LEAA DISSEMINATION DOCUMENT

CRIME LABORATORIES - THREE STUDY REPORTS

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JOHN JAY COLLEGE NATIONAL SURVEY

MASSACHUSETTS GOVERNOR'S COMMITTEE STATE STUDY

PUBLIC ADMINISTRATION SERVICE CONSOLIDATION STUDY EXCERPT

Grantee Reports Submitted to

Office of Law Enforcement Assistance,
United States Department of Justice

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PREFACE

Under the Law Enforcement Assistance Act of 1965, numerous grants have been made for studies designed to identify criminal justice needs, help determine priorities for research and action, and provide guidance to law enforcement administrators and planners. These grants have included several national surveys, including a comprehensive review of the country's correctional systems and surveys of police-community relations, criminal victimization, and new police field operations techniques.* The first LEAA project report reproduced herein is another such survey and its focus is an important one--police laboratories and their personnel. The second and third items also focus on crime laboratories, one within a particular state and the other from the perspective of coordination and pooling of services.

The John Jay Survey

This survey, undertaken by the John Jay College of Criminal Justice, City University of New York, largely substantiates the finding of the National Crime Commission that, as essential as modern laboratory services may be to effective law enforcement, good local facilities are currently beyond the means of the vast

* LEAA Grants 003, 005, 021, and 66-6. Reports of these projects have been included in the published reports and papers of the President's Commission on Law Enforcement and Administration of Justice and can be obtained from the Government Printing Office. The four studies mentioned are entitled Correction in the United States, reproduced in Appendix A, Task Force Report: Corrections; A National Survey of Police and Community Relations, reproduced as Field Surveys V; Criminal Victimization in the United States, reproduced as Field Surveys II; and Report on Police Field Procedures, reproduced as a Commission Consultant's Paper.

majority of police departments in the United States.* The study includes data on existing facilities and manpower, presents recommendations for regional laboratories and other improvement measures, offers estimates on personnel needs, and seeks to define training and college level programs to upgrade personnel and develop new technicians for forensic work. The report also confirms the disparity between the extensive need for forensic analysis in the solution of major crimes and those limited instances in which scientific evidence is effectively employed in present criminal investigations.

It is to be hoped that the John Jay study, taken as a first and modest step toward defining the need for improved and more extensive laboratory resources, will stimulate both action and further study to solve the manpower, facilities, and educational needs confronting law enforcement in this critical area.

The Massachusetts Crime Commission and Public Administration Service Studies

To complement the John Jay materials and acquaint readers with other LEAA-supported efforts which have examined problems in this field, excerpts from two other project reports have been included in this compilation. One is a special study of crime laboratories in Massachusetts completed as part of the first year work program of that state's Governor's Committee on Law Enforcement and Administration of Justice. The work of the Massachusetts Commission

*See Task Force Report: The Police, President's Commission on Law Enforcement and Administration of Justice, page 90 (1967).

is supported under the LEAA special matching grant series for state planning committees in criminal administration. This report reviews existing state and local facilities and, consistent with the Commission's planning function, offers a detailed blueprint for action to expand and improve crime laboratory services.

The final report item is an excerpt from a larger study--the study on consolidation of police services conducted by the Public Administration Service of Chicago under LEAA Contract No. 66-3. The excerpt deals with coordination and pooling of laboratory services, including discussion of current local practices, the role that States can play in this area, and its conclusions as to worthwhile programs for centralization, pooling, and coordination of activities.

* * *

The national survey, state study, and consolidation excerpt have been combined in this dissemination report to provide a working document for those concerned with improvement of state and local crime labora systems. Further information on these projects may be obtained y inquiry directed to the Office of Law Enforcement Assistance or its grantees.

Office of Law Enforcement Assistance
April 1968

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STUDY OF NEEDS AND THE DEVELOPMENT OF CURRICULA IN THE FIELD OF FORENSIC SCIENCE

(A Survey of Crime Laboratories)

Final Report to

Office of Law Enforcement Assistance
U. S. Department of Justice

Director and Principal Investigator: Dr. Alexander Joseph

Consultants:
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Research Assistant: Mr. Paul E. Murphy

This study was supported by Grant No. 013 awarded by the Attorney General under the Law Enforcement Assistance Act of 1965 to the John Jay College of Criminal Justice, The City University of New York.

METHODOLOGY

The creation of an advisory board of consultants was the first step in executing this project. This board consisted of: Dr. J. William Magee, OLEA, formerly of the Chemistry and Physics Section, FBI Laboratory; Professor Ralph F. Turner (Criminalistics), School of Police Administration and Public Safety, Michigan State University; Professor James W. Osterburg (Criminalistics), Department of Police Administration, Indiana University; Dr. Henry Guttenplan, Professor, Pennsylvania State University, formerly Inspector and Commanding Officer, Office of Scientific Research, New York City Police Department; Mr. J. D. Chastain, Director, Texas Department of Public Safety Laboratories; Mr. Charles A. McInerney, Director, Pittsburgh and Alleghany County Crime Laboratory; and Mr. Joseph Nicol, Superintendent, Illinois State Police Crime Laboratory, Joliet, Illinois, representing all sections of the nation geographically, and representing academic forensic science, state police laboratories, big city police laboratories and small police laboratories.

During the Summer of 1966 the first draft of a questionnaire was prepared in such manner as to facilitate statistical analysis. At the first meeting of the Advisory Board in September, the questionnaire was revised and an experimental version prepared for field testing by five crime laboratories located in widely divergent areas of the United States. The field test version of the questionnaire was also submitted to a research psychologist for evaluation as to consistency, accuracy, and ease of recording replies. The final form of the questionnaire can be found in Appendix No. 1, pages 26-27.

The Advisory Board set a criterion that a laboratory which did not at least do wet chemistry was not to be included in the data analyses. One hundred forty (140) replies to the questionnaire were received; from the remaining, 55 letters were received indicating that there was no such laboratory, and five laboratories known to exist did not reply to the questionnaire.

The Board's suggestions for site visits were designed to get a representative cross section of small, medium and large laboratories in widely different geographical areas. The laboratories visited were the following: F.B.I. Laboratory, Washington, D.C. ... New York State Police Laboratory, Albany, N. Y. ... New York City Police Laboratory, N.Y. ... Suffolk County Police Laboratory, Long Island, N.Y. ... Los Angeles County Coroner's Office, Cal. ... San Francisco Police Department, Crime Laboratory, Cal. ... Santa Clara County Laboratory of Criminalistics, San Jose, Cal. ... County Sheriff's Laboratory, San Bernardino, Cal. ... Wisconsin State Police Laboratory, Madison, Wis. ... Seattle Police Department Laboratory, Wash. ... Kansas City Police Laboratory, Mo. ... Chicago Police Crime Laboratory, Ill. ... Illinois State Police Laboratory, Joliet, Ill. ... Indianapolis State Police Laboratory, Ind. ... Connecticut State Police Laboratory, Hartford, Conn. ... Boston City Police, Mass. ... Florida Sheriff's Bureau, Tallahassee, Fla. ... Dade County Crime Laboratory, Miami, Fla.

A list of topics discussed during site visits will be found in Appendix 3, page 35. Visits to the laboratories indicated a variation from less than minimal to excellent, in both personnel and equipment. However, the majority of the laboratories visited were well equipped to do the job they had to do. The shortage in laboratory personnel in most laboratories outside of California seems to be due to low salary schedules and fringe benefits which are not competitive with local industry. The FBI Laboratory and crime laboratories in large cities such as New York and Chicago have very large staffs. However, the number of criminalists or forensic scientists employed in other laboratories varies from one to forty.

All of the laboratories visited were heavily involved in court testimony. Obviously this testimony reduces the effective number of personnel available in a laboratory. All of the laboratories visited made evidence available to the defense with the district attorney's permission or by court order. Statistical reports were maintained. It did not appear to make very much difference whether the head of the laboratory was a civilian or a police administrator as long as he had a strong academic background in science. However, in those laboratories, which employed a combination of civilian and police officers in the laboratory proper, friction of various kinds arose due to salary differences and working hours. All the directors agreed that a B.S. degree in analytical chemistry or criminalistics was the desirable minimum educational qualification, with the exception of personnel engaged in documents, firearms comparison and explosives specialization. All but one of the laboratory directors interviewed strongly favored some type of national criminalistics research institute.

SUMMARY AND INTERPRETATION

It is important to know that the statistical data gathered from the questionnaires are not intended to compare one laboratory with another. The data are simply the responses of individual laboratories to the questionnaires.

The President's Crime Commission on Law Enforcement and Administration of Justice Report "The Challenge of Crime in a Free Society" makes the following statement on page 118:

> "The Commission has found that the police are not making the most of their opportunities to obtain and analyze physical evidence. They are handicapped by technical lacks. There is a very great lack in police departments of all sizes of skilled evidence technicians, who can be called upon to search crime scenes not merely for fingerprints, but for potentially telltale evidence like footprints, hairs, fibers, or traces of blood or mud. In one 2,000-man force, for example, there are only 2 technicians on each shift. More often than not, perhaps, such evidence would not lead

> directly to the identification of a criminal about whom nothing else is known, but it might help greatly to establish a case for or against a suspect. The two chief reasons for the lack of skilled technicians are that few persons with the requisite science education have been recruited into police operations, and that few training programs for evidence technicians have so far been developed."

The paragraph quoted above is supported by the findings of this study for the United States as a whole, although it is obvious that the description does not fit all communities or their crime laboratories.

At present, crime laboratories are located in various law enforcement agencies including state and city police departments, county and state sheriffs' bureaus, and - in two cases - in offices of district attorneys.

The police laboratory is usually the scientific arm of a law enforcement agency. The director of the laboratory is responsible for maintaining adequate scientific personnel resources and necessary scientific equipment for use in the investigation of crime. This equipment varies from portable instruments and kits transported to crime scenes to complex analytical instruments including chromatographs, spectrophotometers, and other types of sophisticated equipment. Narcotics, alcohols, chemicals, pharmaceuticals, poisons, combustibles and explosives are analyzed in the chemistry and instrumentation sections of a laboratory. Blood, semen and other body fluids are examined in serology and biochemical sections. Tool marks, firearms, obliterated serial numbers, latent fingerprints, shoe impressions, tire marks, and trace materials are processed in the microscopic and photographic sections. The instrumentation section is called upon to process minute traces and contaminated samples of evidentiary materials. The questioned document section process bad checks, other fraudulent documents, typewritten and written letters involved in threats.

Various reference files are maintained by laboratories to assist members of law enforcement agencies in various phases of crime investigation. These reference files may include laundry and dry cleaning marks; a fraudulent check file; typewriter file; unlawful letter file; paint file; tire and heel marks, and unidentified bullet and cartridge files. Because it is difficult, costly and time consuming to maintain most of these files, small laboratories tend to rely on state and federal laboratories for these services.

There are seventeen (17) states in which no agency at the state, county or city level has a crime laboratory. On the other hand there are thirty-three (33)* state police crime laboratories whose primary function is handling cases under the jurisdiction of the state police.

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*The state crime laboratory for the State of Rhode Island is part of the University of Rhode Island and not officially a state law enforcement agency. However, it does provide laboratory services for the law enforcement agencies in the State of Rhode Island.

The data indicates that there are forty (40) known crime laboratories in cities with populations of over 100,000. Since there are 151 cities in the United States with population of 100,000, there are approximately 111 cities with a population of over 100,000 that do not have crime laboratories. In other words, approximately three-quarters of the cities with populations of over 100,000 in the United States do not have a crime laboratory in their police department. (See maps pages 6 and 7.)

The remaining laboratories are found in smaller police departments and in counties. The total of all laboratories is 105 (five laboratories did not respond). The total number of cases handled by these laboratories was 312,459 for the year 1965.

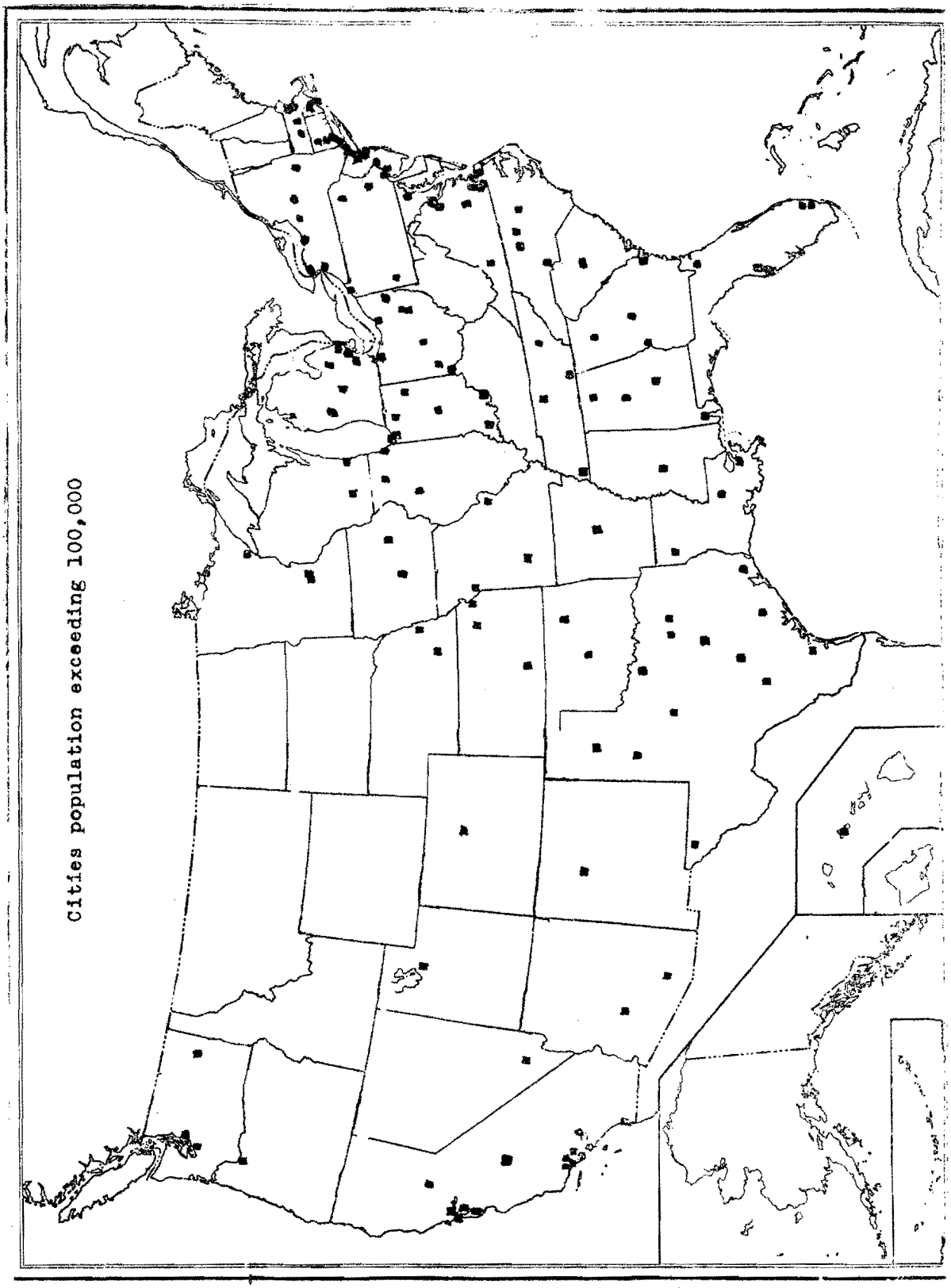
The histogram on page 13 contains a numerical summary of equipment and functions carried on by the police laboratories surveyed in this study. It is obvious that with the exception of a handful of laboratories, almost all laboratories require additional facilities, equipment and personnel to enable them to meet all their responsibilities.

Many crime laboratories do not accurately know their budgets. Only 54% supplied responses to the question concerning the size of their budgets. In many cases the personnel of the laboratory are paid by other sub-divisions of the local law enforcement agency. Many laboratories only reported their expense budget rather than personnel budget.

More than one-half of the laboratories surveyed reported unsolved technical problems.

Of the total number of 459 civilian personnel now employed (1966) in crime laboratories, almost all possess Bachelor of Science or equivalent degrees. Of the 623 full-time police personnel, only a fraction hold Bachelor of Science degrees with notable exceptions in large municipal laboratories. Among the personnel there are approximately 20 Ph. D's. The areas of document examination, firearms comparison, and fingerprints have the lowest number of degree holders. The majority of the civilian and police personnel working in the laboratories have been qualified as experts by the various courts of jurisdiction. Almost all present crime laboratories have at least one vacancy. These vacancies remain unfilled because starting salary levels are too low and the fringe benefits

MAP NO. 1



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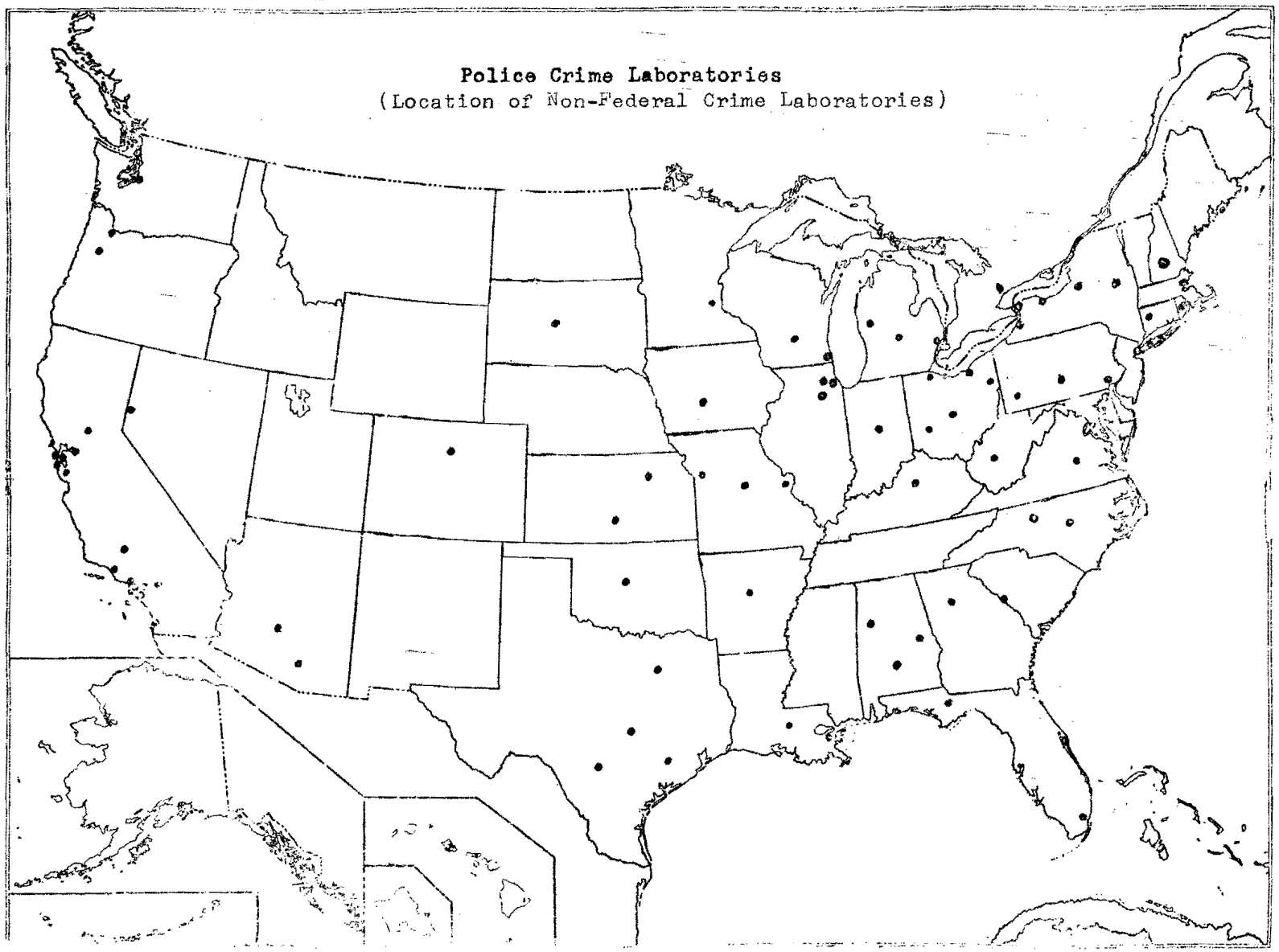

Police Crime Laboratories
(Location of Non-Federal Crime Laboratories)

too few to compete with industry, universities, and other government agencies. On the average, the starting salary for civilian personnel holding a Bachelor of Science degree in chemistry or criminalistics is less than $8,000 per year. In some laboratories, the starting salary is as low as $5,400 per year. However, among the laboratories that were visited the better laboratories had salary schedules which ranged from $8,500 to $13,500 as of 1966 with directors earning a higher salary in some cases. In addition to present vacancies, most laboratories visited indicated that they are undermanned because of budgetary restrictions.

The retention of professional scientific personnel in a crime laboratory depends upon a graded system of promotion similar to that found in the better laboratories in the State of California, civil service qualifications with emphasis upon education, ability and experience determine promotion. Laboratories with combinations of police and civilian personnel tend to have personnel problems because of differences in pay and working hours. In some laboratories the civilians cannot be called into a case after working hours. In addition, whenever police personnel receive an increase in salary the civilians, who do the same work, tend to become unhappy; and, when civilians are raised to salary levels beyond the level of police salaries for the same work in the laboratory, the police morale is affected. It does not seem to be important whether the head of the laboratory is a civilian or a police officer if the director has the professional scientific respect of the laboratory staff.

The President's Crime Commission Report strongly believes that it should be an important goal of the police to develop the capacity to make a thorough search of the scene of every serious crime and to analyze evidence so discovered.

There are variations in the practice and philosophy of the crime laboratory within the governmental structure. In two counties in the United States the laboratory is under the jurisdiction of the district attorney. In the majority of the cases the laboratory is responsible to the chief of detectives; in some cases the laboratory reports to the department's executive officers; in some instances the laboratory head reports to the sheriff of a county; in many cases the laboratory is under the direct control of the executive in charge of technical services; in no cases are laboratories supported by public funds operating as an arm of the court, or as an independent scientific organization which would serve both the court, police and the defense counsel. Some directors of crime laboratories believe the laboratory should be an arm of the court. A substantial number of criminalists, who are laboratory directors, propose to make crime laboratories independent organizations serving both the prosecutors and defense attorneys, as well as law enforcement agencies. The Wisconsin State Crime Laboratory, by statute (Wisconsin 1965, Statutes 165.01 State Crime Laboratory), is an independent investigative body that serves the courts, law enforcement agencies and defense attorneys. It should be pointed out, however, that evidence in the hands of the crime laboratories today is made available to the defense by the permission of the district attorney or by court order; the evidence is carefully safeguarded and continuity of possession is maintained.

At the present time many city laboratories also service surrounding geographical and political jurisdictions through informal or formal agreements. In some areas state laboratories do not provide services to city police departments or towns that do not have laboratories because requests for service are not received. In one state, the state laboratory is a sheriff's bureau and services the sheriffs but not the other law enforcement agencies unless called upon. In every case the position of the crime laboratory within the governmental structure contributes to or limits its efficiency.

In the selection of geographical areas with sufficient population densities necessary to support a crime laboratory, the problem of the autonomy of crime laboratories arises. In many cases the best place to locate a new laboratory would be in a part of a state which might service several counties, cities or even areas of adjoining states. It is obvious in the latter instance that the position and operation of the crime laboratory within the overlapping governmental structure would be exceedingly complicated, for the laboratory would cross the different jurisdictional lines of law enforcement agencies. Methods for administering and financing such installations are not a subject of this report. This report cannot resolve these problems. However, there have been interstate public service agencies and compacts formed in the fields of transportation, sanitation and pollution control which could provide a precedent.

A model regional crime laboratory as determined by the Advisory Board for this project would serve 500,000 to 1,000,000 people in an area where there are 5,000 Part I offenses per year. In accordance with the Crime Commission Report, all Part I crimes should be processed by a laboratory. Such a laboratory would have to be within two hours driving time of any point in its jurisdiction, and in sparsely settled areas, withing two hours flying time from any point in its jurisdiction. The laboratory would offer complete technical services and analyses in the following fields: (1) Physiological fluids. ... (2) Hairs and fibers and other trace evidence. ... (3) Comparative microscopy. ... (4) Wet chemistry. (5) Instrumental analysis. ... (6) Document examination, writings, typewriting. (7) Polygraph. ... (8) Photography. ... (9) Latent prints. ... (10) Crime scene services. The Board of Consulstants decided that the number of scientific personnel required to operate a regional laboratory which would provide the laboratory functions just enumerated is 12 to 20 scientific personnel. Such a laboratory would require a capital budget of approximately $200,000. This amount of money would provide for a library, furniture and fixtures, comparison microscopes, a polarizing microscope, stereo microscopes, x-ray diffraction unit, emission spectrometer, infrared spectrophotometer, electrophoresis equipment, ultra-violet spectrophotometer, an analytical gas chromatograph, mobile units including trucks, equipment and supplies and miscellaneous photographic equipment.

The recognition by local authorities of the need for crime laboratories is the most crucial problem we face in an attempt to implement recommendations for such laboratories. The problem is complicated by the fact that some police departments deny this need. The greater the number of jurisdictions a laboratory

serves, the more serious and complicated the problem. Complicated, too, is how a crime laboratory can best serve the need of very sparsely settled areas. Such communities do not generate 5,000 Part I crimes, the minimum number of cases essential to the viability of a crime laboratory.

