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DEVELOPMENT OF FORENSIC SCIENCE

HIGHER EDUCATION GUIDELINES

Final Report

79-DF-AX-0080

DEVELOPMENT OF FORENSIC SCIENCE HIGHER EDUCATION GUIDELINES

Final Report

May 1980

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Prepared for:

OFFICE OF CRIMINAL JUSTICE EDUCATION AND TRAINING
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Attention: Dr. J. Robert Lewis

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ABSTRACT

The purpose of the project was to develop guidelines for multi-year programs of higher education in the forensic sciences. Methods utilized included a review of the literature from each of the forensic science disciplines, a workshop for leading forensic science educators and a national survey of educators. A program designed to coordinate higher education in the forensic sciences is presented which includes recommendations to establish a forensic science educators committee to oversee the development of forensic science curricula and materials, and to design and implement the curricula at interested colleges and universities. The authors recommend a five-year forecast of higher education needs be undertaken and the careers of recent graduates of forensic science educational programs be traced, in order for the committee to develop a responsive five-year educational plan for the future. Financial support for selected students enrolled in forensic science educational programs to be chosen by the committee is also recommended.

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FORENSIC SCIENCES HIGHER EDUCATION GUIDELINES COMMITTEE

Michael M. Baden
Robert V. Blanke
Cordell Brown
David Crown
Peter R. De Forest
Ellis R. Kerley
Lowell J. Levine
Robert L. Sadoff

Oliver Schroeder, Jr.

ACKNOWLEDGMENTS

The project staff wishes to thank John O. Sullivan and George E. Gantner for their contributions at the educators workshop. We also appreciate the cooperation of the many forensic science educators who responded to the survey component of the project.

A special expression of gratitude goes forth to Joseph L. Peterson for his thoughtful review of and suggestions for this report.

THE IDEAL FORENSIC SCIENTIST:

He must have, in superior measure, the separate and collective expertise which all (forensic scientists) possess, knowledge of criminal law and procedure commensurate with that of Melvin Belli and F. Lee Bailey, the thoroughness and integrity of Hans Gross, the cleverness of Vidoq, the audacity of Sir Bernard Spillsbury, the experience of Milton Helpern and the consummate intuitive skill of Sherlock Holmes.

Turner, 1975

CHAPTER I. SUMMARY

A. Introduction

Forensic science is the study and practice of the application of science to the purposes of justice. It is designed to:

1) determine whether a crime has been committed
2) identify suspects and associate them with crime scenes and/or victims
3) dissassociate suspects from criminal acts, thereby helping to exonerate them
4) reconstruct a crime and
5) assist judges and juries in the resolution of court actions brought before them.

Individual subdisciplines comprise the forensic sciences, which include: criminalistics, forensic pathology, toxicology, physical anthropology, psychiatry, document examination, odontology and jurisprudence. Despite advances in the utilization of science in the justice system, results of the Crime Laboratory Proficiency Testing Research Program, funded by LEAA, demonstrated the existence of significant problem areas in the examination and identification of physical evidence--problems often attributable to shortcomings on the part of the examiner.

The quality and adequacy of education in the forensic sciences varies according to subdiscipline. Areas such as forensic psychiatry and physical anthropology require a medical degree or doctorate, respectively. In other subdisciplines no educational requirement is specified. It is not unusual for forensic scientists to acquire their training on-the-job with little or no previous formal education in their forensic specialty field. One improvement in education needed to elevate the standards of forensic science practitioners is to provide them with a common formal basic education in the forensic sciences that is equivalent for all persons employed in the profession. This education

plan for higher education in the forensic sciences, sponsored by the Law Enforcement Assistance Administration's Office of Criminal Justice Education and Training (OCJET) is a major step in furthering the quality of work in the nation's crime laboratories and from each forensic science subdiscipline.

B. Project Objectives

This project had as its goals the following objectives:

1) To review the current literature in the field of forensic science education;

2) To trace the growth and justify the need for the development of college level curricula in the forensic sciences;

3) To formulate recommendations to LEAA's Office of Criminal Justice Education and Training (OCJET) concerning: a) priority problem areas in forensic science higher education and b) program descriptions which are responsive to the problems identified.

4) Prepare cost estimates for implementing the above program.

C. Methodology

Three (3) methods of investigation were utilized to collect the information to satisfy the project objectives:

1) To review the forensic science literature;

2) To conduct a workshop of leading forensic science educators, and

3) To survey forensic science educators from across the nation.

The one-day forensic science educators workshop was attended by:

Area of Expertise	Persons and Affiliation
Physical Anthropology	Ellis Kerley, Ph.D. Professor of Anthropology University of Maryland College Park, Maryland

Toxicology	Robert V. Blanke, Ph.D. MCV Hospital Toxicology Lab. Richmond, Virginia
Psychiatry	Robert Sadoff, M.D. Clinical Associate Professor of Psychiatry University of Pennsylvania
Jurisprudence	Oliver Schroeder, Jr., J.D. Professor of Law Case Western University Cleveland, Ohio
Odontology	Lowell J. Levine, D.D.S. Consultant to the Medical Examiner of New York City Huntington Station, New York
Document Examination	David Crown, D.Crim. Chief, Questioned Documents Lab. Office of Technical Services Fairfax, Virginia
Criminalistics	Peter R. DeForest, D. Crim. Professor of Criminalistics John Jay College New York, New York
Pathology	Michael Baden, M.D. Chief Medical Examiner New York, New York
Crime Laboratory	Cordell G. Brown Chairman American Society of Crime Laboratory Directors Committee on Education and Training Denver, Colorado

Additional invited attenders were:

J. Robert Lewis	OCJET/LEAA Project Monitor
John O. Sullivan	NIJ/OJARS Forensic Science Program Manager
George E. Gantner	St. Louis University - Medical School Professor
Earl Walter	General Accounting Office

Each educator brought to the workshop a brief prepared statement which identified problem areas in forensic science education and suggested programs designed to remedy those problems. Participants considered program plans at various levels of funding.

A survey was mailed to 225 forensic science educators or institutions of higher education which offered coursework related to forensic science or forensic science subdisciplines. The questionnaire requested educators to identify problem areas and to suggest remedial programs for the forensic sciences in general and for the educator's specialty area.

D. Summary of Literature Review

Little has been written about higher education in the forensic sciences. That which has been published is generally discipline specific. The LEAA funded "Assessment Project of the Personnel of the Forensic Sciences Profession" of 1977, conducted by the Forensic Sciences Foundation, revealed 231 institutions or agencies offering instruction in the forensic sciences. A lack of comprehensive degree oriented programs in areas other than criminalistics or general forensic science was noted. Most coursework was found to be limited to the introductory level.

CRIMINALISTICS

A 1968 study of the field of criminalistics conducted by the John Jay College of Criminal Justice showed wide variations in the educational backgrounds of crime laboratory workers and suggested the need for professional development at many jurisdictions. Curricula for bachelor of science and master of science programs in criminalistics were proposed.

Peterson and De Forest investigated the frequency of specialized degrees among forensic science personnel and found it to be low. McGee has described educators in the forensic sciences as caught between the needs of their profession and the framework imposed by the college or university. The literature contains

various criminalistics curricula suggested over the years by a number of authors.

FORENSIC ODONTOLOGY

Almost half of the nation's dental schools do not offer formal courses in forensic dentistry. The result is that much forensic odontology is learned informally on-the-job and many students are never exposed to the field at all during the course of their dental studies.

FORENSIC TOXICOLOGY

Most toxicologists have been educated and trained in related fields or through post-graduate educational programs. An insufficient number of toxicologists are graduated from existing programs to satisfy the nation's demand for their services.

QUESTIONED DOCUMENT EXAMINATION

Apprenticeship is still the general rule regarding the training of questioned document examiners.

FORENSIC PSYCHIATRY

A number of medical schools have begun to offer programs in forensic psychiatry but to date few psychiatrists can claim to be qualified "forensic" psychiatrists based on their education and training. No special educational requirements (beyond psychiatric training) are stipulated for a psychiatrist to call him or herself a "forensic" psychiatrist.

FORENSIC JURISPRUDENCE

Law school programs generally neglect to educate new lawyers about the forensic sciences or its subdisciplines.

FORENSIC MEDICINE/PATHOLOGY

The field of forensic pathology is seriously understaffed. Reasons include a general lack of exposure to the field or an emphasis in existing coursework upon the negative aspects of the discipline.

FORENSIC ANTHROPOLOGY

No degree programs exist in forensic anthropology, although "forensic track" possibilities are identifiable. Forensic anthropology courses are rare.

E. Workshop, Catalogue and Survey Results

At their one-day workshop, the forensic educators agreed upon the following program recommendations:

1) A Forensic Sciences Educators Committee should be formed at an appropriate level of funding to coordinate higher education in the forensic sciences.

2) Among the charges of this committee should be the following:

   a. Commission the development of concept papers for each forensic science discipline detailing specific curricula needs and priorities.

   b. Develop a curriculum of courses to satisfy the common higher educational needs of the forensic sciences.

   c. Develop appropriate higher education curricula for each of the forensic science disciplines.

   d. Develop a plan for the implementation of such curricula at existing institutions of higher education. This might occur in the following phases:

      1) Publication of suggested curricula;

      2) Presentation of a curricula "package" to appropriate educators;

      3) Solicit support to facilitate the adaptation and implementation of the curricula at universities and colleges;

      4) Recommend the development of innovative educational materials that might be utilized to promote incorporation of curricula at institutions of higher education.

3) An assessment study of higher education in the forensic sciences be undertaken to project current and future needs and to establish a 5 year educational plan for the forensic sciences in general and for each of the forensic science disciplines, to include the following:

   a. Forecasting of employment needs;

   b. Development of remedial programs for in-service personnel;

   c. Formulate recommendations for the modification of existing forensic science higher education programs;

   d. Determination of needs for education and training in each discipline;

   e. Conduct a follow-up survey of graduates of forensic sciences higher education programs.

4) Funds be made available in the form of fellowships, assistantships or scholarships for the support of individual students enrolled in forensic sciences higher education programs.

A survey of graduate and undergraduate college and university catalogues revealed that none listed coordinated programs in all aspects of the forensic sciences, although some colleges and universities offered courses in several forensic disciplines. The survey of catalogues noted a virtual lack of coordinated programs either to educate forensic scientists in the basic aspects of all forensic disciplines or to educate practitioners of most forensic disciplines in the basics of forensic science and the legal system.

A sizable number of responses to the survey of forensic science educators were found to correspond in whole or in part with the program recommendations developed by the forensic science educators committee.

F. Program Recommendations

Curricula Development

The establishment of a Forensic Science Educators Committee composed of up to twelve (12) panel members is recommended. This panel would be responsible for the development of curricula and educational materials in each of the forensic science disciplines. It is estimated that three years is required to accomplish these tasks at funding levels of $232,256 for the curricula development (two years) and $34,105 for the materials development (third year).

Implementation Plan

It is recommended that the educators committee coordinate the distribution, publicity and implementation of the previously developed curricula and educational materials at interested colleges and universities. The committee would develop curricula and material modules suitable for implementing at new forensic science programs and upgrade already functioning programs. Presentation of these educational packages to forensic educators and college and university administrators would also be carried out by the committee. The packages would be introduced and publicized in professional journals, through direct mailings, and through forensic science, educational, and criminal justice professional organizations. The estimated cost associated with presenting the educational packages would approximate $136,000 with an additional option of $400,000 to be utilized for overhead funds to facilitate adoption of these packages at colleges and universities.

Student Stipends

$200,000 per year in educational stipends is recommended for students enrolled in forensic science higher education programs. The educators committee would be charged with implementing a selection process to determine those most eligible for these awards.

Higher Education Five-Year Plan

The undertaking of an assessment study of higher education in the forensic sciences to culminate in the development of a comprehensive five-year plan is advised. The purpose of this forecasting plan would be to coordinate and direct the upgrading of higher education and training in the various forensic science disciplines. Among the primary components of this research project would be the following:

a. Forecasting employment needs.

b. Developing remedial programs for in-service personnel.

c. Recommending modification of existing forensic science higher educational programs.

d. Determining needs for education and training in each forensic science discipline.

e. Conducting a follow-up study of graduates of forensic science educational programs.

