's central laboratories (London) to the point where it can provide back-up service for all crime laboratories in the state; (2) continue expansion of the northeast and northwest laboratories; (3) establish two new satellite laboratories in accordance with a long-range plan; (4) establish additional resident investigators; and (5) upgrade investigative and laboratory personnel through additional training.

Expected Accomplishments

Improve crime laboratory services on a regional basis in three areas of the State.

Increase detection, apprehension and prosecution capabilities of law enforcement agencies through the provision of speedy evidence analysis.

OHIO, Cont.

Establish a single collection point for all arson evidence and explosive evidence in the State, through the State Arson Bureau.

Reduce crime through prompt examination of physical evidence and expert court testimony.

Reduce turn-around time in physical evidence examination, broaden criminalistics services.

Provide polygraph instrumentation and operator training for four agencies.

OKLAHOMA

CRIMINAL JUSTICE PLANS - issued

RECENT AWARDS

A 1972 subgrant of \$29,021 to replace depleted laboratory equipment and acquisition of additional equipment has been received.

OREGON

CRIMINAL JUSTICE PLANS - information unavailable

PENNSYLVANIA

CRIMINAL JUSTICE PLANS - plan issued

RECENT AWARDS

Several crime labs have been funded in Pennsylvania including the Penn State Lab and four satellite labs. The state comprehensive plan proposes to equip four Pennsylvania State Police Regional Laboratories, strategically located to overcome the obstacles of time and distance, with the necessary operational equipment and manpower to promptly handle increasing requests for criminal laboratory services on cases submitted by local and state police throughout the Commonwealth. The grant is \$247,474 of which \$119,054 is state contribution and \$128,420 is federal.

RHODE ISLAND

CRIMINAL JUSTICE PLANS - information unavailable

SOUTH CAROLINA

CRIMINAL JUSTICE PLANS - ten year plan is issued

SOUTH DAKOTA

CRIMINAL JUSTICE PLANS - in preparation

RECENT AWARDS

A regional crime lab has been funded and an additional grant of \$250,000 was designated for equipment. There is one state lab at the University of South Dakota Medical School which does the official testing for drugs and blood alcohol, however, firearms evidence is sent directly to the FBI Lab in Washington.

TENNESSEE

CRIMINAL JUSTICE PLANS - plan issued

OTHER ITEMS

In considering the design of a crime lab for the State of Tennessee, the first consideration was given to a delineation of the problem and an effort to determine the needs in the state. To determine needs, a work load had to be determined. One approach was to tie the work load to the number of Part I offenses reported in the State of Tennessee each year according to the FBI Uniform Crime Reports. Another method of measurement was to determine the number of cases for the crime laboratory by the number of sworn police personnel in the state. This would allow for the determination of need based on an average number of laboratory cases submitted per officer per year. Also considering the laboratory itself, the flow of evidence in the criminal justice system was reviewed.

At the time of this survey, the Tennessee Bureau of Criminal Identification has only one full-time laboratory examiner who spends approximately 100% of his time in ballistics examinations. The police agencies in the State of Tennessee rely upon the FBI Crime Laboratory in Washington, D.C.

The plan called for the selection and employment of a Director of the Laboratory by July 31, 1973, to be followed by staffing of personnel. Actual laboratory operations would start by June 1, 1974. The laboratory facility is in Nashville.

TEXAS

CRIMINAL JUSTICE PLANS - plan issued

OTHER ITEMS

Objectives for 1974 are to:

- Provide crime laboratory facilities in three police agencies. The ability to study criminal evidence scientifically is necessary in modern police agencies.
- Provide Department of Public Safety (DPS) regional crime laboratory facilities in three additional locations. Lack of laboratory service has impeded good police work and hindered prosecution of some criminal cases. Ultimately high quality laboratory service should be available in a reasonable driving distance from each police agency in Texas.
- Continue to upgrade service in the DPS headquarters laboratory and nine field laboratories through additional personnel, equipment, and facilities.

Objectives for 1975 are to:

- Improve existing crime laboratory facilities in three local police agencies.
- Provide for additional services in three existing DPS field crime laboratory facilities.

Multiyear forecast by 1978:

- DPS field laboratories will be operating in 12 strategic locations, enabling most police agencies to be within 100 miles of a full-scale chemical laboratory.
- The state's four largest metropolitan areas will have improved crime laboratory service in the central-city police department.
- Evidence technicians will be available from each regional laboratory for technical investigative services to all law enforcement agencies.

TEXAS (Con't)

- Additional technical, investigative, and identification equipment will have been provided to or made available to all police agencies in the state.
- The state will have automated fingerprint identification capability.

CRIME LABORATORIES:

Implementation will be by grants DPS and to units of local government in which a police agency currently is operating a full-scale crime laboratory. Purposes for which grants will be made include:

- recruitment programs on college campuses to secure additional trained chemists and toxicologists;
- employment of additional trained persons of demonstrated that such employment will improve and expand laboratory services;
- purchase of technical equipment to expand capabilities of existing crime laboratories;
- operational costs including materials and personnel travel;
- acquisition of facilities.

UTAH

CRIMINAL JUSTICE PLANS - plan issued

RECENT AWARDS

Four applications are expected from local agencies based upon established regional priorities. One subgrant, projected at \$8,000 will provide evidence collection and processing equipment for Region 2 police agencies. Another subgrant will assist in the development of a technical services division of the Box Elder County Sheriff's Office. Funds will also be expended to improve photography capabilities of police agencies in Iron County, Region 7.

OTHER ITEMS

In 1973, a survey of crime laboratory services for Utah is in the final stages of completion. After an assessment has been made, a determination will then be made for future plans. A long-range objective is to have a comprehensive state system for crime laboratories by 1980 with a turn around time of 24 hours for blood alcohol determinations and a seven-day turn around time for other physical evidence.

At the present time, the University of Utah, Weaver State College, and the State Department of Health are providing some criminalistic services. The state relies heavily on the federal laboratories such as the FBI Lab and DEA Labs. There are also some private consultants who do certain analyses on a consultant basis.

Two applications will be received from state agencies based upon established priorities. One will further develop the services provided to local law enforcement agencies by the Utah Bureau of Identification and the other will continue delivery of forensic laboratory services by the Weber State College Criminalistics Laboratory.

Budget

a. Part C Block Request	\$37,851
b. Part E Block Request	0
c. State Support	2,902
d. Local Support	1,904
e. Other Support	0
f. Program Total	\$42,057
g. Ratio: 90% Federal, 10% State/Local	
h. Prior Funding	

VERMONT

CRIMINAL JUSTICE PLANS - in preparation

OTHER ITEMS

A plan to fund a state forensic science laboratory at Montpelier, Vermont has been approved.

VIRGINIA

CRIMINAL JUSTICE PLANS - plan issued

WASHINGTON

CRIMINAL JUSTICE PLANS - plan issued

OTHER ITEMS

The 1973 Grant Award Program Information of the Comprehensive Plan for Law Enforcement and the Administration of Justice provides for crime laboratory facilities and services as follows:

Program Area D-4 Improve Crime Laboratory Facilities and Services

Objectives

Implement a state-operated, full-service laboratory system which will provide scientific analysis and expert testimony relative to evidence submitted by all law enforcement agencies and prosecuting attorneys.

Develop the capability to provide expert technical assistance in crime scene investigations of serious felonies committed outside major metropolitan areas.

Implementation

Funds will be utilized to provide additional scientific equipment and a full-service criminalistics laboratory in the Seattle area, intended to provide service to all criminal justice agencies in western Washington.

Subgrant Data

One grant of approximately \$250,000 will be awarded to a state agency, pursuant to agreement with Seattle and King County that the project will provide services for the benefit of local agencies to assist in the phased development of a full-service crime laboratory in Seattle. Additional staff personnel also may be employed under this project consistent with the availability of funds.

Special Requirements

1. Any request for funding must be directed toward the continued development of a statewide criminal laboratory system.
2. Any laboratories receiving assistance must be available to law enforcement agencies within the state on a no-charge basis.

Washington, Cont.

3. All crime laboratory facilities must be located within a secure setting.
4. Equipment will be amortized over a five-year period, at which time it becomes the sole property of the grantee free of the conditions of the grant award.

Budget

	<u>LEAA</u>	<u>State, local or other</u>
(1) Part C Block Support	\$170,000	\$ 60,000
(2) Part E Block Support	\$ 0	0
(3) Prior Funding - Carry Forward	<u>\$ 80,000</u>	<u>\$ 30,000</u>
(4) Program Total	\$250,000	\$ 90,000
(5) Prior Funding	\$450,000	\$167,254

WEST VIRGINIA

CRIMINAL JUSTICE PLANS - plan issued

OTHER ITEMS

The 1974 plans include creating mobile laboratories under the auspices of the State Crime Laboratory in South Charleston.

WISCONSIN

CRIMINAL JUSTICE PLANS - plan issued

OTHER ITEMS

Prior to 1974, the State of Wisconsin operated on an ad hoc basis in providing funds for the state and local crime laboratories. A plan has been developed which upgrades the state laboratory in Madison and providing a mobile crime laboratory for the northern part of Wisconsin. This plan also calls for a regional laboratory on the eastern side of the state near Milwaukee.

Factors being considered for funding include the total case load and crime necessary to process evidence.

WYOMING

CRIMINAL JUSTICE PLANS - in preparation

OTHER ITEMS

At the present time in Wyoming, there is no general crime laboratory available to law enforcement agencies. Agencies currently send lab work to the FBI in Washington, D.C.; to eight different locations in Wyoming, none of which has experience, training or specialized equipment for criminalistics; and to five other laboratories outside the state. Uniformity of analysis is thus non-existent and the availability of expert testimony concerning work performed is often untested.

A project for the State of Wyoming will establish a basic forensic laboratory facility in the Division of Criminal Investigation. Included will be purchase of scientific laboratory equipment, necessary supplies and remodeling required for establishment of the laboratory. Estimated completion date is for June 30, 1974.

APPENDIX B

STANDARDS ON SUPPORT SERVICES AS DEFINED BY  
THE NATIONAL ADVISORY COMMISSION ON CRIMINAL JUSTICE  
STANDARDS AND GOALS - JANUARY 1973

Standard 12.1 - The Evidence Technician

Every State and every police agency should acknowledge the importance of efficient identification, collection, and preservation of physical evidence; its accurate and speedy analysis; and its proper presentation in criminal court proceedings. These are essential to professional criminal investigation, increased clearance of criminal cases, and ultimately, the reduction of crime. Every agency should insure the deployment of specially trained personnel to gather physical evidence 24 hours a day.

1. Every police agency immediately should consider the use of specially trained regular patrol officers to devote a maximum of 25 percent of their regular duty time to the location, collection, and preservation of physical evidence.

2. Every police agency with 75 or more personnel should consider immediately the use of specially trained evidence technicians to locate, collect, and preserve physical evidence at crime scenes and to deliver such evidence to the appropriate laboratory facility. These technicians may partially or entirely eliminate the need for deployment of specially trained regular patrol officers in gathering physical evidence.

3. Every police agency should immediately provide for all incoming sworn personnel a formalized basic training course in evidence-gathering techniques to develop the agency's capacity to retrieve and use any physical evidence present at the scene of a criminal investigation. Every sworn officer should then be held responsible for evidence collection in cases where an evidence technician or a specially trained patrol officer is not available.

4. Every police agency with 1,000 or more personnel should immediately maintain a mobile evidence-collection van containing equipment for securing and illuminating large crime scene areas and for storing and preserving physical evidence. The van should be staffed by qualified evidence technicians and should be used for major occurrences.

**CONTINUED**

**1 OF 3**

5. Every police agency should be responsible for its own crime scene searches and should immediately insure that all crime scenes are thoroughly examined for physical evidence, and that all evidence collected is submitted to the appropriate laboratory facility for analysis.

6. Every State should, by 1975, provide specialized training for local evidence technicians on a centralized or regional basis in order to achieve a statewide level of proficiency in the collection of physical evidence.

#### Standard 12.2 - The Crime Laboratory

Every State by 1982 should establish a consolidated criminal laboratory system composed of local, regional, or state facilities capable of providing the most advanced forensic science services to police agencies.

1. Every police agency should immediately insure that it has access to at least one laboratory facility capable of timely and efficient processing of physical evidence and should consider use of each of the following:

a. A local laboratory that provides analysis for high volume, routine cases involving substances such as narcotics, alcohol, and urine; routine analysis and processing of most evidence within 24 hours of its delivery; immediate analysis of certain types of evidence, such as narcotics, where the detention or release of a subject depends upon the analysis; and qualitative field tests and quantitative followup tests of narcotics or dangerous drugs.

b. A regional laboratory (serving an area in excess of 500,000 population where at least 5,000 Part I offenses are reported annually) that provides more sophisticated services than the local laboratory, is situated within 50 miles of any agency it routinely serves, can process or analyze evidence within 24 hours of its delivery, and is staffed with trained teams of evidence technicians to assist in complex investigations beyond the scope of local agencies.

c. A centralized State laboratory that provides highly technical analyses that are beyond the capabilities of local or regional facilities.

2. Every crime laboratory within a police agency should be a part of the organizational entity that includes other support services, and should be directed by an individual who reports only to the agency's chief executive or to a staff authority who reports directly to the chief executive.

3. In maintaining a staff of formally qualified personnel who can provide efficient and reliable assistance in criminal investigations, every crime laboratory should provide that:

a. Every employee responsible for the completion of scientific analyses or testing hold at least an earned baccalaureate degree in chemistry, criminalistics, or closely related field from an accredited institution, and have a thorough working knowledge of laboratory procedures;

b. Every employee performing supervised basic scientific tests or duties of a nonscientific nature meet the agency's requirements for the employment of regular sworn or civilian personnel;

c. The laboratory director be familiar with management techniques necessary to perform his administrative functions satisfactorily;

d. All laboratory personnel be adequately trained and experienced;

e. Civilian personnel be used regularly so sworn personnel may be more appropriately deployed in other assignments, but provide that qualified sworn personnel be used when their abilities or expertise cannot be found elsewhere;

f. The working staff be sufficient to meet the demands of the laboratory caseload;

g. Salaries be commensurate with the specialized duties and qualifications of each position so that well-qualified personnel are attracted to and retained in these positions;

h. Promotional and career paths for laboratory personnel result in salaries at least equal to those employed in other equivalent laboratories; and

i. A clerical pool capable of handling all of the clerical needs of the laboratory be maintained.

4. Every laboratory that employs more than 10 nonclerical personnel also should establish at least one research position for solving specific laboratory problems and developing new laboratory techniques.

5. Every police chief executive should insure that the police laboratory function receives appropriate fiscal support and that the adequacy of its facilities is considered in structuring the agency's annual budget; every laboratory director should be able to assess and control the amount, type, and quality of evidence received by the laboratory.

6. Every police agency laboratory and every regional laboratory should receive from all agencies using its services partial annual support based on the number of sworn personnel employed by each agency, rather than on case costs.

7. Every crime laboratory director should, by 1974, design and implement a reporting system that provides data relative to its involvement in:

- a. Reported crimes;
- b. Investigated crimes;
- c. Suspects identified or located;
- d. Suspects cleared;
- e. Suspects charged;
- f. Prosecutions;
- g. Acquittals; and
- h. Convictions.

8. Every crime laboratory should establish close liaison immediately with:

a. All other elements of the criminal justice system to insure that laboratory findings are consistent with law enforcement needs and are being effectively used as investigative tools;

b. The scientific and academic establishments, to insure use of the latest techniques and devices available to the criminalist and the investigator.