Still another problem and perhaps in many respects the most important is the education of police officers who must be made aware of the need to obtain physical evidence through the utilization of laboratory personnel who, in addition to the processing of latent fingerprints, can be called upon to search crime scenes for traces of evidence of all kinds. The problem is made more complex by the shortage of such skilled personnel and because many police officers are unaware of the facilities and services available to them through a crime laboratory. The successful utilizations and functioning of the established crime laboratories is therefore contingent upon the development first of regional educational programs for police officers.

SIGNIFICANCE AND RECOMMENDATIONS

It was virtually impossible for the committee to make precise recommendations for the location of new crime laboratories because there was no practical way to determine which existing laboratories would consider it feasible to expand their jurisdictions of service. However, the criterion for a model regional crime laboratory is the capacity to serve a minimum of 500,000 to 1,000,000 people with an average of 5,000 Part I offenses per year. Other factors which complicate such efforts are mentioned above. It is obvious, however, that there is a dearth of technical services available to law enforcement agencies in various parts of the country: Northern Alabama; Alaska; Southwest Arizona; Central Arkansas; South Central Colorado; Central Connecticut; Delaware; Northeast Florida, West Coast Florida, East Central Florida; South Georgia; Hawaii; Southern Idaho; North Indiana; East Iowa; Western Kansas; Western Kentucky; Northern Louisiana; Central Maine; Central Massachusetts; Southeast Michigan; Central Minnesota; Northwest Mississippi; South Central Missouri; Central Montana; Central Nebraska; Northwest Nevada; Southern New Hampshire; Northeast New Jersey, Southern New Jersey; Central New Mexico; East Central New York, Central New York; Southern North Carolina; Central North Dakota; Eastern Oregon; Northeast Pennsylvania; Rhode Island (present facility is State University Laboratory); Central South Carolina; East Central South Dakota; Western Tennessee; Northwest Texas, West Texas; Northern Utah; Central Vermont; West Central Virginia; East Washington; East Central West Virginia; North Wisconsin and Central Wyoming.

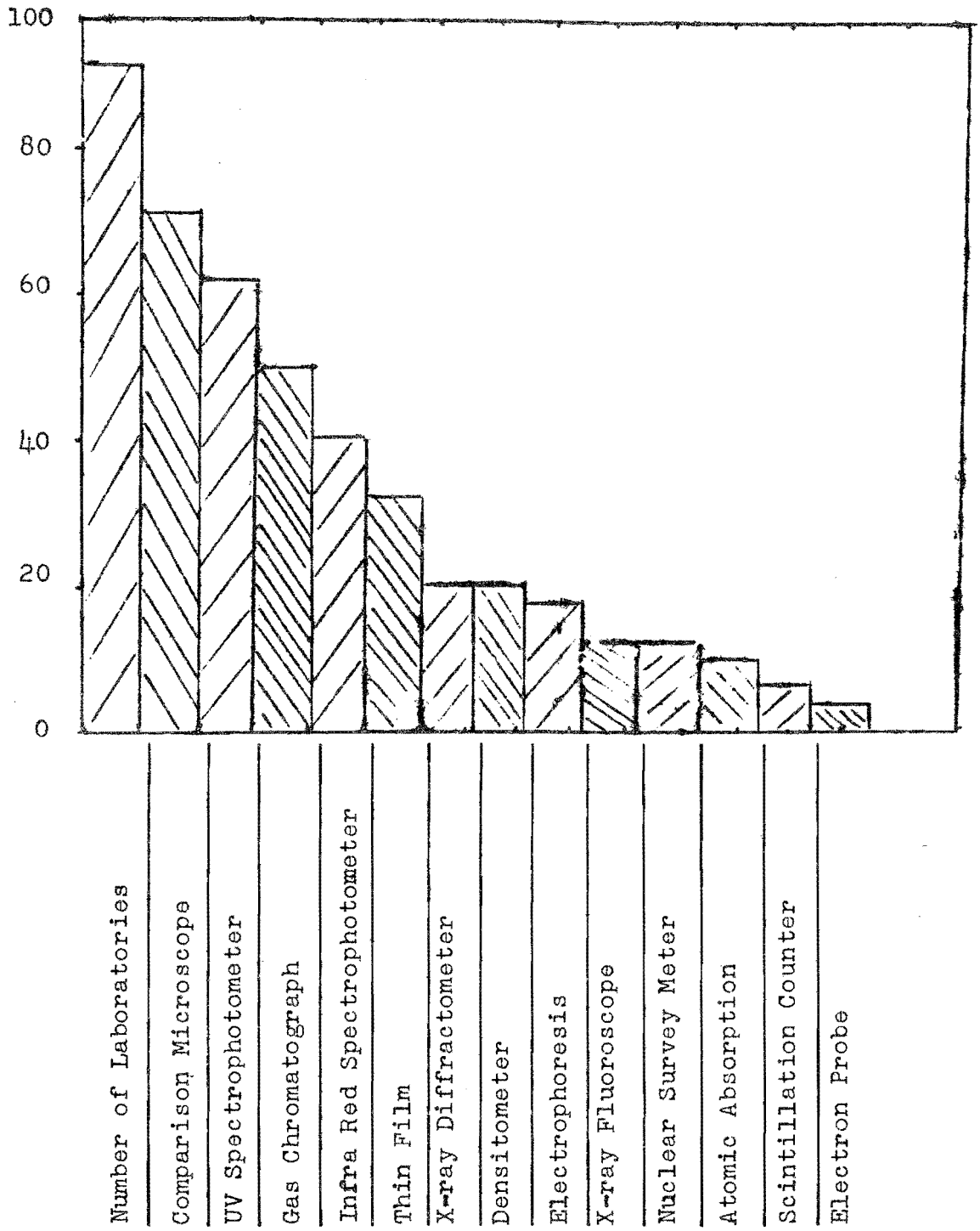
The data strongly indicates a need for further investigation and improvement in the traditional link between science and technology and the criminal justice process. Some directors of large crime laboratories felt that the number of crimes committed in their jurisdictions that should have been serviced by the laboratory was six to twelve times greater than the number of cases submitted by investigating officers. This ties in very closely with the findings of the President's Commission, quoted earlier.

Some of the larger city crime laboratories, such as the one in New York City, accept small numbers of on-the-job trainees from other police departments for an optimum period of two years or longer in questioned documents and firearms comparison. In addition to the program of criminalistics at the University of California at Berkeley, there are small programs turning out a few criminalists at Michigan State University, Florida State University and California State College at Los Angeles now offers a M.S. with a major in criminalistics. Pre-requisites are a B.S. in chemistry or physics with a minimum of 24 units in chemistry. (At present there are eight students in this program as of 1967). In the Fall of 1967 John Jay College of Criminal Justice of The City University of New York launched its first undergraduate program in criminalistics. This program leads to a Bachelor of Science degree. The first class consists of thirty undergraduate students. Since some of these students have been admitted with two years advanced standing in the physical sciences, about one-half of the group may obtain their B.S. degree in criminalistics in June 1969.

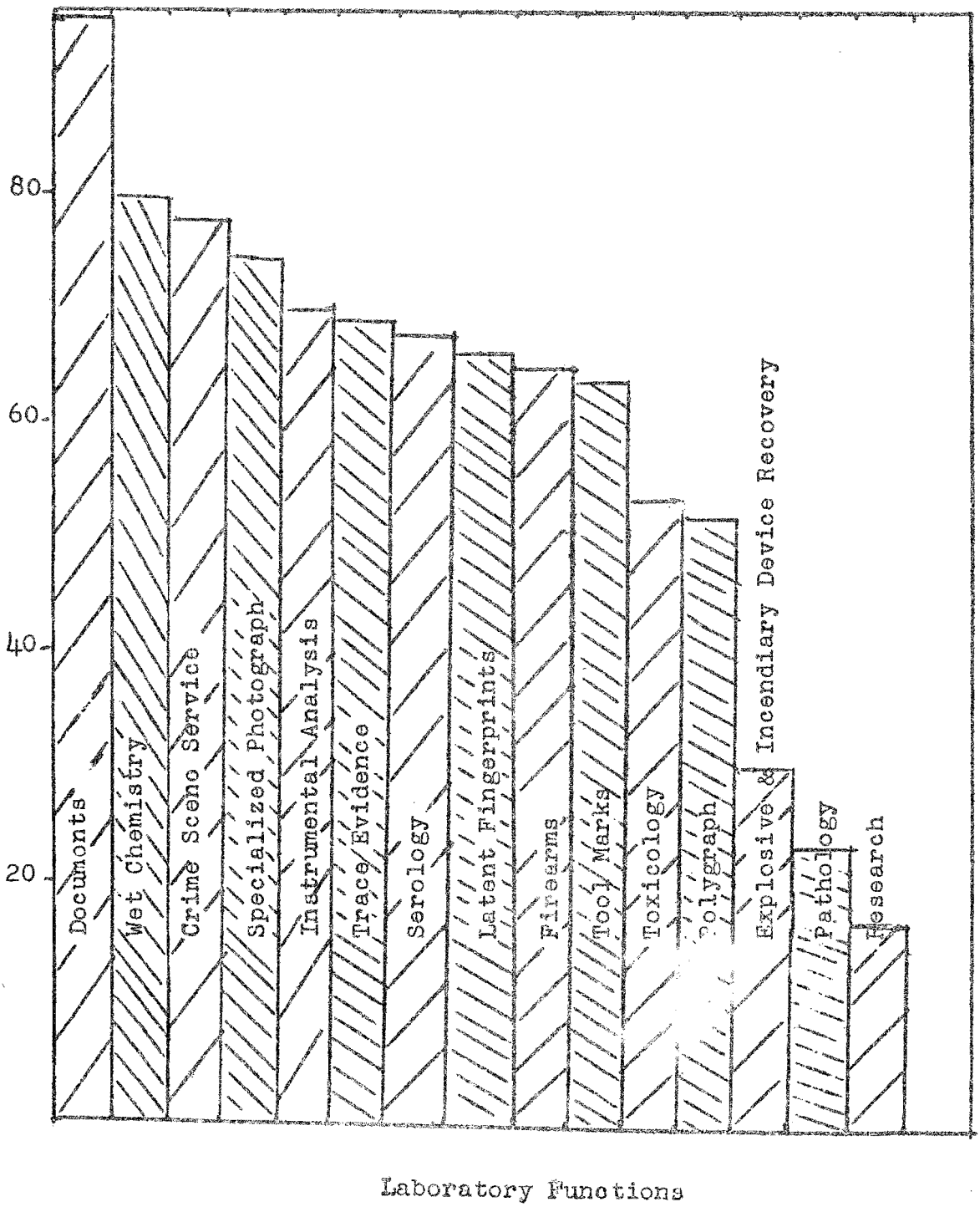
An examination of the educational backgrounds of personnel in many crime laboratories indicates a need for considerable upgrading. The number of experts qualified by "On-the-Job" training is excessive, covering more than 25% of the personnel. If compensation and fringe benefits were improved, personnel with college degrees in the physical sciences and criminalistics could be successfully recruited.

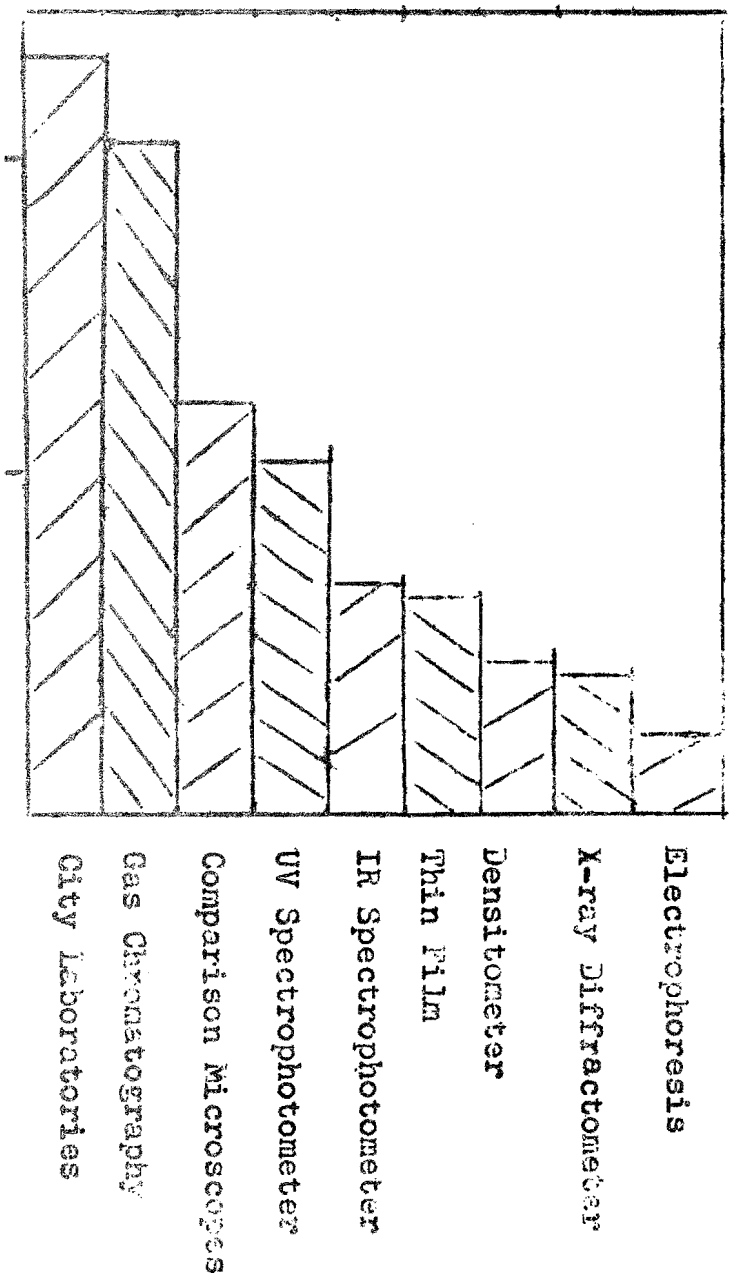
Only a small number of non-federal large crime laboratories can be considered fully equipped. Even the largest of the laboratories, with instrumentation investments approaching a half million dollars, required additional instrumentation to take advantage of new developments in science and technology. Almost all of the crime laboratories surveyed in this study have equipment shortages. The graphs on the following pages indicate the situation with respect to laboratory functions and instrumentation. These shortages range from the lack of two instruments to a total lack of instrumentation. Beyond the comparison microscope the next most common instrument one finds is an ultra-violet spectrophotometer. Nevertheless, only fifty-six of the laboratories have this equipment. Forty have infrared spectrophotometers; forty-six are equipped with gas chromatographs; only twenty-two laboratories are equipped with x-ray diffractometers; one laboratory is equipped with an electron probe; thirty-two have thin layer chromatography equipment and seventeen are equipped to use electrophoresis in analyses. There are other instruments available today such as mass spectrometers and gamma ray spectrometers (the latter being used with micro samples of evidence that have been neutron activated), and nuclear magnetic resonance apparatus may in the future be utilized by crime laboratories. Research work in applying these and other powerful tools to criminalistics is just starting.

Many law enforcement officers at all levels of command lack an understanding of both the capabilities and the limitations of crime laboratories. The education of the majority of law enforcement officers in the capabilities and limitations of the crime laboratories is just as important as the proliferation of



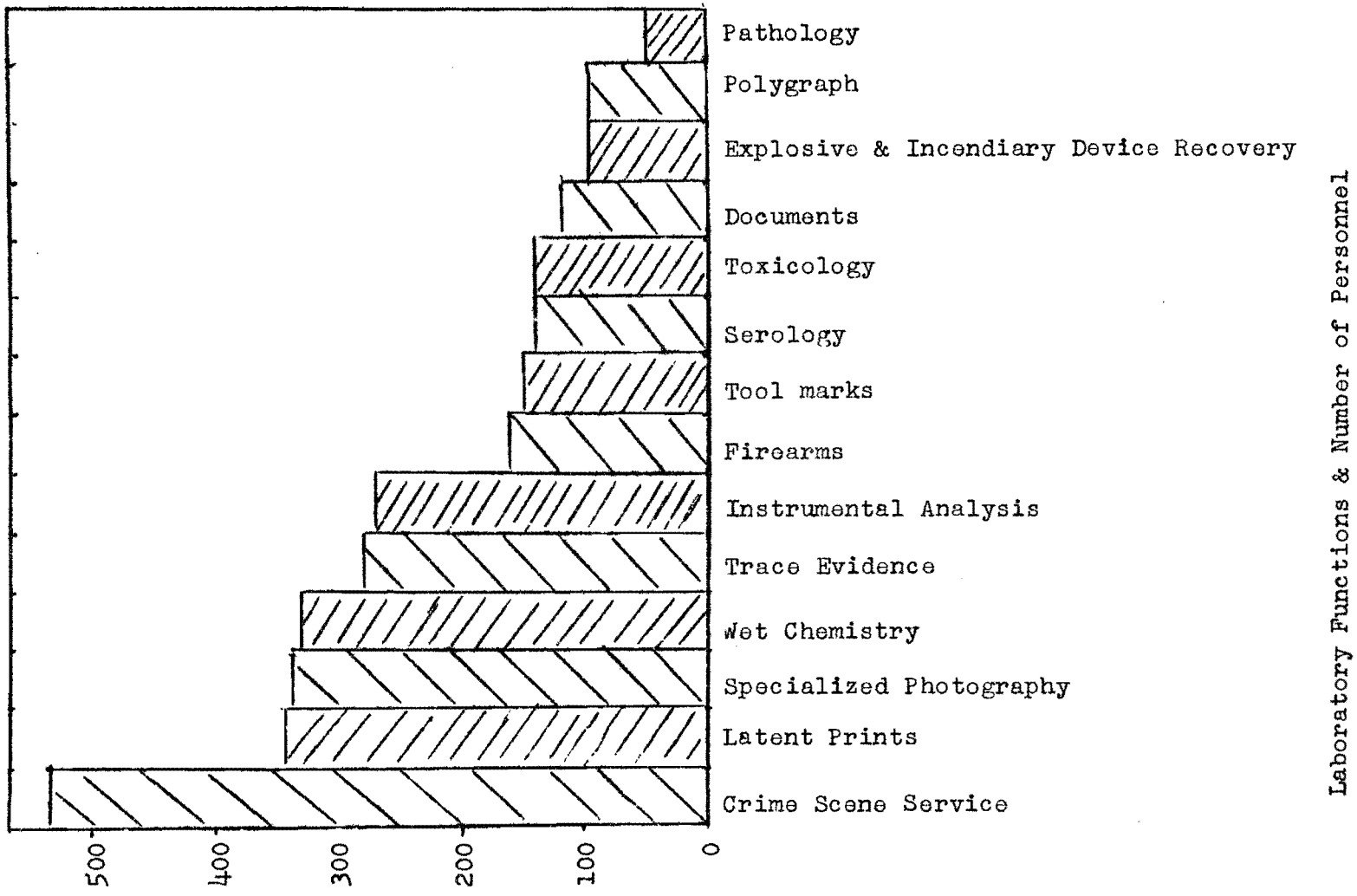
Instrumental Analysis - All Laboratories

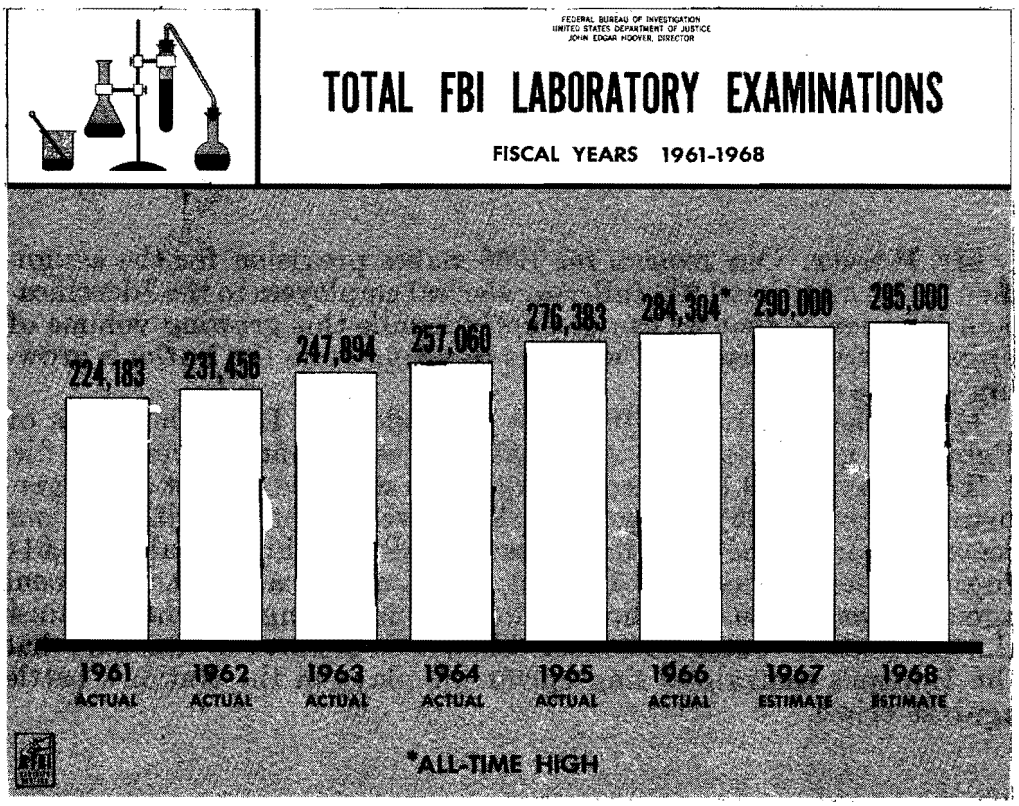

80
60
40
20
Documents
Wet Chemistry
Crime Scene Service
Specialized Photograph
Instrumental Analysis
Trace Evidence
Serology
Latent Fingerprints
Firearms
Tool Marks
Toxicology
Polygraph
Explosive & Incendiary Device Recovery
Pathology
Research
Laboratory Functions

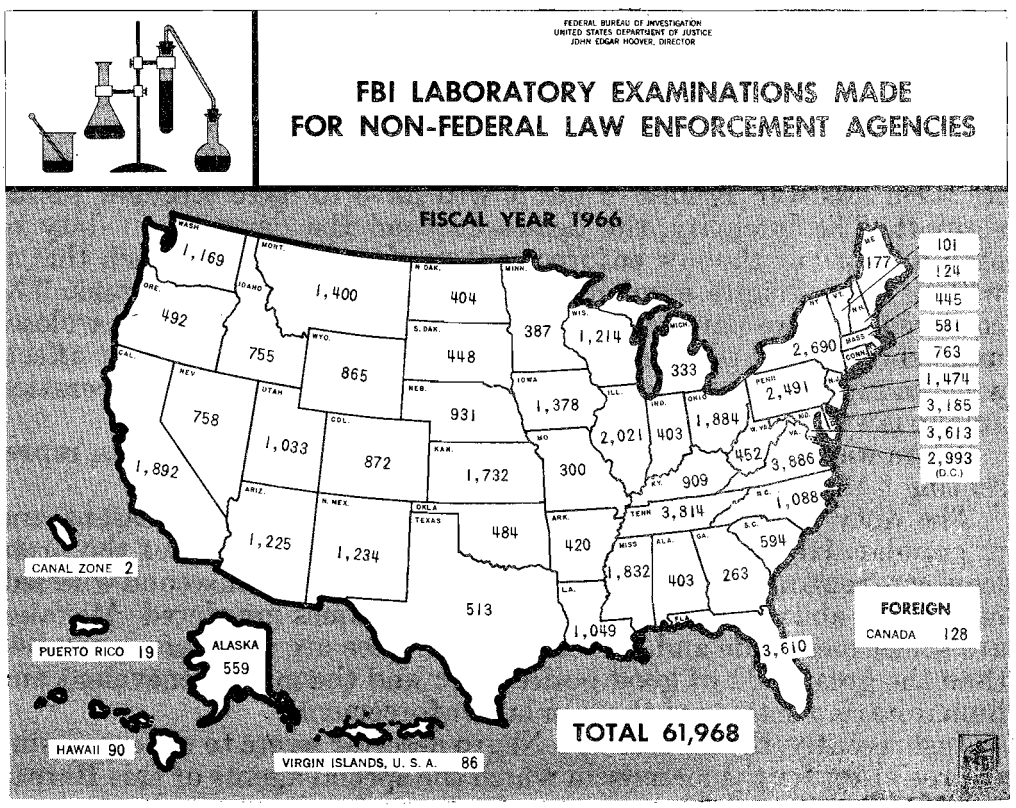


City Laboratories

Instrumental Analysis


Pathology
Polygraph
Explosive & Incendiary Device Recovery
Documents
Toxicology
Serology
Tool marks
Firearms
Instrumental Analysis
Trace Evidence
Wet Chemistry
Specialized Photography
Latent Prints
Crime Scene Service
500
400
300
200
100
0
Laboratory Functions & Number of Personnel


FEDERAL BUREAU OF INVESTIGATION
UNITED STATES DEPARTMENT OF JUSTICE
JOHN EDGAR HOOVER, DIRECTOR
TOTAL FBI LABORATORY EXAMINATIONS
FISCAL YEARS 1961-1968
224,183
231,456
247,894
257,060
276,383
284,304*
290,000
295,000
1961 ACTUAL
1962 ACTUAL
1963 ACTUAL
1964 ACTUAL
1965 ACTUAL
1966 ACTUAL
1967 ESTIMATE
1968 ESTIMATE
*ALL-TIME HIGH


FEDERAL BUREAU OF INVESTIGATION
UNITED STATES DEPARTMENT OF JUSTICE
JOHN EDGAR HOOVER, DIRECTOR
FBI LABORATORY EXAMINATIONS MADE
FOR NON-FEDERAL LAW ENFORCEMENT AGENCIES
FISCAL YEAR 1966
WASH 1,169
MONT. 1,400
N. DAK. 404
MINN. 387
WIS. 1,214
MICH. 333
ORE. 492
IDAHO 755
WYO. 865
S. DAK. 448
NEB. 931
IOWA 1,378
ILL. 2,021
IND. 403
OHIO 1,884
CAL. 1,892
NEV. 758
UTAH 1,033
COL. 872
KAN. 1,732
MO. 300
KY. 909
TENN. 3,814
ARIZ. 1,225
N. MEX. 1,234
OKLA. 484
TEXAS 513
ARK. 420
LA. 1,049
MISS. 1,832
ALA. 403
GA. 263
FLA. 3,610
S.C. 594
N.C. 1,088
VA. 452
W. VA. 3,886
PENN. 2,491
N.Y. 2,690
MD. 763
DEL. 101
N.J. 1,474
CONN. 581
MASS. 3,185
R.I. 445
VT. 124
N.H. 177
ME. 3,613
D.C. 2,993
CANAL ZONE 2
PUERTO RICO 19
ALASKA 559
HAWAII 90
VIRGIN ISLANDS, U. S. A. 86
FOREIGN
CANADA 128
TOTAL 61,968

crime laboratories and the improvements of present crime laboratories. The map on page 17 furnished by the Federal Bureau of Investigation, indicates 61,968 examinations performed by the F.B.I. Laboratory for non-federal law enforcement agencies; this indicates that non-federal law enforcement agencies are not adequately utilizing the excellent facilities of the F.B.I. Laboratory. The total number of cases handled by non-federal crime laboratories in the United States is 312,459 in 1965. It should be pointed out that a single case may require on the average of three to ten examinations. In rare instances one case may be subjected to as many as several hundred different examinations. The F.B.I. Laboratory in the year 1966 conducted a total of 284,304 examinations, including 61,968 examinations made for non-federal law enforcement agencies.