The research could be completed in 18 months at a cost of approximately $121,545.

CHAPTER II PROBLEM STATEMENT

A. The Forensic Sciences

Forensic science is the study and practice of the application of science to the purposes of justice. It is equipped to aid law enforcement, prosecution and defense purposes. The forensic sciences provide scientific analysis, examination, and expert testimony designed to:

1) determine whether a crime has been committed
2) identify suspects and associate them with crime scenes and/or victims
3) disassociate suspects from criminal acts, thereby helping to exonerate them
4) reconstruct a crime and
5) aid judges and juries in the resolution of court actions brought before them.

Many individual subdisciplines compose the field of forensic sciences, including:

- Criminalistics is the scientific discipline directed to the recognition, identification, individualization and evaluation of physical evidence such as bloodstains, clothing, glass fragments, bullets, etc. These processes aid in reconstructing the facts surrounding an event at the time that it occurred.
- Forensic Pathology is the application to problems at law of the basic medical specialty of pathology. Pathology itself is the study of the reaction of the body to disease using disease to include everything from pneumonia, tuberculosis, to being struck by an automobile or shot with a firearm. The forensic pathologist investigates and interprets injury and death resulting from

violence or occurring in a sudden, unexpected or unexplained manner.

- Forensic Toxicology is the study and understanding of the harmful effects of external substances such as poisons, drugs, pollutants and potentially toxic chemicals which may be introduced into living systems. The forensic toxicologist works in the areas of drug abuse, toxicological aspects of criminal investigations and postmortem cases.
- Physical Anthropology involves the use of standard physical anthropologist techniques to identify skeletal remains. The physical anthropologist is routinely involved in mass disaster investigations such as aircraft accidents, floods, etc., in the identification of human remains.
- Forensic Psychiatry provides the legal system with an understanding of and recommendations about psychiatric factors that are relevant to specific civil or criminal cases. A forensic psychiatrist may provide services ranging from hypnosis of a witness to facilitate recall of an event, to preparing sentencing reports and recommendations to judges, to treating individuals who have a propensity to commit criminal acts.
- Forensic Document Examination involves the scientific examination of handwriting, typewriting, printing, ink, paper or other aspects of a document. The document examiner also works to establish the age of a document, detect alterations and restore erased writing.
- Forensic Odontology involves the application of dentistry to

legal problems. More specifically, the odontologist, often working closely with the forensic pathologist examines and evaluates injuries to the teeth, jaws and oral tissues and examines dental remains for the purposes of victim identification. He also examines bite marks in cases of homicide, battered children and sexual assault to provide identification of a suspect.

Jurisprudence is the discipline specializing in the communication of forensic scientist's findings to the triers of fact in legal settings. The jurisprudent helps determine the significance of the experts' tests and analyses and services to elucidate the critical scientific issues of the case at hand.

The past decade has witnessed the emergence of the forensic sciences as a major force in the arsenel of the justice system to control crime and to provide a high quality of justice. Through the utilization and interpretation of complex analytical techniques, forensic science often provides crucial information to decision makers, unavailable through routine methods of criminal investigation, to solve the case.

B. Problems of Forensic Science Higher Education

In spite of the progress in recent years made by the criminal justice system in its use of the forensic sciences, significant problem areas are yet to be resolved. Results of the Crime Laboratory Proficiency Testing Research Program, funded by LEAA, demonstrated that many crime laboratories were experiencing serious difficulties in the examination and identification of materials routinely encountered at crime scenes and in the course of criminal investigations and submitted to the laboratory for analysis. Often shortcomings could be attributed to the training, education or experience of the

examiner.

The explosion of drug related casework has been responsible for the creation of backlogs of cases awaiting analysis. Because of such backlogs, investigations are delayed due to the crime laboratories inability to examine evidence in a timely manner. The great majority of the scientific work force in this field do not have degrees in forensic science, but in other natural science disciplines. Most "forensic expertise" therefore, is gained through inservice and on-the-job training. This is, in part, responsible for variations of quality emanating from various forensic laboratories--a matter of great concern to the legal profession as well as the scientists themselves. Growth and advancement of the field is further retarded by the nature, volume and quality of the research and the forensic science literature, which fall short of the level they should be.

Although there is very little literature on the topic of higher education in the forensic sciences, it is obvious that the quality and adequacy of education varies according to the subspeciality. It is therefore not possible to discuss forensic science higher education as a single cohesive entity, given the diverse evidential material and scientific tests and procedures which characterize each respective specialty.

Of particular concern is the education of the scientist to be employed in one of the 240 crime laboratories across the nation. This forensic scientist, commonly referred to as a "criminalist", may specialize in the identification and analysis of one of many types of physical evidence among them blood, hair, fibers, toolmarks, ballistics, soils, and glass. Although there are institutions of higher education offering programs in this field, many of those who enter the field of criminalistics received their Bachelor of Science in one or another of the natural sciences, with little, if any, exposure to the forensic sciences.

To illustrate this diversity among forensic scientists in terms of higher

education, consider other forensic subdisciplines such as forensic pathology, psychiatry, odontology, anthropology or toxicology. In general, individuals entering these fields possess advanced educational degrees in scientific areas such as pathology, psychiatry, dentistry, anthropology and toxicology who then apply the knowledge and techniques learned in these parent disciplines to the concerns of the criminal justice system. For example, the forensic toxicologist is first trained in the general area of toxicology and the specializes in the characterization of substances (such as drugs and alcohol) which are frequently encountered in cases having legal implications. The forensic psychiatrist earns a degree in medicine with a specialization in psychiatry and neurology. The forensic training is not widely available, the result being that many psychiatrists testify in court as forensic experts without sufficient training or expertise.

The composite picture that is characteristic of many forensic scientists is that of an individual practicing in the field with little or no formal education in forensic science per se. Expertise, or at least experience has been acquired through informal on-the-job training without the benefit of relevant theoretical background or academic preparation, and outside of any coherent discipline.

To achieve the goal of elevating all of the practitioners in the forensic sciences to a higher level, it is necessary to provide formal basic education in the forensic sciences that is equivalent in all the forensic disciplines. Discipline specific education should follow and build upon this basic education. Intensive training workshops, sponsored by the NIJ, FBI, DEA and organizations such as the Forensic Sciences Foundation, and conferences such as those sponsored by regional forensic science associations and the American Academy of Forensic Sciences are helpful and must continue. Nevertheless, these alternatives in themselves are not sufficient to meet the current and future

educational requirements of this expanding field.

Development of a program plan for higher education in the forensic sciences fills a void in LEAA/NIJ's dedicated efforts over the past ten years to upgrade the quality of service in the forensic sciences. Whereas NIJ has sponsored programs and projects in such areas as systems analysis of crime laboratory operations; development of advanced techniques to characterize common types of physical evidence (notably blood, hair, semen, gunshot residue); and has embarked on programs to insure that laboratories utilize analytical methods that are both reliable and valid, there has been no systematic national effort to assess the quality and suitability of formal forensic science educational programs and their relationships to the needs of the field. Such a national program plan emanating from LEAA's Office of Criminal Justice Education and Training (OCJET) is a major step, in promoting excellence in the nation's forensic laboratories, by improving the education and personnel who in upcoming years will be employed in the fields of the forensic sciences.

CHAPTER III PROJECT OBJECTIVES

This project had as its goals the following objectives:

1) To review the current literature in the field of forensic science education;
2) To trace the growth and determine the need for the development of college level curricula in the forensic sciences;
3) To formulate recommendations to LEAA's Office of Criminal Justice Education and Training (OCJET) concerning: a) priority problem areas in forensic science higher education and b) program descriptions which are responsible to the problems identified.
4) Prepare cost estimates for implementing the above program(s).

CHAPTER IV METHODOLOGY

Three (3) methods of inquiry were utilized by the project staff to gather the necessary information to satisfy the project goals, while remaining within the very limited project time and budget constraints. The three methods were: 1) a review of the forensic science literature 2) a workshop of leading forensic science educators, and 3) a survey of forensic educators at institutions nationwide offering forensic science coursework.

A. Review of the Literature

Articles, reports and monographs from 1968 to the present were reviewed by the authors. These included the leading journals in the field of the forensic sciences, such as the Journal of Forensic Sciences and journals related to each forensic science subdiscipline such as the Bulletin of the American Academy of Psychiatry and Law for forensic psychiatry and various medical and dental journals for forensic pathology, toxicology, odontology, etc. Various indices available at the National Library of Medicine were also searched for publications relating to higher education in the natural sciences which also pertain to the forensic sciences. A selective review of college and university catalogues was also conducted with the cooperation of the University of Maryland.

B. Forensic Science Educators Workshop

A one-day meeting of forensic science educators was held in Alexandria, Virginia, on September 15, 1979. Due to budget considerations, only one expert from each forensic science discipline was invited, and in most cases, this individual resided close to the Washington, D.C. metropolitan area where the workshop was held. The following forensic educators attended the session:

Area of Expertise	Person and Affiliation
Physical Anthropology	Ellis Kerley, Ph.D. Professor of Anthropology University of Maryland College Park, Maryland

Toxicology	Robert V. Blanke, Ph.D. MCV Hospital Toxicology Lab. Richmond, Virginia
Psychiatry	Robert Sadoff, M.D. Clinical Associate Professor of Psychiatry University of Pennsylvania
Jurisprudence	Oliver Schroeder, Jr., J.D. Professor of Law Case Western University Cleveland, Ohio
Odontology	Lowell J. Levine, D.D.S. Consultant to the Medical Examiner of New York City Huntington Station, New York
Document Examination	David Crown, D.Crim. Chief, Questioned Documents Lab. Office of Technical Services Fairfax, Virginia
Criminalistics	Peter R. De Forest, D.Crim. Professor of Criminalistics John Jay College New York, New York
Pathology	Michael Baden, M.D. Chief Medical Examiner New York, New York
Crime Laboratory	Cordell G. Brown Chairman American Society of Crime Laboratory Directors Committee on Education and Training Denver, Colorado

In this way, the project was able to keep travel costs to an absolute minimum. The invited experts all had national reputations in their forensic specialty areas and were personally involved with forensic science academic programs.

In addition to the forensic science educators listed above, the meeting was attended by the following invited guests:

J. Robert Lewis	OCJET/LEAA Project Monitor
John O. Sullivan	NILECJ/LEAA Forensic Science Program Manager
George E. Gantner, M.D.	St. Louis University Professor, Forensic and Environmental Pathology St. Louis University - Medical School
Earl Walter	General Accounting Office

Each forensic science educator brought with him a brief prepared statement which identified the primary problems facing higher education in the forensic sciences generally and in his particular area of forensic expertise. These statements also enumerated program areas that the expert proposed be addressed by OCJET.

To aid the participants in preparing their statements, items were selected from a similar project (relating to general criminal justice) involving the Joint Commission on Criminology and Criminal Justice Education and Standards. These were revised to pertain to the forensic sciences and forwarded to the educators before their meeting. Examples of such issues were the desirability of establishing forensic science departments/programs within specific colleges or universities and the overriding question of whether students should earn baccalaureate degrees in appropriate natural science subjects areas before they pursued specialized forensic education at the master's degree level.

The participants were also asked to approximate the costs of implementing recommended higher education programs. It was explained that the final report to the government would require setting national funding priorities for the forensic sciences generally over a range of support levels. Participants were asked to consider various programs at funding levels such as $250,000, $500,000, $750,000, $1 million, etc., in addition to multi-year programs.

Each participant was instructed to forward his statement to the Foundation

before the workshop, or else to bring copies of the statement to the meeting.