#### Recommendation 12.1 - Certification of Crime Laboratories

It is recommended that a national program be established to insure that all tests and analyses performed by State, regional, or

local laboratory facilities are procedurally sound and scientifically valid. The program should provide for the certification of those facilities whose testing procedures and scientific analyses meet the minimum standards set by the agency administering the program.

1. An existing national agency or organization should be designated to administer the program. This body should develop minimum standards by which it can measure every crime laboratory's level of proficiency.

2. The national agency or organization should conduct periodic evaluations of every State, regional, and local laboratory to determine its level of proficiency in performing laboratory tests. In conducting the evaluation, it should rate the laboratory only on the basis of those tests which it actually performs in rendering services.

3. The national agency or organization should, on the basis of the evaluation, certify every laboratory that meets or exceeds the designated minimum standards in all the tests which it performs.

APPENDIX C

NILECJ FUNDED RESEARCH GRANTS  
(1970-1972)

This appendix contains an alphabetical listing of grants by subject covering the period 1970-1972. Grant numbers, award amounts, grant names and location are provided with a title and project summary of the grant.

SUBJECT: Bioluminescence

Grant Number	Award Amount	Grantee Name and Location
70NI360032	\$38,324	New York City Police Dept. 240 Centre Street New York, NY

Title:

Development of Bioluminescent Narcotic Detector

Project Summary:

The Grantee will select and develop a bioluminescent microbial strain sensitive to heroin under all environmental conditions common to New York City and, upon successful demonstration, produce operational field detectors to be explored to determine the feasibility of developing a sensitive detector for minute traces of heroin in the atmosphere to aid in locating secreted quantities of heroin. (See NI 70-031).

Comments:

The contractual effort applied to this program, advanced the concept of detection by bioluminescence from the feasibility phase to the realistic practicality of field applications. Biosensor sensitivities were enhanced sufficiently to enable detections of dynamite vapors from various package configurations (luggage, cartons). The prime program objectives were met by the detection of heroin vapors from "cutting rooms and walls." Prior to this contract, it was only possible to detect heroin and dynamite vapors from a plastic container through access holes in the container. Biosensors sensitive to marijuana and cocaine vapors were also developed, although not to the extent of being used for field detections.

SUBJECT: Blood

Grant Number	Award Amount	Grantee Name and Location
71NI110105	\$9,426	The Catholic University of America Washington, DC 20017

Title:

Determination of Age of Blood Stains by Non-destructive Methods

Project Summary:

This project seeks to develop a means for determining the age of blood stains after the death of an individual. The study will employ a non-destructive technique, either Mössbauer spectroscopy or electron spin resonance, to measure the age of blood exposed to air or remaining in a cadaver. The assumption underlying these techniques is that one of the blood components, hemoglobin, contains heme, which is an iron porphyrin complex. The grantee will test the hypotheses: (1) that the nature of the bonding between the iron and porphyrin is altered with the passage of time and (2) that the metamorphosis is reproducible. This research will provide police authorities with a more accurate account of the time of death and will also preserve the blood samples for further evaluation through non-destructive analysis.

SUBJECT: Blood

Grant Number	Award Amount	Grantee Name and Location
69NI360042	\$2,780	John Jay College of Criminal Justice New York, New York

Title:  
Adaptation of Scotland Yard Micro-electrophoresis Identification of Subgroups in Dried Blood

Summary:

Study of new techniques for identifying dried blood subgroups to a high resolution.

Comments:

A laboratory manual on a new Scotland Yard Laboratory technique for increasing the identifiable human blood subgroups from about 10 to several thousand was developed under this grant. Workshops to transfer this technology to the U.S. were conducted.

SUBJECT: Blood

Grant Number	Award Amount	Grantee Name and Location
70NI360059	\$39,075	John Jay College of Criminal Justice New York, New York

Title:

The Examination & Typing of Bloodstains in the Crime Lab

Project Summary:

Prior to the development of new technology in England, utilizing electrophoresis analysis, it was possible to identify no more than 12 distinct subgroups of dried blood. This new technology has made possible the identification of several thousand distinct subgroups in dried blood thereby improving the probability of individual identification. In August, 1970, the grantee conducted a workshop for about 20 criminalists from major crime laboratories throughout the nation in order to effectively and quickly introduce this technology in to the American Criminal Justice System. A laboratory manual was produced resulting in the widespread use of this technology in U.S. crime laboratories. Earlier work on this project was performed under 69-053.

SUBJECT: Bloodstains

Grant Number	Award Amount	Grantee Name and Location
69NI360051	\$5,000	Herbert L. MacDonnell & Associates P.O. Box 1111 Corning, NY 14830

Title:

Flight Characteristics & Stain Patterns of Human Blood

Project Summary:

The major objective of this research is a study of the relationship between bloodstain evidence and the mechanism of the act and/or conditions required for its protection. A report summarizing the findings will be issued within one year from the starting date of the investigation.

Comments:

This study provided the criminalist and investigator with simple and useful suggestions and not firm rules. To help reconstruct conditions of bloodstain patterns, an enormous set of empirical results are presented from which information as to the several ways blood formed its patterns can be obtained.

SUBJECT: Bomb

Grant Number	Award Amount	Grantee Name and Location
70NI240031	\$60,000	U.S. Army Land Warfare Laboratory Aberdeen, MD

Title:

Bomb Detection Study & Heroin Detection Feasibility Study

Project Summary:

This proposal is to perform a comparative analysis of three technologies which offer the highest promise to achieve the capability to sense minute quantities of heroin effluent in the atmosphere. This capability will enable law enforcement personnel to determine if a quantity of heroin is secreted in a nearby location. Three technologies which offer possibilities to achieve this goal are bioluminescence, mass spectrometry, and plasma chromatography. Limited Warfare Laboratory will do a comparative analysis of the results of these three technical approaches, which will be the basis of deciding which approach(s), if any, should receive major funding support for development. In addition, the program will experiment with training dogs to sense minute quantities of explosives in the atmosphere to locate clandestine bombs in buildings.

SUBJECT: Chemical Laboratory

Grant Number	Award Amount	Grantee Name and Location
70DF420444	\$120,000	Philadelphia Police Department Headquarters, Franklin Sq. Philadelphia, PA 19106

Title:

Phila. Police Dept., Chemical Laboratory Section

Project Summary:

The Philadelphia Police Department proposes to acquire the modern equipment and additional personnel which will enable the chemical laboratory section to operate at that peak of efficiency necessary for improved law enforcement. Under this program, all units within the chemical lab section would be expanded, either with equipment/personnel or both. For instance, the mobile crime detection unit would be expanded by 10 men and two mobile crime labs enabling that unit to decentralize its operation. This increase in capability would necessarily result in an increase in evidentiary matter to be analyzed necessitating an increase in the capability of the analysis section. Past experience has shown that, of the crime scenes serviced by the mobile unit, approximately 90% were cleared by arrest or investigation. Additionally, neighboring jurisdictions which now request service, free of charge, could be accommodated more quickly and the service requests of the Philadelphia Police Department would not be appreciably curtailed due to lack of manpower or equipment. The evaluation of this project will be accomplished through comparison of those service statistics developed during this grant period with statistic available from prior years.

SUBJECT: Coordinated City & County System

Grant Number	Award Amount	Grantee Name and Location
73DF060010	\$150,000	County of Orange Sheriff's & Police Dept 550 North Flower St. (P.O. Box 449) Santa Ana, California 92702

Title:

Coordinated City & County Regional Criminalistics System

Project Summary:

This award provides support for the development of an improved system for conducting blood alcohol and dangerous drug tests. The basic goal of the system is to reduce crime and a social behavior, and to improve the criminal justice system through more effective utilization of scientific laboratory resources. This award, in the amount of \$150,000, is made under authority contained in section 301 of Public Law 90-351, as amended.

SUBJECT: Crime Control Program

Grant Number	Award Amount	Grantee Name and Location
71DF390495	\$111,527	Ohio Department of Urban Affairs Room 3200, 50 West Broad St. Columbus, OH 43215

Title:

Dayton Metropolitan Scientific Crime Control Program

Project Summary:

This award of \$111,527 is made under police improvement programs F-1, science in law enforcement - expanded laboratory services, as authorized under section 306, Title 1, Omnibus Crime Control and Safe Streets Act of 1968 (Public law 90351), and as described by LEAA, FY 70 guide for discretionary grants. The Dayton Police Department investigated 20,472 part I crimes in 1969 as compared with 11,929 in 1965. Other area law enforcement agencies have been confronted with similar increases. The Dayton Police Department's capability in the area of criminalistics is not sufficient to meet the increased demands for service in Dayton. Other area law enforcement agencies completely lack the sophisticated resources necessary for the scientific collection, preservation, and evaluation of evidence. Police departments, in attempting to modernize their scientific crime control methods, have been confronted with the following problems: 1) a lack of qualified personnel trained in the field of criminalistics, 2) lack of sophisticated laboratory equipment, and 3) lack of technical assistance in the field. After careful analysis of the above problems and the economic factors involved, it became apparent that the formation of a regional crime laboratory centered on a college campus could provide a solution to the above problems. The program's goal is to develop a central crime lab and training program.

SUBJECT: Crime Detection

Grant Number	Award Amount	Grantee Name and Location
72DF040051	\$50,500	Phoenix Police Dept. Phoenix Police Dept. 17 SO 2nd Avenue Phoenix, Arizona 85003

Title:

Comprehensive Scientific Crime Detection System

Project Summary:

This project will sufficiently enhance the current capability of the Phoenix Police Department Crime Laboratory to enable it to accommodate a greatly increased caseload which has risen 838% in the last 5 years. In addition, student criminalists and investigators from all over the state, who study under Phoenix's three teaching criminalists, will benefit from the project through the use of the analytical equipment and familiarization with the capabilities of the crime laboratory. This award of \$50,000 is made under police improvement program F-1, science in law enforcement--expanded laboratory services as described in LEAA FY 1971 Guide for Discretionary Grant Programs and authorized by P.L. 90-351 as amended.

SUBJECT: Crime Lab Expansion

Grant Number	Award Amount	Grantee Name and Location
71DF040674	\$52,700	Arizona Department of Public Safety P.O. Box 6638 Phoenix, AZ 85007

Title:

Department of Public Safety State Crime Lab Expansion Project

Project Summary:

This expansion project for the Department of Public Safety Crime Laboratory will provide much greater service to Arizona's police agencies than is presently available. With LEAA assistance, Arizona will have a full service crime lab, centrally located and available to all agencies. The lab will have well rounded capabilities in nearly all areas of analyzation. The existing facilities will be expanded and additional personnel added. The Department of Public Safety provides all departments with forms which are submitted with all evidence for request of analyzation, in addition to training bulletins on the collection, preservation, and marking of evidence. The director of crime lab maintains current statistics on all cases and will cooperate with any special evaluation programs specified by LEAA.

SUBJECT: Crime Lab Expansion

Grant Number	Award Amount	Grantee Name and Location
71DF050974	\$50,000	Arkansas Medical Examiner Office 4301 West Markham Street Little Rock, AR 72201

Title:

Expansion of Arkansas Medical Examiner Office and Laboratory

Project Summary:

The office of the Arkansas State Medical Examiner was created by Act 321 of 1969 and is charged by law to investigate deaths due to violence including suspected homicides, suicides and accidental deaths or deaths which occur under unusual or suspicious circumstances or suddenly when in apparent good health. Furthermore, the medical examiner is required to establish a laboratory having adequate facilities for conducting pathological, bacteriological and chemical examinations as may be necessary to perform in discharging the duties as prescribed by law.

SUBJECT: Crime Lab Expansion

Grant Number	Award Amount	Grantee Name and Location
70DF060448	\$41,711	Police Dept. of San Francisco 850 Bryant Street San Francisco, CA 94103

Title:

Multifaceted Expanded Laboratory Services for San Francisco

Project Summary:

This project to be undertaken by the city and county of San Francisco involves the San Francisco Police Department's Crime Lab. The program would serve to update equipment of this laboratory and its program in drug narcotic analysis. This equipment would include an infrared spectrophotometer and a gas chromatograph. The program would also include the establishment of procedures used in the operation of the above mentioned instruments for routine analysis as well as experiments. It would also include the development of a library of known data which would be helpful in identifying known and unknown materials principally narcotics, and the known drugs used as hallucinogenics. Many drugs now encountered are manufactured illegally in an illicit laboratory. Their identification is quite complex. Some of these compounds are recognized as drugs on the legal market and others have not been recognized as having any therapeutic value. Identification of these materials is essential before prosecution can be completed. In addition to the problems of drug analysis, the increased use of explosives and incendiaries poses a problem in identification. Both the gas chromatograph and the IR spectrophotometer are extremely useful in the identification of bomb components and residues. Procedures and reference files for this type of operation would also be included.

SUBJECT: Crime Lab Expansion

Grant Number	Award Amount	Grantee Name and Location
71DF090629	\$104,644	Department of Health State of Connecticut Hartford, CT

Title:

Expansion of State Toxicology Lab Facilities and Services

Project Summary:

The ultimate goal of this project is to improve the administration of criminal justice in Connecticut in all its phases detection, apprehension, adjudication and rehabilitation-by improving the operations and procedures of a key element in Connecticut's criminal justice system, namely the provision of criminal laboratory services. The state toxicology laboratory is Connecticut's only official facility for the examination and identification of suspected narcotics and other dangerous drugs and alcohol determination in blood or urine and as such is the key element in the prosecution of cases involving drug abuse and alcohol. It is also the only facility for examination of physiological fluids, hairs, etc. Due to the increasing workload, the laboratory is unable to handle all of the cases submitted to it and the resulting delays have caused the dismissal or nullifying of cases and the subsequent release of arrestees without charge not to mention a waste of resources of the criminal justice system. The proposed project will provide funds for the purchase of new equipment to replace older equipment, now subject to frequent breakdowns, as well as additional equipment. It will also provide funds for the intensive training of seven new scientific personnel to man the new equipment.

SUBJECT: Crime Lab Expansion

Grant Number	Award Amount	Grantee Name and Location
71DF131046	\$79,250	Georgia Dept. of Public Safety P.O. Box 1456 Atlanta, GA 30301

Title:

Expanding the Service Capability of the Ga. State Laboratory

Project Summary:

To assist the state of Georgia in providing additional crime laboratory facilities with emphasis on drug identification. In the last year a severe quantitative deficiency in bench space and staff has opened a two month gap between submission and analysis of drug evidence. Additional floor space (2300 sq. ft.) and staff (6) have been authorized primarily to overcome the backlog of drug cases. A secondary but associated bottle-neck in available transportation particularly to and from court has also occurred and cannot currently be alleviated because of Georgia's budgetary problems. Addition of staff, increase in case load and anticipated additional requests for public relations work in the area of drug abuse will only intensify this secondary problem. Space and rapid training of additional personnel are the backbone of this program and it is felt that only through relatively rapid mechanism of a discretionary grant can the necessary training, bench space, instrumentation, modification of construction and laboratory furniture be brought together in an optimum effort. The practical results will be the elimination of the 2½ month lag period between drug submission and analysis and of the other benefits thereof. Laboratory personnel can then be released for expansion into other areas of laboratory service and the laboratory will have a larger base of trained laboratory.

SUBJECT: Crime Lab Expansion

Grant Number	Award Amount	Grantee Name and Location
70DF180453	\$88,780	Indiana State Police State Office Building Indianapolis, IN

Title:

Expansion of State Police Forensic Laboratory Facilities

Project Summary:

This project will expand the capability of the central laboratory facility of the Indiana State Police, institute four regional labs, and a training and developmental lab in conjunction with Indiana University. The Forensic Laboratories will serve the state police, other state agencies, the state criminal justice system, and local agencies of government. The specific objective of this program is to expand existing services with emphasis on the creation of regional labs to better serve local units of government without laboratory or specialized investigative services. The project in conjunction with Indiana University which will be used to train state and local personnel in forensic techniques. University personnel will also support Forensic Laboratory operations through specialized expertise, methodology, method testing, training and presentation of expert testimony to support forensic technicians.