In many jurisdictions the crime laboratory tends to be neglected with respect to the allocation of departmental financial resources. There is a tendency to look at instrumentation and scientific equipment as items apart from the criminal justice process. The purchase of a $5,000 to $10,000 instrument even in a jurisdiction with a population of seven million and a high crime index is often difficult because traditional methods of law enforcement budgeting tend to limit the availability of funds.

In order to obtain a well integrated operation, it may be desirable to establish smaller local laboratories as branches of the central State laboratory. The same division of work would prevail, but the local jurisdictions would not control their laboratory operations; rather they would be under the direction of the central State laboratory with possibly the whole system under some independent agency. Something like this arrangement is in operation in Texas except that the local laboratories are not responsible directly to the central laboratory but should be in order to give proper supervision and co-ordination.

A common technique that provides for the sharing of personnel and equipment by different jursidictions is called a mutual aid agreement. Some are formal arrangements, but very often they are simple informal arrangements for mutual utilization of personnel and equipment as required. Such mutual aid agreements are useful; however, they do not materially raise the quality of law enforcement and they are not binding if more than one agency needs to use the same personnel or equipment simultaneously. There is a tendency to be concerned mainly with personnel and equipment and not physical facilities. This is something which restricts the usefulness of these agreements. Attention should be directed to co-ordinate and consolidate law enforcement efforts on a formal basis and restrict mutual aid agreements.

With the advent of new techniques and new scientific equipment for use in crime laboratories, a departmental budget must provide support for education of crime laboratory personnel on a continuing basis. This includes subscriptions to scientific journals; attendance at short term specific courses offered by colleges and/or commercial scientific apparatus companies; time off for graduate courses in some cases, with tuition paid by the department.

The single most valuable method of keeping up-to-date, for personnel who already are highly skilled, is attendance at professional meetings such as meetings of the Academy of Forensic Science, the Symposia on Science and Technology carried on in 1966 and 1967 with the support of the Office of Law Enforcement Assistance, and attendance at specialized seminars and scientific conventions such as those held by the American Chemical Society, the American Physical Society and similar professional groups where new techniques are discussed and new instruments are on display. Monies must be provided for this purpose.

In research and science teaching, it is a common practice for college professors and researchers to exchange places for one or two years with colleagues at other institutions and research laboratories. It is suggested that this procedure be tried with respect to crime laboratory personnel. One objection to the exchange of personnel is the inconvenience that would result because the exchange personnel must remain available as court witnessess in their original jurisdictions. In addition, numerous administrative problems might arise such as seniority, continuation of pension benefits, medical and life insurances, and other fringe benefits. A Research Institute in Science and Technology might very well serve as a means of exchange of personnel.

As stated previously, there are seventeen (17) states that did not have a crime laboratory in 1966. The police departments of these states, in some cases, utilize the facilities of the F. B. I. Laboratory. The total examinations (not cases) from non-federal agencies for the year 1966 made in the F. B. I. Laboratory was 61,968. Many areas of the United States with large populations as indicated by Map No. 1, have essentially no crime laboratory coverage (each dot on Map No. 2 - represents a non-federal crime laboratory). In addition many of the laboratories located on Map No. 2 have limited facilities and in some cases lack sufficient personnel resources. The majority of the laboratories listed on the map need support to raise them to the proposed standards for a laboratory recommended by the Advisory Board (see page 9 of this report). The suggestions for the location of additional crime laboratories in the United States on page 10 were based upon population densities taken from the Rand McNally Map of Population Densities adjusted to the year 1965. A comparison of the list of suggestions for new crime laboratories on page 10 with Map No. 2 "Location of Non-Federal Crime Laboratories" further indicates the need for additional laboratory facilities. In general, of the 40 city laboratories with a population exceeding 100,000 (with a few notable exceptions), most would require substantital support for the expansion of services to their law enforcement agency. It is important to stress the fact that approximately 100 cities with populations exceeding 100,000 have no crime laboratory service. Even in those cases where there is a state laboratory, the distances and time for travel required make it impossible for laboratories to service all Part I crimes as suggested in the President's Crime Commission Report.

In addition, all but a handful of state crime laboratories will require substantial support for expansion of their services. In many cases where the

state crime laboratory is the only one in the state, distances preclude complete coverage of the state.

The lack of a standard report form to describe the work of individual State, City and County crime laboratories makes it difficult to compare the work of one laboratory with another. The reader of this document will have to study the raw statistics on pages 54-68 with great care in order to compare the work and activities of different laboratories. Just as there is the F.B.I. Uniform Crime Reporting Program, there is a need for a reporting program dealing with the cases and examinations involved in the work and activities of non-federal crime laboratories. The wide range of educational background observed among the laboratory staffs varies from one college graduate to 100% college graduates, and indicates the need for further professional development in many jurisdictions. Where the educational background limits the maximum efficiency of the laboratory it is recommended that arrangements be made with local colleges or universities to provide the required scientific professional training.

In some states the position of "Criminalist" is a Civil Service title with sound scientific educational requirements. It is interesting to note that some of the most sophisticated crime laboratories strongly indicate their need for additional scientific expertise in the field of criminalistics. On page 11 it was indicated that the number of trained criminalists graduating from universities in the United States is far too small to meet even present day needs, without considering the needs of expansion. To implement the increased development of existing laboratories, the creation of new regional laboratories and the conversion of some present laboratories into regional laboratories would require a tenfold increase in the number of qualified professional criminalists or forensic scientists available for service in these laboratories. In order to provide for personnel needs of present laboratories and the personnel needs of proposed laboratories, universities or colleges should set up programs in criminalistics (forensic science) sufficient to graduate 300 criminalists a year for a period of ten years. The board, after careful analysis of the data concerning the scientific functions carried on in crime laboratory work, submits the following suggested curriculum to serve as a model for institutions of higher learning which might want to enter this specialized field. It is believed that federal support would be required to set up some phases of the program. The model curriculum is intended as a general guide. Each institution embarking in this area of scientific education should make variations in accordance with the practices and requirements of its own institution.

This curriculum meets the standards of the American Chemical Society (ACS) for evaluating undergraduate professional education in chemistry. Students completing this program would qualify for graduate work in the future.

CRIMINALISTICS TRAINING:

Credits			
10	College Chemistry with Qualitative Analysis-Laboratory	1	year
3	Quantitative (inorganic analysis)	1/2	year
6	Organic Chemistry (including qualitative organic analysis)	1	year
3	Bio-Chemistry	1/2	year
6	Physical Chemistry	1/2	year
3	Instrumentation (Physical Organic Chemistry)	1/2	year
12	Internship, full-time	1/2	year
9	Social and Behavioral Science	1-1/2	years
12	Mathematics - Groups, Sets, Fields, Booleian Algebra, Calculus, Statistics, Probability and Computer Theory	2	years
8	Human Biology	1	year
8	General Physics	1	year
6	Introduction to Law and Order	1	year
3	Law and the Criminal Process	1/2	year
3	Investigative Process	1/2	year
3	Introduction to Criminalistics	1/2	year
3	The Crime Laboratory	1/2	year

(30 Credits of Liberal Arts and Humanities according to individual college requirements.)

128 TOTAL CREDITS

SUGGESTED FOUR-YEAR CRIMINALISTICS PROGRAM LEADING TO BACHELOR OF SCIENCE DEGREE

	1st SEMESTER	2nd SEMESTER
FRESHMAN	General Chemistry Mathematics Human Biology English, Humanities and Social Sciences	General Chemistry Mathematics Human Biology English, Humanities and Social Sciences
SOPHOMORE	Mathematics Physics Physical Chemistry Language Humanities and Social Sciences Quantitative Analysis	Mathematics Physics Physical Chemistry Language Humanities and Social Sciences

	1st SEMESTER	2nd SEMESTER
JUNIOR	Organic	Organic
	Introduction to Law and Order	Investigative Process
	Law and Criminal Process	Crime Laboratory
	Introduction to Criminalistics	Humanities and Social Sciences
SENIOR	Instrumentation	Instrumentation
	Biochemistry	Introduction to Law and Order
	Electives	Internship

SUGGESTED MASTER'S DEGREE PROGRAM
(For the training and research of teaching personnel for criminalistics who already possess a Bachelor of Science degree in chemistry or in a related area.)

Research Thesis	4 - 8 credits
Research Methodology	2 - 4 credits
Advanced Criminalistics	5 - 10 credits
Advanced Administration of Justice	3 - 5 credits
Electives in Pure Sciences	5 credits

A study of the statistical data in Appendix No. 4, pages 54-68 indicates that there are a variety of approaches used by crime laboratories to increase their technical capabilities by making use of local industrial laboratories, university laboratories, hospitals, private pathologists and state departments of health. In some cases, for example, the State of Rhode Island, the laboratory that reported for the state is a university laboratory (University of Rhode Island). When there are such special organizational arrangements and the necessary liaison depends on a single individual's "professional personality" - there is a possibility of the particular service thus provided being discontinued if the individuals involved in the liaison should pass away or terminate their employment, or if the University policy changes. These special arrangements, at best, are really stop gaps except for cases requiring very highly sophisticated scientific apparatus.

With few exceptions, directors of crime laboratories recognize the need for additional instrumentation and the continuing need for the replacement and upgrading of equipment. In addition, the majority of the laboratory directors recognize their shortcomings, and with proper support will take advantage of the opportunity for upgrading their facilities and services.

TECHNICAL PROBLEMS TO BE SOLVED

A compilation of the unsolved laboratory problems reported by directors of crime laboratories was based on the replies to the questionnaire. The majority of laboratories were concerned with unsolved technical laboratory problems; the compilation is listed below. It should be noted that in the recommendations for research in criminalistics, presented in the latter part of this report, some of the same unsolved technical problems were identified by the Advisory Board:

PROBLEMS	NUMBER
Analyses for unusual materials: enovid, ergotrate, digitalis, etcetera.	1
Blood-identification of minute quantities	13
Developing better tests for body fluids (semen, saliva, etcetera)	3
Analysis of trace amounts of drugs (LSD, etcetera)	6
Evidence - evaluation (glass, grease)	5
Evidence - preservation and collection on statewide basis	1
Hair identification	9
Instrumentation	3
Poisons - unknown analyses	2
Paints - comparative analyses	4

The adaptation of new developments in the field of science and technology to the daily working requirements of criminalistics may be illustrated by a discussion of the scientific analysis of hair. One would think of this as a fairly common and simple clue material. If the criminalist could positively identify a hair caught under the fingernail of a crime victim and place it definitely at its origin, he would naturally have a fine analytical tool. Recently it has been proposed that neutron activation analysis be recognized as having a great potential for identifying individual characteristics of human hair.

The complexity of the equipment and the requirements of a high flux reactor do not make it a readily available tool for police crime laboratories. Not only is this technique expensive but it presents radioactivity hazards. The mass spectrograph and magnetic nuclear resonance are research tools which may be superior to neutron activation for trace analysis. However, very little work has been done in criminalistics in this field.

Some experts in the field of gas chromatography believe that their field has hardly been scratched, while others feel that the tool has been pushed to its scientific limit. However, the combination of a gas chromatograph and a mass spectrometer is a powerful tool for the organic analytical chemist. For certain types of evidence, pyrolysis and differential thermal analysis lend themselves to identification of substances present in complex mixtures. However, the basic scientific research to make these tools useful to the field of criminalistics is just getting underway. Even in relatively simple problems such as detection of alcohol in the blood of drunken drivers, simpler and more rapid techniques can be developed.

The electron micro probe, utilized at the Department of Public Safety, Bureau of Criminal Identification and Investigation at Joliet, Illinois is the only instrument of its type in use in a non-federal crime laboratory in the United States. The number of pieces of atomic absorption equipment in use in crime laboratories is very small.

It is obvious that scientific research institutes, specializing in basic research in criminalistics, should preferably be established in universities. Arrangements for research to be done in crime laboratories should also be made possible through financial support.

RESEARCH NEEDS

1. There is a need for standardization of physical examination procedures for individualization of all types of evidence whether this be hair, fibers, paint, bullets, and so on.

2. There is a great need for a survey of the scientific literature with storage and information retrieval computer arrangements, making such information available by phone, or by means of computer terminals connected by data phone line to every crime laboratory.

3. Research in sciences and engineering conducted by graduate students, in both the social and physical sciences, has been supported on a large scale by the federal government. There are many universities today whose federal subsidy for research for this current year exceeds all of the monies spent in all phases of criminalistics for the one-third of a century during which criminalistics has existed as a professional science. Federal support for graduate research and for the training of personnel to educate future generations of criminalists is a self-evident and imperative need.

4. There is a need for statistical studies in all areas of trace evidence comparisons such as glass, paint, hairs and fibers. This arises from the fact that it is almost impossible to assign mathematical probabilities to the occurrence of two materials from different sources having a common origin. In a burglary case, for example, it might be shown that a slit of glass in a suspect's shoe is identical to known glass from the point of entry in refractive index, density gradient, and qualitative spectrographic analyses, techniques now available to a large number of crime laboratories. Even where more specific analysis is possible, such as neutron activation analysis, which identifies and quantitates numerous elements, it is still not possible to evaluate the significance of identities in terms of probability.

5. Because the problem of maintaining reference standards for every kind of physical evidence is too cumbersome for local and state laboratories there is a need for some central or regional facility to assist in this area. Reference standards which would be most meaningful to the average laboratory should include firearms, paper, writing instruments and machines, tires and heels, paints, glass,

fibers, hairs, safe insulation, and other materials. Research is needed on the experimental design of probability studies that are essential to the development of the profession of criminalistics or forensic science.

6. Polygraph - a commonly used instrument requires many research studies which are really bio-medical and engineering studies.

7. Simplified methods for neutron activation analysis must be found to eliminate the complex requirements of the system involving a high flux reactor and a sophisticated gamma ray spectrometer.

8. The various types of voice identification systems must be evaluated to find the one best system suited to law enforcement needs.

9. Mass spectroscopy of organic compounds has not been utilized because of the cost of the instrumentation.

10. Mass spectrometers are now available from different manufacturers for analyses of organic compounds. These range in price from $48,000 to $150,000. Research work should be carried on utilizing this type of mass spectrograph for rapid detection of narcotics and other organic compounds in body fluids. Reference curves for various compounds must be developed to make this instrumentation readily usable in crime laboratories.

11. There is a need for further work on the identification of dried blood to permit identification of blood subgroupings.

12. Research must be done to utilize "On-the-Line" computers to make evidence evaluation data available to all laboratories tied into an electronic computer network. The Seminar, "On-the-Line Computers for Research Instruments" held by IBM at Homestead, San Jose, California, in August 1966, indicated that the state of the art in this field is such that research in this area can begin immediately if funds are available.

13. Additional research must be undertaken on firearm residues. Neutron activation analysis has thus far been useful to some degree but, as yet, does not provide all the answers. Research in the requirements for tagging of ammunition components may provide the most useful approach.

14. The many common clue materials can be tagged non-radioactively by manufacturers if cooperation was forthcoming. This is already done in some states with whiskey. Research on the use of tagging components, which would always be present, would simplify identification of paints and other tagged items.

15. The role of questioned document examinations in laboratories is an area in which a great deal of research needs to be done. Computer analysis of handwriting as developed by the F.B.I. Laboratory for signatures on fraudulent checks is a good beginning in this area.

BUREAU OF BUDGET #43-66002 - Approval Expires June 30, 1967

JOHN JAY COLLEGE OF CRIMINAL JUSTICE OF THE CITY UNIVERSITY OF NEW YORK · OLEA, Research Grant #013 (U.S. Department of Justice)
235 East 20 Street, New York, New York 10003 · TITLE OF PROJECT: Study of the Needs and Development of Curricula in the Field of Forensic Science

1. a. Name of your laboratory _____
   b. What is the population of the area you serve? _____
   (1) By Legal Mandate _____ (2) By Informal Cooperation _____
2. State total laboratory case load for 1965. (Note: Multiple examinations for one case are to be considered as a single case, i.e., six different examinations in one homicide case is a single case for this questionnaire.) _____
3. Laboratory Personnel: (Please Indicate Number) a. Professional Civilian - Full Time ____ Part Time ____ b. Police- Full Time _____ Part Time _____ c. Clerical Civilian _____
4. Do you have personnel who provide testimony in Court? Yes No
   Indicate Number _____
5. Which of the services in column A does your laboratory provide? Indicate by Yes or No in column B. This number may exceed 3a plus 3b above.
6. In each of the instances where the answer is No do you refer the work to Federal (F), State (S), University (U), or Private (P) laboratories? Indicate the appropriate letter(s) in column C. This number may exceed 3a plus 3b above.
7. How many members of your staff are involved in providing each of the services indicated in column B? Place appropriate number in column D.
8. What is the highest level of training for each of your staff members providing the services indicated in column B?
   a. Apprentice Training (Civilian)
   b. On-the-Job Training (Police)
   c. Two Years of College Training
   d. B.S.
   e. M.S.
   f. Ph.D.
   g. M.D.
   h. Post Graduate Courses
   i. Commercial Company Course
   Place appropriate letter (a,b,c,etc.) in column E. (More than one response may be indicated.)
9. Which of the following specialists are used in performing the services indicated in column B? Place appropriate letter(s) in column F.
   a. Micro Analyst
   b. Photographer
   c. Document Examiner
   d. Polygraph Operator
   e. Firearms
   f. Criminalist
   g. Chemist
   h. Laboratory Aide
   i. M.D. (Pathologist)
   j. Serologist
   k. Physicist
   l. Biologist
10. Are the services indicated in column B performed: (1) Only for own department (2) Only for other agencies (3) For own department and other agencies (4) Other. Place appropriate number in column G.
11. Please indicate the number of investigations processed by each functional section in your laboratory. Place appropriate number in column H.

A	B	C	D	E	F	G	H
Document Examination							
Instrumental Analysis							
Wet Chemistry							
Toxicology							
Serology							
Crime Scene Service							
Latent Fingerprint Service							
Fingerprints							
Specialized Photography							
Explosive and Incendiary Device Recovery							
Pathology							
Trace Evidence							
Polygraph							
Comparative Microscopy in (Firearms)....							
(Tool Marks)..							
Other							

12. Please indicate in the proper column the number of examinations per year, manufacturer of instrument and year of purchase.

	No. of Examinations	Manufacturer	Year of Purchase
Differential Thermal Analysis			
Mass Spectrometer			
UV Spectrophotometer			
Infrared Spectrophotometer			
X-ray Diffractometer			
X-ray Fluorescence			
Electron Probe			
Gas Chromatograph			
Emission Spectrometer			
Neutron Activation			
Atomic Absorption Spectrometer			
Densitometers			
Comparison Microscope			
Nuclear Survey Meter			
Scintilation Counter			
Scalar Counter			
Thin Film			
Electrophoresis			

PLEASE CIRCLE "YES" OR "NO" TO THE FOLLOWING QUESTIONS

13. Annual Budget $_____. Date of establishment of laboratory _____
14. As police personnel are promoted are they transferred out of the laboratory assignment? Yes No
15. What is the average term of service in the laboratory? Police _____ Professional Civilian _____
16. Would you send personnel for training in forensic science at a collegiate institute if approved by head of your agency?
    Police Yes No Professional Civilian Yes No
17. Would you follow the above policy if no outside financial support was provided if approved by head of your agency? Yes No
18. Do you have access to a computer? Yes No
19. Do you have reference files for:

a. Jewelry Marks	Yes	No	e. Hairs	Yes	No
b. Dry Cleaning Marks	Yes	No	f. Fibers	Yes	No
c. Laundry Marks	Yes	No	g. Automobile Paint	Yes	No
d. Tire Marks	Yes	No	h. Heel Prints	Yes	No

20. Please check memberships of personnel in:
    American Academy of Forensic Science _____ American Physical Society _____
    American Chemical Society _____ American Institute of Biological Sciences _____
    International Association for Identification _____ Other _____
21. a. Do you conduct organized forensic science research for other than regular laboratory activities? Yes No
    b. Please send a photocopy or reference of the most important research paper produced by your laboratory.
22. On the reverse side please list your laboratory's most important unsolved technical problems.

APPENDIX NO. 2

CRIME LABORATORIES IN UNITED STATES

ALABAMA

Tuscaloosa Police Laboratory
Pathology Laboratories
Tuscaloosa, Alabama

State of Alabama
Department of Toxicology and
Criminal Investigation
P. O. Box 231
Auburn, Alabama

ARKANSAS

Firearms Identification and Crime
Laboratory
Arkansas State Police
Little Rock, Arkansas

ARIZONA

Police Department
City-County Crime Laboratory
Tucson, Arizona

Records and Identification
olice Department
South 2nd Avenue, Room 201
enix, Arizona 85003

CALIFORNIA

Crime Laboratory
Glendale Police Department
Glendale, California

Criminalistics Laboratory
Kern County Sheriff's Office
Bakersfield, California

Contra Costa County Sheriff's Office
Criminalistics Laboratory
Martinez, California

Records and Identification
Police Department
120 North Grevillea
Inglewood, California 90301

CALIFORNIA (continued)

Long Beach Police Department
Crime Laboratory
400 West Broadway
Long Beach, California

Los Angeles County Coroner's Office
Hall of Justice
Los Angeles, California 90012

Criminological Laboratory
Los Angeles County Sheriff's Dept.
610 West Temple Street
Los Angeles 12, California

Scientific Investigation Division
150 North Los Angeles Street
Los Angeles 12, California

City of Oakland Police Dept.
Scientific Police Laboratory
Police Administration Bldg.
455 7th Street
Oakland 7, California

Alameda County Sheriff's Office
Crime Laboratory
P. O. Box 787
Pleasanton, California

Pasadena Police Department
P. O. Box 418
Pasadena, California

San Mateo County Crime Laboratory
Sheriff's Office
Hall of Justice
Redwood City, California 94063

Richmond Police Department
Crime Laboratory
Richmond, California

State of California
Bureau of Criminal Identification and
Investigation
Department of Justice
Sacramento 14, California

CALIFORNIA (continued)

City of San Diego Police Department
801 West Market Street
San Diego, California

San Francisco Police Department
Crime Laboratory
Hall of Justice
San Francisco, California

Santa Clara County Laboratory of Criminalistics
875 San Pedro Street
San Jose, California

Orange County Sheriff's Crime Laboratory
Santa Ana, California 92702

Santa Ana Police Department
Crime Laboratory
Santa Ana, California

Ventura County Sheriff's Office
501 Poli Street
Ventura, California

Police Department
Crime Laboratory
San Bernardino, California

COLORADO

Crime Laboratory
Denver Police Department
13th and Champa Streets
Denver, Colorado 80206

CONNECTICUT

Hartford Police Department
Crime Laboratory
Hartford, Connecticut

State Bureau of Identification
Connecticut State Police
100 Washington Street
Hartford, Connecticut

DISTRICT OF COLUMBIA

Police Laboratory
Metropolitan Police Department
Washington, D. C.