C. Survey of Forensic Science Educators

A total of 225 survey instruments were distributed to forensic science educators nationwide and/or institutions of higher education that offered course-work related to the profession. The mailing list was compiled from a number of sources including:

- "Assessment of the Forensic Sciences Profession - A Survey of Educational Offerings in the Forensic Sciences" - Volume I, LEAA/NILECJ Grant #73-NI-99-0052-G, 1977.
- Participants at the Forensic Science Educators Workshop
- Various forensic science publications and surveys

A copy of the two-page survey follows on pages 21 and 22.

Appendix A contains the mailing list utilized for this survey.

The Forensic Sciences Foundation, Inc.
11400 ROCKVILLE PIKE
ROCKVILLE, MARYLAND 20852
(301) 770-2723

Dear Forensic Science Educator:

The Forensic Sciences Foundation, Inc. has been awarded a grant from the Law Enforcement Assistance Administration (LEAA) to make recommendations to its Office of Criminal Justice Education and Training (OCJET) concerning a program plan to upgrade higher education in the forensic sciences.

As a part of this project, the Foundation is soliciting input from forensic science educators nationwide concerning priority areas where federal funds might best be utilized to improve the quality of higher educational offerings in the forensic sciences, especially those that relate to the development of forensic science curricula.

Please take a few moments to suggest the types of national programs or sequence of steps towards which federal funds, if available, might be used to develop a nationwide forensic science curriculum or other programs which would enhance the overall quality of higher education generally in the forensic sciences.

I. What are the two (2) most serious national problem areas or concerns regarding higher education in the field of forensic sciences in general?

1.

2.

II. What steps or programs would you suggest might be undertaken to alleviate the problems listed above?

III. Which of the following comes closest to describing your forensic science discipline?

_____Criminalistics (1)

_____Forensic Pathology (2)

_____Forensic Odontology (3)

_____Forensic Physical Anthropology (4)

_____Forensic Psychiatry (5)

_____Questioned Document Examination (6)

_____Forensic Toxicology (7)

IV. For the discipline selected above, what are the two (2) most serious national problem areas or concerns regarding higher education in that discipline?

1.

2.

V. What steps or programs would you suggest might be undertaken to alleviate the problems listed above?

Comments:

Please return to: The Forensic Sciences Foundation, Inc., 11400 Rockville Pike, Suite 515, Rockville, Maryland 20852. Att: Ira Silvergleit.

CHAPTER V RESULTS

A. Literature Review

Given the diversity of disciplines that combine to form the forensic sciences, it should come as no surprise that what little has been written concerning higher education in the forensic sciences tends to be discipline specific. When an author has chosed to employ the term "forensic science," in an article, the content usually focused upon the specialty area of the author.

In 1977, as part of the LEAA funded "Assessment Project"* conducted by the Forensic Sciences Foundation, a total of 231 institutions or agencies offering instruction in the forensic sciences were discovered. Of particular interest was the finding that a relationship existed between the size and configuration of a state crime laboratory system and magnitude of educational offerings. Specifically, a strong correlation was demonstrated between those states with a large number of forensic science educational offerings and states employing state-wide criminalistics satellite laboratory systems. Criminalistic and general forensic science courses and programs were most widely represented among educational offerings. The survey noted the lack of comprehensive, degree oriented educational programs in the other forensic disciplines. Much forensic science training was shown to be "on-the-job," and many of the more formal course offerings never proceeded beyond the introductory level.

The authors of the Assessment Project recommended a study of forensic science degree programs be initiated, forensic science recruitment and counseling commence

*Field, K.S., Lipskin, B.A. and Reich, M.A. "Assessment of the Forensic Sciences Profession - A Survey of Educational Offerings in the Forensic Sciences." Volume I. NILECJ/LEAA: 1977.

at colleges and universities and that information regarding educational opportunities in the forensic sciences be made available to criminal justice agencies.

CRIMINALISTICS

In 1968, the John Jay College of Criminal Justice conducted a LEAA supported survey to study a range of problems in the field including the needs and the development of curricula in the forensic sciences.* Wide variations in the educational backgrounds of laboratory personnel were observed, ranging from laboratories with one college graduate to laboratores employing all college graduates. The report's authors suggested the need for professional development at many jurisdictions. While almost all of 459 civilian laboratory personnel surveyed possessed a bachelor of science or equivalent educational degree, of 623 full-time police personnel employed in laboratories, only a small fraction held B.S. degrees (the exception being in large municipal crime laboratories). Twenty Ph.D.'s were identified among laboratory personnel in this 1968 survey.

A need for continuing education for crime laboratory personnel was stressed by the authors of the John Jay report. They proposed a four-year bachelor of Science curriculum and a master's degree curriculum which were sufficiently adaptable to be modified as necessary by institutions of higher education. The need for federal support to implement the programs was recognized, as well as the needs of research and of training future forensic science educators.

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*Joseph, A. "Crime Laboratories - Three study reports." LEAA project reports #013, #140 and #66-3. 1968.

The lack of a nucleus of scientifically qualified personnel makes the education and training of forensic scientists the most pressing need of the field according to Peterson and De Forest.* A specialized degree in forensic science was found to be unusual among forensic science personnel, who typically earned their degrees in one of the natural sciences and then received specialized "on-the-job" training in forensic science. Furthermore, they found that little or no published information existed concerning forensic science educational programs.

Twenty-one American colleges or universities offered degrees in either criminalistics or forensic science, according to the results of Peterson and De Forest's survey conducted in 1976. In addition, one university offered a certificate in document examination. The programs were typically available as part of the chemistry or science department, but almost an equal number were included in criminal justice or law enforcement programs. Based upon their findings, the authors recommended the setting of minimum standards in forensic science curricula offerings and qualifications for instructional staff, and the exploration of the desirability of initiating a forensic science accreditation process at the university level.

The late Paul L. Kirk--a pioneer in forensic science education--suggested in an article by Osterburg, the consideration of a new role for the university in forensic science education and basic research (the two most fundamental needs of the criminalistics profession).† Kirk proposed the concept of a single institution to become an advanced institute for the study of criminalistics,

*Peterson, J.L. and De Forest, P.R. "The status of forensic science degree programs in the United States." Journal of Forensic Science, 22, #1, 1977, pp. 17-33.

†Osterburg, James W. "Reflection on the state of criminalistics." Journal of Criminal Law, Criminology and Police Science, 62, #4, 1971, pp. 568-569.

where scientists would be allowed time away from their laboratories to further their professional education and development.

Forensic educators have been characterized by McGee as "the men in the middle"--caught between the needs of their profession and the framework prescribed by institutions of higher education.* He argues that educators and administrators of college and university programs have not responded adequately to the professional needs of the forensic sciences and claims:

- There are few successful forensic science/criminalistics higher educational programs;
- Only a small number of graduates are produced from these programs;
- A mutual feeling of misunderstanding persists between educators and administrators;
- A critical shortage of adequately prepared forensic scientists exists;
- This shortage will continue for 5 to 10 years.

A four year criminalistics curriculum has been proposed by McGee.† Saferstein and Epstein have suggested a course outline of lectures and laboratory exercises for students enrolled in law enforcement programs. It is designed to introduce students to the role of the scientist and crime laboratory in the justice system, and to the theory and techniques of the forensic sciences.‡

*McGee, W.W. "Education in Forensic Science - the Men in the Middle." In Davies, G. (Ed.) Forensic Science, ACS Symposium Series #13, Washington, D.C.: American Chemical Society. 1975, pp. 10-21.

†Ibid.

‡Saferstein, R. and Epstein, R. "An Introductory Forensic Science Course in a Law Enforcement Program." In Davies, G. (Ed.). Forensic Science. ACS Symposium Series #13. Washington, D.C.: American Chemical Society, 1975, pp. 22-27.

Interdisciplinary programs in the forensic sciences have emerged, whereas the classic forensic science curriculum of the past was based in a natural science, most notably in chemistry, physics or biology. Nevertheless some of these new programs have been criticized by Turner for the haste in which they have been organized, the minimal qualifications of some faculty and administrators' obsession with obtaining costly and elaborate instrumentation.*

Criminalistic subspecialties exist such as for latent print examiners, for which there are usually no education or training requirements. Cowger, noting that friction skin identification is the oldest and most trusted practice in forensic science, argues that this profession has been slighted as a result of the public's and law and justice communities' trust in the infallibility of latent print identification.† To become certified by the International Association for Identification (IAI), examiners are required to complete 40 to 80 hours of courses for which a certificate of completion is issued without examination. Technical training and experience standards are also required. Cowger discusses the Associate of Arts degree being promoted as a minimum standard for certification by the International Association for Identification and follow-up baccalaureate degree (within ten years), but believes that even these modifications are inadequate.

*Turner, R.F. "Forensic Science Education - A Perspective." In Davies, G. (Ed.). Forensic Science. ACS Symposium Series #13. Washington, D.C.: American Chemical Society, 1975, pp. 1-7

†Cowger, J.F. "Moving towards professionalization of latent print examiners." Journal of Forensic Sciences, 24, #3, 1979, pp. 591-595.

FORENSIC ODONTOLOGY

Riesner and Woolridge have suggested the following present and future needs of forensic odontology/dentistry:

- Increased exposure of students to the subject of forensic odontology in dental school curricula
- Additional forensic odontologists be employed on the faculties of dental colleges
- Appointment of forensic odontologists to staff or other dental organizations
- Heightened awareness of the importance of dental evidence by other professions*

In a recent survey of dental school deans, 42% of the respondents reported that formal courses in forensic dentistry were not offered at any level at their school.† 58% of the dental programs did offer coursework in forensic dentistry, although the emphasis was heavily weighted towards lecture rather than the laboratory. Unfortunately, most forensic dentistry has to be learned "on-the-job." The authors note:

> The dental profession can no longer support the concept of self-training or self-appointment of forensic specialists. Formal instruction in the principles of forensic dentistry should be a goal of organized dentistry in the United States. Only in this manner can the profession create a generation of practitioners capable of managing the complexities of dental legal questions.
>
> Herschaft & Rasmussen, 1978, p. 532

*Riesner, N.R. and Woolridge, E.D. "Forensic odontology - An overview." Annals of Dentistry, 36, #3, 1977, pp. 74-76.

†Herschaft, E.E. and Rasmussen, R.H. "The teaching of forensic dentistry: A status report." Journal of Dental Education, 42, #9, 1978, pp. 532-536.

Only eight dental schools offered continuing education coursework in forensic odontology. Most courses in forensic dentistry were available only as electives. Much of the information on forensic odontology was passed on to students as part of another course offering, such as oral pathology or oral diagnosis. Students had an opportunity to witness autopsies at 35 of the 52 responding schools. Only 16 offered forensic rotations for pre-dental students, usually at the graduate level or as part of an elective course. Jurisprudence was offered as a separate course at 42 dental schools.

Herschaft and Rasmussen argue that a significant deficiency exists in the forensic dentistry curricula of many dental schools across the nation. As a result, students are not sufficiently exposed to this field. They recommend the formulation of teaching guidelines for forensic dentistry, setting up an inter-disciplinary forensic dentistry section at each dental school, courses be offered by the Armed Forces Institute of Pathology and the American Academy of Forensic Sciences, and the expansion of continuing educational opportunities for forensic dentists.

In a subsequent publication, Herschaft and Rasmussen presented a model undergratuate curriculum in forensic dentistry.* The need to offer a unified body of knowledge to dental students in their final year of dental education was of primary concern. This coursework would entail 15-25 hours, plus sufficient time for rotation in courts, medical examiner facilities and other legal agencies.

*Herschaft, E.E. and Rasmussen, R.H. "Model curriculum for forensic dentistry in U.S. dental schools." Journal of the American Dental Association, 99, 1979, pp. 21-26.

FORENSIC TOXICOLOGY

Toxicology is a relatively new field of science. Although an increasing number of universities offer students a major in toxicology, it is estimated that approximately 1000 Ph.D.'s in toxicology are required yearly. The current output of toxicologists who enter the job force is inadequate to fill this demand.*

A review by Lynch of the number of toxicology graduates and programs during the year 1960-1961 indicated there were zero graduates and zero programs!† Since it was clear that during this period toxicologists were being trained, the question was, how? Further inquiry showed that most toxicologists were being trained in related fields or through post-graduate programs.