SUBJECT: Crime Lab Expansion

Grant Number	Award Amount	Grantee Name and Location
70DF210442	\$119,900	Kentucky State Police New State Office Building Frankfort, KY 40601

Title:

Expansion of KY St. Police Crime Laboratory Services

Project Summary:

This project is designed to provide adequate modern equipment for the state police laboratory building which was occupied within the last few months. Some of the existing equipment is almost worn out, and some is outmoded greatly, restricting the capabilities of the staff and facility. Two grants from the Kentucky Crime Commission will provide \$60,000 by the end of 1970, which will provide two new staff people and some minor equipment. Major sophisticated equipment is requested in this project so that adequate analysis can be made of the large number of evidence samples submitted. Automation of film processing in the photographic laboratory is undertaken because of the large volume of films currently being submitted from field officers.

SUBJECT: Crime Lab Expansion

Grant Number	Award Amount	Grantee Name and Location
71DF220574	\$57,700	Calcasieu Parish Sheriff Department Post Office Box V. Lake Charles, LA 70601

Title:

Criminalistics Laboratory: Expansion of Present Facilities

Project Summary:

The Sheriff's Department, Parish of Calcasieu, Louisiana, has limited laboratory equipment to conduct technical analysis for their department only. With additional laboratory equipment and larger facilities, this department will be able to provide technical, criminal laboratory services to the surrounding parishes of Allen, Beauregard, Cameron, Jefferson Davis, and Vernon; as well as municipal police departments in this geographical area, who have already evidenced an interest and willingness to participate in this regional program. In addition, it is proposed to conduct in-service training courses in the collection, identification, and preservation of evidence for experienced law enforcement personnel within this region. These qualified, trained investigators would augment crime investigatory operations on a local and regional level.

SUBJECT: Crime Lab Expansion

Grant Number	Award Amount	Grant Name and Location
72DF250016	\$60,000	Commonwealth of Massachusetts Dept. of Public Safety 1010 Commonwealth Ave. Boston, MA 02215

Title:

PO. Improvement Program - Science in Law Enforcement - Expand Laboratory

Project Summary:

Pending determination under a grant in-progress for forensic science improvement requiring joint study of laboratories (Grant No. 70-006B-IN3JAM) as to requirements for other police laboratories in the commonwealth, this application seeks to provide replacement, additional and new equipment to strengthen the services provided by the Department of Public Safety Laboratory on a continuing basis so that the growth can be in an orderly and reasonable time framework.

SUBJECT: Crime Lab Expansion

Grant Number	Award Amount	Grantee Name and Location
71NI250062	\$2,500	Arthur D. Little Inc. Cambridge, MA

Title:

Evaluation of Crime Laboratory Resource Requirements

Project Summary:

Purpose: Evaluation of Crime Laboratory Resource Requirements

Comments:

The study employed selected data from metropolitan New York City during a time when laboratory activity was low.

SUBJECT: Crime Lab Expansion

Grant Number	Award Number	Grantee Name and Location
71DF271048	\$94,100	Bureau of Criminal Apprehension 1246 University Avenue St. Paul, MN 55104

Title:

Laboratory Service Expansion

Project Summary:

The project plan provides for expansion of the Minnesota Bureau of Criminal Apprehension Laboratory sufficient to provide adequate laboratory services to all Minnesota law enforcement agencies. In addition to improving and expanding overall laboratory capability extensive improvement is planned in the following areas: 1. Improved service in the examination of dangerous drug and narcotic evidence. 2. Expanded service to coroners. 3. Training of law enforcement personnel. 4. Crime scene examination. 5. Research. Since this project is an expansion of an existing service it could be implemented without delay and should produce significant results within six months. The BCA Laboratory has maintained complete records of its activity. Evaluation of the project would be conducted by comparison of case loads, performance and other pertinent data and should illustrate the impact of the project in helping to solve law enforcement problems. The project would utilize the services of experienced laboratory staff members and would require the employment and training of additional personnel.

SUBJECT: Crime Lab Expansion

Grant Number	Award Amount	Grantee Name and Location
70DF290449	\$59,500	St. Louis Metropolitan Police Dept. St. Louis, MO 63103

Title:

Expansion of Laboratory Services

The laboratory division of the Metropolitan Police Department of the City of St. Louis also provides a full range of police laboratory services for 55 full-time police departments in St. Louis County, and for numerous police agencies in St. Charles, Jefferson, and Franklin Counties in Missouri and Madison and St. Clair counties in Illinois. These services are provided without cost to the requesting agencies. The caliber of the work performed and the greater amount of serious crimes reported result in a cost to the requesting agencies. The caliber of the work performed and the greater amount of serious crimes reported result in a significant increase in laboratory work load each year. Financial problems have heretofore deferred introduction of an expanded and improved program of crime scene searches and processing of evidence. This grant request, if approved, will enable the department to provide mobile evidence technician services around-the-clock, a technician training program, four vehicles with police accessories, scientific equipment and supplies, another full-time chemist and additional clerical personnel; and will provide valuable training for police personnel from metropolitan law enforcement agencies.

SUBJECT: Crime Lab Expansion

Grant Number	Award Amount	Grantee Name and Location
70DF370445	\$60,000	State Bureau of Investigation Justice Building Raleigh, NC

Title:

North Carolina State Bureau of Investigation, Comprehensive Statewide Laboratory Improvement Project

Project Summary:

The State Bureau of Investigation is continuing to experience crucial shortages across the entire range of crime laboratory services. After the addition of a fifth chemist, the State Bureau of Investigation Raleigh Control Laboratory has been on an average of 300 cases or two-three months behind schedule. This project's goal is to increase the extent to which scientific laboratory services are available to the State Bureau of Investigation and the 420 police agencies for which it has sole crime lab services responsibility. In requesting two chemists with an administrative assistant/secretary for the control office (Raleigh) and two mobile crime labs with two technicians for serving crime lab needs in the state, emphasis is upon upgrading and expanding the service ratios and scope of the state's most important crime laboratory. In addition to serving immediate needs, the mobile labs will be made available to local police training academies and community colleges to aid in better training general practitioners in recognition, preservation and collection of evidence. Plans include using the central lab as a technician training center for those in charge of the mobile labs. Our objective is to create a readily responsive and comprehensive lab service to the entire state and capable of offering the full range of criminal investigation needs, including all major felonies, narcotics and drug abuse enforcement, and other offenses.

SUBJECT: Crime Lab Expansion

Grant Number	Award Amount	Grantee Name and Location
70DF330443	\$26,500	New Hampshire Division of State Police Concord, NH 03301

Title:

Expand State Police Criminal Laboratory Staff and Services

Project Summary:

The project involves the creation of three new positions in the state police crime laboratory. They will perform the functions of their positions as they relate to the analysis or other examinations peculiar to a criminal laboratory. The administrative requirements of reports, analysis documentation and filing will be accomplished by clerical assistance not now available. In addition, certain equipment needed to perform the required analysis and examinations would be obtained and would be maintained within the crime laboratory. At the present, these experiments and analysis must be accomplished on the equipment of another state agency in another part of the city at a time when it is not being used by that agency. As the crime laboratory serves all law enforcement in the state, this project should result in less "down time", greater emphasis on the technical aspect of investigations, and better trained field investigators. The state police would be able to provide laboratory services more efficiently, effectively and expeditiously. They would be self-sufficient in ability to perform analysis and examination in the area of drugs and related substances.

SUBJECT: Crime Lab Expansion

Grant Number	Award Amount	Grantee Name and Location
70DF340446	\$120,000	Dept. of Law & Public Safety Box 68 Trenton, NJ 08625

Title:

Expansion of Central Laboratory and Establishment of Region

Project Summary:

A plan of action to begin filling the existing void in the field of forensic science for the State of New Jersey by the New Jersey State Police has been set forth in this application. The objectives meet with the recommendations which have been set forth by the various commissions studying the criminal justice system in this country. We note, as an example, the President's Commission on Law Enforcement and Administration of Justice. The establishment of new laboratories and expansion of existing facilities are directly recommended. The problems being faced in the State of New Jersey in respect to crime are continually reflected in the ever increasing workload of the Forensic Sciences Bureau of the New Jersey State Police. The narcotic problem in particular has put an extremely heavy burden on the laboratory. The planned central laboratory expansion and establishment of the Region-North Laboratory at Little Falls and the Region - South Lab at Hammonton will afford crime lab services and training in areas of immediate need. A continuing regionalization program is planned. New Jersey State Police Forensic Sciences Lab System will give the state of N.J. a uniquely coordinated network of evidence examination facilities; it will afford standardization of methods and training and availability of a wealth of expertise in every phase of criminalistics.

SUBJECT: Crime Lab Expansion

Grant Number	Award Amount	Grantee Name and Location
72DF340007	\$120,000	Dept. of Law & Public Safety Box 68 West Trenton, NJ 08625

Title:

Expansion of Central Lab. & Establishment of Regional Labs.

Project Summary:

A continuing project which, upon total attainment of project goals, will satisfy the vital need for rapid and efficient scientific services by the 600 law enforcement agencies of the State of New Jersey. Partial project implementation accomplished during the grant year 1970, resulted in significant gains toward improving the efficiency of existing laboratory services by expansion of central laboratory facilities in the areas of staffing, equipment and space. These gains were recorded despite ever-increasing crime counts which resulted in the dramatic growth of requests for laboratory services by the police of the state. Construction of regional laboratories north and south during the period of August, 1971 through July, 1972 will satisfy the need of immediacy necessary to attain the degree of efficiency required for effective scientific services. The training phase of the project, which was initiated during the past grant year, will be continued and expanded to include those police officers whose jurisdiction is within regional laboratory service areas and will be geared toward improving current police methods in the recognition, collection, preservation and submission of evidential materials for scientific analysis.

SUBJECT: Crime Lab Expansion

Grant Number	Award Amount	Grantee Name and Location
71DF440526	\$56,147	R.I. Governor's Committee on Crime 265 Melrose Street Providence, RI

Title:

Expanded Laboratory Services and Police Training Program

Project Summary:

The purpose of this project is to increase the extent to which the University of Rhode Island Laboratory for Scientific Criminal Investigation can serve as a training and service activity for the police improvement programs of the state. The impact and results of the overall program will give various law enforcement agencies of the State of Rhode Island continued and expanded service in the area of examination of physical and biological forms of evidence and assure law enforcement agencies that they will continue to have investigators who are well trained in the collection, preservation and transmission of evidence and who are capable of conducting certain vital tests at the scene of a crime. These goals will be attained through the expansion and increased staffing of the laboratories for scientific criminal investigation and through the reestablishment of the police training school. The training course will be conducted according to the highest standards of instruction. It will be evaluated by faculty, student trainees and various law enforcement officials throughout the state.

SUBJECT: Crime Lab Expansion

Grant Number	Award Amount	Grantee Name and Location
72DF440039	\$63,270	University of Rhode Island Kingston, Rhode Island

Title:

Expanded Lab Services & Police Training Program

Project Summary:

The purpose of this project is to increase the extent to which the University of Rhode Island Laboratory for Scientific Criminal Investigation can serve as a training and service activity for the police improvement programs of the state. The impact and results of the overall program will give various law enforcement agencies of the state of Rhode Island continued and expanded service in the area of examination of physical and biological forms of evidence and assure law enforcement agencies that they will continue to have investigators who are well trained in the collection, preservation, and transmission of evidence, and who are capable of conducting certain vital tests at the scene of a crime. The project will provide 208 hours of training to a minimum of 55 state and local law enforcement officers. As a continuation, it will allow the maintenance of the present staff which in turn should be able to handle 25 percent more cases during the project period. Finally, the project will provide the staff of the crime lab the opportunity to research and refine present evidence analysis techniques. This award of \$63,270 is made under police improvement programs F-1, science in law enforcement--expanded laboratory services, as authorized under section 305, Title 1, omnibus crime control and safe streets act of 1968 (Public Law 90-351), and as described by LEAA, Fiscal Year 1971.

SUBJECT: Crime Lab Expansion

Grant Number	Award Amount	Grantee Name and Location
72DF450026	\$225,000	South Carolina Law Enforcement Division Broad River Road P.O. Box 1166 Columbia, SC 29202

Title:

Expansion of Criminalistic & Forensic Science Capabilities

Project Summary:

This award, in the amount of \$225,000 to the subgrantee, the South Carolina Law Enforcement Division (SLED), will provide for improved and expanded technical training and laboratory facilities at the SLED Headquarters in Columbia. The project will enable SLED to engage in the training of: South Carolina Criminal Justice Academy students in basic crime laboratory functions; experienced officers in investigative and evidence-gathering techniques; local officers receiving training through the SLED narcotics training schools; and the technical officers from the larger state criminal justice agencies in advanced laboratory techniques. Periodic seminars for criminal justice agencies will be held to introduce new criminalistic procedures and forensic science techniques. The laboratory will be used continuously for research and the development of new techniques in analysis and technical training. An expanded laboratory staff will be able to reduce a considerable backlog of criminalistic and forensic analyses, as well as reduce normal processing time in evidence analysis. This is a discretionary grant pursuant to the authority of section 306 of P.L. 90-351, as amended, and program F-1 (Science in Law Enforcement - Expanded Laboratory Services) of the police improvement programs section as specified in the FY 1971 guide for discretionary grant programs.

SUBJECT: Crime Lab Expansion

Grant Number	Award Amount	Grantee Name and Location
72DF 480012	\$43,409	Fort Worth Police Department 1000 Throckmorton Fort Worth, Tx. 76102

Title:

Expanded Crime Laboratory Service

Project Summary:

This project will expand the current capability of the Fort Worth, Texas, Police Department Criminalistics Laboratory through the employment of additional criminalists and acquisition of additional analytical, polygraph, and photographic equipment. The original workload of the laboratory has increased 250% in the last few years, particularly in the area of narcotics and dangerous drug analyses, and this has resulted in a backlog of laboratory work which hampers prompt examination of many serious offenses, and has necessitated the assigning of low priorities to the needs of "outside" agencies. This grant award will enable the Fort Worth Police Department to make prompt and efficient laboratory services readily available to surrounding jurisdictions in addition to its own. This award of \$43,409 is made under Police Improvement Program F-1, Science in Law Enforcement--expanded laboratory services as described in LEAA fiscal year 1971 guide for discretionary grant programs and as authorized by P.L. 90-351, as amended.

SUBJECT: Crime Lab Expansion

Grant Number	Award Amount	Grantee Name and Location
71DF500496	\$24,500	Governor's Commission on Crime Control 43 State Street Montpelier, VT 05602

Title:

Expansion of Forensic Laboratory Services--Vermont

Project Summary:

This award of \$24,500 is made under police improvement program F-1, science in law enforcement--expanded laboratory services, as authorized under Section 306, Title I, Omnibus Crime Control and Safe Streets Act of 1968 (Public Law 90-351), and as described by LEAA, fiscal year 1970 "Guide For Discretionary Grants." Presently, Vermont law enforcement agencies lack the facilities of a complete, centralized forensic laboratory and must depend upon federal agencies or neighboring states for needed examinations. This is especially apparent in the area of chemistry and toxicology. The project outlined in this discretionary grant proposal is a part of an overall program which will provide Vermont with a centralized laboratory under the department of public safety which is available to all Vermont law enforcement agencies. The overall six-year program is divided into two three-year phases. Phase one is designed to build the service capability of the laboratory through equipment acquisition minimizing the increase in personnel. Fingerprint and photographic capabilities to meet current demands. This grant proposal is designed to meet a part of the cost of the second year of the overall project, and it will be used to complete the major equipment requirements.