FLORIDA

City Police Department
Crime Laboratory
Jacksonville, Florida

Dade County Crime Laboratory
1320 N.W. 14th Street
Miami, Florida 33125

Florida Sheriff's Bureau
Crime Laboratory
Tallahassee, Florida

GEORGIA

Commanding Officer
U.S.A. Criminal Investigation Lab.
Fort Gordon, Georgia

ILLINOIS

Crime Detection Laboratory
Chicago Police Crime Lab.
Central Police & Courts Bldg.
1121 South State Street
Chicago, Illinois

State Bureau Criminal Identification and Investigation
515 East Woodruff Road
Joliet, Illinois 60434

Internal Revenue Service
Alcohol & Tobacco Tax Division
725 Main Post Office Building
Chicago, Illinois

INDIANA

City Police Department
Crime Laboratory
Evansville, Indiana

Indiana State Police Laboratory
Stout Field
Indianapolis 21, Indiana

IOWA

Bureau of Criminal Investigation
State Office Building
Des Moines 19, Iowa

KANSAS

Bureau of Investigation
Crime Laboratory
State of Kansas
Topeka, Kansas

KENTUCKY

Police Laboratory
Division of State Police
New Office Building
Frankfort, Kentucky

LOUISIANA

Crime Laboratory
Louisiana State Police Department
P. O. Box 1791
Baton Rouge, Louisiana

Bureau of Identification
Department of Police
2700 Tulane Avenue
New Orleans, Louisiana
(this lab. under construction - to open early in 1968)

MARYLAND

Maryland State Police
Investigation & Identification Division
Pikesville 8, Maryland

MASSACHUSETTS

Boston Police Laboratory
City Police Department
Boston, Massachusetts

The Commonwealth of Massachusetts
Department of Public Safety
1010 Commonwealth Avenue
Boston, Massachusetts 02215

Crime Laboratory
City Police Department
Springfield, Massachusetts

MICHIGAN

City Police Department
Records and Identification Bureau
Dearborn, Michigan

City of Detroit
Department of Police
Scientific Bureau
1300 Beubien Street
Detroit 26, Michigan

Michigan State Police
Crime Laboratory
East Lansing, Michigan

Police Department
Records and Identification
Grand Rapids, Michigan 49502

Division of Crime Detection
Bureau of Laboratories
Lansing Police Department
Lansing, Michigan

MICHIGAN (continued)

Police Department
Identification Bureau
Highland Park, Michigan

MINNESOTA

State of Minnesota
Crime Detection Laboratory
1246 University Avenue
St. Paul, Minnesota

Police Department
Crime Laboratory
101 East 10th Street
St. Paul, Minnesota 55101

Police Identification Bureau
Duluth, Minnesota 55802

MISSISSIPPI

Mississippi Crime Laboratory
Clinton, Mississippi 39056

MISSOURI

Crime Laboratory
Missouri State Highway Patrol
221 West High Street
c/o State Office Building
Jefferson City, Missouri

Police Laboratory
12th and Locust Street
Kansas City, Missouri

Metropolitan Police Department
1200 Clark Street
St. Louis, Missouri 63103

NEVADA

Washoe County Sheriff's Identification
Bureau
Reno, Nevada

NEW HAMPSHIRE

Police Laboratory
New Hampshire State Police
Concord, New Hampshire

NEW JERSEY

City Police Department
Crime Laboratory
Trenton, New Jersey

NEW YORK

New York City Police Department
Crime Laboratory
Police Academy
235 East 20th Street
New York, New York 10003

New York State Police
Division of State Police Scientific Lab.
8 Nolan Road
Albany, New York

Scientific Crime Detection Laboratory
74 Franklin Street
Buffalo 2, New York

Police Laboratory
Police Department
County of Suffolk
Veterans Highway
Hauppauge, New York

Technical Research Bureau
Nassau County Police Department
Mineola, L New York

Police Lab ory
City of Niagara Falls
Department of Public Safety
Police Division
209 Niagara Street
Niagara Falls, New York

NEW YORK (continued)

Monroe County Sheriff's Office
180 Exchange Street
Rochester, New York 14614

County of Monroe
Public Safety Laboratory
524 Public Safety Building
150 Plymouth Avenue South
Rochester, New York 14614

Syracuse Police Laboratory
Police Department
Syracuse, New York

NORTH CAROLINA

Record and Communications
Police Department
200 N. Green Street
Greensboro, North Carolina 27402

Bureau of Investigation
North Carolina State Police
P. O. Box 2528
Raleigh, North Carolina

OHIO

Crime Laboratory and Records
Police Department
Youngstown, Ohio

Police Scientific Laboratory
Cleveland Police Department
Cleveland, Ohio

Ohio State Highway Patrol
Investigation & Laboratory Section
Columbus 5, Ohio

Police Laboratory
Columbus Police Department
Columbus, Ohio

OHIO (continued)

Police Department
Crime Laboratory
Dayton, Ohio

Police Crime Laboratory
Police Department
Toledo, Ohio

Worthington Police Department
789 High Street
Worthington, Ohio 43085

OKLAHOMA

Police Laboratory
Oklahoma State Bureau of Investigations
State Capital Station Box 3366
Oklahoma City, Oklahoma

Police Department
Crime Laboratory
Oklahoma City, Oklahoma

OREGON

Crime Detection Laboratory
Department of Oregon State Police
University of Oregon Medical School
Portland 1, Oregon

PENNSYLVANIA

Police Laboratory
Bureau of Criminal Identification
Pennsylvania State Police
21st and Herr Streets
Harrisburg, Pennsylvania

Police Ballistics Laboratory
Philadelphia Police Department
Room 850, City Hall
Philadelphia, Pennsylvania

PENNSYLVANIA (continued)

Pittsburgh & Allegheny County
Crime Laboratory
401 Court House
Pittsburgh 19, Pennsylvania

RHODE ISLAND

University of Rhode Island
Laboratories for Scientific Criminal
Investigation
Kingston, Rhode Island

Rhode Island Division of Criminal
Identification
Providence Court House
250 Benefit Street
Providence, Rhode Island 02903

SOUTH DAKOTA

Division of Criminal Investigation
and Identification
Attorney General's Office
Pierre, South Dakota

TENNESSEE

Identification Bureau
Police Department
Knoxville, Tennessee

TEXAS

Texas Department of Public Safety
Identification & Criminal Records
Division
Box 4143 N. Austin Station
Austin, Texas

Fort Worth Police Department
Police Crime Laboratory
1030 Burnett Street
Fort Worth 2, Texas

TEXAS (continued)

Houston Police Department
Identification Laboratory
61 Reisner Street
Houston, Texas

Police Laboratory
Police Department
San Antonio 5, Texas

VIRGINIA

City Police Department
Crime Laboratory
Alexandria, Virginia

Crime Laboratory
Police Department
Norfolk, Virginia

Commonwealth of Virginia
Department of Health
Office of the Chief Medical Examiner
404 North 12th Street
Richmond, Virginia 23219

State Crime Laboratory
45th Criminal Investigation Detach-
ment
Richmond Quartermaster Depot
Richmond, Virginia

WASHINGTON

Seattle Police Department
Crime Laboratory
Seattle, Washington

WEST VIRGINIA

Police Laboratory
Department of Public Safety
West Virginia State Police
Charleston, West Virginia 25305

WISCONSIN

Laboratory & Polygraph
Sheriff's Department
Kenosha, Wisconsin

Wisconsin State Crime Laboratory
917 University Avenue
Madison 5, Wisconsin

HAWAII

Police Department
Identification Bureau
Honolulu, Hawaii

PUERTO RICO

San Juan Police Department
Crime Laboratory
San Juan, Puerto Rico

CANADA

Crime Detection Laboratory
RCM Police
Ottawa, Ontario, Canada

The Centre of Forensic Sciences
Attorney General's Laboratory
8 Jarvis Street
Toronto 2, Ontario, Canada

Police Department Crime Detection Laboratory
312 Main Street
Vancouver 4, C.C., Canada

Crime Detection Laboratory
RCM Police
Winnipeg, Manitoba, Canada

April 1967
John Jay College of Criminal Justice
The City University of New York

APPENDIX NO. 3

INQUIRIES MADE DURING

VISITS TO CRIME LABORATORIES

1. Laboratory Library.
2. Ten most recent acquisitions.
3. Library budget?
4. Are the books read?
5. Educational level.
6. Training of personnel.
7. Number of times personnel have testified in court personally?
8. Number of times laboratory reports have been read into the record without an appearance?
9. Most recent date of testimony in felony?
10. What was the testimony?
11. How often do members testify in court?
12. What is the most recent date in reference files?
13. An example of the preparation of a case with demonstrations of evidence. Who does this?
14. Volume of work.
15. Statistics if maintained. Type of working records.
16. Salary schedules relative to titles of technical personnel?
17. Classifications or titles.
18. Other laboratories with whom they work, i.e., medical examiner, etc.
19. Is evidence available for the defense?
20. Attitudes toward a central research institute in forensic science.
21. Should the laboratory be headed by a scientist or the Police Department?
22. What does the laboratory do?
23. What is the position in the Police Department organizational structure?
24. Where are you in the T. O.?
25. Frequency of use of instrumentation.
26. What should basic qualifications of personnel be?
27. Variety of work.
28. Assess philosophy, if possible.

PERSONAL LABORATORY VISITS

CALIFORNIA

Los Angeles Sheriff's Crime Lab. - November 14, 1966

1. Excellent laboratory.
2. Good library budget.
3. Crump, criminalist, is assistant under Lt. Noble in Division of Technical Services of General Services of Department.
4. Seven personnel: (7 plus head), 3 Ballistics, 2 Documents and 2 Polygraphs.
5. 2,100 testimonies - latest testimony the same day of visit - felony. Total cases 12,353 in 1965.
6. Reference files: checks tires, excellent photo section - prepares exhibits.
7. Salary schedules: Head Criminalist $11,592; Chemist $10,380; Sgts. 1E Ballistics, Documents and Polygraph $10,687; Lab. Aides $8,352 (County population is about 8 million, same as New York City but 5-1/2 million outside of Los Angeles City under L.A. Sheriff, 2-1/2 million under jurisdiction of L.A. City Police).
8. Evidence available to defense by Court order.
9. Monthly statistical and annual statistical reports are maintained.
10. Feel that it does not matter whether police or civilian is head of lab. Lab. does all work except Path.; has no IR.
11. Chief of lab. reports to Under Sheriff who reports to Assistant Sheriff, who reports to the Sheriff.
12. Instruments in daily use.
13. Qualifications should be B.S. in Chemistry or Criminalistics.
14. National Science Research Institute strongly supported.

San Bernardino Crime Lab. - November 15, 1966

1. A small D.A.'s crime lab.
2. Has excellent library - reviews 78 different journals - all read.
3. Personnel: 4 B.S. in Criminalistics; 1 BPH head of lab.; B.S. in Criminalistics; 2 lab. aides. Unusual situation is that all civilians in lab are sworn personnel.
4. 250 testimonies per year, averaging one working day a week. Latest testimony November 15 - two testimonies: marijuana and manslaughter.
5. Reference files: firearms, case markings, etc. starting a document signature exemplar file, fibers and paint.
6. Photo section not part of lab but does exhibits for lab.
7. 3,000 cases per year.
8. Salary Schedules: Head $12,936, Associate Criminalists $9,696.
9. Has Beckman D.U. and Gas Chromatograph - no IR.
10. Evidence available to defense with D.A. consent.
11. Pathology and Toxicology go to a separate agency. Operating under an elected coroner whose requirements for the job are a highschool graduate and citizenship. Bad relations with coroner. The lab reports to Chief Inspector who reports to Sheriff.
12. San Bernardino County is the largest county in the world. Lab is only 8 years old.
13. In favor of newsletter and national research institute of criminalistics.

CALIFORNIA (continued)

San Francisco County and City Crime Lab. - November 17, 1966

1. Good library.
2. Latest acquisitions - 6 months. Books are read.
3. Staff: one criminologist supervisor, three criminalists.
4. Crime scéne team - 9 officers plus two firearms.
5. 452 court testimonies in 1965.
6. Reports are not read into record. Illegal in California.
7. Latest testimony in court - 11/17/66 - type of case burglary with weapon.
8. Photo lab is separate but very large and prepares exhibits.
9. 5,300 cases a year - 417 cases were solved with the five print file.
10. Reference files - firearms, laundry marks (good - up to date) drugs and pills (5 figure file).
11. Caseload 1,210 per month average for 1965.
12. Medical Center at University of California does Path and Tox.
13. Evidence available for defense with DA consent.
14. John Williams, director of lab, approves a central research institute in criminalistics.
15. Belives lab should be headed by scientist or a police officer with some scientific training.
16. Lab does all except Path and Tox and sends out IR.
17. Lab reports to Chief of Inspectors (inspectors are investigating detectives).
18. Basic requirements should be B.S. in criminalistics except crime scene, photo and firearms.

San Jose Crime Lab -Santa Clara County D.A. Office - November 16, 1966

1. Undoubtedly the best all around lab visited thus far.
2. Excellent library - well read - uses lab funds for library books.
3. Criminalist, Director Lowell Bradford, probably the best in the country.
4. Graduate criminalists - one imported from Scotland Yard doing Tox plus 5 two year technicians. Training of personnel by OJT a center school for special courses.
5. Testimony - 600 cases 1965, nothing read into record (California Law). Defense has access to evidence with D.A. approval.
6. Big load is drunk driving and narcotics - at least 3 testimonies per day average. Full and court displays prepared.
7. Salaries - 3 grades of criminalists - (1) $647 to $789 per month (2) $751 to $913 per month (3) $870 to $1057 per month.
8. Toxicologist - $887 to $1080 per month.
9. Lab supervisor - $959 to $1167 per month.
10. Director - $1057 to $1286 per month.
11. Approves of a National Research Institute in Criminalistics but feels it should be tied to a University.
12. Strongly believes all lab personnel should be civilians. Lab does all work except IR and Path. Lab does extensive research work.
13. More papers published than in any other lab inspite of its small size.

CALIFORNIA (continued)

San Jose Crime Lab - Santa Clara County D.A. Office

14. Reports directly to D.A. (thus far best labs visited are those that have been under D.A.'s. Reason: D.A. apparently could get more money than P.D.'s and use evidence in court.)
15. Bradford believes that labs should be completely independent organizations to service the police and the D.A.

CONNECTICUT

State Police - Hartford Crime Lab. - September 30, 1966

1. No laboratory except as indicated below.
2. All personnel are state troopers.
3. All personnel testify in court.
4. No reports read into the record.
5. Most recent date of testimony in a felony - September 29, 1966.
6. Maintains reference files for dry cleaning marks for the State of Connecticut.
7. Demonstration of evidence prepared.
8. Promoted personnel are retained within the laboratory. Only one civilian on staff.
9. Laboratory has two principle divisions - fingerprints and latents and a large document section.
10. Serology work by State Department of Health laboratory in Hartford and also routine toxicology.
11. Wet chemistry and dry chemistry works sent to FBI.

They are very much interested in the formation of a central research institute in forensic science. They believe that a laboratory should be headed by a professional police officer.

In effect, this laboratory is the only one in the entire state with the exception of one city. It is truly a regional laboratory handling work from the entire state and perhaps can serve adequately as a goal for regional laboratories when we come to looking into this in the spring after all data are in.

MASSACHUSETTS

Boston Police Lab. - November 4, 1966

1. Ballistics is a separate division.
2. Practically no library except issues of Journal of Forensic Science and a handful of books.
3. Library budget almost nil. The few publications on hand seem to be read and studied.
4. Educational level. Three patrolmen, one pharmaceutical man who is the toxicologist. Salary $5,400 per year.
5. Testimony in court - each member on average of three days a week.
6. Most recent testimony on November 3rd.

MASSACHUSETTS (continued)

Boston Police Lab.

7. Have small reference files, tire prints, heels, etc. Demonstration when requested by D.A., prepared by one patrolman on staff who is a photographer.
8. Volume of work - over 500 cases a year.
9. Small, inadequate, dirty basement laboratory. Particles of concrete dirt on floor larger than some samples of evidence.
10. Unable to get money to lay new floor or cover with linoleum.
11. No filing system for evidence.
12. All instrumentation done by State Health Department Lab.
13. In homicides, etc. crime scene team is pushed away by Sgts., medical examiners and higher brass.
14. Work of lab processes - wet chemistry has just gotten old model Beckman UV Spectrophotometer.
15. Philosophy none - all discouraged and unhappy but still interested in their work.
16. Lab is apparently low man on totem pole in department.

NEW YORK

Suffolk County Police Lab - Hauppague, - October 7, 1966

1. Total laboratory personnel - 9.
2. Active library.
3. Personnel - 100% police except for director Dr. Newman, Biochemist. Has contributed several articles in forensic science. Personnel trained by college work 2 years, Suffolk County Community College, and on the job training, two personnel trained by New York City Police Lab.
4. 306 personal testimonies in court 1965 - 1966 increased 96%. Recent testimony - homicide. Testimony in court almost daily.
5. Reference files - hair, paint, tires.
6. Demonstrations prepared only on request of Court or D.A.
7. Volume of work - total number of cases 10,584 in 1965.
8. Statistics maintained on a case basis. No difficulty on salary schedules because all are police. Working relationship excellent.
9. Discussion with the entire lab personnel indicated with exception of the director that they felt that a laboratory should be headed and manned by police trained as criminalists. Director claimed that his set-up was best because a scientist as head could maintain scientist direction in spite of police personnel involved.
10. Instrumentations: IR, Spectrophotometer and Gas Chromatograph, comparison microscopes new. Serology, pathology done by medical examiner. Firearms section. No fingerprint work. Are now conducting research on correlation of work on breath test with blood alcohol.

PERSONAL LABORATORY VISIT

NEW YORK CITY

OFFICE OF SCIENTIFIC RESEARCH, NEW YORK CITY POLICE DEPARTMENT CRIME LABORATORY - September 26, 1966

1. Laboratory has a large library - very complete chemical publication references. In addition to the very large Police Academy Library, the library of the John Jay College of Criminal Justice are available in the same building to the crime laboratory personnel.

2. Library budget for total libraries exceeds $30,000 per year.

3. Reference books and journals read constantly.

4. Educational level - all civilians and police engaged in scientific work are required to have a minimum of B.S. degree, There are a few exceptions in Ballistics and the Bomb Squad.

5. Training of personnel - personnel are trained after appointment by being sent to specialized institutions. Chemists trained in organic analysis at John Jay College; on-the-jop training is carried on in Ballistics, Bomb Squad and Documents.

6. Court testimony - testimony by personnel varies by several times to thousands of times.

7. Laboratory reports cannot be read into the records.

8. Most recent date of testimony in felony was same day as this visit.

9. Testimony was on possession of powder chemical identified as a narcotic (heroin).

10. Reference files were used the same day as this visit. Laundry mark in a murder case - Culprit apprehended.

11. Demonstrations of evidence are prepared by the photographic department which is equipped for micro and macro and one to one photography. Case involved matching of fibers and weave in a torn T-shirt used as a mask in a murder.

12. Volume of work - 20,978 for 1965. (Caseload is climbing 15% per year since advent of new Supreme Court decisions.)

13. Statistics maintained- very carefully - all evidence is entered in a handwritten hard bound log and assigned to a correct functional section.

14. Salary schedules - 60% of the total personnel (103) were salaries for police rank held by scientific and technical personnel. The other 40% with civilian titles - as chemists run from $5,400 to $11,400 for Senior Chemists. The majority of the civilian personnel have salary schedules not commensurate with their education or their responsibilities.

15. Classifications are set for civilians by Civil Service. (Chemists, Physicists and Serologists.) New classifications in effect 1967 having starting salary of $9,500 with B.S. and three years experience.

16. The Office of the Chief Medical Examiner is directly involved with the laboratory in murder cases for which it is necessary to process physical evidence.

17. Evidence is available for the defense with permission of the Court or D.A.

18. Director is strongly in favor of a central research institute in forensic science.

19. The laboratory is open-minded as to whether or not the laboratory is to be headed by a civilian scientist or a police officer. This is the case because the police officers appointed as administrators have always been laboratory personnel with education and experience in criminalistics. As of 1967 the commanding officer is Deputy Inspector and Civilian Scientific Director. (Dr. Manning).

20. The laboratory engages in all of the 13 functions listed in the graph on page 16.

21. The laboratory was originally under the Bureau of Technical Servides. The latest recommendation is that it be placed under the Chief of Detectives.

22. Instrumentation is used daily. Basic qualifications B.S. for Physics, Chemistry, Biology or Criminalistics.

23. The laboratory does all varieties of work indicated on page 16.

24. The philosophy of the laboratory is the utilization of the laboratory by all members of the police department starting with the crime scene team, scientific processing of the evidence, and the preparation of evidence for court. In addition, that one of the functions is to help prove innocense as well as provide evidence for quilt.

WASHINGTON

Seattle Crime Lab - November 18, 1966

1. One man lab - George Ishii - B.S. in Analytical Chemistry, has two highschool graduate lab assistants who also do photography.
2. 100 volume library - most recent acquisition linguist - books are read. Is receiving second person as Assistant Criminalist with B.S. in criminalistics.
3. 100 testimonies a year in court.
4. Laboratory reports read into record without appearance in 15% of cases - only permissible in lower courts. Recent date of testimony November 17th, homicidal.
5. Reference files: firearms, tool marks, narcotics.
6. 2,500 cases per year.
7. Photo lab prepares exhibits. Daily working records - statistics made up once a year.
8. Salary schedule: Head $10,000; Assistants $8,400; Lab Aides $5,000. Lab aides are under clerk category.
9. Works with coroner.

WISCONSIN

Madison Crime Lab. - January 25-26, 1967.

1. They have a laboratory library.
2. Ten most recent acquisitions are listed on attached paper marked "I".
3. Library budget is listed on attached paper marked "II"
4. Books are read frequently.
5. Educational level: 2 Ph.D's and 2 B.S.'
6. In service training and use of facilities at State University for training in toxicology and pharmacology.
7. Number of times personnel have testified in court personally - 40 times per month.
8. No record of times laboratory reports have been read into the record without an appearance.
9. Most recent date of testimony in a felony - November 3, 1966.
10. Testimony - burglary - tool marks and firearms.
11. There are ten members involved - and they each appear twice a week to testify in court.
12. Journals kept current.
13. The technician concerned prepares a case with demonstrations of evidence.
14. Statistics and type of working records - see attached schedule marked "III".
15. Volume of work - see schedule marked "III"
16. Salary schedules relative to titles of technical personnel - see schedule attached marked "IV".
17. Other laboratories with whom they work - University of Wisconsin, College and Medical School - Anthropology and Pathology. Mechanical Engineering Department of University of Wisconsin. Examination of skidmarks, etc. they would use their facilities.

WISCONSIN continued

Madison Crime Lab.

18. Evidence is availabe for defense at time of trial with written notice from the defendant.
19. They are interested in a research center - not a central type but should be regional type research institutes.
20. The laboratory should be headed by a civilian scientist and entire staff in laboratory to be civilian. Is obvious from setup he is divorced from the Police Department.
21. The laboratory does criminal investigation work of potential felonies; no civilian cases except when a state official is a part to the fact - civil example bridge damage.
22. Position in the Police Department organizational structure - Superintendent.
23. See diagram marked "V" for T.O. position.
24. Daily use of instrumentation.

FLORIDA

Dade County Crime Laboratory, Miami - May 2, 1967

1. Good library.
2. Recent acquisitions.
3. Budget expenditures for library from $290-600 per year.
4. Books are read by the staff.
5. Educational level: one Ph.D. in documents and the remainder B.S.
6. Personnel trained on premises and by means of seminars.
7. 653 court testimonies.
8. Most recent date of testimony in a felony - same day of visit.
9. The case - armed robbery.
10. Members testify in court every day.
11. Most complete reference file - ammunition and guns.
12. Volume of work - laboratory is very busy.
13. Statistics are maintained.
14. Salary schedules: Technician $428-547/mo.; Criminalist (1) $574-732/mo.; Criminalists(2) $769-848/mo.; Criminalists (3) $890-982/mo.
15. Works very closely with medical examiner in Miami and Dade County.
16. Evidence available for the defense by court order.
17. Favors a central research institute in forensic science because working laboratories are too busy and lack personnel and funds for research.
18. Believes scientist should head laboratory.
19. Laboratory engaged in all laboratory functions.
20. The laboratory is a bureau under the Division of Central Services reporting to the Director of Public Safety.
21. Instrumentation is used daily in every possible case where appropriate.
22 Laboratory director is very conscious of the needs of research and the role of probability in criminalistics.

Florida Sheriff's Bureau, Tallahassee - April 30, 1967

1. Good laboratory library.
2. Twelve very recent acquisitions.
3. Library budget is over $250 a year.
4. Books are all read by the staff.
5. With the exception of documents and ballistics all other personnel have a B.S. degree.
6. Personnel are trained under an understudy system.
7. Personnel testify in court almost daily, sufficiently to interfere with laboratory work.
8. Most recent date of testimony in felony - same day of visit.
9. Testimony dealt with aggrevated assault leading to murder.
10. Only reference file is hair and fibers.
11. The photographic section prepares demonstrations of evidence.
12. One problem involving volume of work results from rapid turnover of personnel due to higher salaries and fringe benefits offered by local industry.

Florida Sheriff's Bureau, Tallahassee (continued)

13. Statistics are maintained.
14. New proposed salary schedules are: Criminalist (1) $720-927/mo.; Criminalists (2) $660-843/mo.; Criminalists (3) $555-697/mo.
15. Does not work with medical examiners directly. Big cities utilize medical examiners, other communities utilize the university or local pathologist.
16. Evidence available for defense by court order.
17. In favor of a central research institute in forensic science.
18. Laboratory head should be a scientist who is a capable administrator.
19. Laboratory engages in laboratory functions except pathology.
20. The laboratory is an investigative agency under technical services for the State Sheriff's Bureau.
21. Instrumentation in constant use.
22. Believe that basic qualification for personnel is a B.S. degree with the exception of documents and firearms.
23. Philosophy of laboratory is investigative agency. Available to be called upon by sheriffs and other jurisdictions.

INDIANAPOLIS CRIME LABORATORY VISIT 12/28/66
BY PAUL MURPHY

1. Has laboratory library.

2. Some of most recent acquisitions are: Methods of Forensic Science by Lindquist;. 4 Volumes; Guide to activation analysis by Lyon; Gas and Liquid Chromatography by Juvet; Interpretation of UV Spectra Natural Products by Scott; Narcotics by Williams.

3. Library budget - $500 - (They also use State Library and Historical Institute which is next door to lab.)

4. Books are read.

5. Educational level - average two years of college education.

6. Training of personnel - in-service-training - Dr. Forney (Toxicologist at the Indiana University in Bloomington trains personnel in the chemical test. Police Department - in-service-training and specialized training acquired at various colleges and institutes (for example, Harvard Homicide School; General Electric for X-ray diffraction; FBI; Lilly for the Spectrophotometer.

7. Number of time personnel have testified in court - about 1/3 of time on court cases stipulated.

8. Most recent date of testimony - October 1966.

9. Double Homicide.

10. Members testify in court twice every three days (average).

11. Rec t date in reference files - December 21, 1966.

12. Th ficer who works on the case prepares the courtroom demonstr ns. A Lt. in charge of records is also available for coui oom testimony, if required.