This situation is also true for the education and training of forensic toxicologists. In general, they are educated in other sciences, most notably as chemists or biologists, and then go on to study forensic toxicology. Organic chemistry, pharmachology and organic chemistry are the specific fields from which most forensic toxicologists derive their education. Still others are educated in pathology or general medicine. Few programs offer specific courses in medico-legal topics or forensic toxicology. Currently an apprenticeship under a practicing forensic toxicologist, training in a coroner's office or on-the-job training are the principal means of educating forensic toxicologists. A very few doctoral level programs in toxicology offer a specialization in forensic toxicology.

*Rawls, R. "More universities offering major in toxicology." Chemistry and Engineering News. March 26, 1979.

†Lynch, V. de P. "A Baccalaureate Program in Toxicology." Journal of Forensic Science, 19, #1, 1974, pp. 142-146.

QUESTIONED DOCUMENT EXAMINATION

In their quest to be recognized as a "profession," questioned document examiners have debated how to properly train new examiners for more than three decades.* According to Miller, these issues appear to resurface at ten year intervals, although progress towards a resolution of the question is rarely made. Questioned document examiners are trained in one of three ways:

- Self-taught of Self-made
- Apprenticeship or On-the-job training
- College or University education

Miller has discussed these three methods of gaining expertise and the pros and cons associated with them.†

Self-teaching is a difficult way to learn questioned document examination and rarely produces individuals proficient in their field. The result can be of serious consequence to the justice system.

Most competent examiners in the U.S. have been trained through the apprenticeship methods or while on-the-job in questioned document laboratories. Miller cautions the nation's questioned document examiners not to overrate the merits of this training process simply because it is the most common. Apprenticeship implies a multi-year full-time position in a laboratory with examiners supervising all work done by the trainee, in addition to 20 to 40 hours of formal classroom instruction each month, preparation of cases for court, and the opportunity to witness actual court cases.

*Miller, James T. "Questioned document analysis - Professionals?" Paper presented at annual meeting of American Academy of Forensic Sciences, Chicago, 1970.

†Miller, James T. "Professionalization of document examiners." Paper presented at annual meeting of the American Academy of Forensic Sciences, Las Vegas, 1973.

Unfortunately, many examiners have been much less rigorously trained. This is particularly true in rural areas where a lack of qualified examiners may exist:

> Unfortunately, the document examiner who was not present to supply the services is also not present to supply the training necessary to prepare the fledgling examiner. His typical instruction is a mail-order course, reading a few books, and, if he is fortunate, a couple of days spent with a practicing document examiner, too often no more knowledgeable than the beginner.
>
> Miller, 1973, p.2.*

College or university study is not readily available to train examiners for a number of reasons:

- There is no established market for graduates.
- There are no suitable texts available.
- There are few, if any, instructors available.
- The actual scope of the discipline is poorly defined.†

A few of the college and universities that offer programs in forensic science, criminalistics or criminal justice, are beginning to offer courses in questioned document examination, although most are undergraduate introductory survey courses. The Antioch School of Law in Washington, D.C. offers the only formal program with a major in questioned document examination in Forensic Science at the Masters level. Following formal education, the graduate must then train with an experienced examiner to become qualified as an expert witness. Acquiring a theoretical background in the principles of questioned document examination does not appear to be a problem; the problem appears to be learning the proper application of the theory.

*Ibid, p.2.

†Ibid, p. 11.

The U.S. Postal Service, the Secret Service and the F.B.I. are among the federal agencies that offer training programs for questioned document examiners. Following these programs, the student must then work cases while under supervision before being allowed to testify in court.

The Southern Association of Forensic Sciences has proposed guidelines for a 18-24 month training program for questioned document examiners.

Training workshops in special topics have been offered by the Forensic Sciences Foundation, Inc.

Thus, the general state of higher education in the questioned document examination can be summarized as follows:

> Attempts have been made to develop academic programs for questioned document training, but no program to date has replaced the apprenticeship method, which has produced many of today's leading examiners. An occassional private examiner has successfully trained new workers, but the principal training today is in federal and state laboratories.
>
> Hilton, 1979, p. 895*

*Hilton, O. "History of questioned document examination in the United States." Journal of Forensic Science, 24, #4, 1979, pp. 890-897.

FORENSIC PSYCHIATRY

Traditionally, the psychiatrist who engaged in the practice of "forensic psychiatry" received most of his or her training in association with another forensic psychiatrist or on his or her own.* Only recently have forensic psychiatrists begun to enroll in law courses or pursue degrees in both law and psychiatry. A multidisciplinary approach to the profession characterizes the contemporary forensic psychiatrist, to which the term "social-legal psychiatry" has been applied.† Universities and colleges that have pioneered the training of these professionals include: Boston University; Harvard University; Yale University; The Menninger Foundation; George Washington University; Emory College; Temple University; Tulane University; University of Pittsburgh; University of Maryland; University of Southern California; and the University of California at Los Angeles.

To be a complete forensic psychiatrist involves a number of functions, among them the:

- evaluation function
- post trial function
- training function
- research function
- other attributes‡

*Sadoff, R.L. "Comprehensive Training in Forensic Psychiatry." American Journal of Psychiatry, 131, #2, 1974, pp. 223-225.

†Robitscher, J. "The new face of legal psychiatry." American Journal of Psychiatry, 129, #3, 1972, pp. 315-321.

‡Robey, A. and Bogard, W.J. "The Complete Forensic Psychiatrist." American Journal of Psychiatry, 126, #4, 1969, pp. 519-525.

In 1960, formal training programs in forensic psychiatry began, supported by the National Institute of Mental Health. Between two and six psychiatrists graduated from these programs each year.* Sadoff suggests that recent reductions in federal funding for these programs are a function of the government's policy decision to train, at approximately equal cost, many persons in law and psychiatry rather than one elite forensic psychiatrist. He proposes that education in forensic psychiatry be broad and include not only training in civil and criminal legal matters but also training in private legal evaluations, consulting in the private sector and how to work with legislators in the drafting of laws. Sadoff believes it has become virtually impossible to establish new educational programs exclusively in forensic psychiatry, and therefore, educational programs in forensic psychiatry must be incorporated into large university medical centers and include sociology, criminology, applied behavior and correctional sciences.

No special educational requirements (beyond psychiatric training) are stipulated for one to become a "forensic" psychiatrist. Because forensic psychiatry is so peripheral to the field of general psychiatry, Dietz suggests that few physicians have received sufficient training in the course of their general psychiatric training to be qualified as fully trained forensic psychiatrists.† He has also proposed an ideal fellowship in forensic psychiatry.

Not only is the specialty of forensic psychiatry underrepresented in the curriculum of most of the nation's medical schools, but systematic legal medicine education in general is also lacking.‡ Medical schools are usually content to

*Sadoff, op.cit.

†Dietz, P.E. "Educating the Forensic Psychiatrist." Journal of Forensic Sciences, 24, #4, 1979, pp. 880-884.

‡Dietz, P.E. "Clinical Approaches to Teaching Legal Medicine to Physicians: Medicolegal Emergencies and Consultations." American Journal of Law and Medicine, 2, #1, 1976, pp. 133-145.

informally lecture future physicians on the threat of medical malpractice litigation only. They do not recognize legal medicine as a clinical specialty.

Another important but rare experience in the education of the forensic psychiatrist is exposure to the judicial process through moot court training.* Fortunately, there are indications that use of the moot court may be on the upswing in the education of forensic psychiatrists.

Rosner, the Medical Director of the Psychiatric Clinic of the New York Supreme Court has informally notified a number of leading forensic psychiatrists of his goal to coordinate the currently separated post-residency Fellowship Training Programs in Psychiatry and Law.† It is his hope that psychiatrists will establish uniform standards and criteria for accreditation of fellowship training programs, match programs between potential fellows and existing fellowship programs, create a national pool of faculty and video tape library in forensic psychiatry, and allow individual fellows to have clinical rotations away from specific fellowship programs in which they are enrolled. Rosner is investigating the availability of federal funding to implement this program.

*Dunlop, S.R. "Using a moot court experience in the eduation of psychiatry residents." Bulletin of the AAPL, VI, #4, 1979, pp. 423-432.

†Rosner, R. Personal Communication, November 16, 1979.

FORENSIC JURISPRUDENCE

A special expertise separates the forensic jurisprudent from the rest of the legal profession--expertise in the area of scientific evidence. As stated by Matte, "His business is the conversion of technical data into legal fact."* The forensic jurisprudent is also involved with issues of admissibility of scientific evidence, jury system limitations in deciding technical cases, and related problems.

Most law school programs tend to emphasize the theory rather than the practice of law. According to Joling, the type of education offered jurisprudents is of a standard "cookbook" variety, designed to stress legal precedents.† Too often, the result is "continuing ignorance, propagating stupidity, and perpetuating further injustice."

It is not surprising therefore that most lawyers lack a basic orientation to the scientific method and are usually unexposed to the various disciplines that comprise the forensic sciences. Such training has been virtually non-existent in pre-law and post JD educational programs, and those which have existed have been of questionable value. There are indications however, that several legal educators have begun to recognize this shortcoming and are taking steps to remedy the problem at some of the nation's law schools.

Joling and Matte suggest that lawyers be exposed to the basic principles of forensic science while in law school, as part of the standard law curriculum. Further coursework in forensic science should then be made available at the post-graduate level, after the lawyer enters law practice. Students who complete the

*Matte, P.J. "The role of forensic jurisprudence in the judicial process." Journal of Forensic Sciences, 19, No. 2, 1974, pp. 327-336.

†Joling, R.J. "Educating the forensic jurisprudent." Journal of Forensic Sciences, 19, #2, 1974, pp. 337-350.

necessary education and training to qualify as forensic jurisprudents should be awarded LLM or equivalent degrees.

Joling has proposed a series of exemplary undergraduate curricula designed to prepare entering forensic jurisprudents with the knowledge necessary to properly function in the courtroom.* He also proposes a basic curriculum for continuing education in the forensic sciences. An outline of courses for a basic program in forensic jurisprudence which could be completed in approximately one year has been suggested by Matte.†

*Ibid.

†Matte, op. cit.

FORENSIC MEDICINE/PATHOLOGY

Some background in legal medicine is essential for all physicians according to Paul, since every doctor may, at some time in his/her career, be called to testify in a court of law.* He notes:

> The mauling that (the physician) receives at the hands of the lawyers under these circumstances is guaranteed to antagonize him to any future medicolegal involvement.
>
> Paul, 1977, p. 405.

The results of a survey of four-year medical schools in 1970 disclosed the following situation regarding the teaching of legal medicine:

- 11 schools have separate divisions of legal medicine
- 42 offer some type of course in legal medicine for medical students; 1 offers a JD/MD six-year program; 7 which don't plan to offer it shortly; 1 will probably discontinue it
- of the 42 programs, 27 offer legal medicine as an elective and 15 require it

Although there is considerable diversity among medical schools, most offer the course during the student's fourth year. Concerning these courses:

- Forensic Pathology is covered in 29 courses
- Psychiatry and Law is covered in 24 courses
- 4 programs utilize a moot court demonstration.†

*Paul, D.M. "The general principles of clinical forensic medicine and the place of forensic medicine in a modern society." Yale Journal of Biology, 50, #4, 1977, pp. 405-417.

†Beresford, H.R. "The teaching of legal medicine in medical schools in the United States." Journal of Medical Education, 36, #5, 1979, pp. 401-404.

Forensic pathology has become seriously understaffed, according to Wecht.* He envisions a bleak outlook for the specialty in the future and notes that approximately half of the pathologists doing forensic work have not received formal education and training in forensic pathology. Furthermore, there is a declining interest in forensic pathology among medical students and residents, a problem that has been echoed by others.† The reasons for the dwindling of forensic pathology interest are many, including low salary (approximately half that of a hospital pathologist), long hours, government employment, frequent court appearances, unpleasant case material, poor working conditions, lack of support by government and organized medicine, and inadequate training opportunities. Wecht argues that the cost of a trained pathologist can easily be offset by the funds saved from a reduction in the number of cases going to trial--the result of reliable medicolegal investigations undertaken by a well trained forensic pathologist.