SUBJECT: Crime Lab Expansion

Grant Number	Award Amount	Grantee Name and Location
70DF780454	\$25,000	Department of Public Safety P.O. Box 902 St. Thomas, VI 00801

Title:

Expanded Laboratory Services and Training of Narcotics

Project Summary:

Funding for this program is being requested specifically to provide the department's mobile crime laboratory with additional equipment which is essential for the testing of heroin and which cannot be acquired as surplus material from the United States government. The grant is also being requested to provide for the contracted services of an expert who will conduct a comprehensive training program for 100 police officers having investigatory or enforcement responsibilities in narcotics cases. It should be pointed out that this grant is being requested not to initiate a new program, but rather to supplement the equipment within the mobile unit which has already been approved as a project by the Law Enforcement Assistance Administration. The unit is on order and delivery to the department of public safety is expected in the near future. The Virgin Islands are the unwilling witnesses of an increasing wave of narcotic and drug laws abuse. The trained manpower and equipment required to combat the problem are severely lacking.

SUBJECT: Crime Lab Expansion

Grant Number	Award Amount	Grantee Name and Location
71DF540620	\$120,000	Department of Public Safety Room 146, Capitol Building Charleston, WV 25305

Title: State Police Crime Lab Expansion - West Virginia

Project Summary:

This plan is three-fold in nature. It calls for expansion and improvement of the chemical and fingerprint sections of our state criminalistic laboratory. In the chemical section this plan will provide all law enforcement agencies in the state of West Virginia with services in laboratory examination and related services, increase the amount of time which is devoted to drug-identification and research on new methods, increase our capacity to handle routine criminalistic procedures, such as blood grouping, paint, hair and fiber comparisons, and provide a complete analyses in toxicology which are presently on a limited basis. By improving our services in drug ID and routine criminalistics, law enf. agencies submitting evidence can expect answers in a reasonable time to permit them to follow up with their investigation. With the toxicological analyses which are not provided now we can expect answers for many deaths which are now labeled "unknown or natural causes." These improvements will require three additional chemists and additional equipment. The fingerprint section is presently staffed with two men who examine evidence, compare fingerprints, footwear evidence, and make field trips to assist investigating officers. Additional equipment and personnel will enable this section of the laboratory to give more assistance to field personnel.

SUBJECT: Crime Lab Expansion

Grant Number	Award Amount	Grantee Name and Location
72DF050004	\$166,684	Wisconsin SPA Subgrantee City of Milwaukee Health Department

Title:

Expansion of Forensic Laboratory Services

Project Summary:

Establish a complete, efficient, effective and responsive lab service devoted to identification of all narcotics and dangerous drugs and make service available to police agencies.

SUBJECT: Criminal Justice Center

Grant Number	Award Amount	Grantee Name and Location
71DF010795	\$99,475	Jefferson County Commission Jefferson County Birmingham, AL 35203

Title:

Regional Criminal Justice Center (Alabama-Region III)

Project Summary:

The Jefferson County Board of Commissioners has resolved to provide support to a plan to develop a regional criminal justice center in anticipation of making application to LEAA for funds to construct a pilot facility which would provide supporting services to law enforcement agencies within the eight counties comprising the region three law enforcement planning. Discretionary funds will be used to provide a feasibility study and comprehensive plan for the construction of facilities and a program for the operation of a regional criminal justice center which would provide the services of (1) training and education of law officers, (2) information system and communications, (3) corrections, including security detention and rehabilitation, and (4) forensic science- criminalistic and medical examinations. Planning will include the development of coordinated programs for the cooperative regional use of services and facilities within authoritative bounds, feasibility, site selector, design efforts, preliminary architectural specification drawings, staff coordination of the planning requirements, public project promotion, and a program for operation of the center including the staffing, budget requirements, and instructional requirements for promoting the use of the facility.

SUBJECT: Criminalistic Laboratory

Grant Number	Award Amount	Grantee Name and Location
72DF350028	\$27,596	Albuquerque Police Department 401 Marquette, N.W. Albuquerque, NM 87103

Title:

Survey for Regional Criminalistic Laboratory

Project Summary:

The Albuquerque Police Department recently organized a technical services division, which will eventually include all photographic laboratory and criminalistic laboratory services. We propose that a survey be conducted by a qualified criminalist, over approximately a one-year period, to gather pertinent data that will be used when initiating the actual crime lab project. This survey should include: (1) needs for services of a regional criminalistic laboratory, (2) similar operations in other areas, (3) local support available, and (4) hardware and personnel needs. At the same time, the criminalist will work directly with the APD on analyses related to current crime cases. This project will complement a block grant commitment by the State of New Mexico to the statewide needs for a criminalistic laboratory. We expect to eventually set up a complete regional crime laboratory that will handle a large volume of varied evidence for analysis, resulting in an increased level of successful prosecution. Evaluation will be performed mainly by a UNM agency that will be handling similar evaluations of LEAA projects in Albuquerque. This agency will not be involved in the actual survey.

SUBJECT: Criminalistics Examination

Grant Number	Award Amount	Grantee Name and Location
72DF310010	\$78,687	Omaha Police Division 505 South 15th St. Omaha, Nebraska 68102 402-348-6600

Title:

Community Based Resources for Criminalistics Examination

Project Summary:

The proposal seeks federal funds to provide readily attainable evidence examination at the local level and thereby to increase scientific evidence utilization in the courts and other criminal justice agencies. Funds would provide for the salary of a criminalist, basic equipment, evaluation costs, etc. The project is unique in that it proposes to develop forensic science services for the Omaha-Douglas County Criminal Justice Agencies by utilizing existing laboratory resources. A formal arrangement with various laboratories would take advantage of the already existing brainpower, equipment, facilities which would otherwise go untapped. The project may result in substantial improvements in terms of laboratory services and the process may serve as a model for other communities. Most laboratories, for example, are overburdened by drug analysis and are forced to ignore or delay examination of serious crimes. "Farming out" drug analysis to another laboratory (Lutheran Hospital) may allow the criminalist and his laboratory to devote its time to examinations of evidence directly related to Part 1 crimes. Because there will be no necessity for elaborate equipment buying and facilities exclusively for the police department, there should be substantial savings financially.

SUBJECT: Criminalistics Operations

Grant Number	Award Amount	Grantee Name and Location
60NI290044	\$100,000	Midwest Research Institute 425 Volker Boulevard Kansas City, MO 64110

Title:

A Systems Analysis of Criminalistics Operations

Project Summary:

This study will be a comprehensive systems analysis of the crime laboratory in law enforcement and criminal justice. Emphasis will be placed on quantifying the knowledge of present experts in criminalistics so as to allow a structured approach to both enhance and multiply this expertise to the benefit of all areas of the country. The primary goal of the study is to recommend systems of criminalistics operations that would meet cost/benefit criteria while serving the needs of local communities, regional areas and the nation.

Comments:

This is an excellent study which offers procedures which have general applicability and utility for planning purposes.

SUBJECT: Criminalistics System Improvement

Grant Number	Award Amount	Grantee Name and Location
73DF290007	\$46,670	Kansas City, Missouri Police Department 1125 Locust Kansas City, MO 64106 Tel. (861) 842-6525

Title:

Criminalistics System Improvement

Project Summary:

The project is designed to maximize material analytical capability locally and increase participation in the resolution of the specific offenses of homicide, rape and burglary. The impact will be major within the police and court components of the criminal justice system. These components will be serviced upon demand on location with out respect for geographical or functional boundaries. This additional capability will impact on the quality of convictions and expedite egress from the system of those wrongly accused. The award of \$46,670 for this project is made under the national scope program as described in the FY 1973 guide for discretionary grant programs and as authorized under public law 90-351, as amended.

SUBJECT: Dangerous Drugs

Grant Number	Award Amount	Grantee Name and Location
72DF100036	\$43,780	Dept. of Health & Social Services 3000 Newport Gap Pike Wilmington, Dela. 19808 303-998-0453

Title:

Upgrading Analysis of Narcotics and Dangerous Drugs Phase II

Project Summary:

The refunding of this grant will provide for an expansion of the existing crime laboratory and increase its capability to deal with the increased requests for drug analyses. The number of submissions surged from 1,007 requests in 1969 to 5,173 in 1971. The provision of two forensic chemists (a third will be hired with block grant action funds supplementing this discretionary award), existing backlog. The project seeks to analyze and report within seven days up to 90% of the drug cases submitted and complete and report the remaining cases within 30 days. This effort should significantly reduce the time to trial in drug cases. This project is refunded under program F-1, science in law enforcement-expanded laboratory services, of the fiscal year 1971 guide for discretionary grant programs for a total of \$43,780.

SUBJECT: Death

Grant Number	Award Amount	Grant Name and Location
72DF060037	\$12,963	Board of Supervisors, County of Los Angeles Hall of Administration 500 West Temple Street Los Angeles, CA 90012

Title:

Seminar On Death Investigation

Project Summary:

The intent of this proposal is to provide for interdisciplinary and multi-area approaches to death investigation, principally homicide. One of the requisites is to bring together some of the outstanding authorities in the areas of forensic pathology, field investigation and coroner's toxicology to a workshop setting of a large, modern medical examiner's facilities. A setting will then be provided for law enforcement officials and scientists to convene in an atmosphere conducive to the exchange of information on, and to present, new concepts and methodologies in death investigation through the multi-disciplinary approach. A syllabus will be published as a result of the meeting which can be disseminated by LEAA to interested law enforcement agencies throughout the country. Currently it is planned to conduct this seminar in Los Angeles, May 25-28, 1972. Over 150 persons, primarily from throughout California, are to be invited.

SUBJECT: Dermatoglyphics and Crime

Grant Number	Award Amount	Grantee Name and Location
71NI250128	\$79,900	Behavioral Sciences Foundation 275 Charles Street Boston, MA 02114

Title:

Dermatoglyphics and Crime

Project Summary:

The association between violent behavior and sex chromosome aberrations have been known since 1965. This project proposes to examine thousands of fingerprints in both the general and the offender populations in order to test the feasibility of using fingerprints as a rough index to identify individuals who are most likely to exhibit chromosomal aberrations. In previous studies 50% of those with aberrant fingerprints have exhibited chromosomal anomalies. Thus, screening via fingerprints offers an inexpensive and efficient method to establish the incidence of chromosomal aberration. Fingerprints may very well prove to be a better prediction of behavior than a blood sample culture - the usual method of determining chromosomal aberrations.

SUBJECT: Detection of Trace Organics

Grant Number	Award Amount	Grantee Name and Location
73NI990054IA	\$125,000	Atomic Energy Commission Washington, DC

Title:

Detection of Trace Organics

Project Summary:

The major emphasis of this project is on the detection of trace inorganic constituents of the atmosphere. It is important to develop techniques for the detection of trace organic constituents for several reasons: organic traces can react with oxides of nitrogen to produce deleterious oxidants, organic traces can be involved in heteromolecular nucleation processes resulting in optically active and respirable aerosols and trace organics themselves can be carcinogenic and/or mutagenic. The objective of this study is to develop techniques for detecting trace amounts of these organic compounds.

SUBJECT: Document Service

Grant Number	Award Amount	Grantee Name and Location
72DF220056	\$56,747	Northwest Criminalistics Laboratory P.O. Box 534 Shreveport, LA 71162

Title:

Establish a Comprehensive Questioned Document Service For Law Enforcement

Project Summary:

The objective of this project is to establish a document service to assist police agencies in Louisiana. It is recognized that there are only a few highly trained document examiners in the United States. There is no comprehensive document service available to law enforcement officers in the State of Louisiana. This service is badly needed in the general areas of forgery and to assist the recently formed investigative bodies dealing with organized crime and drugs. For example, drug investigations often involve forged prescriptions which need immediate analyses. The training in this case will be very extensive to ensure that it will produce a highly qualified document examiner. The training will include handwriting analysis, typewriter analysis, ink analysis, paper analysis, and miscellaneous analysis (including examination of rubber stamp, postage stamp, decipherment of charred and water soaked documents, adding machines, checkwriters, etc.). Most of the training will be done on an individual basis with Mr. James Kelly in the Atlanta, Georgia Crime Laboratory. Mr. Kelly is one of the nation's best document examiners. Several other training seminars will be attended to learn specialized subjects such as the photography of questioned documents. Mr. Bobby Foley, who has a master's degree in the field of chemistry, has much more academic training than all but a very few of the nation's document examiners.

SUBJECT: Drug Control

Grant Number	Award Amount	Grantee Name and Location
71DF530550	\$100,000	Washington State Patrol 913 Capitol Center Building Olympia, WA

Title:

Initial Organization and Development of the Drug Control Assistance Unit

Project Summary:

The Drug Control Assistance Unit of the Washington State Patrol was created by an act of the Washington State Legislature, February 19, 1970. This law requires the Drug Control Assistance Unit to provide investigative services for drug law enforcement, provide laboratory services for all crime investigation, provide training assistance for local law enforcement personnel and establish a drug abuser intelligence system. The legislature provided \$150,000 for the Drug Control Assistance Unit until July 1, 1971. The major orientation of the Drug Control Assistance Unit will be to provide services to local law enforcement as they request it, emphasizing the responsibility and control of the local jurisdiction. We propose to provide drug testing laboratory services during the first year, expanding this into a complete crime laboratory system as additional funds become available. It is important to note that our goal in laboratory development is to incorporate and consolidate with existing laboratory systems to avoid duplication of manpower and equipment. Investigators for the Drug Control Assistance Unit will be principally undercover, thus supplying an unmet need of most local law enforcement agencies. Our training will be directed not only at our own personnel but also to all criminal drug investigators in the state.

SUBJECT: Drug

Grant Number	Award Amount	Grantee Name and Location
72DF100016	\$250,000	Dept of Health & Social Services Div of Drug Abuse Control 3000 Newport Gap Pike Wilmington, DEL

Title:

Criminal Justice Drug Treatment Project

Project Summary:

The criminal justice drug treatment project, also referred to as treatment alternatives to street crime, is designed as one part of a comprehensive multi-modality approach to drug abuse prevention and treatment being conducted by the State of Delaware. The project is a pilot being conducted through the cooperation of the state, city, public and private agencies, and the U.S. Special Office for Drug Abuse Prevention. The project addresses itself to the problem of handling the drug abuser in the criminal justice system where incarceration is represented as the principal means of control. The broad effects of providing this treatment alternative to incarceration will be the reduction of drug abuse related crime and a reduction in the recidivism rate of drug abuse related crime, therefore, providing both a service to the drug abuser and protection for the community. To accomplish the goals of the project, two major tasks are necessary: 1. To develop an experimental drug addict and abuser identification, screening, and referral system within the confines of the Wilmington Criminal Justice System. 2. To develop, expand, and upgrade the treatment services administered or coordinated by the State Office of Drug Abuse Control (SODAC) in order to meet the increased demand such identification, screening and referral will create.

SUBJECT: Drugs

Grant Number	Award Amount	Grantee Name and Location
71NI240119	\$45,000	US Army Land Warfare Lab Director US Army Land Warfare Lab Aberdeen Proving Ground, MD 21005

Title:

Detection of Narcotics by Dogs

Project Summary:

Additional funding is provided the grantee of an earlier award (71 179) to continue investigating the feasibility of training dogs to detect heroin. The experimental training program consists of two phases. In Phase 1, the dog was trained to detect and respond to heroin. In Phase 2, the dog was tested for its ability to respond under conditions that closely approximated actual operational conditions.