13. Volume of work - criminal investigations - 666 cases; accident investigations - 31 cases (see attached statistical reports).

14. See attachments for statistics. Working records - typewritten records, blood alcohol records, names files of victimes and suspects; micro film files are data processed and kept in a central records office; record of photographic equipment issued to all troopers in the State (707 - 4 x 5 cameras and 14 - 35mm); Keep records of all chemical tests in the State; Record service and repair to instruments.

15. Paid by rank.

16. One Lt., Director (T) - Central Office Laboratory. Four 1st. Sgt. (T) Central Office - twelve Sgts. (T) stationed in district offices throughout the State.

17. Work with State Toxicologist (Dr. Forney) Lilly; State Petroleum Lab.; Purdue University (Engineering Lab.) and private labs. Pittman Moore-Bacteriologist).

18. Evidence is available for defense - they also testify for the defense on occasion (re-examination of a case from municipal lab.)

19. Attitudes towards a central research institute - good - (see attached for further information).

20. A scientist whether civilian or police as long as he is a scientist.

21. Lab. does all forensic science analyses - do criminal and non-criminal cases.

22. A section in the investigations division of the State Police.

23. Lt. Normington, Director of Lab.

24. Daily use of instrumentation - Infrared X-ray diffraction, spectrophotometer, densitometers, fluoroscope.

25. Qualifications of personnel should be some scientific background that can be channeled in a certain area of investigation.

26. Variety of work - each member assigned to district station; brings in evidence from crime scene and four members of the Central Lab. analyze it - 4 members are all around technicians.

VISIT TO JOLIET, ILLINOIS STATE POLICE CRIME LAB. ON 1/24/67
By Paul Murphy

1. This lab. has a library - no formal budget, utilizes miscellaneous funds. Books are read.

2. Educational level - one M.A., one M.A. pending, the rest have B.S. degrees. Superintendent has B.S. and M. S.(Physics).

3. Recent acquisitions: Pattee, X-Ray Optics and X-Ray Micro Analysis Bellamy, Infrared Spec. of Comples Molecules; Town, Paint Manual Gustafson, Forensic Odon-Tology; Reed and Inbow, Truth & Deception

4. Classifications or titles and salary schedules - see attached material for infromation.

5. In-service training of personnel with literature and alalysis of knowns.

6. Number of times personnel have testified in [illegible]s personally - 10 oer month. Most recent date of testimon[illegible]n felony - January 17, 18, 1967, for Armed Robbery in[illegible]ing paint analysis. Each member testifies in court at least one a month.

7. Most recent date in reference files - 1965 Chemical abstracts.

8. The Analyst prepares the case with demonstrations of evidence.

9. Volume of work - 2,500 (1,500 in Springfield and Joliet, Illinois) per year.

4. Members testify in court almost everyday.

5. Reference files - all except dry cleaning and laundry marks which are transferred to New York City.

6. Most recent reference files -- hair.

7. Demonstrations prepared at request of DA or court.

8. Volume of work - 1965 5,030 cases. -- 1966 to date 6,000 cases.

9. Statistics maintained by case not by number of examinations.

10. Salary schedules - B. S. Chemists at $10,400. Pay is as regular State Troopers except for civilian personnel. There is friction between civilian and police in the laboratory when one or the other get an increase. Opinion of director of laboratory is that lab. should be entirely police. Turnover of civilian personnel due to industry competition is too great. Civilians also not available in emergencies.

11. Serology work done in lab. Relationships of medical examiners or coroners only cross when the local coroner or examiner calls in State Troopers.

12. All evidence is the responsibility of the Troop Commander of the 7 troops in New York State. Crime scene work done by troopers in field. Do own identification work, refer more comples work to main laboratory. Director of Laboratory Lt. Cesaro pointed out the need of four satellite laboratories to cover the distances of more than 300 miles between Buffalo and Albany. It takes too long to bring some evidence in for processing.

13. Evidence is made available for the defense only on Court order. The original processor of the evidence in the lab. must be present when Court order examinations of evidence are made by the defense.

14. Highly in favor of a National Central Institute in Forensic Science.

15. Believe that a lab. should be headed by a police officer with scientific training. Work of lab. sections, fingerprinting is separate. Wet Chemistry instrumentation has Emission Spectrometer Gas Chromatograph, Infrared UF, Fire Arms Section, storage vaults, Serology.

16. Pathology carried at Albany Medical College and other Pathologists on a private consultation basis.

17. Instrumentation is in constant use except where Civil Service Personnel were lacking due to the inability to fill position.

18. Variety of work all phases except Pathology. Philosophy of lab. primarily arranged as a regional lab. for New York State except those cities that have their own labs. A very strong "esprit de corps" exists, especially among police.

19. Position in T. O. Laboratory Director reports to Assistant Superintendent in charge of Administration, who is one of three deputy superintendents. Present incumbent was formerly head of police lab.

10. Statistics are maintained - receipted form, lab. work sheet and lab analysis report.

11. Other laboratories with whom they work with is State (toxicology) Washington, D. C. (documents)

12. Evidence is available for the defense. Defendent submits a Discovery Petition.

13. They feel that there should be a research institute because there is not time or staff available in the present lab. setup. However, a research center should be a regional setup rather than a central one. For example, there should be about five regional offices set up within the United States.

14. The feeling here is that a scientist independent from police [illegible] agency to head lab.

15. The lab does general scientific criminal investigations.

16. Superintendent of the Bureau of Criminal Identification. - [illegible] position in PD structure.

17. Position in T.O. - Department of Public Safety
Bureau of Criminal Identification
Crime Lab.

18. Daily use of instrumentation.

19. The basic qualification of personnel should be (1) basically scientific background (2) interested and has aptitude for lab work.

20. No variety of work - each man has specialty.

OCTOBER 6, 1966 - Visit to Scientific Laboratory - New York State
Albany, New York

1. Laboratory is library - Books and journals circulated on receipt before placement on the shelves. Observed personnel coming to take books from library.

2. Training of Personnel - Two types of personnel - troopers involved in scientific work had previous scientific training or completed scientific training while on duty at the laboratory. Civilians are primarily chemists or biochemists, hired from Civil Service Lists. There are several civilian vacancies. Great difficulty in hiring B. S. Chemists at $10,400. New York State pays for graduate courses towards Masters or PhD. Time arrangements made so students can go to RPI for graduate work. State University at Albany not providing PhD work in Chemistry as yet. State University at Albany's Department of Criminal Justice apparently does not intend to go into forensic science graduate work, much to the dismay of State Police.

3. 216 Court appearances to give testimony. Most recent date of testimony in felone -- same days as visit. Testimony was drunken driving.

20. Number of people in New York State Lab. - 24 (16 Troopers and 8 civilians).

VISIT TO KANSAS CITY, MISSOURI CRIME LAB. - December 29, 1966
By - Paul Murphy

1. Small library.
2. Latest acquisitions - see attached list.
3. Library budget -$300. for ballistic books.
4. Books are read.
5. Educational level - all are high school graduates; two with college degrees.
6. Training of personnel - sent to specialized training schools (University of Mo.) and private laboratories.
7. Personnel testify in court personally several times weekly.
8. Laboratory reports read in record without an appearance - 2/3 of the time.
9. Recent date of testimony in felony, December 28, 1966.
10. Documentary evidence in homicide.
11. Members testify in court almost daily.
12. Recent date in reference files - December 28, 1966.
13. The person who analyzes the evidence prepares the demonstrations.
14. Volume of Work - no special laboratory statistics - reported under miscellaneous activity data in the annual activity report. Fingerprints lifted 4128; firearms test shots fired 840; photo mugs 85,369. Firearms identification is their main activity. Detective Units process crime scenes with kits and bring physical evidence into laboratory for analysis. Only in major crimes do they initially call crime lab.
15. See attached Annual Activity Report for statistics maintained. Type of working records - photographic file; typewritten reports file
16. Salary Schedules:

Police		Civilian	
1 Lt. (Lab. CO)	$7,200 annually	2 Supervisors	$7,800 annually
2 Det. Sgts	6,770 "	5 Technicians	5,820)- "
1 Det.	6,200 "		to 6,570)

Laboratory organizational set-up - four sections.

Ballistics	- 1 Det. Sgt.	- 2 Civilian Technicians
Photography	- 1 Civilian Supervisor	- 2 Civilian Technicians
Chemical	- 1 " "	- 1 Det.
Polygraph	- 1 Det. Sgt.	- 1 Civilian Technician

(Photography - the photo unit handles all the photography work for the department including criminal mug shots, press photographers, identification cards, etc.).

17. Other labs with whom they work - Mid-West Research Institute in Kansas City, Missours; FBI and also they have a Federal Food and Drug Lab. one block away, (this lab. assists in most of their chemical analysis).
18. Evidence is available for defense.
19. Lt. Hollenbeck expressed a great need for research in this field and indicates he allows 10% of time for research.
20. Scientist to head lab. - preferably a police scientist, if possible.
21. Laboratory does mainly crime scene searches; analysis of collected physical evidence therefrom.
22. Laboratory Unit is part of the central services and detention

division which in turn is part of the Auxiliary Services Bureau. This is a recent organizational change and not reflected in statistical report.

24. Lt. Lee Hollenbeck is Commanding Officer of the Lab. Unit. (Six months ago took over laboratory - previously worked in Juvenile for many years. A high school diploma to his credit only - no previous lab. experience whatsoever.)
25. Little instrumentation apparatus in use. Most insttumental analysis done by outside agencies. X-Ray Diffractometer only instrument in use and this model is an old model (outdated). Photography work and Ballistics work copy their major portion of lab. work.
26. Basic qualifications should be at least high school graduate with some scientific background.

Kansas City Lab. is engaged in a unique type of criminal investigative operation. There is a metropolitan squad which covers six counties and 30 jurisdictions within a tri-state area. The executive assistance of Kansas City is its head. This procedure is in its initial stage - however, has proven very satisfactory to date with an almost total crime clearance rate. This squad operates in a similar way to our Tactical Patrol Force by saturating an area of major crime with police personnel including police lab. Kansas City allocates 40 of its total force of 1000 men to this operation.

CRIME LABORATORY DIVISION

CHICAGO POLICE DEPARTMENT

1. Laboratory Library - The laboratory library had many reference books for the various sections, too numberous to copy all the titles, however, it did appear to be a good library of references. I did notice that the library subscribes to Chemical Abstracts, American Academy of Forensic Sciences Journal, Journal of Criminal Law, Criminalistics and Police Science, Chemical and Engineering News, Analytical Chemistry, and Medicine, Science and the Law.
2. Ten most recent acquisitions - Laboratory Director could not recall these and would take a good amount of time to look this up which I didn't feel was necessary. Books were not antiquated.
3. Library Budget - Averages $2,250 annually, which includes all publications. (Doesn't appear that this is much used.)
4. Are the books read - Several reference books were noted on desks of workers and the books appeared to be in use, therefore, I would say they are read.
5. Educational level - These would be considered college level publications.
6. Training of Personnel - Here I am assuming we are considering training after they have been employed. The Laboratory Director states, if employee is in the Bachelors Degree requirement area, that he is given on-the-job training and reading assignments while he is gaining proficiency in his specific specialty. Some university seminars are utilized as occasions arise. For personnel not requiring a degree, some are given six months on-the-job training but as a whole it usually averages about two years before those personnel are considered competent to sign reports.
7. Number of times personnel have testified in court personally?

This averages 150 to 200 annually for the whole lab. staff.

8. Number of times laboratory reports have been read into the record without an appearance? Director states that every laboratory report not requiring actual court appearance is read into the record at some time or another in court litigation. Therefore, based on a nine month's work report this would be approximately 15,000 per year. (Personal note -- this sounds rather execptional to me, however, this is what has been stated.)
9. Most recent date of testimony in felony? - The date of this interview, which was October 25, 1966, two people were testifying in court.
10. What was the testimony - Two persons were testifying concerning work done by the Chemistry Section.
11. How often do members testify in court. - Members testified in court 150 to 200 times annually.
12. What is the most recent date in reference files? This laboratory keeps a firearms and bullet reference file which is added to daily.
13. An example of the preparation of a cse with demonstrations of evidence. Who does this? This is not done on routine cases, only on major cases in which document exemplars may be prepared firearms photomicrographs may be prepared, scale drawings and models of buildings, rooms, etc. Plats and diagrams are made of the crime scene area on all major cases. This work is done by laboratory personnel, usually those assigned to the mobile units.
14. Volume of work - Attached is a Crime Laboratory Division Activity Report for nine months of 1966 (through September) which can be projected to an estimated annual report. Laboratory Director states that the figures given for the laboratory are cases, not individual examinations.
15. Statistics if maintained. Type of working records. - The previously mentioned activity report comes as close to answering this question as was available. A case file is made on each individual case which contains the diagrams, notes, charts, etc. on each specific case.
16. Salary schedules relative to titles of technical personnel? Attached are two pages giving the titles and salaries along with the number of personnel for 1966. The second sheet contains some positions which are requested for 1967.
17. Classifications or titles. The attachments described in Item 16 cover this.
18. Other laboratories with whom they work, ie., medical examiner, etc. This laboratory works with the coroner's office and has an office in the coroner's office for micro examinations, blood typing, etc.
19. Is evidence available for the defense? Only if subpoenaed on cases in which examinations or analyses have already been made for police. Do not make analyses at request of the defendant.
20. Attitudes towards a central research institute in forensic science Director feels this is a wonderful idea if it is designed to do research only and accept no case work.
21. Should the laboratory be headed by a scientist of the Police Department? Director feels this should be headed by a policeman who is scientifically trained. He does not feel that just a Captain or Lieutenant of police should be the head of the laboratory nor neither should a civilian with high academic background and no police experience. Probably depends on the personality.
22. What does the laboratory do? This question will be answered by the activity report which was mentioned in Item 14.
23. What is the position in the Police Department organizational

structure? The attached schematic of the table of organization shows this.

24. Where are you in the T. O.? The chart mentioned in the previous question answers this question.
25. Frequency of use of instrumentation. Daily, the following instruments are used. Infrared and ultraviolet spectrophotometers, x-ray diffraction with fluorescence attachment, gas chromatography differential thermal analysis, electrophoresis, and the emission spectrograph.
26. What should basic qualifications of personnel be? Bachelors Degree with a major in natural science except the mobile unit personnel and gun room personnel which are usually sworn personnel. Attempt to get people who have twoyears of college to fill these positions. As for the polygraph examiners, the Laboratory Director feels that possibly a Bachelors Degree in psychology or sociology is O.K., however, he prefers these personnel to be LLBs.
27. Variety of work. - This laboratory covers just about any imaginable work that could arise in a criminal case and the laboratory directory states that they attempt to do all the work themselves and do not refer it to other laboratories.
28. Assess philosphy, if possible. - This Laboratory Director has been in this position for many years and is an old hand at crime laboratory activities. His basic ideas concerning the laboratory is that it is a vital service to law enforcement in the investigative roll and in proving cases for courtroom presentations. However, he does not feel that the plice crime laboratory should be used by defense attorneys to submit evidence for examination. If the defense needs examinations they should be taken to other laboratories. On table of organization, since it is of such technical nature and not easily understood by most administrators, he feels that the laboratory chain of command should be as close as possible to the department head, in this instance the Superintendent. However, this laboratory is responsible toa Deputy Superintendent which poses no problem since the Laboratory Director is given a free hand in laboratory operations and directions. He also feels that basic college academic preparation in chemistry, physics and related physical sciences (BS or MS) plus on-the-job training has worked out rather well to prepare his personnel to do a good job. If degrees are to be given in Forensic Science it should be a minimum of requirements for BS in physical sciences plus forensic classes.

APPENDIX NO. 4

LABORATORY	1. POPULATION (a)	L (b)	IC (c)	2. CASE LOAD	3. COURT
DISTRICT ATTORNEY					
1. Santa Clara California				600	7
2. Allegany & Pittsburgh Ct. Pittsburgh, Pa.	1,700,000	x			8
COUNTY					
3. Sheriff's Crim. Lab. Kern County, Cal.				252	1
4. Sheriff's Crim. Lab. Los Angeles, Cal.	5,000,000	x	x	13,000	16
5. Sheriff's Crim. Lab. San Bernardino, Cal.	700,000	x	x	2,300	4
6. Sheriff's Crim. Lab. Contra Costa, Cal.	451,053	x		3,136	3
7. San Mateo San Mateo, Cal.	500,000	x		710	2
8. Coroner's Lab. San Mateo, Cal.		x		1,750	1
9. Sheriff's Crim. Lab. Ventura, Cal.	330,030		x	11,375	3
10. Dade County Miami, Florida	1,114,000	x	x	4,750	24
11. Sci. Invest. Bureau Mineola, N. Y.	1,500,000		x	1,509	14
12. Monroe Pub. Sfty. Lab. Rochester, N. Y.	625,000	x	x	798	3
13. Police Dept. Lab. Suffolk, N. Y.	1,000,000	x	x	1,584	5
14. Washoe Sher. ID Bureau Reno, Nevada					3
STATE					
15. Toxicology C.I.D. Auburn, Alabama	3,500,000	x		4,180	8
16. Tuscaloosa Pathology Lab. Tuscaloosa, Alabama	50,000		x	30	1
17. Firearms Id. & Crime Lab. Arkansas				218	2
18. Sacramento Crime Lab. Sacramento, Cal.	350,000		x	1,145	3
19. San Diego Police Lab. San Diego, Cal.	1,212,900	x	x	5,822	6
20. Dept. of Justice-BC ID I. Cal.	18,000,000		x	4,311	8
21. Center of Forensic Sc. Toronto, Ontario, Canada	7,000,000	x		4,500	56

LAB.		1. (a)	(b)	(c)	2.	3.
STATE						
22.	Florida Sheriff's Crime Lab. Talahassee, Florida	5M		x	1,756	6
23.	US Army Crim.Invest. Lab. Fort Gordon, Georgia				1,624	
24.	Ill.Bur.Crim. Inv.& Id. , Illinois	10M	x		1,943	9
25.	Iowa Bur. Crim. Invest. Des Moines, Iowa	2.78M	x		1,247	4
26.	Indiana State Police Indianapolis, Indiana	4.90M		x	395	7
27.	Kentucky Police Cr. Lab. Frankfort, Kentucky	3M	x	x	15,000	5
28.	Louisiana Police Cr. Lab. Baton Rouge, Louisiana	3M		x	798	4
29.	Mass.Dept.Pub.Sfty.Chem.Lab. Boston, Massachusetts	5M		x	7,800	7
30.	Michigan Pol.Inv.Serv.Station East Lansing, Michigan	6M	x	x	19,000	12
31.	C.Det., Bureau of Labs - Dept. of Public Health, Michigan	6.5M	x		4,121	9
32.	Minn.Bur.Crim.Appre.Lab. St. Paul, Minnesota	3.5M		x	690	7
33.	Mississippi Crime Lab. Clinton, Mississippi		x			3
34.	Missouri HPC Lab. Jefferson City, Missouri				1,726	17
35.	State Police Crime Lab. Concord, New Hampshire	0.62M	x		868	3
36.	NY Police Scientific Lab. Albany, New York	7M		x	5,030	12
37.	No.Car. Bur. of Invest. Raleigh, No. Carolina	4.80M	x		2,733	7
38.	Ohio HP Crime Lab. Columbus, Ohio	10M	x	x	10,692	12
39.	Oklahoma Bureau of Invest. Oklahoma City, Oklahoma	2.55M	x		22,277	9
40.	Oregon Crime Det. Lab. Portland, Oregon		x		2,059	4
41.	State Bur. ID. & INVEST. Salem, Oregon	2.50M	x			6
42.	State Pol. Lab. Division Harrisburgh, Pa.	8M	x		1,557	11
43.	Univ.RI Scien.Crim.In.Lab. Kingston, Rhode Island	0.5M	x		150	20
44.	D.C.I.&ID. Att.Gen.Office Pierre, South Dakota	0.70M		x	385	1
45.	Texas Dept.Pub.Sfty. Lab. , Texas	9M	x		9,696	30
46.	DH-OFF.Ch. Med.Examiner Richmond, Virginia	4.50M	x		10,286	10
47.	Crim.Id Bur. Tech. Lab. Charleston, West Virginia	1.80M	x	x	1,557	7
48.	Wisconsin State Crime Lab. Madison, Wisconsin	4.14M	x		790	11

LAB.	1. (a)	(b)	(c)	2.	3.
CITY					
49. Phoenix Pol. Crime Det. Lab. Phoenix, Arizona	0.55M	x		253	3
50. Tuscon Pol. City County Crime Tuscon, Arizona	0.35M	x		600	2
51. Glendale PD Crime Lab. Glendale, Cal.	0.13M	x		487	4
52. Inglewood Police Dept. Inglewood, Cal.	0.09M	x		1,000	3
53. Chief Med.Ex.Cor. Office Los Angeles, Cal.	7.01M	x		5,847	27
54. Sc.Inv.Div.LA Pol.Dept. Los Angeles, Cal.		x		1,973	85
55. Criminalistics Sec.Oak.PD Oakland, California	0.38M			3,976	4
56. San Francisco Police Dept. San Francisco, Cal.	0.75M	x		6,372	13
57. Santa Ana Pol. Crime Lab. Santa Ana, Cal.	0.14M	x		500	4
58. Denver Police Crime Lab. Denver, Colorado	1.30M	x	x		
59. Police Dept. Crime Lab. Glastonbury, Conn.	1.17M	x	x		2
60. Honolulu Police Dept. Honolulu, Hawaii	0.50M		x	240	
61. Chicago, Illinois	5.00M	x	x	34,407	54
62. Laboratory Police Dept. Evansville, Indiana	0.16M	x	x	516	3
63. Kansas Bur.Inv.-Lab.Div. Topeka, Kansas	2.00M	x	x	833	4
64. ID Bureau New Orleans Louisiana	0.65M		x	50	11
65. Police Rec.& ID Bureau Dearborn, Michigan	0.11M	x		4,146	7
66. Grand Rapids Pol.Crime Lab. Grand Rapids, Michigan	0.50M	x	x		3
67. Police Dept. ID Bureau Highland Park, Michigan	0.03M			278	2
68. Kenosha Sheriff's Dept. Kenosha, Michigan	0.11M	x		600	2
69. Duluth Police ID Bureau Duluth, Minnesota	0.11M	x		350	3
70. St. Paul Police Dept. St. Paul, Minnesota	0.50M	x	x	1,071	4
71. Kansas C.-Missouri Pol.Lab. Kansas City, Missouri	0.50M	x		1,458	3
72. Met.Police Dept.-Lab.Div. St. Louis, Missouri	2.25M	x	x	2,822	9
73. Elizabeth Police Id.Bureau Elizabeth, New Jersey	0.12M	x			2
74. Police Laboratory Newark, New Jersey	0.80M	x	x	1,300	3

LAB.	1. (a)	(b)	(c)	2.	3.
CITY					
75. Buffalo Pol.Sc.Crime Lab. Buffalo, New York	0.50M	x	x	2,146	12
76. Science Research P.D. New York City	9.00M	x	x	20,978	92
77. Niagara Falls NY Police Niagara Falls, N. Y.	0.10M	x	x	1,133	4
78. Syracuse Police Lab. Syracuse, New York	0.50M	x	x		6
79. ID.DIV.Greensboro PD Greensboro, North Carolina	0.13M	x		4,500	5
80. Cleveland POL.Sc. Lab. Cleveland, Ohio	1.50M	x	x	5,006	6
81. Columbus, Ohio	0.53M	x		2,067	3
82. Dayton Police Crime Lab. Dayton, Ohio	0.61M	x	x	2,314	11
83. Toledo Police Crime Lab. Toledo, Ohio	0.40M		x		3
84. Crime Lab. & Rec.Pol.Dept. Youngstown, Ohio	0.22M	x	x	660	7
85. Okla.City Pol. Crime Lab. Oklahoma City, Oklahoma	0.60M		x	3,796	11
86. Philadelphia Police Lab. Philadelphia, Pa.	3.50M	x	x	5,223	32
87. Identification Bureau Knoxville, Tennessee	0.56M	x	x	1,500	4
88. Fort Worth Crime Lab. Fort Worth, Texas	1.05M	x	x	1,877	2
89. Houston Police Lab. Houston, Texas	2.10M	x	x	4,414	4
90. San Antonio Police Lab. San Antonio, Texas	0.70M	x	x		2
91. Identification Bureau Alexandria, Virginia	0.12M	x		651	2
92. Norfolk Police Dept. Norfolk, Virginia	0.32M		x		11

LAB.	4. PERSONNEL						5. BUDGET	6. DATE
	Civilian (a)		Police (b)		Clerical (c)			
	F.T.	P.T.	F.T.	P.T.				
1.	11				3			
2.	6		2		1		9,635	1951
3.	1							
4.	16		11		4		250,000	1932
5.	4				2			1957
6.	2	2	1		1		61,613	1959
7.	2		2		1		1,500	1956
8.	2	1					2,500	1956
9.	3				1		26,500	1958
10.	14		10		5			
11.			14		1		150,000	1938
12.	4				2		71,186	1926
13.	1		8		1			
14.			3					
15.	21	1			8		209,465	1935
16.	6	2		1	2			1964
17.			2		1			
18.	3	1					75,000	1963
19.	7		2		1			1940
20.	8				4			1935
21.	56	2			10		140,000	1951
22.	11				3		167,352	1958
23.	2		11		1		202,000	1950
24.	9				4		225,000	1941
25.			6		2		20,000	1939
26.			18		1		18,000	1936
27.	3		2		1			1950
28.	4				1		70,000	
29.	7	2			1		110,000	1912
30.	4		20		4		247,000	1932
31.	16						110,000	1942
32.	7				1			1947
33.	1	1	1		1			1966
34.	3		15		2		250,000	1936
35.			3		1			1932
36.	8		8		4		500,000	1936
37.			8		11			1940
38.	3		11	1	5			1947
39.	9						76,000	1953
40.			4		1			
41.			10		9			1933
42.	4		8		1		134,800	1939
43.		1			1		17,500	1953
44.			1	2				1939
45.	32				4		297,830	1938
46.	9	3			2		330,000	1948
47.			7		13		160,000	1935
48.	11	6			9		274,433	1947
49.	3							1962
50.	1		1				24,000	1960
51.	1		3					1940
52.	1		2					

LAB.	4. PERSONNEL					5. BUDGET	6. DATE
	Civilian (a)		Police (b)		Clerical (c)		
	F. T.	P.T.	F.T.	P.T.			
53.	8	23			50	987,183	1872
54.	33		52		7		
55.	4					43,002	1944
56.	3		10		3	129,000	1958
57.			4				
58.			12				1949
59.	1		3			3,300	1963
60.	1		1			30,000	1938
61.	8		46		7		
62.			3			2,800	1918
63.			4			34,690	1942
64.							
65.			7				1931
66.					3		
67.			2		1		
68.			2				1949
69.			*			25,000	1900
70.	3		1			5,000	1934
71.	4		4		1	55,000	1939
72.	4		6		2	24,900	1935
73.			2	1		1,000	1928
74.	2		1		1		1935
75.	1		11				1930
76.	4		88		3	27,292	1935
77.			4			2,500	1940
78.	3		4			5,000	1945
79.	4		1			4,000	1962
80.		1	5		1		1927
81.	3		1	1			1945
82.	1		10			138,000	1956
83.			3				1937
84.			7		1	4,750	1954
85.			11		1	3,800	1930
86.	20		15		4	365,900	1923
87.			2	2			
88.	3				2	39,781	1961
89.	4		7		1	60,000	1953
90.	2		4		1	42,000	1950
91.			6		1	1,300	1947
92.			11				

* Unknown amount.