In 1974, only 30 centers in the United States were accredited to teach forensic pathology.‡ 58 programs offered residencies in this area, but still positions went unfilled. Sexton and Hennigar suggest that most physicians don't receive sufficient exposure to forensic pathology to be able to consider it as a specialty. They conducted a survey of pathology department chairmen 108 medical schools (and of the National Association of Medical Examiners) and found:

- confusion between forensic pathology and medical jurisprudence course-work

*Wecht, C.H. "Forensic Pathology - A Specialty in Trouble." New England Journal of Medicine, 297, #22, December 1977, pp. 1232-1234.

†Sexton, J.S. and Hennigar, G.R. "Forensic Pathology - The hidden specialty: A Survey of Forensic Pathology Training Available to Medical Students and Residents." Journal of Forensic Science, 24, #2, 1979, pp. 275-281.

‡Ibid.

- forensic pathology is a "hidden specialty" among the population of full-time pathologists
- less than 19% of the schools offer it as an elective
- only 27% offer the course at all
- less than 10% of medical students are exposed to this material.

In short, physicians are needed to fill forensic pathology positions as chief and deputy chief medical examiners, as well as for medical examiners on the local level. The usual coursework offered to students is a "horror show" that more often than not turns students away from the discipline. According to Sexton and Hennigar, students should learn:

- hospital and forensic autopsy procedures
- external causes of death
- clues
- diagnosis of strangulation, SIDS, poisoning, etc.

All of these subjects should be incorporated into the medical school curriculum. Wecht has recommended that the American Board of Pathology require all pathology residents to have at least three months intensive instruction in forensic pathology at an approved training center.

FORENSIC ANTHROPOLOGY

"Forensic physical anthropology appears to be the only forensic science section which has no recognized degree programs," according to Sheilagh Brooks, a Professor of Anthropology.* The results of a survey distributed to each member of the Physical Anthropology Section of the American Academy of Forensic Sciences confirms the above statement, although Brooks has received several indications of what she identifies as "forensic track" possibilities.† She indicates the results of this survey will be submitted for publication in the future.

Few courses are offered specifically in forensic anthropology. Most tend to be in physical anthropology and/or osteology. They are usually oriented towards an academic emphasis rather than applied.‡

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*Brooks, Sheilagh T. Personal communication. November 26, 1979.

†Brooks, Sheilagh T. "The Teaching of Forensic Anthropology: A Survey of Courses, Workshops and Programs." Paper presented at annual meeting of American Academy of Forensic Sciences, New Orleans, Louisiana, 1980.

‡Field, et.al., op. cit. p. 52.

B. Forensic Science Educators Workshop

The meeting mintues of the one-day forensic science educators workshop are attached as Appendix B. Each participant presented his problem statement and program recommendations to the group. A summary of each educator's recommendation is included below. Following lengthy discussions, the educators agreed upon the following program recommendations to be presented to OCJET:

PROGRAM RECOMMENDATIONS

1. A Forensic Sciences Educators Committee should be formed at an appropriate level of funding to coordinate higher education in the forensic sciences.
2. Among the charges of this committee should be the following:
   a. Commission the development of concept papers for each forensic science discipline detailing specific curricula needs and priorities.
   b. Develop a curriculum of courses to satisfy the common higher educational needs of the forensic sciences.
   c. Develop appropriate higher education curricula for each of the forensic science disciplines.
   d. Develop a plan for the implementation of such curricula at existing institutions of higher education. This might occur in the following phases:
      1) Publication of suggested curricula;
      2) Presentation of a curricula "package" to appropriate educators;
      3) Solicit support to facilitate the adaptation and implementation of the curricula at universities and colleges;
      4) Recommend the development of innovative educational materials that might be utilized to promote incorporation of curricula at institutions of higher education.

3. An assessment study of higher education in the forensic sciences be undertaken to project current and future needs and to establish a 5 year educational plan for the forensic sciences in general and for each of the forensic science disciplines, to include the following:
   a. Forecasting of employment needs;
   b. Development of remedial programs for in-service personnel;
   c. Formulation of recommendations for the modification of existing forensic science higher education programs;
   d. Determination of needs for education and training in each discipline;
   e. Conducting a follow-up survey of graduates of forensic sciences higher education programs.
4. Funds be made available in the form of fellowships, assistantships, or scholarships for the support of individual students enrolled in forensic sciences higher education programs.

These program recommendations are elaborated in Chapter VI. Each recommendation is followed by cost estimates to implement the recommendation.

SUMMARY OF INDIVIDUAL EDUCATORS' RECOMMENDATIONS

GENERAL RECOMMENDATIONS FOR FORENSIC SCIENCES

BADEN

1. teach courtroom behavior
2. define terms
3. institute educator's committee
4. establish professional standards

BLANKE

1. identify areas of commonality
2. initiate model course development
3. develop implementation plan
4. upgrade ongoing programs

BROWN

1. institute degree programs for working criminalists
2. include: philosophy
3. non-interruption of work
4. module form

RECOMMENDATIONS FOR FORENSIC DISCIPLINES

PATHOLOGY

1. educate physicians
2. foster interdisciplinary coordination
3. provide financial incentives for private pathologists
4. develop general forensic pathology curriculum

TOXICOLOGY

1. begin educational program
2. work towards accreditation

CRIMINALISTICS

1. same as above

GENERAL RECOMMENDATIONS (CONT'D.)

CROWN

1. develop core curriculum
2. develop standards
3. offer fellowship funds

DE FOREST

1. establish ongoing educators committee
2. offer fellowship funds
3. foster interdisciplinary education of scientists and users
4. support training grants for institutions

KERLEY

1. define needs
2. develop core curriculum
3. develop discipline curricula
4. grant implementation funds

DISCIPLINE RECOMMENDATIONS (CONT'D.)

DOCUMENT EXAMINATION

1. same as above

CRIMINALISTICS

1. same as above

ANTHROPOLOGY

1. plug in core group of courses
2. develop program of concentration in forensic anthropology
3. develop teaching materials
4. compose program to enhance utilization by court

GENERAL RECOMMENDATIONS (CONT'D.)

LEVINE	SADOFF	SCHROEDER
1. establish educators committee	1. coordinate programs	1. develop "witness" program
2. define baseline knowledge	2. foster course development	2. 4 courses suggested
3. develop course structure	3. integrate forensic sciences at graduate levels	
4. develop teaching module	4. establish educators' committee	

DISCIPLINE RECOMMENDATIONS (CONT'D.)

ODONTOLOGY	PSYCHIATRY	JURISPRUDENCE
1. delineate requirements of forensic odontologist	1. survey and follow-up students	1. same as above
2. develop course content	2. develop standards	
3. survey and evaluate existing programs	3. foster interdisciplinary coordination	
4. develop teaching module	4. coordinate forensic science disciplines	

C. Catalogue Survey

A survey of graduate and undergraduate catalogues of publicly supported and major private universities revealed that none of these institutions listed coordinated programs of higher education all aspects of the forensic sciences, although some offered courses in several forensic disciplines.

In general, pathology departments either offered a single course in forensic pathology or simply included the topic briefly in pathology courses offered to medical students and pathology residents. A few medical schools did separate legal medicine as an area of concentration. It was apparent that for the majority of legal courses, non-forensic aspects, such as liability and compensation, were taught as often, if not more so than forensic topics.

Several universities included departments of, or programs in, criminalistics or criminal justice. However, there appeared to be little or no coverage of the other forensic sciences in their curricula. Some disciplines, such as questioned documents, were virtually absent from university catalogues, and, for the most part, appear to be learned outside of the regular university educational programs. Other disciplines, such as anthropology, appeared in most of the university catalogues surveyed, but, less than ten of the 301 university anthropology departments examined offered any courses specifically in forensic anthropology, and none of those had a program, curriculum or concentration that involved education in the other forensic disciplines.

To a large extent, forensic jurisprudence, psychiatry and odontology appear to be learned as specialities after completion of the formal educational process, although a few courses in these areas are available at institutions of higher education across the country. Toxicology, on the other hand, has a formal graduate curriculum that is available at a considerable number of universities, and, by its nature, is more directly preparatory for forensic work than are some

other areas of study. Nevertheless, there is very little time devoted to any of the other forensic sciences or the general aspects of forensic science in the formal education of toxicologists.

The catalogue survey revealed a virtual lack of coordinated university programs to either educate forensic scientists in the basic aspects of all forensic disciplines or to educate the future practitioners of most forensic disciplines in the basics of forensic science and the legal system.

D. Survey Results

Fifty-two of the survey questionnaires mailed to forensic educators or institutions which offered forensic coursework were returned to the Foundation Project Staff--an overall response rate of 23.1%. A copy of the questionnaire appears on pages 21 and 22. The response distribution for each forensic science discipline was:

Discipline	Surveys Mailed	Surveys Returned	Response Rate
Questioned Documents	6	1	16.6%
Odontology	22	4	18.2%
Anthropology	22	7	31.8%
Toxicology	22	5	22.7%
Psychiatry	41	10	24.4%
Criminalistics	45	12	26.7%
Jurisprudence	44	1	2.3%
Pathology*	23	12	52.2%
Total	225	52	23.1%

Considerable overlap was noted in the survey distribution mailing list which may account for the poor response rate overall. Many forensic educators may have received more than one copy of the survey, especially if they were responsible for teaching more than one course listed in the "Assessment Study." For courses where the instructor could not be identified, the survey was addressed to "Forensic Science Instructor" with the course title, in care of the appropriate university or college. Undoubtedly, some of these surveys never reached the appropriate instructor, especially if the course had been discontinued or had undergone a change in title. Some instructors could have received multiple copies

*Note: A prepaid, self-addressed envelope was provided to potential respondents in the pathology survey.

of the survey particularly if their names appeared separately on the mailing list of instructors and the course was listed in the "Assessment Study." Instructors who taught courses in two or more forensic areas, such as in criminalistics and questioned documents, may have also received more than one survey. If those instructors returned only one copy of the survey (which is likely), the response rate would be diminished. The additional fact that there was no jurisprudence category listed separately on the survey may account for the poor response rate for forensic jurisprudents.

The results of the survey, arranged by forensic science discipline, are attached as Appendix C. These summarized responses have been edited to comply with the tabulation format, although the authors have attempted to maintain the substance and flavor of the original replies. Unfortunately, some educators used the survey as an opportunity to comment on issues not directly related to higher education in the forensic sciences. Nevertheless, it is interesting to note the significant number of responses that correspond in whole or in part with the program recommendations developed by the forensic science educators committee.

CHAPTER VI. PROGRAM RECOMMENDATIONS

CURRICULA DEVELOPMENT AND IMPLEMENTATION

Phase 1. Educators Committee and Curricula Development

Responsibility for coordinating programs affecting higher education in the field of the forensic sciences, in particular the development of higher education forensic science curricula, should rest with standing Forensic Science Educators Committee. This committee should be composed of up to twelve (12) panel members - one from each of the eight (8) forensic science discipline areas composing the American Academy of Forensic Sciences (AAFS), plus up to four (4) additional members chosen by the chairperson, representing other interested groups. For example, the additional members might represent the:

- Committee on Education and Training of the American Society of Crime Laboratory Directors (ASCLD),
- Education Committee of AAFS
- Federal Bureau of Investigation (FBI)
- Forensic Sciences Department Chairmen
- Law Enforcement Assistance Administration
- Criminal Justice System (police, courts, prosecution)
- Regional Forensic Science Associations
- Senior Forensic Science Educators

Funding for the Educators Committee should be at a level appropriate to support periodic meetings of the committee and the undertaking of projects chosen by the panel which relate to higher education in the forensic sciences. (See table 1, page 54). An initial commitment to support this panel for three to five years should be strongly considered, with some committee members replaced (on the average) every eighteen months. In this manner, the committee would not suffer a delay in its work due to a complete turnover of members, and thus,

TABLE 1

FORENSIC SCIENCES HIGHER EDUCATION

PROGRAM PLAN

OBJECTIVE	PROGRAM	FUNDING	DURATION
Curricula Development	Educators' Committee	$232,256/year	2 years
Educational Materials Development	Educators' Committee	$ 34,105/year	1 year
Package Presentation	Educators' Committee	$136,000/year	1 year
Option: University Implementation Funds	Overhead Funds	$400,000/year	1 year
Student Stipends	Aid to Students	$200,000/year	4 years
Develop Five Year Plan (I)	Research Project I		
Graduate Student Follow-up (II)	Research Project II	$121,545 (I & II)	18 months

continuity over the committee's multi-year program of work would be maintained. A multi-year program plan is shown in Table 2.