Practical Application: It has been emphasized that there is much less odor emitted by heroin and cocaine than is emitted by marijuana, opium or hashish. Although the basic training principles and maintenance procedures presented in the manual apply to both groups of drugs, there are some fundamental differences in the practical application of these principles.

- (1) Special care must be taken when working with training samples of heroin and cocaine. Such extreme care is not necessary when dealing with training samples of the more odorous drug group.
- (2) The dog must work more thoroughly in order to detect heroin and cocaine. The time required to detect a sample of heroin as opposed to a sample of marijuana may be tenfold.
- (3) Heroin is the most difficult drug to train a dog to detect.

SUBJECT: Drugs

Grant Number	Award Amount	Grantee Name and Location
71NI350159	\$19,000	UCLA Los Alamos Scientific Lab Los Alamos Scientific Lab Los Alamos, New Mexico

Title:

Evaluation of a Heroin Detector

Project Summary:

This project, comprising the work of Contract No. DAAD05-71-C-0109, entitled Illicit Drug Detection, was begun on 1 Oct. 1970. The project was directed to explore the utility of the membrane separator-mass spectrometer system for the detection of heroin. Two such systems having substantially the same inlet configurations have been used during the course of the project. The first of these was a Varian M-66 cylindrical mass spectrometer equipped with a three stage membrane separator for sample inlet. The second was a highly modified quadrupole mass spectrometer originally furnished by the Finnigan Instrument Corp. and developed for use with a three stage separator by Varian under contract with the U.S. Army Land Warfare Lab. The latter instrument is a transportable instrument able to operate in a field environment without the massive arrangements usually associated with mass spectrometer systems.

Also filed under Heroin

SUBJECT: Drugs

Grant Number	Award Amount	Grantee Name and Location
71NI240001	\$15,000	U.S. Army Warfare Lab. Aberdeen, MD

Title:

Heroin Detection Feasibility Study

Project Summary:

The objective of this continuation project (NI 70-031) is to conduct a series of preliminary tests to establish the technical feasibility of detecting processed heroin by using either the mass spectrometer or the plasma chromatography instrument.

Also filed under Heroin

SUBJECT: Identification of Marihuana

Grant Number	Award Amount	Grantee Name and Location
70-0650PG-24	\$10,000	Campus Research Office University of California Berkeley, California

Title:

Identification of Marihuana in Blood, Urine, and Saliva

Project Summary:

The intent of this program was the development of a chemical test for marihuana and hashish. The main result of the research, however, was the extraction, recovery and assay of a considerable amount of crude cannabinoid substance.

SUBJECT: Drugs

Grant Number	Award Amount	Grantee Name and Location
7ONI480056	\$88,657	The University of Texas Medical Branch Galveston, TX 77550

Title:

Marihuana: The Effects of its Chronic Use on Brain Functioning

Project Summary:

This interdisciplinary research will provide objective data for evaluating the effects of the chronic use of marihuana on brain functioning and behavior. Some of the more specific experiments include: a study of the dose-response relationship between electroencephalogram patterns and concomitant spontaneous behavior in cats; the combined effects of marihuana and other commonly used drugs such as alcohol, LSD and amphetamines on brain functioning and behavior; a comparison of personality, family and developmental history and psychophysiological factors among adolescent marihuana users and non-users; and a study of the genetic effects, if any, related to the chronic use of marihuana.

Also filed under Marihuana

SUBJECT: Drugs

Grant Number	Award Amount	Grantee Name and Location
71NI240088	\$29,012	Huntingdon Research Center P.O. Box 6857 Baltimore, MD 21204

Title: New Methodology for the Detection of Heroin & Related Drugs

Project Summary:

With the proliferation of drug addiction rehabilitation programs in the past year the inadequacies of the various types of urinalysis and the use of nalline to detect the presence of drugs in the body has been high-lighted. N.I.M.H. is presently conducting a survey of urinalysis methods in an attempt to differentiate the most effective procedures. However, any type of urinalysis presents major drawbacks. Expertise is required and is not always readily available. The process is cumbersome, undignified and expensive. Many treatment units have compromised by doing spot checks rather than the daily analysis which should ideally be the case. When the heroin on the street is of poor quality only the quinine with which it is cut shows up in the urinalysis if much time has elapsed since injection of the drug. This could lead to false accusations since the presence of quinine could be due to drinking gin and tonic or taking bromoquinine for a cold. The use of nalline presents many similar disadvantages. It will be cheap, portable and require no expertise to administer. Saliva rather than urine could be used and it is a method that can be applied to all drugs including marihuana.

Also filed under Heroin.

SUBJECT: Equipment

Grant Number	Award Amount	Grantee Name and Location
71DF150536	\$6,558	Honolulu Police Department 1455 S. Beretania St. Honolulu, HI 96814

Title:

Specialized Crime Laboratory Equipment for Honolulu P.D.

Project Summary:

The workload of the Honolulu Police Department's Crime Laboratory, which supports the police departments of the other counties in the state, as well as criminalistics requests for the federal and military agencies in the state and the Pacific basin area, has increased 550% in the last decade. Areas of competence are increasing at a rapid rate, thus necessitating specialized competencies among the staff. There is an immediate need to secure the services of additional forensic personnel, and to upgrade the facilities and equipment of the present crime laboratory if it is to continue servicing the criminalistics needs of the state and Pacific basin area. The long range objectives of this program are to: (1) increase the performance capabilities of the crime laboratory; and (2) establish a training program conducted by the forensic staff to prepare duty officers in the performance of elementary examinations and instrument analysis in order to free the forensic staff for more sophisticated work. This application is therefore being submitted to immediately upgrade the equipment of the present laboratory.

SUBJECT: Evidence

Grant Number	Award Amount	Grantee Name and Location
71NI060054	\$2,000	Joseph L. Peterson 2033 Haste Street, #207 Berkeley, CA 94704

Title:

Decision Making Model for the Physical Evidence Collection Process

Project Summary:

The criminalistics laboratory supplies information to various agencies of the criminal justice system through the analysis of physical trace material. This natural science discipline makes use of updated technologies and primarily focuses on questions of identification and individualization. Our legal framework places considerable faith in the results of such scientific determinations, although, operationally, law enforcement agents continue to depend on more "non-physical" methods of investigation and proof. In most jurisdictions, also, the criminalist in the laboratory must depend upon law enforcement agents to supply him with the collected materials from crime scenes. This delegation of information collection functions to "nonscientific" personnel has created a condition which seriously challenges the overall objectivity of the laboratory. It appears to this student that the most critical questions in this area of criminal justice are not "laboratory oriented," but centered in the decision processes which culminate in evidence being considered for analysis. A three month field study in 1969 (Parker and Peterson) determined that crime sites could yield large quantities of "physical evidence" but that most of it is screened out by police personnel. To date, no one has seriously attacked the question of how this screening occurs. This is the focus of this study.

Comments:

This study has had a great impact on the forensic science community and has been the source of many studies throughout the country. The intent is to utilize more fully the evidence-gathering capability of crime-scene investigators and channel the evidence to the forensic labs for scientific examination and analysis.

SUBJECT: Evidence

Grant Number	Award Amount	Grantee Name and Location
72DF295003	\$40,000	St. Louis Metro Police Dept. 1200 Clark Ave. St. Louis, Missouri 63103

Title:

Expand Evidence Technician Unit

Project Summary:

A number of years ago, O.W. Wilson recommended that police departments form evidence technician units which would have special skills and training in perceiving, collecting, and preserving physical evidence. In October 1970 the St. Louis Metropolitan Police Department established a twenty-man unit of specially trained police officer evidence specialists and commenced a program of round-the-clock evidence collection assistance. The unit, known as the Evidence Technician Unit (ETU), operates three evidence collection vans, one in each of the city's three police field operations "areas." A fourth van is used as a backup whenever any of the others is out of service for maintenance or repairs. At the same time as the formation of the ETU, the facilities and staff of the crime laboratory were expanded to accommodate the increased volume of evidence specimens.

SUBJECT: Evidence

Grant Number	Award Amount	Grantee Name and Location
73DF010043	\$60,000	St. Dept. of Toxicology & Crim. Invest. P.O. 231 Wire Road Auburn, Alabama

Title:

Improving Physical Evidence Utilization in Criminal Justice

Project Summary:

This award, in the amount of \$60,000, to the subgrantee, the Alabama State Department of Toxicology and Criminal Investigation will provide for a project to improve the impact of physical evidence on criminal justice in Alabama. The basic goal of the project is to be accomplished by providing training in criminalistics, and developing expertise at the scene of the crime and within the crime laboratory. It is anticipated that the impact of this project will: (1) significantly increase the generation and receipt of worthwhile evidence by the crime laboratory; (2) provide for a shorter turn-around time for cases involving physical evidence; and, (4) provide for an overall improvement in crime scene investigation. The project will be evaluated by extensive studies of records kept by the department of toxicology and criminal investigation and further studies of local police records.

SUBJECT: Evidence

Grant Number	Award Amount	Grantee Name and Location
69NIO60032	\$25,000	Univ. of California, Berkeley 400 Sproul Hall Berkeley, CA 94720

Title:

Physical Evidence Utilization

Project Summary:

- (1) Provide an indicator for measuring utilization of physical evidence in forensic problems.
- (2) Survey frequency of physical evidence in crimes by type of evidence and type of crime.

Comments:

This research program established a frequency profile of the potential input of physical evidence from scenes of crimes in a Forensic Science laboratory. This profile of evidence types represents a maximum input against which actual operations and investigation alternatives may be viewed. It yielded for selected crime categories a measure of all pertinent physical characteristics at locations of criminal activity. Of the approximately 750 cases investigated, 88 percent were judged to have physical evidence in three distinct categories (e.g., fingerprints, toolmarks, glass, blood, etc.). Data described the frequency of twenty-three evidence types with seven crime categories. Only a negligible quantity of evidence from Part I Crimes was actually submitted to a laboratory for scientific analysis.

SUBJECT: Explosive

Grant Number	Award Amount	Grantee Name and Location
71NI240102	\$32,000	U.S. Army Land Warfare Laboratory Aberdeen Proving Grounds Aberdeen, MD

Title:

Test and Evaluation of Hydronautics Explosive Detection

Project Summary:

This grant will be used to test and evaluate the technical aspects of Hydronautics explosive vapor detection system for applicability to domestic, civilian, bomb-disposal problems.

SUBJECT: Fingerprint

Grant Number	Award Amount	Grantee Name and Location
71NI360089	\$49,970	NY St. Identification & Intelligence System Executive Park Tower, Stuyvesant Plaza Albany, NY 12203

Title:

New Fingerprint Recording Method

Project Summary:

The problem of developing an automated computerized fingerprint storage and retrieval system has had several major obstacles, including wide variations in the scale, density and distortion which result from present day "rolled-ink" methods of recording fingerprints. The applicant proposes to develop a system which would record a fingerprint on a photosensitive material, through a high resolution fiber-optics system. A conventional photograph of a fingerprint is not acceptable because of the curvature distortion which would result; important identification characteristics are frequently found near the edge of fingerprints. The recording medium would be both quick (a few seconds) and inexpensive (a few cents for material). The production/procurement costs would be acceptable to almost all law enforcement agencies (about two hundred dollars per system).

SUBJECT: Fingerprint

Grant Number	Award Amount	Grantee Name and Location
73-NI-99-0002-G	\$12,271	New York State Identification and Intelligence System Albany, New York

Title: Semi-Automatic Fingerprint Encoding System

Project Summary:

This project will enable the law enforcement system to search a single fingerprint of poor quality (such as a crime scene latent print) against a large master file, as well as to evaluate the operational impact of such a capability. An integral part of the program is the testing and evaluation of a Semi-Automated Fingerprint Encoding System which will provide for a third level of fingerprinting classification, namely minutiae location. The project will be a cooperative venture with local police agencies. Earlier work on this project was done under 70-095.

SUBJECT: Fingerprint

Grant Number	Award Amount	Grantee Name and Location
73NI990045G	\$68,350	California Crime Technological Research Foundation Sacramento, California

Title: Project SEARCH- Latent Fingerprint Study

Project Summary:

The objectives of this project are to analyze and evaluate commercially available single print latent fingerprint search systems and to assess available technology which could be applied to fingerprint systems. The grantee will identify and analyze approximately 10 commercial single-print systems. In assessing available technology, the grantee will identify technological advances applicable to latent print systems which warrant further research. A final technical report will describe the state-of-the-art relative to latent prints. In addition to that report, the grantee will produce a document, to be written for police administrators, heads of crime laboratories and heads of identification bureaus, which will set forth guidelines for selection of a latent print search system.

SUBJECT: Fingerprint

Grant Number	Award Amount	Grantee Name and Location
70NI360095	\$114,342	NY State Ident. & Intell. System
73NI99002G	\$12,271	Albany, NY

Title:

Semi-Automated Single Fingerprint System

Project Summary:

The significant aspect of this project is the creation of an experimental single fingerprint classification system for research in the area of, crime scene or latent fingerprint identification. An integral part of the program is the testing and evaluation of a semi-automated fingerprint encoding system which will provide for a third level of fingerprinting classification: minutiae location. The program contemplated will be a comparative venture with local police agencies.

This project will enable the law enforcement system to search a single fingerprint of poor quality (such as a crime scene latent print) against a large master file, as well as to evaluate the operational impact of such a capability. An integral part of the program is the testing and evaluation of a Semi-Automated Fingerprint Encoding System which will provide for a third level of fingerprinting classification, namely minutiae location. The project will be a cooperative venture with local police agencies. Earlier work on this project was done under 70-095.

SUBJECT: Forensic

Grant number	Award Amount	Grantee Name and Location
73NI990052G	\$219,236	The Forensic Science Foundation, Inc. Rockville, Md.

Title:

Assessment of the Forensic Science Profession

Project Summary:

The objective of this project is to perform an assessment of the forensic science profession; specifically, its personnel (professional and para-professional), their education and training. The grantee will gather data on individuals within the profession, on the scientific laboratories in which they function, and on all forensic science education and training programs in the country. Based on the analyses of these data, recommendations will be made regarding manpower deficiencies within the profession, the nature of educational programs required to train qualified personnel, and other improvement programs to increase the contribution of the forensic sciences to the criminal justice system.

SUBJECT: Forensic Analysis

Grant Number	Award Amount	Grantee Name and Location
71NI510019	\$39,857	University of Virginia Charlottesville, VA 22901

Title:

Forensic Analysis: Spark Source Mass Spectrometry and Neutron Activation Analysis

Project Summary:

This project will continue research into the application of modern chemical instrumentation to forensic problems. Spark Source Mass Spectrometry (SSMS) and Neutron Activation Analysis (NAA) will be used to obtain elemental concentration profiles which act as "fingerprints" of sample specimens for comparison purposes and to determine possible common origin. These techniques will be applied to a number of sample types using experiences and information obtained from the first phase of this study. Major instrumental advances in both SSMS and NAA will be evaluated. Greatly improved detection-readout facilities will be used to obtain greater amounts of data and to increase the accuracy and precision of results. Increased confidence in the experimental data will be demonstrated and the significance of this to the forensic scientist will be studied.