7.
INSTRUMENTAL ANALYSIS

LAB.	a.	b.	c.	d.	e.	f.	g.	h.	i.	j.
1.			*	*				*		
2.			90	18					17	
3.			50							
4.				360				300	220	
5.			250					150	10	
6.			129	38	1			114		
7.			75							
8.			1700					500		
9.			*					*		
10.			510		415			296	275	
11.			*	*				*	*	
12.			100	100				100	100	
13.			*	*					*	
14.										
15.			*	*				*	*	
16.										
17.										
18.			1000	150				1500		
19.										
20.			*	*				*		
21.	*		*	*	*	*		*	*	*
22.			*	*	*			*	*	
23.			*	*	*			*		
24.			*	*		*	*	*		
25.										
26.			*	40	75					
27.			90	30	40	40		1200		
28.			*	*				*	*	
29.			6000		100			1000	50	
30.										
31.			*	*	*			*		
32.			260	200				140	35	
33.			*	*					*	
34.			100					50	60	
35.										
36.			1843		52			594		
37.			*		*			*		
38.			275	275					111	
39.			460	106				29	162	
40.			*	*						
41.										

Key for small letters:

a. Differential Thermal Analysis
b. Mass Spectrometer
c. UV Spectrophotometer
d. Infrared Spectrophotometer
e. X-ray Diffractometer
f. X-ray Fluorescence
g. Electron Probe
h. Gas Chromatograph
i. Emission Spectrometer
j. Neutron Activation

* Quantity unknown.

7.
INSTRUMENTAL ANALYSIS

LAB.	a.	b.	c.	d.	e.	f.	g.	h.	i.	j.
42.			*	*	*	*		*	*	
43.	*		*	*	*	*		*	*	*
44.										
45.			2500	300	100	100		1000	100	
46.			25,000	500				1000	10	
47.			143	75				715	50	
48.			95	10	800			20	20	
49.			400	30				60		
50.			50	70				100	10	
51.										
52.										
53.				5847				500		
54.			*	*	*			*	*	
55.			*					*	*	
56.			578		6			43		
57.			100							
58.										
59.										
60.				*				*		
61.			1000	200	300			1000	200	
62.										
63.										
64.										
65.										
66.										
67.			200	25						
68.										
69.										
70.			39					3	13	
71.									11	
72.			5		75	20		35	120	
73.										
74.			900							
75.			104	237						
76.			100	250	260			4000	125	
77.										
78.			240	260					60	
79.										
80.			35						331	
81.			150						116	

Key for small letters:

a. Differential Thermal Analysis
b. Mass Spectrometer
c. UV Spectrophotometer
d. Infrared Spectrophotometer
e. X-ray Diffractometer
f. X-ray Fluorescence
g. Electron Probe
h. Gas Chromatograph
i. Emission Spectrometer
j. Neutron Activation

* Quantity unknown.

LAB.

7.
INSTRUMENTAL ANALYSIS

	a.	b.	c.	d.	e.	f.	g.	h.	i.	j.
82.										
83.										
84.										
85.										
86.			520	115				160	78	
87.										
88.			*					*	*	
89.			3200		38	10		38	5	5
90.										
91.										
92.										

Key for small letters:

a. Differential Thermal Analysis
b. Mass Spectrometer
c. UV Spectrophotometer
d. Infrared Spectrophotometer
e. X-ray Diffractometer
f. X-ray Fluorescence
g. Electron Probe
h. Gas Chromatograph
i. Emission Spectrometer
j. Neutron Activation

* Quantity unknown.

LAB. 7.

INSTRUMENTAL ANALYSIS

	k.	l.	m.	n.	o.	p.	q.	r.
1.		*	*					
2.		17	248				50	
3.			34					
4.		220	*				*	*
5.			250				100	
6.			128					
7.			100					
8.							750	
9.			*				*	
10.		110	1,220	10	6		50	
11.	*		*					
12.			100				100	
13.		*	*	*		*	*	
14.								
15.			*				*	*
16.								
17.								
18.			100				125	
19.			67					
20.			*				*	*
21.	*	*	*				*	*
22.		*	*				*	
23.			*					
24.		*						
25.			42					
26.		6	250					
27.			50				30	
28.			*					*
29.								
30.			500					
31.			*					
32.		*	360				35	
33.			*					
34.		40	200					2
35.								
36.		880	8,500					
37.	*							
38.			44					
39.			153					
40.			*					
41.								
42.		*	*					

Key for small letters:

k. Atomic Absorption Spectrometer
l. Densitometers
m. Comparison Microscope
n. Nuclear Survey Meter
o. Scintilation Counter
p. Scalar Counter
q. Thin Film
r. Electrophoresis

* Quantity unknown

LAB. 7.

INSTRUMENTAL ANALYSIS

	k.	l.	m.	n.	o.	p.	q.	r.
43.	*	*	*	*	*	*	*	*
44.			75					
45.		100	5,174			700	50	10
46.							500	
47.			180				59	
48.	3	20	2,500	3			40	20
49.			300				1,000	50
50.		5	100				35	
51.								
52.								
53.								
54.			*					*
55.			*					*
56.			150					
57.			50					
58.								
59.			100					
60.			60					
61.		200	100Th.				75	125
62.								
63.								
64.			200					
65.			50					
66.								
67.			100					
68.								
69.								
70.			40				*	*
71.			246				28	
72.			1,435				50	
73.								
74.			850					
75.			520					
76.		125	35,246	15			260	12
77.								
78.			40					
79.								
80.			591				21	
81.		20	164	6				
82.			50					
83.			*					
84.			18					
85.								
86.		40	1,650				40	
87.								
88.			*				*	
89.		5					218	
90.			*					
91.								
92.								

Key: See bottom of page 63.

LAB.

	8.	9. a.	9. b.	10. a.	10. b.	11.	12.	13.
1.	*		5		*			*
2.		8	1.5	*	*	*		
3.				*	*	*		
4.				*	*			
5.					*	*		*
6.				*	*	*	*	*
7.	*	3	4	*	*	*	*	*
8.					*		*	
9.					*	*		*
10.		4	9	*	*	*	*	
11.		8		*			*	
12.			20		*			*
13.	*	5	7	*	*	*	*	*
14.		3		*		*	*	
15.					*		*	
16.	*		3		*	*		
17.		20		*		*		
18.	*		10		*		*	
19.	*	7	6			*		
20.			10		*	*	*	
21.				*	*	*		
22.			5		*			
23.		3		*	*	*		
24.	*		5		11			*
25.				*	*	*	*	
26.		6		*		*	*	
27.				*	*	*		
28.			2		*	*	*	
29.			13		*	*		
30.	*	18	25	*	*	*		
31.			6		*	*	*	
32.	*				*		*	
33.				*	*	*	*	*
34.				*	*	*		
35.		25		*	*	*	*	*
36.		25	20	*	*	*	*	
37.	*	9		*		*		
38.		10	5	*	*	*	*	
39.		10	2	*	*			
40.		9		*		*	*	
41.		12		*		*		
42.		15	6					
43.					*		*	*
44.		10		*			*	
45.			10		*	*		

8. Promoted out of Lab.
9. Service (years)
   a. police, b. civilian
10. Training
   a. police, b. civilian
11. No financial support.
12. Computer
13. Research

LAB.

	8.	9. a.	9. b.	10. a.	10. b.	11.	12.	13.
46.			7		*	*	*	*
47.	*	25		*		*	*	
48.			9		*	*	*	*
49.					*	*	*	*
50.		7	3				*	*
51.		7	1	*	*	*		
52.				*	*	*		
53.			13		*	*	*	
54.		10	33	*	*	*	*	
55.			22					*
56.		*	*					
57.				*				
58.		11		*			*	
59.		8		*	*	*		
60.								
61.	*	15	2				*	
62.	*	11		*		*		
63.		11		*		*		
64.	*	15		*		*	*	
65.				*				
66.	*			*	*	*	*	
67.		10		*		*		
68.	*	13		*				
69.	*	20	10	*				
70.				*		*	*	*
71.		9	4	*	*	*	*	
72.		10	6	*	*	*	*	
73.	*	8		*		*		
74.	*		13	*	*	*		
75.	*	3	4	*	*	*	*	
76.	*	10	25	*	*			
77.	*	10		*				
78.		12	22	*	*		*	
79.		4		*	*	*	*	
80.	*	8	8	*		*	*	
81.			10	*	*	*		
82.		4	4		*	*		
83.	*	10		*			*	
84.		7	4	*		*		
85.		8		*	*			
86.		10	30	*	*	*	*	*
87.								
88.			5		*			
89.		9	2	*	*	*	*	
90.		6	5	*	*	*	*	
91.		6		*		*		
92.	*	10		*		*	*	

Key: See Page 66.

LAB.

REFERENCE FILES

14

	a.	b.	c.	d.	e.	f.	g.	h.
1.	*	*	*	*	*			
2.					*	*	*	
3.								
4.				*	*	*		
5.				*	*	*	*	
6.				*	*	*		
7.					*	*		*
8.								
9.								
10.				*	*		*	*
11.	*	*	*	*	*	*	*	*
12.				*	*	*	*	
13.				*	*	*	*	*
14.								
15.					*	*		
16.								
17.		*	*		*	*	*	
18.					*	*	*	
19.				*				
20.				*	*	*	*	
21.					*	*	*	
22.				*	*	*	*	*
23.					*	*	*	*
24.					*	*	*	
25.								
26.					*		*	
27.					*	*		
28.					*	*		
29.					*	*	*	
30.					*	*		
31.							*	
32.				*				
33.					*	*		
34.					*	*		
35.					*			
36.								
37.								
38.								
39.							*	
40.					*			
41.								
42.					*	*	*	
43.					*	*		
44.				*				
45.				*	*	*	*	*

a. Jewelry Marks
b. Dry Cleaning Marks
c. Laundry Marks
d. Tire Marks
e. Hairs
f. Fibers
g. Automobile Paint
h. Heel Prints

LAB.

REFERENCE FILES

14

	a.	b.	c.	d.	e.	f.	g.	h.
46.								
47.					*	*		
48.				*	*	*	*	
49.		*		*	*	*	*	*
50.				*	*	*		
51.								
52.								
53.								
54.				*	*	*	*	*
55.					*	*		*
56.		*	*		*	*	*	
57.					*	*		
58.		*	*				*	
59.	*	*	*					
60.								
61.	*	*	*	*	*		*	*
62.								
63.		*	*	*				
64.								
65.	*							
66.								
67.								
68.								
69.								
70.				*	*	*		
71.						*		
72.		*	*		*	*	*	
73.								
74.								
75.		*	*		*	*		
76.	*	*	*					
77.								
78.		*	*					
79.								
80.		*	*		*		*	
81.				*	*	*		
82.		*	*					
83.					*			
84.		*	*					*
85.								
86.					*	*		
87.		*	*					
88.					*	*		
89.					*	*	*	
90.								
91.				*				
92.	*	*	*					
Total	7	18	17	23	48	41	28	12

KEY: See page 68.

APPENDIX NO. 5
LABORATORIES' UNSOLVED TECHNICAL PROBLEMS

ALABAMA

State Department Toxicology & Criminal Investigation: "Large work load with insufficient number of personnel (technical) to perform it. Also, more instrumentation needed to speed up determinations."

ARIZONA

Tucson Police - City and County Crime Lab.: "A good way to quant. CO_2 in blood. We don't have a Van Slyka."

CALIFORNIA

Dept. of Justice - Bureau of Criminal Identification & Investigation: "Gas chromotographic analysis of toxicological specimens and pure drugs - LSD. Keeping abreast of manufacturing practices so as to be able to interpret laboratory findings. Keeping informed and trained in the application of modern instrumentation and how it might be of help in laboratory. Individualization of human hair."

Contra Costa County Sheriff's Department Criminalistics Lab., Martinez - "Evaluation and interpretation of comparative results."

County of L.A., Office of Chief Medical Examiner-Coroner: "Extraction of LSD from biological specimens and analysis for unknown poisons."

L.A. County Sheriff's Department Criminalistics Lab.: "Positive hair identification. Positive blood identification."

Oakland Criminalistics Section: "Our technical problems deal mostly with finding time to investigate methods recommended by others and obtaining adequate background data with available equipment which will provide a basis for properly evaluating case evidence where purity of sample is a problem or where methods applicable to gross specimens are unsuited to the material, in the size and form in which it is received."

San Diego Police Lab.: "The quantitative determination of halucenogenic drugs in biological substances."

San Mateo County Coroner's Lab.: "Our most difficult technical problems involve requests for unusual and/or non-existent analyses, such as, blood, urine, or liver tests for such materials as 1080, enovid, ergotrate, gitaligin, marijuana, LSD DMT, oleander, etc. We average about one "impossible" request per week, all on human sample material, if we don't count LSD and marijuana. Analysis of solid drug or narcotic material of this nature is no problem."

COLORADO

Denver Police Crime Lab.: "Computerizing fingerprint search systems. Identification of new drugs by both instrumental and wet chemical means. Both drugs in pure form and diluted with other substances and biological samples. Drugs, such as, LSD, etc."

FLORIDA

Dade County - "Lack of sufficient instrumentation. Lack of funds for training, seminars, and meetings. Explosives residue analysis. Lack of time for research. Lack of time to develop standards files."

Sheriff's Bureau Crime Lab.: "Grouping of old and/or deteriorated blood stains."

ILLINOIS

Chicago - "Individualization and specific identification of blood and hair."

State Bureau of Criminal Identification & Investigation: "Statistical evaluation of evidence such as paint,glass, etc."

KENTUCKY

State Police Crime Lab.: "Carbon monoxide in blood - method employed - the liberated blood gases are injected into a gas chromatograph (thermal unit) and this peak is compared with the peak obtained when a portion of the same specimen is totally saturated with CO. Comment - we like the ratio method, since hemoglobin determinations can be difficult when the blood is hemolyzed, or old. The difficulty arises in obtaining a true total CO saturation. Automotive paints in small quantities - this is limited to microscopic procedures. We do not have pyrolotic equipment. Drugs in urine - method of extraction and detection of metabolites have not been successful in the limited number of examinations attempted. Identification of drugs - (solid dosage forms) we do not have extensive reference files in X-ray diffraction, UV and IR spectrophotometry. We do no blood grouping (only precipitin serum test). Our efforts in the past have not displayed reliable results."

LOUISIANA

State Police Crime Lab.: "Amphetamine in blood. Insufficient technically trained personnel (low salaries). Low Budget, cannot always purchase needed equipment. Typing blood stains and other body fluids. Do not have convenient access to technical papers."

MASSACHUSETTS

Dept. of Public Safety Chemistry Lab.: "The identification of partial or single latents at crime scenes, through searching a file rather than on a suspect basis."

MICHIGAN

State Police Crime Lab.: "It would seem the most important problem is the attempt to individualize certain types of trace evidence. We are currently working with Michigan State University in an effort to cause the establishment of a nuclear reactor and facilities for neutron activation analysis to include research and examinations in the criminalistics field. Our major practical problem is to obtain proper physical facilities for a unified, complete crime laboratory organization. A new building complex, now in the planning stage and designed for completion in 1970, may answer this problem. - - -Note: All examinations listed throughout the survey are by approximate case or complaint numbers rather than by individual examinations."

MINNESOTA

St. Paul Police Department: "Our laboratory size and case load prevents specialization to a great degree. We are doing too many routine examinations which could be handled by police personnel trained to handle these examinations, in addition to typing and filing our own reports and other materials. Because of this we do not utilize our equipment to its fullest capabilities and do not have the time to devote to keeping up with new procedures and checking our own techniques as much as we should."

Bureau Crime Apprehension Lab.: "Methodology which would allow greater degrees of proof in trace evidence such as, glass, paint, hairs, fibers, etc. Data allowing better expressions of probability. Not technical. . . . . but more thought re Lawyer - Criminalists relations, problems etc. . . . "

MISSOURI

Kansas City Police Lab.: "Who fired the gun? Identification of single hair. Individualization of blood samples."

NEW YORK

New York City Police Department: "1. Best qualitative and quantitative tests for narcotics, barbiturates, amphetamines, hallucinogenic substances and tranquilizers in body fluids must be developed for use in drug and driving cases, under Section 1192 of the Vehicle and Traffic Law of New York State. 2. More sensitive and confirmatory

NEW YORK continued

New York City Police Department 'tests must be developed to detect minute quantities of LSD in mixed contaminated substances, i.e. - on sugar cubes. Present techniques utilizing thin layer chromatography are time consuming and must be confirmed by other approaches. 3. Rapid methods for grouping of human dried blood are needed. Present techniques are time consuming. Also, more definitive characteristics for dried blood are unavailable. Research in this area is necessary, so that additional unique characteristics may be developed that will aid in identifying blood definitively in criminal cases. 4. Research is needed to develop unique characteristics of dried semen and spermatozoa. The demonstration of additional unique characteristics may aid in linking semen from a crime scene to a particular criminal. 5. The variability of physical characteristics of hair from the same individual limits the value of hair evidence in the identification of criminals. Much additional research must be completed if hair evidence is to be used more successfully in criminal cases."

New York State Police Scientific Lab.: "Information concerning drug levels and impairment. Positive method for identification of seminal stains. Method for positive comparison of human hairs. Positive method for identification and comparison of automobile and other paints. Grouping of dried blood stains and many others."

Suffolk County Police Crime Lab.: "Shortage of physical space. Lack of communication with other police labs."

Rochester Public Safety Laboratory: "Neutron activation. Soils geology."

OHIO

Youngstown Police Department Crime Lab. & Records: "In Furman Laboratory Training."

Cleveland Police Scientific Lab.: "Individual characterization of small amounts of dried body fluids, e.g. blood, seminal stain, saliva, etc."

OKLAHOMA

Oklahoma City Police Crime Laboratory: "We need technical equipment and specialized training in: Document examination; instrumental analysis; serology; toxicology; comparative microscopy; spectrometer - and we need a chemist."

PENNSYLVANIA

Pennsylvania State Police Lab.: "Statewide system of proper evidence collection and preservation. Obtaining personnel with training and experience."

Philadelphia Police Laboratory: "Inability to acquire instruments not listed in Item 12 because of cost. Trained personnel."

Pittsburgh & Allegheny County Lab.: "Presence of antibody inhibiting factors and cell lysing factors sometimes present important technical problems in efforts to obtain valid blood groupings from dried stains. In comparison of trace evidence materials, such as, hairs, and fibers, it is not possible to assign any mathematical degrees of probability as to identity of source on the basis of multiple similarities of physical characteristics."

SOUTH DAKOTA

Divisions of Criminal Investigation, Identification Attorney General's Office: (Pierre) "Except in the areas of photography, fingerprints, polygraph examinations, and comparative microscopy, the State of South Dakota does not have a police laboratory. All other examinations of evidence must be referred to the FBI or some other institution for examination. This is sometimes inconvenient. Perhaps, as a result of your study, we can learn to some extent whether or not we could justify expansion to include several other laboratory functions and what funds might be required."

TEXAS

Fort Worth Police Department Crime Laberatory: "Improving procedures for grouping of dried blood stains. Investigation of more effect in methods for comparison of hairs and fibers. The fact that we really aren't certain is most of the problem."

Texas Department of Public Safety Labs.: "Gunshot residues, toxicology, hair comparison, age of blood, identification of unknown. Equipment, operating funds, salaries."

Texas Rangers: "Probably gunshot residue, hair comparison, age of blood, identification of unknowns."

WISCONSIN

Kenosha Sheriff Department: "Space in laboratory. Manpower to operate efficiently. Adequate training of personnel. Budget to operate independently. Equipment."

AJ:eb
March 1967

CRIME LABORATORIES IN MASSACHUSETTS

Governor's Committee on

Law Enforcement and Administration of Justice

March 4, 1968

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I. INTRODUCTION

Quick access to a good crime laboratory is an absolute necessity to the police today. Since the police are witness to only a small number of serious crimes, solution of many cases may be dependent upon finding and knowing the type of a small, dried patch of blood on the floor rug of a car; upon identifying a particular heelprint, poison, narcotic, or drug; upon matching specimens of paint, glass, or soil; or in knowing whether a document is a forgery.

As the President's Committee on Law Enforcement and Administration of Justice noted in its 1967 report, recent Supreme Court rulings have imposed additional restrictions upon the police which require that law enforcement agencies depend more upon scientific analysis of evidence and less upon the traditional methods of interrogation and investigation. This added dependency upon technical evaluation of evidence makes it increasingly important that police laboratory facilities be capable not only of performing a wide variety of analyses and tests, but that they be able to perform them without delay.

In order to determine whether essential crime laboratory services were available to Massachusetts law enforcement agencies, the Governor's Committee on Law Enforcement and Administration of Justice has undertaken an extensive evaluation of existing services. The Committee's staff has met and consulted with laboratory and ballistics experts in Massachusetts and neighboring states; it has reviewed all authoritative texts and publications on the subject of crime laboratories; it has conferred with experts in the field of scientific analysis of evidence; and finally, it has reviewed the findings and recommendations of the President's Crime Commission and of a recent national study of crime laboratories conducted by the City University of New York's John Jay College of Criminal Justice.

As a result of its study, the Committee has found that in spite of the concerted efforts of the administrators involved to obtain needed improvements:

> Existing laboratory facilities, equipment, and staffing are not adequate to meet the needs of law enforcement in Massachusetts today.

This finding is based upon the following facts:

* The Commonwealth has only two crime laboratories at present, one within the Massachusetts Department of Public Safety and one within the Boston Police Department. In addition, the Department of Public Safety does operate six photography laboratories throughout the State which provide limited laboratory service. (Further, the Commonwealth's Department of Public Health does make the facilities of its food and drug laboratories in Boston and Amherst available for the analysis of narcotics and drugs upon the request of police agencies.)

* Both crime laboratories lack essential equipment. Most knowledgeable experts agree that an effective modern crime laboratory must have, at a minimum, nine major pieces of equipment.[1] The Department of Public Safety Laboratory has only six of these major pieces of equipment, most of which are not sufficiently sensitive to meet the demands of present-day police work, and all but one of which are more than ten and in some cases, more than 20 years old. The Commissioner of Public Safety has requested funds to replace three pieces of outdated equipment and to add one that is not now available to the Laboratory. Should this request be approved, the Department of Public Safety would have all nine pieces of essential equipment. Five pieces of them, however, would still be outdated. The Boston Police Department has only one of the nine essential pieces of equipment and this, too, is an outdated model.

* Although the combined firearms identification and photography staff of the two departments is close to appropriate strength, the number of personnel assigned to the crime laboratories is insufficient. Based upon population and crime rates, Massachusetts should have up to 54 criminalists working in its crime laboratories and its firearms identification and photography sections; it has 44.

* Both laboratories and firearms identifications sections are overcrowded, operate in non-airconditioned space, and lack sufficient space for necessary equipment.

* Neither laboratory conducts more than limited research, provides its personnel with university-based training, or provides a formal system of training to law enforcement personnel in techniques of crime scene search. The Committee was encouraged to learn, however, that the Firearms Identification Bureau of the Department of Public Safety does engage in research and is applying for federal funds to study the applicability of computers to firearms identification.

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[1] This equipment is as follows: a comparison microscope, polarizing microscope, stereo microscope, X-ray diffractometer, emission spectrograph, densitometer, infrared spectrophotometer, ultraviolet spectrophotometer, and an analytical gas chromotograph.

* Present salary scales for laboratory and firearms identification personnel, in general, are not competitive either with private industry and educational institutions, or with other governmental agencies and this serves as a substantial obstacle to the hiring of qualified personnel. The supervisors of the Boston Police Department Laboratory and ballistics unit and of the Department of Public Safety Firearms Identification Bureau are adequately paid, and the Commissioner of Public Safety has requested an appropriate increase in salary for the supervisor of the department's laboratory. The salaries for most other personnel, however, are inadequate.