In addition to its principal role to develop and implement a general forensic science curriculum and curricula for each of the forensic disciplines, the Educators Committee would oversee supplementary education related projects. It could also recommend and coordinate training workshops of national scope, and monitor local workshops sponsored by the various regional forensic science associations. The feasibility of sponsoring conferences or workshops for forensic educators could be explored, along with the publication of an educators newsletter. As detailed below, the development of educational materials to aid teachers of forensic science courses would also fall within the purview of the Educators Committee.

The committee might serve as a source of consultants and technical assistance for colleges and universities seeking to evaluate and upgrade forensic science related programs or course offerings. It could act as a clearinghouse for information concerning teaching positions in the forensic sciences, suggest forensic science faculty to administrators of institutions of higher learning, produce packages of informational materials to encourage students to pursue forensic science related careers and advice on how best to prepare for such careers, and aid graduates in securing employment after graduation.

Curricula Development

The development of a general forensic science curriculum and curricula for each discipline would commence with the preparation of discipline-specific concept papers and statements detailing these theoretical concepts and practices of which all forensic scientists should have a working knowledge. The papers would also map out a strategy for the implementation of the curricula and identify the educational materials that should be developed shortly thereafter into a

TABLE 2

FORENSIC SCIENCES HIGHER EDUCATION

MULTI YEAR PROGRAM

	YEAR				
	1	2	3	4	5
PROGRAM					
Educators' Committee	X	X	X	X	X
Curriculum Development (General)	X				
Curricula Development (Disciplines)		X			
Develop Educational Materials/Package			X		
Presentation of Package				X	
Research Project - Five Year Plan				X	X
Research Project - Graduate Student Follow-Up				X	X
Student Support	X	X	X	X	

package to supplement the curricula. Representatives on the committee may decide to conduct surveys of educators in their disciplines in order to complete these concept papers, and assure that the papers adequately reflect the nationwide concerns of the discipline.

Each discipline would select two additional representatives to aid its committee representative in the preparation of the concept paper. These forensic scientists would meet with the discipline's representative on the Educators Committee and collaborate until the paper was completed.

The forum for these papers would be a meeting of the Forensic Science Educators Committee. The papers might also be published in a suitable professional forensic science journal. Comments and suggestions from other members of the profession would be encouraged. The goal would be to develop two types of curricula packages; one for the forensic sciences in general and others for each of the forensic science disciplines.

Estimated Budget For First Year

Salaries		
Principal Investigator 10% x $40,000/year	=	$ 4,000
Project Director 50% x $20,000/year	=	10,000
Secretary 40% x $13,000/year	=	5,200
Research Assistant 50% x $14,000/year	=	7,000
TOTAL SALARIES	=	26,200
Fringe Benefits 21% x $26,200	=	5,502
Consultants		
Committee Chairman $21/hour x 32 hours/mo. x 12 mos.	=	8,064

Committee Meetings $135/day x 4 mtgs./yr. x 2 days x 12 members	=	12,960
Concept Paper Preparation $135/day x 20 days x 12 members	=	32,400
$135/day x 10 days x 2 discipline reps. x 8 disciplines	=	21,600
Intra Discipline Meetings $135/day x 1 day x 3 persons x 2 mtgs. x 8 disciplines	=	6,480
Project Advisors $135/day x 2/discipline x 9 disciplines x 10 days	=	24,300
Casual Labor $6/hr. x 8 hrs./day x 10 days x 9 disciplines	=	4,320
TOTAL CONSULTANTS	=	$110,124
Travel		
Committee Meetings 4 mtgs. x 20 persons x $300 airfare	=	$ 24,000
Discipline Meetings 2 mtgs. x 4 persons x 9 disciplines x $300 airfare	=	21,600
TOTAL TRAVEL	=	45,600
Local Travel	=	2,500
Per Diem 4 mtgs. x 20 persons x 2 days x $50/day	=	8,000
2 mtgs. x 3 persons x 9 disciplines x 1 day x $50/day	=	2,700
TOTAL PER DIEM	=	10,700
Supplies $50/mo. x 12 months	=	600
Telephone 20 calls/discipline/mo. x 12 mos. x 9 disciplines x $3/call	=	6,480
30 staff calls/mo. x 12 mos. x $3	=	1,080
TOTAL TELEPHONE	=	7,560

Postage	=	1,000
Reproduction	=	2,000
Printing	=	1,500
Conference Room Rental @ $50/day/room	=	1,300
Conference Supplies & AV Rental $75/mtg./day x 26 days	=	1,950
TOTAL DIRECT COSTS	=	$216,536
Indirect Costs $26,200 x 60%	=	15,720
TOTAL FUNDS REQUIRED		$232,256

CURRICULA IMPLEMENTATION PLAN

This plan for curricula implementation is designed to showcase the curricula developed by the Forensic Science Educators Committee - to assure that educators, forensic science personnel and college and university administrators are made aware of the curricula, and that educational materials, such as audio-visual aids, laboratory equipment, specimens, and the like also developed by the committee would receive nationwide exposure. These curricula and related materials would be developed as a unified package, in a manner such that institutions of higher education could choose to adopt and implement selected segments of the program (by forensic discipline) or the entire package. The committee would also establish modules of educational materials designed to upgrade existing programs related to forensic sciences higher education underway at colleges and universities across the nation.

Phase 2. Development of Forensic Science Educational Materials

An adjunct function of the Forensic Sciences Educators Committee would include the development of forensic science educational materials designed to supplement the curricula package that emerges from Phase 1. These forensic science educational materials might include:

- casts (e.g. impressions of toolmarks, tireprints, bitemarks, bones, etc.)
- slides
- specimens
- printed material
- teaching aids
- laboratory equipment
- micro-films
- film strips

- movies
- projector overlays
- audio tapes
- videotapes

and other materials which the committee decides are required to enhance and augment the forensic science curricula.

The committee would also be charged with compiling listings of available forensic science bibliographies, laboratory manuals, and other currently available educational and training aids. This function would well serve the forensic science community, especially educators at existing colleges and universities with forensic science educational programs, and assist those institutions contemplating the implementation of a forensic program in the future. Should the search of the literature and teaching materials uncover voids in these areas, the educators committee would recommend and undertake development of additional aids to, in effect, fill in the gaps.

One representative from each of the eight forensic disciplines on the educators committee would coordinate the development of education materials. He or she would prepare a written statement describing the educational materials currently available and their sources, and those needed, which would be discussed and consolidated at a one-day conference of the committee. To expedite preparation of the written statements, each participant would receive a small budget to conduct a survey by mail or telephone investigating the disciplines state-of-the-art regarding the availability of educational materials. After the one-day meeting, the educators would be asked to revise their statements, based on the statements of their collegues, and propose a plan for the actual development of the needed educational materials. Each individual would be asked to rank order the discipline's needs in order of priority to determine the sequence in which

to develop the materials.

Finally, a marketing strategy would be developed by the committee. A non-profit organization, such as the Forensic Sciences Foundation, could be utilized to advertise and disseminate the materials to interested colleges, universities and educators.

Proposed Phase 2 Budget

Statement Preparation		
Ten (10) days x 8 committee members x $135/day	=	$ 10,800
Postage $50 x 8 members	=	400
Telephone 100 calls x $2/call x 8 members	=	1,600
Printing and Supplies $100 x 8 members	=	800
Secretarial Assistance $70/day x 2 days x 8 members	=	1,120
Educators Meeting (one-day)		
$300 airfare x 11 members	=	3,300
$ 50 per diem x 11 members	=	550
$ 25 local travel x 11 members	=	275
$135 consultant fee x 1 1/2 days x 8 members	=	1,620
Statement Revision		
$135 consultant fee x 1 day x 8 members	=	1,080
$ 70/secretary x 8 members	=	560
Development Funds		
$1,000/discipline x 8 disciplines	=	8,000
Distribution Funds		
$ 500/discipline x 8 disciplines	=	4,000
PHASE 2 FUNDS REQUIRED		$534,104

Phase 3. Presentation of an Educational Package

Presentation of the forensic science curricula would involve two (2) strategies and target audiences:

- presentation to the nation's forensic educators, and
- presentation to college and university administrators.

The former would detail the packages of curricula and educational materials developed by the educators committee in hopes of garnering support among those who would utilize the materials firsthand. It would explain to forensic educators the advantages of adopting these curricula to the profession as a whole, to the individual programs, to the university or college and to the student seeking employment in the field.

One mechanism that could readily be adopted by the committee to assure that the curricula package was distributed widely among the forensic science profession could be to have it published in the Journal of Forensic Sciences, the official publication of the American Academy of Forensic Sciences. A second distribution strategy could be to mail informational copies of the package to the more than 2,000 members of the American Academy. Thirdly, the package could be forwarded to the nation's regional forensic science associations either to be reproduced in their newsletters or to be distributed among their memberships. The package could also be sent to organizations with management orientations such as the American Society of Crime Laboratory Directors (ASCLD).

Each of these four distribution plans could be completed within a minimum amount of time and at a modest level of funding.

In addition to the publication and distribution of the curricula package it would also be presented to forensic science educators and to college and university administrators at appropriate conferences. Ideally, three presentations would be given--one each in the east, midwest and west. Among the meetings of

forensic science educators where the committee would deliver a presentation would be at the forensic science educators session at the annual meeting of the American Academy of Forensic Sciences. Conferences such as the American Association of University Administrators, the Academy of Criminal Justice Sciences or the various regional associations of higher education would be appropriate forums to present the package to college and university administrators. Display booths at forensic science related scientific meetings, as well as at the other sessions mentioned above could be another dissemination technique.

Each program or panel presentation would involve up to ten people for the presentation. To reduce costs, a professional videotape of the program presentation would be commissioned to be loaned subsequently to groups, colleges or universities. Possibly three panel participants could then take this videotape to sites interested in exploring the feasibility of adopting the package.

Proposed Estimated Budget

Publication Costs		
Printing and Postage	=	$ 1,500
Purchasing mailing lists	=	500
Casual Labor - mailing	=	150
Telephone	=	100
Presentations		
Airfare $300 x 10 persons x 3 presentations	=	9,000
Per Diem $50/day x 2 days x 10 persons x 3 presentations	=	3,000
Local Travel $25 x 10 persons x 3 presentations	=	750
Supplies	=	500
Postage, reproduction, telephone	=	1,000

Display Booth

Construction	=	1,000
Materials	=	250
Shipping	=	750
Personnel Travel $300 x 3 meetings	=	900
Per Diem $50 x 3 meetings x 5 days/mtgs.	=	750
Personnel $100/day x 15 days	=	1,500

Video Tape Production

Taping	=	1,500
Reproduction 3 copies x $150/copy	=	450

College/University Presentations

Airfare 3 persons x $300/person x 10 universities	=	9,000
Per Diem $50/day x 3 persons x 2 days/mtg. x 10 meetings	=	3,000
Local Travel $25 x 3 persons x 10 meetings	=	750
Supplies	=	150
Postage, telephone, reproduction	=	500
FUNDS REQUIRED	=	136,000

Recommended Option

University overhead funds earmarked for curricula implementation for new forensic science programs and to upgrade existing programs to meet the standards of the newly developed curricula

$400,000

TOTAL FUNDS REQUIRED $536,000

STUDENTS STIPENDS

The Forensic Science Educators Committee would have responsibility for the selection of students to receive financial support for graduate study. One graduate level student for each of the eight disciplines could be supported at up to five colleges and/or universities. Half time support at a level approximating $5,000 per student would be made available nationwide to exceptionally qualified students. This level of support represents an average between the estimated levels of $4,000 for beginning graduate students and $6,000 for those near completion of their terminal degree. The actual support level would be adjusted to fit the specific university or college level. Should the committee choose to support students at the undergraduate level, funding would again be adjusted accordingly.