SUBJECT: Forensic Science

Grant Number	Award Amount	Grantee Name and Location
71DF250529	\$120,000	Department of Public Safety Boston, MA

Title:

Forensic Science Improvement Program

Project Summary:

Laboratory services in Massachusetts are presently provided primarily by two laboratories in Boston, one belonging to the State Department of Public Safety and the other to the Boston Police Department. Although recent improvements have been to both laboratories, they are still understaffed and under-equipped to meet the enormous demands placed upon them. Further, laboratory services are unavailable in the western part of the commonwealth. To help meet this problem, the Governor's committee will provide \$135,000 in fiscal year 1970 block grant funds to develop a master plan for laboratory services in the Commonwealth, to provide a prototype regional laboratory in the western part of the state, to begin a neutron activation analysis program, and to develop a crime scene search training program. In conjunction with these projects, discretionary funds would be used to provide more complete services to all criminal justice agencies in the Commonwealth. As part of the development of the laboratory master plan, each of these projects will be evaluated by a qualified consultant to determine the quality and quantity both of evidence submitted to the laboratories and the analysis of that evidence.

SUBJECT: Gunpowder

Grant Number	Award Amount	Grantee Name and Location
71NI060108	\$9,995	EG&G Inc. 130 Robin Hill Road Goleta, CA 93017

Title:

Characteristics of Gunpowder and Primer Residue

Project Summary:

The grantee will conduct a feasibility study of the time-dependent characteristics of gunpowder and primer residues. Hopefully, a set of such characteristics will be utilized by crime laboratories in determining if a firearm has been recently discharged and in making estimates of how much time has elapsed from firearm discharge. If successful, this method would enhance the capabilities of crime laboratories and expedite investigatory processes by eliminating innocent suspects.

SUBJECT: Gunshot

Grant Number	Award Amount	Grantee Name and Location
7ON11426513	\$10,000	Pennsylvania State University University Park, PA 16802

Title:

Development of Techniques for the Detection of Airborne Gunshot

Project Summary:

The major objective of this project was to develop a technique which can tell an investigative officer whether or not a firearm has recently been fired in a room, and if so, when it was fired. The technique to be developed is envisioned as operating in the following way: Upon arriving at the scene of a crime which involved the discharging of a firearm, the investigative officer would use a small portable air sampler to collect samples of the debris suspended in the air of the rooms potentially involved. The samples would then be promptly taken to a laboratory having a neutron activation analysis capability, where they would be rapidly analyzed for traces of gunshot residues. The presence of such residues would establish where the firearm was fired.

Comments:

The method being investigated can successfully detect gunshot residues. The technique as it has been developed to date is not yet able to provide time of firing information. The electrostatic precipitator collection system shows greater promise than air filter systems for collecting gunshot residues because of higher collection efficiency for a wider range of particle discrimination according to particle size. The second year's program will explore the merits of this type of collecting system.

SUBJECT: Handwriting

Grant Number	Award Amount	Grantee Name and Location
71NI110027	\$3,000	N. A. S. A. Washington, DC

Title:

Latent Indented Writing Reading Instrument

Project Summary:

A fiber optics device developed by the National Aeronautics and Space Administration for flange imperfection inspection (for discovering imperfections in connecting surfaces of tubes and pipes) will be examined for application in the detection of faint handwriting impressions on paper caused by traces left on sheets under the original paper. The problem of detecting such "indented writing" has been a major impediment in the work of forensic scientists who should be helped by this new identification technique..

SUBJECT: Heroin

Grant Number	Award Amount	Grantee Name and Location
71NI240001	\$15,000	U.S. Army Warfare Laboratory Aberdeen, Md.

Title:

Heroin Detection Feasibility Study

Project Summary:

The objective of this continuation project (NI 70-031) is to conduct a series of preliminary tests to establish the technical feasibility of detecting processed heroin by using either the mass spectrometer or the plasma chromatography instrument.

Comments:

71-053-G is a continuation of 70-031, 70-032 and 71-001. The report presented the findings of various methods of heroin detection including bioluminescence, mass spectrometry and plasma chromatography. An evaluation of these methods is presented by the New York City Police Department.

SUBJECT: Heroin

Grant Number	Award Amount	Grantee Name and Location
71NI350159	\$19,000	UCLA Los Alamos Scientific Lab Los Alamos, N.M.

Title:

Evaluation of a Heroin Detector

Project Summary:

This project, comprising the work of Contract No. DAAD05-71-C-0109, entitled Illicit Drug Detection, was begun on 1 Oct. 1970. The project was directed to explore the utility of the membrane separator-mass spectrometer system for the detection of heroin. Two such systems having substantially the same inlet configurations have been used during the course of the project. The first of these was a Varian M-66 cycloidal mass spectrometer equipped with a three stage separator by Varian under contract with the U.S. Army Land Warfare Lab. The latter instrument is a transportable instrument able to operate in a field environment without the massive arrangements usually associated with mass spectrometer systems.

The project investigation was originally divided into two phases. The first phase was planned for laboratory tests and analysis to determine signatures of heroin and the common adulterants used with the drug, and the instrument conditions required for optimum detection, with attention directed to possible background interferences and effects of wrapping materials. The second phase was planned to use the vapor detection equipment in field tests simulating typical detection scenarios, including detection of heroin secreted on an individual, in a room, and in a vehicle.

Also filed under drugs

SUBJECT: Heroin

Grant Number	Award Amount	Grantee Name and Location
71NI240088	\$29,012	Huntington Research Center P.O. Box 6857 Baltimore, Md. 21204

Title:

New Methodology for the Detection of Heroin & Related Drugs

Project Summary:

With the proliferation of drug addiction rehabilitation programs in the past year the inadequacies of the various types of urinalysis and the use of nalline to detect the presence of drugs in the body has been highlighted. N.I.M.H. is presently conducting a survey of urinalysis methods in an attempt to differentiate the most effective procedures. However, any type of urinalysis presents major drawbacks. Expertise is required and is not always available. The process is cumbersome, undignified and expensive. Many treatment units have compromised by doing spot checks rather than the daily analysis which should ideally be the case. When the heroin on the street is of poor quality only the quinine with which it is cut shows up in the urinalysis if much time has elapsed since the presence of quinine could be due to drinking gin and tonic or taking bromoquine for a cold. The use of nalline presents many similar disadvantages. It will be cheap, portable and require no expertise to administer. Saliva rather than urine could be used and it is a method that can be applied to all drugs including marihuana.

Also filed under Drugs

SUBJECT: Infrared Data File, Pilot Computerized

Grant Number	Award Amount	Grantee Name and Location
70NI1366517	\$10,000	N.Y. State Identification & Intelligence System A.E. Smith State Office Bldg., 4th Floor Albany, N.Y. 12225

Title:

Pilot Computerized Infrared Data File

Project Summary:

The purpose of this project was to evaluate under operational conditions, the application of a commercially supplied computerized infrared data file and search system to the needs of forensic science laboratories.

The project plan called for the purchase of an infrared data search system and the use of this system by selected forensic laboratories operating within New York State.

The major goals of the study were:

1. To demonstrate the utility of the central computerized data file concept for Forensic Science laboratories.
2. To provide data to enable the Criminalistics Research Bureau to make recommendations for further development of the central data file concept as applied to forensic science operations.
3. To provide an immediate, albeit developmental in nature, computerized data file service for selected Forensic Science laboratories.

Comments:

This file is now operational.

SUBJECT: Laboratory Consolidation

Grant Number	Award Amount	Grantee Name and Location
72DF090024	\$34,552	Arizona SPA Subgrantee Maricopa County

Title:

Laboratory Consolidation

Project Summary:

Transfer existing toxicological laboratory located in Maricopa County to the Arizona Dept. of Public Safety Laboratory.

SUBJECT: Laboratory

Grant Number	Award Amount	Trantee Name and Location
70DF410447	\$27,934	Oregon State Police 107 Public Service Building Salem, OR 97310

Title:

Creation of Satellite Crime Laboratory

Project Summary:

Project involves creation of satellite crime laboratory at Pendleton, Oregon, and to staff and equip the laboratory to provide analytical service, field investigation aid to criminal investigators, consultation, training, liaison with other scientific facilities and expert testimony in court without charge to all law enforcement agencies, district attorneys, and for defendants in criminal actions on order to a court. The proposed laboratory would serve an area comprised of ten counties situated in the northeastern section of Oregon with an area of 41,120 square miles and a population of 135,575. Application for block fund grant has been submitted to LEAA for an identical crime laboratory facility to be located at Ashland, Oregon, to serve an area comprising seven counties in southern Oregon consisting of 27,273 square miles with a population of 327,940. These two laboratories would serve as adjuncts to existing crime laboratory facilities at Portland, which would continue to serve the northwestern section of the state - the most populous. Presently, the entire state is served by existing crime laboratory facilities in Portland and five technicians employed are required to travel constantly about the state responding to calls for assistance in crime scene searches and evidence gathering with frequent court appearances to testify as to laboratory analyses.

SUBJECT: Laboratory

Grant Number	Award Amount	Grantee Name and Location
70DF480452	\$91,688	Texas Dept. of Public Safety P.O. Box 4087 N. Austin Sta. Austin, TX 78751

Title:

Crime Laboratory Improvement for Texas Dept. of Public Safety

Project Summary:

The criminalistic laboratory of the Texas Department of Public Safety is a comprehensive crime laboratory serving the State of Texas and all government agencies therein, including armed forces and other federal agencies when requested. It contains a complete chemistry laboratory, firearms section and photography laboratory. This project will enable the department crime laboratory to render current service to state, county, local, federal and armed forces enforcement personnel and agencies of chemical analysis of dangerous drugs and narcotics for criminal enforcement purposes. Such services include the necessary function of appearing as witnesses in these cases where prosecution becomes necessary. The project requires hiring chemists to do the chemical analyses, equipment on which the analyses can be made and a restructuring of available space to do the work.

SUBJECT: Laboratory

Grant Number	Award Amount	Grantee Name and Location
71DF190575	\$22,700	City of Des Moines (Police Department) Des Moines, IA

Title:

Des Moines Police Criminalistics Laboratory Program

Project Summary:

In order to provide additional means to combat the increasing rise in crime within the Des Moines area this project proposes the equipping, staffing, and general re-evaluation of the current crime laboratory operations within the Des Moines Police Department. Specific lack of qualified trained criminalists, sophisticated laboratory equipment and technical assistance and coordination of the laboratory operation are needed in the Des Moines Police Department. It is the intent of this grant to solve these basic problems by providing the department with a trained, qualified individual to perform as a criminalist and to coordinate certain of the various laboratory operations. In addition, the grant provides for the equipping of the laboratory with essential equipment and supplies needed to perform these additional crime laboratory tasks.

SUBJECT: Laboratory

Grant Number	Award Amount	Grantee Name and Location
73NI990001IA	\$2,146,534	National Bureau of Standards Washington, D.C.

Title:

Law Enforcement Standards Laboratory and Support Services

Project Summary:

These funds are provided for the establishment and maintenance of a Law Enforcement Standards Laboratory which will define voluntary minimum performance standards for equipment; develop standard procedures for measuring equipment performance; design a program for inspecting and certifying commercial testing laboratories; develop user guidelines; develop design standards so that equipment or components from different manufacturers can be used together; and recommend to LEAA the promulgation of equipment standards. The Institute will then publish and distribute the standards to law enforcement agencies, manufacturers, and other interested persons. Other interagency agreements initiated for the establishment and support of the Law Enforcement Standards Laboratory are 70-047, 71-016, 71-037, 71-156, and 72, 0001.

Comments:

The "Standard Reference Collections of Forensic Science Materials: Status and Needs" has been reviewed in draft and is soon to be published.

SUBJECT: Laboratory

Grant Number	Award Amount	Grantee Name and Location
71DF510567	\$120,900	Northern Virginia Planning District VA

Title:

Northern Virginia Police Science Laboratory

Project Summary:

An immediate and substantial need exists in Northern Virginia for prompt and accurate analysis of physical evidence for effective law enforcement. The local jurisdictions realize that reliance on the cooperation and generous complimentary services of the Bureau of Narcotics and Dangerous Drugs cannot continue because of increases both in federal crimes and criminal activity in Northern Virginia. Therefore, a regional agreement to establish such a laboratory in Northern Virginia has been made by Arlington, Fairfax, Loudoun, and Prince William counties, and the cities of Alexandria, Fairfax, and Falls Church. A compact on the operation and support of a regional laboratory will be formalized soon. Federal funds are needed to establish the staff capability and training programs envisioned and the necessary lab equipment. Support for such a project is forthcoming from the State of Virginia and regional police science laboratories are a high priority item in the State plan. The lab program is projected to have a development time of three to five years with the local jurisdictions eventually underwriting the cost of operation except for those funds which the state will provide through federal block grant funds and the regular state program. The principal objective of the proposed laboratory is to process evidence in narcotics cases.

Comments:

The Northern Virginia Regional Branch of the Bureau of Forensic Sciences has been in operation since March, 1971. Its main area of responsibility has been in drug analysis.

SUBJECT: Laboratory

Grant Number	Award Amount	Grantee Name and Location
70DF210441	\$33,100	Jefferson County Fiscal Court Fiscal Court Building Louisville, KY

Title:

Police Laboratory Service

Project Summary:

It is proposed to establish a police regional crime laboratory at the University of Louisville School of Medicine, Department of Pharmacology. The department is housed in a new building with complete facilities and no new major capital outlay is anticipated for this project. Back-up services from other medical school departments will be available upon the department's concurrence. The initial request for funding anticipates hiring a chemist and also anticipates purchase of consumables as well as hiring several students on a part-time basis. The need of the nine man narcotic squad for analysis of drugs has increased by over forty percent in the last year and it is expected that 452 drug samples will need analysis in 1970. Presently drug analysis takes at least 1 month and the drugs must be sent to Frankfurt to the state laboratory. This delay in analysis as well as problems involved in expert testimony in court, etc., make the need for this regional center (serving Louisville and Jefferson County) critical.

SUBJECT: Laboratory

Grant Number	Award Amount	Grantee Name and Location
71DF100693	\$64,930	Office of the Medical Examiner 3300 Kirkwood Highway Wilmington, DE 19804

Title:

Providing a Statewide Crime Lab (Phase I)

Project Summary:

Delaware at present has no crime laboratory. Crime is increasing in the state proportionately with the remainder of the country. Narcotics arrests have increased tremendously over the past two years. The goal of this project is to initiate the first phase of a statewide crime laboratory. It will function in the new medical examiners building now under construction. Phase I will provide equipment and personnel for analysis of drugs and chemical specimens. All Delaware police agencies will receive the benefits of the lab. Training will be offered in evidence detection and handling by the Police Training Commission. Mobile crime labs will be purchased with assistance of the agency to reduce crime. Evaluation of the project will be ongoing and will be measured by the number of analyses conducted, the number of convictions obtained through expert testimony and cases cleared by the use of the lab facilities.

Comments:

Delaware Crime Lab is now in its second phase of implementation. Two criminalists and the medical examiner comprise the present crime lab.

SUBJECT: Laboratory

Grant Number	Award Amount	Grantee Name and Location
71DF260580	\$67,570	Genesee Co. Prosecuting Attorney's Office 105 Court House Flint, MI 48502

Title:

Regional Crime Laboratory

Project Summary:

This application is to request the necessary financial assistance in the purchasing of crime laboratory equipment and the hiring of professional personnel for our region, which consists of Genesee, Lapeer and Shiawassee counties. In its first comprehensive plan for Michigan, the Michigan Commission on Law Enforcement and Criminal Justice recognizes the need for crime laboratories in order to design and implement a regional system for such laboratories to serve the various law enforcement agencies. Such labs will be created to permit scientific analysis of evidence at a crime scene as quickly as it is discovered. The Genesee County Prosecutors Metropolitan Police Organization is requesting such an action grant for implementation in this region.