In its December, 1967, report on "Crime in Massachusetts," the Committee noted that only 17.2 percent of reported Index Crimes committed in Massachusetts during 1966 were cleared by arrest, compared to a national average of 24.3 percent. The Committee is convinced that a far greater number of crimes can be solved and offenders apprehended and convicted if police personnel receive appropriate training in the searching for and preserving of physical evidence and if appropriately equipped and staffed crime laboratories are readily accessible to all law enforcement agencies in the Commonwealth.

This report outlines a blueprint for action which, if implemented, would provide law enforcement with the laboratory support it needs to more effectively meet the challenge of crime.

II. EXISTING LABORATORY FACILITIES IN MASSACHUSETTS

During 1967, two major studies, one by the President's Crime Commission and the other by the John Jay College of Criminal Justice, analyzed the critical role that crime laboratories play in the control of crime and the apprehension of criminal offenders. Both studies found that well equipped, properly staffed, and readily accessible crime laboratories were essential to effective law enforcement.

In order to increase the ability of the police to solve serious crimes, these reports recommended that a state crime laboratory system be prepared to process evidence of all Part I (or major) crimes. This will not be possible, however, unless laboratories provide complete technical services and analyses in the fields of physiological fluids; hairs, fibers, and other trace evidence; comparative microscopy; wet chemistry; instrumental analysis; examination of documents, writings, and typewritings; polygraph; photography; latent prints; and crime scene services.

According to the John Jay study, these services cannot be provided without modern equipment and a skilled staff that has workable caseloads.

Massachusetts does not compare favorably to the recommendations of these two recent reports. The entire scientific needs of law enforcement in Massachusetts are presently being served by two crime laboratories located in Boston, the State Chemistry Laboratory of the Department of Public Safety and the Police Laboratory of the Boston Police Department.

Although both laboratories have provided significant service, both to their own agencies and to other Commonwealth police departments for a number of years, the Commissioners of both of these departments along with the other members of the Governor's Committee are of the opinion that these laboratories must be improved substantially if they are to fulfill the needs of the Commonwealth's law enforcement community. The following description of these laboratories indicates why this is so.

A. The Department of Public Safety

The Chemistry Laboratory of the Departr of Public Safety now serves the entire Commonwealth. Its annual budget is approximately $114,000 of which $7,500 is for supplies.

The Laboratory does not offer essential services in the field of document, writing, and typewriting examination while polygraph, photographic, and most comparative microscopy (firearms identification) services are performed by other bureaus of the Department of Public Safety.

Except for one new laboratory bench and three new sinks, the wooden furniture in the Laboratory is at least 25 years old, while the building in which the equipment is housed was constructed in 1919 and was adapted to its present use in 1942.

The Laboratory presently occupies about 2,000 square feet and its space is not air-conditioned even though air-conditioning is considered to be essential for all modern laboratories.[2]

By comparison, the New York State Police Laboratory, which has a much smaller caseload (Massachusetts has 7,800 cases a year; New York has only 5,030) has 11,000 square feet in a new air-conditioned building. Although the Hartford, Connecticut, Laboratory has an even smaller caseload (4,982), it considers itself very much overcrowded with some 3,000 square feet in an air-conditioned facility. The Ontario Centre of Forensic Sciences in Toronto, which has a caseload of 6,061, is building a new laboratory with 100,000 square feet of space.

The Firearms Identification Bureau is also seriously overcrowded. It is presently located in a room of 360 square feet. All testing of handguns must be done in this room which is not sound proofed. Further, there is not enough room for shot and pattern dispersion testing. These tests, and all tests with shoulder weapons, must be conducted on the Framingham or Southborough ranges--between 19 and 27 miles from Boston. Recently, the Department of Public Safety retained an architect to design a new headquarters building in Boston. It is anticipated that this building, when completed, will contain the adequate space for the laboratory and Firearms Identification Bureau that is recommended in a subsequent section of this report.

Further increasing the Department's laboratory problems is the dearth of essential and up-to-date equipment. The Department lacks three of the major pieces of equipment which almost all comparable laboratories have: a comparison microscope, a densitometer, and an infrared spectrophotometer. Without a comparison microscope, for example, a laboratory cannot effectively analyze tool marks on a safe or a jimmied lock or door.

In addition, most of the equipment which the State Chemistry Laboratory does possess is obsolete. The Department's polarizing microscope was purchased prior to 1945; its Picker x-ray diffractometer, before 1946; its Bausch and Lomb emission spectrograph, before 1942; and its Beckman ultraviolet spectrophotometer, in 1956. Its only recent piece of equipment, a Dynatromic gas chromotograph, which was purchased in 1963, is one of the simplest and most insensitive made.

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[2]For example, the standards of the United States Bureau of Standards for volumetric work can be met only by holding the room temperature at 68^{o} F$\pm$ 1^{o}.

Likewise, the Firearms Identification Bureau purchased one of its two ballistics comparison microscopes in 1928 and its binocular microscope in 1931.

Aside from the fact that many pieces of equipment are not now available or are outdated, some of the equipment is so heavily used that significant delays can result before evidence can be analyzed. For example, a gas chromotograph requires a full day to be set for a particular analysis. Since one instrument is used for all work, most of a technician's time is spent changing the settings for a different analysis. While the State Chemistry Laboratory has only one of each item of equipment, the New York State Police, by comparison, have two ultraviolet spectrophotometers (one of which is an automatic recording instrument), two gas chromotographs, two comparison microscopes, and a number of other microscopes. The New York City Police Laboratory has two infrared automatic recording spectrophotometers, two gas chromotographs, and ten comparison microscopes. The Hartford, Connecticut, Laboratory, meanwhile, has several recording ultraviolet spectrophotometers, three gas chromotographs, and several stereo microscopes.

The Committee was pleased to learn that the Commissioner of Public Safety has requested for fiscal year 1969 an infrared spectrophotometer, a gas chromotograph, a spectrograph, and an x-ray diffractometer. Certainly, this request should be approved. However, even with the approval of this request, the Laboratory will still lack certain essential equipment, will still need to replace outdated and insensitive models now being used, and will still need to have duplicate pieces of constantly used equipment. An indication of what equipment is utilized in crime laboratories in the United States is reflected in Table I.

Although the work of this Laboratory has more than tripled in ten years (from 500 to 1,800 cases per year plus 6,000 racing chemistry cases), there have been practically no increases up to this time in personnel, space, or budget for supplies and equipment.

There are at least three standards for determining the number of criminalists needed for laboratory and ballistics work. A recent authoritative text, The Crime Laboratory: Organization and Operation, prepared by Dr. Paul L. Kirk, Professor of Criminalistics, University of California, Berkely; and Lowell W. Bradford, Director, Laboratory of Criminalistics, Santa Clara County, California (hereinafter referred to as Kirk and Bradford) recommends that there be one trained criminalist for every 100,000 to 150,000 of population. In their study, the John Jay College of Criminal Justice recommends that there be one examiner for every 175 cases handled per year. Finally, the Ontario Centre of Forensic Sciences in Toronto, Canada, recommends that there be one examiner for every 50 cases handled per year.

Massachusetts has a population of 5,383,000, while the total caseload of the Department of Public Safety Laboratory and Firearms Identification Bureau is 8,550. Boston has a population of 616,326,

TABLE I

EQUIPMENT

	Equipment Available to Crime Labs	Massachusetts	Chicago	L.A. Sheriff	L.A. Medical Exam.	L.A. Police	Texas	San Francisco	Ontario	San Diego	Philadelphia	New York State	Cleveland	Connecticut	Illinois	Port Worth	Florida	San Mateo	Missouri	Fort Gordon	Pennsylvania	West Virginia
Z	Comparison Microscope	O	X	X		X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X
Z	Polarizing Microscope*	X	Most Laboratories Probably Have																			
Z	Stereo Microscope*	X	Most Laboratories Probably Have																			
Z	X-Ray Diffractometer	X	X			X	X	X	X			X				X	X			X	X	X
Z	Emission Spectrograph	X	X	X		X	X		X		X	X	X	X		X	X		X		X	X
Z	Densitometer	O	X	X			X		X		X	X		X	X				X		X	
Z	Infrared Spectrophotometer	O	X	X	X	X	X		X		X	X		X	X		X			X	X	X
Z	Ultraviolet Spectrophotometer	X	X			X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X
	Spectrofluorometer*													X								
	Mass Spectrometer																					
	Nuclear Magnetic Resonance Spectrometer*																					
	Atomic Absorption Spectrometer													X								
Z	Analytical Gas Chromotograph	X	X	X	X	X	X	X	X		X	X		X	X	X	X	X	X	X	X	X
	Differential Thermal Analysis																					
	Electron Microprobe														X							
Z	Electrophoresis Equipment		X	X		X	X		X					X					X			
	Thin Layer Chromotography	X	X	X			X		X		X		X	X		X	X	X				X
	Pyrolysis*																					
	Neutron Activation Analysis	T	X						X													
	Gamma Ray Spectrometer*																					
	Nuclear Survey Meter																					
	Scintilation Counter																					
	Scalar Counter						X															
	X-Ray Fluoroscope	X					X		X			X		X	X						X	

Z = Minimum Equipment Recommended by John Jay Study for Model Regional Laboratory Plus Densitometer which Should Be Used with Emission Spectrograph

* = Not Included on John Jay Questionnaire

O = Needed by Massachusetts

T = Will Be Available at Lowell Tech in Spring of 1968.

As noted in the text, all of Massachusetts's equipment is 10 - 20 years old, or older, except the Gas Chromotograph.

while the total caseload of the Boston Police Department Laboratory and ballistics section is 1,425. Under the Kirk and Bradford recommendations, therefore, Massachusetts should have 36 to 54 trained criminalists -- including 32 to 48 in the Department of Public Safety. Under the John Jay recommendation, it should have 57 -- with at least 49 in the State Laboratory. Finally, under the Centre of Forensic Sciences recommendation, it should have 200 -- with at least 171 in the State Laboratory.

In contrast to these standards, the Department of Public Safety has 35 criminalists: seven chemists, three State Police firearms experts, three polygraph experts, and twenty-two photographers. In addition, however, the State Laboratory must devote considerable time to performing services for the State Racing Commission and for the State Fire Marshal -- work not done by most comparable laboratories. At the same time, the Laboratory does not have a questioned documents examiner.

Present laboratory personnel have been spending proportionately less time on analysis in recent years because of an increasing amount of time which they must devote to court appearances (314 such appearances in fiscal 1966). This is true in spite of the fact that they testify in only 40 percent of the cases for which they are called. The work load of the Laboratory was further increased when it took over toxicology tests for the Suffolk Medical Examiners when the Boston Police Laboratory discontinued this work. Finally, the Laboratory is beginning to experience an increase in pressure as a result of recent United States Supreme Court decisions (which indicate that greater reliance must be placed upon physical evidence), the passage of the Highway Safety Act (which increased demands for analysis of alcohol and drugs), enactment in Massachusetts of the new "Implied Consent" law, and the discontinuance of pathological consultations by the Harvard Medical School.

The John Jay survey disclosed that nearly every laboratory in the United States and Canada is overcrowded, understaffed, underpaid, underequipped, and overworked. The Chemistry Laboratory of the Department of Public Safety is no exception. Of all comparable laboratories, Cleveland was the only one with a smaller staff or budget. However, the Cleveland caseload, crime index, and population served is much lower than that of the Massachusetts Laboratory as shown by Table II on the following page. This table compares the personnel, budget, and salaries of the State Chemistry Laboratory with other laboratories having similar caseloads or serving similar populations. (It should be noted that budget figures from some laboratories such as Ontario do not include salaries). Table III compares the caseload per examiner of the State Chemistry Laboratory with these same laboratories along with other laboratories having both larger and smaller caseloads. For the most part, even the

TABLE II

COMPARISON OF PERSONNEL AND BUDGET

Laboratory	Case Load	Crime Index	Population	Personnel		Budget
				Professional	Clerical	
Massachusetts	7,800	89,055	5,400,000	7	4	$112,500
Chicago	13,441	125,000	5,000,000	59	9	685,000
Los Angeles						
Sheriff	13,000	127,872	5,000,000	27	4	250,000
Medical Exam.	5,847	259,417	7,000,000	8(+23PT)	50	987,183
City Police	1,973	131,645	2,000,000	85	7	NA
Total	20,820	259,417	7,000,000	120(+23PT)	61	1,237,183+
Texas	9,696	113,746	9,000,000	32	4	297,830
San Francisco	6,372	29,084	750,000	13	3	129,000
Ontario	6,061	NA	7,000,000	67	9	140,000
San Diego	5,822	11,935	1,200,000	10	1	NA
Philadelphia	5,223	31,004	3,500,000	35	4	365,900
New York State	5,030	65,000	7,000,000	21	4	500,000
Cleveland	5,006	18,936	1,500,000	5(+1PT)	1	NA
Connecticut	4,982	37,548	2,900,000	8	4	NA
Florida	1,756	91,447	5,000,000	11	3	167,352

TABLE III

COMPARISON OF CASE LOADS PER EXAMINER

Los Angeles Police	23
MASSACHUSETTS POLIGRAPH SECTION	34
ONTARIO (RECOMMENDED)	50
Santa Clara County, California	54
Wisconsin	56
Missouri	96
Ontario (Actual)	112
BOSTON POLICE LABORATORY	125
Fort Gordon, U.S. Army	125
Pennsylvania	129
Philadelphia	149
Florida	159
MASSACHUSETTS PHOTOGRAPHY BUREAU	168
New York City	174
RECOMMENDED BY JOHN JAY	175
BOSTON POLICE BALLISTICS	184
Illinois	216
West Virginia	222
Chicago	229
New York State	239
MASSACHUSETTS FIREARMS BUREAU	250
Los Angeles Medical Examiner	292
MASSACHUSETTS LABORATORY Racing Cases Are Not Included In This Outline	300
Texas	303
United States Average	331
Los Angeles Sheriff	481
San Francisco	490
San Mateo	547
Connecticut	622
Fort Worth	626
Dan Diego	647
Cleveland	910

laboratories with smaller caseloads have larger staffs and budgets than the Department of Public Safety Laboratory. For instance, of the smaller laboratories listed in Table III, only Fort Worth and San Mateo County, California, have a smaller staff or budget -- five persons for Fort Worth and seven for San Mateo.

On the basis of case load per examiner, shown on Table III, the Chemistry Laboratory and Firearms Identification Bureau need more personnel. The Committee found, however, that the Photography Bureau and the Polygraph Sections of the Detective Bureau were adequately staffed and equipped. Therefore, no further mention of them is made in this report.

However, caseloads alone are not true indicators of the laboratory work which actually needs to be done. The President's Crime Commission stated that police should make a thorough search of the scene of every serious crime and analyze all evidence discovered. The John Jay study interpreted this to mean that all evidence in Part I crimes would be processed by a laboratory. That this, in fact, is not done may be seen by comparing caseloads and crime indices. If it were done, the John Jay study indicated that larger laboratories might well have to handle a caseload six to twelve times greater than the number of cases now submitted by investigating officers. This finding is consistent with the one made by the President's Crime Commission.

Existing salary schedules for laboratory personnel in the Department of Public Safety will make it extremely difficult to attract additional qualified personnel even if an increase of personnel to appropriate levels was authorized.

The composition of the present staff and salary ranges are as follows:

Laboratory Trained Criminalists	Range	Present
1 Grade 20 Supervisor of laboratory (Ph.D)	$10,400--13,650	$12,650
1 Grade 18 Senior Chemist, D.P.S. (B.S., LL.B.)	9,600--12,100	12,100
1 Grade 16 Senior Chemist (M.S.)	8,500--10,400	10,400
4 Grade 15 Assistant Chemists, D.P.S. (2-B.S., 2-M.S.) (one additional assistant chemist is called for in the fiscal 1969 budget request)	8,000--10,000	(3) 10,000 (1) 9,000
Laboratory Technicians, Assistants, Clerks		
1 Grade 8 laboratory technician (no degree)	4,869-- 6,186	6,186
1 Grade 4 laboratory assistant (college student) (Two Northeastern University students alternate on this position)	4,000-- 5,000	4,000
2 Grade 7 senior clerk stenographers	4,700-- 5,800	5,800
(plus one or two laboratory assistants during racing seasons)		
Firearms Identification Bureau		
1 Grade 17 supervisor (State Police Captain)	9,110--11,495	11,495
2 Grade 12 Firearms technicians (State troopers)	6,349-- 8,034	8,034

When these salaries are compared to the 1966 median salaries for chemists prepared by the National Science Foundation, it seems obvious that State Laboratory salaries are not competitive. The following table compares the present salaries of Laboratory chemists with these medians which are based on degree and years of experience.

Position	Degree	Experience	Salary	NSF Median
Supervisor	Ph.D	25-29	$12,650	$18,000
Senior Chemist, D.P.S.	B.S., LL.B.	25-29	12,100	14,000
Senior Chemist	M.S.	20-24	10,400	14,000
Assistant Chemist, D.P.S.,	M.S.	15-19	10,000	13,000
Assistant Chemist, D.P.S.,	B.S.	15-19	10,000	12,000
Assistant Chemist, D.P.S.,	B.S.	10-14	10,000	11,000
Assistant Chemist, D.P.S.,	M.S.	10-14	9,000	11,900

It should also be noted that salaries for chemists are rising rapidly. According to David A.H. Roethel, Manager, Office of Professional Relations, American Chemical Society, median salaries as reported by the National Science Foundation, rose 9.1 percent between 1964 and 1966. Although he does not give 1967 figures for experienced chemists, starting salaries went up 7.6 percent between 1966 and 1967.

Salary information for firearms personnel is much more limited. The New York State Police pays its technical sergeant (who is in charge of ballistics) $10,280, while Chicago pays its firearms technician II (also in charge of ballistics) $9,540 to $11,604. Under these men are firearms technicians I paid $9,200 by New York and $8,244 to $10,020 by Chicago. By comparison, the supervisor of the Firearms Identification Bureau received $11,495 while the firearms technicians in the Bureau received $8,034.

B. The Boston Police Department

While the ability of the Department of Public Safety's Laboratory to effectively serve law enforcement has been reduced in recent years, that of the Boston Police Department's Crime Laboratory has been even more limited despite the fact that it is adequately staffed.

The Laboratory was visited on November 4, 1966, by a survey team from the John Jay College of Criminal Justice as part of a nationwide study of crime laboratories for the Office of Law Enforcement Assistance of the United States Department of Justice. The survey team found that the Laboratory was below standards in physical accommodations, instrumentation, and personnel.

These deficiencies have resulted partially from a dilution of the services of the Laboratory due to split responsibility. Until recently, some examinations were performed at the Boston Police Department Laboratory, some at the Boston City Hospital Mortuary, and others at the Harvard School of Legal Medicine. All instrumentation was and is still done by the State Chemistry Laboratory. Without question, the Boston Police Department Laboratory does not even have sufficient equipment to perform minimal services. It has only one piece of major equipment, an old model Beckman spectrophotometer; but the Boston Police Department in a letter to the Governor's Committee indicated that it is not even being used. The John Jay survey also reported that the Laboratory is not equipped to perform instrumental analysis. The functions that the Laboratory does perform are document examination, wet chemistry, physiological fluids, serology, crime scene service, latent fingerprint service, specialized photography, trace evidence, and comparative microscopy and tool marks.

The present Boston Police Laboratory and ballistics staff consists of the following:

Laboratory Staff

Title	Salary
1 Assistant Biological Chemist	$9,776
3 Patrolmen	7,305

Ballistics Staff

Title	Salary
1 First Grade Detective (Unit Supervisor)	$9,722
1 Second Grade Detective	7,705
3 Patrolmen	7,305

According to recognized national standards, the size of the Laboratory and ballistics staffs are adequate for Boston's population. Whereas Kirk and Bradford recommend a staff of four to six for a city or regional laboratory of Boston's size, Boston has a staff of nine. (The larger number is easily justified by the daily influx of people into the city from the suburbs). However, the educational qualifications of the existing Laboratory personnel do not meet acceptable standards.

The assistant biological chemist is the only person in the Laboratory who has a B.S. degree in chemistry or criminalistics. As recommended by Kirk and Bradford and the John Jay study, such a degree should be a minimum requirement for all professional laboratory personnel.

Ballistics personnel have had no formal education in this field primarily due to the unavailability of training facilities in the Boston area. However, the John Jay study and Kirk and Bradford point out that this is the one area of laboratory work where a college degree is not essential. Ballistics personnel have gained their knowledge through years of experience in the unit, individual study, and visits to arms manufacturing companies. The First Grade Detective has 20 year's experience; the Second Grade Detective, 14 years; and the patrolmen, 5 years, 3 years, and one year respectively.

The Committee was recently informed that the Department has been trying to find a criminalistics laboratory director with appropriate credentials who would be in charge of the development, supervision, improvement, and equipping of an integrated criminalistics laboratory. To date, the Department has not been successful in filling this position.

II. A BLUEPRINT FOR ACTION

It is the firm belief of the Governor's Committee that one essential step in more effectively dealing with crime in the Commonwealth must take the form of improving the law enforcement's ability to gather, identify, and analyze evidence in criminal cases, and to do so quickly and expeditiously. And in the Committee's view, the recommendations which follow will, if implemented, lead to this improvement.

A. Expansion of State Crime Laboratory

Although it is imperative that all law enforcement agencies have access to complete criminal laboratory and ballistics facilities, the cost of staffing and operating laboratories capable of meeting all law enforcement needs is clearly beyond the financial ability of most Massachusetts police departments. Since, however, the President's Crime Commission recognized that each police agency must have professional laboratory services, it recommended the implementation of the following program:

* States should provide central laboratory facilities capable of performing almost all complex and sophisticated scientific evaluations needed in police work. Local agencies would forward all complex work to this agency, and perform only routine work themselves. State services should be provided free of charge to all law enforcement agencies. Training of local personnel would be an important aspect of the State Laboratory's work. The FBI Laboratory should continue to analyze the sophisticated evidence submitted to it.

* Basic laboratory services must be readily available within each locality or region to handle routine requests for service. Facilities for such services could be operated jointly by two or more jurisdictions with costs shared on an agreed basis. These facilities should perform only those scientific evaluations considered to be routine and those not requiring a heavy investment in limited-use equipment.

* Well-developed police laboratories serving metropolitan needs should be continued, freeing State agencies to develop needed laboratory facilities in other parts of the State. Duplication of facilities between local and State agencies, and between local agencies in the same area, should be avoided.

* Consideration should be given to placing all police laboratories in a state under the direction of a single administration.

In order to correct present inadequacies, the Governor's Committee recommends that:

The Commonwealth of Massachusetts should expand the present Chemistry Laboratory of the Department of Public Safety to enable it to provide essential services to all public law enforcement agencies in the State.

As envisioned by the Committee, this Laboratory, which should be renamed the State Crime Laboratory, would perform almost all complex and sophisticated evaluations for the Commonwealth's police agencies. It would be located in air-conditioned space of at least 6,000 square feet and would be staffed and equipped to provide the most detailed, specialized analysis needed by law enforcement; to conduct research to improve techniques of analysis; and to train laboratory and police personnel.

Appropriate expansion of the State Crime Laboratory will not be possible unless it is adequately staffed with trained personnel and provided with adequate funds to carry on its work.

In keeping with the standards set by Kirk and Bradford and the John Jay College of Criminal Justice and to enable the Department of Public Safety to better serve law enforcement in Massachusetts, the Committee recommends:

The number of Department of Public Safety criminalists available in Boston should be increased to a total of 22 to 32 and they should be provided adequate clerical and technical assistance.

Further, since an adequate salary scale is essential to attracting qualified personnel, the Committee recommends:

Salaries of State Crime Laboratory and Firearms Identification Bureau personnel should be upgraded, except for those individuals whose salaries already meet national standards.

Equipment in the existing State Laboratory is inadequate and outdated. The Department of Public Safety is aware of this deficiency and has already requested some of the equipment which is so desperately needed. However, approval of this request is still not sufficient.

The Committee recommends:

The Commonwealth should purchase all equipment necessary to provide appropriate services to law enforcement and should replace existing outdated equipment.

This should include the four pieces of equipment requested by the Department along with the additional equipment listed in this report as the minimum essential equipment for a major crime laboratory.

Outside training of personnel is very important. The John Jay study found that the number of experts qualified by "on-the-job" training is excessive, covering more than 25 percent of all personnel.

The study concluded:

> With the advent of new techniques and new scientific equipment for use in crime laboratories, a departmental budget must provide support for education of crime laboratory personnel on a continuing basis. This includes subscriptions to scientific journals; attendance at short term specific courses offered by colleges and/or commercial scientific apparatus companies; time off for graduate courses in some cases, with tuition paid by the department.
>
> The single most valuable method for keeping up-to-date, for personnel who already are highly skilled, is attendance at professional meetings such as meetings of the Academy of Forensic Science, the Symposia on Science and Technology carried on in 1966 and 1967 with the support of the Office of Law Enforcement Assistance, and attendance at specialized seminars and scientific conventions such as those held by the American Chemical Society, the American Physical Society and similar professional groups where new techniques are discussed and new instruments are on display. Monies must be provided for this purpose.

The Committee recommends:

Funds should be provided which will permit laboratory personnel to attend training courses and educational programs and enable state crime laboratories to undertake programs of research leading toward improvement in the gathering, identification, and analysis of evidence.

In addition to the training of its own personnel, the laboratory should be prepared to train police officers in crime scene searching.

The President's Crime Commission stated:

> There is a very great lack in police departments of all sizes of skilled evidence technicians, who can be called upon to search crime scenes not merely for fingerprints, but for potentially telltale evidence like footprints, hairs, fibers, or traces of blood or mud . . . The two chief reasons for the lack of skilled technicians are that few persons with the requisite science education have been recruited into police operations, and that few training programs for evidence technicians have so far been developed.
>
> The undeveloped state of training in this field also accounts for the fact that many patrolmen and detectives have no more than a rudimentary idea of how to search the scene of a crime . . .
>
> In any case, the Commission strongly believes that it should be an important goal of the police to develop the capacity to make a thorough search of the scene of every serious crime and to analyze evidence so discovered.