Proposed Budget

8 students x 5 institutions x $5,000/students = $200,000

HIGHER EDUCATION FIVE YEAR PLAN

The undertaking of an assessment study of higher education in the forensic sciences to culminate in the development of a comprehensive five-year plan is strongly advised. In conjunction with the formation of the Forensic Science Educators Committee, and advised by them, this plan would be a valuable tool with which to plan, coordinate and direct the upgrading of education and training in the various forensic science disciplines. A half decade into the future such a plan would serve to focus efforts towards common objectives, and insure long-term continuity of purpose among forensic educators and the profession as a whole.

Precise forecasting of the educational needs of the forensic sciences profession is envisioned as the key planning component of this program. If the current state of forensic science higher education is clearly established and the future requirements predicted, a five-year plan designed to meet those requirements could then be orchestrated. Among the primary components of this research project would be the following:

a. to forecast employment needs.

b. to develop remedial programs for in-service personnel.

c. to recommend modification and upgrading of existing forensic science higher educational programs.

d. to determine need for education and training in each forensic science discipline.

e. to conduct a follow-up study of forensic science educational program graduates.

Employment Forecast

Forecasting employment needs beyond a year or two in any field is difficult - as much art as it is science. In order to predict accurately the future personnel needs of the forensic sciences profession, it would be necessary to collect data independently for each of the forensic disciplines. At least five types of data

would be required:

- Historical data
- Opinion data from experts
- Critical incident data
- Economic data
- Demographic data (including crime rates)

The historical data would serve as the basis for the formulation of trend-line predictions. Past employment data would be graphed for each discipline and through the use of sophisticated computer and/or statistical programs, these curves could then be projected five years into the future.

Of course, projections based upon historical data are based on the assumption that the behaviors of the past will continue relatively unchanged - that is, projections usually fail to take into account future events or factors which may have substantial impact on the accuracy of efforts to extrapolate based on mathematical models. For this reason, it becomes necessary to collect additional subjective information from recognized forensic science managers and employers, regarding the future employment needs of their agencies. These projections can then be used to modify the historical trend predictions. Managers and laboratory directors are in all likelihood aware of future personnel needs, and may have engaged in similar types of forecasting at the local or agency level. In addition, they often have established working relationships with local forensic science educators in the course of fulfilling their organization's recruitment requirements. They are therefore attuned to the gradually changing educational requirements for persons entering the forensic sciences.

The third through fifth data components required for the forecast, closely akin to the previous data, are assessments of factors relating to the criminal justice system, crime in general, forensic science, or other topics that would

directly or indirectly have an effect upon the accuracy of the historical trend predictions. These data would be secured by interviewing knowledgeable persons from throughout the justice system, persons involved in the latest research on new analytical techniques, scientific equipment manufacturers, legislators, etc. Through these interviews, factors that would change the employment picture and/or educational requirements of future personnel could be established. Such factors might include, but not be limited to:

- changes in legislation affecting controlled substances (decriminalizing marijuana possession is one probable trend)
- new laboratory or analytical equipment or techniques (reducing the demand for scientists, for example)
- unionization of forensic personnel
- fluctuations in the crime rate
- certification of personnel
- accreditation of forensic laboratories
- regional or national economic variations
- changes in the structure of federal agencies such as LEAA, FBI, DEA, etc.
- Supreme Court decisions
- attitudinal changes of the judiciary and police administrators regarding the need for forensic science

Any consensus among experts on factors affecting manpower needs and education would then be incorporated into subsequent forecasts.

Graduate Follow-up Study

In conjunction with the manpower study, it is important to track the employment experience of recent graduates of forensic science higher education programs. This will afford planners with information at both the suppliers and consumer ends of the cycle concerning the success or failure experienced by students entering the work force yet having different educational backgrounds.

For instance, it may prove to be the case that employers strongly perfer candidates with masters degrees or those with just bachelors. It would also describe the mobility of graduates seeking employment and those areas of the nation either over-supplied or lacking sufficient manpower to meet their needs for the coming five years. These data would also provide indications as to those universities and colleges that might best serve their regions by adopting, expanding or contracting their forensic science programs.

The follow-up study of graduates of forensic science programs would take approximately eighteen months to complete, utilizing the skills of a full-time researcher (or combination of researcher/research-aid), depending of the scope of the study. The scope of the research would be related directly to sample size, number of institutions surveyed, number of agencies surveyed, type of analysis, etc.

Project Products

The forecast and graduate follow-up studies would provide invaluable data for the Educators Committee seeking to establish the educational needs of each discipline. On the basis of these studies, existing programs of higher education would be able to more closely tailor their programs to the needs of the profession and at the same time better serve their forensic science students. It should become clear as to where new programs would best be started or old programs phased out, ans which institutions would be most suited to provide remedial programs for in-service forensic science personnel.

Estimated Budget

Personnel		
Principal Investigator $35,000 x 20% x 1 1/2 years	=	$ 10,500
Project Director $20,000 x 100% x 1 1/2 years	=	30,000
Secretary $12,000 x 50% x 1 1/2 years	=	9,000

Travel and Per Diem		
$300 x 10 trips	=	3,000
$ 50/day x 10 trips x 5 days	=	2,500
$25 local travel x 10 trips	=	250
Supplies		
$50/month x 18 months	=	900
Telephone		
$200/month x 18 months	=	3,600
Postage		
$75/month x 18 months	=	1,350
Reproduction		
$150/month x 18 months	=	2,700
Printing		
$50/month x 18 months	=	900
Consultants		
$135/day x 100 days	=	13,500
$ 65/day x 50 days	=	3,250
Fringe Benefits		
$49,500 x 21%	=	10,395
Total Direct Costs	=	91,845
Indirect Costs		
$49,500 x 60%	=	29,700
TOTAL FUNDS	=	$121,545

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APPENDIX A

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APPENDIX B

MINUTES

FORENSIC SCIENCE EDUCATORS' WORKSHOP

September 15, 1979
Alexandria, Virginia

Participants	Affiliation
Michael Baden	NYC Medical Examiner's Office
Robert Blanke	Medical College of Virginia
Cordell Brown	Colorado Bureau of Investigation
David Crown	Antioch Law School
Peter DeForest	John Jay College
Ellis Kerley	University of Maryland
Lowell Levine	Private Practice
Robert Sadoff	Private Practice
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Earl Walter	Government Accounting Office

Dr. Kerley introduced the workshop participants and described the scope and objectives of the project in general and the educators' workshop in particular. He stressed the importance of determining national priorities concerning higher education for the field of forensic sciences and the subdisciplines. Ira Silvergleit reviewed the methodology of the project, which will encompass a review of the literature concerning higher education in the forensic sciences, the educators' workshop and a review and survey of existing forensic science programs. Included in the latter component would be reviews of the proceedings of the Educators' Meeting at the American Academy annual meeting (co-chaired by Cordell Brown) and of an article on educational offerings in criminalistics authored by Pete De Forest and Joe Peterson. Pete offered to send a copy of that article to FSF. Mr. Walter, Mr. Sullivan and Mr. Lewis offered brief remarks and a welcome to the committee.

Participants then presented their problem and program statements to the committee. A copy of each statement was distributed to each participant. Dr. Sadoff agreed to send to FSF a copy of a chart he had prepared outlining advanced training opportunities nationwide in forensic psychiatry.

The group broke for lunch at 12:15.

Upon reconvening, Dr. Kerley summarized the highlights of each problem and program presentation:

Dr. Sadoff noted that too often the practicing specialists are not involved in teaching;

CONTINUED

1 OF 2

Dr. Levine suggested the importance of developing a core curriculum for the forensic sciences in general which the disciplines could "plug" into existing educational programs;

Dr. Blanke stressed the need for accreditation of forensic science educational programs;

Dr. De Forest described the high per capita cost of educating criminalists due to equipment costs and low enrollments, and the necessity for flexible admission standards;

Mr. Brown suggested the adaptation of the "open wall" university structure which could be most beneficial to working criminalists;

Dr. Baden stressed the importance of post-doctoral courses for medical examiners to teach the forensic aspects of the discipline to medical students;

Dr. Schroeder conceptualized the "witness for justice" concept as a way of integrating the foci of the various disciplines; and

Dr. Crown warned of the danger of overproduction of forensic questioned document examiners.

The group agreed that the development of a "forensic science curriculum" for all potential and currently employed members of the profession should be a priority item. Dr. Blanke noted a program underway and funded by HEW which the forensic sciences might use as a guide.

In response to a question from Dr. Baden, Pete De Forest noted that there were approximately twelve (12) undergraduate criminalistics programs nationwide. Dr. Kerley indicated that only seven (7) anthropology programs existed that offered forensic anthropology as a part of their curricula. Dr. Levine expressed the need for the development of a core program of courses that could be "plugged" into existing programs at any educational level. Dr. Sadoff postulated that such programs could serve to enhance the interest of students in the forensic sciences. This in turn might encourage them to pursue the forensic sciences as an area of concentration in their future studies.

The feasibility of a central administrative office to facilitate the dissemination of the core curriculum to colleges and universities was put forth by Dr. Sadoff with elaboration by Dr. De Forest. Dr. Baden noted that the College of American Pathologists had received a similar grant from LEAA approximately five (5) years ago. Dr. Blanke stressed that even if the curriculum or parts of it were adopted by colleges and universities, there still existed the need to accredit these programs to assure a satisfactory level of educational quality.

There was some consensus that the graduate level of higher education held the greatest potential for rapid improvement of the quality of forensic science education.

The group then discussed the scope of this model forensic science curriculum, and decided that perhaps the scope of the program was only a series of basic courses and not a "full-blown" academic curriculum. They agreed to emphasize the upgrading of existing programs, rather than to initiate new programs at colleges or universities.

Dr. Sadoff underscored the need to determine the current offerings available nationwide in each forensic science area. FSF staff pointed out that the current project would attempt to determine these programs. Dr. Kerley called upon each participant to furnish FSF with such a listing for his discipline.

Dr. De Forest suggested that a committee such as this Forensic Science Educators' Workshop be maintained and continue meeting periodically to encourage the type of dialogue established at the meeting among the disciplines. He continually stressed the need for fellowships and scholarships to existing students in the forensic sciences.

Dr. Schroeder reiterated that the focus be on the utilization of existing educational programs due to the financial distress of most colleges and universities.

At this point the chairman, Dr. Kerley, asked each participant to list four (4) priorities for the forensic sciences and their particular discipline.

The committee discussed the suggestions posed by the various participants. Paramount among the suggestions and confirmed by a voice vote of the group, was that a committee, such as the Forensic Science Educators' Committee, be appointed to coordinate the development of a basic core curriculum for the forensic sciences and for the disciplines. These curricula coursework would be interdisciplinary in nature and would be designed to fit into a semester schedule to familiarize those interested in the

forensic sciences with the other areas and the field's relationship to the law. The coursework could be taken at any point in one's career.

A suggestion to also charge the committee with the development of educational standards was turned down while one to recommend the development of an implementation plan was accepted. Implied in these recommendations was an emphasis to focus on the needs of the users of the curriculum, that is, the students.

Funding for this committee would include travel, meetings, support staff, funds to commission the writing of relevant concept papers, consultation fees, etc. Some committee members expressed reservations that the curriculum development could be accomplished in one year's time.

A second recommendation to LEAA would be to assess and project the forensic science needs in education over the next five (5) years.

The committee agreed with the expressions of Cordell Brown and Lowell Levine that many "traditional" methods of education were of limited value in terms of reaching the majority of forensic scientists. They suggested that the use of innovative measures, such as "universities without walls," video-taped courses, etc., be investigated.