SUBJECT: Laboratory

Grant Number	Award Amount	Grantee Name and Location
71NI420370	\$14,725	University City Science Institute Philadelphia, Pennsylvania

Title:

Study of Crime Laboratories

Project Summary:

This study was undertaken as a practical exercise in operations research problem formulation and solution by a graduate seminar at the University of Pennsylvania. The study goal was to devise methods for determining the best forensic science service for a particular area. In order to accomplish this, the demands placed upon this service by the pattern of criminal activity and the requirements of the judicial system were analyzed for the City of Philadelphia and the laboratories serving the States of Pennsylvania and New Jersey. On the basis of these analyses a simulation model of a laboratory, as a production facility subject to constraints of time, and a capital budgeting model were developed to assist management decisions. Interpretations of various factors of the simulation model as they apply to forensic laboratories were also made. Several surveys of crime laboratories were conducted and the data used in the models are presented.

SUBJECT: Laboratory

Grant Number	Award Amount	Grantee Name and Location
72DF480025	\$160,091	City of San Antonio and Bexar Company San Antonio, TX

Title:

Regional Crime Laboratory

Project Summary:

This application proposes funding to enable the existing resources of the San Antonio Police Crime Lab and the Bexar County Medical Examiner's Service and Pathology Lab to be combined, enlarged and improved sufficiently to provide crime lab service to the nine counties contiguous to Bexar County. The crime lab service will be patterned after that provided by the Texas Department of Public Safety Lab: chemical analysis evidence substances including narcotics, polygraph examiners, "ballistics" firearms examination, document examination, ninhydrin and other chemical latent print processing. The primary reason for providing this service is to relieve the undue case load of the Department of Public Safety and expedite return reports in the interests of justice. Medical examiner service will be provided at a minimal cost to agencies using it. Forty hours of basic training in handling of physical evidence will be provided for one or more peace officers from each law enforcement agency in region and each agency will be provided an investigation kit.

SUBJECT: Laboratory

Grant Number	Award Amount	Grantee Name and Location
72DF220024	\$83,900	Jefferson Parish Sheriff's Office P.O. Box 327 Gretna, LA70053

Title:

Southeastern Louisiana Criminalistics Laboratory

Project Summary:

This program will establish and equip a crime laboratory to serve a multi-parish region of Southeastern Louisiana, with a capability for all basic types of services. At present no such facility exists within the area, and all work must be done by the seriously overloaded units in Orleans Parish, in Baton Rouge, or at Dallas, Texas. Particular emphasis will be placed on narcotics, and priority will be given to analyses requested by the new regional narcotics unit. The laboratory will serve as a field training unit for criminalists, and will also seek to improve techniques for handling and presenting of evidence.

SUBJECT: Laboratory

Grant Number	Award Amount	Grantee Name and Location
72DF240028	\$119,819	Maryland State Police Pikesville, MD 21208

Title:

State Crime Laboratory

Project Summary:

This project will establish a Forensic Science laboratory within the Maryland State Police Department, which will provide service to all police agencies in the state. In addition, a cooperative arrangement with Baltimore City Police Department has been made to mutually assist one another as necessary. This project will no longer force the Maryland State Police to rely heavily on the various federal laboratory services, and will accordingly eliminate the lengthy delay in awaiting the test results of individual case evidence analysis, particularly in the realm of narcotics and dangerous drug abuse. This award of \$119,819 is made under police improvement program F-1, Science in Law Enforcement--expanded laboratory services as described in FY1971, Guide for Discretionary Grant Programs and authorized by P.L. 90-3 51, as amended. These federal funds will be used for salaries and travel.

Comments:

FY74 plans call for two satellite crime labs from the Pikesville State Lab, one in western Maryland and one on the Eastern shore. The state has also funded mobile crime lab vans for field tests.

SUBJECT: Laboratory

Grant Number	Award Amount	Grantee Name and Location
72DF060028	\$27,596	New Mexico SPA Subgrantee City of Albuquerque

Title:

Survey for Regional Criminalistics Laboratory

Project Summary:

Survey for recently organized Technical Services Division by qualified criminalist.

SUBJECT: Marihuana

Grant Number	Award Amount	Grantee Name and Location
7ONI1480056	\$88,657	The University of Texas Medical Branch Galveston, Tx.

Title: Marihuana: The Effects of its Chronic Use on Brain Functioning

Project Summary:

This interdisciplinary research will provide objective data for evaluating the effects of the chronic use of marihuana on brain functioning and behavior. Some of the more specific experiments include: A study of the dose-response relationship between electroencephalogram patterns and concomitant spontaneous behavior in cats; the combined effects of marihuana and other commonly used drugs such as alcohol, LSD and amphetamines on brain functioning and behavior; a comparison of personality, family and developmental history and psychophysiological factors among adolescent marihuana users and non-users; and a study of the genetic effects, if any, related to the chronic use of marihuana.

Also filed under drugs.

SUBJECT: Microchemistry

Grant Number	Award Amount	Grantee Name and Location
7INI360110	\$7,650	John Jay College of Criminal Justice 315 Park Ave. South New York, NY 10010

Title:

Microchemistry Methods of Assay - Erythrocyte Isozymes

Project Summary:

"Activity Staining" is the only method used currently to detect the presence of isoenzymes (or isozymes) in fresh or dried blood following electrophoresis. The grantee is developing an alternate method which utilized autoradiography, a technique for detecting the presence of radioactive material in another substance. Autoradiography offers three improvements on the activity staining methods: (1) the process is less cumbersome; (2) the isoenzymes are more easily handled than the coupled enzyme assays which result from activity staining. During the second stage of the project, the grantee will attempt to improve the method of electrophoresis. Activity staining requires porosity. Therefore, starch is used for the electrophoresis of blood samples. Since autoradiography does not require porosity, the grantee will test substitutes for starch with the hope of obtaining one which will yield better resolution of isoenzymes.

SUBJECT: Microfilm

Grant Number	Award Number	Grantee Name and Location
71DF060882	\$64,000	Berkeley Police Department Hall of Justice Berkeley, CA 94703

Title:

A Total Police Investigative and Administrative Microfilm SY

Project Summary:

This project proposes to establish a total microfilm system within all divisions of the Berkeley Police Department and establish a Miracode System that will automate the filing and retrieval of such important investigative information as fingerprint arrest photographs, physical descriptions, and MO factors. One of the prime objectives of both systems is to recapture much needed space for a department that has outgrown its facilities but has no financial hope of obtaining new space. This system will provide for efficiency in record control not heretofore available. A more efficient investigative tool is provided in this system which will aid in alleviating many of the crime problems. The costs of needed improvements are considerably less than usual because much of the necessary support equipment is already on hand. The goals and objectives of this project are stated as follows: (1) establish microfilm files and review capabilities in all appropriate divisions of the police department, thereby conserving space that is needed because of substantial growth during the past five years; (2) establish better control over records and to provide an additional copy of all records for security storage; (3) provide an automated method of comparing latent fingerprints found at crime scenes with those of known offenders.

SUBJECT: Miracode Identification

Grant Number	Award Amount	Grantee Name and Location
72DF480020	\$68,885	City of Austin (Austin Police Dept) 200 East 7th Street Austin, Tx. 78701

Title:

Miracode Identification and Retrieval System (MIRS)

Project Summary

The Miracode System is designed to aid in the apprehension of criminals through better means of identification of fingerprints and mug shots. We expect the Miracode System to help us increase the number of arrests per year and to aid in reducing our unsolved crimes. We also expect to utilize Miracode for retrieval of arrest records and offense reports. Our present system's capabilities lag seriously behind our needs for ready access, identification and identification technicians will encode all present fingerprints and mug shots. Their addition to our staff will enable 24-hour identification and retrieval capability. In summary, we expect the Miracode System to make our criminal records more readily accessible, thus aiding in the identification and subsequent apprehension of known criminals in the Austin, Texas area.

**CONTINUED**

**2 OF 3**

SUBJECT: Narcotic

Grant Number	Award Amount	Grant Name and Location
73NI990011C	\$115,991	Institute for Defense Analysis Arlington, Virginia

Title:

National Narcotic Intelligence Requirements and Recommendations

Project Summary:

The purpose of this study is to determine the intelligence needs of the national narcotic control community and to examine alternative means of making use of existing and potential intelligence resources to provide an effective all-source intelligence system to service national narcotic control objectives. The study will emphasize primarily narcotic intelligence needs at the national level but the interface between the federal intelligence system and state and local agencies will also be considered. Areas of potential contribution by local agencies to a national intelligence overview, and means by which a national system could assist local jurisdictions will be examined.

SUBJECT: Neutron Activation Analysis

Grant Number	Award Amount	Grantee Name and Location
69NI110020	\$90,000	Atomic Energy Commission Washington, DC 20545

Title:

Neutron Activation Analysis

Project Summary:

Examine and develop neutron activation analysis applications in criminalistics with special emphasis on the statistical basis for conclusions. Paint, paper, bullet lead, and gunshot residue will be examined. AEC will administer the contract (Phase 111).

Comments:

Final reports have been published and are available through the LEAA Library. They are voluminous.

The study generated six reports describing the uses of neutron activation analysis as an aid in forensic analysis. Specific items described included papers, paints, gunshot residues and bullets. The general reports describe the results of a number of additional exploratory efforts encompassing a broad spectrum of materials which included hair, automobile grease, plastics, rubber, sail, ink, wood, some drugs, etc. Numerous reference sources are cited for further information.

SUBJECT: Neutron Activation

Grant Number	Award Amount	Grantee Name and Location
71DF70835	\$51,680	Illinois Bureau of Identification 515 East Woodruff Road Joliet, IL 60432

Title:

Neutron Activation Analysis Utilizing Automated Data Analysis

Project Summary:

The main emphasis of the proposed project is the utilization of the facilities and available expertise at the nearby Atomic Energy Commission's Argonne National Laboratory (ANL) to widen the services of the Illinois State Crime Laboratory for state law enforcement agencies. Arrangements have been made to use ANL high flux reactor and associated facilities for Neutron Activation Analysis (NAA) capabilities. While the value and acceptance of NAA in criminalistics is well documented, the need for a high flux reactor and qualified personnel to operate the equipment and interpret the data has limited the practical forensic applications to only a few locations. Clearly an additional NAA capability would not only benefit Illinois but possibly other midwestern states. The proposed multipurpose lab computer, which is needed for efficient and accurate evaluation of gamma ray spectra, can also be used for automation and data processing of other laboratory instruments; also other applications, such as in ballistics, are becoming apparent. The computer has also additional capability for fast and inexpensive information storage and retrieval. This would ultimately benefit the laboratory operations by saving time and minimizing human error. It should be emphasized that the procedures for operating the equipment have been developed and no additional research is needed.

SUBJECT: Police Improvement

Grant Number	Award Amount	Grantee Name and Location
70DF390440	\$24,505	Columbus Division of Police 120 West Gay Street Columbus, OH 43215

Title:

Forensic Police Improvement Programs - Science in Law Enforcement

Project Summary:

The goals of the expanded laboratory services program are: 1) to expand existing crime laboratory facilities for the full range of crime investigation needs; 2) to provide a mobile unit for the collection and preservation of evidence; 3) to train officers in the recognition, preservation and collection of evidence; 4) to expand facilities in order to accommodate other law enforcement agencies in training and the use of crime laboratory facilities; and 5) to develop programs to reduce the mandatory court appearances of laboratory experts. Laboratory services are essential to effective law enforcement. Success in complicated investigation may depend in large part upon the scientific evaluation of pertinent data. The proposed expanded laboratory services program would serve to increase efficiency in law enforcement. The program will be subject to a continual evaluation by the Division of Police and the crime laboratory supervisor. Outside law enforcement agencies will be encouraged to objectively evaluate the program.

Comments: MITRE/Forensic Laboratory Analysis Program is currently making a study of the Columbus Police Department Laboratory operations and its effectiveness in the criminal justice system.

SUBJECT: Project Search

Grant Number	Award Amount	Grantee Name and Location
72SS063301	\$399,397	CA Crime Tech. Research Foundation 1927 13th St. Sacramento, Ca. 95814

Title:

Project Search - Requirements Analysis of State Identification Bureau

Project Summary:

The purpose of this project is to develop concepts that can be used by state identification bureaus to increase the efficiency of their operations. The concepts will include those leading to the automation of large operations and those improving the performance of smaller bureaus that will probably never fully automate. The project will be carried out by the coordinated efforts of the 20 search states. The project will conduct a rigorous requirements analysis of the identification operations in the United States. A mail survey will be made of all states with a follow-up detailed on-site survey of the project search states. The investigation will include the entire identification function from the taking of fingerprints through the production of the criminal history record. Specifically included will be the office procedures in the identification sections, name search techniques, retention rules and schedules, and service to users. Research will be conducted to evaluate the applicability of projects currently being undertaken by private industry to the development of methods for recording fingerprints. This will involve automatic equipment procedures and will also include the transmission of fingerprints, an area currently investigated in part by the search technology committee.

SUBJECT: Project T.A.P.S.

Grant Number	Award Amount	Grantee Name and Location
70DF510450	\$59,050	City of Portsmouth #1 High Street Portsmouth, Va. 23704

Title:

Project T.A.P.S.

Project Summary:

The first goal of all police oriented programs, to insure increased safety to life and property for all citizens, can best be attained by increase in technological services. Specifically, this goal can be better reached through the professional assimilation, categorization and analysis of physical evidence, in a more efficient and rapid manner than is presently possible. A second goal will be to increase regional cooperation among the four cities and act as a pilot project for future state regional laboratory programs (presently very limited in nature). A third goal of this program will be to increase the effectiveness of Portsmouth's and the region's arrest to crime ratio and crime to conviction ratio which is below national and state standards. In addition, this project should cut down the backlog of court cases and insure speedier justice for the accused. A fourth goal will be to serve the dual purpose of increasing professionalism of the Portsmouth Police Department and other regional forces in addition to developing a better image of law enforcement for the average citizen. These goals will be best reached through the establishment of a pilot regional criminal laboratory, staffed with a chemist.

Comments:

The Norfolk Regional Crime Laboratory has absorbed the crime laboratory formerly at Portsmouth, Virginia.

SUBJECT: Scientific Services Support

Grant Number	Award Amount	Grantee Name and Location
71DF060872	\$146,563	County of Los Angeles 500 West Temple Street, RM 213 Los Angeles, CA 90012

Title:

Scientific Services Support Unit

Project Summary:

While great attention is being given to expanding the overall capabilities of police agencies within Los Angeles County, the Sheriff's Department, as the primary county law enforcement agency, has been left with the responsibility of supplying scientific services support. This fact makes it imperative for the department to continue to develop capabilities of supplying those services as demand dictates. During the past decade, the Sheriff's Scientific Services Bureau has doubled its case load every three to four years and within the same time frame, the bureau has doubled its staff. However, procedures have remained the same. It has become apparent that a new cost-benefit program is needed. The purpose of the project is to improve, refine, and consolidate the field service capabilities of the Sheriff's Scientific Services Bureau.

SUBJECT: Symposium

Grant Number	Award Amount	Grantee Name and Location
70-002	\$33,149	IIT Research Institute Annapolis, Maryland

Title:

Third National Symposium of Law Enforcement Science and Technology

Project Summary:

This report details the events and activities involved in this symposium which was held on March 31 to April 2, 1970 in Chicago. It was designed to stimulate the application of science and technology to the criminal justice system by: (1) providing a professional forum for the exchange of ideas and information; (2) identifying the relevant capabilities of science and technology and (3) fostering communication with the criminal justice and scientific and engineering communities.