Similar recommendations were made by Kirk and Bradford and the John Jay survey.

At the present time, the laboratory supervisor gives presently approximately 30 lectures a year on toxicology and criminalistics.

The Committee recommends:

The State Crime Laboratory, in conjunction with the Municipal Police Training Council should provide extensive training in the collection and preservation of evidence both to recruits and to in-service personnel.

Although the eventual goal is to have all police officers trained in the collection and preservation of evidence, such a training program will take time. In the meantime, it might be advantageous for departments to train a limited number of men and form them into crime scene search teams. Until such time as more officers can be trained, these teams would be responsible for the collection and preservation of all physical evidence.

B. Regional Laboratories

According to the John Jay national survey, there is a particularly pressing need to establish regional laboratory facilities in the Southeastern, Central, and Western parts of Massachusetts. However, this study failed to take into consideration the existence of six photographic laboratories throughout the state. These regional laboratories already perform all routine laboratory services called for by the President's Crime Commission.

Based upon the recommendations of Kirk and Bradford, a professional staff of 14 to 20 "trained criminalists" would be needed in the Southeastern, Central, and Western parts of the state. The photography laboratories are presently staffed by 13 state troopers. With the lower crime rates in these parts of the state, this number seems to be sufficient.

The Committee recommends:

Those Municipal police agencies in the Southeastern, Central, and Western parts of the state that do not use the existing six Department of Public Safety regional photographic laboratories should do so for routine, but important, scientific analysis of evidence.

C. The Boston Police Department

There is a clear need for the Boston Police Department to upgrade its present laboratory in order for it to provide appropriate routine laboratory services either to its own personnel or to other departments within the metropolitan area of Boston.

The Department is fully aware of its laboratory deficiencies and has been trying to overcome them. The number of personnel is adequate, and the Department is paying a reasonable salary for the current head of the Laboratory. Further, the Department has already included in its 1968 budget a request for $21,423 for new laboratory equipment, and is seeking a director for an integrated criminalistics laboratory encompassing the Crime Laboratory, ballistics unit, photography laboratory, and latent print unit. However, there are still major problems that would have to be solved for the Laboratory to be effective. Since a college degree is essential for crime laboratory

work, the Department would either have to send the three patrolmen assigned to the Laboratory to a university or college to obtain their B.S. degrees in chemistry or ciminalistics, or hire civilian personnel who meet these qualifications. At the same time, salaries should be increased to conform to those which are paid to graduate chemists. Next, the Department would have to correct deficiencies noted by the John Jay College of Criminal Justice. Boston's Superintendent of Police Buildings estimates the cost of renovating the physical structure of the present Laboratory at approximately $20,000. The Department believes the City of Boston will be willing to provide this money plus the funds requested for new equipment. However, it is understood that the Department is looking for outside sources of money should the city funds not be forthcoming. The Department has also indicated that State or federal aid would expedite matters.

If the above deficiencies were corrected, the Boston Laboratory would easily meet appropriate standards for a regional laboratory. If it did, the Laboratory could continue to process routine cases, while continuing to send more complex cases to the State Crime Laboratory.

The Committee recommends:

The Boston Police Laboratory be improved and upgraded by the addition of equipment and by the improvement of its staff and physical plant to meet the standards described for a regional laboratory.

If the Boston Police Department is not improved sufficiently to qualify as a regional laboratory, all laboratory work for the metropolitan area of Boston, both complex and routine, should be performed by the State Crime Laboratory. This would be consistent with the recommendation by the International Association of Chiefs of Police in its survey of the Boston Police Department in 1962, and in keeping with the recommendations of the President's Crime Commission.

III. CONCLUSION

The recent and rapid increase in crime and violence has produced unanimous agreement on the importance of enabling our state's law enforcement agencies to respond effectively to the challenge to the lives and safety of our citizens. Many of the steps which must be taken to upgrade the quality of law enforcement in Massachusetts are of necessity slow, and can be taken only after several preparatory steps have been taken. Others, essential to the improvement of our law enforcement system, can and indeed, must be taken immediately. One such step is the improvement of crime laboratory facilities.

The apprehension and conviction of a large percentage of offenders depends upon careful search of crime scenes and prompt and accurate analysis of evidence gathered. The laboratory facilities which exist in the Commonwealth today are inadequate for the state's needs. Equipment is either totally absent or obsolete, facilities are crowded, staffs are too small and underpaid, and many police officers throughout the state are not adequately trained in crime scene search and preservation of physical evidence.

For these reasons, it is imperative that the Committee's recommendations for establishment of a State Crime Laboratory and a regional laboratory network, plus those calling for improvement of equipment and personnel, be implemented immediately.

These recommendations are consistent with those of the President's Crime Commission and the recent national study of police laboratories conducted by the John Jay School of Criminal Justice of New York. They are consistent with the Committee's findings in its study of law enforcement in Massachusetts and with the needs of the Commonwealth.

These recommendations are timely, for they recognize a situation which exists now and can be improved by prompt and imaginative action.

Finally, these recommendations are practical, for they recognize not only the Commonwealth's needs, but its ability to meet them.

The Committee urges that they be implemented immediately.

APPENDIX

In an attempt to assess the possible costs to the Commonwealth of the recommendations contained in this report, the Committee's staff has drafted specific proposals in this appendix to implement the recommendations of the Committee on personnel and equipment for the Department of Public Safety. These proposals are based upon the standards suggested by the President's Crime Commission, Kirk and Bradford, and the John Jay College of Criminal Justice; on the experience of other laboratories; on the recommendations of this Committee; and on discussions with Leo L. Laughlin, the Commissioner of Public Safety, and various members of his staff. These proposals are not recommendations of the Committee. They are listed here only as a guideline to what might be needed and as an indication of the possible cost to the Commonwealth of implementing the Committee's recommendations.

Proposed Staff for the State Crime Laboratory

1 Grade 26 Director of Laboratory and Chief Toxicologist-Diplomate (Ph.D)	$14,489 - $18,431
1 Grade 22 Assistant Director and Senior Toxicologist (Ph.D.)	$11,973 - $15,149
4 Grade 20 Forensic Chemists III (M.S. or B.S.)	$10,400 - $13,650
1 Grade 18 Document Examiner (B.S)	$ 9,600 - $12,100
4 Grade 18 Forensic Chemists II, (M.S. or B.S.)	$ 9,600 - $12,100
4 Grade 16 Forensic Chemists I (B.S.)	$ 8,500 - $10,777
1 Grade 8 Laboratory Technician (High School Graduate)	$ 4,896 - $ 6,185
2 Grade 7 Senior Clerk-Stenographer	$ 4,700 - $ 5,800
1 Grade 3 Junior Clerk-Stenographer	$ 3,838 - $ 4,836
1 Grade 4 Laboratory Assistant (High School Graduate) (Two Northeastern University students alternate on this position.)	$ 4,000 - $ 5,000

Under this proposal the laboratory supervisor, as requested by Commissioner Laughlin, would be upgraded to director and chief toxicologist -- a title that more nearly describes his actual duties; the new positions of assistant director and senior toxicologist and of questioned document examiner would be created and the number of personnel in other grades in the laboratory would be expanded from 10 to 17. The senior chemist, D.P.S., the senior chemist and two of the assistant chemists, D.P.S., would become Forensic

Chemists III. The remaining assistant chemists, D.P.S., would become Forensic Chemists II.

This proposal would bring the size of staff and the salaries more nearly in line with other laboratories handling similar case loads. Of course, the work of the laboratory would be increasing at the same time, primarily in the fields of document examination (where nothing is now being done), toxicology, alcohol testing, research, and training of police personnel. Automobile accident and criminalistic examinations would also be increased.

The professional staff of the laboratory is exempt from Chapter 31 of the General Laws (Civil Service) and the rules and regulations made thereunder. Therefore, there should be no difficulty in establishing educational requirements suggested for these positions.

Proposed Staff for Firearms Identification Bureau

1 Grade 17 Supervisor	$9,110 - $11,497
3 Grade 15 Qualified Firearms Specialist	$8,000 - $10,000
1 Grade 12 Male Firearms Clerk	$6,349 - $ 8,034

This proposal would add a firearms specialist and clerk to the present staff and upgrade the salaries of the specialists in line with salaries paid in New York and Chicago. The additional firearms specialist would reduce the caseload per examiner of the Bureau to 184 a year, identical to that of the Boston Police Department and more in line with the 175 recommended by the John Jay College of Criminal Justice. It is recognized that the change in salary for firearms specialists would require a change in present statutes. However, this would be desirable in order to bring their salaries into line with those paid in other jurisdictions.

Proposed Equipment for the State Crime Laboratory

1 Comparison Microscope (new) (stand type)	$7,600
1 Polarizing Microscope (replacement)	$1,100
1 Stereo Microscope (replacement)	$ 700
1 X-Ray Diffractometer (replacement)	$7,000
1 Combination Emission Spectrograph (replacement) and Densitometer (new)	$26,000
1 Infrared Spectrophotometer (new) (recording model)	$17,000
1 Ultraviolet Spectrophotometer (replacement) (automatic recording model)	$10,000
3 Gas Chromotographs (one replacement - two new)	8,700 each

Proposed Equipment for Firearms Identification Bureau

1 Bullet Comparison Microscope (Replacement)	$4,000 - $5,000
1 Binocular Microscope (Replacement)	$ 700 - $1,000
2 Cameras for Tool Mark Comparisons (New)	$ 400 - $ 500 each
1 Custom-Built Microscope Bench with Sliding Doors for Protection of Optical Equipment	$ 400 - $ 500
1 Stainless Steel Water Recovery Tank A vertical tank is preferred. It is less expensive ($2,000) than a horizontal tank ($2,500), but installation is much more expensive since it has to be placed through two floors (12 to 15 feet high). New York paid $3,000 for its horizontal bullet recovery unit plus $2,000 for a bullet backstop.	
1 Target Holder	$ 150

In addition to the equipment recommended immediately for the State Crime Laboratory, there are a number of other types of equipment still considered experimental in their application to law enforcement. Among them are reactors and gamma ray spectrometers for neutron activation analysis; nuclear magnetic resonance spectrometers; mass spectrometers; atomic absorption spectrometers; differential thermal analysis; pyrolysis; and the electron microprobe.

The John Jay report urges that research be undertaken in universities and crime laboratories to further develop these tools, especially neutron activation analysis, nuclear magnetic resonance, and mass spectroscopy which are used in the analysis of trace evidence.

Neutron activation analysis has already been accepted in a number of court cases dealing with simple types of evidence. Research into more complex types of analysis is presently being conducted by a number of skilled persons in the United States including Dr. Constantine J. Maletskos, Department of Legal Medicine, Harvard Medical School and member of the faculty of the Cancer Research Center at the New England Deaconess Hospital. In addition, a reactor will be installed in the Spring of 1968 at Lowell Technological Institute which will be available to law enforcement for activation analysis. A committee has already been formed by Attorney General Elliot L. Richardson and Dr. Martin J. Lydon, president of the Institute, to study and develop techniques for using the reactor for activation analysis. Included on the committee are both Dr. McBay and Dr. Maletskos along with personnel from the Institute and the office of the Attorney General.

Neutron activation analysis is from 100 to 1,000 times more sensitive than most methods currently used in crime laboratories to analyze trace evidence. The John Jay report also indicated that mass spectrograph and magnetic nuclear resonance are research tools which may even be superior to neutron activation for trace analysis.

The John Jay report further noted that no crime laboratories presently have a mass spectrometer. "However," it continues, "the combination of a gas chromatograph and a mass spectrometer is a powerful tool for the organic analytical chemist . . . . Mass spectroscopy of organic compounds has not been utilized because of the cost of instrumentation. However, $100,000 is not too great an expense for a good sized laboratory to invest on what appears to be one of the finest trace evidence identifying tools that has been devised." Research by the academic community into new and more sensitive equipment for crime laboratories should be accelerated.

Cost of Recommendations

The total first year cost of the recommendations on the preceding pages, including equipment, salaries, and supplies for the Department of Public Safety comes to $336,270 only $152,332 more than the $183,938 requested for these budget items by the Department of Public Safety for fiscal year 1969. These costs are broken down as follows:

Present Cost (as requested for Fiscal Year 1969);		
Equipment Cost (Laboratory Only)		
From the State	$21,000	
From the National Highway Safety Bureau	10,000	
Subtotal		$31,000
Annual Cost		
Salaries		
Laboratory (from State)	$105,775	
(from National HSB)	12,100	
Firearms Identification Bureau	27,563	
Subtotal		$145,438
Supplies		7,500
Total Annual Cost		$152,938
Total Equipment and Annual Cost		$183,938
Proposed Cost		
Equipment Cost		
Laboratory	$93,800	
Firearms Identification Bureau	12,770	
Subtotal		$106,570
Annual Costs		
Salaries		
Laboratory	$177,786	
Firearms Identification Bureau	41,914	
Subtotal		$219,700
Supplies		10,000
Total Annual Costs		$229,700
Total First Year Costs		$336,270
Increase over Fiscal 1969		
Equipment Cost	$106,570	
	-31,000	
		$75,570
Salary Cost	$219,700	
	145,438	
		$74,262
Supplies	$10,000	
	7,500	
		$2,500
Total Annual Increase		$76,762
Total First Year Increase		$152,332

The equipment cost given here for the State Crime Laboratory and Firearms Identification Bureau includes only that equipment recommended in this appendex. Assuming that new quarters are provided, there would be additional costs of such quarters, miscellaneous equipment, desks, typewriters, and specialized furniture. The Minimum capital cost suggested by the John Jay survey for equipment other than building space is $160,000 to $200,000.

Salary estimates are made on the assumption that personnel will begin at the lowest salary in their grade unless their salary is already above that point. In such cases it is assumed that they would continue at that salary. It should be noted, however, that all personnel, with the exception of the supervisor and laboratory assistants, are presently at the top of their pay grade. Under the new salary structure all personnel would be advancing in pay as they build up seniority.

The only guide for laboratory and office supplies is given by Kirk and Bradford. They state that "this item is ordinarily not more than about 10 percent of the total budget, and may be reduced significantly after initial stocking of the operation." The supply estimate for the State Crime Laboratory is based both on this guide and the experience of the Chemistry Laboratory. The budget for training and education of personnel and for travel and other expenses has not been included.

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COORDINATION AND CONSOLIDATION OF POLICE SERVICE

PROBLEMS AND POTENTIALS

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CHAPTER IV

COORDINATION AND CONSOLIDATION OF AUXILIARY SERVICES

(pages 81, 108-115)

Auxiliary services are nonline functions other than staff services which provide technical, special, or supportive services to line or other nonline elements of a law enforcement agency. They include such functions and activities as records and communications, detention, laboratory services, and buildings and equipment. After field services, auxiliary services are the most costly part of police management. Generally, auxiliary services as a group are susceptible of joint performance between or among a number of law enforcement agencies.

* * * * *

Laboratory Services

Laboratory services are essential to effective law enforcement. Success in complicated investigations may depend in large part upon the scientific evaluation of pertinent data. The import of recent United States Supreme Court decisions suggests that law enforcement agencies must depend increasingly upon scientific analysis of crimes rather than rely upon traditional methods such as interrogation of suspects.

Two distinct activities are involved in laboratory work: (1) the gathering of evidence at the scene of the crimes and the scientific analysis of evidence. Both activities are essential to the adequate

evaluation and use of evidence. Evidence must be gathered and preserved according to established court criteria to guarantee its value in court testimony and for use in laboratory analysis. A laboratory technician can make a detailed and thorough analysis of evidence only if it has been properly gathered and handled before reaching the laboratory, and evidence that has been mishandled is not admissible in court proceedings.

Competent technicians and good equipment are essential to the success of any laboratory evaluation. This report does not attempt to suggest how many persons or what equipment is needed to perform minimal laboratory services. Suffice it to say that a good laboratory facility is beyond the means of almost all police departments in the United States.

Current Local Practices

The "crime laboratories" of many law enforcement agencies are primarily bureaus of identification which house a number of records but perform no real scientific analysis.[32/] Other jurisdictions have fully equipped laboratories filled with the latest scientific tools, but no qualified technicians to operate them. One of the greatest obstacles to the development of regionally oriented laboratory operations is the unwillingness of departments to lose their laboratories, even if they are not effectively utilized. As is the case with criminal investigations or data processing equipment, a crime laboratory is regarded as a status symbol.

Local practices relating to laboratory services vary greatly. Evanston, Illinois, for example, established a police laboratory in 1948, but the facility was never used, primarily because of lack of professional staff, and is now not operational.[33/] In the State of Arizona there is only one crime laboratory, that of the City of Phoenix. This facility performs all necessary tests, including some complex work, for the city

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[32/] Paul L. Kirk and Lowell W. Bradford, The Crime Laboratory (Springfield, Illinois: Charles C. Thomas, 1965), p. 5.

[33/] Wayne Anderson, City Manager, Evanston, Illinois, Law Enforcement Regionalization Seminar: Discussion Notes (Chicago: Public Administration Service, 1966) mimeo, p. 28.

police department but services beyond the city are severely limited because it has only two full-time, fully trained technicians.[34/] The Sauk-Prairie Police Department, serving Sauk City and Prairie du Sac, Wisconsin, sends materials needing scientific analysis to the Wisconsin State Crime Laboratory in Madison.[35/] Kansas City, Missouri, maintains a laboratory which is equipped to provide such basic services as blood analysis, tool-mark identification, firearms identification, and some limited documents examination, but all more sophisticated laboratory work either is not done or is sent to the Federal Bureau of Investigation.

These varied local practices reveal some of the current problems in crime laboratory work. Some cities have the facilities and personnel to do their own work competently, but are not in a position to accept requests for laboratory work from other jurisdictions. Some jurisdictions have limited laboratory facilities that perform basic services and either send more sophisticated analysis work to some other jurisdiction or ignore it. Other jurisdictions have no local facilities, or have them but do not use them, and rely upon outside agencies for such work as they have done.

In sharp contrast is the laboratory operation of the Chicago Police Department. Operating one of the best equipped and staffed facilities in the country, the Chicago Police Laboratory in 1965 processed materials for 140 jurisdictions, including federal and state agencies, counties, and other municipalities, in addition to its regular work for the Chicago Department. Physical evidence submitted to the laboratory for scientific evaluation involved some 150,000 specimens requiring more than 250,000 individual examinations.[36/]

The Chicago Police Department Laboratory serves the needs of the surrounding metropolitan area. With few exceptions all municipalities in

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[34/] Interview, Lawrence M. Wetzel, Assistant Chief of Police, Phoenix, Arizona, May 10, 1966.

[35/] Interview, Robert Rentmeester, Chief of Police, Sauk-Prairie Police Department, Sauk City, Wisconsin, July 18, 1966.

[36/] Chicago Police Department, Crime Laboratory Division, Annual Report, 1965, mimeo., pp. 5-9.

Cook County call upon it for specialized services, and these services are performed free of charge to any requesting agency with a legitimate need. Consequently, much more use is made in the Chicago area of scientific aids in criminal investigation than in many other sections of the country.

In addition to providing laboratory services, the Chicago Police Department will train the personnel of other departments, especially in the collection and preservation of physical evidence, but also in some more technical operations. For example, the microanalysis section of the laboratory has the only staff within the Chicago area which can successfully group dry blood stains. The next closest facility with this capability is at the Wisconsin State Crime Laboratory in Madison, and the technicians working there were trained by the Chicago Police Department.[37/] Because of the capabilities of the Chicago Police Laboratory, and because the department is willing to serve all jurisdictions, there is no need for other crime laboratories in the Chicago area.

Problems in Local Practices

This capsule summary of current local practices in police laboratory services indicates some pervasive problems. Proximity, timeliness, and quality are the most important measures of laboratory service. The Kansas City program, for example, fails on all three counts because it does not perform scientific evaluations requiring sophisticated analysis, sends material to the Federal Bureau of Investigation for analysis, or fails to provide for tests. While it may make good sense for Baltimore, Maryland, to use the facilities of the FBI exclusively for scientific analyses, the latter facilities may not be close enough for Kansas City to readily secure timely service. Kansas City largely ignores the facilities of the Food and Drug Administration which has a large regional laboratory adjacent to the police headquarters which is capable of performing most necessary examinations. Jurisdictions should attempt to resolve the questions of timeliness and proximity regionally.

37/ Public Information Division, Chicago Police Department, "Microanalysis--The 'Catch-All'," 7 Chicago Police Star, June, 1966, p. 4.

Another problem is duplication of facilities. The ability of a department to maintain an adequate laboratory should not be the only criterion in establishing one. Both the city and the county of Los Angeles have such facilities when one would suffice for the area. "The prime concern should be a matter of its availability from a geographic standpoint."[38] Duplication of facilities within the same region should be avoided.

With but one police laboratory in the State of Arizona, many jurisdictions have no opportunity to obtain scientific examination and evaluation of physical data. A number of jurisdictions make frequent use of FBI services, but reservations regarding timeliness and proximity usually apply. Recently, Maricopa County (of which Phoenix is a part) proposed that a central laboratory serving the county and the cities of Phoenix, Scottsdale, Tempe, Mesa, and Glendale be established.[39] Under the proposal, the county would provide the facilities, and all the jurisdictions would share the cost. Such a laboratory would not meet the needs of other jurisdictions in the state, however, which suggests that perhaps the state should provide laboratory facilities. This has been the decision in Wisconsin and in several other states.

When states establish laboratory facilities, however, they should place them judiciously. The Division of Criminal Investigation and Identification in the Illinois Department of Public Safety provides technical service to law enforcement agencies in the state. Recently, the Division built a new laboratory facility in Joliet, which is within the area already served by the Chicago Police Department Laboratory. One reason given for the selection of this location was that it is near the population center of the state.[40] Other factors should be considered, however, among them the pattern of requests for assistance from police agencies.

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[38] Pitchess, Seminar, p. 27.

[39] Clyde A. Murray, "Centralized, Cooperative Crime Lab Considered," Phoenix Republic, June 25, 1966.

[40] Interview, Joseph Nicol, Director, Division of Criminal Identification and Investigation, June 24, 1966.

The Role of States in Laboratory Services

The state can provide meaningful laboratory assistance to local police agencies through several possible alternatives.

A State Crime Bureau. Several states have established crime bureaus to provide technical services to local law enforcement agencies throughout the state. They are generally not successful in providing complete technical service, tending, rather, to emphasize records activities more than laboratory services; or if they provide technical services, tending to emphasize such routine activities as latent fingerprint and blood alcohol analysis--work usually accomplished as effectively on the local level.[41/]

The first requisite in establishing a state program of laboratory service is to determine what can be done best by the state and what on the local or regional level. Much laboratory work is of a simple, routine nature, if the evidence has been properly collected and preserved. Consequently, local units may well maintain the small laboratory facilities concerned with primary analysis and forward all complex work to a state or regional agency for detailed or specialized analysis. The state agency could also perform crime scene work in appropriate cases. This arrangement permits all needs to be met; the local facility provides timely service in simple analyses, and the state laboratory provides sophisticated analyses and quality control.

All police laboratory technicians need specialized training, in addition to formal training in a specific scientific field, and the state agency could also perform this training function. Gathering and preserving evidence is so crucial to the entire police laboratory program that sound training is mandatory even at the initial level of operation. Qualified instructors should be available to local jurisdictions to assist with in-service training programs, and the state agency also could operate training programs for the instructors of local departments in evidence gathering and preservation. The entire state program should be available free of cost to any requesting law enforcement agency.

41/ Kirk and Bradford, op. cit., p. 25.

Provision of a state central laboratory would not entirely eliminate the problem of duplication of facilities, but would reduce it to manageable proportions. At the same time, such a program would allow for the training of personnel in the gathering and preservation of evidence.

Other Approaches. In order to obtain a well-integrated operation, it may be desirable to place the smaller local laboratories and the central state laboratory under a single administration. Such an arrangement is in operation in Texas.[42/] The same division of work would prevail, but the local jurisdictions would not control their laboratory operations; rather, they would be under the direction of the state laboratory or some other independent agency.

Medical examiners, as well as police, need laboratory services. In many communities a single facility is used for both functions. Sheriff Donald E. Clark of Multanomah County, Oregon, suggests that police laboratories as such be eliminated and placed under the control of a separate agency, possibly a state or local medical examiner.[43/] One benefit would be to have expert witnesses not affiliated with the police department--a concern of some courts.

Summary and Conclusions

The cost of staffing and operating a laboratory facility capable of handling all needs of a police department is considerable, and a complete program is beyond the financial ability of most departments. At the same time, the need for adequate professional laboratory services is readily apparent. The following conclusions have been reached:

1. Basic laboratory services must be readily available within each locality or region to handle routine requests for service. Facilities for such services could be operated jointly by two or more jurisdictions with costs shared on an agreed basis. These facilities

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[42/] Ibid., p. 23.

[43/] Clark, Seminar, p. 27

should perform only those scientific evaluations considered to be routine and those not requiring a heavy investment in limited-use equipment. Duplications in local facilities should be eliminated.

2. States should provide central laboratory facilities capable of performing all complex and sophisticated scientific evaluations needed in police work. Local agencies would forward all complex work to this agency, and perform only routine work themselves. State services should be provided free of cost to all law enforcement agencies. Training of local personnel would be an important aspect of the state laboratory's work.

3. Well-developed police laboratories serving metropolitan needs should be continued freeing state agencies to develop needed laboratory facilities in other parts of the state. Duplication of facilities between local and state agencies, and between local agencies in the same area, should be avoided.

4. Consideration should be given to coordinating and consolidating laboratory services for medical examiners and law enforcement, and related agencies, in one facility capable of serving all needs. In many areas such services could be provided on a local or regional basis.

5. Consideration should be given to placing all police laboratories in a state under the direction of a single administration, possibly an independent agency.

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