The curriculum committee would also be charged with suggesting educational support recommendations for students in the form of fellowships, etc.

Dr. Schroeder suggested that FSF staff get the draft of the committee's recommendations to the committee members as quickly as possible for comment.

The meeting adjourned at 4:45 p.m.

APPENDIX C

Problems	Programs
Lack of coordinated effort in higher educational programs	Convene national meeting of educators to develop program guidelines
Need additional high quality prestigious programs	Funding to support a program in each geographic area
Lack accreditation of programs	Set up accrediting committee to set examination
Poor training of those entering the field	Internship funds, student support
Lack of funding to set up and maintain programs	Lobby state legislators
To develop and implement comprehensive forensic sciences programs	Set up regional program centers
Too few graduate level courses beyond the B.S. degree	Establish state or national certification program
	Set up national board to coordinate forensic sciences education, identify needed research and area for development
Lack of curriculum development	Establish curriculum committee for discipline with at least a 5 year commitment
Insufficient quality of programs for training	Define a model education program; Establish an accrediting system for programs
Proliferation of low quality undergraduate programs	Fund research
Lack of certification of departments	Establish minimum standards and certification program
Lack of interface with academic institutions	
Criminalistics	Develop set of national standards
Poor preparation of cases for trial by lay people	Establish local and regional training programs

Problems	Programs
Poor acceptance of forensic areas into the general curriculum of the particular disciplines	
Needed inter-sepcialty communication	Establish interdisciplinary colloquia and seminars
To solicit increased input from working professionals into the educational programs	Establish visiting faculty programs and research funds
Quality control of forensic programs	Develop standard forensic sciences curricula
Lack of respectable programs in criminalistics, toxicology and questioned document examination	Programs to make talent available on a more equal basis
Need to share resources	Share persons in 2 week blocks of time
Inadequate credentials of many instructors	Establish an educators' committee
Need for more general background for students - less specialization at undergraduate level	Internship funds
Failure to coordinate programs with crime laboratories and medical offices	Develop contacts and attract practitioner faculty
To attract students to the low visibility field of forensic science	Initiate a public information campaign
Lack of understanding by university administrators	Examine the European programs
Low priority of forensic sciences by university administrators	Develop a few select centers of excellence
Lack of outside funding	Federal support for education, research
Needed university support	Federal funds for selected universities
Insufficient continuing education programs	Develop application and theory manuals; Set up regional centers

The Forensic Sciences (continued)

Problems	Programs
No LEEP funds for pre-service students	
Needed laboratory equipment	Federal funds
Continuing education for those in the field	Funds for leaves of absence and intensive workshops
Low visibility of field	Educate institutions to provide programs
Union opposition to incentives for education	
Inadequate utilization of the forensic disciplines	Conferences to include prosecution, defense attorneys and law enforcement personnel
Lack of knowledge and utilization by small law enforcement agencies	Regional seminars and lecture programs
Need training in preservation, documentation, photography of evidence	
University administrators lack awareness of the need for forensic sciences programs	Programs to educate university administrators
To educate public officials (legislators) in the need for forensic sciences	Initiate public relations program
B.A. programs not coordinated with other fields	
Students need paraprofessional training and experience in local coroner's offices or police departments	Funds to support wages of students; Establish forensic science track
Active research is needed to complement training programs	Research funds
Failure of criminal justice programs to incorporate forensic sciences	Require forensic science for all criminal justice students
More intense screening of applicants to keep caliber of students high	Funds to support students; Program to develop ethical standards

The Forensic Sciences (continued)

Problems	Programs
Inadequate support for qualified persons to gain training in the forensic sciences	Establish institutional training grants to support students at programs at qualified institutions; Establish fellowships for post graduate level training
To better relate the forensic sciences to the administration of justice	Include forensic sciences education for law students, medical students, dental students and all science students
To identify the qualifications of forensic scientists to assure quality evidence for legal decisions	Same as above
Educate scientists in how to be expert scientific witnesses	Interdisciplinary courses merging science with legal processes
Relative lack of academic credibility of existing programs	Define goals and objectives in academic programs
Poor definition of criteria of proof (scientific vs. legal)	"Kill the lawyers" - Shakespeare
Unqualified instructors	Set up regional programs or at universities with qualified personnel.
Universities lack space and funds to establish and develop outstanding forensic science curriculum.	Government could fund the programs or at least purchase the necessary equipment.
Inadequate monetary compensation for graduates when they practice in the forensic sciences.	Educate the public to the need to hold good people in the field through adequate compensation.
Public unaware of the field	Educate the public

(1) Criminalistics

Problem	Program
quality control	---
standardization	---
lack of support for graduate study and research	support graduate fellowships
training for those already in the field	make available funds for training and leaves of absence
training for those entering the field	establish funds to existing schools
lack of long-term renewable grants to support graduate students	establish funds
slow transfer of new methods to laboratory level	place researchers in laboratories for 2-3 week periods
too much specialization at undergraduate level	limit specialization at Masters level
poor background of those entering serology	create and support internships
diverse backgrounds and tasks in criminalistics	redefine disciplines
existence of generalists	allow passage of time
where to place criminalistics - hard science or social sciences	agree on reasonably uniform curriculum
to raise the image of criminalistic programs	maintain a few good programs
to certify departments	develop certification program
continuing education	develop manual
lack of resources: 1) personnel, 2) equipment	establish equipment grants
opportunity for education especially beyond the Bachelor degree	continue regional workshops and support "open wall" universities
quality control	establish educators committee develops standard forensic science curricula

(2) Forensic Pathology

Problems	Programs
Failure to include forensic pathology in curricula of medical schools	Develop national curriculum and bring it to the attention of schools
Lack of formal academic programs in forensic pathology at post-graduate levels	Encourage post-graduate educational programs in large medical examiners' offices. Include residency rotation to include pathology training.
Personnel recruitment	
Lack of financial support for education	Long term support of education programs, e.g., Ph.D. curriculum
To attract pathologists to forensic pathology	
To interest departmental chairmen of universities in encouraging training in forensic pathology	Provide for a workshop for chairmen
Paucity of support in the academic medical community for forensic pathology and/or legal medicine. Results: low salaries, few persons entering the field	Federally supported grants/ fellowships/scholarships to schools of medicine and academic medical centers for postgraduate education in forensic pathology
Lack of uniform standards of performance	Define magnitude of task. Enlist support of AMA and NADA. Establish minimum levels of forensic performance
Not many physicians desire this type of practice or education	Improve working conditions and salaries compared to pathologists in private practice

(2) Forensic Pathology

Problems	Programs
Lack of comprehensive course curricula	Federal funds for educational institutions
Lack of federal support for forensic pathology residency training programs	Funding for residency training and stipends
Need for uniform medical examiners system in each state	Explore legislation for such needs
Program to deal with cases in the public eye (e.g., Presley, etc.)	
To include role of doctor and forensic scientist as agent of society in medical curriculum	Work with Association of American Medical Colleges
Inadequate didactic and practical training in forensic medicine compared to residencies in other specialties	Consultation between FSF and American Board of Pathology regarding certification of forensic pathologists
Death leading to dearth of programs that have produced practitioners	Establish forensic pathology residencies with solid foundations
Sloppy practice by general pathologists leading to local confusion and high priced "hired mouths" to fill void	Subsidize Quincy with propaganda built in to deride bumbling, inept "pissologists"

(3) Forensic Odontology

Problem	Program
Lack of planning for forensic courses in dental school	
No time in dental school for forensic odontology	Saturation compaign for legislators and deans
Lack of curriculum in forensic odontology	
Lack of continuing education in forensic odontology	Funding and grants
Total lack of availability of advanced educational opportunities	Advanced seminars
Many unqualified individuals testifying in court	Eliminate or educate these persons
To standardize bite mark procedures Standardization of bite mark techniques More scientific approach to bite mark evidence	Conferences

(5) Forensic Psychiatry

Problem	Program
Difficult to obtain expertise at small training programs	A pool of national lecturers to teach for short periods at various programs
No good standard textbook in child forensic psychiatry; also, few good visual materials	Compile a catalogue of materials with funds for inter-training program loan. A catalogue of national speakers with available funding would also be most helpful.
To educate attorneys about the nature of mental illness to facilitate treatment of mentally ill	Education programs in law schools. C.M.E.
To upgrade the quality of psychiatric experts	C.M.E. certification
Lack of training in and impetus toward prison medicine for medical students and residents	Fellowships, teaching grants, research grants
Lack of programs to study the motivation of offenders	Same as above
Absence of standards and minimum requirements for teaching the various related disciplines	Influence credentialing bodies to include questions on forensic psychiatry on exams. This will result in more educational courses.
Failure to recognize the extent of mental illness in populations of detainees	Formulate small group of forensic educators to work the issues out
Lack of available training opportunities in forensic psychiatry	Federal, NIMH, and state supported training programs
Lack of standards wich are enforceable	Set standards by professional organizations, licensing boards, legal profession, etc.
Need for advanced specialized training in forensic psychiatry	Funding to develop programs
Lack of consensus re: what should be taught in a formal training program	American Academy of Psychiatry and Law is discussing these issues
Standards & criteria for level of practice	
Lack of good training program and training curriculum in forensic psychiatry	Funding for fellowships and program development

(5) Forensic Psychiatry (continued)

Problem	Program
Overemphasis on criminal area	Funding in this area
Few formal training programs	Funding for training centers
Problems in right to refuse treatment and involuntary hospitalization	Special study
Need to expose all residents to forensic psychiatry; faculty support	Develop goals & methods as guidelines to teach forensic psychiatry to residents
Educate the legal system	
Misunderstanding of the meaning and interpretation of competence and responsibility	National or regional educational programs for psychiatrists and psychologists
Quality of pre-sentence recommendations and availability of treatment programs	Same as above

(6) Forensic Physical Anthropology

Problem	Program
Lack of formal educational programs which lead to a degree	Funds to develop 1-2 programs
No formalized forensic programs	
No degree programs	
Lack of anthropological research	Support researchers
Lack of funding for applied research in techniques of forensic anthropology	Funding for applied research
Scarcity of teaching materials	Funds for development of educational materials
Lack of large skeletal collections at museums and universities	funds to preserve material from cadavers used by state anatomical control boards
Few full-time professors are practicing forensic scientists	Funds to support paraprofessional training in coroner's or medical examiner's office
Anthropology professors are unaware of forensic anthropology	Funds for educational programs; development of career opportunity information
Students in physical anthropology unaware of forensic courses	Develop publicity and regional training centers
"Cookbook" rather than dynamic approach	Support scholars at educational centers
Lack of courses or syllabi for professors to compare	Funds for development of curricula
Lack of courses, curricula, qualified colleges	
Lack of communication among forensic odontology, pathology and anthropology	Continue joint sessions at AAFS annual meetings

(7) Forensic Toxicology

Problem	Program
Courses taught be non-forensic scientists to poorly prepared students	Clearly state the prerequisite B.S. training and provide advance degree programs
Mediocre quality of the typical forensic "scientist" is a major problem	Requisite internship or residency training (or Post Doctoral research) at accredited laboratories with Board exams to be passed upon completion
Need for research programs concerning illegal pollution by industry, etc.	Facilitate grants to small universities near pollution areas
Need for research programs concerning determination of drug intoxication	
Approve curriculum of a course of study to provide basis for the discipline	Appropriate training grant funds for Ph.D. degree course of study or establish a center for the various disciplines
Develop curriculum committee to supply above	
Forensic toxicology is identified as a specific discipline by national funding agencies	Establish a review board at NIH with members who are more oriented to the needs of practicing forensic toxicologists
Scientists with most field experience not involved in training graduate students	Place more medical examiner systems under or partially under control of academic institutions
Insufficient post-graduate programs for training in forensic toxicology	Define model education program; Accrediting system for programs
Insufficient opportunities for practicing forensic toxicologists to acquire additional training outside of short courses and workshops	Fellowships

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