SUBJECT: Trace Metal

Grant Number	Award Amount	Grantee Name and Location
71-015-G	\$42,900	Minnesota Bureau of Criminal Apprehension St. Paul, Minnesota

Title:

Ultraviolet Detection of Metal Traces

Project Summary:

A Trace Metal Detection Technique (TMDT) has been developed, to determine whether a suspect or nonmetallic material has been in contact with metal objects. The method uses a test solution to treat skin, clothing or other material which produces visible metal trace patterns when the treated area is subject to ultraviolet light. The metal trace patterns give off fluorescent colors that are unique to types of metals. The identification may be as specific as type, model and size of a weapon. Equipment test procedures, and photographic techniques are fully described.

SUBJECT: Training

Grant Number	Award Amount	Grantee Name and Location
70DF290451	\$54,506	The Curators of the University of Miss 111 Jesse Hall Columbia, MD 65201

Title:

Statewide Training and Service Program in Neutron Activation

Project Summary:

This project is intended to provide the foundation for a sophisticated program in the characterization of physical evidence - on a statewide basis - through the prudent application of the technique of neutron activation analysis, combined with the training of experienced investigative officers in proper sample collection and handling procedures as well as in the capabilities and limitations of this analytical technique. A training program for police laboratory personnel is included to enhance their overall scientific background in practical applications of modern analytical chemistry. This part of the program will not be limited to neutron activation analysis. The proposed program is designed to benefit Missouri Police Departments, sheriff's offices, and state highway patrol and local prosecuting attorneys and their assistants. These groups, along with major case squads, will evaluate the overall and local impact of the program on law enforcement in Missouri. Because of the similarity in the requirements for proper collection and handling of physical evidence specimens, it is anticipated that the impact of this program will extend the competence of investigative and laboratory personnel in other methods of physical evidence collection and characterization besides neutron activation analysis.

SUBJECT: Training

Grant Number	Award Amount	Grantee Name and Location
71DF210630	\$6,415	Kentucky Law Enforcement Council P.O. Box 608 Eastern Kentucky University Richmond, KY 40475

Title:

Training in the Area of Police Photography

Project Summary:

I. Need: Police Photography is an important aid in the investigation, solution and prosecution of crime. Within Kentucky, only a very few local police departments are capable of handling their own evidence, identification or accident investigation photography. There is a need to implement and improve this important area in local law enforcement. II. Short-range goal of this project: A total of 10 one-week courses in basic police photography and darkroom techniques to be completed by the end of this project period. III. Long-range goals of this project: A. To increase the effectiveness of every department willing to take advantage of this training with regard to criminal investigation, apprehension and prosecution through the use of police photography. B. To increase the number of departments maintaining criminal identification files, an important aid to the apprehension of wanted or known criminals throughout the state.

SUBJECT: Training

Grant Number	Award Amount	Grantee Name and Location
71DF220537	\$80,580	Dept. of Public Safety P.O. Box 1791 Baton Rouge, LA 70821

Title:

Criminalistics Training and Specialty Liaison Services

Project Summary:

Funding requested in this application will be expended to generally increase the capacity of the state police crime laboratory, provide statewide in-service training of criminalists and police officers in criminalistic techniques, and to establish liaison with specialized laboratories for analyses outside the scope of the existing crime laboratory. 1. On the job training will be provided for criminalists employed within the state and for training police officers in recognition, collection and preservation of physical evidence. Experienced crime laboratory staff will provide training in these areas. The increased burden on the present staff will be offset by the addition of one toxicologist, two criminalists, and one evidence clerk. Space in the existing laboratory building will be increased to provide for the expanded operations. Three automobiles will be provided for the purpose of transporting laboratory personnel for in-service training of police officers, court appearances, and crime scene investigations. A complete video tape system will be purchased for use in all training functions. 2. Liaison will be established with specialized laboratories to improve the examination and analysis of physical evidence to the state-of-the-art level by eliciting subcontractual services.

SUBJECT: Training

Grant Number	Award Amount	Grantee Name and Location
71DF420539	\$116,940	Pittsburgh & Ally Co. Crime Laboratory Court House Pittsburgh, PA 15219

Title:

Training Police Officers as Crime Scene Specialists and Improve Equipment

Project Summary:

The purpose of this project is to make crime scene search training and equipment available to all police forces in Ally County (129 Boro, TWP and third class cities as well as Pittsburgh Bureau of Police). The Pittsburgh Bureau of Police is to be provided with two (2) crime scene mobile units operating 24 hours per day, 365 days per year manned by a total of six (6) officers specially trained in evidence collection techniques; 40 crime scene kits are to be put into the 40 largest county police departments, with 120 officers trained in evidence collection techniques; and to furnish Pittsburgh and Ally county crime laboratories with the physical capacity to meet the demands for present needed services of Pittsburgh and the 129 surrounding political jurisdictions which comprise Ally County. The laboratory will be provided with a mobile unit van and a laboratory automobile utilized to continue crime scene coverage by laboratory personnel anywhere in the county where needed. Initial training of officers will be conducted by laboratory criminalists who will routinely supervise these police personnel in techniques and provide in-service training on a regular basis. Laboratory will build a classroom equipped with educational aids to implement training and education. A training manual will be developed to be utilized in future training of police officers in this program and similar programs.

SUBJECT: Training

Grant Number	Award Amount	Grantee Name and Location
71DF370758	\$19,090	State Bureau of Investigation 421 N. Blount Street Raleigh, NC

Title: Year Round Internship Program

Project Summary:

State Bureau of Investigation initiated a year round internship program, beginning during the summer of 1971, with 12 interns. The purposes of this internship program would be to provide direct manpower assistance to the chemical laboratory, identification section, photographic section, intelligence section, training officer, and to the six district offices, and also to provide a meaningful learning context for the student interns who participate. This program would also give student interns insight into the SBI and hopefully will motivate a number of these interns to make the SBI a career. The Governor's Committee on Law and Order and the N.C. Internship Office of the Department of Administration will be available for direct and indirect assistance as needed.

SUBJECT: Training

Grant Number	Award Amount	Grantee Name and Location
71NI170118	\$154,782	College of Amer. Pathologists Foundation 230 N. Michigan Ave. Chicago, IL 60601

Title:

Training Seminars in Forensic Pathology

Project Summary:

Except for the medical-legal autopsies performed by a small number of full-time forensic pathologists, most of the thousands of autopsies are performed by non-professionals or by clinical pathologists insufficiently trained in forensic pathology and working only part-time in this work. As a result, thousands of autopsies each year are inadequately performed with possible serious consequences for criminal justice. The present project should improve this situation by giving part-time clinical pathologists some basic instruction in forensic work. The grantee will provide intensive three-day seminars in forensic pathology to such personnel throughout the country. In addition, the present project will lead to the production of a modern textbook in forensic pathology.

SUBJECT: Voice

Grant Number	Award Amount	Grantee Name and Location
71NI260078	\$152,513	Department of Michigan State Police 714 S. Harrison Road East Lansing, MI 48823

Title: Research of Voice Identification

Project Summary:

During the third phase of this voice identification project (Olea-347 and NI 70-004), the grantee will develop improved automated speaker identification techniques and evaluate their effectiveness in law enforcement activities. The primary method to be researched involves computerized fast fourier analysis.

Most important of all, the conclusions resulting from these experiments is that a technique for semiautomatic, completely objective speaker identification has been successfully developed and demonstrated to be practical and reliable. Accuracy is extremely good and will undoubtedly be improved through subsequent refinements of the technique. With a reasonable amount of voice data, 99 percent accuracy is obtainable. Even greater accuracy is possible if a "gray area" is defined and no decision made on the 1 to 5 percent of cases in that area. While these conclusions are based on a population of speakers speaking predominantly one regional dialect of American English, there is no reason to believe that equivalent results cannot be obtained for other linguistic communities.

SUBJECT: Voice

Grant Number	Award Amount	Grantee Name and Location
70NI3666509	\$10,000	Rensselaer Polytechnic Institute Troy, NY 12181

Title:

Study of Voice Recognition using Digital Color Encoded Voiceprints

Project Summary:

At the recent Seventh International Congress of Phonetic Sciences held this summer, Prof. Morris Halle of the Mass. Institute of Technology, a noted linguistic scholar, in referring to voice identification techniques stated "Such techniques should remain within the realm of scientific investigation." It is in that context that this study was undertaken.

The overall goal of the study is to formulate and test methods for improving the display of conventional speech spectrograms (commonly called "voiceprints") with particular emphasis on color enhancement techniques. The basic hypothesis is that given a conventional speech spectrogram as a means of suspect identification; a color enhanced display will improve their readability. The work, therefore, is not initially concerned with proving the usefulness of the spectrogram as compared to other methods of identification.

Comments:

The effectiveness of color sonagrams, speech spectrograms, or "voiceprints" has been studied. It has been clearly established that the use of color greatly improves the ease and speed with which such recordings may be read. Using conventionally generated data, however, the use of color encoding does not (except for a few dB) reduce the errors of classification as may have anticipated by the reader. This may be explained by considering that the observer who is classifying the original TVSD's is already performing a great deal of processing and feature extraction. The color enhancement of the data acts as a means of preprocessing the information, and thereby reduces the amount of processing required by the observer. As such the advantages of the technique are easier and faster interpretations but not an overall lower classification error. The observer apparently just automatically reduces the level and amount of processing he performs to maintain the same overall level of processing between the color preprocessing and his own as he alone provided before.

SUBJECT: Weapons

Grant Number	Award Amount	Grantee Name and Location
73NI990017IA	\$35,000	U.S. Army Land Warfare Laboratory Aberdeen Proving Ground, Md.

Title:

Test and Evaluation of Less Than Lethal Weapons, Material and Techniques

Project Summary:

The overall objectives of this project are to determine the characteristics of weapons which are presently used, or are proposed for use, by law enforcement agencies and to establish criteria by which weapons may be compared with respect to degree of effectiveness and lethality. The primary combination of characteristics sought is maximum effectiveness as a police weapon with minimum lethality. The work involves two specific objectives. Initially, the grantee will define the parameters relevant to weapons performance and weapons effect. These parameters will be objectively measured in a laboratory environment and, if necessary, will be medically evaluated. Secondly, the grantee will determine the desirable effects of weapons such as common police handguns, blunt instruments, electromagnetic weapons, kinetic energy weapons and chemical weapons. See also 72NI990015IA.

SUBJECT: Workshop

Grant Number	Award Amount	Grantee Name and Location
71NI170024	\$5,726	IIT Research Institute 10 West 35th St. Chicago, IL 60616

Title:

Workshop in Forensic Application of Scanning Electron Microscope

Project Summary:

This grant supported a one-day workshop on April 30, 1971 on forensic science applications of the Scanning Electron Microscope (SEM). The workshop was part of the four-day IIT Research Institute's annual international SEM symposium in Chicago. The conference provided an opportunity for criminalists from many countries to communicate with SEM experts and explore together possible applications of this new tool to law enforcement particularly to American police agencies.

APPENDIX D

SELECTED BIBLIOGRAPHY OF FORENSIC LITERATURE

A comprehensive review of the forensic literature with emphasis on the criminalistics area indicated the following books would be most useful to state planners:

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APPENDIX E

GLOSSARY OF INSTRUMENTAL TECHNIQUES

Instrumental Techniques

Definition

Chromatography

Method of separation involving motion of a solute in gaseous or liquid phase over a solid or liquid stationary phase. Great versatility is possible because rate of movement is influenced by many variables such as solubility of components and nature of adsorbent.

Thin layer chromatography. A sample mixture dissolved in a solvent is placed at the bottom of a glass plate, coated with an even layer of an adsorbent, such as silica gel or alumina. The mixture is allowed to soak gradually up the plate. Various components travel at different rates and thus separate on the plate. If colorless, they are detected by viewing in ultraviolet light or by spraying with chemical reagents.

Paper Chromatography. Similar to thin layer chromatography except that an adsorbent paper such as filter paper is used instead of a glass plate.

Gas Chromatography. Technique used for separation of gases and volatile liquids and solids. Samples are vaporized and carried by a chemically inert carrier gas through a separation tube which is maintained at high temperature to keep the sample vaporized. Separation results from interaction of sample vapor with the stationary packing material in the tube.

Differential Thermal Analysis

As a sample is heated at a constant rate, slight temperature changes are monitored by thermocouples and recorded graphically. When temperature reaches transition points, such as changes in crystalline structure of a component, the sample absorbs larger amounts of heat producing a flattened or downward deflected area in the temperature curve called an endotherm. Upward deflections indicating release of heat are called exotherms.

Electron Probe  
Analysis

A nondestructive form of analysis where a finely focused beam (microprobe) of electrons is directed at a sample. An electron, when hitting an atom, creates a vacancy in the inner electron shell. To fill the gap, an outer electron drops down to a lower energy level, emitting an x-ray photon of characteristic energy.

Electrophoresis

Charged particles migrate under the influence of an electric field. As an analytical tool, electrophoresis is usually carried out in a buffered solvent system on a support medium which ranges from filter paper to an adsorbent-coated glass plate or a semisolid starch block.

Mass Spectrometry

Molecules bombarded by electrons in a mass spectrometer generate charged ions. Each ion has a particular ratio of mass to charge ( $m/e$ ). Ions are separated according to  $m/e$  ratios using an electric or magnetic field or by time of flight in a field-free environment and are detected electronically. Results are shown graphically where intensity of peaks is proportional to abundance of the ion.

Microscopy

A variety of special microscopes are used in forensic science.

Comparison microscope. An instrument developed for the juxtaposition comparison of firearms identification, tool marks, etc.

Stereomicroscope. A stereobinocular microscope contains two optical systems so that a specimen can be viewed in three dimensions.

Scanning electron microscope. Specimens are scanned with a beam of electrons which are then reflected from the surface. Images are produced on a screen similar to a television picture. The technique makes it possible to examine irregular surfaces directly with magnifications ranging from 20 to 150,000 times.

Neutron Activation  
Analysis

A sample is bombarded with neutrons in a nuclear reactor causing elements, not already radioactive, to become radioactive isotopes. These isotopes are then identified by the type--alpha, beta, or gamma--and decay rates of their emissions.

Spectrophotometry

A technique which measures interaction between radiation and atoms or molecules corresponding to energy transitions within the atom or molecule.

Emission spectra. Light emitted by vapors of a heated substance has a color characteristic of the elements that are present. An emission spectroscope separates light from a heated sample using prisms or gratings and produces spectra as a series of colored lines on a dark background (line spectrum). Elements are identified by comparison with standard elemental spectra.

Visible absorption spectra.

White light passing through a vapor is absorbed at specific frequencies. The emerging light, when separated into its components, shows dark bands in the otherwise continuous spectrum which correspond to the emission spectrum of the gas. Comparison with standards may indicate elemental composition. More detailed information is obtained by directing light of a specific wavelength through a sample and measuring intensity of the emerging beam. Results are shown graphically by plotting absorbance against wavelength (or frequency).

Infrared. Absorption of infrared (IR) radiation (wavelength about 2.5 to 25 $\mu$ ) causes vibrational changes in the sample molecule. Each atom or group of atoms absorbs radiation at a specific frequency producing a complicated series of sharp peaks or absorption bands which are characteristic for each compound.

Spectrophotometry  
(Continued)

Ultraviolet. Most ultraviolet spectrophotometers measure absorption in the ultraviolet-visible region of the spectrum from wavelengths 210 to 780 nm. It is used in the analysis of drugs and narcotics and general purpose spectrum scanning for criminalistic samples to identify compounds.

X-ray Diffraction  
Analysis

X-rays are deflected by atoms of a crystal in a regular pattern which is characteristic of the lattice structure of the crystal. The pattern can be recorded on a photographic plate and used to identify the crystal.

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